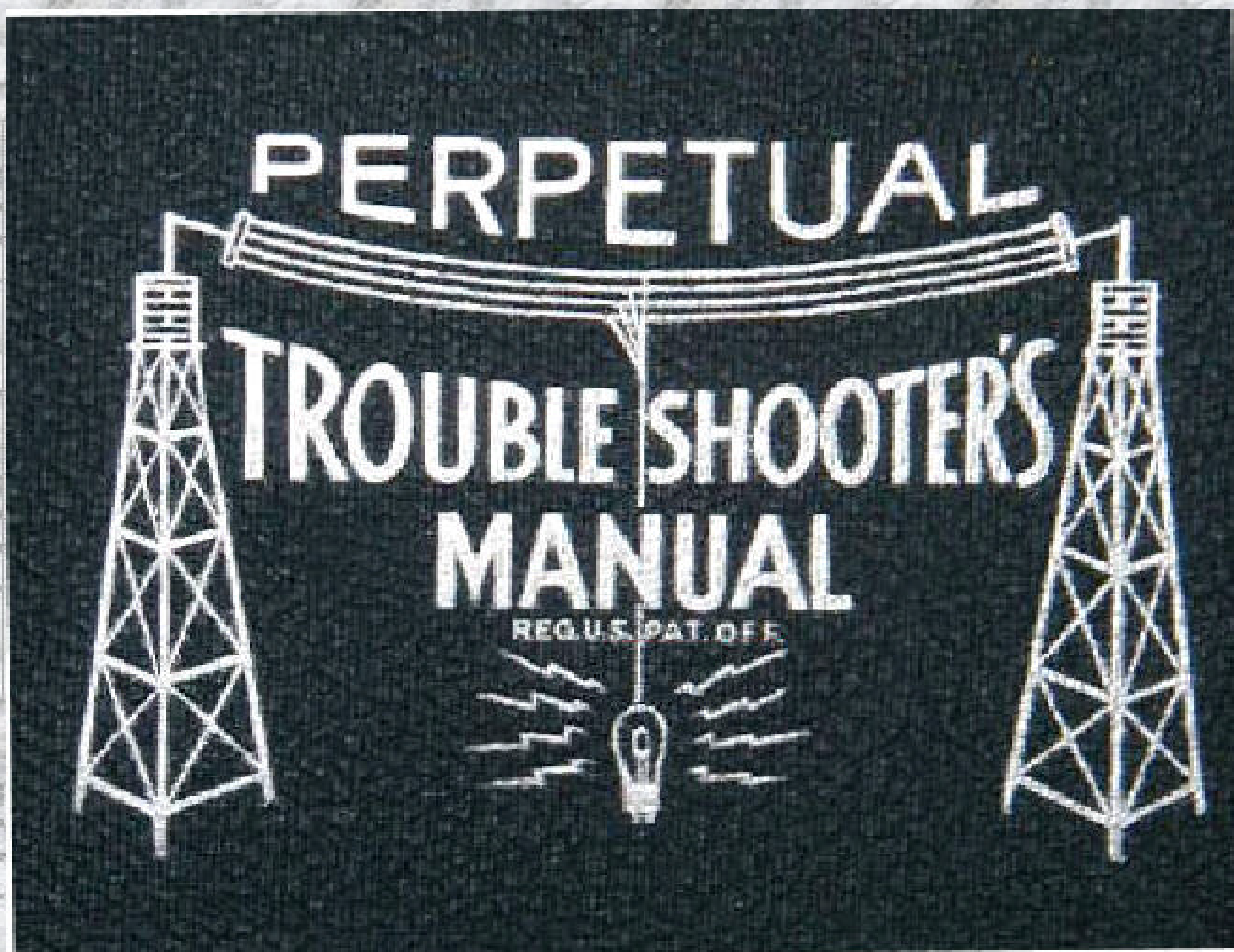
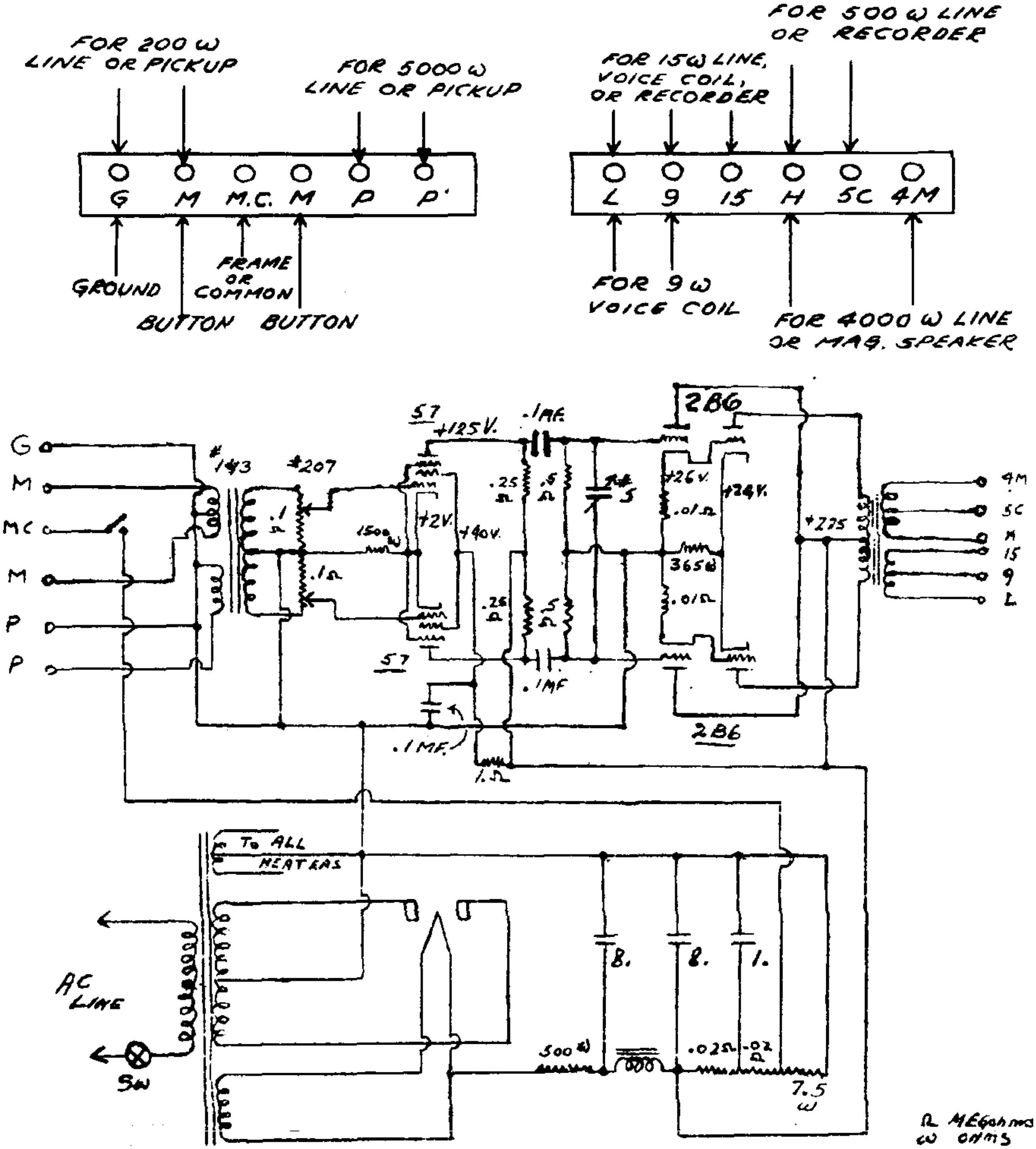
RIDER'S
VOLUME - V

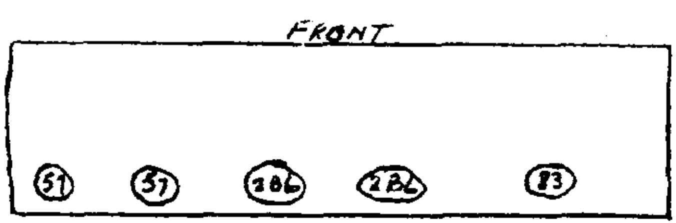


COVERING LATE 1933
THROUGH
LATE 1934

ACRATEST PRODUCTS

MODEL 108
Schematic
Layout



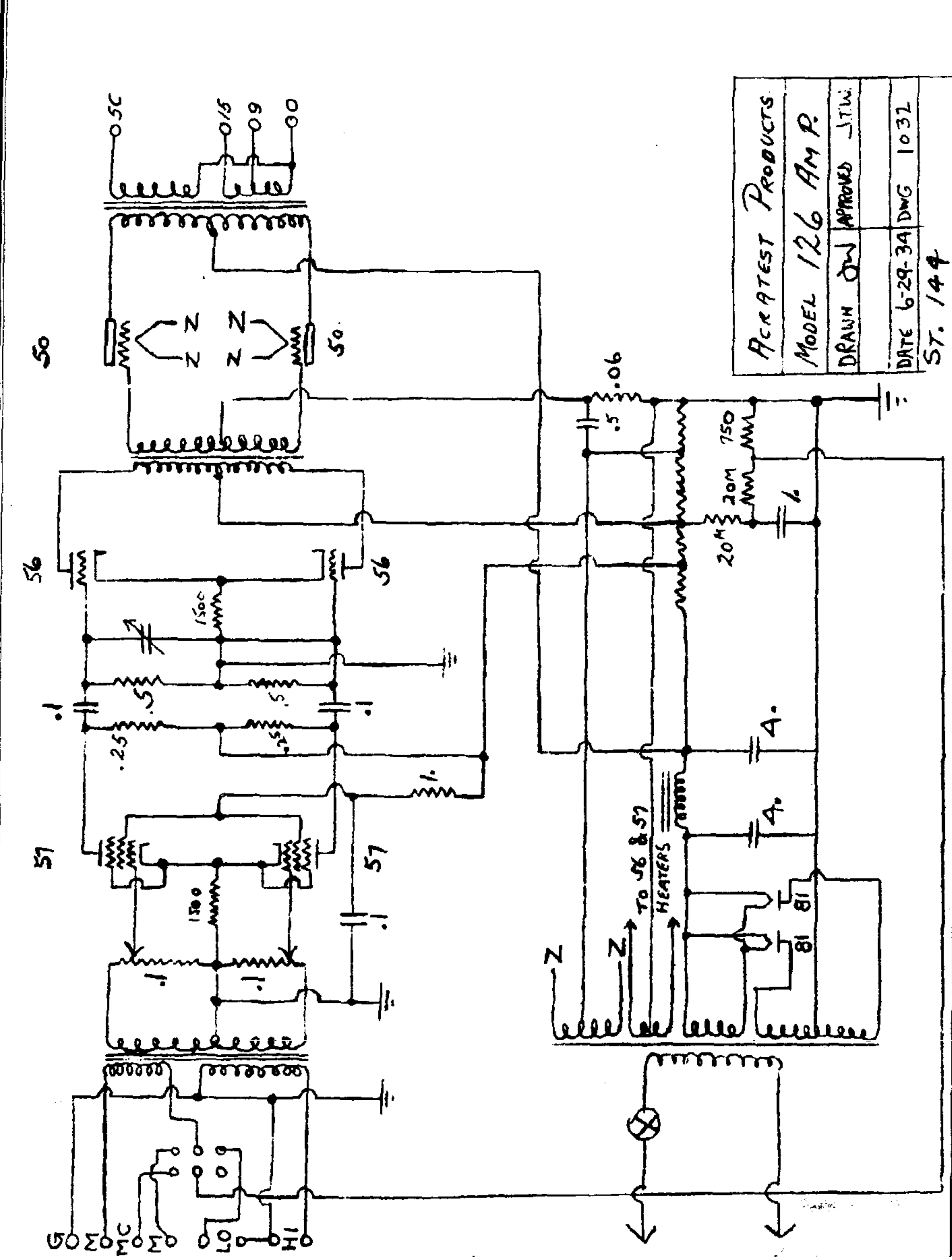


SOCKET LAYOUT

MODEL 108
AMPLIFIER

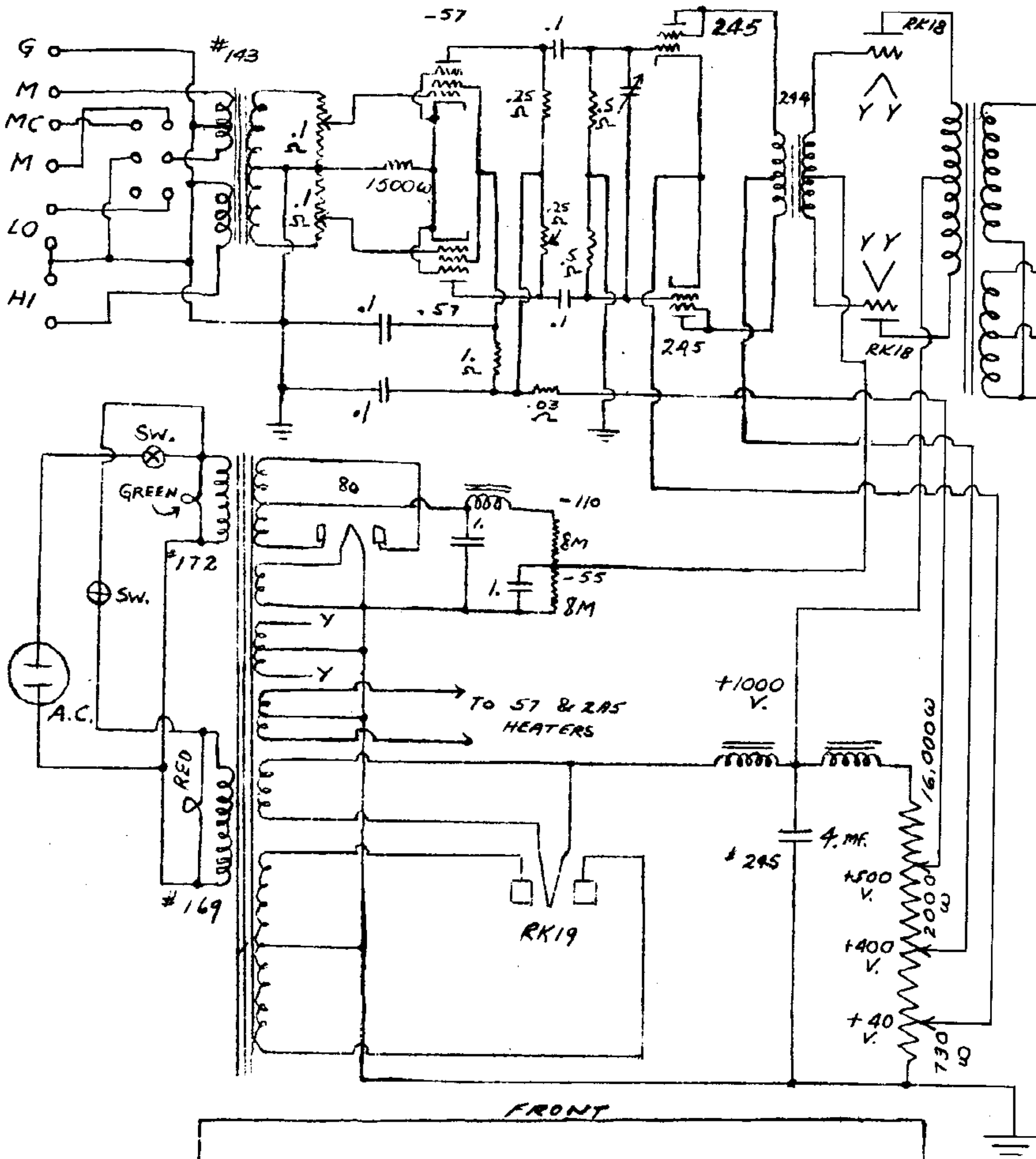
MODEL 126
Schematic

ACRATEST PRODUCTS

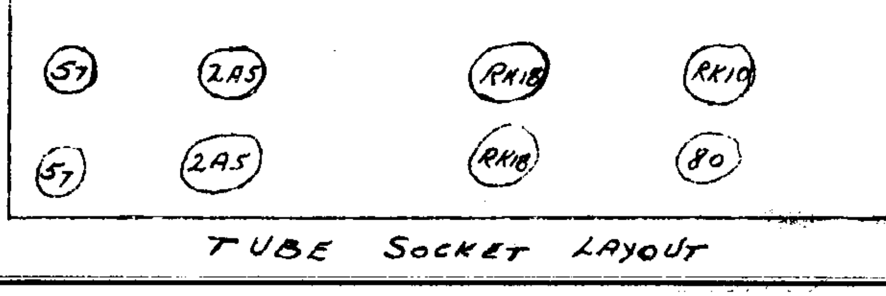


ACRATEST PRODUCTS

MODEL 418
Schematic
Socket Layout



FRONT

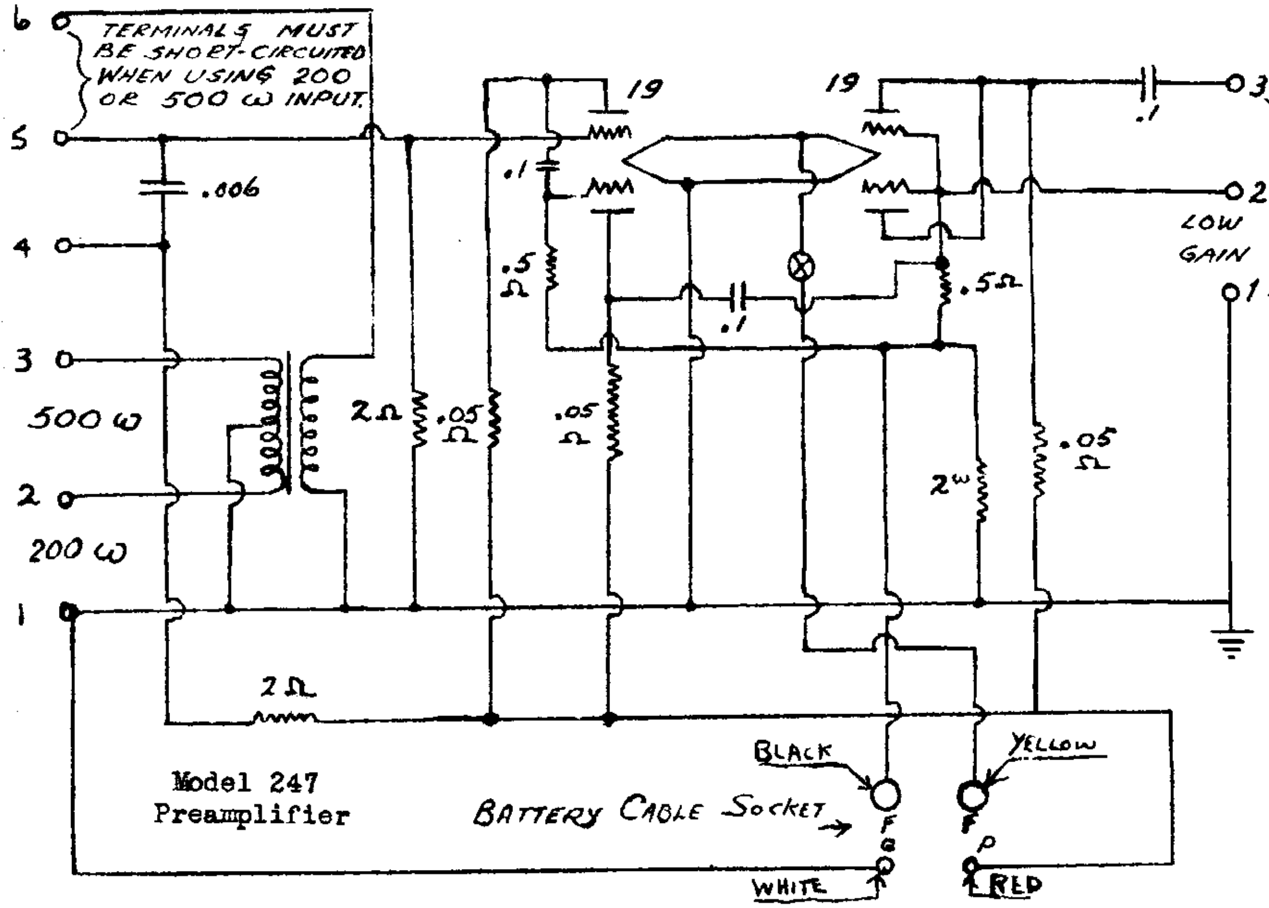


MODEL 418

TUBE SOCKET LAYOUT

MODEL 247
MODEL 739
Schematic

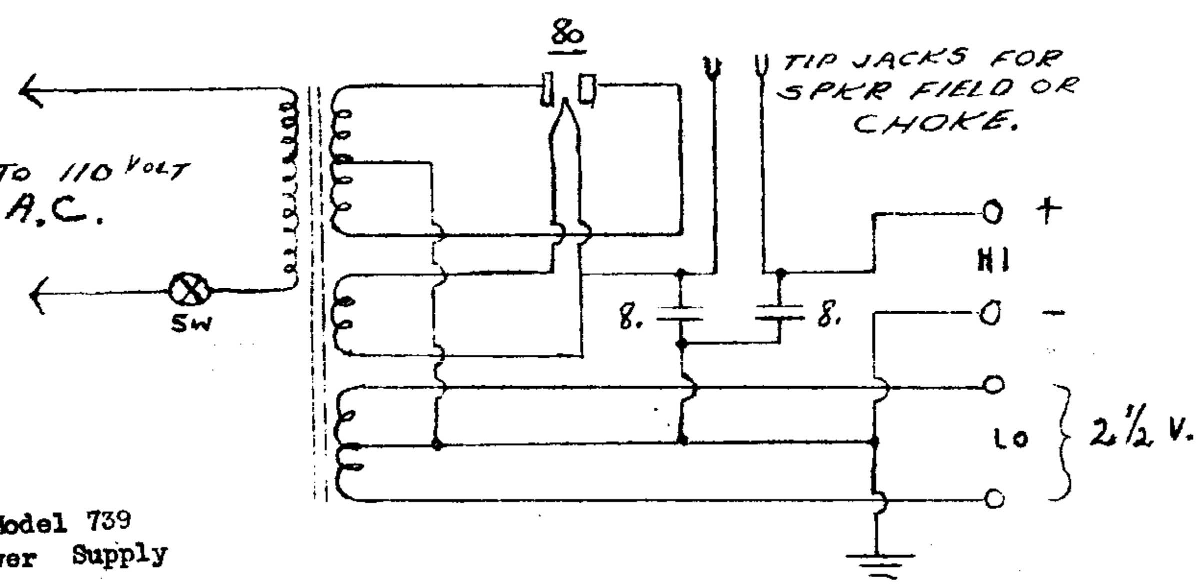
ACRATEST PRODUCTS



Model 247
Preamplifier

White = external ground, Red = B+90 - 135, Yellow = A + 3v., B-, Black = A-

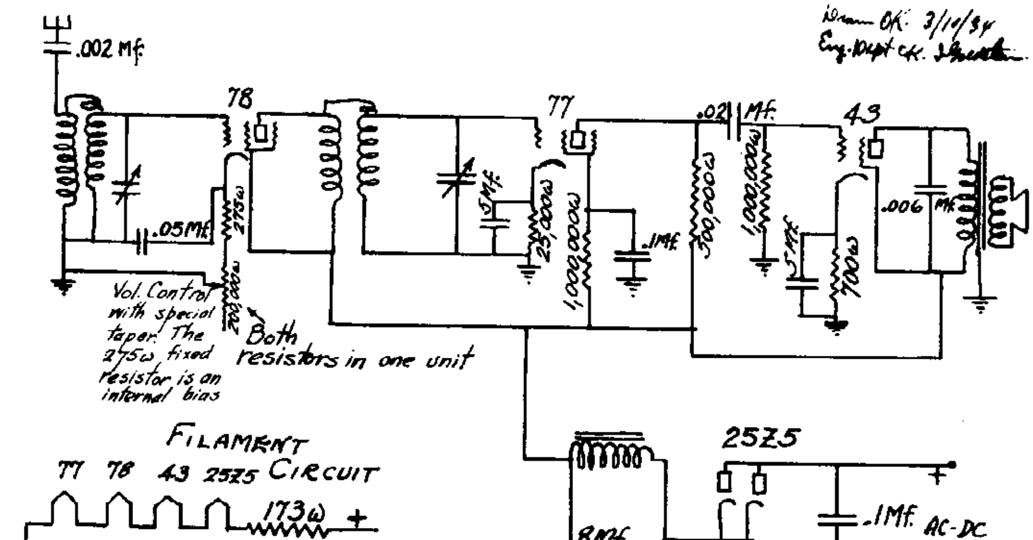
Terminals 1 & 4 = Photo -cell or condenser microphone
" 1 & 5 = Crystal mic., high imp. pickup, or radio tuner



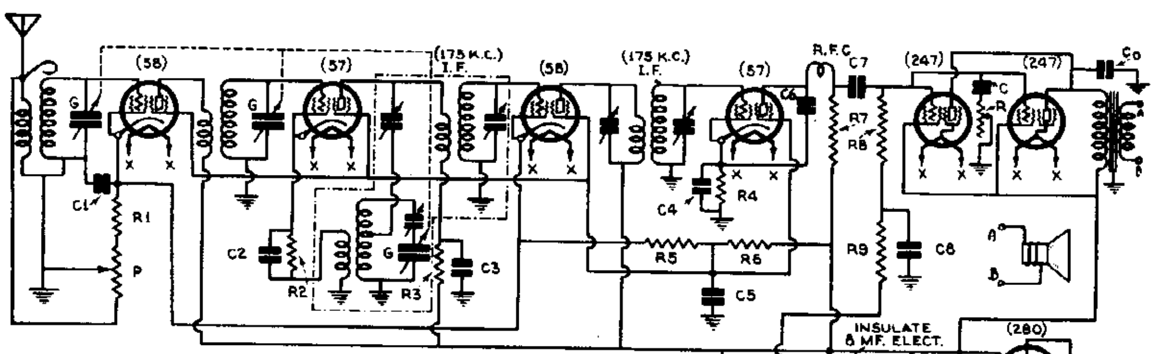
Model 739
Power Supply

AIR KING PRODUCTS CORP.

MODEL 4 Tube Comet Schematic
MODEL 7 Tube Bdc't Super. Schematic



MODEL 4 TUBE COMET



P — 10,000 OHMS (TAPER)
R1 — 300 "
R2 — 3500 "
R3 — 2000 "
R4 — 40,000 "
R5 — 30,000 " (1/2 WATT)
R6 — 15,000 " (2 ")
R7 — 0.3 MEG.
R8 — 0.5 "
R9 — 0.25 "
R — 1.0 "

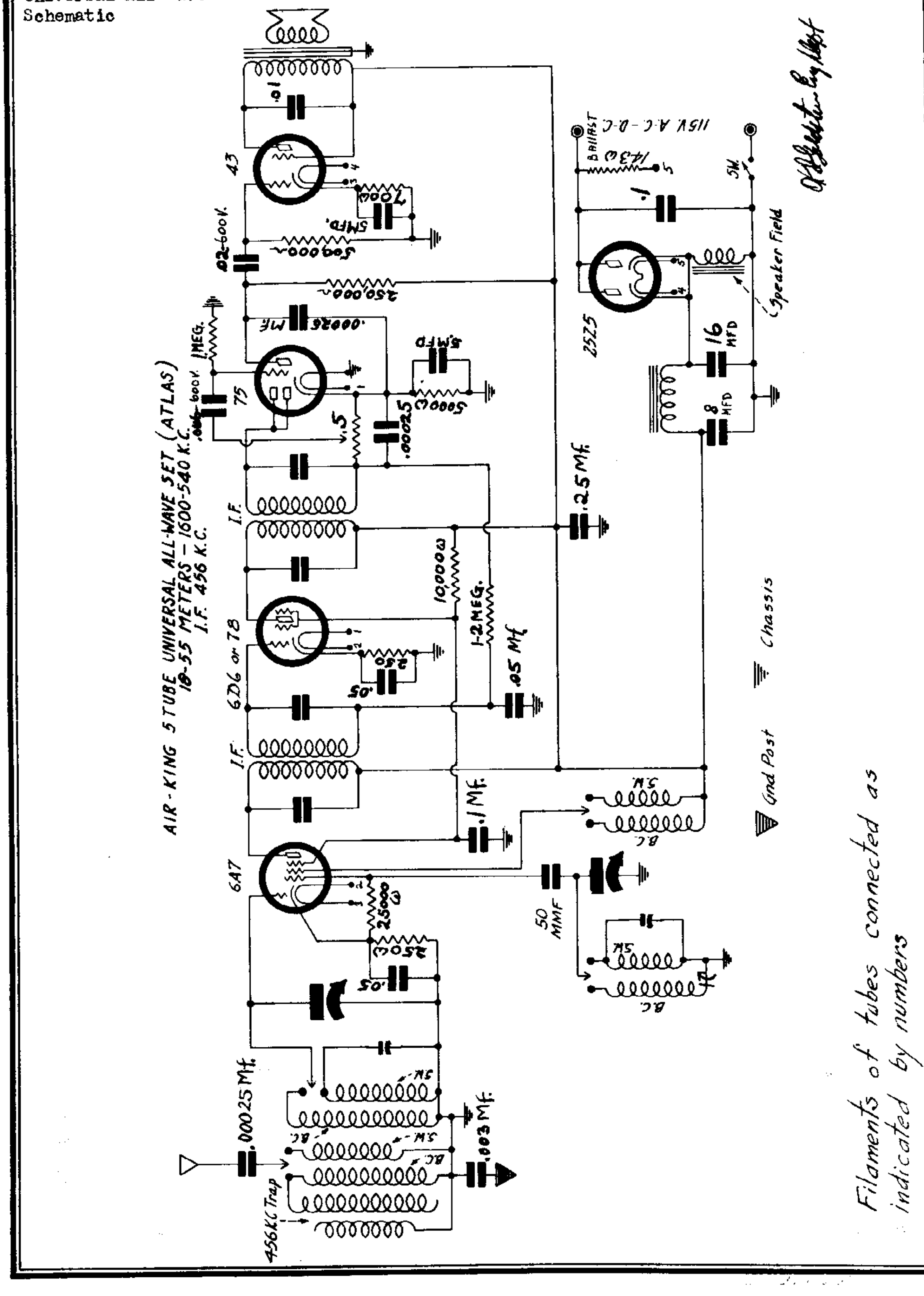
C, Co — .006 MFD.
C1 — 0.1 MFD.
C2 — .002 "
C3 — 0.1 "
C4 — 0.5 "
C5 — 0.25 "
C6 — .0005 "
C7 — .05 "
C8 — 0.1 "
C9 — 8 MFD. } ELECTROLYTIC
C10 — 8 " }
C11 — 0.1 "
G — 3 GANG .000365 MFD.

IF PEAK 175 KC.

7-TUBE BROADCAST "SUPER"

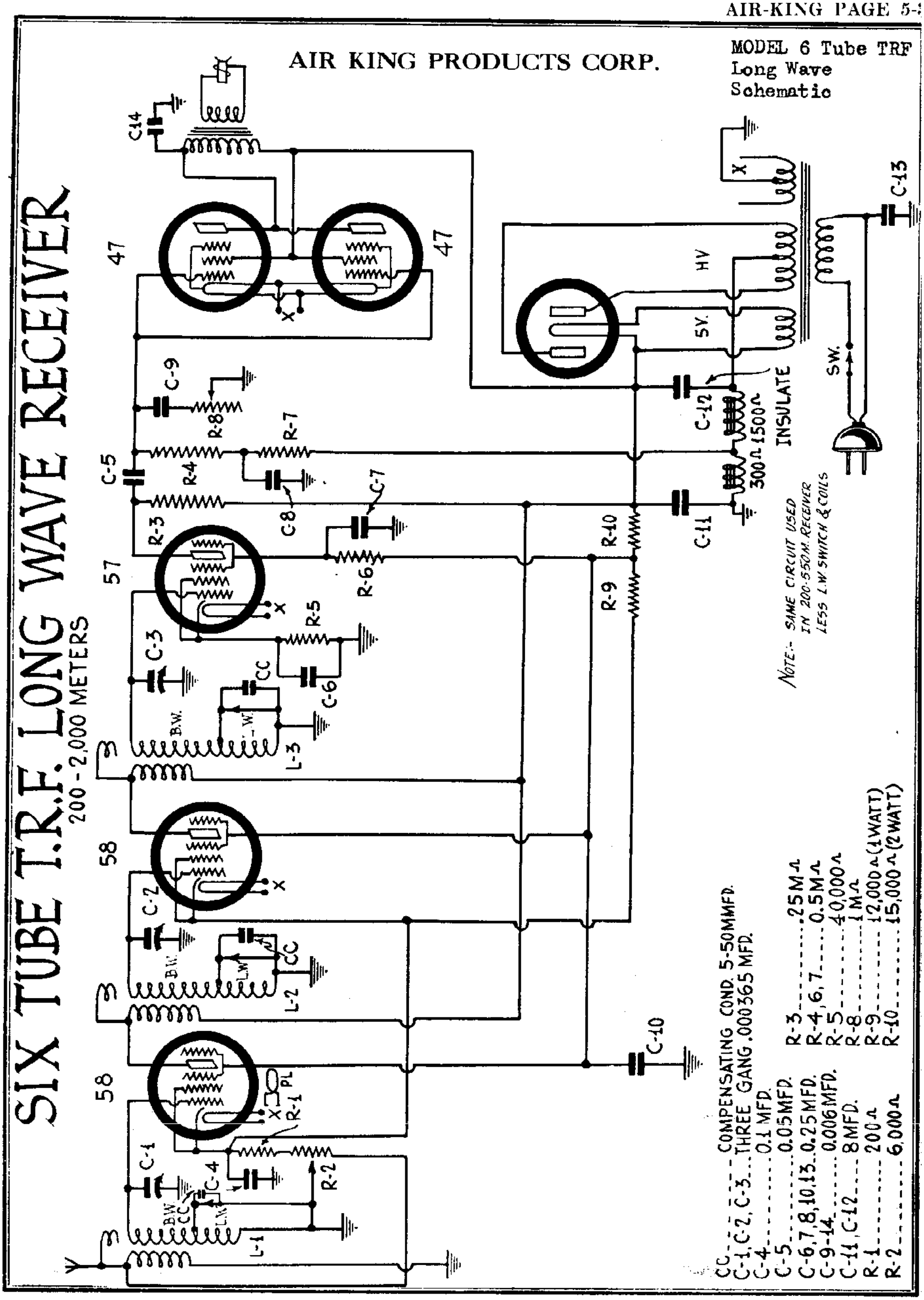
MODEL Atlas 5 Tube
Universal All-Wave
Schematic

AIR KING PRODUCTS CORP.



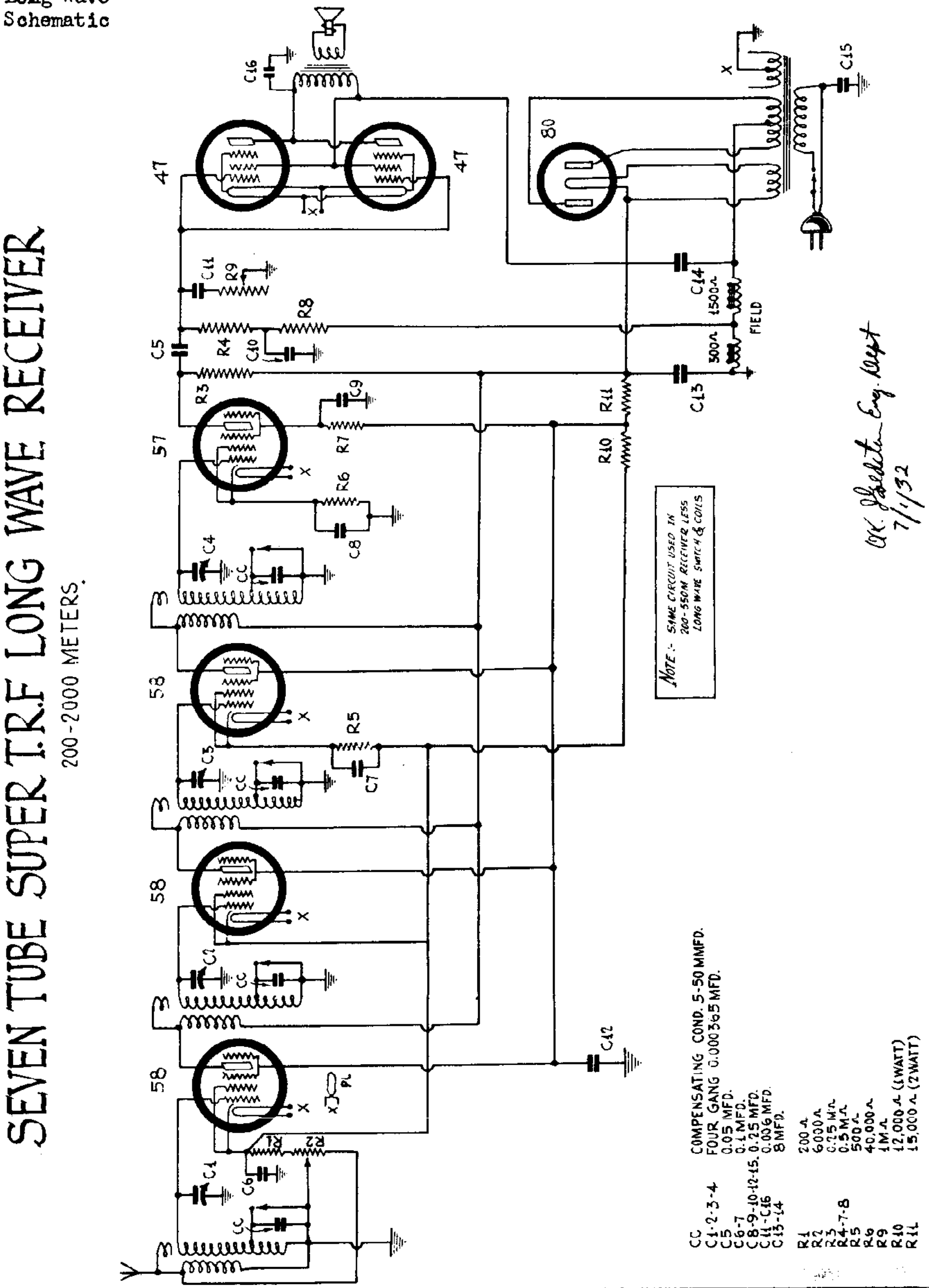
AIR KING PRODUCTS CORP.

MODEL 6 Tube TRF
Long Wave
Schematic



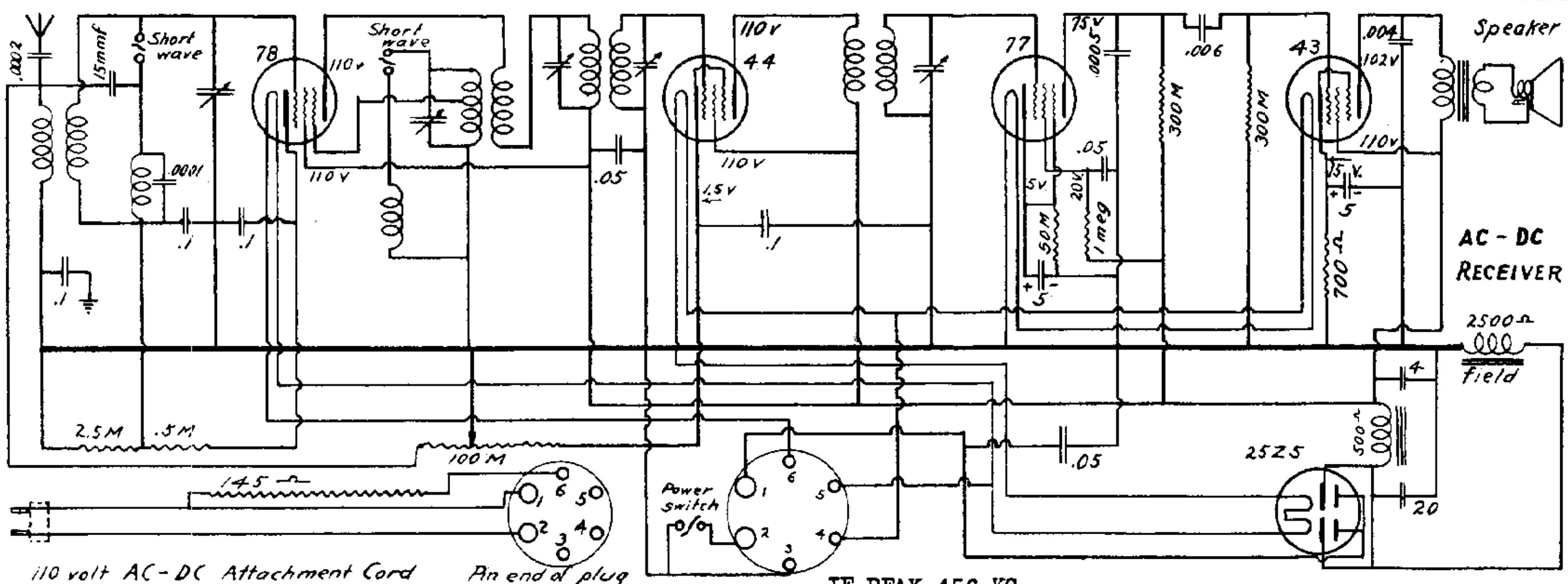
MODEL 7 Tube TRF
Long Wave
Schematic

AIR KING PRODUCTS CORP.



MODEL F-9501
Schematic
Alignment

ALLIED RADIO CORP.



IF PEAK 456 KC.

OPERATING INSTRUCTIONS

Long and Short Wave

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost for operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

TO OPERATE:

Turn left hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right hand knob slowly back and forth till a station is heard. Numbers on the dial correspond to kilocycle of station when one zero is added. Adjust this knob carefully to secure best tone and adjust left hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

TO RECEIVE SHORT WAVES:

Push handle of switch in rear toward end of cabinet for short wave position. Local police calls, etc., will then be heard at approximately 65 and 100 on the dial, and amateurs, etc., at various other positions. Often local conditions make short wave reception difficult unless the aerial wire is grounded or attached to outside aerial. Reception of short wave requires a good aerial and more careful adjustment of both knobs than is necessary on the broadcast band.

PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

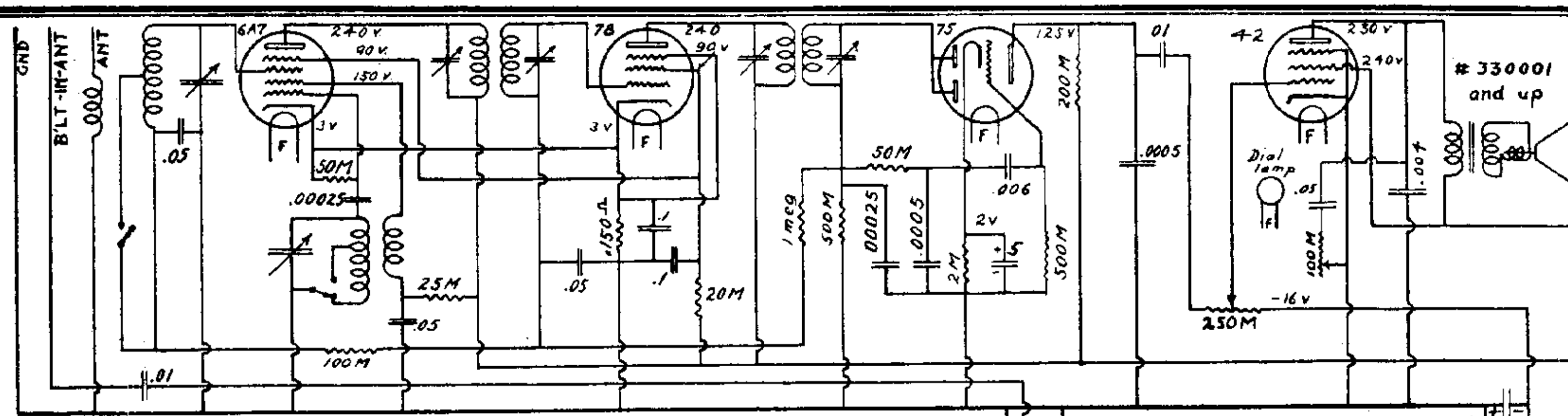
SERVICE NOTES:

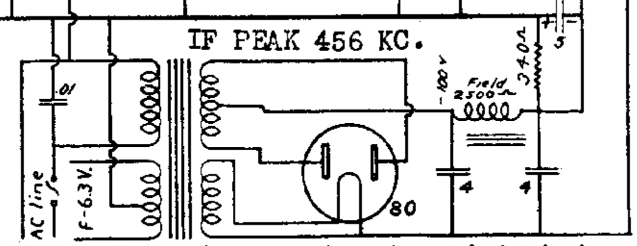
To balance set remove from cabinet. Intermediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

If used in automobile, antenna stage should be trimmed to car antenna at time of installation.

MODEL F-9505
Schematic, Alignm't
MODEL F-9511
Schematic, Alignm't

ALLIED RADIO CORP.





IF PEAK 456 KC.

CAUTION: *Do not attempt to operate on current other than that noted on instrument*

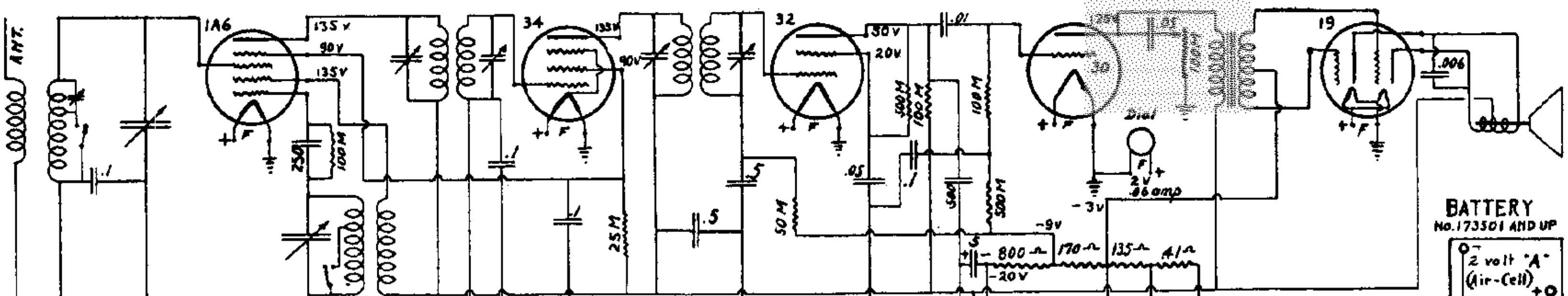
INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

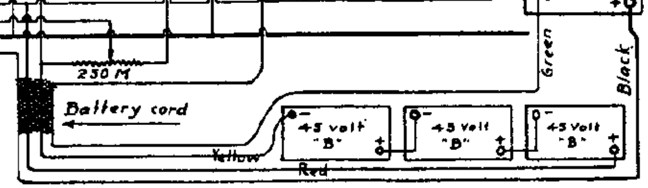
SHORT WAVE: Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

Model F-9505





CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

IF PEAK 456 KC.

INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

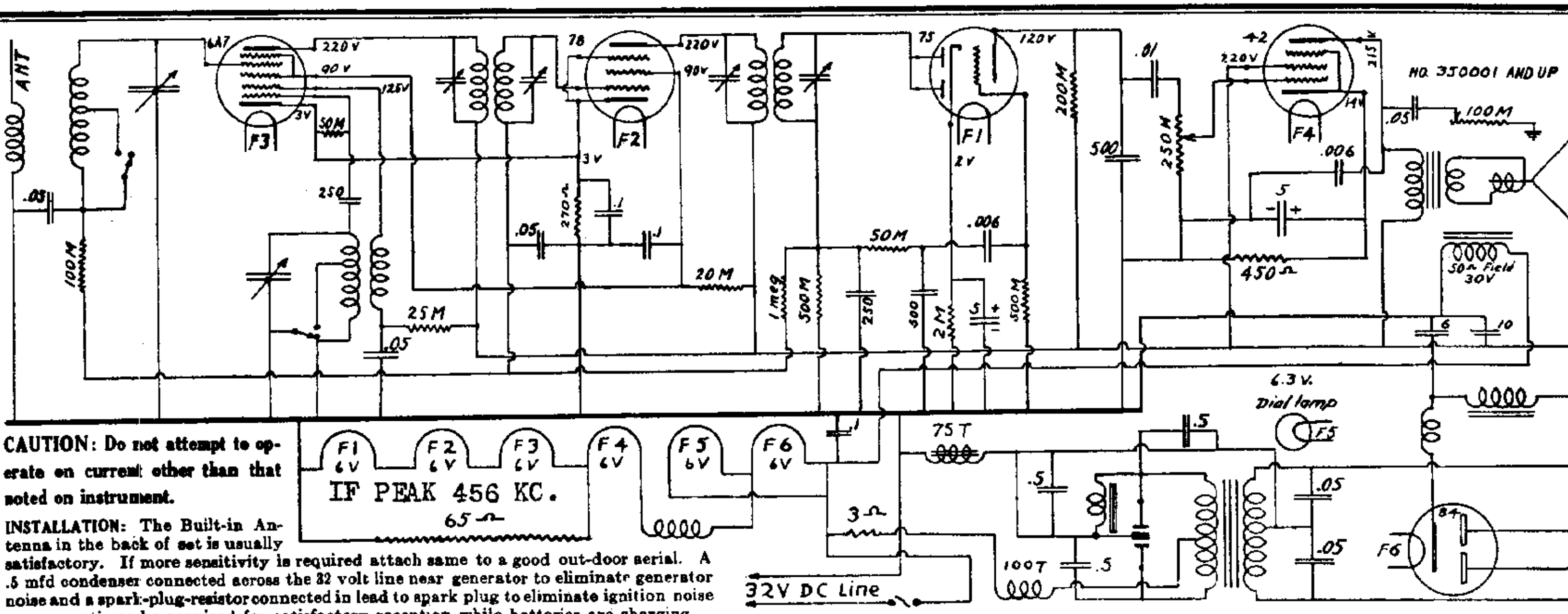
PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

Model F-9511

ALLIED RADIO CORP.

MODEL F-9515
Schematic, Alignm't
MODEL F-9521
Schematic, Alignm't



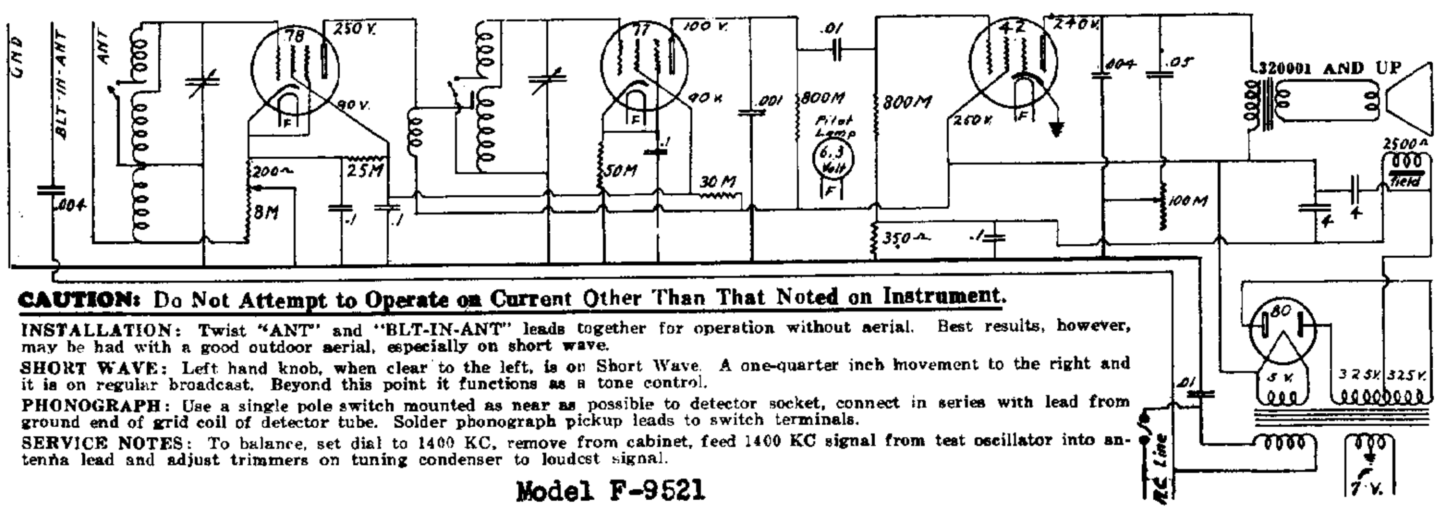
CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging.

USE NO GROUND CONNECTION ON SET. **SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

Model F-9515



CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial, especially on short wave.

SHORT WAVE: Left hand knob, when clear to the left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

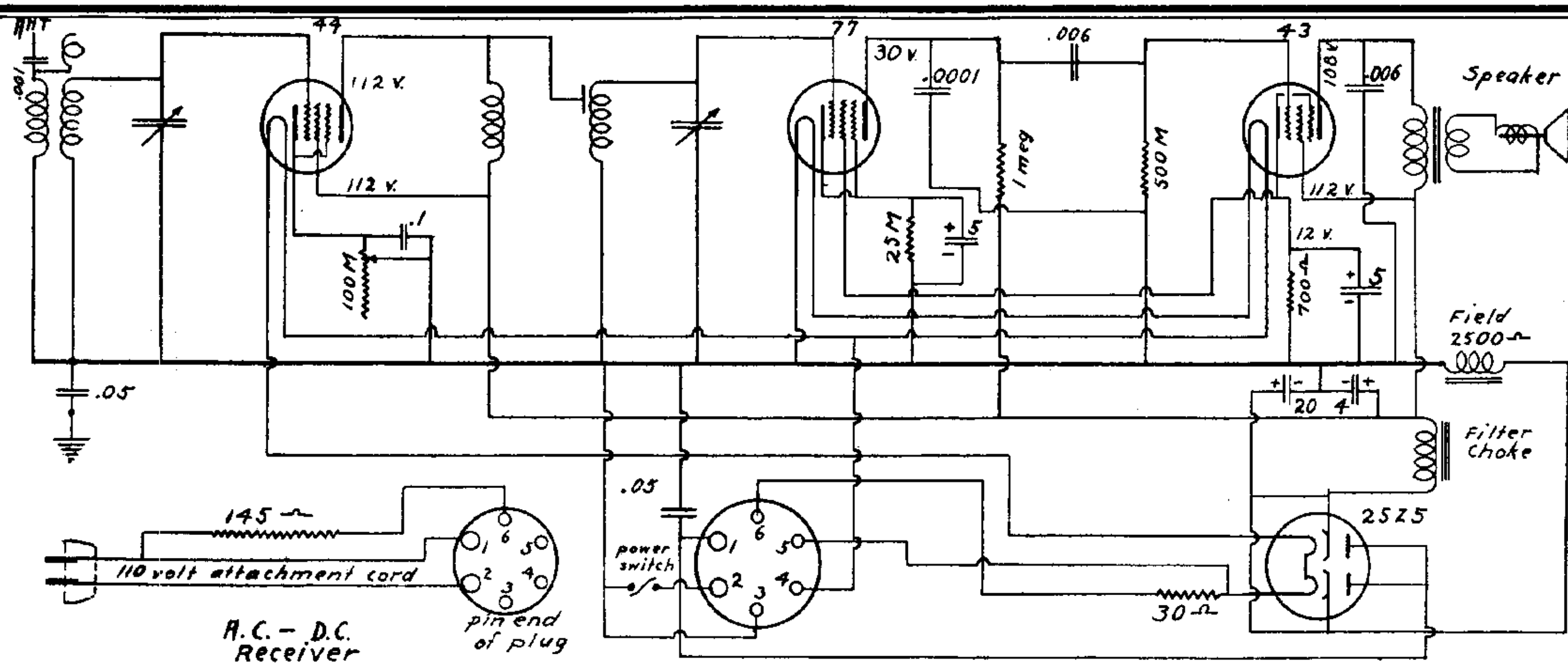
PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.

Model F-9521

MODEL F-9525, F-9527
Schematic, Alignment

ALLIED RADIO CORP.



OPERATING INSTRUCTIONS

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 200 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

TO OPERATE:

Turn left-hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right-hand knob slowly back and forth till a station is heard. Adjust this knob carefully to secure best tone and adjust left-hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

PHONOGRAPH:

Connect pick-up leads to single pole toggle switch, which may be mounted in large hole in rear flange of set. Unsolder black wire and 5 mfd condenser from ground lug of coil on under side of chassis and resolder to one side of toggle switch. Solder other side of switch to ground lug of coil.

SERVICE NOTES:

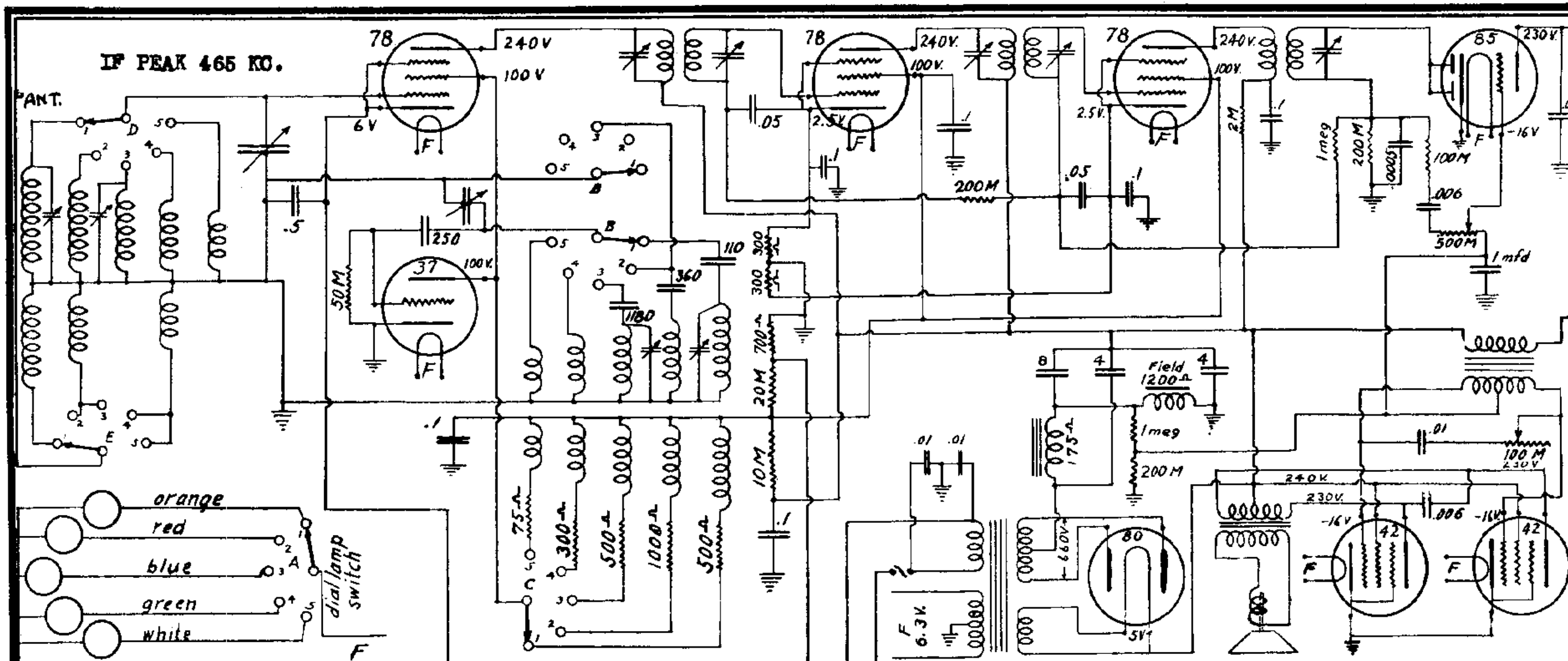
To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt headed screws on bottom of cabinet.

To balance set remove from cabinet, turn tuning condenser plates completely out, attach a test oscillator delivering 1712 K. C. to antenna of set and adjust trimmers on tuning condenser to loudest signal. Change test oscillator signal to 1400 K. C., turn tuning condenser until signal is tuned in and check trimmers again without moving tuning condenser.

If used in automobiles antenna stage should be trimmed to the car antenna at time of installation.

MODEL F-9531, F-9591
Schematic, Alignment

ALLIED RADIO CORP.



The built-in aerial at the back of the set usually gives satisfactory sensitivity when stretched around the edge of the floor or along the picture moulding of the room. A good outside aerial connected to the built-in aerial sometimes increases sensitivity. Power noise interferes especially with short-wave reception. If set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. Any radio dealer can supply such an aerial kit with full instructions for installing.

CONTROL KNOBS:

The lower middle knob is for selecting the various frequency bands as indicated on the dial. The upper middle knob is tuning control. The right-hand knob is power switch and volume control and the left-hand knob is tone control.

PHONOGRAPH:

Mount a single pole toggle switch and two insulated pin jacks in the rear of the chassis near the tube socket marked "85," connect one side of the switch to one pin jack, the remaining pin jack to one outside terminal of the volume control and the remaining switch terminal to the other outside terminal of the volume control. Plug the phonograph pickup leads into the pin jacks.

SERVICE NOTES:

The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

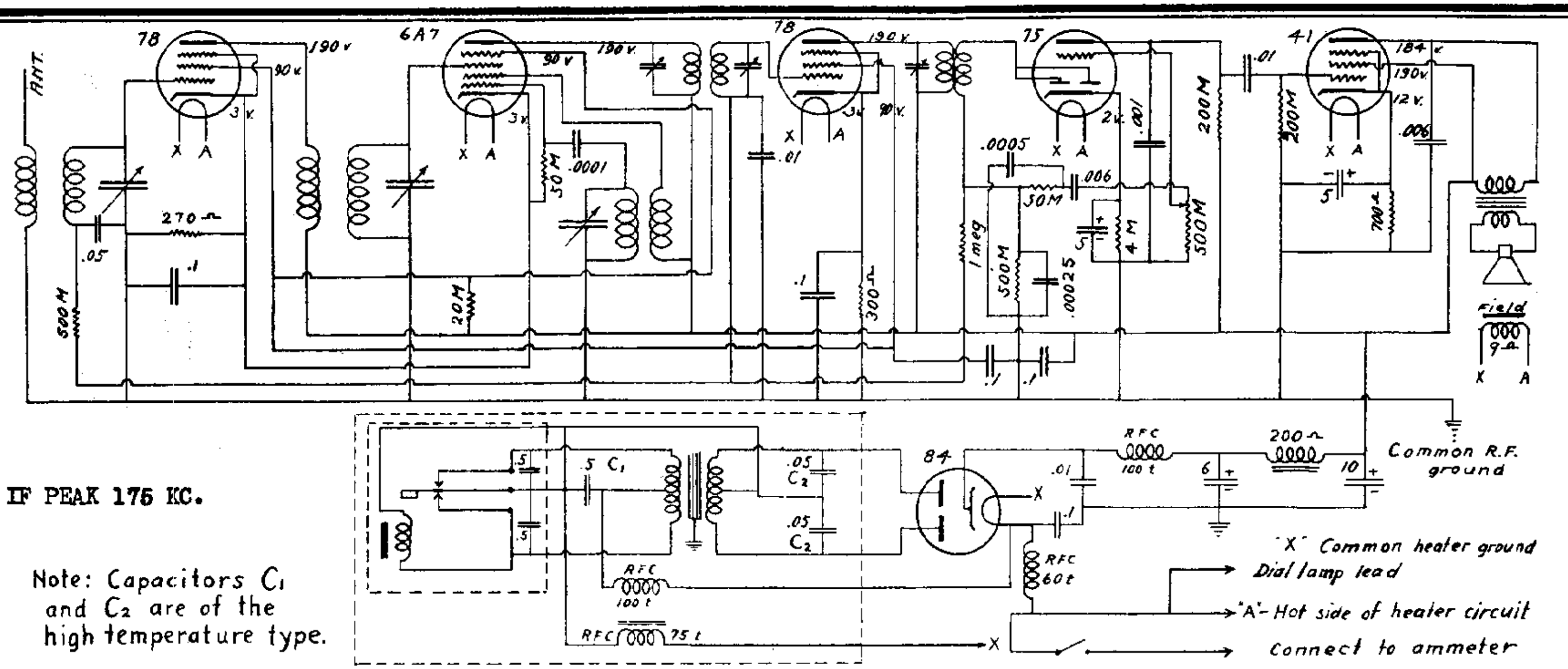
NOTE: Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

SHORT WAVE TIPS:

In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T tune above 12,000 kilocycles (below 25 meters) for distant stations after dark. DON'T expect to find stations on all parts of the dial. Short-wave stations are widely separated, except in a few instances. DON'T skim over the dial. It requires some knowledge of tuning to get good results. Tune very slowly. DON'T pass up any weak signal, as it may often be brought in stronger by careful tuning.

MODEL F-9541
Schematic, Alignment

ALLIED RADIO CORP.



IF PEAK 175 KC.

Note: Capacitors C_1 and C_2 are of the high temperature type.

After the set has been unpacked, remove the four screws from bottom of cabinet, remove the front cover by carefully inserting screw driver at either side and exerting slight twisting pressure, slide chassis forward out of cabinet and inspect tubes to make sure if they are completely down in their sockets, after which replace chassis, front of cabinet and four screws as they were originally.

Determine most satisfactory mounting position on bulkhead which should be at the left hand side or directly in front of steering column. Spot the mounting bolt location and drill ½" diameter hole. Insert bolt through hole and assemble washer and nut on engine side. Hang receiver over bolt head and tighten nut.

Attach flexible shafts to control unit by first inserting shaft as far in as possible and then tighten set screws of shaft housing, being careful it is not so tight as to cause shaft to bind in housing.

Mount control unit on steering column in approximately correct position, set pointer to 530 on dial, turn upper control of receiver to extreme clockwise position, carefully place right hand shaft in position on upper receiver control and left hand shaft on lower control and tighten set screws securely.

Adjust control unit position so that shafts leave set with least amount of bend possible and fasten securely in this position. Trial of controls will show best location for smooth operation.

Attach heavy rubber covered lead to ammeter terminal.

Connect pilot light wire from control head to short black wire on set, making connection close to set, and tape up joint. Ground shield by loosening screw under nearest corner of set and connecting wire therefrom to end of shield and tighten up screw.

Disconnect ignition leads from spark plugs, attach one suppressor to top of each plug and reattach the ignition lead to free end of suppressor. Disconnect center wire from distributor head, and substitute distributor suppressor, then plug center wire into free end of suppressor.

Attach generator bypass condenser to generator frame by means of screw holding cut-out. Connect wire from condenser to generator side of cut-out switch.

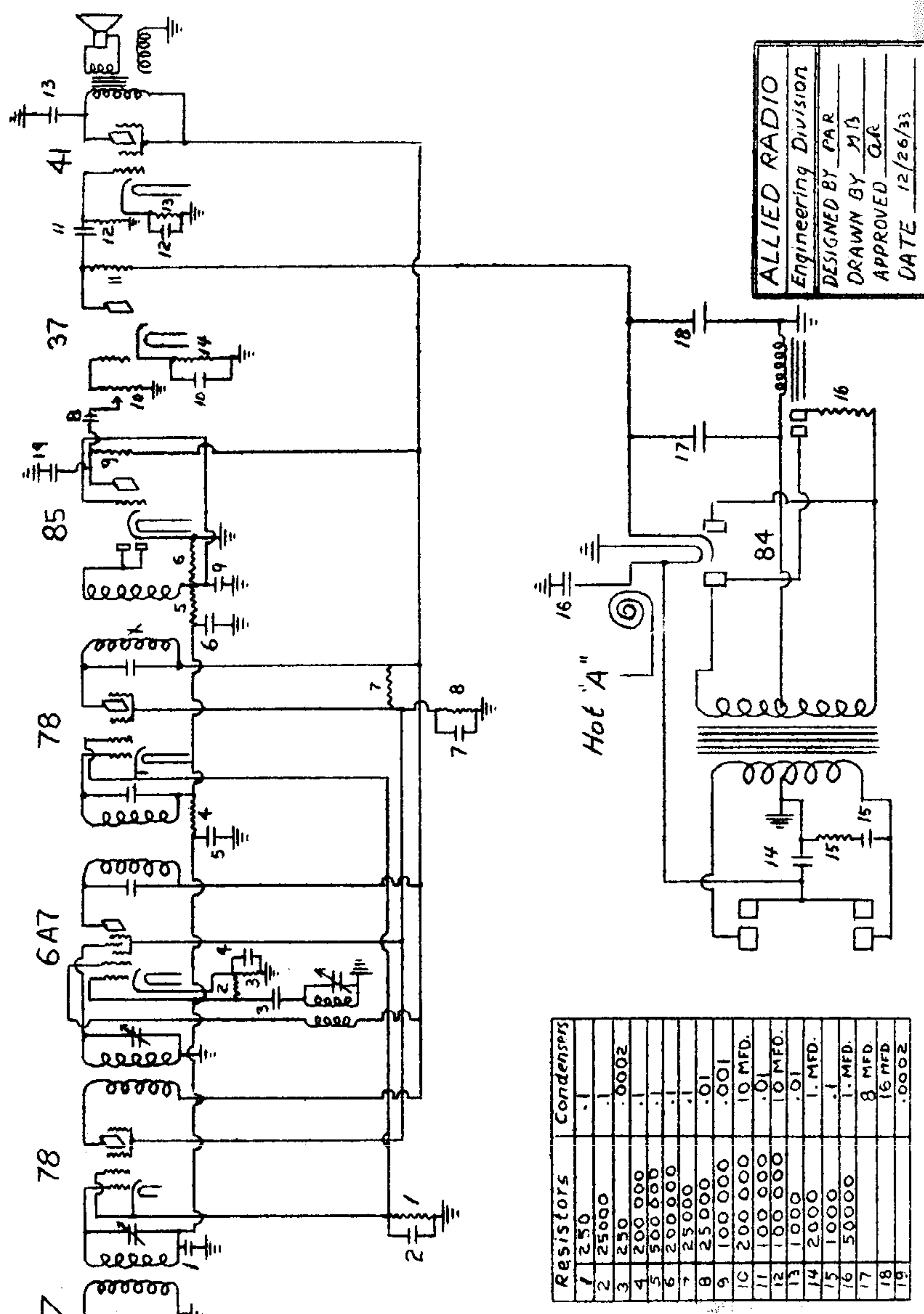
Turn left hand knob on control head to right. If connection directions have been correctly followed, dial should become illuminated immedately and the tubes reach correct operating temperature in approximately 30 seconds.

Balancing Intermediate Frequency Coils. These are peaked to 175 K. C. and are trimmed through the top of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Chassis must first be removed from cabinet and signal from test oscillator fed into grid cap of the 6A7 tube.

Balancing R. F. Coils. The tuning control must first be attached to tuning condenser shaft with pointer set to 530 when tuning condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car slightly readjust first trimmer through hole in top of cabinet.

ALLIED RADIO CORP.

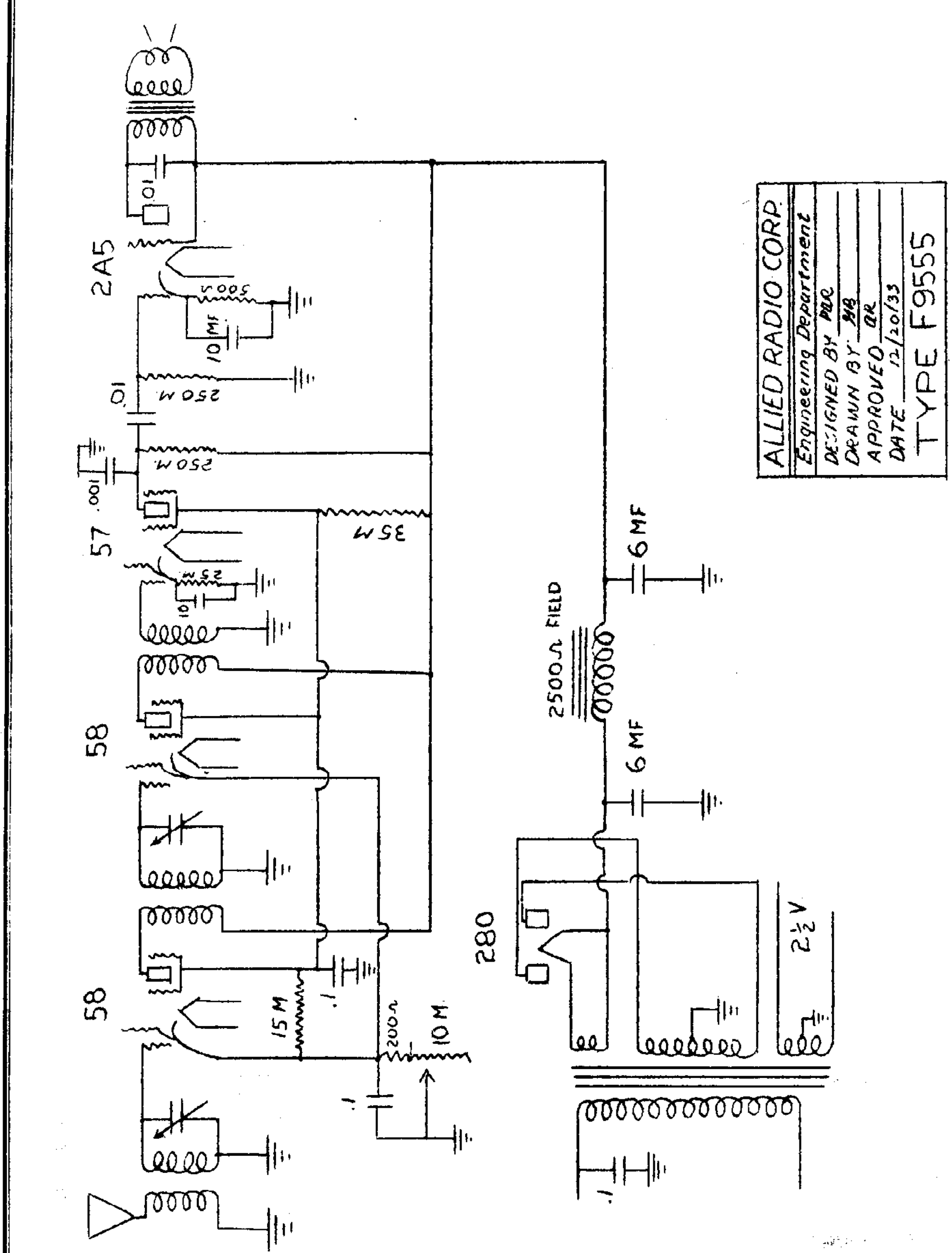
MODEL F-9551
Schematic



	Resistors	Condensers
1	250	.1
2	25000	.1
3	250	.0002
4	200 000	.1
5	500 000	.1
6	200000	.1
7	25000	.1
8	25000	.01
9	100 000	.001
10	200 000	10 MFD.
11	100 000	.01
12	100 000	10 MFD.
13	1000	.01
14	2000	1. MFD.
15	1000	.1
16	50000	1. MFD.
17		8 MFD
18		16 MFD
19		.0002

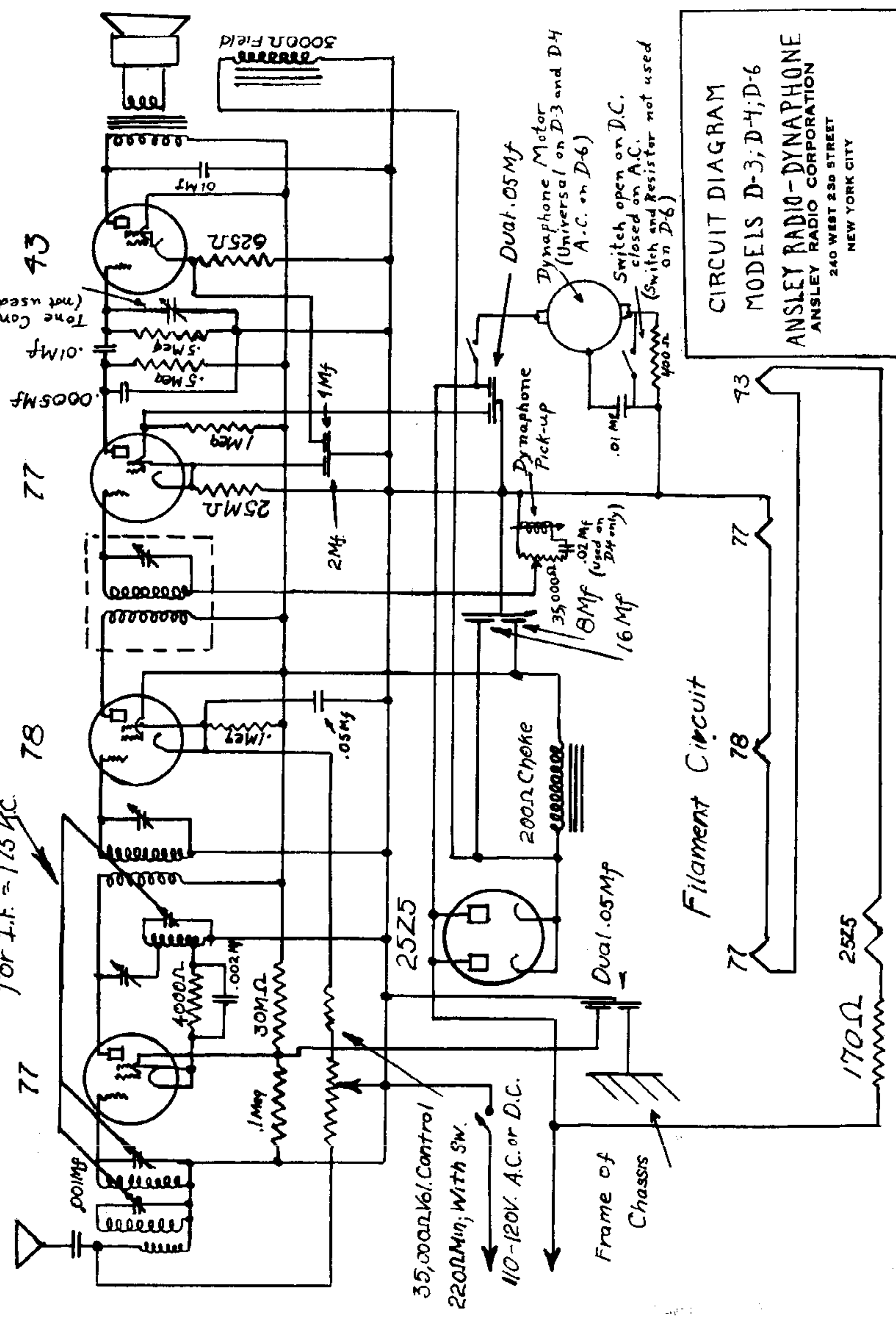
MODEL F-9555
Schematic

ALLIED RADIO CORP.



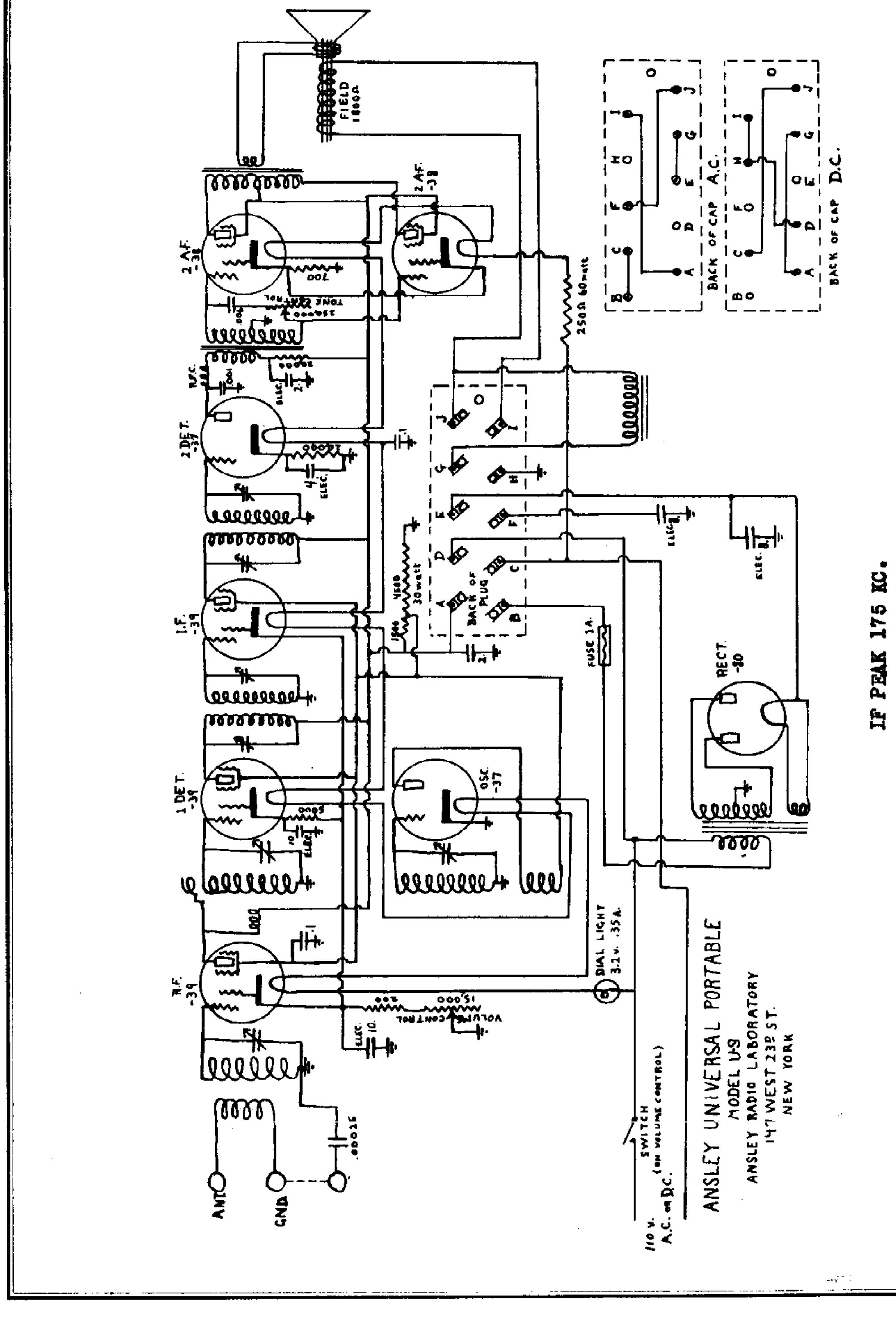
ANSLEY RADIO CORP.

MODEL D-3,D-4,D-6
Schematic



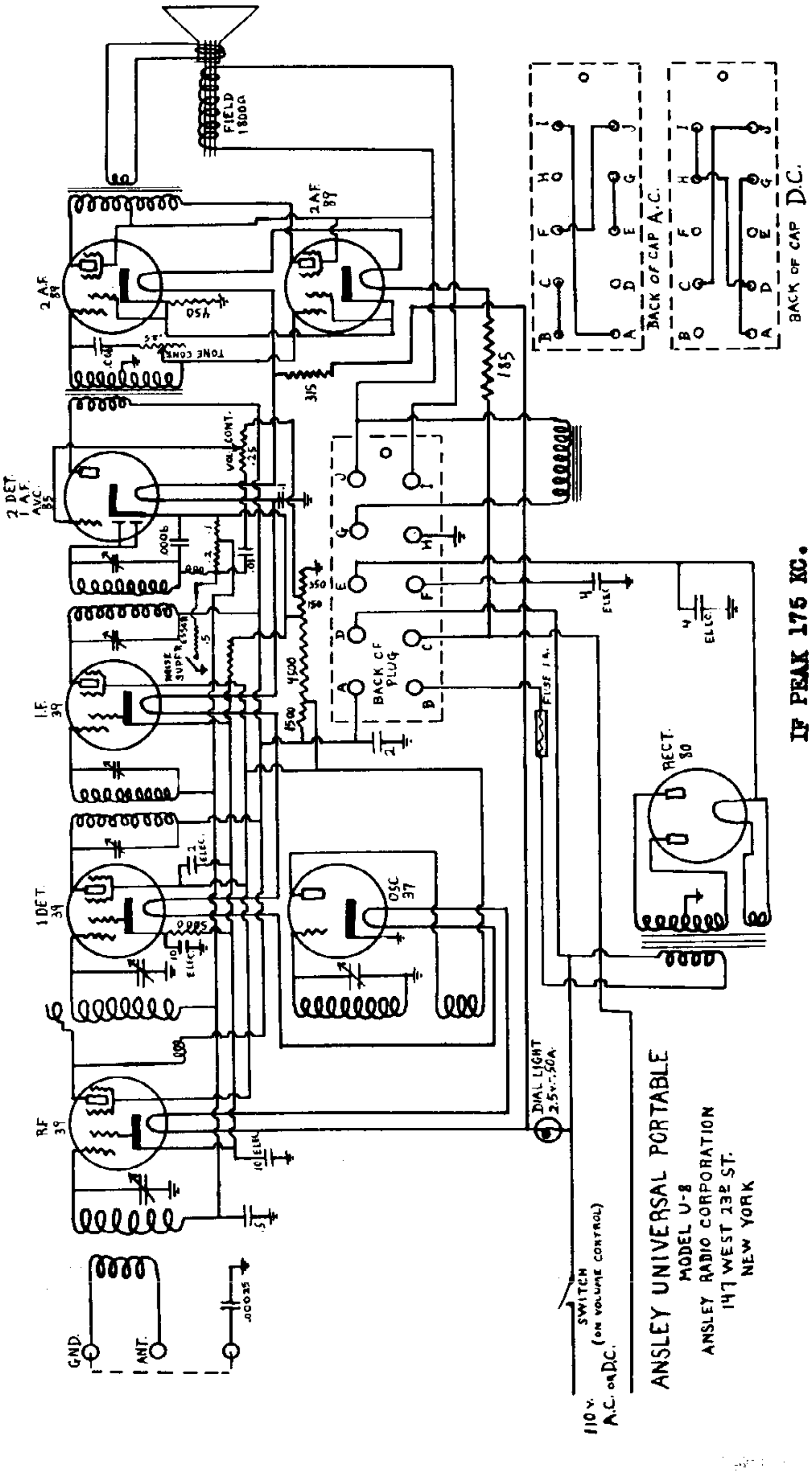
MODEL U-3
Schematic

ANSLEY RADIO CORP.



MODEL U-8
Schematic

ANSLEY RADIO CORP.



ATWATER-KENT MFG. CO.

MODEL 165-Q

26809	Cabinet, less screen
26679	Screen
25745	Name decalcomania
25965	Tone decalcomania
24278	Knob (tuning and volume)
25145	Knob (tone)
25022	Variable condenser
26727	Dial assembly
25692	Volume control, .5 Ω
25004	Volume control bracket
24327	Shield for T5
24554	Shield for T4 includes A5
36980	Tone control and police switch
25226	Shaft and blade

TRANSFORMER

Code No.	Part No.	Name of Part
T1	37080	No. 1 R. F. T.
T2	37090	No. 2 R. F. T.
T3	37110	Osc. T.
T4	37180	No. 1 I. F. T.
T5	37190	No. 2 I. F. T.
T6	37150	Input T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30340	Red-blue, .1 Ω, 1/3-W.
R2	30390	Red-bl'k, 20,000 Ω, 1/3-W.
R3	30340	Red-blue, .1 Ω, 1/3-W.
R4	30380	Red-green, 3,300 Ω, 1/3-W.
R5	36430	Blue-yel., 5,000 Ω, 1/3-W.
R6	30370	Green, 2 Ω, 1/3-W.
R7	31970	Red-yel., .25 Ω, 1/3-W.
R8	30340	Red-blue, .1 Ω, 1/3-W.
R9	30360	Gray-blue, 1 Ω, 1/3-W.
R10	30320	Maroon, 10,000 Ω, 1/3-W.
R11	36240*	Wire wound, 1.03 Ω

* A No. 37120 resistor (1.03 Ω) is supplied with set for use with 3-V dry "A" battery.

CONDENSERS

Code No.	Part No.	Name of Part
C1	31160	.05 MF, 100-V., NI
C2	31160	.05 MF 100-V., NI
C3	33930	25 MMF, 500-V.
C4	36950	730 MMF, 100-V.
C5	27630	.01 MF, 200-V., IND.
C6	27630	.01 MF, 200-V., IND.
C7	27630	.01 MF, 200-V., IND.
C8	21160	200 MMF, 450-V.
C9	29890	.005 MF, 450-V., IND.
C10	22472	7 MF, 200-V.
	34010	Multiple by-pass, J-15

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A4	24495	Single I. F.
A5	31290	Single I. F.
A6	33080	Single I. F.

SOCKETS

Part No.	Name of Part
24494	6 prong
24492	4 prong
25196	Speaker

165-Q SPEAKER No. 37170

525-Q SPEAKER No. 39200

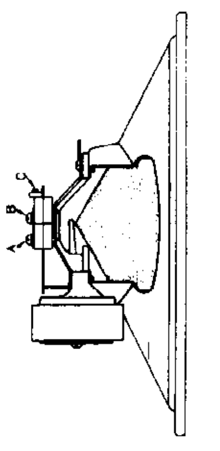
Part No.	Name of Part
26874	Cable and plug assembly (525-Q)
26755	Cable and plug assembly (165-Q)
27128	Magnet
27129	Magnet clamping plate
8188	8/32 hex. nut
9898	No. 6 lock washer
23318	No. 2 washer
27138	Clamping block top
27139	Clamping block bottom
27141	Adjusting screw, 6/32
27142	Cover plate
27143	Mounting bracket
27144	Sound unit assembly, less magnets
27145	Conehead assembly
27146	Coil
27147	Armature
27211	Mount. brackets, pair (525-Q)
27148	Spring
27149	Terminal

MODEL 525-Q

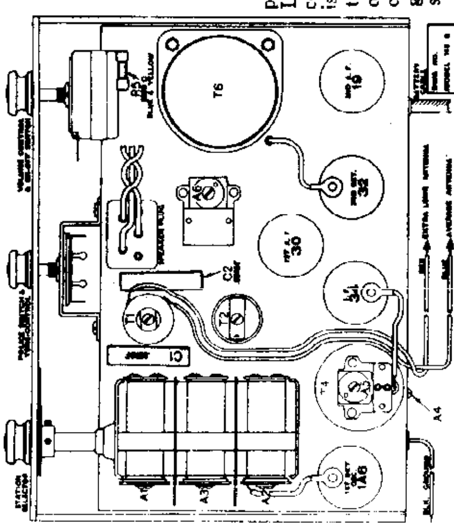
(For parts not listed below refer to Model 165-Q parts list)

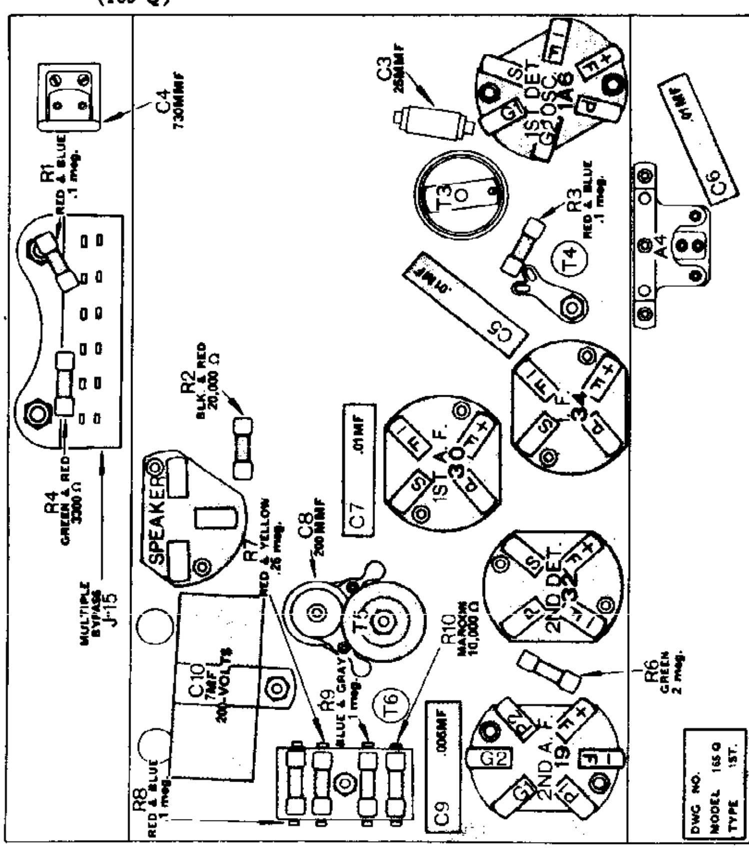
Part No.	Name of Part
26565	Variable condenser assembly
27305	Knob shaft
37450	Osc. T (T3)
26719	Dial light socket
26722	Battery cable with resistor
26519	Dial assembly
26721	Dial lamp (air cell, 2-V., 60 MILS.)
26642	Base cover
26569	Knob (tuning and volume)
26571	Knob (tone)
36250*	Wire wound, 1.15 Ω (R11)
26669	Shipping container
26545	Escutcheon nameplate
25691	Escutcheon window
26718	Volume control, .5 Ω
37490	Tone control switch
26573	Shaft and blade

* A No. 37130 resistor (1.15 Ω) is supplied with set for use with a 3-V. dry "A" battery.



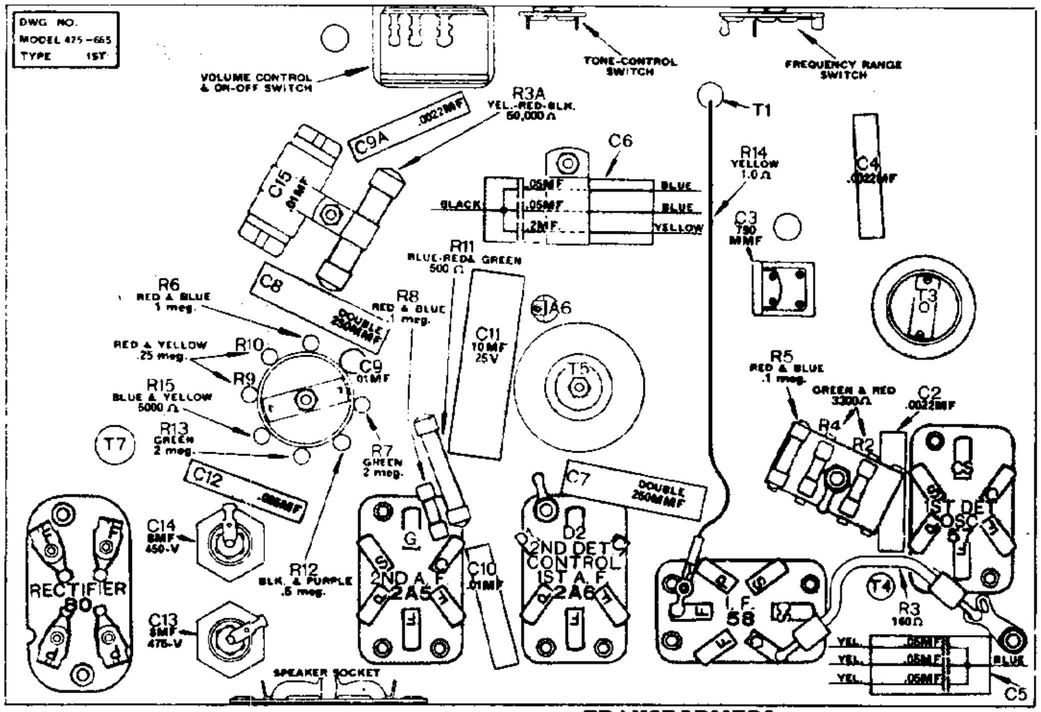
Speaker Adjustment: When adjustment is required, put the set and speaker in operation and tune in a signal. Loosen screw A and tighten B, or vice versa, in order to center the armature in the magnet gap. If the armature is not correctly centered, it may strike against one pole of the magnet and cause chattering. If the speaker overloads or chatters only on a very strong signal, turn screw C anti-clockwise: This tightens the armature movement. (In general it is not advisable to disturb the adjustment of screw C.)

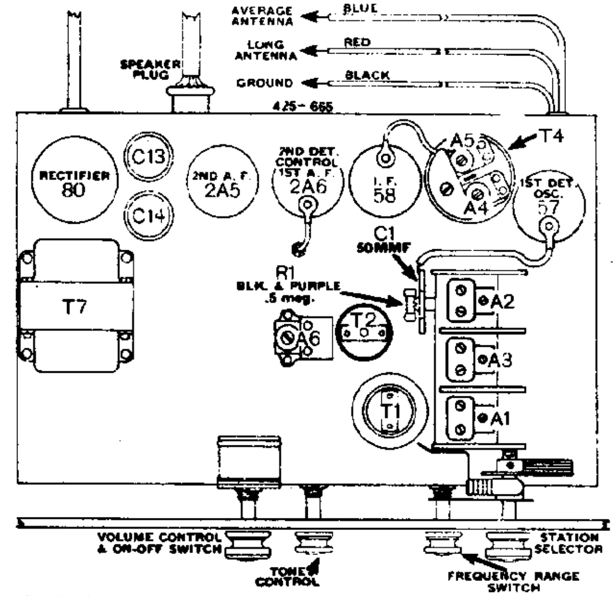




MODEL 425,665
Socket,Trimmer,Parts

ATWATER-KENT MFG. CO.





The circuit of these models is similar to that used in Models 165, 185 and 525.

MODELS 425 and 665

Part No.	Name of Part
26177	Variable condenser assembly
20116	Knob shaft bracket
17961	Dial rubber
24122	Dial gear
25885	Dial assembly
15404	Dial lamp, 2.5-V.
25811	Knob, volume and tuning, 425
25812	Knob, tone and range, 425
25737	Knob, volume and tuning, 665
25738	Knob, tone and range, 665
26742	Escutcheon, 425
26774	Escutcheon, 665
30560	Tone control switch complete
24207	Shaft and blade
20096	Shaft key
24079	Volume control, .5 U
24052	Volume control bracket
37050	Range switch
26903	Shaft and blade

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	37210	No. 1 R. F. T.
T2	37220	No. 2 R. F. T.
T3	37230	Osc. T.
T4	26878	No. 1 I. F. T.
T5	37590	No. 2 I. F. T.
T6	21672	Output T.
T7	25191	Power T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30350	Bl'k-purple, .5 U, 1/3-W.
R2	30380	Red-green, 3300 Ω, 1/3-W.
R3	28950	Flexible, 160 Ω
R3A	34340	Yel.-red-bl'k, 50,000 Ω, 1½-W.
R4	30380	Red-green, 3300 Ω, 1/3-W.
R5	20980	Red-blue, .1 U, ½-W.
R6	30340	Red-blue, .1 U, 1/3-W.
R7	30370	Green, 2 U, 1/3-W.
R8	30340	Red-blue, .1 U, 1/3-W.
R9	31970	Red-yel., .25 U, 1/3-W.
R10	31970	Red-yel., .25 U, 1/3-W.
R11	32010	Blue-red-green, 500 Ω,
R12	30350	Bl'k-purple, .5 U, 1/3-W.
R13	30370	Green, 2 U, 1/3-W.
R14	31860	Flexible, 1 Ω
R15	36430	Blue-yel., 5000 Ω, 1/3-W.

CONDENSERS

Code No.	Part No.	Name of Part
C1	30260	50 MMF, 450-V.
C2	33660	.0022 MF, 450-V., IND.
C3	36020	790 MMF, 100-V.
C4	33660	.0022 MF, 400-V., IND.
C5	32410	.05, .05 and .05 MF, 100-V.
C6	32390	.05, .05 and .2 MF, 200-V.
C7	33630	250 MMF (double), 450-V., IND.
C8	33630	250 MMF (double), 450-V., IND.
C9	27630	.01 MF, 200-V., IND.
C9A	33660	.0022 MF, 450-V., IND.
C10	27630	.01 MF, 200-V., IND.
C11	25379	10 MF, 25-V., dry electrolytic
C12	30250	.025 MF, 450-V., NI
C13	25168	8 MF, 475-V., electrolytic
C14	26381	8 MF, 450-V. (blue)
C15	23250	.01 MF, 450-V.

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A4, 5	30110	Double I. F.
A6	37910	Single I. F.

SOCKETS

Part No.	Name of Part
22733	6 prong
22689	4 prong rectifier
21336	4 prong speaker

MISCELLANEOUS

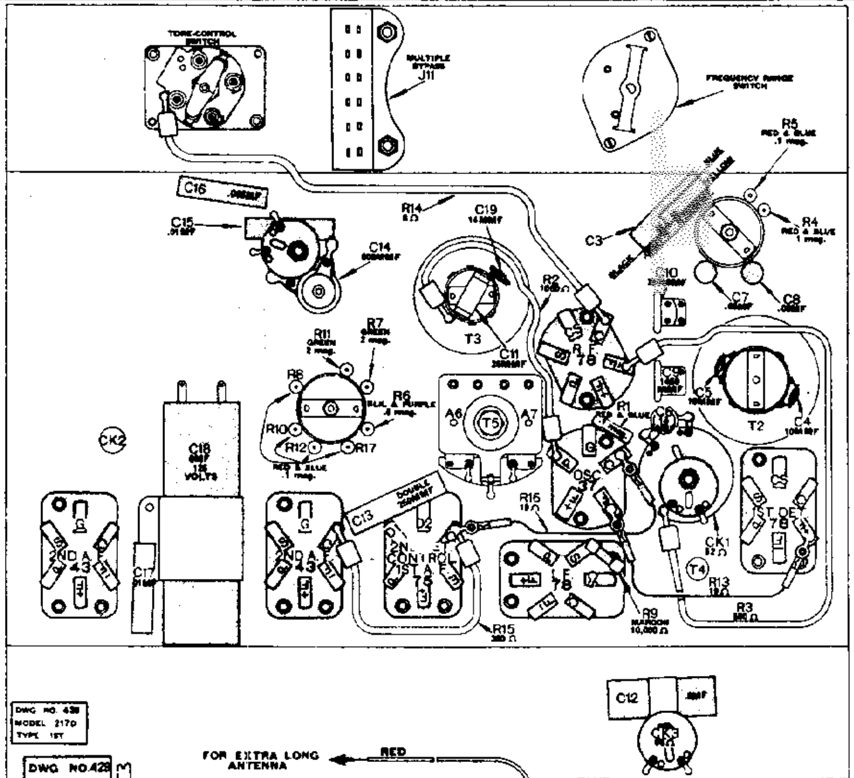
Part No.	Name of Part
21877	No. 1 I. F. T. shield
24327	No. 2 I. F. T. shield
22683	Tube shield
24677	Base cover
26792	Instruction and log card, F1122
24725	Shipping container

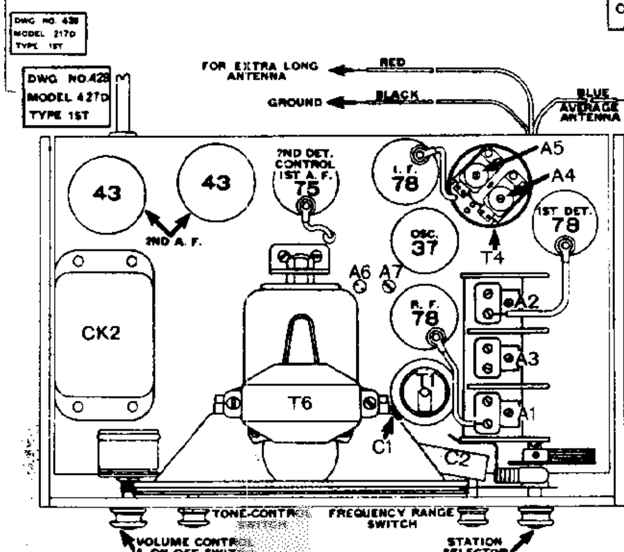
425-665 SPEAKER No. 33400

Part No.	Name of Part
18870	Field coil, 2000 Ω
21672	Output T.—(T6)
19465	Diaphragm
19789	Cable and plug
15079	Speaker plug
23657	Choke (CK1)

MODEL 217D,427D,667D
Socket,Trimmer,Parts

ATWATER-KENT MFG. CO.





In Models 427-D and 667-D the speaker is mounted in the cabinet, under the chassis.

MODEL 217-D

Part No.	Name of Part
26178	Cabinet complete
25831	Screen
25691	Escutcheon
25687	Name plate
25811	Knob—volume and tuning
25812	Knob—tone and range switch
25885	Dial plate
25672	Range switch
27092	Tone control switch, complete
24207	Tone control switch shaft and blade
26177	Variable condenser assembly
22654	No. 1 I. F. T. shield cap
24064	Speaker mounting bracket
26079	Instruction and log card, F1098
25679	Shipping container
16099	Pilot lamp, 6-V.
24079	Volume control, .5 U

RESISTORS

Code No.	Part No.	Name of Part
R1	30340	Red-blue, .1 U, 1/3-W.
R2	16320	Flexible, 1050 Ω
R3	23780	Flexible, 550 Ω
R4	20980	Red-blue, .1 U, ½-W.
R5	20980	Red-blue, .1 U, ½-W.
R6	20930	Bl'k-pur., .5 U, ½-W.
R7	20940	Green, 2 U, ½-W.
R8	20980	Red-blue, .1 U, ½-W.
R9	30320	Mar'n. 10,000 Ω, 1/3-W.
R10	20980	Red-blue, .1 U, ½-W.
R11	20940	Green, 2 U, ½-W.
R12	20980	Red-blue, .1 U, ½-W.
R13	16610	Flexible, 19 Ω
R14	26470	Flexible, 8 Ω
R15	25840	Flexible, 300 Ω
R16	16610	Flexible, 19 Ω
R17	20980	Red-blue, .1 U, ½-W.

CONDENSERS

Code No.	Part No.	Name of Part
C1	34470	14 MMF, 500-V., red
C2	31160	.05 MF, 100-V., NI
C3	34020	.05 MF and 250 MMF, 200-V., NI
C4	34460	10 MMF, 500-V., black
C5	34460	10 MMF, 500-V., black
C6	34470	14 MMF, 500-V., red
C7	31160	.05 MF, 100-V., NI
C8	31160	.05 MF, 100-V., NI
C9	36030	1450 MMF, 100-V.
C10	36020	790 MMF, 100-V.
C11	33930	25 MMF, 500-V.
C12	31510	.5 MF, 100-V., NI
C13	33630	Double 250 MMF, 450-V., IND.
C14	17440	500 MMF, 450-V.
C15	27630	.01 MF, 200-V., IND.
C16	29890	.005 MF, 450-V., IND.
C17	32810	.01 MF, 450-V., NI
C18	23981	8 MF, dry electrolytic, 125-V.
C19	35980	14 MMF, 500-V.
	31340	Multiple bypass condenser (J11)

CHOKES

Code No.	Part No.	Name of Part
CK1	35180	R. F. plate choke
CK2	26411	Audio filter choke
CK3	19210	1st detector plate filter choke

TRIMMERS

Code No.	Part No.	Name of Part
A4, 5	30110	Double I. F. trimmer
A6, 7	30630	Double I. F. trimmer

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	35410	No. 1 R. F. T.
T2	36040	No. 2 R. F. T.
T3	35430	Oscillator T.
T4	25841	No. 1 I. F. T.
T5	25842	No. 2 I. F. T.
T6	36190	Output T. (on speaker)

217-D SPEAKER No. 37500

Part No.	Name of Part
21161	Diaphragm
35310	Field coil (70 Ω)
36190	Output T. (T6)

MODEL 427-D

(For parts not listed below refer to Model 217-D)

25688	Escutcheon name plate
25691	Dial window
17816	Speaker hook
24725	Shipping container

427-D SPEAKER No. 37600

667-D SPEAKER No. 37600

Part No.	Name of Part
22902	Cable and plug

MODEL 667-D

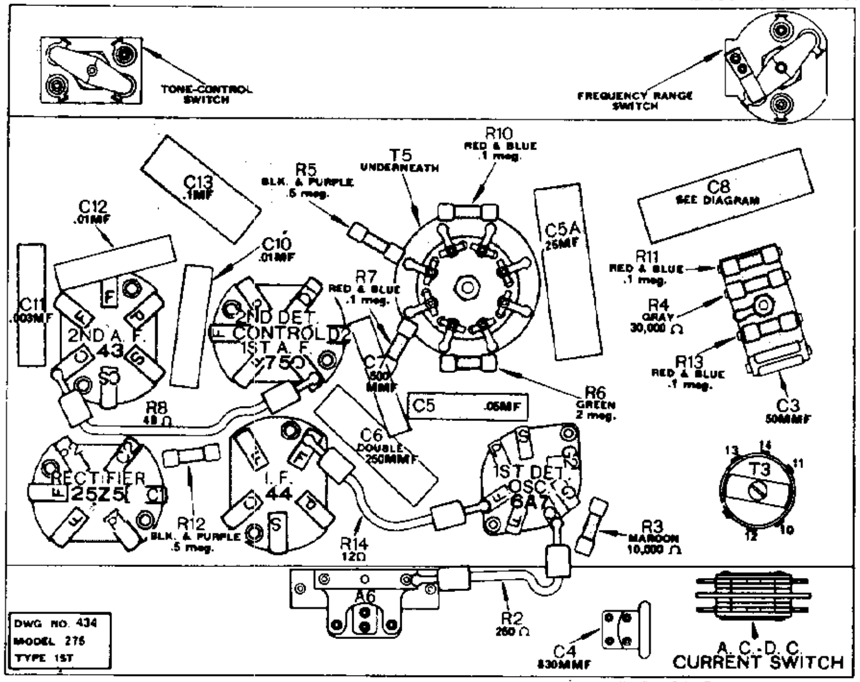
(For parts not listed below refer to Model 217-D)

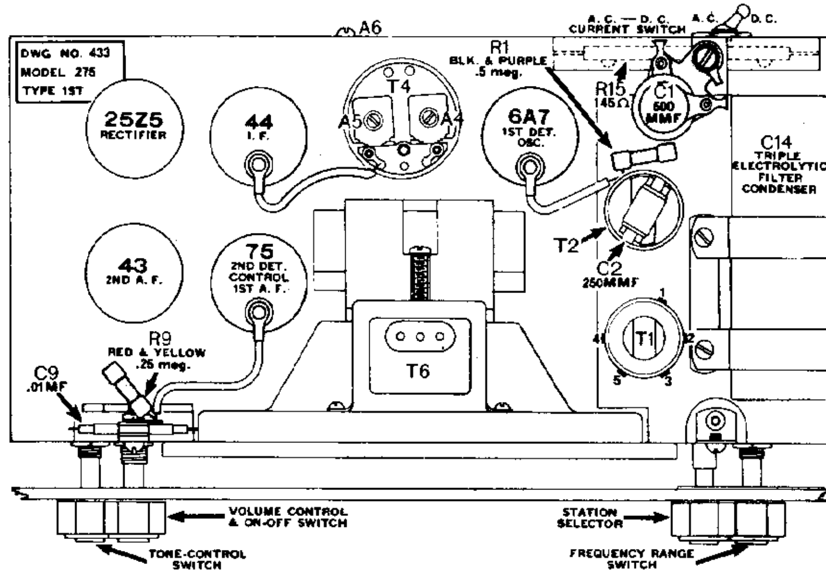
25864	Escutcheon name plate
25865	Dial window
17816	Speaker hook
24725	Shipping container
25737	Knob—dial and volume
25738	Knob—tone and range

Ω = ohms. U = megohms. W. = watt.
IND. = inductive. NI = non-inductive.

MODEL 275
Socket, Trimmer
Parts List

ATWATER-KENT MFG. CO.





MODEL 275

Part No.	Name of Part
25798	Volume control, .5 U
26443	Cabinet complete
26444	Cloth screen
25865	Escutcheon window
25936	Escutcheon name plate
25814	Knob (volume and tuning)
25738	Knob (tone and range)
26283	Dial plate
24892	A. C.-D. C. switch
35560	Range switch
35630	Tone control switch
25022	Variable condenser

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	35450	No. 1 R. F. T.
T2	35460	No. 2 R. F. T.
T3	35470	Oscillator T.
T4	26326	No. 1 I. F. T.
T5	35910	No. 2 I. F. T.
T6	26501	Output A. F. T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30350	Bl'k-pur., .5 U, 1/3-W.
R2	31830	Flexible, 250 Ω
R3	30320	Mar'n, 10,000 Ω, 1/3-W.
R4	31840	Gray, 30,000 Ω, 1/3-W.
R5	30350	Bl'k-pur., .5 U, 1/3-W.
R6	30370	Green, 2U, 1/3-W.
R7	30340	Red-blue, .1 U, 1/3-W.
R8	19820	Flexible, 48 Ω
R9	31970	Red-yel., .25 U, 1/3-W.
R10	30340	Red-blue, .1 U, 1/3-W.
R11	30340	Red-blue, .1 U, 1/3-W.
R12	30350	Bl'k-pur., .5 U, 1/3-W.
R13	30340	Red-blue, .1 U, 1/3-W.
R14	35820	Flexible, 12 Ω
R15	31690	Iron core, 145 Ω

CONDENSERS

Code No.	Part No.	Name of Part
C1	35590	500 MMF, 450-V.
C2	33670	250 MMF, 500-V.
C3	35840	50 MMF, 500-V.
C4	35990	830 MMF, 100-V.
C5	31160	.05 MF, 100-V., NI
C5A	35930	.25 MF, 200-V., NI
C6	33630	Double 250 MMF, 450-V., IND.
C7	28130	500 MMF, 450-V., IND.
C8	35790	Multiple .05, .05, .05, .03, .1 and .2 MF, 100-V.
C9	23250	.01 MF, 450-V.
C10	27630	.01 MF, 200-V., IND.
C11	35760	.003 MF, 200-V., IND.
C12	27630	.01 MF, 200-V., IND.
C13	26660	.1 MF, 200-V., NI
C14	26158	Triple dry electrolytic 14, 8 and 8 MF

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A4, 5	35650	Double I. F. trimmer
A6	35610	Single I. F. trimmer

SOCKETS

Part No.	Name of Part
26111	Socket (7 prong)
24494	Socket (6 prong)
24493	Socket (5 prong)

MISCELLANEOUS PARTS

Part No.	Name of Part
26706	Vernier shaft
26707	Vernier cap
26708	Ball bearing
26709	Trimmer screw
26711	Trimmer washer
27133	Trimmer mica
26323	T4 shield
21878	Shield disc
24327	T5 shield
26137	T5 shield insulator
24727	Antenna lead and card
26059	Instruction and log card, F1097
26332	Shipping container
26284	Dial light socket
16099	Dial lamp, 6-V.
26451	Tube shield
26014	Top shield
25324	Base cover
26017	Back plate

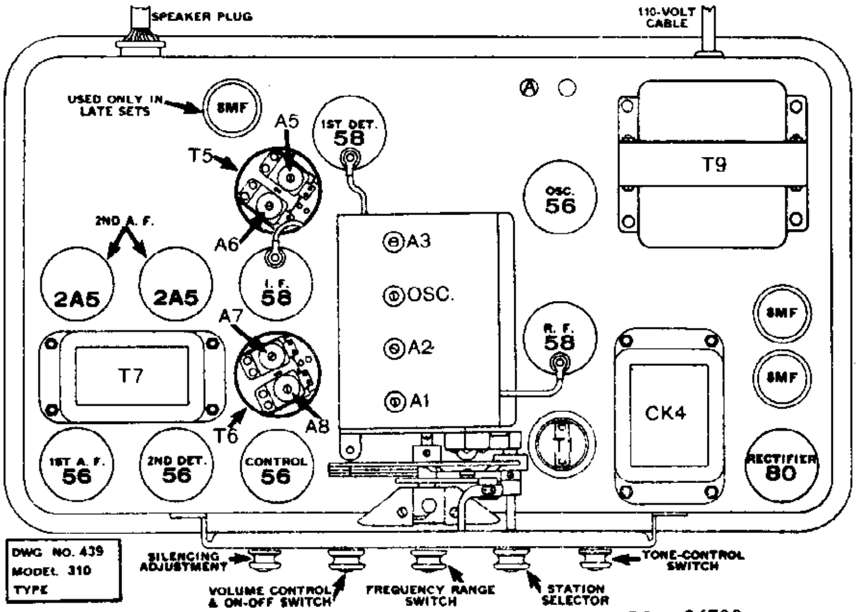
In some Model 275 sets, the oscillator grid trimmer A3 is not used.

SPEAKER

Part No.	Name of Part
26159	Speaker complete
25603	Diaphragm assembly
26501	Output transformer
26502	Field coil
26503	Choke coil (CK1)

MODEL 310, 510
Socket, Trimmer, Parts

ATWATER-KENT MFG. CO.

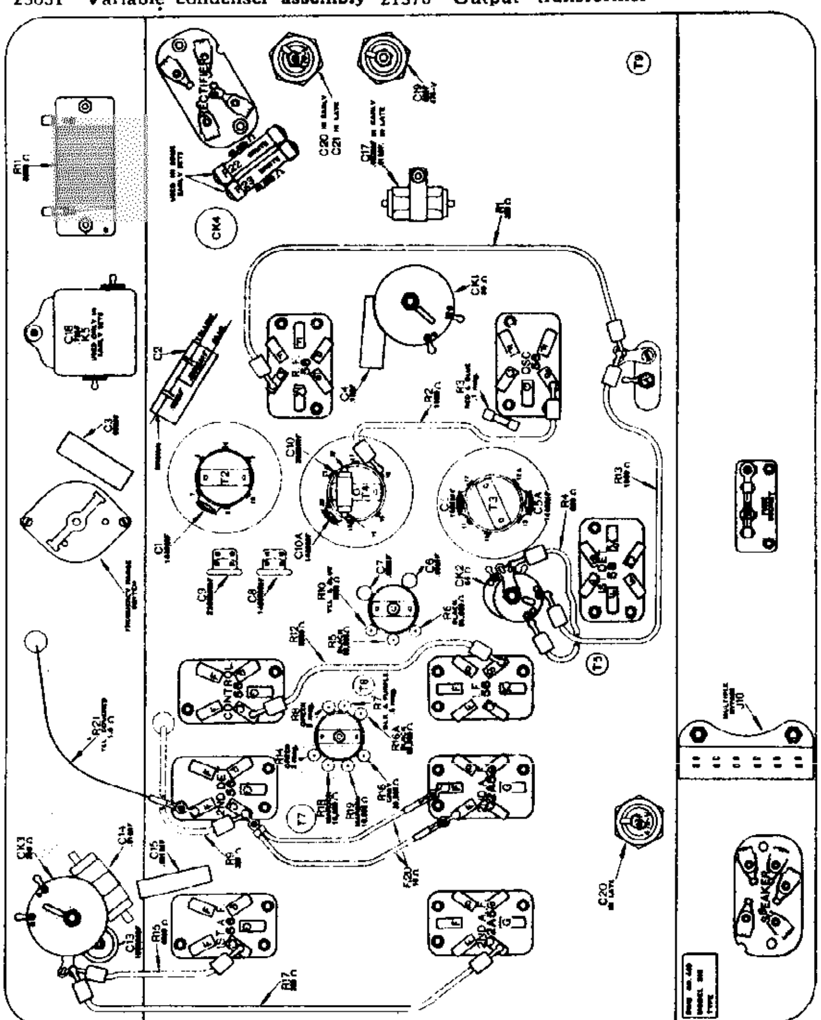


MODEL 310 and MODEL 510

Part No.	Name of Part
25798	Volume control, .5 U
23031	Variable condenser assembly

310-510 SPEAKER No. 36500

Part No.	Name of Part
34630	Field coil (625 Ω)
20737	Diaphragm
20657	Cable and plug assembly
21370	Output transformer



TRANSFORMERS

Code No.	Part No.	Name of Part
T1	34540	No. 1 R. F. T.
T2	34550	No. 2 R. F. T.
T3	34560	No. 3 R. F. T.
T4	34570	Oscillator T.
T5	23356	No. 1 I. F. T.
T6	23975	No. 2 I. F. T.
T7	34980	Audio input T.
T8	21370	Audio output T.
T9	25875	Power transformer used in 310 below 7750943* in 510 below 2564911*
T9	26395	Power transformer used in 310 above 7750942 in 510 above 2564910

* In a few early type sets, the power transformer is a sealed type No. 26154.

RESISTORS

Code No.	Part No.	Name of Part
R1	20050	Flexible, 355 Ω
R2	16320	Flexible, 1050 Ω
R3	30340	Blue-red, .1 U, 1/3-W.
R4	23780	Flexible, 550 Ω
R5	21040	Bl'k, 65,000 Ω, ½-W.
R6	21040	Bl'k, 65,000 Ω, ½-W.
R7	20930	Bl'k-pur., .5 U, ½-W.
R8	20940	Green, 2 U, ½-W.
R9	20050	Flexible, 355 Ω
R10	28050	Yel.-blue, 5000 Ω, ½-W.
R11	20150	Flat, wire wound, 8000 Ω
R12	24340	Flexible, 8000 Ω
R13	16320	Flexible, 1050 Ω
R14	20940	Green, 2 U, ½-W.
R15	24470	Flexible, 4000 Ω
R16	20970	Gray, 30,000 Ω, ½-W.
R16A	21040	Bl'k, 65,000 Ω, ½-W.
R17	25950	Flexible, 200 Ω
R18	20950	Maroon, 10,000 Ω, ½-W.
R19	20950	Maroon, 10,000 Ω, ½-W.
R20	17077	Filament shunt, 10 Ω
R21	31860	Flexible, 1.0 Ω
R22	28750	White, 40,000 Ω, 1½-W.
R23	28750	White, 40,000 Ω, 1½-W.

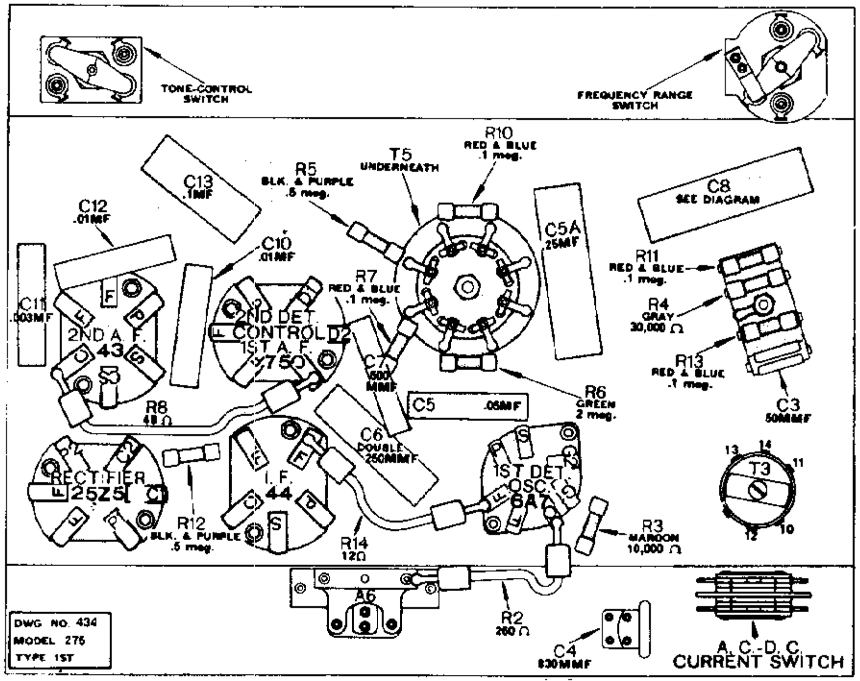
CONDENSERS

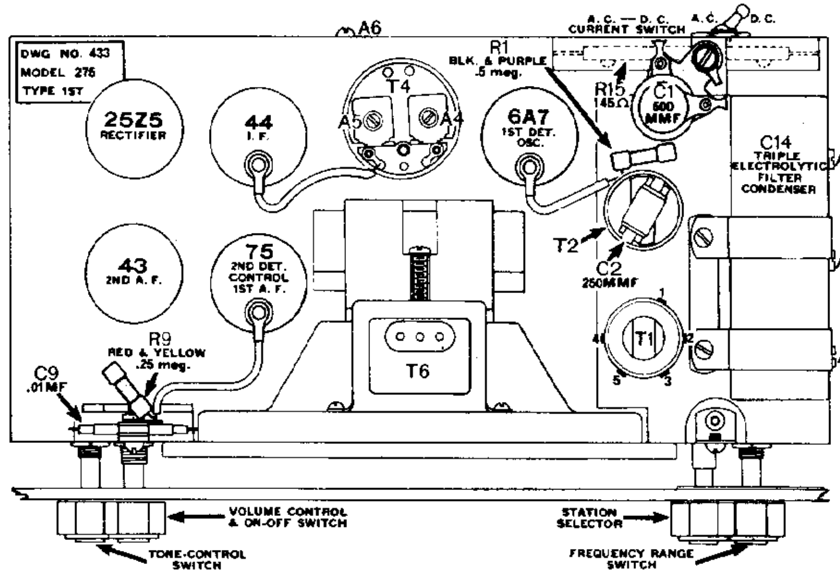
Code No.	Part No.	Name of Part
C1	36280	14 MMF, 500-V.
C2	34020	.05 and 250 MMF, 200-V., NI
C3	31160	.05 MF, 100-V., NI
C4	31530	.1 MF, 100-V., NI
C5	34460	10 MMF, 500-V.
C5A	36280	14 MMF, 500-V.
C6	31160	.05 MF, 100-V., NI
C7	31160	.05 MF, 100-V., NI
C8	34670	1450 MMF, 100-V.
C9	34680	2200 MMF, 100-V.
C10	33930	25 MMF, 500-V.
C10A	35970	14 MMF, 500-V.
C11	33670	250 MMF
C12	33670	250 MMF
C13	22220	100 MMF, 450-V.
C14	23250	.01 MF, 450-V.
C15	33640	.001 MF, 450-V.
C16	16490	B-6, 100-V.
C17	32740	.003 MF, 500-V. (early)
C17	23250	.01 MF, 450-V. (late)
C18	26620	.7 MF, 450-V. (K5)
C19	22538	8 MF, 475-V.
C20	22538	8 MF, 475-V.
C21	22538	8 MF; 475-V.
	30720	Multiple bypass, 200-V. (J10)

CHOKES

Code No.	Part No.	Name of Part
CK1	17015	R. F. plate choke
CK2	19210	1st detector choke
CK3	17390	2nd detector plate choke
CK4	26970	Filter choke unit used in 310 below 7750943 and 510 below 2564911
	36170	Filter choke unit used in 310 above 7750942 and 510 above 2564910

ATWATER-KENT MFG. CO.





MODEL 275

Part No.	Name of Part
25798	Volume control, .5 U
26443	Cabinet complete
26444	Cloth screen
25865	Escutcheon window
25936	Escutcheon name plate
25814	Knob (volume and tuning)
25738	Knob (tone and range)
26283	Dial plate
24892	A. C.-D. C. switch
35560	Range switch
35630	Tone control switch
25022	Variable condenser

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	35450	No. 1 R. F. T.
T2	35460	No. 2 R. F. T.
T3	35470	Oscillator T.
T4	26326	No. 1 I. F. T.
T5	35910	No. 2 I. F. T.
T6	26501	Output A. F. T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30350	Bl'k-pur., .5 U, 1/3-W.
R2	31830	Flexible, 250 Ω
R3	30320	Mar'n, 10,000 Ω, 1/3-W.
R4	31840	Gray, 30,000 Ω, 1/3-W.
R5	30350	Bl'k-pur., .5 U, 1/3-W.
R6	30370	Green, 2U, 1/3-W.
R7	30340	Red-blue, .1 U, 1/3-W.
R8	19820	Flexible, 48 Ω
R9	31970	Red-yel., .25 U, 1/3-W.
R10	30340	Red-blue, .1 U, 1/3-W.
R11	30340	Red-blue, .1 U, 1/3-W.
R12	30350	Bl'k-pur., .5 U, 1/3-W.
R13	30340	Red-blue, .1 U, 1/3-W.
R14	35820	Flexible, 12 Ω
R15	31690	Iron core, 145 Ω

CONDENSERS

Code No.	Part No.	Name of Part
C1	35590	500 MMF, 450-V.
C2	33570	250 MMF, 500-V.
C3	35840	50 MMF, 500-V.
C4	35990	830 MMF, 100-V.
C5	31160	.05 MF, 100-V., NI
C5A	35930	.25 MF, 200-V., NI
C6	33630	Double 250 MMF, 450-V., IND.
C7	28130	500 MMF, 450-V., IND.
C8	35790	Multiple .05, .05, .05, .03, .1 and .2 MF, 100-V.
C9	23250	.01 MF, 450-V.
C10	27630	.01 MF, 200-V., IND.
C11	35760	.003 MF, 200-V., IND.
C12	27630	.01 MF, 200-V., IND.
C13	26660	.1 MF, 200-V., NI
C14	26158	Triple dry electrolytic 14, 8 and 8 MF

In some Model 275 sets, the oscillator grid trimmer A3 is not used.

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A4, 5	35650	Double I. F. trimmer
A6	35610	Single I. F. trimmer

SOCKETS

Part No.	Name of Part
26111	Socket (7 prong)
24494	Socket (6 prong)
24493	Socket (5 prong)

MISCELLANEOUS PARTS

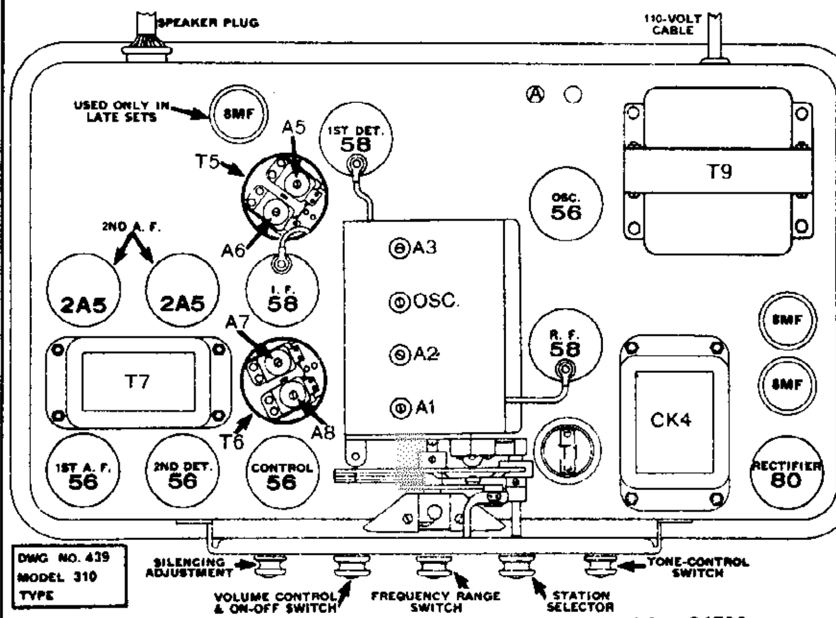
Part No.	Name of Part
26706	Vernier shaft
26707	Vernier cap
26708	Ball bearing
26709	Trimmer screw
26711	Trimmer washer
27133	Trimmer mica
26323	T4 shield
21878	Shield disc
24327	T5 shield
26137	T5 shield insulator
24727	Antenna lead and card
26059	Instruction and log card, F1097
26332	Shipping container
26284	Dial light socket
16099	Dial lamp, 6-V.
26451	Tube shield
26014	Top shield
26324	Base cover
26017	Back plate

SPEAKER

Part No.	Name of Part
26159	Speaker complete
25603	Diaphragm assembly
26501	Output transformer
26502	Field coil
26503	Choke coil (CK1)

MODEL 310, 510
Socket, Trimmer, Parts

ATWATER-KENT MFG. CO.

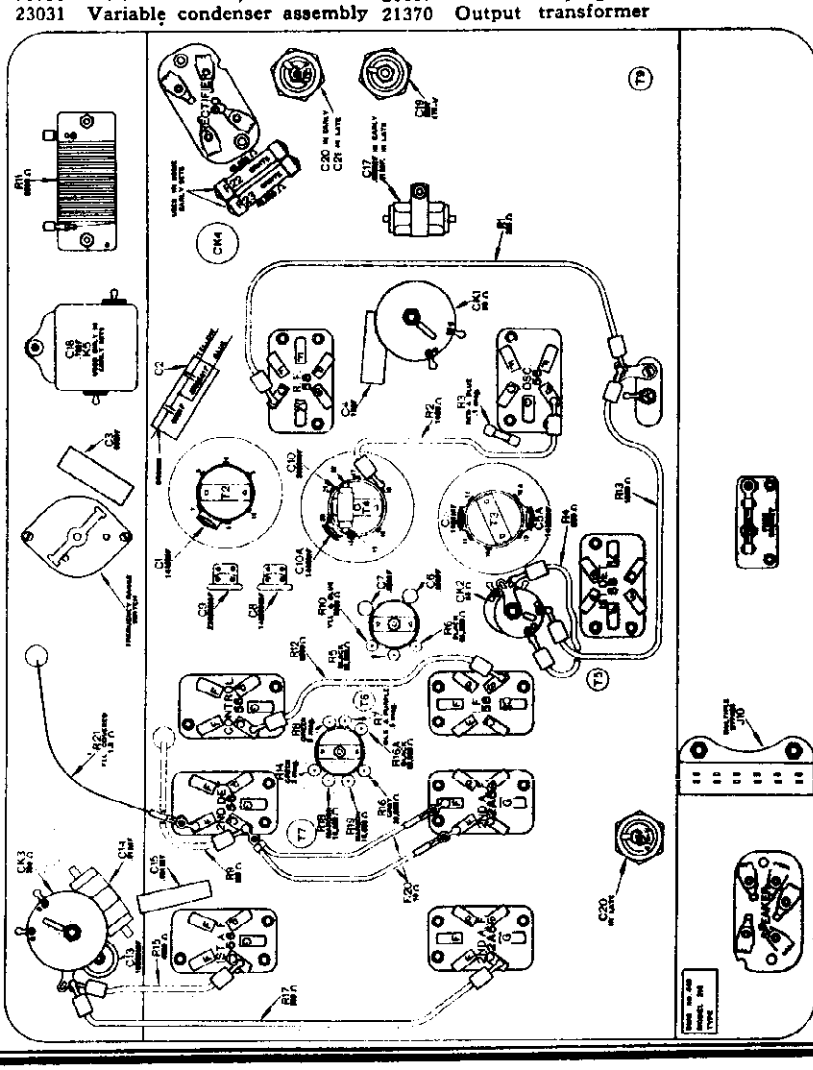


MODEL 310 and MODEL 510

Part No.	Name of Part
25798	Volume control, .5 U
23031	Variable condenser assembly

310-510 SPEAKER No. 36500

Part No.	Name of Part
34630	Field coil (625 Ω)
20737	Diaphragm
20657	Cable and plug assembly
21370	Output transformer



TRANSFORMERS

Code No.	Part No.	Name of Part
T1	34540	No. 1 R. F. T.
T2	34550	No. 2 R. F. T.
T3	34560	No. 3 R. F. T.
T4	34570	Oscillator T.
T5	23356	No. 1 I. F. T.
T6	23975	No. 2 I. F. T.
T7	34980	Audio input T.
T8	21370	Audio output T.
T9	25875	Power transformer used in 310 below 7750943* in 510 below 2564911*
T9	26395	Power transformer used in 310 above 7750942 in 510 above 2564910

* In a few early type sets, the power transformer is a sealed type No. 26154.

RESISTORS

Code No.	Part No.	Name of Part
R1	20050	Flexible, 355 Ω
R2	16320	Flexible, 1050 Ω
R3	30340	Blue-red, .1 U, 1/3-W.
R4	23780	Flexible, 550 Ω
R5	21040	Bl'k, 65,000 Ω, ½-W.
R6	21040	Bl'k, 65,000 Ω, ½-W.
R7	20930	Bl'k-pur., .5 U, ½-W.
R8	20940	Green, 2 U, ½-W.
R9	20050	Flexible, 355 Ω
R10	28050	Yel.-blue, 5000 Ω, ½-W.
R11	20150	Flat, wire wound, 8000 Ω
R12	24340	Flexible, 8000 Ω
R13	16320	Flexible, 1050 Ω
R14	20940	Green, 2 U, ½-W.
R15	24470	Flexible, 4000 Ω
R16	20970	Gray, 30,000 Ω, ½-W.
R16A	21040	Bl'k, 65,000 Ω, ½-W.
R17	25950	Flexible, 200 Ω
R18	20950	Maroon, 10,000 Ω, ½-W.
R19	20950	Maroon, 10,000 Ω, ½-W.
R20	17077	Filament shunt, 10 Ω
R21	31860	Flexible, 1.0 Ω
R22	28750	White, 40,000 Ω, 1½-W.
R23	28750	White, 40,000 Ω, 1½-W.

CONDENSERS

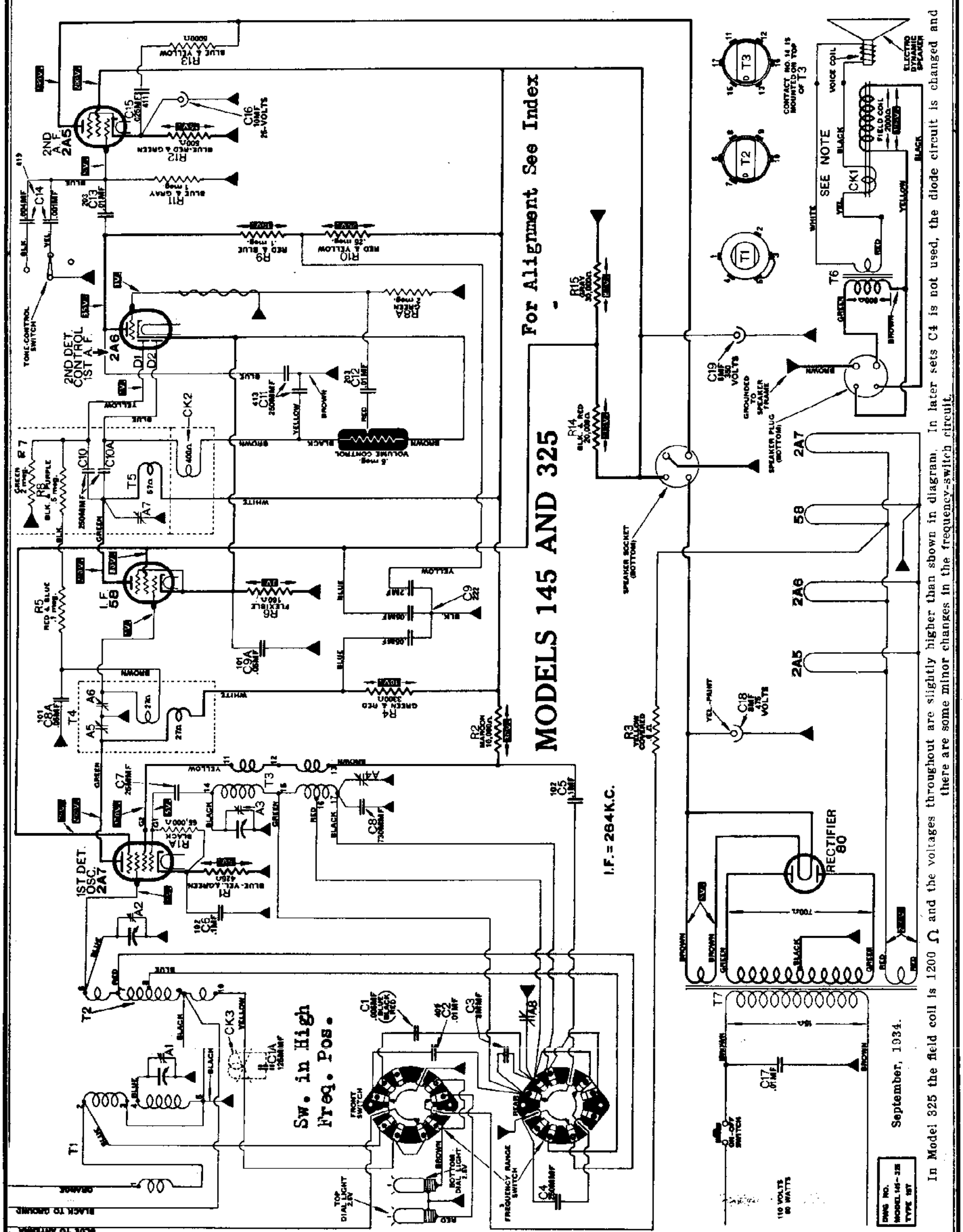
Code No.	Part No.	Name of Part
C1	36280	14 MMF, 500-V.
C2	34020	.05 and 250 MMF, 200-V., NI
C3	31160	.05 MF, 100-V., NI
C4	31530	.1 MF, 100-V., NI
C5	34460	10 MMF, 500-V.
C5A	36280	14 MMF, 500-V.
C6	31160	.05 MF, 100-V., NI
C7	31160	.05 MF, 100-V., NI
C8	34670	1450 MMF, 100-V.
C9	34680	2200 MMF, 100-V.
C10	33930	25 MMF, 500-V.
C10A	35970	14 MMF, 500-V.
C11	33670	250 MMF
C12	33670	250 MMF
C13	22220	100 MMF, 450-V.
C14	23250	.01 MF, 450-V.
C15	33640	.001 MF, 450-V.
C16	16490	B-6, 100-V.
C17	32740	.003 MF, 500-V. (early)
C17	23250	.01 MF, 450-V. (late)
C18	26620	.7 MF, 450-V. (K5)
C19	22538	8 MF, 475-V.
C20	22538	8 MF, 475-V.
C21	22538	8 MF, 475-V.
	30720	Multiple bypass, 200-V. (J10)

CHOKES

Code No.	Part No.	Name of Part
CK1	17015	R. F. plate choke
CK2	19210	1st detector choke
CK3	17390	2nd detector plate choke
CK4	26970	Filter choke unit used in 310 below 7750943 and 510 below 2564911
	36170	Filter choke unit used in 310 above 7750942 and 510 above 2564910

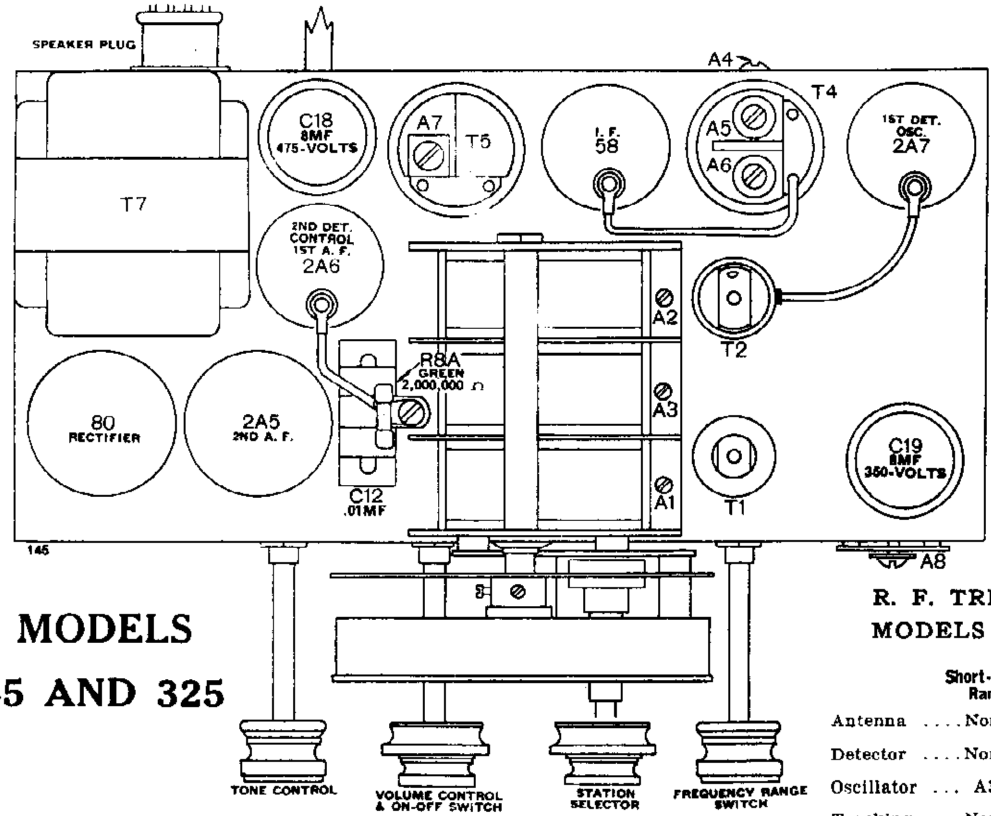
ATWATER-KENT MFG. CO.

MODEL 145,325
Schematic



MODEL 145,325
Socket,Trimmer,Chassis

ATWATER-KENT MFG. CO.



September, 1934.

MODELS 145 AND 325

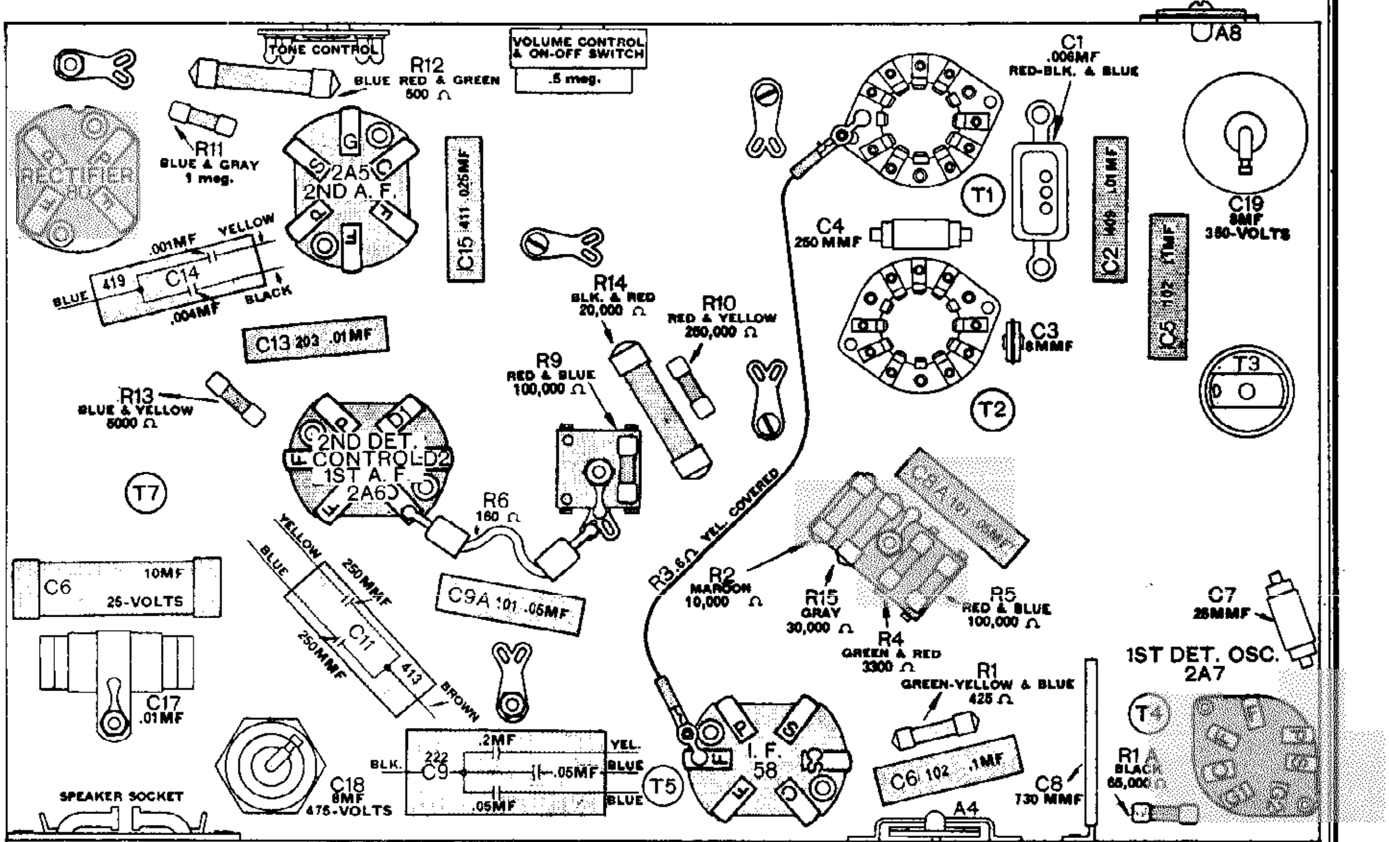
(I. F. = 264 KC.)

For Alignment Data and Parts List, see Index

R. F. TRIMMERS ON MODELS 145 AND 325

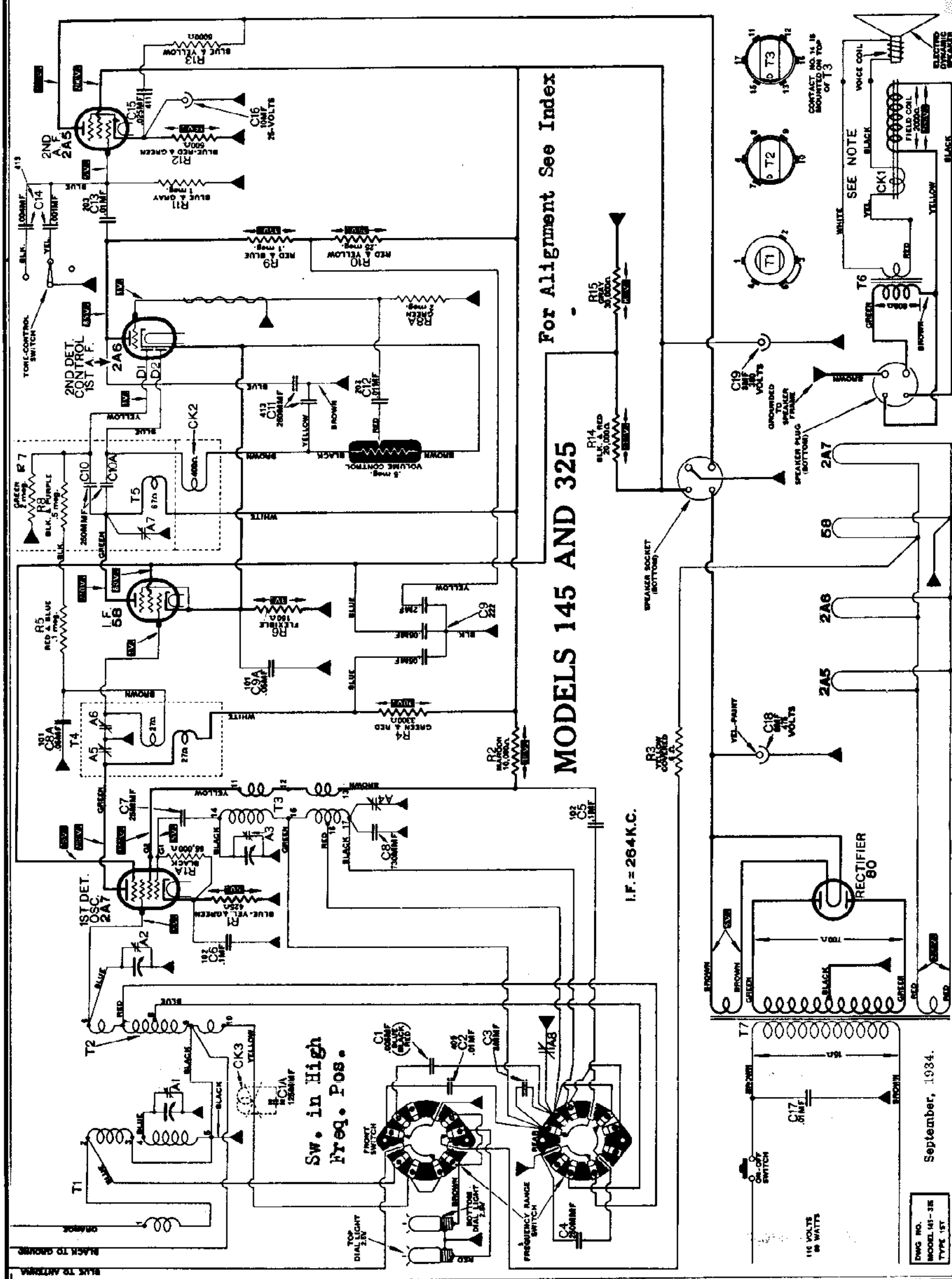
	Short-Wave Range	Police Range	Broadcast Range
Antenna	None	None	A1
Detector	None	None	A2
Oscillator	A3	None	A8
Tracking	None	None	A4

The I. F. trimmers are A5, A6 and A7.



ATWATER-KENT MFG. CO.

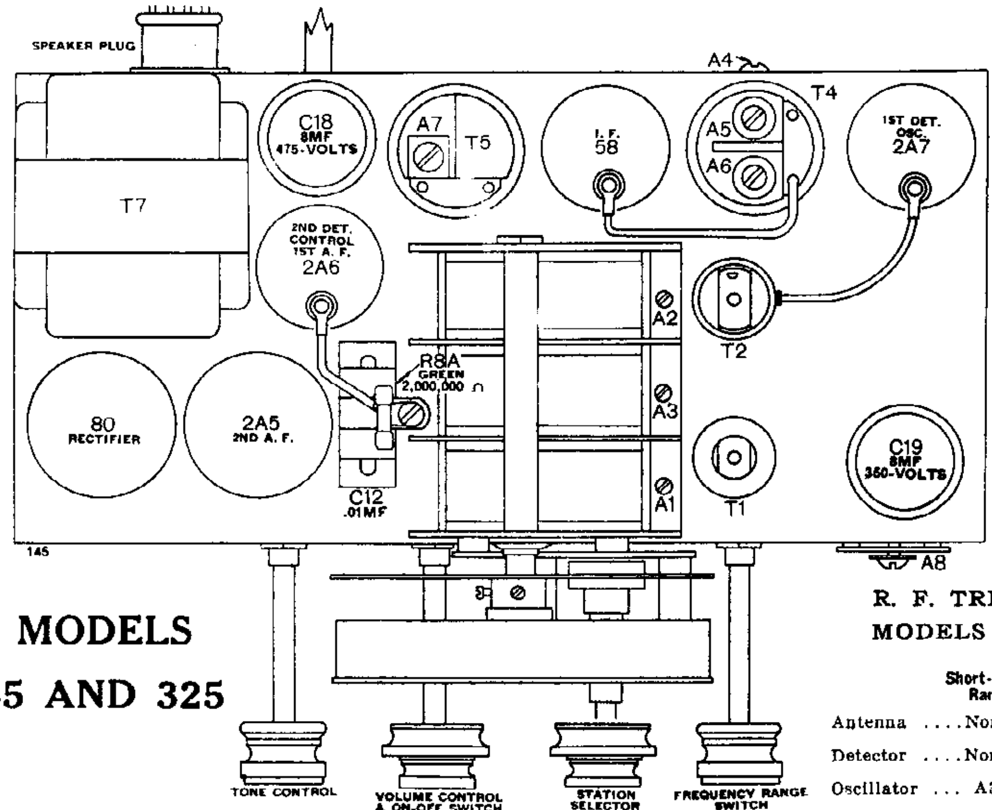
MODEL 145,325
Schematic



In Model 325 the field coil is 1200 Ω and the voltages throughout are slightly higher than shown in diagram. In later sets C4 is not used, the diode circuit is changed and there are some minor changes in the frequency-switch circuit.

MODEL 145,325
Socket,Trimmer,Chassis

ATWATER-KENT MFG. CO.



September, 1934.

MODELS 145 AND 325

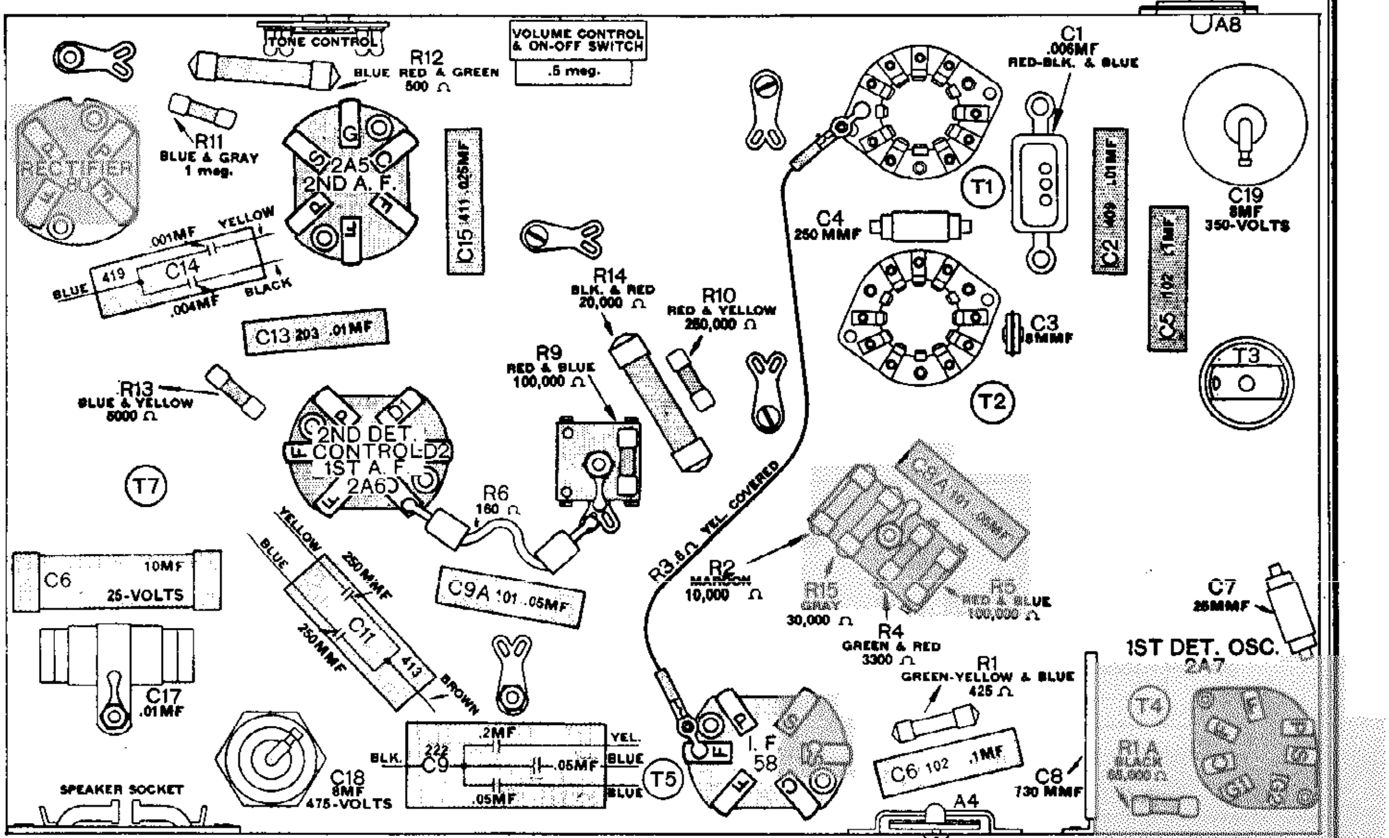
(I. F. = 264 KC.)

For Alignment Data and Parts List, see Index

R. F. TRIMMERS ON MODELS 145 AND 325

	Short-Wave Range	Police Range	Broadcast Range
Antenna	....None	None	A1
Detector	....None	None	A2
Oscillator	... A3	None	A8
Tracking	...None	None	A4

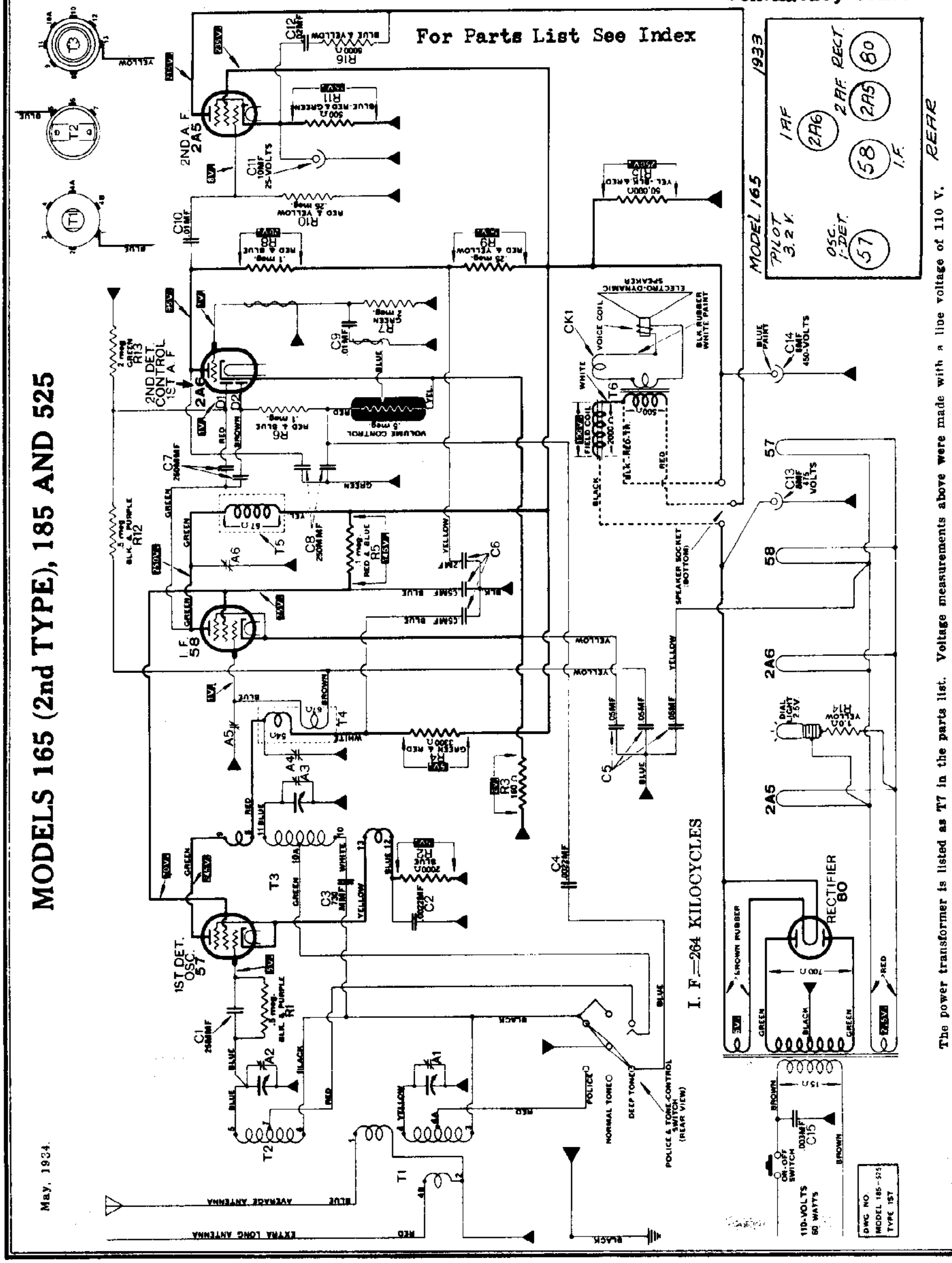
The I. F. trimmers are A5, A6 and A7.



ATWATER-KENT MFG. CO.

MODEL 165 (2nd), 185
and 525
Schematic, Socket

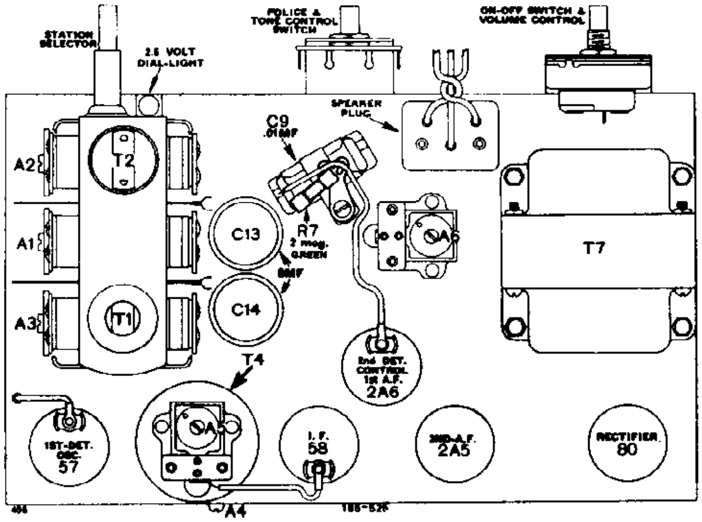
For Parts List See Index

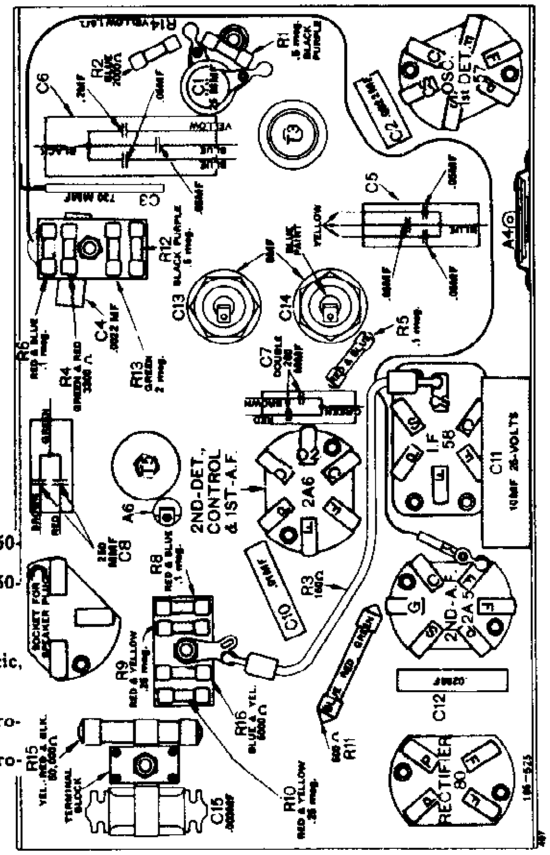


The power transformer is listed as T7 in the parts list. Voltage measurements above were made with a line voltage of 110 V.

MODEL 165 (2nd), 185
and 525
Socket, Trimmer, Parts

ATWATER-KENT MFG. CO.





2nd TYPE MODEL 165

Part No.	Name of Part
25309	Cabinet complete
24293	Volume control, .5 U
25022	Variable condenser
25312	Police and tone control switch complete
25311	Switch base complete
25226	Switch shaft and blade
24278	Knob volume and tuning
25145	Knob—tone
15404	Dial lamp, 2.5-V.

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	33820	No. 1 R. F. T.
T2	32440	No. 2 R. F. T.
T3	32450	Osc. T.
T4	32620	No. 1 I. F. T.
T5	32630	No. 2 I. F. T.
T6	21672	Output T.
T7	25191	Power T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30350	Bl'k-purple, .5 U, 1/3-W.
R2	33250	Blue, 2000 Ω, 1/3-W.
R3	28950	Flexible, 160 Ω
R4	30380	Red-green, 3300 Ω, 1/3-W.
R5	20980	Red-blue, .1 U, ½-W.
R6	30340	Red-blue, .1 U, 1/3-W.
R7	30370	Green, 2 U, 1/3-W.
R8	30340	Red-blue, .1 U, 1/3-W.
R9	31970	Red-yel., .25 U, 1/3-W.
R10	31970	Red-yel., .25 U, 1/3-W.
R11	32010	Blue-red-green, 500 Ω, 1-W.
R12	30350	Bl'k-purple, .5 U, 1/3-W.
R13	30370	Green, 2 U, 1/3-W.
R14	31860	Flexible, 1 Ω
R15	34340	Yel.-bl'k-red, 50,000 Ω, 1½-W.
R16	36430	Yel.-blue, 5000 Ω, 1/3-W.

CONDENSERS

Code No.	Part No.	Name of Part
C1	33650	25 MMF, 500-V.
C2	33660	.0022 MF, 450-V., IND.
C3	25638	730 MMF, 100-V.
C4	33660	.0022 MF, 450-V., IND
C5	32410	.05, .05 and .05 MF, 100-V., IND.
C6	32390	.05, .05 and .2 MF, 200-V., IND.
C7	33630	250 MMF (double), 450-V., IND.
C8	33630	250 MMF (double), 450-V., IND.
C9	23250	.01 MF, 450-V.
C10	27630	.01 MF, 200-V., IND.
C11	25379	10 MF, dry electrolytic, 25-V.
C12	33660	.02 MF, 200-V., IND.
C13	25168	8 MF, 475-V., electrolytic
C14	26381	8 MF, 450-V., electrolytic (blue)
C15	32740	.003 MF, 500-V.

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A4	24495	Single I. F.
A5	24554	Single I. F. (includes I. F. shield)
A6	33080	Single I. F.

SOCKETS

Part No.	Name of Part
25196	Speaker
24492	Rectifier
24494	Small 6 prong (3 used)
22733	Large 6 prong (1 used)

MISCELLANEOUS

Part No.	Name of Part
25194	Cloth screen
25213	Cabinet feet
24323	Power T. cover (2 used)
24554	I. F. shield and trimmer, A5
19566	110-V. cable and plug
24549	Dial assembly
25745	Name decalcomania
25965	Tone decalcomania
26706	Vernier shaft
26707	Vernier cap
26708	Ball bearing
26709	Trimmer screw
26711	Trimmer washer
27133	Trimmer mica
22683	Tube shield
26671	Instruction and log card, F1109
25189	Shipping container

165-185 SPEAKER No. 34100

Part No.	Name of Part
18870	Field coil (2000 Ω)
21672	Output T.—(T6)
21161	Diaphragm
25179	Cable and plug
25308	Speaker plug (3 prong)
23657	Choke (CK1)

MODEL 185

(For parts not listed below refer to Model 165)

Part No.	Name of Part
26702	Cabinet
26602	Screen
25865	Dial window
26544	Escutcheon name plate
36580	Tone control switch complete
25814	Knob (volume and tuning)
25738	Knob (tone)
26481	Tone decalcomania
26618	Shipping container

MODEL 525

(For parts not listed below refer to Model 165)

Part No.	Name of Part
26565	Variable condenser
27305	Knob shaft
26519	Dial assembly
26569	Knob (volume and tuning)
26571	Knob (tone)
26545	Escutcheon name plate
25691	Dial window
26564	Volume control, .5 U
36590	Tone control switch complete
26669	Shipping container

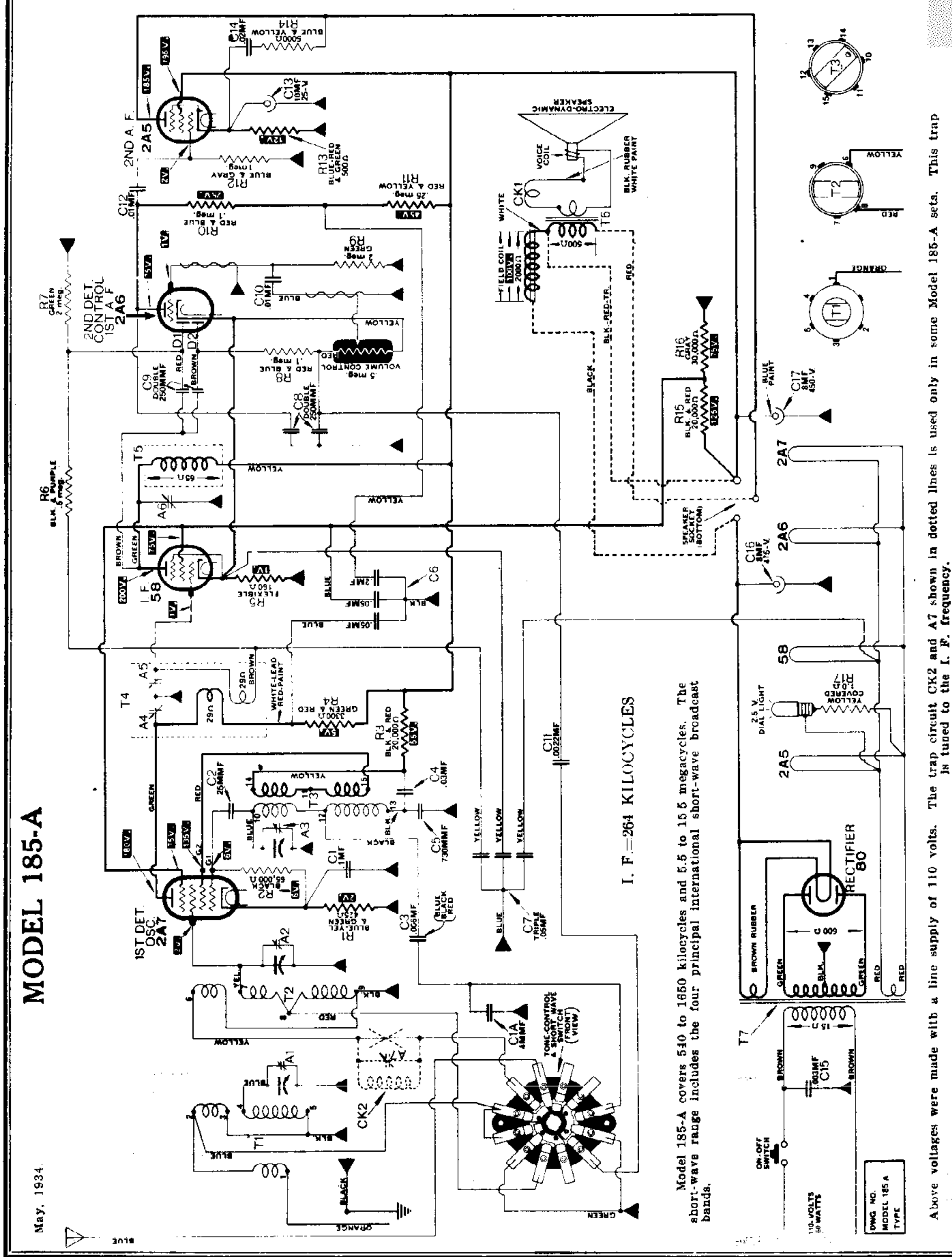
525 SPEAKER No. 38500

Part No.	Name of Part
18870	Field coil (2000 Ω)
21672	Output T.—(T6)
19465	Diaphragm
25179	Cable and plug
25308	Speaker plug (3 prong)

Ω ohms. U megohms. IND.—inductive. NI.—non-inductive. W.= watt.

ATWATER-KENT MFG. CO.

MODEL 185-A
Schematic

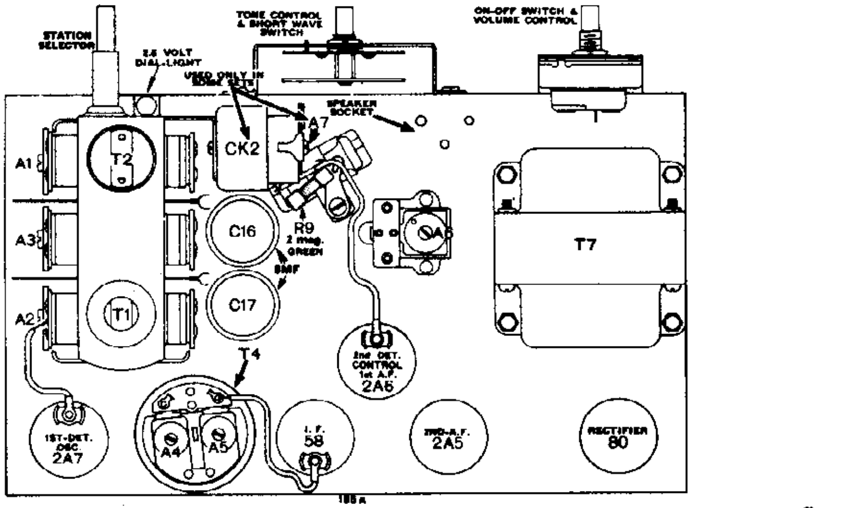


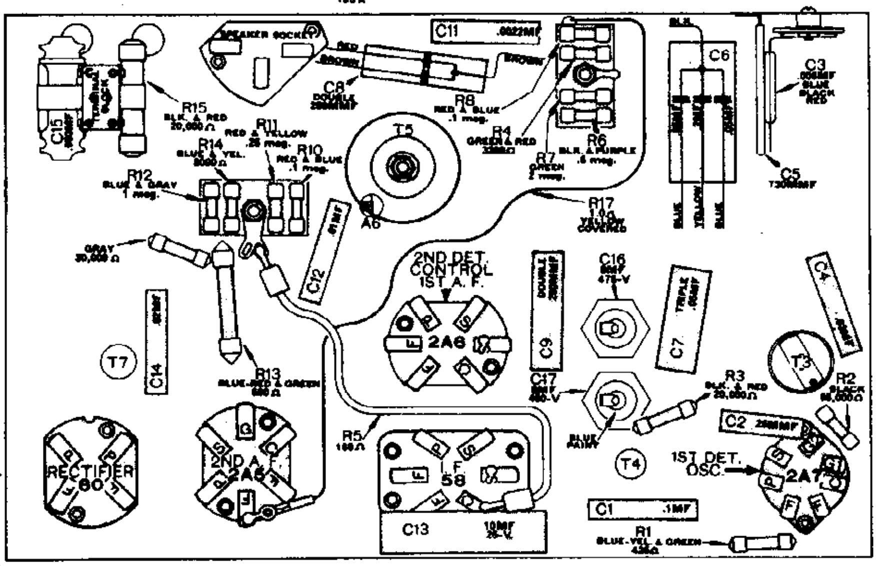
Model 185-A covers 540 to 1650 kilocycles and 5.5 to 15.5 megacycles. The short-wave range includes the four principal international short-wave broadcast bands.

Above voltages were made with a line supply of 110 volts. The trap circuit CK2 and A7 shown in dotted lines is used only in some Model 185-A sets. This trap is tuned to the I. F. frequency.

MODEL 185-A
Socket, Trimmer, Parts

ATWATER-KENT MFG. CO.





The 30,000 ohm resistor (gray) in the center left-hand side of this chart is R16.

MODEL 185-A

Part No.	Name of Part
27218	Cabinet less screen
26602	Screen
27186	Escutcheon name plate
25737	Knob—tuning and volume
25738	Knob—tone and range
24293	Volume control, .5 U
25022	Variable condenser assembly
27124	Tone and range switch complete
27127	Insulator for above
27122	Mounting bracket
20093	Nut

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	38120	No. 1 R. F. T.
T2	38130	No. 2 R. F. T.
T3	38140	Oscillator T.
T4	27196	No. 1 I. F. T.
T5	32630	No. 2 I. F. T.
T6	21672	Output T.
T7	25191	Power T.

RESISTORS

Code No.	Part No.	Name of Part
R1	37540	Blue-yel.-green, 425 Ω, ½-W.
R2	31980	Bl'k, 65,000 Ω, 1/3-W.
R3	23120	Red-bl'k, 20,000 Ω, ½-W.
R4	30380	Green-red, 3300 Ω, 1/3-W.
R5	28950	Flexible, 160 Ω
R6	30350	Bl'k-purple, .5 U, 1/3-W.
R7	30370	Green, 2 U, 1/3-W.
R8	30340	Red-blue, .1 U, 1/3-W.
R9	30370	Green, 2 U, 1/3-W.
R10	30340	Red-blue, .1 U, 1/3-W.
R11	31970	Red-yel., .25 U, 1/3-W.
R12	30360	Blue-gray, 1 U, 1/3-W.
R13	32010	Blue-red-green, 500 Ω, 1-W.
R14	36430	Blue-yel., 5000 Ω, 1/3-W.
R15	28030	Bl'k-red, 20,000 Ω, 1½-W.
R16	20970	Gray, 30,000 Ω, ½-W.
R17	31860	Flexible (yel. covered), 1.0 Ω

CONDENSERS

Code No.	Part No.	Name of Part
C1	31530	.1 MF, 100-V., NI
C1A	38280	4 MMF, 500-V.
C2	38070	25 MMF, 500-V.
C3	25035	.006 MF, 450-V.
C4	29530	.03 MF, 200-V., NI
C5	28060	730 MMF, 100-V.
C6	32390	.05, .05, .2 MF, 200-V., IND.
C7	32410	Triple .05 MF, 100-V., IND.
C8	33630	Double 250 MMF, 450-V., IND.
C9	33630	Double 250 MMF, 450-V., IND.
C10	23250	.01 MF, 450-V.
C11	33660	.0022 MF, 450-V., IND.
C12	27630	.01 MF, 200-V., IND.
C13	25379	10 MF, 25-V. (dry electrolytic)
C14	36420	.02 MF, 200-V., IND.
C15	32740	.003 MF, 500-V.
C16	25168	8 MF, 475-V. (electrolytic)
C17	26381	8 MF, 450-V. (blue) (electrolytic)

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A4, 5	32880	Double I. F.
A6	33080	Single I. F.
A7	38180	Trap trimmer (used only in some models)

CHOKES

Code No.	Part No.	Name of Part
CK1	23657	Choke on speaker
CK2	27324	Trap choke (used only in some models)

SOCKETS

Part No.	Name of Part
26111	7 prong
25196	Speaker
24492	Rectifier
24494	Small 6 prong (2 used)
22733	Large 6 prong

MISCELLANEOUS

Part No.	Name of Part
27088	Tone decalcomania
24327	Shield for T5
25056	Shield for T4
24323	Power T. cover (2 used)
24327	Wave trap shield (A7)
27182	Dial assembly
15404	Pilot lamp, 2.5-V.
27179	Tuning tag, F-1135
27113	Instruction folder, F-1134
26618	Shipping container

185-A SPEAKER No. 34100

Part No.	Name of Part
18870	Field coil (2000 Ω)
21672	Output T. (T6)
21161	Diaphragm
25179	Cable and plug
25308	Speaker plug (3 prong)
23657	Choke (CK1)

Ω=ohms. U=megohms. IND.=inductive.
NI=non-inductive. W.=watt.

ATWATER-KENT MFG. CO.

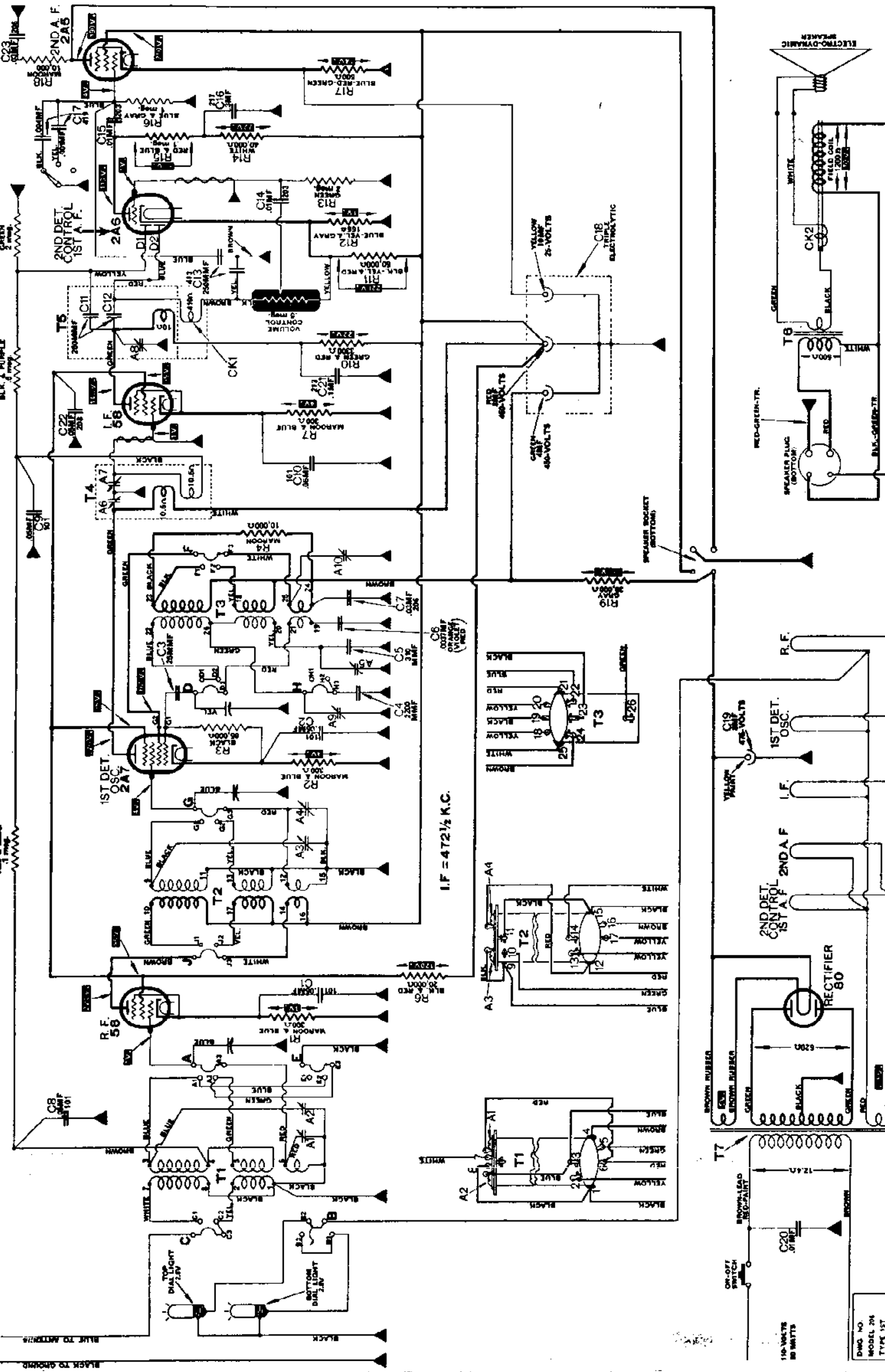
MODEL 206,376 (1st) Schematic

For Alignment See Index

September, 1934.

MODELS 206 AND 376 (1st TYPE)

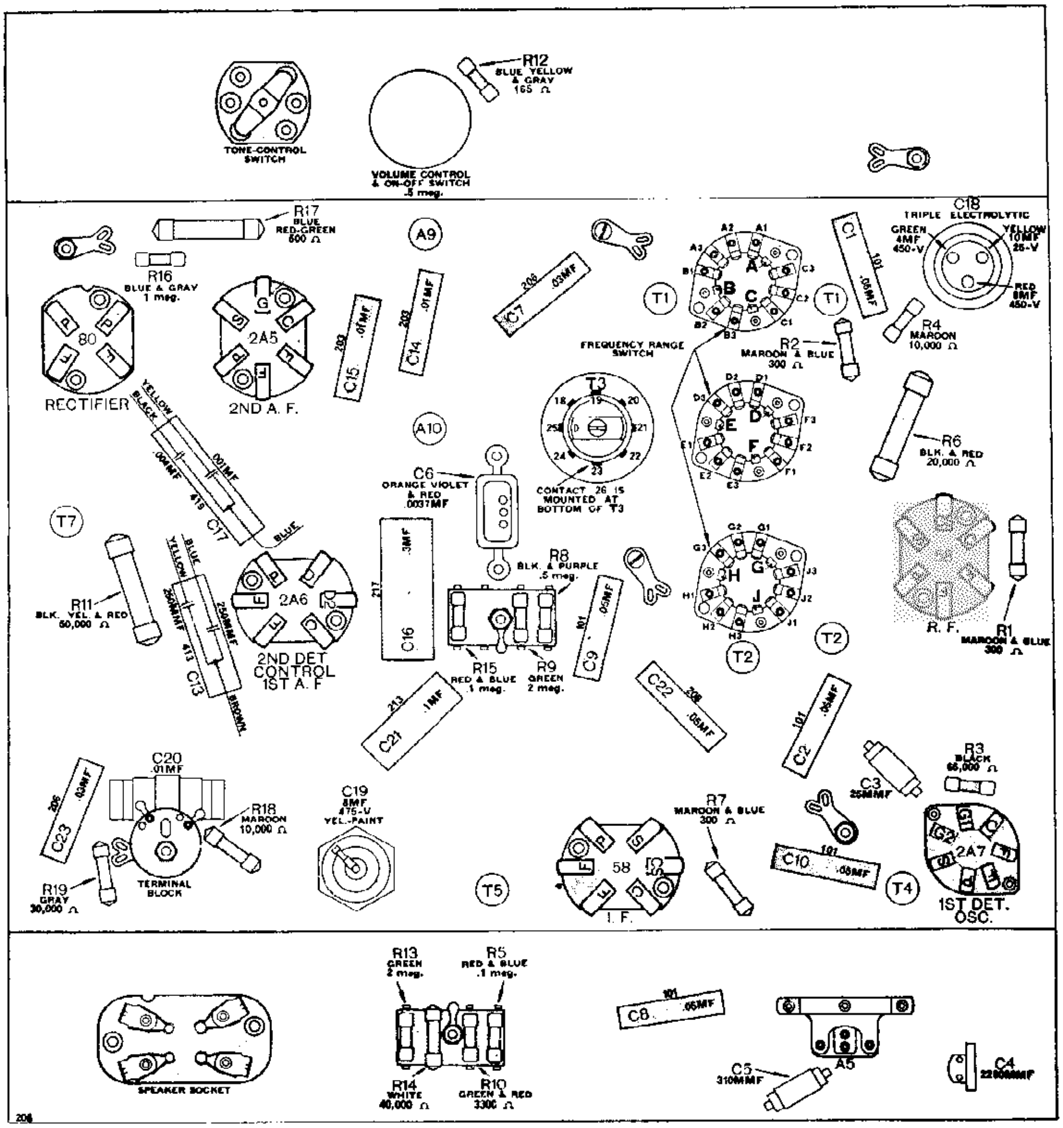
Switch in High-Frequency position.

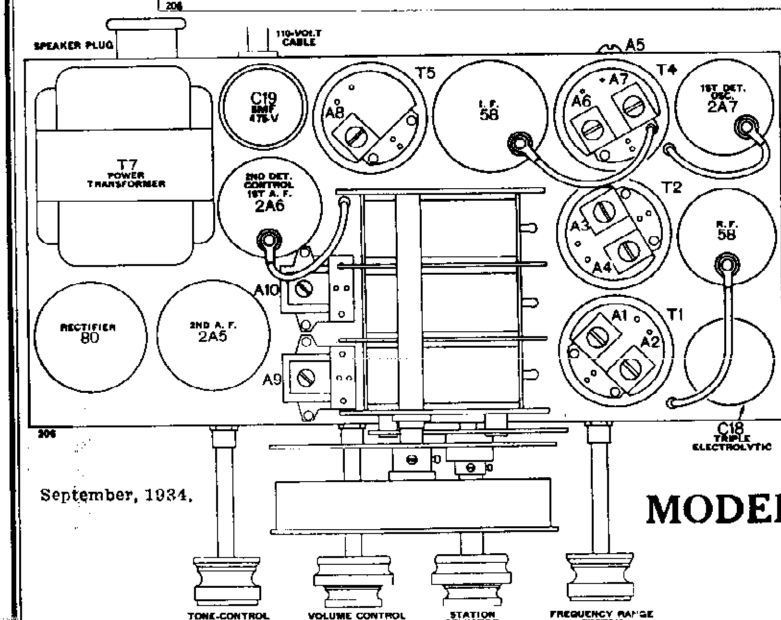


The 1st type of Models 206 and 376 have cylindrical I. F. transformer shields. The 2nd type has square I. F. shields and the circuit is different from that shown above.

MODEL 206,376 (1st)
Socket,Trimmer,Parts

ATWATER-KENT MFG. CO.





R. F. TRIMMERS ON MODELS 206 AND 376

	Short-Wave Range	Police Range	Broadcast Range
R. F.	A1	None	A2
1st-Detector	A4	None	A3
Oscillator	A10	None	A9
Tracking	None	None	A5

The I. F. trimmers are A6, A7 and A8.

For Alignment Data and Parts List, see Index

September, 1934.

MODELS 206 and 376 (1st TYPE)

ATWATER-KENT MFG. CO.

PARTS LIST

MODEL 206

28834	Cabinet less screen
27908	Screen
27944	Escutcheon and crystal assem.
27388	Crystal
27432	Var. cond. assem.
27692	Tuning gear
27514	Spacer
27959	Screw
28281	Front and back plate assem.
28594	Tuning shaft assem.
22657	Dial rubber
27574	Dial plate holder
27947	Dial pointer holder
27522	Dial pointer
27685	Dial plate
25377	Bushing under var. cond. assem.
28422	Plate under var. cond. assem.
24323	Power trans. cover
25056	I. F. T. shield (early)
27781	Osc. trans. shield
27543	R. F. T. shield
27887	R. F. T. shield insulator
40090	Pilot light assem.
27676	Pilot lamp, 2.5-V. (frosted)
27602	Range switch
25058	I. F. T. shield cover without hole
25059	I. F. T. shield cover with hole
25601	Rubber grommet
39620	Tone control switch assem.
28192	Shaft and blade for above
27425	Vol. control, .5 U
27559	Inst. folder, F-1146
27862	Shipping container

TRANSFORMERS

T1	40880	No. 1 R. F. T.
T2	41160	No. 2 R. F. T.
T3	41170	Oscillator T.
T4	*28161	No. 1 I. F. T. (EARLY)
T5	*28162	No. 2 I. F. T. (EARLY)
T6	21672	Output trans.
T7	28084	Power trans.

* Early style with cylindrical shield. In later sets No. 1 I. F. T. complete with trimmers and shield is No. 28527, No. 2 I. F. T. is No. 28528.

RESISTORS

(See table on page 19.)

CONDENSERS

(For tubular condensers see page 18.)

C3	33930	25 MMF, 500-V.
C4	40380	2200 MMF
C5	40390	360 MMF
C6	*27598	3700 MMF
C11	33670	250 MMF, 500-V.
C12	33670	250 MMF, 500-V.
C18	27592	4-8-10 MF
C19	22538	8 MF 475-V. (yel. paint)
C20	23250	.01 MF, line cond.

* In late sets C6 is No. 27593, 5700 MMF, green, violet and red.

TRIMMERS

A1-2	39430	On T1
A3-4	39430	On T2
A5	38890	Rear of chassis on bottom

MODEL 206 (Contd.)

A6-7	32880	On T4
A8	40610	On T5
A9	40450	Next to A10
A10	39630	Front of chassis alongside of var. cond.

CHOKES

CK1	28163	On No. 2 I. F. T.
CK2	25525	On speaker

206 SPEAKER No. 41900

25525	Choke (CK2)
28345	Cable and plug
15079	Plug
21672	Output trans. (T6)
19465	Diaphragm
21260	Field coil (1200 Ω)

MODEL 376

For parts not listed below refer to Model 206.

28517	Base plate
28531	Escutcheon and crystal
27559	Inst. sheet, F-1146
28756	Shipping container

376 SPEAKER No. 41800

25525	Choke (CK2)
21260	Field coil (1200 Ω).
20737	Diaphragm
20657	Cable and plug
18582	Plug
19469	Segment

MODEL 559

27287	Var. cond. assem.
25601	Rubber grommet
27301	Washer
22649	Screw
27286	Range switch
27272	Crank arm
35380	Reflector assem.
27958	Front panel assem.
27321	Vol. control, .5 U
27314	Vol. cont. mtg. bracket
25558	Vol. cont. cover
27289	Tone cont. switch
27317	Mtg. bracket for above
38740	Sensitivity switch assem.
27628	Shaft and blade for above
27472	Antenna jumper
25913	R. F. coil shield
25056	I. F. T. shield
26255	I. F. T. shield insul.
25058	I. F. T. shield cover without hole
25059	I. F. T. shield cover with hole
18534	Fuse
27057	Bottom cover
22683	Tube shield
23743	Aux. tube shield
27334	Tone cont. cond. clamp
27249	Mica for trimmers on strips
17109	Screw for above
17064	Insul. washer for above
27072	Station directory, F-1131
27545	Inst. folder, F-1143
27683	Shipping container

MODEL 559 (Contd.)

PARTS FOR TUNING ARRANGEMENT

27469	Dial gear
27276	Pointer arm
27254	Dial pointer
27332	Counter shaft gear (lge.)
27333	Idler gear (sml.)
27259	Gear screw
27957	Broadcast pinion gear
28116	Gear frame
27294	Tuning shaft
28016	Tuning bracket
27351	Screw (5/32" dia.)
27293	Detention spring
27298	Shaft spacer
27297	Bracket holding pin

TRANSFORMERS

T1	38310	No. 1 R. F. T., broadcast
T2	38340	No. 1 H. F., 1st range
T3	38360	No. 1 H. F., 2nd range
T4	38380	No. 1 H. F., 3rd range
T5	38320	No. 2 R. F. T., broadcast
T6	38330	Oscillator T., broadcast
T7	38350	No. 2 H. F., 1st range
T8	38370	No. 2 H. F., 2nd range
T9	38390	No. 2 H. F., 3rd range
T10	27448	No. 1 I. F. T.
T11	27449	No. 2 I. F. T.
T12	27451	No. 3 I. F. T.
T13	27452	No. 4 I. F. T.
T14	38610	A. F. input trans.
T15	21370	A. F. output trans.
T16	26395	Power trans.

RESISTORS

(For tubular resistors see page 19.)

R6	33230	Flexible, 2000 Ω
R7	33210	Flexible, 670 Ω
R17	33210	Flexible, 670 Ω
R21	24340	Flexible, 8000 Ω
R22	24340	Flexible, 8000 Ω
R24	25950	Flexible, 200 Ω
R26	17077	Flexible, 10 Ω
R27	31860	Dial light res., 1.0 Ω

CONDENSERS

(For tubular condensers see page 18.)

C6	22220	100 MMF, 450-V.
C7	25661	8 MMF, 500-V.
C8	25661	8 MMF, 500-V.
C9	27391	350 MMF (orange, green and brown)
C10	27389	1250 MMF (green, red and brown)
C11	34470	14 MMF, 500 V. (red paint)
C12	27392	4000 MMF (red, blk. and yel.)
C13	34470	14 MMF, 500-V. (red paint)
C25	39340	125 MMF
C26	39340	125 MMF
C27	35290	125 MMF
C36	23250	.01 MF, line cond., 450-V.
C37	22538	8 MF, 475-V.
C38	22538	8 MF, 475-V.
C39	22538	8 MF, 475-V.

MODEL 559 (Contd.)

CHOKES

CK1	17015	R. F. plate choke
CK2	19210	R. F. plate circuit choke
CK3	19210	1st det. plate circuit choke
CK4	19210	2nd I. F. plate circuit choke
CK5	19210	R. F. 1st I. F. screen choke
CK6	36180	B filter choke

TRIMMERS

28770	Single trimmer
32880	Double I. F. trimmer

SOCKETS

24494	6 prong (58)
22733	6 prong (2a5-55)
22689	4 prong
21337	5 prong
18449	Fuse

559 SPEAKER No. 36500

34630	Field coil (625 Ω)
20737	Diaphragm
20657	Cable and plug assem.
21370	Output trans.

MODEL 825

27731	Volume control, .5 U
28796	Cabinet complete
27902	Cloth screen
25865	Escutcheon window
27983	Escutcheon name plate
26283	Dial plate
24892	A. C.-D. C. switch
41050	Range switch
28805	Shaft and blade
41040	Tone control switch
28797	Shaft and blade
27593	Variable condenser

TRANSFORMERS

T1	35450	No. 1 R. F. T.
T2	35460	No. 2 R. F. T.
T3	35470	Oscillator T.
T4	26326	No. 1 I. F. T.
T5	35910	No. 2 I. F. T.
T6	26501	Output A. F. T.

RESISTORS

(For tubular resistors see page 19.)

R2	31830	Flexible, 250 Ω
R8	19820	Flexible, 48 Ω
R14	35820	Flexible, 12 Ω
R15	31690	Iron core, 145 Ω

CONDENSERS

(For tubular condensers see page 18.)

C1	35590	500 MMF, 450-V., mica
C2	33570	250 MMF, 500-V., mica

PARTS LIST

MODEL 825 (Contd.)

C3	35840	50 MMF, 500-V., mica
C4	35990	830 MMF, 100-V., mica
C9	23250	.01 MF, 450-V., paper
C14	26158	Triple dry electrolytic 14, 8 and 8 MF

TRIMMER CONDENSERS

A4, 5	35650	Double I. F. trimmer
A6	35610	Single I. F. trimmer

SOCKETS

26111	Socket (7 prong)
24494	Socket (6 prong)
24493	Socket (5 prong)

MISCELLANEOUS PARTS

26706	Vernier shaft
26707	Vernier cap
26708	Ball bearing
26709	Trimmer screw
26711	Trimmer washer
27133	Trimmer mica
26323	T4 shield
21878	Shield disc
24327	T5 shield
26137	T5 shield insulator
24727	Antenna lead and card
26284	Dial light socket
16099	Dial lamp, 6-V.
26451	Tube shield
26014	Top shield
26324	Base cover
26017	Back plate
27563	Instruction and log card, F1150
27866	Shipping container

SPEAKER

26159	Speaker complete
25603	Diaphragm assembly
26501	Output transformer
26502	Field coil
26503	Choke coil (CK1)

MODEL 944

28773	Cabinet, less screen
27892	Screen
25213	Foot
27487	Escutcheon name plate
27936	Dial window
27935	Dial assembly
27433	Var. cond. assem.
28089	Vernier cap
28091	Ball bearing
28092	Cap spring
28093	Spring retaining screw
28094	Tuning shaft

MODEL 944 (Contd.)

28095	Trimmer mica
25199	Pilot light socket and resistor
15404	Pilot lamp, 2.5 V.
24323	Power T. cover
28282	Side mounting angle plate
26312	C11 shield
27567	Vol. control, 20,000 Ω
27095	R. F. shield
27597	I. F. coil shield
27724	I. F. coil shield insulator
27631	Tall tube shield
26451	Short tube shield
25059	I. F. T. cover with hole
25029	Four (4) contact terminal block
28075	Eight (8) contact terminal block
27564	Instruction folder, F-1151
27851	Shipping container

TRANSFORMERS

T1	38990	No. 1 R. F. T.
T2	39010	Oscillator
T3	27486	No. 1 I. F. T.
T4	21672	Output T.
T5	25191	Power T.

RESISTORS

(For tubular resistors see page 19.)

R11	20050	Flexible, 355 Ω
R12	31860	Flexible, 1.0 Ω

CONDENSERS

(For tubular condensers see page 18.)

C3	33670	250 MMF, 500-V., mica
C4	35290	125 MMF
C11	22538	8 MF, yel. paint, 475-V.
C12	27584	4 MF, 350-V.
C14	23250	.01 MF, line cond.

TRIMMERS

A3	38660	I. F. plate trimmer
A4	36570	2nd detector trimmer
A5	39090	Rear of set

CHOKE

CK1	23657	On speaker

SOCKETS

24494	6 prong (1st det. and A. F.)
22733	6 prong (2nd det.)
24492	4 prong
25196	Speaker

944 SPEAKER No. 34100

18870	Field coil, 2,000 Ω
21672	Output trans. (T4)
21161	Diaphragm
25179	Cable and plug
25308	Plug (3 prong)
23657	Choke

Ω - ohms. U — megohms.

Doublet Antenna Data

ATWATER-KENT MFG. CO.

INSTRUCTIONS FOR CONNECTING DOUBLET ANTENNA TO RECEIVER

If the receiver is provided with doublet antenna connections (as on Atwater Kent Models 112, 318, 447, and 559), connect the transmission line as specified in the instructions for the set. (See Fig. 2.) **Do not forget to remove the jumper wire** which is used on these models between the ground terminal and one of the antenna terminals. This jumper is required when using a plain antenna, but is not used with a doublet.

On the Atwater Kent models just mentioned, the frequency-range switch on the set automatically changes the doublet to a plain antenna on the standard broadcast and police bands.

DOUBLET TRANSFORMER

For receivers which are not provided with doublet antenna connections, **it is necessary to use Atwater Kent Model "DT" Doublet Transformer,** part No. 28083. This transformer is not included in the Atwater Kent Type "D" doublet antenna kit, but can be purchased separately.

The Model "DT" doublet transformer has a convenient mounting bracket to permit mounting on the rear of cabinet. The transformer has four terminals which are clearly marked. The connections are shown in Fig. 3.

Model "DT" transformer has a two-position switch. **For short-wave broadcast reception, turn knob** on this switch so the dot is at "SW" (short wave).

For standard broadcast reception turn the knob so dot is at "BC" (broadcast).

IMPORTANT

In some cases, depending on local conditions, a better ratio of signal-to-noise may be obtained WITHOUT a ground connection to the receiver. Try it both ways, and if there is less electrical interference without the ground, leave the ground connection off. (Of course, this does not apply to the ground on the lightning arrestor, which must be connected as shown in the illustration.)

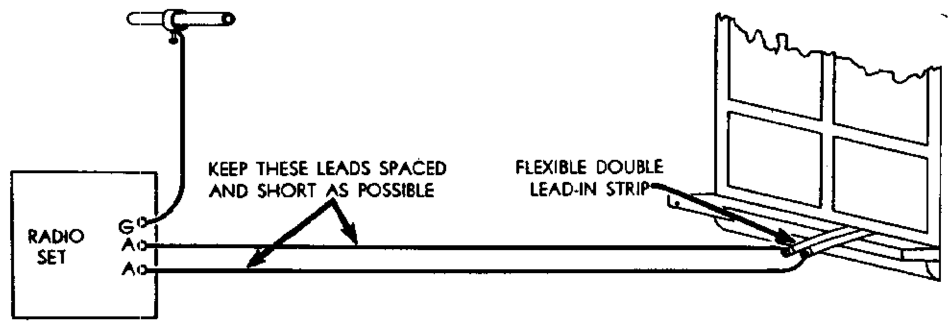


Fig. 2. How to connect the doublet transmission leads to receiver that is provided with doublet-antenna terminals, such as Atwater Kent Models 112, 318, 447, and 559. The leads to the set may be twisted for a distance of 2 or 3 feet without loss of signal strength.

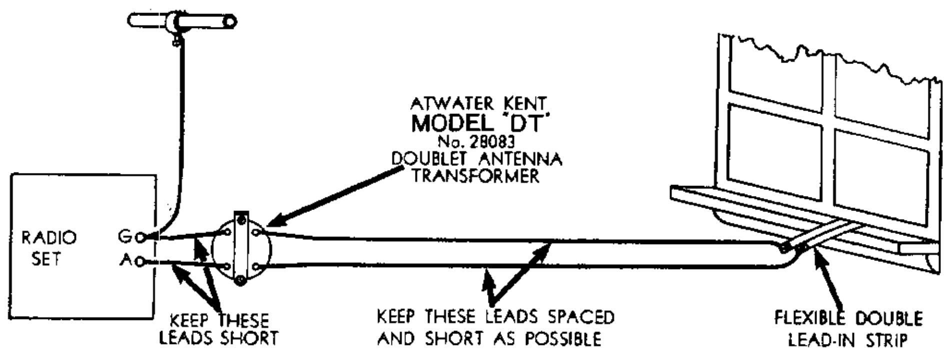
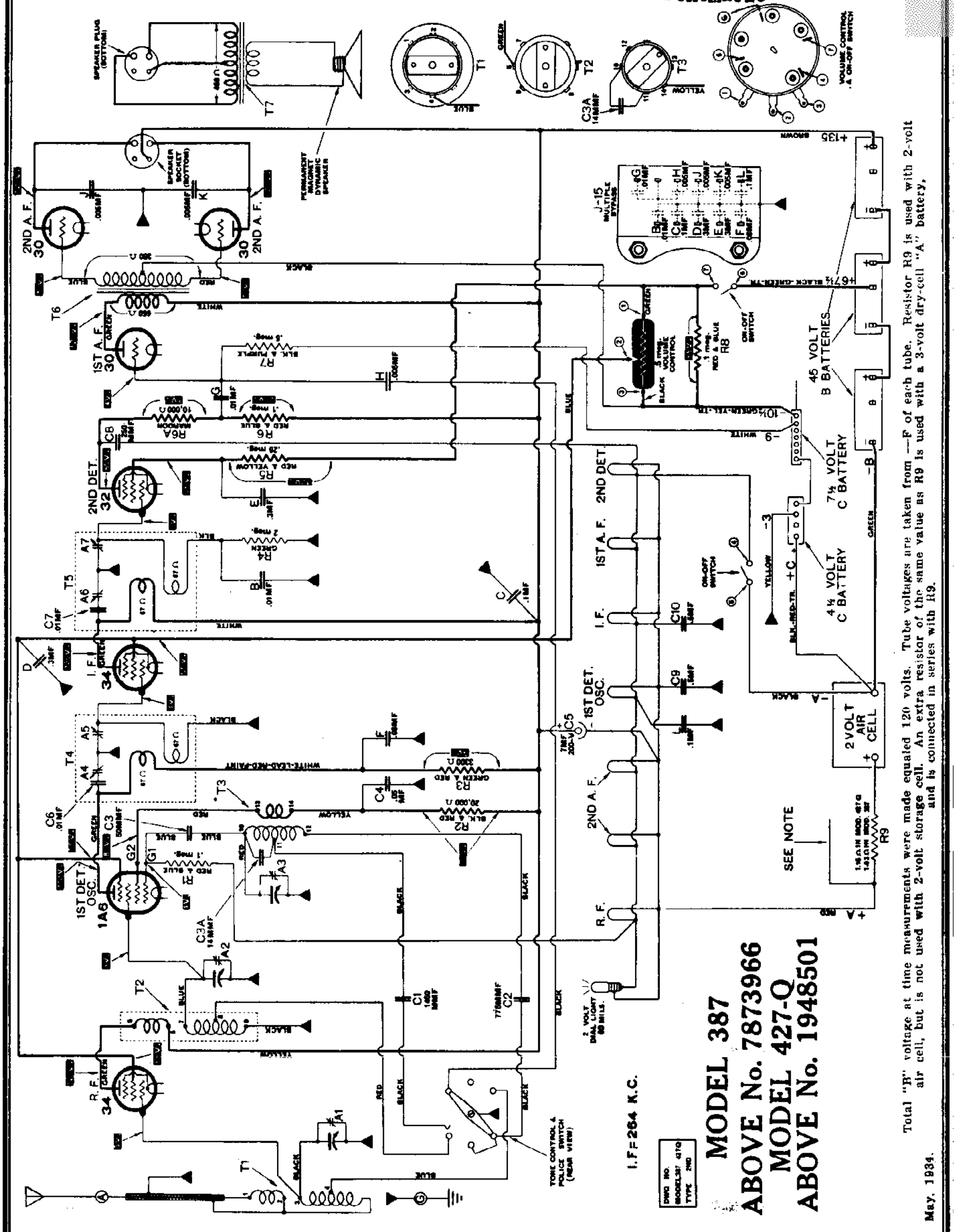


Fig. 3. For short-wave sets that are not provided for doublet-antenna connections, it is necessary to use Atwater Kent Model "DT" doublet transformer and connect it as shown in this drawing. The transformer has a bracket for attachment to the rear of cabinet, and a two-position switch to change from short-waves to standard broadcast.

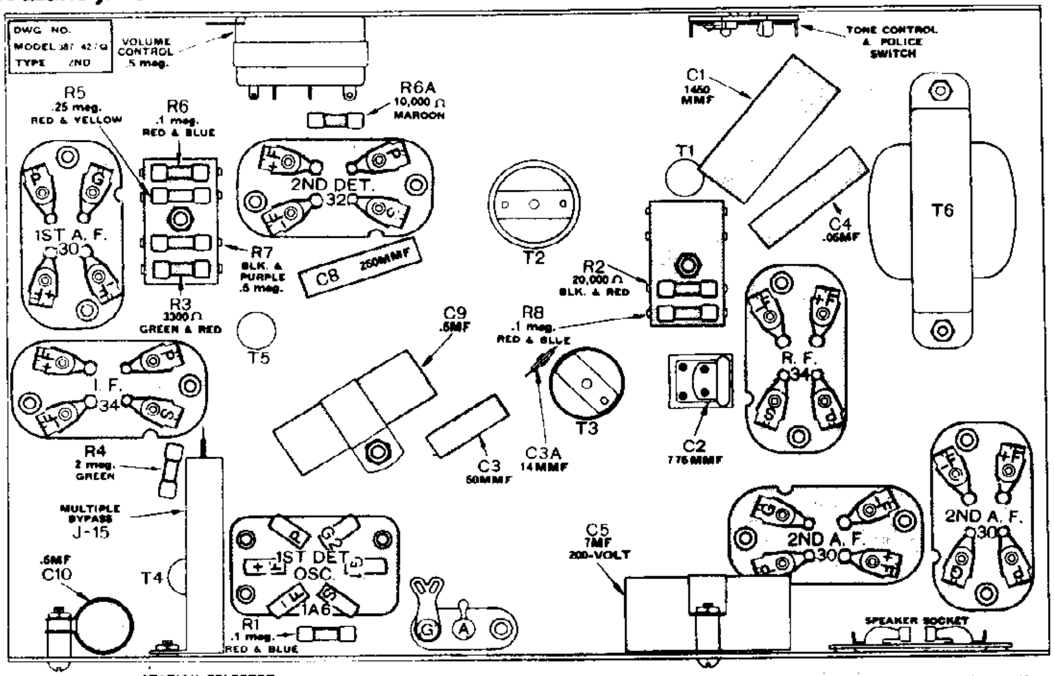
MODEL 387 Above 7873966
MODEL 427Q Above 1948501
Schematic

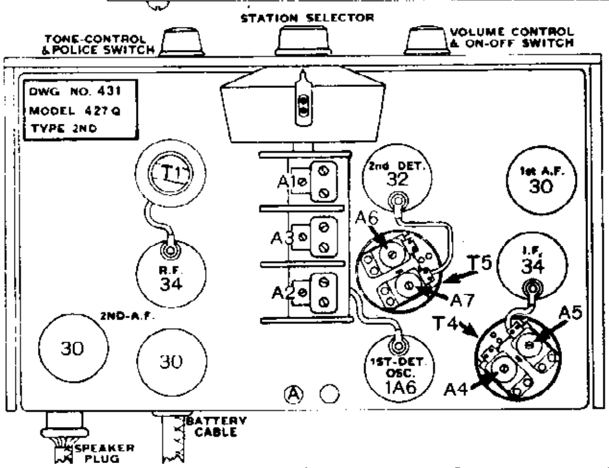
ATWATER-KENT MFG. CO.



MODEL 387 Above 7873966
MODEL 427Q Above 1948501
Socket, Trimmer, Parts

ATWATER-KENT MFG. CO.





This late type of Models 387 and 427-Q differs from the early type by having a police-switch circuit which permits tuning in both police bands.

2nd TYPE 387
(Above Serial No. 7873966)

2nd TYPE 427-Q
(Above Serial No. 1948501)

Part No.	Name of Part
27054	Dial assembly
26721	Dial lamp (2-V., 60 MILS.)
37830	Tone control switch complete
26337	Cabinet complete (387)
26053	Screen
25686	Escutcheon
26031	Knob—volume and tone control
25811	Knob—dial
26177	Variable condenser assembly
25692	Volume control, .5 U
25704	Battery cable
23288	Dial plate

TRIMMERS

Code No.	Part No.	Name of Part
A4, 5	30110	Double I. F. trimmer
A6, 7	30110	Double I. F. trimmer

CONDENSERS

Code No.	Part No.	Name of Part
C1	37840	1450 MMF. 100-V.
C2	30580	775 MMF, 100-V.
C3	35840	50 MMF, 500-V.
C3A	36280	14 MMF, 500-V.
C4	26820	.05 MF. 200-V., NI
C5	22472	7 MF, 200-V., dry electrolytic
C6	27630	.01, 200-V.
C7	27630	.01, 200-V.
C8	33620	250 MMF, 450-V., NI
C9	31510	.5 MF. 100-V., NI
C10	31510	.5 MF. 100-V., NI
	34010	Multiple by-pass (J15)

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	37920	No. 1 R. F. T.
T2	37930	No. 2 R. F. T.
T3	37940	Oscillator T.
T4	26068	No. 1 I. F. T.
T5	26068	No. 2 I. F. T.
T6	35030	Input T.
T7	23701	Output T.

SOCKETS

Part No.	Name of Part
20237	4 prong
22733	6 prong
21336	Speaker (4 prong)

RESISTORS

Code No.	Part No.	Name of Part
R1	30340	Red-blue, .1 U, 1/3-W.
R2	30390	Bl'k-red, 20,000 Ω, 1/3-W.
R3	30380	Red-green, 3300 Ω, 1/3-W.
R4	30370	Green, 2 U, 1/3-W.
R5	31970	Red-yel., .25 U, 1/3-W.
R6	30340	Red-blue, .1 U, 1/3-W.
R6A	30320	Maroon, 10,000 Ω, 1/3-W.
R7	30350	Bl'k-purple, .5 U, 1/3-W.
R8	30340	Red-blue, .1 U, 1/3-W.
R9	36250*	Wire wound, 1.15 Ω in 427-Q
R9	36240†	Wire wound, 1.03 Ω in 387

* A No. 37130 resistor (1.15 Ω) is supplied with set for use with a 3-V. dry "A" battery.
† A No. 37120 resistor (1.03 Ω) is supplied with set for use with a 3-V. dry "A" battery.

MISCELLANEOUS

Part No.	Name of Part
21877	I. F. T. shield
22678	R. F. T. shield
22654	I. F. T. shield cap
25735	Battery cable tag, F1082
25602	Instruction and log card, F1072
25804	Shipping container
15213	Tube shield

387 SPEAKER No. 31700

Part No.	Name of Part
19465	Diaphragm
19918	Magnet assembly
23701	Output transformer, less case
23764	Cable and plug

427-Q SPEAKER No. 36400

Part No.	Name of Part
23863	Speaker cable and plug assem.

Ω = ohms. U = megohms. IND. = inductive. NI = non-inductive. W. = watt.

MODEL 511 Tun-O-Matic
Schematic, Data

ATWATER-KENT MFG. CO.

ACTION OF ATWATER KENT Tune ♦ O ♦ Matic

A simple diagram of the Tune-O-Matic is shown on this page. It is NOT necessary to understand the circuit details in order to set up the Tune-O-Matic, but a few notes on the mechanical action are given below for your convenience.

The tuning motor is a shaded-pole induction type. The motor shaft rotates in only one direction, and the required forward and reverse drive for the variable condenser is secured by an ingenious and simple arrangement for tipping the motor, which is pivoted for this purpose. Tipping is accomplished by a solenoid and lever.

The motor drive shaft extends between two rubber-tired wheels, one large, and one small. When the solenoid is not energized, the motor drive shaft rests against the small wheel and the resulting motion drives the variable condenser in the direction from 540 to 1600 K. C. When the solenoid is energized, the motor is tipped so that its drive shaft rests against the large wheel, and the variable condenser is then driven in the direction from 1600 to 540 K. C.

The current that energizes the solenoid is controlled by a switch (mounted above the top rear of the variable condenser). This switch opens at 1600 K. C. and closes at 540 K. C. The switch is operated by a cam on the shaft of the variable condenser.

Eight adjustable discs are mounted on the shaft of the variable condenser, which is extended out in back of the condenser. Each disc has a small insulated sector on the rim. Each disc is held by spring tension to the shaft. Normally, the discs do not move with respect to the shaft, but by holding the front gear of the variable condenser, and using a special wrench which is furnished with Model 511, each disc may be rotated on its shaft so that the insulated sector is in the desired position. Between adjacent disc there is a spacer which is keyed to the shaft. This prevents the movement of any disc other than the one moved with the wrench.

Eight contact fingers are mounted at one side of the discs, each finger contacting with the rim of its corresponding disc.

The electrical action is briefly as follows:

Assume that we have one lead of station "G" plugged in the 4:30 jack and the switch is set to automatic.

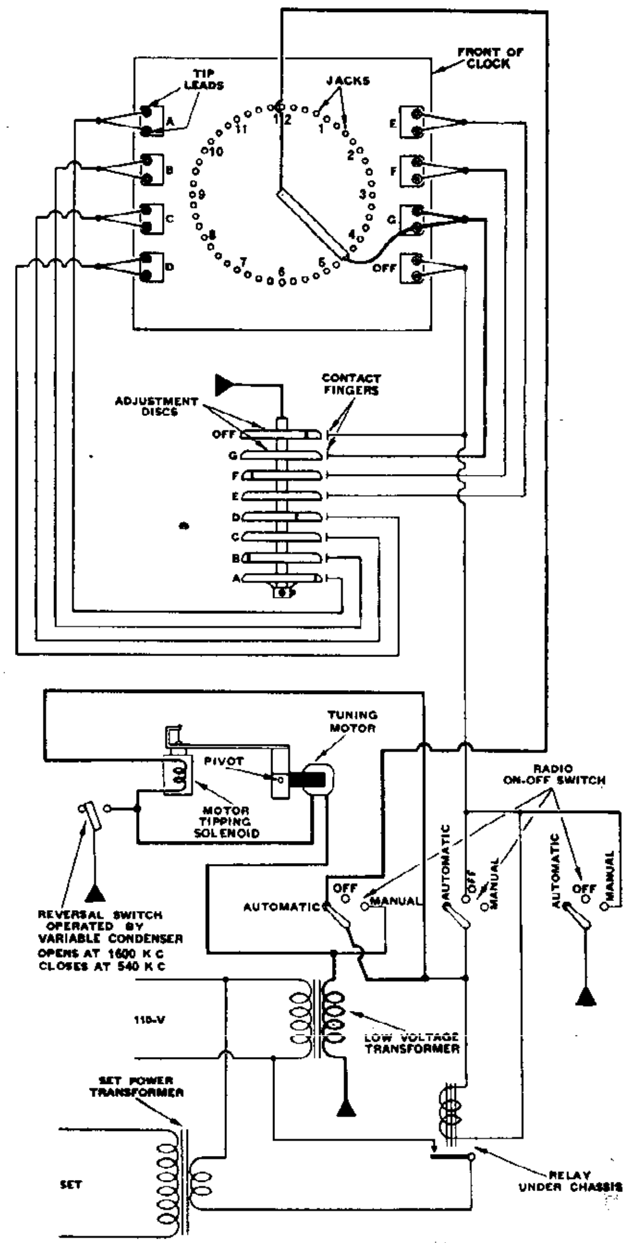
When the contact blade on the rear of the jack panel comes to the 4:30 jack, the electric circuit through the motor and solenoid is completed and the solenoid tips the motor shaft against the large rubber-tired wheel. The motor turns the variable condenser from the automatic-off position, near 1600 K. C., across the dial to the frequency of station "G".

When the motor reaches this point, the insulated sector of disc "G" has come under its contact finger and the circuit, from the finger through the disc to ground, is broken. This cuts the high-impedance relay into the motor circuit and reduces the current through the motor and solenoid to such a low value that the motor stops turning and the solenoid lever comes up, throwing the motor drive shaft against the small rubber-tired wheel which acts as a mechanical brake, bringing the motor to a dead stop on station "G". Simultaneously, the relay has completed the 110-volt circuit to the set power transformer and the set, now tuned to station "G", begins to operate.

Now plug one of the "off" leads into the 4:45 jack. When the contact finger moves off the 4:30 jack, the circuit through the relay is broken, the set is turned off, and the contact finger, now on the 4:45 jack, completes the circuit through the motor and solenoid, driving the condenser to 540 K. C., where a cam on the shaft trips the switch, thus cutting out the solenoid, and the motor tips back against the small rubber-tired wheel, driving the condenser back in the opposite direction to 1600 K. C.

Beyond the 1600 K. C. end of the dial, the cam on the variable condenser shaft again trips the switch, which opens, and the solenoid, being energized, tips the motor shaft against the large wheel, starting the condenser moving back. But at 1600 K. C. the insulated sector of the "off" disc comes under its contact finger, breaking the circuit and stopping the motor. **In the off position, NO CURRENT IS DRAWN BY THE SET**; the only current is the small amount required by the electric clock.

Inspection of the diagram will show that the jack panel is shorted out by the switch when the condenser is moving from 540 to 1600 K. C. For greatest accuracy all tuning is done while the condenser is moving from 1600 to 540 K. C.



MODEL 511 Tun-O-Matic Data

ATWATER-KENT MFG. CO.

SETTING UP THE Tune ♦ O ♦ Matic

The Tune-O-Matic mechanism should be adjusted by the dealer in his store, and not in the customer's house. If the customer indicates his choice of seven different stations, the dealer should adjust the Tune-O-Matic for these seven stations. If the choice is left to the dealer, he should select the seven strongest and most reliable stations. In any case, do not select a weak station, a station with pronounced fading habits, nor a station that has interference; such stations can be received better with manual tuning.

1. Make a list of the seven desired stations, listing them numerically by frequency, and mark the call letters of the seven stations on the station index plates at the front of the clock unit, beginning at the top of the left-hand row and working down the left hand row, then to the top of the right-hand row and working down the right-hand row. The bottom index plate on the right-hand row is marked "OFF". Each celluloid plate has two spring-return tip-jack leads. There are two leads for each of the seven stations and two "off" leads.

2. Remove the small cover at center rear of chassis. This cover is held by two screws and encloses eight adjustment discs and eight corresponding contact fingers. (The disc nearest the front of the set is the "off" disc and it is adjusted at the factory to a point beyond the 1600 K.C. end of the dial.

3. Turn the tone control extreme right (high pitch), and turn the on-off switch to the "manual" position (right). Tune in the first station on the list; we will refer to this as station "A".

4. Without disturbing the tuning, firmly grasp the dial gear at front of variable condenser in one hand and move the **rear** disc, by means of special wrench furnished with set, until the rear contact finger is on the small insulated sector of the rear disc.

The wrench is designed to fit loosely on the rim of the disc in order that it may be moved easily to any desired point on the rim. In using the wrench to move the disc, it is necessary to press against the wrench in such a way that the wrench grips the rim of the disc, and then press slowly but firmly in moving the disc.

If you have not held the dial gear securely while turning the disc, the set may have detuned slightly. (Detuning is most readily noticed when the tone control is set at high pitch). In this case retune the station carefully and readjust the rear disc.

5. Plug one of the top left-hand pair of tip leads into the jack at which the HOUR hand points or has just passed. **Note that the clock is marked in 15-minute intervals, not in minutes.** Turn on the on-off switch to "automatic" (left) and tune off the station. This will cause the set to shut off and start the Tune-O-Matic motor. Allow the automatic mechanism to bring the pointer back to the station, at which point the motor will stop and the set will be turned on. After the tubes have heated and the station comes in, note whether the station is correctly tuned in. If the station is not tuned in correctly, a slight readjustment of the disc in the correct direction is necessary. Again throw the station off tune and repeat the procedure if necessary.

6. Proceed with the 2nd station as outlined in paragraphs numbered 4 and 5, above, but adjust the 2nd disc from the rear and use one of the 2nd pair from the top left row of tip leads to plug into the jack at which the hour hand points.

7. Adjust for the remaining stations in the same way, noting that the adjustment discs and the corresponding pairs of tip leads shown on page 1 of customer's instructions are as follows:

Rear disc..........(Station "A").
2nd from rear disc (Station "B").
3rd from rear disc (Station "C").
4th from rear disc (Station "D").
5th from rear disc (Station "E").
6th from rear disc (Station "F").
7th from rear disc (Station "G").
Front disc (OFF). This is set at factory.

ADDITIONAL AUTOMATIC "OFF" POSITIONS

If more than two automatic "off" positions are required, it is possible to obtain two additional "off" positions by using one of the seven station discs for this purpose.

Use the 2nd disc from the front and adjust it so its insulated sector is in the same position as the front or regular "off" disc. Mark "OFF" on the index plate directly above the regular "off" plate.

This arrangement provides selection of six different stations with four automatic "OFF" positions.

ADDITIONAL STATION LEADS

If seven good stations are not continuously available, it is necessary to double up on the good stations. Use two adjacent discs for each good station, marking the index plates to correspond.

INSTALLING ATWATER KENT REMOTE CONTROL ON MODEL 511 Tune ♦ O ♦ Matic

The Atwater Kent remote control consists of a small control box with a ten-point switch and illuminated switch dial. Seven of these ten points are used to select the seven different stations for which the Tune-O-Matic has been previously adjusted. There are two "off" points (one at each end of the switch movement), and one point marked "time" which restores the set to automatic time operation.

THE SWITCH ON THE CONTROL UNIT MUST BE PLACED IN THE "TIME" POSITION WHEN IT IS DESIRED TO HAVE THE SET TUNE AUTOMATICALLY.

The remote control has 25 feet of cable so the control unit may be placed across the room or in an adjoining room from the set.

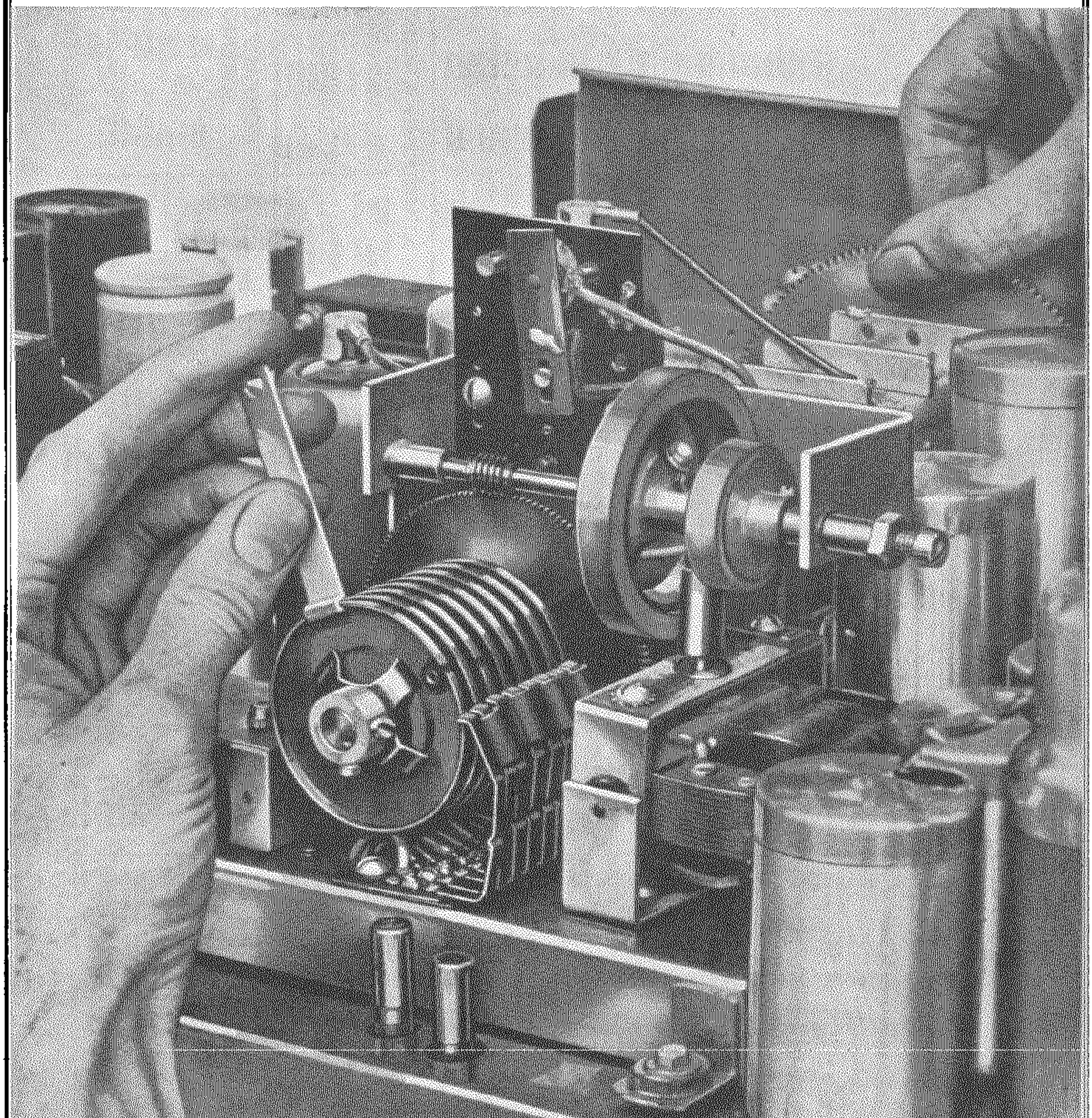
The other end of the remote control cable has a multi-prong socket and plug. Attach the socket to the left-rear side of the cabinet by means of the two screws furnished with the unit.

Remove the plug of the Tune-O-Matic clock unit from the socket at top-left of chassis and insert it in the socket which you have just fastened to rear of cabinet. Then insert the plug at end of remote control unit into the socket on top of chassis.

This control unit does not have a volume control, but Model 511 has a super-automatic volume control circuit which ensures constant volume level from one station to another.

ATWATER-KENT MFG. CO.

SETTING UP THE Tune • O • Matic



ADJUSTING REAR DISC WITH SET TUNED TO STATION "A"

General Parts List

ATWATER-KENT MFG. CO.

TUBULAR FIXED CONDENSERS
(By Part Numbers)

Part No.	Value	Type†	Voltage	Superseded by	Code No. printed on late type condensers
24509	.01 & .01	IND.	200	31190	.
26550	.5	NI	200	.....	219
26660	.1	NI	200	.....	213
26820	.05	NI	200		208
27234	.5	NI	200	26550	.
27434	.008, .03	IND.	450	.....	417
27619	.008, .02	IND.	450	.....	418
27630	.01	IND.	200	.....	203
28040	.005	IND.	200	.....	201
28130	.0005	IND.	450	.....	402
29030	.02	NI	450	.....	410
29530	.03	NI	200	.....	206
29890	.005	IND.	450	.....	408
29910	.015	NI	450	.	414
30240*	250 MMF	IND.	450	33620	
30250	.025	NI	450		411
30670	250 MMF	IND.	450	33620	...
31140	250 MMF Double	IND.	450	33630	.
31150	.3	NI	100	....	104
31160	.05	NI	100	...	101
31190	.01 & .01	IND.	200	....	220
31330	250 MMF Double	IND.	450	33630	
31510	.5	NI	100	.....	105
31520	.2	NI	100	.....	103
31530	.1	NI	100	...	102
31540	.001	IND.	450	33640	..
31890	.05, .05, .5	IND.	100	31920	...
31910	.1, .1, .2	IND.	100	31930	
31920	.05, .05, .5	IND.	100	....	110
31930	.1, .1, .2	IND.	100		111
32350	.05, .05, .2	IND.	200	32390	..
32360	.05, .05, .05	IND.	100	32410	.
32370	.0022	IND.	450	33660	
32390	.05, .05, .2	IND.	200	....	222
32410	.05, .05, .05	IND.	100	....	107
32420	.0022	IND.	450	33660	
32750	.2, .1	IND.	100	.	106
32760	.2, .1	IND.	100	32750	
32810	.01	NI	450	..	409
33620	250 MMF	IND.	450	.....	401
33630	250 MMF Double	IND.	450	.....	413
33640	.001	IND.	450	.....	403
33660	.0022	IND.	450	.....	405
34020	.05 & 250 MMF	IND.	200	.....	221
35420	.08	NI	200	.....	212
35760	.003	IND.	450	.	407
35780	.2, .1, .05, .05, .05, .3	IND.	100	35790	
35790	.2, .1, .05, .05, .05, .03	IND	100	..	108
35930	.25	NI	200	.....	215
36420	.02	IND.	200	....	205
36440	.1, .1, .05	IND.	100	....	109
36450	.05, .05, .005, .005	IND.	200	....	223
36490	.05	NI	450	.....	412
36650	.0015	IND.	450	.....	404
36660	.0025	IND.	450	.....	406
36670	.007	IND.	200	.....	202
36680	.015	IND.	200	.....	204
36690	.04	NI	200	.....	207
36710	.055	NI	200	.....	209
36720	.065	NI	200	.....	210
36730	.07	NI	200	.....	211
36740	.2	NI	200	.....	214
36750	.27	NI	200	....	216
36760	.3	NI	200	....	217
36770	.4	NI	200	....	218
38160	.03, .015, .008	IND.	450	...	415
38260	.001, .004, .008	IND.	450	...	416
39650	.004, .001	IND.	450		419

† Condensers designated as inductive (IND.) are constructed in such a way that the current must travel through one or more turns of the tin-foil plates in order to reach the ends of the plates. Such condensers have a slight inductive effect and are primarily used as low-frequency bypasses where the effect of this slight inductance is negligible.

Condensers designated as non-inductive (NI) are constructed in such a way that the current reaches the entire area of the plates without having to pass through any turns of the plates. Non-inductive condensers are used as high-frequency bypasses.

TUBULAR FIXED CONDENSERS
(By Code Numbers)

Code No. printed on late type condensers	Part No.	Value	Type†	Voltage
101	31160	.05	NI	100
102	31530	.1	NI	100
103	31520	.2	NI	100
104	31150	.3	NI	100
105	31510	.5	NI	100
106	32750	.2, .1	IND.	100
107	32410	.05, .05, .05	IND.	100
108	35790	.2, .1, .05, .05, .05, .03	IND.	100
109	36440	.1, .1, .05	IND.	100
110	31920	.05, .05, .5	IND.	100
111	31930	.1, .1, .2	IND.	100
201	28040	.005	IND.	200
202	36670	.007	IND.	200
203	27630	.01	IND.	200
204	36680	.015	IND.	200
205	36420	.02	IND.	200
206	29530	.03	NI	200
207	36690	.04	NI	200
208	26820	.05	NI	200
209	36710	.055	NI	200
210	36720	.065	NI	200
211	36730	.07	NI	200
212	35420	.08	NI	200
213	26660	.1	NI	200
214	36740	.2	NI	200
215	35930	.25	NI	200
216	36750	.27	NI	200
217	36760	.3	NI	200
218	36770	.4	NI	200
219	26550	.5	NI	200
220	31190	.01, .01	IND.	200
221	34020	.05, 250 MMF	IND.	200
222	32390	.05, .05, .2	IND.	200
223	36450	.05, .05, .005, .005	IND.	200
224	27234	.5	NI	200
401	33620	250 MMF	IND.	450
402	28130	.0005	IND.	450
403	33640	.001	IND.	450
404	36650	.0015	IND.	450
405	33660	.0022	IND.	450
406	36660	.0025	IND.	450
407	35760	.003	IND.	450
408	29890	.005	IND.	450
409	32810	.01	NI	450
410	29030	.02	NI	450
411	30250	.025	NI	450
412	36490	.05	NI	450
413	33630	250 MMF Double	IND.	450
414	29910	.015	NI	450
415	38160	.03, .015, .008	IND.	450
416	38260	.001, .004, .008	IND.	450
417	27434	.008, .03	IND.	450
418	27619	.008, .02	IND.	450
419	39650	.004, .001	IND.	450

* In models where No. 30240 is used as a diode coupling condenser and mounted inside an I. F. transformer assembly, use No. 33670 (small mica type) for replacement. The No. 33620 condenser, which normally supersedes No. 30240, is too large for mounting inside the I. F. transformer shield.

SMALL BUTTERFLY CONDENSERS
(500 Volts)
(Illustration is full size)

Part No.	Color	Angle Between Lugs	Rated Capacity
25561	Green	180°	8 MMF
34460	Bl'k	77°	10 MMF
34470	Red	123°	14 MMF
36220	Blue	123°	7 MMF
36230	Blue	123°	7 MMF
38280	Gray	123°	4 MMF

1/3, 1/2, 1, and 2 WATT TUBULAR RESISTORS
(When replacing a tubular resistor, use a resistor of the same value and size)

These four illustrations are full size.

Resistance in Ohms	Identifying Color	1/3 Watt Size	½ Watt Size	1 Watt Size	2 Watt Size
165	Blue, Gray and Yellow	41330	—	—	—
200	Blue, Yellow and Red	—	37590	—	—
300	Maroon and Blue	—	37530	—	31490
425	Blue, Yellow and Green	—	37540	—	—
500	Blue, Red and Green	39790	—	32010	—
1,100	Black, Red and Blue	31480	—	—	—
1,500	Black and Green	37710	—	—	—
2,000	Blue	33250	—	—	—
2,500	Gray, Red and Green	39130	—	—	—
3,300	Green and Red	30380	26410	19346	—
4,000	Green and Blue	—	—	18049	—
5,000	Blue and Yellow	36430	28050	—	—
6,000	Purple	—	—	20151	28770
7,500	Yellow	—	—	15544	—
10,000	Maroon	30320	20950	15545	27210
12,500	Purple and Yellow	—	—	15941	—
15,000	Gray and Yellow	—	20960	22211	27220
	Gray and Green	—	—	21784	—
20,000	Black and Red	30390	23120	15891	28030
30,000	Gray	31840	20970	15285	29710
40,000	White	—	26160	15724	28750
50,000	Black, Yellow and Red	30330	—	22407	34340
65,000	Black	31980	21040	15592	—
100,000	Red and Blue	30340	20980	16282	28760
150,000	Black and Yellow	—	—	28864	—
250,000	Red and Yellow	31970	20920	19581	—
500,000	Black and Purple	30350	20930	19649	—
800,000	Red and Gray	—	23130	20223	—
900,000	Green and Yellow	—	23170	—	—
1,000,000	Blue and Gray	30360	21050	—	—
2,000,000	Green	30370	20940	15892	—

PARTS NUMBERS OF KNOBS

Model No.	Vol. Control knob	Station Selector, dial or tuning knob	Tone control knob	Frequency range switch knob	Silencing switch knob
112	27728§	27728§	27494§	27358§	26571‡
145	27496‡	24278* 27498-	27495§	26569§	.
206	27496‡	24278* 27498†	27495§	26569§	.
318	27728§	27728§	27494§	27358§	26571‡
325	27496‡	24278* 27498†	27495§	26569§	
447	27728§	27728§	27494§	27358§	26571‡
511	26569§	26569§	27495§	26571‡	27495§
559	27728§	27728§	27494§	27358§	26571‡
825	27493‡	27493‡	26571‡	26571‡	...
944	27493‡	27493‡		.	.

CABINET PARTS FOR CONSOLE SETS

25925	Wing nut	
21142	Washer	
27704	Clamp (small)	
25742	Clamp (large)	
25746	Clamp bolt	

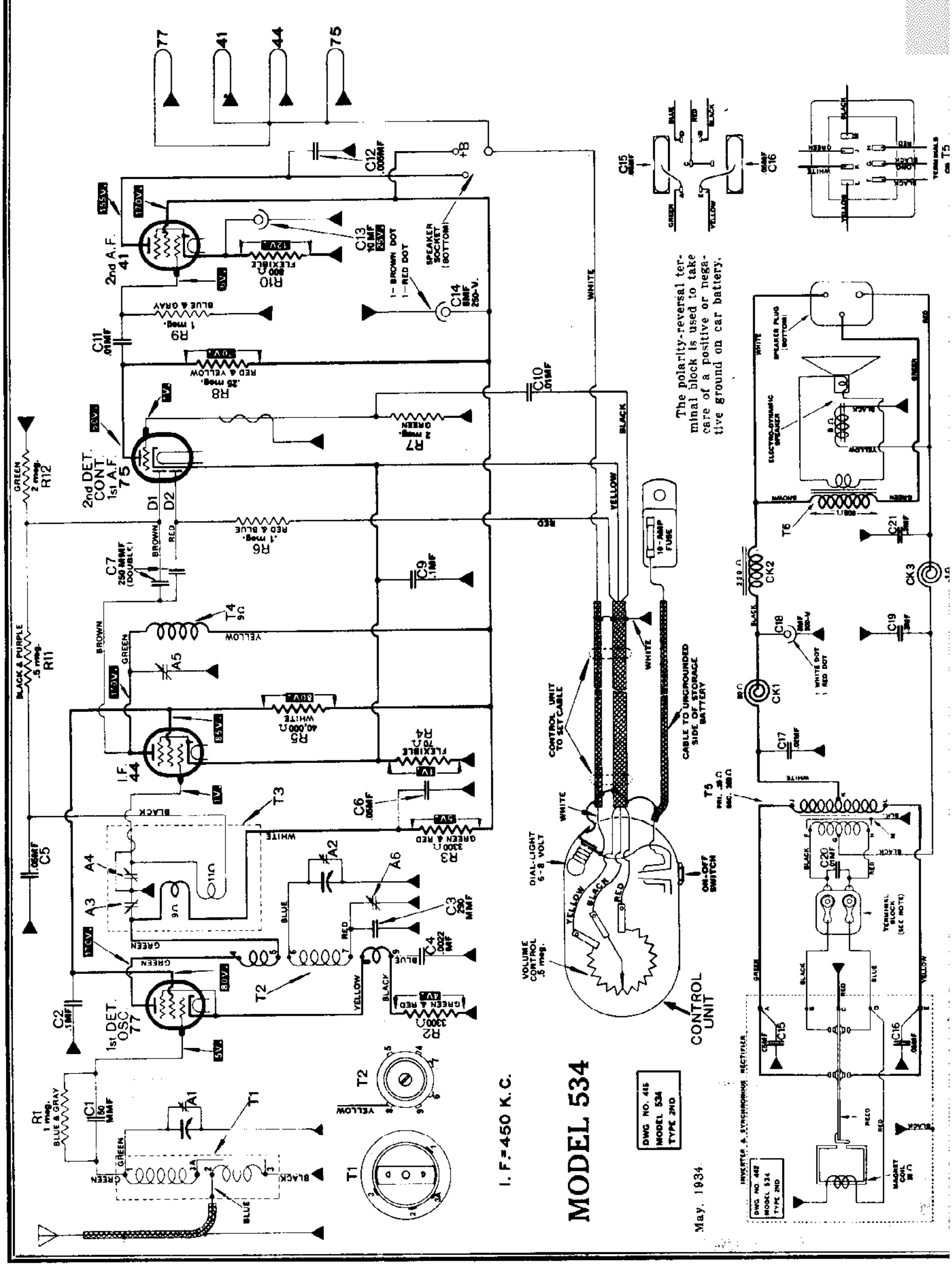
COMPACT CABINET AND SCREEN NUMBERS

Model Number	Cabinet Less Screen	Cabinet With Screen	Screen
135 Z	..	28831	27908
145	28839	.....	27906
206	28834	.....	27908
206-D	28834	.....	27908
447	28026	.	27904
465-Q	.....	28832	27907
768-Q	.....	28629	27904
825	.....	28796	27902
944	28773	...	27892

* No. 24278 single knob (front). † No. 27498 single knob (back). ‡ No. 28114 knob spring, .012 thk. § No. 28115 knob spring, .015 thk.

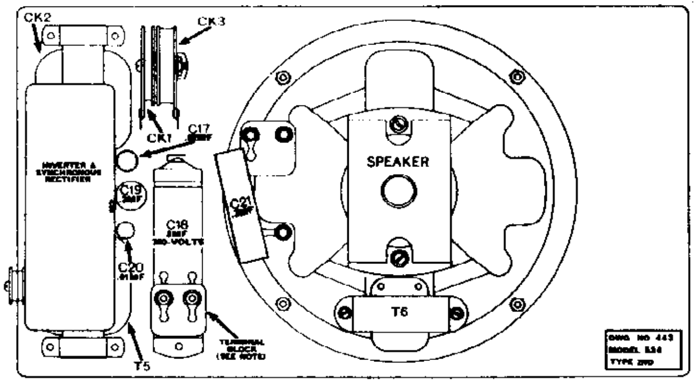
MODEL 534 (2nd)
Schematic

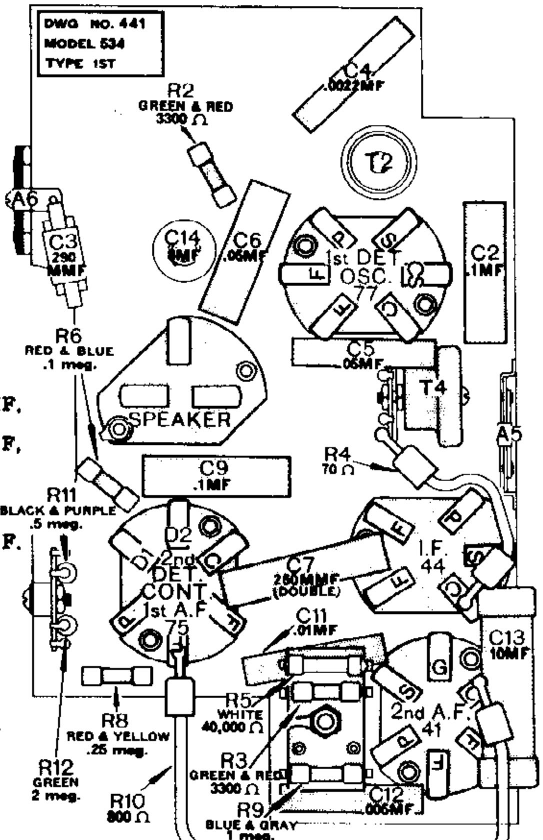
ATWATER-KENT MFG. CO.

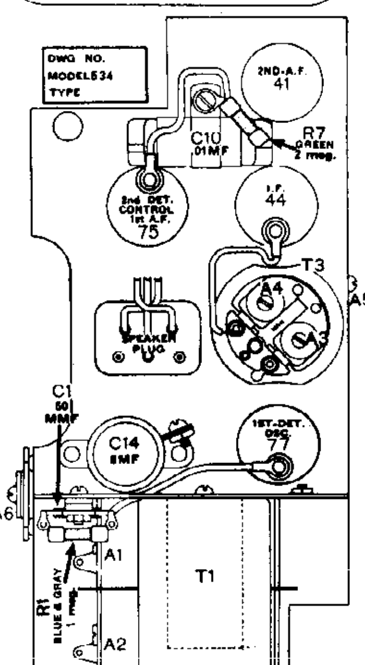


MODEL 534 (2nd)
Socket, Speaker, Parts
Trimmers

ATWATER-KENT MFG. CO.







MODEL 534

Part No.	Name of Part
25655	Set container
25653	Container cover
25475	Wire screen
25482	Set mounting bolt, 2½" x ⅜"
24486	Nut, ⅜"
24485	Lockwasher, ⅜"
21143	Plug suppressor
21144	Distributor suppressor
23260	Generator condenser, 1 MF, 200-V.
23520	Ignition filter
25609	Shield for No. 1 R. F. T.
25441	Shielded grid lead and cap
25287	Variable condenser assembly
25406	Station selector clamp
25519	Antenna cable, 24"
21126	Control pulley
21127	Control pulley spring
25851	Spring centering ring

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	33710	No. 1 R. F. T.
T2	33720	Oscillator T.
T3	25651	No. 1 I. F. T.
T4	33790	No. 2 I. F. T.
T5	25371	Power T.
T6	25606	Output T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30360	Blue-gray, 1 Ʊ, 1/3-W.
R2	30380	Red-green, 3300 Ω, 1/3-W.
R3	30380	Red-green, 3300 Ω, 1/3-W.
R4	15820	Flexible, 70 Ω
R5	26160	White, 40,000 Ω, ½-W.
R6	30340	Red-blue, .1 Ʊ, 1/3-W.
R7	30370	Green, 2 Ʊ, 1/3-W.
R8	31970	Red-yellow, ¼ Ʊ, 1/3-W.
R9	30360	Blue-gray, 1 Ʊ, 1/3-W.
R10	20120	Flexible, 800 Ω
R11	30350	Bl'k-purple, .5 Ʊ, 1/3-W.
R12	30370	Green, 2 Ʊ, 1/3-W.

CONDENSERS

Code No.	Part No.	Name of Part
C1	30260	50 MMF, letter E stamped on washer, 450-V.
C2	31530	.1 MF, 100-V., NI
C3	33680	290 MMF, 100-V.
C4	33660	.0022 MF, 450-V., IND.
C5	31160	.05 MF, 100-V., NI
C6	26820	.05 MF, 200-V., NI
C7	33630	Double 250 MMF, 450-V., IND.
C9	31530	.1 MF, 100-V., NI
C10	23250	.01 MF, 450-V.
C11	27630	.01 MF, 200-V., IND.
C12	28040	.005 MF, 200-V., IND.
C13	25379	Dry electrolytic, 10 MF, 25-V.
C14	25385	Dry electrolytic, 8 MF, 250-V.
C15	33070	.05 MF, 450-V.
C16	33070	.05 MF, 450-V.
C17	29030	.02 MF, 450-V., NI
C18	25384	Dry electrolytic, 8 MF, 300-V.
C19	31150	.3 MF, 100-V., NI
C20	27630	.01 MF, 200-V., IND.
C21	31150	.3 MF, 100-V., NI

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A3, 4	32880	Double I. F. trimmer
A5	24495	Single I. F. trimmer
A6	31870	Single trimmer

CHOKES

Code No.	Part No.	Name of Part
CK1	17015	R. F. "B" filter choke
CK2	33450	A. F. filter choke
CK3	23530	R. F. "A" filter choke

SOCKETS

Part No.	Name of Part
24493	5 prong
25196	3 prong
24494	6 prong
23147	Fuse

POWER UNIT SUPPLY

Part No.	Name of Part
25595	Vibrator assembly
25563	Connector card, female
25564	Connector card and bracket, male
25344	Insulator (fish paper)

MISCELLANEOUS PARTS

Part No.	Name of Part
21406	Fuse, 10 amp.
25658	Shipping container
20976	Lockswitch key

REMOTE CONTROL UNIT

Part No.	Name of Part
33430	Remote control unit complete
21496	Volume control, .5 Ʊ
21325	Volume control knob
24169	Dial knob
21491	Lockswitch
21407	Dial lamp (6-8 volts, ¼ amp.)
25483	Remote control unit to set cable, 4'
26179	Station selector cable, 4' 11"
26181	Station selector cable sheathing, 4'
25492	Shielded lead to ungrounded side of battery, 6' 6"
25266	Escutcheon
26173	Dial

534 SPEAKER

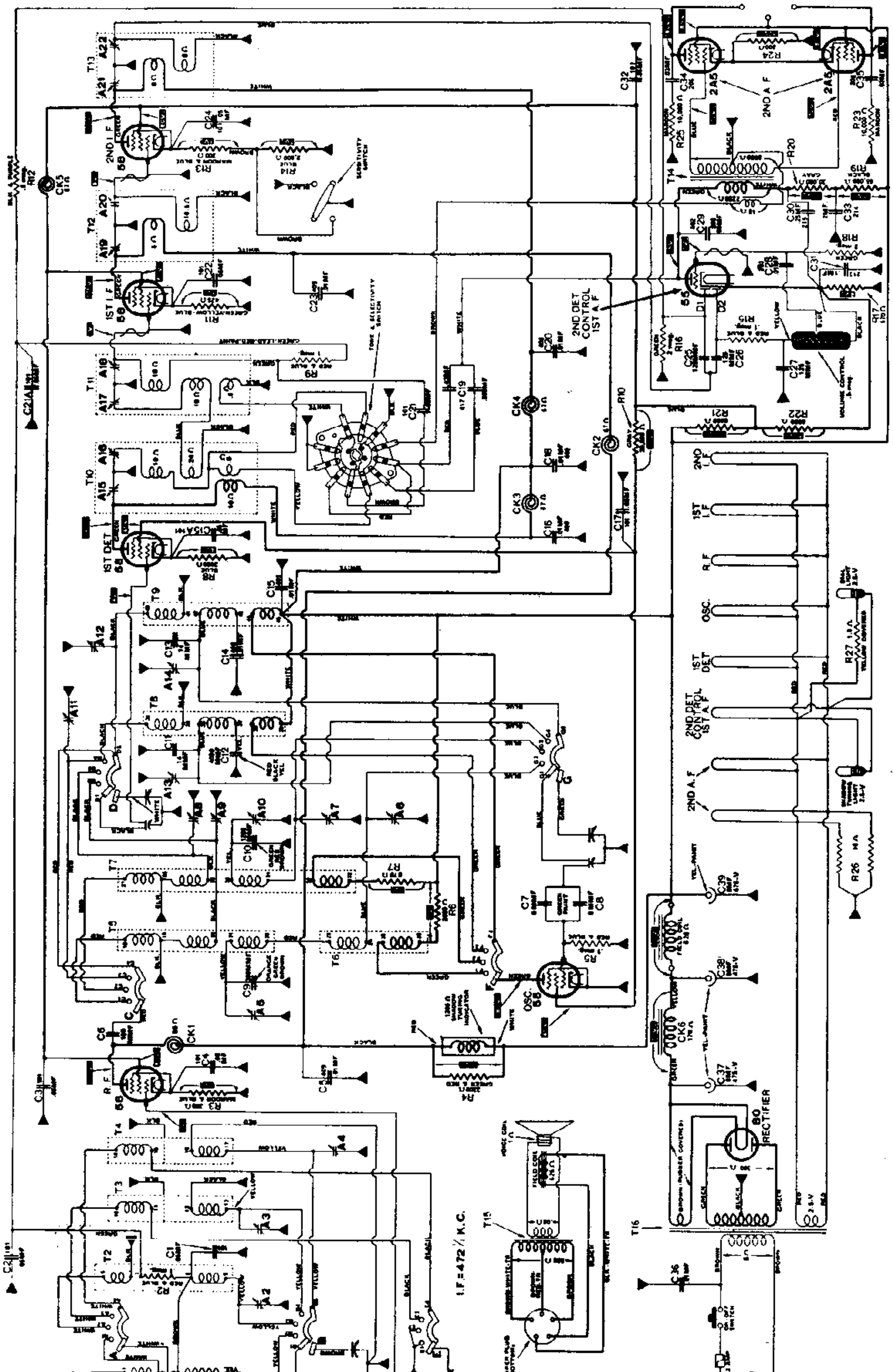
Part No.	Name of Part
25534	Speaker complete
25603	Conehead assembly
25605	Field coil, 8 Ω
25606	Output transformer (T6)
25403	Speaker cable and plug
25652	Cloth cover

ATWATER-KENT MFG. CO.

MODEL 559

For Alignment See Index

Switch in highest frequency position



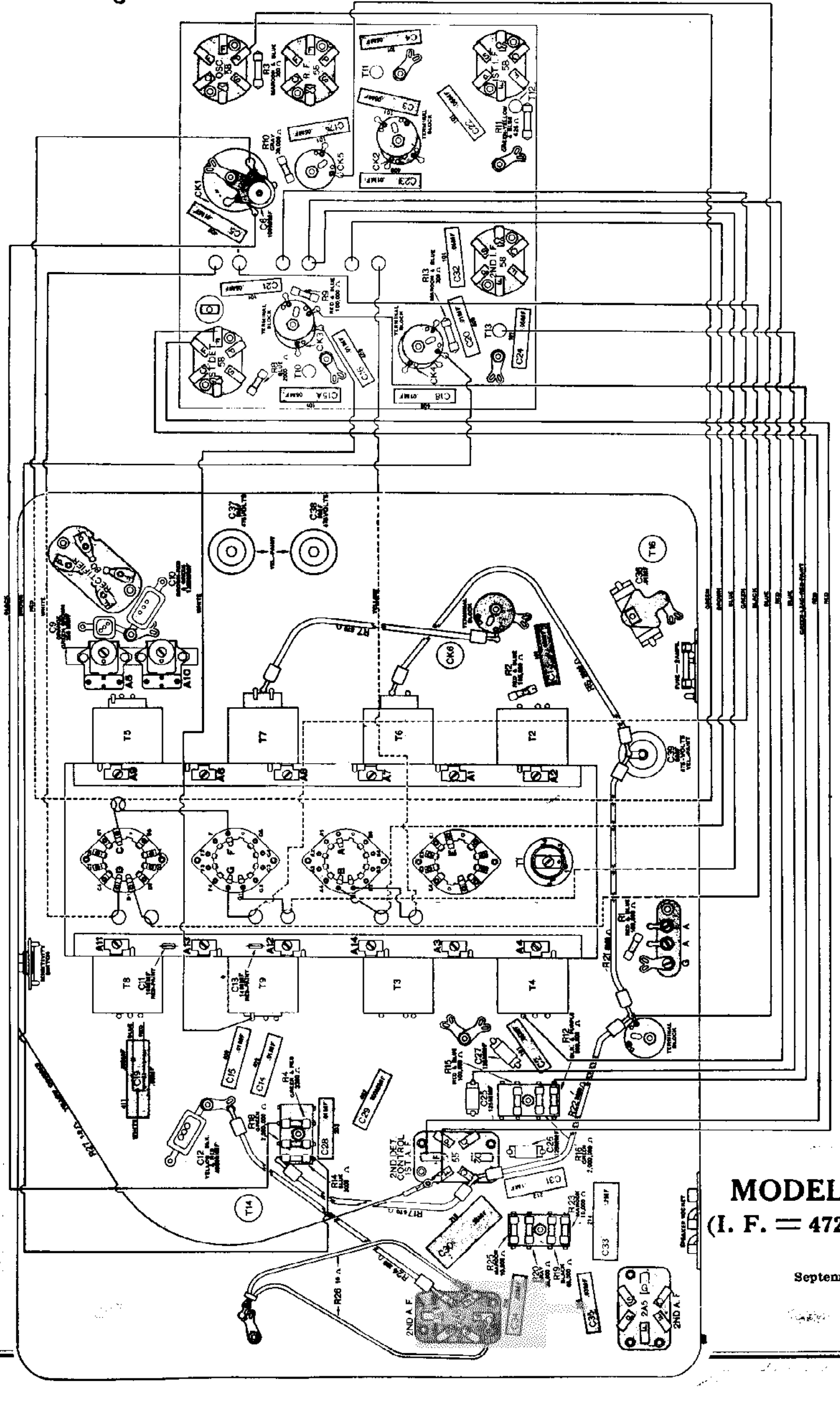
Voltage measurements were made with sensitivity switch at "local." The R. F. and I. F. circuit of Model 112 is the same as Model 559.

September, 1934.

MODEL 559
Chassis Wiring

ATWATER-KENT MFG. CO.

Switch in highest frequency position



This view shows the connections between the top unit and the main base.

For Alignment Data, Socket Layout and Parts List, See Index

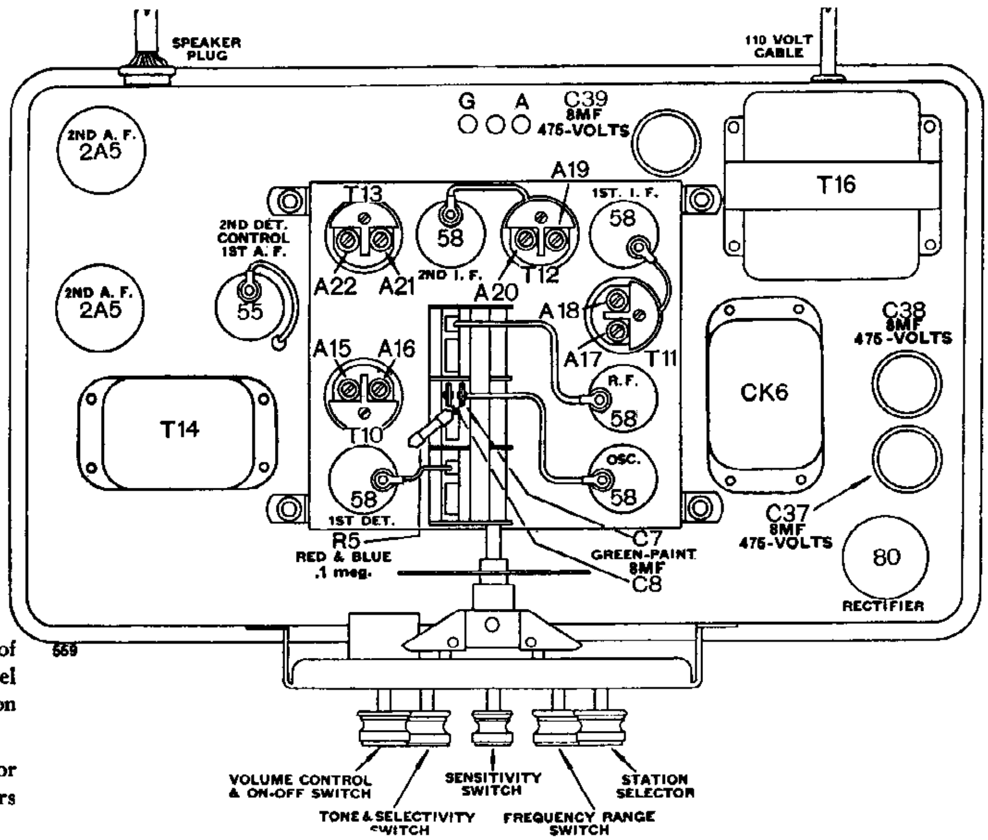
MODEL 559
(I. F. = 472½ KC.)

September, 1934.

ATWATER-KENT MFG. CO.

MODEL 559
Socket, Trimmers
Alignment Notes (1)
Balancing Gadget

TOP VIEW MODEL 559



The location of trimmers on Model 112 is the same on Model 559.

Refer below for names of trimmers on these models.

R. F. TRIMMERS ON MODELS 112 AND 559

	10-18 MC Range	4-10 MC Range	1.5-4 MC Range	540-1600 KC Range
R. F.	A4	A3	A2	A1
1st-Detector	A12	A11	A8	A9
Oscillator	A14	A13	A7	A6
Tracking	None	None	A10	A5

The I. F. trimmers are A15 to A22, inclusive.

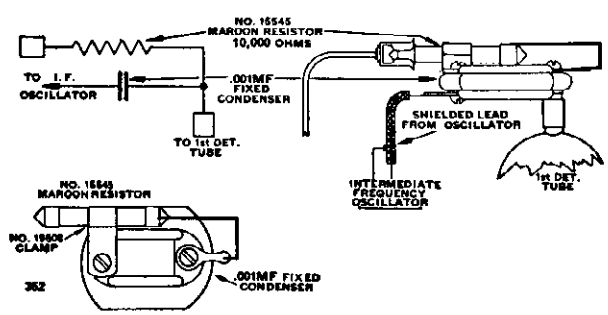


Fig. 1. I. F. Coupling unit.

ADJUSTING TRIMMER CONDENSERS

EQUIPMENT.

1. OSCILLATOR. The oscillator should extend from the lowest I. F. frequency (125 KC in Atwater Kent sets) to at least 18 MC. The oscillator should have a good attenuator and should be well shielded. If the oscillator is not well shielded, it may be difficult to peak the pre-selector trimmers on some models, owing to pick-up by the 1st-detector grid circuit. In general, it is advisable to connect an .00025MFD fixed condenser in series with the oscillator pick-up lead at the antenna terminal of the set.

2. OUTPUT METER. Use a sensitive output meter and keep the radio volume control turned on full volume. This is necessary to minimize the effect of the automatic-volume-control action of the set which would otherwise prevent sharp peaking of the trimmers.

3. BALANCING UNIT. Build two of the Type "A" balancing units and one of the I. F. coupling units shown on right. These are required for correct adjustment of Atwater Kent super-heterodynes. The Type "B" balancing unit, also described, is used on earlier models of Atwater Kent sets.

4. Use a non-metallic screw driver for adjustment of the trimmers.

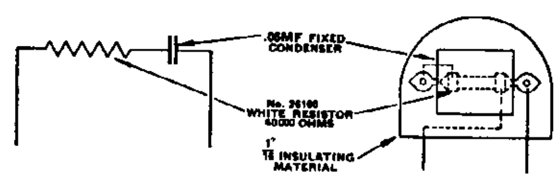


Fig. 2. Balancing unit "A."

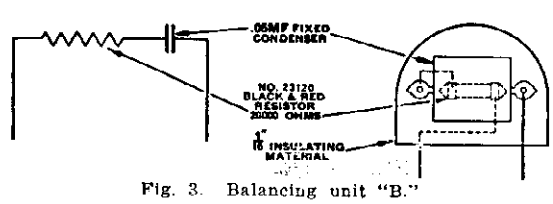


Fig. 3. Balancing unit "B."

ATWATER-KENT MFG. CO.

ADJUSTING TRIMMER CONDENSERS (Contd.)

GENERAL NOTES.

1. Do not make any trimmer adjustments and do not disturb the dial gear or the dial indicator adjustments unless absolutely necessary.

2. With all-wave sets, it is very desirable to use a test oscillator that extends to 18 MC (18,000 KC). If you attempt to use harmonics of a broadcast oscillator, you are likely to use the wrong harmonic and set the trimmers incorrectly.

3. When using a test oscillator, you will experience "double-spot" or image reception, particularly on the highest frequency range of the set. The double-spot point is twice the I. F. frequency below the correct point. For instance, if a set has an I. F. frequency of 472½ kilocycles, and you are tuning in an 18 MC signal, the double-spot or image will be twice 472½ or 945 KC (.94 MC) below 18. In such a case you will hear the signal at 18 MC and also at 17.06 MC. In properly aligned sets of six tubes or more, the image should be weaker than the desired signal.

4. Because of the facts mentioned in paragraphs 2 and 3 above, it is very desirable, wherever possible, first to check the short-wave dial calibration and determine how far, and in what direction, the readings are "off." This should be done on actual reception of short-wave stations of known frequency. This pre-checking will assist you in selecting the correct harmonic (in case you are using a broadcast oscillator), and it will also minimize possibility of confusing the correct signal and the image signal.

5. On oscillator trimmers there may be two different settings at which the signal is received. Always use the *first* of these two positions as you screw the trimmer in from a loose or minimum-capacity position. THIS IS IMPORTANT.

6. On sets with a combined oscillator and 1st-detector tube, tune the set to a quiet point near 1,000 KC while adjusting the I. F. trimmers.

OSCILLATOR GOVERNS DIAL ACCURACY.

It is essential to understand definitely that in a super-heterodyne the dial calibration depends on the oscillator circuit of the set, providing that the I. F. trimmers are correctly aligned. The pre-selector (R. F. and 1st-detector) trimmers do not affect the dial calibration but simply affect sensitivity.

If the dial calibration of one or more of the frequency ranges of the set is "off", check the oscillator trimmer, the oscillator tracking condenser and tracking trimmer, and the oscillator transformer for the particular range or ranges in question.

The oscillator **trimmer** is used to adjust the **high-frequency** end of the particular range.

The oscillator **tracking condenser** adjusts the **low-frequency** end of the particular range.

In Atwater Kent sets the fixed tracking condenser on the broadcast range (and in some models also on the police range) is shunted with an adjustable tracking trimmer condenser. The adjustable tracking trimmer condenser is not used on the high-frequency ranges.

The adjustment of the trimmers for the high-frequency and low-frequency end of a particular range is slightly interlocking. For example, assume that the broadcast range of a set is off calibration. First turn the tuning knob so the dial pointer is at 1500 KC and, using a 1500 KC signal, peak the broadcast oscillator trimmer. Then turn the set to 560 KC and, using a 560 KC signal, peak the oscillator broadcast tracking trimmer for maximum output. This adjustment will have slightly affected the previous adjustment at 1500 KC so it will be necessary to repeat the adjustment at 1500 KC and also possibly at 560 KC.

If adjustment of the oscillator trimmer and the oscillator tracking trimmer does not correct the dial readings, it may be necessary to replace the fixed oscillator tracking condenser or the oscillator transformer for that particular range.

Naturally, the I. F. trimmers should be checked, and adjusted if necessary, before any attempt is made to align the R. F. or oscillator trimmers.

GENERAL PROCEDURE.

First check the I. F. trimmers. If reception is satisfactory and the dial calibration is correct on the broadcast range, it is safe to assume that the I. F. trimmers are correctly adjusted.

If the dial calibration is "off" (or the set is weak) on only one range, adjust the trimmers for that range only. If this does not correct the trouble, inspect the resistors, condensers, transformers, and switch contacts associated with that particular range.

In checking a set, do not disturb the position of the wiring any more than necessary.

MODELS 112 AND 559

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust the I. F. oscillator to 472½ KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full. **Put tone control in 2nd-position from right.**

Put balancing unit A (shown in Fig. 2) across trimmer A21 and peak A22.

Put unit A across A22 and peak A21.

Put unit A across A19 and peak A20.

Put unit A across A20 and peak A19.

Put one unit A across A17 and another unit A across A15; peak A18 and A16.

Put one unit A across A18 and another unit A across A16; peak A17 and A15.

In case of instability while adjusting A21 and A22, place an extra balancing unit A across A18.

Remove the I. F. coupling unit and the balancing units and seal the trimmer screws.

R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground terminals of the set. Use the weakest possible signal to give a reading on the output meter. Loosen the trimmer screws for the frequency range or ranges that are to be re-adjusted.

10 to 18 MC range. Tune oscillator exactly to 18 MC and turn tuning knob of set so indicator is at 18 MC mark. Adjust trimmers A14, A4 and A12 for peak output.

4 to 10 MC range. Tune oscillator exactly to 10 MC and turn set to 10 MC mark on the 4 to 10 MC range. Peak trimmers A13, A3 and A11.

1.5 to 4 MC range. Tune oscillator to 4 MC and turn set to the 4 MC mark on the 1.5 to 4 MC scale. Peak trimmers A7, A2 and A8. Tune oscillator to 1.5 MC and, with set at 1.5, peak A10. Repeat adjustments on A7 and A10 if necessary.

Broadcast range. Tune oscillator and set to 1500 KC. Peak trimmers A6, A1 and A9. Tune oscillator to 560 KC and turn set to the 560 KC mark. Peak A5. Repeat adjustments on A6 at 1500 and A5 at 560 if necessary.

MODELS 145 AND 325

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust the I. F. oscillator to 264 KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full. Turn the set to a quiet point near 1000 KC.

Peak trimmer A7, A6 and A5. Remove the I. F. coupling unit and seal the trimmer screws.

DIAL POINTER ADJUSTMENT.

With the variable condenser all the way in, the dial pointer should be set at 535 KC.

R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground terminals of set. Use the weakest possible oscillator signal. Loosen the trimmer screws.

Short-wave range. Oscillator at 15 MC, and set turned to 15 MC mark, peak trimmer A3

Police range. There are no trimmer adjustments for this range.

Broadcast range. Oscillator at 1500 KC and dial pointer at 1500 KC mark, peak trimmers A8, A2 and A1. Tune oscillator and set to 560 KC. Peak A4. Repeat adjustments on A8 at 1500 KC and A4 at 560 KC if necessary.

MODELS 206 AND 376 (1st type)

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust the oscillator to 472½ KC. Use the weakest possible signal that will give a reading on the output meter with the radio volume control on full.

Turn the set to a quiet point near 1000 KC.

Peak trimmers A8, A7 and A6 for maximum output. Remove the I. F. coupling unit and seal the I. F. trimmers.

DIAL POINTER ADJUSTMENT.

With the variable condenser rotor completely meshed, the dial pointer should be set at 535 KC.

R. F. TRIMMERS.

Connect a suitable R. F. oscillator to the antenna and ground terminals of set.

Broadcast range. Oscillator at 1500 KC and dial pointer at 1500 KC mark, adjust trimmers A9, A2 and A3. Tune oscillator and set to 560. Peak A5. Repeat adjustments on A9 at 1500 KC and A5 at 560 KC if necessary.

Police range. There are no trimmer adjustments for this range.

Short-wave range. With oscillator at 15 MC and set turned to 15 MC, peak trimmers A10, A1 and A4.

MODELS 318 AND 447

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust oscillator to 472½ KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full.

Put balancing unit A (shown in Fig. 2) across trimmer A19 and peak A20.

Put unit A across A20 and peak A 19.

Put unit A across A17 and peak A18.

Put unit A across A18 and peak A17.

Put unit A across A15 and peak A16.

Put unit A across A16 and peak A15.

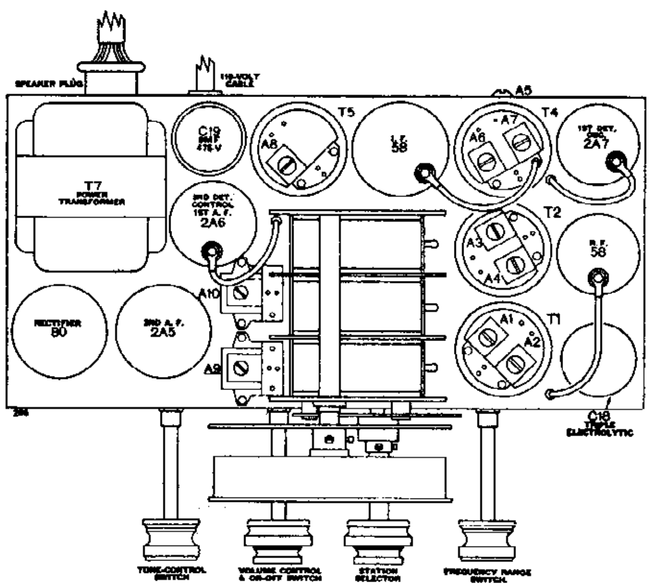
Remove the I. F. coupling unit and balancing unit and seal the I. F. trimmers.

R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground terminals of set. Use the weakest possible oscillator signal that will give a reading on the output meter. Loosen the trimmer screws for the frequency range or ranges that are to be re-adjusted.

12 to 22.5 MC range. Oscillator at 18 MC, dial pointer at 18 MC, peak trimmers A13, A4 and A8.

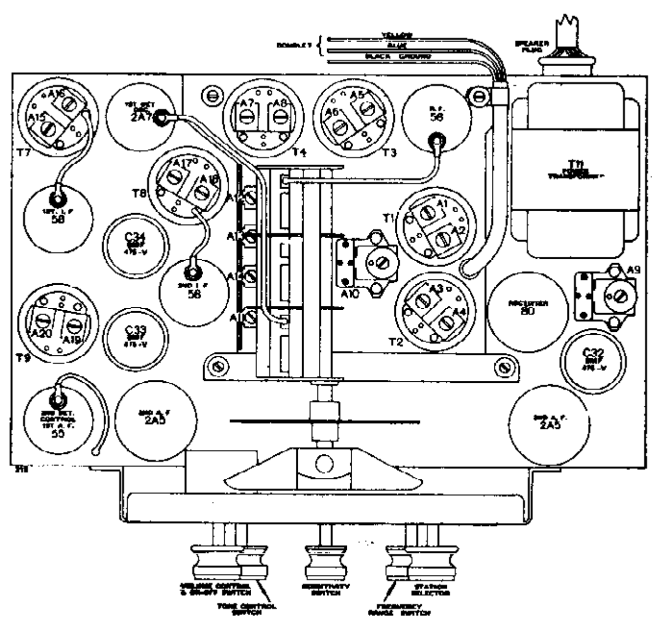
4.6 to 12.2 MC range. Oscillator at 12 MC, dial pointer at 12 MC, peak trimmers A14, A2 and A6 for maximum output.



R. F. TRIMMERS ON MODELS 206 AND 376

	Short-Wave Range	Police Range	Broadcast Range
R. F.	A1	None	A2
1st-Detector	A4	None	A3
Oscillator	A10	None	A9
Tracking	None	None	A5

The I. F. trimmers are A6, A7 and A8.



R. F. TRIMMERS ON MODELS 318 AND 447

	12-22.5 MC Range	4.6-12.2 MC Range	1.6-4.6 MC Range	540-1600 KC Range
R. F.	A4	A2	A3	A1
1st-Detector	A8	A6	A7	A5
Oscillator	A13	A14	A12	A11
Tracking	None	None	A10	A9

The I. F. trimmers are A15 to A20, inclusive.

MODEL 944
Alignment
MODEL 145,325
Parts List

ATWATER-KENT MFG. CO.

ADJUSTING TRIMMER CONDENSERS (Contd.)

1.6 to 4.6 MC range. Oscillator at 4 MC and dial pointer at 4 MC, peak trimmers A12, A3 and A7. Tune oscillator to 1.7 MC, and with dial pointer at 1.7, peak A10. Repeat adjustments on A12 at 4 MC and A10 at 1.7 MC if necessary.

Broadcast range. Oscillator at 1500 KC and dial pointer at 1500 KC mark, peak trimmers A11, A1 and A5. Tune oscillator to 560 KC, turn dial pointer to 560 KC mark, and peak A9. Repeat adjustments on A11 at 1500 KC and A9 at 560 KC if necessary.

MODEL 944

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector by means of the I. F. coupling unit shown in Fig. 1. Adjust the I. F. oscillator to 450 KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter, with the condenser A5 turned well out in counter-clockwise direction (when facing rear of chassis). Peak the I. F. trimmers A3 and A4 for maximum output. Now turn the regenerative control condenser "in" (clockwise from rear of chassis) until a "squeal" or audio howl indicating oscillation of the I. F. stage, then back off about one-quarter turn, or until the audio howl stops. The adjustments of the I. F. trimmers should again be checked for peak—*i. e.*, the peaking procedure and adjustment of the regenerative condenser should be repeated until maximum output is obtained.

R. F. TRIMMERS.

Check the dial setting by turning the gang condenser to maximum position and observing, by means of steel scale held vertically over the condenser shaft axis, whether the 540 KC mark on the dial is perpendicular to a line along the top of the condenser frame in back of the dial. Connect an R. F. oscillator to the antenna and ground terminals of the set. Use the weakest possible signal to give a reading on the output meter. Loosen the trimmer screws. Tune the oscillator to 1500 KC and turn the tuning knob of the set to a dial mark half way between 140 and 150 and perpendicular to a line along the top of the condenser frame. (Determined as explained in setting dial at 540 KC.) Peak the trimmers A1 and A2 for maximum output. Retune oscillator and set to 1100 KC and check regenerative condenser A5 adjustment for maximum sensitivity—*i. e.*, one-quarter turn below audio howl. If oscillation occurs at any other point on the dial after the above adjustments, it will be necessary to again turn back a fraction of a turn on the condenser A5.

Note.—1st-detector grid clip must be inside of shield can when adjusting the R. F. trimmers.

PARTS LIST

MODEL 145

28839	Cabinet less screen
27906	Screen
27945	Escutcheon and crystal assem.
27388	Crystal
27431	Var. cond. assem.
27692	Tuning gear
27574	Dial plate holder
27947	Dial pointer holder
27522	Dial pointer
27535	Pointer screw
27523	Dial plate
24323	Power trans. cover
25056	I. F. T. shield
27485	Range switch
19566	110 V. cable
40090	Pilot light assem.
28827	Dial lamp socket
26526	Ferrule and bushing
26524	Spring
22683	Tube shield
28281	Front and back plate assem.
28594	Tuning shaft assem.
22657	Dial rubber and bushing
25058	I. F. T. shield cover
25059	I. F. T. shield cover (hole)
27676	Pilot lamp, 2.5 V. (frosted)
27425	Vol. control, .5 Ʊ
39620	Tone control switch assem.
28192	Shaft and blade for above
27562	Inst. sheet, F-1149
27867	Shipping container

TRANSFORMERS

T1	39820	No. 1 R. F. T.
T2	39830	No. 2 R. F. T.
T3	39840	Oscillator T.
T4	27789	No. 1 I. F. T.
T5	27791	No. 2 I. F. T.
T6	28621	Output T.
T7	25191	Power T.

MODEL 145 (Contd.)

RESISTORS

(For tubular resistors see page 19.)

R6	28950	Flexible, 160 Ω

CONDENSERS

(For tubular condensers see page 18.)

C1	25035	.006 MF, blue, blk. and red
C3	27650	8 MMF
C4	33670	250 MMF, 500-V., mica
C7	33930	25 MMF
C8	39660	730 MMF
C10	33670	250 MMF, 500-V., mica
C10A	33670	250 MMF, 500-V., mica
C18	22538	8 MF, 475 V.
C19	27585	8 MF, 350 V.

TRIMMERS

A4	39630	Rear
A5,6	32880	T4
A7	36570	T5
A8	38890	Front

CHOKES

CK1	28623	On speaker
CK2	40140	R. F. choke

MODEL 145 (Contd.)

SOCKETS

24494	6 prong
24492	4 prong
21336	Speaker
26111	7 prong

MODEL 145 SPEAKER

42100	Complete speaker
28619	Diaphragm assem.
28621	Output trans. (T6)
28622	Field coil
28623	Choke coil (CK1)

MODEL 325

(For parts not listed below refer to Model 145.)

27985	Bottom plate
27946	Escutcheon and crystal assem.
28535	Dial plate
40140	R. F. choke (CK2)
27865	Shipping container

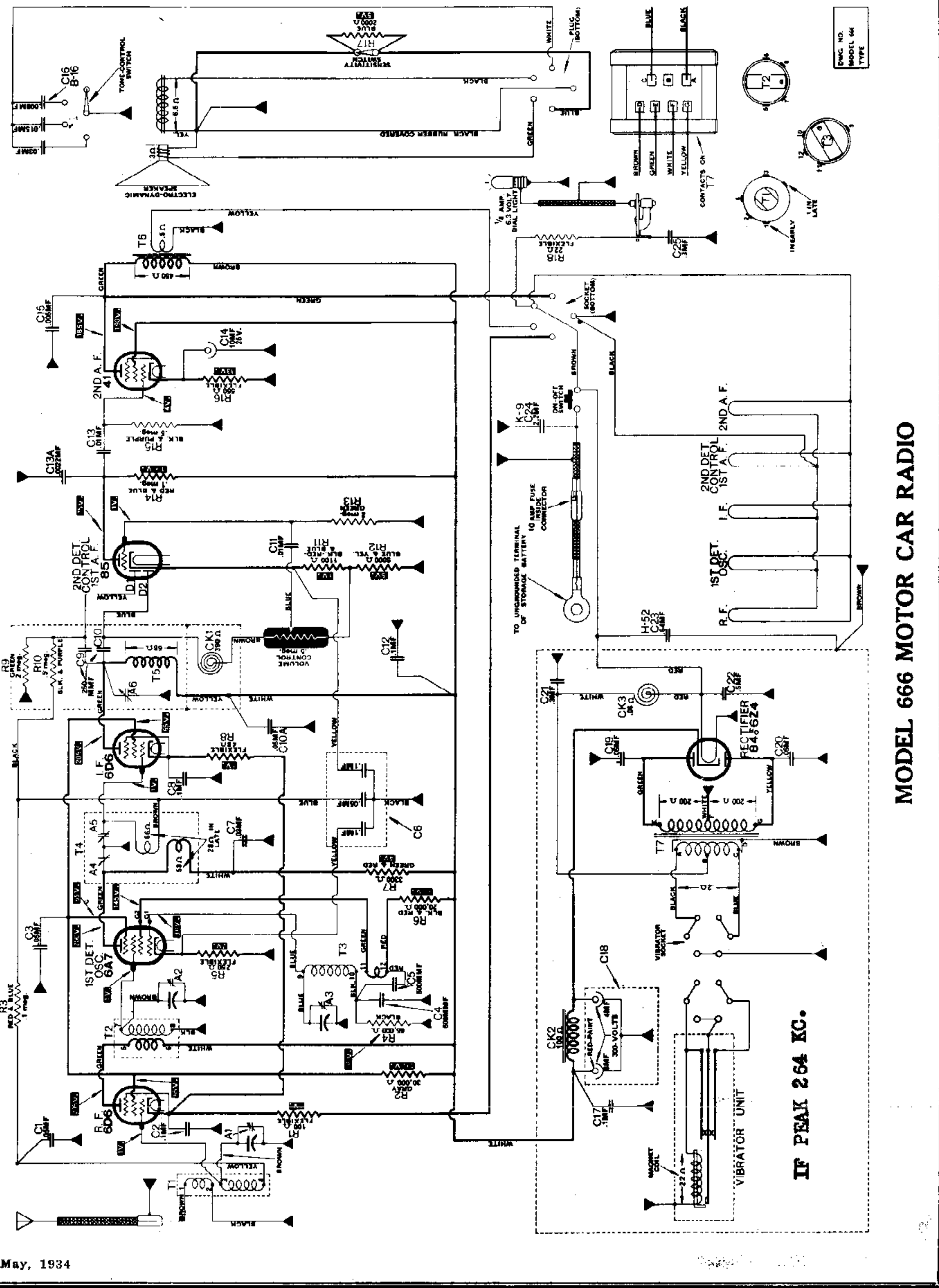
MODEL 325 SPEAKER 41800

27661	Cone housing
25525	Choke (CK1)
21260	Field coil
20737	Diaphragm
20657	Cable and plug assem.
18582	Plug only
19469	Segment

Ω = ohms. Ʊ = megohms.

MODEL 666
Schematic

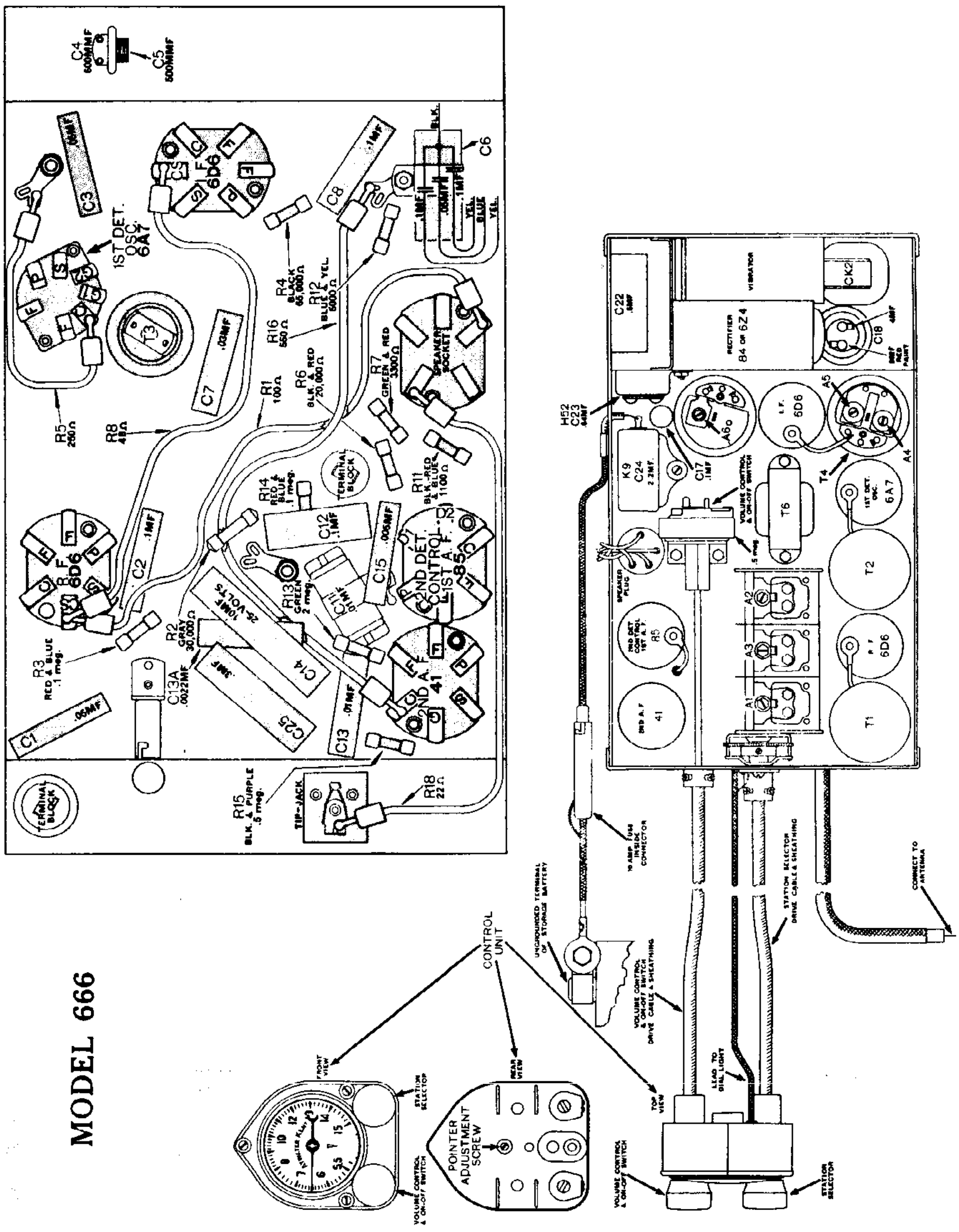
ATWATER-KENT MFG. CO.



May, 1934

MODEL 666
Socket, Trimmer
Parts Layout

ATWATER-KENT MFG. CO.



ATWATER-KENT MFG. CO.

MODEL 666

Part No.	Name of Part
27052	Set container complete, less lid
27033	Set container lid
26523	Rubber gasket
26549	Tuning cable bushing
26036	Inner plate for above
25482	Bolt 2½" x ⅜"
24485	Lockwasher ⅜"
24486	Nut ⅜"
26462	Variable condenser assembly
26589	Shield for No. 1 R. F. T. (early short)
27095	Shield for No. 1, 2 R. F. T. (late long)
26591	Shield for No. 2 R. F. T. (early short)
26072	I. F. T. shield
26505	Volume control, .5 U
26033	Volume control bracket
26039	Coupling
23260‡	Generator condenser
24540	Tone control switch complete
22297	Switch shaft and blade
13664	Sensitivity switch
26127	Knob (tone)
26598	Cloth
26983	Wire screen

‡ In late 666 a No. 38270 tubular condenser is supplied.

TRANSFORMERS

Code No.	Part No.	Name of Part
T1*	38010	No. 1 R. F. T. (late type)
T2*	38020	No. 2 R. F. T. (late type)
T3	37890	Oscillator T
T4*	27096	No. 1 I. F. T. (late type)
T5	26593	No. 2 I. F. T.
T6	26982	Output T.
T7	26291	Power T.

* Below Serial No. 8148331 T1 is part No. 35680, T2 is part No. 35690, T4 is part No. 26592.

RESISTORS

R1	20040	Flexible, 100 Ω
R2	20970	Gray, 30,000 Ω, ½-W.
R3	30340	Red-blue, .1 U, 1/3-W.
R4	31980	Bl'k, 65,000 Ω, 1/3-W.
R5	31830	Flexible, 250 Ω
R6	30390	Red-bl'k, 20,000 Ω, 1/3-W.
R7	30380	Red-green, 3300 Ω, 1/3-W.
R8	19820	Flexible, 48 Ω
R9	30370	Green, 2 U, 1/3-W.
R10	30350	Bl'k-purple, .5 U, 1/3-W.
R11	31480	Bl'k-red-blue, 1100 Ω. 1/3-W.
R12	36430	Yel.-blue, 5000 Ω. 1/3-W.
R13	30370	Green, 2 U, 1/3-W.
R14	30340	Red-blue, .1 U, 1/3-W.
R15	30350	Bl'k-purple. .5 U, 1/3-W.
R16	23780	Flexible, 550 Ω
R17	33250	Blue, 2000 Ω, 1/3-W.
R18	16840	Flexible, 22 Ω

CONDENSERS

Code No.	Part No.	Name of Part
C1	31160	.05 MF, 100-V., NI
C2	31530	.1 MF, 100-V., NI
C3	26820	.05 MF, 200-V., NI
C4	36460	600 MMF, 100-V.,
C5	36510	500 MMF, 500-V.
C6	36440	.1, .1, .05, 100-V., I
C7	29530	.03 MF, 200-V, NI
C8	31530	.1 MF, 100-V.
C9	33670	250 MMF, 500-V.
C10	33670	250 MMF, 500-V.
C10A	26820	.05 MF, 200-V., NI
C11	23250	.01 MF, 450-V.
C12	26660	.1 MF, 200-V., NI
C13	32810	.01, 450-V., NI
C13A	33660	.0022 MF, 450-V., IND.
C14	25379	10 MF, 25-V.
C15	28040	.005 MF, 200-V., IND.
C16*	30270	.008, .015, .03 MF (B16)
C17	26660	.1 MF, 200-V., NI
C18	26995	4 MF-8 MF, 300-V.
C19	36490	.05 MF, 450-V., NI
C20	36490	.05 MF, 450-V., NI
C21	31150	.3 MF, 100-V., NI
C22	31510	.5 MF, 100-V., NI
C23	36480	.64 MF, H 52, 200-V.
C24	37760	2.2 MF, 100-V., K9
C25	31150	.3 MF, 100-V., NI

* In late 666 this condenser is No. 38160, using clamps Nos. 27208 and 27209.

TRIMMERS

Code No.	Part No.	Name of Part
A4, 5	32880	Double I. F. trimmer
A6	36570	Single I. F. trimmer

CHOKES

Code No.	Part No.	Name of Part
CK1	26594	2nd det. plate choke, 390 Ω
CK2	27011	"B" filter choke, 100 Ω
CK3	36630	"A" filter choke, .06 Ω

SOCKETS

Part No.	Name of Part
24493	5 prong
24494	6 prong, 85 and 41
27023	6 prong, R. F. and I. F.
26111	7 prong
26572	Tip jack

POWER UNIT ASSEMBLY
(Miscellaneous parts)

Part No.	Name of Part
26986	Vibrator socket (6 prong)
26985	Rectifier socket (5 prong)
27005	Vibrator
26997	Container
26761	Lid for above
25408	Oval head screw
15648	Filister head screw
26046	Mounting bracket (T7)

MISCELLANEOUS

Part No.	Name of Part
27034	Instruction folder F-1127
21406	Fuse 10A
26451	I. F. tube shield (short)
27042	85 tube shield (long)

SPEAKER

Part No.	Name of Part
26851	Speaker, less cable
26826	Conehead assembly
26827	Field coil, 6.5 Ω
26559	Cable and plug assembly

REMOTE CONTROL HEAD
(Same as used on Model 815

1934 Set Model Specifications

ATWATER-KENT MFG. CO.

The last figure in the model number indicates the number of tubes; for instance, Model 165 has 5 tubes; Model 310 has 10 tubes, etc. The letter "Q" indicates battery operation; the letter "D" indicates D. C. operation.

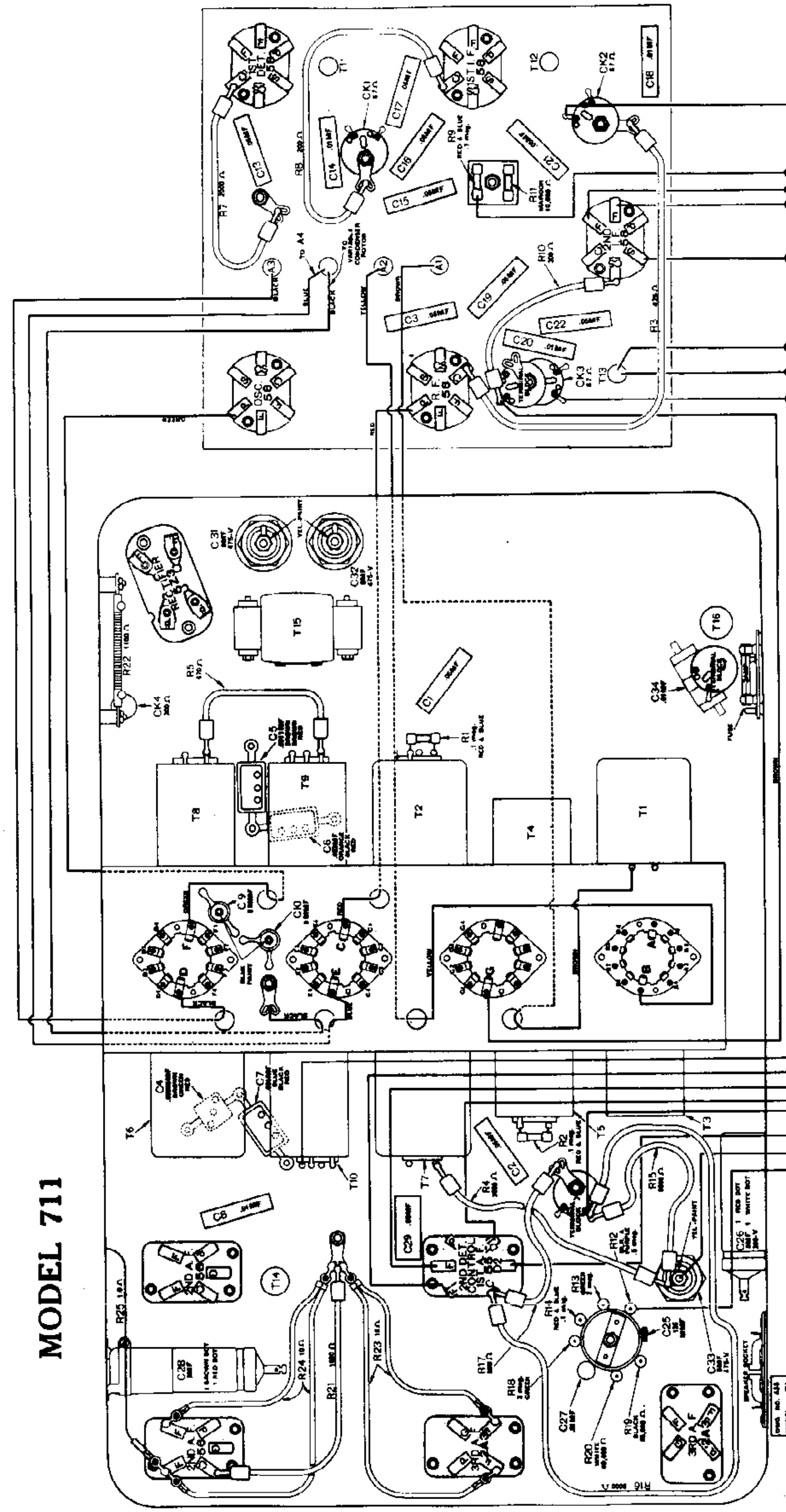
All models listed below have tone control, and all models with exception of 387, 427Q, 165Q and 525Q have automatic volume control. All models have dynamic speakers, with exception of 165Q and 525Q, which have special magnetic speakers.

Cabinet Description	Model Number	Power Supply	Part No. Complete	Part No. Speaker	Wattage	Shadow Tuning	Silencing Adjustment	Frequency Range	Intermediate Frequency	Tubes: R. F.	1st Det.	Oscillator	I. F.	2nd Det.	Control	1st A. F.	2nd A. F.	3rd A. F.	Rectifier
Compact, arch top	165	110V, 60C	34000	34100	60	NO	NO	540-1712†	264	..	57		58	—2A6—			2A5	..	80
Compact, arch top	165Q	Battery	38700	37170	††	NO	NO	540-1712†	264	..	1A6		34	32	..	30	19	..	..
Compact, modern	185	110V, 60C	38300	34100	60	NO	NO	540-1712†	264	..	57		58	—2A6—			2A5	..	80
Compact, modern	185A	110V, 60C	40000	34100	60	NO	NO	540-1700‡‡	264	..	2A7		58	—2A6—			2A5	..	80
Compact, arch top	217	110V, 60C	35500	36300	70	NO	NO	540-3200	264	58	58	56	58	—55—			2A5	..	80
Compact, arch top	217D	110V, D.C.	36900	37500	45	NO	NO	540-3200	264	78	78	37	78	—75—			43 (2)	..	
Compact, modern	275	110V*	36200	26159	50	NO	NO	540-1750*	264	..	6A7		44	—75—			43	..	25Z5
Console, rounded front	310	110V, 60C	35900	36500	120	YES	YES	540-3200	130	58	58	56	58	56	56	56	2A5 (2)	..	80
Compact, arch top	387	Battery	35200	31700	**	NO	NO	550-1500**	264	34	1A6		34	32	..	30	30 (2)	..	..
Console	425	110V, 60C	39500	33400	60	NO	NO	540-3200	264	..	57		58	—2A6—			2A5	..	80
Console	427	110V, 60C	35600	33400	70	NO	NO	540-3200	264	58	58	56	58	—55—			2A5	..	80
Console	427D	110V, D.C.	37000	37600	45	NO	NO	540-3200	264	78	78	37	78	—75—			43 (2)	..	..
Console	427Q	Battery	35800	36400	**	NO	NO	550-1500**	264	34	1A6		34	32		30	30 (2)	..	..
Console, modern	510	110V, 60C	36000	36500	120	YES	YES	540-3200	130	58	58	56	58	56	56	56	2A5 (2)	..	80
Console	525	110V, 60C	38400	38500	60	NO	NO	540-1712†	264	..	57		58	—2A6—			2A5	..	80
Console	525Q	Battery	39100	39200	††	NO	NO	540-1712†	264	..	1A6		34	32		30	19	..	..
Single unit, remote control	534	6V (Auto)	35100	25534	4A	NO	NO	540-1500	450	..	77		44	—75—			41	..	..
Console, modern	665	110V, 60C	39600	33400	60	NO	NO	540-3200	264	..	57		58	—2A6—			2A5	..	80
Single unit, remote control	666	6V (Auto)	39900	26851	6A	NO	NO	540-1500	264	6D6	6A7		6D6	—85—			41	..	6Z4
Console, modern	667	110V, 60C	36100	33400	70	NO	NO	540-3200	264	58	58	56	58	—55—			2A5	..	80
Console, modern	667D	110V, D.C.	37100	37600	45	NO	NO	540-3200	264	78	78	37	78	—75—			43 (2)	..	
Console***	711J or T	110V, 60C	36600	36700	150	YES	YES	540-23MC	472½	58	58	58	58 (2)	—55—			56 (2)	2A3 (2)	5Z3
Console, modern	711R	110V, 60C	36800	36700	150	YES	YES	540-23MC	472½	58	58	58	58 (2)	—55—			56 (2)	2A3 (2)	5Z3
Console***	788J or T	110V, 60C	39300	39400	70	YES	YES	540-23MC	472½	58	58	58	58 (2)	—2A6—			2A5	..	80
Console, modern	788R	110V, 60C	39700	39400	70	YES	YES	540-23MC	472½	58	58	58	58 (2)	—2A6—			2A5	..	80
Console	808A	110V, 60C	34600	34500	70	YES	NO	540-20MC	472½	58	58	58	58 (2)	—2A6—			2A5	..	80
Single unit, remote control	816	6V (Auto)	37400	26851	5A	NO	NO	540-1500	264	39‡	6A7		39‡	—85—			41 (2)	..	..
Single unit, remote control	926	6V (Auto)	39000	26851	6A	NO	NO	540-1500	264	39‡	6A7		39‡	—85—			41 (2)	..	..
Separate speaker, remote control	936	6V (Auto)	38800	38900	6A	NO	NO	540-1500	264	39‡	6A7		39‡	—85—			41 (2)	..	..

* Model 275 may be used on 110 Volts, 25-60 cycles, or 110 Volts, D. C. It has a police switch to tune in the 2400-kilocycle police band.
† Has police switch to tune in the 2400-kilocycle police band.
** The "B" consumption of Models 387 and 427Q is from 20 to 27 milliamperes depending on signal strength and volume level. (25 milliamperes is average.) Late Models 387 and 427Q have a police switch for both police bands.
†† The "B" consumption of Models 165Q and 525Q is from 16 to 25 milliamperes depending on signal strength and volume level. (22 milliamperes is average.)
*** The J cabinet is rounded-front. The T cabinet has doors.
‡ Late 816 926 and 936 utilize 6D6 tubes instead of 39 tubes for R. F. and I. F.
‡‡ Model 185A also covers the short-wave range of 5.5 to 15.5 megacycles, which includes the four principal international short-wave broadcast bands.

MODEL 711
Chassis Wiring

ATWATER-KENT MFG. CO.



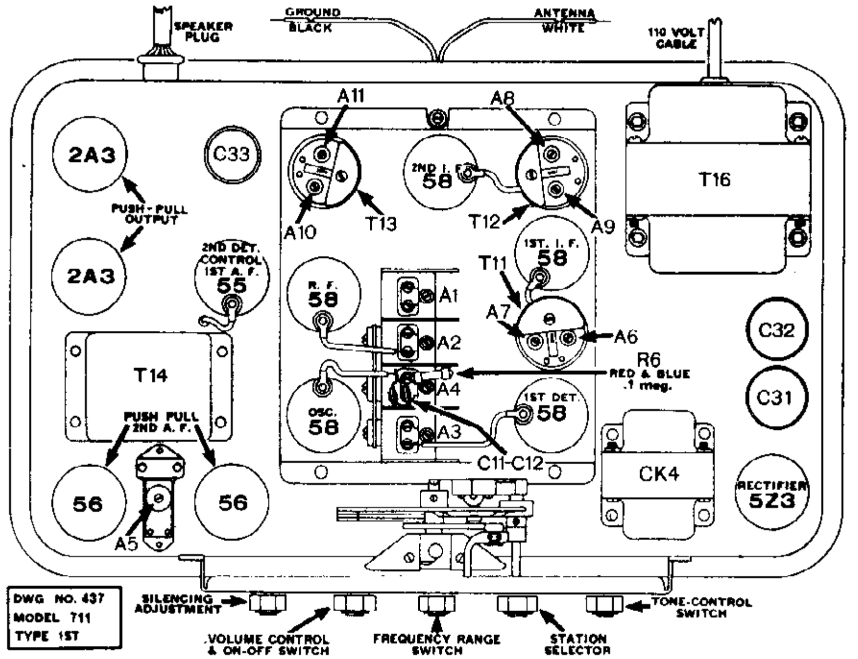
MODEL 711

This bottom chart shows all connections between the upper tube base and the main base.

In late 711, the R. F. bias resistor R3 is grounded at the front ground lug (near C13) instead of as shown, in order to reduce tendency to oscillation.

MODEL 711
Socket, Trimmers
Parts List

ATWATER-KENT MFG. CO.



MODEL 711

Part No.	Name of Part
26441†	Front panel complete with escutcheon
25923	Escutcheon
25737	Knob—volume and station selector (711R)
25738	Knob—tone and silencing adjustment (711R)
27003†	Knob—range switch (711R)
25145	Knob—tone and silencing adjustment (711T-J)
25811	Knob—volume and station selector (711T-J)
27002†	Knob—range switch (711T-J)
25924†	Dial plate
25689	Shadow tuning indicator
25839	Range switch
34520	Tone control switch complete
25846	Variable condenser assembly

† The range switch, knob and dial in late Model 711 sets have colored dots. Only the late type knobs, dials and panel assemblies are furnished for service.

Part No.	Name of Part
25798	Volume control, .5 U
26338	Silent tuning adjustment, 14,000 Ω

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	34830	No. 1 R. F. T.
T2	34840	No. 2 R. F. T.
T3	34870	No. 1 H. F., 1st range
T4	34890	No. 1 H. F., 2nd range
T5	34920	No. 1 H. F., 3rd range
T6	34850	No. 3 R. F. T.
T7	34860	Oscillator T.
T8	34880	No. 2 H. F., 1st range
T9	34910	No. 2 H. F., 2nd range
T10	34930	No. 2 H. F., 3rd range
T11	26251	No. 1 I. F. T.
T12	25503	No. 2 I. F. T.
T13	25503	No. 3 I. F. T.
T14	35350	Audio T. unit
T15	26207	Output T.
T16	26257	Power T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30340	Red-blue, .1 U, 1/3-W.
R2	30340	Red-blue, .1 U, 1/3-W.
R3	17380	Flexible, 425 Ω
R4	33230	Flexible, 2000 Ω
R5	33210	Flexible, 670 Ω
R6	20980	Red-blue, .1 U, ½-W.
R7	21030	Flexible, 2000 Ω
R8	25950	Flexible, 200 Ω
R9	30340	Red-blue, .1 U, 1/3-W.
R10	25840	Flexible, 300 Ω
R11	30320	Mar'n, 10,000 Ω, 1/3-W.
R12	20930	Bl'k-pur., .5 U, ½-W.
R13	20940	Green, 2 U, ½-W.
R14	20980	Red-blue, .1 U, ½-W.
R15	24340	Flexible, 8000 Ω
R16	24340	Flexible, 8000 Ω
R17	20120	Flexible, 800 Ω
R18	20940	Green, 2 U, ½-W.
R19	21041	Bl'k, 65,000 Ω, ½-W.
R20	26160	White, 40,000 Ω, ½-W.
R21	20380	Flexible, 1500 Ω
R22	19180	Iron core, 1100 Ω
R23	17077	Flexible, 10 Ω, white-bl'k tracer
R24	17077	Flexible, 10 Ω, white-bl'k tracer
R25	31860	Flexible, 1.0 Ω, yellow

CONDENSERS

Code No.	Part No.	Name of Part
C1	31160	.05 MF, 100-V., NI
C2	31160	.05 MF, 100-V., NI
C3	31160	.05 MF, 100-V., NI
C4	25032	.00025 MF, 450-V.
C5	25837	.0011 MF, 450-V.
C6	25034	.003 MF, 450-V.
C7	25035	.006 MF, 450-V.
C8	32810	.01 MF, 450-V.
C9	36220	8 MMF, 500-V.
C10	36220	8 MMF, 500-V.
C11	25661	8 MMF, 500-V.
C12	25661	8 MMF, 500-V.
C13	31160	.05 MF, 100-V., NI
C14	32810	.01 MF, 450-V., NI
C15	31160	.05 MF, 100-V., NI
C16	31160	.05 MF, 100-V., NI
C17	31160	.05 MF, 100-V., NI
C18	32810	.01 MF, 450-V., NI
C19	31160	.05 MF, 100-V., NI
C20	32810	.01 MF, 450-V., NI
C21	31160	.05 MF, 100-V., NI
C22	31160	.05 MF, 100-V., NI
C23	35290	125 MMF, 500-V.
C24	35290	125 MMF, 500-V.
C25	26670	125 MMF, 500-V.
C26	25384	8 MF, 300-V.
C27	27630	.01 MF, 200-V.
C28	25385	8 MF, 250-V.
C29	35420	.08 MF, 200-V., NI
C30†	29690	Tone control condenser (B15)
C31	22538	8 MF, 475-V.
C32	22538	8 MF, 475-V.
C33	22538	8 MF, 475-V.
C34	23250	.01 MF, 450-V.

† In late sets this condenser is No. 38260.

CHOKES

Code No.	Part No.	Name of Part
CK1	19210	1st detector plate filter choke
CK2	19210	1st I. F. plate filter choke
CK3	19210	2nd I. F. plate filter choke
CK4	25894	Audio filter choke

TRIMMER

Code No.	Part No.	Name of Plate
A5	20190	Single I. F. trimmer
A6, 7	32880	Double I. F. trimmer
A8, 9	32880	Double I. F. trimmer
A10, 11	32880	Double I. F. trimmer

SOCKETS

Part No.	Name of Part
22733	6 prong, lower base
22734	5 prong, lower base
22689	Rectifier socket
22735	4 prong, lower base
21336	Speaker, 4 prong
18449	Fuse socket
24494	6 prong, upper base

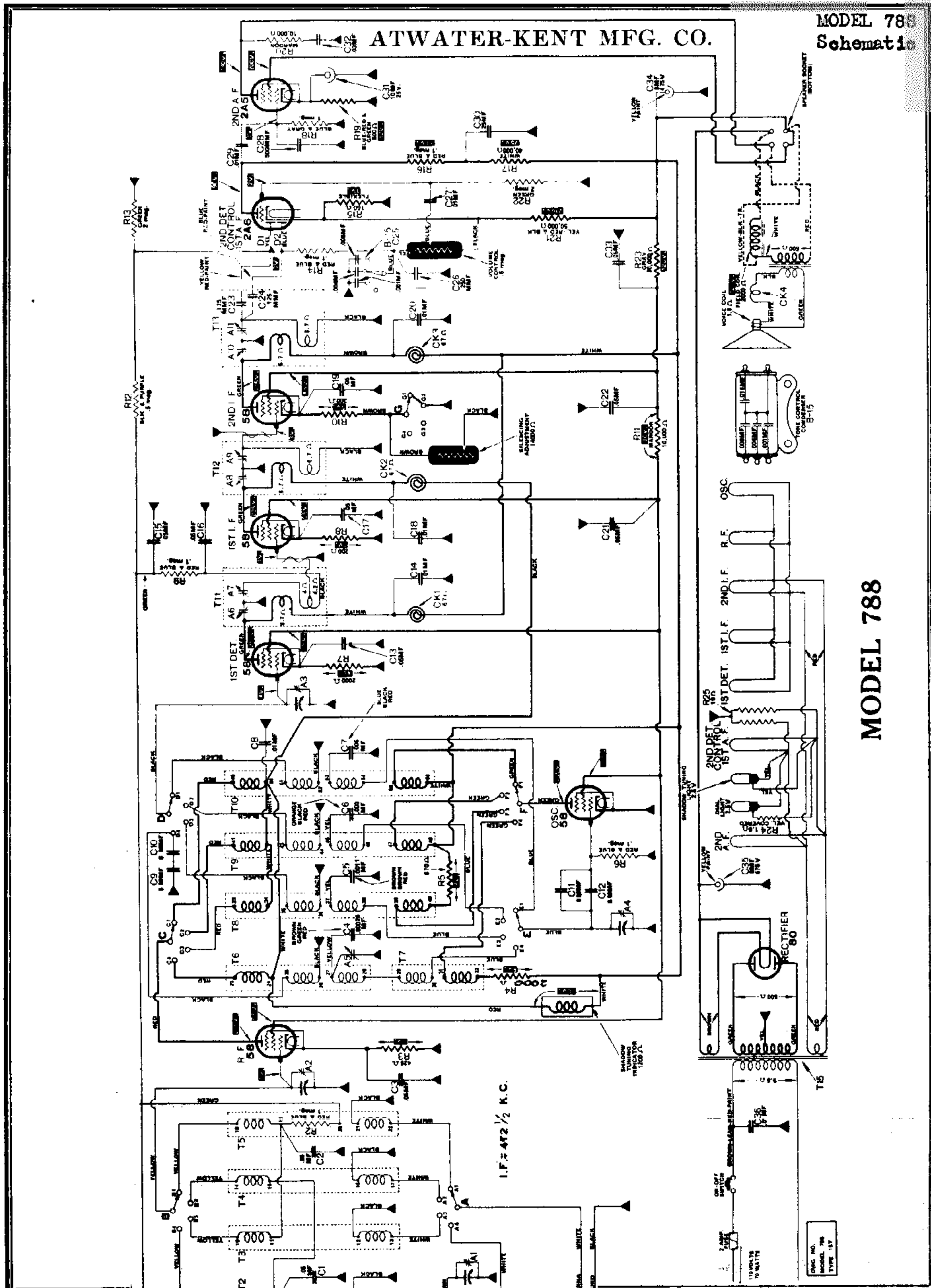
MISCELLANEOUS

Part No.	Name of Part
25059	I. F. T. shield cap (with hole)
25058	I. F. T. shield cap (without hole)
22865	Bottom plate
22683	Tube shield
26255	I. F. T. shield insulator
25056	I. F. T. shield
25906	Filter choke cover
25758	Power T. cover
26254	Power T. insulator
35380	Dial light socket and reflector
15404	Dial lamp (2.5-V.)
26793	Instruction folder, F1123
26237	Shipping container
26218	Shields for T1, 2, 6, 7
26217	Shields for T8, 9, 10
26216	Shields for T3, 4, 5
27072	Wave guide, F1131
23774	Fuse 3A
26934	Tuning inst. tag, F1124

711 SPEAKER No. 36700

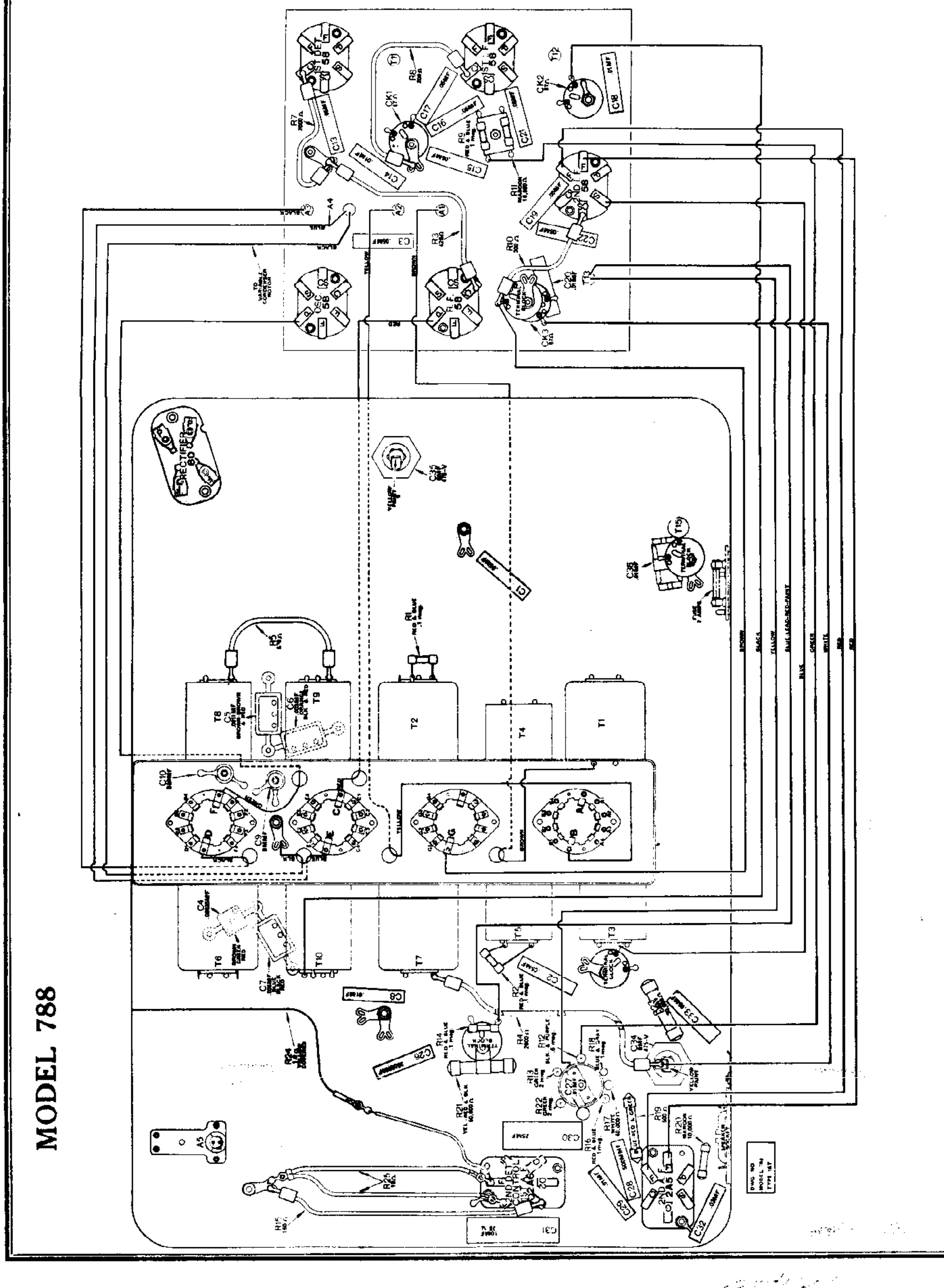
Part No.	Name of Part
26243	Diaphragm
23668	Cable and plug
35080	Field coil (325 Ω)
15079	Speaker plug

Ω = ohms. U = megohms. IND. = inductive. NI = non-inductive. W. = watt.


ATWATER-KENT MFG. CO.
MODEL 788
I.F. = 472 1/2 K.C.
2ND A F 2A5
2ND DET CONTROL 1ST A F 2A6
2ND I F 58
1ST I F 58
1ST DET 58
OSC 58
R F 58
RECTIFIER 80

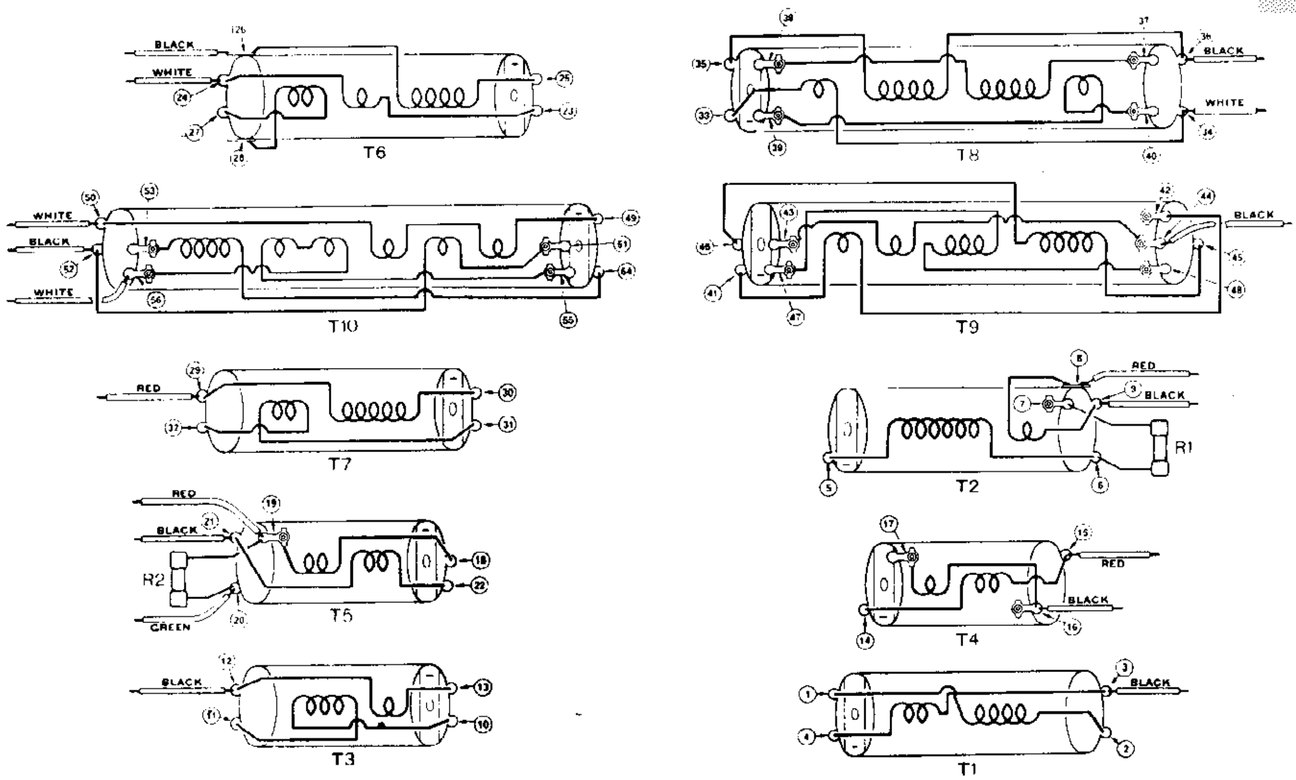
MODEL 788
Chassis Wiring

ATWATER-KENT MFG. CO.

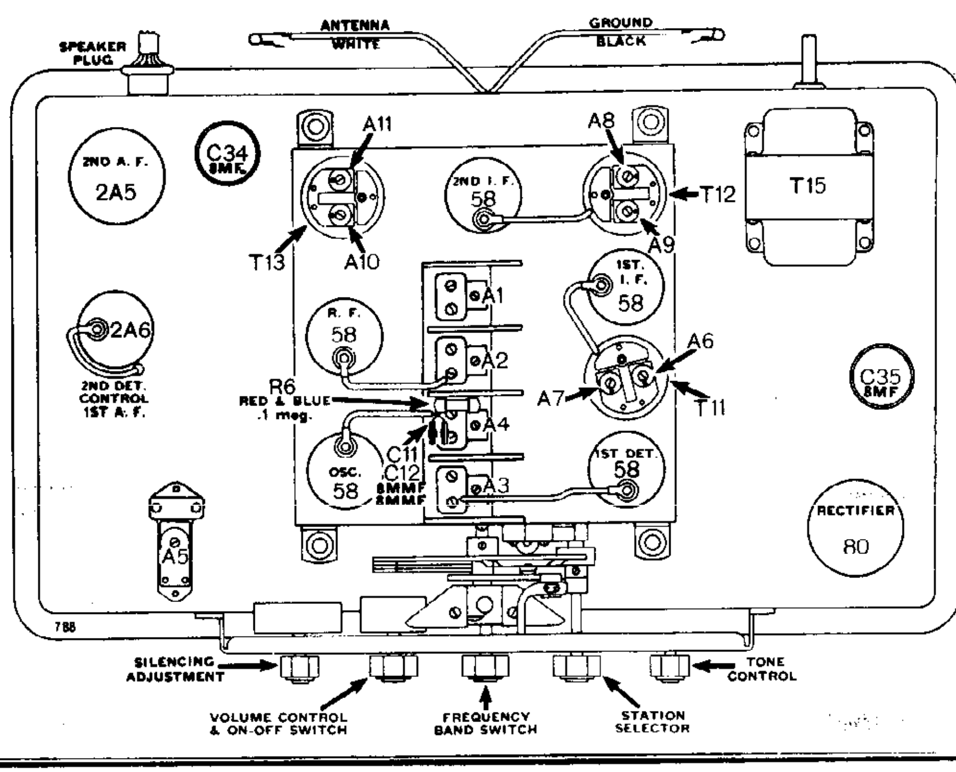


ATWATER-KENT MFG. CO.

MODELS 711 AND 788 R. F. TRANSFORMERS



MODEL 788



MODEL 788
Parts List

ATWATER-KENT MFG. CO.

MODEL 788

Part No.	Name of Part
27238*	Front panel complete with escutcheon
26775	Escutcheon
25737	Knob—volume and station selector (788R)
25738	Knob—tone and silencing adjustment (788R)
27003*	Knob—range switch (788R)
25145	Knob—tone and silencing adjustment (788R)
25811	Knob—volume and station selector (788T)
27002*	Knob—range switch (788T)
25924*	Dial plate
25839	Range switch
25689	Shadow tuning indicator
27245	Shadow tuning indicator screen
34520	Tone control switch complete
26339	Shaft and blade
25846	Variable condenser assembly
25798	Volume control, .5 U
26338	Silent tuning adjustment, 14,000 Ω

* The range switch knob and dial in late Model 788 sets have colored dots. Only the late type knobs, dials and panel assemblies are furnished for service.

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	34830	No. 1 R. F. T.
T2	34840	No. 2 R. F. T.
T3	34870	No. 1 H. F. coil, 1st range
T4	34890	No. 1 H. F. coil, 2nd range
T5	34920	No. 1 H. F. coil, 3rd range
T6	34850	No. 3 R. F. T.
T7	34860	Oscillator T.
T8	34880	No. 2 H. F. coil, 1st range
T9	34910	No. 2 H. F. coil, 2nd range
T10	34930	No. 2 H. F. coil, 3rd range
T11	26251	No. 1 I. F. T.
T12	25503	No. 2 I. F. T.
T13	25503	No. 3 I. F. T.
T14	21672	Output T.
T15	25221	Power T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30340	Red-blue, .1 U, 1/3-W.
R2	30340	Red-blue, .1 U, 1/3-W.
R3	17380	Flexible, 425 Ω
R4	33230	Flexible, 2000 Ω
R5	33210	Flexible, 670 Ω
R6	20980	Red-blue, .1 U, ½-W.
R7	21030	Flexible, 2030 Ω
R8	25950	Flexible, 200 Ω
R9	30340	Red-blue, .1 U, 1/3-W.
R10	25840	Flexible, 300 Ω
R11	30320	Mar'n, 10,000 Ω, 1/3-W.
R12	20930	Bl'k-purple, .5 U, ½-W.
R13	20940	Green, 2 U, ½-W.
R14	30340	Red-blue, .1 U, 1/3-W.
R15	28950	Flexible, 160 Ω
R16	20980	Red-blue, .1 U, ½-W.
R17	26160	White, 40,000 Ω, ½-W.
R18	30360	Blue-gray, 1 U, 1/3-W.
R19	32010	Blue-red-green, 500 Ω, 1-W.
R20	20950	Maroon, 10,000 Ω, ½-W.
R21	34340	Yel.-red-bl'k, 50,000 Ω, 1½-W.
R22	20940	Green, 2 U, ½-W.
R23	29710	Gray, 30,000 Ω, 1½-W.
R24	31860	Flexible, 1.0 Ω
R25	17077	Flexible, 10 Ω

CONDENSERS

Code No.	Part No.	Name of Part
C1	31160	.05 MF, 100-V., NI
C2	31160	.05 MF, 100-V., NI
C3	31160	.05 MF, 100-V., NI
C4	25032	.00025 MF, 450-V.
C5	25837	.0011 MF, 450-V.
C6	25034	.003 MF, 450-V.
C7	25035	.006 MF, 450-V.
C8	32810	.01 MF, 450-V.
C9	27650	8 MMF, 500-V.
C10	27650	8 MMF, 500-V.
C11	25661	8 MMF, 500-V.
C12	25661	8 MMF, 500-V.
C13	31160	.05 MF, 100-V., NI
C14	32810	.01 MF, 450-V., NI
C15	31160	.05 MF, 100-V., NI
C16	31160	.05 MF, 100-V., NI
C17	31160	.05 MF, 100-V., NI
C18	32810	.01 MF, 450-V., NI
C19	31160	.05 MF, 100-V., NI
C20	32810	.01 MF, 450-V., NI
C21	31160	.05 MF, 100-V., NI
C22	31160	.05 MF, 100-V., NI
C23	35290	125 MMF, 500-V.
C24	35290	125 MMF, 500-V.
C25†	29690	.001-.004-.008-.016 MF (B15)
C26	33620	250 MMF, IND.
C27	27630	.01 MF, 200-V., NI
C28	28130	500 MMF, 450-V., IND.
C29	27630	.01 MF, 200-V., NI
C30	35930	.25 MF, 200-V., NI
C31	25379	10 MF, 25-V.
C32	29530	.03 MF, 200-V., NI
C33	31160	.05 MF, 100-V., NI
C34	22538	8 MF, 475-V.
C35	22538	8 MF, 475-V.
C36	23250	.01 MF, 450-V.

† In late sets this condenser is No. 38260.

CHOKES

Code No.	Part No.	Name of Part
CK1	19210	1st detector plate filter choke
CK2	19210	1st I. F. plate filter choke
CK3	19210	2nd I. F. plate filter choke
CK4	25525	Choke on speaker

TRIMMERS

Code No.	Part No.	Name of Part
A5	20190	Single I. F. trimmer
A6, 7	32880	Double I. F. trimmer
A8, 9	32880	Double I. F. trimmer
A10, 11	32880	Double I. F. trimmer

SOCKETS

Part No.	Name of Part
22733	(6 prong) lower base
22689	Rectifier socket
21336	Speaker (4 prong)
18449	Fuse socket
24494	(6 prong) upper base

MISCELLANEOUS

Part No.	Name of Part
25059	I. F. T. shield cap (with hole)
25058	I. F. T. shield cap (without hole)
22865	Bottom plate
22683	Tube shield
26255	I. F. T. shield insulator
18534	Fuse 2A
25056	I. F. T. shield
24323	Power T. cover
25469	Power T. insulator
35380	Dial light socket and reflector
26793	Instruction folder, F-1123
26237	Shipping container
27072	Wave guide, F-1131
26934	Tuning inst. tag, F-1124

788 SPEAKER No. 39400

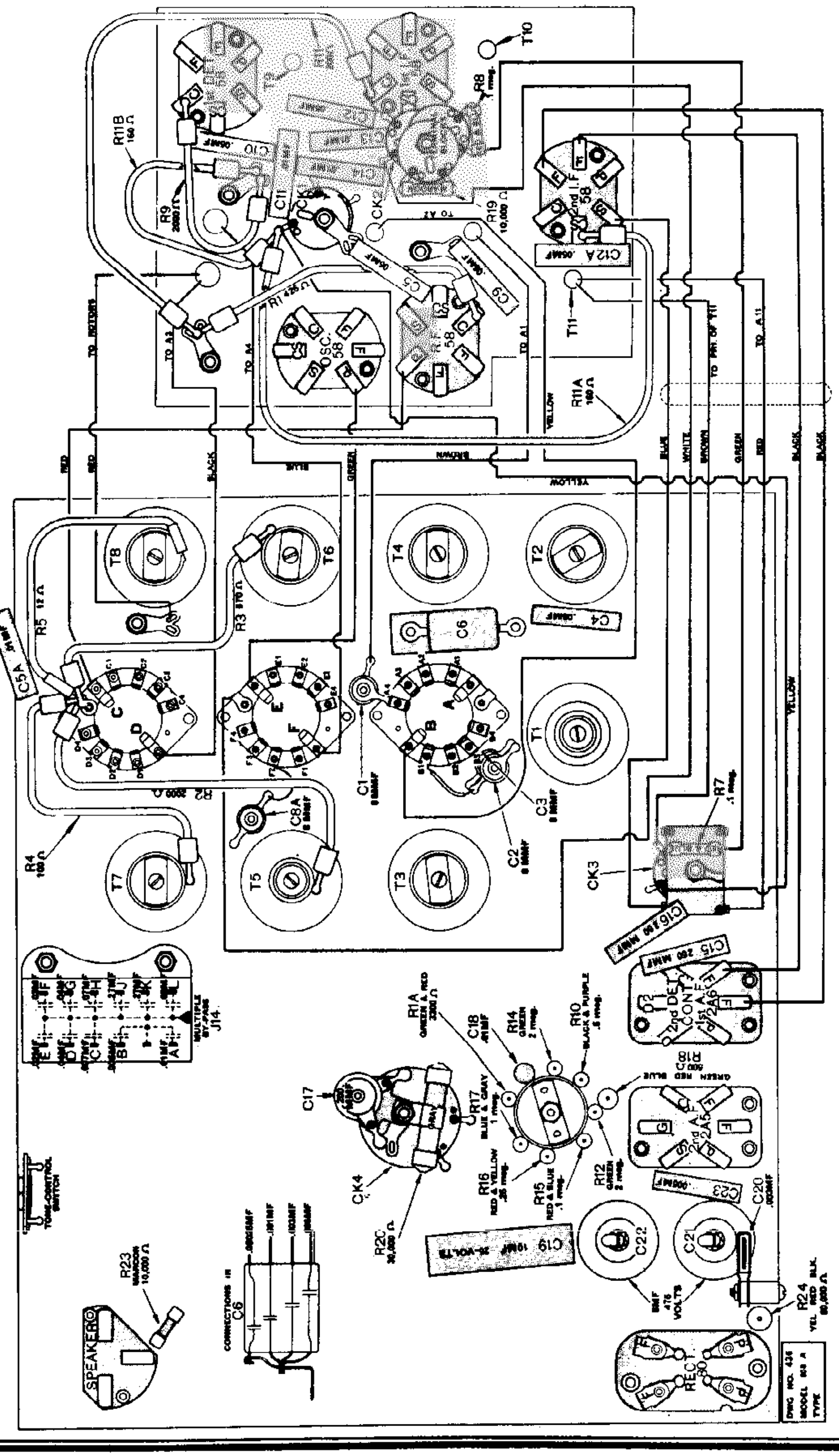
Part No.	Name of Part
20737	Diaphragm
26804	Cable and plug
18870	Field coil
15079	Speaker plug
25525	Choke (CK4)

Ω=ohms. U=megohms. IND.=inductive. NI=non-inductive. W.=watt.

MODEL 808-A
Chassis Wiring

ATWATER-KENT MFG. CO.

MODEL 808-A

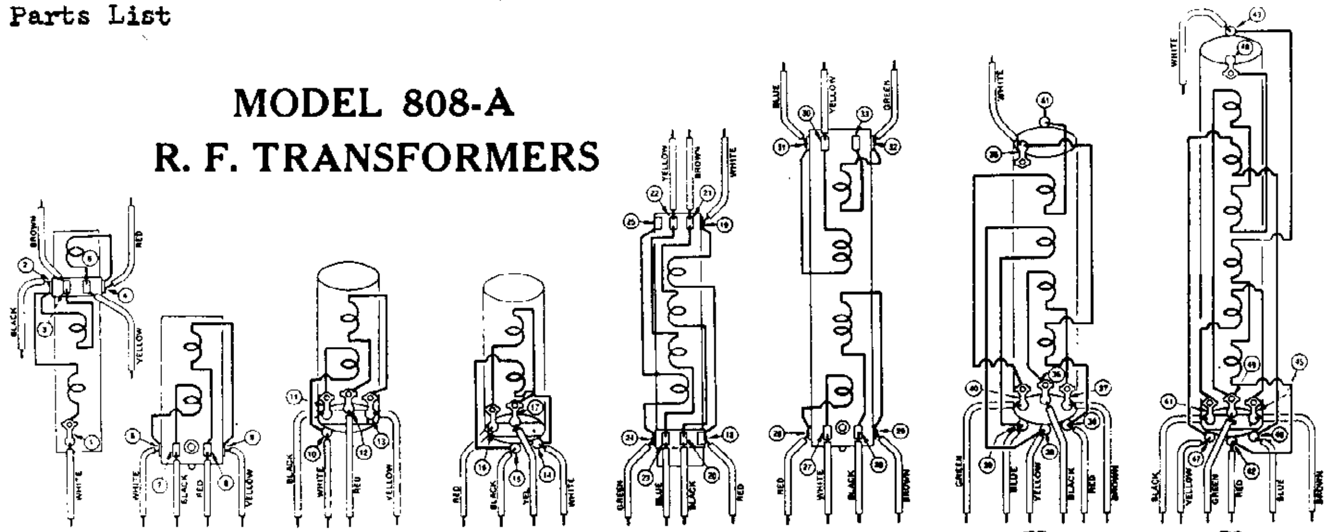


There are three types of quality filter in the plate of the 2A5.
The first type used an .007-MF condenser.
The second type used an .005-MF condenser.
The third type uses resistor R23 in series with .03-MF.

MODEL 808-A
R.F.Transformers
Parts List

ATWATER-KENT MFG. CO.

MODEL 808-A
R. F. TRANSFORMERS



May. 1934

MODEL 808-A

Part No.	Name of Part
24079	Volume control, .5 U
25689	Shadow tuning indicator
15404	Shadow tuning lamp, 2.5-V.
25871	Shadow tuning plate
25736	Knob—tone and frequency
25811	Knob—volume and tuning
24889	Range switch
25023	Variable condenser assembly
30560	Tone control switch
24207	Tone control switch shaft and blade
25144	Dial plate
25273	Dial plate assembly

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	32650	No. 1 broadcast coil
T2	32670	No. 1 H. F. coil, 1st range
T3	32690	No. 1 H. F. coil, 2nd range
T4	32720	No. 1 H. F. coil, 3rd range
T5	32660	No. 2 broadcast coil
T6	32680	No. 2 H. F. coil, 1st range
T7	32710	No. 2 H. F. coil, 2nd range
T8	32730	No. 2 H. F. coil, 3rd range
T9	26135	No. 1 I. F. T. (tapped secondary)
T10	25503	No. 2 I. F. T. (less trimmer)
T11	25503	No. 3 I. F. T. (less trimmer)
T12	21672	Output T.
T13	25221	Power T.

RESISTORS

Code No.	Part No.	Name of Part
R1	17380	Flexible, 425 Ω
R1A	26410	Red-green, 3300 Ω, ½-W.
R2	33230	Flexible, 2000 Ω
R3	33210	Flexible, 670 Ω
R4	33220	Flexible, 100 Ω
R5	33240	Flexible, 12 Ω
R6	20980	Red-blue, .1 U, ½-W.
R7	20980	Red-blue, .1 U, ½-W.
R8	20980	Red-blue, .1 U, ½-W.
R9	21030	Flexible, 2000 Ω
R10	20930	Bl'k-purple, .5 U, ½-W
R11	25950	Flexible, 200 Ω
R11A	28950	Flexible, 160 Ω
R11B	28950	Flexible, 160 Ω
R12	20940	Green, 2 U, ½-W.
R14	20940	Green, 2 U, ½-W.
R15	20980	Red-blue, .1 U, ½-W.
R16	20920	Red-yellow, 250,000 Ω, ½-W.
R17	30360	Blue-gray, 1 U, 1/3-W.
R18	32010	Blue-red-green, 500 Ω, 1-W.
R19	20950	Maroon, 10,000 Ω, ½-W.
R20	29710	Gray, 30,000 Ω, 1½-W.
R21	17077	Flexible, 10 Ω
R22	31860	Flexible, 1 Ω
R23	20950	Maroon, 10,000 Ω, ½-W.
R24	34340	Yel.-red-bl'k, 50,000 Ω, 1½-W.

CONDENSERS

Code No.	Part No.	Name of Part
C1	27650	8 MMF, 500-V.
C2	27650	8 MMF, 500-V.
C3	27650	8 MMF, 500-V.
C4	31160	.05 MF, 100-V., NI
C5	31160	.05 MF, 100-V., NI
C5A	32810	.01 MF, 450-V., NI
C6	32480	Tracking cond. assembly
C7	27650	8 MMF, 500-V.
C8	27650	8 MMF, 500-V.
C8A	27650	8 MMF, 500-V.
C9	31160	.05 MF, 100-V., NI
C10	31160	.05 MF, 100-V., NI
C11	32810	.01 MF, 450-V., NI
C12	31160	.05 MF, 100-V., NI
C12A	31160	.05 MF, 100-V., NI
C13	32810	.01 MF, 450-V., NI
C14	32810	.01 MF, 450-V., NI
C15	33620	250 MMF, 450-V.
C16	33620	250 MMF, 450-V.
C17	21160	140-220 MMF, 450-V.
C18	27630	.01 MF, 200-V., IND
C19	25379	10 MF, 25-V., dry elec.
C20	32740	.003 MF, 500-V.
C21	22538	8 MF, 475-V.
C22	22538	8 MF, 475-V.
C23	29890	.005 MF, 450-V., IND.
	33060	Multiple by-pass cond.

CHOKES

Code No.	Part No.	Name of Part
CK1	19210	1st detector plate choke
CK2	19210	1st I. F. plate choke
CK3	19210	2nd I. F. plate choke
CK4	17015	2nd det. plate choke

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A5	20190	Single trimmer
	32880	Double I. F. trimmer

SOCKETS

Part No.	Name of Part
25196	Speaker
22689	Rectifier
22733	6 prong, lower base
24494	6 prong, upper base

MISCELLANEOUS PARTS

Part No.	Name of Part
22683	Tube shield
25056	I. F. shield
25057	Coil shields
25059	I. F. shield cover (with hole)
25058	I. F. shield cover (without hole)
25929	Inst. and log card, F-1086
25428	Shipping container
24323	Power T. cover

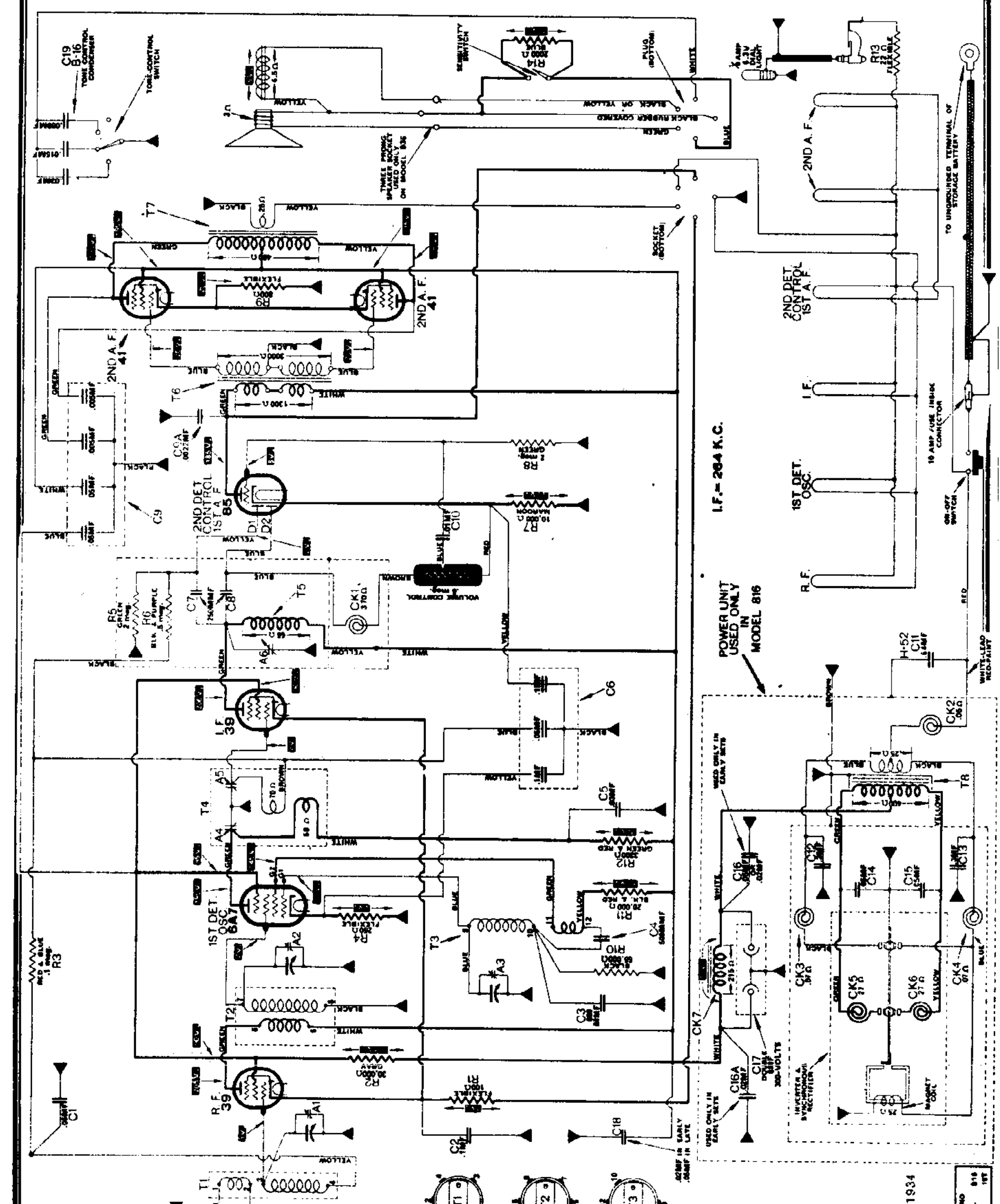
808-A SPEAKER No. 34500

Part No.	Name of Part
20737	Diaphragm
18870	Field coil, 2000 Ω
21672	Output T. (T12)
25405	Cable and plug

Ω = ohms. U = megohms. IND. = inductive.
NI = non-inductive. W. = watt.

MODEL 816,926,936(1st)
Schematic

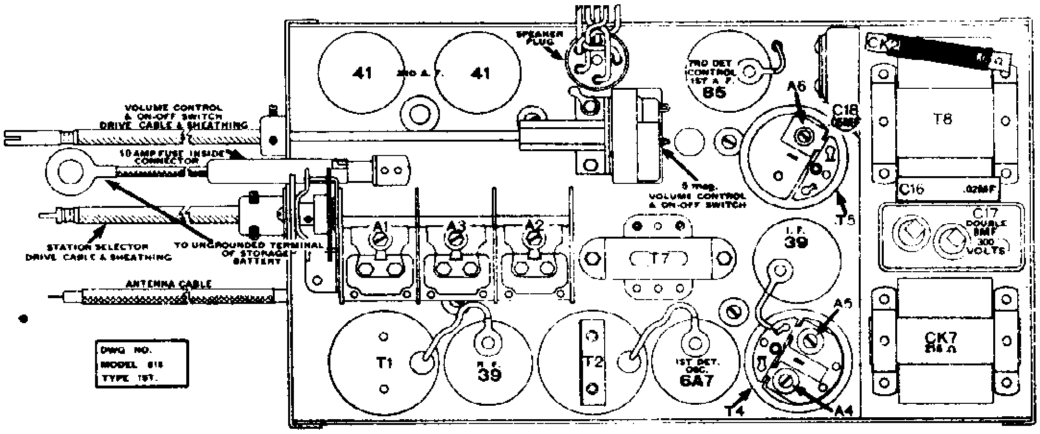
ATWATER-KENT MFG. CO.



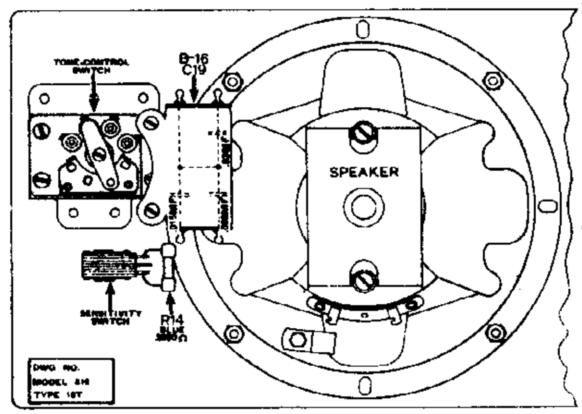
May, 1934

MODEL 816,926,936 (1st)
Socket,Trimmers,Parts,
Power Unit Schematic

ATWATER-KENT MFG. CO.

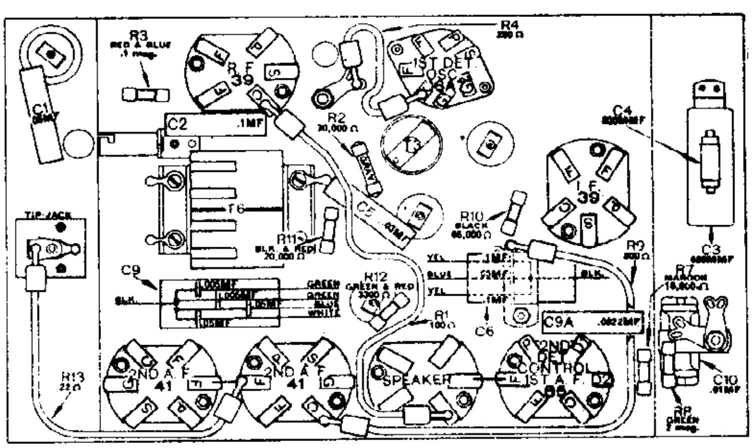


In late type sets, the "A" battery cable is brought out the top side, near the speaker plug.

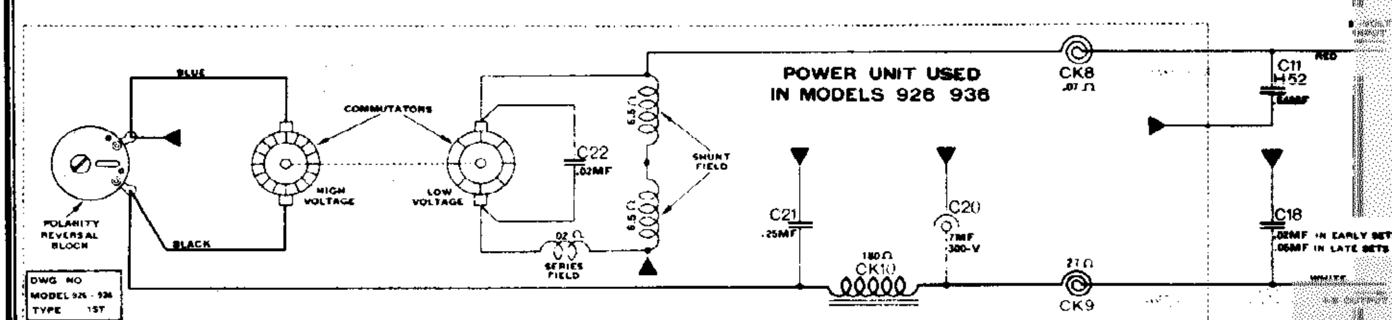


1st TYPES OF

MODELS 816, 926 AND 936



Model 936 has a separate speaker which plugs into a three-prong socket on the inside of lid of set container.



MODEL 816,926,936 (1st)
Parts List

ATWATER-KENT MFG. CO.

MODEL 816
(Below Serial No. 1121818)

Part No.	Name of Part
26586*	Set container complete, less lid
26496	Set container lid (bl'k)
26549	Tuning cable bushing
26036	Inner plate for above
26102	Polarity reversal cover
26096	Sound insulators (felt)
26452	Lid mounting bracket
26128	Thumbscrew
19455	Mounting washer
26462	Variable cond. assembly
25478	Grommet for var. cond.
26072	Shield for No. 1 I. F. T.
26538	Insulator for above shield
26589	Shield for No. 1 R. F. T.
26591	Shield for No. 2 R. F. T.
25818	Clamp for No. 36440 cond.
26505	Volume control, .5 U
26033	Volume control bracket
26039	Volume control coupling
24540	Tone control switch
26127	Knob for above
13664	Sensitivity switch
21143	Plug suppressor
21144	Distributor suppressor
23260	Generator cond., 1 MF, 200-V.

* When ordering cabinet, specify brown or black

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	35680	No. 1 R. F. T.
T2	35690	No. 2 R. F. T.
T3	35710	Oscillator T.
T4	26592	No. 1 I. F. T.
T5	26593	No. 2 I. F. T.
T6	26606	Audio input T.
T7	26478	Audio output T.
T8	26291	Power T.

RESISTORS

Code No.	Part No.	Name of Part
R1	20040	Flexible, 100 Ω
R2	20970	Gray, 30,000 Ω, ½-W.
R3	30340	Red-blue, .1 U, 1/3-W.
R4	31830	Flexible, 250 Ω
R5	30370	Green, 2 U, 1/3-W.
R6	30350	Bl'k-purple, .5 U, 1/3-W.
R7	30320	Mar'n, 10 000 Ω, 1/3-W.
R8	30370	Green, 2 U, 1/3-W.
R9	20120	Flexible, 800 Ω
R10	31980	Bl'k, 65,000 Ω, 1/3-W.
R11	30390	Red-bl'k, 20,000 Ω, 1/3-W.
R12	30380	Red-green, 3300 Ω, 1/3-W.
R13	16840	Flexible, 22 Ω
R14	33250	Blue, 2000 Ω, 1/3-W.

CONDENSERS

Code No.	Part No.	Name of Part
C1	31160	.05 MF, 100-V., NI
C2	31530	.1 MF, 100-V., NI
C3	36460	600 MMF, 100-V. (mica)
C4	36510	500 MMF, 500-V. (mica)
C5	29530	.03 MF, 200-V., NI
C6	36440	.1, .05, .1 MF, 100-V., IND.
C7	33670	250 MMF, 500-V.
C8	33670	250 MMF, 500-V.
C9	36450	.05, .05, .005, .005 MF, 200-V., IND.
C9A	33660	2200 MMF, 450 V., IND.
C10	23250	.01 MF, 450-V.
C11	36480	.64 MF, H-52, 200-V.
C12	31150	.3 MF, 100-V., NI
C13	31150	.3 MF, 100-V., NI
C14	36490	.05 MF, 450-V., NI
C15	36490	.05 MF, 450-V., NI
C16*	36490	.05 MF 450-V., NI
C16A	29030	.02 MF, 450-V., NI
C17	26092	8 MF-8 MF, 300-V. (electrolytic)
C18**	36880	.02 MF, 450-V., NI
C19	30270	Tone control cond. (B-16)

* C16 is .02 MF, 450-V., NI 29030 in some of these sets.
** C18 is .05 MF, 200-V., NI 26820 in later sets.

TRIMMERS

Code No.	Part No.	Name of Part
A4, 5	37960	Double I. F. trimmer
A6	36570	Single I. F. trimmer

CHOKES

Code No.	Part No.	Name of Part
CK1	26594	2nd detector plate choke
CK2	36630	R. F. "A" filter choke
CK3	36610	R. F. "A" filter choke
CK4	36610	R. F. "A" filter choke
CK5	36620	R. F. "B" filter choke
CK6	36620	R. F. "B" filter choke
CK7	25416	A. F. "B" filter choke

POWER UNIT ASSEMBLY

Part No.	Name of Part
26863	Vibrator
26854	Rubber (2)
26855	Rubber (1)
26061	Inside vibrator container
26062	Lid for above
26521	Grommet
26085	Tubular condenser clamp
26663	Middle container body
26091	Middle container lid
26136	Vibrator lid insulator
26664	Outer container body
26665	Outer container lid

SPEAKER

Part No.	Name of Part
26851	Speaker less cable
26826	Cone head assembly
26827	Field coil, 6.5 Ω
26559	Speaker cable and plug

MISCELLANEOUS PARTS

Part No.	Name of Part
21878	Disc shield, No. 2 I. F. T.
26578	Disc (insul.) for No. 2 I. F. T.
21406	Fuse, 10 amp.

REMOTE CONTROL HEAD

Part No.	Name of Part
26646	Remote control head complete with mounting parts (less cables)
26893	Pointer gear (fibre)
26894	Spring washer
26108	Mounting strap and bushing
26884	Head assembly
26892	Pointer and shaft
26886	Screw No. 4—36 x ¼
26888	Cork gasket
26889	Dial assembly
26891	Diffusing strip
26107	Mounting bracket
26528	Screw ¼—20 x ½
26104	Assem. vol. cont. cable, 35 in.
26105	Assembled tuning cable, 31 in.
26109	Key
26887	Glass
27118	Lamp (6-8-V., ⅙A), green
26895	Gear shaft assembly
26896	Tuning knob
27312	Tuning knob spring
26897	Key knob
26898	Screw No. 10—32 x ¼ F. H. cup pt.
26899	Shielded wire (dial lite lead)
26901	Wire clamp
26531	Screw ¼—20 x ⅞
24082	Wire tip
27059	Steering column mounting bracket assembly
26107	Mounting bracket (column type)
26531	Column clamp screw
26108	Column clamp
21141	Lockwasher
26528	Mounting screw
26943	Panel mounting bracket assem.
26944	Mounting bracket (panel type)
26945	Wing screws
26946	Flat head screws
26947	Felt pad

EXTRA LENGTH ASSEMBLED CABLES

Part No.	Name of Part
27114	Assem. vol. cont. cable, 3½ ft.
27115	Assembled tuning cable, 3½ ft.
27016	Assem. vol. cont. cable, 11 ft.
27017	Assembled tuning cable, 11 ft.

MODEL 926
(Below Serial No. 8276401)

Model 926 speaker and chassis is identical to Model 816, but the 926 uses a genemotor power unit

POWER UNIT MODELS 926 and 936

Part No.	Name of Part
26093	Power unit container
26942	Lid for above
36610	R F "A" filter choke (CK8)
36620	R F "B" filter choke (CK9)
22359	A F "B" filter choke (CK10)
26864	7 MF, 300-V., dry electrolytic (C20)
35930	.25 MF, 200-V., NI (C21)
36420	.02 MF, 200-V., IND. (C22)

GENEMOTOR No. 26734

Part No.	Name of Part
26964	Motor end bracket assembly
26965	Generator end bracket assembly.
26966	Generator brushes assembly
26967	Motor brushes assembly
26968	Field coils and field core assembly
26969	Field coils set
26971	Armature
26972	Ball bearing
26973	Motor mounting bracket
26974	Rubber bumpers
26975	Steel studs 4⅝" x 8/32 thd.
26976	Hex. iron nuts—cadmium plated
26977	Ground lug
26978	2⅝" long—No. 18 extra flexible bare ground lead
27043	Field core assembly
27044	Shunt field (2 leads)
27045	Shunt and series field (4 leads)

MODEL 936
(Below Serial No. 4542201)

Model 936 chassis is identical to Model 816, but the 936 uses a genemotor power unit (listed above), and a separate speaker (listed below).

Part No.	Name of Part
26806	Lid
25196	Socket (3 prong)
26831	Cable and plug assembly (5 wire)
21963	Tone control knob

936 SPEAKER No. 38900

Part No.	Name of Part
26822	Diaphragm
30710	Field coil
26823	Cable and plug assembly (3 wire)

Ω=ohms. U=megohms. IND.=inductive. NI=non-inductive. W.=watt.

DATA FOR CURRENT MODELS

The last figure in the model number indicates the number of tubes; for instance, Model 145 has 5 tubes; Model 511 has 11 tubes, etc. The letter "Q" indicates battery operation; the letter "D" indicates D. C. operation; the letter "Z" indicates 32-volt operation.

All models listed below have tone control, and all models with exception of 465Q and 655Q have automatic volume control. All models have dynamic speakers, with exception of battery sets, which have special magnetic speakers.

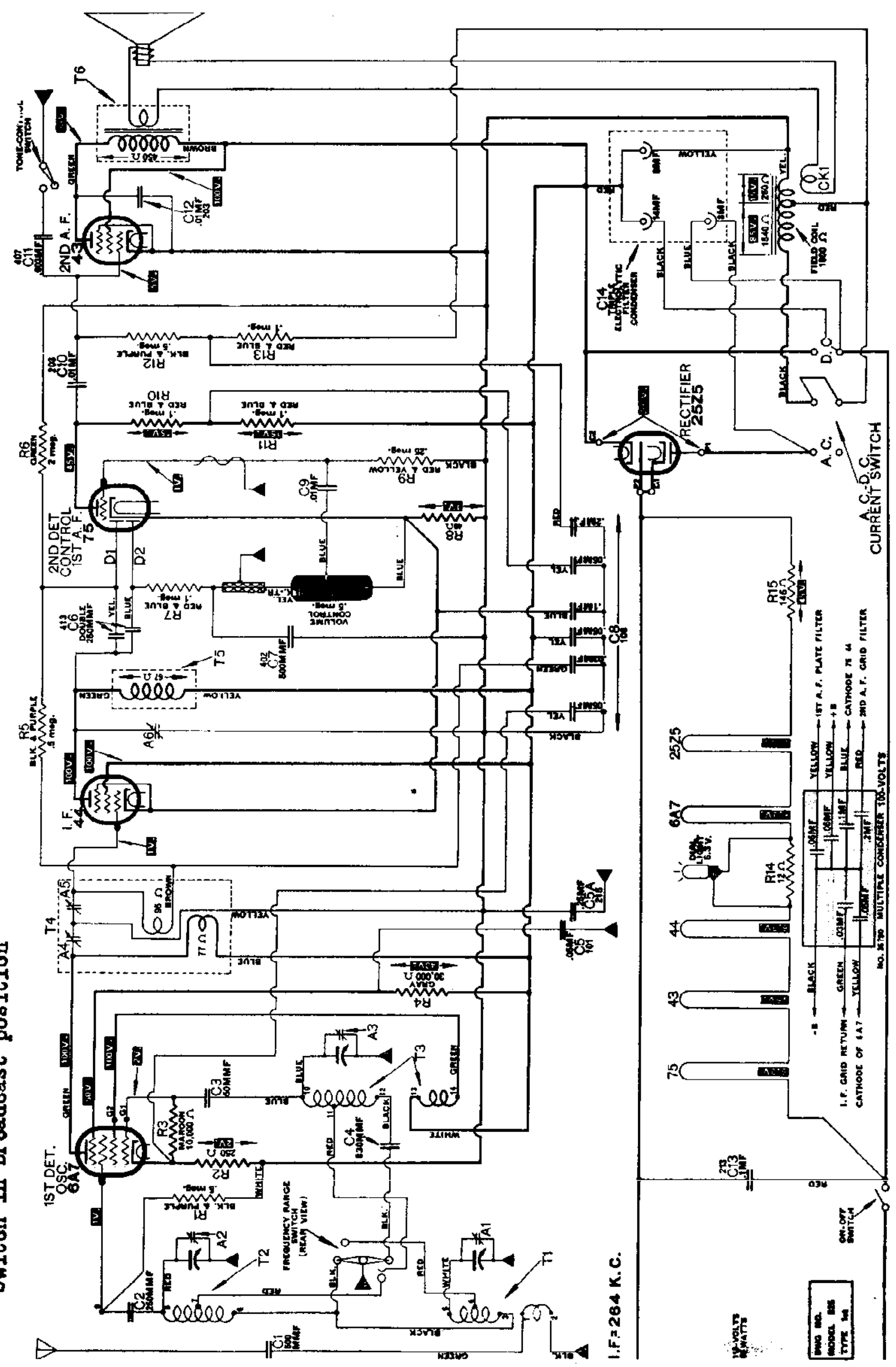
Model	Type	Cabinet	Power Supply	I. F. Frequency	Part No. Speaker	Line Watts	Output Watts	Shadow Tuning	Silencing Adjustment	Frequency Range	Tubes: R. F.	1st Det.	Oscillator	I. F.	2nd Det. AVC. 1st A. F.	2nd A. F.	3rd A. F.	4th A. F.	Rectifier
112	All Wave	Console	110V, 60C	472½	36700	150	15	YES	YES	540-18000	58	58	58	58(2)	—2B7—	56	56(2)	2A3(2)	5Z3
145	Standard and Short Wave	Compact	110V, 60C	264	42100	60	3.3	NO	NO	540-1600 1.6-4.8 5.3-16	..	—2A7—		58	—2A6—	2A5	..	..	80
206	Standard and Short Wave	Compact	110V, 60C	472½	41900	80	3.3	NO	NO	540-1600 1.6-5.0 5.7-15.5	58	—2A7—		58	—2A6—	2A5	..	..	80
318	All Wave	Console	110V, 60C	472½	41600	120	6.6	YES	YES	540-22500	58	—2A7—		58(2)	—55—	2A5(2)	..	..	80
325	Standard and Short Wave	Console	110V, 60C	264	41800	60	3.3	NO	NO	540-1600 1.6-4.8 5.3-16	..	—2A7—		58	—2A6—	2A5	..	..	80
376	Standard and Short Wave	Console	110V, 60C	472½	43700	80	3.3	NO	NO	540-1600 1.6-5.0 5.7-15.5	58	—2A7—		58	—2A6—	2A5	..	..	80
447	All Wave	Compact	110V, 60C	472½	41700	90	3.3	YES	YES	540-22500	58	—2A7—		58(2)	—2A6—	2A5	..	..	80
511*	Standard and Short Wave	Console	110V, 60C	472½	36700	150	15	YES	NO	540-1600 5.5-15.5	58	—2A7—		58(2)	—2B7—	56	56(2)	2A3(2)	5Z3
559	All Wave	Console	110V, 60C	472½	36500	120	6.6	YES	YES	540-18000	58	58	58	58(2)	—55—	2A5(2)	..	..	80
944	Broadcast	Compact	110V, 60C	450	34100	45	2.0	NO	NO	540-1720	..	—57—		..	57	2A5	..	..	80
465Q	Standard and Short Wave	Compact	2V	264	42900	**	1	NO	NO	540-1600 1.6-4.8 5.3-16	..	—1C6—		34	32 .. 30	19	..	..	..
655Q	Standard and Short Wave	Console	2V	264	43200	**	1	NO	NO	540-1600 1.6-4.8 5.3-16	..	—1C6—		34	32 30	19	..	..	..
768Q	All Wave	Compact	2V	472½	43100	††	1	NO	NO	540-22500	.	—1C6—		34(2)	-30- 32	30	30(2)	..	..
978Q	All Wave	Console	2V	472½	43200	††	1	NO	NO	540-22500	.	—1C6—		34(2)	-30- 32	30	30(2)	..	..
206D	Standard and Short Wave	Compact	110V, DC	472½	43500	45	2	NO	NO	540-1600 1.6-5.0 5.7-15.5	78	—6A7—		78	—85—	43(2)	..	..	..
376D	Standard and Short Wave	Console	110V, DC	472½	43600	45	2	NO	NO	540-1600 1.6-5.0 5.7-15.5	78	—6A7—		78	—85—	43(2)	..	..	..
135Z	Standard and Short Wave	Compact	32V	264	42700	40	2	NO	NO	540-1600 1.6-4.8 5.3-16	..	—6A7—		78	—75—	43	..	..	6Z4
215Z	Standard and Short Wave	Console	32V	264	42800	40	2	NO	NO	540-1600 1.6-4.8 5.3-16	..	—6A7—		78	—75—	43	..	..	6Z4
825	AC-DC	Compact	110V, AC-DC	264	26159	50	1.0	NO	NO	540-1720†	..	—6A7—		39	—75—	43	..	..	25Z5

* Model 511 has automatic tuning. † Has switch to tune in the 2400 kilocycle police band. ** "B" drain, 22 MA. †† "B" drain, 25 MA.

MODEL 825 AC-DC
Schematic

ATWATER-KENT MFG. CO.

Switch in Broadcast position



I.F.=284 K.C.

MODEL 825 (A. C.—D. C.)

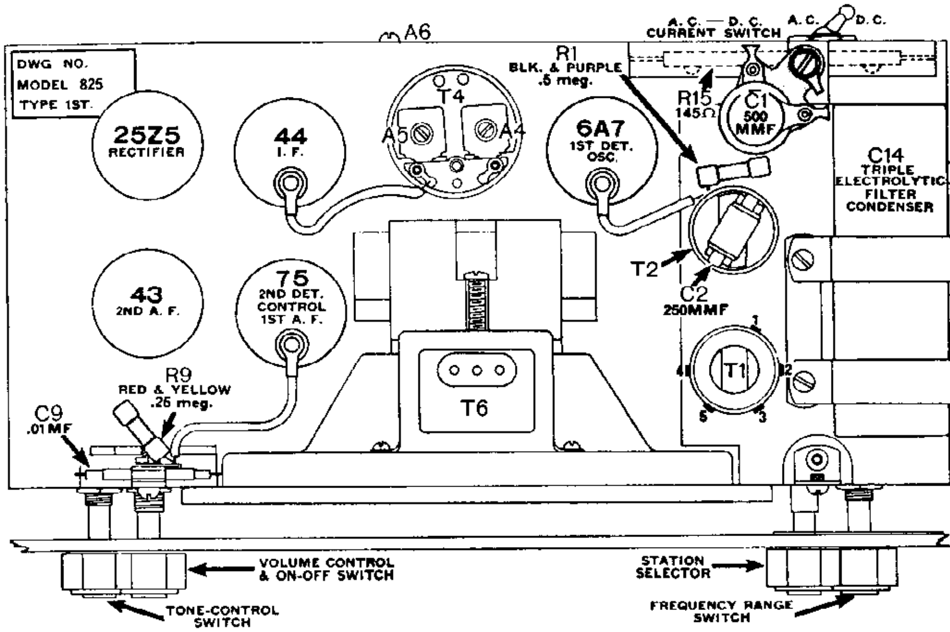
For Alignment Data and Parts List, see Index

September, 1934.

MODEL 825 AC-DC
Socket, Trimmers
Parts Layout

ATWATER-KENT MFG. CO.

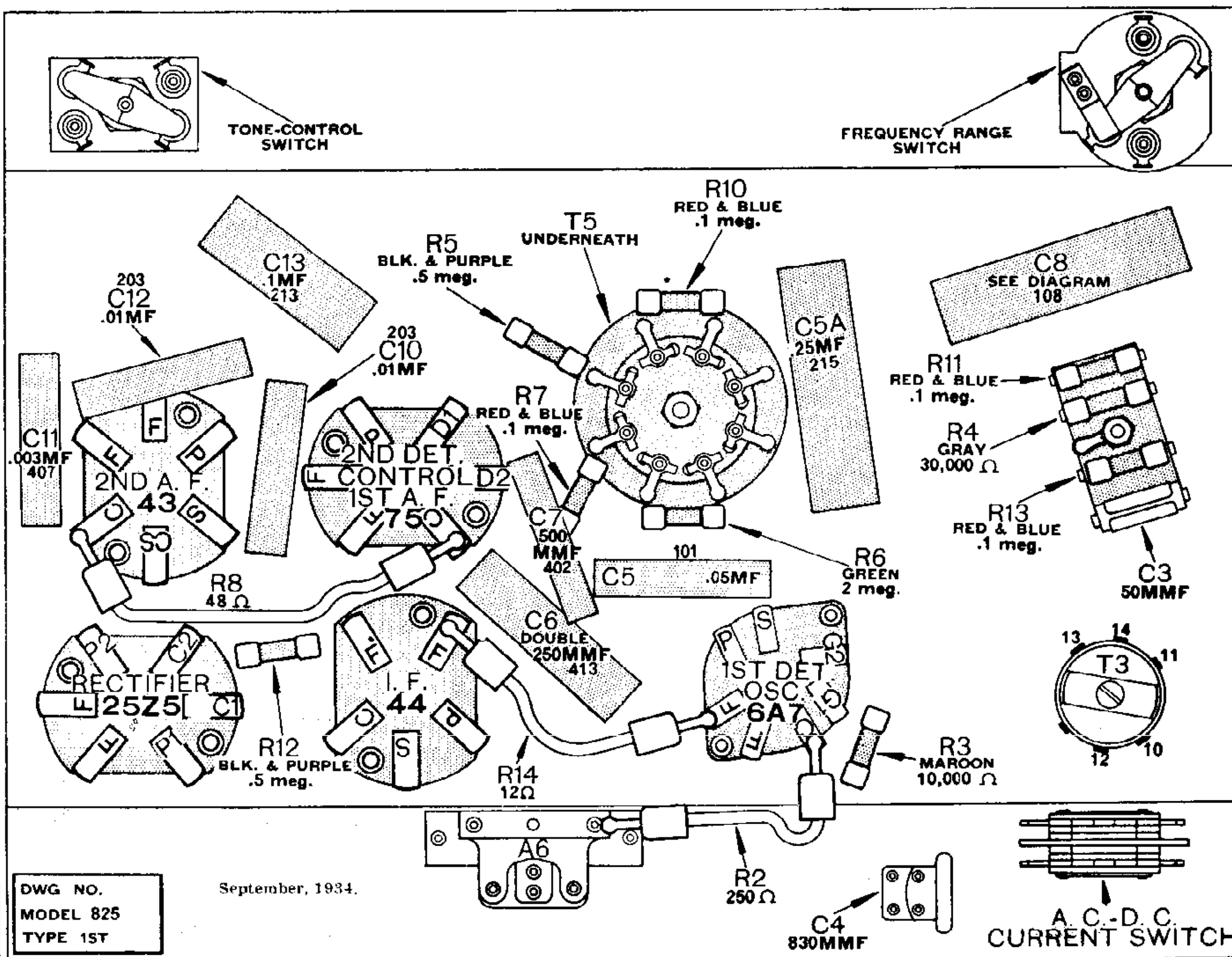
MODEL 825 (A. C.- D. C.)



(I. F. = 264 KC.)

Trimmers A1, A2 and A3 are adjusted at 1500 KC.

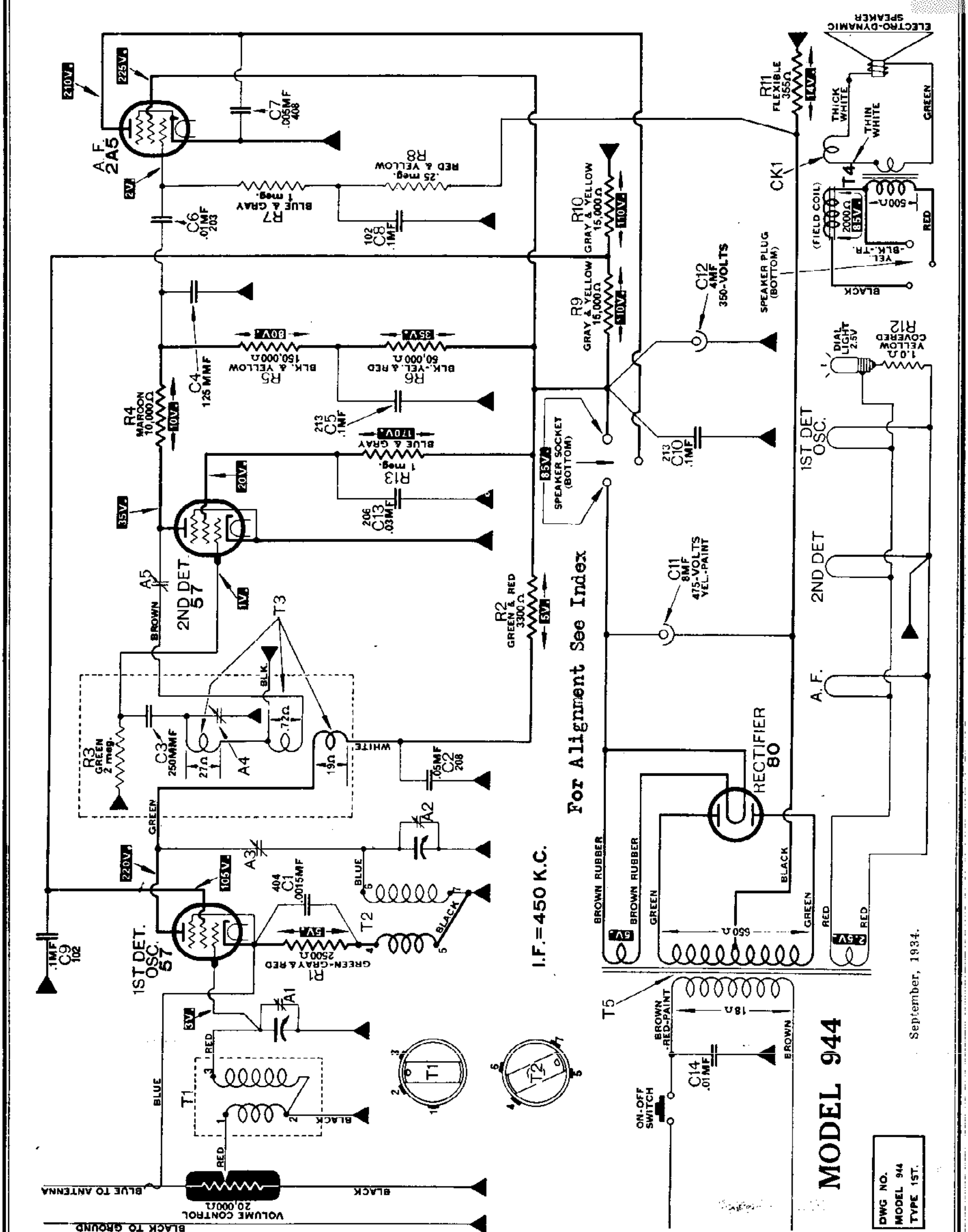
A4, A5 and A6 are adjusted at 264 KC.



September, 1934.

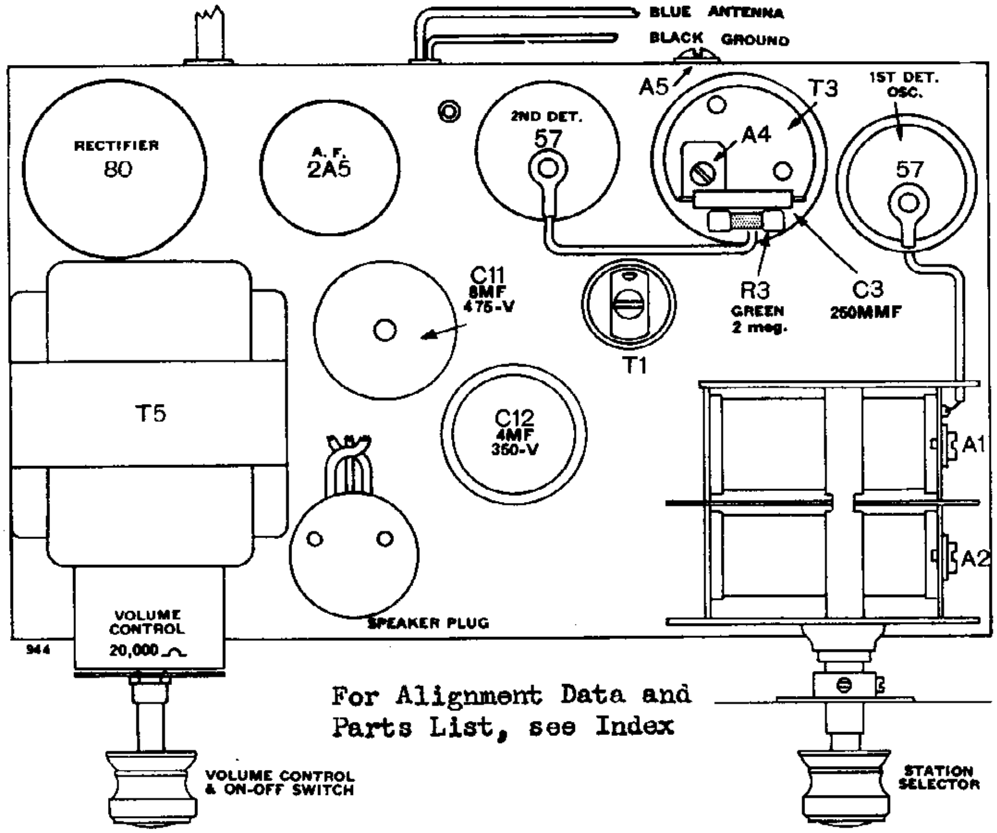
MODEL 944
Schematic

ATWATER-KENT MFG. CO.



MODEL 944
Socket, Trimmers
Parts Layout

ATWATER-KENT MFG. CO.



Trimmers A1 and A2 are adjusted at 1500 KC.

Trimmers A3 and A4 are adjusted at 450 KC.

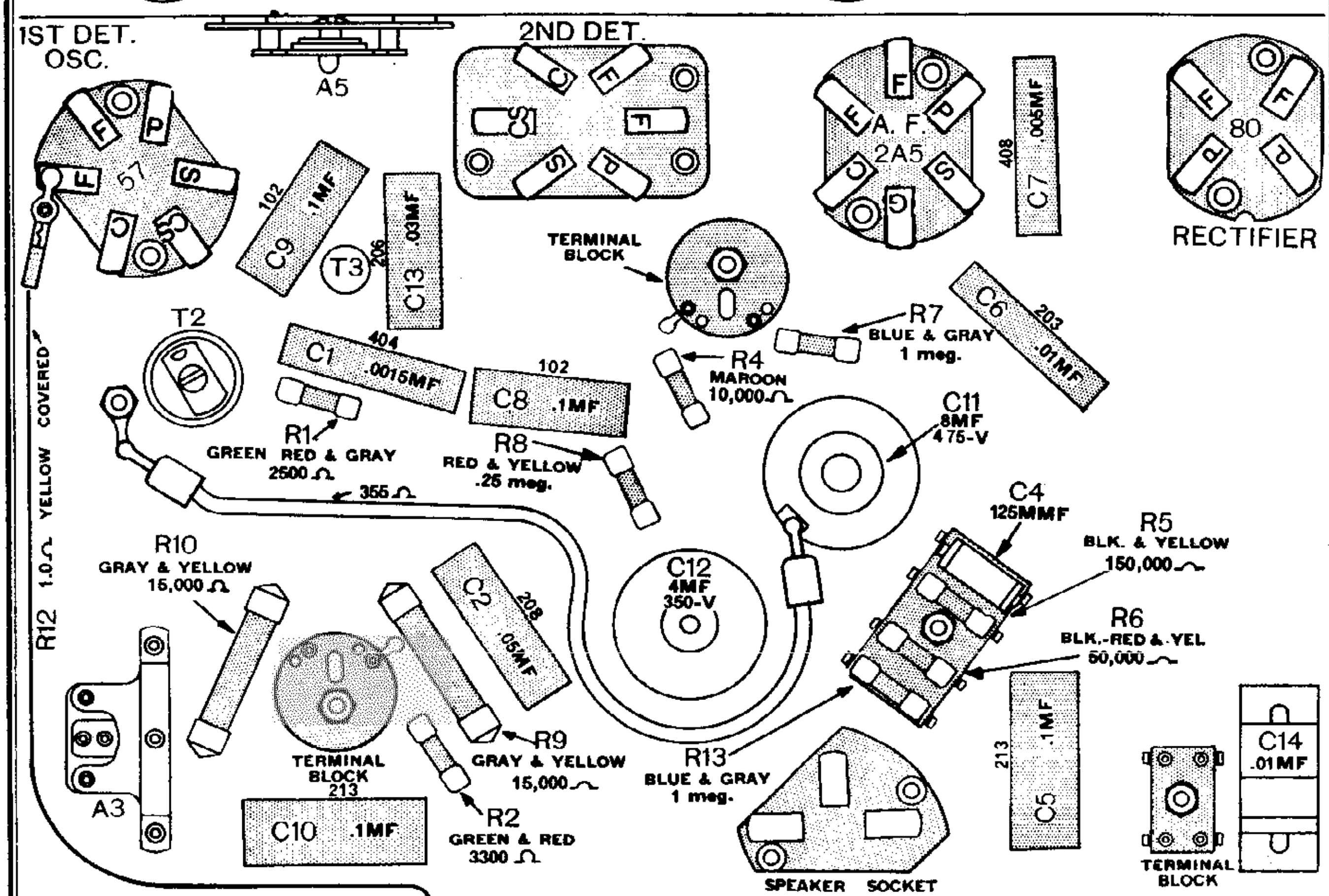
Trimmer A5 controls sensitivity, and is adjusted in accordance with instructions at about 1100 KC.

(I. F. = 450 KC.)

MODEL 944

For Alignment Data and Parts List, see Index

944
September, 1934.



AUDIOLA RADIO CO.

Six Tube Auto Radio

This receiver is a six tube superheterodyne using the most modern circuit design and tubes. Tubes used are: one 6D6 R.F. Amplifier; one 6A7 combination 1st detector and oscillator; one 6D6 I.F. Amplifier; a 75 diode detector with delayed A.V.C. and one stage audio; one 41 power output tube; and one 84 rectifier tube.

In the installation of this receiver there are a few important fundamental principles to adhere to:

(1) Avoid having any battery wires in close relation to the high voltage spark coil or plug wires.

(2) The antenna must be routed over the most quiet location. Interference will often go through the antenna shielding if touching brake, accelerator, or steering column rods. The lead in must be shielded up to the antenna and the shield bonded to the set chassis. In many installations the antenna shield must also be bonded to the chassis of the car where the shield turns up to the top.

(3) If the chassis has to be removed from housing, be certain to tighten the three screws on the bottom when replacing the chassis.

(4) After installation is completed, adjust antenna trimmer on some distant station around 1400 to 1500 K.C. turn in either direction for loudest signal. The antenna trimmer is directly under the serial number on the top of the set. The front cover screws must always be tight.

(5) The gang condenser control (tuning) must run very freely and have not less than 1/32 of an inch end play.

Shield antenna lead-in and bond the shield to frame at center post. If antenna comes down front post, shield as high as possible and also ground the shield to dash.

In case of antenna pick-up, use heavy "A" choke and double condenser as in diagram #1.

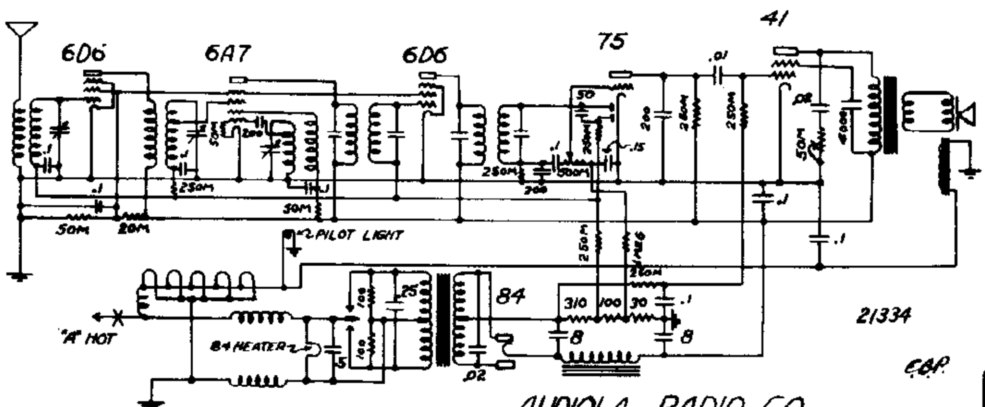
In case of chassis pick-up, separate primary and high tension ignition wires, shield and ground the shield at both ends.

In Chevrolets, it is sometimes necessary to shield the floorboards on the right hand side and ground with floorboard screws.

In Ford V8 shield primary and "A" lead to generator separately and ground shields to spark plug housing brackets as in diagram #2.

In case of floating power, bond center bolt on Audiola set to motor block.

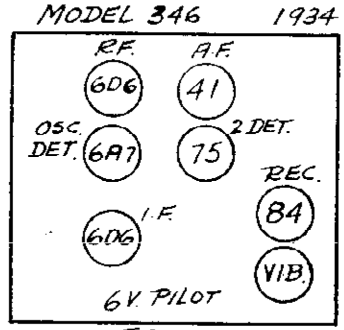
346



MODEL B-6 IS SAME AS 346, EXCEPT MODEL B-6 HAS NO TONE CONTROL

AUDIOLA RADIO CO.
CHICAGO, ILL.

MODEL 346 1934



FRONT

IF PEAK 177.5 KC.

SPECIAL INSTRUCTIONS FOR ELIMINATING INTERFERENCE

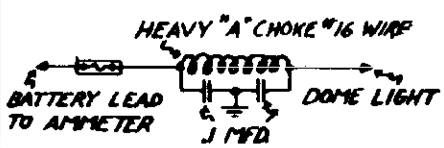


DIAGRAM #1

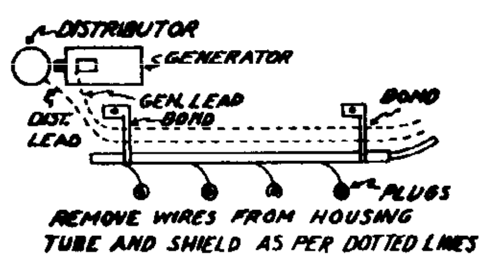


DIAGRAM #2

MODEL 347
Schematic, Socket
Alignment

AUDIOLA RADIO CO.

Seven Tube Auto Radio

This receiver is a seven tube superheterodyne using the most modern circuit design and tubes. Tubes used are: one 6D6 R.F. Amplifier; one 6A7 combination 1st detector and oscilator; one 6D6 I.F. Amplifier; an 85 diode detector with delayed A.V.C. and one stage audio; two 41 power output tubes and one 84 rectifier tube.

In the installation of this receiver there are a few important fundamental principles to adhere to:

(1) Avoid having any battery wires in close relation to the high voltage spark coil or plug wires.

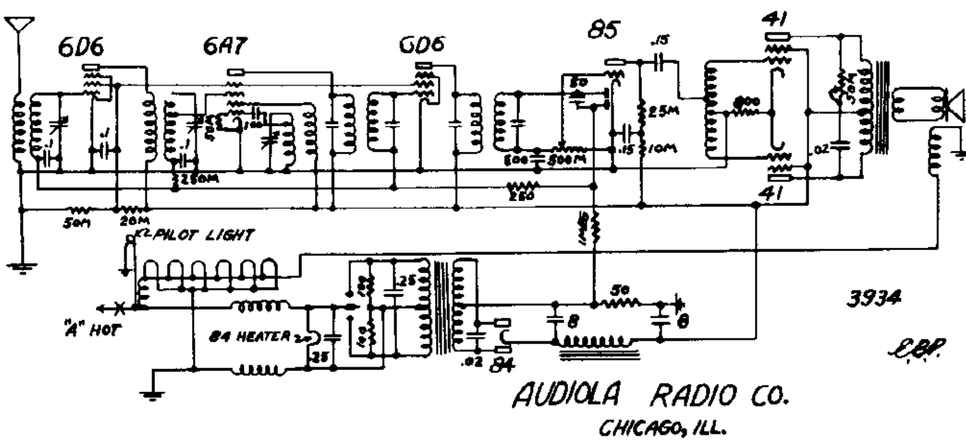
(2) The antenna must be routed over the most quiet location. Interference will often go through the antenna shielding if touching brake, accelerator, or steering column rods. The lead in must be shielded up to the antenna and the shield bonded to the set chassis. In many installations the antenna shield must also be bonded to the chassis of the car where the shield turns up to the top.

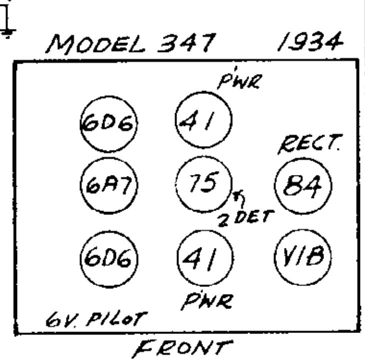
(3) If the chassis has to be removed from housing, be certain to tighten the three screws on the bottom when replacing the chassis.

(4) After installation is completed, adjust antenna trimmer on some distant station around 1400 to 1500 K.C. turn in either direction for loudest signal. The antenna trimmer is directly under the serial number on the top of the set. The front cover screws must always be tight.

(5) The gang condenser control (tuning) must run very freely and have not less than 1/32 of an inch end play.

347





NO SUPPRESSORS

AudiolA is first to develop an auto radio that eliminates motor noise without the use of spark plug suppressors.

This is an important engineering advancement in the auto radio art. We are pleased to have made this contribution to the radio industry.

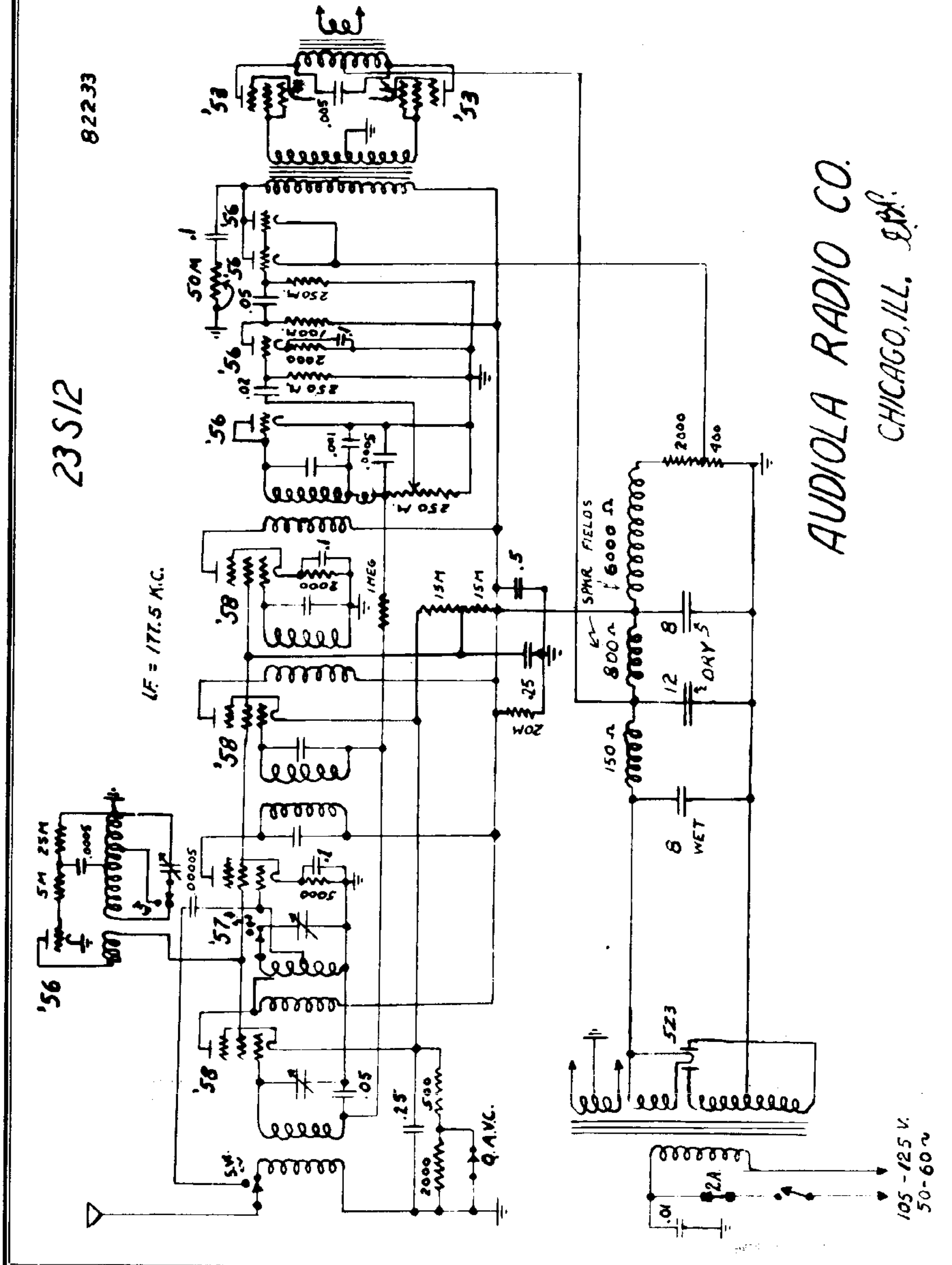
It is important that you understand this new pioneering development.

We have successfully installed the AudiolA auto radio without spark plug suppressors, and eliminated all motor noise and other noise, from every car that we have tried. This has covered almost every make and model of automobile.

For Elimination of Interference data, see Model 346.

AUDIOLA RADIO CO.

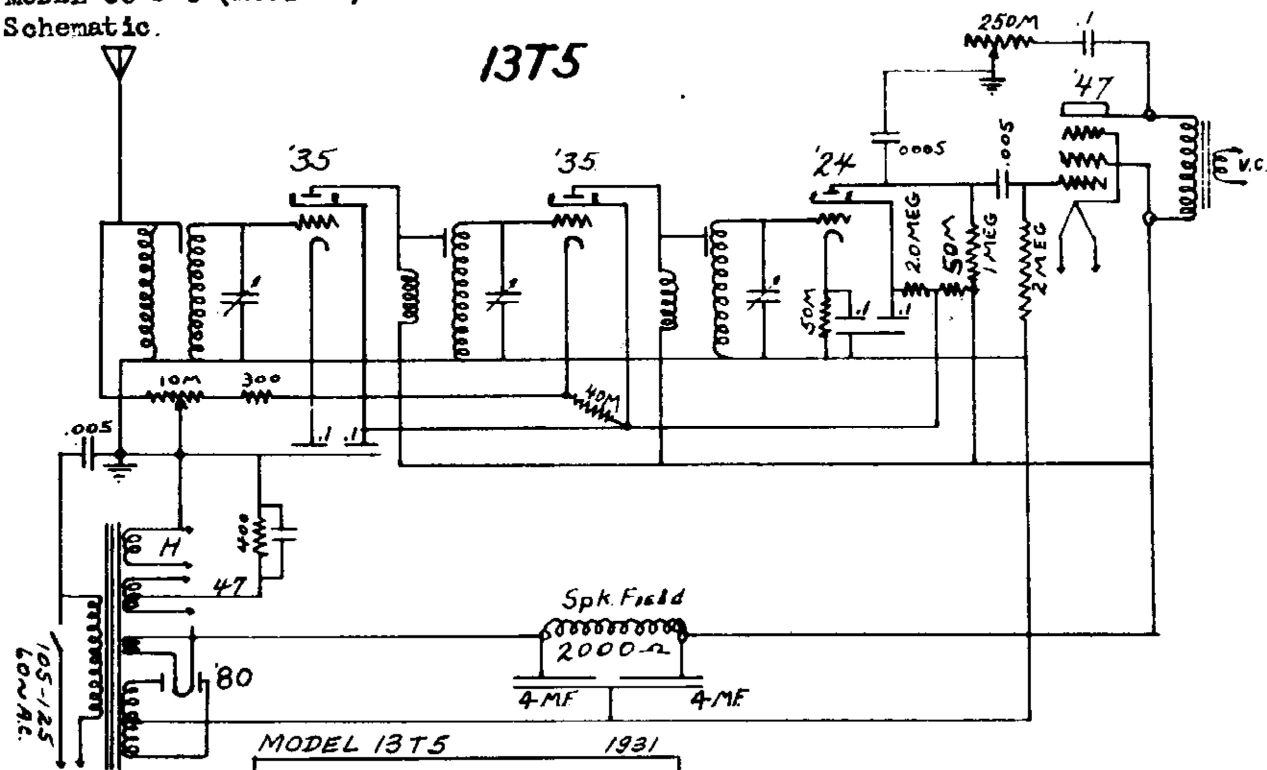
MODEL 23-S-12 (Revised)
Schematic

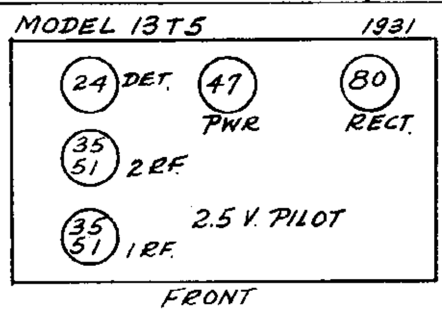


MODEL 13-T-5
Schematic, Socket
MODEL 33-S-5 (Revised)
Schematic.

AUDIOLA RADIO CO.

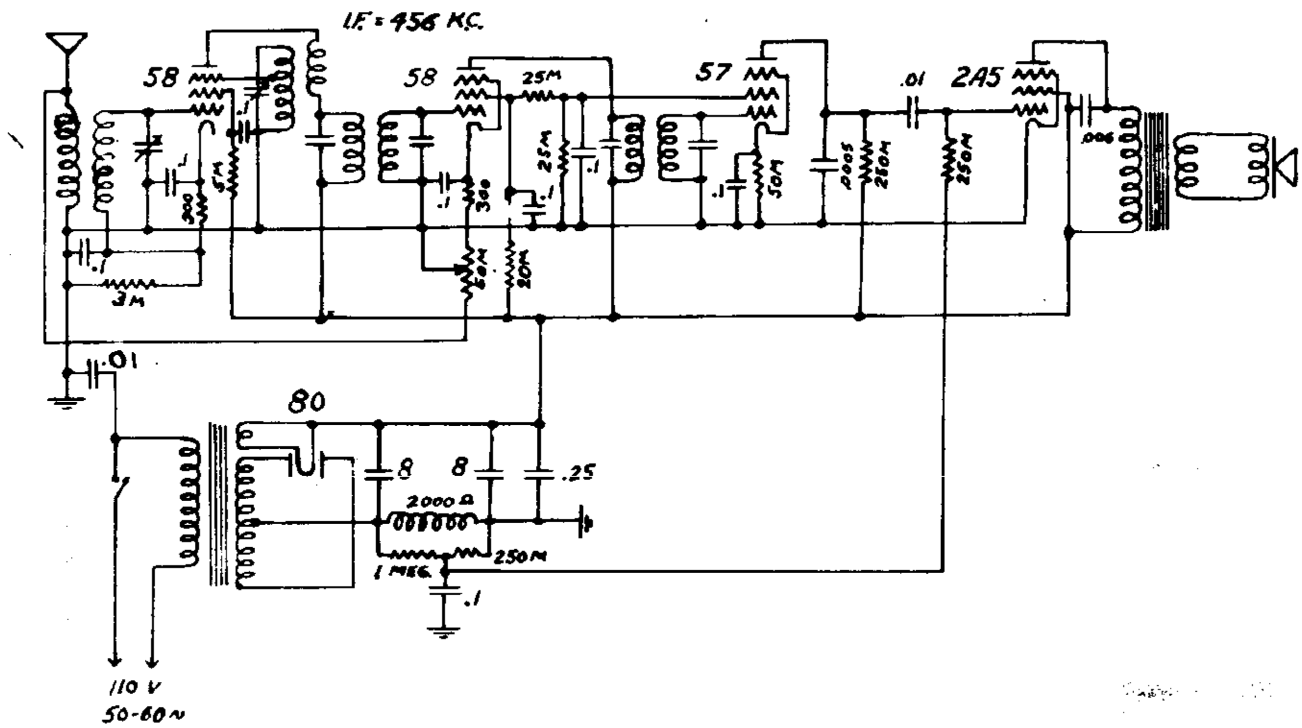
13T5





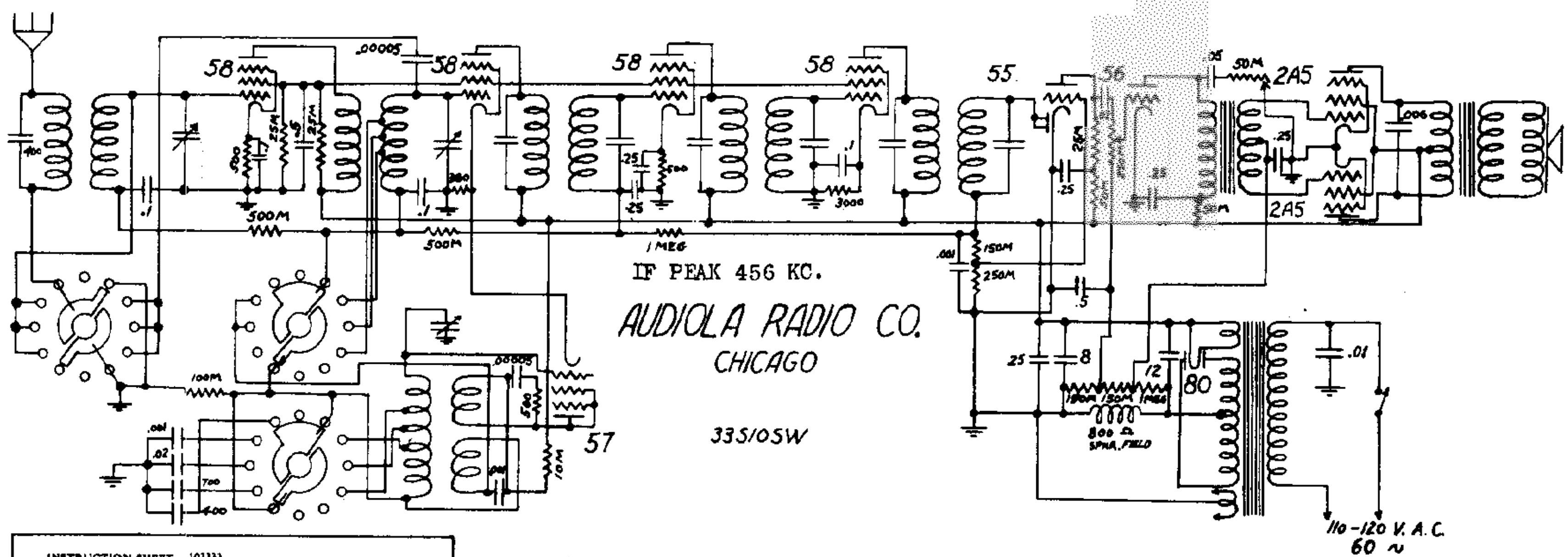
Audiola Radio Co.
Chicago
9631

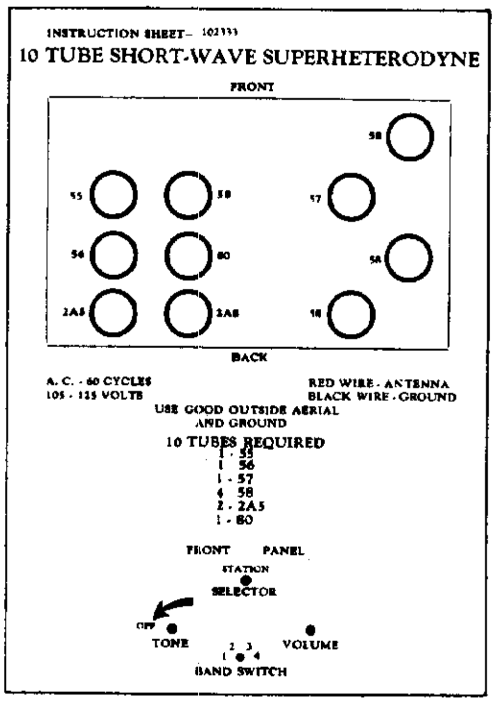
33S5



MODEL 33-S-10 SW
Schematic, Socket Alignment

AUDIOLA RADIO CO.





OPERATING INSTRUCTIONS FOR TEN TUBE SHORT WAVE SUPERHETERODYNE

A drawing is included showing correct placement and type of tubes.

This receiver covers a frequency range of 540 to 20,000 kilocycles (555 to 15 meters) by the use of four overlapping wave bands, each selected by means of the band switch as indicated.

When the band switch is in extreme left position, set covers band No. 1, which is the broadcast band, and subsequent positions cover the other three bands.

Band No. 1 readings may be converted to kilocycles by adding two ciphers (multiplying by 100). Bands Nos. 2, 3, and 4 are calibrated in megacycles and may be converted into kilocycles by adding three ciphers (multiplying by 1000).

Too much emphasis cannot be placed on the desirability of tuning the set extremely slowly when tuning on bands Nos. 2, 3, and 4. Due to extreme sharpness and selectivity in these positions, stations would be otherwise passed by unless the tuning operation is done slowly. The foregoing is especially true when "tuning in" weak and far-distant stations.

Under the right conditions of time, location, and weather, one may reasonably expect to tune in distant or foreign stations. We do not make unsubstantiated claims that it is possible to tune in foreign stations at will.

There is very little "static" in the short wave bands, but due to the extreme sensitivity, all sorts of electrical disturbances may be heard if conditions are not correct. Even the ignition system of a passing car may impair reception. Practice proper handling and tuning of the short wave bands and you will be rewarded with many interesting and entertaining broadcasts.

Always bear in mind the difference in time in different parts of the world when tuning for foreign stations. For example, when it is seven o'clock in the evening in Chicago, it is two o'clock in the morning in most of Europe.

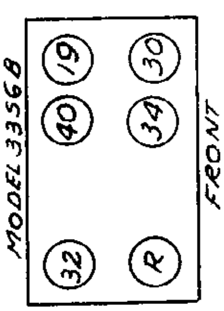
The majority of reliable United States and Canadian short wave broadcasting stations may be found around 6 and 7 (6000 and 7000 kilocycles) on band No. 3, and around 9 and 10 (9000 and 10,000 kilocycles) on band No. 4.

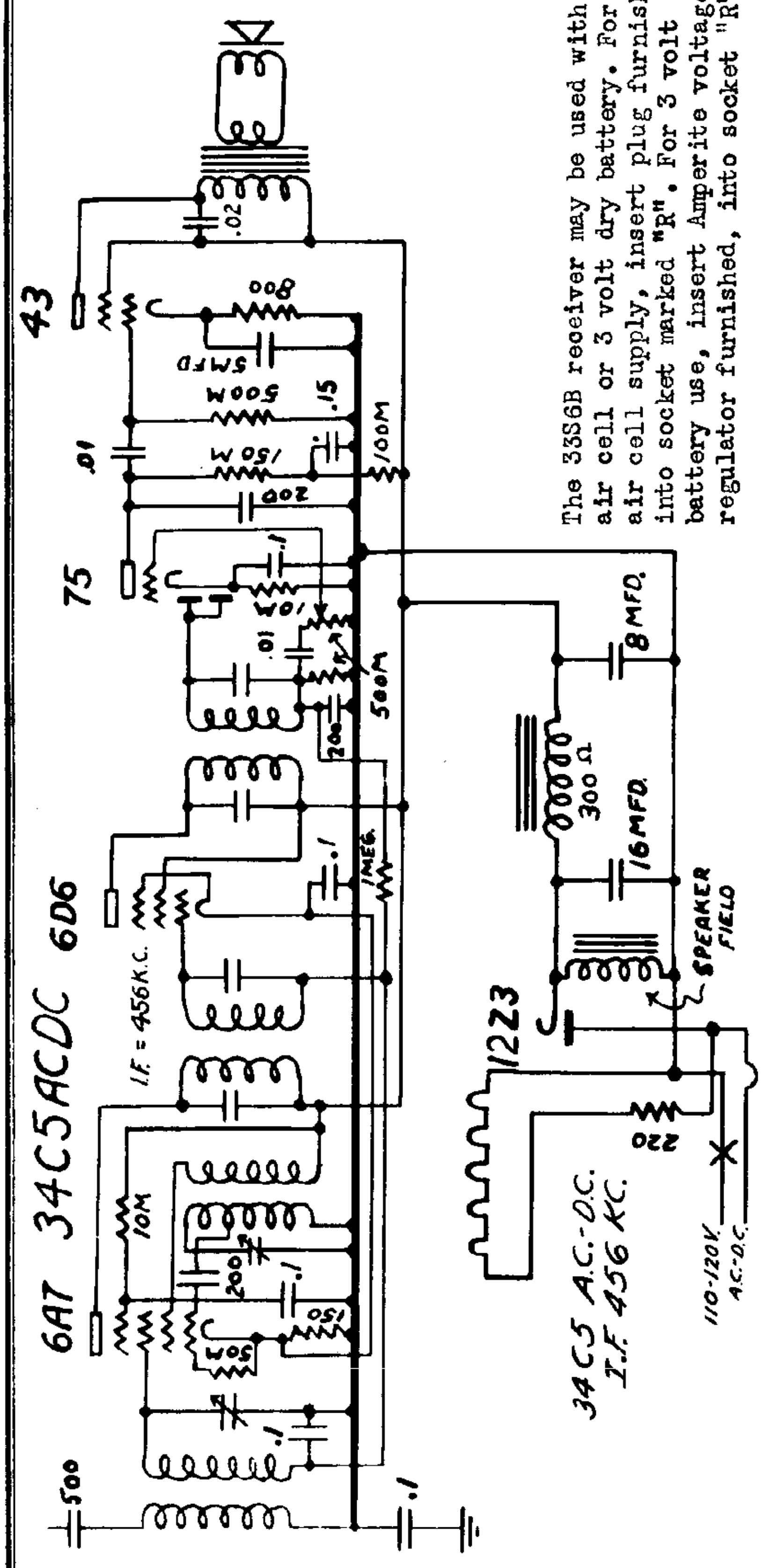
A good aerial and good ground are necessary if the best results are to be secured.

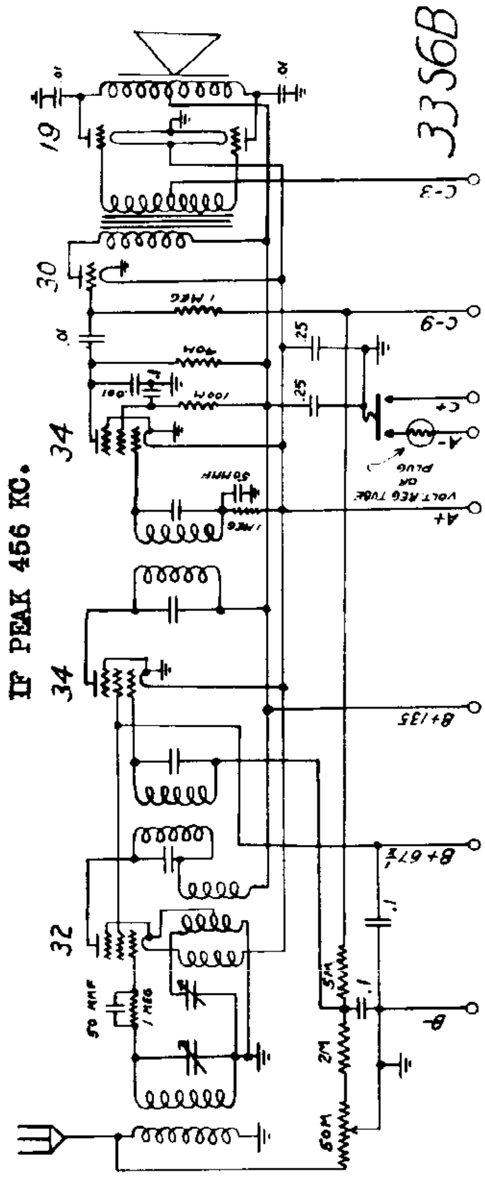
MODEL 33-S-6B
Schematic, Socket
MODEL 34-C-5 AC-DC
Schematic

AUDIOLA RADIO CO.

The 33S6B receiver may be used with air cell or 3 volt dry battery. For air cell supply, insert plug furnished into socket marked "R". For 3 volt battery use, insert Amperite voltage regulator furnished, into socket "R".

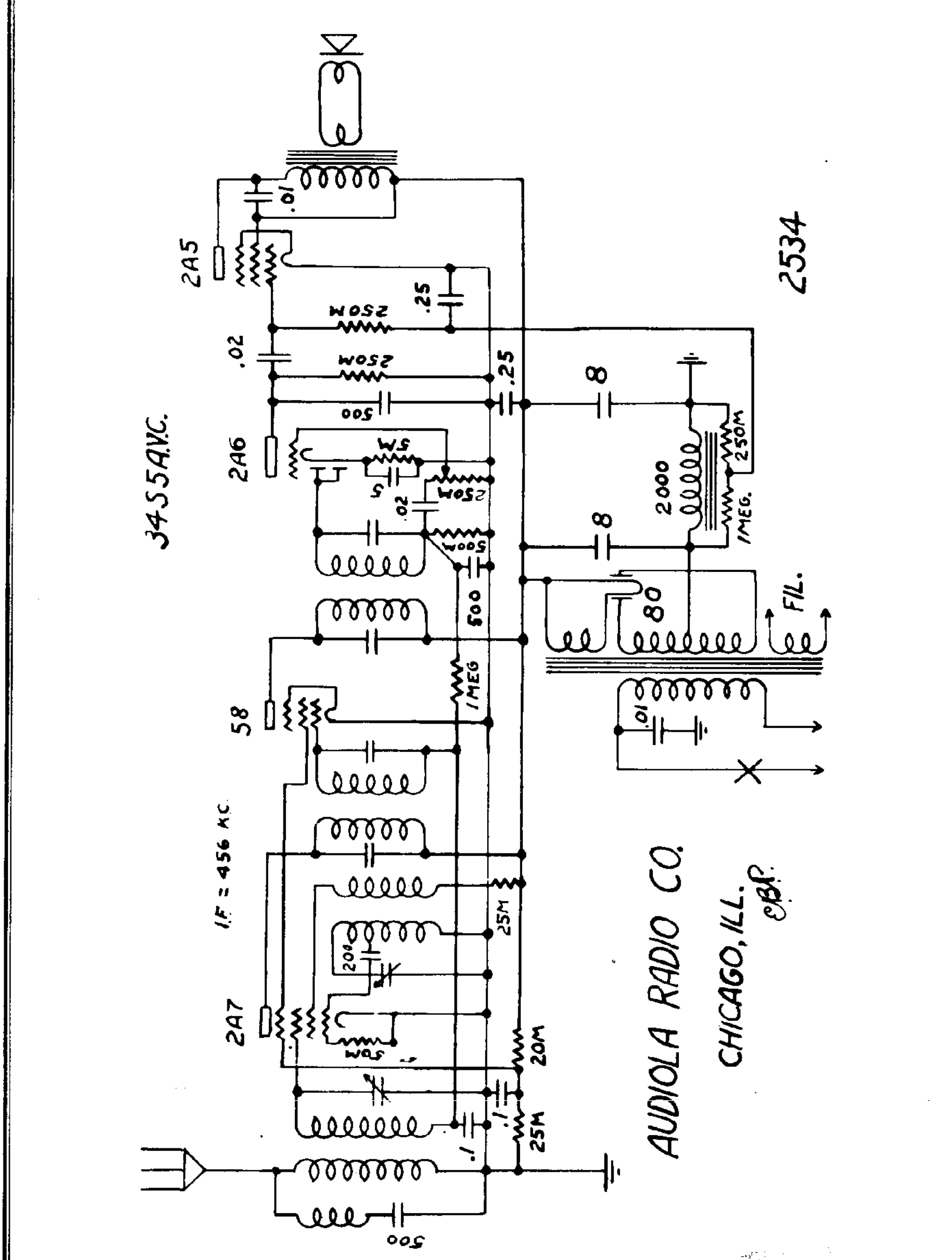






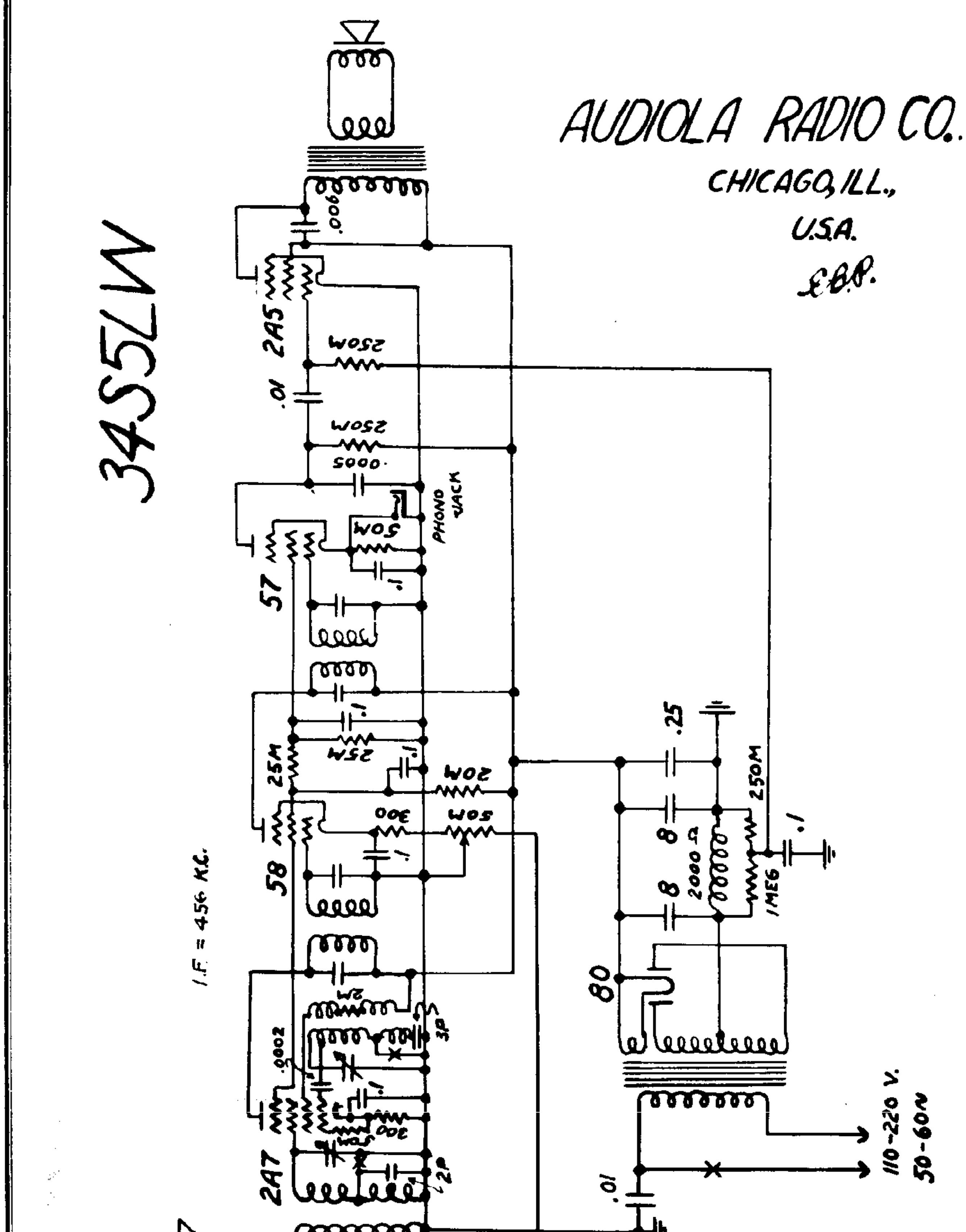
MODEL 34-S-5 AVC
Schematic

AUDIOLA RADIO CO.

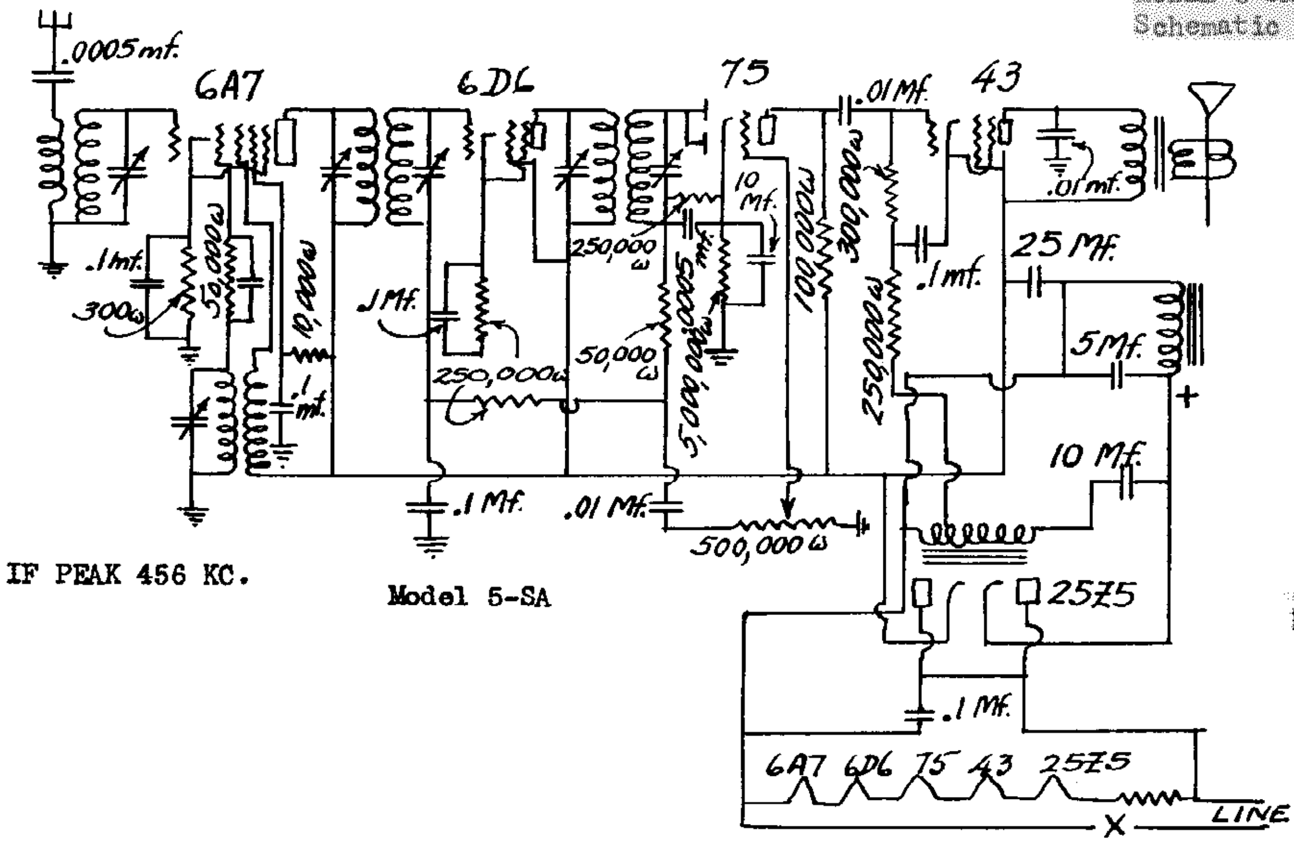


MODEL 34-S5-LW
Schematic

AUDIOLA RADIO CO.



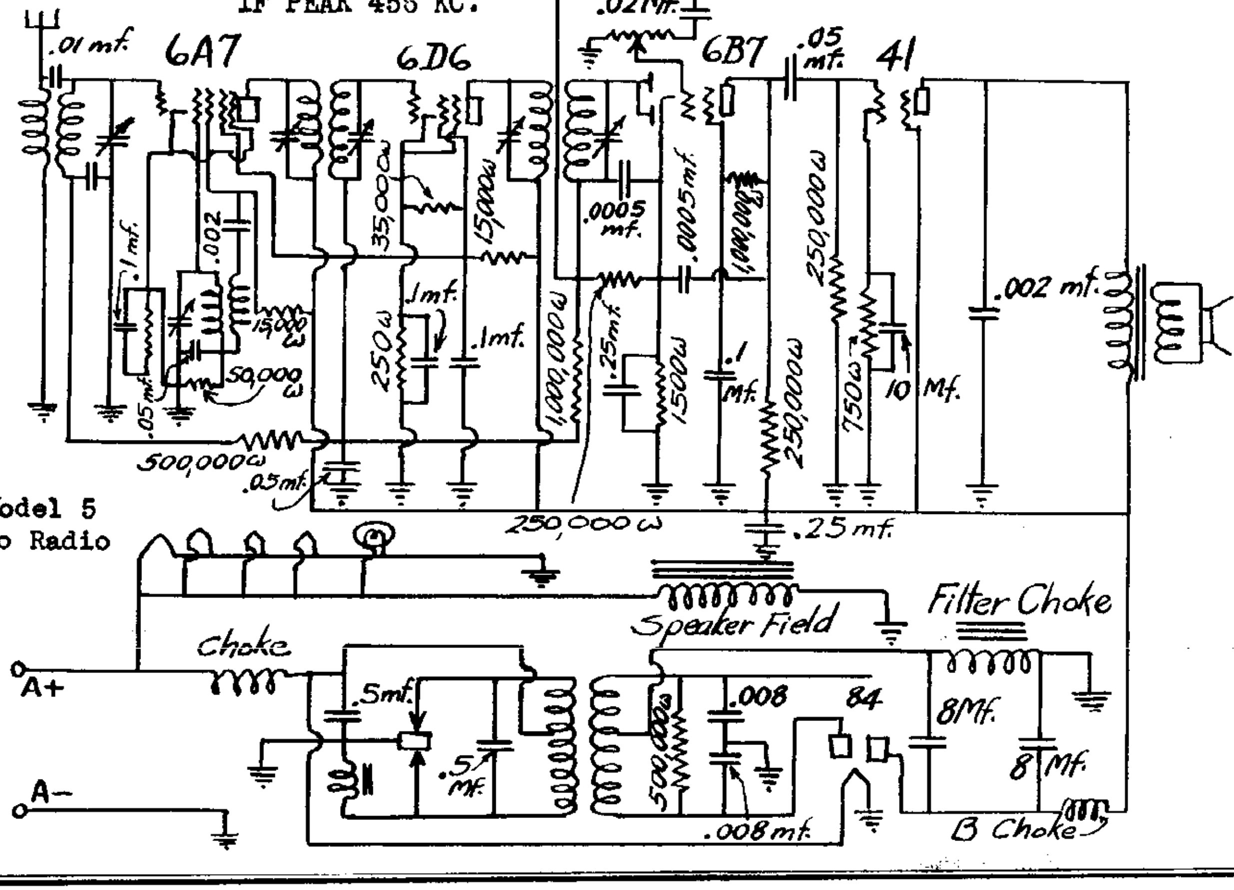
AUTOCRAT RADIO CORP.



IF PEAK 456 KC.

Model 5-SA

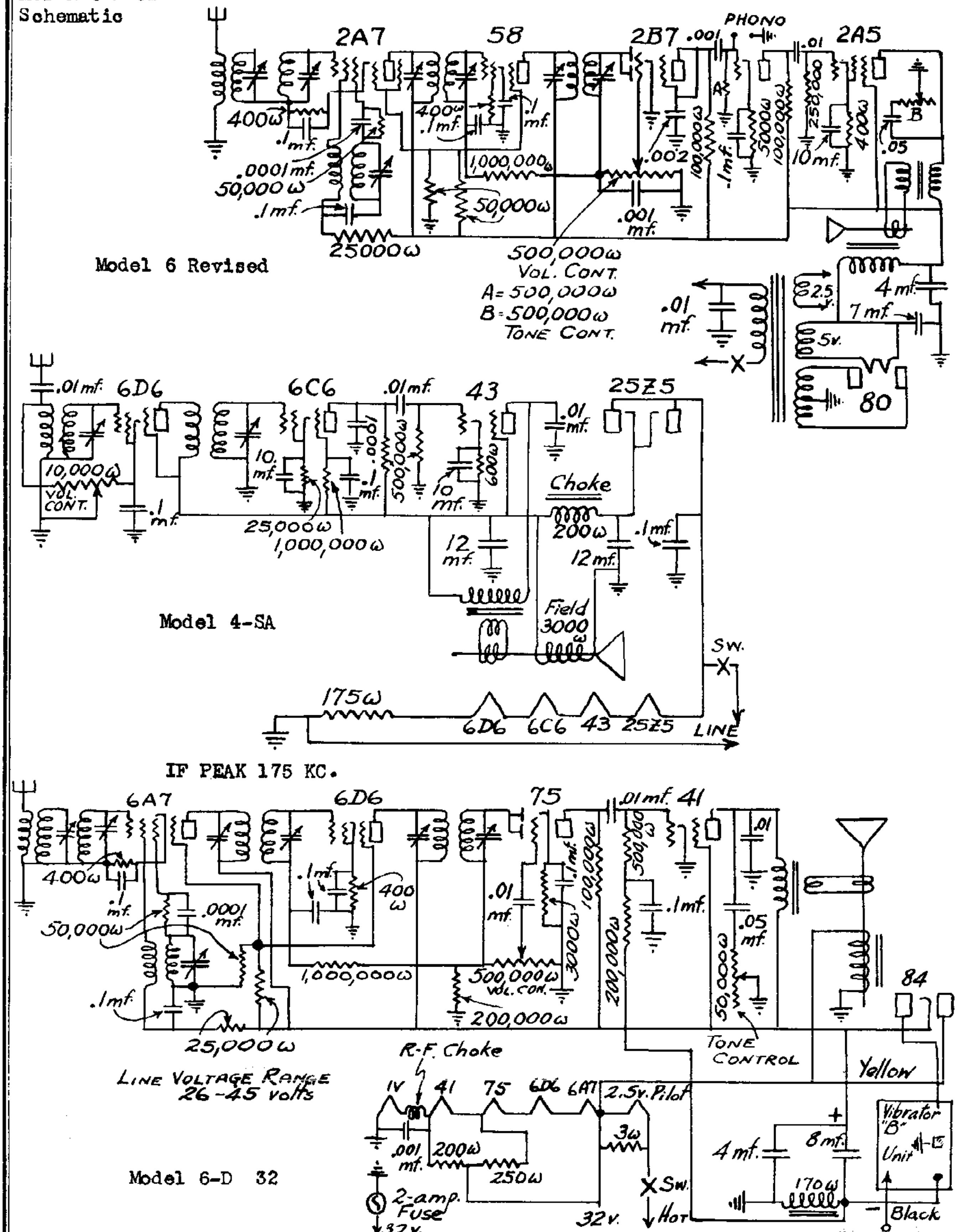
IF PEAK 456 KC.



Model 5
Auto Radio

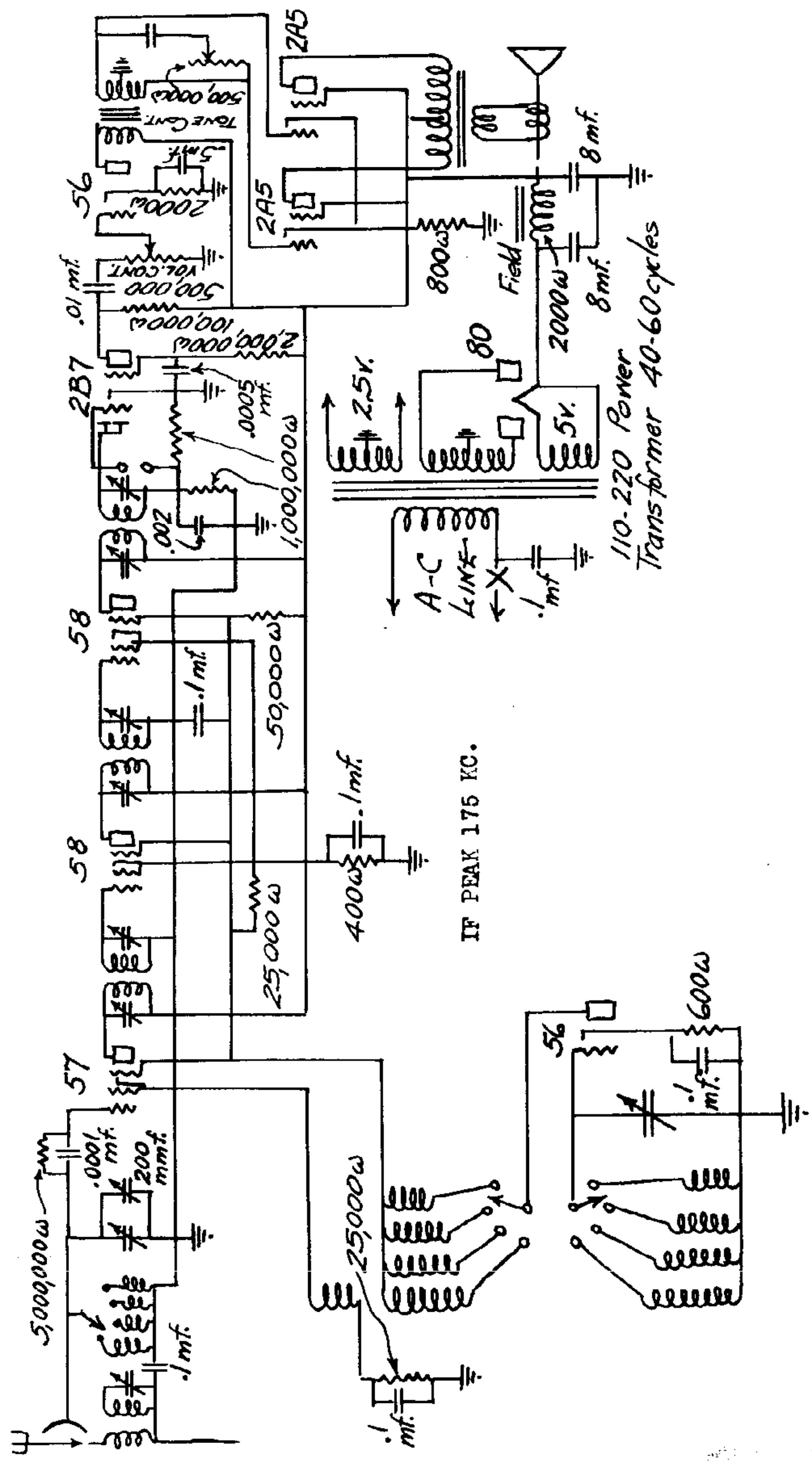
MODEL 4-SA
Schematic
MODEL 6 (Revised)
MODEL 6-D-32
Schematic

AUTOCRAT RADIO CORP.

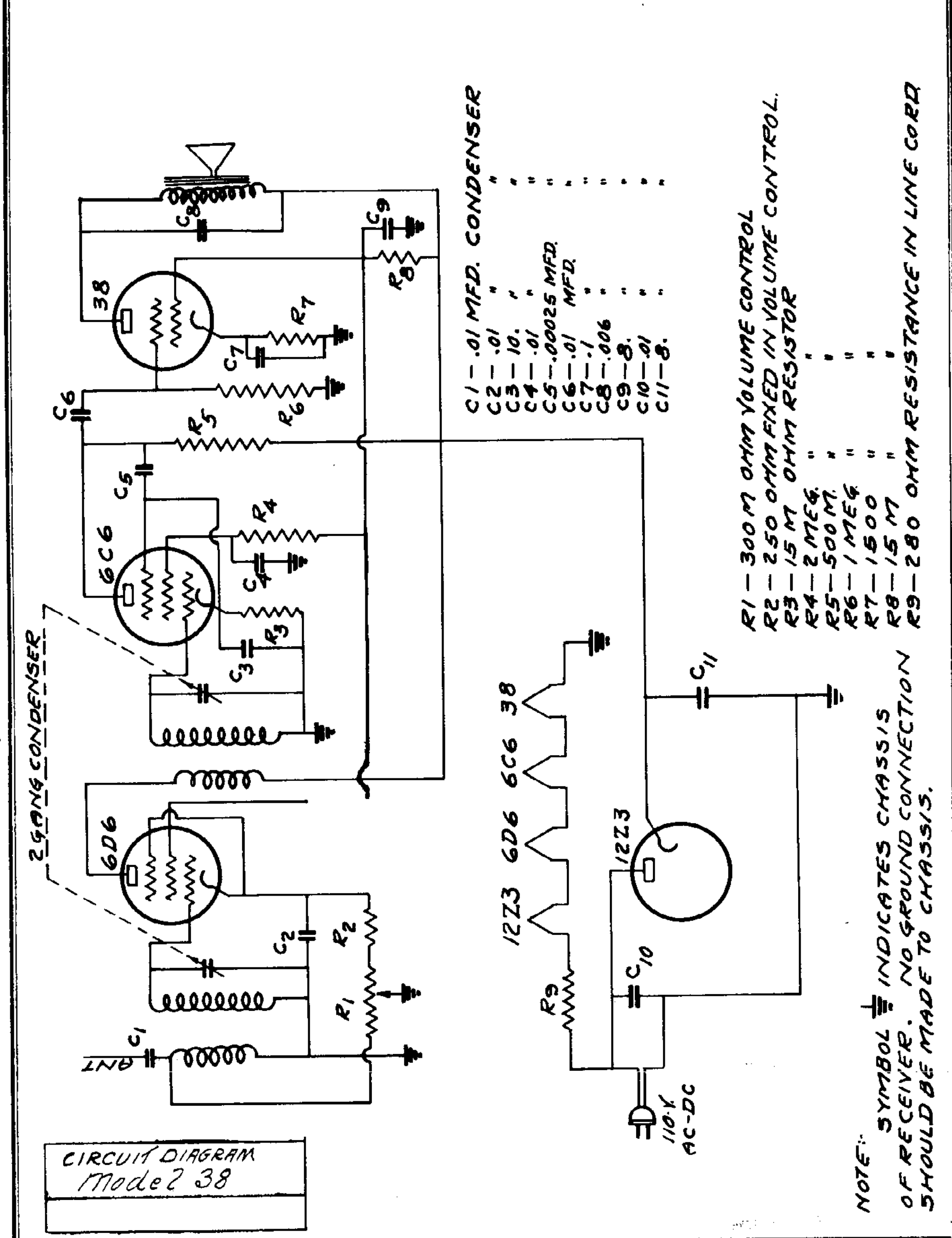


MODEL 90-SL
Schematic

AUTOCRAT RADIO CORP.

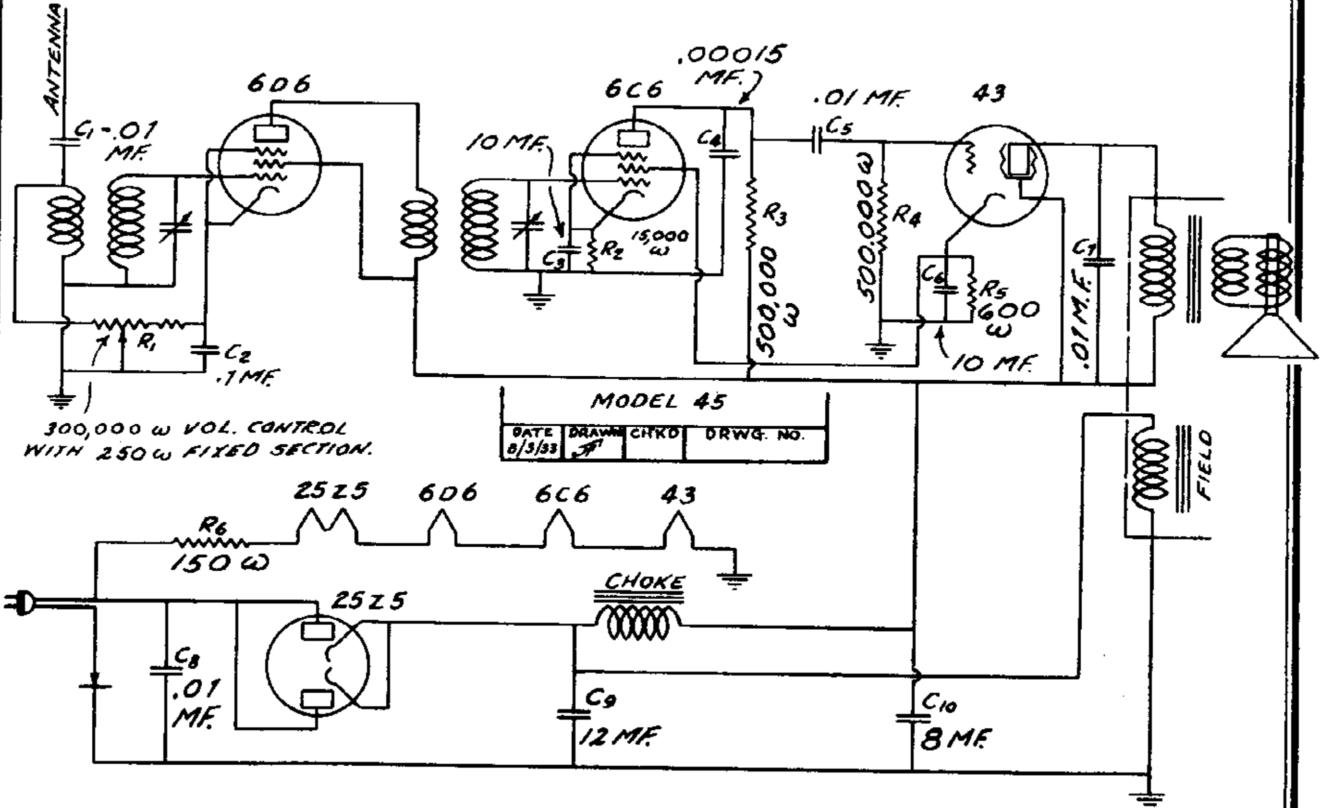


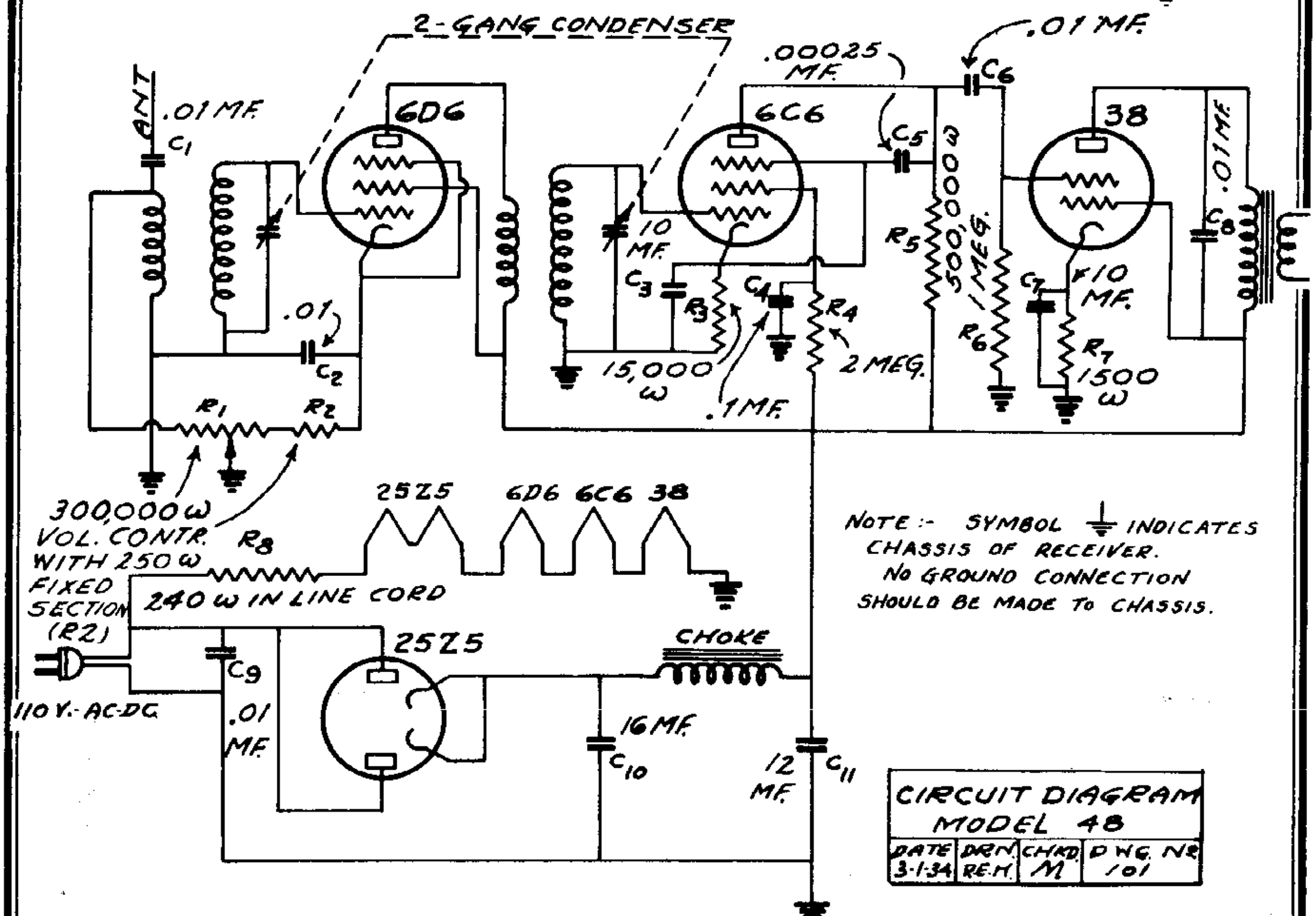
BALKEIT RADIO CO.



MODEL 45
MODEL 48
Schematics

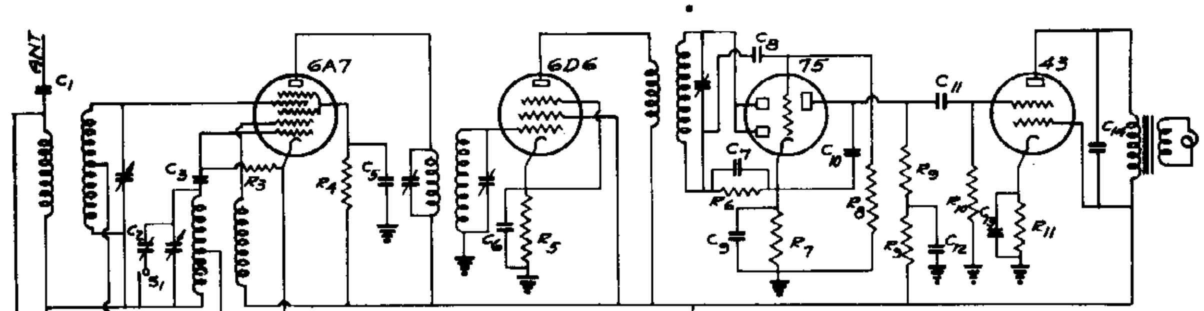
BALKEIT RADIO CO.

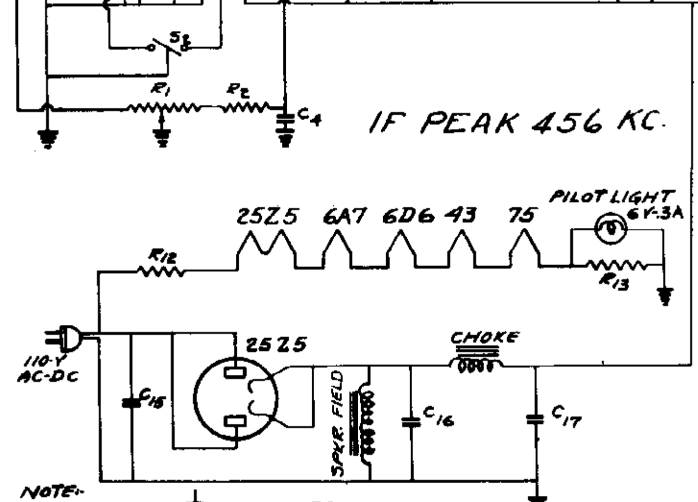




BALKEIT RADIO CO.

MODEL 59
MODEL 69
Schematics





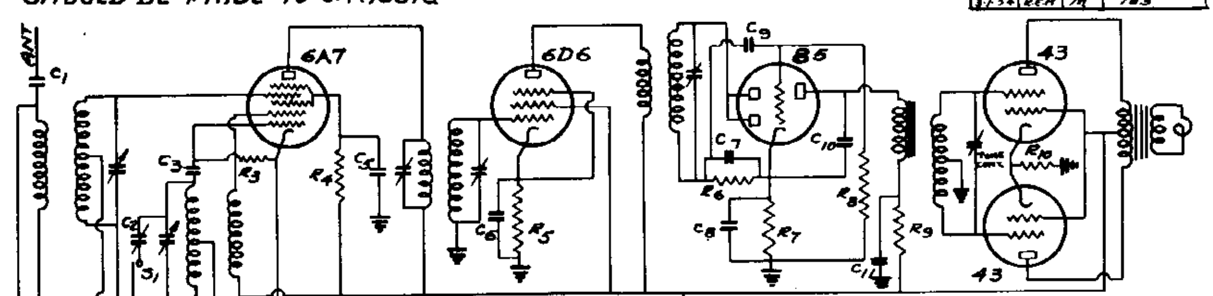
S-1 AND S2 = COMBINATION SWITCH FOR BROADCAST AND SHORT WAVE.

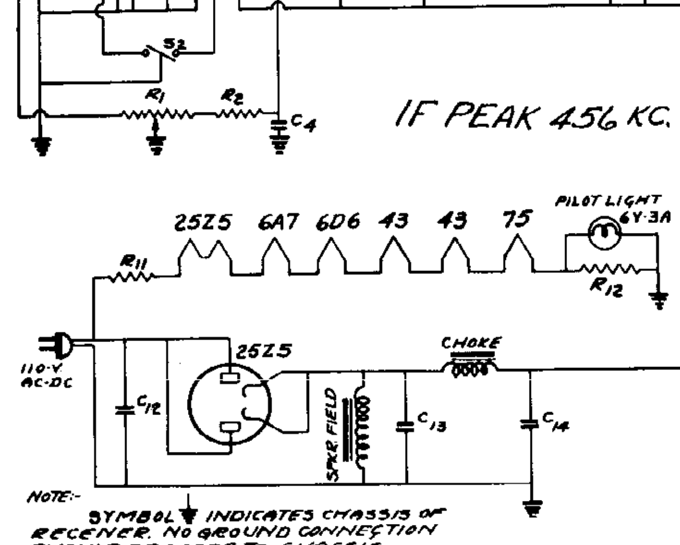
R1 — 10 M OHM VOLUME CONTROL.
R2 — 250 OHM CONTAINED IN VOL. CONTROL
R3 — 250 M OHM RESISTOR
R4 — 25 M " "
R5 — 250 " "
R6 — 500 M " "
R7 — 8 M " "
R8 — 500 M " "
R9 — 250 M " "
R10 — 1 MEG. " "
R11 — 600 " "
R12 — 150 " "
R13 — 20 " "

C1 .00025 MF. CONDENSER (PAD)
C2 — 75 MMFD. "
C3 — .00025 MFD. "
C4 — .01 " "
C5 — .1 " "
C6 — .1 " "
C7 — .00025 " "
C8 — .1 " "
C9 — 10 " "
C10 — .0005 " "
C11 — .1 " "
C12 — .1 " "
C13 — 10 " "
C14 — .006 " "
C15 — .01 " "
C16 — 20 " "
C17 — 20 " "

NOTE:- SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

CIRCUIT DIAGRAM MODEL 59			
DATE	DRN.	CHKD.	DWG. NO.
3-1-34	R.E.H.	M	103





S-1 AND S2 - COMBINATION SWITCH FOR BROADCAST AND SHORT WAVE

R1 — 10 M OHM VOLUME CONTROL.
R2 — 250 OHM CONTAINED IN VOL. CONTROL
R3 — 250 M OHM RESISTOR
R4 — 25 M " "
R5 — 250 " "
R6 — 500 M " "
R7 — 1 M " "
R8 — 500 M " "
R9 — 50 M " "
R10 — 400 " "
R11 — 60 OHM RESISTANCE IN LINE CORD
R12 — 20 OHM RESISTOR

C1 — .00025 MF CONDENSER (PAD)
C2 — 75 MMFD. "
C3 — .00025 MFD "
C4 — .01 " "
C5 — .1 " "
C6 — .1 " "
C7 — .00025 " "
C8 — 10. " "
C9 — .1 " "
C10 — .0005 " "
C11 — 3. (150 V) " "
C12 — .1 " "
C13 — 20. " "
C14 — 20. " "

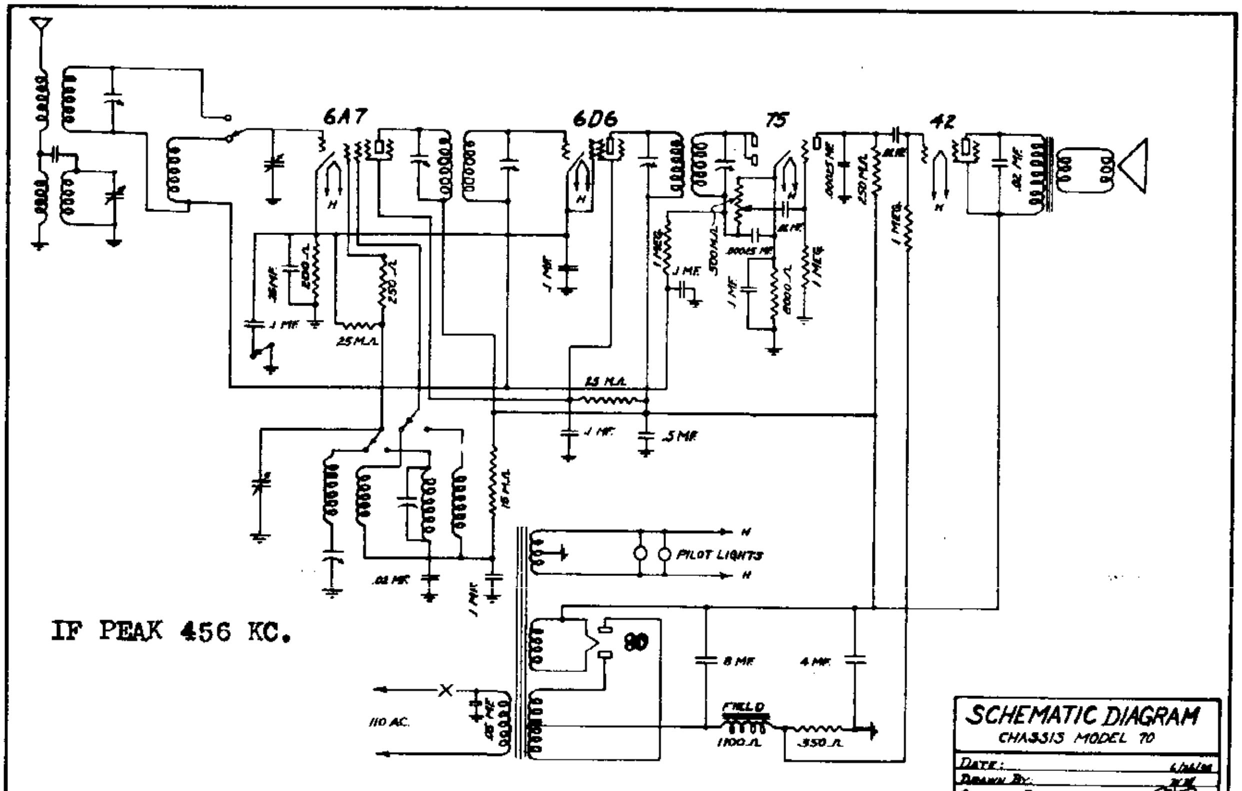
NOTE:- SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

CIRCUIT DIAGRAM MODEL 69			
DATE	DRN.	CHKD.	DWG. NO.
3-2-34	R.E.H.	M	104

MODEL 60,70
Scheratic, Parts

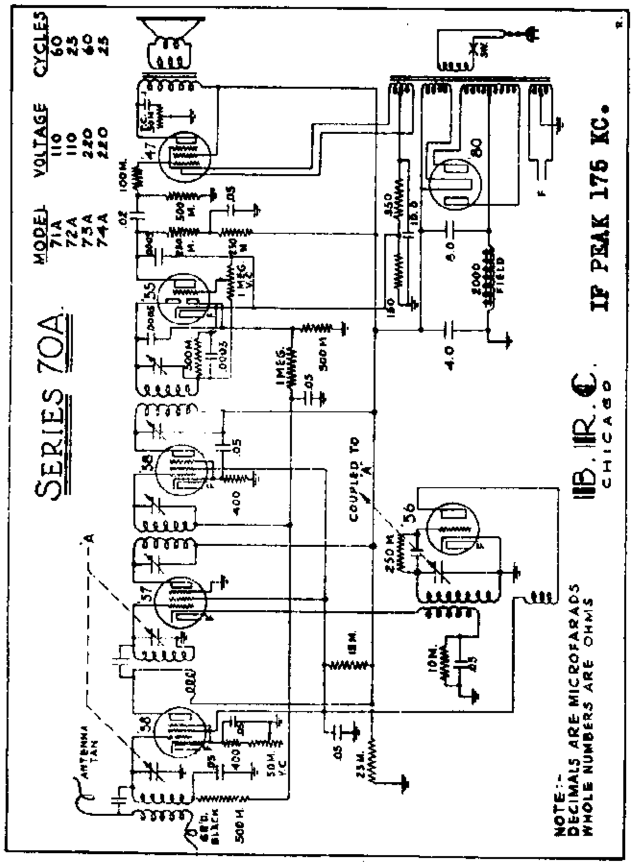
BALKEIT RADIO CO.

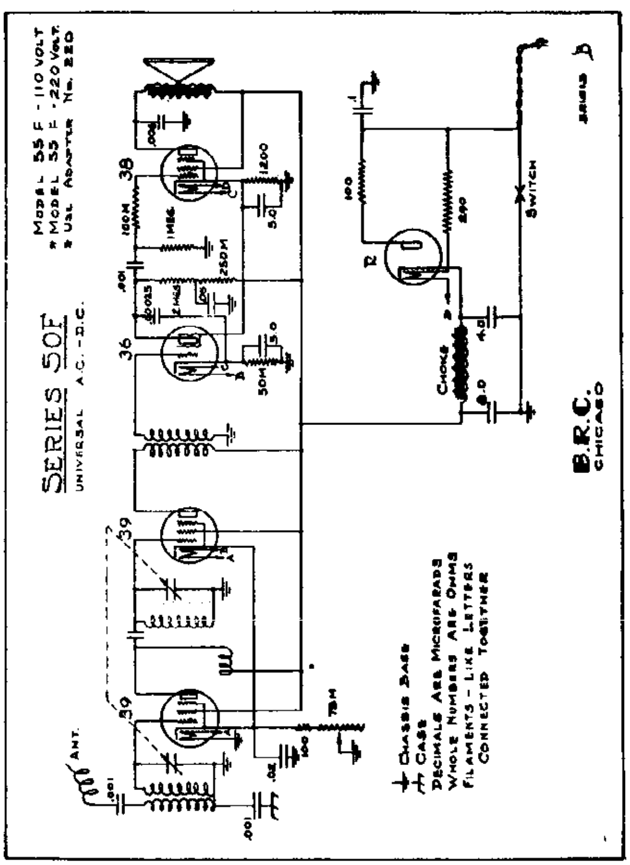
PART NO.	DESCRIPTION	LIST PRICE
701	FILTER CONDENSER	2.40 EACH
702	.1 BY-PASS CONDENSER	.14 "
703	.05 " "	.14 "
704	.02 " "	.14 "
705	.25 " "	.18 "
706	.5 " "	.35 "
707	.00025 " "	.20 "
708	1-WATT RESISTOR	.20 "
709	MISCELLANEOUS RESISTORS(SPECIFY VALUES)(SEE DIAGRAM	.20 "
717	350 OHM POWER RESISTOR	.30 "
718	VOLUME CONTROL	1.25 "
719	SHORT WAVE AND BROADCAST SWITCH	.75 "
720	OSCILLATOR COIL 456 KC	.90 "
723	CORD AND PLUG	.50 "
733	POWER TRANSFORMER	4.25 "
738	3-GANG CONDENSER	4.50 "
739	1ST I F TRANSFORMER	2.10 "
740	2ND I F TRANSFORMER	2.10 "
741	PRE SELECTOR COIL	1.25 "
745	PILOT LAMP	.25 "
749	TRIMMER	.20 "
751	KNOB (LARGE)	.20 "
751-A	KNOBS	.15 "
754	PILOT LIGHT SOCKET	.15 "
758	SPEAKER	6.00 "
758-A	SPIDER AND VOICE COIL	.40 "
758-B	6" DIAPHRAM	.30 "
762	S.W. OSCILLATOR COIL	.60 "
763	ANTENNA S.W. OSCILLATOR COIL	.60 "
767	DIAL DRIVE DISC	.60 "
768	CELLULOID DRIVE DISC	.50 "
769	DIAL FACE	.60 "
777	DIAL POINTER	.12 "
779	CONVEX DIAL CRYSTAL	.30 "

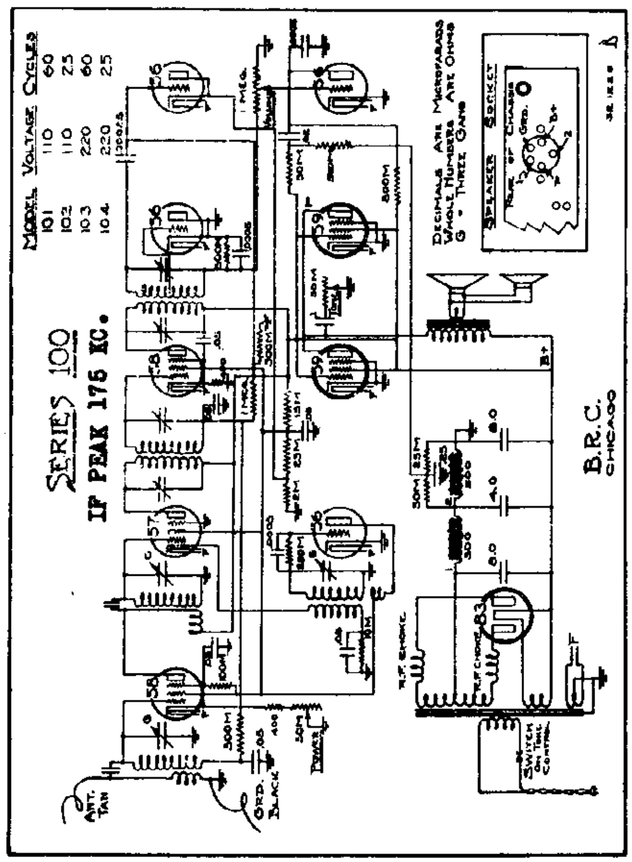


MODEL 50-F
MODEL 70-A
MODEL 100
Schematics

BELMONT RADIO CORP.

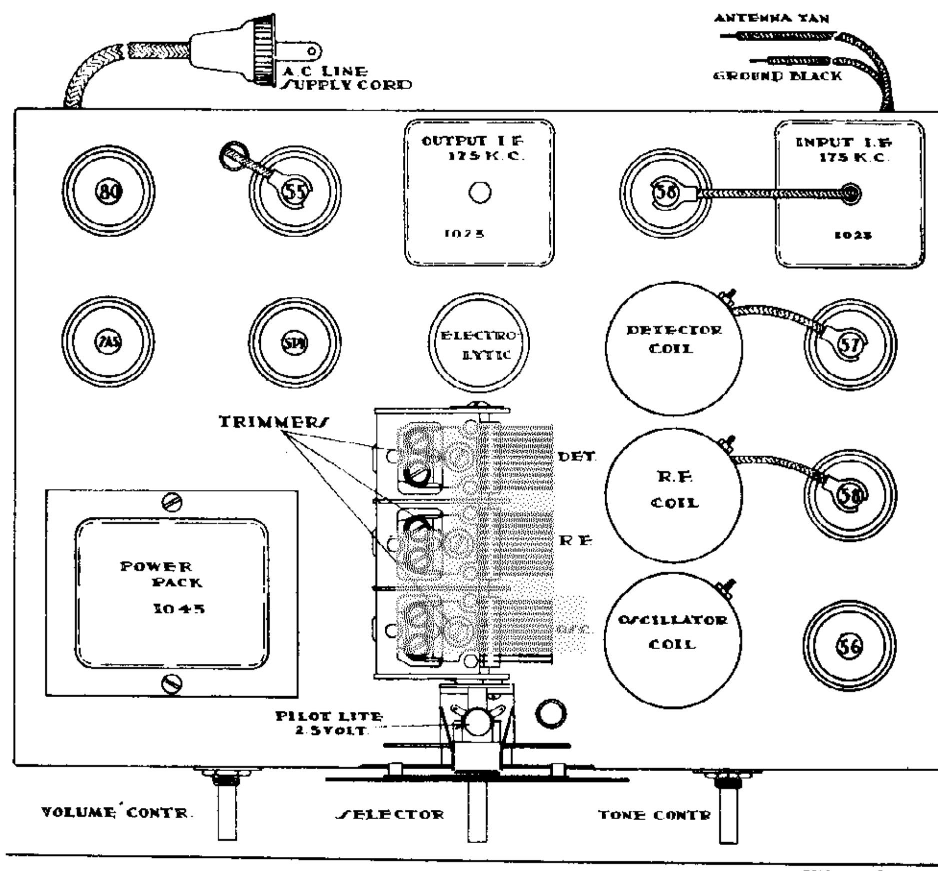


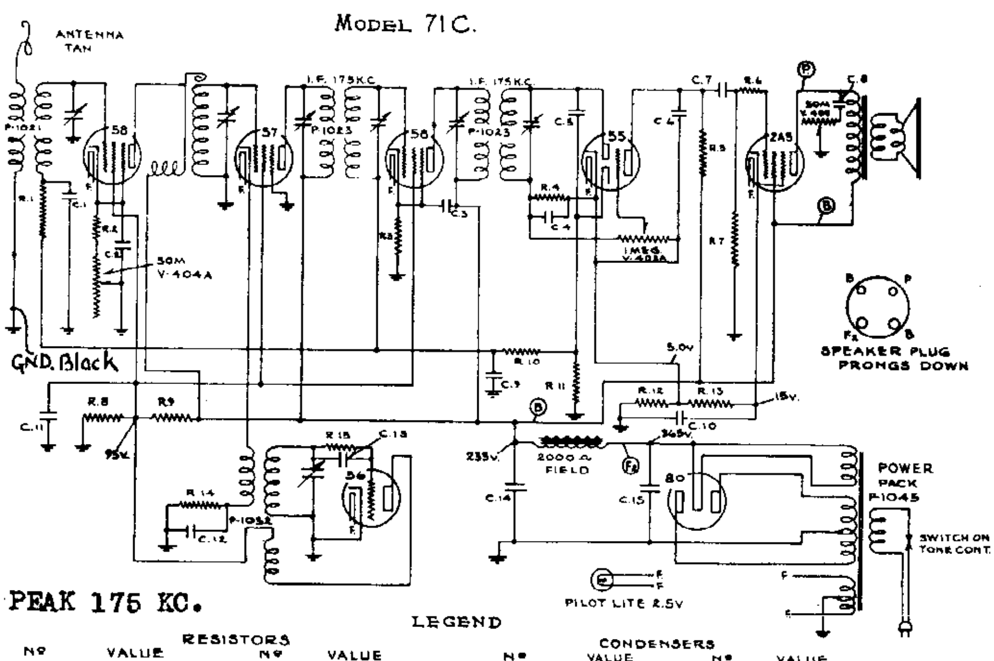




MODEL 71-C
Schematic, Socket
Alignment

BELMONT RADIO CORP.





IF PEAK 175 KC.

LEGEND

RESISTORS

Nº	VALUE	Nº	VALUE
R.1:-	500M	R.9:-	15M *
R.2:-	400	R.10:-	1MEG.
R.3:-	400	R.11:-	500M
R.4:-	500M	R.12:-	150 *
R.5:-	250M	R.13:-	300 *
R.6:-	100M	R.14:-	10M
R.7:-	500M	R.15:-	250M
R.8:-	25M *		

NUMBERS PREFIXED BY P OR V ARE PARTS.
* R.8, R.9, R.12 & R.13 IN ONE UNIT P-1049
* C.10, C.14, & C.15 " " " P-1047

CONDENSERS

Nº	VALUE	Nº	VALUE
C.1:-	.05	C.9:-	.05
C.2:-	.05	C.10:-	12.0MF. *
C.3:-	.05	C.11:-	.05
C.4:-	500MMF.	C.12:-	.05
C.5:-	500MMF.	C.13:-	500MMF.
C.6:-	500MMF.	C.14:-	4.0MF. *
C.7:-	.02	C.15:-	8.0MF. *
C.8:-	.1		

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL, WITH 119 VOLTS A.C. LINE.

35219

SERVICE NOTES

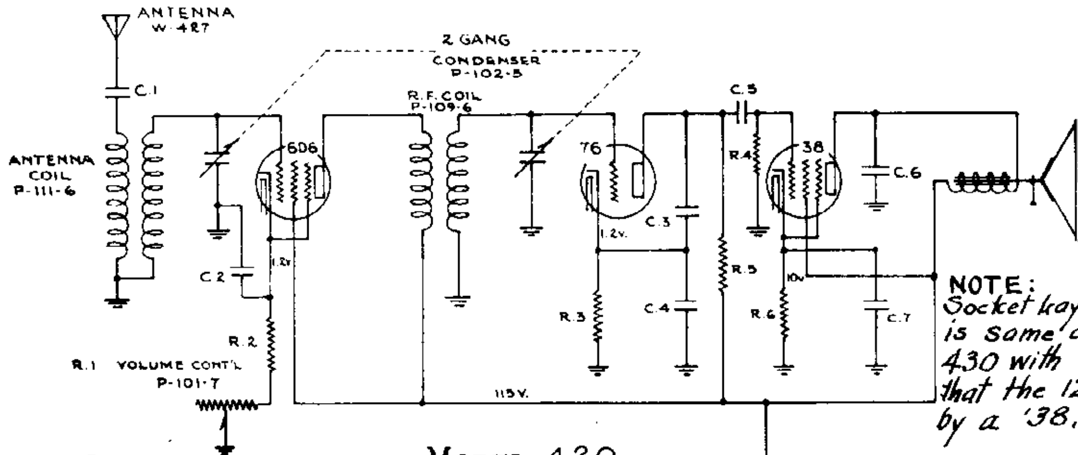
To peak I.F. transformers connect oscillator (set at 175 KC) to grid of 57 first detector and (Black) ground wire. Adjust four trimmers from bottom of chassis (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

Connect an oscillator in series with a 200 MMFD condenser to the Tan (Antenna) wire and Black (ground) wire, with the oscillator set at 1720 KC and the variable condenser at its minimum position (extreme right of its rotation) adjust trimmer of oscillator (front) section of variable condenser to resonance. Set oscillator to 1400 KC and rotate variable condenser until signal is tuned in, then adjust ANT. and R.F. trimmers (center and rear sections of condenser) to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles, bend plates of center and rear sections of variable condenser only if necessary.

MODEL 430
Schematic, Socket

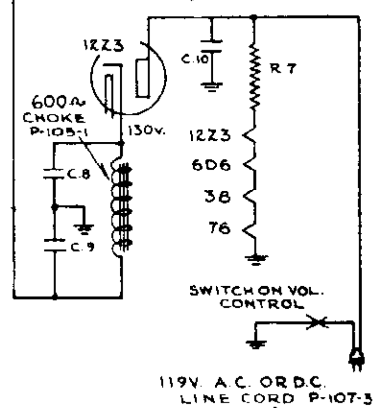
BELMONT RADIO CORP.

MODEL 420
Schematic, Socket



NOTE:
Socket layout of Model 420
is same as that of Model
430 with the exception
that the 12A5 is replaced
by a '38.

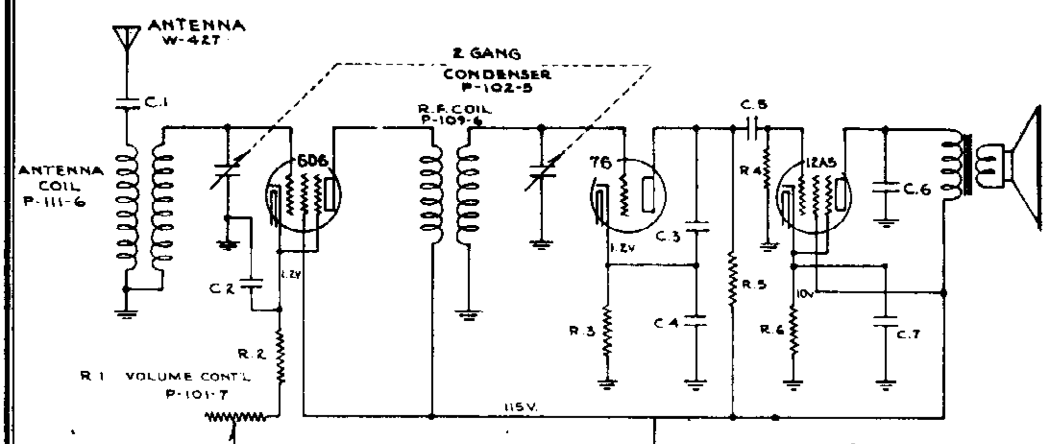
MODEL 420



Nº	VALUE
R.1:-	75M VOL. CONT'L. MAX. R.
R.2:-	100 VOL. CONT'L. MIN. R
R.3:-	50M ⅓W. 20V.
R.4:-	500M ⅓W. 20V.
R.5:-	250M ⅓W. 50V.
R.6:-	1100 ⅓W. 10V.
R.7:-	260Ω 0.300 AMP. IN CORD

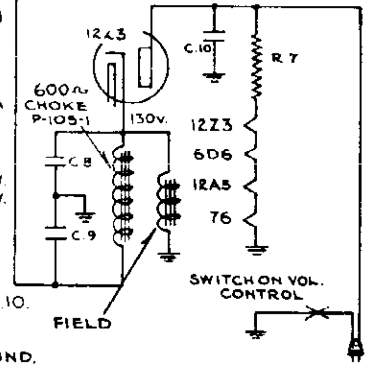
Nº	VALUE
C.1:-	.0005 MICA
C.2:-	.05 X 200V.
C.3:-	.001 MICA
C.4:-	8 MFD.
C.5:-	.003 X 600V.
C.6:-	.005 X 600V.
C.7:-	8 MFD.
C.8:-	8 MFD.
C.9:-	8 MFD.
C.10:-	.05 X 400V.

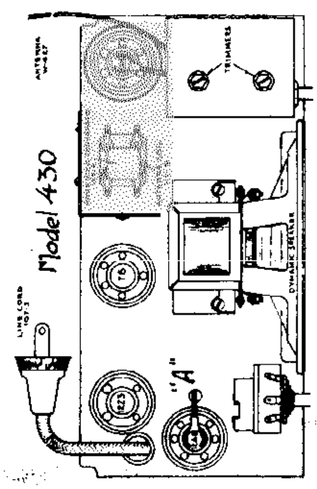
CONDENSERS IN BY-PASS BLOCK P-145-1:- C.2, C.5, C.6, C.10.
CONDENSERS IN ONE UNIT:- C.4, C.7, C.8, C.9,- P-119-1
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND.
VOLUME ON FULL.



"A" This replaced by
a '38 in Model 420.

MODEL 430





Model 430

Nº	VALUE
R.1:-	75M VOL. CONT'L. MAX. R.
R.2:-	100 VOL. CONT'L. MIN. R.
R.3:-	50M ⅓W 20V.
R.4:-	500M ⅓W. 20V
R.5:-	250M ⅓W. 50V
R.6:-	1100 ⅓W. 10V.
R.7:-	260Ω 0.300 AMP. IN CORD

Nº	VALUE
C.1:-	.0005 MICA
C.2:-	.05 X 200V.
C.3:-	.001 MICA
C.4:-	5 MFD.
C.5:-	.003 X 600V.
C.6:-	.005 X 600V.
C.7:-	5 MFD.
C.8:-	8 MFD.
C.9:-	16 MFD.
C.10:-	.05 X 400V.

34103

CONDENSERS IN BY-PASS BLOCK P-145-1:- C.2, C.5, C.6, C.10.
CONDENSERS IN ONE UNIT:- C.4, C.7, C.8, C.9, P-119-3
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND.
VOLUME ON FULL.

MODEL 420,430
Alignment

BELMONT RADIO CORP.

SERVICE MANUAL FOUR TUBE T.R.F. RECEIVERS

105-115 Volts Alternating (any cycles) or Direct Current - 40 Watts

530 - 1720 Kilocycles

Both of the above models are four tube T.R.F., two gang receivers, the principle difference being that model 420 is equipped with a permanent magnet speaker and the model 430 with an electro dynamic speaker.

The tube complement of model 420 is as follows:

1 - Type 6D6 - remote cut-off pentode as an R.F. amplifier.
1 - Type 76 - triode as a detector.
1 - Type 38 - pentode as an output tube.
1 - Type 12Z3 - high vacuum rectifier.

The tube complement of model 430 is as follows:

1 - Type 6D6 - remote cut-off pentode as an R.F. amplifier.
1 - Type 76 - triode as a detector.
1 - Type 12A5 - pentode output tube.
1 - Type 12Z3 - high vacuum rectifier.

SERVICE NOTES

Should it ever become necessary to check alignment or re-align these receivers, the correct procedure is as follows:

Before any adjustments are made, the chassis must be removed from the cabinet. To do this it is necessary to pull off the volume and selector knobs, remove the back of the cabinet and the four screws which fasten the chassis to the base of the cabinet.

FREQUENCY ALIGNMENT:

1. Disconnect antenna wire from lug on antenna coil to which it is attached and connect in its place, in series with a 50 mmfd. condenser, a test oscillator. With this oscillator set at 1400 kilocycles and the R.F. (front trimmer) opened as far as possible, trim the antenna (rear) trimmer to resonance with oscillator (maximum deflection on an output meter connected across the two leads of the PM speaker on the model 420 and across the primary of the speaker input transformer on the model 430).
2. Check tracking at 1200-1000-800-600-530 kilocycles, bending plates only if absolutely necessary.
3. Re-set oscillator to 1712 kilocycles, tuning oscillator by rotating variable condenser for a check to ascertain if receiver tunes to 1712.

NOTES:

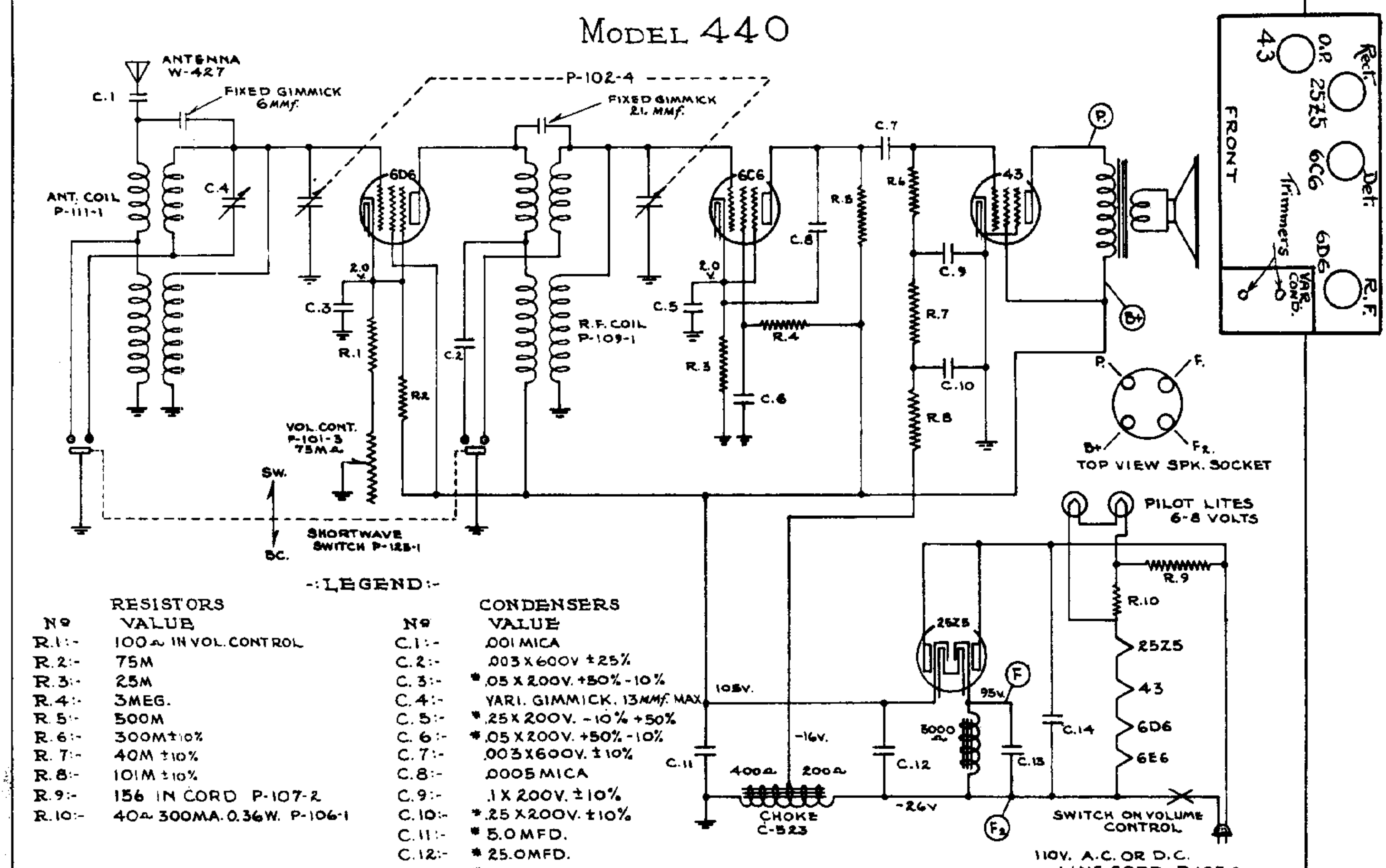
If trouble is experienced in getting receiver tuned down to 1712, look for the following:

That the green grid and black ground wires connected to the antenna coil are well separated from each other and that both the green leads to the grid cap and the antenna are clear of the tube shield (this reduces to a minimum the external capacity of the antenna coil).

MODEL 440
Schematic, Socket

BELMONT RADIO CORP.

MODEL 440



-:LEGEND:-

RESISTORS

Nº	VALUE
R.1:-	100Ω IN VOL. CONTROL
R.2:-	75M
R.3:-	25M
R.4:-	3MEG.
R.5:-	500M
R.6:-	300M ±10%
R.7:-	40M ±10%
R.8:-	101M ±10%
R.9:-	156 IN CORD P-107-2
R.10:-	40Ω 300MA. 0.36W. P-106-1

CONDENSERS

Nº	VALUE
C.1:-	.001 MICA
C.2:-	.003 X 600V ±25%
C.3:-	* .05 X 200V. +50% -10%
C.4:-	VARI. GIMMICK. 13MMf. MAX.
C.5:-	* .25 X 200V. -10% +50%
C.6:-	* .05 X 200V. +50% -10%
C.7:-	.003 X 600V. ±10%
C.8:-	.0005 MICA
C.9:-	.1 X 200V. ±10%
C.10:-	* .25 X 200V. ±10%
C.11:-	* 5.0 MFD.
C.12:-	* 25.0 MFD.
C.13:-	* 5.0 MFD.
C.14:-	.1 X 400V. +50% -10%

NOTE:-* C.3, C.6 IN DUAL CONDENSER UNIT P-1030
C.5, C.10 " " " P-118-2
C.11, C.12, C.13 IN ONE UNIT P-103-1

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
NUMBERS PREFIXED BY LETTERS ARE PARTS.

34301 R.

MODEL 440
Alignment

BELMONT RADIO CORP.

105-115 Volts Alternating (any cycles) or Direct Current - 40 Watts.

530-1500 Kilocycles - 1500-4000 Kilocycles

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

BROADCAST BAND ALIGNMENT:

Remove chassis from cabinet by pulling off volume, selector and wave changing switch knobs, removing back and four screws which hold chassis in cabinet, replace knobs and disconnect antenna wire from coil.

1. Set wave changing switch in broadcast position by rotating in clockwise (right) direction.
2. With gang condenser in its minimum capacity position, plates entirely out of mesh, extreme left of its rotation, and with volume control full on, make the following adjustments:
   (a) Connect an oscillator set at 1500 kilocycles in series with a 50 mmfd. condenser to the antenna terminal of the coil (from which antenna lead has been removed) and to ground (chassis), adjust both antenna and R.F. trimmers of the variable condenser to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
   (b) Reset oscillator to 1400 kilocycles, adjust variable condenser to pick up oscillator and re-align antenna trimmer (rear section of variable condenser) to resonance.
   (c) Check output at 1200-1000-800-600 kilocycles. Bend plates only at 1200 and 1000 kilocycles to increase output, and then only if necessary. No bending is necessary at 600 or 800 kilocycles.

SHORT WAVE BAND ALIGNMENT:

1. Set wave changing switch in counter-clockwise (left) position.

2. With oscillator adjusted to 3700 kilocycles, adjust the condenser mounted on top of the antenna coil and consisting of a center piece of heavy enameled copper wire about which is wrapped a spiral of a smaller enameled copper wire, with your fingers sliding the spiral to and fro until maximum output is attained, as indicated by maximum deflection on the output meter.
3. Next reset oscillator to 1550 kilocycles and adjust slip coil at the bottom of antenna coil assembly until maximum output is obtained (this coil is wound on a paper tube which has been slipped over the dowel on which the other coils are wound). Seal this slip coil with wax after making adjustment.
4. Now reset oscillator to 3700 kilocycles and readjust the condenser previously adjusted, as explained in 1. On completing this readjustment, seal the adjustment by dropping some wax in the hole of the terminal strip at the top of the antenna coil assembly where the spiral enameled wire passes through the strip. Do not put wax on the spiral wire, as this will change the capacity of this small condenser.

NOTES

When making these adjustments with the small condenser at the top of the coil and with the slip coil at the bottom of the antenna assembly, keep the receiver tuned to the generator at all times by gently rocking the variable condenser to and fro.

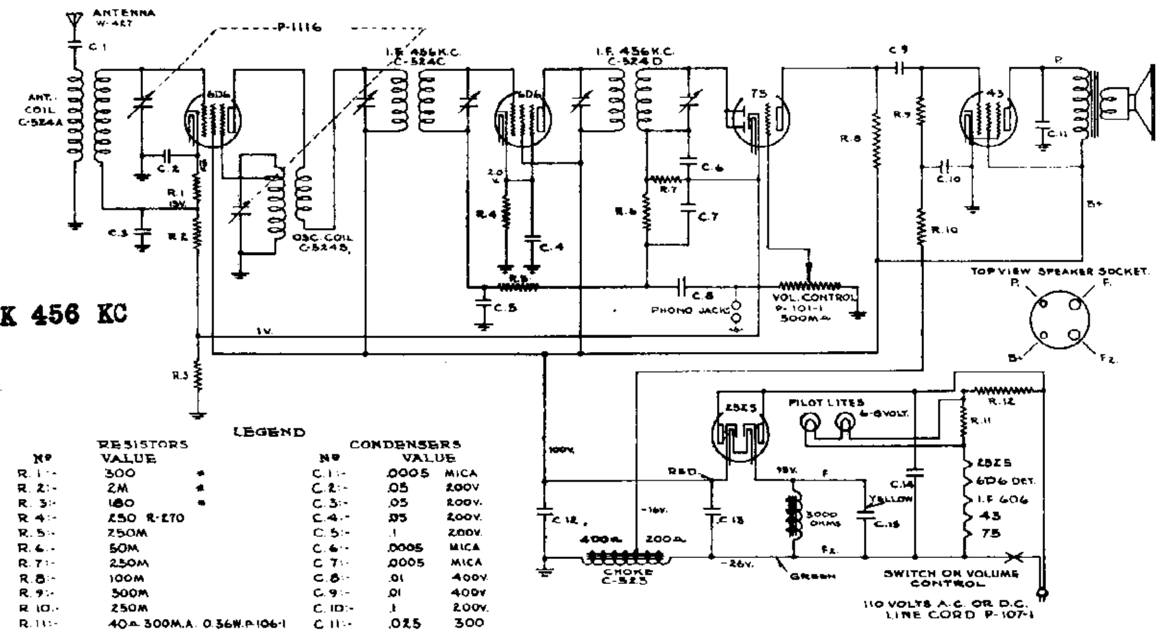
In order to replace pilot lights, it is necessary to remove the chassis. These lamps are connected in series, if one of them burns out the other one will not light. They are 6-8 volt, .15 ampere lamps.

MODEL 540
Schematic, Socket
Alignment, Parts

BELMONT RADIO CORP.

MODEL 540

IF PEAK 456 KC



LEGEND

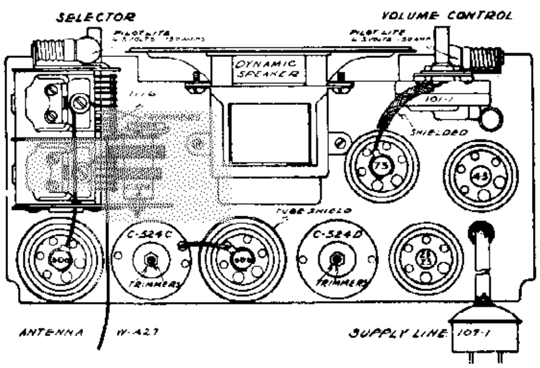
RESISTORS

Nº	VALUE	
R. 1:-	300	*
R. 2:-	2M	*
R. 3:-	180	*
R. 4:-	250 R-270	
R. 5:-	250M	
R. 6:-	50M	
R. 7:-	250M	
R. 8:-	100M	
R. 9:-	500M	
R. 10:-	250M	
R. 11:-	40Ω 300M.A. 0.36W.P-106-1	
R. 12:-	126 IN CORD P-107-1	

CONDENSERS

Nº	VALUE	
C. 1:-	.0005	MICA
C. 2:-	.05	200V
C. 3:-	.05	200V.
C. 4:-	.05	200V.
C. 5:-	.1	200V.
C. 6:-	.0005	MICA
C. 7:-	.0005	MICA
C. 8:-	.01	400V.
C. 9:-	.01	400V
C. 10:-	.1	200V.
C. 11:-	.025	300
C. 12:-	5.0 MFD.	C-525D
C. 13:-	25.0 MFD.	*
C. 14:-	.1	400V.
C. 15:-	5.0 MFD	*

:NOTE:-
* R.1, R.2 & R.3 IN ONE UNIT PART NUMBER R-268.
* C. 13 AND C. 15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A.C. CURRENT.



Part No.	Description
101-1	Volume Control with Switch
106-1	40 Ohm Resistor-10%
107-1	126 Ohm Special Cord and Plug
C-523	600 Ohm Choke
C-524A	Antenna Coil
C-524B	Oscillator Coil
C-524C	Input I.F. Transformer
C-524D	Output I.F. Transformer
C-525C	5-25 Mfd. Electrolytic Condenser
C-525D	5 Mfd. Electrolytic Condenser
R-268	2480 Ohm Resistor
R-270	250 Ohm Wire Wound Resistor

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

1. Volume control on full during all alignment.
2. Variable condenser in minimum capacity position, plates open, at start of all aligning.

I.F. ALIGNMENT

1. To peak I.F. transformers, connect oscillator set at 456 kilocycles td the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

   Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

BROADCAST BAND ALIGNMENT

1. Disconnect antenna wire and connect oscillator in series with a 75 mmfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer), Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

MODEL 575
Schematic,
Alignment

BELMONT RADIO CORP.

Service Notes

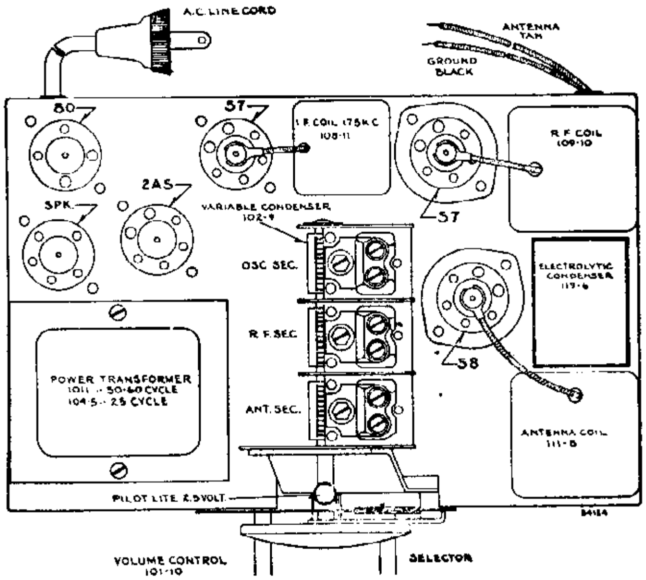
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

Part No. 145-2

Common Black to Brown	—.003	x 600 Volts
Common Black to Green	—.1	x 200 Volts
Common Black to Red	—.1	x 200 Volts
Common Black to Orange	—.25	x 200 Volts
Blue to Blue	—.05	x 400 Volts

Part No. 145-3

Common Black to Brown	—.1	x 200 Volts
Common Black to Green	—.05	x 200 Volts
Common Black to Orange	—.05	x 200 Volts
Common Black to Yellow	—.05	x 200 Volts



Aligning I. F. Transformer

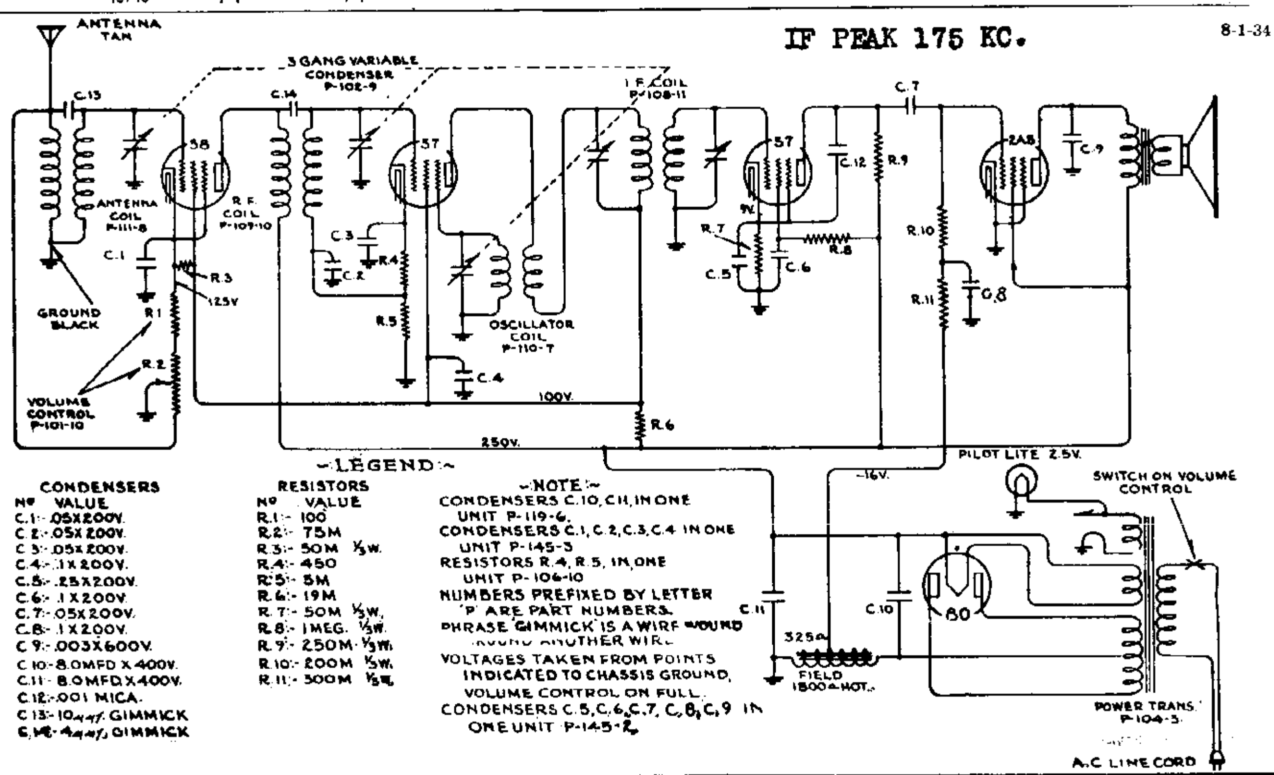
1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:
   (a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.
   (b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.
   (a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.
   (b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.
   (c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

IF PEAK 175 KC. 8-1-34



~LEGEND~

CONDENSERS

No	VALUE
C.1	.05X200V.
C.2	.05X200V.
C.3	.05X200V.
C.4	.1X200V.
C.5	.25X200V.
C.6	.1X200V.
C.7	.05X200V.
C.8	.1X200V.
C.9	.003X600V.
C.10	8.0MFD X 400V.
C.11	8.0MFD X 400V.
C.12	.001 MICA.
C.13	10μμf. GIMMICK
C.14	4μμf. GIMMICK

RESISTORS

No	VALUE
R.1	100
R.2	75M
R.3	50M 1/3W.
R.4	450
R.5	5M
R.6	19M
R.7	50M 1/3W.
R.8	1MEG. 1/3W.
R.9	250M 1/3W.
R.10	200M 1/3W.
R.11	500M 1/3W.

~NOTE~
CONDENSERS C.10, C.11, IN ONE UNIT P-119-6.
CONDENSERS C.1, C.2, C.3, C.4 IN ONE UNIT P-145-3
RESISTORS R.4, R.5, IN ONE UNIT P-106-10
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
PHRASE 'GIMMICK' IS A WIRE WOUND AROUND ANOTHER WIRE.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
CONDENSERS C.5, C.6, C.7, C.8, C.9 IN ONE UNIT P-145-2.

MODEL 640
Schematic, Socket
Trimmers

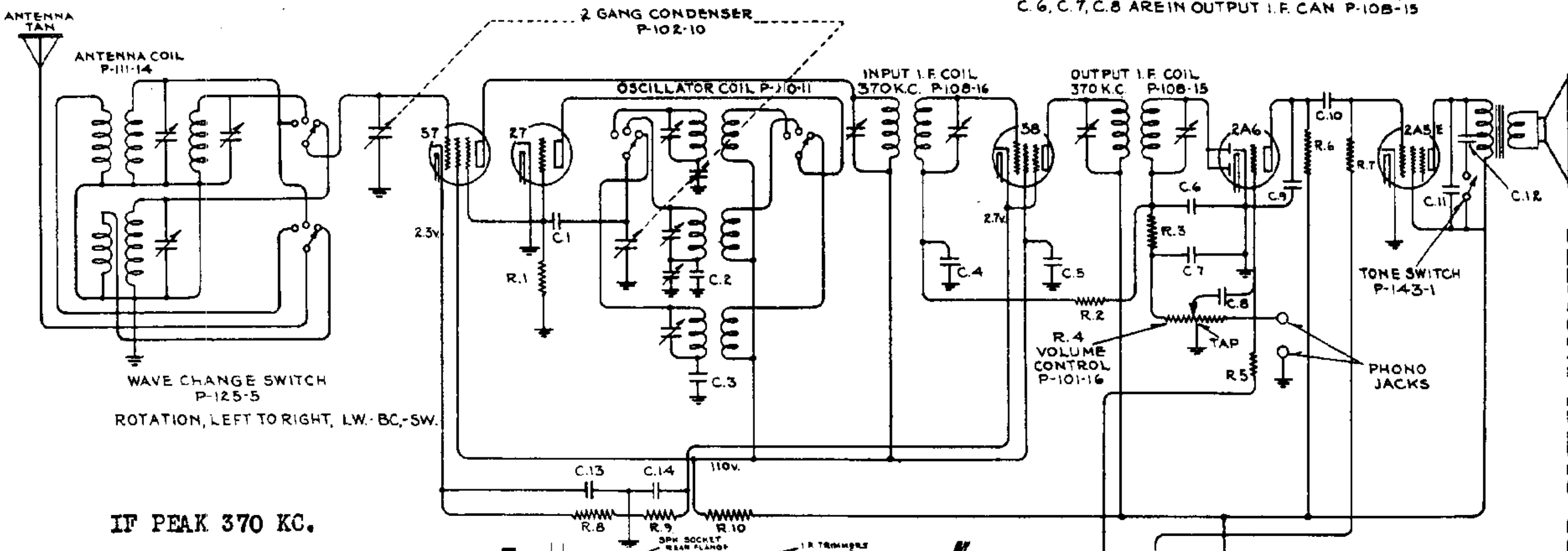
BELMONT RADIO CORP.

CHASSIS ARE SOMETIMES EQUIPPED WITH UNIVERSAL TRANSFORMERS FOR OPERATION ON 40 AND 60 CYCLES AND WITH PRIMARY TAPS FOR 108, 125, 150, 220 AND 250 VOLTS (SEE INSTRUCTIONS) AND ALSO SOMETIMES EQUIPPED WITH 25 CYCLE TRANSFORMERS. SPECIAL AND UNIVERSAL PRIMARIES.

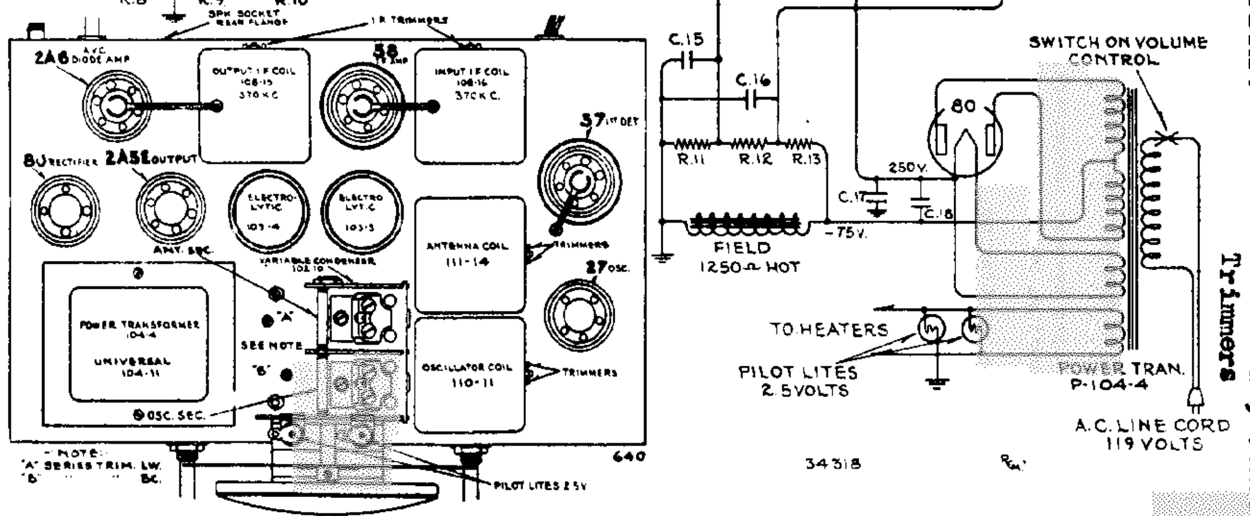
Standard Broadcast Band 200-585 Meters.
Long Wave Band 1000-2150 Meters.
Short Wave Band 19,25-52 Meters.

MODEL 640

-:NOTE:-
CONDENSERS C.11, C.12 IN DUAL UNIT.
" C.15, C.16 " " "
" C.4, C.14 " " "
RESISTORS R.8, R.9, R.10 IN ONE UNIT. P-106-13
NUMBERS PREFIXED BY LETTER 'P' ARE PART NOS
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
RESISTORS, R.2, R.3, R.5 AND CONDENSERS, C.6, C.7, C.8 ARE IN OUTPUT I.F. CAN P-108-15



IF PEAK 370 KC.



CONDENSER Nº	VALUE
C.1:-	50 MICA
C.2:-	490 MICA
C.3:-	6700 MICA
C.4:-	.05 X 200V.
C.5:-	.05 X 400V.
C.6:-	100 MICA
C.7:-	100 MICA
C.8:-	.05 X 200V.
C.9:-	.0005 MICA
C.10:-	.05 X 400V.
C.11:-	.003 X 400V.
C.12:-	.02 X 400V.
C.13:-	.1 X 200V.
C.14:-	.1 X 200V.
C.15:-	.25 X 200V.
C.16:-	.25 X 200V.
C.17:-	18 MFD. 350V. P-103-3
C.18:-	16 MFD. 400V. P-103-4

RESISTORS Nº	VALUE	
R.1:-	50M	⅓W.
R.2:-	300M	⅓W.
R.3:-	50M	⅓W.
R.4:-	500M EA. SIDE OF TAP	
R.5:-	500M	⅓W.
R.6:-	250M	⅓W.
R.7:-	250M	⅓W.
R.8:-	1000	
R.9:-	275	
R.10:-	13M	
R.11:-	25M	⅓W.
R.12:-	250M	⅓W.
R.13:-	750M	⅓W.

MODEL 640
Alignment

BELMONT RADIO CORP.

SERVICE NOTES

Voltages taken from different points of the circuit are measured with a voltmeter having a resistance of 1000 ohms per volt and are made between the points indicated and the chassis pan. These voltages are indicated on the circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNMENT:

No aligning adjustments should be made until the set has been thoroughly checked for all other possible causes of trouble, such as poor installations, low line voltages, defective tubes, condensers and resistors.

ALIGNING I.F. TRANSFORMERS:

1. With volume control full on, at extreme right of its rotation, and with wave changing switch in the long wave position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers, parts number 108-15 and 108-16, in the following manner:
   (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
   (b) Adjust trimming condensers of both I.F. transformers (parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5E output tube Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.

   Note: The two adjustments on each transformer are accessible through holes in the transformer cans from the back of the chassis.

LONG WAVE BAND ALIGNMENT:

1. Shift frequency of external oscillator to 1000 meters and connect in series with a 200 mmfd. condenser to the tan antenna wire and the black ground wire, set wave changing switch to extreme left of its rotation and variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh.
   (a) Adjust long wave shunt trimmers of antenna coil, part number 111-14 and oscillator coil, part number 110-11 to resonance (these adjustments are located nearest to the chassis and each of these coils are adjustable from side of the chassis).
   (b) Shift frequency of external oscillator to 2000 meters, rotate variable condenser to pick up signal.
   (c) Adjust series trimmer to resonance. This adjustment is accessible from top of the chassis between the variable condenser and the power transformer and is marked "A" on top view of chassis.

BROADCAST BAND ALIGNMENT:

1. Set wave changing switch in the broadcast, center, position and re-set external oscillator to 196 meters (1530 kilocycles), set variable condenser at its minimum capacity position, extreme left of its rotation
   (a) Adjust oscillator shunt trimmer, upper adjustment part number 110-11, to resonance.
   (b) Re-set external oscillator to 214 meters (1400 kilocycles), rotate variable condenser to pick up signal, adjust shunt trimmer of antenna coil, upper adjustment part number 111-14, to resonance.
   (c) Re-set external oscillator to 542 meters (550 kilocycles), rotate variable condenser to pick up signal and adjust oscillator series trimmer (between condenser and transformer, marked "B" on diagram) to resonance.

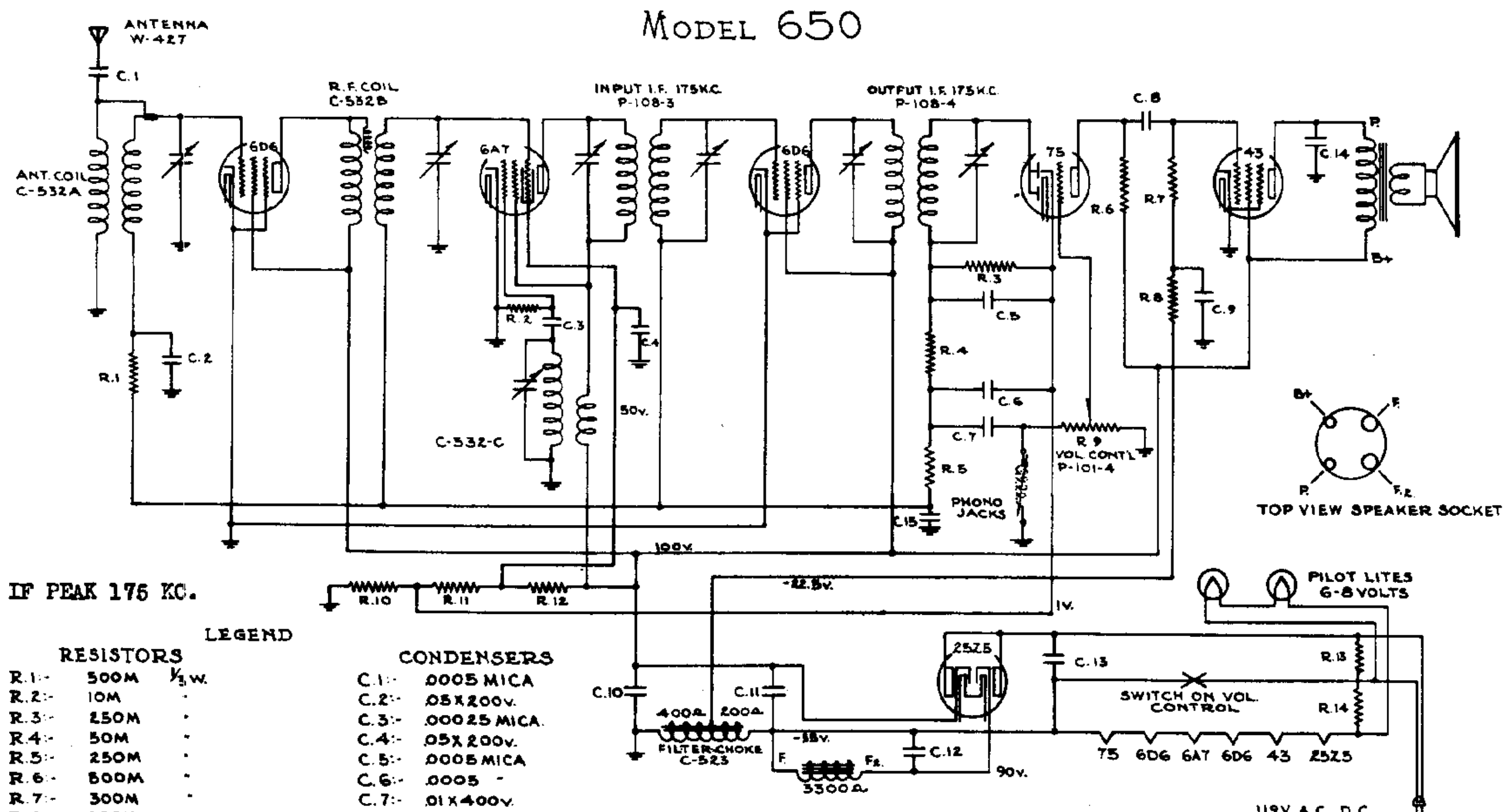
SHORT WAVE BAND ALIGNMENT:

1. Set wave changing switch in the short wave position, extreme right of its rotation, and change external oscillator frequency to 20 meters (15 megacycles), connect oscillator in series with a 300 ohm resistor to tan antenna wire and black ground wire.
   (a) Adjust variable condenser with selector knob so that pointer is opposite the 20 meter calibration on the dial. Adjust center trimmers of oscillator coil, part number110-11 and antenna coil part number 111-14, to resonance. These adjustments are accessible from side of the chassis.

NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31, All of the other dial parts are hardened and should cause no trouble.

BELMONT RADIO CORP.



IF PEAK 175 KC.

LEGEND

RESISTORS

R.1:-	500M	1/3 W.
R.2:-	10M	"
R.3:-	250M	"
R.4:-	50M	"
R.5:-	250M	"
R.6:-	500M	"
R.7:-	300M	"
R.8:-	250M	"
R.9:-	500M	P-101-4
R.10:-	200	
R.11:-	10M	
R.12	7500	
R.13	126Ω	IN CORD
R.14	40Ω 300M.A. 0.36W.	P-106-1

CONDENSERS

C.1:-	.0005 MICA
C.2:-	.05 X 200v.
C.3:-	.00025 MICA.
C.4:-	.05 X 200v.
C.5:-	.0005 MICA
C.6:-	.0005 "
C.7:-	.01 X 400v.
C.8:-	.003 X 600v.
C.9:-	.25 X 200v.
C.10:-	5.0 MFD. C-525D
C.11:-	25.0 "
C.12:-	5.0 "
C.13:-	.1 X 400v.
C.14:-	.025 X 200v.
C.15:-	.1 X 200v.

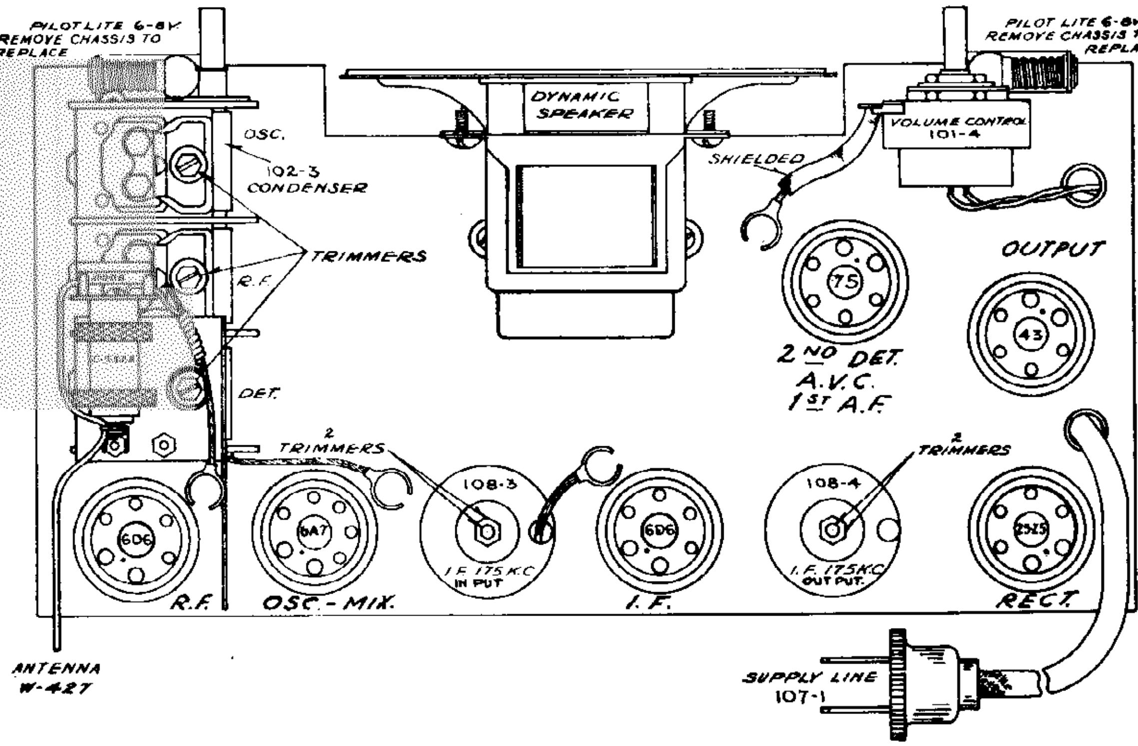
NOTE:- R.10, R.11, R.12 IN ONE UNIT P-106-2
C.11, C.12 " " " C-525C
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS
GROUND VOLUME CONTROL ON FULL.
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.

DUAL CONDENSERS
C.2, C.14 DUAL UNIT
C.5, C.6 " "
C.4, C.15 " "

34262

MODEL 650
Socket, Alignment

BELMONT RADIO CORP.



Before attempting any adjustment, the chassis must be removed from the cabinet. This is accomplished by pulling off the volume and selector knobs, removing the back and the four screws which fasten the chassis to the cabinet.

I.F. ALIGNMENT:

1. With volume control on full, at the extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme left of its rotation) make the following adjustments:
   (a) Connect an oscillator set at 175 kilocycles in series with a .1 mfd. condenser to the control grid (cap at top of type 6A7 oscillator first detector tube).
   (b) Adjust trimming condensers of both input and output I.F. transformers, parts number 108-3 and 108-4, (see top view of chassis) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer. Maximum deflection on the meter indicates resonance.

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

FREQUENCY ALIGNMENT:

1. Disconnect antenna wire from lug on antenna coil to which it is attached and connect to this lug, in series with a 50 mmfd. condenser, an oscillator which has been set at 1720 kilocycles.
2. Adjust trimmer condenser of the oscillator section of variable condenser (the shaft end section) to resonance with oscillator (maximum deflection on an output meter).
3. Change input oscillator to 1400 kilocycles and pick up signal by rotating variable condenser, then adjust trimmers of antenna and R.F. detector sections of variable condenser (center and rear respectively) to resonance with oscillator.
4. Check tracking at 1200-1000-800-600-530 kilocycles by setting oscillator at these frequencies and picking it up by rotating variable condenser. Bend slotted plates of condenser only if necessary.

NOTES:

The pilot lights are connected in series. Should one burn out, the other will not light. To replace them it is necessary to remove chassis from cabinet. The lamps used are 6-8 volts, .15 amperes.

Voltages from chassis to different points are indicated on the schematic circuit diagram and should be measured with a volt meter having a resistance of 1000 ohms per volt.

If receiver fails to function at the low frequencies, the trouble is apt to be a defective 6A7 tube. The remedy of course, is to replace the 6A7. They sometimes fail to oscillate on the lower frequencies.

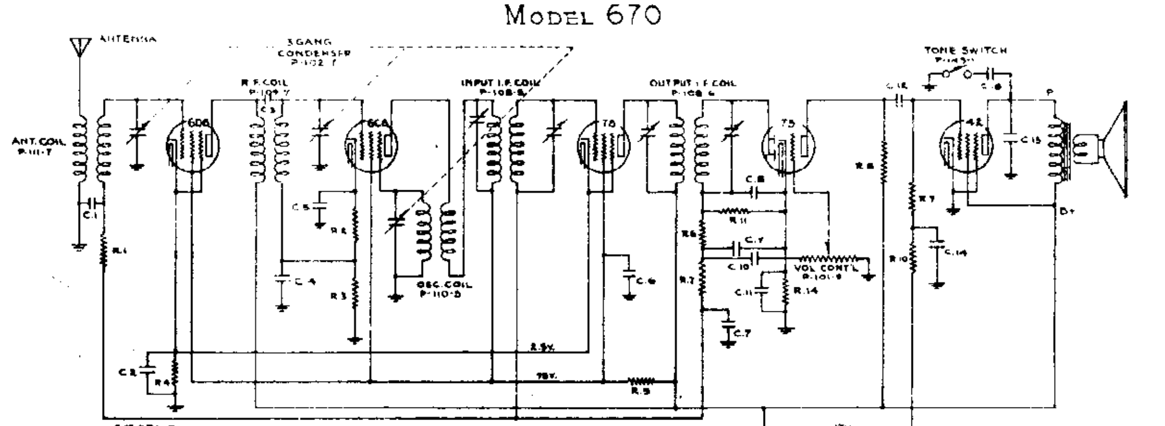
MODEL 670
Schematic
Socket, Trimmers

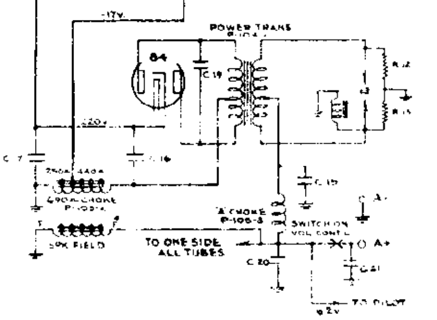
BELMONT RADIO CORP.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

MODEL 670





LEGEND

RESISTORS

Nº	VALUE
R.1 -	250M 1/5W
R.2 -	450Ω
R.3 -	5M
R.4 -	150Ω
R.5 -	19M
R.6 -	50M 1/5W
R.7 -	250M 1/5W
R.8 -	250M 1/5W
R.9 -	200M 1/5W
R.10 -	300M 1/5W
R.11 -	250M 1/5W
R.12 -	100Ω
R.13 -	100Ω
R.14 -	4M 1/5W
VAR. RESISTOR (VOL CONT'L)	500M

CONDENSERS

Nº	VALUE
C.1 -	.05 X 200V
C.2 -	.1 X 200V
C.3 -	1.5 mmf GIMMICK
C.4 -	.05 X 200V.
C.5 -	.05 X 200V
C.6 -	.1 X 200V
C.7 -	.1 X 200V
C.8 -	.0005 MICA
C.9 -	.0005 MICA
C.10 -	.01 X 400V
C.11 -	20 MFD. X 20V.
C.12 -	.01 X 400V.
C.13 -	.003 X 600V.
C.14 -	.1 X 200V
C.15 -	1 MFD X 120V
C.16 -	8 MFD X 350V
C.17 -	8 MFD X 350V
C.18 -	.01 X 400V
C.19	.02 X 1000V
C.20	1 MFD X 120V
C.21 -	.002 MICA

- NOTE -

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE.

RESISTORS IN ONE UNIT, P-106-3, - R. 2, 3, 4, 5.

CONDENSERS IN ONE UNIT, P-103-2 C. 16, 17.

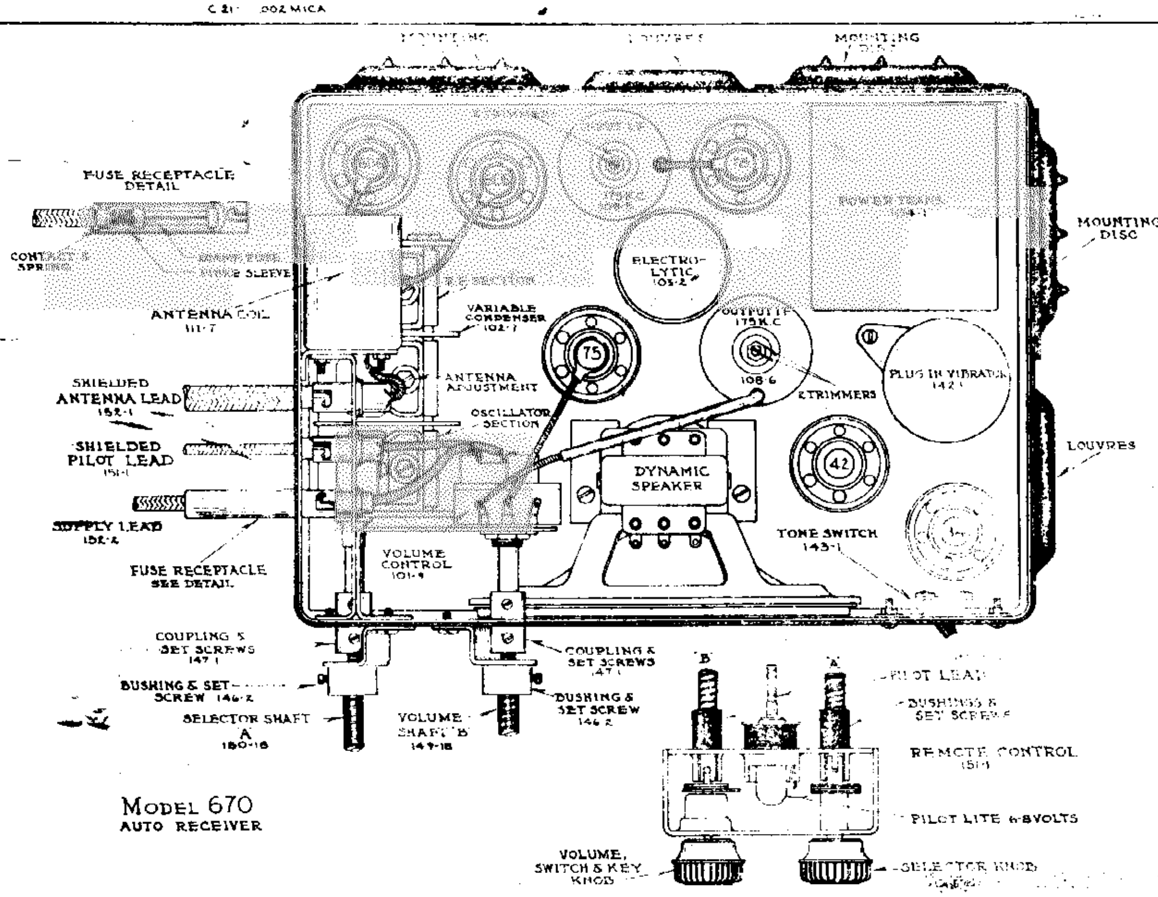
CONDENSERS IN DUAL UNIT - C. 2, 7.

CONDENSERS IN DUAL UNIT - C. 5, 6.

RESISTORS AND CONDENSERS IN OUTPUT I. F. CAN, P-108-6, - C. 8, 9, 10 AND R. 6, 7, 11.

CONDENSER, C. 1, IN ANT. COIL CAN P-111-7.

IF PEAK 176 KC.



MODEL 670
AUTO RECEIVER

MODEL 670
Alignment
Service Notes

BELMONT RADIO CORP.

ELIMINATION OF MOTOR NOISE: (Cont'd)

In some few cases, such as Buicks, it is necessary to use screw type suppressors. Cut lead about two inches from distributor and screw one end of suppressor into the wire attached to distributor, screw wire from coil into other end of suppressor.

Generator capacitor, number 148-1, is connected to generator side of cutout. The ground side of capacitor can be fastened to the generator housing under the same screw that holds the relay housing to generator. In some cases, an additional capacitor, number 148-1, (obtainable from your dealer) must be installed between the battery side of ignition coil and the car frame.

If after connecting suppressors and condensers as outlined above there is still motor noise, make the following tests:

Shield high tension leads.

Bond flexible shaft leads, such as free wheeling, which run close to distributor, radiating ignition interference which is picked up by the antenna inside of car.

Cars using wooden floor boards, place a grounded copper screen under toe board.

Excessive gap between distributor rotor and high tension contacts, replace with a special radio rotor arm or build up end with solder and dress end with file so that its original shape is retained. The rotor should not brush or wipe the contacts, but should just clear them.

In some cases, such as V-8 Ford, it is necessary to pull battery and primary leads out of special tube which houses high tension leads, shield and ground these leads. Also on V-8 Fords it is necessary to install a capacitor at primary terminal of coil housing.

Additional suppressors can be obtained from your dealer.

The ignition system of car must be kept in good condition.

Fouled plugs or plugs with improperly adjusted gaps will affect the operation of receiver as well as of the automobile. Burned or poorly adjusted braker points will also impair the performance. It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery.

It is sometimes necessary to connect a condenser (148-3) between the hot side of the dome light switch and ground.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation, it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

****
SERVICE NOTES
****

Should it ever be necessary or desirable to re-align this receiver, the proper method is as follows:

Adjustments can be made with the receiver mounted in the cabinet, being necessary only to remove the top cover.

I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number 108-5 and 108-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable through the top of the can.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a volt meter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

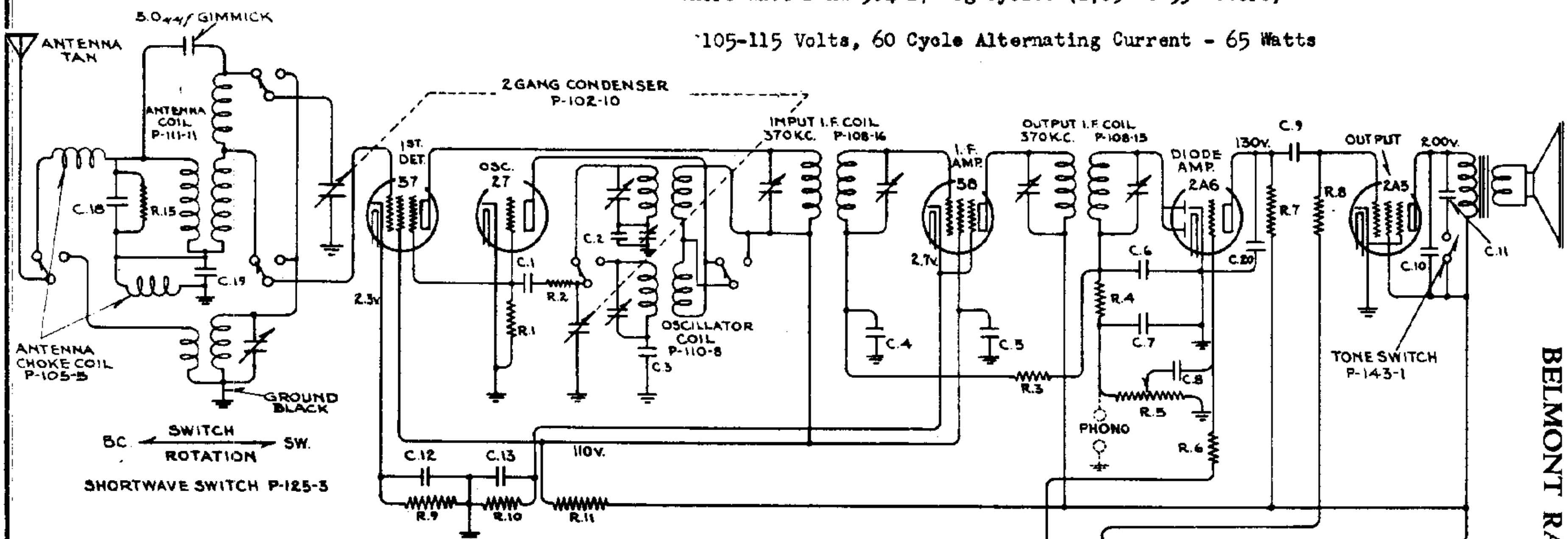
NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

BELMONT RADIO CORP.

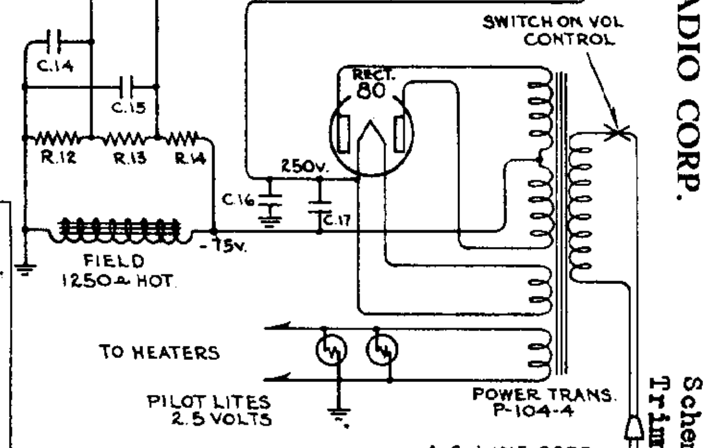
MODEL 675
Schematic, Socket
Trimmers

Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

105-115 Volts, 60 Cycle Alternating Current - 65 Watts



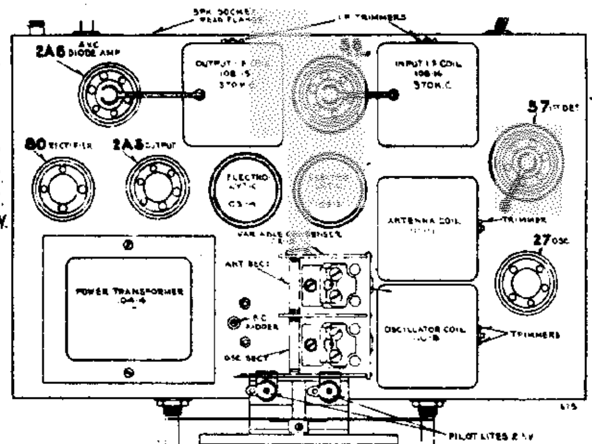
IF PEAK 370 KC.



CONDENSERS Nº	VALUE
C.1:-	50 MICA
C.2:-	490 MICA
C.3:-	5M MICA
C.4:-	.05 X 200V.
C.5:-	.05 X 400V.
C.6:-	100 MICA
C.7:-	100 MICA
C.8:-	.05 X 200V.
C.9:-	.05 X 400V.
C.10:-	.003 X 400V.
C.11:-	.02 X 400V.
C.12:-	.1 X 200V.
C.13:-	.1 X 200V.
C.14 -	.25 X 200V.
C.15:-	.25 X 200V.
C.16:-	18 MFD. 350V. P-103-3
C.17:-	16 MFD 400V. P-103-4
C.18:-	120 μμf.
C.19:-	.01 μμf.
C.20:-	.0005 MICA.

RESISTORS Nº	VALUE	
R.1:-	50M.	1/3W.
R.2:-	50	1/3W.
R.3:-	500M	1/3W.
R.4:-	50M	1/3W.
R.5:-	500M	VOLUME CONTROL P-101-11
R.6:-	500M	1/3W.
R.7:-	250M	1/3W.
R.8:-	250M	1/3W.
R.9:-	1000	
R.10:-	275	
R.11:-	13M	
R.12:-	25M	1/3W
R.13:-	250M	1/3W.
R.14:-	750M	1/3W.
R.15:-	10M	1/3W.

-: NOTE :-
CONDENSERS C.10, C.11 IN DUAL UNIT.
C.14, C.15 " " "
C.13, C.4 " " "
RESISTORS R.9, R.10, R.11 IN ONE UNIT P-106-13
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.



34265

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL
RESISTORS, R.3, 4, & 6, CONDENSERS C.6, 7, & 8 ARE IN OUTPUT I.F. CAN, P-108-15

MODEL 675
Alignment

BELMONT RADIO CORP.

SERVICE NOTES

Voltages taken from different points of the circuit are measured with a voltmeter having a resistance of 1000 ohms per volt and are made between the points indicated and the chassis pan. These voltages are indicated on the circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNMENT:

No aligning adjustments should be made until the set has been thoroughly checked for all other possible causes of trouble, such as poor installations, low line voltages, defective tubes, condensers and resistors.

ALIGNING I.F. TRANSFORMERS:

1. With volume control full on, at the extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers (parts number 108-15 and 108-16) in the following manner:
   (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
   (b) Adjust trimming condensers of both I.F. transformers (Parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.

   Note: The two adjustments on each transformer are accessible through holes in the transformer cans from the back of the chassis.

BROADCAST BAND ALIGNMENT:

1. Shift frequency of external oscillator to 535 kilocycles and connect in series with a 200 mmfd. condenser to the tan antenna wire and the black ground wire.
   (a) Set the variable condenser in its maximum capacity position, extreme right of its rotation.
   (b) Adjust the broadcast oscillator series trimmer to resonance with oscillator. This trimmer is located between the gang condenser and the power transformer (see top view).
2. Shift frequency of external oscillator to 1712 kilocycles and set variable condenser in its minimum capacity position, extreme left of its rotation, plates entirely out of mesh.
   (a) Adjust the broadcast oscillator shunt trimmer to resonance. This adjustment is the top adjustment in the oscillator coil can, part number 110-8.

SHORT WAVE BAND ALIGNMENT:

1. Set the wave changing switch in the short wave position, extreme right of its rotation, and change external oscillator frequency to 15 megacycles.
   (a) Adjust variable condenser with selector knob so that pointer is opposite the 15 megacycle calibration on the dial.
   (b) Adjust the short wave oscillator shunt trimmer to resonance with the signal (use extreme care and make certain that you do not adjust to resonance with the image instead of the signal). This trimmer is the bottom trimmer (closest to the chassis) on the oscillator coil, part number 110-8, and is accessible from the side of the chassis.
   (c) Adjust the short wave antenna trimmer to resonance (single trimmer in antenna can, part number 111-11, accessible from the side of the chassis, between type 27 and 57 tubes).

NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31. All of the other dial parts are hardened and should cause no trouble.

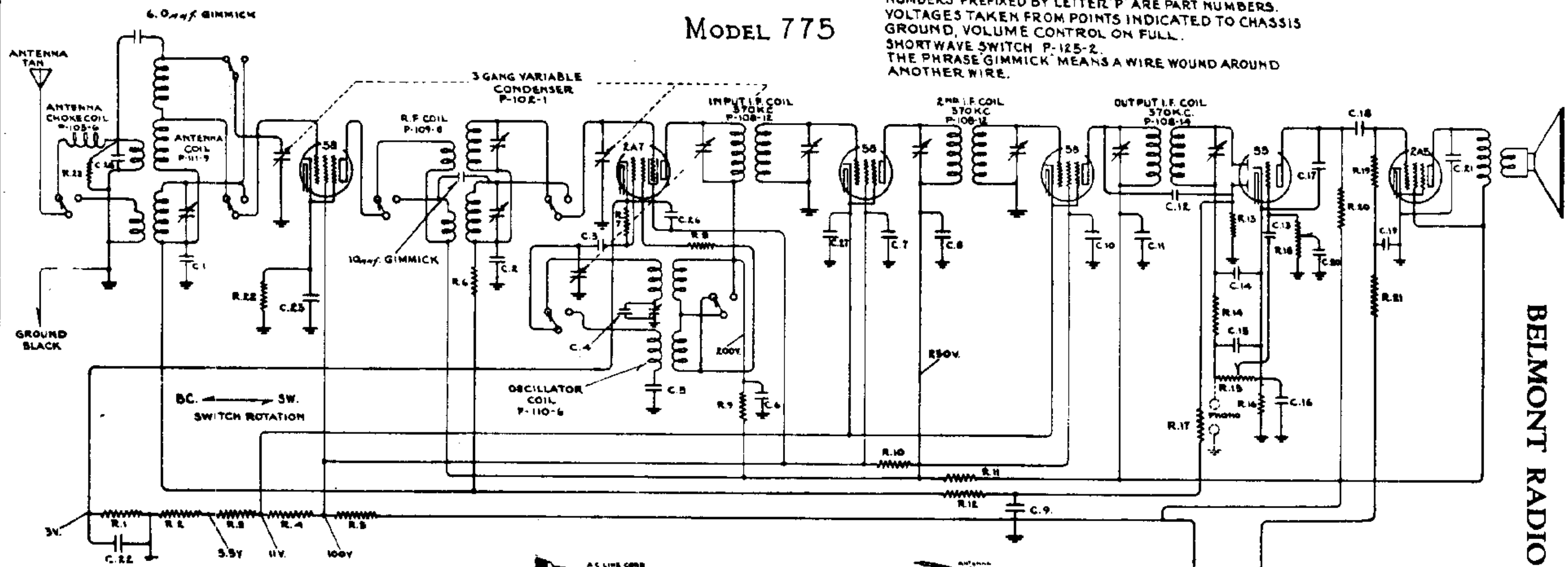
MODEL 775
Schematic, Socket Trimmers, Parts

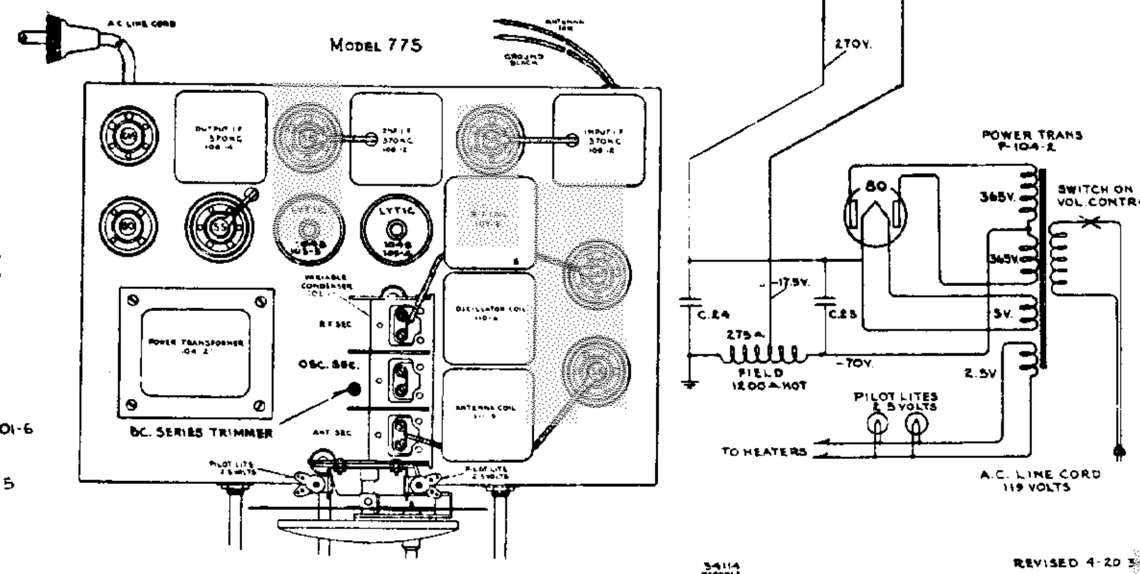
BELMONT RADIO CORP.

IF PEAK 370 KC.

MODEL 775

~NOTE~
CONDENSERS C.8, C.11 ARE IN ONE UNIT P-1064
" C.22, C.23 " " " " P-1059
RESISTORS R.1, R.2, R.3, R.4, R.5 IN ONE UNIT P-106-12
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
SHORTWAVE SWITCH P-125-2.
THE PHRASE 'GIMMICK' MEANS A WIRE WOUND AROUND ANOTHER WIRE.





CONDENSERS

Nº	VALUE
C.1	.05×200V.
C.2	.05×200V.
C.3	.00025 MICA
C.4	.0006 MICA
C.5	.003 MICA
C.6	.05×400V.
C.7	.25×200V.
C.8	.1×400V.
C.9	.01×400V.
C.10	.1×200V.
C.11	.1×400V.
C.12	.00002 MICA
C.13	.05×200V.
C.14	.00025 MICA
C.15	.00025 MICA
C.16	20 MFD. 20V. P-119-5
C.17	.0005 MICA
C.18	.05×400V.
C.19	.25×200V.
C.20	.01×400V.
C.21	.01×400V.
C.22	.1×200V.
C.23	.1×200V.
C.24	16 MFD. 350V. PEAK P-105-4
C.25	8 MFD. 500V PEAK P-105-5
C.26	.05×200V.
C.27	1.0×120V.
C.28	120 μμf.

RESISTORS

Nº	VALUE
R.1	300 Ω
R.2	400 Ω
R.3	300 Ω
R.4	10 M Ω
R.5	13 M Ω
R.6	100M. ½W.
R.7	50M ½W.
R.8	400 ½W
R.9	5M ⅓W
R.10	2M ⅓W
R.11	1M ⅓W
R.12	100M ⅓W.
R.13	1 MEGOHM
R.14	50M ⅓W.
R.15	500M VOLUME CONTROL P-101-6
R.16	20M ⅓W.
R.17	500M ⅓W.
R.18	500M TONE CONTROL P-101-5
R.19	250M ⅓W
R.20	250M ⅓W
R.21	250M ⅓W.
R.22	250 Ω ⅓W
R.23	10M ⅓W.

34114

REVISED 4-20 3

MODEL 775
Alignment

BELMONT RADIO CORP.

SERVICE NOTES

Should it ever become necessary or desirable to re-align this receiver, procedure is as follows:

Before making any adjustments, the chassis should be removed from the cabinet. This is accomplished by removing the four bolts which anchor it to the base of the cabinet and removing the knobs from the front of the cabinet, chassis can then be slipped out.

To properly align this receiver, especially the short wave band, it is essential that the oscillator used have good stability and include an attenuator in addition to covering the frequencies required. An output meter must be used to indicate resonance. It may be connected across the primary of the speaker input transformer.

I.F. ALIGNMENT:

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (plates entirely in mesh) and with band selector switch in broadcast position, left (counter-clockwise), make the following adjustments:
   (a) Connect an oscillator set at 370 kilocycles in series with a .1 mfd. condenser to the control grid of the first detector (cap at top of 2A7 tube), and connect the ground side of the test oscillator to the ground lead of the set (black wire).
   (b) Adjust trimming condensers of all three I.F. transformers, part number 108-12 input I.F., 108-12 second I.F. and 108-14 output I.F. to resonance.
2. Adjustments are provided on each transformer and are accessible from the back of the chassis (see top view of chassis).

BROADCAST BAND FREQUENCY ALIGNMENT:

1. With volume control full on and the gang condenser set to its minimum capacity:
   (a) Re-set test oscillator to 1712 kilocycles.
   (b) Adjust broadcast oscillator shunt trimmer to resonance. This trimmer is the one nearest the top of the oscillator coil and can assembly, part number 110-6.
   (c) Re-set test oscillator to 1400 kilocycles and shift the test oscillator lead from grid cap of the oscillator tube to the grid cap of the R.F. tube (type 58).
   (d) Tune the gang condenser to resonance with the test signal (1400 k.c.)
   (e) Adjust the R.F. tuned circuit to resonance by bending adjustable condenser plate of the R.F. (rear) section of the gang condenser.
   (f) Shift test oscillator lead to the antenna lead (tan wire) and substitute a 200 mmfd. condenser for the .1 mfd. condenser which is in series with the test lead.
   (g) Adjust the antenna tuned circuit to resonance by bending the adjustable condenser plate of the antenna (front) section of the gang condenser.
   (h) Turn the gang condenser to maximum capacity.
   (i) Adjust the broadcast series trimmer (located to the left of the gang condenser and accessible through the top of the chassis) to resonance with the test oscillator, with the test oscillator set at 535 kilocycles.
   (j) Check alignment at 1400, 1000 and 800 kilocycles, bending plates of the R.F. (rear) and antenna (front) sections of the variable condenser if necessary. DO NOT BEND PLATES OF OSCILLATOR (CENTER) SECTION UNDER ANY CIRCUMSTANCES.

SHORT WAVE BAND FREQUENCY ALIGNMENT:

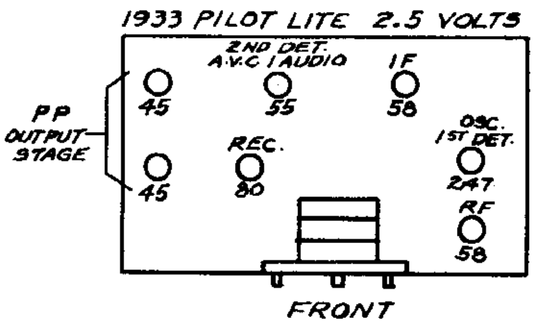
1. Turn the band selector switch to the short wave position, right (clockwise) position.
   (a) Adjust input oscillator to 15 megacycles and attach to grid of first detector (cap at top of 2A7 tube).
   (b) Adjust short wave oscillator shunt trimmer to the oscillator signal. Be careful that you don't adjust it to the image. This adjustment is the one closest to the chassis on the side of the oscillator coil and can assembly, part number 110-6.
   (c) Move the signal generator clip to the grid of the first R.F. tube (type 58).
   (d) Adjust short wave R.F. trimmer to resonance. Adjusting screw is located on side of R.F. coil and can assembly, part number 109-8.
   (e) Connect oscillator in series with a 200 mmfd. condenser to the tan antenna lead and black ground lead and adjust short wave antenna trimmer to resonance (adjustment on side of antenna coil and can assembly, part number 111-9).
   (f) Check sensitivity at 6 megacycles.

NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31. All of the other dial parts are hardened and should cause no trouble.

MODEL 750
Alignment, Socket

BELMONT RADIO CORP.



SERVICE MANUAL SEVEN TUBE SUPERHETERODYNE WITH A.V.C. AND SHORT WAVE

105-115 Volts Alternating Current, 50-60 Cycles, 80 Watts. 530-1720 Kilocycles - 1700-4500 Kilocycles.

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct proceedure is as follows:

1. Volume and tone controls on full during all alignment.
2. Squelch switch in "no squelch" position (counter-clockwise (left) rotation) during all alignment.
3. Adjust variable squelch control on rear flange of chassis to maximum counter-clockwise (left) position.
4. Set variable condenser in minimum capacity position (plates open) at the start of all aligning.

I.F. ALIGNMENT

The intermediate frequency of model 750 is 175 kilocycles, and is aligned as follows:

1. Connect oscillator (set at 175 kilocycles) to I.F. grid (second 58 tube) and adjust both trimmers of second I.F. transformer (underneath chassis) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
2. Connect oscillator output to converter grid (2A7 tube) and adjust both trimmers of first I.F. transformer to resonance. Under no conditions touch the trimmers of the second I.F. transformer after adjusting them (see No. 1).

The four trimmers of the two I.F. transformers are all adjusted from the bottom of the chassis (one nut and one screw adjustment on each I.F. transformer trimmer).

BROADCAST BAND ALIGNMENT

Wave changing switch in clockwise (right) position.

1. Connect an oscillator in series with a 200 mmfd. condenser to the Tan (antenna) lead and Black (ground) lead. With the oscillator set at 1720 kilocycles and the variable condenser at its minimum position (extreme right of its rotation), adjust trimmer of oscillator (rear) section to resonance.
2. Change oscillator to 1400 kilocycles, rotate variable to this frequency and adjust R.F. and antenna trimmers (center and front trimmers respectively) to resonance. Do not touch the oscillator trimmer.
3. Check tracking at the following points only: 1200-1000-800-600-534 kilocycles. NOTE: This receiver will be slightly out of track at 534 kilocycles - do not bend plates in an attempt to track it at this frequency. Rotor plates of condensers should not be bent, except if absolutely necessary, and then only on the center and front sections.

SHORT WAVE BAND ALIGNMENT

Wave changing switch in counter-clockwise (left) position.

1. The frequency range of this short wave band is approximately 1700 to 4500 kilocycles.
2. Peak short wave antenna coil to resonance with oscillator set at 1720 kilocycles by slipping primary.
3. Check for sensitivity at the following frequencies only: 1720 and 3700 kilocycles - under no conditions touch trimmers or plates of variable condenser while checking short wave band.

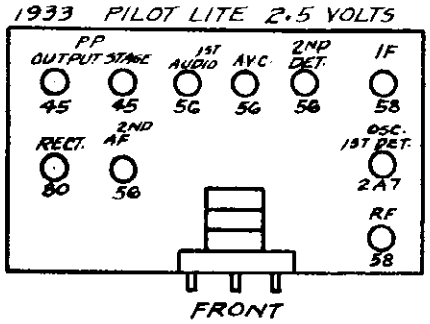
NOTES:

For failure to operate over both bands, check 2A7 tube and connections to and contacts of wave changing switch.

Condenser shaft to which pointer is attached is rotated by means of a celluloid dial attached to the condenser shaft and a bronze friction drive assembly, to which is attached the selector knob. Should this drive ever slip or become rough, it can be adjusted for smooth operation by sliding the bronze washer drive assembly either closer to the variable shaft or farther away from it in the slot in which it is mounted, to insure smooth operation.

MODEL 1050
Alignment, Socket

BELMONT RADIO CORP.



SERVICE MANUAL TEN TUBE SUPERHETERODYNE WITH A.V.C., SQUELCH AND SHORT WAVE

105-115 Volts Alternating Current, 50-60 Cycles, 105 Watts. 530-1720 Kilocycles - 1700-4500 Kilocycles.

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct proceedure is as follows:

1. Volume and tone controls on full during all alignment.
2. Squelch switch in "no squelch" position (counter-clockwise (left) rotation) during all alignment.
3. Adjust variable squelch control on rear flange of chassis to maximum counter-clockwise (left) position.
4. Set variable condenser in minimum capacity position (plates open) at the start of all aligning.

I.F. ALIGNMENT

The intermediate frequency of model 1050 is 175 kilocycles, and is aligned as follows:

1. Connect oscillator (set at 175 kilocycles) to I.F. grid (second 58 tube) and adjust both trimmers of second I.F. transformer (underneath chassis) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
2. Connect oscillator output to converter grid (2A7 tube) and adjust both trimmers of first I.F. transformer to resonance. Under no conditions touch the trimmers of the second I.F. transformer after adjusting them (see No. 1).

The four trimmers of the two I.F. transformers are all adjusted from the bottom of the chassis (one nut and one screw adjustment on each I.F. transformer trimmer).

BROADCAST BAND ALIGNMENT

Wave changing switch in clockwise (right) position.

1. Connect an oscillator in series with a 200 mmfd. condenser to the Tan (antenna) lead and Black (ground) lead. With the oscillator set at 1720 kilocycles and the variable condenser at its minimum position (extreme right of its rotation), adjust trimmer of oscillator (rear) section to resonance.
2. Change oscillator to 1400 kilocycles, rotate variable to this frequency and adjust R.F. and antenna trimmers (center and front trimmers respectively) to resonance. Do not touch the oscillator trimmer.
3. Check tracking at the following points only: 1200-1000-800-600-534 kilocycles. NOTE: This receiver will be slightly out of track at 534 kilocycles - do not bend plates in an attempt to track it at this frequency. Rotor plates of condensers should not be bent, except if absolutely necessary, and then only on the center and front sections.

SHORT WAVE BAND ALIGNMENT

Wave changing switch in counter-clockwise (left) position.

1. The frequency range of this short wave band is approximately 1700 to 4500 kilocycles.
2. Peak short wave antenna coil to resonance with oscillator set at 1720 kilocycles by slipping primary.
3. Check for sensitivity at the following frequencies only: 1720 and 3700 kilocycles - under no conditions touch trimmers or plates of variable condenser while checking short wave band.

Tun-a-lite. VISUAL TUNING CHECK

The visual tuning indicator (tun-a-lite, tube) is mounted horizontally on the front of the variable condenser assembly and its operation in this respect can be checked as follows:

1. Normally there will be a small continuous glow in the base of the tube when no signal is being received.
2. With a strong oscillator input at 1000 kilocycles, the tun-a-lite should glow to approximately the end of the bulb, varying slightly with different tun-a-lites. If the glow "travel" is short, or none at all, remove the tun-a-lite tube and check its socket connections and contacts. If the tube still fails to indicate satisfactorily, replace the tube.

SQUELCH CHECK

The tun-a-lite tube is also used for noise suppression between stations. Its operation can be checked as follows:

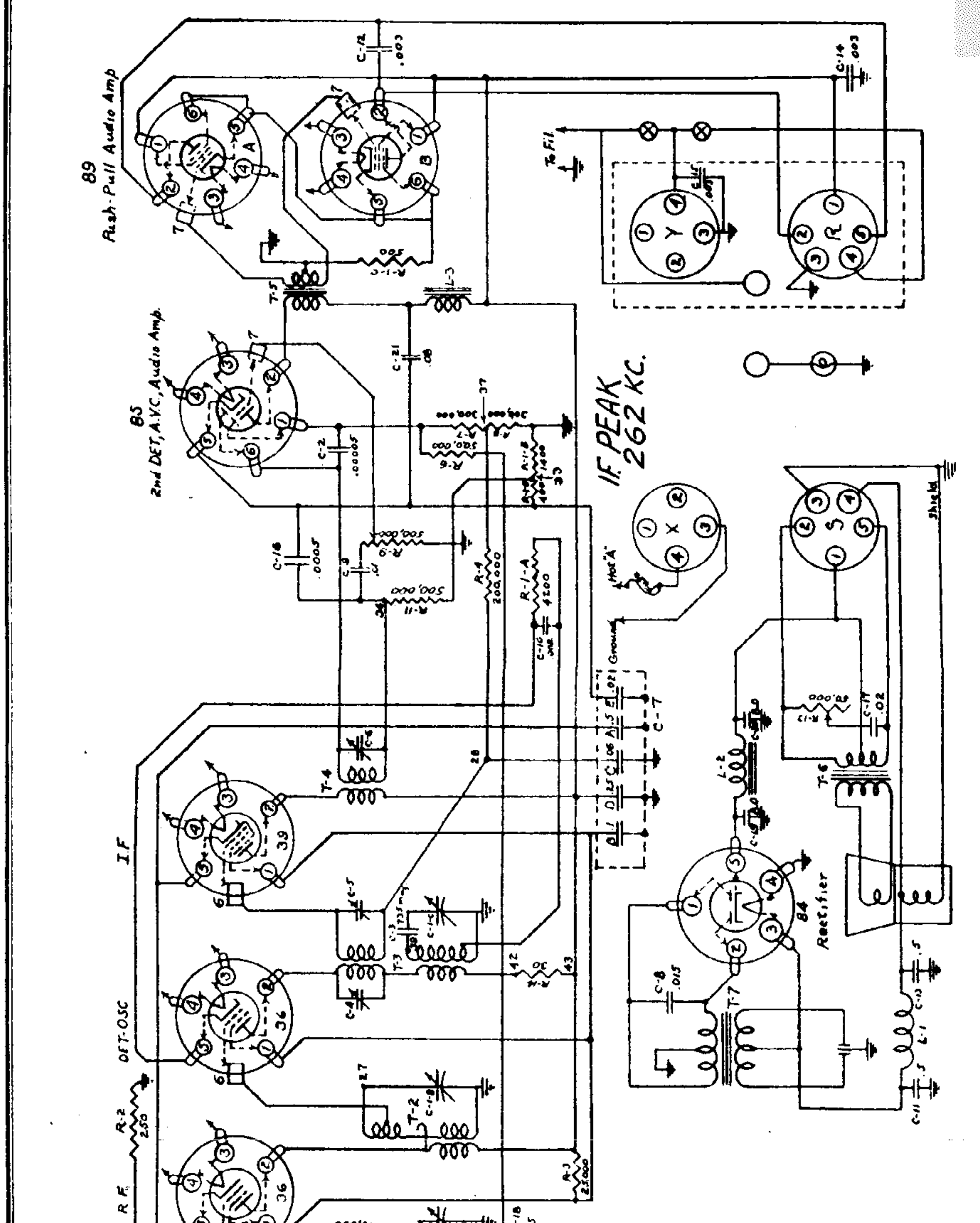
1. Squelch switch adjusted to squelch (clockwise (right) position).
2. Disconnect oscillator, connect antenna, tune set to a position where no signal is received. Noise level at this position should be quite high.
3. Rotate set screw of squelch control on rear flange of chassis, and at some point the noise should cease and the set sound "dead", indicating that the tun-a-lite is squelching and eliminating between station noise.

NOTES: For failure to operate over both bands, check 2A7 tube and connections to and contacts of wave changing switch.

Condenser shaft to which pointer is attached is rotated by means of a celluloid dial attached to the condenser shaft and a bronze friction drive assembly, to which is attached the selector knob. Should this drive ever slip or become rough, it can be adjusted for smooth operation by sliding the bronze washer drive assembly either closer to the variable shaft or farther away from it in the slot in which it is mounted, to insure smooth operation.

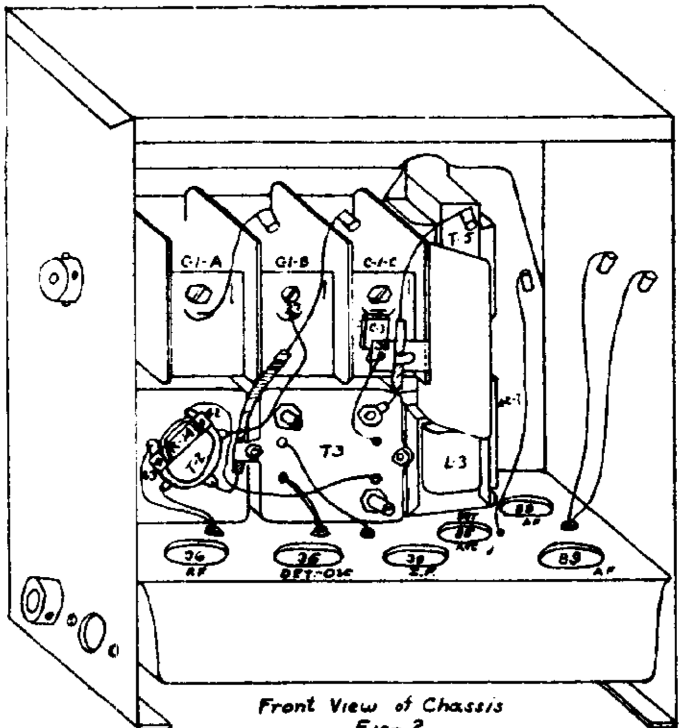
MODEL 980393
Schematic

BUICK MOTOR



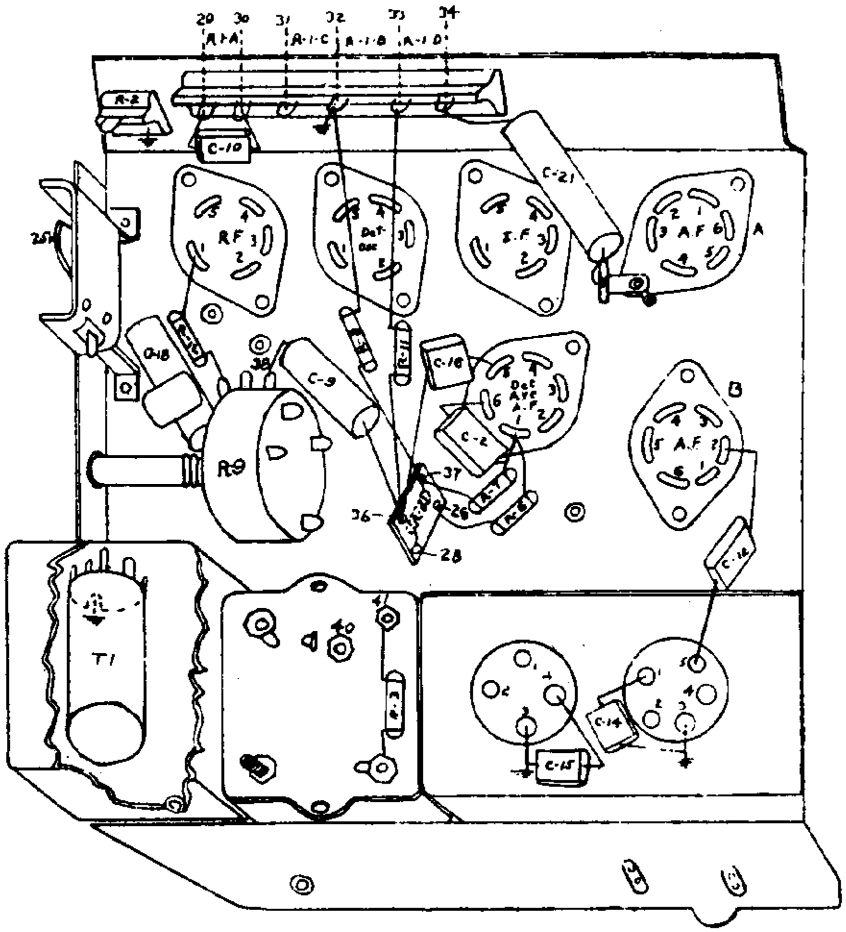
MODEL 980393
Voltage, Trimmers
Socket

BUICK MOTOR



Front View of Chassis
Fig-2

Parts Location



Tube	Screen Contact #1	Plate Contact #2	Heater Contact #3	Heater Contact #4	Cathode Contact #5	Gnd. Contact #6
236 RF	85	165	0	6.0	2.1	
236 Osc.	85	165	0	6.0	6.0	
239 IF	85	165	0	6.0	2.1	
85 Det.	O-A.V.C.	125	0	6.0	7.5	.2 Det.
A-89 AF	165	160	6.0	0	30.0	30.0
B-89 AF	165	160	0	6.0	30.0	30.0
84 Rect.	3.5	3.5	0	6.0	180	

PEAKING ADJUSTABLE CONDENSERS

The complete Condenser Aligning Kit is now available under part No. 1207804. This kit contains all the small parts which are necessary for the proper aligning of the condensers on the U.M.S., B-O-P. and Chevrolet Radio Receivers.

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I. F. transformer is changed or the adjustments are tampered with in the field.

DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and an accurate test oscillator and a screw driver (with fibre handle) are available. Using a standard metal screw driver for this purpose will not give accurate adjustment

Proceed as follows:

A. Disconnect the antenna lead-in from the chassis.

B. Ground the antenna terminal on the chassis to the frame of the chassis.

C. Set "test oscillator" to 262 kilocycles. Some oscillators are not equipped with a frequency of 262 K.C. but do have a frequency of 130 K.C. In this case, the second harmonic of 130 K.C., namely 260 K.C., may be used.

D. Connect the output leads of the test oscillator to the grid of the 1st Detector tube and to ground (frame of the chassis) Leave grid cap in place.

E. Connect an output meter across the plates of the type 89 tubes. If the output meter is not protected, place a .1 mfd. condenser in series with the meter.

F. Turn the tuning condenser rotor to minimum capacity (rotor plates out of stator places).

G. Adjust I. F. Trimmers in the following order, in each case leaving the trimmer set for maximum output as shown by the output meter** (See note

* C-4, Plate circuit of 1st Det.
C-5, Grid circuit of I. F. Amp.
C-6, Diode Input circuit.

* See Fig 2. and 3 for location of condensers.

H. Remove connection grounding the antenna (reverse of instructions under B)

I. Insert the Calibration Block, Part No. 1206418, between the center (2nd R. F.) condenser and the rear of the chassis as follows: Lay the block on the bench with the largest flat side down and the cut-out edge toward the operator. Pick up the block between the first and second fingers of the hand so that the side having the beveled and cut-out edges faces the knuckles of the hand, and the fingers are as close to the beveled corners as is possible. Insert the hand in the case over the center tuning condenser (condenser plates fully closed) and place the Block between the condenser bracket and the chassis back, with the largest face of the Block flat against the back of the chassis. The Block will fit quite tightly and the left side must rest against the shield between the 1st and 2nd R.F. condensers in order to clear the condenser wiper spring.

J. Attach the test oscillator to antenna terminal and ground (frame) of the chassis. (Ant. on test oscillator to Ant. on chassis and ground on test oscillator to frame of chassis.)

K. Set test oscillator at 1400 K.C.

L. Open tuning condenser until it stops against the Calibration Block

M. Place Tube Shield in position around 236 Det.-Osc. tube. Adjust the trimmer condensers on the tuning condenser to maximum output, as measured by the output meter, in the following order:

C-1-C--Oscillator trimmer
C-1-B--2nd R. F. trimmer
C-1-A--1st R. F. trimmer

*NOTE: To insure sharp peaking of all trimmers, set the oscillator output below the point of start of A.V.C. action. Set the output of the oscillator so that it is less than half the maximum output available.

MODEL 980393
Test Data

BUICK MOTOR

LOCATING TROUBLES ISOLATED BY VOLTAGE TESTS

The voltmeter tests of the chassis merely serve to isolate the defect in some particular stage of the circuit. The actual fault must be located, in that stage, by means of a point-to-point check of the resistance values of the defective stage.

NOTE: All tubes should be removed from the chassis before making these tests, unless they are known to be good tubes.

Description of incorrect voltage	Test from	To	Correct reading (in OHMS)	Part or parts probably causing incorrect voltage
A. No filament voltage at any socket	1. Hot "A" lead	X4	Zero	Fuse or green lead
	2. Y4	RF #4	*Zero	Switch
	3. Y4	R #4	Zero	Switch
	4. Y4	Gnd.	#Open	C-15
	5. S4	"	6	Speaker field
B. No plate voltage at any socket	1. Rect. #5	Gnd.	Open	C-19; C-20
	2. " "	S-1	350	L-2
	3. R-1	Gnd.	100,000	C-14;C-7-D;C-7-B; R-3; R-12
C. 89 sockets (a) Plate volts	1. S-1	S-5	425	Output Trans.Pri.
	2. S-1	S-2	225	" " "
	3. R-2	R-5	Open	C-12
(b) Screen "	1. R-1	89 #1 (A)	Zero	Defective wiring
	2. R-2	89 #1 (B)	"	" "
(c) Cathode volts	1. Gnd.	89 #5 (B)	500	R-1-C
(d) Suppressor grid volts	1. Gnd.	89 #5 (B)	500	R-1-C
D. 85 Socket (a) Plate volts	1. R-1	85 #2	9,500	L-3;T-5
(b) A.V.C. and Det. plate V.	1. 34	Gnd.	1,800	R-1-B; R-1-D
	2. 34	85 #6	500,000	R-11;T-4;C-9
	3. 85 #6	85 #1	1,000,000	R-7; R-8;R-1-B; R-11;C-2;C-9
(c) Cathode volts	1. Gnd.	85 #5	1,800	R-1-B; R-1-D; C-7-E
E. 39 IF socket (a) Plate volts	1. IF #2	41	52	T-4 Pri.
	2. 41	Gnd.	100,000	C-1-D; R-3; R-12
(b) Screen volts	1. IF #1	41	25,000	R-3
	2. IF #1	Gnd.	100,000	R-3; R-12; C-1-D; C-7-B
(c) Cathode volts	IF #5	Gnd.	250	R-2; C-7-A

* Switch on # Switch off

Description of incorrect voltage	Test from	To	Correct reading (in ohms)	Part or parts probably causing incorrect voltage
F. 36 Osc. socket (a) Plate volts	1. Osc. #2	42	36	T-5
	2. 42	43	30	R-14
(b) Screen volts	1. Osc. #1	41	25,000	R-3
	2. Osc. #1	Gnd.	100,000	R-3; R-12; C-7-D C-7-B
(c) Cathode	1. Osc. #5	Gnd.	4,200	R-1-A; C-10; T-3
G. 36 F. socket (a) Plate volts	1. RF #2	43	75	T-2
(b) Screen volts	1. RF #1	41	25,000	R-3
	2. RF #1	Gnd.	100,000	R-3; R-12; C-7-D; C-7-B
(c) Cathode	1. RF #5	Gnd.	250	R-2; C-7-A
H. Speaker (a) Weak	S-4	Gnd.	6	Speaker field
(b) Distorted	1. S-1	S-5	200	T-6 Trans.
	2. S-1	S-2	225	T-6 Trans.
	3. S-2	S-5	425	T-6; C-17; R-13
I. Inoperative power unit (a) Vibrator operates	1. Check 84 tube			
	2. Rect. #1	Rect. #2	350	T-7 Sec; C-8
	3. Rect. #1	Gnd.	175	T-7 Sec; C-8
	4. Rect. #5	Gnd.	Open	C-14; C-20
	5. Rect. #5	S-1	350	L-2
(b) Vibrator inoperative	1. S-4	Gnd.	6	C-11; C-13; Vibrator
	2. S-4	Rect. #3	2	L-1

NOTE--It will be necessary to disconnect one lead of all condensers, which have one terminal grounded, in order to test them accurately.

MODEL 980393
Test Data

BUICK MOTOR

SPECIAL TESTS

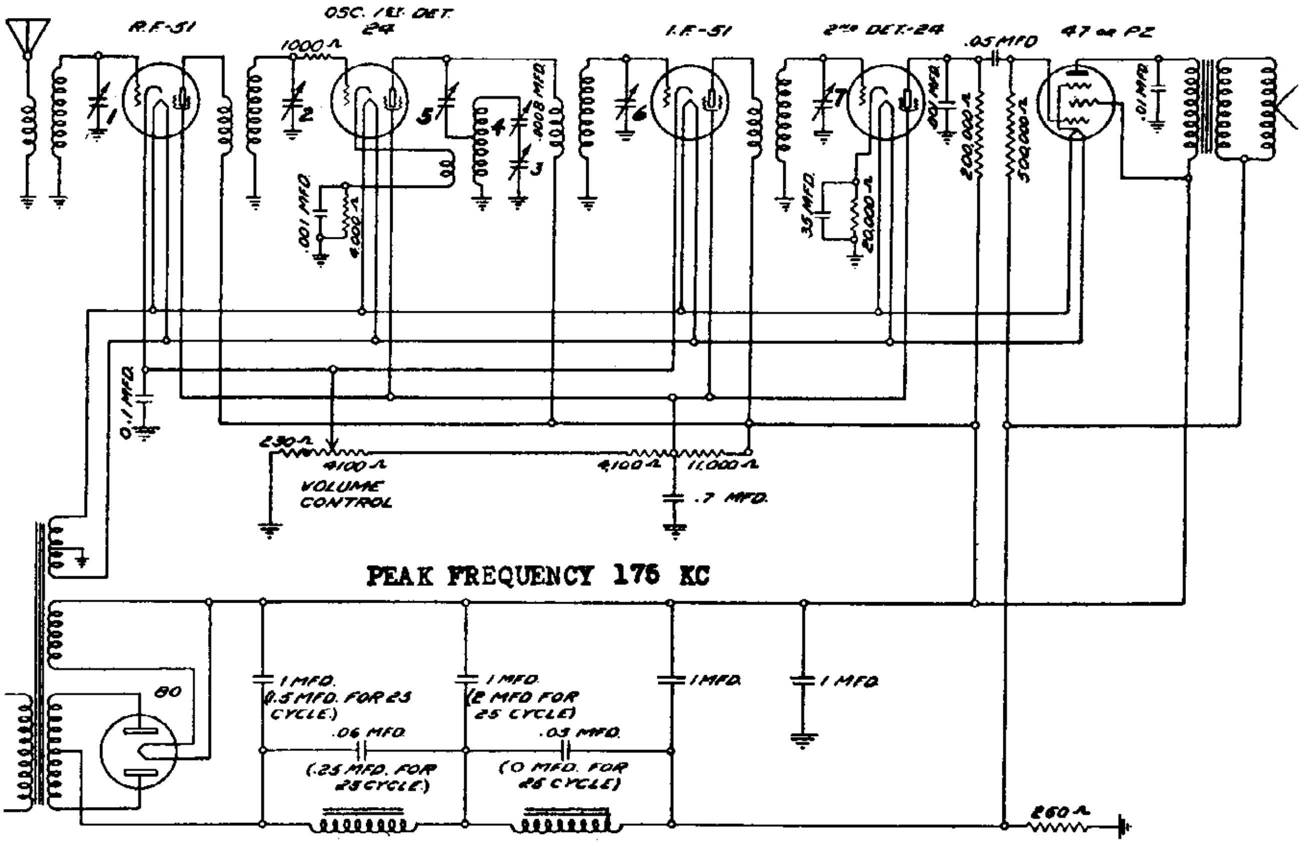
These tests cover all parts of the circuit which are not shown up as defective by the voltage tests

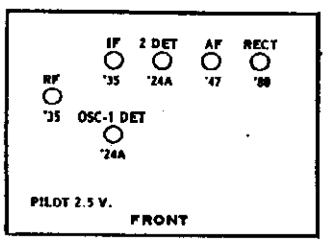
	Test from	To	Correct resistance in ohms	Probable location of trouble if incorrect reading is obtained
1.	Ground (frame)	25	32	T-1 Antenna coil Pri
2.	236 RF #6	26	6	T-1 " " Sec
3.	236 Osc. #6	27	2.5	T-2 RF coil Sec.
4.	236 Osc. #6	Gnd	4	T-2 RF " "
5.	239 Osc. #6	28	50	T-3 IF " "
6.	Ground	29	1	T-3 Osc. coil
7.	"	35	4	T-3 " "
8.	85 Det. #6	36	28	T-4 IF coil Sec.
9.	28	37	200,000	R-4 Resistor
10.	85 Det. #1	26	500,000	R-6
11.	85 Det. #1	37	300,000	R-7
12.	37	Grd.	300,000	R-8
13.	33	36	500,000	R-11
14.	85 Det. #7	Grd.	0-500,000	Vol.Control (Rotate)
15.	89 AF #7 (a)	Grd.	4,000	T-5 Input Trans. Sec
16.	89 AF #7 (b)	Gnd.	4,500	T-5 " " "
17.	36	38	Open	C-9
18.	85 Det. #1	85 Det. #6	1,100,000	R-11; R-1-B;R-8;R-7
19.	39	(Tuning Cond. (stator plates	Open	C-3
20.	Voice coil lead	Input trans. lead	2	Defective voice coil or Input Trans. Sec.

NOTE--Disconnect the voice coil lead at one of its terminals on the lower side of the input transformer and test from the end of the disconnected lead to the terminal from which it came

BULOVA WATCH COMPANY

MODEL 600,601,605,610
Schematic,Voltage
Socket





READING TAKEN WITH WESTON MODEL 565 ANALYZER

MODEL No. CUSTOMER BY

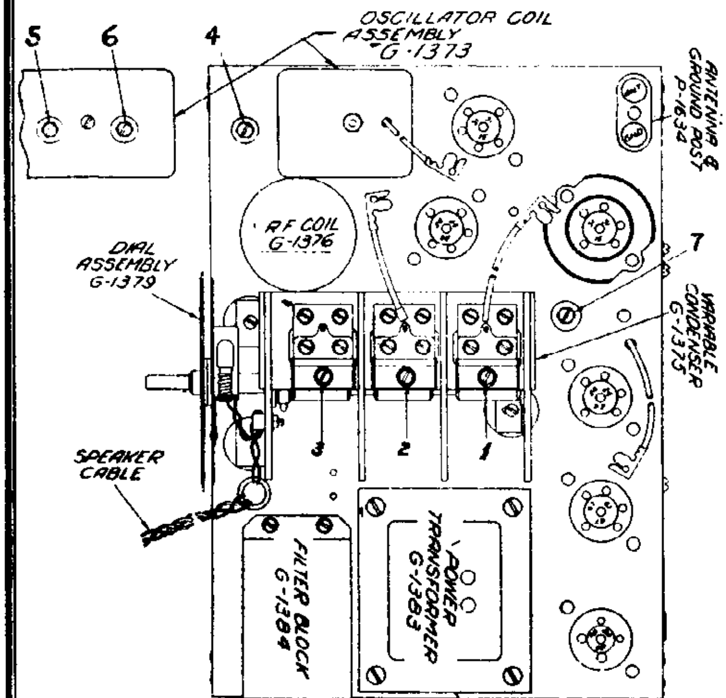
No.	Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volt	Cath. Volts	S. G. Volts	Ip Norm.
1	R. F.	51	2.15	235	2.4	2.5	80.	5.0
2	Autodyne	24	2.15	225	5.0	6.0	75.	3.0
3	I. F.	51	2.15	230	2.4	2.5	75.	4.0
4	2nd Det.	24	2.15	104	10.	15.	65.	0.6
5	Audio	47	2.25	250	16	0	260	30.
6	Rect.	80	4.4					57.5

Line Voltage 115. Order of Test: 1 Rect., 2 Power, 3 Det., Etc.
Volume Control Position, Full On.

NOTE: Since resistance tolerances in the sets are plus or minus 10% and tubes may vary over 20%, your readings may disagree with the above by plus or minus 30%.

MODEL 600,601,605,610
Trimmers,Alignment

BULOVA WATCH COMPANY



READJUSTING TRIMMERS

Number 1 is the antenna trimmer.

Number 2 is the gang condenser trimmer tuning the grid of the Super-autodyne.

Number 3 is the gang condenser trimmer tuning the plate (or oscillator of the super-autodyne).

Number 4 is the oscillator padding trimmer.

Number 5 is the Super-autodyne plate trimmer.

Number 6 is the I. F grid trimmer.

Number 7 is the second detector grid trimmer.

To readjust the trimmer, it will be necessary that a good design of 175 k. c. oscillator be employed, and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency, and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screwdriver when making any of these adjustments.

First, connect the 175 k. c. oscillator output leads from the control grid cap of the super-autodyne tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid cap clip from the tube. Reset trimmers numbers 5, 6 and 7 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k. c., and when trimmers number 5, 6 and 7 are set for maximum output, they will be correctly adjusted and should be sealed.

Next, disconnect the 175 k. c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator, or tune in a broadcast signal around 1400 k. c., then reset trimmers numbers 2 and 1 respectively for maximum output. This adjustment will track the super-autodyne grid circuit of the R. F. stage.

To check the calibration of the receiver, whether it be high or low, trimmer number 3 should be reset until a station of known high frequency is brought in on the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k. c. should be chosen. The setting of the trimmer at 1400 k. c. is more critical than it would be at 600 k. c.; calibration, therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instruction. We will now balance the oscillator to the r. f. and first detector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

Cadillac and La Salle
MOTOR CAR RADIO
SERIES 06W — 1933-34

CADILLAC MOTOR CAR COMPANY DETROIT, MICHIGAN

Description

The new 06W Series Auto Radio Receivers are made up in three units: the chassis unit, speaker—"B" eliminator unit and control unit. The control unit is mounted to the instrument panel, while the speaker — "B" eliminator unit and chassis are mounted on the dash. Current to operate the chassis and "B" eliminator is obtained from the automobile storage battery. Two flexible shafts mechanically connect the control unit to the chassis. One of these is for the volume control and switch, while the other is for the tuning mechanism. A roof antenna is used.

In this manual are covered detailed instructions for the installation of each part and information for completing and maintaining the installation. The following tools are required: portable electric drill, screw drivers, pliers, a heavy soldering iron, hack saw, files, small wrenches, and cutters.

Before making the installation it is suggested that this manual be completely read.

Mounting the Chassis

Before mounting the chassis read the articles on "Mounting the Control Unit" and "Attaching the Flexible Drive Shafts." Hold the control unit in position or mount it in place temporarily, so that the position of the flexible shafts can be determined.

The chassis is mounted in back of the dash at the left side, as shown in Fig. 1. It should be mounted in such a way that the tuning condenser flexible drive shaft to the control unit will be in substantially a straight line as shown in Figs. 1 and 2. The chassis is mounted with the anchor bushings in which the flexible shafts go, facing the control unit, and with the cover at the bottom. It is secured to the dash by means of the dash mounting plate, see Fig. 4. In some of the earlier models it will be necessary to move the cut-out box to a higher location in order to mount the chassis.

First drill the three mounting holes required for the dash mounting plate. The location and size of these holes is shown in Fig. 3. A template for drilling these holes is supplied with the set. Three 4" square head mounting bolts are supplied. Take two of these, which will be used for the upper part of the mounting plate and screw on nut "A" (see Fig. 4). The nut should be just far enough away from the head of the bolt to permit the bracket of the mounting plate to slip down as shown in the illustration. Then put on nut "B" and the washer, after which the two bolts can be put through the dash, with the shanks extending into the engine compartment, as shown in Fig. 4. A washer, lockwasher, and nut are then put on these bolts from the front of the dash to hold them in place.

The distance "X" between nuts "A" and "B" determines how far out the chassis is mounted from the dash. When there is a lot of apparatus in back of the dash, such as wires, tubing, etc., the chassis will have to set out far enough to clear it. However, in practically all models of Cadillac and LaSalle cars, there is no interfering apparatus and therefore the distance "X" will be zero.

Then put a washer on the third mounting bolt and put this bolt through the lower mounting hole with the head on the engine side of the dash, as shown in the illustration. Put on a washer, lockwasher, and nut "D" and tighten it up. Then put on nut "E" with a washer as shown. Nut "E" should be screwed down until it is about $\frac{1}{4}$" from nut "D," when distance "X," as explained above, is zero.

Next secure the dash mounting plate to the chassis box by means of the four chassis mounting screws. The four mounting screws on the broad side of the chassis box are used. As explained above the cover of the box is at the bottom.

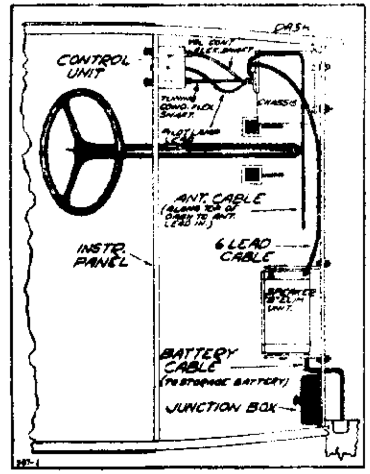


Fig. 1—General Installation—Top View

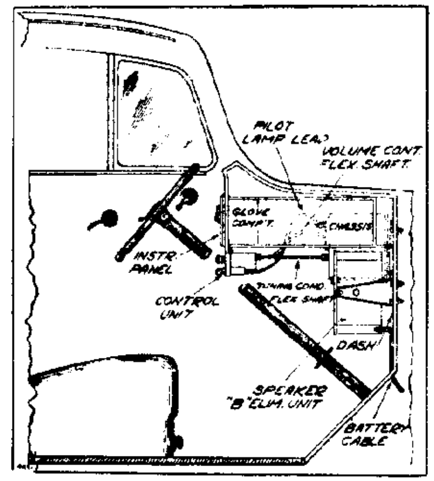


Fig. 2—General Installation—Side View

All the tubes should be in the sockets, the antenna trimmer adjusted (as explained later) and the flexible shafts connected before the chassis is permanently installed. Complete information on the latter procedure is contained in the article on attaching the flexible drive shafts.

The four mounting screws pass through the four slots in the mounting plate (Fig. 3). After they are in place and tight, the dash mounting plate with chassis attached is slipped over the three mounting bolts. The two upper brackets on the plate slip down in back of nut "A" as shown in Fig. 4 and the slot at the bottom of the plate slips over the shank of the lower mounting bolt in back of nut "E." The plate will then hang with the bottom farther away from the dash than the top. A washer, lockwasher, and nut "F" are then put on the lower mounting bolt. Nut "F" is screwed on until the mounting plate is tight up against the washer in back of nut "E." In this position, the bracket at the top of the mounting plate should butt up against nut "A" and be tight. Also the mounting plate will be approximately parallel with the dash.

Mounting the Control Unit

The control unit is mounted to the instrument panel as shown in Figs. 1 and 2. In the 1932 and 1933 models there are two holes on the flange at the bottom of the instrument panel on the left side, which line up with the two holes on the mounting lugs of the control unit. In the earlier models, it will be necessary to drill these holes. Two $\frac{1}{4}$" holes with centers $4\frac{7}{8}$" apart are required. The best location for these holes is at a point where the tuning condenser flexible drive shaft to the chassis will be in substantially a straight line (see Figs. 1 and 2).

Before mounting the control unit permanently attach the flexible shafts, as explained in the next article, and attach the pilot lamp plate to the bottom of the unit, as explained in the article on "Completing the Wiring Connections."

Mounting the Speaker-"B" Eliminator

The speaker-"B" eliminator is mounted on the back of the dash by means of two brackets, as shown in Fig. 5. The best location is at the right side of the dash under the glove compartment as shown in Figs. 1 and 2. It should be mounted with the brackets at the side as shown in (A) Fig. 5, and with the inner bracket mounting holes as indicated in (B) Fig. 5. The box is mounted with the tone control knob at the upper left, as shown in Fig. 1. The grilled portion of the box at the front should face the listener.

In some of the older models which have a hot water heater mounted at the right side of the dash, it will be necessary to mount the speaker-"B" eliminator unit at the center of the dash. In those models which have the coil mounted on the dash, it will be necessary to move the coil to the engine compartment, as explained in the article "Suppression of

CADILLAC

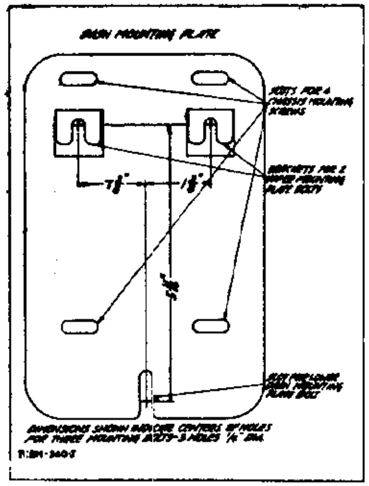


Fig. 3—Dash Mounting Plate

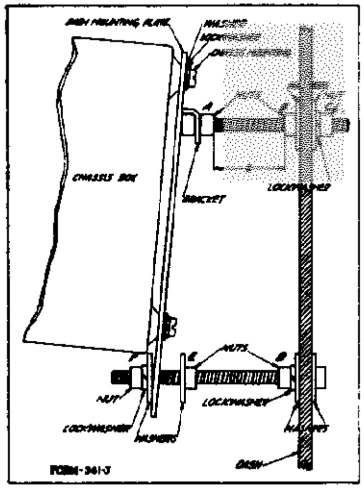


Fig. 4—Details of Chassis Mounting on Dash

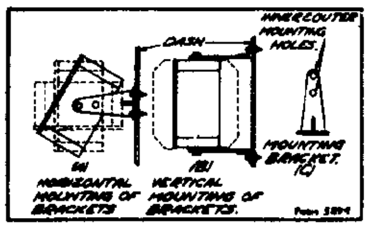


Fig. 5—Method of Mounting Speaker

Ignition and Generator Noise," before this can be done.

In Fig. 5 (B) is shown how the brackets may be mounted vertically if space does not permit their being mounted horizontally, as is the case in some cars.

After the position of the speaker is decided on, drill the four $\frac{5}{16}$" holes required for the bracket mounting bolts. A template for the mounting holes is supplied with the receiver. The holes are arranged in a rectangle. The centers of the holes, the small dimension are 2½" apart and the long dimension 10" apart. Four ¼" x 3" mounting bolts, nuts and lock washers and two reenforcement plates are provided. The mounting bolts are put through the bracket and the dash with the shanks extending into the engine compartment. The reenforcement plates are then put on, one being used for each bracket, after which the lockwashers and nuts are then put on.

Attaching the Flexible Drive Shafts

After the chassis is temporarily mounted and the position of the control unit is known, the flexible shafts may be attached. Remove the chassis from the mounting bolts to make the connection.

Two flexible shafts are supplied with the Cadillac and La Salle auto receiver, one 9" and one 12" long. The 9" shaft is the tuning condenser flexible shaft and is put on in substantially a straight line, as shown in Figs. 1 and 2. The 12" shaft is the volume control shaft. This shaft bends upward from the control unit, as shown in Fig. 2.

The distance between the instrument panel and the dash varies in Cadillac and La Salle cars. In some cars the flexible shaft lengths of 9" and 12" supplied with the receiver are too long. For that reason, these shafts (inside portion) are squared for a length of 3" at one end. The shaft may then be cut at any point along the squared portion to whatever length is required. It should be cut with a three-cornered file or the edge of a grinding wheel. *Do not use a hack saw.* The casing, which is 1½" shorter, must be cut to correspond. This should be tinned first at the point to be cut and may then be cut with a hack saw.

After the length and position of the shafts is decided on, remove the chassis and mounting plate from the mounting bolts. As the shafts are already secured at the control unit (if they have not been taken out to cut), it is necessary only to secure them at the chassis end. Before attaching the shafts, see if the set is in working order. Put the 8-prong socket in place on the chassis and operate the set with the cover off.

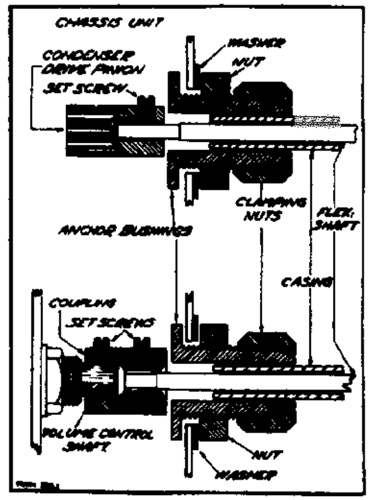


Fig. 6—Details of Flexible Drive Shaft Connections

In Fig. 6 is shown a cross-sectional view of the flexible drive shaft connections at the chassis end. First check the centering of the volume control anchor bushing by eye. The center of the bushing should be in a line with the center of the volume control coupling. In case the center of the bushing is not in line or the shaft turns hard, loosen the nut which holds the bushing in place. Then insert the shaft in the coupling and tighten the set screws as explained below. This will center the bushing and the nut may then be tightened.

Next, take the tube cover plate off. This is the large plate held on the chassis box by 5 screws. Extend the volume control flexible shaft and casing several inches through the hole in the anchor bushing of the tube cover plate so that the plate will be on the casing and out of the way. Turn the volume control coupling counter-clockwise until the switch is snapped to the off position. Lock the receiver on the control unit and turn the volume control knob counter-clockwise until it is in the locked position. Then loosen both set screws in the volume control coupling and insert the flexible shaft in the coupling (see Fig. 6). Tighten the outer set screw first on *one of the four flat faces* of the flexible shaft and then tighten the inner set screw. Then again temporarily hang the chassis on the mounting bolts. Next, check the operation of the switch, volume control and lock. The switch should be off when the volume control knob is in the locked position. It may be necessary to loosen the inner set screw and do a slight amount of adjusting until the proper setting is obtained.

Next, slide the tube cover plate into position and fasten it in place by means of the five screws. Then tighten down the clamping nut on the volume control shaft casing but *do not tighten this nut excessively.*

To attach the tuning condenser flexible shaft, first check the centering of the anchor bushing by eye as was explained above. Then extend the tuning condenser flexible shaft into the hole at the center of the tuning condenser drive pinion. With the rotor plates completely in mesh, turn the dial gear in the control unit until it is at the low frequency end stop. The set screw may then be tightened and the clamping nut secured on the casing as was explained above. In some instances, it may be necessary to loosen the set screw of the large gear on the tuning condenser rotor shaft and adjust the setting of this gear in order to get an accurate calibration.

Antenna

As the Cadillac and LaSalle cars come equipped from the factory with built-in antennas, the antenna portion of the installation is very simple. The lead-in wire from the antenna will be found behind the right cowl pad at the top edge.

If any installations are made in cars which do not have a roof antenna, one will have to be put in. The roof antenna is by far the most satisfactory type and should be used in all cases except in sport models, in which case a plate antenna under the car may be used.

Completing the Wiring Connections

Antenna Cable

Bring the antenna cable of the receiver in the most direct manner possible to the lead-in from the antenna and connect it to the latter. Keep it as high as possible and as far away from any car wiring as possible. Care should be taken not to have the antenna wire come in contact with the shield wires. Ground the pigtail of the antenna cable shield at the antenna end. The pigtail of this shield at the chassis end is grounded.

The shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. If motor noise is experienced, cover the exposed portion of the lead-in wire with loom and braided shield from the point where it leaves the column to the point of connection to the antenna lead of the receiver. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

MODEL 06W
Schematic, Socket
Alignment

CADILLAC

Battery Cable and Six Lead Cable

As shown in Figs. 1 and 2, the battery cable is brought down the dash, through a hole in the dash and thence over to the battery. It passes through the raised portion of the battery compartment cover.

The lug on the lead marked "positive" is connected to the positive side of the battery and the lug on the negatively marked lead is connected to the negative side of the battery. Ground the pigtail of the shield by screwing the No. 6 Parker Kalon screw through the end of the pigtail and through the hole in the lug which is grounded.

The six-lead cable between the chassis and the speaker—"B" eliminator is usually brought over along the dash as shown in Fig. 1.

Pilot Lamp

Before the control unit is permanently mounted, complete the pilot lamp connections. The pilot lamp cable is attached to the eight-prong socket. At the end of this cable is the pilot lamp socket and clip, the latter being attached to an angle bracket. This bracket is to be screwed to the pilot lamp plate which will be found in the bag of parts. A 1/4" 6-32 binding head screw, nut and lockwasher are provided for this purpose. The bracket is put on the pilot lamp plate in such a way that the leads will come out at the back of the control unit. The pilot lamp plate is then screwed to the bottom of the control unit by means of the lug on each side of the plate.

Trying Out the Set and Adjusting

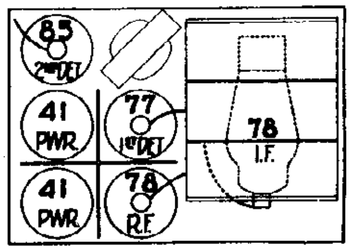


Fig. 7—Location of Tubes

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer condenser.

To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 KC with the volume control about three-quarters on. On one end of the chassis box is a small metal plate. Remove the two screws which hold this plate in place. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

The location of the tubes is shown in Fig. 7.

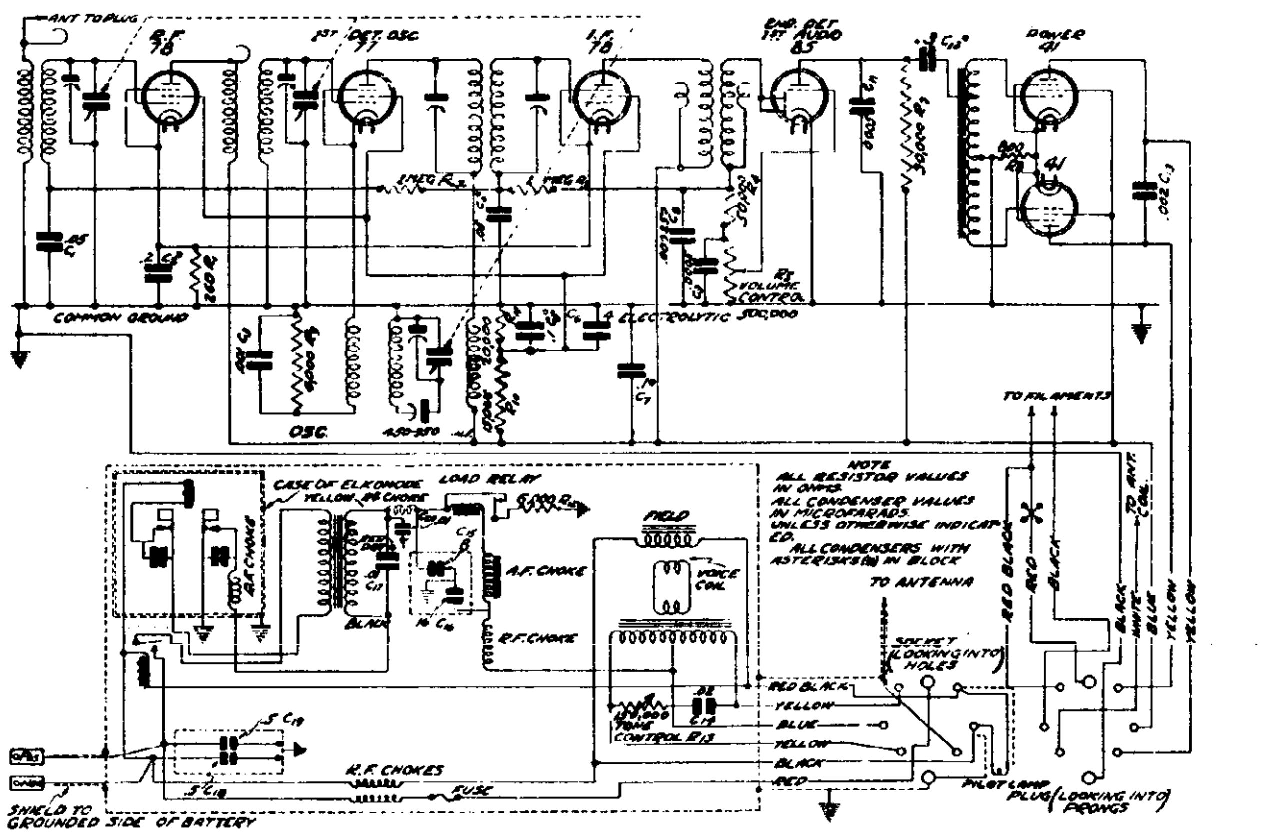


Fig. 9—Schematic Circuit Diagram

IF PEAK 262 KC.

MODEL 06W
Parts List

CADILLAC

Replacement Parts for Series 06W Receivers

"S" Type — Black Finish

"R" Type — Maroon Finish

CHASSIS PARTS

Part No.	Description
P-1763	No. 85 Tube Socket
P-1761	No. 77 Tube Socket
P-1762	No. 78 Tube Socket
P-1665	No. 41 Tube Socket
P-1760	8-Prong Male Plug
P-50581	Tuned Impedance Transformer
P-20546	Pinion Compression Spring
P-20544	Pinion Mtg. Bracket
P-20586	Cond. Drive Pinion
P-20585-A	Cond. Drive Gear
P-1568-A	Tube Shield Assembly
P-10263	⅜ Long Tube Bumper (Rubber)
P-10210	⅝ Long Tube Bumper (Rubber)
P-30417	Volume Control Coupling Unit
P-5094	2nd I. F. Coil and Can Assembly Complete
P-5063	1st I. F. and Oscillator Coil and Can Assembly Complete
P-5069	Complete R. F. Coil and Can Assembly
P-5064	Antenna R. F. Transformer only
P-5065	Interstage R. F. Transformer only
P-20516	6-32 Wing Nuts for Chassis Cover—Black
P-20737	6-32 Wing Nuts for Chassis Cover—Red

Resistors

(In Chassis)

Part No.	Code No.	Resistance	Type
P-B90962	R1	260 ohm	Carbon
P-A90948	R2	1 Megohm	Carbon
P-A90948	R3	1 Megohm	Carbon
P-A90941	R4	50,000 ohm	Carbon
P- 91061	R5	500,000 ohm	Volume Control and Switch
P-B91047	R7	30,000 ohm	Carbon
P-B90964	R8	800 ohm	Carbon
P-A90947	R9	4,000 ohm	Carbon
P-B91020	R10	15,000 ohm	Carbon
P-B90950	R11	20,000 ohm	Carbon

(In Speaker—"B" Eliminator)

Part No.	Code No.	Resistance	Type
P-98001	R12	6,000 ohm	Vit. Enamel
P-91013	R13	150,000 ohm	Tone Control

Condensers

(In Chassis)

Part No.	Code No.	Capacity	Voltage	Type
P-80946	C1	.05	mfd. 200 V.	Tubular
P-80821	C3	.001	mfd. 600 V.	Molded
P-80965	C6	4.0	mfd. 150 V.	Electrolytic
P-80919	C8	.00025	mfd. 600 V.	Moulded
P-80945	C9	.0005	mfd. 600 V.	Moulded
P-80855	C11	.0005	mfd. 600 V.	Moulded
P-80808-A	C13	.002	mfd. 600 V.	Moulded
P-80903-J	C2	0.2	mfd.	Block
	C4	.05	mfd.	
	C5	0.1	mfd.	
	C7	0.1	mfd.	
	C12	0.3	mfd.	
P-1539	600 K. C. Tracking Condenser			
P-80938	Three-Gang Variable Condenser			

(In Speaker—"B" Eliminator)

Part No.	Code No.	Capacity	Voltage	Type
P-80940	C14	.02	mfd. 400 V.	Tubular
P-80939	C15	8.0	mfd. 225 V.	Electrolytic Block
	C16	16.0	mfd. 225 V.	
P-80953	C17	.01	mfd. 160 V.	Metal Case
P-80941	C18	0.5	mfd. 15 V.	Metal Case
	C19	0.5	mfd. 15 V.	
P-80872	C20	.01	mfd. 600 V.	Tubular

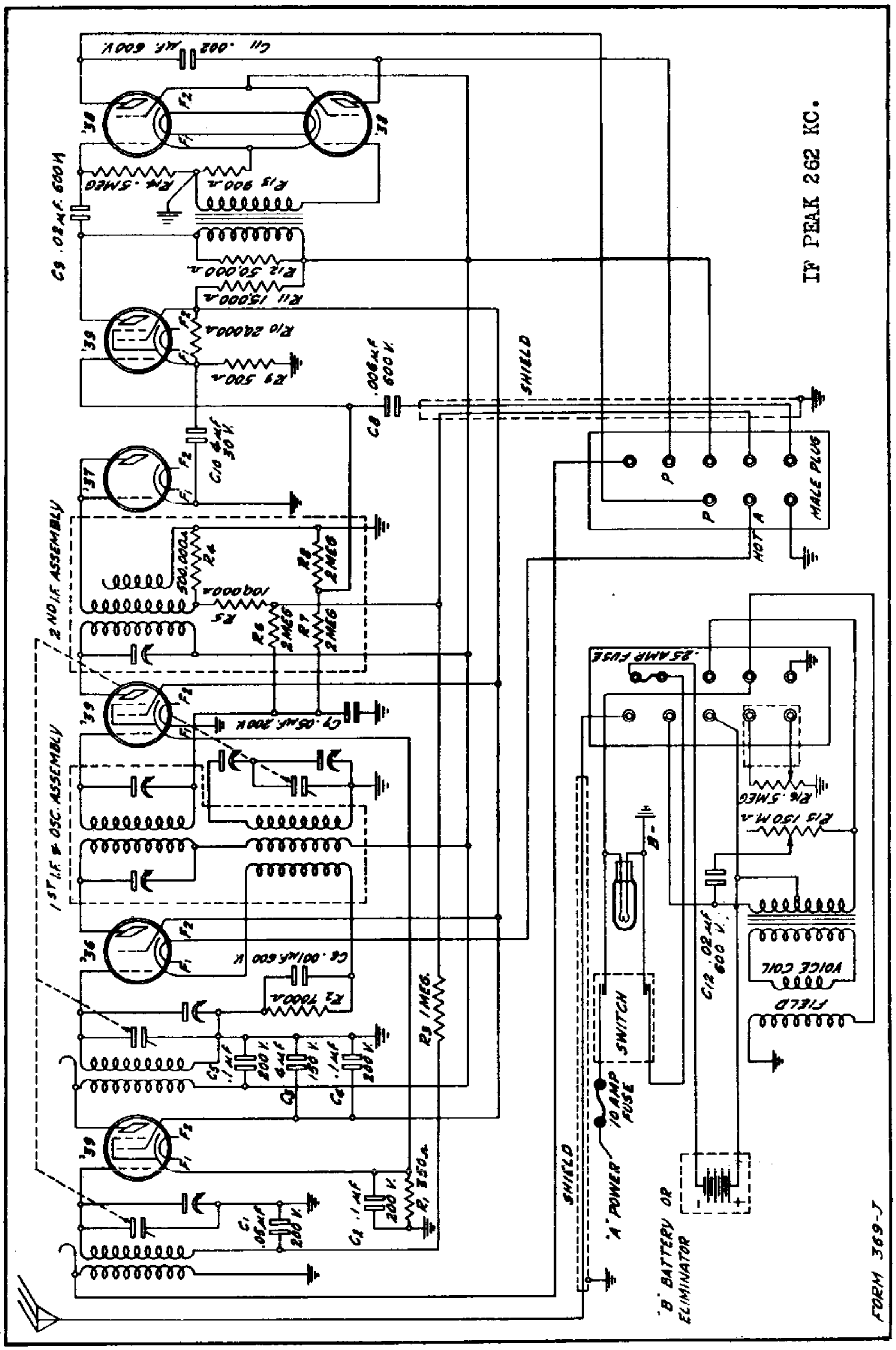
SPEAKER "B" ELIMINATOR PARTS

Part No.	Description
P-50582	Power Transformer Assembly
P-50583	"B" Choke Assembly—Iron Core
P-5089	"B" Choke—Air Core (2 Used)
P-5090	Dual "A" Choke—Air Core
P-1765	Dual Vibrator Elkonode
P-1766	Five-Prong Socket
P-1767	On-Off Relay
P-1768	Automatic Load Relay
P-70737	"A" Cable and Lugs
P-70748	Six-Lead Cable, Antenna Cable, Pilot Lamp Cable and Eight-Prong Socket Assembly, Complete
P-1624	10 Amp. Fuse—Size No. 3AG Fuse Block
P-1771	6-Inch Speaker—S Type Set
P-1772	8-Inch Speaker—R Type Set
P-1790	5-Lug Terminal Strip

CONTROL UNIT PARTS

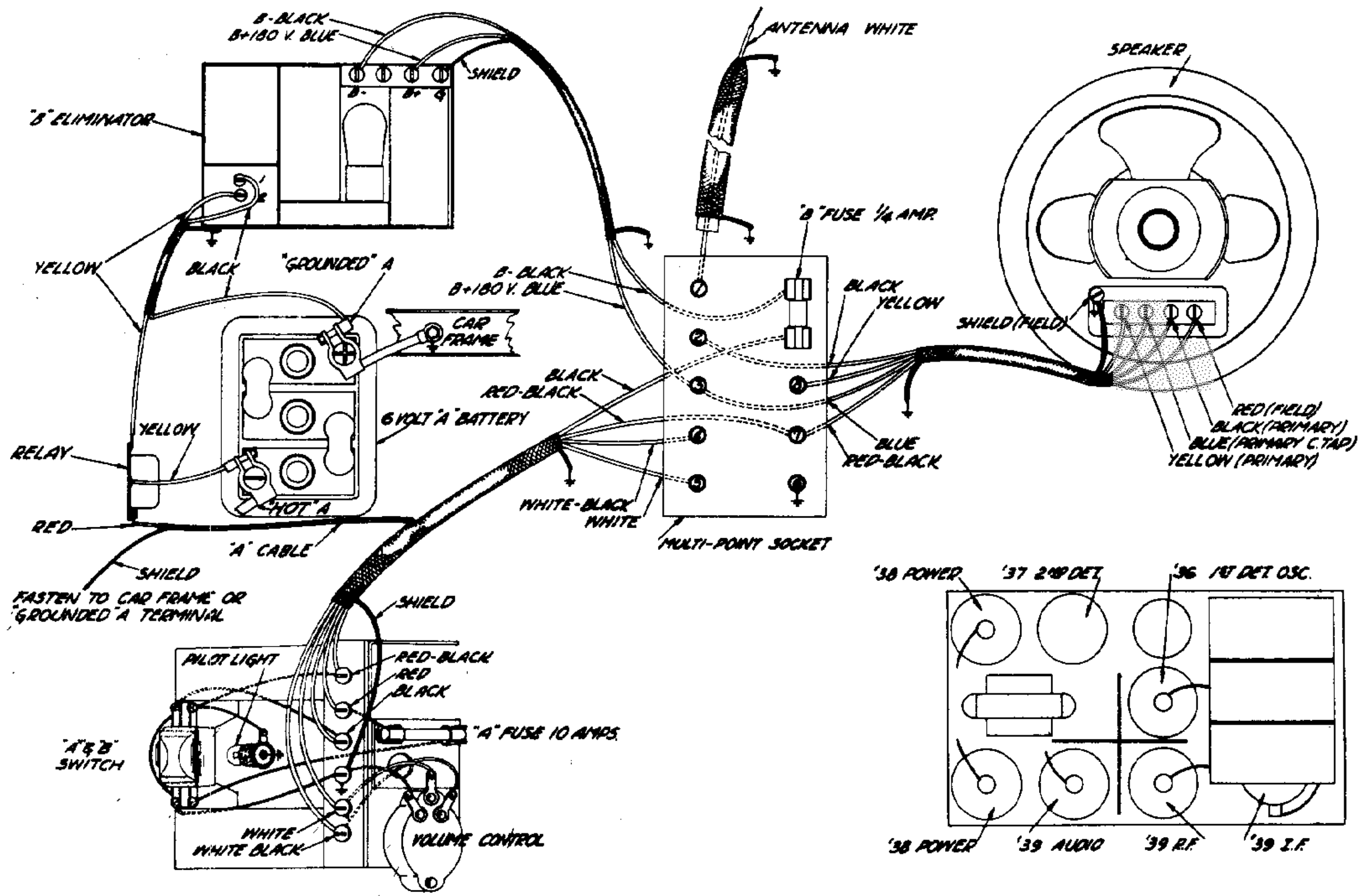
Part No.	Description
P-20534	Dial Gear
P-20537	Dial Retaining Washer
P-30387-A	Worm Drive Gear
P-30378	Anchor Bushing
P-30384	Anchor Bushing Clamping Nut
P-30385	Anchor Bushing Hex. Nuts
P-1848	Lock Assembly
P-30435	Keys
P-20724-A	Lever
P-20725	Ribbon Tension Spring
P-1562	Knobs—S Type Set
P-1855	Knobs—R Type Set
P-1610	Flexible Shaft 9¾ Inch
P-1611	Flexible Shaft 12¾ Inch
P-1849	Dial Strip
P-30437	Volume Control Drive Shaft
P-30390	Drive Shaft
P-1563-A	6-8 Volt Pilot Lamp
P-1871	Pilot Lamp Socket and Clamp

CADILLAC


IF PEAK 262 KC.
MALE PLUG
HOT A
SHIELD
1ST I.F. & OSC. ASSEMBLY
2ND I.F. ASSEMBLY
.25 AMP FUSE
SWITCH
10 AMP FUSE
'A' POWER
'B' BATTERY OR ELIMINATOR
VOICE COIL
FIELD
FORM 369-J

MODEL 2721 (072)
Voltage, Socket
Assembly Diagram

CADILLAC



Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'39	R. F.	6.	177	80	3	3.6
'36	1st Det.	6.	173	76	7 (1)	.9 (1)
'39	I. F.	6.	177	80	3	3.6
'37	2nd Det.	6.	0		0	0
'39	1st Audio	6.	157	77	3.7	3.0
'38	Output	6.	160	162	15.5	7.5

(1) Will vary with dial setting.
NOTE: All bias voltages must be read from cathode to ground.

CADILLAC

Power Units

The "A" battery and "B" eliminator or "B" batteries may not be delivering the correct voltages to the set due to a defect in the units themselves, or to a defect in the wiring, connecting plug, or any of the associated apparatus.

CAUTION — In the installation manual it was stated that the voltages should not be read by removing the cable head and reading them at the multi-post socket. The reason for this is that when the lock switch is turned off with the cable head removed the inductive surge caused by the speaker field may burn out the pilot lamp.

Also, as the voltages are not read under load conditions, a true picture is not obtained of the actual operating voltages.

However, the service technician equipped with the proper apparatus can read the voltages at the cable head in accordance with the instructions as given below. By the method as explained, load conditions are simulated, thus permitting actual working voltages to be read.

If "A" or "B" voltages are not read at the multi-post socket, it will be necessary to check the voltages at the unit in question. If the voltages at the "A" battery and "B" eliminator or "B" battery are O. K., then there is an open in the wiring or connections at some point. Disconnect the wiring from the "A" or "B" unit and "ring through" the leads to the cable head with the continuity meter.

In the case of no "B" voltage, take off the cover of the "B" eliminator and see if the tube is lighted. If the tube is not lighted, see if there is voltage at the "A" supply terminal strip. Should there be no voltage at the latter point, it may be due to the fact that the relay is not contacting, thus causing no power to be supplied to the "B" eliminator.

To Read Power Supply Voltages at Cable Head

Turn off the lock switch and remove the cable head from the chassis.

The following parts are required:

3—Phone tips or prongs taken from an old tube base.

1—Resistor for the "A" circuit as indicated in Fig. 1.

1—Resistor for the "B" circuit as indicated in Fig. 1.

Place these resistors in a wooden box or insulated mounting of some kind, with rubber covered leads extending out of the box. Note that the ground leads of the two resistors are common.

Solder the phone tips to the ends of the three leads.

Then insert the tips in the multi-post socket as shown in Fig. 1.

Turn on the lock switch.

Read the "A" voltage between terminals 6 and 7.

Read the "B" voltage between terminals 3 and 6, using a high resistance voltmeter.

CAUTION—In all of the above procedure great care should be taken not to ground the A+ or B+ to the car frame, chassis, cable, or any other ground.

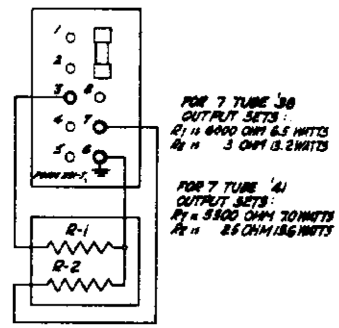


Fig. 1. Using Resistors for Load

The above readings are made under load conditions and indicate that proper power is being supplied to the receiver as far as the multi-post socket.

A very handy method of applying these resistors to the multi-point socket is to mount them in an insulated unit or plug with three prongs extending out and arranged in the shape of contacts three, six and seven in the above diagram. This unit could then be plugged in the correct terminals very easily.

TESTING AND REPAIRING CHASSIS

If all accessories are found, upon test, to be in working order, it will be necessary for the service technician to check the chassis over.

The most convenient place to test and repair a chassis is on a service shop bench. In the case of the auto set, however, it is advisable to do part of the testing in the car, due to the fact that the power units, speaker, control unit and cables are installed in the car and cannot be conveniently taken out for use in testing the receiver. Of course, if a duplicate set of parts are available, then all of the testing can be done on the bench.

Reading Voltages at Sockets

One of the first checks to be made is that of reading the voltages at the sockets. A good percentage of all the circuits in the chassis are involved, and a radically incorrect reading at any point will give a clue as to where the trouble may lie. In the installation manual and in this supplement there is a voltage chart showing all of the voltages and plate currents.

As stated above, the best place to check the voltages would be on a service shop bench, but as this involves removal of the other units and cables, it will be quickest in most cases to make the readings in the car.

In most cases, it will be necessary to remove the chassis either from its mounting on the steering column or from the mounting plate on the dash in order to satisfactorily check the voltages at the sockets. The procedure is as follows:

Turn off the lock switch.

Take off the cable head by removing the five screws.

Take the chassis off of the mounting and lay it on the floor board, on a board, or on a wood box, wherever is the most convenient. This can be done if sufficient slack was left in the wiring cables at the time of installation.

In some instances, it will be necessary to disconnect the flexible drive shaft and casing at one end in order to get the chassis out far enough. In other cases, it might be advisable to take off the control unit entirely to get the chassis off far enough.

It is advisable to take the chassis out of the box, although this is not absolutely necessary. If the chassis is taken out, an inspection of the wiring and parts can be made. If the chassis is not taken out, a long plug and external socket arrangement, such as is provided with a set analyzer, or the plug as described below, will be necessary.

In either case, re-insert the multi-point plug in the socket. Be sure to push the plug all the way in, to insure contact on all prongs.

Then turn on the lock switch.

CAUTION—If the chassis is taken out of the box, be sure to keep it on a dry wood or other insulated location in the front compartment of the auto. Great care should be taken to prevent an A+ or B+ point on the chassis from coming in contact with a ground, such as the car frame, levers, cable shields, etc.

A thousand-ohm-per-volt meter of 0—250 volt range is required for the plate and screen voltages. Lower ranges will be necessary for the grid and heater voltages. It is not necessary to have a high resistance meter for the heater or "A" battery reading.

Two of the sockets are partially covered under the chassis by the bypass condenser block. If the voltages are read under the chassis, at the bottom of the socket, by means of test leads and prods, it is necessary to make top socket contacts for these two tubes or else use the plug method as described.

A handy method of reading the voltages on an auto set is to make a plug about 5" long with an old five-prong tube base at the bottom and a five-prong socket at the top. The five lines are then brought out at the top to binding posts or other terminals which can be reached with the tips of the test prods on the leads from a voltmeter. By providing a link in the plate line, screen line, or other lines, as desired, the current flowing in these circuits can be easily read by opening the link and connecting a milliammeter in place of the link. An extension lead should be made for the control grid line.

Continuity Tests

The auto chassis is very compactly built and when "ringing it through" for servicing, considerable time might be spent in tracing through the wiring. For that reason, we are including in this supplement the complete wiring diagram.

After the chassis has been removed from the box and before making the continuity tests, make a careful inspection of all exposed wiring and soldered connections for opens, grounds, shorts and faulty connections. Then proceed to make continuity tests through the various circuits, using as a guide the wiring diagram, Fig. 3.

Make the continuity tests in an orderly manner, starting with the R. F. and working through the I. F. into the audio system. An exception to this is when there is an indication as to where the trouble is, in which case, time may be saved by starting the tests at the part or circuit in question.

In "ringing through" the various circuits in the chassis, take into consideration the amount of resistance in the circuit and also whether there is an external closed circuit around the one under test. Most service men at the present time use direct reading ohmmeters as continuity meters and in this way check for continuity while at the same time determining the resistance of the circuit. To see whether there is an external closed circuit, reference should be made to the schematic circuit diagram, in the installation manual.

When making continuity tests which are across the electrolytic condensers, the positive test prod must be on the positive lead. This is due to the fact that the anodes of the electrolytic condensers must be kept at a positive potential. If the anode is made negative, the condenser will pass current considerably more readily than if it is positive and the reading will be different than the standard reading which should be obtained.

Alignment of Tuning Condensers

The condensers are aligned at the factory with signal generators and output meters and the receiver will not, as a general rule, lose its alignment unless mishandled or tampered with. When the tuning condensers are out of alignment, the receiver may tune broadly, it may be low in volume all over the band, or a lack of volume on certain parts of the broadcast band may be noticed.

Broad tuning is most frequently caused by misalignment of the intermediate frequency tuning condensers. It may also be caused by mistracking between the oscillator and R. F. condensers.

MODEL 2721 (072)
Parts List
MODEL 2721,2722
Trimmer Data

CADILLAC

Lack of volume at certain points of the dial is generally caused by mistracking between the R. F. and oscillator condensers. This occurs generally at the high frequency end and may be corrected by adjustment of the oscillator 1400 K. C. trimmer condenser. In a few instances, lack of volume at certain parts of the dial may be caused by R. F. condenser misalignment. If this occurs at the high frequency end, the condition may be corrected by the adjustment of the R. F. trimmer condensers. If the set is weak at both ends of the dial, mistracking between the R. F. and oscillator condensers is generally the cause and may be corrected by adjustment of both 600 K. C. and 1400 K. C. trimmers, as explained below.

Low volume all over the band is generally due to I. F. condenser misalignment.

CAUTION—We do not recommend that realignment be attempted unless other possible causes of faulty operation have first been investigated and unless the service technician has the proper equipment. Realignment by anyone other than a qualified radio service technician is not advisable, as one not experienced in the work is almost certain to get into difficulty and throw the set completely out of alignment.

A local and accurately calibrated signal generator as well as an output indicating meter are absolutely essential for correct alignment. This signal generator must provide a signal at the broadcast frequencies of 550 to 1500 K.C. and in addition a signal of 262 K.C. for the intermediate frequency. The broadcast band signals of the signal generator must be accurately known, as the dial scale of the receiver is calibrated in kilocycles. The intermediate frequency of the signal generator likewise must be accurate in order to align the I. F. stages at 262 K.C. A non-metallic screwdriver is necessary.

As in the case of reading the voltages at the sockets, the best place to realign the chassis would be on the service shop bench. However, to avoid removal of the other units and cables, realignment may be done in the car, in the front compartment, on a box, wood board, or other insulated location. The chassis must be removed from the box.

The complete procedure for realignment and retracking is as follows:

Aligning Intermediate Condensers—First align the intermediate condensers. The adjusting screws of the first I. F. primary and secondary trimmer condensers are on the porcelain base of this assembly at the side of the '39 I. F. socket. The adjusting screw of the second I. F. primary trimmer is reached through the hole near the base of the can of this assembly.

One of the best ways of reading the output is by means of a rectifier type meter. This meter, if of low range is connected across the secondary of the output transformer in the speaker. If it is of high range, it may be connected across the primary of the transformer in series with a large condenser to prevent the flow of D.C. plate current through the meter. In either method of connection, opening the voice coil of the speaker will give a better deflection on the output meter.

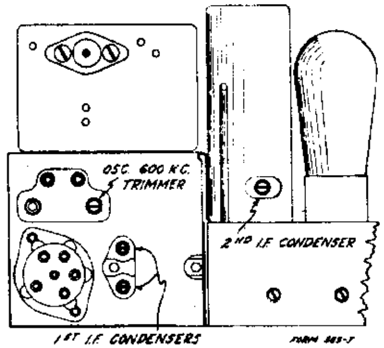


Fig. 2. Location of Intermediate and 600 K. C. Trimmer Condensers

First set the signal generator for a signal of exactly 262 K.C. The rotor of the tuning condenser should be completely out to avoid interference from the oscillator. Remove the grid cap from the grid connection of the '36 first detector tube. Connect the antenna lead from the signal generator to the grid of the '36 first detector. Connect the ground lead of the signal generator to the chassis sub-panel or ground at any convenient point.

Attenuate the signal from the signal generator so as to prevent the levelling-off action of the A. V. C. Using the non-metallic screwdriver, adjust the first I. F. primary and secondary trimmer condensers and the second I. F. trimmer condenser adjusting screws until maximum output is indicated on the output meter.

After all three have been adjusted the first time, go over them again and check the setting for maximum output.

If when alignment has been completed, the output is satisfactory at 600 K.C. and 1400 K.C., but is low in the center of the broadcast band, the intermediate condensers have probably been lined up at some frequency other than 262 K.C. Have the frequency of the 262 K.C. signal generator checked and if it is more than 3 K.C. off, either way, it should be re-calibrated.

Aligning R. F. and Oscillator Condensers—Before aligning and tracking the oscillator and R. F. condensers, connect the flexible drive shaft to the control unit and to the chassis. As explained in the service manual, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C. The tuning condenser will then be correctly set for the 1400 K.C. signal.

Set the signal generator for a signal of exactly 1400 K.C. The signal input from the signal generator should now be made to the antenna lead. Put the grid cap of the '36 first detector tube back in place.

Then adjust the three trimmer condensers on the tuning condenser for maximum output. Adjust the oscillator section trimmer first. (Section farthest from drive gear.)

The next step is to adjust the oscillator 600 K.C. trimmer condenser. The adjusting screw on this condenser will be seen over the '39 I. F. socket. Set the signal generator for a signal of 600 K.C. and turn the tuning condenser rotor until the output meter shows maximum deflection. Then, using the non-metallic screwdriver, adjust the 600 K.C. trimmer condenser screw, rocking the rotor back and forth at the same time, until maximum output is obtained.

Next, set the signal generator for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output. The tuning condenser should then be properly aligned.

Parts List for No. 072 Series Receivers (38 Output)

CHASSIS PARTS

Part No.	Description
P-1529	No. 37 Tube Socket (Long Lug)
P-1531	No. 39 Tube Socket (Long Lug)
P-1535	No. 36 Tube Socket (Short Lug)
P-1530	No. 39 Tube Socket (Short Lug)
P-1530	No. 38 Tube Socket (Long Lug)
P-1532	Multi-Point Plug
P-1543	Multi-Point Socket
P-5033	First I. F. & Oscillator Assembly, Complete with Trimmer Condensers and Can
P-5022	Second I. F. Transformer Assembly, Complete with Trimmer Condenser, Resistors and Can
P-5034	Antenna & Interstage R. F. Transformer, Complete with Cap
P-5035	Antenna R. F. Transformer Only
P-5036	Interstage R. F. Transformer Only
P-1539	Oscillator 600 K. C. Tracking Condenser
P-1615	Condenser Drive Gear with Set Screw
P-30395	Drive Pinion Gear with Set Screw
P-20544	Bracket for Pinion Bearing
P-20545	Bearing for Drive Pinion
P-1092	Grid Cap and Wire
P-10232	Long Rubber Bumper for Tubes
P-10233	Short Rubber Bumper for Tubes
P-20516	6-32 Wing Nuts (for chassis cover)
P-20543	Chassis Box
P-20542	Chassis Box Cover
P-50550	Audio Transformer

Resistors

Part No.	Code No.	Resistance	Type
P-A-90953	R-1	350 ohms	Carbon
P-A-90979	R-2	7,000 ohms	Carbon
P-A-90948	R-3	1 Megohm	Carbon
P-A-90929	R-4	500,000 ohms	Carbon
P-A-90912	R-5	100,000 ohms	Carbon
P-A-90949	R-6	2 Megohm	Carbon
P-A-90949	R-7	2 Megohm	Carbon
P-A-90949	R-8	2 Megohm	Carbon
P-A-91025	R-9	500 ohms	Carbon
P-B-90950	R-10	20,000 ohms	Carbon
P-B-91020	R-11	15,000 ohms	Carbon
P-A-90941	R-12	50,000 ohms	Carbon
P-A-91022	R-13	900 ohms	Carbon
P-A-90929	R-14	500,000 ohms	Carbon
P- 91013	R-15	0-150,000 ohms	Tone Control
P- 91026	R-16	0-500,000 ohms	Volume Control

Condensers

Part No.	Code No.	Capacity Voltage	Type
P-80902-D	C-1	.05 mfd., 200 V.	Electrolytic Cond. Block
	C-3	4.0 mfd., 150 V.	
	C-10	4.0 mfd., 30 V.	
P-20909-D	C-2	.1 mfd., 200 V.	Bypass Cond. Block
	C-4	.1 mfd., 200 V.	
	C-5	.1 mfd., 200 V.	
	C-9	.02 mfd., 600 V.	
	C-7	.05 mfd., 200 V.	
P-80822	C-8	.006 mfd., 600 V.	Moulded
P-80821	C-6	.001 mfd., 600 V.	Moulded
P-80808	C-11	.002 mfd., 600 V.	Moulded
P-80907	C-12	.02 mfd., 600 V.	Metal Can (In Speaker Case)
P-80912-C	Three-Gang Condenser		

CONTROL UNIT PARTS

Part No.	Description
P-91026	R-16 Volume Control
P-1624	10 Ampere Fuse
P-1614	Lock Switch
P-1563	8 Volt Pilot Lamp
P-1562	Control Knob
P-1621	Pilot Lamp Socket & Cover Assembly
P-1618	Celluloid Dial Strip
P-20537	Dial Retaining Washer
P-20534	Dial Drive Gear
P-30390	Drive Shaft
P-30387	Worm Drive Gear

SHIELDED CABLES

Part No.	Description
P-70723	Shielded Antenna Cable
P-70730	Shielded Control Cable
P-70731	Shielded Speaker Cable
P-70732	Shielded "B" Supply Cable

No. 072A Series Receivers (41 Output)

The form 375J Installation Manual and foregoing service supplement cover the 072 Series (38 output) receivers. The copy in general is applicable to the 072A Series (41 output) as the sets differ only in the audio amplifier.

In Fig. 4 is shown the schematic circuit diagram of the 072A set. The schematic circuit diagram of the 072 set is shown in Fig. 1 of the Form 375J Installation Manual. By looking at the two circuits the similarity as well as the points of difference can be noted.

On this page is given an explanation of the parts which are different in the 41 output set, a supplement to the chassis parts list covering the new parts used, and a complete voltage chart for the receiver.

Differences in 072A Chassis

In comparing the No. 072 Series (38 output) receivers with the No. 072-A Series (41 output) the following parts changes in the chassis have been made:

R-2 changed from 7,000 ohms to 6,000 ohms.

R12 changed from 50,000 ohms to 25,000 ohms.

R-13 changed from 900 ohms to 800 ohms.

R-14, as shown in the old schematic circuit diagram (Fig 1 in the installation manual) is not used in the new receiver.

C-9 is changed from a .02 mfd. condenser to a .25 mfd. condenser.

The No. 38 sockets are changed to No. 41 sockets.

A new audio transformer is used.

No. "B" fuse is used with the No. 072-A series receiver.

Voltage Chart for 072A Receivers

Type of Tube	*Function*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate MA*
'39	R. F.	6.	177	80	3	3.6
'36	1st Det.	6.	173	76	6	.7
'39	I. F.	6.	177	80	3	3.6
'37	2nd Det.	6.	0		0	0
'39	1st Audio	6.	88	88	4	3.0
'41	Output	6.	159	162	15	9

NOTE.—Read bias voltages from cathode to ground.

Supplementary Parts List for 072A Receivers

New Parts Used in the 072A (41 Output) Series Receivers

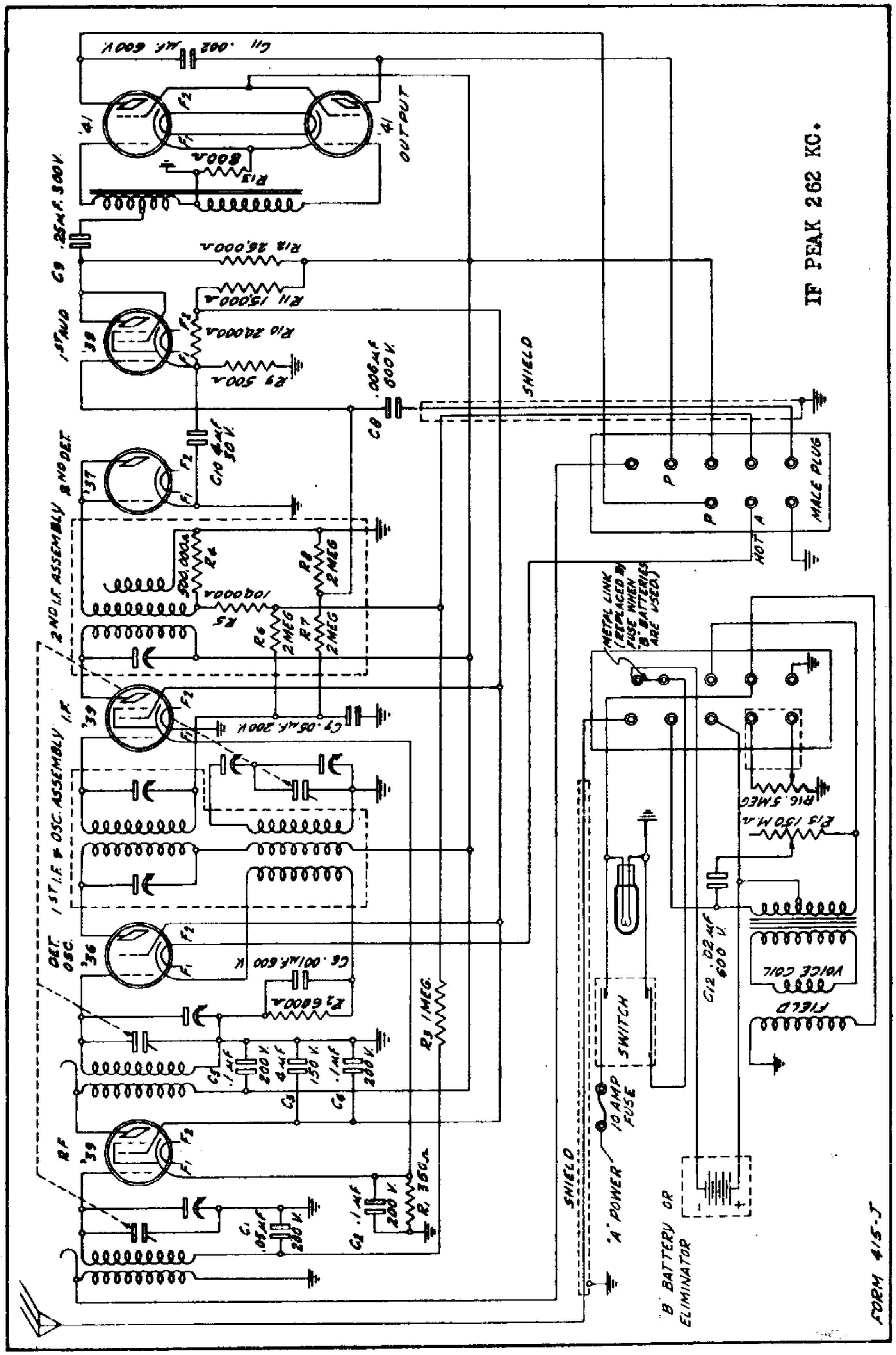
Part No.	Description
P-A-91029	R-2 — 6,000 ohm Carbon Resistor.....
P-A-91038	R-12—25,000 ohm Carbon Resistor.....
P-A-91023	R-13— 800 ohm Carbon Resistor.....
P-50559	Audio Transformer ....
P-1665	No. 41 Sockets ....
P-80903-F	Bypass Cond. Block: C-2 — .1 mfd., 200 V.; C-4 — .1 mfd., 200 V.; C-5 — .1 mfd., 200 V.; C-9 — .25 mfd., 600 V.; C-7 — .05 mfd., 200 V.

Parts Shown in 072 List Not Used in 072A Series Receivers

Part No.	Description
P-A-90979	R-2 — 7,000 ohm Carbon Resistor....
P-A-90941	R-12— 50,000 ohm Carbon Resistor....
P-A-91022	R-13— 900 ohm Carbon Resistor....
P-A-90929	R-14—500,000 ohm Carbon Resistor....
P-50550	Audio Transformer ....
P-1530	No. 38 Socket ....
P-80903-D	Bypass Cond. Block: C-2 — .1 mfd., 200 V.; C-4 — .1 mfd., 200 V.; C-5 — .1 mfd., 200 V.; C-9 — .02 mfd., 600 V.; C-7 — .05 mfd., 200 V.

MODEL 2722 (072-A)
Schematic

CADILLAC



MODEL 2721, 2722
Chassis wiring

CADILLAC

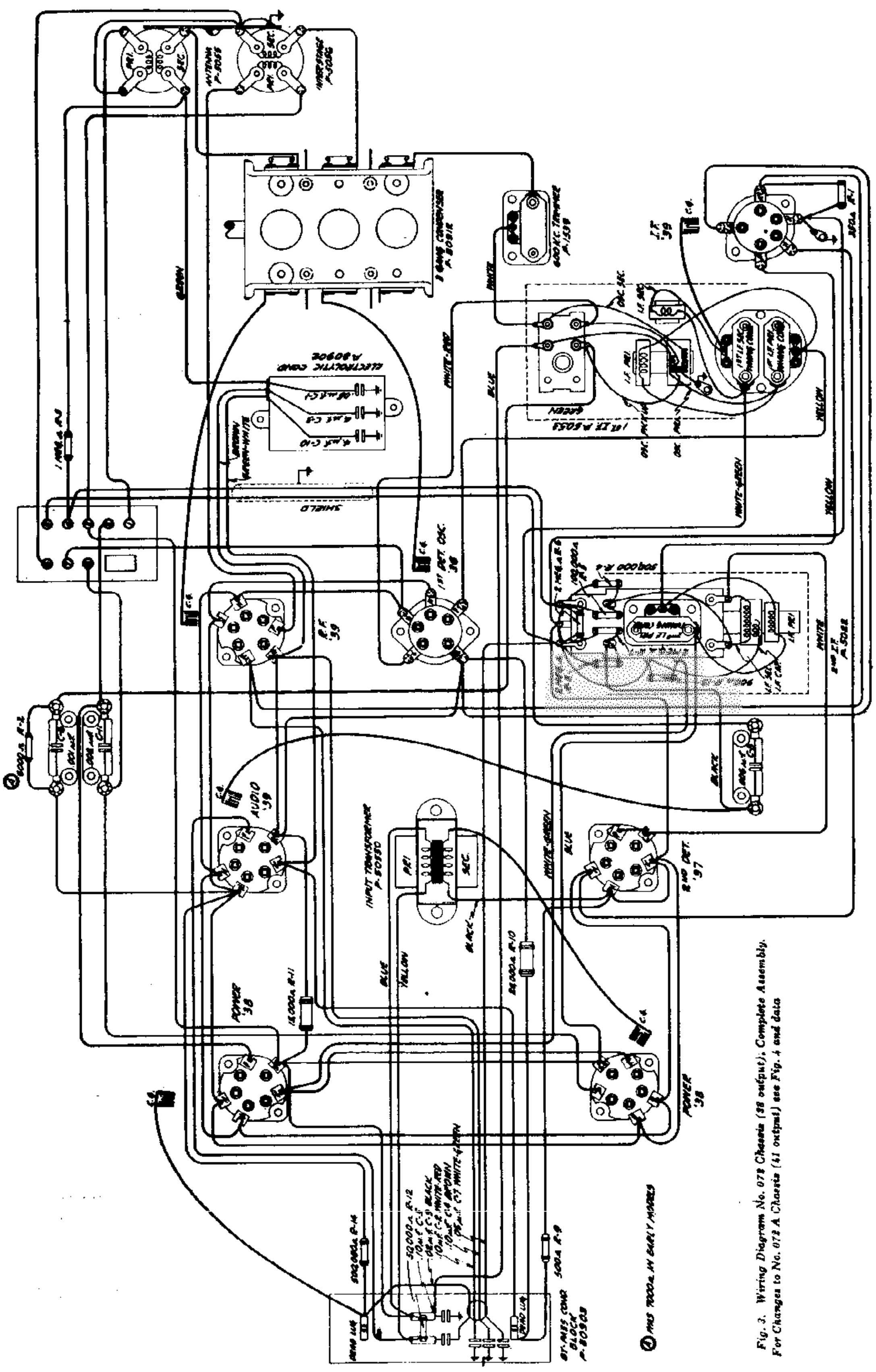
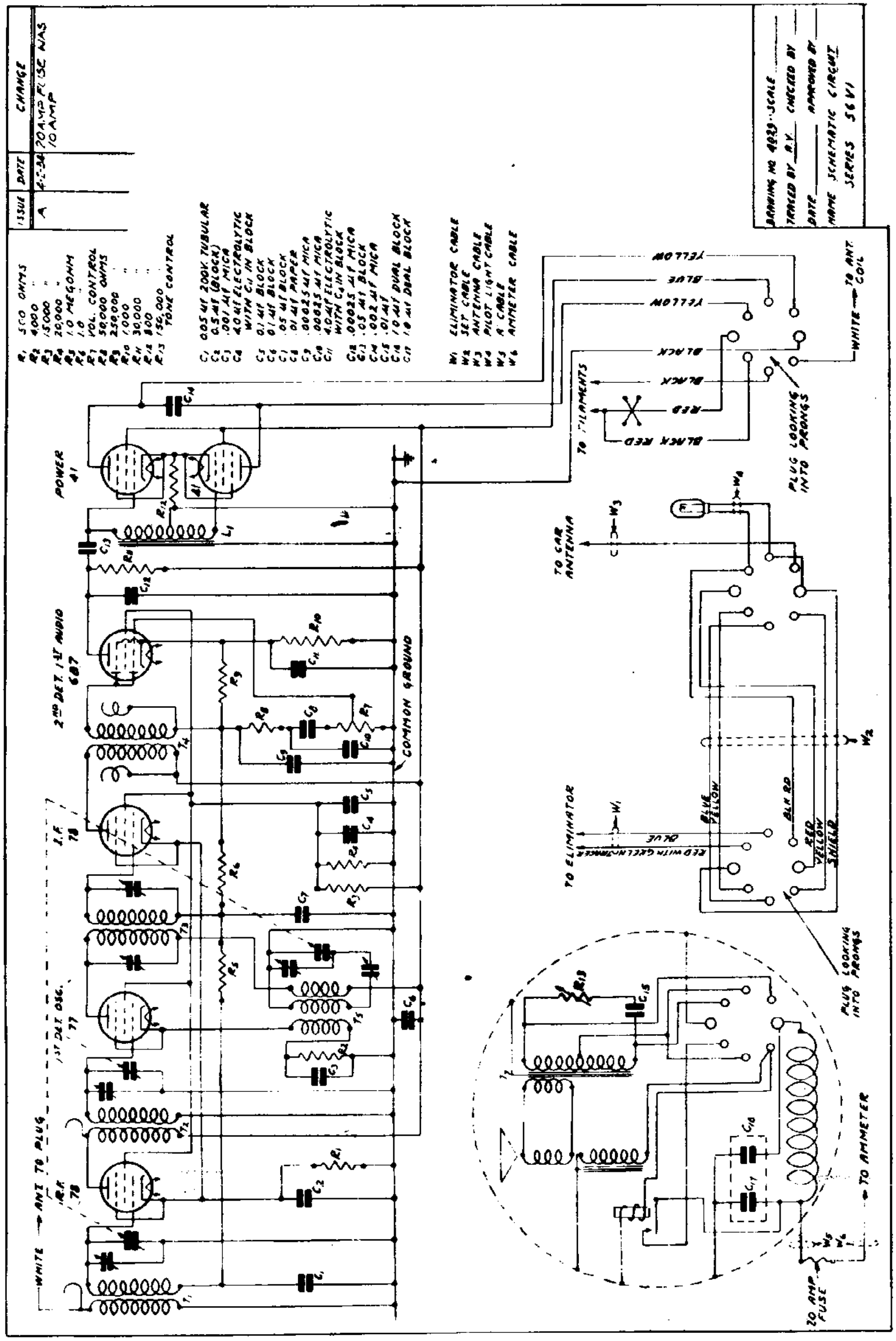


Fig. 3. Wiring Diagram No. 072 Chassis (38 output); Complete Assembly.
For Changes to No. 072 A Chassis (41 output) see Fig. 4 and data

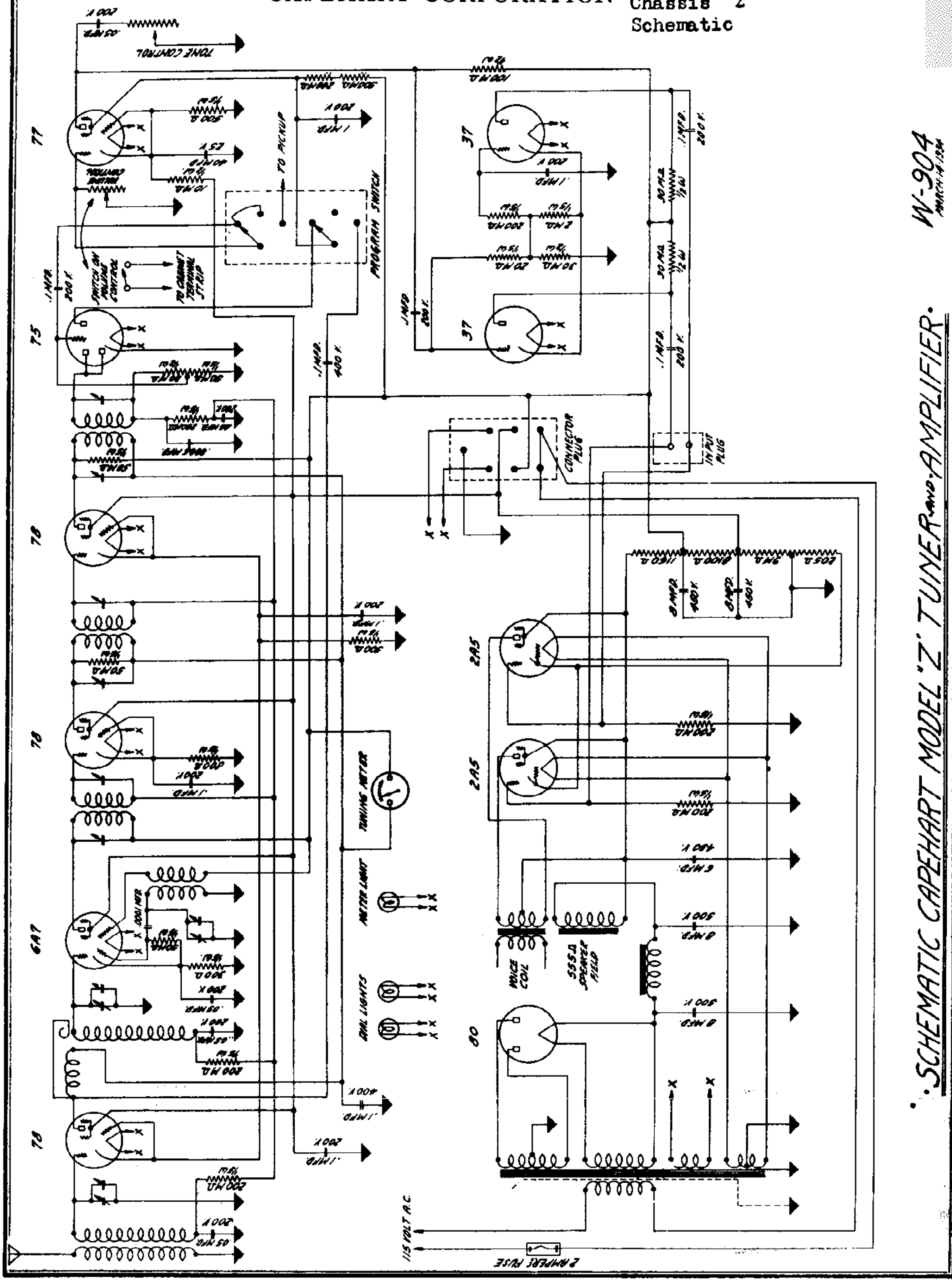
MODEL 56V1
Schematic

CADILLAC



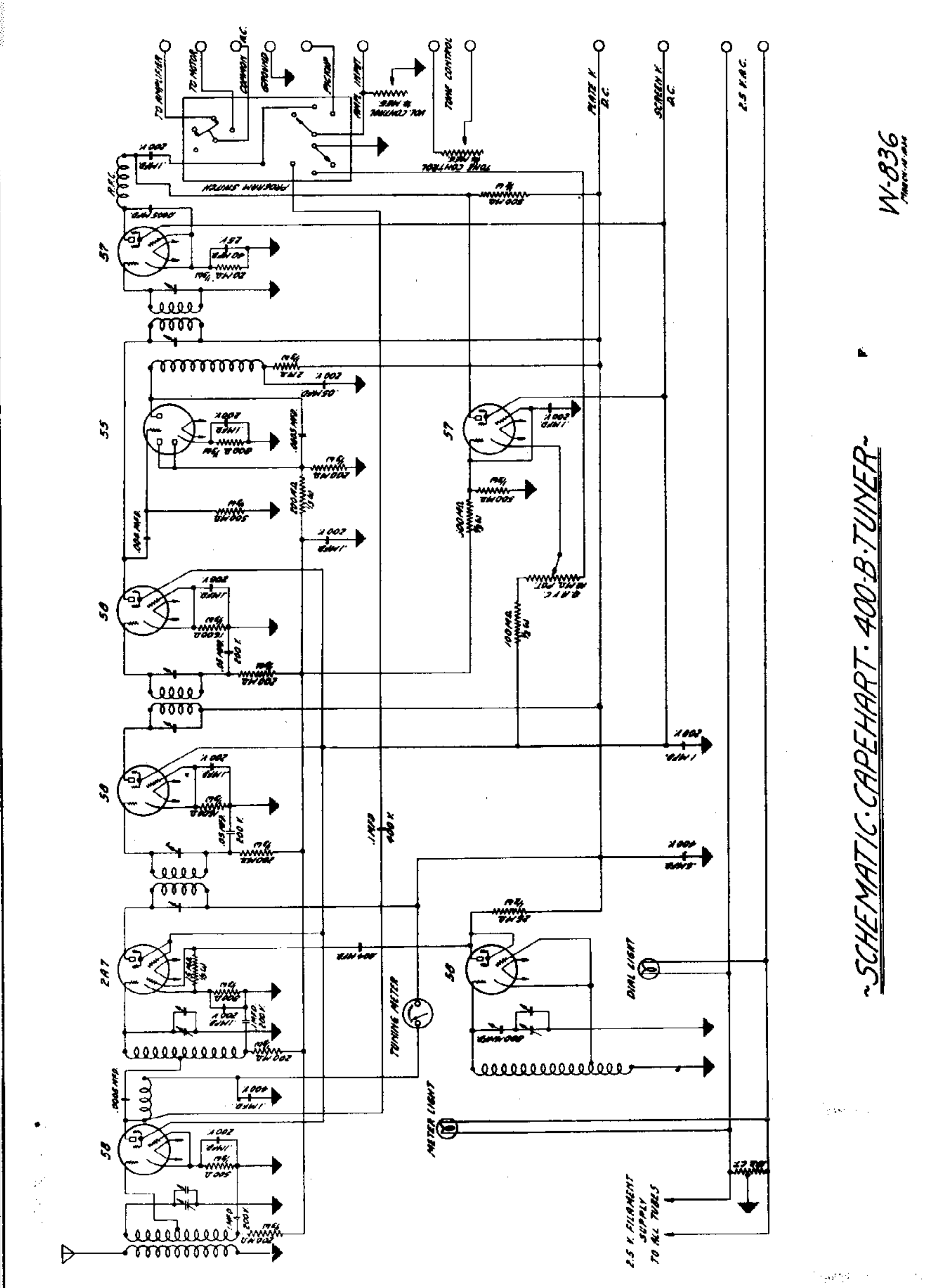
CAPEHART CORPORATION

MODELS 103, 104 Cosmopolitan
Chassis "Z"
Schematic



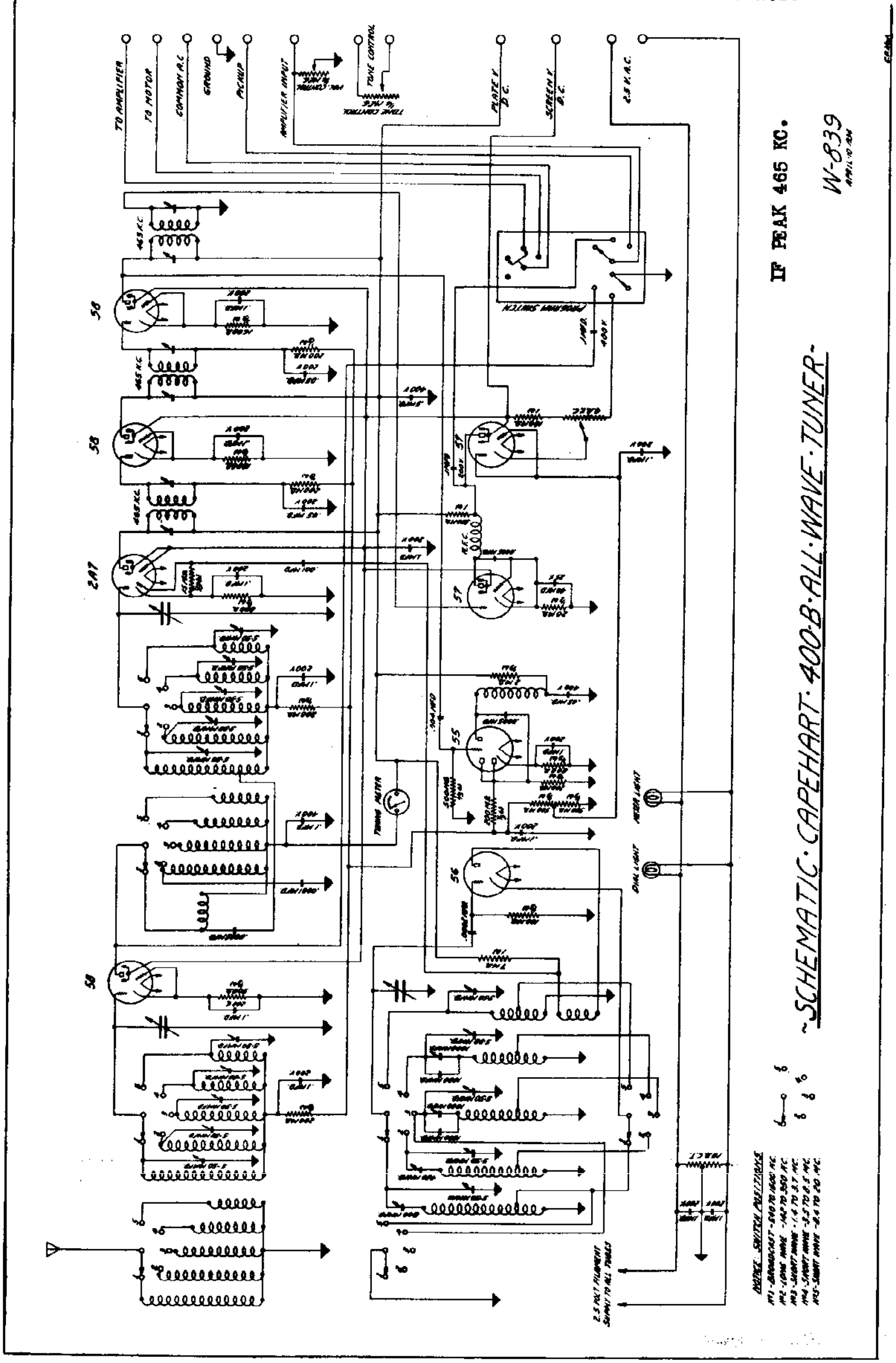
MODELS 400-B, 402-B
404-B Tuner
Schematic

CAPEHART CORPORATION



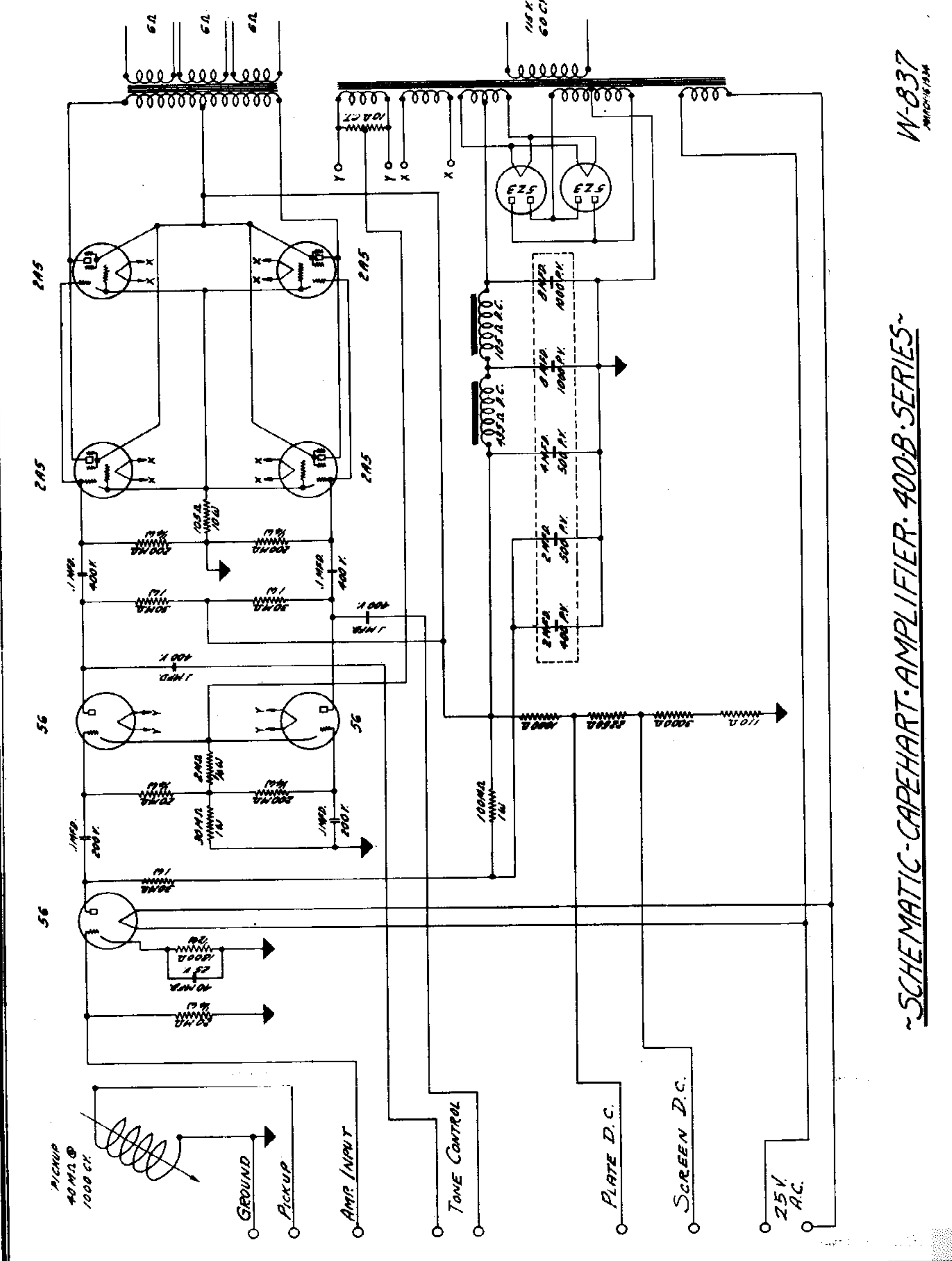
CAPEHART CORPORATION

MODELS 400-B, 402-B
404-B A.W. Tuner
Schematic



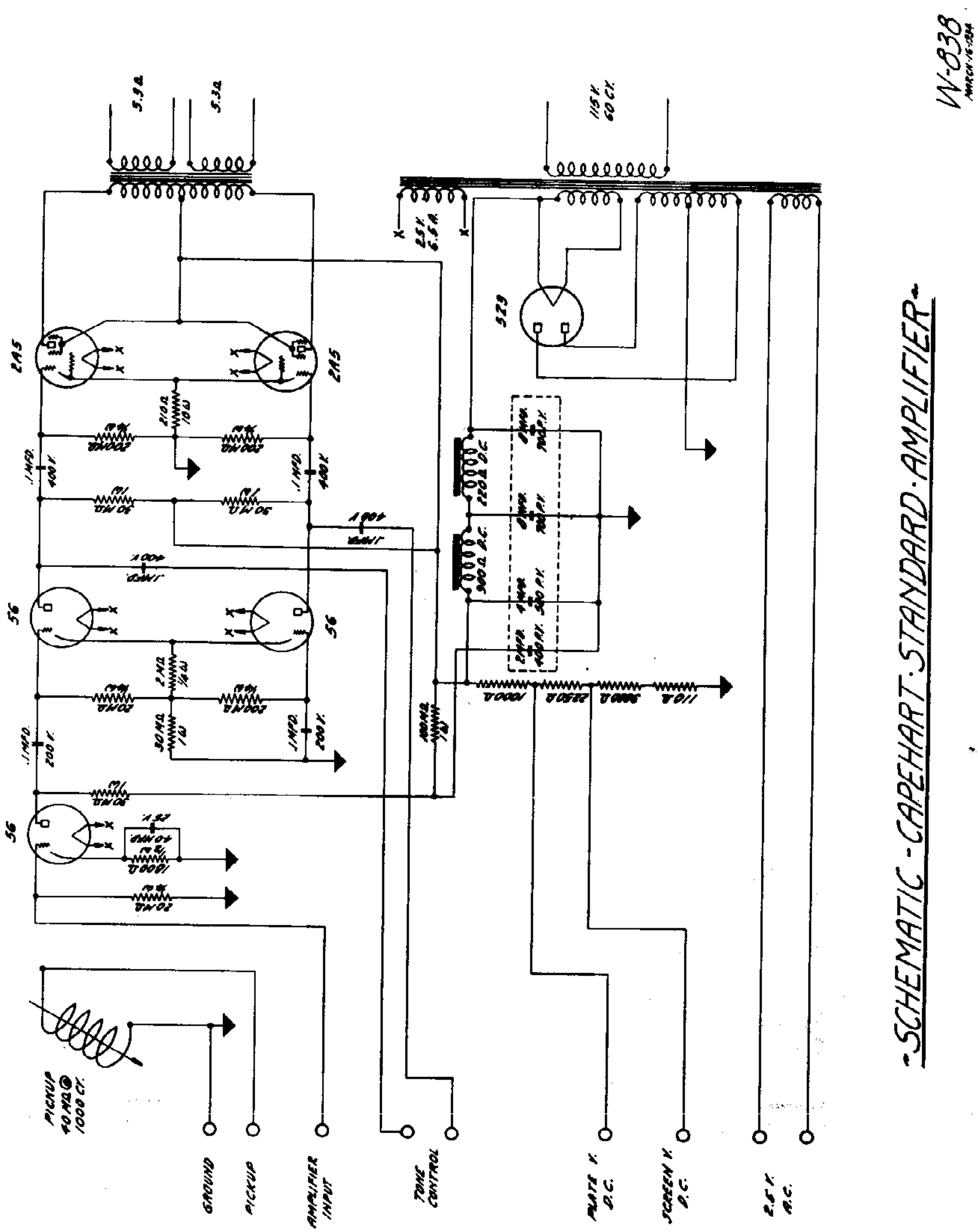
MODELS 400-B, 402-B
404-B Amplifier
Schematic

CAPEHART CORPORATION



MODEL "Standard" Amplifier Schematic

CAPEHART CORPORATION



COLONIAL RADIO CORP.

GENERAL NOTES ON ALIGNMENT

In the service notes on ALIGNMENT PROCEDURE, directions are to couple the test oscillator to the receiver. Since test oscillators of different makes vary considerably in their design and construction, it is not possible to give specific instructions for coupling any particular test oscillator to the receiver. However, the following general method can be applied with practically any test oscillator.

Most test oscillators have two output leads. One of them is the "hot" lead and the other the ground lead. The ground lead should be connected directly to the receiver chassis, except in the case of AC-DC receivers. The connection then should be made through a .1 mfd condenser since the chassis of such receivers is above ground potential. If the test oscillator has only one lead, this information about the ground lead may be disregarded.

As mentioned in all of the service notes, for IF alignment the test oscillator should be connected through a .1 mfd. condenser directly to the control grid cap of the IF or Translator tubes. It is important to leave the grid clip attached to the cap and to leave the tube shields in place. The oscillator tube of the receiver also should be in its socket.

For RF alignment, whether broadcast or short wave, the "hot" lead of the test oscillator should be coupled to the antenna lead of the receiver. The exact means of coupling will depend upon several factors. Among them are the power of the test oscillator, the sensitivity of the receiver, and the extent to which the receiver is out of alignment. If the test oscillator is quite powerful and the receiver one of high sensitivity, merely placing the test oscillator lead parallel to, and several inches away from the receiver's antenna lead may provide sufficient coupling. In some cases it may be necessary to bring the leads very close to each other, or it may even be necessary to twist the antenna lead and the oscillator lead together for several inches. (Of course, the two leads must be separated by their insulation and not make metallic contact.) As the receiver is brought into alignment, thereby increasing its sensitivity, it will be possible to decrease the amount of coupling between the test oscillator lead and the antenna lead. (Move the leads further apart.) Always use the lowest amount of coupling that still will provide a signal strong enough for working purposes. If the test oscillator has a variable control for its power output, it is better to turn this control to its high position and decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. This procedure will insure the greatest possible ac uracy in alignment.

When adjusting the oscillator trimmer condenser, set the variable condenser to the frequency or condenser position indicated in the Service Notes. Do not change this position while adjusting the trimmer. However, when adjusting the antenna or translator trimmers, the proper method is to continually "rock" the variable condenser a degree or two both sides of the alignment frequency and, at the same time, adjust the trimmer.

PREVENTING ADJUSTMENT AT THE IMAGE FREQUENCY

When adjusting trimmers for short wave alignment, it sometimes will be found that a peak can be obtained at two different positions of the trimmer. Only one of these peaks is the correct one to use. The other is the image response. The proper procedure follows.

Oscillator Trimmer:

Screw the oscillator trimmer all the way in (maximum capacity). Then reduce the capacity until a peak is reached. Now continue to reduce the capacity until a second peak is reached. Almost always, this second peak is considerably louder than the first one. The first peak is the image frequency adjustment, and must be avoided.

Antenna and Translator Trimmers:

Screw the trimmers all the way in and then reduce capacity until a peak is reached. If the capacity is reduced still further, a second peak will be obtained. However, the correct setting is the first one, the one using the greater amount of capacity. Note that this is exactly opposite to the procedure for the oscillator trimmer.

MODEL 150,164,182
Supplementary Data

COLONIAL RADIO CORP.

SUPPLEMENTARY SERVICE NOTES

MODELS 150 - 164 - 182

MODEL 150

Certain improvements have been incorporated in the Model 150 auto receivers since the Instruction Booklets and Service Manuals for this model were printed. For the most part these improvements facilitate removal of the chassis from its case when necessary.

1. The permanently connected shielded antenna lead has been replaced with one using a bayonet and socket type of connection.

2. In order to eliminate the necessity for going through the operation of polarity changing in the field, some of the sets are shipped with the polarity connection correct for positive grounded batteries and others for negative grounded batteries. The shipping cartons are stencilled to indicate the polarity connection of the set.

3. The vibrator unit has been improved and it is suggested that a couple of them be carried in stock to replace any that may break down in service. Defective units should be returned to the Colonial Radio Corp., 254 Rano St., Buffalo, N.Y., for replacement.

4. Any letters appearing after Model 150, on the chassis or carton, have no significance. All changes and improvements were incorporated in all of the chassis before being shipped.

MODELS 164 AND 182

As mentioned on Page 138 of the Service Manual, drive cable grounding springs (Part #R-10165), were supplied in later production of Model 164 and 182. When these springs are used, it makes no difference whether an insulated or an uninsulated tip drive cable is used for the tuning condenser, and two brass tip cables are supplied when the grounding springs are included in the original package. Accordingly, if the grounding springs are used, all reference to the insulated tip drive cable in the Instruction Leaflets and in previous Service Manuals may be disregarded.

Two types of speakers have been used on the Model 164. They can be told apart by the fact that one type has a patent notice sticker pasted under the output transformer. Should parts of this speaker need replacement, return the entire speaker. The list of replacement parts for the other type speaker follows:

Part No.	Description	Price
S-9967-A	Speaker - Complete	$8.28
S-9988-A	Speaker cone and voice coil	1.38
S-10152	Speaker field coil	1.65
S-9994	Speaker clamping ring	.05
S-9968	Speaker eyelets	10 for .03
S-10144-A	Speaker transformer	1.28

Two types of set screws for binding the flexible drive cables and casings have been used in the Model 164 and 182 remote controls. One is a 6/32 X 1/8" screw, Part #R-5386, price - .01. The other is 8/32 X 3/16", Part #R-6498, price - .02. It is suggested that a small stock of both of these screws be carried.

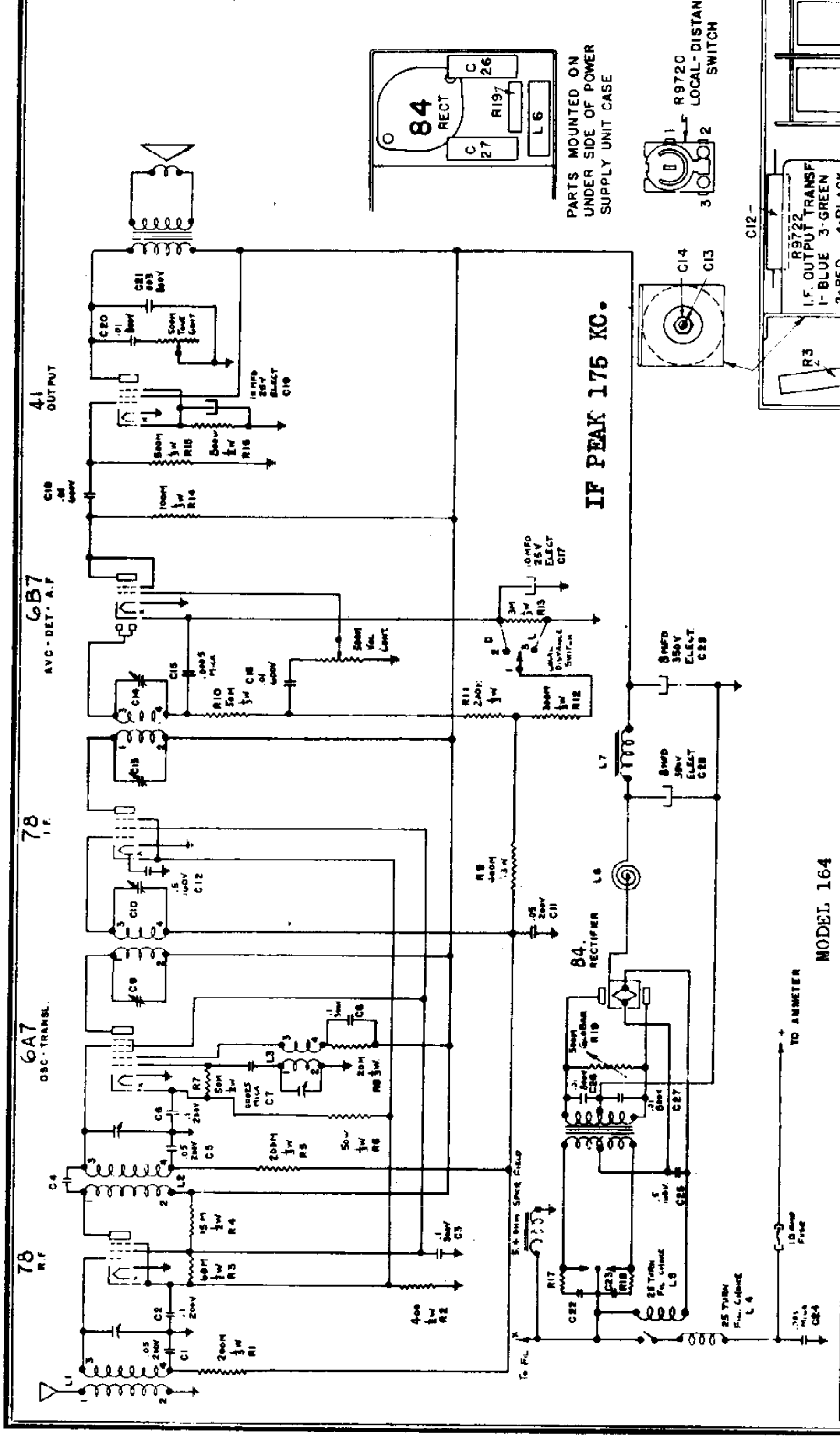
INTERFERENCE ELIMINATION

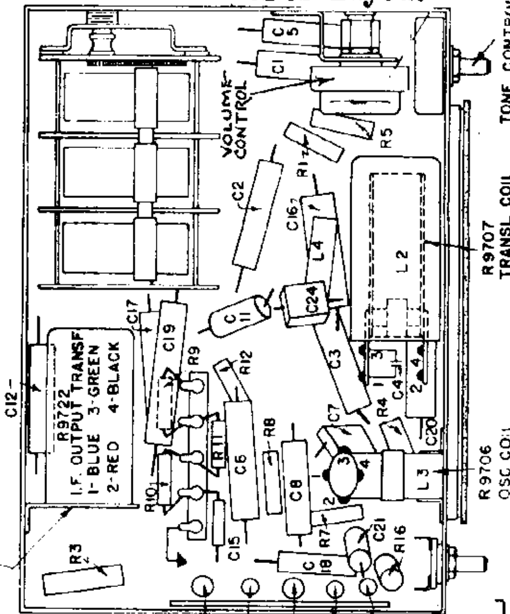
Occasionally a car is encountered in which the "dirt" at the ammeter is exceptionally great. To remedy a condition of this sort, solder a .001 mfd mica condenser, (Part #R-6759), from the fuse container shell to a point about an inch away, on the ammeter end of the "A" lead. Wrap tape around the condenser and lead to protect them.

MODEL 164
Schematic, Voltage
Parts Layout

COLONIAL RADIO CORP.

NOTE: This manual applies only to receivers having a serial number below 50600. Receivers with a serial number above 50600 are shown as Model 164B.





MODEL 164

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M.A.
78 - RF	230	100	4.5	1
78 - IF	230	100	4.5	1
6B7 - AVC-Det-AF	65	65	1.25	.4
41 - Output	205	215	20	3.25
6A7 - Osc-transl.	Ep=230v; Eg#2=135v; Eg#3&#5=100v; Ip=4ma; Ig#2=3ma; Ig#3&#5=3.2ma.			
84 - Rect.	20 m.a. per plate	Total battery drain=6.2 amperes.		

MODEL 164
Remote Control Data
Alignment Data

COLONIAL RADIO CORP.

THE REMOTE CONTROL UNIT

As mentioned in the Instruction Booklet, the flexible drive shaft with the black, insulated tongue at its end, MUST be used for the condenser drive. The insulation is to prevent ignition noise pick up by the cable from being fed into the tuning condenser. Failure to observe these instructions will result in motor noise.

The pilot light switch, in the remote control unit, works coincidentally with the set switch in the chassis. Flickering of the pilot light may be due to poor contact between the phosphor-bronze spring and the rotating drum. Bending of the spring and sandpapering of the drum will correct the condition.

To gain access to the switch, procede as follows:

1. Disconnect the flexible cables from the remote control unit and remove the unit from the steering column.

2. Remove the outer shell from the unit by bending up the tabs.

3. Pull the pointer off of its shaft and then remove the dial.

4. Remove the three flat head screws holding the cover and remove the cover, exposing the mechanism.

The illustration shows how to replace the pointer drive cable. Note that the end of the cable coming from the clamped end of the spring passes OVER the other end of the cable. Also note that when the large pulley is set into place, the spring is diametrically opposite the drive pulley.

When replacing the pointer, turn the Station Selector shaft clockwise to its limit and set the pointer one division to the right of the bottom center line. Then when the shaft is turned all the way counter clockwise, the pointer will stop one division to the left of the center line.

Failure of the set switch and the remote control switch and lock to coincide in their operation will be caused by movement of the cables or of the control unit, after the synchronizing adjustment has been made. To secure simultaneous action of the two switches again, it will be necessary to disconnect the cable, turn the set switch to its "Off" position with a screw driver, turn the Volume Control knob in the control unit to its "Off" position with the key out, and then securely tighten the cable coupling and set screws. If the control unit is not moved then, the operation of the two switches will remain in synchronism.

The pilot light is accessible for replacement when the single screw at the back of the case is removed.

POWER SUPPLY UNIT

The plate supply unit is of the vibrating reed type with rectifier tube. No attempt should be made to repair the vibrator proper. Return it to your distributor for repair or replacement. The unit can be pulled out of its case when the five terminal screws are loosened.

It is very important that the proper polarity connection be made. For cars with the negative battery terminal grounded, the blue lead should be connected to the terminal nearest the outside of the case. For cars with grounded positive terminal, the positions of the blue and black leads are interchanged so that the black lead is connected to the outside terminal. Failure to observe these instructions will cause damage to the vibrator in a very few minutes of operation.

R17, R18, C22 and C23 are part of the assembly of the vibrator proper. C25, C26, C27, L6 and R19 are all mounted within the power supply case. R19 is a resistor whose value varies with the voltage applied to it. When the receiver is first turned on, the output voltage tends to become very high until the tubes heat sufficiently to draw their normal load. Under this condition, the value of R19 drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the resistance of R19 increases greatly so that it no longer constitutes a load on the power supply.

THE IF TUNING ADJUSTMENTS

When peaking the IF stages, use a low enough output from the test oscillator to render the AVC action inoperative. The screw adjusts the primary tuning condenser;the nut adjusts the secondary, as shown in the illustrations.

THE RF TUNING ADJUSTMENTS

There are three holes at the back of the chassis through which the condenser trimmers are accessible. The unit nearest the control end of the chassis is the RF unit. The next one is the translator and the last one the oscillator.

Any trouble with oscillation will be due to proximity between grid and plate leads of the RF and IF stages. Moving the leads apart will correct the trouble.

COLONIAL RADIO CORP.

The following chart will be helpful for making tests of the power supply unit. A continuity meter or ohmmeter may be used.

VIBRATOR UNIT ONLY

TEST	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
Between brass contact adjusting screws. (With piece of paper inserted between contact points.)	Reading	Open transformer primary.
Grey lead to either red lead	Approx. 400 ohms	Open or shorted transformer secondary.
Blue and black leads, (with paper out.)	Reading	Contact points not making contact.
POWER SUPPLY (With Vibrator Disconnected)		
Fahnstock clip to switch	Reading	Open fuse or open L4
Fahnstock clip to ground (With tubes out of sockets.)	Approx. 5. ohms	Open field coil
84 cathode to ground	Approx. 75 M ohms	If low res. reading, shorted C28 or C29. If no reading, open L6, L7, R2 or R4

REMEDIES FOR UNUSUAL NOISE CONDITIONS

If a condition is met in which the installation of standard suppressor equipment still leaves objectionable noise, proceed as follows:

1. Ground the antenna shield to the case by jamming a Parker-Kalon screw between the shield and the case.

2. Bond the bulkhead to the nearest point on the motor.

3. Disconnect the high tension lead running from the coil to the center of the distributor. Disconnect it both at the coil end and at the distributor end. Turn the ignition switch on and turn the motor over with the hand crank. If clicks are heard as the distributor breaker makes and breaks contact, interference comes from this source.

Additional capacity should NOT be put across the breaker points as it will interfere with the proper operation of the coil. (A condenser, connected across the points, is built into all distributors.) Rewire the entire low tension ignition system, using shielded low tension ignition cable which must be well grounded. Do not run the wiring along side of other wiring, but keep it separate, and if possible, along the car chassis channels.

4. If the trouble still persists, it may be necessary to use shielded high tension cable from the distributor to the coil. The shielding must be well grounded.

5. Very often the interference is fed into the antenna through the dome light wiring. This can be determined by disconnecting the dome light lead from the ammeter. If an improvement results, by-pass the dome light at the point where it enters the corner post.

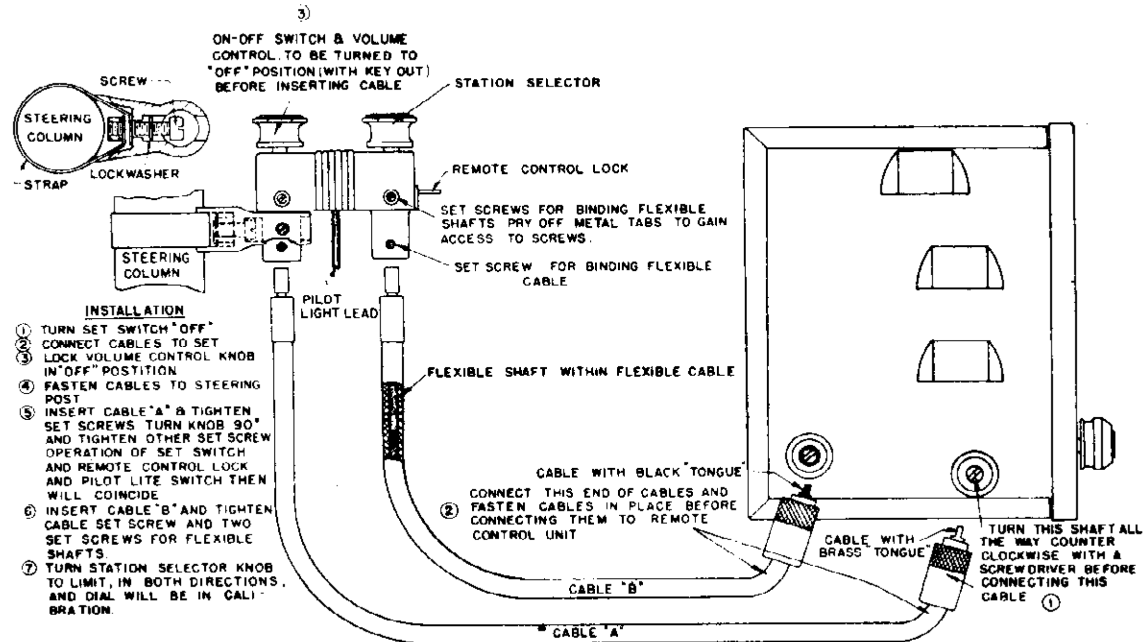
6. Metal windshield tubing, gas and oil lines sometimes have to be bonded to the bulkhead with heavy copper braid.

7. In some cars the high tension coil or leads come very close to the motor side of the floor board. As a result, interference is picked up by the occupant's body and transferred to the car antenna. Trouble of this sort is manifested by noisy reception ONLY when a person is sitting in the car. It can be remedied by tacking a grounded metal plate or screen to the motor side of the floor board, or by placing a grounded screen between the floor matting and the floor board.

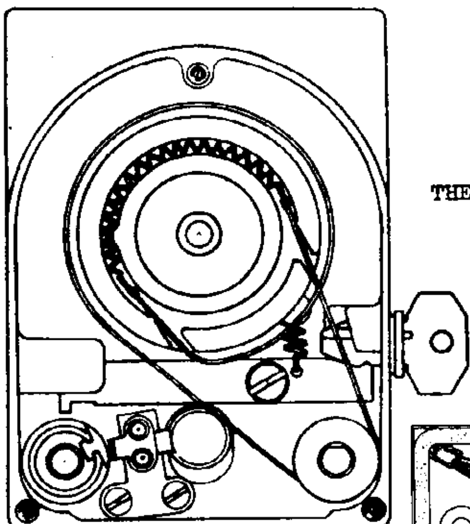
It should be understood that it practically never is necessary to apply ALL these remedies. How many of them are needed will depend on the particular car and installation.

MODEL 164
Socket, Assembly, Speaker

COLONIAL RADIO CORP.

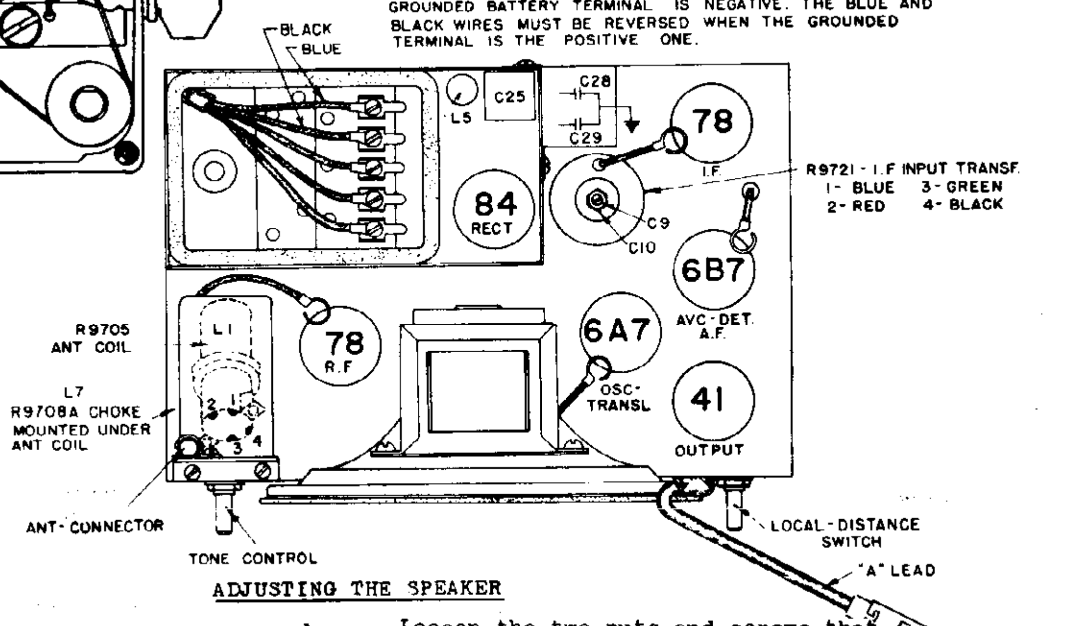


IMPORTANT
IF THE REMOTE CONTROL UNIT IS MOVED AFTER THE CABLE ADJUSTMENTS HAVE BEEN MADE, IT WILL BE NECESSARY TO READJUST IN ORDER TO MAINTAIN PROPER CALIBRATION AND OPERATION OF THE PILOT LIGHT, SWITCH AND LOCK.



THE REMOTE CONTROL MECHANISM

THE CONNECTIONS ILLUSTRATED ARE CORRECT ONLY IF THE GROUNDED BATTERY TERMINAL IS NEGATIVE. THE BLUE AND BLACK WIRES MUST BE REVERSED WHEN THE GROUNDED TERMINAL IS THE POSITIVE ONE.



ADJUSTING THE SPEAKER

Should the speaker cone ever need centering, it will be necessary to remove the speaker from the chassis. Two screws, their heads accessible from the under side of the chassis, hold the speaker to the chassis.

Loosen the two nuts and screws that hold the cone spider, insert thin paper spacers between the pole piece and voice coil support, and re-tighten the spider nuts and screws. Then remove the paper spacers.

MODEL 164-B
Above # 50600
Schematic, Parts

COLONIAL RADIO CORP.

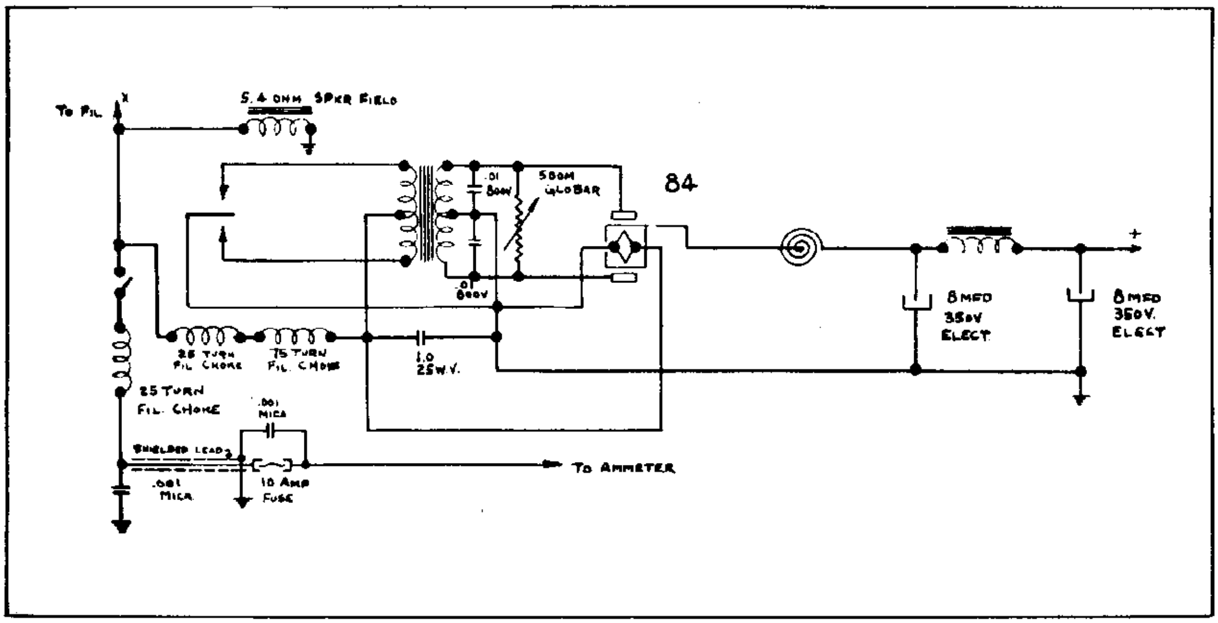
SERVICE NOTES

MODEL 164B

This manual applies to receivers having a serial number above 50600.

A different power supply unit is employed in these receivers, using a plug-in type of vibrator, making replacement of it very simple. Its construction is such that no attention need be paid to polarity. Accordingly, provision for changing polarity is omitted from this model.

The schematic of the chassis is the same as that shown in Fig. 76, Page 136, for the Model 164. The revised schematic for the power supply unit is shown in Fig. 82.



PART NO.	DESCRIPTION
R-6381	Clip - Grid
R-6381-AR	Clip - Grid with shielded lead
R-9705	Coil - Antenna
R-9706	Coil - Oscillator
R-9707	Coil - Translator
R-9577-A	Condenser - Variable
R-9144	Condenser - 10 Mfd. 25 volt
R-9743	Condenser - Electrolytic, dual 8 Mfd.
R-9032	Condenser - .5 Mfd. 160 volt
R-8581	Condenser - .1 Mfd. 300 volt
R-8286	Condenser - .1 Mfd. 200 volt
R-8920	Condenser - .05 Mfd. 200 volt
R-7070	Condenser - .01 Mfd. 600 volt
R-9776	Condenser - .01 Mfd. 800 volt
R-6461	Condenser - .003 Mfd. 800 volt
R-6759	Condenser - .001 Mfd. Mica
R-6760	Condenser - .0005 Mfd. Mica
R-4592	Condenser - .00025 Mfd. Mica
R-8030	Condenser - 1 Mfd. noise suppressor
R-10025	Condenser - .5 Mfd. noise suppressor
R-9711	Control - Tone
R-9710	Control - Volume
R-9717	Connector - Fuse container
R-7688	Fuse - 10 Amp.
R-9733	Instruction leaflet
R-8870-A	Lead - Antenna shielded
R-9578-A	Lead - "A", with clip
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-6710	Resistor - 400 M ohms, 1/3 watt carbon
R-9777	Resistor - 300 M ohms, 1/3 watt carbon
R-6638	Resistor - 200 M ohms, 1/3 watt
R-7586	Resistor - 100 M ohms, 1/3 watt
R-9725	Resistor - 60 M ohms, 1/2 watt
R-6637	Resistor - 50 M ohms, 1/3 watt
R-6640	Resistor - 20 M ohms, 1/3 watt
R-7291	Resistor - 15 M ohms, 1/2 watt
R-8972	Resistor - 3 M ohms, 1/3 watt
R-7441	Resistor - 800 ohms, 1/2 watt
R-6436	Resistor - 400 ohms, 1/2 watt
R-6632	Resistor - 50 ohms, 1/3 watt
R-9745	Resistor - 500 M Globar (R 19)
R-9959	Ring - Felt (speaker)
R-9589-A	Shield - Ant. coil
R-9591	Shield - Translator coil
R-9360	Shield - Tube
R-8253	Socket - 5 Prong
R-8092	Socket - 6 Prong
R-8072	Socket - 7 Prong
S-9718-A	Speaker
R1-8018	Suppressor - Spark plug
R2-8018	Suppressor - Distributor
R-9720	Switch - Sensitivity
R-9721-A	Transformer - IF input
R-9722-A	Transformer - IF output
R-9581	Tube - Rubber, var. cond. mtg.
R-9723	Vibrator
R-9044-A	Choke (L4)
R-9044-B	Choke (L5)
R-9033	Choke (L6)
R-9708-A	Choke (L7)
R-9741	Clip - "A" lead

MODEL 164,182
Service Data

COLONIAL RADIO CORP.

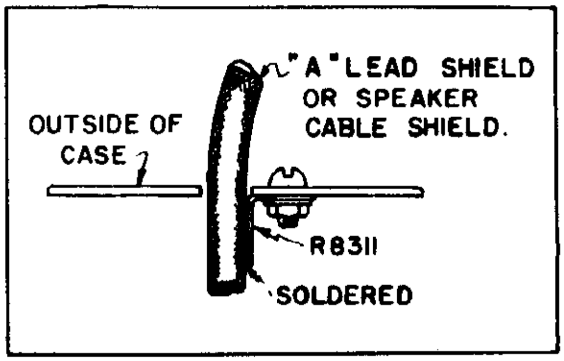
NOTES ON IGNITION INTERFERENCE ELIMINATION FOR MODELS 164 AND 182

The following changes should entirely eliminate ignition interference in instances where difficulty of this sort has been experienced.

SHORTENING THE SHIELD GROUNDING PIGTAIL

The Model 164 has a pigtail soldered to the "A" lead shield, with its other end clamped under one of the acorn nuts. The Model 182 has, in addition, a similar pigtail on the speaker cable shield. These pigtails should be removed and a shorter ground provided as follows:

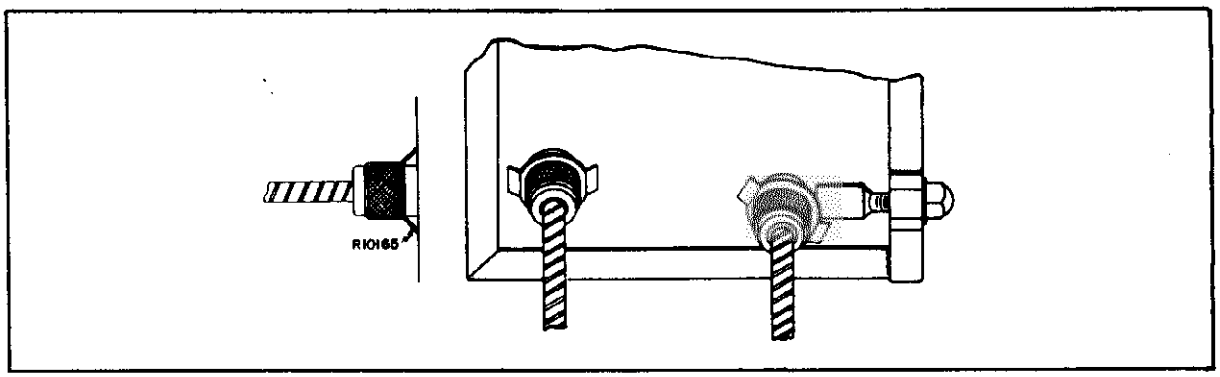
Drill a hole in the case immediately alongside the point where the shields come through the case. Fasten a large soldering lug (R-8311) to the inside of the case by means of a nut and screw passed through the drilled holes and solder the shields to the lugs.



GROUNDING THE SHIELD CABLES AND ANTENNA

To completely eliminate any pickup by the drive cables, grounding springs (Part R10165) are put between the collar on both flexible cable couplings and the case. It will be necessary to scrape away the paint on the case, under the springs, so that they can make good contact with the case.

In cars having an intense interference field near the antenna shield, further improvement can be had by soldering an Antenna Shield Grounding Clip to the antenna shield. (Part No. R-10166). The clip makes contact with the case at the point where the shield enters the case. Sandpaper the case to insure good contact.



INSTRUCTIONS FOR SHORTENING THE DRIVE CABLES

1. Remove the split sleeve from the chassis end of the cable casing.

2. Heat the chassis end of the cable until the solder melts, permitting removal of the brass sleeve. Then take the cable out of its casing.

3. Determine the point where the cable is to be cut and clean it thoroughly with fine sandpaper. Tin this point thoroughly.

4. Cut the casing 5/8" shorter than the length desired for the cable. Replace the split sleeve.

5. Put the cable back in the shortened casing. Slide the brass sleeve along the cable to the tinned portion and solder it there. Do not let it bind against the end of the casing. Then cut the cable at the end of the sleeve with a fine toothed hacksaw.

If the cables are cut in the foregoing manner, there can be no difficulty from unravelling of the strands since the soldered sleeve holds them.

COLONIAL RADIO CORP.

MODEL 182

The COLONIAL Model 182 is a six tube superheterodyne automobile radio receiver. The circuit is shown in block form in Fig. 78 and schematically in Fig. 80.

A 78 RF tube feeds the incoming signal to the 6A7 translator-oscillator. The 175 kc output of this tube is amplified by the pentode portion of the 6F7 tube and then fed to the 6B7. This tube provides AVC, diode detection and, together with the triode portion of the 6F7, furnishes audio amplification for input of the 41 push-pull output stage. The speaker is a seperate 8" dynamic. A dynamotor furnishes the plate supply, drawing its power from the car's battery.

THE AVC AND SENSITIVITY CONTROL CIRCUITS

The 175 kc output of the 6F7 IF stage is impressed between the cathode and diode plates of the 6B7, in series with R12, R13, R14. The diode current flowing causes a voltage drop across these resistors. Only the drop across R12 is used for AVC. Since the grid returns of the 6A7, 78 and 6F7 are connected to R12, the negative bias across it is impressed upon the grids of these tubes. Increases in signal strength are offset by decreases in tube amplification resulting from this increased negative grid bias. The effect is to tend to maintain the output of the 6F7 IF at a constant value.

Residual bias for the tubes is furnished by R2. In addition, the residual bias and therefore the tube amplification is affected by the setting of the Local-Distance switch. When the switch lever is on contact #2, the drop across R15,due to the plate current of the 6B7, bucks the residual from R2, decreasing the total negative bias and increasing tube amplification. In the "Local"position, contact #1, only the residual from R2 is applied to the tube grids.

Be sure the sensitivity control is either FULL clockwise or FULL counter clockwise. If allowed to remain half way between the two positions, R 15 will be shorted, removing the 6B7 bias.

The volume control shunts R12 and R13 for audio frequencies. Accordingly, any desired amount of the audio component across R12 and R13 can be picked off by the moveable arm of the volume control and fed to the control grid of the pentode portion of the 6B7.

When peaking the IF transformers, use a low enough output from the test oscillator to render the AVC action inoperative.

THE RF TUNING ADJUSTMENTS

There are three holes at the back of the chassis through which the condenser trimmers are accessible. The unit nearest the control end of the chassis is the RF unit. The next one is the translator and the last one the oscillator.

THE 6F7 PHASE CHANGER CIRCUIT

In any push-pull circuit, the instantaneous voltage on the grid of one of the tubes must be opposite in polarity to the voltage on the other tube's grid. Ordinarily, this polarity difference or phase change is accomplished by the push-pull input transformer. In the Model 182,it is accomplished as follows:

At some particular instant the polarity of the signal voltage on the 6B7 plate will be negative. This negative voltage is coupled through C18 to the control grid of one of the 41's. This signal voltage on the 6B7 plate also causes a drop (audio frequency) across C17, R16, R10, and C27, with the polarities becoming increasingly negative toward C27. Accordingly, the control grid of the triode portion of the 6F7 is driven in a positive direction by the drop across R10 and C27. This causes the plate current to increase, which is to say that the plate becomes more positive. This positive potential is coupled through C19 to the grid of the other 41 tube. The result, then, is that the grid of one 41 is going in a positive direction while the other is going negative.

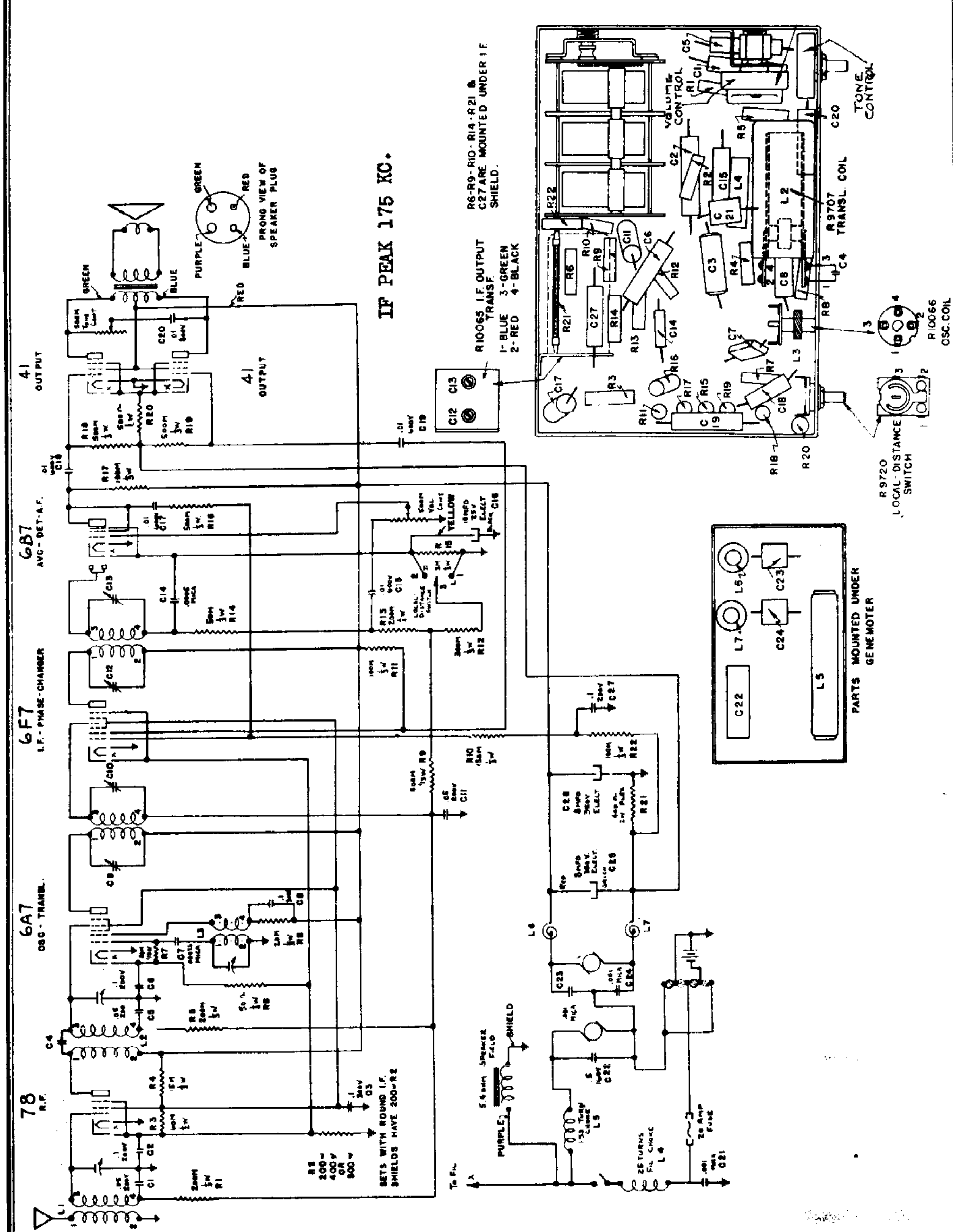
THE POWER SUPPLY UNIT

The plate supply unit is of the rotating dynamotor type. To remove it, take out the three Parker-Kalon screws at the bottom edge of the dynamotor housing and then take out the two screws holding the metal can type of condenser to the housing. The housing and dynamotor then can be loosened from the chassis. Unsoldering the leads under the dynamotor and removing the four screws that hold the dynamotor to the housing case permits complete removal of the dynamotor. After considerable use, the dynamotor commutator may need cleaning. Use the finest sandpaper. NEVER USE EMERY CLOTH.

If the receiver is set up on the bench, outside of its case, be sure to connect a wire from the speaker cable to the chassis, to complete the speaker field circuit.

MODEL 182
Schematic
Parts Layout

COLONIAL RADIO CORP.



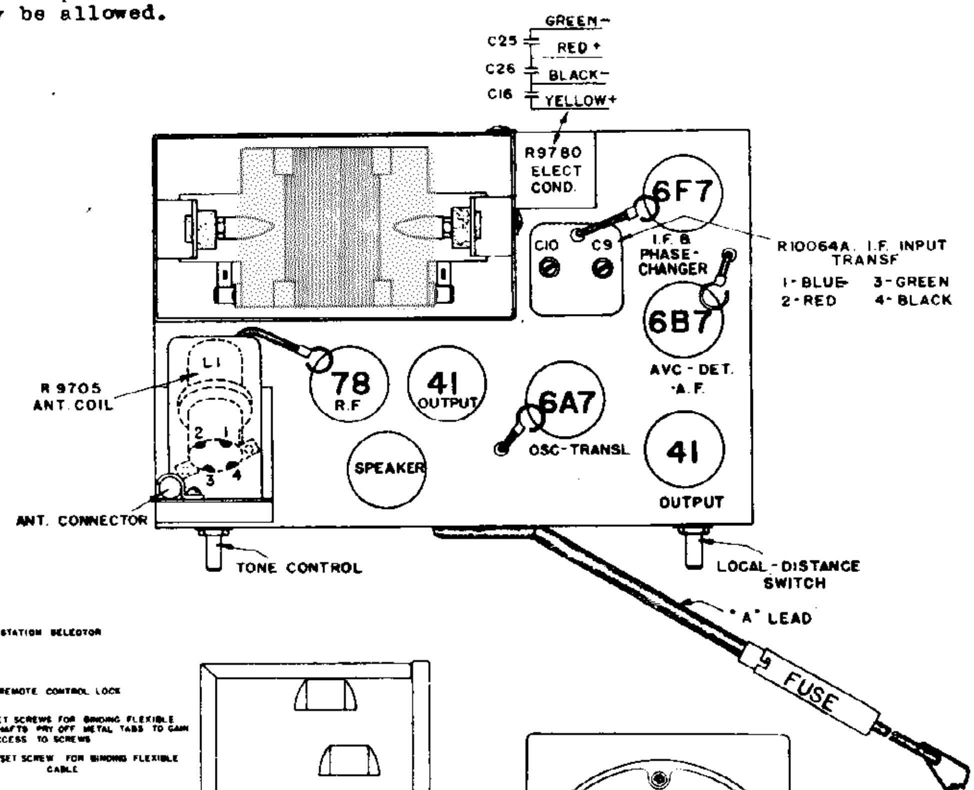
COLONIAL RADIO CORP.

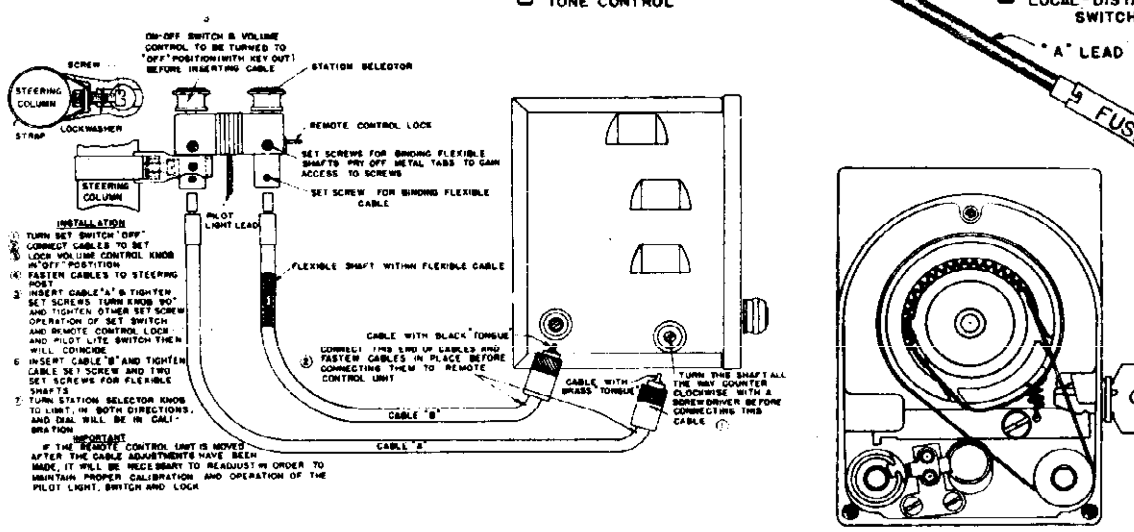
MODEL 182
Voltage, Socket
Trimmer, Assembly

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M.A.
78 - RF	200	95	8	2.25
6B7 - AVC-Det-AF	60	60	1.25	.3
41- Output	205	208	14	2.5
6A7 - Osc-Transl.	Ep=200v; Eg#2=125v; Eg#3&#5=95v; Ip=3.5ma; Ig#2=3ma; Ig#3&#5=3.5ma;			
6F7 - IF & AF	Ep=200v; Eg#2=75v; Eg#3&#5=95v; Ip=5ma. Ig#2=3ma; Ig#3&#5=1ma.			

Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. **Usually,** touching the finger to grid or plate is sufficient to stop oscillation. If an **analyzer** is not used, the voltage readings can be taken with a 1000 ohms per volt voltmeter, from the cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.





THE REMOTE CONTROL MECHANISM - MODEL 182

MODEL 182
Remote Control Data
Parts List

COLONIAL RADIO CORP.

THE REMOTE CONTROL UNIT

As mentioned in the Instruction Booklet, the flexible drive shaft with the black, insulated tongue at its end, MUST be used for the condenser drive. The insulation is to prevent ignition noise pick up by the cable from being fed into the tuning condenser. Failure to observe these instructions will result in motor noise.

The pilot light switch, in the remote control unit, works coincidentally with the set switch in the chassis. Flickering of the pilot light may be due to poor contact between the phosphor-bronze spring and the rotating drum. Bending of the spring and sandpapering of the drum will correct the condition.

To gain access to the switch, procede as follows:

1. Disconnect the flexible cables from the remote control unit and remove the unit from the steering column.

2. Remove the outer shell from the unit by bending up the tabs.

3. Pull the pointer off of its shaft and then remove the dial.

4. Remove the three flat head screws holding the cover and remove the cover, exposing the mechanism.

The illustration shows how to replace the pointer drive cable. Note that the end of the cable coming from the clamped end of the spring passes OVER the other end of the cable. Also note that when the large pulley is set into place, the spring is diametrically opposite the drive pulley.

When replacing the pointer, turn the Station Selector shaft clockwise to its limit and set the pointer one division to the right of the bottom center line. Then when the shaft is turned all the way counter clockwise, the pointer will stop one division to the left of the center line.

Failure of the set switch and the remote control switch and lock to coincide in their operation will be caused by movement of the cables or of the control unit, after the synchronizing adjustment has been made. To secure simultaneous action of the two switches again, it will be necessary to disconnect the cable, turn the set switch to its "Off" position with a screw driver, turn the Volume Control knob in the control unit to its "Off" position with the key out, and then securely tighten the cable coupling and set screws. If the control unit is not moved then, the operation of the two switches will remain in synchronism.

The pilot light is accessible for replacement when the single screw at the back of the case is removed.

REPLACEMENT PARTS LIST

R-6552	Board - Resistor
R-10082	Book - Instruction
R-9588	Bushing - Rubber, Genemotor mtg.
R-9044-A	Choke - L4
R-9757	Choke - L6 & L7
R-10116-A	Choke - L5
R-9741	Clip - "A" Lead
R-6381	Clip - Grid
R-9705	Coil - Antenna
R-10066	Coil - Oscillator
R-9707	Coil - Translator
R-9577-A	Condenser - Variable
R-9780	Condenser - Triple electrolytic
R-8030	Condenser - 1 Mfd. noise suppressor
R-10025	Condenser - .5 Mfd. noise suppressor
R-9032	Condenser - .5 Mfd. 160 volts
R-8286	Condenser - .1 Mfd. 200 volts
R-8581	Condenser - .1 Mfd. 300 volts
R-7354	Condenser - .05 Mfd. 200 volts
R-7070	Condenser - .01 Mfd. 600 volts
R-9776	Condenser - .01 Mfd. 800 volts
R-6759	Condenser - .001 Mfd. Mica
R-6760	Condenser - .0005 Mfd. Mica
R-4592	Condenser - .00025 Mfd. Mica
R-9711	Control - Tone (500 M ohms)
R-9710	Control - Volume (500 M ohms)
R-9717	Connector - (and fuse container)
R-9751	Fuse - 20 Amp.
R-9587	Genemotor
R-9744	Grommet - "A" lead
R-7692	Knob - Tone & sensitivity controls
R-8870-A	Lead - Antenna
R-8219	Nut - Acorn cover
R-9719	Nut - Set mounting
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-6710	Resistor - 400 M ohms, 1/3 watt carbon
R-9777	Resistor - 300 M ohms, 1/3 watt carbon
R-6638	Resistor - 200 M ohms, 1/3 watt carbon
R-9778	Resistor - 150 M ohms, 1/3 watt carbon
R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-9725	Resistor - 60 M ohms, 1/2 watt carbon
R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-6640	Resistor - 20 M ohms, 1/3 watt carbon
R-7291	Resistor - 15 M ohms, 1/2 watt carbon
R-8972	Resistor - 3 M ohms, 1/3 watt carbon
R-10142	Resistor - 500 ohms, 1/3 watt carbon
R-9779	Resistor - 500 ohms, 1 watt carbon
R-6632	Resistor - 50 ohms, 1/3 watt carbon
R-8419	Resistor - 400 ohms, flexible
R-10056	Screw - Polarity changer
R-9589-A	Shield - Antenna coil
R-9591	Shield - Translator coil
S-9590-AC	Speaker - Complete
S-7776-B	Speaker cone & voice coil
S-9767-A	Speaker terminal board
S-9770-A	Speaker cable & plug
S1-9768-AC	Speaker case

COLONIAL RADIO CORP.

SERVICE NOTES

MODEL 602

The COLONIAL Model 602 is a 12 tube, four wave band superheterodyne embodying such features as AVC, sensitivity control, tone control, neon visual tuning indicator, and twin speakers. The circuit is shown in block form in Fig. 85 and schematically in Fig. 86.

A 56 tube is used in the oscillator circuit. A 6A7 serves as an electron coupled translator. Its 175 kc output is amplified by the two 78 IF stages and then fed to the 37 detector, which is used as a diode. Two 37 AF tubes comprise a push-pull input stage to drive the push-pull 2A3H output stage. A 6B7 tube is used in the AVC stage, a 6B7 in the neon visual tuning circuit, and an 83V is the rectifier. The speakers are both moving coil dynamics. One is a 12" and the other an 8".

The incoming signal is fed to the translator control grid through coils L1 and L2 for the broadcast range, L3 for the next range, L4 for the next and L5 for the highest frequency range. L6 is the broadcast oscillator coil. L7 is the oscillator for the next range. L8 is the next, and L9 the one for the highest frequency range. C1 is the broadcast antenna coil trimmer. C3 is the broadcast translator coil trimmer. C2 is the translator trimmer for the first high frequency range. C4 the one for the next range, and C5 is the translator trimmer for the highest frequency range. C6 is the broadcast range oscillator trimmer. C7 is the trimmer for the first high frequency range, C8 the one for the next range, and C9 is the trimmer for the highest frequency oscillator coil. C10 is the padder for the low frequency end of the broadcast range, C11 the one for the next range, C12 for the next and C13 is the padder for the highest frequency oscillator coil.

The location of the coils and condensers is shown in the Service Illustrations. The numbering and lettering corresponds to that used in the Schematic.

6B7 TUNING LIGHT CIRCUIT

The 6B7 tuning light circuit is shown schematically in Fig. 83. A portion of the IF signal voltage, that existing across condenser A, is stepped up and impressed on the diode part of the 6B7 by means of the sharply tuned transformer, T, which is wound with Litz wire. The rectified signal current flows through the 1 megohm resistor from point (1) to point (2) so that point (2) is negative with respect to point (1). The control grid of the 6B7 is connected to point (2) and the cathode to point (1). As the signal is tuned in, the voltage across the 1 megohm resistor increases, increasing the negative control grid bias on the 6B7, thereby cutting down its plate current. The reduced plate current means a decreased voltage drop across the 130 M ohm resistor, making available a greater voltage across the neon tuning flasher. When the signal is properly tuned in, the plate current of the 6B7 is sufficiently decreased to permit the neon lamp to light. Until a signal is tuned in, the plate current of the 6B7 causes sufficient drop across the 130 M ohm resistor to prevent the neon bulb from lighting. The sharply tuned transformer insures that voltage is not applied to the diode part of the 6B7 until the station is accurately tuned in.

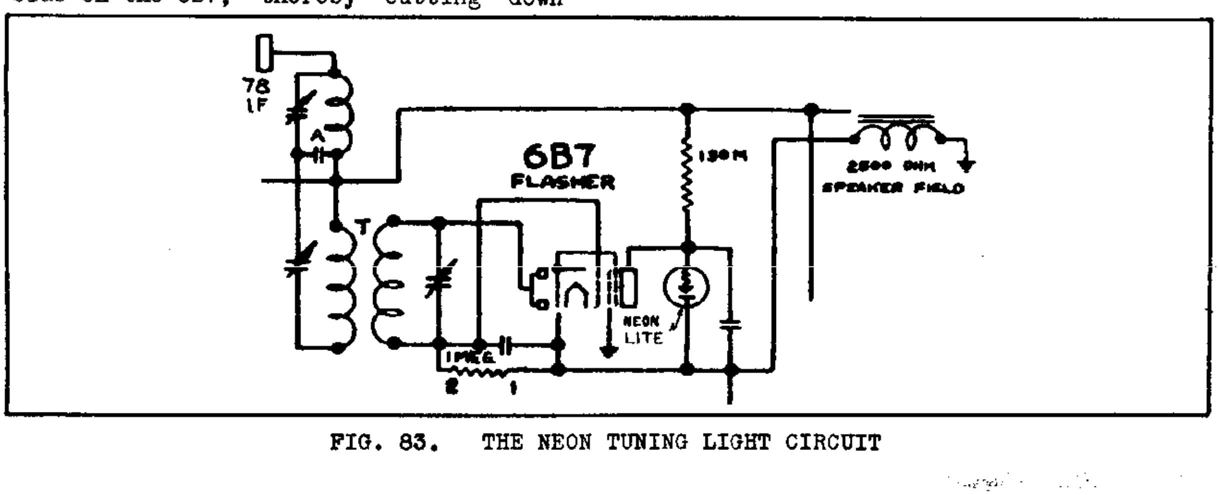


FIG. 83. THE NEON TUNING LIGHT CIRCUIT

COLONIAL RADIO CORP.

6B7 AVC CIRCUIT

The AVC circuit is shown schematically in Fig. 84.

If there were no plate current through the 6B7, its cathode would be negative with respect to diode plate (A) by the amount of the voltage drop across the 2500 ohm speaker field. However, because of the 6B7 plate current and consequent voltage drop across the 50 M ohm resistor, the cathode potential of the 6B7 is raised so that it is approximately 15 volts positive to diode plate (A).

A portion of the IF signal is fed through C1 to diode plate (B). The resulting current, flowing through R1 creates a voltage drop across it with point (1) positive with respect to point (2). This voltage is impressed through R2 onto the control grid of the 6B7. This increased negative control grid bias decreases the plate current and the voltage drop across R3. As a consequence, the cathode bias with respect to ground decreases. This is equivalent to saying that diode plate A becomes positive with respect to the cathode. Current therefore flows from diode plate (A) to the cathode, creating a voltage drop across R4 with point (3) positive with respect to point (4). Since the grid returns of the translator and IF stages are connected to point (4), the voltage drop across R4 is impressed on the control grids of these tubes. This negative bias, which varies in step with the strength of the signal, controls the amplification of these tubes. An increase in signal strength is offset by a decrease in tube amplification so that the output of the IF stage tends to remain at a constant value. Because the cathode is 15 volts positive with respect to diode plate (A) the AVC action is delayed until the received signal is strong enough to cause diode plate (A) to go positive with respect to the cathode. In this way the full sensitivity of the receiver is maintained for stations too weak to give full output from the receiver.

Residual bias for the first IF tube is supplied by the 15 M ohm variable cathode resistor, which serves as a sensitivity control. Set owners should be instructed not to increase the sensitivity any further than necessary for satisfactory reception. Unnecessarily high sensitivity will result in unwanted between-station-noise.

When peaking the IF stages, use a low enough output from the test oscillator to render the AVC action inoperative.

To peak the tuning flasher transformer, tune in a station whose strength is just about sufficient to operate the neon light. Then try retuning it very accurately by ear. If the flasher transformer is off calibration, the light will go out when the station is accurately tuned. With the station accurately tuned in, adjust the transformer tuning condensers until the neon bulb lights.

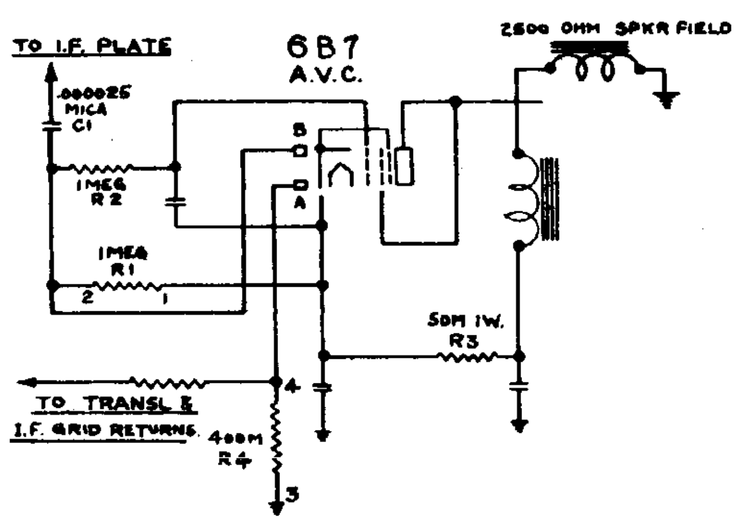


FIG. 84. THE AVC CIRCUIT - MODEL 602

COLONIAL RADIO CORP.

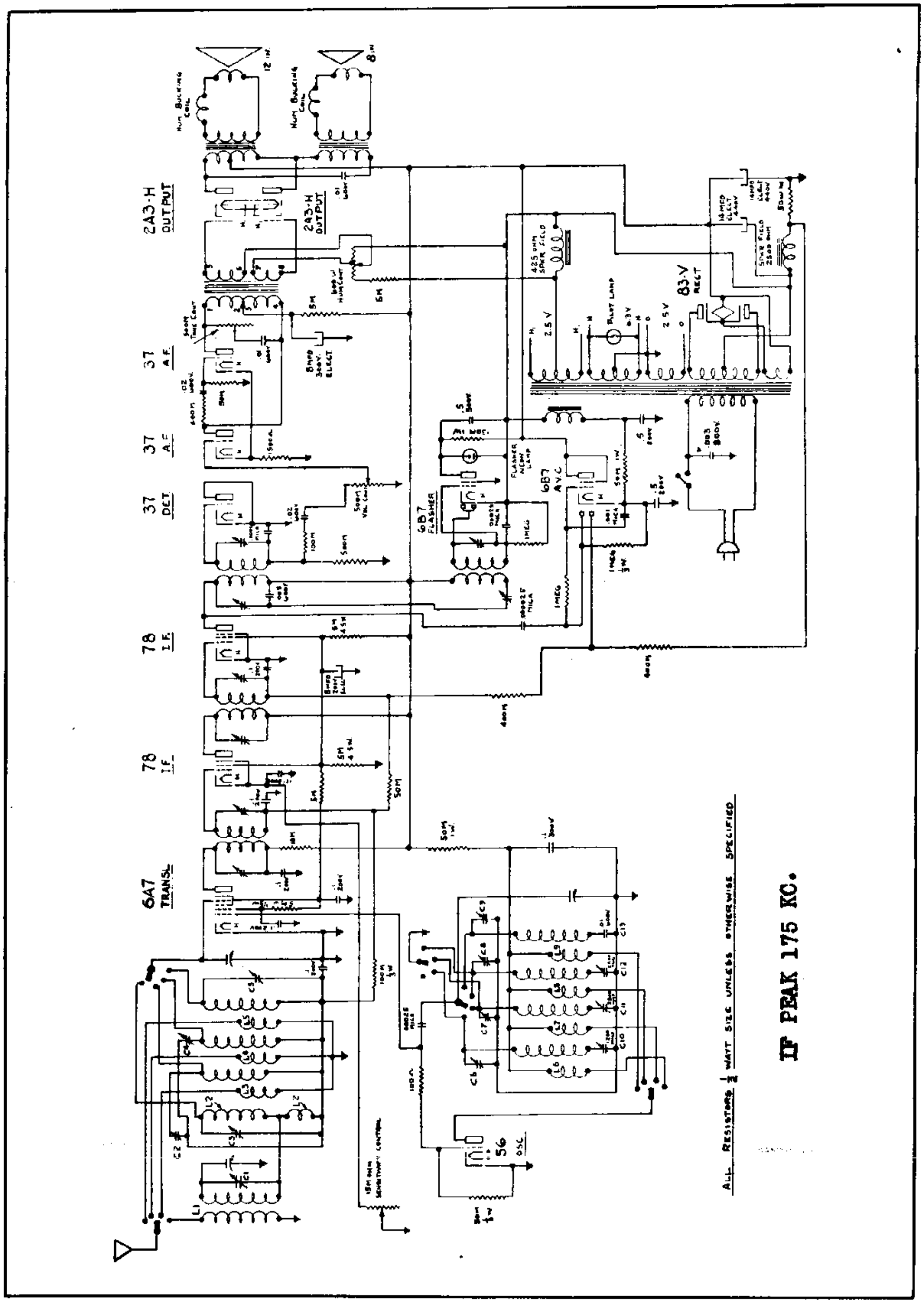
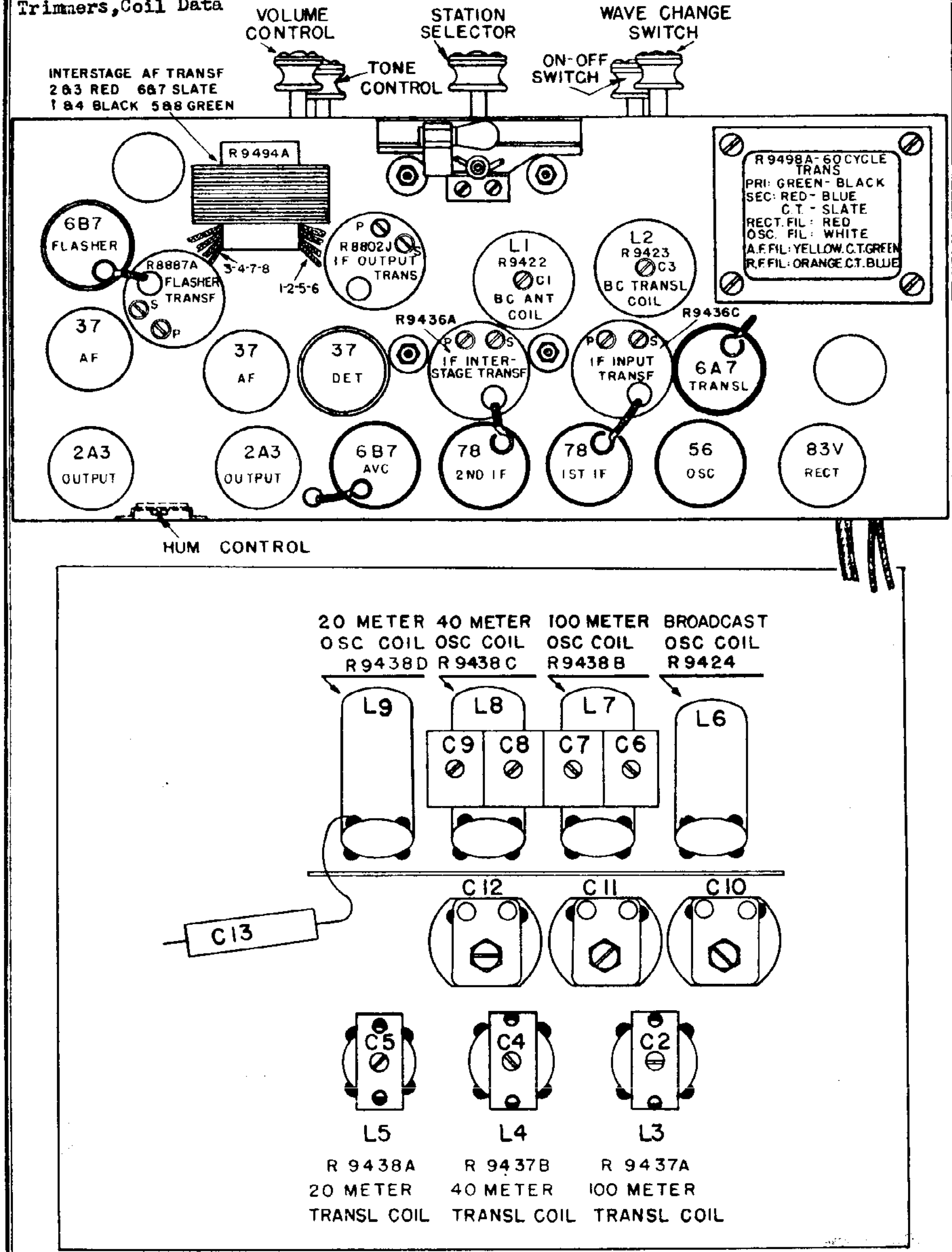


FIG. 86. THE SCHEMATIC - MODEL 602

MODEL 602
Socket Layout
Trimmers, Coil Data

COLONIAL RADIO CORP.



COLONIAL RADIO CORP.

HUM ADJUSTMENT

There is a hum adjustment to be turned with an insulated handle screw-driver, at the rear of the chassis, under the type 2A3H tubes. With the volume control all the way off, turn the hum adjustment to the point of minimum hum. If this point appears to be beyond the end of the control, interchange the positions of the 2A3H tubes. If a balance still cannot be had, the 2A3H tubes must be replaced by ones more nearly matched in their characteristics.

ALIGNMENT

BROADCAST

Disconnect the antenna and connect a .00025 mfd. condenser between the sets antenna and ground leads, to take the place of the normal antenna capacity. Adjust the test oscillator to a frequency near the high frequency end of the broadcast range and couple the oscillator to the receiver antenna lead. With the wave switch in the broadcast position, set the dial accurately to the test oscillator's frequency. Then peak C1, C3, and C6.

Retune the test oscillator and the receiver to a frequency near the low frequency end of the broadcast range. Peak C10.

100 METER RANGE

Turn the wave switch to the first high frequency range. Adjust the test oscillator to a frequency near the high frequency end of this range. Turn the dial to this frequency and peak C7 and C2. Then change the test oscillator's frequency to the low frequency end of the range and peak C11.

40 METER RANGE

Turn the wave switch to the next high frequency range. Adjust the test oscillator to a frequency near the high frequency end of this range. Turn the dial to this frequency and peak C8 and C4. Then change the test oscillator's frequency to the low frequency end of the range and peak C12.

20 METER RANGE

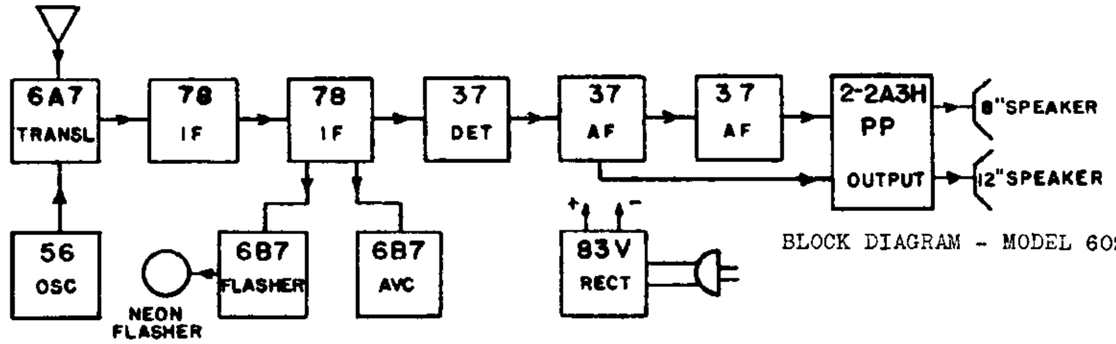
Turn the wave switch to the highest frequency range. Adjust the test oscillator to a frequency near the high frequency end of this range. Turn the dial to this frequency and peak C9 and C5. The padder for this range, C13, is fixed.

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
56 - Osc.	70		4	
78 - 1st. IF	215	110	8	1.5
78 - 2nd. IF	215	110	8	1.5
37 - AF	165		4	
37 - AF	165		4	
2A3H - Output	265		60	
6B7 - AVC	60	60	4	1
6B7 - Flasher	7 - No. sig. 90 - With sig.			
83V - Rect	DC volts = 350. Plate current = 87ma. per plate.			
6A7 - Transl	Ep = 180; Eg#2 = 80; Eg#3 & #5 = 95. Ip = 4ma; Ig#2 = 2ma; Ig #3 & #5 = 4ma.			

Readings taken with 1000 ohms per volt voltmeter, sensitivity control on full, no signal received. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

MODEL 602
Parts List

COLONIAL RADIO CORP.



BLOCK DIAGRAM - MODEL 602

PART NO	DESCRIPTION
R9315	Bezel - Sensitivity control
R5509A	Board - Terminal
R8297A	Board - Terminal, double
R8308A	Board - Terminal, triple
R8900B	Board - Terminal, 5 terminals
R9341	Cabinet
R9521	Card - Operating
R7011A	Clip - Antenna and ground leads
R6381	Clip - Grid
R9422	Coil - Antenna, broadcast
R9423	Coil - Translator, broadcast
R9437A	Coil - Translator, short wave, 100 meter band
R9437B	Coil - Translator, short wave, 40 meter band
R9438A	Coil - Translator, short wave, 20 meter band
R9424	Coil - Oscillator, broadcast
R9438B	Coil - Oscillator, short wave, 100 meter band
R9438C	Coil - Oscillator, short wave, 40 meter band
R9438D	Coil - Oscillator, short wave, 20 meter band
R8776A	Coil - Choke
R9414	Condenser - Variable
R9494A	Condenser - Variable, complete with drive assembly and dial
R9425	Condenser - Padding, 700 mmf.
R9426	Condenser - Padding, 1200 mmf.
R9427	Condenser - Trimmer, 4 gang
R9428	Condenser - Trimmer, 25 mmf.
R6565	Condenser - Tuning, IF output trans
R8824	Condenser - IF tuning
R7236	Condenser - 14 mfd. electrolytic
R9344	Condenser - 8 mfd. 300 volts
R8748	Condenser - 8 mfd. 200 volts
R8826	Condenser - .5 mfd. 300 volts
R8825	Condenser - .5 mfd. 200 volts, dual
R6138	Condenser - .1 mfd. 300 volts
R6444	Condenser - .1 mfd. 200 volts
R6761	Condenser - .02 mfd. 600 volts
R9429	Condenser - .01 mfd. 600 volts
R7070	Condenser - .01 mfd. 600 volts
R6954	Condenser - .005 mfd. 600 volts
R9431	Condenser - .0045 mfd. 600 volts
R6461	Condenser - .003 mfd. 800 volts
R6933	Condenser - .002 mfd. 600 volts
R6760	Condenser - .005 mfd. mica
R6759	Condenser - .001 mfd. mica
R4592	Condenser - .00025 mfd. mica
R4303	Condenser - .0001 mfd. mica
R8711	Condenser - .000025 mfd. mica
R7240	Control - Sensitivity
R6570	Control - Tone and volume
R7566	Cord - Extension
R9433A	Dial and indicator
R9412	Escutcheon
R9442	Instructions
R8520	Knob - Sensitivity control
R9314	Knob - Large
R9312	Knob - Small
R9443	Knob - Small with dot
R2288	Lamp - Pilot
R8830	Lamp - Neon flasher
R5346B	Lead - Antenna
R5345D	Lead - Ground
R9436	Transformer - IF input and interstage, coils and core only
R9436C	Transformer - IF input, complete less shield
R9436A	Transformer - IF interstage, complete less shield
R8802	Transformer - IF output, coils and core only
R8802J	Transformer - IF output, complete less shield
R8887	Transformer - Tuning flasher, coils and core only
R8687A	Transformer - Tuning flasher, complete less shield
R8769A	Transformer - Interstage audio
R8778A	Transformer - Power, 60 cycle
R5823	Resistor - 1 megohm, 1/2 watt carbon
R7585	Resistor - 1 megohm, 1/3 watt carbon
R6179	Resistor - 500 M ohm, 1/2 watt carbon
R5822	Resistor - 400 M ohm, 1/2 watt carbon
R8828	Resistor - 130 M ohm, 1 watt carbon
R7586	Resistor - 100 M ohm, 1/3 watt carbon
R5819	Resistor - 100 M ohm, 1/2 watt carbon
R4354	Resistor - 50 M ohm, 1 watt carbon
R6637	Resistor - 50 M ohm, 1/3 watt carbon
R6445	Resistor - 50 M ohm, 1/2 watt carbon
R6152	Resistor - 10 M ohm, 1/2 watt carbon
R6510	Resistor - 5 M ohm, 1/2 watt carbon
R7226	Resistor - 5 M ohm, 1/3 watt carbon
R8829	Resistor - 1500 ohm, 1/2 watt carbon
R6976	Resistor - 100 ohm, 1/2 watt carbon
R9081	Resistor - 50 ohm, 1 watt carbon
R9062	Resistor - 600 ohm, variable hum adjuster
R8886	Resistor - Candohm
R9484	Screw - Sensitivity control bezel mounting
R7359	Screw - Escutcheon
R6652A	Shaft - Dial drive assembly
R7320	Shield - Bottom chassis
R9415A	Shield - Coil
R7235	Shield - Electrolytic condenser
R8803A	Shield - IF transformer
R5322	Shield - Tube top
R5323A	Shield - Tube bottom
R8366	Socket - 4 prong
R8367	Socket - 5 prong
R8368	Socket - 6 prong
R8369	Socket - 7 prong
S8762C	Speaker - 12", complete
S7606A	Speaker 12" cone and voice coil
S8792	Speaker 12" field coil
S7416	Speaker plug
S8793A	Speaker 12" transformer
S8763C	Speaker - 8", complete
S7776C	Speaker 8" cone and voice coil
S8569	Speaker 8" field coil
S7414	Speaker plug
S8798AC	Speaker 8" transformer
R9411	Sticker - License tube layout, 60 cycle
R6964	Switch - "Off-On"
R9435	Switch - Wave

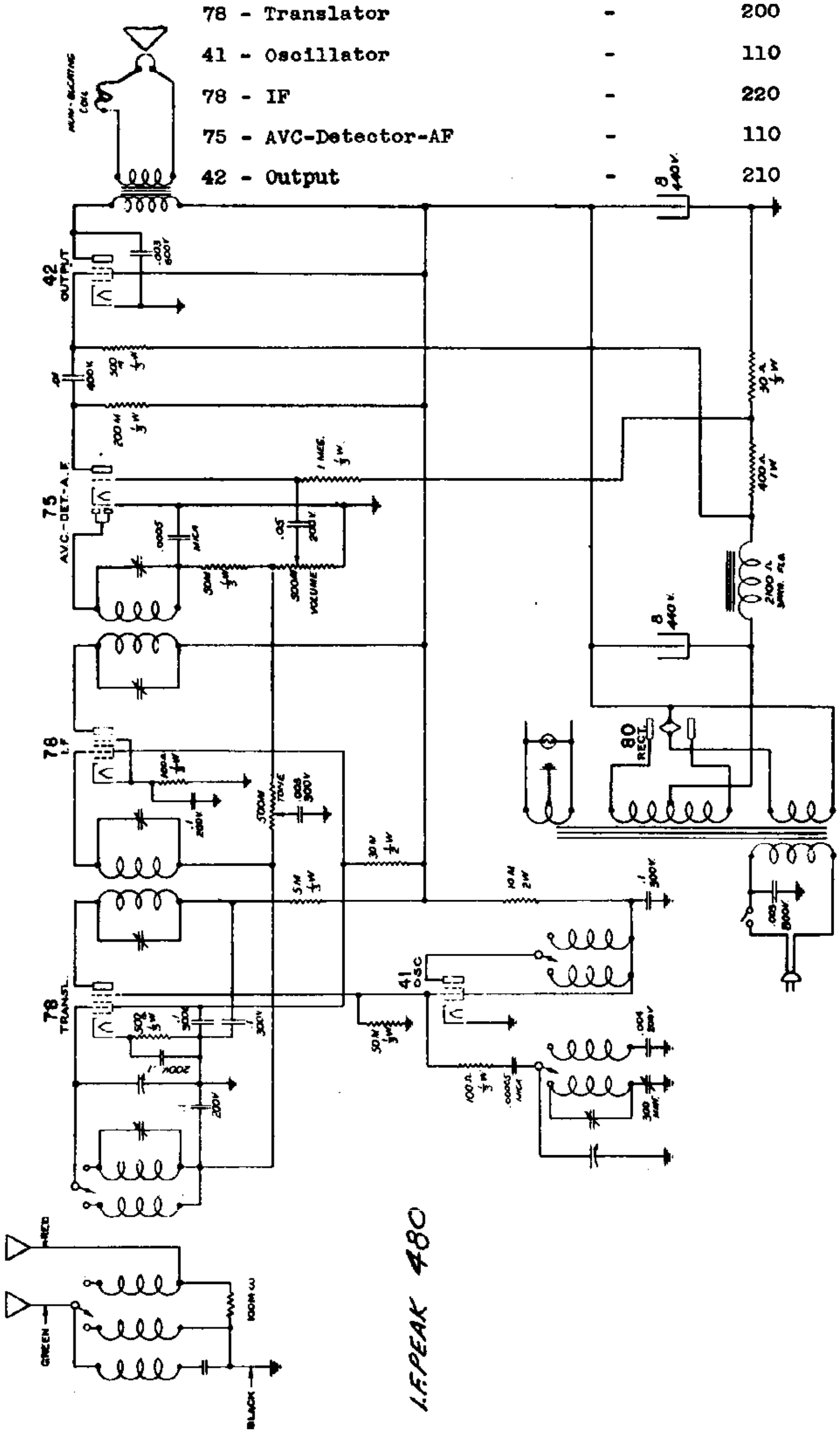
MODEL 603
Voltage Schematic
Interference Data

COLONIAL RADIO CORP.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE	SREEN
78 - Translator	-	200	90
41 - Oscillator	-	110	110
78 - IF	-	220	90
75 - AVC-Detector-AF	-	110	
42 - Output	-	210	220

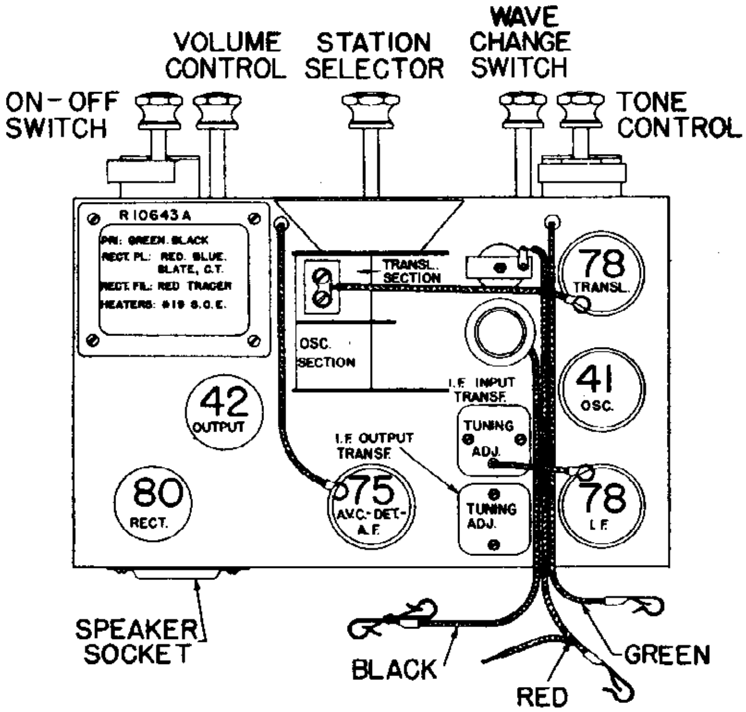


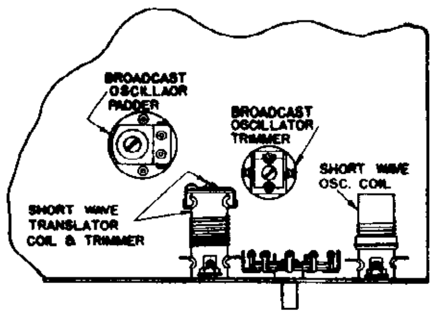
In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multi-layer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

The voltage drop created across the 500 M ohms of the Volume Control, due to the diode current of the 75 tube, is used for AVC voltage.

MODEL 603
Socket Layout
Trimmers
Alignment

COLONIAL RADIO CORP.





ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator in series with a .1 mfd. condenser to the grid of the 78 IF tube. Leave the grid clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid of the 78 Translator tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment (Broadcast):

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1660 kilocycles.

3. Screw the oscillator padder condenser to approximately three quarters of its maximum capacity.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output.

5. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the translator trimmer, mounted on the variable condenser section nearer the dial, for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

7. Repeat the 1660 kc and 1400 kc adjustments.

Always use as low an output from the test oscillator as possible.

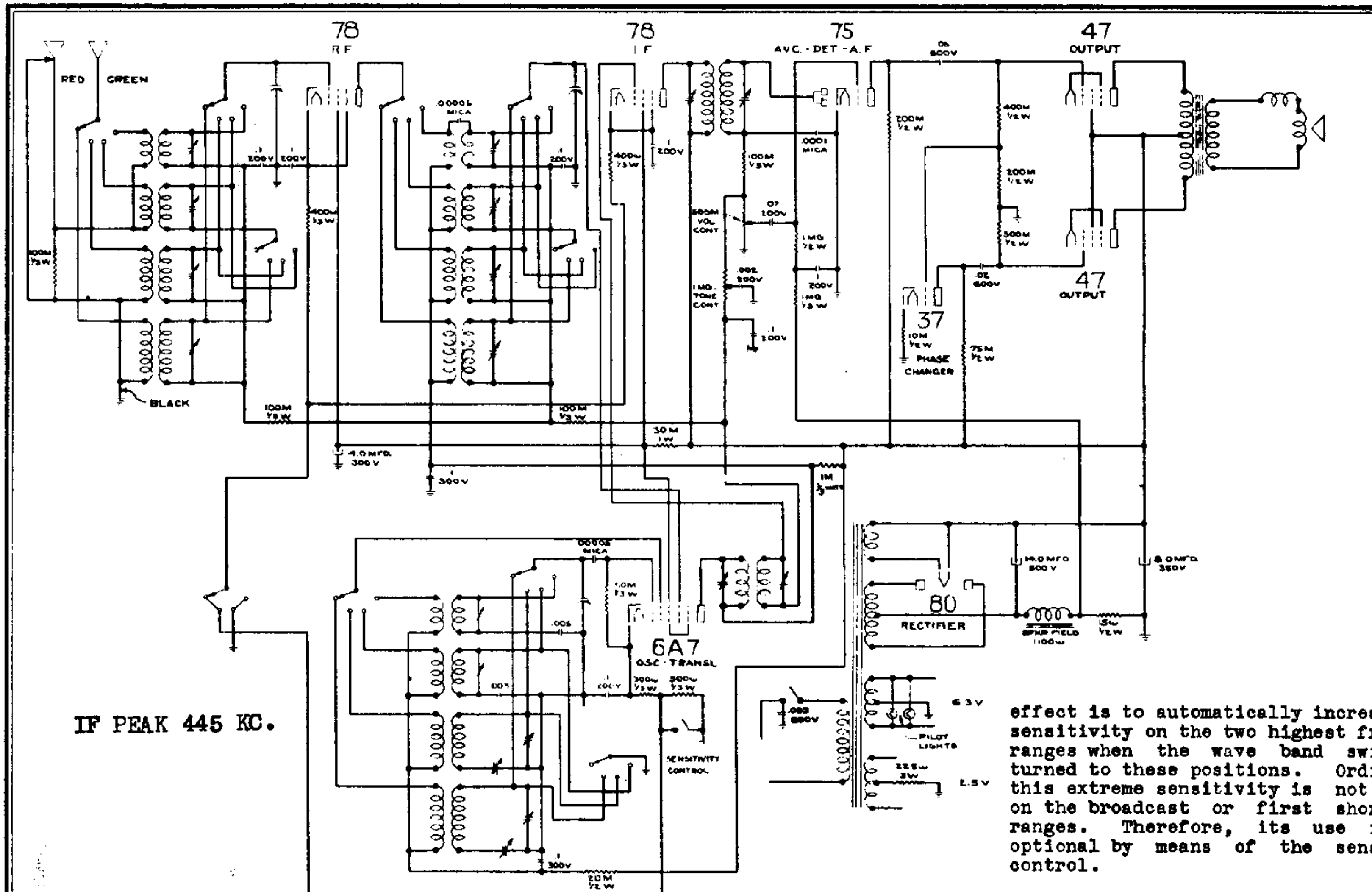
Short Wave Alignment:

1. Leave the test oscillator coupled to the green antenna lead as for broadcast alignment.

2. Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer, mounted on the short wave translator coil, for maximum output.

MODEL 604
Schematic
Circuit Data

COLONIAL RADIO CORP.



IF PEAK 445 KC.

The knob operating the "On - Off" switch also acts as a sensitivity control when it is turned all the way to the right. In this position the 500 ohm resistor in the cathode circuit of the 6A7, is shorted out. When the wave band switch is in either the broadcast or first short wave range positions, the cathodes of the 78 RF and IF tubes are returned to this 500 ohm resistor. Therefore, when this resistor is shorted, the control grid bias on the 6A7 and 78 tubes is reduced, thereby increasing the sensitivity of the receiver. When the wave band switch is in positions "C" or "D", the cathode returns of the 78 tubes are connected to ground instead of to the 500 ohm resistor so that the sensitivity control then only affects the bias of the 6A7 tube. The effect is to automatically increase the sensitivity on the two highest frequency ranges when the wave band switch is turned to these positions. Ordinarily, this extreme sensitivity is not needed on the broadcast or first short wave ranges. Therefore, its use is made optional by means of the sensitivity control.

The voltage drop created across the 500 M ohms of the Volume Control, due to the diode current of the 75 tube, is used for AVC voltage.

The triode portion of the 75 AVC-Detector-AF tube, in conjunction with the 37 Phase Changer tube, acts as a push-pull input stage to the 47 push-pull output stage. The use of the 37 Phase Changer tube eliminates the need for a push-pull input transformer.

MODEL 604
Voltage, Alignment

COLONIAL RADIO CORP.

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 6A7 tube and tune the IF input transformer.

6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment; Band "A" (Broadcast):

1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1520 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 translator trimmer for maximum output.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator padder for maximum output.

6. Repeat the 1520 kc and 1400 kc adjustments for greater accuracy.

Band "B":

1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.

2. Set the test oscillator to 4250 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.

4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 translator trimmer for maximum output.

5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, since they will have been affected by shifting of the turns.

Band "D":

1. Set the test oscillator to 19 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.

3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 translator trimmer for maximum output.

4. Set the test oscillator to 9 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 19 megacycle and 18 megacycle adjustments since they will have been affected by shifting of the turns.

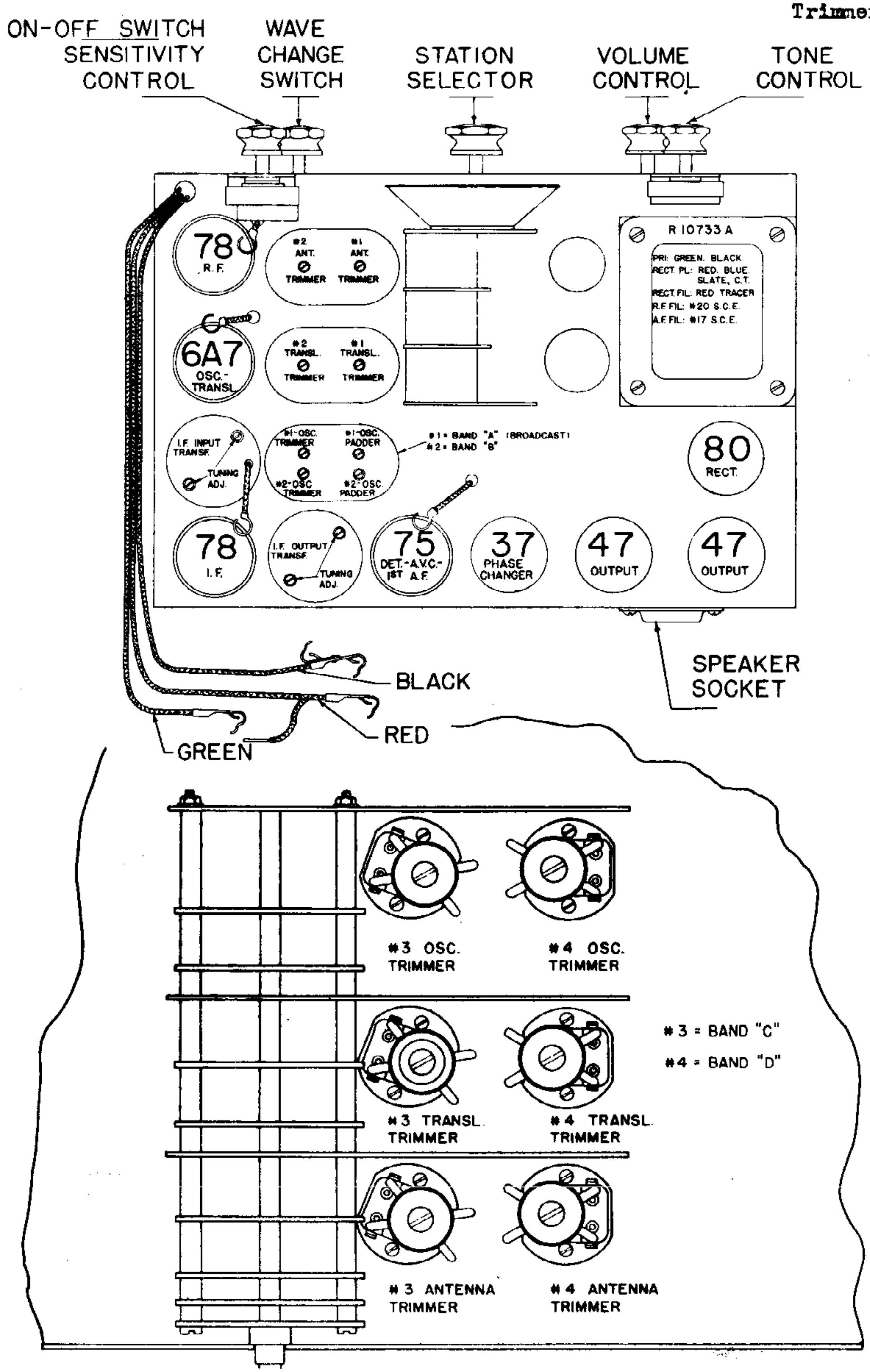
TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE	PLATE	SCREEN	OSC. SECTION PLATE	CATHODE
78 - RF	220	90		3.1
6A7 - Osc-Transl	220	90	160	2.6
78 - IF	235	90		3
75 - AVC-Det-AF	75			0
37 - Phase Changer	125			9
47 - Output	230	235		16

COLONIAL RADIO CORP.

MODEL 604
Socket Layout
Trimmer Data



MODEL 604
Parts List

COLONIAL RADIO CORP.

REPLACEMENT PARTS AND PRICE LIST

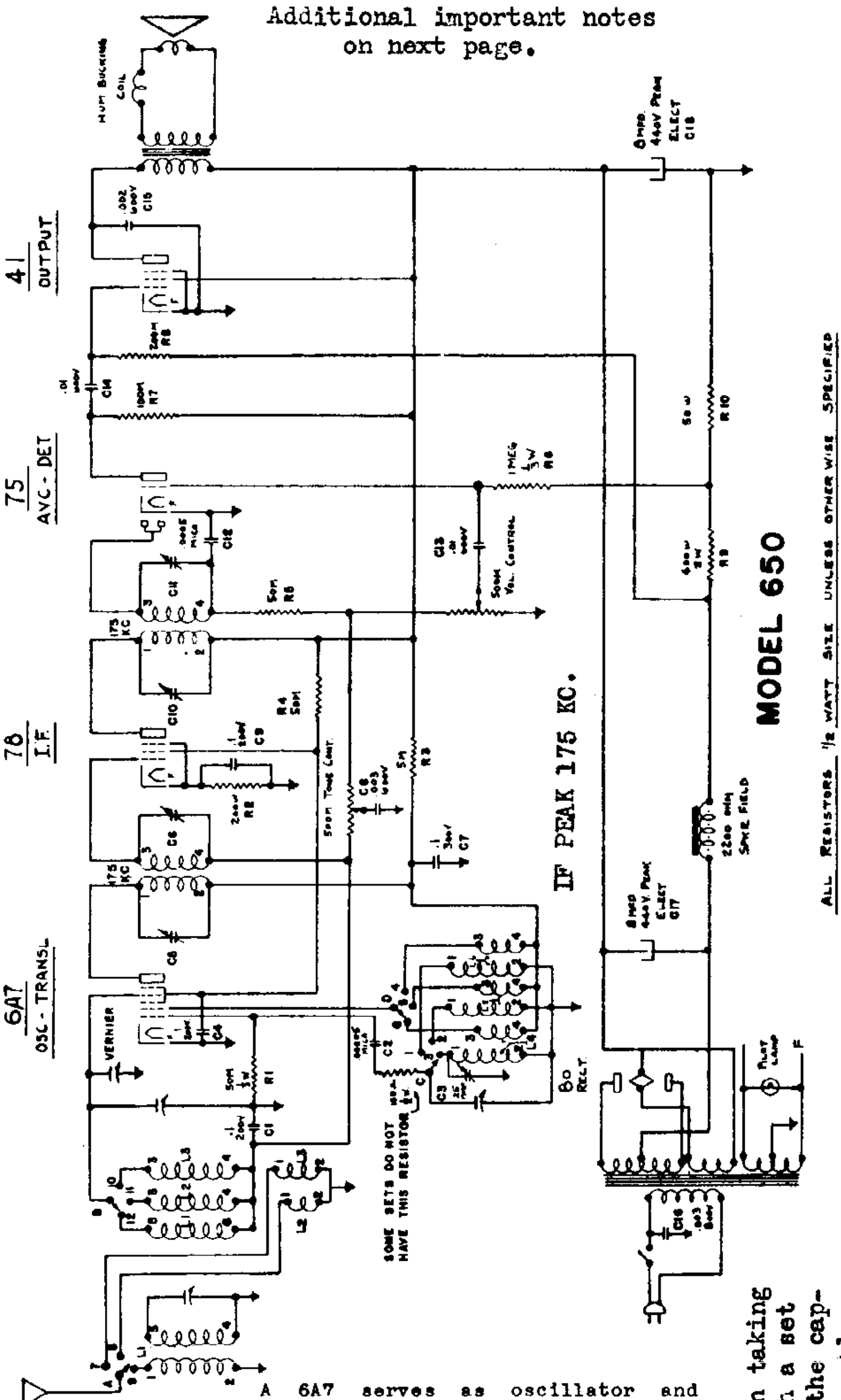
PART NO.	DESCRIPTION	PRICE
R8297A	Board - Terminal, double	.04
R8308A	Board - Terminal, triple	.05
R9446A	Board - Terminal, 4 terminals	.06
R8900A	Board - Terminal, 5 terminals	.08
R10741	Cabinet	23.33
R10765	Card - Operating	.07
R7011A	Clip - Red and green antenna leads	.04
R7011B	Clip - Double, black ground lead	.08
R11043	Clip - Grid	.01
R10731	Coil - Antenna, broadcast	.68
R10730	Coil - Oscillator, broadcast	.35
R10732	Coil - Translator, broadcast	.75
R10729	Coil - Choke	.19
R6973K	Coil - Antenna, short wave, #2 range	.82
R10993A	Coil - Antenna, short wave, #3 range	.56
R10993D	Coil - Antenna, short wave, #4 range	.56
R6973M	Coil - Oscillator, short wave, #2 range	.75
R10993C	Coil - Oscillator, short wave, #3 range	.65
R10993F	Coil - Oscillator, short wave, #4 range	.64
R6973L	Coil - Translator, short wave, #2 range	.83
R10993B	Coil - Translator, short wave, #3 range	.56
R10993E	Coil - Translator, short wave, #4 range	.42
R10735	Condenser - Variable	4.04
R10735B	Condenser - Variable with drive assembly	6.20

R7236	Condenser - 14 mfd. electrolytic	1.47
R8488	Condenser - 8 mfd. electrolytic	.99
R9237	Condenser - 4 mfd. electrolytic	.87
R9426	Condenser - Padding, 1200 mmf.	.49
R10884	Condenser - 475 mmf. padding	.36
R10737	Condenser - Padding, 75 mmf.	.28
R10197	Condenser - Trimmer, 25 mmf.	.15
R10736	Condenser - Trimmer, double, 35 mmf.	.26
R6444	Condenser - .1 mfd. 200 volts	.17
R6138	Condenser - .1 mfd. 300 volts	.20
R9145	Condenser - .05 mfd. 600 volts	.22
R6761	Condenser - .02 mfd. 600 volts	.18
R6629	Condenser - .02 mfd. 200 volts	.16
R6954	Condenser - .005 mfd. 600 volts	.17
R10738	Condenser - .003 mfd. 800 volts in metal case	.21
R10739	Condenser - .003 mfd. 600 volts	.14
R6933	Condenser - .002 mfd. 600 volts	.16
R4303	Condenser - .001 mfd. mica	.25
R10794	Condenser - .00005 mfd. mica	.20
R10740	Control - Tone, 1 megohm	.71
R10648	Control - Volume, 500 M ohms	.71
R7566	Cord - AC line	.56
R10429A	Dial diffusing disk	.98
R7585	Resistor - 1 megohm, 1/3 watt carbon	.18
R5823	Resistor - 1 megohm, 1/2 watt carbon	.20
R6179	Resistor - 500 M ohms, 1/2 watt carbon	.20
R5822	Resistor - 400 M ohms, 1/2 watt carbon	.20
R5830	Resistor - 200 M ohms, 1/2 watt carbon	.20
R7586	Resistor - 100 M ohms, 1/3 watt carbon	.18
R6210	Resistor - 75 M ohms, 1/2 watt carbon	.20
R6637	Resistor - 50 M ohms, 1/3 watt carbon	.18
R6689	Resistor - 30 M ohms, 1 watt carbon	.20
R5821	Resistor - 20 M ohms, 1/2 watt carbon	.20
R6152	Resistor - 10 M ohms, 1/2 watt carbon	.20
R6636	Resistor - 1 M ohms, 1/3 watt carbon	.18
R10142	Resistor - 500 ohms, 1/3 watt carbon	.18
R10078	Resistor - 400 ohms, 1/3 watt carbon	.18
R10621	Resistor - 300 ohms, 1/3 watt carbon	.18
R10751	Resistor - 225 ohms, 3 watt, flexible	.16
R10752	Resistor - 15 ohms, 1/2 watt, flexible	.11
R10639	Ring - Glass clamping	.02
R10484	Rubber - Tube, chassis mounting	10 for .06
R10488	Rubber - Washer, chassis mounting	.05
R10445A	Shaft - Dial drive	.21
R10753A	Shield - Coil	.27
R10754A	Shield - Oscillator coil	.24
R10440	Shield - Tube top	.09
R10441	Shield - Tube cap	.05
R8395	Shield - Tube base	.03
R7235	Shield - Electrolytic condenser	.04
R8315	Socket - 4 prong	.07
R8253	Socket - 5 prong	.08
R8367	Socket - 5 prong, speaker	.08
R8092	Socket - 6 prong	.09
R8072	Socket - 7 prong	.10
S10721A	Speaker - 8"	9.97
R10755A	Switch - Wave	4.19

MODEL 650
Schematic, Voltage
Notes

COLONIAL RADIO CORP.

Additional important notes
on next page.



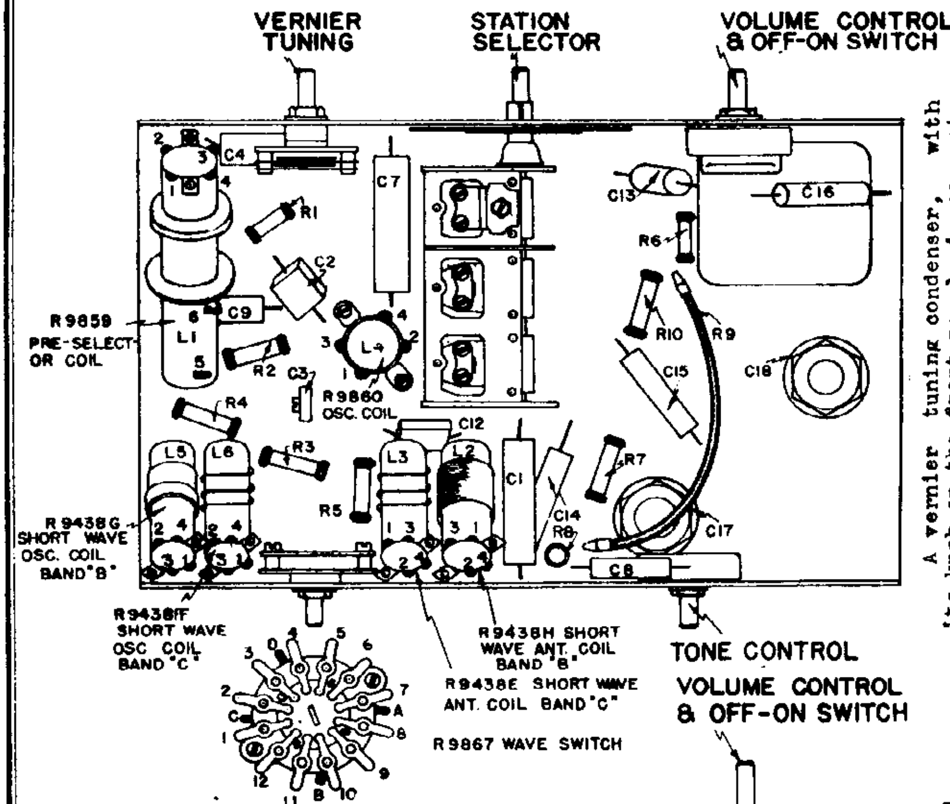
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M. A.
78 - IF	190	65	4.5	1
75 - AVC-Det-AF	130		.3	
41 - Output	175	190	18.5	3
6A7 - Osc-Transl.	Ep=160v.; Eg#2=160v.; Eg#3&5=65v.; Ip=3m.a.; Ig#2=2.25m.a.; Ig#3&#5=1.7m.a.			
80 - Rectifier	Max d.c. voltage=285v. Plate current=17 m.a. per plate			

A 6A7 serves as oscillator and translator. The resultant 175 kc signal in its plate circuit is amplified by the 78 IF stage and then coupled to the 75 tube. This tube functions as diode detector, AVC, and 1st audio. Its audio output is fed to the 41 output pentode and then to the dynamic loudspeaker. An 80 rectifier completes the tube complement.

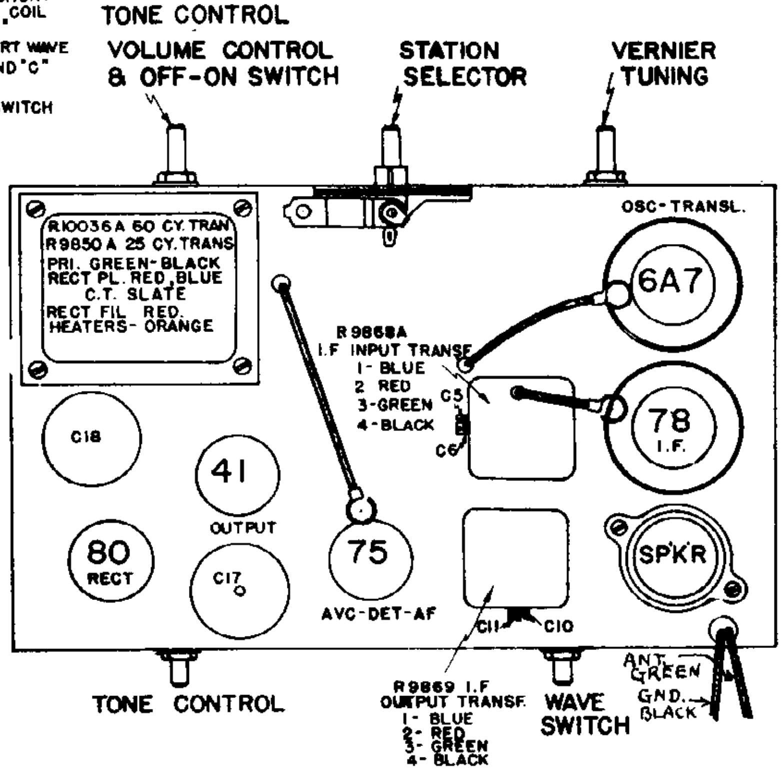
Use care when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually touching grid or plate with finger will stop oscillations. If an analyzer is not used, readings should be made with a 1000 ohms per volt voltmeter from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart values may be allowed.

MODEL 650
Parts Layout, Notes
Socket, Trimmers

COLONIAL RADIO CORP.



A vernier tuning condenser, with its knob on the front panel, is connected across the translator section of the ganged tuning condenser. Through its manipulation, it is possible to bring the circuits into perfect alignment at any frequency setting, thereby greatly increasing the sensitivity and short wave performance of the receiver. When the dot on the vernier knob is at its upper center position, the condenser is set at half capacity. Customers should be instructed to turn the knob either side of this normal position, when tuning, as described in the Instruction Leaflet accompanying the receiver.

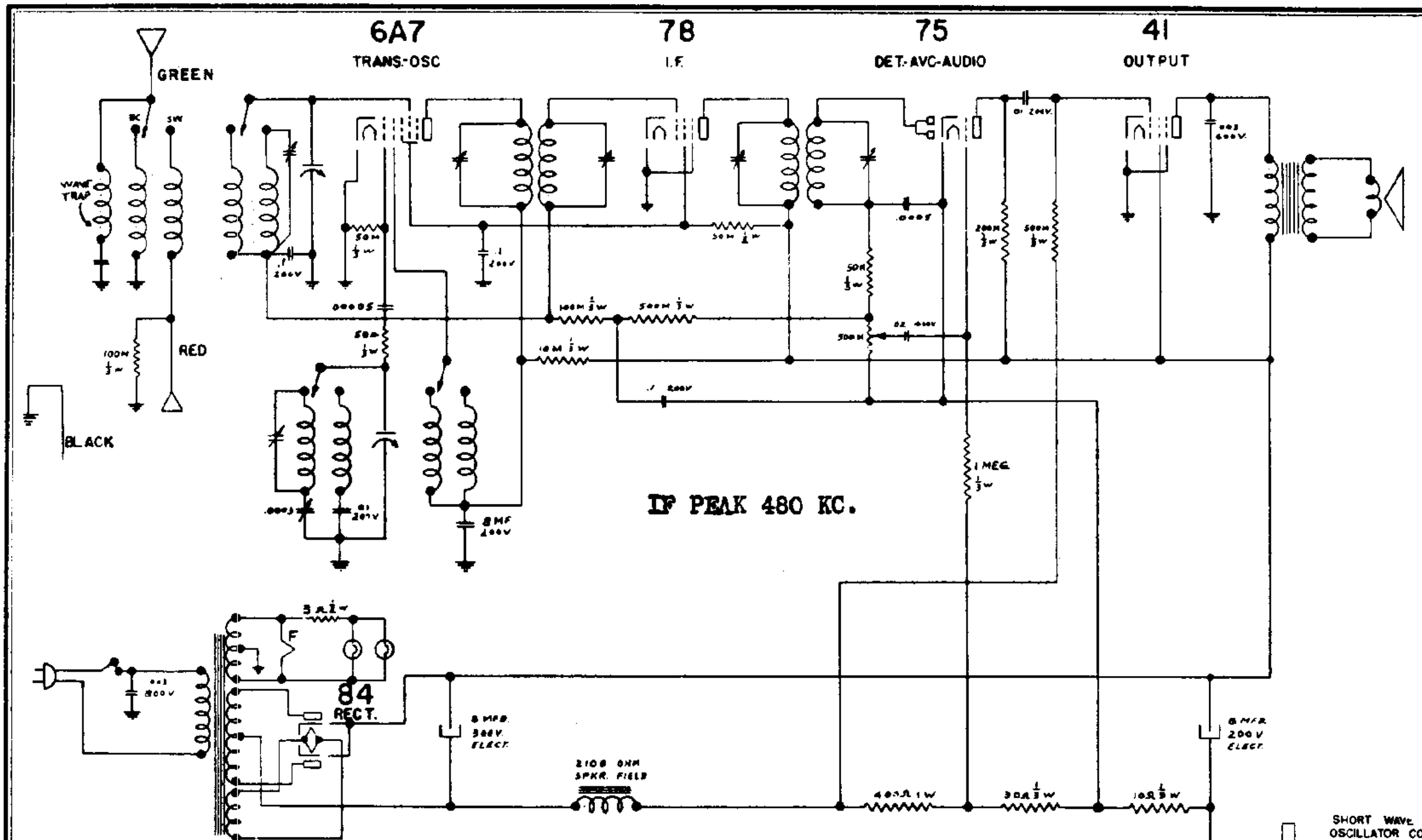


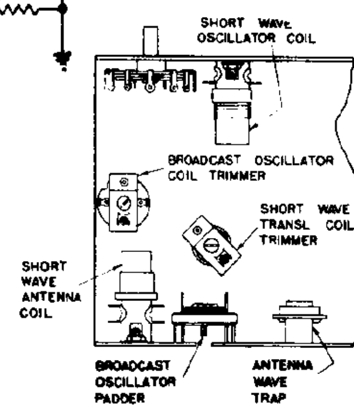
PART NO.	DESCRIPTION
R-9859	Coil - Pre-Selector
R-9860	Coil - Oscillator
R-9438E	Coil - Ant. S.W.
R-9438F	Coil - Osc. S.W.
R-9438G	Coil - Ant. S.W.
R-9438H	Coil - Osc. S.W.
R-9851	Condenser - Tuning
R-9428	Condenser - Trimmer
D-4758P	Condenser - 8 Mfd. electrolytic
R-7236	Condenser - .4 Mfd. electrolytic
R-6444	Condenser - .1 Mfd. 200 V.
R-6138	Condenser - .1 Mfd. 300 V.
R-9429	Condenser - .01 Mfd. 600 V.
R-7681	Condenser - .003 Mfd. 600 V.
R-10096	Condenser - .003 Mfd. 800 V.
R-6933	Condenser - .002 Mfd. 600 V.
R-6760	Condenser - .0005 Mfd. Mica
R-8621	Condenser - .00005 Mfd. Mica
R-9852	Condenser - Vernier
R-9865	Control - Tone, 500 M ohm
R-6571	Control - Volume, 500 M ohm
R-9866	Pointer - Dial
R-7585	Resistor - 1 Meg. 1/3 watt carbon
R-5830	Resistor - 200 M ohms, 1/2 watt carbon
R-5819	Resistor - 100 M ohms, 1/2 watt carbon
R-6445	Resistor - 50 M ohms, 1/2 watt carbon
R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-6510	Resistor - 5 M ohms, 1/2 watt carbon
R-6276	Resistor - 200 ohms, 1/2 watt carbon
R-9858	Resistor - 50 ohms, 1/2 watt carbon
R-8562	Resistor - 400 ohms, flexible

Some of these receivers have a 14 mfd. first filter condenser, others an 8 mfd. one. Either may be used for replacement purpose.

The trimmer condenser on the preselector section of the ganged condenser should be adjusted at about 1500 kc. The oscillator trimmer, C3, should be adjusted so that the set is tuned to 2000 kc when the ganged condenser is at its minimum capacity setting. Adjustments should be made with the Vernier at its half capacity setting.

COLONIAL RADIO CORP.





All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE	SCREEN	OSCILLATOR SECTION GRID	OSCILLATOR SECTION PLATE	CONTROL GRID
6A7 - Osc-Transl	-	140	60	-1.6	140	-.3
78 - IF	-	185	60			-1.5
75 - AVC-DET-AF	-	85				-.4
41 - Output	-	175	185			-.45

NOTE: All control grid readings are lower than the actual applied voltage due to high series resistance in the circuit.

MODEL 651
Socket Layout
Alignment, Trimmers

COLONIAL RADIO CORP.

In order to prevent interference from code stations when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shqwn in the schematic as a coil with a series condenser, actually it consists of two multilayer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is the condenser shown in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters which is the frequency used by ships and also is very near the IF frequency of the receiver.

The 75 AVC-Detector-AF Circuit:

The IF signal existing at the IF output transformer secondary is impressed between the diode plates and the cathode of the 75 tube, in series with the 500 M ohms of the volume control and the 50 M ohm resistor. Diode current flows, creating a voltage drop across these resistances. Only the drop across the volume control resistance is used for AVC voltage. The control grid returns of the 6A7 and 78 tubes are connected through filter resistors to one end of the volume control. This end is negative with respect to the other end of the control so that the voltage drop across it, due to the diode current, is impressed as negative bias on the control grids of the 6A7 and 78 tubes. Any increase in signal strength increases the 75 diode current, increases the voltage drop across the volume control, and so increases the negative bias of the 6A7 and 78 tubes with a resultant decrease in tube amplification. Since increases in signal strength are offset by decreases in tube amplification, the input to the detector tends to remain at a constant value.

Any desired portion of the audio component across the volume control may be picked up by the movable arm of the control and fed through the .02 mfd. condenser to the triode section of the 75 tube. It is there amplified and then coupled to the 41 output tube.

The IF Stages:

1. Connect the output meter (low scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment: (Broadcast)

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to exactly 1640 kc.

With the variable condenser plates open all the way

3. Turn the dial pointer to exactly 1640 kc and adjust the broadcast oscillator trimmer for maximum output.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the variable condenser for maximum output.

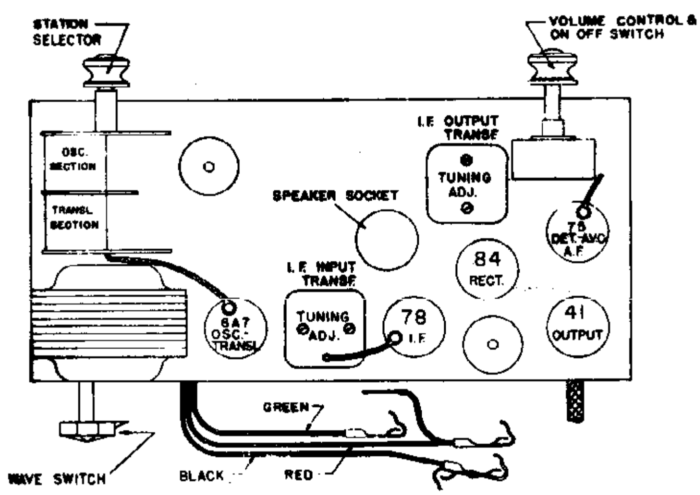
5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Since the adjustments are interacting to an extent, it is advisable to repeat the entire operation.

Always use as low an output from the test oscillator as possible.

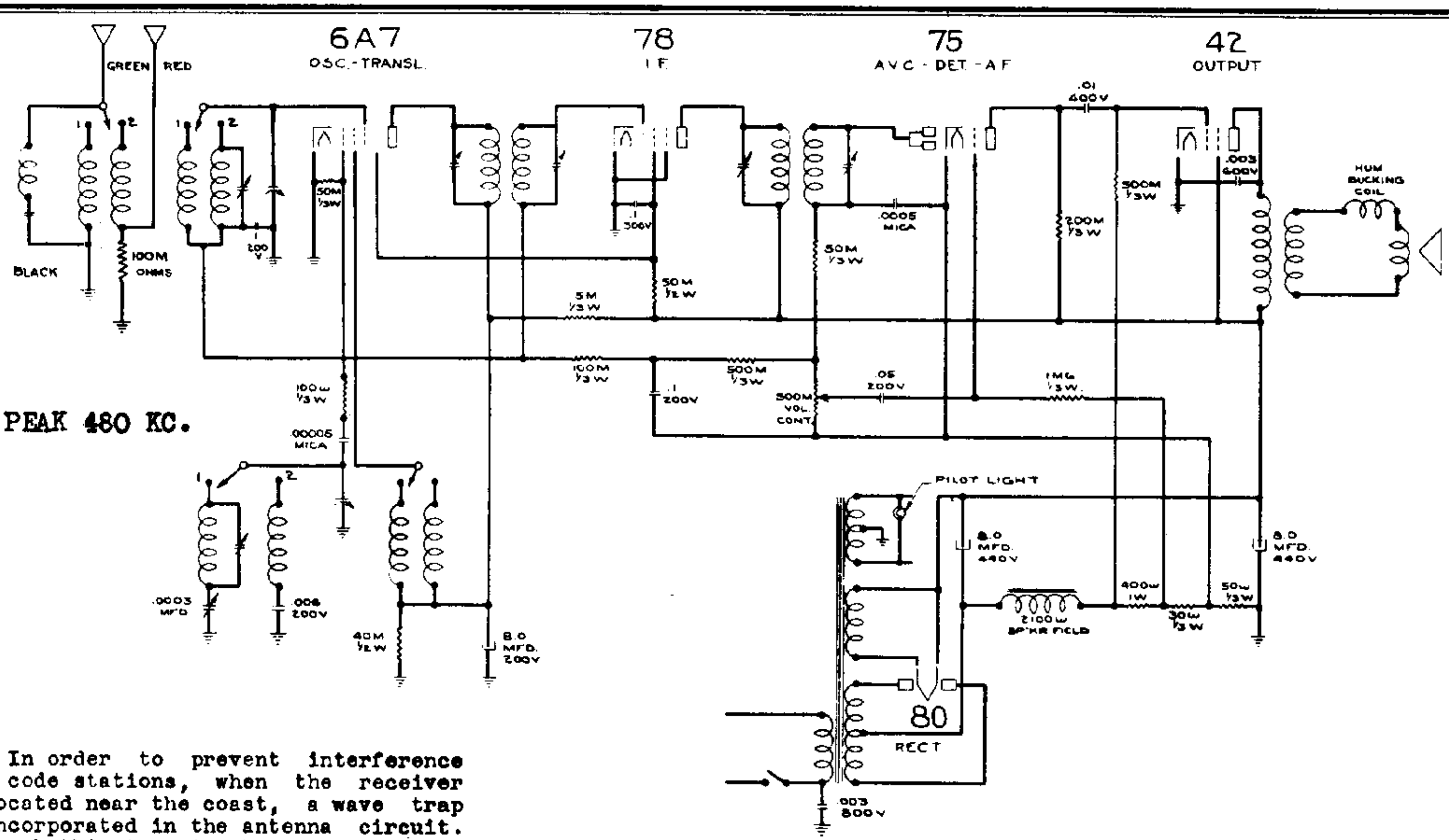
Short Wave Alignment:

Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer on the short wave translator coil for maximum output.



COLONIAL RADIO CORP.

MODEL 652
Schematic
Voltage, Data



IF PEAK 480 KC.

In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multi-layer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

The voltage drop created across the 500 M ohms of the Volume Control, due to the diode current of the 75 tube, is used for AVC voltage.

TUBE VOLTAGE CHART

All measurements are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE	SCREEN	OSC.SECTION PLATE
6A7 - Osc-Transl	-	190	70	190
78 - IF	-	220	70	
75 - AVC-Det-AF	-	100		
42 - Output	-	210	220	

MODEL 652
Socket Layout
Trimmer Data
Alignment

COLONIAL RADIO CORP.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube. Leave the grid clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment (Broadcast):

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1650 kilocycles.

3. Screw the oscillator padder condenser to approximately three quarters of its maximum capacity.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output.

5. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the translator trimmer, mounted on the variable condenser section nearer the dial, for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

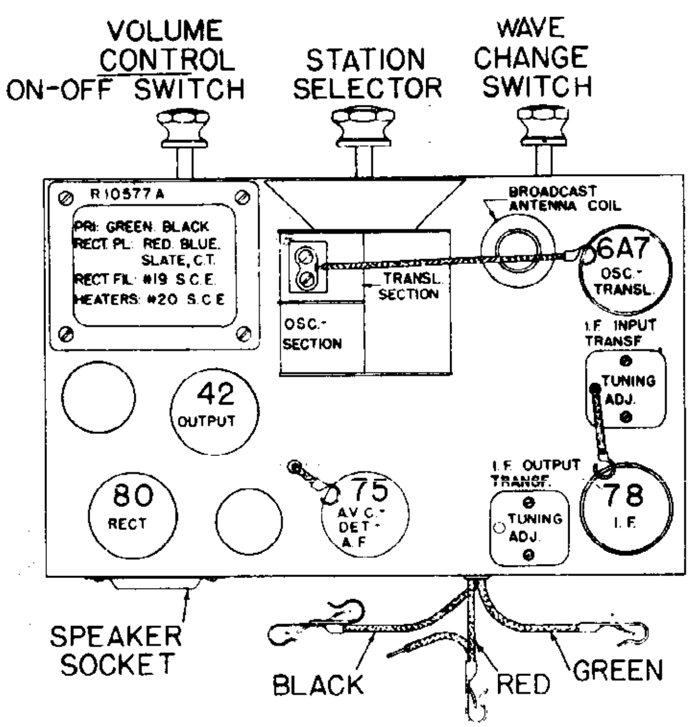
7. Repeat the 1650 kc and 1400 kc adjustments.

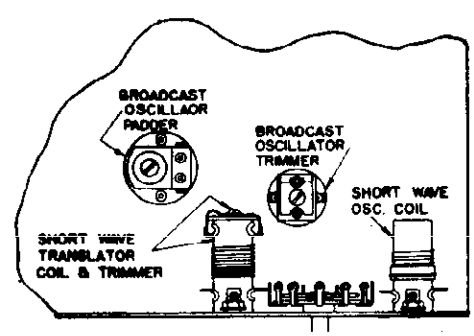
Always use as low an output from the test oscillator as possible.

Short Wave Alignment:

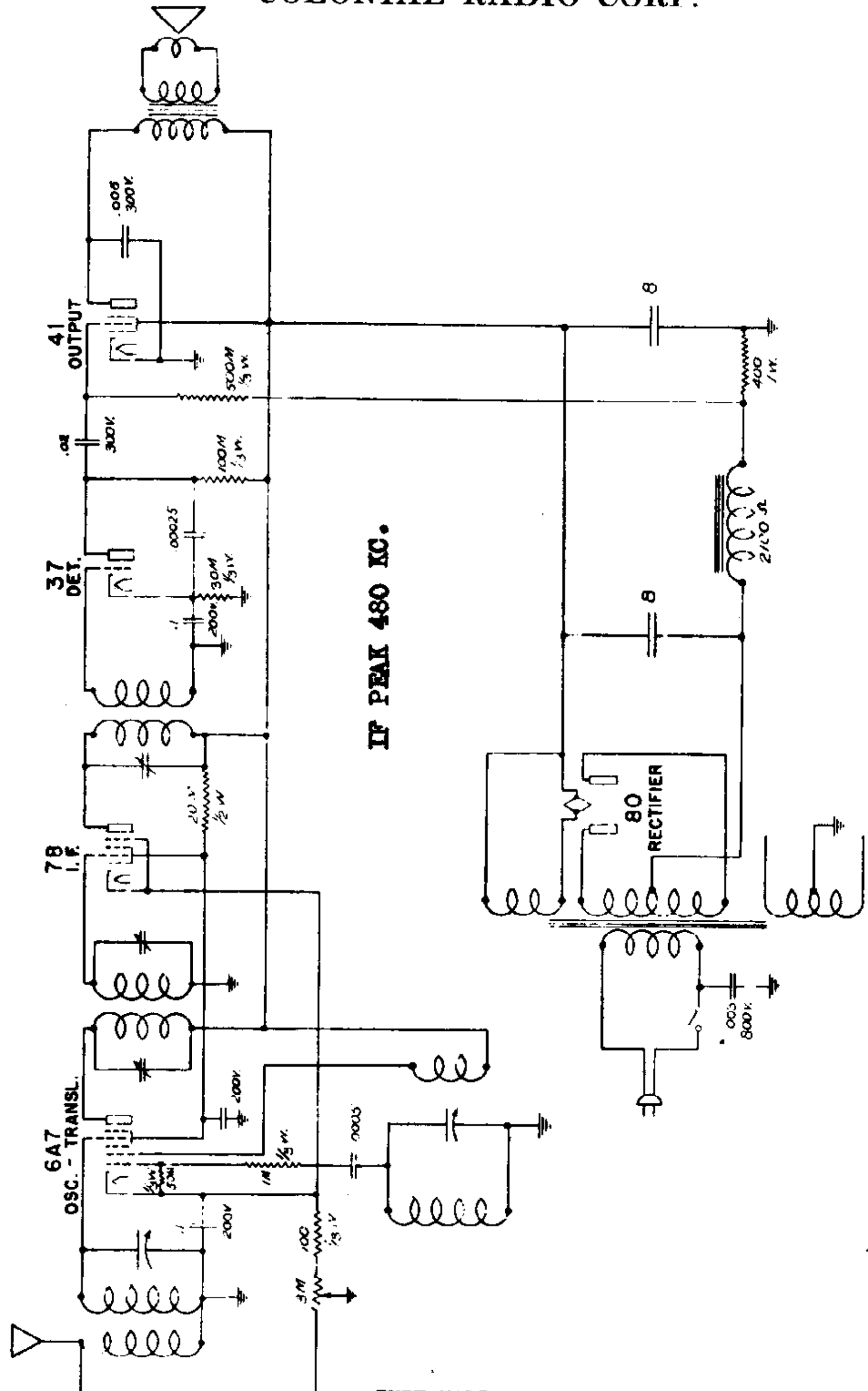
1. Leave the test oscillator coupled to the green antenna lead as for broadcast alignment.

2. Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer, mounted on the short wave translator coil, for maximum output.





COLONIAL RADIO CORP.



TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE	SCREEN	OSC.SEC. PLATE	OSC.SEC. GRID	CATHODE
6A7 - Osc-Transl	-	200	95	200	-.3	2.2
78 - IF	-	200	95			2.2
37 - Detector	-	62				30
41 - Output	-	190	200			0

MODEL 653
Alignment, Socket
Parts List, Trimmers

COLONIAL RADIO CORP.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc, and adjust the IF output transformer tuning condenser. This condenser is mounted on the IF output transformer terminal board under the chassis, about two inches behind the variable condenser.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF input transformer. The locations of its tuning adjustments are shown in the Service Illustration.

6. Repeat the adjustments to secure greater accuracy.

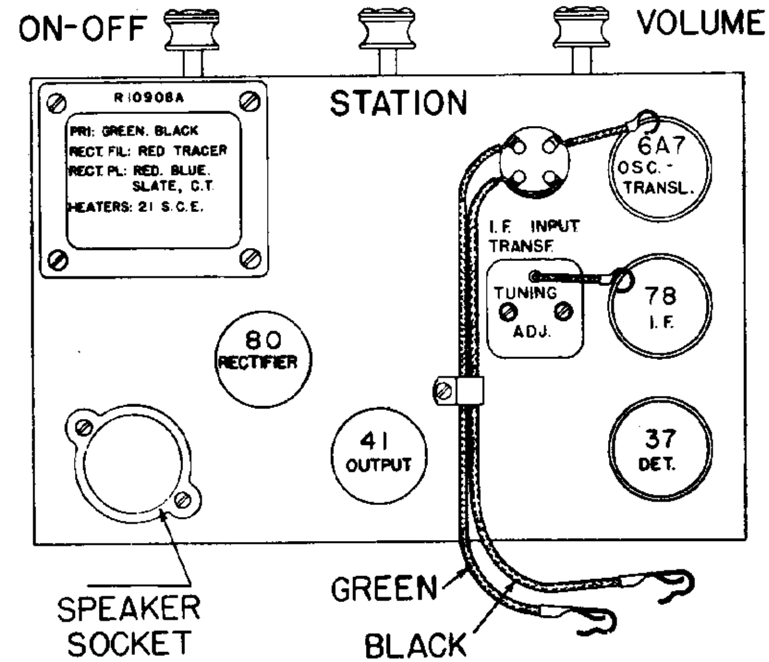
RF Alignment:

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1750 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the trimmer on the oscillator section of the variable condenser for maximum output. The oscillator section is the one furthest from the dial, as shown in the Service Illustration.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output.

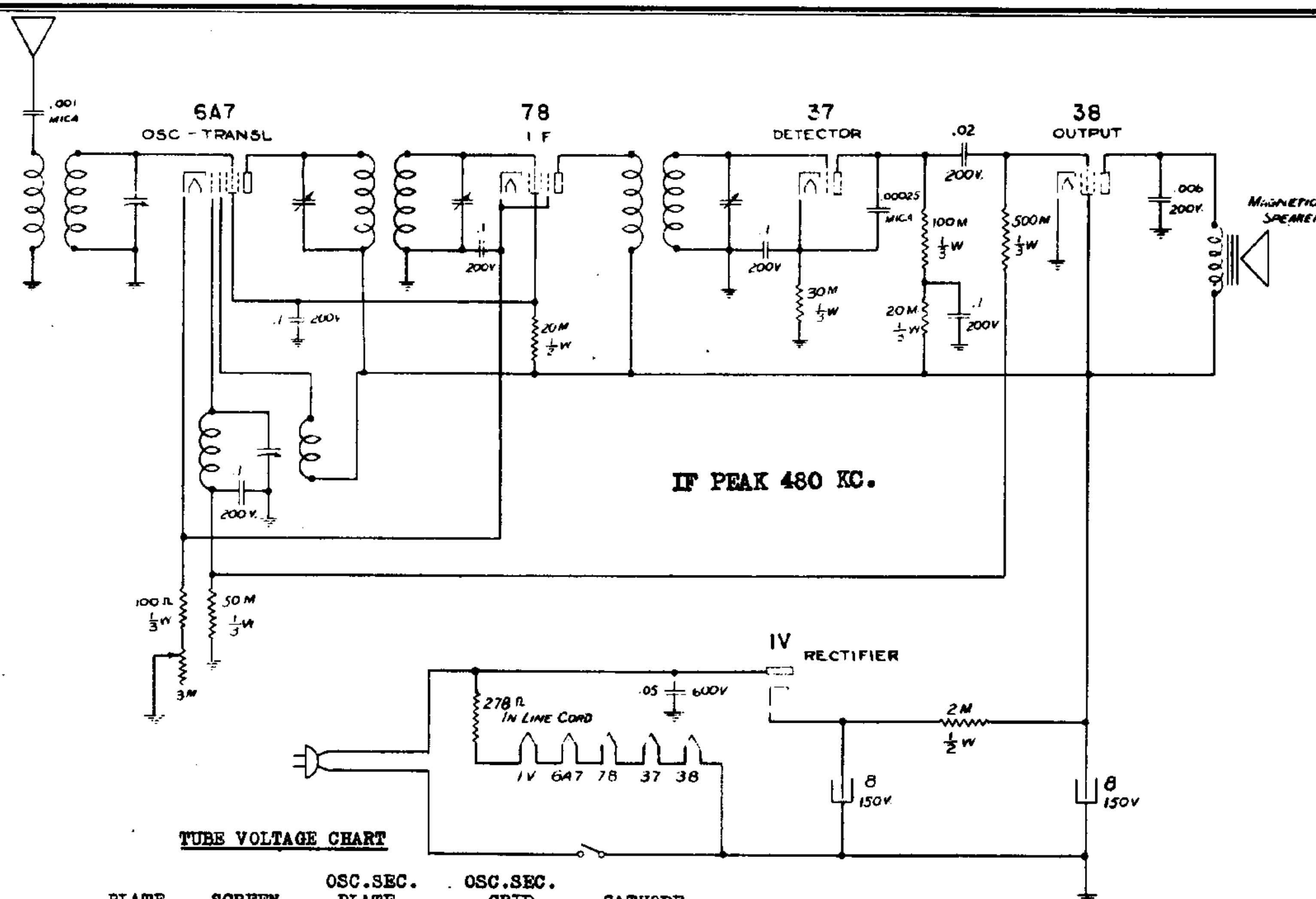


REPLACEMENT PARTS

PART NO.	DESCRIPTION
R10632	Coil - Antenna
R10633	Coil - Oscillator
R10620	Condenser - Variable
R10197	Condenser - Second IF, transformer tuning
D4758P	Condenser - Electrolytic 8 mfd.
R6444	Condenser - .1 mfd. 200 volts
R9818	Condenser - .02 mfd. 400 volts
R10609	Condenser - .006 mfd. 400 volts
R10096	Condenser - .003 mfd. 800 volts
R6760	Condenser - .0005 mfd. mica
R4592	Condenser - .00025 mfd. mica
R7228	Resistor - 500 M ohms, 1/3 watt carbon
R7586	Resistor - 100 M ohms, 1/3 watt carbon
R6637	Resistor - 50 M ohms, 1/3 watt carbon
R6110	Resistor - 30 M ohms, 1/3 watt carbon
R5821	Resistor - 20 M ohms, 1/2 watt carbon
R6636	Resistor - 1 M ohms, 1/3 watt carbon
R6436	Resistor - 400 ohms, 1/2 watt carbon
R8922	Resistor - 100 ohms, 1/3 watt carbon
R10630A	Transformer - IF input
R10631A	Transformer - IF output
R10908A	Transformer - Power

COLONIAL RADIO CORP.

MODEL 654
Schematic
Voltage



TUBE VOLTAGE CHART

TUBE	PLATE	SCREEN	OSC.SEC. PLATE	OSC.SEC. GRID	CATHODE
6A7 - Osc-Transl -	100	45	100	-.1	.8
78 - IF -	100	45			.8
37 - Detector -	55				-3.5
38 - Output -	95	100			0
1V - Rectifier -					135

All readings are to be taken between the chassis and the respective element of each tube.

MODEL 654
Alignment, Socket
Trimmers, Parts

COLONIAL RADIO CORP.

The COLONIAL Model 654 is a five tube, broadcast superheterodyne, designed for operation from either AC or DC power supply. The tubes and their functions are:

6A7 - Oscillator-Translator
78 - IF
37 - Detector
38 - Output
1V - Rectifier

Since the tube heaters are in series, if any one tube burns out, none will light. However, it is necessary to replace only the burned out tube. The others then will light. The full line voltage will appear across the heater prongs of a socket in which there is a burned out tube.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the high scale (about 100 volts) of the output meter across the loud speaker terminals.

2. Connect the ground lead of the test oscillator to the chassis through a .1 mfd. condenser.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc. and tune the IF output transformer. This transformer is mounted under the chassis and has a single bakelite base tuning condenser mounted on its terminal board. There is but one tuning adjustment for this transformer, since only the transformer secondary is tuned.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

6. Repeat the adjustments to secure greater accuracy.

RF Alignment:

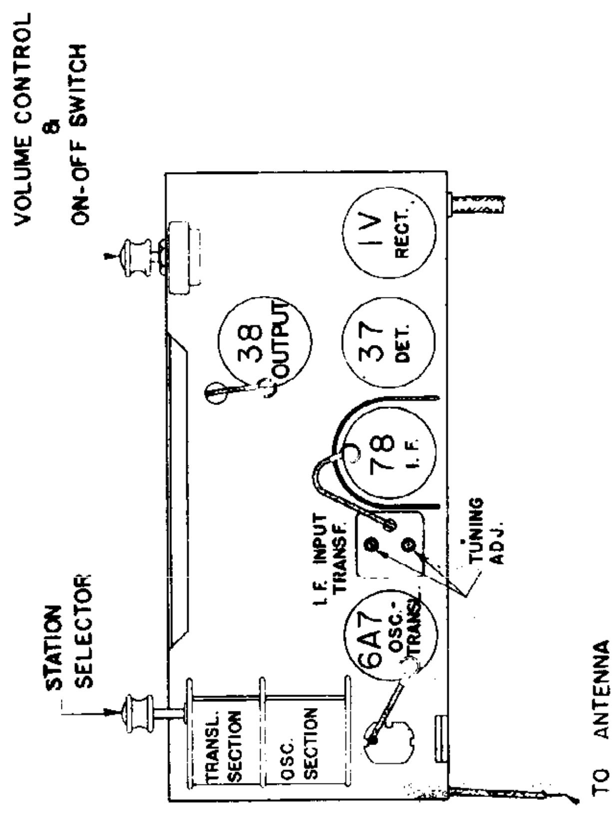
1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1750 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the trimmer on the oscillator section of the variable condenser for maximum output. The oscillator section is the one furthest from the dial, as shown in the Service Illustration.

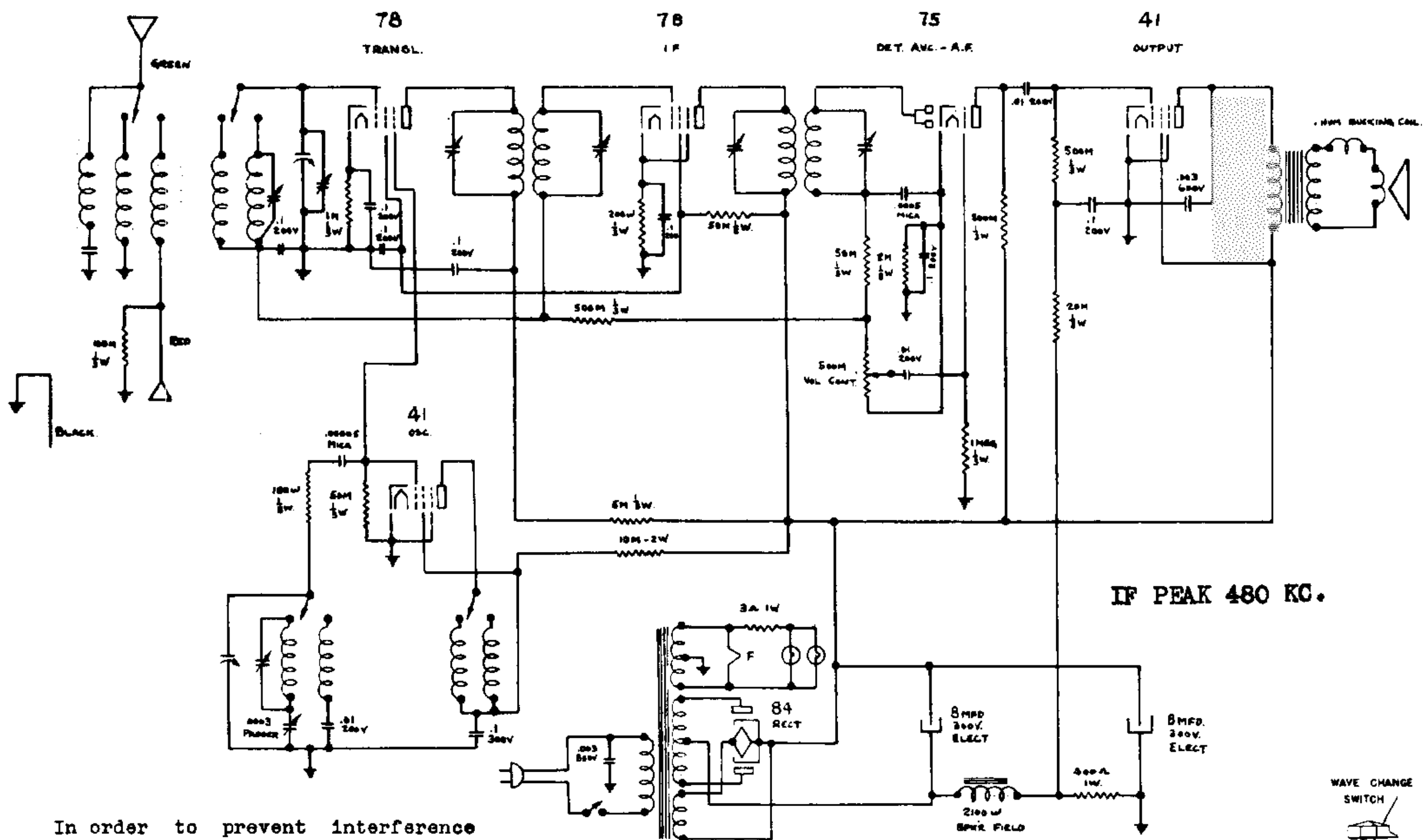
4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output.

PART NO.	DESCRIPTION
R8297A	Board - Terminal, double
R8308A	Board - Terminal, triple
R10690	Cabinet
R11043	Clip - Grid
R10632	Coil - Antenna
R10633	Coil - Oscillator
R8960	Condenser - Variable
R10689	Condenser - Dry electrolytic
R10197	Condenser - Trimmer
R6444	Condenser - .1 mfd. 200 volts
R9145	Condenser - .05 mfd. 600 volts
R6629	Condenser - .02 mfd. 200 volts
R10893	Condenser - .006 mfd. 200 volts
R6759	Condenser - .001 mfd. mica
R4592	Condenser - .00025 mfd. mica
R8059	Control - Volume, 3 M ohms
R10685	Cord - Power supply
R10692	Escutcheon - Station selector
R8663	Escutcheon - Volume control
R10691	Instruction leaflet
R8664	Knob with pointer
R7228	Resistor - 500 M ohms, 1/3 watt carbon
R7586	Resistor - 100 M ohms, 1/3 watt carbon
R6637	Resistor - 50 M ohms, 1/3 watt carbon
R6110	Resistor - 30 M ohms, 1/3 watt carbon
R6640	Resistor - 20 M ohms, 1/3 watt carbon
R5821	Resistor - 20 M ohms, 1/2 watt carbon
R6073	Resistor - 2 M ohms, 1/2 watt carbon
R8922	Resistor - 100 ohms, 1/3 watt carbon
R8315	Socket - 4 prong
R8253	Socket - 5 prong
R8092	Socket - 6 prong
R8072	Socket - 7 prong
S10694	Speaker
R10687A	Transformer - IF input
R10631A	Transformer - IF output

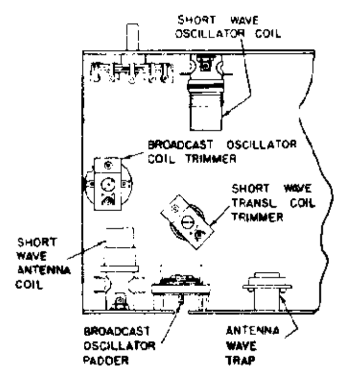


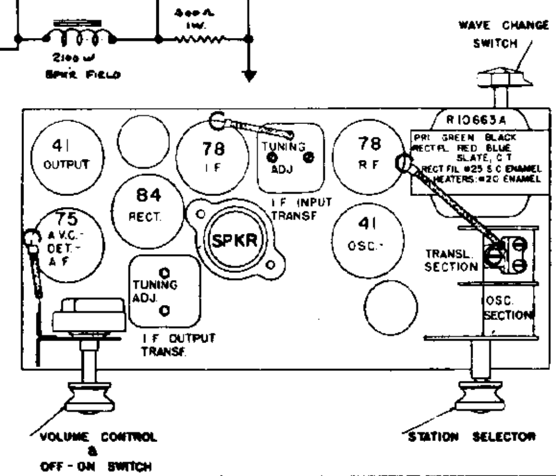
MODEL 655
Schematic, Notes Trimmers, Socket Parts Layout,

COLONIAL RADIO CORP.



IF PEAK 480 KC.





In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multilayer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

MODEL 655
Voltage
Alignment

COLONIAL RADIO CORP.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 78 translator tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment (Broadcast):

1. Screw the oscillator padding condenser to about three quarters of its maximum capacity.

2. Couple the test oscillator to the green antenna lead, leaving the antenna connected. Set the test oscillator to 1610 kc.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. Some of these sets have a trimmer on the oscillator section of the variable condenser as well as one mounted on the broadcast oscillator coil. In others, the adjusting screw has been removed from the trimmer on the variable condenser and only the trimmer on the oscillator coil used. It will be found that in sets using both condensers, that maximum output cannot be reached even though one of the trimmers is screwed all the way in, making it necessary to use the other trimmer. In effect, both trimmers are in parallel when the Wave Switch is in the broadcast position.

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Since the adjustments are interacting to an extent, it is advisable to repeat the entire operation.

Always use as low an output from the test oscillator as possible.

Short Wave Alignment:

Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer on the short wave translator coil for maximum output.

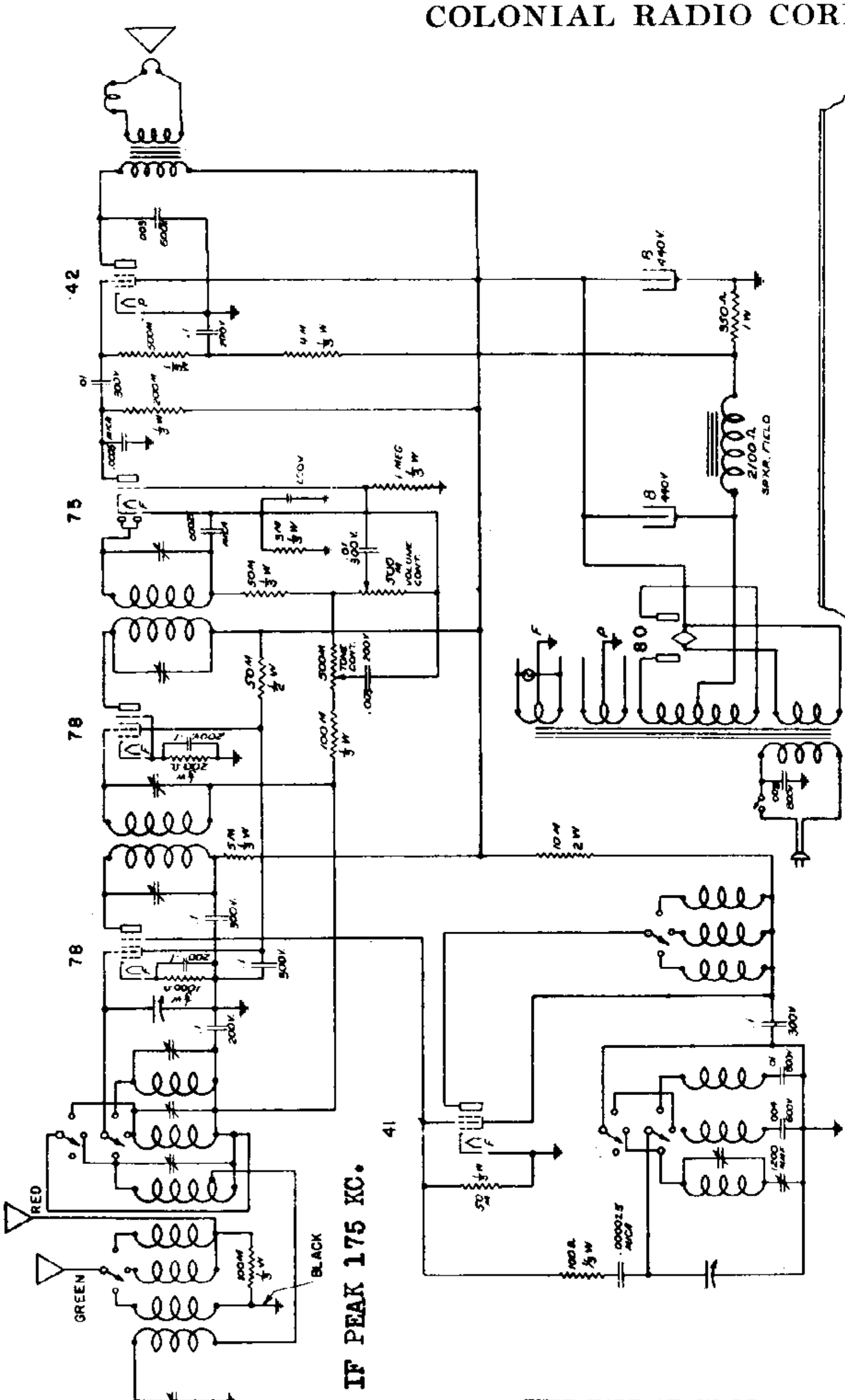
TUBE VOLTAGE CHART

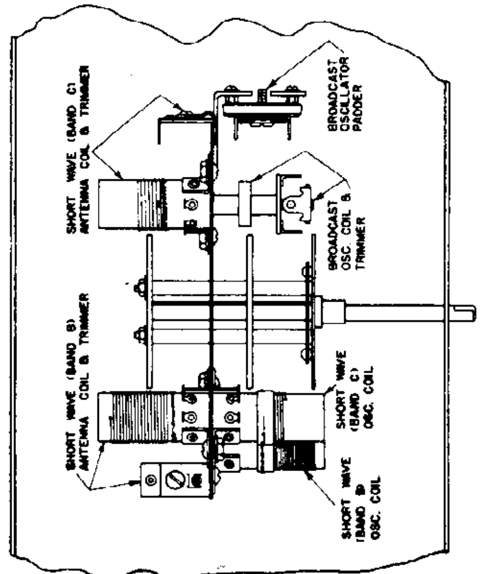
All readings are to be taken between the chassis and the respective element of each tube.

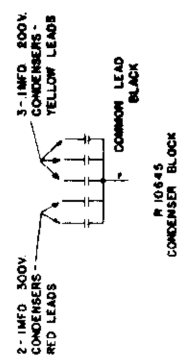
TUBE		PLATE	SCREEN	CATHODE
78 - Translator	-	160	60	2.5
41 - Oscillator	-	75	75	0
78 - IF	-	170	60	1
75 - AVC-Det-AF	-	70		.6
41 - Output	-	160	170	0
84 - Rectifier	-			170

COLONIAL RADIO CORP.

MODEL 656
Schematic, Voltage
Trimmer Data







TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE	SCREEN	CATHODE
78 - Translator	-	200	65	3.2
41 - Oscillator	-	105	105	
78 - IF	-	220	65	.5
75 - AVC-Det-AF	-	65		.75
42 - Output	-	210	220	

MODEL 656
Alignment

COLONIAL RADIO CORP.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd condenser, to the control grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 78 translator tube and tune the IF input transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

6. Repeat the procedure in order to secure greater accuracy.

RF Alignment (Broadcast Band):

1. Set the test oscillator to 1650 kilocycles.

2. Couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

3. Turn the variable condenser plates all the way out. With the wave band selecting switch in position "A", tune the oscillator trimmer for maximum output. The position of this trimmer is shown in the Service Illustration.

4. Set the test oscillator to 1400 kc and adjust the antenna and translator trimmers. The antenna trimmer is the one on the variable condenser section nearest the dial. The translator trimmer is accessible through the hole in the top of the translator coil shield as shown in the Service Illustration.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustration.

6. Repeat the 1650 kc and 1400 kc operations. Then repeat the 600 kc padding operation.

Always use an output from the test oscillator low enough to render the AVC action inoperative.

Short Wave (Band "B") Alignment:

1. Leave the test oscillator coupled to the antenna lead as for broadcast alignment.

2. Set the test oscillator to 5000 kc. and tune in its signal. Screw the short wave (Band "B") antenna coil trimmer all the way in (maximum capacity). Then reduce the trimmer capacity until the output reaches a peak. A second peak may be obtained when the trimmer capacity is reduced still further. However, the correct position in which to leave the trimmer is the one using the maximum capacity, that is, with the trimmer condenser plates most nearly in a closed position.

3. Set the test oscillator to 1800 kc. and tune in its signal. If necessary, turns may be shifted on the short wave antenna coil to secure maximum output. If turns are shifted, it will be necessary to repeat the trimmer adjustment at 5000 kc.

Short Wave (Band "C") Alignment:

1. Leave the test oscillator coupled to the antenna lead as before.

2. Set the test oscillator to 15 megacycles.

3. With the wave band selecting switch in position "C", tune the receiver to 15 megacycles.

4. Screw the short wave (Band "C") antenna coil trimmer all the way in (maximum capacity). Then reduce the trimmer capacity until the output reaches a peak. A second peak may be obtained, when the trimmer capacity is reduced still further. However, the correct position in which to leave the trimmer is the one using the maximum capacity, that is with the trimmer condenser plates most nearly in a closed position.

5. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave (Band "C") antenna coil to secure maximum output. If turns are shifted. it will be necessary to repeat the trimmer adjustment at 15 megacycles.

As mentioned in the instructions for this receiver, either a conventional type antenna or a doublet can be used. If a doublet is used, the wave band selecting switch automatically changes connections on the broadcast band so that the doublet acts as a conventional antenna. Examination of the schematic will reveal that all three sections of the variable condenser are used only when the wave band selecting switch is in the BROADCAST position. In the short wave positions, "B" and "C", the variable condenser section nearest the dial is disconnected.

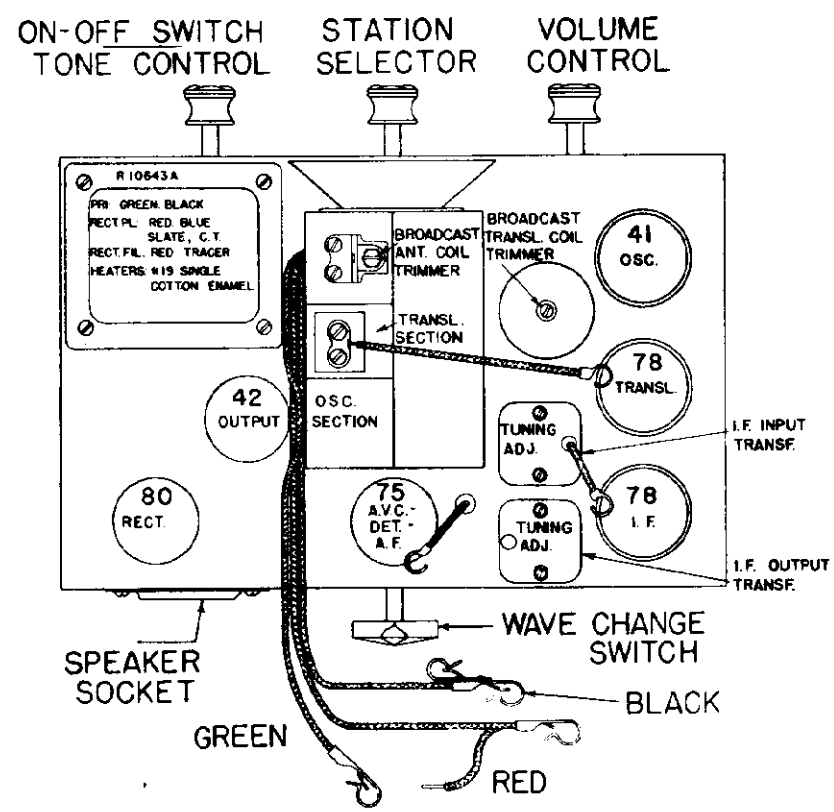
The 500 M ohms of the volume control is used to supply AVC voltage by utilizing the drop across it, due to the diode current of the 75 tube.

COLONIAL RADIO CORP.

MODEL 656
Parts List
Socket Layout
Trimmers

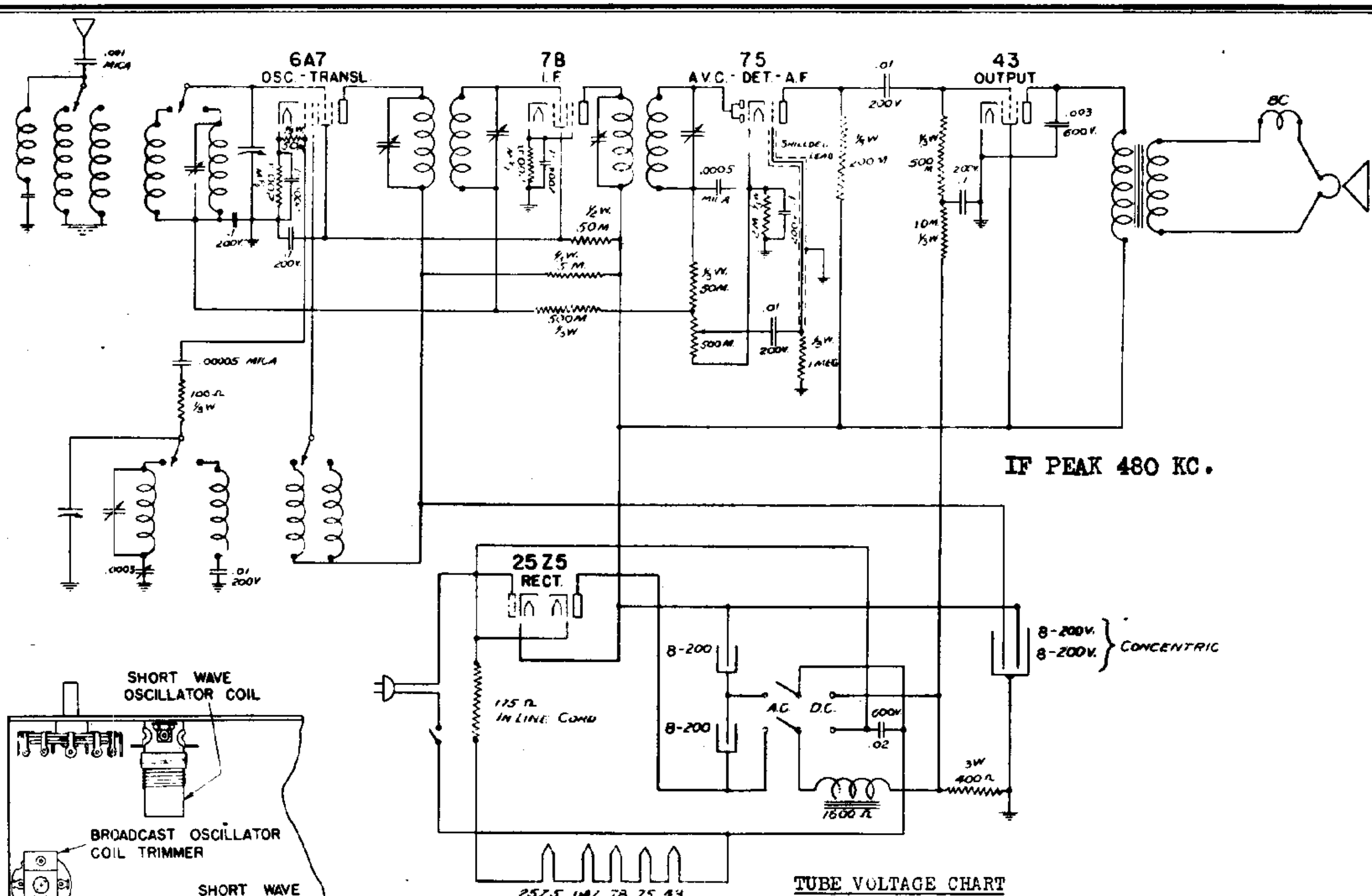
REPLACEMENT PARTS AND PRICE LIST – MODEL 656

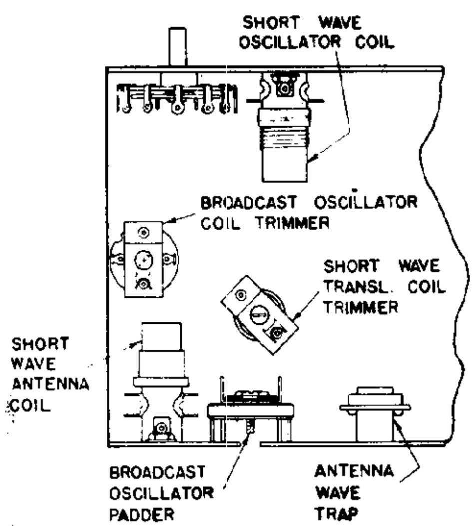
PART NO.	DESCRIPTION
R10638	Coil - Antenna, broadcast
R10883	Coil - Oscillator, broadcast
R10642	Coil - Translator, broadcast
R10926A	Coil - Antenna, short wave, Band "C"
R10926B	Coil - Antenna, short wave, Band "B"
R10926C	Coil - Oscillator, short wave, Band "C"
R10926E	Coil - Oscillator, short wave, Band "B"
R11014	Collar - Stop, wave switch
R10644	Condenser - Variable
R10644A	Condenser - Variable, with drive assembly
D4758P	Condenser - 8 mfd. electrolytic
R9426	Condenser - Padding, 1200 mmf.
R10197	Condenser - Trimmer, 25 mmf.
R10645	Condenser - Block
R6444	Condenser - .1 mfd. 200 volts
R6138	Condenser - .1 mfd. 300 volts
R10647	Condenser - .01 mfd. 600 volts
R6462	Condenser - .01 mfd. 300 volts
R10646	Condenser - .004 mfd. 600 volts
R10096	Condenser - .003 mfd. 800 volts, in metal case
R7681	Condenser - .003 mfd. 600 volts
R10495	Condenser - .003 mfd. 200 volts
R6760	Condenser - .0005 mfd. mica
R8297A	Board - Terminal, double
R8308A	Board - Terminal, triple
R10658	Cabinet
R10930	Card - Operating
R7011A	Clip - Red and green antenna leads
R7011B	Clip - Black ground lead
R11043	Clip - Grid
R4592	Condenser - .00025 mfd. mica
R8711	Condenser - .000025 mfd. mica
R10742	Control - Tone, 500 M ohms with switch
R10648	Control - Volume, 500 M ohms
R7585	Resistor - 1 megohm, 1/3 watt carbon
R7228	Resistor - 500 M ohm, 1/3 watt carbon
R6638	Resistor - 200 M ohm, 1/3 watt carbon
R7586	Resistor - 100 M ohm, 1/3 watt carbon
R6637	Resistor - 50 M ohm, 1/3 watt carbon
R6445	Resistor - 50 M ohm, 1/2 watt carbon
R10465	Resistor - 10 M ohm, 2 watt carbon
R7226	Resistor - 5 M ohm, 1/3 watt carbon
R8972	Resistor - 3 M ohm, 1/3 watt carbon
R6636	Resistor - 1 M ohm, 1/3 watt carbon
R10652	Resistor - 350 ohm, 1 watt carbon
R7227	Resistor - 200 ohm, 1/3 watt carbon
R8922	Resistor - 100 ohm, 1/3 watt carbon
R10656B	Transformer - IF input
R10657A	Transformer - IF output
R10643A	Transformer - Power
R8366	Socket - 4 prong, speaker
R8315	Socket - 4 prong
R8092	Socket - 6 prong
R10549	Socket - Pilot light
R10702	Speaker
R10655A	Switch - Wave



MODEL 657
Schematic, Voltage
Trimmers

COLONIAL RADIO CORP.





TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE	SCREEN	OSC.SEC. PLATE	OSC.SEC. GRID
6A7 - Osc-Transl	-	115	40	115	-2.4
78 - IF	-	135	40		
75 - AVC-Det-AF	-	105			
43 - Output	-	125	135		

MODEL 657
Alignment

COLONIAL RADIO CORP.

In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multilayer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

The 75 AVC-Detector-AF Circuit:

The IF signal existing at the IF output transformer secondary is impressed between the diode plates and the cathode of the 75 tube, in series with the 500 M ohms of the Volume Control and the 50 M ohm resistor. Diode current flows, creating a voltage drop across these resistances. Only the drop across the Volume Control resistance is used for AVC voltage. The control grid returns of the 6A7 and 78 tubes are connected through filter resistances to one end of the Volume Control. This end is negative with respect to the other end of the control so that the voltage drop across it, due to the diode current, is impressed as negative bias on the control grids of the 6A7 and 78 tubes. Any increase in signal strength increases the 75 diode current, increases the voltage drop across the Volume Control, and so increases the negative bias of the 6A7 and 78 tubes with resultant decrease in tube amplification. Since increases in signal strength are offset by decreases in tube amplification, the input to the detector tends to remain at a constant value.

Any desired portion of the audio component across the Volume Control may be picked off by the movable arm of the control and fed through the .01 mfd. condenser to the triode section of the 75 tube. It is there amplified and then coupled to the 43 output tube.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 6A7 tube and

the oscillator trimmer for maximum output. Some of these sets have a trimmer on the oscillator section of the variable condenser as well as one mounted on the broadcast oscillator coil. In others, the adjusting screw has been removed from the trimmer on the variable condenser and only the trimmer on the oscillator coil used. It will be found that in sets using both condensers, that maximum output cannot be reached even though one of the trimmers is screwed all the way in, making it necessary to use the other trimmer. In effect, both trimmers are in parallel when the Wave Switch is in the broadcast position.

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the trimmer on the translator section of

COLONIAL RADIO CORP.

In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multilayer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

The 75 AVC-Detector-AF Circuit:

The IF signal existing at the IF output transformer secondary is impressed between the diode plates and the cathode of the 75 tube, in series with the 500 M ohms of the Volume Control and the 50 M ohm resistor. Diode current flows, creating a voltage drop across these resistances. Only the drop across the Volume Control resistance is used for AVC voltage. The control grid returns of the 6A7 and 78 tubes are connected through filter resistances to one end of the Volume Control. This end is negative with respect to the other end of the control so that the voltage drop across it, due to the diode current, is impressed as negative bias on the control grids of the 6A7 and 78 tubes. Any increase in signal strength increases the 75 diode current, increases the voltage drop across the Volume Control, and so increases the negative bias of the 6A7 and 78 tubes with resultant decrease in tube amplification. Since increases in signal strength are offset by decreases in tube amplification, the input to the detector tends to remain at a constant value.

Any desired portion of the audio component across the Volume Control may be picked off by the movable arm of the control and fed through the .01 mfd. condenser to the triode section of the 75 tube. It is there amplified and then coupled to the 43 output tube.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment (Broadcast):

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1660 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. Some of these sets have a trimmer on the oscillator section of the variable condenser as well as one mounted on the broadcast oscillator coil. In others, the adjusting screw has been removed from the trimmer on the variable condenser and only the trimmer on the oscillator coil used. It will be found that in sets using both condensers, that maximum output cannot be reached even though one of the trimmers is screwed all the way in, making it necessary to use the other trimmer. In effect, both trimmers are in parallel when the Wave Switch is in the broadcast position.

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Since the adjustments are interacting to an extent, it is advisable to repeat the entire operation.

Always use as low an output from the test oscillator as possible.

Short Wave Alignment:

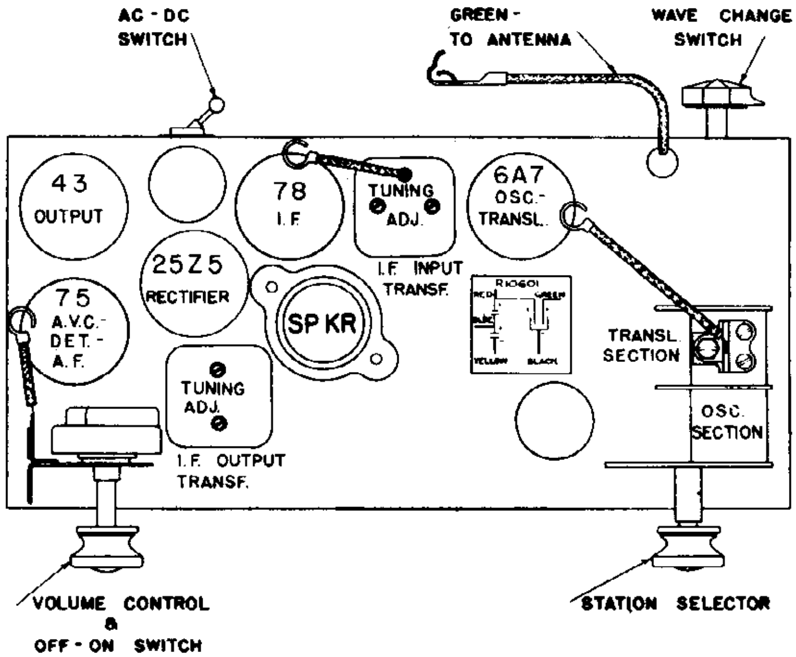
Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer on the short wave translator coil for maximum output.

HUM BALANCE

There is an Isolantite base condenser mounted under the chassis immediately below the volume control. This condenser is used to minimize hum. With the set detuned and the volume control on full, adjust this condenser until the point affording minimum hum is found.

MODEL 657
Socket Layout
Trimmers
Parts List

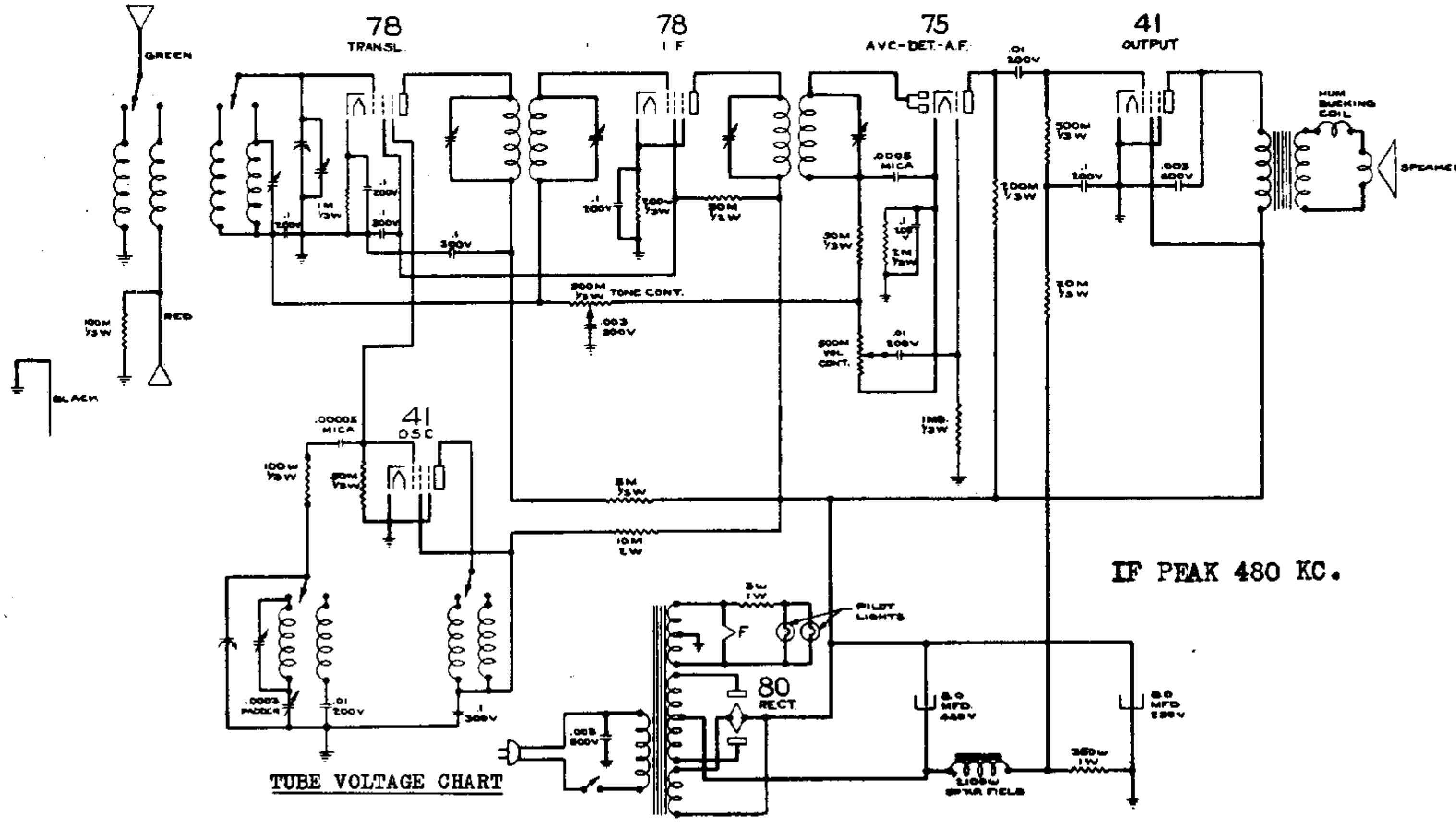
COLONIAL RADIO CORP.



REPLACEMENT PARTS AND PRICE LIST

PART NO.	DESCRIPTION	PRICE
R8297A	Board - Terminal, double	.04
R8308A	Board - Terminal, triple	.05
R10859	Cabinet	5.58
R7011A	Clip - Antenna and ground leads	.04
R11043	Clip - Grid	.01
R10198	Coil - Antenna	.56
R10199	Coil - Oscillator	.35
R9565	Coil - Antenna wave trap	.36
R9829D	Coil - Antenna, short wave	.73
R9829C	Coil - Oscillator, short wave	1.01
R10605	Condenser - Variable	2.82
R10605A	Condenser - Variable, with pilot light bracket assembly	3.42
R10601	Condenser - Electrolytic, dry, block	3.89
R10197	Condenser - Trimmer, 25 mmf.	.15
R9975	Condenser - Padding, 325 mmf.	.37
R6444	Condenser - .1 mfd. 200 volts	.17
R8301	Condenser - .1 mfd. dual, 200 volts	.32
R6761	Condenser - .02 mfd. 600 volts	.18
R8432	Condenser - .01 mfd. 200 volts	.16
R7681	Condenser - .003 mfd. 600 volts	.16
R6759	Condenser - .001 mfd. mica	.25
R6760	Condenser - .0005 mfd. mica	.20
R8621	Condenser - .00005 mfd. mica	.20
R7585	Resistor - 1 megohm, 1/3 watt carbon	.18
R7228	Resistor - 500 M ohms, 1/3 watt carbon	.18
R6638	Resistor - 200 M ohms, 1/3 watt carbon	.18
R6637	Resistor - 50 M ohms, 1/3 watt carbon	.18
R6445	Resistor - 50 M ohms, 1/2 watt carbon	.20
R7587	Resistor - 10 M ohms, 1/3 watt carbon	.18
R7226	Resistor - 5 M ohms, 1/3 watt carbon	.18
R6634	Resistor - 2 M ohms, 1/3 watt carbon	.18
R7227	Resistor - 200 ohms, 1/3 watt carbon	.18
R8922	Resistor - 100 ohms, 1/3 watt carbon	.18
R8562	Resistor - 400 ohms, 3 watt, flexible	.21
R9360	Shield - Tube	.09
R8366	Socket - 4 prong	.07
R8092	Socket - 6 prong	.09
R8072	Socket - 7 prong	.10
R8445	Socket - Pilot light	.19
R10600A	Speaker	5.37
R8076	Switch - AC-DC	.93
R10207	Switch - Wave	.59
R10208A	Transformer - IF input	1.51
R10209	Transformer - IF output	1.49

COLONIAL RADIO CORP.



IF PEAK 480 KC.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE	SCREEN	CATHODE
78 - Translator	-	200	85	3
41 - Oscillator	-	100	100	0
78 - IF	-	220	85	.6
75 - AVC-Det-AF	-	85		.4
41 - Output	-	215	220	0

The voltage drop created across the 500 M ohms of the volume control, due to the diode current of the 75 tube, is used for AVC voltage.

POWER TRANSFORMER COLOR CODE

PRIMARY: Green. Black.

RECTIFIER PLATE: Red. Blue. Slate, center tap.

RECTIFIER FILAMENT: #19 single cotton enamel with red tracer.

HEATERS: #19 single cotton enamel.

MODEL 658
Alignment, Trimmers
Socket Layout

COLONIAL RADIO CORP.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube. Leave the grid clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid of the 78 translator tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment (Broadcast):

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1660 kilocycles.

3. Screw the oscillator padder condenser to approximately three quarters of its maximum capacity.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output.

5. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the translator trimmer, mounted on the variable condenser section nearer the dial, for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

7. Repeat the 1660 kc and 1400 kc adjustments.

Always use as low an output from the test oscillator as possible.

Short Wave Alignment:

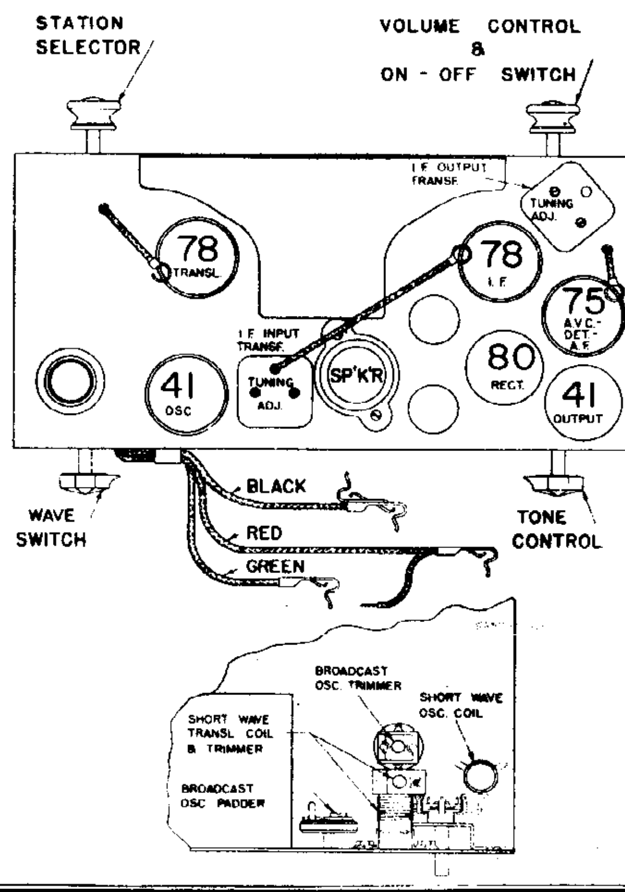
1. Leave the test oscillator coupled to the green antenna lead as for broadcast alignment.

2. Set the test oscillator to 16 megacycles and tune in its signal. Then adjust the trimmer condenser, mounted on the short wave translator coil, for maximum output.

In order to reduce the distributed capacity and thereby extend the high frequency limit of the receiver, the grid and plate leads to the oscillator coil and oscillator socket must be kept out in the open and as far removed from the metal of the chassis as possible.

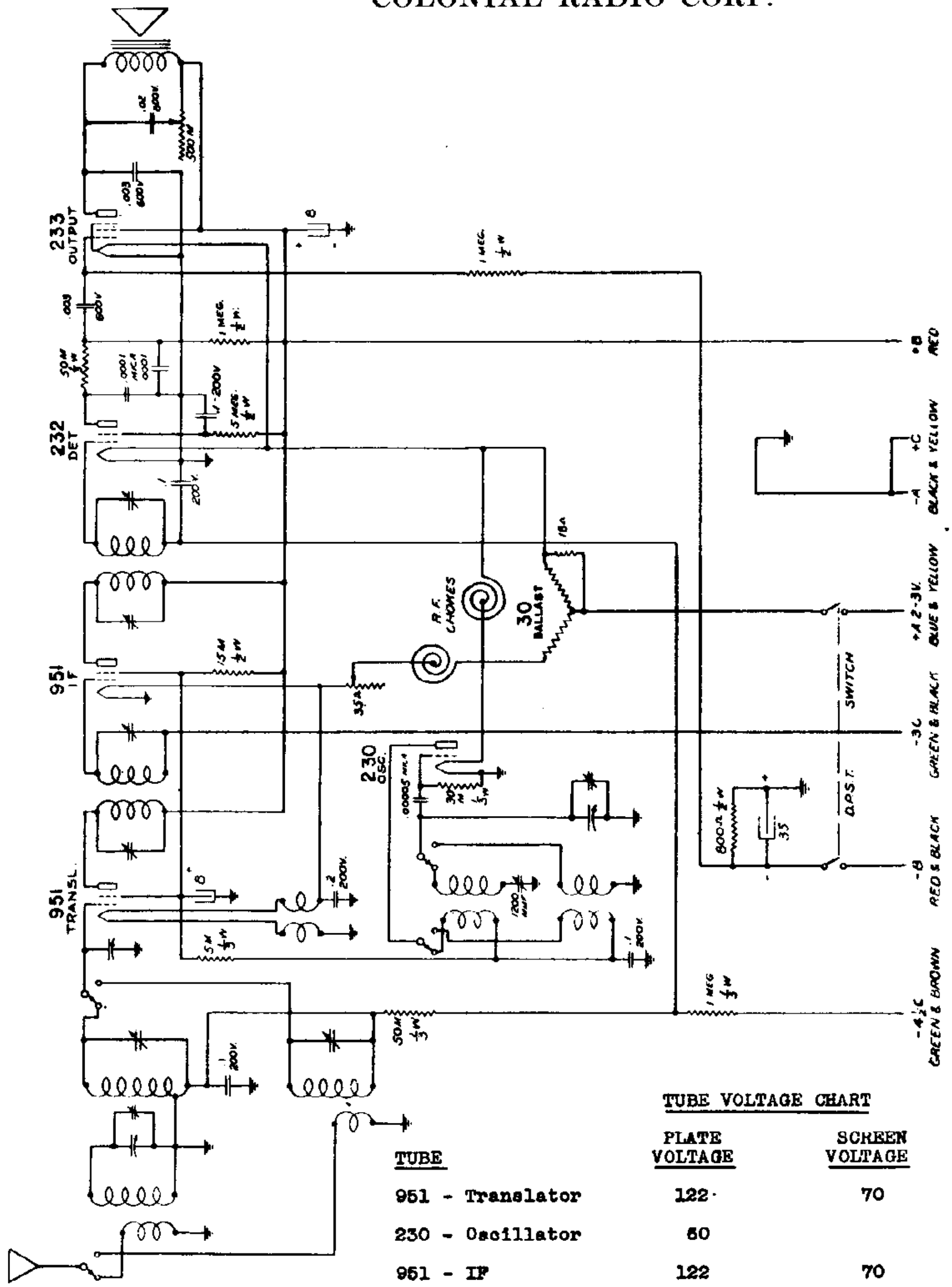
TUBE REPLACEMENT

There are two wood screws inside the cabinet, at the upper rear corners. These are used to secure the cabinet top, for shipping purposes only. They can be easily removed if the rear panel of the cabinet is taken off. Once removed, they need not be replaced. To remove the cabinet top then, for tube replacement, take out the single screw at the top center of the rear panel and push the top up and off.



MODEL 659
Schematic, Voltage

COLONIAL RADIO CORP.



IF PEAK 480 KC.

TUBE VOLTAGE CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	CONTROL GRID VOLTAGE
951 - Translator	122	70	-.1
230 - Oscillator	60		-.6
951 - IF	122	70	-.8
232 - Detector	22.5*	5*	-.1
233 - Output	115	122	-.1

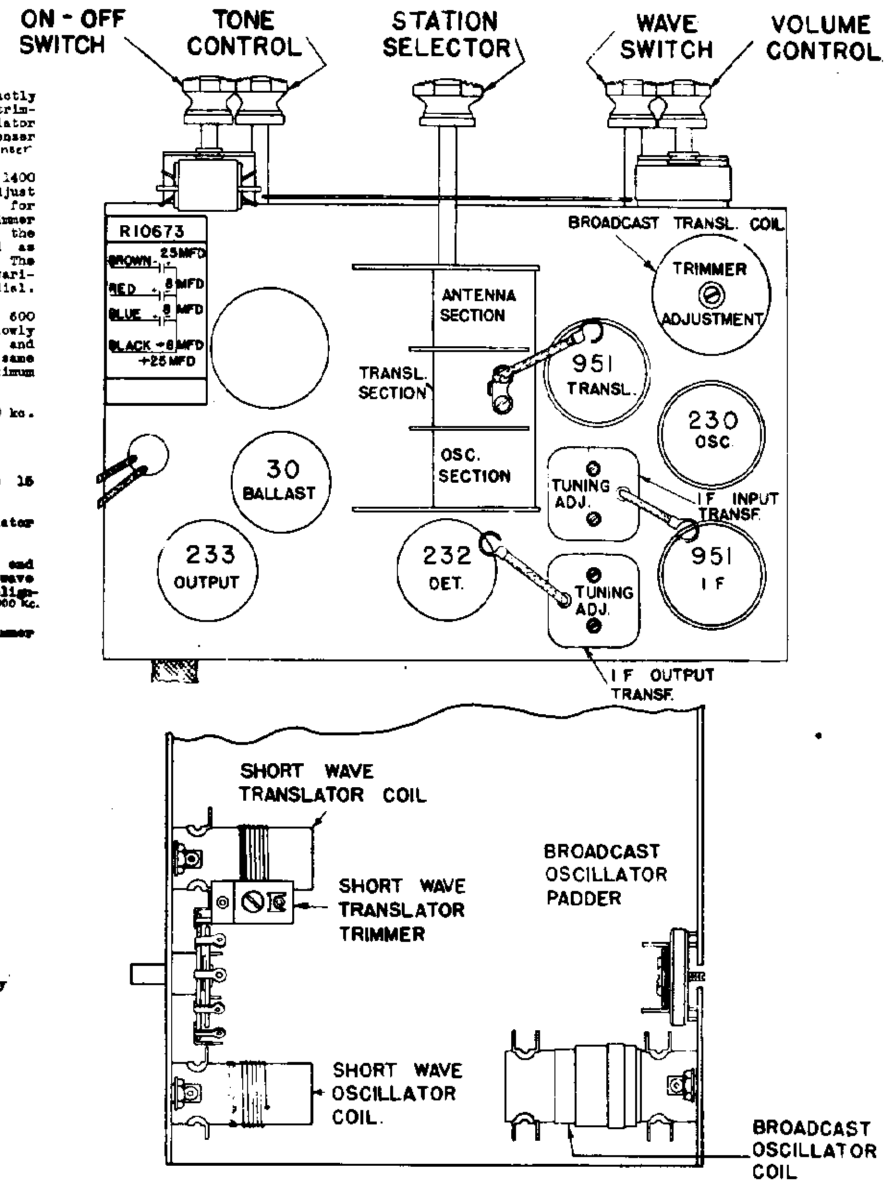
NOTE: All control grid readings are lower than the actual applied voltage due to high series resistance in the circuit.

* - Indicates low reading due to high series resistance in circuit.

All readings are to be taken between the chassis and the respective element of each tube.

MODEL 659
Alignment, Parts
Socket, Trimmers

COLONIAL RADIO CORP.



ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid of the IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc. and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment: (Broadcast)

1. Set the test oscillator to exactly 1600 kc.

2. Couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

3. Turn the dial pointer to exactly 1600 kc. and adjust the oscillator trimmer for maximum output. The oscillator trimmer is on the variable condenser section furthest from the dial. Condenser plates are at minimum capacity

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the translator and antenna trimmers for maximum output. The translator trimmer is accessible through the hole in the top of the translator coil shield as shown in the Service Illustration. The antenna trimmer is the one on the variable condenser section nearest the dial.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Repeat the 1600 kc. and 1400 kc. adjustments.

Short Wave Alignment:

1. Set the test oscillator to 15 megacycles and tune in its signal.

2. Adjust the short wave translator trimmer for maximum output.

3. If necessary, shift the end turns (enamelled wire) of the short wave translator coil to secure accurate alignment and maximum output. Do this at 6000 kc.

4. Re-adjust the translator trimmer at 15 megacycles.

REPLACEMENT PARTS AND PRICE LIST

PART NO.	DESCRIPTION
R8363	Resistor - 5 megohms, 1/2 watt carbon
R5823	Resistor - 1 megohm, 1/2 watt carbon
R7585	Resistor - 1 megohm, 1/3 watt carbon
R6637	Resistor - 50 M ohms, 1/3 watt carbon
R6110	Resistor - 30 M ohms, 1/3 watt carbon
R7291	Resistor - 15 M ohms, 1/2 watt carbon
R7226	Resistor - 5 M ohms, 1/3 watt carbon
R7441	Resistor - 800 ohms, 1/2 watt carbon
R10598	Resistor - 18 ohms, 1/2 watt, flexible
R10670	Coil - Antenna, broadcast
R10674	Coil - Oscillator, broadcast
R10671	Coil - Translator, broadcast
R10931A	Coil - Antenna, short wave
R10931B	Coil - Oscillator, short wave
R10672	Condenser - Variable
R10672B	Condenser - Variable, complete with dial and drive assembly
R10673	Condenser - Electrolytic, block
R9426	Condenser - Padding
R10187	Condenser - Trimmer
R6380	Condenser - .2 mfd. 200 volts
R6444	Condenser - .1 mfd. 200 volts
R6761	Condenser - .02 mfd. 600 volts
R7681	Condenser - .003 mfd. 600 volts
R4303	Condenser - .0001 mfd. mica
R8621	Condenser - .00005 mfd. mica
R10716A	Transformer - IF input
R10717	Transformer - IF output

CROSLEY RADIO CORP.

Model 103

Specifications

Model 103 is a five tube superheterodyne designed for operation from a six volt automobile storage battery. The "B" voltage is furnished by a Crosley Syncronode. The intermediate frequency used is 181.5 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna, and with a battery voltage of 6.3 volts. All voltages are measured from tube contact to chassis with a 300 volt D. C. voltmeter (1000 ohms per volt).

Tube	Position	Plate	Screen Grid	Cathode	Supp. Grid	Filament
78	R. F. Amplifier	210	100	2	2	6.3
78	Oscillator Modulator	210	100	28	0	6.3
6B7	I. F. Amplifier and Diode Detector	210	100	2.5		6.3
78	Audio Amplifier	50	20	2.0	2	6.3
41	Output	195	210	16.0		6.3

Voltage limits are plus or minus 15% of values given.

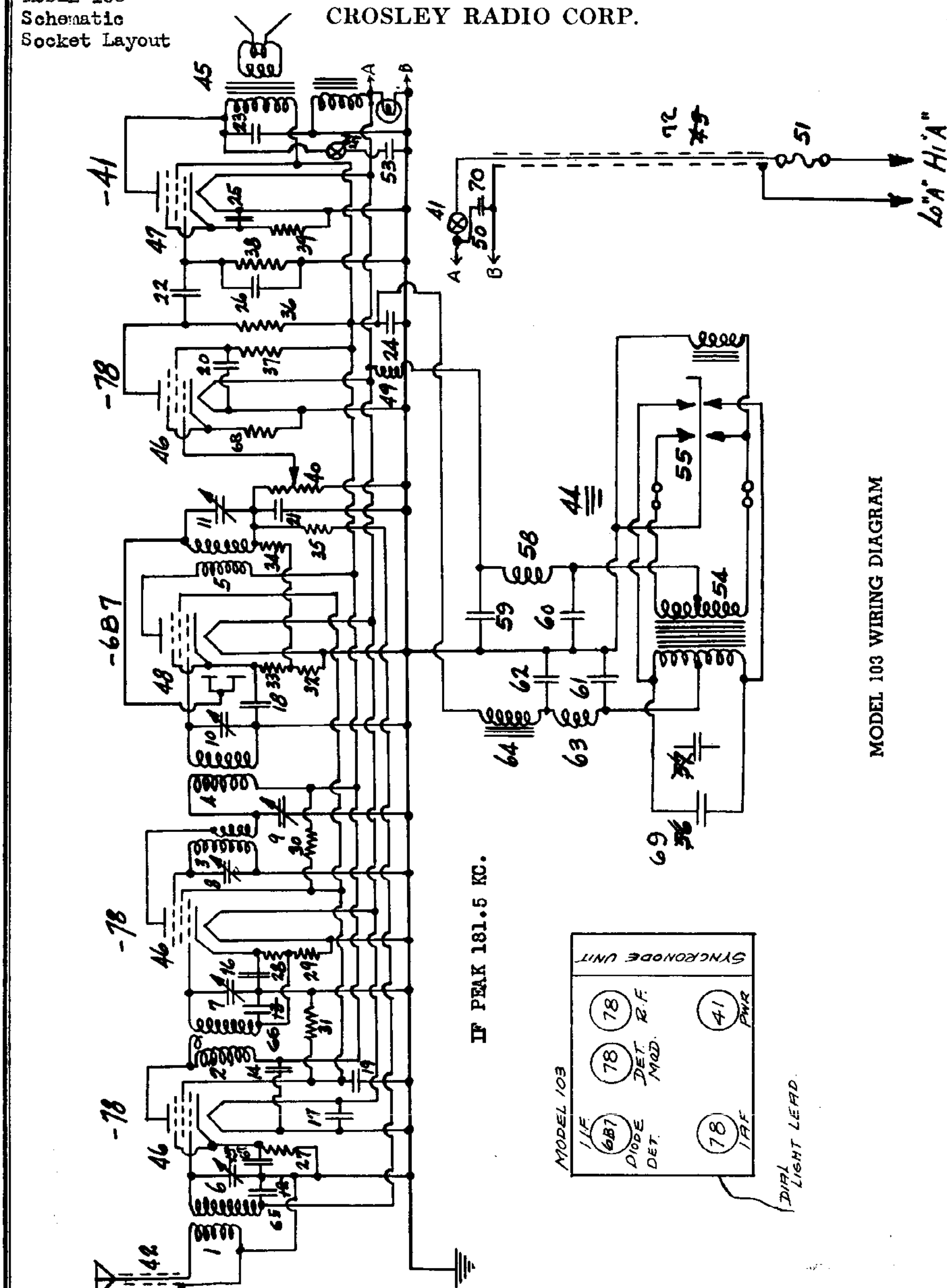
PARTS LIST—MODEL 103

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

Qty.	Part No.	Description	Item	List Each
		RECEIVER CHASSIS		
1	G48-28807	Seven Prong Socket 6B7	48	.10
1	G22-28807	Six Prong Socket 41	47	.10
3	G39-28807	Six Prong Socket 78	46	.10
1	W-27981	Tube Shield Base		.05
1	W-27328	Tube Shield		.10
1	G21-24995	Antenna Coil	1	.40
1	G25-24996	Oscillator Coil	3	.40
1	G7-25968	Radio Frequency Coil	2	.50
1	G1-25444	I. F. Transformer (1st)	4	.75
1	G3-25445	I. F. Transformer (2nd)	5	.75
4	W-25200	Coil Socket		.05
3	W-25024	Coil Shield (Large)		.10
1	W-25025	Coil Shield (Small)		.10
1	G1-29551	Coil Shield Assembly		.15
1	W-29263	Coil Bracket		.05
5	W-24360	Insulating Washer		.05
5	W-21541B	Coil Retaining Ring		.05
1	L-29783	Variable Condenser Gang	6, 7, 8	3.25
1	G1-29302	Coupling Assembly		.40
1	W-30436	Volume Control & Switch	40, 41	1.10
2	G2-25948	I. F. Trimmer Condenser	9, 11	.30
1	W-25008	I. F. Condenser Blade	10	.05
1	W-25584	Mica		.05
1	R-80	Screw		.05
1	W-26060B	Adjusting Nut		.05
1	W-24865	Washer		.05
1	W-25450B	Insulating Washer		.05
1	W-25007B	Insulating Washer		.05
1	W-25446	Bakelite Washer		.05
1	O-4	Flat Washer		.05
1	M-20	Rivet		.05
1	G4-28067	"A" Choke	49	.35
2	21454	Resistor 1 megohm	34, 35	.15
1	23785	Resistor 500,000 ohm	37	.15
1	21875	Resistor 100,000 ohm	36	.15
2	22514	Resistor 750 ohm	39, 68	.15
1	W-30127	Resistor 450 ohm	28	.15
1	W-21237	Resistor 60,000 ohm	31	.15
1	W-25357	Resistor 75 ohm	33	.10
1	W-21455	Resistor 300,000 ohm	38	.15
1	31094	Resistor 4,500 ohm	71	.15
2	W-21964	Resistor 165 ohm	27, 32	.15
1	23616	Resistor 15,000 ohm	30	.15
1	W-26571	Condenser .005 Mfd	21	.15
1	W-23142	Condenser .02 Mfd	22	.20
1	W-30419	Condenser 8-8 Mfd	24, 25	1.40
1	W-23635	Condenser .06 Mfd	23	.20
2	W-20389	Condenser .00005 Mfd	26, 70	.25
1	W-23615	Condenser .05 Mfd	14	.15
1	W-25438	Condenser .1-.1 Mfd	19, 20	.25
2	W-24040A	Condenser .1 Mfd	17, 18	.15
4	W-27203	Condenser .02 Mfd	16, 65, 66, 67	.15
		MODEL 409 SYNCRONODE	44	
1	L-30424	Cover		.50
1	C-30455	Chassis		.50
1	L-29160	Vibrator Assembly	55	4.50
1	G2-28067	"A" Choke Assembly	58	.35
1	G7-28065	Power Transformer	54	2.25
1	G1-24234	R. F. Choke Assembly	63	.15
1	G7-28069	Filter Choke	64	1.45
1	W-29806	Condenser 12 Mfd	62	1.35
		MODEL 409 SYNCRONODE		
1	W-30307	Condenser .25 Mfd	60	.30
1	W-30306	Condenser .5 Mfd	59	.50
1	W-23142	Condenser .02 Mfd. (400 v.)	61	.20
1	W-30984	Condenser .02 Mfd. (800 v.)	69	.30
4	W-29314	Rubber Sleeve (to Mount Sync.)		.05
1	W-20264	Terminal Board		.15
		MODEL 358-3C SPEAKER	45	
1	G2-29529	Cone Assembly		2.50
1	W-29777	Field Coil		1.00
1	G4-24028	Transformer Assembly		1.40
		MISCELLANEOUS		
1	L-30452	Receiver Case		.65
1	C-30450	Cover		.25
1	C-30451	Bottom		.25
1	L-28034	Remote Control		4.11
1	W-28102A	Clamp Spring		.15
8	W-20070	Suppressor (Spark Plug)		.50
1	W-20071	Suppressor (Dist. Head)		.50
3	W-29754	Elim. Condenser		.45
1	W-25784	Tennaflex		1.50
1	W-29323	Mounting Bolt		.10
1	W-29324	Mounting Washer		.05
1	7961	Mntg. Shakeproof Washer		.05
1	W-29325	Mounting Nut		.05
2	W-30739	No. 8x½ P. K. Screw (Top & Bottom)		.05
4	W-30739	No. 8x½ P. K. Screw (Chassis to case)		.05
30	W-31050	No. 8x¼ P. K. Screw (Case)		.05
4	W-31070	6-32x½ Screw (Speaker)		.05
4	W-24074	Elastic Stop Nut (Speaker)		.05
4	O-6	Flat Washer (Speaker)		.05
3	W-20800	Shakeproof Washer (Spr.)		.05
1	W-4562	Solder Lug (Speaker)		.05
1	G1-25891	Antenna Wire		.75
1	W-28010	Antenna Wire Shield	42	.25
1	W-31100	"A" Cable & Fuse Assem.	72	.55
1	W-31102	Fuse Carrier only		.10
1	W-20106	Fuse Carrier Cap		.05
1	W-20110	Spring		.05
2	W-20107	Washer		.05
1	W-31103	10 Ampere Fuse		.10
66"	W-31101	Wire		.03 Ft.
1	W-31076	Lug		.05
1	W-26156A	Switch	52	.30
1	W-23191	Condenser .01 Mfd	53	.25
1	W-29298	Grill Cloth		.15
1	B-29309	Mounting Plate		.20
		REMOTE CONTROL		
1	G8-25868	Drive Shaft Assem. (V. C.)		1.65
1	G9-25868	Drive Shaft Assem. (Dial)		1.55
1	G1-28065	Strap Assembly		.15
1	W-28029B	Column Bracket		.20
1	G4-26317	Bracket Assem.		.30
1	W-29316A	Gear Dial		.30
1	W-4907	Spring Washer		.05
1	G5-23472	Knob		.10
1	G1-28036	Key Knob		.20
1	B-26307D	Housing		.80
1	W-28025C	Cover		.30

MODEL 103
Schematic
Socket Layout

CROSLEY RADIO CORP.



CROSLEY RADIO CORP.

Model 169

Specifications

Model 169 is a four-tube superheterodyne designed for operation from AC electric circuits. It uses an intermediate frequency of 456 kc.

Tubes And Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 for a 220 volt receiver). All voltages, except filament, are measured from tube contact to chassis with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Supp. Grid	Filament
58	Oscillator-modulator	165	82	22	0	2.5
6F7	I. F. Detector	165	82	2	0	2.5
2A5	Output	158	165	10		2.5
80	Rectifier	295				4.9

Voltage limits are plus or minus 10% of values given.

PARTS LIST—MODEL 169

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

* Figures in 2nd last column refer to parts shown in diagram.

Qty.	Part No.	Description	*	List Price Each
1	G20-24995	Antenna Coil	2	.65
1	G17-24996	Oscillator Coil	3	.80
1	G7-25444	First I. F. Transformer	4	.60
1	G9-25445	Second I. F. Transformer	5	.50
1	W25024	Coil Shield (Large)		.10
3	W25025	Coil Shield (Small)		.10
4	W25200	Coil Socket		.05
2	W20891	Insulating Washer		.05
2	W24300	Insulating Washer		.05
4	W21541B	Coil Retaining Ring		.05
1	W29959	Wave Change Switch	40	.80
1	W27435	Variable Condenser Gang	6	2.75
1	G1-27812	Dial Light Assem.	43	.20
1	G5-25050	Dial Assem.		.40
1	G2-25948	Variable I. F. Condenser (1st I. F. Pri.)	7	.30
1	G10-25948	Variable I. F. Condenser (2nd I. F. Sec.)	9	.15
1	W27548	Adjustable I. F. Cond. Blade (1st I. F. Sec.)	8	.05
1	W25584	Mica		.05
1	R-80	Screw		.05
1	W26069B	Adjusting Nut		.05
1	W24865	Metal Washer		.05
1	W25450B	Insulating Washer		.05
1	W25007B	Insulating Washer		.05
1	W25446	Bakelite Washer (Large)		.05
1	0-4	Washer		.05
1	M-20	Rivet		.05
1	W20264	A G. Terminal	1	.15
1	G24-27456	Socket -58	32	.10
1	G49-27456	Socket -6F7	33	.10
1	G43-27456	Socket -2A5	34	.10

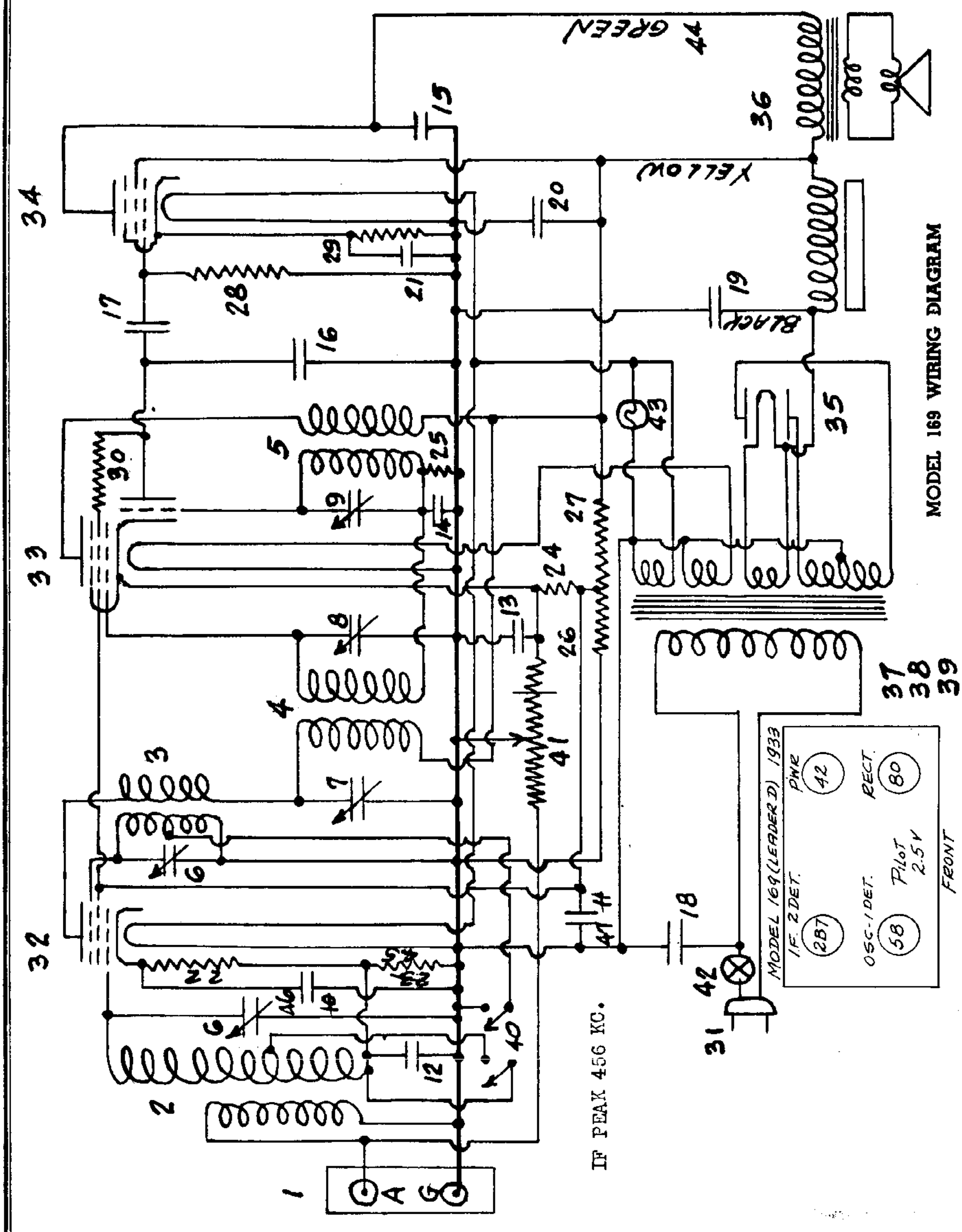
Qty.	Part No.	Description	*	List Price Each
1	G6-27456	Socket -80	35	.10
2	W-26010	Tube Shield Base		.05
1	W-27328	Tube Shield (6F7)		.10
1	B-26000	Tube Shield (58)		.10
1	B-21491	AC Cable & Plug	31	.25
1	W31000A	Speaker Cable	44	.25
1	W26573B	Volume Control & Switch	41-42	1.00
2	G1-23472	Knobs		.10
1	G1-28500	Power Transf. 110 volt, 60 cy.	37	2.25
1	G2-28500	Power Transf. 110 volt, 25 cy.	38	3.00
1	G3-28500	Power Transf. 220 volt, 25 cy.	39	3.25
		FILTER & BYPASS CONDENSERS		
1	W27294	Condenser .02-.02 Mfd.	12-13	.25
1	W24049	Condenser .1 Mfd.	14	.15
1	W23101	Condenser .01 Mfd.	15	.25
1	W25337	Condenser .001-.03 Mfd.	16-17	.30
1	W29592	Condenser .003 Mfd.	18	.20
2	W27203	Condenser .02 Mfd.	46-47	.15
1	W20150	Condenser 6 -7 -8 Mfd.	19-20 21	2.90
		RESISTORS		
1	W25037	Resistor 275 ohm	22	.15
1	24900	Resistor 25,000 ohm	24	.20
1	21454	Resistor 1 megohm	25	.15
1	W28471	Resistor 25000-8500 ohm	26-27	.45
2	23785	Resistor 500,000 ohm	28-30	.15
1	W25521	Resistor 450 ohm	29	.15
1	31094	Resistor 4500 ohm	45	.15

SPEAKER PARTS * 36

	Magnavox 342-2M Spec. 1300	Jensen 342-2J Spec. 2617		
1	28761	29434	Cone & Voice Coil Assem.	2.00
1	28763	29436	Field Coil	1.10
1	28764	29437	Transformer	1.25

MODEL 169
Schematic
Socket Layout

CROSLEY RADIO CORP.

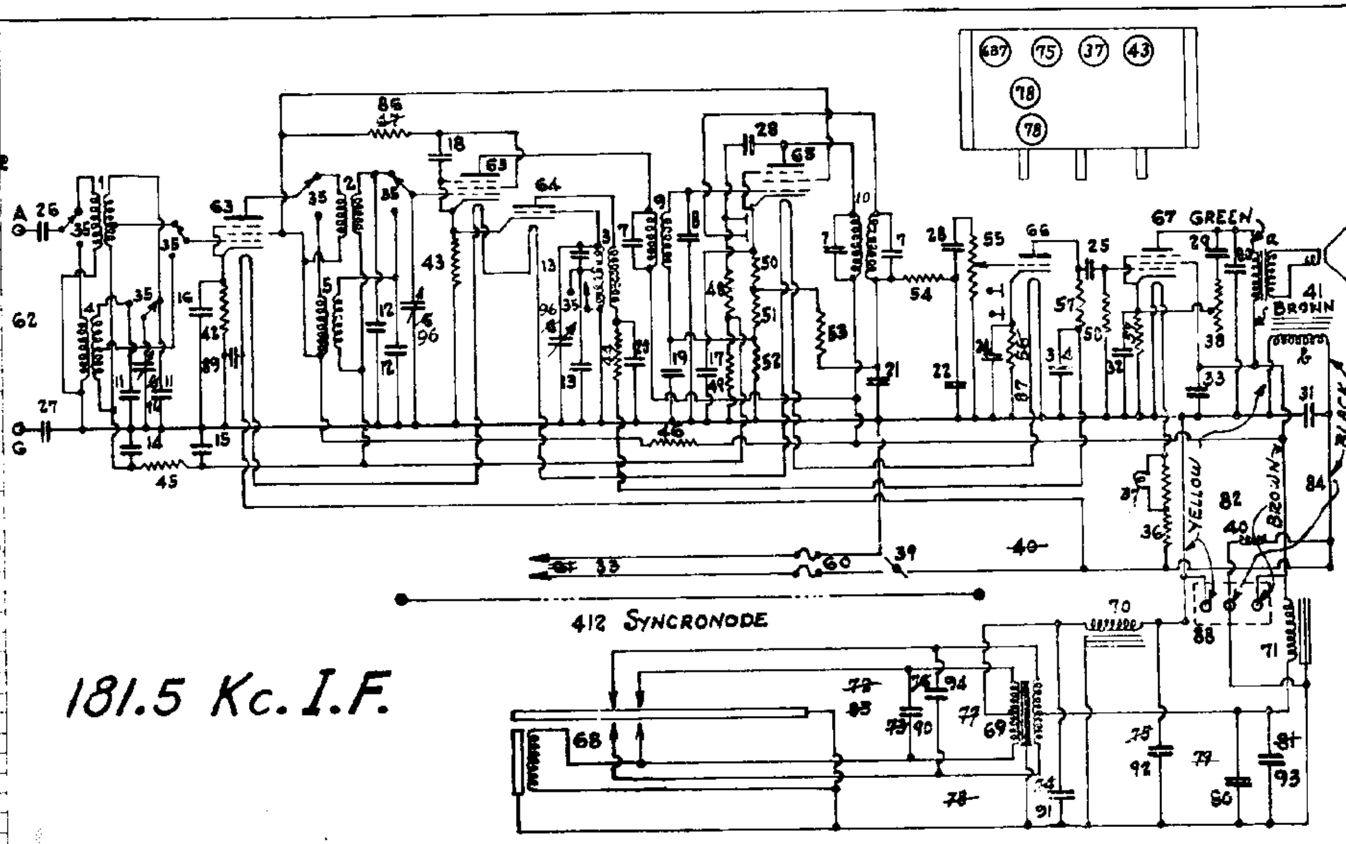


MODEL 119
Schematic, Socket
Parts List

CROSLEY RADIO CORP.

1	G7-24995	La.F. Ant. Trans.
2	G2-25968	La.F. R.F. Trans.
3	G18-24996	Oscillator Coil
4	G14-24995	Hi.F. Ant. Trans.
5	G3-25968	Hi.F. R.F. Trans.
6	~~[illegible]~~	~~Variable Cond.~~
7	~~G7-25440~~	~~I.F. Tuning Condenser~~
8	W-25008A	I.F. Tuning Condenser
9	G1-25444	1st I.F. Trans.
10	G6-25444	2nd I.F. Trans.
11	G1-29699	Ant. Trans. Trim. Cond.
12	G1-29699	R.F. Trans. Trim. Cond.
13	G1-29699	Osc. Coil Trim. Cond.
14	W-27204	0.02 MFD. 200V.
15		0.02 MFD. 200V.
16	W-27204	0.02 MFD. 200V.
17		0.02 MFD. 200V.
18	W-27203	0.02 MFD. 200V.
19	W-27203	0.02 MFD. 200V.
20	W-27203	0.02 MFD. 200V.
21	W-26152A	0.00015 MFD. 400V.
22		0.0001 MFD. 400V.
23	W-23142	0.02 MFD. 440V.
24	W-24784	0.25 MFD. 200V.
25	W-23615	0.05 MFD. 400V.
26	W-23635	0.006 MFD. 400V.
27	W-27688	0.1 MFD. 400V.
28	W-27540	0.0005 MFD. 400V.
29	W-25517A	0.05 MFD. 400V.
30		0.008 MFD. 400V.
31	W-24049	0.1 MFD. 200V.
32	W-30568A	8 MFD. 25V.
33		18 MFD. 250V.
34		8 MFD. 250V.
35	B-30569-C	6P. D.T. Switch
36	W-30574	12Ω 1W. 18Ω
37	W-4099B	6.3V. Dial Light
38	W-25594B	Tone Control
39		S.P.S.T. Switch
40	G3-28067	Filter Choke
41	30591 A	338-DR Speaker
42	W-25937	275Ω
43	W-30127	450Ω
44	21876	10,000Ω
45	23785	500,000Ω
46	W-23013	2000Ω
47	~~26690~~	~~4500~~
48	26577	3 MEG.
49	26577	3 MEG.
50	W-21964	165Ω
51	W-21962	165Ω
52	W-25937	275Ω
53	21454	1 MEG
54	23785	500,000Ω
55	W-25666B	Level Control
56	~~26690~~	~~4500Ω~~
57	21455	300,000Ω
58	23785	500,000Ω
59	W-23907	750Ω
60	W-7983-A	3 Amp. Fuse
61	~~B-21491A~~	~~Cord & Plug~~
62	G7-26719	Ant.-Gnd Term.

[illegible]	G39-27456	78 Socket
[illegible]	G12-27456	37 Socket
[illegible]	G48-27456	6B7 Socket
[illegible]	G41-27456	75 Socket
[illegible]	G30-27456	43 Socket
[illegible]	L-28949	Vibrator Assem.
[illegible]	[illegible] 28065	Power Trans.
[illegible]	[illegible]	"A" Filter Choke
[illegible]	[illegible]	"B" Filter Choke
[illegible]	[illegible]	~~0.01 MFD 600V.AC.~~
73	W-29012	~~2.5 MFD. 40V.~~
74		~~12 MFD. 40V~~
75	~~W-28682~~	~~0.1 MFD. 200V~~
76	W-28622	~~0.1 MFD. 200V~~
77		~~0.1 MFD. 200V~~
78	~~W-23012-A~~	~~40Ω~~
79	~~W-28682~~	~~0.1 MFD 200V.~~
80	W-28978 B	12 MFD. 150V.
81	~~W-30867~~	~~0.25 MFD 160V.~~
82	W-28980	"A"+B Supply Cable
83	B-30375-A	Cord + Plug
84	W-31007	Speaker Cable
85	~~W-29810 A~~	~~.01 MFD. 200V.A.C.~~
86	31094	4500Ω
87	31094	4500Ω
88	G2-31128	Syn. Term. Board
89	W-20707	.0005 MFD. Mica
90	W-31404	.5 MFD. 300V.
91	W-31403-A	.12 MFD. 40V
92	W-30366	5 MFD
93	W-30366	5 MFD.
94	W-29810	.01 MFD. 800V.A.C.
95	G20-25948	I.F. Tuning Condenser
96	G10-33002	Variable Condenser
97		
98		
99		
100		
101		
102		



A	Item 61 replaced by 83	8-29-33	S-392	
B	Item 56 marked 300,000Ω thru error	9-20-33	3505	
C	Item 84 added. Item 41 was 30591	10-11-33 Rec'd	3518	N
D	Item 72 replaced by 85 Item 93 changed to "B"		3519	M
E	Item 47 replaced by 86 Item 56 replaced by 87	10-24-33	3523	L
F	Item 88 added	11-7-33	3527	K
G	Item 89 added	11-21-33	3536	J
H	401 Syncronode replaced with 412		S-457	H
J	Position of item 40 changed	12-21-33	S-465	G
K	Item 94 added	1-17-34	S-478	F
L	Item 80 chg'd. to "B" Items 32 33 34-91 chgd. to "A"	4-11-34	S-526	E
M	Item 7 replaced by item 95	4-17-34	S-530	D
N	Item 6 replaced by item 96	4/18/34	3596	C
				B
				A

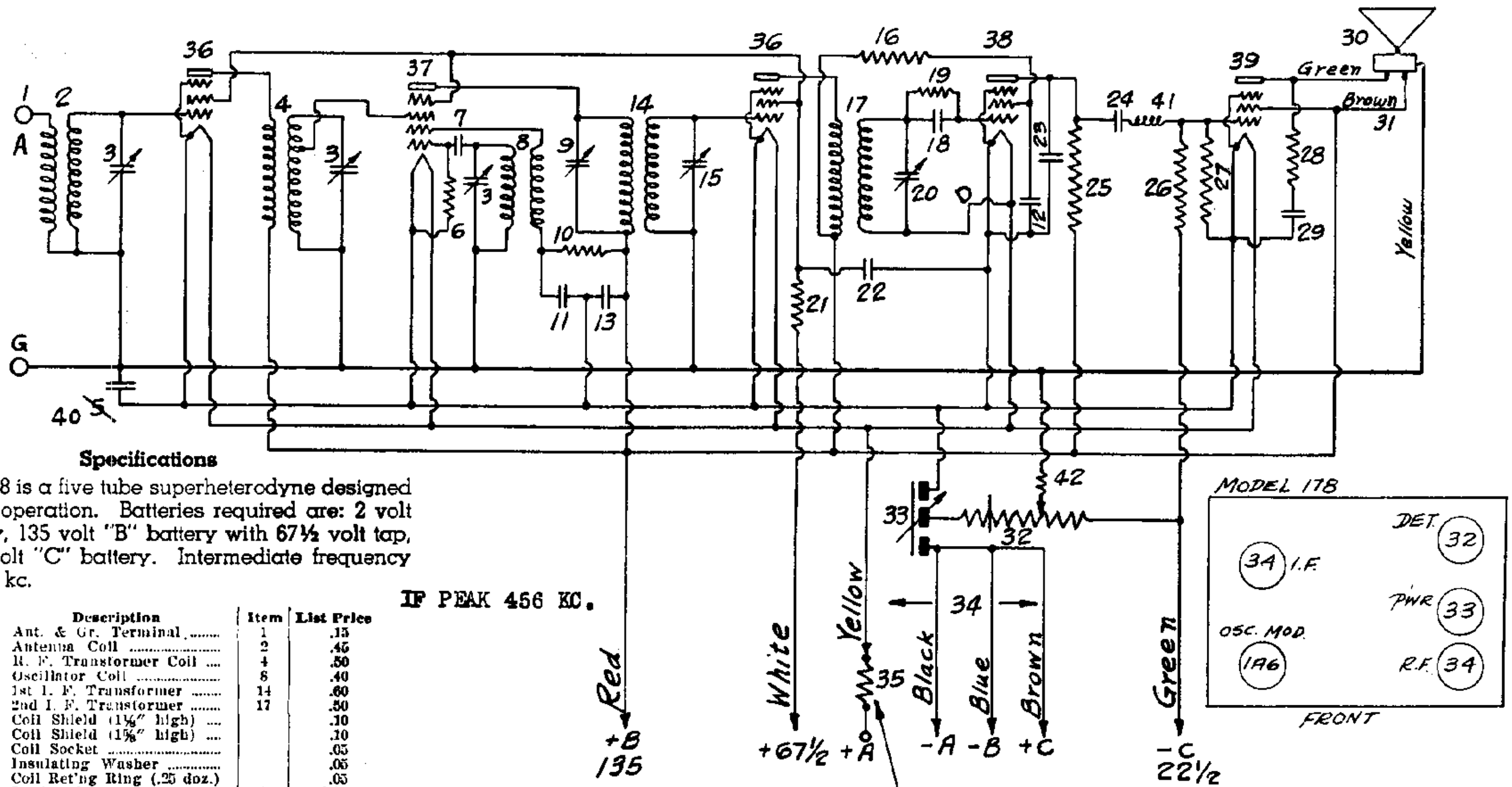
THE CROSLEY RADIO CORPORATION CINCINNATI, OHIO

119 WIRING DIAGRAM

APPROVED	DATE	DWG. NO.
8-18-33	8-12-33	B-30570

MODEL 178
Schematic, Voltage
Parts List, Socket

CROSLEY RADIO CORP.



MODEL 178 WIRING DIAGRAM

IF PEAK 456 KC.

Specifications

Model 178 is a five tube superheterodyne designed for battery operation. Batteries required are: 2 volt "A" battery, 135 volt "B" battery with 67½ volt tap, and 22½ volt "C" battery. Intermediate frequency used is 456 kc.

Part No.	Description	Item	List Price
LW20264	Ant. & Gr. Terminal	1	.15
G10-24993	Antenna Coil	2	.45
G8-25968	R. F. Transformer Coil	4	.50
G13-24996	Oscillator Coil	6	.40
G7-25444	1st I. F. Transformer	14	.60
G9-25445	2nd I. F. Transformer	17	.50
W25025A	Coil Shield (1⅛" high)		.10
W25024A	Coil Shield (1⅝" high)		.10
W25200	Coil Socket		.05
W24360	Insulating Washer		.05
W21541B	Coil Ret'ng Ring (.25 doz.)		.05
B28974	Tuning Condenser gang	3	3.25
G11-25030	Dial Drive Assembly		.30
G2-25048	I. F. Tuning Condenser	9	.30
W27548	I. F. Tuning Cond. Blade	15	.05
W25584	Mica Insulator		.05
R80	Screw		.05
W26060B	Adjusting Nut		.05
W24865	Metal Washer (Round)		.05
W25450B	Insulating Washer (Small)		.05
W25007B	Insulating Washer (Small)		.05
W25446	Bakelite Washer (Large)		.05
O4	Washer		.05
M20	Rivet		.05
G13-25048	I. F. Tuning Condenser	20	.15
G31-27456	-34 Socket	36	.10
G55-27456	-1A6 Socket	37	.10
G10-27456	32 Socket	38	.10
G36-27456	33 Socket	39	.10
W26973A	Tube Shield Base		.05
W26974B	Tube Shield		.10
B30542A	Battery Cable	34	.70
W27933	Speaker Cable	31	.10
W27039B	Vol. Control & Switch	32-33	1.10
G1-24234	R. F. Choke	41	.30
G1-23472	Knobs		.10
B27818	Bottom		.20

FILTER & BY PASS CONDENSERS

Part No.	Description	Item	List Price
W5382	0.00025 Mfd. Cond.	7-18	.15
W25438	0.1-0.1 Mfd. 200 V. Cond.	11-12	.25
W24784	0.25 Mfd. 200 V. Cond.	13	.20
W30321	1.0 Mfd. 160 V. Cond.	22	.55
W25537	0.001-0.03 Mfd. 400 V. Cond.	23-24	.30
W20559	0.006 Mfd. 200 V. Cond	29	.15
W30306	0.5 Mfd. 160 V. Cond.	40	.50

RESISTORS

Part No.	Description	Item	List Price
W21875	100,000 Ohm Resistor	6-42	.15
W22106	20,000 Ohm Resistor	10	.15
W21454	1 Megohm Resistor	16-26	.15
W26577	3 Megohm Resistor	19-27	.15
W21452	1,100 Ohm Resistor	21	.15
W23403	150,000 Ohm Resistor	25	.15
W24814	7,000 Ohm Resistor	28	.20
G2-23300	53 Ohm (Air Cell) Resistor	35	.15
330-3B	Speaker		5.33

Tube	Position and Use	Plate	Voltages Screen Grid	Grid	Filament
34	RF Amplifier	135	67.5	4.0	2.0
1A6	Oscillator	95	5		
	Modulator	135	67.5	4.0	2.0
34	IF Amplifier	135	67.5	4.0	2.0
32	Detector	50	15	0	2.0
33	Output	135	135	8.0	2.0

Voltage limits are plus or minus 10% of values given.

CROSLEY RADIO CORP.

Model 179

Specifications

Model 179 is a seven tube superheterodyne designed for operation from AC electric circuits. The intermediate frequency used is 181.5 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to chassis with the receivei in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, excep filament, are measured with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

Tube	Position and Use	Voltages				
		Plate	Screen Grid	Cathode	Supp. Grid	Filamen
58	RF Amplifier	260	125	3	3	2.5
58	Oscillator-modulator	260	125	34	0	2.5
58	IF Amplifier	260	125	4	4	2.5
56	Diode detector	0		0		2.5
56	AF Amplifier	50		4		2.5
2A5	Output	250	260	16.5		2.5
80	Rectifier	355				

Voltage limits are plus or minus 10% of values given.

PARTS LIST—MODEL 179

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shippe on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject t the usual trade discounts, and are subject to change without notice.

* Figures in 2nd last column refer to parts shown in diagram on page 18.

Qty.	Part No.	Description	* Item	List Each
1	G7-24995	Low F Antenna Coil	2	.60
1	G14-24995	Hi F Antenna Coil	3	.45
2	G1-29699	Ant. R. F. Coil Trimmer Cond.	10-11 12-13	.20
1	G9-25968	Low F. R. F. Coil	64	.50
1	G5-25968	Hi F. R. F. Coil	5	.55
1	G21-24996	Oscillator Coil	6	.60
1	G1-25444	1st I. F. Trans. Coil	7	.75
1	G1-25948	1st I. F. Prim. 2nd I. F. Prim. 2nd I. F. Sec. Trimmer Cond. Assem.	14-15 16	.60
1	W25008A	1st I. F. Sec. Trimmer Cond. Blade	17	.05
1	R80	Screw		.05
1	W26069B	Adjusting Nut		.05
1	W24865	Metal Washer (round)		.05
1	W25446	Bakelite Washer (large)		.05
1	W25450B	Insulating Washer (small)		.05
1	W25007	Insulating Washer (small)		.05
1	M20	Rivet		.05
1	W25584	Mica Insulator		.05
1	G6-25444	2nd I. F. Trans. Coil	8	.80
7	W25200	Coil Sockets		.05
5	W25024A	Coil Shield (1⅝" high)		.05
3	W25025A	Coil Shield (1⅛" high)		.10
7	W21541B	Retainer Ring (.25 doz.)		.05
4	W24360	Square Hole Ins. Washer		.05
3	W26891	Semi-Cir. Hole Ins. Wash.		.05
1	C30704	Var. Tun. Cond Gang	9	3.50
1	G3-27134	Dial Light Socket Assem.		.15
1	G25-25751	Dial Assembly		.90
1	B29787	Dial Cover (celluloid)		.30
1	B30569B	6 P. D. T. Switch	33	1.90
1	LW-20264	Ant.-Gnd. Terminal	1	.15
1	G6-27456	-80 Socket	51	.10
3	G24-27456	-58 Socket	52-53 54	.10
2	G18-27456	-56 Socket	55-56	.10
1	G43-27456	2A5 Socket	57	.10
3	W26010	Tube Shield Base		.05
3	B26009C	Tube Shield		.10

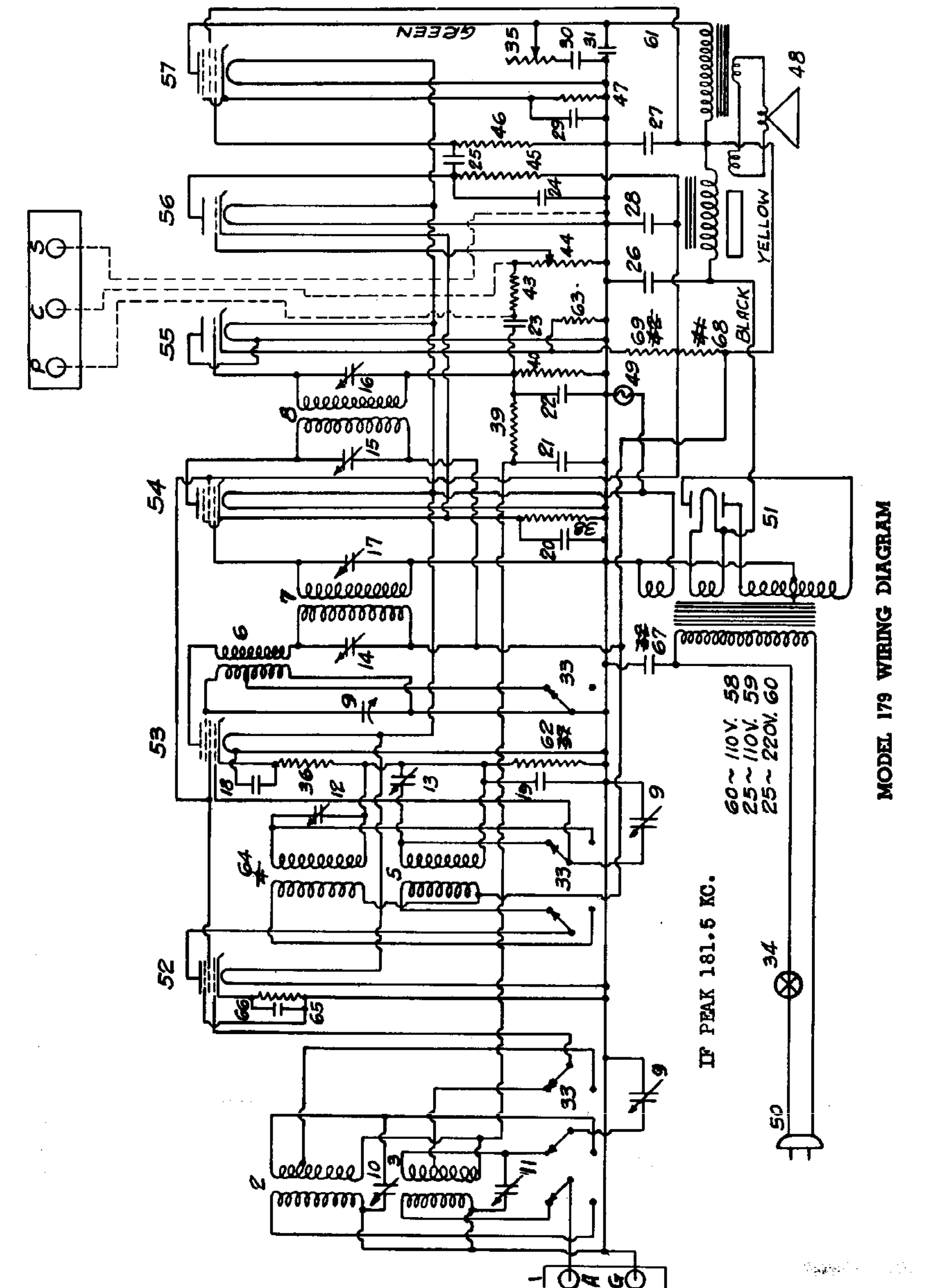
Qty.	Part No.	Description	* Item	List Each
1	B31335A	Tube & Cond. Shield		.20
1	B21491A	Cable & Plug	50	.50
1	W25394B	Tone Control & Switch	34-35	1.10
1	W25606B	Level Control (volume)	44	.90
4	G1-23472	Knob		.10
1	W31157A	Knob (Moderne)		.10
3	W31585A	Knob (Moderne)		.10
1	W31463	Escutcheon		.25
3	S27	Escutch. Screws (.25 doz.)		.05
1	W31009	Speaker Cord	61	.15
		POWER TRANSFORMERS		
1	G17-23559	Power Trans. 60 Cy. 110 V.	58	3.25
	G18-23559	Power Trans. 25 Cy. 110 V.	59	4.75
	G19-23559	Power Trans. 25-60 Cy. 220 V	60	4.75
		FILTER & BYPASS CONDENSERS		
2	W27204	.02-.02 Mfd. 200 Volt	18-19 20-21	.25
1	W25969A	.00017-.03 Mfd. 400 Volt	22-23	.25
1	W25537A	.001-.03 Mfd. 400 Volt	24 25	.30
1	W26194B	12. Mfd. 475 Volt	26	1.25
1	W29130A	7.-6.-8. Mfd. 450-400-25 Volt	27-28 29	2.60
1	W25517A	.05-.008 Mfd. 400 Volt	30-31	.30
1	W27203	.02 Mfd. 200 Volt	66	.15
1	W30805	.01 Mfd. 400 Volt	67	.20
		Resistors		
3	W25937	275 Ohms	36-38 65	.15
1	W26577	3 Megohm	39	.15
1	W21454	1 Megohm	40	.15
2	W23785	500000 Ohm	43-46	.15
1	W23403	150000 Ohm	45	.15
1	W25521	450 Ohm	47	.15
1	W31094	4500 Ohm	62	.15
1	W30127	450 Ohm	63	.15
1	W28471	8500-2500 Ohms (Canddem)	68-69	.45
1	C30719A	Chassis Bottom		.50

312-4 MAGNAVOX SPEAKER SPEC. 939

Qty.	Part No.	Description	* Item	List Each
1	27307	Cone & Voice Coil Assem.		3.00
1	29197	Field Coil		1.75
1	29199	Transformer		1.75

MODEL 179
Schematic

CROSLEY RADIO CORP.



CROSLEY RADIO CORP.

Model 179

Specifications

Model 179 is a seven tube superheterodyne designed for operation from AC electric circuits. The intermediate frequency used is 181.5 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to chassis with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

Tube	Position and Use	Voltages: Plate	Screen Grid	Cathode	Supp. Grid	Filament
58	RF Amplifier	260	125	3	3	2.5
58	Oscillator-modulator	260	125	34	0	2.5
58	IF Amplifier	260	125	4	4	2.5
56	Diode detector	0		0		2.5
56	AF Amplifier	50		4		2.5
2A5	Output	250	260	16.5		2.5
80	Rectifier	355				

Voltage limits are plus or minus 10% of values given.

PARTS LIST—MODEL 179

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

• Figures in 2nd last column refer to parts shown in diagram on page 18.

Qty.	Part No.	Description	• Item	List Each
1	G7-24905	Low. F Antenna Coil	2	.60
1	G14-24905	Hi F Antenna Coil	3	.45
2	G1-29699	Ant. R. F. Coil Trimmer Cond.	10-11 12-13	.20
1	G9-25968	Low F. R. F. Coil	4	.50
1	G5-25968	Hi F. R. F. Coil	5	.55
1	G21-24906	Oscillator Coil	6	.60
1	G1-25444	1st I. F. Trans. Coil	7	.75
1	G1-25948	1st I. F. Prim. 2nd I. F. Prim. 2nd I. F. Sec. Trimmer Cond. Assem.	14-15 16	.60
1	W25008A	1st I. F. Sec. Trimmer Cond. Blade	17	.05
1	R80	Screw		.05
1	W26060B	Adjusting Nut		.05
1	W24865	Metal Washer (round)		.05
1	W25446	Bakelite Washer (large)		.05
1	W25450B	Insulating Washer (small)		.05
1	W25007	Insulating Washer (small)		.05
1	M20	Rivet		.05
1	W25584	Mica Insulator		.05
1	G6-25444	2nd I. F. Trans. Coil	8	.80
7	W25200	Coil Sockets		.05
5	W25024A	Coil Shield (1⅝" high)		.05
3	W25025A	Coil Shield (1⅛" high)		.10
7	W21541B	Retainer Ring......(.25 doz.)		.05
4	W24360	Square Hole Ins. Washer		.05
3	W26891	Semi-Cir. Hole Ins. Wash.		.05
1	C30704	Var. Tun. Cond Gang	9	3.50
1	G3-27134	Dial Light Socket Assem.		.15
1	G25-25751	Dial Assembly		.90
1	B29787	Dial Cover (celluloid)		.30
1	B30569B	6 P. D. T. Switch	33	1.90
1	LW-20264	Ant.-Gnd. Terminal	1	.15
1	G6-27456	-80 Socket	51	.10
3	G24-27456	-58 Socket	52-53 54	.10
2	G18-27456	-56 Socket	55-56	.10
1	G43-27456	2A5 Socket	57	.10
3	W26010	Tube Shield Base		.05
3	B26009C	Tube Shield		.10

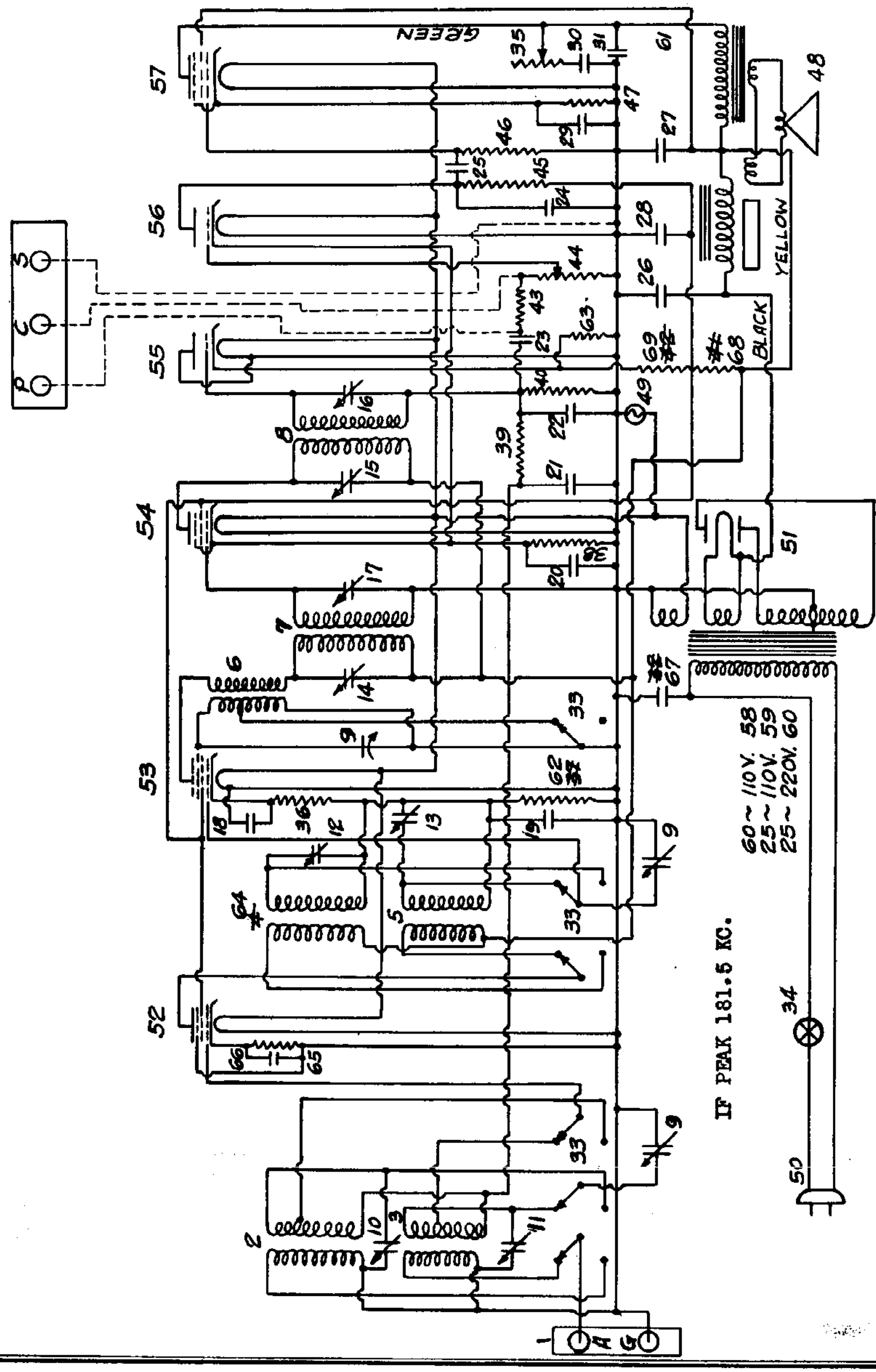
Qty.	Part No.	Description	• Item	List Each
1	B31335A	Tube & Cond. Shield		.20
1	B21491A	Cable & Plug	50	.50
1	W25394B	Tone Control & Switch	34-35	1.10
1	W25666B	Level Control (volume)	44	.90
4	G1-23472	Knob		.10
1	W31157A	Knob (Moderne)		.10
3	W31585A	Knob (Moderne)		.10
1	W31463	Escutcheon		.25
3	S27	Escutch. Screws....(.25 doz.)		.05
1	W31009	Speaker Cord	61	.15
		POWER TRANSFORMERS		
1	G17-23559	Power Trans. 60 Cy. 110 V.	58	3.25
	G18-23559	Power Trans. 25 Cy. 110 V.	59	4.75
	G19-23559	Power Trans. 25-60 Cy. 220 V.	60	4.75
		FILTER & BYPASS CONDENSERS		
2	W27204	.02-.02 Mfd. 200 Volt	18-19 20-21	.25
1	W25969A	.00017-.03 Mfd. 400 Volt	22-23	.25
1	W25537A	.001-.03 Mfd. 400 Volt	24 25	.30
1	W26194B	12. Mfd. 475 Volt	26	1.25
1	W29150A	7.-6.-8. Mfd. 450-400-25 Volt	27-28 29	2.60
1	W25517A	.05-.008 Mfd. 400 Volt	30-31	.30
1	W27203	.02 Mfd. 200 Volt	66	.15
1	W30805	.01 Mfd. 400 Volt	67	.20
		Resistors		
3	W25937	275 Ohms	36-38 65	.15
1	W26577	3 Megohm	39	.15
1	W21454	1 Megohm	40	.15
2	W23785	500000 Ohm	43-46	.15
1	W23403	150000 Ohm	45	.15
1	W25521	450 Ohm	47	.15
1	W31094	4500 Ohm	62	.15
1	W30127	450 Ohm	63	.15
1	W28471	8500-2500 Ohms (Canddem)	68-69	.45
1	C30719A	Chassis Bottom		.50

312-4 MAGNAVOX SPEAKER SPEC. 939

Qty.	Part No.	Description	Item	List Each
1	27307	Cone & Voice Coil Assem.		3.00
1	29197	Field Coil		1.75
1	29199	Transformer		1.75

MODEL 179
Schematic

CROSLEY RADIO CORP.



MODEL 179 WIRING DIAGRAM

CROSLEY RADIO CORP.

Model 180

Specifications

Model 180 is a ten tube superheterodyne designed for operation from AC electric circuits. It uses an intermediate frequency of 181.5 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to chassis with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 for 220 volt receivers). All voltages, except filament, are measured with a 500 volt (1000 ohms per volt) d. c. voltmeter. Filament voltages are measured with a low range a. c. voltmeter.

Tube	Position and Use	Plate	Screen Grid	Cathode	Filament
		Voltages			
58	Modulator	270	112	5.5	2.5
58	RF Amplifier	270	112	3.5	2.5
56	Oscillator	50		5.5	2.5
58	IF Amplifier	270	112	3.7	2.5
56	Diode	0		0	2.5
56	AF Amplifier	50		3.0	2.5
56	Phase Inverter	50		3.0	2.5
Two 2A5	Output	260	270	17.5	2.5
80	Rectifier	360			4.8

All voltage limits are plus or minus 10% of values given.

PARTS LIST—MODEL 180

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be us[ed]. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipp[ed] on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to [the] usual trade discounts, and are subject to change without notice.

* Figures in 2nd last column refer to parts shown in diagram

Qty.	Part No.	Description	* Item	List Price
1	LW20264	Antenna & Ground Terminal	1	.15
1	G14-24995	Antenna Coil (High Freq.)	2	.45
1	G7-24995	Antenna Coil (Low Freq. Broadcast)	3	.60
1	G5-25968	Interstage Coil (H. F.)	7	.50
1	G9-25968	Interstage Coil (Low F. Broad.)	8	.50
1	G18-24906	Oscillator Coil	9	.40
1	G5-24065	1st I. F. Transformer	18	.90
1	G10-24065	Diode Feeding Transformer	19	1.00
1	G3-31207	Coil Shield Assembly		.15
3	W25200	Coil Sockets		.05
2	W25024A	Coil Shield (1⅝" high)		.10
1	W25025A	Coil Shield (1⅛" high)		.10
5	W21541B	Retainer Rings (.25 doz.)		.05
3	W20891	Insulating Washer (Semi-Cir. Hole)		.05
2	W24360	Insulating Washer (Square Hole)		.05
1	B30569C	6 P. D. T. Switch	4	1.90
1	C31356	Var. Cond. Gang	5-6	4.06
1	G25-25731	Dial Drive Assembly		.90
1	G3-27134	Dial Light Bracket		.15
1	W28878A	Condenser Shield Assembly		.10
1	G15-25948	I. F. Tuning Condenser	76	.40
1	G3-25948	I. F. Tuning Condenser	17	.40
3	G24-27456	58 Socket	55-56 57	.10
4	G18-27456	56 Socket	58-59 60-61	.10
2	G43-27456	2A5 Socket	62-63	.10
1	G6-27456	80 Socket	64	.10
5	W26010	Tube Shield Base		.05
3	B26009C	Tube Shield (58 tube)		.10
2	W26231B	Tube Shield (56 tube)		.10
1	B21491B	Cord & Plug	54	.50
1	W25666B	Volume Control	26	.90
1	W25594B	Tone Control & Switch	41-42	1.10
1	G1-24628	Filter Choke	48	1.25
3	W22300	Knob		.15
1	W24556	Knob		.15

Qty.	Part No.	Description	* Item	List Pr[ice]
3	W31585B	Knob (Moderne)		.10
1	W31157B	Knob (Moderne)		.10
1	C23613B	Bottom		.10
1	C28477D	Back		.30
1	C26200G	Tube & Condenser Shield		.30
1	W31942	Speaker Cable	69	.35
		POWER TRANSFORMER		
1	G33-25669	Power Trans. 110 V. 60 Cy.	51	6.00
	G34 25669	Power Trans. 110 V. 25 Cy.	52	9.00
	G35-25669	Power Trans. 220 V. 25 to 60 Cy.	53	9.00
		FILTER & BY PASS CONDENSERS		
1	W25438	0.1-0.1 Mfd. 200 Volt	13-14	.25
1	W27932	0.0001 Mfd. 200 Volt	20	.15
1	W26559	0.006 Mfd. 200 Volt	23	.15
2	W23615	0.05 Mfd. 400 Volt	31-35	.15
1	W26571	0.005 Mfd. 200 Volt	43	.15
3	W27203	0.02 Mfd. 200 Volt	66 74-75	.15
1	W31052	0.05-0.004 Mfd. 400 Volt	72-73	.25
1	B30059A	8.-8.-8. Mfd. 250, 450, 450 V.	45-46 47	3.00
1	W26194B	12. Mfd. 475 Volt	49	1.25
		RESISTORS		
1	W23403	150000 Ohm	71	.15
2	W25937	275 Ohm	12-70	.15
1	W21965	375 Ohm	15	.15
1	W21454	1 Megohm	21	.15
4	W21455	300000 Ohm	22-23 36-37	.15
1	W26577	3 Megohm	24	.15
1	W28589	350 Ohm	25	.15
1	W31361	11000-7000 Ohm	28-29	.45
1	W21453	40000 Ohm	33	.15
1	W22873	220 Ohm	34	.15
1	W31093	2700 Ohm	37	.15
1	W21237A	60000 Ohm	38	.15
1	W4921C	10000 Ohm	65	.25
1	W26578	5 Megohm	68	.15

SPEAKER PARTS (8" Speaker)

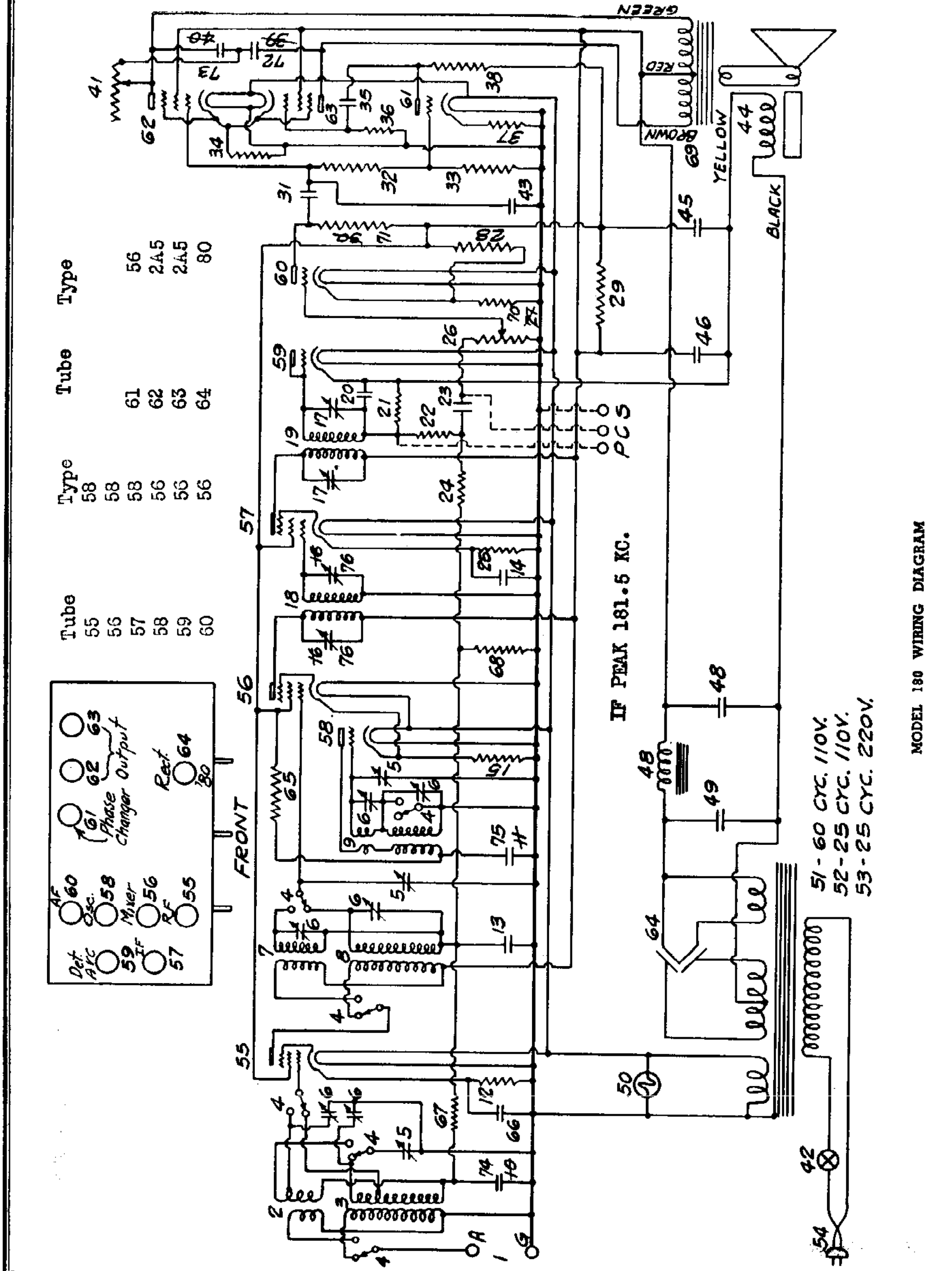
	Magnavox 317-4M Spec. 1104	Rola 317-4R		
1	27307	31090	Cone & Voice Coil Assembly	3.00
1	27797	31091	Field Coil	2.15
1	27798	31092	Transformer	1.65

SPEAKER PARTS (10" Speaker)

	Magnavox 317-5M Spec. 935	Rola 317-5R		
1	27661	31086	Cone & Voice Coil Assembly	3.65
1	27797	31087	Field Coil	2.15
1	29658	31088	Transformer	1.65

MODEL 180
Schematic, Socket

CROSLEY RADIO CORP.



Tube	Type	Tube	Type
55	58	61	56
56	58	62	2A5
57	58	63	2A5
58	56	64	80
59	56		
60	56		

IF PEAK 181.5 KC.

MODEL 180 WIRING DIAGRAM

CROSLEY RADIO CORP.

Model 181

Specifications

Model 181 is a six tube superheterodyne designed for operation from AC electric circuits. The intermediate frequency used is 456 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to chassis with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

Tube	Position and Use	Voltages: Plate	Screen Grid	Cathode	Supp. Grid	Filament
2A7	Oscillator	165		-9.5		
	Modulator	240	110	2.5		2.45
58	IF Amplifier	236	110	0		2.45
56	Diode Detector and AVC					2.45
58	AF Amplifier	52	27	0		2.45
2A5	Output	222	240	0		2.45
80	Rectifier	330				4.8

Chassis to B- 93 volts.

Bias voltages are obtained by a resistor divider shunting the speaker field which is in B- circuit, from rectifier to chassis.

IF Amplifier bias (Grid to B-) 28 volts.
AF Amplifier bias (Grid to B-) 12 volts.
Output bias (Grid to B-) 18 volts.

PARTS LIST—MODEL 181

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

* Figures in 2nd last column refer to parts shown in diagram on page 18.

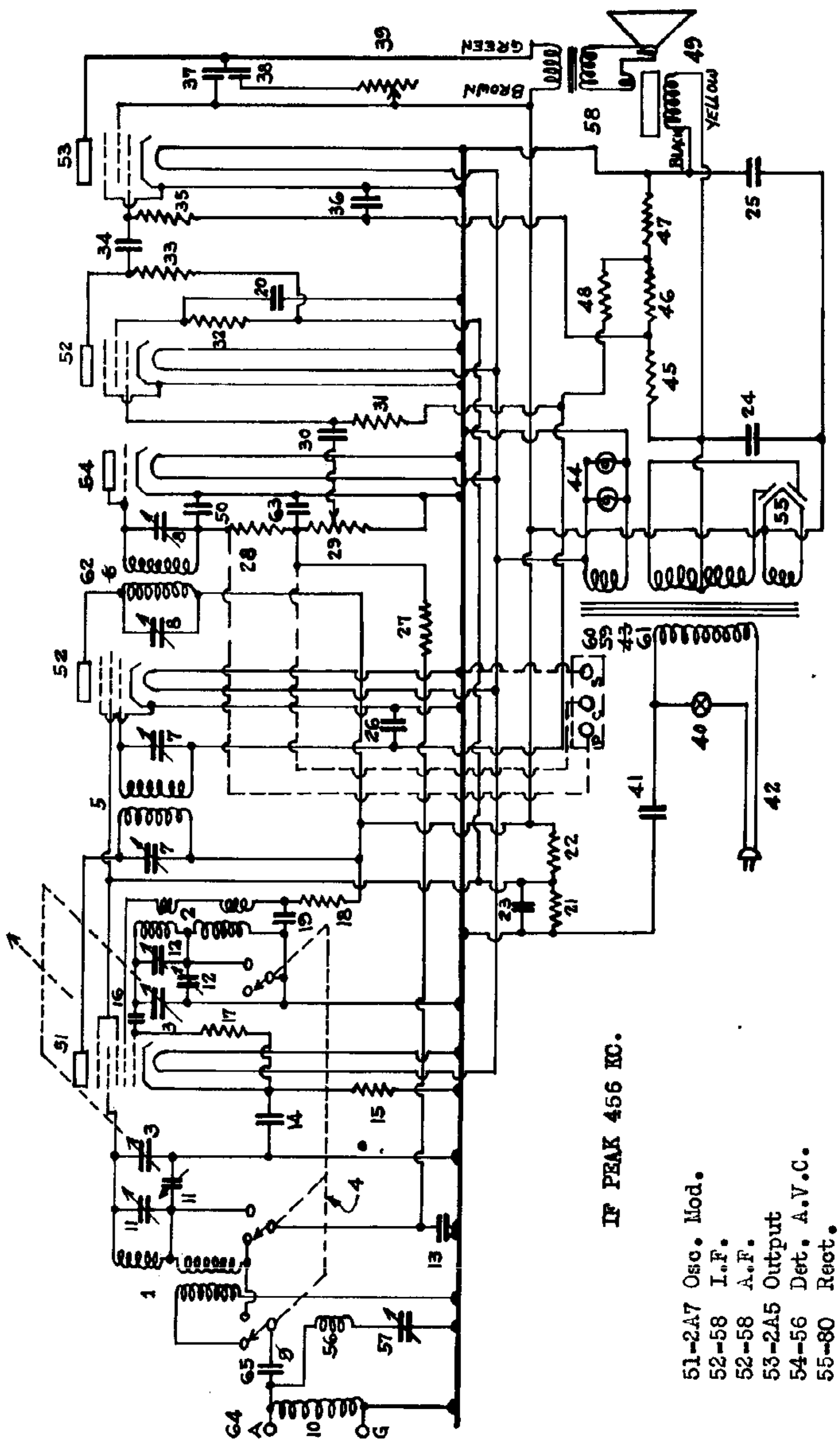
Qty.	Part No.	Description	* Item	List Each
1	G23-24995	Antenna Coil	1	.60
1	G28-24996	Oscillator Coil	2	.65
2	G7-29699	Ant. and Oscillator Coil, Trimmer Condenser	11, 12	.30
1	G2-30795	First I. F. Transformer	5	.55
1	G2-30795	Second I. F. Transformer	62	.55
2	W30027	Coil Shield		.15
2	W30902	Coil Shield		.15
4	W25200	Coil Socket		.05
4	W30026	Retainer Ring		.05
2	W30845	Insulating Washer		.05
2	W30677	Insulating Washer		.05
1	W30744A	No. 3 P. D. T. Change Sw.	4	.85
1	B30769A	Variable Tuning Condenser Assm.	3	2.25
1	G4-27812	Dial Light Socket		.20
1	G9-25050	Dial Assembly		.30
1	G1-30070	V. C. Dial Assembly		.30
2	G14-25948	I. F. Condenser	7, 8	.20
1	W25006	Condenser Blade	57	.05
1	R80	Screw		.05
1	W26069B	Adjusting Nut		.05
1	W24865	Metal Washer		.05
1	W25450B	Insulating Washer		.05
1	W25007	Insulating Washer		.05
1	W25446	Bakelite Washer		.05
1	O-4	Flat Washer		.05
1	M-20	Rivet		.05
1	G1-26719	A. G. Terminal	10	.15
2	G5-24284	R. F. Choke Assm.	56, 64	.45
1	G56-27975	2A7 Socket	51	.10
2	G24-27975	58 Socket	52	.10
1	G43-27975	2A5 Socket	53	.10
1	G18-27975	56 Socket	54	.10
1	G6-27975	80 Socket	55	.10
4	W27981	Tube Shield Base		.05
1	W26231B	Tube Shield		.10
1	W27328A	Tube Shield		.10
2	B26009C	Tube Shield		.10
1	B30875	AC Cord and Plug	42	.45
1	W30636	Tone Control and Switch	39, 40	1.10
1	W30610C	Level Control (volume)	29	.70
2	W31225	Knobs (large)		.10
2	W31224	Knobs (small)		.10
2	W30463	Escutcheons		.25
6	S-27	Escutcheon Screws		.05
1	W31007	4 Lead Speaker Cord	58	.15
		POWER TRANSFORMERS		
1	G4-30745	Power Trans. 110 V. 60 Cy.	61	3.50
1	G2-30745	Power Trans. 110 V, 25 Cy.	59	4.75
1	G3-30745	Power Trans. 220 V.	60	4.75
		FILTER & BY PASS CONDENSERS		
1	W30625	0.003 Mfd. 200 Volt	9	.20
1	W27204	.02-.02 Mfd. 200 Volt	13, 14	.25
1	W30741	.00025 Mfd. 1000 Volt	16	.15
1	W25474	.1-.1 Mfd. 400 Volt	19, 20	.40
1	W30059A	8.-8.-8. Mfd. 250 V.-450 V.-450 V.	23, 24, 25	3.00
1	W24049	.1 Mfd. 200 Volt	26	.15
2	W27206	.02 Mfd. 200 Volt	30, 34	.15
1	W30321	1. Mfd. 160 Volt	36	.55
1	W25517	.008-.05 Mfd. 400 Volt	37, 38	.30
1	W30606	.01 Mfd. 400 Volt	41	.20
2	W27932	.0001 Mfd. 200 Volt	50, 63	.15
1	W26571	.05 Mfd. 200 Volt	65	.15
		RESISTORS		
1	W25037	275 Ohms	15	.12
3	W21875	100000 Ohms	17, 33, 46	.15
1	W5370A	20000 Ohms	18	.24
1	W25970	15000-10000 Ohms	21, 22	.40
1	W26577	3 Megohm	27	.15
1	W21237A	60000 Ohms	28	.15
1	W21454	1 Megohm	31	.15
4	W23785	500000 Ohms	32, 35, 45, 48	.15
1	W22196	20000 Ohms	47	.15

SPEAKER PARTS

Magnavox 354-4M Spec. 262	Crosley 354-4C	Description	List Each
27307	G1-31184	Cone Assem.	3.00
27455	W31445	Field Coil	1.50
27461	G8-24628	Transformer	1.25

MODEL 181
Schematic

CROSLEY RADIO CORP.



MODEL 181 WIRING DIAGRAM

CROSLEY RADIO CORP.

Specifications

Model 182 is a five tube superheterodyne designed for operation from AC or DC electric circuits. The intermediate frequency used is 456 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to negative line (B -) with the receiver in operating condition but with no signal to the antenna circuit (antenna coiled up), and with a line voltage of 117.5 volts, 60 cycle a. c. All voltages except filament, are measured with a 500 volt (1000 ohms per volt) d. c. voltmeter. Filament voltages are measured with a low range AC voltmeter.

PARTS LIST—MODEL 182

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

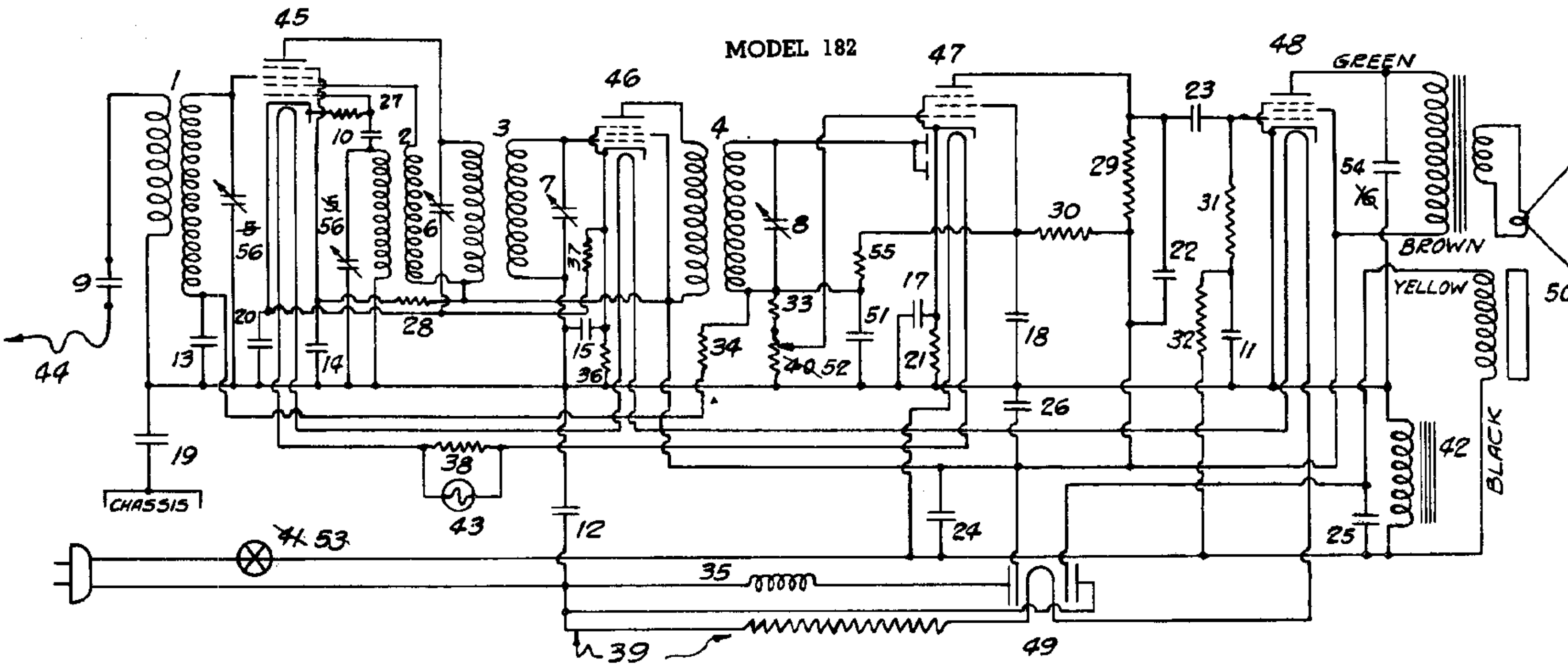
* Figures in 2nd last column refer to parts shown in diagram on page 18.

Qty.	Part No.	Description	* Item	List Each
1	G24-24995	Antenna Coil	1	.45
1	G20-24996	Oscillator Coil	2	.40
1	B31582A	Tuning Condenser Gang	56	2.50
1	W29537B	Condenser Cover		.05
1	G2-30795	1st I. F. Transformer	3	.55
1	G14-25948	I. F. Trimmer Condensers	6-7	.30
1	G10-25445	2nd I. F. Transformer	4	.40
1	G9-25948	Trimmer Condenser	8	.35
3	W25025A	Coil Shield		.10
1	W30802	Coil Shield		.15
4	W25200A	Coil Socket		.05
1	W30026	Retainer Ring		.05
3	W21541B	Retainer Ring		.05
1	W30877A	Insulating Washer		.05
3	W24360	Insulating Washer		.05
1	W31204	Level Control & Switch	52-53	.90
1	G2-27812	Dial Light Bracket Assem.		.15
1	G47-27975	6A7 Socket	45	.10
1	G39-27975	78 Socket	46	.10
1	G48-27975	6B7 Socket	47	.10
1	G30-27975	43 Socket	48	.10
1	G51-27975	25Z5 Socket	49	.10
2	W31210	Tube Shield Ring		.05
2	W31212	Tube Shield Half		.05
2	W31213	Tube Shield Half (with slot)		.05
4	W31211	Tube Shield Clip		.05
1	B30957B	120 Ohm Resistance Cable (A. C. Cord & Plug)	39	.80
1	W29784B	Antenna Roll	44	.30
1	G1-28859	Filter Choke	42	1.15
1	G1-24234	A. F. Choke	35	.30
		FILTER & BY-PASS CONDENSERS		
1	W30325	0.003 Mfd. 200 Volt	9	.20
1	W26571	0.0005 Mfd. 400 Volt	10	.15
1	W24784	0.25 Mfd. 200 Volt	11	.20
1	W30324	0.02-0.02 Mfd. 400 Volt	12-13	.30
1	W27204	0.02-0.02 Mfd. 200 Volt	14-15	.25
1	W25438	0.1-0.1 Mfd. 200 Volt	18-19	.25
1	W27203	0.02 Mfd. 200 Volt	20	.15
1	W30322	0.00017-0.006 Mfd. 200 Volt	22-23	.30
1	W7847A	0.0001 Mfd.	51	.15
1	W31219	0.023 Mfd. 200 Volt	54	.15
1	W26870A	6. Mfd. 25 Volt	17	.65
1	W30962	25.-8. Mfd. 125 Volt	24-25	2.00
1	W30963	10. Mfd. 110 Volt	26	1.25
		RESISTORS		
1	W27503	1400 Ohms	21	.15
2	W21237A	60000 Ohms	27-33	.15
1	W21453	40000 Ohms	28	.15
1	W23406	150000 Ohms	29	.15
2	W23785	500000 Ohms	30-31	.15
1	W21455	300000 Ohms	32	.15
1	W21454	1 Megohm	34	.15
1	W21964	165 Ohm	36	.15
1	W25357	75 Ohm	37	.10
1	W30539	26.7 Ohm	38	.20
1	W26577	3 Megohm	55	.15
		SPEAKER PARTS		
1	G1-29529	Cone & Voice Coil Assem.		2.00
1	31214	Field Coil		1.25
1	G6-29535	Transformer		1.10
	W28735	Black Knob		.10
	W28736	Green Knob		.10
	W30028	Brown Knob		.10
	W31500	Wooden Knob		.10
	W31812	Dial Pointer		.05
	W28608	Bottom		.25

MODEL 182
Schematic, Voltage

CROSLEY RADIO CORP.

MODEL 182



I. F. PEAK
456-K.C.

45-6A7 OSC-MIX.
46-78 I.F.
47-6B7 DET. AF. AVC.
48-43 OUTPUT
49-25Z5 RECT.

Tube	Position and Use	Plate	Screen Grid	Control Grid	Cathode	Supp. Grid	Filament
		Voltages					
6A7	Oscillator	120		—8			
	Modulator	120	50		3		6.5
78	IF Amplifier	120	120		2.5	2.5	6.5
6B7	Diode and AF Amplifier	20	30		3	3	6.5
43	Output	115	120	*—20	0		25.1
25Z5	Rectifier				120		25.1

Voltage limits are plus or minus 15% of values given.
On DC operation, voltages are approximately 90% of those given above.
* Output bias voltage is obtained by using drop across filter choke which is 20 volts.

MODEL 184
Voltage,Parts List

CROSLEY RADIO CORP.

Model 184

Specifications

Model 184 is a four-tube superheterodyne designed for operation from AC electric circuits. It uses an intermediate frequency of 456 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 for a 220 volt receiver). All voltages, except filament, are measured from tube contact to chassis with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Supp. Grid.	Filament
58	Oscillator-modulator	165	82	22	0	2.5
6F7	I. F. & Detector	165	82	2	0	2.5
2A5	Output	158	165	10		2.5
80	Rectifier	295				4.9

Voltage limits are plus or minus 10% of values given.

PARTS LIST—MODEL 184

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be use If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipp on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to t usual trade discounts, and are subject to change without notice.

* Figures in 2nd last column refer to parts shown in diagram on page 18.

Qty.	Part No.	Description	*	List Price
1	W20264	Ant.-Grd. Terminal	1	.15
1	G28-24995	Antenna Coil	44	.65
1	G12-24906	Oscillator Coil	3	.40
1	G7-25444	1st I. F. Transformer	4	.60
1	G9-25445	2nd I. F. Transformer	5	.50
1	W25024	Coil Shield (Large)		.10
3	W25025	Coil Shield (Small)		.10
4	W25200	Coil Socket		.05
4	W26801	Insulating Washer		.05
4	W21541B	Coil Retaining Ring		.05
1	B31784	Variable Condenser Gang		2.75
1	G15-25050	Dial Assem.		.40
1	G2-25948	1st I. F. Prim. Trim. Cond.	7	.30
1	G10-25948	2nd I. F. Prim. Trim. Cond.	9	.15
1	W27548	1st I. F. Sec. Trim. Cond. (Adjustable Blade Only)	8	.05
1	W25584	Mica		.05
1	R80	Screw		.05
1	W26069B	Adjusting Nut		.05
1	W24865	Metal Washer		.05
1	W25450B	Insulating Washer		.05
1	W25007B	Insulating Washer		.05
1	W25446	Bakelite Washer (Large)		.05
1	O4	Washer		.05
1	M20	Rivet		.05
1	G24-27456	Socket -58	32	.10
1	G49-27456	Socket 6-F-7	33	.10
1	G43-27456	Socket 2-A-5	34	.10
1	G6-27456	Socket -80	35	.10
2	W26010	Tube Shield Base		.05

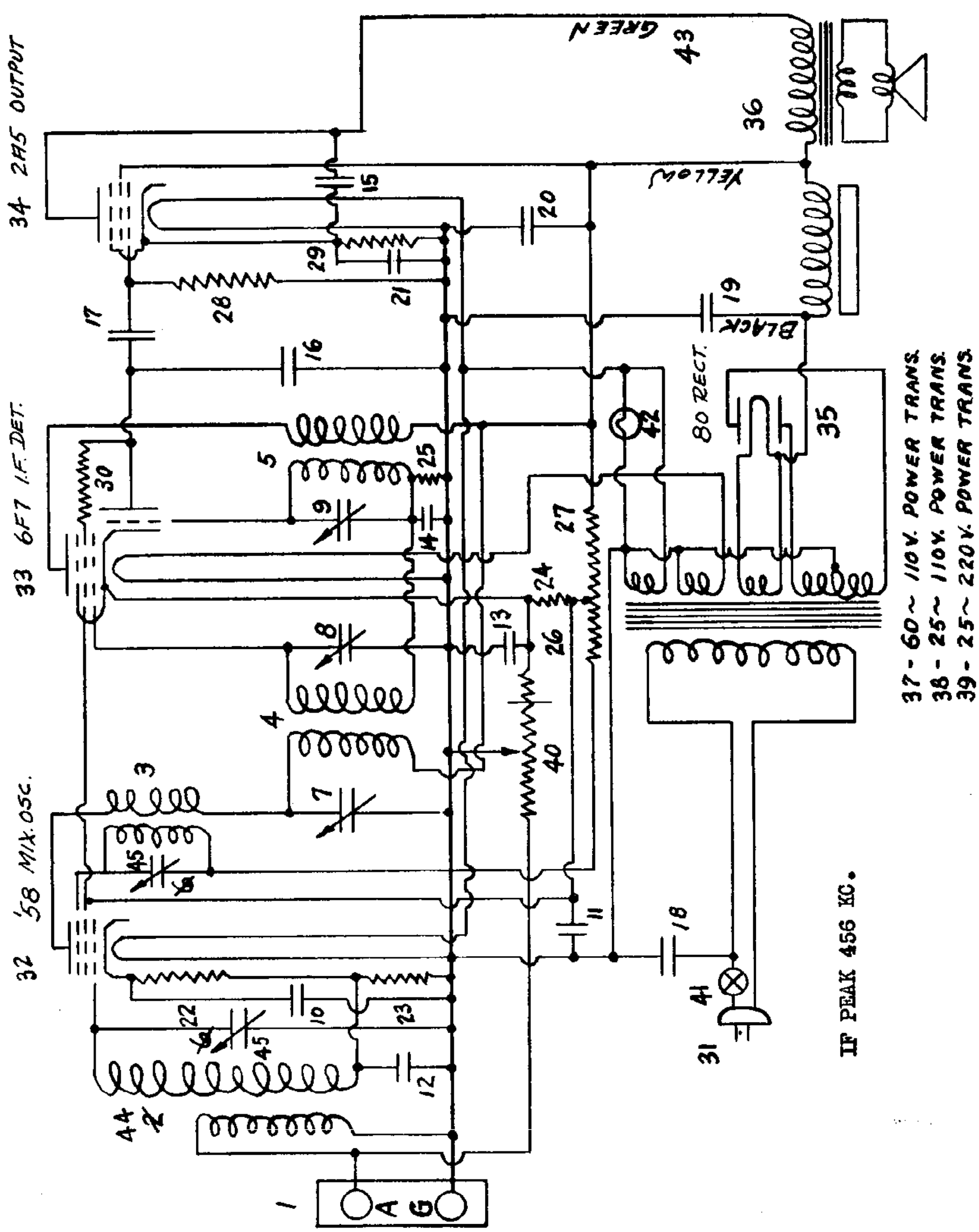
Qty.	Part No.	Description	*	List Pr
1	W27328A	Tube Shield (6F7)		.10
1	B26009C	Tube Shield (58)		.10
1	B21491B	A. C. Cable & Plug	31	.25
1	W31009	Speaker Cable	43	.25
1	W26573B	Volume Control & Switch	40-41	1.00
2	G1-23472	Knobs		.10
1	G1-28500	Power Trans. 110 V. 60 Cy.	37	2.25
	G2-28500	Power Trans. 110 V. 25 Cy.	38	3.00
	G3-28500	Power Transformer 220 V.	39	3.25
		FILTER & BY PASS CONDENSERS		
1	W27204	.02-.02 Mfd. 200 V. Cond.	12-13	.25
1	W24049A	.1 Mfd. 200 V. Condenser	14	.15
1	W23191A	.01 Mfd. 400 V. Condenser	15	.25
1	W25537A	.001-.03 Mfd. 400 V. Cond.	16-17	.30
1	W29592A	.003 Mfd. 400 V. Condenser	18	.20
2	W27203	.02 Mfd. 200 V. Condenser	10-11	.15
1	W29150A	7.-6.-8. Mfd. 450-400-25 V. Filter Condenser	21	2.90
		RESISTORS		
1	W25937	275 Ohm Resistor	22	.15
1	W31094	4500 Ohm Resistor	23	.15
1	W24990	25000 Ohm Resistor	24	.20
1	W21454	1 Megohm	25	.15
1	W28471	25000-8500 Ohm Resistor	26-27	.45
2	W23785	500000 Ohm Resistor	28-30	.15
1	W25521	450 Ohm Resistor	29	.15

SPEAKER PARTS * 36

	Magnavox 324-2M Spec. 1300	Jensen 342-2J Spec. 2617		
1	28761	29434	Cone & Voice Coil Assem.	2.00
1	28763	29436	Field Coil	1.10
1	28764	29437	Transformer	1.25

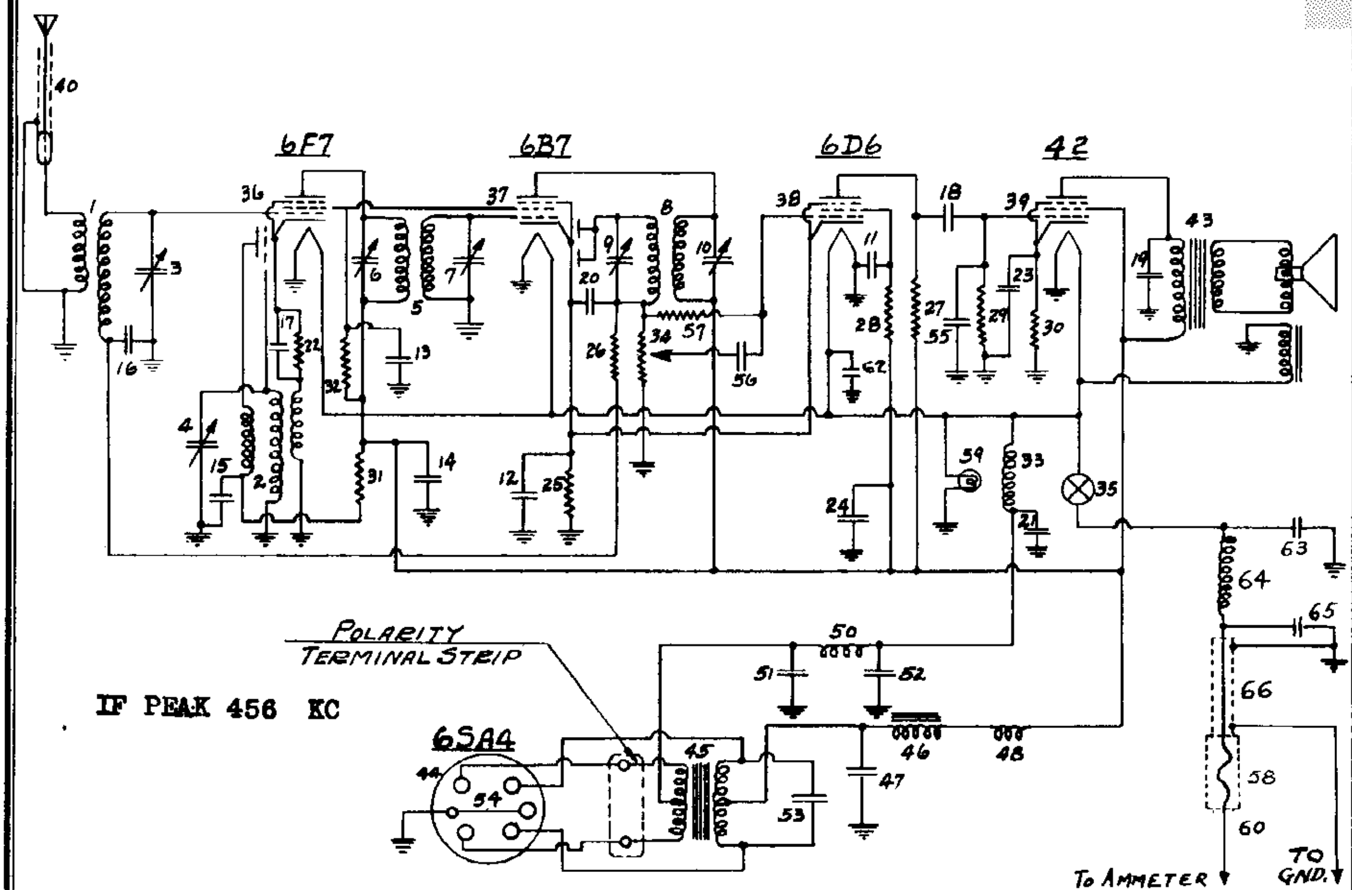
MODEL 184
Schematic

CROSLEY RADIO CORP.



CROSLEY RADIO CORP.

MODEL 4A1
Schematic, Parts List



* Figures in 2nd last column refer to parts shown in wiring diagram of Model 4A1

Qty.	Part No.	Description	* Item	List Each
1	G9-32000	Antenna Coil	1	.60
1	G8-32002	Osc. Coil		.45
1	W32728	Washer (Ant. Coil Shield Base)		.05
1	W30802	Coil Shield (Ant.)		.15
1	W30026	Retaining Ring (Ant.)		.05
1	W25200	Coil Socket (Osc.)		.05
1	W25025A	Coil Shield (Osc.)		.10
1	W26891	Insulating Washer (Osc.)		.05
1	W21541B	Retaining Ring (Osc.)		.05
1	L32698	Variable tuning Cond. Gang	3-4	5.50
1	G7-32004	1st I. F. Trans. Coil and Tuning Condensers	5-6-7	1.85
1	G8-32004	2nd I. F. Trans. Coil and Tuning Condensers	8-9-10	1.75
1	W32712B	Level Control and Power Switch	34-35	1.10
1	W32739A	Level Control Bracket		.10
1	G49-27975	6F7 Socket	36	.10
1	G48-27975	6B7 Socket	37	.10
1	G75-27975	6D6 Socket	38	.10
1	G25-27975	42 Socket	39	.10
1	G81-27975	0SA4 Socket	54	.10
1	LB32037	6SA4 Syncrotube	44	5.00
2	W27981A	Tube Shield Base		.05
2	W30964	Tube Shield (6B7 & 6F7)	36-37	.10
1	G1-32769	Power Transformer	45	2.75
1	G11-24628	"B" Filter Choke	46	1.10
1	G1-32755	R. F. "B" Choke	48	.15
1	G6-28067	R. F. "A" Choke	50	.30
1	G4-28067	"A" Choke	33	.35
1	B32783	Antenna Lead	40	.45
1	G1-25891	Antenna Wire		.90
1	G5-31701	"A" Cable Assem.	60	.25
1	G7-31701	"A" Lead Assem. & Choke Assem.	61	1.40
1	W32757	12 Amp. Fuse	58	.10
		BY-PASS & FILTER CONDENSERS		
1	W32711A	0.1-0.1-0.05-0.05 Mfd. 200 Volt	11-12 13-14	1.00
3	W32780A	0.05 Mfd. 400 Volt	15-18 56	.15
1	W32779A	0.02 Mfd. 200 Volt	16	.15

Qty.	Part No.	Description	* Item	List Each Doz.	Ea.
2	W32781A	0.1 Mfd. 200 Volt	17-62	.15	
1	W32782A	0.01 Mfd. 400 Volt	19	.15	
3	W32741	.0005 Mfd. (Mica)	20-21 55	.15	
2	W30366	0.5 Mfd. 160 Volt	51-52	.50	
1	W32762	0.005 Mfd. 1000 Volt	53	.65	
1	W30419A	8.-8. Mfd. 25 Volt-250 Volt	23-24	1.80	
1	W32759	8. Mfd. 300 Volt	47	1.50	
		RESISTORS			
1	W21452	1100 Ohms	22	.15	
1	W28589	350 Ohms	25	.10	
2	21454	1 Megohm	26-57	.15	
1	21875	100000 Ohms	27	.15	
2	23785	500000 Ohms	28-29	.15	
1	W25521	450 Ohms	30	.15	
2	32331	55000 Ohms (½ Watt)	31-32	.15	
		CASE			
1	L32730	Case		1.70	
1	B32714A	Bottom Cover		.25	
1	B32720B	Top Cover		.25	
1	W32717A	Control Window		.10	
1	B32718A	Control Window Cover		.30	
1	W32724	Knob		.10	
1	W32725A	Knob (Key)		.20	
1	W32723A	Mounting Bracket (Front)		.10	
1	C32742	Mounting Bracket (Rear or Bulkhaed)			
1	W32787A	3" Mounting Bolt		.05	
1	W32788	7/16 Washer		.10	.05
1	W32789	7/16 x 14 Thr. Nut		.15	.05
5	W32734	5/16 x 24 Hex. Hd. Mtg. Bolt		.10	.05
5	W24235	5/16 Shakeproof Washer		.10	.05
1	W6849	5/16 Washer (Black Oxide)		.10	.05
4	W6122	5/16 x ¾ Washer		.15	.05
[illegible]	[illegible]	7/16 Std. Lockwasher		.15	.05
[illegible]	[illegible]	¼-20 x ¾ Rd. Hd. Screw		.15	.05
	W31625A	Distributor Suppressor		.40	
	W33165	Spark Plug Suppressor		.40	
	W29754B	.5 Mfd. Cond. (Eliminator)		.45	
1	33-B	Speaker	43	4.00	

MODEL 4A1
Alignment, Voltage

CROSLEY RADIO CORP.

Alignment Procedure . . .

To align the receiver at intermediate frequency it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6F7 tube through an .02 mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. To make this adjustment it is necessary that a standard 5/16" (across flat) hexagon socket wrench be used for the upper condenser, and a small screw driver fitting inside of the nut hole for adjustment of the lower condenser. Always make this I. F. adjustment very carefully and go over the adjustment several times to be sure that the peak has been reached. To align a receiver at broadcast radio frequency, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 mfd. (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator shunt trimmer which is located on the front section of the gang condenser until the signal is heard best. Without changing the gang condenser setting, adjust the antenna trimmer located on the rear section of the gang condenser. It is necessary that these adjustments be gone over several times until no further improvements can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator at approximately 600 Kc. The approximate sensitivity of the receiver may be checked here and it is possible that by slight bending of the gang condenser plates some improvement may be made. It is very essential, however, that this bending of plates be done with extreme care and by someone who is experienced in this operation.

Automatic Volume Control Circuit . . .

Diode voltage is developed across resistor 34 which is the level control. This voltage is fed back through isolating resistor, part No. 26, to the grid return of the antenna coil, part No. 1, thereby exerting automatic volume control voltage on the pentode section of the 6F7 oscillator modulator. No AVC voltage is impressed on the 6B7 I. F. amplifier because in so doing serious distortion might result. AVC voltage is also impressed on the 6D6 A. F. amplifier by means of coupling resistor 57.

Method of Biasing . . .

Both the pentode and triode section of the 6F7 oscillator modulator obtain their bias from the cathode resistor, part No. 22. The 6B7 I. F. amplifier section obtains its bias from the cathode resistor, part No. 25. Bias for the 6D6 A. F. amplifier is also obtained from resistor No. 25, while the bias for the output type 42 is obtained from resistor part No. 30.

Analysis of Signal Channel . . .

The signal enters at the antenna lead-in terminal through the bayonet socket and then goes to the antenna coil, part No. 1. There is optionally offered a wave trap to be used with this receiver when it is operated in the neighborhood of commercial code stations using frequencies in the region of 456. This wave trap prevents these code stations from riding on through and being amplified by the intermediate frequency amplifier. The signal is tuned by the rear section of the gang condenser, part No. 3, and then impressed on the pentode grid of the 6F7. The 6F7 triode section is equipped with a conventional oscillator circuit tuned by the front section of the gang condenser, part No. 4. The oscillator output is impressed on the cathode of the 6F7 through a pickup coil. The output therefore of the 6F7 pentode section is intermediate frequency which is impressed on the first I. F. transformer, part No. 5. This I. F. transformer is double tuned. The signal is then fed to the grid of the pentode section of the 6B7 I. F. amplifier which tube has a double tuned output I. F. transformer, part No. 8, in its plate circuit. This amplified output is impressed on the two diodes of the 6B7 in parallel and diode voltage is developed across level control, part No. 34. The DC component of this voltage is fed forward through resistor 57 to the grid of the 6D6 A. F. amplifier, but the audio frequency component is fed from the level control contact arm through coupling condenser 56 to the grid of the 6D6 A. F. amplifier. In this way a bias depending on the strength of the signal is impressed on the grid of the 6D6 A. F. amplifier while the actual audio frequency voltage is determined by the setting of the level control. The amplified audio frequency output of the 6D6 is fed through coupling condenser No. 18 to the grid of the 42 output tube and is then amplified and fed to the speaker part No. 43. Condenser No. 19 serves to keep the impedance of the output system more nearly constant.

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Eposc	Esup
6F7	Osc. Mod.	6.0	230	0	8	100	60	—
6B7	I.F. and Diode	6.0	230	0	3	100	—	—
6D6	A.F.	6.0	60	0	3	25	—	3
42	Output	6.0	220	0	16	230	—	—

All voltages are plus or minus 10% and measured to chassis with 500 volt 1000 ohm per volt voltmeter. Battery voltage 6 volts.

CROSLEY RADIO CORP.

MODEL Fiver Jr.(5M3)
Voltage, Notes
Alignment

General Description . . .

Chassis 5M3 is used in the Fiver Jr. It is a low-priced but highly efficient 5-tube superheterodyne receiver covering the frequency range of 535-1750 Kc. The intermediate frequency is 456 Kc.

Tubes Used and Their Function . . .

The tubes used are 6D6 oscillator modulator, 6D6 I. F. amplifier, 76 detector, 42 output, and 80 rectifier. The tube voltages are shown in the table below:

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Esup
6D6	Osc-Mod.	6.3	235	29	32	120	0
6D6	I. F.	6.3	235	0	3	120	3
76	Detector	6.3	80	0	10	—	—
42	Output	6.3	225	0	18	235	—
80	Rectifier	4.9	—	—	310	—	

All voltages are measured to chassis voltages and are plus or minus 10%. All DC are voltages measured to chassis at 117.5 volt line with 1000 ohms per volt, 250-volt voltmeter. Power demand 50 watts, 110 volts, 60 cycles.

Method of Biasing . . .

Referring to the circuit diagram, it will be seen that the 6D6 oscillator modulator tube has a more or less complex biasing system. This is because resistor No. 22 in the cathode circuit creates a bias for the input section of the tube, while resistors 22 and 23 in series create the bias for the suppressor grid oscillator section. The 6D6 I. F. amplifier obtains its bias from the volume control, part No. 40. There is a fixed limiting resistance in this volume control so that at the full volume position there is still the bias indicated in the voltage chart, and as the volume is reduced, the bias on the 6D6 I. F. amplifier increases. The 76 detector obtains its bias from the cathode resistor, part No. 24, while the 42 output tube obtains its bias from its cathode resistor, part No. 29.

Volume Control Circuit . . .

As explained above, as the volume control is backed off of the maximum sensitivity position, cathode bias is inserted in the 6D6 I. F. amplifier circuit. At the same time, resistor 40, being connected across the antenna and ground, tends to short circuit the antenna circuit. Thus, reduction in sensitivity is obtained simultaneously by reducing the gain in the I. F. amplifier and reducing the effectiveness of the antenna.

Analysis of Signal Channel . . .

Starting with the antenna, the signal is fed through the antenna coil, part No. 2, and tuned by the radio frequency section of the gang condenser, part No. 6. The signal is then impressed on the control grid of the 6D6 oscillator modulator. This tube is so connected that the combination cathode, suppressor grid, and plate of the 6D6 tube form a conventional triode oscillator. The oscillator frequency is determined by the setting of the gang condenser oscillator section, part No. 6, in conjunction with oscillator coil, part No. 3. The plate shape of the oscillator section of the gang condenser is such that a constant I. F. frequency of 456 Kc. is present at the primary terminals of the first I. F. transformer, part No. 4. This I. F. transformer is double tuned and the I. F. signal is then impressed on the grid of the 6D6 I. F. amplifier. The amplified output of this tube is impressed on the second I. F. transformer, part No. 5, which is single tuned, with condenser part No. 9. To prevent overload being serious in the 76 detector circuit, resistor No. 25 is used so that when grid current is drawn the bias on the tube increases very rapidly. In the plate circuit of the 76 detector there is present in addition to the normal DC plate current, both intermediate frequency and audio frequency. The intermediate frequency is bypassed by condenser No. 16, while the audio frequency is passed on to the output tube grid through condenser No. 17. The grid circuit of the output tube is completed through resistor No. 28. The amplified audio output of the type 40 tube is, of course, fed to the speaker in the usual manner.

Power Supply System . . .

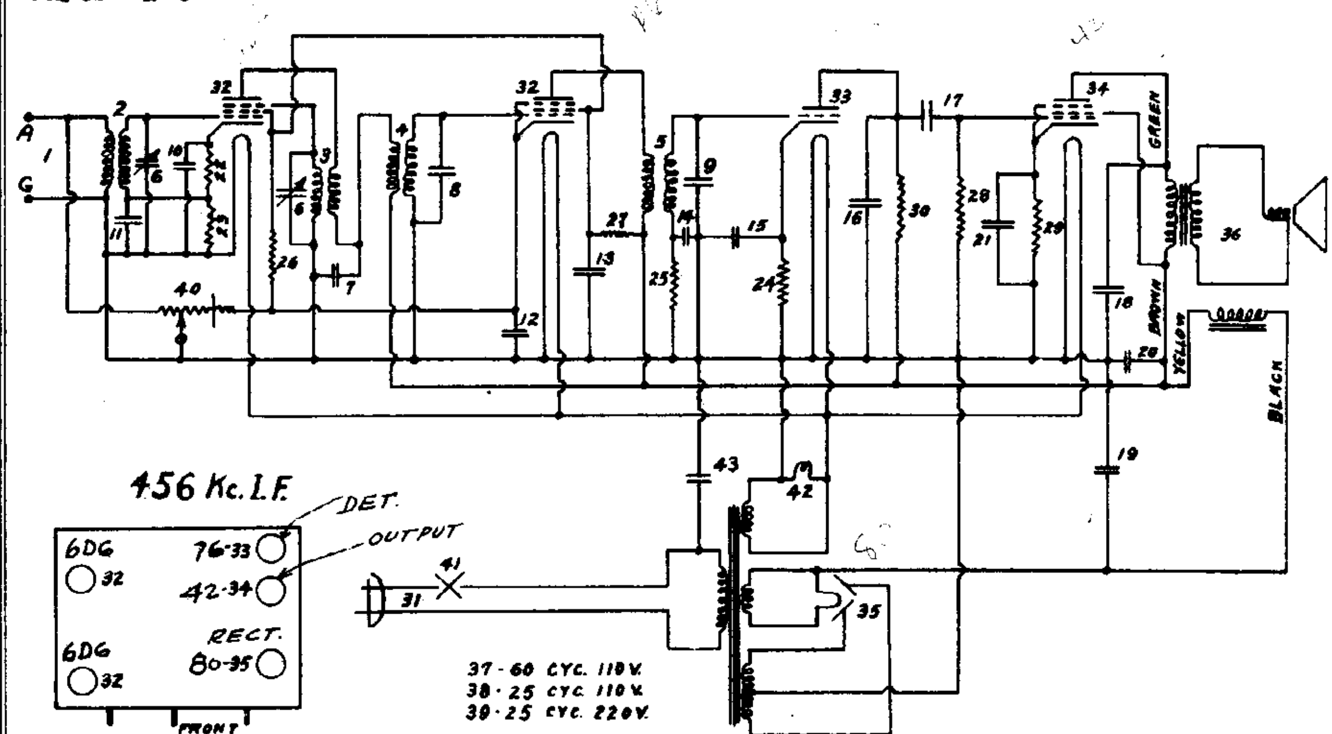
The power supply system consists of a transformer, part No. 37, for 110-volts, 60 cycles, part No. 38 for 110-volt 25 cycles, and part No. 39 for 220 volts, a type 80 rectifier tube, electrolytic condenser part No. 19, the speaker field as a filter choke, and electrolytic condenser part No. 20.

Alignment Procedure . . .

To align the I. F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator, so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6D6 oscillator modulator tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the three I. F. tuning condensers located on the top of the chassis for maximum signal output. To make this adjustment, it is necessary that a standard 1/4" (across flats) hexagon socket wrench be used. The wrench is preferably insulated. Always make these adjustments very carefully and go over

MODEL Fiver Jr.(5M3)
Schematic, Socket
Parts List

CROSLEY RADIO CORP.



them several times to be sure that the peak has been reached.

To align the receiver at radio frequency it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the modulated oscillator to 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0001 (dummy antenna) condenser and the low side to receiver chassis. Now, with dial set at 140, adjust the gang condenser oscillator trimmer, which is in the rear section of the gang until the signal is heard best. Then adjust the R. F. trimmer, which is in the front section of the gang condenser, for maximum signal. The set is now aligned at 1400 Kc. and by setting the modulated oscillator to 600 Kc., the set may be rechecked at this point. It will be sometimes found that a slight bending of the gang condenser plate will help the sensitivity at 600 Kc. This operation should be done very carefully so that no short circuiting of the condenser plates result.

PARTS LIST—MODEL 5M3

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 5M3

Qty.	Part No.	Description	* Item	List Each
1	G7-32000	Antenna Coil	2	.35
1	G6-32002	Osc. Coil	3	.40
1	G3-32004	1st I. F. Trans. Coil	4	.55
1	G4-32004	2nd I. F. Trans. Coil	5	.55
4	W25200	Coil Socket		.05
2	W25024A	Coil Shield		.10
2	W25025A	Coil Shield		.10
4	W26891	Insulating Washer		.05
4	W21541B	Retaining Ring		.05
1	G3-33001	Tuning Condenser Gang	44	2.25
1	G19-25050	Dial Assem.		.35
1	G12-27812	Dial Light Brkt Assm.		.20
1	G2-25948	1st I. F. Primary Tuning Cond.	7	.30
1	W27548	1st I. F. Sec. Tuning Cond. Adj. Blade	8	.05
1	W25008A	2nd I. F. Sec. Tuning Cond. Adj. Blade	9	.05
2	W31472	First Blade		.05
2	W25584	Mica Insulator		.05
2	W26069B	Adjusting Nut		.05
2	W25446	Bakelite Washer		.05
2	W24865	Metal Washer		.05
2	W25450B	Insulating Washer		.05
2	W25007B	Insulating Washer		.05
2	O-4	Flat Washer		.05
2	M-20	Rivet (.120x7/32) Tubular		.05
2	R80	4-36x¾ Rd. Hd. Mach. Screw		.05
1	W26573B	Vol. Control & Line Switch	40-41	1.10
2	G75-27456	6D6 Socket	32	.10
1	G80-27456	76 Socket	33	.10

Qty.	Part No.	Description	* Item	List Each
1	G25-27456	42 Socket	34	.10
1	G6-27456	80 Socket	35	.10
2	W26010	Tube Shield Base (6D6)		.10
2	B26000C	Tube Shield		.05
1	B21491C	Cable & Plug	31	.50
1	G5-28500	Power Trans. 60 cy. 110 V.	37	3.00
	G6-28500	Power Trans. 25 cy. 110 V.	38	4.00
	G7-28500	Power Trans. 25 cy. 220 V.	39	4.00
1	LW-20264	Ant.-Gnd. Terminal	1	.15
		FILTER & BY-PASS CONDENSERS		
1	W25537A	0.001-0.03 Mfd. 400 V.-400 V.	16-17	.30
1	W23191A	0.01 Mfd. 400 V.	18	.25
1	W30805	0.01 Mfd. 400 V.	43	.20
1	W28622	0.1-0.1 Mfd. 200 V.-200 V.	45-46	.25
2	W28623	0.02-0.02 Mfd. 200 V.-200 V.	47-48 49-50	.25
1	W29150B	8.-6.-12. Mfd. 450 V.-450 V.-25 V.	19-20 21	2.60
		RESISTORS		
1	W25937	275 Ohm	22	.15
1	31094	4500 Ohm	23	.15
1	21237A	60000 Ohm	24	.15
1	21454	1 Megohm	25	.15
1	W27120	25000-8500 Ohm	26-27	.40
1	23785	500000 Ohm	28	.15
1	W23907	750 Ohm	29	.20
1	21455	300000 Ohm	30	.15
2	W32352	Knob		.10

CROSLEY RADIO CORP.

General Description . . .

Chassis 5V1 is used in the DeLuxe Fiver and DeLuxe Fiver Lowboy. It is a 5-tube 3-gang automatic volume control dual band receiver. The frequency bands are 535 to 1720 Kc. and 1650 to 4500 Kc. The intermediate frequency is 181.5 Kc., the use of which insures adequate selectivity.

Tubes Used and Their Function . . .

The tubes used are 6A7 oscillator-modulator, 6D6 I. F. amplifier, 6B7 diode and audio frequency amplifier, 42 output, and 80 rectifier. The tube voltages are shown in the table below:

Type	Where Used	Ef	Ep	Eg	Ek	Esup	Eg-osc	Ep-osc
6A7	Osc-Mod.	6.5	240	0	3	0	-15	125
6D6	I. F.	6.5	240	-3.5	0	0	—	—
6B7	Diode-AF	6.5	30	-3.5	0	—	—	—
42	Output	6.5	230	-18	0	—	—	—
80	Rectifier	5.1	—	—	240	—	—	—

All voltages are plus or minus 10%. All DC voltages are measured to chassis at 117.5 line with 1000 ohms per volt 250-volt voltmeter. Power demand is 50 watts at 110 volts 60 cycles.

Method of Biasing . . .

Referring to the circuit diagram, it will be seen that the input section of the 6A7 oscillator modulator obtains its bias from the cathode resistor, part No. 30, while the oscillator section of the same tube gets its bias from the grid leak and condenser combination, in which part No. 31 is the grid leak and part No. 12 is the grid condenser. Bias for the remainder of the tubes is obtained from the voltage divider network connected across the speaker field, which also is the filter choke. Resistors 41, 42 and 43 form its voltage divider network, and the bias voltage applied to the 6D6 I. F. amplifier is that voltage drop across resistor 41. The audio frequency amplifier section of the 6B7 tube obtains its bias from the drop across resistor 41. The grid circuit is completed through volume control part No. 29. The output tube bias is the drop across the combined resistors 41 and 42, completed, of course, through resistors 39 and 56.

Automatic Volume Control Circuit . . .

Automatic volume control voltage is generated across resistor 34 and is fed back through filter resistor 33 to the 6A7 control grid via the switch and second secondary in the preselector system. No automatic volume control is exerted on the I. F. amplifier stage, which is the 6D6, because in so doing there is a serious danger of introducing distortion.

Analysis of Signal Channel . . .

The signal enters at the antenna terminal and when the switch is thrown to the broadcast position flows through the antenna coil primary. In the first secondary circuit it is tuned by means of one section of the gang condenser, part No. 5, and then due to the inductive coupling between the first secondary and the second secondary, signal is fed over to this latter coil where it is tuned by another section of the gang condenser, part No. 5. This signal is impressed on the grid of the oscillator modulator tube. The oscillator section of this tube is tuned by the specially-shaped third section of the gang condenser, part No. 5, in conjunction with oscillator coil, part No. 2. The frequency of the oscillator is such that a constant intermediate frequency of 181.5 kilocycles is present in the plate circuit of the first detector or oscillator-modulator tube. This intermediate frequency signal is fed to the first I. F. transformer, part No. 3, which transformer is double tuned. The signal is then fed to the grid of the 6D6 I. F. amplifier and then the amplified output is fed to the second I. F. transformer. part No. 4, which transformer is also double tuned. The I. F. signal is then impressed on the diode plates in parallel. In this stage there is developed across resistor 34 a DC diode voltage, an audio frequency voltage, and some intermediate frequency. The audio frequency and intermediate frequency signals pass through coupling condenser, part No. 20, but the filter resistor, part No. 35, excludes most of the intermediate frequency so that mostly audio frequency is present across resistor 29, the volume control. This audio frequency is then amplified through the pentode section of the 6B7 tube and the amplified audio output is fed through coupling condenser 18 to the grid of the output tube type 42. The output of the type 42 tube is fed to the speaker in the conventional manner. Resistor 56 in the grid circuit of the output tube acts as a further filter for whatever intermediate frequency might still be present and also tends to suppress distortion at extremely loud volume. Condenser part No. 16 is connected across the speaker transformer and tends to hold the impedance of the speaker load more constant at the higher audio frequencies.

For the high frequency band the signal channel is slightly different in that the first section of the preselector is not used. Instead the signal is fed directly over to the second secondary through coupling condenser part No. 10. The switch is now connected into the tap on the second secondary so that part of this secondary acts as an antenna primary and the balance as the high fre-

PARTS LIST—MODEL 5V1

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 5V1

		FILTER & BY-PASS CONDENSERS		
1	B30059C	8.-8.-8. Mfd. 250 V. 450 V. 450 V.	23-24 25	3.00
2	W30321A	1. Mfd. 160 V.	14-68	.55
1	W27668	0.0001 Mfd.	10	.15
1	W26571	0.0005 Mfd. 400 V.	12	.15
1	W30323	0.01 Mfd. 200 V	16	.15
1	W25537A	0.001-0.03 Mfd. 400 V.-400 V.	17-18	.30
1	W30322A	0.00017-0.006 Mfd. 200 V. 200 V.	19-20	.30
1	W30805	0.01 Mfd. 400 V.	55	.20
2	W28621	0.02 Mfd. 200 V.	60-61	.15
1	W29271A	0.02-0.02 Mfd. 400 V. 400 V.	63-64	.25

		RESISTORS		
1	W25037	275 Ohms	30	.15
1	21237A	60000 Ohms	31	.15
1	21876	10000 Ohms	32	.15
1	26577	3 Megohm	33	.15
4	23785	500000 Ohms	34-36 38-43	.15
2	21455	300000 Ohms	35-56	.15
2	21875	100000 Ohms	37-42	.15
1	W31883	8500-25000 Ohms	39-40	.55
1	24090	25000 Ohms	41	.20
1	W23013	2000 Ohms	60	.15
3	W32352	Knobs		.10

MODEL Deluxe Fiver, L-B
(Chassis 5V1)
Schematic, Alignment
Socket Layout

CROSLEY RADIO CORP.

quency secondary. The oscillator coil is tapped in the usual manner simply to reduce inductance.

Power Supply System . . .

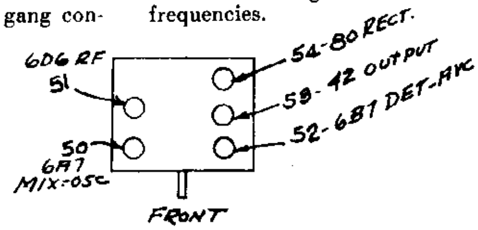
The power supply system consists of a transformer part No. 45 for 110 volts 60-cycle, part No. 46 for 110 volts 25-cycle, part No. 47 for for 220 volts, a rectifier tube type 80, the speaker field as the filter choke, and filter condensers parts 24 and 25. In this circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminates the use of a large bypass condenser on the cathode of the output tube, type 42. At the same time, better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit.

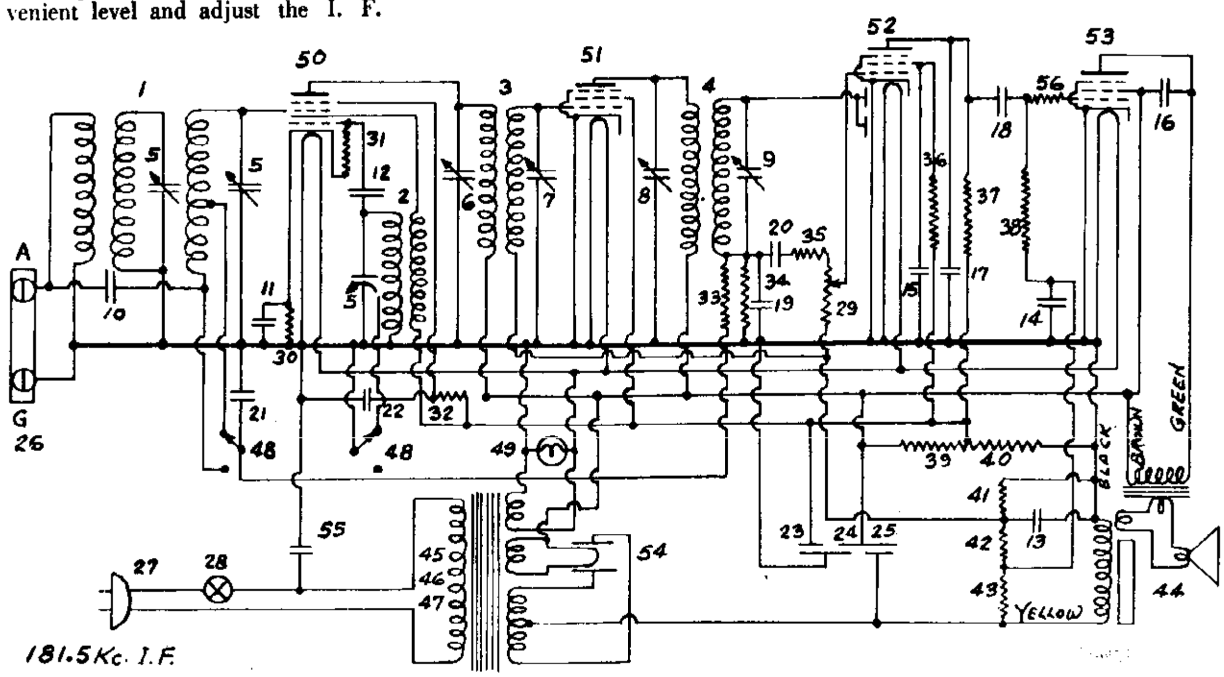
Alignment Procedure . . .

To align the I. F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 181.5 Kc. with good accuracy. This oscillator should have an attenuator so that strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator, which has been adjusted to 181.5 Kc. to the control grid connection on the top of the 6A7 tube, through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers, three of which are located on top of the chassis and one in the rear of the chassis, for maximum signal output. To make this adjustment, it is necessary that a standard ¼" (across flats) hexagon socket wrench be used. This wrench should be insulated. Always make these I. F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached.

To align the receiver at broadcast frequencies it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator to 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0001 (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator trimmer on the gang condenser (the oscillator section is in the rear of the gang) until the signal is heard best. Without changing the gang condenser setting, adjust the remaining two sections of the gang condenser. The gang condenser adjustment may be accomplished with an ordinary screwdriver. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. The performance of the receiver may now be checked at 600 Kc. by setting the modulated oscillator to 600 Kc. and the receiver dial to that point around 60, which gives best reception. Sometimes it is possible to make a slight improvement in the performance at this point by bending some of the gang condenser plates slightly. This operation should be done very carefully so that no short circuiting of the condenser plates results.

The receiver may be checked in the higher frequency band if a modulated oscillator, capable of covering frequencies of 1700 to 4000 is available. It is not necessary, however, to align the receiver at these frequencies because if the receiver is properly aligned at broadcast frequencies it will be in alignment at the higher frequencies.





CROSLEY RADIO CORP.

General Description . . .

Chassis 5H1 is used in the Model Fifty and Model Fifty Lowboy. It is a 5-tube short wave and broadcast chassis employing the latest superheterodyne circuit, in which has been incorporated a high efficiency tuned radio frequency stage for both short wave and broadcast. The frequency ranges covered are 535 to 1750 Kc., which is the normal broadcast band and the lower frequency police band, and 5700 to 15500 Kc., which is the short wave or high frequency band. The intermediate frequency is 456 Kc. and while there is only one intermediate frequency stage, adequate selectivity is obtained through the use of very high efficiency I.F. transformers, in addition to the three-gang condenser.

Tubes Used and Their Function . . .

The tubes used are 6F7 radio frequency amplifier and audio frequency amplifier, 6A7 oscillator, modulator, 6B7 intermediate frequency amplifier and diode detector, 42 output tube and type 80 rectifier. The tube voltages are shown in the table below:

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Esup	Epl	Egl
6F7	R.F.-A.F.	6.5	250	—3.5	0	125	—	35	—3.5
6A7	Osc.-Mod.	6.5	250	—3.5	0	125	—	190	—15.0
6B7	I.F.-Diode	6.5	250	—3.5	0	125	—		
42	Output	6.5	230	—18	0	250			
80	Rectifier	5.1							

All voltages are plus or minus 10%. All D.C. voltages measured to chassis at 117.5 volt line with 1000 ohms per volt, 250-volt voltmeter. Power demand 50 watts, 110 volts, 60 cycles.

Method of Biasing . . .

Referring to the circuit diagram attached, it will be seen that the bias for the pentode section of the 6F7 tube is obtained from the drop across resistor No. 52. Resistors Nos. 52, 53 and 54 form a voltage divider network across the speaker field, which field also acts as a filter choke. The tap between resistors Nos. 52 and 53 may be followed through resistors Nos. 48 and 47 and thence to the grid return of the 6F7 pentode section. The cathode of the 6F7 returns to the ground, as does also the lower end of resistor No. 52, therefore the drop across resistor No. 52 is impressed on the grid of the pentode section of the 6F7 tube. The grid of the pentode section of the 6F7 returns, of course, through the band change switch. The same condition exists for the grid section of the 6A7 tube. The 6A7 also obtains its bias from the drop across resistor No. 52 but in this case this voltage is fed through resistor No. 48 only and then to the grid return of the 6A7 tube. The oscillator section of the 6A7 obtains its bias, of course, from the grid leak and condenser combination, resistor No. 56 being the low frequency grid leak and resistor No. 57 being the high frequency grid leak. The bias for the pentode section of the 6B7 tube is also obtained from the voltage drop across resistor No. 52 but in this case this voltage is not fed through any filter resistor. Now returning to the triode section of the 6F7, which section is an audio amplifier, it will be found that the bias for this section is also obtained from the drop across resistor No. 52 and through volume control part No. 70. The bias for the output tube type 42, must be greater than that for the other tubes and it is generated due to the drop across resistors 52 and 53 in series and is fed through the grid leak, part No. 51.

Automatic Volume Control Circuit . . .

Automatic volume control voltage is developed in the diode circuit across resistors 35, 47 and 48. Since resistor 48 returns to the junction between resistors 52 and 53, a delay voltage is supplied and this voltage is equal to the drop across resistor 52. The audio frequency diode resistor is part No. 49 and it will be noted that it returns directly to ground which is the same point that the low potential end of resistor 52 returns. Automatic volume control is exerted on the 6F7 pentode section which is the radio frequency stage. While the full diode voltage is that drop across resistors 35, 47 and 48 in series, only the voltage across 47 and 48 is impressed on the radio frequency amplifier. In a similar manner automatic volume control is exerted on the 6A7 control grid and this voltage is obtained from the drop across resistor 48. No automatic volume control is exerted on the intermediate frequency amplifier stage, which is the 6B7, because in so doing there is serious danger of introducing distortion.

Analysis of Signal Channel . . .

Starting with the antenna, the signal enters switch contacts, part No. 21, at which point, depending upon the position of the switch, it will flow either to the broadcast or short wave antenna coil primary, parts Nos. 1 and 2 respectively. Tuning is accomplished by the first section of the gang condenser, part No. 20, connected in the secondary circuit of the antenna coil. The signal is then impressed on the radio frequency pentode grid of the 6F7 tube and is amplified by the tube. The output of the 6F7 tube goes into the primary of the inter-stage radio frequency transformer, part Number 3 or 4, depending on whether the switch is connected to the low or high frequency position. The secondaries of the interstage coils are again tuned by another section of the gang condenser, part No. 20, and the signal is then impressed on the control grid of the 6A7 oscillator modulator tube. The oscillator section of the 6A7 tube uses the oscillator coils 5 and 6 for the low

CROSLEY RADIO CORP.

and high frequency bands respectively, and the oscillator is tuned by the third section of the gang condenser, part No. 20. In this tube the frequency of the signal is changed from radio frequency to 456 Kc., the intermediate frequency. The signal passes from the plate of the 6A7 tube to the first intermediate frequency transformer, part No. 7, and the primary and secondary of this transformer are both tuned to obtain maximum selectivity. The output of the secondary of the transformer is impressed on the control grid of the 6B7 tube in which the intermediate frequency signal is amplified and fed to the second intermediate frequency transformer, part No. 10, which transformer is also tuned in both the primary and secondary circuits. The signal is now impressed directly on the audio frequency diode, in the 6B7 tube and through condenser No. 27 on the automatic control diode of the same tube. In the audio frequency diode the signal is converted from intermediate frequency to audio frequency which audio frequency is present across resistor 49 and condensor 46. There is also a direct current voltage and some intermediate frequency also present here. The audio frequency signal is separated from the direct current voltage by condenser 45 and whatever intermediate frequency there may be left in this circuit is filtered by resistor 50 and the remaining pure audio frequency voltage is impressed across volume control, part No. 70. Adusting the position of the arm of this volume control applies greater or less audio frequency voltage on the grid of the triode section of the 6F7. This triode is used as an audio frequency amplifier. The plate of this tube is connected to the audio coupling resistor, part No. 58, and the audio frequency voltage is coupled to the grid of the output tube, type 42, through condenser 32. The grid circuit of the output tube is completed through resistor 51. The amplified audio output is impressed across the speaker transformer in the speaker assembly, part No. 59.

Power Supply System . . .

The power supply system consists of a transformer, part No. 67, for 110-volt 60-cycle, part No. 68 for 110-volt 25-cycle, and part No. 69 for 220-volt 25-60 cycle, a rectifier tube type 80, the speaker field as a filter choke, wet electrolytic condenser part No. 39, and dry electrolytic condenser part No. 38. In this particular circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser on the cathode of the output tube, type 42. At the same time, better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit.

Alignment Procedure . . .

To align the I. F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator which has been adjusted to 456 Kc. to the control grid connection on the top of the 6A7 tube through an .02 mfd. series condenser. The low side of the oscillator to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. To make this adjustment it is necessary that a standard 5/16 inch (across flats) hexagon socket wrench be used for the upper condenser, and a small screwdriver fitting inside of the nut hole for adjustment of the lower condenser. Always make this I.F. adjustment very carefully and go over your adjustment several times to be sure that the peak has been reached.

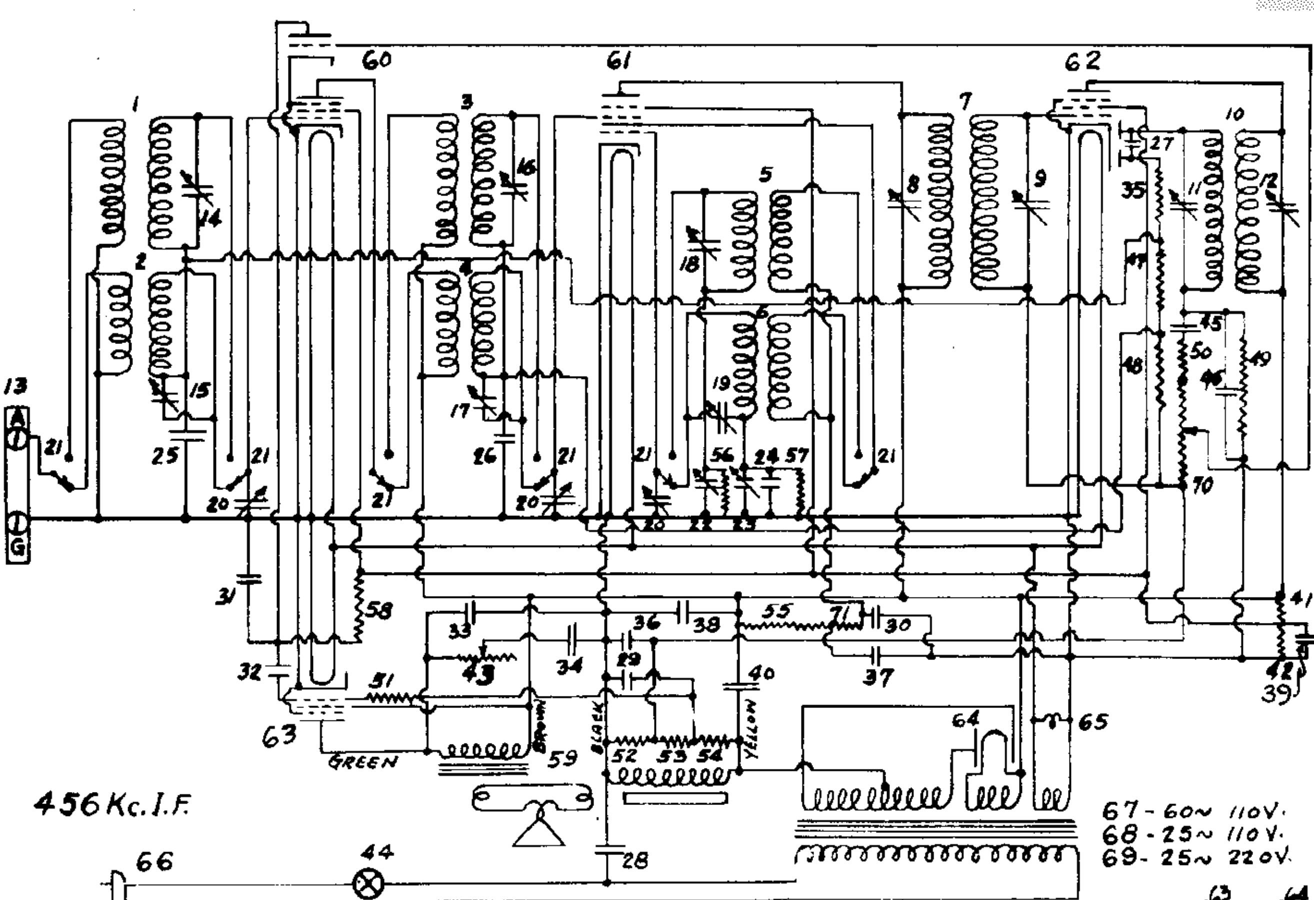
To align the receiver at broadcast radio frequency it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna, be available. Set the oscillator at 1400 Kc., and connect the high side of the oscillator to the receiver antenna terminal through a .0002 (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator broadcast shunt trimmer indicated on the diagram attached and located under the chassis until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers for maximum signal. It is necessary that these adjustments be gone over several times until no further improvements can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is obtained. Now readjust the oscillator series trimmer located on the side of the chassis as shown on the diagram attached for maximum signal. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adjustment if a still greater signal is obtainable.

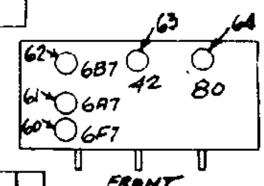
To align the set in the high frequency or short wave band, it is necessary that a modulated oscillator be available for frequencies of 6000 and 15000 Kc. The procedure for this band is similar to the broadcast band except that a 750 ohm midget carbon resistor is used for the dummy antenna instead of the .0002 condenser. Set the modulated oscillator to 15,000 Kc. and the receiver dial to 15. Adust the oscillator shunt trimmer for the high frequency band to maximum signal. Now adjust the antenna and interstage R.F. trimmers for maximum signal, making sure to go over the adjustment several times so that no further improvement can be made. Now set the modulated oscillator to approximately 6000 Kc. and the receiver dial to 6. Readjust the modulated oscillator slightly for maximum signal and then adjust the oscillator series trimmer for the high frequency band for best signal, making whatever slight adjustments in the tuning control are necessary to bring in maximum signal.

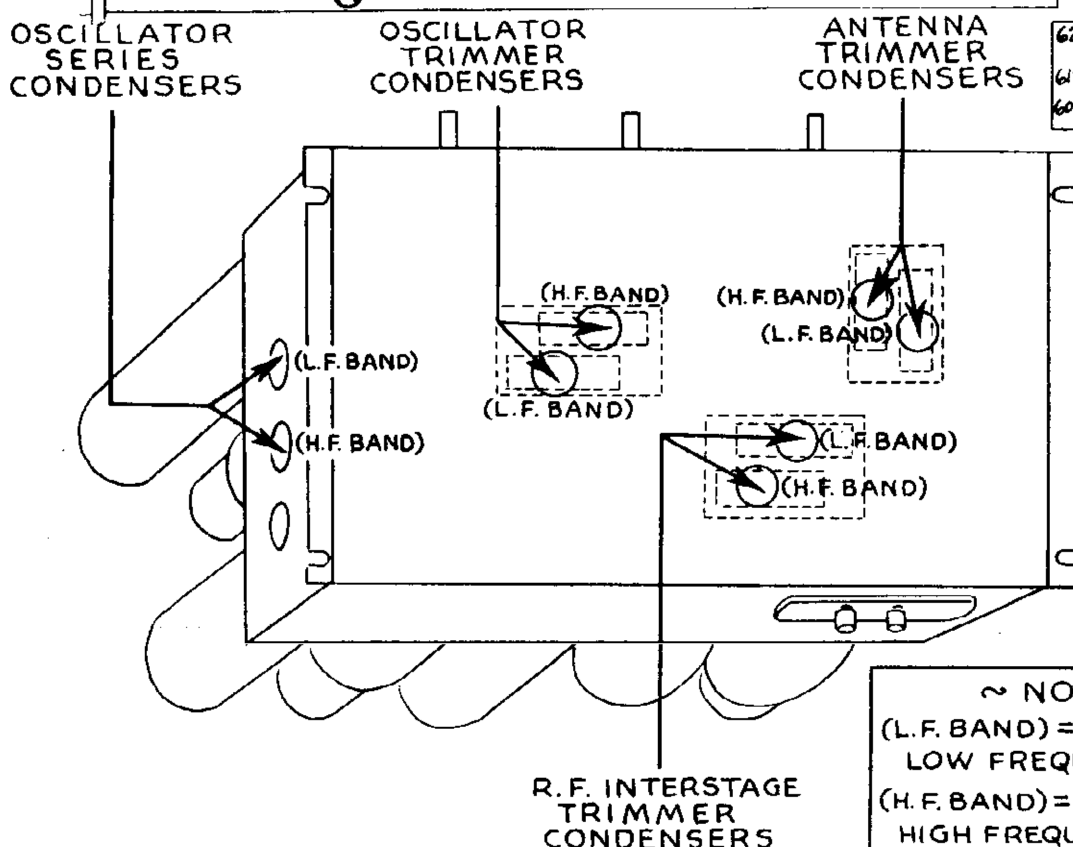
Tuning Receiver In High Frequency Band . . .

Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is received.

CROSLEY RADIO CORP.







60 - R.F. - A.F.
61 - OSC. - MOD.
62 - I.F. DIODE
63 - OUTPUT
64 - RECT.

~ NOTE ~
(L.F. BAND) = LOW FREQUENCY BAND
(H.F. BAND) = HIGH FREQUENCY BAND

MODEL 50,(5H1),51,(5C2)
Parts List

CROSLEY RADIO CORP.

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

PARTS LIST—MODEL 5C2

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 5C2

Qty.	Part No.	Description	* Item	List Each
1	G1-32000	Antenna Coil	2	1.10
1	G2-32003	1st I. F. Trans. Coil	53	.70
1	G1-32003	Diode Feeding Trans.	52	.80
2	W25200A	Coil Socket		.05
2	W25024A	Coil Shield		.10
2	W21541B	Retainer Ring		.05
2	W26891	Insulating Washer		.05
1	G5-33002	Variable Tuning Condenser Gang	62	3.75
1	W31812	Dial Pointer		.05
1	G2-27817	Dial Light Bracket Assm.		.15
1	G3-33006	1st I. F. Prim & Sec. Trimmer Cond.	58-59	.30
1	G4-33006	2nd I. F. Prim. & Sec. Trimmer Cond.	60-61	.50
1	W32242	Vol. Control & Line Switch	50-51	1.00
or	W31204	Vol. Control & Line Switch	16-15	1.00
1	G49-27975	6F7 Socket	44	.10
1	G39-27975	78 Socket	45	.10
1	G48-27975	6B7 Socket	46	.10
1	G30-27975	43 Socket	47	.10
1	G51-27975	25Z5 Socket	48	.10
2	W32300	Tube Shield Base		.05
2	W31212	Tube Shield (Half)		.05
2	W31213	Tube Shield (Slotted Half)		.05
2	W31210	Tube Shield Ring		.05
1	B30957B	Resistor Cable & Plug (120 Ohms)	19	.70
1	W31765	Antenna	1	.20
1	G2-28859	Filter Choke	41	1.25
		FILTER & BY-PASS CONDENSERS		
1	W31992	10.-8.-25.-16. Mfd. 25 V.-125 V.-125 V.-100 V.	37-38 39-40	3.50
1	W30325	0.003 Mfd. 200 V.	25	.20
1	W25516	0.25-0.25 Mfd. 200 V.-200 V.	30-31	.40
1	W27668	0.0001 Mfd.	32	.15
1	W30322A	0.00017-0.006 Mfd. 200 V.-200 V.	34-35	.30

Qty.	Part No.	Description	* Item	List Ea
1	W30323	0.01 Mfd. 200 V.	36	.15
1	W28321	0.02 Mfd. 200 V.	63	.15
1	W28623	0.02-0.02 Mfd. 200 V.-200 V.	64-65	.25
1	W29271A	0.02-0.02 Mfd. 400 V.-400 V.	66-67	.25
1	W29910A	0.25 Mfd. 200 V.	68	.20
		RESISTORS		
1	W28589	350 Ohms	6	.10
1	W27503	1400 Ohms	7	.10
1	W24337	60 Ohms	8	.10
1	W30539	28.7 Ohms	9	.20
1	21237A	60000 Ohms	10	.15
1	21454	1 Megohm	11	.15
1	26578	5 Megohm	12	.15
2	23785	500000 Ohms	13-17	.15
1	23403	150000 Ohms	14	.15
1	21455	300000 Ohms	18	.15
1	W22514	750 Ohms	56	.15
1	24990	25000 Ohms	57	.20
		CABINET AND SPEAKER		
	4D	Cabinet Assembly		5.47
1	W33139	Dial Plate		.15
1	W33140	Vol. Control Plate		.15
1	W28723	Bull's Eye		.05
1	W29023	Bezel		.05
1	W33164	Grille Cloth		.10
1	B33167A	Baffle		.10
1	W33168	Back Cover		.50
1	W33143	Knob		.10
1	W33144	Knob		.10
1	G5-31692	Speaker & Plate Assm.		4.50
1	G1-29529	Cone & Voice Coil		2.00
1	G6-29535	Transformer		1.10
1	W31214	Field Coil		1.25
4	W28742	Speaker Mounting Screws (Chrome)		.05

PARTS LIST—MODEL 5H1

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 5H1

Qty.	Part No.	Description	* Item	List Each
1	G3-32000	Antenna Coil (Low Freq.)	1	.45
1	G1-32002	Antenna Coil (High Freq.)	73	.50
1	G2-32001	R. F. Coil (L. F.)	3	.55
1	G1-32001	R. F. Coil (H. F.)	4	.15
1	G2-32002	Osc. Coil (L. F.)	5	.40
1	G1-32002	Osc. Coil (H. F.)	6	.50
1	G9-32004	1st I. F. Trans. and Trimmer Condensers	7-8 9	1.60
1	G10-32004	2nd I. F. Trans. and Trimmer Condensers	10-11 12	1.60
1	G10-33009	L. F. & H. F. Ant. Trimmer Condensers	14-15	.35
1	G9-33009	L. F. & H. F. R. F. Trimmer Cond.	16-17	.30
1	G8-33009	L. F. Osc. Trimmer Cond.	18	.25
1	G2-33007	L. F. & H. F. Osc. Series Trimmer Cond.	22-23	1.25
1	G7-33002	Variable Tuning Condenser Gang	74	4.00
1	G20-25050	Dial Assm.		.60
6	W25200	Coil Shield Socket		.05
3	W30802	Coil Shield		.15
2	W25025A	Coil Shield		.10
1	W25024A	Coil Shield		.10
3	W26891	Insulating Washer (L. F. and R. F. & Osc. Coils)	1-3 5	.05
3	W21541B	Retaining Ring	1-3-5	.05
3	W30026	Retaining Ring	2-4-6	.05
1	G13-27812	Dial Light Bracket Assm.		.20
1	W25694B	Tone Control & Line Switch	43-44	1.10
1	W25666B	Level Control (Volume)	70	.90
1	B32285	6 Pole D. T. Switch	21	1.30
1	B30375A	Cord & Plug	66	.45
1	G16-26719	Ant.-Gnd. Terminal	75	.15
1	G49-27456	6F7 Socket	60	.10
1	G47-27456	6A7 Socket	61	.10
1	G48-27456	6B7 Socket	62	.10
1	G25-27456	42 Socket	63	.10
1	G6-27456	80 Socket	64	.10
3	W26010	Tube Shield Base		.05
3	W27328A	Tube Shield (6F7, 6A7, 6B7)		.10

Qty.	Part No.	Description	* Item	List Ea
1	G6-30745	Power Trans. 60 cy. 110 V.	67	3.75
	G7-30745	Power Trans. 25 cy. 110 V.	68	5.25
	G-830745	Power Trans. 25 cy. 220 V.	69	5.25
		FILTER & BY-PASS CONDENSERS		
1	W29097C	8.-8.-8. Mfd. 450 V.-450 V.-250 V.	37-38 39	2.85
1	W26194B	12. Mfd. 475 V.	40	1.25
1	W30321A	1. Mfd. 160 V.	29	.55
1	W32304	0.0014 Mfd. 300 V.	24	.30
1	W32380	0.05 Mfd. 200 V.	25	.20
1	W32379	0.02 Mfd. 200 V.	26	.15
1	W27540	0.0005 Mfd. 400 V.	27	.15
1	W30805	0.01 Mfd. 400 V.	28	.20
1	W32378	0.01 Mfd. 400 V.	30	.15
1	W25537A	0.001-0.03 Mfd. 400 V.-400 V.	31-32	.30
1	W25517	0.008-0.05 Mfd. 400 V.-400 V.	33-34	.30
1	W24784	0.25 Mfd. 200 V.	36	.20
1	W30322	0.006-0.00017 Mfd. 200 V.-200 V.	45-46	.30
		RESISTORS		
2	26577	3 Megohm	35-48	.15
2	21454	1 Megohm	47-49	.15
1	W31883	8500-25000 Ohm	41-42	.55
3	23785	500000 Ohm	50-51 54	.15
1	21875	100000 Ohm	53	.15
1	21876	10000 Ohm	55	.15
1	21237A	60000 Ohm	56	.15
1	21453	40000 Ohm	57	.15
1	23403	150000 Ohm	58	.15
1	24814	7000 Ohm	71	.20
1	24990	25000 Ohm	72	.20
1	W31007A	Speaker Cord (4 Wire)		.25
3	W32352	Knob		.10
1	W32353	Knob		.10
1	W31463	Escutcheon		.25
3	S-27	Escutcheon Screws (.10 doz.)		.05

MODEL 51 (5C2)
Voltage, Data

CROSLEY RADIO CORP.

General Description . . .

Chassis 5C2 is used in the Model 51. It is a 5-tube AC-DC superheterodyne receiver employing a 3-gang condenser, Automatic Volume Control and electro-dynamic speaker. The frequency range is 535-1750 Kc. The intermediate frequency is 181.5. Use of this low intermediate frequency assures very good selectivity.

Tubes Used and Their Function . . .

The tubes used are 6F7, Oscillator-modulator, 78 I. F. amplifier, 6B7 diode and audio frequency amplifier, 43 output, and 25Z5 rectifier. The tube voltages are shown in the table below:

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Esup	Ep-osc
6F7	Osc-Mod.	6.5	100	0	5	100	—	100
78	I. F.	6.5	100	0	3	100	3	—
6B7	Diode-AF	6.5	15	0	1	15	—	—
43	Output	27	96	-20	0	100	—	—
25Z5	Rectifier	27	—	—	100	—	—	—

All voltages are plus or minus 10%. All DC voltages are measured to –B at 117.5 volt line with 1000 ohms per volt, 250-volt voltmeter. Power demand 50 watts, 110 volts, 60 cycles. Voltages on other frequencies and DC will vary slightly from the above table.

Method of Biasing . . .

Referring to the circuit diagram it will be seen that the 6F7 Pentode section obtains its bias from the cathode resistor part No. 5. The oscillator section obtains the major portion of its bias from the grid leak and condenser combination in which part No. 55 is the grid leak and 54 the grid condenser. The 78 I. F. amplifier obtains its bias from the cathode resistor, part No. 6. Bias for the 6B7 audio amplifier is obtained from cathode resistor part No. 7. The effect of this circuit is that a slight bucking bias is applied to the diode section, but a very weak signal soon overcomes this bias and the diode then acts as though there were no bias resistor. The pentode audio amplifier section, however, makes use of this initial bias in resistor No. 7 and after signal is applied, depending on the strength of the signal, a varying amount of bias will be applied to accommodate the signal from the AVC circuit. Bias for the output tube, type 43, is obtained from the drop across the filter choke, part No. 41. and whatever hum component there is remaining is filtered through resistor 18 and bypass condenser 30.

Automatic Volume Control Circuit . . .

Automatic volume control voltage is developed in the diode circuit across resistor 10 in series with volume control, parts No. 15 or 50. This voltage is fed back through filter resistor No. 11 to the control grid return of the 6F7 modulator section. No automatic volume control is exerted on the intermediate frequency amplifier, type 78 tube, because in so doing there is a serious danger of introducing distortion.

Analysis of Signal Channel . . .

Starting with the antenna, part No. 1, which is a self-attached reel of wire in the case of this receiver, the signal flows through condenser part No. 25. The purpose of this condenser is to insulate the antenna from the balance of the set, so that if it should touch any devices having voltage on them, neither the receiver nor the device will be burned out. The signal then feeds into the primary of the first preselector coil and is transferred to the first secondary and tuned with one section of the gang condenser, part No. 20. This first secondary coil is coupled inductively to the second secondary coil, which coil is tuned by another section of the gang condenser part No. 20. The output of this double-tuned preselector circuit is fed to the grid of the 6F7 modulator section. The oscillator section of the 6F7 is tuned with the third section of the gang condenser, part No. 20, in conjunction with coil part No. 2, all of these coils bearing the same part number, since they are mounted on one continuous core. The shape of the oscillator section of the gang condenser is such that a constant intermediate frequency of 181.5 is generated when the signal is applied and this intermediate frequency is present across the primary of the first I. F. transformer, part No. 53. This I. F. transformer is double tuned by condensers 21 and 22 respectively, and the signal is then applied to the grid of the 78 I. F. amplifier. The amplified I. F. output is then fed to the second I. F. transformer, part No. 52, which transformer is also double tuned. This then goes to the diode plates connected in parallel. As mentioned above, the diode resistor is a combination of fixed resistor part No. 10 and the volume control part No. 15 or 50. All of the diode voltage developed is used for automatic volume control, while only that portion of the combination DC diode voltage and audio frequency voltage across the volume control is fed to the grid of the 6B7 audio frequency amplifier. Due to the fact that some intermediate frequency is present in this circuit, and it is necessary to eliminate it, this is done in the plate circuit of the 6B7 amplifier with bypass condenser, part No. 34. The audio frequency voltage is fed over to the grid of the type 43 output tube thru coupling condenser 35, while the grid circuit of this tube is completed thru resistors 17 and 18. The amplified output of this tube is, of course, fed to the speaker in the usual manner. A very important part of the audio frequency amplifier is resistor, part No. 13, connected between plate of the type 43 output tube and the screen of the type 6B7 audio amplifier. Naturally some audio frequency is fed through this resistor, as well as the direct current voltage which supplies the screen. However, at the screen of the 6B7 is located a bypass condenser, part No. 33, so that the higher audio frequencies do not affect the screen of this tube, while the lower audio frequencies are not bypassed, and the effect, therefore, is a regenerative one so far as the lower audio frequencies are concerned. The result of this circuit is that in spite of the very small proportions of the cabinet and speaker a desirable amount of lower notes are reproduced by the set.

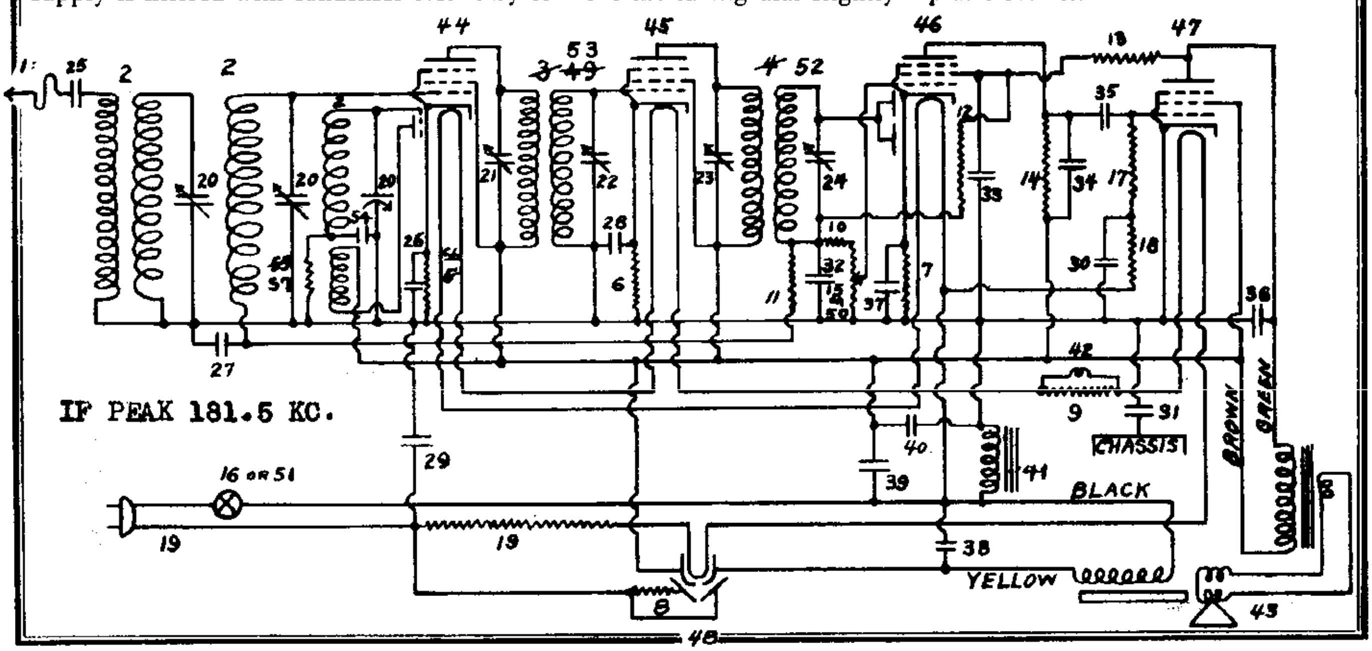
Power Supply System . . .

Since this is an AC-DC receiver, no power transformer is used. To supply the filament of the tubes a series resistor, part No. 19, is used to drop the voltage to the required amount, while the plate voltage supply is obtained from the 25Z5 rectifier. This rectifier has two plates and two cathodes, all of which are separated from each other. It is therefore possible to use one plate and cathode to supply the plates of the remaining tubes and the other plate and cathode to supply the speaker field. In so doing much smoother operation is obtained and less hum results. The speaker field supply is filtered with condenser No. 38. The signal plate supply is filtered with condensers No. 39 and 40, in conjunction with choke, part No. 41.

Alignment Procedure . . .

To align the I. F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 181.5 Kc. with good accuracy. This oscillator should have an attenuator, so that strength of the oscillator output can be regulated. Connect the high side of the output of the modulated oscillator, which has been adjusted to 181.5 Kc. to the receiver antenna wire, as close to where it enters the cabinet as possible, through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. It will be found that the best way to make this connection to the antenna wire is with a sharp, pointed prod, so that the insulation on the antenna wire is not permanently damaged. The unused dead end portion of the antenna wire should be rolled up on its reel. With the oscillator set to a convenient level, adjust the four I. F. transformer tuning condenser adjustment nuts available through the front flange of the chassis for maximum signal output. To make these adjustments, it is necessary that a standard 1/4" (across flats) hexagon socket wrench be used for the adjustment nut. The wrench should be insulated. It may be necessary to move the tuning dial slightly for best results. Always make these I. F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached.

To align the receiver at broadcast frequency, it is necessary that an adjustable oscillator, having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and turn the tuning control of the receiver to 140 on the dial. Connect the high side of the oscillator to the receiver antenna through a .0001 Mfd. (dummy antenna) condenser. Now adjust the oscillator section trimmer on the gang condenser (the oscillator section is the rear-most section of the gang) until the signal is heard best. Then adjust the remaining two R. F. trimmers on top of the gang condenser for best signal. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. The set is now aligned at 1400 Kc. and by adjusting the modulated oscillator to 600, the set may be rechecked at this point. It will sometimes be found that a slight bending of the gang condenser plates will help the sensitivity at 600 Kc. This operation should be done with extreme care, however, so that no short circuiting of the condenser plates results.



CHASSIS 6V2

General Description . . .

Chassis 6V2 is used in the Dual Sixty and Dual Sixty Lowboy. It is a 6-tube 3-gang automatic volume control dual range receiver. The chassis has a continuously variable tone control. The frequency bands covered are 535 to 1700, and 1650 to 4500 Kc. The intermediate frequency is 181.5 Kc., the use of which insures adequate selectivity.

Tubes Used and Their Function . . .

The tubes used are type 58 R. F. amplifier, type 2A7 oscillator modulator, type 58 I. F. amplifier, type 55 diode and A. F. amplifier, type 2A5 output, and type 80 rectifier. The tube voltages are shown in the table below:

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Ep-osc	Eg-osc
58	R. F.	2.5	225	0	3	120	—	—
2A7	Osc.-Mod.	2.5	225	0	3.5	120	175	-15
58	I. F.	2.5	225	-4	0	120	—	—
55	Diode-AF	2.5	40	-4	0	—	—	—
2A5	Output	2.5	210	-18	0	225	—	—
80	Rectifier	4.9	330AC	—	225	—	—	—

All voltages are plus or minus 10%. All DC voltages are measured to chassis at 117.5 line with 1000 ohms per volt, 250-volt voltmeter. Power demand is 60 watts at 110 volts 60 cycles.

Method of Biasing . . .

Referring to the circuit diagram, it will be seen that the bias for the R.F. tube is obtained from the cathode bias resistor, part No. 29. The bias for the input section of the type 2A7 oscillator modulator is obtained from cathode bias resistor, part No. 30, while the oscillator section obtains its bias from the grid leak and condenser combination in which part No. 15 is the grid condenser and part No. 35 the grid leak. The remainder of the tubes are shunt biased. The bias voltages are obtained from a voltage divider network connected across the speaker field, which field acts as a filter choke connected in the negative leg of the power supply. Referring to the diagram, it will be seen that the grid return of the I.F. amplifier tube, type 58, is connected to the junction point between resistors 34 and 46.

The other side of resistor 46 returns to ground so that the voltage drop across resistor 46 is the bias on the I.F. amplifier grid. This same bias voltage is used for the type 55 audio amplifier section, but in this case it is fed through volume control part No. 42. In the case of the output tube, type 2A5, the voltage developed across resistors 34 and 46 is fed through resistor 40 to the grid of this tube.

Automatic Volume Control Circuit . . .

In the broadcast band automatic volume control is exerted on the 58 R.F. amplifier, but in the high frequency band automatic volume control is used on the 2A7 oscillator modulator. The automatic volume control voltage is developed across resistor 36 and fed back to filter resistor, part No. 37, directly to the grid return of the high frequency antenna coil, part No. 4, and then to a switch contact in the secondary circuit of the broadcast antenna coil. When the switch is thrown to the broadcast band (down in the circuit diagram) the automatic volume control voltage goes through the switch, part No. 45, to the grid of the R.F. amplifier through the antenna coil secondary, part No. 2. With the switch thrown in the high frequency position (up in the circuit diagram), the automatic volume control voltage is fed through the secondary of the high frequency antenna coil, part No. 4, and then to the switch, part No. 45, to the grid of the oscillator modulator tube, type 2A7.

Analysis of Signal Channel . . .

The signal enters at the antenna terminal and depending on the position of the switch, part No. 45, is transferred either to the broadcast antenna coil or the high frequency antenna coil, parts No. 2 and No. 4 respectively. In the broadcast band the signal is tuned with one section of the gang condenser, part No. 8, and fed to the grid of the 58 R. F. amplifier. The broadcast antenna coil is tapped, as indicated in the diagram, for the purpose of improving the image ratio. The effect of this tap is to produce an unsymmetrical selectivity characteristic, so that at the point of the normal image response, approximately 360 Kc. higher, this unsymmetrical selectivity curve tends to attenuate the image signal very materially. The amplified R.F. output of this tube is fed to the interstage transformer, part No. 3, the secondary of this transformer being tuned by another section of the gang condenser, part No. 8. The signal then goes to the control grid of the 2A7 oscillator modulator. The oscillator section of this tube is tuned by the third section of the gang condenser, which has specially-shaped plates, also indicated as part No. 8. The frequency of the oscillator is such that a constant intermediate frequency of 181.5 Kc. is present in the plate circuit of the 2A7 oscillator modulator tube. The I.F. output of the oscillator modulator tube is impressed on the first I.F. transformer, part No. 6, which transformer is double tuned. The output of this transformer is impressed on the grid of the type 58 I.F. amplifier. The amplified output of the type 58 I.F. amplifier is impressed on the second I.F. transformer, part No. 7, which transformer is also double-tuned. The I.F. signal is then impressed on the diode plates of the type 55 tube connected in parallel. In this stage there is developed across resistor 36, a DC diode voltage, an audio fre-

MODEL Dual Sixty (6V2)
Alignment, Trimmers

CROSLEY RADIO CORP.

quency voltage, and some intermediate frequency. The audio and intermediate frequency signals pass through the coupling condenser, part No. 19 but the filter resistor, part No. 38, excludes most of the intermediate frequency remaining so that only audio frequency is present across the volume control, part No. 42. The audio frequency is amplified through the triode section of the 55 and then fed through coupling condenser 21 to the grid of the type 2A5 output tube. The slight amount of intermediate frequency remaining at this point is filtered through bypass condenser No. 20. The power audio output of the 2A5 is then fed to the speaker in a conventional manner. Condenser 22 is permanently connected across the speaker to hold its impedance at a more nearly constant value at higher audio frequency, while condenser 23 and variable resistor 43 form a tone control combination.

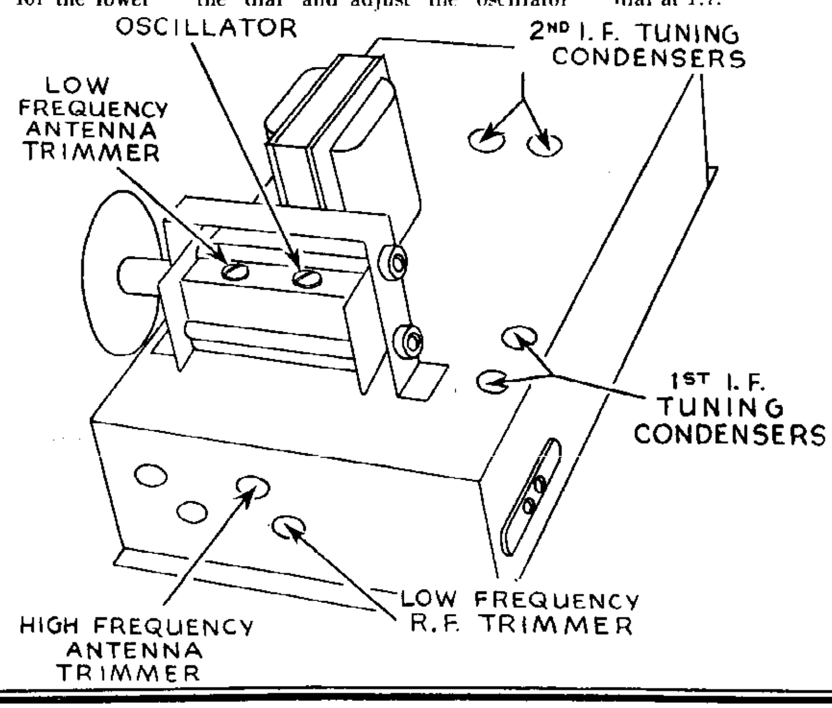
Power Supply System . . .

The power supply system consists of a transformer, part No. 51, for 110 volts, 60 cycles, part No. 52 for 110 volts 25 cycles, and part No. 53 for 220 volts, a type 80 rectifier tube, the speaker field as the filter choke, and the electrolytic filter condensers, part Nos. 25 and 26. In this circuit the filter choke (speaker field) is included in the negative leg of the power supply system, because in so doing it is posible to use the drop across the filter choke for biasing, and climinate the use of a large bypass condenser in the cathode of the output tube. type 2A5. At the same time, better audio quality for the lower notes is obtained than with ordinary bypass condenser circuits.

Alignment Procedure . . .

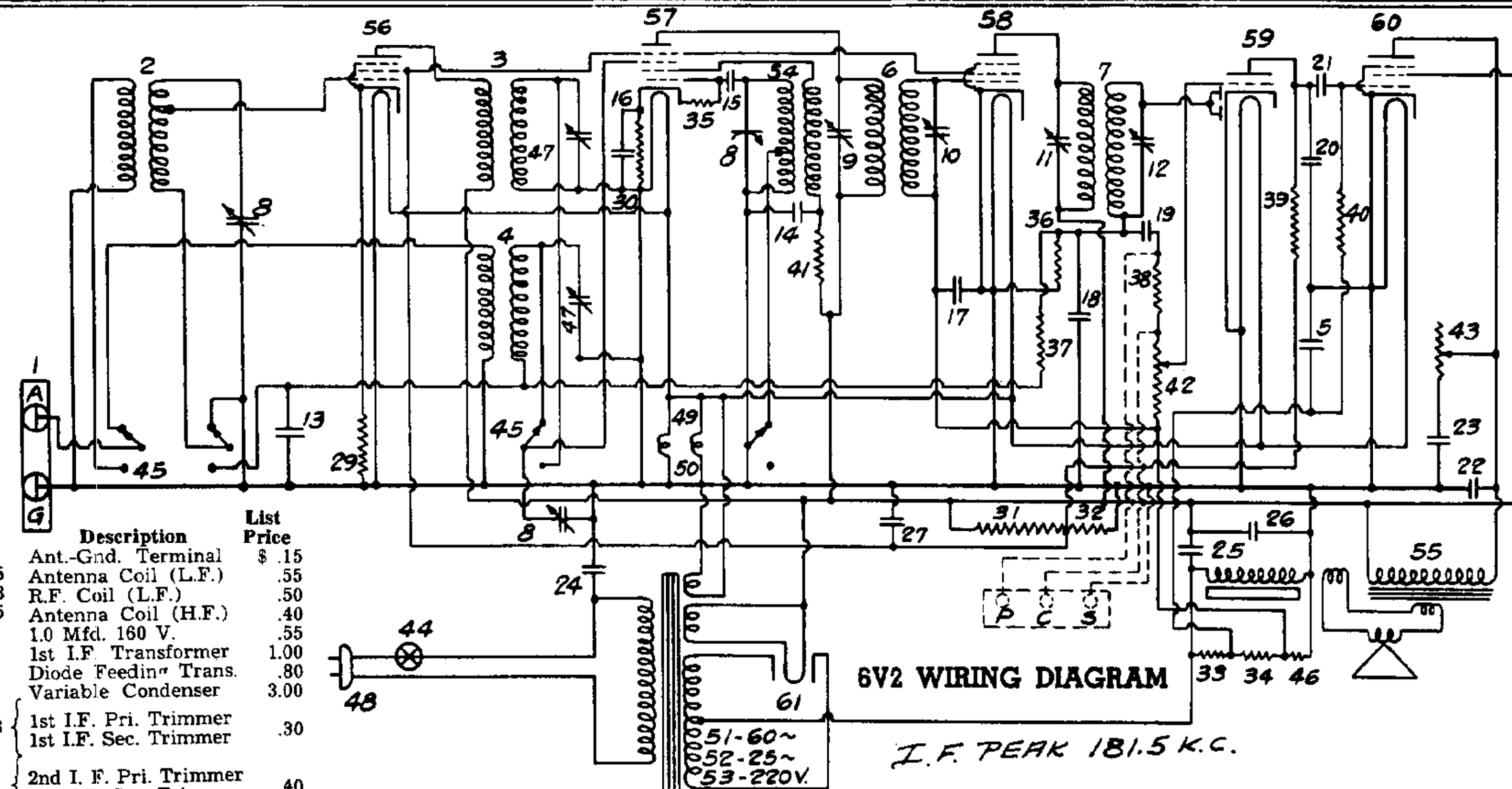
To align the I.F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 181.5 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator which has been adjusted to 181.5 Kc. to the control grid connection on the top of the 2A7 tube, through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I.F. transformer tuning condenser, all four of which are accessible from the top of the chassis for maximum signal output. To make this adjustment it is necessary that a standard 1/4" (across flats) hexagon socket wrench be used. The wrench is preferably insulated. Always make these I.F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached. To align the receiver at broadcast frequencies, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna be available. Set the oscillator to 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 Mfd. (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial and adjust the oscillator trimmer on the top of the gang condenser as indicated in the diagram until the signal is heard best. Without changing the gang condenser setting, adjust the R.F. trimmer, which is also on top of the gang, and the antenna trimmer for the broadcast band, located as indicated in the diagram on the side of the chassis, for maximum signal. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from this modulated oscillator for best accuracy. The performance of the receiver may now be checked at 600 Kc. by setting the modulated oscillator to 600 and the receiver to that point around 60 which gives best reception. Sometimes it is possible to make a slight improvement in the performance at this point by bending some of the gang condenser plates slightly. This operation should be done very carefully so that no short circuiting of the condenser plates results.

To align the receiver in the higher frequency band it is necessary that a modulated oscillator, capable of adjustment to frequencies of 1700 and 4000 Kc. be available. Set the oscillator to 4000 Kc. and throw the wave change switch to the high frequency band. Adjust the receiver in the neighborhood of 4.0 on the dial until maximum signal is heard. Now adjust the short wave antenna trimmer located on the side of the chassis as indicated in the diagram for best signal. The receiver may now be re checked at 1700 Kc. by setting the oscillator at 1700 and the receiver dial at 1.7.



MODEL Dual Sixty (6V2)
Dual Sixty LB
Schematic, Parts List

CROSLEY RADIO CORP.



* Item	Part No.	Description	List Price
1	G1-26719	Ant.-Gnd. Terminal	$ .15
2	G30-24995	Antenna Coil (L.F.)	.55
3	G10-25968	R.F. Coil (L.F.)	.50
4	G31-24995	Antenna Coil (H.F.)	.40
5	W-30321	1.0 Mfd. 160 V.	.55
6	G4-30795	1st I.F. Transformer	1.00
7	G6-25444	Diode Feeding Trans.	.80
8	B-31877	Variable Condenser	3.00
9	G14-25948	1st I.F. Pri. Trimmer	.30
10		1st I.F. Sec. Trimmer	
11	G3-25948	2nd I. F. Pri. Trimmer	.40
12		2nd I.F. Sec. Trimmer	
13	W-30324	0.02 Mfd. 400 V.	.30
14		0.02 Mfd. 400 V.	
15	W-26571	0.0005 Mfd. 400 V.	.15
16	W-27203	0.02 Mfd. 200 V.	.15
17	W-24784	0.05 Mfd. 200 V.	.20
18	W-30322A	0.00017 Mfd. 200 V.	.30
19		0.006 Mfd. 200 V.	
20	W-22537A	0.001 Mfd. 400 V.	.30
21		0.03 Mfd. 600 V.	
22	W-31052	0.004 Mfd. 400 V.	.35
23		0.05 Mfd. 400 V.	
24	W-30805	0.01 Mfd. 400 V.	.20
25	B-30059-B	8 Mfd. 450 V.	3.00
26		8 Mfd. 450 V.	
27		8 Mfd. 250 V.	
28			
29	W-25937	275 Ohms	.15
30	W-25937	275 Ohms	.15
31	W-31883	3500 Ohms	.50
32		25,000 Ohms	
33	23785	500,000 Ohms	.15
34	21875	100,000 Ohms	.15
35	21237-A	60,000 Ohms	.15
36	23785	500,000 Ohms	.15
37	26577	3 Meg.	.15
38	23785	500,000 Ohms	.15
39	23403	150,000 Ohms	.15
40	23785	500,000 Ohms	.15
41	21876	10,000 Ohms	.15
42	W-30610-D	Level Control	.70
43	W-30836	Tone Control	1.10
44		S. P. S. T. Switch	
45	B-31878	4 P. D. T. Switch	1.00
46	22199-A	25,000 Ohms	.15
47	G7-29699	R.F. Trimmer Cond.	.30
48	B-30375-A	Cord & Plug	.45
49	W-22221	2.5 V. Dial Light	.10
50	W-22221	2.5 V. Dial Light	.10
51	G4-30745	60 Cy. Power Trans.	3.50
52	G2-30745	25 Cy. Power Trans.	4.75
53	G3-30745	220 V. Power Trans.	4.75
54	G33-24996	Oscillator Coil	.60
55	354-4	Speaker	6.67
56	G24-27975	58 Socket	.10
57	G56-27975	2A7 Socket	.10
58	G24-27975	58 Socket	.10
59	G29-27975	55 Socket	.10
60	G43-27975	2A5 Socket	.10
61	G6-27975	80 Socket	.10

MODEL Sixty-One (6H2)
Sixty-One LB
Voltage,Notes

CROSLEY RADIO CORP.

CHASSIS 6H2

General Description . . .

Chassis 6H2 is used in the Model Sixty-one and Model Sixty-one Low-boy. It is a 6 tube short wave and broadcast chassis employing the latest superheterodyne circuit, in which has been incorporated a high efficiency tuned radio frequency stage for both short wave and broadcast. The frequency ranges covered are 535 to 1750 Kc., which is the normal broadcast band and the lower frequency police band, and 5700 to 15500 Kc., which is the short wave or high frequency band. The intermediate frequency is 456 Kc. and while there is only one intermediate frequency stage, adequate selectivity is obtained through the use of very high efficiency I.F. transformers, in addition to the three-gang condenser.

Tubes Used and Their Function . . .

The tubes used are 6D6 radio frequency amplifier, 6A7 oscillator modulator, 6B7 intermediate frequency amplifier and diode detector, 76 audio frequency amplifier, 42 output tube and type 80 rectifier. The tube voltages are shown in the table below:

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Esup	Epl	Egl
6D6	R.F.	6.5	250	0	-3.5	125	—	—	—
6A7	Osc.-Mod.	6.5	250	0	-3.5	125	—	190	-15.0
6B7	I.F.-Diode	6.5	250	0	-3.5	125	—	—	—
76	A.F.	6.5	35	0	-3.5	—	—	—	—
42	Output	6.5	230	-18	0	250	—	—	—
80	Rectifier	5.1							

All voltages are plus or minus 10%. All D.C. voltages measured to chassis at 117.5 volt line with 1000 ohms per volt, 250-volt voltmeter. Power demand 60 watts, 110 volts, 60 cycles.

Method of Biasing . . .

Referring to the circuit diagram attached it will be seen that the bias for the 6D6 R.F. tube is obtained from the drop across cathode resistor No. 45. The input section of the 6A7 also obtains its bias from the drop across cathode resistor No. 41. The oscillator section of the 6A7 obtains its bias, of course, from the grid leak and condenser combination, resistor No. 42 being the grid leak. The bias for the pentode section of the 6B7 tube is also obtained from the voltage drop across resistor No. 45 but is not fed through the filter resistor. The 76 audio amplifier bias is also obtained from the drop across resistor No. 45. The bias for the output tube type 42, due to the drop across resistor 54, is fed through the grid leak, part No. 50.

Automatic Volume Control Circuit . . .

Automatic volume control voltage is developed in the diode circuit across resistors 44 and 46. A delay voltage is supplied and this voltage is equal to the drop across resistor 45. The audio frequency diode resistor is part No. 47 and it will be noted that it returns directly to resistor 45. Automatic volume control is exerted on the 6D6 which is the radio frequency stage. While the full diode voltage is that drop across resistors 44 and 46 in series, only the voltage across 46 is impressed on the radio frequency amplifier. In a similar manner automatic volume control is exerted on the 6A7 control grid and this voltage is obtained from the drop across resistor 46. No automatic volume control is exerted on the intermediate frequency amplifier stage, which is the 6B7, because in so doing there is serious danger of introducing distortion.

Analysis of Signal Channel . . .

The signal enters at terminals A1, A2, and G. These three terminals are provided to permit the use of a doublet antenna with transposed lead-in and no ground if desired. With such an antenna, the two lead-in wires are connected to A1 and A2 and the strap between A2 and G is open circuited. If it is desired to operate the receiver with simply a conventional antenna and ground, connect A2 and G together and to the ground wire. The conventional antenna is connected to the A1 terminal.

The signal enters switch contacts, part No. 74, at which point, depending upon the position of the switch, it will flow either to the broadcast or short wave antenna coil primary, parts Nos. 2 and 3 respectively. Tuning is accomplished by the first section of the gang condenser, part No. 10, connected in the secondary circuit of the antenna coil. The signal is then impressed on the 6D6 tube and is amplified. The output of the 6D6 tube goes into the primary of the inter-stage radio frequency transformer, part Nos. 4 or 5, depending on whether the switch is connected to the low or high frequency position. The secondaries of the inter-stage coils are again tuned by another section of the gang condenser, part No. 10, and the signal is then impressed on the control grid of the 6A7 oscillator modulator tube. The oscillator section of the 6A7 tube uses the oscillator coils 6 and 7 for the low and high frequency bands respectively, and the oscillator is tuned by the third section of the gang condenser, part No. 10. In this tube the frequency of the signal is changed from radio frequency to 456 Kc., the intermediate frequency. The signal passes from the plate of the 6A7 tube to the first intermediate frequency transformer, part No. 8, and the primary and secondary of this transformer are both tuned to obtain maximum selectivity. The output of the secondary of the transformer is impressed on the control grid of the 6B7 tube in which the intermediate frequency signal is amplified and fed to the second intermediate frequency transformer, part No. 9, which transformer is also tuned in both the primary and secondary circuits. The signal is now impressed directly on the audio frequency diode, in the 6B7 tube and through condenser No. 40 on the automatic control diode of the same tube. In the audio frequency diode the signal is converted from intermediate frequency to audio frequency which audio frequency is present across resistor 47 and condenser 26. There is also a direct current voltage and some intermediate frequency present here. The audio frequency signal is separated from the direct current voltage by condenser 27 and whatever intermediate frequency there may be left in this circuit is filtered by resistor 48 and the remaining pure audio frequency voltage is impressed across volume control, part No. 58. Adjusting the position of the arm of this volume control applies greater or less audio frequency voltage on the grid of the 76. This triode is used as an audio frequency amplifier. The plate of this tube is connected to the audio coupling resistor, part No. 49, and the audio frequency voltage is coupled to the grid of the output tube, type 42, through condenser 29. The grid circuit of the output tube is completed through resistor 50. The amplified audio output is impressed across the speaker transformer in the speaker assembly, part No. 70.

Power Supply System . . .

The power supply system consists of a transformer, part No. 71, for 110-volt 60-cycle, part No. 72 for 110-vole 25-cycle, and part No. 73 for 220-volt 25-60 cycle, a rectifier tube type 80, the speaker field as a filter choke, wet electrolytic condenser part No. 36, and dry electrolytic condenser Part No. 37. In this particular circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser on the cathode of the output tube, type 42. At the same time, better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit.

Alignment Procedure . . .

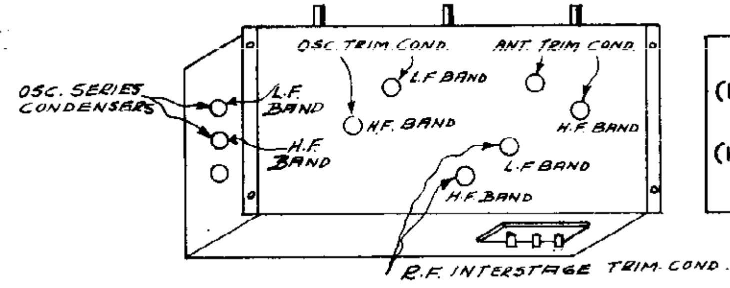
To align the I. F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator which has been adjusted to 465 Kc. to the control grid connection on the top of the 6A7 tube through an .02 mfd. series condenser. The low side of the oscillator to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. To make this adjustment for I.F. transformers in a round shield it is necessary that a standard 5/16 inch (across flats) hexagon socket wrench be used for the upper condenser, and a small screwdriver fitting inside of the nut hole for adjustment of the lower condenser. A screwdriver only will adjust the I.F. transformers in a square shield. Always make this I.F. adjustment very carefully and go over your adjustment several times to be sure that the peak has been reached.

To align the receiver at broadcast radio frequency it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna, be available. Set the oscillator at 1400 Kc., and connect the high side of the oscillator to the receiver antenna terminal through a .0002 mfd. (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator broadcast shunt trimmer indicated on the diagram and located under the chassis until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers for maximum signal. It is necessary that these adjustments be gone over several times until no further improvements can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is obtained. Now adjust the oscillator series trimmer located on the side of the chassis as shown on the diagram attached for maximum signal. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adjustment if a still greater signal is obtainable.

To align the set in the high frequency or short wave band, it is necessary that a modulated oscillator be available for frequencies of 6000 and 15000 Kc. The procedure for this band is similar to the broadcast band except that a 750 ohm midget carbon resistor is used for the dummy antenna instead of the .0002 condenser. Set the modulated oscillator to 15,000 Kc. and the dial to 15. Adjust the oscillator H.F. shunt trimmer until the signal is heard best. Now adjust the antenna and interstage H.F. trimmers for maximum signal, making sure to go over the adjustment several times so that no further improvement can be made. Now set the modulated oscillator to approximately 6000 Kc. and the receiver dial to 6. Readjust the modulated oscillator slightly for maximum signal and then adjust the oscillator series trimmer for the high frequency band for best signal, making whatever slight adjustments in the tuning control are necessary to bring in maximum signal.

Tuning Receiver In High Frequency Band . . .

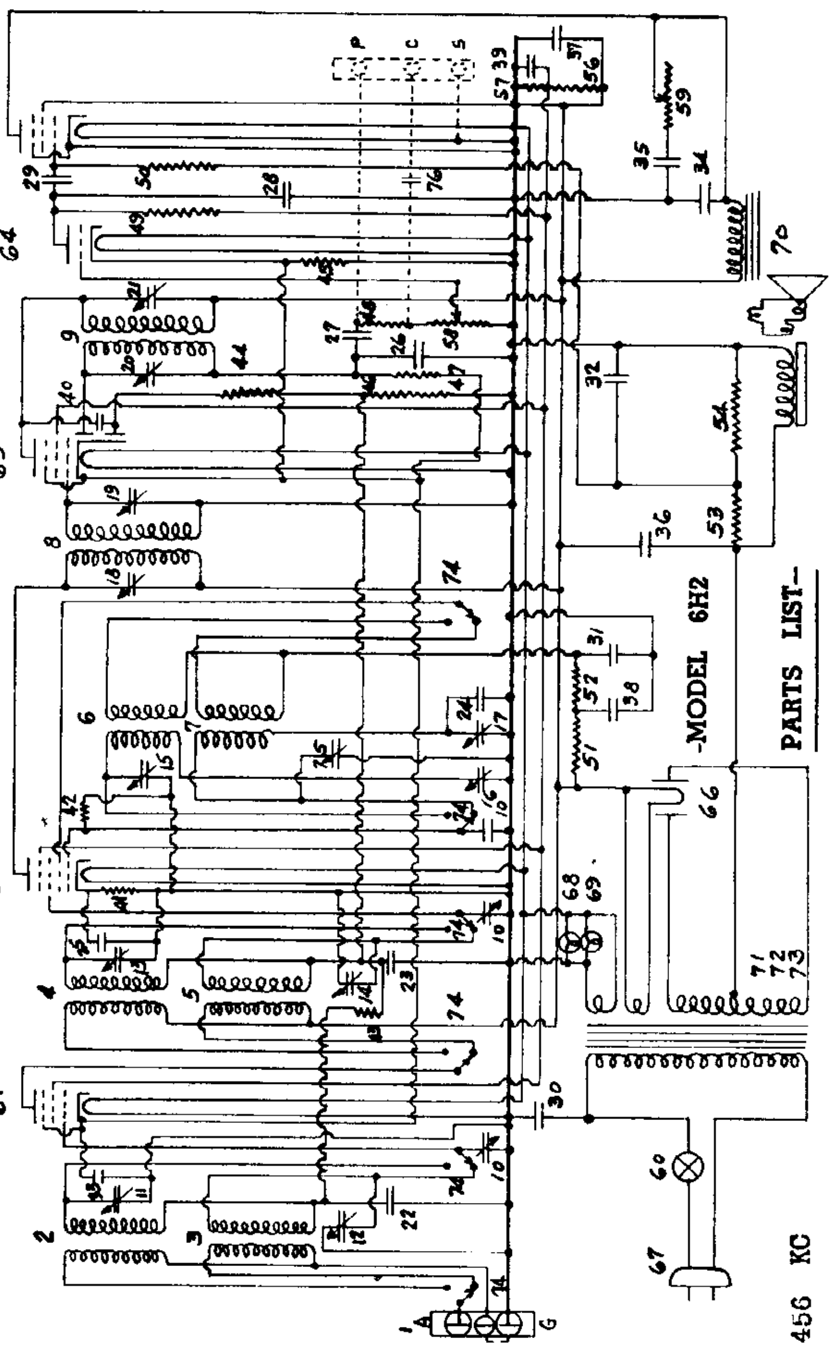
Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is received.



~ NOTE ~
(L.F. BAND) = LOW FREQUENCY BAND
(H.F. BAND) = HIGH FREQUENCY BAND

MODEL Sixty-One (6H2)
Sixty-One LB
Schematic, Parts List
Socket Layout

CROSLEY RADIO CORP.



PARTS LIST–

IF PEAK 456 KC

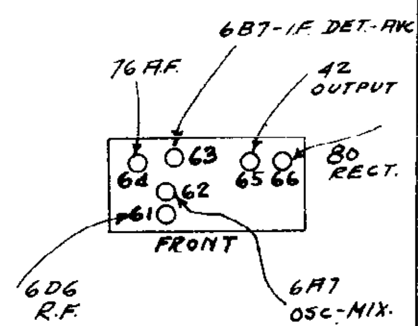
* Figures in 2nd last column refer to parts shown in wiring diagram of Model 6H2

Qty.	Part No.	RESISTORS	Item	List Each
1	W28589	350 Ohms (Flexible)	41	.10
1	21453	40000 Ohms	42	.15
4	23785	500000 Ohms	43-48 50-53	.15
2	26577	3 Megohms	44-46	.15
1	W27504	100 Ohms (Flexible)	45	.10
1	21454	1 Megohm	47	.15
1	23403	150000 Ohms	49	.15
1	21876	10000 Ohms	51	.15
1	24814	7000 Ohms	52	.20
1	33474	120000 Ohms	54	.15
1	W31883	8500-25000 Ohms	56-57	.55
3	W32352	Knob		.10
1	W32353	Knob		.10
1	W31007A	Speaker Cord (4 Lead)		.25
1	W32219A	Dial Glass		.10
1	W32220A	Dial Glass Retainer		.06
1	B32190C	Escutcheon		.90
1	W33106A	Escutcheon Gasket		.06
4	D28	Escutcheon Screws (.10 doz)		.05

Qty.	Part No.	FILTER & BY-PASS CONDENSERS	Item	List Each
1	W29007C	8.-8.-8. Mfd. 450 V.-450 V.-250 V.	37-38 39	2.85
1	W28194B	12. Mfd. 475 V.	36	1.25
1	W30321	1. Mfd. 160 V.	32	.55
3	W32379	0.02 Mfd. 200 V.	22-23 25	.15
1	W32304	0.0014 Mfd.	24	.30
1	W30322A	0.00017-0.006 Mfd. 200 V.-200 V.	26-27	.30
1	W25537A	0.001-0.03 Mfd. 400 V.-400 V.	28-29	.30
1	W30805	0.01 Mfd. 400 V.	30	.20
1	W32378	0.01 Mfd. 400 V.	31	.15
1	W24784	0.25 Mfd. 200 V.	33	.20
1	W25517	0.008-0.05 Mfd. 400 V.-400 V.	34-35	.30
1	W27540	0.0005 Mfd. 400 V.	40	.15

Qty.	Part No.	Description	Item*	List Each
1	G3-32000	Antenna Coil (Low Freq.)	2	.45
1	G1-32002	Antenna Coil (High Freq.)	3	.50
1	G2-32001	R. F. Trans. Coil (L. F.)	4	.55
1	G1-32001	R. F. Trans. Coil (H. F.)	5	.65
1	G2-32002	Oscillator Coil (L. F.)	6	.40
1	G1-32002	Osc. Coil (H. F.)	7	.50
1	G9-32004	1st I. F. Trans. (With Trimmers	8-18 19	1.60
1	G10-32004	2nd I. F. Trans. (With Trimmers	9-20 21	1.60

Qty.	Part No.	Description	Item*	List Each
1	B30375A	Cable & Plug	67	.45
1	W28552	Level Control (Volume) (3 Megohms)	58	.75
2	G4-27134	Dial Light Brkt Assm.		.20
1	W25594B	Tone Control (80000 Ohm) & Line Switch	59-60	1.10



CROSLEY RADIO CORP.

CHASSIS 7H2

General Description . . .

Chassis 7H2 is used in the Model 72 and 72 Lowboy. It is a seven-tube short wave and broadcast chassis employing the latest superheterodyne circuit, in which has been incorporated a high efficiency tuned radio frequency stage for both short wave and broadcast. The frequency ranges covered are 535 to 1750 Kc., which is the regular broadcast band and lower frequency police band, and 5700 to 15500 Kc. which is the short wave or high frequency band. The intermediate frequency is 456 Kc. Two stages of I. F. are used to assure adequate selectivity. A special friction type 80:1 drive is used to make tuning as smooth and easy as possible. Instead of the customary tuning knob, a special fishing-reel type of crank is provided so that the tuning can be spun quickly from one end of the dial to the other. With the high ratio drive employed, this would be quite laborious if a conventional knob were used for tuning.

Tubes Used and Their Function . . .

The tubes used are type 58 R. F. amplifier, type 2A7 oscillator modulator, type 58 first I. F. amplifier, type 58 second I.F. amplifier, type 2B7 diode detector and audio amplifier, type 2A5 output tube and type 80 rectifier. The tube voltages are shown in the table below:

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Ep-osc.
58	RF	2.5	225	0	3	100	
2A7	Osc. Mod.	2.5	225	0	3	100	150
58	1st IF	2.5	225	0	4.5	100	
58	2nd IF	2.5	225	0	4.5	100	
2B7	Diode AF	2.5	50	0.5	0	22	
2A5	Output	2.5	215	2.0	0	225	
80	Rectifier	4.9	—	—	225	—	

Voltage Across Speaker Field, — 120.

All d. c. voltages are plus or minus ten percent. All voltages measured to chassis at 117.5 volt line with 1000 ohms per volt, 500-volt voltmeter. Power demand 75 watts at 110 volts 60-cycle.

Method of Biasing . . .

Referring to the circuit diagram attached, it will be seen that the bias for the first type 58 tube is obtained from the resistor, part No. 78, in the cathode circuit of this tube. Bias for the type 2A7 is obtained in a similar manner from cathode resistor, part No. 19. The oscillator section of the 2A7 obtains its bias, of course, from the grid leak and condenser combination, resistor 20 being for the broadcast or low frequency band and resistor 23 for the short wave or high frequency band. Bias for both I. F. tubes is obtained in the broadcast band from cathode resistor, part No. 34. In the high frequency band it is desired that the sensitivity of the set be improved, so bias resistor No. 31 is connected in shunt to resistor No. 34 so that the I. F. amplification is thereby increased when the set is switched to the short wave or high frequency band. The result of this circuit arrangement is that the set has substantially the same sensitivity in both broadcast and short wave bands, in spite of the fact that the radio frequency coils in the short wave band cannot possibly be as efficient as they are in the broadcast band. The next two tubes employ shunt instead of self biasing. Resistors 55, 56 and 57 form a voltage divider network connected across the speaker field, which also is the filter choke. The most negative point of this voltage divider network is the end of resistor 57 which connects to the speaker field, while the positive end of the network is that end of resistor 55 which connects to the type 2B7 and 2A5 cathodes. It will therefore be seen that the negative grid bias for the type 2B7 audio frequency amplifier section is obtained at the junction point between resistors 55 and 56. The voltage obtained at this point has some hum present and it is therefore necesary that it be fed through the hum filter resistor, part No. 43, and thence through the grid circuit completing resistor, part No. 41, to the type 2B7 grid. Bias for the output tube, type 2A5 is obtained at the junction point between resistors 56 and 57 and fed through the grid circuit completing resistor to the grid of the 2A5 output tube. It is therefore seen that the bias fed to the output tube is necessarily larger than that fed to the 2B7, since it is the drop across two resistors, while that fed to the 2B7 is the drop across only one resistor.

Automatic Volume Control Circuit . . .

Automatic volume control is developed in the diode circuit across volume control resistor, part No. 39. This voltage is picked off at the junction between resistor 38 and the volume control, part No. 39, and fed through isolating resistor, part No. 75, to the grid return circuit of the 2A7 tube. The same point is also fed to the grid return of the first type 58 I.F. amplifier. From this point there is connected an additional isolating resistor, part No. 27, and from there to the type 58 R.F. amplifier grid return. No automatic volume control is exerted on the second intermediate frequency amplifier type 58 tube because in so doing there is serious danger of introducing distortion.

Analysis of Signal Channel . . .

Starting with the antenna, the signal enters switch contact indicated as part No. 1, and depending on which position the switch happens to be in, flows either to the short wave antenna coil primary or to the broadcast antenna coil primary, parts No. 2 and No. 3 respectively. It is to be noted that a resistor, part No. 77, is connected across the broadcast antenna coil primary for the purpose of securing better alignment. The secondary of the antenna coil is tuned with a section of the gang condenser, part No. 14, and the signal is then impressed on the grid of the type 58 R.F. amplifier. The amplified output of the tube follows through the switch and into the primary of broadcast or high frequency interstage coil, depending on the switch position. The output of the secondary of the interstage coil is tuned with another section of the gang condenser, part No. 14, and fed to the control grid of the type 2A7 modulator oscillator tube. The oscillator section of this tube is automatically connected at the same time the switch is thrown so that the frequency of the oscillator is controlled by the third section of the gang condenser, part No. 14, so as to give a constant intermediate frequency of 456 Kc. in the plate circuit of the type 2A7 modulator oscillator. This intermediate frequency is now fed into the primary of the first I.F. transformer, part No. 29, and thence to the secondary of the same transformer. This transformer is tuned in both primary and secondary circuits to obtain maximum selectivity. The output of transformer No. 29 is fed to the first type 58 I.F. amplifier and the output of this tube then goes to the second I.F. transformer, part No. 33, which I.F. transformer is also double tuned. The signal then follows to the grid of the second type 58 I.F. amplifier whose output is in turn fed to the primary of a single tuned diode type I.F. transformer, part No. 35. The tuned secondary circuit of the diode transformer feeds the two diode plates of the type 2B7 connected in parallel. The diode resistor is a combination of part No. 38 and volume control No. 39 connected in series, but only that portion of the diode voltage developed across part No. 39 is used. The reason for this connection is that smoother action is obtained without regeneration. Both audio frequency and direct current are present across resistor No. 39 and, to separate out the direct current, condenser, part No. 40, is used to couple the audio frequency over to the grid of the type 2B7 audio frequency amplifier. Resistor No. 41 completes the grid circuit of this tube. The amplified audio frequency in the plate circuit of the 2B7 is fed through coupling condenser, part No. 47 into the grid of the type 2A5 output tube, which grid circuit is completed with resistor No. 48. The plate circuit of the output tube is connected to the speaker transformer in the customary manner. Condenser No. 50 is used to match the impedance of the output tube and speaker-more closely at higher audio friequencies, while condenser No. 51 and variable resistor No. 52 form the tone control.

Power Supply System . . .

The power supply system consists of a transformer, part No. 63, for 110-volt 60-cycle, part No. 64 for other uses, a rectifier tube type 80, the speaker field as a filter choke, wet electrolytic condenser, part No. 60, and dry electrolytic condenser, part No. 8. In this particular circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser in the cathode of the output tube, type 2A5. At the same time better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit. The Universal transformer, part No. 64, is a special transformer originally developed for export use, but because of its enthusiastic reception it has been incorporated in this chassis. The primary of the transformer is equipped with four voltage taps clearly marked so that the set can be made to operate from 90 to 265 volts in four steps. The transformer operates on any frequency from 25 to 100 cycles.

Alignment Procedure . . .

To align the I.F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be regulated. Be sure that the band change switch is thrown to the low frequency or broadcast band position. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 2A7 tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I.F. transformer condensers for maximum signal output. The first and second I.F. transformer tuning condensers are located on the left-hand side of the chassis, while the diode tuning condenser is located under the chassis as indicated in the diagram attached. To make these adjustments, it is necessary that a standard ¼" (across flats) hexagon socket wrench be used for the adjustment nut. The wrench is preferably insulated. Always make this I.F. adjustment very carefully and go over the adjustments several times to be sure that the peak has been reached.

To align the receiver at broadcast frequency, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator broadcast shunt trimmer, indicated on the diagram as "oscillator trimmer condenser L.F. band" and located under the chassis, until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers, also located under the chassis and indicated in the diagram attached for maximum signal. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is heard. Now adjust the oscillator series trimmer for the low frequency band located under the chassis as shown in the diagram for maximum signal. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adustment if a still greater signal is obtainable.

CROSLEY RADIO CORP.

To align the set in the high frequency or short wave band, it is necessary that a modulated oscillator be available for frequencies of 6000 and 15000 Kc. The procedure for this band is similar to the broadcast band, except that a 750 ohm midget carbon resistor is used for the dummy antenna instead of the .0002 condenser. Set the modulated oscillator to 15000 Kc. and the receiver dial to 15. Adjust the oscillator trimmer condenser under the chassis to maximum signal. Now adjust the antenna and interstage trimmers for maximum signal, making sure to go over the adjustment several times so that no further improvement can be made. Now set the modulated oscillator to approximately 6000 Kc. and the receiver to 6. Readjust the modulated oscillator slightly for maximum signal and then adjust the high frequency band oscillator series trimmer for best signal, making whatever slight readjustments in the tuning control are necessary to bring in maximum signal.

Tuning Receiver In High Frequency Band . . .

Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adujstment of the receiver to the center of the carrier after a high frequency station is located and received.

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be usec If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shippe on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to th usual trade discounts, and are subject to change without notice.

PARTS LIST—MODEL 7H2

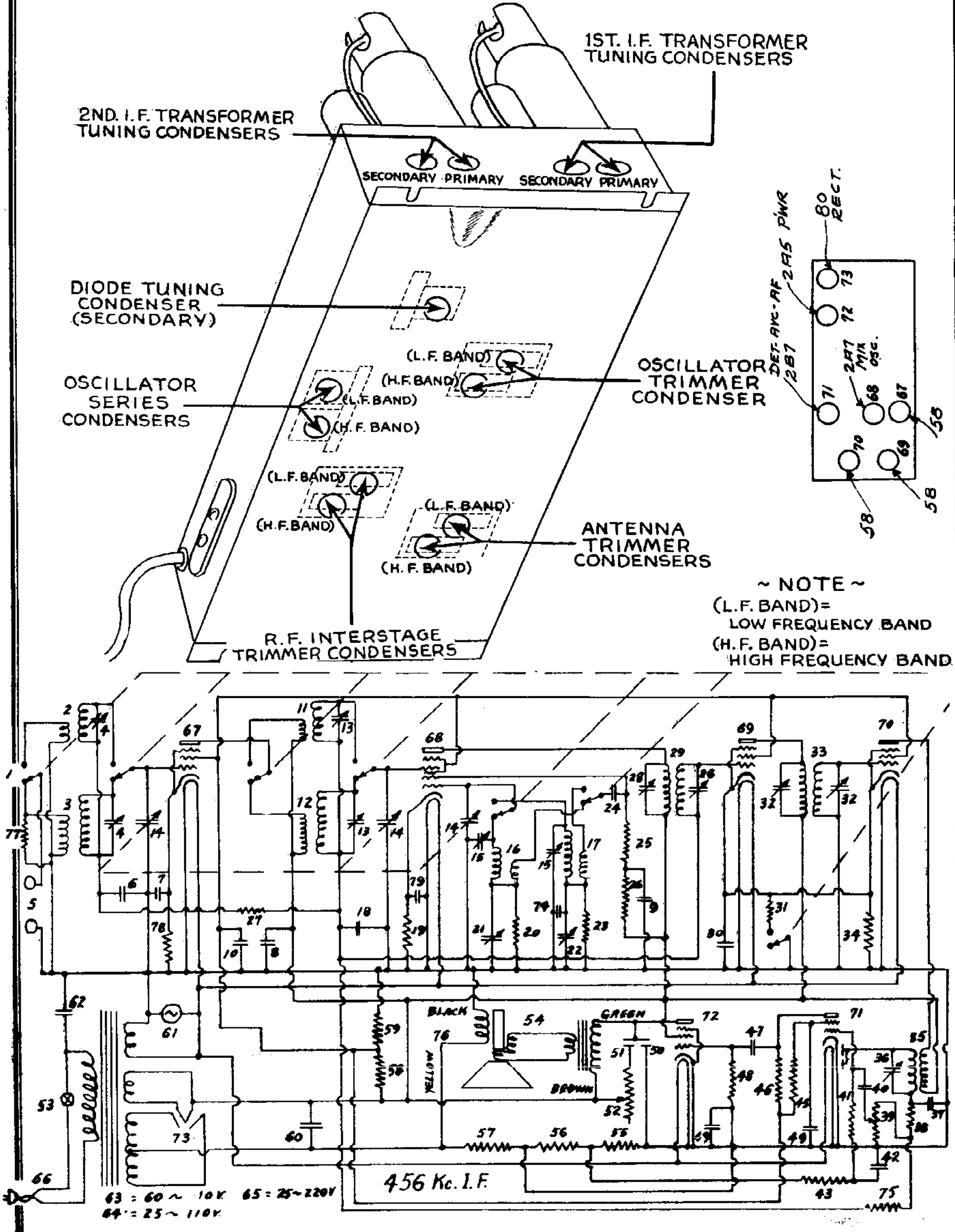
* Figures in 2nd last column refer to parts shown in wiring diagram of Model 7H2

Qty.	Part No.	Description	* Item	List Each
1	G1-32002	Antenna Coil (H. F.)	81	.50
1	G3-32000	Antenna Coil (L. F.)	3	.45
1	G1-32001	R. F. Coil (H. F.)	11	.65
1	G2-32001	R. F. Coil (L. F.)	12	.55
1	G2-32002	Osc. Coil (L. F.)	16	.40
1	G1-32002	Osc. Coil (H. F.)	17	.50
1	G1-32004	1st I. F. Trans.	29	.50
1	G1-32004	2nd I. F. Trans.	33	.50
1	G2-32004	3rd I. F. Trans. (Diode)	35	.50
1	W31386	Coil Shield Bracket		.05
6	W25200	Coil Socket		.05
3	W30802	Coil Shield		.15
2	W25025A	Coil Shield		.10
1	W25024A	Coil Shield		.10
3	G1-24064	Coil Shield	29-33 35	.15
6	W26891	Insulating Washer		.05
3	W21541B	Retaining Ring	3-12 16	.05
3	W30026	Retaining Ring	81-11 17	.05
1	G1-33008	Ant. Tuning Condenser	86	.35
1	G1-33008	R. F. Tuning Condenser	87	.35
1	G2-33009	Osc. Tuning Condenser	80	.30
1	G7-33006	I. F. Condenser	88-89	1.25
2	G6-33006	1st & 2nd I. F. Condensers	90-91	.90
1	G1-33005	3rd I. F, Condenser	92	.25
1	G13-33002	Variable Tuning Condenser Gang	82	4.00
1	G1-32086	Dial Drive Assm.		2.75
2	G4-27134	Dial Light Bracket Assm.	61	.20
2	W32128A	Light Diffuser		.10
2	W32244	Light Diffuser Retainer		.05
1	B32147A	7 Pole D. T. Switch	1	1.35
1	W32062	Level (Volume) Control (1 Meg.)	39	.80
1	W32063	Tone Control & Switch	52-53	1.20
1	G16-26719	Ant.-Gnd. Terminal	93	.15
1	G5-30743	Power Trans. 60 cy. 110 V.	63	3.75
	G36-25669	Power Trans. 25 cy. 110-220 V.	64-65	9.00
3	G24-27975	58 Socket	67-69 70	.10
1	G56-27975	2A7 Socket	68	.10
1	G46-27975	2B7 Socket	71	.10
1	G43-27975	2A5 Socket	72	.10
1	G6-27975	80 Socket	73	.10
5	W21981	Tube Shield Base		.05

Qty.	Part No.	Description	* Item	List Each
3	B26009	Tube Shield (58 Tube)		.10
2	W28632	Tube Shield (2A7-2B7)		.10
1	B21491A	Cord & Plug	66	.50
		FILTER & BY-PASS CONDENSERS		
1	W26194B	12. Mfd. 475 V. Condenser	60	1.25
1	W29097C	8.-8.-8. Mfd. 450 V.-450 V.-250 V. Condenser	8-9 10	2.85
1	W32380	0.05 Mfd. 200 V. Condenser	18	.20
1	W25435	0.003 Mfd. 400 V.	24	.15
3	W24049	0.1 Mfd. 200 V.	30-42 44	.15
1	W27932	0.0001 Mfd. 200 V.	37	.15
1	W27216	0.05 Mfd. 200 V.	47	.15
1	W30321	1.0 Mfd. 160 V.	49	.55
1	W31052	0.004-0.05 Mfd. 400 V.-400 V.	50-51	.30
1	W30805	0.01 Mfd. 400 V.	62	.20
1	W32304	0.0014 Mfd.	74	.30
2	W28621	0.02 Mfd. 200 V.	83-85	.15
1	W28619	0.006 Mfd. 200 V.	84	.15
1	W32379	0.02 Mfd. 200 V.	6	.15
		RESISTORS		
2	W25937	275 Ohm	19-78	.15
1	W21237A	60000 Ohm	20	.15
1	W21453	40000 Ohm	23	.15
2	W21876	10000 Ohm	25-26	.15
1	W21455	300000 Ohm	27	.15
2	W22514	750 Ohm	31-34	.15
2	W23403	150000 Ohm	38-56	.15
3	W21454	1 Megohm	41-43 57	.15
2	W23785	500000 Ohm	45-48	.15
1	W21875	100000 Ohm	46	.15
1	W22831	15000 Ohm	55	.15
1	W31361	7000-11000 Ohms	58-59	.45
1	W26577	3 Megohm	75	.15
1	W31094	4500 Ohm	77	.15
1	W31007A	Speaker Cord (4 Lead)	76	.25
3	W32352	Knob		.10
1	G1-32067	Crank Assm.		.50
1	W32127A	Dial Glass		.10
1	W32126A	Dial Glass Retainer		.05
1	B32125B	Escutcheon		1.00
1	W23880A	Thumb Screw		.05
1	B32172	Tube & Cond. Shield		.10
1	C32149	Bottom		.25

MODEL 72, 72 LB (7H2)
Schematic, Trimmers
Socket Layout

CROSLEY RADIO CORP.



CROSLEY RADIO CORP.

CHASSIS 7H3

General Description . . .

Chassis 7H3 is used in the Models 72 and 72 Lowboy. It is a 7-tube, short-wave and broadcast chassis, employing the latest superheterodyne circuit in which has been incorporated a high efficiency tuned radio frequency stage for both short wave and broadcast. The major difference bewteen chassis 7H3 and its predecessor, chassis 7H2, lies in the addition of a broad A.V.C. Circuit to chassis 7H3 and the further use of A.V.C. on the first audio amplifier. The frequency ranges covered are 535 to 1735 Kc., which is the regular broadcast band and the lower frequency police band, and 5700 to 15,500 Kc., which is the short wave or high frequency band. The intermediate frequency is 456 Kc. Two stages of I.F. are used to assure adequate selectivity. A special friction-type 80-1 drive is used to make tuning as smooth and easy as possible. Instead of the customary tuning knob, a special fishing reel type of crank is provided so that the tuning can be spun quickly from one end of the dial to the other. With the high ratio drive employed, this would be quite laborious if a conventional knob were used for tuning.

Tubes Used and Their Function . . .

The tubes used are—type 6D6 R.F. amplifier, type 6A7 oscillator modulator, type 6B7 first I.F. amplifier and AVC Diode, type 6D6 second I.F. amplifier, type 6F7 A.F. Diode and AVC A.F. amplifier, type 42 output, and type 80 rectifier. The tube voltages are shown in the table below:

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Ep-Osc
6D6	R.F.	6.5	225	—	0	100	—
6A7	Osc.-Mod.	6.5	225	—	(10LF) (0HF)	100	150
6B7	1st I.F. & A.V.C. Diode	6.5	225	0.3	0	100	—
6D6	2nd I.F.	6.5	225	—	2.0	100	—
6F7	Diode & I.F.	6.5	30	.5	0	22	—
42	Output	6.5	215	2.0	0	225	—
80	Rectifier	4.9	—	—	225	—	—

105 volts across speaker field.

All DC voltages are plus or minus 10%. All DC voltages are measured to chassis at 117.5 volt line, with 1000 ohms per volt, 500 volt voltmeter. Power demand is 75 watts at 110 volts 60 cycles.

Method of Biasing . . .

Referring to the circuit diagram it will be seen that the 6D6 R.F. amplifier obtains its bias from the voltage drop across resistor 55. Resistors 55, 56 and 57 form a voltage divider network connected in shunt with the speaker field, which field is in the negative leg of the power supply system. The most positive point of the network is where resistor 55 is connected to chassis, and the most negative point on the network is where resistor 57 connects to the center tap on the power transformer secondary. The grid return of the 6D6 R.F. amplifier follows through isolating resistor part No. 27, and thence through a second group of resistors, parts Nos. 75, 78, 80, down to the junction point between resistors 55 and 56. The 6A7 input section obtains its bias through isolating resistor No. 7 and then through resistor 80 to the same point, namely the junction between resistors 55 and 56. The oscillator section of the 6A7 obtains its bias from the usual grid leak and condenser arrangement in which part No. 20 is the grid leak for the low frequency band and part No. 23 for the high frequency band. Bias for the 6B7 first amplifier, is obtained from the drop across resistor 55, while the bias for the 6D6 second I.F. amplifier is obtained at the same point but through resistors 75, 78 and 80. The 6F7 pentode section, which is used as an audio amplifier, obtains its fixed bias from resistor 55, but there is also a varying bias, depending on the signal strength applied due to the diode voltage drop across the level control, part No. 39. In this case, resistors 65 and 41 form a voltage divider network so that the diode voltage developed is split up in their ratio. The type 42 output tube obtains its bias from the combined drop across resistors 55 and 56 in series, this circuit being completed through grid resistor No. 48.

Automatic Volume Control Circuit . . .

Automatic Volume Control voltage is generated in the diode of the 6B7 first I.F. amplifier. This diode is fed from the second I.F. transformer and the A.V.C. voltage is developed across resistors 78 and 80, after the signal voltage has become sufficiently large to overcome the initial bias across resistor 55. Automatic volume control voltage is fed both forward and back in the circuit of this 7H3 receiver. The full voltage is fed to the 6D6 R.F. amplifier through isolating resistor 75 and 27, while that part of the voltage developed across resistor 80 only is fed through isolating resistor No. 7 to the 6A7 input grid. The 6B7 pentode section does not have any AVC exerted on it because if this were done some distortion might result. The 6D6 second I.F. amplifier has the full voltage exerted on it through isolating resistor 75. It will be noted that in this stage the AVC voltage is sent forward instead of back through the circuit. The first audio amplifier, type 6F7 also has AVC exerted on it. In this case, the grid and plate of the 6F7 triode section are used as a diode and diode voltage is developed across resistors 38 and 39 in series. Resistors 65 and 41 form a voltage divider network so that a portion of this diode voltage is fed onto the input grid of the 6F7 pentode section.

Analysis of Signal Channel . . .

The signal enters at the terminals A1, A2 and G. These three terminals are provided to permit the use of a doublet antenna with transposed lead-ins and no ground connection, if desired. With such an antenna the two lead-in wires are connected to A1 and A2, and the wire strapped between A2 and G is open-circuited. If it is desired to operate the receiver with simply a conventional antenna and ground, connect A2 and G together and to the ground wire. The conventional antenna is connected to the A1 terminal.

The signal flows either to the short wave antenna coil primary or to the broadcast antenna coil primary, parts No. 2 and No. 3 respectively. It is to be noted that a resistor, part No. 77, is connected across the broadcast antenna coil primary for the purpose of securing better alignment. The secondary of the antenna coil is tuned with a section of the gang condenser, part No. 14, and the signal is then impressed on the grid of the type 6D6 R. F. amplifier. The amplified output of the tube follows through the switch and into the primary of broadcast or high frequency interstage coil. The output of the secondary of the interstage coil is tuned with another section of the gang condenser, part No. 14, and fed to the control grid of the type 6A7 modulator oscillator tube. The oscillator section of this tube is automatically connected at the same time the switch is thrown so that the frequency of the oscillator is controlled by the third section of the gang condenser, part No. 14, so as to give a constant intermediate frequency of 456 Kc. in the plate circuit of the type 6A7 modulator oscillator. This intermediate frequency is now fed into the primary of the first I. F. transformer, part No. 29, and thence to the secondary of the same transformer. This transformer is tuned in both primary and secondary circuits to obtain maximum selectivity. The output of transformer No. 29 is fed to the type 6B7 first I. F. amplifier and the output of this tube then goes to the second I. F. transformer, part No. 33, which I. F. transformer is also double tuned. The signal then follows to the grid of the type 6D6 second I. F. amplifier whose output is in turn fed to the primary of a double tuned diode type I. F. transformer, part No. 35. The tuned secondary circuit of the diode transformer feeds the triode grid and plate of the type 6F7 connected in parallel. The diode resistor is a combination of part No. 38 and volume control No. 39 connected in series, but only that portion of the diode voltage developed across part No. 39 is used. The reason for this connection is that smoother action is obtained without regeneration. Both audio frequency and direct current are present across resistor No. 39. Condenser, part No. 40, is used to couple the audio frequency over to the pentode grid of the type 6F7 audio frequency amplifier. Resistor No. 41 completes the grid circuit of this tube. The amplified audio frequency in the plate circuit of the 6F7 is fed through coupling condenser, part No. 47 into the grid of the type 42 output tube, which grid circuit is completed with resistor No. 48. The plate circuit of the output tube is connected to the speaker transformer in the customary manner. Condenser No. 50 is used to match the impedance of the output tube and speaker more closely at higher audio frequencies, while condenser No. 51 and variable resistor No. 52 form the tone control.

Power Supply System . . .

The power supply system consists of a transformer, part No. 63, for 110-volt 60-cycle, part No. 64 for other uses, a rectifier tube type 80, the speaker field as a filter choke, wet electrolytic condenser, part No. 60, and dry electrolytic condenser, part No. 8. In this particular circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser in the cathode of the output tube, type 42. At the same time better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit. The Universal transformer, part No. 64, is a special transformer originally developed for export use, but because of its enthusiastic reception it has been incorporated in this chassis. The primary of the transformer is equipped with four voltage taps clearly marked so that the set can be made to operate from 90 to 265 volts in four steps. The transformer operates on any frequency from 25 to 100 cycles.

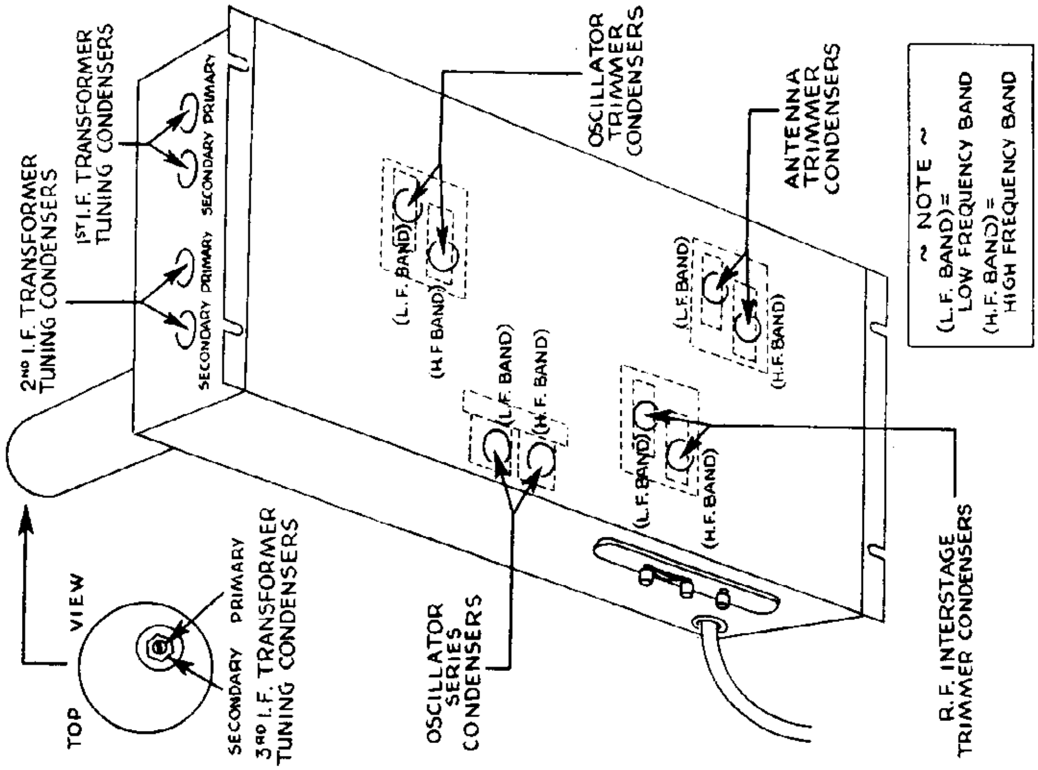
Alignment Procedure . . .

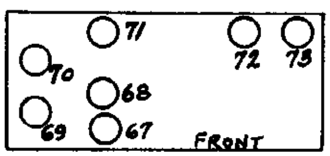
To align the I. F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be regulated. Be sure that the band change switch is thrown to the low frequency or broadcast band position. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6A7 tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. The first and second I. F. transformer tuning condensers are located on the left-hand side of the chassis, while the diode transformer tuning condensers are located on the top of the tall I. F. transformer as indicated in the diagram attached. To make these adjustments, it is necessary that a standard ¼" (across flats) hexagon socket wrench be used for the adjustment nuts and a small screw driver for the slot. The tools are preferably insulated. Always make these I. F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached.

To align the receiver at broadcast frequency, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the A1 receiver antenna terminal through a .0002 (dummy antenna) condenser. Be sure that there is a connection between A2 and G. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator broadcast shunt trimmer, indicated on the diagram as "oscillator trimmer condenser L. F. band" and located under the chassis, until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers, also located under the chassis and indicated in the diagram attached for maximum signal. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is heard. Now adjust the oscillator series trimmer for the low frequency band located

MODEL 72,72 LB (7H5)
Schematic, Trimmers
Socket Layout

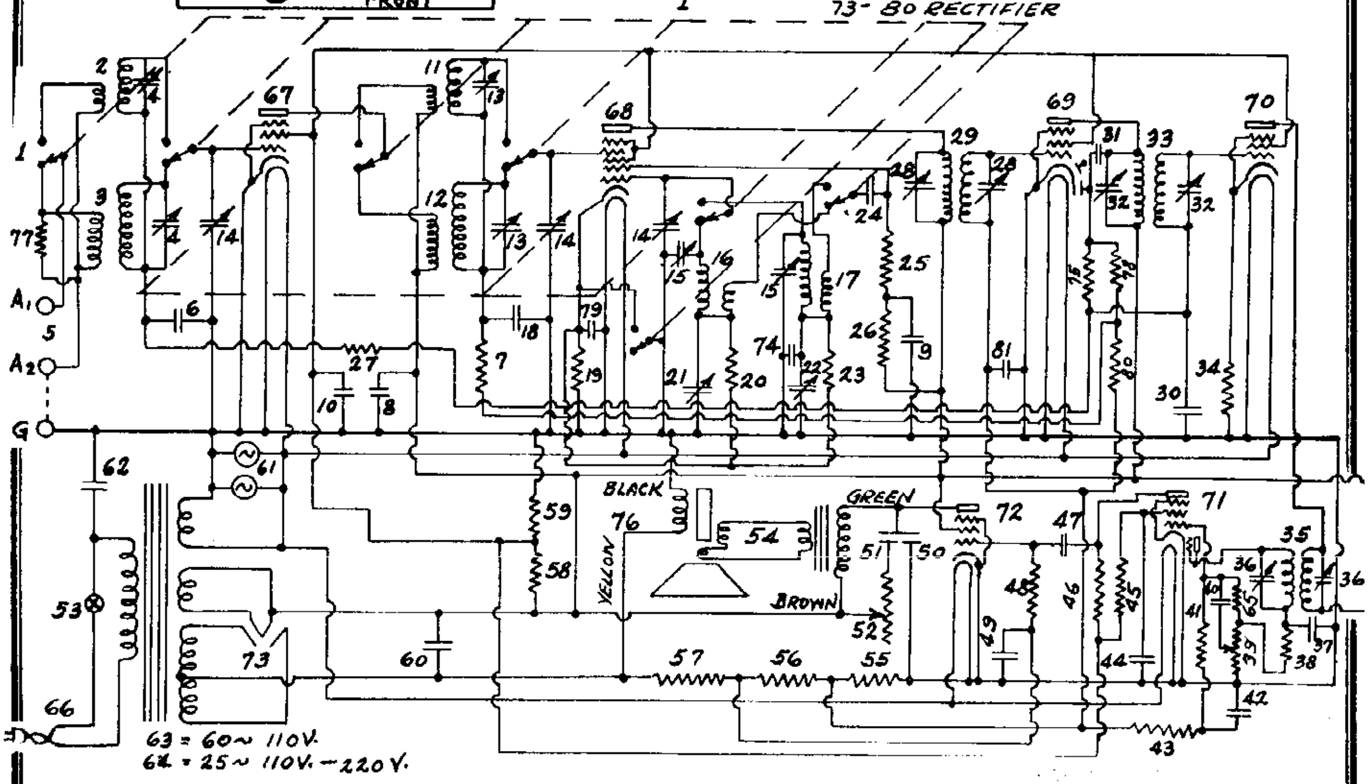
CROSLEY RADIO CORP.





456 Kc. I.F.

67- 6D6
68- 6A7 OSC.
69- 6B7 I.F. AND DIODE
70- 6D6
71- DIODE AND 1st A.F.
72- 42 OUTPUT
73- 80 RECTIFIER



MODEL 72,72 LB (7H3)
Parts List

CROSLEY RADIO CORP.

under the chassis as shown in the diagram for maximum signal. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adjustment if a still greater signal is obtainable.

To align the set in the high frequency or short wave band, it is necessary that a modulated oscillator be available for frequencies of 6000 and 15000 Kc. The procedure for this band is similar to the broadcast band, except that a 750 ohm midget carbon resistor is used for the dummy antenna instead of the .0002 condenser. Set the modulated oscillator to 15000 Kc. and the receiver dial to 15. Adjust the oscillator trimmer condenser under the chassis to maximum signal. Now adjust the antenna and interstage trimmers for maximum signal, making sure to go over the adjustment several times so that no further improvement can be made. Now set the modulated oscillator to approximately 6000 Kc. and the receiver to 6. Readjust the modulated oscillator slightly for maximum signal and then adjust the high frequency band oscillator series trimmers for best signal, making whatever slight readjustments in the tuning control are necessary to bring in maximum signal.

Tuning Receiver In High Frequency Band . . .

Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is located and receiver.

PARTS LIST—MODEL 7H3

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 7H3

Qty.	Part No.	Description	* Item	List Each
1	G1-32002	Antenna Coil (H. F.)	2	.50
1	G3-32000	Antenna Coil (L. F.)	3	.45
1	G1-32001	R. F. Coil (H. F.)	11	.65
1	G2-32001	R. F. Coil (L. F.)	12	.55
1	G2-32002	Osc. Coil (L. F.)	16	.40
1	G1-32002	Osc. Coil (H. F.)	17	.50
1	G1-32004	1st I. F. Trans.	29	.50
1	G1-32004	2nd I. F. Trans.	33	.50
1	G6-32004	3rd I. F. Trans. (Diode) & Trimmer Condensers	35-36	1.90
1	W31386	Coil Shield Bracket		.05
6	W25200	Coil Sockets		.06
3	W30802	Coil Shield		.15
2	W25025A	Coil Shield		.10
1	W25024A	Coil Shield		.10
2	G1-24064	Coil Shield	29-33	.15
5	W26891	Insulating Washer		.05
3	W21541B	Retaining Ring	3-12-16	.05
3	W30026	Retaining Ring	11-2-17	.05
1	G1-33008	Ant. Trimmer Condenser	4	.35
1	G1-33008	R. F. Trimmer Condenser	13	.35
1	G14-33009	Osc. Trimmer Condenser	15	.30
1	G12-33006	L. F. & H. F. Osc. Trimmer Cond. (Series)	21-22	1.00
1	G6-33006	1st I. F. Trimmer Cond.	28	.90
1	G6-33006	2nd I. F. Trimmer Cond.	32	.90
1	G18-33002	Variable Tuning Condenser Gang	14	4.00
1	G1-32066	Dial Drive Assm.		2.75
2	G4-27134	Dial Light Brkt Assm.	61	.20
2	W32128A	Light Diffuser		.10
2	W32244	Light Diffuser Retainer		.05
2	G75-27975	6D6 Socket (R. F. & 2nd I. F.)	67-70	.10
1	G47-27975	6A7 Socket (Osc.)	68	.10
1	G48-27975	6B7 Socket (I. F. & Diode)	69	.10
1	G49-27975	6F7 Socket (Diode & 1st A. F.	71	.10
1	G25-27975	42 Socket (Output)	72	.10
1	G6-27975	80 Socket (Rectifier)	73	.10
5	W27961	Tube Shield Base		.05
3	W28632	Tube Shield (6A7-6B7-6F7)		.10
2	B26000	Tube Shield (6D6 Tube)		.10
1	G9-30745	Power Transformer 60 cy. 110 V.	63	4.25
	G39-25680	Power Transformer 25 cy. 110-220 V.	64	9.00
1	B32147A	7 P. D. T. Switch	1	1.35
1	G16-26719	Ant.-Gnd. Terminal	5	.15
1	W32062	Level Control (Volume) 1 Megohm	39	.80

Qty.	Part No.	Description	* Item	List Ea
1	W32063	Tone Control & Line Switch	52-53	1.20
1	B21491A	Cord & Plug	66	.50
		FILTER & BY-PASS CONDENSERS		
1	W29097C	8.-8.-8. Mfd. 450 V.-450 V.-250 V.	8-9 10	2.85
1	W26194B	12. Mfd. 475 V.	60	1.25
1	W30321	1. Mfd. 160 V.	49	.55
1	W32379	0.02 Mfd. 200 V	6	.15
1	W32380	0.05 Mfd. 200 V.	18	.20
1	W25435	0.003 Mfd. 400 V.	24	.15
2	W27216	0.05 Mfd. 200 V.	30-47	.15
1	W31937	0.0001 Mfd.	31	.15
1	W27932	0.0001 Mfd. 200 V.	37	.15
1	W28619	0.006 Mfd. 200 V.	40	.15
2	W24049	0.1 Mfd. 200 V.	42-44	.15
1	W31052	0.004-0.05 Mfd. 400 V.-400 V.	50-51	.30
1	W30805	0.01 Mfd. 400 V.	62	.20
1	W32304	0.0014 Mfd.	74	.30
		RESISTORS		
3	26577	3 Megohm	7-41-75	.15
1	W27503	1400 Ohm	19	.10
1	21237A	60000 Ohm	20	.15
1	21453	40000 Ohm	23	.15
1	21876	10000 Ohm	25-26	.15
1	21455	300000 Ohm	27	.15
1	W25937	275 Ohm	34	.15
1	23403	150000 Ohm	38	.15
3	21454	1 Megohm	43-57 78	.15
2	23785	500000 Ohm	45-48	.15
1	21875	100000 Ohms	46	.15
1	33390	30000 Ohms	55	.15
1	23408	150000 Ohms	56	.15
1	W31361	7000-11000 Ohms	58-59	.40
1	26578	5 Megohm	65	.15
1	31094	4500 Ohms	77	.15
1	W31007A	Speaker Cord	76	.25
1	W32127A	Dial Glass		.10
1	W32126A	Dial Glass Retainer		.05
1	B32125B	Escutcheon		1.00
3	W32352	Knob		.10
1	G1-32067	Crank Assm.		.50
1	B32172	Tube & Cond. Shield		.10
1	W23880A	Thumb Screw		.05
1	C32149	Bottom		.25

CROSLEY RADIO CORP.

TECHNICAL DATA PERTAINING TO CHASSIS 8H1

General Description...

Chassis 8H1 is used in the Model 80-AW and Model 80-AW Lowboy. It is an 8-tube all-wave receiver, covering the band of 540-24000 Kc., in four steps. Other features are an 80 to 1 ratio drive mechanism with special fishing reel type of control, airplane type dial, push-pull pentode output, doublet antenna terminals, and tone control. Two stages of double-tuned I. F. amplification, making a total of six tuned I. F. circuits are used to insure adequate selectivity. A tuned radio frequency stage is used in all frequency bands. The automatic volume control is of the broad type to obtain smoothest possible operation.

Tubes Used and Their Function...

The tubes used are type 6D6 R. F. amplifier, type 6A7 oscillator modulator, type 6D6 first I. F. amplifier, type 6B7, second I. F. amplifier, AVC diode and AF diode, type 6F7 first AF pentode amplifier, and triode phase inverter, two type 42 push-pull output and type 80 rectifier. The normal tube voltages are as indicated in the table below:

Type	Where Used	Ef	Ep	Eg	Ek SW-BC	Esg	Epx	Egx
6D6	R.F.	6.3	250	0	3	100	—	—
6A7	Osc.-Mod.	6.3	250	0	3	100	220	0 to –10
6D6	1st I. F.	6.3	250	0	7-21	100	—	—
6B7	2nd I. F. and Diode	6.3	250	0	3	100	—	—
6F7	A.F. and Phase Inv.	6.3	140	0	4	35	70	0
42	Output	6.3	240	0	16	250	—	—
80	Rectifier	5.0	—	—	350	—	—	—

All voltages are plus or minus 10%. All DC voltages are measured with 117.5 volts AC line and with a 500-volt 1000-ohms-per-volt DC voltmeter. Power demand is 100 watts.

Method of Biasing...

The type 6D6 R. F. amplifier obtains its normal bias from the cathode resistor, part No. 39. The bias for the input section of the 6A7 oscillator modulator is obtained from the cathode resistor, part No. 40. The oscillator bias is obtained from the grid leak and condenser combination in which part No. 29 is the grid leak and part 50 the grid condenser. The type 6D6 first I. F. amplifier obtains its bias from the cathode resistor, part No. 41, for all bands except No. 4, the broadcast band. When the switch is thrown to the band No. 4 position, auxiliary resistor, part No. 95, is inserted in series with part No. 41. It is the purpose of this auxilary resistor to reduce the gain of the receiver at broadcast frequencies, because if full sensitivity were used the receiver would be entirely too sensitive in the broadcast band. The bias for the 6B7 second I. F. amplifier input section, is obtained from the cathode resistor, part No. 42, which resistor also furnishes the delay voltage for the AVC system. The variable mu pentode AF amplifier and phase inverter, type 6F7, obtains its bias from resistor No. 36, while the output tubes obtain their bias from the resistor No. 43.

Automatic Volume Control Circuit...

The automatic volume control diode in the 6B7 is fed from the plate of this tube through coupling condenser, part No. 51. Diode voltage is developed across resistors 32 and 33 after the signal has become sufficiently strong to overcome the initial bias generated in resistor 42. The voltage across resistor 32 is that part which is used for AVC purposes. Following the circuit diagram, it will be seen that the AVC voltage flows through isolating resistor No. 27 to the grid return of the high frequency interstage coil, part No. 8, and then to the input grid of the 6A7 oscillator modulator. In the other three bands, the AVC voltage is fed through the additional isolating resistor, part No. 26, to the grid return and then to the input grid of the 6A7. AVC voltage is also fed from resistor 27 through isolating resistor 24 to the grid return of the highest frequency antenna coil, part No. 4, and then to the grid of the 6D6 R. F. amplifier. For the other bands the AVC voltage is fed through additional resistor 25 to the grid returns. At this point AVC voltage is also fed to the grid return of the 6D6 first I. F. amplifier. This receiver also has AVC on the audio system, but this AVC voltage is obtained from the audio diode, which diode is also in the 6B7 tube. In this case, the diode is fed from the secondary of the last I. F. transformer, part No. 20, and diode voltage is developed across resistors 28, 46 and 34 in series. That portion across resistors 34 and 46 is fed to the input grid of the pentode section of the 6F7 tube. This voltage will vary in magnitude, depending on the setting of the level control, part No. 46, but there is always a residual amount which is that voltage developed across resistor 34.

Analysis of Signal Channel...

The signal enters at the terminals A1, A2 and G. These three terminals are provided so that it is possible to use either a doublet or a conventional type of antenna with the receiver. When a doublet antenna is used, connect the two lead-in wires to A1 and A2 respectively, and a ground may or may not be connected to the G terminal, as desired. With this connection it is important that the strap between A2 and G termin-

CROSLEY RADIO CORP.

als be removed. In using a conventional type of antenna be sure that the strap is connected between terminals A2 and C. Connect the ground wire to either the A2 or G terminal and the antenna wire to the A1 terminal.

The path of the signal then depends on the position of switch No. 14. It will be seen that the signal may be made to enter antenna coil primaries, part Nos. 1, 2, 3 and 4, for bands Nos. 4, 3, 2 and 1, respectively. The shunting resistor, part No. 23, across the broadcast antenna coil primary is for the purpose of producing better alignment. Each secondary is provided with a trimmer condenser, and the output of the secondary goes through the section of the switch indicated in the wiring diagram just above the gang condenser, part No. 13. The remaining coils not in use are short circuited by another section of the switch. It will also be seen that still another section of the switch is used to insert an additional bias resistor, part No. 95, in series, with part No. 41, so that the receiver operates with higher bias on the I. F. amplifier, type 6D6, when the switch is thrown to the broadcast band No. 4. After tuning with a section of the gang condenser, part No. 13, the signal is impressed on the grid of the 6D6 R. F. amplifier and the amplified output of this tube then goes through another section of switch 14 to the primaries of the interstage coils designated as parts 5, 6, 7 and 8. Separate trimmer condensers are there provided for each of the secondaries and the signal flows through switch 14 to the grid of the 6A7 oscillator modulator tube after tuning with a section of the gang condenser, part No. 13. An additional section of the band change switch is used to short-circuit the coils not in use. The oscillator coils are designated as parts 9, 10, 11 and 12 respectively, they being provided with separate shunt trimmers for all bands and separate series trimmers for tracking in all bands except the highest frequency band No. 1, in which case the series condenser is fixed. Both the primary and secondary of the oscillator coils are switched with separate sections of the band change switch, and the unused secondaries are short-circuited with another section. In the 6A7 oscillator modulator the signal is converted into the I. F. frequency of 456 Kc., and then fed to the primary of the first I. F. transformer, part No. 18. Here it is double-tuned and fed to the grid of the first I. F. amplifier, type 6D6. The output of this tube goes to the second double-tuned I. F. transformer, No. 19, and then to the grid of the second I. F. amplifier, type 6B7. The output transformer for this tube, part No. 20, is double tuned. The voltage developed across the primary of this transformer is fed to one of the diodes through coupling condenser part No. 51 for AVC purposes. In this way the AVC channel is not quite as sharp as the signal channel and a very desirable stabilizing effect is produced. The tuned secondary output is fed to the other diode in the 6B7 tube and diode voltage is developed across the series combination of resistors 28, 46 and 34, of which part No. 46 is the level control. Since resistor 34 is bypassed there is no audio or intermediate frequency present across this resistor, it being used only for the purpose of furnishing a residual bias to the AF amplifier section of the 6F7 tube. To insure stability, that portion of the voltage across resistor 28 is not used. The audio voltage across part No. 46, however, is fed directly to the grid of the 6F7 pentode section. The audio frequency voltage is amplified and the amplified output of the 6F7 pentode section is present across resistor 35. It is fed through coupling condenser 64 to the grid of one of the type 42 output tubes. The grid circuit of this tube is completed through resistors 38 and 31 in series but that portion of the audio frequency voltage present across resistor 31 only is fed to the triode section of the 6F7. The output of this triode section is present across resistor 37. The characteristics of the tube and circuit constant are so adjusted that the voltage across resistor 35 and the voltage across resistor 37 are equal to each other but 180 degrees out of phase, so that when the output of the triode section is fed to the grid of the second push-pull output type 42 amplifier, which grid circuit is completed through resistor 38, the output stage functions as a normal push-pull amplifier. The power output of the type 42 tubes is fed to the speaker transformer in the speaker assembly, part No. 77, in the conventional manner. Condenser 66 across the plates of the two output tubes serves to keep the impedance more constant at all frequencies, while the combination of rheostat 47 and condensers 65 and 92 make up the tone control.

Power Supply System . . .

80, for 110-volt 60-cycle, and part

The power supply system is made up of a power transformer, part No. No. 81 for other voltages and frequencies, a type 80 rectifier tube, first filter condenser part No. 67, filter choke part No. 79, second filter condenser part No. 68, second filter choke made up of the speaker field in assembly 77 and the third filter condenser part No. 69. This power supply system is conventional and requires no further explanation.

Alignment Procedure . . .

To align the I. F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be regulated. Be sure that the band change switch is thrown to the high frequency or No. 1 band position. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6A7 tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. These I. F. transformer condensers are accessible on the top of the three tall I. F. transformer cans. To make these adjustments it is necessary that a standard 5/16" (across flats) hexagon socket wrench be used for the upper condensers, and a small screwdriver fitting inside of the nut hole for the adjustment of the lower condenser. Always make these I. F. adjustments very carefully and go over them several times to be sure that the peak has been reached.

To align the receiver at broadcast frequencies, it is necessary that an adjustable oscillator having the frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial and throw the band change switch to range No. 4. Now adjust the oscillator broadcast shunt trimmer on the end of the coil assembly in the topmost front position as indicated on the diagram until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers in this same top row for maximum signal. Sometimes it is advisable to readjust the dial slightly because the oscilla-

CROSLEY RADIO CORP.

tor is somewhat affected by the R. F. adjustment. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is heard. Now adjust the oscillator series trimmer condenser for the broadcast band, located in the third hole from the front on the chassis end flange, indicated in the diagram, until maximum response is heard. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adjustment if a still greater signal is obtainable.

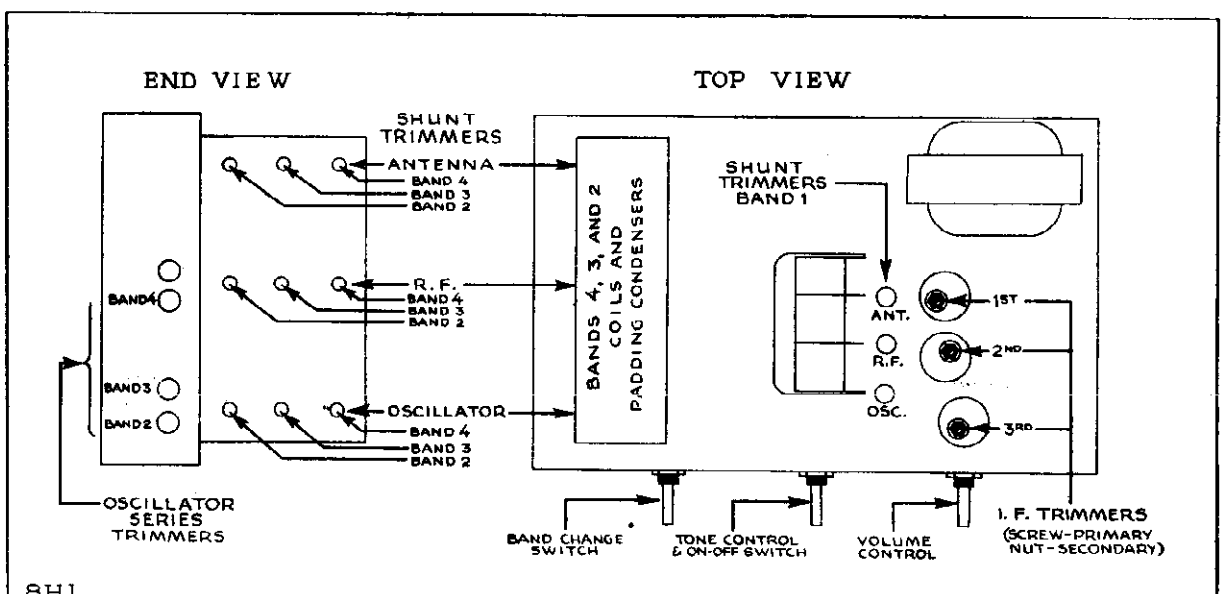
The same procedure is used for the remaining three bands except that the dummy antenna condenser is replaced by a 750-ohm midget carbon resistor. The shunt padding condensers for band No. 3 are located in the middle row on the end of the coil assembly, while the series padding condenser for band No. 3 is the second from the front on the receiver end flange. To align the receiver in band No. 3 it is necessary that a modulated oscillator and suitable attenuator be available, with frequencies of 1700 and 4000 Kc. Set the dial at 4 and the modulated oscillator to 4000 Kc. Adjust the oscillator shunt trimmer, which is the front condenser on the coil shield assembly in the middle row for maximum signal. Then adjust the remaining two condensers in the middle row for maximum signal, making what slight adjustments may be necessary if the oscillator is slightly detuned by the R. F. adjustment. Then set the modulated oscillator to approximately 1700 Kc., and the receiver dial to 1.7. Adjust the modulated oscillator slightly until the signal is heard best and then adjust the oscillator series trimmer located on the receiver end flange (the second from the front) for maximum signal. Make whatever slight readjustments are necessary in the dial to bring this signal in best.

To align the receiver in band No. 2, the bottom row of trimmer condensers on the coil shield assembly are used. An oscillator capable of adjustment to 4500 and 10,000 Kc. is necessary. Set the oscillator at approximately 10,000 and the receiver dial to 10. Adjust the oscillator shunt trimmer condenser, which is the front condenser in the lower row, for maximum signal. Then adjust the remaining two condensers in the lower row, making whatever slight readjustment of the dial is necessary to bring the signal in best. Set the dial of the receiver to 4.5 and the modulated oscillator to 4500 Kc. Now adjust the oscillator series trimmer condenser for this band, which is the frontmost one on the receiver on the chassis end flange, for maximum signal, making whatever slight dial readjustments are necessary.

The aligning condensers for band No. 1 are located directly under and to the right of the gang condenser. To align the receiver in this band, it is necessary that a modulated oscillator and attenuator for a frequency of 22,000 Kc. be available. Set the modulated oscillator to 22,000 Kc. and the receiver dial to 22. Adjust the oscillator shunt trimmer, which is the frontmost of the three trimmer condensers available from the top of the chassis, for maximum signal. Now adjust the remaining two trimmer condensers also available from the top of the chassis, and make whatever slight dial adjustments are necessary to bring the signal in best. There is no series trimmer condenser for this band but the alignment may be checked by setting the modulated oscillator to approximately 11,000 Kc. and tuning it in on the receiver dial. It should come in at about 11 on the dial.

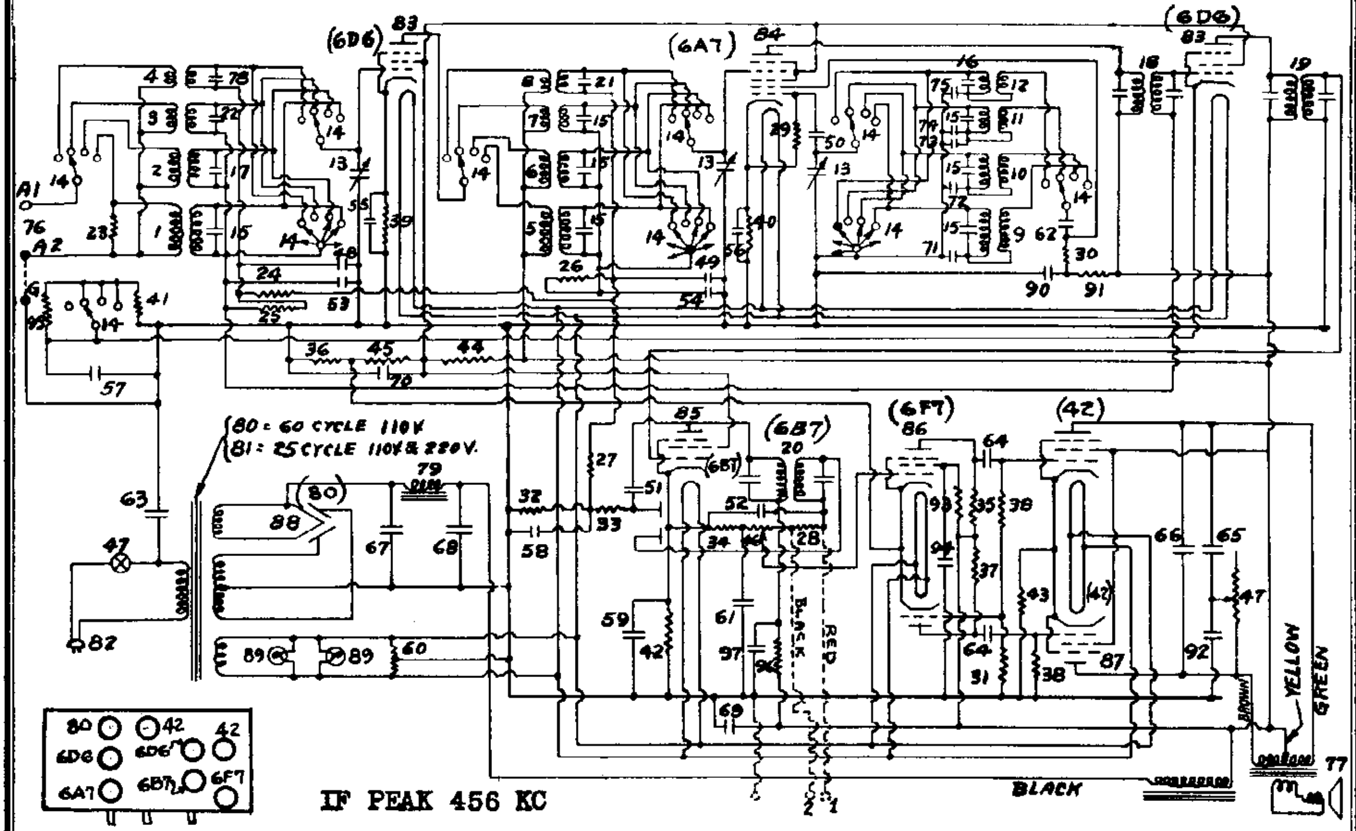
Tuning Receiver In High Frequency Band . . .

Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is located and received.



MODEL 80AW, 80AW LB
Schematic (8H1)
Socket Layout
Parts List

CROSLEY RADIO CORP.



IF PEAK 456 KC

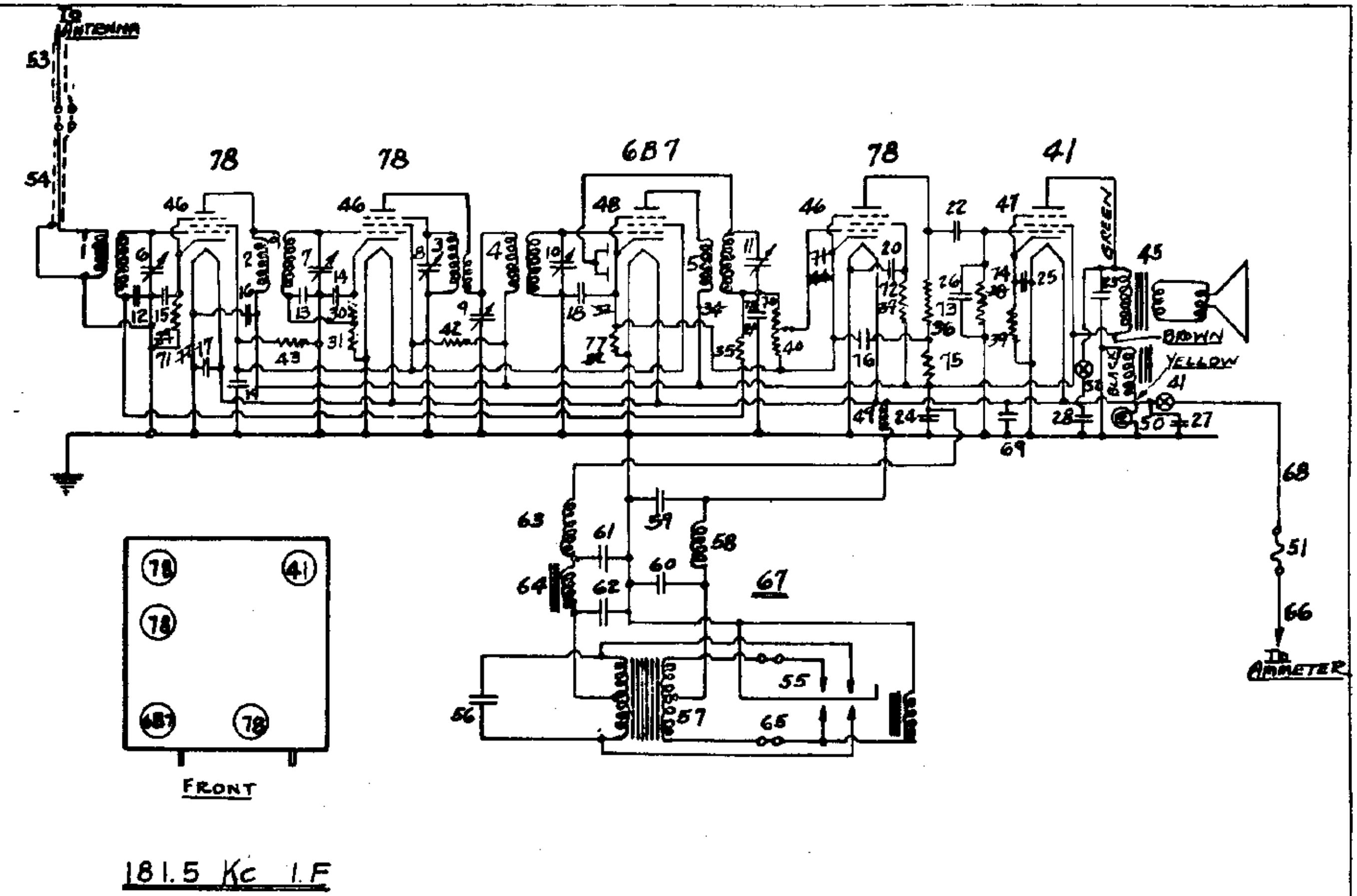
*Figures in 2nd last column refer to parts shown in wiring diagram of Model 8H1

Qty.	Part No.	Description	* Item	List Each
1	G3-32000	Antenna Coil (Broadcast) ..	1	.45
1	G4-32000	Ant. Coil (1500-4000 Kc.)	2	.40
1	G5-32000	Ant. Coil (4000-10000 Kc.)	3	.60
1	G6-32000	Ant. C. (10000-24000 Kc.)	4	.55
1	G2-32001	Inter. Coil (Broadcast)	5	.55
1	G8-32001	Inter. Coil (1500-4000 Kc.)	6	.50
1	G9-32001	In. Coil (4000-10000 Kc.)	7	.60
1	G4-32001	In. Coil (10000-24000 Kc.)	8	.60
1	G2-32002	Osc. Coil (Broadcast)	9	.40
1	G3-32002	Osc. Coil (1500-4000 Kc.)	10	.40
1	G4-32002	Os. Coil (4000-10000 Kc.)	11	.50
1	G5-32002	Os. C. (10000-24000 Kc.)	12	.55
1	W33378	Level Control (Volume)	46	.75
1	W32063	Tone Control & Line Switch	47	1.20
1	G16-26719	Ant. Gnd. Terminal	76	.15
1	B21491C	A. C. Cord & Plug	82	.50
2	G75-27975	Socket 6D6	83	.10
1	G2-33070	Socket 6A7	84	.10
1	G48-27975	Socket 6B7	85	.10
1	G49-27975	Socket 6F7	86	.10
2	G25-27975	Socket 42	87	.10
1	G6-27975	Socket 80	88	.10
1	W33072	Socket Cushion................	84	.05
2	W33071	Washer............................	84	.05
1	W33073	Tube Shield Base........	84	.10
2	W28632A	Tube Shield................	84-85	.10
2	B26009D	Tube Shield	83	.10
3	W27981A	Tube Shiled Base	83-85	.05
2	W32744	Socket Insulator........	86-87	.05
1	G37-25669	Power Trans. 60 Cy. 110 V.	80	6.50
	G38-25669	Power Trans. 25 Cy. 110-120 Volt	81	9.00
1	G1-24628	Filter Choke	79	1.25
1	G12-32004	1st Tuned I. F. Trans.....	18	1.90
1	G5-32004	2nd Tuned I. F. Trans....	19	1.90
1	G6-32004	3rd Tuned I. F. Trans.	20	1.90
	G7-33009	Parallel Padding Cond.	15	.15
	G5-33009	Parallel Padding Cond.	17	.15
	G17-33009	Parallel Padding Condenser	100	.15
	G2-33008	Parallel Padding Condenser	99	.15
	G11-33009	Parallel Padding Cond.	21	.15
	G6-33009	Parallel Padding Cond.	16	.15
	G2-33006	Padding Condenser	72-73	1.90
	G14-33006	Padding Condenser	98	.45
1	B32196B	Band Change Switch......	14	2.50
1	G18-32002	Tuning Condenser Gang	13	4.00

Qty.	Part No.	Description	* Item	List
		FILTER & BY-PASS CONDENSERS		
	W26194B	12 M.F.D. 475 VOLT	67	1.25
1	W29007C	8. 8.-8. Mfd. 450-450-250 Volts	68-69 70	2.85
1	W32258	8. Mfd. 300 Volts...........	90	1.20
1	W30321	1. Mfd. 160 Volts.....................	61	.55
1	W32278	0.001 Mfd.........................	48-49	.30
2	W30741	0.00025 Mfd.	50	.15
1	W32226	0.0005 Mfd........................	51	.15
1	W31937	0.0001 Mfd	52	.15
1	W32379	0.02 Mfd. 200 Volt	53-54	.15
2	W28621	0.02 Mfd. 200 Volt	55-56 57-58 59	.15
5	W23635	0.006 Mfd.	62	.20
1	W23191A	0.01 Mfd. 400 Volt	63-97	.25
2	W23615	0.05 Mfd. 400 Volt	64	.15
1	W31052	0.05-0.004 Mfd. 400-400 Volt	65-66	.30
1	W32279	0.00085 Mfd....................	74	.20
1	W32332A	0.000791 Mfd.................	75	.30
1	W30270	0.001 Mfd.	92	.15
1	W28142	0.02 Mfd. 400 Volt	94	.20
		RESISTORS		
1	21455	4500 Ohms	23	.15
1	31094	300000 Ohms	24-25 26-27	.15
4 3	23785	500000 Ohms	28-38 93	.15
1	21875	100000 Ohms	29	.15
2	24814	7000 Ohms	30-91	.20
2	21237A	60000 Ohms	31-35	.15
2	26577	3 Megohms	32-38	.15
1	21876	10000 Ohms	34	.15
2	W30127	450 Ohms (Flexible)	36-42	.15
1	23403	150000 Ohms	37	.15
2	W25937	275 Ohms (Flex.)	39-40	.15
2	W22511	750 Ohms (Flex.)	41-96	.15
1	W22873	220 Ohms	43	.15
1	W32301	10000-15000 Ohms	44-45	.45
1	W32337	10-10 Ohms	60	.25
1	22831	15000 Ohms	95	.15

CROSLEY RADIO CORP.

MODEL 5A1
Schematic, Socket
Parts List



1	G6-24995	ANTENNA COIL
2	G7-28968	R-F-COIL
3	G25-24996	OSCILLATOR COIL
4	G1-25444	1ST I-F-COIL
5	G3-25445	2ND I-F-COIL
6	L-29783	ANT. TUNING COND.
7		R.F. TUNING COND.
8		OSC. TUNING COND.
9	G2-25948	I.F. PRI. TUNING COND.
10	W-25008-A	I.F. SEC. TUNING COND.
11	G2-25948	DIODE TRANS. TUN. COND.
12	W-27203	0.02 MFD. 200V
13	W-27203	0.02 MFD. 200V.
14	W-27203	0.02 MFD 200V
15	W-27203	0.02 MFD. 200V
16	W-23615	0.05 MFD. 400V
17	W-24049 A	0.1 MFD. 200V
18	W-24049 A	0.1 MFD. 200V
19	W-25438	0.1 MFD. 200V
20		0.1 MFD. 200V
21	~~W-26571~~	~~0.0005 MFD. 200V~~
22	W-23142	0.02 MFD. 400V
23	W-23191-A	0.01 MFD. 400V
24	W-30419 A	8 MFD. 250V
25		8 MFD. 25V
26	W-20389	.00008 (MICA)
27	W-20389	.00005 (MICA)
28	W-23191-A	0.01 MFD. 400V.
29	~~[illegible]~~	~~[illegible] Ω~~
30	W-30127	450 Ω
31	W-27086	6400 Ω
32	W-25937	275 Ω
33	W-28357	75 Ω
34	21454	1-MEG
35	21454	1-MEG
36	~~[illegible]~~	~~100,000 Ω~~
37	~~[illegible]~~	~~500,000 Ω~~
38	~~[illegible]~~	~~300,000 Ω~~
39	W-23907	750 Ω
40	W-30436	LEVEL CONTROL
41		S.P.S.T. SWITCH
42	W-26525 D	15000 Ω
43		25000 Ω
44	~~[illegible]~~	~~750 Ω~~
45		333-3 SPEAKER
46	[illegible]	78 SOCKET
47	[illegible]	41 SOCKET
48	[illegible]	6B7 SOCKET
49	[illegible]	"A" CHOKE
50	W-4099A	6V. DIAL LIGHT
51	W-31103	10 AMP "A" FUSE
52	W-26156-A	S.P.S.T. SWITCH
53	D-31296A	ANTENNA LEAD
54	W-31702	ANTENNA LEAD CONNECTOR
55	W-29160	VIBRATOR ASSEM.
56	W-31632	0.01 MFD. 1000V.
57	G1-31618	POWER TRANS.
58	2-28067	"A" CHOKE
59	W-30366	0.5 MFD 160V.
60	W-30368	0.5 MFD. 160V
61	W-23142	0.02 MFD. 400V.
62	W-31631-B	12 MFD. 300V.

63	G1-24234	R.F. CHOKE ASSEM.	79
64	G10-24628	FILTER CHOKE ASSEM.	80
65	G1-26719	POLARITY REVERSING TERMINAL	81
66	G1-31701	"A" CABLE ASSEM.	82
67	L-31629	413 SYNCRONODE	83
68	G2-31701	"A" CABLE ASSEM	84
69	W-20389	.0005 MFD (MICA)	85
70	~~W-20867~~	~~.0005 MFD. 200V~~	86
71	W-21452	1100 Ω	87
72	21454	1 MEGOHM	88
73	23403	150,000 Ω	89
74	23785	500,000 Ω	90
75	21237-A	60,000 Ω	91
76	W-23615	.05 MFD 400 VOLTS	92
77	W-28589	350 Ω	93
78	W-32601	.0005 MFD. 200V.	94

	RECORD OF CHANGES	Change No.
A	ITEM 64 ADDED. ITEM 62 CHGD TO "A" 2-2-34 / ITEM 21 REPLACED BY ITEM 70 2-7-34 COP 2-14-34	3559
B	ITEMS 42 & 43 CHANGED TO "A"	3563
C	ITEMS 29-36 37-38 & 44 DELETED 3-9-34 / ITEMS 71-72-73 74 75-76 & 77 ADDED	3570
D	ITEM 62 CHG'D TO "B" 4-11-34	5526
E	ITEMS 42 & 43 TO "B" / ITEM 70 REPLACED WITH ITEM 78	3585

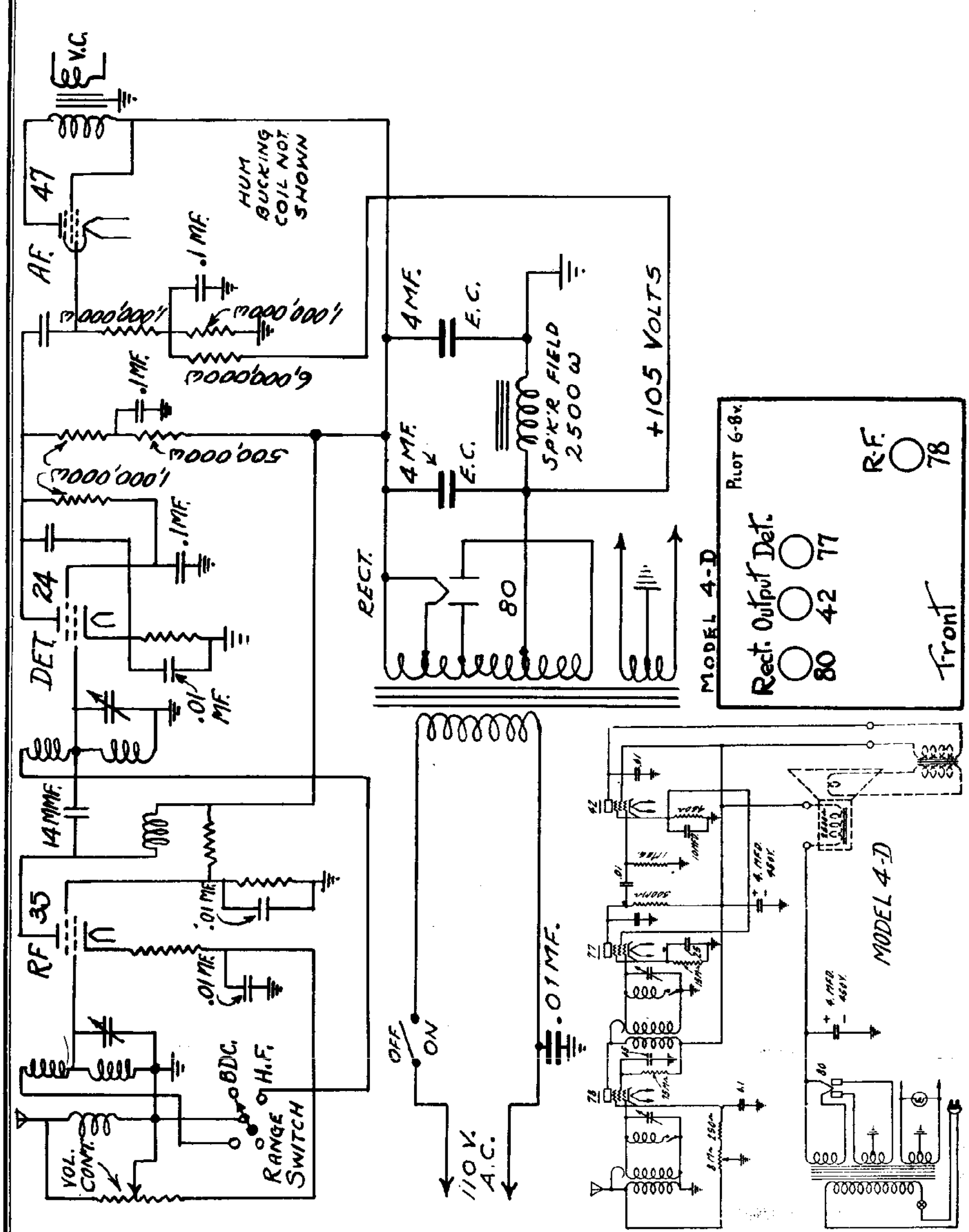
THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

5A1	WIRING DIAGRAM		
APPROVED CG FELIX	DATE 1-24-33	SCHAEFER	DWG NO. B-31760

E

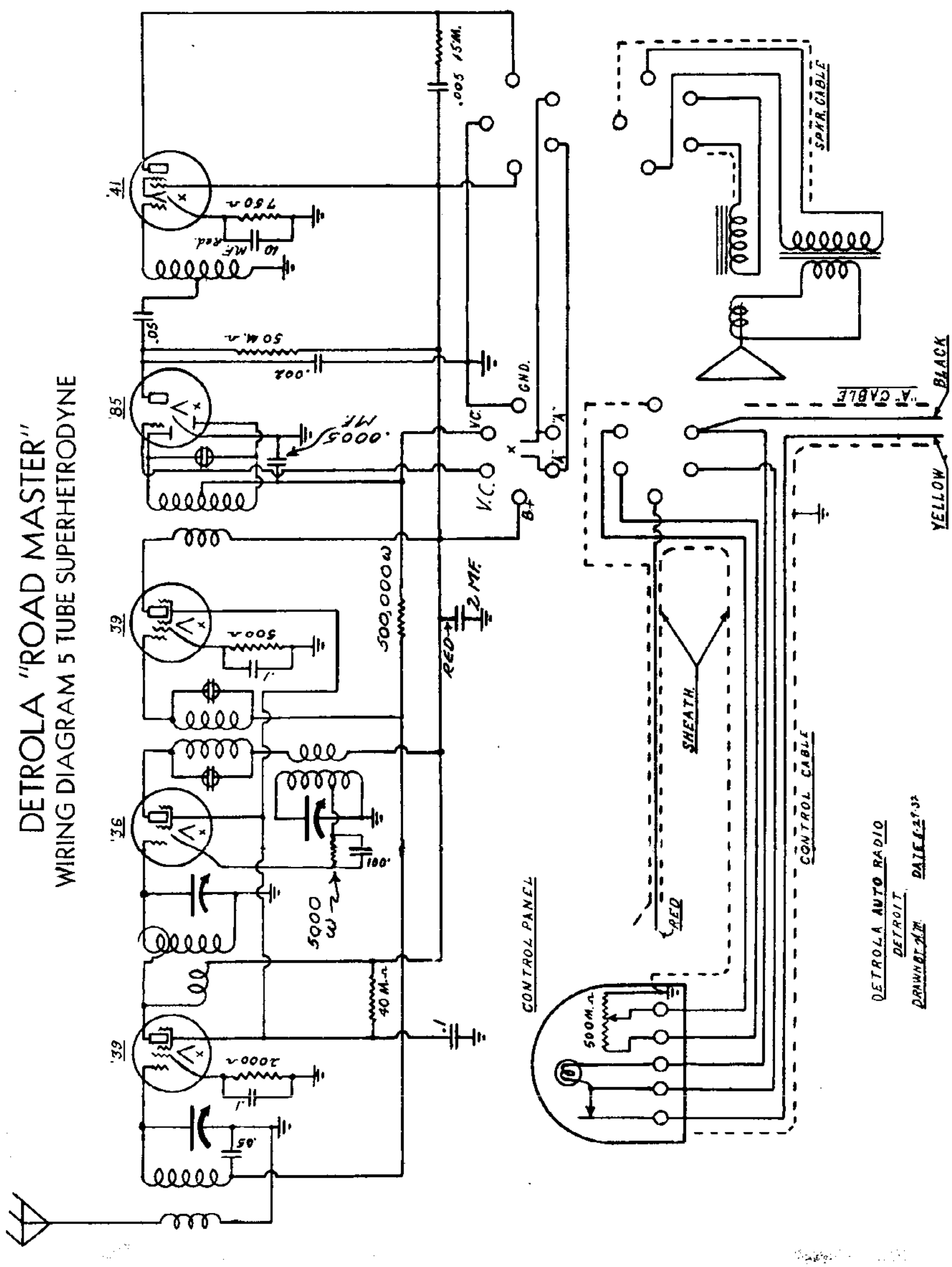
MODEL 4 Tube TRF '32
Schematic
MODEL 4-D
Schematic, Socket

DETROLA RADIO CORP.



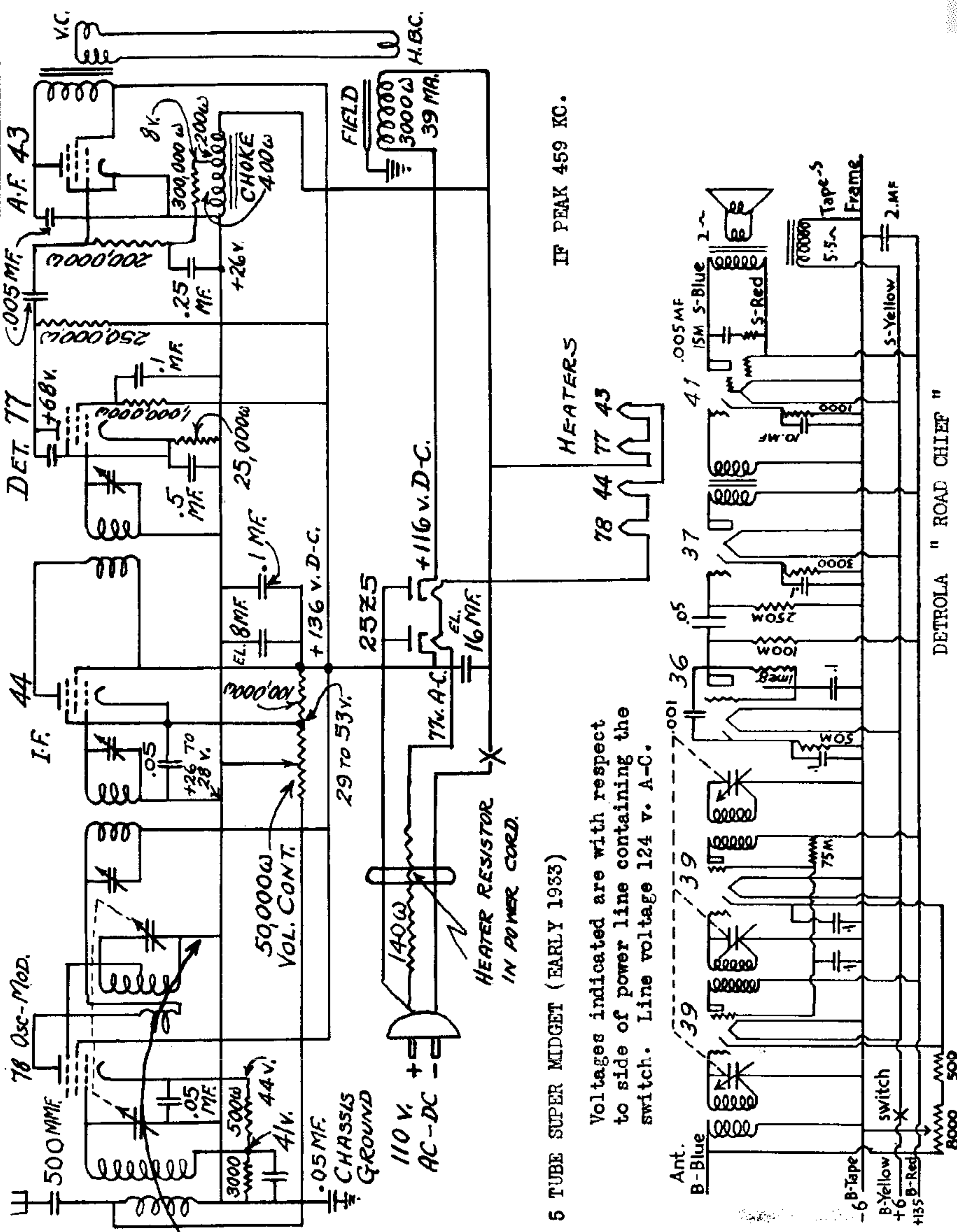
MODEL "Roadmaster"
Schematic

DETROLA RADIO CORP.



DETROLA RADIO CORP.

MODEL 5 Tube Super Midget
Schematic
MODEL "Roadchief"
Schematic



5 TUBE SUPER MIDGET (EARLY 1933)

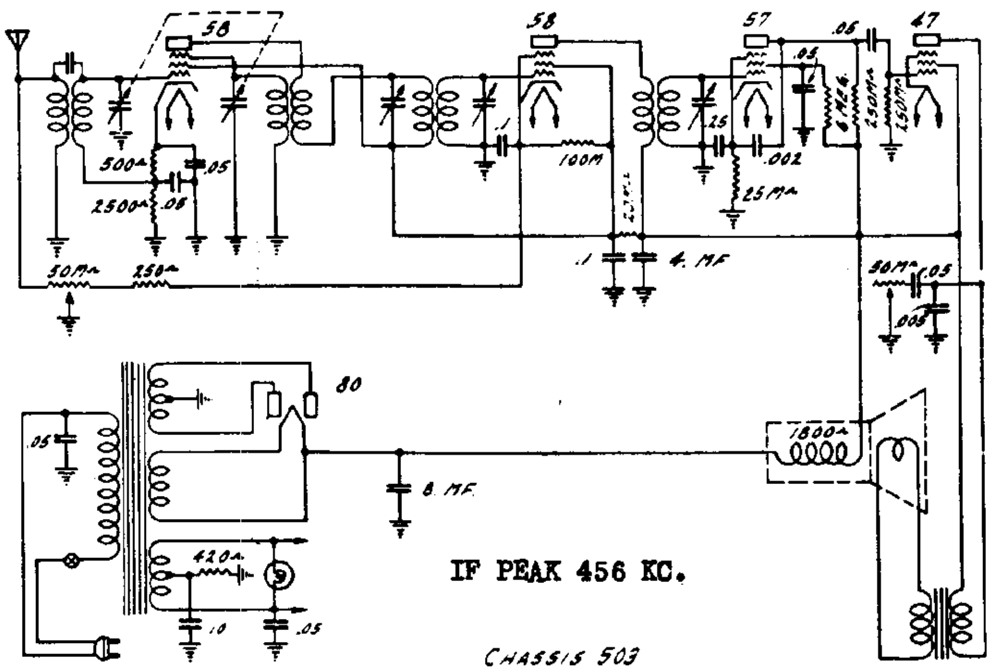
Voltages indicated are with respect to side of power line containing the switch. Line voltage 124 v. A-C.

DETROLA " ROAD CHIEF "

MODEL 503
Schematic, Voltage
Alignment

DETROLA RADIO CORP.

SCHEMATIC DIAGRAM OF MODEL 503 RADIO



VOLTAGE TABLE. Line Voltage 115 v. 60 cyc.

TUBE		Grid	Plate	Screen	Filament
58	Osc-Det	-2.5	60	60	2.5
58	IF	-2.0	250	75	2.5
57	2 Det.	-3.5	75	6	2.5
47	Output	-5.0	210	225	2.5
80	Rect. Fil.to Gnd. 325 volts.				5.0

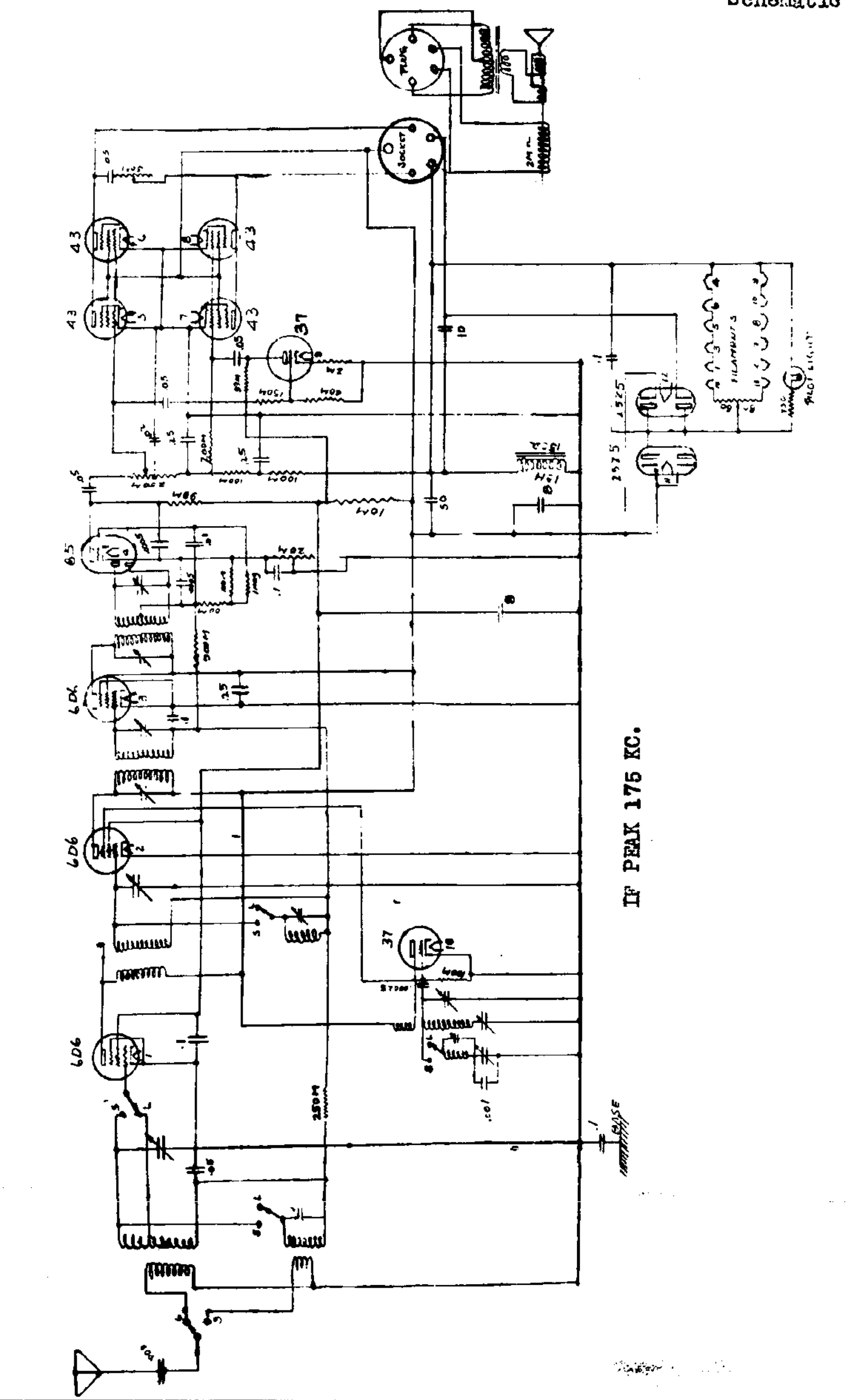
PROCEDURE FOR ALIGNMENT:
Apply a modulated 456-kc. signal to modulator grid and align the four dual trimmers in the top of the I-F. cans for maximum output from the set.

Apply a 600 kc. signal at the antenna and track the oscillator by varying the nut adjustment on the oscillator padding condenser until maximum response is obtained, by rotating the dial. Disregard calibration when making this adjustment.

At all steps in the above procedure the output should be kept only as high as is necessary for good alignment, but the output should be lowered always by decreasing the input to the receiver, never by reducing the setting of the volume control. This control should be set at maximum throughout any adjustments of the R-F. or I-F. circuits. Use a suitable output meter across the voice coil of the speaker for indicating the correct adjustment for maximum response.

DETROLA RADIO CORP.

Schematic Drawing of Model 1200 Receiver (12 Tube)



MODEL 1200
Voltage
Alignment

DETROLA RADIO CORP.

1. Apply a modulated 175 Kilocycle signal to the grid of the modulator (1st detector) tube and align the four dual trimmer adjustments in the top of the IF transformer cans for maximum output from the receiver.

2. With the band switch knob in the 530-1500 Kilocycle or clockwise position, and the tuning dial set to 1400 Kilocycles, apply a 1400 Kilocycle signal at the antenna and adjust the three trimmer screws on the gana condenser for maximum output from the receiver.

3. Apply a 600 Kilocycle signal at the antenna and track the oscillator by varying the nut adjustment on the oscillator padding condenser and returning the dial until maximum response is obtained. This adjustment should be made disregarding calibration.

4. With the band switch in the short wave or counter-clockwise position and the dial set to 3.6 Megacycles, apply a 3600 Kilocycle signal at the antenna and align the three trimmers in the top of the short wave coil cans for maximum response.

5. Apply a 1600 Kilocycle signal at the antenna and track the oscillator as at 600 Kilocycles in the broadcast band by adjusting the slotted screw adjustment on the oscillator padding condenser.

Suitable harmonies of a broadcast oscillator may be used for alignment purposes in the short wave band.

At all steps in the aligning procedure, the output should be kept only as high as is necessary for good alignment but the output should always be lowered by decreasing the input to the receiver, never by reducing the volume control setting. The volume control should be at maximum setting during any adjustments of the RF and IF circuits. A suitable output meter should be connected across the speaker voice coil to indicate the correct adjustment for maximum response.

TABLE OF VOLTAGES
Line Voltage - 115 Volts - 60 Cycles AC
Interchannel Noise Suppressor Set for Maximum Sensitivity

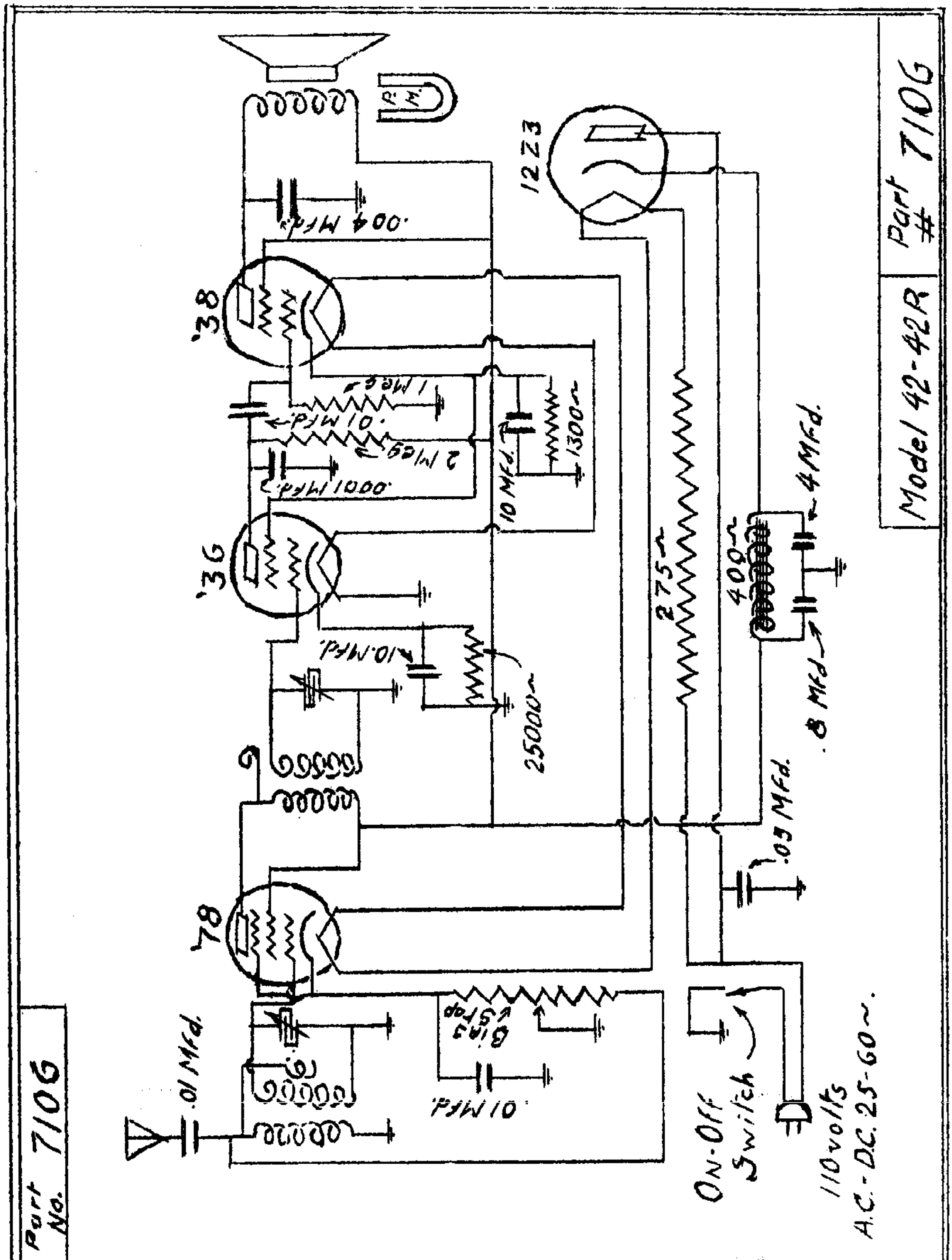
Position	Tube	Plate	Screen	Cathode
RF	6D6	100	60	0
MOD	6D6	100	60	0
OSC	37	100		0
IF	6D6	100	100	0
DET	85	20		0
PHASE REVERSER	37	20		1-2V
OUTPUT	43		100	0

Above voltage's measured with 0-250 V--1000 ohm per volt DC Voltmeter
Drop ACROSS CHOKE - 18 Volts
Drop ACROSS SPEAKER FIELD -
When operated on 115 Volts DC or 25 cycle AC the above voltages will be slightly lower.

FILAMENT VOLTAGES

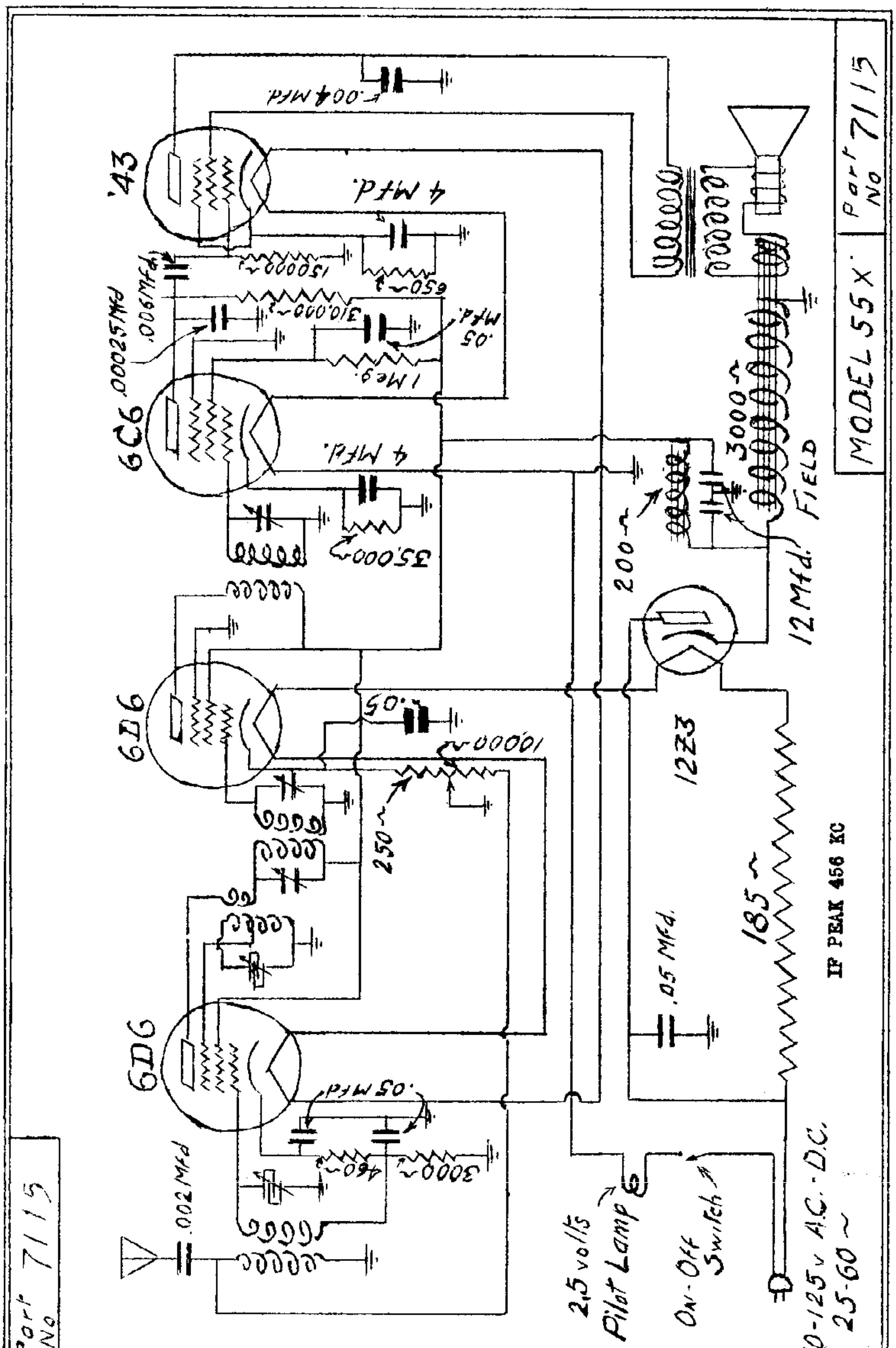
25Z5	-	25 Volts	-	AC or DC
43	-	25 "	-	AC " DC
6D6	-	6.3 "	-	AC " DC
37	-	6.3 "	-	AC " DC
85	-	6.3 Volts	-	AC " DC

DEWALD RADIO



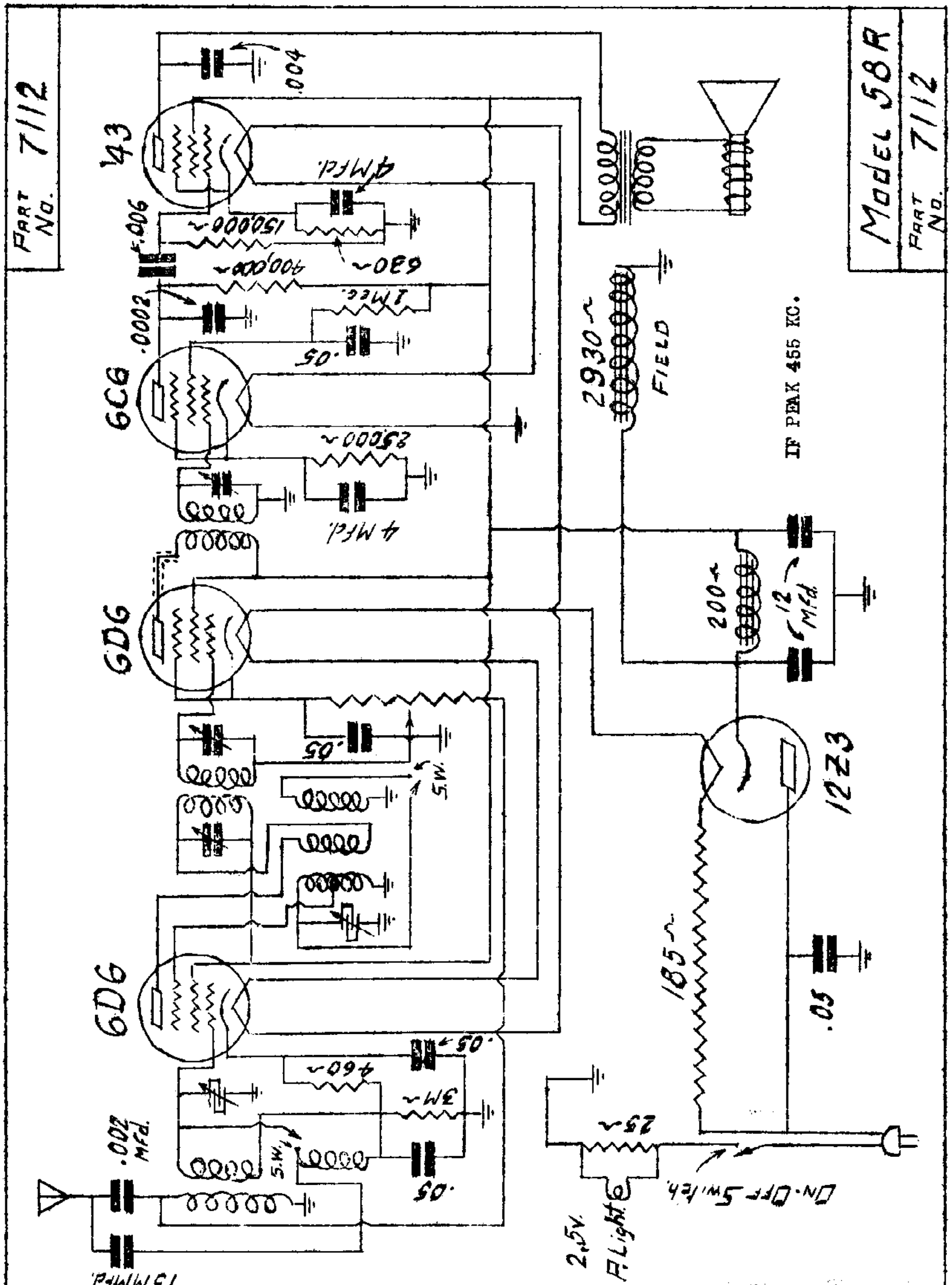
MODEL 55-X
Schematic

DEWALD RADIO



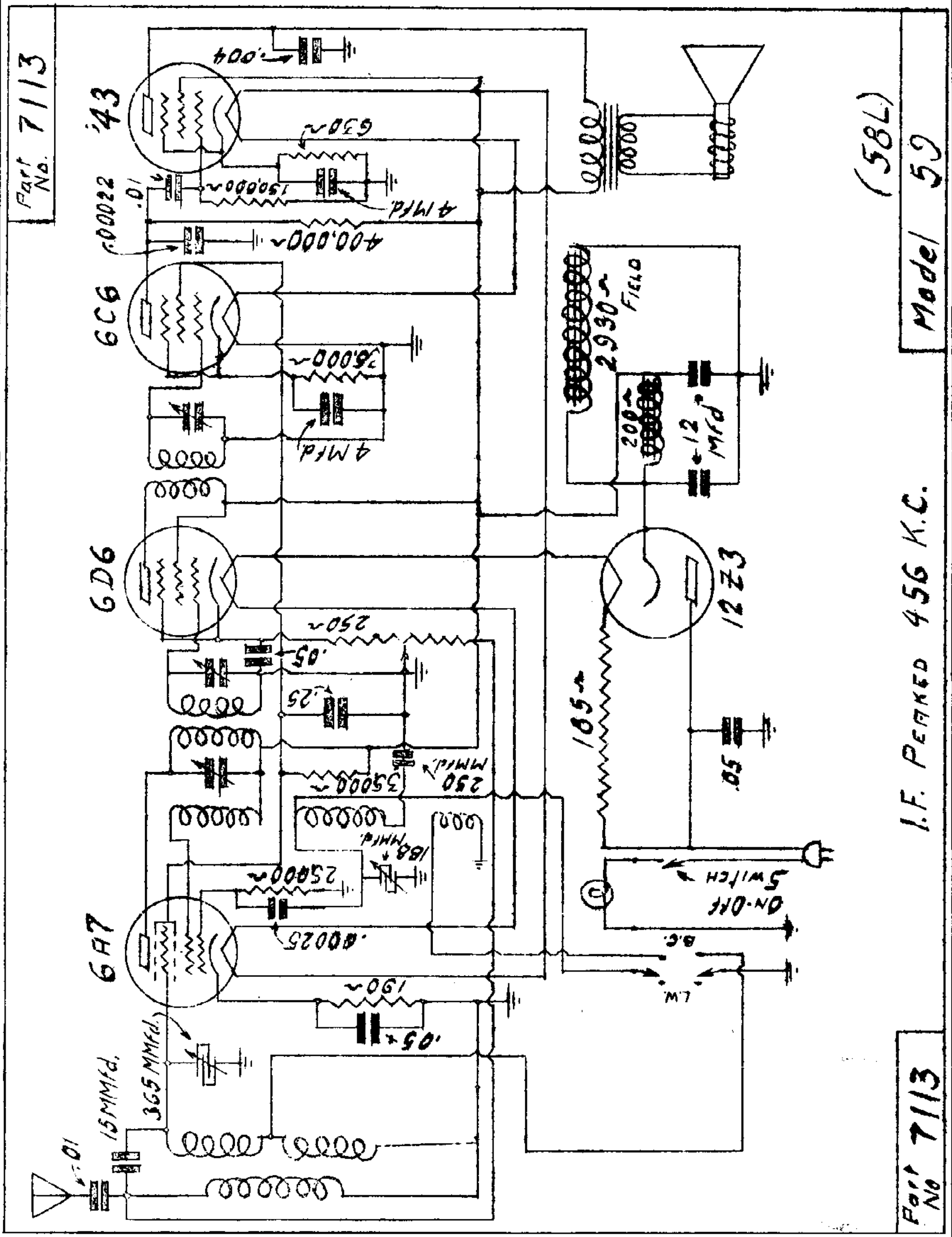
MODEL 58-R
Schematic

DEWALD RADIO



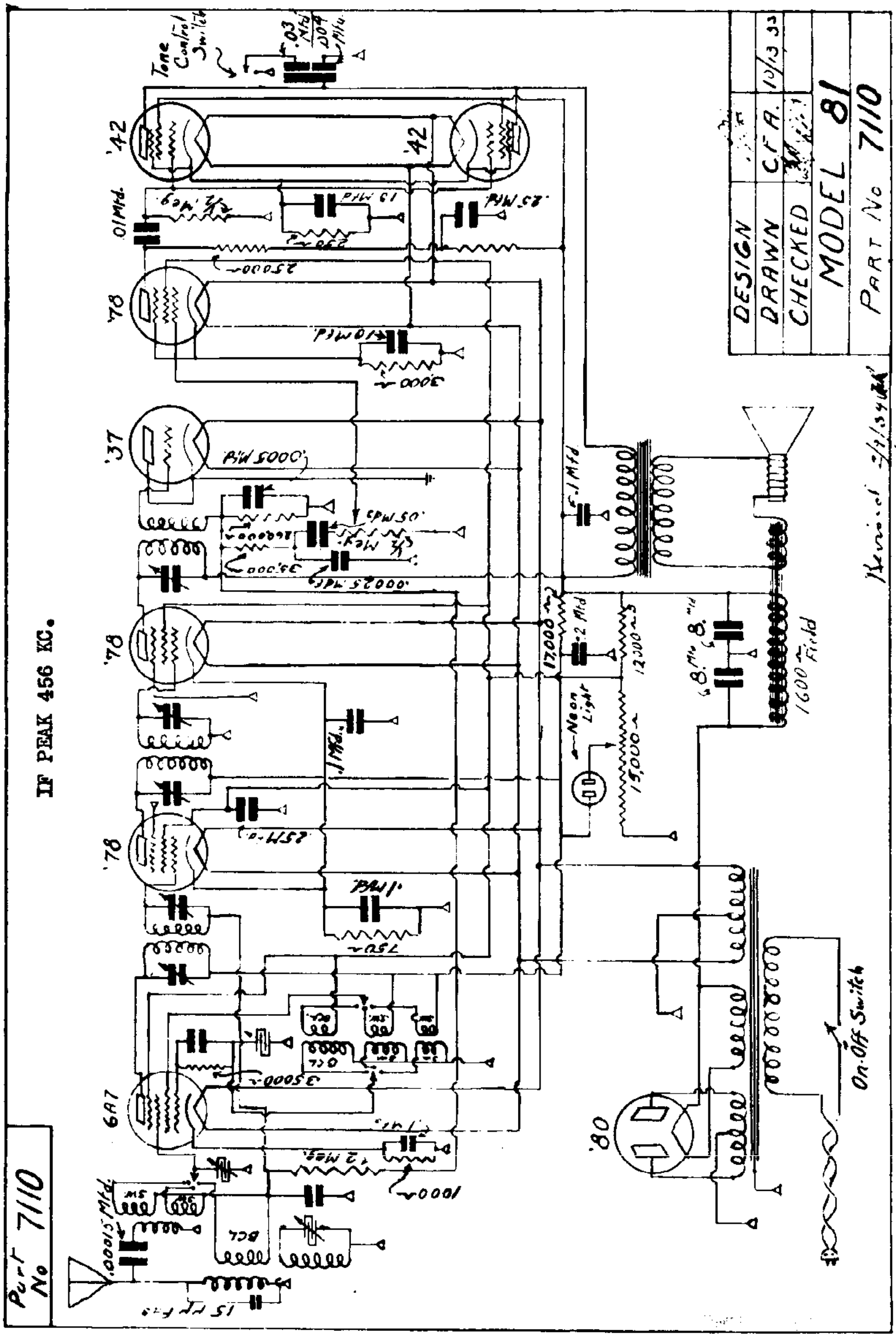
MODEL 58-L, 59
Schematic

DEWALD RADIO



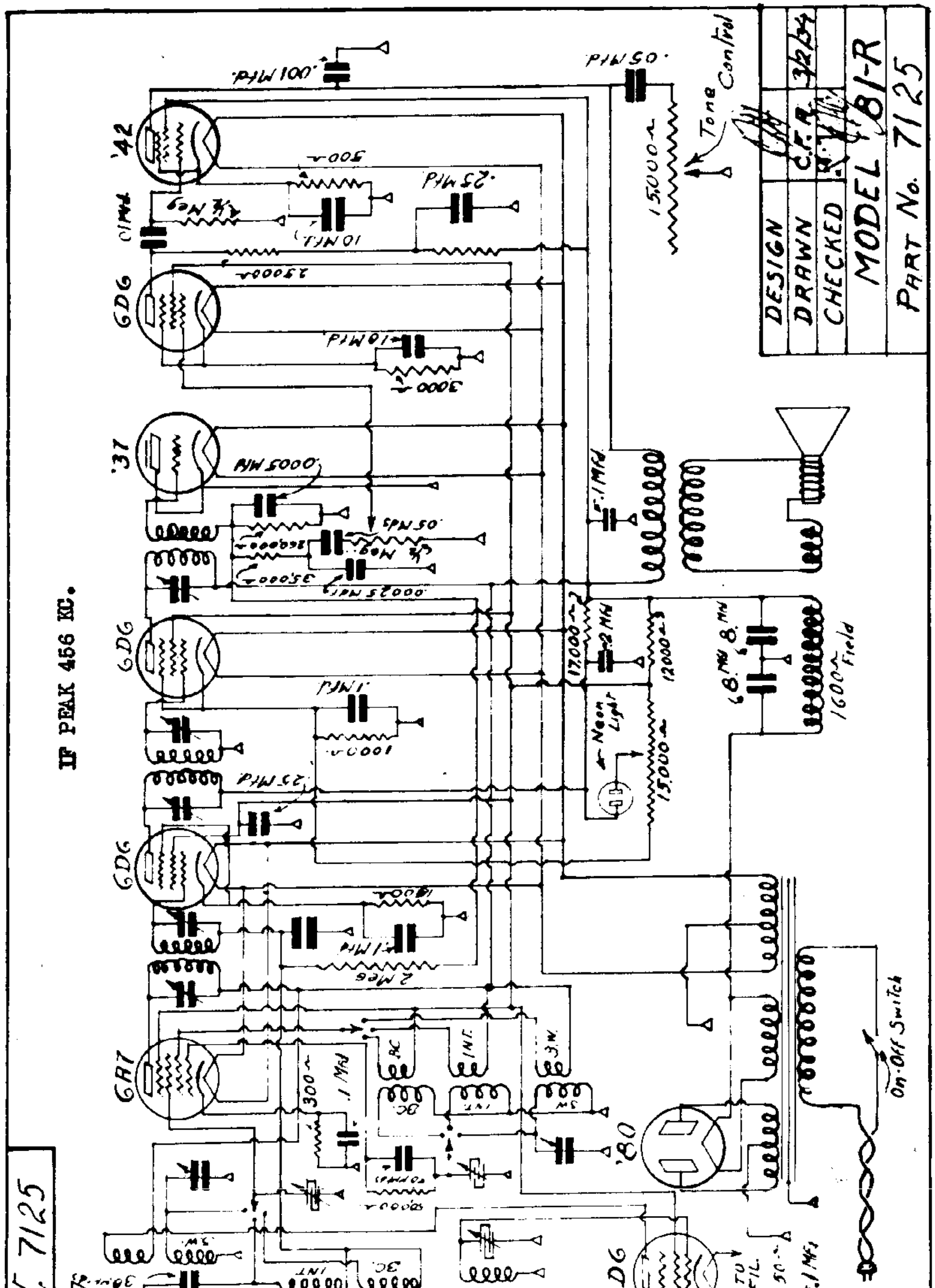
MODEL 81
Schematic

DEWALD RADIO



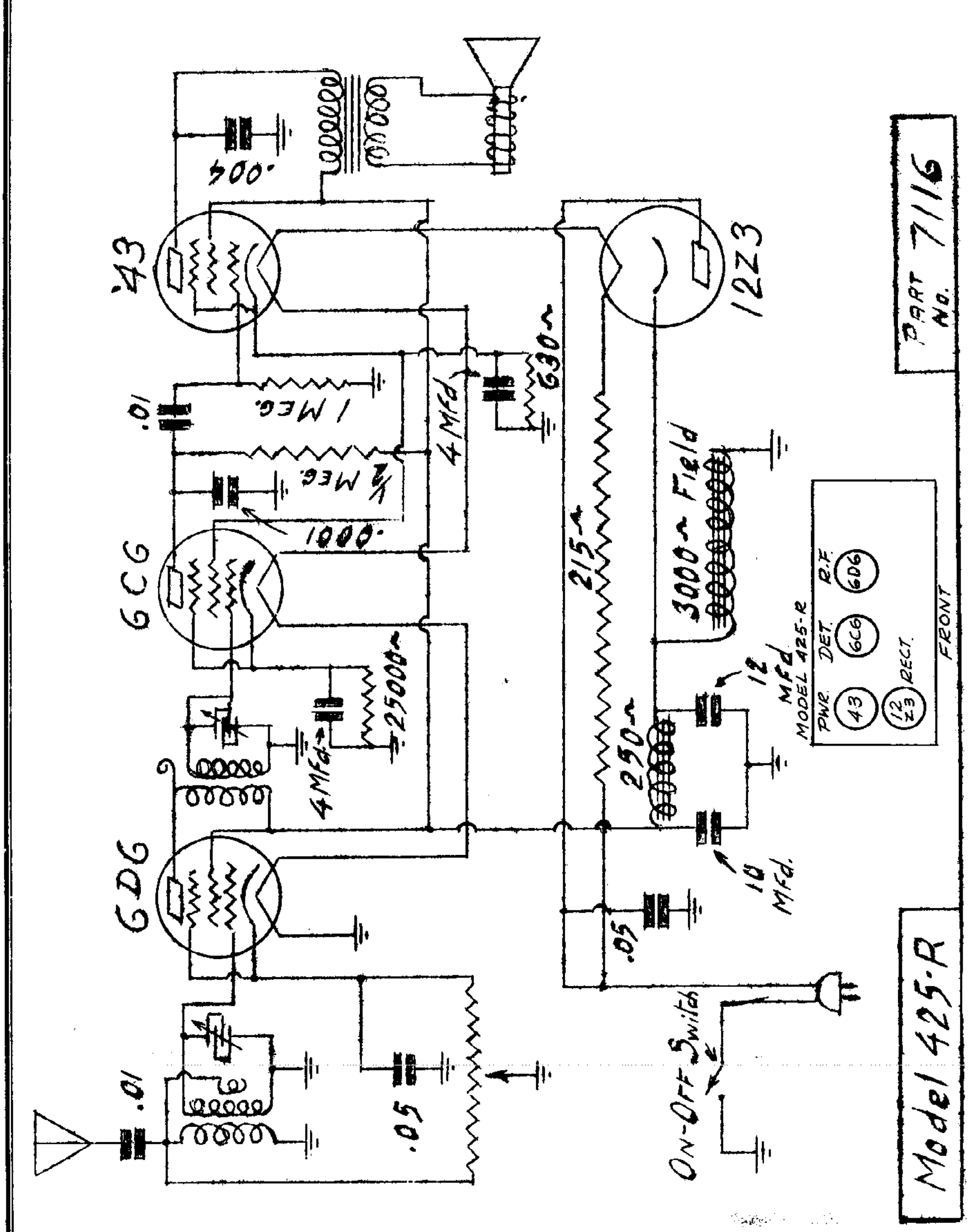
MODEL 81-R
Schematic

DEWALD RADIO



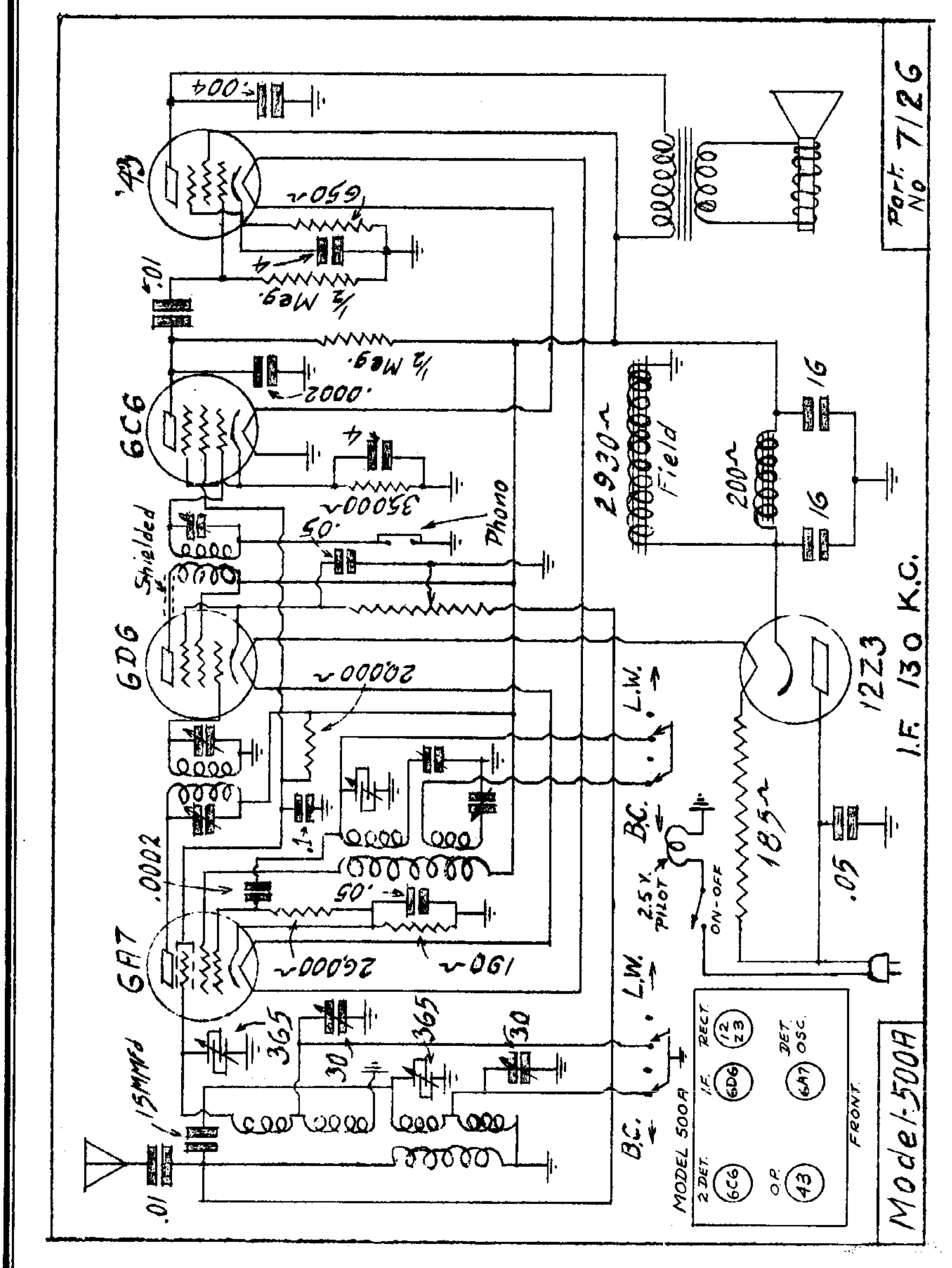
MODEL 425-R, 440
Schematic,
Socket Layout

DEWALD RADIO



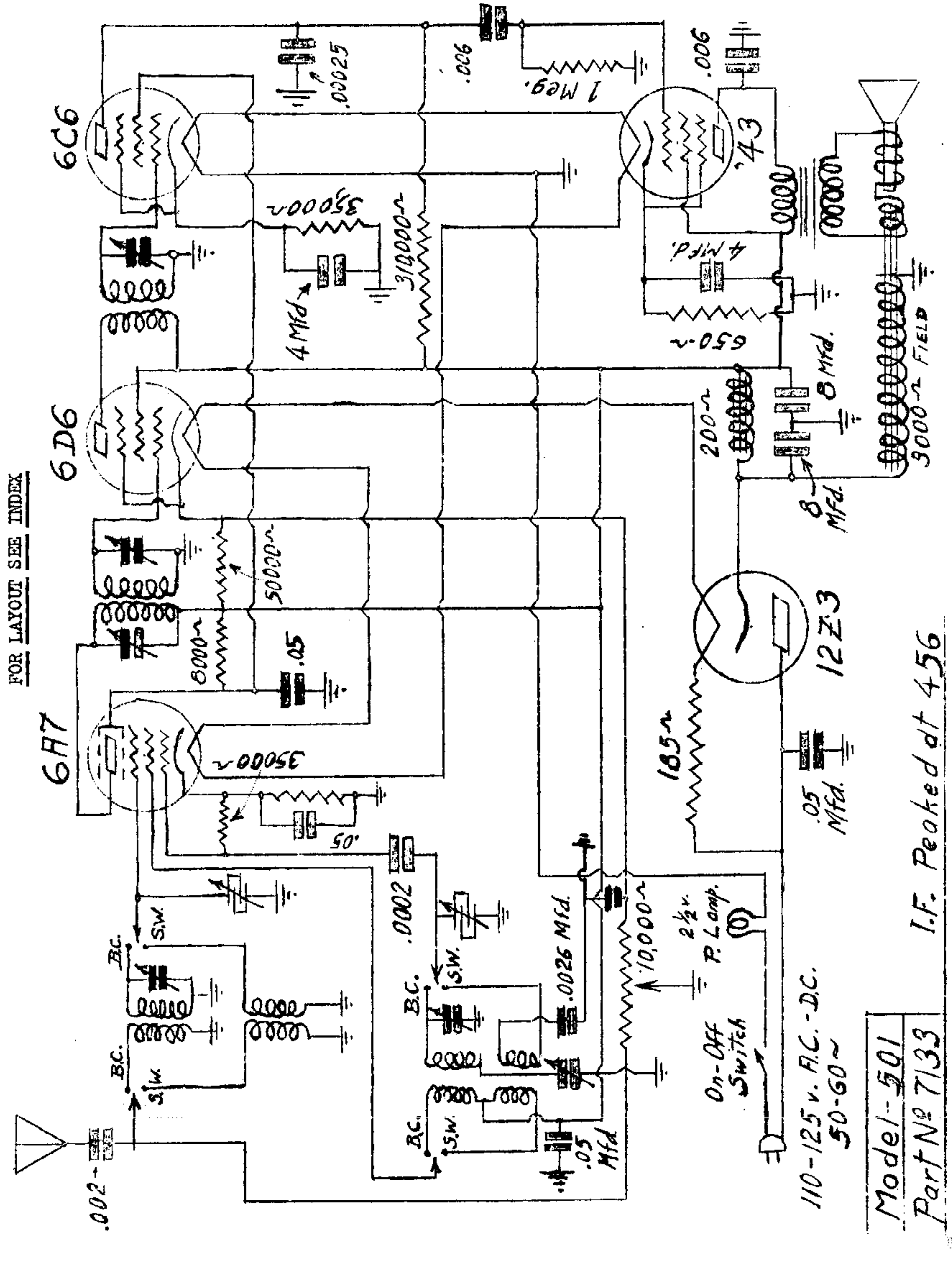
MODEL 500-A
Schematic
Socket Layout

DEWALD RADIO



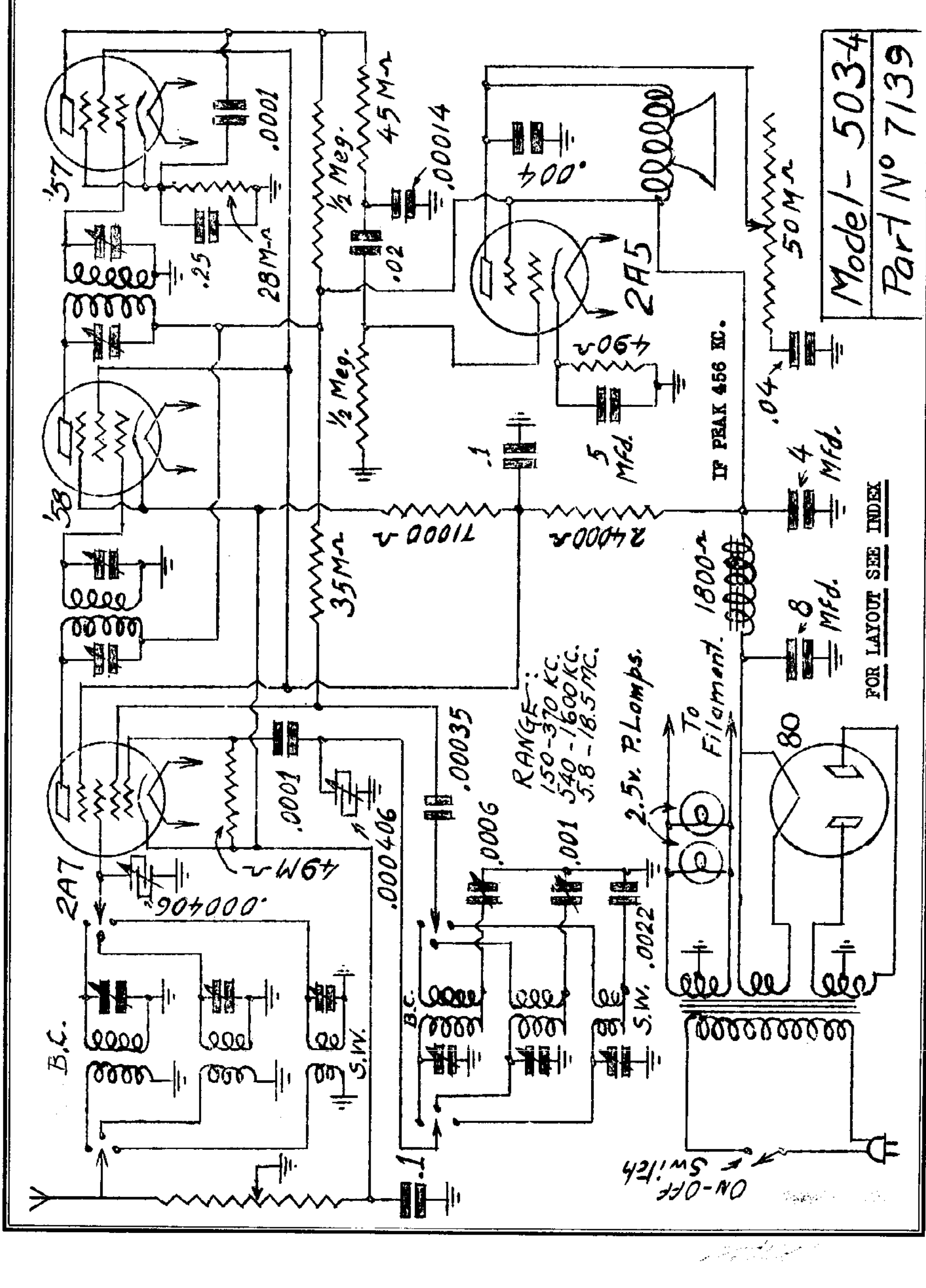
MODEL 501
Schematic

DEWALD RADIO



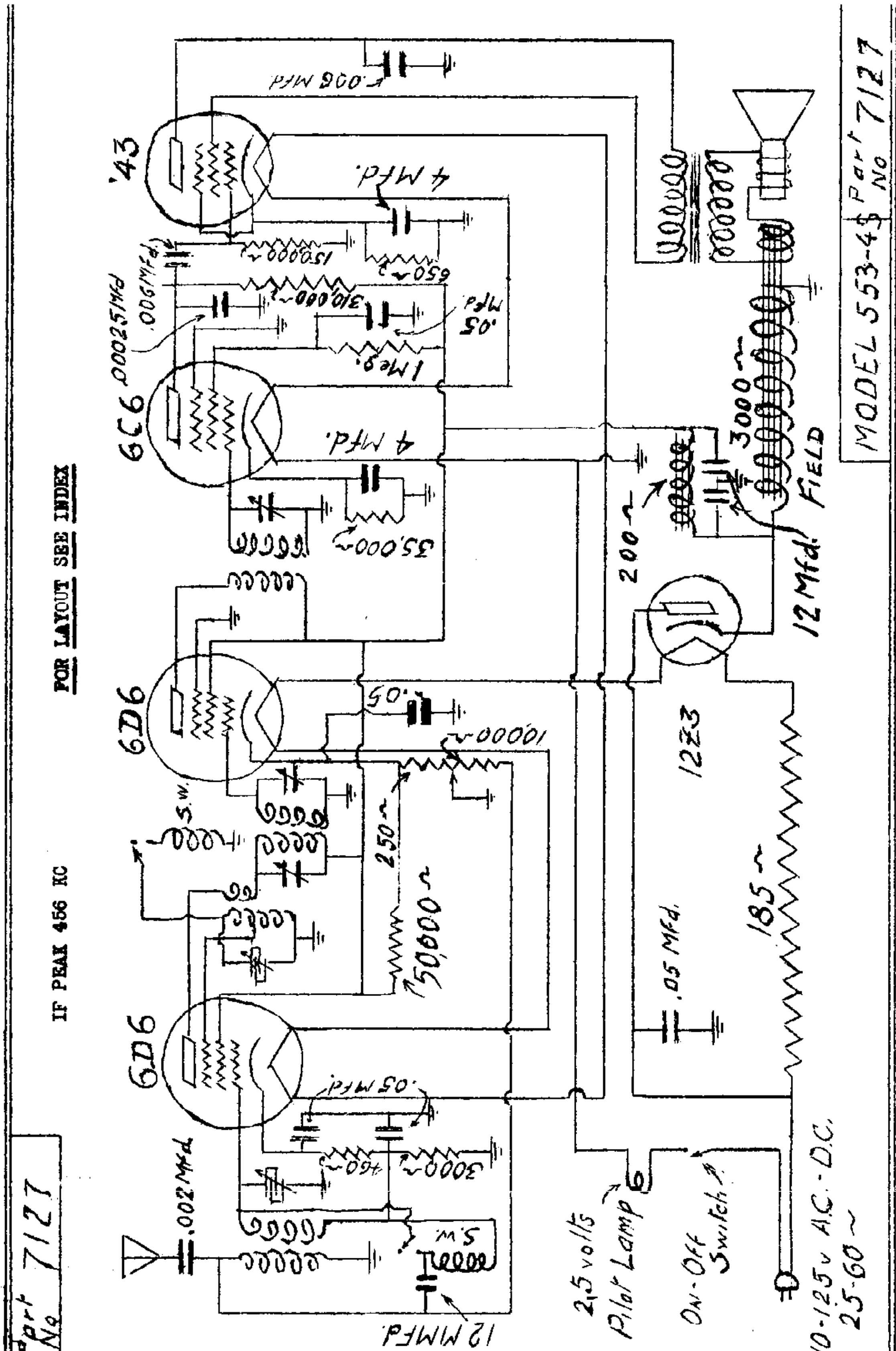
MODEL 503-4
Schematic

DEWALD RADIO



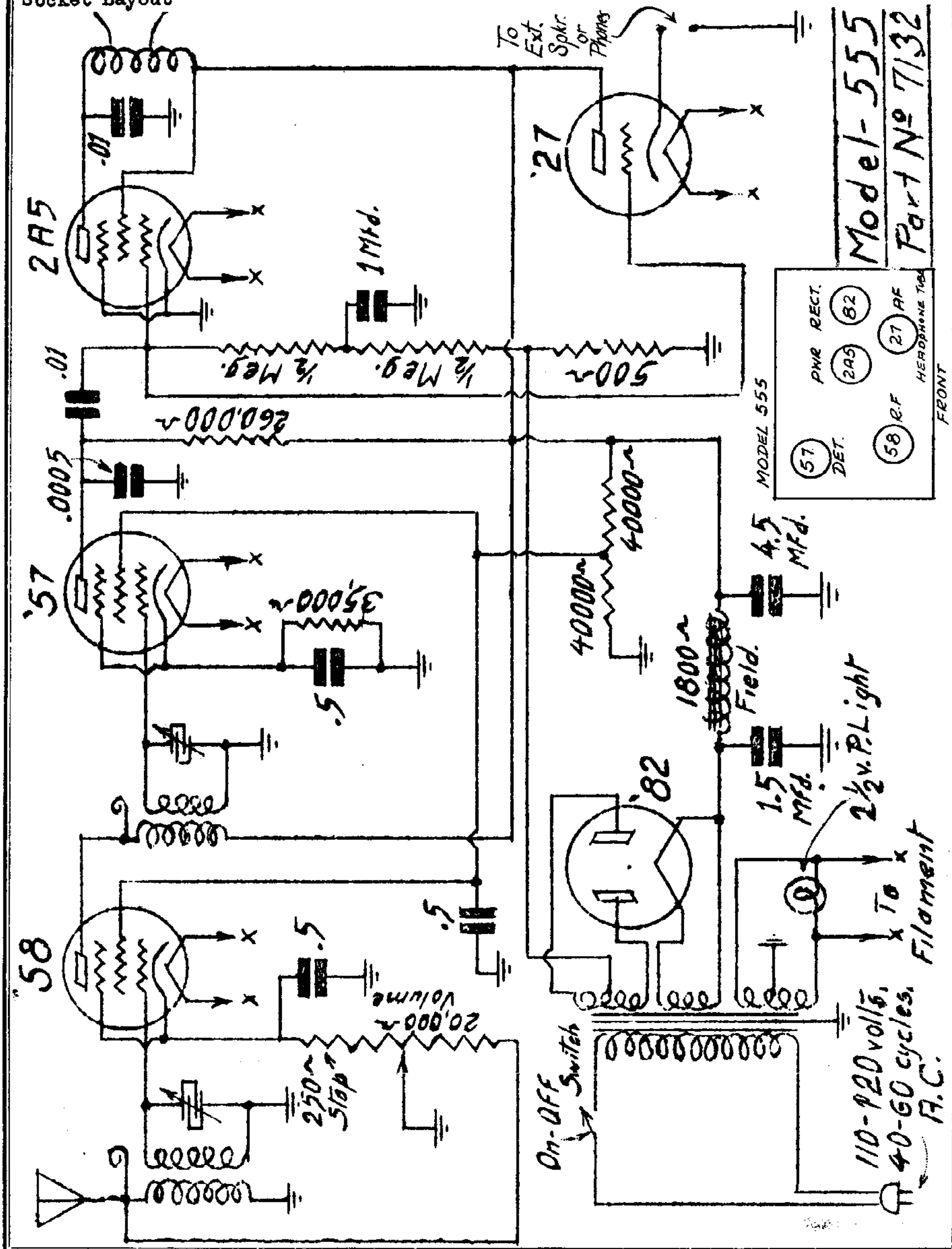
MODEL 553-4S
Schematic

DEWALD RADIO



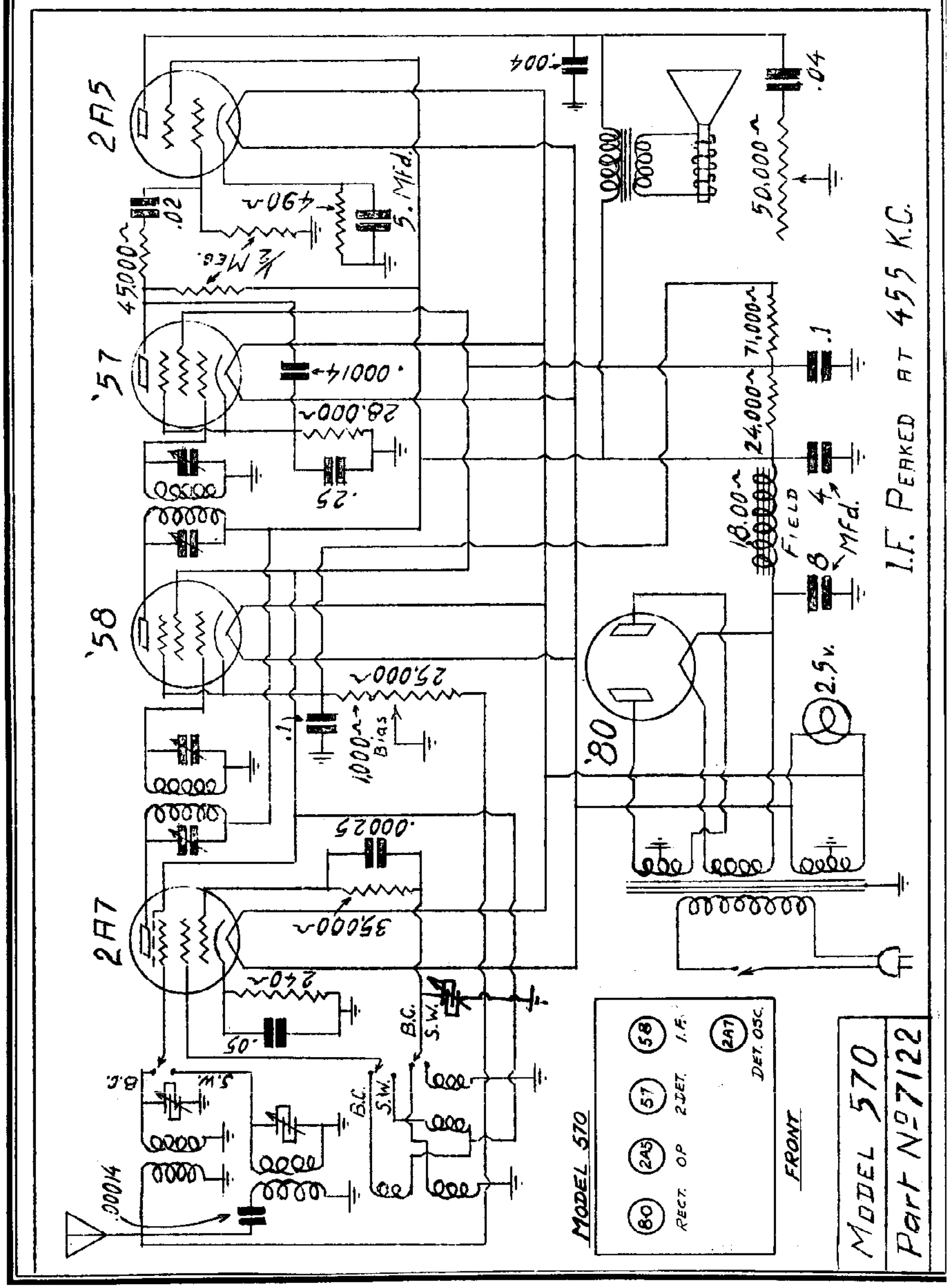
MODEL 555
Schematic
Socket Layout

DEWALD RADIO



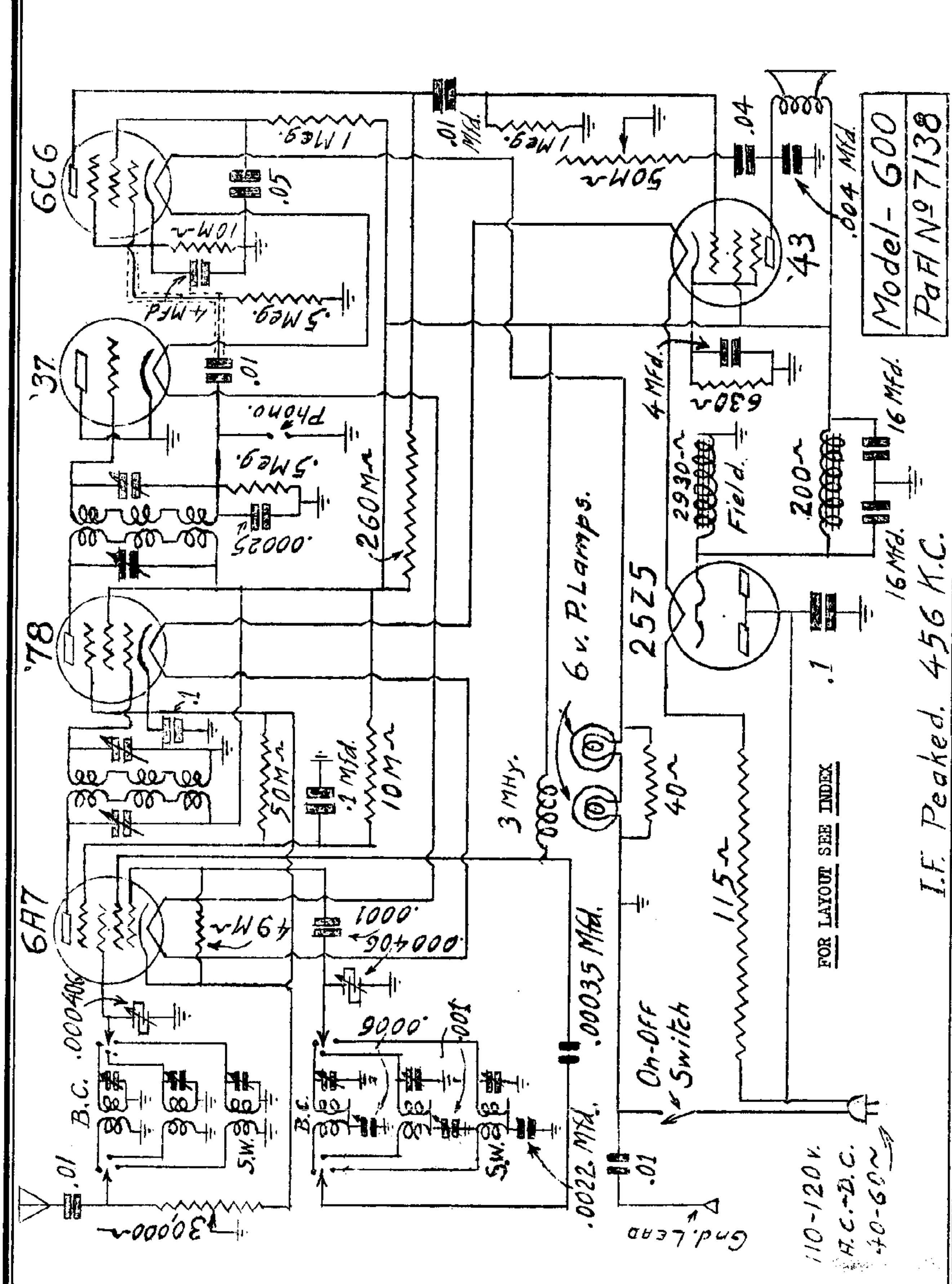
MODEL 570
Schematic
Socket Layout

DEWALD RADIO



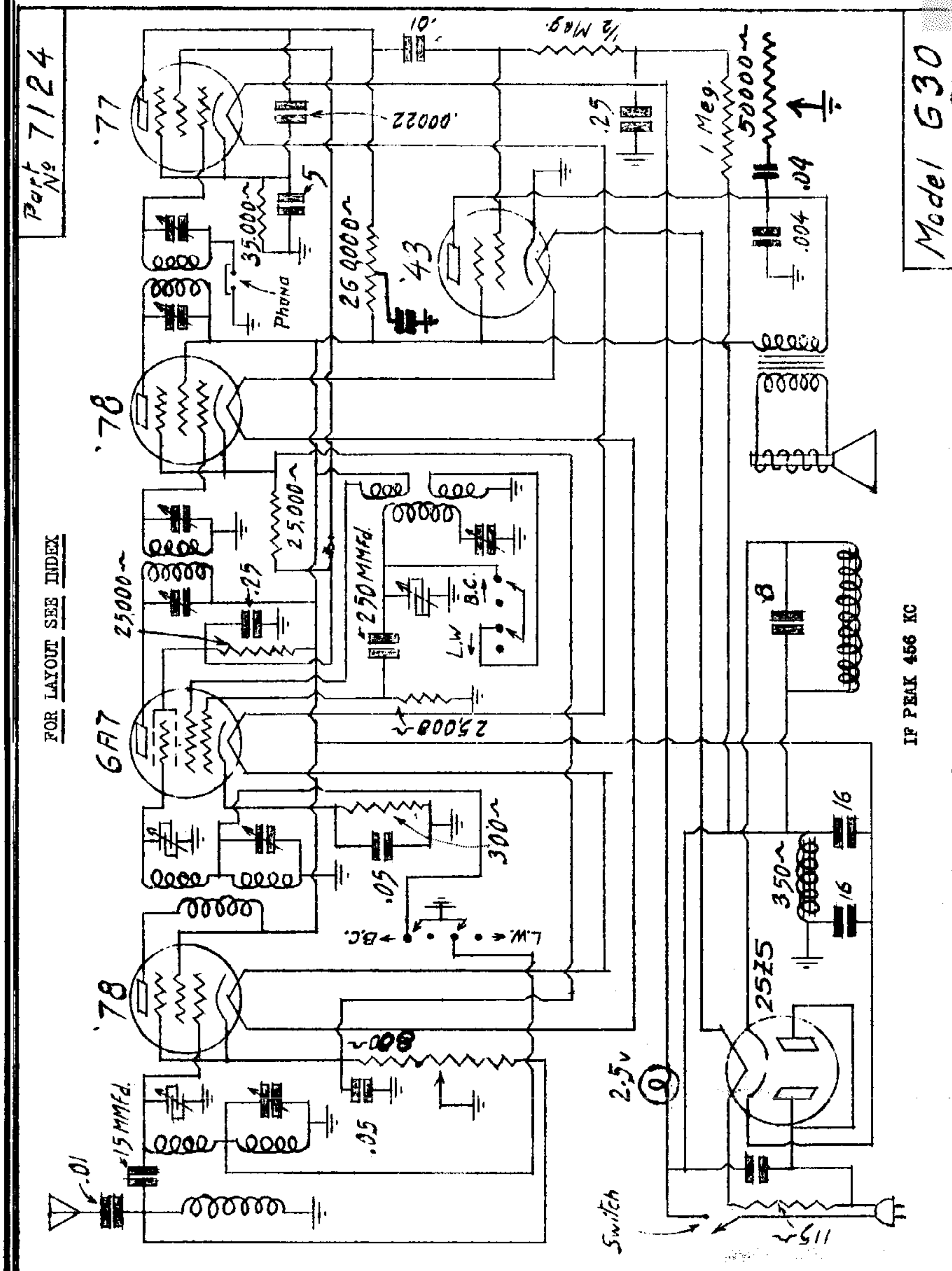
MODEL 600
Schematic

DEWALD RADIO



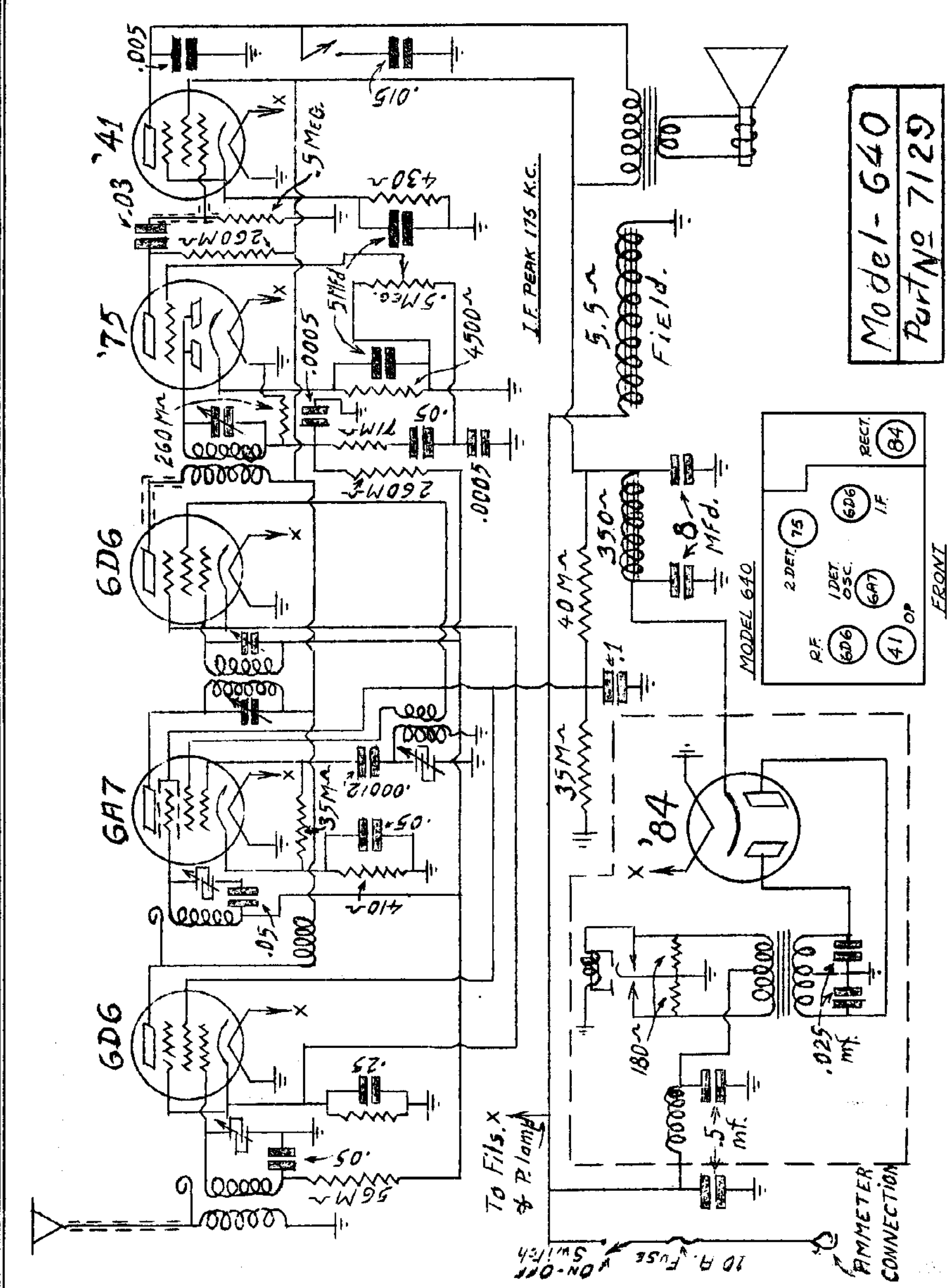
MODEL 630
Schematic

DEWALD RADIO



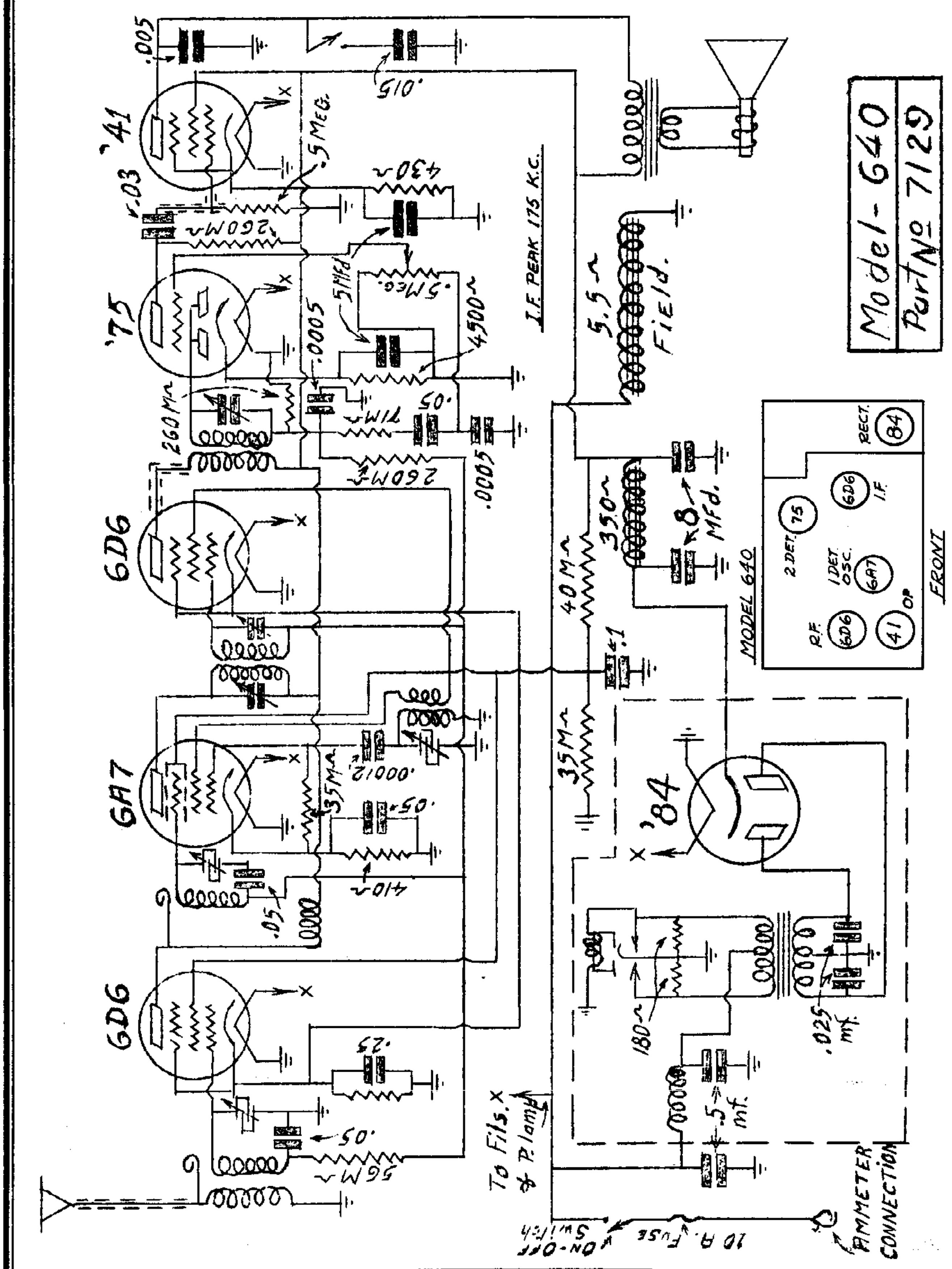
MODEL 640
Schematic
Socket Layout

DEWALD RADIO

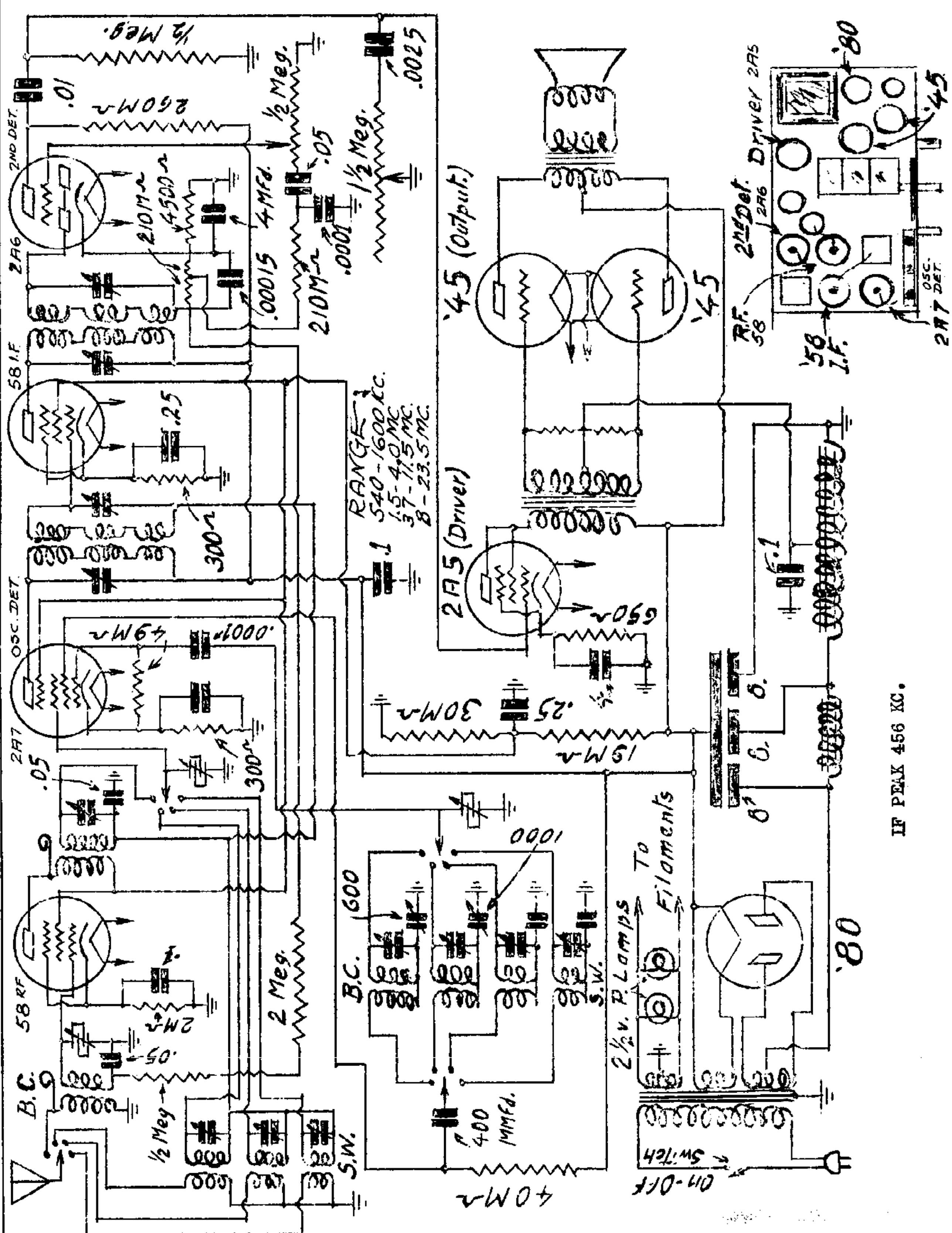


MODEL 640
Schematic
Socket Layout

DEWALD RADIO

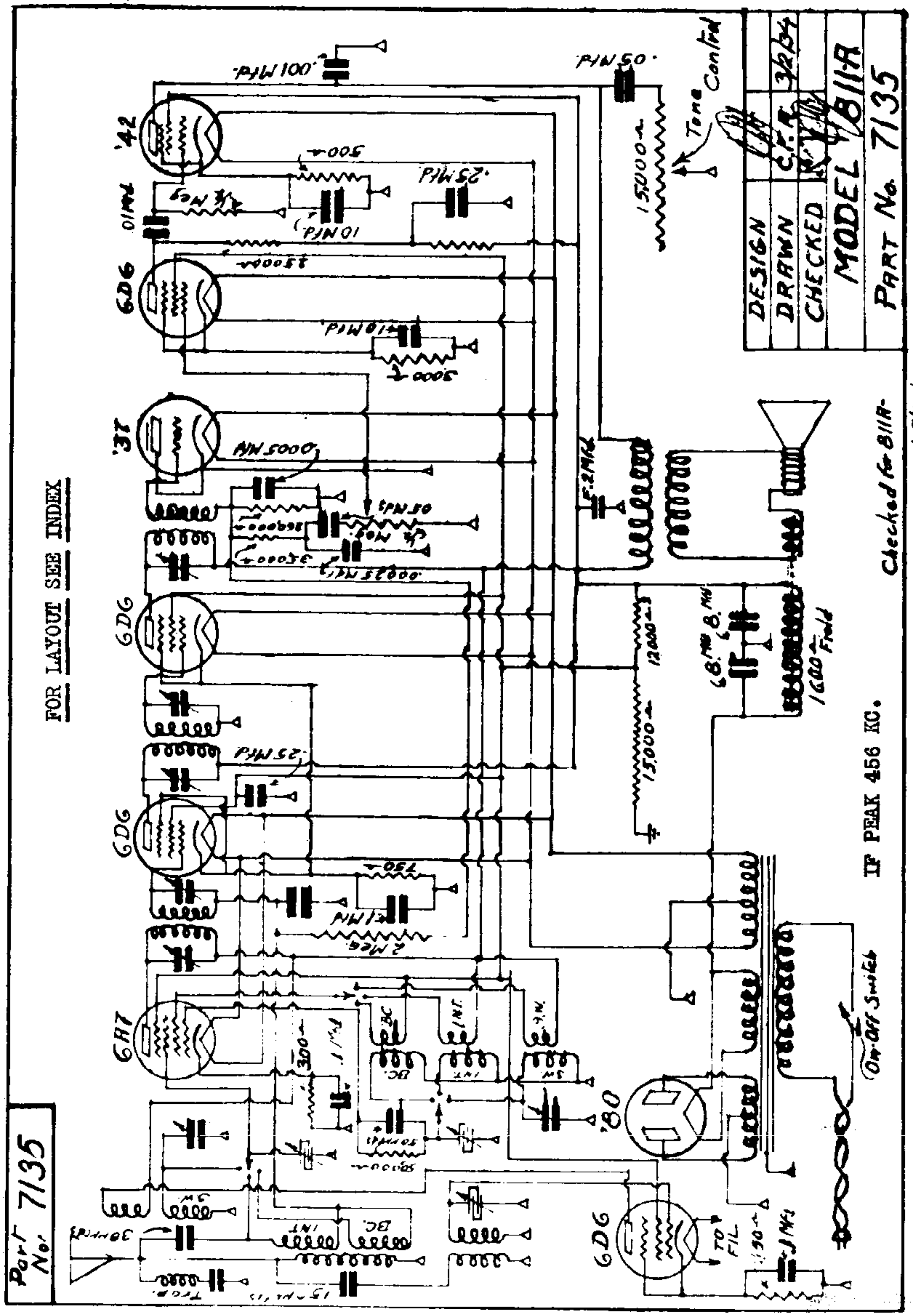


DEWALD RADIO

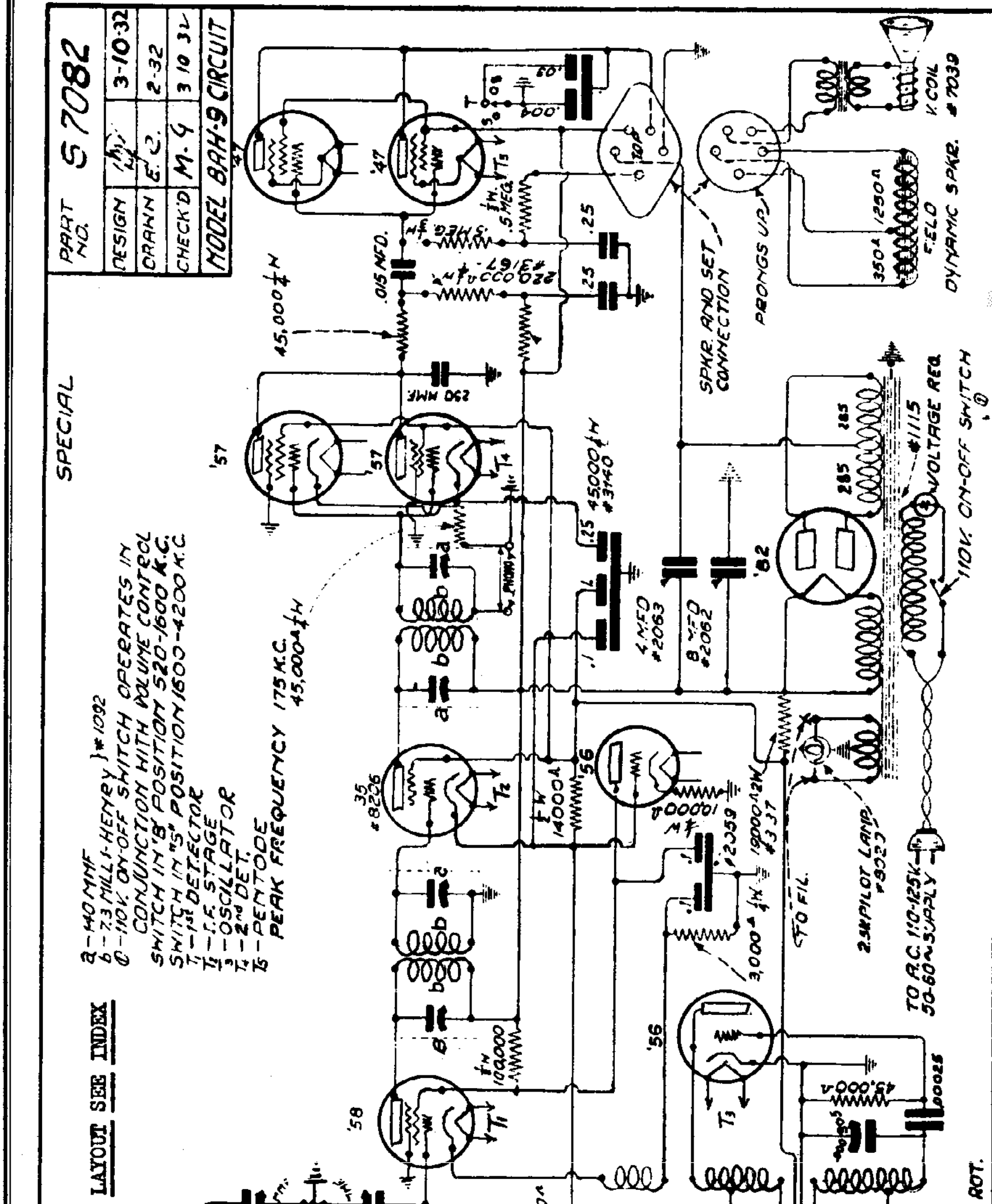


MODEL 811-A
Schematic

DEWALD RADIO

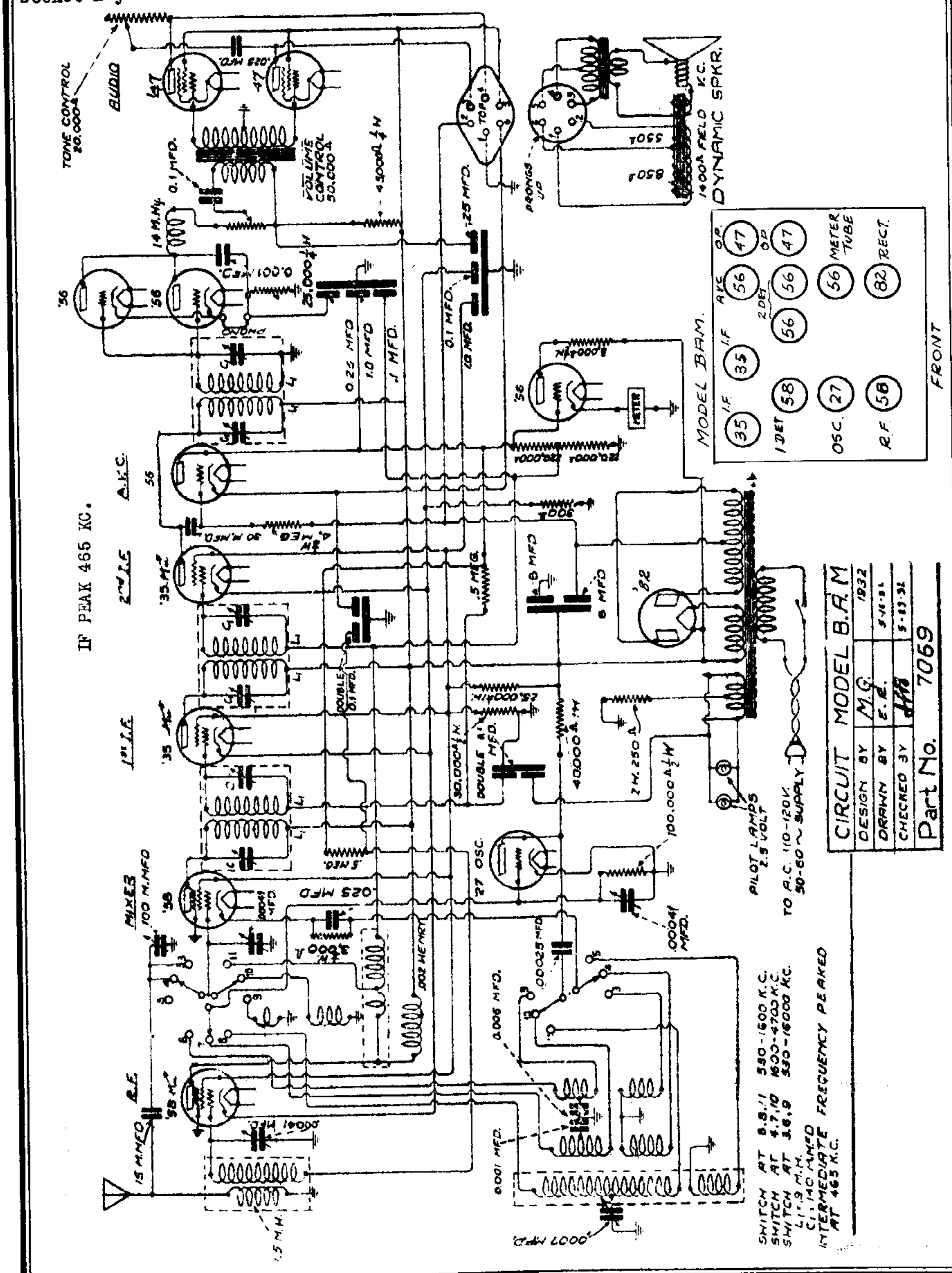


DEWALD RADIO



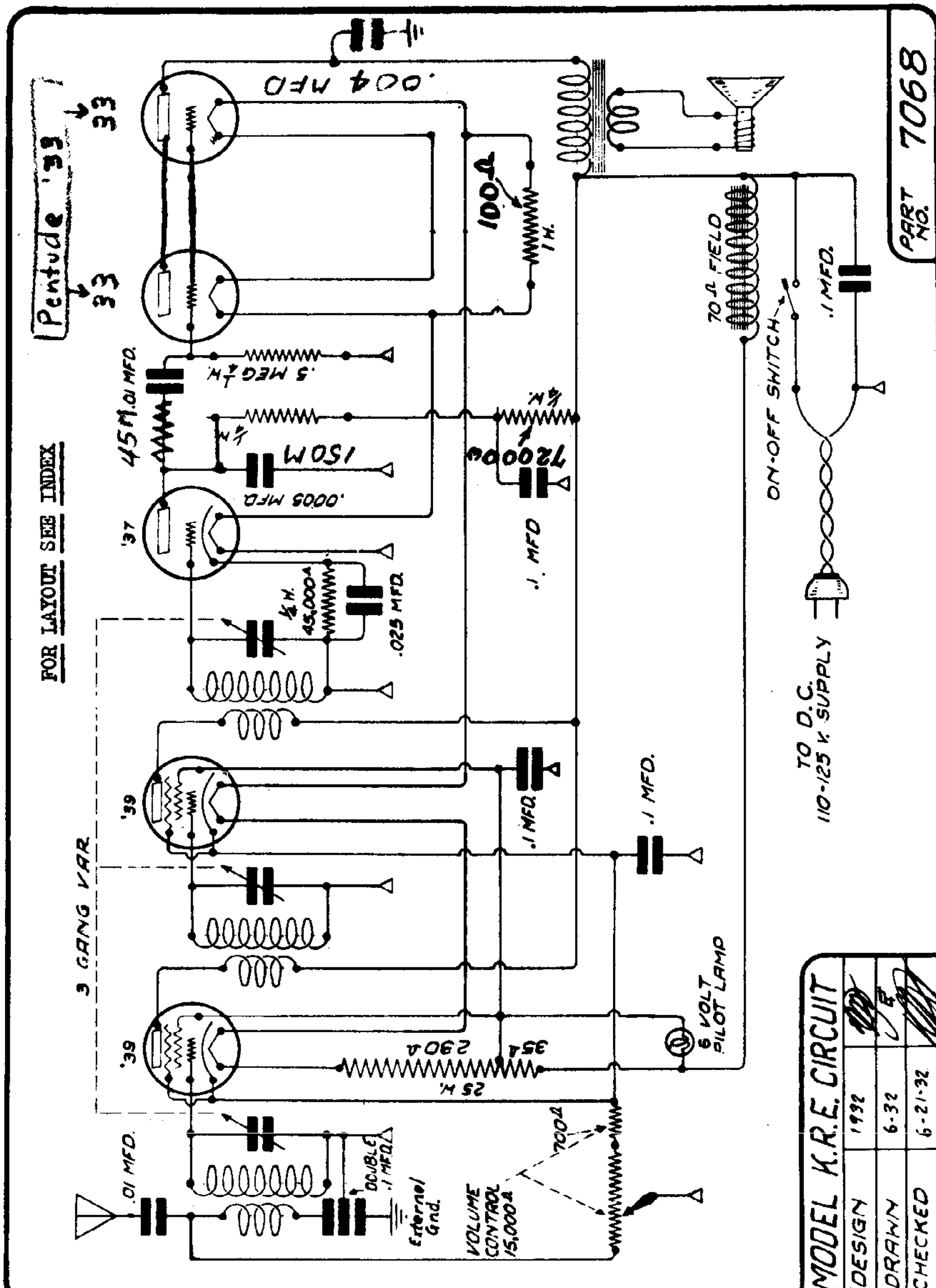
MODEL B-A-M
Schematic
Socket Layout

DEWALD RADIO



MODEL K-R-E
Schematic

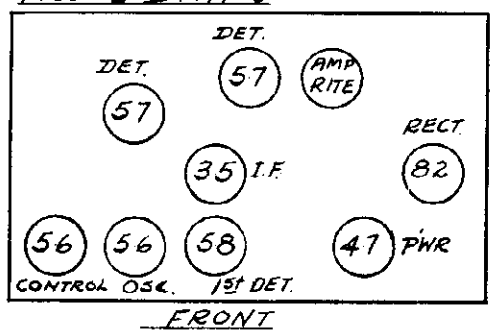
DEWALD RADIO



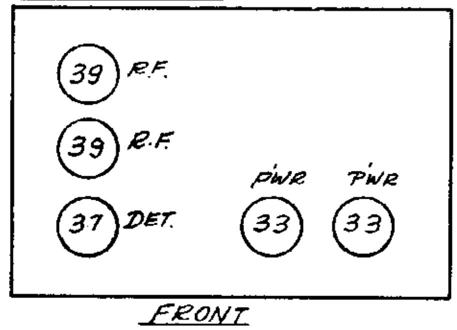
**MODEL BAH-9, KRE, 501
503-4, 553-4-S,
600-A, 601-A, 630,
811-A
Socket Layouts**

DEWALD RADIO

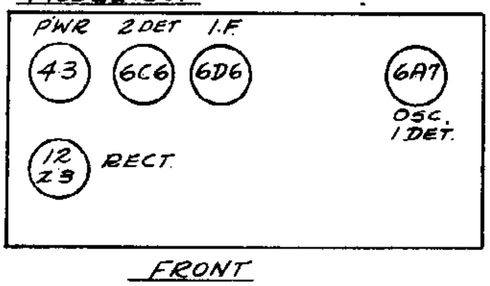
MODEL BAH-9



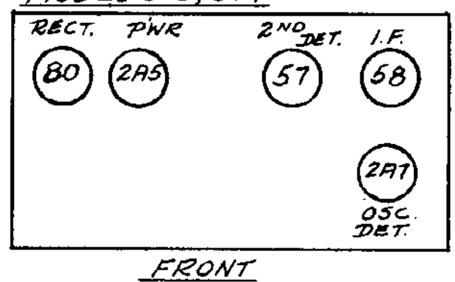
MODEL K.R.E.



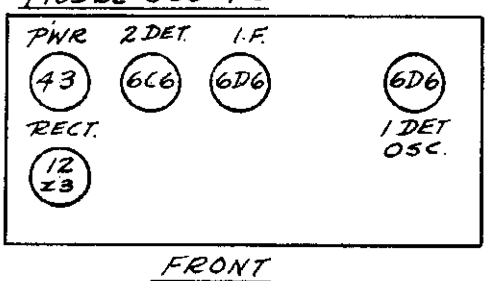
MODEL 501



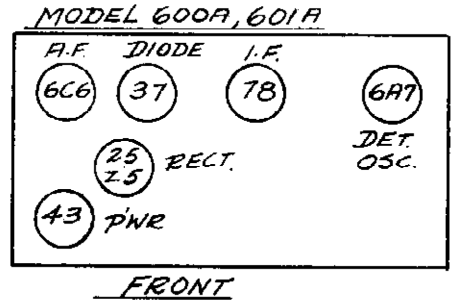
MODEL 503, 504



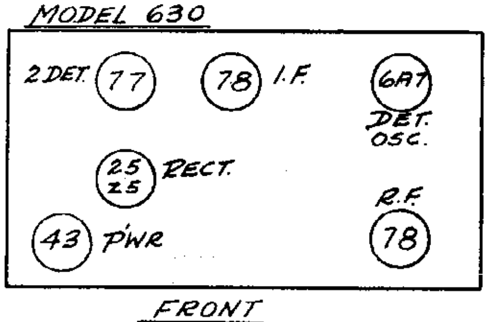
MODEL 553-4-S



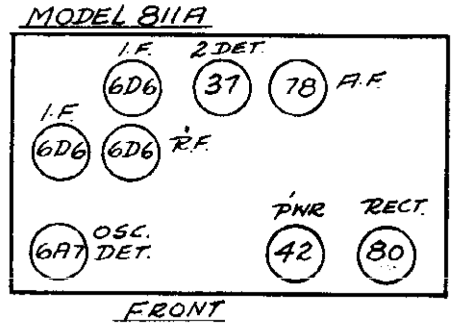
MODEL 600A, 601A



MODEL 630

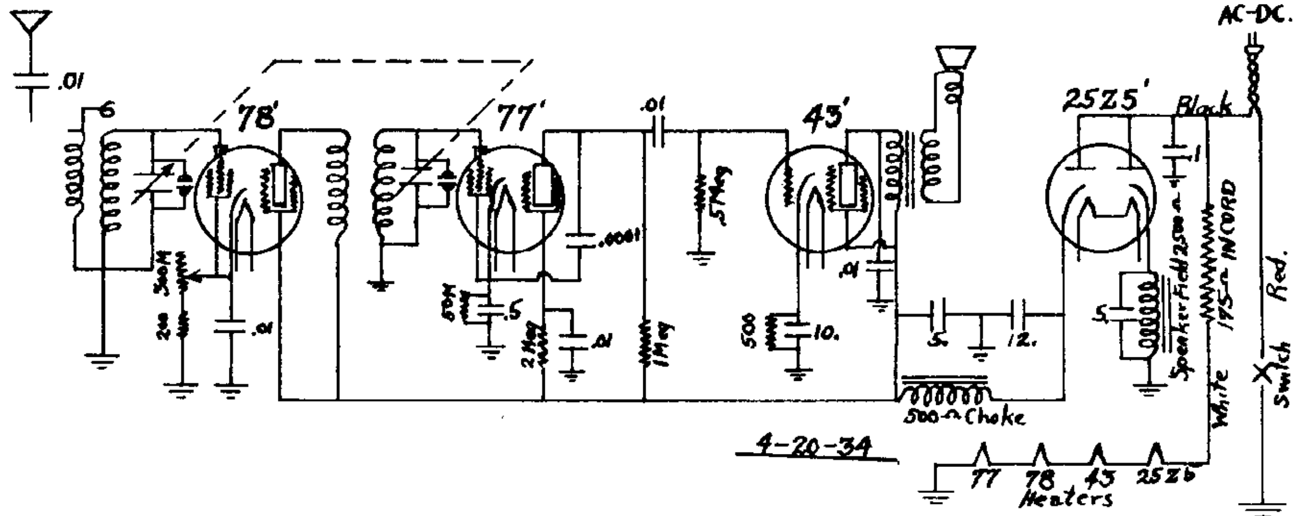


MODEL 811A



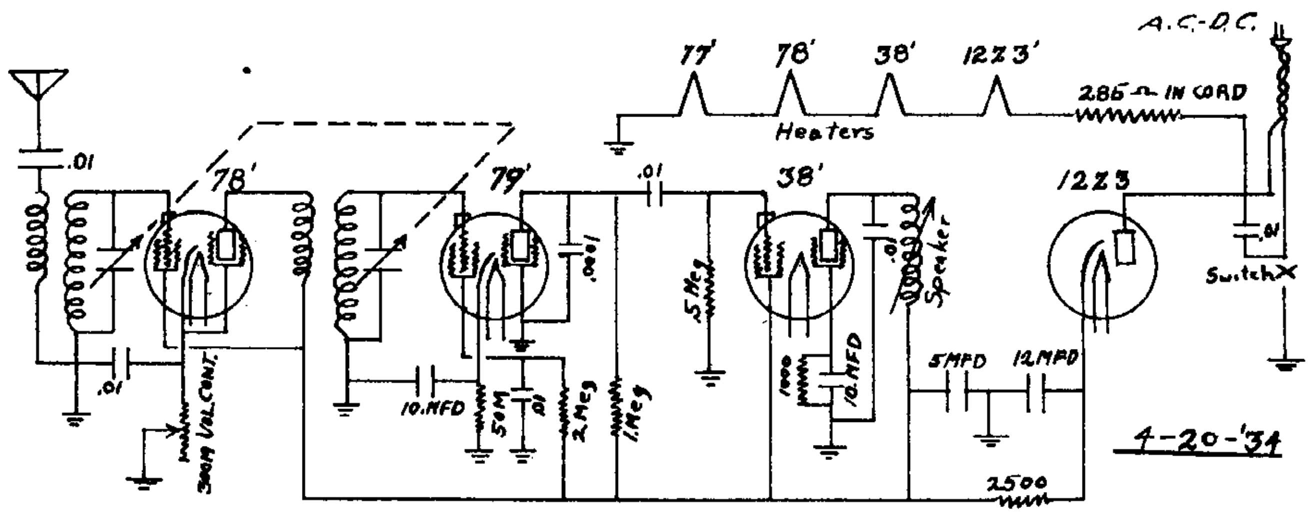
ECHOPHONE RADIO CORP.

MODEL 111
MODEL 128
Schematic, Data



Model 128

To balance set, first remove chassis from cabinet; second, tune condenser to about 1720 kc and align trimmer condenser on detector stage, then do same to antenna stage until loudest noise level is obtained.



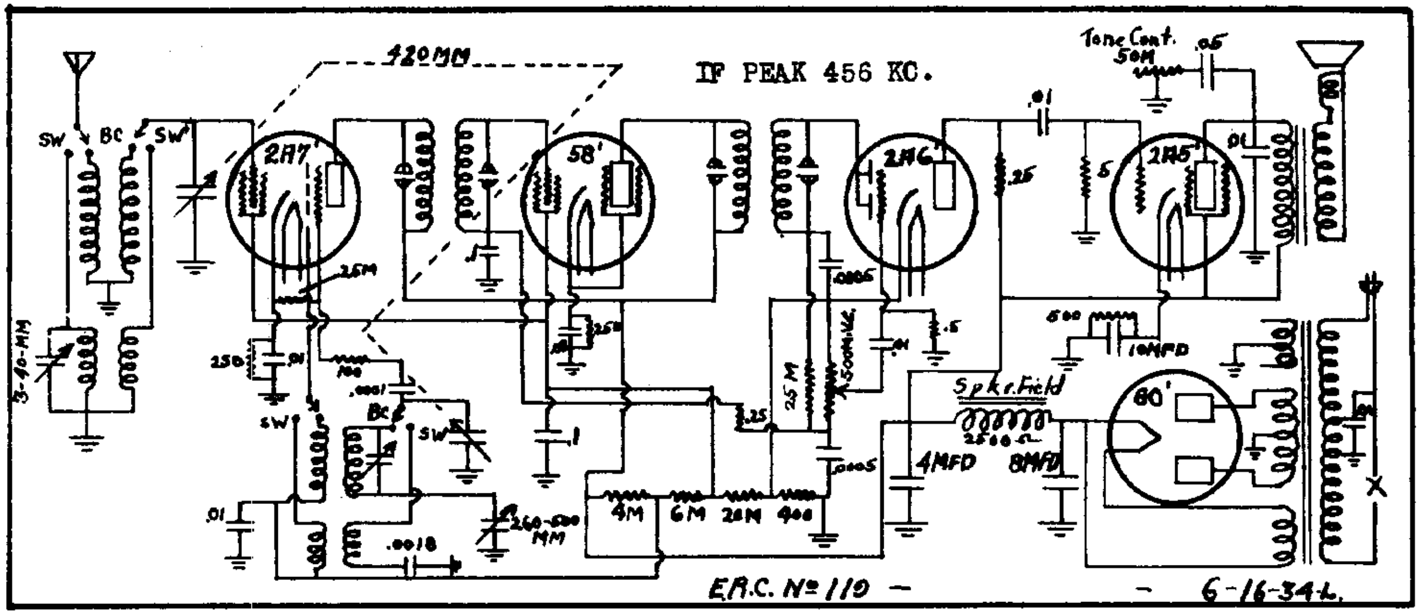
Model 111

This set is designed to oscillate across a major portion of the broadcast band. This regeneration is controllable by reducing the volume of the set. Oscillation in a set of this type increases the sensitivity from ten to twenty times.

MODEL 119
Schematic, Parts List
Alignment

ECHOPHONE RADIO CORP.

405 Escutcheon Plate
406 Silvertone Pyralin Plate
407 Dual 3-40 mmf trimmer cond.
408 260-500 Padder condenser
409 Candohm
410 Knob #XK 3444
451 Variable condenser
455 Power Transformer



This set is designed to operate on 105 to 120 volts AC - 60 cycles only. Also furnished for 25 cycles. Covers the regular broadcast band from 1720-540 KC and 15-55 meters.

The circuit is a superheterodyne, using 1-2A7 1st detector and oscillator, 1 -58 IF, 1-2A6 second detector, first audio and a.v.c., 1- 2A5 power output and 1-80 rectifier.

To align receiver, proceed as follows:

1-Peak the two IF transformers, applying a 456 note at the 2A7 control grid.

2-Turn variable condenser all the way open, peaking the oscillator stage of variable condenser, applying a 1712 KC signal into the antenna, then peak the RF stage.

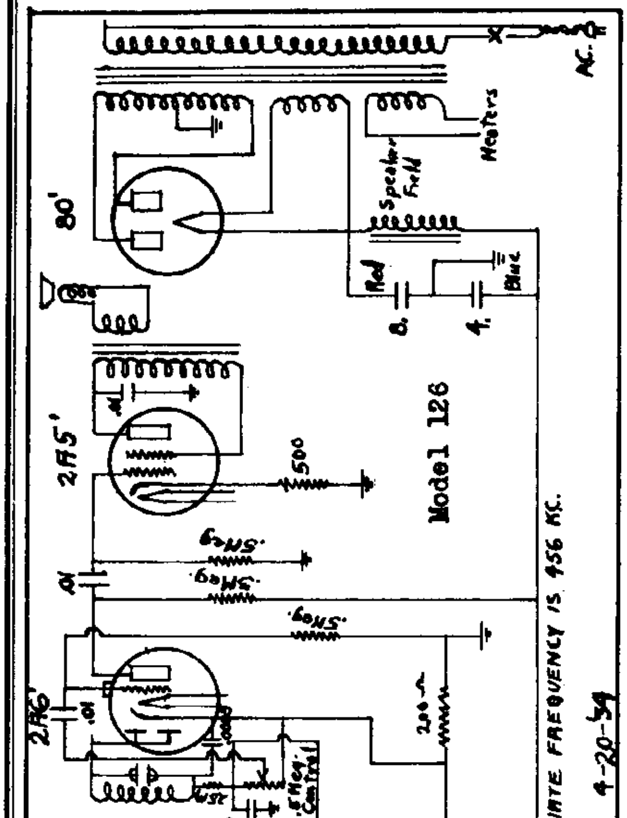
3-Tune gang condenser to approximately 600 KC and adjust low frequency padder to maximum noise level.

4-Tune to some weak signal at 1400 KC and readjust RF section of variable condenser.

No.	
156	8&4 mfd Electrolytic cond.
158	Power cord and plug
256	Volume control 1/switch
306	Tone control w/switch
307	10 mfd 25 volt electrolytic
310	.0018 mica condenser
.401	Dynamic speaker
402	Set of coils complete
402a	BC Antenna coil
402b	SW " "
402c	BC & SW Oscillator coil
402d	Series wnd. I.F. Unit-top or bottom grid
403	Short wave switch
404	Tuning unit with dial

MODEL 124
Schematic, Alignment
MODEL 126
Schematic, Alignment

ECHOPHONE RADIO MFG. CO.



Model 124

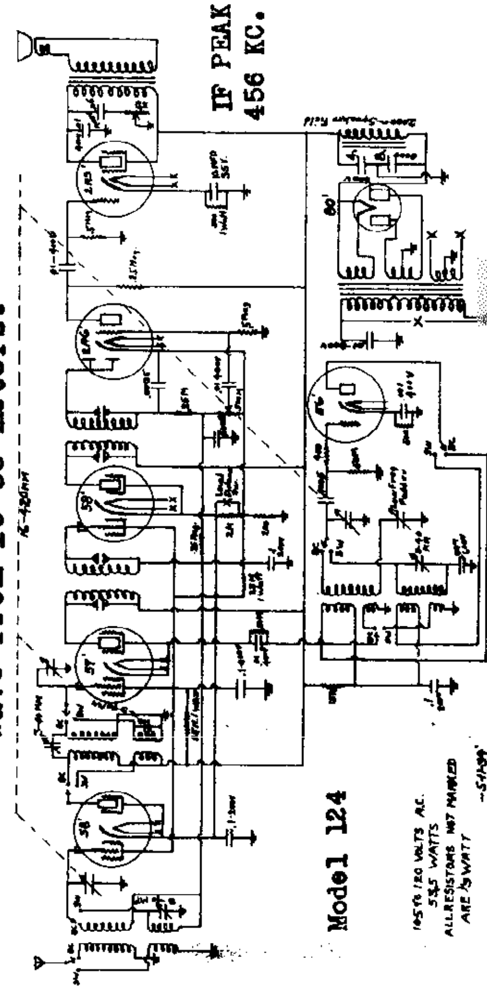
To align set on broadcast, remove 56 oscillator tube, trim Intermediate Frequency Transformers at 456 KC from an oscillator, feeding same into 57, first detector grid. Secondly, open gang condenser wide open and adjust trimmer condensers on top to maximum noise level, then adjust low frequency padder at approximately 600 KC; after doing this go back and recheck at 1700 KC.

To adjust short wave, turn switch left and tune gang condenser to 31 meters on dial and trim small padders underneath to maximum noise level or some station, checking oscillator coil padder with gang condenser tuned at different points.

Model 124

This set is designed to operate on 105-120 volts, A.C. The regular band covers from 1712 KC-550 KC and short wave from 15-55 meters.

IF PEAK 456 KC.



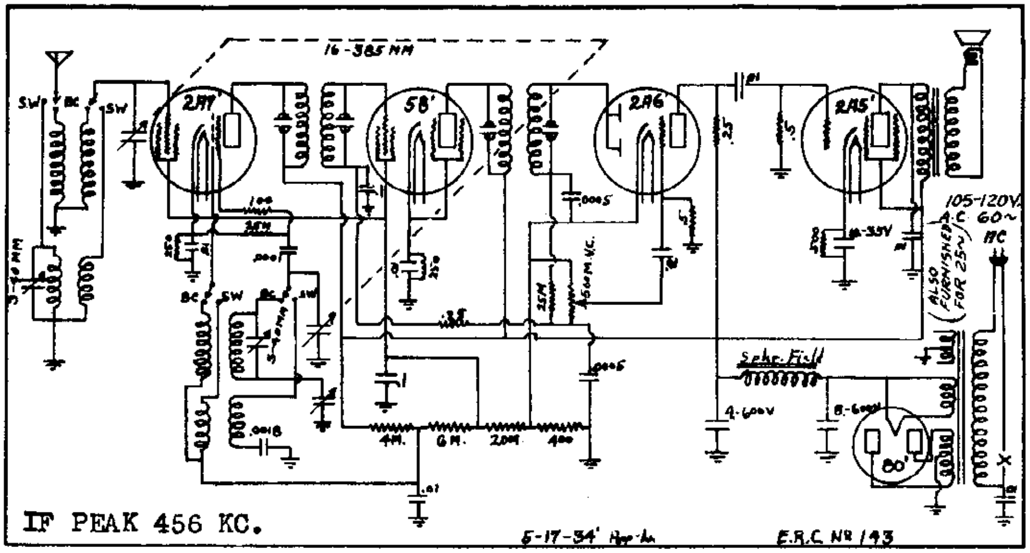
Model 124

Model 126

To balance set, first align the IF transformers at 456 kc with gang condenser closed, next turn condenser all way open and align at 1720 kc, then adjust padder condenser at 600 kc, then go back and check at 1720 kc.

MODEL 143
Schematic, Alignment
Parts List

ECHOPHONE RADIO MFG. CO.



This set covers from 1720 KC to 540 KC regular broadcast including 1712 KC police and 15 - 55 meters short wave which covers major foreign stations.

The circuit uses 1-2A7 1st detector and oscillator; 1-58 IF; 1-2A6 second detector and first audio; 1-2A5 power output and 1-80 rectifier.

To align receiver proceed as follows:

1. Peak the two IF transformers, applying a 456 note at the 2A7 grid.
2. Turn variable condenser wide open, peaking oscillator stage at 1712 KC- then peak RF and antenna stage.
3. Adjust low frequency with gang tuned to 600 KC, to maximum peak.
4. Go back and check trimmers on gang condenser at 1400 KC.

If radio stops playing turn off immediately - check tubes. For-

Hum -check for
- Open resistor
- Bad Filter condenser
- Open by pass condenser
- Defective tube or tubes.

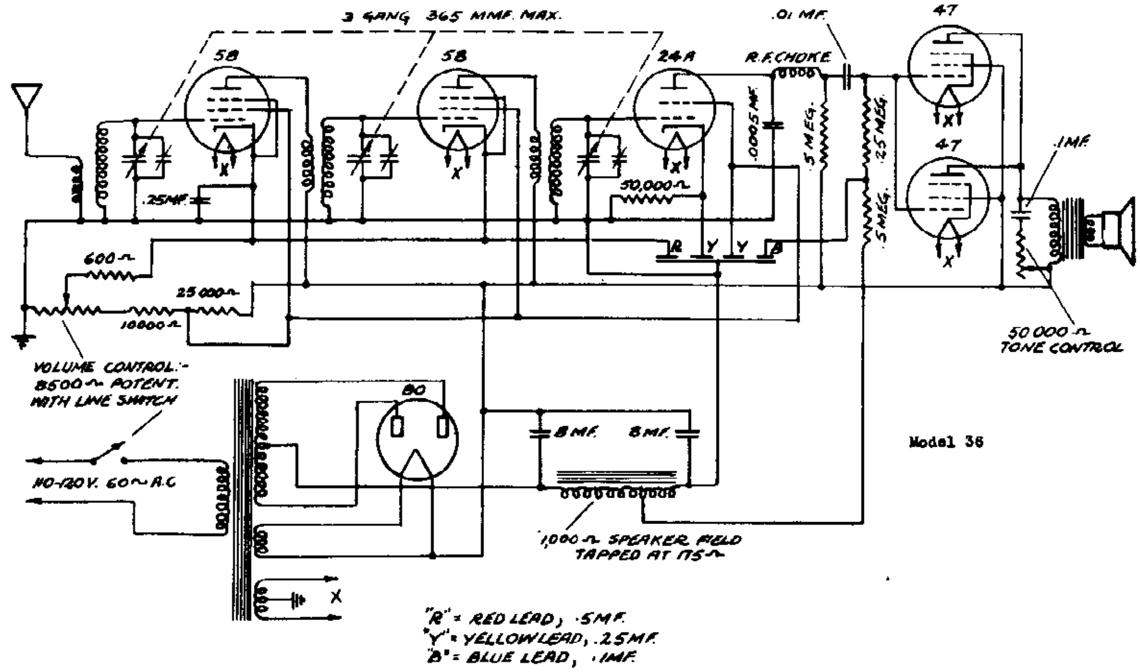
Poor tone- check for
- Bad resistor
- Voice coil in speaker rubbing
- Defective by pass condenser
- Defective filter condenser

PARTS LIST

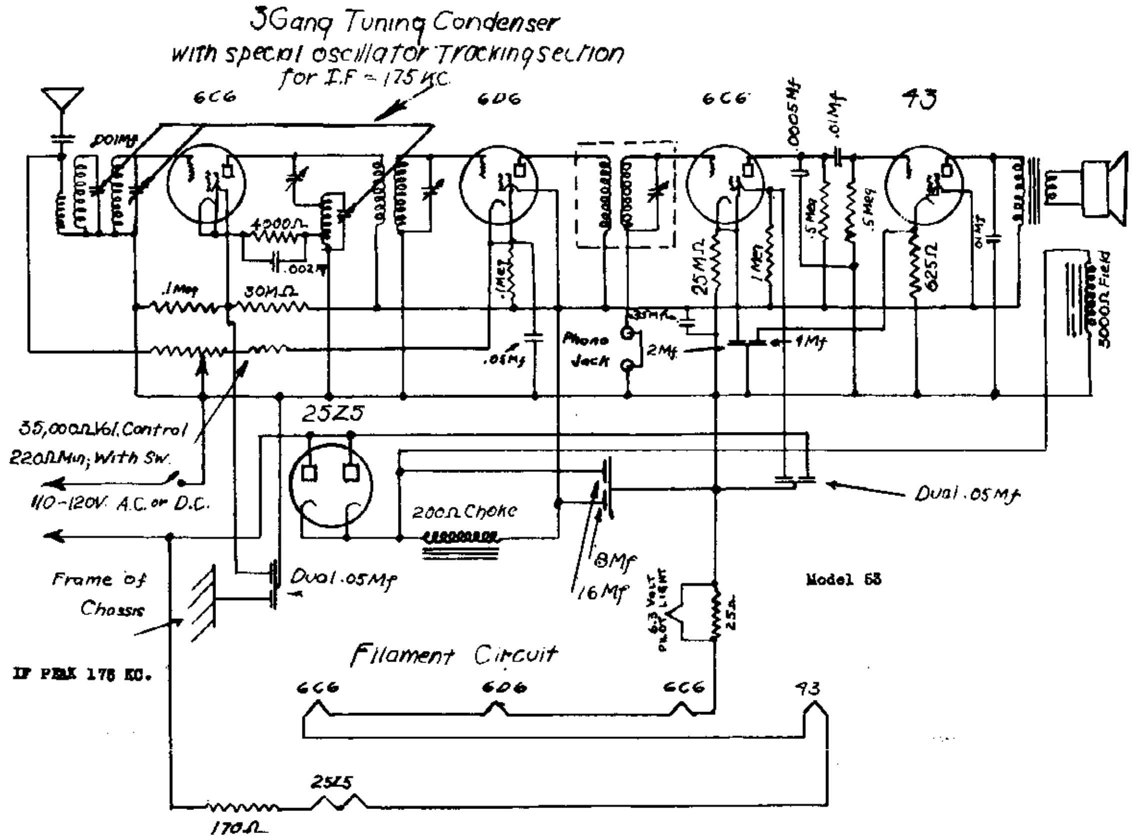
No.	
450	Dynamic Speaker
451	Variable condenser
452	Volume control w/switch
453	Short wave switch
454	Airplane Dial complete
455	Power Transformer
456	Set of coils-complete
456a	RFE Antenna coil-S.W.
456b	RFE Oscillator "
456c	RF Antenna BC
457D	456 KC IF units
156	8&4 mfd condenser
307	10 mfd 25v electrolytic
308	Terminal strip - 5 lug
310	.0018 Mica condenser
309	.01 mfd 800v cond. in can
108	Padder condenser 7 plate
158	Power cord & plug
	Any tube socket (state no.of prongs)
	Any resistor (state ohms & watts)
	Any by pass-not listed above(state capacity)

Weak - check for
- Set out of balance
- Defective coils
- Bad resistor
- Bad condenser

EDISON-BELL CO., INC.



Model 36

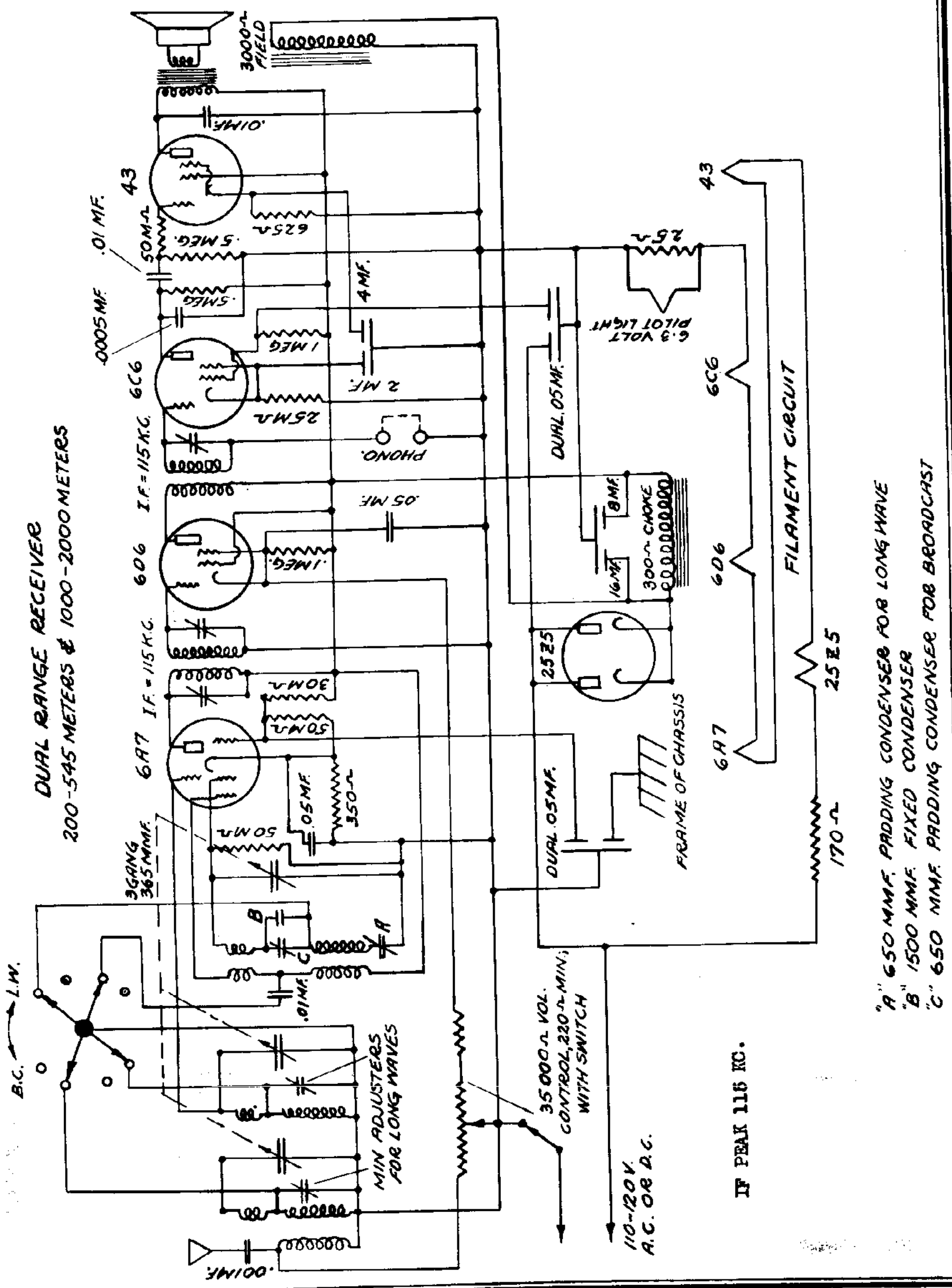


Model 53

IF PEAK 175 KC.

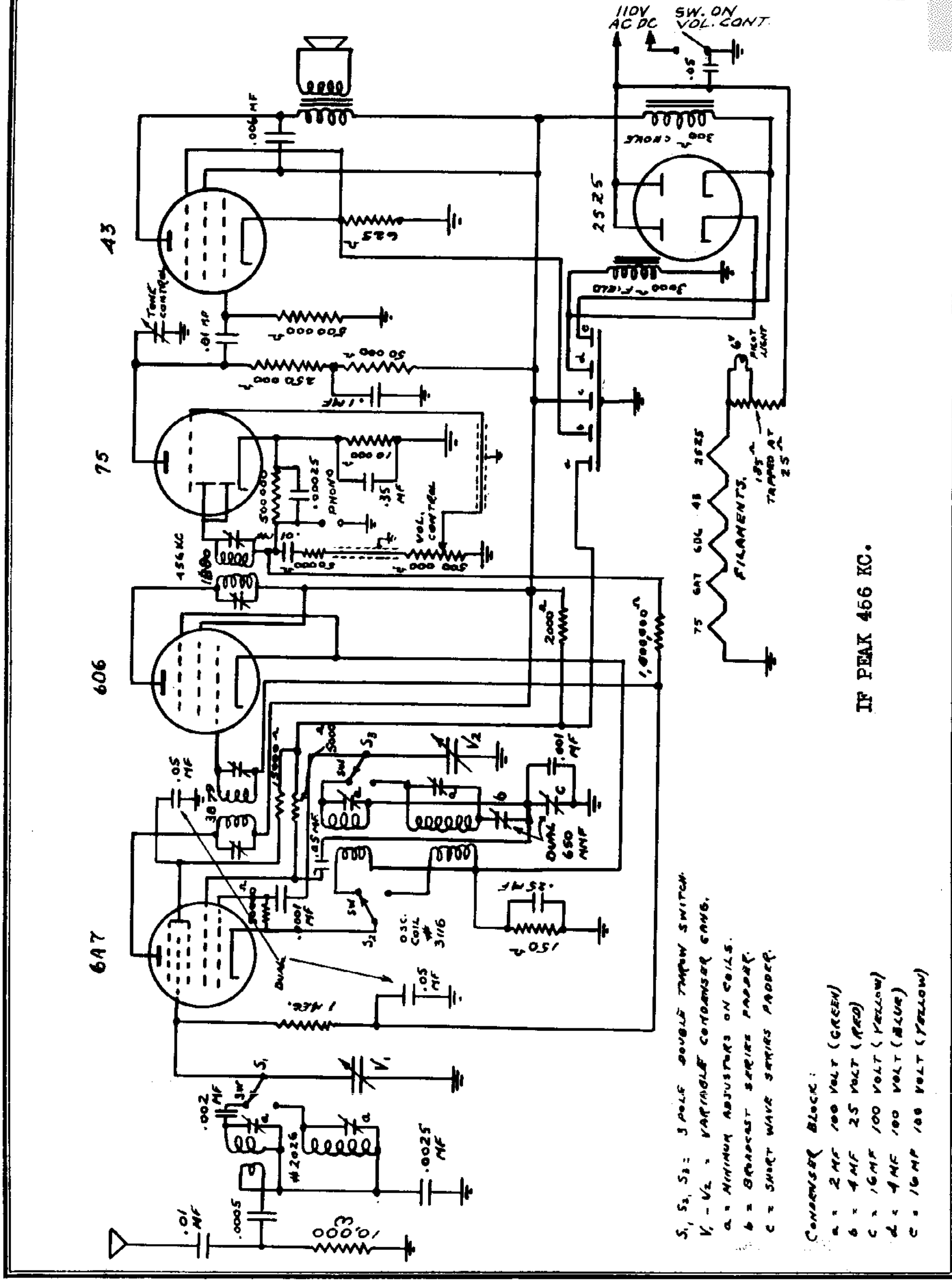
MODEL 53 LW
Schematic

EDISON-BELL CO., INC.



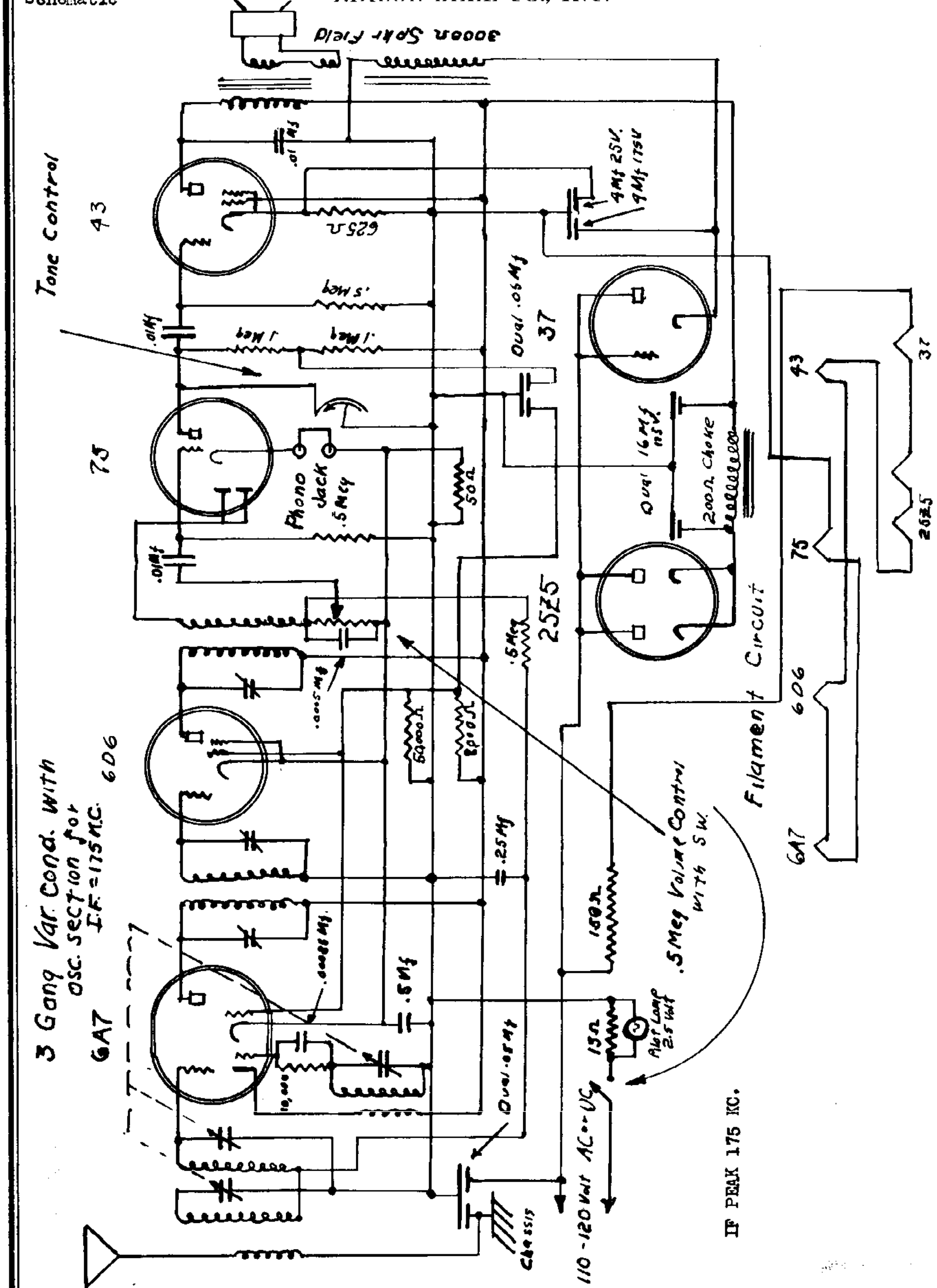
EDISON-BELL CO., INC.

MODEL 55 AW
Schematic



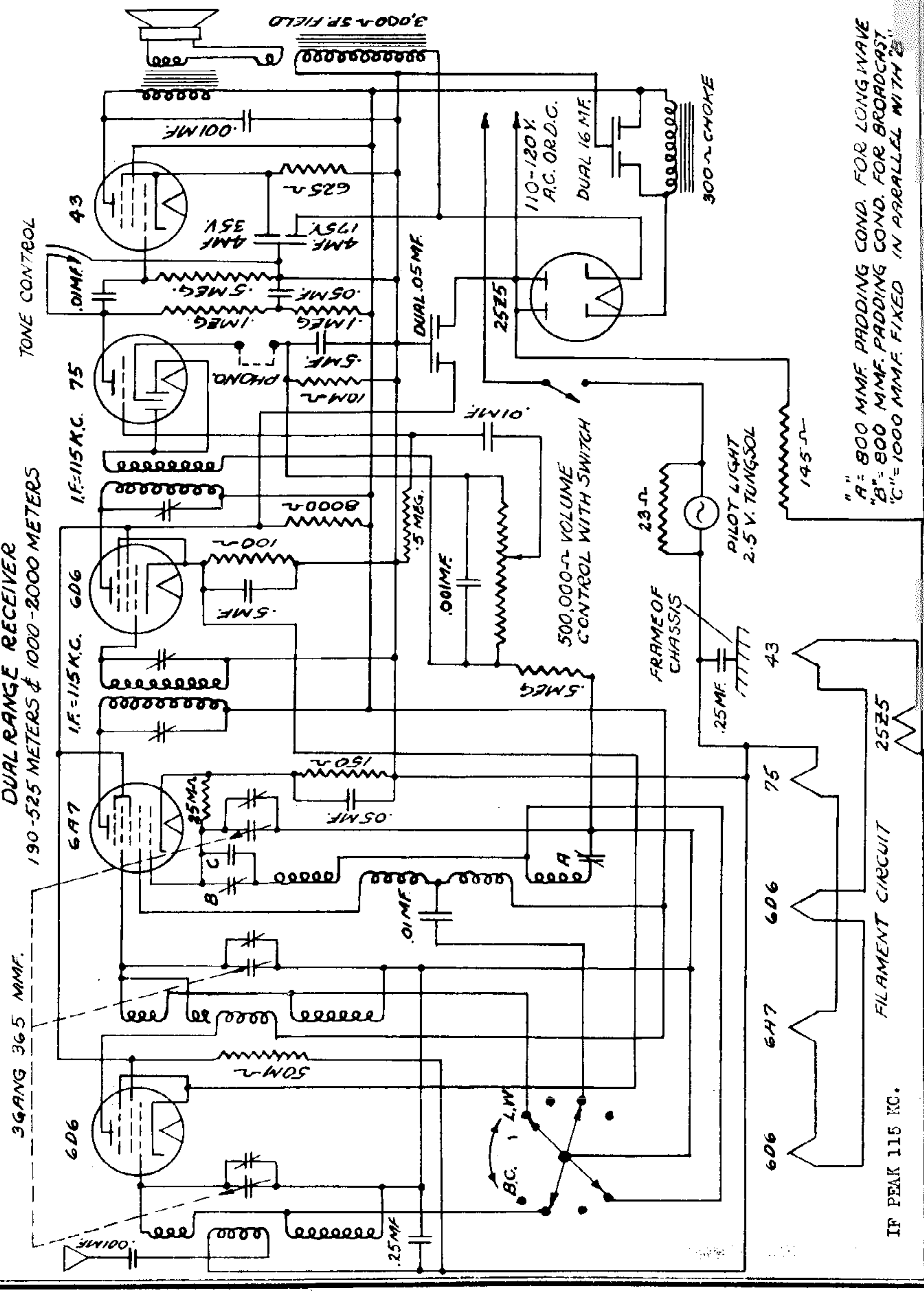
MODEL 63
Schematic

EDISON-BELL CO., INC.



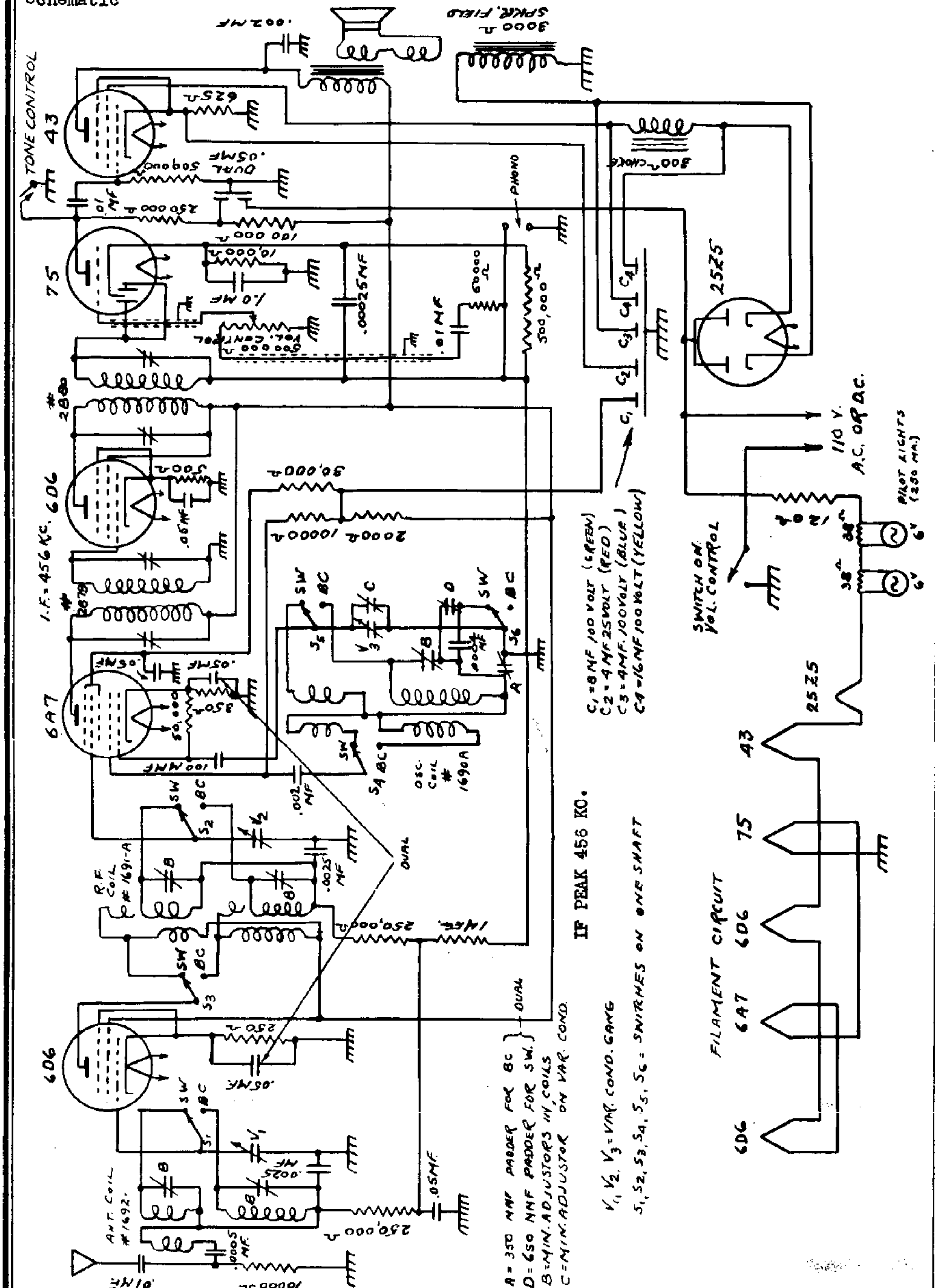
MODEL 63 LW
Schematic

EDISON-BELL CO., INC.



MODEL 66 AW
Schematic

EDISON-BELL CO., INC.



ELECTRICAL RESEARCH LABS.

SHORT WAVE TRIMMER: A short wave trimmer control is incorporated in the receiver and is used for a fine tuning adjustment when tuning for short wave reception from 1.5 megacycles to 24 megacycles. The band selector switch knob consists of two sections. The small front section knob is used for adjusting the short wave trimmer and the large rear section is the band selector switch knob. When tuning for short wave reception always rotate the tuning control slowly until a station is heard with maximum volume. Don't hurriedly skim over the dial or pass up any weak signals. After adjusting the tuning control so as to bring the station in at its loudest point adjust the short wave trimmer control by turning the trimmer knob first in the clockwise and then in the counter-clockwise direction to the position of greatest volume. Occasionally after tuning in this manner still better results may be obtained by readjusting the tuning control,and then further fine adjustment should be made with the short wave trimmer for maximum volume. It may be found that when adjusting the short wave trimmer that the signal will disappear, indicated by the elimination of signal, static and background noises. Rotating the short wave trimmer control slightly either clockwise or counter-clockwise will bring the signal in again. When operating the receiver on the broadcast band (1500 K.C. to 540 K.C.) the trimmer is inoperative.

Line Voltage : 115
Volume Control: Full on
Wave Band : Broadcast

TUBE	Fil.	Plate	Screen	Cathode Volts	Grid No.1	Grid No.2	Grid No. 3 & 5
2A7 Oscillator 1st Detector	2.45	220		2.2	3.5	200	90
58 First I. F. Amplifier	2.45	220	90	6			
58 Second I. F. Amplifier	2.45	220	90	3.5			
2A6 Second Detector	2.45	120##		1			
2A5 Output	2.45	210	220				
80 Rectifier	4.89						

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: Only when an antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 First Detector tube, leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second and third I. F. transformers should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser and padding condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Place the band selector switch for operation on the 1.5 to 4 megacycle band. Tune the receiver to exactly 1.7 megacycles onthe dial, set the short wave trimmer about half the distance between maximum clockwise and counter-clockwise rotation and adjust the oscillator frequency to exactly 1.7 megacycles.

Next, bring this 1.7 megacycle signal in to maximum output by adjusting the padding condenser accessible through the hole in the right hand side and closest to the rear of the chassis.

3. Leave the band selector switch for operation on the 1.5 to 4 megacycle band and tune the receiver to exactly 3.4 megacycles on the dial.

Next, set the test oscillator to exactly 3.4 megacycles and tune the signal in by adjusting the oscillator variable condenser trimmer mounted on top of the variable condenser. The middle section of the variable condenser is the oscillator section. Recheck the 1.7 megacycle adjustment after making the adjustment at 4 megacycles. For best results it is always advisable to check each adjustmet several times. NOTE: This completes the short wave adjustment.

4. Adjust the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Turn the receiver on end and bring this 1400 kilocycle signal in to maximum output by adjusting the trimmer screw on the small trimmer,which is located adjacent to the short wave switch underneath the chassis.

Next, adjust the antenna and preselector variable condenser section trimmers mounted on top of the variable condenser for maximum signal output. (These are the front and rear gang sections).

5. Leave the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver and oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser which is located on the right hand side and towards the front of the chassis for maximum output reading. This adjustment is quite critical and it is necessary to rock the condenser slightly to the right and left to obtain maximum sensitivity.

Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles.

MODEL 6300,6315
6317,6323
Parts List,Notes

ELECTRICAL RESEARCH LABS.

SIX TUBE SUPERHETERODYNE RECEIVER
24 Megacycles to 540 Kilocycles

Band No. 1 - from 10 Megacycles to 24 Megacycles
Band No. 2 - from 4 Megacycles to 10 Megacycles
Band No. 3 - from 1.5 Megacycles to 4 Megacycles
Band No. 4 - from 1500 Kilocycles to 540 Kilocycles

Selection of the desired frequency band is made with the band selector switch knob (large rear knob of double knob) which is located on the lower right front of the cabinet below the tuning control knob. When the band selector switch is placed in the maximum left hand position the receiver is operating on Band No. 1, 10 megacycles to 24 megacycles. Rotating the band selector knob in the clockwise direction the three other positions are in the order named, Band No. 2, 4 megacycles to 10 megacycles, Band No. 3, 1.5 to 4 megacycles and Band No. 4, 1500 kilocycles to 540 kilocycles. All four frequency bands are calibrated on a single dial. The calibrated section of the dial for the band that the receiver is adjusted to operate on is indicated by the dial indicator which is automatically adjusted by the band selector switch knob.

SHORT WAVE RECEPTION: The usual careless tuning that is sufficient to bring in the long wave length regular broadcast stations will fail in tuning in short wave reception. In tuning for short wave stations, great care must be taken so that the stations are not passed over, as the tuning is very sharp and quite critical. Many times a lack of results when tuning for short wave stations is due not only to the operator tuning the receiver incorrectly, but also to the operator trying to pick up foreign and North American short wave stations when the stations are not broadcasting. An important consideration is the time difference between the United States and European Countries;ie., at 10:00 P.M. Central Standard Time it is 4:00 A. M. in England and 5:00 A. M. in most other countries in Europe and, as a rule, no stations are broadcasting at that time. While short wave reception presents a varied and more thrilling entertainment than we have been accustomed to hearing on the broadcast band, the many peculiarities and difficulties of short wave reception have been minimized and the possibilities over-emphasized, which has resulted in the erroneous belief that reception of foreign short wave stations is an easy accomplishment. To the contrary, short wave stations are not tuned in with the ease we have been accustomed to in tuning in local broadcast stations, but requires patience, extreme care in tuning, an understanding of the proper procedure and favorable conditions. Reception of short wave stations, as a rule, is not comparable to the clear, static-free programs received from the local broadcast stations, but is more erratic and is generally accompanied by fading and static although occasionally reception may be as good as local programs.

Reception of short wave stations varies from season to season and between daylight and after sunset.

Band No. 4 (regular broadcast band) from 1500 to 540 kilocycles varies also in that the range of the station is materially increased after dark and fading of distant stations becomes more pronounced. In some locations stations that are received during daylight occasionally fade so badly after sundown that it is impossible to receive good reception after dark. Other stations which cannot be heard during daylight provide good reception after darkness.

Band No. 3, 1.5 to 4.0 megacycles permits reception of police calls and some amateur phone stations. The range of the stations broadcast within this band is increased after sundown.

Band No. 2 from 10.0 to 4.0 megacycles includes the 49 meter band, the 31 meter band and some amateur stations. Stations broadcast within this band include many of the foreign short wave stations and North American Stations. Reception of stations transmitting on the 49 meter band is most reliable during the Summer months when located approximately 300 miles or more during daylight which increases to 1,500 miles or more when a large portion of the signal path lies in darkness. The Winter range is approximately 600 miles during daylight and 2,000 miles or more after sundown. Stations operating on the 31 meter band are most reliable when the receiver is located about 800 miles away during daylight in the Summer months increasing to 2,500 miles after sundown.

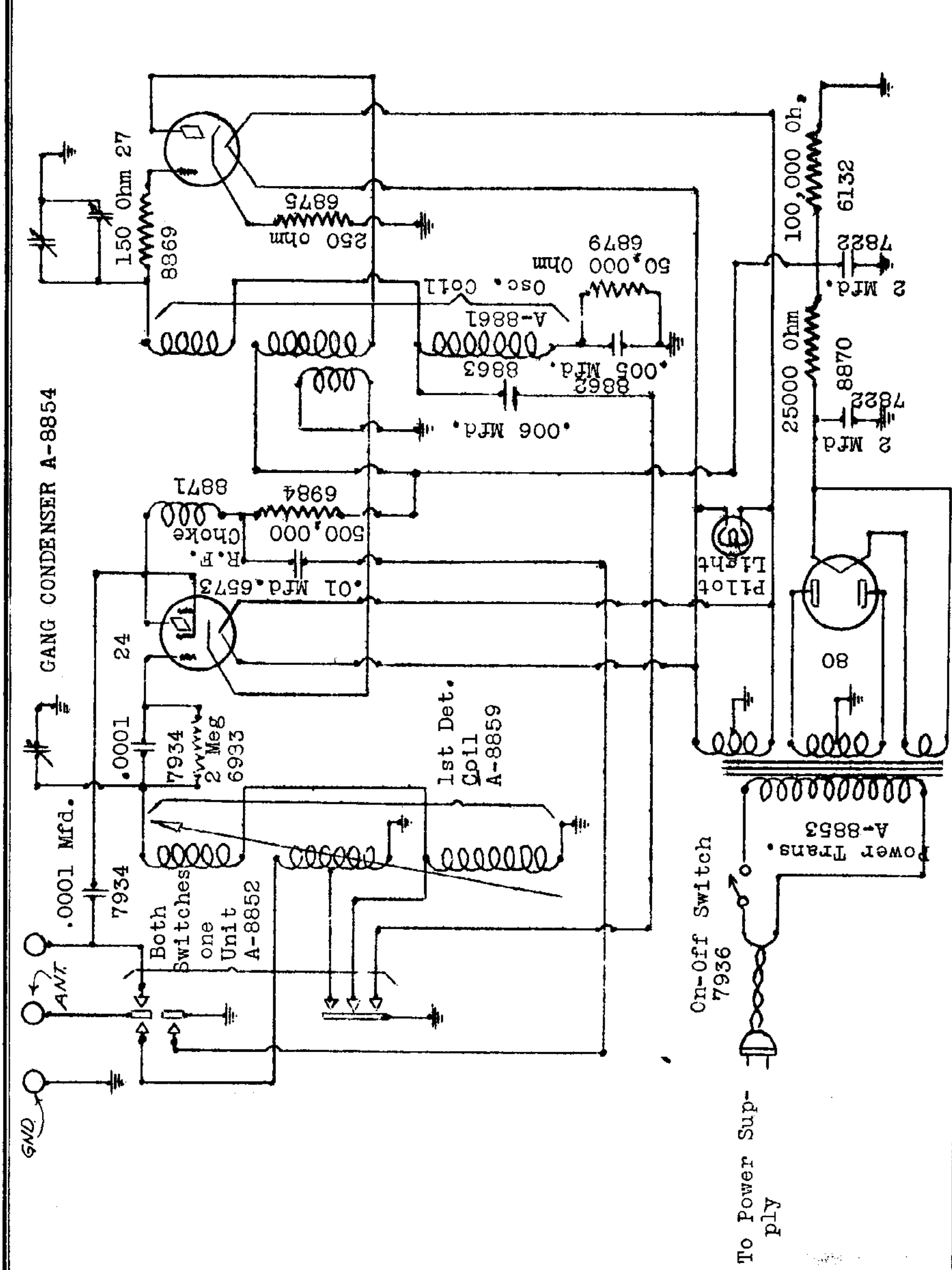
Band No. 1, from 24 megacycles to 10.0 megacycles includes the 25, 19 and 16 meter bands. Reception of stations in the 25 meter band is best during daylight when the receiver and transmitter are located 1,000 miles or less than 2,000 miles apart. After sundown reception may be expected only from stations located a distance of 2,000 miles or more away from the receiver. Stations operating on the 19 meter band provide satisfactory reception generally during daylight hours only. After nightfall or when any appreciable portion of the transmission path is in darkness signals are rarely heard. Stations operating below 19 meters are generally useful only when transmitting during daylight and over a distance of 2,000 miles or more. Ordinarily they cannot be received after sunset.

1039	Broadcast, Antenna, Preselector & Oscillator Coil
1083	Short Wave Oscillator Coil
1092	Short Wave Antenna & First Detector Coil
1038	First I. F. Transformer
9835	Second I. F. Transformer
9662	Third I. F. Transformer
9800	R. F. Choke
6786	10,000 Ohm 1/3 Watt Resistor
7998	1 Meg Ohm 1/3 Watt Resistor
8906	250,000 Ohm 1/3 Watt Resistor
6880	6,000 Ohm 1/3 Watt Resistor
9287	Short Wave Trimmer Disc. Assembly
9682	Short Wave Trimmer Worm Tuning Rod
9673	Padding Condenser
9674	Padding Condenser
9799	Trimmer Condenser
9659	Electrolytic Condenser Dual 8 Mfd.
8875	Electrolytic Condenser 5 Mfd.
1110	Electrolytic Condenser 4 Mfd.
9660	Power Transformer
9663	Dynamic Speaker 6"
9723	Dynamic Speaker 8"
9666	Volume Control
9174	Tone Control

9668	Tuning Meter
1068	Wire Wound Resistor Strip
9671	Pilot Lamp Socket
6248	2.5 Volt Pilot Lamp Bulb
8980	Tube Shield
9082	Tube Shield Cap
9459	.0005 Mfd. Moulded Condenser
9698	1 Mfd. 100 Volt Condenser
9203	.1 Mfd. 400 Volt Condenser
9386	.1 Mfd. 200 Volt Condenser
8961	.05 Mfd. 400 Volt Condenser
1077	.03 Mfd. & .004 Mfd. 400 Volt Condenser
1170	.0005 Mfd. & .05 Mfd. 400 Volt Condenser
9691	.001 Mfd. & .05 Mfd. 400 Volt Condenser
6765	.2 Mfd. 400 Volt Condenser
9032	.2 Mfd. 200 Volt Condenser
[illegible]84	500,000 Ohm 1/3 Watt Resistor
8000	100,000 Ohm 1/3 Watt Resistor
6879	50,000 Ohm 1/3 Watt Resistor
8907	25,000 Ohm 1/3 Watt Resistor
6875	250 Ohm 1/3 Watt Resistor
7997	2,000 Ohm 1/3 Watt Resistor

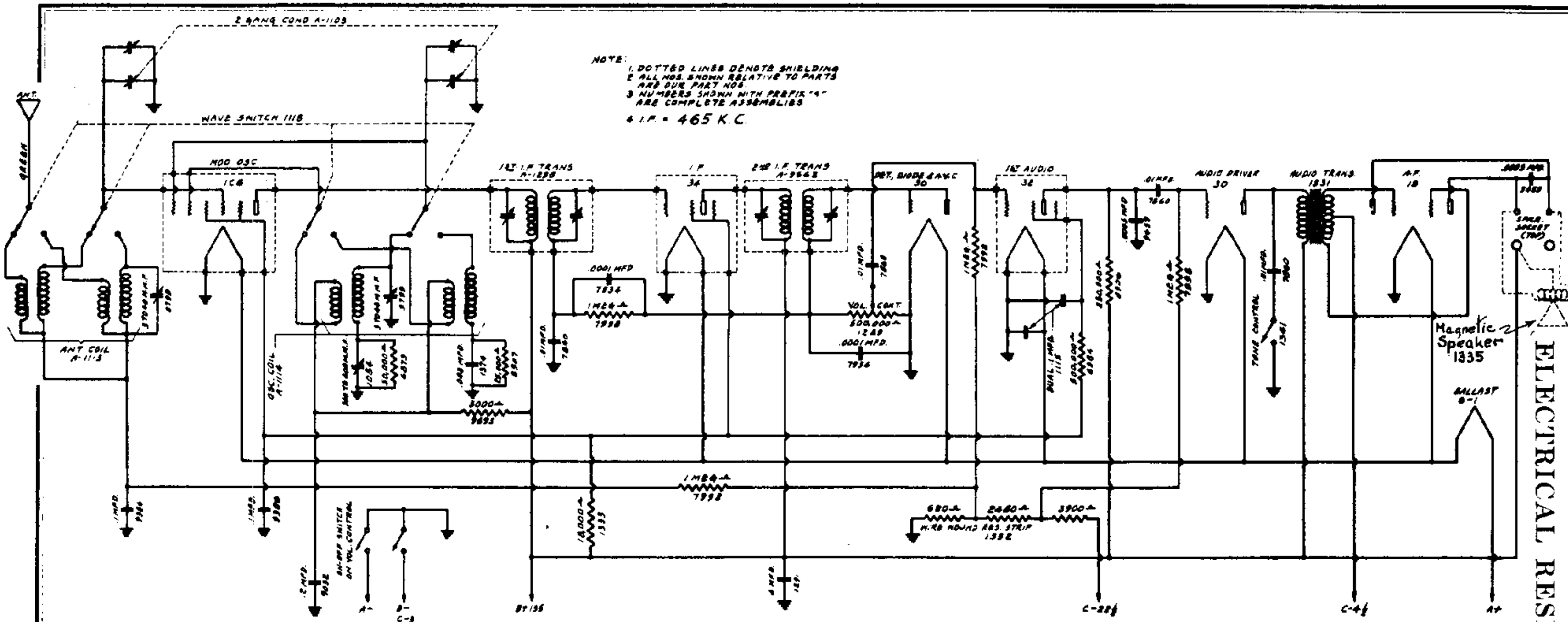
MODEL SW Converter
Schematic

ELECTRICAL RESEARCH LABS.



ELECTRICAL RESEARCH LABS.

MODEL 7700, 7732, 7741
Schematic, Voltage



WIRING DIAGRAM

VOLTAGE TABLE

"A" Battery - 3 Volt Dry Cell
"B" Battery - 3 45 Volt "B" Batteries
"C" Battery - 1 22½ Volt Battery

TUBE		FIL.	PLATE	SCREEN	GRID NO.2	GRID NO 3 & 5
1C6	Oscillator & 1st Detector	2.1	135		115	67½
30	Second Detector	2.1				
34	I. F.	2.1	135	67½		
32	1st Audio	2.1	37.5##	20##		
30	Driver	2.1	135			
19	Output	2.1	135 each plate			

Comparative voltage only
Read all voltages from socket to chassis

Total "B" Drain - .023 Amperes
Total "A" Drain - .620 Amperes

When making tube voltage checks use batteries that deliver full voltage with the receiver turned on.

MODEL 7700,7732,7741
Alignment,Parts List ELECTRICAL RESEARCH LABS.

PART NUMBER		LIST PRICE
1113	Antenna Coil	$1.63
1114	Oscillator Coil	1.63
1298	1st I. F Transformer	2,05
9662	2nd I. F. Transformer	2.05
1331	Audio Transformer	1.40
1291	4 Mfd. Wet Electrolytic Condenser	.85
1115	Dual .1 Mfd. 200 Volt Condenser	.35
7860	.01 Mfd. 400 Volt Condenser	.17
9032	.2 Mfd. 200 Volt Condenser	.23
9459	.0005 Mfd. Mica Mould Condenser	.21
7934	.0001 Mfd. Mica Mould Condenser	.21
1374	.003 Mfd. Mica Mould Condenser	.21
1332	Wire Wound Resistor Strip	.35
7998	1 Meg Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19

PART NUMBER		LIST PRICE
1333	18,000 ohm 1/2 Watt Resistor	$ .19
9693	5,000 ohm 1/3 watt Resistor	.19
8907	25,000 ohm 1/3 Watt Resistor	.19
1292	6 Conductor Battery cable	.68
1289	Volume Control with D.P.S.T. Switch	1.24
1341	Tone Control Switch	.40
1370	One Color Tuning Dial	.30
1338	Two Color Tuning Dial	.35
1103	Two Gang Condenser	3.93
1361	Tube Shield	.15
9988	Tube Shield	.11
1053	Padding Condenser	.50
1054	Padding Condenser	.55
9799	Trimmer Condenser	.15
6-1	Voltage Regulator Tube	3.00
1179	Knob, Large	.15
1180	Knob, Small with Dot	.17
9758	Knob, Small	.14

Prices are subject to change without notice.

PART NO.7700

SERVICE NOTES
for the
BATTERY OPERATED
SEVEN TUBE SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE: For properly aligning either the intermediate transformer or the gang condenser it is necessary that an accurately calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:
1. Connect the high side of the oscillator output to the control grid of the 106 tube leaving the grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the first intermediate ansformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two type intermediate transformer trimmers have been used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning to follow the procedure carefully, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the receiver antenna lead and the ground to the chassis.

2. Place the band selector switch for operation on the short wave band, tune the receiver to exactly 15 megacycles on the dial and set the test oscillator frequency to exactly 15 megacycles. THEN TUNE IN THE 15 MEGACYCLE SIGNAL BY ADJUSTING THE TRIMMER MOUNTED ON TOP OF THE OSCILLATOR SECTION OF THE GANG CONDENSER TO MAXIMUM OUTPUT.

Looking at the front of the receiver the oscillator section is the rear section of the gang condenser.

3. Set the band selector switch for operation on the broadcast band, adjust the test oscillator frequency to 1400 kilocycles and set the receiver dial to exactly 1400 kilocycles. NEXT, BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER LOCATED UNDERNEATH AND NEAR THE CENTER FRONT OF THE CHASSIS.

4. After making this adjustment tune the dial to 1720 kilocycles and set theoscillator frequency to 1720 kilocycles. If the 1720 kilocycle signal cannot be received reduce the 1400 kilocycle trimmer capacity until the 1720 kilocycle signal is brought in.

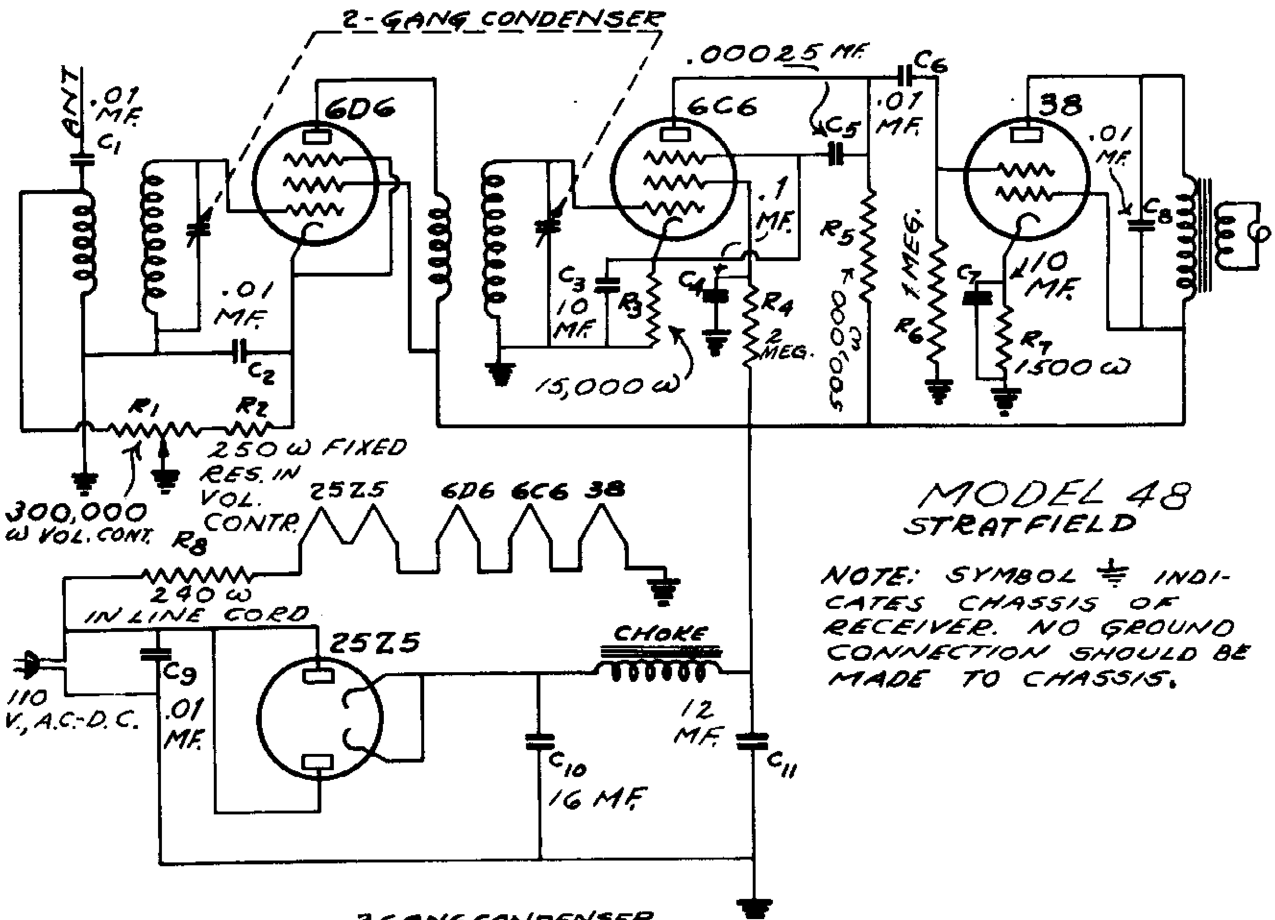
5. Next, set the receiver dial and test oscillator to exactly 1400 kilocycles, and adjust the trimmer located on the front section of the gang condenser for maximum sensitivity.

6. Leave the band selector switch for operation on the broadcast band, tune the receiver and set the oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser, which is located on and accessible through the small hole in the front of the chassis, for maximum sensitivity. As this adjustment is quite critical it is necessary to rock the condenser slightly to the right and left to find the point of greatest sensitivity.

7. Place the band selector switch for operation on the short wave band, adjust the test oscillator frequency to exactly 15 megacycles and set the receiver dial to 15 megacycles. Turn the receiver on its back with the dial up and adjust the trimmer, which is mounted on the top of the coil underneath and near the right hand side of the chassis, for maximum output. Be sure to rock the condenser slightly to the right and left when making this adjustment.

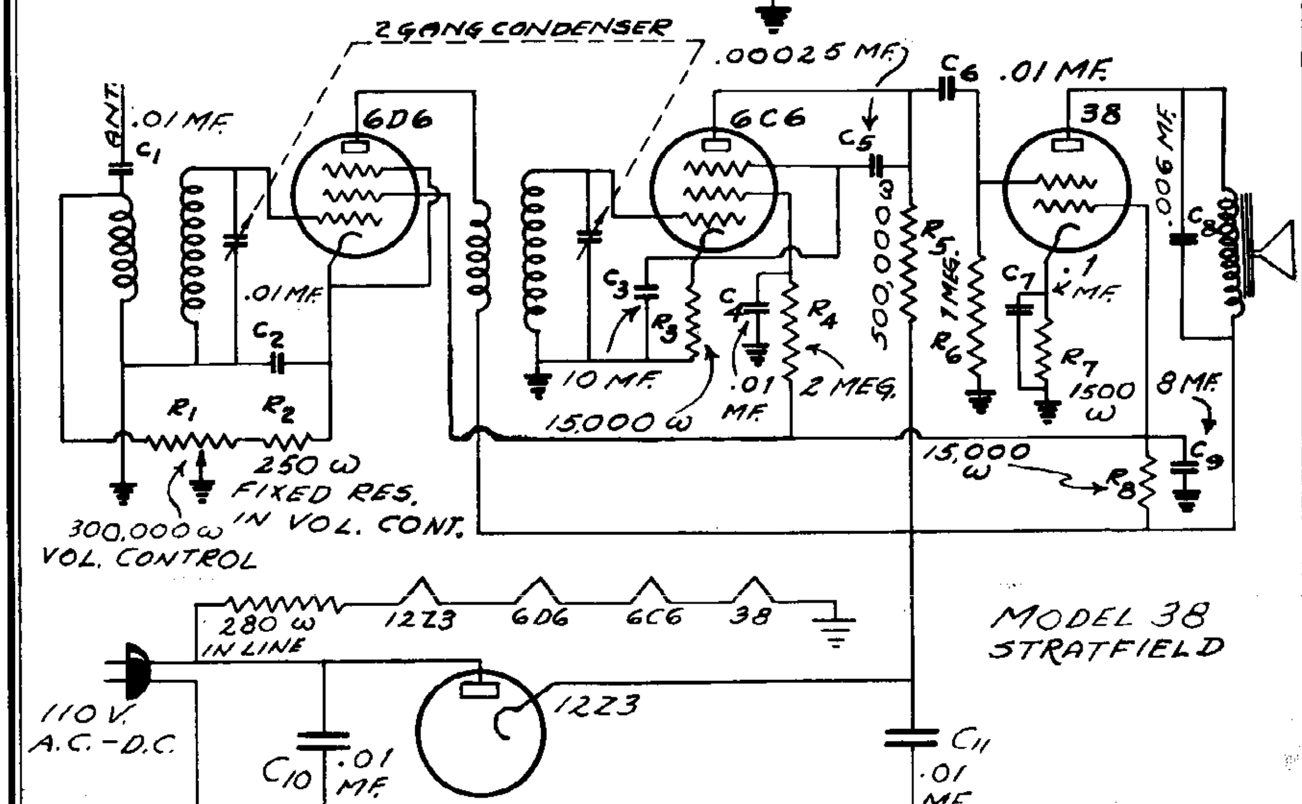
This completes the alignment procedure. It is recommended that all of the adjustments be gone over again Generally it will be found that improved results can be obtained if this is done.

ELECTRIC SPEC. EXPORT CORP.



MODEL 48
STRATFIELD

NOTE: SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

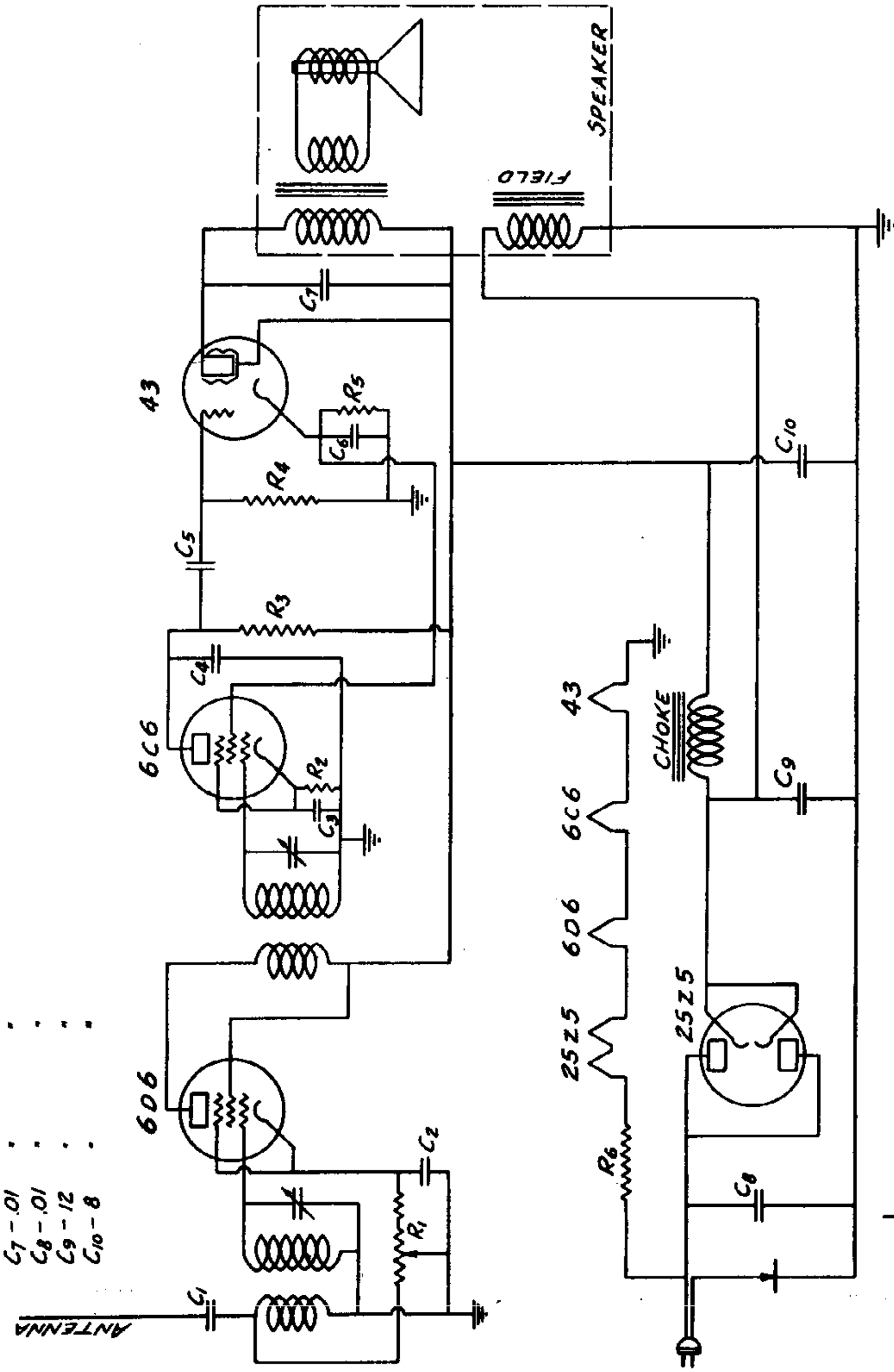


MODEL 38
STRATFIELD

MODEL 45
Schematic

ELECTRIC SPEC. EXPORT CORP.

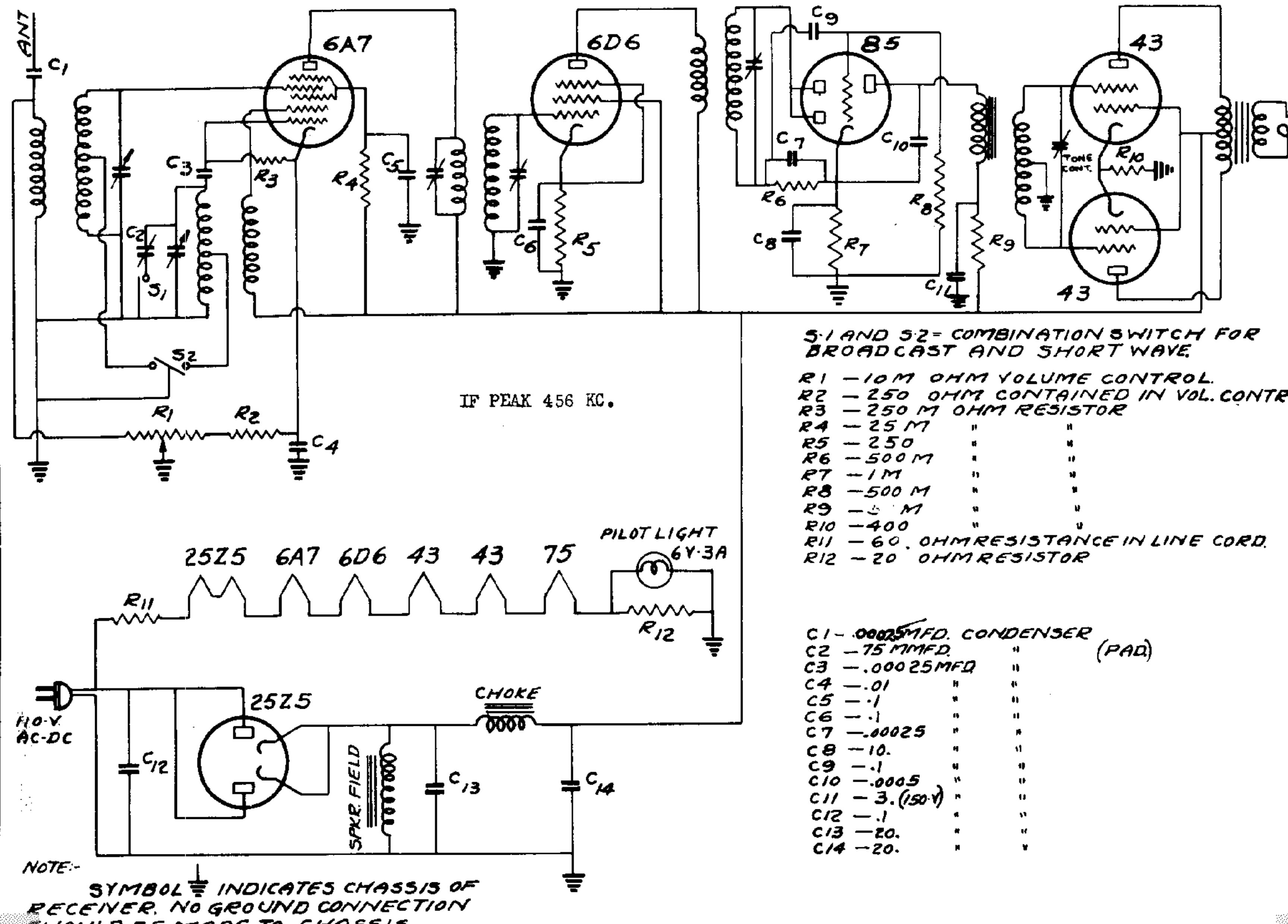
R1 - 300 M OHM VOLUME CONTROL WITH 250 OHM FIXED BIAS RESISTOR
R2 - 15 M OHM RESISTOR
R3 - 500 M " "
R4 - 500 M " "
R5 - 600 " "
R6 - 150 " "



C1 - .01 MFD. CONDENSER
C2 - .1 " "
C3 - 10 " "
C4 - .00015 MFD. "
C5 - .01 MFD. "
C6 - 10 " "
C7 - .01 " "
C8 - .01 " "
C9 - 12 " "
C10 - 8 " "

NOTE:- SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

ELECTRIC SPEC. EXPORT CORP.



S-1 AND S-2 = COMBINATION SWITCH FOR BROADCAST AND SHORT WAVE.

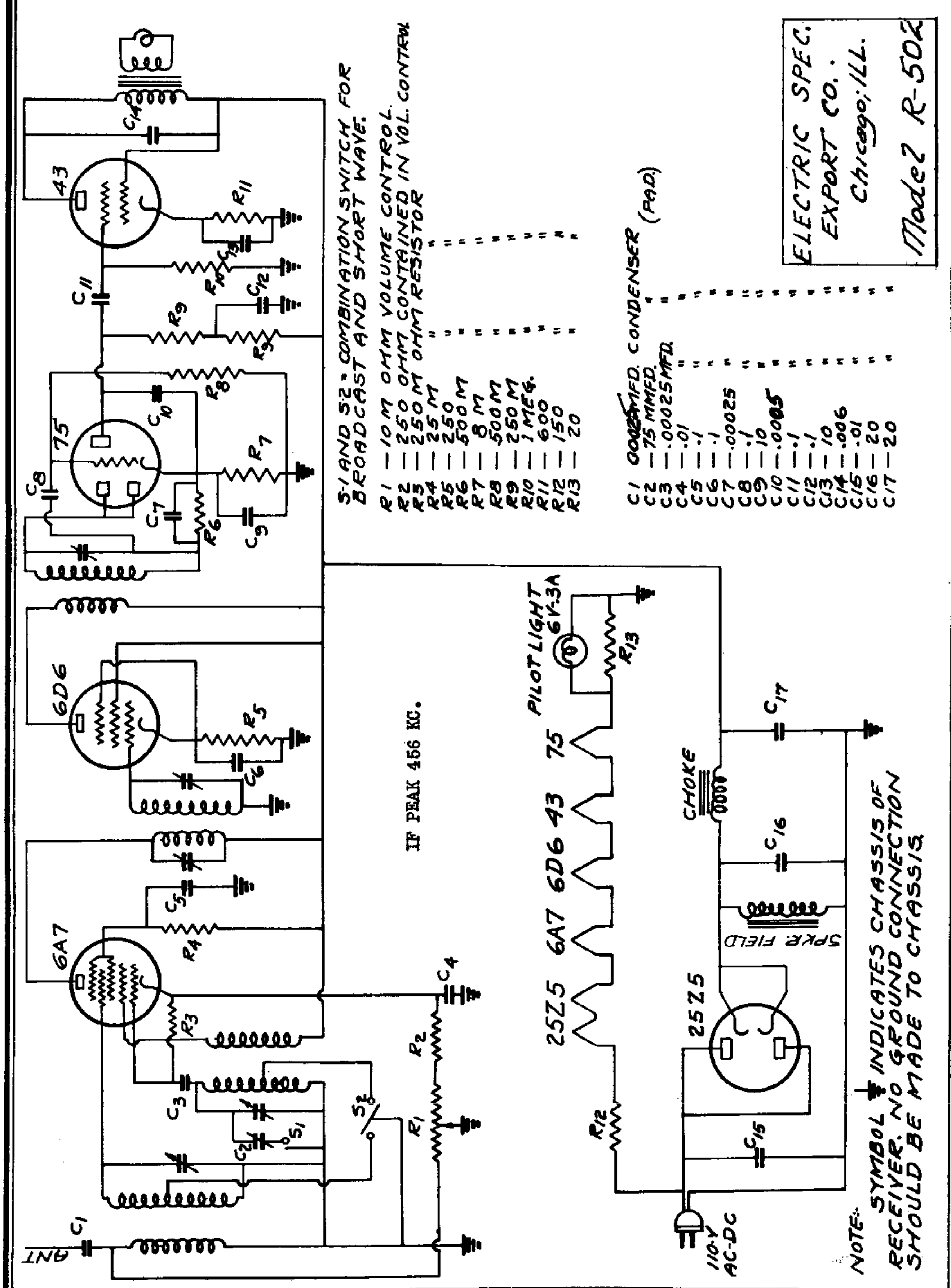
R1 — 10 M OHM VOLUME CONTROL.
R2 — 250 OHM CONTAINED IN VOL. CONTROL.
R3 — 250 M OHM RESISTOR
R4 — 25 M " "
R5 — 250 " "
R6 — 500 M " "
R7 — 1 M " "
R8 — 500 M " "
R9 — [illegible] M " "
R10 — 400 " "
R11 — 60. OHM RESISTANCE IN LINE CORD.
R12 — 20 OHM RESISTOR

C1 — ~~.00025~~ MFD. CONDENSER
C2 — 75 MMFD. " (PAD)
C3 — .00025 MFD. "
C4 — .01 " "
C5 — .1 " "
C6 — .1 " "
C7 — .00025 " "
C8 — 10. " "
C9 — .1 " "
C10 — .0005 " "
C11 — 3. (150 V) " "
C12 — .1 " "
C13 — 20. " "
C14 — 20. " "

NOTE:- SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

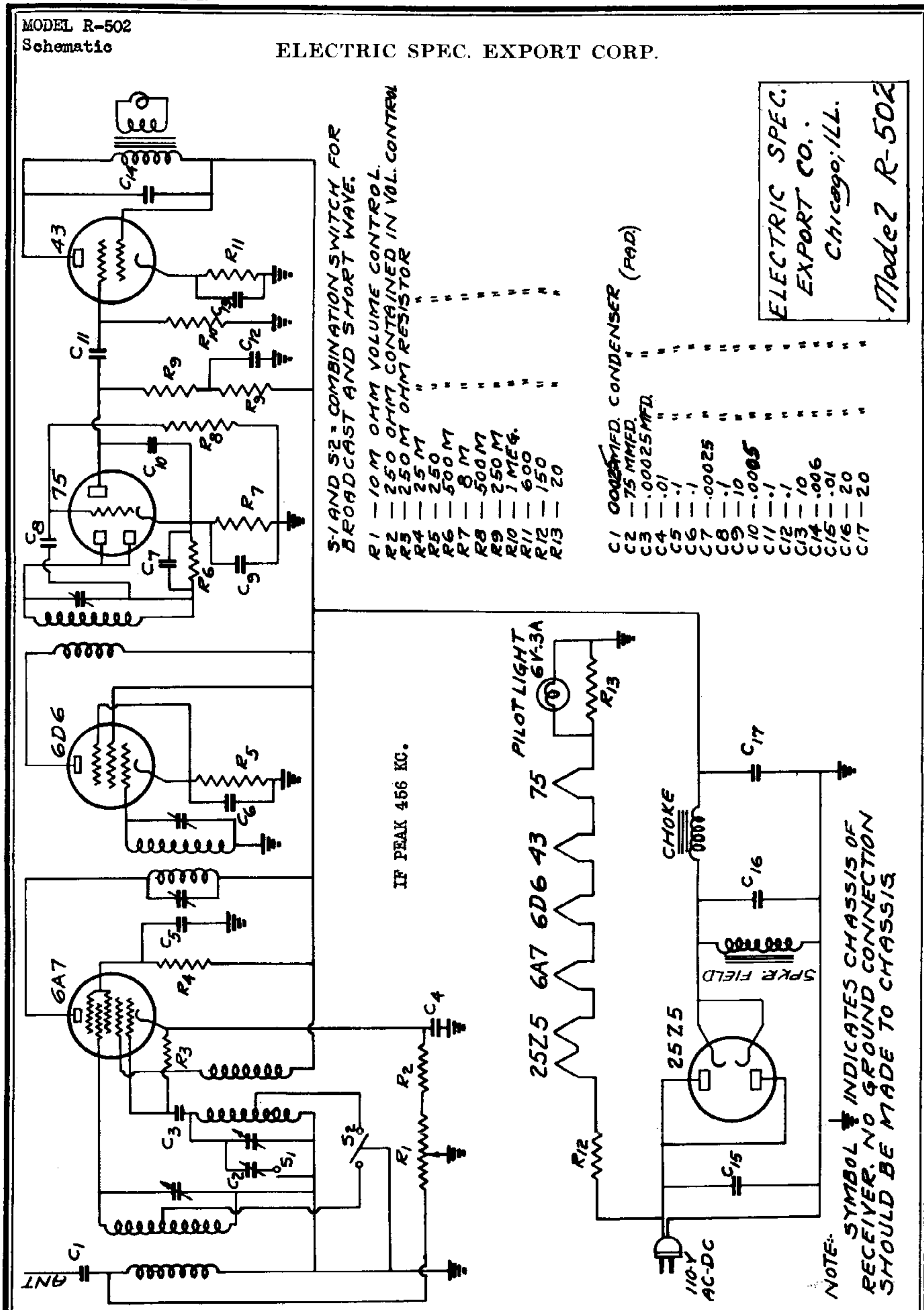
MODEL R-502
Schematic

ELECTRIC SPEC. EXPORT CORP.



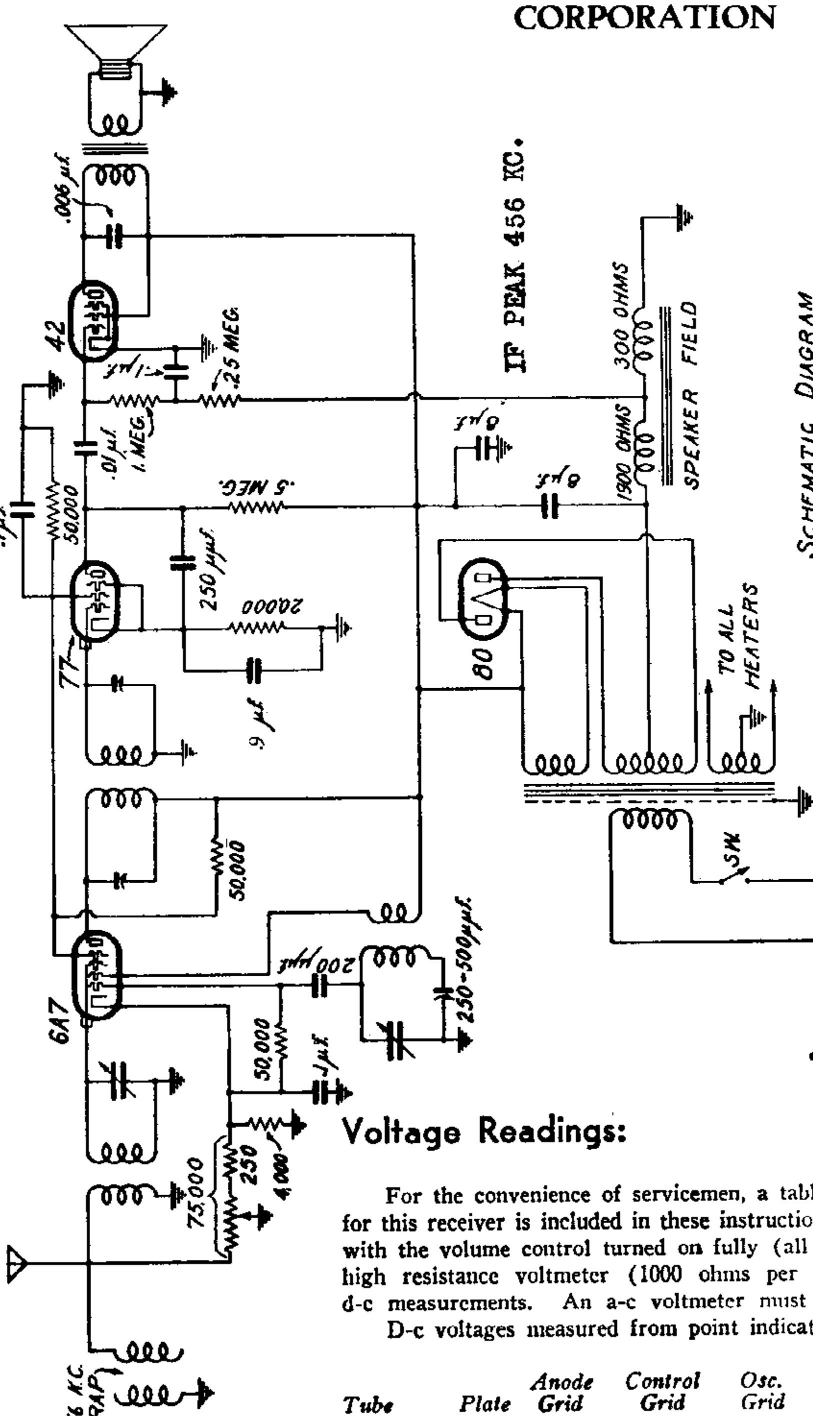
MODEL R-502
Schematic

ELECTRIC SPEC. EXPORT CORP.



MODEL 23 (4-B)
Schematic, Voltage
Parts List

EMERSON RADIO AND PHONOGRAPH CORPORATION



Part No.	Description	List Price (Effective as of Sept. 1st, 1934)
BBT-111	Antenna Coil	$ .75 each
BBT-112	Oscillator Coil	.50 "
BBT-113	Intermediate Transformer	1.50 "
BBT-114	Power Transformer	2.70 "
BBR-112	Volume Control with Switch	.90 "
BBC-120	Two Gang Variable Condenser	2.20 "
UC-93	Electrolytic Filter Condenser—Dual 8 mfd.	1.80 "
BBC-121	Padding Condenser	.30 "
BBS-74	Dynamic Speaker	5.00 "
	Any Resistor (give location or specify value—refer to wiring diagram)	.16
	Any Mica Condenser (give location)	.16
BBC-131	.9 mfd. Roll Type Condenser	.35
	Any Other Roll Type Condenser (give location)	.16

Voltage Readings:

For the convenience of servicemen, a table giving the voltage readings for this receiver is included in these instructions. Readings should be taken with the volume control turned on fully (all the way to the right) and a high resistance voltmeter (1000 ohms per volt) must be used for the d-c measurements. An a-c voltmeter must be used on the a-c circuits. D-c voltages measured from point indicated to ground.

Tube	Plate	Anode Grid	Control Grid	Osc. Grid	Screen Grid.	Suppressors	Cathode
6A7	214	214	—	—	62	—	2
77	70	—	—	—	62	4	4
42	194	—	*—13	—	215	—	—
80	—	—	—	—	—	—	—

*Measured from ground to tap on speaker field winding.

Voltage across field—100 volts d-c.

Voltage across 80 filament—5 volts a-c.

Voltage across all other filaments or heaters—6.2 volts a-c.

The above voltages, with slight variations, should be obtained with an a-c input line voltage of 117.5.

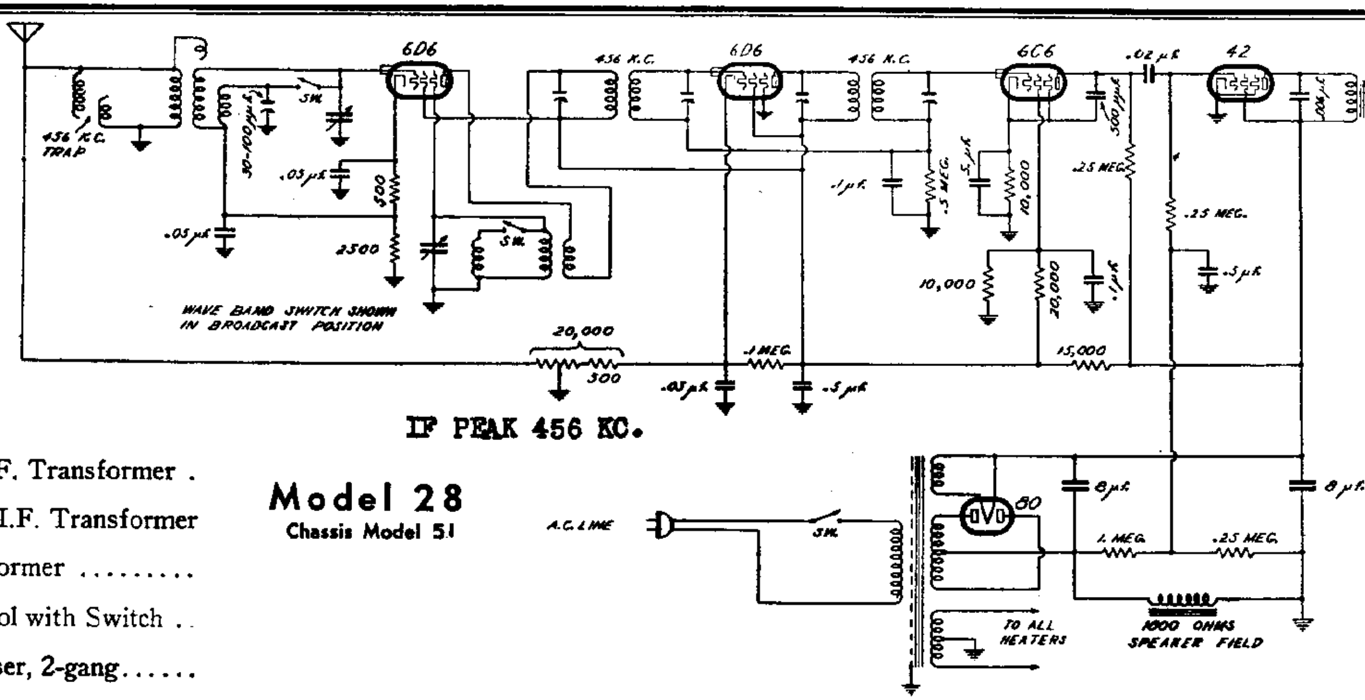
Model 23
Chassis Model 48

MODEL 28 (5-J)
Schematic, Voltage
Parts List

EMERSON RADIO AND PHONOGRAPH CORPORATION

Broadcast
540—1500 Kilocycles
550— 200 Meters

Short Wave
1500—3000 Kilocycles
200— 100 Meters



IF PEAK 456 KC.

Model 28
Chassis Model 51

Part No.	Description
ST-62	Antenna Coil
ST-63	Oscillator Coil
DDT-120	First Stage I.F. Transformer .
DDT-121	Second Stage I.F. Transformer
DDT-122	Power Transformer ....
DDR-121	Volume Control with Switch ..
UC-90	Variable Condenser, 2-gang......
UC-93	8x8 Mfd. Electrolytic Condenser .
IC-43	5 Mfd. Electrolytic Condenser ...
EC-19	.5 Mfd. Roll-type Paper Condenser.
	Any other Condenser, (specify capacity or location in circuit)
UR-90	15,000-ohm 2-watt Resistor.......... Any other Resistor, (give resistance or location in circuit)
	Any socket (specify tube no.)........
UD-10	Dial Assembly ....
KL-6	Pilot Lamp......................
DDS-78	Dynamic Speaker ....
US-56	Short-wave to Broadcast change-over Switch
SC-81	Adjustable Trimmer Condenser ....

Voltage Readings:

For the convenience of servicemen, the following voltage readings will serve as a guide in trouble shooting.

Readings are to be taken with all the tubes in their places, volume control turned on full and antenna wire grounded to chassis.

The D.C. Voltmeter used should be 1000 ohms per volt, or over. Line volts 117 A.C.

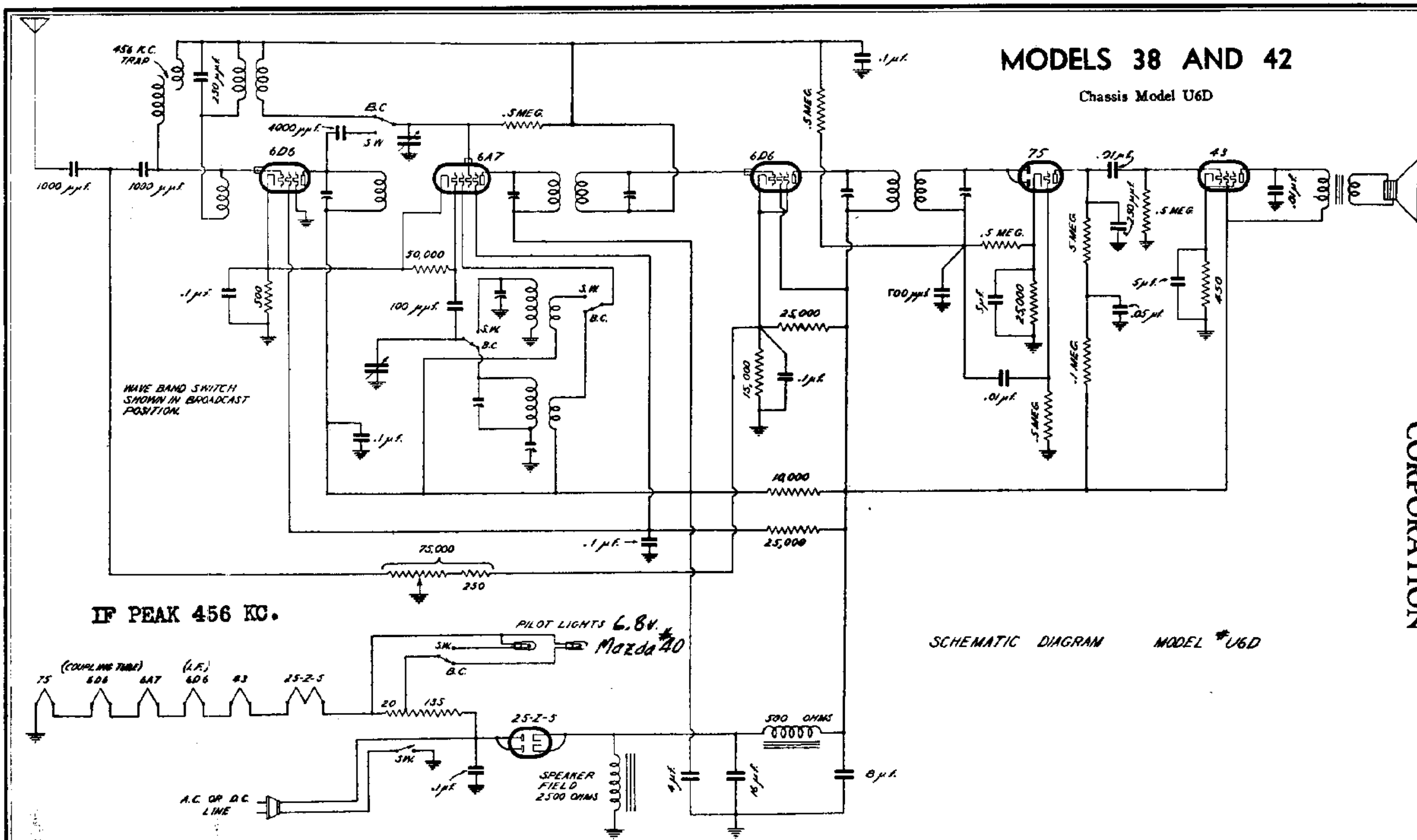
	Fil.	Ground to Plate	Ground to Screen	Ground to Cathode	Ground to Suppressor
6D6 Osc. 1st Det.	6.3 A.C.	80 D.C.	80 D.C.	12 D.C.	....
6D6 I.F. Amplifier	6.3 A.C.	80 D.C.	80 D.C.	3 D.C.	....
6C6 2nd Det.....	6.3 A.C.	150 D.C.	30 D.C.	1.7 D.C.	1.7 D.C.
42 Output	6.3 A.C.	245 D.C.	255 D.C.	....	....
80 Rectifier	5.0				

Voltage across speaker field, 90.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS 38 AND 42

Chassis Model U6D



Voltages listed below are from the point indicated to ground.

	Plate	Screen	Suppressor	Cathode
6D6 R.f.	70	50	0	3
6A7 Oscillator-Modulator	70	50	—	3
6D6 I.f.	100	100	3.5	3.5
75 A.f.	60	—	—	1
43 Output	100	100	—	12.5

Voltage across field 125 volts.

Line voltage—117.5 volts a.c.

MODEL 38,42 (U-6-D)
Parts List,Alignment

EMERSON RADIO AND PHONOGRAPH CORPORATION

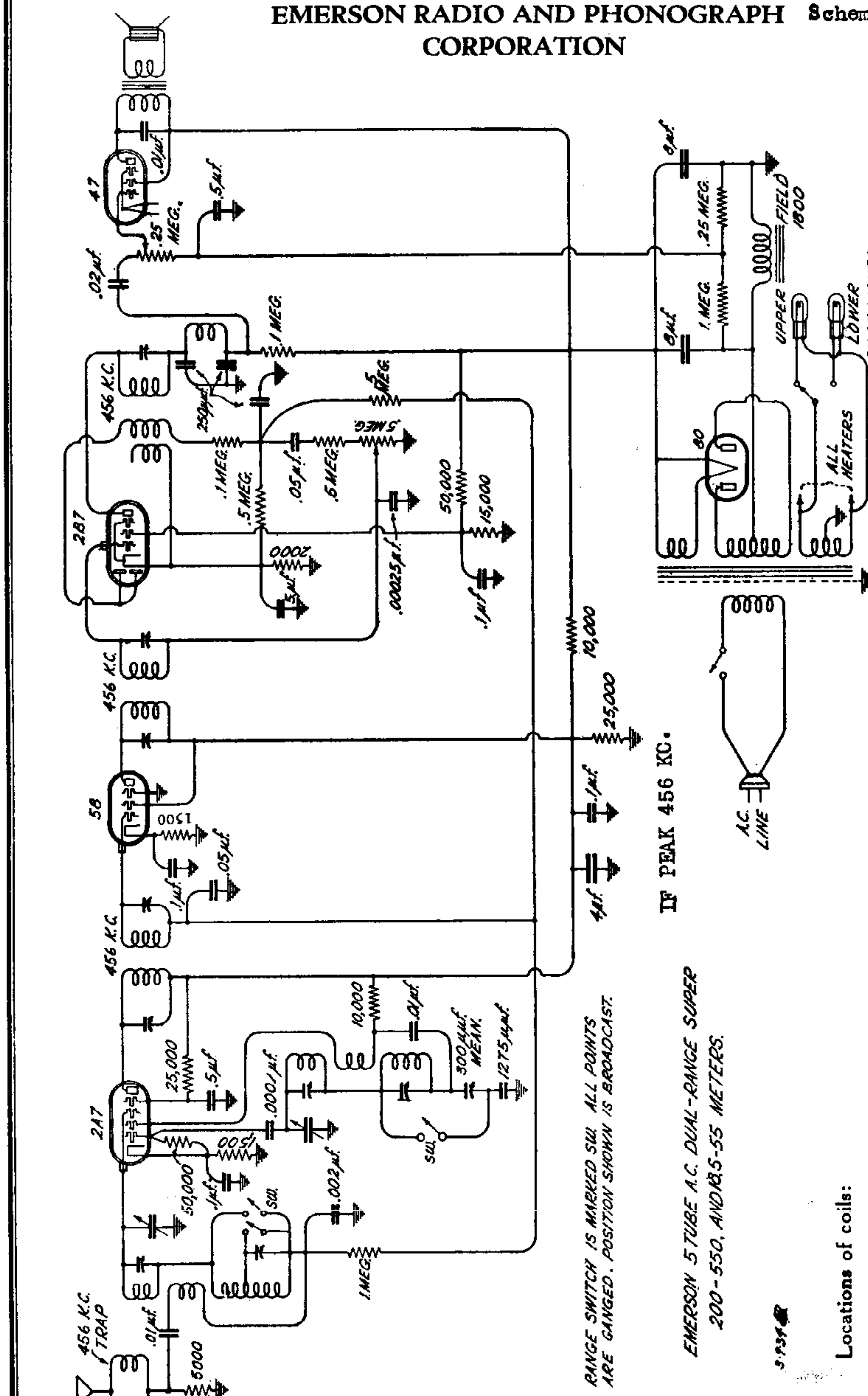
Alignment procedure:

1. Short circuit oscillator stator of the variable condenser to ground.
2. Introduce the 456 kc signal on the grid of the 6D6 i-f tube.
3. Adjust the single tuned i-f transformer for maximum response on the output meter.
4. Remove the 456 kc signal from the 6D6 grid and put it on the 6A7 grid.
5. Adjust both trimmers on first i-f transformer for maximum response.
6. Remove 456 kc signal from 6A7 grid.
7. Remove the short circuit from the stator of the oscillator section of the gang condenser.
8. Set the range changing switch to the broadcast band.
9. Make sure that the needle on the dial reaches its extreme position at both ends of the broadcast band when the gang condenser is at maximum and minimum. If the needle does not do this, loosen the set-screw on the hub of the dial and rotate the gang condenser to maximum capacity. Then rotate the needle of the dial (by means of the selector knob) to its extreme position at the 550 kc end of the broadcast band. Tighten the set-screw securely and proceed to realign the set.
10. Set the needle on the dial to 1600 kc.
11. Introduce a 1600 kc signal into the antenna.
12. Adjust oscillator trimmer (the one farthest from the chassis on the oscillator coil) for maximum response.
13. Introduce a 600 kc signal into the antenna. Rock the gang condenser back and forth around the 600 kc dial reading and at the same time adjust the series padding condenser for maximum output. Leave the series padder set to the point of maximum sensitivity. The series padder is on the front of the chassis.
14. Check alignment on 1600 kc.
15. Now throw the range switch to short-wave position and introduce a 15 megacycle (mc) signal into the antenna.
16. Set the dial needle to 15 mc.
17. Adjust oscillator trimmer for maximum output. The short-wave oscillator trimmer is the one nearest the oscillator coil.
18. Connect the antenna to the set and adjust the interstage coil for maximum noise at 15 mc. The interstage coil is the one with only one trimmer on it. Before starting the adjustment turn the trimmer out so as to have minimum capacity and gradually increase it. A peak will be noticed and then as the capacity is increased the noise diminishes and disappears. When the capacity is increased further, the noise may increase again. The peak with the trimmer having less capacity than it has when the noise disappears is the proper peak.

Part No.	*Description*		
CCT-115	Composite broadcast short-wave antenna coil	CCC-124	Two-gang variable condenser
CCT-116	Short-wave r-f interstage tuning choke	BBC-121	250-500 mmf padding condenser
CCT-117	Composite broadcast—short wave oscillator coil	CCR-116	Special ballast resistor
CCT-118	Double-tuned 456 kc first i-f transformer	CCR-118	450 ohm 1 watt wire-wound resistor
CCT-119	Double-tuned 456 kc second i-f transformer	CCD-15	Dial assembly
KT-40	Iron-core filter choke	KL-6	Pilot lamp, Mazda No. 40
CCR-117	Volume control with switch	CCS-76	Range—change switch
CCC-125	4-8-16 mf, 150 volt d.c., electrolytic filter cond	CCS-75	5" dynamic speaker
HC-32	Dual 5 mf electrolytic condenser, 25 volts d-c		
CCC-126	.004 mfd. mica condenser		

MODEL 39,59 (D-S5)
Schematic

EMERSON RADIO AND PHONOGRAPH CORPORATION



Locations of coils:

1. Antenna coil—without shield underneath chassis.
2. Oscillator coil—in round can fastened to front of chassis, underneath.
3. Last i.f. coil—fastened to back of chassis, in small can, underneath.
4. First i.f. coil—on top of chassis with grid lead feeding into 58 tube.
5. Second i.f. coil—on top of chassis with grid lead feeding into 2B7.

MODEL 39,59 (D-S5)
Voltage
Alignment

EMERSON RADIO AND PHONOGRAPH CORPORATION

Line voltage 115 volts, A.C.—60 Cycles

	Plate to ground	*Screen to ground*	*Cathode to ground*
2A7 Oscillator	70	50	6
2A7 Modulator	90	...	...
58	90	90	5.5
47	227	235	...
2B7	115	53	3

ADJUSTMENTS

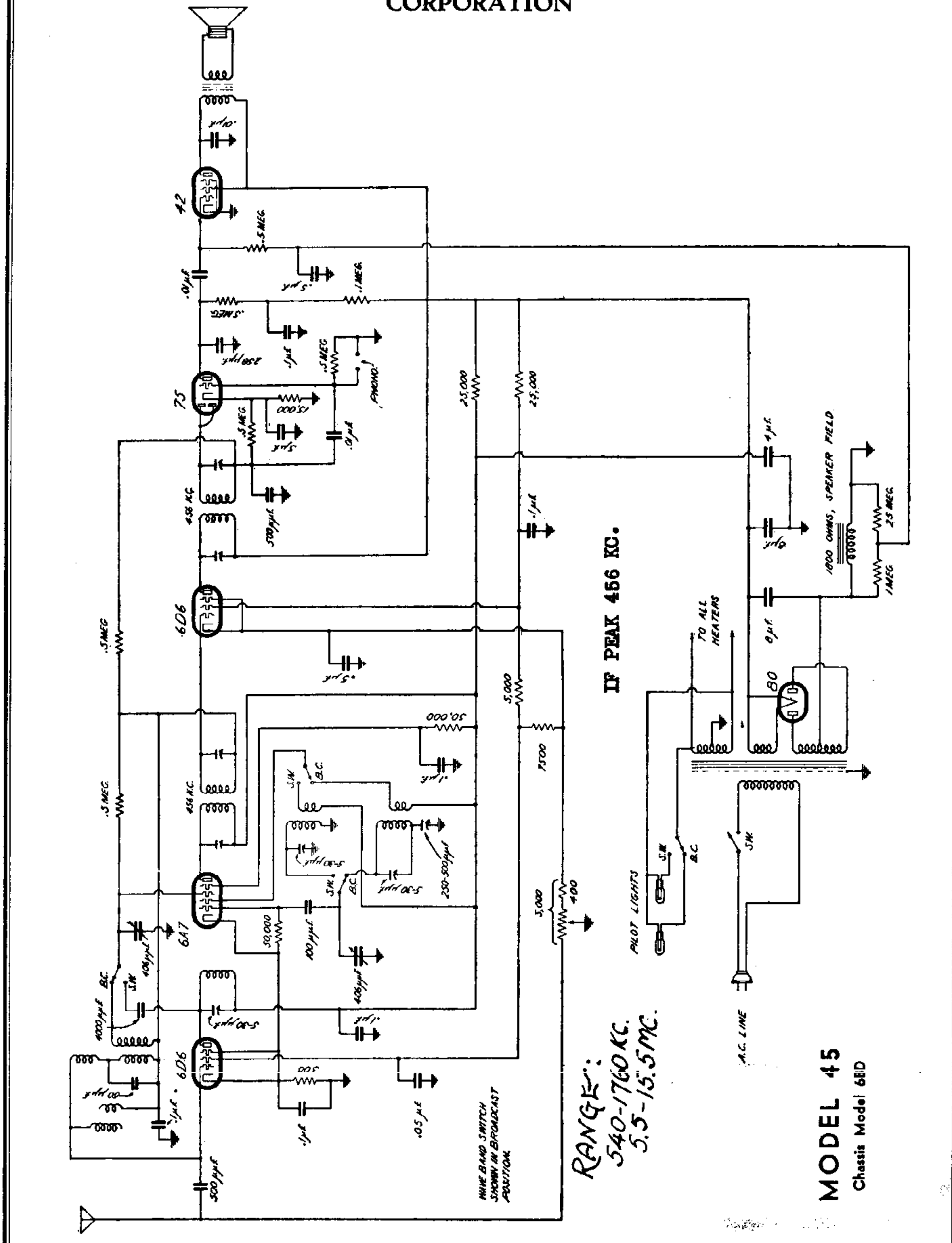
This instrument was carefully aligned and adjusted at the factory. ***No one but an experienced serviceman should make an attempt at re-aligning the receiver.*** If it becomes necessary, the following procedure should be accurately executed: :

A good accurate oscillator should be used with frequencies of 456 k.c., 600 k.c., 1425 k.c., and 15,000 k.c. In addition, an output meter across the voice coil should be used for the precise results necessary.

Alignment procedure:

1. Short circuit oscillator stator of variable condenser to ground.
2. Introduce 456 k.c. on the grid of the 58 tube.
3. Adjust the trimmer on the single tuned i.f. coil for maximum response on the output meter.
4. Adjust the two trimmers on the double tuned i.f. coil following the 58 tube.
5. Remove the oscillator signal from the 58 grid and introduce it on the grid of the 2A7 tube.
6. Adjust the two trimmers on the first i.f. coil.
7. Re-align all i.f. trimmers for maximum response on the output meter.
8. Remove the 456 k.c. signal from the 2A7 grid. It will not be used again.
9. Remove the short circuit from the stator of the oscillator section of the condenser.
10. Rotate the range changing switch to the left for the short-wave range.
11. Make sure that the needle on the dial reaches its extreme position at both ends of the broadcast scale when the condenser is at maximum and minimum. If this condition is not obtained, loosen the set-screw on the hub of the dial and rotate the condenser plates to maximum capacity. Then rotate the needle of the dial (by means of the selector knob) to its extreme position at the 550 k.c. end of the broadcast scale. Tighten the set-screw securely once again and re-alignment may proceed.
12. Set the pointer of the dial to a little above the higher wave length edge of the 19-meter, brown segment, on the dial.
13. Introduce a strong 15,000 k.c. signal into the antenna.
14. Adjust the short-wave oscillator trimmer, (the trimmer nearest the chassis on the oscillator coil), until the signal comes to maximum. Attenuate the signal.
15. Adjust the short-wave antenna trimmer (the one on the free end of the antenna coil) until the signal again comes to maximum. When these conditions are fulfilled the receiver is aligned on the short-wave range. Remove the 15,000 k.c. signal from the antenna.
16. Rotate the range switch to the right (broadcast position) and set the pointer of the dial to 1425.
17. Introduce the 1425 k.c. signal into the antenna. Adjust the oscillator trimmer (the trimmer on the oscillator coil, furthest from the edge of the chassis) for maximum response. Attenuate this signal.
18. Adjust the broadcast antenna trimmer for maximum response (the trimmer on the end of the antenna coil closest to the chassis). Remove the 1425 k.c. signal from the antenna.
19. Introduce 600 k.c. into the antenna. Rock the gang condenser back and forth around the 600 k.c. dial reading, and at the same time, adjust the series padding condenser for maximum output. Leave the series padder set to the point of maximum sensitivity. (Series padder is on side of oscillator coil can). Broadcast alignment is now complete.

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 45 (6BD)
Alignment
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION

1. Short circuit oscillator stator of the variable condenser to ground.
2. Introduce the 456 kc signal on the grid of the 6D6 I-f tube.
3. Adjust both trimmers of the second stage I-f transformer for maximum response on the output meter.
4. Remove the 456 kc signal from the 6D6 grid and put it on the 6A7 grid.
5. Adjust both trimmers on first I-f transformer for maximum response.
6. Remove 456 kc signal from 6A7 grid.
7. Remove the short circuit from the stator of the oscillator section of the gang condenser.
8. Set the range changing switch to the broadcast band.
9. Make sure that the needle on the dial reaches its extreme position at both ends of the broadcast band when the gang condenser is at maximum and minimum. If the needle does not do this, loosen the set-screw on the hub of the dial and rotate the gang condenser to maximum capacity. Then rotate the needle of the dial (by means of the selector knob) to its extreme position at the 550 kc end of the broadcast band. Tighten the set-screw securely and proceed to re-align the set.
10. Introduce a 1600 kc signal into the antenna.
11. Rock the gang condenser back and forth around the unmarked cardinal division at the bottom of the high frequency end of the dial and at the same time adjust oscillator trimmer (the one farthest from the chassis on the oscillator coil) for maximum response.
12. Introduce a 600 kc signal into the antenna. Rock the gang condenser back and forth around the 600 kc dial reading and at the same time adjust the series padding condenser for maximum output. Leave the series padder set to the point of maximum sensitivity. The series padder is on the front of the chassis.
13. Check alignment on 1600 kc.
14. Now throw the range switch to short-wave position and introduce a 15 megacycle (mc) signal into the antenna.
15. Set the dial needle to 15 mc.
16. Adjust oscillator trimmer for maximum output. The short-wave oscillator trimmer is the one nearest the chassis on the oscillator coil.
17. Connect the antenna to the set and adjust the interstage coil for maximum noise at 15 mc. The interstage coil is the one with only one trimmer on it. Before starting the adjustment turn the trimmer out so as to have minimum capacity and gradually increase it. A peak will be noticed and then as the capacity is increased the noise diminishes and disappears. When the capacity is increased further, the noise may increase again. The peak with the trimmer having less capacity than it has when the noise disappears is the proper peak.

Voltage Analysis:

Readings should be taken with a 1000 ohms per volt meter.

Voltages listed below are from the point indicated to ground. With volume control on full.

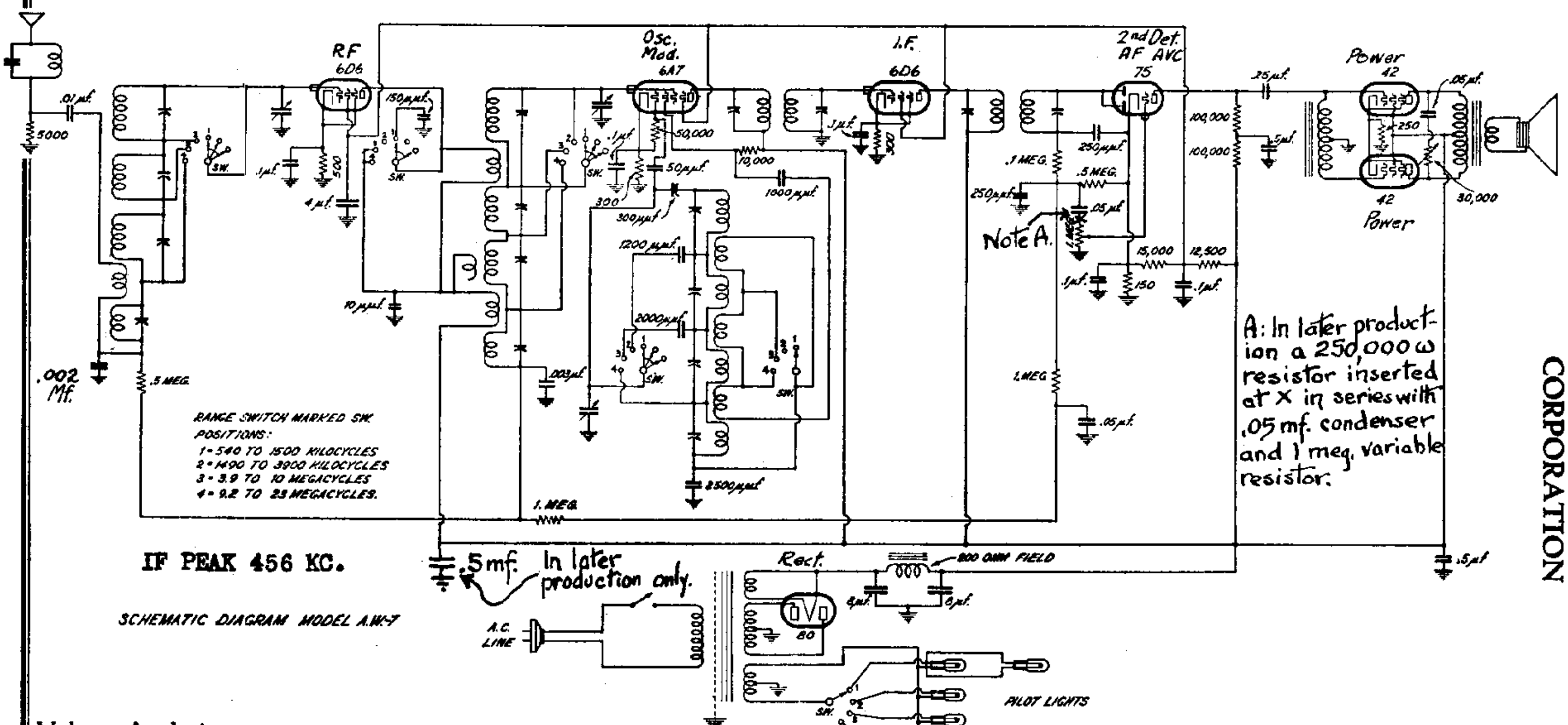
	Plate	*Screen*	*Suppressor*	*Cathode*
6D6 R-f.	100	45	3.0	3.0
6A7 Oscillator-Modulator	100	50	—	3.0
6D6 I-f.	250	80	4.0	4.0
75 A-f.	85	—	—	1.5
42 Output	230	250	—	0

The pilot lights used are Mazda No. 40, 6-8 volts and .15 ampere.

Voltage across field 100 volts. Line voltage—117.5 volts a.c.

MODEL 71,770 (AW-7)
Schematic, Voltage
Socket Layout

EMERSON RADIO AND PHONOGRAPH CORPORATION



IF PEAK 456 KC.

SCHEMATIC DIAGRAM MODEL A.W-7

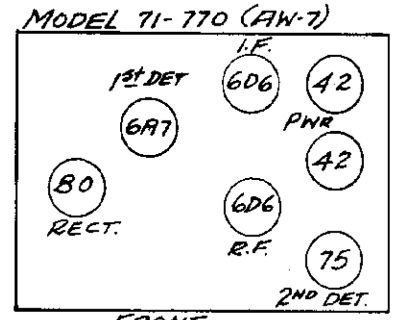
Voltage Analysis:

Readings should be made with a 1000 ohms per volt meter:

Line voltage 115 *volts, A.C.*—60 *cycles.*

	Plate to ground	Screen to ground	Cathode to ground	Oscillator Anode to ground
6D6 R.F. amplifier	250	100	4.5	...
6A7 Oscillator-modulator	250	100	4.5	160
6D6 I.F. amplifier	250	100	3	...
75	150	...	1.25	...
42	240	250	16.5	...

MODEL 71-770 (AW-7)



MODEL 415, 416
Revised
Voltage, Schematic

EMERSON RADIO AND PHONOGRAPH CORPORATION

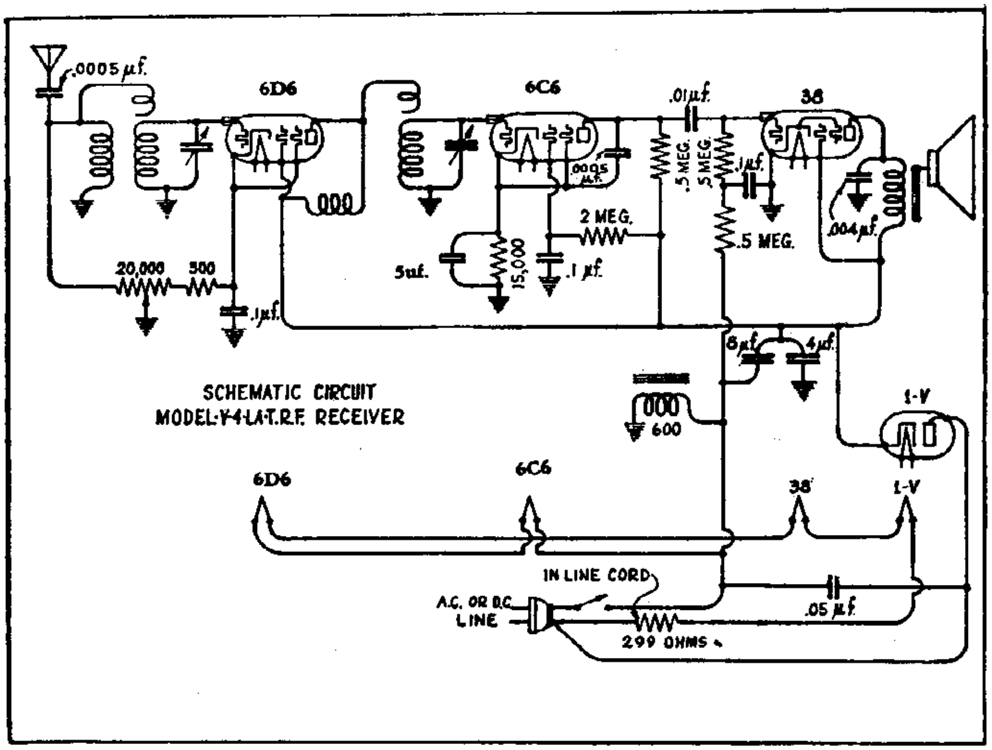
Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC, and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

Chassis	*To— Plate*	*Screen*	*Cathode*
6C6—Detector	10- 15	9- 12	1- 2
6D6—R.F. Amplifier	105-115	105-115	2- 3
38—Output Pentode	105-115	105-115	——

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.



Notes:

Due to the compact construction of this Model, in order to keep the heat out of the cabinet, the filament dropping resistor has been placed in the cord, thus dissipating the heat along a greater area. The cord will, therefore, become warm under normal operating conditions, without impairing the performance and without damage to the set. Allowing the heat to be radiated by the cord instead of in the set, assures more efficient operation of the set. The total heat and current drain is about the same as a 30 watt electric bulb. To insure normal heating of the cord during operation, stretch out to its full length.

Do not attempt to shorten cord by cutting out a section, as this will ruin the cord.

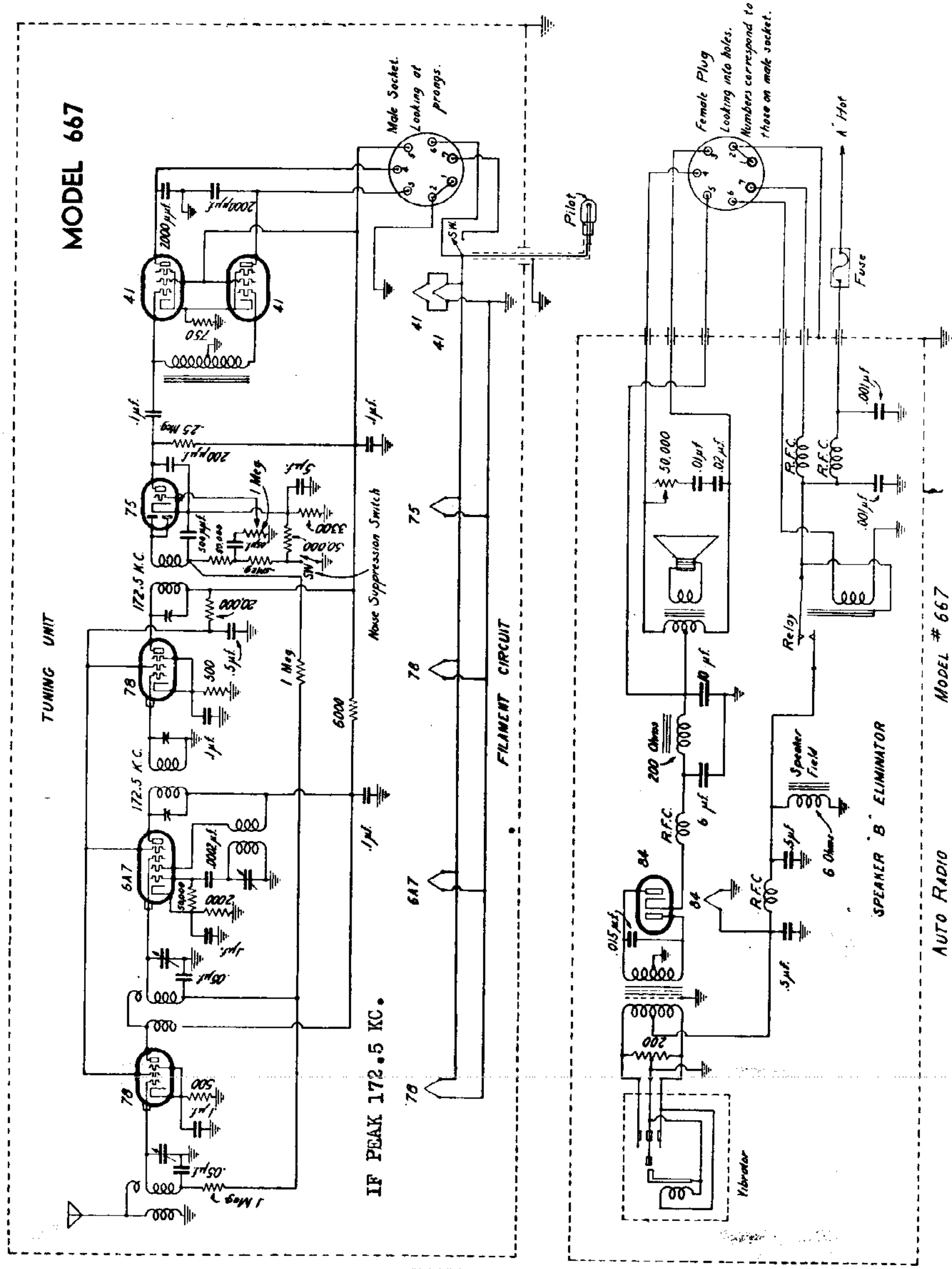
The antenna can be replaced in its compartment by winding the wire in a small coil. Start the winding close to the set so that the loose end of the wire forms the last coil. If the coil is begun with the end away from the set the wire will twist and kink as it is wound.

Tubes may be replaced by removing the back of the cabinet.

Instructions for Replacing Shielded Tubes:

1. Remove lead at top of tube.
2. Take firm hold of tube and shield and remove both (at the same time) from socket.
3. Slip off ring toward base of tube.
4. TO REPLACE SHIELD REVERSE ABOVE PROCEDURE.

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 667
Voltage, Alignment
Installation Data

EMERSON RADIO AND PHONOGRAPH CORPORATION

After unpacking the receiver and before starting to install it, a careful check of the parts furnished should be made.

The following is a list of the items:

1. The receiver proper, complete with six tubes in their places inside, and with front cover intact.
2. Receiver mounting bracket with plate, nut, and lockwasher.
3. Remote control head.
4. Two drive cables.
5. Speaker-eliminator complete with vibrator, tube, mounting bracket, battery cable and receiver connector cable with plug.
6. One distributor suppressor.
7. Six spark plug suppressors.
8. One generator condenser.
9. One ammeter condenser.
10. Four screws and four lock washers for securing bracket to receiver.
11. Two bolts, two nuts and two lockwashers for mounting speaker.

Make a general examination of the receiver. See that the tubes are pushed down in their sockets and that the grid caps are in place on the proper tubes. In order to do this it will be necessary to remove the cap nuts from the front cover plate and slide the receiver out of its housing by pulling out on the cover plate.

Mounting the receiver—while the receiver may be mounted in any available location, three recommended positions are listed below—

1. Mounted so that the control cables face right.
2. Mounted so that the control cables face front.
3. Mounted so that the control cables face left.

Positions 2 and 3 will be found best for most cars. It should be borne in mind that the controls will operate more smoothly if the cables are bent as little as possible. Select a position for the receiver that will allow the cables to fall in an easy sweep. There should be no sharp bends or kinks.

Hold the receiver up against the dash in the desired location with the cables in the direction chosen. Mark around it with a pencil, and in the center of the area bounded by the pencil lines drill a ½" hole through the dash.

Mount the bracket on the receiver using the four screws and lockwashers. Put a lockwasher under the head of each screw and insert the screws through the bracket holes and into the tapped holes in the case. Screw up tightly.

Now lift the receiver into place, pushing the bracket bolt through the hole in the dash. On the engine side of the dash put the mounting plate on the bolt, then the lockwasher and nut. After making certain that the receiver is straight, tighten the nut securely.

Mount the control head on the steering column and connect the cables to control head, following instructions given on the red tag.

To attach the control cables to the receiver insert the free end of the right hand cable into the upper chuck on the receiver. Push the cable in lightly while turning the right hand knob back and forth until the tongue on the drive cable engages with the slot in the condenser shaft. While holding the cable in place tighten the set screw in the chuck enough to prevent turning or withdrawal of the cable housing. If the set screws are too tight the cables will bind.

Proceed in the same manner to connect the other drive cable, inserting the key or key knob into the key hole at the left on the control head, and turning back and forth as before. On turning all the way to the left, the switch will snap to the "off" position.

Connect the pilot light leads to the control head, the black wire going to the insulated post.

Tie the control cables and pilot light lead to the steering column and the dash, using friction tape. Do this at as many points as is necessary to prevent swinging and vibration, always bearing in mind the fact that smooth operation of the controls depends on the manner in which the cables are run.

Now line up the dial pointer, following the instructions furnished on the red tag.

Install the speaker in any convenient location that the length of cable will allow. Drill two ⅜" holes and mount the bracket, using the ⅜" bolts.

Two cables extend from the speaker. On one of these cables is the female end of a detachable six prong plug, the male end of which is on the receiver. Connect the speaker to the receiver by means of this plug, observing that the two large pins on the male half of the plug engage with the two large holes in the female half of the plug. Do not try to force the plug together in any other manner.

A 10 ampere fuse is located in a small tubular holder in the battery lead. To replace the fuse, remove the cap, insert the fuse and replace the cap. The fuse is intended to protect the receiver, and in no case should one larger than 10 amperes be used.

The other cable terminates in a clip, designed for connection to the ammeter binding post. Before attaching this clip the remote control should be tested. See that the knob for the volume control and switch operates properly. When turned all the way to the left the switch should be heard to snap to the "off" position. On turning the knob to the right the switch first snaps on and then operates as the volume control.

The clip on the battery cable may now be attached. Squeeze the sides of the clip together so that the holes are in line, then push it over the battery post of the ammeter and release. If uncertain as to which post is on the battery side of the ammeter, connect the clip to either post and switch on the set by turning the left hand control knob to the right. The dial will immediately light up. Now notice the reading on the ammeter as the set is turned on and off. If when the set is on the ammeter shows discharge, turn off the set and move the clip to the other post.

At this point the antenna should be connected. Proceed as follows:

Assuming that the car is already equipped with a suitable antenna, see that the lead-in is shielded and kept away from the motor compartment and high tension ignition wires.

Check the antenna for a possible ground and if found satisfactory connect it to the inner wire extending through and beyond the shield of the antenna lead on the receiver. Be careful to make a good splice, soldering if possible. Make the splice close enough to both shields so that the portion of wire left unshielded will be short.

Cover the splice with several layers of friction tape and then connect both shields together, again soldering if possible. Ground the shield at one or more points to the dash or car body.

For installations in cars not equipped with built-in antennae, see the instructions given under "Antenna".

The installation of the receiver may now be considered complete, provided all the foregoing instructions were faithfully carried out. A preliminary test can now be made, after which the suppression of any motor noises that are present may be undertaken.

Intermediate Frequency.

To align the intermediate frequency transformers use a good modulated oscillator set for 172.5 k.c. Set the volume control for maximum volume and short circuit the rear section of the variable condenser.

Connect the oscillator output across the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two i.f. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

Radio frequency and oscillator stages.

To align the r.f. and oscillator sections, remove the short from the variable condenser, and couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350 and 1450 k.c. Set the dial to the frequency selected, following the pointer alignment instructions on the red tag. Adjust the trimmers on the variable condenser, beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the r.f. sections may be aligned by tuning in a weak station between 1350 and 1450 k.c. and aligning as before. If an output meter is not available, adjust for maximum volume from the speaker.

Voltage analysis:

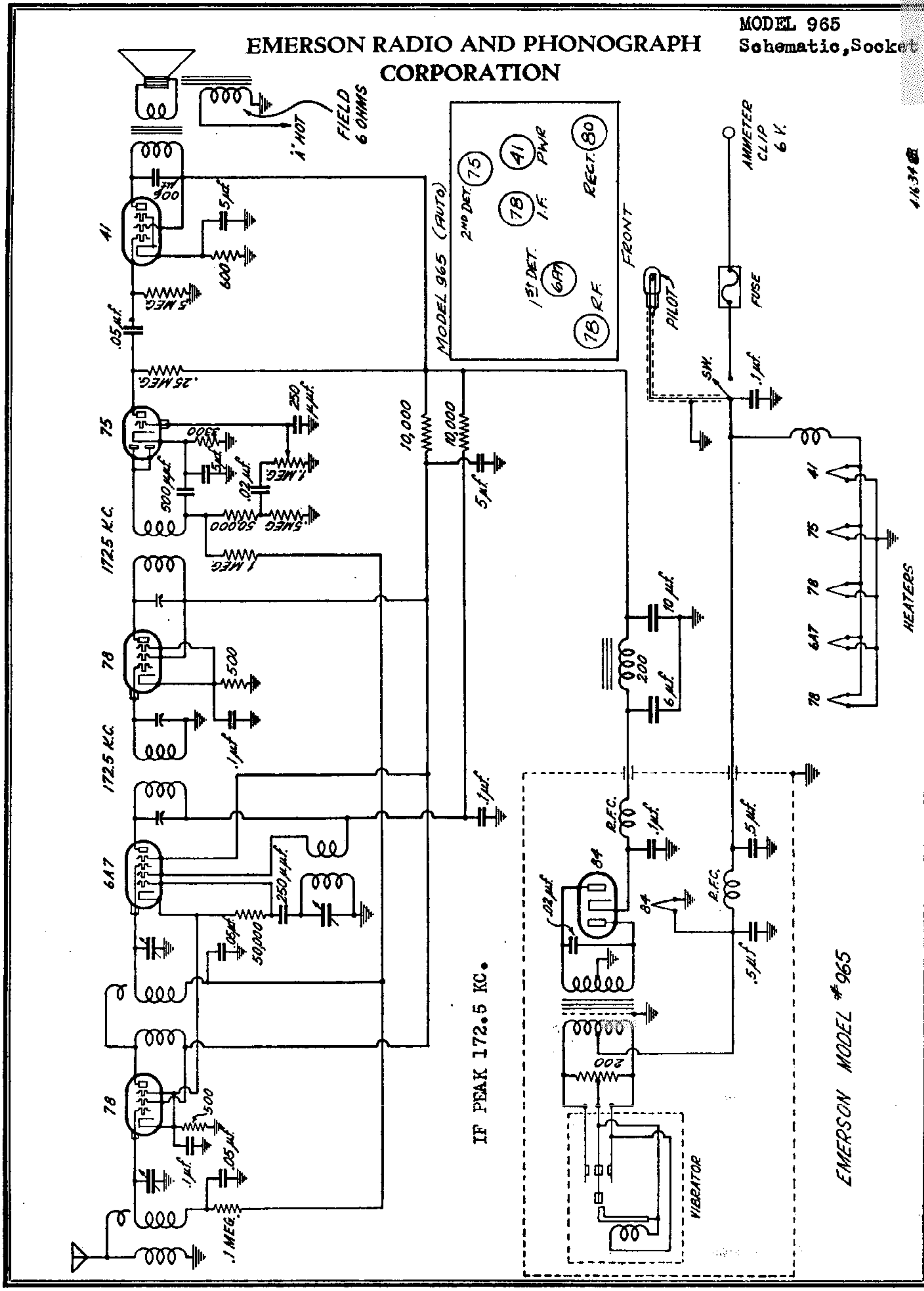
Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over. Voltages are measured from the chassis (ground) to the point indicated. Ground the antenna to the shield when taking readings.

Voltage across battery—6 volts.
Voltage across speaker field—6 volts scant.
Voltage across all heaters—6 volts scant.

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. Plate*
78 R.f.	135	90	3.5	3.5	....
6A7	135	90	12.5	....	140
78 I.f.	180	90	3.	3.	....
75	75	....	1.	....	....
41	185	192	16.5	....	....
41	185	192	16.5	....	....

MODEL 965
Schematic, Socket

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 965
Voltage,Alignment

EMERSON RADIO AND PHONOGRAPH CORPORATION

Tubes and their functions:

1—78 Radio frequency amplifier.

1—6A7 {Electron coupled oscillator. First detector.}

1—78 Intermediate frequency amplifier.

1—75 {Diode second detector. Audio frequency amplifier. Automatic volume control.}

1—41 Output power tube.

1—84 Full-wave rectifier.

1—Non-synchronous vibrator inverter.

Voltage Analysis:

Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

Battery volts—6. Volts across heaters—6 scant. Volts across speaker field—6 scant.

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. plate*
78	110	110	6	6	—
6A7	170	110	6	—	170
75	110	—	1.3	—	—
78	110	110	3.5	3.5	—
41	210	220	15	—	—

If the set fails to operate look for some minor cause which might be one of the following:—

1. No "A" supply—"A" lead to set not making contact with ammeter post. Fuse blown.
2. Low "A" supply—The car battery needs recharging.
3. Tubes not in place in their sockets.
4. Grid caps not in place.
5. Defective tubes.
6. Antenna lead shorted to shield at splice, or otherwise grounded.

A 10-ampere fuse is located in a small tubular holder in the battery lead. To replace the fuse, unscrew the threaded cap, insert the fuse and replace the cap, screwing up firmly. The fuse is intended to protect the receiver and in no case should one larger than 10 amperes be used.

ADJUSTMENTS

Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ k.c. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

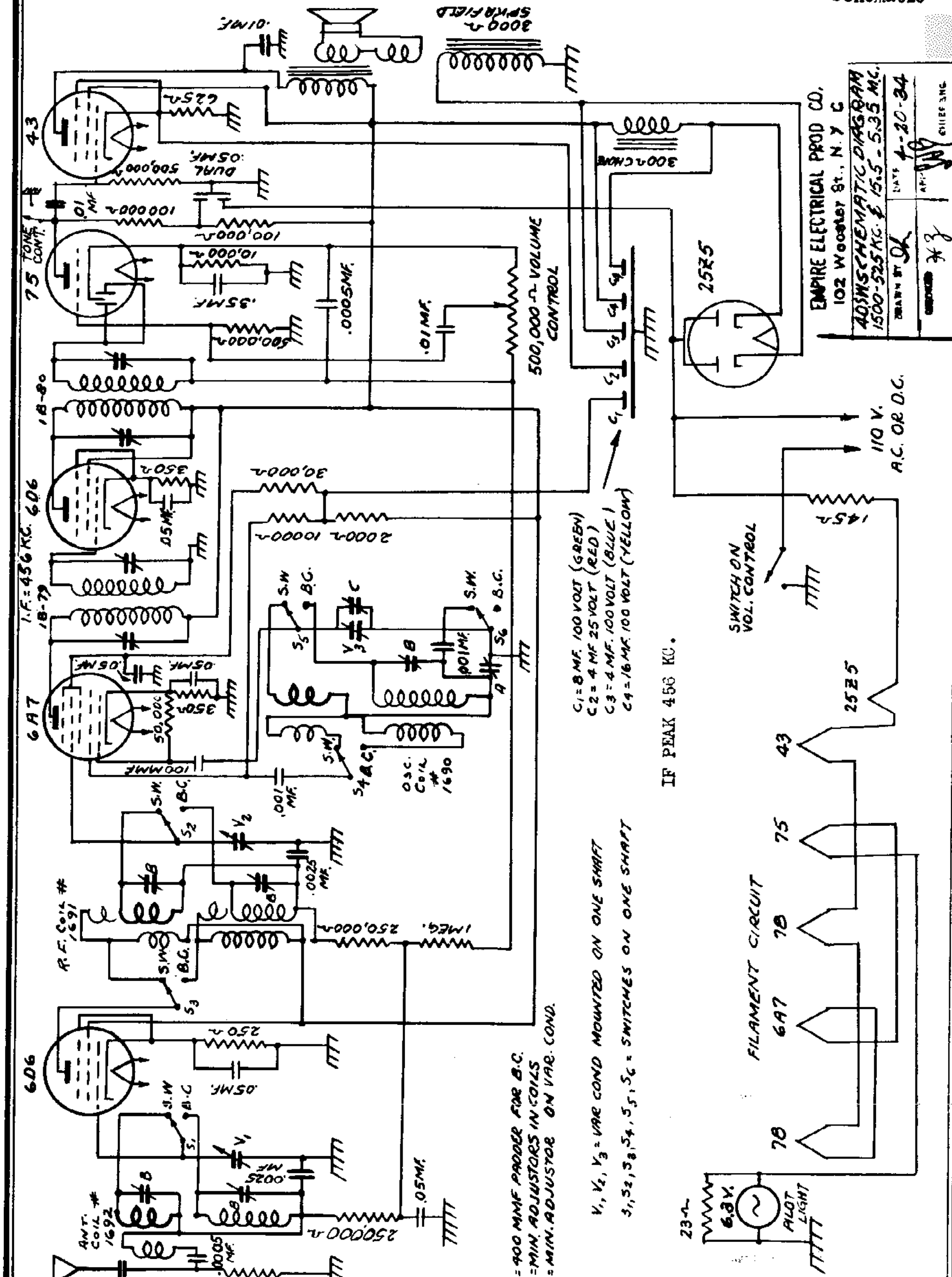
Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two I.F. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

Radio Frequency and Oscillator

To align the R.F. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350-1450 k.c. Set the dial to the frequency selected. Adjust trimmers on the variable condenser beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the R.F. sections may be aligned on broadcast.

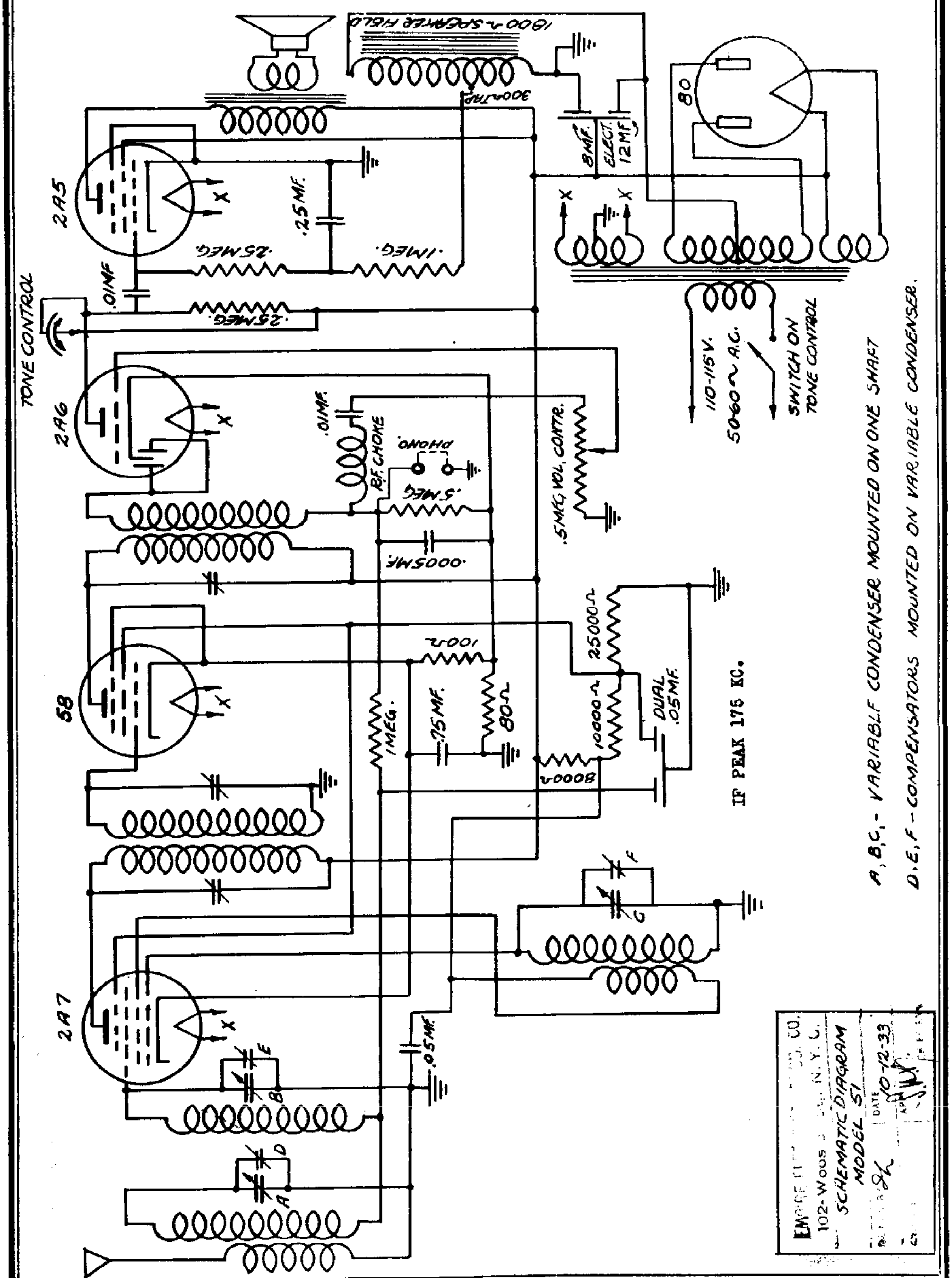
Tune in a weak station between 1350 and 1450 k.c. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

EMPIRE ELECTRICAL PRODUCTS CO.



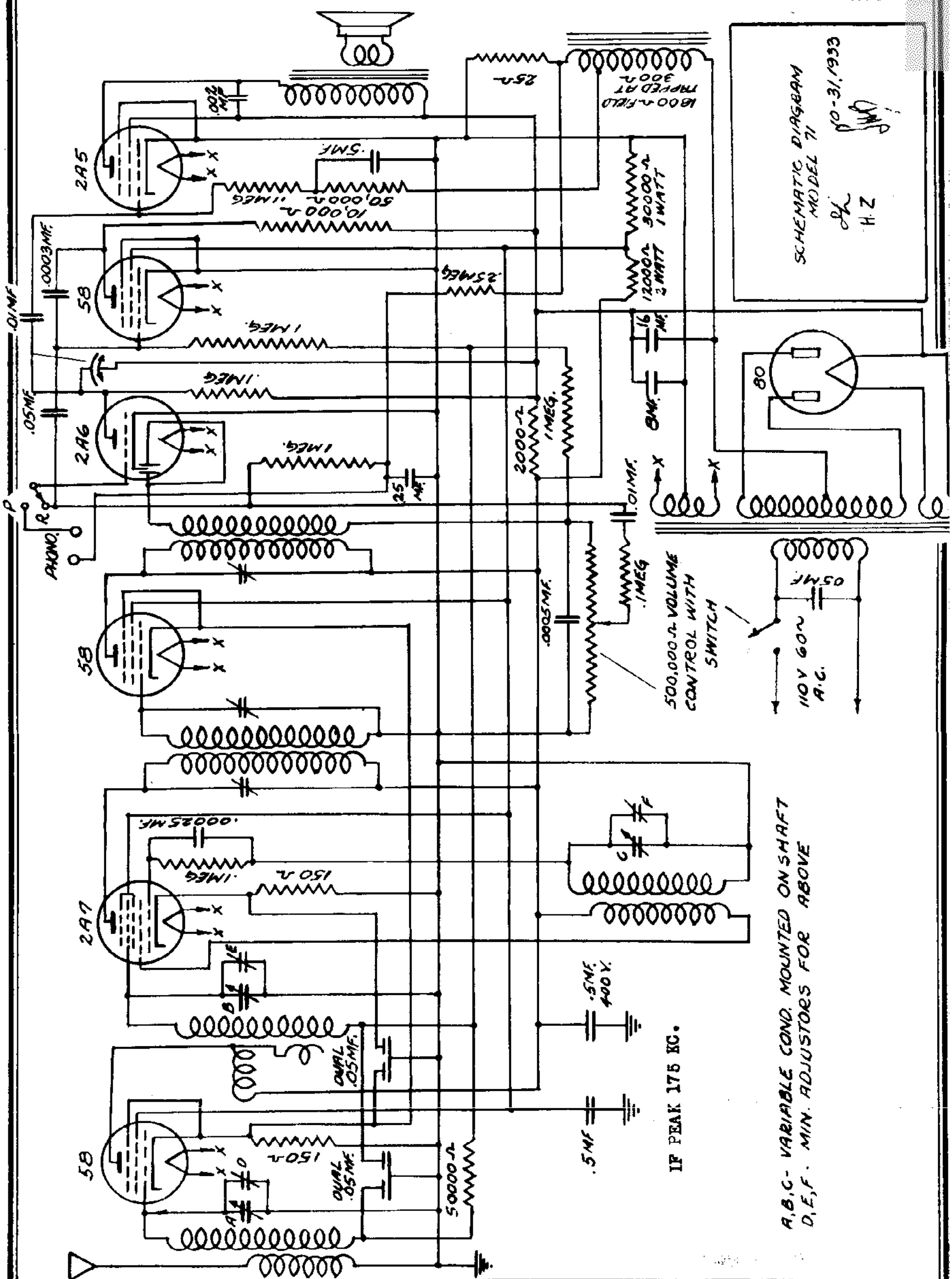
MODEL 51
Schematic

EMPIRE ELECTRICAL PRODUCTS CO.



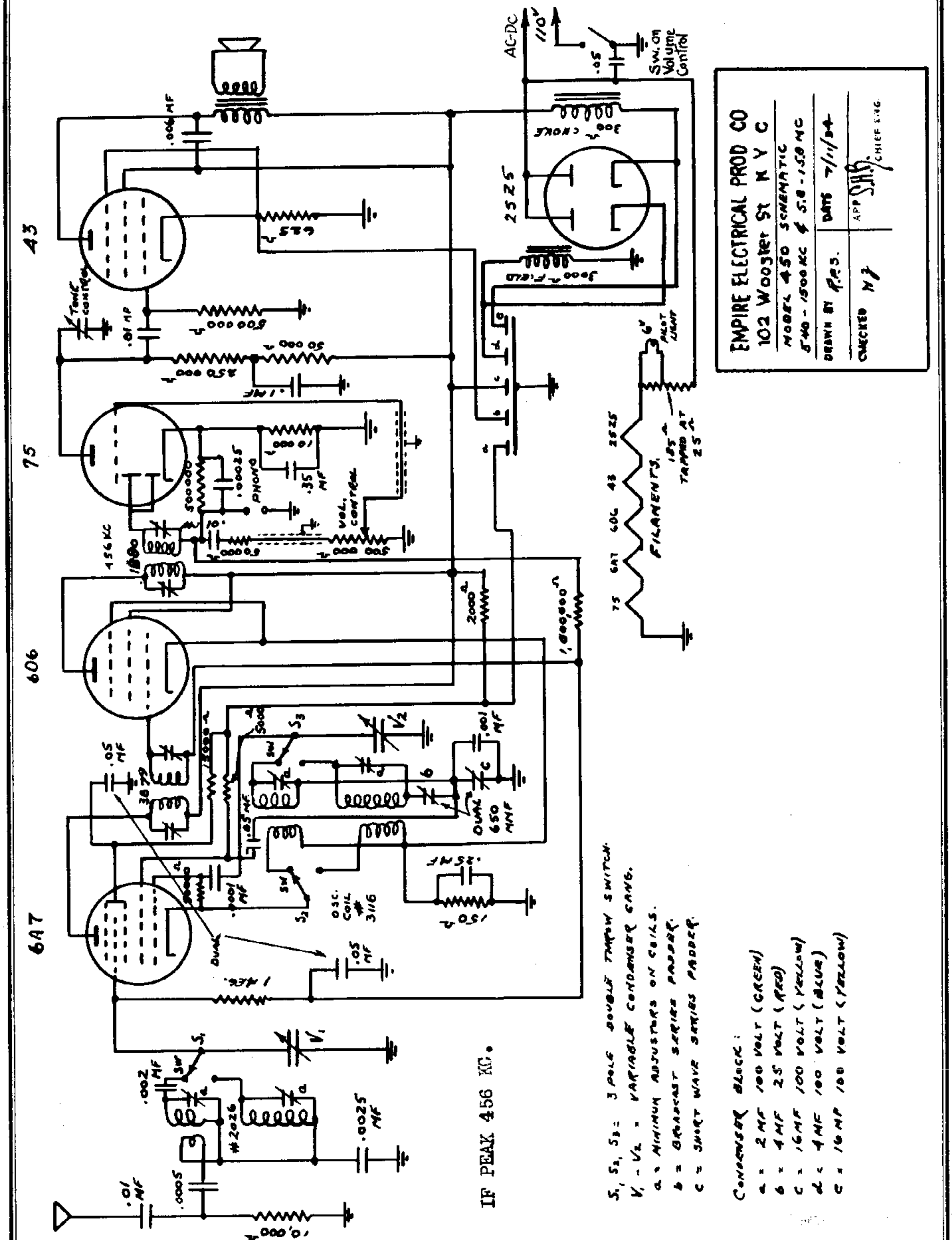
MODEL 71
Schematic

EMPIRE ELECTRICAL PRODUCTS CO.

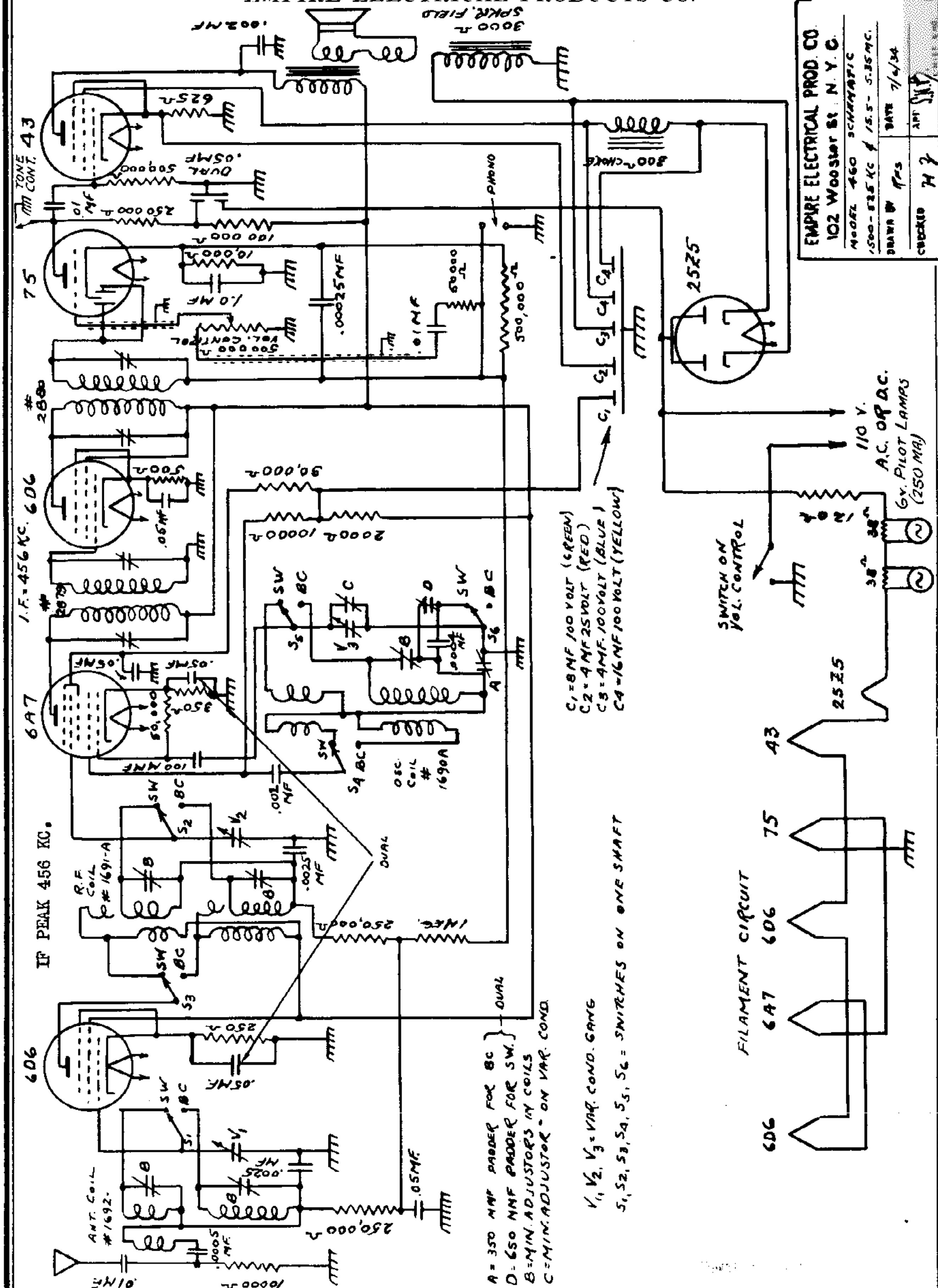


MODEL 450-A
Schematic

EMPIRE ELECTRICAL PRODUCTS CO.

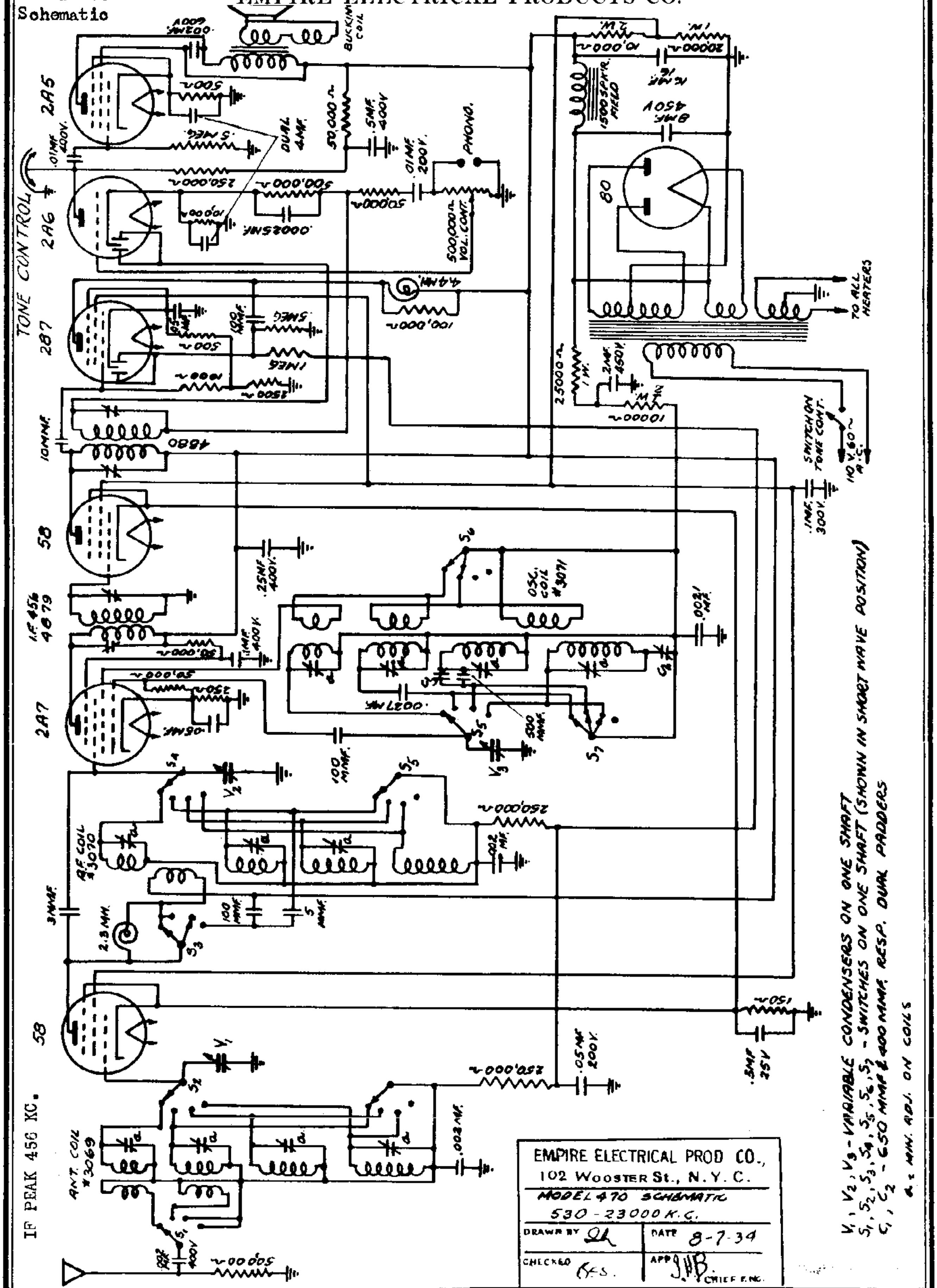


EMPIRE ELECTRICAL PRODUCTS CO.



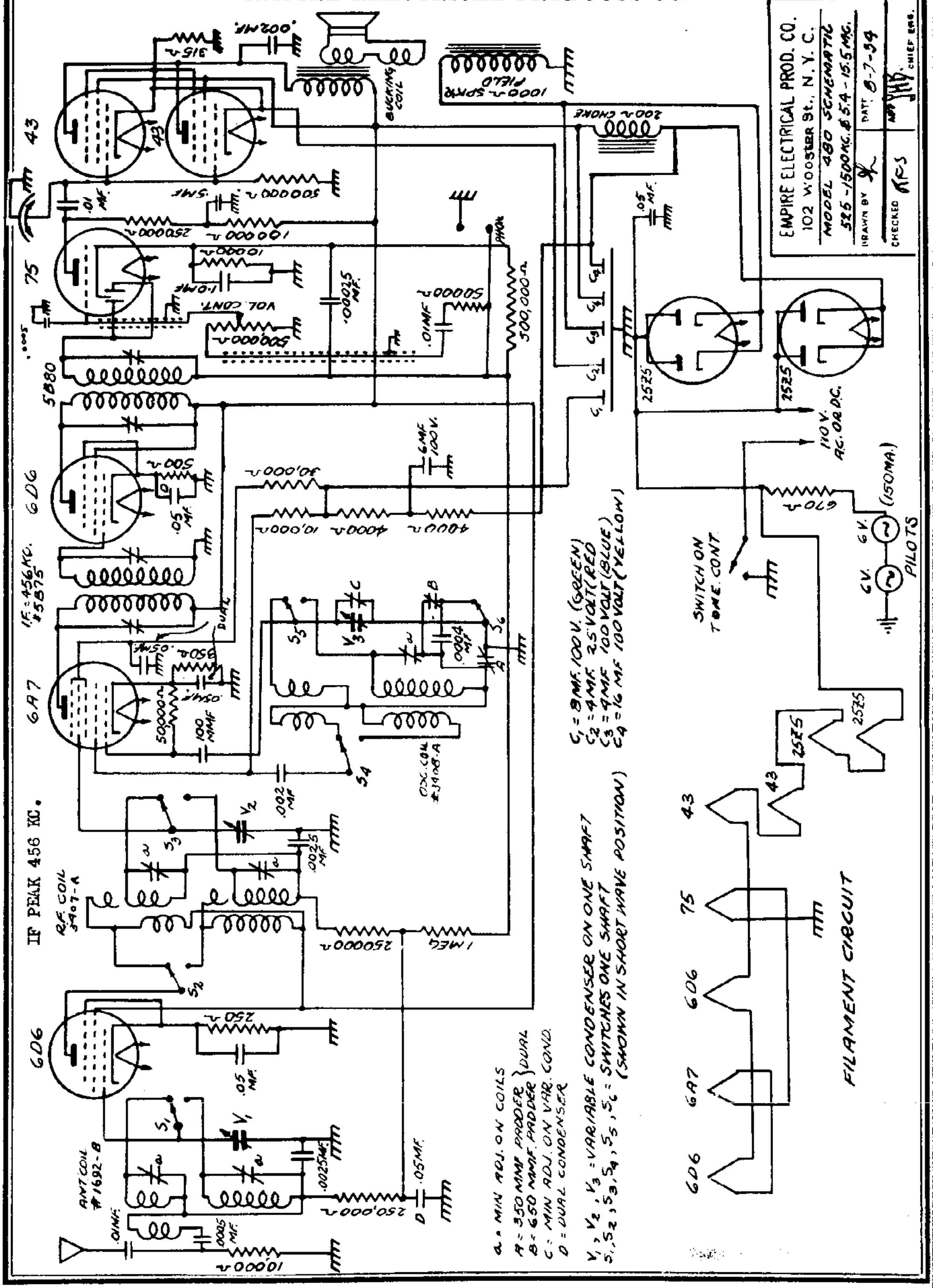
MODEL 470-C
Schematic

EMPIRE ELECTRICAL PRODUCTS CO.



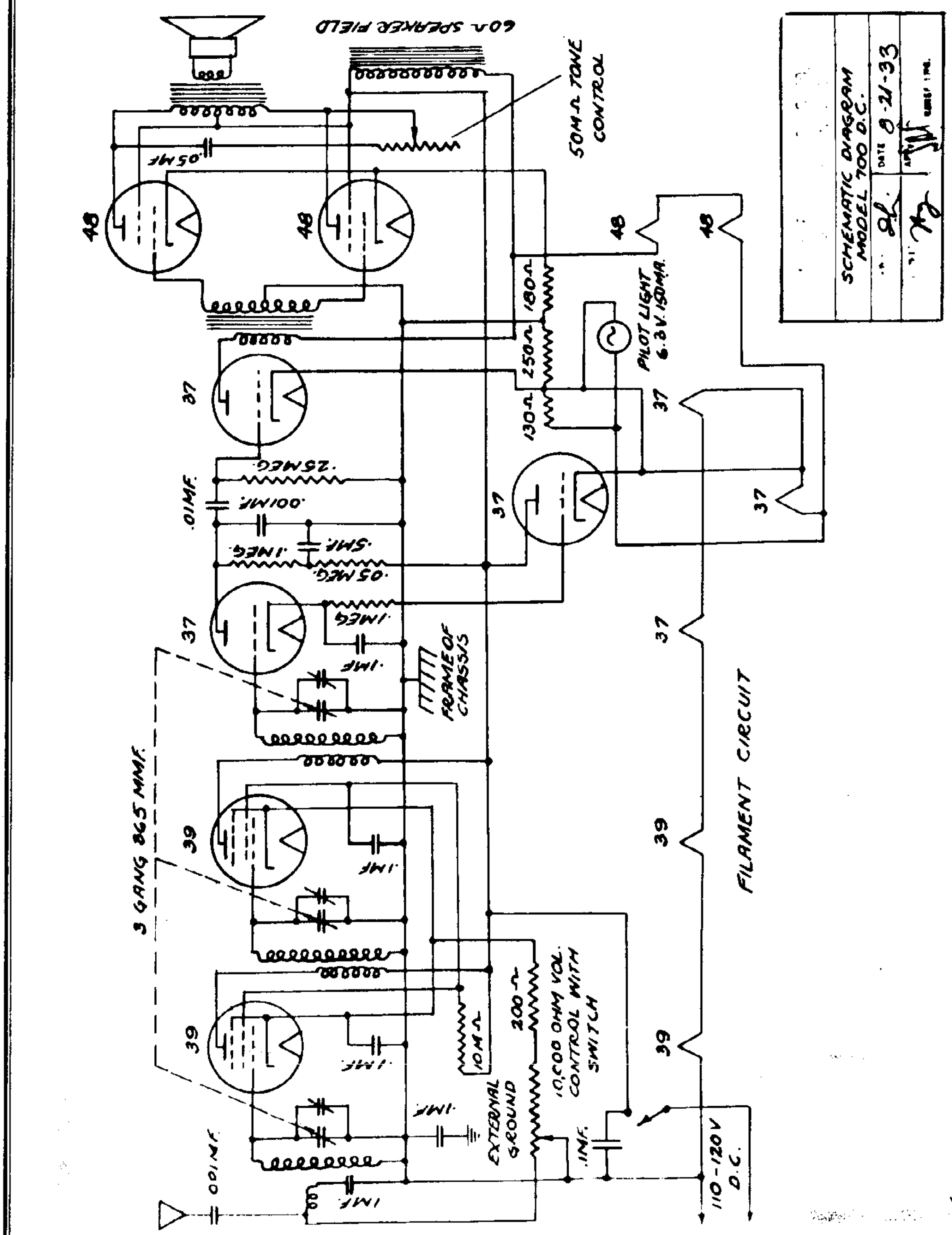
MODEL 480-C
Schematic

EMPIRE ELECTRICAL PRODUCTS CO.



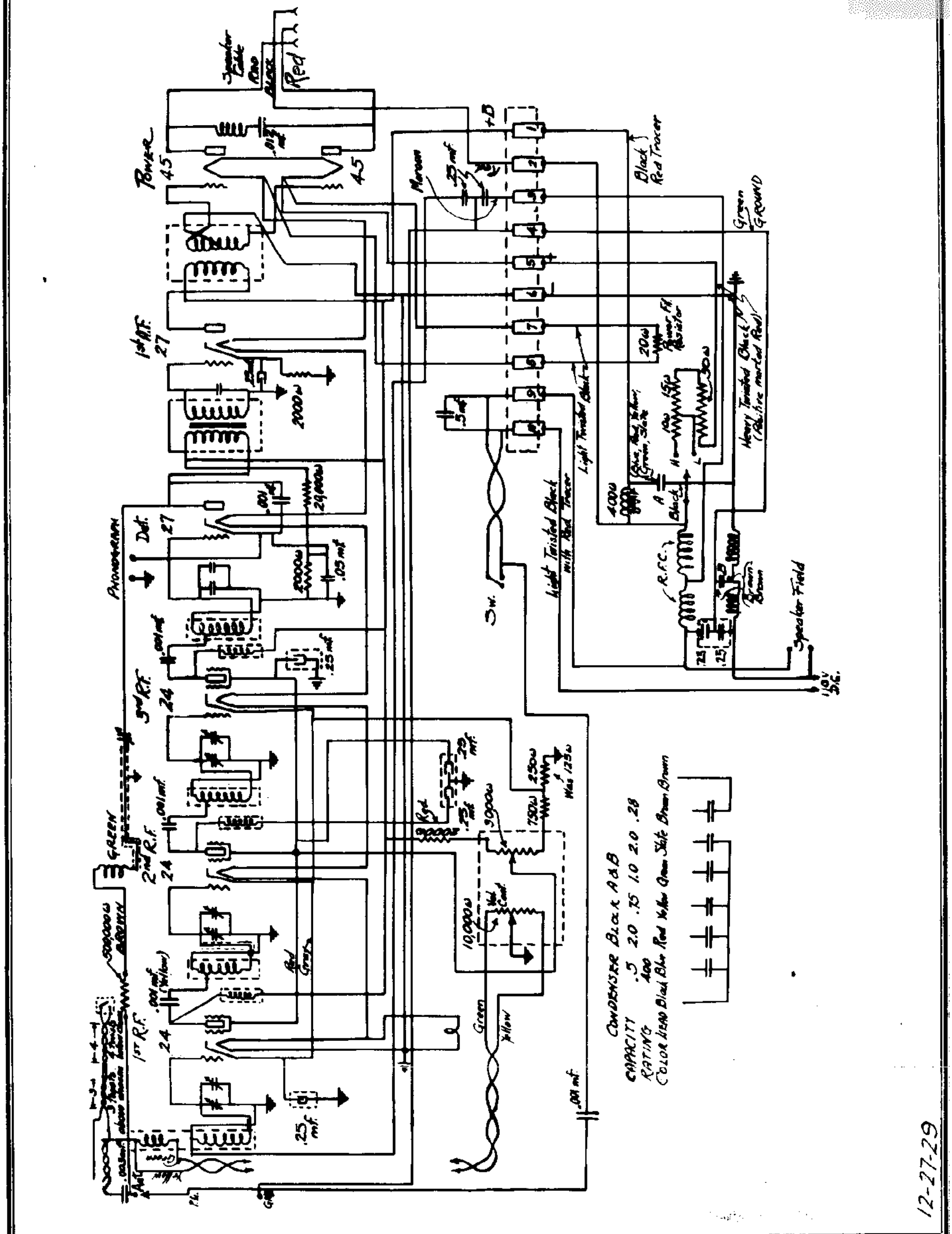
MODEL 700 DC
Schematic

EMPIRE ELECTRICAL PRODUCTS CO.



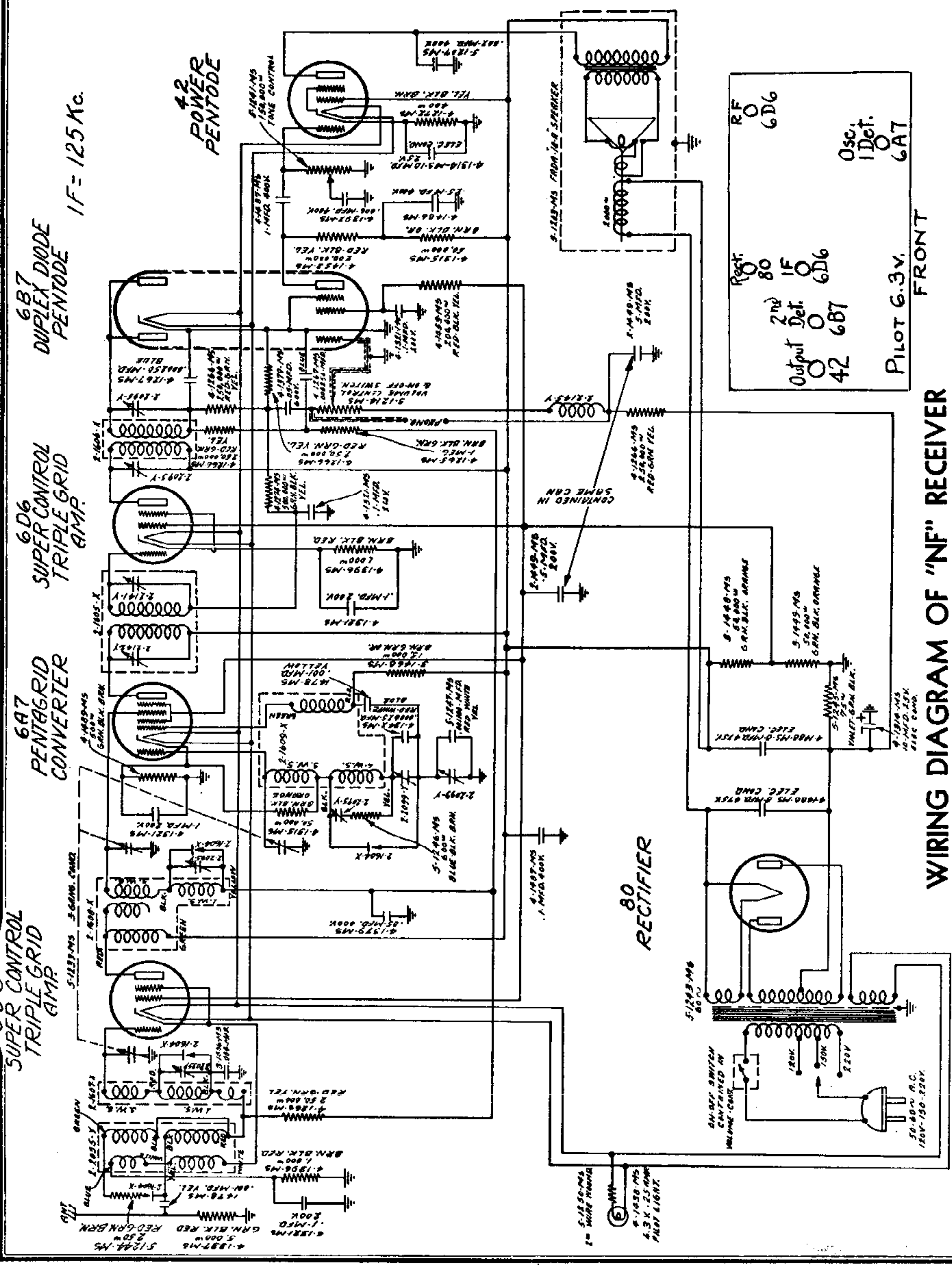
MODEL S, 26-36
Schematic

FADA RADIO & ELECTRIC CORP.



MODEL NF
Schematic
Socket Layout

FADA RADIO & ELECTRIC CORP.



WIRING DIAGRAM OF "NF" RECEIVER

MODEL 133,134,135
(RW)
Alignment, Trimmers
Socket Layout

FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR MODELS 133, 134, 135 ETC.

"RW" CHASSIS (60-25 CYCLES)

NOTE:- The wave band switch is to be in the normal wave (550 to 1500 KC) position for the following adjustments.

ADJUSTMENT OF I.F. CONDENSERS

The four (4) I.F. condensers are located as indicated in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Remove the shield cap from the first detector tube shield. Connect a lead wire from the dummy antenna system of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube, nor remove the tube shield. Connect the ground (slate) lead of the receiver to the ground post of the signal generator. In the event that the signal generator being used does not have a dummy antenna system, connect a 250 mmfd. condenser in series with the lead wire.

3rd - Remove the F-37 oscillator tube from the receiver socket.

4th - Place an output meter across the secondary of the receiver output transformer (which is mounted on the speaker) so that the variations in signal output can be noted. Output meters (with a multi-range scale) are generally supplied with good quality commercial signal generators.

5th - Place the signal generator in operation and adjust the frequency output to 265 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the receiver.

6th - With the aid of a #4 socket wrench, adjust the four (4) I.F. condensers to resonance as indicated by the greatest deflection on the output meter.

ADJUSTMENT OF OSCILLATOR SERIES COMPENSATOR

The oscillator series compensator can be adjusted through the hole near the input push-pull transformer (see sketch)

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Set the calibrated dial of the receiver to read 600 KC.

3rd - With the aid of a #4 socket wrench adjust the oscillator series compensator until a maximum output signal is indicated on the output meter. To insure perfect adjustment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - After the oscillator series compensator is properly adjusted, turn the calibrated dial of the receiver to 1400 KC and adjust the signal generator to the same frequency. Then readjust all variable condenser compensators as outlined in the foregoing instructions.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER COMPENSATORS

There are three holes (see sketch) in the overall condenser shield housing which permit the insertion of a screw driver for compensating purposes.

1st - Place F-37 oscillator tube in socket.

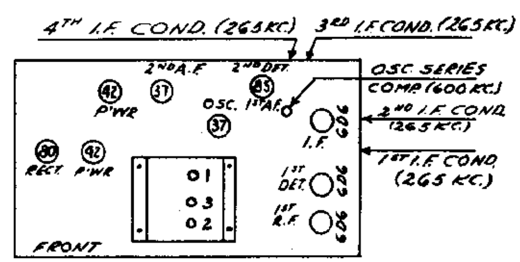
2nd - Remove the lead wire which is connected to both the control grid of the first detector tube and to the dummy antenna system of the signal generator. Replace the shield cap on the first detector tube shield.

3rd - Connect the antenna (red) wire of the receiver to the dummy antenna system of the signal generator. The ground (slate) wire should remain connected to the ground post of the signal generator.

4th - Adjust the carrier frequency output of the signal generator to 1400 KC.

5th - Set the calibrated dial of the Receiver to read 1400 KC.

6th - Starting with the compensator nearest the rear of the receiver, adjust each compensator (as indicated on sketch) in turn for maximum signal output. Do not disturb the setting of the ganged variable condenser during these operations. Leave the volume control on full and regulate the signal output with the attenuator control of the signal generator.



MODEL 141,141-Z (NA)
Alignment, Trimmers
Voltage,Socket Layout

FADA RADIO & ELECTRIC CORP.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position, to assure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

ADJUSTMENT OF I.F. CONDENSERS

The four (4) I.F. condensers are located as indicated in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Connect a lead wire from the dummy antenna system of the signal generator to the control grid of the 6A7 first detector tube. Do not disconnect the control grid connector from the tube nor remove the tube shield. Connect the ground (slate) lead of the receiver to the ground post of the signal generator. In the event that the signal generator being used does not have a dummy antenna system, connect a 250 mmfd. condenser in series with the lead wire.

3rd - Place an output meter across the secondary of the receiver output transformer (which is mounted on the speaker) so that the variations in signal output can be noted. Output meters (with a multi-range scale) are generally supplied with good quality commercial signal generators.

4th - Place the signal generator in operation and adjust the carrier frequency output to 265 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the receiver.

5th - With the aid of a #4 socket wrench, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER COMPENSATORS

The compensators are located at the top of their respective tuning condenser section and can be adjusted with the aid of a screw driver in the order indicated on the attached sketch.

1st - Remove the lead wire which is connected to both the control grid of the first detector tube and to the dummy antenna system of the signal generator.

2nd - Connect the antenna (red) wire of the receiver to the dummy antenna system of the signal generator. The ground (slate) wire should remain connected to the ground post of the signal generator.

3rd - Adjust the carrier frequency output of the signal generator to 1400 KC.

4th - Set the calibrated dial of the receiver to read 1400 KC.

5th - Starting with the compensator nearest the rear of the receiver, adjust each compensator (as indicated on sketch) in turn for maximum signal output. Do not disturb the setting of the gang condenser during these operations. Leave the volume control on full and regulate the signal output with the attenuator control of the signal generator.

COMPENSATING INSTRUCTIONS FOR MODELS 141 & 141-Z

"NA" CHASSIS (60-25 CYCLES)

ADJUSTMENT OF OSCILLATOR SERIES COMPENSATOR

The oscillator series compensator can be adjusted through the hole in the right hand side of chassis (see sketch).

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Set the calibrated dial of the receiver to read 600 KC.

3rd - With the aid of a #4 socket wrench adjust the oscillator series compensator until a maximum output signal is indicated on the output meter. To insure perfect adjustment it is necessary to "rock" the gang variable condenser in order to follow the maximum signal output.

4th - After the oscillator series compensator is properly adjusted, turn the calibrated dial of the receiver to 1400 KC and adjust the signal generator to the same frequency. Then readjust all variable condenser compensators as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON NA CHASSIS -- MODEL 141 (60 CYCLE)

Line voltage - 115 volts A.C. -- Input watts 50.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
6-A-7	1st Det.-Osc.	236	2.5	2.2**	88
6-D-6	Int. freq.	236	7.5	2.2**	88
37	2nd Det.	---	---	---	--
77	1st A.F.	78*	0.23	2.1**	54*
42	Pwr.Pentode	204	30.0	14.0	234
80	Rectifier	---	58. TOTAL		

*These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

**Correct readings cannot be obtained at control grid due to series resistors. To be measured across each respective bias resistor.

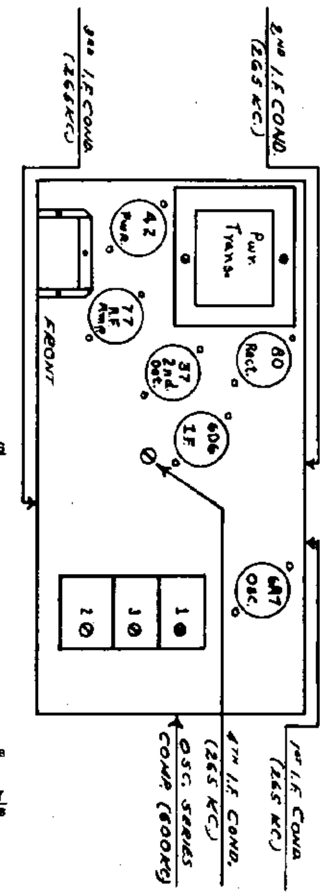
VOLTAGE ACROSS ELECTROLYTIC CONDENSER (5-1209-Na)

1st section	2nd section
381 volts	238 volts

Voltage across 2,000 ohm speaker field - - - - - - - - - 123 volts

D.C. RESISTANCE VALUES

		PRIMARY	SECONDARY
2-1801-X	Antenna coil	20.0 ohms	5.4 ohms
2-1802-X	Pre-selector coil	---------	5.4 "
2-1803-X	Oscillator coil --Total winding	---------	5.3 "
1993-X	I.F. trans.	36.3 ohms	77.0 "
1994-X	I.F. trans.	50.0 "	50.0 "
Output trans. (mounted on 18-A speaker)		673.0 "	.4 "
Speaker field coil		2,000	ohms
Speaker voice coil		3.5	"
2-2134-Y	Hum bucking choke	.4	"
5-1204-Na	Power trans. high voltage sec. winding	410.0	" (green)
"	" " primary "	9.0	" (white)
"	" " heater sec. "	0.16	" (red)
"	" " rectifier sec. "	0.16	" (yellow)



MODEL (52),5212, 5212-A,5241 Schematics

FAIRBANKS-MORSE HOME APP., INC.

MODEL (51),5106, 5107,5108,5109, 5111,5112,5141, 5143

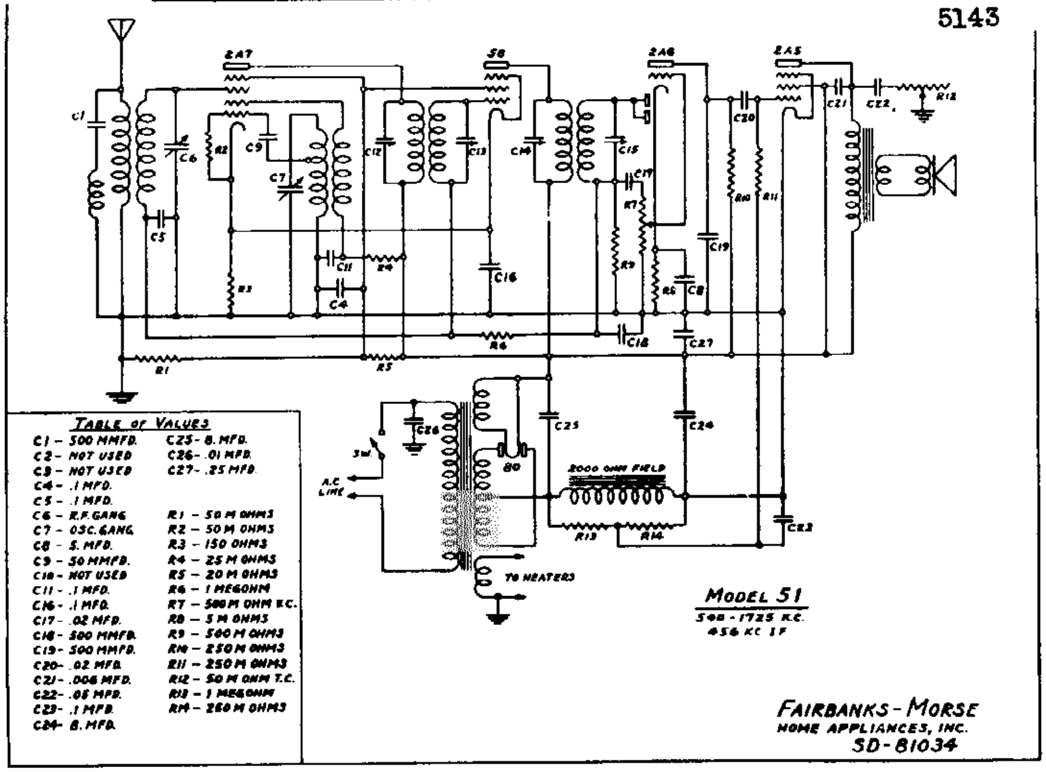


TABLE OF VALUES

C1 – 500 MMFD.	C25 – 8. MFD.
C2 – NOT USED	C26 – .01 MFD.
C3 – NOT USED	C27 – .25 MFD.
C4 – .1 MFD.	
C5 – .1 MFD.	
C6 – R.F. GANG	R1 – 50 M OHMS
C7 – OSC. GANG	R2 – 50 M OHMS
C8 – 5. MFD.	R3 – 150 OHMS
C9 – 50 MMFD.	R4 – 25 M OHMS
C10 – NOT USED	R5 – 20 M OHMS
C11 – .1 MFD.	R6 – 1 MEGOHM
C16 – .1 MFD.	R7 – 500 M OHM T.C.
C17 – .02 MFD.	R8 – 5 M OHMS
C18 – 500 MMFD.	R9 – 500 M OHMS
C19 – 500 MMFD.	R10 – 250 M OHMS
C20 – .02 MFD.	R11 – 250 M OHMS
C21 – .006 MFD.	R12 – 50 M OHM T.C.
C22 – .05 MFD.	R13 – 1 MEGOHM
C23 – .1 MFD.	R14 – 250 M OHMS
C24 – 8. MFD.	

Model 51

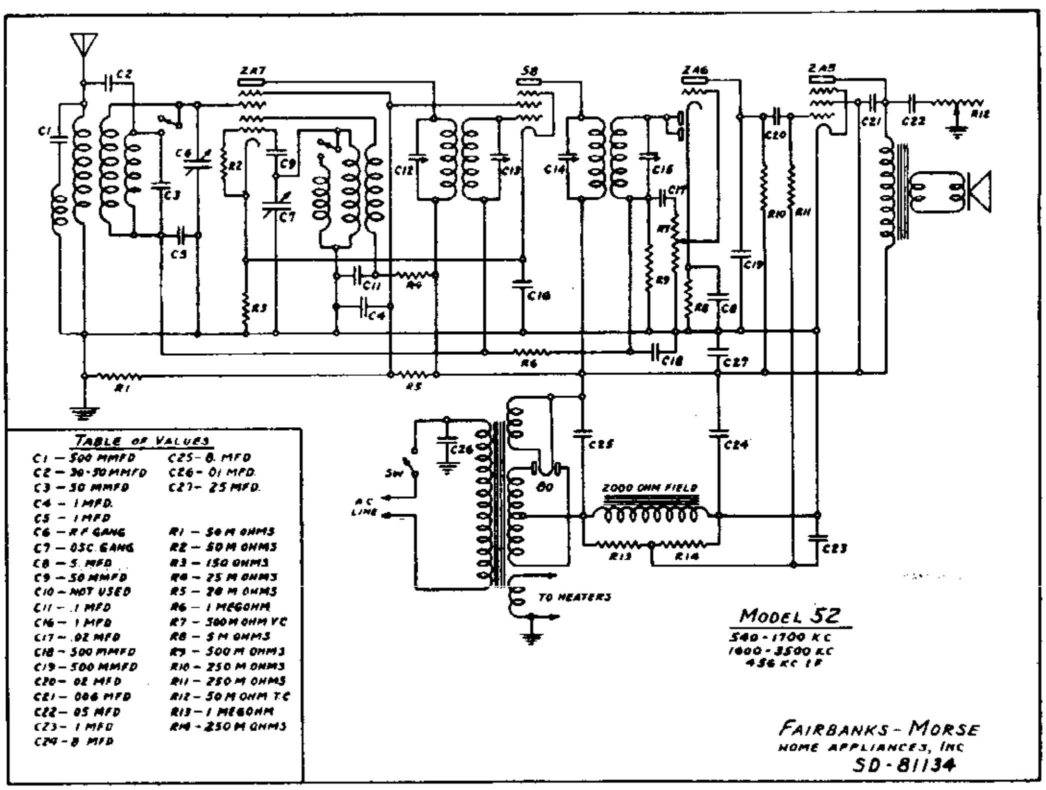


TABLE OF VALUES

C1 – 500 MMFD	C25 – 8. MFD
C2 – 30-50 MMFD	C26 – 01 MFD.
C3 – 50 MMFD	C27 – 25 MFD.
C4 – 1 MFD.	
C5 – 1 MFD	
C6 – R F GANG	R1 – 50 M OHMS
C7 – OSC. GANG	R2 – 50 M OHMS
C8 – 5. MFD	R3 – 150 OHMS
C9 – 50 MMFD	R4 – 25 M OHMS
C10 – NOT USED	R5 – 20 M OHMS
C11 – .1 MFD	R6 – 1 MEGOHM
C16 – 1 MFD	R7 – 500 M OHM VC
C17 – .02 MFD	R8 – 5 M OHMS
C18 – 500 MMFD	R9 – 500 M OHMS
C19 – 500 MMFD	R10 – 250 M OHMS
C20 – 02 MFD	R11 – 250 M OHMS
C21 – 006 MFD	R12 – 50 M OHM T.C
C22 – 05 MFD	R13 – 1 MEGOHM
C23 – 1 MFD	R14 – 250 M OHMS
C24 – 8 MFD	

Model 52

MODEL (53) 5312, 5312-A, 5341
Schematic, Coil Data

FAIRBANKS-MORSE HOME APP., INC.

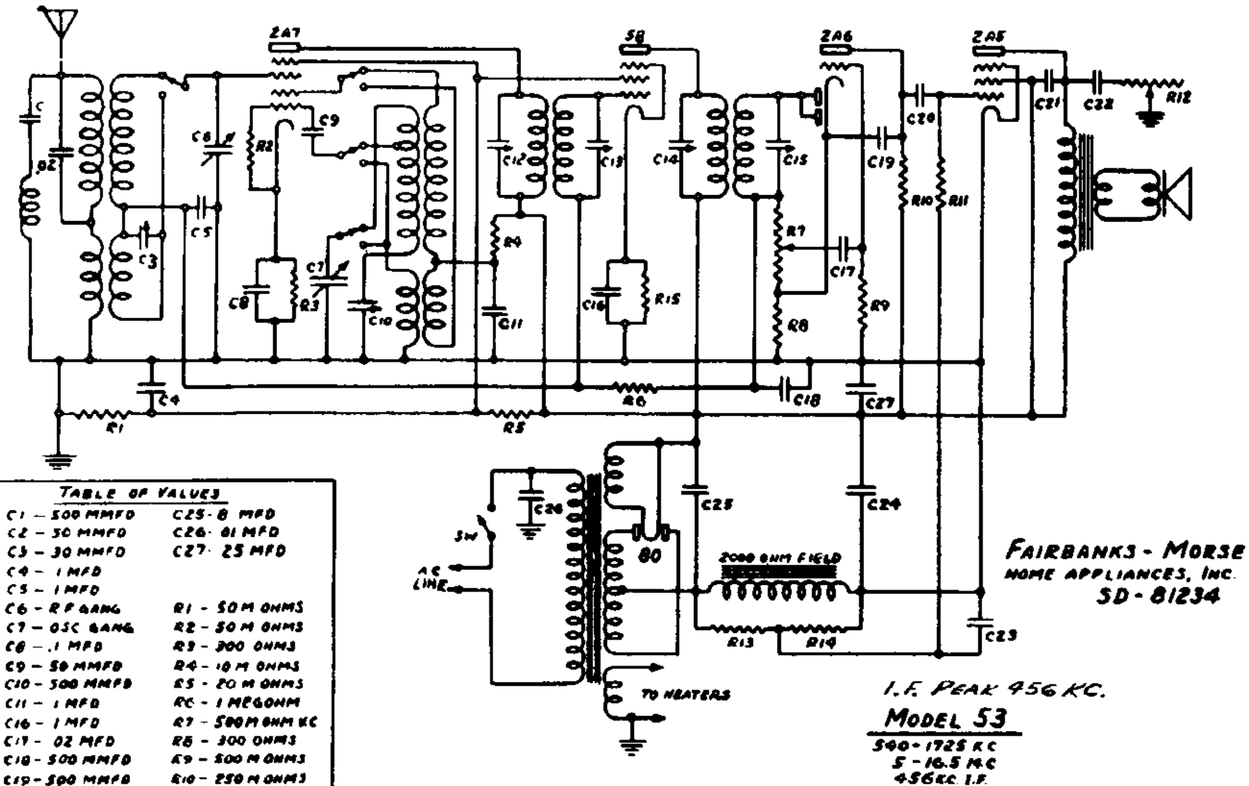


TABLE OF VALUES

C1 — 500 MMFD	C25 - 8 MFD
C2 — 50 MMFD	C26 - .01 MFD
C3 — 30 MMFD	C27 - 25 MFD
C4 — 1 MFD	
C5 — 1 MFD	
C6 — R F GANG	R1 - 50 M OHMS
C7 — OSC GANG	R2 - 50 M OHMS
C8 — .1 MFD	R3 - 300 OHMS
C9 — 50 MMFD	R4 - 10 M OHMS
C10 — 500 MMFD	R5 - 20 M OHMS
C11 — 1 MFD	R6 - 1 MEGOHM
C16 — 1 MFD	R7 - 500 M OHM VC
C17 — .02 MFD	R8 - 300 OHMS
C18 — 500 MMFD	R9 - 500 M OHMS
C19 — 500 MMFD	R10 - 250 M OHMS
C20 — .02 MFD	R11 - 250 M OHMS
C21 — .006 MFD	R12 - 50 M OHM TC
C22 — .05 MFD	R13 - 1 MEGOHM
C23 — 1 MFD	R14 - 250 M OHMS
C24 — 8 MFD	R15 - 300 OHMS

MISCELLANEOUS RESISTANCE — TABLE —

PART	MODELS	PRIMARY	SECONDARY
Antenna Wave Trap Coil	51-52-53		4 OHMS
Antenna Coil	51-(52-53-B.C.) 52 S.W. 53 S.W.	24 OHMS 24 OHMS 1 OHM	3 OHMS 1 OHM .1 OHM
Oscillator Coil (Grid)	51-(52-53-B.C.) 52-S.W. 53-S.W.		3 OHMS 1.5 OHMS 1 OHM
Oscillator Coil (Plate)	51-(52-53-B.C.) 52-S.W. 53-S.W.	3 OHMS 3 OHMS 1 OHM	
First I. F. Transformer	51-52 53	12 OHMS 8 OHMS	12 OHMS 8 OHMS
Second I. F. Transformer	51-52-53	12 OHMS	12 OHMS
Output Transformer	51-52-53	600 OHMS	.75 OHM
Speaker (Voice Coil) (Field)	51-52-53	2 OHMS	 2000 OHMS
Power Transformer Primary High Voltage Secondary (Each Half)	51-52-53	15 CHMS	 250-275

FAIRBANKS-MORSE HOME APP., INC. MODEL 51,52,53 Series Alignment, Color Code, Notes

MODELS 51, 52, AND 53

THE CIRCUIT

Models 51, 52, and 53 are 5 tube superheterodynes. The circuits are very similar, the only differences being those made necessary in order to cover different wave bands. These sets are in many ways a radical departure from conventional design. Maximum performance with a minimum number of tubes is accomplished thru the use of new multi-purpose tubes and new type, high efficiency, I. F. transformers. Due to the use of a high impedance primary, a litz wire secondary, and a wave trap, very good pre-selection and high gain are obtained in the tuned antenna stage. The antenna circuit is fed into a 2A7 which serves the triple purpose of R. F. amplifier, electron coupled oscillator, and first detector. The I. F. output of this tube is fed into the double tuned, first I. F. transformer and from there into the 58 I. F. amplifier. The output of this tube is fed into the second, double tuned, I. F. transformer. The output of this transformer is fed into the 2A6 where three functions are accomplished. Detection, automatic volume control, and audio amplification. The A. F. output of this tube is resistance coupled to the grid circuit of the 2A5, high gain, output tube from where it is transfered to the loudspeaker. A familiar type 80 rectifier is used in a conventional power supply circuit.

WAVE BANDS

The model 51 chassis is a standard broadcast receiver covering a frequency range of 540 to 1725 kilocycles. The model 52 is a dual band chassis covering frequency ranges of 540 to 1700 kilocycles and 1600 to 3500 kilocycles. The model 53 is a split band chassis covering frequency ranges of 540 to 1725 kilocycles and 5 to 16.5 megacycles.

SUGGESTED SERVICE PROCEDURE

If the set does not operate test all tubes. If no tube tester is available replace the tubes in the set, one by one, with tubes known to be good. A noisy tube cannot always be found by checking in a tube tester, however by sharply tapping each of the tubes in the set the bad tube can usually be located.

If, after replacing any defective tubes, the set is still inoperative follow the instructions given under Resistance and voltage analysis.

ALIGNMENT PROCEDURE

Proper adjustment of the tuned circuits will only be possible thru the use of a good service oscillator and output meter.

The gang condenser plates are properly adjusted in the factory and under no condition should it be necessary to bend them.

All adjustments should be made with the volume control full "on". The wave band switch on models 52 and 53 should be in the broadcast position.

1. Supply a 456 kilocycle signal to the grid of the 2A7 thru a .00005 Mfd. condenser. Carefully adjust both trimmers on the first I. F. transformer. The center screw will peak the grid side and the hexagon nut will peak the plate side. Next adjust the second I. F. transformer in the same manner. Since these adjustments are very critical it is advisable to go back over them to make sure they are correct.

2. Turn the gang condenser until it is fully meshed. The dial should read 540 kilocycles, if it is incorrect loosen the set screw and move the dial until the reading is correct.

3. Supply a 1500 kilocycle signal from the test oscillator to the antenna of the set. Tune the set until the dial reads 1500 kilocycles. Adjust the trimmer on the oscillator section of the gang condenser (front section) until the signal comes in at 1500 on the dial. Adjust the trimmer on the R. F. section, of the gang condenser, for maximum output with minimum input from the service oscillator. Some sets do not have a trimmer on the oscillator section and in this case it will only be necessary to adjust the R. F. trimmer for maximum output with the set tuned to the correct frequency reading.

4. On the model 53 a low frequency padding condenser will be found located on the front of the chassis. To adjust this condenser tune the set and the service oscillator to 600 kilocycles. Adjust the padding condenser for maximum output at the same time tune the set back and forth across the 600 kilocycle signal to make sure the correct peak is obtained.

5. If all adjustments have been carefully made the dial readings will be approximately correct on all frequencies If not it will be necessary to go over the entire procedure again.

6. On models 51 and 53 it will sometimes be necessary to make high frequency adjustments at 1200 kilocycles rather than 1500 in the event police calls do not come in properly after alignment.

7. On the model 53 a small trimmer condenser will be found under the chassis and connected across the secondary of the short wave R. F. coil. This condenser should be peaked at 16 megacycles. Turn the band selector to the short wave position and tune the set to 16 megacycles. Supply a 16 megacycle signal to the antenna and adjust the trimmer for maximum output. If no oscillator, supplying a 16 megacycle signal, is available it may be possible to pick up the tenth harmonic of the 1500 kilocycle signal (15 megacycles) from a standard service oscillator. If neither is available it will be necessary to use the signal from a short wave station, near 16 megacycles, or adjust for maximum noise level.

COLOR CODES

SHORT WAVE COIL ASSEMBLY
MODEL 53

ANTENNA COIL
White—Antenna
Other End—Ground

OSC. GRID COIL
Green—Grid
Other End—Ground

OSC. PLATE COIL
Blue Plate
Red B Plus

RF GRID COIL
Green and White—Grid
Black and White—Grid Return

CONDENSER BY-PASS CAN ASSEMBLY

Red Lead	.25	MFD	400 Volts	C-27
Brown Lead	.1	MFD	300 Volts	C-16
Blue Lead	.1	MFD	300 Volts	C-11
Green	.1	MFD	300 Volts	C-23
Red with White	.1	MFD	300 Volts	C- 4

CAN—COMMON GROUND

POWER TRANSFORMER
Black (two) 2.5 Volts
Brown (two) PRIMARY
Yellow (two) 5. Volts
Green (two) High Voltage
Red C. T. High Voltage

FIRST I. F. TRANSFORMER
Blue—P-2A7
Red—B PLUS
Green—Grid
Black and White—Grid Return

SECOND I. F. TRANSFORMER
Blue—Plate
Red—B PLUS
Green—Diode Plates
Black and White—Diode Plate Return

The inner screw on the adjustment condenser is the grid adjustment. The outer hex nut is the plate adjustment.

STANDARD RMA RESISTOR AND CONDENSER COLOR CODE

0—Black	2—Red	4—Yellow	6—Blue	8—Grey
1—Brown	3—Orange	5—Green	7—Purple	9—White

RESISTORS

The body color represents the first figure of the resistance value.

The end color represents the second figure of the resistance value.

The dot color represents the number of ciphers following the first two figures.

MICA CONDENSERS

The first dot on the condenser represents the first figure of the capacity.

The second dot on the condenser represents the second figure of the capacity.

The third dot on the condenser represents the number of ciphers following the first two figures.

MODEL 51,52,53 Series
Voltage

FAIRBANKS-MORSE HOME APP., INC.

RESISTANCE AND VOLTAGE ANALYSIS

The following chart gives detailed information regarding the resistance from various points to various other points on the chassis. The measured voltage from the various tube socket contacts to ground is also given. When this chart is faithfully followed little difficulty should be experienced in finding almost any fault that may develop.

Resistance Tests. These tests should be made with an accurate ohm-meter. The speaker should be connected. All tubes should be removed from the set. The volume and tone controls should be full "on". The A. C. line plug must be removed from the A. C. outlet.

Voltage Tests. These readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on". The antenna should be disconnected. Tune the set to a point where no signal is received.

RESISTANCE AND VOLTAGE ANALYSIS CHART

FROM	TO	MODEL	*VOLTS	†OHMS	POSSIBLE FAULTY UNITS
K-2A7	GND	51-52	2.5	150	C-16 R-3
		53	2.5	300	C-8 R-3
OSC G 2A7	K 2A7	51-52-53	....	50M	R-2
OSC P 2A7	GND	51-52	135	95M	R-1 R-4 R-5 COIL C-4 C-11 C-24 C-25 C-27
		53	170	80M	R-1 R-4 R-5 COIL, SWITCH, C-4 C-11 C-24 C-25 C-27
CG-2A7	GND	51-52	0	1.5 MEG	R-6 R-9 COIL (SWITCH 52) C-5 C-17 C-18
		53	0	1.5 MEG	R-6 R-7 R-8 COIL, SWITCH, C-5 C-17 C-18
P 2A7	GND	51-52-53	205	70M	R-1 R-5 COIL, C-4 C-11 C-24 C-25 C-27
SG 2A7	GND	51-52-53	85	50M	R-1 C-4
K 58	GND	51-52	2.5	150	C-16 R-3
		53	2.5	300	C-16 R-15
SG 58	GND	51-52-53	85	50M	R-1 C-4
CG 58	GND	51-52	0	1.5 MEG	R-6 R-9 COIL, (SWITCH 52) C-5 C-17 C-18
		53	0	1.5 MEG	R-6 R-7 R-8 COIL, SWITCH, C-5 C-17 C-18
P 58	GND	51-52-53	205	70M	R-1 R-5 COIL, C-4 C-11 C-24 C-25 C-27
DP 2A6	GND	51-52-53	....	500M	C-17 C-18 R-7 R-8
G 2A6	GND	51-52	0	500M	R-7 C-17 (VOLUME CONTROL "ON")
		53		500M	R-9 C-17 (VOLUME CONTROL "ON")
P 2A6	GND	51-52-53	85	320M	R-1 R-5 R-10 C-4 C-19 C-24 C-25 C-27
K 2A6	GND	51-52	.8	5M	R-8 C-8
		53	.125	300	R-8
P 2A6	G 2A5	51-52-53	....	820M	C-20
K 2A5	GND	51-52-53	0	0	....
G 2A5	GND	51-52-53	0	500M	R-11 R-14 C-23
SG 2A5	GND	51-52-53	205	70M	C-4 C-24 C-25 C-27 R-1 R-5
SG 2A5	P 2A5	51-52-53	....	600	C-21 PRI. OUTPUT TRANSFORMER
P 2A5	GND	51-52-53	195	70600	R-1 R-5 C-4 C-22 C-24 C-25 C-27 PRI. OUTPUT TRANSFORMER
F 80	GND	51-52-53	205	70M	R-1 R-5 C-4 C-24 C-25 C-27
P 80	GND	51-52-53	80	2250 2275	OPEN H.V. SECONDARY, FIELD SHORTED H.V. SECONDARY, FIELD
ANT	GND	51-52-53	....	26	ANT. COIL PRIMARY
AC PLUG	GND	51-52-53	....	OPEN	C-26 (SWITCH "ON")

*VOLTAGE AS MEASURED WITH 1000 OHM PER VOLT WESTON METER.
*†VARIATIONS OF 10% PLUS OR MINUS ARE ALLOWABLE ON ALL READINGS.
†IF SOME RESISTANCE READINGS ARE LOW TRY REVERSING POLARITY OF OHM-METER.

FAIRBANKS-MORSE HOME APP., INC.

MODEL 51 CHASSIS EMPLOYED IN MODELS

5106—5107—5108—5109
5111—5112—5141—5143

MODEL 52 CHASSIS EMPLOYED IN MODELS

5212—5212A—5241

MODEL 53 CHASSIS EMPLOYED IN MODELS

5312—5312A—5341

COMPOSITE PARTS LIST MODELS 51 - 52 - 53

Part Number	Used on Models	Description of Part	List Price
14061	51-52-53	Wave Trap Coil	1.00
14007	51-52-53	Combination Antenna Oscillator Coil	2.50
14104	52	Short Wave Oscillator and R. F. Coil	1.50
14206	53	Short Wave Coil Assembly	2.50
14210	53	First I. F. Transformer	3.00
11022	51-52	First I. F. Transformer	1.50
11023	51-52-53	Second I. F. Transformer	1.50
14003	51-52-53	Power Transformer 115 Volt 60 Cycle	4.00
T-6204	51-52-53	Power Transformer 115 Volt 25 Cycle	6.00
T-6203	51-52-53	Power Transformer 240 Volt 60 Cycle	4.50
T-6202	51-52-53	Power Transformer 110 and 220 Volt 60 Cycle	5.00
T-6201	51-52-53	Power Transformer 135 Volt 50 Cycle	5.00
14002	51-52	Gang Condenser Clockwise (With Tracking Section)	3.00
14055	51-52	Gang Condenser Counter Clockwise (No Tracking Section)	3.00
14203	53	Gang Condenser Clockwise	3.00
14201	53	Gang Condenser Counter Clockwise	3.00
14009	51	Dial Assembly (Scale and Hub)	.50
14111	52	Dial Assembly (Scale and Hub)	.50
14022	51-52-53	Escutcheon (Peep Type)	.50
14522	53	Escutcheon (Full Vision)	1.00
14056	52-53	Aeroplane Dial—Disc and Hub with Two Pilot Light Sockets	1.00
14211	53	Dial Assembly (Scale and Hub)	.50
14212	53	Aeroplane Dial Scale (Celluloid)	.50
14005	51-52-53	5 Inch Speaker 2000 OHM Field	6.00
14004	51-52-53	6 Inch Speaker 2000 OHM Field	8.00
14552	51-52-53	8 Inch Speaker 2000 OHM Field	12.00
S-5910	51-52-53	Speaker Socket	.10
S-5911	51-52-53	2A5 Socket	.10
S-5912	51-52-53	2A6 Socket	.10
S-5913	51-52-53	2A7 Socket	.10
S-5914	51-52-53	80 Socket	.10
S-5915	51-52-53	58 Socket	.10
14024	51-52-53	Dial Lamp 2.5 Volt	.10
S-5820	51-52-53	Tube Shield	.15
V-6503	51-52-53	Volume Control and Switch R-7	1.20
V-6504	51-52-53	Tone Control—R-12	.80

Part Number	Used on Models	Description of Part	List Price
R-1836	51-52-53	250,000 OHM ½ Watt Resistor R-10	.20
R-1236	51-52-53	250,000 OHM ¼ Watt Resistor R-11	.20
R-1296	51-52-53	1 Megohm ¼ Watt Resistor R-13	.20
R-1266	51-52-53	500,000 OHM ¼ Watt Resistor R-9	.20
R-1581	51-52	5,000 OHM ½ Watt Resistor R-8	.20
R-1716	51-52	25,000 OHM ½ Watt Resistor R-4	.20
R-1746	51-52-53	50,000 OHM ½ Watt Resistor R-1	.20
R-1146	51-52-53	50,000 OHM ¼ Watt Resistor R-2	.20
R-1431	51-52	150 OHM ½ Watt Resistor R-3	.20
R-2901	51-52-53	20,000 OHM 1 Watt Resistor R-5	.20
R-846	53	300 OHM ¼ Watt Resistor R-3	.20
R-1656	53	10,000 OHM ½ Watt Resistor R-4	.20
EC-16	51-52-53	By-Pass Condenser Can Assembly (C-4-C11-C-16-C-23-C-27)	1.60
EL-8	51-52-53	8 MFD. Electrolytic Cond. 450 Volt C-24-25	1.00
EC-4	51-52-53	.05 Tubular Condenser 400 Volt C-22	.20
EC-12	51-52-53	.006 Tubular Condenser 400 Volt C-21	.20
EC-3	51-52-53	.02 Tubular Condenser 400 Volt C-20	.20
EC-2	51-52-53	.01 Tubular Condenser 400 Volt C-26	.20
EC-5	51-52-53	.1 Tubular Condenser 300 Volt C-4-C-5-C-8-C-11-C16	.25
EL-6	51-52	5. MFD. Tubular Elect. Cond. 25 Volt C-8	.50
C-304	51-52-53	500 MFD. (.0005 MFD.) Moulded C-1-C-18-C-19	.20
C-303	51-52-53	200 MFD. (.002 MFD.) Moulded C-9	.20
C-301	51-52-53	50MMFD. (.00005 MFD.) Moulded C-9	.20
C-207	53	Trimmer Condenser (Short Wave) C-3	.25
C-203	52-53	Padding Condenser C-10	1.00
14058	51-52-53	A. C. Line Cord and Plug Assembly	.40
14025	52	Band Selector Switch	1.00
14202	53	Band Selector Switch	1.25
		Knobs, each	.20

When ordering knobs give coloring, size, shape, shaft size, if push or set screw type, model of set, and style of cabinet.

NOTE

Speaker cones cannot be supplied.

Speakers on which cones have been damaged will be repaired at the following prices:

5 Inch Speaker Cone Repair	2.50
6 Inch Speaker Cone Repair	2.50
8 Inch Speaker Cone Repair	2.50

MODEL 61
Schematic

FAIRBANKS-MORSE HOME APP., INC.

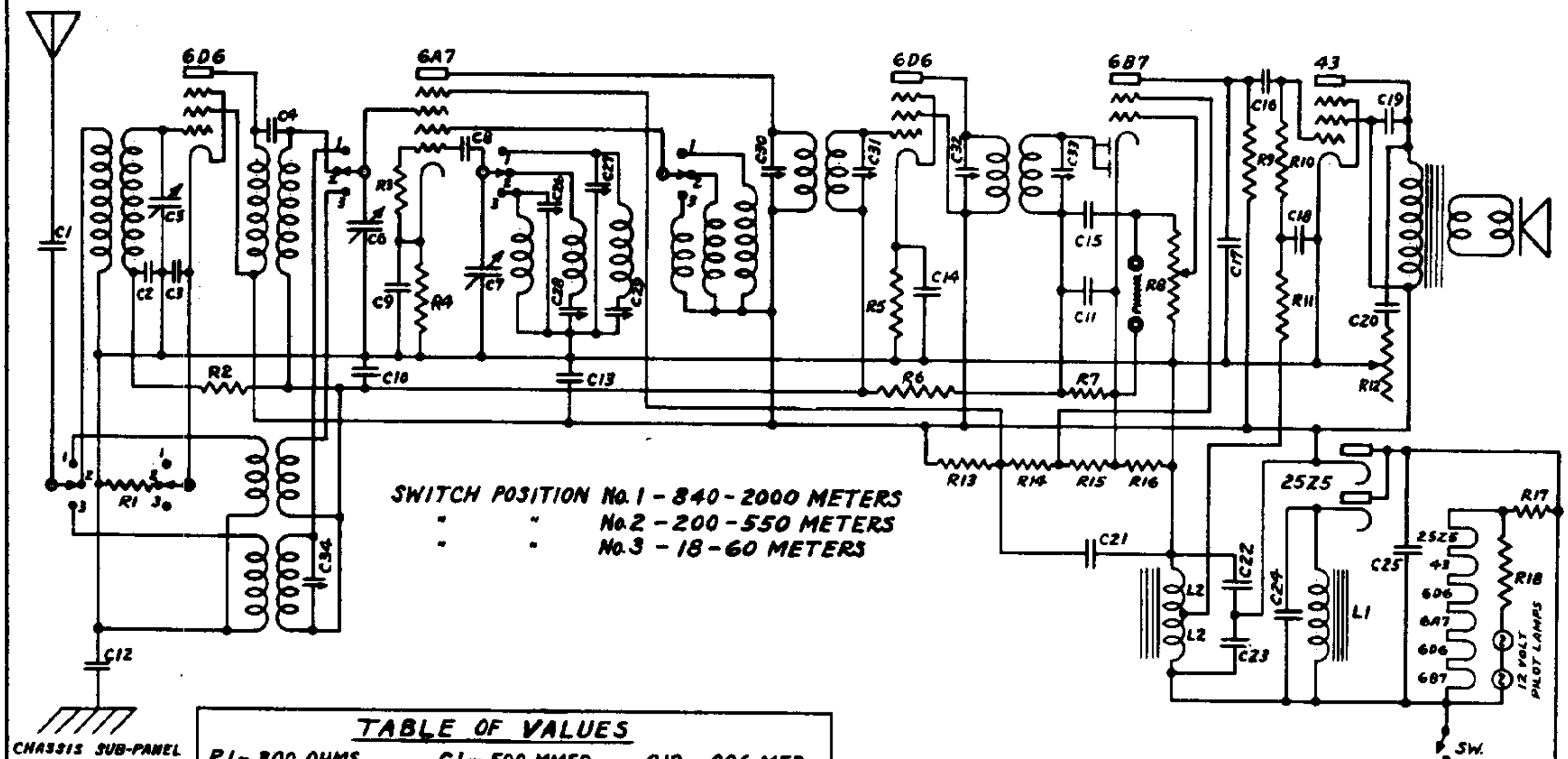


TABLE OF VALUES

R1 - 300 OHMS	C1 - 500 MMFD.	C19 - .006 MFD.
R2 - 500 M OHMS	C2 - .05 MFD.	C20 - .05 MFD.
R3 - 25 M OHMS	C3 - .1 MFD.	C21 - .1 MFD.
R4 - 500 OHMS	C4 - 3 MMFD.	C22 - 10. MFD.
R5 - 300 OHMS	C5 - R.F. GANG	C23 - 16. MFD.
R6 - 500 M OHMS	C6 - DET. GANG	C24 - 5. MFD.
R7 - 500 M OHMS	C7 - OSC. GANG	C25 - .1 MFD.
R8 - 500 M OHM V.C.	C8 - 100 MMFD.	
R9 - 500 M OHMS	C9 - .1 MFD.	
R10 - 250 M OHMS	C10 - .05 MFD.	
R11 - 2 MEGOHMS	C11 - 200 MMFD.	L1 - SPK. FIELD 3200 OHMS
R12 - 50 M OHM T.C.	C12 - .1 MFD.	
R13 - 7500 OHMS	C13 - .25 MFD.	L2 — 300 OHMS
R14 - 5750 OHMS	C14 - .1 MFD.	L2' — 200 OHMS
R15 - 4250 OHMS	C15 - .01 MFD.	
R16 - 520 OHMS	C16 - .01 MFD.	
R17 - 112 OHMS	C17 - 100 MMFD.	
R18 - 512 OHMS	C18 - .05 MFD.	

MODEL 61
I.F. 456 K.C.

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
SD-82334

FAIRBANKS-MORSE HOME APP., INC.

MODEL (70),7014, 7040,7052
Schematic,Coil Data

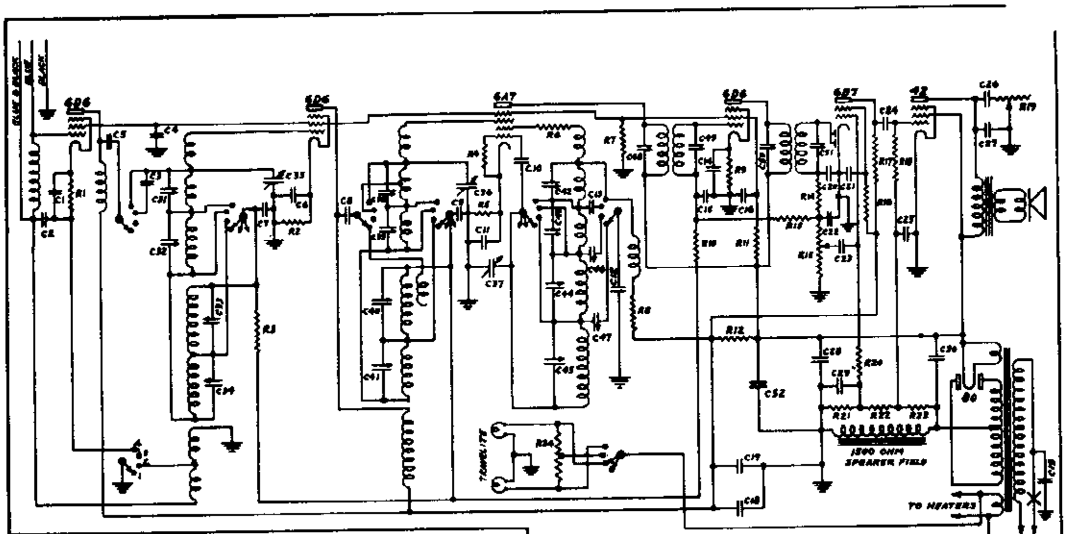


TABLE OF VALUES

C1 - .1 MFD.	C16 - 4. MFD.	R1 - 300 OHMS	R16 - 2 MEGOHMS
C2 - .01 MFD.	C17 - 4. MFD.	R2 - 300 OHMS	R17 - 500 M OHMS
C3 - 30 MMFD.	C18 - .05 MFD.	R3 - 1000 OHMS	R18 - 500 M OHMS
C4 - .1 MFD.	C19 - .01 MFD.	R4 - 100 M OHMS	R19 - 50 M OHM T.C.
C5 - .01 MFD.	C20 - 200 MMFD.	R5 - 300 OHMS	R20 - 1 MEGOHM
C6 - .1 MFD.	C21 - .05 MFD.	R6 - 100 OHMS	R21 - 100 M OHMS
C7 - .05 MFD.	C22 - 200 MMFD.	R7 - 15 M OHMS	R22 - 250 M OHMS
C8 - .01 MFD.	C23 - .01 MFD.	R8 - 10 M OHMS	R23 - 2 MEGOHMS
C9 - .05 MFD.	C24 - .01 MFD.	R9 - 300 OHMS	R24 - 50 OHMS
C10 - 50 MMFD.	C25 - .25 MFD.	R10 - 1 MEGOHM	
C11 - .1 MFD.	C26 - .05 MFD.	R11 - 10 M OHMS	
C12 - .006 MFD.	C27 - .006 MFD.	R12 - 1000 OHMS	C52 - .05 MFD.
C13 - .01 MFD.	C28 - 8. MFD.	R13 - 500 M OHMS	
C14 - .05 MFD.	C29 - .1 MFD.	R14 - 50 M OHMS	
C15 - .05 MFD.	C30 - 16. MFD.	R15 - 250 M OHM KC.	

ALL SWITCHES ARE SHOWN IN BROADCAST POSITION, No. 1.

MODEL 70
456 K.C. I.F.
530-1500 K.C. 1500-4200 K.C.
4.17-12 MC. 3.5-24 MC.

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
SD-81734

FIGURE 2

First I.F. Transformer

Plate .... Blue
"B" Plus .... Red
Grid Return .... Black
Grid (Top) .... Green
Capacity Lead.. Green or Black

Second I.F. Transformer

Plate .... Blue
"B" Plus .... Red
Diode Return .... Black
Diodes .... Green

Power Transformer

Primary .... Two White Leads
6.3 Volt Filament .... Two Black Leads
5. Volt Filament .... Two Green Leads
High Voltage .... Two Yellow Leads
C.T. High Voltage .... Green and Yellow

Dry Electrolytic Condenser (EL-18)

4 Mfd. 300 Volt .... Blue Lead
4 Mfd. 300 Volt .... Red and White
Common Ground .... Black Lead

COIL RESISTANCE VALUES

(Refer to Figure 5 for reference point numbers)

COIL	FROM	TO	D. C. RESISTANCE
Antenna	Top Lug	3	.13 Ohm
	3	2	.02 Ohm
	2	4	.04 Ohm
	5	6	3.5 Ohms
	6	4	1. Ohm
	1	8	3. Ohms
	8	9	5.75 Ohms
R. F. First Detector	Top Lug	3	.08 Ohm
	3	2	.03 Ohm
	2	7	.025 Ohm
	7	4	.025 Ohm
	5	6	3.6 Ohms
	6	4	1. Ohm
	1	9	19. Ohms
Oscillator	9	8	.6 Ohm
	1	3	.02 Ohm
	3	4	.06 Ohm
	4	7	.9 Okm
	7	5	4.5 Ohms

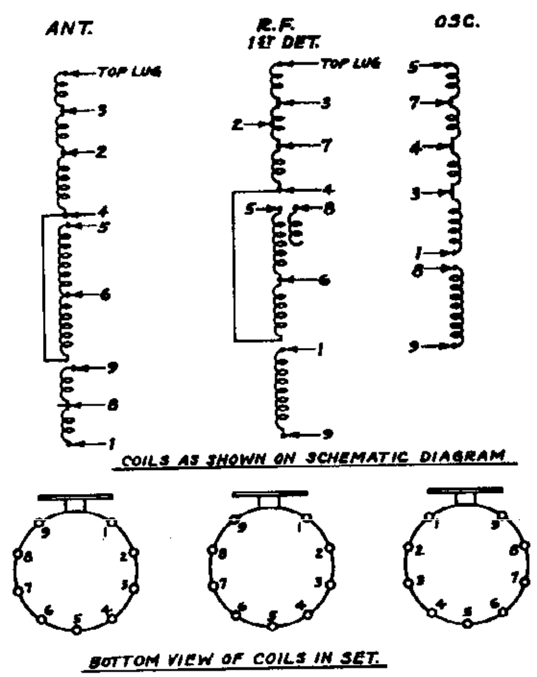


FIGURE 5

MISCELLANEOUS RESISTANCES

Power Transformer

Primary Winding .... 6. Ohms
6.3 Volt Winding .... .12 Ohm
5. Volt Winding .... .14 Ohm
High Voltage Winding ....350. Ohms

Oscillator "B" Choke
11. Ohms
Antenna Choke
.7 Ohm
Antenna Plate Choke
3.5 Ohms

MODEL (70)
7040, 7042, 7014
Socket, Trimmers
Parts View

FAIRBANKS-MORSE HOME APP., INC.

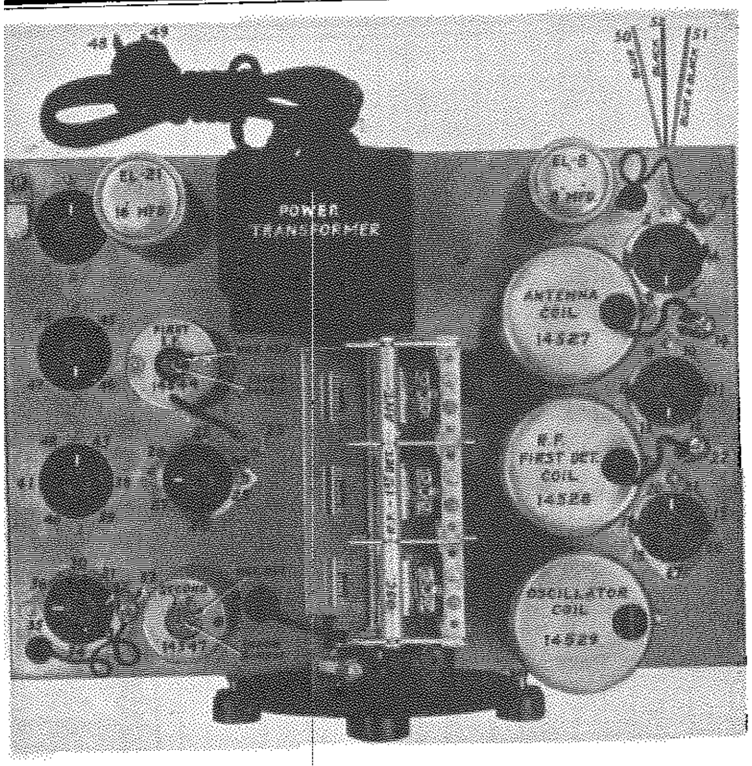


FIGURE 3

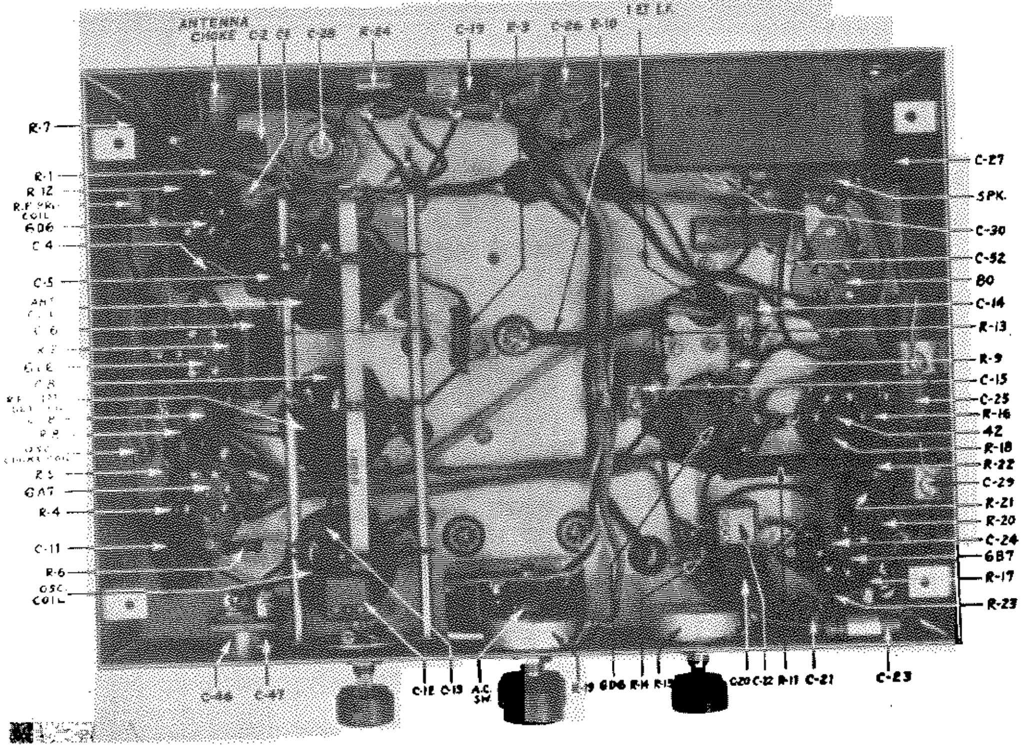


FIGURE 4

WAVE BANDS

The Model 70 is an all wave chassis covering a frequency range from 530 Kilocycles to 24 Megacycles in four bands. Band selection is accomplished by means of a dual four gang switch, controlled by a knob located on the right side of the front panel. The counter-clockwise (extreme left) position is **Band Number One** (530—1500 Kilocycles); turning in a clockwise direction, the next position is **Band Number Two** (1500—4200 Kilocycles); the next position is **Band Number Three** (4.17—12 Megacycles); and the next position (extreme right) is **Band Number Four** (9.5—24 Megacycles). One Megacycle is 1000 Kilocycles.

TUBES AND CIRCUIT

New multi-purpose tubes are employed thereby giving performance equal to the ordinary ten tube set. Two type 6D6 tubes are used as first and second radio frequency amplifiers. A 6A7 is used as a combined oscillator and first detector. A 6D6 is used as the intermediate frequency amplifier. A 6B7 tube is employed and performs three functions, second detector, distortionless automatic volume control, and first audio amplifier. A 42 is used as the audio output tube. A familiar type 80 rectifier is used in a full wave power supply circuit.

Several unique features will be found in this chassis. The most unusual is that two radio frequency amplifier stages are employed on both of the higher frequency bands. Special low loss coils are used. Each coil has a separate high frequency trimmer for each band. A total of eight tuned circuits are brought into use on each band. A new type, high gain, intermediate frequency transformer is used.

HUM

A ground is made to the A. C. line through a .01 Mfd. condenser, connected to the primary of the power transformer. If a hum is noted in the set the A. C. plug should be reversed to connect the grounded side of the line to the grounded side of the set. In most cases the line ground is some distance from the wall outlet to which the set is connected, for this reason an external ground should be used.

STANDARD R M A

Resistor and Condenser Color Code

0 Black	2 Red	4 Yellow	6 Blue	8 Grey
1 Brown	3 Orange	5 Green	7 Purple	9 White

Resistors

The **Body Color** represents the **first figure** of the resistance value.

The **End Color** represents the **second figure** of the resistance value.

The **Dot Color** represents the **number of ciphers** following the first two figures.

Mica Condensers
(Capacity in Micro-Microfarads)

The **First Dot** on the condenser represents the **first figure** of the capacity.

The **Second Dot** on the condenser represents the **second figure** of the capacity.

The **Third Dot** on the condenser represents the **number of ciphers** following the first two figures.

The colors on the condensers should be read from left to right with the condenser in an upright position.

MODEL (70) Series
Voltage Data

FAIRBANKS-MORSE HOME APP., INC.

VOLTAGE ANALYSIS CHART

Voltage readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on". The antenna should be disconnected. The blue wire and the blue and black wire should be twisted to the black wire.

FROM GROUND TO†	MEASURED VOLTAGES**				METER††	
	Band 1 530-1500 Kilocycles	Band 2 1500-4200 Kilocycles	Band 3 4.17-12 Megacycles	Band 4 9.5-24 Megacycles	Range in Volts	Resistance of Range In Ohms
6D6 Ant. Stage 1. Cathode	17	16	2.5	2.5	30	30,000
2. Suppressor	17	16	2.5	2.5	30	30,000
3. Screen	100	100	85	85	300	300,000
4. Plate	225	225	210	210	300	300,000
5. Heater	0	0	0	0	...	......
6. Heater	6.15 A. C.	6.15 A. C.	6.15 A. C.	6.15 A. C.	...	......
7. Grid	0	0	0	0	...	......
6D6 R. F. Stage 8. Cathode	3	3	2.5	2.5	30	30,000
9. Suppressor	3	3	2.5	2.5	30	30,000
10. Screen	100	100	85	85	300	300,000
11. Plate	225	225	210	210	300	300,000
12. Heater	0	0	0	0	...	......
13. Heater	6.15 A. C.	6.15 A. C.	6.15 A. C.	6.15 A. C.	...	......
14. Grid	0	0	0	0	...	......
6A7 Converter 15. Cathode*	2.8	3	3.5	4	30	30,000
16. Osc. Grid G1*	—6.5	—3	2	2	30	30,000
17. Osc. Plate G2	180	175	150	130	300	300,000
18. Screen G3-G5	100	100	85	85	300	300,000
19. Plate	235	235	230	230	300	300,000
20. Heater	6.15 A. C.	6.15 A. C.	6.15 A. C.	6.15 A. C.	...	......
21. Heater	0	0	0	0	...	......
22. Grid	0	0	0	0	...	......
6D6 I. F. Stage 23. Cathode	2.5	2.5	2	2	30	30,000
24. Suppressor	2.5	2.5	2	2	30	30,000
25. Screen	100	100	85	85	300	300,000
26. Plate	235	235	230	230	300	300,000
27. Heater	6.15 A. C.	6.15 A. C.	6.15 A. C.	6.15 A. C.	...	......
28. Heater	0	0	0	0	...	......
29. Grid	0	0	0	0	...	......
6B7 Det. and A. F. 30. Cathode	0	0	0	0	...	......
31. Diode Plate	0	0	0	0	...	......
32. Diode Plate	0	0	0	0	...	......
33. Screen	30	30	27.5	27.5	300	300,000
34. Plate	35	35	35	35	300	300,000
35. Heater	0	0	0	0	...	......
36. Heater	6.15 A. C.	6.15 A. C.	6.15 A. C.	6.15 A. C.	...	......
37. Grid	......	......	......	......	...	......
42 Output 38. Cathode	0	0	0	0	...	......
39. Grid	— 1	— 1	— 1	— 1	30	30,000
40. Screen	235	235	230	230	300	300,000
41. Plate	225	225	220	220	300	300,000
42. Heater	0	0	0	0	...	......
43. Heater	6.15 A. C	6.15 A. C	6.15 A. C.	6.15 A. C.	...	......
80 Rectifier 44. Plate	—130	—130	—135	—135	300	300,000
45. Plate	—130	—130	—135	—135	300	300,000
46. Filament	235	235	230	230	300	300,000
47. Filament	235	235	230	230	300	300,000

A. C. Line—115 Volts

†The figures in the first column refer to the socket hole numbers shown on Figure 3.
††It is essential that a meter be used which is similar to the one indicated in the last two columns.
**Allowable variation—10% plus or minus on all readings.
*Subject to large variations due to 6A7 characteristics.

FAIRBANKS-MORSE HOME APP., INC.

MODEL 70 Series
Voltage Data

RESISTANCE ANALYSIS CHART

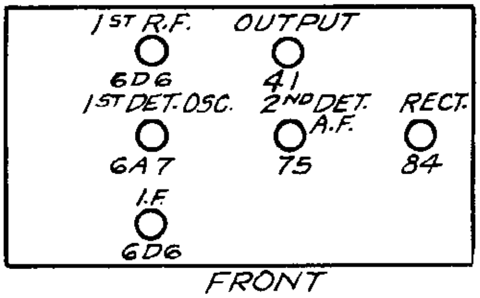
These tests should be made with an accurate ohm-meter. The speaker must be connected. All tubes must be removed from the set. The volume and tone controls should be full "on". The A.C. line plug must be removed from the A.C. outlet.

FROM†	TO	Resistance In Ohms*	If Reading Differs More Than 10% Plus or Minus From Stated Value Check These Parts
6D6 Ant. Stage 1. Cathode	Ground	300	C-1; R-1; Switch (switch must be on Band 3 or 4)
2. Suppressor	Ground	300	C-1; R-1; Switch (switch must be on Band 3 or 4)
3. Screen	Ground	15,000	C-4; C-16; C-52; C-28; C-30; C-26; C-27; C-17; C-18; C-12; R-7; R-11; R-12
4. Plate	Ground	26,000	C-5; C-8; C-17; C-18; C-28; C-30; C-16; C-4; C-52; R-12; R-11; R-7; Plate Choke
5. Heater	Ground	0	Open Ground
6. Heater	Ground	0	Filament Winding; Travelite
7. Grid	Ground	10	Antenna Choke; R. F. Primary
6D6 R. F. Stage 8. Cathode	Ground	300	C-6; R-2
9. Suppressor	Ground	300	C-6; R-2
10. Screen	Ground	15,000	C-4; C-16; C-52; C-28; C-30; C-26; C-27; C-17; C-18; C-12; R-7; R-11; R-12
11. Plate	Ground	26,000	C-5; C-8; C-17; C-18; C-28; C-30; C-16; C-4; C-32; R-12; R-11; R-7; Coil Primary
12. Heater	Ground	0	Open Ground
13. Heater	Ground	0	Filament Winding; Travelite
14. Grid	Ground	1.75 Meg.	C-7; C-9; C-15; C-22; R-3; R-10; R-13; R-15; Coil; Switch
6A7 Converter 15. Cathode	Ground	300	C-11; R-5
16. Osc. Grid G1	Ground	50,300	C-10; C-11; R-4; R-5 (100,000 on early production)
17. Osc. Plate G2	Ground	36,100	C-13; C-17; C-18; C-28; C-30; C-52; C-26; C-27; C-16; C-4; C-12; R-8; R-6; R-12; R 11; R-7; Coil; Choke; Switch
18. Screen G3-G5	Ground	15,000	C-4; C-16; C-52; C-28; C-30; C-26; C-27; C-17; C-18; C-12; R-7; R-11; R-12
19. Plate	Ground	25,000	C-52; C-28; C-30; C-16; C-4; C-17; C-18; C-26; C-27; R-11; R-7; R-12; I. F. Primary
20. Heater	Ground	0	Filament Winding
21. Heater	Ground	0	Open Ground
22. Grid	Ground	1.75 Meg.	C-7; C-9; C-15; C-22; R-10; R-13; R-15; Coil; Switch
6D6 I. F. Stage 23. Cathode	Ground	300	C-14; R-9
24. Suppressor	Ground	300	C-14; R-9
25. Screen	Ground	15,000	C-4; C-16; C-52; C-28; C-30; C-26; C-27; C-17; C-18; C-12; R-7; R-11; R-12
26. Plate	Ground	25,000	C-52; C-28; C-30; C-16; C-4; C-17; C-18; C-26; C-27; R-11; R-7; R-12; I. F. Primary
27. Heater	Ground	0	Filament Winding; Travelite
28. Heater	Ground	0	Open Ground
29. Grid	Ground	750,000	C-15, C-22; R-13; R-15; I. F. Secondary
6B7 Det. and A. F. 30. Cathode	Ground	0	Connection
31. Diode Plate	Ground	300,000	C-20; C-22; C-23; R-14; R-15; I. F. Secondary
32. Diode Plate	Ground	300,000	C-20; C-22; C-23; R-14; R-15; I. F. Secondary
33. Screen	Ground	2 Meg.	C-21; R-16; R-12; R-11; R-7
34. Plate	Ground	526,000	C-24; C-5; C-8; C-17; C-18; C-28; C-30; C-16; C-4; C-32; R-17; R-12; R-11; R-7
35. Heater	Ground	0	Open Ground
36. Heater	Ground	0	Filament Winding; Travelite
37. Grid	Ground	1.1 Meg.	C-23; C-29; R-20; R-21
42 Output 38. Cathode	Ground	0	Connection
39. Grid	Ground	800,000	C-24; C-25; C-29; R-18; R-21; R-22; R-23; Field
40. Screen	Ground	25,000	C-30; C-28; C-52; C-16; C-4; C-26; C-27; C-17; C-18
41. Plate	Ground	25,450	C-26; C-27; C-30; C-28; C-52; C-16; C-4; C-17; C-18; Output Transformer
42. Heater	Ground	0	Open Ground
43. Heater	Ground	0	Filament Winding; Travelite
80 Rectifier 44. Plate	Ground	1,675	High Volgage Secondary; Field
45. Plate	Ground	1,675	High Voltage Secondary; Field
46. Filament	Ground	25,000	C-30; C-28; C-52; C-16; C-4; C-26; C-27; C-17; C-18
47. Filament	Ground	25,000	C-30; C-28; C-52; C-16; C-4; C-26; C-27; C-17; C-18
Miscellaneous 48. A. C. Line	Ground	Open	C-19; Primary; Switch
49. A. C. Line	Ground	Open	C-19; Primary; Switch
50. Ant. (Blue)	Ground	0	Antenna Choke; R. F. Primary
51. Doublet (Blue & Black)	Ground	0	R. F. Primary
52. Ground (Black)	Ground	0	Connection
48. A. C. Line	49. A. C. Line	6	Primary; Switch; A. C. Cord; Plug
44. Plate 80	45. Plate 80	350	High Voltage Secondary
46. Fil. 80	47. Fil. 80	0	Rectifier Filament Winding

Travelite sockets and R-24 must be checked separately.
*If some resistance readings are low try reversing polarity of Ohm-meter.
†The figures in the first column refer to the socket hole numbers shown on Figure 3.

MODEL 346,B-6
MODEL 347
Schematics,Voltage
Socket

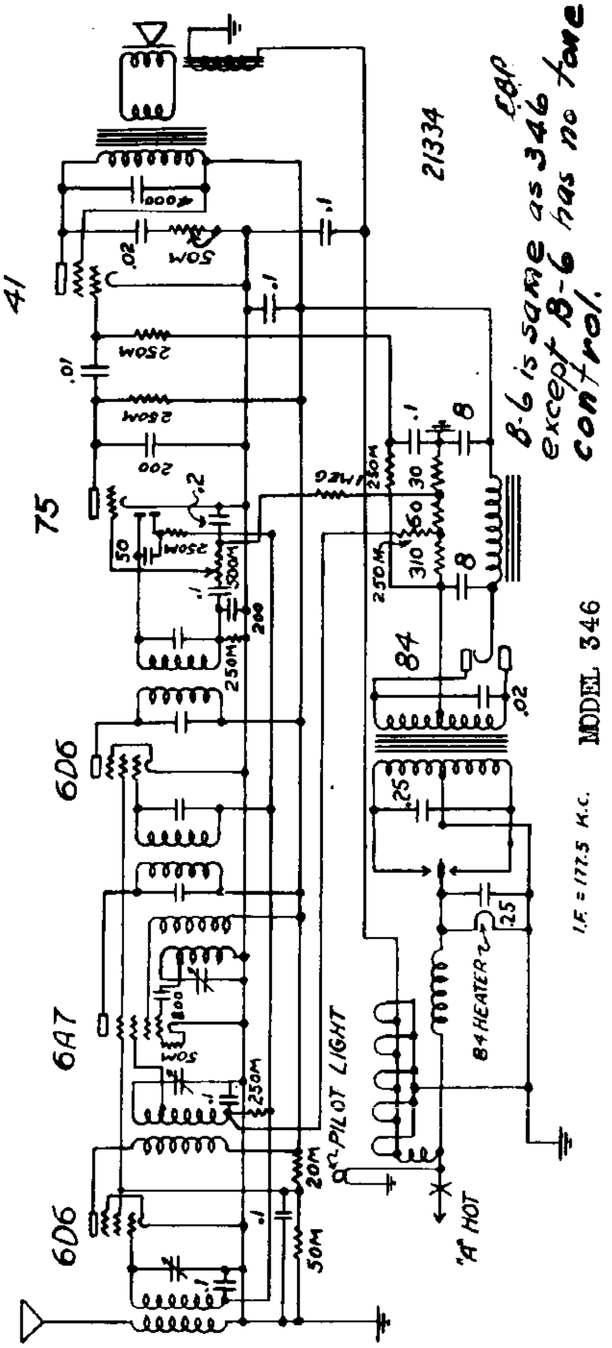
FAIRBANKS-MORSE HOME APP., INC.

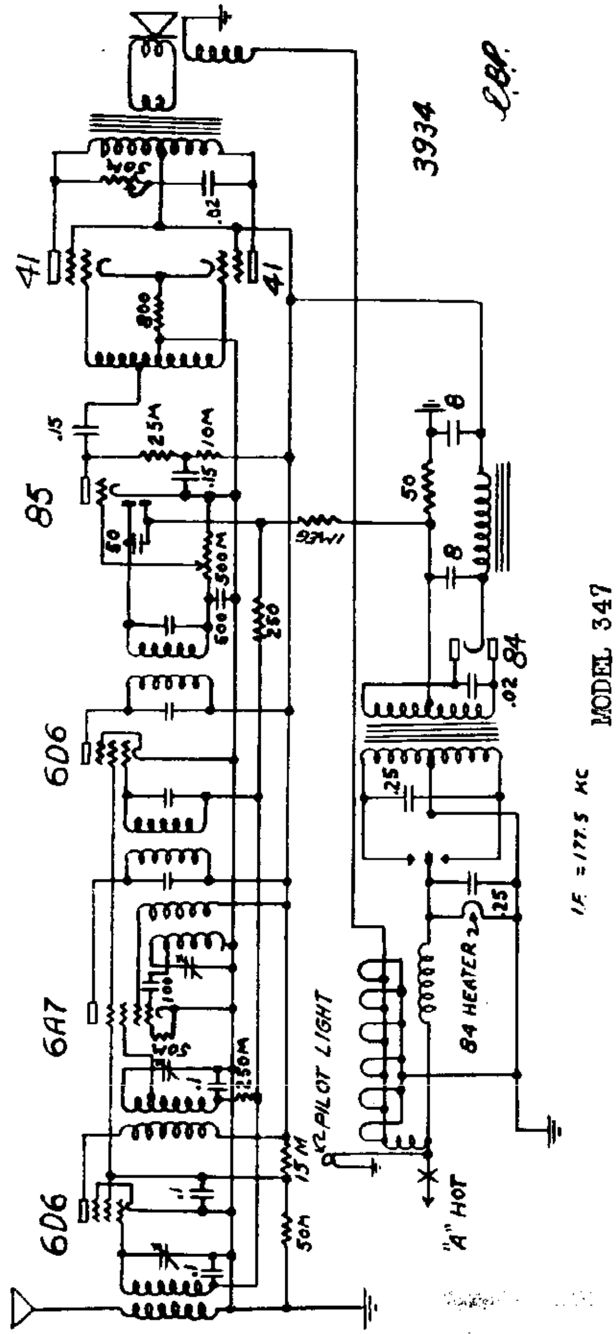


VOLTAGE CHART

The following chart gives the voltages and plate currents of all the tubes when the set is in operating condition, but with no signal being received. A thousand ohm-per-volt meter of the 0-250 volt type is used for all voltage readings.

Type of Tube	Function	Heater Voltage	Plate to Ground	Screen to Ground	Grid to Ground	Normal Plate M.A.
6D6	R. F.	6.1	230	100	1b	5
6A7	1st Det.		230			2.5
	and Osc.	6.1	230a	100	1b	5.5a
6D6	I. F.	6.1	230	100	1b	5
75	2nd Det.					
	1st Audio	6.1	120			.3
41	Output	6.1	215	230	10c	15





FAIRBANKS-MORSE HOME APP., INC.

MODEL 32 Volt
Schematic

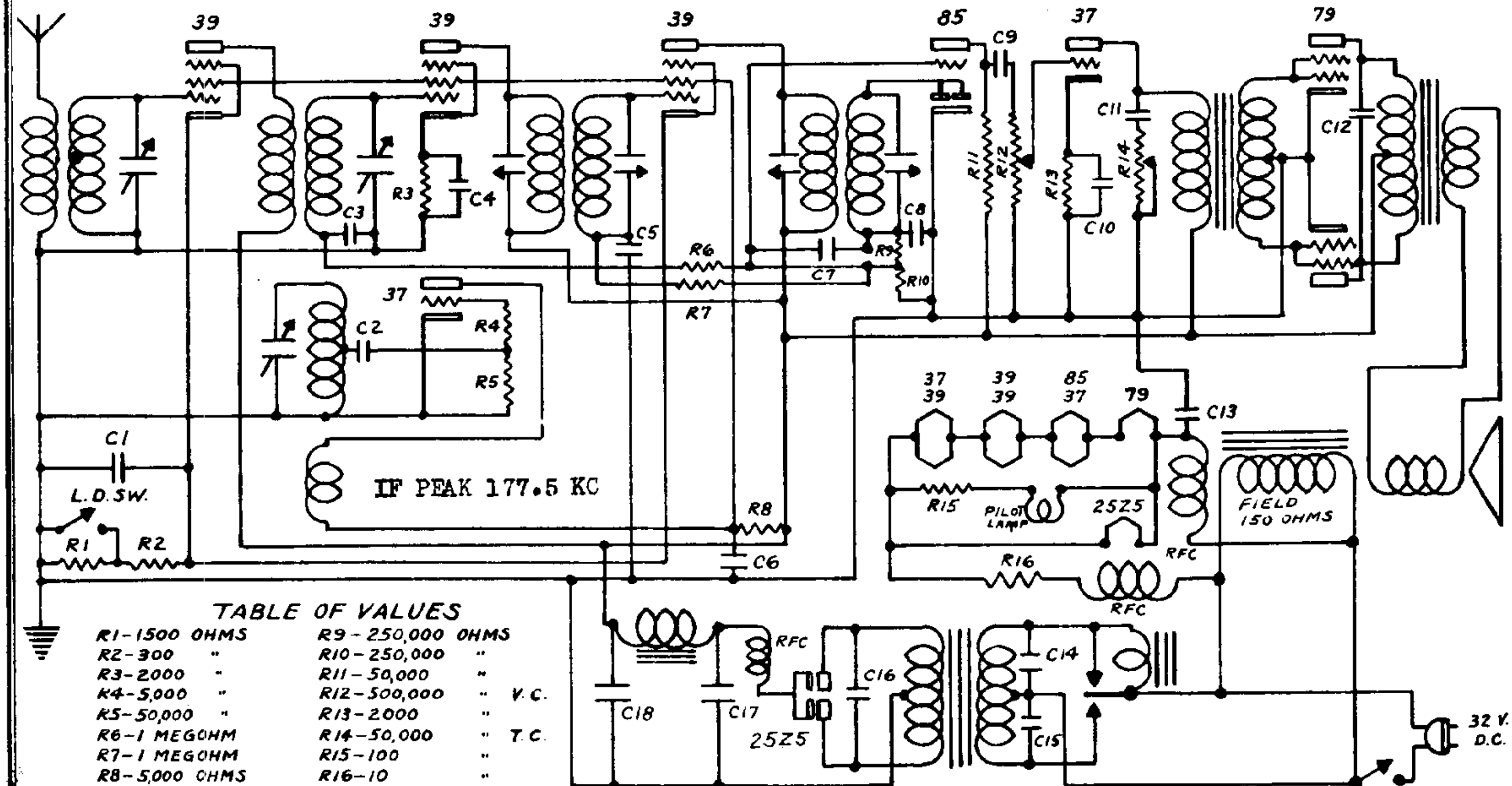


TABLE OF VALUES

R1-1500 OHMS	R9-250,000 OHMS		
R2-300 "	R10-250,000 "		
R3-2000 "	R11-50,000 "		
R4-5,000 "	R12-500,000 "	V.C.	
R5-50,000 "	R13-2000 "		
R6-1 MEGOHM	R14-50,000 "	T.C.	
R7-1 MEGOHM	R15-100 "		
R8-5,000 OHMS	R16-10 "		
C1-.25 MFD.	C10-5. MFD.		
C2-500 MMFD.	C11-.05 "		
C3-.1 MFD.	C12-.01 "		
C4-.05 "	C13-.1 "		
C5-.1 "	C14-.25 "		
C6-.25 "	C15-.25 "		
C7-.05 "	C16-.06 "		
C8-1000 MMFD.	C17-8. "		
C9-.02 MFD.	C18-8. "		

FAIRBANKS - MORSE
HOME APPLIANCES, INC.

32 VOLT DIRECT CURRENT RECEIVER

S.D. 8234

MODEL 32 Volt
Voltage, Parts
Alignment

FAIRBANKS-MORSE HOME APP., INC.

VOLTAGES

Tolerances of about 10% plus or minus are allowable on the following list of measured voltages. In the event all voltages are low try replacing the 25Z5 rectifier tube or vibrator. All measurements are made to ground except on filament voltage.

TUBE		PLATE	GRID	SCREEN	CATHODE	HEATER
39	1st Det.	205	0	120	12.5	6.3
39	R. F.	205	0	120	5	6.3
39	I. F.	205	0	120	5	6.3
37	Osc.	120	0	-	0	6.3
37	A. F.	185	0	-	12.5	6.3
85	2nd Det.	45	0	-	0	6.3
79	A. F.	205 each	0 each	-	0	6.3
25Z5	Rect.	-	-	-	-	-

ALIGNMENT PROCEDURE

If the set is weak or broad it is possibly out of alignment and the following adjustments should be made.

1. A 177.5 kilocycle signal, from a good service oscillator, should be supplied to the grid of the 39 first detector tube thru a small condenser (.00005 MFD). The trimmers on the first and second I. F. transformers should be adjusted for maximum output with minimum input from the service oscillator. The first I. F. transformer is located at the left of the chassis and the second I. F. at the right of the chassis, viewed from the front. These trimmers may be reached from the bottom of the chassis.
2. Supply a 1500 kilocycle signal to the antenna of the set. Tune the dial to 1500 kilocycles. Adjust the trimmer on the oscillator section of the gang condenser (the rear section) for maximum output with minimum input from the service oscillator.

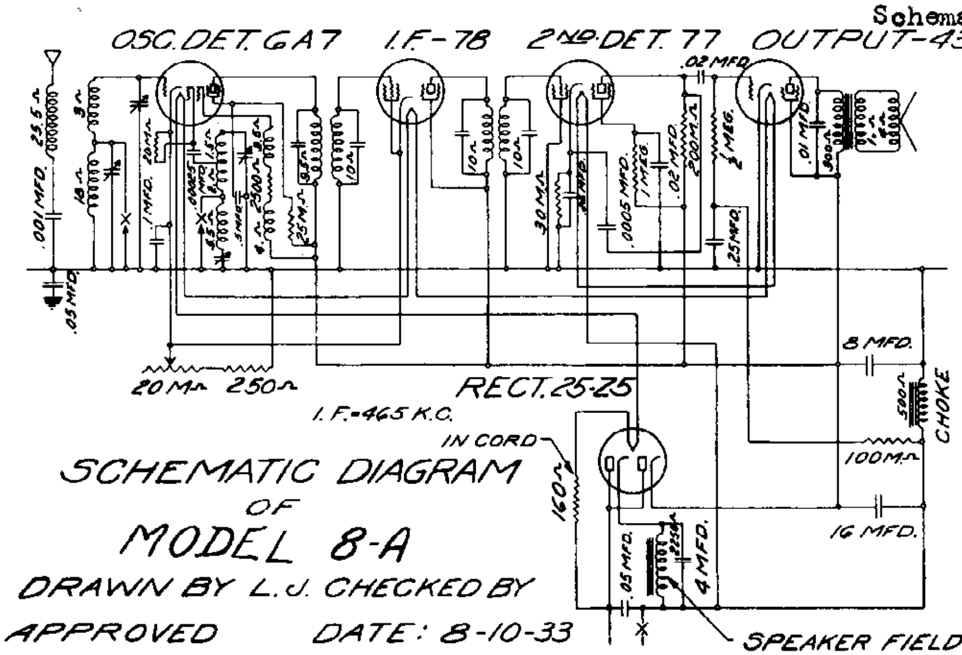
3. Adjust the trimmers on the R. F. and first detector sections of the gang condenser for maximum output with minimum input from the service oscillator.

PARTS LIST

Part Number	Description of Part	Part Number	Description of Part
R-5005	10 Ohm Resistor Wire Wound	R-1896	1 Megohm Resistor 1/2 Watt
R-5006	100 Ohm Resistor Wire Wound	C-304	500 MMFD. Moulded Condenser
R-1446	300 Ohm Resistor 1/2 Watt	C-311	1000 MMFD. Moulded Condenser
R-1506	1500 Ohm Resistor 1/2 Watt	EC-1	.004 MFD. Condenser Tub. 400 V.
R-921	2000 Ohm Resistor 1/4 Watt	EC-3	.02 MFD. Condenser Tubular 400 V.
R-1521	2000 Ohm Resistor 1/2 Watt	EC-4	.05 MFD. Condenser Tubular 400 V.
R-1581	5000 Ohm Resistor 1/2 Watt	EC-5	.1 MFD. Condenser Tubular 300 V.
R-1746	50,000 Ohm Resistor 1/2 Watt	EC-6	.25 MFD. Condenser Tubular 400 V.
R-2346	50,000 Ohm Resistor 1 Watt	EC-7	.25 MFD. Condenser Tubular 300 V.
R-1236	250,000 Ohm Resistor 1/4 W.	EL-6	5. MFD. Cond. Tub. Electrolyt. 25 V.
R-1836	250,000 Ohm Resistor 1/2 W.	EL-9	8. MFD. Cond. Tub. Electrolyt. 250V.
14611	Dial Assembly Complete	14601	Power Transformer
V-6511	Volume Control	14602	Vibrator Assembly
V-6512	Tone Control	14603	Filter Choke
SW-6102	Switch	14604	Antenna Coil

MODEL 8-A
Schematic, Voltage
MODEL 7-A, 13-A, 24-A
Schematic, Voltage

FEDERATED PURCHASER

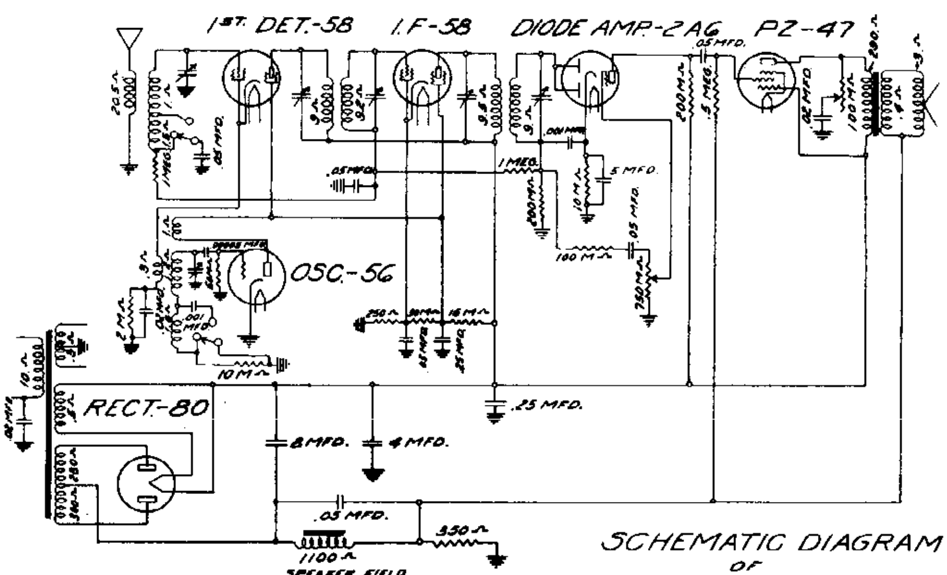


SCHEMATIC DIAGRAM OF MODEL 8-A
DRAWN BY L.J. CHECKED BY
APPROVED DATE: 8-10-33

SOCKET VOLTAGE ANALYSIS OF MODEL 8-A
Line Voltage 110

TUBE	STAGE	Ep	Eg	Ek	Esg	Esug	Ip	Ep-O	Eg-O	Ip-O
6A7	Osc-Det.	105	2.4	20	38		1	92	.1	3
78	I-F.	105	2.1	20	105	0	6.5			
77	2 Det.	35	15	18	.6	1.4	.1			
43	Output	100	.3	18	107		19			
25Z5	Rectif.	110*		110**			37*			

* per plate ** per cathode Vol. Cont. Full On O-Oscillator



SCHEMATIC DIAGRAM OF MODELS 7-A, 13-A, 24-A.
DRAWN BY L.J. CHECKED
APPROVED DATE: 8-23-33

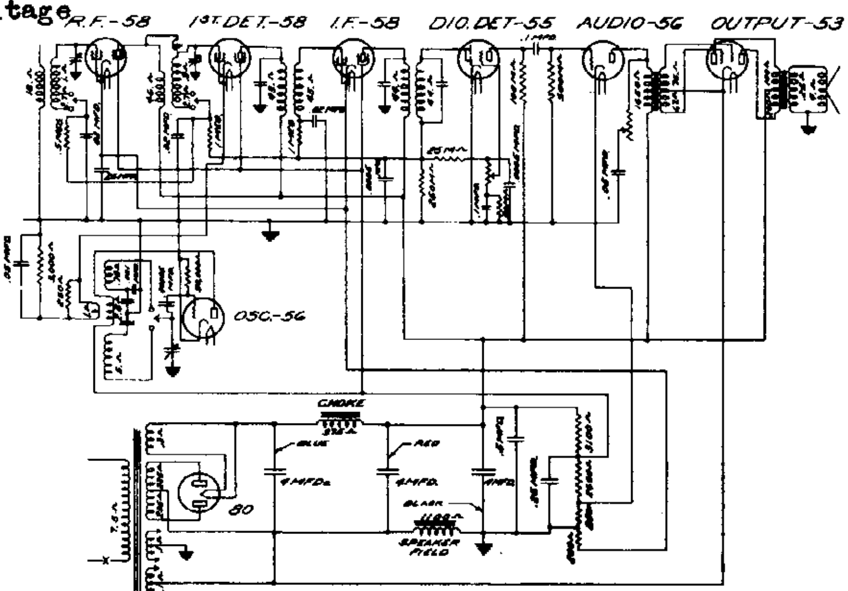
SOCKET VOLTAGE ANALYSIS OF MODELS 7-A, 13-A, 24-A
Line Voltage - 109 v.

TUBE	STAGE	Ep	Eg	Ek	Esg	Esug	Ip	Ef
58	1 Det	235	.4	7	80	0	2.7	2.1
56	Osc.	95	.6	0			5	2.1
58	I-F.	243	.3	2.2	85	0	6	2.1
2A6	Diode	140	4.	1.1	.1**		.2	2.1
47	Output	235	.5	240			24	2.1
80	Rectif.	328*					24*	4.7

* per plate ** Diode plate Vol.Cont.-Full On

MODEL 6-A, 12-A
Schematic
MODEL 14-A
Schematic, Voltage

FEDERATED PURCHASER



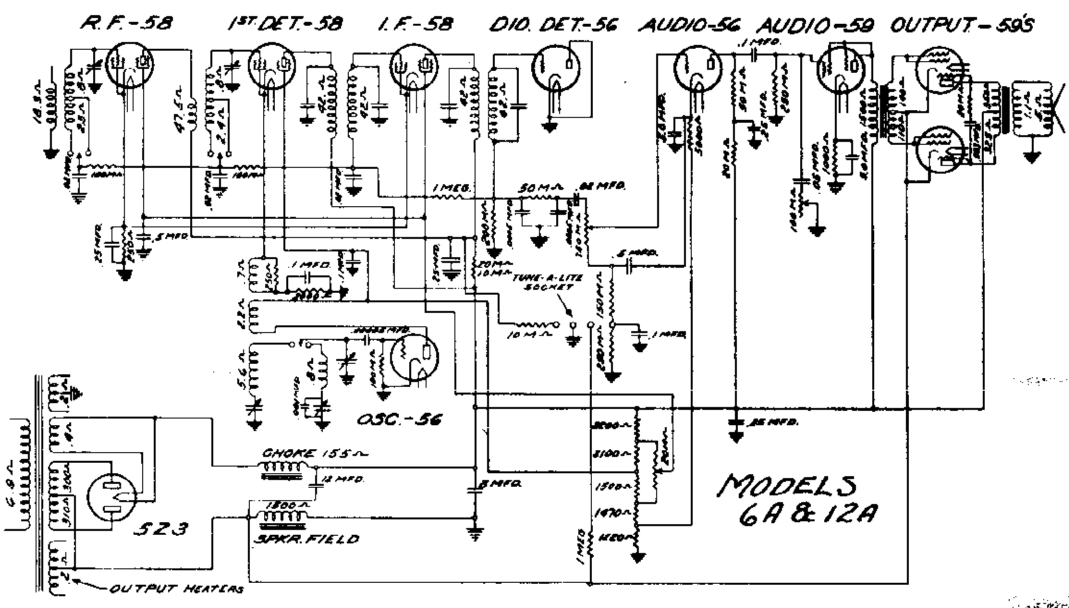
IF = 175 K.C.

SCHEMATIC DIAGRAM of MODEL 14-A
DRAWN BY L.V. CHECKED BY
APPROVED DATE - 11-8-33

SOCKET VOLTAGE ANALYSIS OF MODEL 14-A
Line Voltage - 107 v.

TUBE	STAGE	Ep	Eg	Ek	Esg	Esug	Ip
58	R-F	190	.3	2.9	83	0	6
58	1 Det.	190	.3	7	78	0	2
56	Osc.	83	.3	0			4.5
58	I-F.	190	.3	2.9	83	0	5.5
55	Diode	36	.2	0	.2**		2
56	A-F.	198	.2	10			5
53	Output	292*	0	0			12*
80	Rectif.	292*					37*

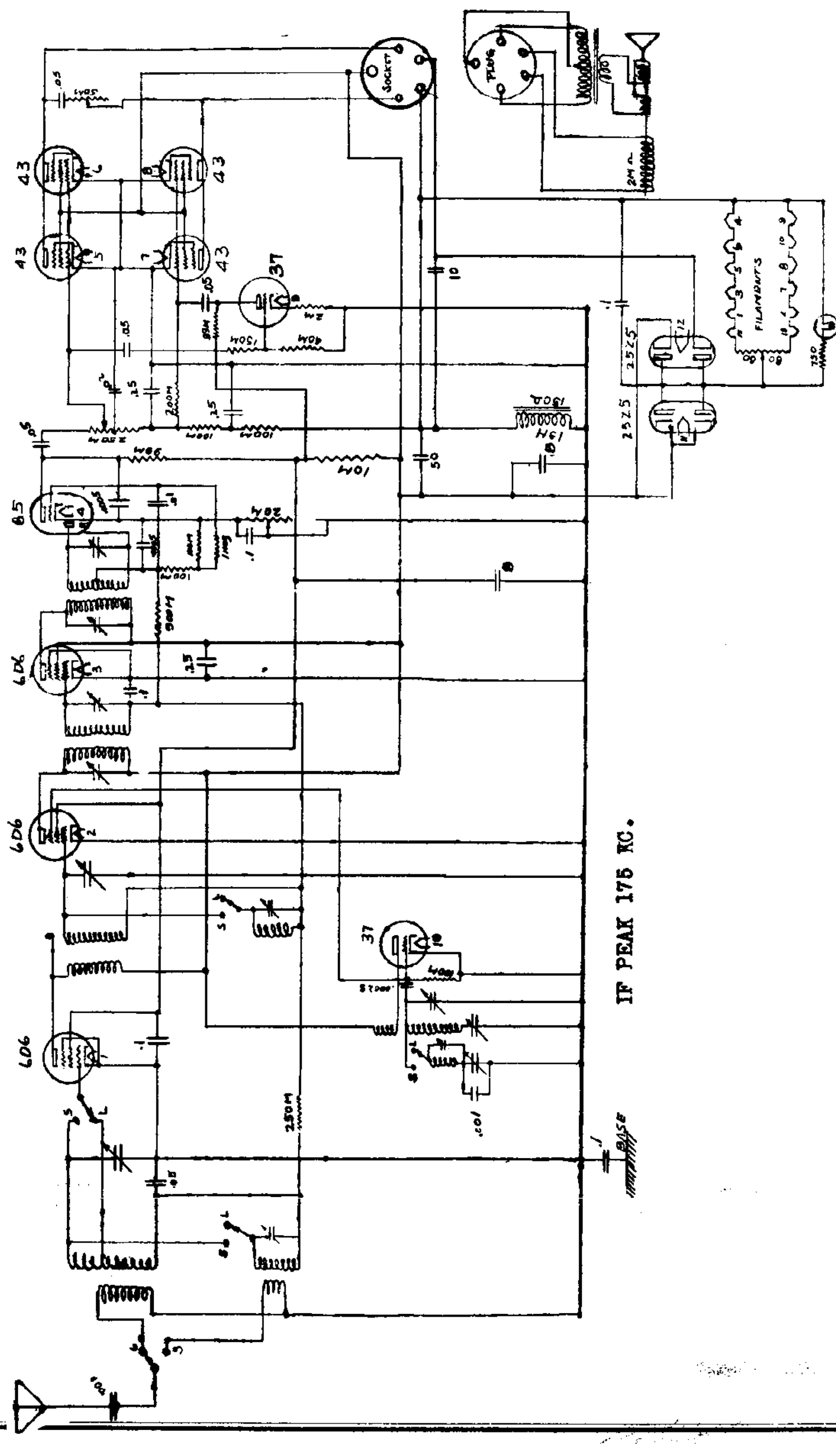
* per plate **Diode voltage Vo.Cont.Full On



I.F. = 175 K.C.

MODEL 32-A, 36-A
Schematic

FEDERATED PURCHASER



MODEL 32-A,36-A
Alignment,Voltage

FEDERATED PURCHASER

TABLE OF VOLTAGES
Line Voltage - 115 Volts - 60 Cycles AC
Interchannel Noise Suppressor Set for Maximum Sensitivity

Position	Tube	Plate	Screen	Cathode
RF	6D6	100	60	0
MOD	6D6	100	60	0
OSC	37	100		0
IF	6D6	100	100	0
DET	85	20		0
PHASE REVERSER	37	20		1-2V
OUTPUT	43		100	0

Above voltage's measured with 0-250 V--1000 ohm per volt DC Voltmeter
Drop ACROSS CHOKE - 18 Volts
Drop ACROSS SPEAKER FIELD -
When operated on 115 Volts DC or 25 cycle AC the above voltages will be slightly lower

FILAMENT VOLTAGES

25Z5	-	25 Volts	-	AC or DC
43	-	25 "	-	AC " DC
6D6	-	6.3 "	-	AC " DC
37	-	6.3 "	-	AC " DC
85	-	6.3 Volts	-	AC " DC

ALIGNMENT PROCEDURE

Should it ever become necessary to realign the RF and IF circuits, the procedure outlined below should be followed.

1. Apply a modulated 175 Kilocycle signal to the grid of the modulator (1st detector) tube and align the four dual trimmer adjustments in the top of the IF transformer cans for maximum output from the receiver.

2. With the band switch knob in the 530-1500 Kilocycle or clockwise position, and the tuning dial set to 1400 Kilocycles, apply a 1400 Kilocycle signal at the antenna and adjust the three trimmer screws on the gana condenser for maximum output from the receiver.

3. Apply a 600 Kilocycle signal at the antenna and track the oscillator by varying the nut adjustment on the oscillator padding condenser and returning the dial until maximum response is obtained. This adjustment should be made disregarding calibration.

4. With the band switch in the short wave or counter-clockwise position and the dial set to 3.6 Megacycles, apply a 3600 Kilocycle signal at the antenna and align the three trimmers in the top of the short wave coil cans for maximum response.

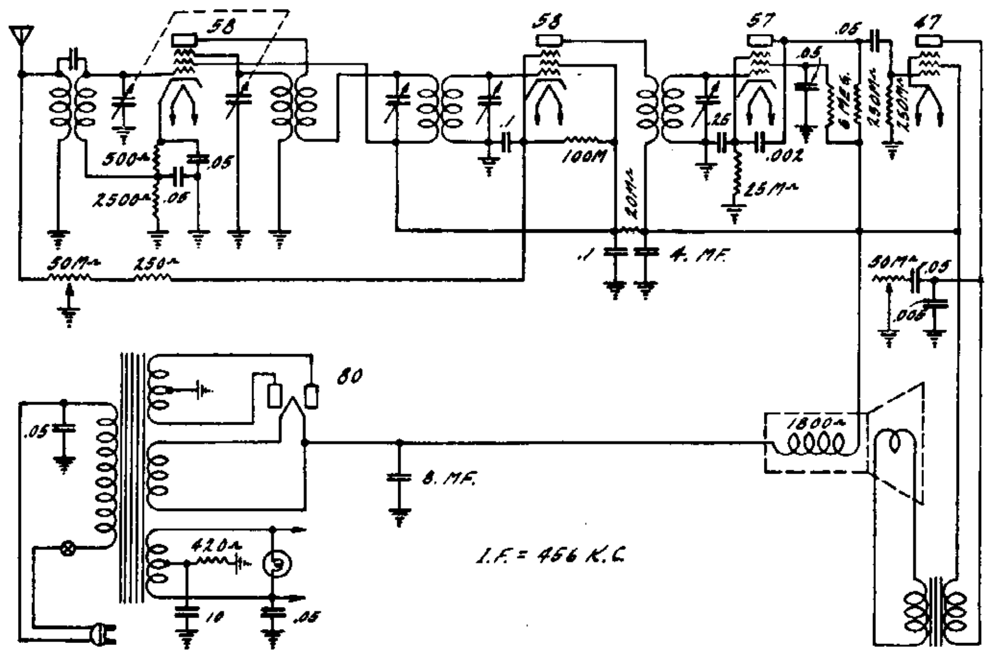
5. Apply a 1600 Kilocycle signal at the antenna and track the oscillator as at 600 Kilocycles in the broadcast band by adjusting the slotted screw adjustment on the oscillator padding condenser.

Suitable harmonies of a broadcast oscillator may be used for alignment purposes in the short wave band.

At all steps in the aligning procedure, the output should be kept only as high as is necessary for good alignment but the output should always be lowered by decreasing the input to the receiver, never by reducing the volume control setting. The volume control should be at maximum setting during any adjustments of the RF and IF circuits. A suitable output meter should be connected across the speaker voice coil to indicate the correct adjustment for maximum response.

MODEL 38-A
Schematic, Voltage
Alignment

FEDERATED PURCHASER



ALIGNMENT PROCEDURE

1. Apply a modulated 456 KC. signal to the grid of the modulator tube and align the four dual trimmer adjustments in the top of the I-F. transformer cans for maximum output from the receiver.

2. Apply a 600 KC. signal at the Antenna and track the Oscillator by varying the nut adjustment on the Oscillator Padding Condenser and turning the dial until maximum response is obtained. This adjustment should be made disregarding calibration.

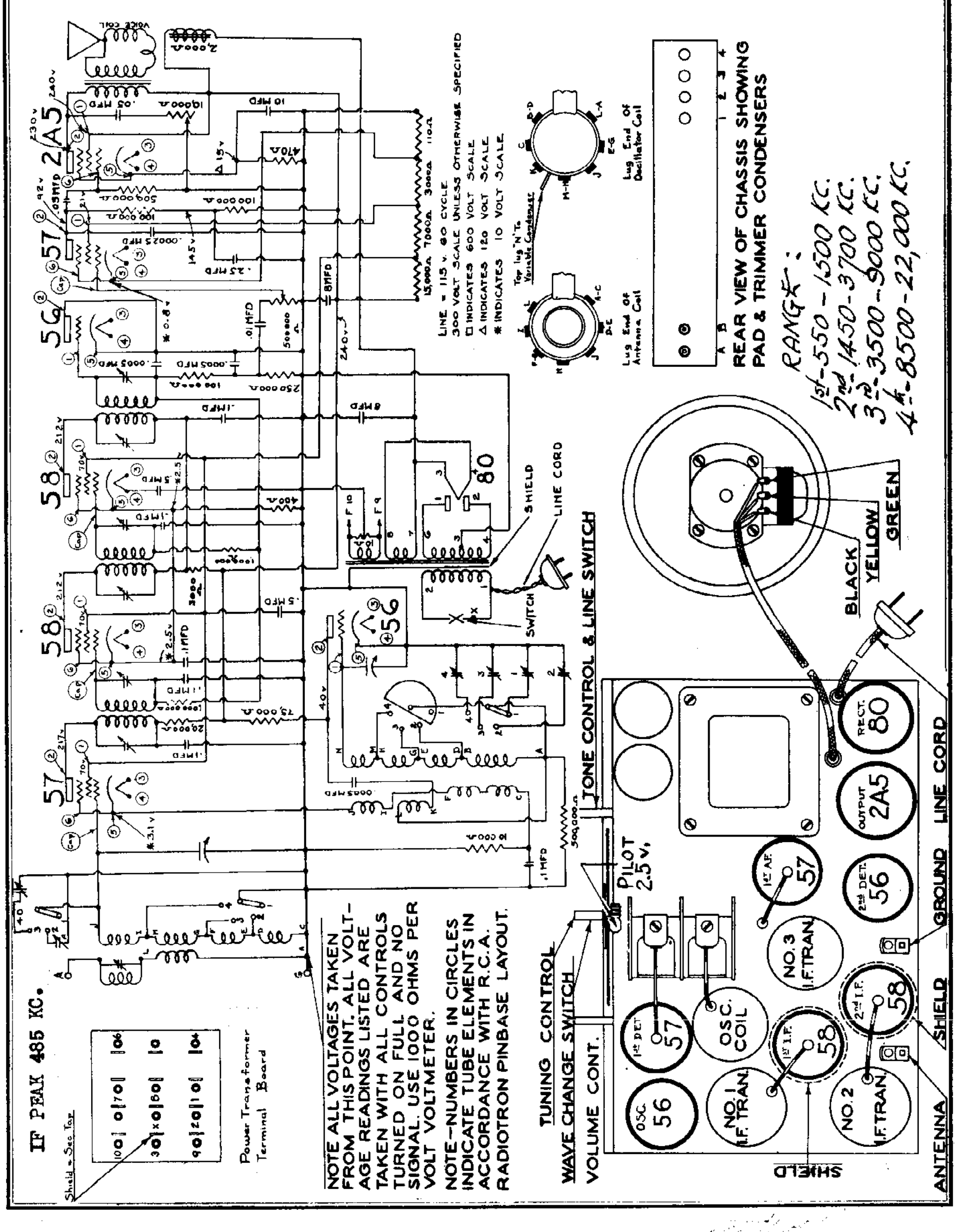
During the aligning procedure, the output should be kept only as high as is necessary for good alignment, but the output should ALWAYS BE LOWERED by decreasing the input to the receiver, NEVER by reducing the Volume Control setting. The Volume Control should be set at maximum during any adjustments of the R-F. and I-F. circuits. A suitable output meter should be connected across the speaker voice coil to indicate the correct adjustment for maximum response.

TABLE OF VOLTAGES   Line: 115 volts, 60 cycles

TUBE	FUNCTION	GRID	PLATE	SCREEN	FILAMENT
58	Osc. 1st Det.	-2.5	60	60	2.5
58	IF	-2.0	250	75	2.5
57	2nd Det.	-3.5	75	6	2.5
47	Output	-5.0	210	225	2.5
80	Rectifier Filament to Ground 325 volts.				5.0

MODEL 39-A,43-A,44-A,
86,87
Schematic,Voltage,
Trimmers,Socket

FEDERATED PURCHASER



FEDERATED PURCHASER

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER, AND TURN THE VOLUME & TONE CONTROLS TO THEIR MAXIMUM POSITIONS (clockwise).

The I.F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I.F. amplifier to be at fault, in that event:-

(1) Attach the output meter from plate to screen of 2A5 tube.
(2) Feed the signal from the local oscillator tuned to exactly 485 kc. into the receiver at the control grid of the first detector, providing a D.C. path from the point to ground.
(3) Adjust the I.F. trimmers to give maximum indication on the output meter. There are three I.F. transformers, each with two screw adjustments. On the early models these adjustments are on the bottom of the transformers, accessible from the under side of the chassis. On the later models these adjustments are on the top of the transformers.
(4) NEXT-feed the 485 kc. signal in at the antenna post, replace the first detector grid cap, and adjust the wave trap condenser for MINIMUM indication on the output meter. This adjustment is a $\frac{1}{4}$" hex nut on a two plate trimmer under the chassis, below the gang condenser, near the band switch.

(1) Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc., should come in.
(A) Set Band switch to band 1 (top scale).
(B) Adjust oscillator trimmer (screw adjustment, top-rear of gang condenser) until desired signal is heard. There will be two peaks in adjusting this trimmer. The peak obtained with the loosest trimmer setting is correct.
(2) Repeat operation 1 at, or near, 550 kc., using band 1.
(A) Adjust oscillator pad (fourth adjustment from right, on rear of chassis pan) until desired signal is heard.
(3) Repeat operation 1 at, or near, 1450 kc., using band 2.
(A) Adjust oscillator pad (third adjustment from right on rear of chassis pan) until the desired signal is heard.
(4) Repeat operation 1 at, or near, 3500 kc., using band 3.
(A) Adjust oscillator pad (second adjustment from right on rear of chassis pan) until the desired signal is heard.
(5) Repeat operation 1 at, or near, 8500 kc., using band 4.
(A) Adjust oscillator pad (extreme right adjustment on rear of chassis pan) until the desired signal is heard.

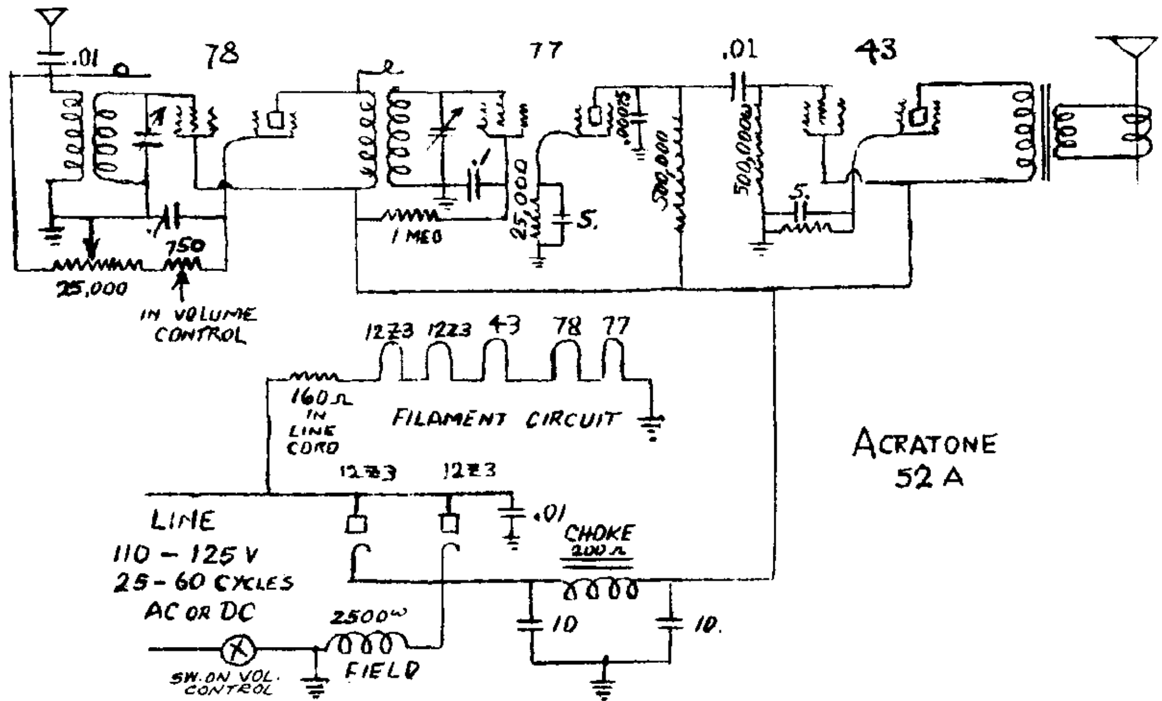
TO ALIGN (or gang) THE R.F. CIRCUITS

(1) Set the dial to 1400 kc., using band 1.
(A) Attach oscillator, tuned to set, to antenna post.
(B) Attach output meter from screen to plate of 2A5 tube.
(C) Adjust R. F. trimmer (screw adjustment, top-front-of gang condenser) for maximum output. KEEP SIGNAL INPUT LOW!
(2) Set the dial to 3700 kc., using band 2.
(A) Tune the oscillator to the receiver and adjust R.F. trimmer (extreme left adjustment on rear of chassis pan) for maximum output. KEEP SIGNAL INPUT LOW!
(3) Set the dial to 9000 kc., using band 3.
(A) Tune the oscillator to the receiver and adjust R.F. trimmer (second adjustment from left on rear of chassis pan)

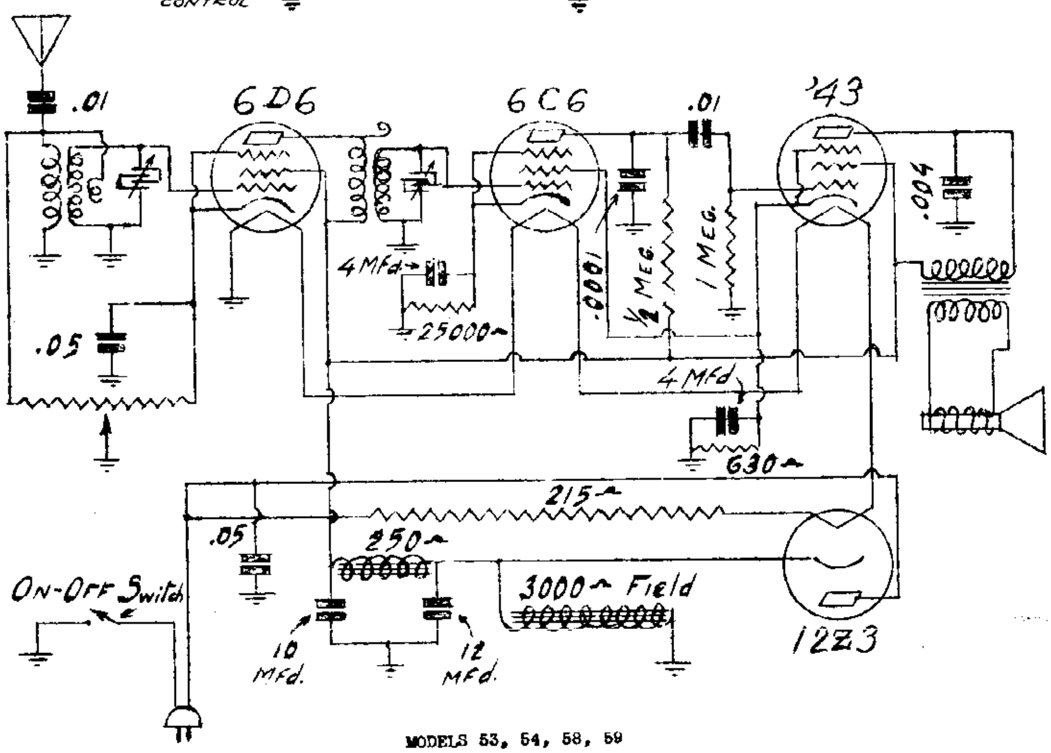
Note 1-In case the local oscillator will not reach the higher alignment frequencies, harmonics of lower frequencies may be used.

MODEL 52-A
MODEL 53,54,58,59
Schematic

FEDERATED PURCHASER



ACRATONE
52 A

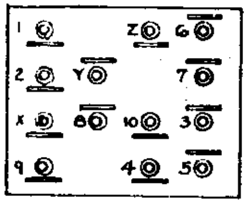


MODELS 53, 54, 58, 59

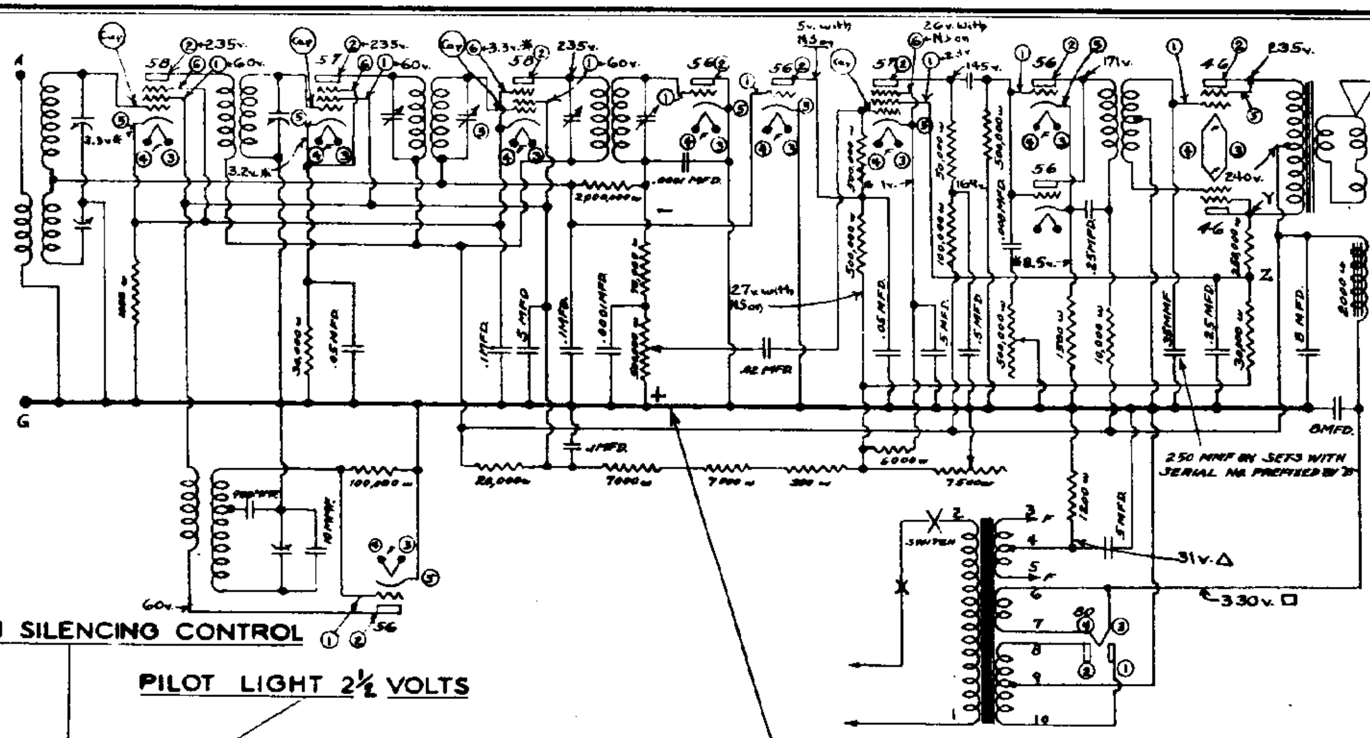
MODEL 79,80
Schematic,Voltage
Socket Layout

FEDERATED PURCHASER

IF PEAK 175 KC.



POWER TRANSFORMER
TERMINAL BOARD



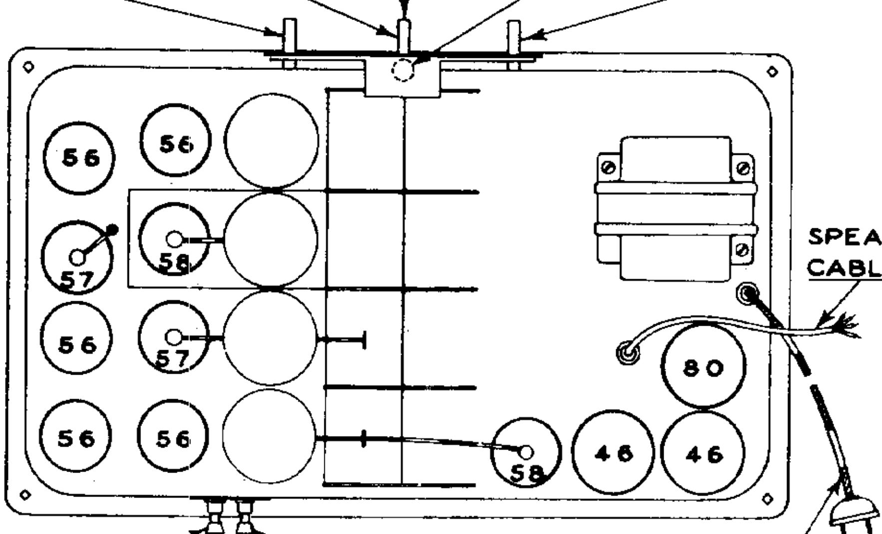
NS or INTER-STATION SILENCING CONTROL

TUNING CONTROL

PILOT LIGHT 2½ VOLTS

VOLUME CONTROL

TONE CONTROL



SPEAKER CABLE

ANTENNA

GROUND

LINE CORD

NOTE - ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
300v. SCALE UNLESS OTHERWISE SPECIFIED.
□ INDICATES 600v. SCALE Δ=120v. * = 10v.
LINE = 115v. 60 CYCLE.
INTERMEDIATE FREQUENCY = 175 K.C.
NUMBERS IN CIRCLES INDICATE TUBE ELEMENT IN ACCORDANCE WITH R.C.A. RADIOTRON PINBASE LAYOUT.

MODEL 79,80
Alignment

FEDERATED PURCHASER

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER, and TURN ALL CONTROLS TO THEIR MAXIMUM POSITIONS (CLOCKWISE).

The I. F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier to be at fault. In that event:-

(1) Attach the output meter from plate to plate of the 46 tubes.

(2) Feed the signal from the local oscillator tuned to exactly 175 kc. into the receiver at the control grid of the 57 first detector, providing a D. C. path from this point to ground

(3) Adjust the I. F. trimmers to give maximum indication on the output meter. The 4 I. F. trimmers are mounted under the chassis pan, adjustable through holes in the chassis pan under the gang condenser, accessible when the rotor plates of the gang condenser are completely engaged with the stator plates. The adjustments are ¼" hex nuts. A recheck of each adjustment to insure perfect alignment of the I. F. stages is recommended.

(1) Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc., should be received.

(A) Adjust the oscillator trimmer (screw adjustment, top front end of gang condenser) until desired signal is heard.

(2) Set the dial to the point where a station (or oscillator) of known frequency, about 1100 kc., should be received.

(A) Bend rotor plates of front section of gang condenser to correct the calibration. If the dial reading for resonance with the desired signal is higher than the true frequency bend the rotor plates out, and vica versa.

(3) Repeat operation 2 at, or near, 750 kc.

(4) Repeat operation 2 at, or near, 600 kc.

This completes the alignment procedure, and this (front) section of the gang condenser is NOT TO BE DISTURBED during the alignment of the R. F. circuits.

TO ALIGN (or gang) THE R. F. CIRCUITS

(1) Set the dial to 1400 kc.

(A) Attach the output meter from plate to plate of the 46 tubes.

(B) Attach the local oscillator to the antenna post of the receiver and adjust to resonance with the receiver.

(C) Adjust the R. F. trimmers (screw adjustments, top of gang condenser, ALL EXCEPT FRONT SCREW, for maximum indication on the output meter. KEEP SIGNAL INPUT LOW!

(2) Set the dial to 1100 kc.

(A) Adjust local oscillator to resonance with receiver.

(B) Bend rotor plates on ALL EXCEPT FRONT SECTION for maximum indication on the output meter. KEEP SIGNAL INPUT LOW!

(3) Repeat operation 2 at 750 kc.

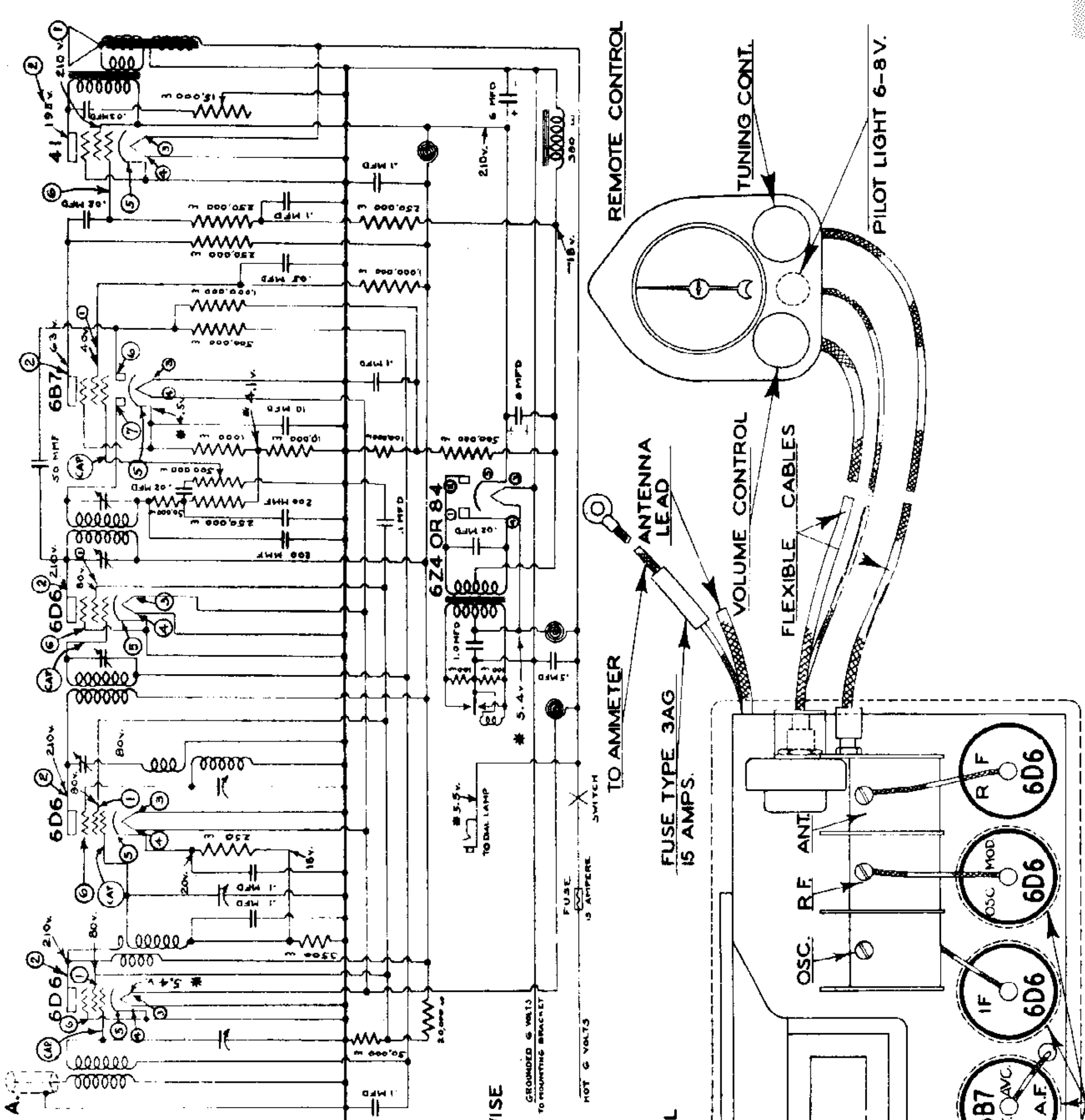
(4) Repeat operation 2 at 600 kc.

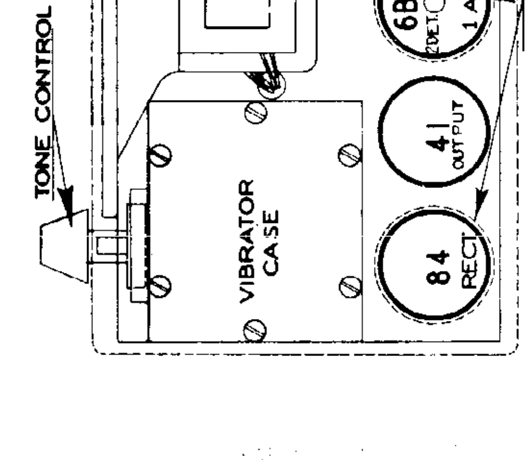
This completes the alignment of the R. F. circuits.

The alignment operations involving plate bending should be performed with utmost care if maximum results are to be obtained.

FEDERATED PURCHASER

MODEL 92
Schematic, Voltage
Socket Layout



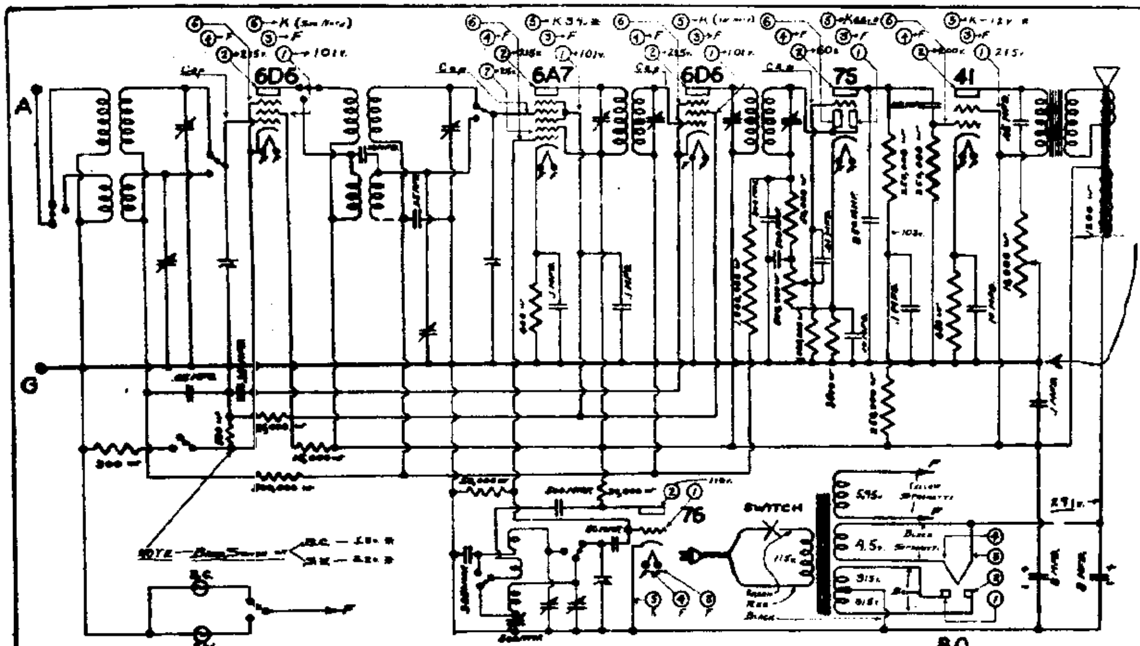


NUMBERS IN CIRCLES INDICATE TUBE ELEMENTS IN ACCORDANCE WITH R.C.A RADIOTRON PINBASE LAYOUT.

NOTE–ALL VOLTAGES TAKEN FROM THIS POINT ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
300v. SCALE UNLESS OTHERWISE SPECIFIED.
* INDICATES 10v. SCALE
INTERMEDIATE FREQ. 175 K.C.

MODEL 93,94,96,97
Schematic, Voltage
Socket Layout
Trimmers

FEDERATED PURCHASER



IF PEAK 370 KC.

NOTES

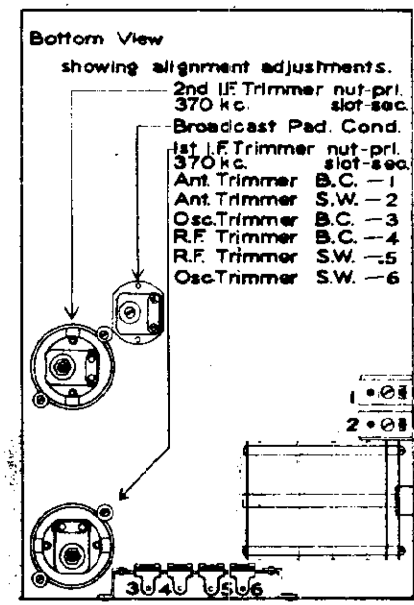
ALL VOLTAGES MEASURED

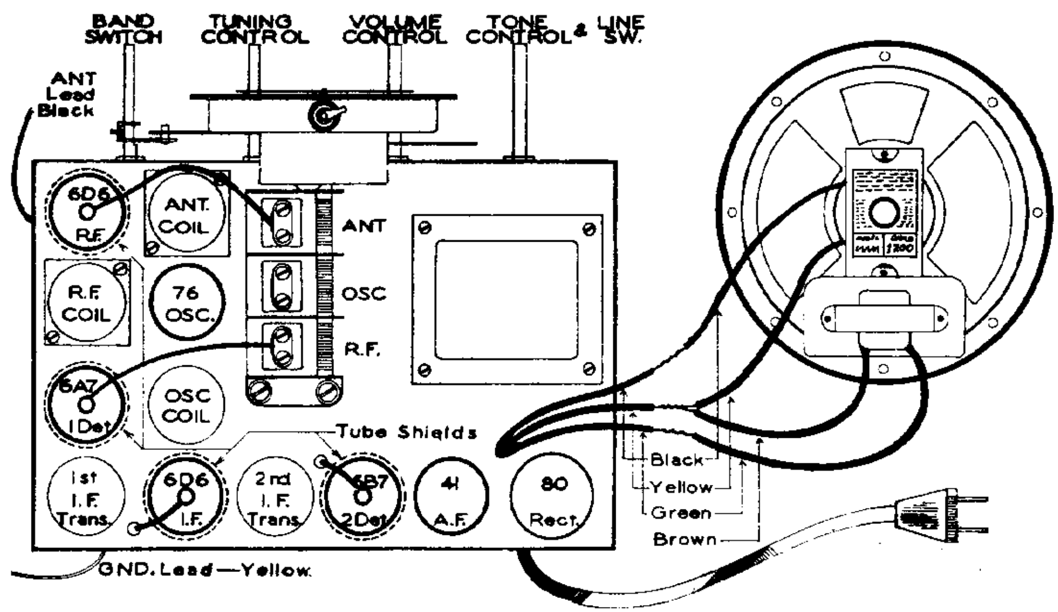
1. From this point (ground) with line at 115 v. 60 c.
2. With a 1000 ohm/volt voltmeter
3. With all controls turned full ON (on BC band)
4. With NO SIGNAL! Short ant. lead if necessary.
5. Use the 300v. scale unless otherwise indicated.
6. △ Indicates 100v. scale ✳ Indicates 10v. scale.

NUMBERS IN CIRCLES indicate tube elements in accordance with R.C.A.-Cunn. Pinbase Layout.

FREQUENCY RANGE 550 to 1550 kc. & 6 to 16 mc.

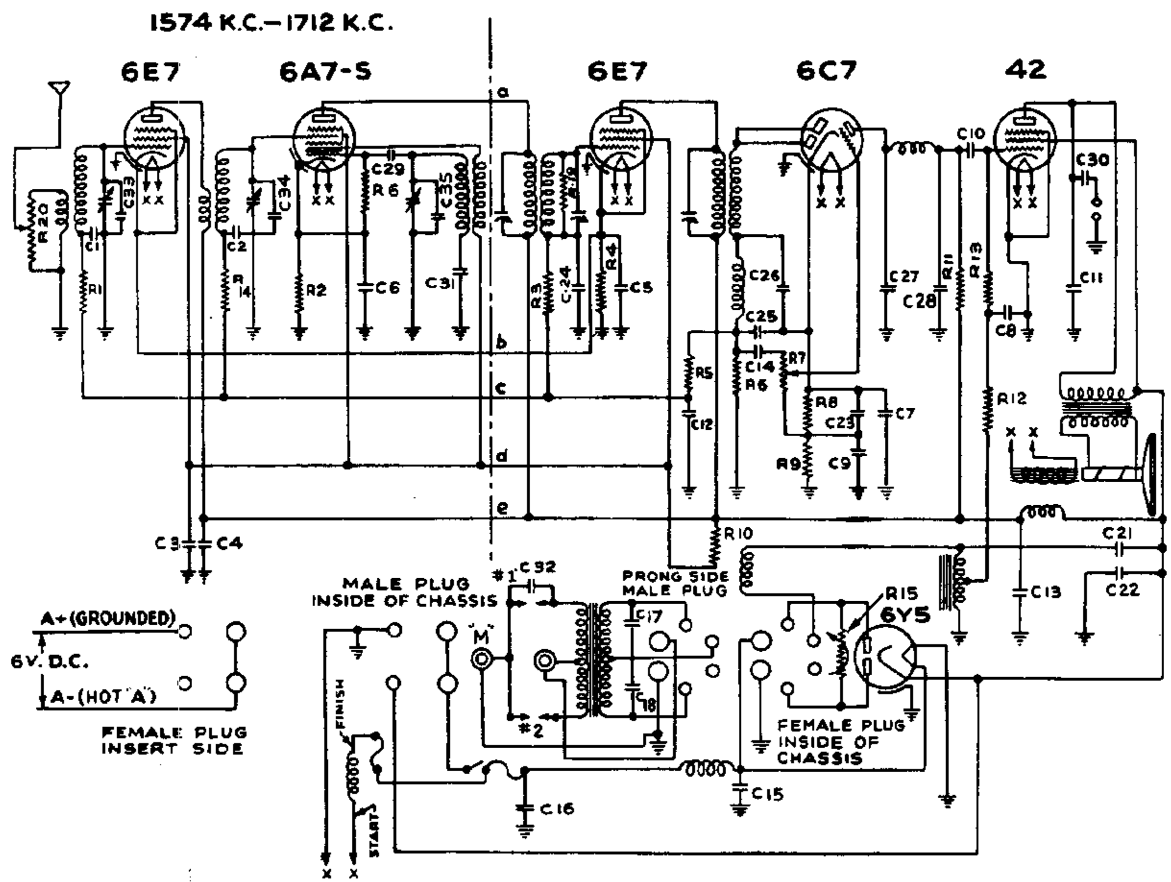
PILOT LIGHTS—6.3v. 2 req'd. code.... blue bead
NOTE—pilot lites wired to band switch to light only the calibration of the band in use.





MODEL Ford Glove Box Type Police Radio Built by Grigsby-Grunow Schematic

FORD MOTOR CAR CO.



RESISTORS

R1 — 300,000	R11 — 200,000
R2 — 300	R12 — 250,000
R3 — 300,000	R13 — 250,000
R4 — 160	R14 — 300,000
R5 — 300,000	R15 — 510,000 GLOBAR
R6 — 100,000	R16 — 50,000
R7 — 200,000 V.C.	R17 — 450
R8 — 2,500	R18 — 450
R9 — 5,000	R19 — 1,000,000
R10 — 15,000	R20 — 10,000

CONDENSERS

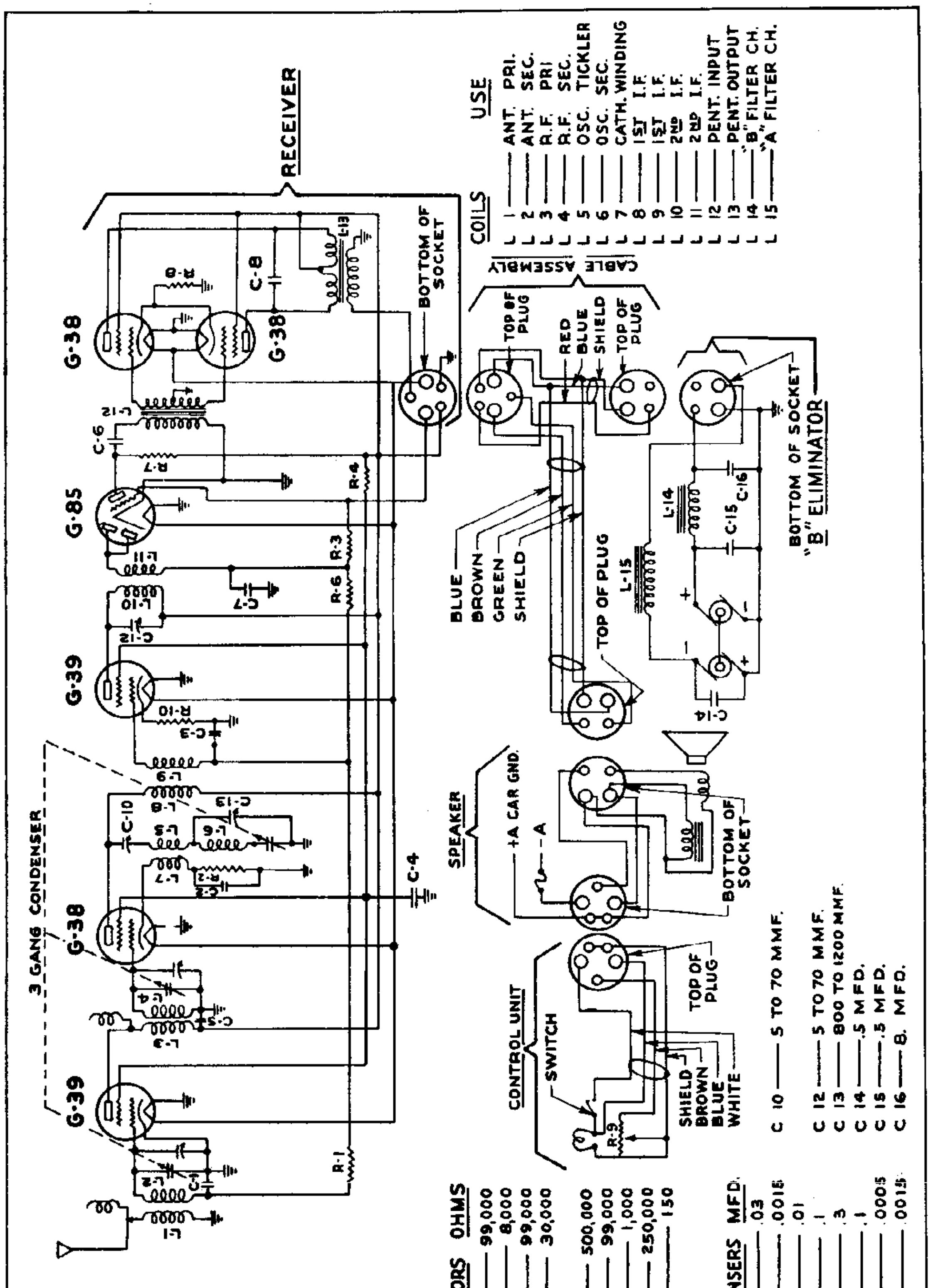
C1 — .03	R.F.#1	C19 — .25
C2 — .03	R.F.#1	C20 — .25
C3 — .25	R.F.#2	C21 — 8.0
C4 — .25	R.F.#2	C22 — 8.0
C5 — .25	R.F.#2	C23 — 10.0
C6 — .1	R.F.#2	C24 — .01
C7 — .25	A.F.#1	C25 — .0005
C8 — .25	A.F.#1	C26 — .0005
C9 — .25	A.F.#1	C27 — .0005
C10 — .03	A.F.#1	C28 — .0005
C11 — .005	A.F.#2	C29 — .00025
C12 — .03	A.F.#2	C30 — .1
C13 — .25	A.F.#2	C31 — .0005
C14 — .03	A.F.#2	C32 — 20.0
C15 — .5		C33 — .00005
C16 — .5		C34 — .000025
C17 — .008		C35 — .00005
C18 — .008		

M-TERMINAL CONNECTED TO ARMATURE

FORD GLOVE BOX TYPE POLICE AUTO RADIO RECEIVER (BUILT BY GRIGSBY GRUNOW CO.)

MODEL Ford B-18805
Auto Radio Built by
Grigsby-Grunow
Schematic

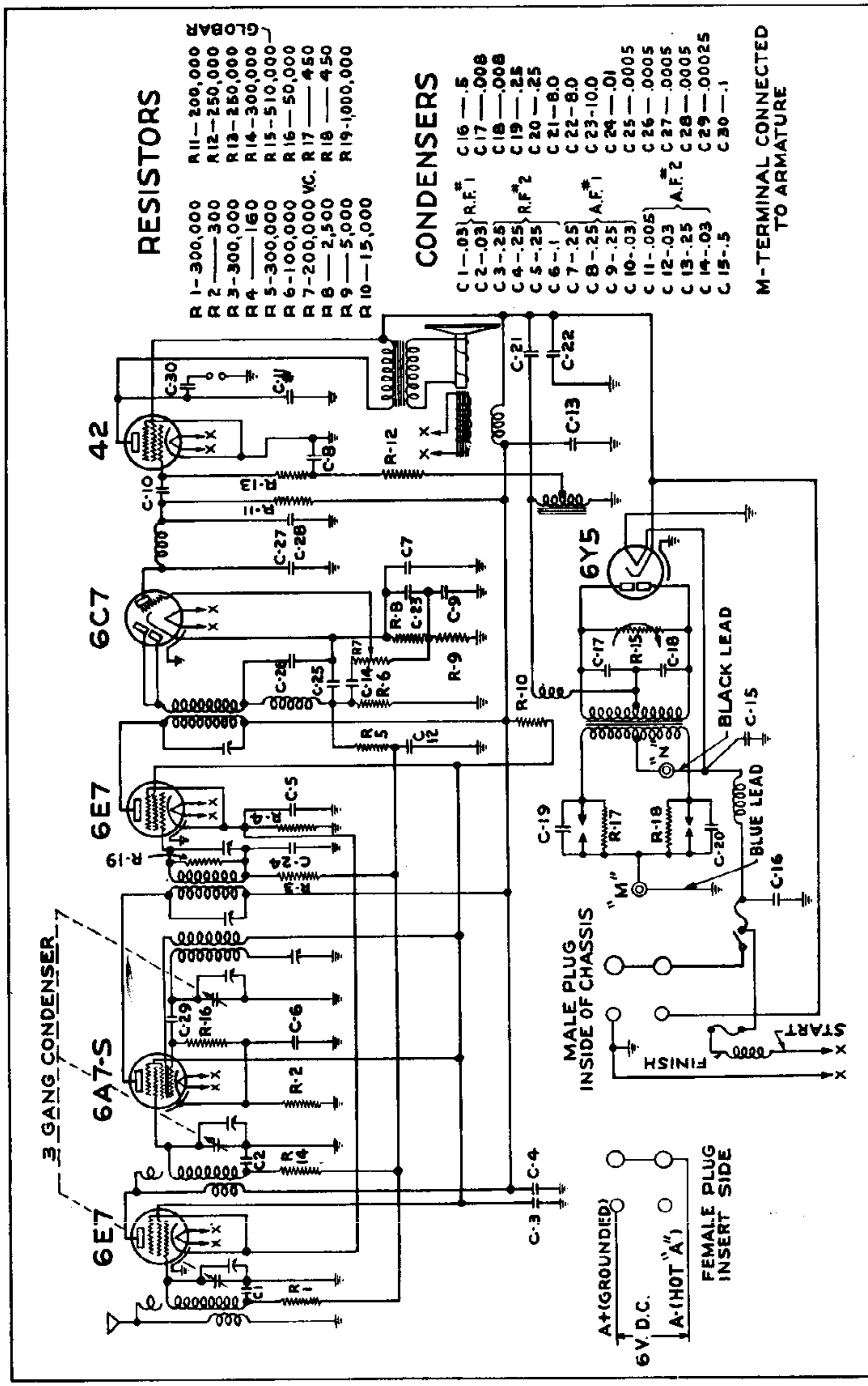
FORD MOTOR CAR CO.



Ford B-18805 Auto Radio Receiver with Motor-Generator "B" Supply

MODEL Ford 40-18805
Glove Box Auto Radio
Built by Grigsby-
Grunow
Schematic

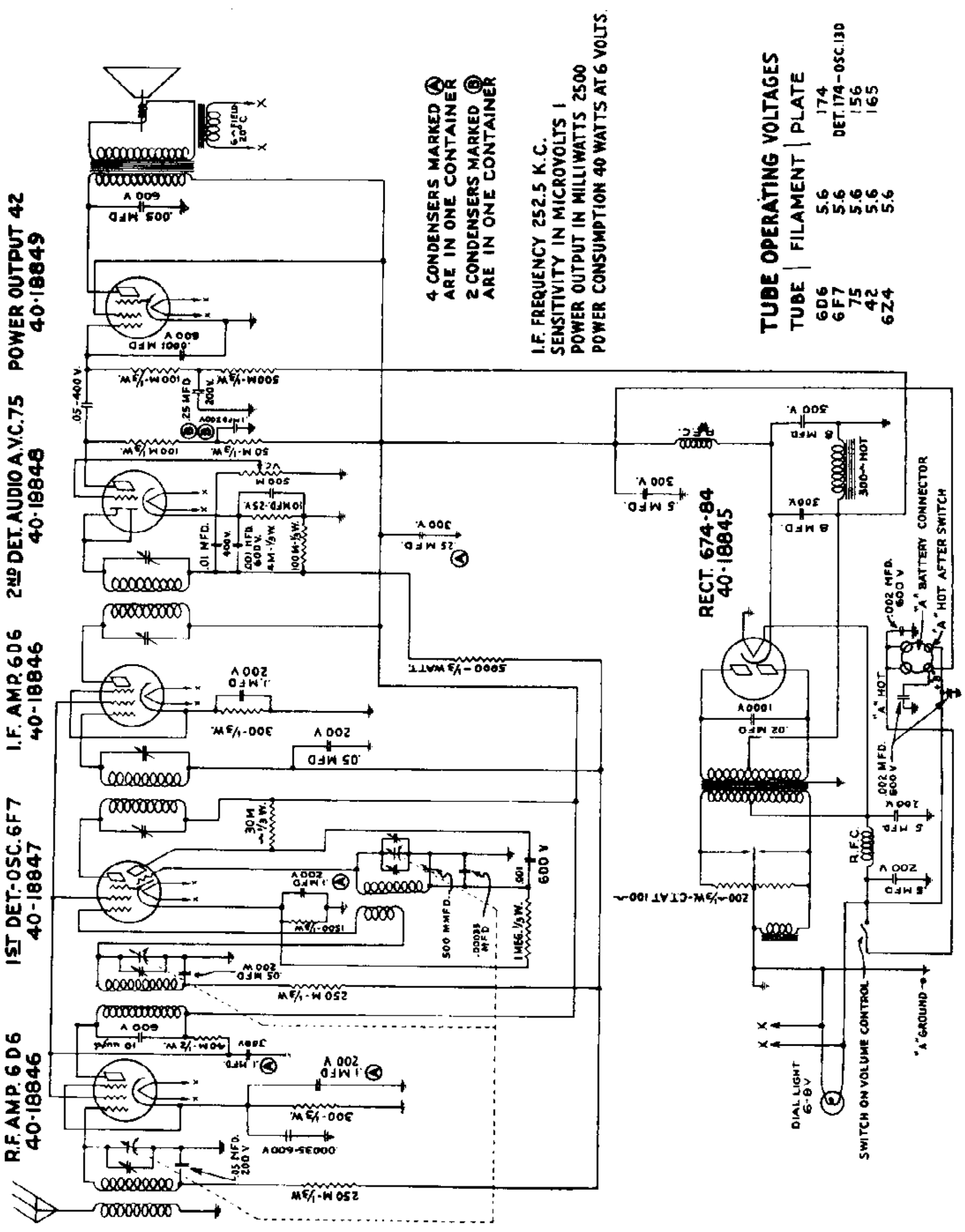
FORD MOTOR CAR CO.



Ford 40-18805-B Glove Box Type Auto Radio Receiver (built by Grigsby Grunow Co.)

MODEL Ford-Lincoln
Auto Radio Built by
Zenith
Schematic

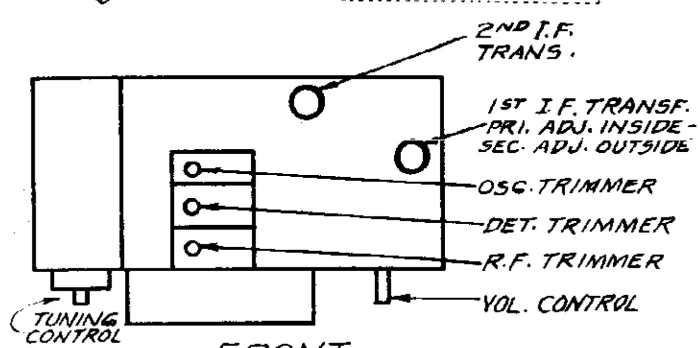
FORD MOTOR CAR CO.

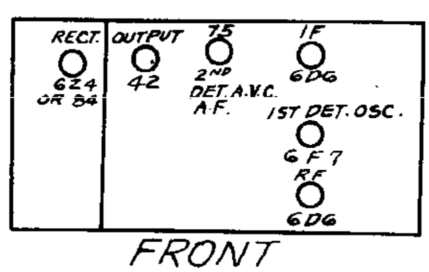


TUBE OPERATING VOLTAGES

TUBE	FILAMENT	PLATE
6D6	5.6	174
6F7	5.6	DET. 174 - OSC. 130
75	5.6	156
42	5.6	165
6Z4	5.6	

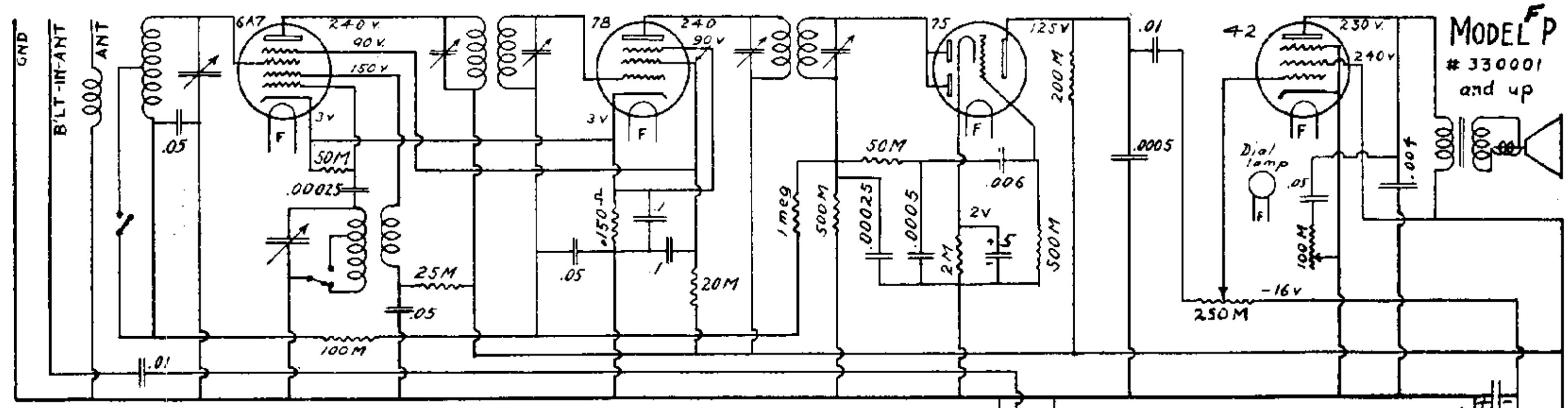
FORD GLOVE BOX TYPE AUTO RADIO RECEIVER (BUILT BY ZENITH RADIO CORP.)

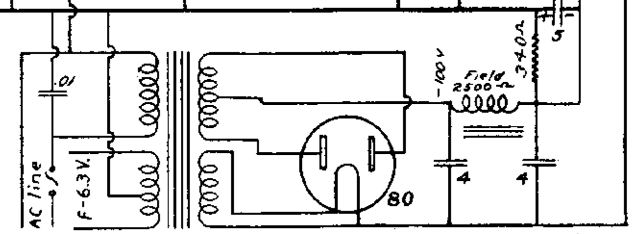




MODEL FP (330001 up)
Schematic,Alignment
MODEL FP Battery
(173501 up)
Schematic,Alignment

FORDSON RADIO, INC.





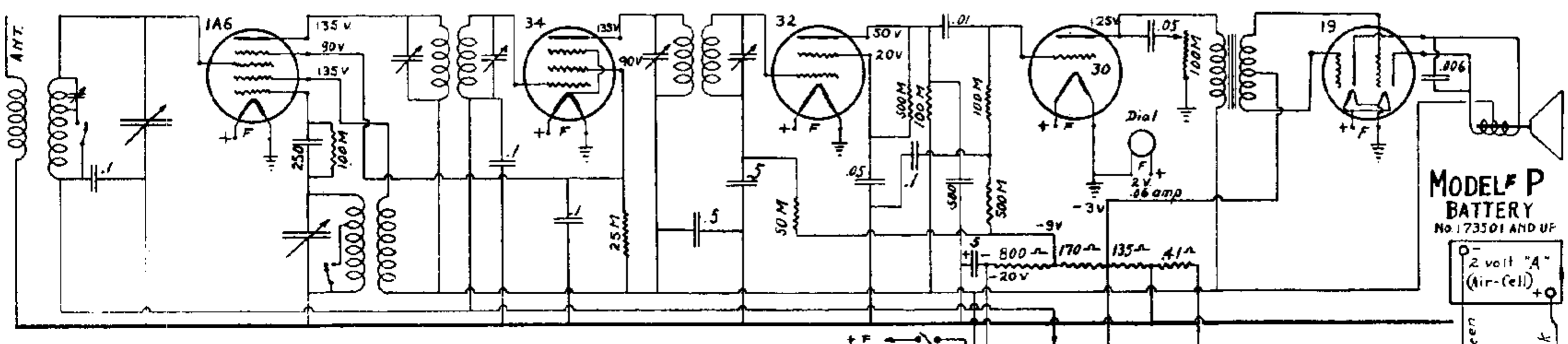
CAUTION: *Do not attempt to operate on current other than that noted on instrument*

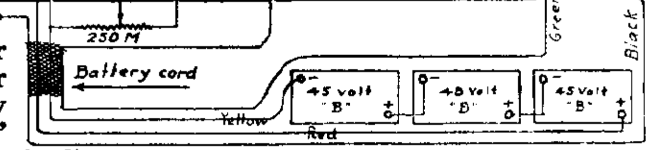
INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

SHORT WAVE: Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal



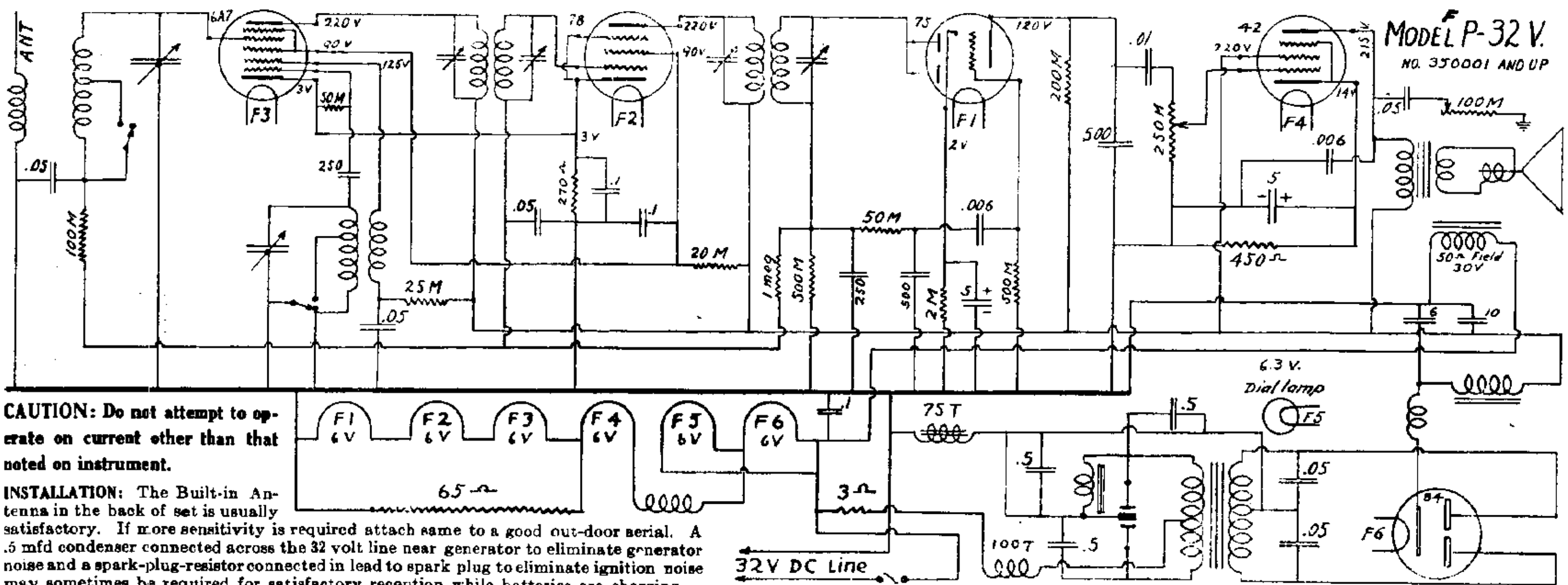


CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.
PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.
SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

MODEL FP 32 V
(350001 up)
MODEL FR (189001 up)
Schematic, Alignment

FORDSON RADIO, INC.

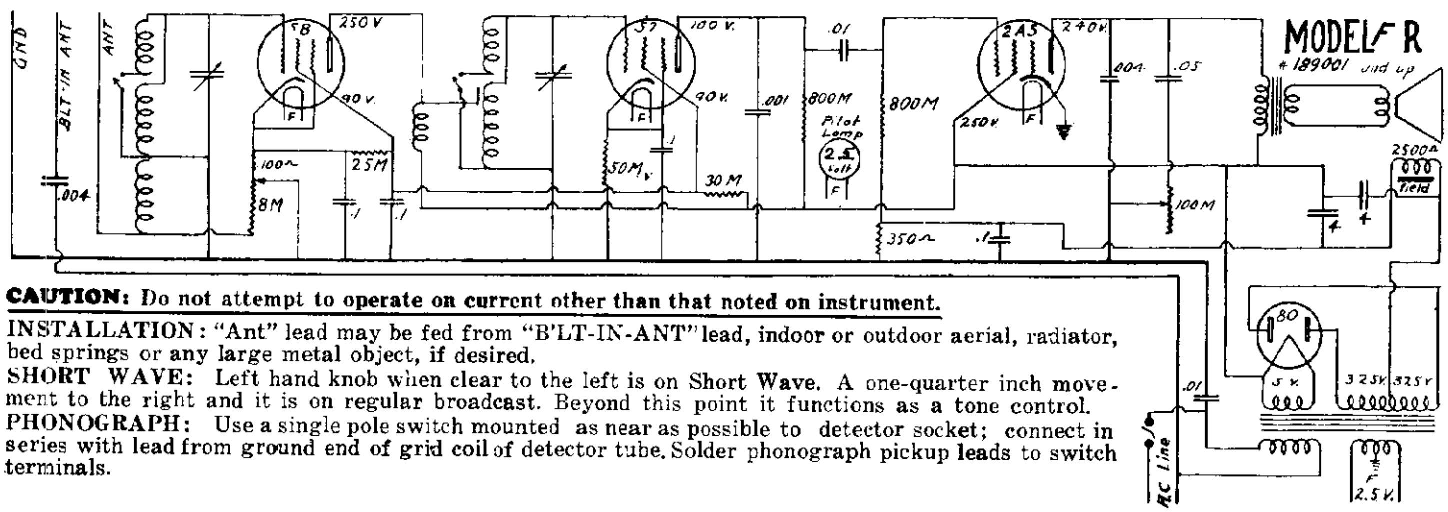


CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging.

USE NO GROUND CONNECTION ON SET. **SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control. **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal



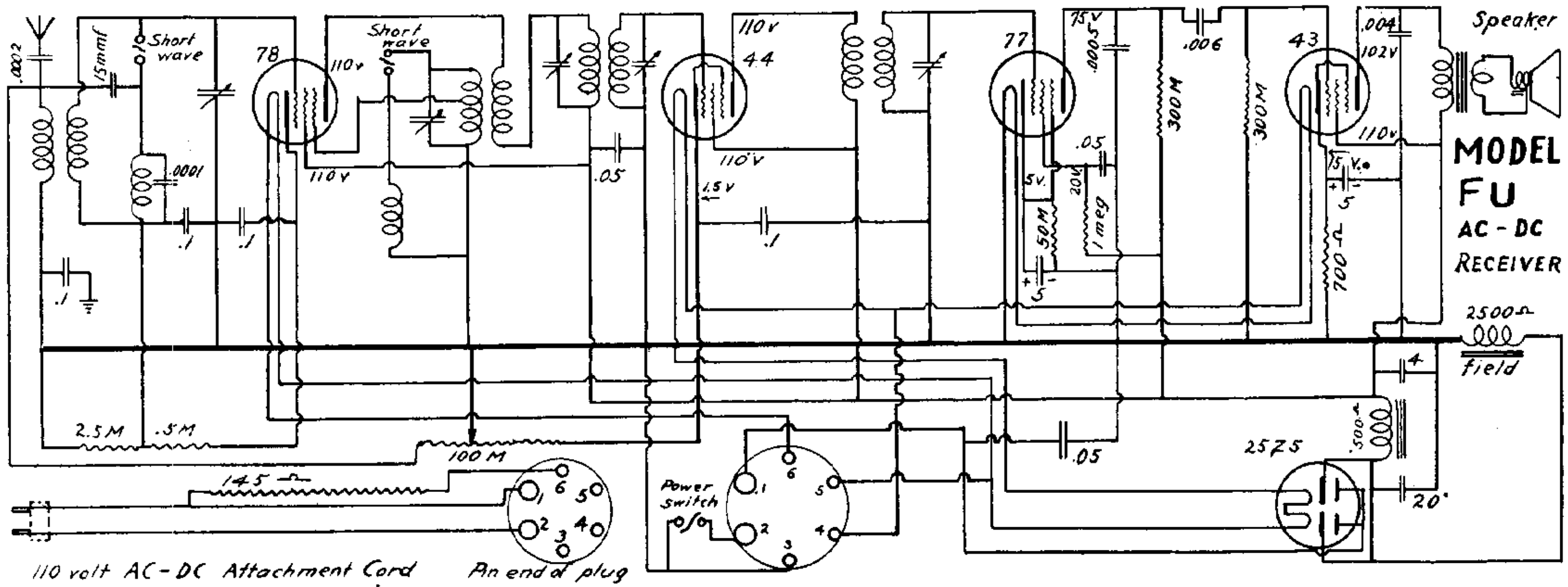
CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket; connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

FORDSON RADIO, INC.



110 volt AC-DC Attachment Cord

OPERATING INSTRUCTIONS

ModelFU Long and Short Wave

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

TO OPERATE:

Turn left hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right hand knob slowly back and forth till a station is heard. Numbers on the dial correspond to kilocycle of station when one zero is added. Adjust this knob carefully to secure best tone and adjust left hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

TO RECEIVE SHORT WAVES:

Push handle of switch in rear toward end of cabinet for short wave position. Local police calls, etc., will then be heard at approximately 65 and 100 on the dial, and amateurs, etc., at various other positions. Often local conditions make short wave reception difficult unless the aerial wire is grounded or attached to outside aerial. Reception of short wave requires a good aerial and more careful adjustment of both knobs than is necessary on the broadcast band.

PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

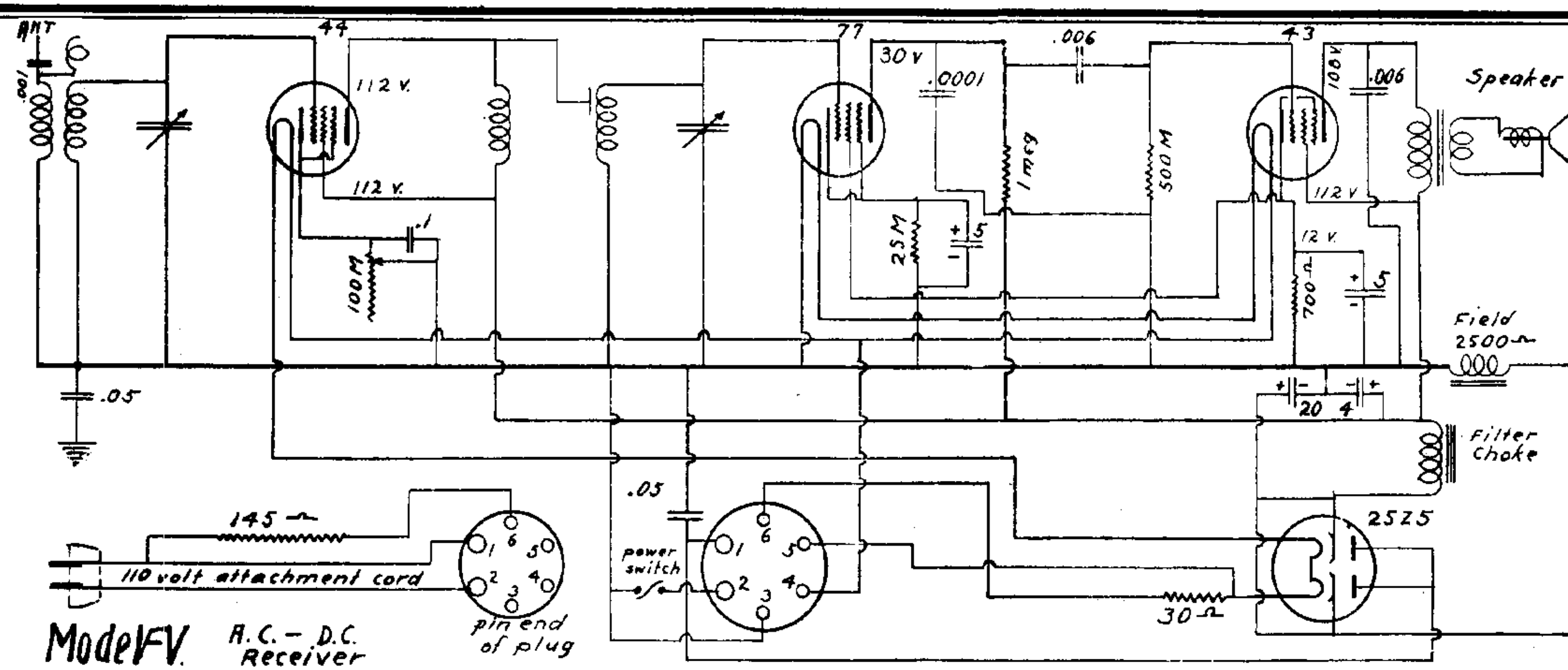
SERVICE NOTES:

To balance set remove from cabinet. Intermediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

If used in automobile, antenna stage should be trimmed to car antenna at time of installation.

MODEL FV
Schematic, Alignment

FORDSON RADIO, INC.



OPERATING INSTRUCTIONS

ModelFV

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 200 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily **all the aerial required. No** ground connection should be used. Sometimes results are better if **the tip of the antenna** wire is connected to **a radiator or other ground** connection or to **an outside aerial.**

TO OPERATE:

Turn left-hand knob to **right as far as it will** go. Wait **a few moments for tubes to heat. Turn** right-hand knob slowly back and forth till **a station** is heard. Adjust this knob **carefully to secure** best tone and adjust **left-hand knob** to volume desired. When left **knob is turned entirely** to left a click is heard and power **is turned** off. When operating on D. C. **current and set** fails to operate after waiting **a reasonable time** for tubes to heat up, reverse **power supply plug.**

PHONOGRAPH:

Connect pick-up **leads to single pole toggle** switch, which **may be mounted in large hole** in rear flange **of set. Unsolder black wire and 5** mfd condenser from **ground lug of coil** on under side of chassis **and resolder to one side of toggle** switch. Solder other side of switch to ground lug of coil.

SERVICE NOTES:

To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt headed screws on bottom of cabinet.

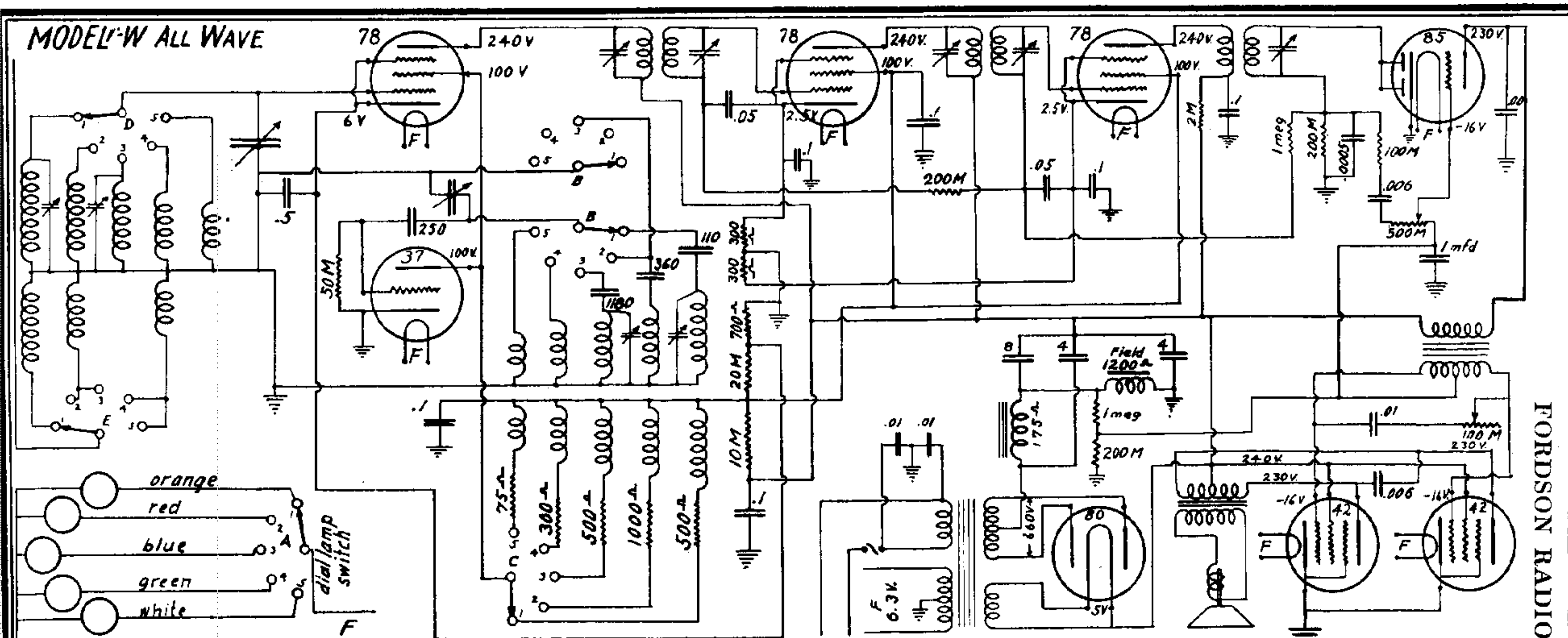
To balance set remove from cabinet, turn tuning condenser plates completely out, attach a test oscillator delivering 1712 K. C. to antenna of set and adjust trimmers on tuning condenser to loudest signal. Change test oscillator signal to 1400 K. C., turn tuning condenser until signal is tuned in and check trimmers **again** without moving tuning condenser.

If used in automobiles antenna stage should be trimmed to the car antenna at time of installation.

GUARANTEE:

This instrument is **guaranteed** for ninety days, within which **period** any **part** showing electrical or mechanical defect **will** be replaced without charge when returned **prepaid** to the **factory.**

FORDSON RADIO, INC.



IF PEAK 456 KC

INSTALLATION:

The built-in aerial at the back of the set usually gives satisfactory sensitivity when stretched around the edge of the floor or along the picture moulding of the room. A good outside aerial connected to the built-in aerial sometimes increases sensitivity. Power noise interferes especially with short-wave reception. If set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. Any radio dealer can supply such an aerial kit with full instructions for installing.

CONTROL KNOBS:

The lower middle knob is for selecting the various frequency bands as indicated on the dial. The upper middle knob is tuning control. The right-hand knob is power switch and volume control and the left-hand knob is tone control.

PHONOGRAPH:

Mount a single pole toggle switch and two insulated pin jacks in the rear of the chassis near the tube socket marked "85," connect one side of the switch to one pin jack, the remaining pin jack to one outside terminal of the volume control and the remaining switch terminal to the other outside terminal of the volume control. Plug the phonograph pickup leads into the pin jacks.

SERVICE NOTES:

The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

NOTE: Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

SHORT WAVE TIPS:

In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T tune above 12,000 kilocycles (below 25 meters) for distant stations after dark. DON'T expect to find stations on all parts of the dial. Short-wave stations are widely separated, except in a few instances. DON'T skim over the dial. It requires some knowledge of tuning to get good results. Tune very slowly. DON'T pass up any weak signal, as it may often be brought in stronger by careful tuning.

GALVIN MFG. CO.

SERVICE NOTES

1934 Motorola Auto Radio

Twin "8" — Dual "6"

To assist you in gaining an understanding of the operation and servicing of the Dual "6" and Twin "8" we are outlining herein a brief description of the circuits employed together with the function of various units. For general installation instructions see the sheet enclosed with each Motorola set.

* * * * * * *

TWIN "8" ----The signal is fed into the primary of the antenna coil, which is of the aperiodic type and is induced into its associated secondary circuit, tuned by the 1st gang of the variable condenser. The signal is then fed to the 78 tube used as the first RF amplifier.

Reference to the circuit diagram (Fig. 3) will show that the 2nd RF stage is impedance coupled, feeding its energy into the grid of the 77 autodyne. In the aperiodic type of antenna coil the gain drops slightly near the 500 K.C. end, while in the impedance type coupling used in the 2nd RF coil rises slightly at this point. It will be seen then that by using these two in combination an overall flat sensitivity curve is obtained.

The type 77 autodyne tube is used because of its simplicity, performance and ability to withstand the vibration to which an auto set is subjected. The use of the padder system in the oscillator is used to allow greater accuracy in dial calibration.

In the 85 tube full wave rectification is used and A.V.C. bias is obtained by voltage drop across the 200M ohm resistance connecting the secondary of the diode feeder to ground. Full A.V.C. voltage is applied to the grids of the RF stage and IF stage and to the grid of the 85 tube. The audio component is amplified in the triode section of the 85, which is resistance coupled to the #37, 2nd audio used as a driver and is impedance coupled to the L.A. tubes operating in Push-Pull Class A Prime.

* * * * * * *

The DUAL "6" ----For all ordinary servicing of the RF section of the Dual "6" the above description will be sufficient.

Reference to the circuit diagram (Fig. 4) will show that a #75 is used as a diode detector resistance coupled to a single 42 output tube.

The manual volume control is in the grid of the 75 whereas in the Twin "8" it is in the grid circuit of the 37 tube.

Fixed bias is used on the 75 grid obtained through the voltage drop across the screen network.

* * * * * * *

SERVICING

In shooting trouble in an auto radio it is well to endeavor to isolate it to one particular section of the set.

The set may be divided into four parts for servicing. (1) Outer housing. (2) Power supply. (3) Speaker. (4) Set chassis.

The audio end of the chassis may be easily checked by removing the grid cap of the 85 or 75 tube and, if normal, a loud hum will occur.

Check the autodyne circuit by tuning the variable condensers to the minimum position and touching the oscillator stator plates. If a click is heard when touching them and also when removing the finger, it indicates that the autodyne is oscillating properly.

ALIGNMENT OF VARIABLE CONDENSERS

Because of the necessity of aligning the variable condensers with the chassis out of the housing it is important to use a definite point. Unless this is done the dial calibration will be incorrect when replacing the chassis in its housing. This point we may take as 1400 KC which is exactly 32° of angular rotation from minimum condenser setting.

Connect the oscillator feeder to the antenna pin of the chassis and set the oscillator to 1400 KC.

Carefully adjust the trimmers of the oscillator and RF variable condensers for maximum reading of output meter.

Next set the service oscillator to 600 KC rotating the variable condensers to a point 155 degrees 30 min. from minimum condenser setting.

Adjust the 600 KC padder condenser (accessible from the front of the chassis) for highest output reading.

The 600 KC setting may also be found by setting the service oscillator to 600 KC. Tune in the oscillator signal and rotate the variable condensers back and forth while adjusting the 600 KC trimmer condenser for highest reading of the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

ALIGNMENT OF THE IF TRANSFORMERS

The IF transformers and diode feeder in the Twin "8" and Dual "6" should always be aligned with a good calibrated service oscillator or signal generator.

Connect the feeder from the oscillator to the grid of the 77 autodyne tube. Remove the grid connection and connect a 500M ohm resistor from grid of the tube to the ground.

Rotate the variable condensers to the full open position.

Set the oscillator to a frequency of 262 KC and adjust the IF and diode feeder trimmers to obtain maximum reading on the output meter.

PART REPLACEMENTS

In the design of the Twin "8" and Dual "6" interchangeability of parts has been accomplished wherever possible. This greatly simplifies service. In these sets the complete power packs and their various parts along with the RF oscillator, IF coils and variable condenser are interchangeable.

Volume Control — (1) Remove rear set cover. (2) Disconnect volume control and switch leads. (3) Remove hex head screws holding volume control mounting plate and remove complete assembly. (4) Replace with standard Motorola replacement control.

By-Pass Condensers — (1) Disconnect condenser and push up-wards from bottom of chassis. (2) Insert new condenser from bottom of chassis and reconnect.

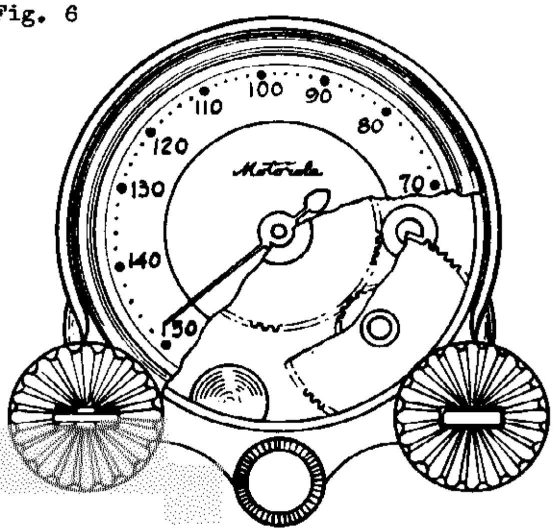
Tube Sockets — (1) Disconnect all wires at socket contacts, insert tube in socket, press down firmly and turn in counter-clockwise direction until released. (2) Place new socket on tube base, press it down firmly into chassis hole and turn in clockwise direction.

Coil and IF Transformer — (1) Each coil may be removed without disturbing any other units. (2) Remove mounting screws, disconnect its respective wires and insert new coil.

MODEL Twin "8"
MODEL Dual "6"
Control Adjustment

GALVIN MFG. CO.

Fig. 6



ADJUSTMENT OF MOTOROLA UNIVERSAL AIRPLANE TYPE CONTROL

The general construction of the control head is shown in the cut away view. (Fig. 6).

In connecting the flexible shafts to the control head:

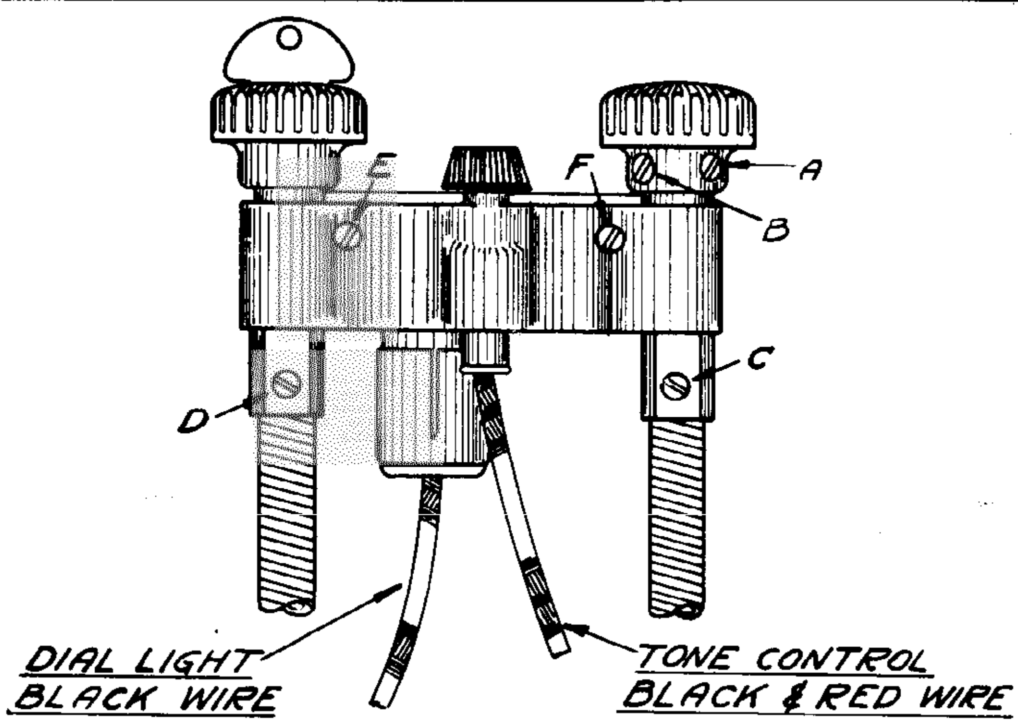
1. Insert the volume control shaft into the control head to its limit then release the shaft housing about 1/32 inch to relieve any binding. Tighten set screw (D) Fig. (7) against housing.

2. Insert condenser drive shaft into control head so that the shaft extends into the tuning knob. Tighten knob set screws A and B. Release shaft housing about 1/32 inch to relieve binding. Tighten set screw (C) against housing. The tuning knobs may be removed by completely removing the set screws E and F, Fig. (7). This is necessary when mounting control in instrument panel.

To adjust indicator arrow, tune in a station of known frequency preferably between 1000 KC and 1300 KC, then insert screw driver in rear center of control head and adjust indicator to correct frequency setting.

Special lengths of flexible shafts may be secured from your Motorola distributor or from the factory.

Fig. 7



MODEL Twin "8"
Resistance Test Data

GALVIN MFG. CO.

TWIN 8 OUTER HOUSING CONTINUITY TEST

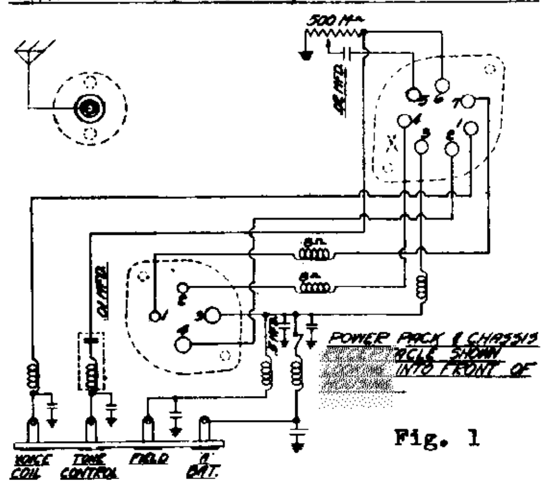


Fig. 1

TWIN "8"
VOLTAGE AT BATTERY 6.2

TUBE	PLATE	SCREEN	CATHODE	CONTROL GRID	FIL.
78 R.F.	220	55	.5	*	5.8
77 AUTODYNE	220	55	4.5	–	5.8
78 I.F.	220	55	1.5	*	5.8
85 DIODE	40			–	5.8
37 1st AUDIO	60			3.8**	5.8
LA POWER	222	220		-20**	5.8

* A.V.C. VOLTAGE APPLIED TO GRIDS.
** VOLTAGE MEASURED FROM GRID. RETURN TO GROUND.

CONTINUITY OF TWIN "8" CHASSIS

Refer to circuit diagram Fig. (3)

TEST	SHOULD TEST	IF OTHERWISE
Terminal #4 to P of LA.	400 ohm	Open output trans.
P of 37 tube to grid of LA . . .	Open	Shorted .05 cond.
Terminal #7 to P of 1st 78. . . .	25 ohm	Open prim. choke.
Terminal #7 to P of 77.	35 ohm	Open prim. I.F.
Terminal #7 to P of 2nd 78. . . .	110M ohm	Open resistor.
Terminal #7 to Screen of LA . .	Short	Loose connect.
Diode of 85 to Ground	200M ohm	AVC net-work shorted.
Terminal #2 to ground	500 ohm	Open 400 or 100 ohm re-sistor.
Terminal #2 to Grids of LA's. .	2000 ohm	Defective input Choke.
Terminal #7 to Ground.	200M ohm	Open bleed-er or shorted plate by-pass.
Screen of 78 to ground	100M ohm	Shorted .02 screen by-pass con-denser.

CONTINUITY OF TWIN "8" HOUSING AND SPEAKER

Readings taken from front of housing with chassis removed. Volume control full on position. "A" Battery disconnected. Speaker connected.

TEST	SHOULD TEST	IF OTHER-WISE
Chassis re-ceptacle terminal . .	#1 to Voice Coil termi-nal . . .Closed	Loose con-nections.
Chassis re-ceptacle terminal . .	#2 to Power Pack #4 .Closed	Loose con-nections.
Chassis re-ceptacle terminal . .	#3 to Power Pack #3 .Closed	Open fil. choke.
Chassis re-ceptacle terminal . .	#4 to Power Pack #2 . 8 ohm	Open R.F. choke.
Chassis re-ceptacle terminal . .	#6 to Ground . . . .500M ohm	Open volume control.
Chassis re-ceptacle terminal . .	#6 to chassis recept. #5 Open	Shorted .02 coupling cond.
Chassis re-ceptacle terminal . .	#7 to Power Pack Term. #1. . . . 8 ohm	Open R.F. choke.
Chassis re-ceptacle terminal . .	#1 to ground . . . . . . 2 ohm	Open voice coil.
Power Pack terminal . .	#3 to A Bat. terminal.Closed	Defective power switch.
Power Pack terminal . .	#3 to ground . . . . . .4½ ohm	Open speaker field.
Ant. re-ceptacle . .	To ground Open	Shorted ant.

MODEL Dual "6"
Resistance Test
Data

GALVIN MFG. CO.

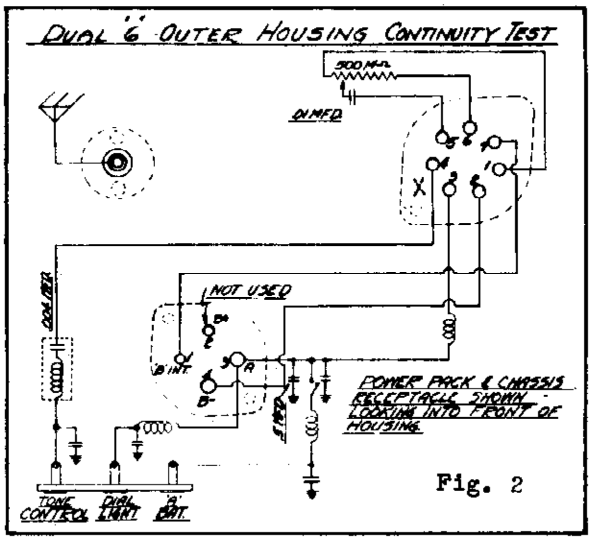


Fig. 2

DUAL "6"					
TUBE	PLATE	SCREEN	CATHODE	CONTROL GRID	FIL.
78 R.F.	210	70	.6	*	5.8
77 AUTODYNE	210	70	5.6	-	5.8
78 I.F.	210	70	2.5	*	5.8
75 DIODE	65		.6	-	5.8
42 POWER	200	205		-16	5.8

* A.V.C. VOLTAGE APPLIED TO GRIDS.

CONTINUITY OF CHASSIS DUAL "6"

Refer to circuit diagram Fig. (4)

	SHOULD READ	IF OTHERWISE
Terminal #5 to Grid 75	Short	Loose connect.
Terminal #2 to ground.	300 ohm	Open bias resistor.
Terminal #7 to ground.	60M ohm	Shorted plate or screen by-pass open resistor.
Terminal #6 to ground.	250 ohm	Def. 75 bias resistor.
Terminal #3 to ground.	Low resistance	Through tube fil.
Terminal #4 to P of 75 tube.	Short	Loose connect.
Terminal #6 to ground	200M ohm	AVC network short to ground.

CONTINUITY OF DUAL "6" SET HOUSING

Readings taken from front of housing with chassis removed. Volume control full on position "A" battery disconnected.

TEST	SHOULD TEST	IF OTHERWISE
Chassis recept. term. #1 to Term. #6.	500M ohm	Def. volume control.
Chassis recept. term. #2 to Power Pack term. #4.	Closed	Loose connect.
Chassis recept. term. #3 to Power Pack term. #3.	Closed	Def. fil. choke.
Chassis recept. term. #3 to "A" Bat. Term. board . . .	Closed	Def. power switch.
Chassis recept. term. #4 to tone control term.board.	Open	Shorted .004 term. cond.
Chassis recept. term. #5 to term. #6.	Open	Shorted .01 coupling cond.
Ant. receptacle to ground. . .	Open	Shorted antenna.

MODEL Twin "8"
Schematic

GALVIN MFG. CO.

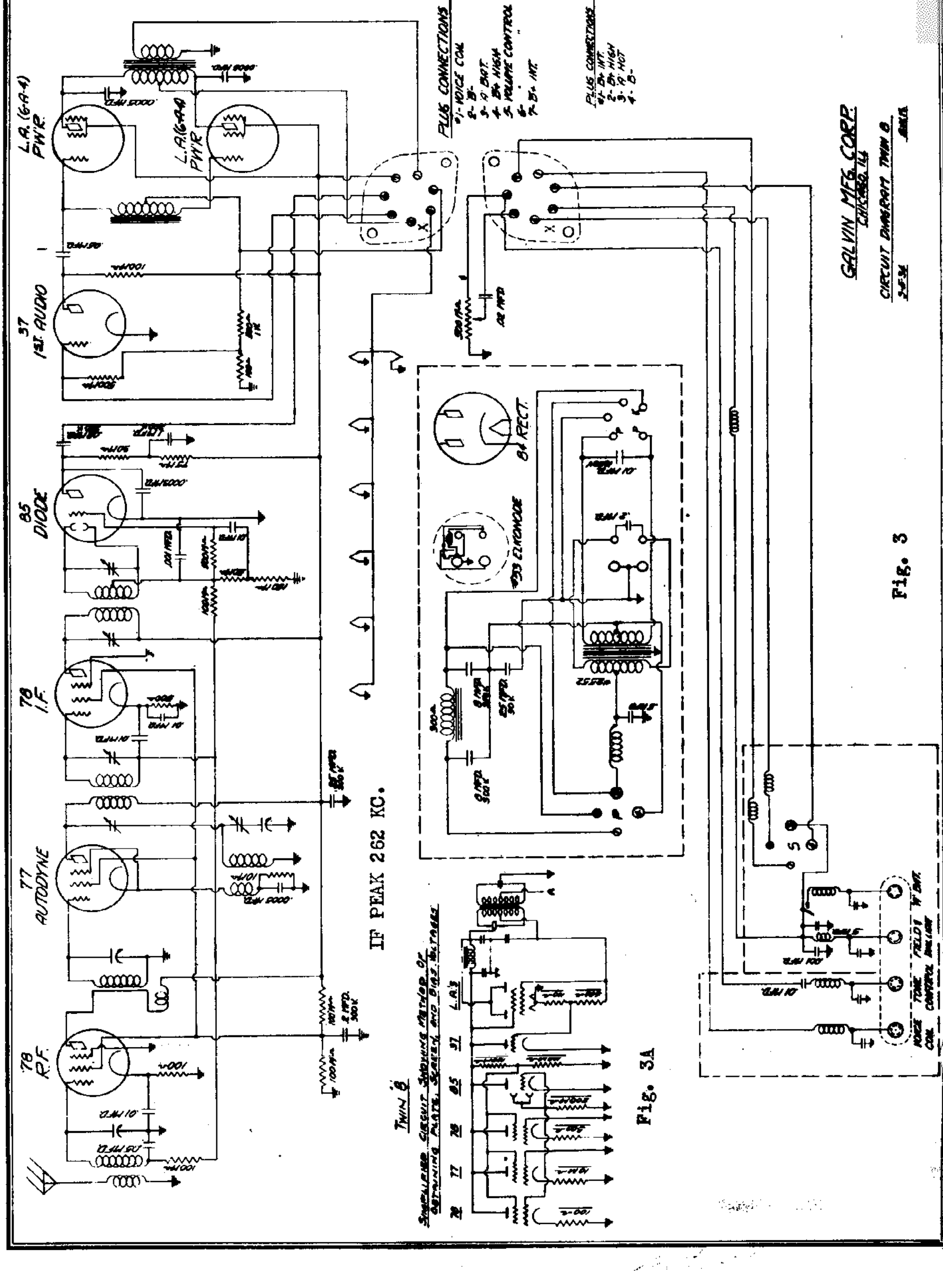
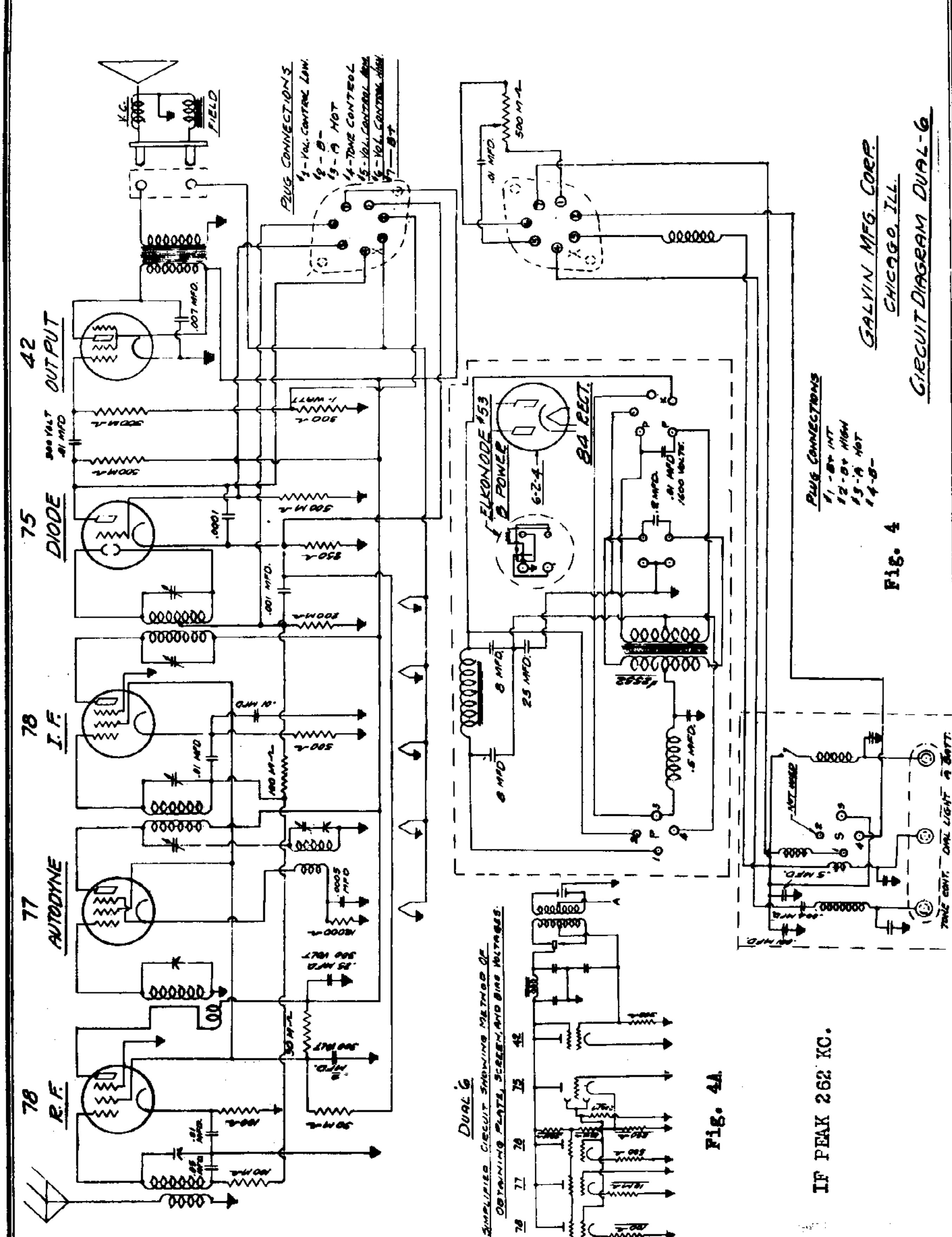


Fig. 3

Fig. 3A

MODEL Dual "6"
Schematic

GALVIN MFG. CO.



GALVIN MFG. CO.

MODEL Twin "8"
MODEL Dual "6"
Power Pack Test Data

POWER PACK CONTINUITY TEST

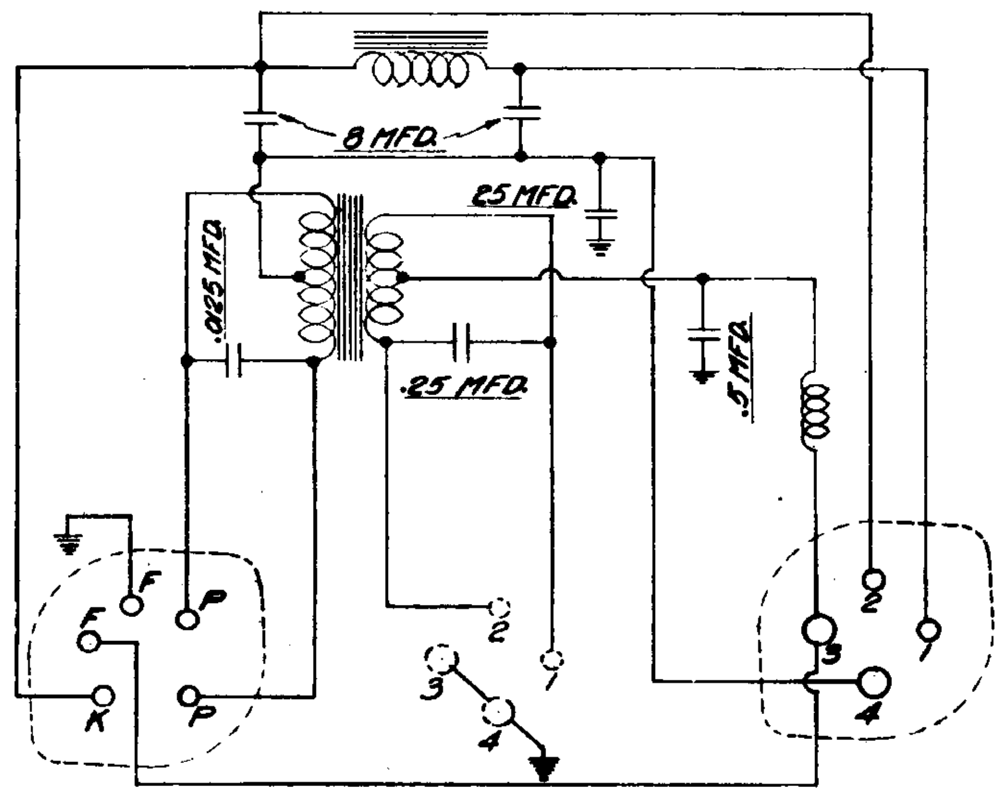


Fig. 5

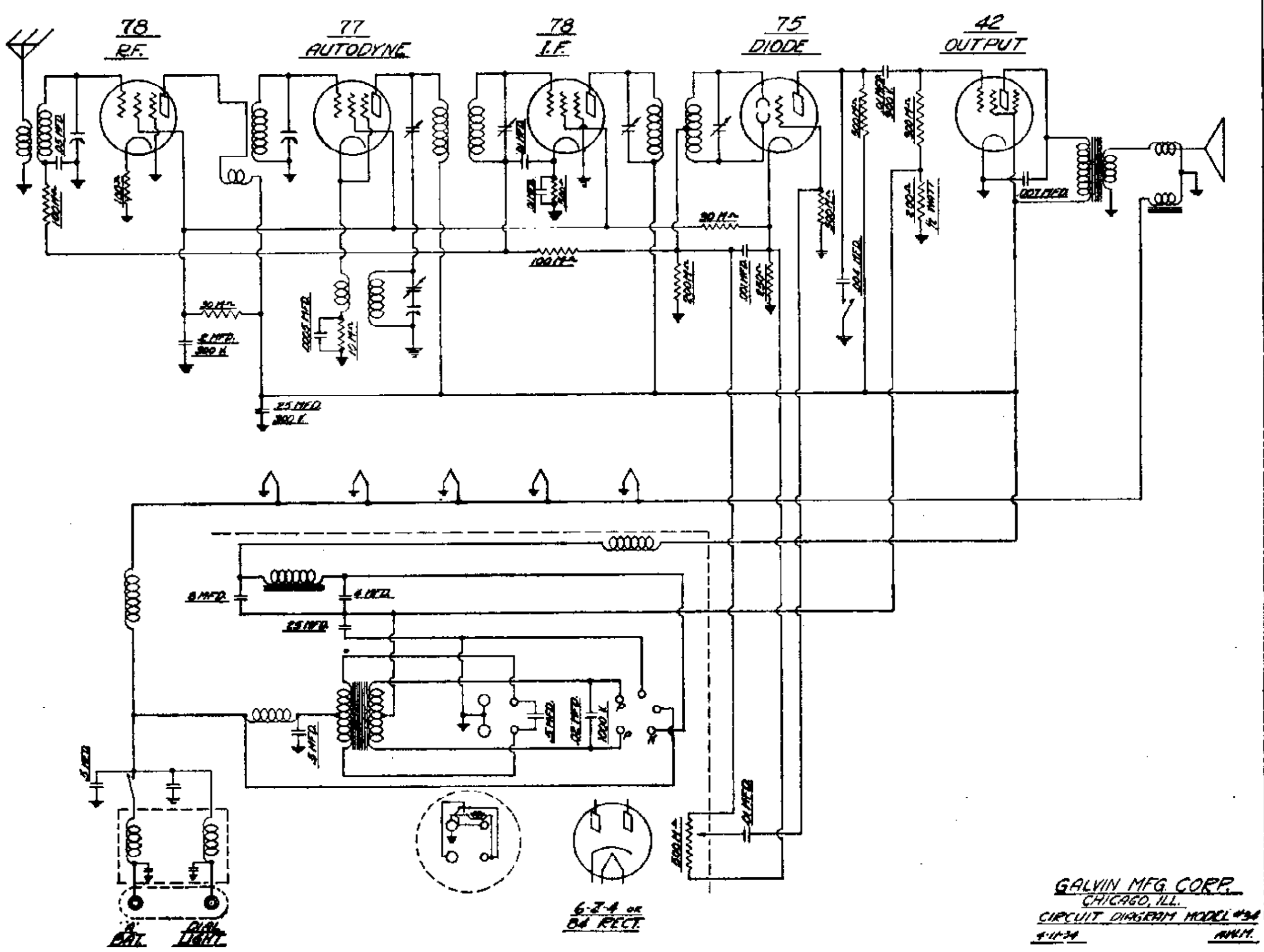
CONTINUITY TEST ON POWER PACK

TEST	SHOULD TEST	IF OTHERWISE
1. Terminal #1 to K of 84 socket . .	300 ohm	Defective filter choke.
2. Terminal #1 to terminal #4 socket	Open *	Effective 8 mfd. cond.
3. Terminal #4 to ground socket. . .	Open *	Defective 25 mfd. cond.
4. Terminal #2 to terminal #4 socket	Open *	Defective 8 mfd. cond.
5. Terminal #3 to terminal #1 and 2 Elk. socket.	Closed	Loose connection.
6. Terminal #3 to ground	Closed through 84 fil.	Def. tube shorted .5 mfd. cond.
7. Terminal #4 to P and P of 84 socket	200 ohm	Def. sec. power trans.
8. P to P on 84 socket	400 ohm	Shorted buffer cond.
9. K to P and P of 84 socket	Open	Defective 84 tube.

* On tests #2, 3 and 4 allowance should be made for polarization, or normal leakage of electrolytic condenser.

MODEL 34
Schematic

GALVIN MFG. CO.



ADJUSTMENT OF TUNING CONDENSER GEAR

The tuning condenser gear may be adjusted against its drive pinion by simply turning the cam screw, reaching through a hole in the left side of front cover. This hole is covered by button, easily pried upward with screwdriver. Turn screw to the left until slight drag is felt on the station selector knob, then back off slightly until free movement is obtained. After adjustment has been made tighten small locking screw located on face of cam screw.

BALANCING THE SET TO THE ANTENNA

After the set is installed ready for operation, it may be necessary to balance the set to the antenna. This is done by adjustment of the antenna trimmer, located under a 3/8" hole in the TOP of the set. This hole is covered by a button which is removed by simply prying upward with a screw driver.

In making this adjustment tune in a very weak station around 120 to 140 on the dial. Adjust the trimmer with a screw driver until the point of maximum volume is reached.

ADJUSTING THE STATION SELECTOR INDICATOR

Tune in a station of known frequency preferably between 1000KC and 1300 KC.

Insert a screw driver in the center rear of the control head and adjust indicator to the frequency of the station being received. (See Fig. 4).

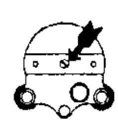


Fig. 4

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 450 (4A)
Temporary Alignment Parts List

ALIGNMENT PROCEDURE CHASSIS 4A

1. Equipment

A - Test Oscillator

A - A modulated oscillator capable of producing signals at 262 K.C., 455 K.C., 1400 K.C., 3700 K.C. (10 M.C. and 20 M.C. used on 7B & 11A only) is necessary for alignment of the 1934 Grunow Receivers.

B - Out-put Meter

This may be any of the standard out-put meters on the marked but should be sufficiently sensitive to provide a good deflection at low signal strength, it should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means

Coupling condensers of .25 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting

Turn dial pointer so that end mark of dial is directly under pointer with variable condenser fully meshed.

It will be necessary to simulate the dial plate during alignment when Chassis is removed from cabinet.

3. I.F. Alignment

A - Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6F7 (1st Detector Tube) located on rear right hand corner of Chassis as you face same. Connect the ground lead to the Chassis.

B - Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on out-put meter.

C - Align four I.F. trimmers (A1, A2, A3, A4) located on under side of Chassis at base of I. F. Coils.

4. 1400 K.C. Alignment

A - Connect signal lead of oscillator to antenna lead (the blue wire leading from rear of Chassis) through 200 Mmf. Condenser.

B - Set Dial at 1400 K.C. and place oscillator in operation at 1400 K.C. Throw range switch on rear of Chassis to broadcast position.

C - Align oscillator trimmer (A5), which is the first of the two on the variable condenser as you face Chassis.

D - Align Antenna Trimmer (A6), which is the second trimmer on variable condenser as you face Chassis.

5. 600 K.C. Alignment

A - Place oscillator in operation at 600 K.C.

B - Tune in signal to maximum (this point does not have to be exactly at the 600 K.C. dial setting).

C - Adjust the 600 K.C. trimmer (A7 - located on rear face of Chassis and covered with a seal) in direction of signal increase and at the same time rock the tuning condenser back and forth through resonance. Continue this procedure until maximum signal is obtained on the out-put meter.

D - This should be performed with great care so that the alignment is the best that can be obtained, otherwise the selectivity of the set will suffer.

E - Recheck adjustment on 1400 K.C. antenna trimmer.

6. 3700 K.C. Alignment

A - Throw Range Switch to S.W. position.

B - Set oscillator in operation at 3700 K.C.

C - Turn Dial pointer to 3700 K.C. or 3.7 M.C.

D - Adjust 3700 K.C. Trimmer (A8) located on top of Chassis near variable condenser.

7. Recheck Dial Calibration and 1400 K.C. Alignment.

Model 450
Chassis 4A - Speaker 8B1

Part No.	Specifications	Quantity Required
20861	Attachment Cord	1
20962	Grid Cap	2
21598	Rubber Grommet	1
22858	1 Meg. Ohm Resistor, ½ Watt	1
23284	Bakelite Washer	6
23558	Vertical Terminal Strip	1
23538	200,000 Ohm Resistor, ½ Watt	1
23849	500,000 Ohm Resistor, ½ Watt	1
23998	250,000 Ohm Resistor, ½ Watt	1
24254	1,000 Mmf. Condenser	1
24789	4 MFD - 25 V. Dry Electrolytic Condenser	1
26564	Tube Shield Base	2
26634	35000 Ohm Resistor, ½ Watt	1
27338	I.F. Shield and Eyebolt Assembly	1
27382	Trimmer Condenser Assembly	1
27784	400 Ohm Resistor, ½ Watt	1
27831	Pilot Light Assembly	2
28045	Pilot Lamp	2
28566	Oscillator Coil Mtg.Strip	1
28522	Trimmer Condenser Assembly	1
28721	.01 MFD 500 Volt Tubular Condenser	1
28722	.04 MFD 500 Volt Tubular Condenser	1
28726	.1 MFD 400 Volt Tubular Condenser	1
28729	.5 MFD 100 Volt Tubular Condenser Assembly	1
28876	.02 MFD 500 Volt Tubular Condenser	1
29087	Tube Shield	2
29115	Candohm Resistor	1
29117	Two Gang Condenser	1
29118	2 Meg. Ohm Resistor, ½ Watt	2
29119	Volume Control	1
29120	Range Switch	1
29121	Power Transformer Assembly - 60 Cycle	1
29132	Antenna Coil Assembly	1
29135	0.1 MFD 100 Volt Tubular Condenser	1
29136	1st I.F. Assembly	1
29137	2nd I.F. Assembly	1
29159	Double Pointer Knob	1
29160	Single Pointer Knob	1
29164	50 M. Ohm Resistor	1
29168	Dual 8 MFD 450 Volt Electrolytic Cond.	1
29170	.017 MFD 500 Tubular Condenser	1
29176	Speaker Cable Assembly	1
29264	Antenna and Gr. Lead Assembly	1
31077	Socket (5 Prong)	1
31079	Socket (6 Prong)	1
31080	Socket (7 Prong)	1
62523	5/8" X. #8 Hex. Hd. S.T. Screw Type Z	4
62847	Flat Washer 500 ODX .187 ID	4

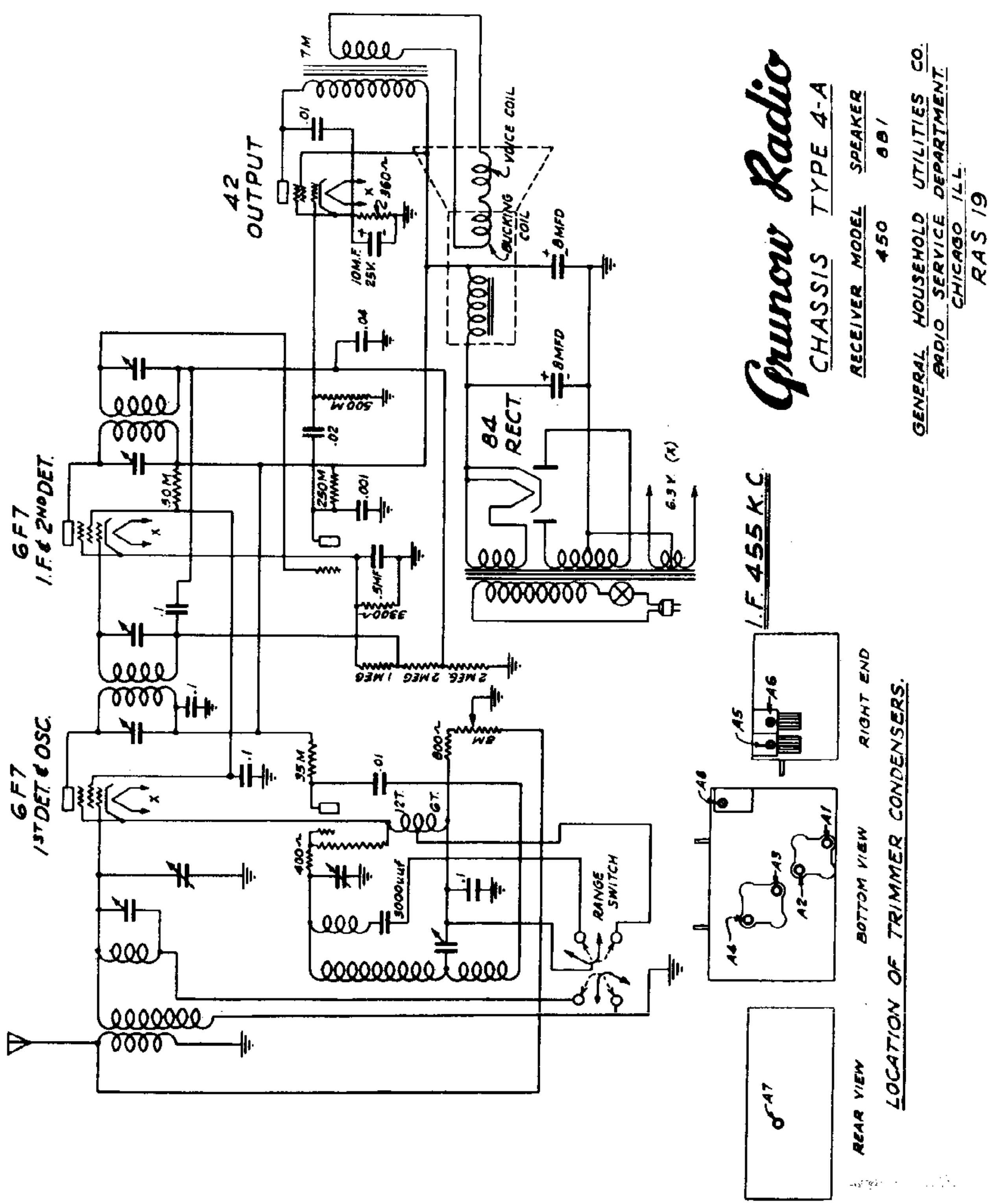
SPEAKER PARTS
Type 8-B1

Part No.	Specifications
28844	Field Yoke and Pole Piece Assembly
29058	Cone Mtg. Gasket
29040	Speaker complete
29042	Field Coil
29045	Speaker Head Assembly
29047	Terminal Strip Cover
29741	Transformer
29769	Clamp Ring
31355	Cone and Voice Coil Assembly

Complete Speakers may not be returned for credit.

MODEL 450 (4A)
Temporary
Schematic, Trimmers

GENERAL HOUSEHOLD UTILITIES CO.



GENERAL HOUSEHOLD UTILITIES CO.

SEPTEMBER 1934

Grunow Radio

TEMPORARY
SERVICE NOTES & PARTS LIST

CHASSIS TYPE 4 B
RECEIVER MODEL 460
SPEAKER TYPE 8B3

GENERAL HOUSEHOLD UTILITIES CO.
CHICAGO U.S.A.
31555-1
LITHO. U.S.A.

ALIGNMENT PROCEDURE CHASSIS 4B

1. Equipment

A - Test Oscillator

A - A modulated oscillator capable of producing signals at 455 K.C., 600 K.C., 1400 K.C. and 1700 K.C. is necessary for alignment of the 4B Grunow Receivers.

B - Out-put Meter
This may be any of the standard out-put meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, it should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means
Coupling condensers of .25 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting

Turn dial pointer until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment

A - Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6A7 (1st Detector Tube) located on front right hand corner of Chassis. Connect the ground lead to the Chassis.

B - Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attentuated at oscillator to lowest value consistent with obtaining a readable indication on out-put meter).

C - Align three I.F. trimmers (A1-A2-A3) located on top of Chassis. Two on top of 1st I.F. Can and 1 on Chassis between 42 and 6F7 tube.

4. 1700 K.C. Alignment

A - Connect signal lead of oscillator to antenna lead, (the blue wire leading from rear of chassis) through 200 Mmf. Condenser.

B - Set dial pointer at 1700 K.C. and place oscillator in operation at 1700 K.C.

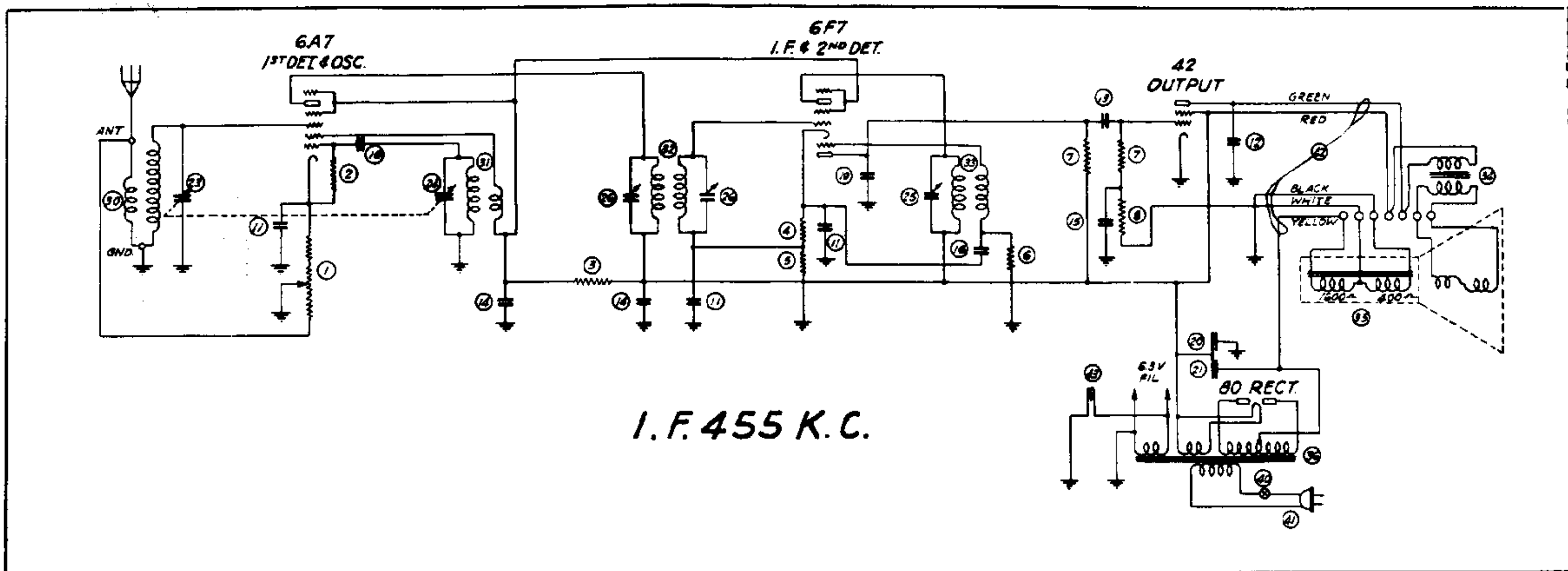
C - Align oscillator trimmer (A4) which is the first of the two on the variable condenser.

5. 1400 K.C. Alignment

A - Place oscillator in operation at 1400 K.C.
B - Set dial pointer at 1400 K.C.
C - Align antenna trimmer (A5). This operation may require rocking the variable condenser back and forth through resonance. The object of this operation is to be sure that the receiver will reach 1712 K.C. and at the same time have maximum sensitivity on the rest of the broadcast band.

MODEL 460 (4B)
Temporary Schematic
Trimmers

GENERAL HOUSEHOLD UTILITIES CO.



RESISTORS			
ITEM	PART NO	DESCRIPTION	NO REQ
1	31222	VOLUME CONTROL (7,500~)	1
2	23853	50,000 OHM ±20% - ¼ W.	1
3	31231	20,000 OHM ±5% ½W-WIREW	1
4	31224	400 OHM ±10% - 10 M.A. WIRE W	1
5	31224	1400 OHM ±10% - 10 M.A. - WIRE W	
6	22858	1 MEG OHM ±20% - ¼ W	1
7	23849	500,000 OHM ±20% - ¼ W.	2
8	23986	250,000 OHM ±20% - ¼ W.	1

PAPER CONDENSERS			
ITEM	PART NO.	DESCRIPTION	NO REQ
11	29135	0.1 MFD +20% -10% 100 V.	3
12	28720	0.005 MFD +20% -10% 700 V	1
13	29567	0.02 MFD. +20% -10% 400 V.	1
14	28726	0.1 MFD ±10% 400 V.	2
15	28728	0.25 MFD. ±10% 100V	1
16	30143	0.05 MFD ±10% 100V.	1

MICA CONDENSERS			
18	24487	250 - MMFD ±10%	1
19	31339	2300 - MMFD ±10%	1

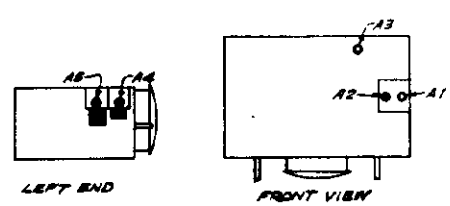
ELECTROLYTIC CONDENSERS			
ITEM	PART NO.	DESCRIPTION	NO. REQ.
20	31208	8 MFD 350 D.C VOLTS	1
21	31208	8 MFD 350 D.C VOLTS	

ADJUSTABLE CONDENSERS			
23	31218	R.F. SEC. OF 2 GANG	1
24	31218	OSC SEC. OF 2 GANG	1
25	27382	15 TO 75 MMF.	1
26	30170	20-120 MMF	

TRANSFORMERS & CHOKES			
ITEM	PART NO	DESCRIPTION	NO REQ
30	31234	ANT COIL ASSEMBLY	1
31	31232	OSC COIL ASSEMBLY	1
32	31235	1ST I.F. ASSEMBLY	1
33	31288	2ND I.F. ASSEMBLY	1
34	29741	OUT-PUT TRANS.	1
35	29786	SPEAKER FIELD	1
36	31226	POWER TRANS. (50-60~)	1

MISCELLANEOUS			
ITEM	PART NO.	DESCRIPTION	NO. REQ
40	31225	LINE SWITCH	1
41	20861	LINE CORD	1
42	31266	SPEAKER CABLE	1
43	31267	PILOT LIGHT ASSEMBLY	1
	23284	BAKELITE WASHER	1
	26566	TUBE SHIELD BASE	1
	20962	GRID CAP	1
	28366	OSC. COIL MTG STRIP ASSEM	1
	31075	4 PRONG SOCKET	1
	31079	6 PRONG SOCKET	1
	31080	7 PRONG SOCKET	2
	31172	DIAL WINDOW	1

MISCELLANEOUS - CONTINUED			
	31209	DIAL POINTER	1
	31211	REFLECTOR & DIAL MTG	1
	31219	JUNCTION TERM. BOARD	1
	31237	DIAL CHART	1
	28010	KNOB	3
	29162	TUBE SHIELD	2
	31165	8B3 SPEAKER	1
	62570	¼" x #8 H.H SELF TAP SCREW	4
	63039	FELT WASHERS	5
	63867	FLAT WASHERS	4



LOCATION OF TRIMMER CONDENSERS.

Grunow Radio
CHASSIS TYPE 4-B
RECEIVER MODEL 460 — SPEAKER 8B3
GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO, ILL.
RAS-18

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 550 (5B)
Temporary
Parts List
Alignment

ALIGNMENT PROCEDURE CHASSIS 5B

1. Equipment

A - Test Oscillator

A modulated oscillator capable of producing signals at 455 K.C., 600 K.C. and 1400 K.C. is necessary for alignment of the 5B Chassis.

B - Out-put Meter

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection so that extremely strong signals may be read.

C - Coupling Means

Coupling Condensers of 200 Mmf., 25 Mfd., should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. I. F. Alignment

A - Connect signal lead of oscillator through .25 Mfd. condenser to grid of 78 tube. (1st Detector Tube). The ground lead to ground post on rear of Chassis.

B - Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on out-put meter).

C - Align three I. F. trimmers (A1-A2-A3) located on under side of Chassis at base of I.F. Coils.

3. Dial Calibration

A - With condensers fully meshed dial pointer should be directly over end mark on dial.

B - When Chassis is removed from cabinet it will be necessary to simulate dial escutcheon which incorporates dial pointer.

4. 1400 K.C. Alignment

A - Connect signal lead of oscillator through 200 Mmf. Condenser to antenna leading from Chassis.

B - Turn dial to 140 (1400 K.C.) and align 1400 K.C. oscillator trimmer (A4), located forward on variable condenser.

C - Align Antenna Trimmer (A5) which is the second trimmer on variable condenser.

5. 600 K.C. Alignment.

A - Place oscillator in operation at 600 K.C. Tune in signal (this does not have to be exactly on 600 Dial Setting).

B - Adjust 600 K.C. trimmer (A6) located on under side of Chassis directly under variable condenser) in direction of signal increase. Rocking dial knob through resonance until maximum output is obtained.

C - Recheck dial calibration: Over several points on dial.

CHASSIS 5B

MODEL 550

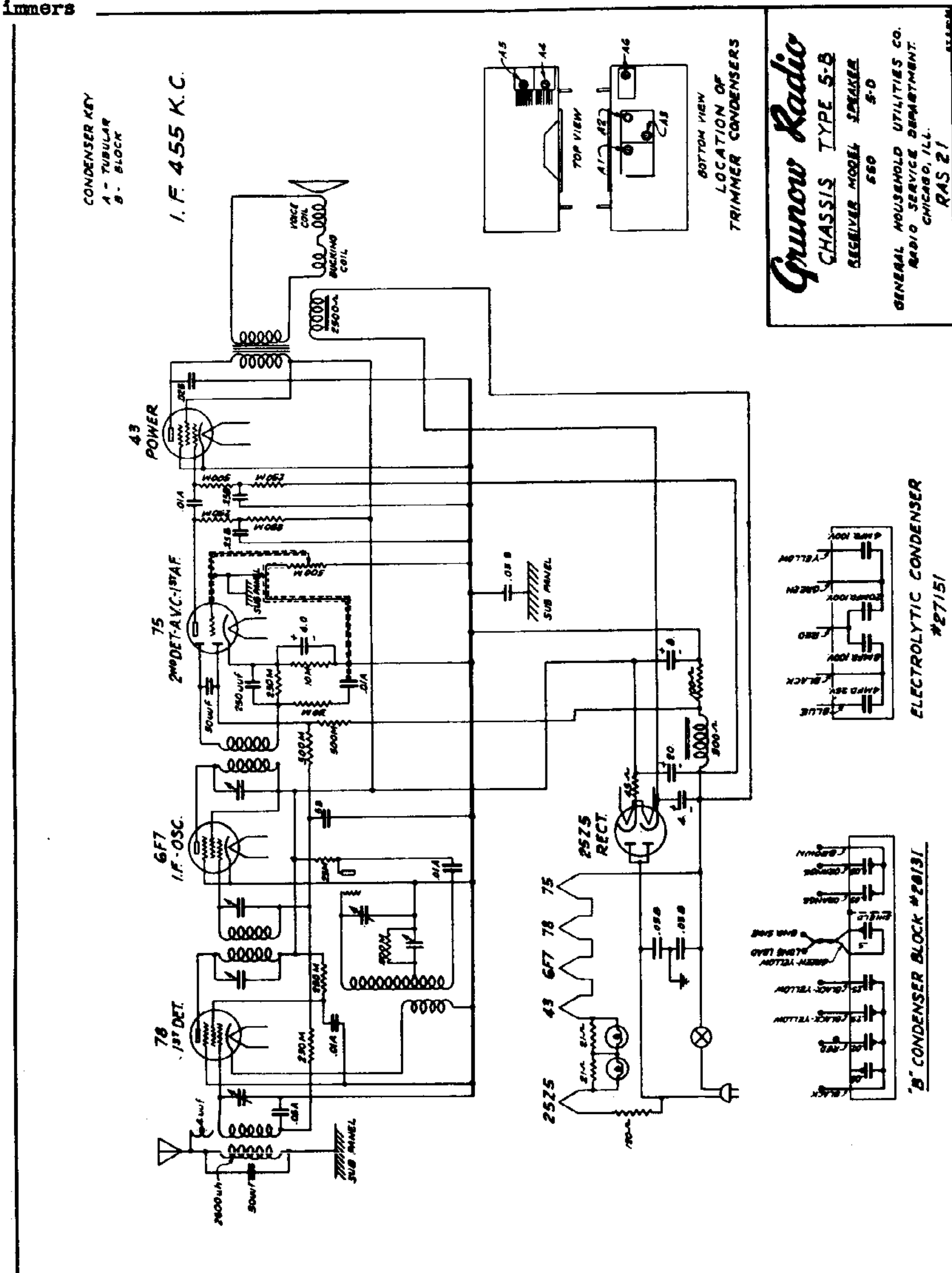
Part No.	Description	Quantity Required
20962	Grid Cap only	5
22856	Resistor, 25,000 ohm, Carbon, ½ Watt	1
23558	Insulated Terminal-Single	1
23849	Resistor, 500,000 Ohm, Carbon, ½ Watt	5
23852	Resistor, 10,000 Ohm, Carbon, ½ Watt	1
23855	Resistor, 50,000 Ohm, Carbon, ½ Watt	1
23998	Resistor, 250,000 Ohm, Carbon, ½ Watt	6
24416	Insulated Terminal—Double	1
24487	Condenser, 250 Mmf. Mica	1
26198	Oscillator Transformer Shield	1
26247	I. F. Transformer Shield	2
26564	Tube Shield Base	2
27151	Electrolytic Filter Condenser Block	1
27153	Resistor, 100 ohm, Candohm	1
27155	Resistor, 21-21 ohm, Candohm	1
27163	Volume Control	1
27164	Filter Choke Assembly	1
27170	Tuning Condenser Assembly	1
27171	Volume Control Pilot Lamp Socket	1
27182	Tuning Condenser Pilot Lamp Socket	1
27184	Oscillator Transformer	1
27185	1st I. F. Transformer	1
27186	2d I. F. Transformer	1
27188	Trimmer Condenser Assembly	1
27404	Attachment Cord (Voltage Reducing)	1
27686	Antenna Transformer	1
27740	Selector Dial Assembly	1
27741	Volume Control Dial Assembly	1
27992	Resistor, 45 ohm, Candohm	1
28045	Pilot Lamp, 6-8 Volt	2
28125	Ground Binding Post	1
28151	Bypass Condenser Block	1
28721	Condenser, .01 Mfd., 500 Volt Tubular	5
28723	Condenser, .05 Mfd., 400 Volt Tubular	1
29085	Condenser, 50 Mmf., Mica	1
29087	Tube Shield	2
29453	Condenser, .01 Mfd. 400 Volt Tubular	1
29903	Grille, Chromium Plated	1
29904	Escutcheon Plate	2
29905	Knob, Selector or Volume Control	2
29909	Cabinet Insulator Assembly	1
51079	Tube Socket - 6 Prong	4
51080	Tube Socket - 7 Prong	1
62521	Wood Screw - Cabinet Insulator	2
62522	Wood Screw - Cabinet Back	6
62570	Chassis Mounting Screws	4
63847	Chassis Mounting Washer	4
64500	Escutcheon Pin	4

SPEAKER PARTS

Part No.	Description	Quantity Required
26321	Cone Head Assembly	1
28435	Field Coil	1
28436	Bucking Coil	1
28437	Output Transformer	1

MODEL 550 (5B)
Temporary
Schematic
Trimmers

GENERAL HOUSEHOLD UTILITIES CO.



GENERAL HOUSEHOLD UTILITIES CO

ALIGNMENT PROCEDURE CHASSIS 6A

1. Equipment

A - Test Oscillator

A modulated oscillator capable of producing signals at 262 K.C., 455 K.C., 600 K.C., 1400 K.C., 3700 K.C., (10 M.C. and 20 M.C. used on 7B & 11A only) is necessary for alignment of the 1934 Grunow Receivers.

B - Output Meter

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means

Coupling Condensers of 200 Mmf., .25 Mfd., should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment

Connect signal lead of test oscillator to grid of the 6D6 (1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to Chassis.

A - Set Dial pointer to 1400 K.C. and range switch on position "A". (Left)

B - Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

C - Attenuate test oscillator out-put to lowest value consistent with obtaining a readable indication on out-put meter.

D - Adjust four I.F. Trimmers, (A1-A2-A3-A4), located on under side of Chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 3700 K.C. Alignment

A - Throw range switch to position "B". (Right)

B - Connect signal lead of test Oscillator to Antenna post on Chassis through 200 Mmf. Condenser.

C - Turn dial pointer to 3700 K.C.

D - Place Oscillator in operation at 3700 K.C.

E - Align Oscillator Trimmer (A5), (front trimmer located on top of variable condenser.

5. 1400 K.C. Alignment

A - Throw range switch to position "A". (Left)

B - Turn Dial pointer to 1400 K.C.

C - Place Oscillator in operation at 1400 K.C.

D - Align the 1400 K.C. Trimmer (A6), (located on the front left face of the Chassis, the lower of the two at this location).

E - Align the second and third trimmers (A7 & A8) on the top of the variable condenser.

F - Repeat the 1400 K.C. alignment at least twice.

6. 600 K.C. Alignment

A - Place Oscillator in operation at 600 K.C.

B - Tune in 600 K.C. signal (this does not have to be exactly on 600 K.C. dial setting).

C - Adjust 600 K.C. trimmer (A9), (located on the front left face of the Chassis, the upper of the two at this location), in direction of signal increase. At the same time, rock the tuning condenser back and forth through resonance. Continue this procedure until maximum signal is obtained on output meter.

CHASSIS 6A - 6AW - 6AX - 6AZ
MODELS 650 - 651

Part No.	Description	Number Required
20678	Ground Terminal	1
20661	Attachment Cord	1
20929	Resistor, 50,000 ohm Carbon 1 Watt	1
23370	Resistor, 100,000 Ohm, Carbon, ½ Watt	2
23849	Resistor, 500,000 Ohm, Carbon, ½ Watt	5
23863	Resistor, 50,000 Ohm, Carbon, ½ Watt	1
23896	Resistor, 250,000 Ohm Carbon, ½ Watt	2
24261	Condenser, 100 Mmf. Mica	1
24487	Condenser, 250 Mmf. Mica	2
24673	Resistor, 75,000 Ohm, Carbon, ½ Watt	1
[illegible]	2d I.F. Transformer Shield	1
[illegible]	Trimmer Condenser	1
[illegible]	1st I.F. Transformer Shield	1
[illegible]	Knob, Selector and Volume Control	2
[illegible]	Pilot Light Socket - Insulated	2
28010	Knob - Tone Control	1
28045	Pilot Light, 6-8 Volt	2
[illegible]	Dial Pointer Screw	1
28717	Condenser, .002 Mfd., 700 Volt Tubular	1
28721	Condenser, .01 Mfd., 600 Volt Tubular	2
28725	Condenser, .05 Mfd., 400 Volt Tubular	1
28726	Condenser, .1 Mfd., 400 Volt Tubular	1
28919	Resistor - Candohm	1
28922	Bypass Condenser Block	1
28923	2d I. F. Transformer	1
28925	Drive Drum Assembly	1
28959	Trimmer Condenser Assembly	1
29002	1st Detector Transformer	1
29005	Antenna Transformer	1
29007	Oscillator Transformer	1
29011	Resistor, 40,000 Ohm, Carbon, 1 Watt	1
29065	Electrolytic Condenser Clamp	1
29074	Condenser, 250 - 100 Mmf. Mica	1
29083	Condenser, 50 Mmf. Mica	1
29086	Condenser, 18 Mfd. 500 Volt Electrolytic	1
29087	Tube Shield	2
29253	Speaker Cable	1
29399	Dial Pointer	1
29400	Dial Chart	1
29401	Tuning Condenser, 3 Gang	1
29404	Volume Control	1
29406	Tone Control	1
29409	Tuning Condenser Mounting Bracket	1
29410	Reflector Assembly	1
29425	Drive Cable with Eyelets	1
29426	Cable Tension Spring	1
29453	Condenser, .01 Mfd. 400 Volt Tubular	1
29567	Condenser, 8 Mfd. 450 Volt Dry Electrolytic	1
29564	Condenser, .075 Mfd., 100 Volt Tubular	1
29575	Tube Shield	2
29597	Condenser, 600 Mmf. Mica	1
29623	Drive Shaft Bearing	1
29854	Power Transformer, 115 Volt, 50-60 cycles	1
29864	1st I.F. Transformer	1
29921	Drive Shaft	1
29922	Front Bearing Plate	1
29924	Antenna Binding Post Assembly	1
29925	Power Transformer, 115 Volt - 60 Cycles only	1
29926	Power Transformer, 115 Volt - 25 to 50 Cycles	1
29927	Range Switch	1
29932	Escutcheon Window	1
29933	Window Retaining Ring	1
29934	Escutcheon	1
29946	Range Switch Front Bearing Plate	1
29947	Escutcheon Retaining Spring	1
29949	Range Switch Mounting Bracket	1
29958	Decalcomania - "A,B"	1
29968	Condenser, 1950 Mmf. Mica	1
29969	Condenser, 480 Mmf. Mica	1
30005	Power Transformer, 110-135-220-250 Volts, 50-60 Cycles	1
31075	Tube Socket - 4 Prong	1
31079	Tube Socket - 6 Prong	4
31080	Tube Socket - 7 Prong	1
31118	Resistor, 1 Ohm, Ohmite	1
61118	Chassis Mounting Screw	4
65839	Felt Knob Washer	4
63853	Chassis Mounting Washer	4

SPEAKER PARTS

Type 6A3

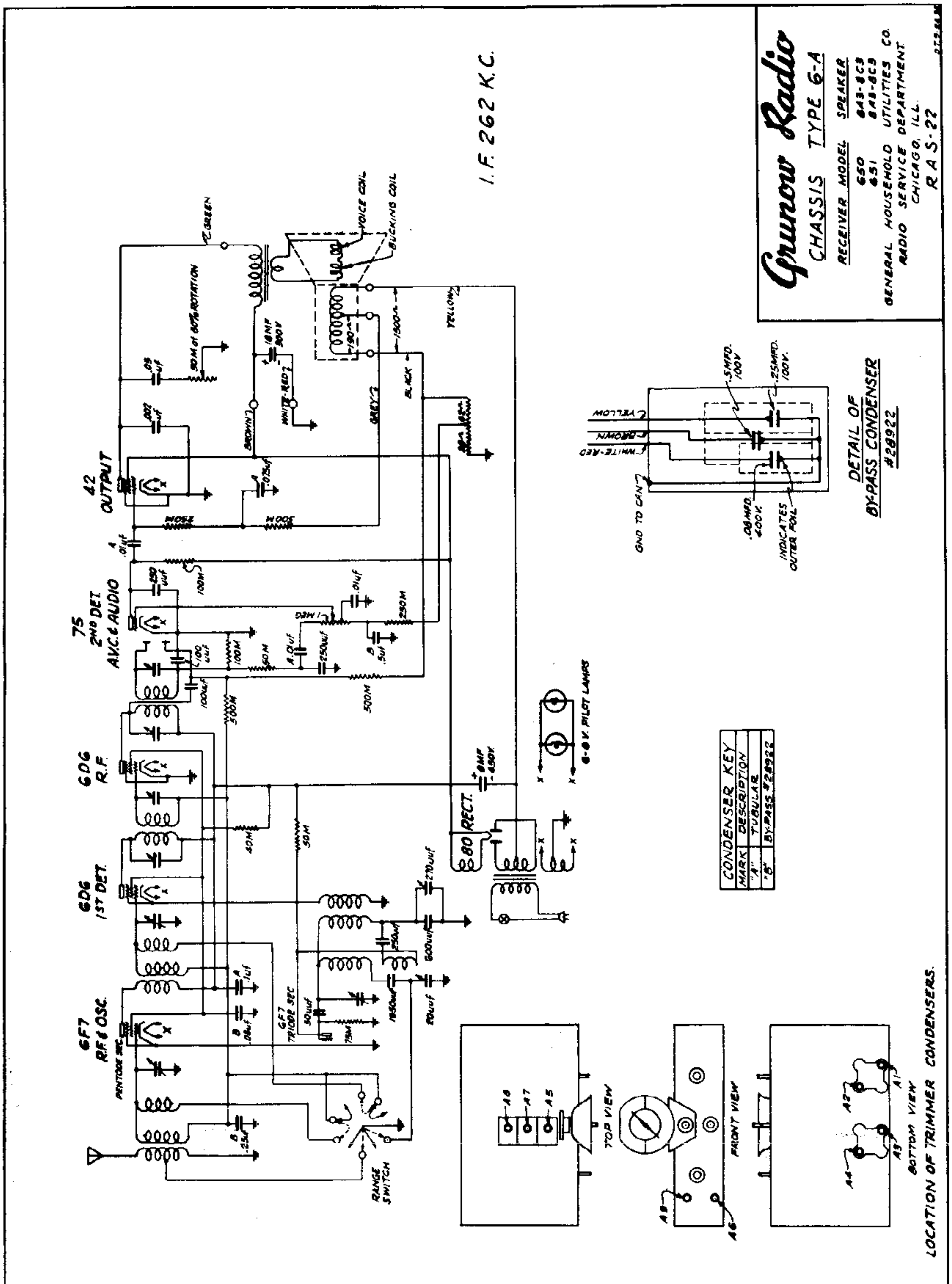
20003	Speaker Pot & Pole Piece Assy.
20040	Speaker pot clamp
20045	Terminal strip cover
20047	Terminal Strip
20058	Spider Clamp Ring
29078	Electrolytic Mtg. Bracket
29675	Speaker complete
29706	Cone Mtg. Gasket
29726	Field Coil Assy.
29732	Output Transformer
29735	Speaker Head Assy.
31309	Cone & Voice Coil Assy.

Type 8C3

20040	Speaker Pot Clamp
20045	Terminal Strip Cover
20047	Terminal Strip
20058	Spider Clamp Ring
29078	Electrolytic Mtg. Bracket
29674	Speaker Complete
29699	Speaker Pot and Pole Piece Assy.
29705	Cone Mtg. Gasket
29732	Output Transformer
29767	Speaker Head Assy.
29768	Field Coil Assy.
31309	Cone and Voice Coil Assy.

MODEL 650,651 (6A)
Temporary
Schematic,Trimmers

GENERAL HOUSEHOLD UTILITIES CO.



GENERAL HOUSEHOLD UTILITIES CO.

MODEL 660,661,662 (6C)
Temporary Alignment, Parts

ALIGNMENT PROCEDURE

1. Equipment

A - Test Oscillator

A modulated oscillator capable of producing signals at 262 K.C. - 600 K.C. - 1400 K.C. - 16 M.C.

B - Output Meter

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means

Coupling condensers of 200 Mmf., 25 Mfd. and a 400 ohm resistor should be used when coupling test oscillator to receiver during alignment as specified in the following paragraphs.

2. Dial Setting

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment

A. Connect signal lead of test oscillator to grid of the 6A7 (first detector tube) through a .25 Mfd. condenser. Connect the ground lead to the chassis.

B - Set dial pointer to 1400 K.C. and range switch on counter-clockwise (broadcast) position.

C - Place test oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

5. 1400 K.C. Alignment

A - Turn range switch counter-clockwise to broadcast position.

B - Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

C - Place test oscillator in operation at 1400 K.C. and set dial pointer on 1400 K.C.

D - Adjust the lower of the two trimmers (A11) located at the left front end of chassis and trimmers on 2nd (A8) and 3rd (A9) section of variable condensers to maximum output.

6. Recheck Operation No. 4 (16 M.C. Alignment)

7. 600 K.C. Alignment

A - Place test oscillator in operation at 600 K.C.

B - Tune in signal to maximum. (This point does not have to be exactly at 600 K.C. dial setting)

C - Adjust the 600 K.C. padding condenser (A10) (this is the upper of the two trimmers located at the left front end of chassis), in direction of signal increase; at the same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

D - Attenuate test oscillator output to lowest value consistent with obtaining a readable indication on output meter.

E - Adjust the four I.F. trimmers (A1-A2-A3-A4) located on the under-side of the chassis, until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 16 M. C. ALIGNMENT

A - Connect signal lead of test oscillator through 400 ohm resistor to antenna binding post of chassis.

B - Connect the ground lead to ground terminal of chassis.

C - Set range switch to S.W. range (clockwise position).

D - Place test oscillator in operation at 16 M.C. and set dial pointer on 16 M.C.

E - Adjust trimmer (A5) on front section of variable condenser (oscillator) --, trimmer (A6) on top of detector coil and A7 on top of the antenna coil - to maximum output - (the detector and antenna coils are located on left-hand side on top of the chassis).

F - On oscillator alignment use the lower of the two images for the oscillator alignment point. It will be noted that there are two settings at which the signal will be received. Use the setting giving most capacity, that is, the setting at which the trimmer screw is farthest in. While adjusting the detector and antenna coil trimmers rock the variable condensers back and forth until maximum output is obtained.

PARTS LIST
CHASSIS 6C - 6CW - 6CX - 6CZ
MODELS 660 - 661 - 662

Part No.	Description
22856	Resistor, 25,000 Ohm, Carbon, ¼ Watt
23284	Bakelite Washer
23558	Insulated Terminal
23570	Resistor, 100,000 Ohm, Carbon, ¼ Watt
23849	Resistor, 500,000 Ohm, Carbon, ¼ Watt
23850	Resistor, 16,000 Ohm, Carbon, ¼ Watt
23853	Resistor, 50,000 Ohm, Carbon, ¼ Watt
23998	Resistor, 250,000 Ohm, Carbon, ¼ Watt
24251	Condenser, 100 Mmf. Mica
24487	Condenser, 250 Mmf. Mica
28045	Pilot Lamp, 6-8 Volt
28421	Resistor, 2,000 Ohm, Carbon, ¼ Watt
28720	Condenser, .005 Mfd., 700 Volt Tubular
28725	Condenser, .05 Mfd., 400 Volt Tubular
28726	Condenser, .1 Mfd., 400 Volt Tubular
28729	Condenser, .5 Mfd., 100 Volt Tubular
28925	Drive Drum Assembly
28939	Trimmer Condenser Assembly
29074	Condenser, 250-100 Mmf., Mica
29085	Condenser, 50 Mmf. Mica
29087	Tube Shield
29135	Condenser, .1 Mfd., 100 Volt Tubular
29404	Volume Control
29406	Tone Control
29409	Tuning Condenser Mounting Bracket
29410	Reflector Assembly
29428	Resistor, Candohm
29432	Antenna Transformer
29434	1st Detector Transformer
29435	Oscillator Transformer
29453	Condenser, .01 Mfd., 400 Volt Tubular
29530	2d I.F. Transformer
29551	Antenna and Doublet Binding Posts
29557	Condenser, 8 Mfd., 450 Volt, Dry Electrolytic
29562	Condenser, 18 Mfd., 300 Volt, Wet Electrolytic
29564	Condenser, .075 Mfd., 100 Volt Tubular
29567	Condenser, .02 Mfd., 400 Volt Tubular
29989	Condenser, 480 Mmf., Mica
29990	Condenser, .02 Mfd., 400 Volt Tubular
31035	Power Transformer, 115 Volt, 50-60 Cycles
31051	Tuning Condenser, 3 Gang
31053	Power Transformer, 110-135-220-250 Volt, 50-60 Cycles
31072	Oscillator Transformer Shield
31114	Speaker Cable
31116	Resistor, 1 ohm, Ohmite
31117	Knob, Range Switch
31171	Resistor, 25,000 ohm, Carbon, 2 Watt
31185	1st I.F. Transformer
31199	Drive Cable with Eyelets
31202	Power Transformer, 115 Volts, 25-50 Cycles
31216	Drive Shaft - Outer
61154	Chassis Mounting Screw

SPEAKER PARTS

Type 8-B2

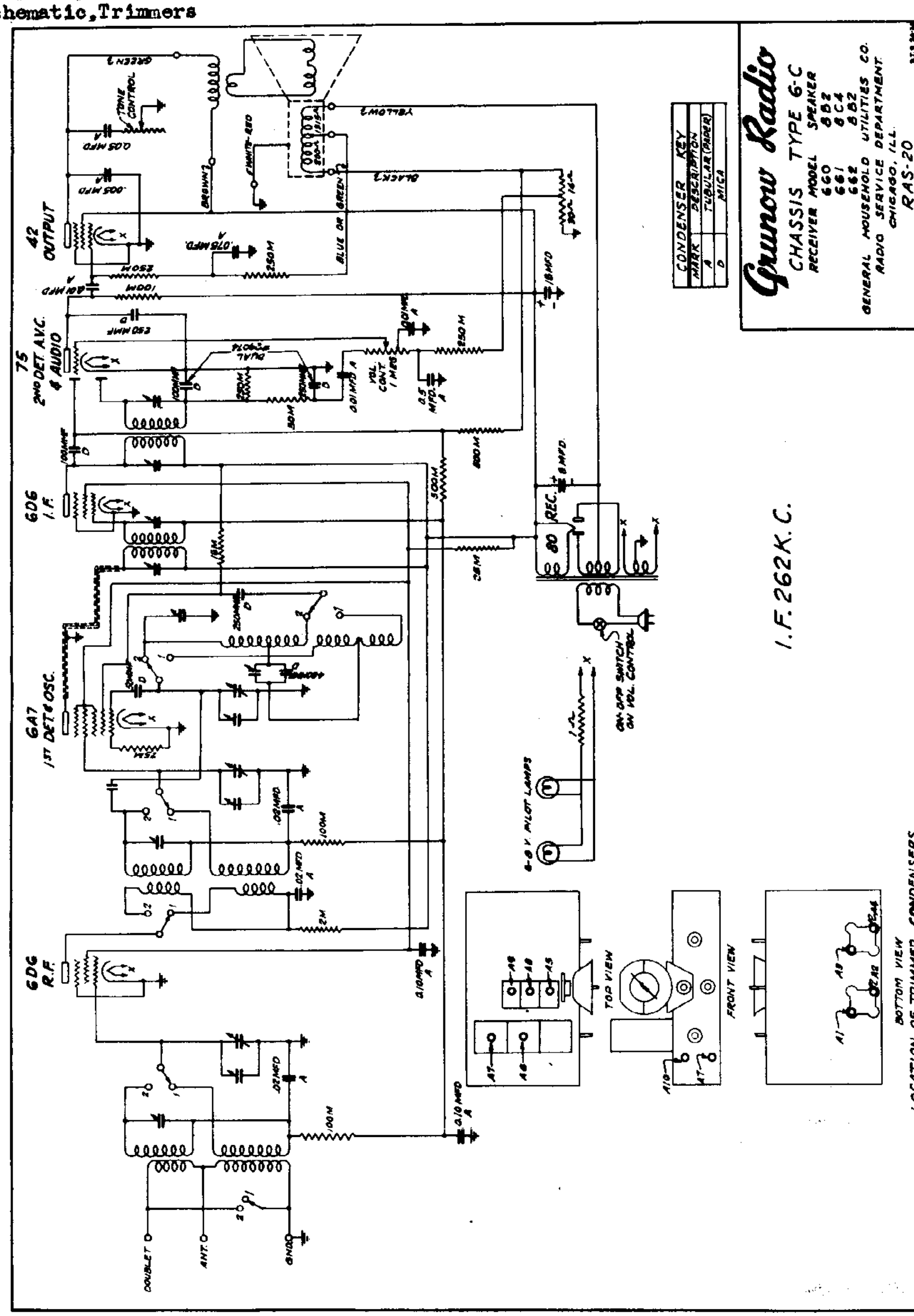
Part No.	Description
28844	Field Yoke and Pole Piece Assembly
29038	Cone Mounting Gasket
29043	Speaker Head Assembly
29047	Terminal Strip
29051	Terminal Strip Cover
29670	Speaker Complete
29741	Output Transformer
29769	Clamp Ring
29774	Field Coil
31355	Cone and Voice Coil Assembly

Type 8-C4

Part No.	Description
20040	Speaker Pot Clamp
20045	Terminal Strip Cover
20058	Spider Clamp Ring
29671	Speaker Complete
29699	Speaker Pot and Pole Piece Assembly
29705	Cone Mounting Gasket
29732	Output Transformer
29767	Speaker Head Assembly
29778	Speaker Field Coil Assembly
31309	Cone and Voice Coil Assembly

MODEL 660,661,662
(6C)
Temporary
Schematic,Trimmers

GENERAL HOUSEHOLD UTILITIES CO.



GENERAL HOUSEHOLD UTILITIES CO

SEPTEMBER 1934

Grunow Radio

TEMPORARY
SERVICE NOTES & PARTS LIST

CHASSIS TYPE 6D
RECEIVER MODELS 670 & 671
SPEAKER TYPES 8C6 10A5

GENERAL HOUSEHOLD UTILITIES CO.
CHICAGO U.S.A.
31561-1 LITHO. U.S.A.

ALIGNMENT PROCEDURE CHASSIS 6D

GENERAL

The Type 6D Chassis is used in conjunction with the 8C6 speaker in receiver model 670 and with the 10A5 speaker in the model 671 receiver.

This Chassis is a 6 tube all wave (550 to 21800 K.C.) superheterodyne, using 1 - 6D6 tube as an R.F. Amplifier, 1 - 6A7 tube as first Detector and Oscillator, 1 -6D6 tube as a Bi-Selector I.F. Amplifier, 1 - 75 tube acting as a second Detector, Automatic Volume Control and Audio Amplifier, 1 - 42 tube as the Audio Output and an 80 tube for the Rectifier.

The intermediate frequency is 455 K.C. An efficient range switch controls the four ranges in which the receiver operates.

ALIGNMENT

1. Equipment

A - Test Oscillator
A modulated Oscillator capable of producing signals at 455 K.C., 600 K.C., 1400 K.C., 4500 K.C., 12 M.C. and 21 M.C. is necessary for alignment of the Type 6D Chassis.

B - Output Meter
This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means
Coupling Condensers of 200 Mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment

Connect signal lead of test Oscillator to grid of the 6A7 (1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

A - Set Dial pointer to 1400 K.C. and range switch on position "A". (Broadcast).

B - Place test Oscillator in operation at 455 K.C. Turn receiver volume control and tone control to maximum.

C - Attenuate test Oscillator output to lowest value consistent with obtaining a readable indication on output meter.

D - Adjust five I.F. Trimmers, (A1, A2, A3, A4, A5), located on the I.F. transformers on top of the Chassis, (2 Trimmers are on top of each transformer and the fifth is at the lower side of the 1st I.F. transformer, (this is the Bi-Selector I.F. stage), until maximum output is obtained. During alighment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 4500 K.C. Alignment

A - Connect signal lead of test Oscillator through 200 Mmf. Condenser to Antenna binding part.

B - Connect the test Oscillator ground lead to the ground post of Chassis.

C - Turn Range Switch to range "B" and set Dial Pointer to 4500 K.C.

D - Align the following "B" range trimmers: Oscillator (A6), Detector (A7) Antenna (A8).

5. 1400 K.C. Alignment

A - Place test Oscillator in operation at 1400 K.C.

B - Turn Dial to 1400 K.C.

C - Turn Range Switch to range "A".

D - Adjust the following "A" range trimmers: Oscillator (A9), Detector (A10) Antenna (A11).

6. 600 K.C. Alignment

A - Place test Oscillator in operation at 600 K.C.

B - Tune in signal to maximum (this point does not have to be exactly at 600 K.C. setting).

C - Adjust the 600 K.C. Padding Condenser, (A12) in direction of signal increase. At same time rock the tuning condenser back and forth through resonance while adjusting Padding Condenser until maximum output is obtained.

7. 12 M.C. Alignment

A - Connect signal lead of test Oscillator through 400 ohm resistor to Antenna binding post of Chassis.

B - Connect the ground lead to ground terminal of Chassis.

C - Set Range Switch to range "C".

D - Place test Oscillator in operation at 12 M.C.

E - Adjust the following "C" range trimmers: Oscillator (A13), Detector (A14), Antenna (A15).

F - When adjusting the Detector Trimmer (A14) on the "C" range it is necessary to rock the tuning condenser in a manner similar to that required when setting the 600 K.C. Padding Condenser.

G - When adjusting the Oscillator Trimmer on the "C" range with a 12 M.C. signal it will be noted that there are two settings at which the signal will be received. Use the higher frequency setting, that is, the setting at which the trimmer screw is farthest out. On the "A", "B" and "C" range the Oscillator operates at a higher frequency than the incoming signal, and consequently the trimmer capacity will be lower when adjustment is completed.

8. 21 M.C. Alignment

A - Set Range Switch on range "D".

B - Place test Oscillator in operation at 21 M.C.

C - Turn Dial Pointer to 21 M.C.

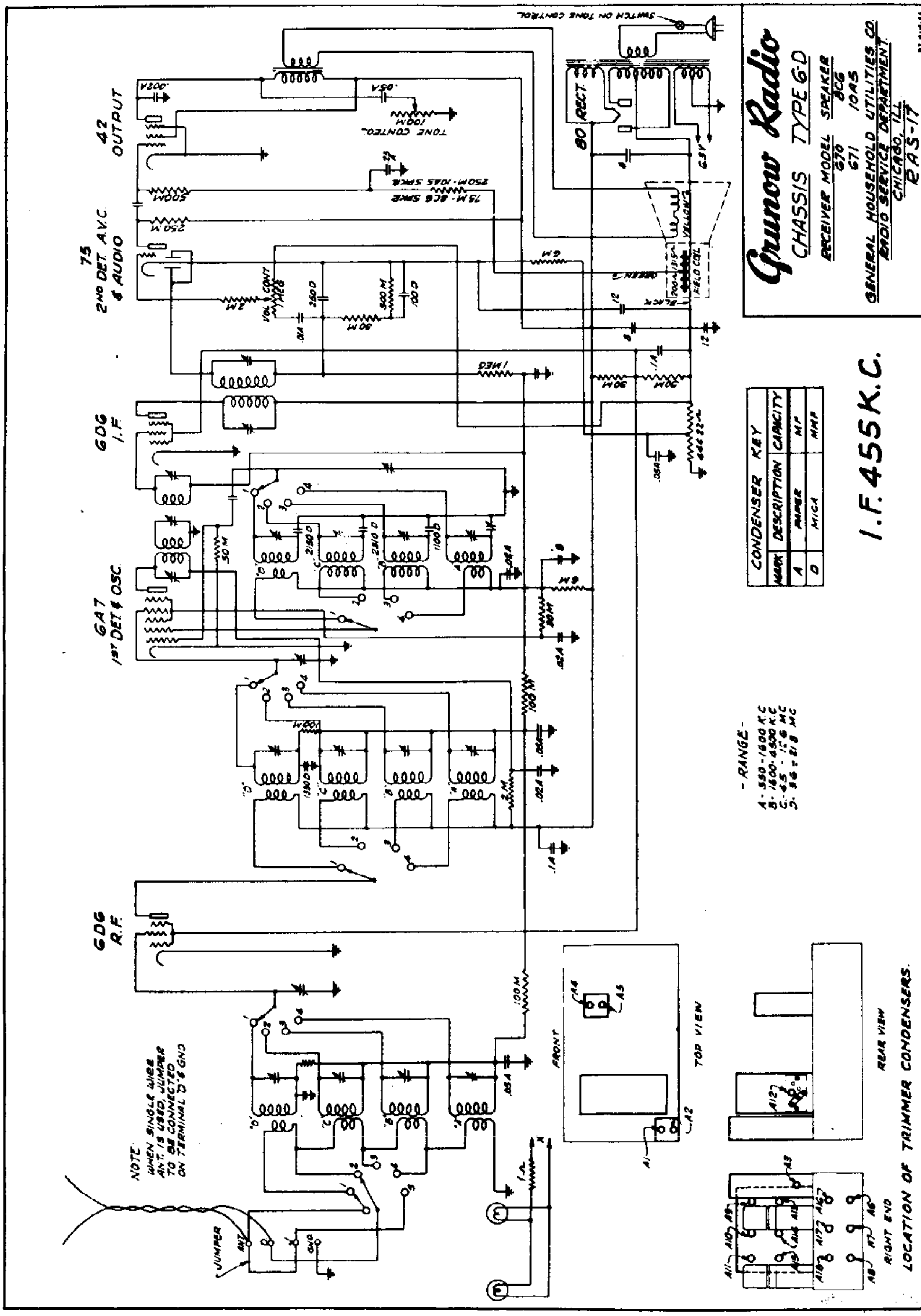
D - Adjust the following "D" range trimmers: Oscillator (A16), Detector (A17), Antenna (A18).

E - When adjusting the Detector Trimmer (A17) on the "D" range it is necessary to rock the tuning condenser back and forth through resonance in the same manner as required when setting the 600 K.C. Padding Condenser.

F - When adjusting the Oscillator trimmer on the "D" range with a 21 M.C. signal it will be noted that there are two settings at which the signal will be received. Use the lower frequency setting, that is, the setting at which the trimmer screw is farthest in. On the "D" range the Oscillator operates at a lower frequency than the incoming signal, and consequently the trimmer capacity will be higher when adjustment is completed.

MODEL 670,671 (6D)
Temporary
Schematic

GENERAL HOUSEHOLD UTILITIES CO.



GENERAL HOUSEHOLD UTILITIES CO.

Service Notes and Parts List

Grunow Radio

CHASSIS TYPE 7B

Receiver Model	Speaker Model
750	8A4—8C2
751	10A3
752	10A3
753	10A3

GENERAL HOUSEHOLD UTILITIES COMPANY
RADIO SERVICE DEPT. CHICAGO, U. S. A.

Chassis 7B —115 volt 60 cycle
Chassis 7BX—115 volt 25-50 cycle
Power Consumption 75 watts.

Chassis 7BW 115 volt 50-60 cycle
Chassis 7BZ {110—135—220—250 volt / 50-60 cycle}
Tubes—1-6D6, 1-6A7, 1-6F7, 1-75, 1-42, 1-76, 1-80

INTRODUCTION

The following characteristics apply to the Grunow Radio —Chassis Type 7B:

This model is a 7 tube Super-Heterodyne All Wave (540 to 21,500 KC) Receiver using 1-6D6 tube as an R. F. Amplifier, 1-6A7 tube as a 1st Detector or mixer—being electronicly coupled to a 76 oscillator tube. 1-6F7 tube the pentode section of which is used as an I.F. amplifier with a frequency of 262 K.C. and the Triode section being used as a Signal Beacon or beat oscillator. Plate Voltage of the Signal Beacon being applied by closing the switch on the tone control. A 75 tube (double diode—high mu Triode) is used as a diode detector or signal rectifier, delayed automatic volume control (AVC) and high-gain audio amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small input signal. This tube receives its bias through the voltage drop produced in the tapped speaker field. The rectifier tube is an 80, the output of which is well filtered through the choke action of the speaker field and the 16 and 18 mfd. electrolytic condensers.

The broadcast section of the receiver consists of the following 4 tuned circuits: R.F. input, bi-selector, mixer input and oscillator. These circuits are tuned with a 4-gang variable condenser of rugged construction.

The short wave section of the receiver consists of 3 tuned circuits, the bi-selector being cut out to prevent losses when the receiver is working at the higher frequencies.

The Signal Beacon is a beat oscillator using the triode section of the 6F7 tube, and is a feature of the 7B Chassis. When this section of the tube is brought into operation it acts as a local oscillator and beats against the incoming signal. The presence of a station's signal will be indicated by a high pitched "whistle", becoming lower in pitch as a "resonance", or exact tuning, is approached. The Signal Beacon note becomes very low and finally reaches zero; at this point the receiver is said to be tuned to "zero beat", which indicates that it is tuned exactly to the station. The Signal Beacon is also used to receive telegraph or continuous wave signals.

The remainder of the circuit is typical and has been designed along the lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

SERVICE DATA

The chassis frame is built in such a way that the end plates may be disconnected allowing easy inspection of the underside of the chassis assembly. (Fig. 6).

The range switch and coil assembly is made up in a unit and may be removed for inspection or repair. (Fig. 7). The removal of this assembly necessitates the unsoldering of 13 wire leads. These leads and the positions to which they are connected are marked on the illustrations with letters. The leads A-B-C on the Coil Assembly (Fig. 7) are attached to the points marked A-B-C on the Chassis Assembly (Fig. 5). The leads marked D-E-F-G on the Coil Assembly (Fig. 7) are attached to the points of corresponding letters on the Chassis Assembly (Fig. 6). Leads H-I-J-K-L-M on Coil Assembly are connected as follows:

Lead "H" connects the ground side of the short wave antenna transformer (Red) to the rotor ground of the variable condenser.

Lead "I" connects Arm 2 of Deck 5 to the No. 1 stator of the variable condenser.

Lead "J" is the shielded lead connecting the bi-selector transformer to the No. 2 stator of the variable condenser.

Lead "K" connects Arm 2 of Deck 3 to the No. 3 stator of the variable condenser.

Lead "L" connects the switch assembly ground to the varible condenser rotor ground.

Lead "M" connects Arm 2 of Deck 2 with No. 4 stator of the variable condenser.
Care should be exercised in making these connections. (A soldering iron with a bent point should be used in this operation).

Continuity and Voltage

Continuity and voltage readings should be taken from the underside of the Chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

The Range Switch

In servicing the 7-B Receiver, consider the radio frequency and as four different and distinct radios:

One working from 550 to 1500 k.c. (D Range)
One working from 1500 to 4200 k.c. (C Range)
One working from 4100 to 10,000 k.c. (B Range)
One working from 8500 to 21,500 k.c. (A Range)

These four radios are put into operation as desired by means of the Range Switch.

When on position "A" the short wave coils covering the range from 8,500 to 21,500 k.c. are connected into the three tuned circuits of the receiver, one coil as an R.F. Transformer, one as the Detector Coupler, and one as the Oscillator Transformer.

On position "B" the 4100 to 10,000 k.c. coils are put into operation.

On "C" position, the 1500 to 4200 k.c. coils are shunted across the 550 to 1500 k.c. coils in such a manner as to lower the total inductance of the combined coils and reduce the losses caused by open end coils.

On both the "C" and "D" positions, four coil sets are put into the circuit and the receiver operates as a four tuned circuit radio. On all four ranges the receiver works at maximum sensitivity and selectivity. All coils and condensers are of such construction that atmospheric and temperature changes have minimum effect.

Each circuit is completely shielded from each other, and the complete range switch and coil assembly may be removed for inspection or repair.

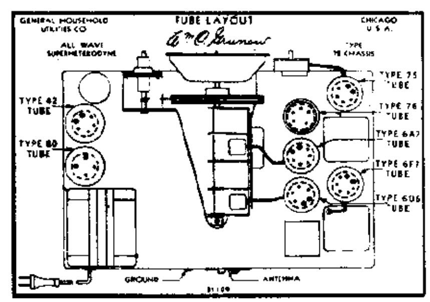


Fig. 1

MODEL 750,751,752
753 (7B)

GENERAL HOUSEHOLD UTILITIES CO.

Schematic, Voltage

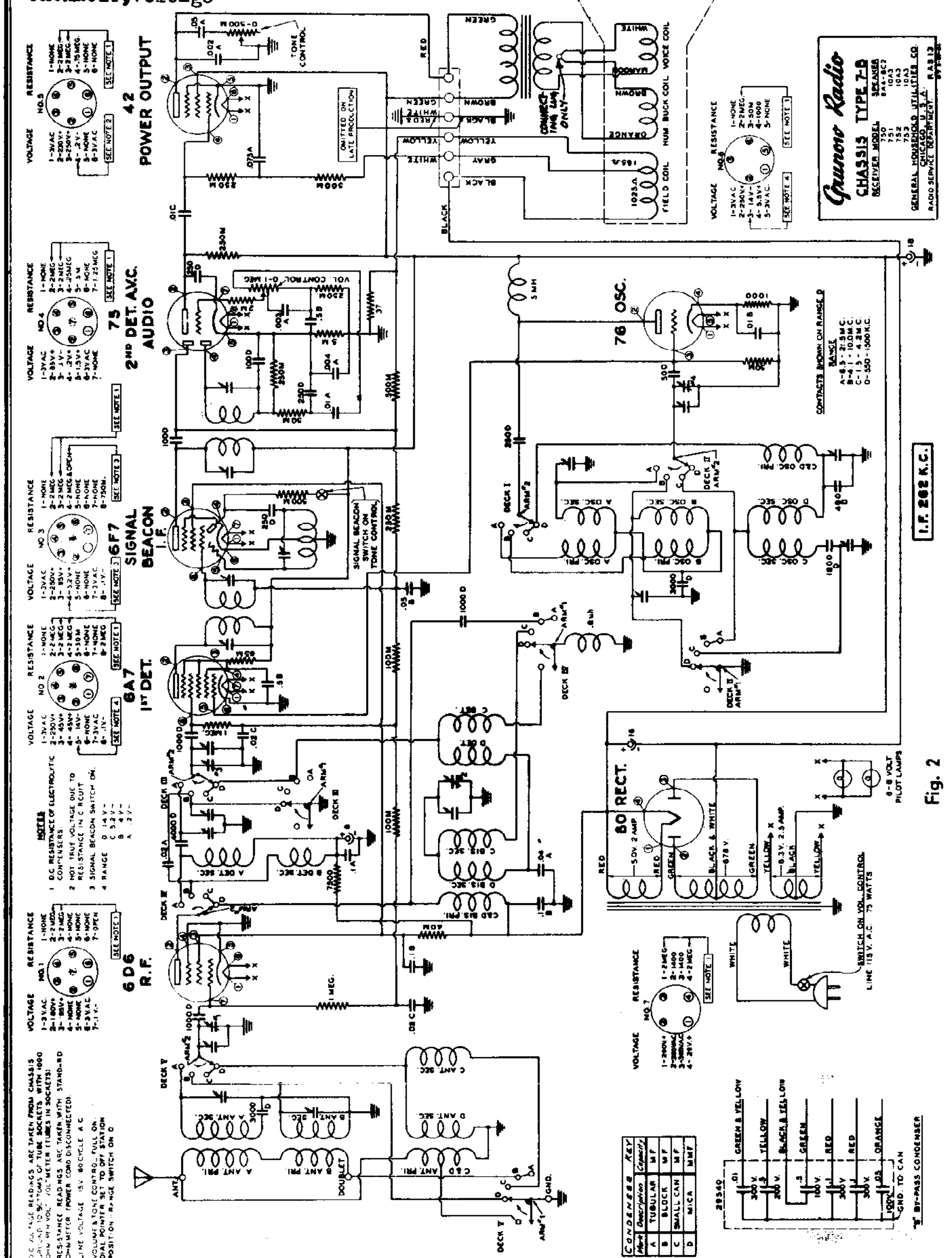


Fig. 2

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 750,751,752
753 (7B)
Trimmers,Coil

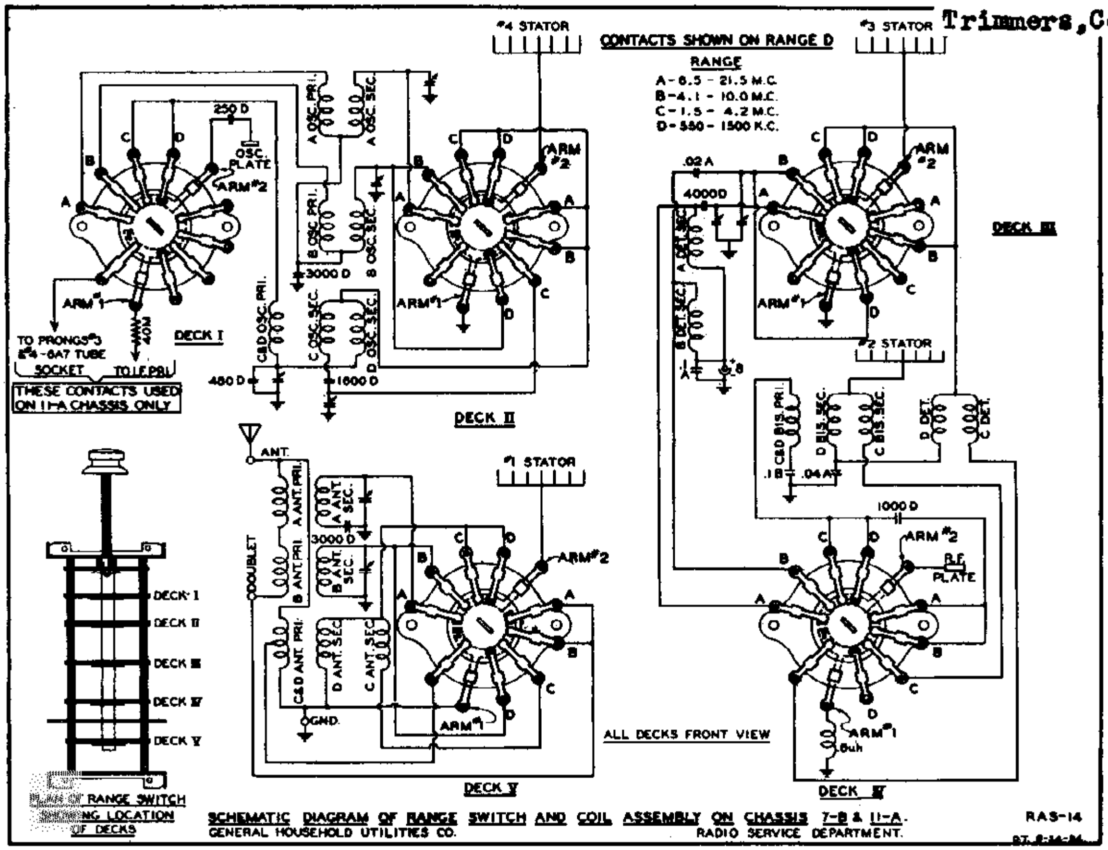
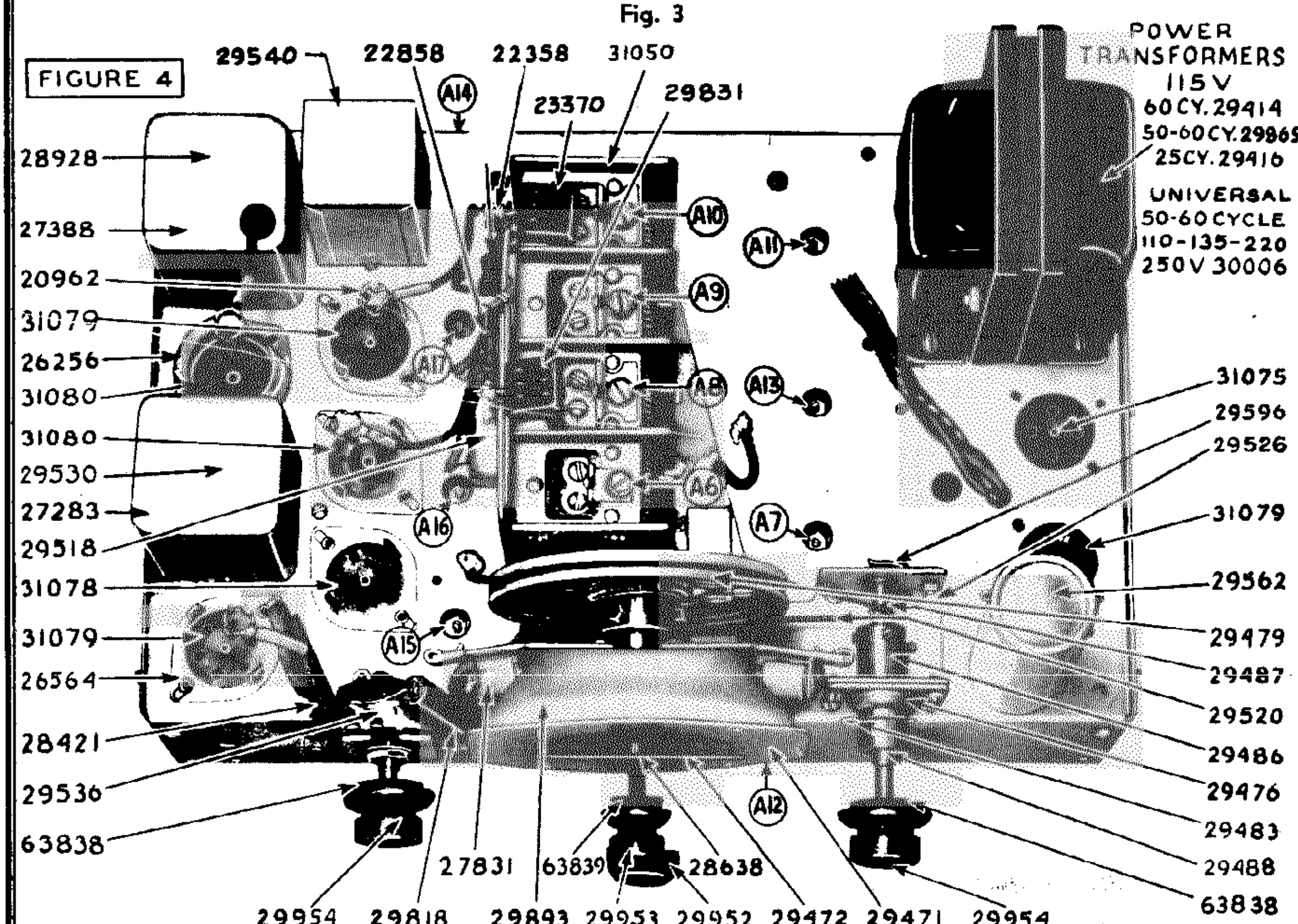


Fig. 3

FIGURE 4



MODEL 750,751,752
753 (7B)

GENERAL HOUSEHOLD UTILITIES CO.

Alignment,Parts

PARTS AND PRICE LIST

Part No.	Description	No. used	List Price
22858	Resistor, 1 Megohm, Carbon, 1/4 watt	3	.20
23284	Bakelite Washer, Trim. Condensers	13	.20
23370	Resistor, 100,000 ohm Carbon, 1/4 watt	3	.20
23849	Resistor, 500,000 ohm Carbon, 1/4 watt	3	.20
23853	Resistor, 50,000 ohm Carbon, 1/4 watt	2	.20
23998	Resistor, 250,000 ohm Carbon, 1/4 watt	4	.20
24251	Condenser, 100 Mmf. Mica	1	.15
24487	Condenser, 250 Mmf. Mica	2	.20
27283	2nd I. F. Transformer Shield	1	.35
27382	Trimmer Condenser Assembly	5	.35
27388	1st I. F. Transformer Shield	1	.30
27455	Tube Shield (Tubular)—76	1	.15
27490	Resistor, 1,000 ohm Carbon	1	.20
28183	Resistor, 7500 ohm Carbon, 1 watt	1	.20
28421	Resistor, 2000 ohm Carbon, 1/4 watt	1	.20
28717	Condenser, .002 Mfd., 700 Volt, Tubular	1	.25
28723	Condenser, .05 Mfd. 400 Volt Tubular	1	.25
28726	Condenser, .1 Mfd., 400 Volt, Tubular	1	.25
28928	1st I. F. Transformer (includes 27388)	1	2.90
29011	Resistor, 40,000 ohm Carbon, 1 watt	1	.20
29074	Condenser, 250-100 Mmf. Mica	1	.30
29083	Condenser, 50 Mmf. Mica	1	.20
29087	Tube Shield (Goat) 6A7, 6F7, 76	3	.10
29414	Power Transformer, 115 Volt, 60 cycles only	1	6.00
29416	Power Transformer, 115 Volt, 25 to 50 cycles only	1	$ 7.25
29453	Condensers .01 Mfd., 400 V Tubular	1	.25
29471	Dial Chart for General Instrument Condenser only—see 30033	1	.50
29496	Antenna Transformer, Broadcast	1	1.75
29497	Bi-Selector Transformer, Broadcast	1	1.50
29498	1st Detector Transformer, Broadcast	1	1.25
29499	Oscillator Transformer, Broadcast	1	1.50
29500	Antenna Transformer, Short Wave (Red)	1	1.75
29501	1st Detector Transformer, Short Wave (Black)	1	1.25
29502	Oscillator Transformer, Short Wave (Green)	1	1.50
29508	Trimmer Condenser Assembly — includes 29989	1	.75
29509	Range Switch and Coil Assembly	1	26.50
29515	Resistor Panel Assembly — includes 29518	1	1.26
29518	Condenser, .02-.02 Mfd. (small can)	1	.75
29523	Condenser Mounting Bearing	1	.10
29524	Cable Tension Spring	1	.10
29526	Condenser Mounting Bracket Ass'bly	1	.60
29530	2nd I. F. Transformer Assembly	1	3.10
29533	Resistor, 5000-37 Ohm, Candohm	1	.40
29534	Condenser, .01 Mfd. (small can)	1	.60
29536	Volume Control, 0-1 Megohm	1	1.30
29537	Tone Control, 0-500,000 Ohm	1	$ 1.15
29539	Oscillator Plate Choke	1	.60
29540	Bypass Condenser Block	1	2.50
29551	Antenna and Doublet Binding Post Assembly	1	.10
29552	Escutcheon Window	1	.15
29553	Window Retaining Ring	1	.10
29554	Escutcheon	1	.60
29558	Condenser, 16 Mfd., 450 Volt Dry Electrolytic	1	1.90
29559	See 31052		
29562	Condenser, 18 Mfd., 300 Volt Wet Electrolytic	1	1.25
29563	Resistor, 65,000 ohm Carbon, 1/2 watt	1	.20
29564	Condenser, .075 Mfd., 100 V Tubular	1	.30
29566	Condenser, 1600 Mmf. Mica	2	.30
29575	Tube Shield (Goat)	1	.10
29579	Signal Beacon Assembly	1	2.25
29580	Signal Beacon Trimmer Condenser	1	.75
29582	Signal Beacon Coil Assembly	1	1.25
29584	Signal Beacon Shield	1	.30
29596	Drive Leaf Spring	2	.05
29611	Coupling Inductance Coil	1	.25
29612	Escutcheon Retaining Spring	1	.20
29613	Condenser, 4,000 Mmf. Mica	1	.50
29616	Insulated Terminal—Single	1	.10
29617	Insulated Terminal—Double	1	.15
29812	Condenser, .04 Mfd., 500 V Tubular	1	.30
29813	Condenser, .004 Mfd., 700 V Tubular	1	.25
29818	Condenser, .003 Mfd., 700 V Tubular	1	.25
29830	Condenser, 3,000 Mmf., Mica	2	.40
29831	Condenser, 1,000 Mmf. Mica	3	.30
29832	Tube Shield Body	4	.15
29836	—Trimmer Condenser Assembly	1	.25
29850	Drive Drum Assembly	1	1.10
29865	Power Transformer, 115 Volt, 50-60 cycles only	1	7.00
29900	Trimmer Condenser Assembly	1	.50
29948	Insulated Terminal—Single	2	.10
29949	Insulated Terminal—Double	1	.10
29952	Knob—Range Switch	1	.30
29953	Knob—Tone Control	1	.20
29954	Knob—Selector or Volume Control	2	.20
29957	Decalcomania, "A, B, C, D"	1	.10
29989	Condenser, 480 Mmf. Mica	1	.30
29990	Condenser, .02 Mfd. 400 V Tubular	1	.20
29997	Speaker Cable	1	.95
30006	Power Transformer, 110-135-220-250 Volt, 50-60 cycles	1	7.50
30032	Dial Chart, for Reliance Condenser only	1	.50
30034	Tuning Condenser, 4 Gang, Reliance	1	7.50
31060	Tuning Condenser, 4 Gang, General Instrument	1	7.50
31062	Condenser, 8 Mfd., 350 Volt Dry, Electrolytic	1	1.25
31075	Tube Socket—4 Prong	1	.10
31078	Tube Socket—5 Prong	1	.10
31079	Tube Socket—6 Prong	3	.15
31080	Tube Socket—7 Prong	2	.15
31215	Tube Shield Cap	4	.10

SPEAKER PARTS

Part No.	Description	List Price
	TYPE 10A3—USED ON MODEL No. 751-752-753	
20010	Speaker Pot & Pole Piece Assembly	$ 1.15
20041	Speaker Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
27240	Cone Gasket	.10
27591	Output Transformer	1.75
28755	Cone & Voice Assembly	3.30
29984	Field Coil Assembly	3.30
29678	Speaker Complete	11.50
	TYPE 8A4—USED ON MODEL No. 750	
20003	Speaker pot & pole piece assembly	.80
20040	Speaker Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
29242	Field Coil Assembly	2.20
29673	Speaker Complete	10.00
29705	Cone Mounting Gasket	$ .10
29732	Output Transformer	1.75
30058	Spider Clamp Ring	.25
31309	Cone & Voice Coil Assembly	3.10
	TYPE 8C2—USED ON MODEL No. 750	
20040	Speaker Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
29677	Speaker Complete	10.00
29697	Speaker Field Coil Assembly	2.50
29699	Speaker Pot & Pole Piece	1.20
29705	Cone Mounting Gasket	.10
29732	Output Transformer	1.75
30058	Spider Clamp Ring	.25
31309	—Cone & Voice Assembly	3.10

ALIGNMENT PROCEDURE

Do not attempt to align the 7B Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

A—Test Oscillator.

A modulated oscillator capable of producing signals at 262 K.C.—600 K.C.—1400 K.C.—3700 K.C.—10 M.C. and 20 M.C. is necessary for alignment of the 7B chassis.

B—Insulated screw driver—(All bakelite or fibre) about 6" long.

C—Output Meter.

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

D—Coupling Means.

Coupling Condensers of 200 mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscilator to receiver during alignment as specified in the following paragraphs.

E—The receiver should be aligned in a location free from local interference (man made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended).

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. ALIGNMENT.

Connect signal lead of test oscillator to grid of the 6A7—(1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

A—Set Dial pointer to 1400 K.C. and range switch on position D.

B—Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

C—Attenuate test oscillator output to lowest valve consistent with obtaining a readable indication on output meter.

D—Adjust four I. F. Trimmers, A1-A2-A3-A4 Fig. 6, located on under side of chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

E—Turn the tone control counter clockwise until the Signal Beacon switch snaps on.

F—Adjust Signal Beacon trimmer, A5, Fig. 5, which is located on left hand face of Chassis to zero beat with the 262 K.C. incoming signal.

4. 3700 K.C. ALIGNMENT.

A—Connect signal lead of test oscillator through 200 Mmf condenser to Antenna binding post.

B—Connect the test oscillator ground lead to the ground post of Chassis.

C—Turn range switch to range "C" and set dial pointer to 3700 K.C.

D—Align Set Oscillator or front trimmer A6, Fig. 4, on variable condenser. It may be necessary to approximate adjustment of the other three trimmers on variable condenser to obtain sufficient sensitivity to make 3700 K.C. adjustment.

5. 1400 K.C. ALIGNMENT.

A—Place test oscillator in operation at 1400 K.C.

B—Turn dial pointer to 1400 K.C.

C—Turn Range Switch to range D.

D—Adjust 1400 K.C. padding condenser, A7, Fig. 4, which is the first of three located on top of Chassis on the right hand side as you face it.

E—Adjust 1st Det. Trimmer A8, Fig. 4, which is the second from front on top of variable condenser.

F—Adjust Bi-selector trimmer A9, Fig. 4, which is the third from front on top of variable condenser.

G—Adjust Antenna Trimmer A10, Fig. 4 which is the fourth from the front on top of variable condenser.

6.—600 K.C. ALIGNMENT.

A—Place test oscillator in operation at 600 K.C.

B—Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

C—Adjust the 600 K.C. Padding Condenser A11, Fig. 4, (which is on top of Chassis on right hand side third from front as you face Chassis), in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

7. 10 M.C. ALIGNMENT.

A—Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.

B—Connect the ground lead to ground terminal of Chassis.

C—Set Range Switch to Range "B" and turn dial pointer to 10 M.C.

D—Place test oscillator in operation at 10 M.C.

E—Adjust set oscillator trimmer A12, Fig. 4, (located on front face of chassis).

F—Adjust detector trimmer A13, Fig. 4, (located on right hand side on top of Chassis second from front).

G—Adjust antenna trimmer A14, Fig. 4, (located on rear face of Chassis).

8. 20 M.C. ALIGNMENT.

A—Set Range Switch on Range A.

B—Place Test Oscillator in operation at 20 M.C.

C—Turn Dial Pointer to 20 M.C.

D—Adjust Set Oscillator trimmer A15, Fig. 4, (located on top of Chassis on left of gang condenser, first from front).

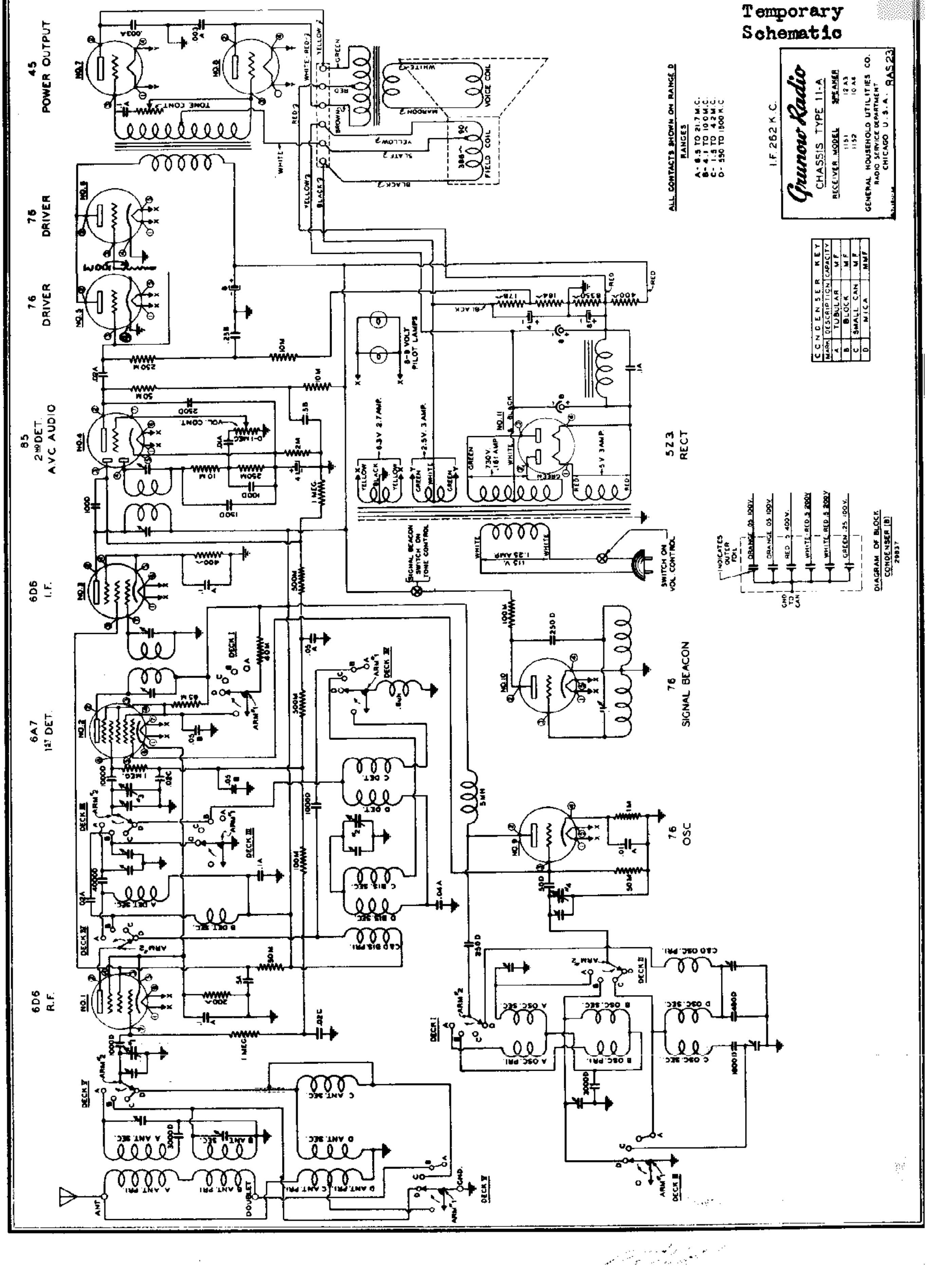
E—Adjust Detector trimmer A16, Fig. 4, (located second from front on top of Chassis on left hand side).

F—Adjust Antenna trimmer A17, Fig. 4, (located third from front on top of Chassis on left hand side).

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 1151, 1152 (11A)

Temporary Schematic



MODEL 1151, 1152 (11A)
Temporary Parts
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

ALIGNMENT PROCEDURE
CHASSIS TYPE 11A

1. Equipment.

A - Test Oscillator
A modulated oscillator capable of producing signals at 262 K.C., 455 K.C., 600 K.C., 1400 K.C., 3700 K.C., 10 M.C. and 20 M.C. is necessary for alignment of the 1934 Grunow Receivers.

B - Output Meter
This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means
Coupling Condensers of 200 Mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting.
Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment.
Connect signal lead of test oscillator to grid of the 6A7 (1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

A - Set Dial pointer to 1400 K.C. and range switch on position D.

B - Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

C - Attenuate test oscillator output to lowest valve consistent with obtaining a readable indication on output meter.

D - Adjust four I.F. Trimmers, located on under side of chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

E - Turn the tone control clockwise until the beat oscillator switch snaps on.

F - Adjust beat oscillator trimmer which is located on under side at rear of Chassis to zero beat with the 262 K.C. incoming signal.

4. 3700 K.C. Alignment.

A - Connect signal lead of test oscillator through 200 Mmf. condenser to Antenna binding part.

B - Connect the test oscillator ground lead to the ground post of Chassis.

C - Turn range switch to range "C" and set dial pointer to 3700 K.C.

D - Align Set Oscillator or front trimmer on variable condenser. It may be necessary to approximate adjustment of the other three trimmers on variable condenser to obtain sufficient sensitivity to make 3700 K.C. adjustment.

5. 1400 K.C. Alignment.

A - Place test oscillator in operation at 1400 K.C.

B - Turn dial to 1400 K.C.

C - Turn Range Switch to range D.

D - Adjust 1400 K.C. padding condenser, which is the first of three located on top of Chassis on the right hand side as you face it.

E - Adjust 1st Det. Trimmer which is the second from front on top of variable condenser.

F - Adjust Bi-selector Trimmer which is the third from front on top of variable condenser.

G - Adjust Antenna Trimmer which is the fourth from the front on top of variable condenser.

6. 600 K.C. Alignment.

A - Place test oscillator in operation at 600 K.C.

B - Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

C - Adjust the 600 K.C. Padding Condenser (which is on top of Chassis on right hand side third from front as you face Chassis), in direction of signal increase. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

7. 10 M.C. Alignment.

A - Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.

B - Connect the ground to lead to ground terminal of Chassis.

C - Set Range Switch to Range "B".

D - Place test oscillator in operation at 10 M.C.

E - Adjust set oscillator trimmer (Located on front face of Chassis).

F - Adjust detector trimmer (located on right hand side on top of Chassis second from front).

G - Adjust antenna trimmer (located on rear face of Chassis).

8. 20 M.C. Alignment.

A - Set Range Switch on Range A.

B - Place Test Oscillator in operation at 20 M.C.

C - Turn Dial Pointer to 20 M.C.

D - Adjust Set Oscillator trimmer. (Located on top of Chassis on left of gang condenser, first from front).

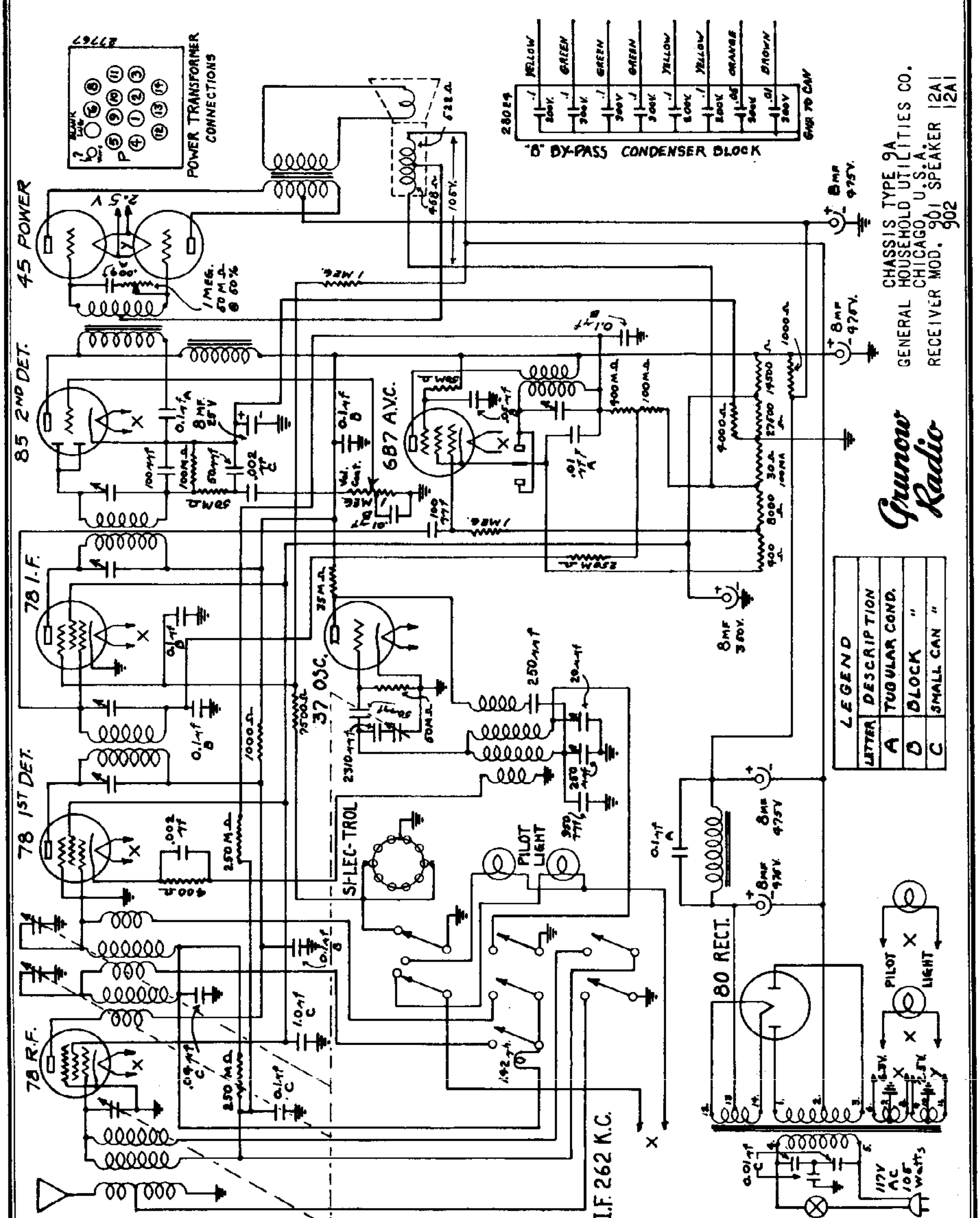
E - Adjust Detector trimmer (located second from front on top of Chassis on left hand side).

F - Adjust Antenna trimmer (located thrid from front on top of Chassis on left hand side).

Part No.	Description
[illegible]	Resistor, 50,000 Ohm Carbon, 1 Watt
[illegible]	Resistor, 1 Megohm Carbon, ½ Watt
23970	Resistor, 100,000 Ohm Carbon, ½ Watt
[illegible]	Resistor, 500,000 Ohm Carbon, ½ Watt
[illegible]	Resistor, 10,000 Ohm Carbon, ½ Watt
[illegible]	Resistor, 50,000 Ohm Carbon, ½ Watt
[illegible]	Resistor, 250,000 Ohm Carbon, ½ Watt
24281	Condenser, 100 Mmf. Mica
24487	Condenser, 250 Mmf. Mica
24769	Condenser, 4 Mfd. 25 Volt Dry Electrolytic
27480	Resistor, 1,000 Ohm Carbon ½ Watt
27710	Condenser, 8 Mfd. 475 Volt Wet Electrolytic (Chrome)
27711	Condenser, 8 Mfd. 475 Volt Wet Electrolytic
27715	Condenser, 4 Mfd. 350 Volt - 8 Mfd. 100 Volt Dry Electrolytic
27784	Resistor, 400 Ohm Carbon, ½ Watt
28421	Resistor, 2,000 Ohm Carbon, ½ Watt
28675	Short Wave Coil Shield Assembly
[illegible]	Condenser, .1 Mfd. 400 Volt tubular
[illegible]	Condenser, .02 Mfd. 400 Volt tubular
[illegible]	1st I.F. Transformer (Includes 27588)
29011	Resistor, 40,000 Ohm Carbon, 1 Watt
29074	Condenser, 250-100 Mmf. Mica
[illegible]	Condenser, 50 Mmf. Mica
29135	Condenser, .1 Mfd. 100 Volt tubular
29455	Condenser, .01 Mfd. 400 Volt tubular
29496	Antenna Transformer - Broadcast
29497	Bi-Selector Transformer - Broadcast
29498	1st Detector Transformer - Broadcast
29499	Oscillator Transformer - Broadcast
29500	Antenna Transformer - Short wave
29501	1st Detector Transformer - Short Wave
29502	Oscillator Transformer - Short Wave
[illegible]	Trimmer Condenser Assembly - Includes 29989
29509	Range Switch and Coil Assembly
29516	Resistor Panel Assembly - Includes 29618
[illegible]	Condenser, .02-.02 Mfd. Bathtub Type
[illegible]	Oscillator Plate Choke
[illegible]	Resistor, 45,000 Ohm Carbon, ½ Watt
[illegible]	Condenser, 1,600 Mmf. Mica
[illegible]	Condenser, .02 Mfd. 400 Volt Tubular
[illegible]	Signal Beacon Trimmer Condenser
29602	Signal Beacon Coil Assembly
29613	Condenser, 4,000 Mmf. Mica
29626	Volume Control
29627	Tone Control
29628	Insulated Terminal
[illegible]	Power Transformer, 115 Volt, 60 Cycles only
29631	Power Transformer, 115 Volt, 25-60 Cycles only
29632	Condenser, 8 Mfd. 500 Volt Dry Electrolytic
[illegible]	Filter Choke
[illegible]	Audio Input Transformer
29640	Resistor, 200 Ohm Carbon, ½ Watt
29641	Resistor - Candohm
[illegible]	Condenser, 150 Mmf. Mica
[illegible]	Condenser, .15 Mfd. 200 Volt tubular
[illegible]	Condenser, .04 Mfd. 400 Volt tubular
[illegible]	Condenser, .004 Mfd. 700 Volt tubular
[illegible]	Condenser, .008 Mfd. 700 Volt tubular
[illegible]	Condenser, 5,000 Mmf. Mica
[illegible]	Condenser, 1,000 Mmf. Mica
[illegible]	Tube Shield Body
[illegible]	Trimmer Condenser Assembly
[illegible]	Bypass Condenser Block
[illegible]	2d I.F. Transformer Assembly
[illegible]	Drive Drum Assembly
[illegible]	Power Transformer 115 Volt, 50-60 Cycles
[illegible]	Reflector Assembly
[illegible]	Speaker Cable
[illegible]	Trimmer Condenser Assembly
[illegible]	Condenser, 450 Mmf. Mica
[illegible]	Condenser, .02 Mfd. 400 Volt tubular
[illegible]	Power Transformer 110-150-220-250 Volt, 50-60 Cycles
	SPEAKER PARTS
	Type 10A4
[illegible]	Pot & Pole Piece Assy.
[illegible]	Pot clamp
[illegible]	Terminal strip cover.
[illegible]	Terminal strip.
[illegible]	Cone Mtg. Gasket
[illegible]	Cone and Voice Coil Assy.
[illegible]	Output Transformer.
[illegible]	Cone head Assy.
[illegible]	Field Coil.
[illegible]	Speaker Comp.
	Speaker Type 12A5
[illegible]	Terminal strip cover
[illegible]	Terminal strip
[illegible]	Pot & Pole Piece Assy.
27242	Cone Mtg. Gasket
[illegible]	Speaker Comp.
[illegible]	Output transformer
[illegible]	Cone head Assy.
[illegible]	Field Coil
[illegible]	Cone & Voice Coil Assy.

MODEL 901,902 (9A)
(Revised)
Schematic

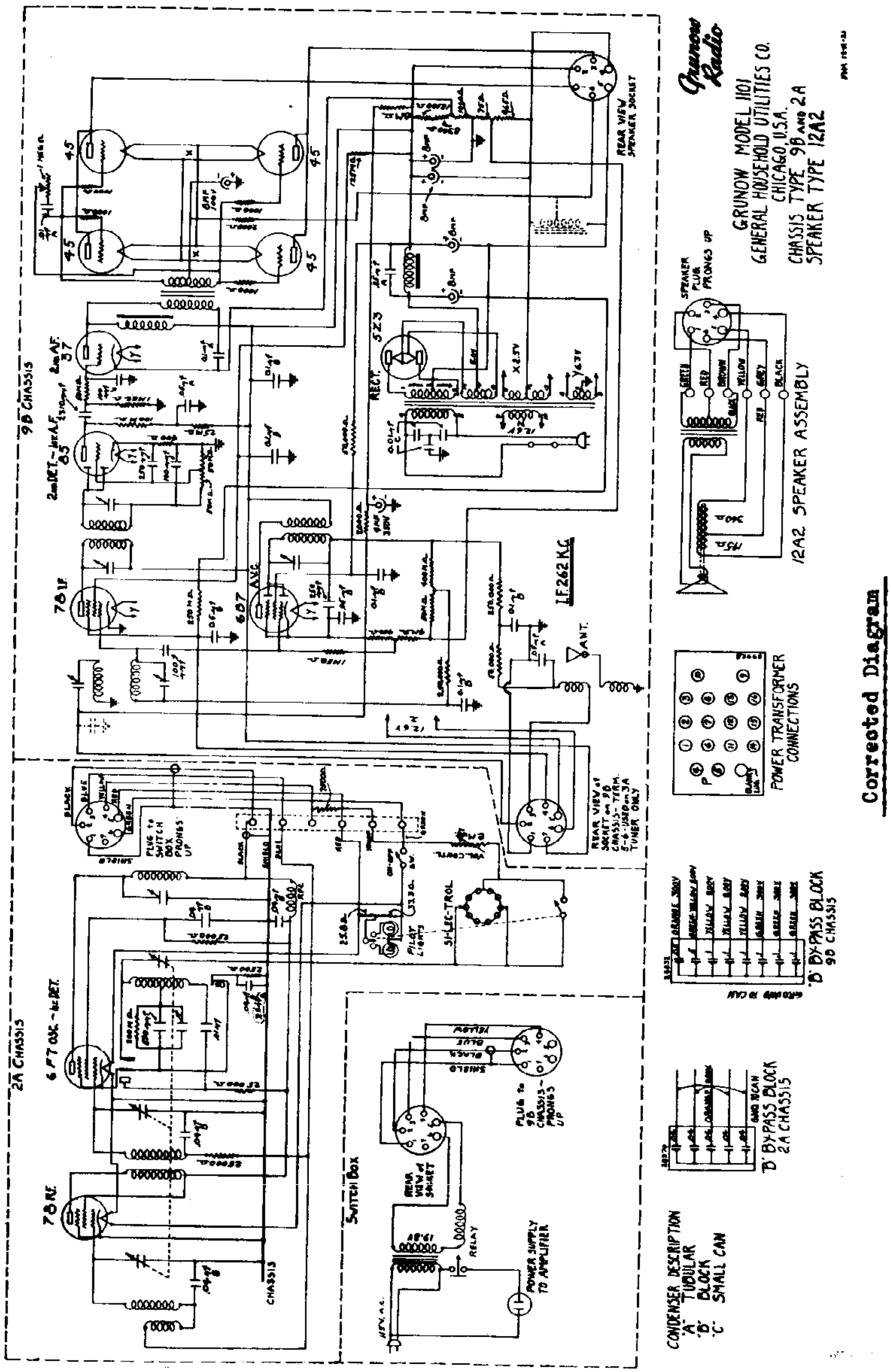
GENERAL HOUSEHOLD UTILITIES CO



THIS PRINT SUPERSEDES ALL PRIOR TO THIS DATE 2-13-34

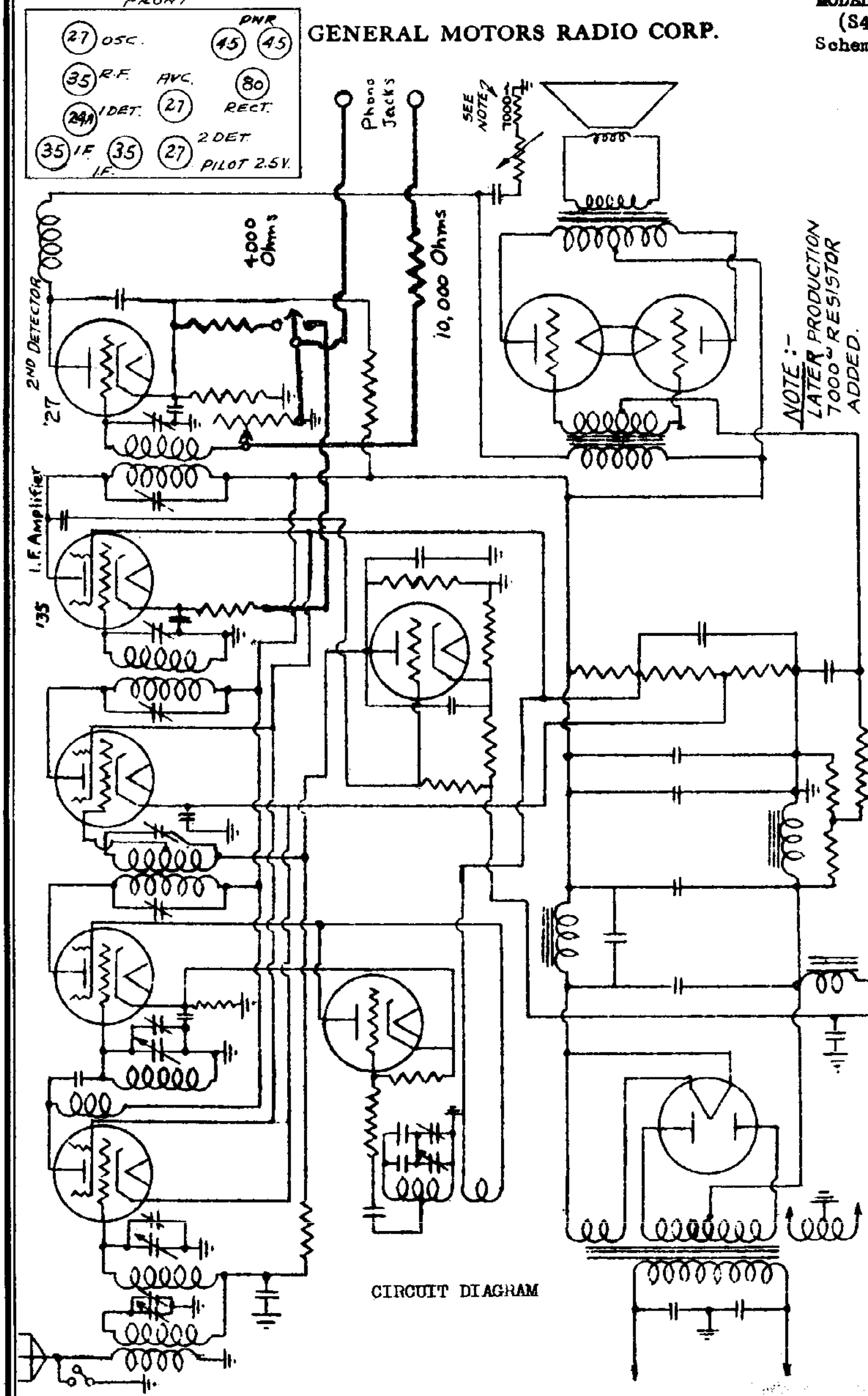
MODEL 1101 (9B-2A)
(Revised)
Schematic

GENERAL HOUSEHOLD UTILITIES CO.



MODEL 292,293
(S4-A,S4-B)
Schematic,Socket

GENERAL MOTORS RADIO CORP.



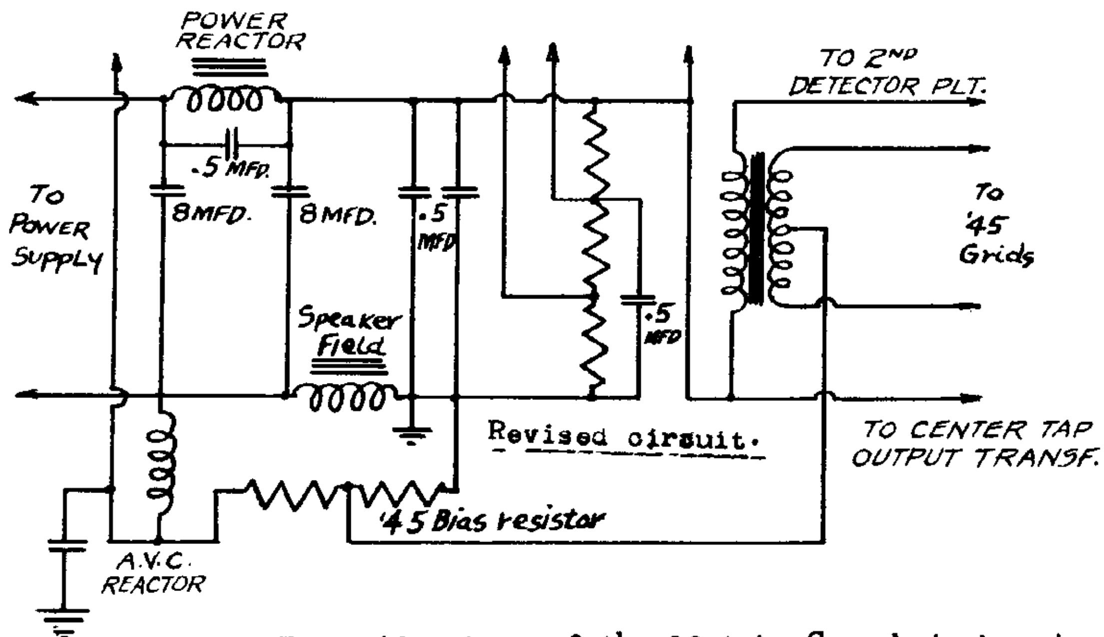
CIRCUIT DIAGRAM

SPECIAL PARTS LIST FOR S4A AND S4B

Name of Part	Part No.				
Shaft, Switch Cable Drive.	1204770	Resistor, 4,000 Ohms...	1204108	Bracket, Phono Switch..	1204763
Switch, Phono-Radio.......	1204552	Resistor, 10,000 Ohms...	1201633	Cable, Switch Drive....	1204764
Transformer, No. 3 I.F....	1202591	Insulator, Phono Jack...	1200435	Cord, Phono Motor......	1204762
Pick-Up Head & Cable ...	1202609	Jack, Phono..........	1200438	Cover, Needle Cup......	1204612

MODEL 292,293
Changes
MODEL 253,254,255,
256,257,258
Changes

GENERAL MOTORS RADIO CORP.



The grid return of the 10 tube Superhet chassis has been changed on chassis beginning with serial numbers approximately as follows:

Chassis model	Serial #
S-3-A	3429
S-3-B	1069
S-4-A	1296
S-4-B	1001

Note:For original circuit refer to:
Rider Manuals
Early 346-I
Revised 2-11 & 2-12
Radiotron 1101-1102

The change in the circuit also involves changes in parts numbers of two parts as follows:

	Part # below serial listed above	Part # above serial listed above.
245 bias resistor	1203535	1205259
Bypass cond.pack	1205971	1204162 or 1205971

Note if it should be necessary to replace the bypass cond.pack on models which use the original circuit ,use part # 1205971.

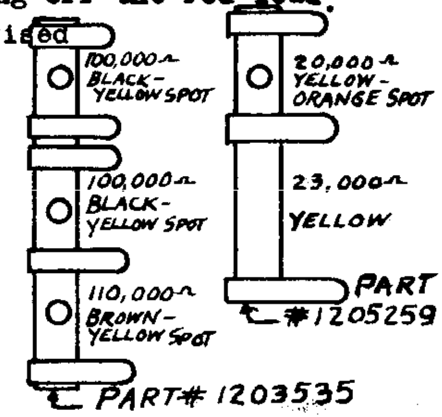
If it should be necessary to replace bypass cond.pack on models which use the new circuit(shown above) with the tone control in the 2nd det.plate circuit,use part # 120597 by cutting off the red lead.

To replace bypass cond.pack on models having revised circuit,as above,with tone control in 45 plate circuit,use cond.pack part # 1204162.

The two bypass cond.packs can be distinguished by the number of leads,as follows:

\# 1204162 = 7 leads
\# 1205971 = 8 leads

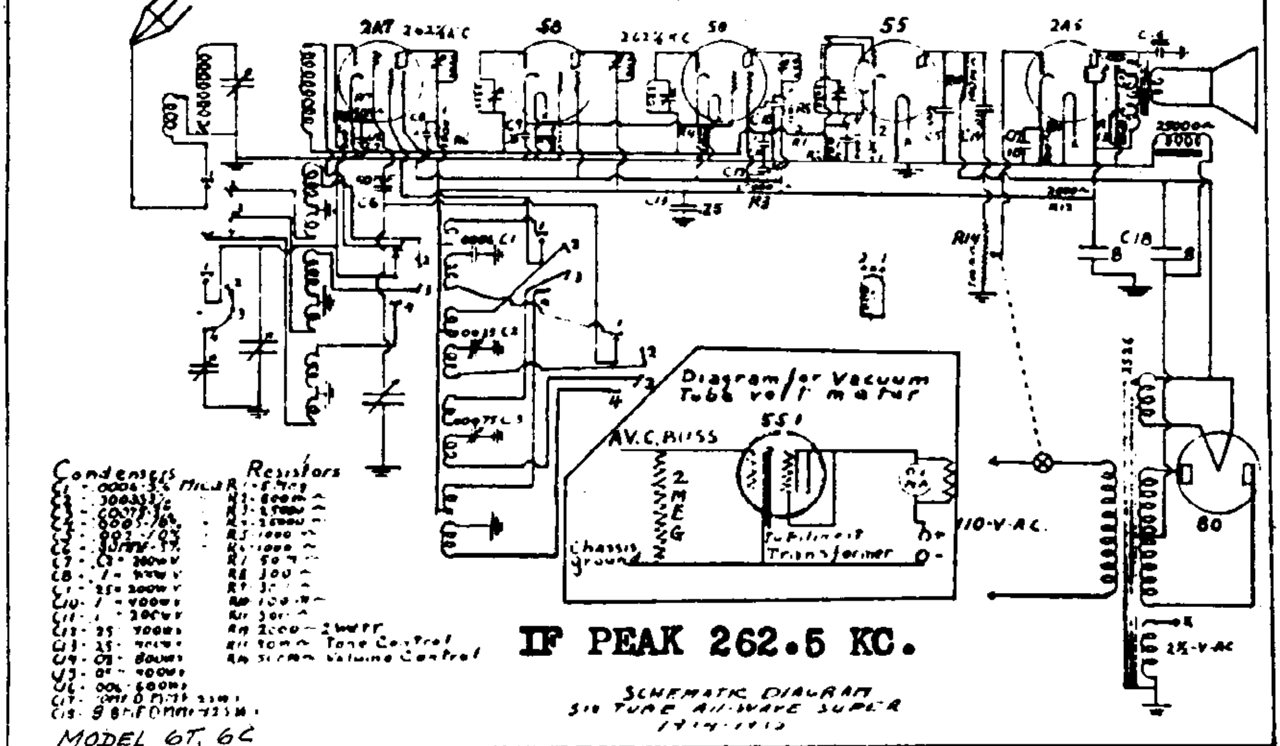
The 245 bias resistors can be distinguished by their length,color and number of sections,as shown on the diagram here.

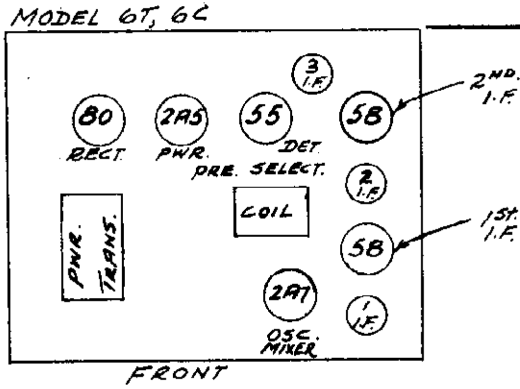


MODEL 6T,6C
Schematic,Alignment
MODEL 8T,8C,47,50
Alignment

GILFILLAN BROS., INC

Models 6-T and 6-C





SERVICE DATA (SIX TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)
SERVICE DATA EIGHT TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—O to 1 or O to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262½ K. C. oscillator to the first detector grid (No. 2-A 7 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

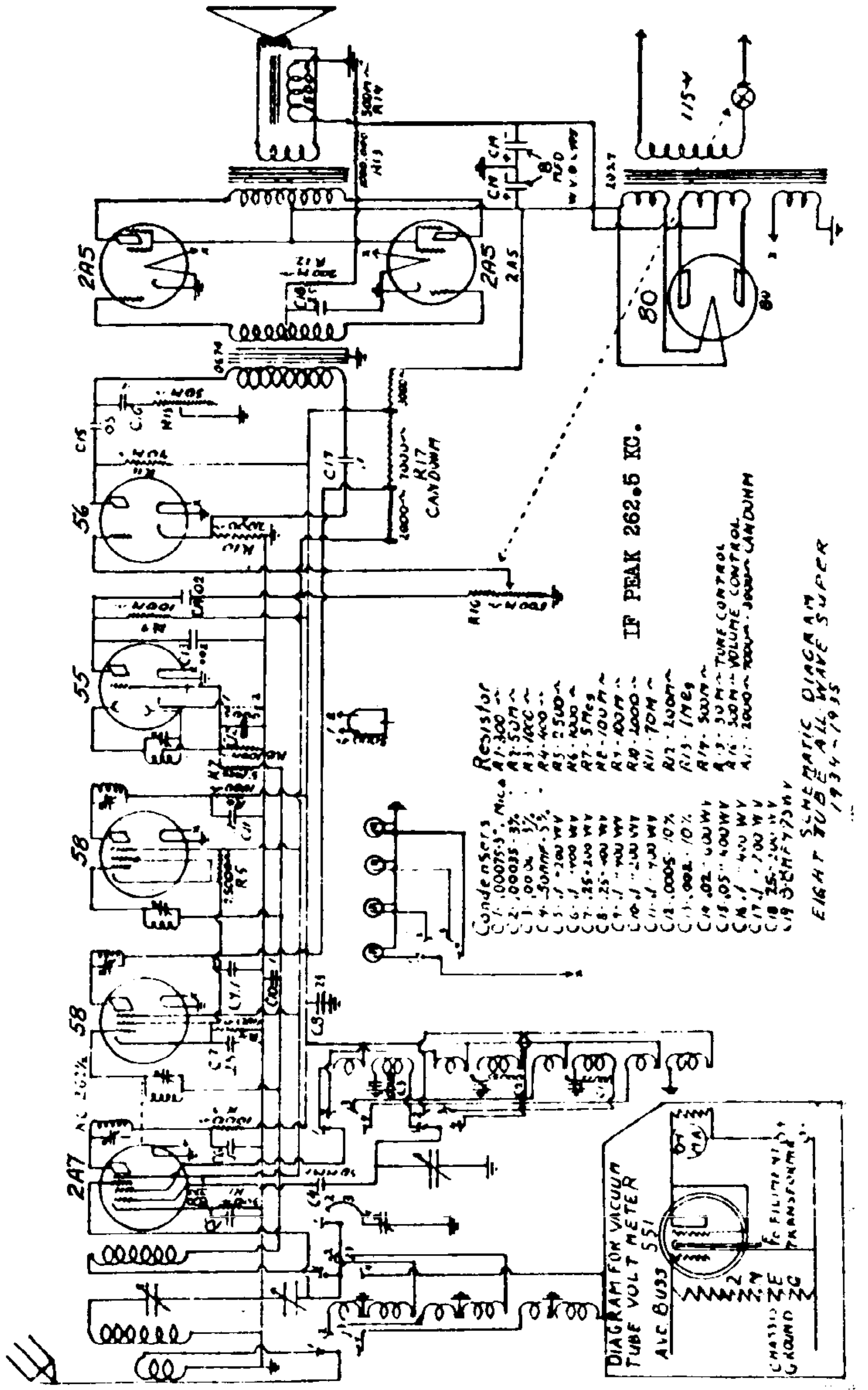
If the intermediates are balanced on 262½ K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

MODEL 8C, 8T, 47, 50
Schematic

GILFILLAN BROS., INC.

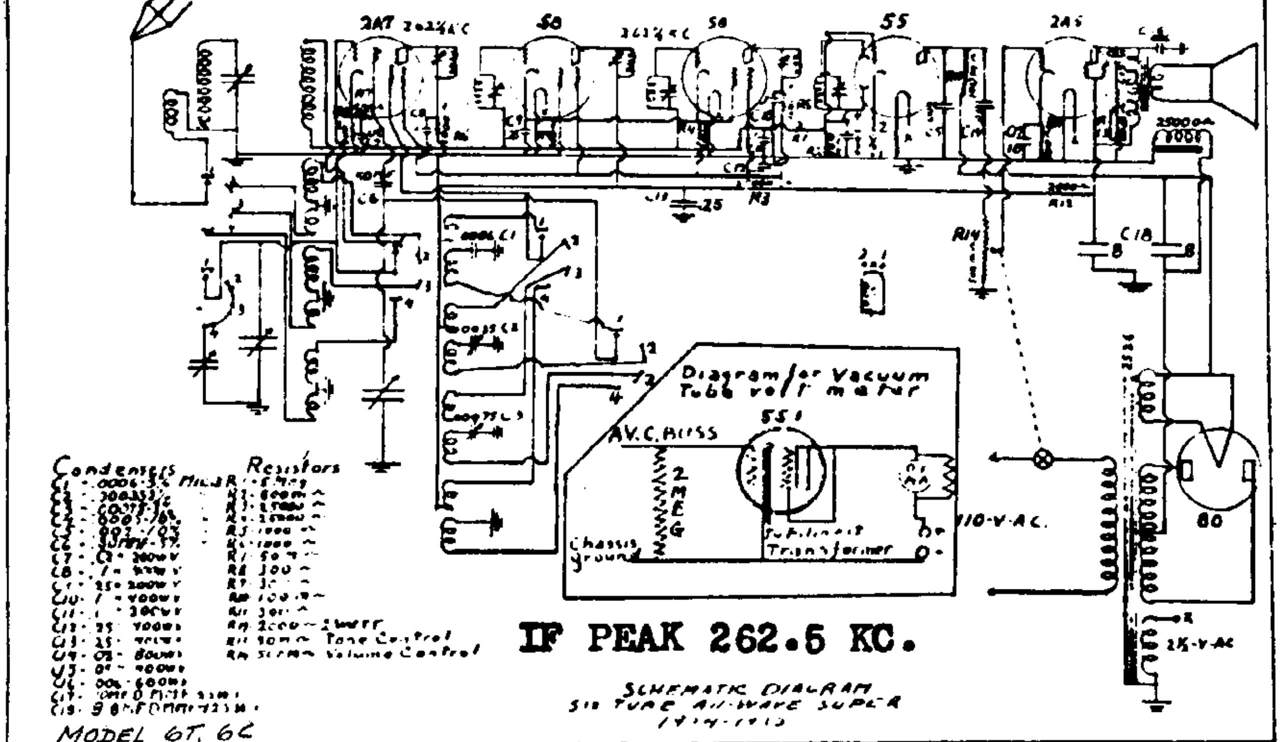


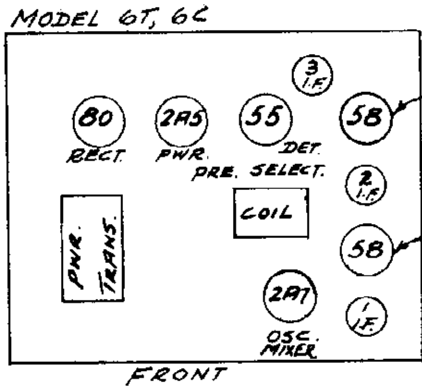
For Alignment, See Index

GILFILLAN BROS., INC

MODEL 6T, 6C
Schematic, Alignment
MODEL 8T, 8C, 47, 50
Alignment

Models 6-T and 6-C





SERVICE DATA (SIX TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)
SERVICE DATA EIGHT TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—O to 1 or O to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262½ K. C. oscillator to the first detector grid (No. 2-A 7 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

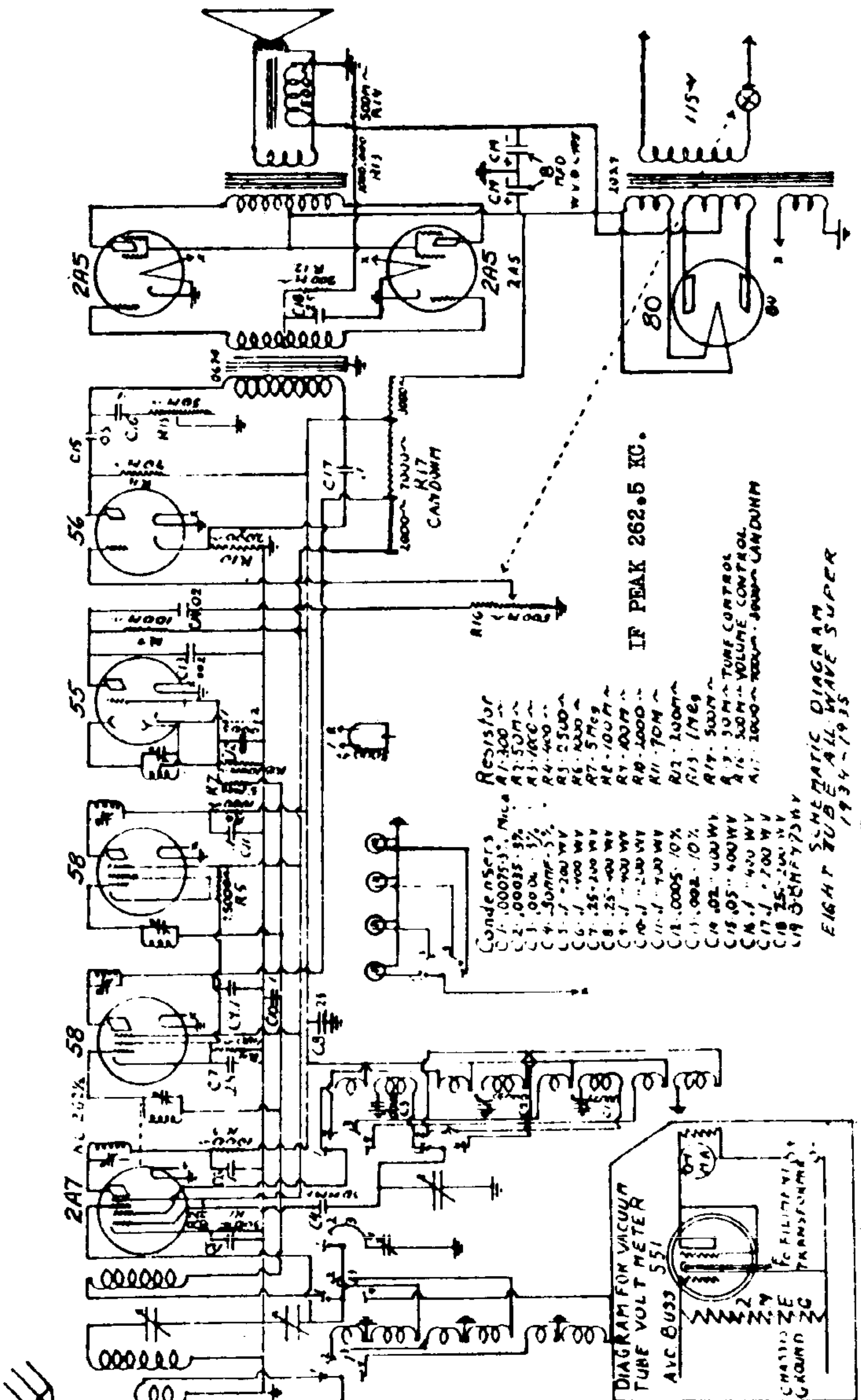
If the intermediates are balanced on 262½ K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

MODEL 8C,8T,47,50
Schematic

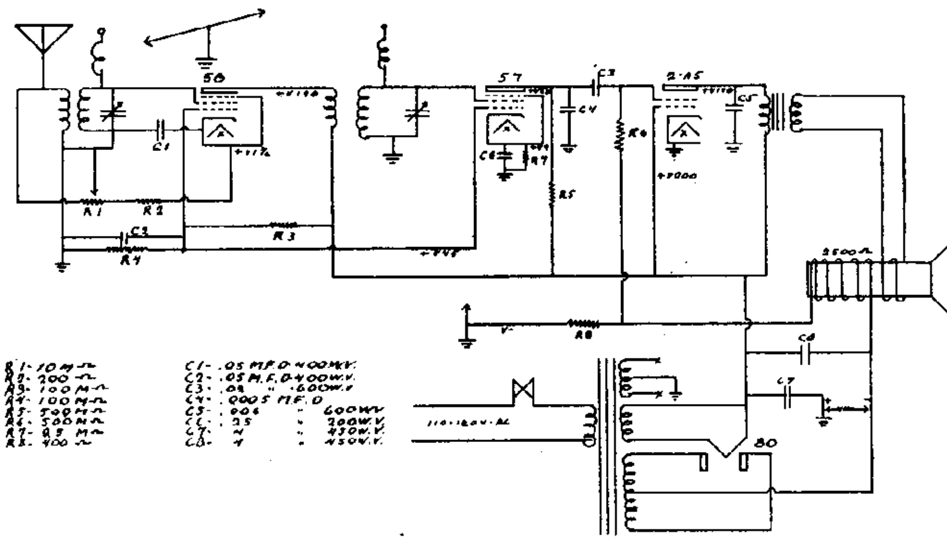
GILFILLAN BROS., INC.



For Alignment,
See Index

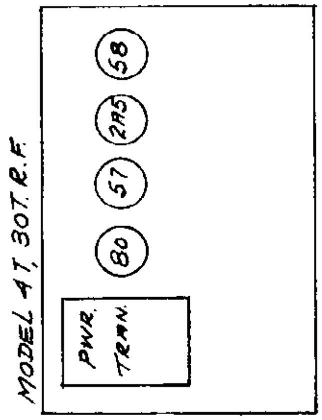
MODEL 4T,30
Schematic,Socket
Alignment
MODEL 5C,5T,32,35,41
Schematic,Socket
Alignment

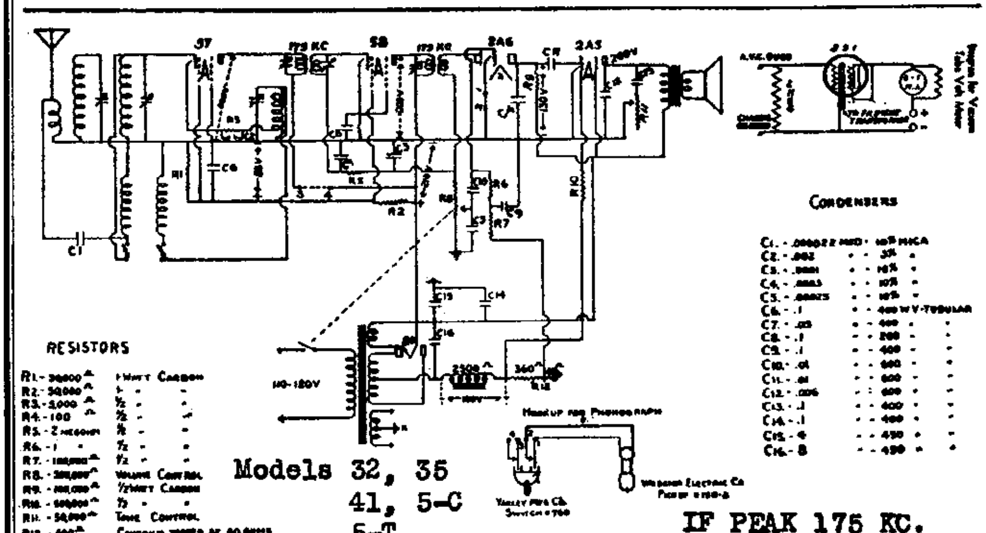
GILFILLAN BROS., INC.



4 Tube T.R.F.
1934-1935

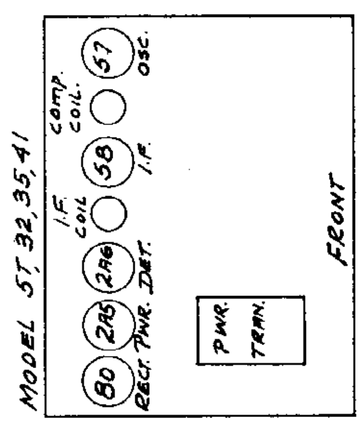
Models 30 and 4-T





Models 32, 35
41, 5-C
5-T

IF PEAK 175 KC.



SERVICE DATA, FIVE TUBE SUPER-HETERODYNE, 1934-1935

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 175 K.C. oscillator to the first detector grid (No. 57 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube volt meter as described and carefully adjust 3 screws on top of intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

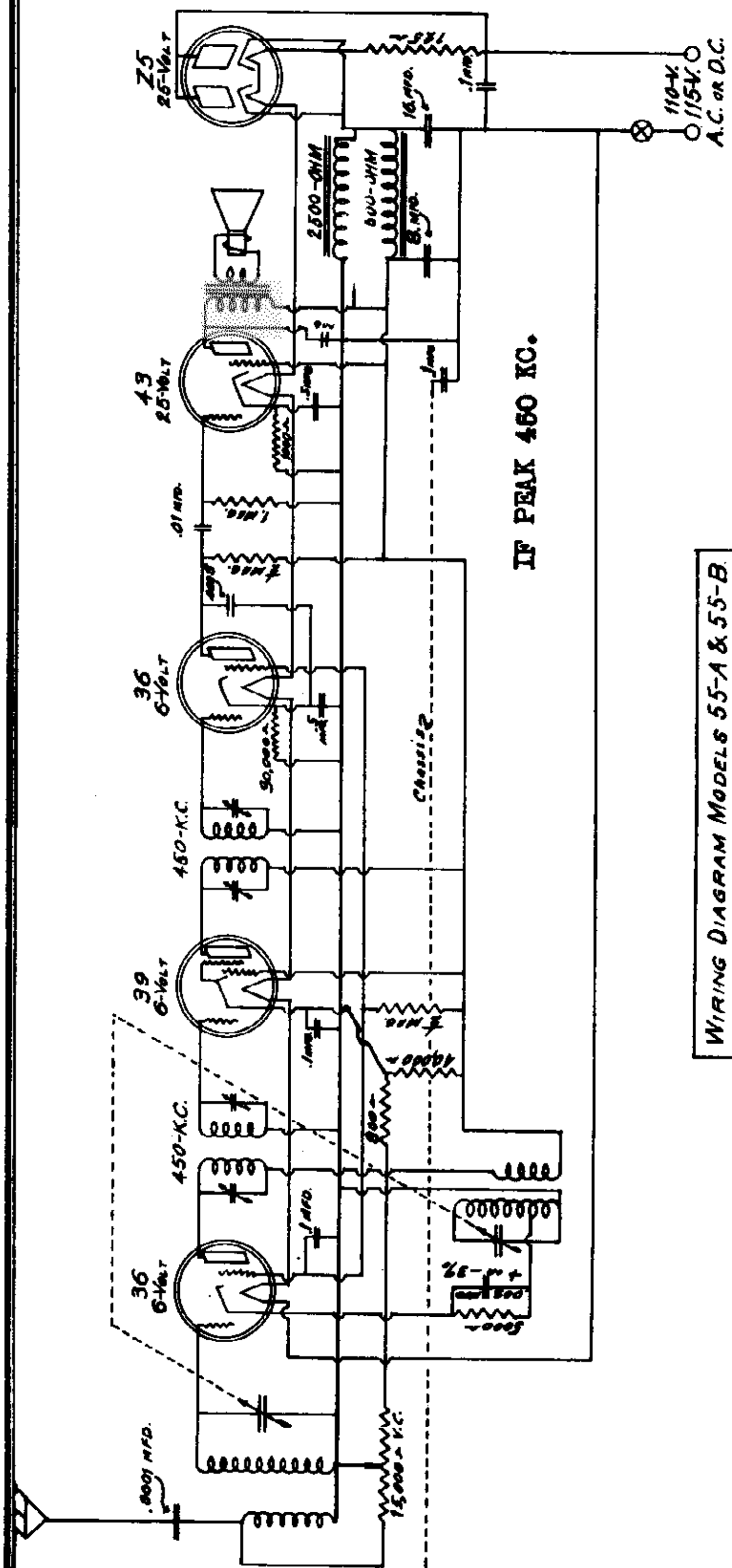
If the intermediates are balanced on 175 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

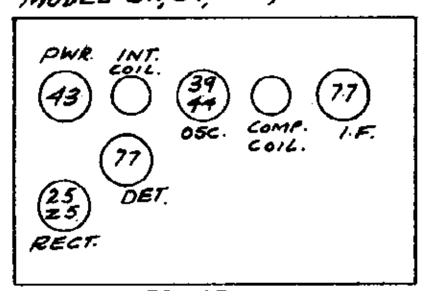
MODEL 5X, 34, 55A, 55B
Schematic, Socket
MODEL 6C, 6T, 8C, 8T, 47, 50
Socket Layout

GILFILLAN BROS., INC.



WIRING DIAGRAM MODELS 55-A & 55-B
GILFILLAN BROS. INC.
LOS ANGELES, CALIF.

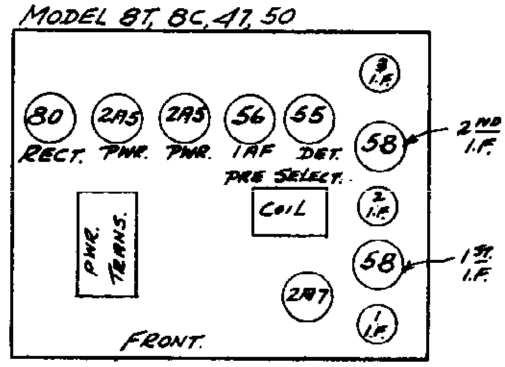
MODEL 5X, 34, 55A, 55B, AC-DC.



FRONT

3-26-33
Designed by Chas Zingle
Drawn by Bernard Smith

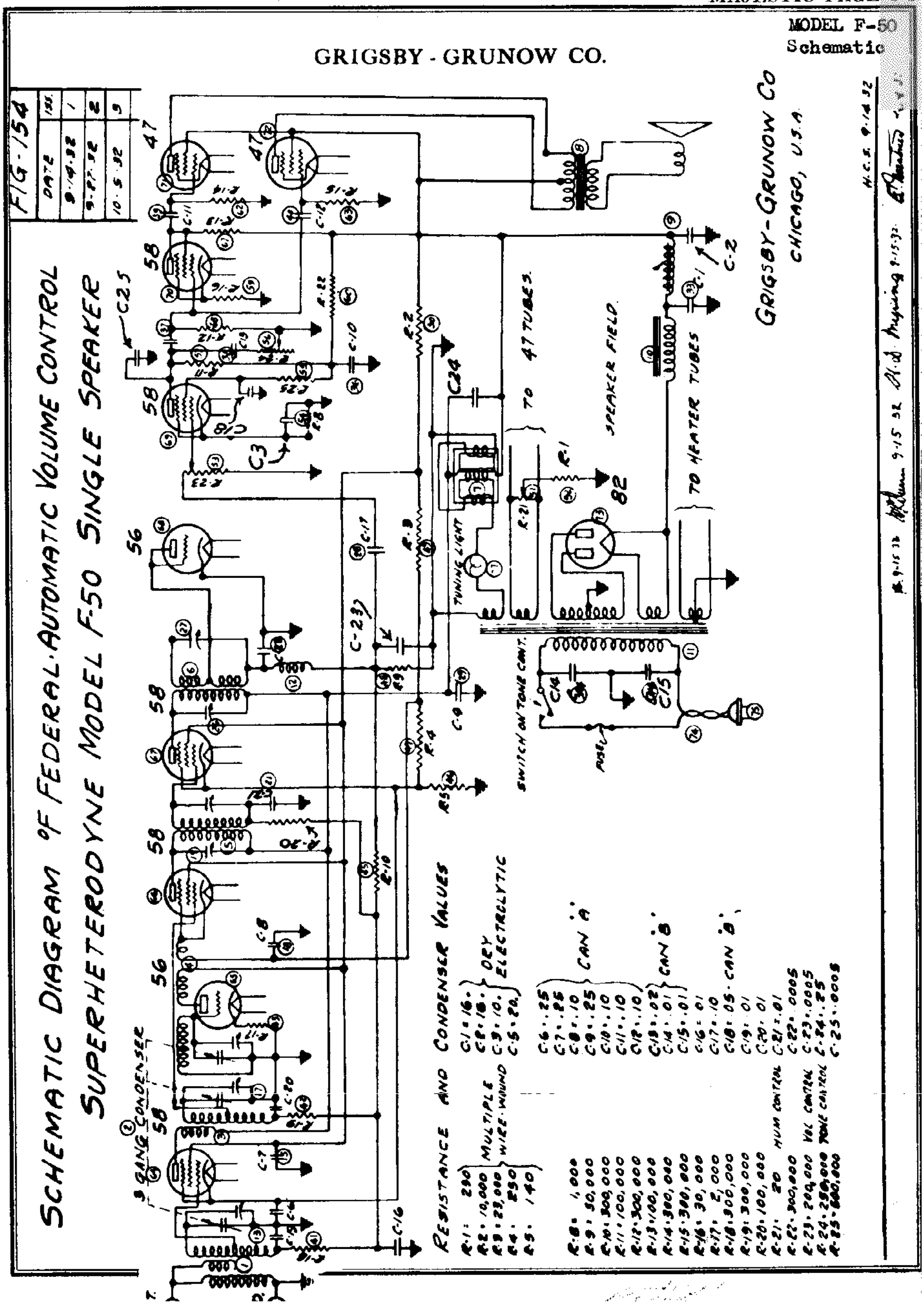
MODEL 8T, 8C, 47, 50



FRONT

MODEL F-50
Schematic

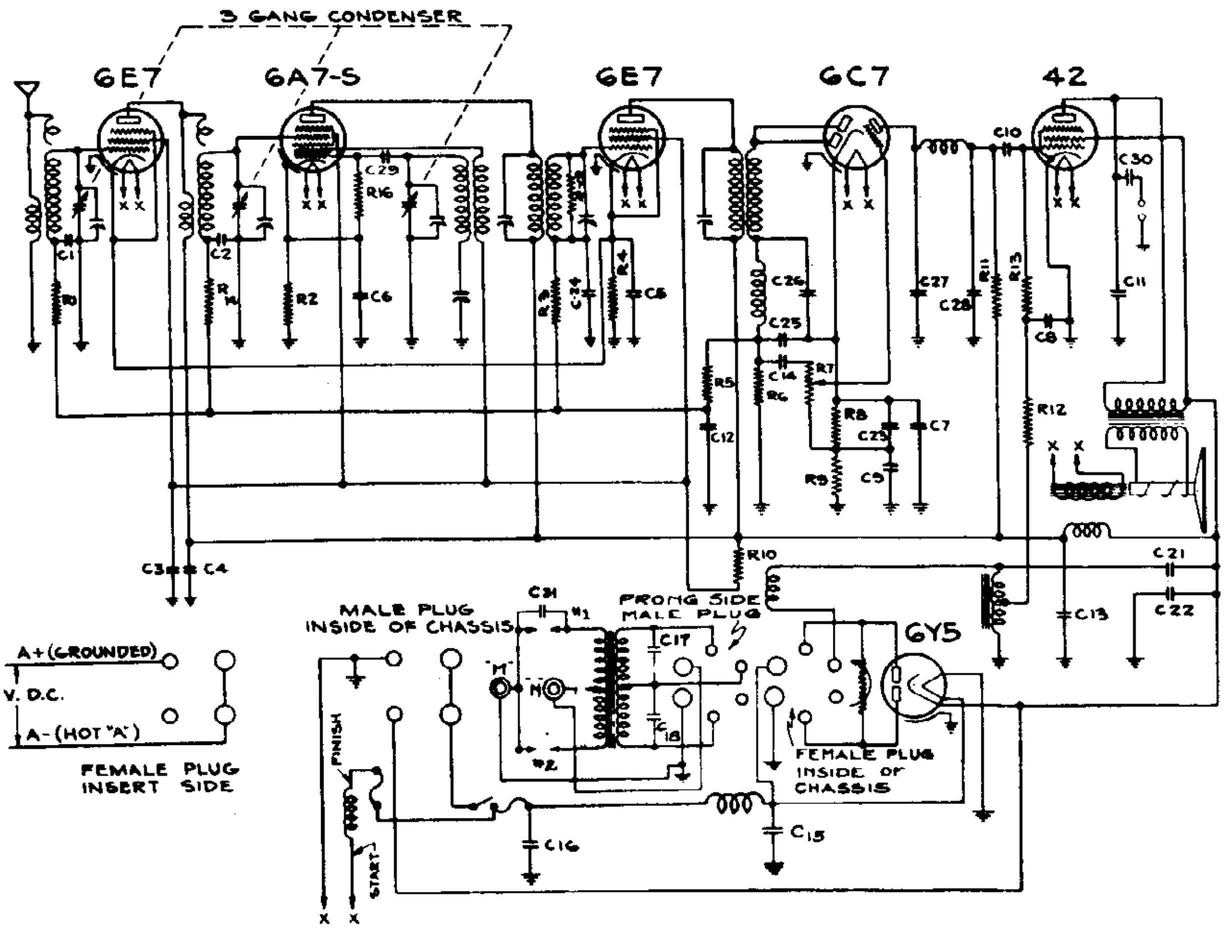
GRIGSBY - GRUNOW CO.



MODEL 118
Schematic

GRIGSBY - GRUNOW CO.

SCHEMATIC DIAGRAM OF MAJESTIC MODEL 118 AUTOMOBILE RECEIVER



RESISTORS

R1 — 300,000	R11 — 200,000
R2 — 300	R12 — 250,000
R3 — 300,000	R13 — 250,000
R4 — 160	R14 — 300,000
R5 — 300,000	R15 — 510,000 GLOBAR
R6 — 100,000	R16 — 50,000
R7 — 200,000 V.C.	
R8 — 2,500	
R9 — 5,000	R19 — 1,000,000
R10 — 15,000	

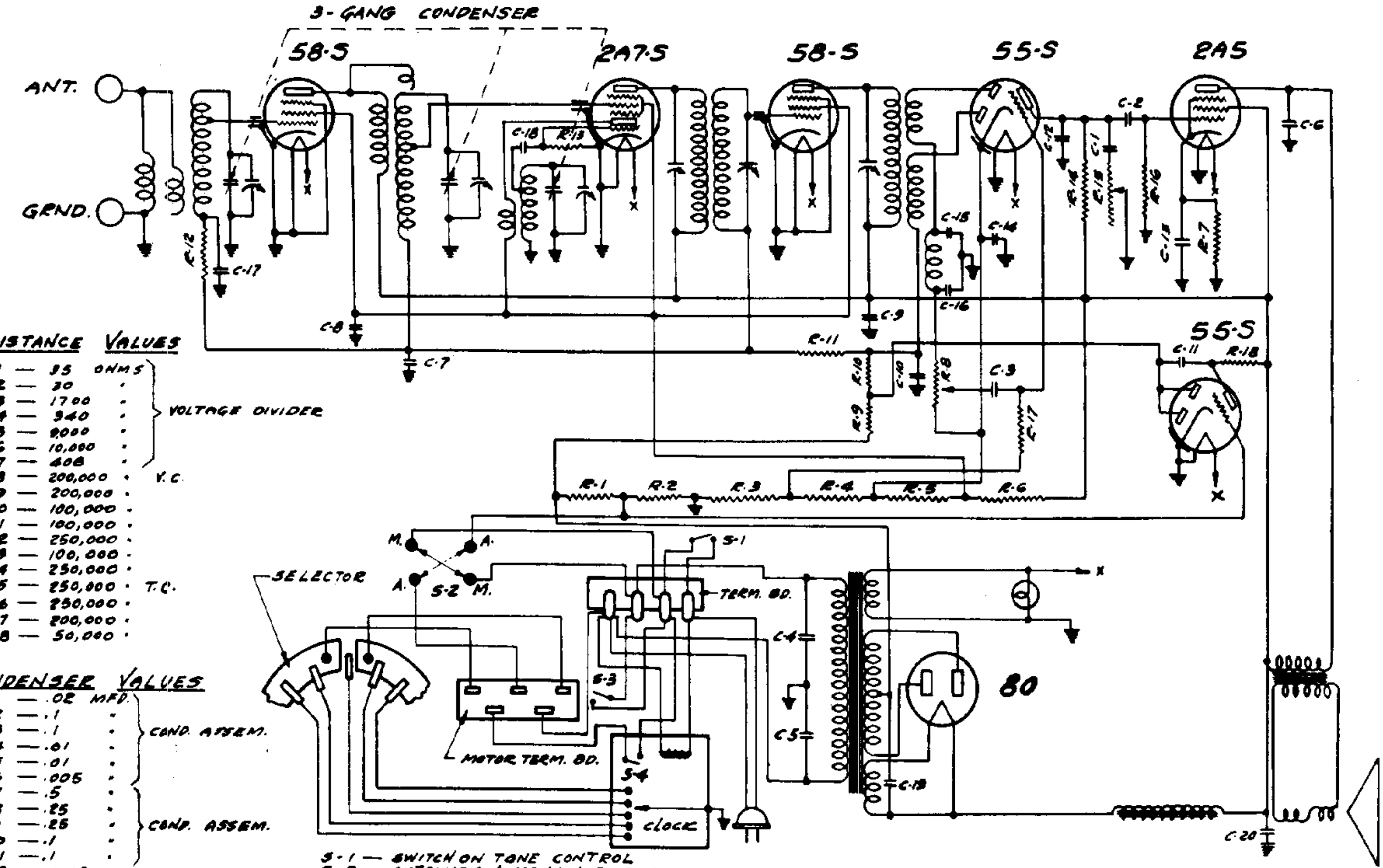
CONDENSERS

C1 — .03	R.F. #1	C16 — .5
C2 — .03	R.F. #1	C17 — .008
C3 — .25	R.F. #2	C18 — .008
C4 — .25	R.F. #2	
C5 — .25	R.F. #2	
C6 — .1	R.F. #2	C21 — 8.0
C7 — .25	A.F. #1	C22 — 8.0
C8 — .25	A.F. #1	C23 — 10.0
C9 — .25	A.F. #1	C24 — .01
C10 — .03	A.F. #1	C25 — .0005
C11 — .005	A.F. #2	C26 — .0005
C12 — .03	A.F. #2	C27 — .0005
C13 — .25	A.F. #2	C28 — .0005
C14 — .03	A.F. #2	C29 — .00025
C15 — .5.		C30 — .1
		C31 — 20.0

M - TERMINAL CONNECTED TO ARMATURE

GRIGSBY - GRUNOW CO.

SCHEMATIC DIAGRAM OF MAJESTIC MODEL-570 RECEIVER



RESISTANCE VALUES

R-1 — 35 OHMS	} VOLTAGE DIVIDER	
R-2 — 30		
R-3 — 1700		
R-4 — 340		
R-5 — 9000		
R-6 — 10,000		
R-7 — 408		
R-8 — 200,000	V.C.	
R-9 — 200,000		
R-10 — 100,000		
R-11 — 100,000		
R-12 — 250,000		
R-13 — 100,000		
R-14 — 250,000		
R-15 — 250,000	T.C.	
R-16 — 250,000		
R-17 — 200,000		
R-18 — 50,000		

CONDENSER VALUES

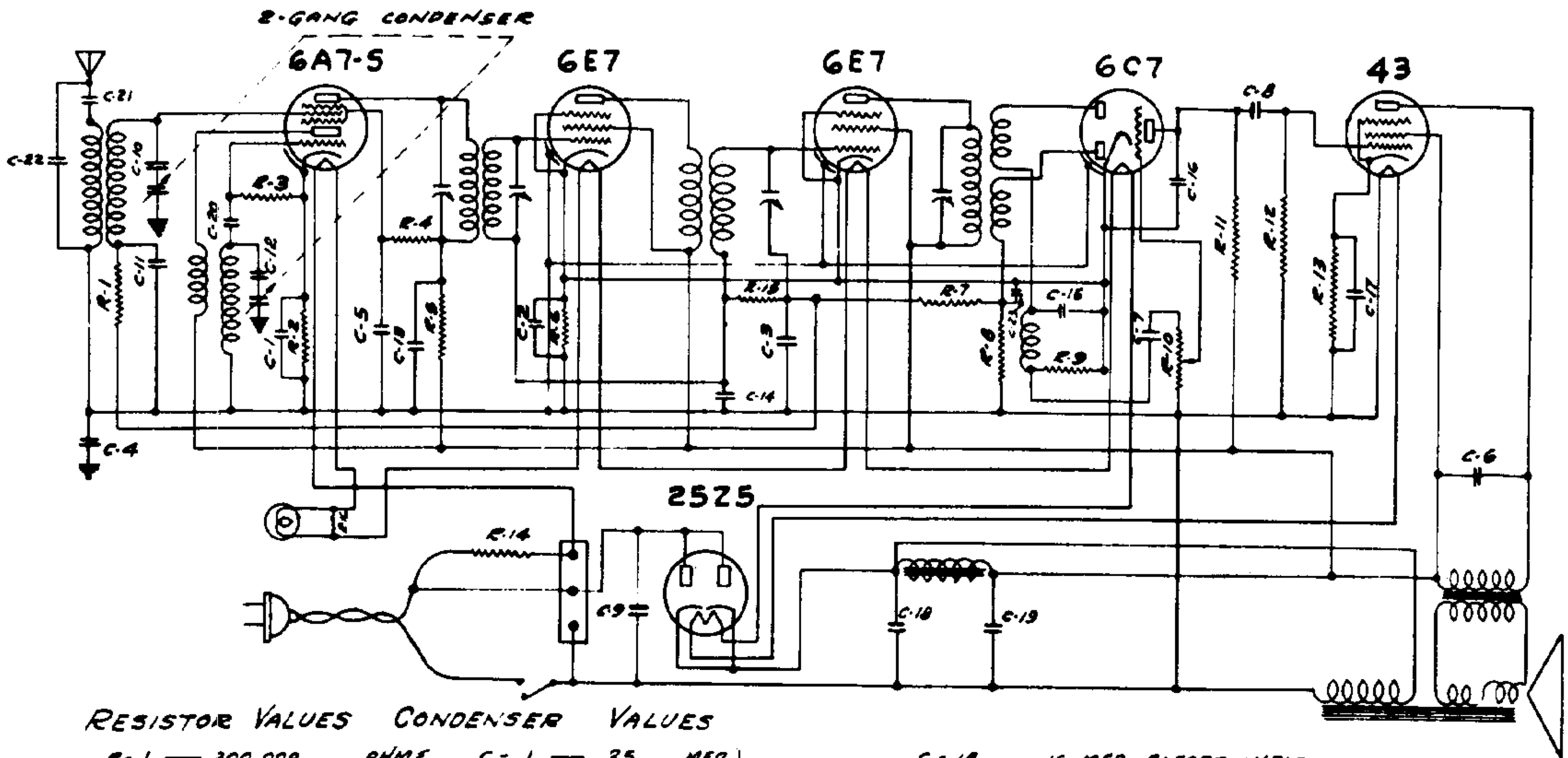
C-1 — .02 MFD.	} COND. ASSEM.
C-2 — .1	
C-3 — .1	
C-4 — .01	
C-5 — .01	
C-6 — .005	
C-7 — .5	} COND. ASSEM.
C-8 — .25	
C-9 — .25	
C-10 — .1	
C-11 — .1	
C-12 — .0005	
C-13 — 20	} ELEC.
C-14 — 10	
C-15 — .0005	
C-16 — .0005	
C-17 — .01	
C-18 — .00025 MFD.	
C-19 — 16 " ELEC.	
C-20 — 8 " ELEC.	

S-1 — SWITCH ON TONE CONTROL
S-2 — AUTOMATIC & MANUAL SWITCH
S-3 — SWITCH ON GANG
S-4 — SWITCH IN CLOCK.

MODEL 600 AC-DC
Schematic

GRIGSBY - GRUNOW CO.

SCHEMATIC DIAGRAM OF MAJESTIC MODEL 600 A.C.-D.C. RECEIVER



RESISTOR VALUES

R-1	300,000	OHMS
R-2	400	"
R-3	50,000	"
R-4	6,000	"
R-5	1,000	"
R-6	140	"
R-7	100,000	"
R-8	200,000	"
R-9	200,000	"
R-10	500,000 V.C.	"
R-11	100,000	"
R-12	500,000	"
R-13	700	"
R-14	100	"
R-15	300,000	"
R-16	34.5	"

CONDENSER VALUES

C-1	.25	MFD.	BY PASS ASSEM
C-2	.25	"	BY PASS ASSEM
C-3	.25	"	BY PASS ASSEM
C-4	.5	"	BY PASS ASSEM
C-5	.1	"	BY PASS ASSEM
C-6	.03	"	BY PASS ASSEM.
C-7	.03	"	BY PASS ASSEM.
C-8	.1	"	BY PASS ASSEM.
C-9	.1	"	
C-10	.01	"	
C-11	.01	"	
C-12	.01	"	
C-13	.03	"	
C-14	.01	"	
C-15	.0005	"	
C-16	.0005	"	
C-17	10. ELECTROLYTIC		
C-18	16. MFD. ELECTROLYTIC		
C-19	8.	"	"
C-20	.0006	MFD.	
C-21	.001	"	
C-22	.00005	"	
C-23	.0005	"	

GULBRANSEN CO.

MODEL 872
Schematic, Changes
Socket Layout

Change in Later Models

In the first models of this chassis, resistors R-1 and R-3 were carbon resistors of the values as shown in Fig. 1. Resistors R-12 and R-14, were in one vitreous enamel unit. The voltages for the sets with these resistors are shown in the voltage chart on Page 4 at the left.

In later models the four above mentioned resistors were replaced by one armored wire wound resistor unit. New values are used as follows

Code	Resistance
R-12	220 ohms
R-14	40 ohms
R-1	9,540 ohms
R-3	10,650 ohms

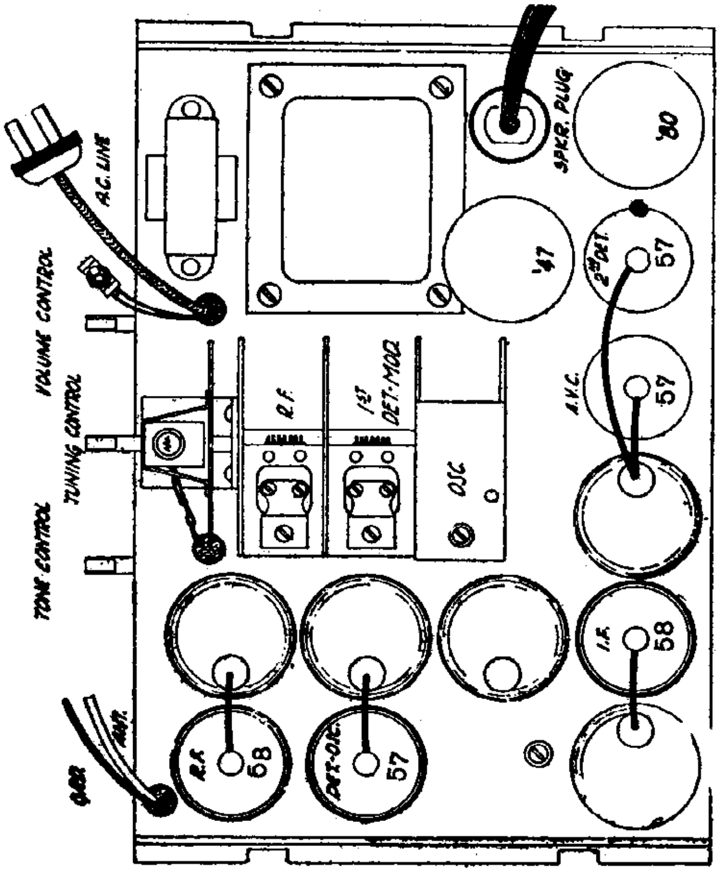
The voltages for the sets with the four-section wire wound resistor are shown in the second voltage chart on Page 4 at the right.

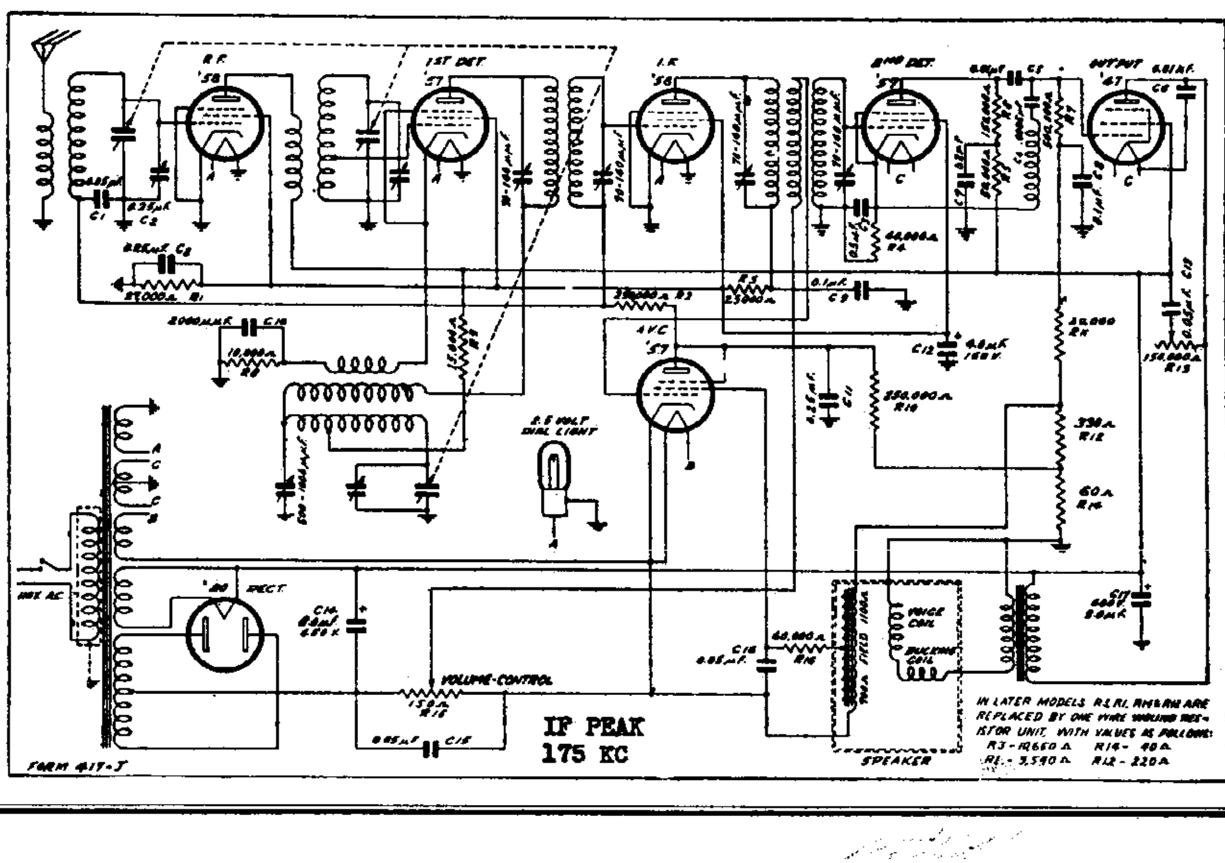
Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and an additional filter condenser are used. Also, a slight change is made in the power unit wiring. In the twenty-five cycle set, condenser C-17 the dry electrolytic unit is put in parallel with condenser C-14. An 8.0 mfd. wet electrolytic condenser is put in place of condenser C-17.

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true that is the sixty cycle chassis cannot be operated from a twenty-five cycle power supply.

A 110-220 volt 40-60 cycle power transformer is also available for this model.





MODEL 872
Alignment, Voltage
Parts List

GULBRANSEN CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are necessary. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Voltages at Sockets

LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM

			For early Models with 2-section vitreous enamel resistor.				For later Models with 4-section armoured wire-wound resistor.			
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
'58	R.F.	2.4	282	107	4 (1)	8.	258	106	2.8 (1)	8.0
'57	1st Det.	2.4	270	100	5	.4	250	103	5	.4
'58	I.F. (2)	2.4	282	107	4 (1)	8.	258	106	2.8 (1)	8.0
'57	A.V.C.	2.4	90	40	9.5	0	103	45	10	0
'57	2nd Det.	2.4	207	98	6	.15	190	101	6	.15
'47	Audio	2.4	262	280	24 (3)	31	242	260	17 (3)	30
'80	Rect.	4.8				30 per plate				34 per plate

(1) Read Across R-14.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation.
(3) Read Across R12 and R14.

REPAIR PARTS LIST FOR 7 TUBE SUPERHETERODYNE RECEIVER

When ordering parts, the part number and the serial number of chassis must be given. If there is a spot of paint on the chassis be sure to give this color. If this information is not available return the old part to insure getting the correct part.

Part No.	Name	List Price
P-1677	No. 57 Tube Socket	$1.15
P-1678	No. 58 Tube Socket	.15
P-1468	No. 47 Tube Socket	.15
P-1474	No. 80 Tube Socket	.15
P-1479	Speaker Socket	.15
P-40420	Aluminum Tube Shield	.20
P-40425	Tube Shield Base	.10
P-40411	Aluminum Coil Shield—R.F. Coils	.20
P-1476	Three-Lug Insulated Terminal Strip	.10
P-1513	Eleven-Lug Insulated Terminal Strip	.15
P-1054	"On-Off" Switch	.80
P-20529	Drive Shaft	.10
P-10224	Rubber Drive Pinion	.10
P-30374	Brass Bushing for Rubber Pinion	.10
P-10191	Rubber Cushions for Channel Brackets	.10
P-1273	Pilot Lamp 2.5 Volt	.25
P-5062	Antenna R.F. Transformer Assembly	.80
P-5057	Interstage R.F. Transformer Assembly	.80
P-5058	Oscillator Coil Assembly	.95
P-5059	1st I.F. Transformer Assembly, complete with can	2.25
P-5060	2nd I.F. Transformer Assembly, complete with can	2.50
P-50541	Output Transformer Assembly	1.75
P-50542	Power Transformer, 60 cycle, 110 volt	5.25
P-50543	Power Transformer, 25 cycle, 110 volt	8.50
P-50545	Power Transformer, 40-60 cycle, 110 volt	8.00
P-1497	Pilot Light Bracket and Drive Gear Assembly	.45
P-1383-C	Drive Bracket and Bearing	.30
P-1684	Celluloid Dial Strip	.20

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80862-C	C-1	.05 mfd.	200 V.	Tubular	$ .30
P-80888-A	C-2	.25 mfd.	200 V.	Tubular	.40
P-80886-C	C-3 / C-7 / C-11	.5 mfd. / .2 mfd. / .25 mfd.	200 V. / 400 V. / 200 V.	Block	1.60
P-80867	C-4	.0005 mfd.	600 V.	Molded	.25
P-80872-B	C-5	.01 mfd.	600 V.	Tubular	.25
P-80872-B	C-6	.01 mfd.	600 V.	Tubular	.25
P-80864-D	C-8	.1 mfd.	200 V.	Tubular	.25
P-80887-B	C-9	.1 mfd.	400 V.	Tubular	.40
P-80914	C-10	.002 mfd.	600 V.	Tubular	.20
P-80891-B	C-12	4.0 mfd.	150 V.	Electrolytic	.85
P-80890-B	C-13	.05 mfd.	400 V.	Tubular	.20
P-80894-B	C-14 / C-17	8.0 mfd. / 8.0 mfd.	450 V. / 450 V.	Electrolytic Block	2.85
P-80862-C	C-15	.05 mfd.	200 V.	Tubular	.30
P-80862-C	C-16	.05 mfd.	200 V.	Tubular	.30
P-80849		8.0 mfd.	450 V.	Wet Electrolytic (25 Cycle only)	2.20
P-1385-B	600 K.C Trimmer Condenser				.75
P-80882	Three-Gang Condenser				5.70

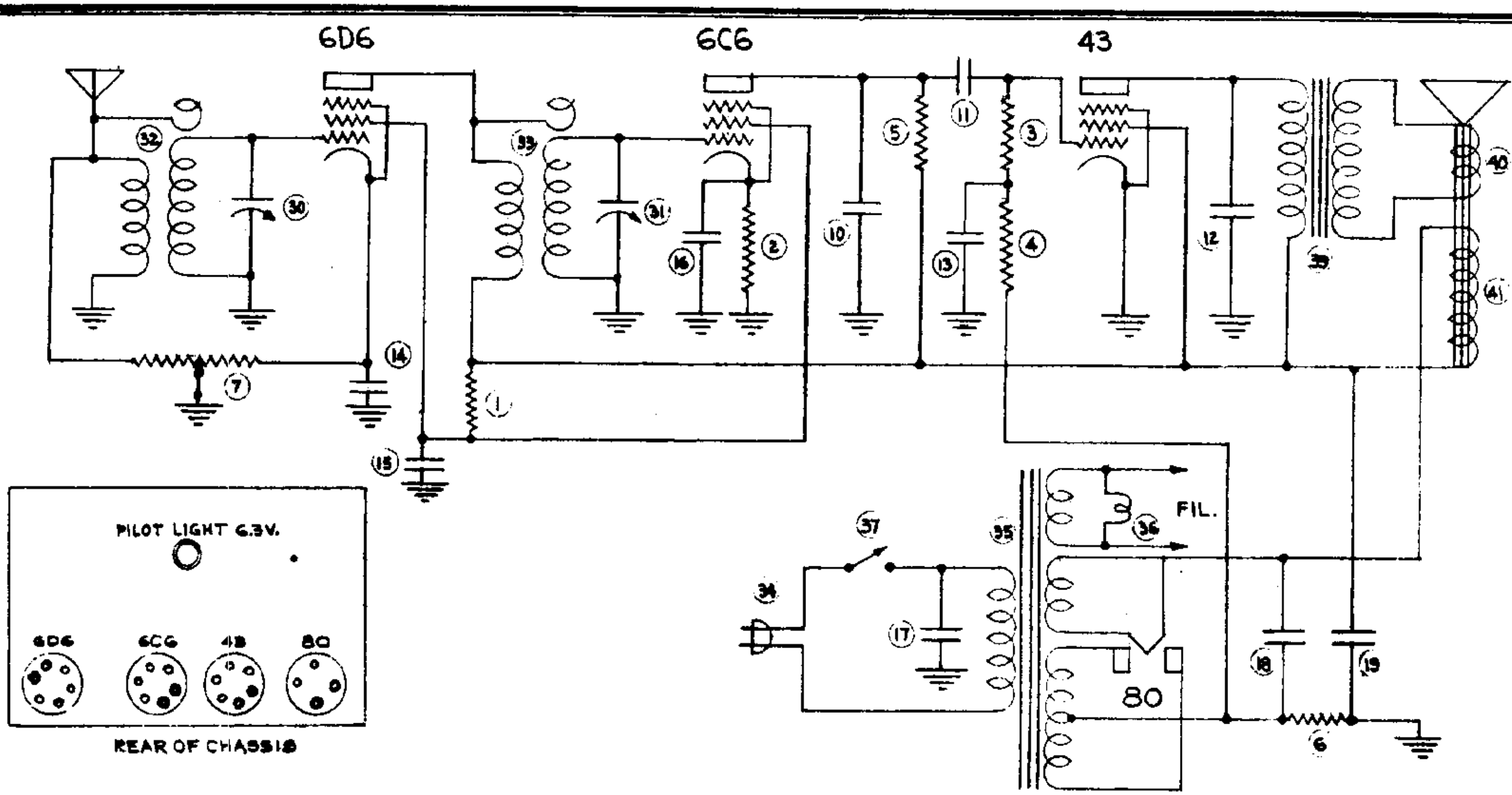
RESISTORS

Part No.	Code	Resistance	Wattage	Type	List Price
*P-91003	R-1	27,000 ohms	.5 Watts	Carbon	$ .25
P-90954	R-2	250,000 ohms	.2 Watts	Carbon	.25
*P-91002	R-3	25,000 ohms	1.0 Watts	Carbon	.25
P-90916	R-4	40,000 ohms	.2 Watts	Carbon	.25
P-90941	R-5	50,000 ohms	.2 Watts	Carbon	.25
P-90963	R-6	150,000 ohms	.2 Watts	Carbon	.25
P-90929	R-7	500,000 ohms	.2 Watts	Carbon	.25
P-90930	R-8	10,000 ohms	.2 Watts	Carbon	.20
P-90905	R-9	15,000 ohms	.2 Watts	Carbon	.25
P-90954	R-10	250,000 ohms	.2 Watts	Carbon	.25
P-90956	R-11	30,000 ohms	.2 Watts	Carbon	.25
*P-91040	R-12 / R-14	330 ohms / 60 ohms		Vitreous Enamel	.50
P-90993	R-13	150,000 ohms		Tone Control	.90
P-91041	R-15	150 ohms		Volume Control	.80
P-90916	R-16	40,000 ohms	.2 Watts	Carbon	.25
†P-91048	R12 / R14 / R1 / R3	220 ohm / 40 ohm / 9540 ohm / 10650 ohm	1.0 Watts / .2 Watts / 1.0 Watts / 2.5 Watts	Armored Wire-wound Resistor	1.05

* Used in early models—in later models these resistors are replaced by resistor P-91048.
† See above.

MODEL 410
Schematic, Socket Parts List

HALSON RADIO CORP.



REAR OF CHASSIS

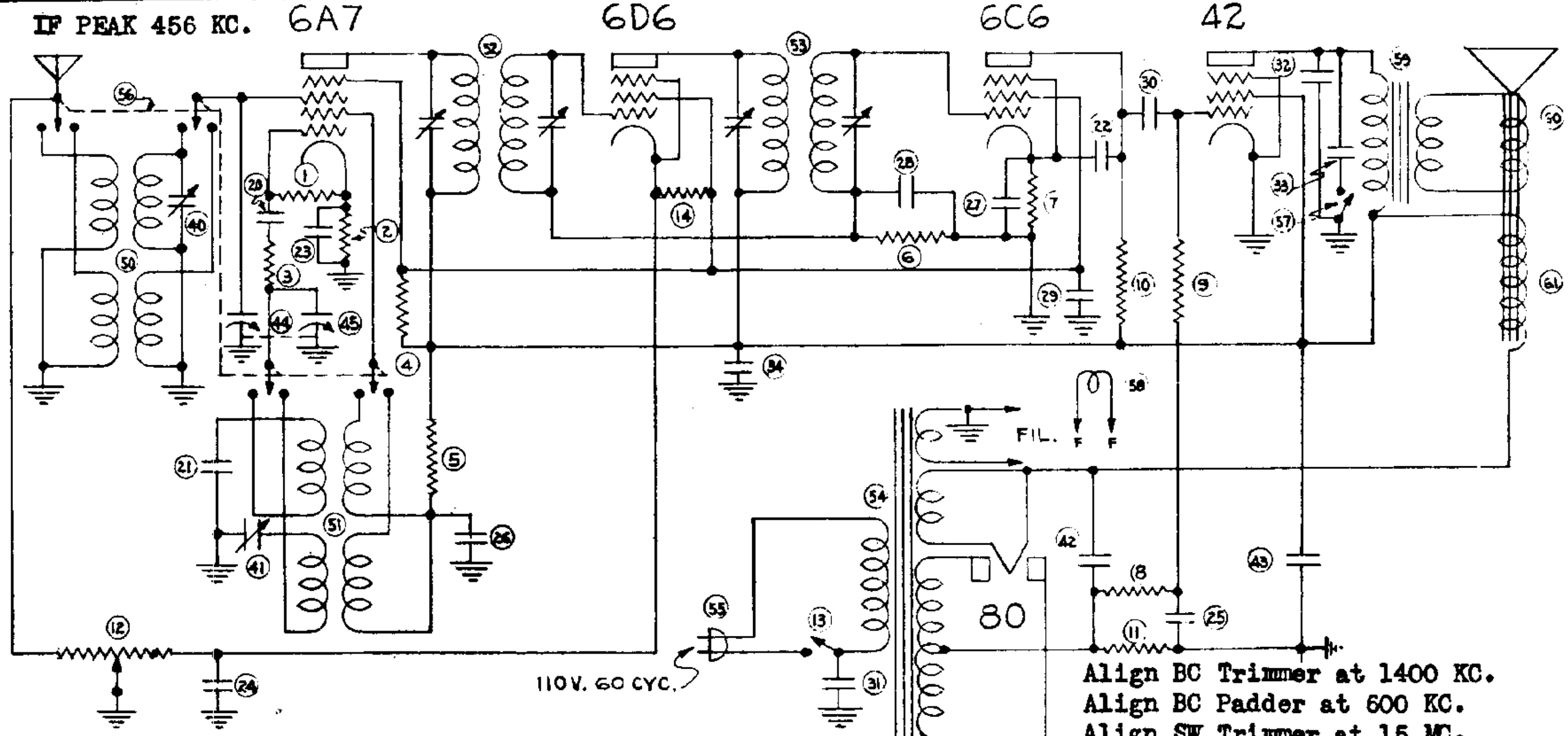
1	1158	RESISTOR	110,000Ω	1 WATT	
2	1160	"	51,000Ω	1/4 "	
3	1165	"	260,000Ω	" "	
4	"	"	"	" "	
5	1029	"	"	1 "	
6	1292	"	400Ω	1 "	
7	1289	VOLUME CONTROL 25,000Ω			
10	1098	CONDENSER	510 M.M.F. MICA		
11	1101	CONDENSER	.01	M.F.	400V.
12	"	"	"	"	"
13	1040	"	.05	"	200V.
14	"	"	"	"	"
15	1036	"	.1	"	"
16	1103	"	.25	"	"
17	1102	"	.02	"	400V.
18	1194	ELECTROLYTIC COND. 8 M.F. 450V.			
19	"	"	"	"	"
30	1285	VARIABLE COND. 370 M.M.F.			
31	"	" " " " "			
32	1286	ANTENNA COIL			
33	1288	R.F. COIL			
34	1115	LINE CORD & PLUG			
35	1184	POWER TRANSFORMER			
36	1086	PILOT LIGHT 6.3V.			
37	—	LINE SWITCH ON NO.7			
39	1293 SPKR. ASSY.	OUTPUT TRANS. 7000Ω			
40		VOICE COIL			
41		FIELD COIL 2000Ω			

ALIGN TRIMMERS AT 1400 KC.

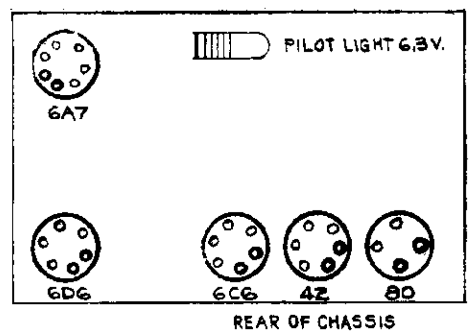
CIRCUIT DIAGRAM			MODEL 410
DRAWN BY E.A.W.	CHECKED BY [signature]	APPROVED BY [signature]	HALSON NUMBER 410
HALSON RADIO MFG. CORP. N.Y.C.			

MODEL 520
Schematic, Socket
Alignment

HALSON RADIO CORP.



ITEM	PART NO.	NAME	
a 1	1160	RESISTOR	51,000Ω ¼ WATT
2	1031	"	310Ω " "
3	1218	"	210Ω " "
4	1164	"	21,000Ω 1 "
5	"	"	" " "
6	1030	"	510,000Ω ¼ "
7	1160	"	51,000Ω " "
8	1165	"	260,000Ω " "
9	"	"	" " "
10	1029	"	" 1 "
11	1273	" (WIRE)	310Ω " "
12, 13	1209	VOLUME CONT. 25,000Ω & LINE SWITCH	
a 14	1245	RESISTOR	51,000Ω ½ WATT
20	1099	CONDENSER	260 M.M.F. MICA
21	1096	"	2500 " "
22	1098	"	510 " "
23	1040	"	.05 M.F. 200 V.
24	"	"	" " "
25	"	"	" " "
26	1103	"	.25 " "
27	"	"	" " "
28	1036	"	.1 " "
29	"	"	" " "
30	1102	"	.02 " 400V.
31	"	"	" " "
32	1101	"	.01 " "
33	1275	"	.05 " "
34		"	.05 " "
40	1107	ANT. TRIMMER COND. 5-30 M.M.F	
41	1104	PADDING COND. 250-400 "	
42	1194	ELECTROLYTIC COND 8 M.F. 450V.	
43	"	" " " "	
44, 45	1206	VARIABLE COND. 370 M.M.F.	
50	1211	ANTENNA COIL	
51	1212	OSCILLATOR COIL	
52	1213	I.F. TRANS. 456 K.C.	
53	"	" "	
54	1112	POWER TRANS. 110 V. 60~	
55	1220	LINE CORD & PLUG	
56	1210	WAVE CHANGE SWITCH	
57	1203	TONE CONT. SWITCH	
58	1086	PILOT LIGHT 6.3 V.	
59	1221	SPKR. ASSY.	OUTPUT TRANS. 7000Ω
60			VOICE COIL 4Ω
61			FIELD COIL 1670Ω (HOT)



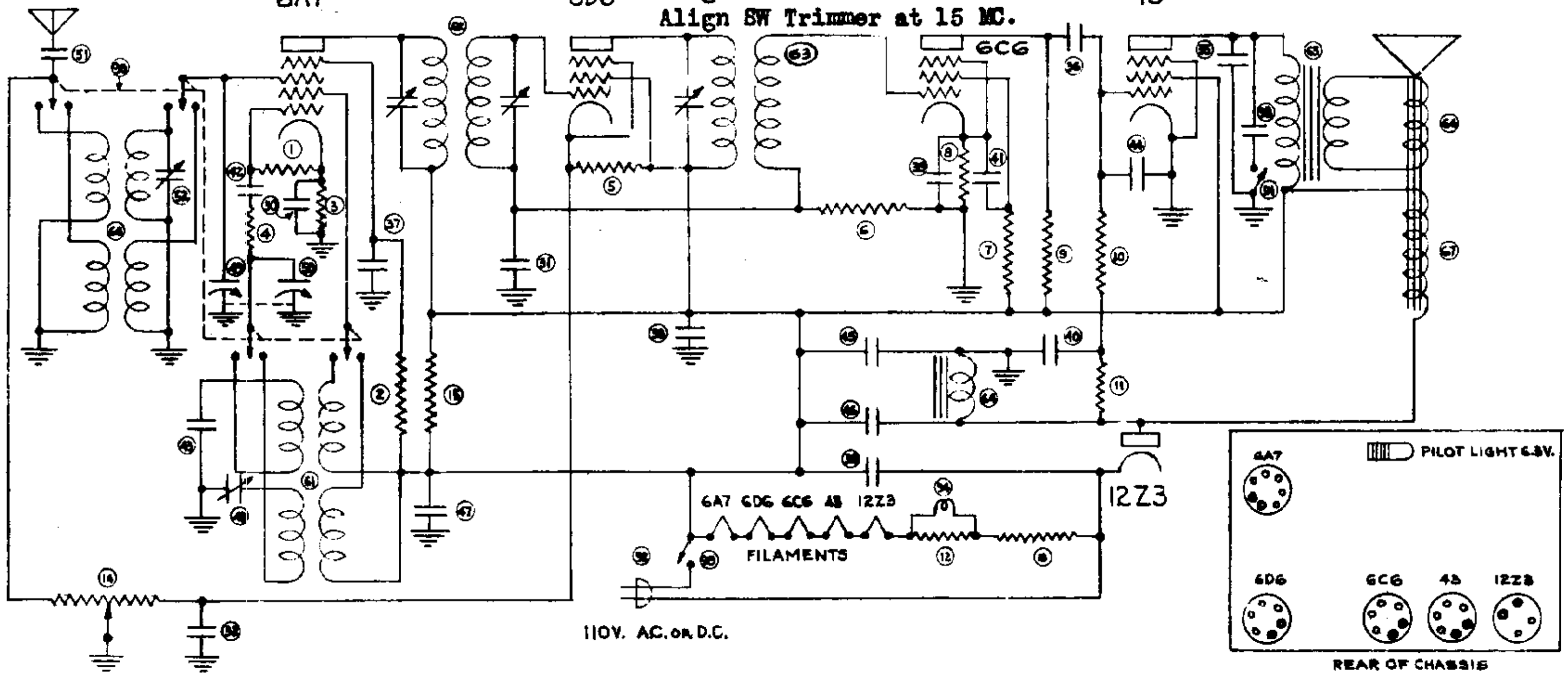
REVISIONS			
LTR.	WAS	DATE	NAME
a	110,000Ω	7-6-34	E.P.W.
a	added	"	"

CIRCUIT DIAGRAM	MODEL 520	
DRAWN BY E.P.W. 6-28-34	CHECKED BY Andy	APPROVED BY H.B.
HALSON RADIO MFG. CORP. N.Y.C. N.Y. U.S.A.		

MODEL 530
Schematic, Socket
Alignment

HALSON RADIO CORP.

IF PEAK 456 KC.
Align BC Trimmer at 1400 KC.
Align BC Padder at 600 KC.
Align SW Trimmer at 15 MC.

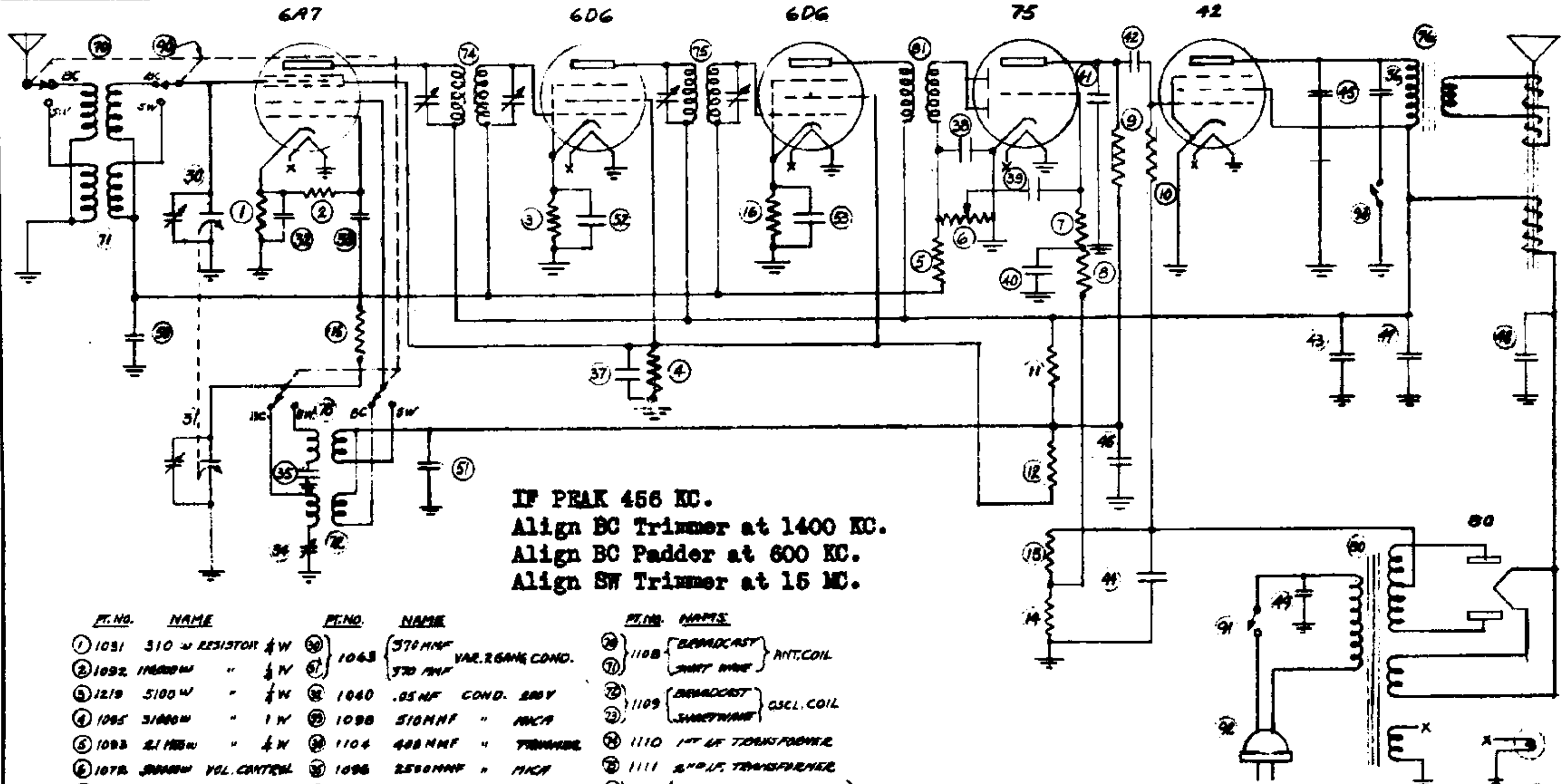


No.	Part No.	Description
1	1242	RESISTOR 21,000Ω ½ WATT
2	"	" " "
3	1243	" 260Ω "
4	1276	" 110Ω "
5	1245	" 51,000Ω ½ WATT
6	1094	" 1.1 MEG.Ω ½ WATT
7	"	" " "
8	1027	" 31,000Ω "
9	1029	" 260,000Ω 1 WATT
10	1030	" 510,000Ω ½ WATT
11	1165	" 260,000Ω "
12	1016	" 20Ω 2 WATT
13	—	RESISTANCE 190Ω WITH 92
14	1209	VOLUME CONT. 25,000Ω WITH 93
15	1315	RESISTOR 5100Ω ½ WATT
30	1040	CONDENSER .05 M.F. 200V.
31	"	" " " "
32	"	" " " "
33	"	" " " "
34	1102	" .02 " 400V.
35	1101	" .01 " "
36	"	" " " "
37	1040	CONDENSER .05 M.F. 200V.
38	1036	" .1 "
39	1103	" .25 " "
40	"	" " " "
41	1056	" .1 " "
42	1099	" 260 M.M.F. MICA
43	1096	" 2500 " "
44	1098	" 510 " "
45	1320	" ELEC. 8 M.F. 150V.
46	"	" " " " "
47	"	" " " " "
48	1104	PADDING COND. 250-400 M.M.F.
49	1206	VARIABLE COND. 370 M.M.F.
50	1206	" " " " "
51	1101	CONDENSER .01 M.F. 400V.
52	1107	ANT. TRIMMER COND. 5-30 M.M.F.
60	1211	ANTENNA COIL
61	1212	OSCILLATOR COIL
62	1213	I.F. TRANSFORMER 456 K.C.
63	1316	I.F. TRANSFORMER 456 K.C.
64	1281	FILTER CHOKE
65	1279 SPKR. ASSY.	OUTPUT TRANS. 4300Ω
66	1279 SPKR. ASSY.	VOICE COIL
67	1279 SPKR. ASSY.	FIELD COIL 4500Ω
80	1210	WAVE CHANGE SWITCH
91	1203	TONE CONTROL SWITCH
92	1278	LINE CORD & PLUG WITH 13
93	—	LINE SWITCH WITH 14
94	1086	PILOT LIGHT BULB 6.3V.

CIRCUIT DIAGRAM		MODEL 530	HALSON NUMBER 530
DRAWN BY E.P.W. 7-13-34	CHECKED BY Andy	APPROVED BY DOS	
HALSON RADIO MFG. CORP. N.Y.C.			

MODEL 610
Schematic, Socket
Alignment

HALSON RADIO CORP.

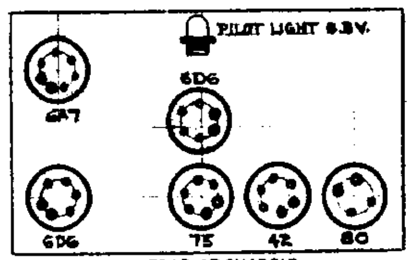


IF PEAK 456 KC.
Align BC Trimmer at 1400 KC.
Align BC Padder at 600 KC.
Align SW Trimmer at 15 MC.

	PT. NO.	NAME		
1	1031	310 Ω	RESISTOR	1/4 W
2	1092	110000 Ω	"	1/4 W
3	1219	5100 Ω	"	1/4 W
4	1095	31000 Ω	"	1 W
5	1093	2.1 MEG Ω	"	1/4 W
6	1078	500000 Ω	VOL. CONTROL	
7	1093	2. MEG Ω	RESISTOR	1/4 W
8	1094	1.1 MEG Ω	"	1/4 W
9	1091	110000 Ω	"	1 W
10	1030	510000 Ω	"	1/4 W
11	1064	6800 Ω	VOLTAGE DIVIDER	1/2 W
12	1064	8200 Ω	VOLTAGE DIVIDER	1/2 W
13	1064	250 Ω	VOLTAGE DIVIDER	1 W
14	1064	26 Ω	VOLTAGE DIVIDER	1 W
15	1218	210 Ω	RESISTOR	1/4 W
16	1159	510 Ω	"	1/4 W

	PT. NO.	NAME			
30	1063	370 MMF	VAR. 2 GANG COND.		
31	1063	370 MMF	VAR. 2 GANG COND.		
32	1040	.05 MF	COND.	200 V	
33	1098	510 MMF	"	MICA	
34	1104	400 MMF	"	TRIMMER	
35	1096	2500 MMF	"	MICA	
36	1102	.02 MF	"	400 V	
37	1040	.05 MF	"	200 V	
38	1097	110 MMF	"	MICA	
39	1101	.01 MF	"	400 V.	
40	1040	.05 MF	"	200 V	
41	1098	510 MMF	"	MICA	
42	1101	.01 MF	"	400 V.	
43	1100	.1 MF	"	400 V.	
44	1036	.1 MF	"	200 V.	
45	1101	.01 MF	"	400 V.	
46	1088	8 MF 300 V			ELECTROLYTIC CONDENSER
47	1088	8 MF 450 V.			ELECTROLYTIC CONDENSER
48	1088	8 MF 450 V.			ELECTROLYTIC CONDENSER
49	1102	.02 MF	COND.	400 V.	
50	1036	.1	"	200 V.	
51	1040	.05	"	200 V.	
52	1040	.05	"	200 V.	
53	1040	.05	"	200 V.	

	PT. NO.	NAME	
70	1108	BROADCAST	ANT. COIL
71	1108	SHORT WAVE	ANT. COIL
72	1109	BROADCAST	OSCL. COIL
73	1109	SHORTWAVE	OSCL. COIL
74	1110	1ST I.F. TRANSFORMER	
75	1111	2ND I.F. TRANSFORMER	
76	1116	OUTPUT TRANSFORMER	SPEAKER ASSEMBLY
77	1116	SPEAKER VOICE COIL	SPEAKER ASSEMBLY
78	1116	SPEAKER HUM-BUCK COIL	SPEAKER ASSEMBLY
79	1116	SPEAKER FIELD COIL	SPEAKER ASSEMBLY
80	1112	POWER TRANSFORMER	
81	1271	3RD. I.F. TRANSFORMER	
90	1069	RANGE SWITCH	
91	——	LINE SW. ON VOL. CONT.	
92	1115	LINE CORD & PLUG	
93	1086	PILOT LIGHT 6.3V.	
94	1203	TONE CONT. SWITCH	

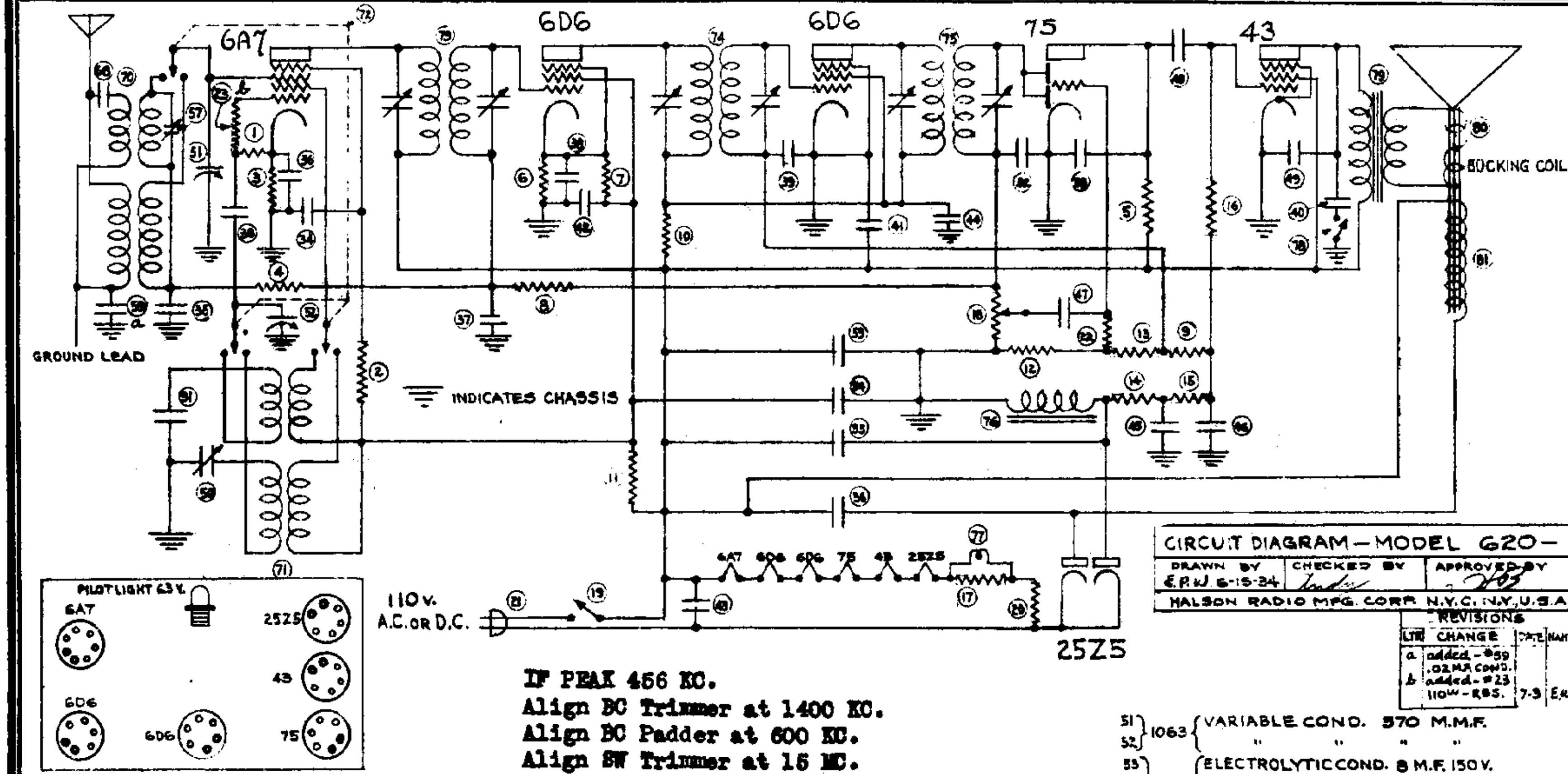


REAR OF CHASSIS

TITLE CIRCUIT DIAGRAM MODEL 610			
SCALE	MATERIAL	FINISH	HALSON
DRAWN BY R.F. 5/8/34	CHECKED BY	APPROVED BY	
HALSON RADIO MFG. CORP. NYC			

MODEL 620
Schematic, Socket Alignment

HALSON RADIO CORP.

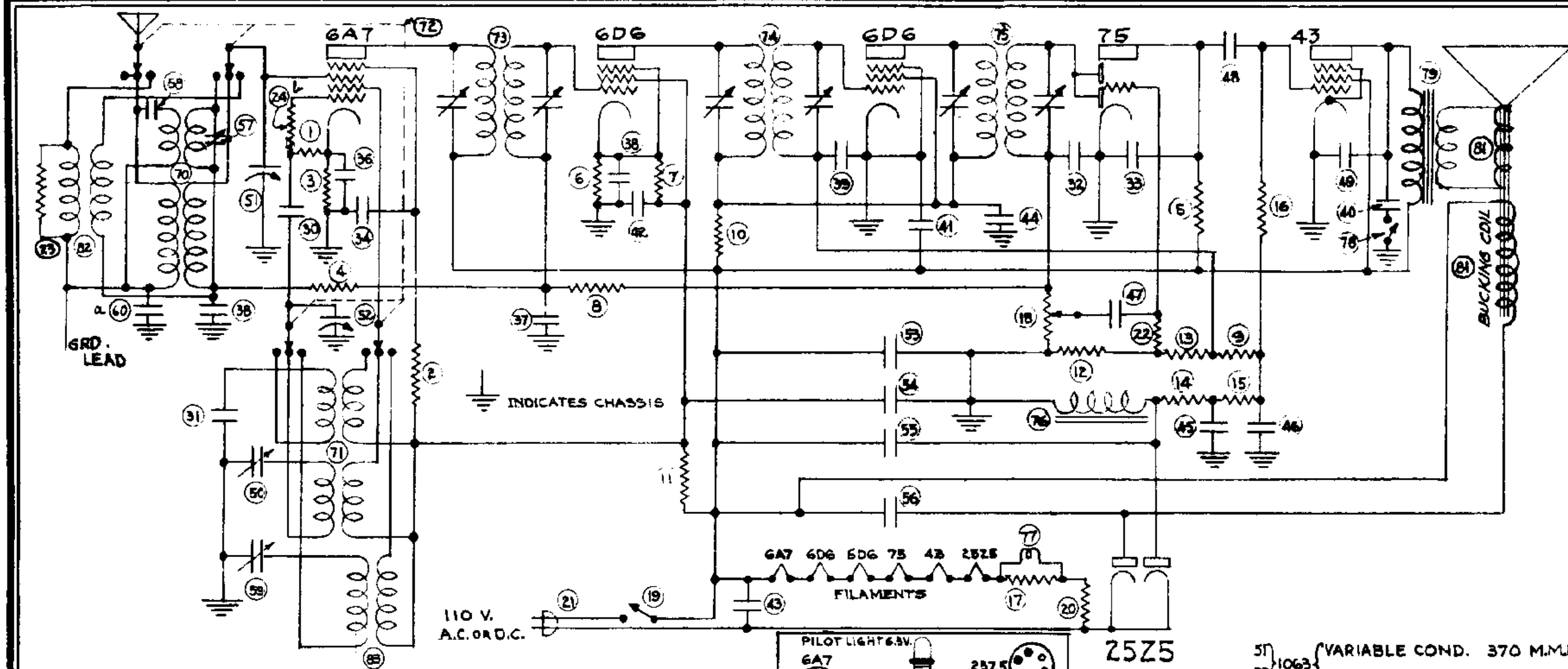


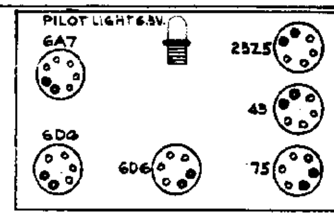
IF PEAK 456 KC.
Align BC Trimmer at 1400 KC.
Align BC Padder at 600 KC.
Align SW Trimmer at 16 MC.

ITEM	PART NO.	NAME		
1	1242	RESISTOR	21,000w	¼ WATT
2	"	"	"	"
3	1243	"	260w	"
4	1165	"	260,000w	"
5	"	"	"	"
6	1159	"	510w	"
7	1245	"	51,000w	½ WATT
8	1094	"	1.1 MEGw	¼ WATT
9	"	"	"	"
10	1092	"	2,100w	"
11	1244	"	5,100w	"
12	1246	"	310,000w	"
13	1248	"	3.1 MEGw	"
14	1092	"	110,000w	"
15	"	"	"	"
16	1246	RESISTOR	510,000w	¼ WATT
17	1249	"	20w	2 WATT
18, 19	1240	VOL. CONT. & LINE SWITCH	100,000w	
20, 21	1238	RESISTANCE & LINE CORD & PLUG	127w	
22	1246	RESISTOR	510,000w	½ WATT
b-23	1276	"	110w	"
30	1099	CONDENSER	260 M.M.F.	MICA
31	1096	"	2500 "	"
32	1097	"	110 "	"
33	1098	"	510 "	"
34	1241	"	.5 M.F.	200V.
35	1040	"	.05 "	"
36	1040	CONDENSER	.05 M.F.	200 V.
37	"	"	" "	"
38	"	"	" "	"
39	"	"	" "	"
40	"	"	" "	"
41	1103	"	.25 "	"
42	"	"	" "	"
43	"	"	" "	"
44	1036	"	.1 "	"
45	"	"	" "	"
46	"	"	" "	"
47	1101	"	.01 "	400V.
48	"	"	" "	"
49	"	"	" "	"
50	1104	PADDING COND.	250-400 M.M.F.	
a-59	1102	CONDENSER	.02 M.F.	400
51, 52	1063	VARIABLE COND.	570 M.M.F.	
53	1230	ELECTROLYTIC COND.	8 M.F.	150 V.
54	1230	"	16 "	"
55	1230	"	8 "	"
56	1230	"	4 "	"
57	1237	ANT. TRIMMER COND.	5-30 M.M.F.	
58	1097	CONDENSER	110 M.M.F.	MICA
70	1238	ANTENNA COIL		
71	1109	OSCILLATOR COIL		
72	1069	WAVE CHANGE SWITCH		
73	1250	I.F. TRANSFORMER	1ST	456 K.C.
74	"	" "	2ND	"
75	1251	" "	3RD	"
76	1231	FILTER CHOKE	430w	
77	1086	PILOT LIGHT	6.3 V.	
78	1203	TONE CONTROL SWITCH		
79	1252	OUTPUT TRANS.	4300w PRI. IMP.	
80	SPKR. ASSY.	VOICE COIL		
81	SPKR. ASSY.	FIELD COIL	2300w HOT	

MODEL 630
Schematic, Socket
Alignment

HALSON RADIO CORP.





IF PEAK 456 KC.
Align BC Trimmer at 1400 KC.
Align BC Padder at 600 KC.
Align SW Trimmer at 15 MC

ITEM	PART NO.	NAME		
1	1242	RESISTOR	21,000Ω	1/4 WATT
2	"	"	"	"
3	1243	"	260Ω	"
4	1165	"	260,000Ω	"
5	"	"	"	"
6	1159	"	510Ω	"
7	1245	"	51,000Ω	1/2 WATT
8	1094	"	1.1 MEGΩ	1/4 WATT
9	"	"	"	"
10	1032	"	2,100Ω	"
11	1244	"	5,100Ω	"
12	1246	"	310,000Ω	"
13	1248	"	3.1 MEGΩ	"
14	1092	"	110,000Ω	"
15	"	"	"	"
16	1246	RESISTOR	510,000Ω	1/4 WATT
17	1249	"	20Ω	2 WATT
18	1240	VOL. CONT.	100,000Ω	
19	1240	& LINE SWITCH		
20	1233	RESISTANCE	127Ω	
21	1233	& LINE CORD & PLUG		
22	1246	RESISTOR	510,000Ω	1/4 WATT
23	1267	"	11,000Ω	"
b 24	1276	"	110Ω	"
30	1099	CONDENSER	260 M.M.F.	MICA
31	1096	"	2500	" "
32	1097	"	110	" "
33	1098	"	510	" "
34	1241	"	.5 M.F.	200V.
35	1040	"	.05	" "
36	1040	CONDENSER	.05 M.F.	200V.
37	"	"	" "	"
38	"	"	" "	"
39	"	"	" "	"
40	"	"	" "	"
41	1103	"	.25 "	"
42	"	"	" "	"
43	"	"	" "	"
44	1036	"	.1 "	"
45	"	"	" "	"
46	"	"	" "	"
47	1101	"	.01 "	400V
48	"	"	" "	"
49	"	"	" "	"
50	1104	PADDING COND.	250-400 M.M.F.	
51	1063	VARIABLE COND.	370 M.M.F.	
52	1063	"	"	
53	1230	ELECTROLYTIC COND.	8 M.F.	150V.
54	1230	"	16 "	"
55	1230	"	8 "	"
56	1230	"	4 "	"
57	1262	ANT. TRIMMER COND.	3-30 M.M.F.	
58	1097	CONDENSER	110 M.M.F.	MICA
59	1262	"	50 TO 120 M.M.F.	
a 60	1102	"	.02 M.F.	400 V.
70	1238	ANTENNA COIL		
71	1109	OSCILLATOR COIL		
72	1069	WAVE CHANGE SWITCH		
73	1250	I.F. TRANSFORMER	1ST	456 K.C.
74	"	" "	2ND	"
75	1251	" "	3RD	"
76	1231	FILTER CHOKE	430Ω	
77	1086	PILOT LIGHT	6.3V.	
78	1203	TONE CONTROL SW.		
79	1252 SPKR. ASSY.	OUTPUT TRANS.	4300Ω PRI. IMP.	
80	1252 SPKR. ASSY.	VOICE COIL		
81	1252 SPKR. ASSY.	FIELD COIL	2300Ω HOT	
82	1264	L.W. ANT. COIL		
83	1265	L.W. OSCL. COIL		

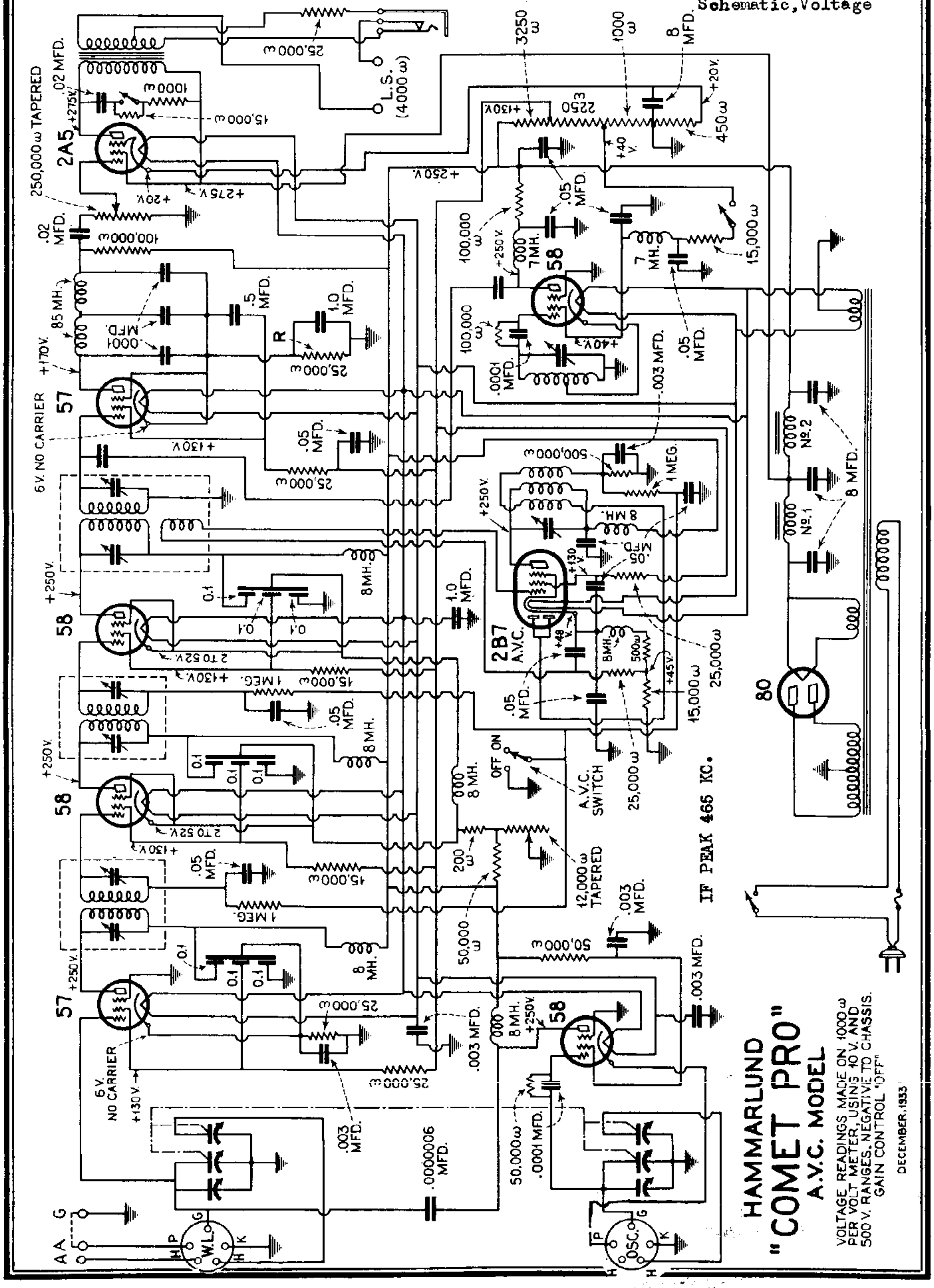
CIRCUIT DIAGRAM - MODEL - 630		
DRAWN BY E.P.W. 6-22-34	CHECKED BY ANDY	APPROVED BY [signature]
HALSON RADIO MFG. CORP.	N.Y.C. N.Y.	

REVISIONS

LTR	CHANGE	DATE	NAME
a	60-.02 M.F. added	"	
b	24-110Ω	7-3	E.P.W.

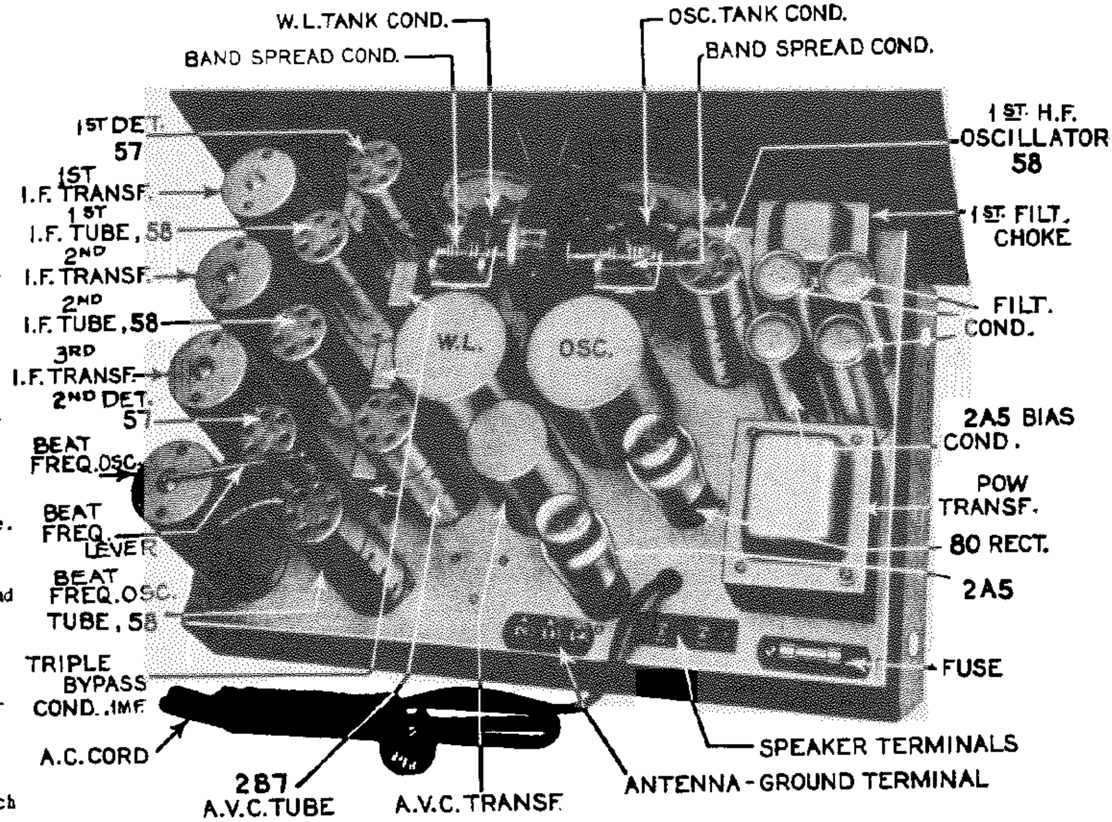
HAMMARLUND MFG. CO.

MODEL "Comet Pro" AVC
Schematic,Voltage



MODEL "Comet Pro" AVC
Alignment, Socket

HAMMARLUND MFG. CO.



Should it be necessary to remove the Comet "Pro" chassis from its shield cabinet it is easily accomplished by removing the four machine screws which extend through the bottom of the cabinet and the twelve screws around the edge of the front panel. The entire panel and chassis assembly may then be slipped out of the cabinet by drawing it forward. When thus removed all parts and wiring located beneath the chassis are exposed for examination or test. The shield cans found under the chassis may be removed if necessary by pulling them off.

First remove the chassis from the cabinet and prop it up on its rear edge so that both the top and bottom are accessible. Then connect the 10 ohm range of a 1000 ohm per volt voltmeter across the 25,000 ohm resistor between the cathode of the second detector and ground. This resistor is marked "R" in the schematic diagram. This meter will function as a resonance indicator, showing maximum deflection when exact resonance is obtained.

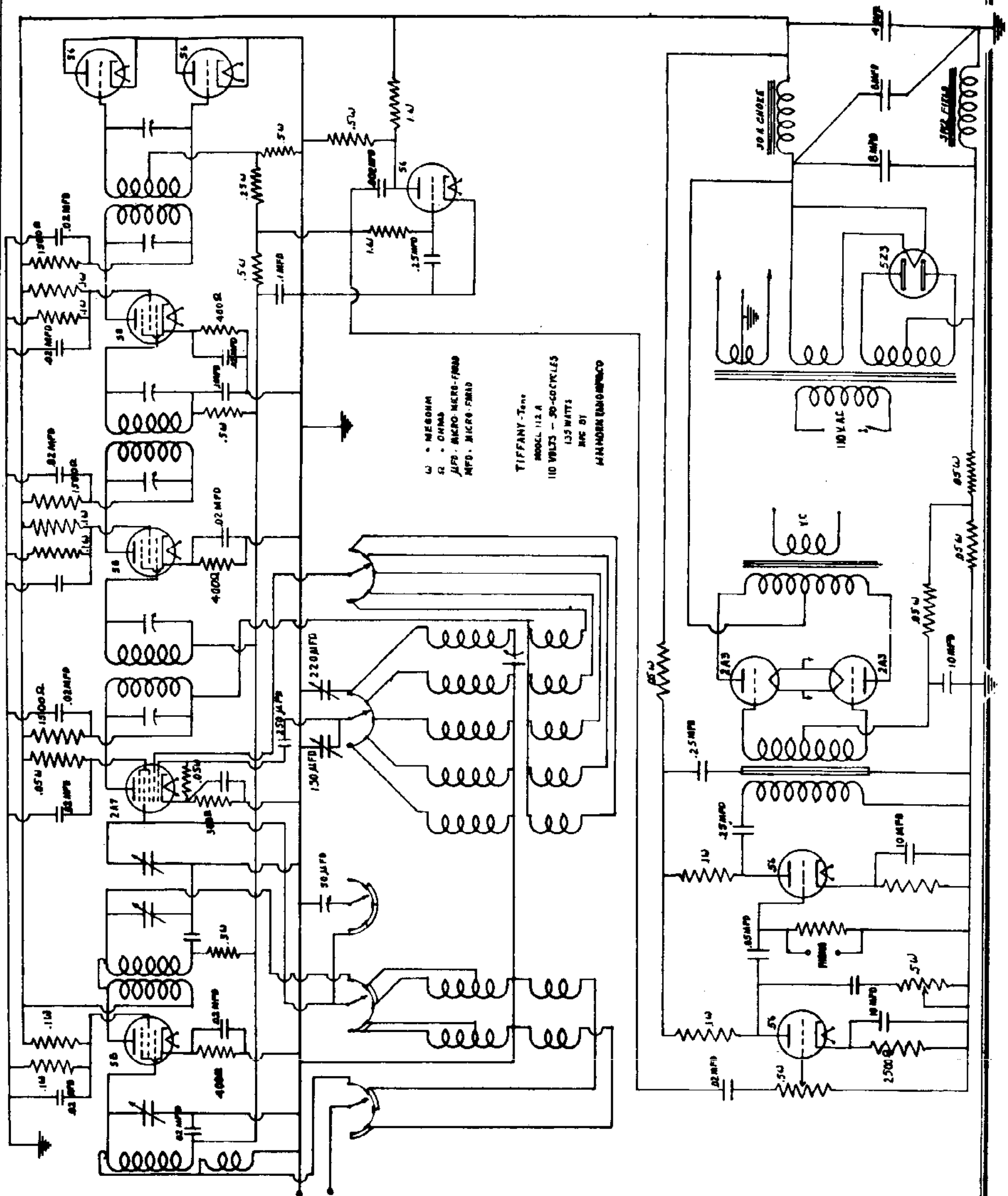
Next provide a signal source. If an oscillator is available, tune it to 465 kc. and couple it to the receiver. If such an oscillator is not at hand the carrier of a fairly powerful station may be employed provided the station selected is one which is free from fading and interference. This signal should be tuned in on the receiver in the usual way and the gain control adjusted to cause an increase of about 2 volts in the voltmeter reading.

The actual alignment can now proceed. First adjust the bottom condensers of the three i.f. transformers. These are accessible from the under side of the chassis. Adjust them one after the other until maximum deflection of the resonance indicating meter is obtained. If the meter reading increases materially during this process retard the gain control to bring it back to the original plus 2 volts reading. Then make a similar adjustment of the condensers at the tops of the three i.f. transformers. Finally repeat this whole process, readjusting each condenser a second time to insure exactness of resonance.

After the i.f. stages are thus accurately lined up, turn on the heterodyne-beat oscillator and set its top lever so that it points diagonally away from the rear right-hand corner of the chassis. Then adjust the bottom adjustment screw on this transformer for exact zero beat. When this has been accomplished the receiver is in accurate alignment.

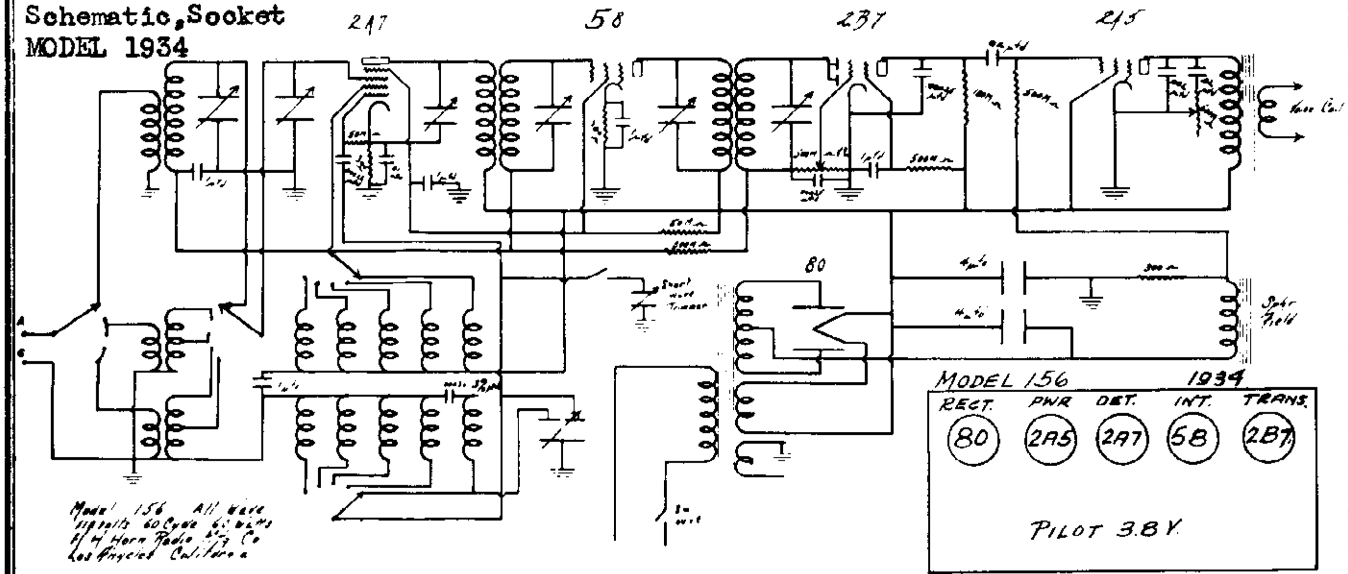
MODEL 112-A
Schematic

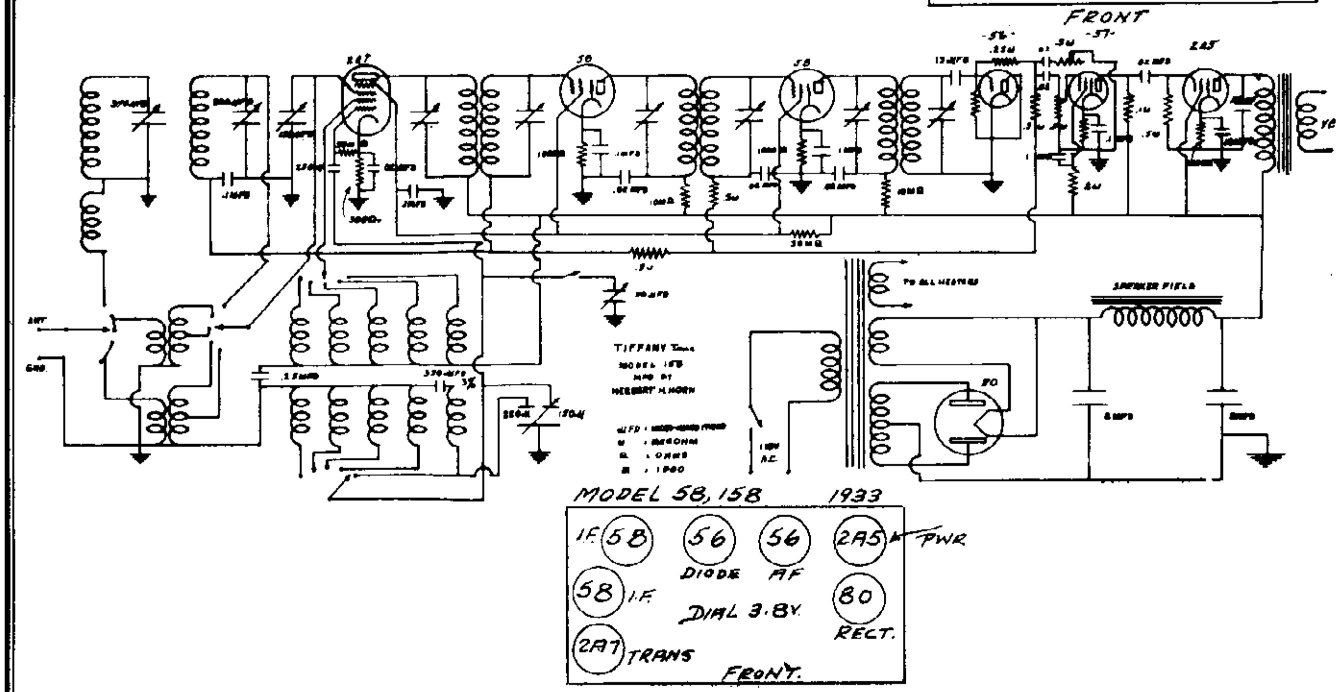
HERBERT H. HORN

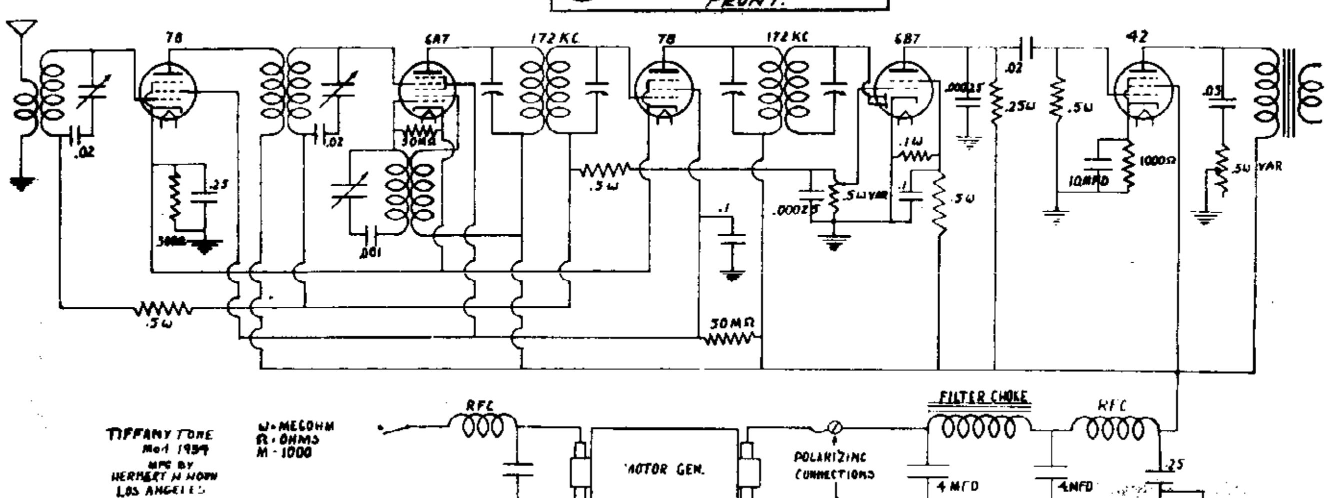


MODEL 58,158
Schematic,Socket
MODEL 156
Schematic,Socket
MODEL 1934

HERBERT H. HORN

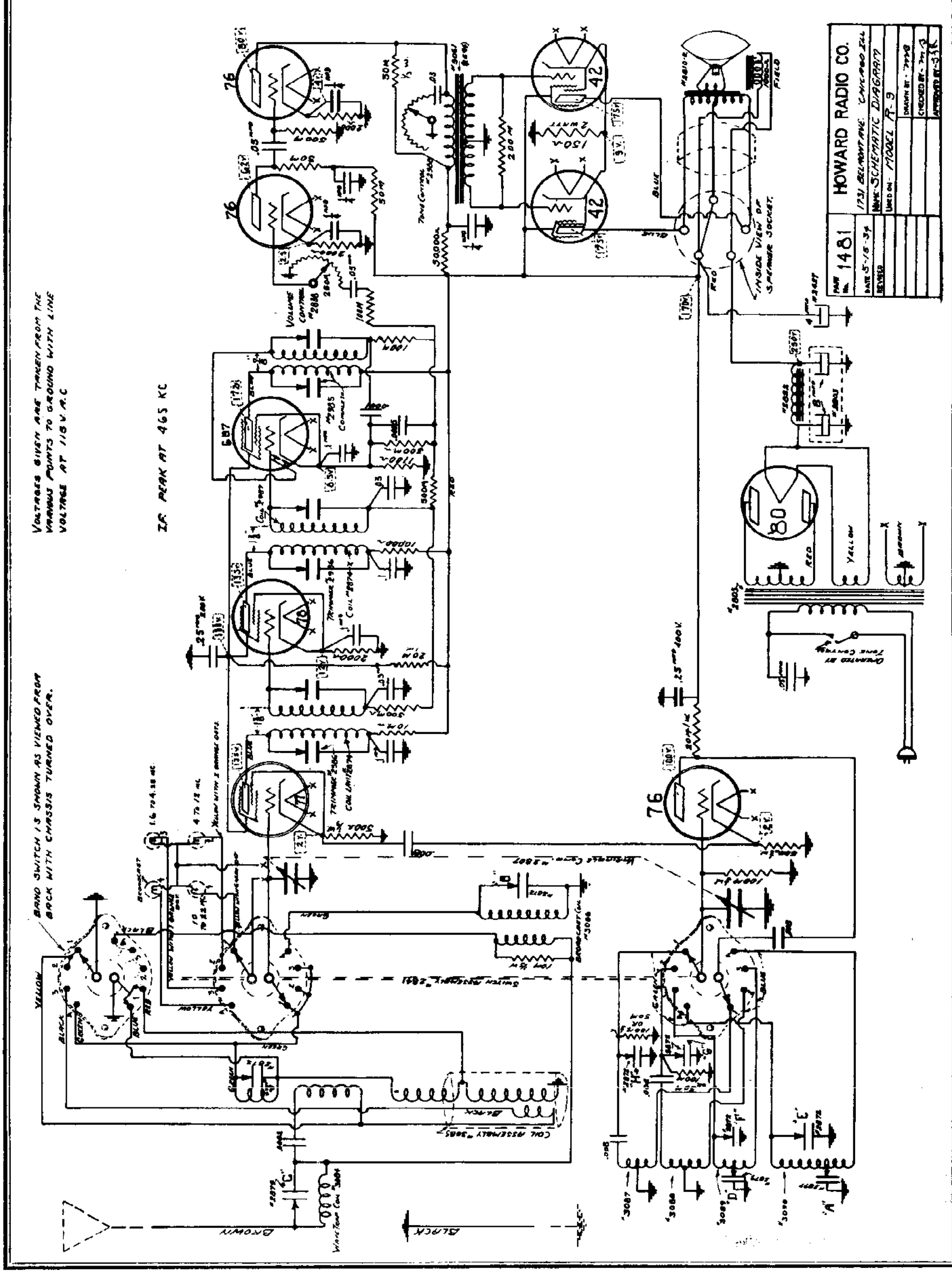






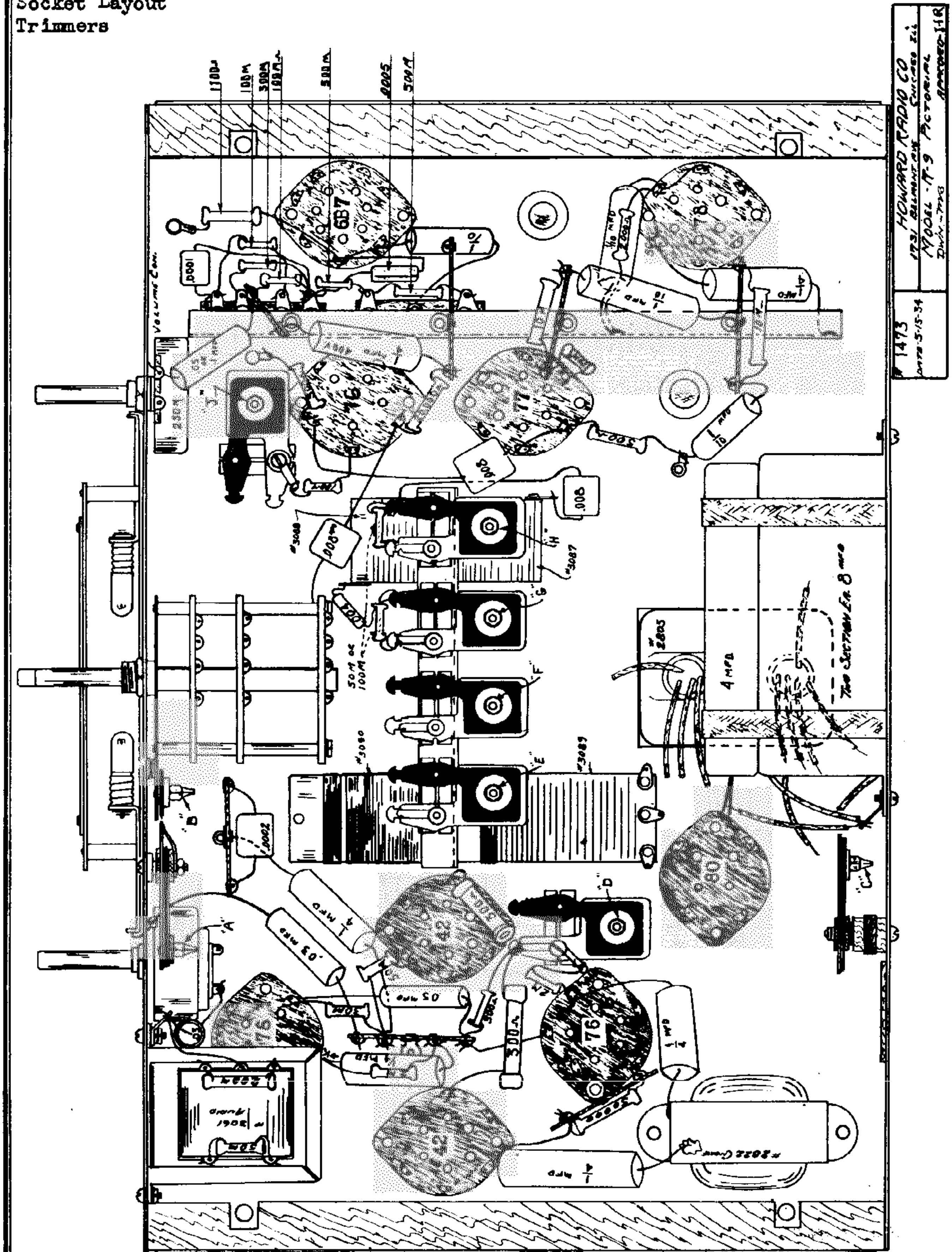
MODEL R-9
Schematic

HOWARD RADIO CO.



MODEL R-9
Parts Layout
Socket Layout
Trimmers

HOWARD RADIO CO.



HOWARD RADIO CO.

NOTES

(1) One of the sections of the gang condenser is not used.
(2) The two lower pilot light bulbs may be changed when necessary by loosening the screw holding the light bracket and it will pull out to the side. It is not necessary that the chassis be taken out of the cabinet.
(3) It is important that the chassis is made to float as freely as possible within the cabinet.
(4) When adjusting the oscillator circuits be sure to start on the right signal. The best procedure is to turn the trimmer all the way out and then pick the strongest signal when tuning in. If the oscillator happens to be on the wrong side, the set will be very insensitive around the center of the band.
(5) Keep the input low from the signal generator when making the various adjustments, to prevent overloading.

The alignment of the I.F.'s; the intermediate frequency is 465 KC and the stages are aligned in the customary manner by adjusting the trimmers in the top of the IF cans for the maximum deflection with 465 KC input.

The Alignment of the Oscillator Circuits;

Before making any adjustments be sure that the hand is directly over the first line above 550 (which would be about 540) when the variable condenser is turned to maximum capacity.

I Starting with the 1st Short Wave Band (1.6 to 4 Megacycles)
  (1) Set your signal generator to 4 MC.
  (2) Set dial to 4 MC.
  (3) Then peak oscillator Trimmer (lettered "F" on the pictorial diagram) to the signal.
  (4) Set generator to 1.6 MC.
  (5) Set dial to 1.6 MC.
  (6) Peak Oscillator Padding Condenser lettered "D" to signal.
  (7) Reset generator and dial back to 4 MC and check any variation.

II Second (2) S.W.Band, 4 to 12 MC.
  (1) Set Generator and dial to 12 MC. Peak Oscillator trimmer lettered "G" for 12 MC.
  (2) Cut down the signal generator to a very weak input in to the set, and adjust the RF trimmer lettered "J" at 12 MC.

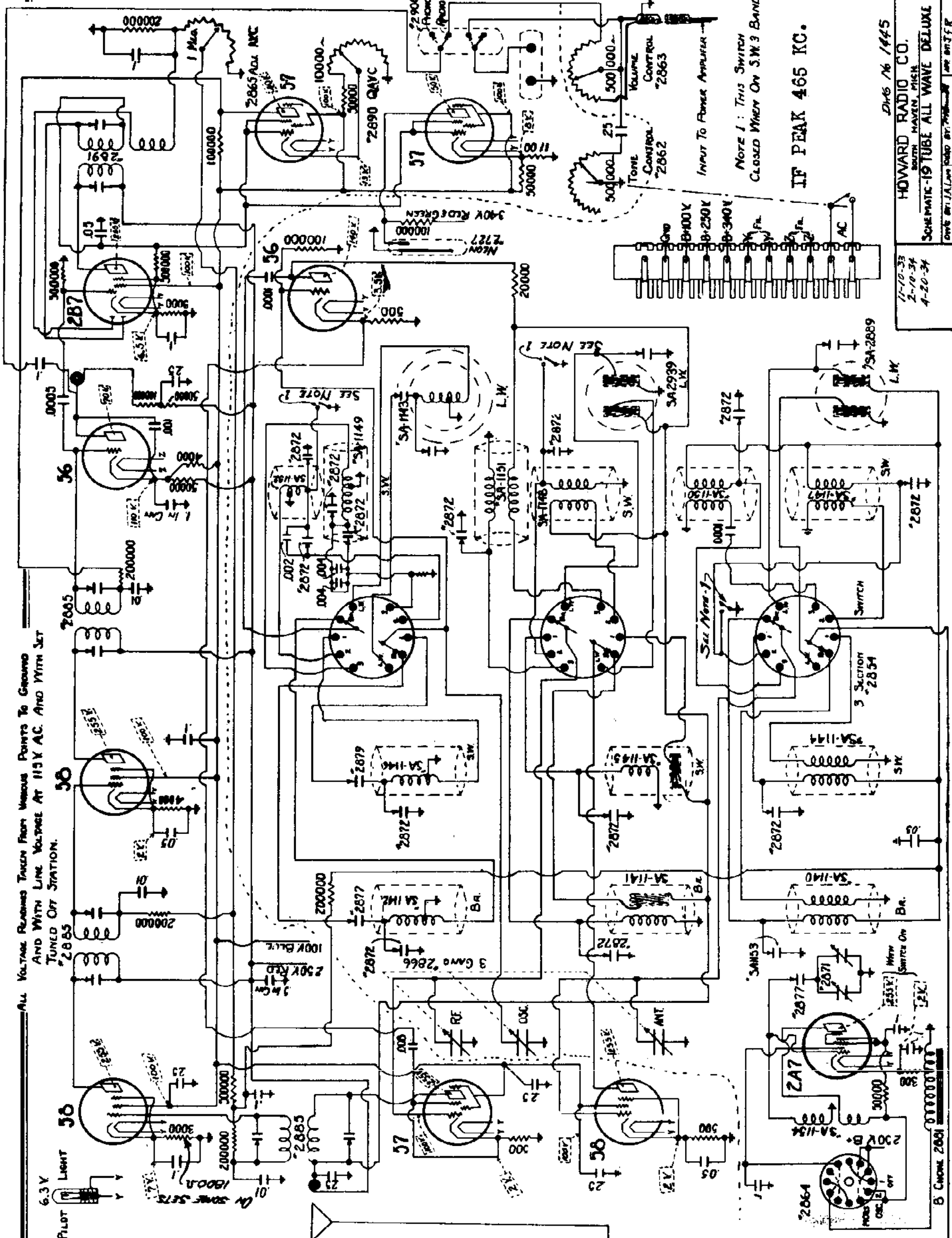
III The 3rd S.W.Band 10 to 22 MC.
  (1) Set generator and dial to 20 MC.
  (2) Peak Oscillator trimmer lettered "H" at 20 MC.

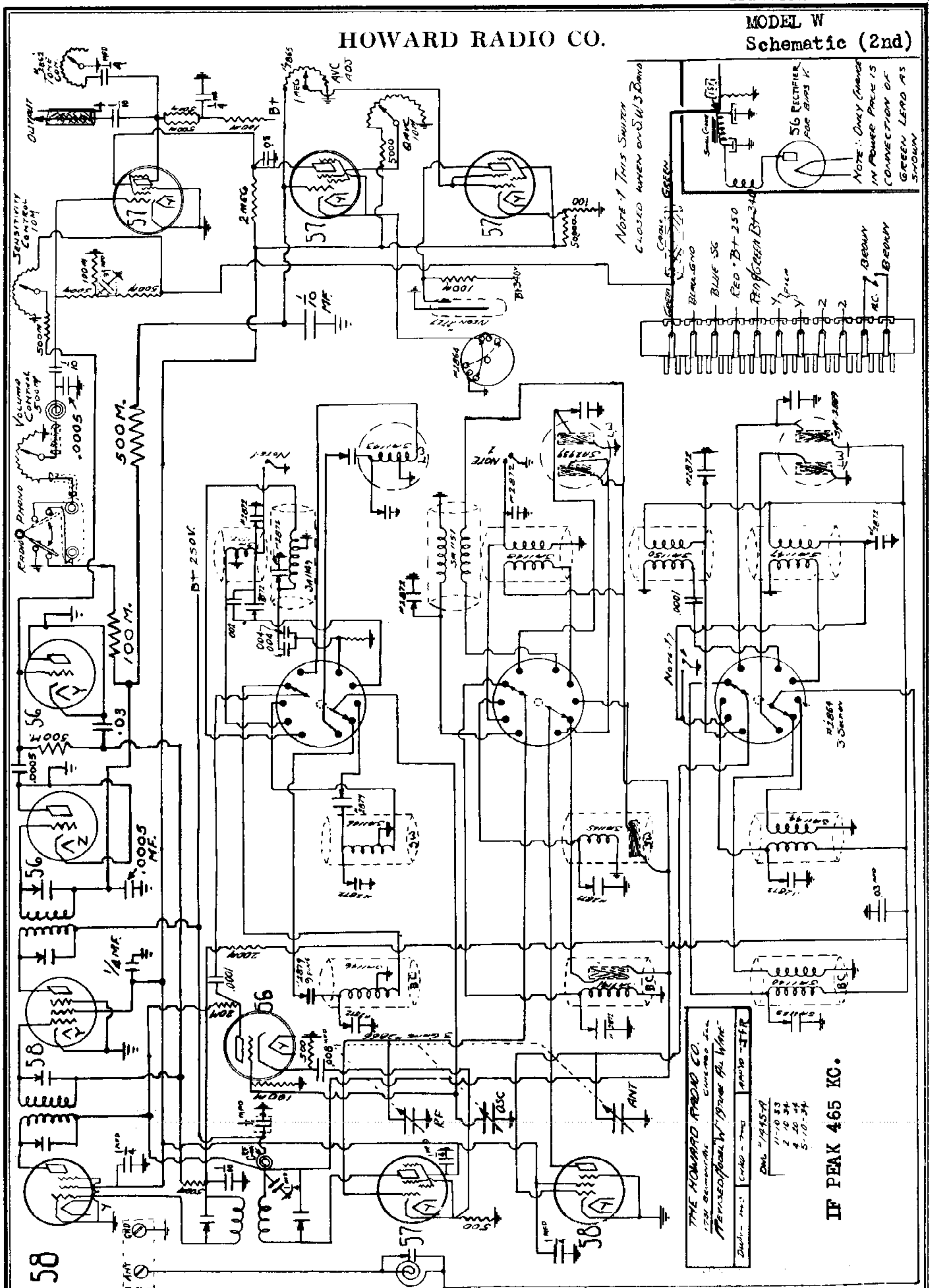
IV The Broadcast band is aligned by;
  (1) Adjusting trimmer "E" at 1400 KC.
  (2) Peak Padding Condenser "A" at 600 KC.
  (3) Adjust trimmer "B" across secondary winding of RF coil to peak at 1400 KC.

V The wave trap (Trimmer "C") is adjusted to a minimum setting with 465 KC fed in to the Antenna.

MODEL W
Schematic (1st)

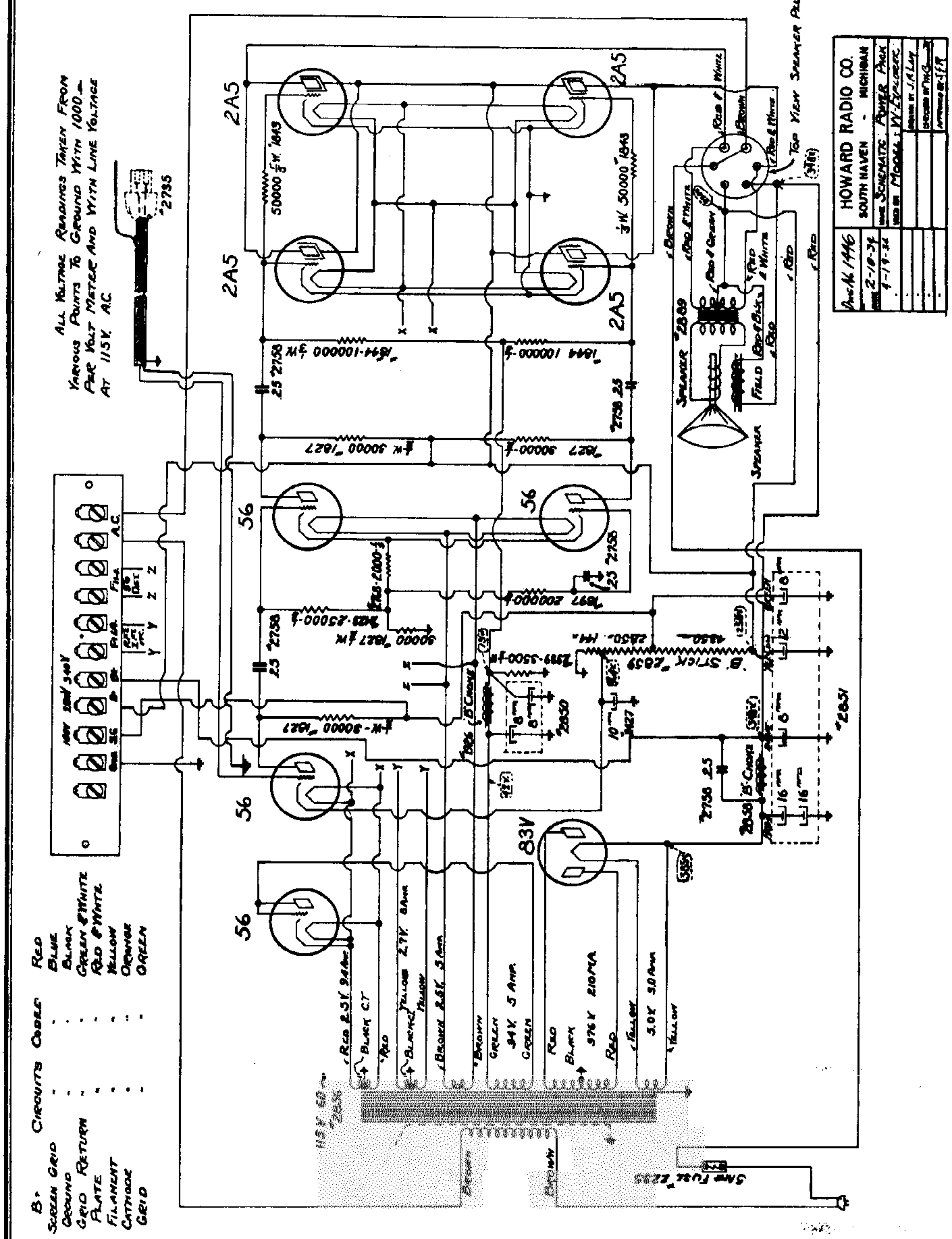
HOWARD RADIO CO.




HOWARD RADIO CO.
MODEL W
Schematic (2nd)
IF PEAK 465 KC.
500 M.
100 M.
B+ 250V.
.0005 MF.
1/4 MF.
1/10 MF.
THE HOWARD RADIO CO.
58
57
56

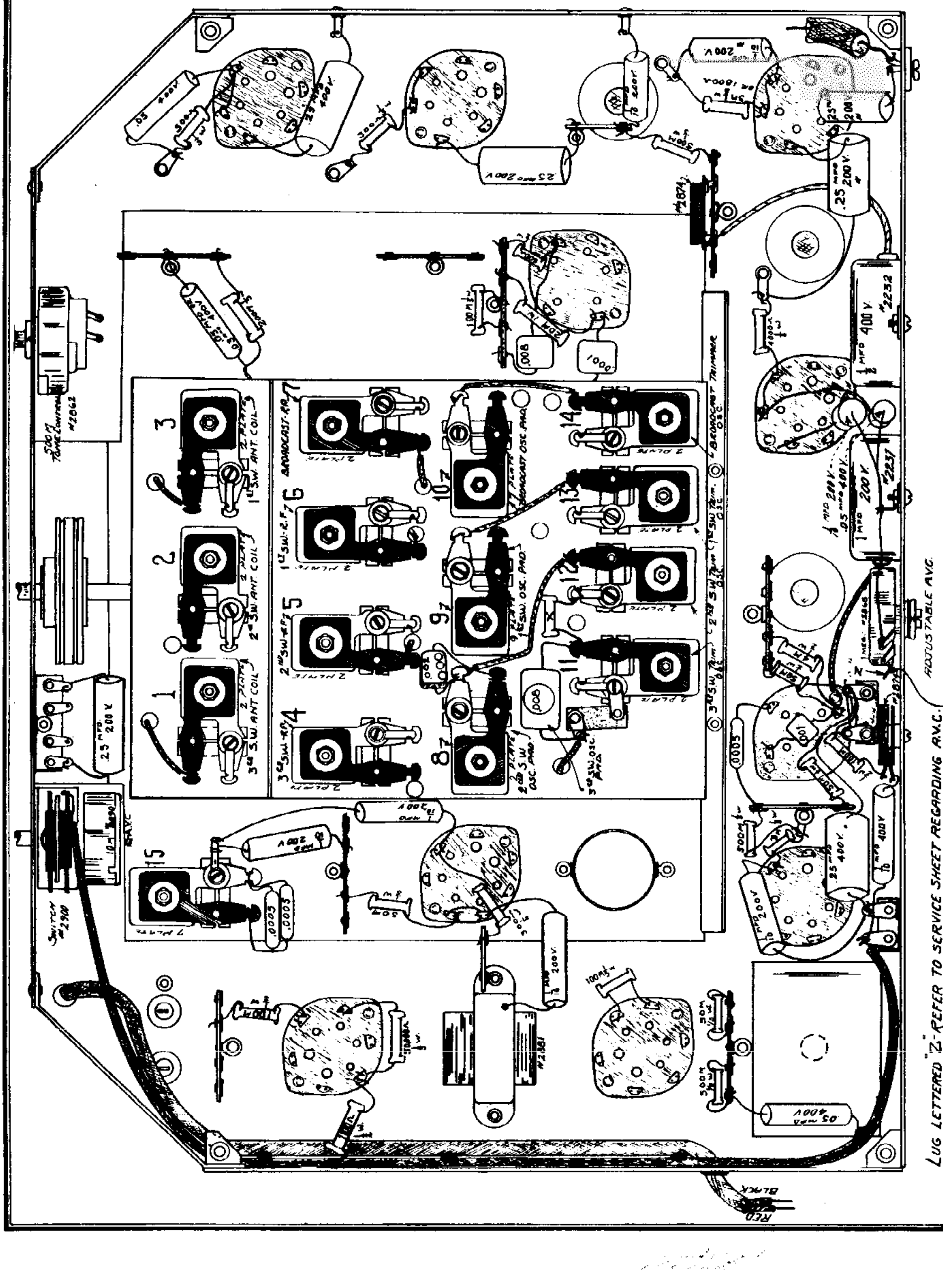
MODEL W
Power Amplifier
Schematic

HOWARD RADIO CO.



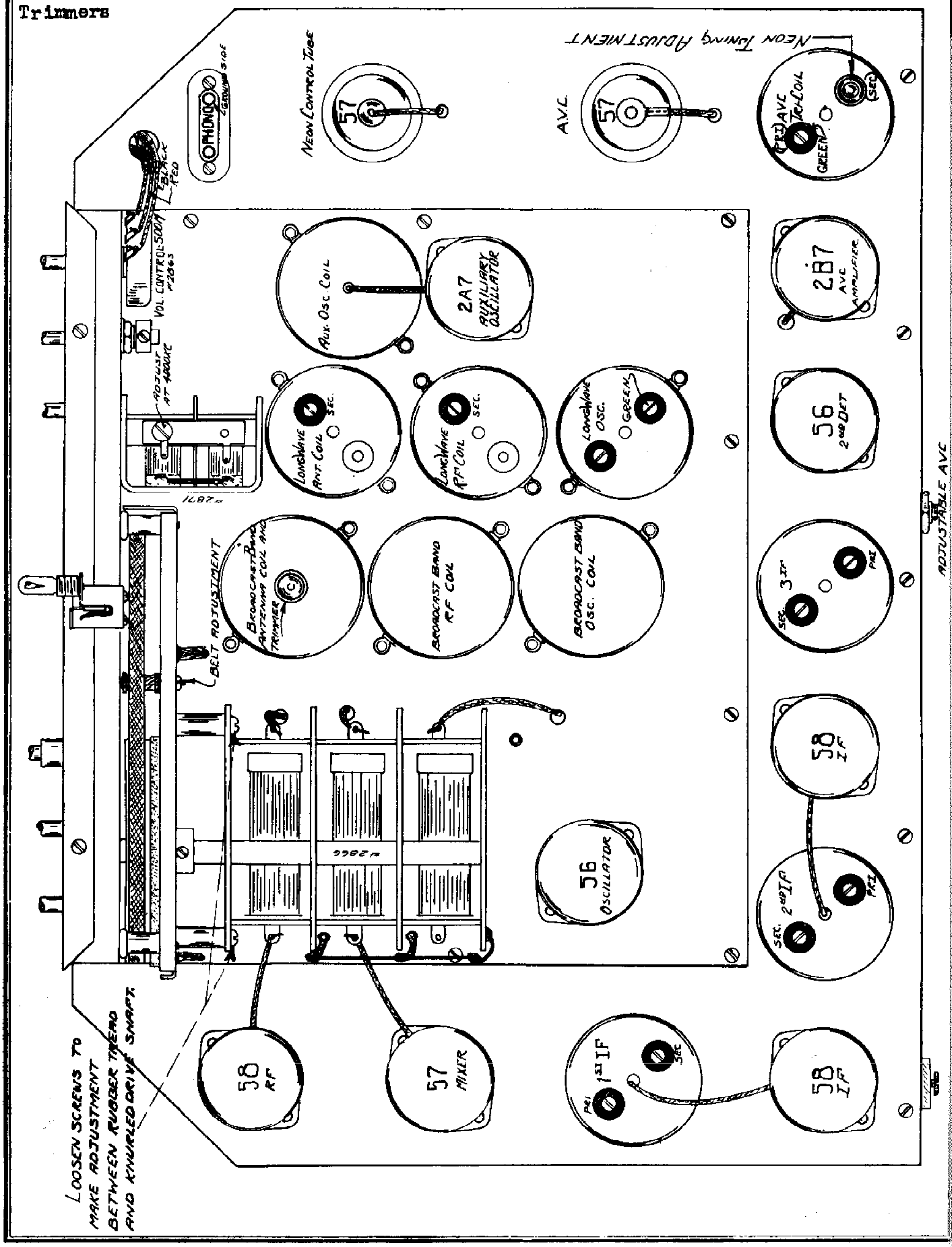
MODEL W
Receiver
Socket Layout
Trimmers

HOWARD RADIO CO.



MODEL W
Receiver
Socket Layout
Trimmers

HOWARD RADIO CO.



HOWARD RADIO CO.

There are two important things to keep in mind when adjusting *this receiver.*

1. Since all adjustments are made with AVC inactive, extreme care must be used to attenuate the input signal low enough so that there will be no overloading of tube amplifiers while making adjustments. If the input signal voltage is attenuated to the point where the speaker voice coil power does not exceed 50 or 75 milliwatts no trouble will be experienced from this source.

2. After the high frequency adjustments have been made on short wave bands, the test oscillator or generator should be advanced to 930 KC higher in frequency - the output voltage of generator advanced considerably and notice of the image signal of receiver oscillator falls at this point. In case this signal is not heard, the adjustment of the receiver oscillator has been incorrectly made. As an example:
   After the third shortwave band has been adjusted at 20 m.c. it should be possible to move the test oscillator to 20, 930 KC and hear the signal.

6. THE ALIGNMENT OF THE FREQUENCY METER

(a) Turn main dial to where 4800 KC comes in. This may be checked by your signal generator. The signal generator is not used, however, in aligning the Frequency Meter.
(b) Make certain the hand on the Frequency Meter falls on 1.5 when the 2-gang condenser is at full capacity.
(c) Turn the oscillator switch all the way to the right to the Modulator position.
(d) Turn frequency dial to 4 and adjust the trimmer on the two-gang variable condenser to resonance with the main dial setting.
(e) Turn band indicator switch to first short wave band (1.5 to 3.5)
(f) Set the main dial to where 1500 KC comes in, which is at the .55 figure (as mentioned before).
(g) Turn frequency dial to 1.5 and adjust Trimmer No. 15 for maximum signal.

7. AVC ADJUSTMENT

Looking at the bottom view drawing #1416, there will be noted a terminal of the AVC control marked "Z". Connect the negative terminal of a high resistance voltmeter (1000 ohms per volt at least, using a medium voltage scale) to this terminal marked "Z". Connect the positive side of voltmeter to chassis ground.

Adjust the receiver to a signal having approximately two or three thousand microvolt intensity (Note: a fairly powerful local station may also be used for this).

In the top of the coil can assembly in upper right hand corner (facing rear of tuner) will be found an adjustment. This adjustment is the one located in top next to neon adjustment.

Watching voltmeter, set the above adjustment with insulated screw driver until a maximum reading is obtained on voltmeter.

The AVC circuit has been fundamentally adjusted by the above procedure and should be set for the locality in which set is to be operated, in accordance with adjustment number 8.

8. AVC ADJUSTMENT FOR VARIOUS LOCALITIES

In certain localities especially close to a broadcast station, it may be necessary to readjust the AVC (slotted shaft) control.

In order to properly make this adjustment, tune the receiver in exact resonance with the most powerful station to be received. Then if the station's signals sound "fringy" or rough, turn the control to the right until this condition stops. Do not turn this control beyond this point.

9. NEON TUNING INDICATOR

Facing the back of tuner chassis, extending through one of the tall shielded assemblies in the upper right hand corner, will be found a small black knurled knob. This knob is used to adjust the Neon resonance indicator. Due to the fact that in some localities the signal strength from certain stations varies somewhat, it is advantageous to be able to set this adjustment.

At the time of day during which the station signals are the most powerful (usually in the evening) adjust the receiver dial to a powerful station, then turn the neon adjustment until the light just fills the opening in arrow of dial. Then readjust the tuning dial of receiver. Should the light become more brilliant, leave the dial at point of highest brilliancy and again readjust neon indicator until it just fills the arrow opening.

A little practice will enable the user to set this indicator to meet the individual requirements.

When once adjusted for the locality in which the receiver is to be used, it should not have to be readjusted.

Since the inter-station silent tuning system is a proportional function of the neon light, the inter-station silent tuning system will be correctly adjusted.

The neon light system is not intended to work on the short wave stations. However, on the more powerful signals it will generally give an indication of resonance.

THE PROCEDURE TO ALIGN THE I.F. STAGES

The IFs are aligned in the usual system of feeding the intermediate frequency of 465 KC into the grid of the 57 1st Detector tube.

Make certain that the AVC adjustment (which is the slotted shaft extending from the back of the chassis) is turned all the way to the left when gaining the IF, RF or oscillator circuits.

The two trimmers in each of the three IF Coil Cans should be very carefully tuned to resonance as they are very critical and will greatly affect the performance of the receiver.

The sensitivity of the IF stages should be between 10 and 20 Microvolts.

ALIGNING THE R.F. AND OSCILLATOR CIRCUITS

After the IFs are aligned, the various circuits may be aligned in the order given below.

Keep the AVC adjustment all the way off to the left as before.

It is not necessary that the oscillator be taken out of its socket when aligning any of the RF circuits.

Always adjust the oscillator stage before the RF in any particular band.

Be sure to start on the right signal when adjusting the oscillator trimmer. The best procedure is to turn the trimmer all the way out and then pick the strongest signal when turning in. If the oscillator happens to be on the wrong side, the set will be very insensitive around the center of the dial.

The plates on the variable condenser should be bent to make the KC readings on the dial line up ONLY on the Broadcast Band.

Before adjusting any band, make certain that the pointer of the station indicator is set on the last black line when the dial is turned all the way to the left on the broadcast band just above .55 — at this point the variable condenser should be all the way in to maximum capacity.

1. THE LONG WAVE

(a) Turn the band indicator to .15 to .35
(b) Set dial to .35
(c) Feed 350 KC into the antenna post and adjust the trimmer in the long wave oscillator can for resonance. The correct trimmer for this adjustment is the one that is not green coded on the trimmer washer. (Refer to pictorial diagram, top view).
(d) Adjust RF and antenna stages. There is only one trimmer for each.
(e) Rotate dial to just above .17 and adjust the oscillator trimmer that is coded green, for resonance with 175 KC.
(f) Recheck the 350 KC setting.

2. THE BROADCAST BAND

It is necessary on the broadcast band only that a metal bottom with holes in line with the trimmer nuts be used so that the circuits will not be detuned when the regular bottom plate is screwed back on.

(a) Turn band indicator to Broadcast .55 to 1.5
(b) Set dial to 1.4
(c) Feed in 1400 KC and adjust trimmer No. 14 (see pictorial diagram, bottom view) for resonance.
(d) Adjust RF and antenna stages. The RF is No. 7, and the Antenna Trimmer consists of the knurled knot extending from the top of the Antenna Coil Can.
(e) Rotate dial to .55 and adjust trimmer No. 10 for resonance with 550 KC.
(f) Recheck the setting at 1400 and bend plates of variable condenser at 950 or other points where necessary for KC reading on dial.

3. THE FIRST SHORT WAVE BAND

(a) Turn band indicator to 1.5 to 3.5.
(b) Set dial to 3.5
(c) Feed in a 3500 KC signal and adjust Trimmer No. 13 for resonance.
(d) Adjust RF and Antenna stages, Trimmers Nos. 3 and 6
(e) Rotate dial to where the hand points to .55 on the broadcast band. The dial calibration may be found to be slightly off at this point and the .55 figure corresponds to 1.5 on the First Short Wave Band. Feed in 1500 KC and adjust Trimmer No. 9 for Resonance.
(f) Recheck setting at 3500 KC.

4. THE SECOND SHORT WAVE BAND

(a) Turn band indicator to 3.5 to 9
(b) Set dial to about 8.9. The calibration is slightly off at this point and the 8.9 figure corresponds to 8.5
(c) Feed in 8500 KC and adjust Trimmer No. 12 for resonance
(d) Adjust RF and Antenna stages with Trimmers Nos. 3 and 2
(e) Rotate dial to 3.5 and adjust Trimmer No. 8 for resonance with 3500 KC
(f) Recheck setting at 8.5 (8.9).

5. THE THIRD SHORT WAVE BAND

(a) Turn band indicator to 9 to 21
(b) Set the dial to 20
(c) Feed in 20000 KC signal and adjust oscillator trimmer No. 11 for resonance
(d) Adjust RF and Antenna stages, trimmers Nos. 1 and 4
(e) The alignment at 9 is obtained by use of the fixed condensers. This should not require any change.
(f) In order to make the band more sensitive where most of the foreign reception is obtained, it is advisable to turn the dial to 12 on the third band and readjust the Antenna coil trimmer (No. 1) to peak at 12000 KC.

HOWARD RADIO CO.

10. THE POWER AMPLIFIER

The Power Amplifier schematic diagram will clearly give all information that is needed from a servicing standpoint.

The tuner is coupled to the Audio by the 56 tube, resistance coupled to two 56 drivers into the four push-pull parallel 2A5s.

The rectifier circuit uses the 83V tube for the B Supply.

However, the bias voltage for the 2A5s is obtained by an additional rectifying circuit comprising the 56 tube and additional choke and filter.

11. VARIOUS MECHANICAL ADJUSTMENTS

(a) The adjustment of the white fabric drive belt is very easily made tighter or looser by use of a socket wrench to turn the nut holding the idler pulley stud which is adjustable in the slot (see pictorial diagram). Pushing the stud upward tightens the belt, and downward loosens the tension of the belt. There is no necessity for making this belt real tight, as the belt is under no load -- only the dial disc -- it is advisable to just take out the slack.

(b) Adjustment of the rubber tread drum against the knurled drive shaft is accomplished by loosening the screws holding the variable condenser spacers (see pictorial diagram).

It is advisable to loosen and reset the fabric belt as mentioned above after making this adjustment, since the changing of one will affect the other.

The right tension between the drum and the knurled shaft can be easily determined by turning the condenser to one extreme rotation and adjusting the space just so it will pull the drive mechanism. Too much pressure will cause too much work between the rubber and shaft, resulting in slippage of the drive on slow speed. Too little pressure of course will result in slippage at any speed.

(c) For other drive adjustments, remove the Escutcheon Plate three screws on top, five along bottom -- to adjust the drive discs, if necessary.

12. NOTES:-

(1) The replacement parts list is given on the last sheet of this manual.

(2) On some of the models the dual speed is accomplished by use of a push-pull knob instead of a double knob.

(3) The first terminal lug next to the ground terminal on the 11 terminal strip is not used.

(4) The resistance value of the resistor marked "X" on the pictorial diagram may be of different values, since it is placed there to reduce tendency of oscillations in the Third Short Wave Band.

(5) On one series of sets a single shielded wire is used to couple tuner to amplifier. The later sets use a double shielded wire. The red wire is the feed wire to the amplifier, and the black is ground and connects directly from the volume control to the ground lug within the power pack. This provides a better ground connection in addition to the shielding.

(6) Should the receiver blow fuses easily the 83V tube should be checked the first thing.

REPLACEMENT PARTS LIST OF "W" (EXPLORER) TUNER

Part No.	Name	Amt. Per Unit	Price Ea.
2885	1st IF complete	1	$ 1.10
2885	2nd IF complete	1	1.10
2885	3rd IF complete	1	1.10
2891	Tri Coil Assembly complete	1	1.10
SA1140	Broadcast Antenna Coil complete	1	1.10
SA1141	Broadcast RF Coil complete	1	1.00
SA1142	Broadcast OSC Coil complete	1	1.10
SA1144	Short Wave #1 Band Antenna Coil	1	.90
SA1145	Short Wave #1 Band RF Coil	1	.90
SA1146	Short Wave #1 Band OSC Coil	1	.90
SA1147	Short Wave Band #2 Antenna Coil	1	.90
SA1148	Short Wave Band #2 RF Coil	1	.90
SA1149	Short Wave Band #2 OSC Coil	1	.90
SA1150	Short Wave Band #3 Antenna Coil	1	.85
SA1151	Short Wave Band #3 RF Coil	1	.85
SA1152	Short Wave Band #3 OSC Coil	1	.85
SA1154	Auxillary OSC Coil	1	.75
S.2889	Long Wave Antenna Coil Assembly	1	1.10
SA2939	Long Wave RF Coil Assembly	1	1.10
SA1143	Long Wave OSC Coil Assembly	1	1.20
2872	Two Plate Trimmer	12	.25
2877	Seven Plate Trimmer	2	.35
2879	Nine Plate Trimmer	1	.35
2864	Oscillator Switch	1	.30
2863	Volume Control 500,000 ohms	1	.75
2890	10,000 ohm Noise suppressor	1	.75
2862	500,000 Ohm tone control and switch	1	1.00

MODEL W
Parts List

HOWARD RADIO CO.

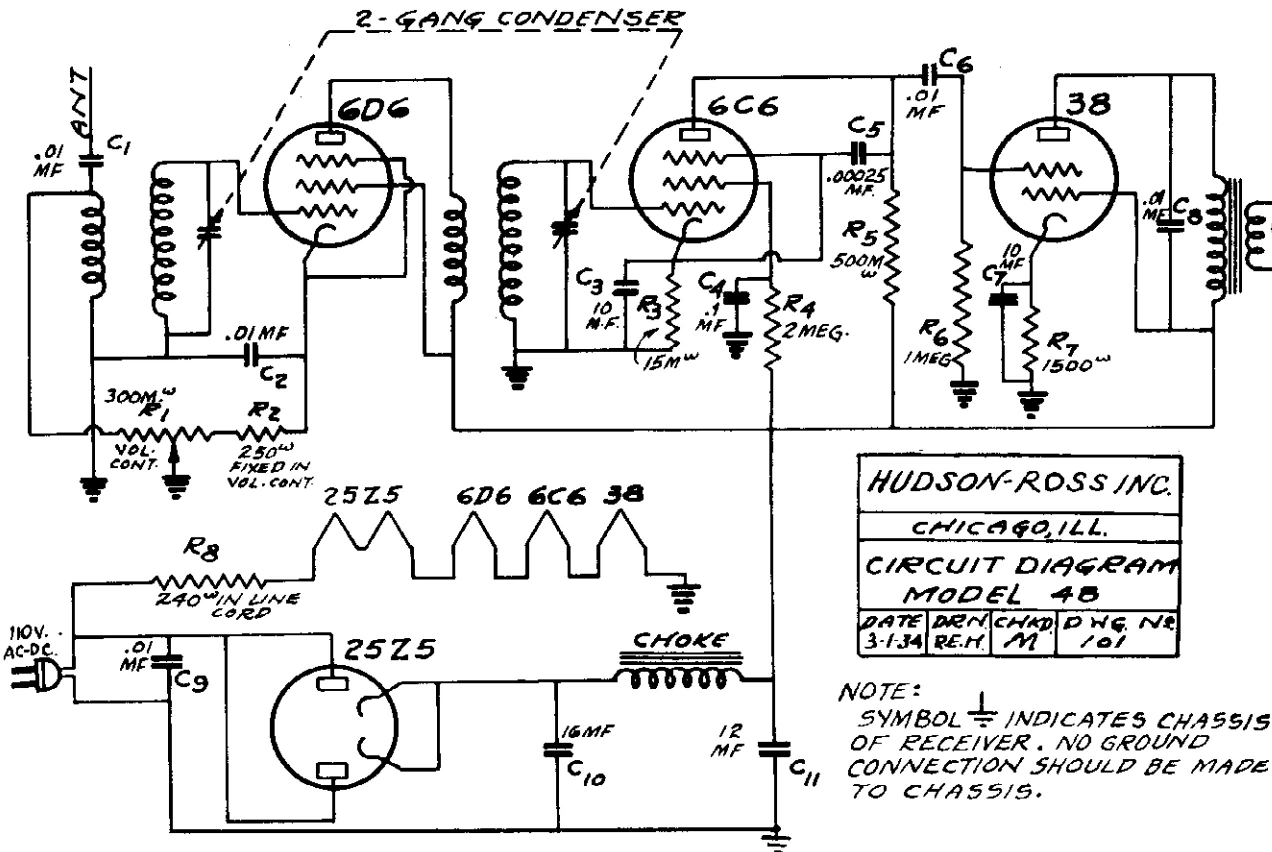
Part No.	Name	Amt. Per Unit	Price Ea.
2384	1/4 mfd. 200 volt Paper Condenser	4	.25
2758	1/4 mfd. 400 volt Paper Condenser	2	.25
2378	1/10 mfd. 200 volt Paper Condenser	8	.20
2756	1/10 mfd. 400 volt Paper Condenser	1	.20
2757	.05 mfd. 400 volt Paper Condenser	4	.20
1767	.01 mfd. 200 volt Paper Condenser	3	.20
2759	.03 mfd. 200 volt Paper Condenser	1	.20
2231	1 mfd. 200 volt Paper Condenser	1	.60
2232	1/2 mfd. 400 volt Paper Condenser	1	.60
2287	.002 Mica Condenser	1	.25
2381	.0001 Mica Condenser	2	.20
2419	.008 Mica Condenser	2	.35
1801	.001 Mica Condenser	1	.20
2422	.0005Mica Condenser	3	.20
2763	500,000 Ohm 1/5 watt Resistor	3	.15
1897	200,000 Ohm 1/5 watt Resistor	5	.15
1844	100,000 Ohm 1/5 watt Resistor	2	.15
1873	100,000 Ohm 1/2 watt Resistor	3	.15
1843	50,000 Ohm 1/5 watt Resistor	3	.15
1747	50,000 Ohm 1/2 watt Resistor	2	.15
1772	20,000 Ohm 1 watt Resistor	1	.20
2274	4,000 Ohm 1/2 watt Resistor	1	.15
1956	4,000 Ohm 1/5 watt Resistor	1	.15
1835	3,000 Ohm 1/5 watt Resistor	1	.15
2383	3,000 Ohm 1/2 watt Resistor	1	.15
1829	1,800 Ohm 1/2 watt Resistor	1	.15
2375	1,100 Ohm 1/2 watt Resistor	1	.15
2774	500 Ohm 1/5 watt Resistor	1	.15
2206	500 Ohm 1/2 watt Resistor	2	.15
2761	300 Ohm 1/5 watt Resistor	1	.15
2871	Two Gang Variable	1	2.50
2866	Three Gang Variable	1	3.00

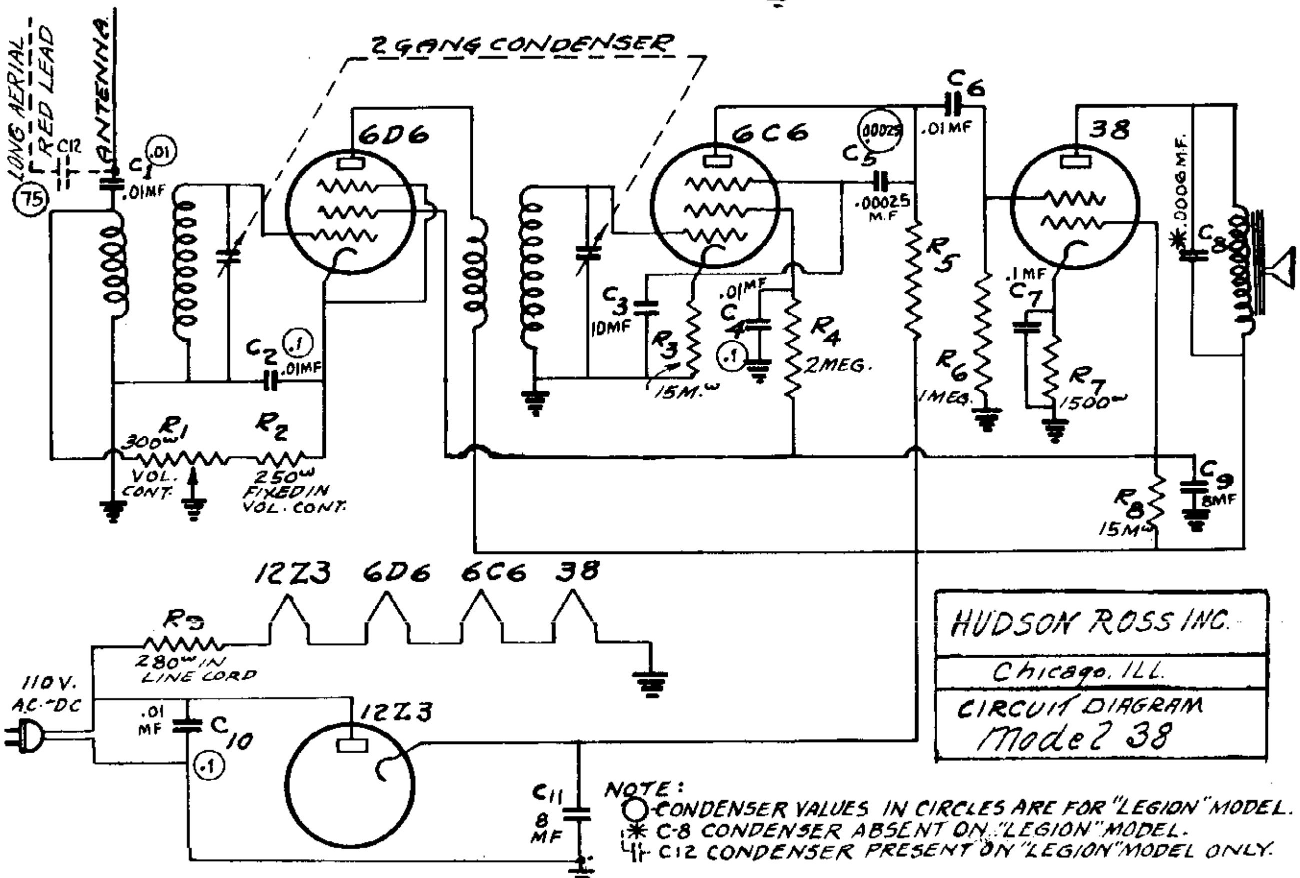
REPLACEMENT PARTS LIST OF POWER AMPLIFIER

Part No.	Name	Amt. Per Unit	Price Ea.
2856	Power Transformer, 110 volt 60 cycle	1	$ 7.50
2235	5 Amp. Fuse	1	.10
2859	"B" Voltage Divider	1	.70
2851	Filter Block 4 Section	1	7.00
2850	Filter Condenser 2 Section	1	2.00
2427	10 mfd. Electrolytic Condenser	1	.75
1926	Small "B" Choke	1	1.00
2858	Large "B" Choke	1	2.00
2758	1/4 mfd. Condenser 400 volt	5	.25
1827	30,000 Ohm 1/2 watt Resistor	4	.15
2423	25,000 Ohm 1/5 watt Resistor	1	.15
2768	2,000 Ohm 1/5 watt Resistor	1	.15
2339	3,500 Ohm 1/2 watt Resistor	1	.15
1897	200,000 Ohm 1/5 watt Resistor	1	.15
1844	100,000 Ohm 1/5 watt Resistor	1	.15
1843	50,000 Ohm 1/5 watt Resistor	2	.15
2980-C	Speaker Cone for the "Ortho"	1	1.00
2980-T	Speaker Transformer	1	2.00
2980-P	Speaker - 6 prong plug	1	.25

MODEL 38 Schematic
MODEL 48 Schematic

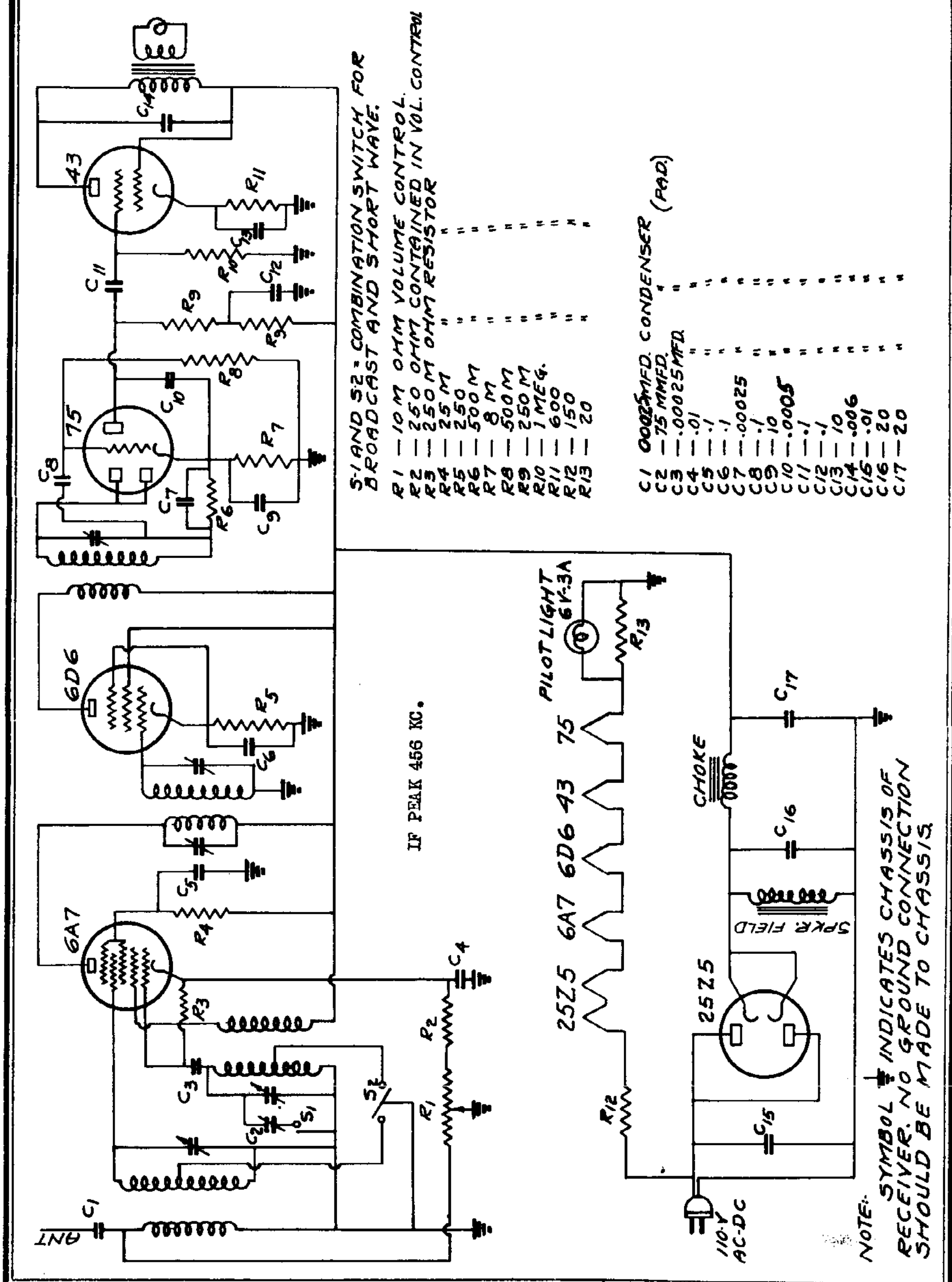
HUDSON-ROSS, INC.





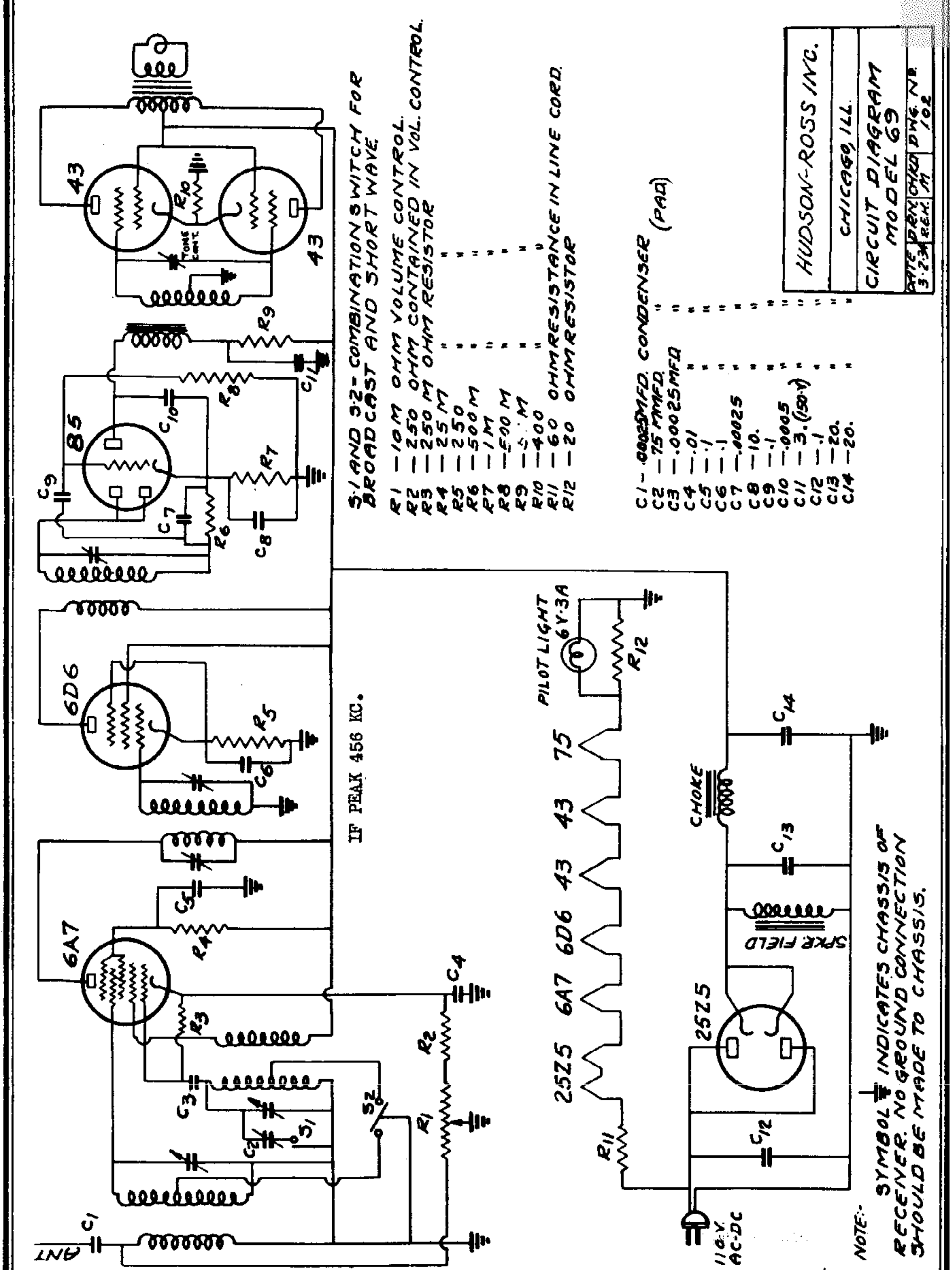
MODEL 59
Schematic

HUDSON-ROSS, INC.



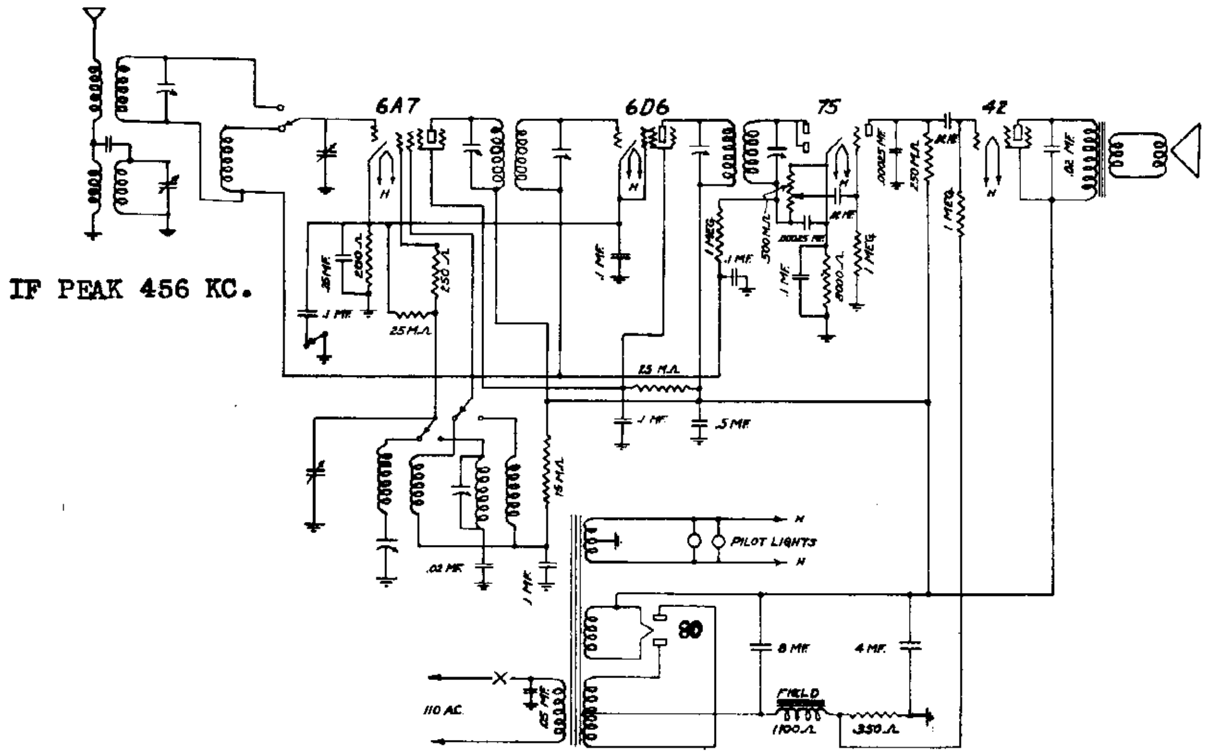
MODEL 69
Schematic

HUDSON-ROSS, INC.



MODEL 80
Schematic,Parts

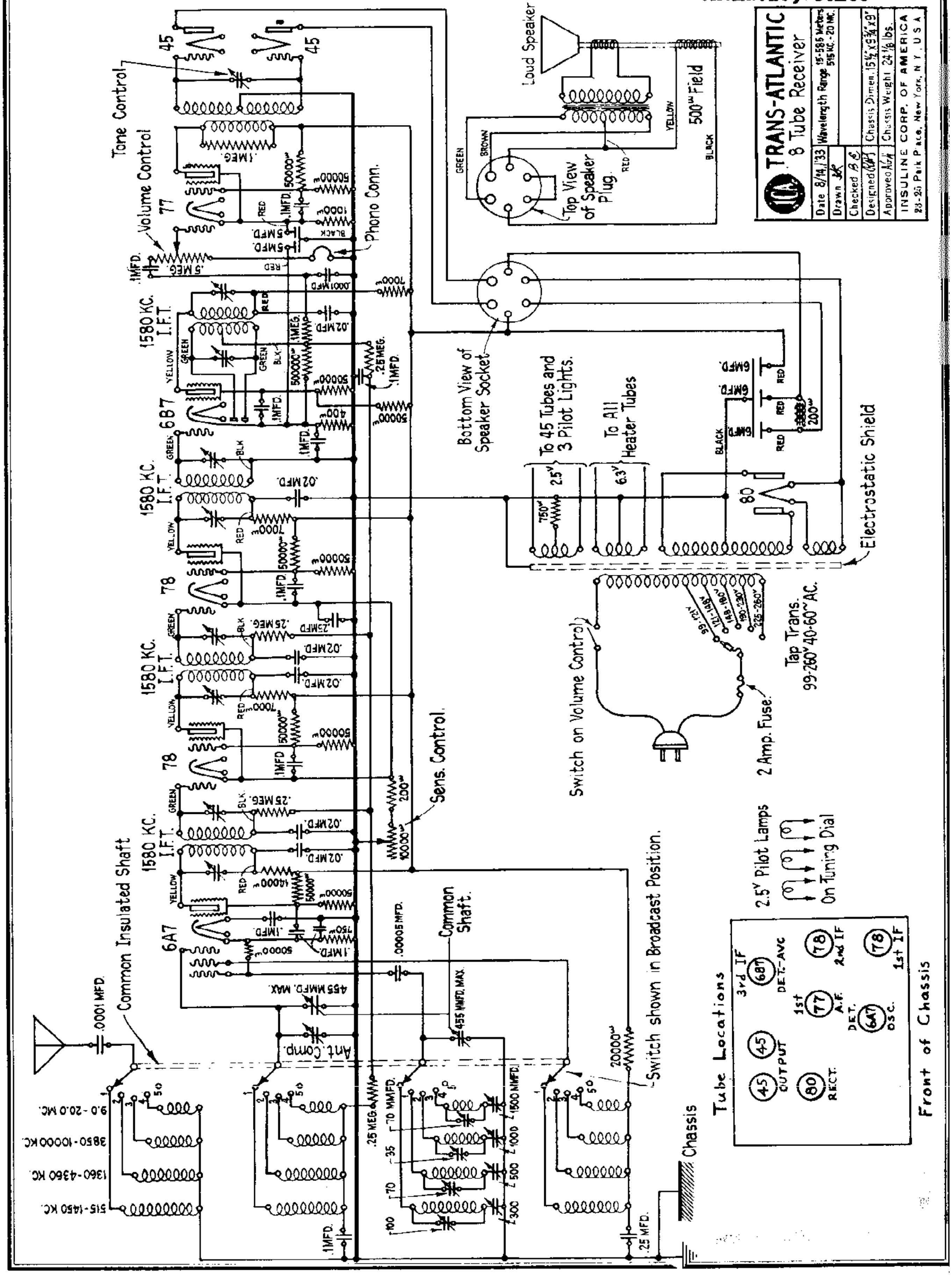
HUDSON-ROSS, INC.



PART NO.	DESCRIPTION
701	FILTER CONDENSER
702	.1 BY-PASS CONDENSER
703	.05 " "
704	.02 " "
705	.25 " "
706	.5 " "
707	.00025 " "
708	1-WATT RESISTOR
709	MISCELLANEOUS RESISTORS(SPECIFY VALUES)
717	350 OHM POWER RESISTOR
718	VOLUME CONTROL
719	SHORT WAVE AND BROADCAST SWITCH
720	OSCILLATOR COIL 456 KC
723	CORD AND PLUG
733	POWER TRANSFORMER
738	3-GANG CONDENSER
739	1ST I F TRANSFORMER
740	2ND I F TRANSFORMER
741	PRE SELECTOR COIL
745	PILOT LAMP
749	TRIMMER
751	KNOB (LARGE)
751-A	KNOBS
754	PILOT LIGHT SOCKET
758	SPEAKER
758-A	SPIDER AND VOICE COIL
758-B	6" DIAPHRAM
762	S.W. OSCILLATOR COIL
763	ANTENNA S.W. OSCILLATOR COIL
767	DIAL DRIVE DISC
768	CELLULOID DRIVE DISC
769	DIAL FACE
777	DIAL POINTER
779	CONVEX DIAL CRYSTAL

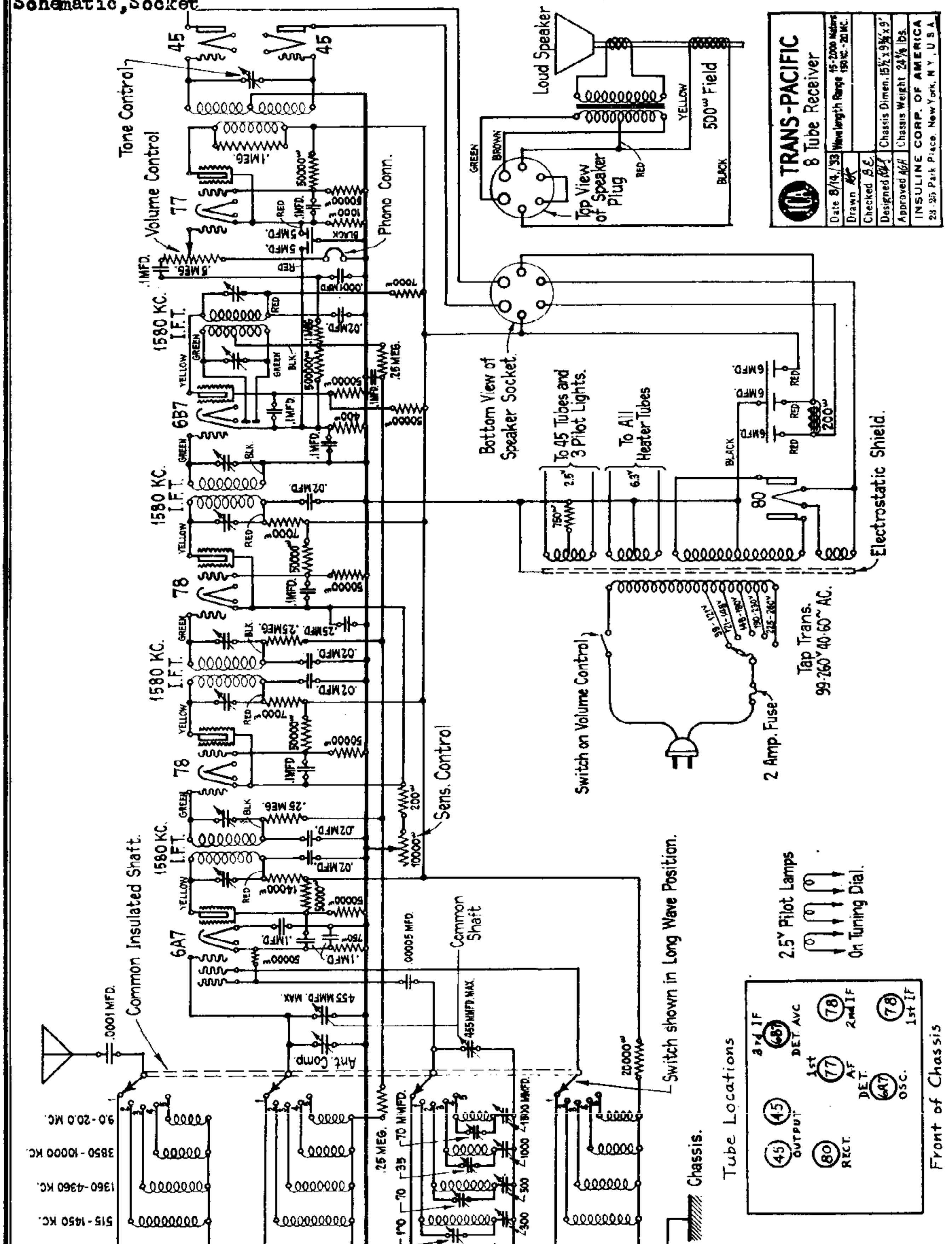
INSULINE CORP. OF AMERICA

MODEL "Trans-Atlantic"
Schematic, Socket



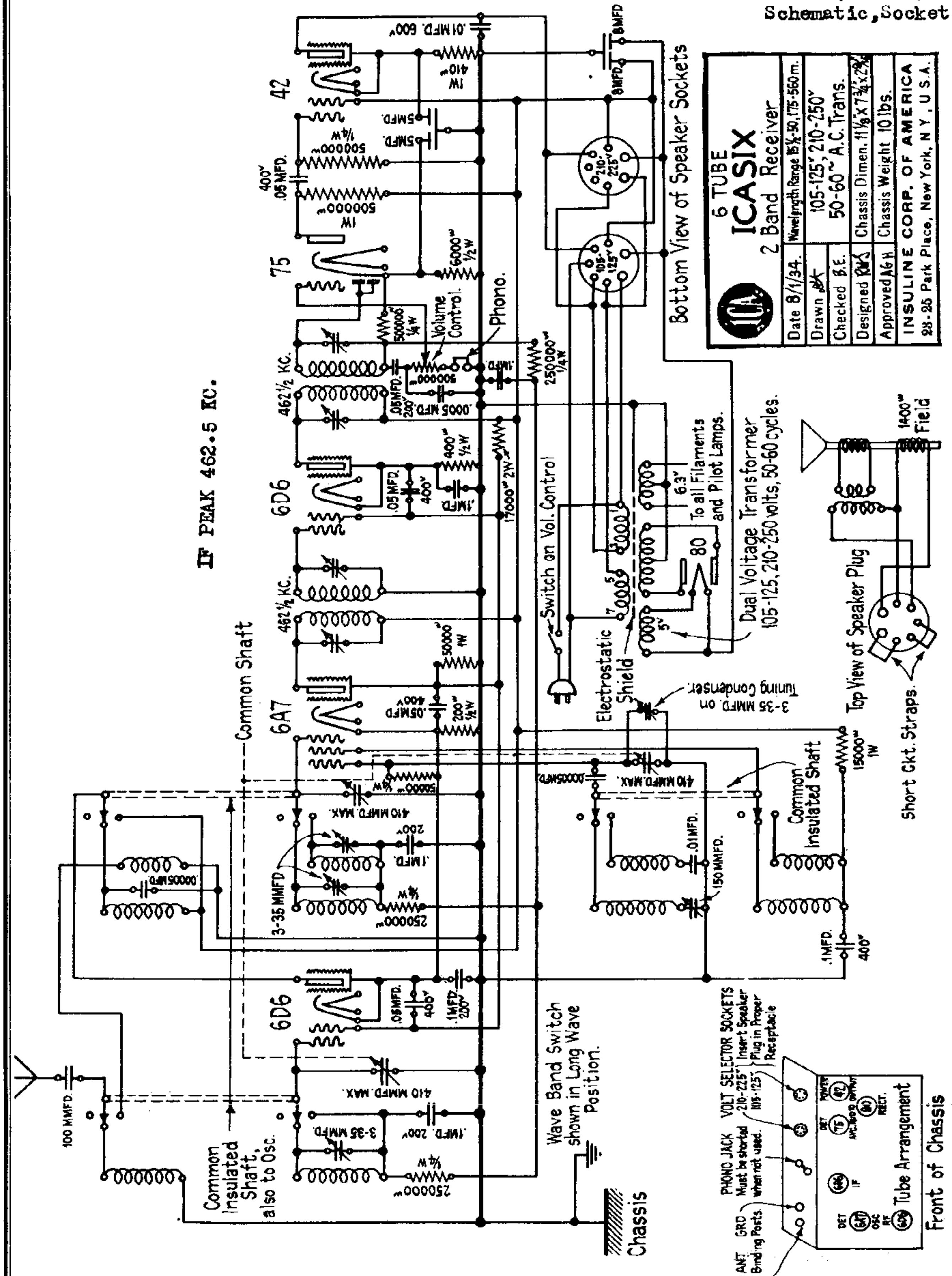
MODEL "Trans-Pacific"
Schematic, Socket

INSULINE CORP. OF AMERICA



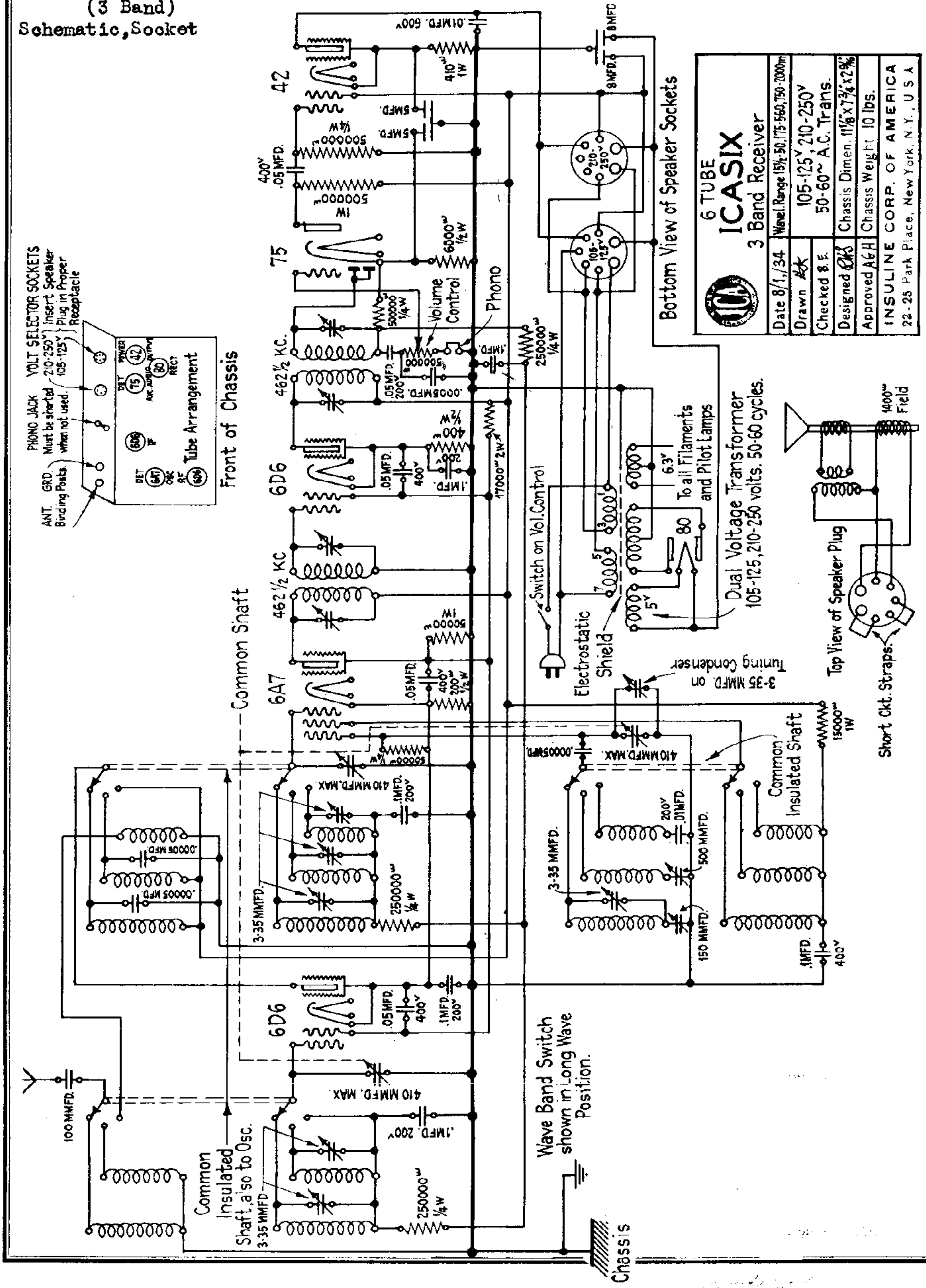
MODEL "Icasix"
(2 Band)
Schematic, Socket

INSULINE CORP. OF AMERICA



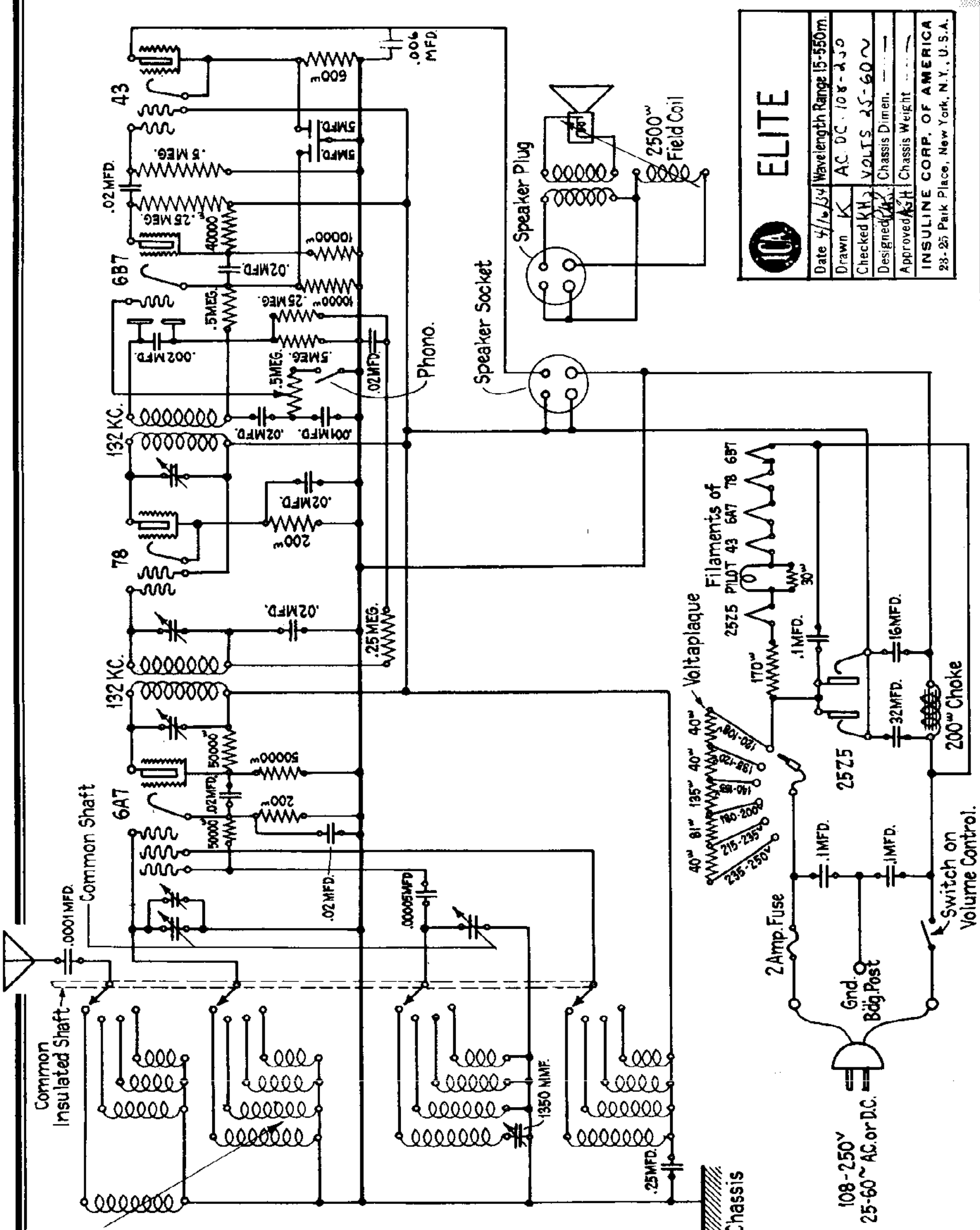
MODEL "Icasix"
(3 Band)
Schematic, Socket

INSULINE CORP. OF AMERICA



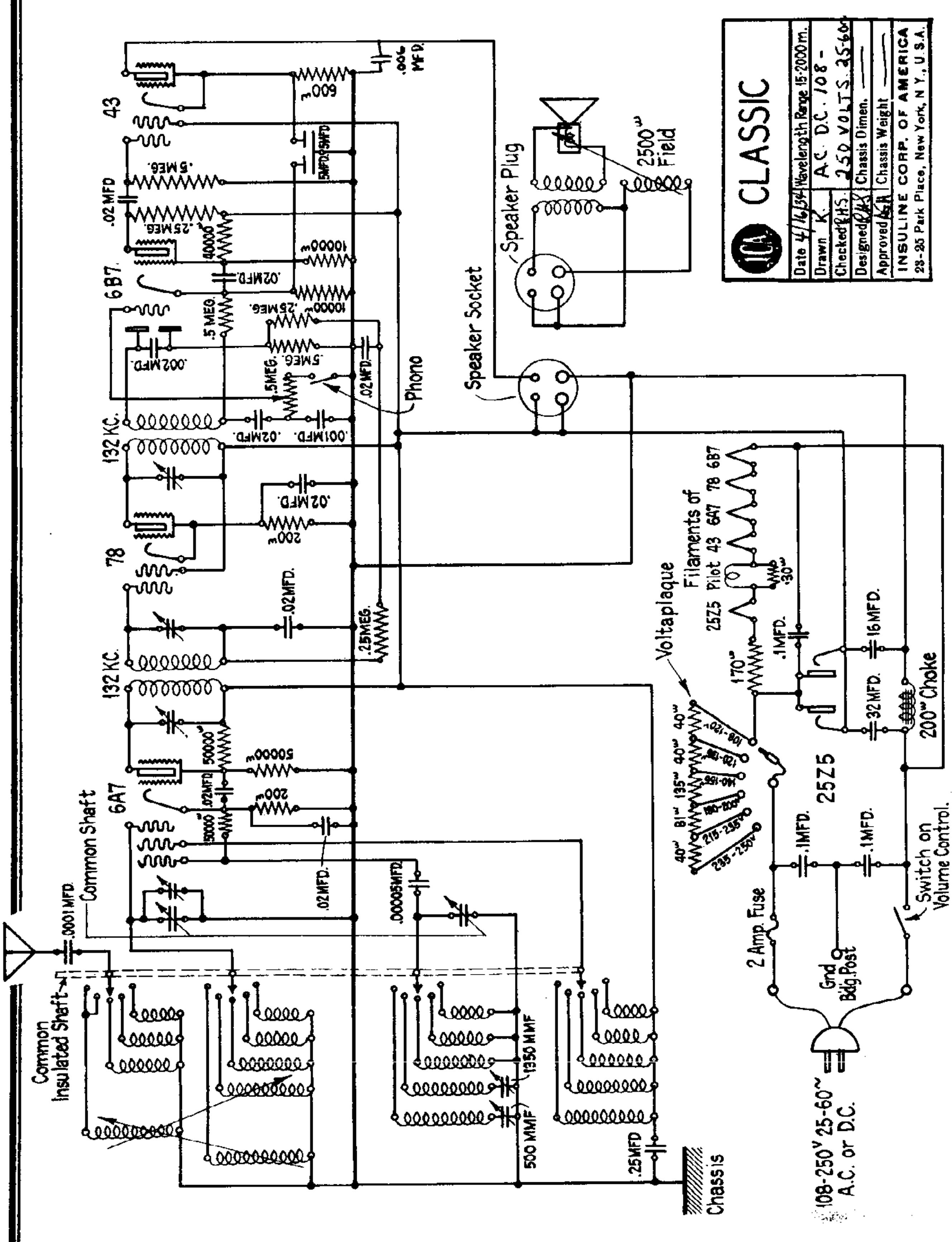
MODEL "Elite"
Schematic

INSULINE CORP. OF AMERICA



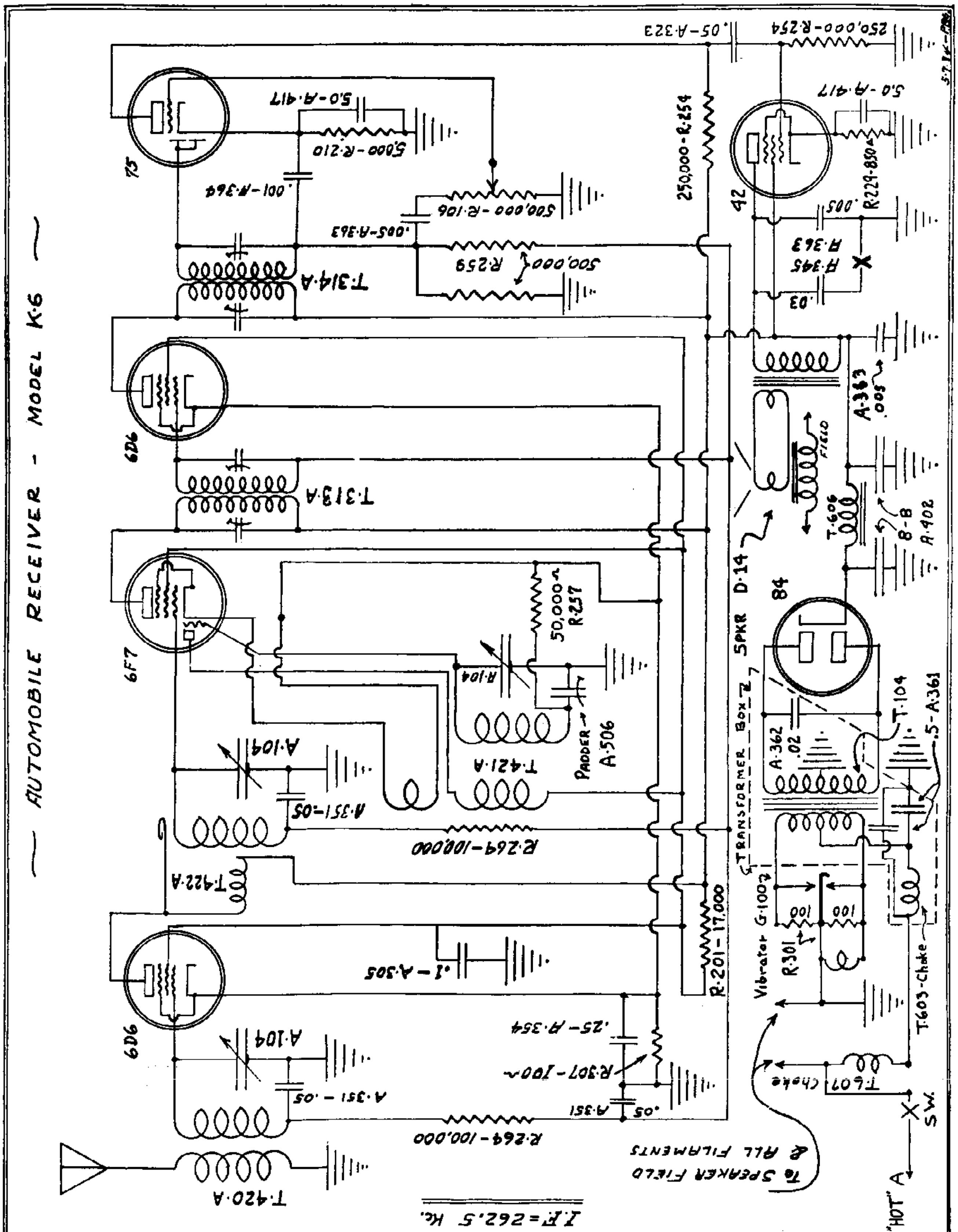
MODEL "Classic"
Schematic

INSULINE CORP. OF AMERICA



MODEL K-60 (K-6)
(St.Regis)
Schematic

INTERNATIONAL RADIO CORP.



MODEL K-60 (K-6)
(St.Regis)
Voltage,Alignment

INTERNATIONAL RADIO CORP.

TO REPLACE DIAL LIGHT

Dial light socket assembly may be pried out from the rear of control head by using a small screw driver or knife blade.

AVERAGE TUBE VOLTAGES:

Measurements made from indicated points to chassis. Battery voltage 6 volts.

POSITION	TUBE	Ef	Ek	E_{g1}	E_{g3}	E_{g2}	Ep
R. F. Amplifier	6D6	5.6	2	*	2	75	185
1st Det.-Osc.	6F7	5.6	3	Det. * Osc. —1	3	75	Det. 185 Osc. 75
I.F. Amplifier	6D6	5.6	2	*	2	75	185
2nd Det.-A.V.C.	75	5.6	2	0	0	—	75
Power Amp.	42	5.6	15	0	—	185	175
Rectifier	84	5.6	185	—	—	—	—

f—Filament; k—Cathode; g_1—Control Grid; g_3—Suppressor Grid; g_2—Screen Grid; p—Plate; *—Depends on applied signal strength.

Balancing and Aligning

Each automobile radio is carefully balanced on accurate oscillators before leaving the factory. If it is necessary to rebalance because of part changes or other causes a good test oscillator capable of delivering modulated signals at 262½, 1500 and 600 Kc. will be needed. The customary audio out-put meter may be used IF the out-put of the test oscillator is weak enough to get below the A.V.C. action. Otherwise a microammeter will be needed to measure the A.V.C. voltage developed. It should be connected from ground to the junction of two 100M resistors and one condenser in the center bottom of the chassis.

To balance the I.F. circuits, attach the antenna wire to the test oscillator. Short out the oscillator section of the tuning condenser in the radio by inserting a thin piece of metal between the plates. Set the test oscillator to 262½ Kc. and adjust the trimmers on the I.F. transformers for maximum output. Go over all four adjustments at least twice for accuracy.

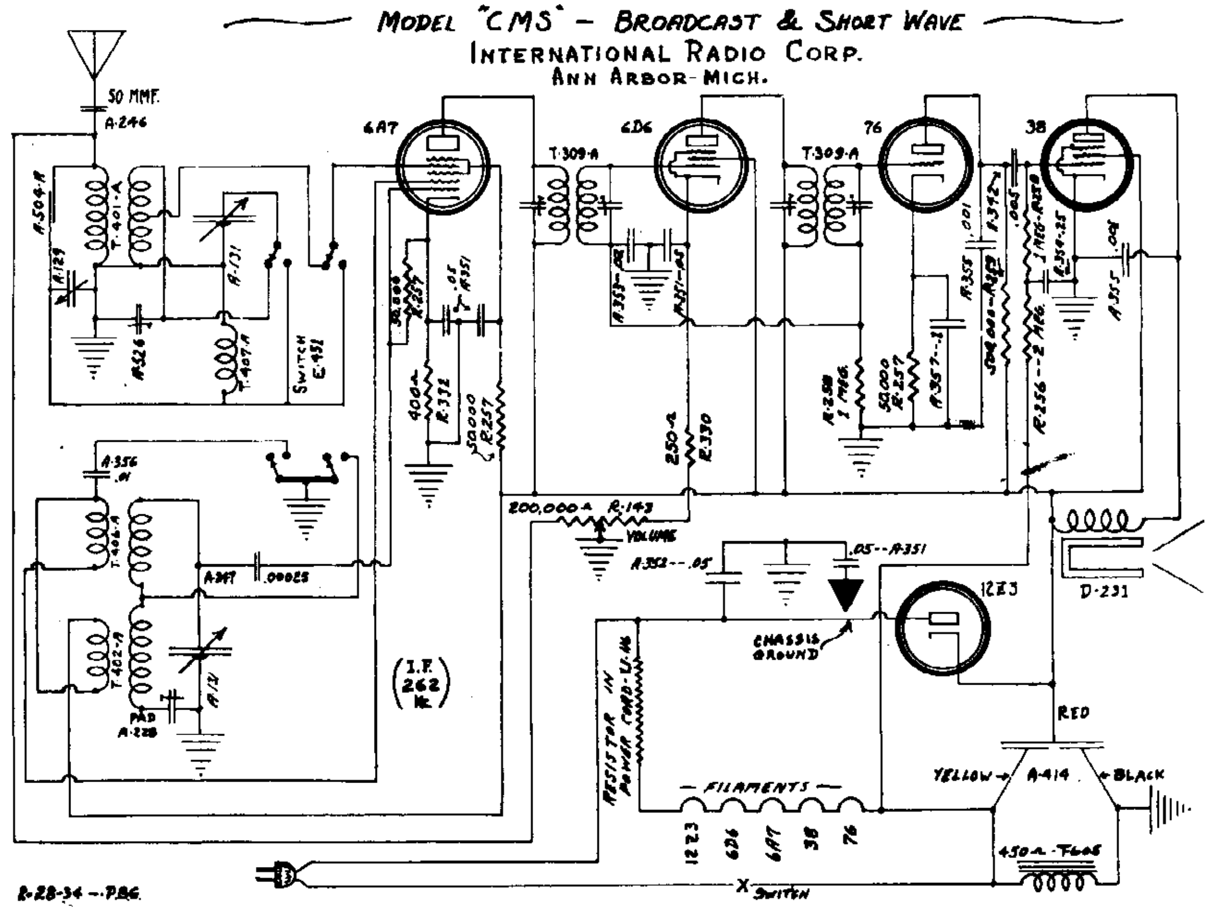
Next set the test oscillator at 1500 Kc. and open the tuning condenser until it is tuned to the test signal as indicated by maximum output. Adjust the small trimmers on top of the condenser gang for maximum output.

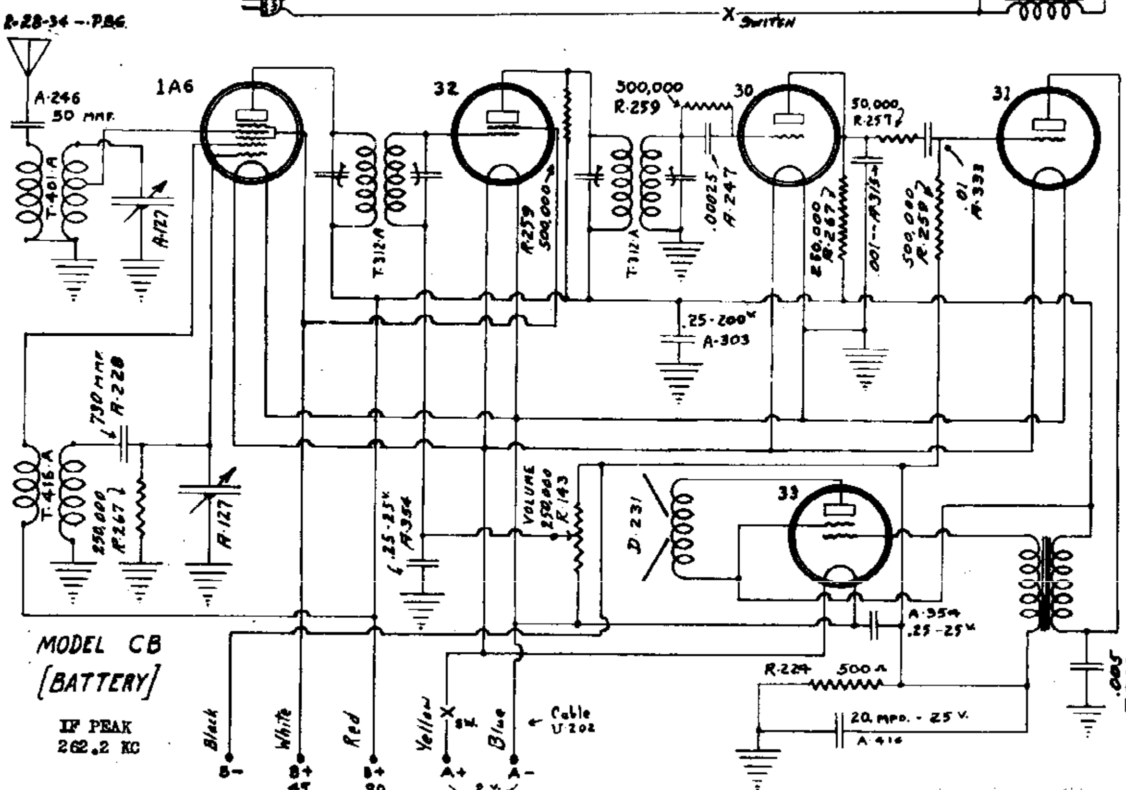
Set the test oscillator at 600 Kc. and, while rocking the tuning condenser slowly back and forth across this setting, adjust the padder condenser for maximum output. Go over the adjustments at least twice for accuracy.

MODEL CB (Battery)
Schematic
MODEL CMS
Schematic

INTERNATIONAL RADIO CORP.

MODEL "CMS" – BROADCAST & SHORT WAVE
INTERNATIONAL RADIO CORP.
ANN ARBOR-MICH.



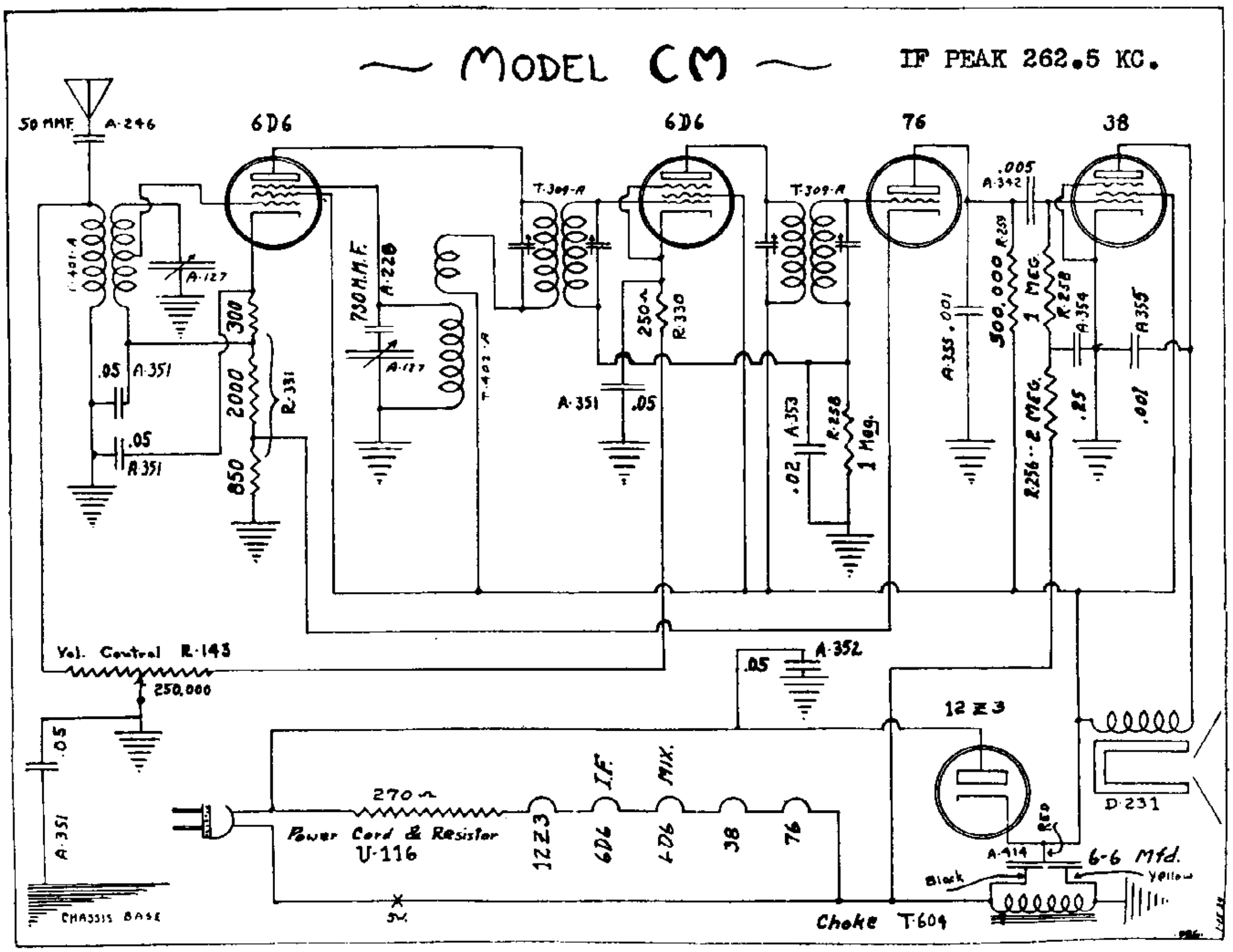


MODEL CB [BATTERY]

IF PEAK
262.2 KC

MODEL CM
Schematic, Voltage

INTERNATIONAL RADIO CORP.



For Balancing Data, Alignment Data **See Index**

CHASSIS CM

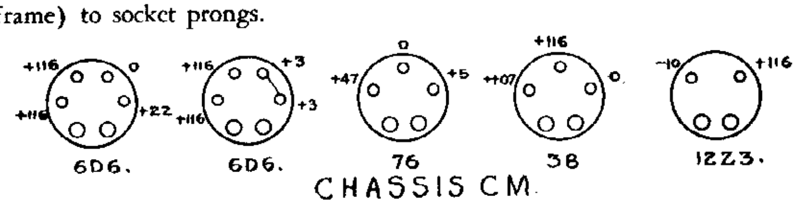
To adjust IF units and align condensers follow these operations in the order given using an output meter connected across the speaker—Operations 1 (oscillator section of 2 gang condenser nearest rear of chassis), 2, 3 and 4.

Color Code Marking of Coils

1st IF—Red
Antenna—Red
2nd IF—Red
Oscillator—Red

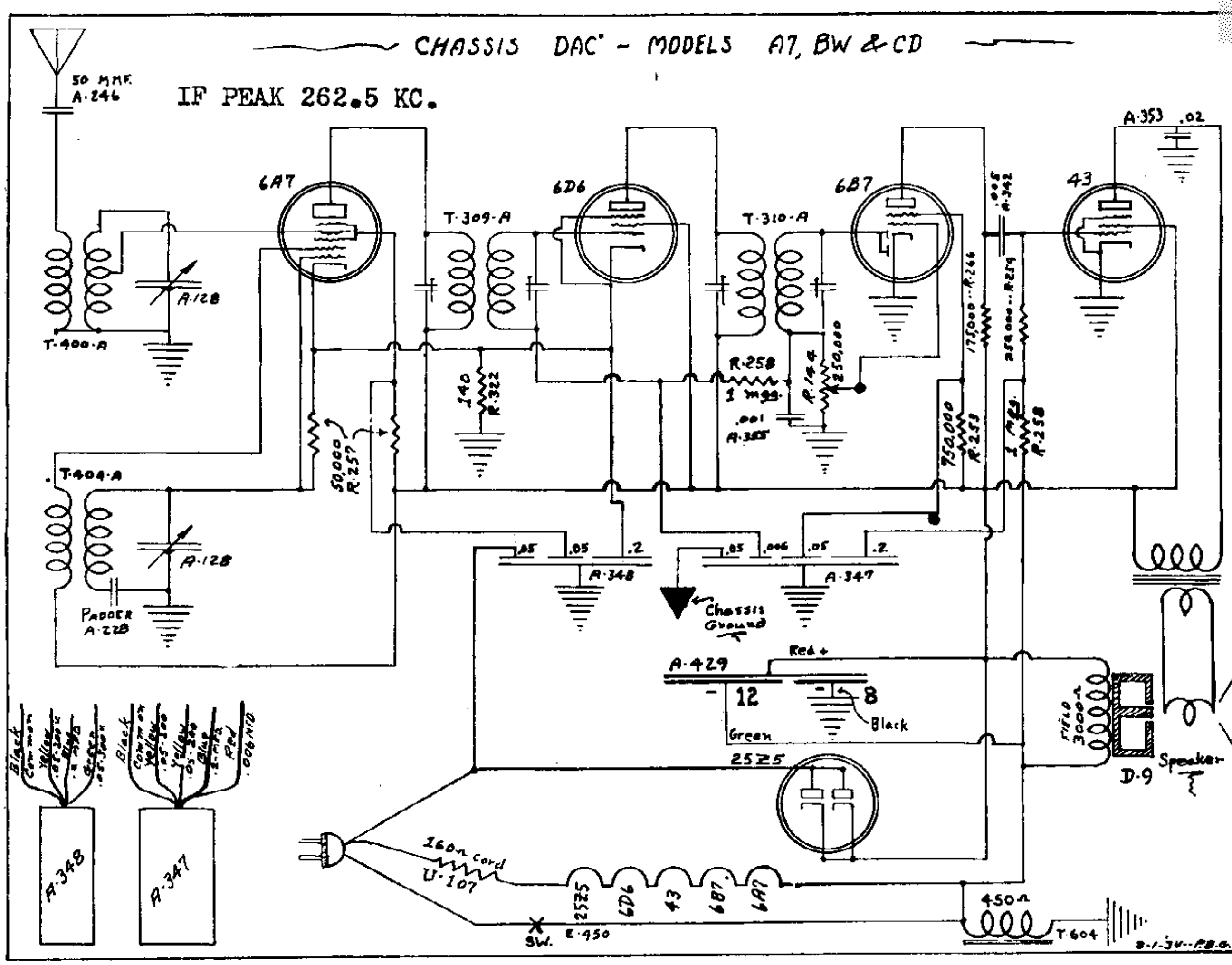
Socket Voltages

Approximately normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.



CHASSIS CM
BOTTOM VIEW.

INTERNATIONAL RADIO CORP.



For Balancing Data, Alignment Data **see Index**

CHASSIS DAC

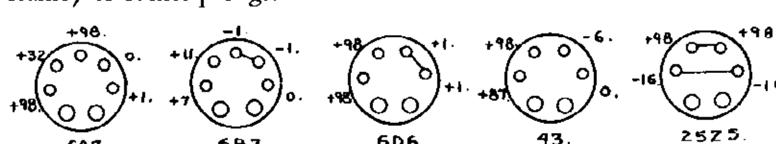
To adjust units and align condensers follow these operations in the order given using microammeter or D. C. milliammeter connected as previously described—Operations 1 (oscillator section of 2 gang condenser nearest front of chassis), 2, 3, and 4.

Color Code Marking of Coils

1st IF—Red	2nd IF—Green
Antenna—Green	Oscillator—Yellow

Socket Voltages

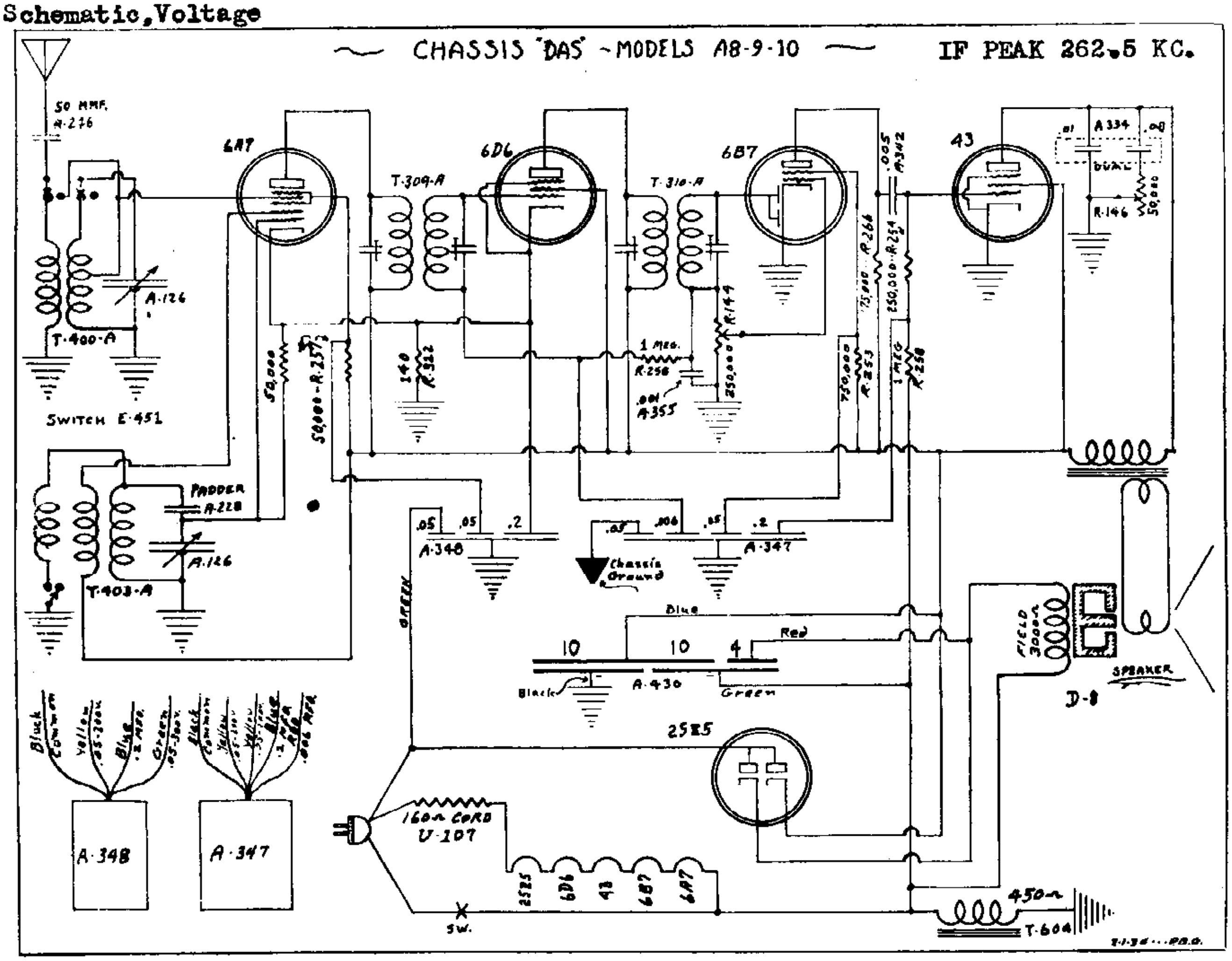
Approximate normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.



CHASSIS DAC.
BOTTOM VIEW.

MODEL A-8, A-9, A-10, AD-11, AD-12 (Chassis DAS) Schematic, Voltage

INTERNATIONAL RADIO CORP.



CHASSIS DAS

For Balancing and Alignment Data, see Index

To adjust IF units and align condensers follow these operations in the order given using microammeter or D. C. milliammeter as previously described—Operations 1 (oscillator section of 2 gang condenser nearest front of chassis), 2, 3, and 4.

Aligning Short Wave on DAS Chassis

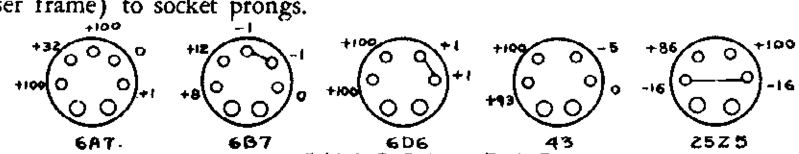
When properly adjusted for the broadcast band No Additional Adjustments Are Necessary on the Short Wave Band.

Color Code Marking of Coils

1st IF—Red Antenna—Green

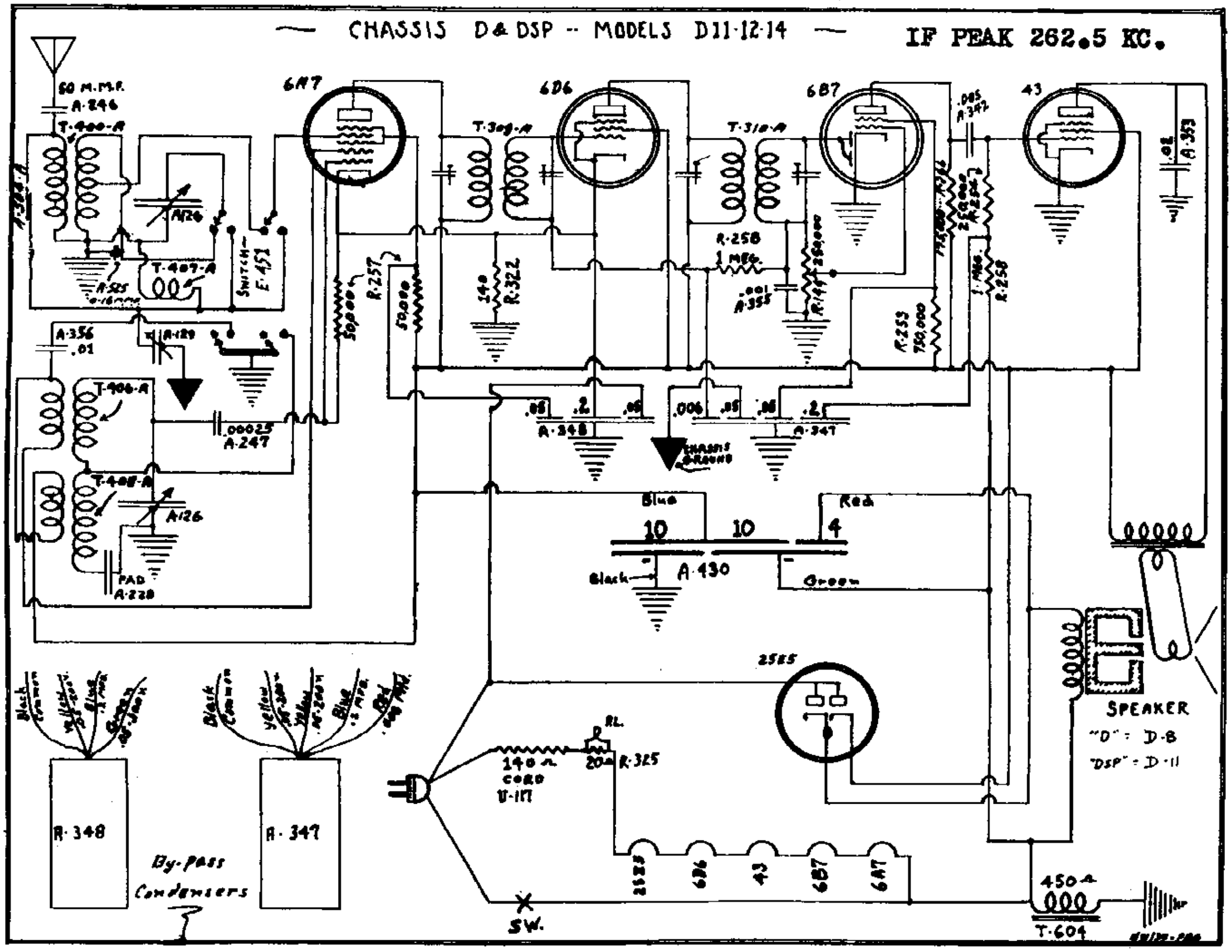
2nd IF—Green Oscillator—No mark

Approximate normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.



CHASSIS DAS.
BOTTOM VIEW.

INTERNATIONAL RADIO CORP.



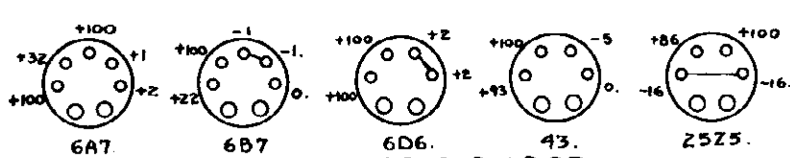
For Balancing Data, Alignment Data **see Index**

Color Code Marking of Coils

1st IF—Red	2nd IF—Green
BC Antenna—Green	BC Oscillator—Green
SW Antenna—Green	SW Oscillator—Green

Socket Voltages

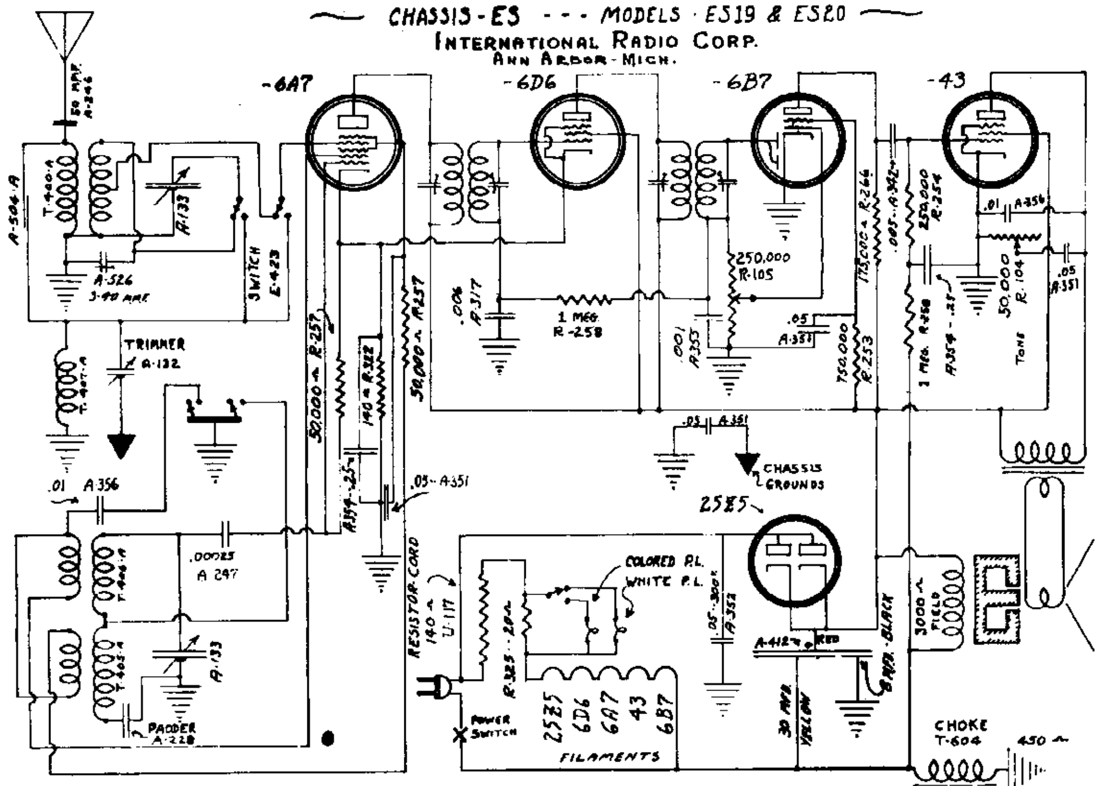
Approximate normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.



CHASSIS D.&DSP
BOTTOM VIEW.

MODEL ES-19, ES-20
Chassis ES
Schematic
Alignment Data

INTERNATIONAL RADIO CORP.



3-26-34 -- PBA

Instructions for Balancing and Aligning

Adjustments have been carefully made at the factory and should not need to be changed unless it has been necessary to replace an IF transformer or coil or the adjustments have been tampered with. Later in this bulletin, when the different chassis are taken up one by one, reference will be made to the following operations.

OPERATION No. 1 Adjustment of IF transformers. When adjusting the IF units the oscillator section of the 2 gang variable condenser must be shorted out. This is easily accomplished by inserting a thin strip of metal between the plates. Set the test oscillator to 262½ kilocycles and connect its output to the antenna wire of the set. Using a No. 4 fibre spintite socket wrench adjust the 4 nuts at the ends of the IF units until exact resonsnace is obtained. It is advisable to go over them more than once as when one nut is adjusted it may throw the adjustment on the other end of the unit, slightly out of resonance

OPERATION No. 2. Adjusting trimmers on 2 gang condenser at 1500 kilocycles. Set the test oscillator to 1500 kilocycles and connect its output to the antenna wire of the set. If the output of the oscillator is too strong connect through a very small fixed condenser or place the output wire of the oscillator near the antenna wire without making any direct connection. Open the variable condenser until maximum signal is indicated by the meter. Then adjust the trimmer on the antenna section of the condenser until maximum signal is indicated on the meter. See "Recommended Service Department Equipment" for instructions regarding meter.

OPERATION No. 3. Aligning 2 gang condenser on 1000 kilocycles. Test oscillator set at 1000 kilocycles and coupled to antenna wire of set. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections.Should the meter fail to show an increase in signal as the strip is inserted in either section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

OPERATION No. 4 Aligning 2 gang condenser at 550 kilocycles. Instructions same as for operation 3 except test oscillator and set tuned at 550 kilocycles.

CHASSIS' D & DSP

Chassis DSP is the same as chassis D except that an external 6" dynamic type speaker is used.

To adjust IF units and align condensers follow these operations in the order given—Operations 1 (oscillator section of 2 gang condenser nearest front of chassis), 5 (given below), 6 (given below), 3, 4 and 7 (given below). Use microammeter or DC milliammeter as previously described.

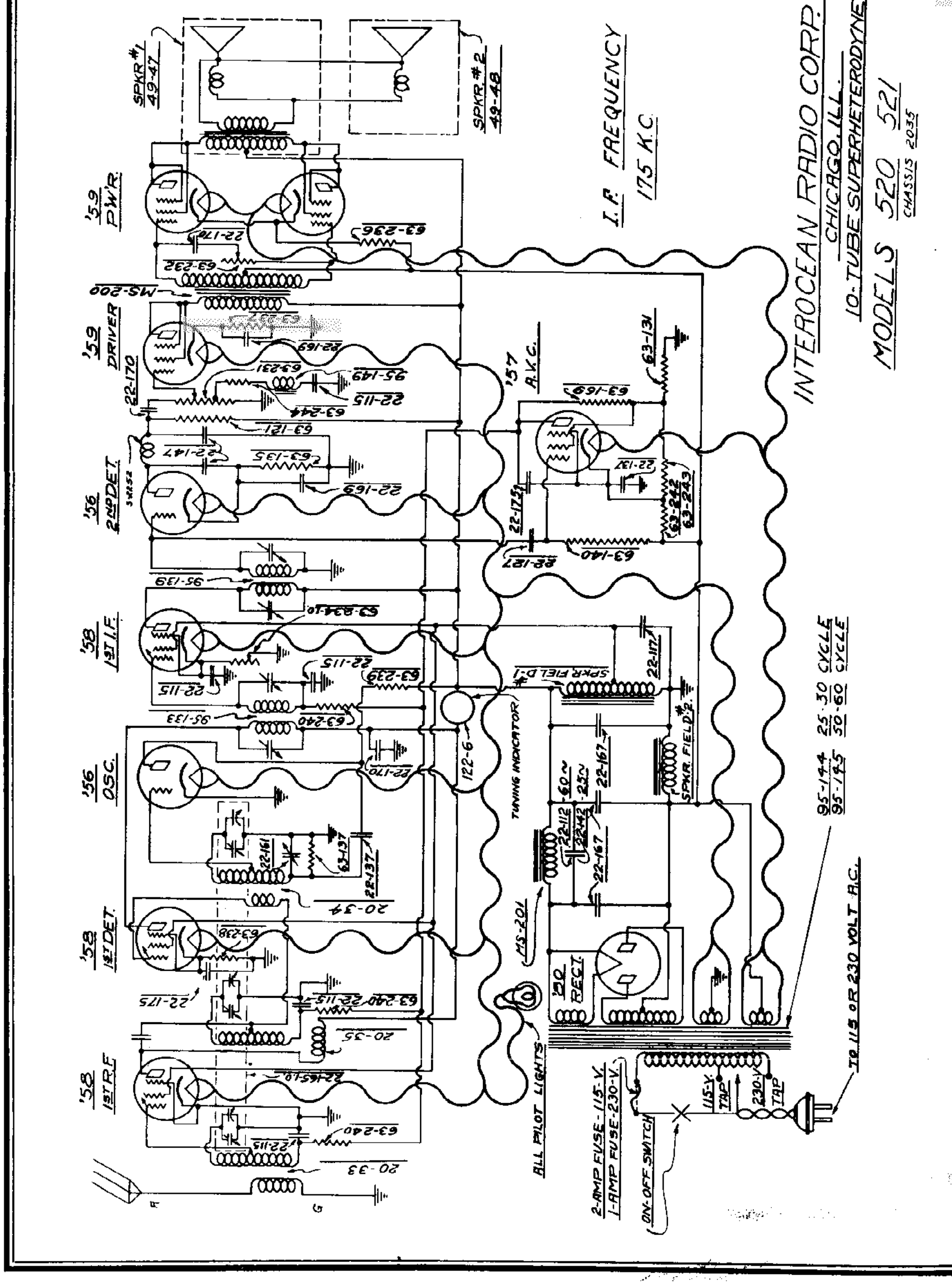
OPERATION No. 5 Be sure the switch on the rear of the chassis is turned to the short wave position. Remove short from the oscillator section of the 2 gang condenser and proceed as follows. Turn the small two plate vernier condenser so that it is only about 1/5 meshed. If the test oscillator is to be coupled direct to the antenna wire it should be attached close to the chassis. The coiled up antenna wire acts as an RF choke and high frequency signals will not go through it. A pin pushed through the insulation of the antenna wire will allow connection close to the chassis. Set the test oscillator so that it is radiating a signal on approximately 22 meters and rotate the condenser gang very slowly until this signal is picked up. Alternately change the setting of the trimmer on the oscillator section of the 2 gang and retune the 2 gang until the maximum signal is indicated.

OPERATION No. 6 Turn the switch on the rear of the chassis to the broadcast position. Tune in the 1500 kilocycle signal from the broadcast test oscillator. It will have been noted that there is no trimmer in the customary location on the antenna section of the 2-gang condenser. The trimmer is mounted externally near the 2 plate vernier condenser. This trimmer is used only on the broadcast band, the 2-plate vernier being in the circuit on the short wave position. Adjust the broadcast antenna trimmer for maximum signal.

OPERATION No. 7. Turn the switch on the rear of the chassis to the short wave position. Set the two plate vernier condenser so that it is about 4/5 meshed. Pick up the 45 meter signal from the short wave test oscillator. Test for resonance with the feeler strip as described in operation 3 but do not bend any plates. If the antenna section of the condenser gang has insufficient capacity it will be necessary to crowd together two or three turns of wire on the short wave antenna coil. If too much capacity, they must be spread somewhat. The short wave antenna coil is the space wound coil on the bottom of the chassis.

MODEL 520, 521
Chassis 2035
Schematic

INTEROCEAN RADIO CORP.



MODEL 520, 521
Voltage, Socket
Parts List

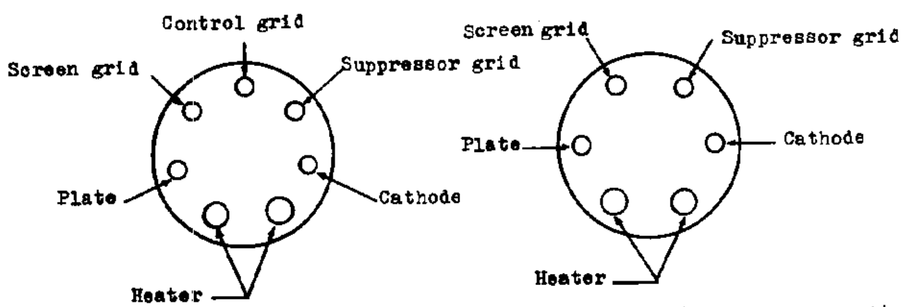
INTEROCEAN RADIO CORP.

VOLTAGE READINGS - MODELS 520 521

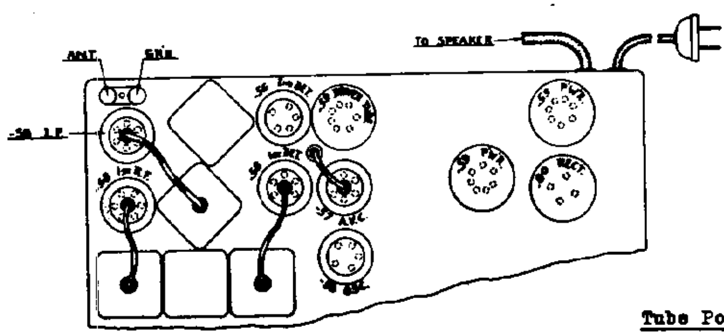
Antenna Disconnected — Meter 1000 Ohms Per Volt

Tube Type	Position	Fil. Volt.	Plate Volt.	Cath. Volt.	Screen Volt.	Plate Current
Z-58	R.F.	2.5	220	0	100	5.2
Z-58	1st Det.	2.5	220	+2	100	3.
Z-56	Osc.	2.5	120	0	0	4.
Z-58	I.F.	2.5	220	0	100	6.
Z-56	2nd Det.	2.5	120	20	0	.75
Z-57	A.V.C.	2.5	-40	-75	-2	0
Z-59	Driver	2.5	220	+25	220	8.2
Z-59	Power	2.5	230	-65	230	25.
Z-59	Power	2.5	230	-65	230	25.
Z-80	Rect.	5.0	400*			62.5*

Line voltage 115 (Reading to Ground) Volume control maximum



Six and seven prong socket connections (Bottom of socket)



Tube Position

PARTS AND PRICES
MODELS 520 521
CHASSIS NO. 2035

Dial and Meter Assembly

11-3	Dial Pulley String.....per ft.	$ .25
26-38	Calibrated Dial Strip	.15
80-69	Dial Cord Tension Spring	.01
80-85	Volume and Tone Control Dial Tension Spring	.01
83-274	Volume Control Dial Strip	.10
83-275	Tone Control Dial Strip	.10
100-18	2.5 Volt Pilot Lamp	.12
122-5	Shadowgraph Meter	2.00

Condensers

22-112	.1 mfd 300 Volt (Filter)	.25
22-115	.1 " 200 " (5 used, see footnote)	.35
22-117	.5 " 300 " (Filter)	.50
22-137	.05 " 400 " (Oscillator Plate)	.25
22-142	.4 " 300 " (Filter, 25 Cycle Only)	.40
22-147	.0005 600 " (2nd Detector Plate)	.20
22-161	Padder	.45
22-165	Three Gang Variable	3.50
22-167	8. mfd 500 Volt (Filter)	1.50
22-169	8. " 50 " (2nd Detector Cathode, Driver Cathode, and 1st Audio Cathode)	.55
22-170	.1 " 400 " (1st Detector Plate, Audio Coupling and Tone Control)	.25

Resistors

63-121	100M Ohm 1 Watt (2nd Detector Plate)	.25
63-135	50M " 1 " (2nd Detector Cathode)	.25
63-137	250M " ½ " (Oscillator Grid)	.25
63-140	1 Meg" ½ " (A. V. C. Grid)	.25
63-169	400 " ½ " (A. V. C. Plate)	.25
63-231	Volume Control Assembly	1.25
63-232	Tone Control Assembly	.75
63-234	Sensitivity Control	.75
63-236	500 Ohm........(Power Bias) (Wide Metal)	.25
63-237	1500 " ....(Driver Bias) (Narrow Metal)	.25
63-238	1000 " ¼ Watt (1st Detector Cathode)	.25
63-239	34M " 1 " (Oscillator Plate)	.25
63-240	1900 " ¼ " (R.F., 1st Detector & I.F. Grids)	.25
63-242	2500 " ½ " (A. V. C. Cathode)	.25
63-243	18M " 1 " (A. V. C. Cathode)	.25
63-244	500 " ¼ " (Acoustic Filter)	.25

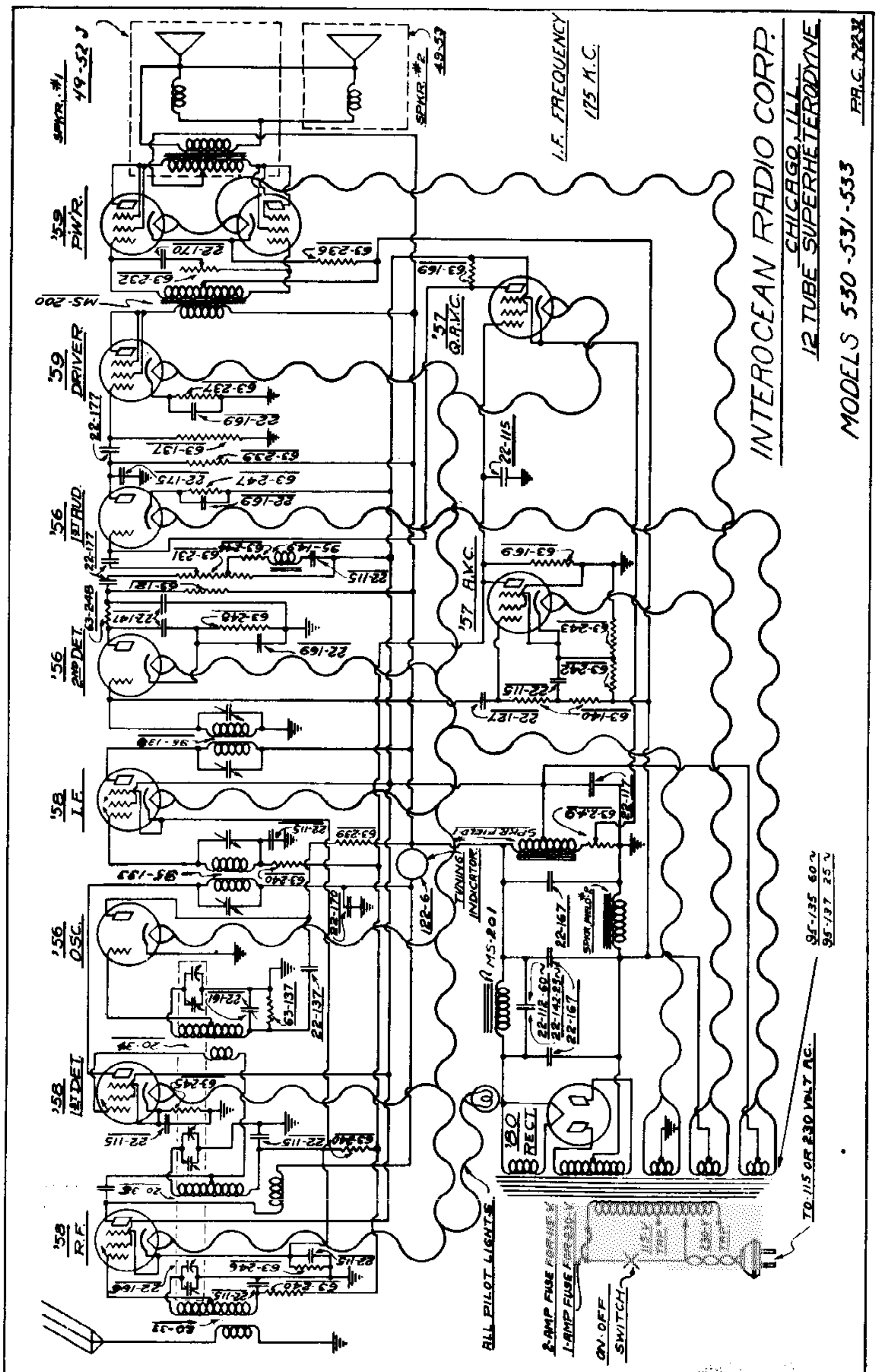
Coils

20-33	Antenna Coil	.75
20-34	Oscillator Coil	.86
20-35	Detector Coil	1.00
S-2252	2nd Detector Plate Choke and Bracket	.50
95-133	1st I. F. Transformer (with Grid Lead)	1.25
95-139	2nd I. F. Transformer (without Grid Lead)	1.25

*22-115 R. F., 1st Detector, I. F. Grid Returns, I. F. Cathode, and Acoustic Filter.

MODEL 530,531,533
Chassis 2038
Schematic

INTEROCEAN RADIO CORP.



MODEL 530,531,533
Voltage,Socket
Alignment

INTEROCEAN RADIO CORP.

VOLTAGE READINGS - MODELS 530 531 533

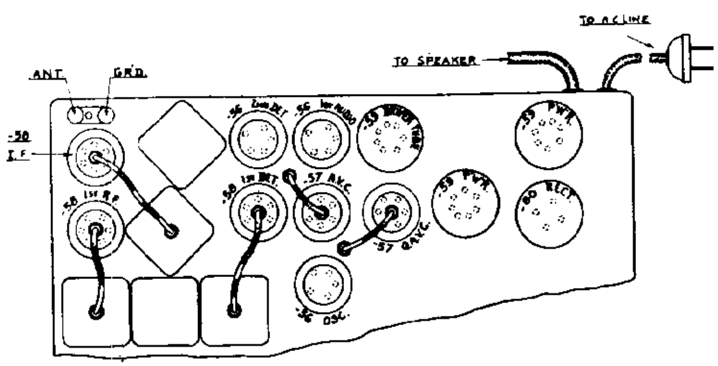
Antenna Disconnected* — Meter 1000 Ohms Per Volt

Tube Type	Position	Fil. Volt.	Plate Volt.	Cath. Volt.	Screen Volt.	Supp. Volt.	Plate Current
Z-56	1st R.F.	2.5	175	2.2	75	2.2	5.7
Z-58	1st Det.	2.5	190	4.5	75	4.5	2.3
Z-56	Osc.	2.5	100	0	-	-	3.5
Z-58	1st I.F.	2.5	200	2.2	75	2.2	5.5
Z-55	2nd Det.	2.5	110	10	-	-	.3
Z-56	1st Audio	2.5	170	80	-	-	.8
Z-57	A.V.C.	2.5	-	-85	-	-85	-
Z-57	Q.A.V.C.	2.5	30	13	75	13	-
Z-59	Driver	2.5	190	20	190	190	13
Z-59	Power	2.5	195	-70	195	195	22
Z-59	Power	2.5	195	-70	195	195	22
Z-80	Rect.	5.0	360	-	-	-	65

Line Voltage 115 (Reading to Ground) Volume control maximum

(All readings, with exception of heaters, taken from socket connections to ground. Use 1,000 ohm per volt D. C. meter.)

BALANCE I.F. frequency at 175 K.C. Condenser gang at 1500 K.C. and oscillator padder at 600 K.C.



Tube Position

PARTS AND PRICES

MODELS 530 531 533
CHASSIS 2038

Dial and Meter Assembly

11-3	Dial Pulley String....per ft.	$ .10
26-38	Calibrated Dial Strip....	.15
80-69	Dial Cord Tension Spring....	.01
80-85	Volume and Tone Control Dial Tension Spring....	.01
83-274	Volume Control Dial Strip....	.10
83-275	Tone Control Dial Strip....	.10
100-18	2½ Volt Pilot Lamp....	.12
122-5	Shadowgraph Meter....	2.00

Condensers

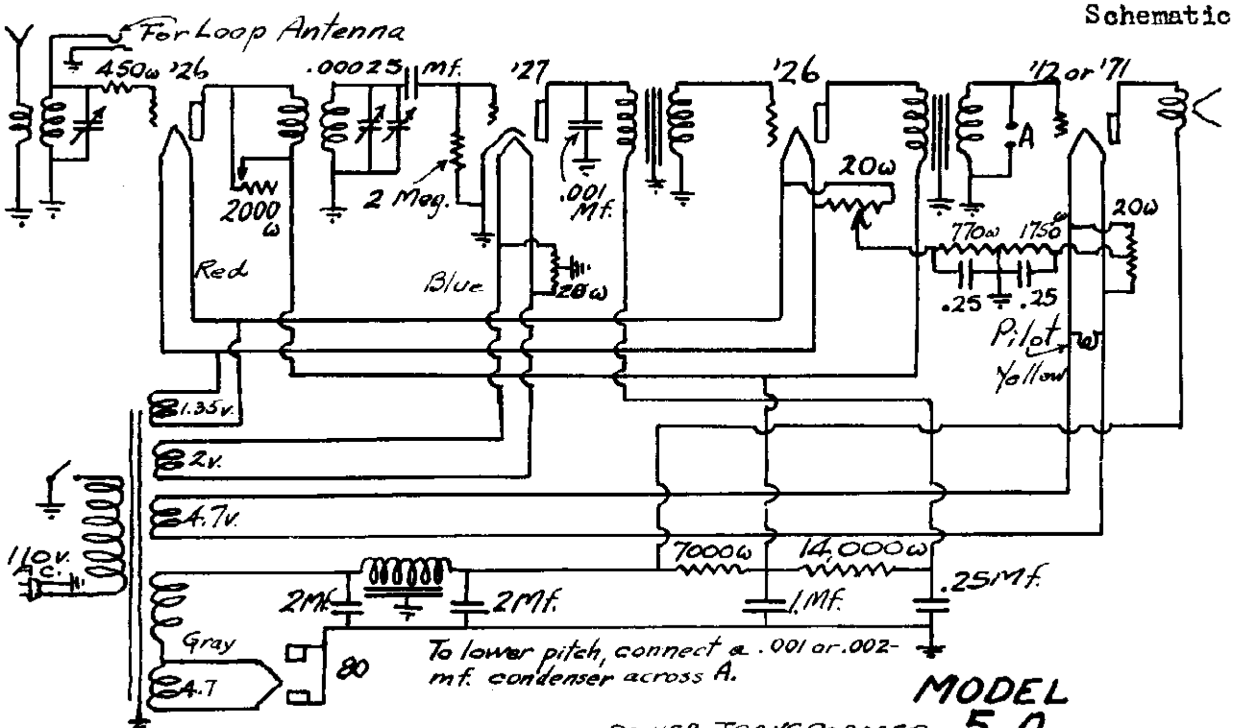
22-112	.1 mfd 300 volt...(Filter)....	.25
*22-115	.1 " 200 " ...(Eight Used, See Below)....	.35
22-117	.5 " 300 " ...(Filter)....	.50
22-127	.000025 600 " ...(A.V.C. Grid)....	.35
22-137	.05 mfd 400 " ...(Oscillator Plate)....	.25
22-142	.4 " 300 " ...(Filter 25 Cycle Only)....	.40
22-147	.0005" 600 " ...(2nd Detector Plate)....	.20
22-161	Padder....	.45
22-165	Three Gang Variable....	3.50
22-167	8. mfd 500 volt...(Filter)....	1.50
22-169	8. " 50 " ...(2nd Det. Cathode, Driver Cathode & 1st Audio Cathode)....	.55
22-170	.1 " 400 " ...(1st Det. Plate, Tone Control)....	.25
22-175	.002 " 600 " ...(1st Audio Plate)....	.25
22-177	.2 " 400 " ...(2nd Det. Plate, 1st Audio Grid, 1st Audio Plate)....	.25

Resistors

63-121	100M ohm 1 watt...(2nd Detector Plate)....	.25
63-137	250M " ½ " ...(Driver Grid)....	.25
63-140	1 meg" ½ " ...(A.V.C. Grid & Cathode)....	.25
63-169	400 " ½ " ...(A.V.C. & Q.A.V.C. Plate)....	.25
63-231	Volume Control & Switch Assembly....	1.40
63-232	Tone Control....	.75
63-236	500 ohm ...(Wide Metal) (Power Tube Bias)....	.25
63-237	1500 " ...(Narrow Metal) (Driver Tube Bias)....	.25
63-239	24M " 1 watt...(Osc. & 1st Audio Plate)....	.25
63-240	1900 " ¼ " ...(R.F. 1st Det. & I.F. Grids)....	.25
63-242	2500 " ½ " ...(A.V.C. Cathode)....	.25
63-243	18M " 1 " ...(A.V.C. Cathode)....	.25
63-244	500 " ¼ " ...(Acoustic Filter)....	.25
63-245	1500 " ¼ " ...(1st Detector Cathode)....	.25
63-246	150 " ¼ " ...(R.F. Cathode)....	.25
63-247	8M " ¼ " ...(1st Audio Cathode)....	.25
63-248	50M " 1 " ...(2nd Det. Plate & Cathode)....	.25
63-249	Sensitivity & Quiet Control....	.75

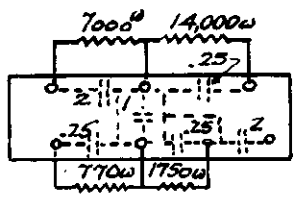
*22-115 R.F. 1st Detector, I.F. Grid Returns, A.V.C. Plate, A.V.C. Cathode, 1st Detector Cathode, R.F. Cathode, and Acoustic Filter.

JACKSON-BELL CO., LTD.

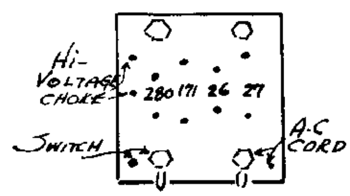


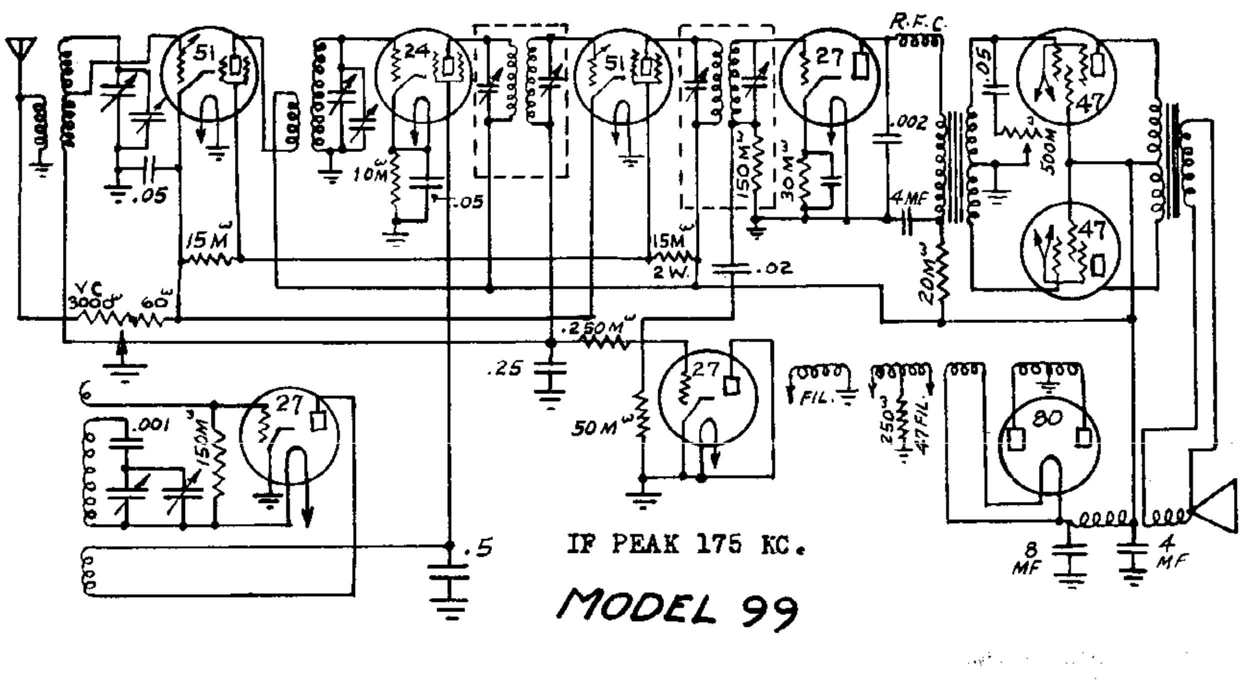
MODEL 5-A

CONDENSER BLOCK



POWER TRANSFORMER

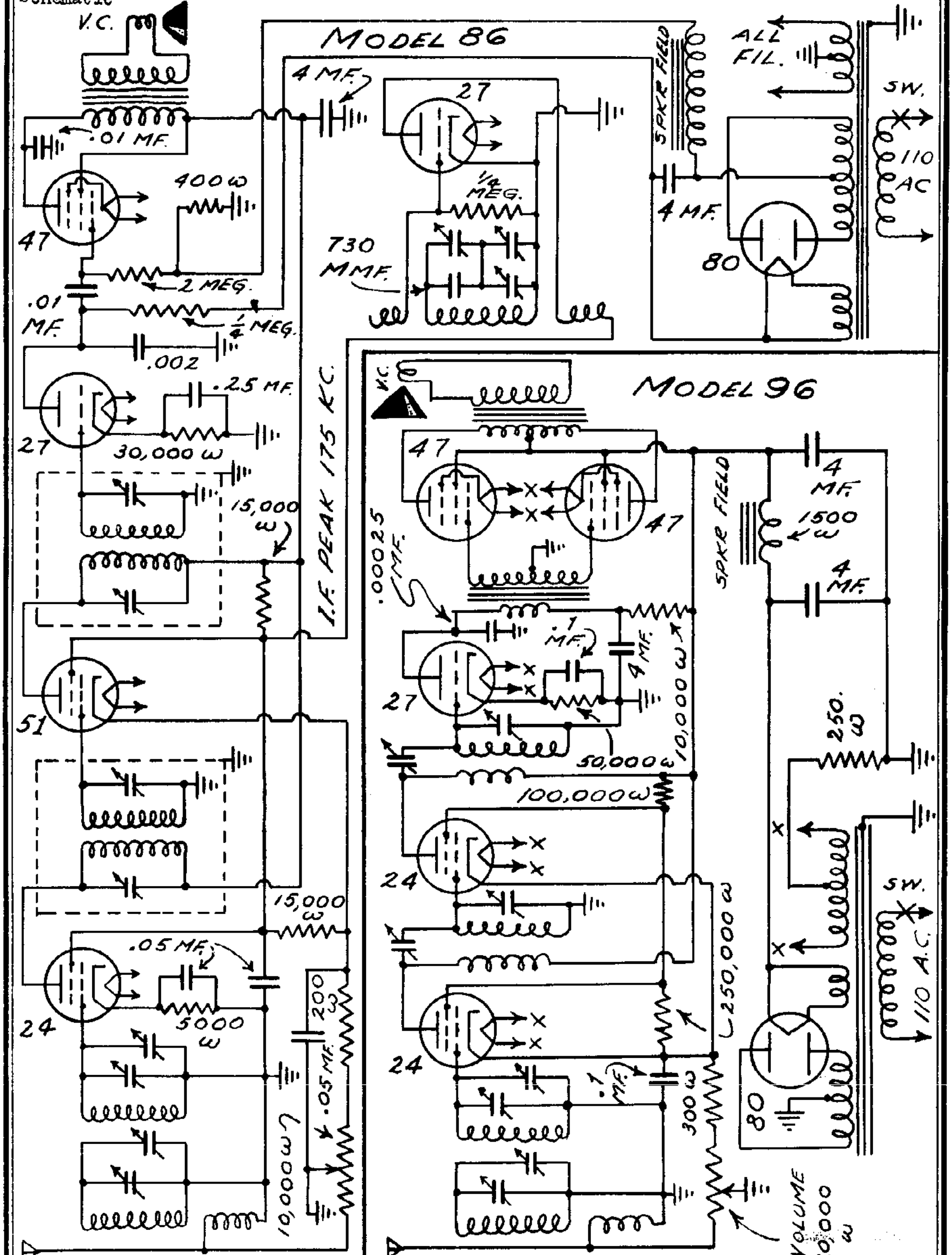




MODEL 99

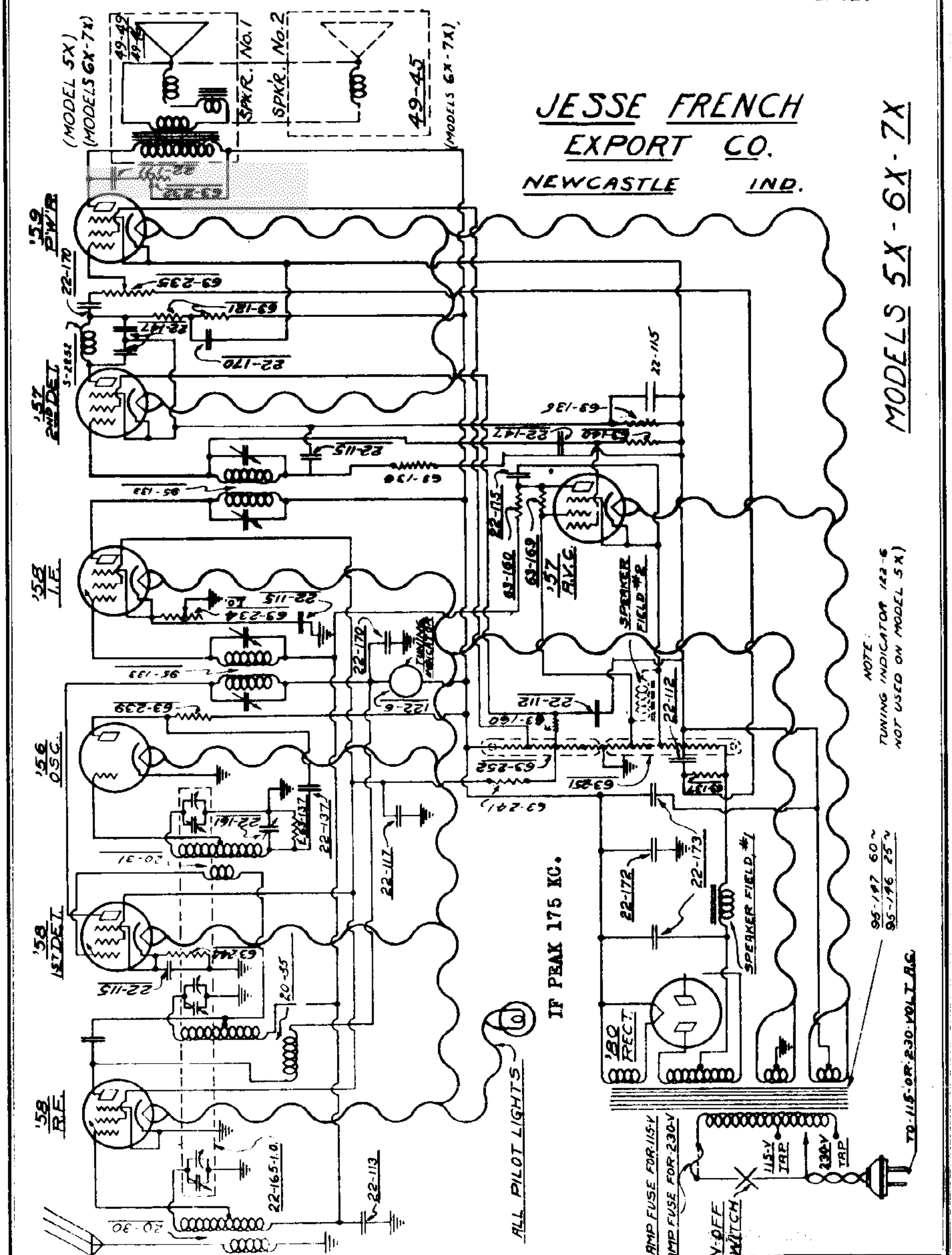
MODEL 86
MODEL 96
Schematic

JACKSON-BELL CO., LTD.



MODEL 5X, 6X, 7X
Schematic

JESSE FRENCH EXPORT CO.



MODEL 5X, 6X, 7X
Socket, Voltage
Parts List

JESSE FRENCH EXPORT CO

SOCKET VOLTAGES

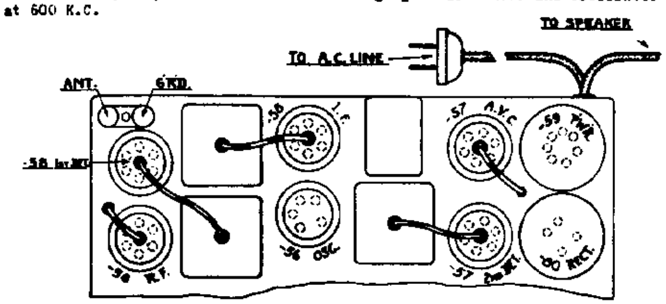
MODELS 5X 6X 7X

Tube Type	Position	Fil. Volt.	Plate Volt.	Cath. Volt.	Screen Volt.	Supp. Volt.	Plate Current
Z-58	R.F.	2.4	190	0	95	0	7.
Z-58	1st Det.	2.4	190	2.3	95	2.3	4.
Z-56	Osc.	2.4	100	0	-	-	4.
Z-58	I.F.	2.4	190	0	90	0	2.
Z-57	2nd Det.	2.4	90	-60	70	-60	.2
Z-57	A.V.C.	2.4	-10	-65	-2	-65	0
Z-59	Power	2.4	175	-70	165	-70	25
Z-80	Rect.	5.	*350	-	-	-	*36

Line 115 Volts — All Controls Maximum

(All readings, with exception of heaters, taken from socket connections to ground. Use 1,000 ohm per volt D. C. meter.)

BALANCE I.F. frequency at 175 K.C. Condenser gang at 1500 K.C. and oscillator padder at 600 K.C.



PARTS AND PRICES
MODELS 5X 6X 7X
CHASSIS 2037

Dial and Meter Assembly

11-3	Pulley String .... per ft.	$ .10
26-38	Dial Drum Strip	.10
51-19	Tuning Shaft Pulley (small idler)	.05
51-22	Tuning Shaft Pulley (large idler)	.10
80-65	Dial Drum Pulley Tension Spring	.01
80-69	Volume and Tone Control Tension Spring	.01
100-18	2½ volt Pilot Lamp	.12
122-5	Shadow Meter	2.00
S-2242	Volume Control Dial Assembly	.35
S-2243	Tone Control Dial Assembly	.35

Condensers

22-112	.1 mfd 300 volt.(2nd Detector Screen & Power Grid)	.25
22-113	.5 " ....(R.F.1st Detector & I.F.Grid Return)	.35
*22-115	.1 " 200 volt.(Four used, see below)	.35
22-117	.5 " ....(R.F.1st Detector, & I.F. Screen)	.50
22-137	.05 " 400 volt.(Oscillator Plate)	.25
22-147	.0005" 600 volt.(2nd Detector Plate & A.V.C.Screen)	.25
22-161	Padder	.45
22-165	Three Gang Variable	3.50
22-170	.1 mfd 400 volt.(R.F. & 1st Detector Plate, 2nd Detector Plate)	.35
22-171	.05 " 600 volt.(Tone Control)	.25
22-172	2. " 450 volt.(Filter)	.60
22-173	8. " 500 volt.(Filter)	1.25
22-175	.002 " 600 volt.(A.V.C. Plate)	.25

Resistors

63-121	100M ohm 1 Watt...(2nd Detector Plate)	.25
63-135	25M " ½ " ...(2nd Detector Cathode)	.25
63-137	250M " ½ " ...(Oscillator & Power Grid)	.25
63-140	1 Meg " ½ " ...(A.V.C. Screen)	.25
63-160	100M " ½ " ...(A.V.C. Plate)	.25
63-169	400M " ½ " ...(A.V.C. Grid)	.25
63-232	Manual Tone Control	.75
63-234	Manual Sensitivity Control	.75
63-235	Manual Volume Control	1.25
63-239	24M ohm 1 Watt...(Oscillator Plate)	.25
63-241	5M " 1 " ...(RF., 1st DET., I.F. Screen)	.25
63-244	500 " ½ " ...(1st Detector Cathode)	.25
63-251	Voltage Divider...(six tap)	.65
63-252	Voltage Divider...(five tap)	.60

*22-115 R. F., 1st Detector, I. F. Grid Return, A.V.C. Plate, A.V.C. Cathode, 1st Detector Cathode, R.F. Cathode, and Acoustic Filter.

Coils and Chokes

20-30	Antenna Coil	$ .75
20-31	Oscillator Coil	.85
20-35	Detector Coil	1.00
95-133	1st & 2nd I. F. Transformer	1.25
S-2252	Plate Choke and Bracket	.50

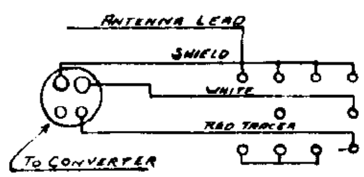
Miscellaneous

45-46	Large Knob	.20
45-62	Small Knob	.10
49-45	Dynamic Speaker for Models 6X and 7X without transformer	6.00
49-46	Dynamic Speaker for Models 6X and 7X with transformer	8.00
49-49	Dynamic Speaker for Model 5X with transformer	7.00
52-32	Speaker Multicord	.35
57-343	Escutcheon Plate	.50
78-56	59 Seven Prong Socket	.15
78-57	56 Five Prong Socket	.15
78-58	58 Six Prong Socket	.15
78-59	57 Six Prong Socket	.15
78-60	80 Four Prong Socket	.15
95-146	115 volt 25 cycle Power Transformer	5.50
95-147	115 volt 60 cycle Power Transformer	3.75
126-109	Tube Shield	.10
136-2	2 amp Fuse	.06

MODEL "Gypsy" Schematic
MODEL 55 Schematic

KINGSTON PRODUCTS CORP.

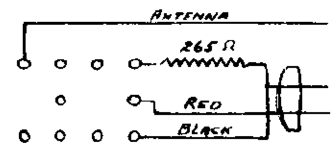
GIPSY" AUTO KIT CABLE & PLUG

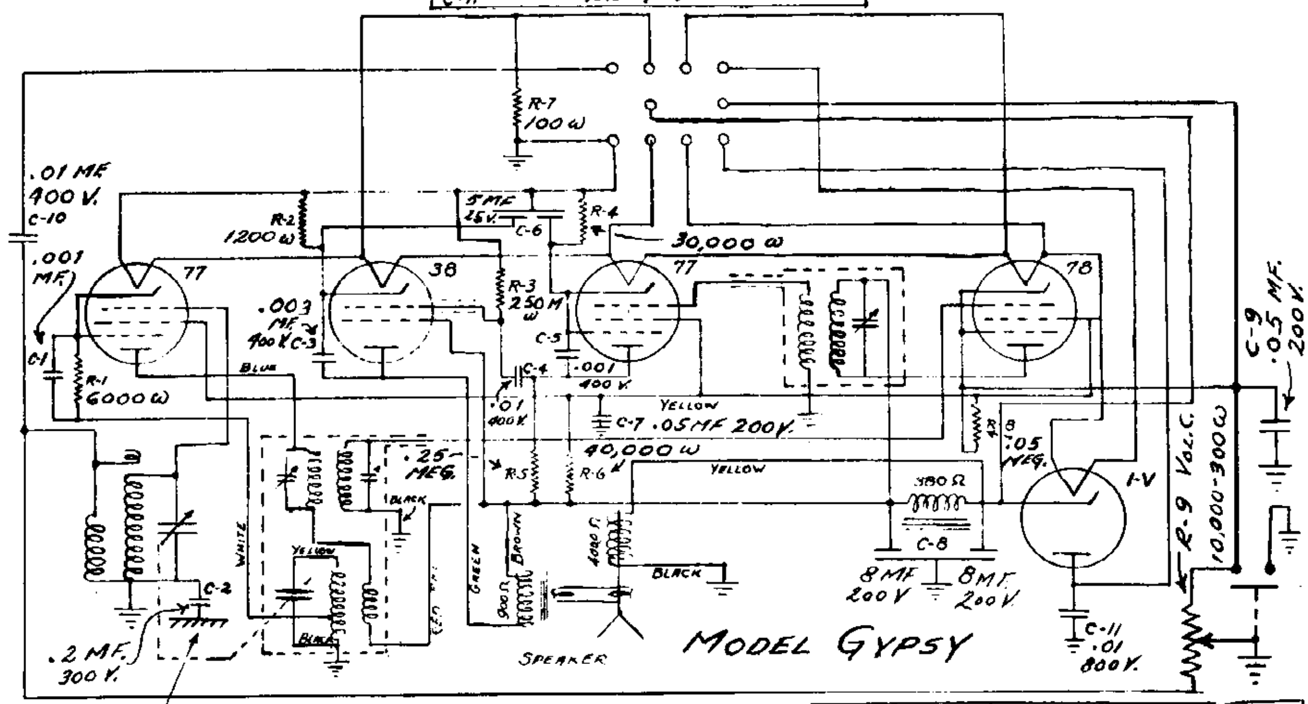


CHANGE NOTES

ITEM	WAS	SERIAL #
R-1	1200 Ω	A-189
R-4	50,000 Ω	A-189
R-2	1100 Ω	A-189
C-2	.1 MFD.	A-189
C-9	.1 "	A-189
C-7	.1 "	A-189
ITEM	WAS	SERIAL #
OSC. COIL	TURNS. CHANGE	A-189
R-7	ADDED	
C-11	.02 - 400V	

110V. AC-DC CABLE & PLUG

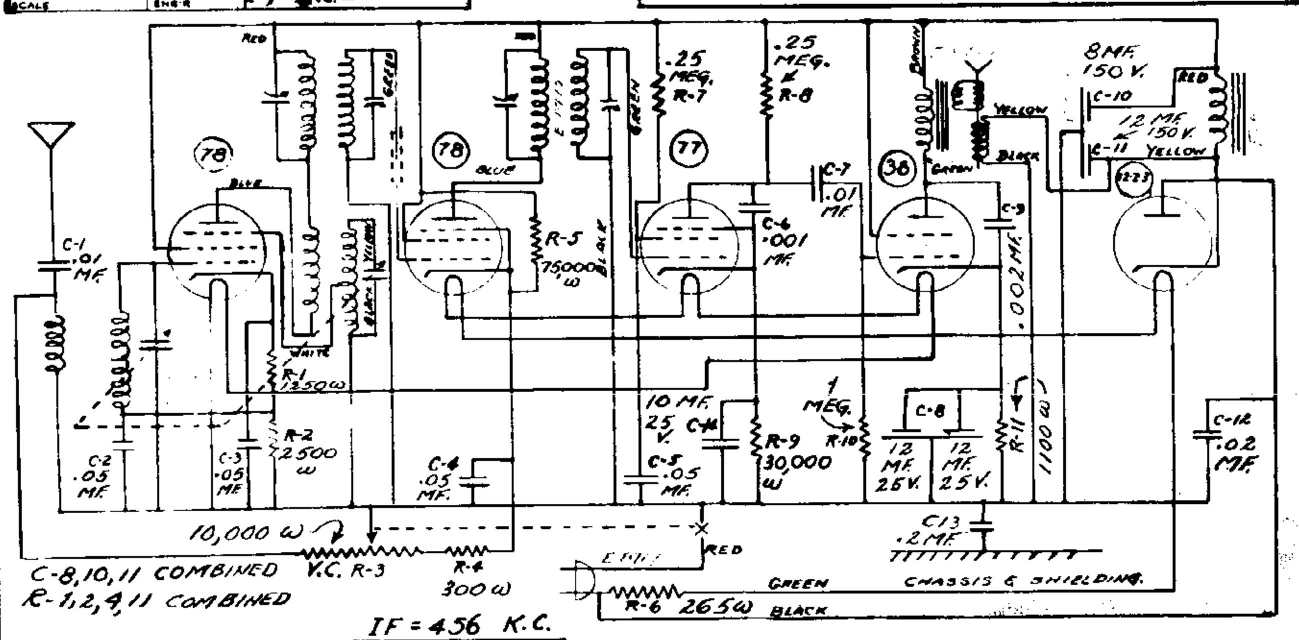




CHASSIS & SHIELDING

KINGSTON PRODUCTS CORP. KOKOMO, IND.	
DRAWN BY F.A.D.	PART WIRING DIAGRAM
TRACED BY	
CHECKED BY G.W.S.	GYPSY MODEL RADIO
DATE 9-22-33	
MATERIAL	REQ'D
SCALE	ENG'R R. No. E-8726

KINGSTON PRODUCTS CORP. KOKOMO, IND.	
DRAWN BY F.A.D.	PART CIRCUIT - MODEL 55
TRACED BY	
CHECKED BY	
DATE 2-13-34	
MATERIAL	REQ'D 1
SCALE	ENG'R No. E-8986

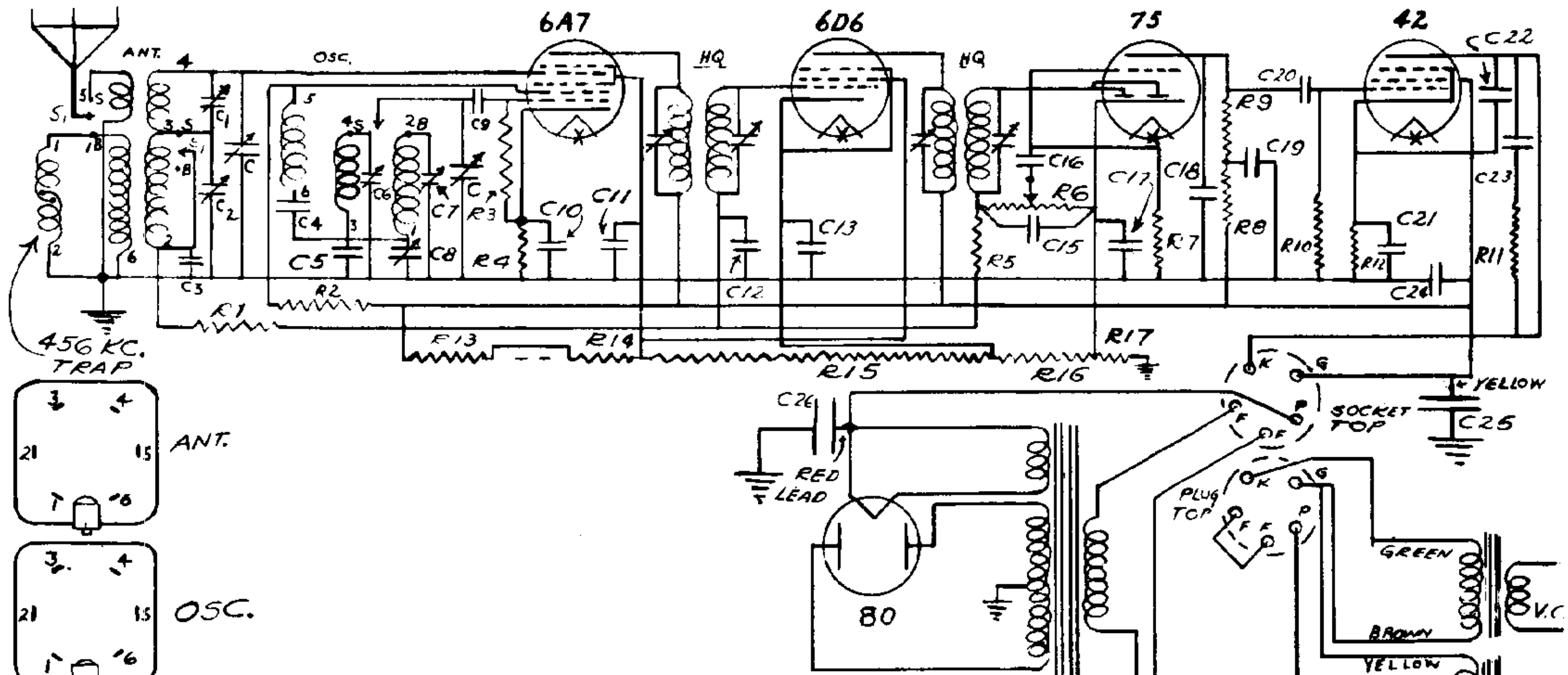


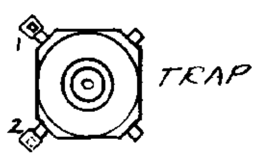
C-8,10,11 COMBINED
R-1,2,4,11 COMBINED

IF = 456 K.C.

MODEL 500-A, 500
Schematic

KINGSTON PRODUCTS CORP.





CONDENSERS	
C	370MMF 2GANG
C1	3 PLATE TRIM.
C2	2 " "
C3	.05-200
C4	.0025 MICA
C5	.004 MICA
C6	2 PLATE TRIM.
C7	2
C8	300MMF PADDER
C9	.00005 MICA
C10	.05-200
C11	.2 400
C12	.05-200
C13	.1-200
C15	.0005 600
C16	.01 600
C17	.25 200
C18	.001 600

CONDENSERS	
C19	.05 600
C20	.01 600
C21	12 MFD 25V.
C22	.002 600
C23	.05 600
C24	.2 400
C25	6 MFD 350 X
C26	6 MFD 350 X
S1	3 P.D.T. SWITCH
S2	AC. SWITCH +

X-COMMON

RESISTORS	
R1	1000,000
R2	20000 ½ W
R3	50,000
R4	500
R5	2000,000
R6	500000 VOL. +
R7	500,000
R8	100,000
R9	500,000
R10	1000,000
R11	5,000
R12	400
R13	3000
R14	3500
R15	6500
R16	100
R17	50

R12–R17: CANDOHM

+ -COMBINE-SWITCH & VOLUME

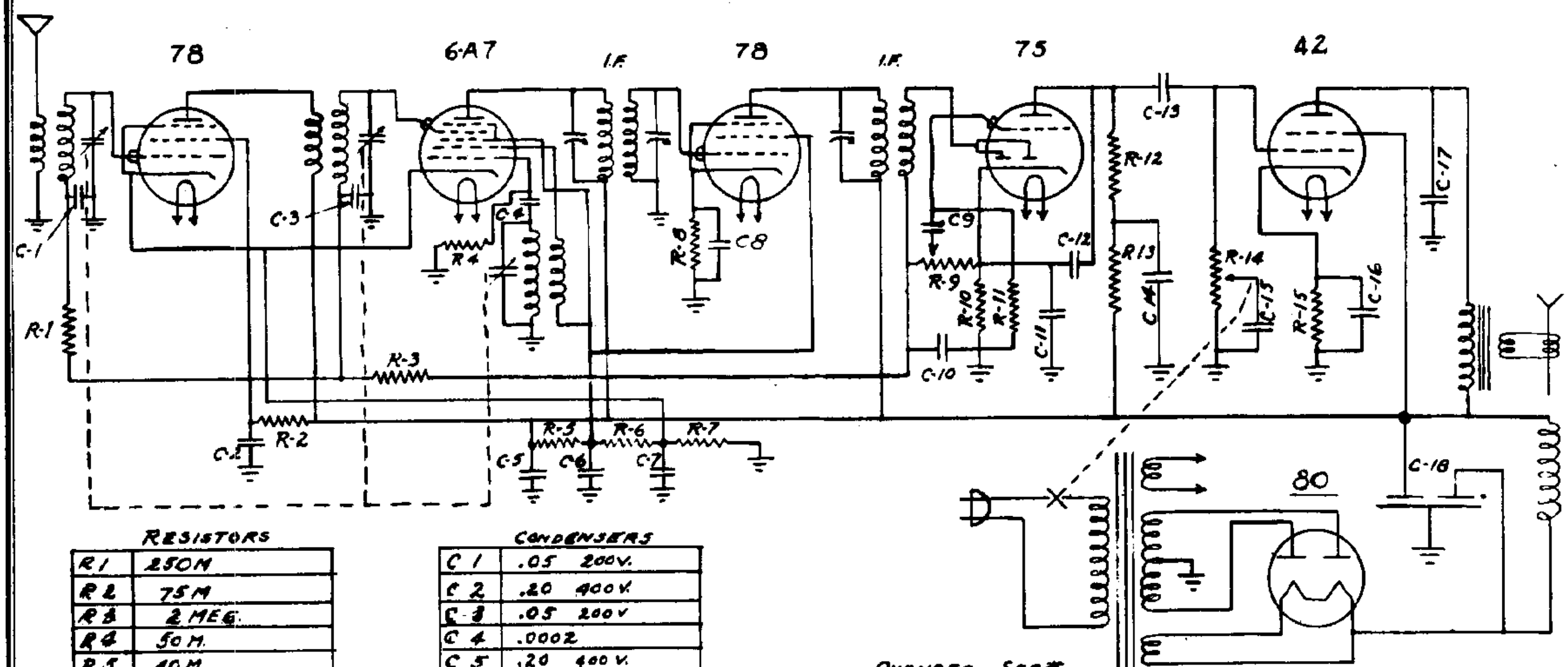
456 KC-I.F.

RANGE-B 1560-540 KC
RANGE-S 18.5-50 METERS

KINGSTON PRODUCTS CORP. KOKOMO, IND.	
DRAWN BY G.W.S	PART 500 CIRCUIT DIAGRAM
TRACED BY	
CHECKED BY	MOD. 500-A
DATE 7-26-34	
MATERIAL	
SCALE	SUPR'S. F.A.O. — REG'D. 1 — No. E17140

MODEL 600-A, 600-B, 610-B
Schematic

KINGSTON PRODUCTS CO.



RESISTORS	
R1	250M
R2	75M
R3	2 MEG.
R4	50M.
R5	40M
R6	50M
R7	250Ω
R8	2500Ω
R9	500M V.C.
R10	5M
R11	500M.
R12	250M
R13	100M.
R14	500M. -T.C.
R15	500Ω
Ⓑ R16	25 M.

CONDENSERS	
C 1	.05 200V.
C 2	.20 400V.
C 3	.05 200V
C 4	.0002
C 5	.20 400V.
C 6	.20 400V.
C 7	.20 200V.
C 8	.05 200V.
C 9	.01 400V.
C 10	.0005 400V.
C 11	.20 200V.
Ⓐ C 12	.0005
C 13	.01 600V.
C-14	.05 400V.
C-15	.01 200V
C-16	10. ELEC.
C-17	.001 800V.
C-18	6-6 ELEC.
Ⓒ C-19	.05 600

— CHANGES - SER.# —

Ⓐ	WAS .0001	C-1100
Ⓑ	ADDED	"
Ⓒ	ADDED	"
Ⓓ	I.F. CHANGED.	"

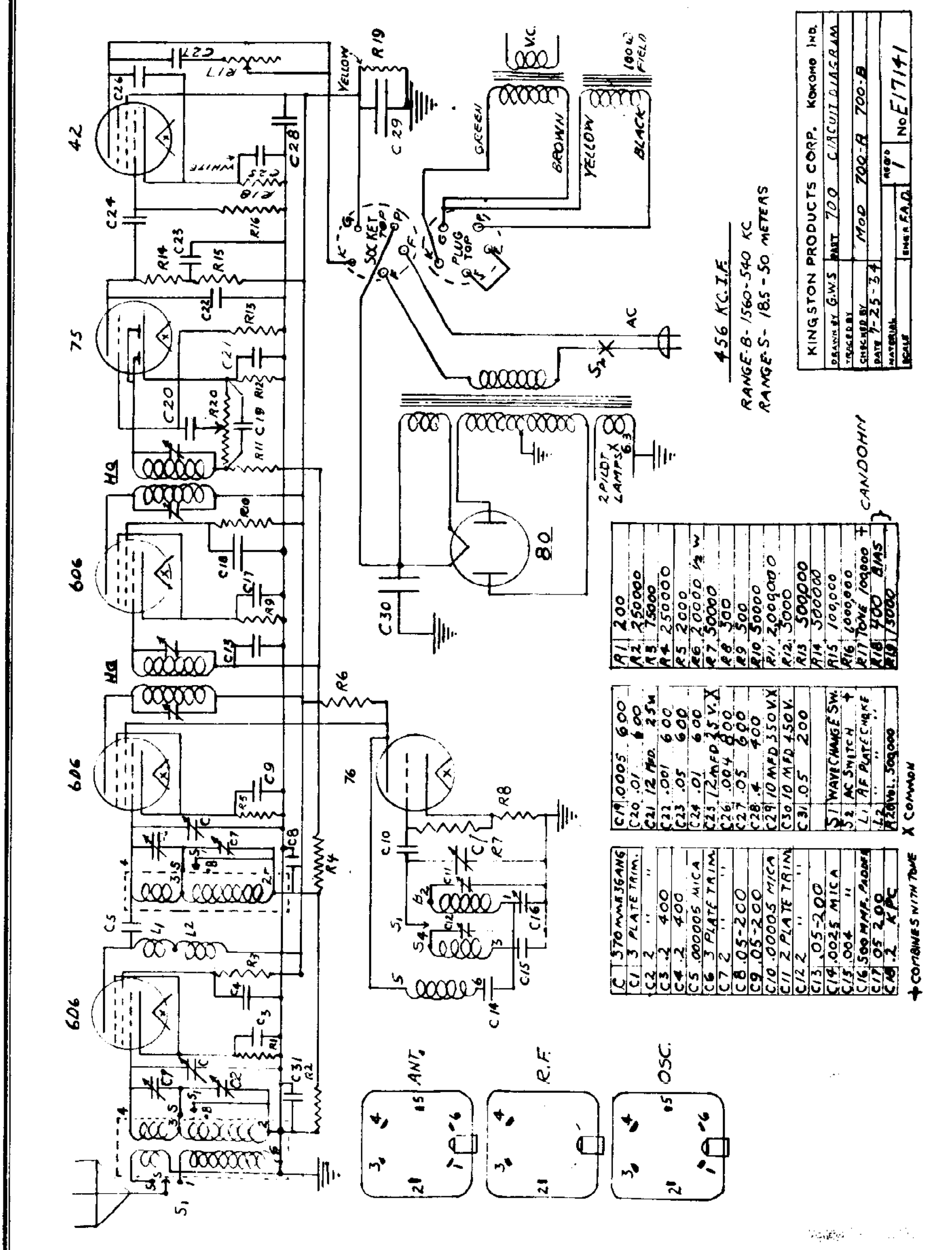
I.F. = 182.5 K.C. BELOW #C-1100

Ⓓ I.F. = 172.5 K.C. ABOVE #C-1100

KINGSTON PRODUCTS CORP. KOKOMO, IND.	
DRAWN BY W	PART CIRCUIT DIAGRAM
TRACED BY	
CHECKED	MODELS 600-A 600-B 610-A
DATE 2-10-34	
MATERIAL	
SCALE	NO. E-8905

MODEL 700, 700-A
700-B
Schematic

KINGSTON PRODUCTS CO.



R1	200
R2	250000
R3	75000
R4	250000
R5	2000
R6	20000 1/2 W
R7	50000
R8	500
R9	500
R10	50000
R11	2,000,000
R12	3000
R13	500000
R14	500000
R15	1000,000
R16	1000,000
R17	TONE 100,000 +
R18	400 BIAS
R19	13000

CANDOHM

C19	.0005	600
C20	.01	600
C21	12 MFD.	25 M
C22	.001	600
C23	.05	600
C24	.01	600
C25	12 MFD	35 V. X
C26	.004	800
C27	.05	600
C28	.4	400
C29	10 MFD	350 V. X
C30	10 MFD	450 V.
C31	.05	200
S1	WAVECHANGE SW.	
S2	AC SWITCH +	
L1	AF PLATE CHOKE	
L2	"	
R20	VOL. 500,000	

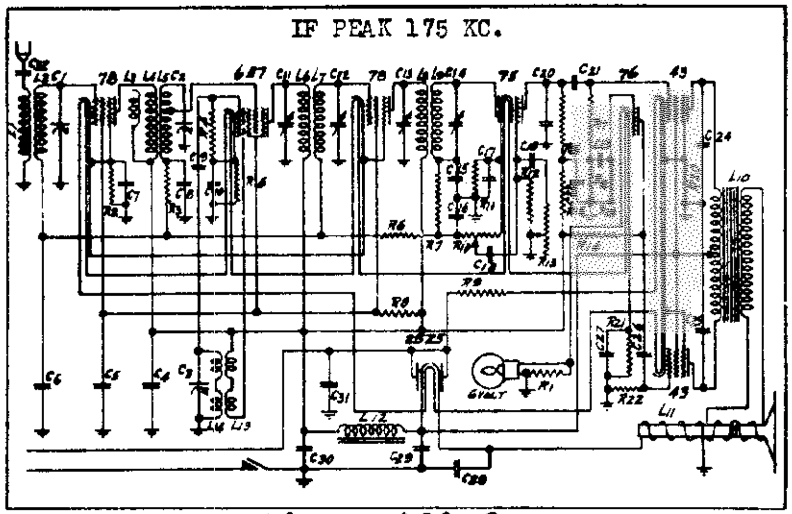
X COMMON

C	570 MMF 3 GANG
C1	3 PLATE TRIM.
C2	2 "
C3	.2 400
C4	.2 400
C5	.000005 MICA
C6	3 PLATE TRIM.
C7	2 "
C8	.05-200
C9	.05-200
C10	.00005 MICA
C11	2 PLATE TRIM.
C12	2 "
C13	.05-200
C14	.0025 MICA
C15	.004 "
C16	500 MMF. PADDER
C17	.05 200
C18	.2 KPC

+ COMBINES WITH TONE

MODEL AM-8 Schematic, Parts List
MODEL AM-10 Schematic, Parts List

LAFAYETTE RADIO & TELEVISION CORP.



MODEL AM-8

RESISTORS

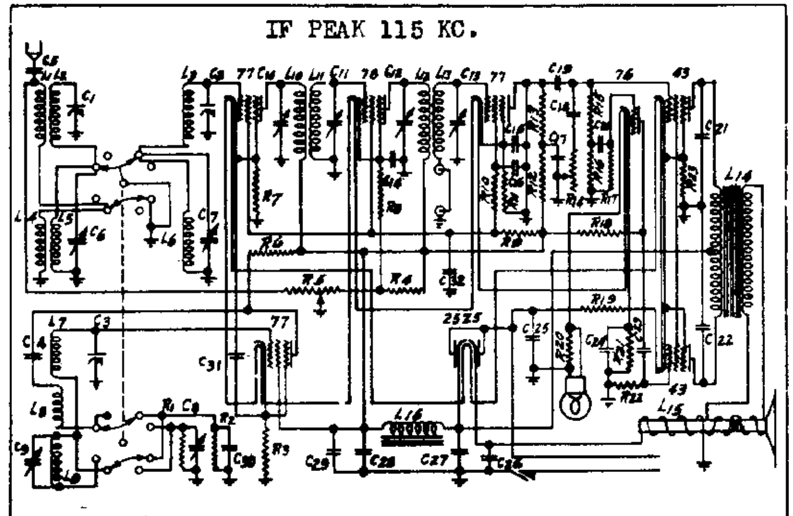
CODE	PART NO.	
R1	1309	13 Ohm Pilot Light Shunt Resistor
R2	1062	250 Ohm R.F. and I.F. Cathode Resistor
R3	923	100,000 Ohm A.V.C. Network Resistor
R4	921	40,000 Ohm Oscillator Grid Leak Resistor
R5	1062	250 Ohm 6A7 Cathode Resistor
R6	925	1 Megohm A.V.C. Network Resistor
R7	898	50,000 Ohm A.V.C. Network Filter Resistor
R8	941	20,000 Ohm 78 & 6A7 Screen Feed Resistor
R9	1119	36 Ohm Filament Series Resistor
R10	1315	500,000 Ohm Volume Control
R11	919	5,000 Ohm 75 Cathode Resistor
R12	925	500,000 Ohm 75 Grid Lead Resistor
R13	1317	250,000 Ohm Tone Control
R14	924	250,000 Ohm 76 Plate Resistor
R15	923	100,000 Ohm 75 Plate Filter Resistor
R16	924	250,000 Ohm 75 Plate Resistor
R17	925	500,000 Ohm 43 Grid Leak Resistor
R18	922	75,000 Ohm Push-pull Network Resistor
R19	925	500,000 Ohm 76 Grid Leak Resistor
R20	1062	250 Ohm 43 Cathode & Screen Resistor
R21	920	10,000 Ohm 76 Cathode Resistor
R22	925	500,000 Ohm 43 Grid Leak Resistor

CONDENSERS

CODE	PART NO.	
C1	833	371 MMFD. Preselector Section of 3 Gang Condenser
C2	833	371 MMFD. Preselector Section of 3 Gang Condenser
C3	833	336 MMFD. Oscillator Section of 3 Gang Condenser
C4	266	1. MFD. B Supply By-pass Condenser
C5	272	.1 MFD. Screen By-pass Condenser
C6	272	.1 MFD. A.V.C. By-pass Condenser
C7	272	.1 MFD. R.F. & I.F. Cathode By-pass Condenser
C8	272	.1 MFD. First Detector By-pass Condenser
C9	268	.00025 MFD. Oscillator Coupling Condenser
C10	272	.1 MFD. 6A7 Cathode By-pass Condenser
C11	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C12	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C13	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C14	1107	70-200 Second I.F. Secondary Trimmer Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	339	.0001 MFD. Diode Filter Condenser
C17	272	.1 MFD. 75 Cathode By-pass Condenser
C18	269	.01 MFD. Volume Control Condenser
C19	269	.01 MFD. Tone Control Condenser
C20	265	.001 MFD. 75 Plate Filter Condenser
C21	269	.01 MFD. Audio Feed Condenser
C22	272	.1 MFD. 75 Hum Filter Condenser
C23	269	.01 MFD. Inverter Feed Condenser
C24	343	.004 MFD. Output Plate Filter Condenser
C25	343	.004 MFD. Output Plate Filter Condenser
C26	269	.01 MFD. Push-pull Coupling Condenser
C27	272	.1 MFD. 76 Cathode By-pass Condenser
C28	1295	4 MFD. Field Supply Filter Condenser
C29	1295	10 MFD. Push-pull Plate Supply Filter Condenser
C29	1085	19 MFD. Push-pull Plate Supply Filter Condenser
C30	1295	4 MFD. B Supply Filter Condenser
C31	272	.1 MFD. Power Line By-pass Condenser

INDUCTANCES

CODE	PART NO.	
L1	1138	Preselector Primary 480 Turns #36 S.S.E.
L2	1138	Preselector Secondary 144 Turns #36 D.C.C.
L3	1213	Detector Primary Condenser Winding 32 Turns #36 S.S.E.
L4	1213	Detector Primary 450 Turns #36 S.S.E.
L5	1213	Detector Secondary 91 and 108 Turns #36 D.C.C.
L6	1101	8,000 Microhenry First I.F. Primary 175 K.C.
L7	1101	8,000 Microhenry First I.F. Secondary
L8	1101	8,000 Microhenry Second I.F. Primary 175 K.C.
L9	1101	8,000 Microhenry Second I.F. Secondary
L10		43 Push-pull Output Transformer
L11		2,500 Ohm Speaker Field
L12	940	20 Henry Filter Choke
L13	1111	Oscillator Primary 35 Turns & 15 Turns #36 S. S.E.
L14	1111	Oscillator Secondary 72 Turns & 80 Turns #36 D.C.C.



MODEL AM-10

RESISTORS

CODE	PART NO.	
R1	1042	25,000 Ohm Long Wave Oscillator Grid
R2	1042	25,000 Ohm Broadcast Oscillator Grid
R3	1063	500 Ohm Oscillator Cathode
R4	922	75,000 Ohm I.F. Cathode Feed
R5	1296	10,000 Ohm Volume Control & Switch
R6	941	20,000 Ohm Oscillator Plate Feed
R7	919	5,000 Ohm First Detector Cathode
R8	1062	250 Ohm I.F. Cathode
R9	921	40,000 Ohm Screen Feed
R10	924	250,000 Ohm Second Detector Screen
R11	1003	15,000 Ohm Second Detector Cathode
R12	923	100,000 Ohm Second Detector Plate Hum Resistor
R13	924	250,000 Ohm Second Detector Plate
R14	1317	250,000 Ohm Tone Control
R15	925	500,000 Ohm 43 Grid Leak Resistor
R16	922	75,000 Ohm Push-pull Network Resistor
R17	925	500,000 Ohm 76 Grid Leak Resistor
R18	924	250,000 Ohm 76 Plate Feed Resistor
R19	1119	36 Ohm Filament Series Resistor
R20	1309	13 Ohm Pilot Light Shunt Resistor
R21	920	10,000 Ohm 76 Cathode
R22	925	500,000 Ohm 43 Grid Leak Resistor
R23	1062	250 Ohm 43's Cathode & Grid

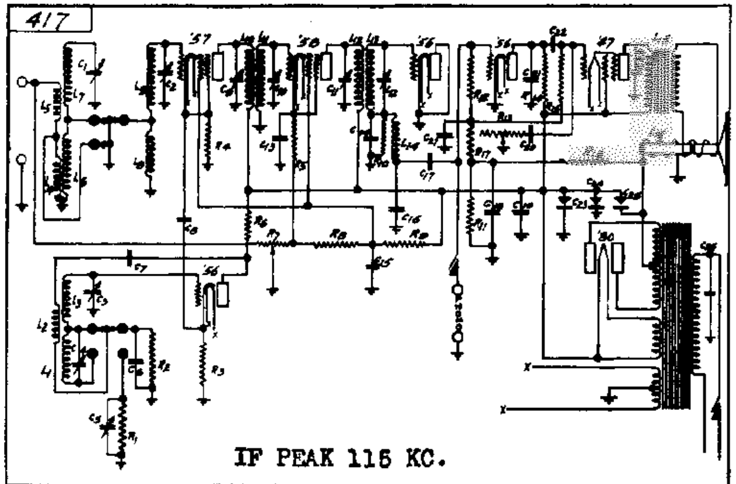
CONDENSERS

CODE	PART NO.	
C1	833	371 MMFD. Preselector Section of 3 Gang Condenser
C2	633	371 MMFD. Preselector Section of 3 Gang Condenser
C3	833	336 MMFD. Oscillator Section of 3 Gang Condenser
C4	269	.01 MFD. Oscillator Coupling Condenser
C5	269	.01 MFD. Antenna Series Condenser
C6	971	2 Plate First Preselector Trimmer
C7	971	2 Plate Second Preselector Trimmer
C8	784	4 Plate Long Wave Oscillator Trimmer
C9	972	2 Plate Long Wave Oscillator Trimmer
C10	993	75-150 MMFD. First I.F. Primary Trimmer
C11	994	75-150 MMFD. First I.F. Secondary Trimmer
C12	995	75-150 MMFD. Second I.F. Primary Trimmer
C13	996	75-150 MMFD. Second I.F. Secondary Trimmer
C14	272	.1 MFD. I.F. Cathode By-pass Condenser
C15	926	25 MFD. Second Detector Cathode Filter Condenser
C16	269	.01 MFD. Second Detector Screen By-pass Condenser
C17	272	.1 MFD. Second Detector Plate Hum Filter
C18	269	.01 MFD. Tone Control Condenser
C19	269	.01 MFD. Audio Feed Condenser
C20	269	.01 MFD. Invertor Feed Condenser
C21	343	.004 MFD. 43 Plate Filter Condenser
C22	343	.004 MFD. 43 Plate Filter Condenser
C23	269	.01 MFD. Push-pull Feed Condenser
C24	272	.1 MFD. 76 Cathode By-pass Condenser
C25	272	.1 MFD. Lone By-pass Condenser
C26	1295	4 MFD. Field Supply Filter Condenser
C27	1295	10 MFD. Push-pull Plate Supply Filter Condenser
C27	1085	10 MFD. Push-pull Plate Supply Filter Condenser
C28	1295	4 MFD. B Supply Filter Condenser
C29	266	1 MFD. B Supply By-pass Condenser
C30	343	.004 MFD. Broadcast Oscillator Condenser
C31	269	.01 MFD. Oscillator Coupling Condenser
C32	272	.1 MFD. Screen By-pass Condenser

INDUCTANCES

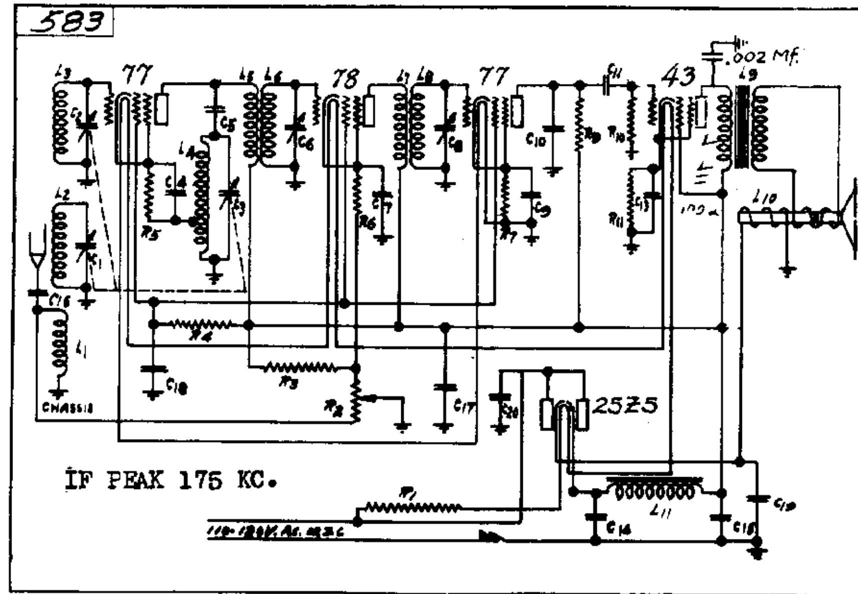
CODE	PART NO.	
L1	976	Broadcast Preselector Primary 178 Turns #36 S. S. E.
L2	976	Broadcast First Preselector Secondary 139 Turns #36 S. S. E.
L3	976	Broadcast Second Preselector Secondary 132 Turns #36 S. S. E.
L4	781	Long Wave Preselector Primary
L5	781	Long Wave First Preselector Secondary
L6	781	Long Wave Second Preselector Secondary
L7	782	Long Wave Oscillator Secondary
L8	782	Long Wave & Broadcast Oscillator Primary
L9	782	Broadcast Oscillator Secondary
L10	999	25,000 Microhenry First I.F. Primary
L11	999	25,000 Microhenry First I.F. Secondary
L12	1156	14,000 Microhenry Second I.F. Primary
L13	1156	14,000 Microhenry Second I.F. Secondary
L14		43 Push-pull Output Transformer
L15		2500 Ohm Speaker Field
L16	940	20 Henry Filter Choke

MODEL A-7, M-69, M-70
Schematic, Parts List LAFAYETTE RADIO & TELEVISION CORP.
MODEL A-15
Schematic, Parts List



Model M-69, 70. Also A-7

CODE	PART NO.		RESISTORS
R1	94	25,000	Ohm Type J Resistor Long Wave Oscillator Grid
R2	94	25,000	Ohm Type J Resistor Broadcast
R3	279	500	Ohm Type J Resistor Oscillator Cathode
R4	193	1,000	Ohm Type J Resistor First Detector Cathode
R5	325	250	Ohm Type J Resistor First I.F. Cathode
R6	278	20,000	Ohm Type J Resistor Oscillator Plate Feed
R7	512	10,000	Ohm Potentiometer Volume Control and Switch
R8	192	40,000	Ohm Type J Resistor Volume Control Voltage Feed
R9	278	20,000	Ohm Type J Resistor R.F. and I.F. Screen Feed
R10	201	500,000	Ohm Type J Resistor Second Detector Grid
R11	200	100,000	Ohm Type J Resistor C Bias Network
R12	201	500,000	Ohm Type J Resistor First Audio Grid Bias
R13	534	250,000	Ohm Variable Resistance, Tone Control
R14	204	100,000	Ohm Type J Resistor First Audio Plate Feed
R15	201	500,000	Ohm Type J Resistor 247 Grid Bias
R16	198	1	Megohm Type J Resistor C Bias Network
R17	201	500,000	Ohm Type J Grid Bias Hum Filter
			CONDENSERS
C1)			(365 MMFD Preselector Section of Three Gang Condenser
C2)	547		(365 MMFD Preselector Section of Three Gang Condenser
C3)			(350 MMFD Oscillator Section of Three Gang Condenser
C4			One Plate Long Wave Reciprocal Oscillator Trimmer
C5			Four Plate Long Wave Grid Oscillator Trimmer
C6	503		.004 Broadcast Oscillator Condenser
C7	503		.004 MFD Oscillator Feed Condenser
C8	269		.01 MFD Oscillator Cathode Feed Condenser
C9			75 - 150 MMFD First I.F. Primary Trimmer
C10			75 - 150 MMFD First I.F. Secondary
C11			75 - 150 MMFD Second I.F. Primary Trimmer
C12			75 - 150 MMFD Second I.F. Secondary Trimmer
C13	272		.1 MFD I.F. Cathode By-pass Condenser
C14	339		.0001 MFD Second Detector Grid By-pass
C15	272		.1 MFD R.F. and I.F. Screen By-pass Condenser
C16	307		.0005 MFD Second Detector R.F. Filter Condenser
C17	269		.01 MFD First Audio Feed Condenser
C18	180		1. MFD C Bias By-pass Condenser
C19	266		1. MFD B. By-pass Condenser
C20	269		.01 MFD Tone Control Condenser
C21	662		.002 MFD First Audio Plate Filter Condenser
C22	269		.01 MFD Second Audio Coupling Condenser
C23	721		8 MFD Electrolytic Filter Condenser
C24)	533		(4 MFD Electrolytic Filter Condenser
C25)			(4 MFD Electrolytic Filter Condenser
C26	269		.01 MFD Power Line By-pass Condenser
C27	272		.1 MFD Grid Bias Hum Filter Condenser
C28	343		.004 MFD Output Plate Filter Condenser
			INDUCTANCES
L1			Long Wave Oscillator Secondary 1975 Microhenrys
L2			Long Wave and Broadcast Oscillator Primary 10 Turns #36 P.E.
L3			Long Wave Oscillator Secondary 95 Turns #32 P.E.
L4			Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E.
L5			Broadcast First Preselector Primary U.W. 110 Turns #36 S.S.E.
L6			Long Wave First Preselector Secondary U.W. 3560 Microhenries
L7			Broadcast First Preselector Secondary 126 Turns #32 P.E.
L8			Long Wave Second Preselector Secondary 3380 Microhenries
L9			Broadcast Second Preselector Secondary 118 Turns #32 P.E.
L10)			(25,000 Microhenries First I.F. Primary U.W. 115 K.C.
L11)	A 999		(25,000 Microhenries First I.F. Secondary U.W. 115 K.C.
L12)			(25,000 Microhenries Second I.F. Primary U.W. 115 K.C.
L13)	A 999		(25,000 Microhenries Second I.F. Secondary U.W. 115 K.C.
L14	100		5.5 Millihenries R.F. Choke
L15			Output Transformer
L16			2,500 Ohm Speaker Field

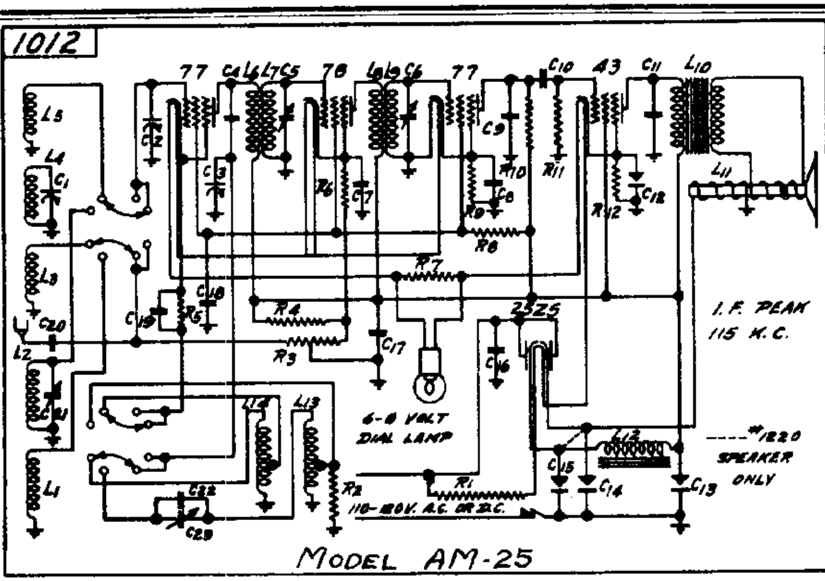


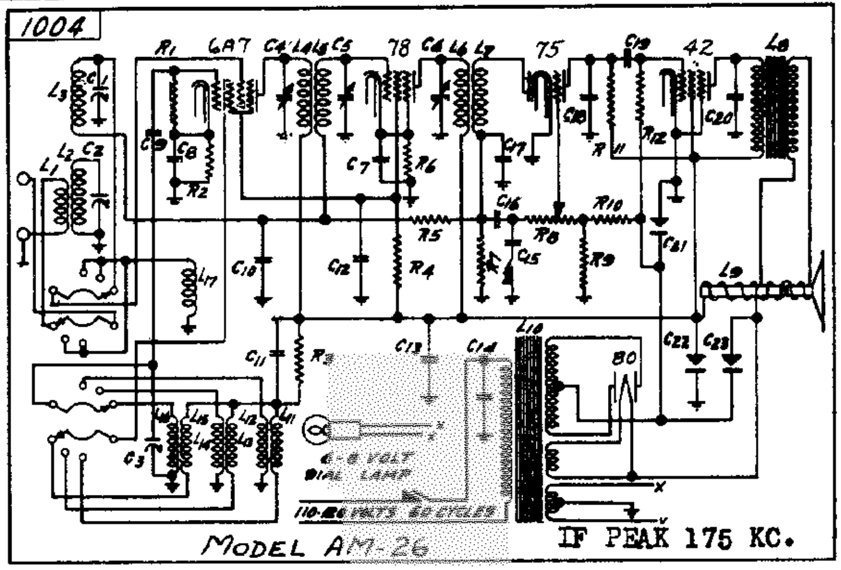
Model A-15

Code	Part No.		RESISTORS
R1	~~[illegible]~~ 1125	~~[illegible]~~ 120	Ohm Filament Resistor In Power Cord
R2	853	10,000	Ohm Volume Control and Switch
R3	922	75,000	Ohm Resistor I.F. Cathode Feed
R4	921	40,000	Ohm Resistor Screen Feed
R5	919	5,000	Ohm Resistor First Detector & Oscillator Cathode
R6	1063	500	Ohm Resistor I.F. Cathode Feed
R7	941	20,000	Ohm Resistor Second Detector Cathode
R8			
R9	924	250,000	Ohm Resistor Second Detector Plate Load
R10	925	500,000	Ohm Resistor Output Grid Bias
R11	1063	500	Ohm Resistor 43 Bias
R12	1308	20	OHM PILOT LIGHT SHUNT
			CONDENSERS
C1	833	365	MMFD. Preselector Section of Variable Condenser
C2	833	365	MMFD. Preselector Section of Variable Condenser
C3	833	350	MMFD. Oscillator Section of Variable Condenser
C4	265	.001	MFD. First Detector & Oscillator Cathode Condenser
C5	264	.00005	MFD. Oscillator Coupling Condenser
C6	477	75-150	MMFD. First I.F. Trimmer Condenser
C7	272A	.1	MFD. I.F. Cathode By-pass Condenser
C8	849 183A	75-150	MMFD. Second I.F. Trimmer Condenser
C9	~~[illegible]~~ 183A	.2	MFD. Second Detector Cathode
C10	265	.001	MFD. Second Detector Plate R.F. Filter
C11	269A	.01	MFD. Audio Feed Condenser
C12			
C13	928	25	MFD. C. Bias By-pass
C14	~~[illegible]~~ 1085	12	MFD. Voltage Filter Condenser
C15	~~[illegible]~~	4	MFD. Voltage Filter Condenser
C16	265	.001	MFD. Antenna Series Condenser
C17	257A	.5	B Supply By-pass Condenser
C18	272A	.1	200 Volt Screen By-pass Condenser
C19	~~[illegible]~~ 1075	4	MFD. Voltage Filter Condenser
C20	272A	.1	MFD. 200 Volt Line By-pass Condenser
			INDUCTANCES
L1	847		Preselector Primary 178 Turns #36 S.S.E. U.W.
L2	847		Preselector First Secondary 128 Turns #36 S.S.E. U.W.
L3	847		Preselector Second Secondary 135 Turns #36 S.S.E. U.W.
L4	938		Oscillator Coil 98 Turns Tapped 15 Turns #36 S.S.E.
L5	938		First I.F. Primary 650 Turns #36 S.S.E. U.W.
L6	938		First I.F. Secondary 650 Turns #36 S.S.E. U.W.
L7	937		Second I.F. Primary 650 Turns #36 S.S.E. U.W.
L8	937		Second I.F. Secondary 650 Turns #36 S.S.E. U.W.
L9			Single #43 Output Transformer
L10	917		3,000 Ohm Speaker Field
L11	940		32 Henry Choke

LAFAYETTE RADIO & TELEVISION CORP.

MODEL AM-25 Schematic, Parts List
MODEL AM-26 Schematic, Parts List





MODEL AM-25

CODE	PART NO.	RESISTORS
R1	1125	130 Ohm Resistor in Power Cord A.P.
R2	1063	500 Ohm Long Wave Oscillator Resistor
R3	1296	10,000 Ohm Volume Control & Switch
R4	922	75,000 Ohm I.F. Cathode Resistor
R5	919	5,000 Ohm Oscillator Feed Resistor
R6	1063	500 Ohm I.F. Cathode Bias Resistor
R7	1308	20 Ohm Pilot Light Shunt Resistor
R8	921	40,000 Ohm R.F. & I.F. Screen Feed Resistor
R9	941	20,000 Ohm Second Detector Cathode Bias Resistor
R10	924	250,000 Ohm Second Detector Plate Load Resistor
R11	925	500,000 Ohm 43 Grid Bias Resistor
R12	1063	500 Ohm 43 Cathode Bias Resistor

CODE	PART NO.	CONDENSERS
C1	855	371 MMFD. First Preselector Section of 3 Gang
C2	855	371 MMFD. Second Preselector Section of 3 Gang
C3	855	356 MMFD. Oscillator Section of 3 Gang
C4	264	.00005 MFD. Oscillator Plate Feed Condenser
C5	1521	75-150 MMFD. First I.F. Trimmer
C6	1525	75-150 MMFD. Second I.F. Trimmer
C7	272A	.1 MFD. 200 Volt I.F. Cathode By-Pass
C8	183A	.2 MFD. 200 Volt Second Detector Cathode By-Pass
C9	662	.002 MFD. Mica Second Detector Plate Filter
C10	269A	.01 MFD. 400 Audio Feed Condenser
C11	269A	.01 MFD. 400 Volt Output Plate Filter
C12	928	25 MFD. 25 Volt 43 Cathode By-Pass
C13	1295	4 MFD. 150 W.V. Dry Electrolytic
C14	1295	4 MFD. 150 W.V. Dry Electrolytic
C15	1295	10 MFD. 150 W.V. Dry Electrolytic
C16	272A	.1 MFD. 200 Volt Line By-Pass Condenser
C17	267A	.5 MFD. 200 Volt B. Supply By-Pass Condenser
C18	272A	.1 MFD. 200 Volt R.F. & I.F. Screen By-Pass
C19	265	.001 MFD. Mica Oscillator Coupling Condenser
C20	265	.001 MFD. Mica Antenna Series Condenser
C21	972	2 Plate L.W. Preselector Trimmer
C22	339	2-.0001 MFD. Mica L.W. Oscillator Series Condenser
C23	1522	75-100 MMFD. L.W. Oscillator Series Trimmer

CODE	PART NO.	INDUCTANCES
L1	1475	L.W. Preselector Primary 800 Turns #36 S.S.E.
L2	1475	Long-Wave Preselector Secondary 490 Turns #36 S.S.E.
L3	647	Broadcast Preselector Primary 178 Turns #36 S.S.E.
L4	647	Broadcast First Secondary 133 Turns #36 S.S.E.
L5	647	Broadcast Second Secondary 128 Turns #36 S.S.E.
L6	1470	Microhenry First I.F. Primary
L7	1470	25,000 Microhenry First I.F. Secondary
L8	1473	25,000 Microhenry Second I.F. Primary
L9	1473	25,000 Microhenry Second I.F. Secondary
L10		#43 Output Transformer 917 Rola 1220 Quam
L11		3000 Ohm Speaker Field 917 Rola 1220 Quam
L12	940	20 Henry Choke
L13	1476	L.W. Oscillator 390 Turns #36 S.S.E. Tapped 20 Turns
L14	1470	Broadcast Oscillator 106 Turns #36 S.S.E. Tapped 30 Turns

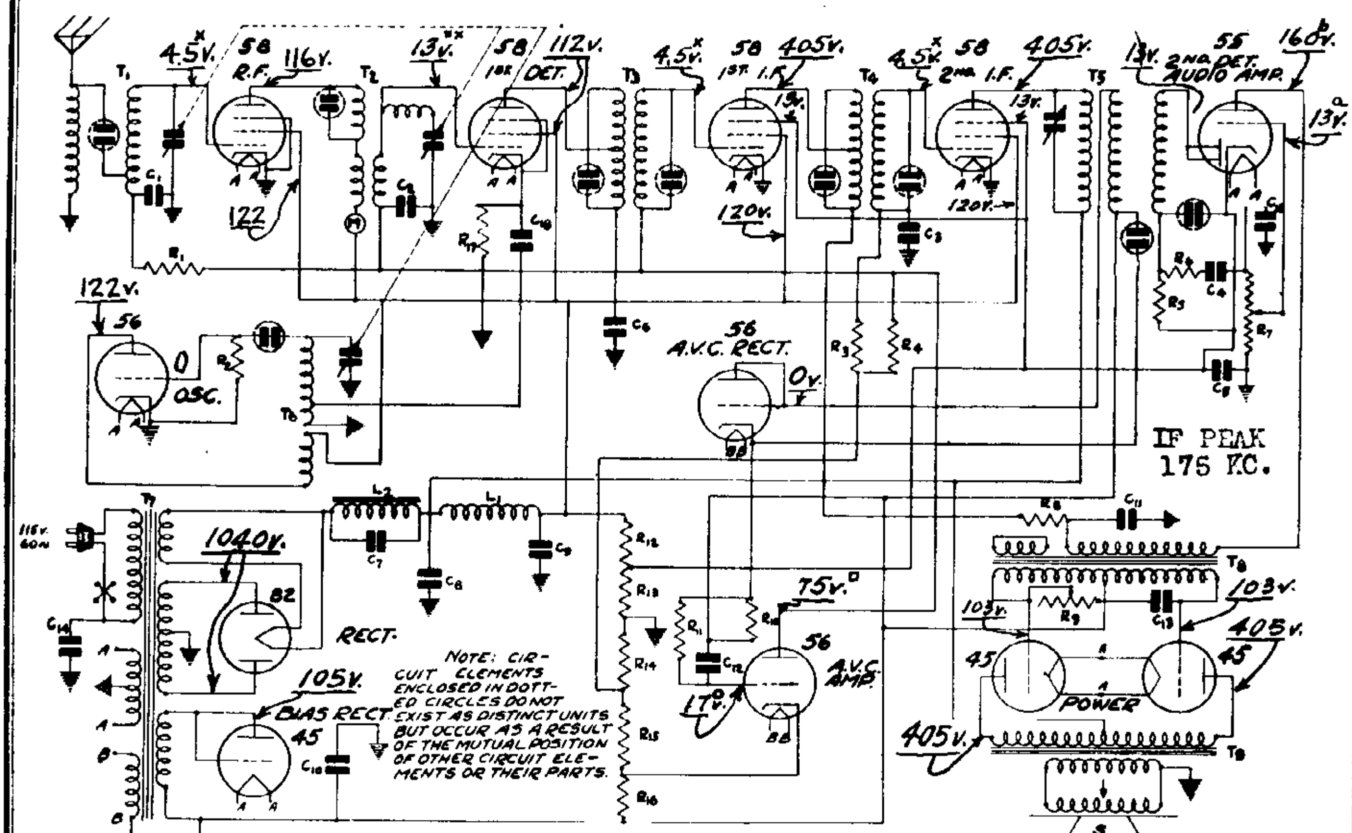
MODEL AM-26

CODE	PART NO.	RESISTORS
R1	898	50,000 Ohm Oscillator Grid Leak
R2	1062	250 Ohm 6A7 Cathode Bias
R3	920	10,000 Ohm Oscillator Feed
R4	898	50,000 Ohm 6A7 & 78 Screen Grid
R5	926	1 Meg Ohm A.V.C. Network
R6	1063	500 Ohm 78 Cathode Bias
R7	925	500,000 Ohm A.V.C. Network
R8	1391	500,000 Ohm Volume Control & Switch
R9	1122	40 Ohm C Bias Network
R10	1063	500 Ohm C Bias Network
R11	923	100,000 Ohm 75 Plate Resistor
R12	925	500,000 Ohm 42 Grid Resistor

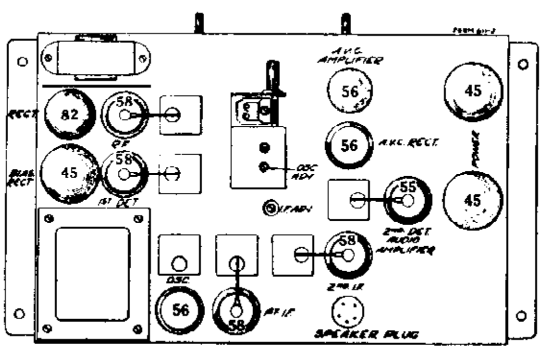
CODE	PART NO.	CONDENSERS
C1	833	371 MMFD. Preselector Section of 3 Gang
C2	833	371 MMFD. Preselector Section of 3 Gang
C3	833	356 MMFD. Oscillator Section of 3 Gang
C4	1104	70-200 MMFD. First I.F. Primary Trimmer
C5	1105	70-200 MMFD. First I.F. Secondary Trimmer
C6	849	75-150 MMFD. Second I.F. Primary Trimmer
C7	272A	.1 MFD. 200 Volt 78 Cathode By-Pass
C8	272A	.1 MFD. 200 Volt 6A7 Cathode By-Pass
C9	264	.00005 MFD. Mica Oscillator Coupling Condenser
C10	272A	.1 MFD. 200 Volt A.V.C. By-Pass
C11	272A	.1 MFD. 200 Volt Oscillator Feed By-Pass
C12	272A	.1 MFD. 200 Volt 6A7 & 78 Screen Grid By-Pass
C13	569A	.2 MFD. 400 Volt B By-Pass
C14	269A	.01 MFD. 400 Volt Line By-Pass
C15	345A	.004 MFD. 600 Volt Tone Control Condenser
C16	269A	.01 MFD. 400 Volt Second Detector Feed
C17	307	.0005 MFD. Mica Diode Filter Condenser
C18	265	.001 MFD. Mica 75 Plate Filter
C19	269A	.01 MFD. 400 Volt Audio Feed
C20	269A	.01 MFD. 400 Volt 42 Plate Filter
C21	928	25 MFD. 25 Volt Electrolytic C Bias Filter
C22	1379	4 MFD. 350 W.V. Electrolytic B Filter
C23	721	8 MFD. 450 W.V. Electrolytic B Filter

CODE	PART NO.	INDUCTANCES
L1	1108	Antenna Primary 178 Turns #36 S.S.E.
L2	1108	Preselector, First 136 Turns #36 S.S.E.
L3	1108	Preselector, Second 126 Turns #36 S.S.E.
L4	1101	8,000 Microhenries First I.F. Primary
L5	1101	8,000 Microhenries First I.F. Secondary
L6	1172	6,000 Microhenries Second I.F. Primary
L7	1172	6,000 Microhenries Second I.F. Secondary
L8	1380	Single 42 Output Transformer
L9	1380	1,500 Ohm Speaker Field
L10	1301	Power Transformer (Unless Special)
L11	1444	Foreign Band Oscillator Primary 9¼ Turns #36 D.C.C.
L12	1444	Foreign Band Oscillator Secondary 6¾ Turns #24 S.S.C.
L13	1487	Police Band Oscillator Primary 15 Turns #36 S.S.E.
L14	1487	Police Band Oscillator Secondary 40 Turns #36 D.C.C.
L15	1111	Broadcast Oscillator Primary 50 Turns #36 S.S.E.
L16	1111	Broadcast Oscillator Secondary 120 Turns #36 D.C.C.
L17	1486	Short Wave Antenna Impedance [illegible]

MODEL B-51, B-52
B-53, B-54 LAFAYETTE RADIO & TELEVISION CORP.



*As read across R-14. **As read across R-17 and R-14. °As read across R-15 with 1,000,000 ohm meter.
°As read across R-16. a Vol. Cont. at Minimum.
b Triode plate to cathode



CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80862	C1	.050 mfd.	200 V.	Tubular	$0.30
P-80987	C2	.150 mfd.	200 V.	Tubular	.25
P-80862	C3	.050 mfd.	200 V.	Tubular	.30
P-80862	C4	.050 mfd.	200 V.	Tubular	.30
P-80888	C5	.250 mfd.	200 V.	Tubular	.40
P-80888	C6	.250 mfd.	200 V.	Tubular	.40
P-80985	C7	.150 mfd.	200 V.AC	Tubular	.55
P-80984	C8	16. mfd.	450 V.	Electrolytic Block	4.00
	C9	6. mfd.	150 V.		
	C10	8. mfd.	100 V.		
	C11	4. mfd.	350 V.		

16 mfd. Section—Term. 3+, Term. 1−
6 mfd. Section—Term. 5+, Term. 1−
4 mfd. Section—Term. 4+, Term. 1−
8 mfd. Section—Term. 6+, Term. 2−

Part No.	Code	Capacity	Voltage	Type	List Price
P-80862	C12	.050 mfd.	200 V.	Tubular	.30
P-80868	C13	.004 mfd.	600 V.	Tubular	.25
P-80997	C14	.010 mfd.	600 V.	Metal Can	.50
P-80919	C16	.00025 mfd.	600 V.	Moulded	.20
P-80914	C18	.002 mfd.	200 V.	Tubular	.20
P-80991	3 Gang Condenser				3.85
P-1922	3rd I. F. Trimmer Condenser				.50

RESISTORS

Part No.	Code	Resistance	Type	
P-A95204	R1	200,000 ohm	Carbon	$0.20
P-A95504	R2	.5 megohm	Carbon	.25
P-A95105	R3	1 megohm	Carbon	.25
P-A95504	R4	.5 megohm	Carbon	.25
P-B94803	R5	80,000 ohm	Carbon	.25
P-A95104	R6	100,000 ohm	Carbon	.25
P- 96008	R7	2 megohm	Vol. Con. & Switch	1.20
P-C94403	R8	40,000 ohm	Carbon	.25
P- 97006	R9	3 megohm	Tone Control	.90
P-A95204	R10	200,000 ohm	Carbon	.20
P-A95105	R11	1 megohm	Carbon	.25
P- 98003	R12 R13	4000 ohm 390 ohm	Armoured Wire Wound	.50
P-A94902	R14	9,000 ohm	Carbon	.25
P-A94154	R15	150,000 ohm	Carbon	.25
P-A94353	R16	35,000 ohm	Carbon	.25
P-A95352	R17	3,500 ohm	Carbon	.20

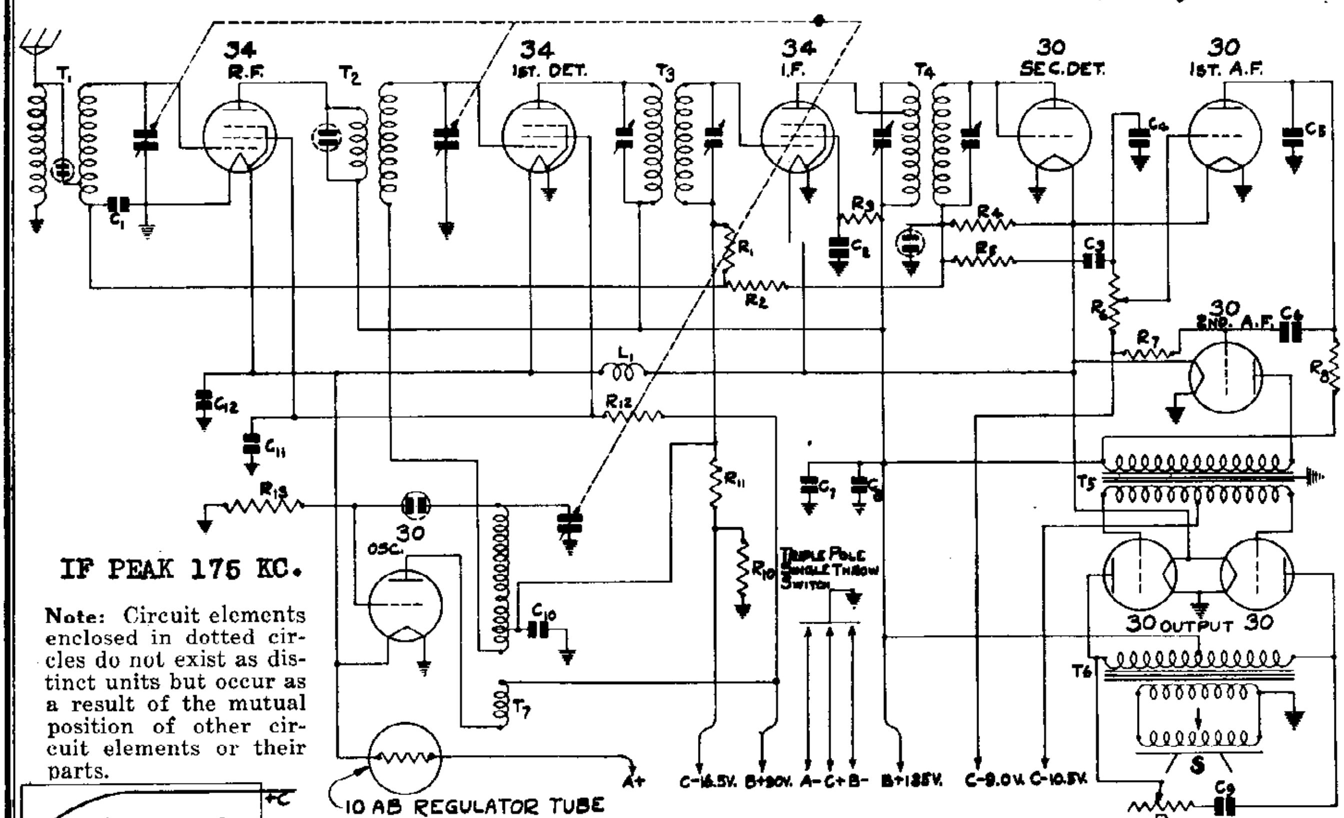
"A" preceding the number signifies .2 watt
"B" preceding the number signifies .5 watt
"C" preceding the number signifies 1.0 watt

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the 3rd I. F. primary condenser for maximum output. The adjusting screw for this condenser is reached from the top of the sub-panel and will be seen in back of the tuning condenser.

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

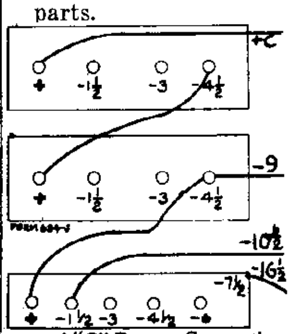
MODEL B-60
Schematic, Voltage
Socket, Parts List

LAFAYETTE RADIO & TELEVISION CORP



IF PEAK 175 KC.

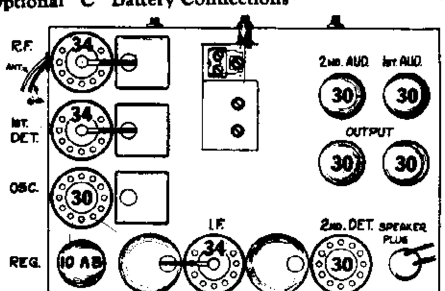
Note: Circuit elements enclosed in dotted circles do not exist as distinct units but occur as a result of the mutual position of other circuit elements or their parts.

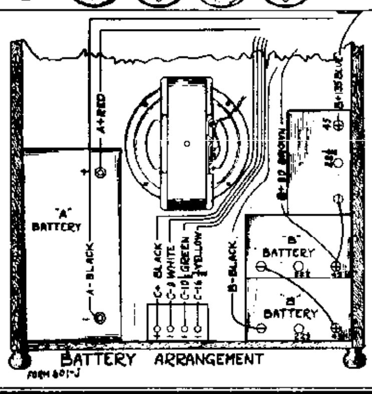


Optional "C" Battery Connections

Part No.	Code	Resistance	Type
P-A95504	R1	.5 megohm	Carbon
P-A94105	R2	1.0 megohm	Carbon
P-A95353	R3	35,000 ohms	Carbon
P-A94204	R4	200,000 ohms	Carbon
P-A95104	R5	100,000 ohms	Carbon
P- 96009	R6	1 megohm	Volume Control
P-A94105	R7	1 megohm	Carbon
P-A95104	R8	100,000 ohms	Carbon
P- 97005	R9	150,000 ohms	Tone Control
P-A94153	R10	15,000 ohms	Carbon
P-A94405	R11	4 megohms	Carbon
P-A94153	R12	15,000 ohms	Carbon
P-A95504	R13	.5 megohm	Carbon

Part No.	Code	Capacity	Voltage	Type
P-80864	C1	.10 mfd.	200 V.	Tubular
P-80862	C2	.050 mfd.	200 V.	Tubular
P-80862	C3	.050 mfd.	200 V.	Tubular
P-80919	C4	.00025 mfd.	600 V.	Moulded
P-80919	C5	.00025 mfd.	600 V.	Moulded
P-80862	C6	.050 mfd.	200 V.	Tubular
P-80968	C7	4.00 mfd.	150 V.	Electrolytic
P-80862	C8	.050 mfd.	200 V.	Tubular
P-80940	C9	.02 mfd.	400 V.	Tubular
P-80981	C10	.01 mfd.	400 V.	Tubular
P-80888	C11	.25 mfd.	200 V.	Tubular
P-80888	C12	.25 mfd.	200 V.	Tubular
P-80980	Three Gang Variable Condenser			





Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read From Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
34	R.F.	2.0	135	65	3.0(1)	2.6
34	1st Det.	2.0	135	65	4.5(1)	2.5
30	Osc.	2.0	90		2–4(2)	3.3
34	I.F.	2.0	135	90	4.5(1)	3.0
30	2nd Det.	2.0				
30	1st Audio	2.0	90		9.0(3)	.45
30	2nd Audio	2.0	130		9.0(4)	3.4
30	Output	2.0	135		10.5	2.5

(1) Computed figure—cannot be read because of high resistance circuit.
(2) Varies with frequency setting. (4) As read at battery.
(3) Volume Control at minimum.

Aug., 1933

MODEL B-60
Alignment
Parts List

LAFAYETTE RADIO & TELEVISION CORP.

Batteries

The batteries and voltages required are shown in Figs. 2 and 3.

The majority of potential complaints on short "B" battery life can be prevented if proper instructions are given to the customer at the time the receiver is installed. The average "B" drain of this receiver under no signal conditions is 18 milliamperes. **A milliammeter in the negative "B" line will quickly determine whether the "B" drain is excessive or normal.**

Two factors directly affect the "B" battery consumption. One is the strength of the station signal. When the signal is weak, little or no automatic volume control action is obtained, and the 34 tubes draw high plate current. As the strength of the incoming signal increases, plate current in these tubes is reduced with a corresponding reduction in total "B" battery current. The other factor is the volume used. As the volume is increased, the "B" battery drain of the output tubes is increased.

As this receiver does not have a pilot lamp, it is easy to forget to turn it off. When this happens, the receiver may be on as long as 24 hours or more. A continuous drain of this kind for a long period will shorten the life of the "B" batteries considerably. **Caution the customer regarding this.**

The "A" Battery consists of any direct current power supply source delivering from 2 to 3 volts. An air cell, 3 volt dry cell bank, and 2 volt storage cell are some of the units which can be used. **Caution—do not use a 6 volt storage battery.**

For the "C" battery a special 22½ volt "C" battery with 9, 10½ and 16½ volt taps, as indicated in Fig. 2, may be used. If such a battery is not available, two standard 4½ volt "C" batteries and a standard 7½ volt "C" battery can be connected as shown in Fig. 3 to supply the necessary voltages.

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

Tubes

The tubes used in this receiver are all of the 2 volt series. The 34's are R. F. Pentodes with the suppressor grid tied internally to the cathode. The 30 tube is a general purpose triode. All of these tubes are of the filament or directly heated cathode type. All of them have a 2 volt filament and should not be connected to a power supply not intended for this type of tube. The filaments of both types of tubes take 60 milliamperes at 2 volts and the total "A" drain is therefore 9 times .06 or .54 amperes. The average "B" drain of the receiver under no signal conditions is 18 milliamperes. The tube marked 10AB is a voltage regulator which keeps the filament voltage within safe operating limits over a battery range of 2 to 3 volts.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K. C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required. If, after the receiver has been aligned at 1400 K. C., the sensitivity is still low at some portion of the band, adjust the signal generator to that setting and tune for maximum output with the station selector knob on the receiver. Then, without readjusting the trimmers, bend the slotted rotor plates on the **front two sections** of the gang to obtain maximum output. Care should be taken not to bend these plates too far in an inward direction as the condenser may short as a result.

After any adjustment of this nature, set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

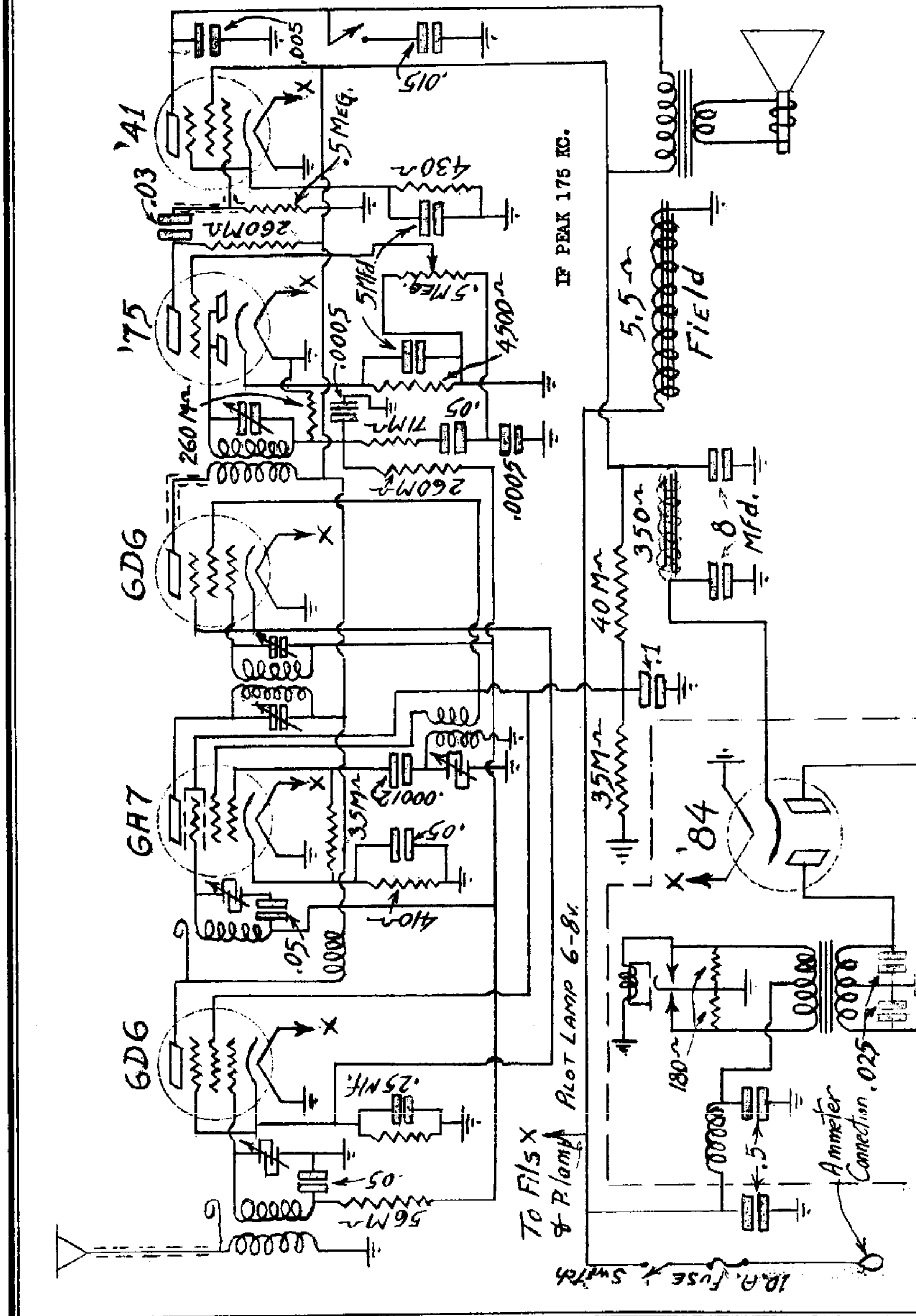
REPAIR PARTS LIST FOR 10 TUBE BATTERY OPERATED SUPERHETERODYNE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

Part No.	Item
P-1727	No. 30 Socket
P-1729	No. 34 Socket
P-1832	Reg. Socket
P-1640	Spkr. Socket
P-20406B	Tube Shield
P-20408	Tube Shield Base
P-1960	On-Off Switch
P-1504	8-Lug Terminal Strip
P-20714	Bottom Plate
P-5115	Antenna R. F. Transf. Assembly less can
P-5116	Interstage R. F. Transf. Assembly less can.
P-5117	Oscillator Coil Assembly less can
P-40482	Cans for the above assemblies
P-5128	1st I. F. Assembly complete with can
P-5129	2nd I. F. Assembly complete with can
P-5111	Filament Choke
P-50589	Audio Input Transformer
P-50590	Audio Output Transformer
P-70751	9-Wire Battery Cable
P-10272	Rubber Mtg. Feet
P-1540	Knobs, Plain
P-1724	Knob, Indicator
P-30842	Grid Cap Only
P-10224	Rubber Drive Pinion
P-30374	Bushing for Rubber Pinion
P-1897	Permanent Magnet Dynamic Speaker
P-1627	Tuning Meter

MODEL LW-10
Schematic

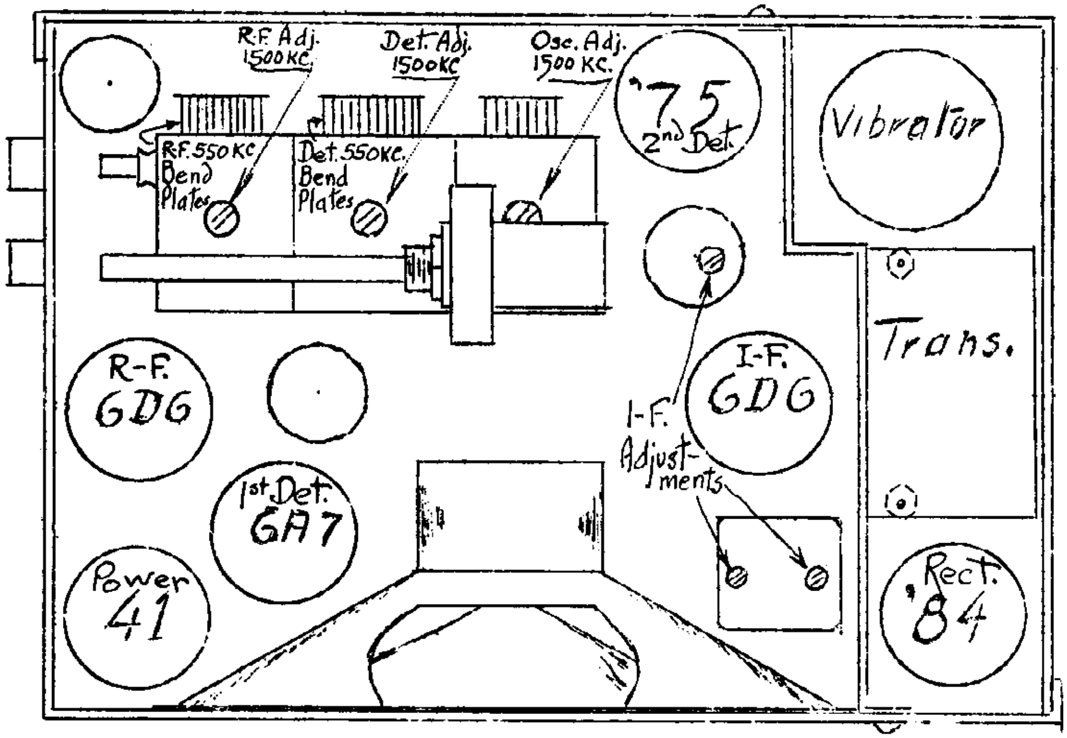
LAFAYETTE RADIO & TELEVISION CORP.



The set operates on 6 to 8 volts battery with either POSITIVE or NEGATIVE grounded.

MODEL LW-10
Socket, Parts
Alignment

LAFAYETTE RADIO & TELEVISION CORP.



I-F. Alignment
Connect test oscillator, set at 175 KC. to Grid of 6A7 and Gnd. Ground stator of oscillator condenser during the adjustment.

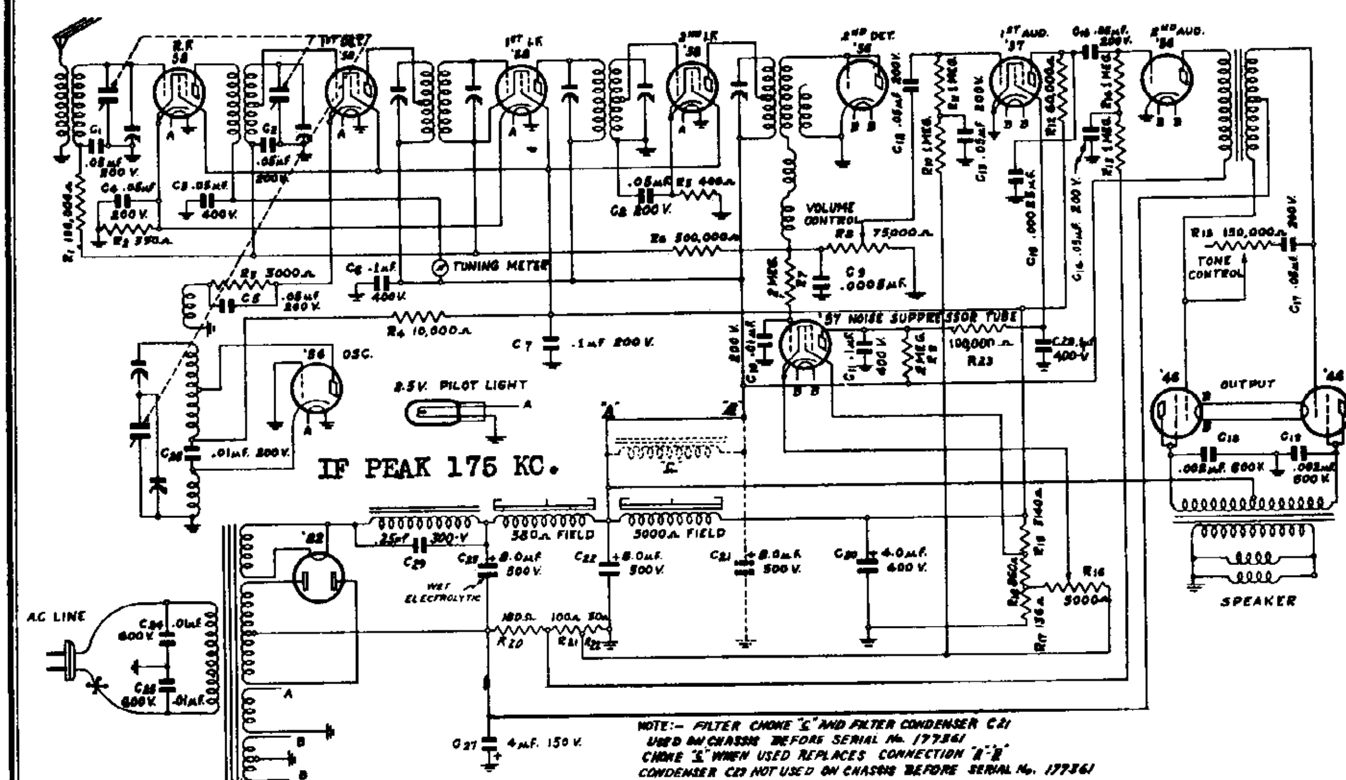
R-F. Alignment
Connect test oscillator to antenna and ground. Adjust as shown above.

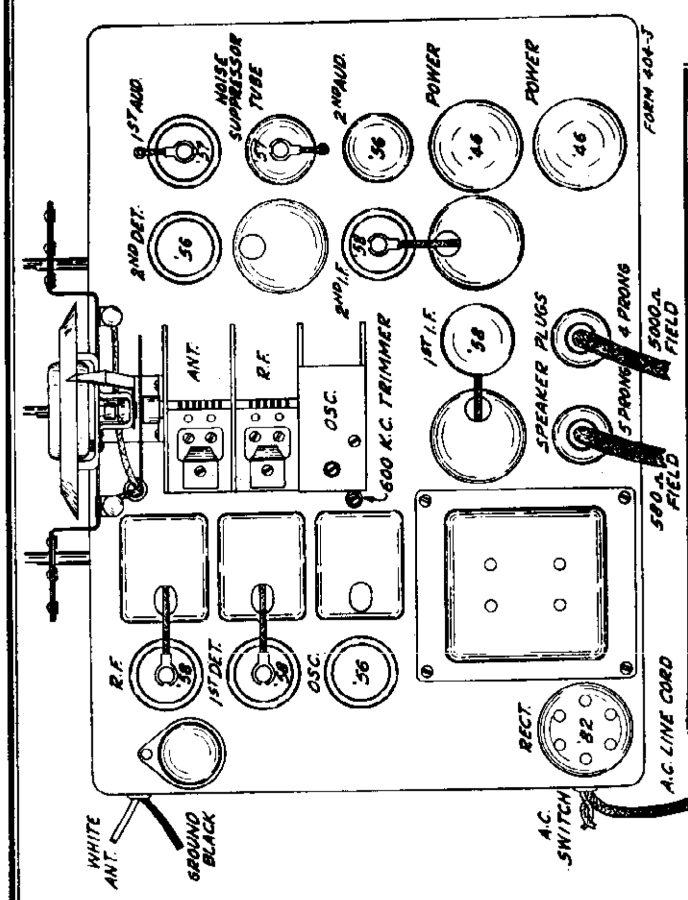
1233	Filter Choke.
1234	Dual IF Transformer.
1235	Single I.F. Transformer
1236	Antenna Transformer
1237	Oscillator Coil.
1238	R.F. Transformer
2206	Variable Condenser
2213	.00012 Mica Condenser
2051	.0005 Mica Condenser
2215	.005 Tubular Condenser
2084	.015 Tubular Condenser
2190	.02 Tubular Condenser
2046	.05 Tubular Condenser
2022	.1 Tubular Condenser
2033	.25 Tubular Condenser
2209	.5 Tubular Condenser
2211	5 Mfd -25 Volt Electrolytic Condenser
2212	5 Mfd. Electrolytic Strap
2210	Dual 8 Mfd. Electrolytic Filter Cond
2152	Generator Condenser
2214	Ammeter Condenser
3276	Distributor Suppressor
3277	Spark Plug Suppressor
5077	Antenna Cable
5081	Pilot Light Cable less socket
7128	Speaker
8401	Volume Control & Switch
8399	Fuse Retainer
8403	Pilot Light Socket only
8407	Pilot Light Bulb
8405	Knob, Tone Control
8404	Switch, Tone Control
9392	Mounting Stud
	Wing Nuts

MODEL 640 ELIMINATOR

1239	Power Transformer
2207	.5 120 Volt Metal Clad Cond. with Stud
2208	.025 1000 Volt Metal Clad Cond.
1163-C	R.F. Choke (A circuit)

LAFAYETTE RADIO & TELEVISION CORP.





Voltages at Sockets

LINE VOLTAGE 115—ANTENNA SHORTED TO GROUND—NOISE SUPPRESSOR AT MAXIMUM CLOCKWISE POSITION

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
58	R.F.	2.4	242	90	4 (1)	4
58	1st Det.	2.4	250	86	7 (1)	2
56	Osc.	2.4	24		0	8
58	1st I.F. (2)	2.4	252	90	4 (1)	4
58	2nd I.F. (2)	2.4	254	91	3	5.7
56	2nd Det.	2.4	0		0	0
57	1st Audio	2.4	65	55	4 (3)	.4
57	NoiseSup.	2.4	55	20	3 (1)	0
56	2nd Audio	2.4	255		14 (4)	3.3
46	Power	2.4	260	260	34	23
82	Rectifier	2.4	880 volts plate to plate			53 per plate

(1) Read from cathode to ground.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation and motor boating.
(3) Read across 30 ohm section of voltage divider.
(4) Read across 30 ohm and 100 ohm section of voltage divider.

MODEL L-11, L-12
Schematic,
Voltage
Socket
Trimmers

LAFAYETTE RADIO & TELEVISION CORP.

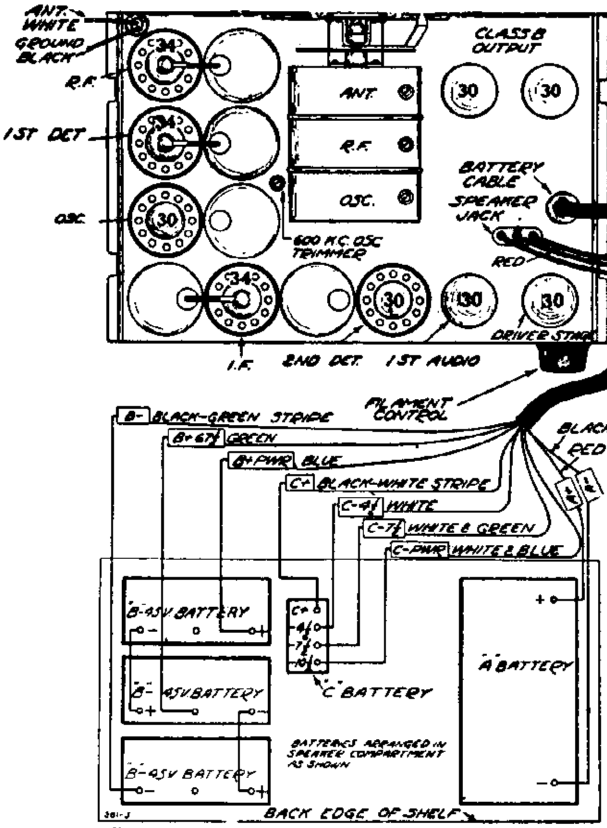


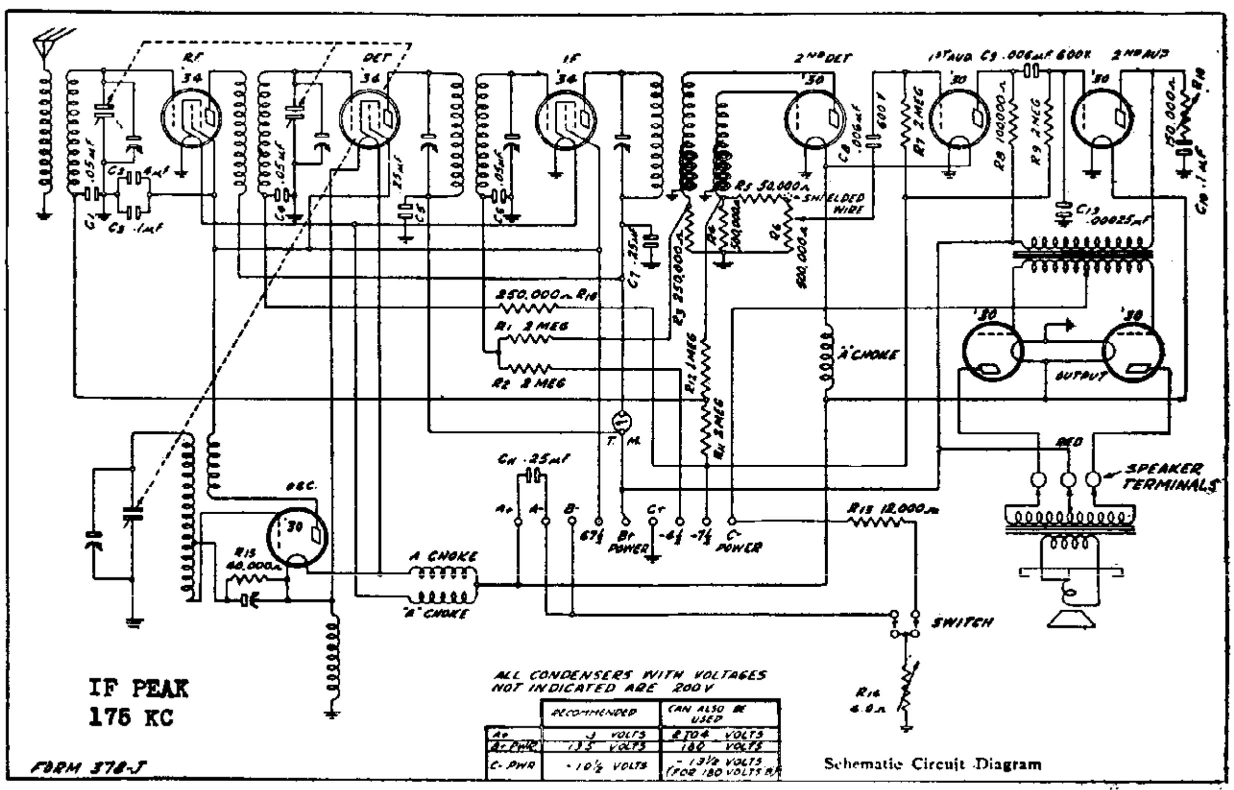
Fig. 2—Tube Arrangement and Battery Connections

Voltages at Sockets

"B" AND "C" BATTERIES UP TO RATED VOLTAGE—FILAMENT CONTROL KNOB SET SO THAT FILAMENT VOLTAGE IS 2—ANTENNA LEAD SHORTENED TO GROUND—VOLTAGES READ FROM NEGATIVE FILAMENT LEG

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'34	R.F	2.0	125	65	2.88 (1)	2.3
'34	1st Det.	2.0	130	65	7.5 (1)	1.4
'30	Osc.	2.0	67		4-15 (2)	1.6-4 (2)
'34	I.F	2.0	120	65	2.38 (1)	2.4
'30	2nd Det.	2.0	0		0	0
'30	1st Audio	2.0	85		7.5 (1)	.5
'30	Driver	2.0	125		7.5 (1)	4.0
'30	Output	2.0	130		10.	1.1

(1) Computed figure—cannot be read with ordinary voltmeter because of high resistance in this circuit. See article "Voltages" for further information.
(2) Subject to variation with dial setting.



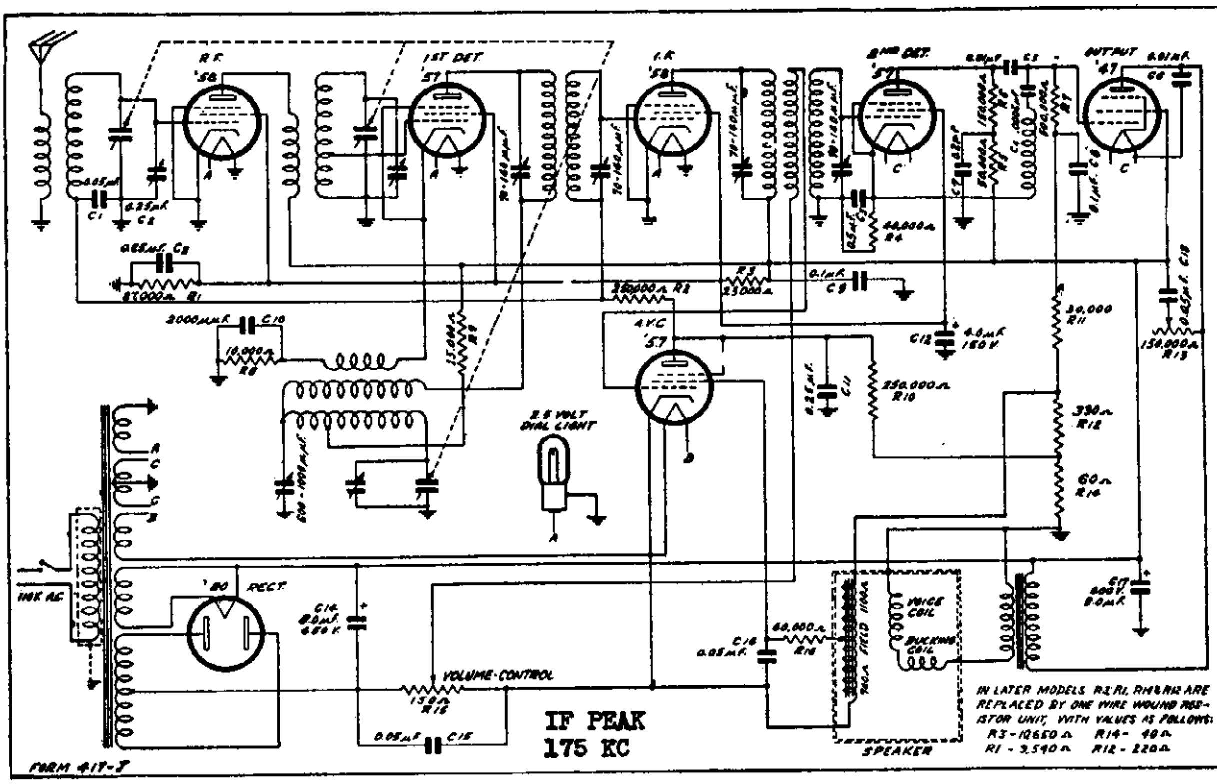
ALL CONDENSERS WITH VOLTAGES NOT INDICATED ARE 200V

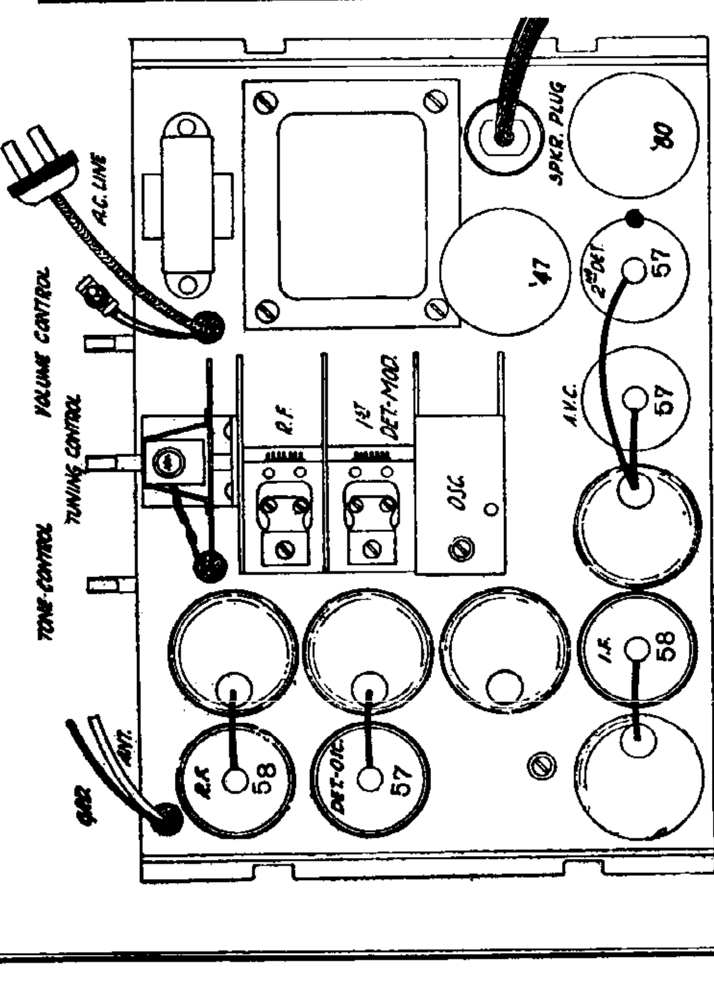
	RECOMMENDED	CAN ALSO BE USED
A+	3 VOLTS	2 TO 4 VOLTS
B+ PWR	135 VOLTS	180 VOLTS
C- PWR	-10½ VOLTS	-13½ VOLTS (FOR 180 VOLTS B)

Schematic Circuit Diagram

LAFAYETTE RADIO & TELEVISION CORP

MODEL L-16, L-17
L-18, L-19
Schematic
Socket, Changes





Change in Later Models

In the first models of this chassis, resistors R-1 and R-3 were carbon resistors of the values as shown in Fig 1 Resistors R-12 and R-14, were in one vitreous enamel unit. The voltages for the sets with these resistors are shown in the voltage chart on Page 4 at the left.

In later models the four above mentioned resistors were replaced by one armored wire wound resistor unit New values are used as follows

Code	Resistance
R-12	220 ohms
R-14	40 ohms
R-1	9,540 ohms
R-3	10,650 ohms

The voltages for the sets with the four-section wire wound resistor are shown in the second voltage chart on Page 4 at the right.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and an additional filter condenser are used Also, a slight change is made in the power unit wiring In the twenty-five cycle set, condenser C-17 the dry electrolytic unit is put in parallel with condenser C-14 An 8.0 mfd wet electrolytic condenser is put in place of condenser C-17

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply However, the reverse is not true that is the sixty cycle chassis cannot be operated from a twenty-five cycle power supply

A 110-220 volt 40-60 cycle power transformer is also available for this model.

MODEL L-16, L-17
L-18, L-19
Alignment, Parts
Voltage

LAFAYETTE RADIO & TELEVISION CORP.

REPAIR PARTS LIST FOR 7 TUBE SUPERHETERODYNE RECEIVER

When ordering parts, the part number and the serial number of chassis must be given. If there is a spot of paint on the chassis be sure to give this color. If this information is not available return the old part to insure getting the correct part.

Part No.	Name	List Price
P-1677	No. 57 Tube Socket	$ .15
P-1678	No. 58 Tube Socket	.15
P-1468	No. 47 Tube Socket	.15
P-1474	No. 80 Tube Socket	.15
P-1479	Speaker Socket	.15
P-40420	Aluminum Tube Shield	.20
P-40425	Tube Shield Base	.10
P-40411	Aluminum Coil Shield—R.F. Coils	.20
P-1476	Three-Lug Insulated Terminal Strip	.10
P-1513	Eleven-Lug Insulated Terminal Strip	.15
P-1054	"On-Off" Switch	.80
P-20529	Drive Shaft	.10
P-10224	Rubber Drive Pinion	.10
P-30374	Brass Bushing for Rubber Pinion	.10
P-10191	Rubber Cushions for Channel Brackets	.10
P-1273	Pilot Lamp 2.5 Volt	.25
P-5062	Antenna R.F. Transformer Assembly	.80
P-5057	Interstage R.F. Transformer Assembly	.80
P-5058	Oscillator Coil Assembly	.95
P-5059	1st I.F. Transformer Assembly, complete with can	2.25
P-5060	2nd I.F. Transformer Assembly, complete with can	2.50
P-50541	Output Transformer Assembly	1.75
P-50542	Power Transformer, 60 cycle, 110 volt	5.25
P-50543	Power Transformer, 25 cycle, 110 volt	8.50
P-50545	Power Transformer, 40-60 cycle, 110 volt	8.00
P-1497	Pilot Light Bracket and Drive Gear Assembly	.45
P-1383-C	Drive Bracket and Bearing	.30
P-1684	Celluloid Dial Strip	.20

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80862-C	C-1	.05 mfd.	200 V.	Tubular	$ .30
P-80888-A	C-2	.25 mfd.	200 V.	Tubular	.40
P-80886-C	C-3	.5 mfd.	200 V.	Block	1.60
	C-7	.2 mfd.	400 V.		
	C-11	.25 mfd.	200 V.		
P-80867	C-4	.0005 mfd.	600 V.	Molded	.25
P-80872-B	C-5	.01 mfd.	600 V.	Tubular	.25
P-80872-B	C-6	.01 mfd.	600 V.	Tubular	.25
P-80864-D	C-8	.1 mfd.	200 V.	Tubular	.25
P-80887-B	C-9	.1 mfd.	400 V.	Tubular	.40
P-80914	C-10	.002 mfd.	600 V.	Tubular	.20
P-80891-B	C-12	4.0 mfd.	150 V.	Electrolytic	.85
P-80890-B	C-13	.05 mfd.	400 V.	Tubular	.20
P-80894-B	C-14	8.0 mfd.	450 V.	Electrolytic Block	2.85
	C-17	8.0 mfd.	450 V.		
P-80862-C	C-15	.05 mfd.	200 V.	Tubular	.30
P-80862-C	C-16	.05 mfd.	200 V.	Tubular	.30
P-80849		8.0 mfd.	450 V.	Wet Electrolytic (25 Cycle only)	2.20
P-1385-B	600 K.C Trimmer Condenser				.75
P-80882	Three-Gang Condenser				5.70

RESISTORS

Part No.	Code	Resistance	Wattage	Type	List Price
*P-91003	R-1	27,000 ohms	.5 Watts	Carbon	$ .25
P-90954	R-2	250,000 ohms	.2 Watts	Carbon	.25
*P-91002	R-3	25,000 ohms	1.0 Watts	Carbon	.25
P-90916	R-4	40,000 ohms	.2 Watts	Carbon	.25
P-90941	R-5	50,000 ohms	.2 Watts	Carbon	.25
P-90963	R-6	150,000 ohms	.2 Watts	Carbon	.25
P-90929	R-7	500,000 ohms	.2 Watts	Carbon	.25
P-90930	R-8	10,000 ohms	.2 Watts	Carbon	.20
P-90905	R-9	15,000 ohms	.2 Watts	Carbon	.25
P-90954	R-10	250,000 ohms	.2 Watts	Carbon	.25
P-90956	R-11	30,000 ohms	.2 Watts	Carbon	.25
*P-91040	R-12	330 ohms		Vitreous Enamel	.50
	R-14	60 ohms			
P-90993	R-13	150,000 ohms		Tone Control	.90
P-91041	R-15	150 ohms		Volume Control	.80
P-90916	R-16	40,000 ohms	.2 Watts	Carbon	.25
†P-91048	R12	220 ohm	1.0 Watts	Armored Wire-wound Resistor	1.05
	R14	40 ohm	.2 Watts		
	R1	9540 ohm	1.0 Watts		
	R3	10650 ohm	2.5 Watts		

* Used in early models—in later models these resistors are replaced by resistor P-91048.
† See above.

Voltages at Sockets

LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM

			For early Models with 2-section vitreous enamel resistor.				For later Models with 4-section armoured wire-wound resistor.			
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
'58	R.F.	2.4	282	107	4(1)	8.	258	106	2.8(1)	8.0
'57	1st Det.	2.4	270	100	5	.4	250	103	5	.4
'58	I.F.(2)	2.4	282	107	4(1)	8.	258	106	2.8(1)	8.0
'57	A.V.C.	2.4	90	40	9.5	0	103	45	10	0
'57	2nd Det.	2.4	207	98	6	.15	190	101	6	.15
'47	Audio	2.4	262	280	24(3)	31	242	260	17(3)	30
'80	Rect.	4.8				30 per plate				34 per plate

(1) Read Across R-14.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation.
(3) Read Across R12 and R14.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are necessary. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

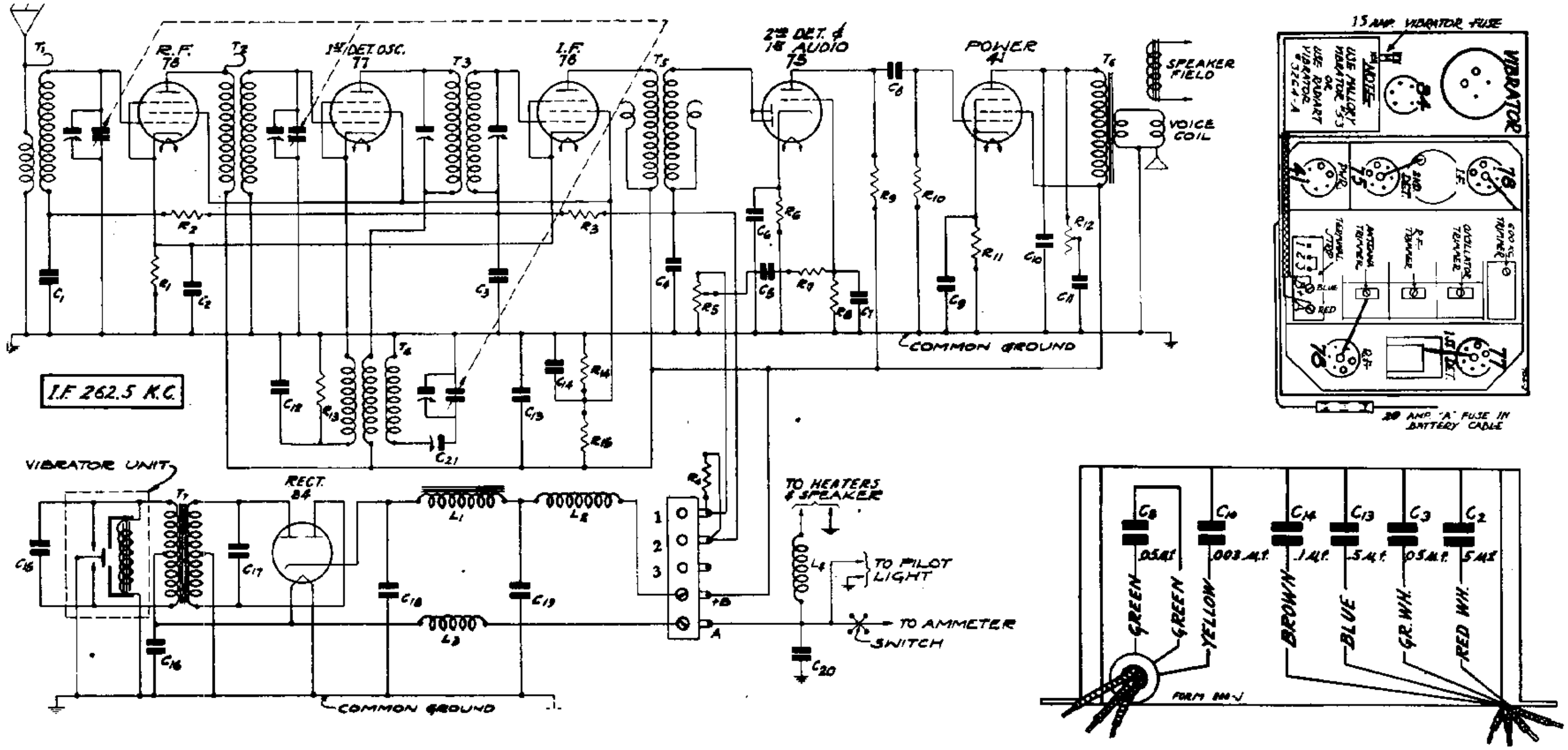
Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

MODEL L-30
Schematic
Trimmers
Voltage
Socket

LAFAYETTE RADIO & TELEVISION CORP.



Voltages At Sockets

On the following chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the box, by means of an analyzer plug.

If the chassis unit is taken out of the box all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, the power unit must also be taken out. Connect a jumper from chassis base to the metal wall of unit to complete the ground circuit.

Connect the Hot side of battery to the battery cable on the chassis and the ground side of the battery to the metal chassis base.

The reading at the battery should be 6 volts with the set operating.

VOLTAGES AT SOCKETS

Antenna Disconnected—Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M.A.
78	R. F.	5.7	220	100	3.5	5.0
77	1st Det. and Osc.	5.7	220	100	8.0 (1)	1.1 (1)
78	I. F.	5.7	220	100	3.5	5.0
75	2nd Det.	5.7	140 (2)		1.0	0.3
41	Output	5.7	200	210	15.5	18.0
84	Rect.	5.7				20. per plate

(1) Subject to variation.
(2) Triode Plate to Cathode—as read with 1,000,000 ohm meter.

June, 1934

MODEL L-30
Alignment

LAFAYETTE RADIO & TELEVISION CORP.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

Do not take the chassis out of the box. First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximum output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency mark. This is the large point, 5 points below the 55 mark. Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator R. F. and antenna trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first. See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser is mounted on the end of the gang condenser. See Fig. 2.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Remove the cover of he chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing "B" Unit From Box

Disconnect the "A" and "B+" leads at the terminal strip. On the end of the box at which the "B" unit is located will be found 9 screws around the edge. Remove these 9 screws. The "B" unit and end plate can then be lifted out.

Replacing the Vibrator

Note that vibrator unit is of the plug-in type. This unit can be inserted and removed in the same manner as a tube.

Replacing Chassis Unit

In replacing the chassis unit be sure that the ground spring near the output transformer makes a good contact with the chassis box. Reverse the procedure as given above for removing this unit.

Replacing "B" Unit

When replacing the "B" unit be sure that the ground spring makes a good contact to the partition wall in the chassis box. Reverse the procedure as given above for removing this unit.

Removing Speaker

If service work is required on the chassis, it is advisable in some cases to remove the speaker, as this will permit ready access to all of the units and wiring.

The pot magnet is secured to the vertical walls of the chassis base by means of 3 screws, 2 on one side and 1 on the other. Remove these screws. Then carefully lift out the speaker as far as the leads will permit. The yellow field lead and the black secondary lead may then be unsoldered.

Trouble Shooting and Service

Vibrator Unit

When servicing this receiver a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out. These units are plugged in in the same manner as a tube. One or more vibrator units should be kept on hand for replacement purposes.

"B" Unit

In case of failure in the "B" unit try out a new vibrator. If this does not remedy the difficulty and the "B" unit cannot be repaired locally it is not necessary to return the entire chassis. Remove the "B" unit from the chassis box as per the instructions in this manual after which this unit may be carefully packed and returned separately.

Weak Reception

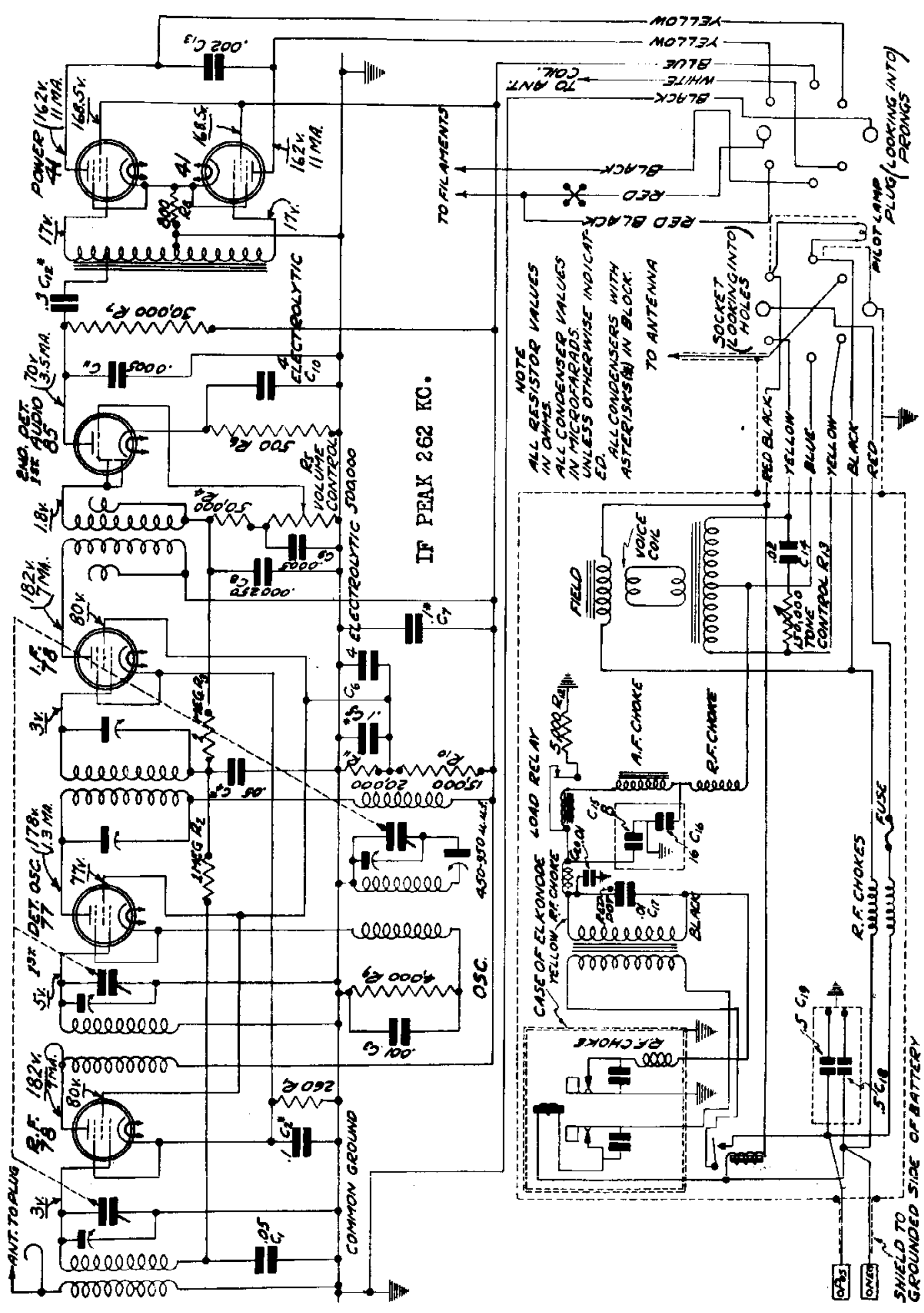
Defective Tubes—Try out a new set of tested tubes and note any difference in performance.

Poor Antenna—To try out the effectiveness of the antenna used, check the volume against the volume when using a straight length of wire about 15 feet long, run out of the car through one of the windows. If, upon test, the external wire is found to be much superior as far as volume is concerned, the antenna is not satisfactory and will have to be re-vamped or a new one installed. The antenna or lead-in may be too near grounded metal portions of the car frame or body resulting in a high capacity to ground. There may be grounded metal mesh in the car roof. There may be a poor soldered connection between the antenna, lead-in, or antenna lead from the set. The antenna system may be partially grounded at some point.

Antenna Trimmer not Adjusted—See Article "Adjusting Antenna Trimmer."

MODEL S-17762
Schematic

LAFAYETTE RADIO & TELEVISION CORP.



LAFAYETTE RADIO & TELEVISION CORP.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

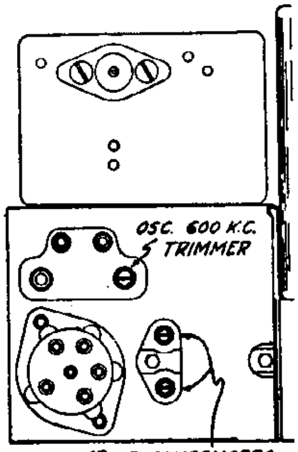


Fig. 12—Location of Trimmers

A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. The location of the adjusting screws for these condensers is shown in Fig. 12.

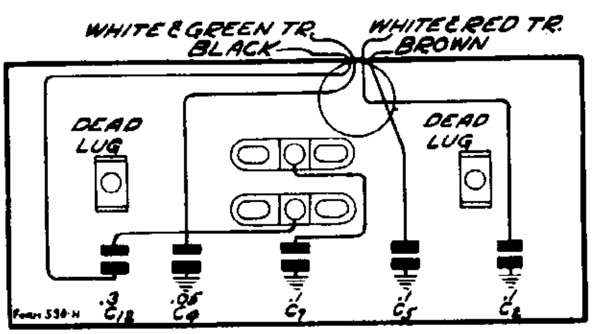
Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first (section farthest from drive gear).

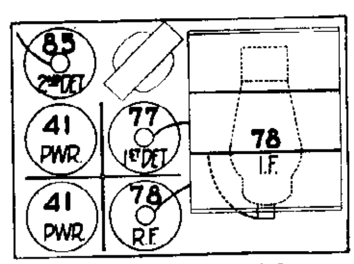
Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The location of this condenser is shown in Fig. 12.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.



Condenser Block—Internal Wiring



Location of Tubes

Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer condenser. The location of the tubes is shown in Fig. 8. Do not start the engine of the car yet.

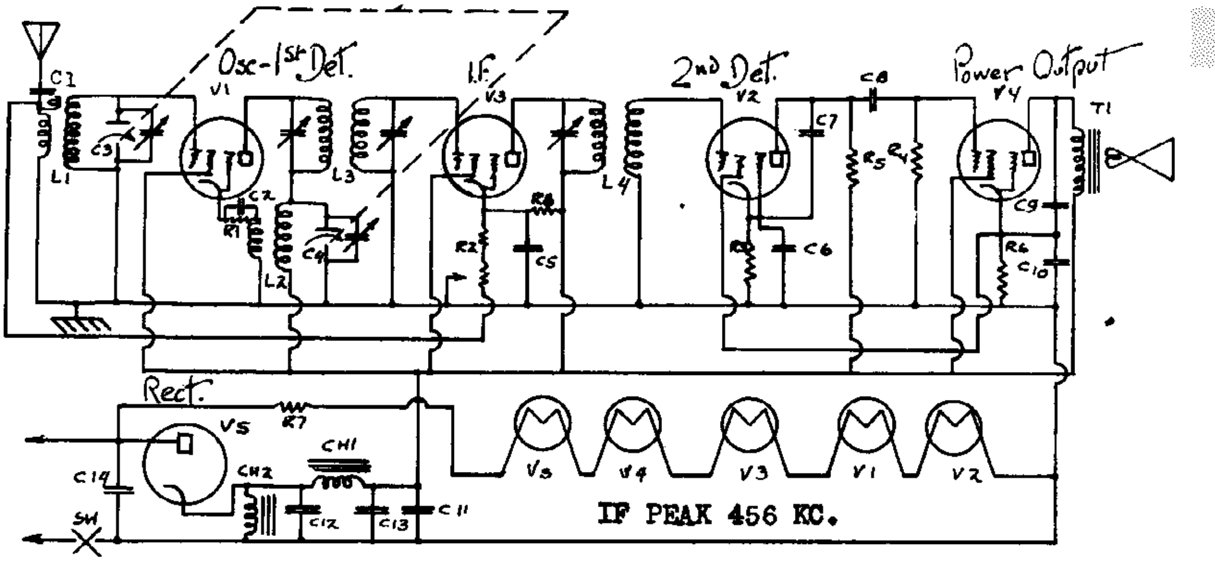
To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 KC with the volume control about three-quarters on. On one end of the chassis box is a small metal plate. Remove the two screws which hold this plate in place. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

If the receiver fails to operate, check the items as given under the article by that name.

MODEL 503-US
Schematic, Alignment

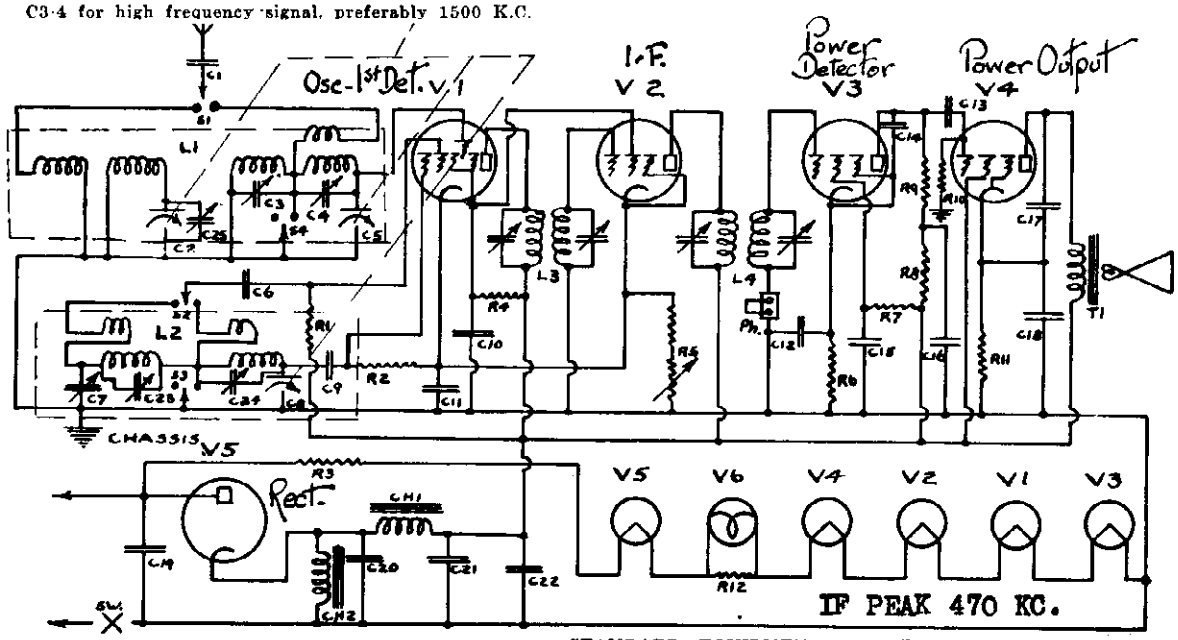
LANG RADIO CORP. (New Co.)

MODEL UG-5B
Schematic, Alignment



V1 2—6C6 Tube	C7—.00025 Condenser	R7—205 Ohms Line Cord
V3—6D6 Tube	C8-9—.01 Condenser	R8—35M Resistor
V4—43 Tube	C12—12 Mmfd. Conderser	L1—Antennae Coil
V5—12Z3 Tube	C13— 8 Mmfd. Condenser	L2—Oscillator Coil
C1-2—.002 Condenser	R1—7000 Ohm Resistor	L3—D.T. I.F. 456 Coil
C3—365 Mmfd. Var. Cond.	R2—10M 200 Min. Vol. Cont.	L4—S.T. I.F. 456 Coil
C4—456 K.C. Osc. Cond.	R3—20M Resistor	CH1—Filter Choke
C5-11-14—.05 Condenser	R4-5—1 Meg. Resistor	CH2—3M Field
C6-10—10 Mmfd. Condenser	R6—700 Ohm Resistor	T1—Speaker Transformer

To align the receiver, turn C3-4 out—with R2 fully on, apply 456 signal to grid of V3 and adjust L4—apply 456 signal to V1 and adjust L3—with antennae wire coiled up and capacitatively coupled to the signal, adjust trimmers on C3-4 for high frequency signal, preferably 1500 K.C.



540 K.C. to 1550 K.C.

STANDARD EQUIPMENT IS WITHOUT PHONOJACKS

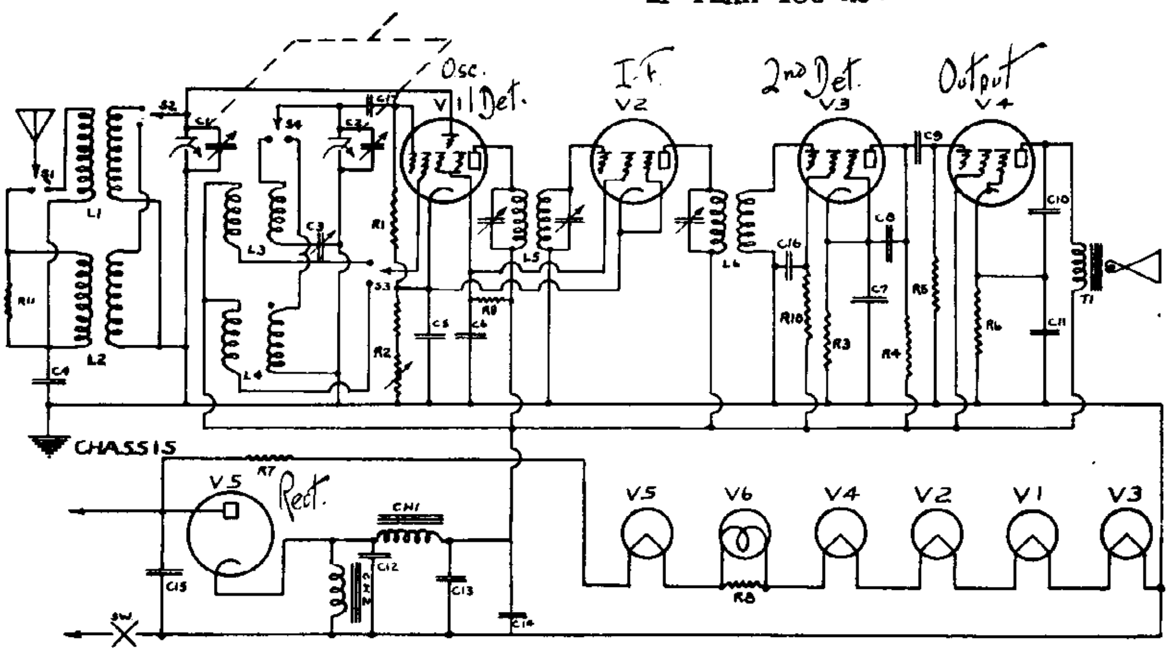
V1—6A7 Tube 5,900 to 15,400 K.C.	C11—.25 mfd. Cond.	R1-2-4 20,000 Ohm Resistor
V2—6D6 Tube	C12-18—10 mfd. Cond.	R3—205 Ohms in line cord
V3—6C6 Tube	C13-17 .01 mfd. Cond.	R5—4M Ohm Vol. Cont. 190 Ohm min.
V4—43 Tube	C14—.0005 mfd. Cond.	R6—50,000 Ohms
V5—12Z3 Tube	C20—12 mfd. Cond.	R7—2 Meg Ohm Resistor
V6—6.3 Volt Pilot Light	C21—8 mfd. Cond.	R8—100,000 Ohm resistor
C1-6—.002 mfd. Cond.	CH1—Choke	R9-10—500,000 Ohm resistor
C2-5-8—365 mmfd. Var. Cond.	CH2—3000 Ohm Speakerfield	R11— 700 Ohm resistor
C3-4-23-24-25—40 mmfd. Trimmer	Ph.—Phono.	R12—25 Ohm resistor
C7—600 mmfd. Trimmer	T1—Speaker Transformer	L1—Antennae Coil
C9—.00005 mfd. Cond.	S1-2-3-4—Band switch	L2—Oscillator Coil
C10-15-16-19-22—.05 mfd Cond.	SW.—Switch on Volume control	L3-4—D.T. 470 K.C. I.F. Coil

To align the receiver: Turn band switch to shortwave—short C8—apply 470 K.C. to grid of V2 and adjust L4—apply 470 K.C. to grid of V1 and adjust L3—remove short from C8—apply 15,000 K.C. to antennae and adjust C24 and C4—turn band switch to broadcast—apply 1,400 K.C. to antennae and adjust C3, C23, and C25—apply 600 K.C. and adjust C7—readjust C3, C23 and C25 if necessary.

MODEL 502-US
Schematic, Alignment
Parts List

LANG RADIO CORP. (New Co.)

IF PEAK 456 KC.



V1—6A7 Tube
V2—6D6 Tube
V3—6C6 Tube
V4—43 Tube
V5—12Z3 Tube
V6—6.3 Volt Pilot Light
C1-2 365 mmfd. Var. Cond.
C3—600 mmfd. Cond.
C4—.002 mfd. Cond.
C5—.25 mfd. Cond.
C6-14-15-16—.05 mfd. Cond.
C7-11—10 mfd. Cond.
C8-17—.00025 mfd. Cond.
C9-10—.01 mfd. Cond.
C12 12 mfd. Cond.
C13—8 mfd. Cond.
CH1—200 Ohm Choke
CH2—3000 Ohm Speaker Field
T1—Speaker Transformer
S1-2-3-4—Band Switch
SW—Switch on Volume Control
R1-3-9—20M Ohm Resistor
R2—4000 Ohm Vol. Control 190 Ohm min.
R4-5—500M Ohm Resistor
R6—700 Ohm Resistor
R7—170 Ohm Resistor
R8—205-Ohms in line cord
R10—2 meg. Ohm Resistor
L1—Broadcast Antennae Coil
L2—Short Wave Antennae Coil
L3—Broadcast Oscillator Coil
L4—Short Wave Oscillator Coil
L5—D.T. I.F. 456 K.C. Coil
L6—S.T. I.F. 456 K.C. Coil
R11—10M Ohm Resistor

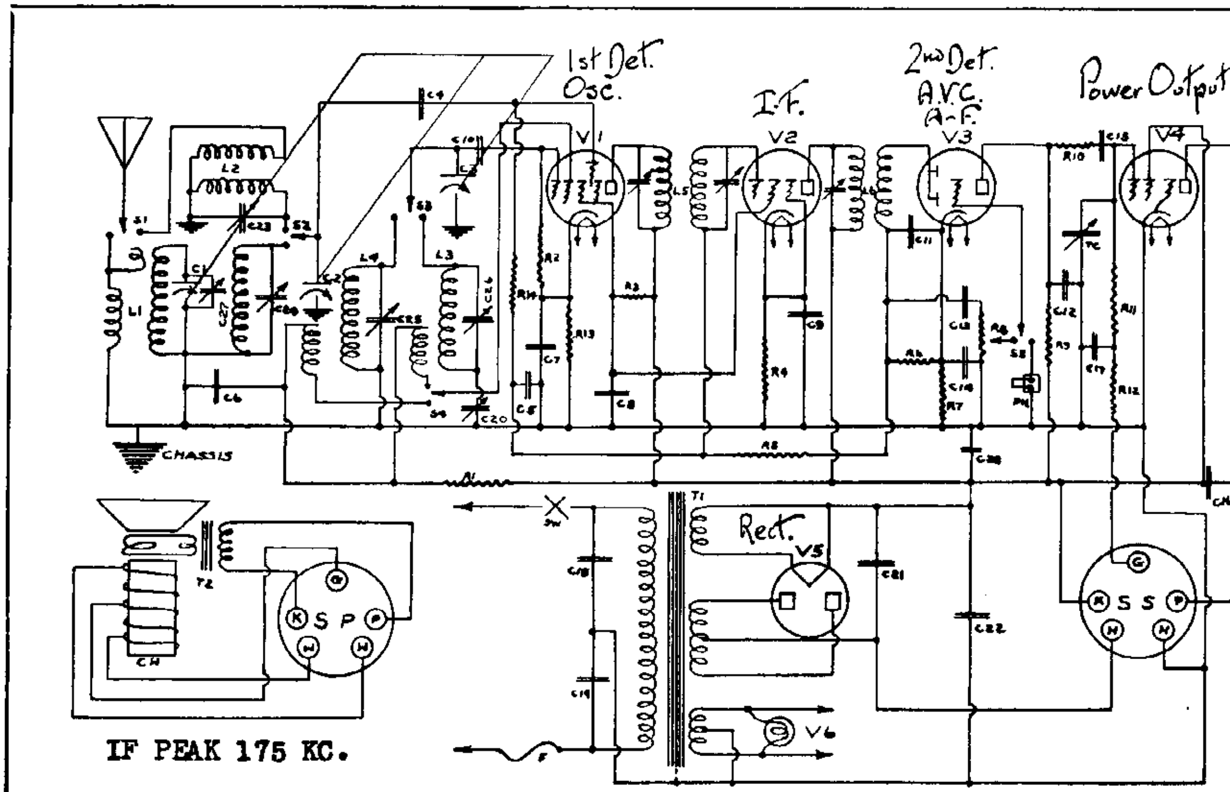
To align receiver: Turn band switch to broadcast— short C2—apply 456 K.C. to grid of V2 and adjust L6—apply 456 K.C. to grid of V1 and adjust L5—remove short from C2—apply 1400 K.C. to antennae and adjust trimmers on C1, C2—apply 600 K.C. and adjust C3.

540 to 1550 K.C. | 502 US | 5,900 to 15,400

This receiver is a five tube Universal dual wave receiver. One band covers the usual broadcasting 540 to 1550 kilocycles, and the other takes in the high frequency broadcasting 5900 to 15400 kilocycles. The high frequency range includes the important international broadcast bands 19, 25, 31 and 49 meters. Tuning and selection of bands are facilitated by the use of colors on the dial. The broadcast band is calibrated in kilocycles, and the high frequency bands are indicated in tan, amateur in red, airplane in blue, and unclassified in white. 49 meter band is from 6.01 to 6.15 megacycles; 31 meter is from 9.5 to 9.6 megacycles; 25 meter is from 11.7 to 11.9 megacycles, and 19 meter is from 15.1 to 15.34 megacycles.

LANG RADIO CORP. (New Co.)

MODEL 503-AS
Schematic, Parts
Alignment



IF PEAK 175 KC.

V1—2A7 Tube
V2—58 Tube
V3—2A6 Tube
V4—2A5 Tube
V5—80 Tube
V6—2.5 Pilot Light
C1-2-3—365 mmfd. Var. Cond.
C4-10—.0001 mfd. Cond.
C5-6-7-8-9—.05 mfd. Cond.
C11-12—.00025 mfd. Cond.
C13-15-18-19—.01 mfd. Cond.
C23-24-25 26-27—40 mmfd. Cond.
C28—.1 mfd Cond.
C14—5 mfd Cond.
C16 .006 mfd. Cond.
C17—.25 mfd. Cond.

C20—1000 mmfd. Cond.
C21—12 mfd. Cond.
C22 8 mfd. Cond.
R1—20,000 Ohms
R2-10—50,000 Ohms
R3—25,000 Ohms
R4—700 Ohms
R5-14—1 meg.
R6-11—500,000 Ohms
R7 3,000 Ohms
R8—½ meg. Volume Control
R9-12—250,000 Ohms
R13—300 Ohms
PH—Phono
F—Fuse
SP—Speaker Plug

SS—Speaker Socket
T2—Speaker Transformer
T1—Power Transformer
TC—Tone Control
S1-2-3-4—Band Selector Sw.
L1—Broadcast Antennae Coil
L2 Shortwave Antennae Coil
L3—Broadcast Oscillator Coil
L4—Shortwave Oscillator Coil
L5—D.T. I.F. 175 K.C. Coil
L6—S.T. I.F. 175 K.C. Coil
S5—Phono switch on volume control
SW—Power switch on tone control
CH—Speaker Field 1800—Tapped at 300 Ohms

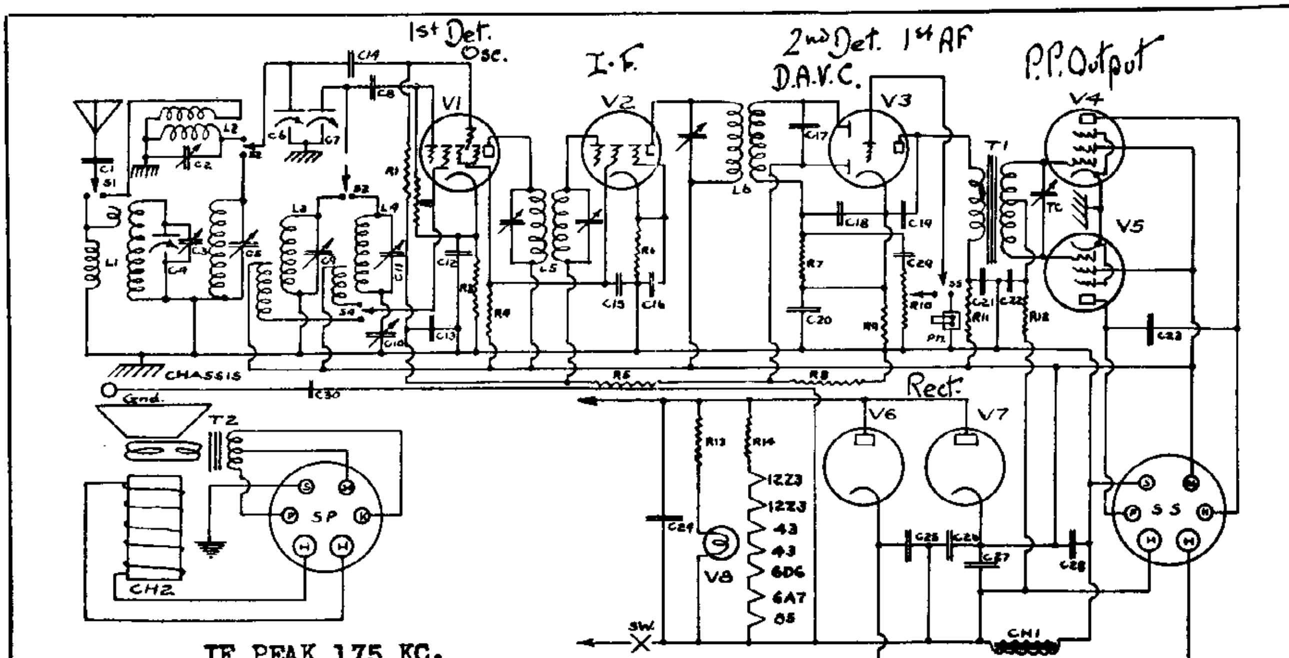
To align the receiver: Turn the band selector switch to broadcast—Short C3—Apply 175 K.C. to grid of V2 and adjust L6—Apply 175K.C. to grid of V1 and adjust L5—Remove short from C3—Apply 1400 K.C. to antennae and adjust C27, C24, C26—Apply 600K.C. and adjust C20—Shift band switch to shortwave—Apply 15 megacycles and adjust C25 to low peak then adjust C23.

540 to 1550 K.C. — 503 AS — 5.5 to 17.0 megacycles

This receiver is a five tube A.C. dual wave receiver. One band covers the usual broadcasting 540 to 1550 K.C., and the other takes in the high frequency broadcasting 5500 to 17000 K.C. The high frequency range includes the important international broadcast bands 19, 25, 31, and 49 meters. Tuning and selection of bands are facilitated by the use of "Select-Ur-Band" dial. Movement of the selector switch automatically shifts the mask on dial, so that only proper band can be seen. The broadcast part is calibrated in kilocycles, and the high frequency in megacycles. Broadcast bands are indicated in tan, amateur in red, airplane in blue, and unclassified in white. 49 meter band is from 6.01 to 6.15 megacycles; 31 meter is from 9.5 to 9.6 megacycles; 25 meter is from 11.7 to 11.9 megacycles; and 19 meter is from 15.1 to 15.34 megacycles.

MODEL 703-US
Schematic, Parts
Alignment

LANG RADIO CORP. (New Co.)



IF PEAK 175 KC.

V1—6A7 Tube	C20—5 mfd. Cond.	R10—½ Meg. Volume Control
V2—6D6 Tube	C21—6 mfd. Cond.	PH—Phono
V3—85 Tube	C22—.25 mfd. Cond.	LI—Broadcast Ant. Coil
V4—43 Tube	C23—.006 mfd. Cond	L2—Shortwave Ant. Coil
V5—43 Tube	C25-28—8 mfd. Cond.	L3—Shortwave Osc. Coil
V6—12Z3 Tube	C26—16 mfd. Cond.	L4—Broadcast Osc. Coil
V7—12Z3 Tube	CH1—370 Ohm Choke	L5—D. T. 175 K C I. F. Coil
V8—6.3 Pilot Light	CH2—Speaker Choke	L6—S. T. 175 K C I. F. Coil
C1—.002 mfd. condenser	R1-5-8 1,000,000 Resistor	T1—Audio Trasnformer
C2-3-5-9-11—40 mmfd. Trimmer	R2—30,000 Ohm Resistor	T2—Speaker Transformer
C4-6-7—365 mmfd. Variable Cond.	R3—300 Ohm Resistor	TC—Tone Control
C8-14—.0001 mfd. condenser	R4—20,000 Ohm Resistor	S1-2-3-4—Band Selector Switch
C10—1000 mmfd. Trimmer	R6—400 Ohm Resistor	S5—Phono Switch on Volume Control
C12-13-15-16-24-27-30—.05 mfd. cond.	R7-12—250,000 Ohm Resistor	SW—Power Switch on Tone Control
C17—.00005 mfd. Cond.	R11-9—3000 Ohm Resistor	SS—Speaker Socket
C18—.00025 mfd. Cond.	R13—767 Ohm Resistor	SP—Speaker Plug
C19—001 mfd. Cond.	R14—86 Ohm Resistor	

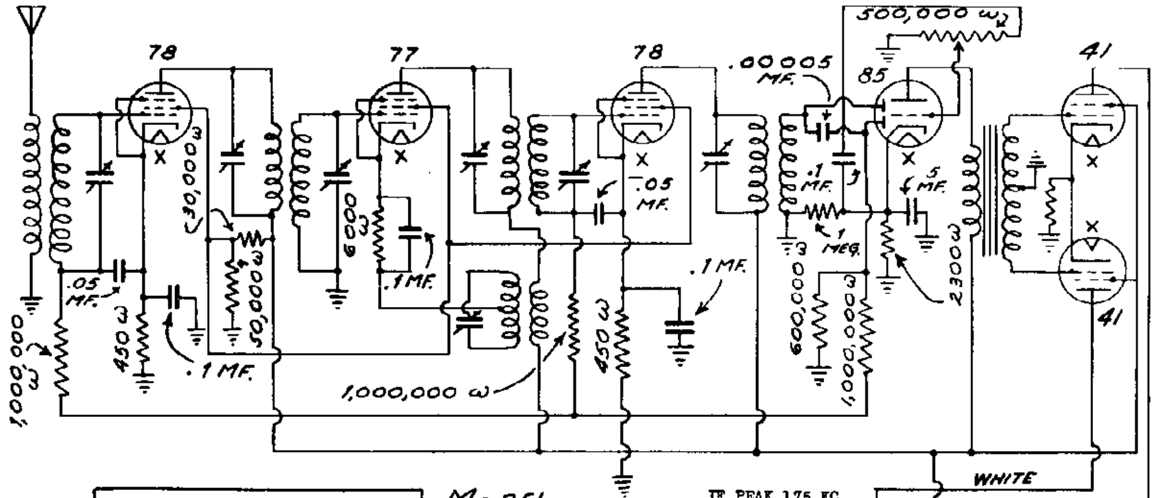
To align the receiver: Turn the band selector to broadcast—Short C7—apply 175 KC to grid of V2 and adjust L6—apply 175 KC to grid of VI and adjust L5—Remove short from C7—apply 1400 KC to antennae and adjust C3, 5, 11—apply 600 KC and adjust C10, Shift band switch to shortwave—apply 15 megacycles and adjust C9 to low peak, then adjust C2.

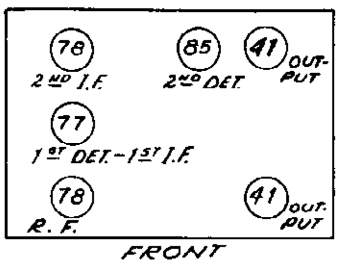
540 to 1550 KC — 703 US — 5.5 to 17.0 Megacycles

This receiver is a seven tube Universal dual wave receiver. One band covers the usual broadcasting 540 to 1550 K. C. and the other takes in the high frequency broadcasting 5500 to 17000 K. C. The high frequency range includes the important international broadcast bands 19, 25, 31, and 49 meters. Tuning and selection of bands are facilitated by the use of the "Select-Ur-Band" dial. Movement of the selector switch automatically shifts the mask on dial, so that only proper band can be seen. The broadcast part is calibrated in kilocycles, and the high frequency in megacycles. Broadcast bands are indicated in tan, amateur in red, airplane in blue, and unclassified in white. 49 meter band is from 6.01 to 6.15 megacycles, 31 meter is from 9.5 to 9.6 megacycles, 25 meter is from 11.7 to 11.9 megacycles and 19 meter is from 15.1 to 15.34 megacycles.

MODEL 88
Schematic
MODEL 90
Schematic, Socket

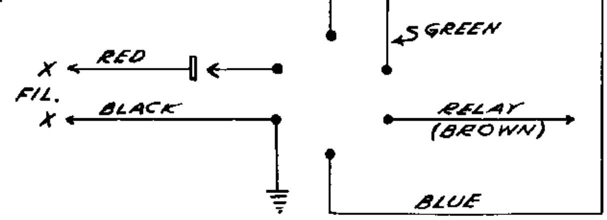
LARKIN CO., INC.

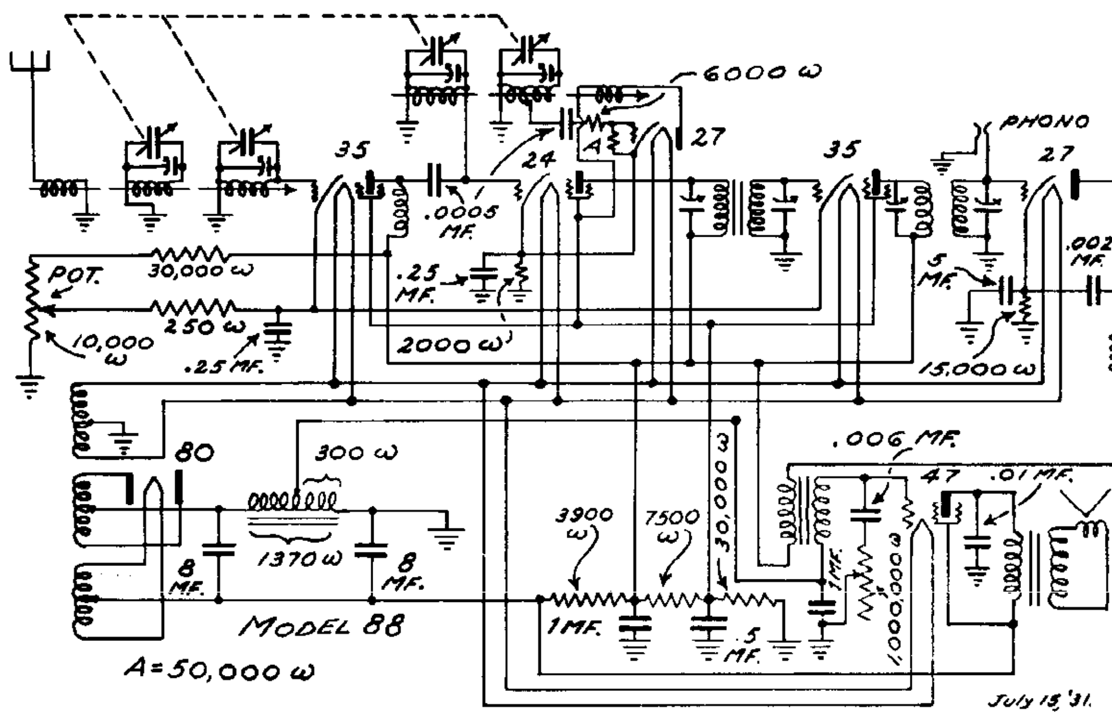




MODEL 90

IF PEAK 175 KC





MODEL 88

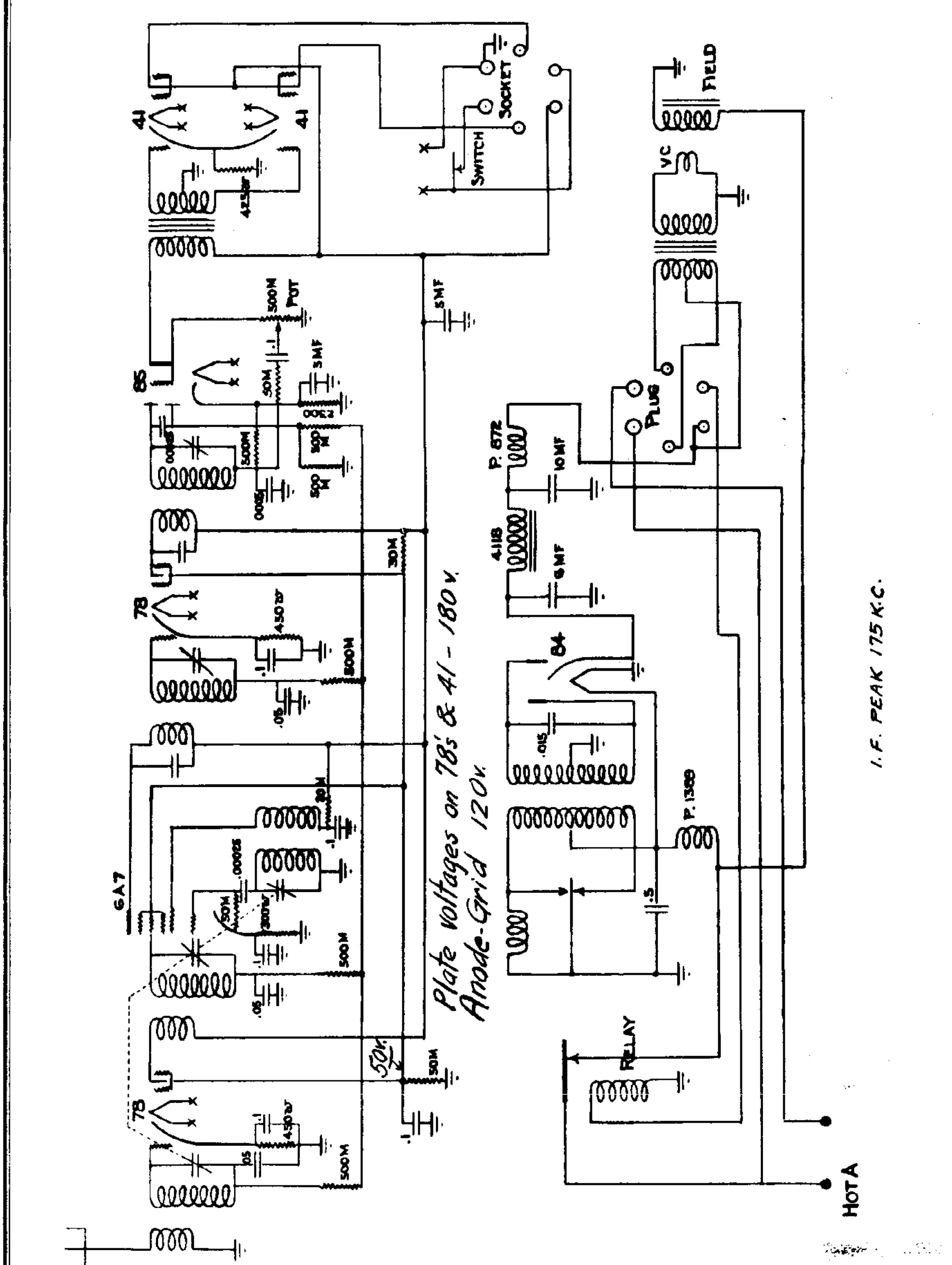
A=50,000 ω

July 15 '31.

IF PEAK 175 KC

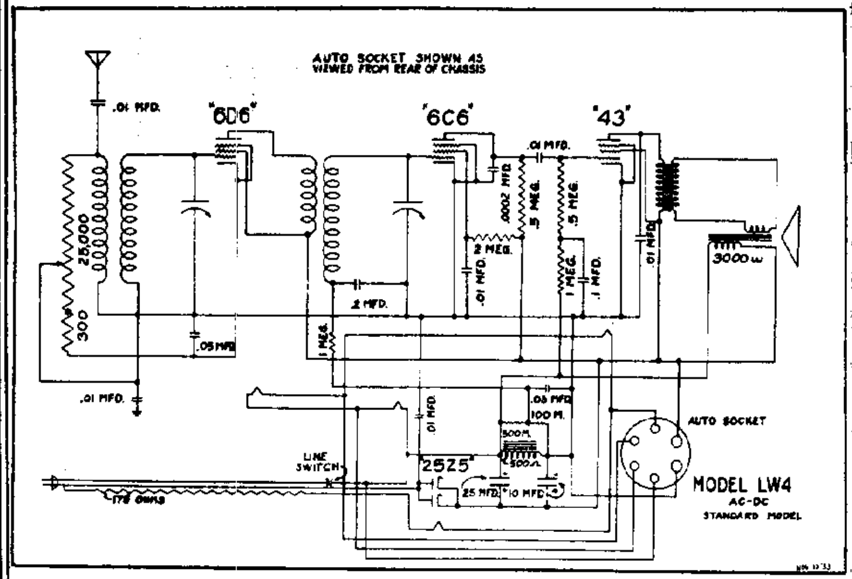
MODEL 91
Schematic

LARKIN CO., INC.



MODEL LW-4
Schematic, Voltage
MODEL LW-4-DW
Schematic, Voltage

LEWOL MFG. CORP.



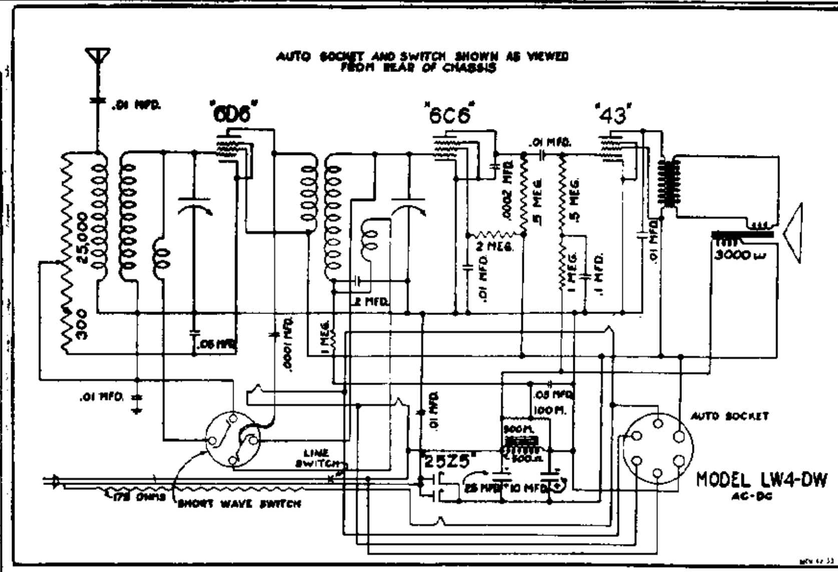
TUBE SOCKET VOLTAGES

Type	Position	Heater	Cathode	Screen	Plate
6D6	R.F.	6	2.5	100	100
6C6	Det.	6	-0-	12*	30*
43	Output	25	-0-	100	100
25Z5	Rectifier	25	100	......	......

All voltages measured to -B line (variable condenser frame).

* Measurements made with meter having a resistance of about 300,000 ohms.

Align condenser trimmers at 1690 Kc and check 1712 Kc.



CIRCUIT DIAGRAM—DUAL WAVE MODEL

TUBE SOCKET VOLTAGES

Type	Position	Heater	Cathode	Screen	Plate
6D6	R.F.	6	2.5	100	100
6C6	Det.	6	-0-	12*	30*
43	Output	25	-0-	100	100
25Z5	Rectifier	25	100	......	......

All voltages measured to -B line (variable condenser frame).

* Measurements made with meter having a resistance of about 300,000 ohms.

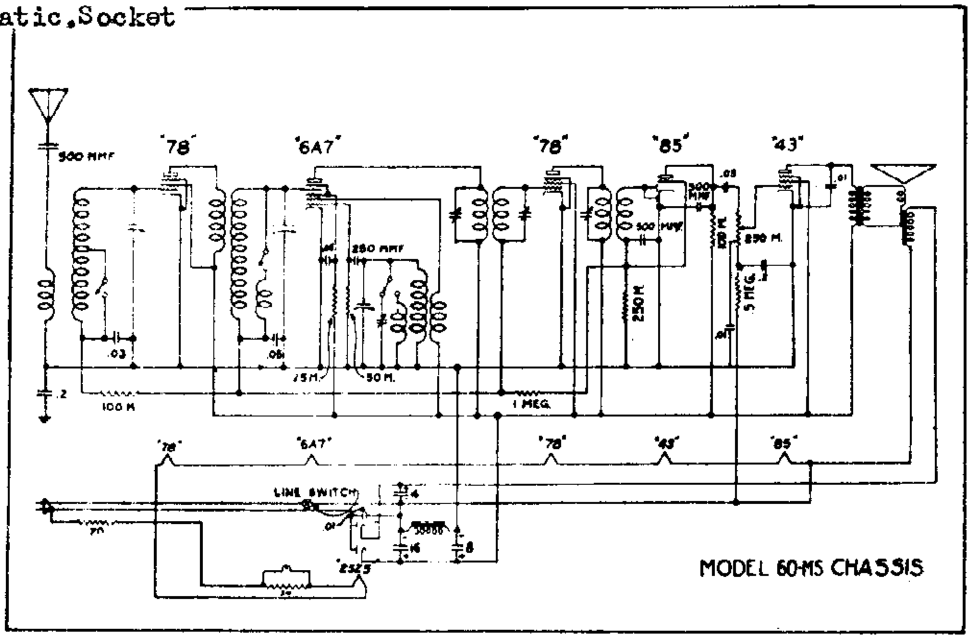
DUAL WAVE MODEL:

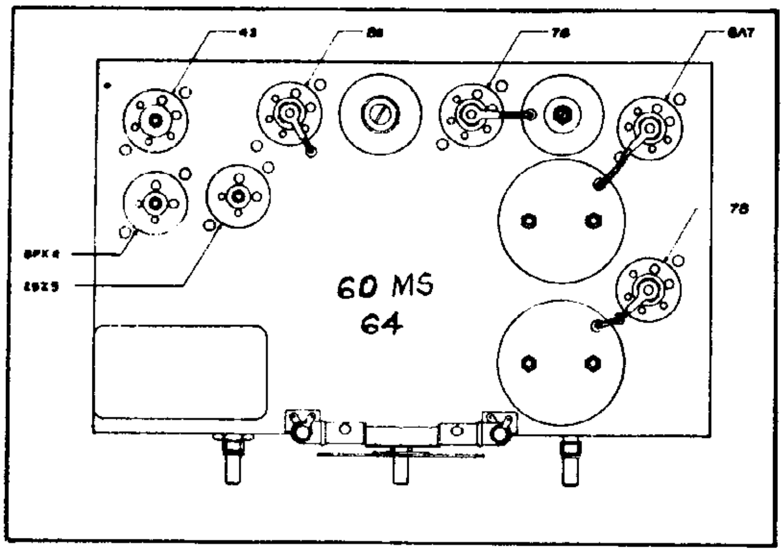
Align condenser trimmers at 1500 Kc with switch on broadcast band position.

Align short wave at 1712 Kc sliding short wave shunt on antenna coil, with switch on short wave position.

MODEL 60-MS
Socket, Schematic
MODEL 64
Schematic, Socket

LEWOL MFG. CORP.





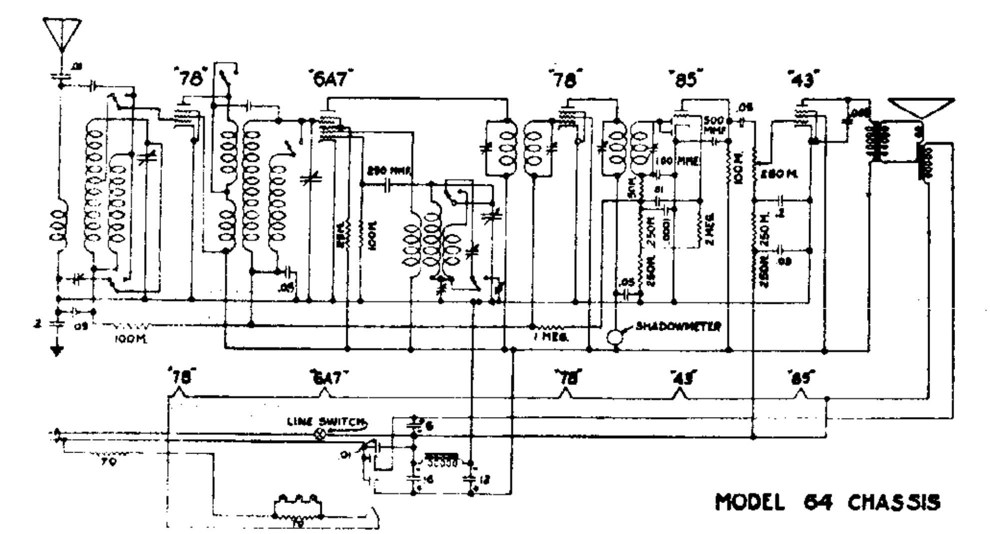
Place tubes in sockets as indicated in diagram.

Corresponding numbers will be found on base of tubes.

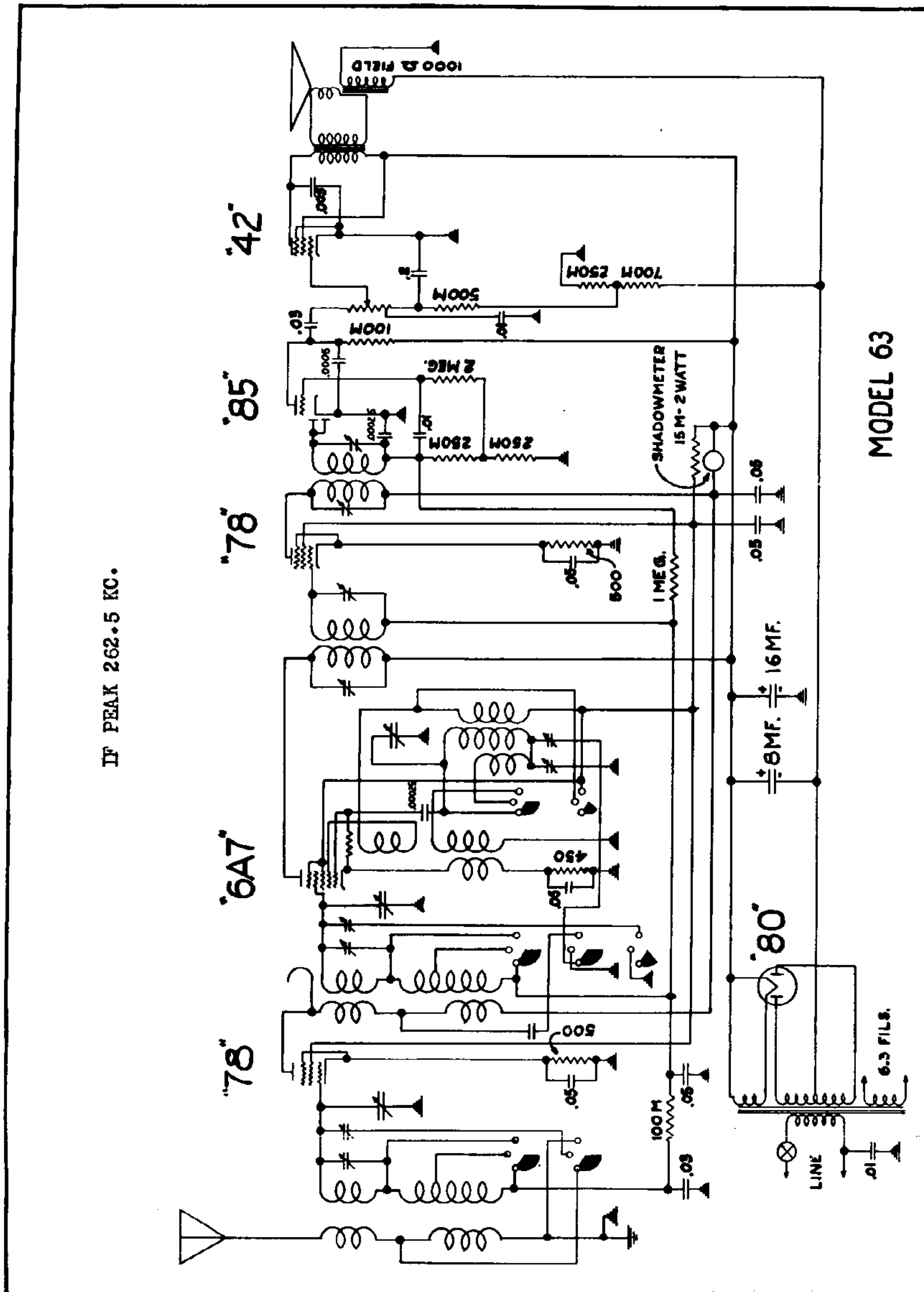
Plug on end of speaker cable should be inserted in "speaker" socket.

The cord which terminates in the wall plug will become warm during the operation of the receiver. This should cause no concern as it is designed to act in this fashion. Be very careful not to cut this cord or lengthen it in any fashion as this will generally impair the operation of the receiver.

A ground connection may be tried and left connected or not as trial will dictate. The black wire is the ground lead. UNDER NO CIRCUMSTANCES ATTACH A GROUND WIRE TO THE CHASSIS DIRECT.



LEWOL MFG. CORP.



MODEL 63
Alignment
Voltage

SERIES "63"
All Wave

TRACKING

Peak IF transformer at 262.5 kc.

Next, align condensor trimmers on broadcast range with switch turned all of the way to the left and dial set at 1500 kc., with a signal of the same frequency. Turn dial to 550 kc., and track with a signal of that frequency by means of a series pad for the broadcast range (inside screw on isolantite base at rear of set).

Turn the frequency change switch to the right one position and turn dial to 4000 kc. Put in a signal of approximately 4000 kc.and move dial, if necessary to maximum response. Adjust the RF and antenna trimmers to resonance for the second band. These are located as follows: with the set inverted and the rear of the chassis nearest the operator, the two trimmers in the furthest right-hand corner are for the antenna coil. The nearer one is for the second band and the further one for the third band. The RF coil trimmers are located toward the center of the rear of the chassis, the left one being the second band and the right being the third band. Oscillator pad is tracked at 1750 kc. (external nut on isolantite base at rear of set).

Again turning the switch one more position to the right which is the third band, track the oscillator trimmer with the dial set at 14,000 kc. and a corresponding signal. Check the alignment at 6000 kc., and if necessary bend the tuning condensor plates slightly. No pad is used here.

TUBE SOCKET VOLTAGES

Type	Position	Heater	Cathode	Screen	Plate	Osc. Plate	Osc. Grid.	Diode	Cont Grid
78	RF	6.3 v.	3.0	100	250	--	--	--	0
6A7	1st Det. & Osc.	6.3 v.	4.5	100	260	100	-6 v.	0	0
78	IF	6.3 v.	3.0	100	250	--	--	--	0
85	2nd Det. & Osc.	6.3 v.	0	--	50	--	--	-1 v.	0
42	Output	6.3	0	260	255	--	--	--	-8 v
80	Rectf.	5.0	260	--	--	--	--	--	--

The above readings taken with a 300 volt 1000 ohm per volt DC voltmeter.

Line voltage 115 volts, 60 cycles AC. All DC voltages taken with respect to chassis ground with switch in first position.

MODEL 1932 Type
Single Reed
Elkonodes

P. R. MALLORY & CO.

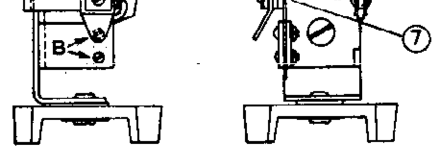
Directions for Servicing 1932 Type Mallory 'Single-Reed' Elkonodes

The 1932 type Mallory Elkonode is a half-wave, single-reed converter used with a BR Raytheon tube for rectification. This Elkonode is supplied in six standard types—from 1 to 6 inclusive—and modifications are supplied for special requirements, such as S101, S102, S103, T112, and S111. 12-volt single-reed Elkonodes are supplied in types G1 to G6 inclusive, and 32-volt Elkonodes in types from F1 to F6 inclusive.

The mechanical construction of the single-reed Elkonode is the same in all types with the exception of the size and number of turns of wire on the Elkonode coil. Following is a table of characteristics indicating the output obtainable from these standard Elkonodes:

Milli-amperes	12	15	17	20	22	25	27	30	32	35	37	40	42	45	47	50
Volts																
220	2	3	4	4	5	6	6									
210	2	3	3	4	5	5	6	6								
200	2	3	3	4	4	5	5	6								
190	2	3	3	4	4	5	5	6	6							
180	1	2	3	3	4	4	5	5	6	6						
170		2	3	3	4	4	5	5	6	6	6					
160		2	2	3	3	4	4	5	5	6	6					
150		2	2	3	3	4	4	4	5	5	6	6	6			
140		1	2	3	3	3	4	4	4	5	5	6	6	6		
135		1	2	2	3	3	3	4	4	5	5	5	6	6		

The following reproductions picture the Mallory single-reed Elkonode in two positions:



No. I — No. II

1. Reed Assembly
2. Stop Post mntg. block
3. Stop Post locking-screw
4. Stop-Post
5. Contact Spring Assm.
6. Cam-nut adjustment
7. Air-gap

(1) is a side view showing the Elkonode with cover and rubber cushion removed. (2) is a front view with can and cushion removed. Numbered arrows clearly indicate the position of the Elkonode parts involved in installing new contact spring assemblies and new reed assemblies.

Routine for Dismantling Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws which fasten outer housing or can to base.

(b) Hold can in upright position and tamp gently against hand permitting base and rubber housing inside of can to drop out gently. (CAUTION: Do not attempt to remove Elkonode assemblies from cans by pulling on the base.)

(c) Remove rubber cushion from Elkonode assembly in the same manner as entire assembly was removed from can.

TO REMOVE SPRINGS:

(d) Remove contact spring assembly by extracting screws at point marked "A" on above diagram.

(e) Remove reed assembly by extracting screws at point marked "B" on above diagram.

(f) Install reed assembly, using care to insure that metal blocks in which this reed is mounted are squarely aligned. NOTE: Use only Kester Resin Core Solder.

(g) Install contact spring assembly using care to properly align metal blocks in which this spring assembly is mounted.

(h) Inspect alignment of contact points to insure that contacts on both reed and contact springs are in proper alignment, and that their surfaces engage squarely and evenly. Alignment of these points is controlled by the position of the springs, and the screws mounting these springs should not be tightened firmly until the points are in alignment.

(i) With points in proper alignment, the air-gap or clearance between pole-piece of the coil and reed should be adjusted to approximately 1/32 inch. This adjustment is provided for by the cam nut and locking screw at point marked "6" in diagram 2. The reed should be in a perfectly perpendicular plane, and the surface of the pole-piece or core of the coil should be exactly parallel with surface of reed.

MODEL 1933-34 Type
Dual Reed Elkonodes

P. R. MALLORY & CO.

(j) Loosen the locking screw of the stop post (identified at point 3, on diagram 1) and adjust the stop post (identified at point 4, diagram 1) so that the tip of contact spring assembly engages screw-side of stop post head, allowing contacts to meet with a light pressure. This stop post is easily adjusted by turning to left until head of contact post pulls contact on left, or contact spring, away from contact on right, or reed contact. Then turn stop post screw to right about 1/8 to 1/4 turn, until contact points meet the light pressure. At this point, stop post locking screw should be firmly tightened down to hold stop post in this position.

(k) If the foregoing mechanical adjustment has been carefully followed out the Elkonode is now ready for Electrical Tests. These tests should be conducted with a master Eliminator, into which the Elkonode can be inserted while the can and rubber cushion are still removed, and with a "dummy" load on the Eliminator which will require 180 volts at 35 m.a. for Elkonode types 6, S101, S102, S103, S111, and T112. The output of the Elkonode is adjusted by increasing or decreasing the air-gap clearance between pole-piece of coil and surface of the armature reed. A cam nut and locking screw arrangement provide a flexible adjustment which sometimes must be supplemented by inserting thin metal shims between coil and bracket. NB—Shims are required only where construction of the unit will not permit air-gap clearance being decreased to point required, by adjustment of cam nut.

(l) Electrical adjustment for other types of Elkonodes, from 1 to 5 inclusive, must be conducted with "dummy" load to equal maximum output available from whichever type Elkonode is involved per characteristics shown in the foregoing table.

(m) Extreme care must be exercised to insure that no dirt or foreign matter is allowed to accumulate on contact points and that entire Elkonode assembly is kept thoroughly dry.

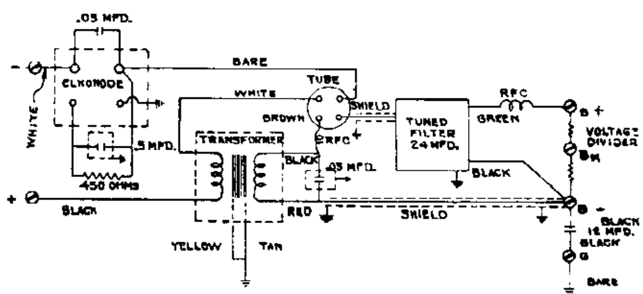
(n) Excessive sparking usually results from improper pressure between and alignment of contact points. If it is found necessary to bend the reed to secure a flat alignment of points, this should be done very carefully, using a pair of thin flat-nosed pliers, to grasp the reed firmly *at the base where it is mounted*. A very slight pressure at this point will be required to change the angle of contact for vibrator points. *No sparking* whatever results from improper adjustment of stop post, permitting contact springs to follow reed springs past the center of cycle of amplitude or arc of vibration. Contacts should be lightly touching when at rest so there is about .014 inch clearance between stop post and contact spring. Stop post will then break this contact at the center of cycle of amplitude.

If the foregoing instructions are followed carefully, and if reliable instruments are used to measure the output of the Elkonode when electrical adjustments are being completed, you should be able to install contact and reed spring assemblies without difficulty. When adjustments have been completed to your satisfaction, place vibrator assembly inside rubber cushion by holding cushion in inverted position, and allowing assembly to drop into place. Next, place entire assembly inside can, in same manner, and fasten can to base, using screws provided for that purpose.

Thorough instructions for servicing other parts of the Mallory Elkon "B" Eliminator are provided in the service and installation bulletin accompanying each unit,—copies of which may be had upon request.

The following equipment is recommended as being extremely useful in conducting repairs on Mallory-Elkon "B" Eliminators and Elkonodes:

1. High resistance volt-meter. Scale: 0 to 300. Resistance: Not less than 1000 ohms per volt.
2. One good quality milliammeter. Scale: 0 to 50.
3. One set feeler gauges.
4. One small screw-driver.
5. One pair thin, flat-nosed pliers (duck-bill type).
6. One 1932 Mallory-Elkon "B" Eliminator chassis.
7. One variable resistor—"dummy" load arrangement to duplicate maximum load for which each of six standard types of Elkonodes is designed.



Directions for Servicing 1933-34 Type Dual-Reed Mallory 'Self-Rectifying' Elkonodes

The 1933 Mallory Self-Rectifying Elkonode is a dual-reed converter which within itself sets up the essentially alternating current required, and likewise rectifies it to the form of direct current required for radio receiver plate supply. No rectifying tube is used with the 1933 Mallory Self-Rectifying Elkonode.

This Elkonode is supplied in five standard types—from 10 to 14 inclusive—and modifications are supplied for special requirements under such designations as Nos. 30, 31, 34, 35 (for Motorola Receivers), and Nos. 36 and 37. 12-volt types are supplied in types G10 to G14 inclusive, and 32-volt types from F10 to F14 inclusive. The mechanical construction of the dual-reed Self-Rectifying Elkonode is the same in all types with the exception of size and number of turns of wire on Elkonode coil.

P. R. MALLORY & CO.

Following is a table of characteristics indicating output obtainable from each standard Elkonode at storage battery terminal voltage of 6.6, for the 6-volt, 13.2 for 12-volt type.

ELKONODE RATING TABLE

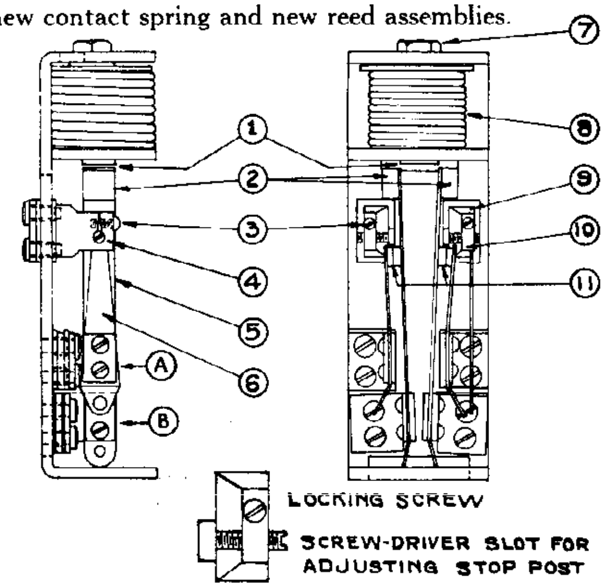
Elkonode Type	Volts Output	For Receivers Requiring the Following Current in Milliamperes in the B Minus Lead at 200 V. on Signal: Without Voltage Dividers in Elim.	With 2 M. A. (100,000 Ohm) Voltage Divider in Elim.	Elkonode Rated Output Watts	Storage Battery Drain in Amps.
10	200	40–45	38–43	8.4	2.1
11	200	35–40	33–38	7.4	1.9
12	200	30–35	28–33	6.4	1.6
13	200	25–30	23–28	5.4	1.4
14	200	20–25	18–23	4.4	1.2

Current at which Phantom Load Relay should be adjusted

Elkonode Type	No. 10	No. 11	No. 12	No. 13	No. 14
Current	20 M.A.	17.5M.A.	15 M.A.	12.5M.A.	10 M.A.

Special Types Should be Adjusted to SET MFRS. Specifications (See Paragraph "N")

The following reproductions picture the Mallory dual-reed or self-rectifying Elkonode in two positions: (3) is a side view showing the Elkonode with cover and rubber cushion removed, and (4) is a front view with cover and cushion removed. Numbered arrows clearly indicate position of Elkonode parts involved in installing new contact spring and new reed assemblies.



ENLARGED STOP POST ASSEMBLY

No. III
1. Air-gap
2. Reed counter weights
3. Stop-post Locking-screw
4. Stop-post
5. Reed Spring Assm.
6. Contact Spring Assm.

No. IV
7. Coil mounting nut
8. Coil
9. Stop-post mounting block
10. Position contact spring behind stop-post head
11. Contact points

Routine for Dismantling Dual-Reed or Self-Rectifying Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws which fasten outer housing or can to base.

(b) Hold can in upright position and tamp gently against hand, permitting base and rubber housing inside of can to drop out gently. (CAUTION: Do not attempt to remove Elkonode assemblies from cans by pulling on base.)

(c) Remove rubber cushion from Elkonode assembly in the same manner as entire assembly was removed from can.

(d) With internal assembly in view, displace condensers by turning each outward from center carefully.

TO REMOVE SPRINGS AND REEDS:

(e) Remove contact spring assembly by extracting screws at point marked "A" on above diagram, No. III.

(f) Remove reed assembly by extracting screws at point marked "B" on above diagram No. III.

(g) Install reed assembly, using care to insure that metal brackets in which these reeds are mounted are squarely aligned with reeds. (NB—Use only Kester Rosin Core Solder.)

(h) Install contact spring assembly using care to properly align metal brackets and blocks with which this assembly is mounted.

(i) Inspect alignment of contact points to insure that contacts on reed and contacts on springs are in proper alignment. Their surfaces must engage squarely and evenly. Alignment of points is controlled by the position of the springs. Screws mounting these springs should not be tightened firmly until points are in alignment.

(j) With points in proper alignment, air-gap or clearance between pole-piece of coil and counter-weights on ends of reed assemblies should be adjusted to approximately 1/32 inch, when reeds are pulled in to *center position*. This adjustment is provided for by removing or inserting shims between the Elkonode frame and coil, at top of coil.

(k) Loosen locking screw of stop posts (identified at point 3, diagram III, above) so that tips of contact spring assembly engage screw side of stop post head, allowing contacts to meet with contacts on reed assemblies at light pressure. Stop post is adjusted by turning to left until head of contact post pulls contact springs away from contact on reed assembly. Then turn stop post screw to right (about 1/8 to 1/4 turn) until contact points on both contact spring and reeds meet with light pressure. At this point, stop post locking screw should be firmly tightened to hold stop post in this position.

MODEL 1933-34 Type
Dual Reed Elkonodes
Dismantling and
Adjustments

P. R. MALLORY & CO.

(l) It is extremely important, if secondary reed and contact spring assembly show any sign of having been burned as a result of "arcing," that condenser No. 16611, rated at .01 mfd. 1600 V., used across the secondary side of the Elkonode be replaced with a new one.

(m) Elkonodes which have become inoperative through the breaking down of this condenser, or which show evidence of overload at contact points, should never be replaced in Eliminators or automotive radio receivers until the adjustment of the "phantom load" relay has been checked carefully. Following is an outline of the causes which may bring about Elkonode failure through no fault of the Elkonode, and the method for correcting them:

(n) Elkonode failure is usually the result of a "no load" operating condition, which ordinarily is due to (A) film of dirt between contact points of phantom load relay, (B) iron filings between core and clapper of phantom load relay, (C) insufficient tension in phantom load relay springs, (D) open phantom load resistor, (E) receiver output tube defective, (F) connections to output tube open.

Most prevalent of these difficulties are items (B) and (C) which invariably cause Elkonode failure through no fault of the Elkonode.

Conditions (A) and (B) are corrected by thorough cleaning with strips of paper. Condition (C) is corrected by inserting milliammeter in coil circuit of phantom load relay, or in B+ lead to receiver, and adjusting spring tension so that relay clapper will pull to core when current is equivalent to current rating for that type of Elkonode, as indicated in foregoing table. Conditions (D) and (F) are detected by continuity checks, while Condition (E) is detected by means of a tube tester.

(o) A choke coil is mounted within the rubber cushion in the base of the Elkonode can, and the continuity of this choke coil should be checked by continuity tests between mounting prongs and soldering terminal of the secondary contact spring assembly.

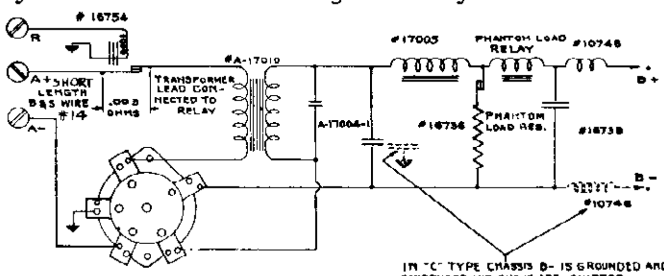
(p) If the foregoing mechanical adjustments have been carefully followed out, the Elkonode is now ready for electrical tests. These tests should be conducted with a master Eliminator, into which the Elkonode can be inserted while the can and rubber cushion are still removed. A "dummy" load to equal the output characteristics of whichever type dual-reed self-rectifying Elkonode is involved should be imposed, and all tests should be conducted with a battery terminal voltage of 6.6. Special types of Elkonodes designed for so-called "all-electric" automotive receivers may best be tested in this same manner, or with a "dummy" resistor load to match the output characteristics of that Elkonode.

(q) Extreme care must be exercised to insure that no dirt or foreign matter is allowed to accumulate on contact points, and that the entire Elkonode assembly is kept thoroughly dry.

(r) "Excessive sparking" usually results from improper pressure between and alignment of contact points. If it is found necessary to bend reed assembly to secure flat alignment of points, this should be done by carefully grasping reed assembly at bracket where it is mounted with a pair of thin, flat-nosed pliers. A very slight pressure will be required to change the angle of contact for vibrator points. "No sparking" results from improper adjustment of stop post, permitting contact spring to follow reed spring past center of cycle of amplitude or arc of vibration. Contacts should be lightly touching when at rest, so a clearance of approximately .012 exists between stop post head and contact spring on interrupter side and .002 to .006 on rectifier side. Stop post will then break these contacts at center of cycle of amplitude.

If the foregoing instructions are followed carefully, and if reliable instruments are used to measure output of Elkonodes when electrical adjustments are being completed, you should be able to install these contact spring and reed assemblies without difficulty. When adjustments have been completed to your satisfaction, place vibrator assembly inside rubber cushion by holding cushion in inverted position and allowing assembly to drop into place. Next, place entire assembly inside can, in the same manner, and fasten can to base.

Thorough instructions for servicing other parts of the Mallory-Elkon "B" Eliminator are provided in Service and Installation Bulletin accompanying each unit, copies of which may be had upon request. A circuit diagram of the entire Eliminator is shown herewith for your convenience in making continuity tests.



It is important that Elkonodes be used only with Eliminators having same type numbers, and that phantom load relays and resistors are matched to type of Elkonode and Eliminator involved. Correct types of phantom load relays and resistors are shown in the parts list.

The following equipment is recommended as being extremely useful in conducting repairs on Mallory-Elkon "B" Eliminators and Elkonodes:

1. High resistance volt-meter. Scale: 0 to 300. Resistance: Not less than 1000 ohms per volt.
2. One good quality milliammeter. Scale: 0 to 50.
3. One set feeler gauges.
4. One small screw-driver.
5. One pair thin, flat-nosed pliers (duck-bill type).
6. One 1933 type 10 Mallory-Elkon "B" Eliminator chassis, with one each proper phantom load relay and resistor for types 10, 11, 12, 13 and 14. (A test-board switching arrangement to cut in whichever type phantom load relay is required for the Elkonode being repaired will be valuable in conducting these tests.)

P. R. MALLORY & CO.

Routine for Dismantling Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws holding cover on can.

(b) Loosen cover from can and hold in upright position, prongs down; gently shake the rubber sock and Elkonode from the can.

(c) Closely observe the manner in which the leads from the prong base to the Elkonode are placed in the outer slots of the rubber sock. This is important for correct placement of wires when replacing assembly in can.

(d) Observe the location of the various parts, especially the position of the reed Armature (2) with respect to the coil pole shoe of the Elkonode. (1).

(e) Unsolder the three leads at the Elkonode terminals, noting that the top lead (with Elkonode held as in diagram) crosses over the ground lead to the center connection at the plug. Unsolder the coil wire at the spring terminal.

(f) Loosen lock nuts A, and A2 and turn the adjusting screws B, and B2 counter clockwise until the insulating bushings (5) are against the frame, then remove screws and slide out bushings.

(g) Loosen stack screws (3) and remove. Press on the under side of the bakelite stack and reed so as to move the assembly out from between the frame. Save the insulating bushings (5), stack screws (3), connector plate (4), adjusting screws, and the lock nuts. Remove the bakelite stack spacers and insulating tubes from the assembly.

ROUTINE FOR REBUILDING THE ELKONODE:

(h) Rebuild the stack assembly, making sure to use the thicker of the four bakelite spacers on either side of the reed.

(i) Since the Elkonode is largely magnetic in operation, extreme care must be taken to prevent particles or filings of iron from attaching themselves to the iron parts of the Elkonode. Clean the pole shoe, frame, and reed thoroughly.

(j) Hold the assembly with the reed in the position shown in the illustration, place the frame under the assembly, as shown also, and insert the assembly from the top. It may be necessary to spread the frame slightly in order to make the insertion. Inspect the stack screws for signs of weakening, and if satisfactory, replace with the connector plate and tighten slightly.

(k) The reed should stand approximately in the center of the frame at rest. The end of the reed should be parallel to the face of the pole shoe and from .003" to .005" distant from it when the reed is pulled down opposite its center. This distance should be accurately set by feeler gauges. The reed may be adjusted because of play in the mounting holes.

(l) Insert the insulating bushings in the slots in the ends of the springs, thread the adjusting screws into place, together with the lock nuts. Adjust the screws to place the contacts close to the reed contacts. The springs should be moved so as to allow the contacts to strike the reed contacts without overlapping. The contacts should be fairly flat in making contact, and still not bind on the insulated adjusting bushing.

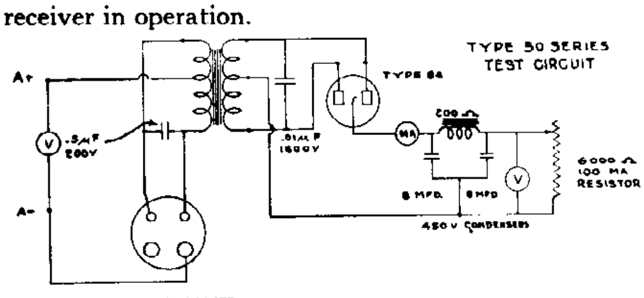
(m) Tighten the stack firmly without disturbing the adjustments. Hold the reed over a piece of white paper in the vertical position shown in the illustration. The end edge of the reed, on the opposite side from the armature should rest from flush with the edge of the pole piece to .003" above same. Any bending of the reed should be done at the extreme armature end, and only slight alterations should ever be necessary. Should the pole shoe not be parallel with the armature in a vertical direction, turn the pole shoe with a pair of long-nosed pliers; *do not attempt to twist the reed.* Check the air-gap spacing and tightness of coil mounting screws, if such adjustments are made, then recheck alignment.

(n) Solder the leads back as before, with the ungrounded heater terminal lead to the reed tail. The connector plate is soldered to the reed tail also, at the same time, and the coil wire to the near spring lug.

(o) Some method of exerting high pressure upon the stack end of the Elkonode while the final tightening of the clamping screws is taking place is essential. It is suggested that an arbor press, capable of exerting a total pressure of about 2000 pounds, be used. Pressure should be exerted directly over the stack, between the screws, while a large screw driver draws the screws down firmly. This prevents loosening of the stack in service and consequent failure.

(p) Turn the adjusting screw B-1 clockwise until the space between the contacts G and H is between .003" and .004", as measured carefully with a feeler gauge, with the lock nut A-1 tightened firmly. Proceed likewise with B-2 and A-2 until clearance between contacts E and F is between .004" to .006". Check lock nuts for tightness. The unit should then be ready for operation.

Following is a test circuit which may be set up for electrically testing and adjusting Elkonodes of the "50" Series. "Sound" tests may be obtained only with receiver in operation.



(Transformer should be the same as used in set from which the Elkonode was taken. The set itself may be used for test if an extension lead is made up. Do not expect quiet operation while set is open and unit is uncanned.)

(q) If test equipment is available, operate the Elkonode on this equipment before placing it in the Elkonode can. The unit should start operation at 4.4 volts (2 cells of 6-volt battery on charge), should provide correct output at 6.6 volts and should operate satisfactorily at 8.8 volts (4 cells on charge). Should any adjustment be necessary, adjust screw B-2 only. A very slight movement of the screw should permit final adjustment.

CAUTION

(r) Do not attempt to bend contact springs.
Use only Kester Rosin Core Solder.
Keep moisture from all parts of the Elkonode.
Keep metallic particles out of Elkonode.
Keep dust, moisture, grease and liquid from the contact surfaces. Clean contact surfaces with a dry, clean piece of linen paper.

MODEL 60,60,80 Series
Elkonodes-Repair

P. R. MALLORY & CO.

(Continued)

(s) When inserting the Elkonode into the rubber sock, be very careful to turn the frame of the Elkonode parallel with the flat sides of the inside holes of the sock, so as to leave the air spaces at the open sides of the Elkonode. The single ground lead (from reed) is taken down the smaller of the two slots, while the other two leads are taken down the larger slots. Place the Elkonode in the sock, so that no wires need be bent to meet this arrangement. Draw the leads to the prong base, and fold under the lid. Insert the sock assembly into the can, with the large slot next to the seam of the can. Screw cover to can with screws provided.

SERVICE EQUIPMENT REQUIRED

1. High resistance volt-meter. Scale: 0 to 300 and 0 to 600. Resistance: Not less than 1000 ohms at 2 volts.
2. A good quality milliammeter. Scale: 0 to 50 and 0 to 100
3. One set feeler gauges.
4. One small screw driver and one large screw driver.
5. One pair thin long-nosed pliers.
6. One medium-sized arbor press.

"60-70-80" Series Units

The series 60, 70, and 80 Mallory Elkonodes are described as single-reed, full-wave inverters, with self-contained synchronous rectifiers. These units within themselves supply the direct current, high voltage for radio receiver plate supply. No tube rectifiers are required with these types. Inasmuch as the mechanical construction of all of the 60, 70 and 80 series units is the same, the following service information will apply to all such units:

The 60 series unit is no longer in production—having been replaced with the 70 series unit, and differs from the 70 series principally in that its self-contained point buffer condensers were of the wax impregnated paper type, rated at .008 mfd. 1600 volts DC. The 70 series is supplied with an oil-impregnated and immersed paper condenser of .01 mfd. capacity, rated at 1600 volts DC, and whenever occasion arises to replace contact spring and reed assemblies in the 60 series unit, advantage should be taken of that opportunity to replace the old unreliable paper condensers with the new type, described as our part A-18237.

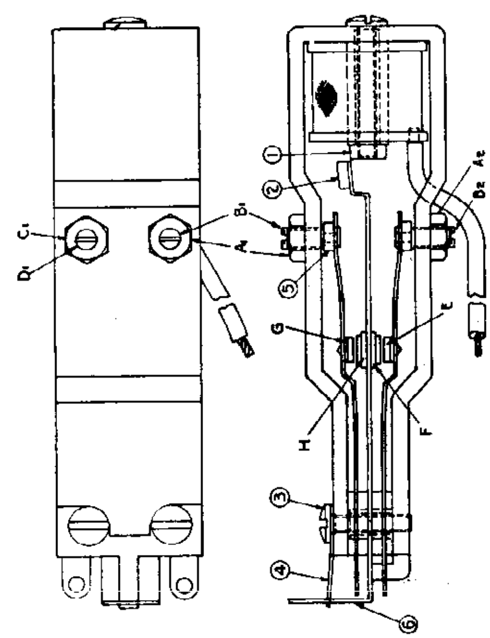
The 80 series Mallory Elkonodes are identical with the 60 and 70 series except that no internal point condensers are supplied. These units are to be used only in cases where the original point buffer condensers in the type 60 Elkonodes have been removed, and suitable condensers installed permanently at the Elkonode socket prong. In some special cases, a manufacturer may have used external secondary buffer condensers in place of the internal point condensers, but such cases will be rare.

As with all other types of Mallory Elkonodes, the prefix letter G denotes 12-volt operation, and the prefix letter F denotes 32-volt operation. Differences in wire size and in the number of turns of the Elkonode driver coil distinguish the 6-, 12-, and 32-volt types, but the output ratings as set forth in the following table apply to 6-, 12-, and 32-volt types alike:

Elkonode Series No.	Maximum Watts Output
60 —70 —80	11
60B—70B—80B	18
61 —71 ·81	11
63 —73 —83	18
65 —75 —83	11

The reed of the Elkonode is grounded to the can, and the receiver circuit ground is necessary for all types but the 60, 60B, 70, 70B, 80 and 80B units, in which cases the ground returns through the A Battery. The types 65, 75 and 85 are for use on household battery receivers, or similar applications where the battery is not on charge while the receiver is in operation. All ratings given are for operating battery voltages of 6.6, 13.2 and 33 volts, for the standard 6-volt, 12-volt and 32-volt series respectively. It is necessary that the Elkonodes be properly polarized in connecting the prong base and transformer, in order to prevent a reversal of output voltage.

The following reproduction pictures the Mallory type 80 Elkonode in both top and side views with covers and with point buffer condensers of course removed:



Explanation of Above Charts

A—A2 Rectifier Lock Nut		1. Magnet Coil Pole Shoe
B1—B2	—Rectifier Adjusting Screw	2. Reed Armature
C1—C2	—Interrupter Lock Nut	3. Stack Clamping Screw
D1—D2	—Interrupter Adjusting Screw	4. Connector Plate
E, F, G, H—Rectifier Contacts		5. Insulating Bushing
E, F, G, H—Duplicate for Interrupter Side		6. Reed Tail

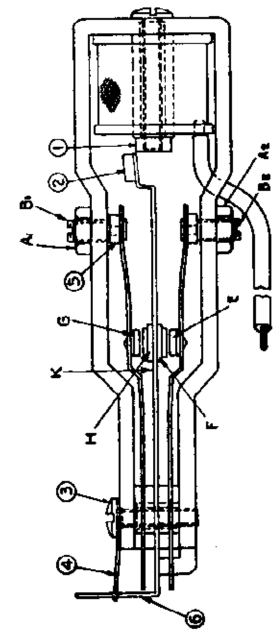
P. R. MALLORY & CO.

The 50 Series Mallory Elkonode is a single-reed full-wave inverter for use in supplying alternating-current voltage which in turn is rectified by a tube rectifier for supplying the high direct-current voltage needed for radio receiver plate supply.

This Elkonode is used in three standard types, Nos. 50, 51, and 53, and in certain modified forms for special requirements. For 12-volt operation, the type number is prefixed with the letter "G" to designate the change in construction. Likewise, for 32-volt operation, the letter "F" is used. The mechanical construction for all types is the same except for a change in the driver-coil windings for the 12-volt and again for the 32-volt types. The types 50 and 51 Elkonodes are adjusted and intended to carry output loads up to *11 watts*. The type 53 Elkonode is designed for loads from 11 to 18 watts. These types have an advantage over earlier types in not being limited to a narrow range of load conditions. Ratings are given, in every case, for operating battery voltages of 6.6, 13.2, and 33 volts, for the 50, G-50, and F-50 Series, respectively.

The following reproduction pictures the Mallory Type 50 Series Elkonode in a top view, with covers removed.

1. **Magnet coil pole shoe**
2. **Reed armature**
3. **Stack clamping screw**
4. **Connector plate**
5. **Insulating bushing**
6. **Reed foil**



A—lock-nut. B—adjusting screw. E, F, G, H—contact points

Instructions For Adjusting Contact Springs When Such Springs Do Not Require Replacement

As with automobile ignition contacts, the tungsten contact points in Elkonodes will show some evidence of wear after they have been in service for a long period of time. This wear progresses gradually, and as long as the Elkonode is capable of operation, any amount of wear at the contact points will have no influence whatever on the performance of the radio set or on the voltage supplied to the tubes. However, after a long period of service the Elkonode may refuse to start, and when this point is reached it should be taken as indicative of excessively worn contact points. The Elkonode has been designed with a generous reserve of tungsten in its contact points, and this reserve may be utilized to give the Elkonode extended life, providing one simple adjustment is made. This adjustment is outlined as follows:

1. Remove the Vibrator unit from the can and rubber sock, by following closely the directions covered by paragraphs A, B, C and D in the procedure for dismantling Elkonode. Use care to avoid bending wires at the soldered connections.
2. Place the Elkonode on a piece of white paper, so that when viewed from above it appears exactly as in drawing above.
3. Loosen lock nut (A2) and turn screw (B2) clockwise until .005" of light can be seen between contacts (F) and (E). If the contact points are roughened, the light can not be seen across their entire diameter, even though they are correctly spaced (i. e., within .005" of touching each other).
4. A check on the accuracy of the spacing adjustment is obtained by pressing lightly against the center of the reed with a small pointed metal instrument in the direction and location shown by arrow (K). When the reed is thus moved, so as to just close contacts F and E, the weight (2) on the free end of the reed should move 1/64 inch from its "at rest" position. Check should be made after lock nut has been firmly tightened down.
5. DO NOT readjust spacing between contacts G and H, unless the tungsten is nearly all worn away. In this case, readjustment is obtained in exactly the same manner as for contacts F and E.
6. In reinserting the Elkonode into its rubber sock, be very careful to turn the "flats" of the sock hole so that they are in line with the lock-nuts. This provides ample space in the sock for the free movement of the reed. In reinserting the "socked" Elkonode into the can, be sure that the can seam lines up with the wider of the wire-carrying channels on the outside of the sock. This is important.

CAUTION: Inasmuch as the Elkonode mechanism is partially magnetic, extreme care should be observed while making adjustments to prevent iron filings or similar metallic matter from getting into the Elkonode.

MODEL 60,70,80 Series
Elkonode Repair
"B" Eliminator Types

P. R. MALLORY & CO.

Directions for Replacing Contact Spring and Reed Assemblies in the 1933 and 1934 '60,' '70,' and '80' Series Mallory Self-Rectifying Elkonodes

ROUTINE FOR DISMANTLING ELKONODE:

(a) Remove screws holding cover on can.

(b) Loosen cover from can and hold in upright position, prongs down; gently shake the rubber sock and Elkonode from the can.

(c) Closely observe the manner in which the leads from the prong base to the Elkonode are placed in the outer slots of the rubber sock. This is important for correct placement of wires when replacing assembly in can.

(d) Observe the location of the various parts, especially the position of the reed Armature (2) with respect to the coil pole shoe of the Elkonode (1).

(e) For your own protection, it will be well to make a pencil sketch of the manner in which the five leads are connected to the Elkonode terminals, before removing these leads. Do not cut them to remove, but carefully unsolder each one. In the 60 and 70 series units, where Condensers are supplied internally, remove them also and unsolder the coil wire at the spring lug.

(f) Remove coil mounting screw from end of frame, and remove coil and pole shoe from frame. Loosen lock nuts A-1, A-2, C-1 and C-2 and remove adjusting screws B-1, B-2, D-1 and D-2. Remove the insulating bushings from the slots in ends of springs.

(g) Loosen stack screws (3) and remove. Press on the under side of the bakelite stack and reed so as to move the assembly out from between the frame. Save the insulating bushings (5), stack screws (3), connector plate (4), adjusting screws, and the lock nuts. Remove the bakelite stack spacers and insulating tubes from the assembly.

ROUTINE FOR REBUILDING THE ELKONODE:

(h) Rebuild the stack assembly (unless you are using stack assembly complete as provided under our part Number A 18448), making sure to use the thicker of the four bakelite spacers on either side of the reed. Make sure that in assembling the springs, the lugs for soldering line up on the outside edge of the stack.

(i) Since the Elkonode is largely magnetic in operation, extreme care must be taken to prevent particles or filings of iron from attaching themselves to the iron parts of the Elkonode. Clean the pole shoe, frame, and reed thoroughly.

(j) Hold the assembly with the reed in the position shown in illustration, (see page 24). Place the frame under the assembly, as shown also, and insert the assembly from the top. It may be necessary to spread the frame slightly in order to make the insertion. Inspect the stack screws for signs of weakening, and if satisfactory, replace with the connector plate and tighten slightly.

(k) Reinsert the driver coil and pole shoe and clamp in place with the screw removed previously. Draw the screw up tightly, and with long-nosed pliers, turn the pole shoe to a vertical position parallel with the reed surface. The coil wire should be inserted through the hole in the frame before the coil is inserted in the frame.

(l) The reed should stand approximately in the center of the frame at rest. The end of the reed should be parallel to the face of the pole shoe, and from .003" to .005" distant from it when the reed is pulled down opposite its center. This distance should be accurately set by feeler gauges. The reed may be adjusted because of play in the mounting holes.

(m) Insert the insulating bushings in the slots in the ends of the springs, thread the adjusting screws into place, together with the lock nuts. Adjust the screws to place the contacts close to the reed contacts. The springs should be moved so as to allow the contacts to strike the reed contacts without overlapping. The contacts should be fairly flat in making contact, and still not bind on the insulated adjusting bushing.

(n) Tighten the stack firmly without disturbing the adjustments. Hold the reed, over a piece of white paper in the vertical position shown in illustration, (see page 24). The end edge of the reed, on the opposite side from the armature should rest from flush with the edge of the pole piece to .003" above same. Any bending of the reed should be done at the extreme armature end, and only slight alterations should ever be necessary. Should the pole shoe not be parallel with the armature in a vertical direction, turn the pole shoe with a pair of long-nose pliers, *do not attempt to twist the reed*. Check the air-gap spacing and tightness of coil mounting screws, if such adjustments are made, then recheck alignment.

(o) Solder the leads to the spring, and reed lugs after threading all into place first. If condensers are to be used, place them in position and solder the leads from them at the same time. Make sure that the insulation is over the "hot" condenser lead and that it does not "short" against the frame. Also make sure that the grounded lead does not touch the spring lug or wire. Solder the coil wire at the same time, and solder the connector plate lug to the reed tail. It is suggested that you use another Elkonode as a sample, since it is quite important that all wires be replaced exactly as removed.

(p) Some method of exerting high pressure upon the stack end of the Elkonode while the final tightening of the clamping screws is taking place is essential. It is suggested that an arbor press, capable of exerting a total pressure of about 2000 pounds, be used. Pressure should be exerted directly over the stack, between the screws, while a large screw driver draws the screws down firmly. This prevents loosening of the stack in service and consequent failure.

(q) Loosen lock nuts C, C-1 and C-2. Turn adjusting screw D-1 clockwise until clearance between contacts G and H is between .002" and .003" as measured with a feeler gauge. Lock nut C-1 should be drawn up firmly before this measurement is taken. Adjust C-2 similarly so that the clearance between contacts E and F is between .004" and .006" with the lock nut (C-2), drawn up firmly. This adjustment sets the interrupter section for correct operation.

(r) Turn the adjusting screw (B-1), until the clearance between contacts G and H is between .009" and .012". Adjust screw B-2 until the clearance between E and F is between .011" and .013". This sets the rectifier section in an approximately correct position for operation.

(s) If test equipment is available it is very advisable to inspect the operation of the Elkonode before assembling into the receiver. (A suitable test circuit is outlined later in this section.) The unit should start operating at 4.4 volts (2 cells of 6-volt battery on charge), should provide correct output at 6.6 volts, and should operate satisfactorily at 8.8 volts both with load and at no load.

(t) Should the unit flare or spark excessively at higher voltages, adjust the rectifier contacts slightly to control this arcing. The contacts E and F should always have slightly wider clearance between them than contacts G and H.

(u) *Do not adjust the interrupter contacts*, unless the unit will not start at 4.4 volts. Then adjust the B-2 screw only and do not make the clearance any smaller than is absolutely necessary. After any adjustment changes, always check the operation thoroughly at all voltages.

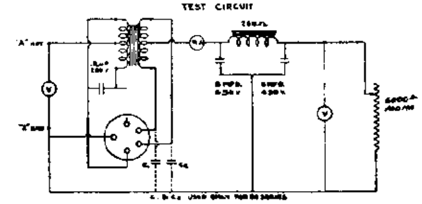
CAUTION

(v) Do not attempt to bend contact springs.
Use only Rosin Core Solder.
Keep moisture from all parts of the Elkonode.
Exercise extreme care to keep metallic particles out of Elkonode.
Keep dust, grease and liquid from the contact surfaces.
Clean with a clean, dry piece of linen paper.

(w) When inserting the Elkonode into the rubber sock, be very careful to turn the frame of the Elkonode parallel with the "flat" sides of the inside holes of the sock, so as to leave the air spaces at the open sides of the Elkonode. The tail of the reed should be pointing toward the narrower of the two slots in the outer surface of the rubber. Bring the two rectifier leads (smaller wire) down the smaller slot and the three interrupter and ground leads down the larger slot. One interrupter and one rectifier lead will have to be reversed to do this and enough slack must be left at the bend to prevent wire breakage at the soldered joint. Draw the remaining wires under the lid and fold down, seeing that the wires are not twisted in the slots.

(x) See that the rubber pad is in the can, insert assembly with the large slot adjacent to the seam of the can and screw the lid to the can with the screws provided.

TYPE 60, 70 & 80 SERIES TEST CIRCUIT



The transformer should be the same as used in the set from which the Elkonode was taken. The set may be used for test if an extension cable is made up. Do not expect quiet operation while the set is open and unit is uncanned.

SERVICE EQUIPMENT REQUIRED

1. High resistance volt-meter. Scale: 0 to 300 and 0 to 600. Resistance: Not less than 1000 ohms at 2 volts.
2. A good quality milliammeter. Scale 0 to 50 and 0 to 100.
3. One set feeler gauges.
4. One small screw driver and one large screw driver.
5. One pair thin long-nosed pliers.
6. One medium-sized arbor press.

Explanation of Descriptive Letters Used to Identify Special Types of Mallory-Elkon "B" Eliminators

The Mallory-Elkon "B" Eliminator is supplied in two basic types—Standard (no descriptive letter) and the "C" type. The standard unit is designed for receivers which employ a floating B minus circuit (B minus not grounded) and with a voltage divider composed of a 75,000 ohm, ½ watt carbon type resistor between B minus and BM and a 25,000 ohm ½ watt carbon type resistor between BM and B plus. The "C" type is designed for receivers having the B minus grounded and where only one high voltage lead is used. Therefore, no voltage divider is used in the "C" type, except in special cases where the Eliminator is built to be used with a particular type of radio set as shown below in PC—CA—and CD:

Type PC—Basic type "C." 50,000 ohm 1 watt carbon type resistor between B plus and BM; 50,000 ohm 1 watt carbon type resistor between BM and B minus.

Type CA—Basic type "C." 1500 ohm 3 watt wire wound resistor between B plus and BM. Connect wire from B plus Choke to BM terminal instead of to B plus terminal.

Type CD Basic type "C." 25,000 ohm 1 watt carbon type resistor between B plus and BM; 75,000 ohm 1 watt carbon type resistor between BM and B minus; 1850 ohm wire wound 3 watt resistor between B plus terminal and radio frequency Choke (B plus).

Type P—Standard basic type. 50,000 ohm 1 watt carbon type resistor between B plus and BM; 50,000 ohm 1 watt carbon type resistor between BM and B minus.

Type M—Standard basic type. Remove resistors between B plus and BM, and BM and B minus. Install 1250 ohm 1 watt resistor between B minus and G terminal. (It is necessary to provide screw for the G terminal point on terminal board.)

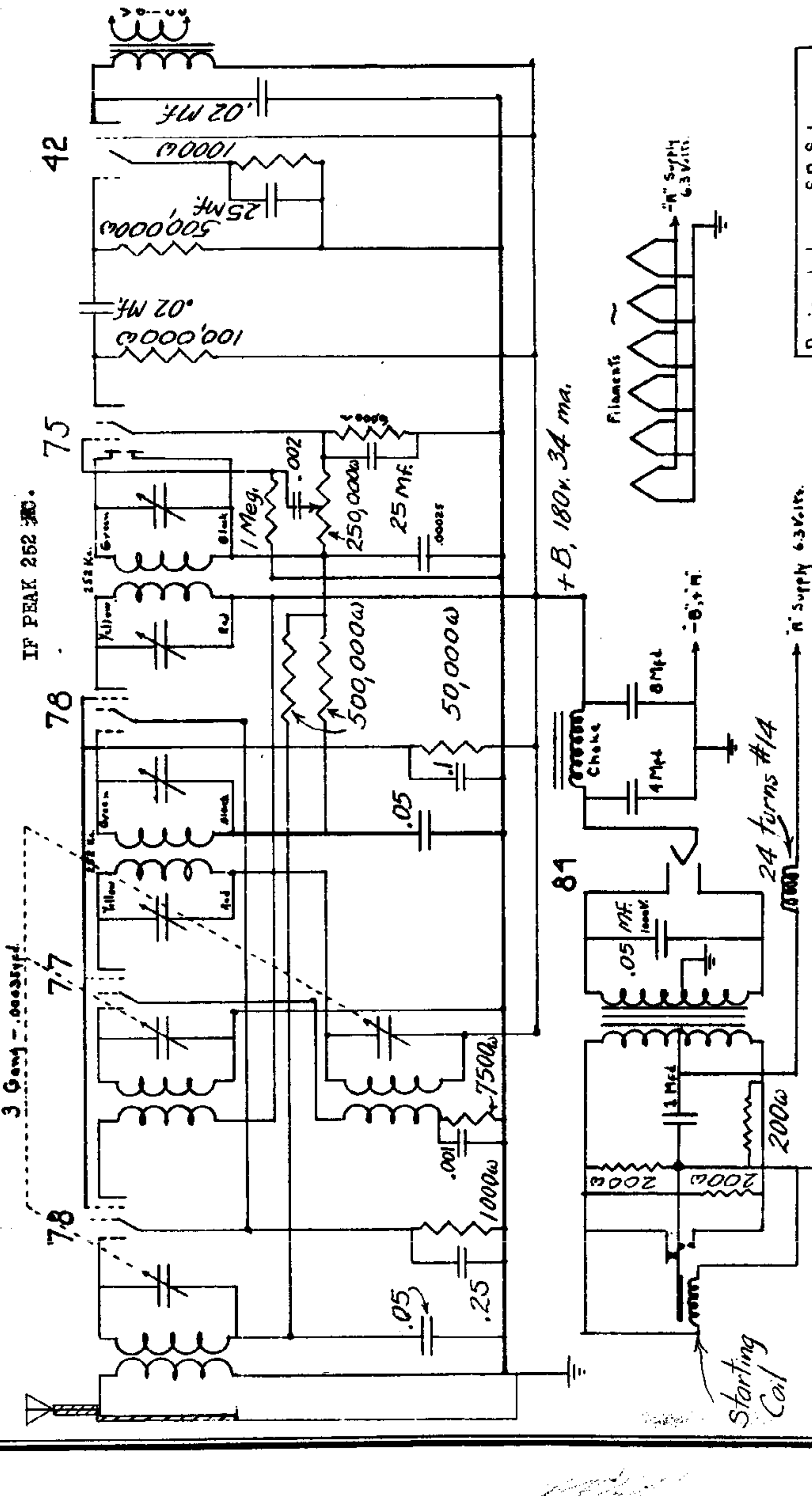
Type S—Standard basic type. Use 20,000 ohm ½ watt resistor between B plus and BM. Install 20,000 ohm ½ watt resistor from BM to G terminal. Install 5000 ohm 1 watt resistor from G terminal to B minus.

Type ST—Standard basic type. Install 20,000 ohm ½ watt resistor between B plus and BM. Install 20,000 ohm ½ watt resistor between BM and G terminal. Install 3500 ohm 1 watt resistor between B minus and G terminal.

MISSION BELL RADIO MFG. CO., INC.

MISSION-BELL RADIO CO.

MODEL 11 AUTO-RADIO

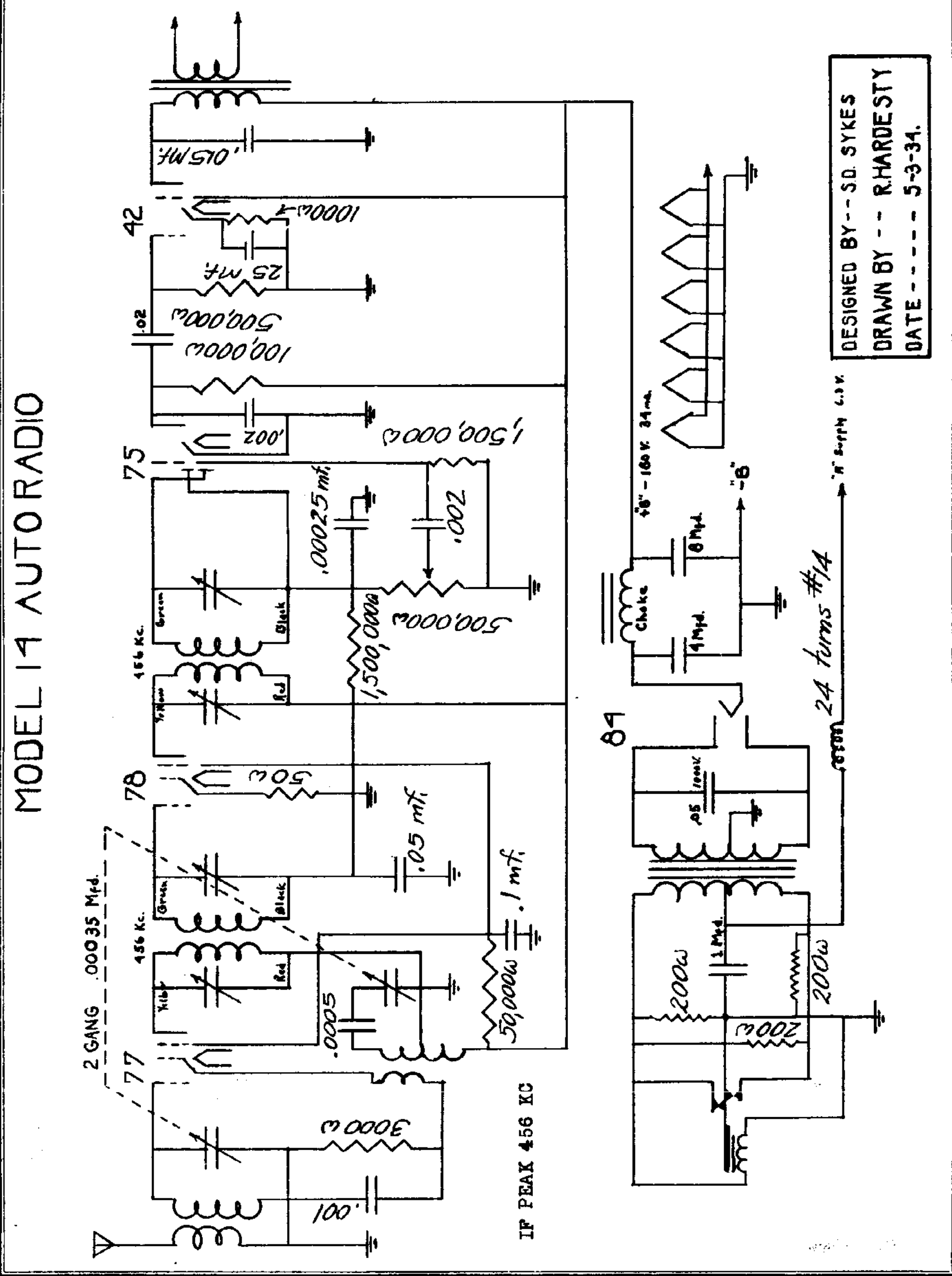


Designed by -- S.D. Sykes.
Drawn by ---- R. Hardesty.
Date ------ 5-7-34.

Model 12 DeLuxe is same as Model 11 with the addition of a special 8-inch electro-dynamic speaker in wooden sound box.

MODEL 14
Schematic

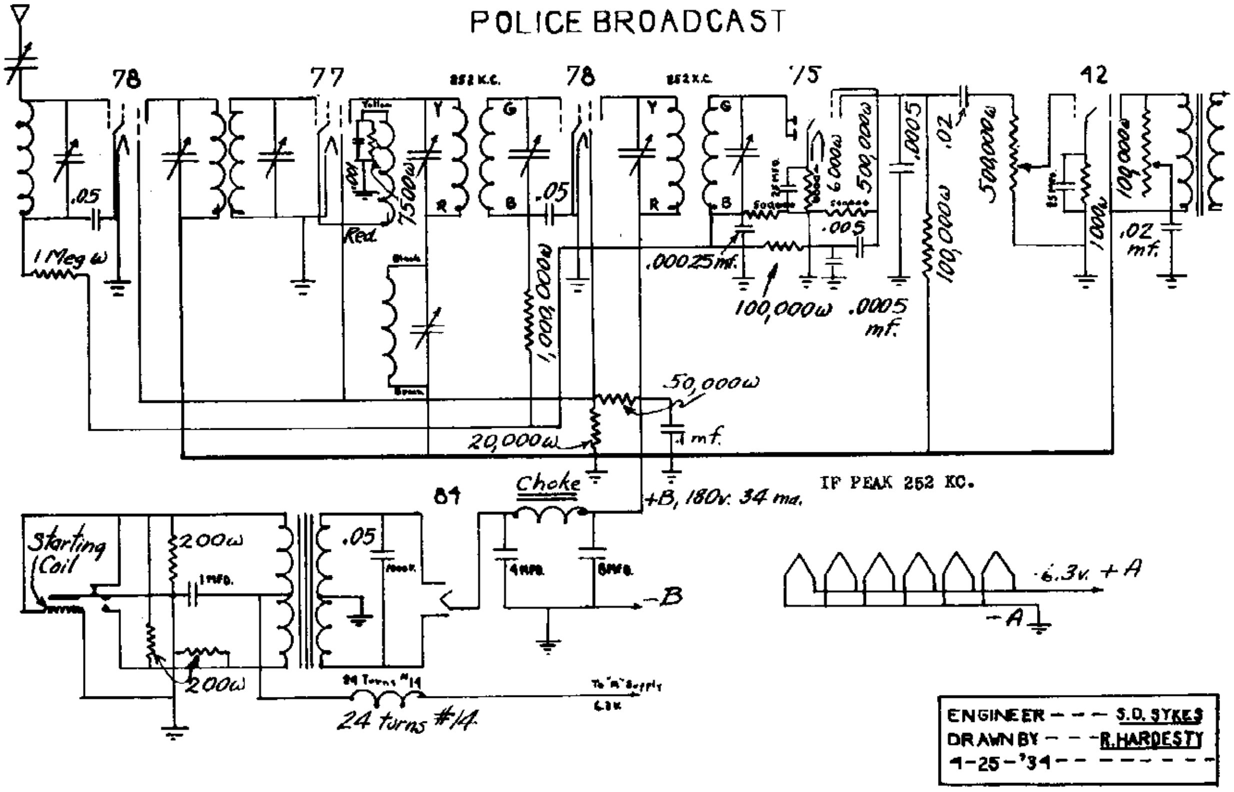
MISSION BELL RADIO MFG. CO., INC.



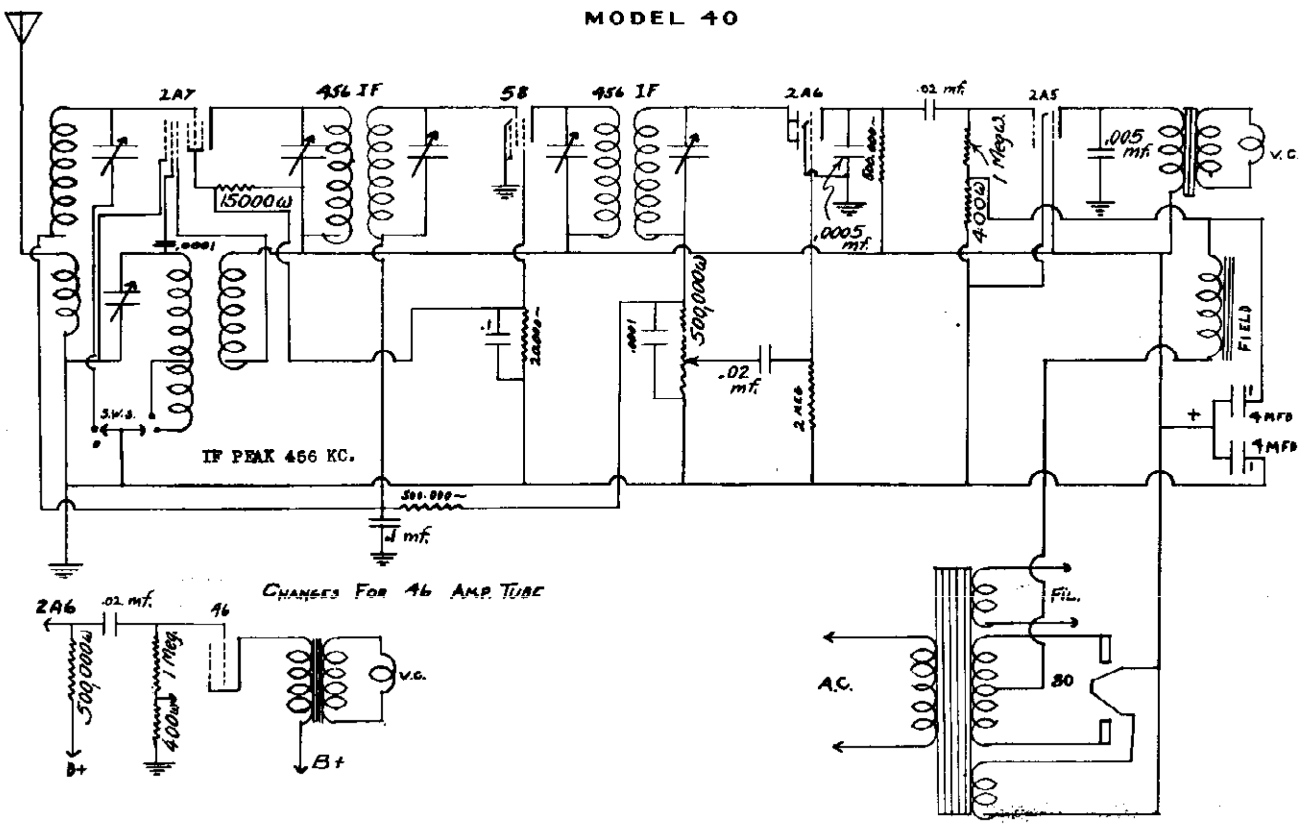
MODEL 25-A Schematic
MODEL 40 Schematic

MISSION BELL RADIO MFG. CO., INC.

MISSION BELL RADIO CO.
MODEL 25-A 6-TUBE SUPER
POLICE BROADCAST

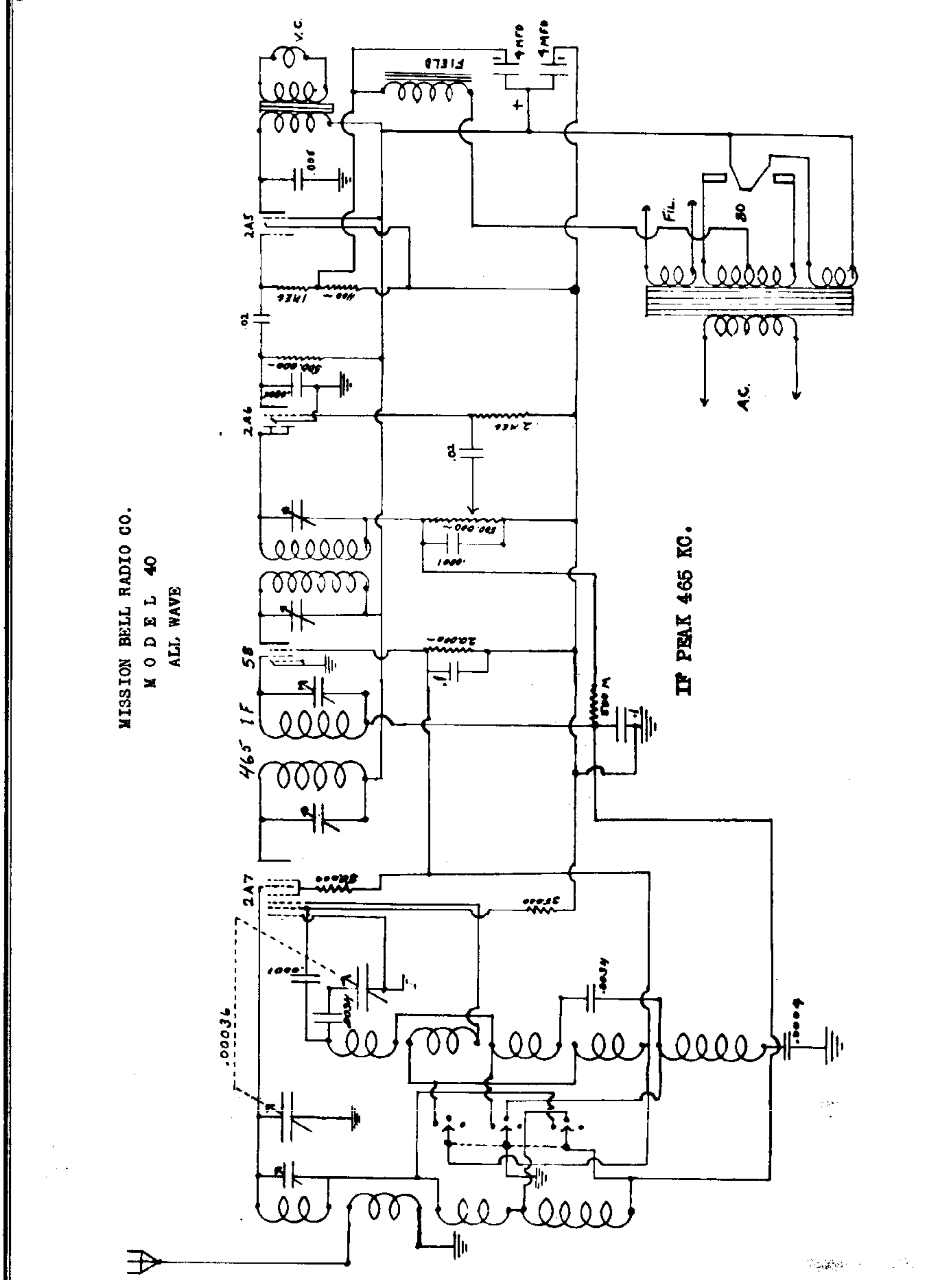


Mission Bell Radio Co.
MODEL 40



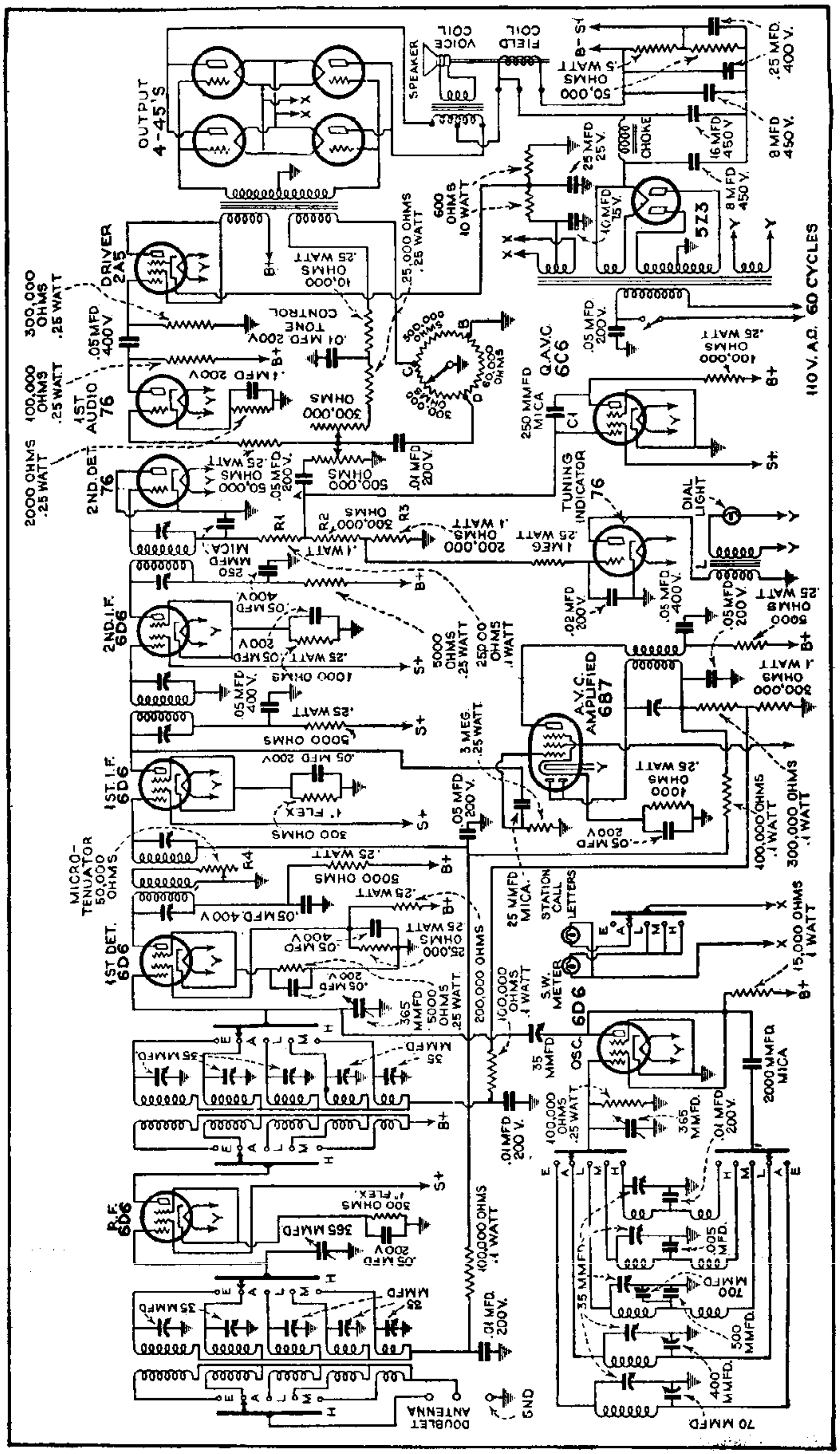
MODEL 40 All-Wave
Schematic

MISSION-BELL RADIO MFG. CO., INC.



MODEL 1935 Deluxe
Schematic

MID-WEST RADIO CORP.



MODEL 62-118
Schematic, Voltage
Socket, Parts

MONTGOMERY-WARD & CO.

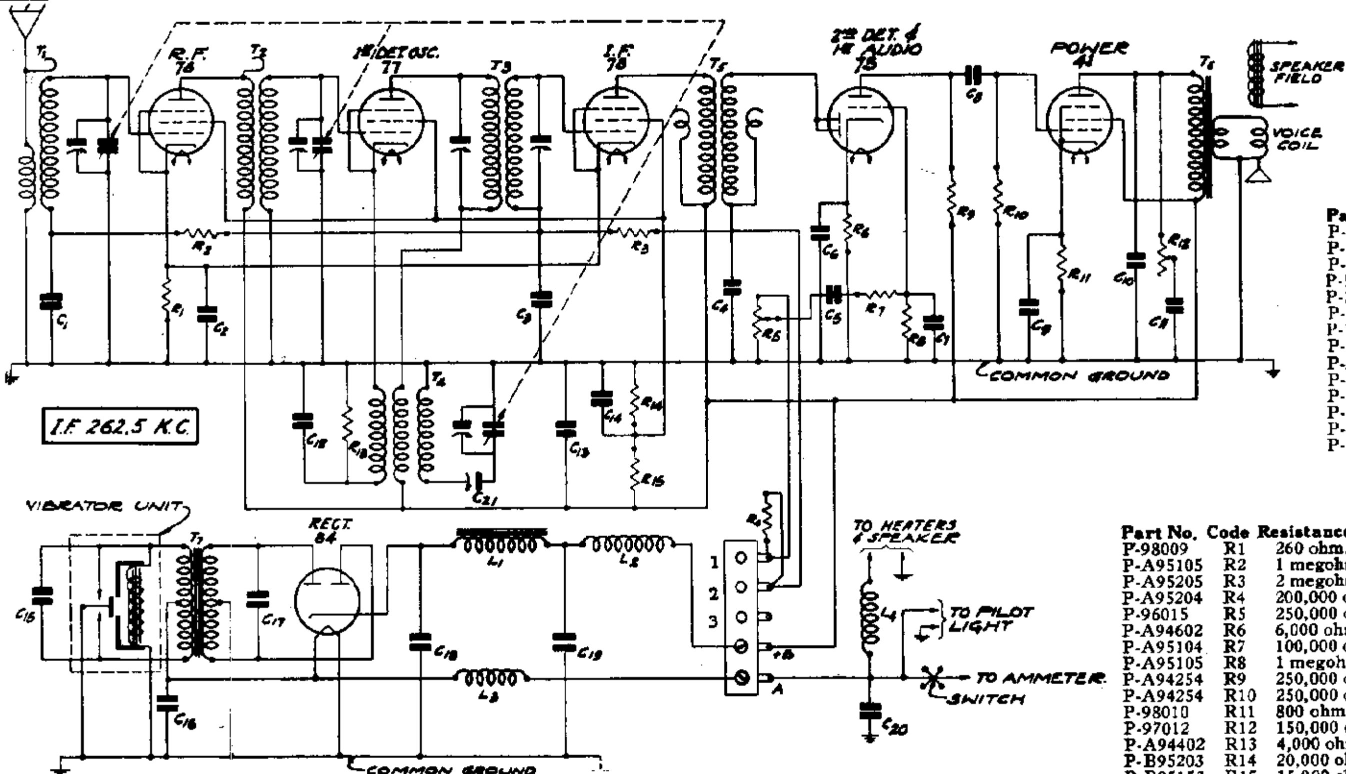


Fig. 1—Schematic Circuit Diagram.

"B" UNIT PARTS

Part No.	Item
P-50637	Filter Choke L1
P-50633	Power Transformer T7
P-5175	Eliminator "A" Choke L3
P-5174	R.F. "B" Choke L2
P-2080	Vibrator—Mallory Type 53
P-2110	Vibrator—Radiart Type 3264
P-1572	Fuse Clip Assembly
P-2024	No. 84 Tube Socket
P-2023	Vibrator Socket
P-2082	Two Lug Terminal Strip
P-2106	Single Insulated Terminal Strip
P-1924	15 Ampere Fuse
P-70765	Eliminator Cable
P-10322	Sponge Rubber Disc

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-98009	R1	260 ohm.	0.5	Wire-Wound
P-A95105	R2	1 megohm	0.2	Carbon
P-A95205	R3	2 megohm	0.2	Carbon (In 2nd I.F.)
P-A95204	R4	200,000 ohm	0.2	Carbon
P-96015	R5	250,000 ohm		Volume Control & Switch
P-A94602	R6	6,000 ohms	0.2	Carbon
P-A95104	R7	100,000 ohm	0.2	Carbon (In 2nd I.F.)
P-A95105	R8	1 megohm	0.2	Carbon (In 2nd I.F.)
P-A94254	R9	250,000 ohm	0.2	Carbon
P-A94254	R10	250,000 ohm	0.2	Carbon
P-98010	R11	800 ohm	0.5	Wire-Wound
P-97012	R12	150,000 ohm		Tone Control
P-A94402	R13	4,000 ohm	0.2	Carbon
P-B95203	R14	20,000 ohm	0.5	Carbon
P-B95153	R15	15,000 ohm	0.5	Carbon

CONDENSERS — IN CHASSIS

Part No.	Code	Capacity	Voltage	Type
P-81009	C1	0.050 mfd.	200 V.	Tubular
P-80919	C4	0.00025 mfd.	600 V.	Moulded (In 2nd I.F.)
P-80862	C5	0.050 mfd.	200 V.	Tubular
P-80919	C7	0.00025 mfd.	600 V.	Moulded (In 2nd I.F.)
P-81025	C11	0.020 mfd.	600 V.	Tubular
P-80821	C12	0.001 mfd.	600 V.	Moulded
P-81024	C20	0.500 mfd.	120 V.	Tubular
P-81026				Three Gang Condenser
P-1539	C21	600 K.C.		Trimmer Condenser
P-81022	C2	0.500 mfd.	200 V.	Condenser Block
	C3	0.050 mfd.	200 V.	
	C8	0.050 mfd.	300 V.	
	C10	0.003 mfd.	600 V.	
	C13	0.500 mfd.	300 V.	
	C14	0.100 mfd.	200 V.	
P-81021	C6	12.00 mfd.	25 V.	Electrolytic Block
	C9	12.00 mfd.	25 V.	

CONDENSERS — IN "B" UNIT

Part No.	Code	Capacity	Voltage	Type
P-81024	C15	0.500 mfd.	120 V.	Tubular
P-81031	C16	1.000 mfd.	120 V.	Tubular
P-81030	C17	0.010 mfd.	1600 V.	Tubular
P-81028	C18	10.00 mfd.	350 V.	Electrolytic Block
	C19	10.00 mfd.	350 V.	

VOLTAGES AT SOCKETS
Antenna Disconnected—Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M.A.
78	R.F.	5.7	220	100	3.5	5.0
77	1st Det. and Osc.	5.7	220	100	8.0 (1)	1.1 (1)
78	I.F.	5.7	220	100	3.5	5.0
75	2nd Det.	5.7	140 (2)		1.0	0.3
41	Output	5.7	200	210	15.5	18.0
84	Rect.	5.7				20. per plate

(1) Subject to variation.
(2) Triode Plate to Cathode—as read with 1,000,000 ohm meter.

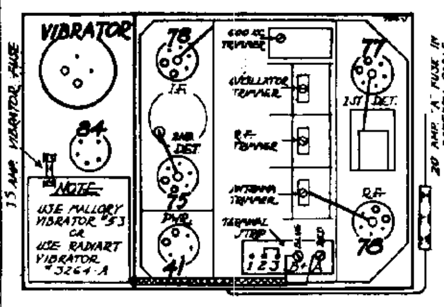


Fig. 2—Location of Tubes.

MODEL 62-118
Alignment, Data

MONTGOMERY-WARD & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

Do not take the chassis out of the box. First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximum output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency **mark. This is the large point, 5 points below the 55 mark.** Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator, R. F., and antenna trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first. See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser is mounted on the end of the gang condenser. See Fig. 2.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Remove the cover of the chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing and Replacing Units From Chassis Box

Removing Chassis Unit From Box

Disconnect the flexible shafts, antenna cable and pilot lamp lead at the chassis box. Pull off the tone control knob and disconnect the battery cable at the fuse receptacle. Remove the cover of the box and take off the black lead on the cover screw. Disconnect the "A" and "B+" leads at the terminal strip. Pull the battery cable inside of the box.

Take out the 4 screws around the speaker grill. Then pull the chassis out by means of the "A" choke and condenser block. Do not pull the chassis out by means of the gang condenser as this might injure the cushion mounting.

Removing "B" Unit From Box

Disconnect the "A" and "B+" leads at the terminal strip. On the end of the box at which the "B" unit is located will be found 9 screws **around the edge.** Remove these 9 screws. The "B" unit and end plate can then be lifted out.

Replacing the Vibrator

Note that vibrator unit is of the plug-in type. This unit can be inserted and removed in the same manner as a tube.

Replacing Chassis Unit

In replacing the chassis unit be sure that the ground spring near the output transformer makes a good contact with the chassis box. Reverse the procedure as given above for removing this unit.

Replacing "B" Unit

When replacing the "B" unit be sure that the ground spring makes a good contact to the partition wall in the chassis box. Reverse the procedure as given above for removing this unit.

Removing Speaker

If service work is required on the chassis, it is advisable in some cases to remove the speaker, as this will permit ready access to all of the units and wiring.

The pot magnet is secured to the vertical walls of the chassis base by means of 3 screws, 2 on one side and 1 on the other. Remove these screws. Then carefully lift out the speaker as far as the leads will permit. The yellow field lead and the black secondary lead may then be unsoldered.

Trouble Shooting and Service

Vibrator Unit

When servicing this receiver a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out. These units are plugged in in the same manner as a tube. One or more vibrator units should be kept on hand for replacement purposes.

"B" Unit

In case of failure in the "B" unit try out a new vibrator. If this does not remedy the difficulty and the "B" unit cannot be repaired locally it is not necessary to return the entire chassis. Remove the "B" unit from the chassis box as per the instructions in this manual after which this unit may be carefully packed and returned separately.

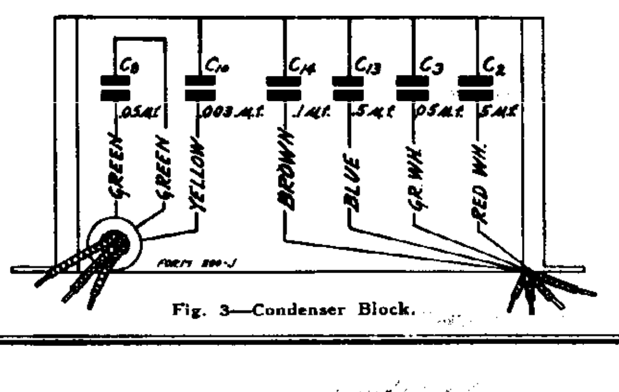
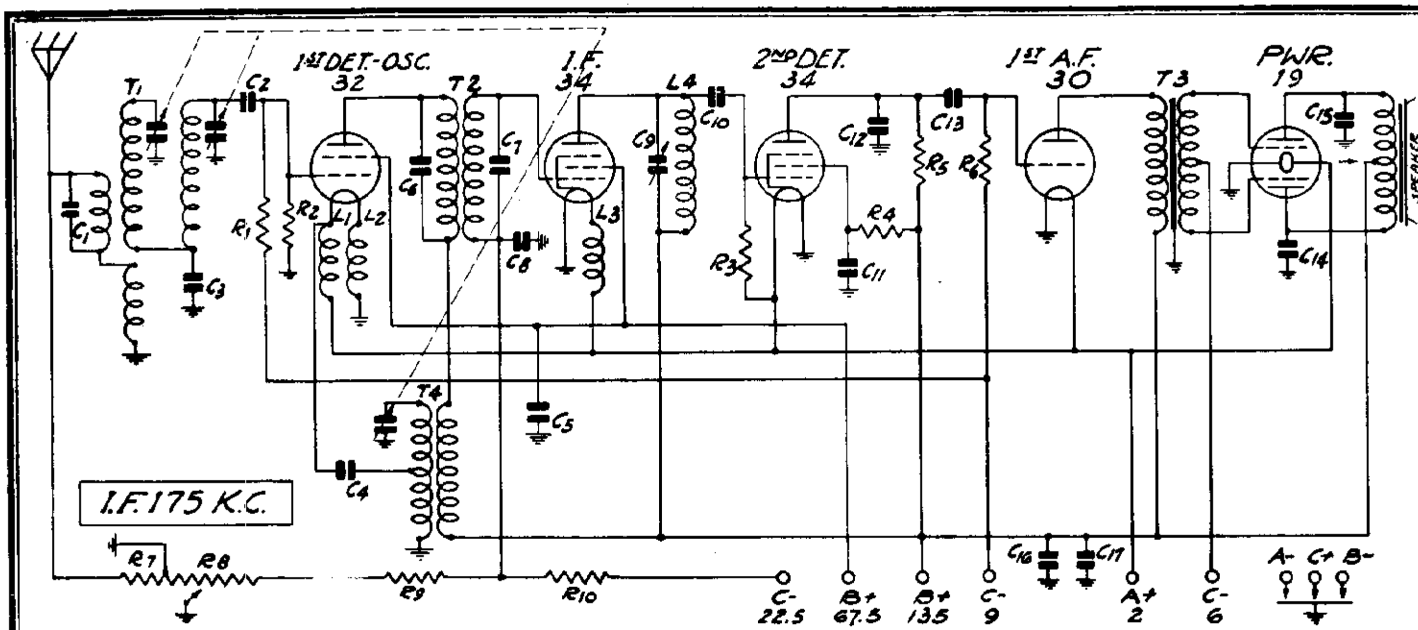
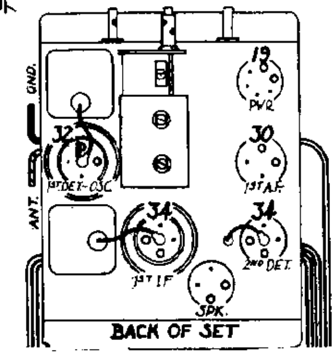


Fig. 3—Condenser Block.

MODEL 62-120, 62-122, 62-126, 62-128
Schematic, Socket, Parts

MONTGOMERY-WARD & CO.





D. C. Resistance of Windings

Following are the D.C. resistances of the various windings in the chassis.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5168	Double Tuned Ant. Coil Pri.	T1	19.2
	Double Tuned Ant. Coil Sec. (Preselector)	T1	3.2
	Double Tuned Ant. Coil Sec. (1st Det.)	T1	3.2
P-5199	1st I.F. Coil Pri.	T2	90.0
	1st I.F. Coil Sec.	T2	116.0
P-50586-D	Audio Input Trans. Pri.	T3	1010.
	Audio Input Trans. Sec. Cent. Tap to outside end	T3	648.
	Audio Input Trans. Sec. Cent. Tap to inside end	T3	588.
P-5187	Oscillator Coil, Grid Winding	T4	4.1
	Oscillator Coil, Plate Winding	T4	10.4
P-5172	Double Filament Reactor Assem.	L1	.61
	Double Filament Reactor Assem.	L2	.61
P-5189	Single Filament Reactor Assem.	L3	.61
P-5188	2nd I.F. Reactor Coil	L4	52.1
P-2124	6" Magnetic Speaker, Center Tap to outside end		272.
	6" Magnetic Speaker, Center Tap to inside end		225.
P-2125	8" Magnetic Speaker (same as P-2124)		

MISCELLANEOUS

Part No.	ITEM
P-2131	No. 32 Socket
P-1645	No. 34 Socket
P-1644	No. 30 Socket
P-1833	No. 19 Socket
P-1640	Speaker Socket
P-20406-A	Tube Shield for 34 and 32 Tubes
P-20786	Tube Shield Base
P-50586-D	Audio Input Transformer T3
P-5168	Double Tuned Ant. Trans. Assem. Comp. with resistors and condensers T1 less can
P-40432	Can for above Assem.
P-5199	1st I.F. Coil and Can Assem. T2
P-5187	Oscillator Coil and Can Assem. T4
P-5188	2nd I.F. Coil and Can Assem. L4
P-5172	Double Filament Reactor L1, L2
P-5189	Single Filament Reactor L3
P-30342-A	Grid Cap Only
P-2060	Knob, plain
P-2122	Knob, Arrow Indicator
P-1441-A	Double Insulated Terminal Strip
P-1786	Five Lug Terminal Strip
P-1831	On-Off Switch
P-20711	Gang Condenser Shield
P-10272	Rubber Chassis Cushions
P-70703	Antenna and Ground Wire
P-70749	"B" Battery Wire Assem.
P-70771	"A" Battery Wire Assem.
P-70772	"C" Battery Wire Assem.
P-2124	Speaker 6"
P-2125	Speaker 8"

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A94505	R1	5 Megohm	0.2	Carbon
P-A94105	R2	1 Megohm	0.2	Carbon
P-A94205	R3	2 Megohm	0.2	Carbon
P-B94104	R4	100,000 Ohm	0.5	Carbon
P-B94403	R5	40,000 Ohm	0.5	Carbon
P-A95105	R6	1 Megohm	0.2	Carbon
P-96001	R7 / R8	3,000 Ohm / 60,000 Ohm		Volume Cont
P-A94901ww	R9	900 Ohm	0.2	Wire Wound
P-A94652	R10	6,500 Ohm	0.2	Carbon
*P-A94106	R1	10 Megohm	0.2	Carbon
*P-A94205	R2	2 Megohm	0.2	Carbon

*These resistors were used on first models.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81812	C1	200 mmf		Wire—Part of Ant. Assem
P-81801	C2	35 mmf		Wire—Part of Ant. Assem.
P-80862	C3	0.05 mf	200V	Tubular
P-80862	C4	0.05 mf	200V	Tubular
P-80862	C5	0.05 mf	200V	Tubular
P-81806	C6	70 mmf		Wire
P-81804	C7	45 mmf		Wire
P-80862	C8	0.05 mf	200V	Tubular
P-1685	C9	70 $\pm$ 30 mmf		I. F. Trimmer
P-81800	C10	50 mmf		Wire
P-81045	C11	0.25 mf	200V	Tubular
P-80863	C12	0.004 mf	600V	Tubular
P-80898	C13	0.006 mf	600V	Tubular
P-80969	C14 / C15	0.01 mf / 0.01 mf	400V / 400V	Dual
P-80864	C16	0.1 mf	200V	Tubular
P-80968	C17	4.0 mf	150V	Electrolytic
P-81036	3 Gang Condenser			

MODEL 62-120, 62-122
62-126, 62-128
Alignment, Voltage

MONTGOMERY-WARD & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

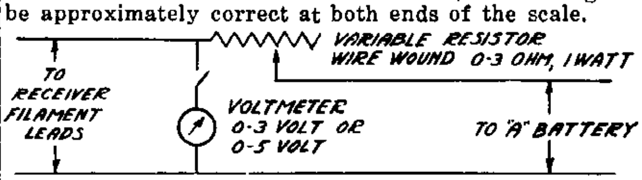


Fig. 4—Using Voltage Regulator with 3 Volt "A" Battery

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment at this frequency, therefore, is required.

Low Volume

In a battery operated receiver the two most common causes of low volume are run down batteries and defective tubes.

Check the "B" and "C" batteries under load with a high resistance voltmeter. See if the filament voltage is low and if so, put in a new "A" unit. A high resistance voltmeter is not necessary for testing the "A" batteries.

The next most common cause of low volume is defective tubes. In any case of low volume, therefore, procure a new set of tubes that have been tested or have been operating satisfactorily in another receiver. Insert these in the chassis one at a time and note any difference in performance.

Altho a short inside antenna is sometimes satisfactory, a good outside antenna 100 to 150 ft. in length is recommended. If the antenna system is faulty or in a shielded location, the volume may be low on distant or weak stations. This is particularly true if the antenna is in or near a steel building. The antenna and lead-in should be inspected for poor connections and grounds. In a shielded location try a longer antenna in a different location.

Misaligning or mistracking of variable tuning condensers is another possible cause of low volume. Instructions for realigning are contained in this manual. Do not, however, attempt realignment unless other causes of low volume have first been investigated.

Other causes of low volume are defective speaker, and various opens, shorts and grounds in the receiver assembly.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

VOLTAGES AT SOCKETS
Volume Control at Maximum—Antenna Shorted to Ground
B+135 Volts
Voltages to Chassis

Type of Tube	Function	Across Filament	Plate to Cath.	Screen to Cath.	Grid to Cath.	Normal Plate M. A.
32	1st Det. & Osc.	2.0	135	67.5	7.5[1][2]	2.5
34	I. F.	2.0	135	67.5	2.5[3]	2.8
34	2nd Det.	2.0	50	40[1]	0	1.8
30	1st Audio	2.0	135		9[4]	3.0
19	Output	2.0	135		6	1.8 Total

(1) With 250,000 ohm meter.
(2) Subject to variation due to oscillatory current.
(3) With 25,000 ohm meter.
(4) As read at "C" battery.

All of the voltage readings as shown in the chart are read with a 1,000 ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

Oscillation and Whistle

Should the set oscillate on being connected up, it may be due to tubes whose characteristics vary considerably from the standard. In case of oscillation, therefore, change the tubes around and try out some new ones.

See if the receiver is properly grounded and if it is, try out a new ground. See if any of the battery voltages are excessively high.

The tube shields must all be on and the control grid leads to the top grid connection tubes firmly in place. Otherwise oscillation may result.

An open bypass condenser or open leads to the bypass condensers are a common cause of oscillation. Check the bypass condensers for capacity and the leads to them for continuity of circuit. A quick way to check bypass condensers for opens is to take a good condenser with test leads attached to the terminals and connect the new condenser across the condenser in the chassis. Oscillation may also be caused by poor chassis ground connections and by poor tuning condenser ground contacts. A shorted "A" line choke would, in some instances, result in oscillation.

MODEL 62-124, 62-129
Schematic, Parts
Coil Resistance

MONTGOMERY-WARD & CO.

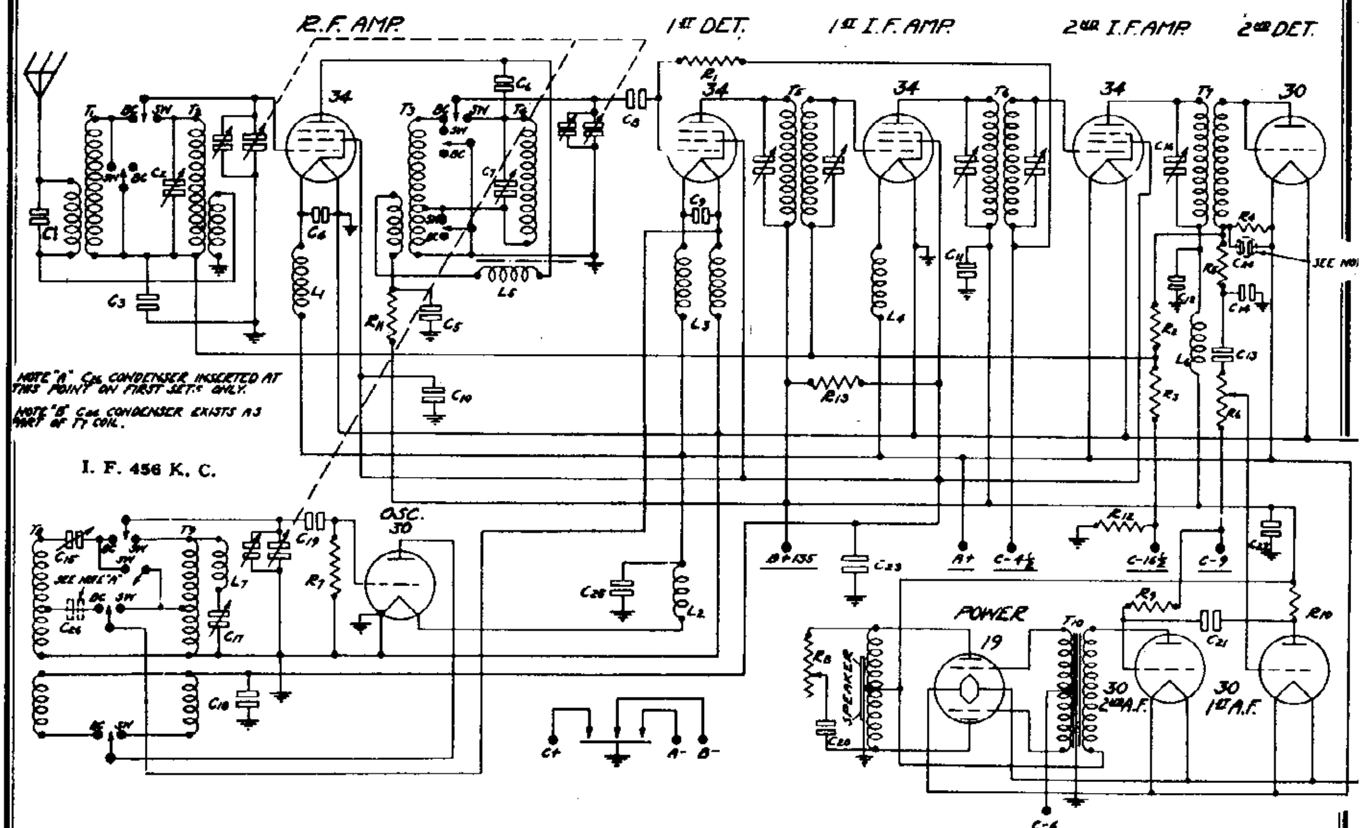


Fig. 1—Schematic Circuit Diagram

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95305	R1	3 Megohm	.2	Carbon
P-A95305	R2	3 Megohm	.2	Carbon
P-A94805	R3	8 Megohm	.2	Carbon
P-A94304	R4	300,000 Ohm	.2	Carbon
P-A95104	R5	100,000 Ohm	.2	Carbon
P- 96016	R6	2 Megohm		Volume Control
P-A94104	R7	100,000 Ohm	.2	Carbon
P- 97013	R8	45,000 Ohm		Tone Control
P-A94105	R9	1 Megohm	.2	Carbon
P-A94104	R10	100,000 Ohm	.2	Carbon
P-A95102	R11	1,000 Ohm	.2	Carbon
P-A95153	R12	15,000 Ohm	.2	Carbon
P-B94652	R13	6,500 Ohm	.2	Carbon
*P- 97011		150,000 Ohm		Tone Control
*P-A95608		60,000 Ohm	.2	Carbon

* These parts were used on first models only—see article on 'Changes in Early Models.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80919	C1	250 mmf.		Moulded
P- 2102	C2	3–40 mmf.		Trimmer
P-81076	C3	.05 mf.	200V	Tubular
P-81076	C4	.05 mf.	200V	Tubular
P-81076	C5	.05 mf.	200V	Tubular
P-81094	C6	.006 mf.	600V	Tubular
P- 2102	C7	3–40 mmf.		Trimmer
P-81800	C8	50 mmf.		Wire Capacitor
P-81076	C9	.05 mf.	200V	Tubular
P-81102	C10	.25 mf.	140V	Tubular
P-81110	C11	.25 mf.	200V	Tubular
P-81076	C12	.05 mf.	200V	Tubular
P-81076	C13	.05 mf.	200V	Tubular
P-80977	C14	100 mmf.		Wire Capacitor
P- 2112	C15	300–500 mmf.		Trimmer
P- 1685	C16	40—100 mmf.		Trimmer
P- 1685	C17	40—100 mmf.		Trimmer
P-81076	C18	.05 mf.	200V	Tubular
P-81005	C19	35 mmf.		Moulded
P-81071	C20	.05 mf.	400V	Tubular
P-81094	C21	.006 mf.	600V	Tubular
P-82001	C22	4.0 mf.	150V	Electrolytic
	C23	8.0 mf.	150V	
	C24	Part of 3rd I. F. Coil Assembly T7		
P-81102	C25	.25 mf.	140V	Tubular
*P-81076	C26	.05 mf.	200V	Tubular
P-81027	3 Gang Condenser			

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5176	B. C. Antenna R. F. Transformer, Primary	T1	28.0
	B. C. Antenna R. F. Transformer, Secondary	T1	5.0
	S. W. Antenna R. F. Transformer, Primary	T2	0.25
	S. W. Antenna R. F. Transformer, Secondary	T2	Small
P-5236	B. C. Interstage R. F. Transformer, Primary	T3	5.25
	B. C. Interstage R. F. Transformer, Secondary	T3	5.0
	S. W. Interstage R. F. Transformer, Secondary	T4	Small
P-5224	B. C. Oscillator Grid Coil	T8	2.4
	B. C. Oscillator Plate Coil	T8	3.5
	S. W. Oscillator Grid Coil	T9	1.0
	S. W. Oscillator Plate Coil	T9	Small
P-5179-A	1st I. F. Coil Primary	T5	12.0
	1st I. F. Coil Secondary	T5	13.0
P-5185	2nd I. F. Coil Primary	T6	5.5
	2nd I. F. Coil Secondary	T6	5.5
P-5186	3rd I. F. Coil Primary	T7	12.0
	3rd I. F. Coil Secondary	T7	30.0
P-50586-B	Audio Transformer Primary	T10	910.0
	Audio Transformer Secondary, Center tap to outside	T10	590.0
	Audio Transformer Secondary, Center tap to inside	T10	530.0
P-5189	Filament Reactor	L1	0.65
P-5189	Filament Reactor	L2	0.65
P-5285	Double Filament Reactor (each)	L3	0.3
P-5189	Filament Reactor	L4	0.65
P-5228	S. W. R. F. Interstage Plate Reactor	L5	28.0
P-5227	I. F. Isolating Reactor	L6	1.6
P-2179	Speaker Voice Coil, Center tap to outside		300.0
	Speaker Voice Coil, Center top to inside		250.0

MODEL 62-124, 62-129
Alignment

MONTGOMERY-WARD & CO.

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1730 K. C. and 5.8-16.0 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning

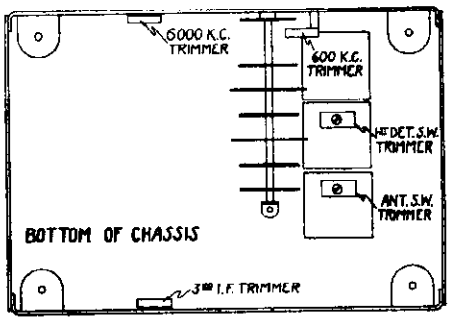


Fig. 3—Trimmer Locations

condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings of these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION—Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 3 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broad-

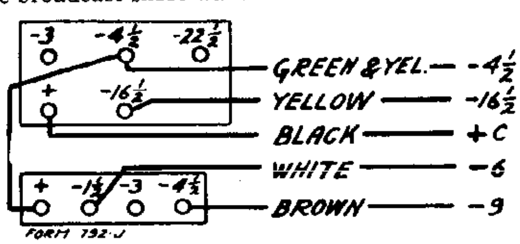


Fig. 4—Optional 'C' Battery Connections

cast position. Set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 3. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjust-

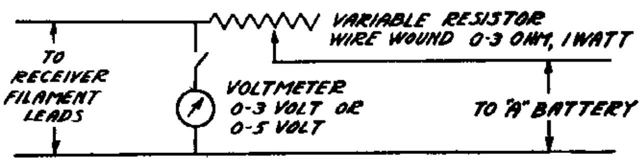


Fig. 5—Using Voltage Regulator with a 3 Volt "A" Battery

ment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies, at which a signal is heard, in order that the oscillator in the receiver will be 456 K. C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 3 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

Changes in Early Models

The condenser, C26 was used only on the early models of this receiver. Another change was in the tone control circuit. In the early models R8 was a 150,000 ohm resistor paralleled by a 60,000 ohm resistor. However, in the later models this arrangement was replaced by a single 45,000 ohm resistor to provide greater sensitivity in tone control.

MODEL 62-124, 62-129
Voltage, Socket, Drive Cord Data

MONTGOMERY-WARD & CO.

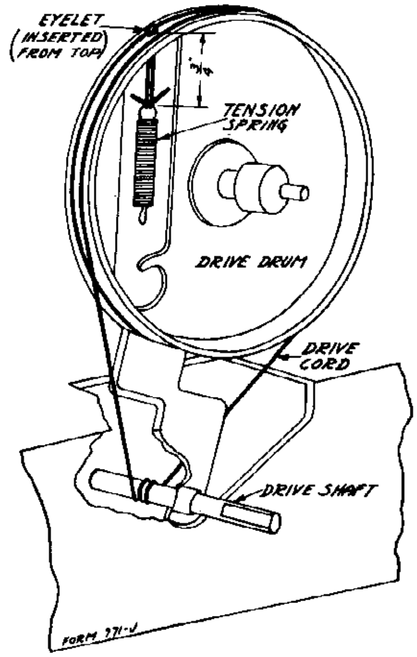


Fig. 6—Drive Cord Replacement

Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read from Negative Filament Terminal

Type of Tube	Function	Across Fila-ment	Plate to Gnd.	Control Grid to Ground	Screen to Gnd.	Normal Plate M. A.
34	R. F.	2.0	135	4.5(1)	80	2.8
34	1st Det.	2.0	135	4.5(1)	80	3.0
30	Osc.	2.0	80			2.8
34	1st I. F.	2.0	135	4.5(1)	80	2.8
34	2nd I. F.	2.0	135	4.5	80	2.8
30	2nd Det.	2.0				
30	1st Audio	2.0	95	9.0(2)		0.35
30	2nd Audio	2.0	135	9.0(3)		3.0
19	Output	2.0	135	6.0		1.3

(1) Computed figure—cannot be read because of high resistance cir.
(2) Volume Control at minimum.
(3) As read at battery.

Replacing Drive Cord

Lift off the pilot light assembly.

Detach the large pointer by removing the center screw.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 6.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 6. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 6.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 6. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly.

Batteries

To prolong "B" battery life instruct the customer to keep the volume down as high volume increases the "B" drain considerably. The average "B" drain is 23.5 milliamperes. The reception of weak signals also increases the "B" drain.

This receiver is designed to operate from a 2 volt storage cell but can be operated from a 3 volt dry cell used in conjunction with the voltage regulator shown in Fig. 5. This device consists of a rheostat in series with the supply, for controlling the voltage and a voltmeter for measuring it.

The voltmeter should not indicate more than 2 volts when the above arrangement is used, an optimum setting being 1.9 to 2.0 volts.

For the grid bias a special 22½ volt "C" battery with 4½, 6, 9 and 16½ volt taps (Fig. 2) may be used. If not available, a standard 4½ volt "C" and a standard 22½ volt "C" battery can be connected as shown in Fig. 4.

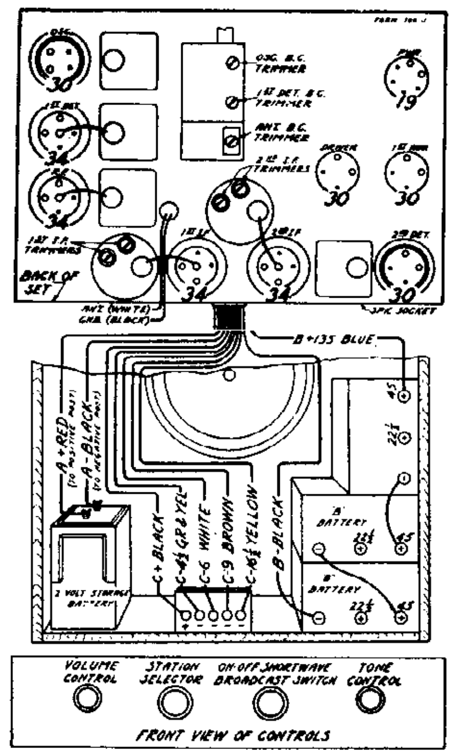


Fig. 2—Arrangement of Tubes, Batteries and Controls

MODEL 62-132, 62-137
Schematic, Parts

MONTGOMERY-WARD & CO.

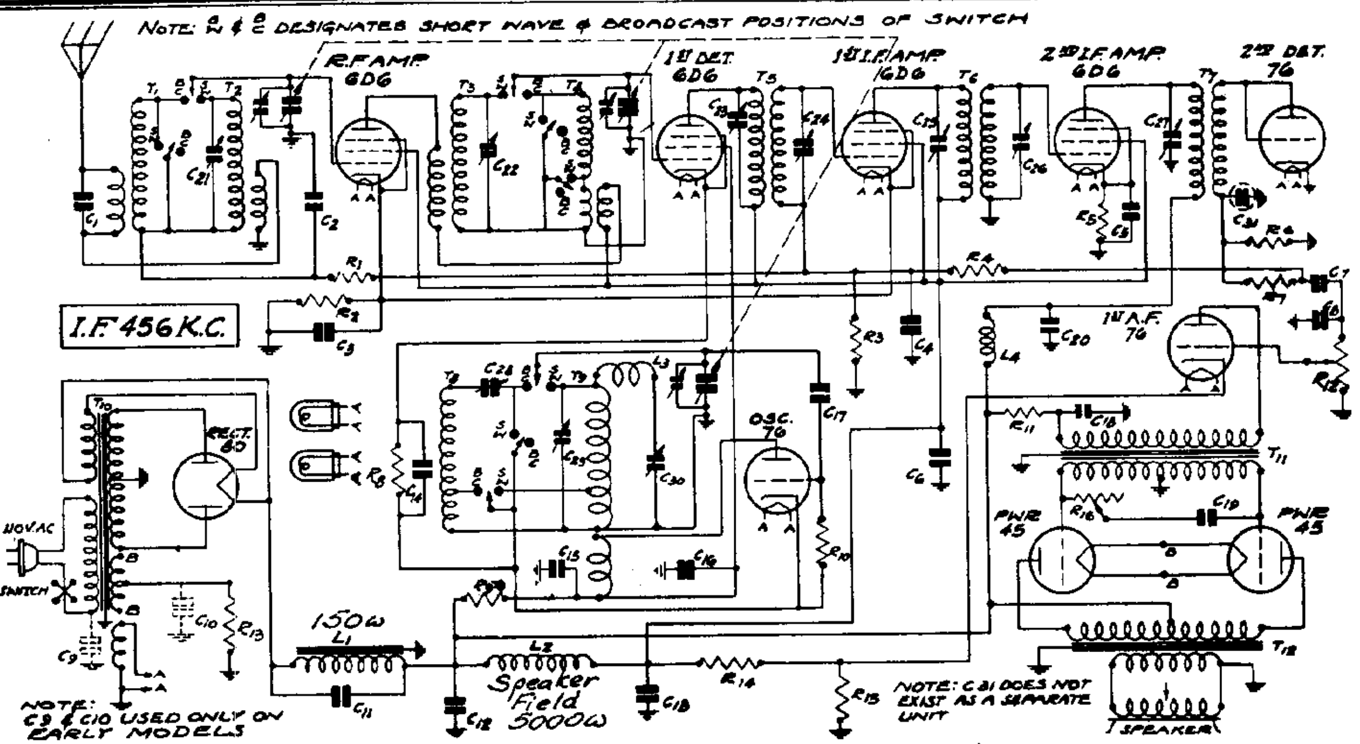


Fig. 1—Schematic Circuit Diagram

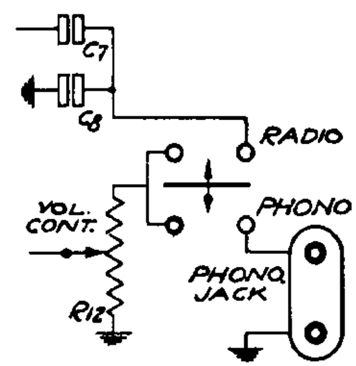


Fig. 5—Phonograph Connections

Part No.	Code	Capacity	Volts	Type
P-80919	C1	250 mmfd.		Moulded
P-80862	C2	.05 mfd.	200V.	Tubular
P-80888	C3	.25 mfd.	200V.	Tubular
P-80862	C4	.05 mfd.	200V.	Tubular
P-80862	C5	.05 mfd.	200V.	Tubular
P-80888	C6	.25 mfd.	200V.	Tubular
P-80862	C7	.05 mfd.	200V.	Tubular
P-81005	C8	35 mmfd.	600V.	Moulded
*P-80997	C9	.01 mfd.	600V.	Condenser in metal can
*P-80888	C10	.25 mfd.	200V.	Tubular
P-80985	C11	.15 mfd.	220V.	Tubular
P-81039	C12	16.0 mfd.	400V.	Wet Electrolytic
P-81018	C13	6.0 mfd.	150V.	Dry Electrolytic
	C16	2.0 mfd.	300V.	
	C18	2.0 mfd.	300V.	
P-80862	C14	.05 mfd.	200V.	Tubular
P-80864	C15	.10 mfd.	200V.	Tubular
P-81005	C17	35 mmfd.	600V.	Moulded
P-80863	C19	.004 mfd.	600V.	Tubular
P-81041	C20	.10 mfd.	400V.	Tubular
P-2102	C21	3-40 mmfd.		Ant. S.W. Trimmer
P-2102	C22	3-40 mmfd.		1st Det. S.W. Trimmer
P-2103	C23	200± 50 mmfd.		Dual Trimmer
	C24	200± 50 mmfd.		Part of I.F. Assem.
P-2103	C25	200± 50 mmfd.		Dual Trimmer
	C26	200± 50 mmfd.		Part of I.F. Assem.
P-1685	C27	70± 30 mmfd.		3rd I.F. Coil Trimmer
P-2112	C28	300-500 mmfd.		600 K.C. Trimmer
P-2102	C29	3-40 mmfd.		Osc. S.W. Trimmer
P-1685	C30	70± 30 mmfd.		6000 K.C. Trimmer
P-81027		Three Gang Condenser		

RESISTORS

Part No.	Code	Resistance	Watts	Type
P-A95204	R1	200,000 ohm	.2	Carbon
P-98023	R2	150 ohm	.5	Flex. Wire Wound
P-A95105	R3	1 megohm	.2	Carbon
P-A95205	R4	2 megohm	.2	Carbon
P-98024	R5	400 ohm	.5	Flex. Wire Wound
P-A94304	R6	300,000 ohm	.2	Carbon
P-A95104	R7	100,000 ohm	.2	Carbon
P-A94252	R8	2,500 ohm	.2	Carbon
P-98022	R9	30,000 ohm	2.0	Carbon
P-A95104	R10	100,000 ohm	.2	Carbon
P-C94303	R11	30,000 ohm	1.0	Carbon
P-96005	R12	2 megohm		Volume Control and Switch
P-98006	R13	780 ohm	3.0	Armored Wire Wound
	R14	6000 ohm	1.4	
	R15	460 ohm	.2	
P-97003	R16	3 megohm		Tone Control

*Used in Early Models only.

Part No.	Item
P-50638	Power Transformer 115V. 60 cycles T 10
P-50639	Power Transformer 115V. 25 cycles T 10
P-50640	Power Transformer 115-230V. 40-60 cycles T 10
P-50641	Power Choke L 1
P-50642	Audio Output Transformer T 12
P-50643	Audio Input Transformer T 11
P-5176	Antenna R.F. Trans. T 1 and T 2 less can
P-5177	Interstage R.F. Trans. T3 and T4 less can
P-5178	Oscillator Coil Assembly T8 and T9 less can
P-5186	3rd I. F. Coil T7 less can
P-40433	Cans for the above coils
P-5184	1st I.F. Coil & Can Assembly T5
P-5185	2nd I.F. Coil & Can Assembly T6
P-5190	H. F. Oscillator Tracking Coil L3
P-5131	I.F. Plate Isolating Reactor L4
P-70702	A.C. Cord & Plug
P-1421	Single Insulated Terminal Strip
P-1441	Double Insulated Terminal Strip
P-2060	Small Knob
P-2062	Large Knob
P-30342A	Grid Cap only
P-30456	Small Pointer
P-20912	Large Double End Pointer
P-2012	Pilot Light Bulb
P-10272	Rubber Mounting Feet
P-10320	Glass Crystal
P-20875	Crystal Retaining Ring
P-1968	10" Dynamic Speaker Console L2
P-2101	Three Position Band Change Switch
P-20905	Condenser Shield
	8" Black Drive Cord (V.C. or T.C. Ind.)
	29" Black Drive Cord (Cond. Drive)
P-2126	Pilot Lamp Socket & Clip Assembly
P-20911	Bottom Shield
P-1011A	Phono-Radio Switch
P-1193	Phono Jack

MONTGOMERY-WARD & CO.

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle, receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

A 115-230 Volt, 40-60 cycle Power Transformer is also available for this model.

Phono Connections

Phonograph connections can be made as shown in Fig. 5. A single pole double throw switch and double pin jack are required. These should be mounted on the back panel of the chassis close to the 2nd detector. The connections are made by opening the diode circuit at the point shown in the illustration and completing the connections to the switch and pin jacks as indicated. A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control of the set will regulate the phono volume.

Voltages at Sockets

LINE VOLTAGE — 115

ANTENNA SHORTED TO GROUND

Type of Tube	Functior	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M. A.
6D6	R. F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I. F.	6.3	95	95	2.8	7.0
6D6	2nd I. F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate

MODEL 62-132, 62-137
Socket, Trimmers
Drive Cord Data

MONTGOMERY-WARD & CO.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth

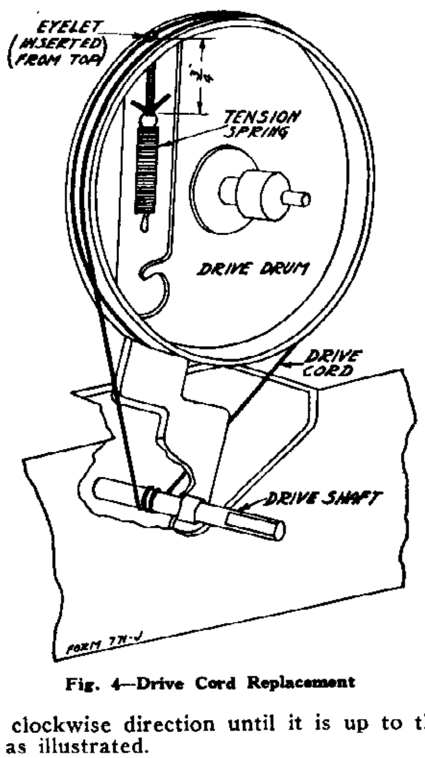


Fig. 4—Drive Cord Replacement

turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

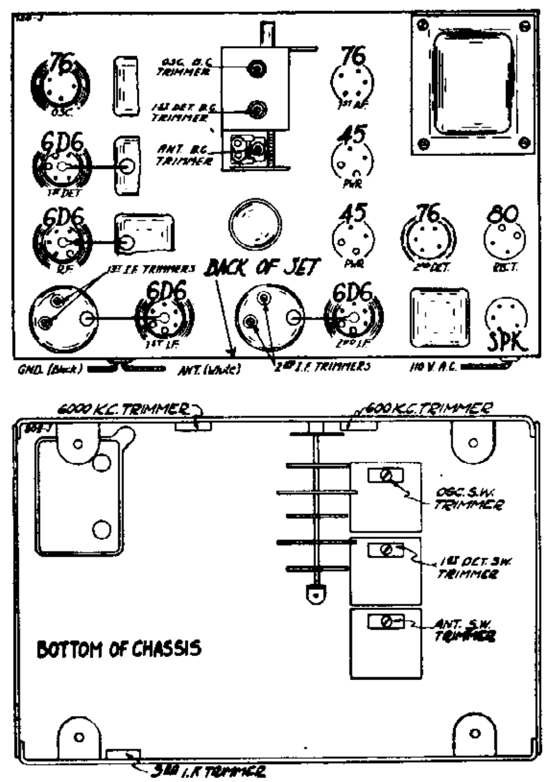


Fig. 2—Tube Arrangement & Location of Trimmers

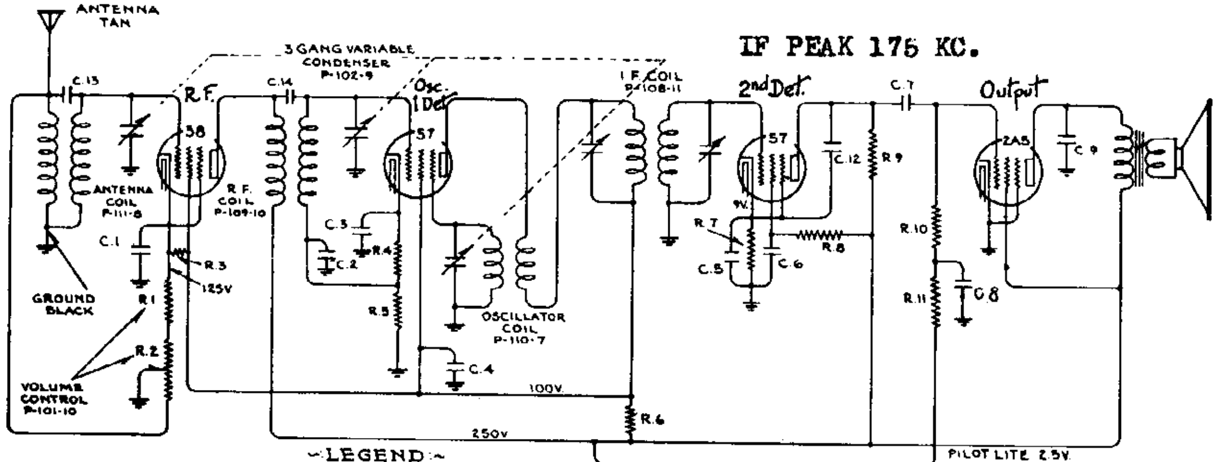
Change in Early Models

In the early models of this receiver the side of the trimmer condenser C27 which is shown in Fig. 1 as connected to ground was connected to the B+ side of the 3rd I. F. coil primary.

MODEL 62-140, 62-140X 62-148, 62-148X
Schematic, Socket

MONTGOMERY-WARD & CO.

IF PEAK 175 KC.



~LEGEND~

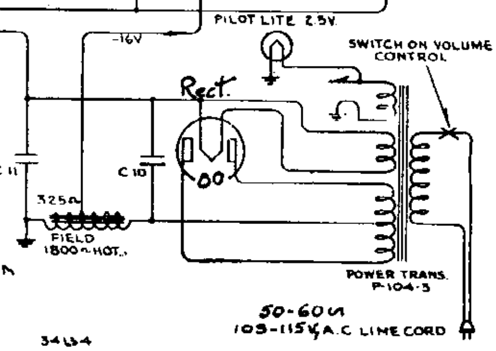
CONDENSERS

No	VALUE
C.1	.05X200V.
C.2	.05X200V.
C.3	.05X200V.
C.4	.1X200V.
C.5	.25X200V
C.6	.1X200V.
C.7	.05X200V
C.8	.1X200V.
C.9	.003X600V.
C.10	8.0MFD.X400V.
C.11	8.0MFD.X400V.
C.12	.001 MICA.
C.13	10μμf. GIMMICK
C.14	4μμf. GIMMICK

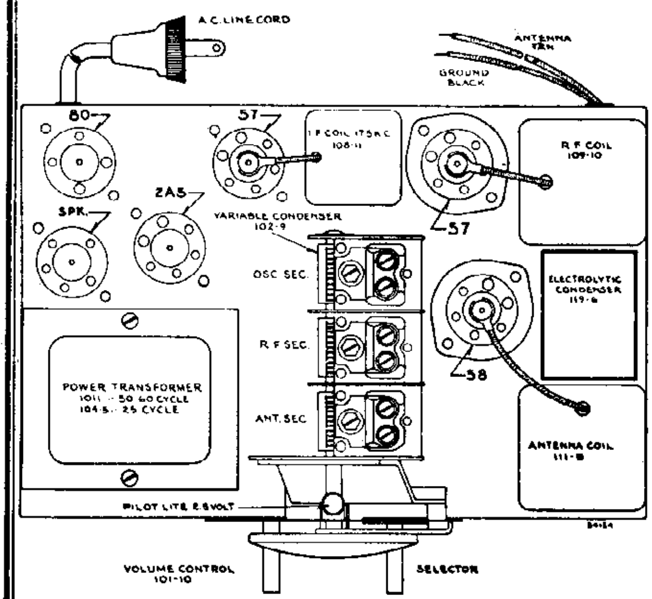
RESISTORS

No	VALUE
R.1	100
R.2	75M
R.3	50M 1/3W.
R.4	450
R.5	5M
R.6	19M
R.7	50M 1/3W
R.8	1MEG. 1/3W.
R.9	250M. 1/3W.
R.10	200M 1/3W.
R.11	300M 1/3W.

~NOTE~
CONDENSERS C.10, C.11, IN ONE UNIT P-119-6.
CONDENSERS C.1, C.2, C.3, C.4 IN ONE UNIT P-145-3
RESISTORS R.4, R.5, IN ONE UNIT P-106-10
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
PHRASE GIMMICK IS A WIRE WOUND AROUND ANOTHER WIRE.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
CONDENSERS C.5, C.6, C.7, C.8, C.9 IN ONE UNIT P-145-2.



3454



SERVICE SUGGESTIONS:

Make certain of the following: That all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps. That the aerial connection is good and not short-circuited to ground. (Pilot lights illuminate when set is turned on.)

PILOT LIGHT:

The pilot light used is 2.5 volt Mazda. No. T41-G3½. To replace, remove receptacle clipped to top of the variable condenser.

Part No. 145-2

Common Black to Brown	—.003	x 600 Volts
Common Black to Green	—.1	x 200 Volts
Common Black to Red	—.1	x 200 Volts
Common Black to Orange	—.25	x 200 Volts
Blue to Blue	—.05	x 400 Volts

Part No. 145-3

Common Black to Brown	—.1	x 200 Volts
Common Black to Green	—.05	x 200 Volts
Common Black to Orange	—.05	x 200 Volts
Common Black to Yellow	—.05	x 200 Volts

Service Notes

Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of similar capacity which is known to be in good condition, until the defective unit is located. Part numbers 145-2 and 145-3 are by-pass condenser blocks and consist of the following condensers:

Should any section of either of these blocks fail, it is not necessary to replace the entire condenser. A small tubular condenser may be used to replace the defective section.

Excessive hum, low volume or reduction in all D. C. voltages is usually caused by open or shorted electrolytic filter condensers. Open by-pass condensers cause oscillation and distorted reproduction.

MODEL 62-140, 62-140X
62-148, 62-148X
Alignment, Parts List

MONTGOMERY-WARD & CO.

25 Cycle Chassis

The 25 cycle model 62-148X chassis may be used on a power supply of from 105 to 125 volts, 60 cycles, but the 60 cycle model 62-148 must not under any circumstances be operated on 25 cycles.

Alignment

The set should be thoroughly checked for all other possible causes of trouble, such as defective tubes, condensers, poor installations and low line voltages before any attempt is made at re-alignment.

Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

(a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.

(b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycle and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

(a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.

(b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.

(c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

Tubes

The tube complement of this chassis is as follows:

1 Type 58 remote cut-off pentode as an R. F. amplifier.
1 Type 57 pentode as an oscillator and first detector.
1 Type 57 pentode as second detector.
1 Type 2A5 pentode output A. F. amplifier.
1 Type 80 high vacuum rectifier.

All resistors are RMA color coded—specify value and/or resistor (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

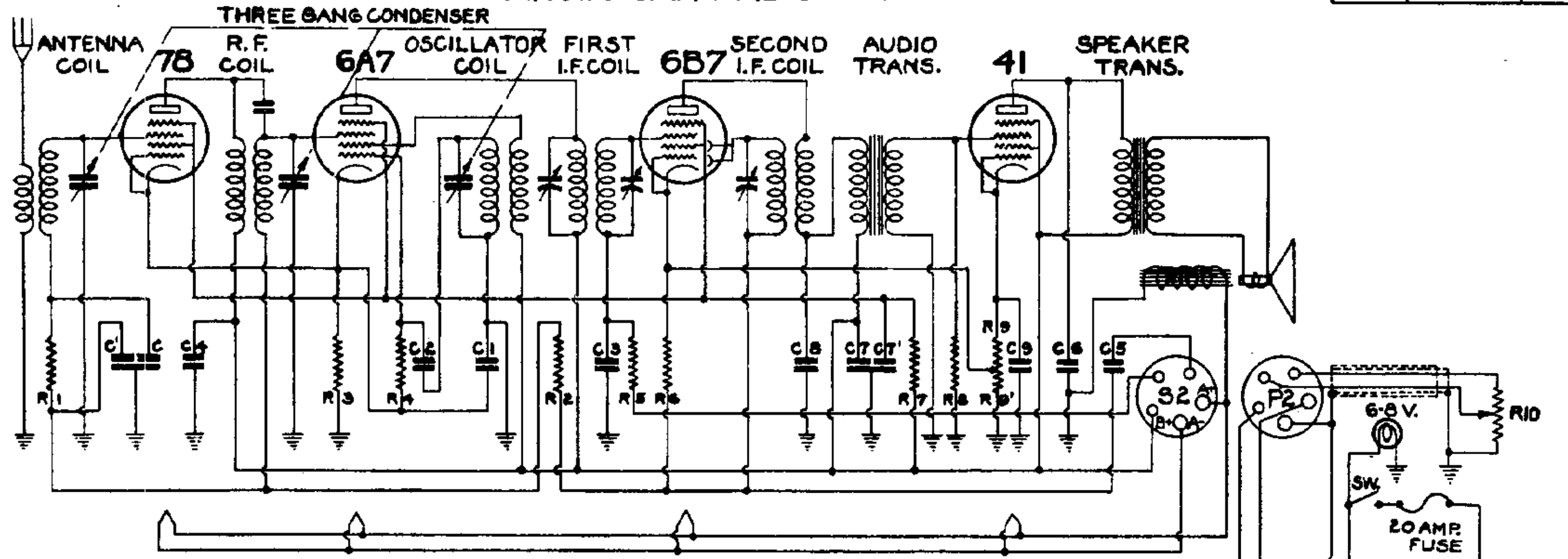
When ordering parts, always specify part and model number as well as serial-number of chassis.

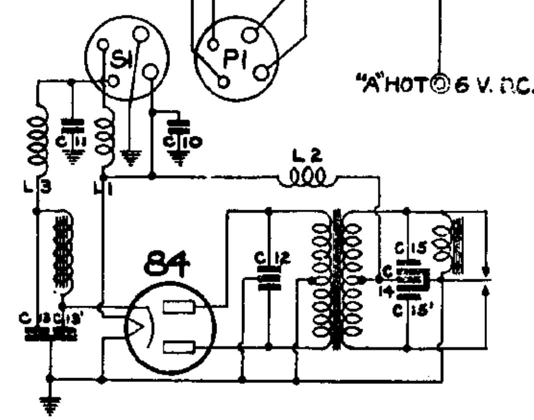
Part No.	Description
BE 101-10	Volume Control with Switch....
BE 102-9	Three Gang Variable Condenser
BE 106-10	5,450 Ohm Metal Clad Resistor..
BE 108-11	I. F. Transformer Complete......
BE 109-10	R. F. Coil Complete............
BE 110-7	Oscillator Coil and Bracket......
BE 111-8	Antenna Coil Complete.........
BE 112-9	Dial Bracket Drive Complete....
BE 112-12	Dial Scale ....
BE 112-15	Dial Glass ....
BE 112-17	Dial Drive Disc................
BE 112-34	Pilot Light Socket..............
BE 112-37	Bakelite Escutcheon Plate........
BE 114-3	Dynamic Speaker ....
	Cabinet—Model 62-148 ....
	Cabinet—Model 62-140 ....
BE 115-15	Coil Cans ....
BE 115-22	Tube Shield—No. 01360........
BE 116-1	2.5 Volt Pilot Lamp—41-G3½...
BE 119-6	Dual 8 Mfd. Electrolytic Condenser
BE 129-1	.001 Mica Condenser............
BE 130-5	300M Ohm—1/5 Watt Carbon Res.
BE 130-8	200M Ohm—1/5 Watt Carbon Res.
BE 130-11	250M Ohm—1/5 Watt Carbon Res.
BE 130-12	50M Ohm—1/5 Watt Carbon Res.
BE 130-19	1 Meg Ohm—1/5 Watt Carbon Res.
BE 130-25	19M Ohm—1.2 Watt Carbon Res.
BE 131-2	Bakelite Knobs (Inc. Springs).....
BE 145-2	.503 Mfd. By-Pass Block..........
BE 145-3	.25 Mfd. By-Pass Block..........
BE 1011	Power Transformer—50-60 Cy.....
BE 1019	Six Foot Cord and Plug..........
	All Sockets ....
BE 104-5	Power Trans.—25 Cycle.........

NOBLITT SPARKS INDUSTRIES

DIAGRAM	ISSUE NO.	DATE
		11-10-33

SCHEMATIC CIRCUIT DIAGRAM
ARVIN CAR RADIO MODEL 10A





CONDENSERS

C	.05	TWIN
C'	.05	TWIN
C1	.10	
C2	.0001	
C3	.0001	
C4	.50	
C5	.01	
C6	.002	
C7	.05	TWIN
C7'	.05	TWIN
C8	.00075	
C9	12.0	
C10	.50	
C11	.10	
C12	TWO .02 CENTER TAP	
C13	16.0	DUAL ELECTROLYTIC
C13'	8.0	DUAL ELECTROLYTIC
C14	1.0	TRIPLE UNIT
C15	12.0	TRIPLE UNIT
C15'	12.0	TRIPLE UNIT

RESISTORS

R1	65,000	
R2	1,000,000	
R3	260	
R4	50,000	
R5	450,000	
R6	450,000	
R7	40,000	
R8	55,000	
R9	800	CANDOHM
R9'	80	CANDOHM
R10	200,000	

CHOKES

- L1 R.F. CHOKE "A" HOT (166 T.)
- L2 R.F. CHOKE "A" HOT (166 T.)
- L3 R.F. CHOKE "B+" (100 T.)

SOCKETS

- S1 POWER UNIT OUTPUT
- S2 REMOTE CONTROL CABLE

PLUGS

- P1 INTER UNIT CABLE
- P2 REMOTE CONTROL CABLE

For Alignment See Index

IF PEAK 175 KC.

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA.

MODEL 10-A (2nd Type)
Voltage, Test Data
Coil Resistance

NOBLITT SPARKS INDUSTRIES

MODEL 10-A SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	220	85	2.0	2.0	*1.8	—	—
6A7	6.3	220	85	2.0	—	*1.8	220	*6
6B7	6.3	220	85	1.75	—	*1.75	—	—
41	6.3	205	220	16.5	—	*16.5	—	—
84	6.3	255 (AC)	—	225	—	—	—	—

* Measured with vacuum tube voltmeter only.

MODEL 10-A POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

78
+ Heater ....Inf.
— Heater 0
Cathode 260
Suppressor (No. 3) 260
Plate to B+......................100
Screen (No. 2) to B+............40,000
Control Grid (No. 1) 1,515,080

6A7
+ Heater ....Inf.
— Heater 0
Anode Grid (No. 2) to B+..........3.5
Osc. Grid (No. 1) 50,260
Screen (No. 3-5) to B+.........40,000
Plate to B+......................125
Cathode 260
Control Grid (No. 4) 1,450,080

6B7
+ Heater ....Inf.
— Heater 0
Cathode 80
Plate to B+......................75
Screen (No. 2) to B+............40,000
Diode 450,000
Control Grid (No. 1) to Grid
Term S2...................450,000

41
+ Heater ....Inf.
— Heater 0
Screen (No. 2) to B+..............0
Plate to B+......................800
Cathode 800
Control Grid (No. 1) 1750

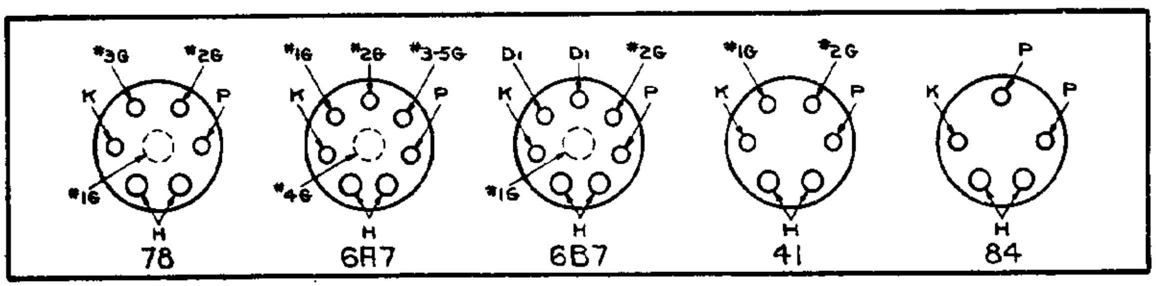
84
+ Heater ....Inf.
— Heater 0
Plates 155
Plate to Plate......................310
Cathode ....Inf.†

†Reads leakage of electrolytic condenser.

COIL RESISTANCES

Ant. Primary 5
Ant. Secondary 5
R. F. Primary........................100
R. F. Secondary........................5
Osc. Primary........................2.5
Osc. Secondary........................3.5
First I. F. Primary....................125
First I. F. Secondary..................40
Second I. F. Primary..................75
Second I. F. Secondary...............75
Audio Transformer Primary........800
Audio Transformer Secondary.....1800

LOOKING AT TOP OF TUBE SOCKETS

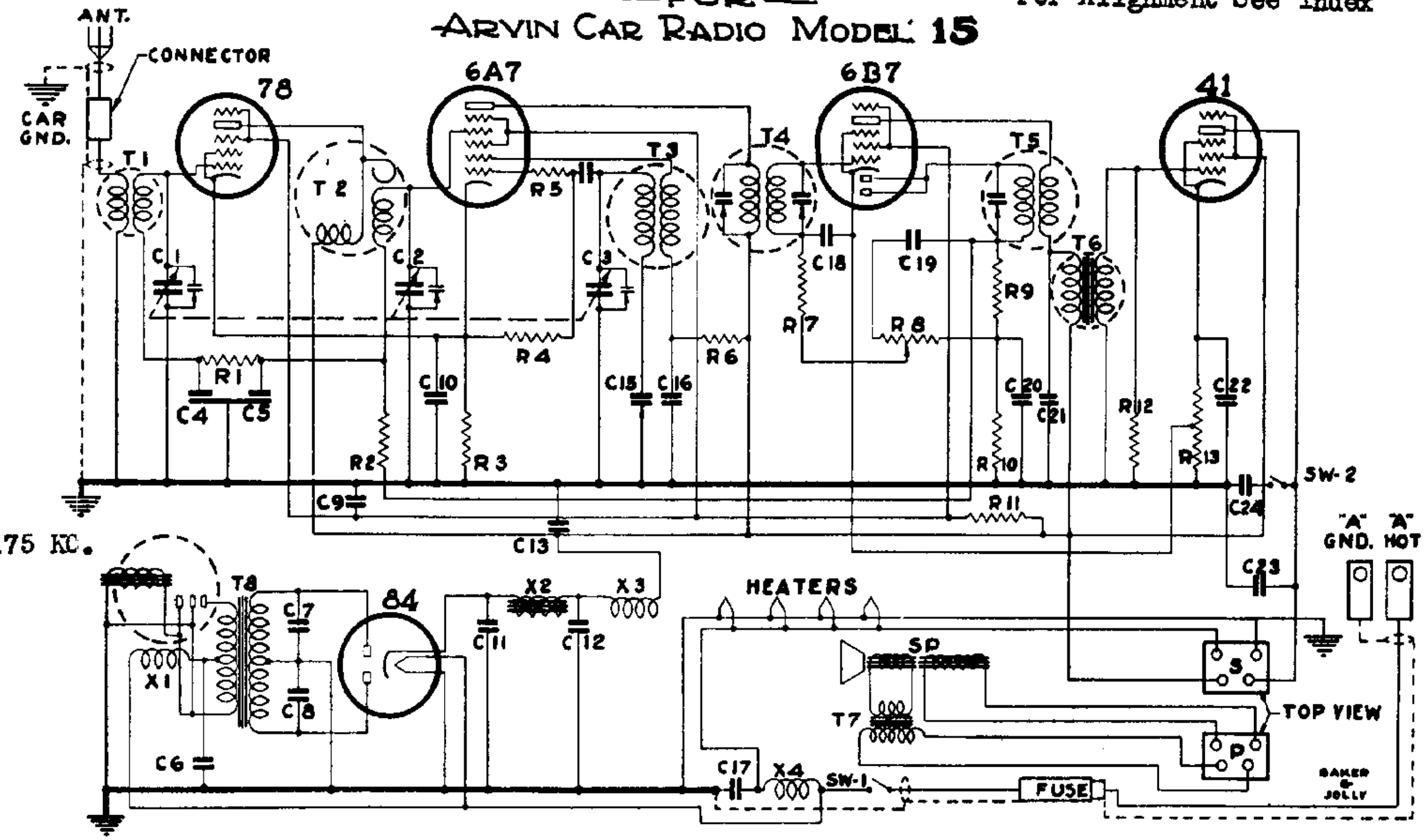


MODEL 15
Schematic, Parts List

NOBLITT SPARKS INDUSTRIES

CIRCUIT DIAGRAM
—FOR—
ARVIN CAR RADIO MODEL 15

For Alignment See Index



IF PEAK 175 KC.

CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4452
C 4, C 5	.015 uf	50 V. Twin	17-3004
C 6	.5	15 V.	29-4284
C 7, C 8	.02 uf	1000 V. Twin	29-4193
C 9	.1 uf	200 V.	17-2097
C10	.1 uf	200 V.	17-2097
C11, C12	12 uf / 4 uf	450 WVDC / 500 PVDC Dual Elec.	17-4184
C13	.5 uf	300 V.	17-3037
C14	100 uuf	600 V. Mica	17-2064
C15	Padder		17-4181-1
C16	.001 uf	600 V. Mica	17-4292

CAPACITORS

	Description		Part No.
C17	.5	15 V.	17-4284
C18	500 uuf	600 V. Mica	17-2211
C19	.01 uf	160 V. Tiny	17-4291
C20	.5 uf	10 V.	29-2224
C21	500 uuf	600 V. Mica	17-2211
C22	12 uf	20 V. Elec.	17-2082
C23	.005 uf	600 V.	17-2252
C24	.02 uf	400 V.	17-2214

MISCELLANEOUS

SW-1 Switch (Integral with R8)	17-4152
SW-2 Switch	17-4445
SP—Speaker	17-4226
S—Socket, Connector	17-4447
P—Plug, Connector	17-4448
V—Vibrator Unit	29-4186

RESISTORS

	Description		Part No.
R 1	100,000 Ω	¼ W.	17-2068
R 2	1,000,000 Ω	¼ W.	17-2080
R 3	200 Ω	¼ W.	17-4287
R 4	100,000 Ω	¼ W.	17-2068
R 5	1,000 Ω	¼ W.	17-2065
R 6	20,000 Ω	¼ W.	17-2072
R 7	500,000 Ω	¼ W.	17-2070
R 8	250,000 Ω Volume Control		17-4152
R 9	500,000 Ω	¼ W.	17-2070
R10	150,000 Ω	¼ W.	17-4283
R11	40,000 Ω	¼ W.	17-4282
R12	50,000 Ω	¼ W.	17-2060
R13	Tapped Candohm		17-3031

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-3020-1
T2	Radio Frequency	00-3017-1
T3	Oscillator	00-3018-1
T4	1st Intermediate	00-2258-A
T5	2nd Intermediate	00-2259-2
T6	Audio	00-2261
T7	Output	00-4111
T8	Power	00-4102

CHOKES

X1	Center Tap Primary R. F.	00-4131-1
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	"A" Radio Frequency	00-4130-1

NOBLITT SPARKS INDUSTRIES

MODEL 15 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	250	50	2.2	2.2	2.0*	—	—
6A7	6.3	250	50	2.2	2.2	2.0*	150	5-10
6B7	6.3	245	50	2.0	—	1.8*	—	—
41	6.3	245	250	18	—	14.0*	—	—
84	6.3	275 (AC)	—	260	—	—	—	—

* Measured with vacuum tube voltmeter only.

MODEL 15 POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set.

78
+ Heater ....Inf.
— Heater 0
Plate to B+ 100
Screen Grid to B+ 40,000
Suppressor Grid 200
Cathode 200
Control Grid 1,750,000

41
+ Heater ....Inf.
— Heater 0
Plate to B+ ....Inf.
Screen Grid to B+ 0
Control Grid 1733
Cathode 692

6B7
+ Heater ....Inf.
— Heater 0
Plate to B+ 2000
Screen Grid to B+ 40,000
Diode 650,000
Diode 650,000
Cathode 52
Control Grid:
V. C. on 900,000
V. C. off 650,000

84
+ Heater ....Inf.
— Heater 0
Plate 190
Plate 220
Plate to Plate 410
Cathode ....Inf.†

†Reads leakage of electrolytic condenser.

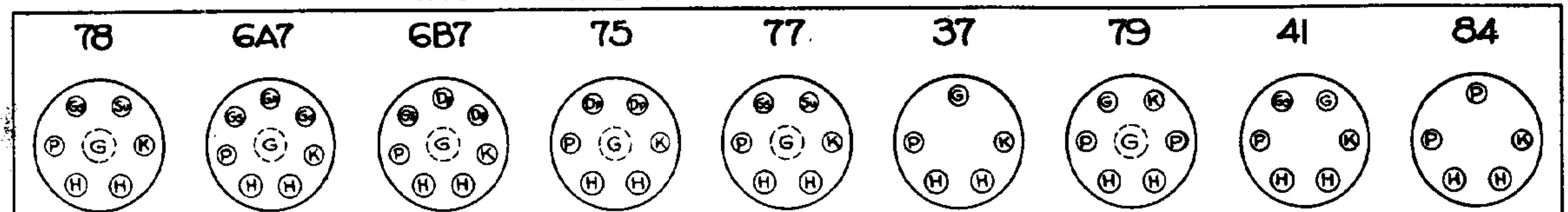
6A7
+ Heater ....Inf.
— Heater 0
Plate to B+ 104
Screen Grid to B+ 40,000
Anode Grid to B+ 20,000
Oscillator Grid 101,200
Cathode 200
Control Grid 1,650,000

COIL RESISTANCES

Ant. Primary 13
Ant. Secondary 5
R. F. Primary 100
R. F. Secondary 5
Osc. Primary 2
Osc. Secondary 4

1st I. F. Primary 82
1st I. F. Secondary 82
2nd I. F. Primary 120
2nd I. F. Secondary 120
Primary Output Transformer 650
Voice Coil 35
Reflex Trans. Primary 1850
Reflex Trans. Secondary 1850

LOOKING AT BOTTOM OF TUBE SOCKETS



SYMBOLS — H-HEATER; P- PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO- OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP- DIODE PLATE

NOBLITT SPARKS INDUSTRIES

MODEL 20-A SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	180	60	0	0	*1.0
77	6.3	180	60	6	6	*5.8
78	6.3	180	60	2.4	2.4	*2.2
75	6.3	120	—	1.3	—	*1.3
41	6.3	175	180	16.0	—	*16.0
84	6.3	200 (AC)	—	190	—	—

* Measured with vacuum tube voltmeter only.

MODEL 20-B SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	220	90	2.2	2.2	*2.0	—	—
6A7	6.3	220	90	2.2	—	*2.0	220	*6
77	6.3	220	90	1.3	1.3	*1.1	—	—
75	6.3	100	—	1.3	—	*1.1	—	—
41	6.3	215	225	16.0	—	*16.0	—	—
84	6.3	240 (AC)	—	—	—	—	—	—

* Measured with vacuum tube voltmeter only.

MODEL 20-B POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

78

+ Heater	Inf.
— Heater	0
Cathode	500
Suppressor Grid (No. 3)	500
Plate to B+	100
Screen (No. 2) to B+	40,000
Control Grid (No. 1)	2,000,000

6A7

+ Heater	Inf.
— Heater	0
Anode Grid (No. 2) to B+	3.5
Osc. Grid (No. 1)	
Screen (No. 3-5) to B+	40,000
Plate to B+	125
Cathode	500
Control Grid (No. 4)	1,500,000

77

+ Heater	Inf.
— Heater	0
Plate to B+	75
Screen (No. 2) to B+	40,000
Suppressor Grid (No. 3)	1000
Cathode	1000
Control Grid (No. 1)	40

75

+ Heater	Inf.
— Heater	0
Plate	100,000
Diode	500,000
Diode	500,000
Cathode	52
Control Grid (No. 1) to Grid Term S2	250,000

41

+ Heater	Inf.
— Heater	0
Plate to B+	Inf.
Screen (No. 2) to B+	0
Cathode	692
Control Grid (No. 1)	250,000

84

+ Heater	Inf.
— Heater	0
Plate	155
Plate	155
Plate to Plate	310
Cathode	Inf.†

†Reads leakage of electrolytic condenser.

COIL RESISTANCES

Ant. Primary	5
Ant. Secondary	5
R. F. Primary	100
R. F. Secondary	5
Osc. Primary	2.5
Osc. Secondary	3.5
First I. F. Primary	125
First I. F. Secondary	40
Second I. F. Primary	75
Second I. F. Secondary	75

MODEL 15
Installation Notes
MODEL 25
Installation Notes

NOBLITT SPARKS INDUSTRIES

SPECIAL INSTALLATION BULLETIN FOR THE MODEL 25 ARVIN CAR RADIO

1934 Models Plymouth and Dodge

The model 25 Arvin Car Radio will install very satisfactorily on these model cars in an *inverted* position directly above the accelerator pedal, leaving the entire right hand side of the dash for mounting an Arvin Heater.

First: Disconnect the free wheeling cable at the bottom, drill another hole in the dash 5 or 6 inches to the right and relocate the cable back through this hole. Connect the freewheeling cable again, making sure that this is done correctly so that it will engage and disengage. The oil pressure gauge tube should be moved to the left by disconnecting it at both ends and relocating it through another hole 4 or 5 inches to the left of its present location. The water temperature gauge tube does not have to be moved. A groove should be cut in the dash insulation for this tube to run in and then the set can be mounted over this. Make sure, however, that the tube is not bent nor pinched by the mounting bracket when the set is pulled up tight.

Now, to mount the set upside down, the mounting bracket is inserted, with the two mounting bolts in place, in the *horizontal* tapered slots in the back of the case. This bracket will then be in a horizontal position on the bulkhead when the set is mounted.

Locate the set just to the left of the cowl vent lever and as high as it will go. The flexible shafts and Bowden wire then enter at the bottom of the set. The tubes will operate satisfactorily in an inverted position. A special socket prevents them from falling out.

1933 Models Plymouth and Dodge

The same installation as explained above may be used on the 1933 models Plymouth and Dodge cars in which case it will not be necessary to relocate the oil pressure gauge tube.

Another way to install the Arvin No. 25 on the 1933 Plymouth and Dodge is as follows:

Relocate the free wheeling cable to either side of its present location. Then attach the radio to the right hand side of the dash directly under (or just to the left of) the glove compartment. The set is mounted in normal position with remote control connections at the top.

This location of the radio leaves room for an Arvin Hot Water Heater just above and to the right of the brake pedal.

SPECIAL INSTALLATION BULLETIN FOR THE MODEL 15 ARVIN CAR RADIO

NOTE: All parts of the model 15 Arvin Radio mentioned in this bulletin are fully described in the regular installation instruction sheet furnished with each set.

All Model V-8 Ford Cars

The model 15 Arvin Car Radio can be installed very satisfactorily on Ford V-8 Cars directly below the glove compartment on the right hand side of the dash.

Remove the glove compartment by taking out the six screws around its front edge and also remove the door by taking the two screws out of the hinges which hold it. Now, by means of a hammer and anvil, flatten out the turned up lip at the rear of the instrument panel flange so as to provide a wider flange on which to mount the front end of the radio. Bend up the ears on either side of the front mounting bracket to conform to the contour of the bottom of the instrument panel. Also spread this bracket apart so that it forms about a 105 degree angle instead of a 90 degree angle.

Now, hold the front mounting bracket up against the instrument panel flange with its shorter leg butting up against the flange, and the longer leg extending upward behind the dash. Locate this bracket so that the right hand edge of its longer leg is just to the left of the loop in the door spring, or in other words, so that this spring will just clear the radio when the door is shut.

Mark the location of the holes to be drilled in the flange by inserting a pencil through the tapped holes in the mounting bracket. Drill a 9/32″ hole at each of these two points. Now lift the bracket into place with the shorter leg underneath and against the instrument panel flange (the illustration in the model 15 installation instruction sheet erroneously shows this leg resting on top of the flange with the screw entering from the bottom) and insert the ¼-20 oval head screw from the top, first through the flange and then into the tapped holes in the bracket by reaching through the glove pocket door opening. Draw these screws up tight with a short screw driver.

Next remove the main mounting plate from the radio as explained in the regular installation instruction sheet and install the rear mounting bracket onto this plate with its longer leg extending horizontally to the rear. Insert the threaded studs extending from the front end of this plate through the oval shaped holes in the bracket just mounted and fasten with the proper washers and nuts.

The rear end of the set is supported by one carriage bolt through the square hole in the center of the rear mounting bracket and clamped to the step plate in the dash. Mark the location of this hole and drill one 11/32″ hole. Insert the carriage bolt and draw up tight with the proper washers and nuts.

You are now ready to replace the glove compartment. This can be pushed through the door opening in the dash from the front and bolted into place in exactly the same manner as it came out. The lower front edge, of course, will have to be bent down around the top of the radio. However, this can be done without great difficulty. Now slip the radio chassis and outer cover, with speaker attached, up into place in the main mounting plate and complete the installation exactly as explained in the regular installation instruction sheet.

This procedure might appear to be a rather complicated and involved installation, however, it really is not at all difficult and in the end makes a very neat and workmanlike job.

MODEL 25
Schematic, Parts List

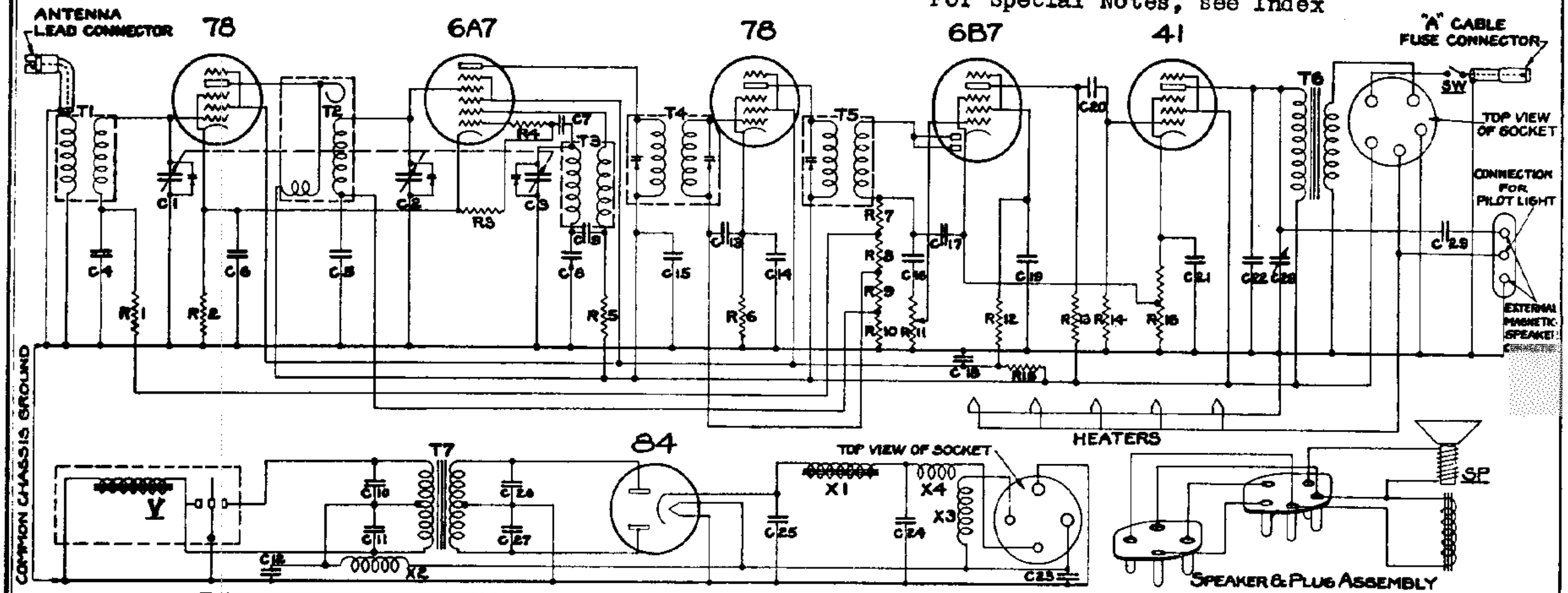
NOBLITT SPARKS INDUSTRIES

DIAGRAM	ISSUE NO.	DATE
D	1	2-15-34

CIRCUIT DIAGRAM OF ARVIN CAR RADIO MODEL 25.

IF PEAK 175 KC.

For Special Notes, see Index



For Alignment See Index

CONDENSERS

	DESCRIPTION	PART NO.
C1, C2, C3	THREE GANG VARIABLE	18-3018
C4, C5	.015 µf 50 V. TWIN	17-3004
C6	.10 µf 200V.	17-2097
C7	100 µµf	17-2094
C8	SERIES PADDER (1400 µµf MAX)	17-4161
C9	.001 µf 600 V.	17-3005
C10	12 µf 15V. ELECTROLYTIC } TRIPLE UNIT	17-2253
C11	12 µf 15V. ELECTROLYTIC } TRIPLE UNIT	
C12	1. µf 15V. } TRIPLE UNIT	
C13	.02 µf 400V.	17-2214
C14	.10 µf 200 V.	17-2097
C15	.25 µf 300 V.	29-4166
C16	.05 µf 300 V.	17-3006
C17	500 µµf	17-2211
C18	.10 µf 200 V.	17-2097
C19	.10 µf 200 V.	17-2097
C20	.05 µf 300 V.	17-3006
C21	12 µf 20V. ELECTROLYTIC	17-2082
C22	.005 µf 800V. SPECIAL	17-2252
C23	.50 µf 10 V.	28-2224
C24	4 µf } 450V. DUAL ELECTROLYTIC	17-4201
C25	12 µf } 450V. DUAL ELECTROLYTIC	
C26, C27	.02 µf 1000 V. TWIN	29-4193
C28	.02 VARIABLE TONE CONTROL	17-4151
C29	.02 µf 400 V.	17-2214

NOTE:
ON ORDERS FOR REPLACEMENT PARTS, STATE PART NUMBER AND QUANTITY DESIRED.

RESISTORS

	DESCRIPTION	PART NO.
R1	500000 Ω, ¼ WATT	17-2070
R2	260 Ω, ¼ WATT	17-2066
R3	100000 Ω, ¼ WATT	17-2068
R4	1000 Ω, ¼ WATT	17-2065
R5	20000 Ω, ¼ WATT	17-2072
R6*	2000 Ω, ¼ WATT	17-4202
R7	250000 Ω, ¼ WATT	17-3011
R8	100000 Ω, ¼ WATT	17-2068
R9	100000 Ω, ¼ WATT	17-2068
R10	30000 Ω, ¼ WATT	17-4276
R11	250000 Ω, †	17-4152
R12	100000 Ω, ¼ WATT	17-2068
R13	30000 Ω, ¼ WATT	17-4276
R14	250000 Ω, ¼ WATT	17-3011
R15	75000 Ω, ¼ WATT	17-2067
R16	CANDOHM, 800 Ω TOTAL, TAPPED AT 100 & 120 Ω	17-4281

* THIS RESISTOR MAY VARY FROM 1000 Ω TO 3000 Ω, CONTROLLING SENSITIVITY.
† VOLUME CONTROL

TRANSFORMERS

	DESCRIPTION	PART NO.
T1	ANTENNA	00-3020-1
T2	RADIO FREQUENCY	00-3017-1
T3	OSCILLATOR	00-3018-1
T4	FIRST INTERMEDIATE FREQUENCY	00-2256-A
T5	SECOND INTERMEDIATE FREQUENCY	00-2259
T6	OUTPUT	00-4111
T7	POWER	00-4102

CHOKES

	DESCRIPTION	PART NO.
X1	FILTER CHOKE	00-4141
X2	CENTER TAP PRIMARY R.F.	00-2178-E
X3	FILAMENT R.F.	00-2178-F
X4	PLATE R.F.	00-2181-1

MISCELLANEOUS

	DESCRIPTION	PART NO.
V	VIBRATOR UNIT	29-2169-B
SW	SWITCH INTEGRAL WITH R-11	17-4152
SP	DYNAMIC SPEAKER	17-4226

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS INDIANA

MODEL 25
Voltage,Test Data
Coil Resistance

NOBLITT SPARKS INDUSTRIES

MODEL 25 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	250	70	2	2	1.8*	—	—
6A7	6.3	250	70	2	—	1.8*	150	5-10
78	6.3	250	70	2.5	2.5	2.3*	—	—
6B7	6.3	220	45	1.8	—	1.6*	—	—
41	6.3	245	255	20	—	20.0*	—	—
84	6.3	275 (AC)	—	255	—	—	—	—

* Measured with vacuum tube voltmeter only.

MODEL 25 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

1st 78
+ Heater .... Inf.
— Heater 0
Plate to B+ 104
Screen Grid to B+ 75,000
Suppressor Grid 260
Cathode 260
Control Grid 730,000

6B7
+ Heater .... Inf.
— Heater 0
Plate to B+ 30,000
Screen Grid to B+ 175,000
Diode 480,000
Diode 480,000
Cathode 100
Control Grid:
V. C. clear on 250,000
V. C. and switch off 0-5

2nd 78
+ Heater .... Inf.
— Heater 0
Plate to B+ 75
Screen Grid to B+ 75,000
Suppressor Grid 2,000
Cathode 2,000
Control Grid 130,000

84
+ Heater .... Inf.
— Heater 0
Plate 190
Plate 220
Plate to Plate 410
Cathode .... Inf.†

†Reads leakage of electrolytic condenser.

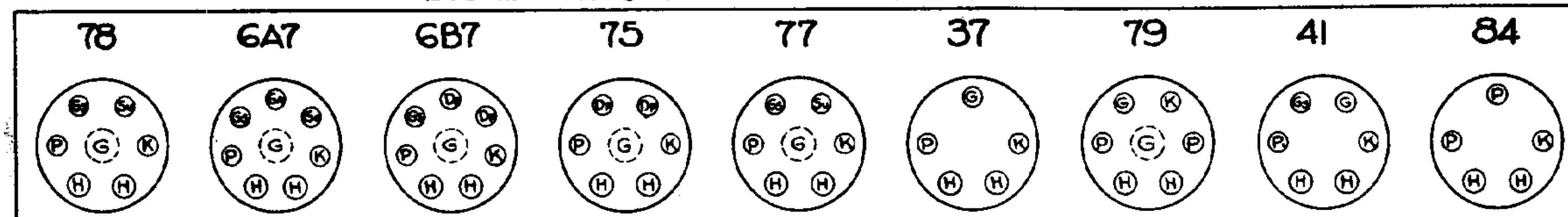
41
+ Heater .... Inf.
— Heater 0
Plate to B+ 650
Screen Grid 0
Control Grid 250,000
Cathode 800

6A7
+ Heater .... Inf.
— Heater 0
Plate to B+ 104
Screen Grid to B+ 75,000
Anode Grid to B+ 20,000
Oscillator Grid 101,260
Cathode 260
Control Grid 30,100

COIL RESISTANCES

Ant. Primary 13
Ant. Secondary 5
R. F. Primary 100
R. F. Secondary 5
Osc. Primary 2
Osc. Secondary 4
1st I. F. Primary 82
1st I. F. Secondary 82
2nd I. F. Primary 120
2nd I. F. Secondary 120
Primary Output Transformer 650
Voice Coil 35

LOOKING AT BOTTOM OF TUBE SOCKETS



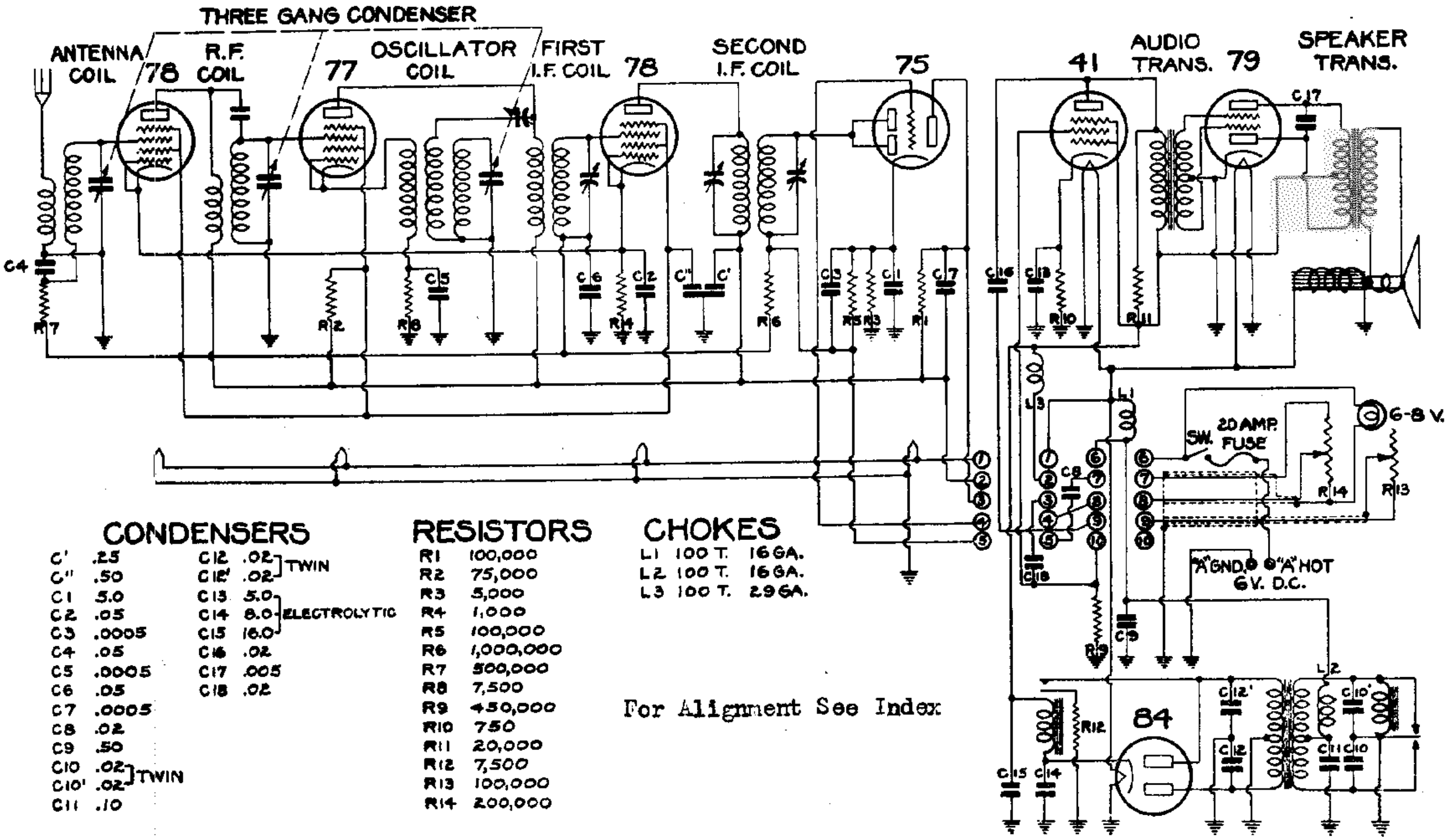
SYMBOLS — H-HEATER; P—PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO—OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP—DIODE PLATE

NOBLITT SPARKS INDUSTRIES

DIAGRAM	ISSUE NO.	DATE
D	1	11-8-33

IF PEAK 175 KC.

SCHEMATIC CIRCUIT DIAGRAM ARVIN CAR RADIO MODEL 30A



CONDENSERS

C'	.25
C''	.50
C1	5.0
C2	.05
C3	.0005
C4	.05
C5	.0005
C6	.05
C7	.0005
C8	.02
C9	.50
C10	.02 TWIN
C10'	.02 TWIN
C11	.10
C12	.02 TWIN
C12'	.02 TWIN
C13	5.0 ELECTROLYTIC
C14	8.0 ELECTROLYTIC
C15	16.0 ELECTROLYTIC
C16	.02
C17	.005
C18	.02

RESISTORS

R1	100,000
R2	75,000
R3	5,000
R4	1,000
R5	100,000
R6	1,000,000
R7	500,000
R8	7,500
R9	450,000
R10	750
R11	20,000
R12	7,500
R13	100,000
R14	200,000

CHOKES

L1	100 T.	16 GA.
L2	100 T.	16 GA.
L3	100 T.	29 GA.

For Alignment See Index

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA.

6

MODEL 30-A (3rd Type)
Voltage, Test Data
Coil Resistance

NOBLITT SPARKS INDUSTRIES

MODEL 30-A SOCKET VOLTAGES—C SERIES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	180	60	2.4	2.4	*2.2
77	6.3	180	60	6	9	*5.8
78	6.3	180	60	2.4	2.4	*2.2
75	6.3	120	—	1.3	—	*1.3
41	6.3	175	180	16.0	—	*16.0
79	6.3	180	—	0	—	0
84	6.3	700 (AC)	—	190	—	—

* Measured with vacuum tube voltmeter only.

MODEL 30-A POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

1st 78
+ Heater .... Inf.
— Heater 0
Cathode .... 1000 some 500
Suppressor Grid (No. 3) .. 1000 some 500
Plate to B+ 35
Screen (No. 2) to B+ 75,000
Control Grid (No. 1) 2,005,000

77
+ Heater .... Inf.
— Heater 0
Plate to B+ 50
Screen (No. 2) to B+ 75,000
Suppressor Grid (No. 3) 7,500
Cathode 7,500
Control Grid (No. 1) 8

2nd 78
+ Heater .... Inf.
— Heater 0
Cathode .... 1000 some 500
Suppressor Grid (No. 3) .. 1000 some 500
Plate to B+ 50
Screen (No. 2) to B+ 75,000
Control Grid (No. 1) 1,505,000

75
+ Heater .... Inf.
— Heater 0
Plate to B+ 100,000
Diode 505,000
Diode 505,000
Cathode 5000
Control Grid (No. 1) .... Inf.

41
+ Heater .... Inf.
— Heater 0
Plate to B+ 590
Screen (No. 2) to B+ 0
Cathode 750
Control Grid (No. 1) 250,000

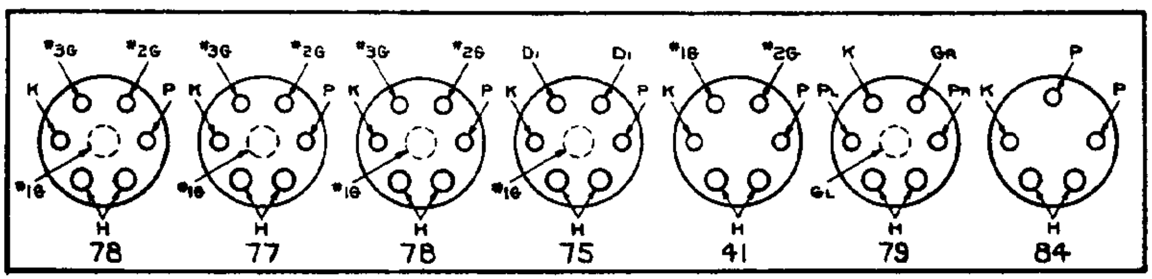
79
+ Heater .... Inf.
— Heater 0
Plate (PL) to B+ 500
Control Grid (GR) 150
Cathode 0
Plate (PR) to B+ 500
Control Grid (GL) 150

84
+ Heater .... Inf.
— Heater 0
Plate 125
Plate 140
Plate to Plate 265
Cathode .... Inf.†

COIL RESISTANCES

†Reads leakage of electrolytic condenser.
Ant. Primary 2
Ant. Secondary 8
R. F. Primary 35
R. F. Secondary 8
Osc. Primary 11
Osc. Secondary 6
First I. F. Primary 50
First I. F. Secondary 50
Second I. F. Primary 50
Second I. F. Secondary 50
Audio Transformer Primary 600
Audio Transformer Sec. .... 150 per half
Speaker Trans. Primary .... 500 per half

LOOKING AT TOP OF TUBE SOCKETS



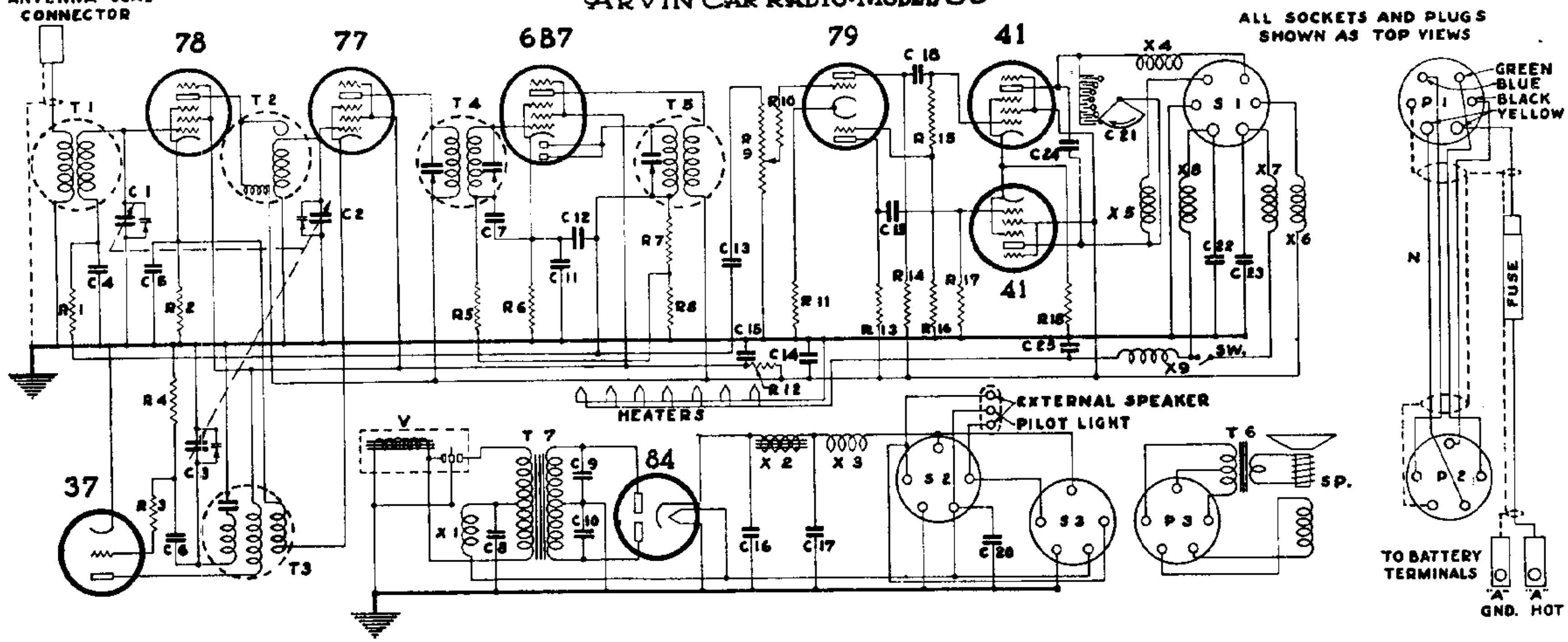
NOBLITT SPARKS INDUSTRIES

MODEL 35 Below E31577H
Schematic, Parts List

For Alignment See Index

IF PEAK 175 KC.

Circuit Diagram for Arvin Car Radio - Model 35



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.01 uf	160 V.	17-4291
C 5	.1 uf	200 V.	17-2097
C 6	100 uuf	600 V. Mica	17-2064
C 7	.01 uf	160 V.	17-4291
C 8	.5 uf	10 V.	29-2224
C 9, C10	.02 uf	1000 V. Twin	29-4193
C11	.1 uf	200 V.	17-2097
C12	500 uuf	600 V. Mica	17-2211
C13	.01 uf	160 V.	17-4291
C14	.5 uf	300 V.	17-3037
C15	.1 uf	200 V.	17-2097
C16	12 uf	450 WVDC Dual Elec.	
C17	4 uf	500 PVDC	17-4184
C18	.01 uf	400 V.	17-2189
C19	.01 uf	400 V.	17-2189

CAPACITORS

	Description		Part No.
C25	.002 uf	600 V. Mica	17-2063
C20	.5 uf	10 V.	29-2224
C21	Tone Control		17-4151
C22	.5 uf	10 V.	29-2224
C23	.5 uf	10 V.	29-2224
C24	.005 uf	600 V.	17-2252

MISCELLANEOUS

Description	Part No.
N—Interconnecting Cable, Complete	00-4180
SP—Speaker	00-4227
SW—Switch (Integral with R9)	17-4152
V—Vibrator	29-4186
Socket S1 Receives Plug P1	
Socket S2 Receives Plug P2	
Socket S3 Receives Plug P3	

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	260 Ω	¼ W.	17-2066
R 3	10,000 Ω	¼ W.	17-4275
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	30,000 Ω	¼ W.	17-4276
R 8	500,000 Ω	¼ W.	17-2070
R 9	250,000 Ω Volume Control		17-4152
R10	250,000 Ω	¼ W.	17-3011
R11	1,000 Ω	¼ W.	17-2065
R12	60,000 Ω	½ W.	17-4190
R13	100,000 Ω	¼ W.	17-2068
R14	100,000 Ω	¼ W.	17-2068
R15	500,000 Ω	¼ W.	17-2070
R16	15,000 Ω	¼ W.	17-4191
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189

TRANSFORMERS

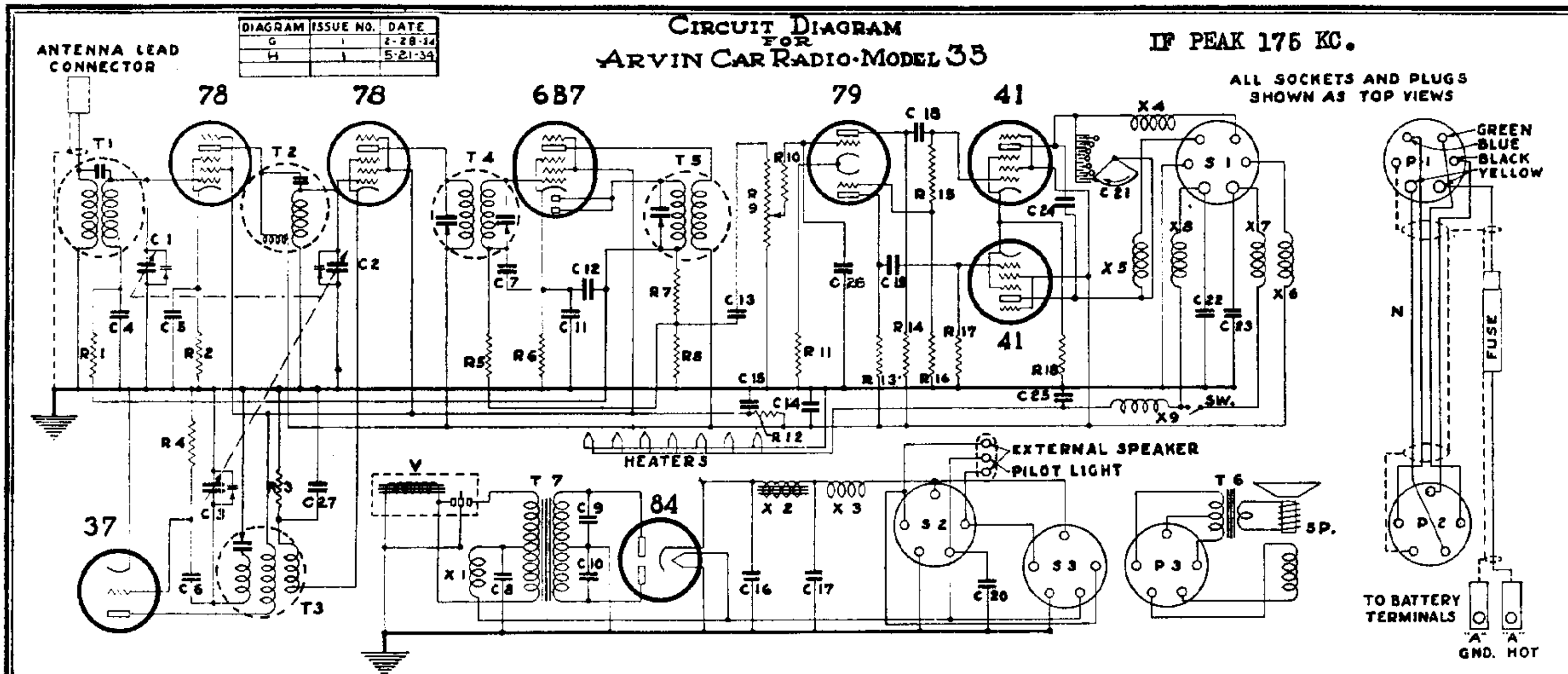
	Description	Part No.
T1	Antenna	00-4134-1
T2	Radio Frequency	00-4132-1
T3	Oscillator	00-4133
T4	1st Intermediate Freq.	00-2258-A
T5	2nd Intermediate Freq.	00-2259
T6	Output	00-4112
T7	Power	00-4101

CHOKES

	Description	Part No.
X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"B" Radio Frequency	00-2181-1
X7	"A" Radio Frequency	00-4130-1
X8	"A" Radio Frequency	00-4130-1
X9	"A" Radio Frequency	00-4131

MODEL 35 Above E31577H
Schematic, Parts List

NOBLITT SPARKS INDUSTRIES



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.05 uf	160 V.	17-4329
C 5	.1 uf	200 V.	17-2097
C 6	100 uuf	600 V. Mica	17-2064
C 7	.01 uf	160 V.	17-4291
C 8	.5 uf	10 V.	29-2224
C 9, C10	.02 uf	1000 V. Twin	29-4193
C11	.1 uf	200 V.	17-2097
C12	500 uuf	600 V. Mica	17-2211
C13	.01 uf	160 V.	17-4291
C14	.5 uf	300 V.	17-3037
C15	.1 uf	200 V.	17-2097
C16	12 uf	450 WVDC	Dual Elec.
C17	4 uf	500 PVDC	17-4184
C18	.01 uf	400 V.	17-2189
C19	.01 uf	400 V.	17-2189

CAPACITORS

	Description		Part No.
C25	.002 uf	600 V. Mica	17-2063
C20	.5 uf	10 V.	29-2224
C21	Tone Control		17-4151
C22	.5 uf	10 V.	29-2224
C23	.5 uf	10 V.	29-2224
C24	.001 uf	600 V. Mica	17-4292
C25	.002 uf	600 V. Mica	17-2063
C26	100 uuf	600 V. Mica	17-2064
C27	.1 uf	200 V.	17-2097

MISCELLANEOUS

Description	Part No.
N—Interconnecting Cable, Complete	00-4180
SP—Speaker	00-4227
SW—Switch (Integral with R9)	17-4152
V—Vibrator	29-4186
Socket S1 Receives Plug P1	
Socket S2 Receives Plug P2	
Socket S3 Receives Plug P3	

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	500 Ω	¼ W.	17-2088
R 3	3,000 Ω	¼ W.	17-2090
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	30,000 Ω	¼ W.	17-4276
R 8	500,000 Ω	¼ W.	17-2070
R 9	250,000 Ω Volume Control		17-4152
R10	250,000 Ω	¼ W.	17-3011
R11	1,000 Ω	¼ W.	17-2065
R12	25,000 Ω	1 W.	17-3010
R13	100,000 Ω	¼ W.	17-2068
R14	100,000 Ω	¼ W.	17-2068
R15	500,000 Ω	¼ W.	17-2070
R16	15,000 Ω	¼ W.	17-4191
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-4134-1S
T2	Radio Frequency	00-4132-1S
T3	Oscillator	00-4133S
T4	1st Intermediate Freq.	00-4489
T5	2nd Intermediate Freq.	00-4488
T6	Output	00-4112
T7	Power	00-4101

CHOKES

	Description	Part No.
X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"B" Radio Frequency	00-2181-1
X7	"A" Radio Frequency	00-4130-1
X8	"A" Radio Frequency	00-4130-1
X9	"A" Radio Frequency	00-4131

For Alignment See Index

NOTE: The above circuit diagram is effective for all Model 35 Arvin Car Radios, beginning with and including that bearing the Serial No. E31577H.

MODEL 35
Voltage, Test Data
Coil Resistance

NOBLITT SPARKS INDUSTRIES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	2.2	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
6B7	6.3	250	60	1.6	—	*1.4
79	6.3	135	—	1.6	—	*1.6
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
37	6.3	60	—	0	—	*6—1500 KC
84	6.3	275 (AC)	—	255	—	—

* Measured with vacuum tube voltmeter only.

MODEL 35 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis disconnected from power pack unit.

78
+ Heater .... Inf.
— Heater 0
Plate to B+ 50
Screen Grid to B+ 60,000
Suppressor Grid 260
Cathode 260
Control Grid 1,530,000

41
+ Heater .... Inf.
— Heater 0
Plate to B+ .... Inf.
Screen Grid to B+ 2
Control Grid 500,000
Cathode 400

77
+ Heater .... Inf.
— Heater 0
Plate to B+ 100
Screen Grid to B+ 60,000
Suppressor Grid 260
Cathode 260
Control Grid 6

41
+ Heater .... Inf.
— Heater 0
Plate to B+ .... Inf.
Screen Grid to B+ 2
Control Grid 500,000
Cathode 400

6B7
+ Heater .... Inf.
— Heater 0
Plate to B+ 90
Screen Grid to B+ 60,000
Diode 530,000
Diode 530,000
Cathode 500
Control Grid 1,500,000

79
+ Heater .... Inf.
— Heater 0
Plate to B+ 100,000
Control Grid 15,000
Cathode 1000
Plate to B+ 100,000
Control Grid (Cap):
V. C. on 500,000
V. C. off 250,000

37
+ Heater .... Inf.
— Heater 0
Plate to B+ 60,000
Control Grid 60,000
Cathode 0

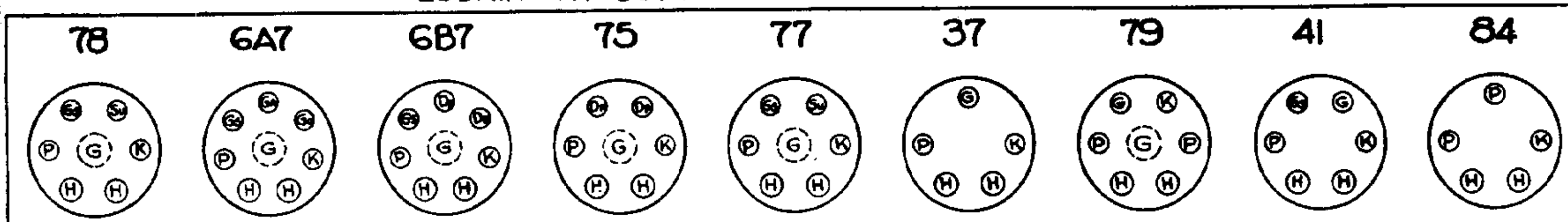
84
+ Heater .... Inf.
— Heater 0
Plate 190
Plate 160
Plate to Plate 350
Cathode .... Inf.†

†Reads leakage of electrolytic condenser.

COIL RESISTANCES

Ant. Primary 2
Ant. Secondary 6
R. F. Primary 50
R. F. Secondary 6
Osc. Primary 2
Osc. Secondary 7
1st I. F. Primary 100
1st I. F. Secondary 100
2nd I. F. Primary 82
2nd I. F. Secondary 82
Primary Output Transformer 600
Voice Coil .... .35

LOOKING AT BOTTOM OF TUBE SOCKETS



SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

NOBLITT SPARKS INDUSTRIES

ALIGNMENT PROCEDURE FOR ARVIN CAR RADIOS

Models 10-A, 20-A, 20-B and 30-A

NOTE: All adjustments in the following instructions should be made with an output meter or some indicating device connected with the output of the radio receiver to insure maximum sensitivity and selectivity.

Remove the radio chassis from the case. Connect grounding wire from the radio chassis to the power pack. Connect the output of the oscillator to the grid cap of the 77 or 6A7 tube after removing the grid clip and adjust the oscillator to 175 kilocycles. Set the output to the lowest amount giving a satisfactory deflection of the output meter. Adjust with a Bakelite screwdriver the first and second I. F. transformer for a maximum output. Replace the grid clip, connect the output of the oscillator to the antenna terminal of the radio set through a .0001 mfd mica condenser and set the oscillator to 1510 kilocycles. Rotate the variable condenser fully out of mesh, then back until the rotor plates begin to enter the stator. Adjust the oscillator padder condenser until the maximum signal is attained. Then readjust the oscillator input to 1400 kilocycles, rotate the variable condenser until the signal is again heard.

Now adjust the antenna and R. F. padders until the output is again at the peak. With the Model 10A, 20A and 30A Radios further adjustment is made at other frequencies by bending the split plates on the R. F. and antenna sections either in or out, depending upon whether more or less capacity is needed to bring the set into resonance.

On the 20B receiver, set the oscillator output to 600 kilocycles and rotate the variable condenser until a signal is heard and then adjust the oscillator series padder condenser located on the right hand condenser back and forth until a point is found where the setting of the padder gives maximum deflection on the output meter. Setting of the padder and variable condenser are both variable, each dependent upon the other, there being one point on the setting of the variable condenser where a maximum deflection will be obtained.

After the 600 kilocycle adjustment has been made return to the 1400 kilocycle position and recheck slightly the adjustment of the radio frequency and the antenna padders to insure no change has been made.

NOTE: After installation on some cars slight readjustment of the antenna padder on all Radios—except model 10A—materially improves the sensitivity of the receiver.

MODEL 45 Below E40356L
Schematic, Parts List
Type 1

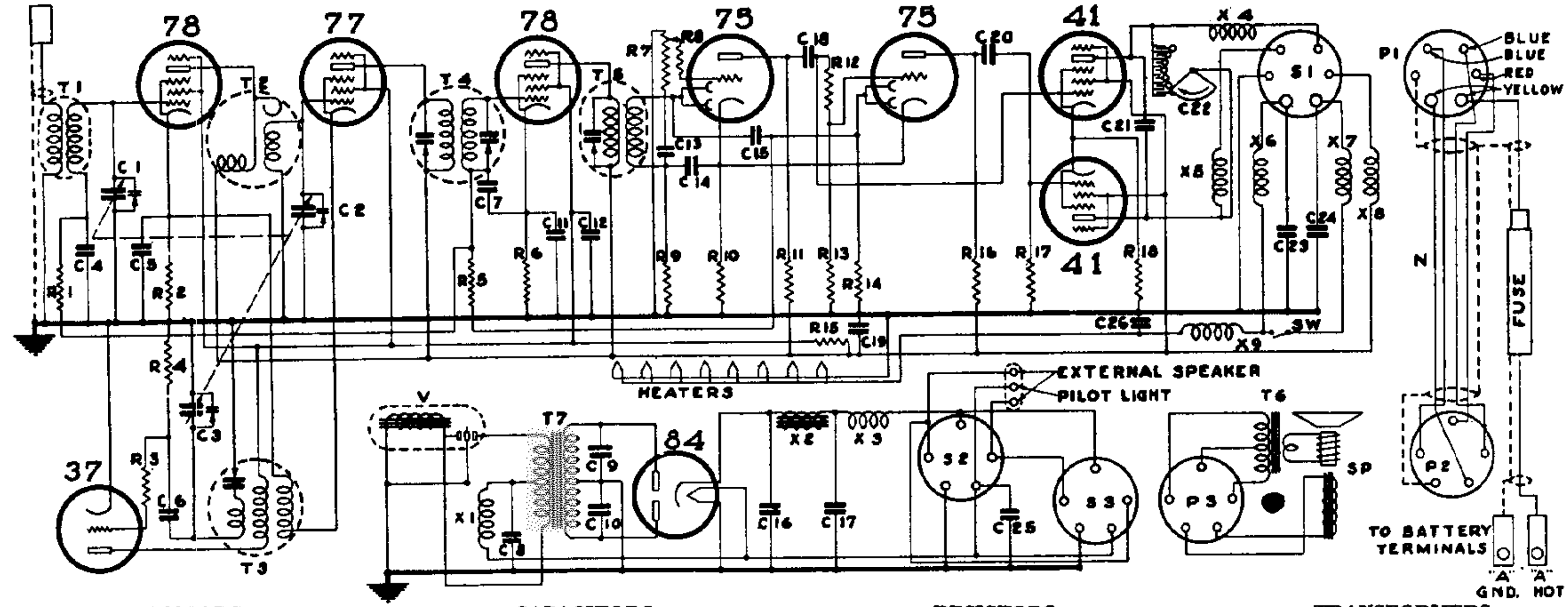
NOBLITT SPARKS INDUSTRIES

For Alignment See Index

IF PEAK 175 KC.

CIRCUIT DIAGRAM FOR ARVIN CAR RADIO — MODEL 45

ALL SOCKETS AND PLUGS SHOWN AS TOP VIEWS



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.01 uf	160 V.	17-4291
C 5	.1 uf	200 V.	17-2097
C 6	100 uuf	600 V. Mica	17-2064
C 7	.01 uf	160 V.	17-4291
C 8	.5 uf	10 V.	17-2224
C 9, C10	.02 uf	1000 V. Twin	17-4193
C11	.1 uf	200 V.	17-2097
C12	.1 uf	200 V.	17-2097
C13	.01 uf	160 V.	17-4291
C14	500 uuf	600 V. Mica	17-2211
C15	500 uuf	600 V. Mica	17-2211
C16	12 uf	450 WVDC} Dual Elec.	
C17	4 uf	500 PVDC}	17-4184
C18	.01 uf	400 V.	17-2189
C19	.5 uf	300 V.	17-3037
C20	.01 uf	400 V.	17-2189

CAPACITORS

	Description		Part No.
C21	.005 uf	600 V.	17-2252
C22	Tone Control		17-4151
C23	.5 uf	10 V.	17-2224
C24	.5 uf	10 V.	17-2224
C25	.5 uf	10 V.	17-2224
C26	.002 uf	600 V.	17-2063

MISCELLANEOUS

N—Interconnecting Cable, Complete	00-4180
SP—Speaker	19-4228
SW—Switch (Integral with R7)	17-4152
V—Vibrator	29-4186
Socket S1 Receives Plug P1	
Socket S2 Receives Plug P2	
Socket S3 Receives Plug P3	

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	260 Ω	¼ W.	17-2066
R 3	10,000 Ω	¼ W.	17-4275
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	250,000 Ω Volume Control		17-4152
R 8	250,000 Ω	¼ W.	17-3011
R 9	500,000 Ω	¼ W.	17-2070
R10	2,500 Ω	¼ W.	17-2087
R11	250,000 Ω	¼ W.	17-3011
R12	500,000 Ω	¼ W.	17-2070
R13	8,000 Ω	¼ W.	17-4290
R14	500,000 Ω	¼ W.	17-2070
R15	60,000 Ω	½ W.	17-4190
R16	250,000 Ω	¼ W.	17-3011
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-4134-1
T2	Radio Frequency	00-4132-1
T3	Oscillator	00-4133
T4	1st Intermediate Freq.	00-2258-A
T5	2nd Intermediate Freq.	00-2259
T6	Output	00-4112
T7	Power	00-4101

CHOKES

	Description	Part No.
X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"A" Radio Frequency	00-4130-1
X7	"A" Radio Frequency	00-4130-1
X8	"B" Radio Frequency	00-2181-1
X9	"A" Radio Frequency	00-4131

MODEL 45 Above E40356L
Schematic, Parts List
Type 2

NOBLITT SPARKS INDUSTRIES

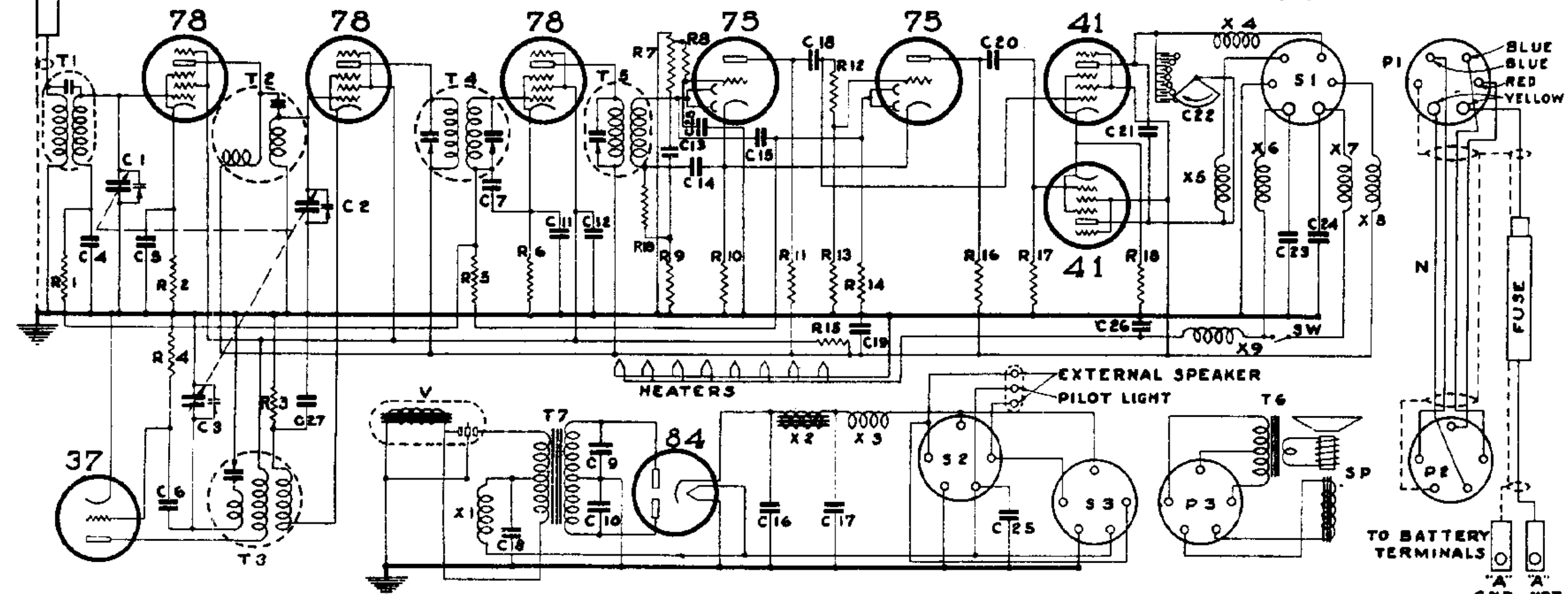
IF PEAK 175 KC.

DIAGRAM	ISSUE NO.	DATE
K	1	2-26-34
L	1	6-21-34

For Alignment See Index

CIRCUIT DIAGRAM FOR ARVIN CAR RADIO — MODEL 45

ALL SOCKETS AND PLUGS SHOWN AS TOP VIEWS



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.05 uf	160 V.	17-4329
C 5	.1 uf	200 V.	17-2097
C 6	100 uuf	600 V. Mica	17-2064
C 7	.01 uf	160 V.	17-4291
C 8	.5 uf	10 V.	17-2224
C 9, C10	.02 uf	1000 V. Twin	17-4193
C11	.1 uf	200 V.	17-2097
C12	.1 uf	200 V.	17-2097
C13	.01 uf	160 V.	17-4291
C14	500 uuf	600 V. Mica	17-2211
C15	500 uuf	600 V. Mica	17-2211
C16	12 uf	450 WVDC	Dual Elec.
C17	4 uf	500 PVDC	17-4184
C18	.01 uf	400 V.	17-2189
C19	.5 uf	300 V.	17-3037
C20	.01 uf	400 V.	17-2189

CAPACITORS

	Description		Part No.
C21	.001 uf	600 V. Mica	17-4292
C22	Tone Control		17-4151
C23	.5 uf	10 V.	17-2224
C24	.5 uf	10 V.	17-2224
C25	.5 uf	10 V.	17-2224
C26	.002 uf	600 V. Mica	17-2063
C27	.1 uf	200 V.	17-2097
C28	100 uuf	600 V. Mica	17-2064

MISCELLANEOUS

Description	Part No.
N—Interconnecting Cable, Complete	00-4180
SP—Speaker	19-4228
SW—Switch (Integral with R7)	17-4152
V—Vibrator	29-4186

Socket S1 Receives Plug P1
Socket S2 Receives Plug P2
Socket S3 Receives Plug P3

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	500 Ω	¼ W.	17-2088
R 3	3,000 Ω	¼ W.	17-2090
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	250,000 Ω Volume Control		17-4152
R 8	250,000 Ω	¼ W.	17-3011
R 9	500,000 Ω	¼ W.	17-2070
R10	2,500 Ω	¼ W.	17-2087
R11	250,000 Ω	¼ W.	17-3011
R12	500,000 Ω	¼ W.	17-2070
R13	8,000 Ω	¼ W.	17-4290
R14	500,000 Ω	¼ W.	17-2070
R15	25,000 Ω	1 W.	17-3010
R16	250,000 Ω	¼ W.	17-3011
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189
R19	30,000 Ω	¼ W.	17-4276

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-4134-1S
T2	Radio Frequency	00-4132-1S
T3	Oscillator	00-4133S
T4	1st Intermediate Freq.	00-4489
T5	2nd Intermediate Freq.	00-4488
T6	Output	00-4112
T7	Power	00-4101

CHOKES

	Description	Part No.
X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"A" Radio Frequency	00-4130-1
X7	"A" Radio Frequency	00-4130-1
X8	"B" Radio Frequency	00-2181-1
X9	"A" Radio Frequency	00-4131

NOTE: The above circuit diagram is effective for all Model 45 Arvin Car Radios, beginning with and including that bearing the Serial No. E40356L.

MODEL 45
Voltage, Test Data
Coil Resistance

NOBLITT SPARKS INDUSTRIES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	2.2	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
78	6.3	250	60	1.6	1.6	*1.4
37	6.3	60	—	0	—	*6—1500 KC
75	6.3	135	—	1.3	—	*1.3
75	6.3	135	—	1.3	—	*1.3
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
84	6.3	275 (AC)	—	255	—	—

* Measured with vacuum tube voltmeter only.

MODEL 45 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis disconnected from power pack unit.

1st 78
+ Heater .... Inf.
— Heater 0
Plate to B+ 50
Screen Grid to B+ 60,000
Suppressor Grid 260
Cathode 260
Control Grid 2,500,000

75
+ Heater .... Inf.
— Heater 0
Plate to B+ 250,000
Diode 500,000
Diode 500,000
Cathode 2500
Control Grid 8000

84
+ Heater .... Inf.
— Heater 0
Plate 190
Plate 160
Plate to Plate 350
Cathode .... Inf.†

†Reads leakage of electrolytic condenser.

77
+ Heater .... Inf.
— Heater 0
Plate to B+ 100
Screen Grid to B+ 60,000
Suppressor Grid 260
Cathode 260
Control Grid 6

41
+ Heater .... Inf.
— Heater 0
Plate to B+ .... Inf.
Screen Grid to B+ 2
Control Grid 508,000
Cathode 400

2nd 78
+ Heater .... Inf.
— Heater 0
Plate to B+ 100
Screen Grid to B+ 60,000
Suppressor Grid 500
Cathode 500
Control Grid 1,500,000

75
+ Heater .... Inf.
— Heater 0
Plate to B+ 250,000
Diode 500,000
Diode 500,000
Cathode 2500
Control Grid:
V. C. on 500,000
V. C. off 250,000

37
+ Heater .... Inf.
— Heater 0
Plate to B+ 60,000
Control Grid 65,000
Cathode 0

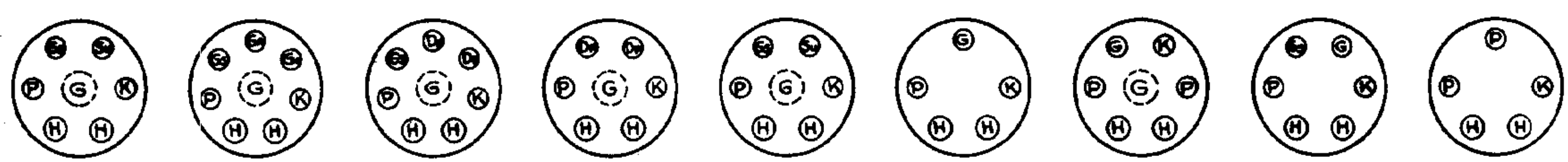
41
+ Heater .... Inf.
— Heater 0
Plate to B+ .... Inf.
Screen Grid to B+ 2
Control Grid 508,000
Cathode 400

COIL RESISTANCES

Ant. Primary 2
Ant. Secondary 6
R. F. Primary 50
R. F. Secondary 6
Osc. Primary 2
Osc. Secondary 7
1st I. F. Primary 100
1st I. F. Secondary 100
2nd I. F. Primary 82
2nd I. F. Secondary 82
Primary Output Transformer 600
Voice Coil .... .35

LOOKING AT BOTTOM OF TUBE SOCKETS

78 6A7 6B7 75 77 37 79 41 84



SYMBOLS — H-HEATER; P- PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

MODEL 15,25,35,45
Alignment
MODEL 35,45
Notes

NOBLITT SPARKS INDUSTRIES

ALIGNMENT PROCEDURE FOR ARVIN

Models 15, 25, 35, and 45

NOTE: All adjustments in the following instructions should be made with an output meter or some indicating device connected with the output of the radio receiver to insure maximum sensitivity and selectivity: Output meter may be connected to external speaker jack on all models.

Remove the radio chassis from the case. Connect the output of the oscillator to the grid cap of the 78 detector (2nd tube in set) or 6A7 tube after removing the grid clip and adjust the oscillator to 175 kilocycles. Set the output of the oscillator to the lowest amount giving a readable deflection of the output meter. Adjust with a Bakelite screwdriver the first and second I. F. transformer for maximum output. Replace the grid clip, connect the output of the oscillator to the antenna terminal of the radio set through a .0001 mfd mica condenser and set the oscillator to 1530 kilocycles. Rotate the variable condenser fully out of mesh, then back until the rotor plates begin to enter the stator. Adjust the oscillator padder, which is the section opposite shaft end, until the maximum signal is attained. Then readjust the oscillator input to 1400 kilocycles, rotate the variable condenser until the signal is again tuned in.

Now adjust the antenna (shaft end) and R. F. (middle) padders until the output is again at maximum.

Then adjust the oscillator series padder condenser (located by the 6B7 tube in the Model 15; on the left-hand side in the Model 25; in the top of the oscillator coil can in the compartment with the 37 tube in the Models 35 and 45) until a maximum deflection is obtained at 550 to 600 kilocycles (condenser plates almost in full mesh). At 600 kilocycles the adjustment of the series padder condenser are both variable; each dependent on the other. However, there is only one point where the relation between their settings will give maximum sensitivity.

NOTE: After installation to car antenna slight readjustment of antenna padders, through holes provided on all models (see installation notes) will improve sensitivity and performance. Always adjust at about ten to twenty dial setting.

SPECIAL SERVICE BULLETIN

for Models 35 and 45

Motor Noise Elimination

The Model 35 and 45 Arvin Car Radios have been especially designed for ease of elimination of motor noise.

The Chassis case is well shielded to prevent chassis pick-up and a special motor noise suppression system has been built into the set to block out "feed-back" through the "A" line. With these two sources of entry of motor noise blocked any such interference present must be picked up by the antenna and carried into the set exactly as a station signal. This type of motor noise is the easiest to eliminate and can usually be suppressed by standard suppression.

In rare cases, however, where a car is exceptionally "hot" it has been found that a slight amount of "chassis-pick-up" is present in the Model 35 and 45 Arvin sets—and the purpose of this bulletin is to suggest a method of eliminating this.

Solder one end of a 3½″ length of shielding to the underneath side of the condenser pulley mounting bracket directly between the two 6-32 screws which hold the Bowden wire housing clamp onto this bracket.

The other end of this piece of shielding is then hung over the edge of the chassis case on top of the copper case ground shim, and when the cover is put on the set, it automatically bonds the condenser pulley assembly to the outer case.

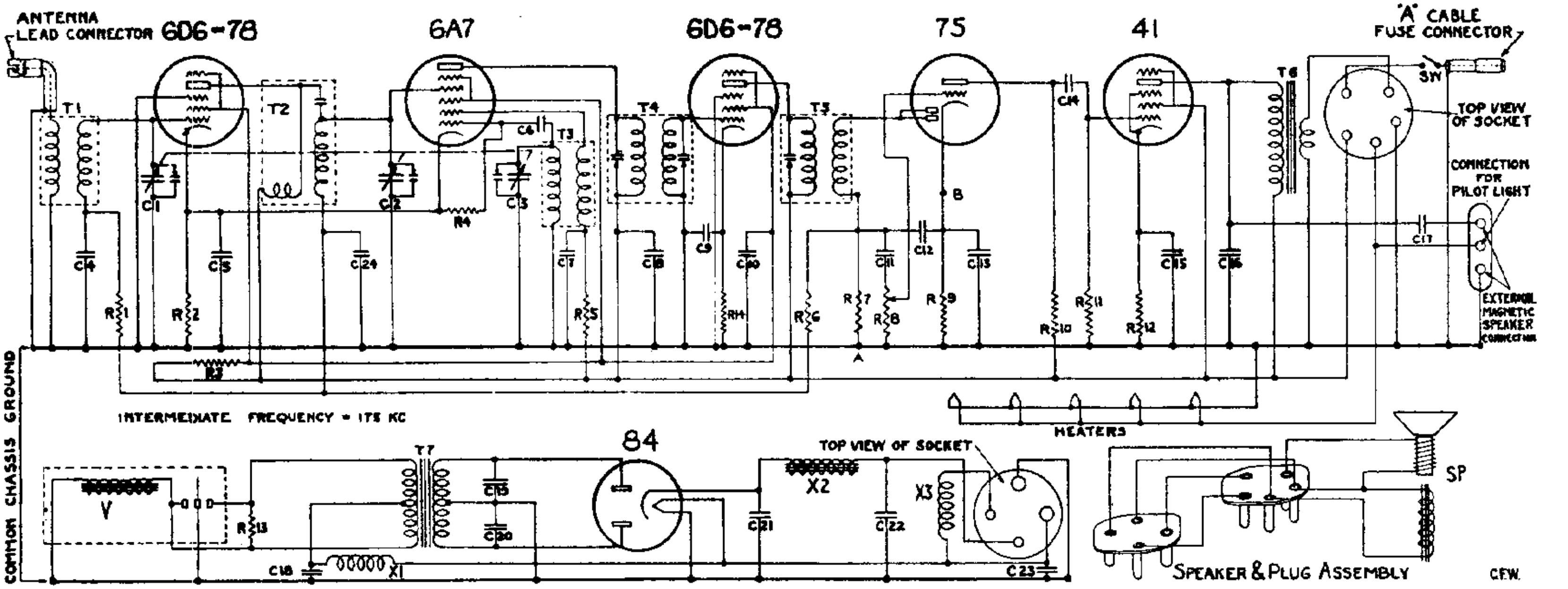
It has been found that this extra ground eliminates the last trace of "chassis-pick-up" motor noise interference from the Model 35 and 45 Arvin Car Radios.

MODEL 16 Schematic, Parts List

NOBLITT SPARKS INDUSTRIES

CIRCUIT DIAGRAM OF ARVIN CAR RADIO MODEL 16

DIAGRAM	ISSUE NO.	DATE
B	1	7-23-34



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		19-2248
C 4	.05 uf	160 V.	17-4329
C 5	.1 uf	100 V.	17-4393
C 6	100 uuf	600 V.	17-2064
C 7	.001 uf	600 V.	17-4292
C 8	.25 uf	300 V.	29-4188
C 9	.02 uf	100 V.	17-4394
C10	.1 uf	200 V.	17-2097
C11	.05 uf	160 V.	17-4329
C12	500 uuf	600 V.	17-2211
C13	.5 uf	10 V.	29-2224
C14	.05 uf	300 V.	17-3006
C15	12. uf	25 V.	17-2082
C16	.007 uf	600 V.	17-4392
C17	.02 uf	400 V.	17-2214
C18	1. uf	10 V.	17-4395
C19, C20	.02 uf Twin	1000 V.	29-4193

CAPACITORS

	Description		Part No.
C21, C22	12. uf, 4. uf Twin	450 V.	17-4201
C23	.5 uf	10 V.	29-2224
C24	.05 uf	160 V.	17-4329

MISCELLANEOUS

	Part No.
SP—Dynamic Speaker	17-4226
SW—Switch, Part of R8	17-4152-1
V—Vibrator Unit	29-2169C

In districts where signal strength is abnormally low, a slight increase in sensitivity may be obtained by removing the inter-channel noise suppression feature. Disconnect R7 at A and reconnect at B.

RESISTORS

	Description		Part No.
R 1	100,000 Ω	¼ W.	17-2068
R 2	260 Ω	¼ W.	17-2066
R 3	30,000 Ω	¼ W.	17-4276
R 4	100,000 Ω	¼ W.	17-2068
R 5	20,000 Ω	¼ W.	17-2072
R 6	1 Megohm	¼ W.	17-2080
R 7	150,000 Ω	¼ W.	17-4283
R 8	250,000 Ω	Pot.	17-4152-1
R 9	5,000 Ω	¼ W.	17-2071
R10	250,000 Ω	¼ W.	17-3011
R11	500,000 Ω	¼ W.	17-2070
R12	800 Ω	½ W.	17-4273
R13	200 Ω	¼ W.	17-4287
R14	2,000 Ω	¼ W.	17-4202

R14 Note: This resistor may be varied to control sensitivity.

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-3020-1
T2	Radio Frequency	00-3017-1
T3	Oscillator	00-4482-1
T4	First I F	00-2258A
T5	Second I F	00-4476
T6	Output	00-4111
T7	Power	00-4102-2

CHOKES

X1	C T Primary	00-2178E
X2	Filter	00-4141
X3	Filament	00-2178F

Note: On orders for replacement parts, state part number and quantity desired.

MISCELLANEOUS GENERAL INFORMATION RELATIVE TO REMOVING MOTOR NOISE

When primary wires to the coil run through the same conduit as the secondary or spark plug wire run—remove this wire from the conduit and shield it if necessary, grounding the shielding at both ends to some part of the motor block or the bulkhead between the passenger's compartment and the motor.

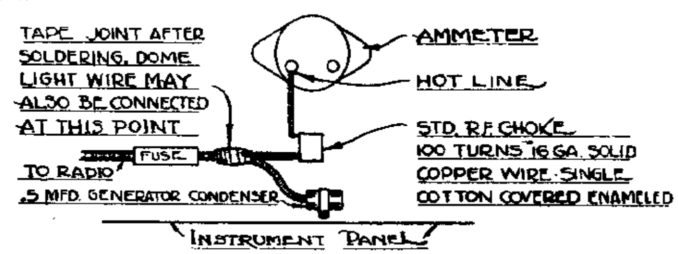
Also, be sure when shielding the secondary lead from the coil to the distributor to ground both ends of this shield, either to the motor or to the bulkhead. On some few cars the hood over the engine appears to be ungrounded or at least is a very high resistance ground and should be grounded with pigtails of shielding cable soldered to both sides of the hood and also to the motor bulkhead or motor block.

On cars equipped with co-incidental lock on the steering post an extra generator condenser should be installed from one switch terminal to ground. The exact terminal on which to install this condenser can be determined only by experiment. The condenser body should be grounded to the dash or to the motor bulkhead. On some Ford V-8's it is necessary to install an extra generator condenser on the generator to the other terminal of the cutout relay, thus making two condensers on the same relay—one on each terminal to ground.

On some Chevrolets, generally of the older models, it is necessary to install an extra condenser from the primary of the ignition coil to ground. The exact terminal to connect this condenser to can only be determined by experiment. Be sure that the grounding of this condenser is solid, preferably to the motor block or to the motor bulkhead.

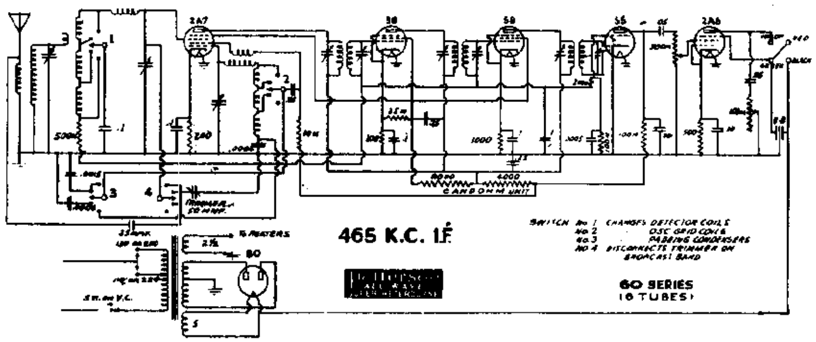
On all cars equipped with "Electrolock" it may be found necessary to remove the primary return wire from the switch to the coil and replace it with a new wire run through a piece of shielding loom grounded near the switch and also to the metal bulkhead on the motor side of the dash. This lead should be brought out through the dash as far as possible from the rest of the electrical wiring of the car.

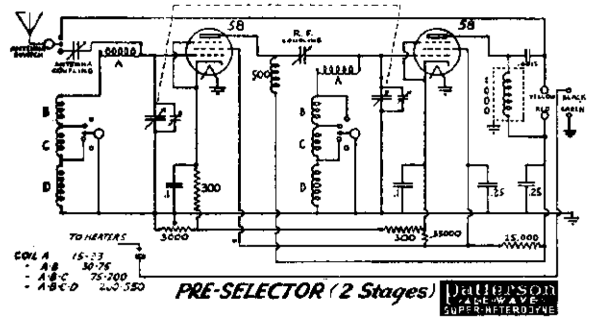
It may be pointed out that loose connections anywhere in the electrical circuit of the car will cause motor noise or what appears to be motor noise. If this condition exists it is wise to check the entire electrical circuit of the car and make sure that all connections are tight before trying any other extreme methods of motor noise elimination.



The use of a choke and condenser at the ammeter with the 10A has proven to be a great help in the elimination of motor noise. (See illustration above.)

PATTERSON RADIO CO.



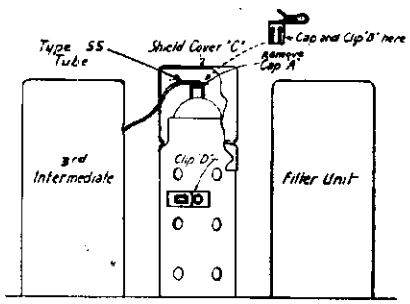


PHONOGRAPH CONNECTION

INSTRUCTIONS FOR CONNECTING ELECTRIC PICKUP TO ALL MODEL RECEIVERS:

The use of jacks and switches for operation of electric phonograph pickups is unsatisfactory with the modern highly perfected radio receivers. The electrical loss in the long leads used to connect the switch and jack into the circuit is enough to unbalance these highly sensitive, long distance receivers and the full capabilities of the set are lost.

For best radio and phonograph operation the rules below should be followed. With the methods graphically shown, full efficiency of the radio and phonograph are utilized and the greatest satisfaction is obtained.



METHOD No. 1

Remove shield cover "C." Remove cap "A."

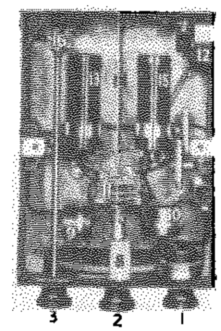
Place cap "B," with attached clip, on top of 55 tube. Connect one phonograph pickup wire to clip "B." Connect other phonograph wire to clip "D." Phonograph will now play and volume control on radio will control phonograph.

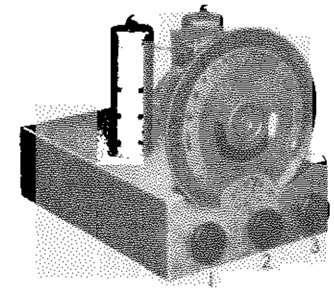
Some pickups work better with a 4½ volt C battery in series with lead that connects to clip "D." (+) to clip. (—) to pickup lead.

1. Sensitivity Control
2. Push, Band Change, Normal Preselection Dial
3. Antenna Change-over Switch
8. Switch Clutch
9. 15-33 First Stage Coil
10. 15-33 Second Stage Coil
11. Band Change Switch, Silver Plated Contacts
12. Output "B" + Choke
13. 3-Band Coils, First Stage
14. Shield
15. 3-Band Coils, Second Stage
16. Antenna Change-over Switch

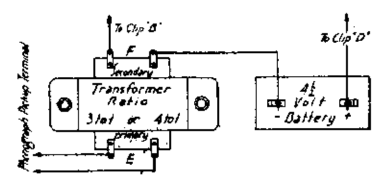
Weight Packed, 22 Lbs.

Same type construction as in the PR-10.





1. Sensitivity Control
2. Push Band Change, Normal Preselection Dial
3. Antenna Change-over Switch
4. Two-Gang Condenser, Rubber Mounted
5. First R.F. Stage, No. 58
6. Second R.F. Stage, No. 58
7. Band Indicator



METHOD No. 2

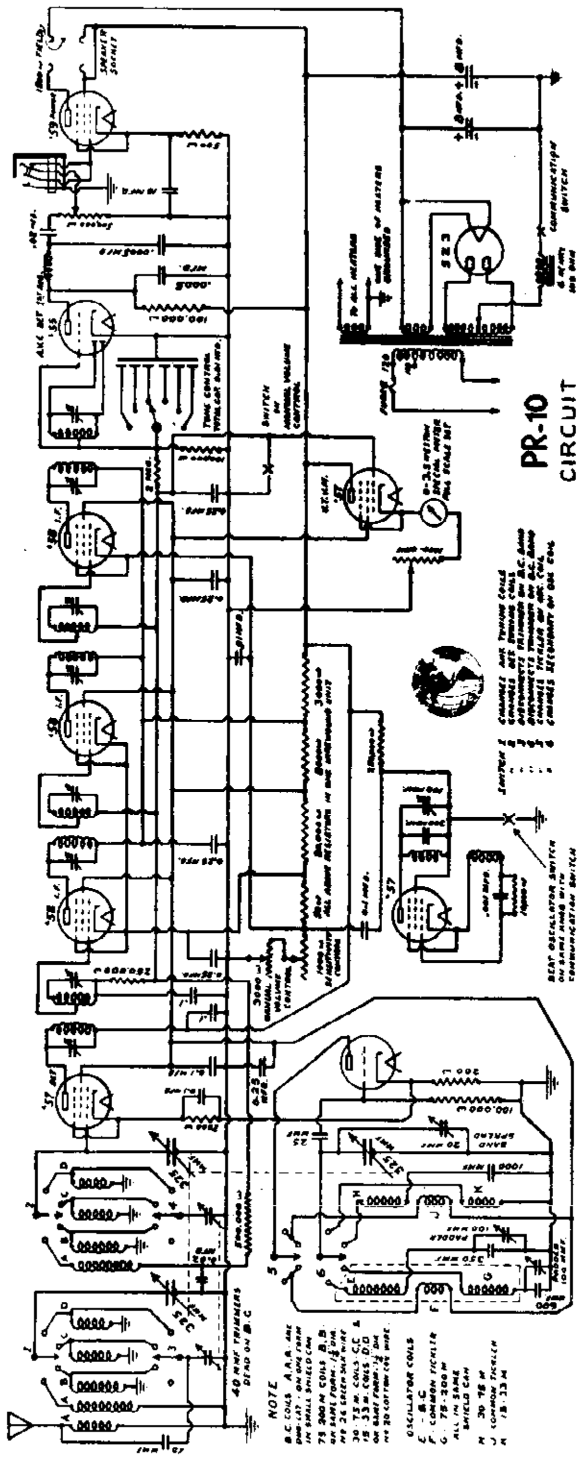
Use Method 2 where extreme volume is required. Remove shield cover "C." Remove cap "A." Place cap "B" (with attached clip), on top of 55 tube. Connect one of transformer (secondary) terminals to negative terminal (—) of 4½ volt battery. Connect positive terminal of battery (+) to clip "D." Connect other (secondary) terminal of transformer to clip "B." Connect phonograph pickup terminal wires to transformer primary terminals. Any good audio transformer may be used as a step up for phonograph use. Phonograph will now operate and volume control on radio set will control phonograph volume.

Cap "A" and cover "C" are not used when phonograph is played. Remove cap "B" and replace cap "A" for radio operation.

MODEL PR-10
Schematic
Socket

PATTERSON RADIO CO.

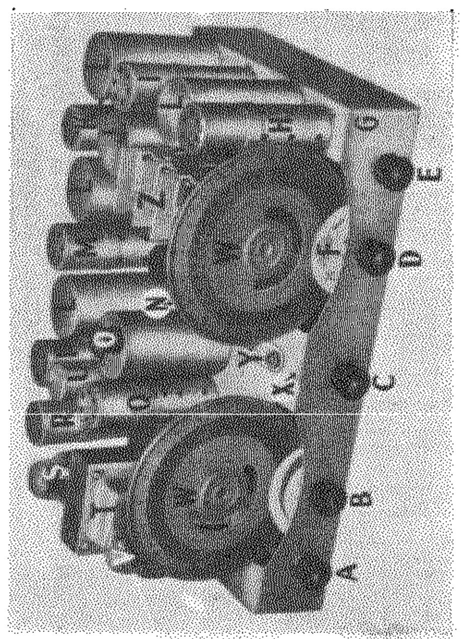
To rebalance the receiver does not require any equipment. The meter will indicate the exact resonance point of the I.F. trimmers and also the condenser gang. Proceed as follows: Set band spread dial at "O," then tune in a station on the high frequency end of the Broadcast band (any station around 1400 K.C. is okay). Next, adjust the trimmer on the condenser section nearest the dial until the station reads exactly on its known K.C. Now, tune in a station in around 600 K.C. and be careful to be on the exact center of the carrier. All of the above operations must be made with the manual control in off position. Next, turn the sensitivity control toward minimum so that the meter reads about R-9. Now, adjust each of the eight I.F. trimmers very carefully until the meter swings the farthest to the right. You probably will not be able to increase the gain more than 1.5-R. It should not be necessary to turn any trimmer more than 1/8 of a turn.



PR-10 CIRCUIT

Everything from A to Z

A—"B" on and off, Beat Oscillator switch.
B—Push, Tone Control. Normal. Band Spread.
C—Volume Control, Power Switch.
D—Push, Band Change. Normal. Main Tuning.
E—Short-Wave Trimmer, two gang.
F—Band Indicator.
G—Heavy 18-gauge Chromium Plated Chassis.
H—First Detector—#57.
I—First I. F. Tube—#58.
J—B. C. and 75 Meter Oscillator.
K—Second I. F. Tube—#58.
L—Three Stages I. F.
M—Third I. F. Tube—#58.
N—High Frequency Oscillator Tube—#56.
O—Beat Oscillator Control.
P—Second Detector and AVC Tube—#55.
Q—Beat Oscillator Tube—#57.
R—Vacuum Tube Volt Meter—#57.
S—Output Tube—#59.
T—Heavy Duty Power Supply.
U—Moisture-proof Filter.
V—Rectifier Tube—5Z3.
W—Patterson Velvet Tuning Dials.
X—Manual Control Mounts Here.
Y—Sensitivity, "R" Meter Adjustments.
Z—Three-gang Condenser, Rubber Mounted.



PR-10 Chassis

PHILCO RADIO & TELEV. CORP.

CHRYSLER • DODGE • PLYMOUTH • CAR RADIO

The Model "CGD" is a custom built radio which is made exclusively for the Chrysler Corporation and its various car divisions and which is sold only through their dealer organizations.

The Receiver and controls are specially designed for installation in the 1934 Chrysler Six Models CA and CB, the Dodge Models DR and DS and the Plymouth Models PE and PF. Many of these cars will be equipped at the car factory with the Philco custom built radio. In many others, the installation will be made by you in your service stations.

Don't file this "Service Broadcast" in your Office. The men in your service station must know how to install and service these radios if you expect to get your share of this profitable installation and service work.

Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and compare them with illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

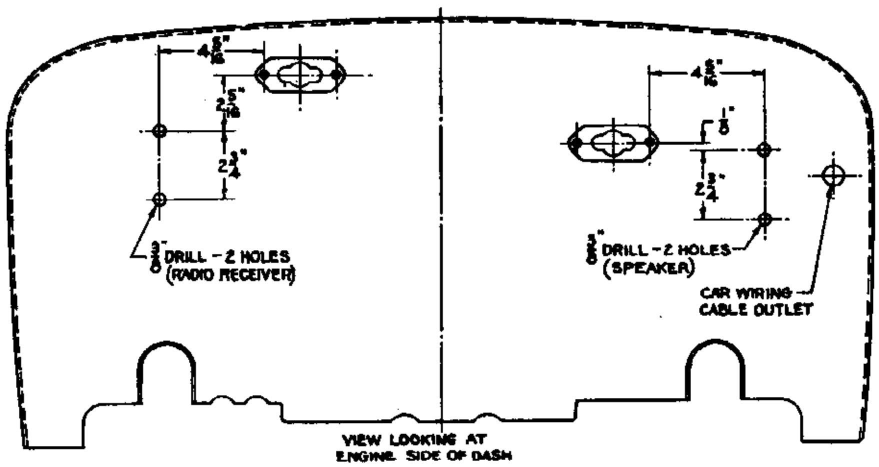


FIGURE 1

Receiver and Speaker Installation

Refer to Figure 1, which gives detailed dimensions for the location and drilling of the holes in the dash. Remove the paint from the dash for ¾" from around the holes to insure good ground contact after drilling. All dimensions are shown from the engine side of the dash. After drilling the holes, bolt the two (2) mounting brackets to the inside of the dash, using both the flat and the lockwashers under the nuts. The left-hand bracket (over the steering column) is for the speaker unit; the right-hand bracket is for the Receiver.

Remove the car wiring cable outlet grommet cap on the left-hand side of the dash, so that the battery cable can be installed. Push the metal fuse housing end of the cable through the grommet from the engine side, leaving just enough slack so that the cable can be connected and fastened in place as shown in Figure 4. Route the cable through the clip that holds the car wiring harness and along under the floor boards to the battery. Replace the grommet and cap, but do not connect the cable terminal to the battery terminal at this time.

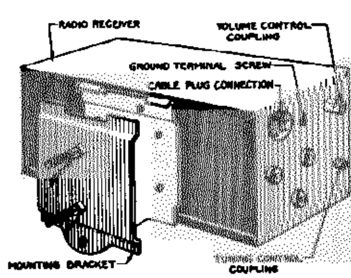


FIGURE 2

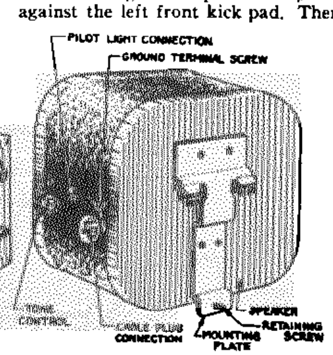


FIGURE 3

The Receiver mounting plate must be fastened to the Receiver housing, using the four (4) self-tapping screws. Four (4) holes are provided for these screws in the side of the housing. To fasten the speaker mounting plate to the speaker, first remove the four (4) hex-head machine screws from the back of the speaker. Use these same four (4) screws to fasten the mounting plate to the back of the speaker. Figures 2 and 3 show the correct positions of the brackets and mounting plates. Hang the Receiver on its bracket and fasten it securely with the hex-head retaining screw at the bottom of the plate.

Before installing the speaker, remove the car wiring fuse on ammeter. To get the speaker in place turn it sideways with the back against the left front kick pad. Then slide it in between the kick pad and the steering column. Push the clutch pedal down to get sufficient clearance and then turn the speaker around over the steering column with its back against the dash. Hang the speaker in place on its bracket and fasten it securely with the hex-head retaining screw at the bottom of the plate. The battery cable must be placed over top of speaker.

Connect the interconnecting cable to both the Receiver and the Speaker, the six (6) hole plug connecting to the Receiver and the four (4) hole plug to the Speaker. The shield terminals at the cable ends must be grounded under their respective ground terminal screws on the Receiver and Speaker housings, shown in Figures 2 and 3. Ground the pigtail in the center of the cable to the dash, using the hole that holds the dash lining retainer and the 8-32 screw.

The antenna lead branches out of the interconnecting cable near the Receiver. Place this lead over the top of the Receiver, splice, and tape it to the antenna lead-in as close as possible to where the lead-in leaves the front right windshield pillar. Cut off excess car

PHILCO RADIO & TELEV. CORP.

lead-in. The shielding must be grounded to the cowl panel by drilling a 1/8" hole where the hood overlaps and as close to the A pillar as possible, using the 8-32 bolt and nut supplied for this purpose. (See Figures 4 and 5.) Remove paint from around hole.

Place the fuse and fuse insulator in the metal fuse housing of the battery cable and connect it to the small fuse connector which branches out of the interconnecting cable close to the Speaker. The two (2) shield terminals at the fuse housing must be connected under the same terminal screw that is used to ground the speaker cable shield at the speaker. Figure 4 shows the general layout of the cables and connections.

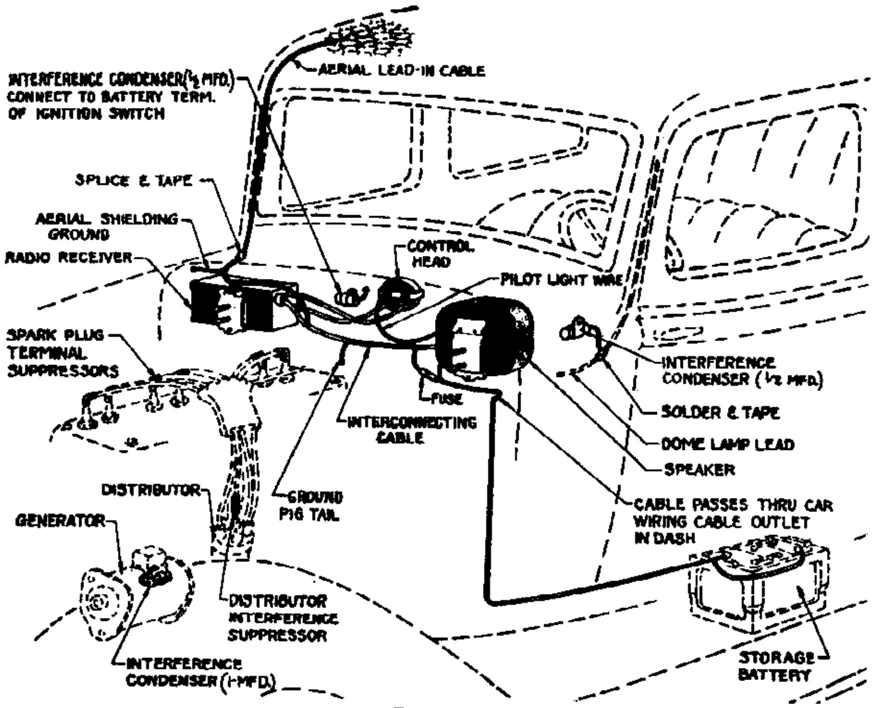


FIGURE 4

Instrument Panel Control

Remove the ash receiver from the panel with an upward pull. Remove the ash receiver bezel from the panel by compressing the retaining tabs at the bottom of the bezel assembly. This can be done best by using a screw-driver and working from in back of the instrument panel. While pushing up on an end tab, pull the bezel forward and it will come out.

Loosen the two (2) screws which secure the instrument board brace to the instrument board flange. The cradle assembly can then be slid forward. Next, loosen the bolts on the brace in back of the instrument panel and remove the toggle spring. Slide the entire assembly forward and remove. Figure 6 gives the details of the ash receiver assembly, while Figure 7 gives an enlarged view of the Section A in Figure 6. Be sure to tighten all bolts and screws that were loosened for this operation. (See Note 1.)

Loosen the car lighting switch to permit more working space. While this operation is not absolutely necessary, it makes the following operation easier.

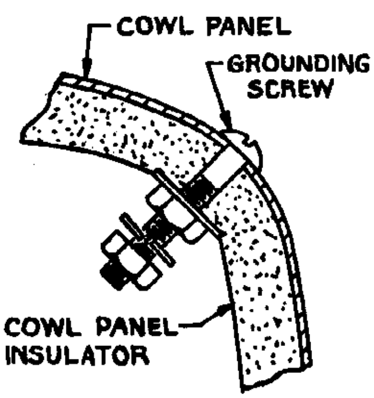


FIGURE 5

Push the flexible shafts of the control through the opening in the panel and install the control unit in this opening.

The "U" retaining clamp must be placed over the studs on the back of the control and the hexnuts tightened to draw the control bezel flush with the instrument panel. (See Figure 8.) Replace and tighten the car lighting switch.

The flexible shafts must be placed around to the Receiver. The ends of the two (2) shafts are different so that they can only be installed in the proper couplings The long shaft and housing is on the left of the control unit, while the short one is on the right.

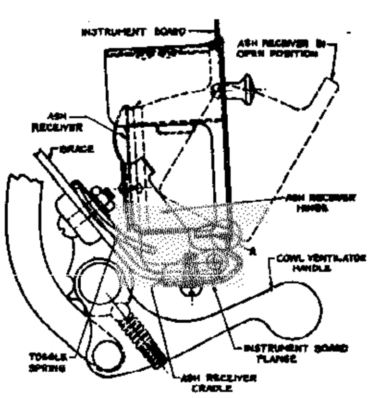


FIGURE 6

The set screws on the coupling bushings must be loosened sufficiently to allow the shaft housings and couplings to be properly seated. After the shafts have been coupled, tighten the set screws again.

Battery Connections

Connect the battery lead to the negative terminal of the storage battery. Be sure this connection is tight. The shield terminal must be connected to positive or ground terminal of the storage battery.

The black lead from the control unit must be connected to the pilot light terminal on the Speaker. (See Figure 3.)

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers.) Pull the knob from the right-hand control shaft and loosen the set screw found there. (See Figure 8.) Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob.

Motor Interference Suppression

Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay

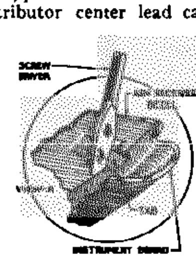


FIGURE 7

NOTE 1.—A hole large enough for the dash control has been provided in the center of the instrument panel in all standard Plymouth Model, Code PF. This hole is covered with a special Plymouth plate which can be removed easily by forcing it out from the rear with the fingers or with a screw-driver.

(see Figure 4). Install a ½ microfarad by-pass condenser, splicing and soldering it to the dome light lead as close as possible to the point where it enters the windshield pillar. The condenser must be fastened to the cowl panel in front of the hood line by drilling a ⅛" hole where the hood overlaps and as close to the pillar as possible, using the 8-32 bolt and nut supplied for this purpose. (See Figures 4 and 5.) Remove paint from around hole. Replace the car lighting fuse—test the lights and horn.

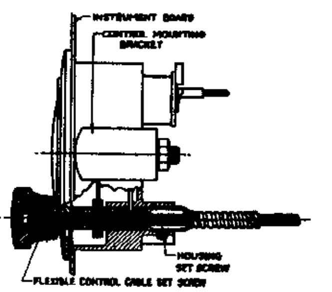


FIGURE 8

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinists' hammer. Replace the rotor and the cap, then turn the engine over by hand. After a couple of revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

In some stubborn cases, it may be necessary to solder a bond to the control wires and tubes where they enter the dash, grounding them securely under one of the dash grommet cap screws. No. 14 stranded and tinned copper wire can be used for this purpose, a length of which is provided (see Figure 9). Be sure that all the high tension wires are properly seated in their sockets in the distributor cap.

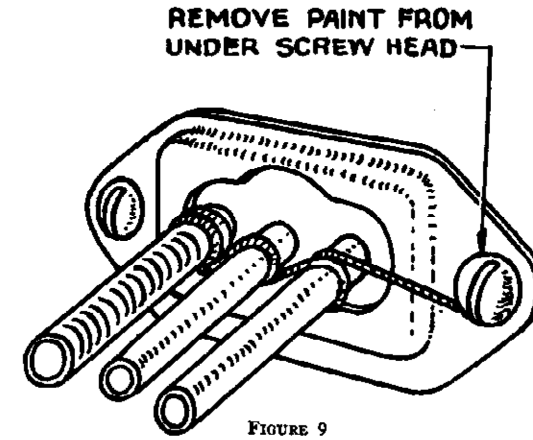


FIGURE 9

An additional ½ microfarad condenser may at times be used to advantage. This condenser should be mounted on the bottom edge of the instrument board and connected to one of the terminals on the ignition switch directly behind the instrument panel.

I. F. Transformer and Padders

The new style I. F. transformer complete with padders is used in the Model G.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figures 10 and 11.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

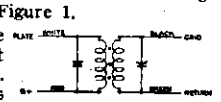


FIGURE 10

Model G Adjustments

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the lid from the Receiver. Remove the grid cap from the 6A7 tube (for location see Figure 11).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Figure 11.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

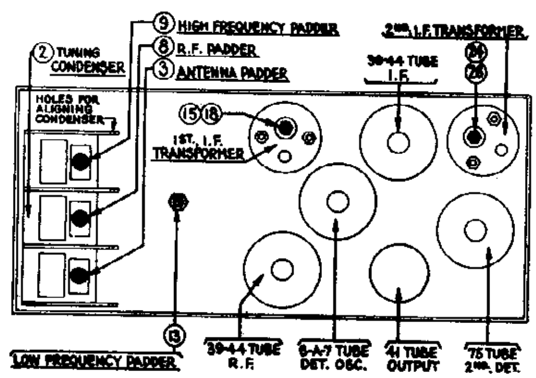


FIGURE 11

The padders 24 and 26 are adjusted first (Figures 11 and 12). Turn the adjusting screw 24 all the way in. A metal screw-driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut 26 with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw 24 for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers 15 and 18.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Figure 11.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder 9 until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

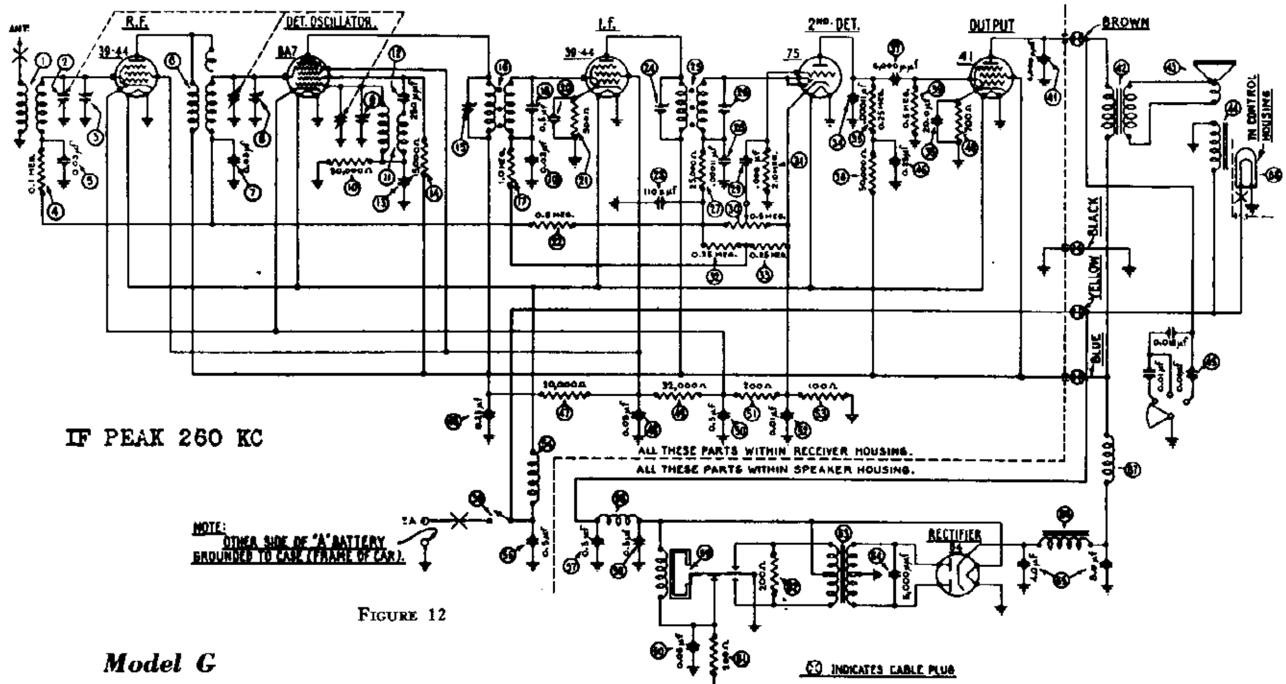
Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder 8 and the antenna padder 3 are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder 13 for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL G
Schematic
Chassis Layout
Parts List

PHILCO RADIO & TELEV. CORP.



IF PEAK 260 KC

FIGURE 12

Model G

1. Antenna Transformer......32-1220
2. Tuning Condenser.........31-1182
3. 1st Padder (on tuning cond.).......
4. Resistor (99,000 ohms)..... 6099
5. Condenser (.03 mfd.).......30-4025
6. R. F. Transformer.........32-1221
7. Condenser (.03 mfd.).......30-4025
8. 2nd Padder (on tuning cond.).......
9. 3rd Padder (on tuning cond.).......
10. Resistor (51,000 ohms)..... 6098
11. Oscillator Transformer.....32-1222
12. Condenser (.00025 mfd.)... 3082
13. Padder....................31-6012
14. Resistor (15,000 ohms)..... 6208
15. Padder (Prim. 1st I. F.) part of 32-1236 assembly.......
16. I. F. Transformer (1st)... 32-1236
17. Resistor (1,000,000 ohms)..33-1090
18. Padder (Secondary 1st I. F.) part of 32-1236 assembly.......
19. Condenser (.03 mfd.)......30-4025
20. Condenser (.5 mfd.).......30-4018
21. Resistor (500 ohms)....... 6977
22. Resistor (500,000 ohms).... 6097
23. Condenser (.00011 mfd.)...30-1006
24. Padder (Prim. 2nd I. F.) part of 32-1237 assembly.......
25. I. F. Transformer (2nd)....32-1237
26. Padder (Secondary 2nd I. F.) part of 32-1237 assembly.......
27. Resistor (25,000 ohms).....33-1013
28. Condenser (.00011 mfd.)...30 1006
29. Condenser (.006 mfd.).....30-4125
30. Volume Control Assembly..33-5056
31. Resistor (2,000,000 ohms)..33-1025
32. Resistor (250,000 ohms)....33-1097
33. Resistor (250,000 ohms)....33-1097
34. Condenser (.00011 mfd.)...30-1006
35. Resistor (250,000 ohms)....33-1097
36. Resistor (51,000 ohms)..... 6098
37. Condenser (.006 mfd.).....30-4123
38. Condenser (20 mfd.).......30-2063
39. Resistor (500,000 ohms).... 6097
40. Resistor (700 ohms)....... 6443
41. Condenser (.006 mfd.).....30-4024
42. Output Transformer....... 2598
43. Cone and Voice Coil.......36-3159
44. Field Coil Assembly.......36-3140
45. Tone Control..............30-4127
46. Condenser (.25, .25 mfd.)..30-4126
47. Resistor (20,000 ohms)..... 5649
48. Condenser (.05 mfd.)......30-4020
49. Resistor (32,000 ohms)..... 3525

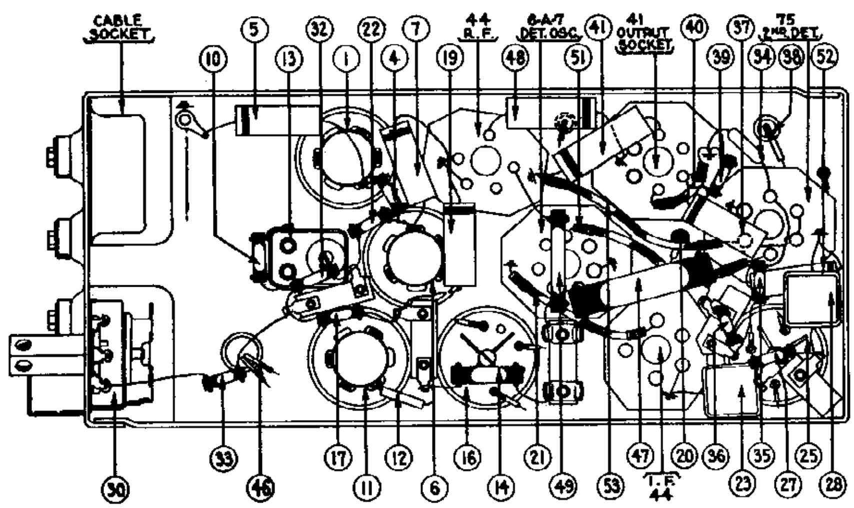


FIGURE 13

50. Condenser (.5 mfd.).......30-4018
51. Resistor (200 ohms)....... 7217
52. Condenser (.01 mfd.)......30-4124
53. Resistor (100 ohms).......33-3023
54. "A" Choke.................32-1312
55. Condenser (.5 mfd.).......30-4015
56. Vibrator Choke............32-1260
57. Condenser (.5 mfd.).......30-4015
58. Condenser (.5 mfd.).......30-4015
59. Vibrator Unit.............38-5036
60. Condenser (.05 mfd.)......30 4039
61. Resistor (200 ohms)....... 7217
62. Resistor (200 ohms)....... 7217
63. Power Transformer.........32-7110
64. Condenser (.006 mfd.).....30-4024
65. Filter Condenser (4 mfd., 8 mfd.).................30-2030
66. "B" Chokes................32-7118
67. R. F. Choke...............32-1260
68. Pilot Lamp................34-2031

Spark Plug Resistor.......33-1015
Distributor Resistor.......33-1113
1 mfd. Condenser......... 4522-S
½ mfd. Condenser.........30-4007
Glass for Control.........27-7325
Bezel Assembly...........42-5115
Dial (Plymouth)...........42-5123
Dial (Dodge & Chrysler 6).42-5122
Pointer (Dodge)...........28-1764
Pointer (Plymouth)........28-1763
Pointer (Chrysler 6).......28-1825
Control Assembly (Plymouth)................42-5113
Control Assembly (Dodge).42-5112
Control Assembly (Chrysler 6)..................42-5134
Knobs (Plym.—tuning)....27-4083
Knobs (Plym.—volume)...27-4084
Knobs (Dodge—tuning)...27-4079
Knobs (Dodge—volume)...27-4080
Knobs (Chry. 6—tuning)..27-4071
Knobs (Chry. 6—volume)..27-4072
Knobs Springs............28-1738
Interconnecting cable......41-3065
Battery Cable.............41-3073
Flexible Shaft—tuning.....28-8188
Flexible Shaft—volume....28-8198
Speaker Mounting Plate...28-1790
Speaker Mounting Bracket.28-1791
Receiver Mounting Plate...28-1792
Receiver Mounting Bracket.28-1848
Fuse..................... 7227
Fuse Insulator............27-7131
"U" Control Bracket......20-1705
5-Prong Socket...........27-6014
6-Prong Socket........... 7547
7-Prong Socket...........27-6005

MARCH, 1934

PHILCO RADIO & TELEV. CORP.

MODEL 10 (Code 122) RECEIVER

The Model 10 (Code 122) represents the latest developments in single-unit automobile radio. Compact and easy to install, its performance is amazing.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a tremendous power output and is equipped with a full-size electro-dynamic speaker, the same type used in high-priced home radio Receivers.

Bass compensation gives full rounded tone at any volume. Four point tone control is provided to satisfy the individual preference. Greater sensitivity, a three-section tuning condenser giving improved selectivity and fidelity, inherently quiet circuits and all the other improvements, make this model the outstanding automobile radio.

The new interference filters and improvement in shielding, cut installation time to just a fraction of what it would be without these improvements. The ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) makes it the most desirable one to sell, install or own.

I. F. TRANSFORMER AND PADDERS

A new style I. F. transformer complete with padders is used in the Model 10. (Code 122.)

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. Stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

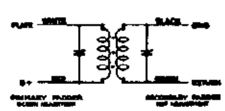


Fig. 1

A new type first I. F. transformer is used, but retains the same part no. 32-1236.

This transformer can be distinguished from the old type, since the bottom fibre spacer is painted green.

MODEL 10 (Code 122) ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (26) and (27) must be adjusted first. These padders should be adjusted to peak. (Figs. 2 and 3.) First adjust the screw, then the nut.

The padders (17) and (21) must be adjusted next. (Figs. 2 and 3.) Turn the adjusting screw (17) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (21) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (17) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid cap to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (12) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (10) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (15) for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

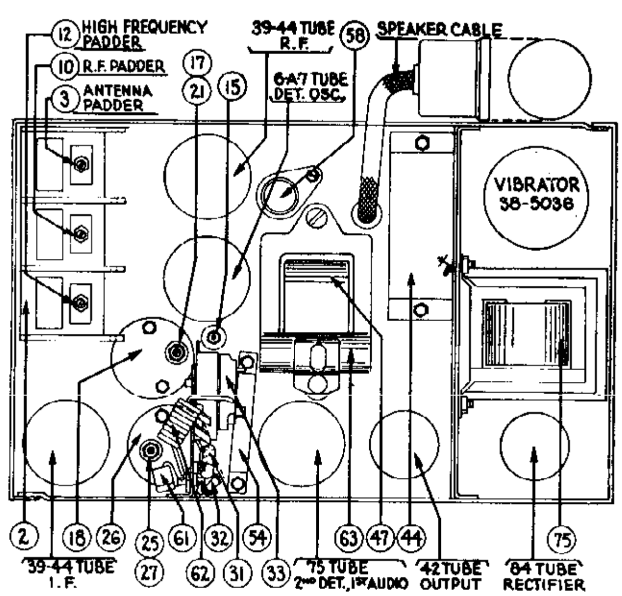


Fig. 2

MODEL 10 (Code 122)
Schematic
Chassis, Parts List

PHILCO RADIO & TELEV. CORP.

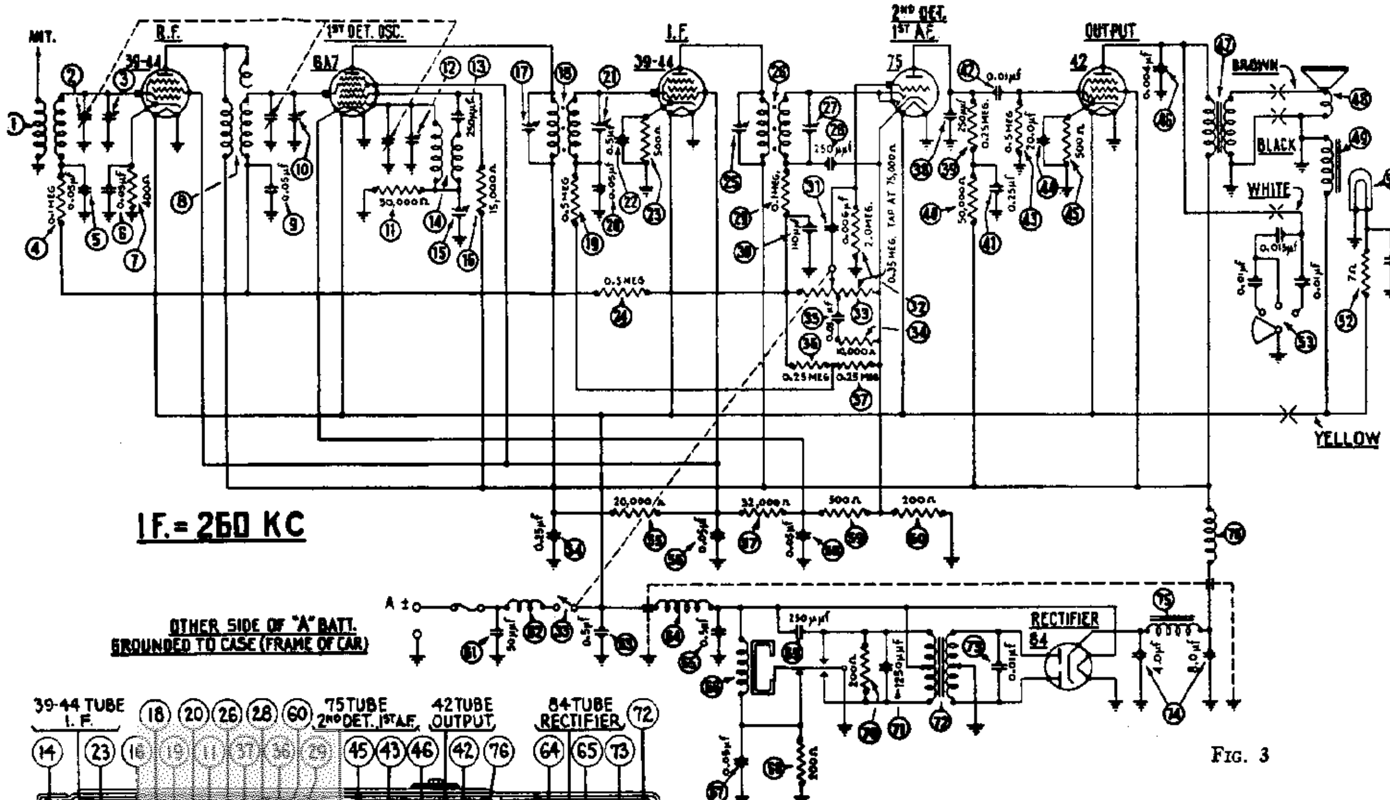


Fig. 3

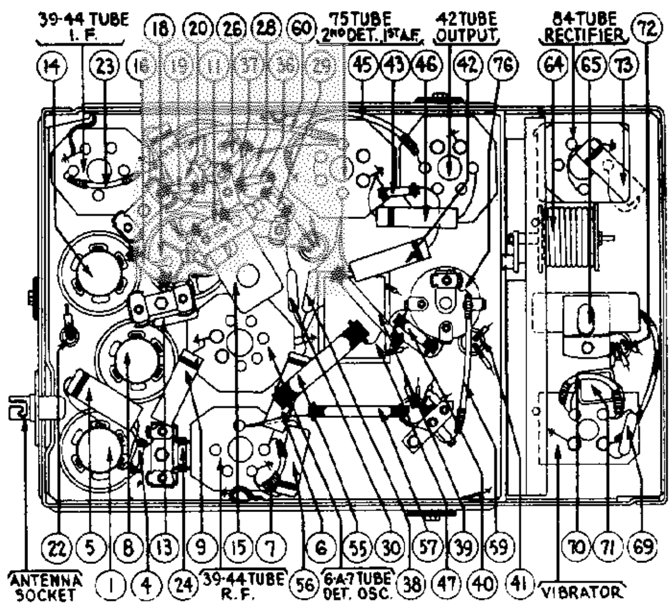


Fig. 4

1	Antenna Transformer	32-1220
2	Tuning Condenser	31-1202
3	First Padder (in tun. cond.)	
4	Resistor (100,000 ohms)	6099
5	Condenser (.05 mfd.)	30-4020
6	Condenser (.05 mfd.)	30-4020
7	Resistor (400 ohms)	33-3016
8	R. F. Transformer	32-1221
9	Condenser (.05 mfd.)	30-4020
10	Second Padder (in tun. cond.)	
11	Resistor (50,000 ohms)	6098
12	Third Padder (in tun. cond.)	
13	Condenser (.00025 mfd.)	30-1032
14	Oscillator Transformer	32-1222
15	Padder	04000S
16	Resistor (15,000 ohms)	6208
17	Padder (Pri. 1st I.F. Trans.)	
18	First I. F. Transformer	32-1236
19	Resistor (500,000 ohms)	6097
20	Condenser (.05 mfd.)	30-4020
21	Padder (Sec. 1st I. F. Trans.)	
22	Condenser (.5 mfd.)	30-4058
23	Resistor (500 ohms)	6977
24	Resistor (500,000 ohms)	6097
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-1237
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condener (.00025 mfd.)	30-1032
29	Resistor (100,000 ohms)	6099
30	Condenser (.00011 mfd.)	30-1031
31	Condenser (.006 mfd.)	30-4125
32	Resistor (2,000,000 ohms)	33-1025
33	Vol. Control Sw. Assembly	38-5851
34	Resistor (10,000 ohms)	33-1000
35	Condenser (.03 mfd.)	30-4025
36	Resistor (250,000 ohms)	33-1097
37	Resistor (250,000 ohms)	33-1097
38	Condenser (.00025 mfd.)	30-1032
39	Resistor (250,000 ohms)	3768
40	Resistor (50,000 ohms)	4237
41	Condenser (.25 mfd.)	30-4065
42	Condenser (.01 mfd.)	30-4169
43	Resistor (500,000 ohms)	6097
44	Condenser (20 mfd.)	30-4065
45	Resistor (500 ohms)	6977
46	Condenser (.004 mfd.)	30-4185
47	Output Transformer	32-7102
48	Cone and Voice Coil	36-3159
49	Field Coil Assembly	36-3130
50	Pilot Lamp	34-2039
51	Condenser (.00005 mfd.)	30-1029
52	Resistor (7 ohms)	33-3035
53	Tone Control	30-4056
54	Condenser (.25 mfd.)	04380
55	Resistor (20,000 ohms)	6649
56	Condenser (.05 mfd.)	30-4020
57	Resistor (32,000 ohms)	3525
58	Condenser (.05 mfd.)	30-4020
59	Resistor (500 ohms)	6977
60	Resistor (200 ohms)	7217
61	Condenser (.00005 mfd.)	30-1029
62	Choke	32-1374
63	Condenser (.5 mfd.)	30-4061
64	Vibrator Choke	32-1259
65	Condenser (.5 mfd.)	30-4061
66	Vibrator	38-5036
67	Condenser (.05 mfd.)	30-4039
68	Resistor (200 ohms)	7217
69	Condenser (.00025 mfd.)	5858
70	Resistor (200 ohms)	7217
71	Condenser (.00125 mfd.)	5886
72	Power Transformer	32-7098
73	Condenser (.01 mfd.)	30-4051
74	Filter Condenser (4-8 mfd.)	30-2015
75	Filter Choke	32-7104
76	R. F. Choke	32-1281
	Spark Plug Resistors	33-1015
	Distributor Resistor	33-1113E
	Interference Condenser	30-4007
	Studs	28-6036
	Nuts (mounting)	W55A
	Battery Cable	38-5296
	Antenna Lead	38-5131

Acorn Nut	W821
Bracket	6035
Strap	04344
Strap Pad	6206
Knob	27-4058
Glass	27-7325
Glass Gasket	27-7509
Pointer	28-1957
Shaft	28-8206
Face Assembly	42-5173
Control Assembly	42-5171

MODEL 10 (Code 122)

JULY, 1934

PHILCO RADIO & TELEVISION CORP.

MODEL 11 RECEIVER

THE PHILCO auto radio Model 11 is a new Philco development in single-unit automobile radio. It is compact, easy to install and will give exceptional performance.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a genuine Philco electro-dynamic speaker, the same type that is used in many of the larger home radio Receivers. A three-section tuning condenser giving improved selectivity, remarkable sensitivity and tone, inherently quiet circuits and other improvements make this model one of the outstanding and most popular automobile radios.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) and the handy, attractive steering-column control which makes this model universal in its use are additional features which make the Model 11 a very desirable one for the dealer and for the owner.

I. F. TRANSFORMER AND PADDERS

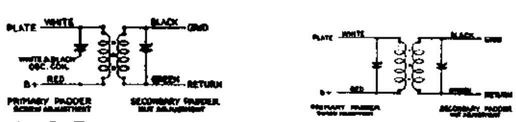
The new style I. F. transformer complete with padders is used in the Model 11.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer
32-1329

2nd I. F. Transformer
32-1237

FIG. 1

MODEL 11 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders 22 and 24 are adjusted first (Figs. 2 and 3). Turn the adjusting screw 22 all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut 24 with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw 22 for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

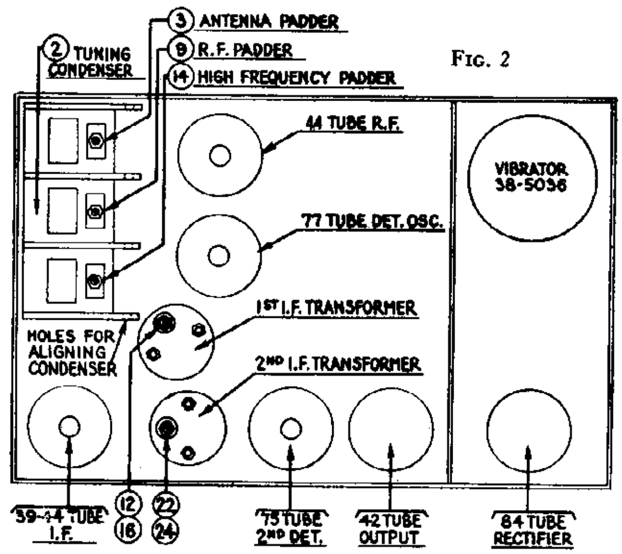


FIG. 2

Repeat the above procedure with the condensers 12 and 16.

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

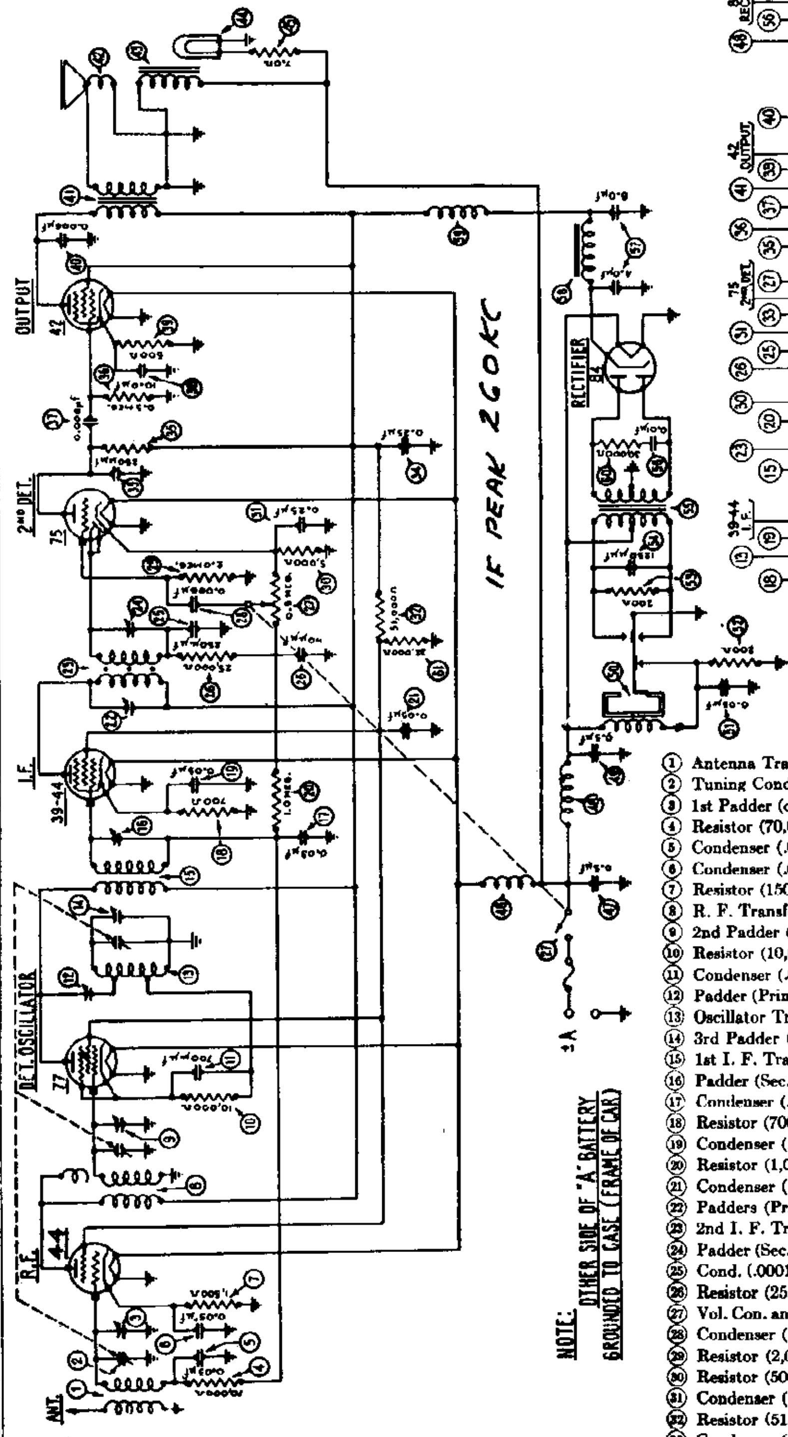
With the tuning condenser in this position adjust the high-frequency padder 14 until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder 9 and the antenna padder 3 are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL 11
Schematic
Chassis Layout
Parts List

PHILCO RADIO & TELEVISION CORP.



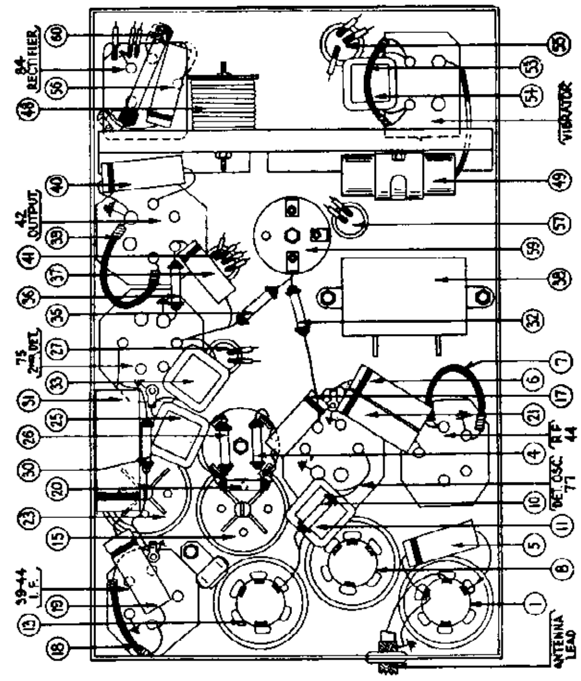


FIG. 4

MODEL 11 PARTS LIST

1	Antenna Transformer	32-1331
2	Tuning Condenser	31-1149
3	1st Padder (on tun. cond.)	
4	Resistor (70,000 ohms)	33-1115
5	Condenser (.03 mfd.)	30-4025
6	Condenser (.05 mfd.)	30-4020
7	Resistor (1500 ohms)	33-3047
8	R. F. Transformer	32-1332
9	2nd Padder (on tun. cond.)	
10	Resistor (10,000 ohms)	33-1000
11	Condenser (.0007 mfd.)	5863
12	Padder (Prim. 1st I. F. Tran.)	
13	Oscillator Transformer	32-1333
14	3rd Padder (on tun. cond.)	
15	1st I. F. Transformer	32-1329
16	Padder (Sec. 1st I. F. Tran.)	
17	Condenser (.03 mfd.)	30-4025
18	Resistor (700 ohms)	6443
19	Condenser (.05 mfd.)	30-4020
20	Resistor (1,000,000 ohms)	33-1096
21	Condenser (.05 mfd.)	30-4020
22	Padders (Prim. 2nd I. F.)	
23	2nd I. F. Transformer	32-1237
24	Padder (Sec. 2nd I. F. Tran.)	
25	Cond. (.00011-.00025 mfd.)	30-1020
26	Resistor (25,000 ohms)	33-1013
27	Vol. Con. and Switch Assm.	33-5058
28	Condenser (.006 mfd.)	30-4125
29	Resistor (2,000,000 ohms)	33-1025
30	Resistor (5000 ohms)	33-1001
31	Condenser (.25 mfd.)	30-4146
32	Resistor (51,000 ohms)	5868
33	Condenser (.00025 mfd.)	3082
34	Condenser (.25 mfd.)	04360
35	Resistor (100,000 ohms)	6099
36	Resistor (500,000 ohms)	6097
37	Condenser (.006 mfd.)	30-4125
38	Condenser (10 mfd.)	7440
39	Resistor (500 ohms)	33-3031
40	Condenser (.006 mfd.)	30-4024
41	Output Transformer	32-7214
42	Cone and Voice Coil	02861
43	Field Coil Assembly	36-3097
44	Pilot Light	6608
45	Resistor (7 ohms)	33-3035
46	"A" Choke	32-1268
47	Condenser (.5 mfd.)	30-4047
48	Vibrator Choke	32-1235
49	Condenser (.5 mfd.)	30-4147
50	Vibrator Unit	38-5036
51	Condenser (.05 mfd.)	30-4039
52	Resistor (200 ohms)	7217
53	Resistor (200 ohms)	7217
54	Condenser (.00125 mfd.)	5886
55	Power Transformer	32-7216
56	Condenser (.01 mfd.)	30-4051
57	Condenser (4.-8. mfd.)	30-2072
58	"B" Choke	32-7215
59	R. F. Choke	32-1281
60	Resistor (30,000 ohms)	7836
61	Resistor (32,000 ohms)	3525
	Spark Plug Resistor	33-1015
	Distributor Resistor	4546
	Screw Type Resistor	4851
	Interference Condenser	30-4007
	Dial	27-5038
	Studs	28-6036
	Nuts (mounting)	W55A
	Knobs (tuning)	03334
	Knobs (volume)	06886
	Battery Cable	38-5296
	Acorn Nut	W821
	Key	6091
	Fuse	7227
	Fuse Insulator	27-7131
	4-Prong Socket	27-6006
	5-Prong Socket	27-6014
	6-Prong Socket	6417
	Cont. Unit Assm. (Dir. Dr.)	42-5150
	Shafts—Tuning	28-8139
	Volume	28-8141
	Cont. Unit Assm. (Gr. Dr.)	42-5157
	Shafts—Tuning	28-8217
	Volume	28-8217

APRIL, 1934

PHILCO RADIO & TELEV. CORP.

Model 18 (Code 124)

Model 18 (code 124) is an eight-tube superheterodyne receiver, for operation on alternating current (A.C.) The range of receivable frequencies is from 530 to 1720 kilocycles which includes standard broadcasts and police stations on the first (lowest) police band. The tubes used are: Type 78 R.F.; type 6A7 detector-oscillator; type 78 I.F.; type 75 2d detector, 1st A.F.; type 42 driver; two type 42 output tubes, and type 80 rectifier. The intermediate frequency is 260 kilocycles.

Adjusting Compensating Condensers

The adjustment of the compensating or padding condensers in Model 18 (124) requires an accurate signal generator, such as the Philco Model 024, an output meter, and a special insulated hex wrench. The adjustments are made as follows:

1. I. F. (Intermediate Frequency). Remove the grid clip from the cap on the 6A7 tube and attach the shielded antenna lead from the signal generator to the grid cap of the 6A7. Set the switch of the signal generator at 260 K. C. (the I. F. of Model 18) and the dial of the set at 550. Turn on the set and signal generator. Adjust each of the three I. F. compensating condensers in turn to give maximum reading in the output meter (connected to primary of output transformer). If the needle on the meter goes off scale, turn down the attenuator adjustment on the signal generator. See Fig. 4 for locations of the I. F. compensating condensers. The first and 2d I. F. primary condensers ㉑ and ㉕ are accessible through the two holes in the chassis sub-base directly over them. The 1st I. F. secondary ㉔ is accessible from the rear.

2. ANT. H. F., DET., and OSC. H. F. CONDENSERS (⑤, ⑩, and ⑫.) These are located on top of the tuning condenser assembly and adjusted from above. ⑤ is mounted on the section nearest front of set. Replace the grid cap clip on the 6A7 and connect the antenna lead of signal generator direct to antenna post of set for these adjustments. Set signal generator at 1500 and dial of set at 1500.

3. OSC., L. F.—This adjustment ⑮ is made from rear of chassis (see Fig. 4). Set Signal Generator and dial of set at 600. The tuning condenser assembly should be "rocked" while this adjustment is being made.

Replacement Parts for Model 18 (Code 124)

No. on Figs.	Description	Part No.	List Price
①	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	$0.25
②	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
③	Antenna Transformer	32-1396	.60
④	Tuning Condenser Assembly	31-1196	6.00
⑤	Compensating Condenser (Ant.)	Part of ④	....
⑥	Condenser (.05 Twin—Bakelite Block)	3615AM	.40
⑦	Resistor (200 ohms Flexible Wire-wound)	7217	.20
⑧	Condenser (.09 Twin-Bakelite Block)	4989AC	.40
⑨	Detector Transformer	32-1397	.50
⑩	Compensating Condenser (Det.)	Part of ④	....
⑪	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
⑫	Compensating Condenser (Osc. H. F.)	Part of ④	....
⑬	Oscillator Transformer	32-1398	.45
⑭	Condenser (.00011 Mfd. Mica)	4519	.35
⑮	Compensating Condenser (Osc. L. F.)	04000R	.45
⑯	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
⑰	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
⑱	Condenser (Double: .05—.15 Bakelite Block)	6287M	.40
⑲	Resistor (2 Meg.) (Red-Black-Green)	5872	.25
⑳	Condenser (.05 Mfd. Bakelite Block)	3615AA	.35
㉑	Compensating Condenser (1st I. F. Pri.)	04000M	.20
㉒	Resistor (2500 ohms) (Red-Green-Red)	7775	.25
㉓	1st I. F. Transformer	32-1288	.55
㉔	Compensating Condenser (1st I. F. Secondary)	04000X	.20
㉕	Compensating Condenser (2d I. F. Primary)	04000A	.15
㉖	2d I. F. Transformer	32-1258	.55
㉗	Condenser (.00011 Mfd. Twin-Bakelite Block)	8035-K	$0.25
㉘	Resistor (.1 Meg. White-White-Orange)	4411	.25
㉙	Condenser (.05 Mfd. Tubular Paper)	30-4020	.35
㉚	Volume Control (350,000 ohms Tapped at 75,000)	33-5069	1.00
㉛	Resistor (.25 Meg.) (Red-Yellow-Yellow)	4410	.25
㉜	Condenser (.01 Mfd. Bakelite Block)	3903-Z	.25
㉝	Resistor (1. Meg.) (Brown-Black-Green)	4409	.25
㉞	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
㉟	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
㊱	Shadowmeter	45-2028	2.50
㊲	Condenser (.00011 Mica)	4519	.35
㊳	Condenser (.09 Mfd.) (Bakelite Block)	4989-N	.35
㊴	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
㊵	Condenser (Electrolytic—1, 1, 2 Mfd.)	30-2029	1.20
㊶	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
㊷	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
㊸	Condenser (.015 Mfd. Bakelite)	3793AB	.35
㊹	Condenser (.006 Mfd. Tubular Paper)	30-4024	.40
㊺	Input (Audio) Transformer	32-7114	2.00
㊻	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
㊼	Condenser (.01 Mfd. Bakelite Block)	3903-P	.25
㊽	Output Transformer	32-7078	1.40
㊾	Voice Coil and Cone Assembly H-13	02625	.80
	Voice Coil and Cone Assembly K-17	36-3159	.50
㊿	Field Coil and Pot. Assembly	36-3104	2.70
51	Resistor (B) (6500 ohms Wire-wound)	33-3033	.30
52	Resistor (Voltage Divider—9.5, 112, 84 ohms Wire-wound)	33-3034	$0.20
53	Tone Control	30-4073	.75
54	Condensers (in Tone Control)	Inside 53	....
55	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
56	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
57	Condenser (Twin .015 Mfd. Bakelite Block)	3793-R	.40
58	Power Transformer	32-7111	5.75
59	Condenser (Electrolytic 8 and 10 Mfd.)	30-2045	1.95
60	Condenser (Electrolytic 8 Mfd.)	30-2025	2.00
61	Condenser (.25 Mfd. Bakelite Block)	6287-N	.40
62	Filter Choke	32-7115	1.80
63	On-Off Switch	42-1064	.40
64	Pilot Lamp (Station Selector)	6608	.11
65	Pilot Lamp (Shadowmeter)	Part of ㊱	....
66	Resistor (2900 ohms) (Red-White-Red)	5309	.25
	A. C. Cord and Plug Assembly	L-943A	.60
	Tube Shield	28-1107	.10
	4 Prong Socket	7544	.10
	6 Prong Socket	7547	.11
	7 Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Chassis Mfg. Screw	W-1345-A	2.75C
	Chassis Mfg. Washer	29-2089	.35C
	Chassis Mfg. Foot (Rubber)	27-4116	.05
	Chassis Mfg. Foot Plate	27-7497	.35C
	Dial Assembly	31-1207	.50
	Dial Scale	27-5049	.25

Tube Socket Voltages

Circuit	R. F.	Det. Osc.	I. F.	1st A. F.	Driver	Output (Class "A")		Recti-fier
Type Tube	78	6A7	78	75	42	42	42	80
Filament (F-F)	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	210	210	210	120	205	280	280	350
Screen Grid (SG-K) (6A7)	80	..	80	..	200	300	300	..
G1-K	..	35	..	..	..	..	..	..
G2-K	..	130	..	..	..	..	..	..
Cathode (K-F)	2.8	2.8	5.3	0	0	0	0	..

All the above values were obtained from the underside of the chassis, using test prods and leads with an A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The **Philco Model 048 All-Purpose Set Tester** is highly recommended for this use. Volume control at maximum and station selector at 520 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

MODEL 18 (Code 124)
Schematic
Socket Layout
Chassis Layout

PHILCO RADIO & TELEV. CORP.

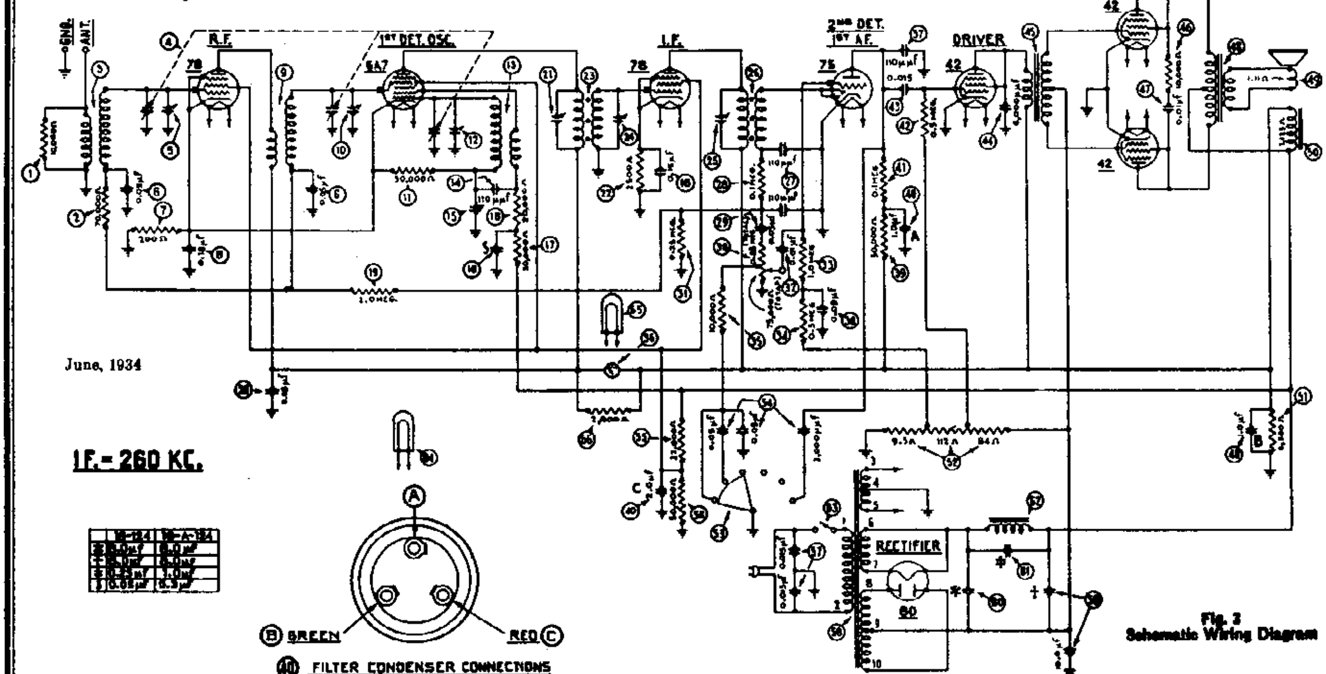


Fig. 3 Schematic Wiring Diagram

NOTE: A resistor No. 5309 (2000 ohms) (red-white-red) is used, shunted across the shadowmeter. Not shown in Fig. 3 or Fig. 4.

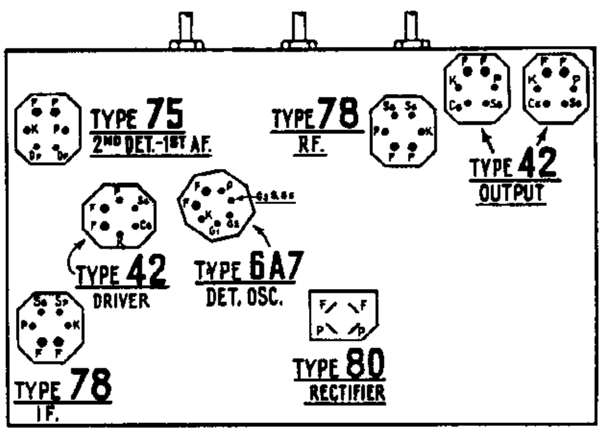


Fig. 1—Socket Layout (Underneath)

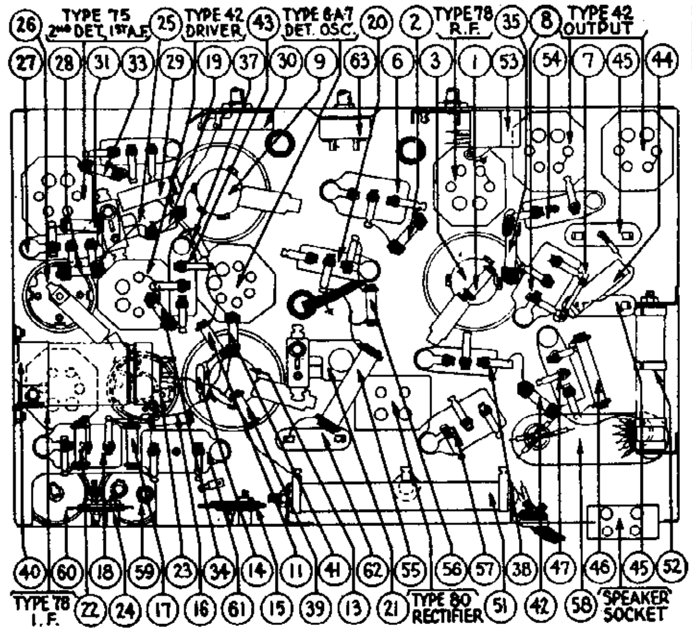


Fig. 4—Bottom View of Chassis Showing Parts

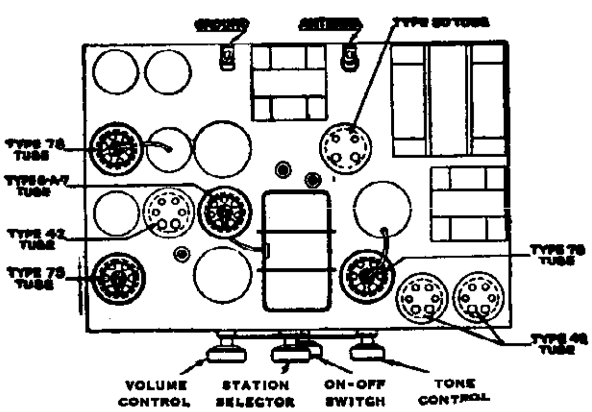


Fig. 2—Top View of Chassis

Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	105-125	Primary	White
3-5	6.3	Filament	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4	....	Center Tap of 3-5	Black—Yellow Tracer
9	....	Center Tap of 8-10	Yellow—Green Tracer

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 28, an accurately calibrated signal generator, an output meter, and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator, which is accurately calibrated and easy to handle. Philco No. 3164 fibre wrench and No. 27-1159 fibre-handled screwdriver are also recommended. For the output meter either Philco Model 025 complete tester or Philco Model 012 shadow output meter is suggested.

The chassis must be removed from cabinet in order to make all adjustments.

Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter adapter leads to the plate and cathode prongs of the type 43 tube. Set the signal generator at 460 K.C. (the intermediate frequency of Model 28) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left-hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ② is located at rear and underneath the chassis, and is shown in Figure 1. It is reached from the rear of the chassis by inserting the fibre wrench through the hole near left-hand rear corner of chassis.

ANTENNA AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator ⑧ (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser ⑭ (located on the other section of tuning condenser) to maximum reading.

Finally, set the signal generator at 600, tune in this signal and adjust the "oscillator L. F." condenser, located underneath chassis (⑱ in Fig. 1) to maximum reading. This adjustment is reached through the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

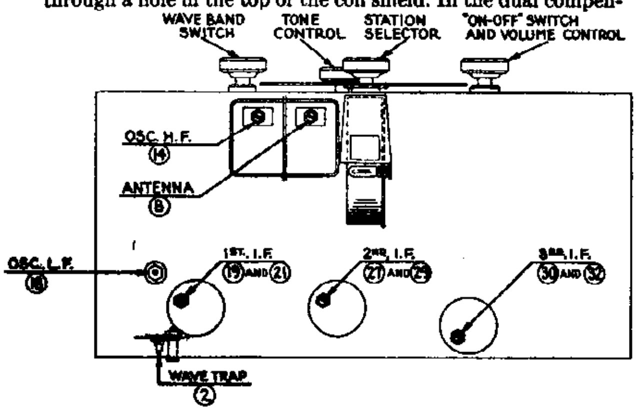
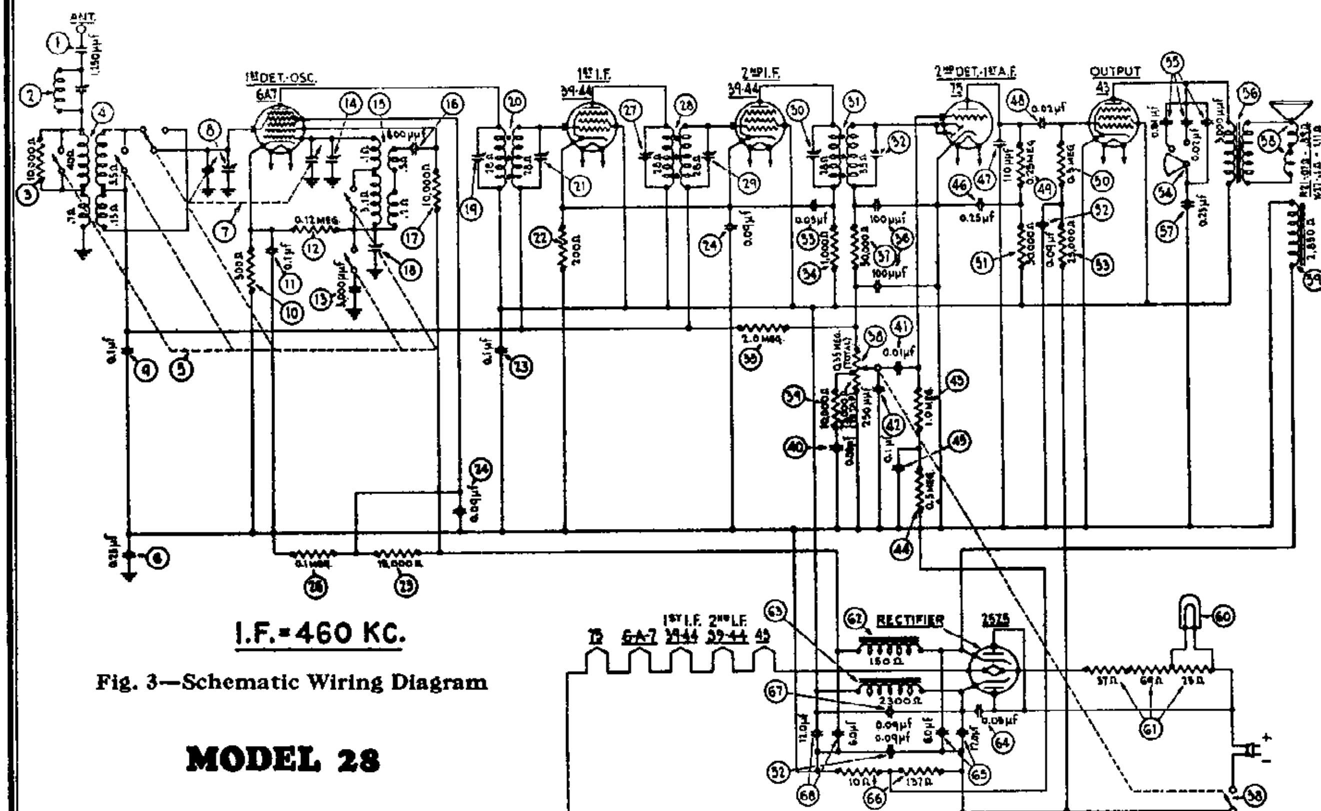


Fig. 1—Top View Showing Location of Compensating Condensers.

No. on Figs.	Description	Part No.	List Price Each
1	Condenser (.00125 mfd.—Mica)	5836	$0.35
2	Wave Trap	38-6060	.50
3	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
4	Antenna Transformer	32-1360	.60
5	Wave Band Switch	42-1062	1.10
6	Condenser (.25 mfd.—Tubular)	30-4146	.40
7	Tuning Condenser Assembly	31-1366	5.70
8	Compensating Condenser (Antenna)	Part of ⑦	....
9	Condenser (.1 mfd.—Tubular)	30-4122	.35
10	Resistor (400 ohms—Flex.) (Yellow-Black-Brown)	33-3016	.20
11	Condenser (.1 mfd.—Tubular)	30-4122	.35
12	Resistor (120,000 ohms) (Brown-Red-Yellow)	33-1128	....
13	Condenser (.003 mfd.—Mica)	30-1028	.60
14	Compensating Condenser (Osc. H. F.)	Part of ⑦	.65
15	Oscillator Transformer	32-1361	.65
16	Condenser (.0008 mfd.—Mica)	5878	.35
17	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
18	Compensating Condenser (Osc. L. F.)	040008	.35
19	Compensating Condenser (1st I. F. Primary)	Part of ⑳	....
20	First I. F. Transformer	32-1362	1.50
21	Compensating Condenser (1st I. F Secondary)	Part of ⑳	....
22	Resistor (200 ohms—Flex.) (Red-Black-Black)	7217	.20
23	Condenser (.1 mfd.—Tubular)	30-4122	.35
24	Condenser (.09 mfd.—Twin Bakelite Block)	4989M	.40
25	Resistor (15,000 ohms) (Brown-Green-Orange)	6208	.25
26	Resistor (.1 meg.) (White-White-Orange)	4411	.25
27	Compensating Condenser (2d I. F. Primary)	Part of ㉘	....
28	2d I. F. Transformer	32-1363	1.50
29	Compensating Condenser (2d I. F. Secondary)	Part of ㉘	....
30	Compensating Condenser (3d I. F. Primary)	Part of ㉛	....
31	3d I. F. Transformer	32-1364	1.55
32	Compensating Condenser (3d I. F. Secondary)	Part of ㉛	....
33	Condenser (.05 mfd.—Tubular)	30-4020	.35
34	Resistor (1000 ohms) (Brown-Black-Red)	5837	.25
35	Resistor (2 megs.) (Red-Black-Green)	5872	.25
36	Condenser (.0001 mfd.—Twin-Bakelite Block)	8035E	.25
37	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
38	Volume Control and On-Off Switch (350,000 ohms, tapped at 75,000)	33-5066	1.45
39	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
40	Condenser (.05 mfd.—Bakelite Block)	8615-BU	.35
41	Condenser (.01 mfd.—Tubular)	30-4124	.25
42	Condenser (.00025 mfd.—Mica)	5858	.35
43	Resistor (1 meg.) (Brown-Black-Green)	4409	.25
44	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
45	Condenser (.1 mfd.—Tubular)	30-4122	.35
46	Condenser (.25 mfd.—Tubular)	30-4146	.40
47	Condenser (.00011 mfd.—Mica)	30-1031	.35
48	Condenser (.02 mfd.—Mica)	30-4113	.30
49	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.25
50	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
51	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	$0.25
52	Condenser (.09 mfd.—Twin-Bakelite Block)	4989M	.40
53	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
54	Tone Control (3-point)	30-4211	.75
55	Condensers (In tone control)	Inside ㊹	....
56	Output Transformer (28C)	32-7243	1.10
57	Condenser (.25 mfd.—Tubular)	30-4146	.40
58	Voice Coil and Cone Assembly P-21	02861	.65
	Voice Coil and Cone Assembly K-27	36-3159	.80
59	Field Coil and Pot Assembly P-21	36-3357	3.50
	Field Coil and Pot Assembly K-27	36-3352	4.00
60	Pilot Lamp	4567	....
61	Resistor (Wire Wound, New Type) (37, 63, 29 ohms)	33-3159	.35
62	Filter Choke	6658	1.50
63	Filter Choke	32-7018	1.50
64	Condenser (.05 mfd.—Tubular)	30-4123	.35
65	Condenser (Electrolytic 6 and 12 mfd., 150 volts)	30-2083	1.70
66	Resistor (Wire Wound, New Type) (10, 137 ohms)	33-3158	.45
67	Condenser (.09 mfd.—Tubular)	30-4122	.35
68	Condenser (Electrolytic 6 and 12 mfd., 150 volts)	30-2083	1.70

MODEL 28
Schematic
Layouts, Voltage

PHILCO RADIO & TELEV. CORP.



I.F.=460 KC.

Fig. 3—Schematic Wiring Diagram

MODEL 28

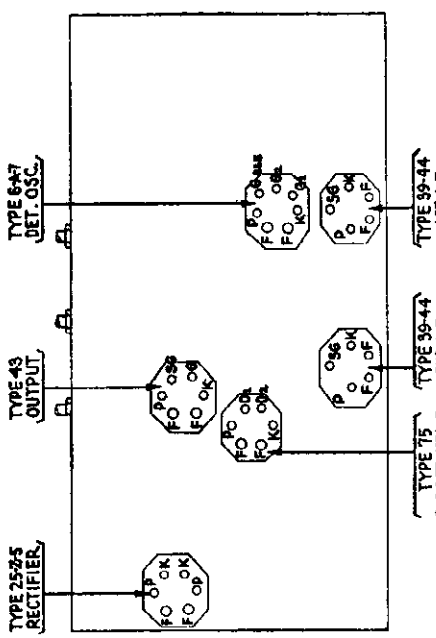


Fig. 2—Bottom View of Sockets for Testing Voltages.

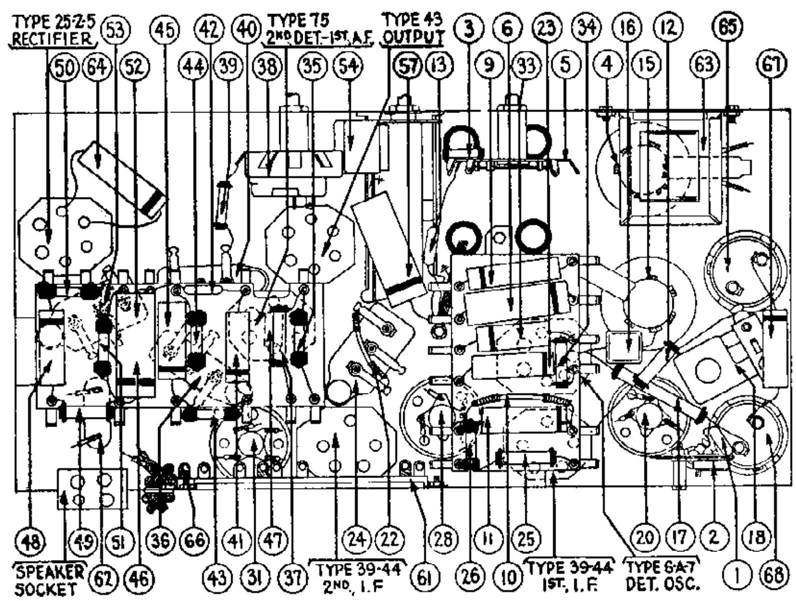


Fig. 4—Bottom View of Chassis Showing Parts.

TUBE SOCKET VOLTAGES

On Line Voltage 120 A.C. — **On Line Voltage 120 D.C.**

Type Tube	6-A-7	39-44	39-44	75	43	25-Z-5	6-A-7	39-44	39-44	75	43	25-Z-5
Plate (P to K)	100	100	98	45	95	120	95	95	85	40	90	..
Screen Grid (SG to K)	G1=-8 G2=80 G3&5=60	100	100	..	100	..	G1=-10 G2=80 G3&5=60	95	95	..	95	..

Total Filament Voltage—75 — **Total Filament Voltage—83**

High resistance D.C. voltmeter used for above tests. Volume control at maximum; dial at 55; wave band switch at left. Refer to Fig. 2 (Socket View).

Philco Model 025 Circuit Tester is recommended for making the above voltage tests.

PHILCO RADIO & TELEV. CORP.

Philco Model 29 is a superheterodyne receiver operating on alternating current and capable of receiving either standard and police broadcasts between 540 and 1720 kilocycles, or short-wave stations between 4.2 and 13 megacycles. The left hand side of the dial is calibrated in kilocycles and the right in megacycles. A two-position switch changes reception from standard to short-waves. This model is equipped with shadow tuning, three point tone control with fixed bass compensation, and automatic volume control. The output is 5 watts.

Model 29 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. tubes, type 75 2d detector, type 42 output tube, and type 80 rectifier. The power consumption is 70 watts. The intermediate frequency is 460 K.C.

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 29, an accurately calibrated signal generator and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator or the 048 Tester which includes a similar instrument. Philco No. 3164 wrench and 27-1159 screwdriver are recommended in addition.

Adjustments are made in the following order:- -

ADJUSTMENT OF INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal on the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 29) turn wave-band switch of receiver to left and dial to 600 K.C. Turn receiver and Signal Generator "ON". Adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located, one pair at the top of each of the three I. F. transformer shields. These are the metal "Cans" near the rear of chassis. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the Signal Generator directly to the antenna and ground terminals of the receiver. Set the wave-band switch of the receiver to the standard broadcast band (left hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. Signal from signal generator. The Wave Trap (1) is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, thru hole at right hand end of set base.

DETECTOR; AND OSCILLATOR — "HIGH" AND "LOW FREQUENCY" ADJUSTMENTS--The "Antenna" and "Oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set, and adjust the antenna compensator (7) (nearest tuning control), to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser (11), located on the other section of tuning condenser, to maximum reading. Finally set the signal generator at 600, tune in this signal and adjust the oscillator L. F. condenser, located underneath chassis ((15) in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

Tube Socket Voltages—(Line Voltage 115)

Function	Det. Osc.	1st I. F.	2nd I. F.	2nd Det.	Output	Rectifier
Type	6A7	39/44	39/44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	210	200	200	200	300	310
Screen (SG to K)	80	80	80	...	315	...
Cathode (K to GND)	4.8	4.8	4.8	0	0	...
6-A-7 Grid G1 to K	35	...	...	...	...	...
6-A-7 Grid G2 to K	170	...	...	...	...	...

Power Transformer Voltages

Terminals	A. C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-4	5.0	Fil. of 80	Blue
5-7	746	Plates of 80	Yellow
8-10	6.3	Filaments	Black
6	...	Center of 5-7	Black—Yellow Tracer
9	...	Center of 8-10	Yellow—Green Tracer

The above tests were made with an A. C. voltmeter for filament voltages and a high-resistance D. C. voltmeter for all others. Dial at 550 K.C., wave-band switch to left, volume control at maximum. Tests made with test prods applied to sockets underneath chassis.

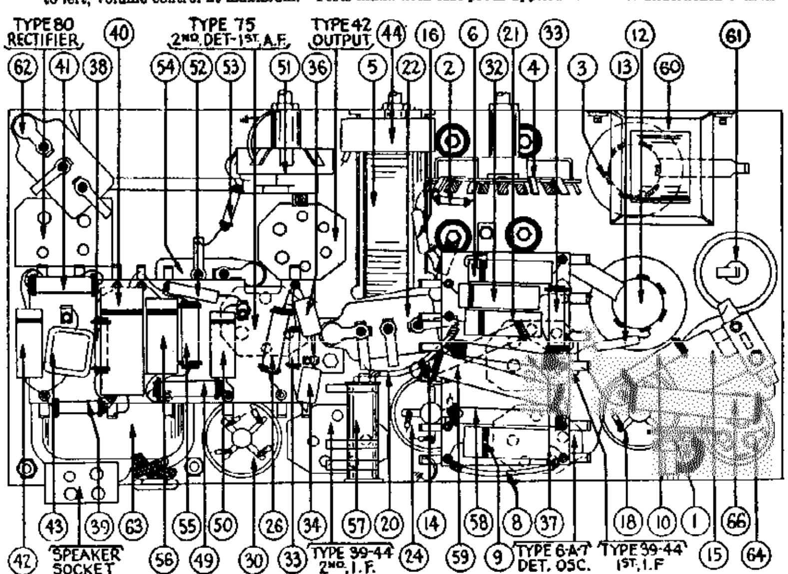


Fig. 4—Bottom View

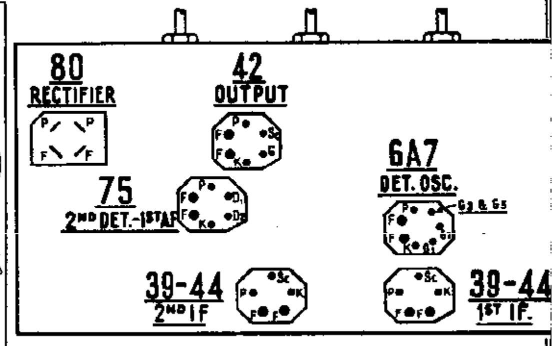


Fig. 1 Tube Socket Layout

MODEL 29
Schematic
Layout, Parts List

PHILCO RADIO & TELEV. CORP.

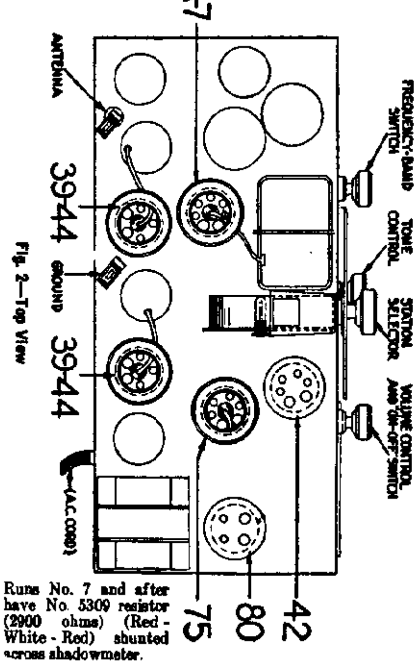
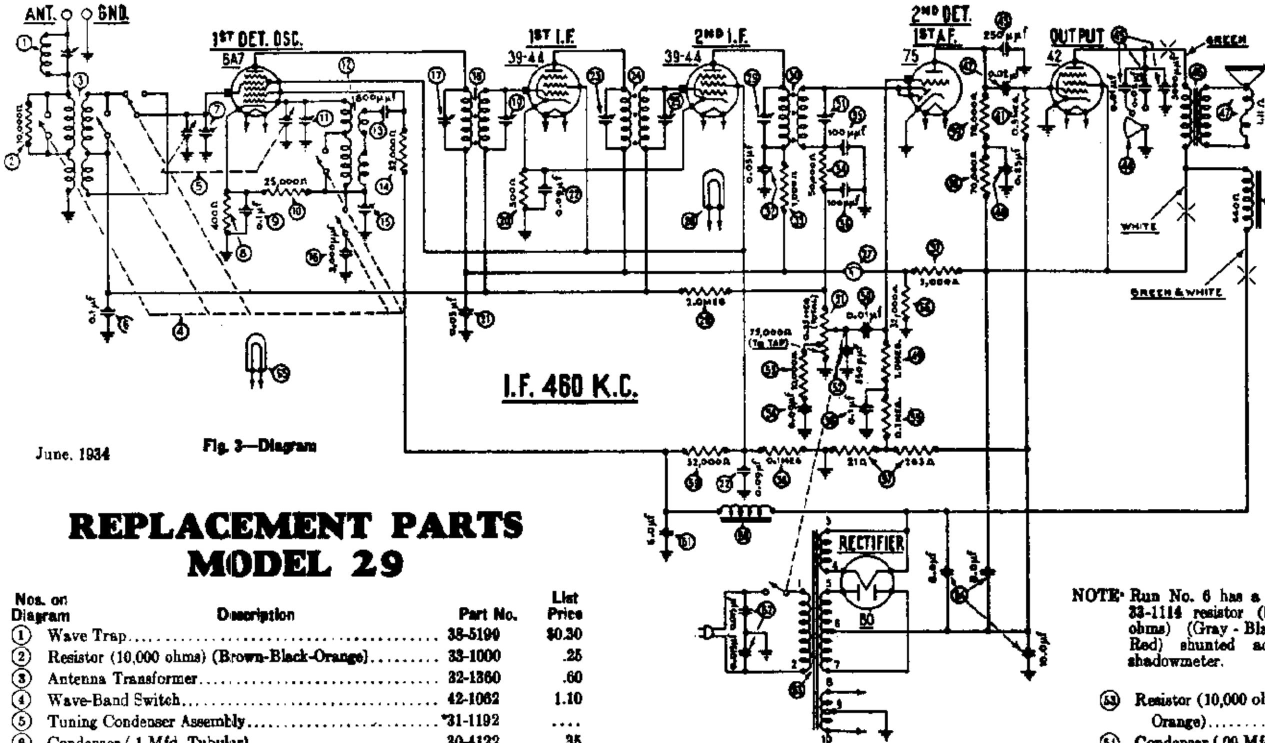


Fig. 2—Top View



June, 1934

Fig. 3—Diagram

REPLACEMENT PARTS MODEL 29

Nos. on Diagram	Description	Part No.	List Price
1	Wave Trap	38-5190	$0.30
2	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
3	Antenna Transformer	32-1360	.60
4	Wave-Band Switch	42-1062	1.10
5	Tuning Condenser Assembly	*31-1192	....
6	Condenser (.1 Mfd. Tubular)	30-4122	.35
7	Compensating Condenser (Det.)	Part of 5	....
8	Resistor (400 ohms Flexible Wire-Wound)	33-3016	.20
9	Condenser (.1 Mfd. Tubular)	30-4122	.35
10	Resistor (25,000 ohms) (Red-Green-Orange)	4516	.25
11	Compensating Condenser (Osc. H. F.)	Part of 5	....
12	Oscillator Transformer	32-1361	.65
13	Condenser (.0008 Mfd. Mica)	5878	.35
14	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
15	Compensating Condenser (Osc. L. F.)	04000S	.35
16	Condenser (.003 Mfd. Mica)	7301	.45
17	Compensating Condenser (1st I. F. Primary)	Part of 18	....
18	First I. F. Transformer	32-1362	1.50
19	Compensating Condenser (1st I. F. Sec.)	Part of 18	....
20	Resistor (500 ohms Flexible Wire-Wound)	6977	.20
21	Condenser (.05 Mfd. Tubular)	30-4123	.35
22	Condenser (.09 Mfd. Twin) (Bakelite Block)	4989-Z	.40
23	Compensating Condenser (2d I. F. Pri.)	Part of 24	....
24	2d I. F. Transformer	32-1363	1.50
25	Compensating Condenser (2d I. F. Sec.)	Part of 24	....
26	Resistor (2 Megohms) (Red-Black-Green)	6873	.25
27	Shadowmeter	6497	2.50
28	Pilot Lamp (Shadowmeter)	Part of 27	....
29	Compensating Condenser (3d I. F. Pri.)	Part of 30	....
30	3d I. F. Transformer	32-1364	1.55
31	Compensating Condenser (3d I. F. Sec.)	Part of 30	....
32	Condenser (.05 Mfd. Tubular)	30-4123	.35
33	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
34	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
35	Condenser (.0001 Mfd. Mica)	30-1031	....
36	Condenser (.0001 Mfd. Mica)	30-1031	....
37	Resistor (5,000 ohms) (Green-Black-Red)	3526	.25
38	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
39	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
40	Condenser (.25 Mfd. Tubular)	30-4134	.45
41	Resistor (500,000 ohms) (Yellow-White-Yellow)	4517	.25
42	Condenser (.02 Mfd. Tubular)	30-4113	.30
43	Condenser (.00025 Mfd. Mica)	5858	.35
44	Tone Control	30-4178	.75
45	Condensers (Inside 44)	Part of 44	....
46	Output Transformer	32-7178	1.60
47	Voice Coil and Cone Assembly (H-16)	02625	.80
48	Field Coil and Pot Assembly (H-16)	36-3218	3.50
49	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
50	Condenser (.01 Mfd. Tubular)	30-4124	.35
51	Volume Control and On-Off Switch	33-5066	1.45
52	Condenser (.00025 Mfd. Mica)	5858	.35

NOTE: Run No. 6 has a No. 33-1114 resistor (8000 ohms) (Gray - Black - Red) shunted across shadowmeter.

Runs No. 7 and after have No. 5309 resistor (2900 ohms) (Red - White - Red) shunted across shadowmeter.

Nos. on Diagram	Description	Part No.	List Price
53	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
54	Condenser (.09 Mfd.) (Bakelite Block)	4989-AM	.35
55	Resistor (100,000 ohms) (White-White-Orange)	4411	$0.25
56	Condenser (.1 Mfd. Tubular)	30-4122	.35
57	B. C. Resistor (263 ohms; 23 ohms; Wire-Wound)	33-3069	.25
58	Resistor (.1 Meg.) (White-White-Orange)	3767	.25
59	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
60	Filter Choke	32-7018	1.50
61	Condenser (Electrolytic—6 Mfd.)	30-2020	1.40
62	Condenser (.015 Mfd. Twin—Bakelite Case)	3703-E	.40
63	Power Transformer	32-7229	5.25
64	Condenser (Electrolytic—8 Mfd., 8 Mfd., 10 Mfd.)	30-2073	3.45
65	Pilot Lamp (Dial)	6608	.11
66	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
	A. C. Cord and Plug Assembly	L-943-A	.60
	Tube Shield	28-1107	.10
	Four-Prong Socket	7544	.10
	Five-Prong Socket	7547	.11
	Six-Prong Socket	7546	.11
	Seven-Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Dial Assembly	*31-1208	.45
	Dial Scale	27-5042	.25
	Chassis Mounting Screw	W-1345A	2.75 C.
	Chassis Mounting Foot (Steel)	29-1983	.03
	Chassis Mounting Foot (Rubber)	27-4116	.05
	Chassis Mounting Foot Plate	27-7497	.35 C.
	Screw (Foot mtg.)	W-644A	1.50 C.

*Note: Some Model 29 sets use tuning condenser assembly No. 31-1250, which has dial assembly 31-1245. This is not interchangeable with 31-1192 and 31-1208.

PHILCO RADIO & TELEV. CORP.

Model 16

Starting with run No. 14, all type Model 16 will use a different type tone control. This will be Part No. 30-4168 which replaces 30-4069 formerly used. Condenser 7653-C (⑱ on wiring diagram in Bulletin 165-B) is replaced by 3615-L.

The new tone control has fixed bass compensation, effective on all four positions, which helps subdue background noise and thus favorably affects short-wave reception.

Starting with Run No. 15, a No. 30-4125 tubular condenser, .006 mfd, will be added, connected between the plate of the 77 tube and the tone control. This gives a smoother variation in control and prevents too great a change in tone from one step to another.

Starting with Run No. 16, the tone control used on Model 16 will be part No. 30-4204, which replaces 30-4168. (See June 1st change notices.) At the same time, condenser 3615-L replaces 3615-J, and external tone control condenser 30-4125 is removed. This latter condenser is now built in as part of the new tone control, thus simplifying assembly of the set.

Model 18-124

Starting with Run No. 4, Resistor ㉙ on wiring diagram of Model 18-124 will be Part No. 5837 (1000 ohms) instead of No. 7775 (2500 ohms). There is a slight change in the antenna and oscillator transformers, the new ones being identified by a red paint mark on the bracket. No change in part number. Change to increase sensitivity.

Model 29 (Code 123-TX)

The differences between regular Model 29 and the TX type are that the latter has the following parts added:

Output transformer	32-7256
Speaker switch (toggle)	3116
Speaker	Type P-22

Model 29-TX also includes a furniture-type speaker, HR-2, which is connected to the receiver by a 25-foot cable and plug assembly, part No. 36-3327, attached to the speaker cabinet.

The A. C. cord on 29-TX is a flat cable and contains an extra wire, which is for use as an antenna lead by connecting the antenna to the binding post mounted on the side of the special flat A. C. plug used. However, the antenna *may* be connected to the regular antenna clip terminal on the receiver chassis if desired and more convenient.

The part number of this special cable and plug assembly is 41-3104.

Model 29

Effective July 1st, condenser ⑱ in wiring diagram of Model 29 is changed from 4989 AM, (.09 mfd.) to 3615 AW (.05 mfd.). This improves the fixed bass compensation used in this model.

Starting with Run No. 8, the cathode resistor (㉚ in wiring diagram of Model 29) will be changed from Part No. 6977 (500 ohms) to 33-3016 (400 ohms). This will prevent variation in performance of sets due to considerable variation in 6A7 tubes.

Starting with Run No. 9, electrolytic condenser ㉓ (on wiring diagram) will be a Part No. 30-2026 instead of 30-2020. The new type is of a higher working voltage.

Models 29 & 45

Effective July 1st, a new wave-trap will be used in this model. Part ① on wiring diagram of Model 29 is changed from Part No. 38-5199 to 38-5995. The new wave trap uses an improved construction which facilitates production.

Effective July 1st, mica condenser ⑩ on wiring diagram of Model 29 was changed from Part No. 7301 to 30-1028. No change in capacity; change to facilitate wiring only.

MODELS 19,38,89
Notes

PHILCO RADIO & TELEV. CORP.

Correcting Intermittent Operation

On some of the earlier models of the 89, 19 and 38, difficulty may occasionally be experienced with intermittent operation. This condition usually occurs during periods of humid weather, and is caused by stopping of the oscillator. In some cases, the radio may be completely dead and at other times this in-operative condition may exist over a portion of the dial only.

There are a number of possible causes for the difficulty and the necessary steps have been taken in later production to correct the condition. On a few of the earlier sets, however, it may be necessary to make one or more of the changes outlined below:

1. **OSCILLATOR TUBE: In most cases, partial or complete failure of the oscillator circuit can be corrected by replacing the oscillator tube.**
2. **BATTERY VOLTAGE: In the Model 38, low voltage of the "A" or "B" battery may cause failure in oscillation.**
3. **CATHODE RESISTOR: In the Models 89 and 19, correct performance can usually be restored by changing the cathode resistor ⑩ in the wiring diagrams of service bulletins 146 and 146A from 15,000 ohms to 10,000 ohms (Philco Part No. 4412). In the Model 38, the cathode resistor ⑫ in the wiring diagram of service bulletin 106 is changed from 6,000 ohms to 4,000 ohms (Philco Part No. 33-1040).**
4. **COMPENSATING CONDENSERS: The first I. F. compensating condensers in Models 89 and 19 ⑮ in service bulletin 146, ⑱ in service bulletin 146-A and ⑲ in service bulletin 166 have been changed from Part No. 04000-M to Part No. 31-6016. The new condenser has a larger insulating surface between the plates of the condenser and the mounting holes. The possibility of moisture absorption is thus eliminated. It is necessary to re-drill a hole in the chassis so that the condenser can be mounted correctly with respect to the opening in the chassis for the compensating condenser wrench.**
5. **BAKELITE WASHERS: In order to prevent moisture absorption with resulting drifting in the compensating condenser adjustment, a bakelite washer and a metal washer are now being used on top of the compensating condenser, in place of the fibre washers previously used. The part number of the bakelite washer is 27-4109 and the metal washer (placed on top of the bakelite) is W-1331. These two replace the old fibre washer Part No. 3500.**
6. **MICA INSULATION: It was found on some sets that the mica which separates the leaves of the high frequency oscillator compensating condensers was extremely thin and would crack easily. Moisture absorption in the cracks was sufficient to stop oscillation. This condition was corrected by replacing the mica.**
7. **WIRE INSULATION: The wire which connects from the oscillator tuning condenser to the oscillator coil should be rubber-covered. Possible moisture absorption in the insulation of the cotton-covered wire may be sufficient to produce leakage to ground.**
8. **OSCILLATOR COIL IMPREGNATION: In some cases, it may be desirable to re-impregnate the oscillator coils in accordance with the present methods of production. The coil is dipped in hot paraffine for twenty seconds. The entire coil, including the terminals, is submerged; the only part which is out of the paraffine is a portion of the mounting lug, thus assuring a good ground connection. The coil and the paraffine both are allowed to cool until the paraffine becomes a considerably heavier consistency, at which time the coil is again dipped, thus allowing a fairly heavy covering over the entire coil. The coil is now entirely sealed and will not be affected by any moisture changes.**
9. **TUNING CONDENSER: A few tuning condensers of the 89 and 38 Models went out of the factory with a sanded surface on the bakelite between the stator and rotor plates. Moisture absorption at this point was sufficient to stop oscillation. Changing the tuning condenser to the type with smooth bakelite insulation will correct the trouble. In present production, these bakelite pieces are dipped in insulating varnish to seal all possible openings which might absorb moisture.**
10. **OSCILLATOR SOCKETS: In extreme cases it may be necessary to change the detector-oscillator tube socket. Moisture absorption occasionally takes place around the rough edges of the socket.**

ELIMINATION OF NOISE INTERFERENCE CAUSED BY THE FARM LIGHTING SYSTEM

The operation of a radio receiver directly from a 32 volt farm lighting system is sometimes interfered with by noises in reception, caused by the operation of the lighting system's charging equipment. These noises are radiated from the service lines and picked up by the antenna and lead-in. A certain amount of the noise also comes directly thru the lines. A whirring or crackling noise may be caused by sparking at the brushes of the generator; and a "clicking" by the sparks at the spark plug of the gasoline motor used to drive the generator, and by the operation of the "breaker" in the spark coil primary.

Installation of the proper type of antenna system is of considerable importance in eliminating these troublesome noises. For maximum freedom from noise the antenna should be the special Philco "Three-Purpose" aerial system, which was designed to prevent pick-up of noise by the antenna lead-in.

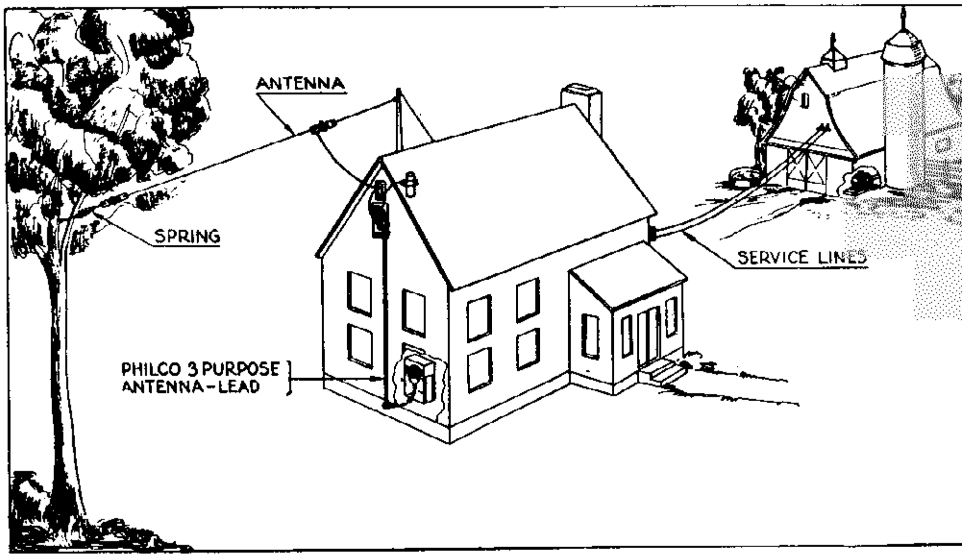


Fig. 8—Best Method of Antenna Installation for Model 32

The antenna wire should in all cases be run in a direction from the house opposite to that of the service leads from the lighting system, as indicated in Fig. 8. Where the Three-Purpose System is used, the instructions furnished with it should be very carefully followed. Note that this system employs a special "transmission line" lead-in, at each end of which a special transformer is installed. The transformers must be installed as per instructions, and if this is done the transmission line (lead-in) will be completely noise-proof. All other necessary parts for the antenna installation such as ground clamps, lighting arrester, etc. are included with the Three-Purpose Antenna System.

Philco has designed a special interference-suppression and filter for 32 volt systems which will eliminate most if not all of the interference encountered in the majority of installations. This unit consists of filter chokes and condensers, and is connected directly in the output lines of the generator as per instructions supplied with this special unit. The unit may be obtained from your Philco Distributor.

It is generally advisable also to connect a ½ mfd. fixed condenser (Philco Part No. 30-4015) from each set of generator brushes to the frame of the generator (which should be grounded). The method of locating these condensers is indicated in Fig. 9 which shows a cut-away view of one end of a generator. These condensers help eliminate the whirring or crackling caused by the generator brushes.

To reduce the clicking noise caused by the ignition at the spark plug, a suppressor (Philco Part No. 4531) should be inserted in series between the terminal of the plug and the cable leading to it. See Fig. 10.

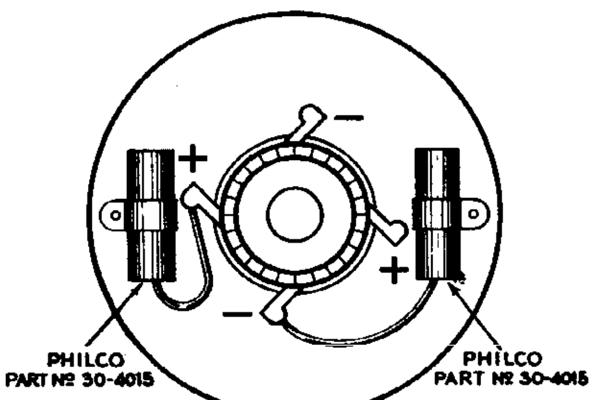


Fig. 9—Condensers Attached to Generator for Suppressing Interference

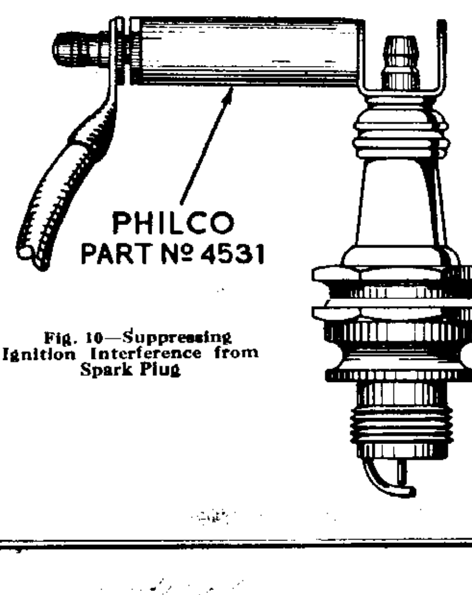


Fig. 10—Suppressing Ignition Interference from Spark Plug

MODEL 32
Alignment Data
Layouts

PHILCO RADIO & TELEV. CORP.

Model 32

Philco Model 32 is a superheterodyne radio receiver designed to operate directly from a 32 volt D. C. (direct current) electric system, such as used on many farms for lighting purposes. In this model the filaments of the tubes (except the rectifier) are connected in series, while the necessary plate and grid voltages are secured from a special vibrator-and-rectifier unit, contained in a separate metal box mounted on a shelf of the radio cabinet. The rectifier tube is inside the vibrator-and-rectifier unit box. It obtains its filament voltage from a secondary winding of the transformer which is also located in the vibrator-and-rectifier unit box.

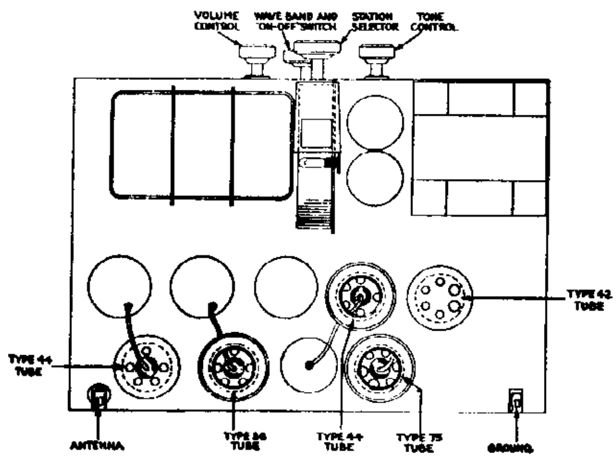


Fig. 1—Top View of Model 32

NOTE: In 32-volt systems where the batteries are old, the voltage is high (40 volts) when generator is running (due to the higher internal resistance of the batteries). In such cases it will help conserve life of the tubes in the set if battery charging is done at periods of the day when the radio is not in use.

Model 32 uses the following tubes: R. F., type 39-44; Detector-Oscillator, type 36; I. F., type 39-44; 2d detector, type 75; Output type 42; Rectifier, type 84.

The frequency range of the model 32 is 520 to 3260 kilocycles. The intermediate frequency (I. F.) is 260 K. C. The power consumption is 50 watts when the line voltage is 32, and approximately 70 watts when the line voltage reaches 38.

With a line voltage of 35 volts to the vibrator and an effective voltage of 28 at primary of power transformer (voltage from white lead to white-black-tracer), the A. C. voltage across secondary should be about 300 volts at 65 milliamperes. Secondary voltage measured from yellow lead to yellow-green-tracer. Voltage across 84 filament approximately 7 volts at .5 amperes. (Filament leads have blue insulation.)

Tube Socket Data Line Voltage 34 Volts

Circuit	RF	Det.-Osc.	IF	AF	Output	Rect.
Type Tube	**39-44**	**36**	**39-44**	**75**	**42**	**84**
Filament Volts	6.8	6.8	6.8	6.8	6.8	6.8
Plate Volts	205	200	235	155	220	300
Screen Grid Volts (SG to K)	85	83	85	......	240	......
Cathode Volts (K to Gnd)	4	8.5	4	0	0	......

The above voltage values were obtained with a high-resistance, multi-range D. C. voltmeter. The readings were taken from the underside of the chassis, with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER is an ideal instrument for taking these readings, and is highly recommended for this purpose. When the above values were obtained, the Station Selector was set at the low frequency (550 K. C.) end of the scale; the Volume Control was at maximum.

Fig. 2—Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis

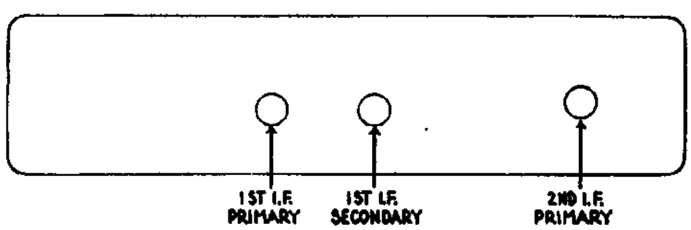


Fig. 3—Rear of Model 32 Chassis, showing location of I.F. Compensating Condensers. I.F. of Model 32 is 260 K. C.

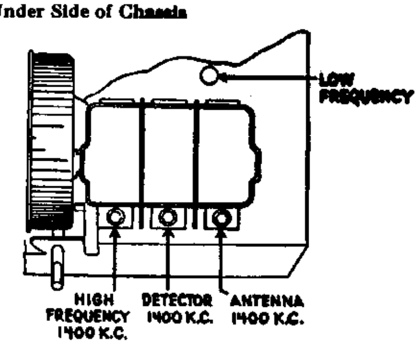


Fig. 4—Top View of Chassis Showing Compensating Condensers Mounted on Tuning Condenser, also Low Frequency Compensating Condenser.

ADJUSTMENT OF MODEL 32

COMPENSATING CONDENSERS

These receivers are adjusted accurately before they are shipped from the Factory. If re-adjustment is required, it is usually necessary to re-align only the intermediate frequency compensating condensers. Fig. 3 shows the location of these compensating condensers. The intermediate frequency is 260 kilocycles.

An accurately calibrated signal generator is required for these adjustments. The PHILCO MODEL 024 is a precision signal generator supplying frequencies from 105 kilocycles to 2000 kilocycles and is recommended for this work.

To adjust the I. F. condensers, remove the grid cap clip from the type 36 tube and connect the shielded antenna lead from the signal generator to the grid cap. Connect the ground lead from signal generator to ground post of set.

Connect the primary terminals of the output transformer to an output meter. Set the signal generator frequency switch at 260 K. C., turn it and the receiver "on" and adjust the attenuator of the signal generator so as to get a half scale deflection on the meter. Now with the fibre hex wrench, adjust each of the I. F. condensers in turn so as to obtain maximum reading in the meter.

If re-adjustment of the intermediate frequency circuits is not sufficient to restore sensitivity, the high frequency and low frequency compensating condensers are re-aligned as described in the following paragraphs. Figure 4 shows the location of these compensating condensers.

When making these adjustments replace the grid clip on the 36 tube, and connect the antenna and ground leads from the signal generator direct to the antenna and ground posts of set.

The High Frequency compensating condenser is first adjusted. This adjustment is made with the signal generator set at 1400 kilocycles. Next the Detector and Antenna Condensers, located on the tuning condenser assembly, should be adjusted, with the signal generator still operating at 1400. It may be necessary to readjust the attenuator on the signal generator for these adjustments.

The last adjustment is that of the low frequency (LF) compensating condenser which is accessible from above through the hole in chassis alongside the tuning condenser assembly. This adjustment is made with the signal generator set to give a 700 K. C. signal.

PHILCO RADIO & TELEV. CORP.

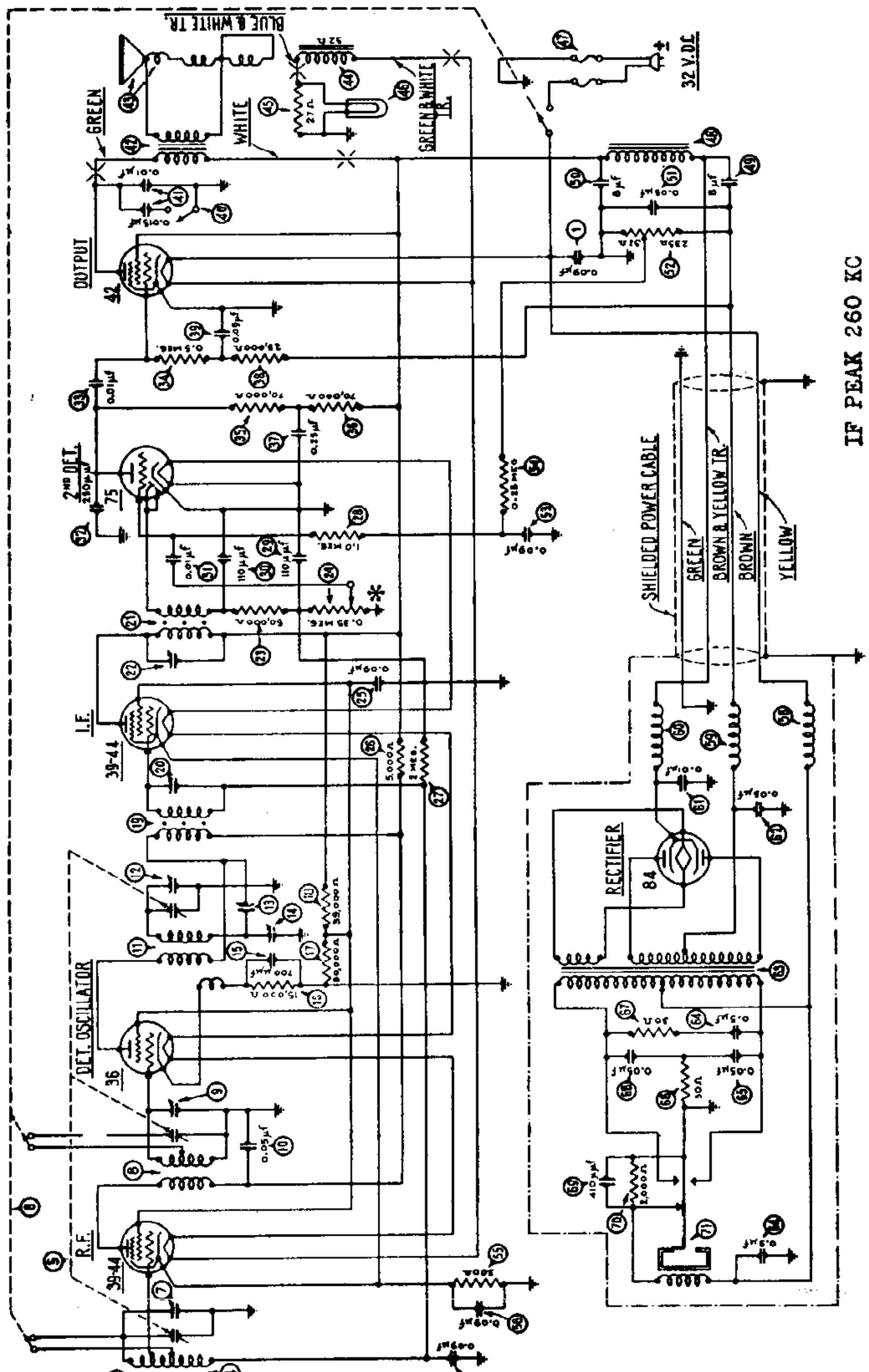


Fig. 5—Wiring Diagram—Model 32

✱ MUST BE GROUNDED AT 75 CATHODE

MODEL 32
Layouts
Parts List

PHILCO RADIO & TELEV. CORP.

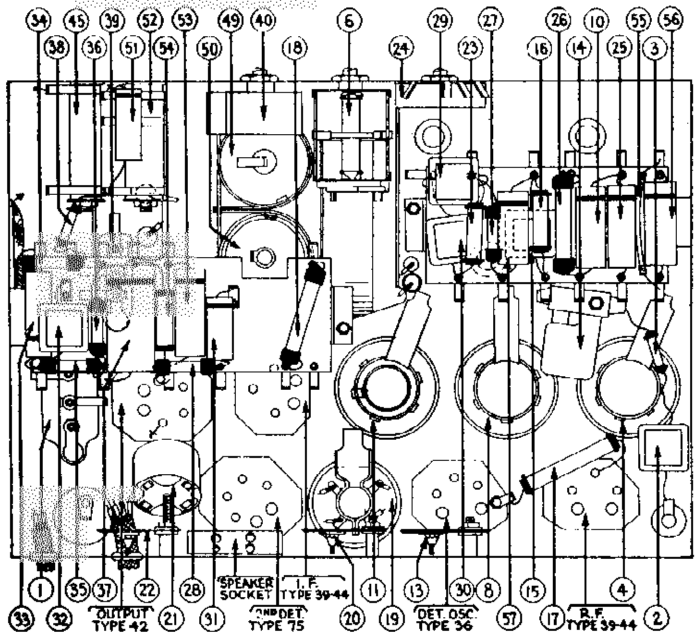


Fig. 6—Bottom View of Chassis

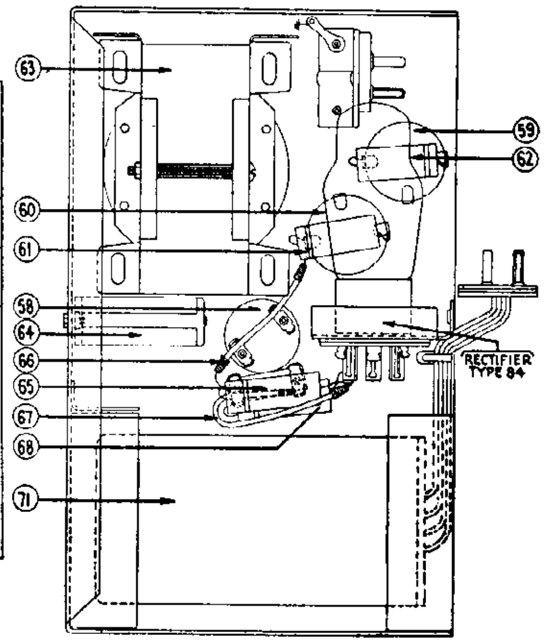


Fig. 7—Bottom of Vibrator and Rectifier Unit

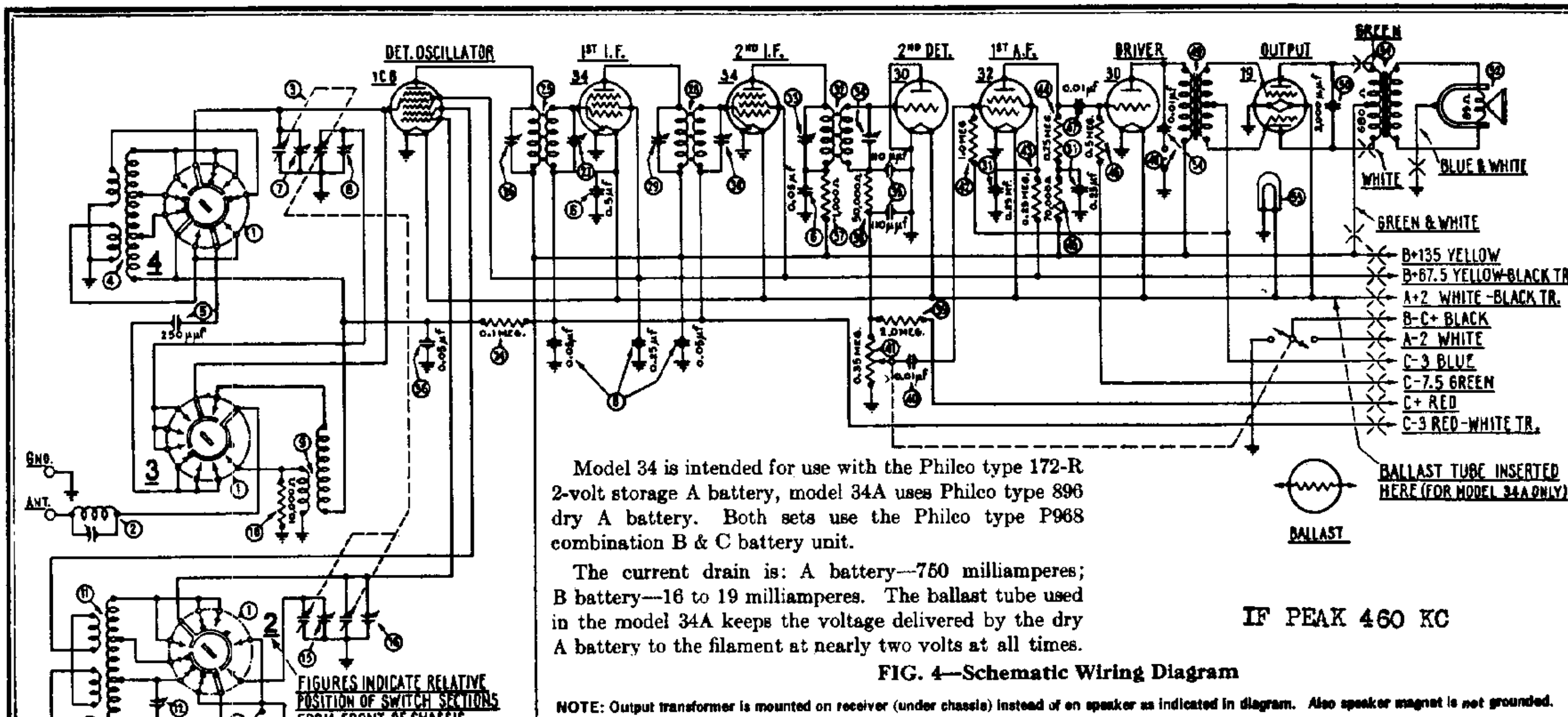
REPLACEMENT PARTS FOR MODEL 32

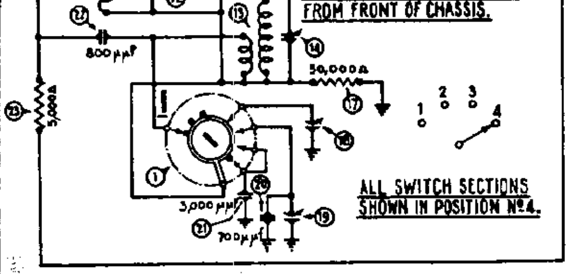
No. on Figs. 6 and 7	Description	Part No.	List Price
1	Condenser (.09 mfd.—.09 mfd.)	4989-G	$0.40
2	Condenser (.0025 mfd.) (mica)	7006	.40
3	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
4	Antenna Transformer	32-1062	.70
5	Tuning Condenser Assembly	31-1059	5.00
6	Wave-band & On-off Switch	42-1017	1.00
7	Compensating Condenser (ant.)	Part of 5	....
8	Detector Transformer	32-1063	.50
9	Compensating Condenser (det.)	Part of 5	....
10	Condenser (.05 mfd. tubular)	30-4123	.35
11	Oscillator Transformer	06620	.90
12	Compensating Condenser (osc. H. F.)	Part of 5	....
13	Compensating Condenser (1st I. F. pri.)	04000-M	.20
14	Compensating Condenser (osc. L. F.)	04000-S	.35
15	Condenser (.0007 mfd.—mica)	5863	.35
16	Resistor (15,000 ohms) (Brown-Green-Orange)	6208	.25
17	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
18	Resistor (39,000 ohms) (Orange-White-Orange)	33-1027	.25
19	First I. F. Transformer	32-1289	.60
20	Compensating Condenser (1st I. F. secondary)	04000-M	.20
21	Second I. F. Transformer	00622	1.20
22	Compensating Condenser (2d I. F. primary)	04000-A	.15
23	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
24	Volume Control (350,000 ohms)	33-5065	1.00
25	Condenser (.09 mfd. tubular)	30-4122	.35
26	Resistor (5,000 ohms) (Green-Black-Red)	3526	.25
27	Resistor (2 meg. Red-Black-Green)	5872	.25
28	Resistor (1 meg. Brown-Black-Green)	4409	.25
29	Condenser (.00011 mfd.—mica)	30-1006	.35
30	Condenser (.00011 mfd.—mica)	30-1006	.35
31	Condenser (.01 mfd. tubular)	30-4124	.25
32	Condenser (.00025 mfd.—mica)	3082	.35
33	Condenser (.01 mfd. tubular)	30-4145	.25
34	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
35	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
36	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	$0.25
37	Condenser (.25 mfd. tubular)	30-4134	.45
38	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
39	Condenser (.09 mfd.) (Bakelite block type)	4989-AL	.35
40	Tone Control	06764	.50
41	Condensers	Part of 49	....
42	Output Transformer (For K-26 spkr.)	32-7042	.95
43	Voice Coil and Cone (For K-26 spkr.)	36-3174	.40
44	Field Coil and Pot Assembly (K-26)	36-3306	2.85
45	Resistor (Pilot light) (27 ohms)	33-3132	.20
46	Pilot Lamp	4567	.12
47	Line Fuses (Located in line plug) (3 amp.)	45-2046	ea. .06
48	Filter Choke	32-7213	1.60
49	Condenser (Electrolytic—8 mfd. wet)	30-2026	1.50
50	Condenser (Electrolytic—8 mfd. dry)	30-2014	1.70
51	Condenser (.05 mfd. tubular)	30-4020	.35
52	B. C. Resistor (235—32 ohms)	7998	.20
53	Condenser (.09 mfd. tubular)	30-4122	.35
54	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.25
55	Resistor (Flexible—300 ohms)	33-3010	.20
56	Condenser (.09 mfd. tubular)	30-4122	.35
57	Condenser (.09 mfd. tubular)	30-4122	.35
	Speaker Plug Socket	4957	.10
	Line Plug Assembly with Cord (Less fuses)	L-1738	.85

VIBRATOR AND RECTIFIER UNIT

No. on Figs. 6 and 7	Description	Part No.	List Price
58	R. F. Choke (Low voltage)	32-1375	$0.40
59	R. F. Choke (High voltage)	32-1348	.30
60	R. F. Choke (High voltage)	32-1348	.30
61	Condenser (.01 mfd. tubular)	30-4145	.25
62	Condenser (.05 mfd. tubular)	30-4020	.35
63	Power Transformer	32-7218	4.95
64	Condenser (.5 mfd.—.5 mfd.—metal case)	30-4155	.85
65	Condenser (.05 mfd. tubular)	30-4020	.35
66	Resistor (30 ohms flexible wire wound)	33-3119	.25
67	Resistor (30 ohms flexible wire wound)	33-3119	.25
68	Condenser (.05 mfd. tubular)	30-4020	.35
69	Condenser (.00041 mfd.—mica)	Inside 71	....
70	Resistor (2,000 ohms)	Inside 71	....
71	Vibrator Unit	38-5640	6.00

PHILCO RADIO & TELEVISION CORP.

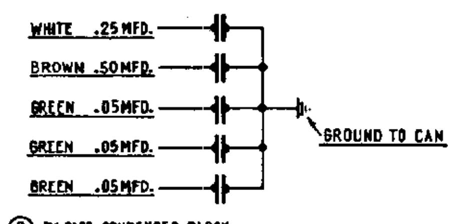




Model 34 is intended for use with the Philco type 172-R 2-volt storage A battery, model 34A uses Philco type 896 dry A battery. Both sets use the Philco type P968 combination B & C battery unit.

The current drain is: A battery—750 milliamperes; B battery—16 to 19 milliamperes. The ballast tube used in the model 34A keeps the voltage delivered by the dry A battery to the filament at nearly two volts at all times.

IF PEAK 460 KC



⑥ BY-PASS CONDENSER BLOCK CONNECTIONS

FIG. 4—Schematic Wiring Diagram

NOTE: Output transformer is mounted on receiver (under chassis) instead of on speaker as indicated in diagram. Also speaker magnet is not grounded.

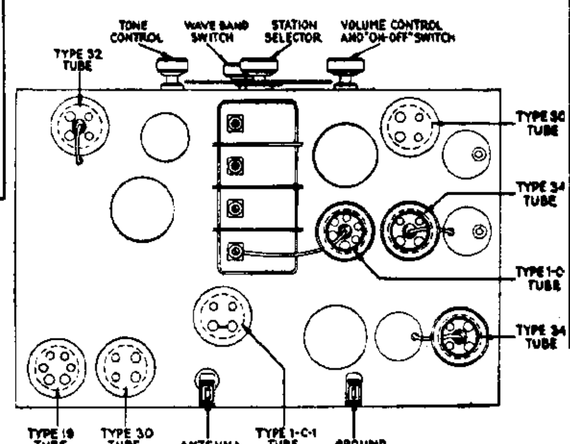


FIG. 1—Top View of Chassis

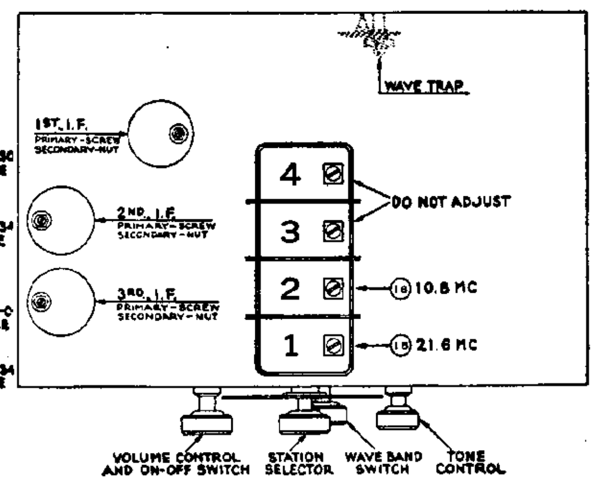


FIG. 2—Position of Compensating Condensers Reached from *Above* Chassis

March, 1934

MODEL 34, 34-A
Alignment Data
Voltage, Socket

PHILCO RADIO & TELEVISION CORP.

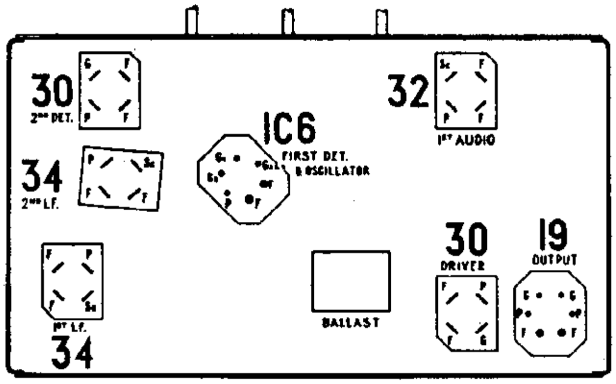


FIG. 3—Tube Socket Layout (View of Underside)

Table 1—Tube Socket Data*

CIRCUIT	Det.-Osc.	1st I. F.	2nd I. F.	2nd Det.	1st A. F.	Driver	Output
TYPE TUBES	1C6	34	34	30	32	30	19
Filament Volts..........	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Plate Volts.............	P-135 G2-120	135	135	..	40	135	135
Screen Grid Volts.......	67½	67½	67½	..	35	..	..

*The above values were obtained from the underside of the chassis, using test prods and leads, with a high-resistance multi-range D. C. voltmeter. The Philco Model 048 All Purpose Set Tester is highly recommended for all tests of this character. Receiver volume control at maximum; station selector at 520 kilocycles. Readings taken with a plug-in adapter will not be satisfactory.

ADJUSTING MODEL 34

The compensating condensers of Model 34 have been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should NOT be undertaken unless the receiver is seriously out of alignment.

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly. These have been adjusted, and sealed, at the factory.

Philco Model 048 All-Purpose Set Tester, which incorporates a signal generator covering broadcast and police band frequencies, is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies for adjusting the compensating condensers in the high frequency circuits.

1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 1C6 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 34) and adjust each of the I.F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I.F. compensating condensers is shown in Figure 2. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 1C6). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (Range 1) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ② condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ② is located at rear and underneath the chassis, and is shown in Figures 2 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 34 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1............520 K.C.—1500 K.C.
Range 2............1.5 M.C.—4.0 M.C.
Range 3............4.0 M.C.—11.0 M.C.
Range 4............11.0 M.C.—23.0 M.C.

Connect the output terminals of the Model 091 or equivalent Signal Generator, to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. Set the Wave-Band Switch to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser ⑮ on Section 1 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be heard. Adjust the compensating condenser ⑯ on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment, otherwise the output of the Signal Generator will be too great. Adjust the compensating condenser ⑫ to give maximum response in the output circuit. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 5.

This concludes adjustments requiring the Model 091 (or equivalent) high frequency signal generator.

The Model 048 or its equivalent is now used again. Turn the Wave-Band Switch of the set to Range 2 and the Station Selector to 1.5 M.C. Set the Signal Generator at 1500 K.C. Make sure the "Antenna" connection between the Signal Generator and the Chassis has been restored. Adjust compensating condenser ⑲ located underneath the chassis, (Figure 5). Adjustment is made from the underside of the chassis.

Tune the Wave-Band Switch to Range 1 and the Station Selector to 1400 K.C. Set the Signal Generator at 1400 K.C. Adjust compensating condenser ⑭, which is located underneath the chassis. (See Figure 5). This adjustment is made from the underside of chassis.

Finally, with Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator at 520 K.C. and adjust compensating condenser ⑱ (Figure 5). This compensating condenser is also mounted underneath the chassis, and reached from below.

For proper and accurate adjustment of Model 34, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without proper equipment as mentioned above.

MODEL 34, 34-A
Chassis Layout
Parts List

PHILCO RADIO & TELEVISION CORP.

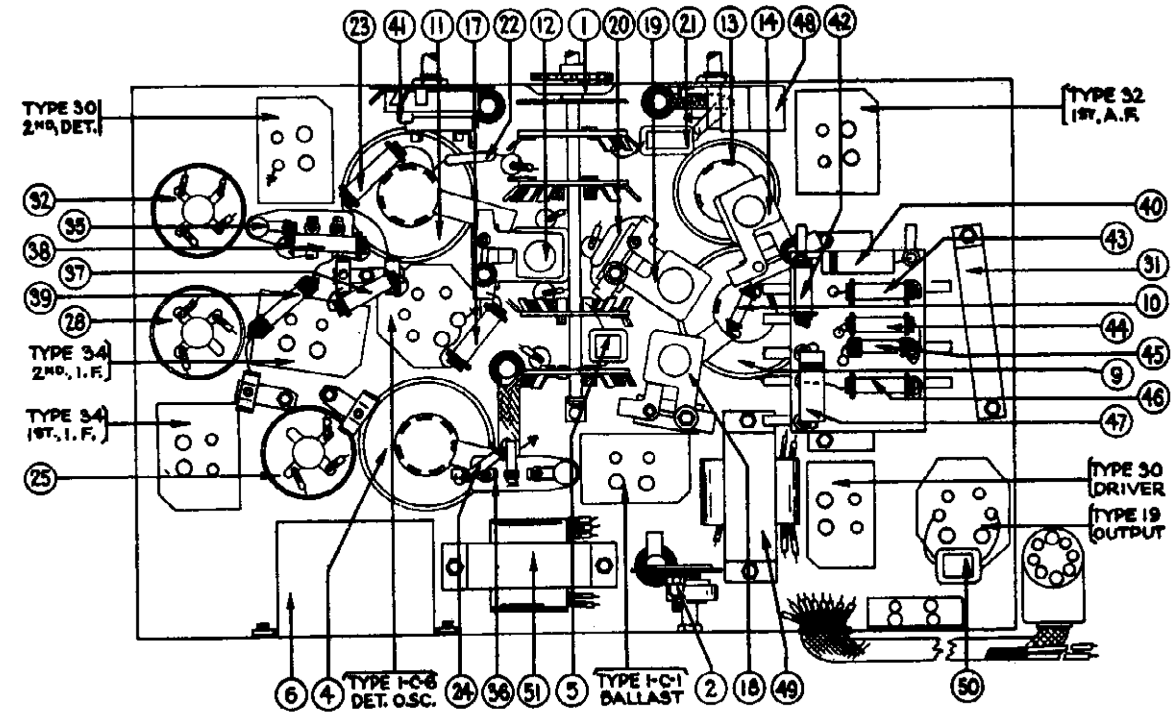


FIG. 5—Bottom View of Chassis, Showing Parts, and Position of Compensating Condensers Reached from Below Chassis

MODEL 34 PARTS

No. on Figs.	Description	Part No.	List Price Each
(1)	Wave-Band Switch	42-1045	$3.60
(2)	Wave Trap	33-5199	.30
(3)	Tuning Condenser Assembly	31-1153	6.25
(4)	Antenna Transformer (H. F. Bands)	32-1271	.70
(5)	Condenser (.00025 mfd.)	3063	.35
(6)	By-pass Condenser Block (.25-.5-.05-.05-.05 mfd.)	30-4151	1.00
(7)	Compensating Condenser (Ant. H. F.)	Part of (3)	....
(8)	Compensating Condenser (Ant. B'cst)	Part of (3)	....
(9)	Antenna Transformer (Broadcast)	32-1270	.55
(10)	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
(11)	Oscillator Transformer (H. F. Bands)	32-1273	.35
(12)	Compensating Condenser (Range 2)	04000-C	.15
(13)	Oscillator Transformer (Broadcast)	32-1272	.70
(14)	Compensating Condenser (Osc. Range 1)	04000-A	.15
(15)	Compensating Condenser (Osc. Range 4)	Part of (3)	....
(16)	Compensating Condenser (Osc. Range 3)	Part of (3)	....
(17)	Resistor (50,000 ohms—Green-Brown-Orange)	4518	.25
(18)	Compensating Condenser (Broadcast; Series)	04000-S	.35
(19)	Compensating Condenser (Range 2; Series)	04000-R	.45
(20)	Condenser (.0007 mfd.)	5863	.35
(21)	Condenser (.003 mfd.)	6009	.60
(22)	Condenser (.0008 mfd.)	6021	.35
(23)	Resistor (5,000 ohms—Green-Black-Red)	5310	.25
(24)	Resistor (100,000 ohms—White-White-Orange)	6099	.25
(25)	First I. F. Transformer	32-1341	1.35
(26)	Compensating Condenser (1st I. F. Pri.)	31-6007, Inc. as part of (25)	....
(27)	Compensating Condenser (1st I. F. Sec.)		....
(28)	Second I. F. Transformer	32-1341	1.35
(29)	Compensating Condenser (2nd I. F. Pri.)	31-6007, Inc. as part of (28)	....
(30)	Compensating Condenser (2nd I. F. Sec.)		....
(31)	Condenser (.25-.25 mfd.) (By-pass)	30-4150	.70
(32)	3rd I. F. Transformer	32-1342	1.35
(33)	Compensating Condenser (3rd I. F. Pri.)	31-6007, Inc. as part of (32)	....
(34)	Compensating Condenser (3rd I. F. Sec.)		....

No. on Figs.	Description	Part No.	List Price Each
(35)	Condenser (.00011 mfd. twin)	8035-C	$0.25
(36)	Condenser (.05 mfd.)	3615-J	.35
(37)	Resistor (1,000 ohms—Brown-Black-Red)	5837	.25
(38)	Resistor (50,000 ohms—Green-Brown-Orange)	4518	.25
(39)	Resistor (2 meg.—Red-Black-Green)	5672	.25
(40)	Condenser (.01 mfd.)	30-4124	.25
(41)	Volume Control and On-Off Switch	33-5064	1.45
(42)	Resistor (1.0 meg.—Brown-Black-Green)	4409	.25
(43)	Resistor (330,000 ohms—Orange-Orange-Yellow)	4410	.25
(44)	Resistor (.25 meg.—Red-Yellow-Yellow)	6046	.25
(45)	Resistor (70,000 ohms—Violet-Black-Orange)	5385	.25
(46)	Resistor (.5 meg.—Yellow-White-Yellow)	4517	.25
(47)	Condenser (.01 mfd.)	30-4124	.25
(48)	Tone Control	30-4152	.50
(49)	Audio (Input) Transformer	7233	1.80
(50)	Condenser (.003 mfd.)	7301	.45
(51)	Output Transformer	32-7235	1.50
(52)	Voice Coil & Cone Assembly (KR-6)	36-3157	.50
(53)	Pilot Lamp	5316	.35
(54)	Condenser (.01 mfd.)	Part of (48)	....
	Pilot Lamp Bracket	38-5633	.55
	Battery Cable	41-3063	2.00
	Tube Shield (1)	28-1107	.10
	Tube Shield (2)	8005	.06 ea.
	Six Prong Socket	7547	.11
	Four Prong Socket	7544	.10
	Speaker Socket	4057	.10
	Knob (Medium)	03062	.10
	Knob (Small)	03064	.10
	Knob (Large)	27-4025	.10
	Dial Assembly	31-1163	1.25
	Dial Scale	27-5080	.60
	Idler Shaft Assembly	31-1056	.25
	Gear (Wave-Band Switch)	28-7012	.20
	Mounting Bolt	W-567	3.00 per C.
	Mounting Washer (Rubber)	5189	.04
	Mounting Washer (Steel)	5068	.85 per C.

MODELS 32,34,38-122
45
Changes

PHILCO RADIO & TELEV. CORP.

Model 32

Starting with Run No. 4, the antenna and ground Fahnestock clip terminals will be replaced with insulated wire leads. This is done to better meet Underwriters' requirements.

Starting with Run No. 5, Model 32 will use a type 77 detector-oscillator tube instead of a type 36. This change gives more stable performance of the oscillator.

This change involves using a six-hole tube socket instead of the original five-hole socket used for type 36. It also requires making the following substitutions:

Part ⑯, No. 6208 resistor (15,000 ohms) is replaced by 33-1114 (8000 ohms)

Part ⑮, No. 5863 condenser (700 Mmfd) is replaced by 7007 (1400 Mmfd.)

On page 3, correct Part No. of ㉔ Volume Control is 30-5063, instead of 30-5055.
(List price given ($1.00) is correct.)

Model 34

Correct *list price* of Part ㊸, 36-3157 voice-coil and cone-assembly, KR-6 speaker, to read 0.75

Starting with Run No. 3, Model 34 will be equipped with a 4-point tone control instead of a 2-point. The part No. of the new control is 30-4168 which replaces 30-4152.

Model 38-122

This model will use a new output transformer, Part No. 32-7286. This replaces No. 2565 formerly used.

Referring to change notice of July 1st regarding ballast tube shunt resistor on Model 38-122, the correct part number of the 20 ohm resistor used will be 33-3043 instead of 33-3160.

A new ballast tube shunt resistor will be used in production effective this date. This will be part No. 33-3160, 20 ohms, instead of part No. 7155, 30 ohms. This gives a slight (desirable) increase in filament voltage.

Model 45

Starting with Run No. 5, the cathode resistor on 6A7 tube, Part No. ㉚ on diagram will be changed from Part No. 6977 (500 ohms) to 33-3016 (400 ohms). This is to prevent variation in output of sets due to variation in 6A7 tubes.

Starting with Run No. 6, electrolytic condenser ㊾ and ㊿ (Part No. 30-2028) is replaced by No. 30-2079, same capacity but higher voltage rating.

Starting with Run No. 8, electrolytic condenser ㊺ (see Service Bulletin 191) will be changed from part No. 30-2020 to 30-2026. Same capacity (6 mfd.), higher voltage rating.

Both Codes 121 and 122 on this model will now use bypass condenser 3615-W for part ㊻. This change was made to simplify assembly on this model and does not affect performance.

Models 45 & 29

Effective July 1st, mica condenser ㉝ on wiring diagram of Model 29 was changed from Part No. 7301 to 30-1028. No change in capacity; change to facilitate wiring only.

Effective July 1st, a new wave-trap will be used in this model. Part ① on wiring diagram of Model 29 is changed from Part No. 38-5199 to 38-5995. The new wave trap uses an improved construction which facilitates production.

MODEL 45
Alignment Data
Voltage, Layouts

PHILCO RADIO & TELEV. CORP.

Model 45

Philco Model 45 is a six tube receiver operating on alternating current and capable of receiving either standard and police broadcasts between 540 and 1720 kilocycles, or short-wave stations between 4.2 and 13 megacycles. The left hand side of the dial is calibrated in kilocycles for standard reception and the right in megacycles for short-wave stations. A two-position switch changes reception from standard to short-waves.

Model 45 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. Tubes, type 75 2d detector, type 42 output tube, and type 80 rectifier. The power consumption is 65 watts. The intermediate frequency is 460 K.C.

Power Transformer Voltages

Terminals	Volts	Circuit	Color Leads
1-2	120	Primary	White
3-4	5.0	Fil. of 80	Blue
5-7	660	Plates of 80	Yellow
8-10	6.3	Filaments	Black
6	...	Center of 5-7	Yellow—Green tr.
9	...	Center of 8-10	Black—Yellow tr.

Tube Socket Voltages

CIRCUIT	Det. Osc.	1st IF	2d IF	2d Det.	Output	Rect.
Type Tube	6A7	39-44	39-44	75	42	80
Filament (F to F).........	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)............	260	255	255	175	250	335
Screen Grid (SG to K).....	G1-35 G2-135 G3&5-85	75	75	...	260	...
Cathode (K to F).........	4.2	3.8	3.8	0	0	...

The above tests were made with an AC voltmeter for filament voltages and a high resistance DC voltmeter for all others. Dial at 550 KC, volume control at maximum. Test made with test prods applied to socket terminals underneath chassis. Line voltage 115.

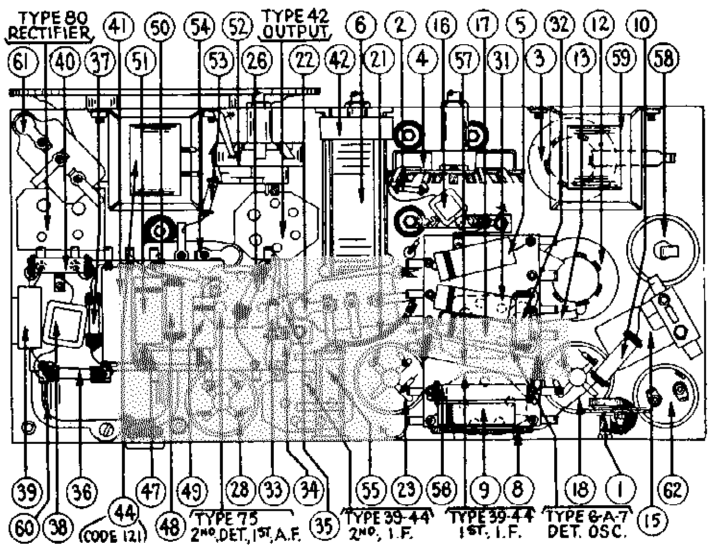


Fig. 4—Bottom View Showing Parts

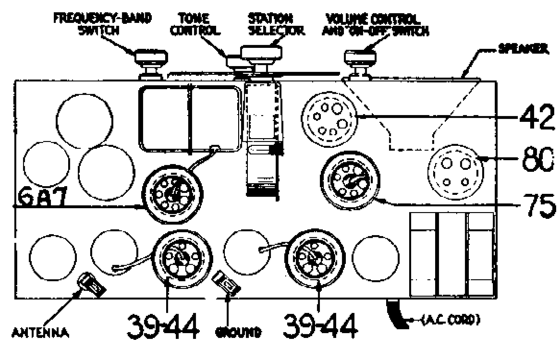


Fig. 2—Chassis Top View

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in model 45, an accurately calibrated signal generator and a special insulated padding wrench are needed. We suggest the Philco Model 024 Signal Generator or the 048 Tester which includes a similar instrument.

The chassis must be removed from cabinet in order to make all adjustments.

Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 45) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap (1) is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, by inserting the fibre wrench thru the hole near right-hand rear corner of chassis.

DETECTOR, AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator (7) (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser (11) (located on the other section of tuning condenser) to maximum reading.

Finally set the signal generator at 600, tune in this signal and adjust the oscillator "L. F. condenser", located underneath chassis (13 in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left hand end of chassis when facing rear).

MODEL 45
Schematic
Parts List
Socket Layout

PHILCO RADIO & TELEV. CORP.

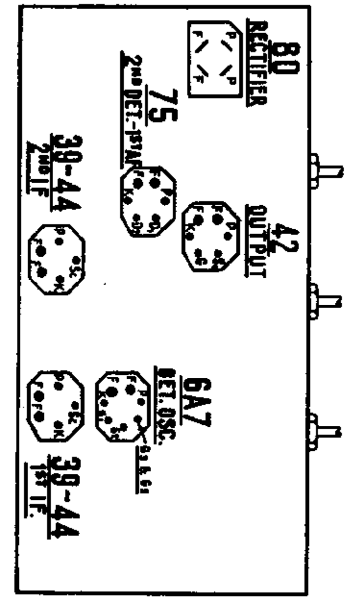
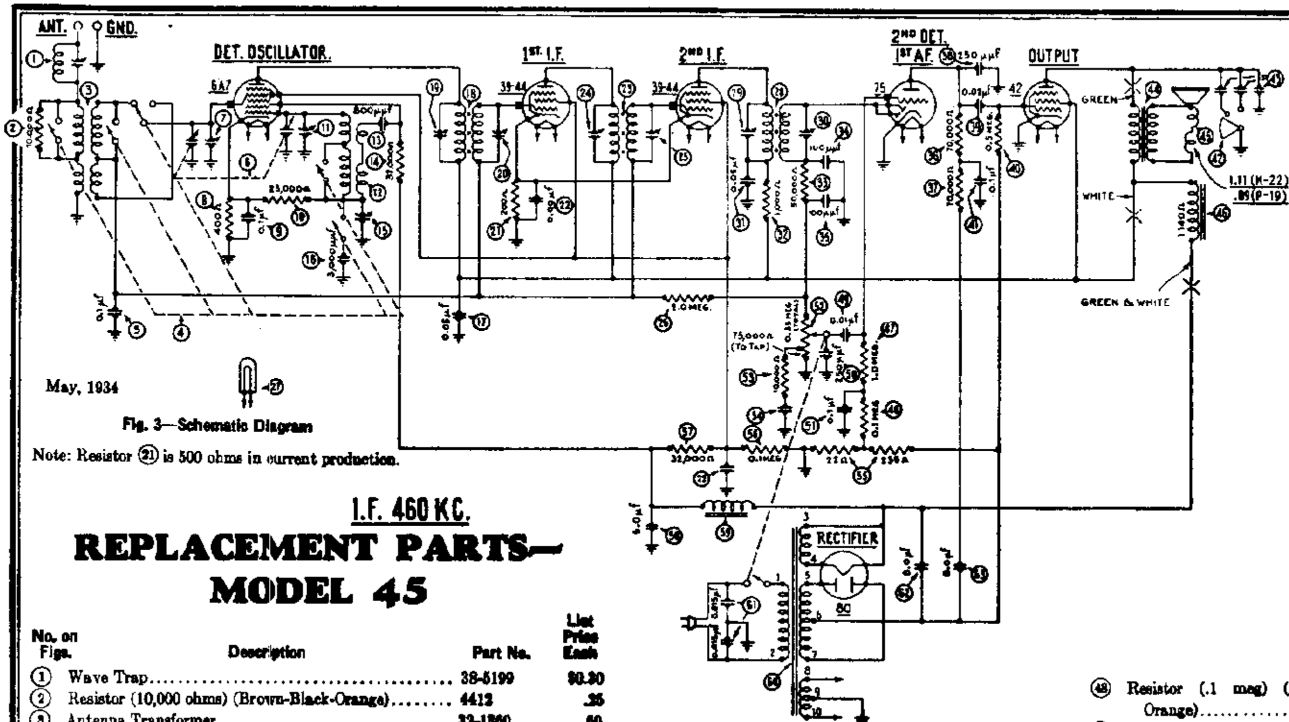


Fig. 1—Tube Socket Layout (underside)



May, 1934

Fig. 3—Schematic Diagram

Note: Resistor (21) is 500 ohms in current production.

I.F. 460 KC.

REPLACEMENT PARTS—MODEL 45

No. on Figs.	Description	Part No.	List Price Each
(1)	Wave Trap	38-5199	$0.30
(2)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(3)	Antenna Transformer	32-1360	.60
(4)	Wave Band Switch	42-1062	1.10
(5)	Condenser (.1 Mfd.) (Tubular)	30-4122	.35
(6)	Tuning Condenser Assembly	31-1169	4.40
(7)	Compensating Condenser (Det.)	Part of (6)	....
(8)	Resistor (400 ohms—Flexible wire wound)	33-3016	.20
(9)	Condenser (.1 Mfd.) (Tubular)	30-4122	.35
(10)	Resistor (25,000 ohms) (Red-Green-Orange)	4516	.25
(11)	Compensating Condenser (Osc. H. F.)	Part of (6)	....
(12)	Oscillator Transformer	32-1361	.65
(13)	Condenser (.0006 Mfd.—Mica)	5878	.35
(14)*	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
(15)	Compensating Condenser (Osc. L. F.)	04000-S	.35
(16)	Condenser (.003 Mfd.—Mica)	7301	.45
(17)	Condenser (.05 Mfd.—Tubular)	30-4123	.35
(18)	1st I. F. Transformer	32-1363	1.50
(19)	Compensating Condenser (1st I. F. Primary)	Part of (18)	....
(20)	Compensating Condenser (1st I. F. Secondary)	Part of (18)	....
(21)	Resistor (500 ohms—Flexible wire wound)	6077	.20
(22)	Condenser (.09 Mfd. twin) (Bakelite block)	4989-Z	.40
(23)	2d I. F. Transformer	32-1363	1.50
(24)	Compensating Condenser (2d I. F. Primary)	Part of (23)	....
(25)	Compensating Condenser (2d I. F. Secondary)	Part of (23)	....
(26)	Resistor (2 megs.) (Red-Black-Green)	5872	.25
(27)	Pilot Lamp	6608	.11
(28)	3d I. F. Transformer	32-1364	1.65
(29)	Compensating Condenser—3d I. F. Primary	Part of (28)	....
(30)	Compensating Condenser—3d I. F. Secondary	Part of (28)	....
(31)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(32)	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
(33)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(34)	Condenser (.0001 Mfd. Mica)	30-1031	....
(35)	Condenser (.0001 Mfd. Mica)	30-1031	....
(36)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(37)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(38)	Condenser (.00025 Mfd. Mica)	5858	.35
(39)	Condenser (.02 Mfd. Tubular)	30-4113	.30
(40)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
(41)	Condenser (.1 Mfd.) (Tubular)	30-4170	.35
(42)	Tone Control	30-4178	.75
(43)	Condensers	Inside 42	....
(44)	Output Transformer (Code 121)	32-7041	.95
*	Output Transformer (Code 122)	2580	1.25
(45)*	Voice Coil & Cone Assembly		
	P-19 (Compact)	36-3027	.50
	K-22 (Lowboy)	30-3174	.40
(46)*	Field Coil and Pot Assembly		
	P-19 (Compact)	36-3298	3.00
	K-22 (Lowboy)	02767	2.70
(47)	Resistor (1 meg.) (Brown-Black-Green)	4409	.25
(48)	Resistor (.1 meg) (White-White-Orange)	4411	.25
(49)	Condenser (.01 Mfd. Tubular)	30-4124	.25
	*Does not appear in Fig. 4.		
(50)	Condenser (.00025 Mfd. Mica)	5858	$0.35
(51)	Condenser (.1 Mfd. Tubular)	30-4122	.35
(52)	Volume Control and On-Off Switch	33-5066	1.45
(53)	Resistor 10,000 ohms (Brown-Black-Orange)	33-1000	.25
(54)	Condenser (Code 121) (.05 Mfd.) (Bakelite Block)	3615-W	.35
	Condenser (Code 122) (.09 Mfd.) (Bakelite Block)	4989-AM	.35
(55)	Voltage Divider (BC Resistor 22—235 ohms) (Wire wound)	33-3037	.20
(56)	Resistor .1 meg (White-White-Orange)	3767	.25
(57)	Resistor 32,000 ohms (Orange-Red-Orange)	33-1026	.25
(58)	Condenser (Electrolytic—6 Mfd.)	30-2020	1.40
(59)	Filter Choke	32-7018	1.50
(60)	Power Transformer	32-7226	4.25
(61)	Condenser (.015 Mfd. twin—Bakelite block)	3793-E	.40
(62) (63)	Condenser (Electrolytic 8—8 Mfd. 450 Volts)	30-3028	2.40
	A. C. Cord and Plug Assembly	L-943-A	.60
	Tube Shield	28-1107	.10
	Four Prong Socket	4955	.10
	Five Prong Socket	4956	.11
	Six Prong Socket	6417	.11
	Seven Prong Socket	27-6006	.11
	Speaker Socket (Lowboy set—code 122)	4957	.10
	Knob	27-4052	.10
	Knob (Large) (Lowboy only)	27-4051	.10
	Dial Assembly	31-1208	.45
	Dial Scale	27-5042	.17
	Mounting screw (Compact set)	W-1345	2.75 C.
	Mounting Washer (Compact set)	5068	.85 C.
	Foot (Rubber)	27-4116	.05

MODEL 49
Alignment Data
Parts List

PHILCO RADIO & TELEV. CORP.

Model 49 is a superheterodyne radio receiver designed for operation on 115 volts direct current (D. C.) only. Model 49 covers two bands of frequencies—from 530 to 1720 KC and from 4.2 to 12.0 megacycles. This gives either standard or short wave reception by turning the wave-band switch on the panel. The intermediate frequency (I. F.) of the set is 260 kilocycles. The power consumption of Model 49 is 50 watts. The receiver uses the following tubes: Type 6A7 detector-oscillator; type 78, R. F.; type 78, I. F.; type 85 2nd detector—1st A. F.; type 76 driver; two (2) type 43 output tubes.

Adjusting Compensating Condensers

For adjusting compensating or padding condensers in Model 49, an accurately calibrated signal generator covering the broadcast range of frequencies is required and also a crystal controlled signal generator for the high frequency adjustments. For the former we suggest the Philco Model 024 Signal Generator and for the latter the Model 091, Crystal Controlled high frequency signal generator. The actual adjusting calls for a special insulated hex wrench and insulated screwdriver. Philco Part No. 3164 Fibre Wrench and No. 27-1159 Screwdriver are recommended. An output meter is also required, for connection to the receiver. Figs. 1 and 2 show the locations of the various compensating condensers.

I. F. ADJUSTMENT—The I. F. (intermediate frequency) of Model 49 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter adapter leads to the plates of the output tubes (type 43) in the receiver. Set the wave-band switch at the left position (standard broadcast).

Set the wave switch of the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. (21) and (23) in Fig. 2) and the 2d I. F. primary and secondary condensers ((26) and (28)) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

NOW REMOVE Antenna lead of signal generator from grid cap of 6A7 tube and reconnect it to antenna post of receiver. Replace cap on 6A7 tube.

ANTENNA, DETECTOR AND OSCILLATOR H. F. (Broadcast)—These condensers Nos. (8), (12), and (14), are located on top of the tuning condenser gang (See Fig. 2) adjustment made by means of the fibre wrench. Set the signal generator at 1500 K. C., tune in the signal at 1500 on dial and adjust these condensers in the order given, to give maximum output reading. (8) is located on the section nearest the front and (12) on the center section.

OSCILLATOR—LOW FREQUENCY—This is condenser (17) (see Fig. 1) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers (4) (Ant.) and (15) (Osc. H. F.) located underneath chassis. (4) is adjusted from underneath, and (15) from above, thru hole in sub-base directly behind tuning condenser assembly. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the wave-band switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

REPLACEMENT PARTS

Nos. on Diagram	Description	Part No.	List Price
(1)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	$0.25
(2)	Antenna (R. F.) Transformer	32-1379	.70
(3)	Wave-band Switch	42-1046	.80
(4)	Compensating Condenser (Ant. S. W.)	04000D	.15
(5)	Tuning Condenser Assembly	31-1334	6.85
(6)	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115	.25
(7)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(8)	Compensating Condenser (Ant.)	Part of (5)	....
(9)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(10)	Detector Transformer	32-1427	.90
(11)	Condenser (.000015 Mica)	30-1030	.35
(12)	Compensating Condenser (Det.)	Part of (5)	....
(13)	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331	.25
(14)	Compensating Condenser (Osc. H. F.)	Part of (5)	....
(15)	Compensating Condenser (Osc. S. W.)	31-6016	.15
(16)	Oscillator Transformer	32-1428	.70
(17)	Compensating Condenser (Osc. L. F.)	04000R	.45
(18)	Condenser (.003 Mfd. Mica)	30-1028	.60
(19)	Condenser (.0008 Mfd. Mica)	6021	.35
(20)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(21)	Compensating Condenser (1st I. F. Primary)	Part of (22)	....
(22)	First I. F. Transformer	32-1381	1.50
(23)	Compensating Condenser (1st I. F. Secondary)	Part of (22)	....
(24)	Resistor 70,000 ohms (Violet-Black-Orange)	33-1115	.25
(25)	Condenser (.09 Mfd. Bakelite Block)	4989N	.35
(26)	Compensating Condenser (2d I. F. Primary)	Part of (27)	....
(27)	2d I. F. Transformer	32-1424	1.00
(28)	Compensating Condenser (2d I. F. Secondary)	Part of (27)	....
(29)	Condenser (.00011 Twin Bakelite Block)	8035E	.25
(30)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
(31)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(32)	Resistor (250,000 ohms) (Red-Yellow-Yellow)	33-1097	.25
(33)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(34)	Condenser (.09 Mfd. Bakelite Block)	4989-P	.35
(35)	Volume Control and On-Off Switch	33-5024	1.45
(36)	Condenser (.05 Mfd. Bakelite Block)	3615-H	.35
(37)	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.25
(38)	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.25
(39)	Condenser (Metal Case Block) (.2-.75-.25-.05-.09)	30-4144	1.30
(40)	Resistor (200 ohms Flexible Wire-Wound)	7217	.20
(41)	Condenser (.09 Mfd. Bakelite Block)	4989P	.35
(42)	Shadowmeter	45-2042	2.50
(43)	Condenser (.00011 Mfd. Mica)	30-1006	.35
(44)	Condenser (.05 Mfd. Bakelite Block)	3615AX	.35
(45)	Resistor (.1 Meg.) (White-White-Orange)	6099	.25
(46)	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.25
(47)	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
(48)	Resistor (.1 Meg.) (Yellow-White-Yellow)	6099	.25
(49)	Tone Control	30-4043	.75
(50)	Condensers in Tone Control	Part of (49)	....
(51)	Audio Transformer	32-7211	5.75
(52)	Condenser (.006 Mfd. Bakelite Block)	7625-E	.25
(53)	Output Transformer	2550	1.75
(54)	Voice Coil and Cone Assembly H-10	02625	.80
	K-13	36-3159	.50
(55)	Field Coil and Pot Assembly	02745	$4.25
(56)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(57)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(58)	Filter Choke	32-7213	1.00
(59)	Filter Choke	32-7018	1.50
(60)	B. C. Resistor (Wirewound; 5.1-10.2-27.0-10.8 ohms)	33-3128	.25
(61)	Pilot Lamp (Dial)	4567	.09
(62)	Pilot Lamp (Shadowmeter)	Part of (42)	....
(63)	Condenser (2.0 Mfd. Metal Case)	30-4140	.80
(64)	Condenser (1.0 Mfd. Metal Case)	04357	.75
(65)	Condenser (.15 Mfd. Twin Bakelite Block)	6287-T	.40
(66)	Condenser (.09 Mfd. Twin Bakelite Block)	4989AP	.35
(67)	Resistor (2900 ohms) (Red-White-Red)	5309	.25
(68)	Resistor (2 Meg.) (Red-Black-Green)	33-1025	.25
	Dial Assembly	31-1205	.50
	Dial Scale	27-5046	.25
	Knob (large)	27-4051	.10
	Knob (small)	27-4052	.10
	Five Prong Socket	7546	.10
	Six Prong Socket	7547	.10
	Seven Prong Socket	27-6005	.11
	Chassis Mtg. Screw	W-1358A	2.60 C.
	Chassis Mtg. Foot (Rubber)	27-4116	.05
	Chassis Mtg. Foot Plate	27-7497	.35 C.
	Chassis Mtg. Washer	29-2089	.35 C.
	Speaker Socket	4957	.10
	Cord & Plug Assembly	L-943A	.60

MODEL 49
Schematic
Voltage, Layouts

PHILCO RADIO & TELEV. CORP.

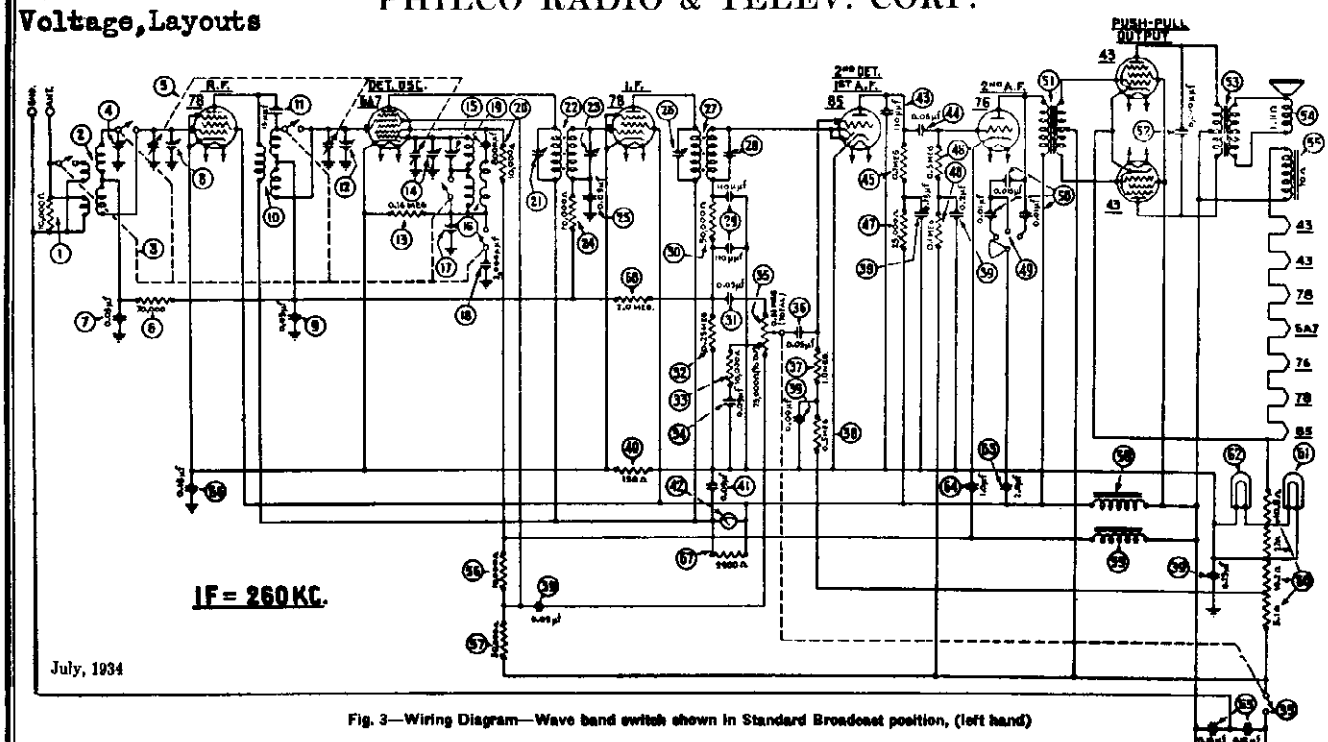


Fig. 3—Wiring Diagram—Wave band switch shown in Standard Broadcast position, (left hand)

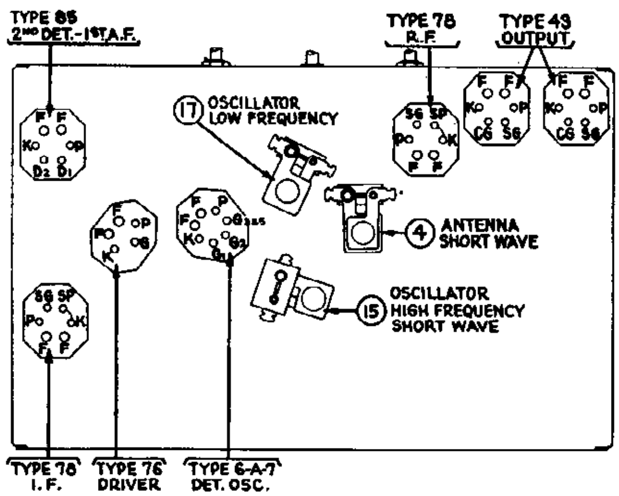


Fig. 1—Tube Sockets

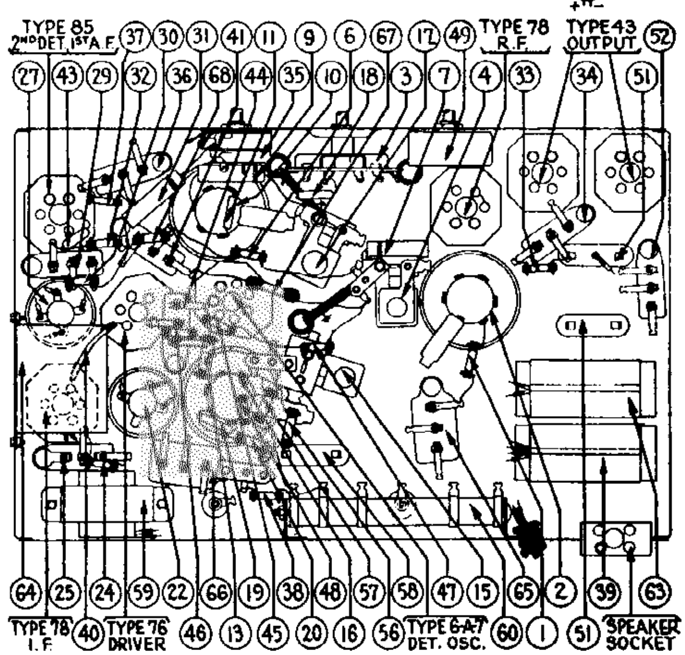


Fig. 4—Bottom View

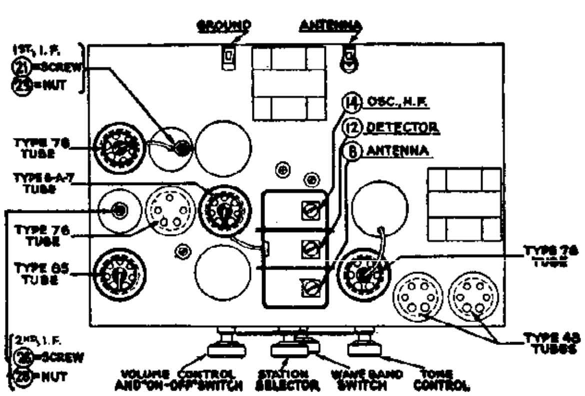


Fig. 2—Top View

All readings above made with a high resistance multirange D. C. voltmeter using test prods applied to tube sockets underneath chassis (See Fig. 1). Volume control at maximum, wave-band switch at left (standard broadcast) and dial at 550 K.C.

Philco Model 025 Circuit Tester or 048 All-Purpose Tester are highly recommended for making the above tests.

Tube Socket Voltages—Line Voltage 120 D.C.

TUBE Type	TUBE Circuit	Filament F to F	Plate P to K	Screen Grid SG to K	Cathode K to F
78	R. F.	5.8	85	100	30
6A7	Det.-Osc.	5.7	90	G3&5-K:85 G2 -K:80 G1 -K:12	22
78	I. F.	6.3	90	100	15
85	2d Det.—1st A. F.	6.3	40	...	15
76	Driver	6.3	100	...	20
43 43	Output	2.6 2.6	100 100	105 105	60 60

PHILCO RADIO & TELEV. CORP.

Model 59

Philco Model 59 is a four-tube superheterodyne receiver operating on alternating current, capable of receiving standard broadcasts, and police calls on the first (lowest) police range. The tubes are as follows: Type 77 detector-oscillator, type 77 second detector, type 42 output and type 80 rectifier. The intermediate frequency is 460 K.C. The power consumption of model 59 is 52 watts.

Tube Socket Data—Line 115 Volts

Circuit	Det. Osc.	2nd Det.	Out-put	Recti-fier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	4.8
Plate Volts—P to K	235	45	235	300
Screen Grid Volts—SG to K	110	35	250	....
Control Grid Volts—CG to K	10.5	.25	.25	....
Cathode Volts—K to F	25	15	15	....

Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1- 2	105-125	Primary	White
3- 5	6.3	Filament	Black
6- 7	5.0	Filament of 80	Blue
8-10	580	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black-Yellow Tracer
9	...	Center Tap of 8-10	Yellow-Green Tracer

*All of the above readings were taken from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high resistance multirange D. C. voltmeter for all other readings. Volume control at maximum and station selector turned to low frequency end. Readings taken with a plug-in adapter will NOT be satisfactory. The Philco Model 048 All-Purpose Set Tester is recommended for all tests of Model 59.

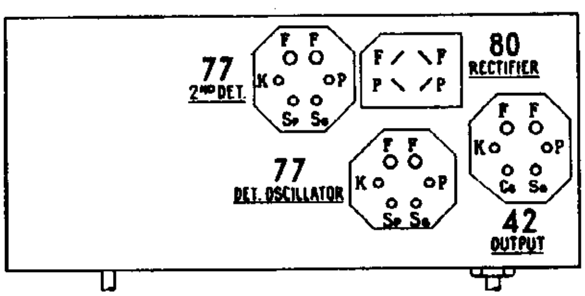


Fig. 1—Tube Socket Layout (Viewed from Bottom)

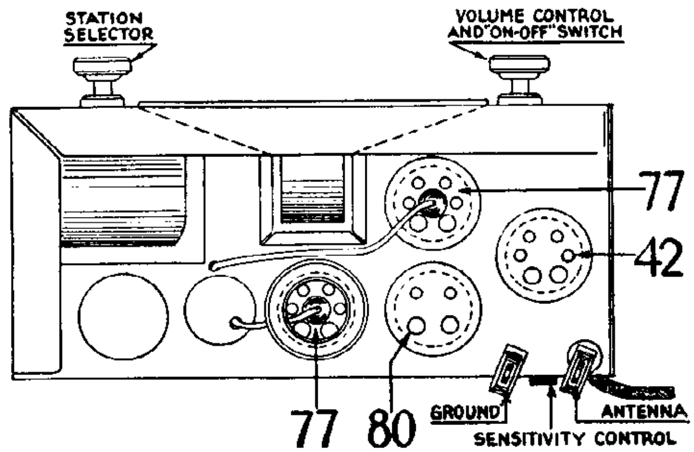


Fig. 2—Top View of Chassis

Adjusting Compensating Condensers

In Model 59 the I. F. primary and secondary condensers and the "regeneration" compensating condenser are located at the rear of chassis and accessible from the rear; the "ANT" and "OSC H. F." are located on the side of the tuning condenser gang.

Referring to Fig. 3, the I. F. primary and secondary condensers (8) and (15) should be adjusted first. Use an accurate signal generator such as the Philco Model 024. Remove the grid cap clip from the detector-oscillator tube and connect the antenna lead from the signal generator to the cap of this tube. Connect the ground lead from the signal generator to the ground terminal of the set. Connect the primary terminals of the output transformer to an output meter. Set the frequency switch of the signal generator at 460 K.C. (the I. F. of model 59), and turn the switches of the set and signal generator on. Turn volume control full on. Turn the dial pointer on the set to 600, and then adjust the I. F. compensating condensers (8) and (15) by means of a fibre wrench so that maximum reading is obtained in the output meter. If the needle goes off scale, adjust the attenuator on the signal generator so that a lower reading is obtained.

Next adjust the ANT. and OSC. H. F. (high frequency) condensers (4) and (9) located on the tuning condenser gang. To adjust these condensers it is necessary to remove the chassis from the cabinet, necessitating removing back plate, base screws, knobs and pointers. Replace the grid clip on the 77 tube and connect the antenna and ground leads of the signal generator direct to the antenna and ground terminals of the set. Set the signal generator switch at 1400, turn the tuning condenser shaft until the rotary plates barely start to mesh with the stationary ones. Tune in the 1400 K.C. signal here and adjust condensers (4) and (9) for maximum output meter reading. When replacing the dial pointer, be sure it is mounted exactly as it was removed.

Finally adjust the regeneration condenser (16). With the set connected to an antenna, turn the station selector to receive a station at about 130 on the dial. With a screw driver turn the small fibre hex-head screw (which operates the regeneration condenser) located at rear of chassis below antenna and ground terminals, clockwise until the set squeals or oscillates. Then turn the hex-screw ¼ of a turn back until the squealing stops. Tune in other stations on different points on the scale to make sure that the squealing is eliminated. It will be necessary to readjust this condenser if a different type 77 tube is used for second detector.

MODEL 59
Schematic
Chassis, Parts List

PHILCO RADIO & TELEV. CORP.

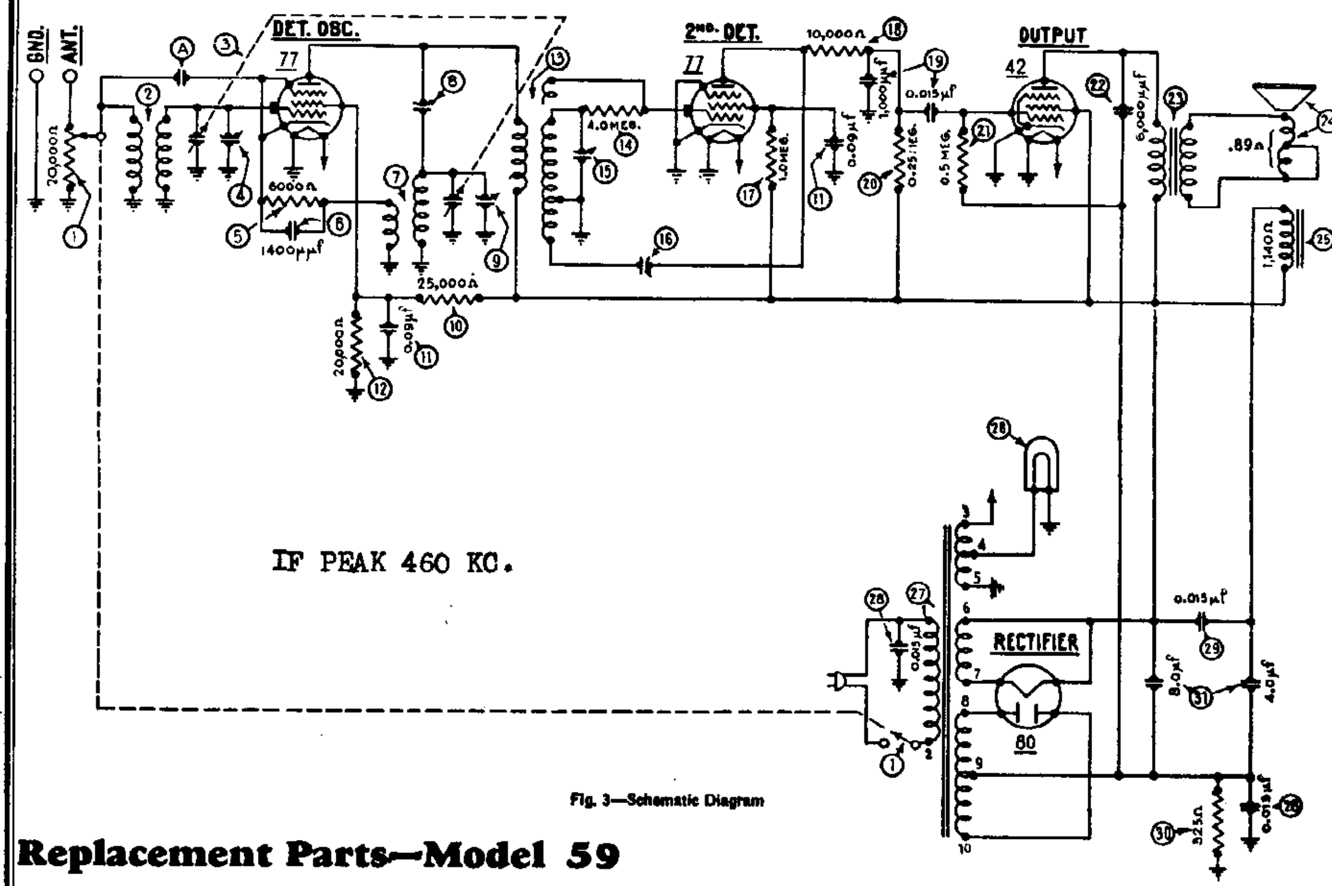


Fig. 3—Schematic Diagram

Replacement Parts—Model 59

No. on Diagram	Item	Part No.	List Price
1	Volume Control and On-Off Switch	33-5057	$1.40
2	Antenna Transformer	32-1388	.45
3*	Tuning Condenser Assembly	31-1190	2.75
4*	Compensating Condenser—Ant.	Part of 3	....
5	Resistor (6,000 ohms—Blue-Black-Red)	7352	.25
6	Condenser (.0014 Mfd.—Mica)	7007	.35
7	Oscillator Transformer	32-1389	.40
8	Compensating Condenser (I. F. Primary)	04000-A	.15
9*	Compensating Condenser (Osc. H. F.)	Part of 3	....
10	Resistor (25,000 ohms—Red-Green-Orange)	3656	.25
11*	Condenser (.09 twin—Black Bakelite)	4989-C	.40
12	Resistor (20,000 ohms—Red-Black-Orange)	6650	.25
13	I. F. Transformer	32-1155	1.20
14*	Resistor (4 Megohms—Yellow-Black-Green)	6010	.25
15	Compensating Condenser (I. F. Secondary)	04000-D	.15
16	Compensating Condenser (Regeneration)	04000	.20
17	Resistor (1 Megohm—Brown-Black-Green)	33-1096	.25
18	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
19	Condenser (.015-.0001 Mfd. Block type)	7762-B	.30
20	Resistor (250,000 ohms—Red-Yellow-Yellow)	33-1097	.25
21	Resistor (500,000 ohms—Yellow-White-Yellow)	6097	.25
22*	Condenser (.006 Mfd. Block type)	7625-E	.25
23*	Output Transformer	32-7041	.95
24*	Voice Coil and Cone Assembly	36-3029	.75
25*	Field Coil and Pot Assembly	36-3061	1.75
26*	Pilot Lamp	6608	.11
27	Power Transformer	32-7064	3.15
28	Condenser (.015 Mfd. Twin)	3793-R	.40
29	Condenser (.015 Mfd.)	See Note A below	
30	Resistor (Wire wound 325 ohms)	7465	.15
31	Condenser (Electrolytic 8.0—4.0 Mfd.)	30-2013	1.95
	Tube Shield	28-1107	.10
	Four Prong Tube Socket	7544	.10
	Six Prong Tube Socket	7547	.11
	A. C. Cord and Plug	L-943A	.60
	Dial Scale	27-5023	.15

*Does not show in Fig. 4.

Note A: Condenser 29 not used in production.

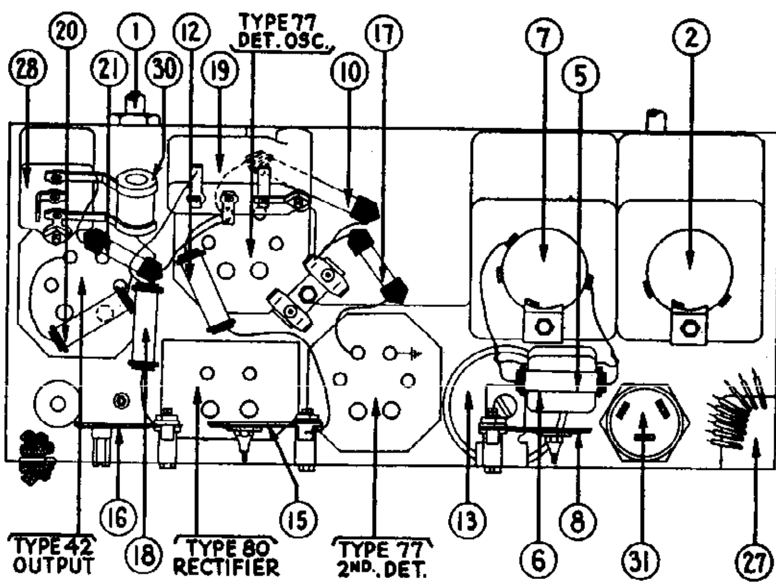


Fig. 4—Base View

May, 1934

PHILCO RADIO & TELEV. CORP.

Model 66

Model 66 is a five-tube superheterodyne radio receiver, capable of receiving either standard broadcasts (and police calls up to 1720 K.C.), or short-wave stations within a frequency range of 5.5 to 16.0 megacycles. The frequency range on standard broadcast is 540-1720 kilocycles.

The tubes used are: Type 6A7 detector-oscillator, type 78 intermediate frequency, type 75 2d detector, type 42 output and type 80 rectifier. The intermediate frequency of the Model 66 is 460 K.C. and the power consumption is 60 watts.

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 66 Receiver requires the use of an accurate signal generator such as Philco Model 024, an efficient output meter (Philco Model 012 or Model 025 are recommended), and a suitable fibre hex wrench. Connect the output meter to the plate and cathode prongs of the 42 output tube.

Adjustments are made in the following order:

(1)—I. F. (Intermediate Frequency)—Remove grid clip from cap on 6A7 tube and connect antenna lead from signal generator to cap of tube. Connect ground lead to ground post on set. Turn on set and signal generator; set wave switch of latter to 460 K. C. (the I. F. of Model 66) and dial of set at 540, wave band switch to left. Adjust each of the four I. F. compensating condensers 17, 19, 22 and 24 in turn so that maximum reading is obtained in the output meter. If the meter reading goes off scale, adjust the attenuator on the signal generator so as to get a lower reading. These I. F. condensers (visible in Fig. 4) are adjusted by inserting the hex wrench thru the holes in rear of chassis sub-base (except one to extreme left when facing rear of set). Two of the holes are covered by small metal buttons which can be removed temporarily by hand.

(2)—WAVE TRAP—Replace grid clip on cap of 6A7 tube and connect antenna lead from signal generator to antenna post on set. Set signal generator at 460 K. C. and adjust wave trap 1 so as to get MINIMUM reading in output meter.

(3)—ANT. and OSC. H. F.—These adjustments 7 and 11 are located on top of the tuning condenser assembly at right (facing front of set) and adjusted from above. The "ANT" 7 is nearest front of set. Set signal generator at 1700 and dial of set at 1700 and adjust these two condensers to get maximum output meter reading.

(4)—OSC. L. F.—This condenser 13 is located underneath chassis (see Fig. 4) and is reached from underneath. Set dial of set and signal generator switch at 600, and adjust for maximum reading.

Replacement Parts for Model 66

No. on Figs.	Description	Part No.	List Price
1	Wave Trap	38-5199	$0.30
2	Wave-band Switch	42-1066	.90
3	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
4	Antenna Transformer	32-1412	.85
5	Condenser (.000015 Mfd.)	30-1030	.35
6	Tuning Condenser Assembly	31-1231	3.65
7	Compensating Condenser (ANT)	Part of 6	....
8	Resistor (200 ohms Flexible) (Red-Black-Brown)	7217	.20
9	Condenser (.05 Mfd. Tubular)	30-4020	.35
10	Resistor (50,000 ohms) (Green-Green-Orange)	6098	.25
11	Compensating Condenser (OSC. HF)	Part of 6	....
12	Condenser (.003 Mfd. Mica)	30-1028	.60
13	Compensating Condenser (Osc. I. F.)	04000-S	.35
14	Condenser (.0008 Mfd. Mica)	5878	35
15	Resistor (32,000 ohms) (Orange-Red-Orange)	5279	.25
16	Oscillator Transformer	32-1413	.60
17	Compensating Condenser (1st I. F. Pri.)	04000M	.20
18	1st I. F. Transformer	32-1414	1.00
19	Compensating Condenser (1st I. F. Secondary)	04000M	.20
20	Resistor (400 ohms Flexible)	33-3016	.20
21	Condenser (.05 Mfd. Tubular)	30-4020	.35
22	Compensating Condenser (2d I. F. Primary)	04000M	.20
23	2d I. F Transformer	32-1415	$1.00
24	Compensating Condenser (2d I. F. Secondary)	04000J	.20
25	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
26	Condenser (.0001 Mfd. Twin Bakelite Block)	8035-B	.25
27	Condenser (.1 Mfd. Tubular)	30-4170	.35
28	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115	.25
29	Resistor (70 000 ohms) (Violet-Black-Orange)	33-1115	.25
30	Condenser (.00011 Mfd. Mica)	30-1006	.35
31	Condenser (.02 Mfd. Tubular)	30-4113	.30
32	Resistor (500,000 ohms) (Yellow-White-Yellow)	6097	.25
33	Tone Control	30-4192	.50
34	Condensers in Tone Control	Inside 33	....
35	Output Transformer	32-7019	1.25
36	Voice Coil & Cone Assembly (S-12)	36-3014	.60
37	Field Coil and Pot. Assembly (S-12)	36-3341	2.75
38	Resistor (2 Megohms) (Red-Black-Green)	33-1025	.25
39	Volume Control and On-Off Switch	33-5006	1.45
40	Condenser (.01 Mfd.) (Bakelite Block)	3903-AB	.25
41	Resistor (1 Megohm) (Brown-Black-Green)	33-1096	.25
42	Condenser (.1 Mfd.)	30-4122	.35
43	Resistor (.1 Meg.) (White-White-Orange)	6099	.25
44	Resistor (B C. Wire-wound) (22-235 ohms)	33-3037	.20
45	Resistor (.1 Meg.) (White-White-Orange)	6099	$0.25
46	Condenser (.05 Mfd. Tubular)	30-4123	.35
47	Resistor (37,000 ohms) (Orange-Violet-Orange)	33-1098	.35
48	Filter Choke	32-7018	1.50
49	Condenser (Electrolytic—6 Mfd.)	30-2021	1.55
50	Condenser (Electrolytic—8-8 Mfd.)	30-2028	2.40
51	Condenser (.09 Mfd. Bakelite Block)	4989-D	.35
52	Power Transformer	8046	3.45
53	Condenser (.015 Mfd. Bakelite Block)	3793-W	.35
54	Condenser (.05 Mfd. Tubular)	30-4020	.35
55	Dial Light	6608	.11
	Four Prong Socket	7544	.10
	Six Prong Socket	7547	.11
	Seven Prong Socket	27-6005	.11
	Tube Shield	28-1107	.10
	Chassis Mounting Screw	W-567	3.00C
	Chassis Mounting Washer (Metal)	W-315	.50C
	Chassis Mounting Washer (Rubber)	5189	.04
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Dial Assembly	31-1234	.30
	Dial Scale	27-5057	.10
	A. C. Cord and Plug Assembly	[illegible]3A	.60

Tube Socket Voltages—Line Voltage 115

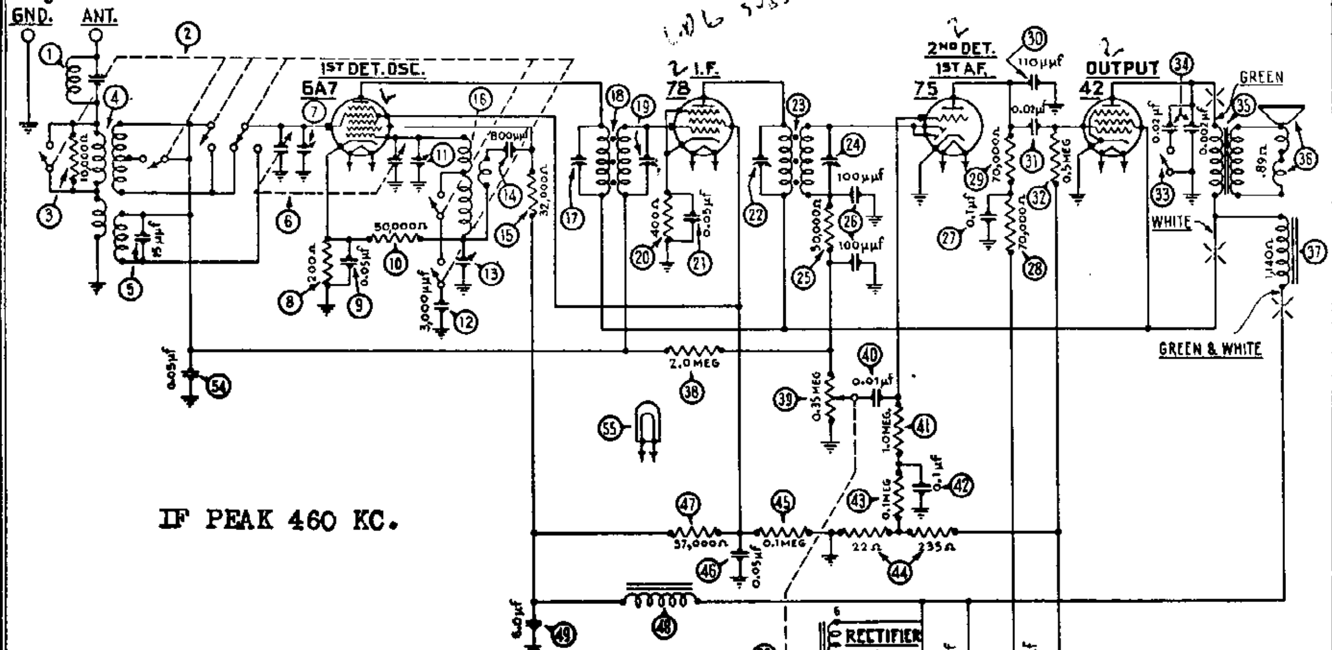
Tube	6A7	78	75	42	80
Circuit	Det. Osc.	I. F.	2d Det.	Output	Rect.
Filament (F-F)	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	260	260	160	*250	340
Screen (SG-K)	85	85	...	260	
Cathode (K-F)	2.1	2.2	0	0	...

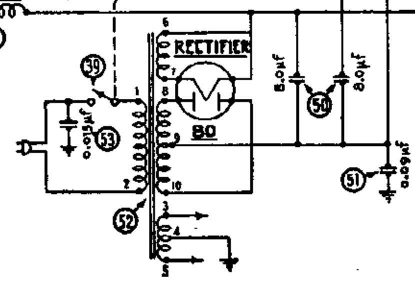
6A7-G1-K: 20; 6A7-G2-K: 130.

The above voltages were obtained by using a high resistance multi-range DC voltmeter, and an AC voltmeter for filaments. Tests made with test prods applied to tube sockets at underside of chassis (see Fig. 1). Volume control at maximum, dial at low frequency end of scale.

MODEL 66
Schematic
Layouts

PHILCO RADIO & TELEV. CORP.





June, 1934

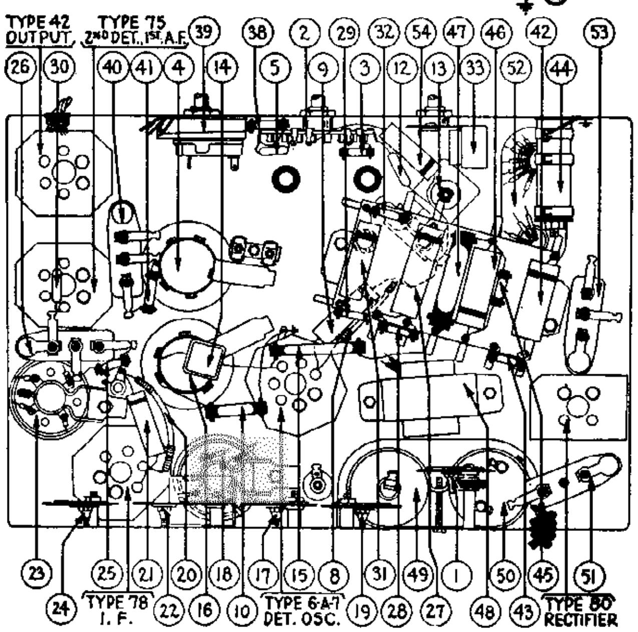


Fig. 4—Base View

Power Transformer Data

Terminals	Volts	Circuit	Color of Leads
1-2	105-125	Primary	White
3-5	6.3	Filaments	Black
6-7	5.0	Filament of 80	Blue
8-10	680	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black—Yellow Tracer
9	...	Center Tap of 8-10	Yellow—Green Tracer

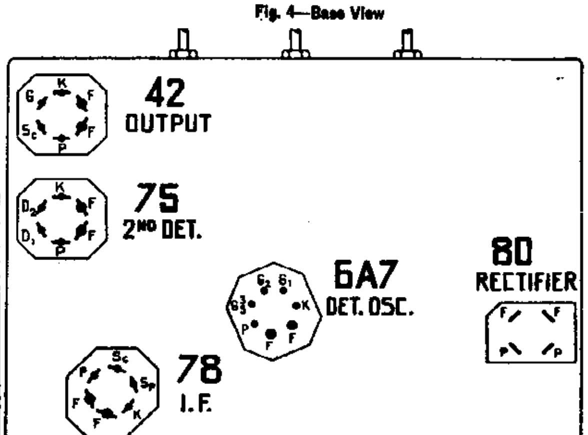


Fig. 1—Tube Sockets (Underside)

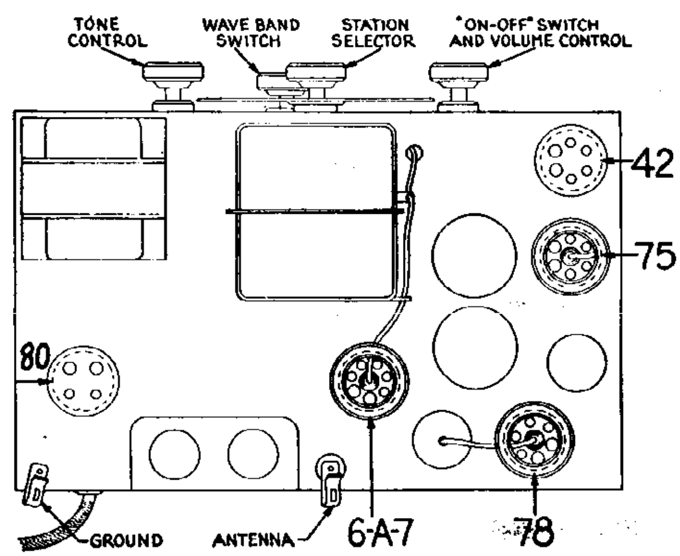


Fig. 2—Top View of Chassis

PHILCO RADIO & TELEV. CORP.

Model 49

A change in the Shadowmeter Circuit on this model becomes effective with Run No. 4. This is in order to reduce the current thru the shadowmeter.

Referring to Figure 3 of Service Bulletin No. 199, the lead from the primary of ㉗ (2nd I. F. transformer) is removed from one side of the Shadowmeter ㊷ and connected to the other side. Resistor ㊸, Part No. 5809 is omitted.

In list of tubes for Model 49 (DC), correct to read 2 type 78 instead of 3.

Starting with Run No. 3, Part ㊾ , 3615AX By-Pass Condenser will be replaced with 3615BB. This change facilitates wiring in the factory.

Model 66

Starting with Run No. 9 the following changes in compensating condensers will be made, which will make padding adjustments less critical.

Replace condenser ⑰, 04000M with an 04000J, and condenser ⑲ 04000M with an 04000A.

Connect a mica condenser, Part No. 30-1029 (.00005 mfd.) across ⑲.

Effective July 1st, a new wave trap will be used. Part ① in diagram will be Part No. 38-5994 instead of 38-5199 previously used. The new wave trap uses an improved construction which facilitates mounting.

Starting July 10th, a 70-ohm wire wound resistor Part No. 33-1129 will be added. Connected in series with condenser ⑭ on the oscillator coil side. This will prevent oscillation at extreme high frequency end of the short wave band.

The part number of the Tone Control on Model 66 will be 30-4212 instead of 30-4192 previously used. No change in wiring needed. The new Tone Control gives a slight desirable increase in response to high notes.

Effective August 1st, a 50 Mmfd. Mica Condenser, Part No. 30-1029 was added across the secondary of the 2nd I. F. Transformer. This makes adjustment of the 2nd I. F. Padder smoother and easier.

At the same time a 20,000 Ohm Resistor, Part No. 6650 was added, connected between the arm of the wave-band switch and the grounded junction of ⑥ and ⑨ This corrects any tendency toward oscillation on the high end of the short-wave band.

A 70-Ohm flexible wire-wound resistor is also added, Part No. 33-3027, connected in series between condenser ⑭ and the upper end (on diagram) of the oscillator transformer plate winding.

CURRENT MODELS—IMPROVEMENT IN COMPENSATING CONDENSER

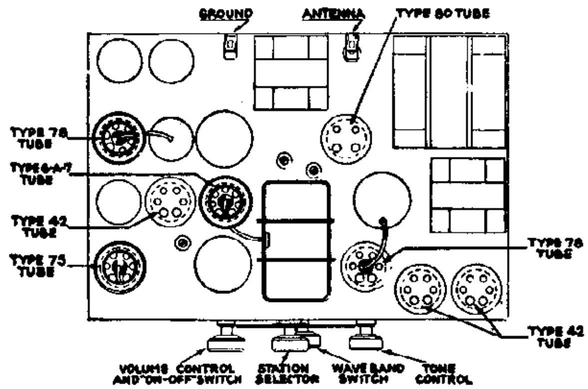
To prevent any tendency to "Frequency Drifting" in current models, a bakelite washer and a metal washer are now being used on top of the Compensating Condenser, in place of the fibre washer previously used.

Part No. of bakelite washer is 27-4109, and of the metal washer (placed on top of bakelite) is W-1331. These two replace the old fibre washer Part No. 3500.

MODEL 118
Layout Change
MODEL 118 (Code 121)
MODEL 118 (Code 123-RX)
Changes

PHILCO RADIO & TELEV. CORP.

Model 118



Incorrect cut was used by printer for Fig. 2 of this Bulletin. Correct cut is reproduced herewith and is same as Fig. 1 of Instruction Book on Model 118.

Correct price of dial scale, Part No. 27-5046 is $0.25

Effective with Run No. 8 on Code 121 and Run No. 2 on Code 123 (RX), the following parts on Model 118 will be changed. These changes are made to facilitate wiring. Note that resistors are not changed in value, but in current rating only. New resistors are 1/3 watt rating.

No. on Bulletin 194	*Old Part No.*	*New Part No.*	*No. on Bulletin 194*	*Old Part No.*	*New Part No.*
(9)	3615-BK	3615-AU	[illegible]	4517	6097
[illegible]	3615-D	3615-AP (twin)	[illegible]	4409	33-1096
[illegible]	4517	6097	[illegible]	4410	33-1097
[illegible]	4412	33-1000	[illegible]	4411	6099
[illegible]	5385	33-1115	[illegible]	4519	30-1031
[illegible]	4518	6098	[illegible]	30-4020	Included in [illegible]
(15)	5872	33-1025			

In the Model 118A (25 Cycle Model) the part numbers of parts which differ from the 60 Cycle Model are

(70) Power Transformer 32-7112 $8.00 list price
(72) Condenser 30-4093 (1.0 Mfd.) 0.60 list price

Also add a condenser, .1 Mfd. Tubular, Part No. 30-4122 connected across field coil of Speaker.

Model 118 (Code 123-RX)

Replacement parts on Model 118-RX which differ from other 118 models are as follows:

No. on Bulletin 194	*Model 118*	*118-RX*
(74) Electrolytic condenser	30-2025	30-2014
([illegible]) Tuning condenser	31-1178	31-1242
Dial assembly	31-1205	31-1241
Dial scale	27-5046	27-5058

Model 118-RX uses a type HR-2 speaker, which is equipped with a 25′ cable-and-plug assembly, part No. 36-3327.

The A. C. cord on Model 118-RX is a flat cable and contains an extra wire, which is for use as an antenna lead by connecting the antenna to the binding post mounted on the side of the special flat A. C. plug used. However, the antenna *may* be connected to the regular antenna clip terminal on the receiver chassis if desired and more convenient.

The part number of this special cable and plug assembly is 41-3104.

PHILCO RADIO & TELEV. CORP.

Model 118

Philco Model 118 is an eight tube superheterodyne radio receiver operating on alternating current (A. C.) and designed for reception on either the standard broadcast band (including police bands up to 1720 K. C.), or a major section of the short wave band. A two-position switch changes reception from broadcast to short-wave. The frequency ranges are 540 to 1720 K. C. and 4.2 to 12 megacycles.

Model 118 is equipped with shadow-tuning, four point tone control with fixed bass compensation, and automatic volume control. The power consumption is 110 watts and the undistorted output of the Super Class "A" Amplifier is 10 watts. The intermediate frequency (I. F.) is 260 K. C.

Model 118 is equipped with the following tubes:

R. F.	Type 78
Detector-Oscillator	Type 6A7
I. F.	Type 78
2d Det. 1st A. F.	Type 75
Driver	Type 42
Output tubes (2) (Connected as triodes)	Type 42
Rectifier	Type 80

Replacement Parts for Model 118

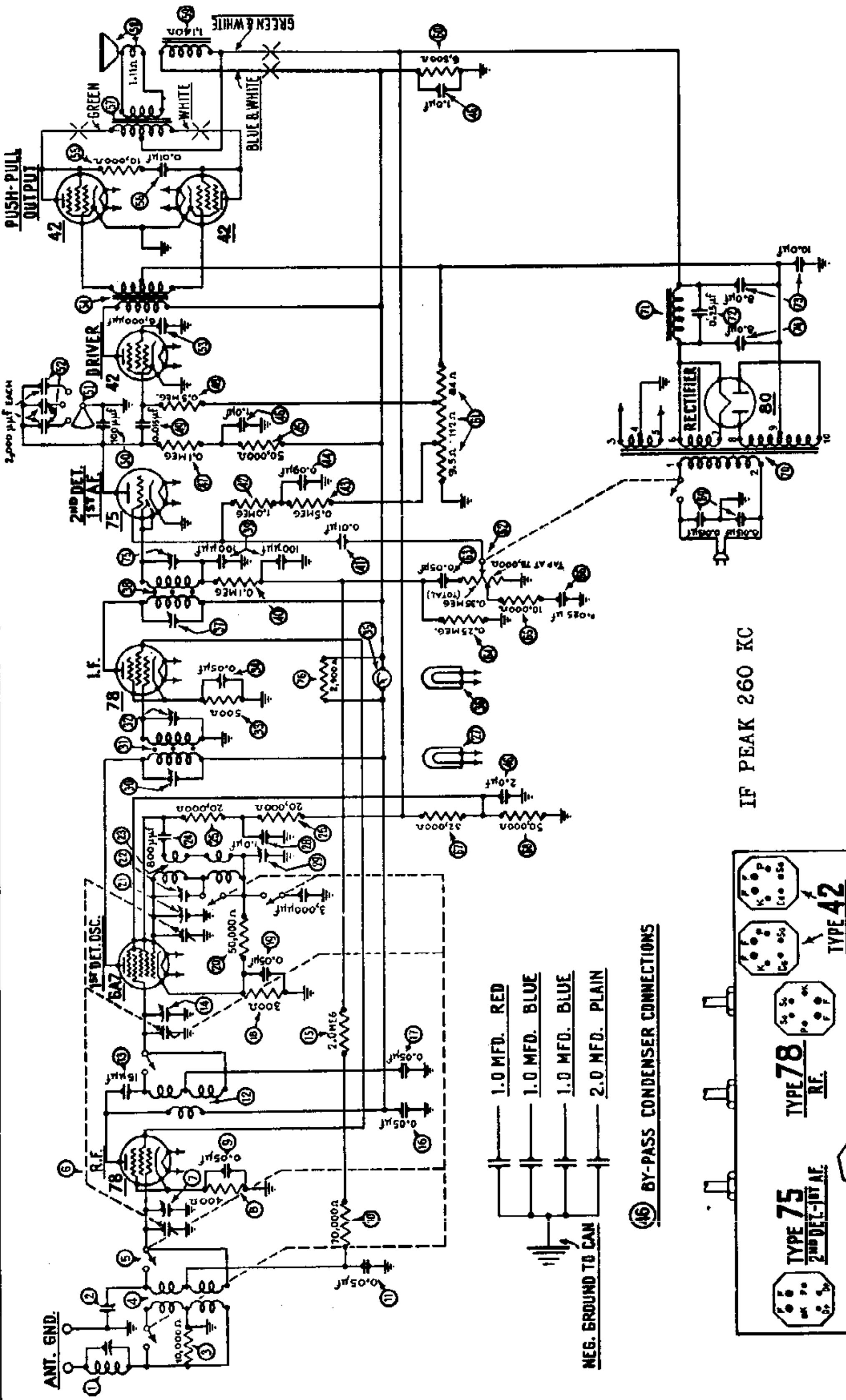
No. on Diagram	Description	Part No.	List Price
1	Wave Trap	38-5740	.45
2	Compensating Condenser (Ant.-H. F.)	04000D	$0.15
3	Resister (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
4	Antenna Transformer	32-1378	1.00
5	Wave Band Switch	42-1046	80
6	Tuning Condenser Assembly	31-1173	6.25
7	Compensating Condenser (Ant.-Broadcast)	Part of 6	....
8	Resistor (400 ohms Flexible Wire-Wound)	33-3016	.20
9	Condenser (.05 Mfd.) (Bakelite Block)	3615BK	.35
10	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
11	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
12	Detector Transformer	32-1379	.70
13	Condenser (.000015 Mfd.) (Mica)	30-1080	.35
14	Compensating Condenser (Det.)	Part of 6	....
15	Resistor (2 Meg.) (Red-Black-Green)	5872	.25
16	Condenser (.05 Mfd.) (Bakelite Block)	3615D	.35
17	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
18	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
19	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
20	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
21	Compensating Condenser (Osc. H. F. Bdcst.)	Part of 6	....
22	Compensating Condenser (Osc. H. F. Shortwave)	31-6016	.30
23	Oscillator Transformer	32-1380	.70
24	Condenser (.0008 Mfd. Mica)	5878	.35
25	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
26	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
27	Pilot Lamp (Station Selector)	6608	.11
28	Compensating Condenser (Osc. L. F.)	04000R	.45
29	Condenser (.003 Mfd. Mica)	7301	.45
30	Compensating Condenser (1st I. F. Pri.)	Part of 31	....
31	1st I. F. Transformer	32-1381	1.50
32	Compensating Condenser (1st I. F. Sec.)	Part of 31	....
33	Resistor (500 ohms Flexible Wire-Wound)	6977	.20
34	Condenser (.05 Mfd.) (Bakelite Block)	3615AU	.35
35	Shadowmeter	6497	2.50
36	Shadowmeter Pilot Lamp	Part of 35	....
37	Compensating Condenser (2d I. F. Pri.)	*04000A	.15
38	2d I. F. Transformer (Early Prod. 32-1258)	32-1424	....
39	Condenser (.0001 Mfd. Twin) (Bakelite Block)	8035-K	.25
40	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
41	Condenser (.01 Mfd. Bakelite Block)	3903Z	.25
42	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
43	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
44	Condenser (.09 Mfd. Bakelite Block)	4989D	.35
45	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	$0.25
46	Condenser (Electrolytic 1, 1, 1, and 2 Mfd.)	30-2078	2.45
47	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
48	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
49	Condenser (.015 Mfd. Bakelite Block)	3793F	.35
50	Condenser (.0001 Mfd. Mica)	4519	.35
51	Tone Control	30-4186	.75
52	Condensers (In Tone Control)	Part of 51	....
53	Condenser (.006 Mfd. Tubular)	30-4024	.40
54	Input Transformer	32-7114	2.00
55	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
56	Condenser (.01 Mfd. Bakelite Block)	3903P	.25
57	Output Transformer	32-7078	1.40
58	Voice Coil and Cone Assembly	H-13-02625	.80
		K-17-36-3020	.60
59	Field Coil and Pot Assembly	36-3104	2.70
60	Resistor (Wire-Wound) (6500 ohms)	33-3033	.30
61	Resistor (Wire-Wound) (9.5, 112, 84 ohms)	33-3034	.20
62	Volume Control and On-Off Switch	33-5024	1.45
63	Condenser (.05 Mfd. Tubular)	30-4020	.35
64	Resistor (240,000 ohms) (Red-Yellow-Yellow)	4410	.25
65	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
66	Condenser (.025 Mfd. Bakelite Block)	7653D	.35
67	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
68	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
69	Condenser (.015 Mfd. Twin) (Bakelite Block)	3793R	.40
70	Power Transformer	32-7111	5.75
71	Filter Choke	32-7115	1.80
72	Condenser (.25 Mfd.)	6287-R	.40
73	Condenser (Elec. 8 Mfd. 10 Mfd.)	30-2045	1.95
74	Condenser (Elec. 8 Mfd.)	30-2025	2.00
75	Compensating Condenser (2d I. F. Secondary)	Part of 38	....
76	Resistor (2900 ohms) (Red-White-Red)	5309	.25
	Chassis Mtg. Screw	W-1345A	2.25C.
	Chassis Mtg. Washer	29-2089	.35C.
	Chassis Mtg. Foot (Rubber)	27-4116	.05
	Chassis Mtg. Foot Plate	27-7497	.35C.
	Knob Assembly (Large)	27-4051	.10
	Knob Assembly (Small)	27-4052	.10
	Dial Assembly	31-1205	.50
	Dial Scale	27-5046	.35 C.
	Tube Shield	28-1107	.10
	4 Prong Socket	7544	.10
	6 Prong Socket	7547	.11
	7 Prong Socket	27-6006	.11
	Speaker Socket	4957	.10
	A. C. Cord and Plug	L-943A	.60

*See Note below Fig. 4.

Note: Part 37, is as shown above only in early production. In later production this part is incorporated as part of 38, not visible from below.

MODEL 118
Schematic
Socket Layout

PHILCO RADIO & TELEV. CORP.



IF PEAK 260 KC

Fig. 3. Schematic Diagram

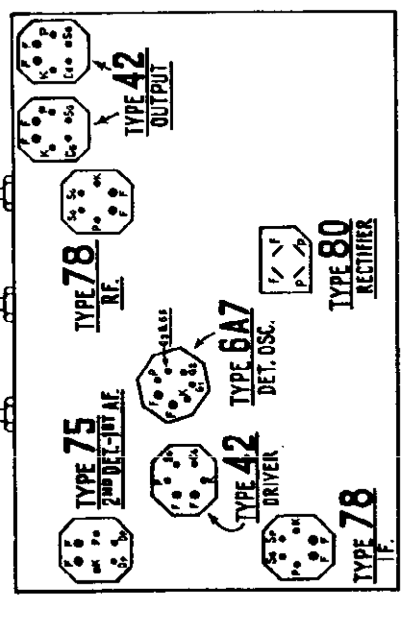


Fig. 1. Tube Socket Layout

June, 1934

MODEL 118
Chassis Layout
Trimmer Locations

PHILCO RADIO & TELEV. CORP.

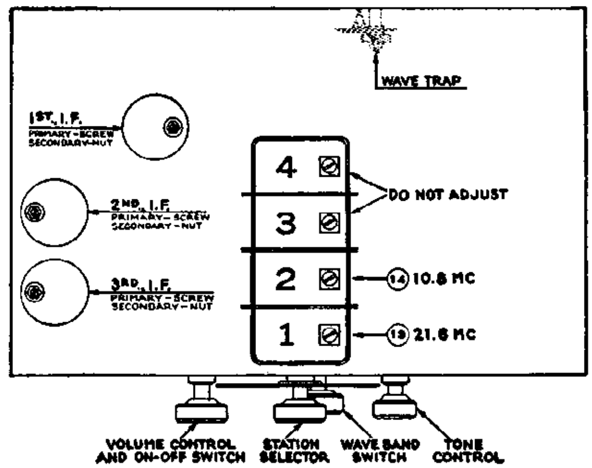


Fig. 2. Top View

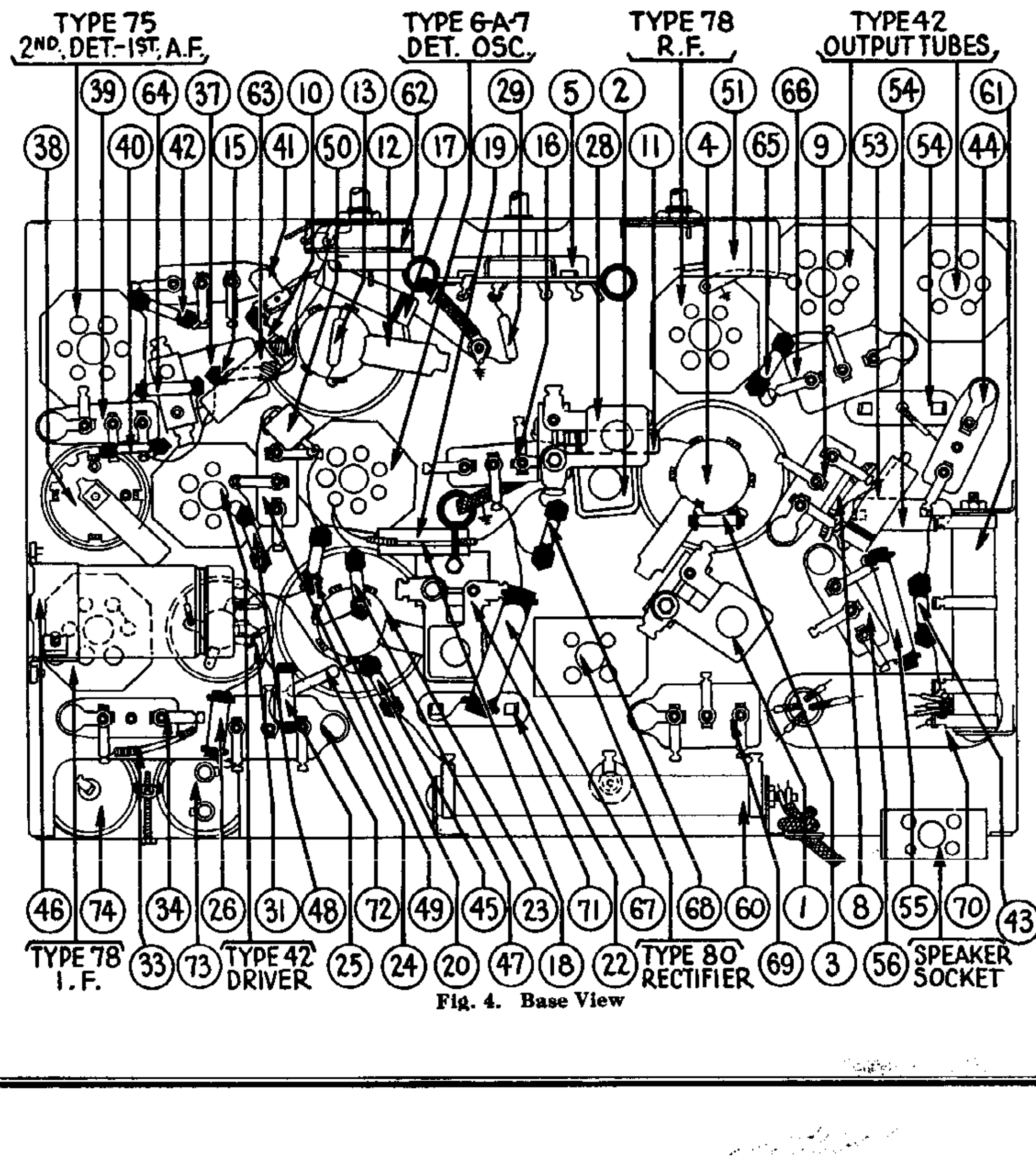


Fig. 4. Base View

MODEL 118
Alignment Data
Voltage

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

For adjusting compensating or padding condensers in Model 118, an accurately calibrated signal generator covering the broadcast range of frequencies is required and also a crystal controlled signal generator for the high frequency adjustments. For the former we suggest the Philco Model 024 Signal Generator and for the latter the Model 091, Crystal Controlled high frequency signal generator. The actual adjusting calls for a special insulated hex wrench and insulated screwdriver. Philco Part No. 3164 Fibre Wrench and No. 27-1159 Screwdriver are recommended. An output meter is also required, for connection to the receiver.

I. F. ADJUSTMENT—The I. F. (intermediate frequency) of Model 118 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter to the primary terminals of the output transformer of receiver. Set the waveband switch at the left position (standard broadcast).

Set the wave switch on the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. ㉚ and ㉜ in Fig. 3) and the 2d I. F. primary and secondary condensers (㊲ and (76)) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

Note: In early production the 1st I. F. compensating condensers only are adjusted as described above. Part (75) is not used. The 2d I. F. primary ㊲ is an 04000A condenser reached and adjusted through hole in top of chassis near the 42 driver tube.

WAVE TRAP—Remove antenna lead from grid cap of 6A7 tube and attach it to antenna post on set. Replace cap on 6A7 tube. With Signal Generator still operating at 260 K. C., adjust wave-trap condenser (① in Figs. 3 & 4) so as to get MINIMUM reading in output meter. This adjustment is made from underneath the chassis.

ANTENNA, DETECTOR AND OSCILLATOR H. F. (Broadcast)—These condensers Nos. ⑦, ⑭, and ㉑, are located on top of the tuning condenser gang, adjustment made by means of the fibre wrench. Set the signal generator at 1500 K. C., tune in the signal at 1500 on dial and adjust these condensers in the order given, to give maximum output reading. ⑦ is located on the section nearest the front and ⑭ on the center section.

OSCILLATOR—LOW FREQUENCY—This is condenser ㉘ (see Figs. 3.and 4) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers ② (Ant. H. F.) and ㉒ (Osc. H. F.) located underneath chassis, and adjusted from underneath. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the waveband switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

Tube Socket Voltages—Line Voltage 115

Function	R.F.	Det.-Osc.	I.F.	A.F.	Driver	Output		Rect.
Type	78	6A7	78	75	42	42	42	80
Filament (F-F)......	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K).........	180	180	200	125	195	280	280	315
Screen (SG-K).......	80	175	80	...	195	290	290	...
Cathode (K to F)....	2.5	2.6	3.2	0	0	0	0	...
6A7· G^1 to K........	26							
6A7· G^2 to K........	150							

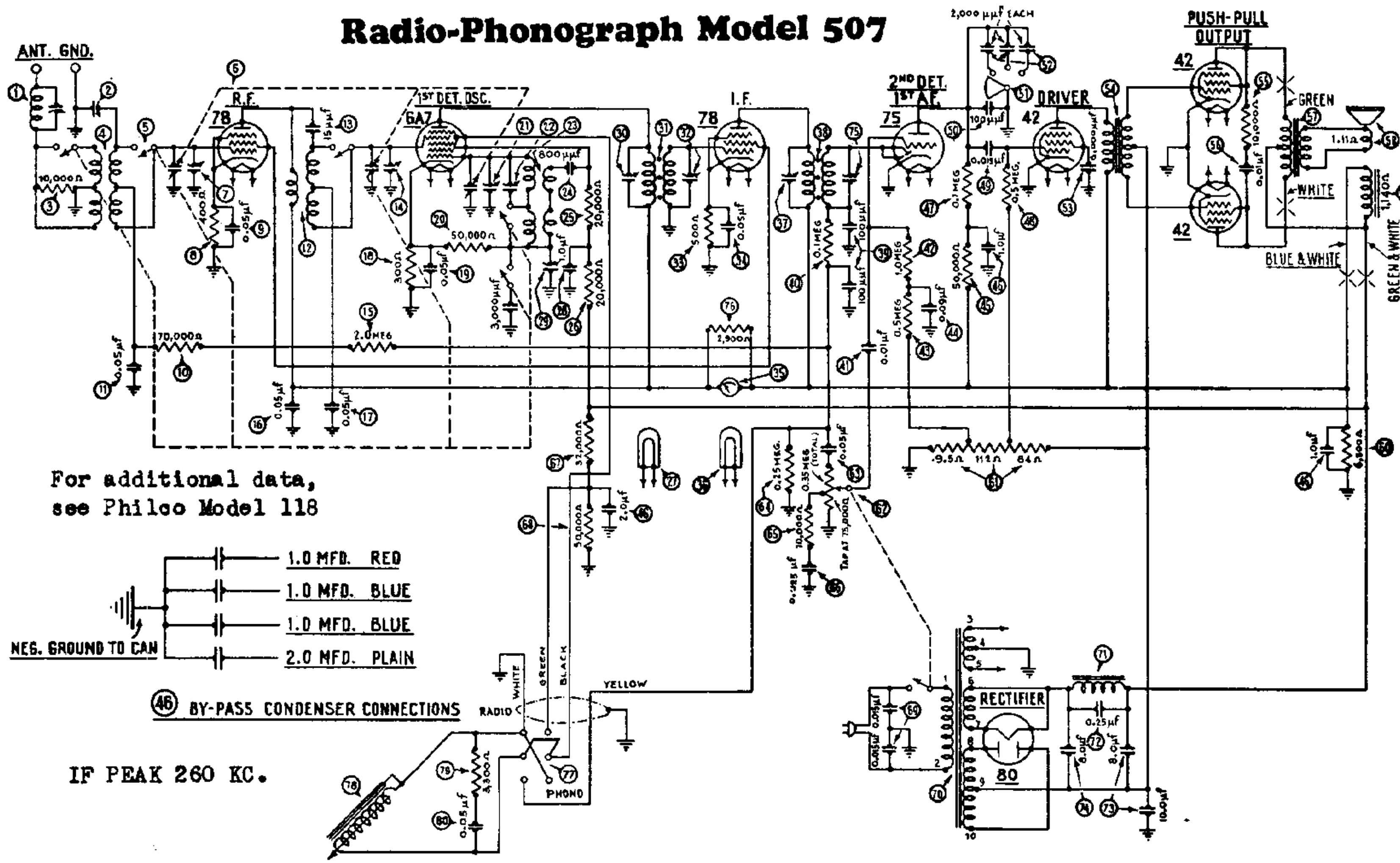
Power Transformer Voltages

Terminals	A.C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-5	6.3	Filaments	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black—Yellow Tracer
9	...	Center Tap of 8-10	Yellow—Green Tracer

The above tests were made with an A. C. voltmeter for filament voltages and a high resistance D. C. voltmeter for all others. Dial at 550 K. C., wave band switch to left, volume control at maximum. Tests made with test prods applied to sockets underneath chassis. Philco Model 048 All-purpose Tester or Model 025 Circuit Tester are recommended for these tests. Use Fig. 1 in making t ets given in left hand table above.

PHILCO RADIO & TELEV. CORP.

Radio-Phonograph Model 507



For additional data, see Philco Model 118

IF PEAK 260 KC.

I. F. = 260 K. C. Fig. 1—Schematic Wiring Diagram. Note: Phonograph motor not shown in diagram. Numbers on this figure from (1) to (76), inclusive, are the same as in Fig. 3, Service Bulletin No. 194

Model 507 uses the same radio chassis as Model 118 Superheterodyne.

NOTE: Part (74) electrolytic condenser is a 30-2014 in Model 507 instead of the 30-2025 used in Model 118.

The electric motor of Model 507 is of the self-starting, synchronous type, depending on the power line frequency (cycles) for its correct speed. If the motor should develop trouble, do not attempt to repair it. Replace it, and communicate with your Distributor with regard to the faulty one. The motor should be lubricated at least once every six months. To do this, take off the turntable and put a few drops of a good grade of light machine oil in the oil-hole in the motor top-plate.

The pick-up is of the high impedance type. The impedance of the pick-up is approximately 2500 ohms, measured at 1000 cycles. The D. C. resistance is 600 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up."

The tone arm must be free to rotate upon its axis at all times. Damage to the records will result if it is not.

The speaker unit is Type H-13.

MODELS 60,89,144
Changes

PHILCO RADIO & TELEV. CORP.

Model 60

Effective August 1st, resistors (10) and (28) in wiring diagram of Model 60, Bulletin No. 164 will be changed from Part No. 4518 (½ watt) to Part No. 6098 (⅓ watt). These changes are made to facilitate wiring in assembly.

Starting with Run No. 7, the following changes will be made. Note that a Wave Trap is added, necessitating several changes; other changes are to improve sensitivity.

Part No. (Fig. 3)	*Remove*	*Add*	*Location*
	....	38-6073 Wave Trap	In series with antenna post
(8)	4989-Z Condenser	....	....
(9)	7217 Resistor	33-3010 (Bias Resistor, 300 Ohms, flex.)	Refer to Schematic Diagram
	....	33-3016 (Bias Resistor, 400 Ohms)	From 78 Cathode to Ground
	....	30-4020 (Condenser .05 Mfd. Tubular	From 78 Cathode to Ground
(24)	3656 (25,000 Ohms)	33-1027 (39,000 Ohms)	Refer to Schematic Diagram
(23)	4412	....	....
(10)	4518 (5,000 Ohms) ½ Watt	6099 (99,000 Ohms) 1/3 Watt	Refer to Schematic Diagram
(28)	4517	6097	Refer to Schematic Diagram
(18)	04000M	04000J	Refer to Schematic Diagram
(20)	30-4063 (.05-.09-.09-.5-.2) (.2 section not used)	30-4217 (.05-.09-.09-.5)	(Filter block)

Model 89

Effective with Run No. 13 compensating condenser (18) on diagram (1st I. F. primary) will be a Part No. 31-6024 instead of 04000M previously used.

The new condenser is of an improved construction which eliminates possibility of "frequency drift" or breakdown.

Starting with Run No. 14, Model 89 will use a type 77 tube as detector-oscillator instead of the type 36 tube previously used. This change results in more stable performance of the oscillator.

In addition to requiring the use of a six-hole socket for the detector oscillator tube instead of the 5-hole previously used, the following changes are required:

Part (10), No. 6208 resistor (15,000 ohms) is replaced by No. 33-1114 (8,000 ohms).

Part (9), No. 8174-B condenser (.09 and .0007 Mfd.) is replaced by No. 8322-B (.09 and .0014).

Model 144

Effective with Run No. 6, electrolytic condenser (71) (see Bulletin No. 193) will be changed from part No. 30-2020 to 30-2026. Same capacity (6 mfd.), higher working voltage.

Starting with Run No. 7, Part (70) filter choke in Model 144 will be a 32-7018 instead of No. 5930 which has been used. This change is to adjust factory material lists and does not affect value of choke or performance of set.

The part number of the Shadowmeter to be used on the Model 144 will be 45-1106 instead of 6497 as listed on Bulletin 193. Change to identify in production.

On Fig. 3 (Schematic) fixed condenser (76) used in the bass compensation circuit, should be marked .02 Mfd. (Part No. 30-4113). The list of parts on Page 3 of Service Bulletin 193 gives this part number and value, which is correct.

PHILCO RADIO & TELEV. CORP.

MODEL 144
Schematic
Transformer Voltages

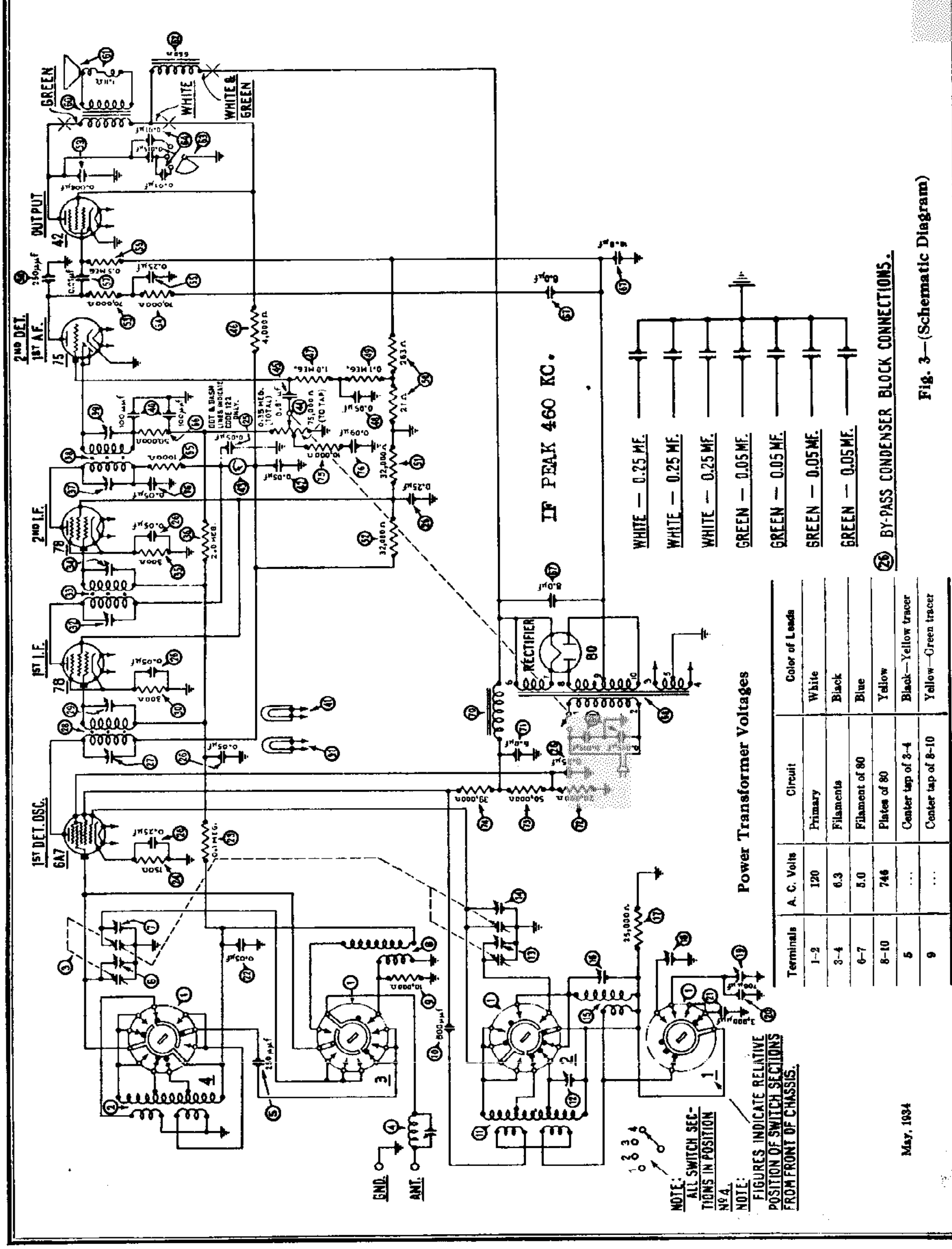


Fig. 3—(Schematic Diagram)

Power Transformer Voltages

Terminals	A. C. Volts	Circuit	Color of Leads
1–2	120	Primary	White
3–4	6.3	Filaments	Black
6–7	5.0	Filament of 80	Blue
8–10	746	Plates of 80	Yellow
5	...	Center tap of 3-4	Black—Yellow tracer
9	...	Center tap of 8-10	Yellow—Green tracer

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

The compensating condensers of Model 144 have been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should NOT be undertaken unless the receiver is seriously out of alignment.

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly (Fig. 5). These have been adjusted, and sealed, at the factory.

Philco Model 024, an accurately calibrated signal generator covering broadcast and police band frequencies, is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies for adjusting the compensating condensers in the high frequency circuits.

1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect an output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 144) and adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I. F. compensating condensers is shown in Figure 5. Each of the I. F. transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (extreme left) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap (4) condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap (4) is located at rear and underneath the chassis, and is shown in Figures 4 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 144 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1	520 K.C.—1500 K.C.
Range 2	1.5 M.C.—4.0 M.C.
Range 3	4.0 M.C.—11.0 M.C.
Range 4	11.0 M.C.—23.0 M.C.

Connect the output terminals of the Model 091 or equivalent Signal Generator, to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. Set the Wave-Band Switch to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser (13) on Section 1 of Tuning Condenser for maximum response in the output of the receiver. Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be heard. Adjust the compensating condenser (14) on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment, otherwise the output of the Signal Generator will be too great. Adjust the compensating condenser (12) to give maximum response in the output meter. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 4.

This concludes adjustments requiring the Model 091 (or equivalent) high frequency signal generator.

The Model 024 or its equivalent is now used again. Turn the Wave-Band Switch of the set to Range 2 and the Station Selector to 1.5 M.C. Set the Signal Generator at 1500 K.C. Make sure the "Antenna" connection between the Signal Generator and the Chassis has been restored. Adjust compensating condenser (19) located underneath the chassis, (Figure 4). Adjustment is made from the underside of the chassis.

Turn the Wave-Band Switch to Range 1 and the Station Selector to 1400 K.C. Set the Signal Generator at 1400 K.C. Adjust compensating condenser (16), which is located underneath the chassis. (See Figure 4). This adjustment is made from the underside of the chassis.

Finally, with Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator at 520 K.C. and adjust compensating condenser (18) (Figure 4). This compensating condenser is also mounted underneath the chassis, and reached from below.

For proper and accurate adjustment of Model 144, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without proper equipment as mentioned above.

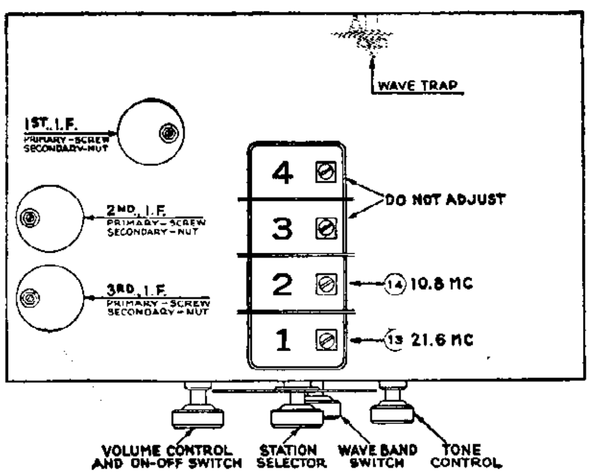


Fig. 5—Position of Compensating Condensers Reached from Above Chassis

PHILCO RADIO & TELEV. CORP.

Model 144

Philco Model 144 is a six-tube superheterodyne receiver operating on alternating current (A. C.) and designed for reception of any frequency from 520 K.C. to 23,000 K.C. (23 megacycles). It is equipped with shadow-tuning, four-point tone-control with fixed bass compensation; Model 144 has 5 watts output. The intermediate frequency (I. F.) is 460 K.C. Tubes used are the following Philco high-efficiency types:—

Detector-Oscillator	Type 6A7
1st I. F.	Type 78
2nd I. F.	Type 78
2nd Detector 1st A. F.	Type 75
Output	Type 42
Rectifier	Type 80

The power consumption of model 144 is 70 watts.

REPLACEMENT PARTS—MODEL 144

Nos. on Diagram	Description	Part No.	List Price
1	Wave-Band Switch	42-1045	$3.60
2	Antenna Transformer (H. F. Bands)	32-1271	.70
3	Tuning Condenser Assembly	31-1175	....
4	Wave Trap	38-5487	.55
5	Condenser (.00025 Mica)	3082	.35
6	Compensating Condenser (Ant. H. F.)	Part of 3	....
7	Compensating Condenser (Ant. Broadcast)	Part of 3	....
8	Antenna Transformer (Broadcast Band)	32-1270	.55
9	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
10	Condenser (.0008 Mfd. Mica)	6021	.35
11	Oscillator Transformer (H. F. Bands)	32-1273	.35
12	Compensating Condenser (Range 2)	04000C	.15
13	Compensating Condenser (Osc. Range 4)	Part of 3	....
14	Compensating Condenser (Osc. Range 3)	Part of 3	....
15	Oscillator Transformer (Broadcast)	32-1272	.70
16	Compensating Condenser (Osc. Broadcast)	04000A	15
17	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
18	Compensating Condenser (Broadcast Series)	04000S	.35
19	Compensating Condenser (Range 2; Series)	04000R	.45
20	Condenser (.0007 Mfd. Mica)	4520	.35
21	Condenser (.003 Mfd. Mica)	7301	.45
22	Condenser (.05 Mfd. Bakelite Block)	3615-L	.35
23	Resistor (100,000 ohms) (White-White-Orange)	4411	.25
24	Resistor (150 ohms Flexible Wire-Wound)	33-3140	.20
25	Condenser (.05 mfd. tubular) (Used in Code 122 only)	30-4123	.35
26	Condenser Block (.25, .25, .25, .05, .05, .05, .05)	30-4167	1.15
27	Compensating Condenser (1st I. F. pri.)	Part of 28	....
28	1st I. F. Transformer	32-1369	1.50
29	Compensating Condenser (1st I. F. Sec.)	Part of 28	....
30	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
31	Pilot Lamp	6608	.11
32	Compensating Condenser (2d I. F. Pri.)	Part of 33	....
33	2d I. F. Transformer	32-1306	.90
34	Compensating Condenser (2d I. F. Sec.)	Part of 33	....
35	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
36	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.25
37	Compensating Condenser (3d I. F. Pri.)	Part of 38	....
38	3d I. F. Transformer	32-1307	.80
39	Compensating Condenser (3d I. F. Sec.)	Part of 38	....
40	Condenser (.0001 Mfd. Twin—Bakelite Block)	8035-L	.25
41	Pilot Lamp for Shadowmeter	Part of 43	....
42	Condenser (.05 Mfd. Bakelite Block)	3615AB	.35
43	Shadowmeter	6497	2.50
44	Volume Control & On-Off Switch	33-5068	1.45
45	Condenser (.01 Mfd. Bakelite Block)	3903J	.25
46	Resistor (4,000 ohms) (Yellow-Black-Red)	7832	$0.25
47	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
48	Condenser (.05 Mfd. Bakelite Block)	3615-L	.35
49	Resistor (100,000 ohms) (White-White-Orange)	4411	.25
50	Resistor BC (263 ohms. 21 ohms, Wire-Wound)	33-3069	.25
51	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
52	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
53	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
54	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
55	Condenser (25 Mfd.) (Metal Case)	4264	.60
56	Resistor (500,000 ohms) (Yellow-White-Yellow)	4517	.25
57	Condenser (.01 Mfd. Bakelite Block)	3903AN	.25
58	Condenser (.00025 Mfd. Mica)	30-1032	.35
59	Condenser (.006 Mfd. Tubular)	30-4024	.40
60	Output Transformer	32-7178	1.60
61	Voice Coil & Cone Assembly	(H-16) 02625	.80
		(K-23) 36-3174	.40
62	Field Coil & Pot Assembly	H-16 (36-3218)	3.50
		K-23 (36-3239)	3.75
63	Tone Control	30-4168	.75
64	Condensers (Inside 63)	Part of 63	....
65	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
66	Resistor (50,000 ohms) (Green-Brown-Orange)	6006	.25
67	Condenser—Electrolytic (8-8-10 Mfd.)	30-2072	3.45
68	Power Transformer	32-7234	4.75
69	Condenser (.015 Mfd. Twin)	3793-H	.40
70	Filter Choke	5930	1.75
71	Condenser (6 Mfd. Electrolytic)	30-2020	1.40
72	Resistor (20,000 ohms) (Red-Black-Orange)	6049	.25
73	Resistor (50,000 ohms) (Green-Brown-Orange)	5066	.35
74	Resistor (39,000 ohms) (Orange-White-Orange)	33-1027	.25
75	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
76	Condenser (.02 Mfd. Tubular)	30-4113	.30
	A. C. Cord and Plug Assembly	L-943A	.60
	Dial Assembly	31-1206	1.25
	Dial Scale	27-5044	.65
	Chassis Mounting Screw	W-1358A	2.00 C.
	Chassis Mounting Foot (Rubber)	27-4116	.05
	Chassis Mounting Foot (Plate)	27-7497	.35 C.
	Tube Shield	28-1107	.10
	4 Prong Tube Socket	7544	.10
	6 Prong Tube Socket	7547	.11
	7 Prong Tube Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Knob (Station Selector)	27-4127	.10

MODEL 144
Voltage
Chassis Layout
Socket Layout

PHILCO RADIO & TELEV. CORP.

Tube Socket Voltages—Line Voltage 115

CIRCUIT	Det.-Osc.	1st I. F.	2nd I. F.	A. F.	Out-put	Recti-fier
TUBE	6A7	78	78	75	42	80
Filament Volts (F-F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts (P-K)	250	230	230	185	300	350
Screen Grid Volts (SG-K)	60	75	75	...	310	...
Cathode Volts (K-Gnd)	1.4	2	2	0	0	...
6A7—G2 to K	160	...	...	...	...	...
6A7—G1 to K	20	...	...	...	...	...

Above values were obtained by means of an A. C. voltmeter for filament voltages and a high resistance D. C. voltmeter for all others. All values obtained from underside of chassis with test prods. Positions of controls were: Volume Control—maximum; Wave-Band Switch—extreme left (counter-clockwise); Dial at 520 K.C.

Philco Model 048 All-Purpose Tester is recommended for making the above tests. Use the illustration below (Fig. 1) as a guide to determine the points to be voltage-tested.

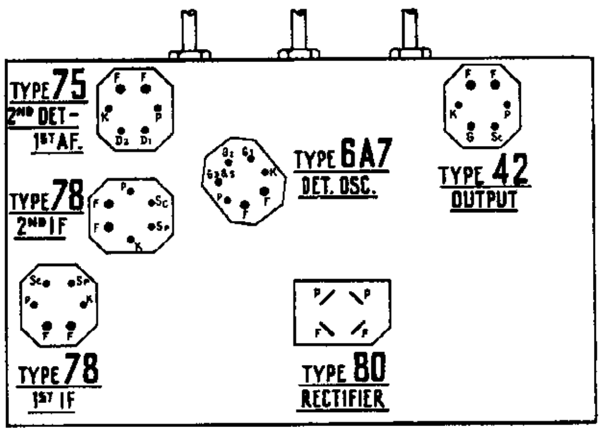


Fig. 1—Tube Sockets (underside)

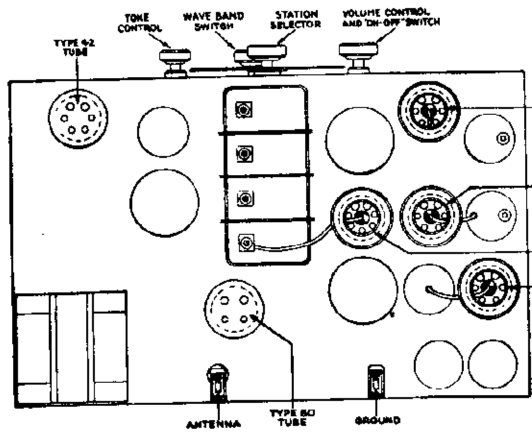


Fig. 2—Chassis—Top View

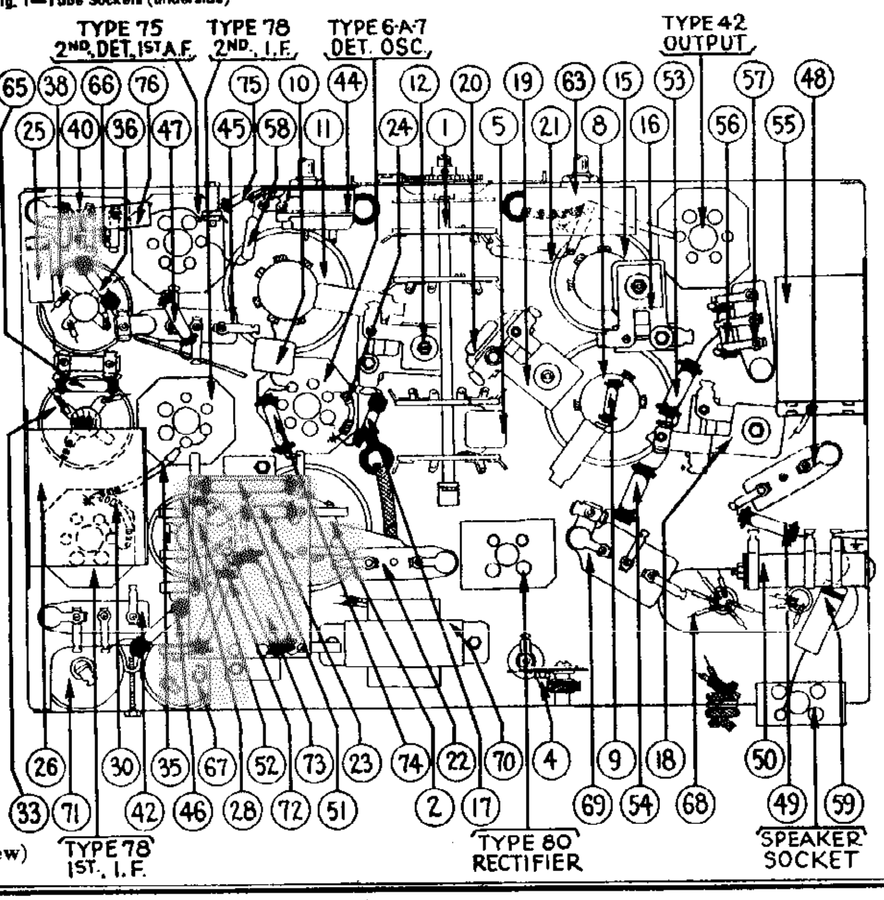
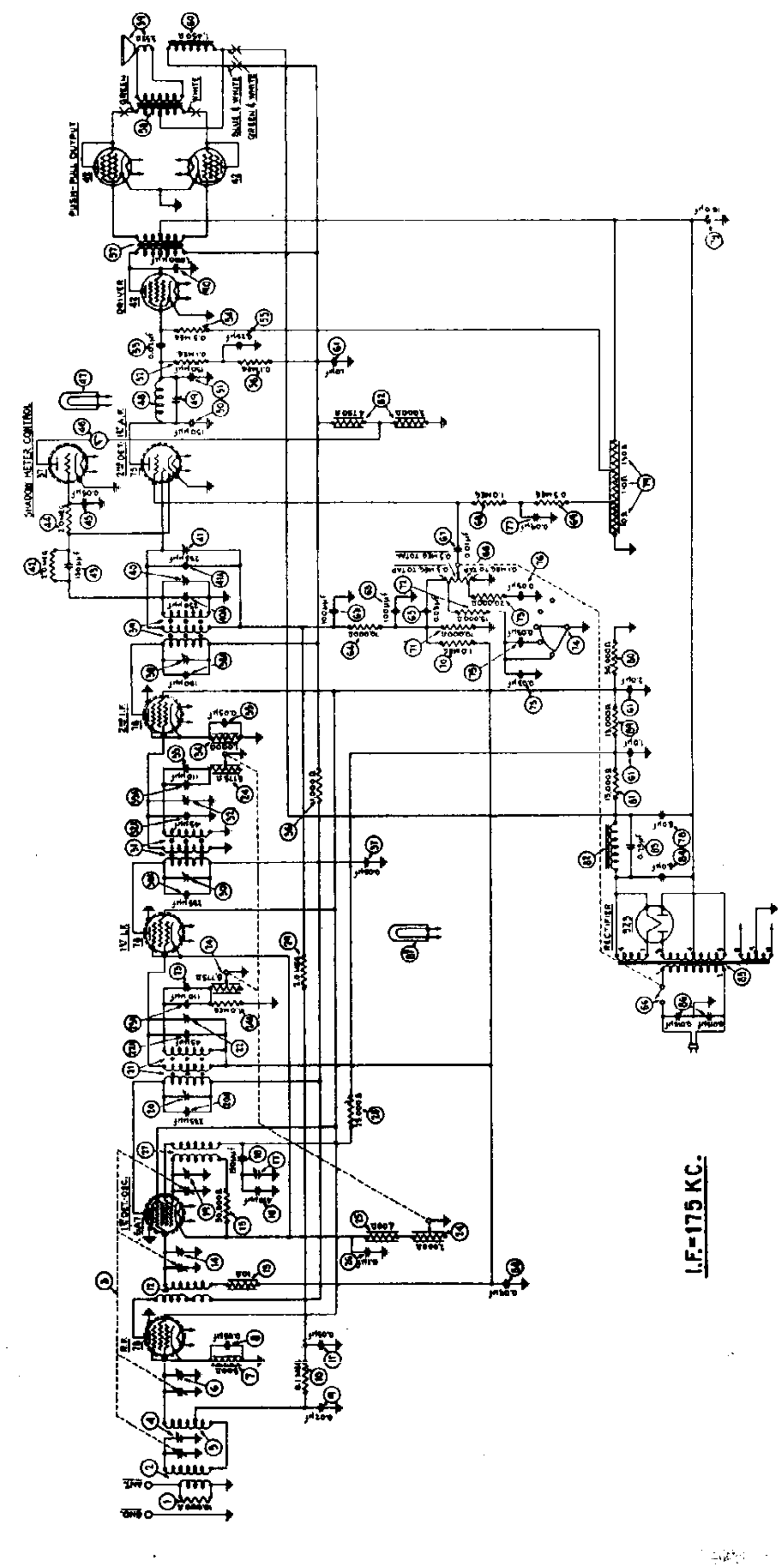


Fig. 4—(Base View)

MODEL 200-X
Schematic

PHILCO RADIO & TELEV. CORP.



Wiring Diagram— Philco Model 200-X

MODEL 200-X
Alignment Data

PHILCO RADIO & TELEV. CORP.

ADJUSTING COMPENSATING CONDENSERS IN MODEL 200-X

The quality performance of this receiver depends to a great extent upon providing a wide channel through the R. F. and I. F. stages to permit the passage of a broadcast signal without cutting of the side bands.

In order to produce this wide tuning band, the set must be carefully and accurately adjusted. These adjustments will be more critical than in the conventional radio, and the padding procedure will be considerably more complicated.

In making the adjustments, it is necessary to use an unmodulated signal generator. The PHILCO Model 048 Set Tester or the Model 024 Signal Generator can be readily adapted for this purpose by the installation of a single-pole double-throw switch, and an additional grid leak resistor, as shown in Figure 9. This switch will adapt the signal generator for either a modulated or an unmodulated signal.

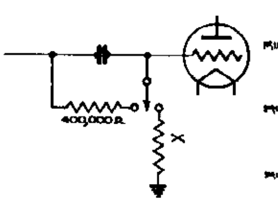


Figure 9

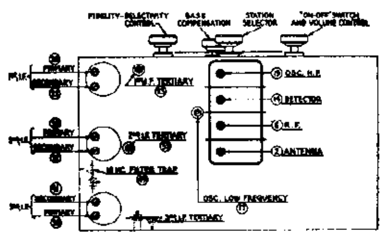


Figure 10

With an unmodulated signal, it is not possible to obtain an indication of output by means of the usual form of output meter. An indirect indication can be obtained, however, through the automatic volume control system by connecting a high resistance voltmeter having a scale reading of 0-5 or 0-10 volts across the R. F. cathode resistor , shown in the wiring diagram Fig. 8. This connection can be made conveniently through the use of leads equipped with test clips. With this arrangement, maximum output at the second detector will be indicated by a minimum reading of the meter, and vice versa. In other words, the action will be just the opposite of an output meter used to measure audio frequency voltage at the power output stage. With no signal applied to the receiver, the bias voltage indicated by the voltmeter, will be approximately 3 volts. This voltage will be reduced by the application of a signal to the R. F. or I. F. input circuits.

I. F. ADJUSTMENTS

After preparing the unmodulated signal generator and connecting the voltmeter as directed, proceed as follows:

1. Set the receiver tuning dial at its extreme low frequency position. Remove the grid clip from the cap of the 6-A-7 detector oscillator tube, and connect the signal generator antenna lead in its place. Connect the ground lead from the signal generator to the ground terminal of the chassis. Adjust the signal generator frequency to exactly 175 K. C. Turn the fidelity control of the receiver all the way to the left.

2. Adjust the 6 I. F. padding condensers [illegible], [illegible], [illegible], [illegible], [illegible] and [illegible] (see Fig. 10) in the tops of the 3 I. F. cans, for maximum output (minimum meter reading), starting with the padder at the front of the chassis, and continuing with the adjustments toward the rear of the set. During these adjustments, the output of the signal generator should be regulated to maintain a voltmeter reading of approximately 2 volts.

3. Connect a 250 Mmf. Condenser from the plate of the 2nd I. F. tube to ground. This will increase the voltmeter reading to approximately 2.5 volts.

4. Readjust the 3d I. F. secondary padder [illegible] for maximum output.

5. Readjust the 3d I. F. primary padder [illegible] for maximum output. Do not touch the grid padder [illegible] again.

6. Turn the fidelity selectivity control all the way to the right.

7. Adjust the 1st & 2nd I. F. tertiary padders [illegible] and [illegible] for MINIMUM output (maximum voltmeter reading).

8. Leaving the fidelity selectivity control in the right hand position, it will be found, upon varying the frequency of the signal generator, that two definite dips will appear in the voltmeter reading—one at 167 K. C. and another at 182 K. C. These dips in the voltmeter reading indicate peaks in the tuning curve. The amplitude of these peaks should be equal; that is, the same voltmeter reading should be obtained at both 167 K. C. and 182 K. C. Any variations in these two readings can be corrected by a *slight* readjustment of the 3rd I. F. primary padder [illegible] . If the peak at 167 K. C. is higher than the one at 182 K. C., the primary padder will have to be turned out. If the reverse is true, the capacity of this padder must be increased. In any case, the voltmeter readings must be made equal by dividing the differences through readjustment.

R. F. ADJUSTMENTS.

The R. F. portion of the receiver is adjusted as follows:

9. Replace the grid clip on the detector-oscillator tube and connect the antenna terminal of the signal generator to the antenna terminal of the chassis. Turn the fidelity selectivity control all the way to the left and set the receiver dial at 1,500 K. C. The same type of output indication is employed as in the I. F. adjustments.

10. Adjust the signal generator for a frequency of 1,500 K. C. Adjust the "oscillator" padding condenser (15) and the "detector" padding condenser (14) for maximum output and in the order mentioned. Regulate the signal generator output control to maintain a voltmeter reading of 2 volts as before.

11. Turn in padder (6) (R. F.) until the voltmeter reads 2.5 volts and then adjust padder (2) (ANT.) for maximum output.

12. Readjust padder (6) for maximum output. Do not touch padder (2) again.

13. Set the receiver dial and the signal generator at 600 K. C. Adjust the "oscillator low frequency" padder (17) for maximum output. As the R. F. tuning is rather broad, there will be a considerable range on the dial that will give about the same output when the oscillator L. F. padder is adjusted for maximum. The padder must be adjusted at the middle of this range. This point may be determined with accuracy in the following manner: Starting with the usual voltmeter reading of 2 volts, slowly turn the receiver dial toward the low frequency end and, at the same time, readjust the padder (17) for maximum output until a point is reached where the maximum output is indicated by a voltmeter reading of 2.5 volts. Note carefully the exact dial reading at this point. Follow the same procedure while turning the dial in the opposite direction until the output reading decreases to the same value. Set the dial at the exact center of these two points and readjust padder (17) , for maximum output.

14. Adjust the 3d I. F. tertiary padder [illegible] to give minimum width in the shadow tuning meter in the receiver. This padder is reached from rear of chassis.

ADJUSTMENT OF 10 K. C. FILTER

The 10 K. C. filter in the audio circuit will rarely require readjustment. As the proper adjustment of this padder ([illegible] on diagram) requires an accurately calibrated audio oscillator, it should be reset only in the event that it has been tampered with or in cases where it has become necessary to replace one of the elements of this filter. An emergency adjustment of this filter can be made in the following manner:

15. Connect the signal generator to the control grid of the type 6-A-7 tube, leaving the grid clip in place.

16. Disconnect the voltmeter from resistor (7) and connect an output meter to the plates of the power output tubes in the usual way.

17. Set the receiver dial at 550 K. C. At this point, the oscillator in the receiver will be tuned to 725 K. C. The adjustment of the signal generator (switch in unmodulated position) to approximately this same frequency will cause an audible beat note to be heard in the speaker. By means of the signal generator tuning control, reduce the frequency of this beat note until zero beat is reached, at which point the output meter reading will decrease to 0. Turning the receiver dial in either direction will gradually increase the frequency of the audible note so that at 540 or 560 K. C. a 10,000 K. C. note will be heard. At either of these points, the padder [illegible] should be adjusted for minimum reading of the output meter.

PHILCO RADIO & TELEV. CORP.

MODEL 700 RECEIVER

THE latest Philco development in single-unit automobile radio is the new Model 700. This Receiver is compac easier to install than ever before and will give exceptional performance.

It is a six-tube super-heterodyne with a genuine full-size Philco electro-dynamic speaker—the same type that i used in many of the larger home radio Receivers. It has remarkable sensitivity, a three-section tuning condenser, giv ing improved selectivity—wonderful tone, with a three-point tone control, and inherently quiet circuits. Interferenc filters in the "A" lead and in the pilot light lead greatly simplify motor interference suppression. In most installa tions standard suppression is sufficient.

Added to this, the ease of installation characteristic of this model (only one unit to install—one lead to the an tenna, one lead to the ammeter) and the convenient, attractive airplane type steering column control, which makes thi model universal in its application, are additional features of the Model 700 which appeal to both the dealer and th public.

I. F. TRANSFORMER AND PADDERS

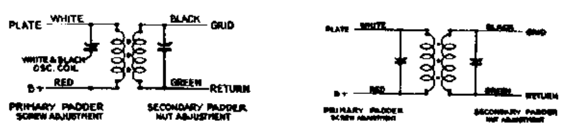
The new style I. F. transformer complete with padders is used in the Model 700.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer 32-1329

2nd I. F. Transtormer 32-1237

FIG. 1

MODEL 700 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders 22 and 24 are adjusted first (Figs. 2 and 3). Turn the adjusting screw 22 all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut 24 with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw 22 for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

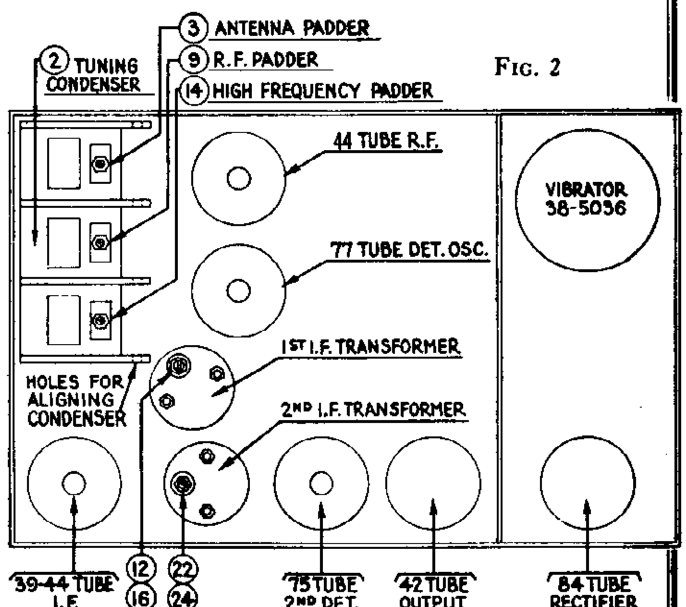


FIG. 2

Repeat the above procedure with the condensers 12 and 16.

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections

MODEL 700
Schematic
Chassis Layout
Parts List

PHILCO RADIO & TELEV. CORP.

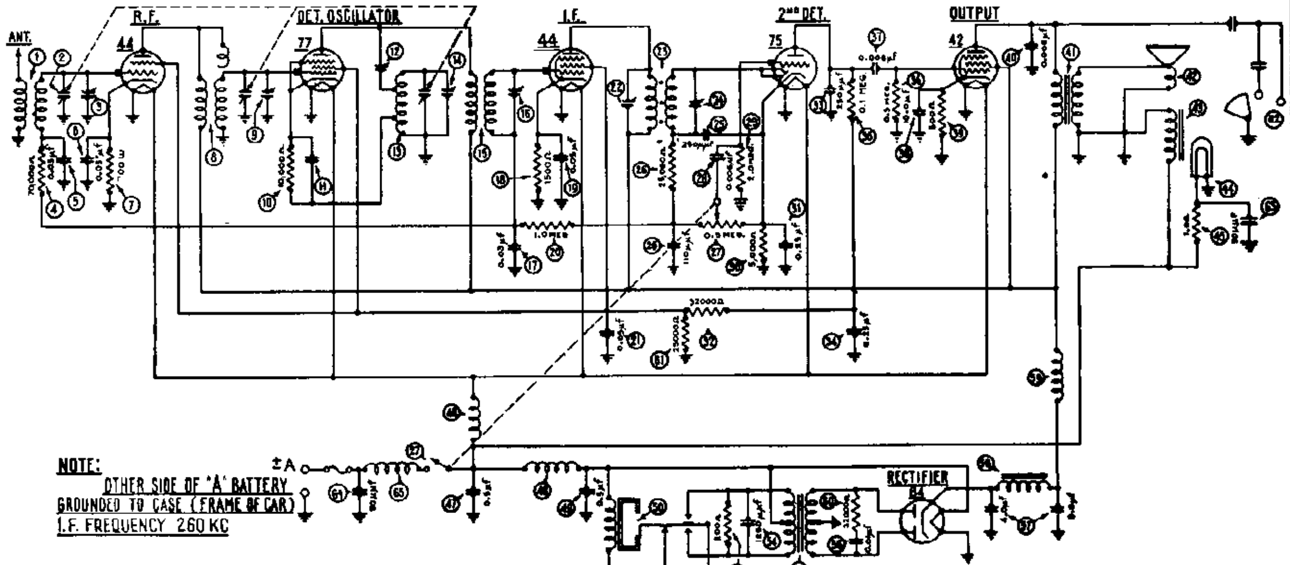


FIGURE 4

FIG. 3

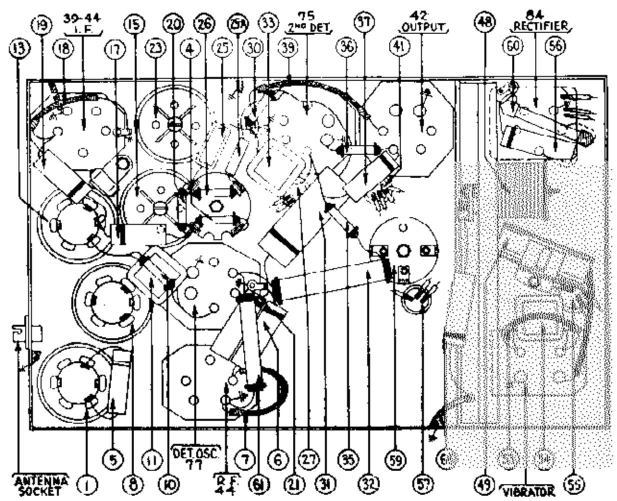


FIG. 4

of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (14) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL 700 PARTS LIST

No.	Part	Part No.
1	Antenna Transformer	32-1331
2	Tuning Condenser	31-1199
3	1st Padder (in tun. cond.)	
4	Resistor (70,000 ohms)	33-1115
5	Condenser (.03 mfd.)	30-4025
6	Condenser (.05 mfd.)	30-4020
7	Resistor (700 ohms)	6443
8	R. F. Transformer	32-1332
9	2nd Padder (in tun. cond.)	
10	Resistor (10,000 ohms)	33-1000
11	Condenser (.0007 mfd.)	5863
12	Padder (Pri. 1st I. F. Tran.)	
13	Oscillator Transformer	32-1333
14	3rd Padder (in tun. cond.)	
15	1st I. F. Transformer	32-1329
16	Padder (Sec. 1st I. F. Tran.)	
17	Condenser (.03 mfd.)	30-4025
18	Resistor (1500 ohms)	33-3047
19	Condenser (.05 mfd.)	30-4020
20	Resistor (1,000,000 ohms)	33-1096
21	Condenser (.05 mfd.)	30-4020
22	Padder (Pri. 2nd I. F. Tran.)	
23	2nd I. F. Transformer	32-1237
24	Padder (Sec. 2nd I. F. Tran.)	
25	Condenser (.00025 mfd.)	30-1032
26	Condenser (.00011 mfd.)	30-1031
26	Resistor (25,000 ohms)	33-1013
27	Vol. Con. & Switch Assm.	38-5534
28	Condenser (.006 mfd.)	30-4125
29	Resistor (2,000,000 ohms)	33-1025
30	Resistor (5000 ohms)	6096
31	Condenser (.25 mfd.)	30-4146
32	Resistor (32,000 ohms)	3525
33	Condenser (.00025 mfd.)	3082
34	Condenser (.25 mfd.)	04360
35	Resistor (100,000 ohms)	6099
36	Resistor (500,000 ohms)	6097
37	Condenser (.006 mfd.)	30-4125
38	Condenser (.10 mfd.)	30-2072
39	Resistor (500 ohms)	33-3031
40	Condenser (.006 mfd.)	30-4024
41	Output Transformer	32-7214
42	Cone & Voice Coil	36-3157
43	Field Coil Assembly	36-3046
44	Pilot Lamp	34-2031
45	Resistor (7 ohms)	33-3035
46	"A" Choke	32-1268
47	Condenser (.5 mfd.)	30-4147
48	Vibrator Choke	32-1235
49	Condenser (.5 mfd.)	30-4015
50	Vibrator	38-5036
51	Condenser (.05 mfd.)	30-4039
52	Resistor (200 ohms)	7217
53	Resistor (200 ohms)	7217
54	Condenser (.00125 mfd.)	5886
55	Power Transformer	32-7216
56	Condenser (.01 mfd.)	30-4051
57	Condenser (4-8 mfd.)	30-2072
58	"B" Choke	32-7215
59	R. F. Choke	32-1281
60	Resistor (32,000 ohms)	3525
61	Resistor (25,000 ohms)	33-1013
62	Tone Control	30-4180
63	Condenser (.00005 mfd.)	30-1029
64	Condenser (.00005 mfd.)	30-1029
65	"A" Choke	32-1374
66	Condenser (1 mfd)	30-4122
	Spark Plug Resistor	33-1015
	Distributor Resistor	33-1113E
	Interference Condenser	30-4007
	Nuts (mounting)	W55A
	Battery Cable	38-5296
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27-7131
	Studs	28-6036
	Bracket	6035
	Strap	04344
	Strap Pad	6206
	Knob	27-4058
	Glass	27-7325
	Gasket (for glass)	27-7509
	Pointer	28-1957
	Face Assembly	42-5189
	Control Housing Cover	29-7064
	Control Unit Assembly	42-5184
	Shaft	28-8206
	Antenna Lead	38-5771
	4-Prong Socket	27-6006
	5-Prong Socket	27-6014
	6-Prong Socket	6417C

PHILCO RADIO & TELEV. CORP.

MODEL 800 (Code 122)
Schematic
Chassis, Parts List

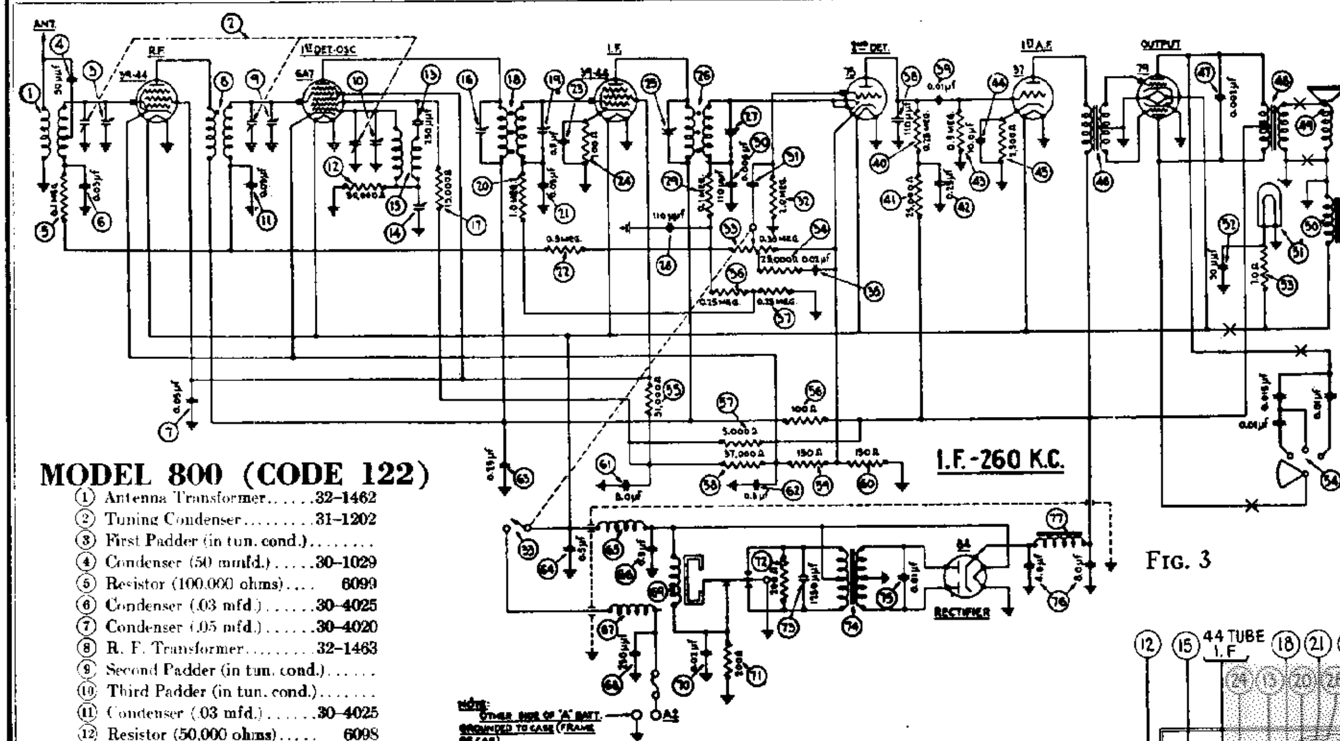


FIG. 3

Strap	04344
Knob	27–4058
Knob Spring	28–1738
Glass	27–7325
Glass Gasket	27–7509
Pointer	28–1957
Shaft	28–8206
Face Assembly	42–5191
Cover	29–7064
4-prong Socket	27–6006
5-prong Socket	27–6014
6-prong Socket	27–6020
7-prong Socket	27–6005
Auto Radio Lock Switch	42–1076

MODEL 800 (CODE 122)

1	Antenna Transformer	32–1462
2	Tuning Condenser	31–1202
3	First Padder (in tun. cond.)	
4	Condenser (50 mmfd.)	30–1029
5	Resistor (100,000 ohms)	6099
6	Condenser (.03 mfd.)	30–4025
7	Condenser (.05 mfd.)	30–4020
8	R. F. Transformer	32–1463
9	Second Padder (in tun. cond.)	
10	Third Padder (in tun. cond.)	
11	Condenser (.03 mfd.)	30–4025
12	Resistor (50,000 ohms)	6098
13	Condenser (250 mmfd.)	30–1032
14	Padder	30–6012
15	Oscillator Transformer	32–1222
16	Padder (Pri. 1st I. F. trans.)	
17	Resistor (15,000 ohms)	6208
18	First I. F. Transformer	32–1471
19	Padder (Sec. 1st I. F. trans.)	
20	Resistor (1,000,000 ohms)	33–1096
21	Condenser (.03 mfd.)	30–4025
22	Resistor (500,000 ohms)	6097
23	Condenser (.5 mfd.)	30–4058
24	Resistor (700 ohms)	6443
25	Padder (Pri. 2nd I. F. trans.)	
26	Second I. F. Transformer	32–1449
27	Padder (Sec. 2nd I. F. trans.)	
28	Condenser (110 mmfd.)	30–1031
29	Resistor (100,000 ohms)	6099
30	Condenser (110 mmfd.)	30–1031
31	Condenser (.006 mfd.)	30–4125
32	Resistor (2,000,000 ohms)	33–1025
33	Volume control & switch assembly	38–5851
34	Resistor (25,000 ohms)	33–1013
35	Condenser (.02 mfd.)	30–4215
36	Resistor (250,000 ohms)	33–1097
37	Resistor (250,000 ohms)	33–1097
38	Condenser (110 mmfd.)	30–1031
39	Condenser (.01 mfd.)	30–4145
40	Resistor (250,000 ohms)	33–1097
41	Resistor (25,000 ohms)	33–1013
42	Condenser (.25 mfd.)	30–4135
43	Resistor (500,000 ohms)	6097
44	Condenser (10 mfd.)	30–4135
45	Resistor (2500 ohms)	33–1100
46	Input Transformer	32–7206
47	Condenser (.002 mfd.)	30–4177
48	Output Transformer	32–7205
49	Cone & Voice Coil	36–3159
50	Field Coil Assembly	02795
51	Pilot Lamp	34–2039
52	Condenser (50 mmfd.)	30–1029
53	Resistor (7 ohms)	33–3130
54	Tone Control	30–4220
55	Resistor (51,000 ohms)	4237
56	Resistor (100 ohms)	33–3023
57	Resistor (5000 ohms)	33–1070
58	Resistor (37,000 ohms)	33–1098
59	Resistor (150 ohms)	33–3045
60	Resistor (150 ohms)	33–3045
61	Condenser (8 mfd.)	30–4135
62	Condenser (.5 mfd.)	30–4018
63	Condenser (.25 mfd.)	30–4134
64	Condenser (.5 mfd.)	30–4015
65	Vibrator Choke	32–1474
66	Condenser (.5 mfd.)	30–4047
67	"A" Choke	32–1493
68	Condenser (250 mmfd.)	32–1493
69	Vibrator	38–5036
70	Condenser (.02 mfd.)	30–4039
71	Resistor (200 ohms)	7217
72	Resistor (200 ohms)	7217
73	Condenser (1250 mmfd.)	5886
74	Power Transformer	32–7098
75	Condenser (.01 mfd.)	30–4051
76	Filter Condenser (4–8 mfd.)	30–2015
77	"B" Choke	32–7104
	Spark Plug Resistors	33–1015
	Distributor Resistor	33–1113E
	Screw Type Resistor	4851
	Interference Condenser	30–4007
	Studs	28–6036
	Nuts (Mounting)	W55A
	Battery Cable	38–5296
	Antenna Lead	38–5131
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27–7131
	Control Assembly	42–5185
	Bracket	6035

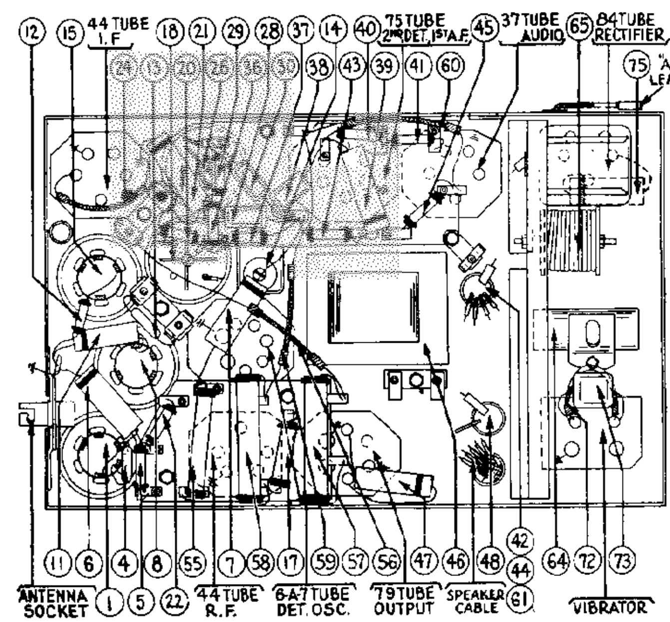


FIG. 4

MODEL 800(Code 122)
Alignment Data
Socket Layout

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 800 (Code 122).

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1471 for the first I. F. stage and 32-1449 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

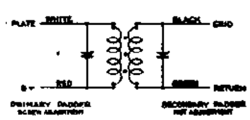


FIG. 1

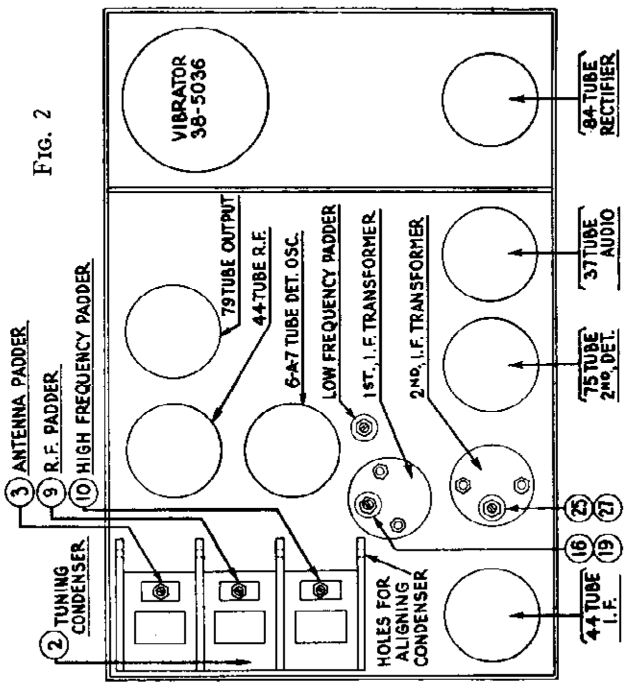


FIG. 2

MODEL 800 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube, grounding the shield. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders 25 and 27 are adjusted first (Figs. 2 and 3). Turn the adjusting screw 25 all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut 27 with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw 25 for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the first I. F. condensers, 16 and 19.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder 10 until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

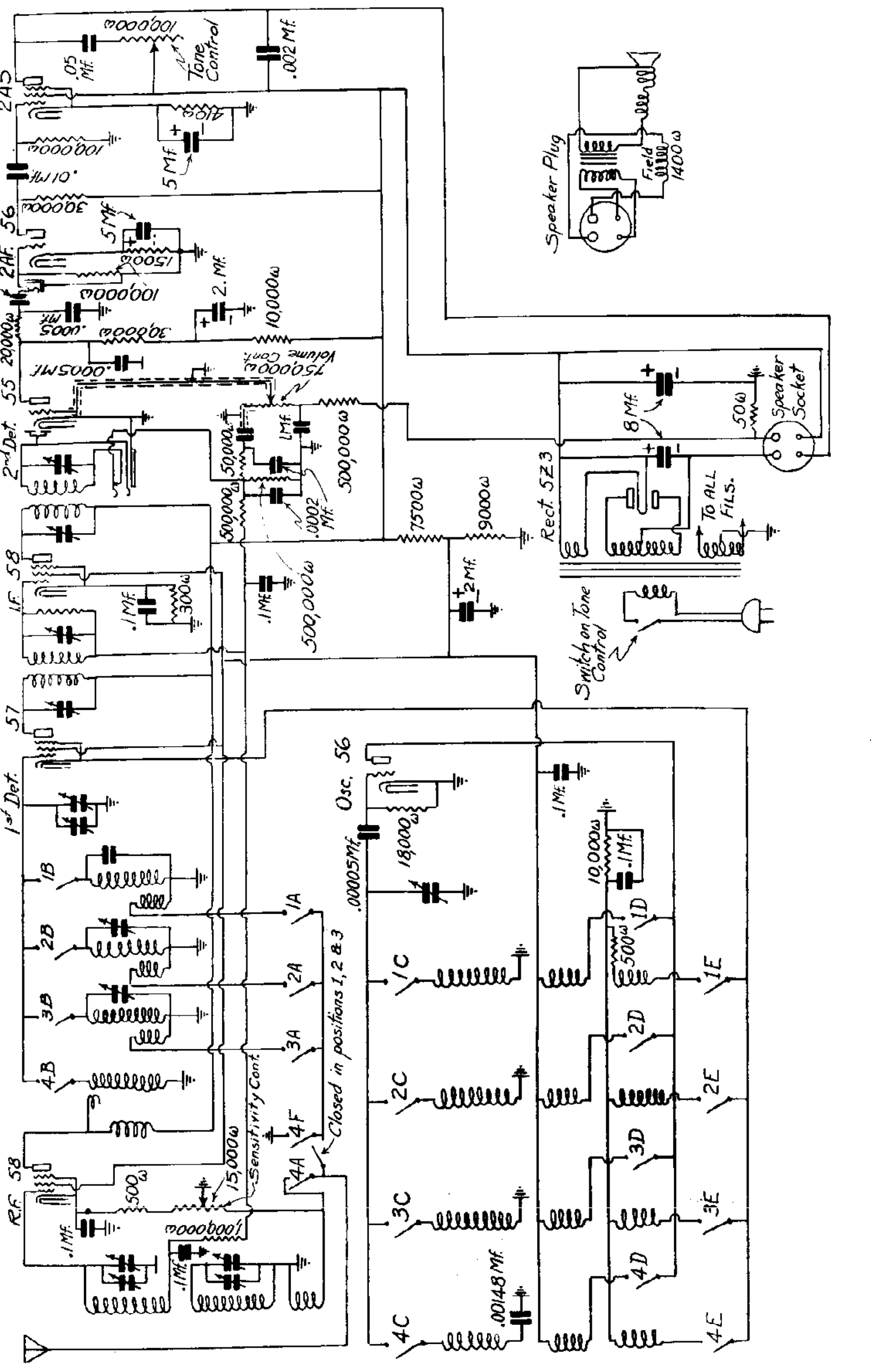
Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder 9 and the antenna padder 3 are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder 14 for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

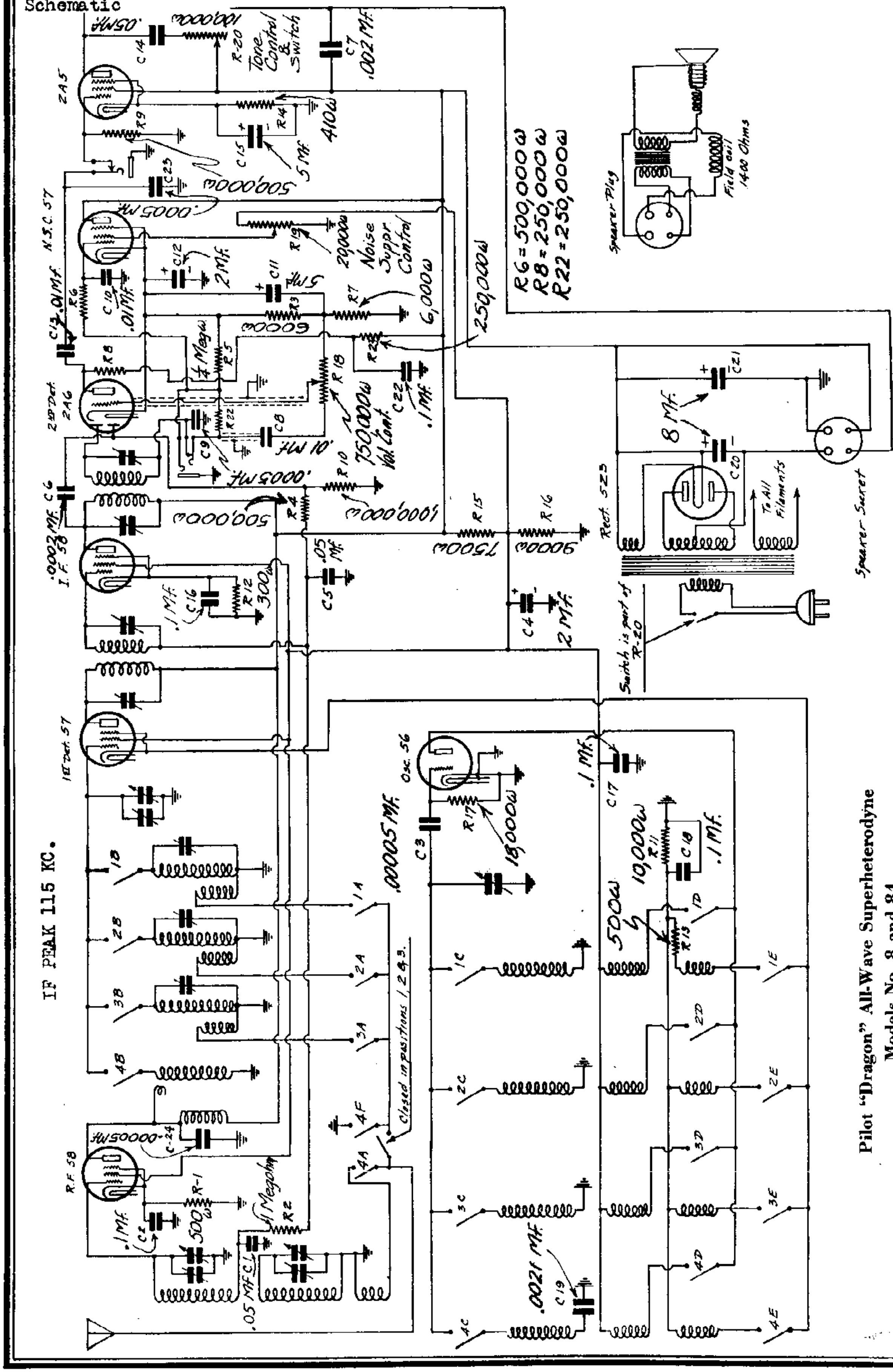
MODEL L-8
(8-Tube Dragon)
Schematic

PILOT RADIO CO. (New Co.)



MODEL 8,84,7,81
(Dragon A-W. Super)
Schematic

PILOT RADIO CO. (New Co.)



Pilot "Dragon" All-Wave Superheterodyne
Models No. 8 and 84

NOTE: In Models No. 7 and No. 81 the schematic diagram is identical except for the short-wave coil circuit.

Operating voltages .... 115, 125, 150, 220, 240, volts. Alternating Current.
Frequency rating .... 45 to 60 cycles.
Power consumption .... 75 watts.

PILOT RADIO CO. (New Co.)

MODEL 8,84,7,81
(Dragon A-W. Super)
Alignment Data

REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet proceed as follows: Be certain that the line cord is not plugged in the power outlet socket. Dismount the Noise Suppression Control from the side of the cabinet. Remove the "slip-on" knobs and felt washers from the controls located at the front of the receiver.

Unfasten the four 10/32 mounting screws which support the chassis in the cabinet. They are located underneath the cabinet, one at each corner.

Remove the speaker plug from its socket at the rear of the chassis.

ADJUSTMENT OF ALIGNMENT CAPACITORS

At the factory the receiver is carefully adjusted and aligned, and precautions are taken to maintain the accuracy of the adjustment. However, should the receiver ever require realignment the following procedure should be observed. In Fig. 2 the location and description of the various alignment capacitators are clearly illustrated. An External modulated oscillator with a frequency range sufficient to cover the requirements of the receiver should be used for obtaining best results.

Before connecting the chassis to the power line, reconnect the loudspeaker cable in its socket at the rear of the chassis. When aligning the Intermediate Amplifier the external oscillator must be set at 115 kilocycles which is the I.F. frequency of the receiver. The Frequency Range Selector Switch should be in the position marked B.C. when aligning the I.F. amplifier and the Broadcast range. For the various short wave ranges its position should correspond with aligning frequency selected from the external oscillator. Connect the antenna lead from the external oscillator to the control grid of the No. 58 tube in the I.F. amplifier stage. The alignment capacitators for the I.F. are located at top of the shielded I.F. transformers. When adjusting these units it is advisable to insulate the metal blade of the screwdriver so that short circuiting the B plus to the chassis will be avoided. Slowly rotate the adjusting screws of each of the capacitors until maximum output is noted in the loudspeaker output circuit. Use an output meter if one is available as a visual indication is likely to be more accurate than the audible method. With the completion of this operation, remove the external oscillator leads from the No. 58 I.F. amplifier tube and connect them in the same manner to the control grid of the No. 57 1st Detector tube. In a similar manner rotate each adjustor screw for maximum audio response in the speaker circuit.

CAUTION: Do not readjust the I.F. stage employing the No. 58 tube, when the external oscillator leads are connected to the No. 57 1st Detector control grid.

After the I.F. Amplifier has been completely realigned remove the external oscillator leads from control grid of the No. 57 tube and connect them to the Antenna and the Ground leads of the receiver. The BLACK wire at the rear of the chassis is the antenna connection; the YELLOW lead is for the ground. Set the frequency of the external oscillator at 1400 kilocycles. Rotate the "FREQUENCY SELECTOR DIAL" to a position where the "shadow line indicator" of the dial light is in a position coincident with the 1400 kilocycle calibration of the dial scale. Adjust the oscillator trimmer of the broadcast range (See Fig. 2) until resonance is indicated by maximum audio response in the speaker output circuit. Proceed next to the 1st Detector alignment capacitor which is located on the top of the gang condenser section of that circuit. The same procedure is followed in aligning the R.F. amplifier and the Preselector stages, the alignment capacitors of which are located also on top of their respective sections of the gang condenser. The correct positions are clearly illustrated in Fig. 2.

ALIGNMENT OF THE SHORT WAVE RANGES

Each of the Short Wave ranges has a separate aligning capacitor in its heterodyne circuit. The alignment frequencies for the various short wave ranges are:

Range No. 3.......... 3700 kilocycles
Range No. 2.......... 8600 kilocycles
Range No. 1..........15,000 kilocycles

The antenna and ground leads of the external oscillator should be connected to the black and yellow wires respectively of the receiver. Adjust the external oscillator to the required frequency for the short wave range being aligned. Rotate the "frequency selector dial" until the signal is noted in the audio output. Turn the tuning condenser slowly from the left to right in the vicinity of the signal, at the same time adjusting the alignment capacitor until the maximum signal response is noted in the loudspeaker output circuit. The signal voltage of the external oscillator should always be held constant while making alignment adjustments. The same alignment procedure should be followed on all of the short wave ranges.

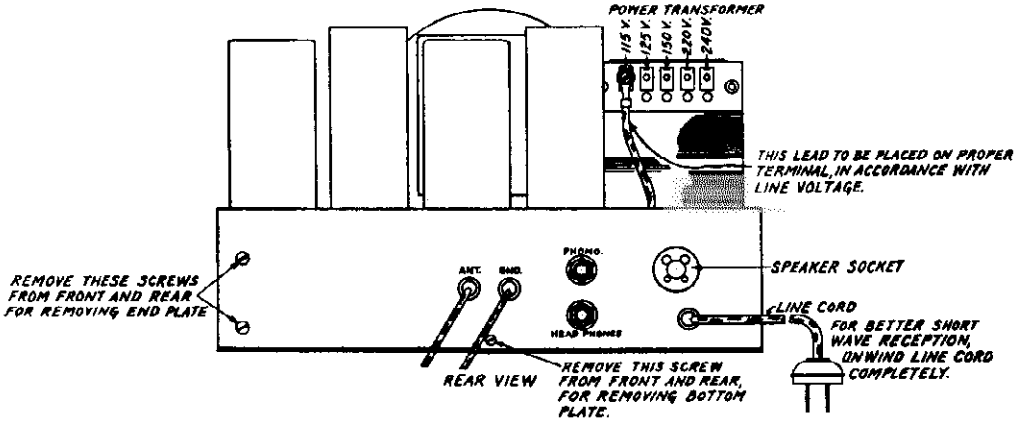
REMOVAL OF FREQUENCY RANGE SELECTOR SWITCH ASSEMBLY

When removing this assembly great care must be exercised by the operator to avoid scratching or marking the coils. Remove the bottom plate and the side plate from the chassis. It is advisable to first unsolder the leads connecting the assembly to the main chassis. Remove the four 8/32 nuts which support the assembly in the chassis. The switch assembly is then ready for removal.

In replacing the switch assembly the same precautions must be observed to avoid damage to the coils. Refasten the assembly firmly in the mounting provided for it. Resolder all connections well. Use only ROSIN CORE SOLDER. DO NOT USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE. Replace the bottom plate and the side plate. It is advisable to realign the receiver after the replacement of the assembly is completed.

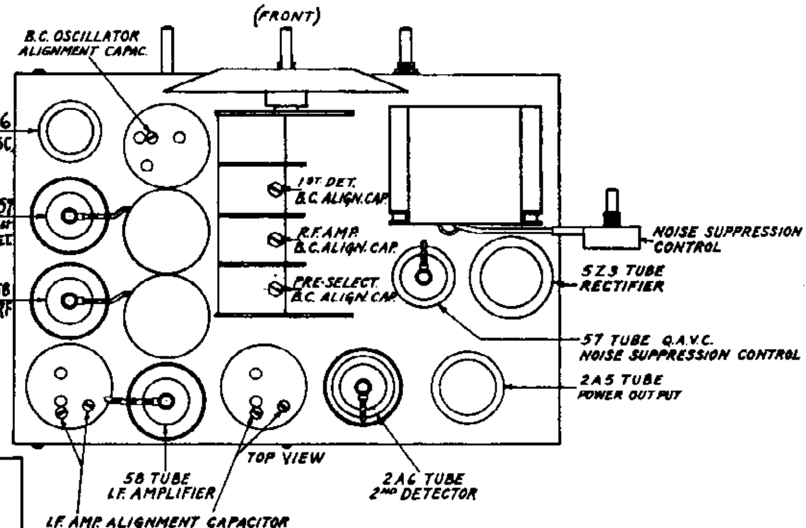
MODEL 8,84,7,81
(Dragon A-W. Super)
Socket Layout
Voltage,Trimmers

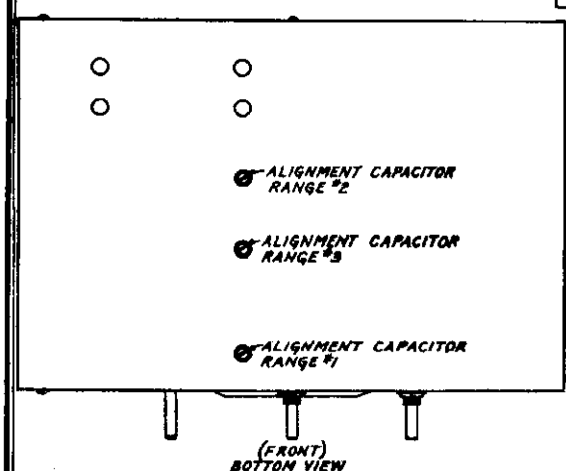
PILOT RADIO CO. (New Co.)



POWER SUPPLY

The operating voltage of the receiver is indicated on the label at the rear of the chassis. In the PILOT "DRAGON" receiver a special type of "universal" power transformer is used. Its design permits the receiver to be used on line voltages of 115, 125, 150, 220, or 240 volts ALTERNATING CURRENT from forty-five to sixty cycles. At the factory the transformer is connected for operation on voltages existing in the location where the receiver is to be used. If doubt exists regarding the voltage of the electric power in your locality consult the power company for advice. When certain that the receiver is connected for the proper operating voltage then plug in the line cord to the nearest outlet.





Frequency coverage of Range Selector Switch positions.

Position BC	540—1500	kilocycles	555—200	metres
3	1500—3900	kilocycles	200—77.	metres
2	3900—9000	kilocycles	77.—33.4	metres
1	9000—21,400	kilocycles	33.4—14.	metres

Intermediate Frequency 115 kc. The use of this frequency provides a very favorable degree of sensitivity and selectivity.

The D.C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 Ohms per volt.

Voltages measured at the tube socket

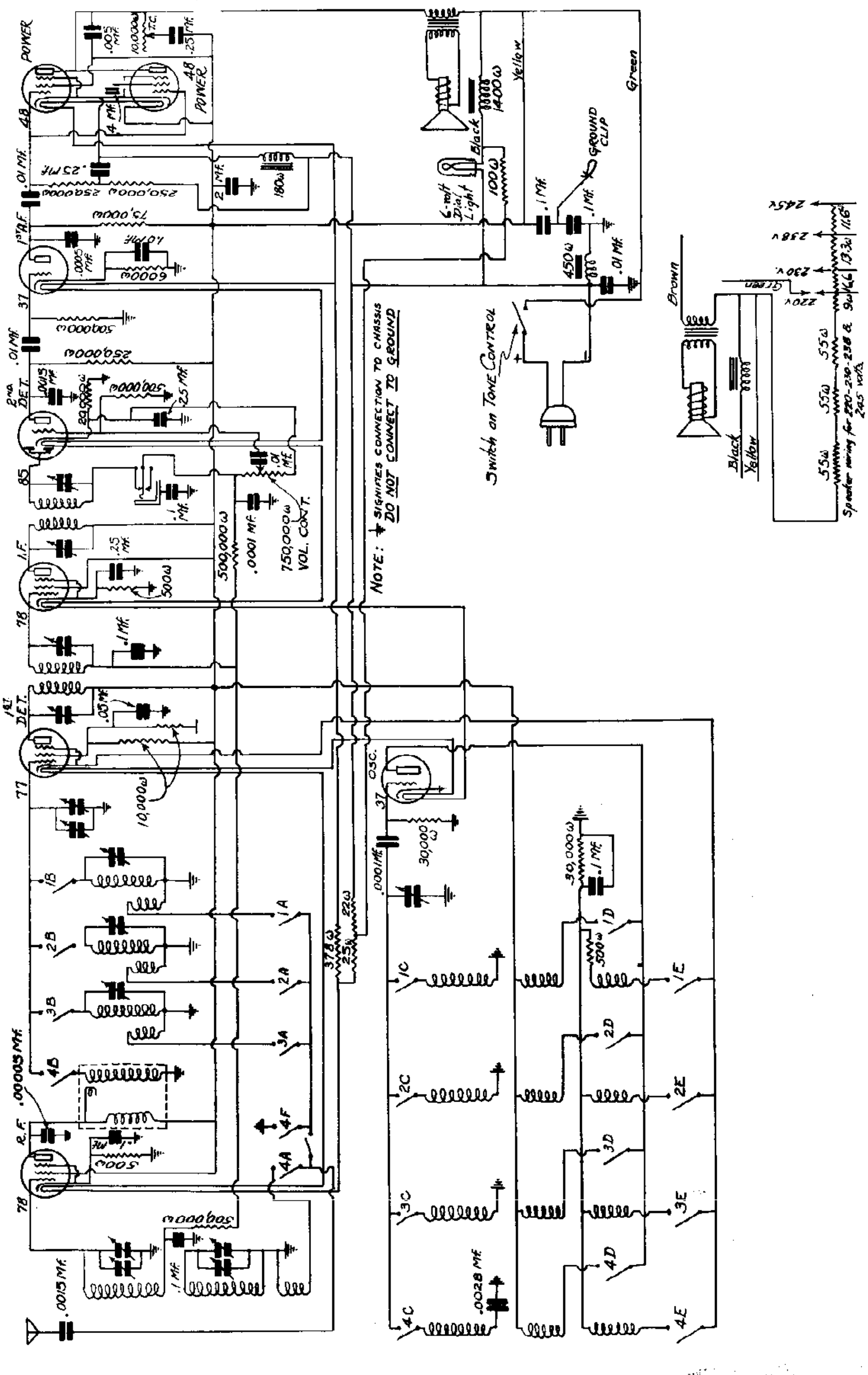
	R.F.	Osc.	1st Det.	Int. Amp.	2nd Det.	Pwr Pentode	Rectifier	N.S.C.
	58	56	57	58	2A6	2A5	5Z3	57
Plate	235	85	230	230	*88	205	335	235
Cathode	3	—	5	2	2	14	—	2
Screen	82	—	80	83	—	220	—	0 to 83
Filament	2.4	2.4	2.4	2.4	2.4	2.4	2.4	4.8

All plate voltages measured to cathode. Screen voltages measured to cathode.

All cathode voltages measured to chassis frame. Measurement at the 5Z3 tube made from filament to center tap of power transformer high voltage center tap. Speaker Field Voltage 100 V.

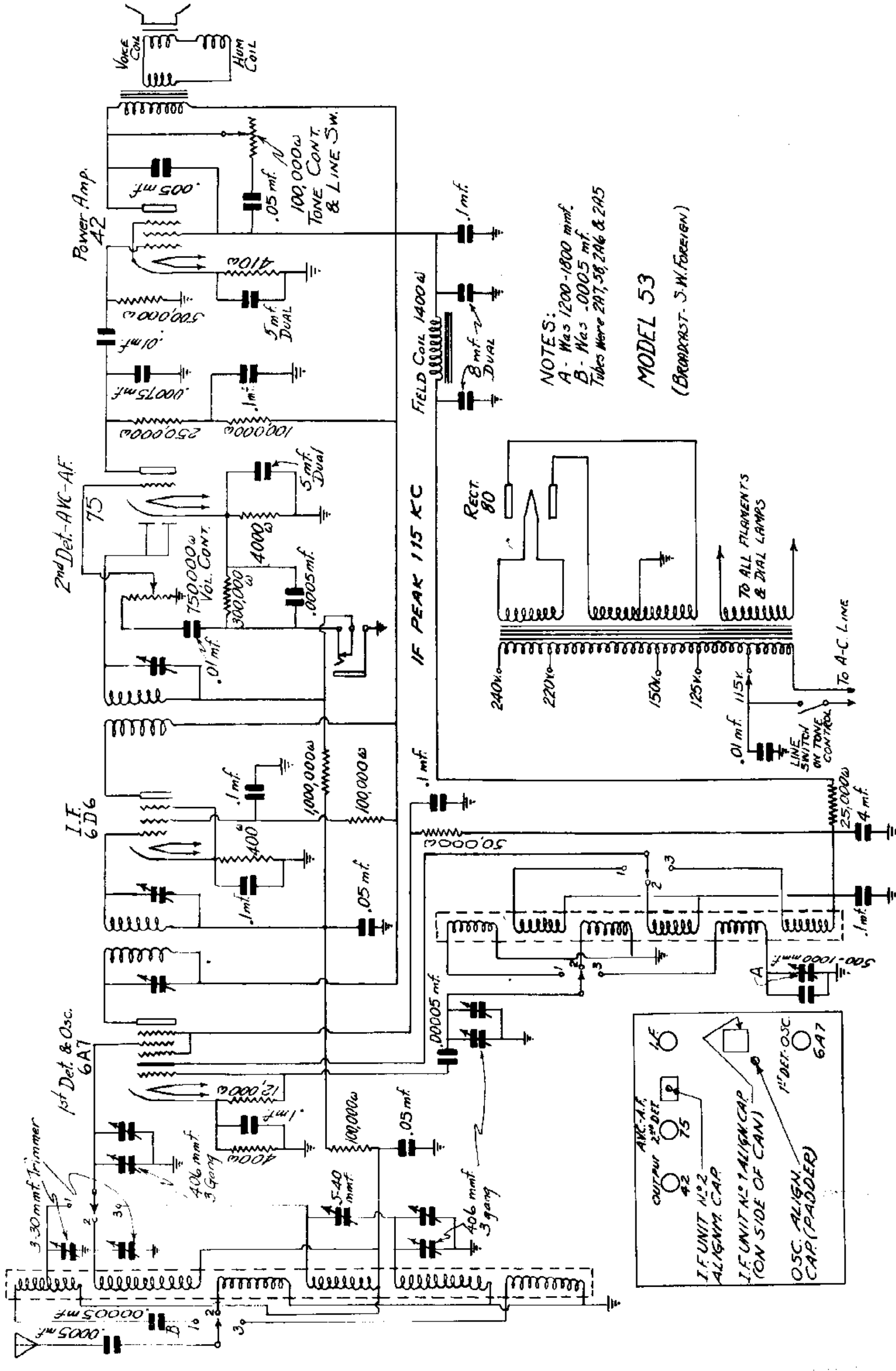
MODEL 28
Schematic

PILOT RADIO CO. (New Co.)



MODEL 53
Schematic
Socket Layout

PILOT RADIO CO. (New Co.)



MODELS 53 and 55
Alignment Data

PILOT RADIO & TUBE CORP.

ALIGNMENT OF INTERMEDIATE-FREQUENCY AMPLIFIER:

The I-F. peak frequency is 115 kc. Remove the chassis from the cabinet. To do this remove the slip-on knobs from the controls at the front of the receiver. Next remove the four screws which hold the chassis to the base of the cabinet. Set the signal generator at 115 kc. Connect the ground lead of the signal generator to the chassis of the receiver. Place the fixed condenser in series with the antenna lead from the signal generator (approximately .002 mf.) and connect the antenna lead to the control grid of the 6A7 tube. Adjust the intermediate-frequency capacitors of the I-F. unit No.1 and No.2 for maximum sensitivity. It is advisable to make these adjustments at least twice. Use a low input from the signal generator when aligning the receiver in order that greater accuracy may be obtained.

BROADCAST BAND ALIGNMENT:

Connect the antenna and ground leads of the signal generator to the antenna and ground leads of the chassis. Use a dummy antenna in place of the .002 mf. condenser, if one be available. Set the frequency range switch of the receiver in the broadcast position. Set the signal generator at 1400 kc. Rotate the tuning condenser of the receiver until the compass dial pointer coincides with the 1400 kc. calibration mark on the dial scale. Adjust the oscillator trimmer on the gang condenser until resonance is indicated in the loudspeaker circuit. Next adjust the heterodyne stage and preselector stage for maximum sensitivity. Next set the signal generator at a frequnecy of 1630 kc. Adjust the image suppression circuit condenser for minimum signal response, as noted in the loudspeaker circuit. When adjusting the image suppression condenser, a strong R-F. signal should be applied to the receiver. Again set the signal generator to 1400 kc. and adjust the oscillator, heterodyne stage and preselector trimmer condensers for maximum sensitivity. Next, set the signal generator at 600 kc. and rotate the tuning condenser on the chassis until resonance is noted in the loudspeaker output circuit. Adjust the 600 kc. alignment capacitor (padder) at the same time, slowly rocking the gang condenser to the right or left for maximum sensitivity. Again, set the signal generator at 1400 kc. Rotate the tuning condenser on the chassis until the compass dial pointer coincides with the 1400 kc. calibration mark on the dial scale. Readjust the oscillator, the heterodyne stage and the preselector circuit trimmer on the gang condenser. for maximum sensitivity. Check the sensitivity of the receiver at 1000 kc. and 600 kc.

SHORT-WAVE BAND No.2 ALIGNMENT:

Set the frequency range switch of the receiver on position Band No.2. Set the signal generator at 6100 kc. (49 meters.) Adjust the Band No.2 alignment capacitor for maximum sensitivity. Set the signal generator at 2400 kc. Check the sensitivity of the receiver at this point also.

SHORT-WAVE BAND No.1 ALIGNMENT:

Set the signal generator at 17,800 kc. (16.85 meters). Rotate the tuning condenser until the signal is noted in the loudspeaker circuit. The compass dial pointer should then be approximately on the 17.8 megacycle mark on the dial scale. Adjust the Band No.1 trimmer for maximum sensitivity. Set the signal generator at 7500 kc. and check the sensitivity of the set at this point.

When making all adjustments, it is advisable to have the volume control and tone control turned on full in a clockwise direction.

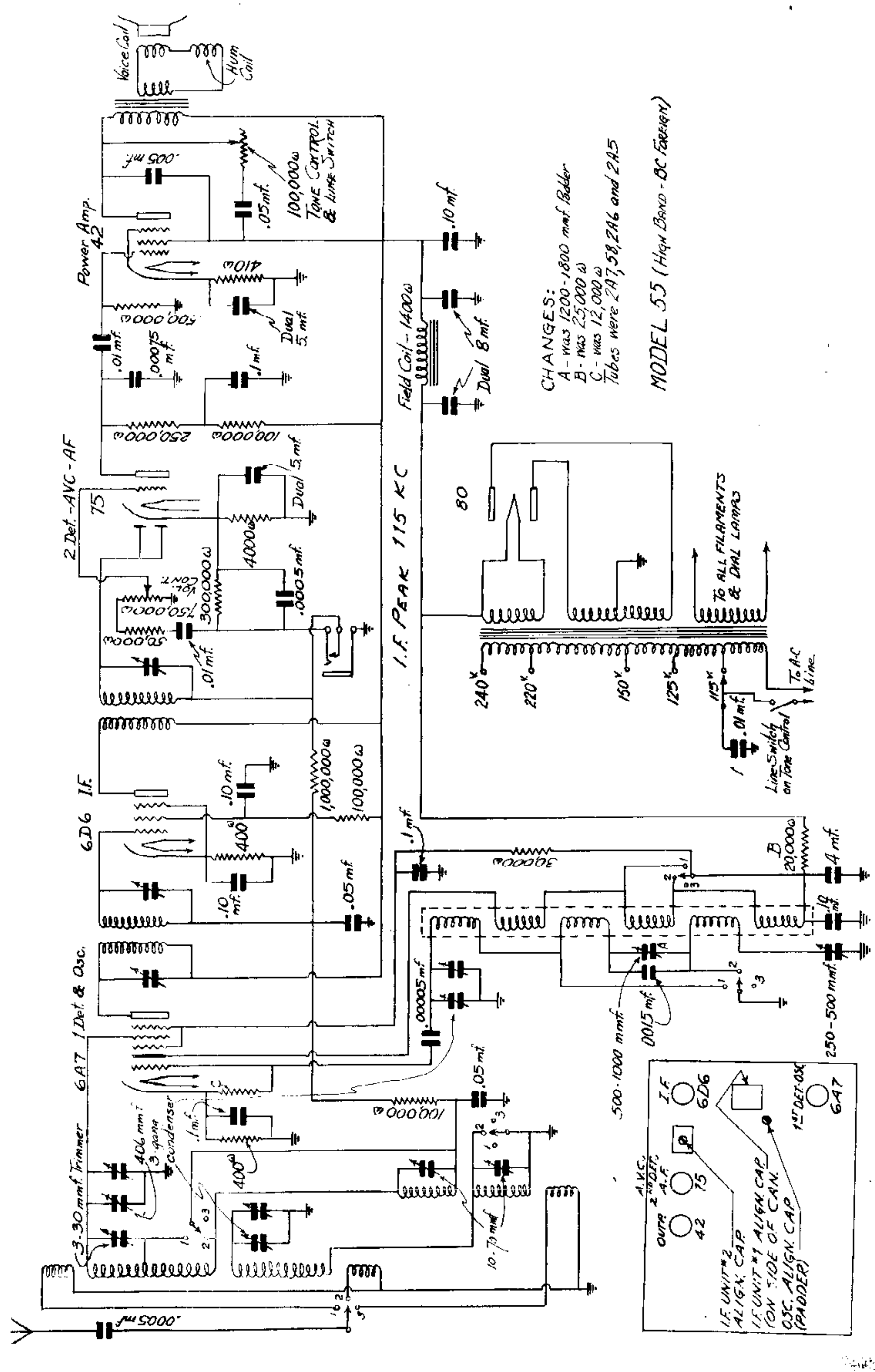
HIGH BAND SECTION ALIGNMENT:

Rotate the frequency range switch to the position marked "High Band". Set the signal generator at 300 kc. Rotate the tuning condenser until the 300 kc. signal is noted in the loudspeaker circuit. The signal should be observed when the dial pointer is on the 1000 meter calibration. Adjust the First Detector and the Preselector circuit alignment capacitors for maximum sensitivity. There is no oscillator capacitor adjustment at 1000 meters.

Set the signal generator at 155 kc. Rotate the tuning condenser until the signal is noted in the loudspeaker circuit at 1930 meters on the dial. Adjust the "High Band" padder condenser for maximum sensitivity. Realign the set at 1000 meters and check the sensitivity at 1500 meters (200 kc.).

MODEL 55
Schematic
Socket Layout

PILOT RADIO CO. (New Co.)



RCA-VICTOR CO., INC.

MODEL R-27, Revised
Schematic
Chassis Wiring

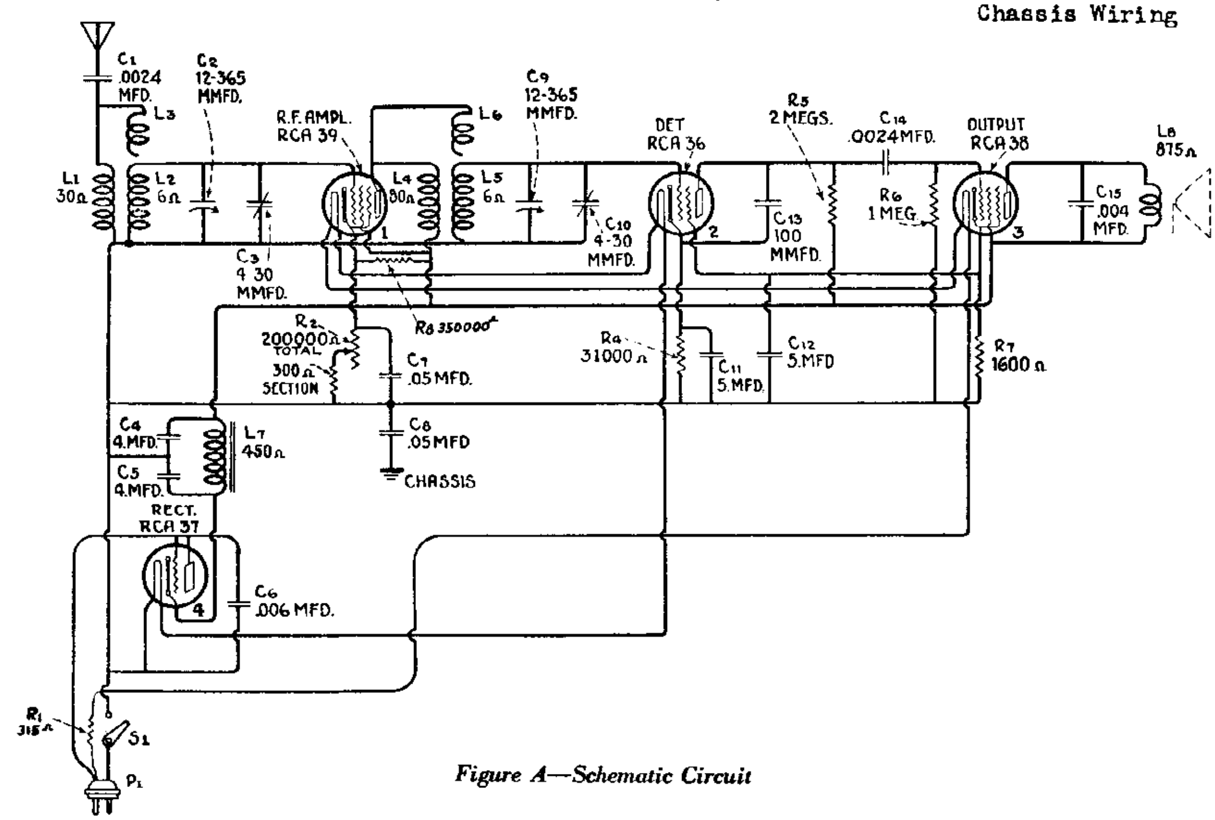


Figure A—Schematic Circuit

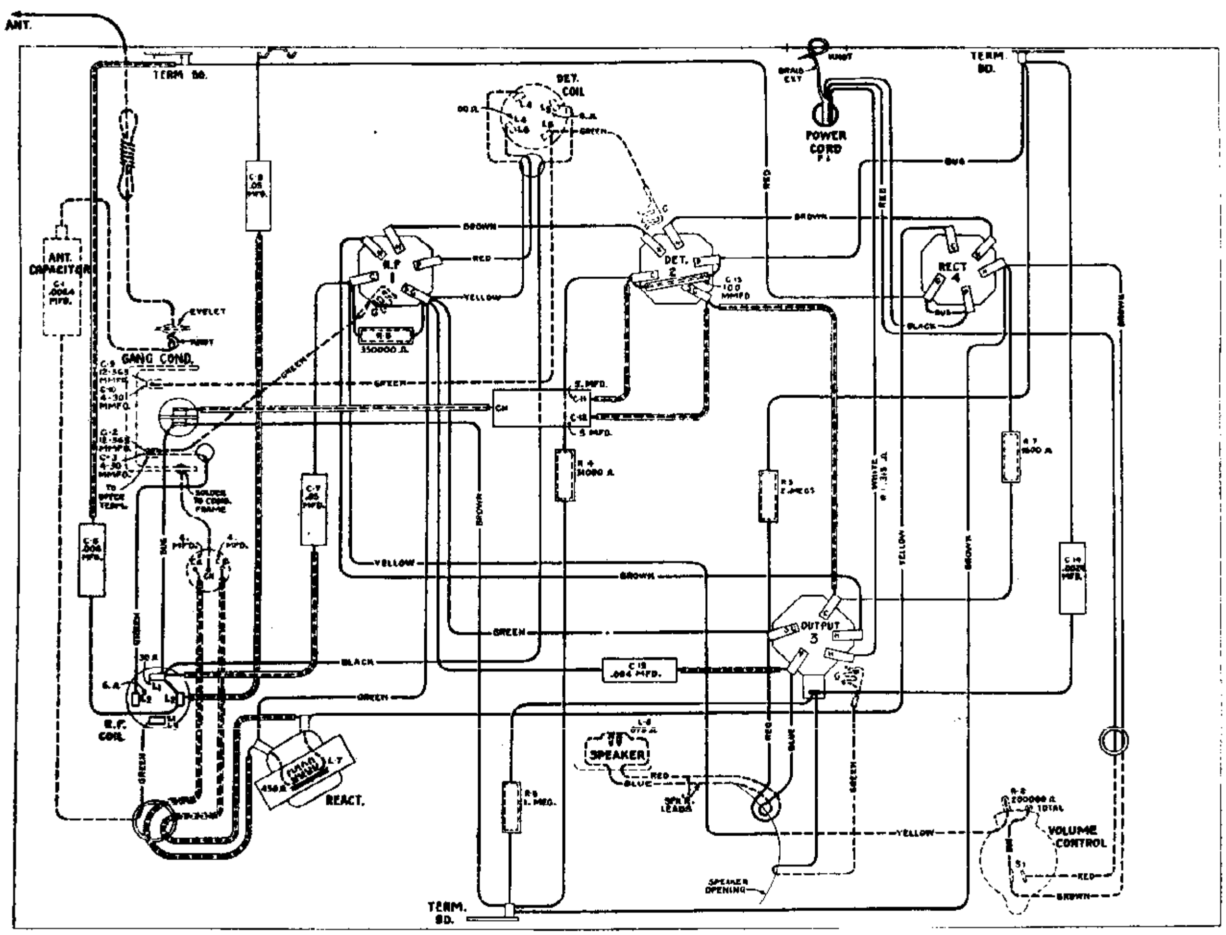


Figure B—Wiring Diagram

MODEL R-27, Revised
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating—
105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption....................40 Watts
Frequency Range...........540 K. C.–1712 K. C.
Type and Number of Radiotrons.......1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation of both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105	105	7.0	6.0
2. RCA-36 Det.	*0.75	11.0	*60	.025	6.0
3. RCA-38 Output	11.0	100	95	5	6.0
4. RCA-37 Rect.	—	—	115	15	6.0

* Impossible to measure on ordinary voltmeter

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type (R6)—Package of 5	$1.00
3537	Reactor—Filter reactor (L7)	1.10
3542	Volume control—Complete with mounting nut (R2, S1)	1.18
3559	Resistor—31,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
3560	Resistor — 1,600 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
3567	Escutcheon — Station selector escutcheon—Package of 2	.42
3568	Escutcheon — Volume control escutcheon—Package of 2	.42
3569	Knob—Station selector or volume control knob—Package of 5	.65
3713	Capacitor—0.05 mfd. (C7, C8)	.32
3714	Coil—Detector coil (L4, L5, L6)	.98
3715	Coil—R. F. coil complete (L1, L2, L3)	1.08
4007	Capacitor—2,400 mmfd. (C1, C14)	.35
4070	Capacitor—0.004 mfd. (C15)	.42
4071	Capacitor—0.006 mfd. (C6)	$0.42
4073	Resistor—350,000 ohms—Carbon type—½ watt—(R8)—Package of 5	1.00
6188	Resistor—2 megohm—Carbon type—½ watt (R5)—Package of 5	1.00
6451	Condenser—2-gang variable tuning condenser (C2, C3, C9, C10)	2.04
6819	Resistor—Filament resistor—Power cord—315 ohms (R1)	1.00
6844	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors (C11, C12)	1.10
6845	Capacitor—Filter capacitor—Two 4.0 mfd. (C4, C5)	1.18
7484	Socket—Radiotron socket—5-contact	.35
10820	Capacitor—100 mmfd. (C13)	.40
	LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE	
7594	Cone—Speaker cone—Package of 5	5.00
7595	Support—Cone support	.60
7596	Mechanism—Speaker mechanism complete with magnet (L8)	3.00
9426	Loudspeaker complete	4.38

MODEL R-28-BW
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

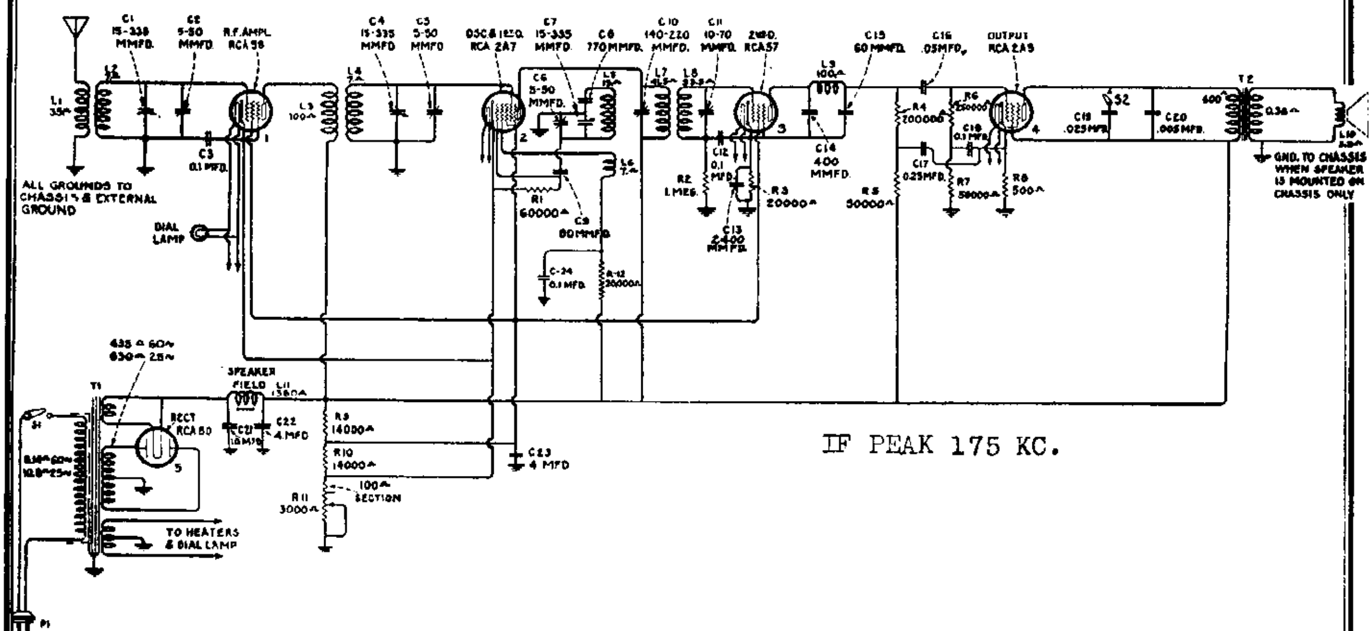


Figure 1—Schematic Circuit Diagram

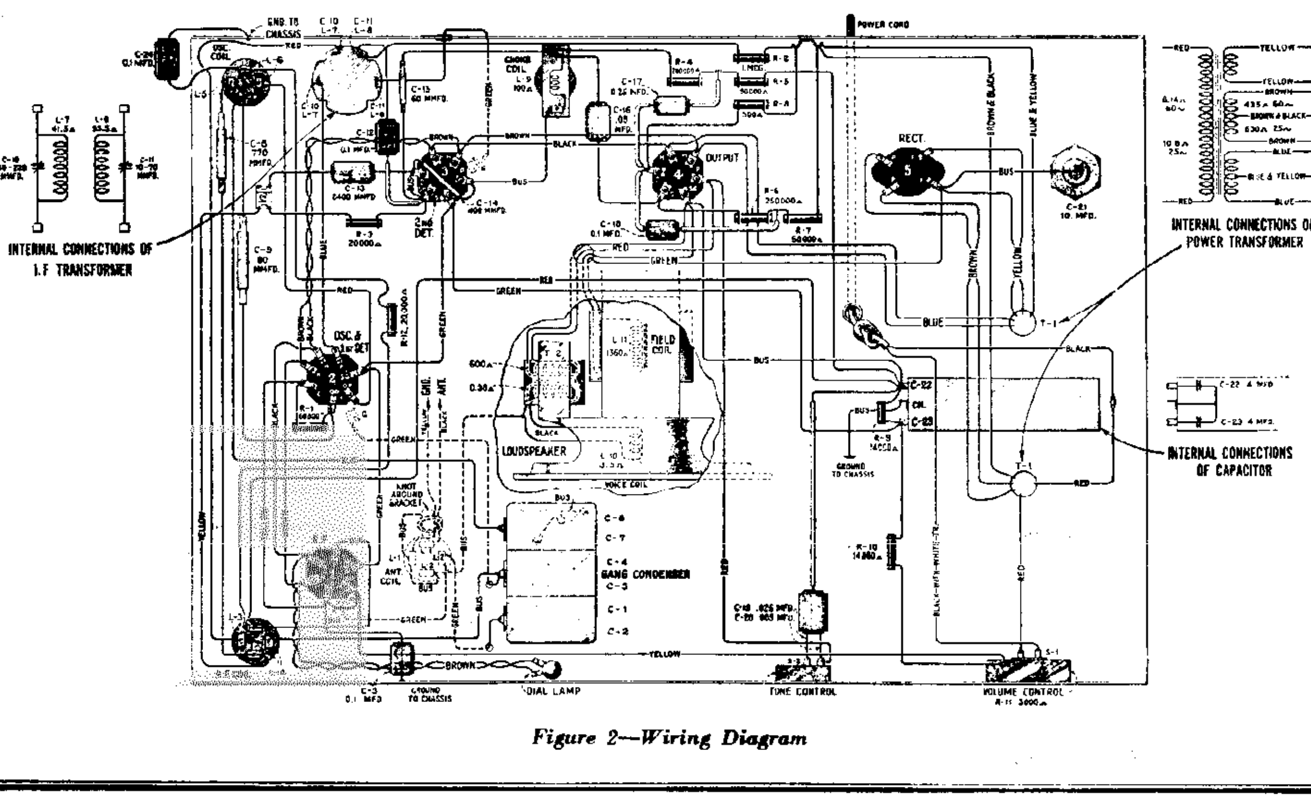


Figure 2—Wiring Diagram

MODEL R-28-BW
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating....................105–125 Volts
Frequency Rating..........25–40 Cycles and 50–60 Cycles
Power Consumption..........................70 Watts
Number and Types of Radiotrons..............1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5
Undistorted Output..........................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	725 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2749	Capacitor—2,400 mmfd.	1.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.60
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3586	Scale—Dial scale	.50
3587	Socket—Dial lamp socket and bracket	.32
3588	Volume control—Complete with mounting nut	1.40
3589	Switch—Tone control switch	.54
3592	Knob—Station selector, operating switch or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3601	Coil—Choke coil	.68
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd.	.30
3605	Capacitor—770 mmfd.	$0.30
3606	Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors	.40
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5	2.00
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	2.50
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	2.50
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	2.50
6443	Capacitor—10 mfd.	1.50
6464	Transformer—I. F. transformer	1.88
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil assembly	.74
6472	Coil—R. F. coil assembly	.94
7485	Socket—Radiotron 6 contact socket	.70
7487	Shield—Radiotron tube shield	.50
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7592	Condenser—3 gang variable tuning condenser	3.35
8985	Transformer—Power transformer—105-125 volts—50-60 cycles	4.26
8986	Transformer — Power transformer — 200-250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9004	Coil assembly—Comprising field coil, magnet and cone support	2.85

MODEL R-28-
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

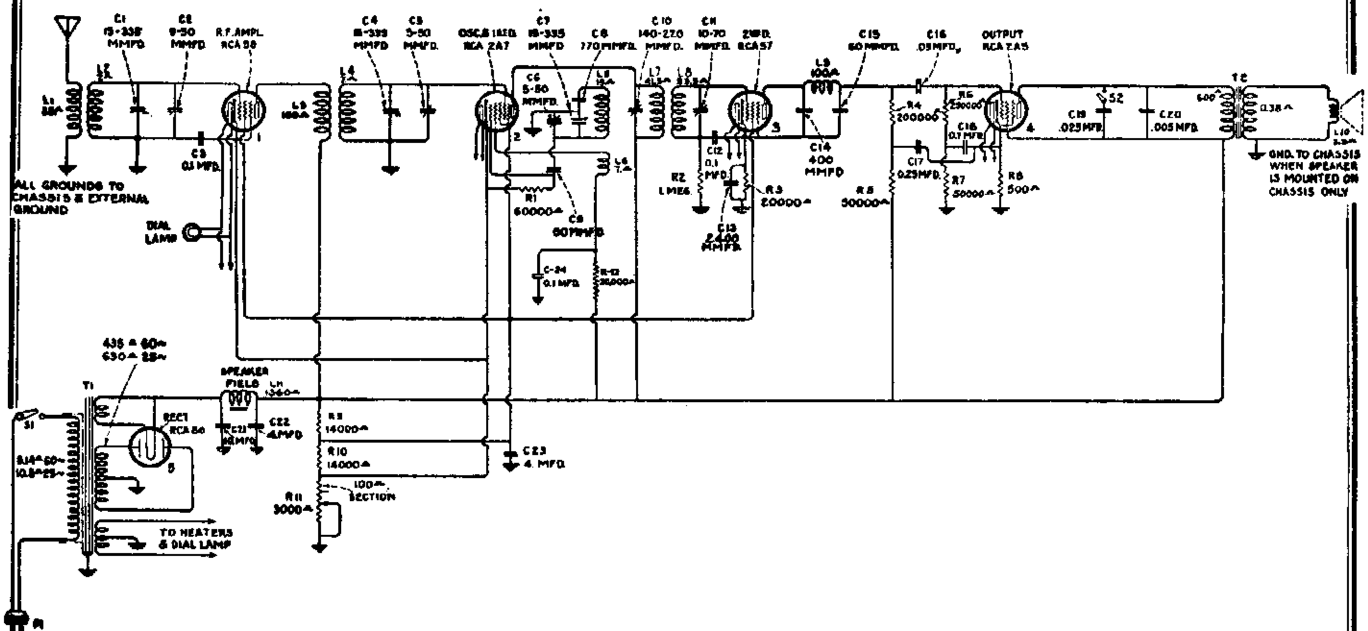


Figure 1—Schematic Circuit Diagram—Note—Sign lamps are connected across R. F. heater

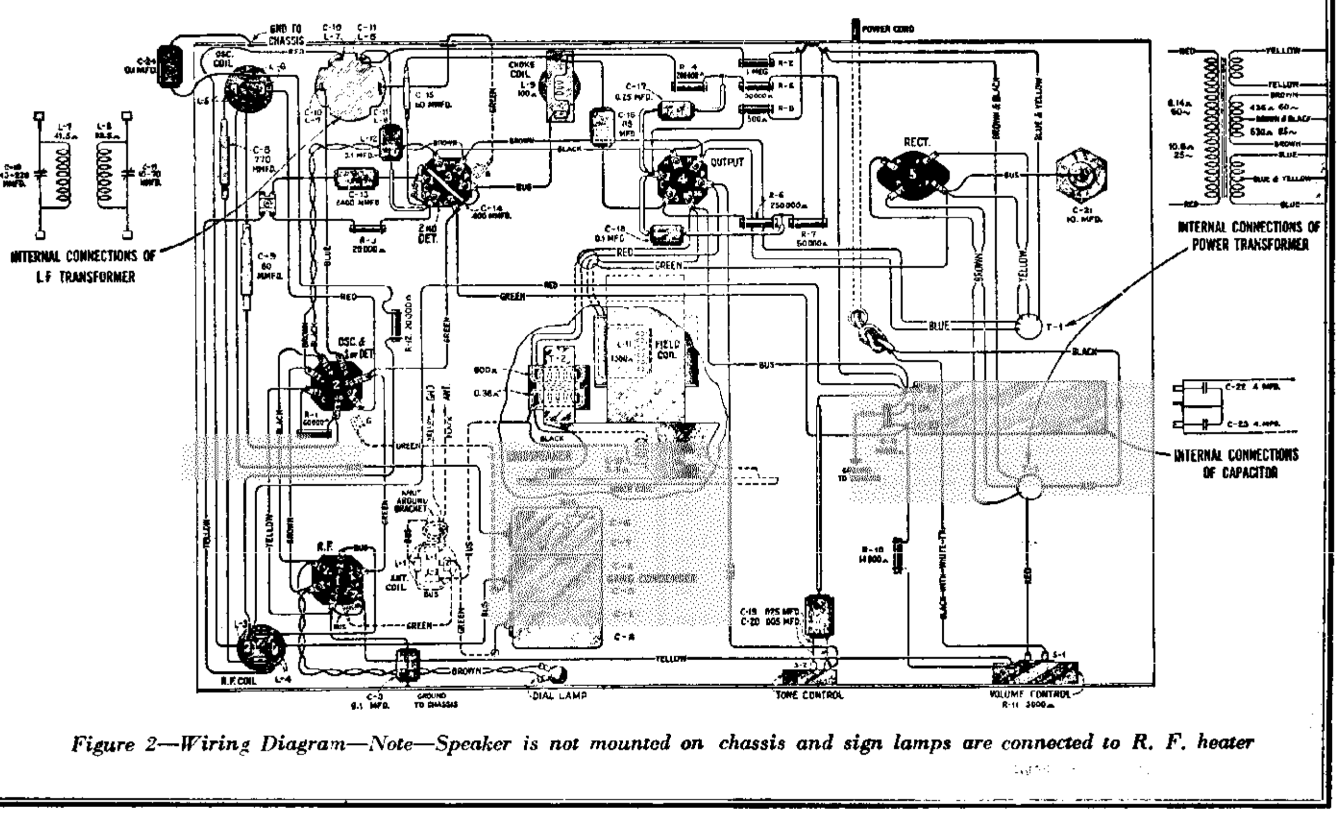


Figure 2—Wiring Diagram—Note—Speaker is not mounted on chassis and sign lamps are connected to R. F. heater

MODEL R-28-BWC
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating ....115 Volts

Frequency Rating..........25-40 Cycles and 50-60 Cycles

Power Consumption ....70 Watts

Number and Types of Radiotrons...............1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5

Undistorted Output..........................1.75 Watts

Frequency Range................540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker, two-point tone control, single heater type Pentode Output and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	725 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

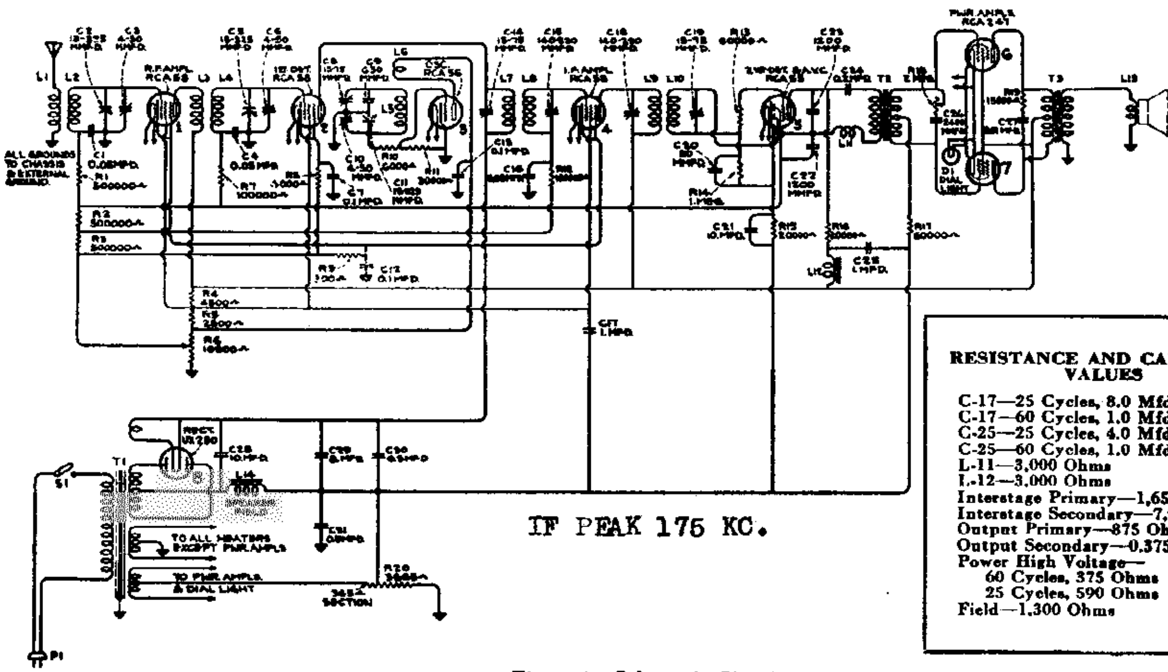
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Contact cap—Package of 5	.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5.	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5.	.40
3588	Volume control—Complete with mounting nut	1.40
3589	Switch—Tone control switch	.54
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5.	1.10
3604	Capacitor—400 mmfd.	.30
3605	Capacitor—770 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors	.40
3623	Shield—Antenna or R. F. Coil Shield	.30
3624	Socket Lamp socket and bracket—Located behind aperture wings	.40
3739	Knob—Station selector or volume control knob—Package of 5	$0.80
3740	Knob—Operating switch knob—Package of 5	.75
3741	Escutcheon—Station selector escutcheon	.30
3742	Screen—Ivory colored screen—Located behind front panel covering aperture "wings"—Package of 2	.54
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil assembly	.74
6472	Coil—R. F. coil assembly	.94
6473	Scale—Dial scale	.50
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7589	Capacitor—Filter capacitor—Two 4. 0 mfd. in container	1.64
7590	Capacitor—10 mfd.	1.40
7592	Condenser—3 gang variable tuning condenser	3.35
8986	Transformer — Power transformer — 200-250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
9025	Transformer—Power transformer—105-125 volts—50-60 cycles	4.26
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9004	Coil assembly—Comprising field coil, magnet and cone support	2.35

MODEL R-73
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.



RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
60 Cycles, 375 Ohms
25 Cycles, 590 Ohms
Field—1,300 Ohms

Figure 3—Schematic Circuit.

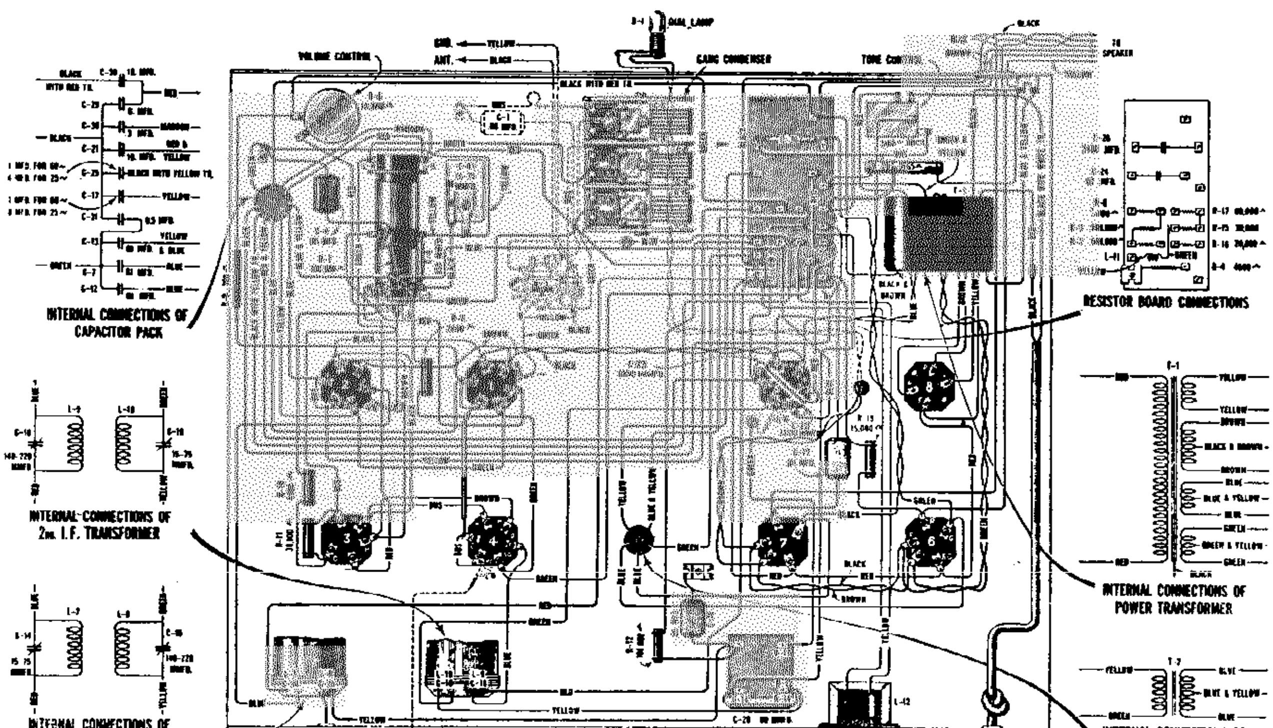


Figure 4—Chassis Wiring Diagram

MODEL R-73
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption............................100 Watts
Type and Number of Radiotrons......3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit.......................Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output..............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency........................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

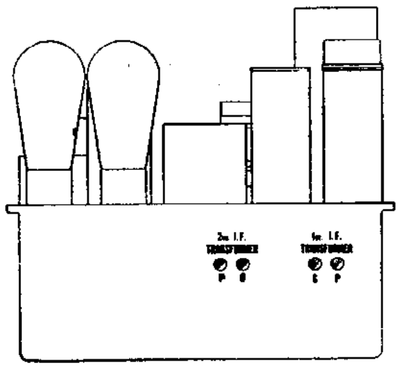


Figure 5—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.
(b) Remove the oscillator tube and connect a ground to the chassis.
(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.
(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

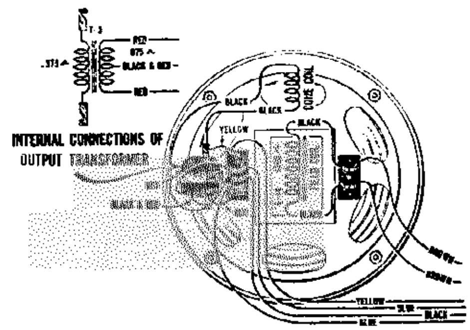


Figure 6—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.
(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.
(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.
(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and no Signal

Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field . 105 Volts
Chassis to Low Side of Field......................90 Volts
Voltage Across Field..........................120 Volts
Rectifier. . 370 Volts R.M.S. Each Plate—80 M.A. Each Plate

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2746	Socket—Dial lamp socket	$0.50
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd. capacitor	1.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	2.50
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	2.75
3369	Resistor—4,500 ohms—Porcelain type—20 watts	1.00
3437	Knob—Noise suppressor knob	.60
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd. mounted on resistor board	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3456	Capacitor—0.05 mfd.	.44
3457	Resistor — Porcelain type — 3,665 ohms — Tapped at 365 ohms	.78
3458	Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd. capacitor	.44
3460	Capacitor—1,200 mmfd. capacitor	.54
3468	Resistor—300 ohms—Flexible type—Pk. of 5	.60
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	2.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	2.50
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	2.50
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.50
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	1.00
6300	Socket—4 contact Radiotron socket	.55
6301	Reactor—Filter reactor	2.00
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	2.50
6308	Coil—R. F. coil complete with mounting bracket	1.90
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	.85
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer — Second intermediate frequency transformer	2.14
6369	Volume control—Complete with mounting nut	1.16
6370	Tone control—Complete with mounting nut	$1.34
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	1.00
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers	1.10
7439	Drum—Dial drum with 3 dial mounting nuts	.50
7440	Scale—Dial and dial scale	.75
7481	Coil—Detector and oscillator coil complete with mounting bracket	3.50
7484	Socket—UY type Radiotron socket	.65
7485	Socket—6 contact Radiotron socket	.70
7510	Shield — Radiotron tube shield — Maroon finish	.50
7511	Shield—Radiotron tube shield top—Maroon finish	.50
7549	Transformer—Interstage audio transformer	2.48
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	7.40
7551	Transformer—Power transformer—105-125 volts—50-60 cycles	6.40
7552	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.52
7556	Transformer—Power transformer—105-125 volts—25-50 cycles	8.50
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation	7.24
7565	Shield—Radiotron tube shield top—Red	.36
7566	Shield—Radiotron tube shield—Red	.38
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board complete with 3 terminals—Package of 5	.50
6371	Transformer—Output transformer	1.90
8920	Ring—Cone retaining ring	.50
8935	Cone—Reproducer cone complete with voice coil—Package of 5	12.50
9421	Coil assembly—Comprising field coil, magnet and cone support	4.32
	CABINET ASSEMBLIES	
6113	Foot—Cabinet felt foot—Package of 5	
7523	Escutcheon—Station selector escutcheon	
X181	Cabinet—Complete less equipment	
X182	Baffle board and grille cloth	

MODEL R-75 (47s Output)
MODEL R-75 (2A5s Output)
Parts Lists

RCA-VICTOR CO., INC.

MODEL R-75

(2A5 OUTPUT TUBES)

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	2.50
3078	Resistor—10,000 ohms—½ watt—Carbon type—Package of 5	2.50
3241	Resistor—300,000 ohms—Carbon type—½ watt—Package of 5	2.50
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	2.75
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd.	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3453	Resistor—2,800 ohms—Carbon type—½ watt—Package of 5	1.00
3460	Capacitor—1200 mmfd.	.54
3472	Capacitor—0.0024 mfd.	.32
3548	Knob—Noise suppressor knob	.24
3549	Capacitor—400 mmfd.	.34
3550	Resistor—370 ohms—Flexible type—Package of 5	.80
3556	Capacitor—0.05 mfd.	.34
3565	Socket—Dial lamp socket	.50
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	2.00
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	2.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6250	Resistor—4,000 ohms—Carbon type—½ watt—Package of 5	2.00
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	2.50
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	2.50
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.50
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	1.00
6300	Socket—4 contact Radiotron socket	.55
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	2.50
6312	Capacitor—650 mmfd.—Located on detector oscillator coil—Package of 5	2.50
6318	Resistor—10,000 ohms—Porcelain type—20 watt	1.00
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	$0.85
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6370	Tone control—Complete with mounting nut	1.34
6452	Volume control—Complete with mounting nut	1.40
6453	Rheostat—Noise suppressor rheostat	1.10
6454	Coil—R. F. coil complete with mounting bracket	.90
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	1.00
7065	Screw driver—Micarta screw driver for I. F., R. F., and oscillator condensers	1.10
7439	Drum—Dial drum with 3 dial mounting nuts	.50
7440	Scale—Dial and dial scale	.75
7481	Coil—Detector and oscillator coil complete with mounting bracket	3.50
7484	Socket—UY type Radiotron socket	.65
7485	Socket—6 contact Radiotron socket	.70
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	5.20
7549	Transformer—Interstage audio transformer	2.48
7582	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., two 1.0 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	8.06
7583	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 4.0 mfd., capacitors in metal container—For 25 cycle operation	10.00
7584	Transformer—Power transformer 105-125 volts—50-60 cycles	5.72
7585	Transformer—Power transformer—105-125 volts—25-50 cycles	9.86
7586	Transformer—Power transformer 200-250 volts—50-60 cycles	5.88
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets	.50
6184	Board—Terminal board complete with 3 terminals	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.50
8969	Cone—Reproducer cone complete with voice coil	6.35
9421	Coil assembly—Comprising field coil, magnet, and cone support	4.32

0556

MODEL R-75

('47 OUTPUT TUBES)

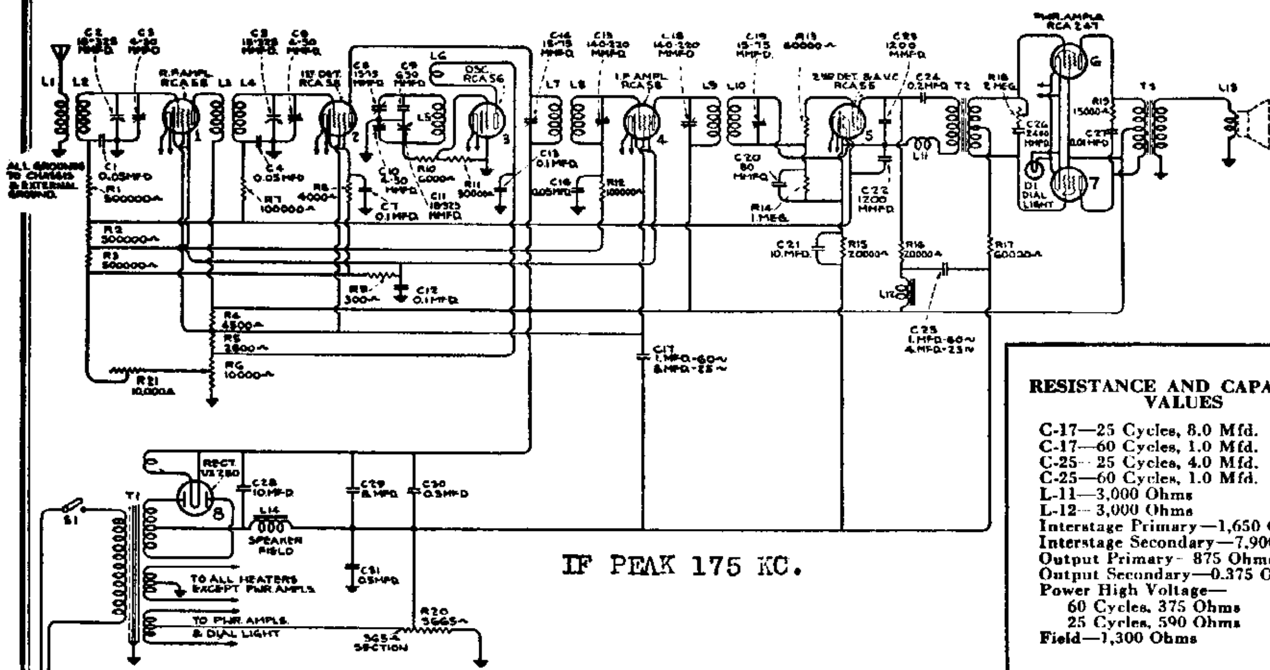
REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2746	Socket—Dial lamp socket	$0.50
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd. capacitor	1.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	2.50
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	2.75
3369	Resistor—4,500 ohms—Porcelain type—20 watts	1.00
3437	Knob—Noise suppressor knob	.60
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd. mounted on resistor board	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3456	Capacitor—0.05 mfd.	.44
3457	Resistor—Porcelain type—3,665 ohms—Tapped at 365 ohms	.78
3458	Resistor—2,800 ohms—Carbon type—½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd. capacitor	.44
3460	Capacitor—1,200 mmfd. capacitor	.54
3468	Resistor—300 ohms—Flexible type—Pk. of 5	.60
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	2.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	2.50
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	2.50
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.50
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	1.00
6300	Socket—4 contact Radiotron socket	.55
6301	Reactor—Filter reactor	2.00
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	2.50
6308	Coil—R. F. coil complete with mounting bracket	1.90
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	.85
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6369	Volume or noise suppressor control—Complete with mounting nut	1.16
6370	Tone control—Complete with mounting nut	$1.34
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	1.00
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers	1.10
7439	Drum—Dial drum with 3 dial mounting nuts	.50
7440	Scale—Dial and dial scale	.75
7481	Coil—Detector and oscillator coil complete with mounting bracket	3.50
7484	Socket—UY type Radiotron socket	.65
7485	Socket—6 contact Radiotron socket	.70
7510	Shield—Radiotron tube shield—Maroon finish	.50
7511	Shield—Radiotron tube shield top—Maroon finish	.50
7549	Transformer—Interstage audio transformer	2.48
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	7.40
7551	Transformer—Power transformer—105-125 volts—50-60 cycles	6.40
7552	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.52
7556	Transformer—Power transformer—105-125 volts—25-50 cycles	8.50
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation	7.24
7565	Shield—Radiotron tube shield top—Red	.36
7566	Shield—Radiotron tube shield—Red	.38
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board complete with 3 terminals—Package of 5	.50
6371	Transformer—Output transformer	1.90
8920	Ring—Cone retaining ring	.50
8935	Cone—Reproducer cone complete with voice coil—Package of 5	12.50
9421	Coil assembly—Comprising field coil, magnet and cone support	4.32
	CABINET ASSEMBLIES	
7441	Escutcheon—Station selector escutcheon	
X-174	Cabinet—Complete less equipment	
X-175	Stretcher assembly—Comprising front, side, and back rails	
X-176	Top—Cabinet top	
X-177	Foot—Cabinet foot	
X-178	Leg—Cabinet center leg	
X-179	Panel—Control panel	

RCA-VICTOR CO., INC.

MODEL R-75 (47s Output)
Schematic
Chassis Wiring



RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
60 Cycles, 375 Ohms
25 Cycles, 590 Ohms
Field—1,300 Ohms

Figure 3—Schematic Circuit

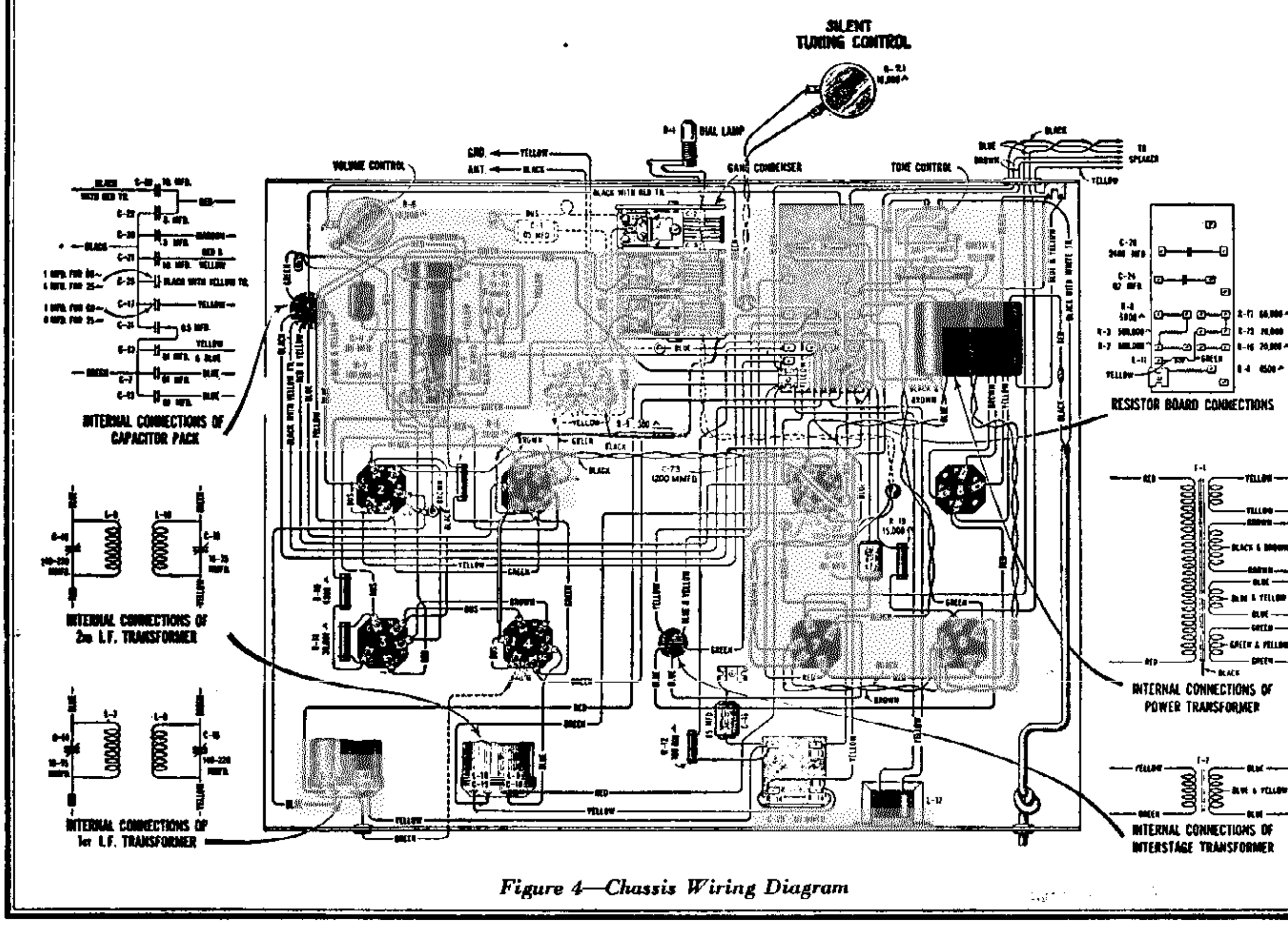


Figure 4—Chassis Wiring Diagram

MODEL R-75 (47s Output)
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating ....105-125 Volts
Power Consumption ....100 Watts
Type and Number of Radiotrons......3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit..........................Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output..............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency.........................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

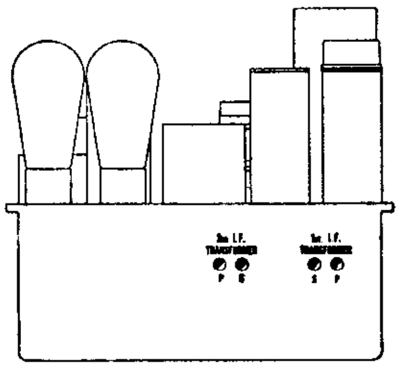


Figure 5—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.
(b) Remove the oscillator tube and connect a ground to the chassis.
(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.
(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

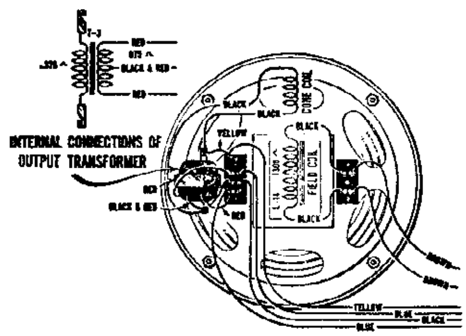


Figure 6—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.
(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.
(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.
(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and No Signal

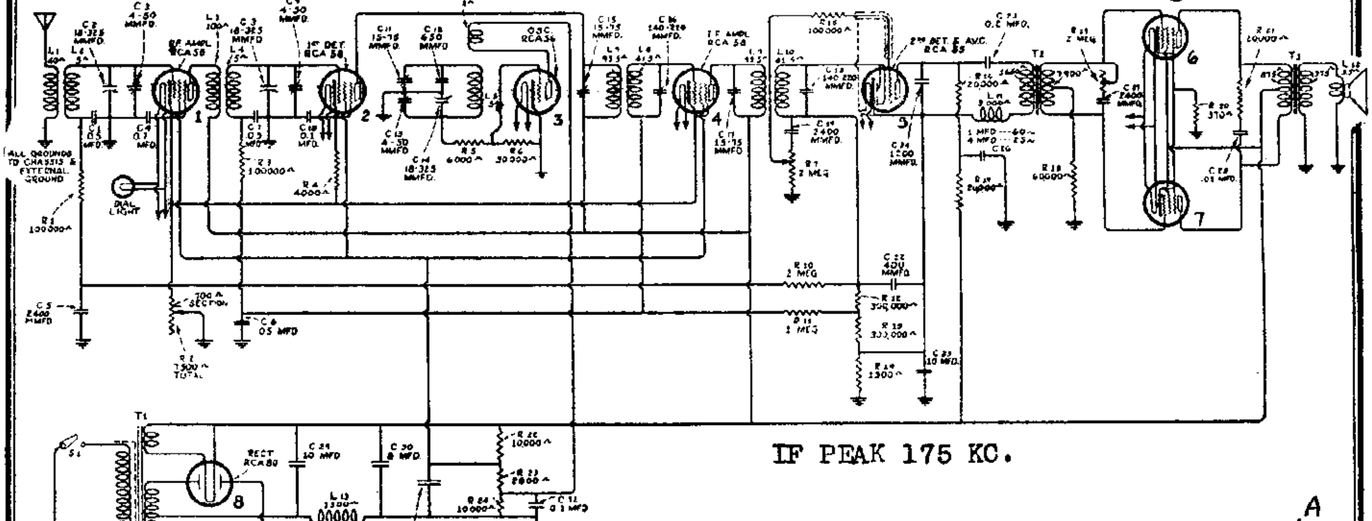
Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field .105 Volts
Chassis to Low Side of Field......................90 Volts
Voltage Across Field............................120 Volts
Rectifier. .370 Volts R.M.S. Each Plate—80 M.A. Each Plate

MODEL R-75 (2A5s Output)
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.



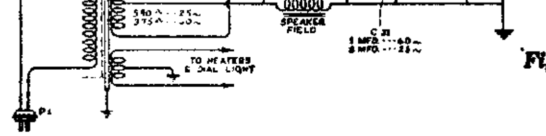
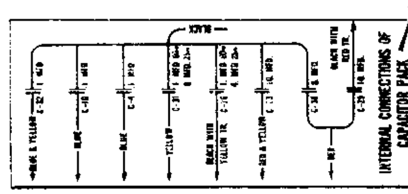


Figure A—Schematic Circuit



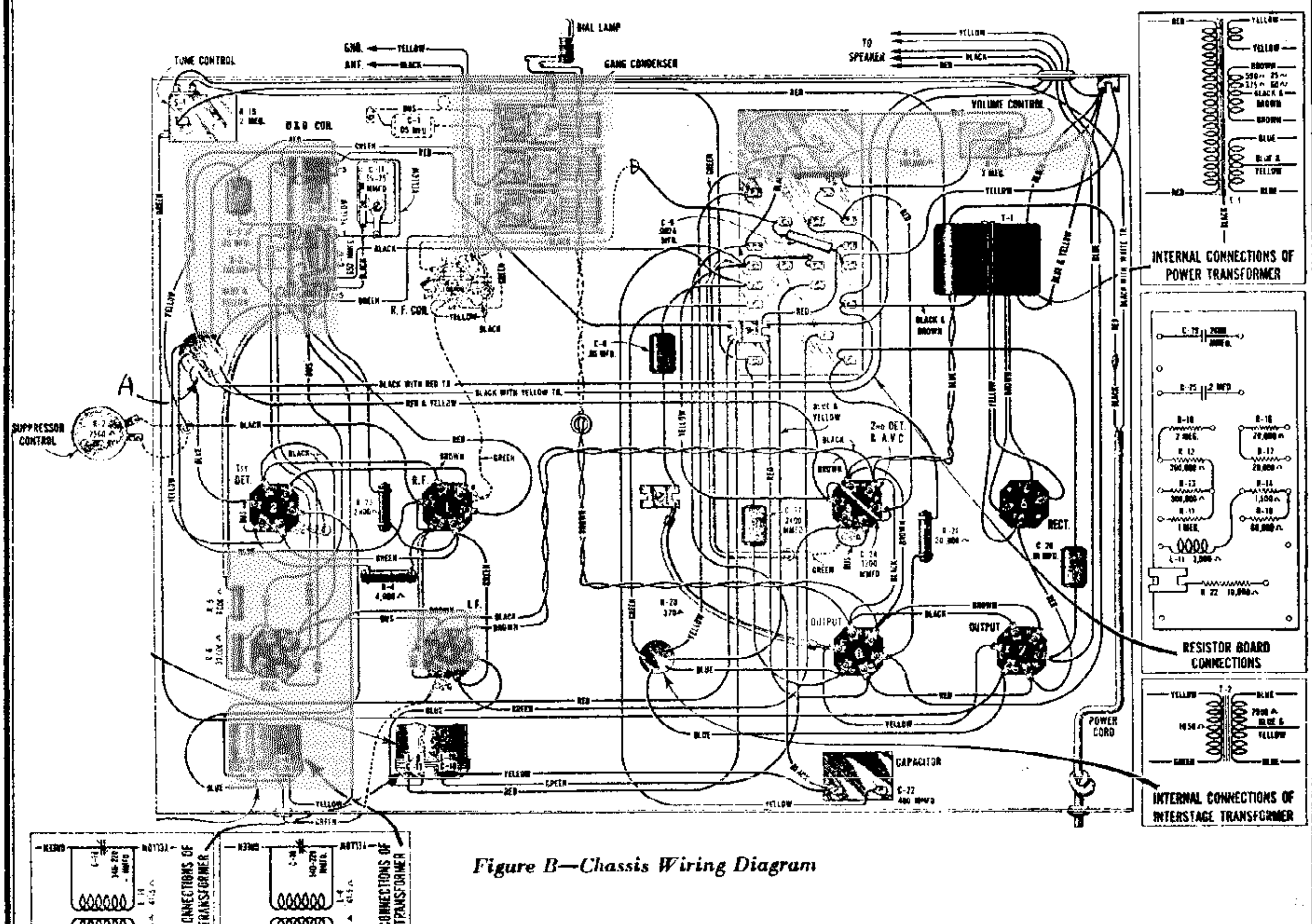


Figure B—Chassis Wiring Diagram

MODEL R-75 (2A5s Output)
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption............................100 Watts
Type and Number of Radiotrons..3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-2A5, 1 UX-280—Total, 8
Type of Circuit..Super-Heterodyne with A.V.C., tone control and push-pull Universal Output Tubes
Undistorted Output............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C., and 1400 K. C.
Intermediate Frequency........................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Universal Output tubes operated as a push-pull pentode stage, Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

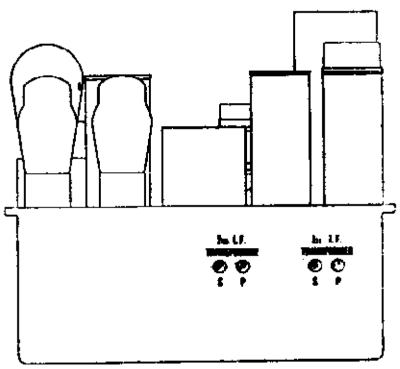


Figure C—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

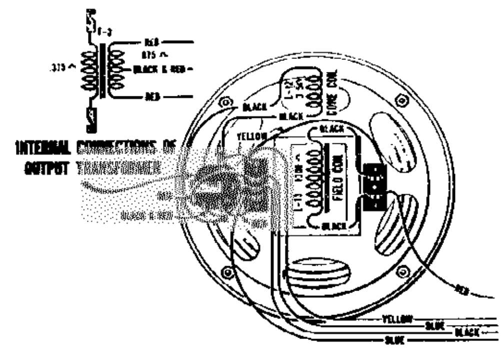


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. at Maximum and No Signal

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Filament or Cathode, Volts	Plate to Filament or Cathode, Volts	Plate Current, M. A.	Heater or Filament, Volts
1. R. F. RCA-58	4.0	100	240	6.0	2.4
2. 1st Det RCA-58	10.0	90	230	2.0	2.4
3. Osc. RCA-56	—	—	75	4.5	2.4
4. I. F. RCA-58	4.0	100	240	6.0	2.4
5. 2nd Det. RCA-55 and A.V.C.	5.8	—	100	4.0	2.4
6. PWR. RCA-2A5	19.0	230	220	20.0	2.4
7. PWR. RCA-2A5	19.0	230	220	20.0	2.4

Rectifier—370 Volts R.M.S. Each Plate

RCA-VICTOR CO., INC.

MODEL 91-B
Schematic
Chassis Wiring

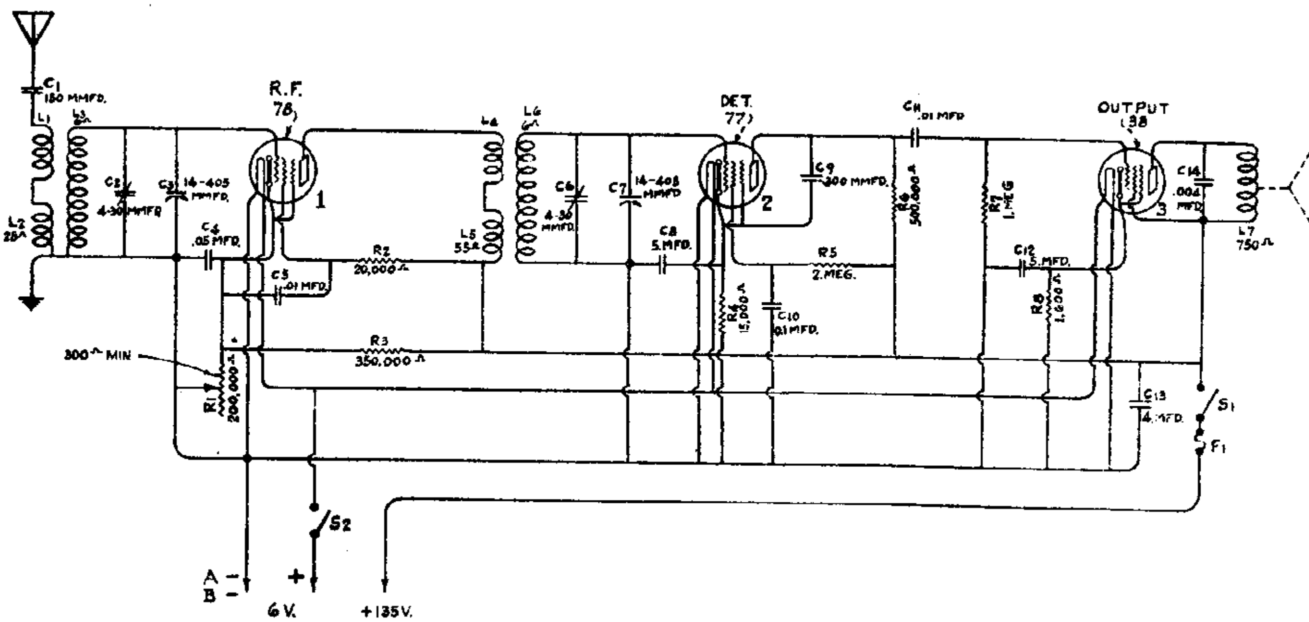


Figure A—Schematic Circuit Diagram

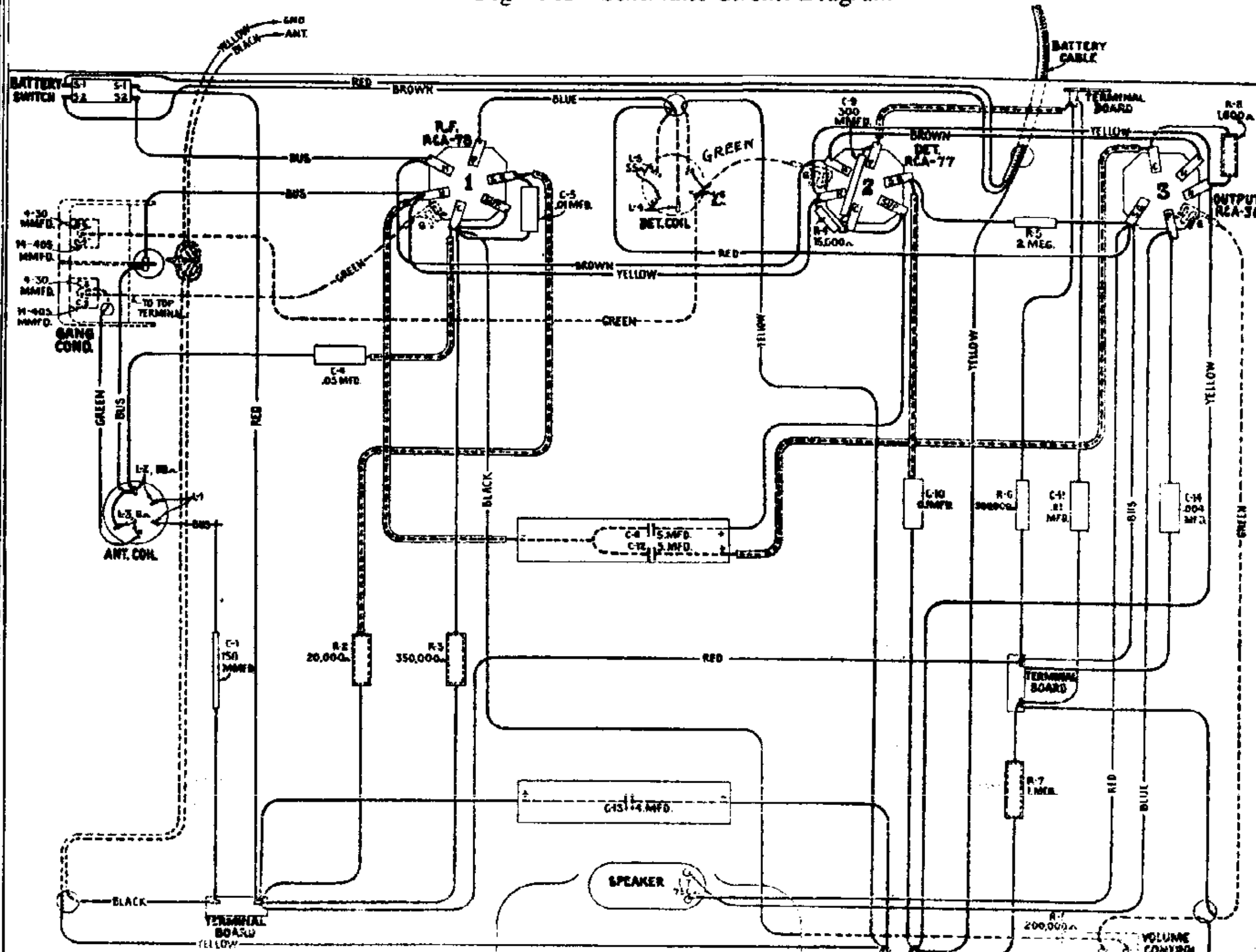


Figure B—Wiring Diagram

MODEL 91-B
Capacitor Adjustment
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

"A" Battery Required............Six-Volt Storage Battery
"B" Battery Required................Three 45-Volt Blocks
"A" Current..................................0.9 Ampere
"B" Current................(Maximum Volume) 18 M. A / (Minimum Volume) 9 M. A.
Type and Number of Radiotrons
1 RCA-78, 1 RCA-77, 1 RCA-38, Total 3
Undistorted Output............................0.2 Watts
Tuning Range............................540–1712 K. C.
Type of Loudspeaker...........................Magnetic

This battery type tuned R. F. receiver incorporates excellent performance in conjunction with minimum cost and up-keep requirements. Service work consists principally of replacements and line-up adjustments. The proper method of aligning the receiver follows.

R. F. Line-up Capacitor Adjustments

Two adjustable capacitors are provided for adjusting the R. F. circuits to maximum electrical alignment. In order to properly adjust the capacitors, a Stock No. 9050 Test Oscillator and 7065 adjustment screwdriver are required. Also an output meter should be connected across or in place of the loudspeaker winding. Proceed as follows:

(A) Place the oscillator in operation at 1400 K. C. and connect its output to the antenna and ground of the receiver. Connect the output meter and place the receiver in operation.

(B) Tune in the signal from the oscillator and adjust the volume control and oscillator output until a deflection is obtained in the output meter. Adjust each trimmer until maximum output is obtained. The proper adjustment is when a minimum value of trimmer capacity is used. Readjusting the dial may be necessary to arrive at such a condition. Then slightly reduce the setting of the detector trimmer by turning it clockwise. This compensates for a slight increase in the capacity of this circuit that occurs when the chassis is returned to its case. A little experimenting will disclose the proper amount of this reduction.

RADIOTRON SOCKET VOLTAGES

Maximum Volume Control Setting

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Filament or Heater, Volts
1. RCA-78 R. F.	2.5	95	132.5	7.0	6.0
2. RCA-77 Detector	2.5*	27*	50*	0.135	6.0
3. RCA-38 Output	12.0	123	115	7.5	6.0

* Cannot be measured with ordinary voltmeter.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3546	Capacitor—150 mmfd. (C1)	$0.32
3560	Resistor—1,600 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3640	Capacitor—0.05 mfd. (C4)	.25
3701	Capacitor—0.01 mfd. (C5, C11)	.30
3748	Fuse—0.5 ampere (F1)—Package of 5	.40
3848	Capacitor—300 mmfd. (C9)	.30
3860	Socket—5-contact Radiotron socket	.32
3877	Capacitor—0.1 mfd. (C10)	.32
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
4070	Capacitor—0.004 mfd. (C14)	.42
4073	Resistor—350,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
4076	Escutcheon—Volume control escutcheon—Package of 2	.26
4077	Escutcheon—Station selector escutcheon—Package of 2	.26
4078	Knob—Station selector knob—Package of 5	.76
4079	Foot—Rubber foot—Package of 4	.22
4096	Knob—Volume control knob—Package of 5	.75
4097	Switch—Operating switch—Double pole—Single throw (S1, S2)	.94
6114	Resistor—20,000 ohms—Carbon type—1 watt (R2)—Package of 5	$1.10
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R6)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R5)—Package of 5	1.00
6516	Connector—Fuse connector	.16
6820	Coil—Antenna coil (L1, L2, L3)	.86
6821	Coil—Detector coil (L4, L5, L6)	.96
6822	Condenser—2-gang variable tuning condenser (C2, C3, C6, C7)	2.34
6829	Volume control (R1)	1.05
6830	Cable—Battery cable	1.12
6831	Capacitor—Two 5.0 mfd. (C8, C12)	.94
6832	Capacitor—4.0 mfd. (C13)	.85
7485	Socket—6-contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
7712	Support—Cone support	.50
7713	Mechanism—Speaker mechanism complete (L7)	3.72
9470	Reproducer—Complete	4.62
9471	Cone—Speaker cone—Package of 5	3.50

MODEL R-92 Recorder
Schematic
Voltage

RCA-VICTOR CO., INC.

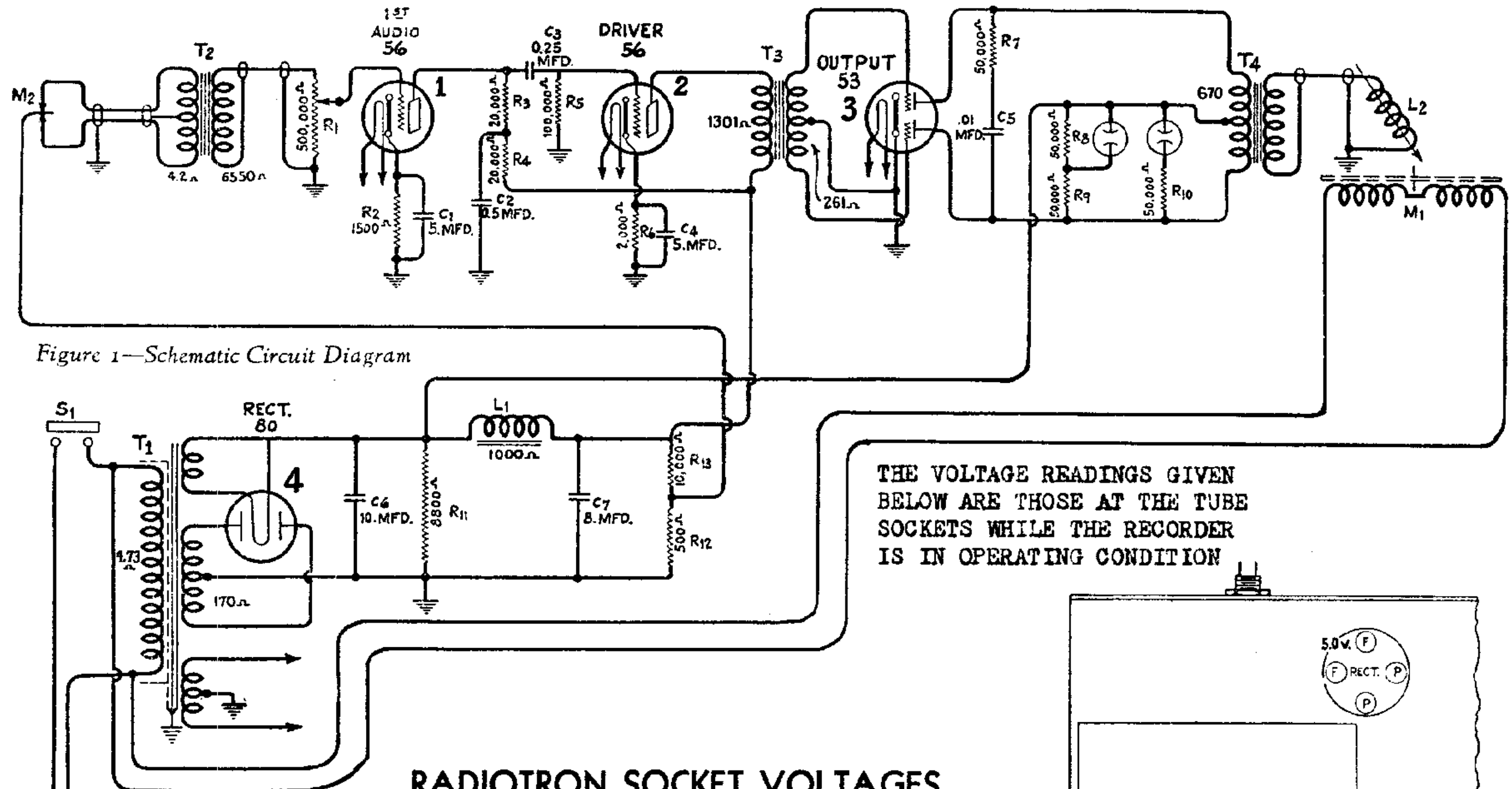


Figure 1—Schematic Circuit Diagram

THE VOLTAGE READINGS GIVEN BELOW ARE THOSE AT THE TUBE SOCKETS WHILE THE RECORDER IS IN OPERATING CONDITION

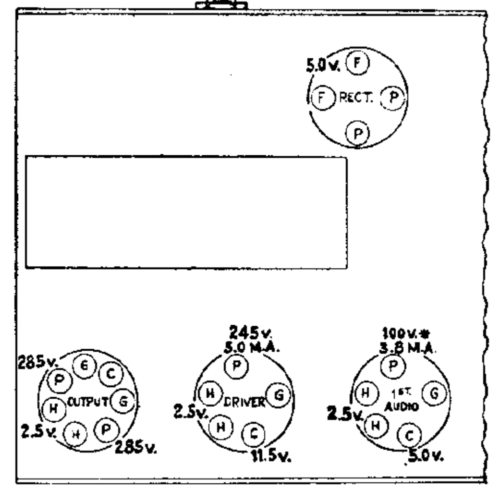


Figure 3—Voltage Readings at Radiotron Sockets

RADIOTRON SOCKET VOLTAGES

Radiotron No.	Cathode to Ground, Volts	Plate to Ground, Volts	Plate Current, M. A.	Heater Volts
RCA-56—1st A. F.	5.0	100*	3.8	2.5
RCA-56—2nd A. F.	11.5	245	5.0	2.5
RCA-53—Power	—	285	30.0	2.5
RCA-80—Rectifier	Total Rectified Voltage—290 Volts			5.0

*Calculated—High Resistance Circuit.

MODEL R-92 Recorder
Chassis Wiring

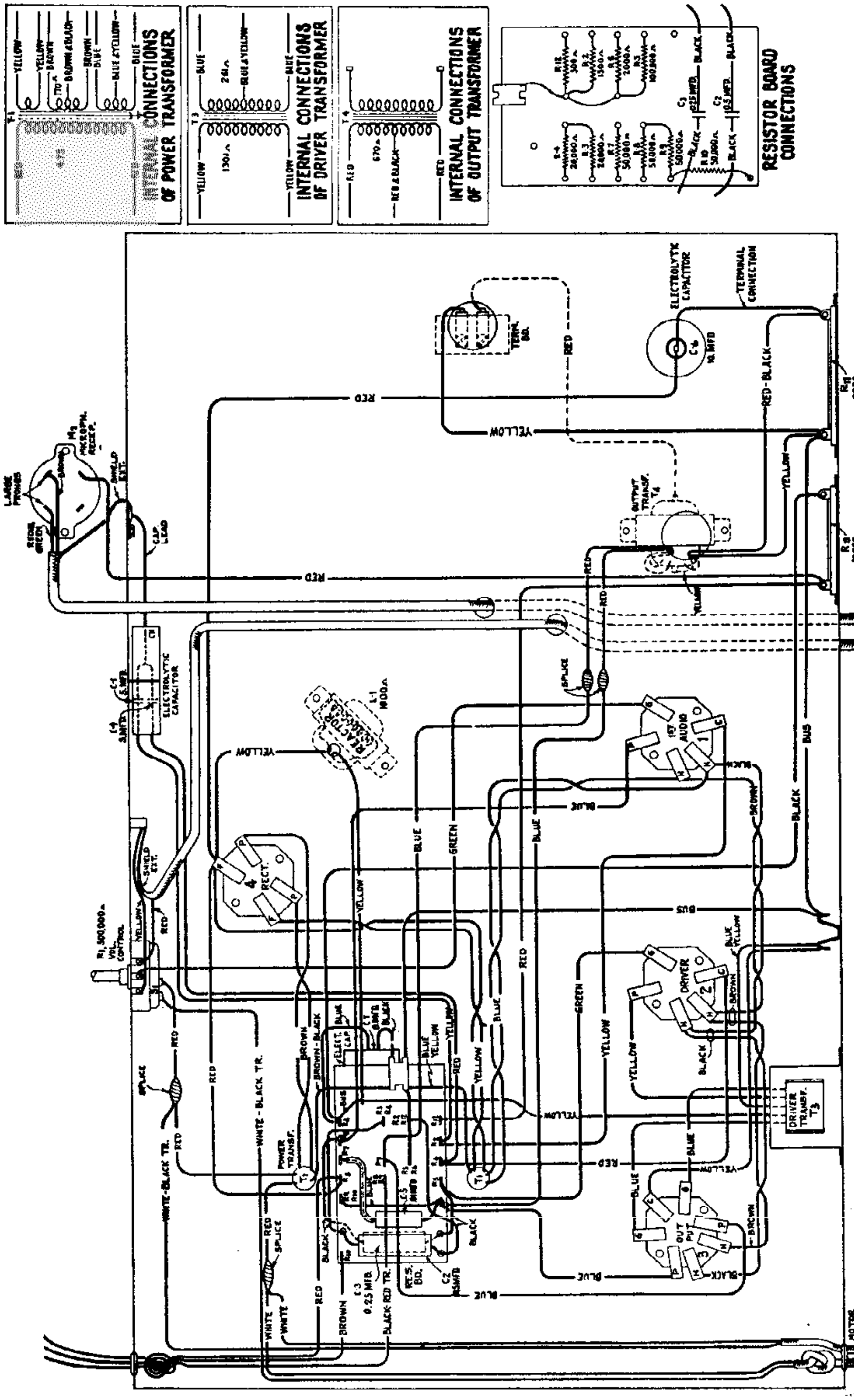


Figure 2—Wiring Diagram

RCA-VICTOR CO., INC.

RCA VICTOR MODEL R-92
STORE RECORDER
SERVICE DATA

Except for the replacement of defective Radiotrons, very little service work will be required in conjunction with this instrument. Figure 1 shows the schematic circuit diagram, Figure 2 the wiring diagram, and Figure 3 the various socket voltages. Figure 4 shows the assembly wiring diagram.

Service Data on Magnetic Pickup

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure 6), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

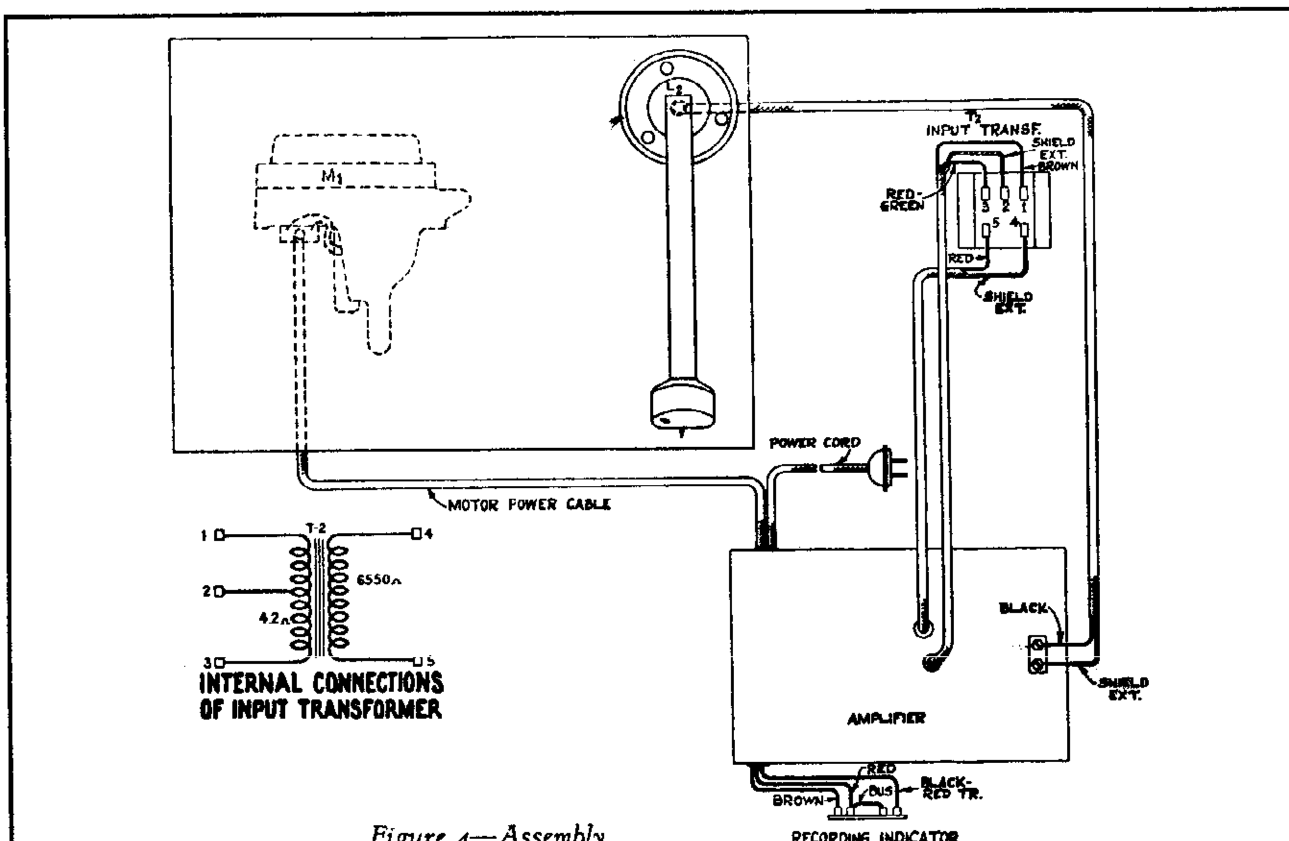


Figure 4—Assembly

MODEL R-92 Recorder
Pickup Adjustments
Parts List

RCA-VICTOR CO., INC.

(d) Remove screws A and B, Figure 6, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

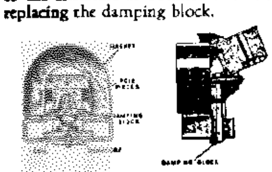


Figure 5

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 6), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(4) Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

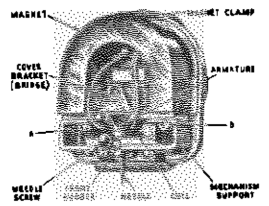


Figure 6

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 7, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly

Figure 7

called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	AMPLIFIER ASSEMBLIES	
3787	Capacitor—0.01 mfd. (C5)	$0.30
6648	Capacitor—0.25 mfd. (C3)	.42
3772	Capacitor—0.5 mfd. (C2)	.32
4498	Capacitor—8.0 mfd. (C7)	1.25
7590	Capacitor—10.0 mfd. (C6)	1.40
3787	Capacitor pack—Comprising two 5.0 mfd. (C1, C4)	.94
6552	Reactor—Filter reactor (L1)	1.04
3114	Resistor—500,000 ohms—Carbon type—½ watt (R8, R9, R10)—Package of 5	1.00
4396	Resistor—500 ohms—Carbon type—½ watt (R12)—Package of 10	2.00
3047	Resistor — 1500 ohms — Carbon type — ½ watt (R2)—Package of 5	1.00
3526	Resistor — 2000 ohms — Carbon type — ½ watt (R6)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3, R4)—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
4398	Resistor—10,000 ohms—6.5 watts (R13)	.74
4400	Resistor—8800 ohms—10.5 watts (R11)	.68
4399	Socket—4-contact socket	.44
6300	Socket—4-contact Radiotron socket	.35
7484	Socket—5-contact Radiotron socket	.35
3719	Socket—7-contact Radiotron socket	.35
6551	Transformer—Driver transformer (T3)	1.48
6556	Transformer—Output transformer (T4)	1.50
9026	Transformer—Power transformer (T1)	4.80
4401	Volume control (R1)	1.10
	MICROPHONE ASSEMBLIES	
4403	Cord—Microphone cord	.62
3216	Cushions—Microphone rubber cushions—Package of 6	.24
4500	Housing—Microphone housing	3.15
4499	Mechanism—Microphone mechanism	6.80
4501	Microphone complete	7.50
4402	Plug—Microphone cord plug	.28
	RECORDING INDICATOR ASSEMBLIES	
4381	Escutcheon—Recorder indicator escutcheon	.72
4161	Lamp—Neon lamp	.56
4164	Screen—Recording indicator lamp screen	18
4382	Screw—Screen escutcheon and terminal board mounting screw assembly—Comprising two screws, two spacers, two nuts and two lockwashers	.20
	PICKUP AND ARM ASSEMBLIES	
4496	Arm—Pickup arm complete	4.70
3417	Armature—Pickup armature	.72
3733	Back—Pickup housing back	.60

Stock No.	Description	List Price
3385	Coil—Pickup coil	$0.50
4383	Cover—Pickup cover	.34
3836	Cover—Pickup back cover	.34
4497	Pickup—Magnetic pickup unit complete (L2)	4.60
4384	Plate—Pickup lifter adjustment plate, spring and screw—Located in arm	.20
3387	Screw—Pickup mounting screw assembly—Comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3419	Screw—Pickup cover holding screw—Package of 10	.40
	TURNTABLE ASSEMBLIES	
3346	Bushing—Speed shifter lever bushing—Package of 4	66
3344	Cover—Grease retainer cover—Package of 2	.70
4394	Lever—Speed shifter lever	.38
3341	Pin—Groov-pin—Package of 2	.56
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3343	Sleeve—Sleeve complete with ball race	2.86
3347	Spring—Speed shifter lever spring—Package of 2	.30
7668	Turntable—Complete less shift lever	8.34
3340	Washer—Thrust washer—Package of 2	.56
	MOTOR ASSEMBLIES	
4395	Mounting assembly—Motor mounting assembly—Comprising 3 studs, 9 washers, 3 cushions	.38
9510	Motor—105-120 volt 60-cycle motor complete	27.44
8942	Rotor and shaft for motor	7.00
8945	Spindle—Turntable spindle and fibre gear for motor	4.68
	MISCELLANEOUS ASSEMBLIES	
4391	Box—Needle box	.70
3261	Bushing—Record drive bushing—Package of 5	.40
4392	Knob—Volume control knob—Package of 5	.75
4385	Lifter—Pickup lifter mechanism complete	3.00
4387	Screw—No. 6-32-¼" headless set screw for pickup lifter cam—Package of 10	.25
4388	Screw—No. 6-32-3/16" headless set screw for pickup lifter cam—Package of 10	25
4389	Screw—No. 6-32-5/16" headless set screw for pickup lifter cam—Package of 10	.25
4390	Screw—No. 6-32-¼" headless set screw for pickup lifter cam—Package of 10	.25
4393	Screw—No. 8-32-3/16" headless set screw for volume control knob—Package of 10	.25
4386	Spring—Pickup lifter spring—Package of 10	.20
6226	Transformer—Input transformer (T2)	2.75

RCA-VICTOR CO., INC

RCA VICTOR DUO JUNIOR MODEL R-93

SERVICE NOTES

Electrical Specifications

Voltage Rating	105-125 Volts
Frequency Rating	25, 50 and 60 Cycles
Power Consumption	4 Watts
Type of Motor	Synchronous Reaction
Turntable Speed	78 R.P.M.
Pickup Impedance at 1000 Cycles	2450 Ohms
Pickup Output Voltage	0.4 Volt at 400 Cycles
Volume Control Resistance	20,000 Ohms

Physical Specifications

Turntable Diameter	7 Inches
Height	5 Inches
Width	11 Inches
Depth	8 Inches

This phonograph turntable and pickup assembly is designed to provide record reproduction to the owner of a modern radio receiver. Use of the audio amplifying system and loudspeaker of the radio receiver provides a quality of reproduction equal to or better than that obtained from radio stations. A switch is provided for changing from radio to record reproduction, or vice-versa. Simplicity, compact size and ease of connections are outstanding features of this instrument.

Electrically, the instrument consists of a magnetic pickup—for transforming the mechanical variations of the record grooves to voltage variations—a volume control for adjusting the output voltage to any desired level and a radio-record switch for shifting the connections to the receiver so that either radio or record reproduction may be obtained as desired by the user.

Figure 1 shows a typical layout for an ideal installation. Figure 2 shows the proper connections to be made between the pickup unit and the switch assembly. Figure 3 shows the schematic diagram, while Figures 4 and 5 show the chassis and cable wiring diagrams respectively.

Connecting Phonograph to the Radio Receiver

When connecting a phonograph unit to a radio receiver, there are a few fundamental facts to be considered. First, the output of the pickup must be connected to the receiver at a point where sufficient audio gain between it and the speaker is available to give normal sound output. Second, when doing this some attention should be given to the possibilities of introducing hum and other undesired noise, both in the audio and in the radio circuits.

In general, it will be found that the grid or cathode circuits of the second detector of a super-heterodyne circuit are suitable for phonograph input. On tuned R. F. receivers, either the detector cathode or the first audio transformer primary circuit may be employed, depending upon the amount of audio gain and the type of detector used.

It is fairly common to find radio receivers employing a volume control located in the audio circuit. In these cases, it is advisable to run the phonograph volume control at maximum and use the radio receiver volume control for adjusting the phonograph output. In circuits using aurally compensated volume controls, advantage of this feature is not taken unless the radio receiver volume control is used.

Investigation of a large number of receivers has shown that four general types of connections, all of which may be made without removing the chassis from the cabinet, cover practically every type of receiver. These connections are as follows:

(1) Receivers having phonograph input jacks and Radio-Record Switches. With these receivers the cable and switch supplied with the R-93 is not used. The phonograph output is connected direct to the phonograph input jack and the Radio-Record Switch on the Receiver is used for changing from Record to Radio reproduction. The 1929 Victor Receiver and numerous Stromberg-Carlson Receivers are typical examples of this type of connection.

(2) Receivers having phonograph terminal board connections. Such connections are made in accordance with the instructions pertaining to that particular instrument.

(3) Receivers using the 2B7 or 6B7 Second Detectors. With receivers of this type, the yellow and green leads are connected in series with the grid cap connection of this tube.

(4) Receivers not having any of the foregoing features. On receivers of this type, an adaptor having a split cathode connection is necessary. Stock No. 4611, five-prong adaptor, or Stock No. 4612, six-prong adaptor, may be used. In such cases, the yellow and green leads are connected in series with the cathode, which is placed under the tube used in the second detector socket of the receiver.

It will be noted that red and blue leads are brought out from the switch for "killing" the radio during record reproduction. With most receivers, these may be connected in series with the antenna lead. However, in event this does not work satisfactorily, then one of the split cathode adaptors must be used in the oscillator socket and the leads connected in series with the cathode. This will effectually "kill" the radio on any super-heterodyne receiver. On the following page, a list of numerous receivers and their proper connections are given.

PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and fool-proof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure 6 shows the main parts of the motor and the points that may require attention.

Operation:

The two stator coils are connected as shown in Figure 2 and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R.P.M., such action may result from one of the following causes:

Difficult to Start—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the lug being bent and rubbing in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.

Slow Speed—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R.P.M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal.

Excessive Vibration and Hum:

A small amount of hum when starting, decreasing to a negligible amount while running, is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) Metal washer not above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

Removing Rotor from Stator:

The rotor which includes the turntable may be removed by loosening the screw shown in Figure 7 until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the retaining screw securely to eliminate the possibility of rattle in operation.

Power Consumption:

The motor consumes 4 watts. It should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

NOTE—The above values of power consumption are average for a 60-cycle motor at 125 volts. At lower voltages the power consumption will be less.

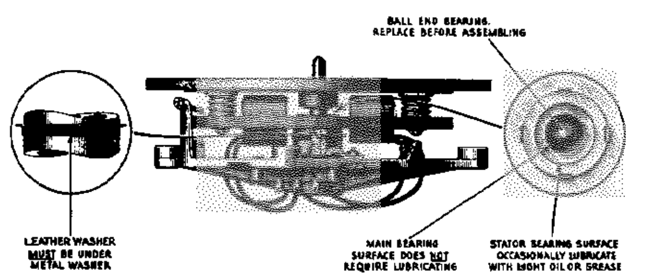


Figure 7—Details of Motor

RCA-VICTOR CO., INC.

PICKUP UNIT SERVICE DATA

The magnetic pickup and tone arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature and replacing the rubber pivots, damping block and replacing the magnet coil.

Disassembling the Pickup:

The pickup may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.

(b) Remove the needle screw and screws "A" and "B."

(c) Remove the pickup assembly from the arm and housing.

(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the terminal board.

(e) If centering the pickup armature is the only adjustment required, such centering can be done without removing the terminal board indicated in (d). The armature is centered by loosening screw F, accessible through the hole shown, and holding the armature with the finger in proper position while screw F is tightened. "Feeling" the armature while deflecting it between its two extremes is the best manner of ascertaining proper centering. When centering, after work has been done or the magnet removed, it is important that the magnet be remagnetized while in place.

(f) If the coil or pivot rubbers are to be replaced, the pickup must be further disassembled. This is done by removing the magnet and then removing screws C and D. The pole piece may now be removed and the old coil and sleeve disassembled. Acetone will be found helpful for dissolving the old cement that holds the coil in place. The new coil, with its sleeve, may now be replaced and cemented in a similar position to that occupied by the old coil. Duco household or Ambroid cement may be used to hold the coil in place. Be careful to center the coil with its paper sleeve before cementing. Only rosin core solder should be used for soldering the coil leads in the pickup.

(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing screw G, clamp H and washer I and removing the armature from its bracket. Damping block J must be removed from the armature. After putting the new pivot rubbers in place, a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block. The rubbers can then be removed by slipping them from each end of the pivot shaft.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the damping block from the armature and clean the armature shaft with emery paper.

(c) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the shaft diameter. This is done so that a snug fit will be obtained.

(d) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 9, will prove desirable for fusing the block in place. The iron should be applied only long enough to melt the block sufficiently to cause a small bulge on each side, and must be removed before any bubbling occurs. The pickup should then be reassembled.

It is important to remember that in all operations after reassembling but before placing in the tone arm,

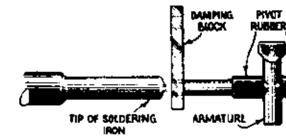


Figure 9—Replacing Damping Block

the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.

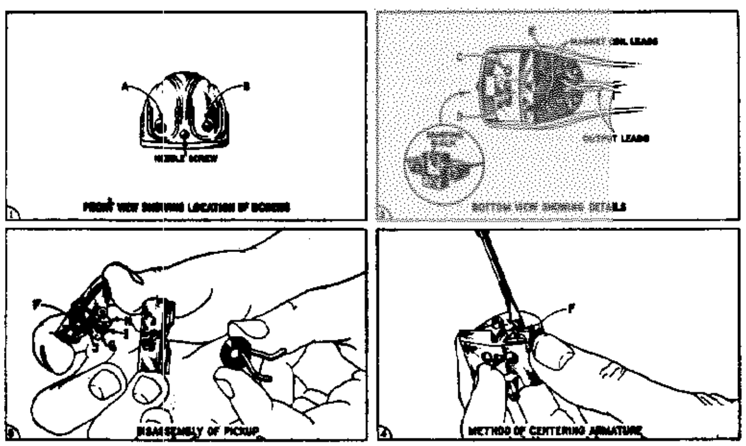


Figure 8—Details of Pickup Assembly

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price	Stock No.	Description	List Price
	MOTOR ASSEMBLIES		9522	Turntable — Turntable assembly complete with rotor laminations—105-125/200-250 volt—50 cycle operation	$4.25
10194	Ball—Steel ball bearing—Package of 20	$0.25	4083	Washer—Leather washer—Package of 10	.20
7657	Base—Motor base and bearing assembly—50-60 cycle—105-125/200-250 volt operation	1.20	4084	Washer—Metal washer—Package of 10	.26
9523	Base—Motor base and bearing assembly—25 cycle operation	1.20		PICKUP AND ARM ASSEMBLIES	
9519	Coil—Stator assembly—Comprising coil and laminations—105-125 volt, 60 cycle operation	2.50	3812	Armature—Pickup armature	.32
			4462	Cable—Pickup cable	.20
			3810	Coil—Pickup coil	.32
9521	Coil—Stator assembly—Comprising coil and laminations—105-125 volt, 50 cycle operation	2.35	4543	Damper — Damper block complete with damper clamp, washer	.10
			4503	Pickup and arm assembly complete	4.95
9524	Coil—Stator assembly—Comprising coil and laminations—105-125 volt, 25 cycle operation	2.25	3811	Screw—Needle holding screw—Package of 10	.46
				CABINET ASSEMBLIES	
9529	Coil—Stator coil assembly—Comprising coil and laminations—50 cycle, 200-250 volt operation	2.50	X-249	Bottom—Lower section of wood cabinet	2.95
			X-248	Cover—Top half of wood cabinet	3.00
9515	Motor—105-125 volts—60 cycle motor	8.80			
9516	Motor—105-125 volts—50 cycle motor	8.42		MISCELLANEOUS ASSEMBLIES	
9517	Motor—105-125 volts—25 cycle motor	9.00	4611	Adaptor—Five-prong split cathode adaptor	1.00
9528	Motor—200-250 volts—50 cycle motor	9.60	4612	Adaptor—Six-prong split cathode adaptor	1.00
4456	Motor accessories—Comprising 3 nuts, 1 shield and 1 screw	.10	4461	Cable — 5-conductor—Radio-Record switch cable	.28
3813	Motor suspension assembly—Comprising one screw, one metal bushing, two rubber bushings, one flat washer, one lockwasher and one nut—Package of 3	.56	4459	Bracket—Volume control mounting bracket	.10
			4463	Foot—Felt foot for bottom cover—Package of 10	.20
			3829	Knob—Radio-Record switch knob—Package of 5	1.10
4457	Spring, screw and washer assembly—Used to mount rotor laminations to turntable—Comprising 3 springs, 3 screws and 9 washers	.15	3961	Knob—Volume control knob—Package of 5	.60
			4458	Post—Binding post—Package of 10	2.50
			4507	Rest—Pickup rest—Package of 5	.60
9520	Turntable — Turntable assembly complete with rotor laminations—60 cycle operation	4.45	4119	Screw—No. 8-32-¼-inch headless set screw for knob—Package of 20	.38
9525	Turntable — Turntable assembly complete with rotor laminations—25 cycle operation	4.85	4460	Switch—Radio-Record switch	.40
			4502	Volume control (R1)	1.16

RCA-VICTOR CO., INC.

MODEL R-93 Phonograph
Models Listing
Connection Diagram

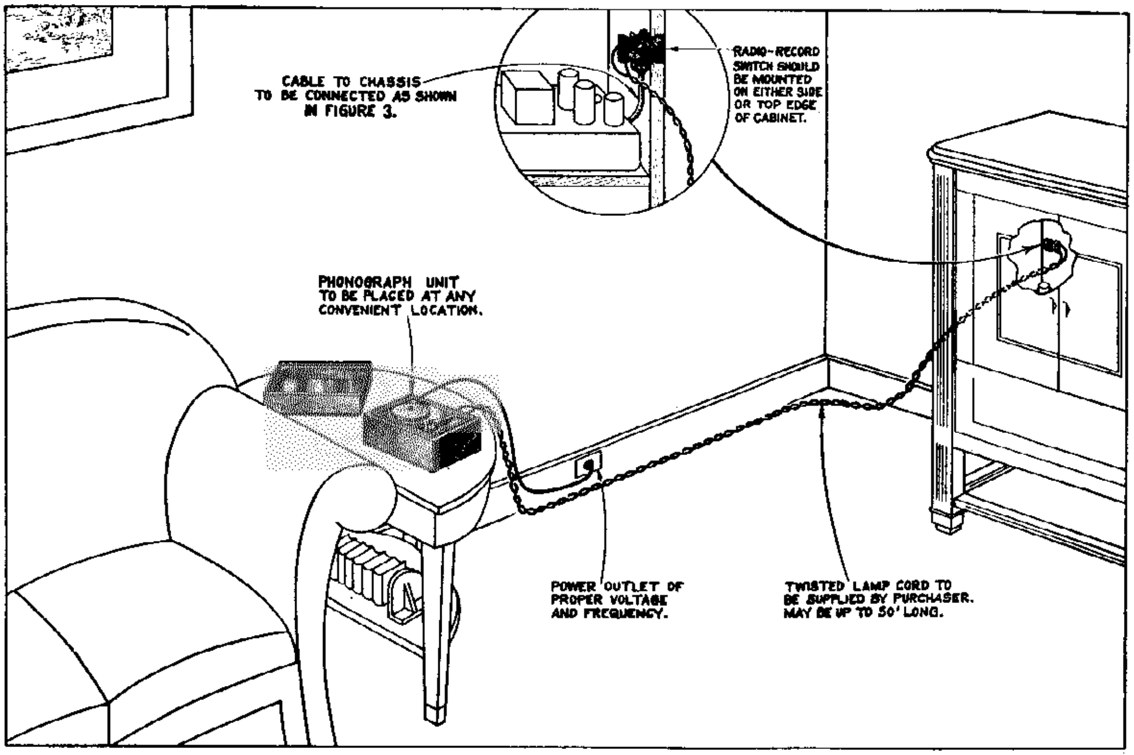


Figure 1—Typical Layout and Connections for Model R-93

RCA VICTOR RECEIVERS — DETAILS OF LEAD CONNECTIONS

Model	Method of Connection	Green	Yellow	Red	Blue	Shield
R-4, 6	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-5	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
R-7	2. Term. Board	Term. 2 (Open Link)	Term. 1	Ant.	Ant. Lead	Term. 4
R-7A	2. Term. Board	Term. 2 (Open Link)	Term. 1	Ant.	Ant. Lead	Term. 4
R-8, 10, 12	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-11	2. Term. Board	Term. 2 (Open Link)	Term. 3	Term. 4	Term. 5	Term. 6
R-17M	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
R-18W	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
R-21	2. Term. Board	Term. 2 (Open Link)	Term. 3	Term. 4	Term. 5	Term. 6
R-22	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
RO-23	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-27	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
R-28	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-37, 38	3. Grid Clip	Grid Cap of Tube	Grid Clip Contact	Ant.	Ant. Lead	Chassis
Rad. 48	2. Term. Board	Term. 4 (Open Link)	Term. 5	Term. 2	Term. 3	Term. 5
R-50, 55	2. Term. Board	Term. 3 (Open Link)	Term. 4	Term. 1 (Open Link)	Term. 2	Term. 6
R-70	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-71, 72	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-73, 75	3. Grid Clip	Grid Cap of Tube	Grid Clip	Ant.	Ant. Lead	Chassis
R-73A, 75A	3. Grid Clip	Grid Cap of Tube	Grid Clip	Ant.	Ant. Lead	Chassis
R-74, 76, 77	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Chassis
R-78	2. Term. Board	Term. 7 (Open Link)	Term. 8	Term. 1	Term. 2	Chassis
Rad. 80	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Bind. Post	Chassis
Rad. 82	2. Term. Board	Term. 2 (Open Link)	Term. 3 (Tie-in Term. 1 to Term. 3)	Term. 1	Term. 3	Term. 3
R-90, 260, 261	4. Adaptor	Det. Cathode	Cathode Socket Contact	Osc. Cathode*	Osc. Cathode Socket Contact	Chassis
110, 111, 115, 210	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead or Bind. Post	Cathode Socket Contact
114	4. Adaptor	Det. Cathode	Cathode Socket Contact	Ant.	Ant. Lead	Det. Cathode (Yellow)
120, 124, 220	3. Grid Clip	Grid Cap of Tube	Grid Clip	Ant.	Ant. Lead on Bind. Post	Chassis
121, 122, 221	3. Grid Clip	Grid Cap of Tube	Grid Clip	Ant.	Ant. Lead on Bind. Post	Chassis
140, 141, 240	2. Term. Board	Term. 3	Term. 1 (Open Link)	Term. 1	Term. 2	Term. 1
280	4. Adaptor	Det. Cathode	Cathode Socket Contact	Osc. Cathode*	Osc. Cathode Socket Cont.	Chassis

MODEL R-93 Phonograph
Schematics

RCA-VICTOR CO., INC.

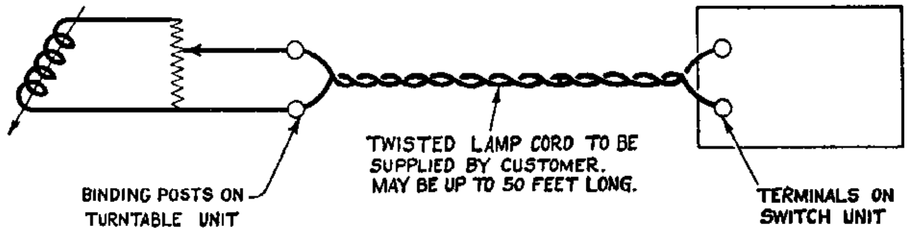


Figure 2—Connections from Pickup to Switch Unit

25 and 50 cycle connections

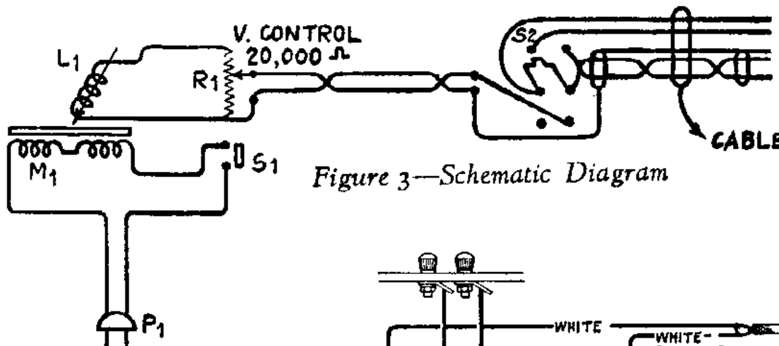


Figure 3—Schematic Diagram

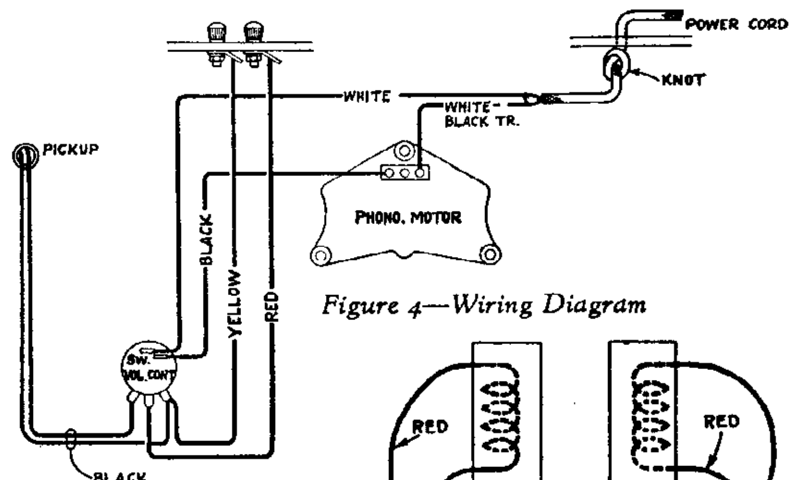


Figure 4—Wiring Diagram

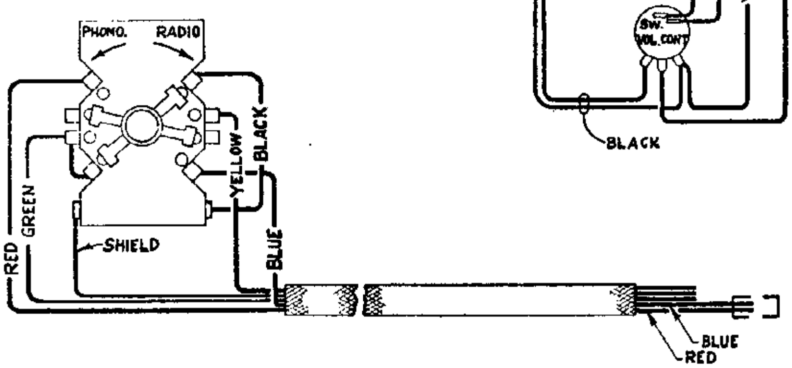
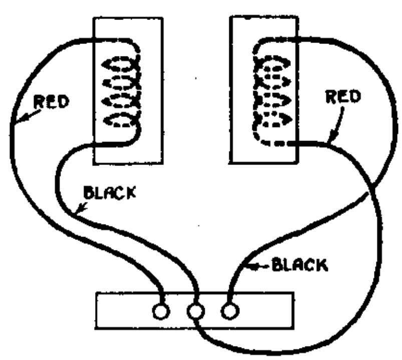
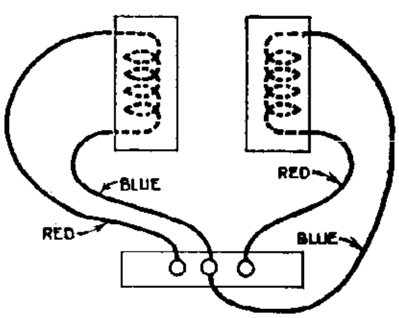


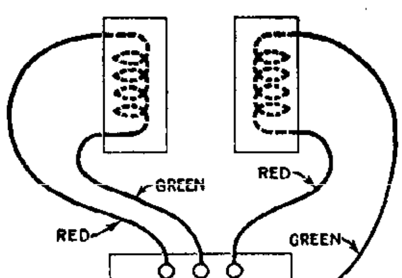
Figure 5—Cable Connections



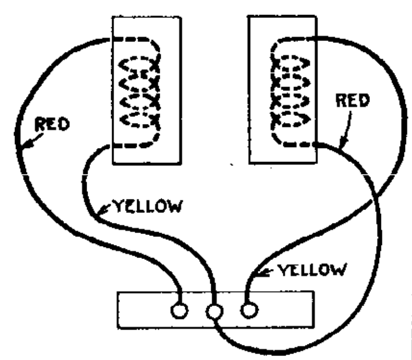
220 Volt—50 Cycle



110 Volt—25 Cycle



110 Volt—50 Cycle



110 Volt—60 Cycle

Figure 6—Motor Wiring Connections

RCA-VICTOR CO., INC.

MODEL 102
Schematic
Chassis Wiring

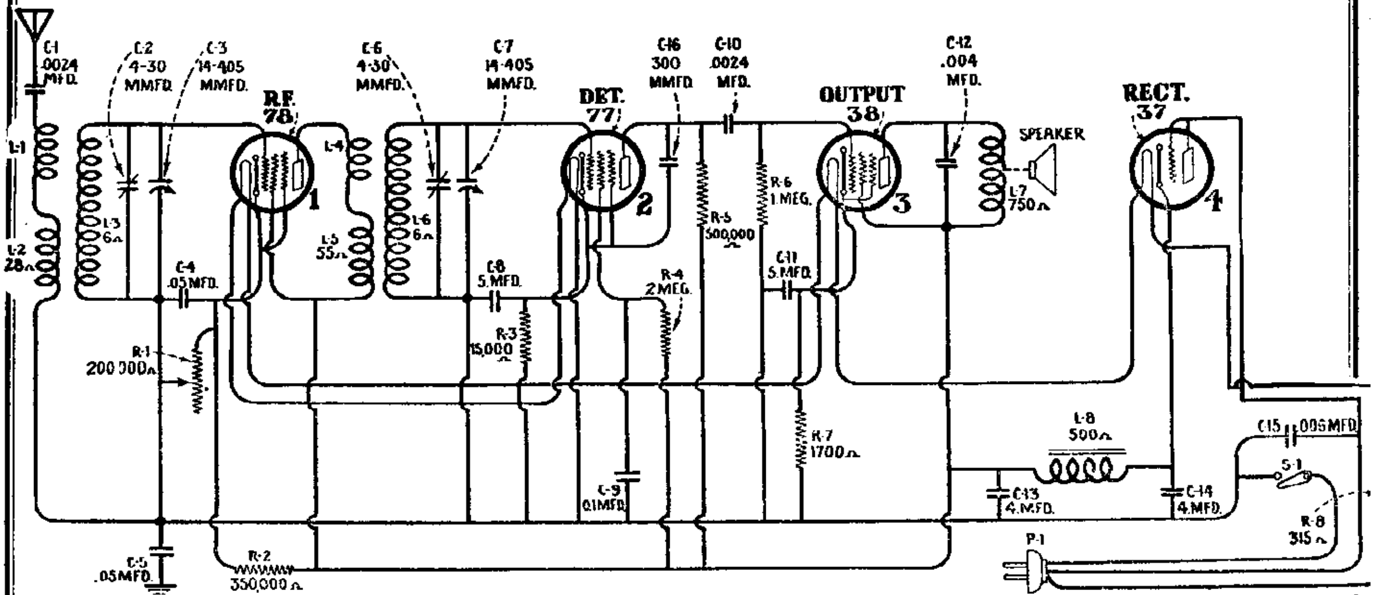
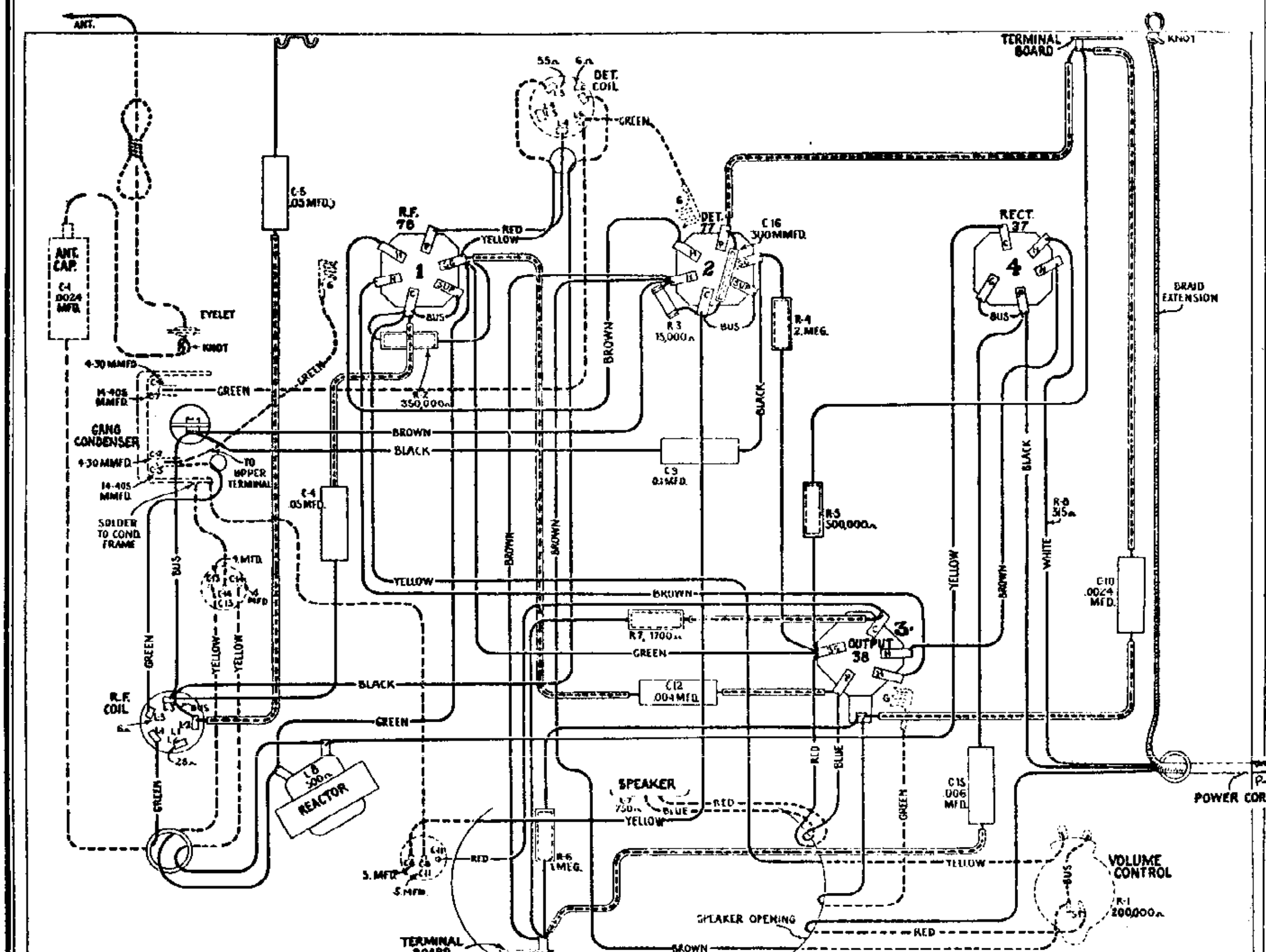


Figure A—Schematic Circuit Diagram



MODEL 102
Voltage
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating. .105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption............................40 Watts
Frequency Range......................540 K. C.–1712 K. C.
Type and Number of Radiotrons—
1 RCA-77, 1 RCA-37, 1 RCA-38, 1 RCA-78—Total 4
Undistorted Output..........................0.18 Watts

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

The receiver is aligned at 1400 K. C. by means of the two trimmer capacitors located on the main tuning capacitor. The proper alignment is made by adjusting the trimmers for maximum output after tuning in a 1400 K. C. signal. This adjustment should be made when they are near their extreme minimum position. After alignment a check to make sure that a 1712 K. C. signal can be heard when the main tuning capacitor is near its extreme minimum position should be made. Stock No. 9050 Test Oscillator and Stock No. 7065 non-metallic screwdriver are desirable for making this adjustment.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-78 R. F.	2.5	105	105	7.0	6.0
2. RCA-77 Det.	*2.0	17.0*	*40	0.1	6.0
3. RCA-38 Output	10.0	100	95	5.5	6.0
4. RCA-37 Rect.	—	—	115 RMS	16.0	6.0

* Impossible to measure on ordinary voltmeter.
Note—Above voltages will be approximately 5% lower on 115 volts D. C. except for heater voltages which will be the same.

Stock No.	DESCRIPTION	List Price
	CHASSIS ASSEMBLIES	
2747	Cap—Contact Cap—Package of 5	$0.50
3048	Resistor—500,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R6)—Package of 5	1.00
3537	Reactor—Filter reactor (L8)	1.10
3542	Volume control (R1, S1)	1.18
3713	Capacitor—0.05 mfd. (C4, C5)	.32
3860	Socket—5-contact Radiotron socket	.32
3932	Capacitor—2400 mmfd. (C10)	.30
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
4007	Capacitor—2400 mmfd. (C1)	.35
4046	Resistor—2 megohm—Carbon type—½ watt (R4)—Package of 5	1.00
4068	Lead—Antenna lead	.30
4069	Capacitor—0.1 mfd. (C9)	.36
4070	Capacitor—0.004 mfd. (C12)	.42
4071	Capacitor—0.006 mfd. (C15)	.42
4072	Capacitor—300 mmfd. (C16)	.26
4073	Resistor—350,000 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
4074	Resistor—1700 ohms—Carbon type—1 watt (R7)—Package of 5	.88
6819	Cord—Power cord—315 ohms (R8, P1)	$1.00
6820	Coil—RF coil (L1, L2, L3)	.86
6821	Coil—Detector coil (L4, L5, L6)	.96
6822	Condenser—2-gang variable tuning condenser (C2, C3, C6, C7)	2.34
6823	Capacitor—Two 4. mfd. capacitors (C13, C14)	1.14
6824	Capacitor—Two 5. mfd. capacitors (C8, C11)	.94
7485	Socket—6-contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
7712	Support—Cone support	.50
7713	Mechanism—Speaker mechanism complete (L7)	3.72
9470	Reproducer—Complete	4.62
9471	Cone—Speaker cone—Package of 5	3.50
	MISCELLANEOUS PARTS	
4076	Escutcheon—Volume control escutcheon—Package of 2	.26
4077	Escutcheon—Station selector escutcheon—Package of 2	.26
4078	Knob—Station selector knob—Package of 5	.75
4079	Foot—Rubber foot—Package of 4	.22
4096	Knob—Volume control knob—Package of 5	.75

RCA-VICTOR CO., INC.

MODEL M-105
Alignment Data
Voltage, Service Data

SERVICE DATA

Type and Number of Radiotrons Used..........1 RCA-41, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7—Total, 4
Total Battery Current (With 6.3 volts between chassis and A (hot) terminal) 5.35 Amperes
Undistorted Output..........................1.35 Watts
Loudspeaker Field Current..................1.35 Amperes
Filtered D. C. Voltage from Rectifier............227 Volts
Total Plate Current.........................47.5 M. A.

This four tube Superheterodyne Automobile Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, "B" battery eliminator and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

"B" Battery Eliminator

This receiver uses a vibrator-type Inverter-Rectifier that provides a source of direct current voltage for use as plate and grid supply for all Radiotrons. *This unit is accurately adjusted and sealed at the factory and service adjustments should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for these adjustments:

R. F. Adjustment

A satisfactorily accurate and rapid adjustment of the three R. F. line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and Radiotron sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and a non-metallic screw driver.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound in the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, and against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10" to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 33¾" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932 or 1933—Mount chassis on left side, and against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F		4.42	85	222	5.35	6.0
RCA-6A7	First Detector	4.42	85	222	11.0 Total	6.0
	Oscillator	4.42	—	223		
RCA-6B7 Second Detector		3.32	84	218	5.35	6.0
RCA-41 Power		13.0	214	200	26.0	6.0

Equipment

A. Equipment Furnished:

1. *Receiver Package*—Includes the receiver and remote control units joined by the wiring cable:

(a) The receiver contains one each of the following Radiotrons installed in sockets: RCA-78, RCA-6A7, RCA-6B7, RCA-41.

(b) The remote control unit contains one dial lamp (6-8 volts).

(c) The wiring cable includes one fuse (20 amperes) installed in attached fuse receptacle.

2. *Outfit Package*—Containing:

(a) Flexible shaft (33¾ inches long).

(b) Receiver unit mounting bolt (5/16 inch diameter), dash support plate, and nuts (2).

(c) Self-tapping screws, washers and rubber bumpers (4 each).

(d) Steering column bracket for remote control unit with strap, screws (2), plain washer (1) and lockwasher (1).

(e) Shield clamp for antenna lead-in wire with screw (1), lockwasher (1) and nut (1).

(f) Key (1) and knob (1) for remote control unit and eyelets (2) for antenna connector packed in small envelope.

(g) Ignition Interference Suppression Equipment:

6 Spark plug type suppressors (additional obtainable from your dealer).

1 Distributor type suppressor.

2 Capacitors.

(h) Instruction Book.

B. Additional Equipment Required:

1. *Antenna*—One of the following types:

(a) Roof (built-in) type—recommended.

(b) Roof (interior) type for attachment to head-lining inside car—also recommended. A special antenna of this type complete with pin-hooks and lead-in wire may be purchased from your dealer.

(c) Plate (sub-mounted) type for attachment to channel members of car chassis—alternative. An efficient plate antenna completely equipped for mounting and a specially-designed shielded lead-in wire also are obtainable from the dealer.

Location of Units

Receiver and Remote Control Units—The arrangement of units shown in Figure 1 is recommended and will be found applicable to the majority of automobiles. Consideration should be given to the possibility of interference of the receiver with other equipment beneath the instrument panel or of the mounting bolt with apparatus on the engine side of the dash. By placing the receiver unit toward the right-hand side of the dash, the flexible shaft will be of correct length as furnished in practically all cases. This position, however, may be considered impractical because of its universal preference for heating devices, necessitating installation of the receiver unit either near the center or at the extreme left-hand side of the dash and the use of a shorter flexible shaft. In such cases, the shaft may be either shortened (as described under "Mounting of Units") or exchanged for one of proper length by the dealer.

NOTE—Two support brackets are attached to the receiver case, one on the rear surface and the other on the right-hand side viewing the loudspeaker opening. The side bracket must be used when the unit is mounted at the extreme left-hand end of the dash in order to avoid sharp bends in the flexible shaft and resultant unsatisfactory operation.

As furnished, the remote control unit is equipped for attachment to the steering column of the car. Its clamp bracket is so designed that the driver may select from a wide variety of possible mounting positions for maximum accessibility. The associated bracket strap will be found to accommodate practically any diameter steering column. If considered desirable, however, the remote control unit may be supported upon the instrument panel by means of an accessory bracket procurable from the dealer.

Antenna:

(a) *Roof (Built-in) Type*—Best results will be obtained by use of a built-in roof antenna. The majority of modern automobiles (closed body types only) are already equipped with such an antenna installed at the factory, the lead-in wire from which will usually be found coiled-up beneath the instrument panel. Many other earlier cars employ a piece of metallic screen—for top material support—which, if ungrounded (not in electrical contact with the metallic frame), may be readily utilized as an antenna.

NOTE—The presence of a top support screen and of grounds in that screen may be determined without removing any portion of the inside fabric (head-lining). First procure any sharp-pointed metallic tool, push the point through the fabric (at several points if necessary) and feel around in an attempt to scrape the screen surface—being careful not to puncture the weather-proof top. If a screen is found, connect an ordinary dash or head-lamp between either terminal of the automobile ammeter and the tool, re-insert the tool through the head-lining and make contact with the screen. If the lamp lights, however dimly, it shall be assumed that the screen is grounded.

In order to use an ungrounded support screen, first release the head-lining at the front corner nearest the receiver. Then connect a flexible rubber-insulated lead to the corner of the screen and solder the joint. Feed the free end of the lead down the adjacent pillar-post of the car into the driving compartment and replace the head-lining.

If the top support screen is grounded, or if no screen is present, it will be necessary to drop the entire head-lining (see Figure 2). In the former case, the screen may be insulated by removal of a strip several inches from all edges and from the dome light fixture. The possibility of subsequent shifting may be eliminated by tacking the screen to one or more of the ribs and by lacing the sides with cord. Where no support screen is used, a copper screen having a total area of at least ten square feet should be inserted. It should be located as far to the rear as possible and insulated from all metallic parts grounded to the frame of the car. The antenna finally should be tested for grounds (see the foregoing "NOTE" for test procedure). If satisfactory, attach the lead-in wire and replace the head-lining of the car.

NOTE—Since a degree of skill—only acquired by experience—is necessary in removing and replacing the top fabric material, such work should be allotted to a competent "trim" man.

(b) *Roof (Interior) Type*—The accessory interior-type roof antenna also will provide very satisfactory performance and, in addition, is extremely simple to install. It may be quickly attached to the head-lining inside the car (preferably as far to the rear as possible) by means of pin-hooks, thereby precluding removal of the fabric. An antenna of this type, however, should not be used in any automobile having a *grounded* top material support screen since the proximity of that screen would seriously reduce its efficiency. Before purchase, therefore, it will be advisable to check this possibility, following the test procedure described under *"Roof (Built-in) Type."*

As furnished, the interior-type antenna is equipped with a sufficient length of lead-in wire ready-attached. The effective antenna wire is enclosed by long-wearing paper procurable either in "gray" or "tan" finish as desired to harmonize with the car upholstery.

(c) *Plate Type*—For these cases where the installation of a built-in roof antenna is considered too costly and the interior roof antenna impractical, good reception from local or semi-distant powerful stations may be procured with the special plate-type antenna also obtainable as an accessory. This unit should be clamped to the frame of the chassis as far to the rear as possible. It is adjustable in length and may be mounted either lengthwise or crosswise of the chassis, which position should be selected with due regard to the prevention of over-crowding. The plate must be placed as close to the ground as possible, but not below the lowest portion of the chassis at the desired location, as sufficient road clearance must be retained. It is also important to avoid any position in which the plate will impede free motion of chassis parts such as springs, drive shaft, or axles in order to prevent damage to the antenna.

Mounting of Units

Details of mounting the various units are shown in Figure 1. The following procedures are recommended:

Receiver Unit—It is necessary first to determine the electrical polarity of the storage battery supply. This may be done most conveniently by making an examination of the battery connections and ascertaining which terminal is grounded (that is, connected to the frame of the car). The positive terminal is usually marked (+) and tends to form corrosion far more rapidly than the negative (—). If the positive terminal is grounded, no change in the electrical connections of the receiver unit will be required. However, if the opposite is true, the cover of the receiver case must be removed and the *red* and *green* leads (attached by spade-type connectors to the two terminals nearest the bottom of the chassis terminal board) shown in Figure 1 must be reversed.

Now replace the case cover and support the assembled unit against the dash in the chosen position. Allowing a clearance of at least two inches above the top surface, where possible, to permit subsequent removal of the case from the mounting bolt head, mark with a pencil or crayon on the dash four points corresponding to the corners of the adjacent case surface. Then determine the exact center of the area bounded by those four points (by drawing diagonal lines between opposite corners) and mark that position with a center-punch. Next drill a ½ inch hole at the center-punch mark and insert the mounting bolt. The support plate and the two nuts then should be assembled upon the bolt from the engine side of the dash as shown but should not be tightened. Attach the four rubber bumpers, by means of the washers and self-tapping screws, at the four small holes on the selected mounting surface of the case. Finally hang the receiver over the bolt head, align sides vertically and tighten the nuts in place.

Remote Control Unit—In attaching the remote control unit to the steering column of the car, it will be advisable first to examine the detailed view (in Figure 1) showing the assembly of its mounting bracket. Four small holes are contained in the associated flexible strap at distances proper for use with steering columns of the most common diameters (1½, 1⅝, 1¾, 1⅞ inches) but the strap length will be found sufficient to permit the insertion of an additional hole if necessary to accommodate a 2 inch column. The proper hole may be determined by wrapping the clamp strap tightly around the column, inserting the machine screw furnished through that hole found to be nearest in alignment with the tapped hole in the clamp bracket. Three tapped holes are provided in the back of the remote control unit, permitting support of that unit either at the right- or left-hand side or above the steering column.

Flexible Shaft—Insert that end of the flexible shaft to which is attached the slotted coupling through the bushed opening in the left side of the receiver unit. Then rotate the shaft from the free end until the coupling slot is felt to engage over the pin contained in the tuning mechanism and slide the shaft forward to the full depth of the slot. With the shaft held in this position, insert the opposite end of the shaft through the bushing at the rear of the remote control unit and push forward until the flatted portion of the shaft protrudes through the front cover. Then proceed to tighten the external set-screw (located at the bottom of the case—see Figure 3) adjusting the shaft position as necessary until the screw is felt to engage in the groove. Tighten the screw fully to the bottom of the slot and then loosen it approximately one-quarter of a turn. Finally, secure the flexible casing in place by tightening the set-screws at each end *firmly*, so as to provide good electrical contact as well as solid mechanical support.

NOTE—In many installations it will be found necessary or desirable to use a flexible shaft of shorter length than 33⅛ inches. While it is simplest to procure a shaft of proper length from the dealer as mentioned heretofore, very little difficulty should be experienced in shortening the original part if deemed expedient. To shorten the shaft, refer to Figure 3 and proceed as follows:

1. Determine the minimum shaft length permissible for the installation.
2. Remove the slotted coupling (using a soldering iron) and withdraw the shaft from its casing.
3. Cut the shaft only at the center of a swaged joint, selecting that joint which allows at least the required length.
4. Cut from the shaft casing a length equal to the amount of shaft removed. (This operation may be simplified by placing the casing between wooden blocks in a vise so that the block ends will serve to guide the back saw blade.)
5. Replace the shaft in its casing and solder the slotted coupling to the end of the shaft.

Connections

Refer to Figure 1 and make connections as follows:

Antenna to Receiver—For least ignition interference, any portion of the antenna lead-in wire which extends behind the instrument panel or into the engine compartment of the car should be fully shielded and cut to eliminate excessive slack when attached to the receiver antenna connector. Before connecting the antenna to the receiver, the following comments applying to the particular type of antenna adopted should be observed:

(a) *Roof Antenna* (Built-in Type)—The lead-in wire from a factory-installed built-in roof antenna usually is unshielded and often is of insufficient length to reach the receiver. If necessary, an extra length of insulated wire may be spliced to the existing lead-in, in which case the joint must be soldered and wrapped with tape. In general, it will be advisable to shield the exposed length of lead-in wire, procuring for this purpose from your dealer a length of shield braid and an equivalent length of insulating loom (or rubber tubing) sufficient to extend between the end of the lead-in wire and its point of entrance from the body pillar post. Slip the loom over the lead-in wire and the shield braid over the loom.

(b) *Roof Antenna (Interior Type)*—If an interior type antenna is used, the lead-in wire should be brought down the outside of that front pillar post nearest the receiver.

(c) *Plate Type Antenna*—With the plate type antenna, the full-shielded end of the special cable should be brought into the automobile driving compartment through a ½ inch hole drilled in the toe-board (if no other opening is available). This end is to be connected to the receiver unit antenna lead (as explained in following paragraphs) and the opposite (unshielded) end then cut off as required to eliminate excessive slack upon connection to the plate. The pigtail extension from the end of the shield must be soldered or bonded to the frame of the car.

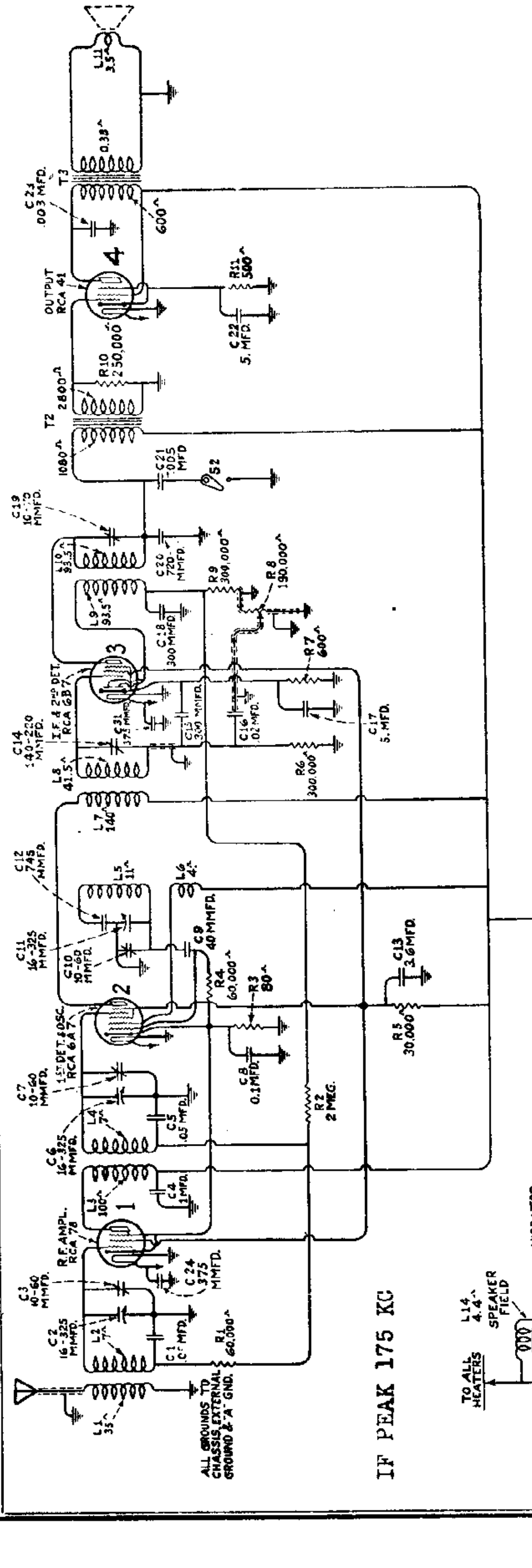
Refer to the detailed view of the antenna connector shown in Figure 1 and proceed to attach the lead-in wire (if shielded) as follows: First, cut the end of the lead-in so that the internal insulated wire and loom (if present) are flush with the end of the shield covering and push back the shield approximately 1¼ inches. Cut the loom to the end of the shield and then remove sufficient insulation to expose one inch of clean bare-conductor. Now disconnect the female portion of the connector attached to the receiver antenna lead and remove the small internal bushing and spring.

To assemble, slip the bared conductor through the female portion of the connector and then through the spring and bushing, making certain that the insulation enters the end of the connector. Bend over and spread the strands of the conductor against the forward end of the bushing and then force one of the eyelets (packed in small envelope in outfit package) into the bushing to hold the conductor in position. Cut off the ends of the conductor strands approximately ⅛ inch beyond the edge of the eyelet and bend the strands over toward the center of the eyelet. The assembly may be now attached to the receiver portion of the connector and the shield covering on the lead-in wire pushed forward to cover the adjacent end of the female portion. Finally, bond the shield to the connector by means of the small clamp furnished. No soldering operations are required.

NOTE—An unshielded lead-in wire (as in the case of the interior-type antenna) may be attached to the antenna connector as described above except that all references to the shield braid and loom may be neglected.

MODEL M-105
Schematic
Installation Details

RCA-VICTOR CO., INC.



IF PEAK 175 KC

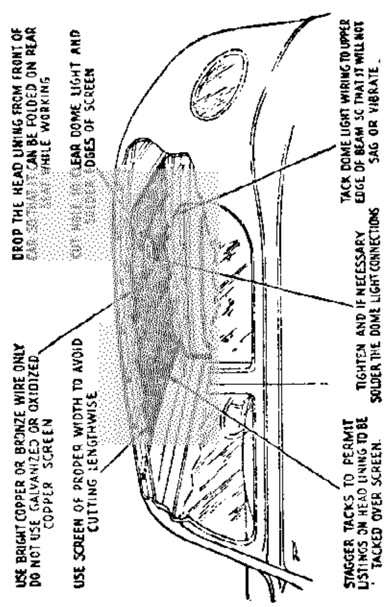


Figure 2

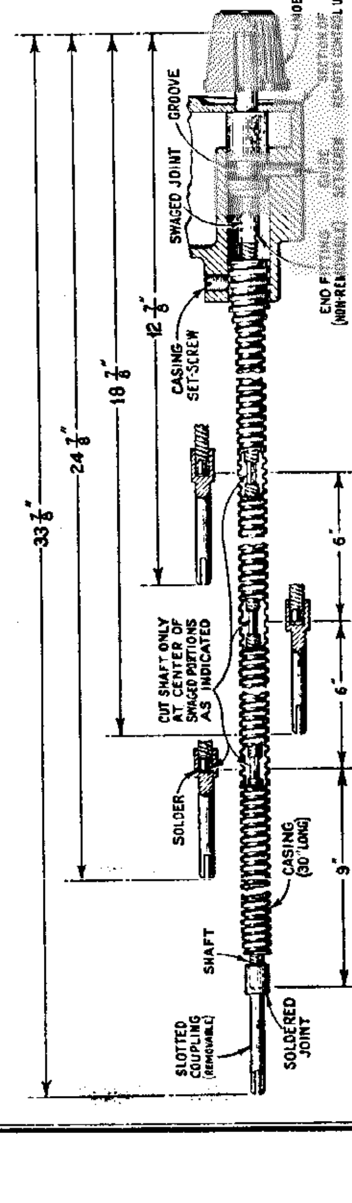
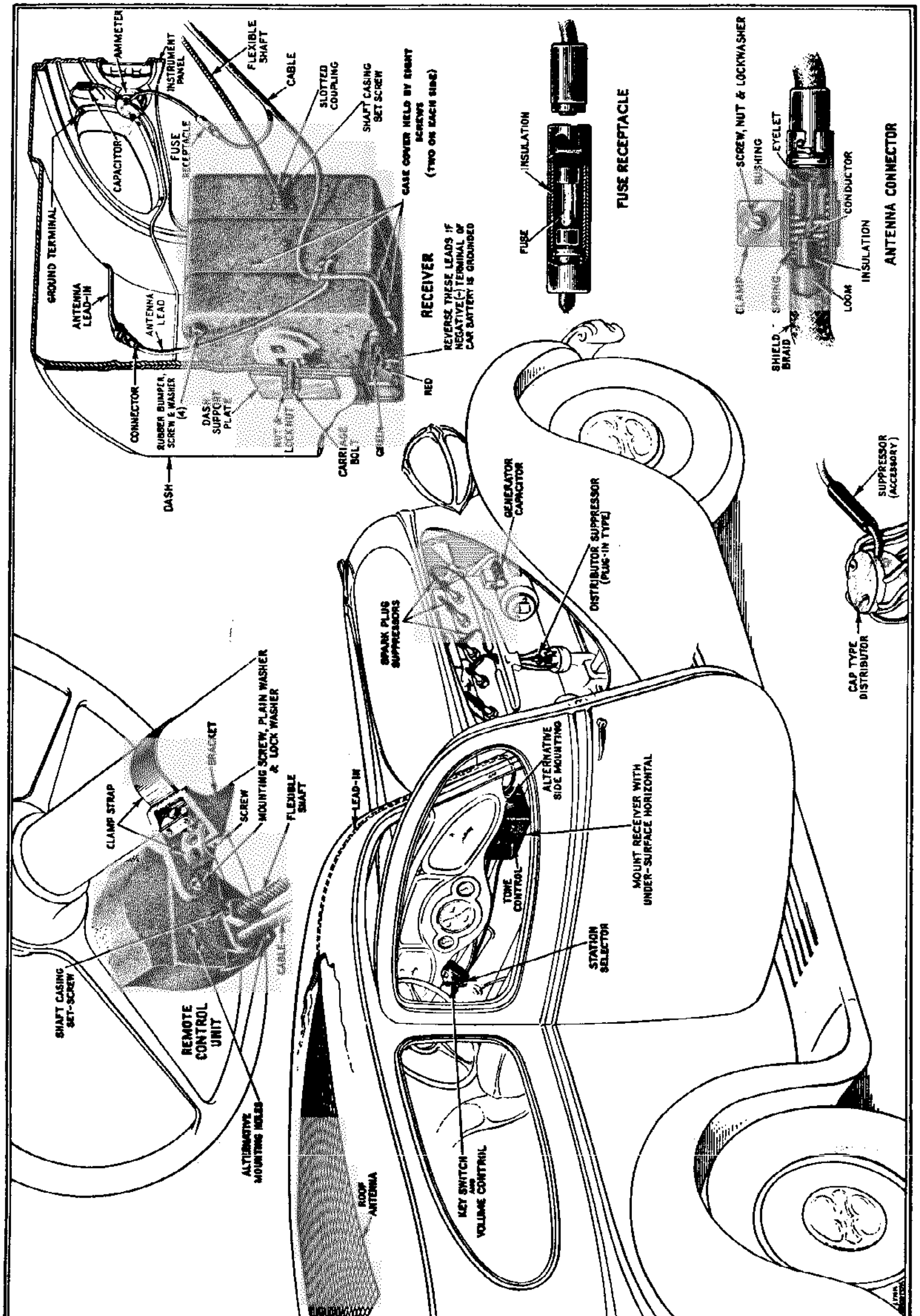


Figure 3

MODEL M-105
Installation Details

RCA-VICTOR CO., INC.



MODEL M-105
Chassis Wiring

RCA-VICTOR CO., INC.

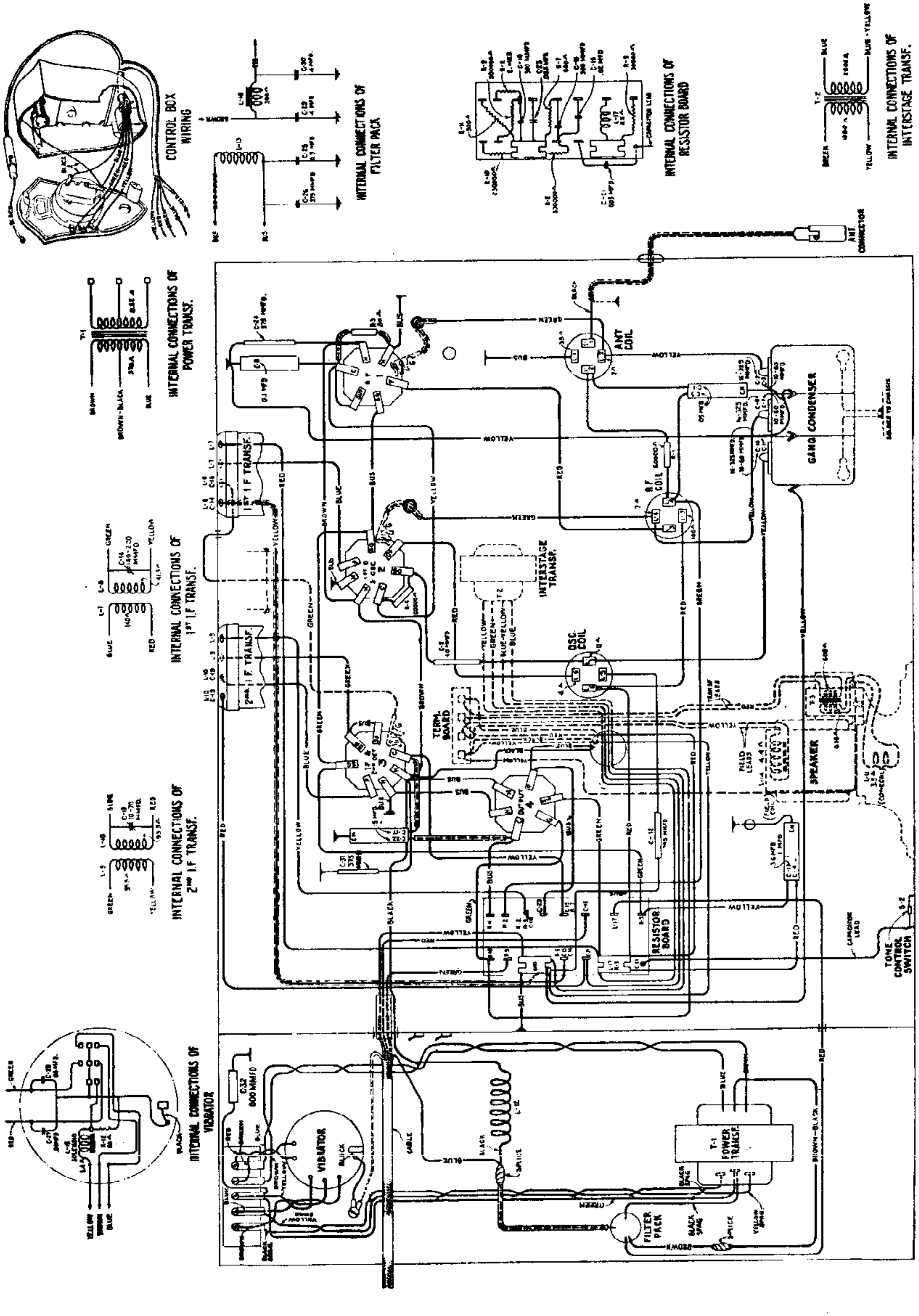


Figure B—Wiring Diagram

MODEL M-105
Parts List

RCA-VICTOR CO., INC.

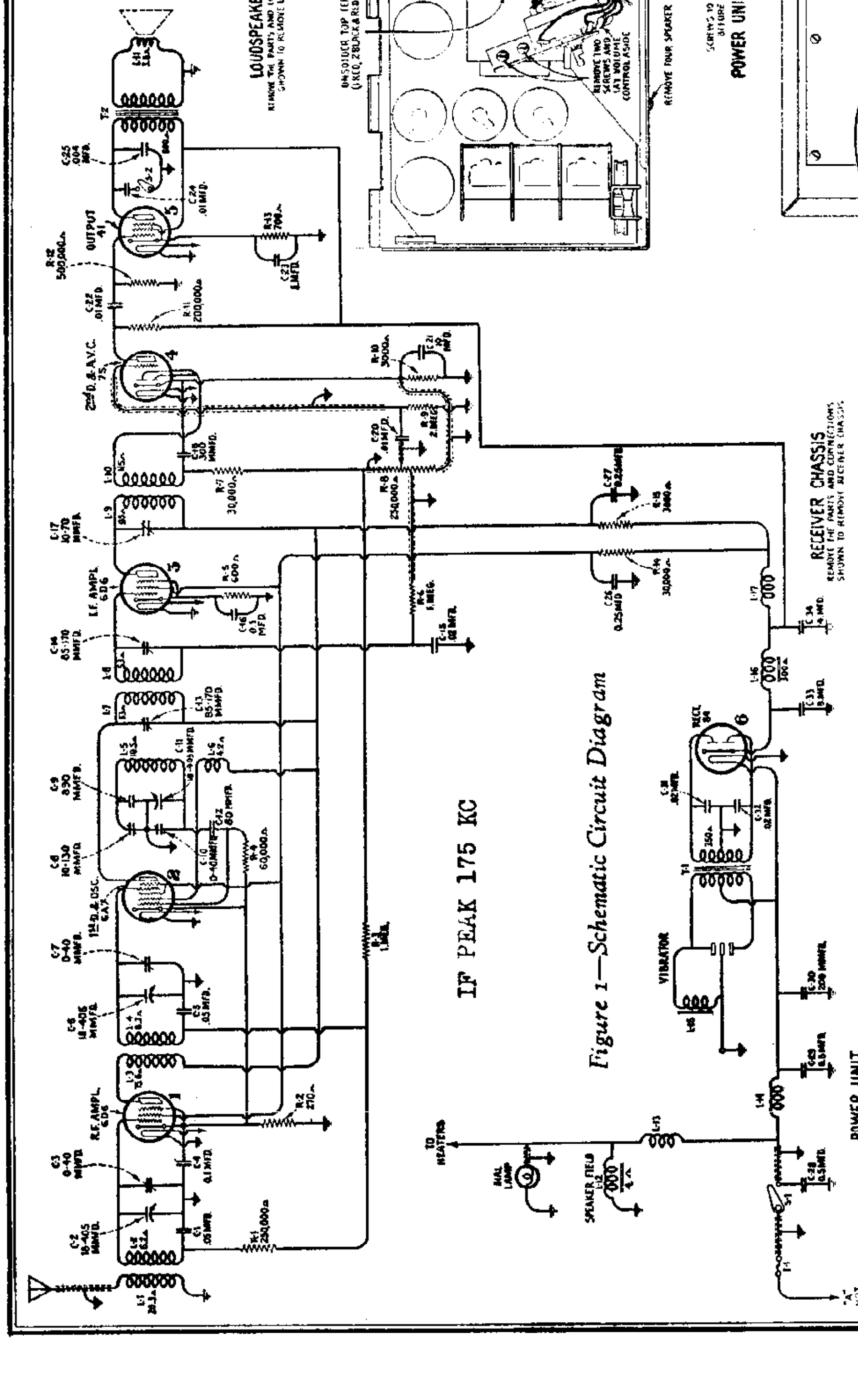
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3536	Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22)	1.10
3572	Socket—Radiotron 7-contact socket	.38
3584	Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C15, C18)	.34
3617	Capacitor—0.005 mfd. (C21)	.38
3618	Capacitor—0.02 mfd. (C16)	.38
3621	Coil—Choke coil—Located on resistor board (L17)	.35
3623	Shield—Antenna R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3636	Transformer—First intermediate frequency transformer (L7, L8, C14)	1.74
3637	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.65
3641	Capacitor—0.1 mfd. (C8)	.35
3645	Knob—Tone control knob—Package of 5	.90
3695	Capacitor—375 mmfd. (C24, C31)	.22
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3745	Capacitor—745 mmfd. (C12)	.34
3746	Capacitor—800 mmfd. (C32)	.34
3920	Capacitor—.003 mfd. (C23)	.25
3921	Mounting screws, washer and bushing assembly—For 3-gang variable tuning condenser—Comprising three spacers, three screws, three washers and three lock-washers	.34
3922	Resistor—300,000 ohms—Carbon type—¼ watt (R6, R9)—Package of 5	1.00
4091	Resistor—80 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt (R2)—Package of 5	1.00
6298	Cord—Tuning condenser drive cord—Package of 5	.60
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6490	Tone control switch	.35
6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitor (C4, C13)	1.08
6493	Drum—Tuning condenser drive drum	.40
6514	Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5)	.28
6515	Cable—Shielded cable with antenna connector	.32
6516	Connector—Fuse connector	.16
6517	Cable—Main cable complete with fuse connector	1.40
6540	Coil—R. F. coil assembly (L3, L4)	.94
6731	Coil—Antenna coil (L1, L2)	.88
6732	Transformer—Interstage audio transformer (T2)	2.00
7485	Socket—Radiotron 6-contact socket	.40
7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30)	4.06
7601	Condenser—3-gang variable tuning condenser	2.84
9049	Transformer—Power transformer (T1)	3.75
	CONTROL BOX ASSEMBLIES	
3649	Key—Volume control and switch key	$0.18
3650	Screw—Self locking No. 10-32-5/16" fulldog point set screw—Package of 10	.32
3651	Screw—Self locking No. 10-32-3/16" cupped point set screw—Package of 10	.32
3652	Screw—Self locking No. 10-32-¼" cupped point set screw—For flexible drive shaft—Package of 10	.32
3690	Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
3718	Bracket—Control box dash mounting bracket	.25
3757	Coupling—Slotted coupling for end of flexible drive shaft—Package of 5	.40
3758	Connector—For control box end of flexible drive shaft—Package of 5	.68
6161	Knob—Station selector knob—Package of 5	.90
6496	Shaft—Flexible drive shaft complete with connectors—Approximately 24¾" long	1.60
6497	Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33¾" long	1.75
6499	Volume control—Combination volume control and switch (R8)	1.36
6500	Nut—Volume control and switch lock nut	.24
6531	Shaft—Flexible drive shaft complete with connectors—Approximately 12¾" long	.85
6532	Shaft—Flexible drive shaft—Complete with connectors—Approximately 18¾" long	1.24
6784	Scale—Dial scale	.58
7695	Box—Control box complete	3.70
7698	Cover—Control box cover	.44
	MISCELLANEOUS PARTS	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
3647	Nut—Cap nut and lock washer—Package of 10	.35
3648	Screw—No. 10-32-5/16" cap screw and lockwasher—Package of 10	.32
3689	Bracket—Receiver mounting bracket, bolt and nut assembly—One set	.30
3791	Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case	.30
3827	Cable—From fuse connector to ammeter	.10
3856	Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10	.30
3884	Clamp—Cable clamp—Package of 10	.20
4051	Bumper—Rubber bumper used in mounting receiver chassis—Package of 4	.20
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor splice-in suppressor	.56
6494	Capacitor—Ammeter capacitor—0.5 mfd.	.46
6495	Capacitor—Generator capacitor—0.5 mfd.	.72
6670	Suppressor—Spark plug suppressor—"Elbow type"	.56
7065	Screw-driver—For R. F. and I. F. adjustments	.80
7621	Antenna—Roof antenna—Paper type (Brown)	1.50
7622	Antenna—Roof antenna—Paper type (Gray)	1.50
7686	Housing—Front section of housing complete with mounting screws	3.48
7689	Vibrator Complete	7.84
7699	Housing—Rear section of housing complete with mounting screws	1.92
9050	Oscillator—Test oscillator—150-25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
3688	Transformer—Output transformer (T3)	1.50
7607	Screen—Metal screen	.44
7608	Coil assembly—Comprising field coil, magnet and cone support (L14)	2.40
9023	Cone—Reproducer cone complete (L11)—Package of 5	5.00

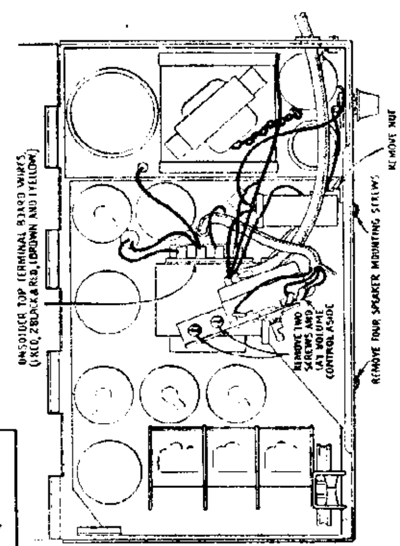
RCA-VICTOR CO., INC.

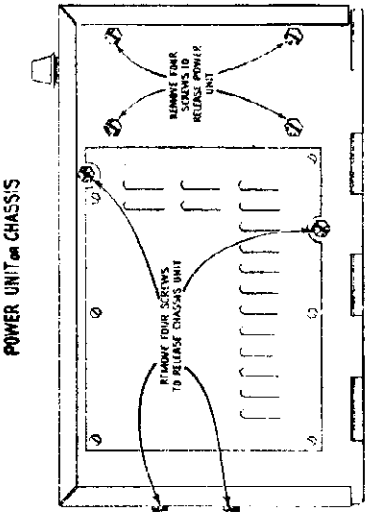
MODEL M-107
Schematic
Service Details

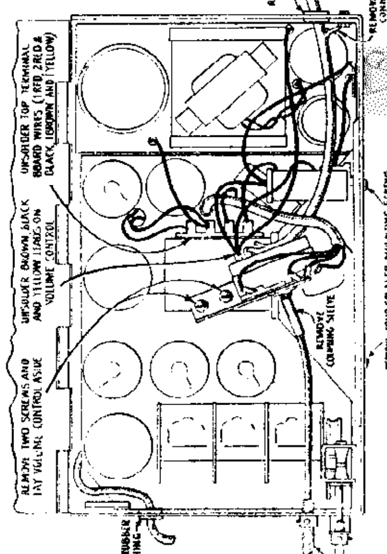


IF PEAK 175 KC

Figure 1—Schematic Circuit Diagram







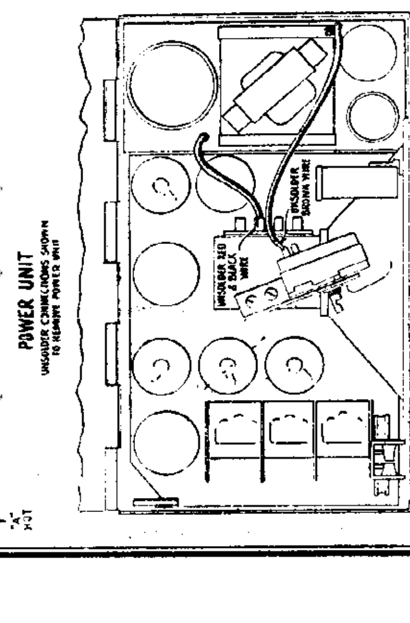


Figure 2
Details of Removing Units from Chassis

MODEL M-107
Chassis Wiring

RCA-VICTOR CO., INC.

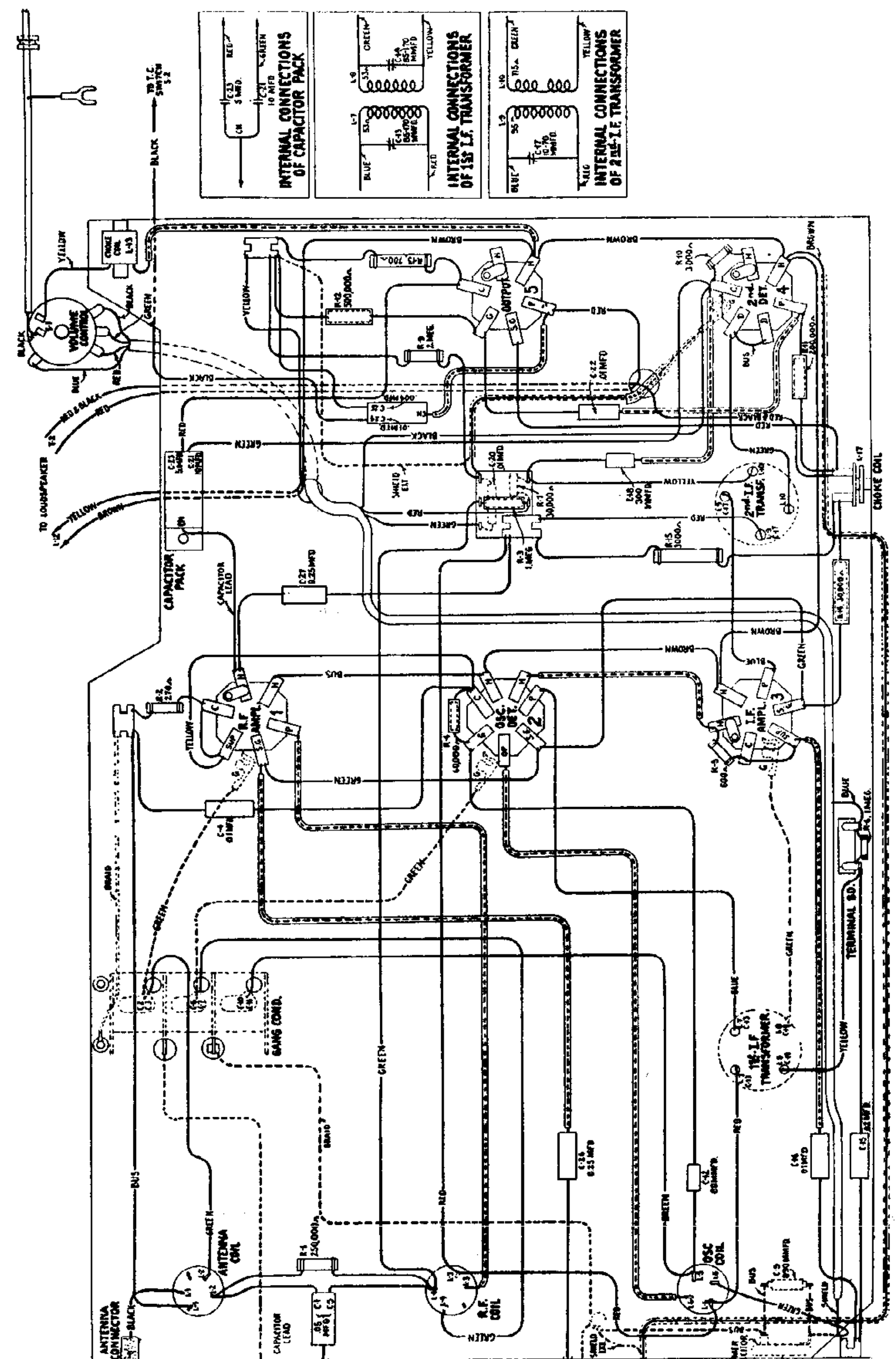


Figure 5—Receiver Assembly Wiring Diagram

RCA-VICTOR CO., INC.

SERVICE DATA

(1) Removing Units from Chassis:

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver and soldering iron are the only tools required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

(2) Line-Up Capacitor Adjustments:

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full-Range Test Oscillator, type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the primary and secondary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments:

The three-gang capacitor trimmer screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

(4) R. F. Interference from Vibrator with Shielded Lead-In Disconnected from Antenna:

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The various by-pass capacitors, such as C-28, C-29 and C-30 and chokes L-13, L-14 and L-16, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with one of similar mechanical as well as electrical construction.

MODEL M-107
Vibrator Data
Trimmer Locations
Socket Layout

RCA-VICTOR CO., INC.

(5) Voltage Readings:

The following voltages are those at the tube socket while the receiver is in operating condition. No allowance has been made for currents drawn by the meter and if low resistance meters are used, such allowances must be made.

(6) Vibrator Inverter:

The Vibrator Inverter unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by replacement, not by attempted adjustment.

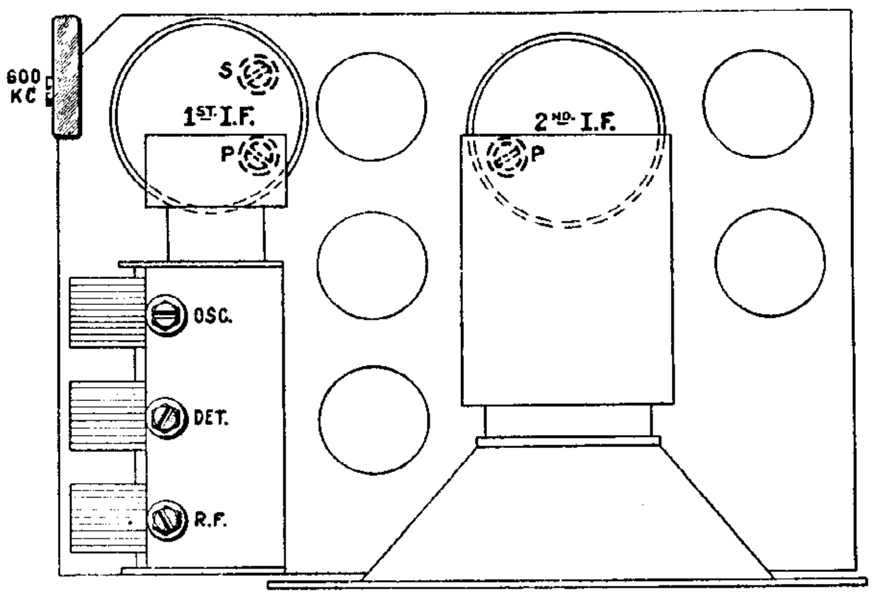


Figure 3—Location of Line-Up Capacitors

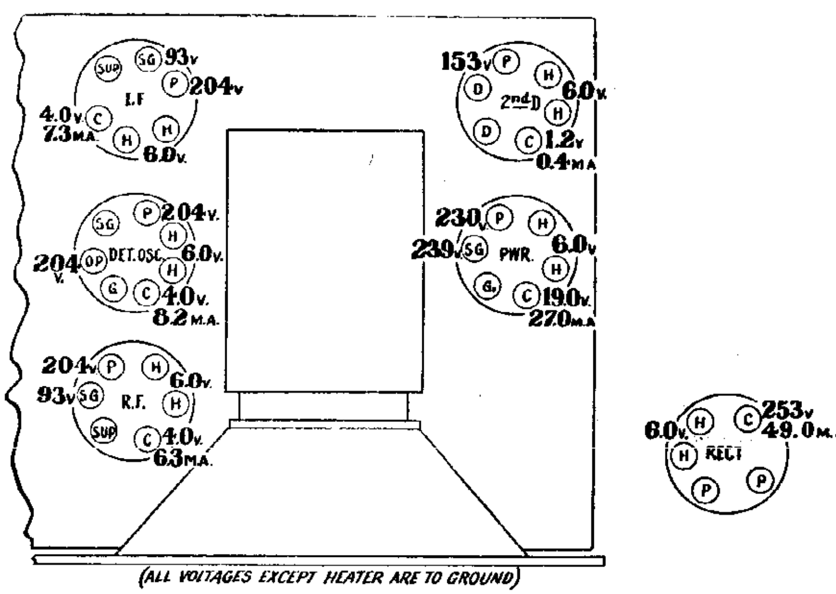


Figure 4—Voltages at Individual Socket Contacts

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal—Minimum Volume

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, D. C.
RCA-6D6—R. F.		4.0	93	204	6.3	6.0
RCA-6A7	1st Det.	4.0	93	204	8.2	6.0
	Osc.	—	—	204		
RCA-6D6—I. F.		4.0	93	204	7.3	6.0
RCA-75—2nd Det.		1.2	—	153*	0.4	6.0
RCA-41—Pwr.		19.0	239	230	27.0	6.0
RCA-84—Rect.		253	—	—	49.0	6.0

* Voltage impossible to measure with ordinary voltmeter.

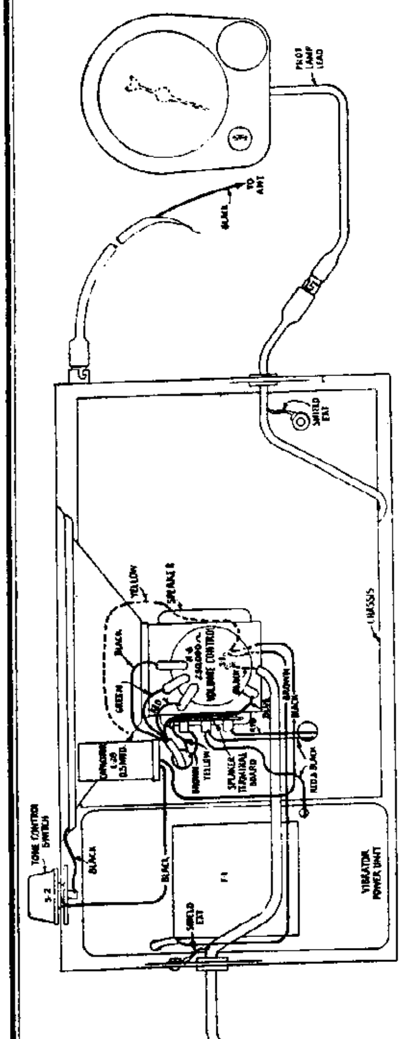


Figure 6—Assembly Wiring Diagram

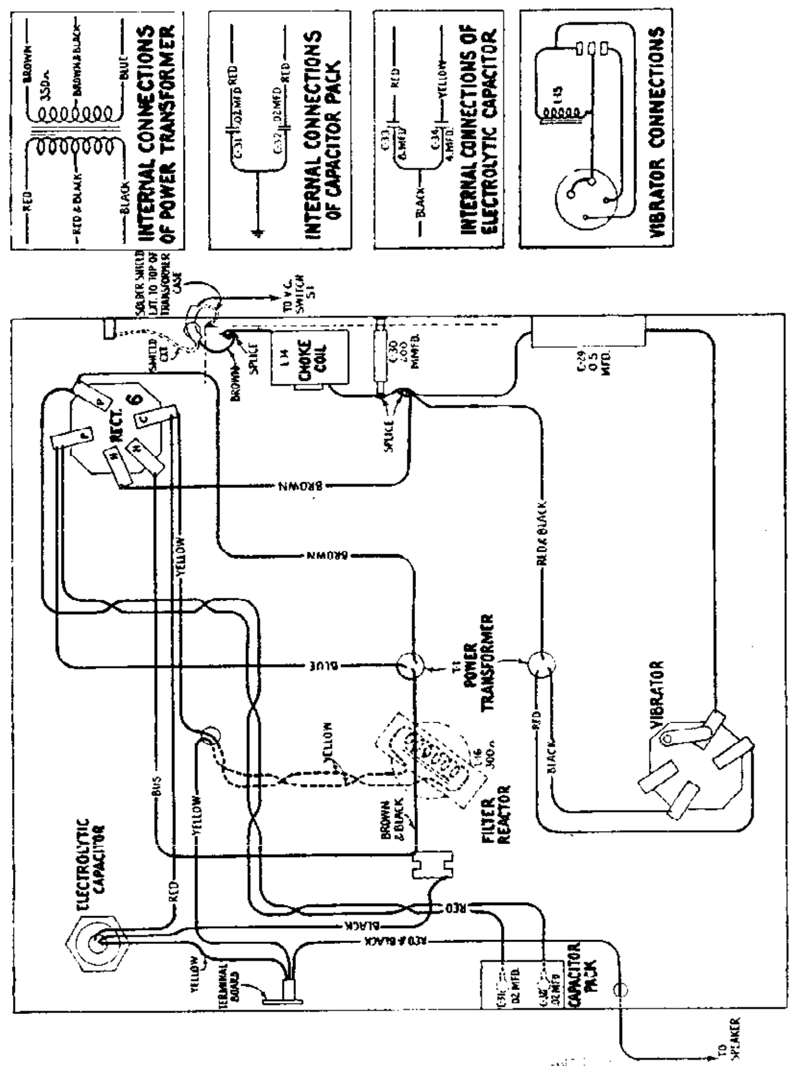


Figure 7—Power Unit Wiring Diagram

MODEL M-107
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	REPRODUCER ASSEMBLIES	
4305	Bracket—Tuning condenser drive bracket assembly	$0.45
6981	Cable—4-conductor shielded volume control cable	.42
4300	Cable—Single-conductor—Power input cable	.56
4301	Cable—Single-conductor—Dial lamp cable	.38
3861	Capacitor—Adjustable trimmer capacitor (C8)	.78
4246	Capacitor—80 mmfd. (C12)	.24
4248	Capacitor—300 mmfd. (C18)	.22
4245	Capacitor—890 mmfd. (C9)	.26
3639	Capacitor—.02 mfd. (C15)	.25
3701	Capacitor—.01 mfd. (C20, C22)	.30
3877	Capacitor—0.1 mfd. (C4, C16)	.32
3597	Capacitor—.25 mfd. (C26, C27)	.40
4304	Capacitor—0.5 mfd. (C28)	.72
6979	Capacitor pack—Comprising one .01 and one .004 mfd. (C24, C25)	.28
6963	Capacitor pack—Comprising one 5. mfd. and one 10 mfd. capacitor (C21, C23)	1.10
4243	Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5)	.35
6965	Coil—Antenna coil (L1, L2)	.70
4299	Coil—Choke coil (L13)	.35
4298	Coil—Choke coil (L17)	.28
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—R. F. coil assembly (L3, L4)	.80
7768	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	4.75
4306	Cord—Tuning condenser drive cord—Package of 10	1.05
6493	Drum—Tuning condenser dial drum and hub with set screws	.40
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
4307	Roller—Tuning condenser idler roller—Package of 5	.25
6135	Resistor—270 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3218	Resistor—600 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
4242	Resistor—3,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3152	Resistor—30,000 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R11)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R12)—Package of 5	1.00
3033	Resistor — 1 megohm — Carbon type — ¼ watt (R3, R6)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R9)—Package of 5	1.00

Stock No.	Description	List Price
4302	Resistor—700 ohms—Carbon type—1 watt (R13)—Package of 10	$2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R14)	.22
4239	Resistor—3,000 ohms—Carbon type—3 watt (R15)	.25
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
4233	Shield—Detector oscillator or output Radiotron shield	.22
4236	Shield—I. F. or R. F. amplifier Radiotron shield	.22
4232	Socket—6-contact Radiotron socket	.35
3572	Socket—7-contact Radiotron socket	.38
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6960	Transformer—First intermediate frequency transformer (L7, L8, C13, C14)	1.80
6962	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.85
6978	Volume control (R8)	1.20
	CONTROL BOX ASSEMBLIES	
6976	Back—Control box back	.75
7769	Box—Control box complete	3.90
3690	Bracket and strap assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
7770	Cover—Control box front cover	.86
4259	Cover—Station selector dial cover—Transparent celluloid—Package of 5	.92
4261	Dial—Station selector dial	.15
4258	Key—Volume control key	.20
4256	Lamp—Dial lamp	.30
4260	Pointer—Station selector indicator	.18
4257	Ring—Station selector dial cover ring (escutcheon)	.75
4262	Screen—Dial light screen—Package of 5	.26
4255	Screw—No. 4-40-¼ inch oval head machine screw for holding cover to control box back—Package of 10	.16
4252	Screw—No. 10-32-1⅛-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10	.32
3652	Screw—No. 10-32-¼-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10	.32
4254	Shaft—Volume control coupling shaft	.36
4250	Shaft and gear—Station selector pointer shaft and gear	.56
4251	Shaft and gear—Station selector drive shaft and pinion gear	.20
4253	Spring—Volume control key holding spring—Package of 10	.32

REPLACEMENT PARTS—Continued

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	FLEXIBLE SHAFT AND CABLE ASSEMBLIES	
7762	Cable—Dial lamp cable with socket and section of connector	$.76
4264	Clamp—Metal clamp for holding flexible shafts—Package of 10	.35
4295	Screw—No. 10-32-¼-inch cupped point set screw—Fastens flexible shaft housing to metal case—Package of 10	.20
7771	Shaft—Station selector flexible drive shaft approximately 28 inches long	1.44
7773	Shaft—Station selector flexible drive shaft approximately 23 inches long	1.32
7772	Shaft—Volume control flexible drive shaft approximately 32 inches long	1.68
7774	Shaft—Volume control flexible drive shaft approximately 27 inches long	1.56
4265	Sleeve—Coupling sleeve for volume control shaft—Package of 5	.15
4263	Socket—Dial lamp socket	.20
	POWER SUPPLY UNIT	
4013	Capacitor—200 mmfd. (C30)	.30
4293	Capacitor—0.5 mfd. (C29)	.60
7779	Capacitor—Comprising two .02 mfd. capacitors (C31, C32)	.96
7776	Capacitor—Comprising one 8. mfd. and one 4 mfd. capacitors (C33, C34)	1.90
3956	Clamp—Capacitor mounting clamp—Package of 5	.32
7778	Coil—Filter reactor choke coil (L14)	.45
7777	Reactor—Filter reactor (L16)	1.14
4308	Screw—Binder head No. 6-32-¼-inch screw for mounting capacitor pack—package of 10	.18
6980	Socket—4-contact vibrator socket	.20
7484	Socket—5-contact Rectifier socket	.35
7775	Transformer—Vibrator transformer (T1)	3.78
7780	Vibrator complete (L15)	4.96
	REPRODUCER ASSEMBLIES	
9496	Coil—Field coil, magnet and cone support (L12)	2.95
9492	Cone—Reproducer cone (L11)—Package of 5	3.70
6982	Transformer—Output transformer (T2)	1.35
9494	Reproducer complete	5.65
4277	Screw—No. 8-32-¼-inch binder head reproducer mounting screw—Package of 10	.22
	HOUSING ASSEMBLIES	
4322	Bracket assembly—Station selector drive shaft bracket and bushing	.28
4321	Cloth—Grille cloth	.22
7781	Housing—Front section of housing complete—Less hinge pin	3.38

Stock No.	Description	List Price
7782	Housing—Rear section of housing complete—Less hinge pin	$2.68
4320	Nut—Wing nut—Package of 10	.38
4266	Pin—Hinge pin—Package of 5	.42
4318	Screw—Wing screw—Package of 10	.98
4319	Screw—No. 6-¼-inch slotted hex head self tapping—Fastens case bottom to front section of housing—Package of 10	.50
4295	Screw—No. 10-32-¼-inch headless set screw—Used to fasten drive shafts to housing—Package of 10	.20
	MISCELLANEOUS ASSEMBLIES	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
3689	Bracket—Receiver mounting bracket, bolt and nut assembly	.30
4283	Cable — Antenna lead-in cable — Approximately 35 inches long	.80
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—Ammeter capacitor—.5 mfd.	.60
4292	Capacitor—Generator capacitor—.5 mfd.	.90
4291	Clip—"A" supply clip—Package of 10	.70
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
3646	Fuse—20 ampere (F1)—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4323	Knob—Tone control switch knob—Package of 5	.70
4282	Knob—Station selector knob—Package of 5	.65
7766	Lead—Power lead with female section of fuse connector—From power cable to battery	.30
4492	Plate—Ornamental plate located on housing front—Package of 2	.58
4494	Plate—RCA Victor name plate	.94
4493	Screw—No. 4 self-tapping screw for mounting ornamental plates—Package of 10	.56
4495	Screw—No. 8 self-tapping screw for mounting station selector drive shaft and bushing—Package of 10	.52
4294	Screw—No. 10-32-⅜-inch hex head used to mount receiver chassis to housing—Package of 10	.45
4303	Screw—No. 10-32-⅞-inch hex head used to mount power unit to housing—Package of 10	.22
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
6152	Suppressor—Distributor suppressor	.56
6151	Suppressor—Spark plug suppressor	.56
6669	Switch—Tone control switch (S2)	.50
4285	Washer—Antenna or fuse connector insulating washer—Package of 10	.22

MODEL M-116
Voltage
Alignment Data

RCA-VICTOR CO., INC.

Power Requirements ....105–125 volt, 50–60 Cycle A. C. or 6-volt Storage Battery
Power Consumption . . 115 Volts, 60 Cycles A. C.—40 Watts, Battery—5.7 Amperes at 6.3 Volts
Number and Types of Radiotrons ....1 RCA-78, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-41, 1 RCA-1-V—Total 5
Maximum Undistorted Power Output............1.8 Watts
Maximum Output.............................3.6 Watts
Type of Rectifier...............A. C.—Radiotron RCA-1-V Battery—Vibrator Inverter-Rectifier
Tuning Frequency Range.............540 K. C.–1500 K. C.

This automobile receiver is of unique design and construction. Among its many features is its adaptability to either battery or 110-volt alternating current operation. This is accomplished by having a separate power transformer and a

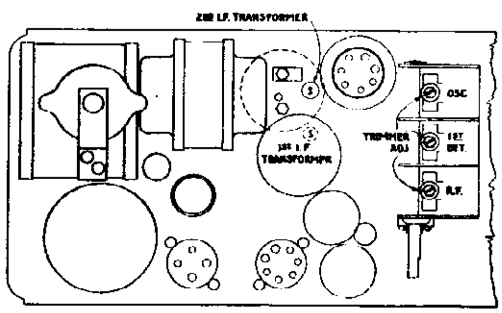


Figure C—Location of Line-up Capacitors

tube rectifier for alternating current, while the conventional vibrator inverter-rectifier with its associated transformer is used for battery operation.

Other important features include its compact portable size, full vision "airplane" type dial, tone control, sensitivity switch, electro-dynamic loudspeaker and the inherent sensitivity, selectivity and tone quality characteristic of the superheterodyne.

Figure A shows the schematic diagram, Figure B the wiring diagram, Figure C the location of the line-up capacitors and Figure D the wiring of the battery cable. A brief description of the circuit follows:

Radio Circuit—The radio circuit consists of four Radiotrons; namely, an RCA-78 R. F. stage, an RCA-6A7 first detector-oscillator, an RCA-6B7 intermediate frequency amplifier, second detector and A. V. C. and an RCA-41 output amplifier.

Power Circuit—The power circuit for battery operation consists of a vibrator inverter-rectifier with its associated transformer and filter circuits. The heaters of the various Radiotrons are powered direct from the car storage battery. The operating switch is so arranged that at one position battery operation is obtained, while at the other position, proper connections are made for A. C. operation.

When the switch is at the A. C. position, the A. C. input current is connected to the primary of the A. C. transformer. Two secondaries are provided, one for furnishing power to the Radiotron heaters and the dial lamp, the other for plate supply to Rectifier RCA-1-V. The output of the rectifier is then filtered by the same filtering system as that used for battery operation. The loudspeaker field is used as a filter reactor.

Inverter-Rectifier Adjustments

This receiver uses a vibrator inverter-rectifier for supplying all plate and grid voltages when operated from a battery source. *This unit is accurately adjusted and sealed at the factory and service adjustment should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. In order to make these adjustments, it is first necessary to remove the cover of the instrument. The following procedure should be used:

R. F. Adjustment:

(a) Check the position of the dial pointer. It should be aligned with the low-frequency end graduation, as indicated by the small arrow marked "Max. Cap." when the tuning capacitor rotor is fully meshed with the stator.

(b) Procure a modulated oscillator giving a signal at 1400 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter. Connect the output meter across the cone coil of the loudspeaker.

(c) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(d) Place the oscillator and receiver in operation and adjust the oscillator output so that a small deflection is obtained in the output meter when the volume control is at its maximum position.

(e) Then adjust the three line-up capacitors until a maximum deflection in the output meter is obtained. Readjust these capacitors a second time, as there is a slight interlocking of adjustments.

I. F. Adjustments:

(a) Procure a modulated oscillator giving a signal at 175 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter.

(b) Connect the oscillator between the control grid of the first detector and ground.

(c) Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(d) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output. At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

RADIOTRON SOCKET VOLTAGES

115 Volts A. C. or 6.3 Volt Battery—No Signal—Max. Sensitivity

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.2	86	216	5.5	5.9
RCA-6A7	First Detector	4.2	86	216	10.0 Total	5.9
	Oscillator		—	216		
RCA-6B7 Second Det.		2.7	87	207	4.5	5.9
RCA-41 Power		15.0	255	235	30.0	5.9
RCA-1-V		—	—	325 RMS	50.0	5.9

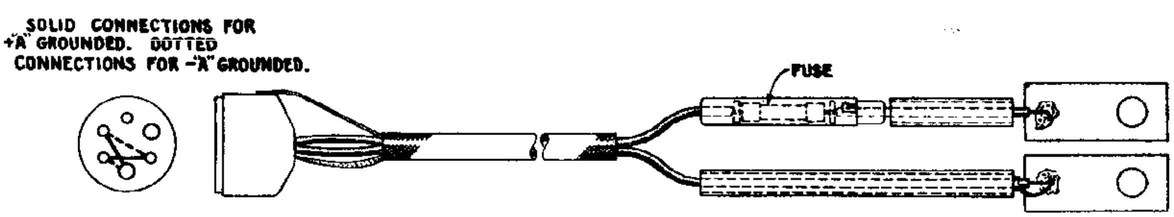


Figure D—Internal Connections of Cable

MODEL M-116
Chassis Wiring

RCA-VICTOR CO., INC.

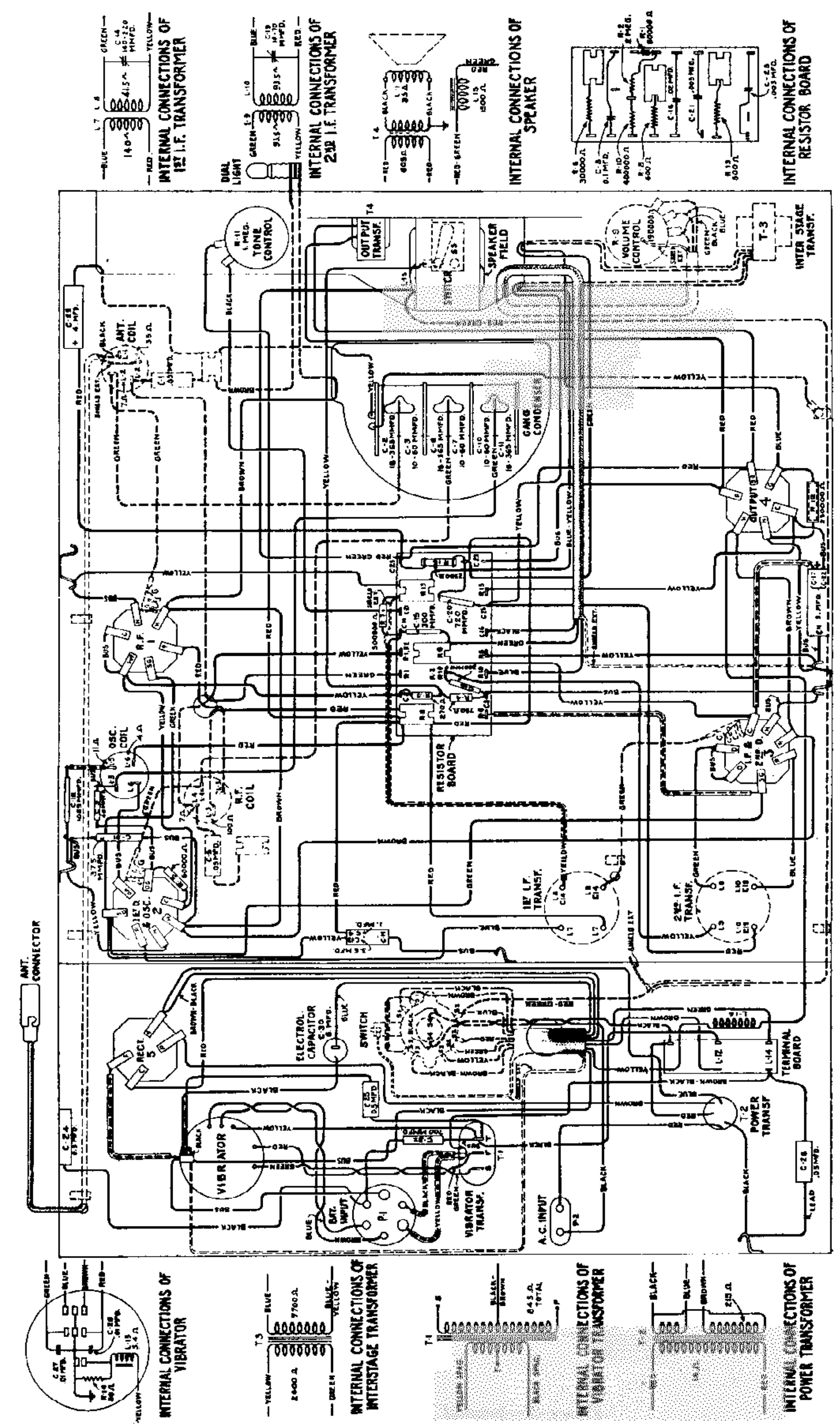


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

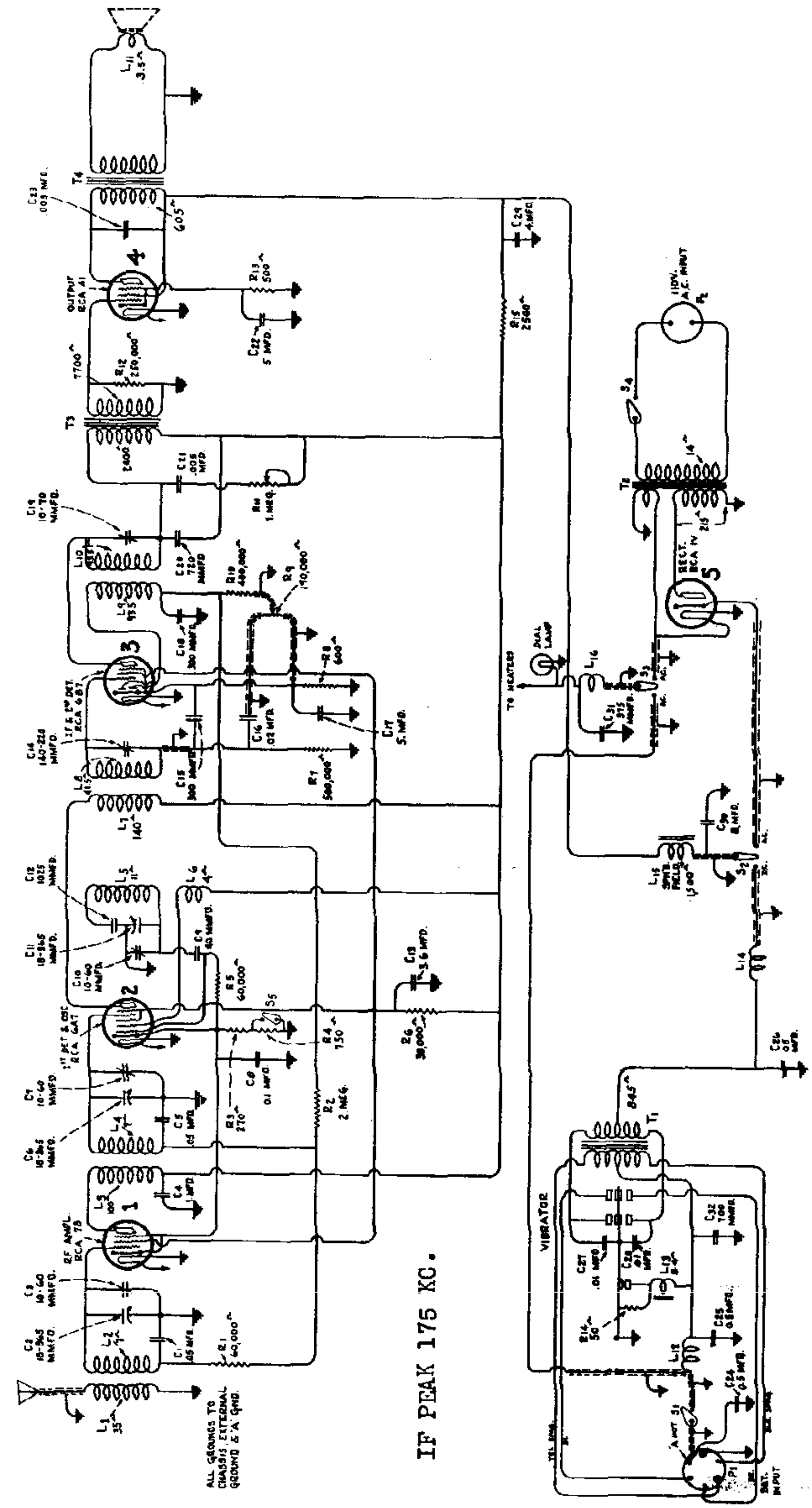


Figure A—Schematic Circuit Diagram

MODEL M-116
Installation Notes
Parts List

RCA-VICTOR CO., INC.

INSTALLATION

Automobile Installation

A typical installation of this receiver in an auto is accomplished in the following manner: Lift the seat upon which the instrument will rest, lay the battery cable and antenna shielded lead-in wire in position and then replace the seat. In cases where the automobile battery is mounted beneath that seat, however, it will be necessary to connect the battery cable to the battery (as described in the subsequent paragraph entitled "Connection to Battery") before replacing the seat. Finally, mount the receiver on the seat, attach the connector of the lead-in wire to the short (antenna) lead extending from the rear of the instrument and, with the power switch "off" (in AC position), insert the battery cable plug in the receptacle located adjacent to the antenna lead entrance.

Connection to Antenna—Feed the antenna lead-in wire beneath floor mat to the side of car nearest the wire extending from the antenna. The wire from a factory-installed roof antenna ordinarily is brought down one of the front pillar posts and left in a coil behind the instrument panel. In such cases, therefore, the lead-in wire after leaving the floor mat should be concealed behind the kick-board, then soldered to the wire extending from the antenna at the lower end of the body pillar post, after cutting the necessary length from each wire to eliminate excessive slack. Insulate the joint with tape and then solder or bond the pig-tail extension from the lead-in shield braid to the car frame.

A similar procedure is followed when either alternative form of antenna ("interior" roof or plate type) is employed except that the lead-in wire probably will follow a different route in each case. Such antennas should be mounted as far to the rear of the car as possible to insure minimum ignition interference. The lead-in wire for the interior type unit thus may be carried down the rear quarter of top and then behind the back cushion of seat in open and convertible models or may be anchored to any convenient pillar post in closed models. With the plate antenna, the lead-in wire should be fed through any opening in the floor board.

Connection to Battery—Since, in most cars, the storage battery is located below the floor boards of the driving compartment, the battery cable has been made sufficiently long to reach the battery after passing beneath the driver's seat (see note concerning longer cable available for rear seat operation—Equipment, "Battery Cable Package"). Run the cable under the floor mat and through the floor opening provided above the battery and connect the cable lugs to the battery terminal clamps as illustrated. The lug stamped "BATT. GROUND" must be connected to that side of the battery grounded to the car frame and the remaining lug (on lead with fuse receptacle) attached to the supply side of the battery. Finally, replace the floor cover, notching the side of the opening if necessary to provide clearance for the battery cable.

Suppression of Ignition Interference—

1. Disconnect all wires from the spark plugs. Fasten one spark-plug suppressor to the top of each plug and re-attach the wires to the free ends of the suppressors. These suppressors may be mounted either in line with or at right angles to the plugs in order to avoid interference with metallic parts grounded to the engine or frame.

2. If the distributor is of the plug-in type, disconnect the center wire from the head. Plug the distributor suppressor into the distributor head and insert the wire in the free end of the suppressor.

NOTE—For cap-type distributors, exchange the distributor suppressor at your dealer's for one of a special type. Cut the wire leading from the distributor to the coil and screw the suppressor into the end attached to the distributor. Screw the other end of the wire (leading to the coil) into the opposite end of the suppressor.

3. Clamp the generator capacitor against the generator frame. The screw holding the cut-out ordinarily may be utilized for securing this unit. Connect the capacitor lead to the terminal on the generator side of the cut-out switch. (In some cases, however, less interference will be encountered with this lead connected to the opposite side of the cutout; the most suitable position therefore should be determined by trial.)

4. The ignition capacitor (unit with two leads) must be connected between the battery terminal of the ammeter and any convenient screw on the instrument panel. In certain cars, interference will be reduced still further by connecting an additional capacitor (obtainable from your dealer) between the battery side of the ignition coil and the car frame.

Home Installation

The circular insert on the frontispiece illustrates a typical installation of this receiver on lighting-circuit operation. Simply place the instrument upon a table or other level surface, attach the antenna lead-in wire (using the small connector furnished) and, with the power switch "off" (in "AUTO" position), connect the power cord to an electrical outlet supplying *alternating current* at the voltage and frequency (cycles) specified on the rating label inside the case.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—¼ watt (R6)	$0.22
2734	Capacitor—745 mfd. (C-36)—Package of 5	1.50
2747	Cap—Contact cap—Package of 5	.50
2917	Washer—"C" washer for condenser drum and shaft assembly—Package of 10	.25
3218	Resistor—600 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3469	Resistor—2,500 ohms—Carbon type—1 watt (R15)—Package of 5	1.10
3536	Capacitor—Comprising two 5.0 mfd. (C17, C22)	1.10
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
3597	Capacitor—0.25 mfd. (C33)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1, R5)—Package of 5	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3621	Coil—Choke coil—Located on terminal board (L14)	.35
3625	Shield—Antenna, R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type (R13)—Package of 5	1.10
3639	Capacitor—0.02 mfd. (C16)	.25
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C30)	.40
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R12)—Package of 5	1.00
3751	Capacitor—0.5 mfd. (C25)	.40
3877	Capacitor—0.1 mfd. (C8)	.32
3888	Capacitor—0.05 mfd. (C1, C5)	.25
3920	Capacitor—0.003 mfd. (C23)	.25
3937	Capacitor—300 mmfd. (C15, C18)	.34
3950	Shield—Radiotron shield	.26
3954	Screw—Chassis mounting screw and washer assembly—Package of 10	.32
3955	Coil—Choke coil—Located on terminal board (L12)	.68
3956	Clamp—Capacitor mounting clamp—Package of 5	.32
3957	Indicator—Station selector indicator pointer—Package of 5	.42
3958	Plug—2-contact "AC" connection plug	.50
3959	Plug—6-contact "DC" connection plug	.40
3968	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
3969	Cord—Tuning condenser drive cord—Package of 10	1.22
3970	Drum and shaft assembly—Small—For tuning condenser drive	.24
3971	Escutcheon—Switch escutcheon engraved "AC-DC"	.24
3972	Drum and bushing assembly—Large—For tuning condenser drive	.34
3993	Screw—Set screw for tuning condenser drive drum—Package of 10	.25
4001	Capacitor—1,025 mmfd. (C12)	.32
4002	Capacitor—375 mmfd. (C31)	.30
4003	Capacitor—700 mmfd. (C32)	.30
4020	Resistor—750 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
4089	Capacitor—Two 0.05 mfd. (C34, C35)	.40
6135	Resistor—270 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
6165	Lamp—Station selector dial lamp—Package of 5	1.75
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R7) Package of 5	1.00
6243	Resistor—2 megohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6283	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6512	Capacitor—0.005 mfd. (C21)	.78
6738	Capacitor—8.0 mfd. (C30)	1.54
6739	Condenser—3-gang variable tuning condenser assembly (C2, C3, C6, C7, C10, C11)	5.16
6740	Transformer—First intermediate frequency transformer (L7, L8, C14)	2.16
6741	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.78
6742	Coil—Antenna coil assembly (L1, L2)	.88
6743	Coil—R. F. coil assembly (L3, L4)	.98
6744	Capacitor—0.05 mfd. (C26)	.30
6745	Coil—Oscillator coil assembly (L5, L6)	.62
6746	Volume control (R9)	1.20
6747	Tone control (R11)	1.20
6748	Switch—Noise suppressor switch (S5)	.40
6749	Switch—AC-DC switch (S1, S2, S3, S4)	2.14
6759	Transformer—Interstage transformer (T3)	2.55
6781	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. (C4, C13)	1.10
6782	Capacitor—4.0 mfd. (C29)	1.10
7485	Socket—6-contact Radiotron socket	.40
9456	Transformer—Power transformer—105-125 volts, 50-60 cycles (T2)	$4.00
9457	Transformer—Power transformer—9 volts (T1)	4.78
	CABLE ASSEMBLIES	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
4008	Shield—Metal shield for cable plug—Package of 5	.58
4009	Terminal—Metal terminal (plain) for battery connection—Package of 5	.44
4010	Terminal—Metal terminal engraved "Batt-Ground"—For battery connection—Package of 5	.44
6150	Plug—Battery cable plug	.50
6516	Connector—Fuse connector	.16
6760	Cable—7-conductor shielded—Switch cable	.60
6761	Cable—2-conductor shielded—Approximately 10½ inches long, from resistor board to volume control	.36
6762	Lead—Antenna lead-in—Approximately 15½ inches long—With connector	.64
6773	Cable—Battery cable—Plus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
6774	Cable—Battery cable—Minus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
6775	Cable—Battery cable—Plus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.30
6776	Cable—Battery cable—Minus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.30
6777	Cable—Antenna lead-in cable—Shielded—Approximately 98 inches long—With connector	1.26
6778	Cable—7-conductor shielded cable	.42
6779	Cable—2-conductor shielded cable—Approximately 58 inches long	1.10
6780	Cable—2-conductor shielded cable—Approximately 102 inches long	2.04
6834	Cable—Battery cable—Minus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal	3.92
6835	Cable—Battery cable—Plus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal	3.92
6836	Lacquer—Touch up lacquer (1 pint of lacquer and 1 pint of thinner)	2.25
	MISCELLANEOUS PARTS	
3960	Handle—Carrying handle	.44
3961	Knob—Tone control, volume control or suppressor switch knob—Package of 5	.60
3962	Knob—Station selector knob—Package of 5	1.00
3963	Knob—"AC-DC" switch knob—Package of 5	.60
3964	Bezel—Metal bezel for station selector dial glass	.54
3965	Glass—Station selector dial glass	.22
3966	Spring—Contact spring—Grounds vibrator shield to case—Package of 10	.92
4011	Capacitor—0.5 mfd. (C24)	.60
4037	Scale—Station selector dial scale—Package of 5	1.38
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor suppressor—Splice in type	.56
6494	Capacitor—0.5 mfd.—Ammeter capacitor	.46
6495	Capacitor—0.5 mfd.—Generator capacitor	.72
6670	Suppressor—Spark plug suppressor—"Elbow" type	.56
6763	Cord—Power cord with connectors	.94
7694	Vibrator—Complete (C27, C28, L13, R14)	10.04
7696	Housing—Metal housing—Top section	5.44
7697	Base—Housing base	.90
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6750	Screen—Dust screen	.28
6751	Screen—Metal screen	.46
6764	Transformer—Output transformer (T4)	1.42
6772	Ring—Felt ring—Used between speaker and metal housing—Package of 5	1.20
8987	Cone—Reproducer cone (L11)—Package of 5	5.00
9458	Reproducer complete	5.30
9459	Coil—Comprising field coil, magnet and cone support (L15)	3.34

RCA-VICTOR CO., INC.

MODEL 118,211
Schematic
Trimmer Locations

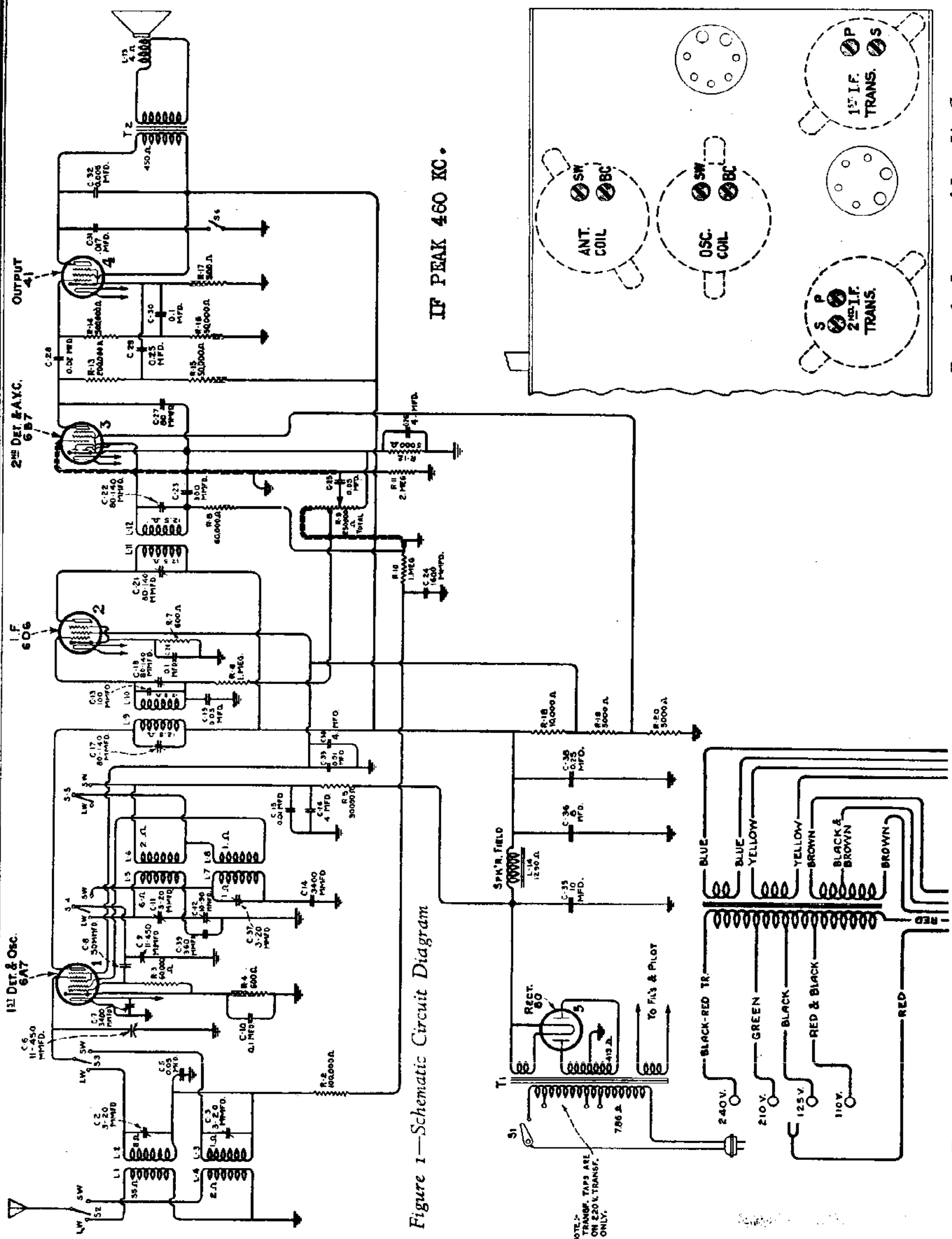


Figure 1—Schematic Circuit Diagram

Figure 5—Power Transformer Connections

Figure 6—Location of Line-Up Capacitors

MODEL 118,211
Chassis Wiring

RCA-VICTOR CO., INC.

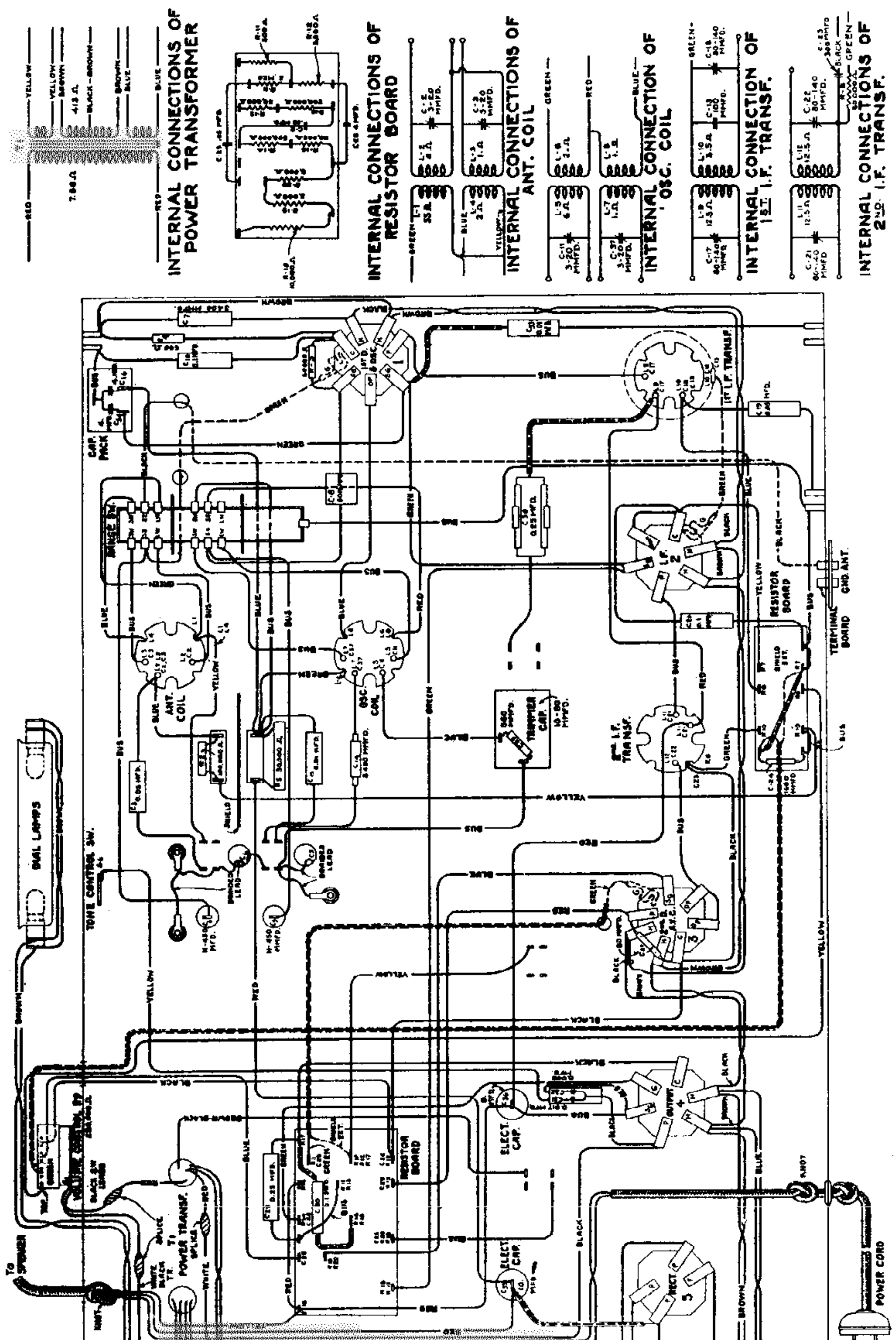


Figure 2—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 118,211
Voltage
Socket Layout
Loud Speaker Wiring

RADIOTRON SOCKET VOLTAGES

115-Volt, A. C. Line—Maximum Volume Control—No Signal

		Cathode to Grid Volts	Screen Grid to Ground	Plate to Ground	Plate M.A.	Heater Volts
	Detector		105	265	3.5	
6A7		6.0				6.3
	Oscillator		---	220	4.5	
6D6	I.F.	6.0	105	265	9.0	6.3
6B7	2nd Det. AVC	3.0	50*	90*	0.7	6.3
41	Power Output	16.5	265	245	30.0	6.3
80	Rectifier	---	---	690**	64.0	5.0

* = Voltage calculated from 265 v. +B
** = Plate to plate

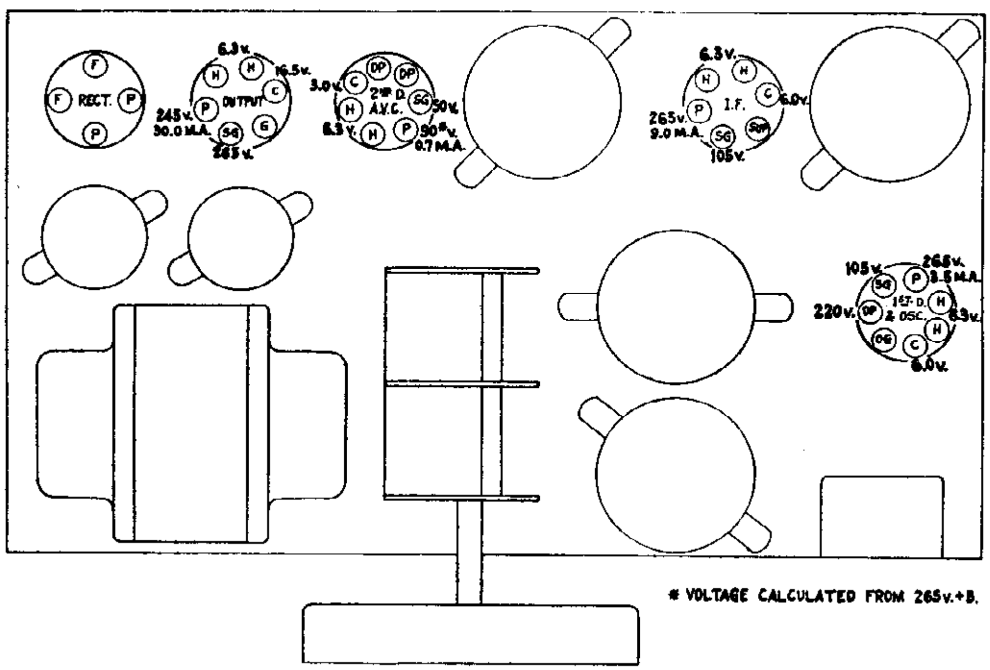


Figure 7—Radiotron Socket Voltages

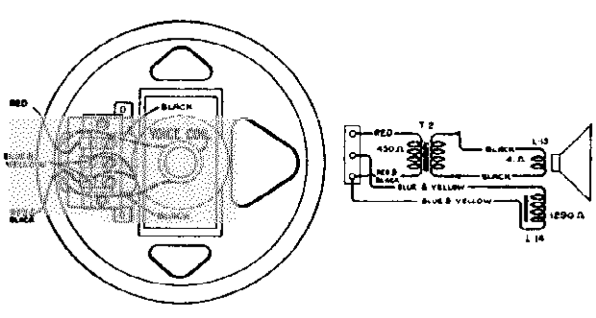


Figure 3—Table Model Loudspeaker Wiring

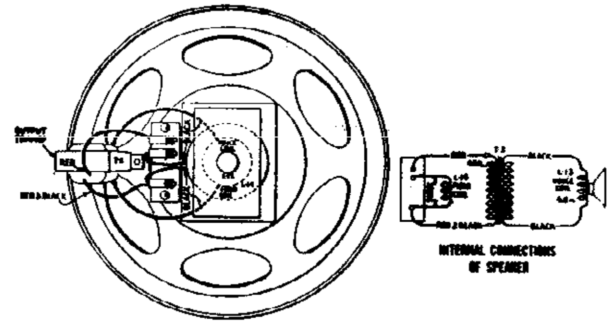


Figure 4—Console Model Loudspeaker Wiring

RCA-VICTOR CO., INC.

SERVICE DATA

(1) Line-Up Capacitor Adjustments:

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator and an alignment tool (Stock No. 4160) be available. Figure 5 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 460 K. C. and the adjustment screws are accessible as shown in Figure 6. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments:

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1720 K. C., the dial indicator at 1720 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the two trimmers under the two R. F. coils, designated as BC in Figure 6, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 18,000 K. C. and set the dial at 18M. Adjust the two trimmer capacitors designated as SW in Figure 5 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. The detector trimmer *must* be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Both of these adjustments must be made as indicated irrespective of output.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

(2) Radiotron Socket Voltages:

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made:

(3) Power Transformer Connections:

Models supplied for 220-volt power supply, use a power transformer having a tapped primary. The tapped primary permits it to be used either on lines of 100-130 volts or 195-250 volts. Figure 5 shows the internal connections of the transformer and the voltages to be used with the various taps. The taps are located on a terminal strip at the top of the transformer so that necessary changes may be made without removing the receiver from the cabinet.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
10194	Ball—Steel ball for condenser drive assembly—Package of 20	$0.25
4358	Bracket—Capacitor mounting bracket	.15
4427	Bracket—Volume control mounting bracket	.18
2747	Cap—Contact cap—Package of 5	.50
4428	Capacitor—8 mfd. (C36)	1.05
7790	Capacitor—10 mfd. (C35)	1.05
4442	Capacitor—50 mmfd. (C8)	.22
4509	Capacitor—80 mmfd. (C27)	.15
4413	Capacitor—360 mmfd. (C39)	.22
4441	Capacitor—1600 mmfd. (C24)	.35
4439	Capacitor—3400 mmfd. (C14)	.35
4471	Capacitor—3400 mmfd. (C7)	.44
4443	Capacitor—0.01 mfd. (C15)	.25
4444	Capacitor—0.01 mfd. (C33)	.22
4435	Capacitor—0.02 mfd. (28)	.25
3888	Capacitor—0.05 mfd. (C25)	.25
4417	Capacitor—0.05 mfd. (C5)	.25
3901	Capacitor—0.05 mfd. (C19)	.36
3877	Capacitor—0.1 mfd. (C20, C30)	.32
4415	Capacitor—0.1 mfd. (C10)	.22
3597	Capacitor—0.25 mfd. (C29, C38)	.40
3796	Capacitor—4.0 mfd. (C26)	.60
3861	Capacitor — Adjustable trimmer capacitor (C12)	.78
6787	Capacitor pack—Comprising one 0.005 and one 0.017 mfd capacitors (C31, C32)	.30
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34)	1.64
4422	Clutch—Condenser drive clutch assembly complete	.88
4430	Coil—Antenna coil (L1, L2, L3, L4, C2, C3)	1.92
4432	Coil—Oscillator coil (L5, L6, L7, L8, C11, C37)	1.65
4504	Condenser—2-gang variable tuning condenser (C6, C9)	2.78
4434	Drive—Tuning condenser drive assembly complete	2.42
3632	Resistor—500 ohms—Carbon type—¼ watt (R17)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R4, R7)—Package of 5	1.00
4436	Resistor—5,000 ohms—Carbon type—¼ watt (R12)—Package of 10	2.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R6, R10)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3891	Resistor—5,000 ohms—Carbon type—1 watt (R19, R20)—Package of 5	1.10
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	.22
6318	Resistor—10,000 ohms—Porcelain type (R18)	.80
3943	Screen—Translucent screen for dial lamps—Package of 2	.18
4446	Screen—Chassis mounting screw assembly—Comprising 4 screws, 4 lockwashers, 4 washers, 4 spacers and 4 cushions	.28
3993	Screw—No. 6-32-⅛" square head set screw for condenser drive—Package of 10	$0.25
7800	Shield—Antenna, oscillator or I. F. transformer coil shield	.45
4145	Shield—First detector and oscillator Radiotron shield	.30
4103	Shield—I. F. Radiotron shield	.20
4438	Shield—Second detector—AVC Radiotron shield	.25
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
7485	Socket—6-contact Radiotron socket	.40
6676	Socket—6-contact output Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4426	Switch—Tone control switch (S6)	.35
4437	Switch—Range switch (SW-BC) (S2, S3, S4, S5)	2.35
9511	Transformer—105–125 volts—50–60 cycles	4.78
4431	Transformer—First intermediate frequency transformer (L9, L10, C13, C17, C18)	2.28
9512	Transformer—Power transformer—105–125 volts—25–40 cycles	6.58
9513	Transformer—Power transformer—200–230 volts—50–60 cycles (T1)	4.85
4433	Transformer—Second intermediate frequency transformer (L11, L12, R8, C21, C22, C23)	2.15
4429	Volume control (R9)	1.40
	REPRODUCER ASSEMBLIES (CONSOLE)	
4473	Board—Reproducer terminal board	.26
4445	Cable—3-conductor-reproducer cable	.36
9460	Coil—Field coil—Magnet and cone support	6.00
8935	Cone—Reproducer cone—Package of 5	5.25
9527	Reproducer complete	8.00
4472	Transformer—Output transformer	1.40
	REPRODUCER ASSEMBLIES (TABLE)	
4448	Board—Reproducer terminal board	.25
4445	Cable—3-conductor-reproducer cable	.36
9531	Coil—Field coil magnet and cone support	2.75
9492	Cone—Reproducer cone (L13)—Package of 5	3.70
9514	Reproducer complete	6.00
4447	Shield—Terminal board shield	.18
4505	Transformer—Output transformer (T2)	1.55
	MISCELLANEOUS ASSEMBLIES	
6706	Bezel—Station selector dial escutcheon bezel—Model 118	.42
4450	Dial—Station selector dial—Model 211	.52
4474	Dial—Station selector dial—Model 118	.76
6840	Escutcheon—Station selector escutcheon—Model 211	.56
6707	Glass—Station selector dial glass—Model 118	.20
6614	Glass—Station selector dial glass—Model 211	.30
4449	Knob—Station selector, volume control, tone or range switch knob—Package of 5	.60
4348	Lamp—Pilot lamp	.38
4363	Pointer—Station selector indicator pointer—Model 211	.18
4475	Pointer—Station selector indicator pointer—Model 118	.18
6708	Ring—Spring retaining ring for dial glass—Package of 5—Model 118	.44
6615	Ring—Spring retaining ring for dial glass—Package of 5—Model 211	.34
4613	Screw—8-32-⅜" headless set screw for knob—Package of 10	.25

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Type and Number of Radiotrons Used—2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-41, 1 RCA-79 —Total, 6

Battery Current (6.3 Volt Battery):
- Speaker Field (Cold) .... 1.35 Amperes
- Tubes .... 2.2 Amperes
- Dial Lamp .... 0.15 Ampere
- Power Supply (No Signal) .... 2.8 Amperes
- Total (No Signal) .... 6.5 Amperes
- Total (Maximum Output) .... 8.0 Amperes (Average)

Tuning Frequency Range .... 540 K. C.–1600 K. C.
Maximum Undistorted Output .... 4.2 Watts
Maximum Output .... 6.8 Watts
Line-up Frequencies .... 175 K. C., 600 K. C., 1400 K. C.

(1) Removing Units from Chassis:

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver is the only tool required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

(2) Loose or Tight Tuning Action:

An adjustment screw is provided at the worm drive unit, so that proper tension may be provided for the particular worm being used. The instruction book accompanying the instrument describes the proper manner of turning the drive assembly when using either right or left hand drives. However, whenever this change is made, the adjusting screw located on the front of the drive unit should be loosened or tightened until a satisfactory amount of tension and elimination of backlash is obtained.

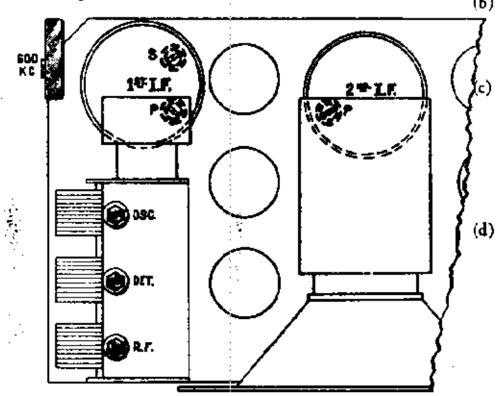


Figure 3—Location of Line-up Capacitors

(3) Line-up Capacitor Adjustments:

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full Range Test Oscillator, Type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments:

The three-gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

(4) R. F. Interference from Vibrator:

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The clip from the top of the R. F. tube shield to the gang-capacitor must be in place.

(c) The various by-pass capacitors, such as C-29, C-30, C-31, C-34, C-37, and chokes L-16 and L-14, L-13, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with ones of similar mechanical as well as electrical construction.

(5) Voltage Readings:

The following voltages are those at the tube socket while the receiver is in operating condition. No allowance has been made for currents drawn by the meter and if low resistance meters are used, such allowances must be made.

(6) Vibrator Inverter-Rectifier:

The Vibrator Inverter-Rectifier unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by replacement, not by attempted adjustment.

(7) Stiff Tuning Mechanism:

In event the station selector turns hard or stiff, it is probably due to excessive pressure between the worm and drive gear. Proper tension between these units exists when the gear is pushed ⅛" beyond the point of contact with the worm, before being tightened.

(8) Antenna Lead Clamp

A clamp has been provided for holding the antenna lead securely to the side of case. This clamp is held by one of the chassis mounting screws and prevents the antenna lead from interfering with the operation of the brake pedal or starter button. When making an installation it is important to see that this lead is securely clamped.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal—Maximum Sensitivity

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, D. C.
RCA-6D6—R. F.		3.9	76	192	4.5	5.9
RCA-6A7	1st Det.	3.9	76	192	7.5	5.9
	Osc.		—	192		
RCA-6D6—I. F.		3.6	76	192	5.3	5.9
RCA-75—2nd Det.		1.25	—	165	.46	5.9
RCA-41—A. F.		22.0	—	235	14.5	5.9
RCA-79—Pwr.		0	—	256	10.5	5.9

MODEL M-123
Schematic
Socket Layout

RCA-VICTOR CO., INC.

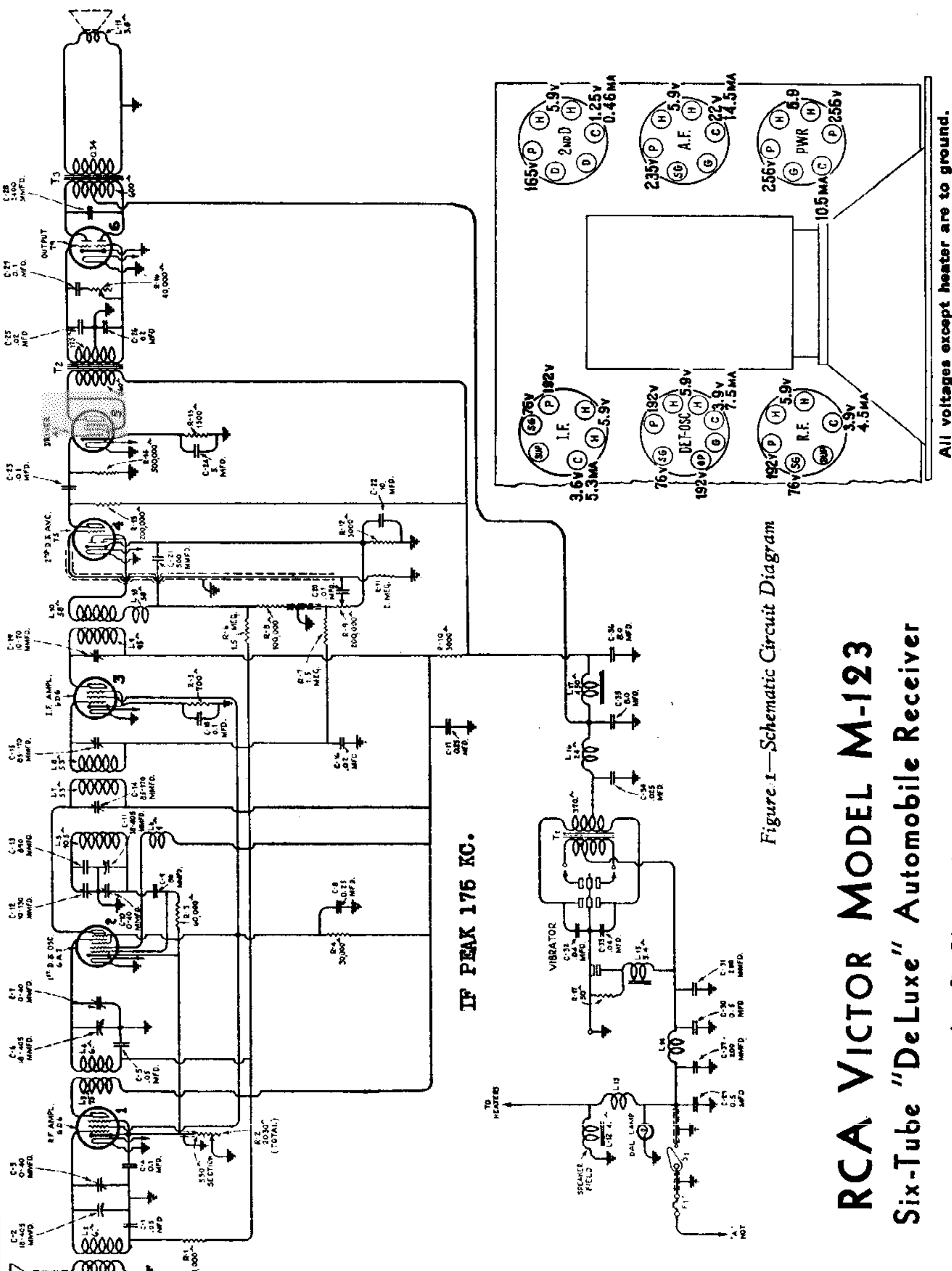


Figure 1—Schematic Circuit Diagram

Figure 4—Voltages at Individual Socket Contacts

RCA Victor Model M-123

Six-Tube "DeLuxe" Automobile Receiver

{First Edition
Copyright June, 1934}

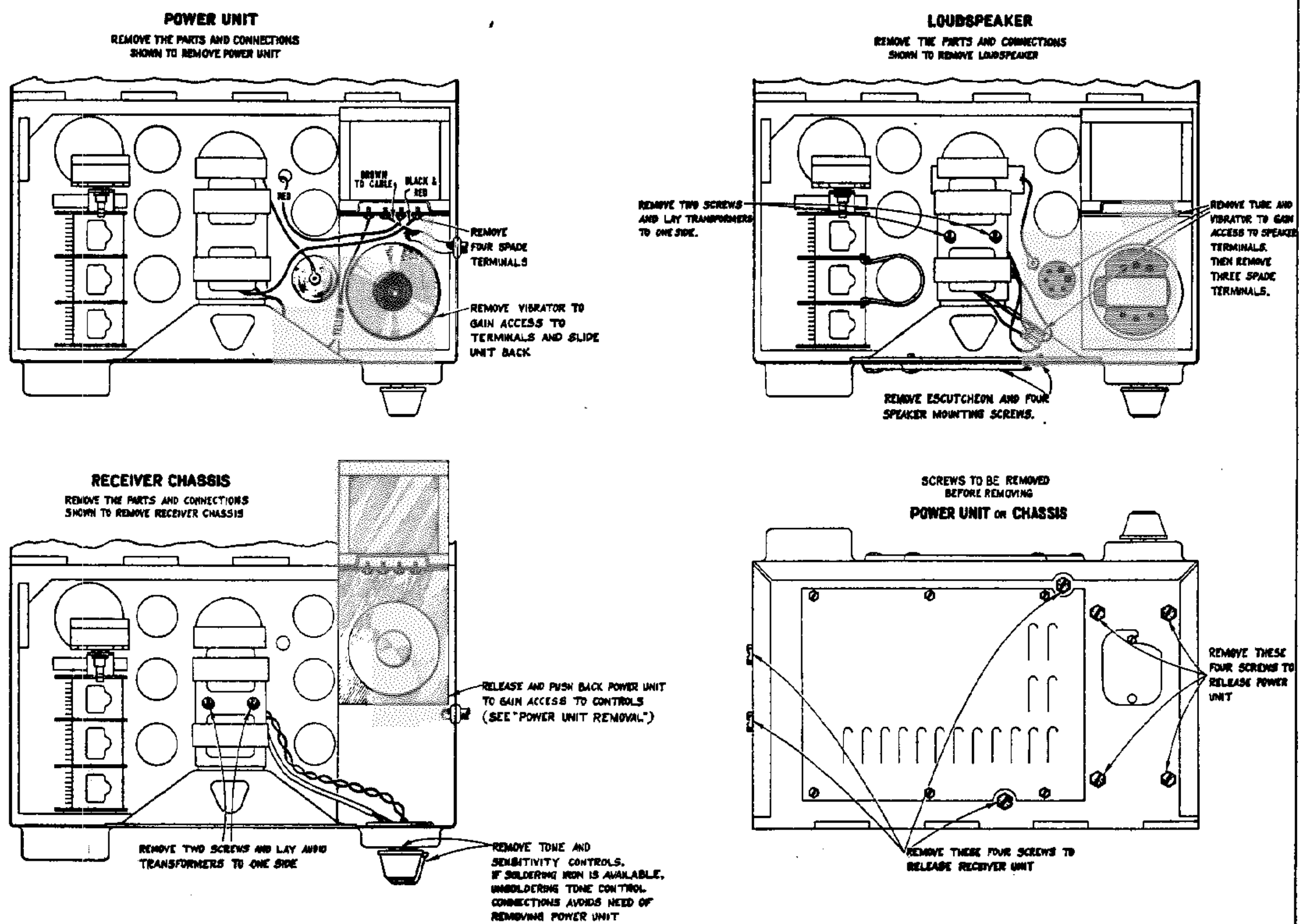


Figure 2—Details of removing units individually from chassis

MODEL M-123
Chassis Wiring

RCA-VICTOR CO., INC.

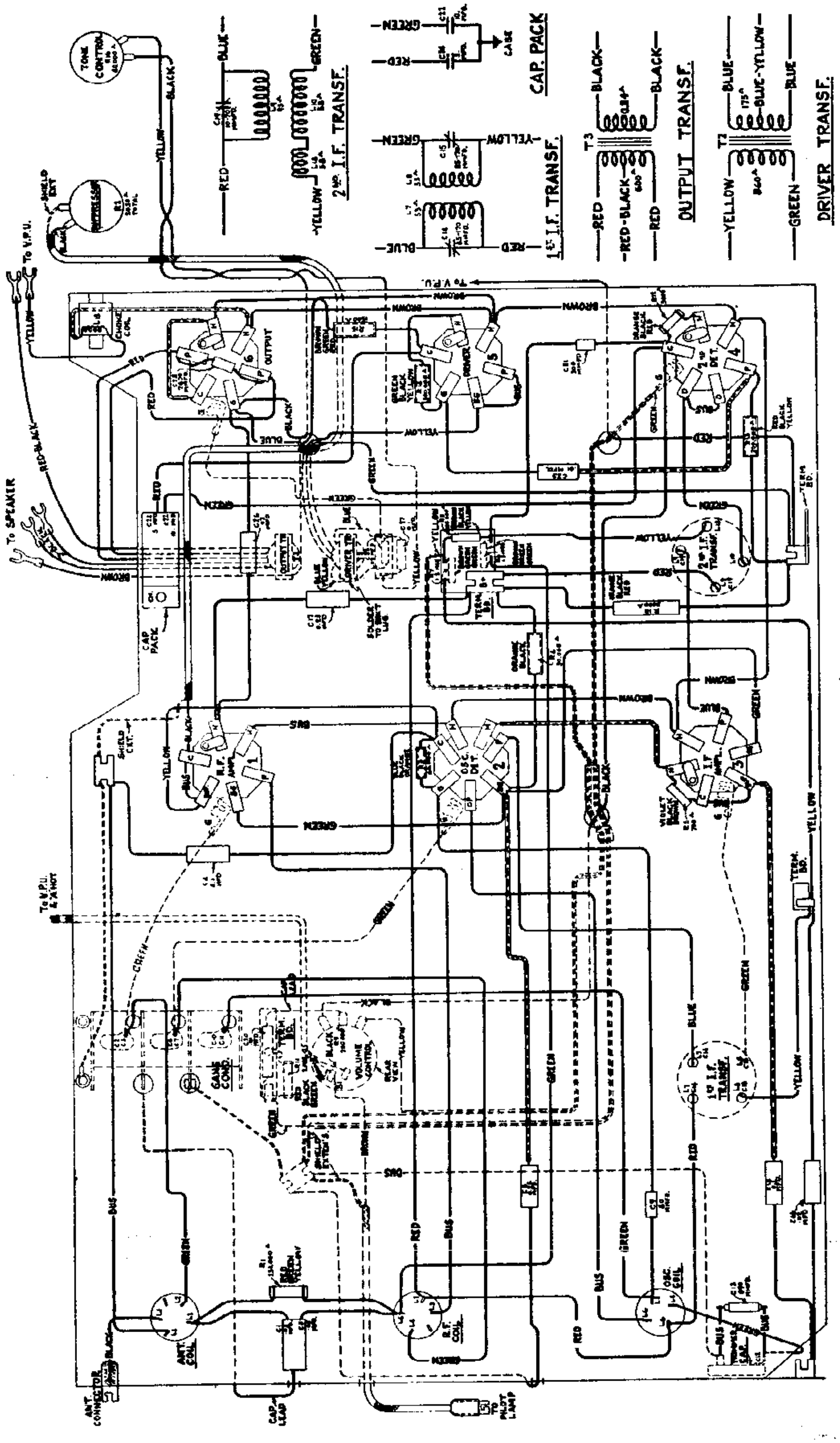


Figure 5—Receiver Assembly Wiring Diagram

RCA-VICTOR CO., INC.

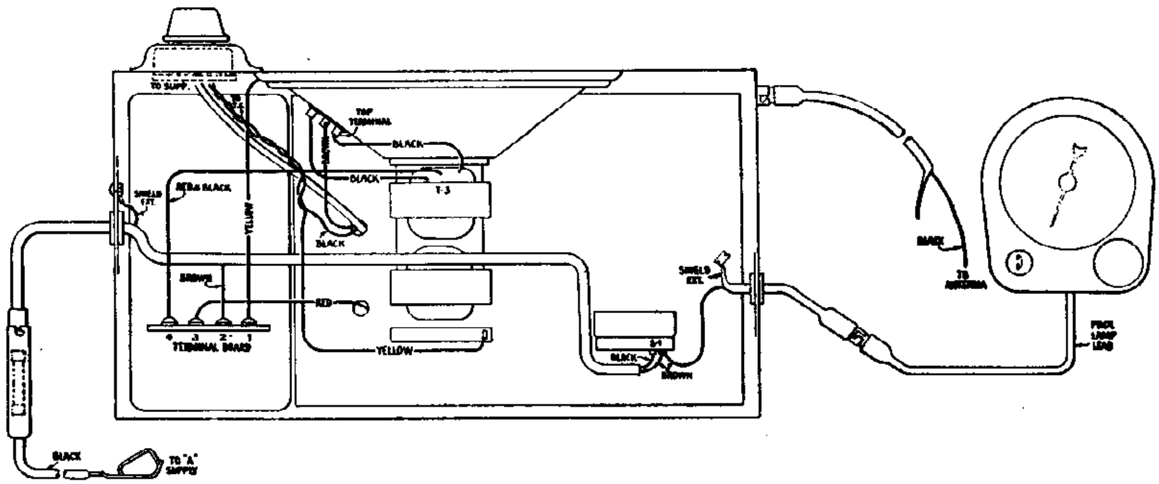


Figure 6—Assembly Wiring Diagram

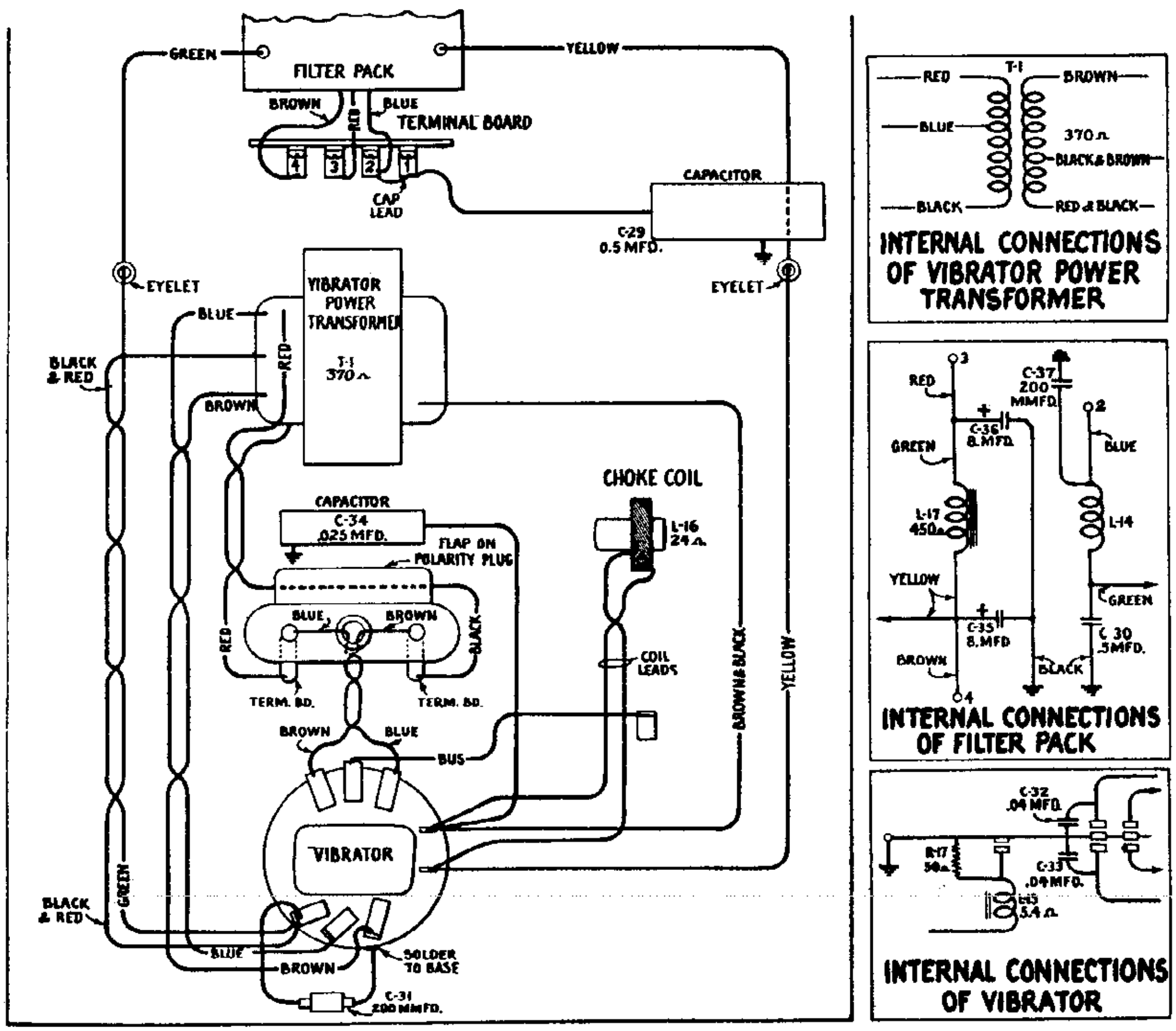


Figure 7—Vibrator Inverter-Rectifier Unit Wiring

MODEL M-123
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4237	Cable—Single-conductor shielded cable with female section of connector—From volume control switch to pilot lamp cable	$0.35
4238	Cable—Two-conductor power cable from S1 to power lead connector	.95
4244	Cap—Contact cap—Package of 5	.20
3861	Capacitor—Adjustable capacitor (C12)	.78
4246	Capacitor—80 mmfd. (C9)	.24
4248	Capacitor—300 mmfd. (C21)	.22
4245	Capacitor—890 mmfd. (C13)	.26
4247	Capacitor—2,400 mmfd. (C28)	.34
3702	Capacitor—0.25 mfd. (C8)	.42
3639	Capacitor—.02 mfd. (C16, C25, C26)	.25
3701	Capacitor—.01 mfd. (C20, C23)	.30
3641	Capacitor—0.1 mfd. (C27)	.35
3877	Capacitor—0.1 mfd. capacitor (C4, C18)	.32
3597	Capacitor—0.25 mfd. (C17)	.40
4243	Capacitor pack—Comprising two 0.05 mfd. capacitors (C1, C5)	.35
6963	Capacitor pack—Comprising one 10. and one 5. mfd. capacitors (C22, C24)	1.10
6965	Coil—Antenna coil (L1, L2)	.70
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—R. F. coil (L3, L4)	.80
6961	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	3.85
6973	Drive assembly—Variable tuning condenser drive assembly	.40
4249	Drive bracket and worm assembly—For variable tuning condenser drive	1.20
6968	Reactor (L13)	.35
4240	Resistor—700 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
4242	Resistor — 3,000 ohms — Carbon type — ¼ watt (R12)—Package of 5	1.00
3602	Resistor — 60,000 ohms — Carbon type — ¼ watt (R3)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
4241	Resistor—1.5 megohms—Carbon type—¼ watt (R6, R7)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5	1.00
3047	Resistor—1,500 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R4)	.22

Stock No.	Description	List Price
4239	Resistor — 3,000 ohms — Carbon type — 3 watts (R10)	$0.25
6972	Rheostat—Noise suppressor rheostat (R2)	.90
3584	Ring—Retaining ring for antenna, radio frequency or oscillator coils—Package of 5	.40
3993	Screw—No. 6-32-¼-inch square head set screw—For mounting condenser drive assembly to shaft—Package of 10	.25
3623	Shield—Antenna, radio frequency or oscillator coil shield	.30
4233	Shield—Oscillator or second detector Radiotron shield	.22
4235	Shield — Intermediate frequency Radiotron shield	.24
4236	Shield—Radio frequency Radiotron shield	.22
4232	Socket—6-contact Radiotron socket	.35
3572	Socket—7-contact Radiotron socket	.38
6971	Tone control (R16)	.90
6969	Transformer—Audio driver transformer (T2)	1.50
6970	Transformer—Audio output transformer (T3)	1.52
6960	Transformer — First intermediate frequency transformer (L7, L8, C14, C15)	1.80
6962	Transformer—Second intermediate frequency transformer (L9, L10, L18, C19)	1.85
6964	Volume control (R9, S1)	1.20
	CONTROL BOX ASSEMBLIES	
6974	Box—Control box complete	3.80
6976	Back—Control box back	.75
6975	Cover—Control box front cover	.86
4259	Cover—Station selector dial cover—Transparent celluloid—Package of 5	.92
4261	Dial—Station selector dial	.15
4258	Key—Volume control key	.20
4256	Lamp—Dial lamp	.30
4260	Pointer—Station selector indicator	.18
4257	Ring—Station selector dial cover ring	.75
4262	Screen—Dial light screen—Package of 5	.26
4252	Screw—No. 10-32-11/32-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10	.32
3652	Screw—No. 10-32-⅛-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10	.32
4255	Screw—No. 4-40-⅛-inch oval head machine screw for holding control box cover—Package of 10	.16
4254	Shaft—Volume control coupling shaft	.36
4250	Shaft and gear—Station selector pointer shaft and gear	.56
4251	Shaft and gear—Station selector drive shaft and pinion gear	.20

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
4253	Spring—Volume control key holding spring—Package of 10	$0.32
3690	Strap and bracket assembly—For mounting control box to steering column—Comprising one bracket, two screws, one lock-washer and one strap	.40
	FLEXIBLE SHAFT AND CABLE ASSEMBLIES	
7762	Cable—Dial lamp cable with socket and section of connector	.76
4264	Clamp—Metal clamp—Package of 10	.35
4295	Screw—No 10-32-⅛-inch cupped point set screw—Fastens flexible shaft housing to shaft bushing—Package of 10	.20
7760	Shaft—Station selector flexible drive shaft—Approximately 31½ inches long	1.60
7764	Shaft—Station selector flexible drive shaft—Approximately 27 inches long	1.55
7761	Shaft—Volume control flexible shaft—Approximately 29 inches long	1.60
7763	Shaft—Volume control flexible drive shaft—Approximately 24 inches long	1.55
4265	Sleeve—Coupling sleeve for volume control shaft—Package of 5	.15
4263	Socket—Dial lamp socket	.20
	REPRODUCER ASSEMBLIES	
9493	Coil—Field coil magnet and cone support (L12)	2.70
9492	Cone—Reproducer cone (L11)—Package of 5	3.70
9491	Reproducer complete	4.16
	VIBRATOR ASSEMBLIES	
4280	Board—Terminal board—Located on filter pack	.35
4013	Capacitor—200 mmfd. (C31)	.30
4274	Capacitor—.025 mfd. (C34)	.80
4273	Capacitor—0.5 mfd. (C29)	.90
4275	Coil—Choke coil (L16)	.30
7758	Filter pack—Comprising one reactor, one choke coil, two 8 mfd. capacitors, one 0.5 and one 200 mmfd. capacitors (C30, C35, C36, C37, L14, L17)	6.00
4276	Plug—2-prong plug	.25
4279	Screw—Binder head No. 6-32-¼-inch screw—Fastens shield to cover—Package of 10	.22
4278	Socket—Vibrator mounting socket	.26
7759	Transformer—Vibrator transformer (T1)	3.95
7757	Vibrator assembly complete (R17, C32, C33, L15)	8.50
	HOUSING ASSEMBLIES	
4272	Bracket—Volume control shaft bracket—For left-hand mounting located on front of receiver housing	.28

Stock No.	Description	List Price
4270	Cover—Tuning condenser drive bracket and worm assembly cover	$0.25
7755	Housing—Front section of housing complete—Less hinge pin	.80
7756	Housing—Rear section of housing complete—Less hinge pin	.54
4267	Nut—Wing nut—Package of 10	.46
4266	Pin—Hinge pin—Package of 5	.42
4268	Screw—Wing screw—Package of 10	.68
4269	Screw—No. 6 self-tapping screw for fastening front and bottom sections of housing—Package of 10	.50
4271	Screw—Self-tapping No. 6 screw for fastening tuning condenser drive bracket and worm cover to housing—Package of 10	.50
4295	Screw—No. 10-32-⅛-inch headless set screw—Located in worm gear cover and bracket used to fasten drive shafts—Package of 10	.20
	MISCELLANEOUS ASSEMBLIES	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
4283	Cable — Antenna lead-in cable — Approximately 35 inches long	.80
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—Ammeter capacitor—0.5 mfd.	.60
4292	Capacitor—Generator capacitor—0.5 mfd.	.90
4291	Clip—"A" supply clip—Package of 10	.70
7767	Escutcheon—Grille escutcheon and name plate	1.06
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
3646	Fuse—20 ampere—Package of 5	.40
7765	Grille—Baffle board and grille cloth	.38
4290	Insulator—Fuse connector insulator—Package of 10	.35
4132	Knob—Noise suppressor or tone control knob—Package of 5	.55
4282	Knob—Station selector knob—Package of 5	.65
7766	Lead—Power lead with female section of fuse connector—From power cable to battery	.30
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
6152	Suppressor—Distributor suppressor	.56
6151	Suppressor—Spark-plug suppressor	.56
4277	Screw—No. 8-32-¼-inch binder head screw used to mount escutcheon—Package of 10	.22
4294	Screw—No. 10-32-5/16-inch hexagon head screw—Used to mount chassis to housing—Package of 10	.45
4285	Washer—Antenna or fuse connector insulating washer—Package of 10	.22

MODEL 124
Alignment Data
Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Voltage Rating............................105–125 Volts
Frequency Rating.................25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons...............2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output..........................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C. and 1400 to 2800 K. C.

This receiver is a six tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

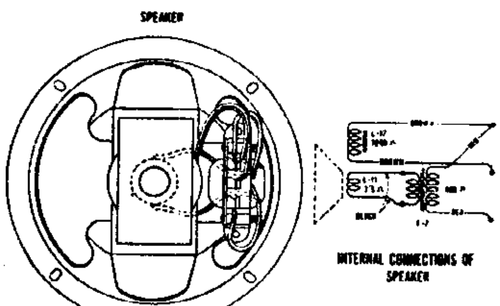


Figure C—Loudspeaker Wiring

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

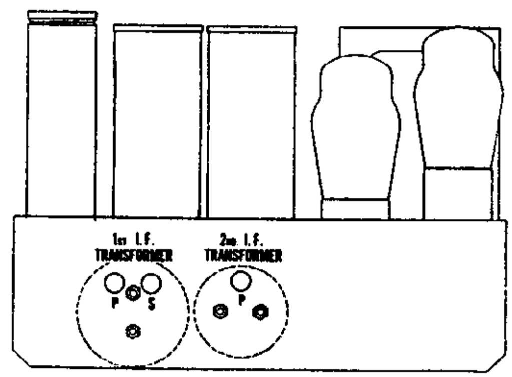


Figure D—Location of I. F. Line-up Adjustment Screws

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be opposite the last division of the low frequency end of scale with the indicator at its center position. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important points to remember are that the receiver volume control must be at its maximum position and that the input signal from the external oscillator must be no greater than necessary.

TUBE SOCKET VOLTAGES

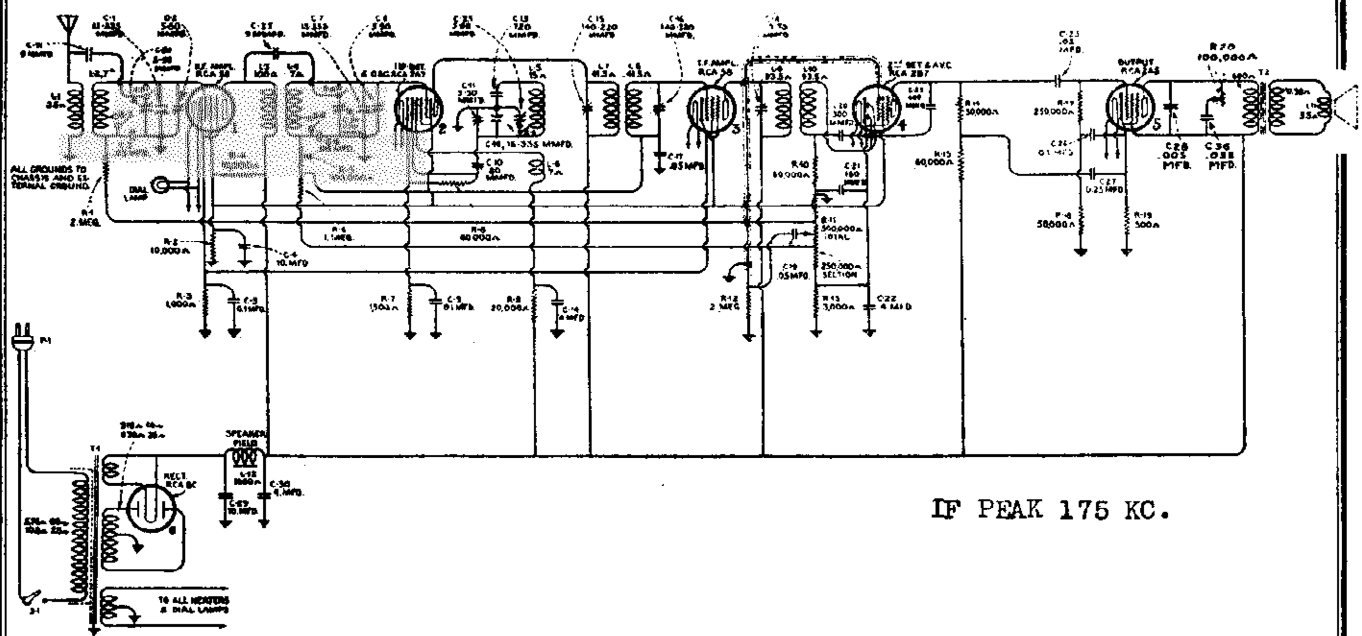
115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.81
6. RCA-80 Rectifier	700–350 Volts—75 M. A. Total Current				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

MODEL 124
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.



IF PEAK 175 KC.

Figure A—Schematic Circuit Diagram

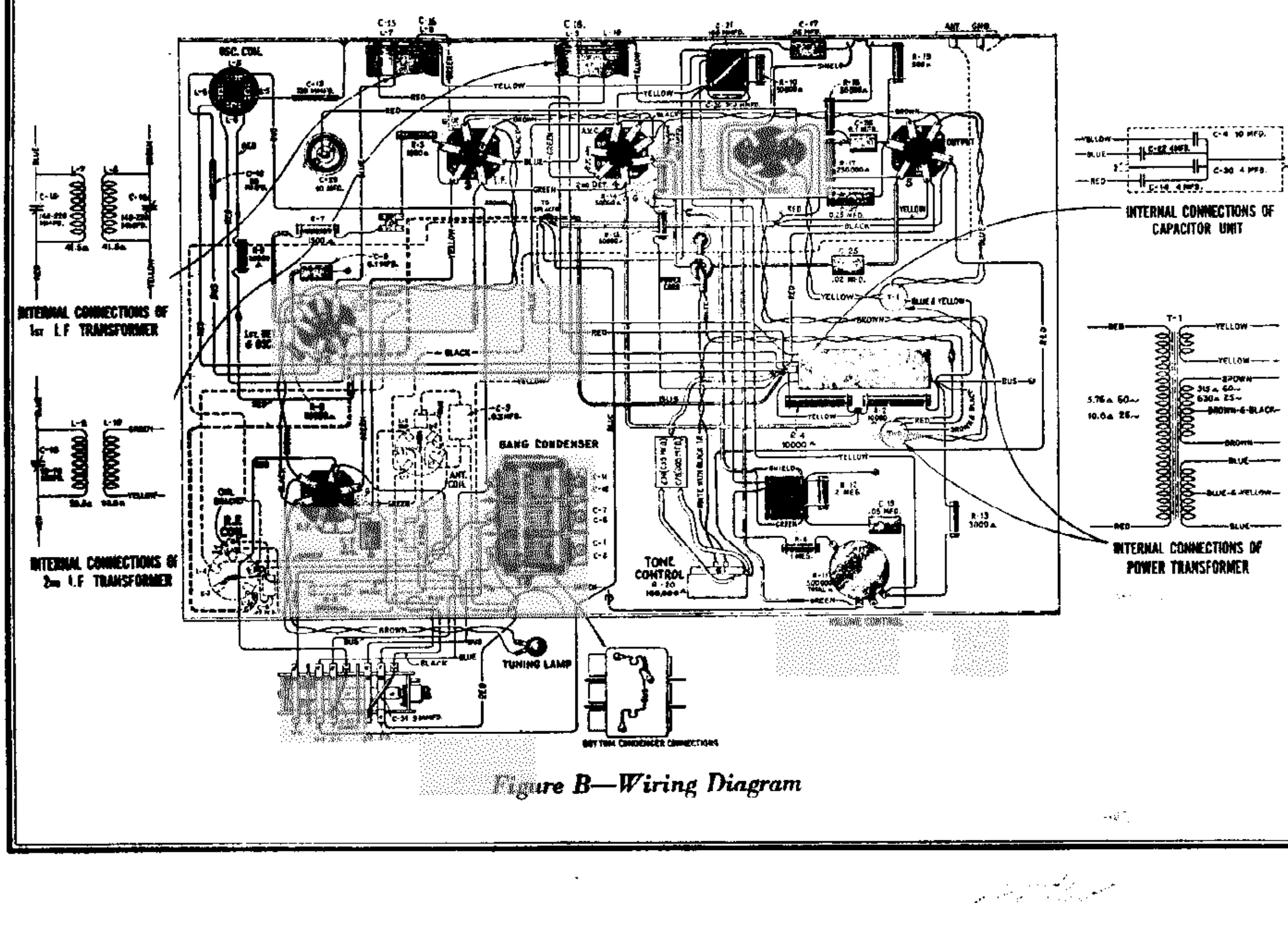


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

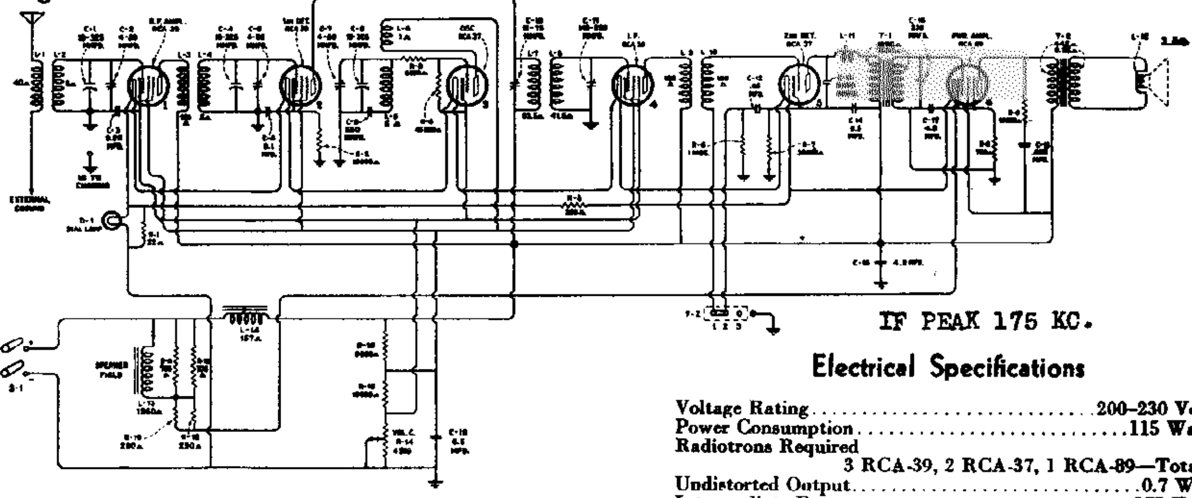
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd. (C13)	$0.75
2747	Cap—Contact cap—Package of 5	.50
3047	Resistor — 1500 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
3076	Resistor — 1 megohm — Carbon type — ½ watt (R6)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt (R13)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C10)	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt (R17)—Package of 5	1.00
3572	Socket—Radiotron 7-contact socket	.38
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C27)	.40
3598	Capacitor—0.1 mfd.—R. F. and I. F. by-pass (C5)	.36
3616	Capacitor—300 mmfd. (C20)	.34
3623	Shield—Antenna or R. F. coil shield	.30
3626	Shield—Oscillator coil shield	.22
3630	Resistor — 10,000 ohms — Carbon type — 3 watt (R2, R4)	.25
3632	Resistor — 500 ohms — Carbon type — 1 watt (R19)—Package of 5	1.10
3633	Capacitor—400 mmfd. (C23)	.38
3634	Capacitor—160 mmfd. (C21)	.34
3639	Capacitor—0.02 mfd. (C25)	.25
3640	Capacitor—0.05 mfd. (C3, C6, C17, C19)	.25
3641	Capacitor—0.1 mfd. (C9, C26)	.35
3721	Resistor — 1,000 ohms — Carbon type — ½ watt (R3)—Package of 5	1.00
3783	Capacitor—9 mmfd. (C31, C33)—Package of 2	.50
4103	Shield—Radiotron shield—I. F. or R. F.	.20
4133	Knob—Station selector, volume control, tone control or range switch knob—Package of 5	.80
4135	Socket—Dial lamp socket and bracket	$0.25
4140	Shield—Radiotron shield—1st detector	.30
4141	Shield—Radiotron shield—2nd detector	.36
6188	Resistor — 2 megohm — Carbon type — ½ watt (R1, R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R8, R10, R15)—Package of 5	1.00
6300	Socket—Radiotron 4-contact socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
6471	Coil—Oscillator coil (L5, L6)	.74
6483	Transformer—1st intermediate frequency transformer (L7, L8, C15, C16)	1.84
6484	Transformer—2nd intermediate frequency transformer (L9, L10, C18)	1.70
6485	Volume control—With mounting nut (R11)	1.20
6487	Capacitor assembly—Comprising three 4.0 mfd. and one 10.0 mfd. capacitors (C4, C14, C22, C30)	2.90
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6534	Switch—Range switch (S2, S3, S4, S5, S6, C32, C34, C35)	1.25
6598	Condenser—3-gang variable tuning condenser (C1, C2, C7, C8, C11, C12)	3.00
6619	Tone control with mounting nut (R20)	1.44
6620	Capacitor—Comprising one .005 and one .035 mfd. (C28, C36)	.50
6851	Scale—Dial scale and drive assembly	1.22
6853	Escutcheon—Station selector escutcheon	.34
7485	Socket—Radiotron 6-contact socket	.40
7590	Capacitor—10.0 mfd. (C29)	1.40
9005	Transformer—Power transformer—105-125 volts, 50-60 cycles (T1)	4.80
9006	Transformer—Power transformer—200-250 volts, 50-60 cycles	5.05
9024	Transformer—Power transformer—105-125 volts, 25-40 cycles	5.85
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer (T2)	1.44
6852	~~Cable—3-conductor reproducer cable~~	.26
9032	Coil assembly—Comprising coil, magnet and cone support (L12)	2.35
9428	Cone—Reproducer cone (L11)—Package of 5	5.00
9440	Reproducer complete	4.75

MODEL 25 DC
Schematic
Chassis Wiring
Voltage

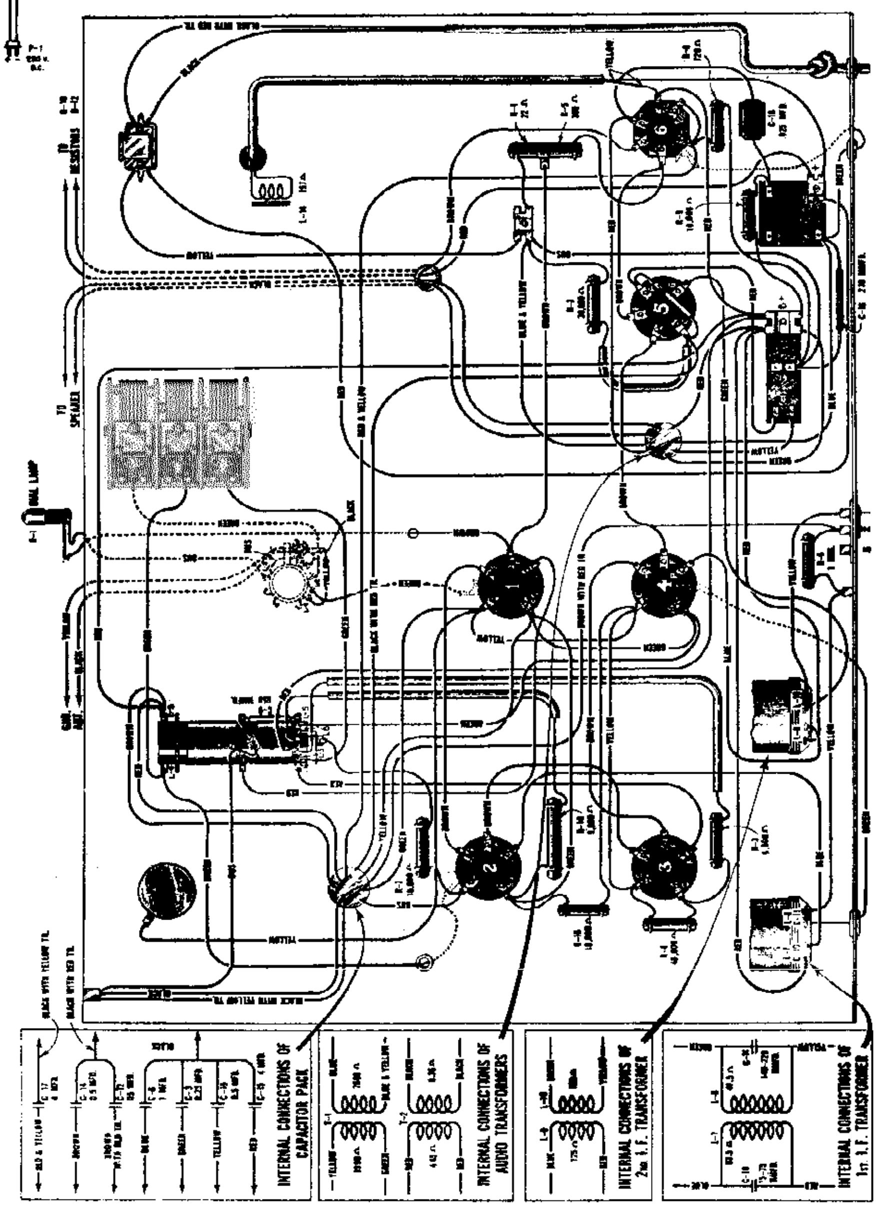
RCA-VICTOR CO., INC.



IF PEAK 175 KC.

Electrical Specifications

Voltage Rating.............................200-230 Volts
Power Consumption...........................115 Watts
Radiotrons Required
3 RCA-39, 2 RCA-37, 1 RCA-89—Total 6
Undistorted Output.............................0.7 Watt
Intermediate Frequency.........................175 K. C.
R. F. and Oscillator Line-up Frequency.....1400 K. C. Only



Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Heater or Filament, Volts	Radiotron Socket Voltages
1. R. F. RCA-39	3.5	90	205	5.0	6.0	
2. 1st Detector RCA-39	10	83	200	1.0	6.0	
3. Oscillator RCA-37	—	—	90	4.5	6.0	
4. I. F. RCA-39	3.5	90	205	5.0	6.0	
5. 2nd Detector RCA-37	20	—	185	.75	6.0	
6. Power RCA-89	18.5	190	180	15.0	6.0	

All above voltages measured at maximum volume control setting with no signal impressed on input. 220 Volt, D. C. source used.

MODEL 126-B
Schematic
Socket Layout

RCA-VICTOR CO., INC.

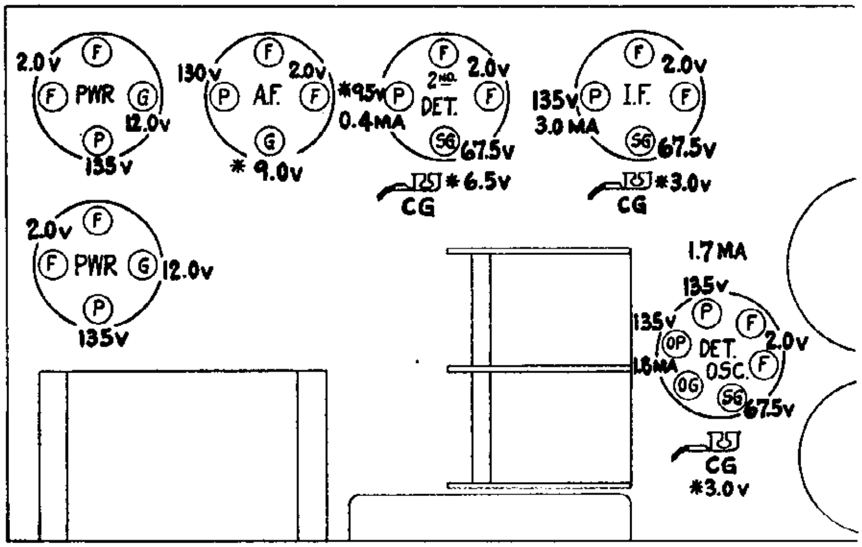


Figure 5—Socket Voltage Readings

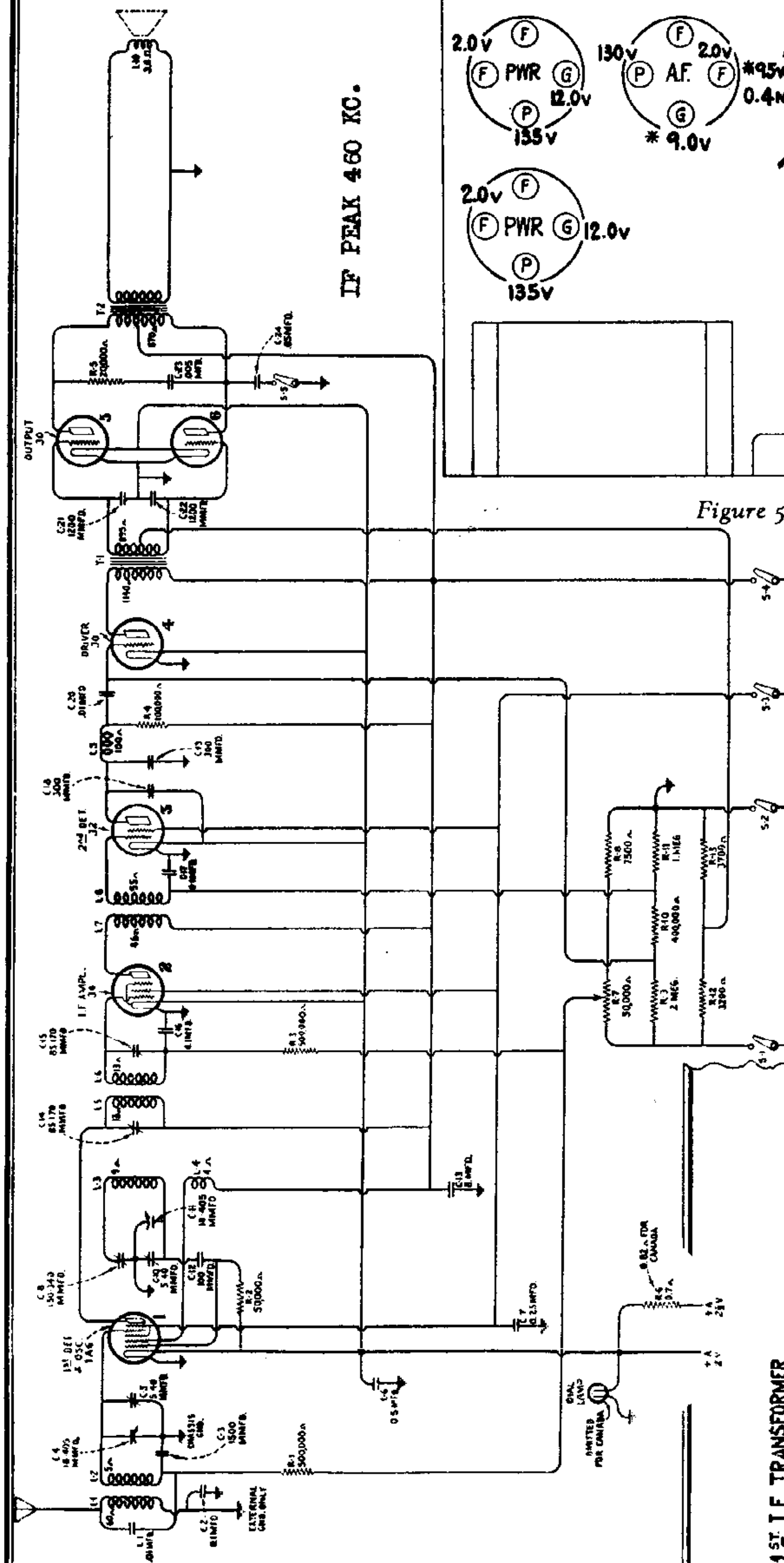


Figure 1—Schematic Circuit Diagram

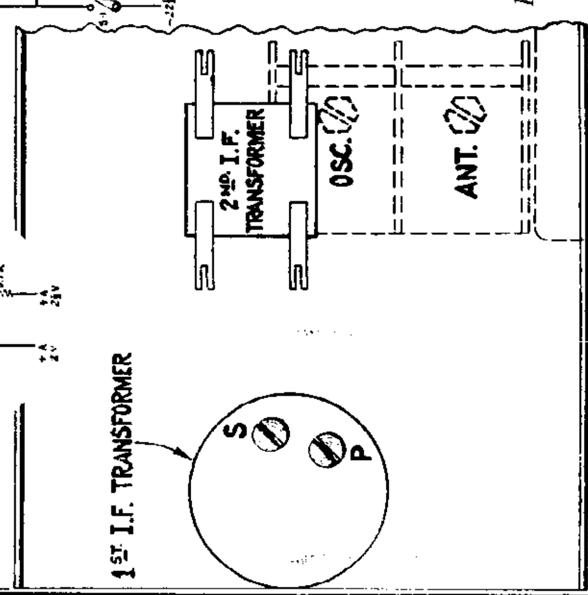


Figure 4—Location of Line-up Capacitors

MODEL 126-B
Chassis Wiring

RCA-VICTOR CO., INC.

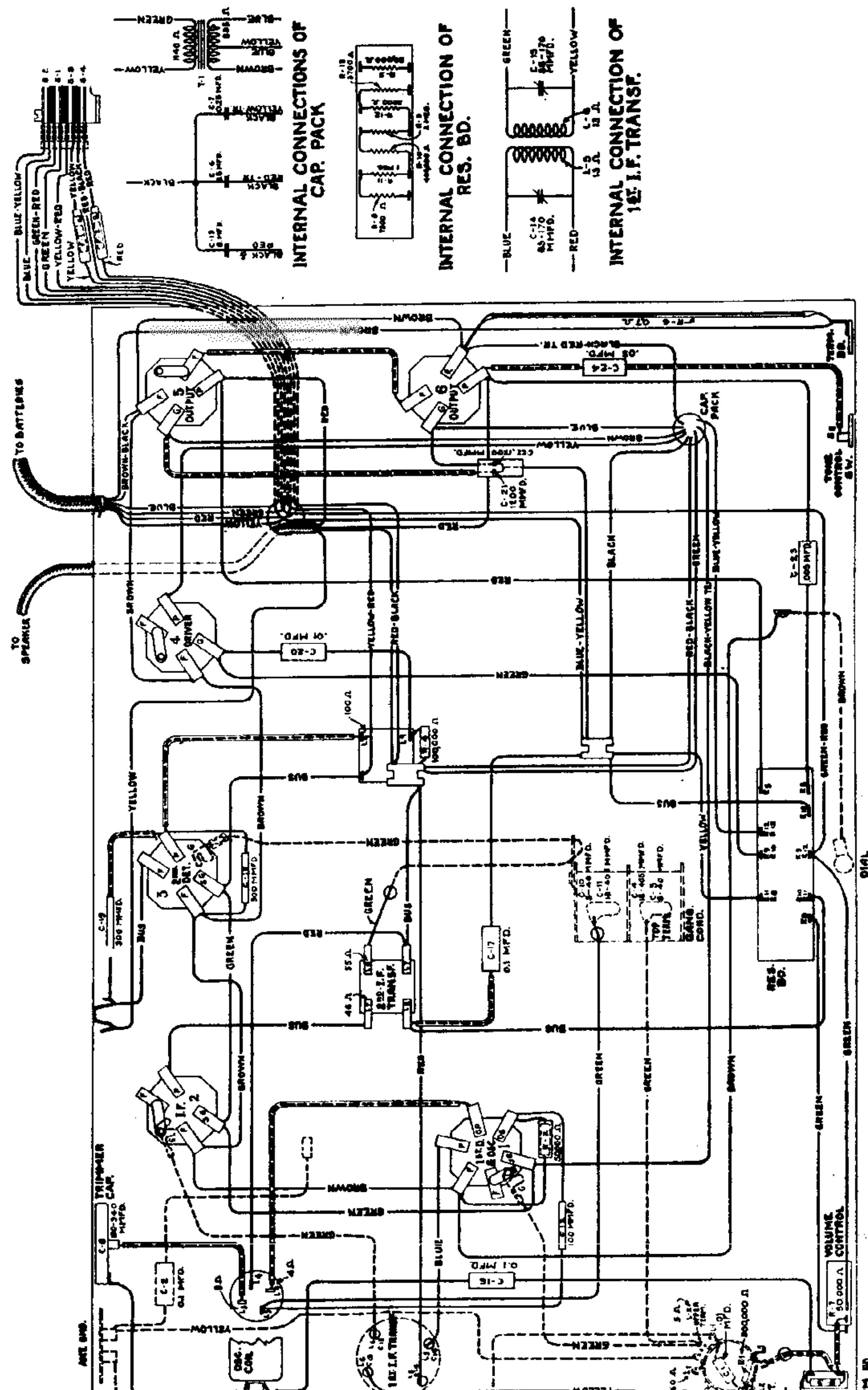


Figure 2—Chassis Wiring Diagram

RCA-VICTOR CO., INC.

SERVICE DATA

(1) Important

Always disconnect the batteries before attempting to remove the chassis from the cabinet. Always turn the operating switch "off" before changing tubes, batteries or fuses.

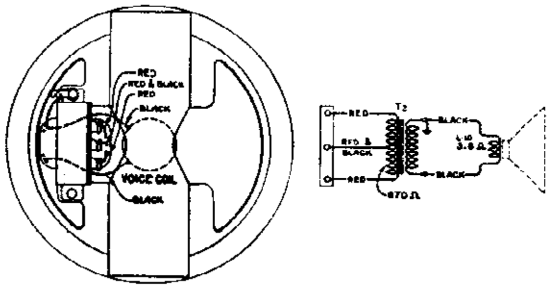


Figure 3—Loudspeaker Wiring

(2) Line-up Capacitor Adjustments

Line-up capacitors are provided in the first detector, oscillator and intermediate amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator, such as Full Range Test Oscillator, type TMV-97-B (Stock No. 9050), a non-metallic screw driver, such as alignment wrench (Stock No. 4160), and an output indicator are required for properly aligning this receiver. Refer to Figure 4 for the location of the line-up capacitors.

I. F. Adjustments

Two transformers comprising four circuits, two of which have trimmer capacitors, are used in the I. F. amplifier. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and connect the output of the oscillator between the control grid cap of the first detector (RCA-1A6) and ground. Connect an output indicator across the voice coil leads of the loudspeaker. Place the oscillator in operation at 460 K. C. and adjust its output and the receiver volume control until a deflection is obtained in the output indicator.

(b) Adjust the secondary and then the primary of the first I. F. transformer (see Figure 4) until a maximum deflection is obtained in the output indicator.

This completes the I. F. adjustments. It is good practice to always follow the I. F. adjustments with the detector and oscillator adjustment, as there is an interlocking of adjustments that always occurs.

Detector-Oscillator Adjustments

The two-gang capacitor trimmer screws are accessible at the top of chassis. The series (600 K. C.) trimmer is accessible from the rear. Proceed as follows:

(a) Connect the oscillator between the antenna and ground terminals of the receiver. Connect the output meter across the voice coil leads of the loudspeaker.

(b) Place the oscillator in operation at 1400 K. C., set the dial at 140 and adjust the oscillator output and receiver volume control until a deflection is obtained in the output indicator.

(c) Adjust each trimmer on the gang capacitor until a maximum deflection is obtained.

(d) Set the oscillator at 600 K. C. and tune in the signal on the receiver. Then adjust the series trimmer, located on the rear of the chassis, until maximum output is obtained. While making this adjustment, rock the tuning capacitor back and forth through the signal. Then again check the adjustments in (b).

(3) Voltage Readings

The following voltages are those at the tube sockets while the receiver is in operating condition. No allowance has been made for current drawn by the meter and if low resistance meters are used, such allowances must be made.

RADIOTRON SOCKET VOLTAGES

135-Volt "B" Supply—No Signal—Maximum Volume Control

Radiotron No.		Control Grid to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Plate, M. A.	Filament Volts, D. C.
RCA-1A6	1st Det.	*3.0	67.5	135	1.7	2.0
	Osc.	—	—	135	1.8	
RCA-34—I. F.		*3.0	67.5	135	3.0	2.0
RCA-32—2nd Det.		*6.5	67.5	*95	0.4	2.0
RCA-30—Driver		*9.0	—	130	3.5	2.0
RCA-30—Output		12.0	—	135	1.0	2.0
RCA-30—Output		12.0	—	135	1.0	2.0

*These voltages cannot be measured with ordinary voltmeter, as they are obtained by means of high resistance bleeders across a 22½-volt "C" battery.

MODEL 126-B
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
4000	Capacitor—Adjustable trimmer capacitor (C8)	.78
4353	Capacitor—100 mmfd. (C12)	.30
4354	Capacitor—1500 mmfd. (C3)	.36
4352	Capacitor—300 mmfd. (C18, C19)	.25
6512	Capacitor—0.005 mfd. (C23)	.28
3888	Capacitor—0.05 mfd. (C24)	.25
3701	Capacitor—0.01 mfd. (C1, C20)	.30
3877	Capacitor—0.1 mfd. (C2, C16, C17)	.32
4355	Capacitor pack — Comprising two 1200 mmfd. capacitors (C21, C22)	.26
4349	Capacitor and transformer pack—Comprising one 8.0 mfd., one 0.5, one 0.25 mfd. capacitor and driver transformer (C7, C6, C13, T1)	3.95
6992	Coil—Antenna coil (L1, L2, R1, C1)	.98
4343	Coil—Choke coil (L9)	.60
6664	Coil—Oscillator coil (L3, L4)	.94
6660	Condenser—2-gang variable tuning condenser (C4, C5, C10, C11)	2.78
4356	Resistor—0.7 ohm—Flexible type (R6)—Package of 10	1.50
4345	Resistor — 3200 ohms — Carbon type — ¼ watt (R12)—Package of 10	2.00
4346	Resistor — 3700 ohms — Carbon type — ¼ watt (R13)—Package of 10	2.00
4344	Resistor — 7500 ohms — Carbon type — ¼ watt (R8)—Package of 10	2.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R11)—Package of 5	1.00
6242	Resistor—2 megohm—Carbon type—¼ watt (R9)—Package of 5	1.00
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
3682	Shield—First detector and oscillator—Radiotron shield	.22
4351	Shield—I. F. Radiotron socket shield	.25
6665	Shield—Oscillator coil shield	.34
3056	Shield—Second detector—Radiotron shield—Package of 2	.40
3858	Socket—Dial lamp socket	.26
6300	Socket—4-contact second detector—Radiotron socket	.35

Stock No.	Description	List Price
6980	Socket—4-contact output (No. 5) Radiotron socket	$0.20
3859	Socket—4-contact output (No. 6) Radiotron socket	.30
4232	Socket—6-contact—1st detector and oscillator—Radiotron socket	.35
6669	Switch—Tone control switch (S5)	.50
4347	Terminal strip—Engraved "ANT-GND"	.25
6993	Transformer—First intermediate frequency transformer (L5, L6, C14, C15)	2.10
6994	Transformer—Second intermediate frequency transformer (L7, L8)	1.05
6995	Volume control (R7)	1.10
	REPRODUCER ASSEMBLIES	
4350	Cable—4-conductor—Reproducer cable	.54
9428	Cone—Reproducer cone (L10)—Package of 5	5.00
9503	Housing—Cone housing and core assembly	2.70
3949	Magnet	1.40
9502	Reproducer assembly complete	8.40
6996	Transformer—Output transformer (T2)	1.68
	MISCELLANEOUS ASSEMBLIES	
4289	Body—Fuse connector body—Package of 10	.35
4357	Cable—Battery cable—6-conductor	1.52
4288	Cap—Fuse connector cap—Package of 10	.36
6516	Connector—Fuse connector complete	.16
4468	Dial—Station selector dial	.22
6176	Escutcheon—Operating switch escutcheon—Package of 5	.50
4286	Ferrule—Fuse connector ferrule and bushing—Package of 10	.38
3748	Fuse—0.5 ampere (F1, F2)—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
3088	Knob—Operating switch knob—Package of 5	.50
4085	Knob—Station selector knob and pointer—Package of 5	.60
4132	Knob—Volume control or tone control switch knob—Package of 5	.55
4348	Lamp—Dial lamp	.38
9050	Oscillator—Test oscillator—90 to 25,000 K.C.	29.50†
3886	Reflector—Dial light reflector	.30
3238	Screw—Set screw for operating switch knob—Package of 10	.25
4393	Screw—No. 8-32-5/16-inch headless set screw for knobs—Package of 10	.25
4160	Screw driver—Combination insulated screw driver and socket wrench for I. F. and R. F. adjustments	1.00
4284	Spring—Fuse connector spring—Package of 10	.30
4540	Switch—Operating switch (S1, S2, S3, S4)	2.28
4285	Washer—Fuse connector insulating washer—Package of 10	.22

† Full Discount Not Allowed

MODEL 127
Schematic
Trimmer Locations

RCA-VICTOR CO., INC.

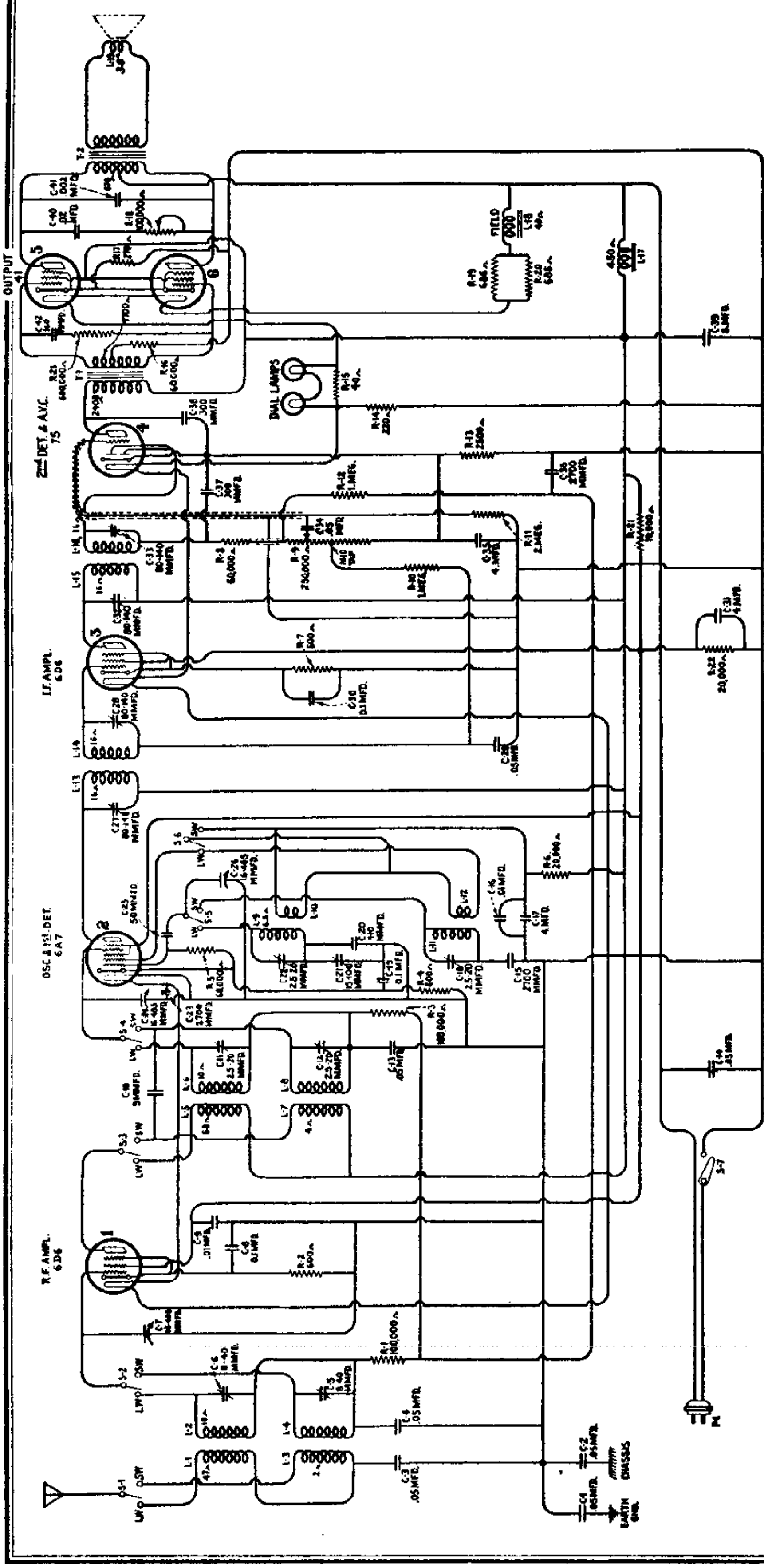


Figure 1
Schematic Circuit

IF PEAK 370 KC.

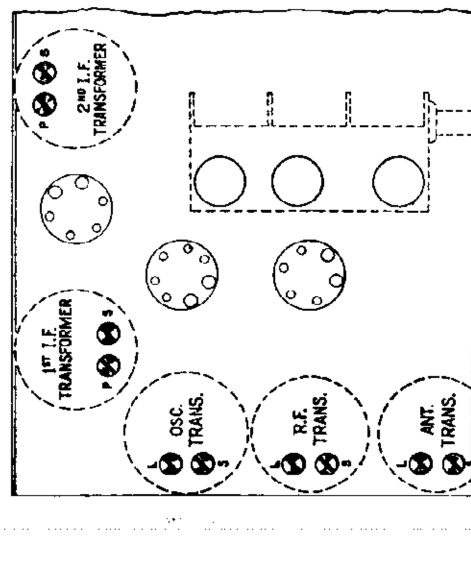


Figure 4—Location of Line-up Capacitors—Viewing bottom of chassis

MODEL 127
Chassis Wiring

RCA-VICTOR CO., INC.

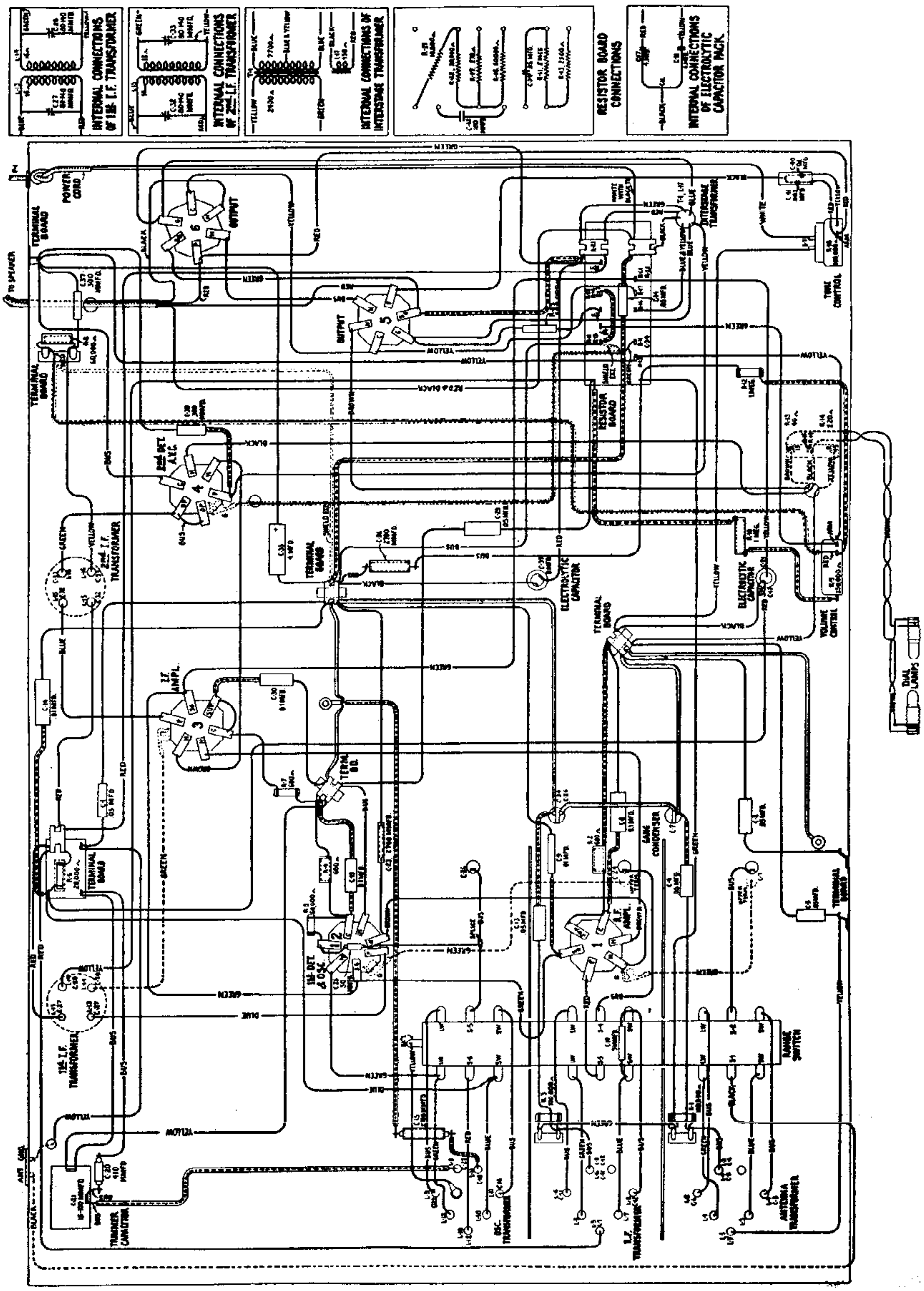
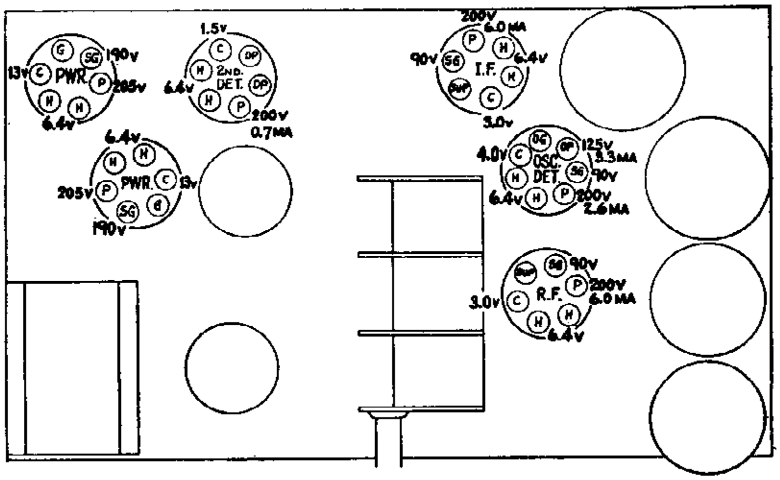


Figure 2—Wiring Diagram

RCA-VICTOR CO., INC.



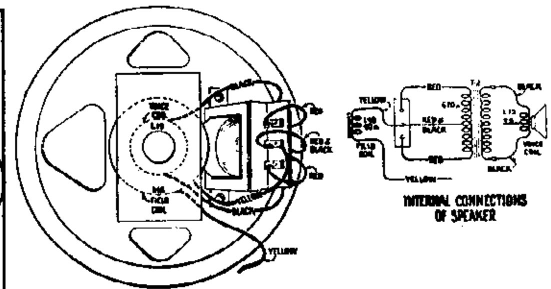


Figure 3—Loudspeaker Wiring

ALL VOLTAGES ARE TO—B

Figure 5—Radiotron Socket Voltages

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made.

RADIOTRON SOCKET VOLTAGES

220-Volt, D. C. Line—No Signal

Radiotron No.		Cathode to B— Volts, D. C.	Screen Grid to B— Volts, D. C.	Plate to B— Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		3.0	90	200	6.0	6.4
RCA-6A7	1st Detector	4.0	90	200	2.6	6.4
	Oscillator	—	—	125	3.3	
RCA-6D6 I. F.		3.0	90	200	6.0	6.4
RCA-75 2nd Detector		1.5	—	200	0.7	6.4
RCA-41 Power		13.0	190	205	25.0	6.4
RCA-41 Power		13.0	190	205	25.0	6.4

MODEL 127
Alignment Data
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
10194	Ball—Steel ball for condenser drive assembly—Package of 20	$0.25
2747	Cap—Contact cap—Package of 5	.50
3938	Capacitor—9 mmfd. (C10)	.25
3849	Capacitor—50 mmfd. (C25)	.30
6314	Capacitor—160 mmfd. (C23)—Package of 5.	2.00
4352	Capacitor—300 mmfd. (C37, C38)	.25
4297	Capacitor—410 mmfd. (C20)	.30
4031	Capacitor—2700 mmfd. (C15, C23, C36)	.50
3701	Capacitor—0.01 mfd. (C9, C16)	.30
4211	Capacitor—0.05 mfd. (C1, C2, C3, C14, C34)	.30
3901	Capacitor—0.05 mfd. (C4, C13)	.36
3888	Capacitor—0.05 mfd. (C29)	.25
3877	Capacitor—0.1 mfd. (C8, C19, C30)	.32
3796	Capacitor—4.0 mmfd. (C35)	.60
6986	Capacitor—8.0 mmfd. (C39)	1.60
3861	Capacitor — Adjustable trimmer capacitor (C21)	.78
6985	Capacitor—Comprising two 4.0 mmfd. capacitors (C17, C31)	1.50
4373	Capacitor pack—Comprising one 0.002 mfd. and one 0.02 mfd. capacitors (C40, C41)	30
6983	Coil—Antenna coil (L1, L2, L3, L4, C5, C6)	2.68
6700	Coil—Oscillator coil (L9, L10, L11, L12, C18, C22)	2.30
6699	Coil—R. F. coil (L5, L5, L7, L8, C11, C12)	2.44
6694	Condenser—3-gang variable tuning condenser (C7, C24, C26)	3.75
3941	Dial—Station selector dial scale—Package of 5	1.75
4467	Drive—Variable tuning condenser drive assembly complete	2.40
4340	Lamp—Dial lamp—Package of 5	.60
3906	Mounting assembly—Variable condenser mounting assembly—Comprising 3 bushings, 3 lock-washers, 3 nuts and 3 washers—Package of 1 set	.28
3940	Pointer—Station selector indicator—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R4, R7)—Package of 5	1.00
4338	Resistor — 2500 ohms — Carbon type — ¼ watt (R13)—Package of 10	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5, R8, R16)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3439	Resistor—600,000 ohms—Carbon type—¼ watt (R23)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10, R12)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5	1.00
4337	Resistor—270 ohms—Carbon type—1 watt (R17)—Package of 10	2.20
5114	Resistor—20,000 ohms—Carbon type—1 watt (R6, R22)—Package of 5	1.10
4339	Resistor — 260 ohms — Porcelain type — Tapped at 220 ohms (R14, R15)	.52

Stock No.	Description	List Price
3991	Resistor — 10,000 ohms — Porcelain type (R21)	$0.60
3943	Screen—Translucent celluloid screen—For dial lamps—Package of 2	.18
3878	Screw—No. 8–32–$\frac{3}{16}$ headless cup point set screw for fastening station selector pointer—Package of 20	.25
3768	Screw—Square head No. 6–32–¼ set screw for condenser drive—Package of 10	.35
6704	Shaft—Tuning condenser drive shaft assembly.	.64
4145	Shield—First detector and oscillator Radiotron shield	.30
4103	Shield—I. F. amplifier Radiotron shield	.20
3950	Shield—R. F. amplifier Radiotron shield	.26
4216	Shield—Radiotron shield top	.10
4215	Shield—Second detector Radiotron shield	.15
3529	Socket—Dial lamp socket	.32
6676	Socket—6-contact Radiotron socket	.40
7485	Socket—6-contact second detector and AVC Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
6696	Switch—Range switch (S1, S2, S3, S4, S5, S6)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C27, C28)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C32, C33)	1.78
6987	Transformer pack—Audio transformer pack—Comprising one reactor and one inter-stage transformer (T1, L17)	4.50
6705	Tone control (R18, S7)	1.20
6695	Volume control (R9)	1.20
	REPRODUCER ASSEMBLIES	
7811	Cable—Reproducer cable	.45
9498	Coil—Field coil, magnet and cone support (L18)	3.50
9499	Cone—Reproducer cone (L19)—Package of 5.	6.10
9497	Reproducer complete	6.75
6988	Transformer—Output transformer (T2)	1.60
	MISCELLANEOUS ASSEMBLIES	
6706	Bezel—Metal bezel for station selector dial	.42
6707	Glass—Station selector dial glass	.20
6989	Knob—Range switch or tone control knob—Package of 5	.65
6991	Knob—Station selector knob—Package of 5	1.15
6990	Knob—Volume control knob—Package of 5.	1.15
9050	Oscillator — Test oscillator — 90–25,000 K. C.	29.50†
4341	Resistor—Porcelain type—686 ohms (R19, R20)	2.12
6708	Ring—Retaining ring for dial glass—Package of 5	.44
4342	Screw—Receiver mounting screw assembly—Comprising four bushings, four screws and four washers	.30
4160	Screwdriver—Combination insulated screw-driver and socket wrench for I. F. and R. F. adjustments	1.00

† Full discount not allowed.

SERVICE DATA

CAUTION—This receiver operates on 220-volt direct current without a transformer between the line and the various parts of the receiver, such as A. C. receivers use. It is therefore extremely important to use the utmost caution when operating the receiver outside of the cabinet. Also a knob must always be placed on the shaft of the main tuning capacitor, as under certain conditions the full line voltage is obtained between this point and ground.

(1) Line-up Capacitor Adjustments

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator and an alignment tool (Stock No. 4160) be available. Figure 4 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground, preferably through a series condenser. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis.

Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as S in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

RCA-VICTOR CO., INC.

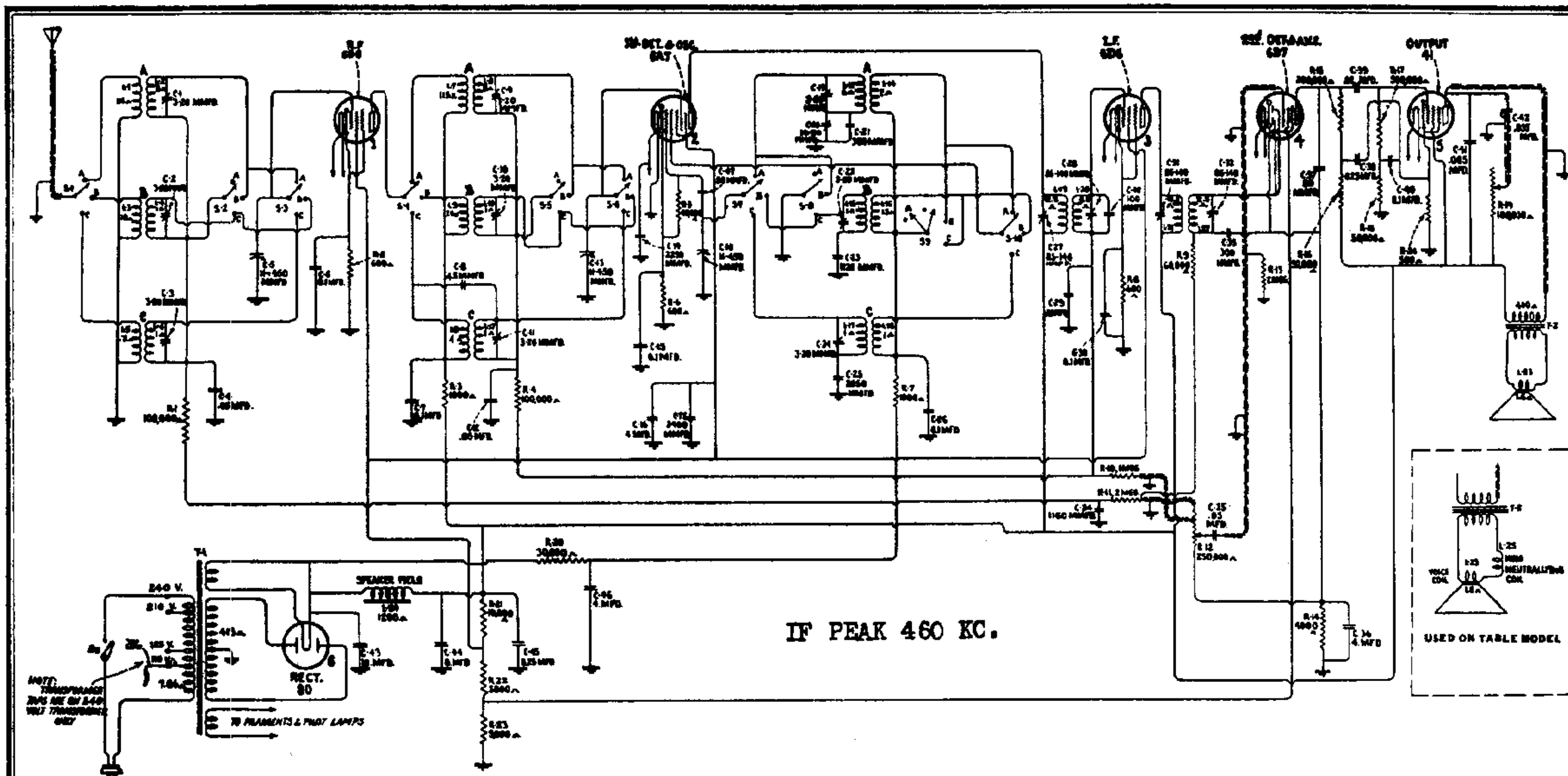
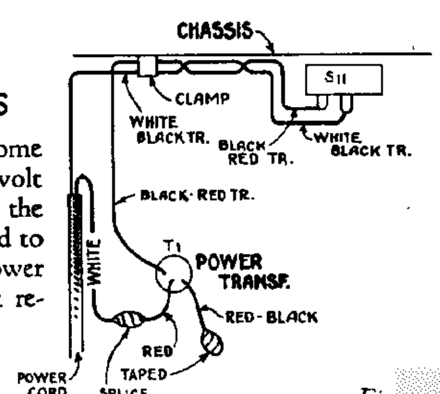
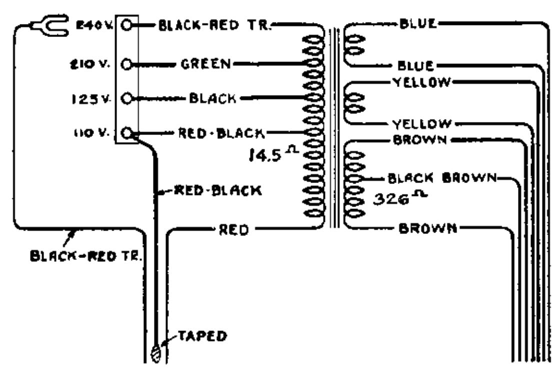


Figure 1—Schematic Circuit Diagram

POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 5 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.





INTERNAL CONNECTIONS OF POWER TRANSF.

Figure 5—Universal Transformer Connections

MODEL 128, 224
Chassis Wiring

RCA-VICTOR CO., INC.

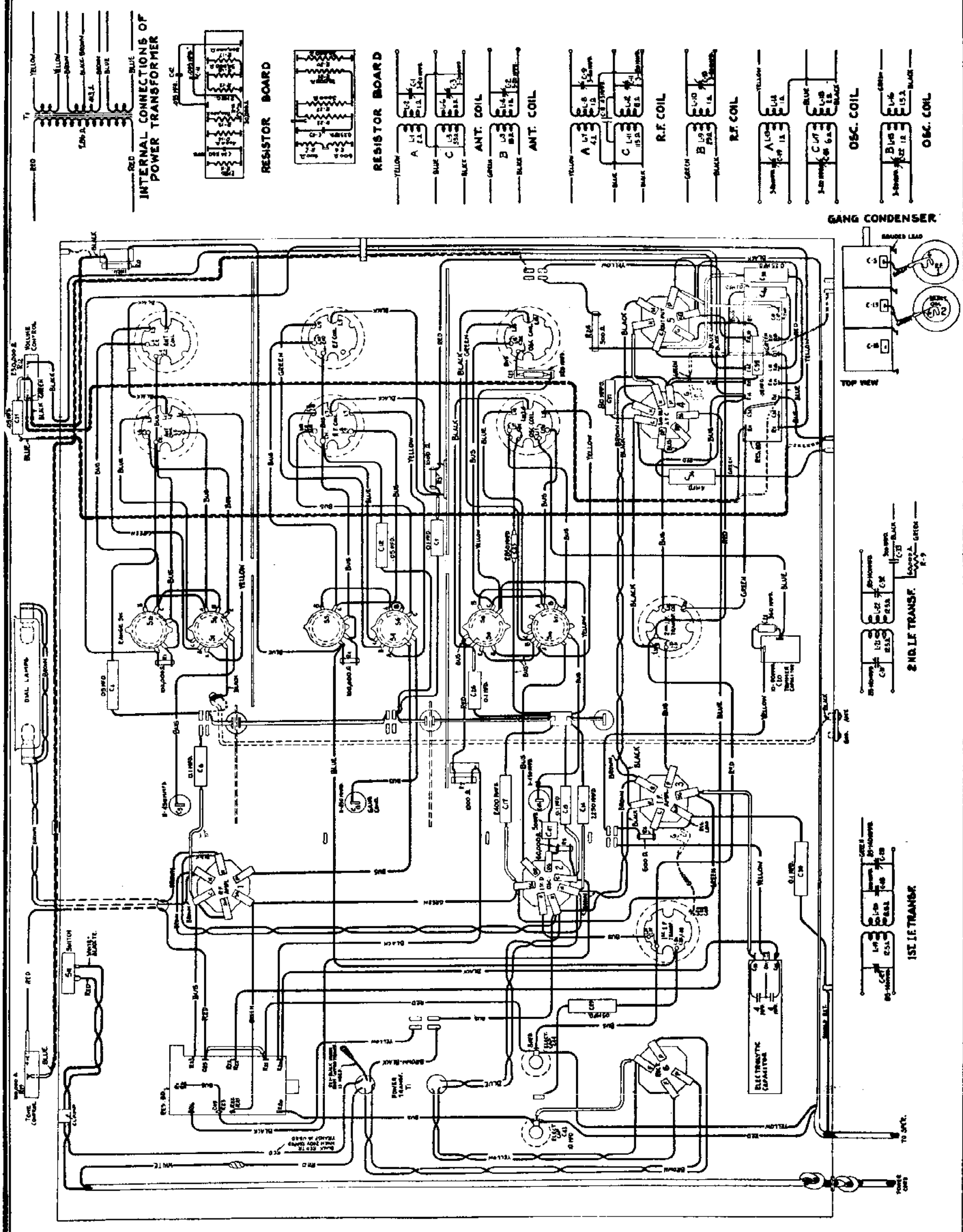


Figure 2—Chassis Wiring Diagram

RCA-VICTOR CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector and automatic volume control and a single Pentode output stage. An RCA-80 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figure 1 shows the schematic circuit diagram, Figure 2 the chassis wiring, and Figures 3 and 4 the loudspeaker wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that three different groups of tuned circuits are used, one for each tuning band. A three-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with tuning capacitor disconnected, fall in the next higher frequency band.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

The output of the I. F. amplifier is then applied to the diode electrodes of the RCA-6B7, which is a combined second detector, automatic volume control and A. F. amplifier. The direct current component of the rectified signal produces a voltage drop across resistor

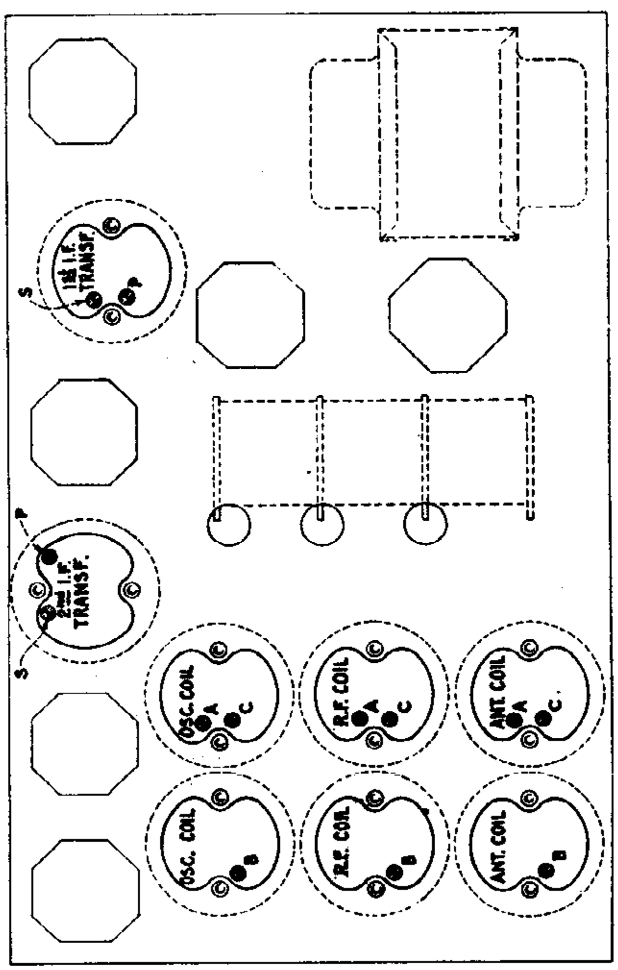


Figure 6—Location of Line-up Capacitors

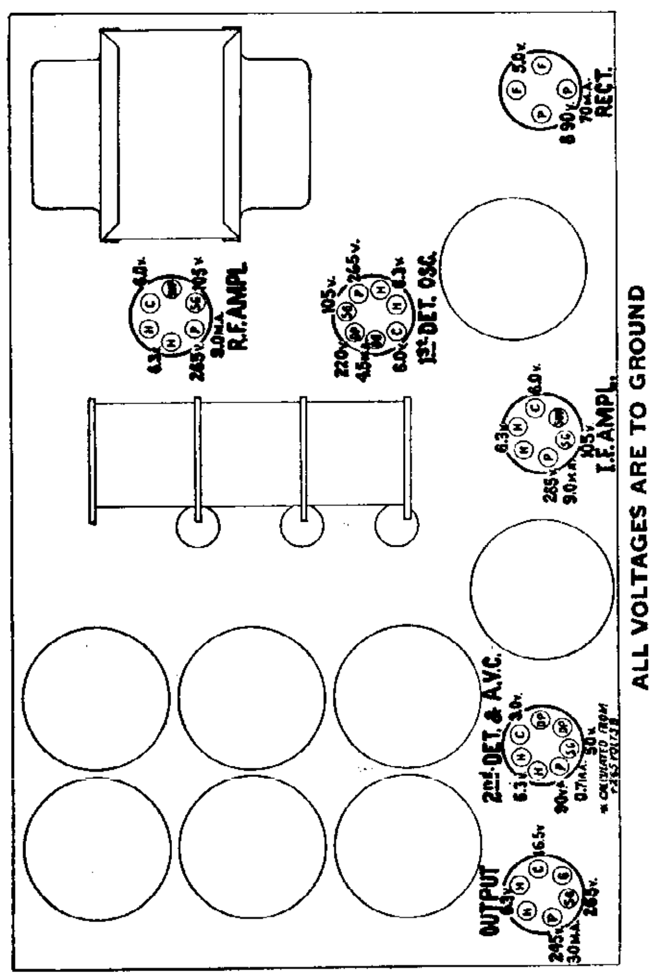


Figure 7—Tube Socket Voltages

R-12. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F. first detector and I. F. give

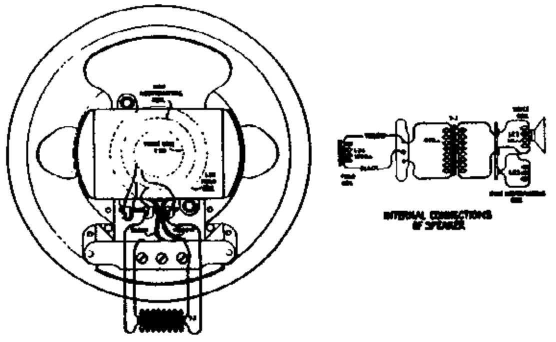


Figure 3—Table Loudspeaker Wiring

the automatic volume control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-6B7 and thereby regulates the audio output of the entire receiver.

The output of the RCA-6B7 is resistance coupled to the grid of the RCA-41 tube, which is the power output amplifier. This tube is operated as a Pentode and provides high audio gain and satisfactory output power. The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

The tone control consists of a variable resistor and fixed capacitor connected in series across the primary of the output transformer. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-80 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

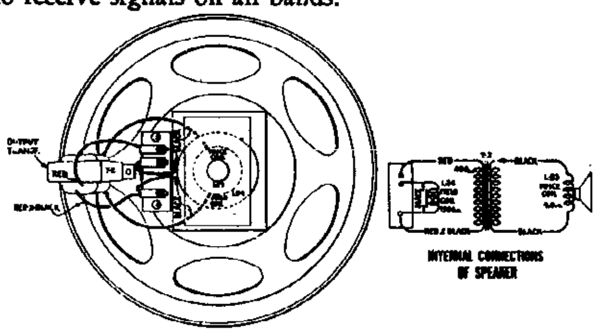


Figure 4—Console Loudspeaker Wiring

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 8. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has one I. F. stage, two transformers having four adjustable capacitors may require adjustment. The transformers are all peaked, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

RCA-VICTOR CO., INC.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in band "A." Three are required in bands "B" and "C."

To properly align the various bands, each band must be aligned individually in the order given. This is "A," "B" and "C." The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64-inch of the horizontal line at the highest frequency end of band "A."

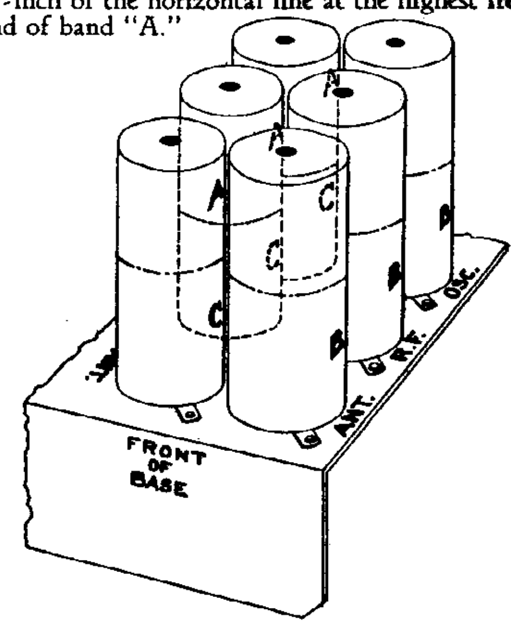


Figure 8—Location of Coils in Shields

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers in the band under test.

Band "A"

(a) Set the Band Switch at "A."

(b) The oscillator series capacitor, located on the rear apron of the chassis, should be set at about the center of its range.

(c) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(d) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (c).

Band "B"

(a) Set the Band Switch at "B."

(b) The detector and antenna trimmers should first be tightened to approximately 3/4 maximum capacity (turned 3/4 inch).

(c) Tune the external oscillator to 5,160 K. C., set the pointer at 5,160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(d) Check for the image signal which should be received at approximately 4,240 K. C. on the dial. It may be necessary to increase the external oscillator output for this check.

(e) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(f) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "C"

(a) Set the Band Switch at "C."

(b) The detector and antenna trimmers should first be tightened to approximately 3/4 maximum capacity (turned 3/4 in.)

(c) Tune the external oscillator to 18,000 K. C., set the pointer at 18 M. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(d) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(e) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(f) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

RCA-VICTOR CO., INC.

VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition.

115-Volt A. C. Line—No Signal—Volume Control Maximum

Radiotron Number		Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		6.0	105	265	9.0	6.3
RCA-6A7	Det.	6.0	105	265	3.5	6.3
	Osc.	—	—	220	4.5	
RCA-6D6—I. F.		6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector		3.0	50	90*	0.7	6.3
RCA-41—Pwr		16.5	265	245	30.0	6.3
RCA-80—Rectifier		—	—	690 (RMS)	70.0	5.0

*Voltage calculated from 265 V. + B.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
9511	Transformer—Power transformer 105-125 volts, 50-60 cycles (T1)	$4.78
9512	Transformer—Power transformer 105-125 volts, 25-40 cycles	6.58
9513	Transformer—Power transformer—105-250 volts—40-60 cycles	4.85
4519	Volume control (R12)	1.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
4422	Clutch—Clutch drive assembly for variable condenser drive	.22
4510	Drive—Tuning condenser drive assembly	2.42
4361	Indicator—Band indicator (celluloid)	.12
3943	Screen—Dial light screen (celluloid)—Package of 2	.18
3993	Screw—Number 6-32-5/32 square head set screws for band indicator operating arm—Package of 10	.25
4669	Screw—Number 8-32-5/32 set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
1378	Stud—Band indicator operating arm stud—Package of 5	.25
	REPRODUCER ASSEMBLY TABLE MODEL	
4526	Cable—3-conductor—Reproducer cable	$0.32
7818	Reproducer complete	6.58
	REPRODUCER ASSEMBLY CONSOLE MODEL	
4473	Board—Terminal board assembly	.26
9460	Coil—Field coil, magnet and cone support (L24)	6.00
8935	Cone—Reproducer cone (L23)—Package of 5	5.25
9527	Reproducer—Complete	8.00
4472	Transformer—Output transformer (T2)	1.40
	MISCELLANEOUS ASSEMBLY	
4577	Bezel—Station selector dial (escutcheon) bezel	.56
4661	Dial—Station selector dial	.62
6614	Glass—Station selector dial glass	.30
4520	Indicator—Station selector indicator pointer	.18
4449	Knob—Station selector, volume control, tone control, range switch or operating switch knob—Package of 5	.60
4678	Ring—Dial glass retaining ring—Package of 5	.34
4527	Screw—Chassis mounting screw assembly comprising 4 spacers, 4 screws, 4 lockwashers, 4 washers, 8 cushions—For table model	.40
4685	Screw—Chassis mounting screw assembly—Comprising 4 spacers, 4 screws, 4 lockwashers, 4 washers and 8 cushions—For console model	.40
4613	Screw—Number 8-32-7/16 headless set screw for knobs—Package of 10	.25

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or tone control mounting bracket	$0.18
2747	Cap—Contact cap—Package of 5	.50
3861	Capacitor — Adjustable trimmer capacitor (C20)	.78
4442	Capacitor—50 mmfd. (C47)	.22
4662	Capacitor—80 mmfd. (C37)	.28
4413	Capacitor—360 mmfd. (C21)	.22
4412	Capacitor—1120 mmfd. (C23)	.25
4515	Capacitor—1160 mmfd. (C34)	.22
4670	Capacitor—2250 (C14)	.30
4523	Capacitor—2400 mmfd. (C17)	.26
4524	Capacitor—2850 mmfd. (C25)	.35
4435	Capacitor—.02 mfd. (C39)	.25
4518	Capacitor—.05 mfd. (C35)	.52
4417	Capacitor—.05 mfd. (C4, C12, C29)	.25
3877	Capacitor—.1 mfd. (C40)	.32
4415	Capacitor—.1 mfd. (C6, C15, C30)	.30
4645	Capacitor—.1 mfd. (C7, C26)	.25
3597	Capacitor—.25 mfd. (C38, C45)	.40
4525	Capacitor—4.0 mfd. (C36)	.70
4428	Capacitor—8 mfd. (C44)	1.05
7790	Capacitor—10 mfd. (C43)	1.05
4692	Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42)	.30
7589	Capacitor Pack—Comprising two 4. mfd. capacitors (C16, C46)	1.64
4358	Clamp—Capacitor mounting clamp	.15
4516	Coil—Antenna coil "PB" (L3, L4, C2)	1.65
7803	Coil—Antenna coil "B & SW" (L1, L2, L5, L6, C1, C3)	1.82
4514	Coil—Detector Coil "PB" (L9, L10, C10)	1.65
7805	Coil—Detector coil "B & SW" (L7, L8, L11, L12, C8, C9, C11)	2.15
7807	Coil—Oscillator coil "B & SW" (L13, L14, L17, L18, C19, C24)	1.62
4511	Coil—Oscillator coil "PB" (L15, L16, C22)	1.52
7801	Condenser—3-gang variable tuning condenser (C5, C13, C18)	4.42
4340	Lamp—Dial lamp—Package of 5	.60
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R6, R8)—Package of 5	$1.00
4370	Resistor—1000 ohms—Carbon type—¼ watt (R3, R7)—Package of 10	2.00
3997	Resistor—4000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
6318	Resistor—10,000 ohms (R21)	.80
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16, R18)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R15)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R17)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11, R13)—Package of 5	1.00
3413	Resistor—5000 ohms—Carbon type—½ watt (R22, R23)—Package of 5	1.00
4513	Resistor — 30,000 ohms—Carbon type—3 watt (R20)	.25
4521	Shield—Antenna R. F. or oscillator coil shield	.42
4145	Shield—First detector or output Radiotron shield	.30
4103	Shield—I. F. amplifier Radiotron shield	.20
6955	Shield—R. F. amplifier Radiotron shield	.25
3782	Shield—Second detector Radiotron shield	.26
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4379	Strip—Antenna terminal engraved "ANT-GND"	.20
6466	Switch—Operating switch (S11)	.45
4512	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	3.42
4517	Tone control (R19)	.90
4431	Transformer — First intermediate frequency transformer (L19, L20, C27, C28, C48)	2.28
4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9)	2.15

RCA-VICTOR CO., INC.

MODEL 135-B, 235-B
Schematic
Trimmer Layout

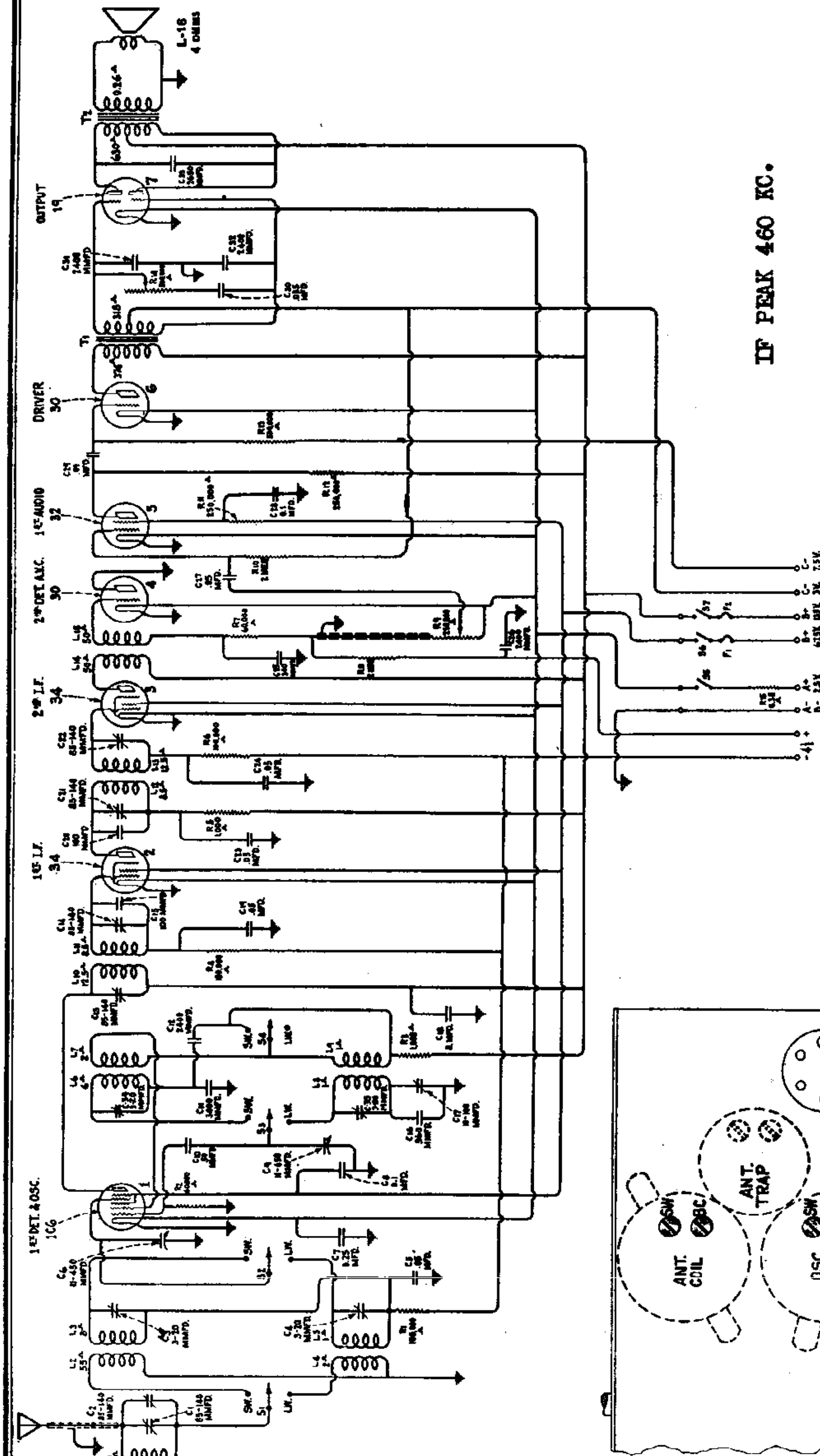


Figure 1—Schematic Circuit Diagram

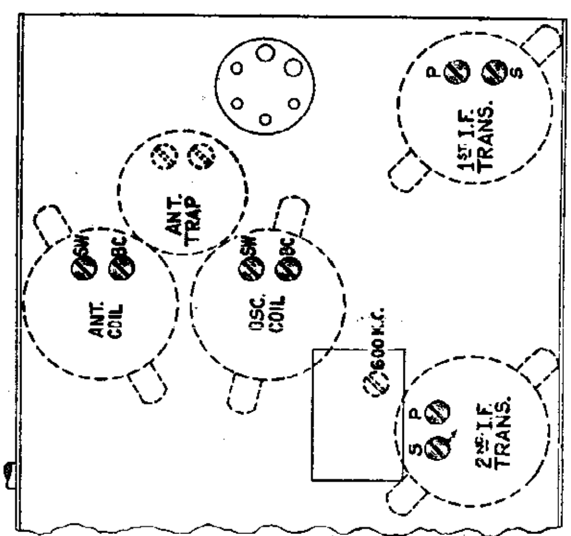


Figure 4—Location of Line-Up Capacitors

MODEL 135-B, 235-B
Socket Layout
Voltage

RCA-VICTOR CO., INC.

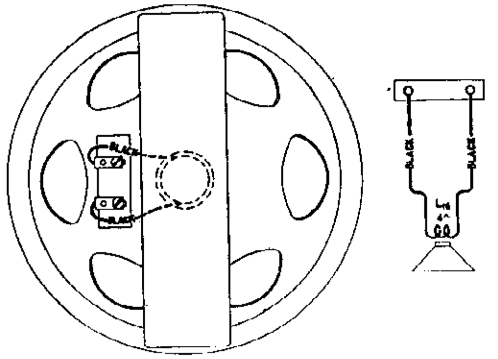


Figure 3—Loudspeaker Wiring

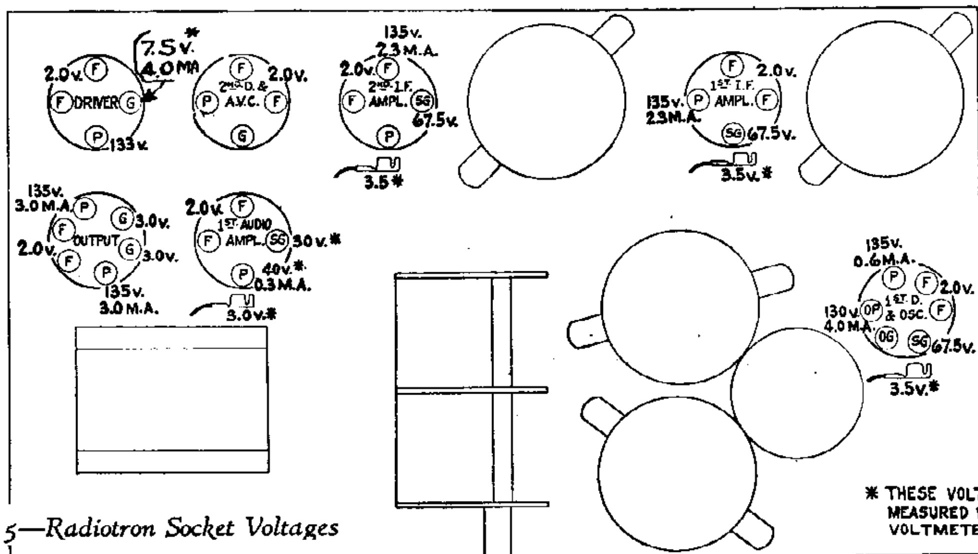


Figure 5—Radiotron Socket Voltages

* THESE VOLTAGES CANNOT BE MEASURED WITH ORDINARY VOLTMETER.

Volume Control at Maximum—No Signal—135 Volt "B" Battery—4.5 and 7.5-Volt Bias Batteries

Radiotron No.		Control Grid to Ground	Screen Grid to Ground	Plate to Ground	Plate, M. A.	Filament Volts
RCA-1C6	1st Detector	3.5*	67.5	135	0.6	2.0
	Oscillator	—	—	130	4.0	
RCA-34—I. F.		3.5*	67.5	135	2.3	2.0
RCA-34—I. F.		3.5*	67.5	135	2.3	2.0
RCA-30—Detector AVC		—	—	—	—	2.0
RCA-32—Audio		3.0*	30*	40*	0.3	2.0
RCA-30—Driver		7.5*	—	133	4.0	2.0
RCA-19—Power		3.0	—	135	3.0	2.0

*These voltages cannot be measured with ordinary voltmeter.

RCA-VICTOR CO., INC.

MODEL 135-B, 235-B
Chassis Wiring

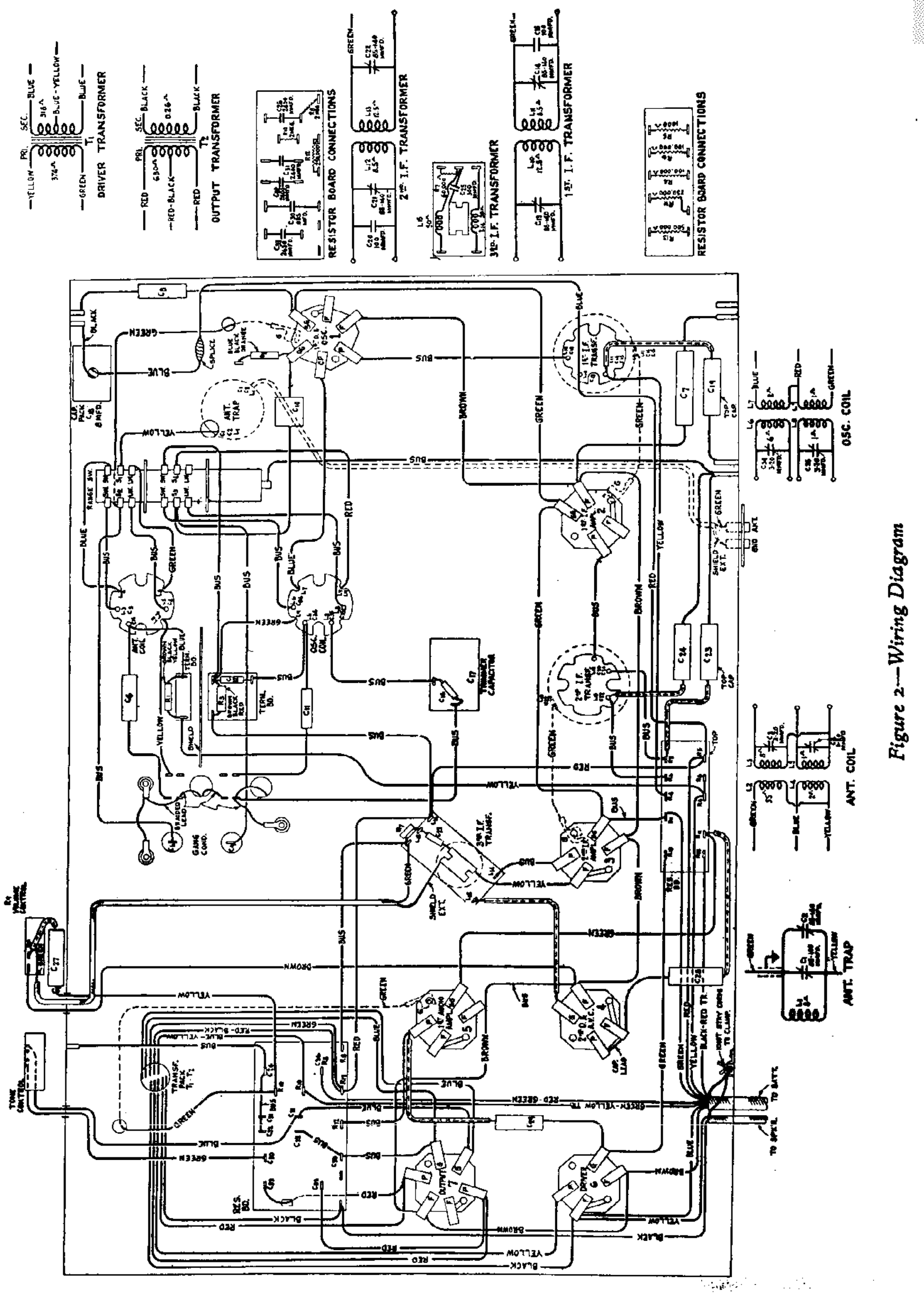


Figure 2—Wiring Diagram

MODEL 135-B, 235-B
Alignment Data
Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

(1) Line-Up Capacitor Adjustments

To properly align this receiver, it is essential that a modulated R. F. oscillator of suitable frequency range such as Stock No. 9050, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments

The I. F. amplifier comprises two stages which have three transformers. The third transformer is untuned so that only a total of four tuned circuits is used. Refer to Figure 4 and proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight indication is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540.

(b) Then set the Test Oscillator at 1720 K. C., the dial indicator at 1720, the Range Switch at the "in" position, and adjust the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

Adjust the two trimmers under the two R. F. coils, designated as BC in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 18,000 K. C. and set the dial at 18M. Adjust the two trimmer capacitors designated as SW in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. The detector trimmer *must* be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. *Both of these adjustments must be made as indicated.*

Trap Circuit Adjustment

A trap circuit, tuned to the I. F. frequency (460 K. C.) is used in the antenna circuit to reduce interference from signals approximately the same frequency as that of the I. F. amplifier. Two parallel trimmers are used and adjustment may be made by means of either or both. Proceed as follows:

(a) Place the receiver in operation and connect the test oscillator output from the antenna to ground terminals of the receiver. Adjust the test oscillator frequency to 460 K. C. and connect the output indicator across the cone coil of the reproducer.

(b) Adjust either or both of the trap circuit trimmers, accessible from the top of the chassis, Figure 4, until a *minimum* output from the receiver is obtained. The point of minimum output is the proper adjustment.

It should be remembered that the trimmers provide an adjustment over a small range. However, in event constant interference is experienced at a slightly different frequency from 460 K. C., adjusting the trap to the frequency of the interference will materially reduce its effect.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume or tone control mounting bracket	$0.18
2747	Cap—Contact cap—Package of 5	.50
4498	Capacitor—8 mfd. (C18)	1.25
4442	Capacitor—50 mmfd. (C10)	.22
3981	Capacitor—300 mmfd. (C25)	.30
4413	Capacitor—360 mmfd. (C16)	.22
2749	Capacitor—2400 mmfd. (C26)	.35
4440	Capacitor—2400 mmfd. (C12, C31, C32)	.26
4529	Capacitor—2650 mmfd. (C33)	.32
4439	Capacitor—3400 mmfd. (C11)	.35
4212	Capacitor—0.01 mfd. (C29)	.30
4518	Capacitor—0.05 mfd. (C27)	.52
4417	Capacitor—0.05 mfd. (C5, C19, C23, C24)	.25
4643	Capacitor—0.035 mfd. (C30)	.30
3877	Capacitor—0.1 mfd. (C8, C28)	.32
4537	Capacitor—0.25 mfd. (C7)	.38
3861	Capacitor — Adjustable trimmer capacitor (C17)	.78
4430	Coil—Antenna coil (L2, L3, L4, L5, C3, C4)	1.92
4432	Coil—Oscillator coil (L6, L7, L8, L9)	1.65
4539	Coil and shield assembly—Antenna trap circuit (L1, C1, C2)	2.05
4504	Condenser—2-gang variable tuning condenser (C6, C9)	2.78
4370	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R3, R5)	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2, R7)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4, R6)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R11, R12)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R8, R10)—Package of 5	1.00
4521	Shield—Antenna, oscillator or I. F. transformer shield	.42
4103	Shield—Driver Radiotron shield	.20
4145	Shield—First detector and oscillator Radiotron shield	.30
3056	Shield—First I. F. amplifier Radiotron shield —Package of 2	.40
4530	Socket—4-contact Radiotron socket	.28
4532	Socket—4-contact audio amplifier—Radiotron socket	.28
4232	Socket—6-contact Radiotron socket	.35
4531	Socket—6-contact output Radiotron socket	.30
4534	Switch—Range switch (S1, S2, S3, S4, SW, LW)	3.64
4536	Tone control (R14)	.95
4431	Transformer—First intermediate transformer (L10, L11, C13, C14, C15)	2.28
7840	Transformer — Second intermediate transformer (L12, L13, C20, C21, C22)	2.35
4538	Transformer—Third intermediate frequency transformer (L14, L15)	2.15
4533	Transformer pack—Audio transformer pack —Comprising driver and output transformer (T1, T2)	3.98
4535	Volume control (R9)	1.40
	REPRODUCER ASSEMBLIES (CONSOLE MODEL)	
4541	Cable—2-conductor reproducer cable	.38
9432	Cone—Reproducer cone (L16)	1.88
7820	Magnet—Cone housing and magnet assembly	8.98
7319	Reproducer complete	12.18
4234	Rivet—Cone mounting rivet—Package of 100	.66

Stock No.	Description	List Price
	REPRODUCER ASSEMBLIES (TABLE MODEL)	
9539	Cone—Reproducer cone—Package of 5	$4.30
9540	Magnet assembly—Comprising cone bracket core and magnet	5.72
9538	Reproducer complete	7.65
	DRIVE ASSEMBLY	
4422	Clutch—Condenser drive clutch assembly complete	.88
4641	Dial—Station selector dial (console model)	.80
4588	Dial—Station selector dial (table model)	.80
4586	Drive—Variable tuning condenser drive assembly complete	2.42
4587	Pointer—Station selector pointer (table model)	.18
4363	Pointer—Station selector pointer (console model)	.18
	MISCELLANEOUS ASSEMBLIES	
6706	Bezel—Metal bezel (escutcheon) for station selector dial glass (table model)	.42
6840	Bezel—Metal bezel (escutcheon) for station selector dial glass (console model)	.56
4289	Body—Fuse connector body—Package of 10	.35
4642	Cable—Battery cable—8-conductor—Complete with switch and connectors (table model)	3.60
4542	Cable—8-conductor battery cable complete with switch and connectors (console model)	3.82
4288	Cap—Fuse connector cap—Package of 10	.36
6516	Connector—Fuse connector complete	.16
6176	Escutcheon—"OFF-ON" operating switch escutcheon—Package of 5	.50
4286	Ferrule—Fuse connector ferrule and bushing —Package of 10	.38
3748	Fuse—0.5 ampere—Package of 5	.40
6614	Glass—Station selector dial glass (console model)	.30
6707	Glass—Station selector dial glass (table model)	.20
4290	Insulator—Fuse connector insulator—Package of 10	.35
3088	Knob—Operating switch knob—Package of 5	.50
4449	Knob—Station selector, volume control, tone control or range switch knob—Package of 5	.60
4644	Resistor—0.42 ohms—Flexible type—Filament series (R15)—Package of 5	.80
6615	Ring—Retaining ring for dial glass—Package of 5 (console model)	.34
6708	Ring—Retaining ring for dial glass—Package of 5 (table model)	.44
4638	Screw—Chassis mounting screw assembly—Comprising eight cushions, four screws, four washers, four lockwashers and four spacers	.52
3238	Screw—6-40-1⅛₄" knurled head—Set screw for operating switch knob No. 3088—Package of 10	.25
4613	Screw—8-32-⅛" headless set screw for station selector volume control, tone control or range switch knob—Package of 10	.25
4284	Spring—Fuse connector spring—Package of 10	.30
4540	Switch—Operating switch	2.28
4285	Washer—Fuse connector insulating washer—Package of 10	.22

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............100–125 Volts and 200–250 Volts

Frequency Rating
25–60 (100–125 Volts Only) and 50–60 Cycles

Power Consumption..........................110 Watts

Type and Number of Radiotrons
3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total, 8

Type of Circuit
Straight Super-Heterodyne for all frequencies with Class "B" Output Stage.

Undistorted Output............................6 Watts

This all-wave super-heterodyne receiver is of the continuous tuning type, utilizing a straight super-heterodyne circuit in all bands. The bands are as follows:

Selector Switch Position	*Frequency Range (Kilocycles)*	*Wave-Length Range (Meters)*
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–300
D	8000–18000	37.5–16.7

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly, with the selector switch, is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure D and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure D.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and, on the three lowest frequency bands, a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low-frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers, due to the additional F. R. stage used.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C., continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300-ohm resistor, for use as a "dummy" antenna, a non-metallic screw-driver such as Stock No. 4160, and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300-ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300-ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

MODEL 140,141,141-E,
240 Revised
Voltage
Wave Band Data

RCA-VICTOR CO., INC.

Power Supply—The instruments in this series are supplied in either of two alternating current power supply ratings: (1) 100–125/200–250 volts, 50–60 cycles and (2) 100–125 volts, 25–60 cycles (see rating label inside cabinet). To insure correct Radiotron operating voltages, both types are equipped to permit rearrangement of the internal connections to conform with the actual voltage available. Thus, the 50-60 cycle models may be adapted for 100–115, 115–125, 200–230 or 230–250 volts; and the 25–60 cycle models for either 100–115 or 115–125 volts.

Of course, alignment correction at the high-frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low-frequency end of a tuning range, it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

Pickup Connections

A terminal board is provided at the rear of the chassis for attaching a magnetic pickup to this instrument. Such connections are shown in Figures F, G and H.

Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure J shows the proper manner of making the various connections possible for this transformer.

The 25–60 cycle transformer uses only one 100–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure I may be used for 100–115-volt lines.

TUBE SOCKET VOLTAGES

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Cathode, Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note.)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note.)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.

RCA-VICTOR CO., INC.

MODEL 140, 141, 141-E, 240 Revised
Schematic, Trimmers

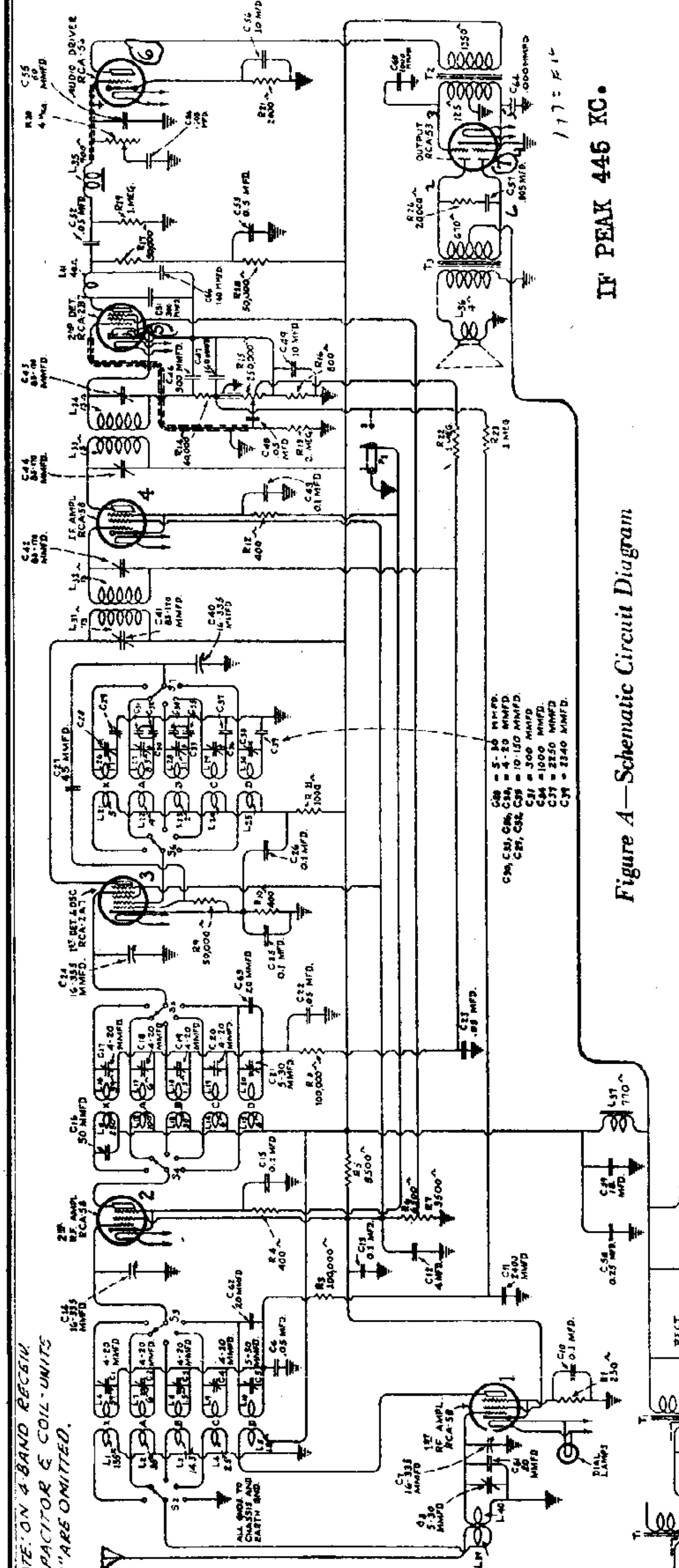


Figure A—Schematic Circuit Diagram

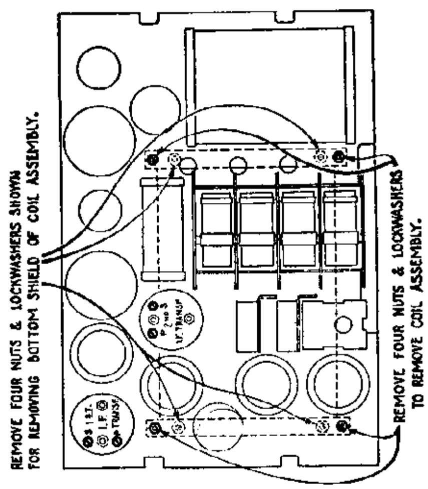


Figure D—Location of nuts and lockwashers holding coil assembly

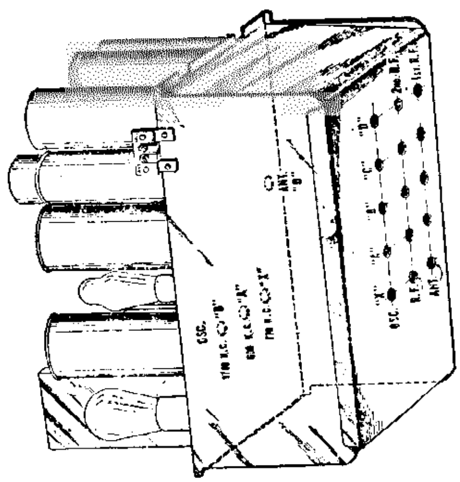


Figure E—Location of line-up capacitors

MODEL 140,141,141-E,
240 Revised
Chassis Wiring

RCA-VICTOR CO., INC.

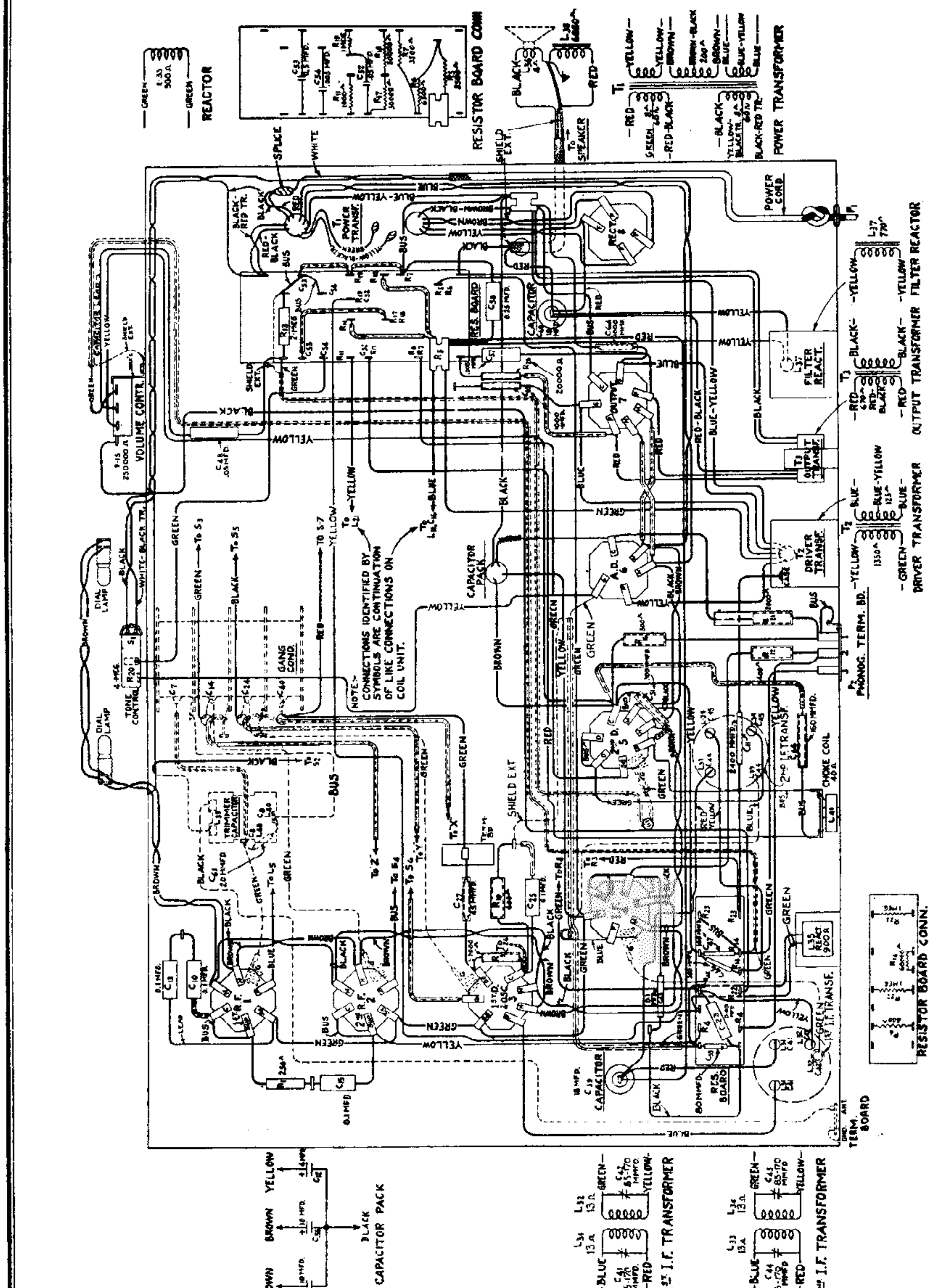


Figure B—Chassis Wiring

RCA-VICTOR CO., INC.

MODEL 140,141,141-E,
240 Revised
Coils Connections

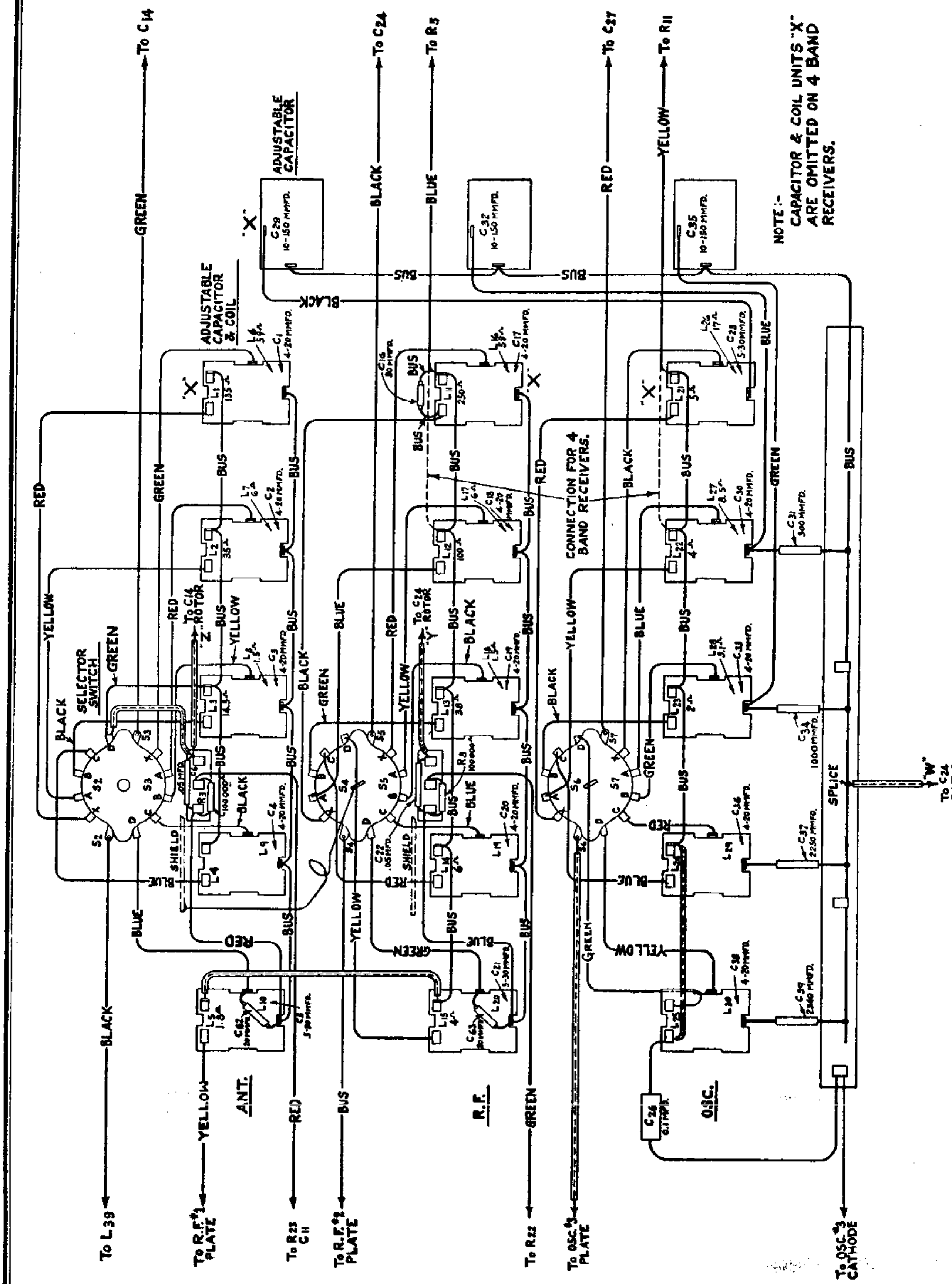


Figure C—Wiring Diagram of Coil Assembly

MODEL 140,141,141-E,
240 Revised
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—½ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16) Pkg. of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C51)	.34
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3643	Capacitor—.005 mfd. (C57)	.25
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—.05 mfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3932	Capacitor—.0024 mfd. (C11)	.30
3973	Capacitor—1,000 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
4103	Shield—First detector and R. F. Radiotron shield	.20
4104	Shield—I. F. Radiotron shield	.20
4205	Coil—Second detector choke (L41)	.50
4207	Capacitor—0.1 mfd. (C13, C43)	.34
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6512	Capacitor—.005 mfd. (C54)	.28
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5- band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48

Stock No.	DESCRIPTION	List Price
6631	Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1)	$2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L22, L27, C30)	1.40
6637	Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments.	
6889	Capacitor—18. mfd. (C60)	1.55
6890	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	2.40
6891	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	2.40
6892	Tone control (R20)	1.50
6955	Shield—Second R. F. Radiotron shield	.25
6956	Shield—Radiotron shield top	.15
7065	Screwdriver—Combination insulated screwdriver and alligator jaw end wrench for R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
9042	Transformer—Power transformer—105–250 volts—50–60 cycles (T1)	6.84
9046	Transformer—Power transformer—105–125 volts—25–40 cycles	9.22
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50†
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	MISCELLANEOUS	
3829	Knob—Volume control or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	1.08
3876	Cable—3-conductor for loudspeaker—4-band	.60
3878	Screws—No. 4-40—⅛ fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	.10
3992	Escutcheon—Range switch escutcheon—4-band	.10
4160	Screwdriver—Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments	1.00
6112	Cushions—Rubber cushions for chassis—Package of 4	.25
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial (RCA)	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.30
6673	Pointer—Station selector pointer—Package of 5	.64
6677	Dial—Station selector dial—5-band—Package of 5	1.42
6678	Dial—Station selector dial—4-band—Package of 5	1.42
6756	Bezel—Metal bezel for station selector dial (Plain)	.50
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

.0869 † Full discount not allowed.

RCA-VICTOR CO., INC.

RCA VICTOR MODELS 143 AND 242

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Voltage Rating.......................... 105–125 Volts and 100–130/195–250 Volts (Double Range)
Frequency Rating.......................... 25–60 and 50–60 Cycles
Power Consumption.......................... 130 Watts (All Frequencies)
Type and Number of Radiotrons.......................... 2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-76, 2 RCA-42, 1 RCA-5Z3—Total, 8

Tuning Frequency Range..........................
- Band X— 140 K. C.– 410 K. C.
- Band A— 540 K. C.– 1720 K. C.
- Band B—1720 K. C.– 5400 K. C.
- Band C—5400 K. C.–18000 K. C.

Line-up Frequencies...... 175 K. C., 410 K. C , 460 K. C., 600 K. C., 1720 K. C., 5160 K. C., 18000 K. C.
Maximum Undistorted Output.......................... 4.0 Watts
Maximum Output.......................... 5.0 Watts

PHYSICAL SPECIFICATIONS

	Model 143	*Model 242*
Height	20$\frac{9}{16}$ Inches	41$\frac{1}{2}$ Inches
Width	17$\frac{7}{8}$ Inches	26 Inches
Depth	14$\frac{1}{2}$ Inches	14 Inches

This eight-tube, four-band Superheterodyne receiver is of the "all-wave" type, having a continuous tuning range extending from 140 K. C. to 18,000 K. C., except for one break between 410 K. C. and 540 K. C. Such a tuning range permits the listener to receive all of the important broadcasting, police, aircraft and amateur call bands used throughout the world.

Excellent sensitivity, selectivity and tone quality, together with a high output (4 watts undistorted), Class A amplifier gives the receiver outstanding performance. Operating features include an "airplane" type dial, a double-ratio vernier drive, a visual band indicator, and a special "second hand" on the dial for logging short-wave stations. Other important features include automatic volume control, sensitivity control, large loudspeaker unit and a terminal board for easily attaching a magnetic pickup.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector and automatic volume control, a first audio stage and a push-pull Pentode output stage. An RCA-80 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figures 1 and 2 show the schematic diagrams, Figures 5 and 7 the chassis wiring, and Figures 3 and 4 the loudspeaker wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that four different groups of tuned circuits are used, one for each tuning band. A four-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with the tuning capacitor disconnected, falls in the next higher frequency band.

RCA-VICTOR CO., INC.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

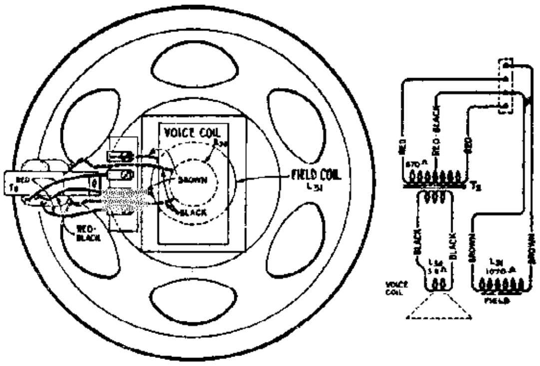


Figure 3—Console Loudspeaker Wiring

The output of the I. F. amplifier is then applied to the diode electrodes of the RCA-75, which is a combined second detector, automatic volume control and A. F. amplifier. The direct current component of the rectified signal produces a voltage drop across resistor R-32. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F., first detector and I. F. give the automatic volume control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-75 and thereby regulates the audio output of the entire receiver.

The output of the detector is resistance coupled to the grid of the RCA-76, first audio stage, which is transformer coupled to the push-pull output stage. On some models the grid coupling resistor between the detector and audio stage is 1 megohm (R-21, Figure 1). Other models have two resistors, R-59, 400,000 ohms, and R-21, 2 megohms (Figure 2), with the band selector switch shorting out R-21 in bands B and C. The purpose of this latter type of connection is to reduce the low frequency output in bands B and C, thereby improving the performance of the receiver in these bands.

The output stage uses two RCA-42's, which give a low distortion, high audio output to the loudspeaker. A high frequency tone control, which consists of a variable resistor and capacitor, is connected across the grids of the output stage. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

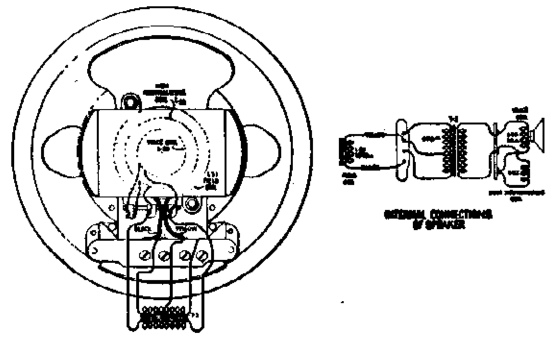


Figure 4—Table Loudspeaker Wiring

The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-5Z3 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To properly align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown on page 15, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

Checking With Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance,

RCA-VICTOR CO., INC.

while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 6. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 K. C. and the signal tuned in, and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage with two transformers having four adjustable capacitors that may require adjustment. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 8. Adjust each trimmer of the I. F. transformers until maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F., OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in Bands "A" and "X." Three are required in Bands "B" and "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator across the voice coil of the loudspeaker. The volume and sensitivity controls must be at the maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of Band "A."

Figure 8 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) Set the band switch at "X."

(b) Tune the external oscillator to 410 K.C., set the dial pointer at 410 K.C. and adjust the oscillator, detector and R.F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K.C. Tune in the 175 K.C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K.C. on Figure 8, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K.C. as described in (b).

Band "A"

(a) Set the band switch at "A."

(b) Tune the external oscillator to 1,720 K.C., set the pointer at 1,720 K.C. and adjust the oscillator, detector and R.F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K.C. Tune in the 600 K.C. signal, irrespective of scale calibration, and adjust the series trimmers, marked 600 K.C., Figure 8, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K.C. as described in (b).

Band "B"

(a) Set the band switch at "B."

(b) Tune the external oscillator to 5,160 K.C. and set the pointer at 5,160 K.C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4,240 K.C. on the dial. It will be necessary to increase the external oscillator output for this check.

(d) The antenna and detector trimmers should now be peaked for maximum output.

Band "C"

(a) Set the band switch at "C."

(b) Tune the external oscillator to 18,000 K.C. and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 9 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) MAGNETIC PICKUP CONNECTIONS

A Terminal Board is provided at the rear of the chassis for adding phonograph facilities to this instrument. Figure 11 shows the various types of connections that will be required for the different turntable assemblies.

(6) VARIATIONS IN MODELS

There are four slight variations in the electrical circuits of these receivers, which should be noted in event service work is necessary in the circuits that differ from the diagrams.

Group 1—	C-52	1120 mmfd.
	R-18	60,000 ohms
	R-19	100,000 ohms
	R-20	15,000 ohms
Group 2—	C-52	200 mmfd.
	R-18	100,000 ohms
	R-19	60,000 ohms
	R-20	10,000 ohms

RADIOTRON SOCKET VOLTAGES

120-Volt A.C. Line—Maximum Volume and Sensitivity—No Signal

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		4.2	110	272	10.5	6.3
RCA-6A7	Oscillator	—	—	225	11.4	6.3
	1st Detector	4.6	110	282		
RCA-6D6 I. F.		4.2	110	272	10.5	6.3
RCA-75 2nd Det.		1.2	—	170*	0.4	6.3
RCA-76 A. F.		14.0	—	252	2.8	6.3
RCA-42 Power		22.0	295	290	24.5	6.3
RCA-42 Power		22.0	295	290	24.5	6.3
RCA-5Z3 Rectifier		—	—	768/384 R. M. S.	110.0	5.0

*Cannot be measured with ordinary voltmeter.

MODEL 143,242
Trimmer Layout
Alignment Data

RCA-VICTOR CO., INC.

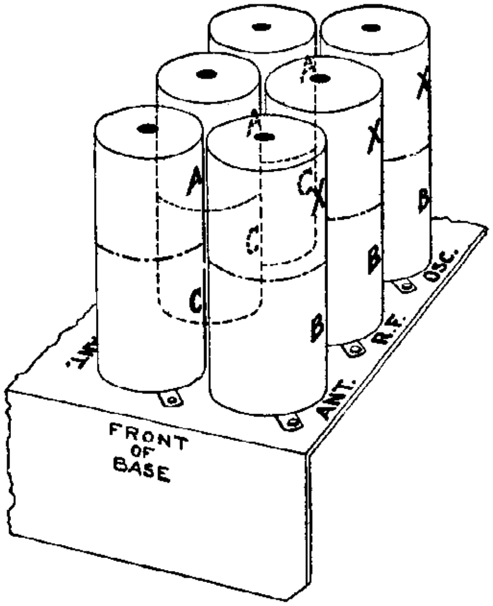


Figure 6—Location of Coils in Shields

Group 3—R-28 and C-52 are removed from the resistor board inside of chassis and mounted externally on phonograph terminal board. No. 3 terminal has been added to terminal board. Electrically, this group is identical with Group 2, the schematic and wiring diagrams being shown in Figures 1 and 5.

Group 4—Resistor R-10 has been removed. Resistor R-59 has been added and Resistor R-21 has been changed to 2 megohms. Capacitors C-52 and C-43 have been changed to 1120 mmfd. Figures 2 and 7 show the schematic and wiring diagrams of the models having these changes.

(7) FIDELITY LINK

It will be noted that a small link is mounted on the rear apron of the chassis which is closed on table models and open on console models. The purpose of the link is to increase the low frequency output of the receiver when open.

(8) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made.

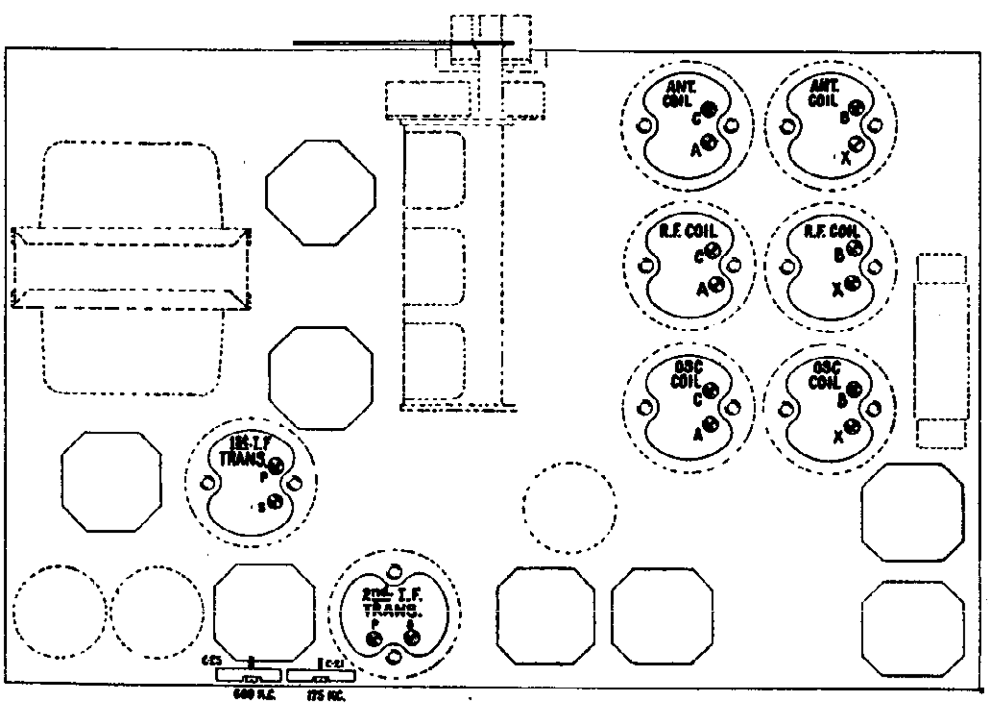
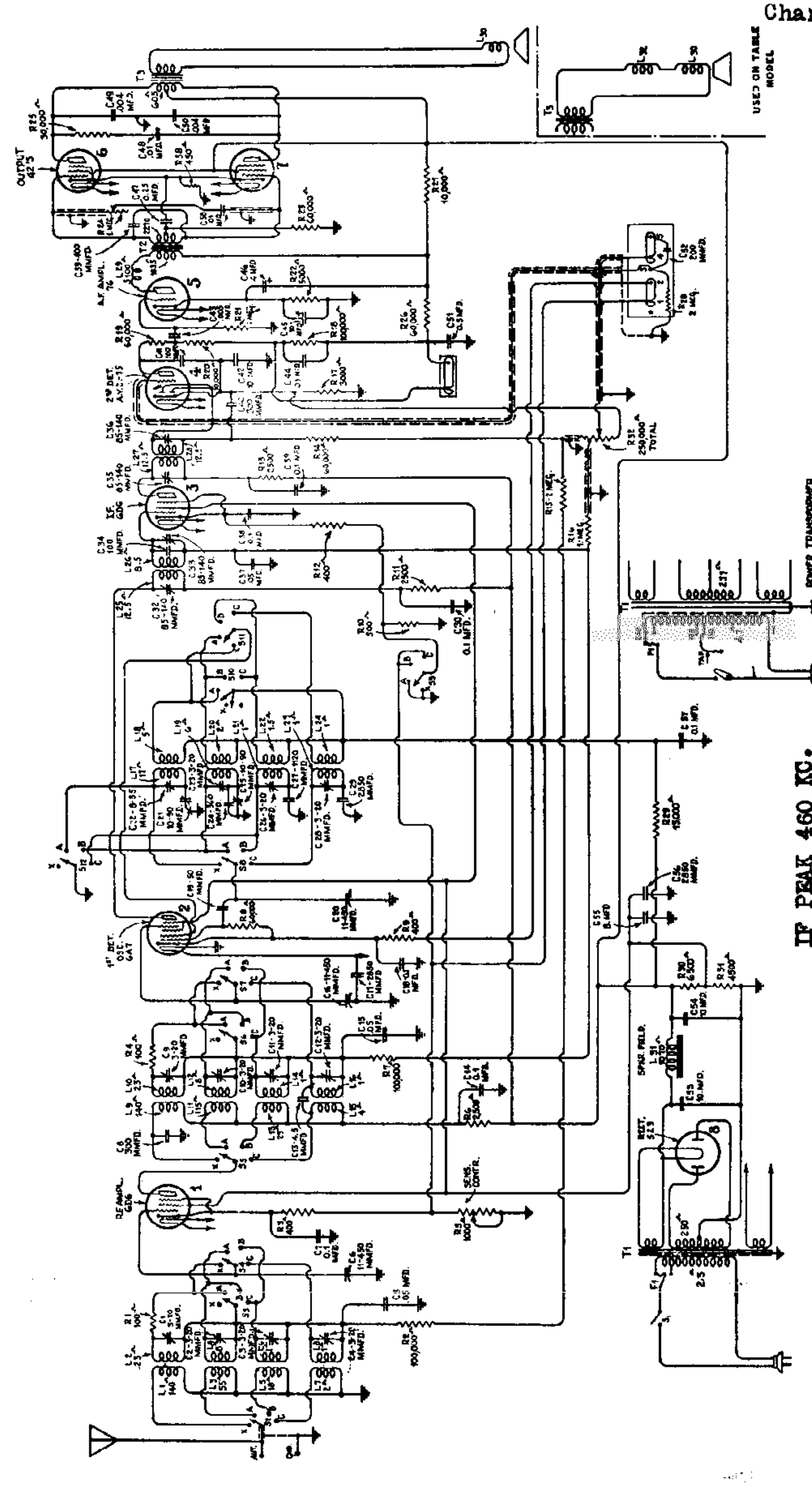


Figure 8—Location of Trimmer Capacitors

MODEL 143,242
Schematic with
Sensitivity Cont.
Change

RCA-VICTOR CO., INC.



IF PEAK 460 KC.

Figure 1—Schematic Circuit Diagram—Sensitivity Control Change with Band position

MODEL 143,242
Schematic with
Fidelity Change

RCA-VICTOR CO., INC.

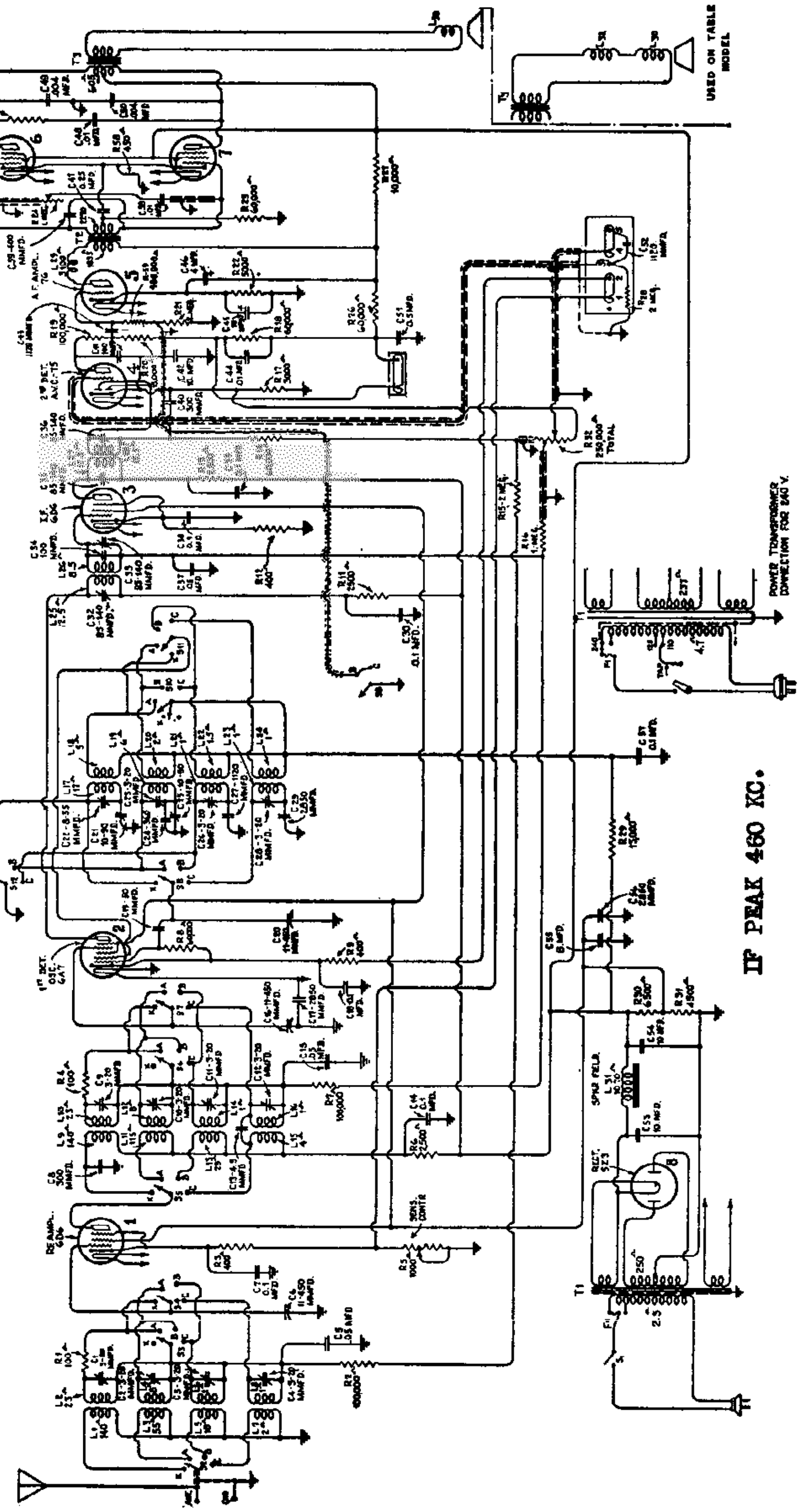


Figure 2—Schematic Circuit Diagram—Fidelity Change with Band position

RCA-VICTOR CO., INC.

MODEL 143,242
Socket Layout
Parts Schematics

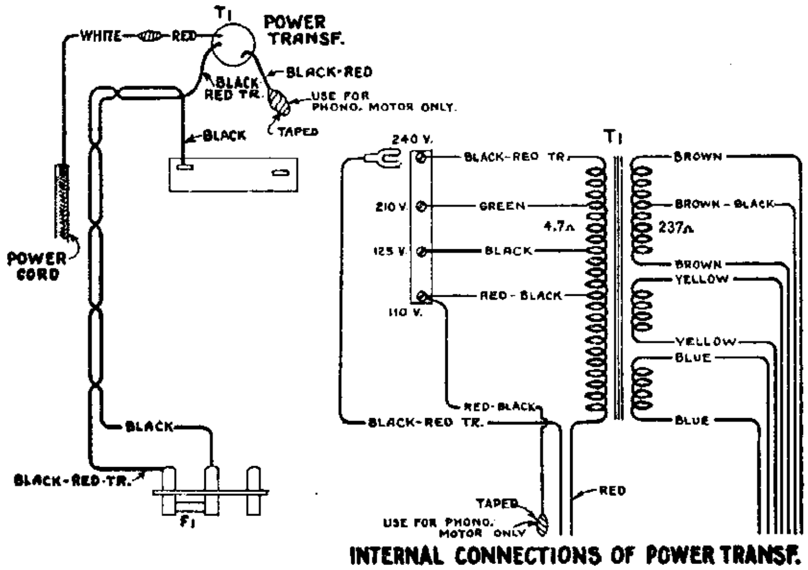
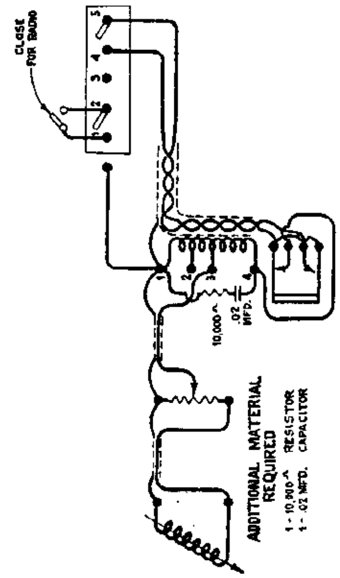
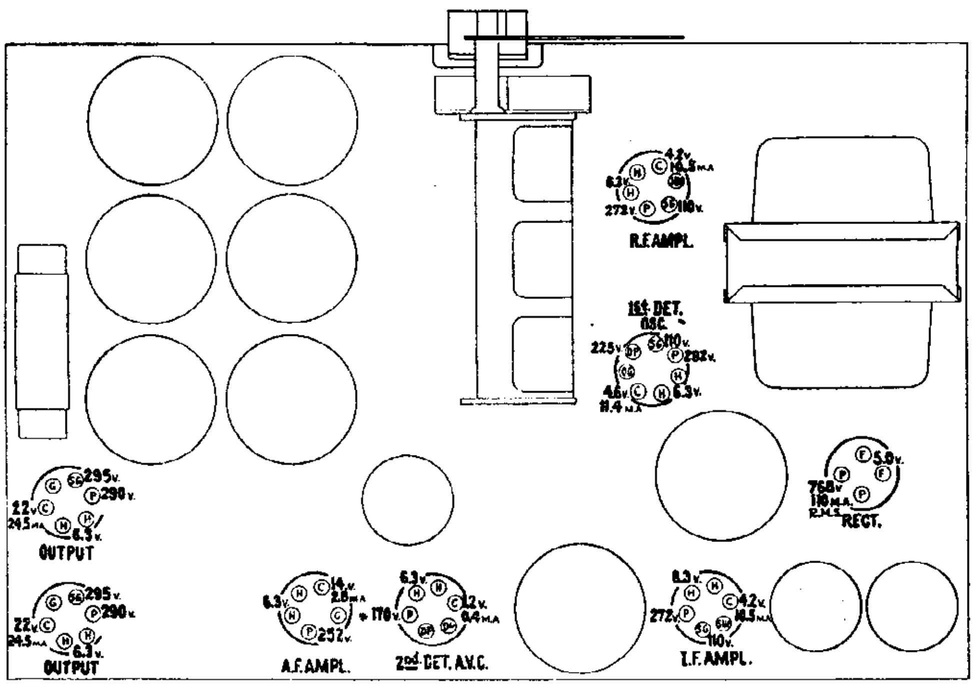


Figure 9—Universal Power Transformer Connections

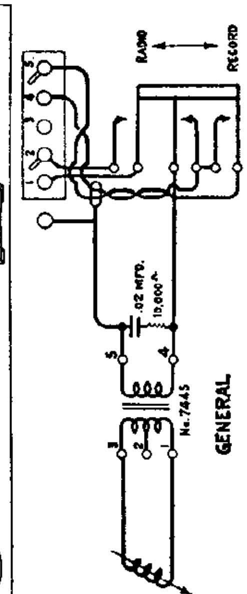


End-Table Connections

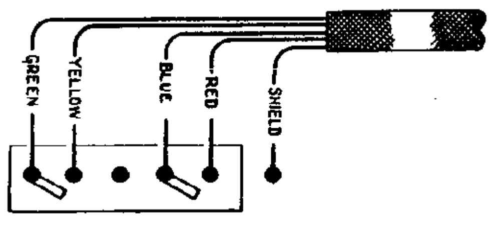


ALL VOLTAGES ARE TO GROUND

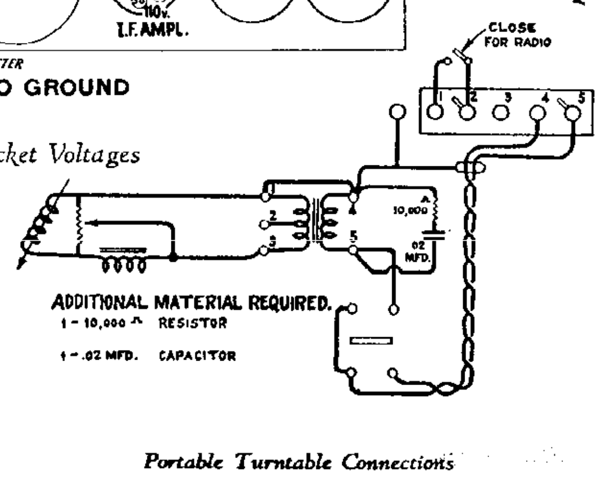
Figure 10—Radiotron Socket Voltages



General Connections



Junior "Duo" Connections



Portable Turntable Connections

Figure 11—Magnetic Pickup Connections—Place Range Switch in A or X position during record reproduction for models with fidelity switching

MODEL 143, 242
Chassis Wiring
with Fidelity Change

RCA-VICTOR CO., INC.

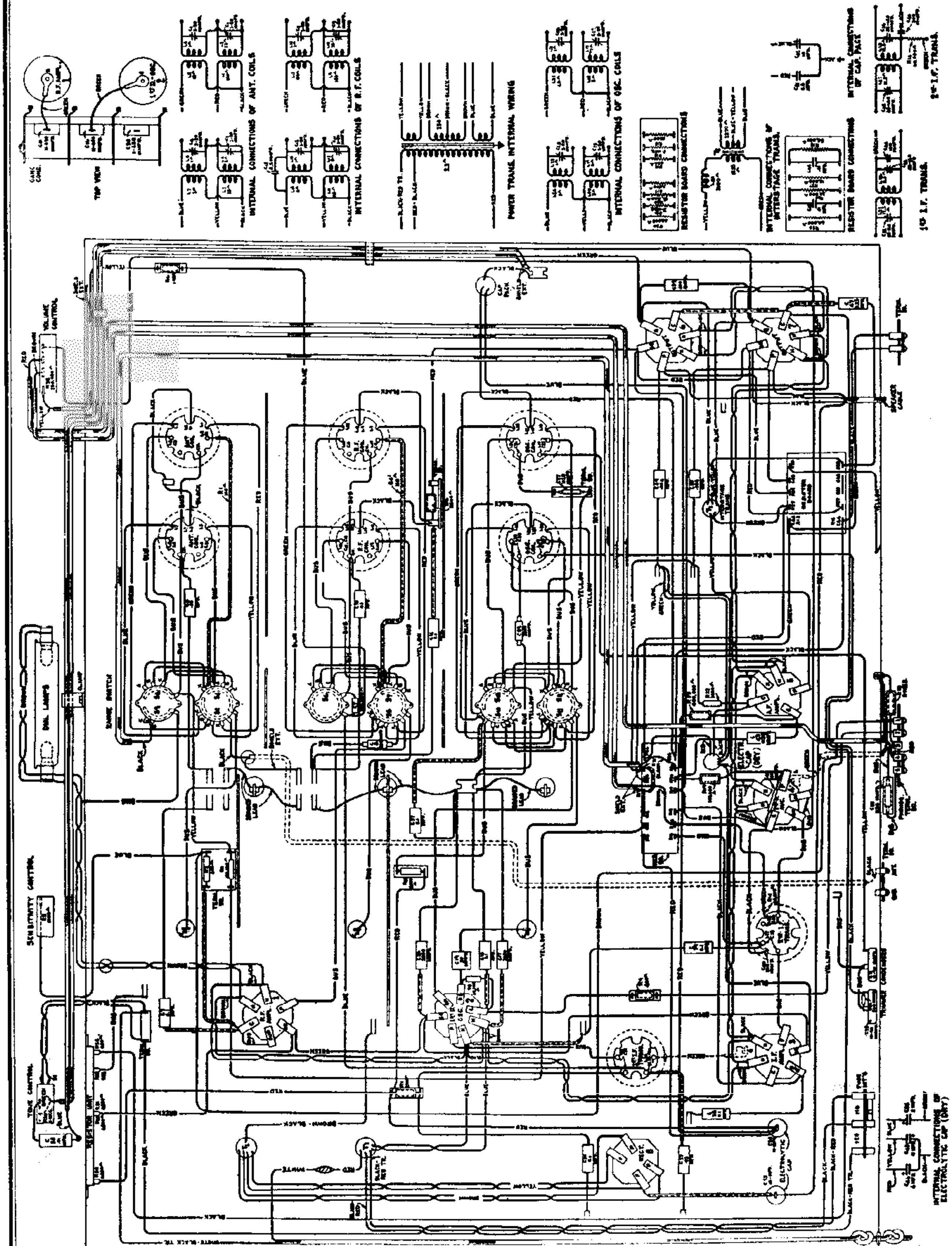


Figure 7—Wiring Diagram—Fidelity Change with Band position

MODEL 143,242
Chassis Wiring
with Sensitivity
Change

RCA-VICTOR CO., INC.

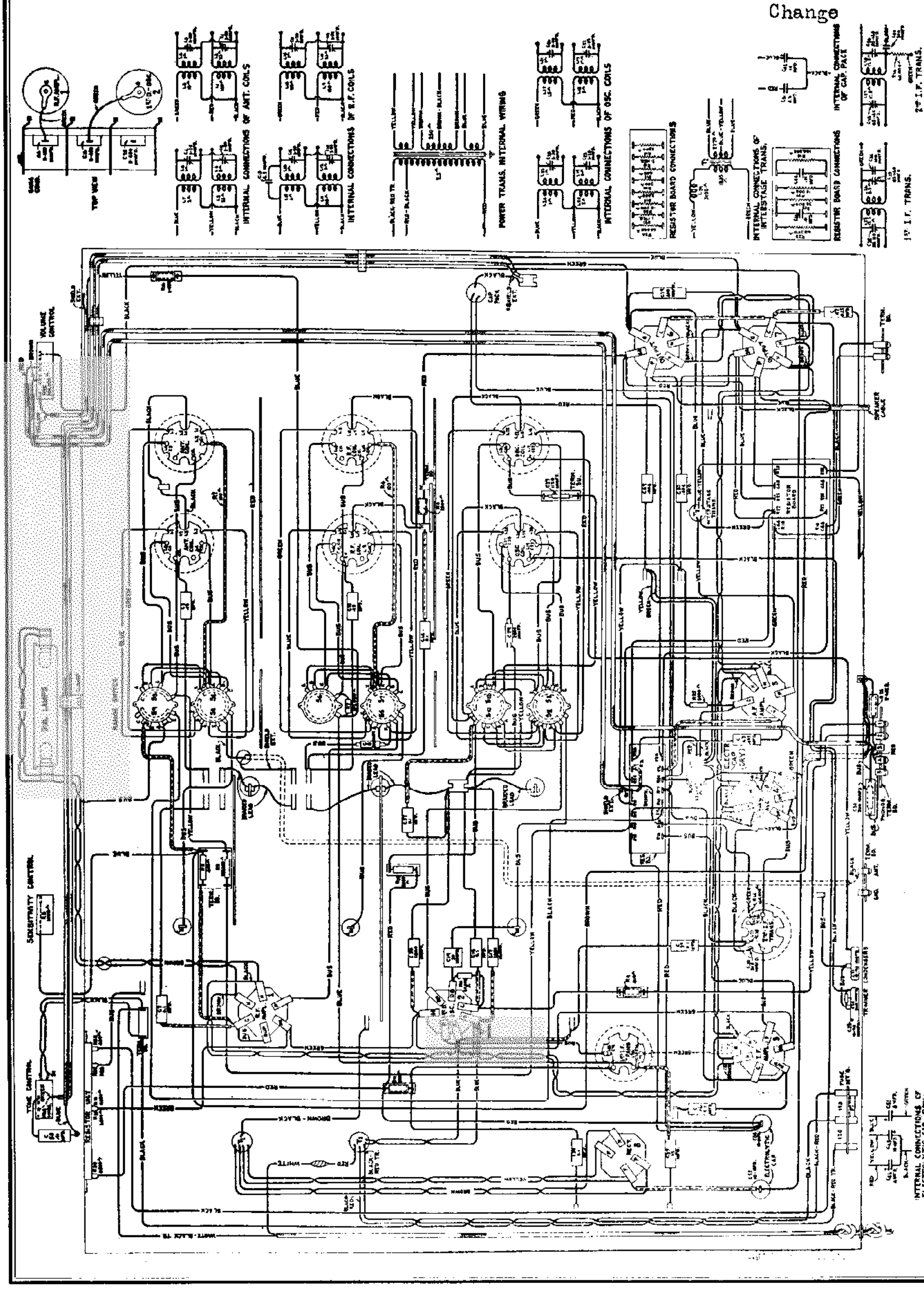


Figure 5—Wiring Diagram—Sensitivity Control Change with Band position

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4632	Board—Terminal board—Two terminals and link—For changing fidelity	$0.25
4379	Board—Antenna terminal board	.20
4427	Bracket—Volume control, tone control or noise suppressor mounting bracket	.18
4244	Cap—Contact cap—Package of 5	.20
3861	Capacitor — Oscillator trimmer capacitor (C21, C25)	.78
4633	Capacitor—50 mmfd. (C19)	.25
4635	Capacitor—100 mmfd. (C41)	.25
4697	Capacitor—200 mmfd. (C52)	.35
3937	Capacitor—300 mmfd. (C8)	.34
4413	Capacitor—360 mmfd. (C24)	.22
4183	Capacitor—400 mmfd. (C59)	.26
4412	Capacitor—1120 mmfd. (C27)	.25
4409	Capacitor—1120 mmfd. (C43)*	.35
4634	Capacitor—1120 mmfd. (C52)*	.35
4524	Capacitor—2850 mmfd. (C29)	.35
4615	Capacitor—2850 mmfd. (C17, C56)	.34
4628	Capacitor—0.004 mfd. (C49, C50)	.28
6512	Capacitor—0.005 mfd. (C43)	.28
3787	Capacitor—0.01 mfd. (C48)	.30
4212	Capacitor—0.01 mfd. (C44)	.30
4624	Capacitor—0.01 mfd. (C58)	.54
3888	Capacitor—0.05 mfd. (C37)	.25
4417	Capacitor—0.05 mfd. (C5, C15)	.25
3877	Capacitor—0.1 mfd. (C38)	.32
4415	Capacitor—0.1 mfd. (C18)	.30
4645	Capacitor—0.1 mfd. (C7, C14, C30, C39, C57)	.25
3750	Capacitor—0.25 mfd. (C47)	.36
7790	Capacitor—10 mfd. (C53, C54)	1.05
4619	Capacitor pack—Comprising one 0.5 mfd., one 10 mfd. capacitor (C42, C51)	1.44
4626	Capacitor pack—Comprising one 4 mfd., one 10 mfd. and one 8 mfd. capacitor (C45, C46, C55)	2.82
4358	Clamp—Electrolytic capacitor clamp—For capacitor stock No. 7790	.15
4693	Clamp—Electrolytic capacitor clamp—For capacitor stock No. 4626	.15
7810	Coil—Antenna coil "PB-LW" (L1, L2, L5, L6, C1, C3)	2.10
7803	Coil—Antenna coil "B.S.W." (L3, L4, L7, L8, C2, C4)	1.82

* R18—60,000 ohms—Some models.
* R19—100,000 ohms—Some models.

Stock No.	Description	List Price
7808	Coil—Detector coil "P.B.-L.W." (L9, L10, L13, L14, C9, C11)	$2.05
7805	Coil—Detector coil "B.-S.W." (L11, L12, L15, L16, C10, C12, C13)	2.15
7807	Coil—Oscillator coil "B.S.W." (L19, L20, L23, L24, C23, C28)	1.62
7809	Coil—Oscillator coil "P.B.-L.W." (L17, L18, L21, L22, C22, C26)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C16, C20)	4.42
4371	Cover—Fuse mount cover	.15
4631	Cover—Terminal strip cover	.15
10907	Fuse—3-ampere—Package of 5	.40
3376	Mount — Fuse mount — 105-125-volt instrument	.40
4604	Mount—Fuse mount for 200-250-volt instrument	.35
4625	Resistor—Wire wound resistor—Comprising one 6500-ohm-4500-ohm and 450 section (R30, R31, R58)	.70
3704	Resistor—400 ohms—Carbon type—¼ watt—Package of 5 (R9, R3, R12)	1.00
4622	Resistor—500 ohms—Carbon type—¼ watt—Package of 10 (R10)	2.00
4338	Resistor — 2500 ohms — Carbon type — ¼ watt—Package of 10 (R6, R11, R13)	2.00
4242	Resistor — 3000 ohms — Carbon type — ¼ watt—Package of 5 (R17)	1.00
4436	Resistor — 5000 ohms — Carbon type — ¼ watt—Package of 10 (R22)	2.00
3881	Resistor—10,000 ohms—Carbon type—¼ watt (R20)—Package of 5	1.00
3998	Resistor—15,000 ohms—Carbon type—¼ watt—Package of 5 (R20)	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R8, R18*, R19, R23, R26)	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5 (R2, R7, R18, R19*)	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R59)—Package of 5	1.00
3033	Resistor — 1 megohm — Carbon type — ¼ watt—Package of 5 (R16, R21)	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt—Package of 5 (R15, R21,* R28)	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt—Package of 5 (R27)	1.00
4623	Resistor—13,000 ohms—Carbon type—½ watt—Package of 10 (R29)	2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R25)	.22
4418	Resistor—100 ohms—Flexible type—Package of 10 (R1, R4)	1.50
4618	Rheostat—Sensitivity control (R5)	1.25

* R20—15,000 ohms—Some models.
* R21—2 megohms—Some models.
* C52—1120 mmfd.—Some models.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
7800	Shield—Antenna, detector or oscillator coil shield	$0.45
4627	Shield—First detector—Oscillator Radiotron shield	.36
7488	Shield—First detector—Oscillator Radiotron shield top	.20
4452	Shield—I. F. amplifier Radiotron shield	.35
4629	Shield—I. F. amplifier Radiotron shield top	.15
4563	Shield—Oscillator coil wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal board, clamp and resistor	.32
4664	Shield—Oscillator wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal strip and resistor	.36
4630	Shield—R. F. amplifier—Radiotron shield	.36
4665	Shield—R. F. coil wiring shield with two resistors and terminal board	.50
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4617	Switch—Range switch (S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12)	3.32
4616	Tone control (R24, S1)	1.28
4431	Transformer—First intermediate frequency transformer (L25, L26, C32, C33, C34)	2.28
9505	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	6.35
9506	Transformer—Power transformer—105-125 volts—25-40 cycles	8.90
9507	Transformer—Power transformer—105-250 volts—40-60 cycles	6.40
4433	Transformer—Second intermediate frequency transformer (L27, L28, C35, C36, C40, R14)	2.15
4620	Transformer and reactor—Interstage transformer and reactor (T2, L29)	2.98
4519	Volume control (R32)	1.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	.88
7799	Drive—Variable tuning condenser drive complete	2.45

Stock No.	Description	List Price
4364	Gear—Spring gear assembly complete with hub, pinion, gear cover and spring	$0.96
4704	Indicator—Band indicator—Celluloid	.12
4367	Indicator—Station selector vernier pointer—Small	.15
4520	Indicator—Station selector main pointer—Large	.18
3943	Screen—Translucent screen for dial light—Package of 2	.18
3993	Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or spdenser drive—Package of 10	.25
4377	Spring — Band indicator and arm tension spring—Package of 5	.25
4360	Stem—Station selector pointer stem	.35
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	REPRODUCER ASSEMBLY (TABLE MODEL)	
9534	Coil—Field coil (L31)	1.90
9533	Cone—Cone mounted and centered on housing (L30)	3.50
9532	Reproducer complete	7.50
9535	Transformer—Output transformer (T3)	1.50
	REPRODUCER ASSEMBLY (CONSOLE MODEL)	
4636	Cable—4-conductor—Reproducer cable	.50
9537	Coil—Field coil magnet and cone support (L31)	3.85
8969	Cone—Reproducer cone—Package of 5 (L30)	6.35
9536	Reproducer complete	8.40
4637	Transformer—Output transformer (T3)	1.50
	MISCELLANEOUS PARTS	
4677	Bezel—Metal bezel (escutcheon) for station selector dial	.56
4621	Dial—Station selector dial	.65
6614	Glass—Station selector dial glass	.30
4449	Knob—Station selector, volume control, tone control, noise suppressor rheostat on range switch knob—Package of 5	.60
4340	Lamp—Dial lamp—Package of 5	.60
4678	Ring—Retaining ring for dial glass—Package of 5	.35
4446	Screw assembly—Chassis mounting screw assembly—Comprising four screws, four lockwashers, four washers, four spacers and eight cushions	28
4613	Screw—No. 8-32-$\frac{1}{4}$" headless set screw for knobs—Package of 10	.25

RCA-VICTOR CO., INC.

MODEL 221
Trimmer Data
Alignment Data
Voltage

Electrical Specifications

Voltage Rating..100–125 Volts
Frequency Rating.............................25–60 and 50–60 Cycle
Power Consumption.............60 Cycle, 75 Watts; 25 Cycle, 80 Watts
Number and Type of Tubes...2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges.........540 K. C.–1500 K. C.—5400 K. C.–15,350 K. C.
Undistorted Output...1.75 Watts

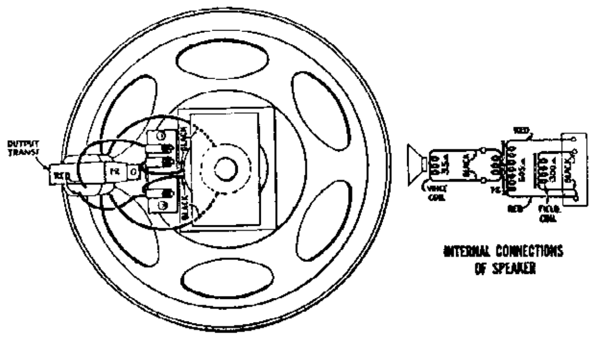


Figure C—Loudspeaker Wiring

This receiver is a six-tube two-band A. C. operated Superheterodyne Receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two-position switch. Other features include a double reduction vernier drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, ten-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Capacitor Adjustments

In order to properly align this receiver, it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1400 K. C., the dial indicator at 1400 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 15 on the megacycle scale. Adjust the three trimmer capacitors designated as S. W. in Figure D for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

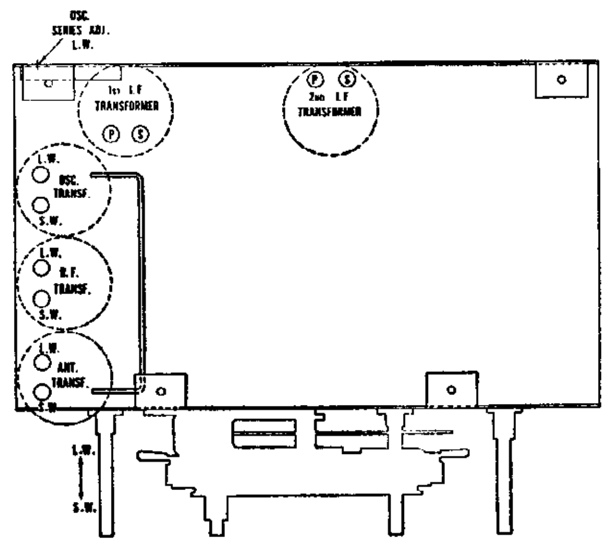


Figure D—Location of Line-Up Capacitors

115 Volts, A. C. Line—No Signal

Type No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.42
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.42
3. RCA-58 I. F.	3.0	100	265	6.0	2.42
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.42
5. RCA-2A5 Power	16.0	255	240	35.0	2.42
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

* The voltages and current refer to the detector part of the tube.

MODEL 221
Chassis Wiring

RCA-VICTOR CO., INC.

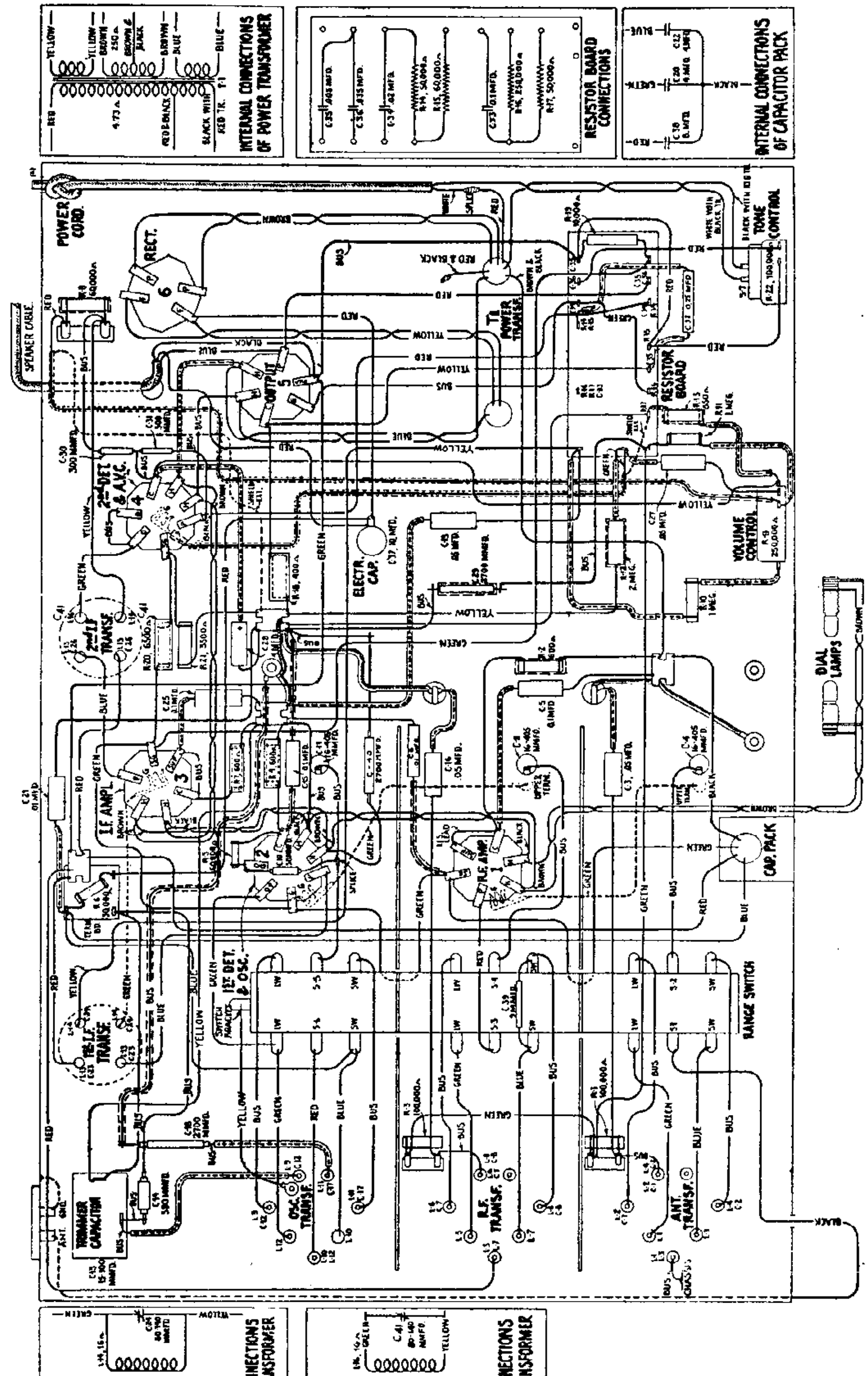


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

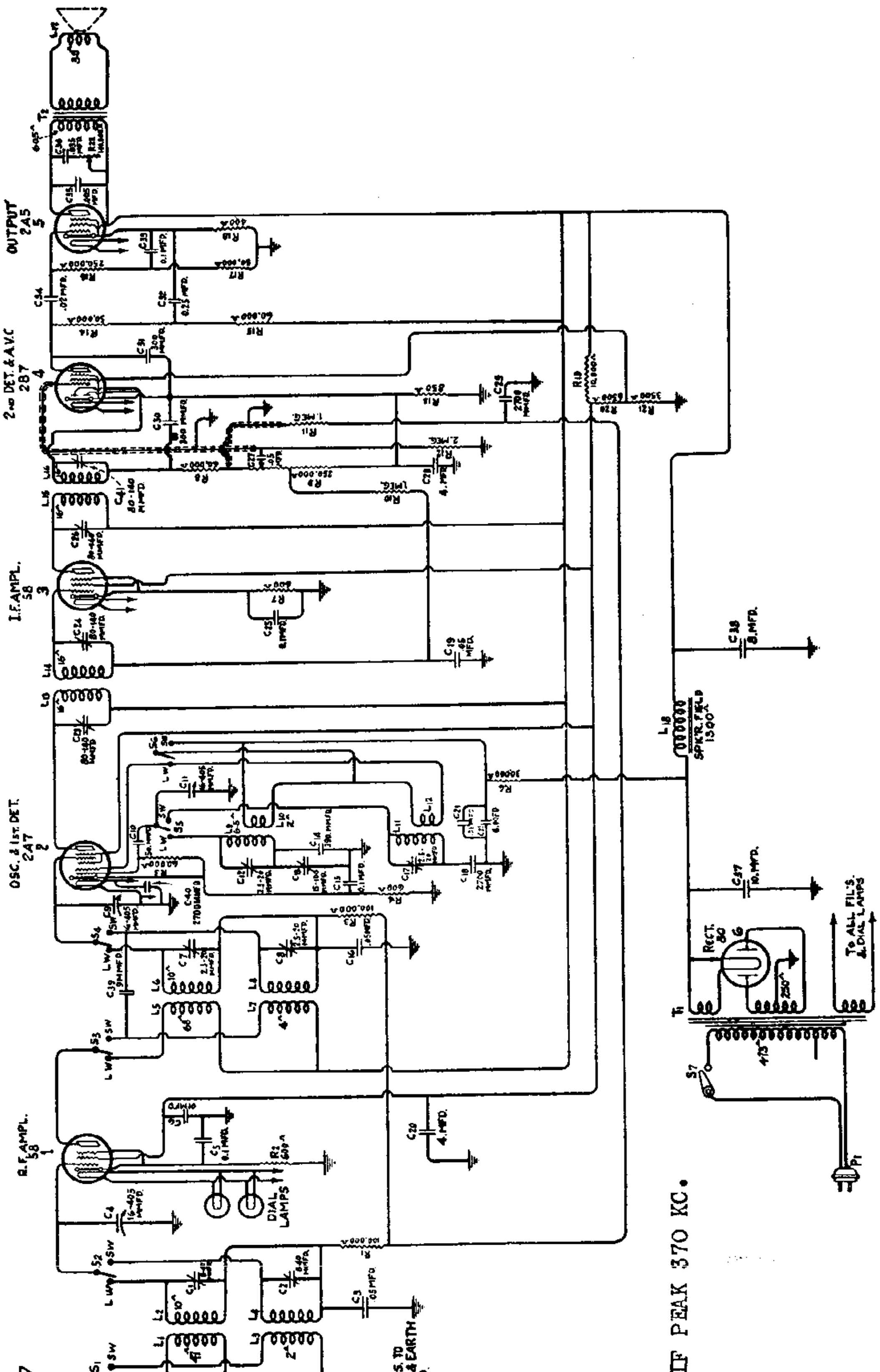


Figure A—Schematic Circuit Diagram

MODEL 221
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R6)	
2747	Cap—Contact cap	
3056	Shield—2nd detector Radiotron shield	
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)	
3252	Resistor—100,000 ohms—Carbon type—½ watt (R1, R3)	
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)	
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)	
3529	Socket—Dial lamp socket	
3572	Socket—7-contact Radiotron socket	
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)	
3631	Resistor—850 ohms—Carbon type—½ watt (R13)	
3639	Capacitor—.02 mfd. (C34)	
3683	Shield—Radiotron shield top	
3701	Capacitor—.01 mfd. (C6, C21)	
3702	Capacitor—.25 mfd. (C32)	
3768	Screw—Square head No. 6-32-¼" set screw for condenser drive	
3796	Capacitor—4. mfd. (C28)	
3849	Capacitor—50 mmfd. (C10)	
3859	Socket—4-contact Radiotron socket	
3861	Capacitor—Adjustable capacitor (C13)	
3877	Capacitor—.1 mfd. (C5, C15, C25, C33)	
3878	Screw—No. 4-40-$\frac{3}{16}$" screw for fastening station selector pointer	
3888	Capacitor—.05 mfd. (C19, C27)	
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)	
3897	Resistor—400 ohms—Carbon type—1 watt (R18)	
3901	Capacitor—.05 mfd. (C3, C16)	
3905	Screw—Chassis mounting screw assembly comprising 4 screws, 4 washers, and 4 cushions	
3906	Mounting assembly — Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers	
3937	Capacitor—300 mmfd. (C30, C31)	
3938	Capacitor—9 mmfd. (C39)	
3939	Resistor — 3,500 ohms — Carbon type — ½ watt (R21)	
3942	Shield—1st detector Radiotron shield	
3943	Screen—Translucent screen for dial light	
3944	Shield—Antenna, R. F. or oscillator coil shield	
3991	Resistor—10,000 ohms—Porcelain type (R19)	
4031	Capacitor—2,700 mmfd. (C18, C29, C40)	
4032	Capacitor—390 mmfd. (C14)	
4075	Knob—Range switch or tone control knob	
4119	Screw—No. 8-32-¼" headless cup point set screw for station selector knob	
4120	Knob—Volume control knob	
4121	Knob—Station selector knob	
6188	Resistor—2 megohm—Carbon type—½ watt (R12)	
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)	
6571	Capacitor—10 mfd. (C37)	
6614	Glass—Station selector dial glass	
6615	Ring—Retaining ring for dial glass	
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	
6676	Socket—6-contact Radiotron socket—Output	
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	
6695	Volume control (R9)	
6696	Switch—Range switch (S1, S2, S3, S4)	
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26, C41)	
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	
6702	Drive—Variable tuning condenser drive assembly complete	
6703	Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38)	
6704	Shaft—Tuning condenser drive assembly shaft	
6705	Tone control complete (R22)	
6841	Dial—Station selector dial	
6842	Pointer—Station selector pointer	
7485	Socket—6-contact Radiotron socket	
7487	Shield—I. F. and R. F. amplifier Radiotron shield	
9446	Transformer—Power transformer—105–125 volts 50–60 cycles (T1)	
9451	Transformer—Power transformer—105–125 volts 25–40 cycles	
10194	Ball—Steel ball for condenser drive assembly	
	REPRODUCER ASSEMBLIES	
6770	Transformer—Output transformer (T2)	
6843	Cable—3-conductor reproducer cable	
8935	Cone—Reproducer cone (L17)	
9460	Coil—Field coil, Magnet and cone support (L18)	
9461	Reproducer complete	

RCA VICTOR MODEL 223
SERVICE NOTES

Electrical Specifications

Voltage Rating..............26-40 Volts D. C.
Power Consumption........60 Watts at 32 Volts
Number and Types of Radiotrons.....2 RCA-6D6, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-38, 1 RCA-84 —Total, 6
Type of Ballast Lamp.............Amperite 5-16
Undistorted Output....1.1 Watts (Max. 1.6 Watts)
Tuning Frequency Range.....540 K. C.–1500 K. C. and 1400 K. C.–2800 K. C.

This receiver is a six-tube, 32-volt D. C. superheterodyne designed primarily for operation from 32-volt farm lighting circuits. Excellent sensitivity and selectivity, large undistorted output and excellent tone quality are inherent features of this receiver. Other outstanding features include 10-inch electro-dynamic loudspeaker, wide tuning range (police, aviation and broadcast), ballast lamp for voltage fluctuations, and a separate power supply with a newly designed filter units.

Figure 1 shows the schematic circuit diagram, Figures 2 and 3 the chassis and power unit wiring, and Figure 5 the assembly wiring diagram. The replacement parts are given on page 9.

Description of Circuit

The circuit of this receiver is similar in many ways to the usual six-tube superheterodyne, although the power supply differs in several respects. Chiefly among the differences is the use of a vibrator interrupter for obtaining alternating current and a tube rectifier for rectifying it at a higher voltage.

The R. F. stage uses Radiotron RCA-6D6, which is a six-volt heater type super-control R. F. amplifying tube. The function of this stage is to select and amplify the desired incoming signal and apply it to the first detector.

The next tube is a combined oscillator-detector which is known as the RCA-6A7 and which provides a local signal and a detector for obtaining an I. F. frequency. The local oscillator, due to the bridge circuits used, provides a signal that has a constant frequency difference from the incoming R. F. signal (175 K. C. higher) at all points throughout the tuning range. The detector portion of the tube serves to extract the beat frequency from the combined signals (oscillator and signal) and apply it to the grid of the I. F. stage.

The plate circuit of the first detector and the grid and plate circuits of the I. F. tube are all tuned by means of small adjustable capacitors to 175 K. C. This group of tuned circuits, together with the R. F. circuits, provides the high selectivity of the receiver. Radiotron RCA-6D6 is used in the I. F. stage.

Radiotron RCA-6B7 is used as a diode second detector, automatic volume control and audio amplifier. The D. C. component of the rectified I. F. signal on the second detector diode is used for automatic bias on the R. F., first detector and I. F. tubes. The audio component of the rectified signal is applied to the pentode section of the RCA-6B7 for further amplification at audio frequencies.

The output of the second detector is applied to the grid of Radiotron RCA-38, pentode output amplifier. Resistance coupling is used between the detector and the output tube while a step-down transformer serves as an impedance matching device between the plate circuit of the RCA-38 and the voice coil of the loudspeaker.

Field excitation for the loudspeaker is obtained by connecting it directly across the 32-volt direct current supply. Heater excitation for the tubes described is obtained by connecting them in series and placing the entire circuit across the 32-volt line.

Plate and grid voltages for all tubes are obtained from a special plate supply unit which consists of a vibrator, a tube rectifier, a thermal voltage regulator and a special filter network for reducing hum or vibrator interference to a negligible degree. The purpose of the vibrator is to interrupt the direct current and apply it first in one direction and then in the opposite direction across individual sections of the primary of the power transformer. The transformer steps the voltage up several times and applies it to the plates of the full-wave rectifier, Radiotron RCA-84. The filament of this tube is connected in series with the Amperite 5-16 voltage regulating tube. This regulating tube maintains a constant current through the rectifier filament over a wide variation of line voltages.

The range switch provides a quick means of shifting from one frequency band to the other. The regular band covers from 540 K. C. to 1500 K. C., while the police band covers from 1400 K. C. to 2800 K. C. This shift is accomplished in the following manner.

A tap is provided on the grid coils of the R. F. and first detector circuits. Also additional coupling capacitors are connected from the antenna to the R. F. grid and from the R. F. plate to the first detector grid. In the oscillator, R. F. and detector circuits, an extra trimmer capacitor is available for paralleling to the main tuning condenser. The effect of these various taps and capacitors is to change the tuning range as follows:

1. At the broadcast position all of the additional circuits are open as shown in Figure 1.

2. At the police band position, all of the additional switches are closed. Shorting of turns in the grid coils reduces their inductance so that the tuning capacitors cover the high frequency range. Connecting the two coupling capacitors increases the coupling and thereby the sensitivity at the higher frequency position. The trimmer capacitor on the oscillator circuit provides proper tracking with the R. F. circuits.

Line-up Adjustments

Inoperation, poor tone quality, or lack of proper sensitivity and selectivity are direct results of lack of alignment. In event the receiver is to be aligned, carefully use the following procedure:

I. F. TUNING ADJUSTMENTS—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter. Test Oscillator, Stock No. 9050, is suitable and recommended for making these adjustments.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. AND OSCILLATOR ADJUSTMENTS—The three-gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C. (Stock No. 9050), a non-metallic screwdriver such as Stock No. 4160, and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position. Also the minimum input signal necessary from the oscillator will permit a more accurate adjustment.

TUBE SOCKET VOLTAGES

32-Volt D.C. Input — No Signal — Volume Control at Minimum

Radiotron No.	Cathode to Ground, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
RCA-6D6 R. F.	8.4	77	216	4.2	6.2
RCA-6A7—Osc. Det.	9.7	76	215	6.5	6.2
RCA-6D6 I. F.	8.4	77	216	4.2	6.2
RCA-6B7—2nd Det.	5.7	80	52	1.9	6.2
RCA-38 Pwr.	19.5	205	197	21.5	6.2
RCA-84 Rect.	244			50	6.5–7.0*

*Varies with ballast tubes and with time.

RCA-VICTOR CO., INC.

SUPPRESSION OF GENERATOR AND IGNITION INTERFERENCE

Operating this receiver while the 32-volt generator is running may present difficulties caused by the radiation of radio-frequency interference from the generator and gasoline engine. This interference usually travels over the lighting lines and is picked up by the antenna system of the receiver. There are two methods of reducing this interference, both of which may be required in bad cases.

1. Suppression of the interference at its source by means of the accessories furnished with the receiver.
2. Placing the antenna in such a position that the interference will not be picked up, and using a Stock No 7718 Shield Kit for transmitting the signal from the antenna to the receiver without picking up noise on the lead-in.

Figure 4 shows a typical installation of the suppression equipment. This equipment is connected as follows:

SUPPRESSOR:—In single-cylinder installations, the suppressor is connected to the spark-plug for the suppression of the high-tension interference generated at this point. In twin-cylinder installations, the single distributor type suppressor should be installed and should eliminate this interference. However, in some cases it may be necessary to install both distributor and plug suppressors.

GENERATOR CAPACITOR:—A capacitor is connected from each brush of the generator to the generator frame, which must be grounded. This reduces the interference caused by sparking at the commutator of the generator. If excessive sparking occurs, it is very unlikely that the capacitors will reduce the noise sufficiently. In this case, the commutator must be thoroughly cleaned and sanded and the brushes reseated. In bad cases it is usually best to clean the foreign matter from between the commutator segments by means of a three-cornered file, and then sand the commutator by placing the sand-paper around a small block and holding it squarely against the commutator while it is running. *Never use emery cloth.*

COIL CAPACITOR:—Some installations will require a capacitor connected from the battery side of the ignition coil to ground. This reduces the interference caused by the primary breaker.

GROUNDS:—It is important that the frame of the generator be thoroughly grounded. A steel ground-rod, driven at least six feet in moist earth, provides a good ground. In event one side of the line is grounded, it is important that the ground be a good one. The ground should be applied at the generator, at the point where the line enters the building where the radio receiver is located and at the extreme far end of the line.

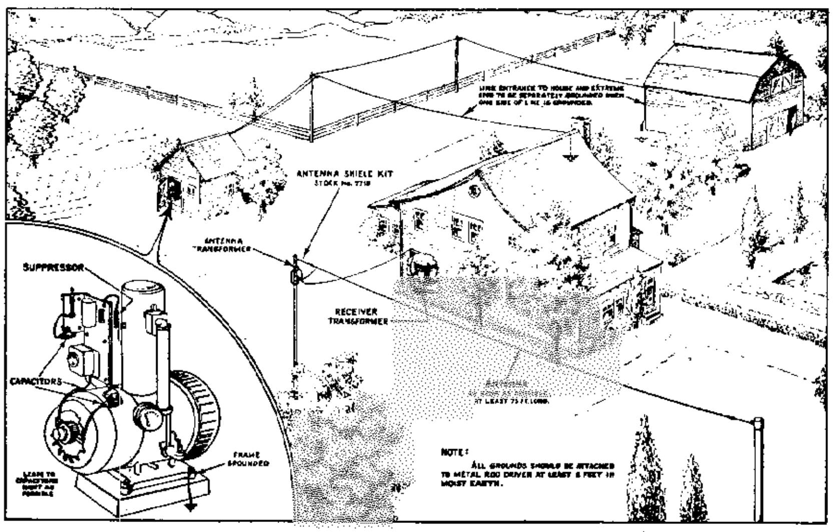


Figure 4—Typical Installation showing suppression equipment and proper antenna system

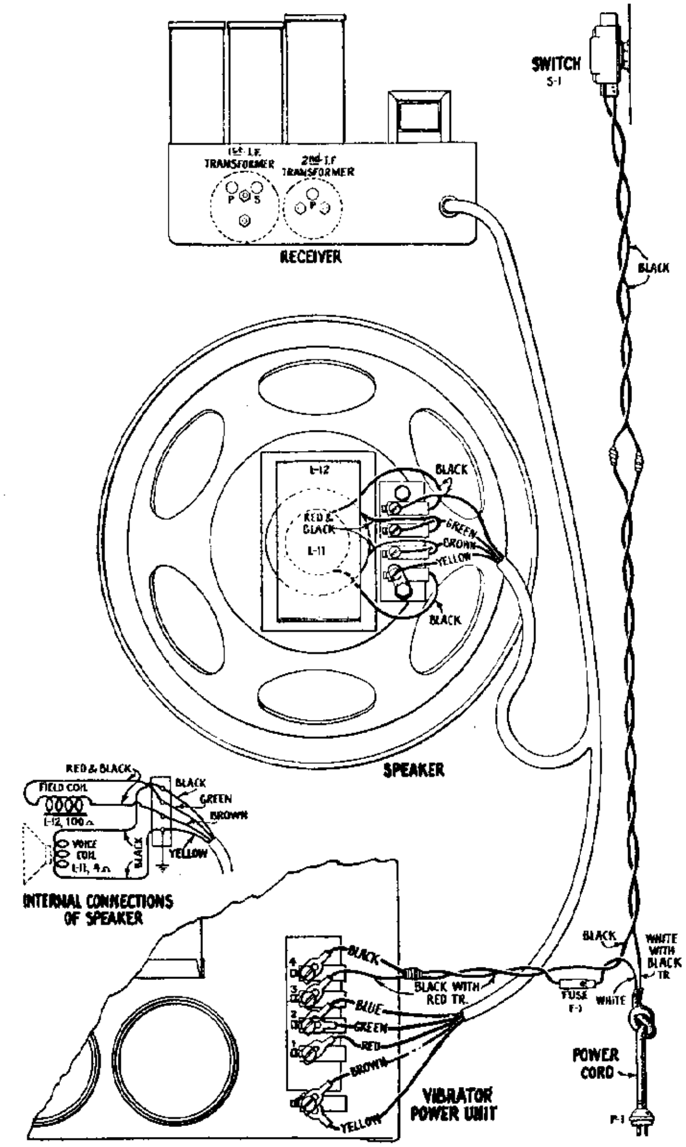
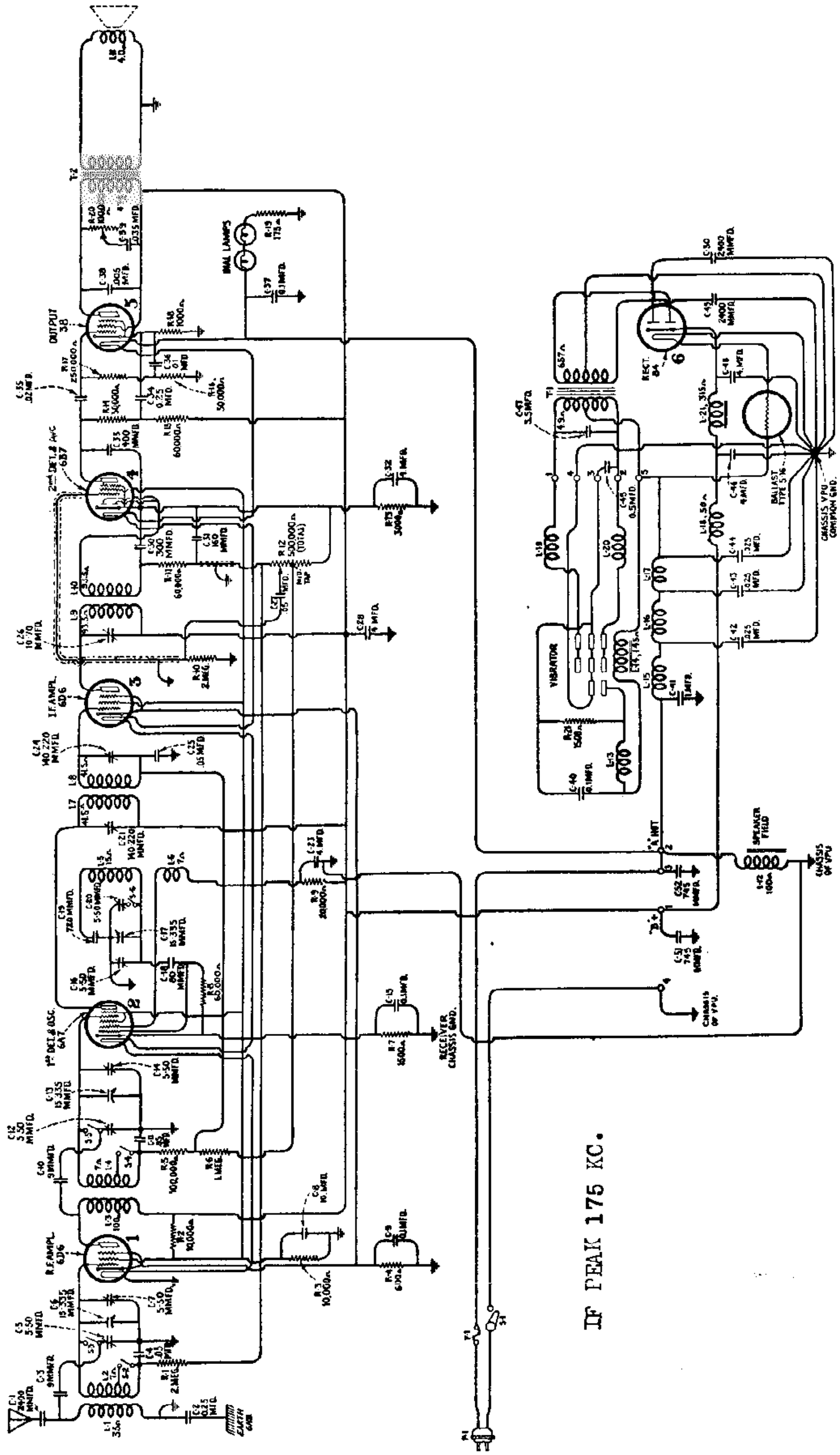


Figure 5—Assembly Wiring Diagram

RCA-VICTOR CO., INC.



IF PEAK 175 KC.

Figure 1—Schematic Circuit Diagram

MODEL 223
Chassis Wiring

RCA-VICTOR CO., INC.

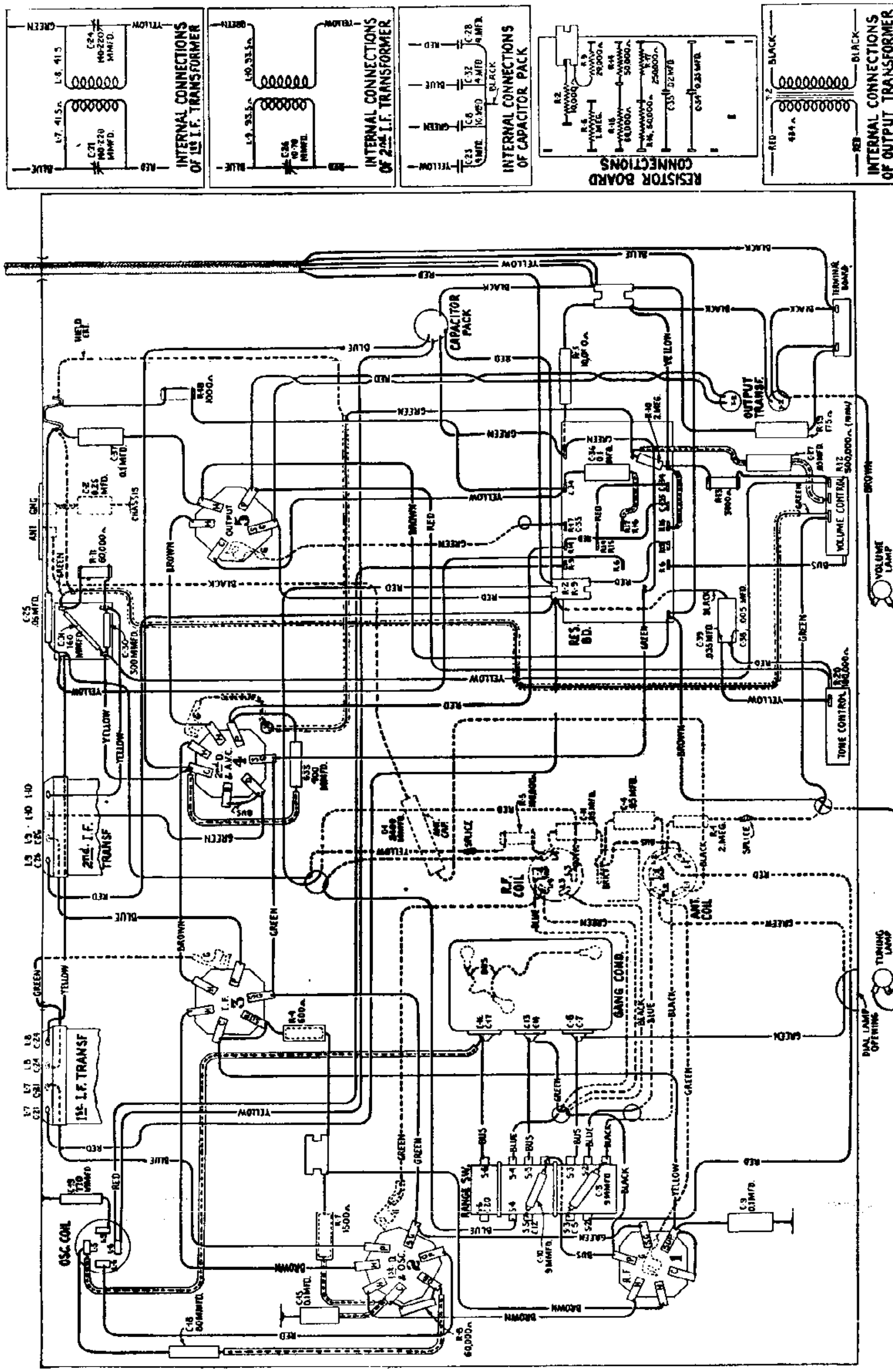


Figure 2—Chassis Wiring Diagram

RCA-VICTOR CO., INC.

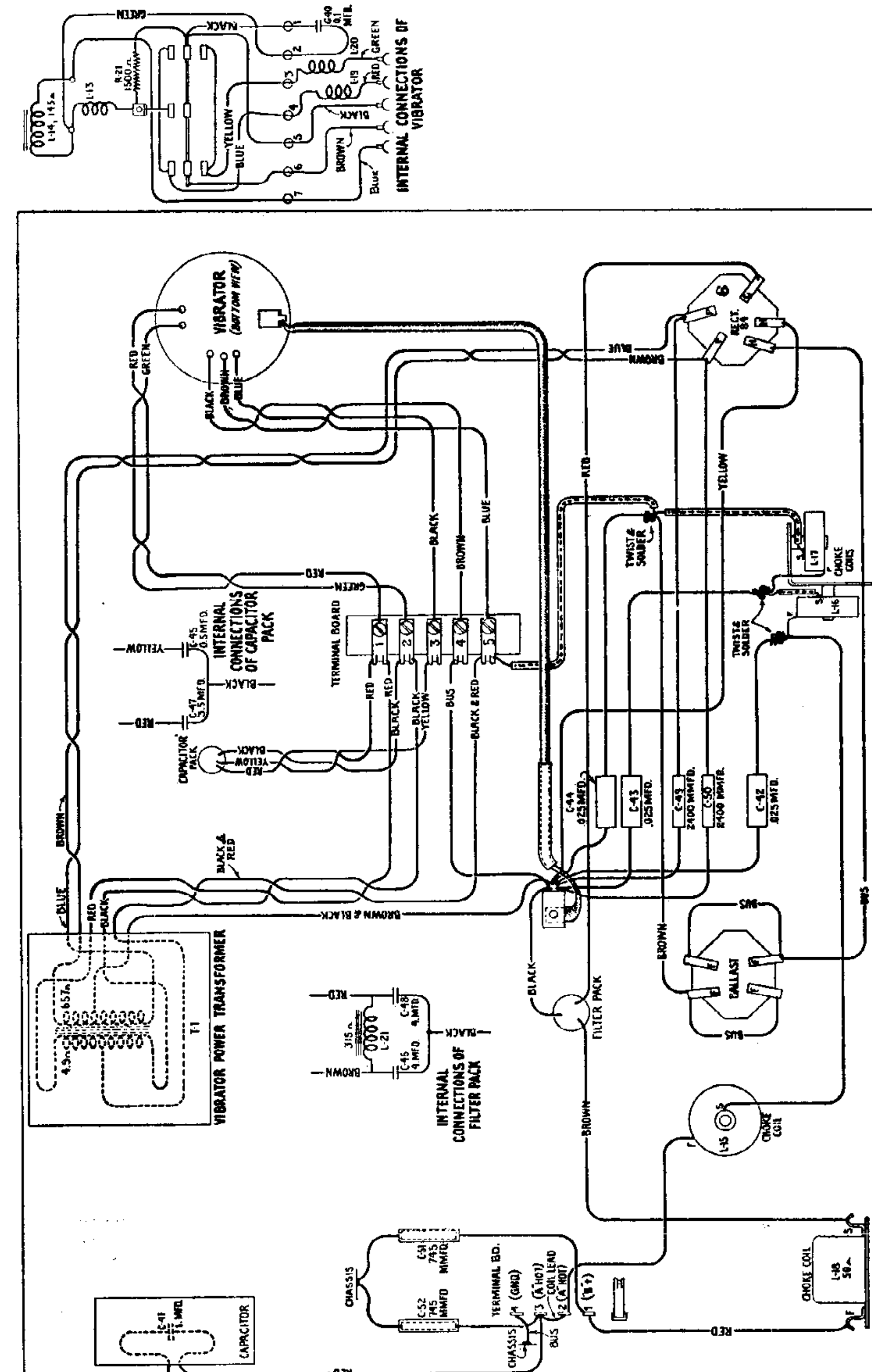


Figure 3—Power Unit Wiring Diagram

MODEL 223
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
2816	Resistor — 1,000 ohms — Carbon type — ½ watt (R18)—Package of 5	$1.00
3047	Resistor — 1,500 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R6)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt (R13) Package of 5	1.00
3514	Resistor—250,000 ohms—Carbon type—½ watt (R17)—Package of 5	1.00
3572	Socket—Contact Radiotron socket	.38
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R16)—Package of 5	1.00
3597	Capacitor—.25 mfd. (C34)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8, R11)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C30)	.34
3622	Shield—Antenna or R. F. coil shield	.36
3624	Socket—Dial lamp socket and bracket	.40
3625	Scale—Volume indicator scale assembly	.40
3626	Shield—Oscillator coil shield	.22
3630	Resistor—10,000 ohms—Carbon type—3 watt (R2, R3)	.25
3634	Capacitor—160 mmfd. (C31)	.34
3639	Capacitor—.02 mfd. (C35)	.25
3750	Capacitor—.25 mfd. (C2)	.36
3783	Capacitor—9 mmfd. (C3, C10)—Package of 2	.50
3877	Capacitor—.1 mfd. (C9, C15, C36, C37)	.32
3888	Capacitor—.05 mfd. (C4, C11, C25, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
3993	Screw—Set screw for volume control dial Package of 10	.25
4046	Resistor—2 megohm—Carbon type—½ watt (R1)—Package of 5	1.00
4142	Mounting assembly for receiver chassis—Comprising 8 cushions, 8 washers, 4 spacers, 4 lockwashers and 4 screws	.38
4143	Capacitor—2400 mmfd. (C1)	.25
4144	Clamp—Capacitor mounting clamp—Package of 5	.20
4145	Shield—Radiotron shield	.30
4181	Capacitor—720 mmfd. (C19)	.30
4182	Capacitor—80 mmfd. (C18)	.25
4183	Capacitor—400 mmfd. (C33)	.26
4184	Capacitor pack—Comprising one .035 and one .005 mfd. capacitors (C38, C39)	.30
4185	Resistor—175 ohms—Wire wound (R19)	.78
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R10)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
6471	Coil—Oscillator coil (L5, L6)	.74
6483	Transformer—First intermediate frequency transformer (L7, L8, C21, C24)	1.84
6484	Transformer—Second intermediate frequency transformer (L9, L10, C26)	1.70
6485	Volume control with mounting nut (R12)	$1.20
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6534	Switch—Range switch (S2, S3, S4, S5, S6, C5, C12, C20)	1.25
6598	Condenser—3-gang variable tuning condenser (C6, C7, C13, C14, C16, C17)	3.00
6622	Dial—Station selector dial scale and drive assembly	.95
6859	Capacitor—Comprising three 4 mfd. and one 10 mfd. capacitors (C8, C23, C28, C32)	2.85
6860	Tone control with mounting nut (R20)	1.15
6851	Transformer—Output transformer (T2)	1.36
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
	VIBRATOR POWER UNIT ASSEMBLIES	
3765	Capacitor—.025 mfd. (C42, C43, C44)	.34
3859	Socket—4-contact Radiotron socket	.30
3860	Socket—5-contact Radiotron socket	.32
4145	Shield—Radiotron shield—Rectifier	.30
4148	Suspension assembly—Comprising one bolt assembly, one "C" washer, two cup washers, two springs, two damping bushings	.40
4150	Clamp assembly—Vibrator mounting clamp assembly	.22
4186	Capacitor—2400 mmfd. (C49, C50)	.28
4187	Capacitor—745 mmfd. (C51, C52)	.25
6862	Filter pack—Comprising one reactor and two 4.0 mfd. capacitors (C46, C48, L21)	3.34
6863	Capacitor—Comprising one 3.5 mfd. and one .5 mfd. capacitors (C45, C47)	3.46
6864	Tube—Regulator tube	3.00
6865	Shield—Regulator tube shield	.22
6865	Coil—Line R. F. choke coil (L15)	.96
6867	Coil—Line R. F. choke coil	.54
6868	Coil—Line R. F. choke coil (L16)	.78
6869	Capacitor—1.0 mfd. capacitor (C41)	.88
6870	Shield—Outer shield with felt pad for vibrator assembly	.60
6871	Coil—Filter coil (L18)	.76
7734	Transformer—Power transformer (T1)	3.60
7735	Vibrator complete (L13, L14, L19, L20, C40, R21)	8.20
	REPRODUCER ASSEMBLIES	
4149	Shield—Terminal board shield	.20
8935	Cone—Reproducer cone (L11) Package of 5	5.25
9474	Reproducer complete	7.10
9475	Coil—Field coil magnet and cone support (L12)	4.55
	MISCELLANEOUS PARTS	
3592	Knob—Station selector—Volume control or tone control knob—Package of 5	.80
3615	Knob—Range switch knob—Package of 5	.60
3881	Escutcheon—Station selector escutcheon	.42
3899	Escutcheon—Volume control escutcheon	.42
4292	Capacitor—Generator capacitor—.5 mfd.	.90
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6516	Connector—Fuse connector complete	.16

RCA-VICTOR CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, and I. F. stage, a combined second detector and automatic volume control, an audio stage, a push-pull driver stage and a push-pull Pentode output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering stage, of which the loudspeaker field is a part. Figures 1 and 2 show the schematic circuit diagrams.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 KC frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang-capacitor connected falls in the next higher frequency band. This gang-switch also has additional contacts for changing the sensitivity in the various bands.

The sensitivity control in bands X and A controls the R. F. and first detector while in bands B, C and D it controls the R. F., first detector and I. F. stage. This is caused by the action of the selector switch. It should also be noted that the sensitivity control is paralleled with a 500-ohm resistor (R-12, Figure 1) in bands B, C and D.

The output of the first detector, which is the I. F. signal (460 KC), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 KC.

The output of the I. F. amplifier is then applied to the grid of the RCA-76 second detector. The plate of this tube is connected to its cathode and the tube operated as a diode detector and automatic volume control. The direct current component of the rectified signal produces a voltage drop across resistors R-32 and R-17. The voltage drop across both resistors constitutes the automatic bias voltage for the R. F. stage, while the drop across R-17 alone constitutes the bias voltage for the first detector and I. F. stage. These automatic bias voltages for the R., F., first detector and I. F. stages give the automatic volume control action of the receiver. It should be noted that resistor R-33 is connected in parallel across resistors R-32 and R-17. This reduces the total amount of resistance in the circuit to a proper value. Resistor R-34 and capacitor C-43, which are connected in series and from a tap on the volume control to ground, provide low frequency, low volume compensation.

The volume control selects the amount of audio voltage that is applied to the grid of the RCA-76 A. F. stage and thereby regulates the volume of the entire receiver. The first audio stage is coupled through a high and low frequency tone control system and transformer to the grid circuit of the push-pull drive stage. It should be noted that a link has been provided in series with the cathode of this stage, so that phonograph connections may be easily made if required.

The driver stage is transformer coupled to the output stage, which consists of two Radiotrons, RCA-42, connected in push-pull. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-29, which carries the entire DC output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

VARIATIONS IN MODELS

The preceding description of the electrical circuit applies to numerous models of this receiver. However, there are other models in which a change from the foregoing has been made. This change consists of using the section of the band selector switch that formerly changed the sensitivity control, for changing the fidelity in various bands, the sensitivity remaining the same in all bands. This permits the receiver to maintain the utmost fidelity in bands X and A while reducing the low frequency output in bands B, C and D. Such a change results in improved performance.

The sensitivity control in these models operates as formerly in bands X and A. That is, the sensitivity control adjusts the residual bias for the R. F. and first detector stages.

MODEL 262
Schematic with
Sensitivity Change

RCA-VICTOR CO., INC.

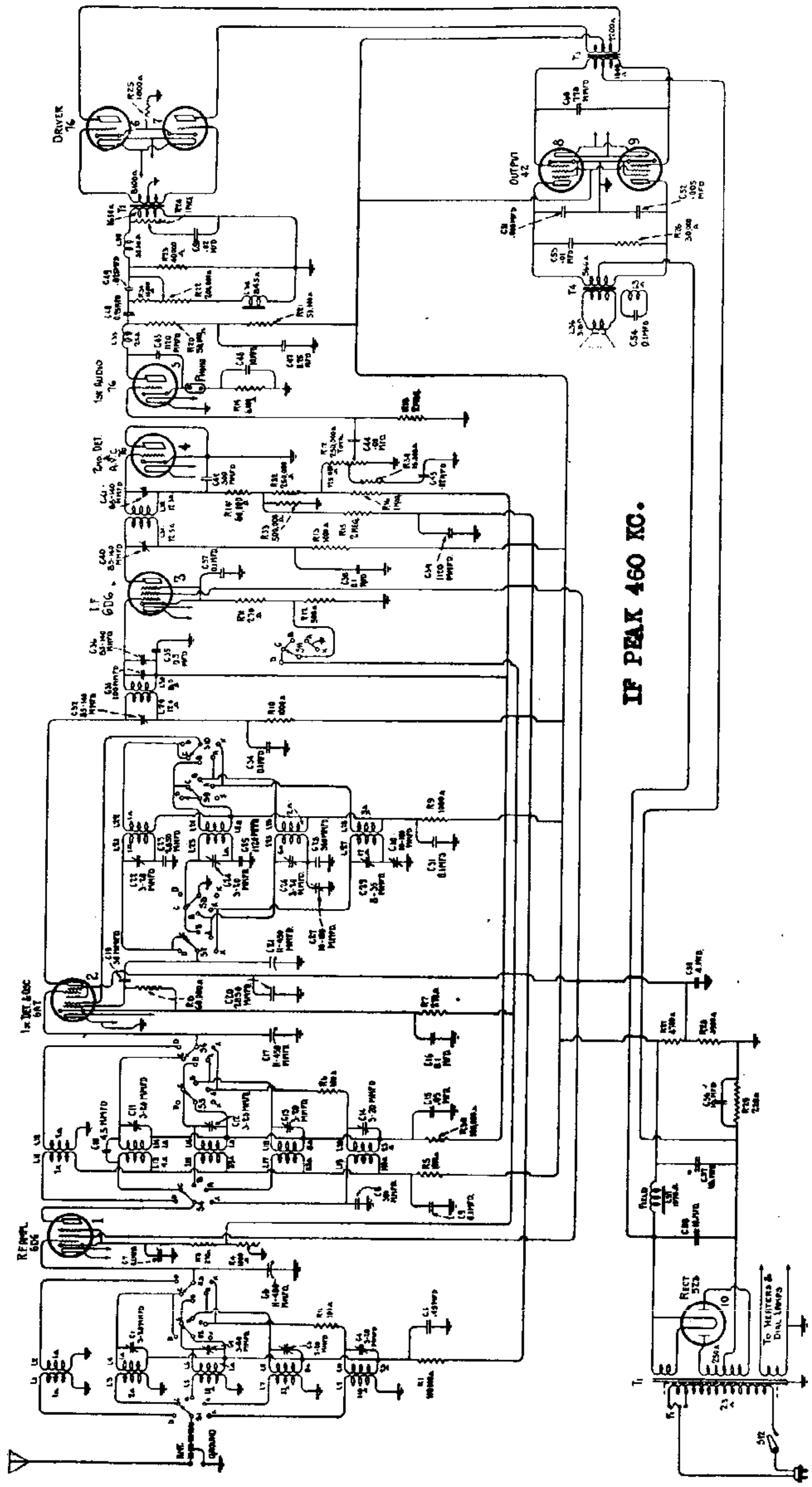


Figure 1—Schematic Circuit Diagram—Models with sensitivity control change for band position

RCA-VICTOR CO., INC.

MODEL 262
Schematic with
Fidelity Change

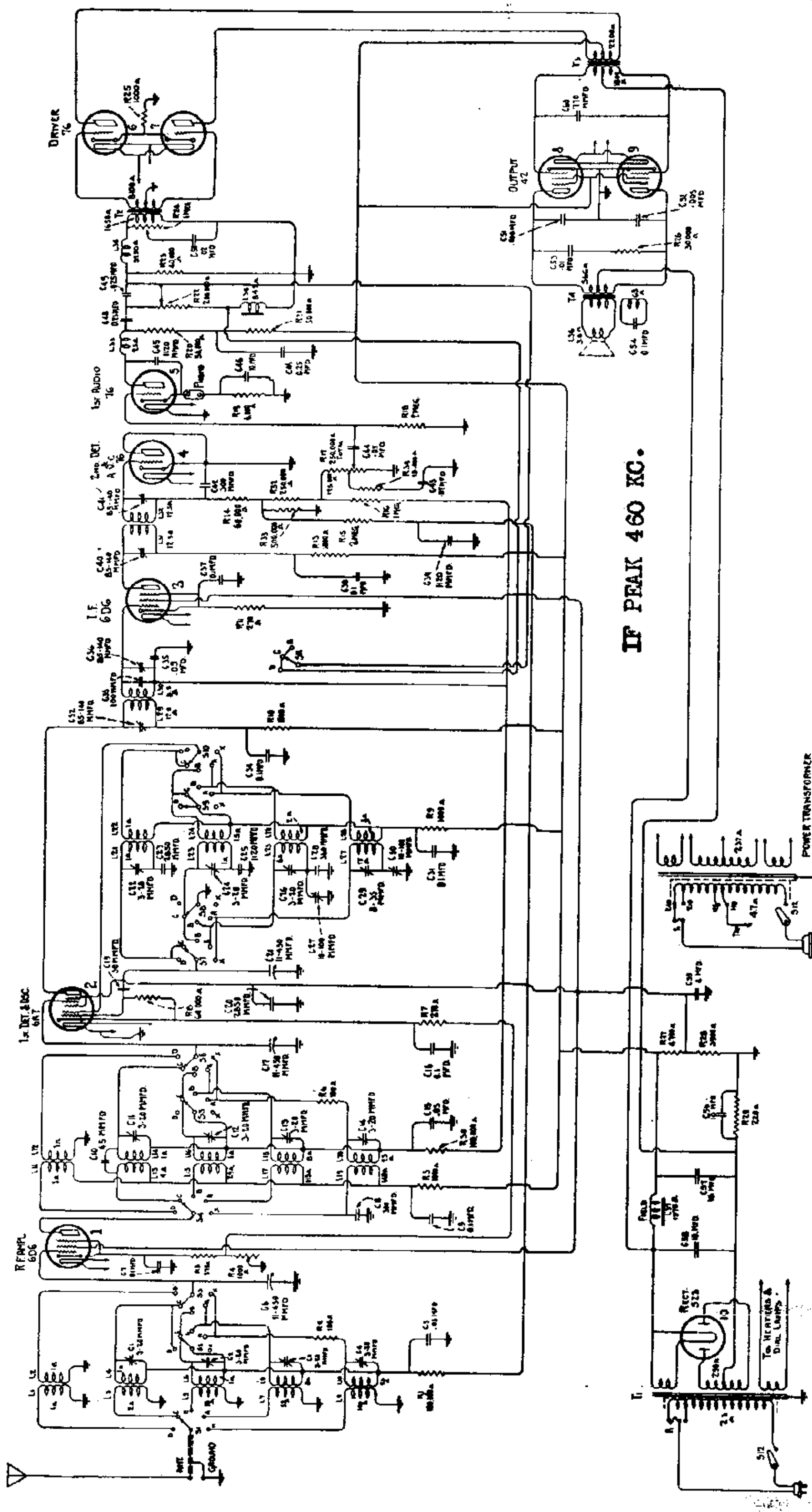


Figure 2—Schematic Circuit Diagram—Models with fidelity change for band position

MODEL 262
Chassis Wiring
with Senitivity
Change

RCA-VICTOR CO., INC.

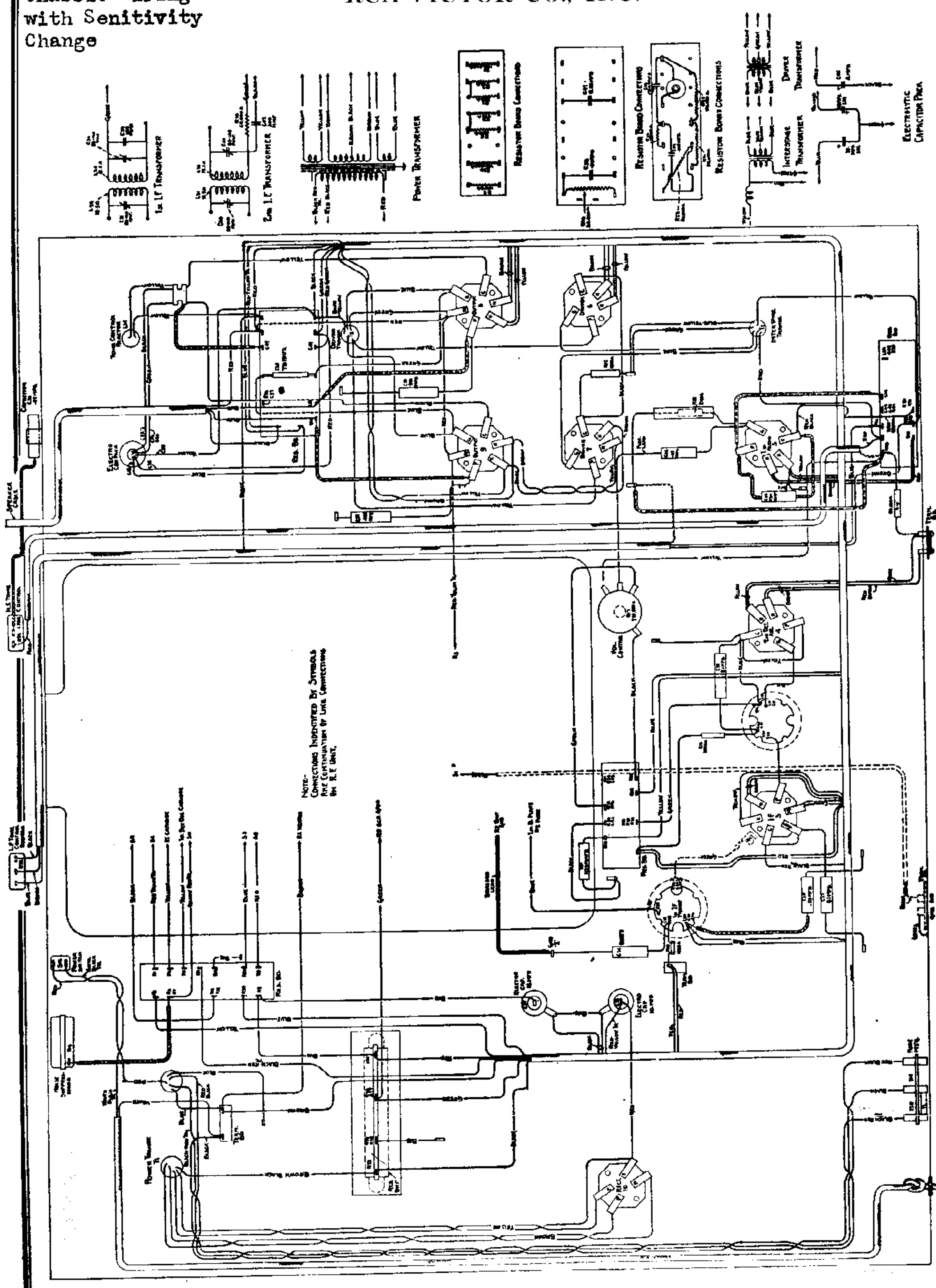


Figure 4—Chassis Wiring Diagram—Models with sensitivity control change for band position

RCA-VICTOR CO., INC.

MODEL 262
Chassis Wiring with Fidelity Change

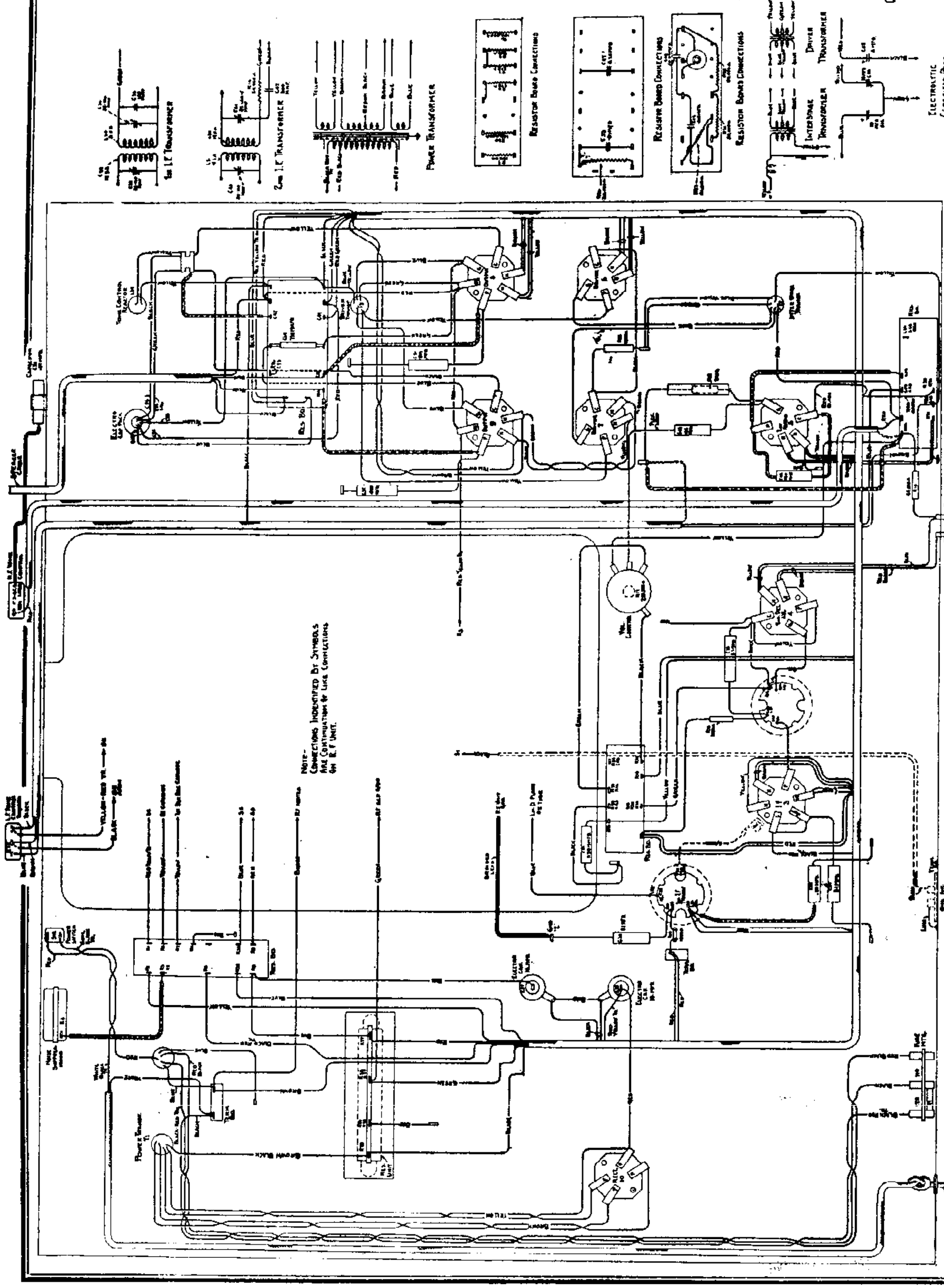


Figure 6—Chassis Wiring Diagram—Models with fidelity change for band position

MODEL 262
RF Unit Wiring with
Sensitivity Change

RCA-VICTOR CO., INC.

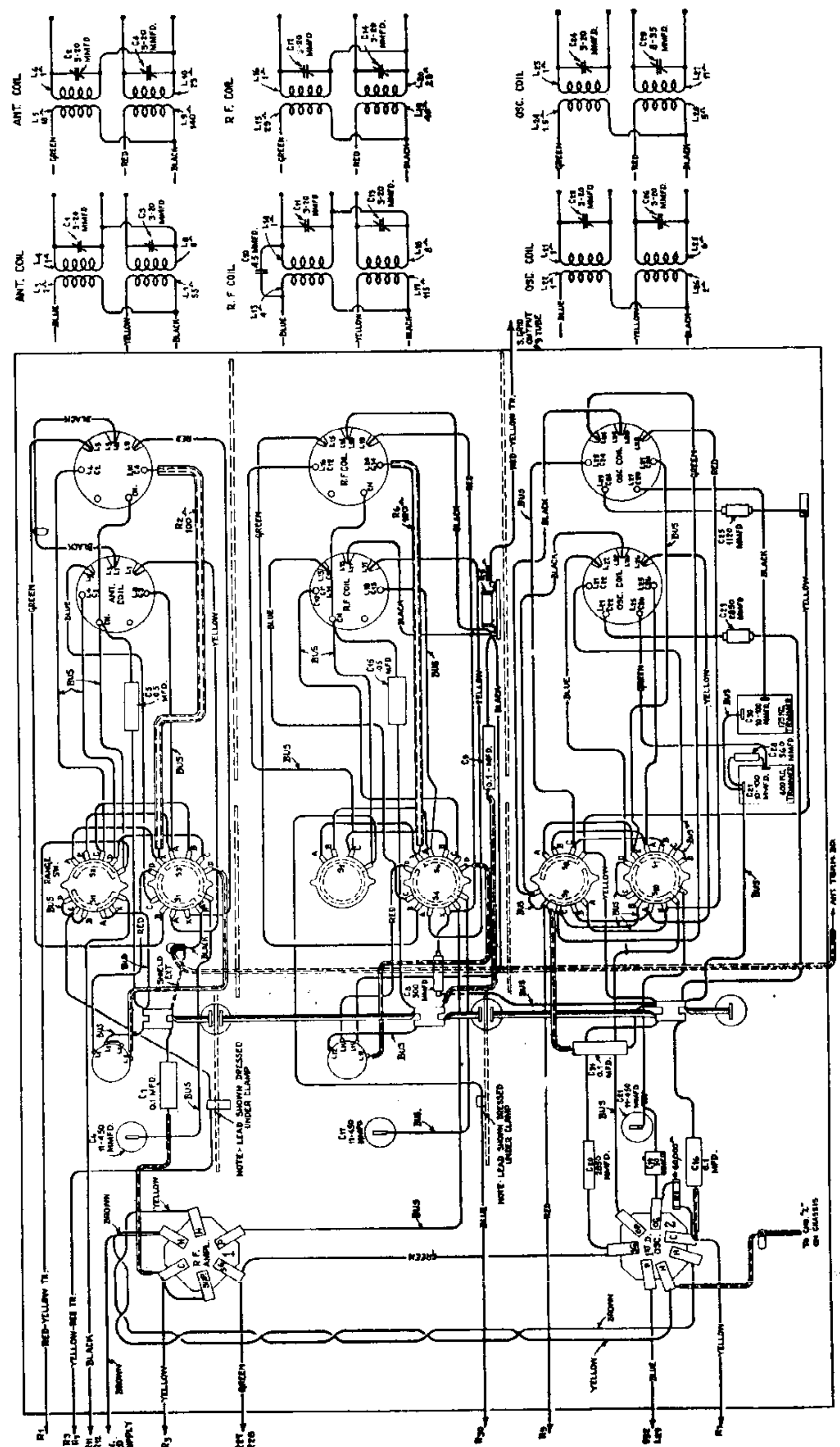


Figure 8—R. F. Unit Wiring Diagram—Models with sensitivity control change for band position

MODEL 262
RF Unit Wiring with Fidelity Change

RCA-VICTOR CO., INC.

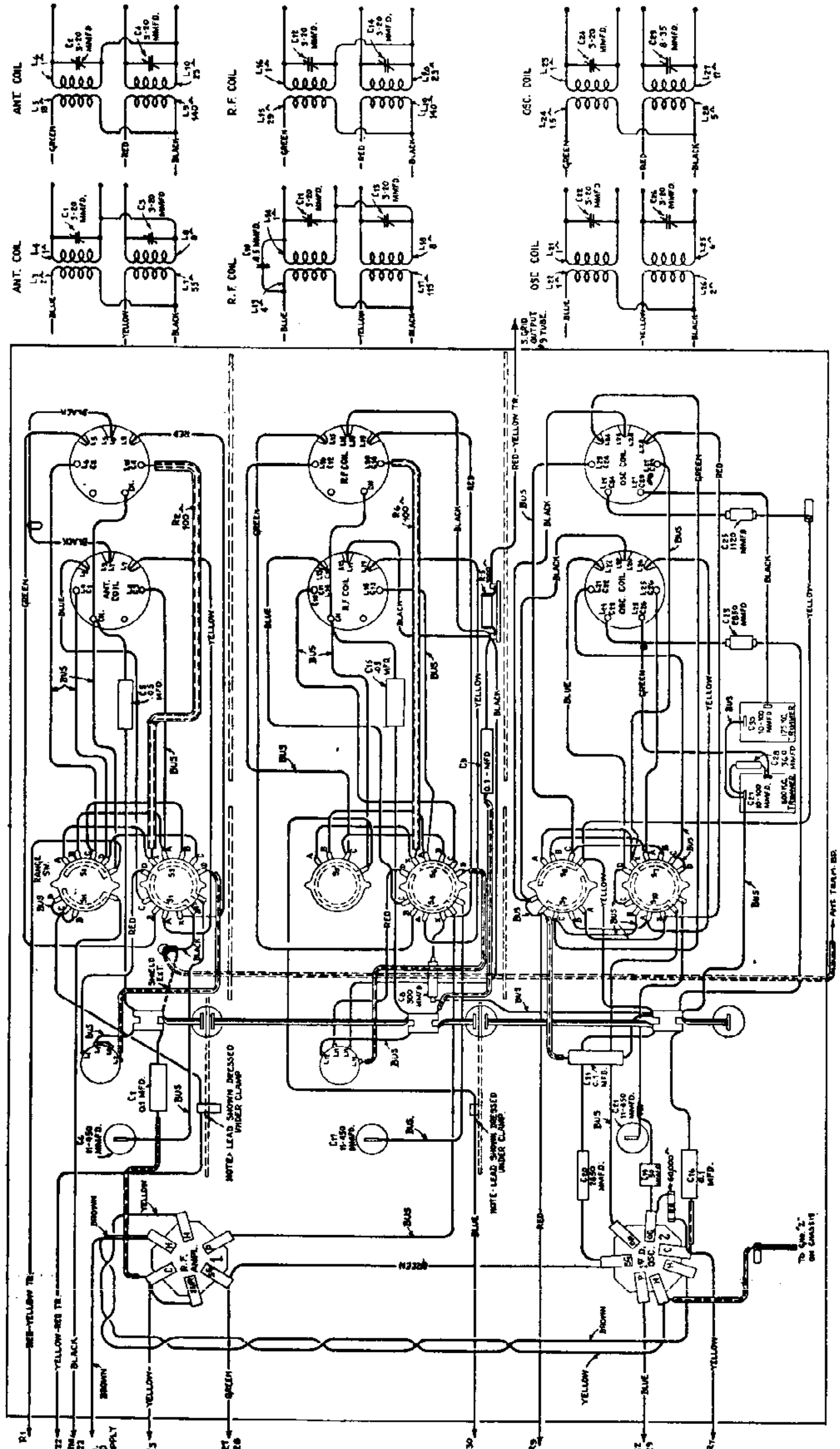


Figure 10—R. F. Unit Wiring Diagram—Models with fidelity change for band position

MODEL 262

Socket and Trimmer Layouts RCA-VICTOR CO., INC.

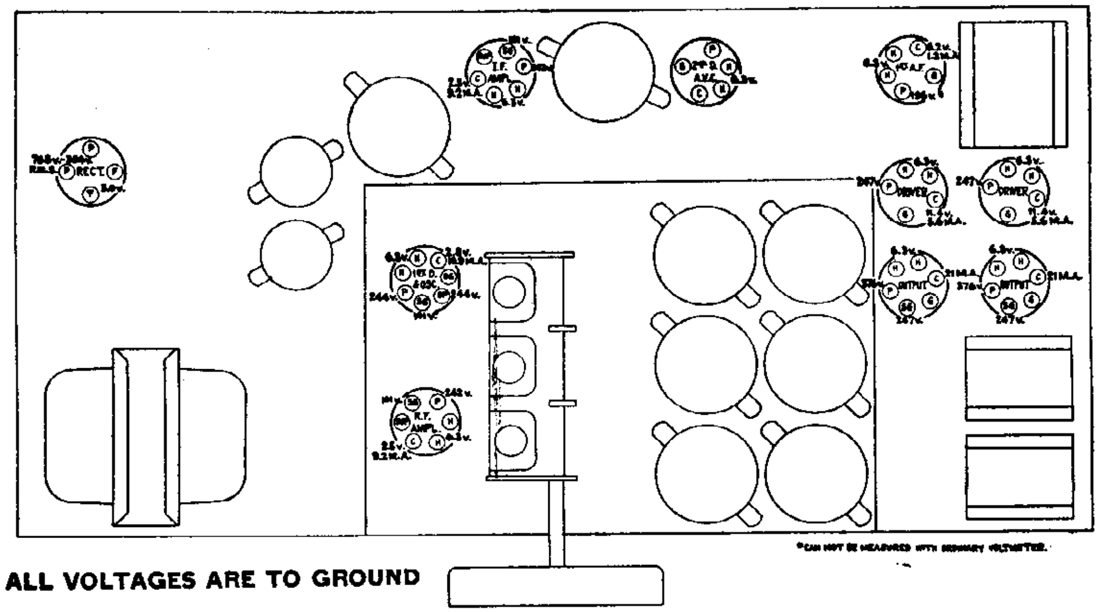


Figure 11—Radiotron Socket Voltages

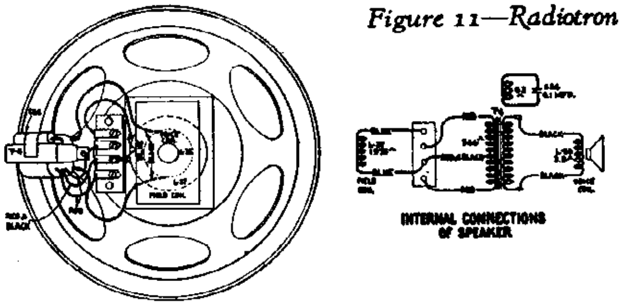


Figure 3—Loudspeaker Wiring

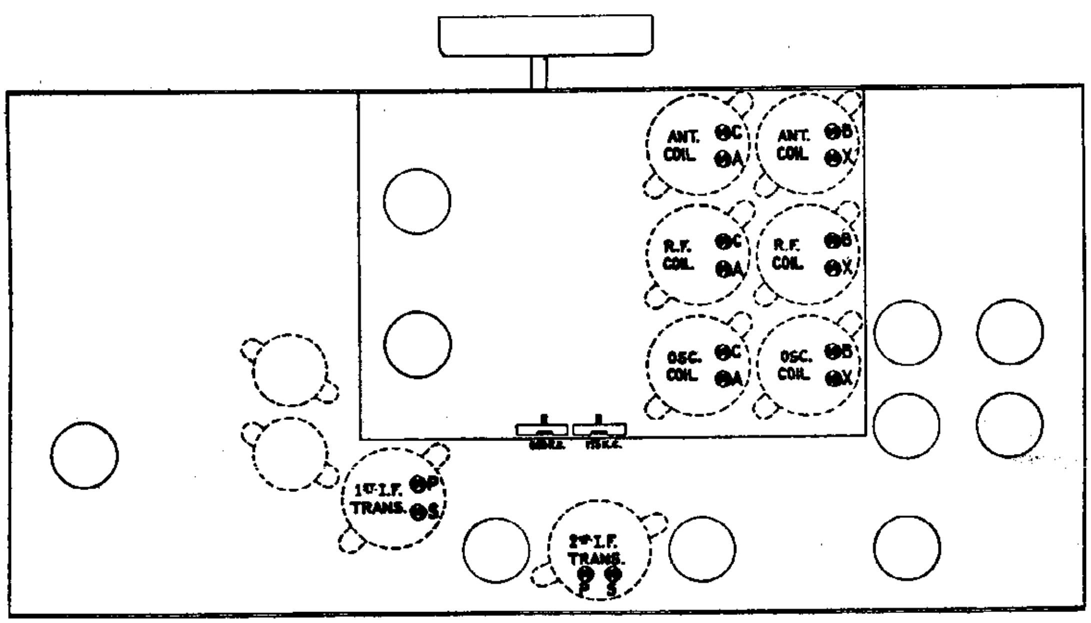


Figure 7—Location of Trimmer Capacitors

Tuning Frequency Range............ Band X— 140 KC - 410 KC; Band A— 540 KC - 1720 KC; Band B— 1720 KC - 5400 KC; Band C— 5400 KC - 18,000 KC; Band D—18,000 KC - 36,000 KC

Line-up Frequencies..................175 KC, 410 KC, 460 KC, 600 KC, 1720 KC, 5160 KC, 18,000 KC
Maximum Undistorted Output..........7 Watts
Maximum Output..........14 Watts

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown on page 15, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cyclinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 KC and the signal tuned in. The output indicator should be connected across the voice coil of the loudspeaker. Then insert the tuning wand, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage, and two transformers having four adjustable capacitors which may require adjustment. The transformers are all peaked at 460 KC.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 KC between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 KC. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

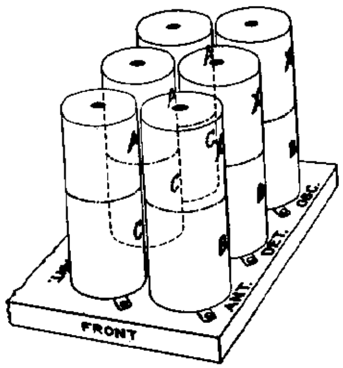


Figure 5—Location of Coils in Shields

(c) Refer to Figure 7. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "A" and "X." Three are required in bands "B" and "C." None are required in band "D."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeakers. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of band "A."

Figure 7 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) Tune the external oscillator to 410 KC, set the pointer at 410 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 175 KC. Tune in the 175 KC signal irrespective of scale calibration and adjust the series trimmer marked 175 KC on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 KC as described in (a).

Band "A"

(a) Tune the external oscillator to 1720 KC, set the pointer at 1720 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 600 KC. Tune in the 600 KC signal irrespective of scale calibration and adjust the series trimmer, marked 600 KC, on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 KC as described in (a).

Band "B"

(a) Tune the external oscillator to 5160 KC, and set the pointer at 5160 KC. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 4240 on the dial. It will be necessary to increase the external oscillator output for this check.

(c) The antenna and detector trimmers should now be peaked for maximum output.

Band "C"

(a) Tune the external oscillator to 18,000 KC, and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

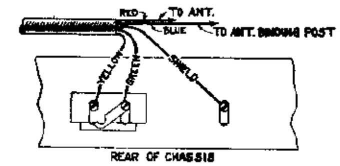


Figure 9—Junior "Duo" Connections

(b) Check for the image signal, which should be received at approximately 17.080 on the dial. It may be necessary to increase the external oscillator output for this check.

(c) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(d) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "D"

No adjustments are required for band "D."

(4) MAGNETIC PICKUP CONNECTIONS

A terminal board (link in series with first audio stage cathode) is provided at the rear of the chassis for adding phonograph facilities to this instrument. Figure 9 shows the connections that will be required for the Junior "Duo" turntable assembly.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 11 shows a chart in which the various voltages of the tube contacts are shown.

MODEL 262
Voltage
Parts List

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Input—Volume and Sensitivity Controls Maximum—Band Switch at "A"—No Signal

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.5	101	242	9.2	6.3
RCA-6A7	Detector	2.8	101	244	10.9	6.3
	Oscillator	—	—	244		
RCA-6D6—I. F.		2.5	101	242	9.2	6.3
RCA-76—2nd Det. AVC		0	—	—	0	6.3
RCA-76—A. F.		6.2	—	196*	1.2	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-5Z3—Rectifier		—	—	768/384 R. M. S.	112	5.0

*Cannot be measured with ordinary voltmeter.

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4372	Bracket—Bass tone control mounting bracket	$0.20
4683	Bracket — Treble tone control mounting bracket	.25
4406	Bracket—Volume control mounting bracket	.25
3794	Capacitor—100 mmfd.—Located on first I. F. transformer (C33)	.30
3981	Capacitor—300 mmfd.—Located on second I. F. transformer (C42)	.30
4668	Capacitor—770 mmfd. (C60)	.30
4409	Capacitor—1120 mmfd. (C39, C45)	.35
3643	Capacitor—0.005 mfd. (C51, C52)	.25
3787	Capacitor—0.01 mfd. (C53)	.30
3639	Capacitor—0.02 mfd. (C43)	.25
4652	Capacitor—0.02 mfd. (C50)	.60
3888	Capacitor—0.05 mfd. (C35)	.25
4694	Capacitor—0.05 mfd. (C44)	.30
3765	Capacitor—0.025 mfd. (C49)	.34
3877	Capacitor—0.1 mfd. (C37)	.32
4354	Capacitor—0.1 mfd. (C34, C38)	.36
3597	Capacitor—0.25 mfd. (C47)	.40
3702	Capacitor—0.25 mfd. (C48)	.42
7790	Capacitor—10. mfd. (C58)	1.05
7788	Capacitor—18. mfd. (C57)	1.10
7833	Capacitor pack—Comprising two 10. mfd. and one 4. mfd. capacitor (C46, C55, C56)	2.00
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4358	Clamp—Mounting clamp for capacitor—Stock No. 7788 or No. 7790	.15
7806	Coil—First audio plate choke (L33)	.30
4371	Cover—Fuse mount cover	.15
10907	Fuse—3 amperes—Package of 5	.40
3376	Mount—Fuse mount—105–125 volt operation	.40
4604	Mount—Fuse mount for 200–250 volt operation	$0.35
7784	Reactor—Tone control reactor (L34)	1.30
6135	Resistor—270 ohms—Carbon type—¼ watt—Package of 5 (R3, R7, R11)	1.00
4622	Resistor—500 ohms—Carbon type—¼ watt—Package of 10 (R12)*	2.00
4370	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R9, R10, R13, R25)	2.00
6243	Resistor—6,000 ohms—Carbon type—¼ watt—Package of 5 (R19)	1.00
3998	Resistor—15,000 ohms—Carbon type—¼ watt—Package of 5 (R34)	1.00
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5 (R23)	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R14)	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5 (R1, R30)	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt—Package of 5 (R32)	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Package of 5 (R33)	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5 (R16)	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt—Package of 5 (R15, R18)	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5 (R20, R21)	1.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R26)	.22
4649	Resistor—Flat type—Total resistance 8820 ohms—Divided as follows: one 220 ohms, one 3,900 ohms and one 4,700 ohms section (R27, R28, R29)	1.05
7804	Rheostat—Sensitivity control rheostat (R4)	1.30

*R12 Resistor—500 ohms—Some Models

REPLACEMENT PARTS (Continued)

Stock No.	Description	List Price
4656	Screw—Volume control mounting assembly—Comprising one bushing, one washer, one shakeproof washer and one nut	$0.18
4452	Shield—First audio, second detector A.V.C. or driver Radiotron shield	.35
3683	Shield—Second detector—A.V.C. Radiotron shield top	.20
4453	Shield—I. F. Radiotron shield	.32
7800	Shield—Intermediate frequency transformer shield	.45
3859	Socket—4-contact rectifier Radiotron socket	.30
7484	Socket—5-contact first audio, second detector A.V.C. or driver Radiotron socket	.35
7485	Socket—6-contact I. F. Radiotron socket	.40
6675	Socket—6-contact output Radiotron socket	.40
4685	Strip—"ANT-GND" terminal strip—Two terminals and link	.20
7796	Switch—Operating switch (S12)	.62
7795	Tone control—Bass tone control (R22)	1.30
4648	Tone control—Treble tone control (R24)	1.25
7841	Transformer—Audio transformer pack comprising interstage transformer and reactor (T2, L35)	4.05
4431	Transformer—First intermediate frequency transformer (L29, L30, C32, C33, C36)	2.28
4433	Transformer—Second intermediate frequency transformer (L31, L32, C40, C41, C42)	2.15
7832	Transformer—Driver transformer (T3)	2.85
9505	Transformer—Power transformer—105–125 volts—50-60 cycles (T1)	6.35
9506	Transformer—Power transformer—105–125 volts—25–40 cycles	8.90
9507	Transformer—Power transformer—105–250 volts—40-60 cycles	6.40
4650	Volume control (R17)	1.38
	R. F. UNIT ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	.50
4646	Capacitor—4.5 mmfd. (C10)	.20
4633	Capacitor—50 mmfd. (C19)	.25
3981	Capacitor—300 mmfd. (C8)	.30
4413	Capacitor—360 mmfd. (C28)	.22
4412	Capacitor—1,120 mmfd. (C25)	.25
4524	Capacitor—2,850 mmfd. (C23)	.35
4615	Capacitor—2,850 mmfd. (C20)	.34
4417	Capacitor—0.05 mfd. (C5, C15)	.25
4415	Capacitor—0.1 mfd. (C7, C16)	.30
4645	Capacitor—0.1 mfd. (C9, C31)	.25
3861	Capacitor—Adjustable capacitor (C27, C30)	.78
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4410	Coil—Antenna coil—Band "D" (L1, L2)	.70
7803	Coil—Antenna coil—B.-S.W. (L3, L4, L7, L8, C1, C3)	1.82
7810	Coil—Antenna coil—P.B.-L.W. (L5, L6, L9, L10, C2, C4)	2.10
7805	Coil—Detector coil—B.-S.W. (L13, L14, L17, L18, C11, C13)	2.15
7808	Coil—Detector coil—P.B.-L.W. (L15, L16, L19, L20, C12, C14)	2.05
4421	Coil—Detector coil—Band "D" (L11, L12)	.70
7807	Coil—Oscillator coil—B.-S.W. (L21, L22, L25, L26, C22, C26)	1.62
7809	Coil—Oscillator coil—P.B.-L.W. (L23, L24, L27, L28, C24, C29)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C17, C21)	4.42
4340	Lamp—Dial lamp—Package of 5	.60
4370	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R5)	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R8)	1.00
4418	Resistor—100 ohms—Flexible type—Package of 10 (R2, R6)	1.50
4656	Screw—Chassis mounting screw assembly—Comprising one bushing, one washer, one shakeproof washer, and one nut (four sets required to mount chassis)	$0.18
7800	Shield—Antenna, detector or oscillator coil shield	.45
4452	Shield—First detector-oscillator Radiotron shield	.35
3683	Shield—Radiotron shield top	.20
4454	Shield—R. F. amplifier Radiotron shield	.44
3529	Socket—Dial lamp socket	.32
7485	Socket—6-contact R. F. amplifier Radiotron socket	.40
3572	Socket — 7-contact first detector-oscillator Radiotron socket	.38
7836	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11)	3.05
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shafts, balls, ring, spring and washers—Assembled	.88
4455	Dial—Station selector dial	.60
7799	Drive—Variable tuning condenser drive assembly complete	2.45
4364	Gear—Spring gear assembly complete with hub, pinion, gear cover and spring	.96
4361	Indicator—Band indicator—Celluloid lettered—D. C. B. A. X.	.12
4363	Pointer—Station selector main (large) pointer	.18
4367	Pointer—Station selector vernier (small) pointer	.15
3943	Screen—Celluloid screen for dial light—Package of 2	.18
3993	Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or variable condenser drive—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	CABLE ASSEMBLIES	
4653	Cable—Main cable	1.90
4654	Cable—4-conductor—Reproducer cable	.58
4655	Cable—Shielded cable—From low-frequency tone control to resistor boards	.58
	REPRODUCER ASSEMBLY	
4645	Capacitor—0.1 mfd.—Located on output transformer (C54)	.25
7835	Coil—Field coil, magnet and cone support (L37)	4.55
8969	Cone—Reproducer cone (L36)—Package of 5	6.35
9543	Reproducer—Reproducer complete	10.36
6999	Screen—Dust (cloth) screen—Package of 6	.12
7834	Transformer—Output transformer and capacitor (T4, C54)	3.75
	MISCELLANEOUS PARTS	
4677	Bezel—Metal bezel (escutcheon) for station selector dial glass	.56
6614	Glass—Station dial glass	.30
3829	Knob—Bass or treble tone control, volume or sensitivity control range switch or operating switch knob—Package of 5	1.10
4657	Knob—Knob station selector knob—Package of 5	.65
4678	Ring—Retaining ring for dial glass—Pkg. of 5	.34
4119	Screw—8-32-¼" headless set screw for knob—Stock No. 4657—Package of 20	.38
4393	Screw—8-32-5/16" headless set screw for knob—Stock No. 3829—Package of 10	.25

RCA-VICTOR CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector stage, two I. F. stages, a combined second detector and automatic volume control, a push-pull audio driver stage and a push-pull Class A output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering system. In addition, a double channel A. V. C. stage is provided

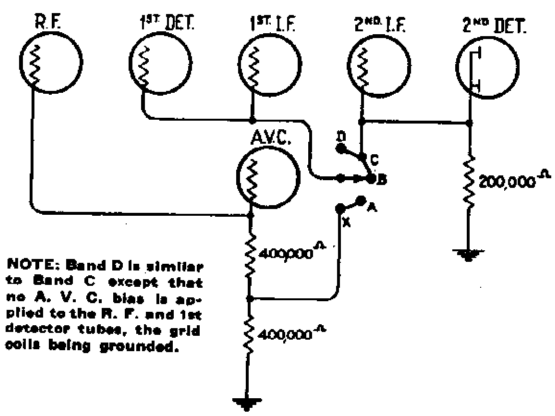


Figure 3—Switching Arrangement of Automatic Volume Control Systems

which uses two additional tubes. Figure 1 shows the over-all schematic circuit diagram while Figure 2 shows the R. F. assembly wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang capacitor connected falls in the next higher frequency band. This gang switch also has additional contacts for performing other functions which will be discussed.

The output of the first detector which is the I. F. signal (460 K. C.) is fed directly through two tuned circuits to the grid of the automatic volume control I. F. amplifier stage. A coupling coil adjacent to the secondary of this transformer is connected directly to the signal I. F. stage, which is in effect parallel to the A. V. C., I. F. stage. Examining the signal amplifier further we find that the output of the first signal I. F. stage is applied through a transformer to the second I. F. stage and thence through a second transformer to the second detector. Both circuits of each transformer are accurately tuned to the I. F. signal, which is 460 K. C.

Further examining the A. V. C., I. F. stage it will be seen that the output of this stage is applied to the A. V. C. tube through an untuned I. F. transformer. The A. V. C. stage, which is an RCA-76, is operated as a straight rectifier, its plate being grounded and only the grid being used. This tube is shielded in the usual manner. A small grid voltage, approximately 5.0 volts, is maintained so that rectification does not occur until the signal level exceeds this grid voltage. When this occurs, a portion of the rectified signal produces a voltage drop across resistors R-18 and R-19. The drop across both of these resistors constitutes the automatic bias voltage for the R. F. stage. The drop across R-19 alone gives the automatic bias voltage for the first detector and first I. F. stage on bands X and A.

Examining the second detector, the diode electrodes provide the detector action while the grid and plate give audio amplification. A portion of the rectified signal also gives a voltage drop across R-23 which is a second automatic volume control system for the receiver. The voltage drop is applied to the second I. F. stage in all bands and to the first detector and first I. F. stage in bands B and C. The change in

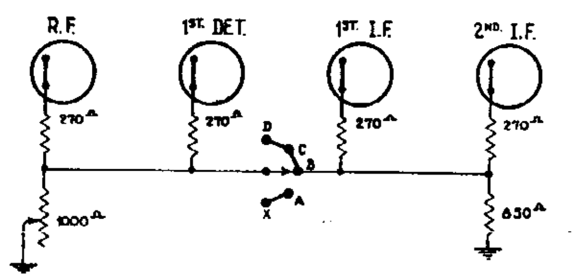


Figure 4—Sensitivity Control Switching Arrangement

automatic volume control systems is made by an additional group of contacts on the band selector switch. Figure 3 shows the switching arrangements for changing the A. V. C. system in the various bands.

MODEL 281
Schematic
Pickup Connections

RCA-VICTOR CO., INC.

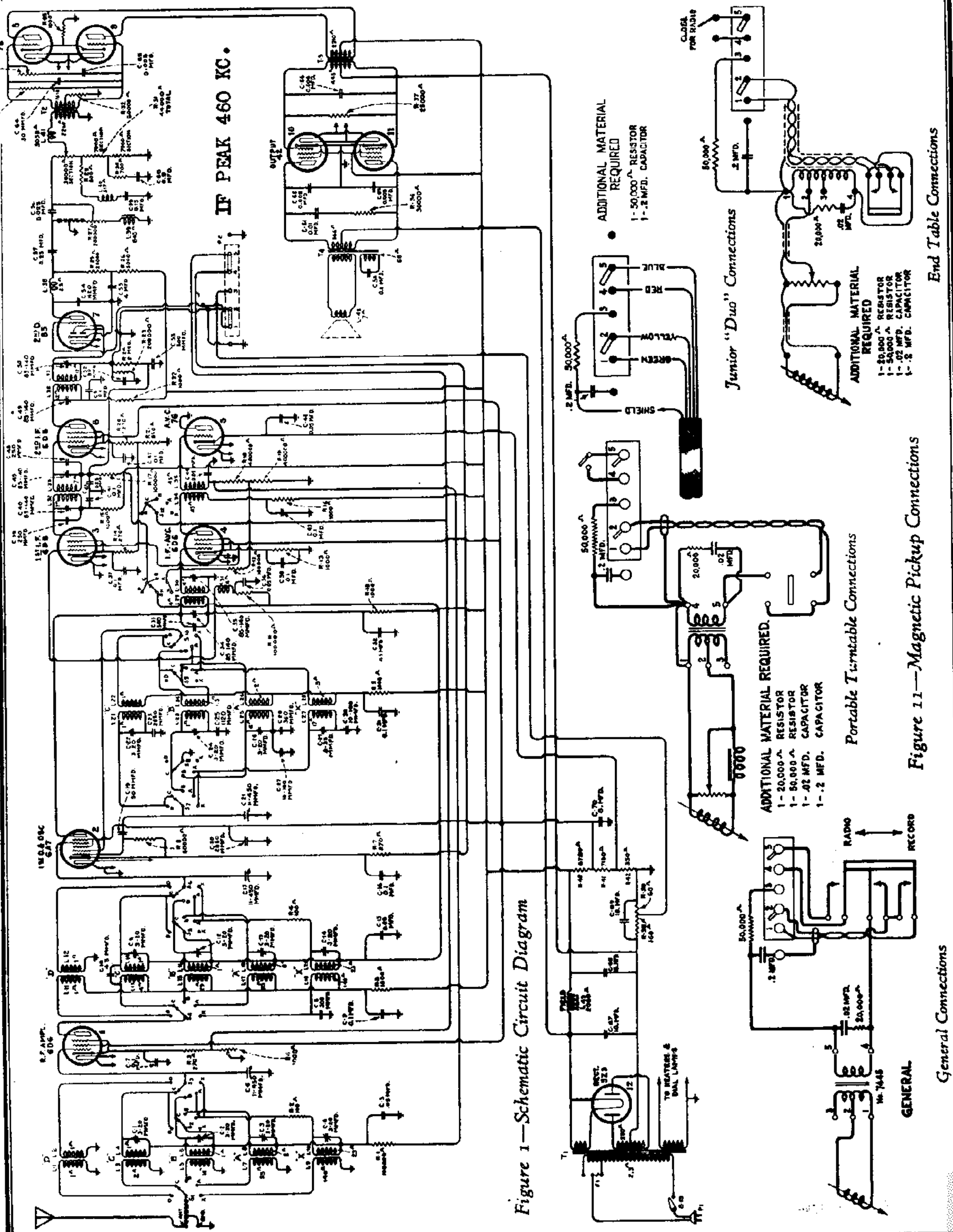


Figure 1—Schematic Circuit Diagram

Junior "Duo" Connections

End Table Connections

Portable Turntable Connections

Figure 11—Magnetic Pickup Connections

General Connections

RCA-VICTOR CO., INC.

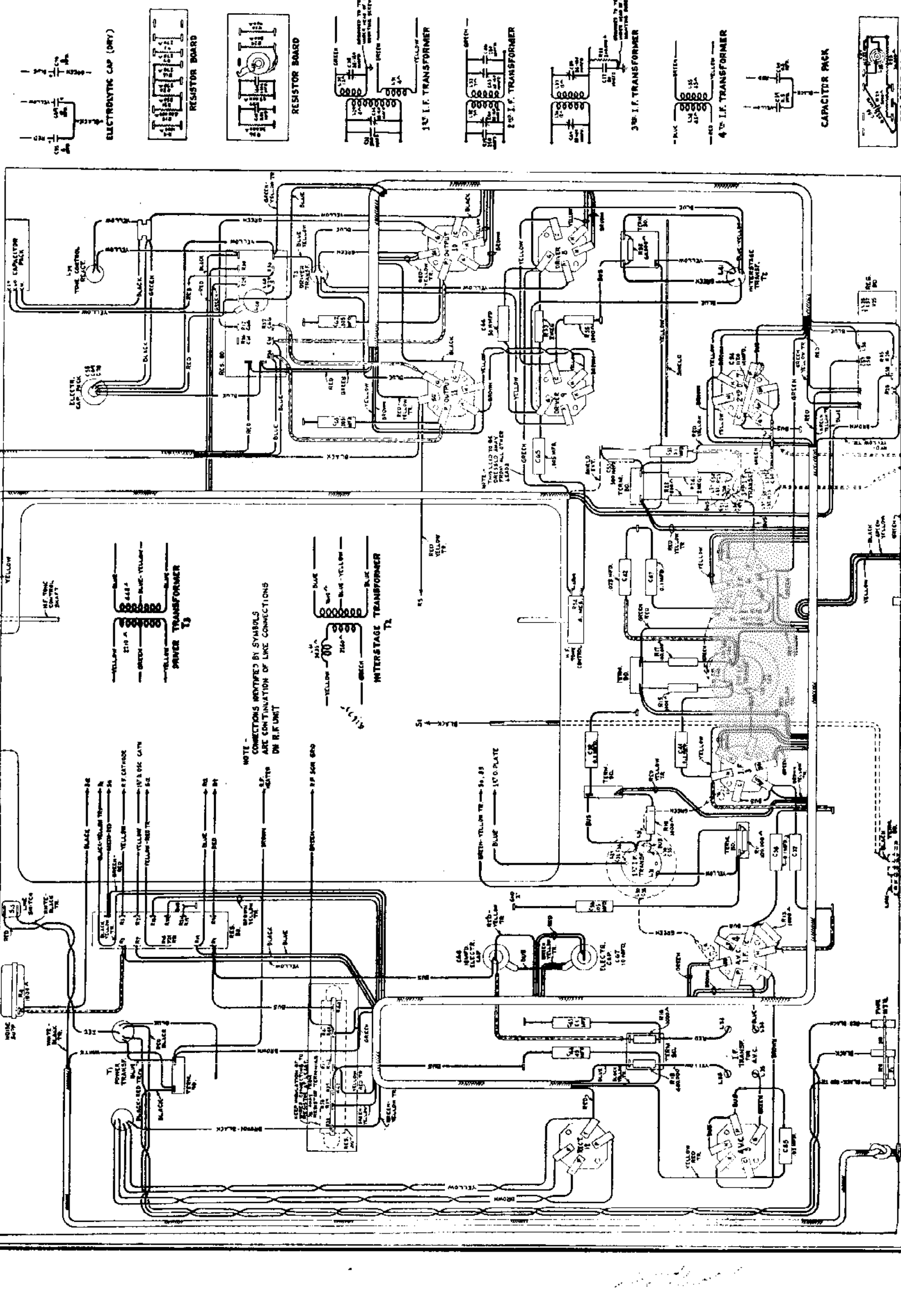


Figure 5—Chassis Assembly Wiring Diagram

MODEL 281
RF Wiring

RCA-VICTOR CO., INC.

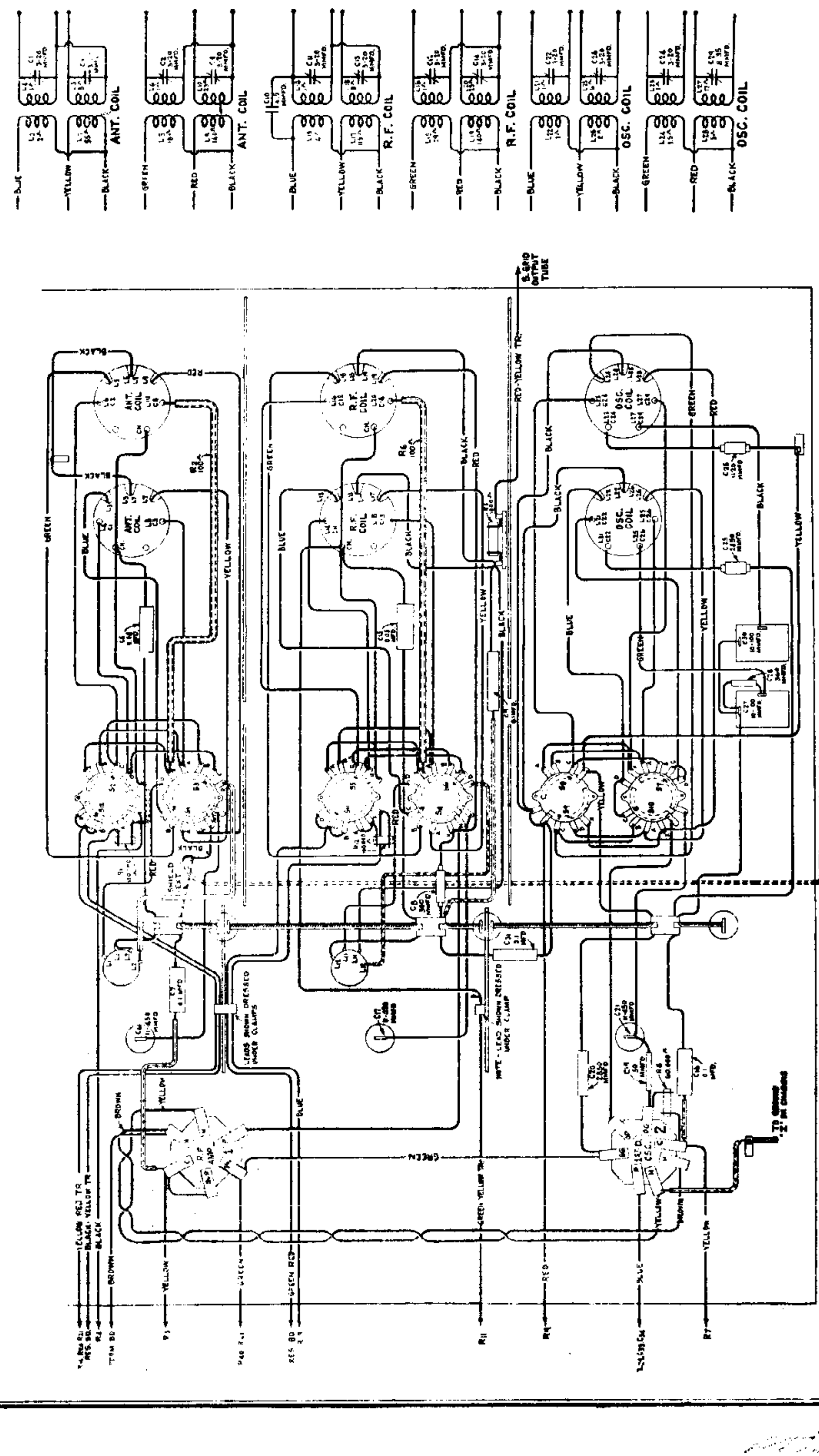


Figure 2—R. F. Assembly Wiring Diagram

Tuning Frequency Range

- Band X .... 140 K. C.–410 K. C.
- Band A .... 540 K. C.–1720 K. C.
- Band B .... 1720 K. C.–5400 K. C.
- Band C .... 5400 K. C.–18,000 K. C.
- Band D .... 18,000 K. C.–36,000 K. C.

RCA-VICTOR CO., INC.

MODEL 281
Socket and
Trimmer Layouts

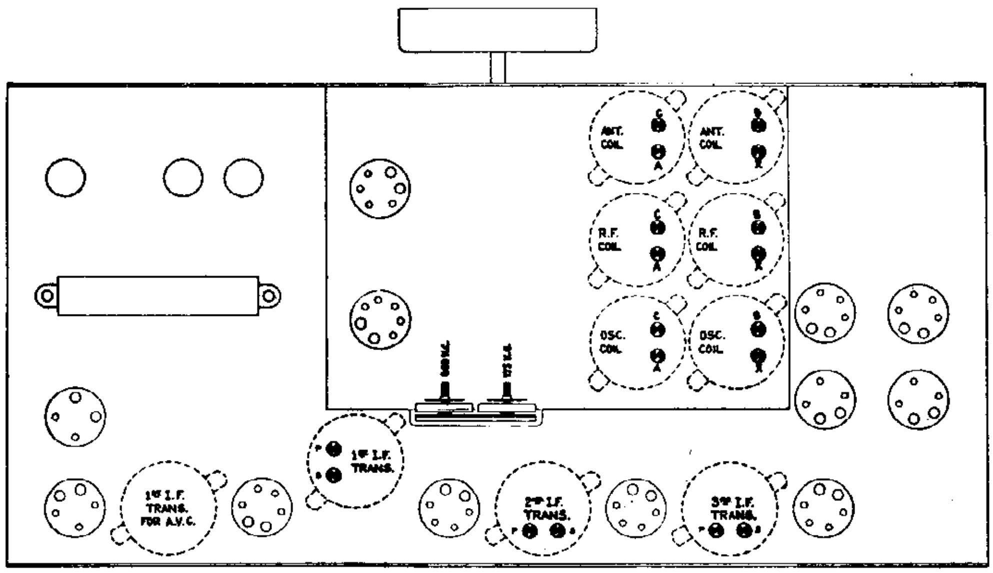


Figure 9—Location of Various Trimmer Capacitors

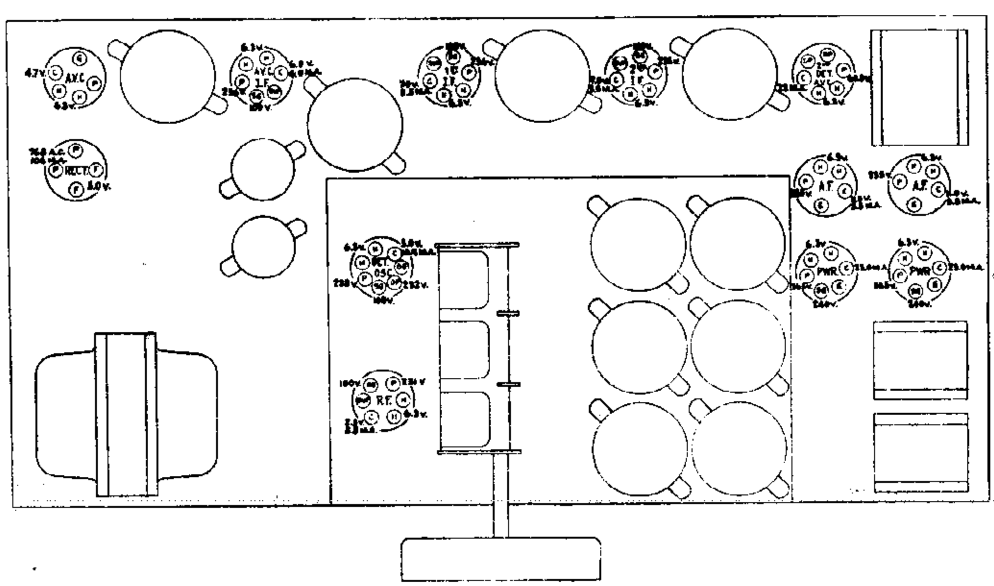


Figure 10—Radiotron Socket Voltages

RCA-VICTOR CO., INC.

At this point, an explanation as to why two automatic volume control systems are used and why the sensitivity control is changed in different bands may be in order.

Two automatic volume control systems are used because of the different receiving conditions in different bands. For example, in the broadcast and long-wave band (X and A) signal levels are very high. Also due to the use of an aurally compensated volume control, a constant input to the second detector must be maintained. From this, it is evident that the double channel I. F. automatic volume control is ideal. It maintains a constant input to the second detector and yet does not function on an extremely weak signal. In the short-wave bands, however, conditions are different. Signal strengths are always very low and fluctuate widely. For this reason it is important to have some automatic volume control action below the level at which the double channel system works. This is provided by the diode A. V. C. of the second detector, which functions on the first detector and two I. F. stages on the short-wave bands. It should be noted that this action is present on the second I. F. stage on all bands. This further flattens the action of the double-channel system in bands X and A.

At this point it is well to examine the sensitivity control which also changes on different bands. The sensitivity control adjusts the residual bias on the R. F. and first detector stages in bands X and A while it controls the R. F., 1st detector and both I. F. stages on bands B, C, and D. Figure 4 shows the switching arrangement used.

The sensitivity control is changed so that in bands X and A it controls the R. F. and 1st detector while in bands B, C, and D it controls the R. F., 1st detector, 1st I. F. and 2nd I. F. stages. The reason for this is that for a given degree of sensitivity in bands X and A the residual bias will be considerably higher in the R. F. and 1st detector stages than in the bands B, C, and D used. This is to prevent possible overloading of these stages due to the high-signal strengths encountered in bands X and A. Also, in bands B, C, and D, for a given degree of sensitivity the R. F. stage operates at a higher gain, which gives an improved signal to noise ratio. This is caused by the paralleling of the sensitivity control with an 850-ohm resistor in these bands.

Returning to the second detector, we find its output circuit is coupled to the grid circuit of the driver stage through a compensated volume control system, tone control system and transformer. The volume control uses two stages of compensation, which serves to increase the high and low frequencies as the volume is reduced. This compensates for the natural loss in sensitivity of the human ear to the high and low frequencies at low sound levels. A low and a high frequency tone control enables the listener to alter the fidelity of the receiver to his individual taste.

The driver stage, which is a pair of RCA-76 Radiotrons connected in push-pull, is transformer coupled to a pair of RCA-42's which are the output stage. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-38 and R-39, which carries the entire D. C. output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it will have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

The loudspeaker used is of the large field ten-inch type. It is fully capable of handling the high-power, high-quality output of the receiver and converting it into faithful sound reproduction.

Figure 5 shows the chassis wiring while Figure 6 shows the loudspeaker wiring.

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To properly align this receiver, the following equipment must be used. This is a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool, a tuning wand, and a "dummy" Radiotron RCA-76. These parts, which are shown in Figure 8, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments. The "dummy" Radiotron, RCA-76, is obtained by removing one heater prong from an otherwise perfect tube.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 7. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in. The A. V. C. tube would be replaced by the "dummy" RCA-76 and the output indicator could be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has three I. F. stages, two for the signal and one for the A. V. C., only three transformers having six adjustable capacitors require adjustment. The fourth transformer is in the A. V. C. circuit and is broadly tuned, not requiring adjustments. The transformers are all peaked, being tuned to 460 K. C.

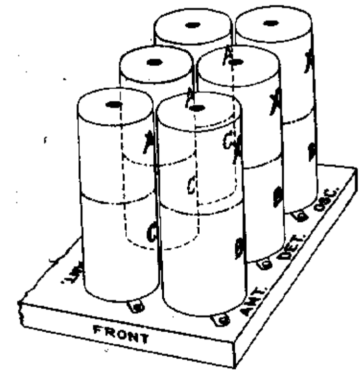


Figure 7—Location of Various Coils in Shields

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker. Replace the A. V. C. tube in the receiver with the "dummy" RCA-76.

(b) Place the oscillator in operation at 460 K. C.; place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn both the volume and sensitivity controls to their maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 9. Adjust each trimmer of the I. F. tuning capacitors until a maximum output is obtained. Go over the adjustments a second time.

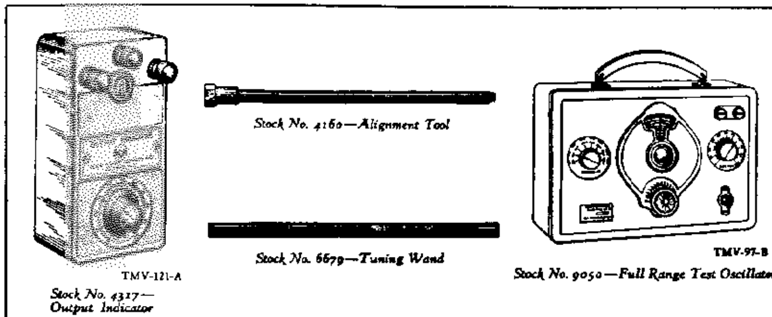


Figure 8—Equipment Required for Aligning Receiver

RCA-VICTOR CO., INC.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and Oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "X" and "A." Three are required in bands "B" and "C" while none are required in band "D." Band "D" uses the second harmonic of the oscillator while the detector and R. F. coils do not have trimmers.

To properly align the various bands, each band must be aligned individually in the order given. This is "X," "A," "B," "C," and "D." The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver. The output indicator must be connected across the voice coil of the loudspeaker while the "dummy" RCA-76 must be placed in the A. V. C. socket. The sensitivity and volume controls must be at their maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The Dial Pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/16" of the horizontal line at the highest frequency end of band "A."

Figure 9 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) The oscillator series capacitor, marked 175 K. C., Figure 9, is first tightened to near its maximum capacity position (screwed "in")

(b) Tune the external oscillator to 410 K. C., set the pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer marked 175 K. C. on Figure 9, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

Band "A"

(a) The oscillator series capacitor, marked 600 K. C., Figure 9, should be set at about the center of its range.

(b) Tune the external oscillator to 1720 K. C., set the pointer at 1720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator to 600 K. C. Tune in the 600 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 600 K. C. on Figure 9, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 K. C. as described in (b).

Band "B"

(a) The detector and antenna trimmers should first be tightened to approximately ¾ maximum capacity (turned ¾ in).

(b) Tune the external oscillator to 5160 K. C., and set the pointer at 5160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4240 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "C"

(a) The detector and antenna trimmers should first be tightened to approximately ¾ maximum capacity (turned ¾ in).

(b) Tune the external oscillator to 18,000 K. C., and set the pointer at 18 M. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "D"

No adjustments are required for Band D.

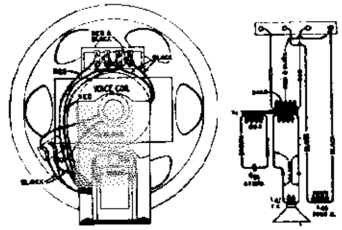


Figure 6—Loudspeaker Wiring

(4) MAGNETIC PICKUP CONNECTIONS

A Terminal Board is provided at the rear of the chassis for adding phonograph facilities to this instrument. In general, it is best to operate the phonograph with its volume control at its maximum output position and use the radio receiver volume control for adjusting volume. The radio volume control is compensated and will result in much better tone quality at low volume than will be obtained if it is operated open and the volume adjusted from the pickup volume control. Figure 11 shows the various types of connections that will be required for the different turntable assemblies.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made.

RADIOTRON SOCKET VOLTAGES

Maximum Sensitivity—No Signal—120-Volt A. C. Input

Radiotron No.		Cathode to Ground, Volts	Screen Grid to Ground, Volts	Plate to Ground, Volts	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.3	100	231	8.8	6.3
RCA-6A7	Osc.	3.0	—	232	10.9	6.3
	Det.		100	238		
RCA-6D6—1st I. F.		7.0	100	236	3.5	6.3
RCA-6D6—2nd I. F.		7.0	100	236	3.5	6.3
RCA-6D6—A. V. C.–I. F.		6.0	100	236	4.0	6.3
RCA-76—A. V. C.		4.7	—	0	0	6.3
RCA-85—2nd Det.		0	—	60	7.2	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-5Z3—Rectifier		—	—	768/384 RMS	104.0	5.0

Power Transformer connected to 120-volt Tap.

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4372	Bracket—Low frequency tone or volume control mounting bracket	$0.20
4406	Bracket—High frequency tone control mounting bracket	.25
2747	Cap—Contact cap—Package of 5	.50
4407	Capacitor—30 mmfd. (C64)	.25
4405	Capacitor—80 mmfd. (C52)—Package of 5	.85
4376	Capacitor—250 mmfd.—Located on second intermediate frequency transformer (C39, C46)—Package of 5	.80
4404	Capacitor—500 mmfd. (C33, C53)—Package of 5	.85
4409	Capacitor—1120 mmfd. (C54)	.35
4070	Capacitor—.004 mfd. (C66)	.42
3643	Capacitor—.005 mfd. (C62, C63)	.25
6512	Capacitor—.005 mfd. (C65)	.28
3787	Capacitor—.01 mfd. (C61)	.30
3888	Capacitor—.05 mfd. (C36, C44, C48)	.25
3765	Capacitor—.025 mfd. (C42, C58)	.34
4645	Capacitor—.1 mfd. (C32, C41, C43, C51)	.23
3877	Capacitor—.1 mfd. (C37, C38, C47)	.32
3702	Capacitor—.25 mfd. (C57)	.42
7790	Capacitor—10 mfd. (C67)	1.05
7788	Capacitor—18 mfd. (C68)	1.10
7787	Capacitor pack—Comprising one .15 mfd. and one 5 mfd. capacitors (C59, C60)	1.10
7789	Capacitor pack—Comprising one 4., one 8. and one 10. mfd. capacitors (C55, C69, C70	2.68
4358	Clamp—Electrolytic capacitor clamp	.15
7806	Coil—Second detector plate choke coil (L38)	.30
4371	Cover—Fuse mount cover	.15
4359	Cover—Terminal board cover	.15
10907	Fuse—3-ampere—Package of 5	.40
3376	Mount—Fuse mount 105–125-volt instrument	.40
7784	Reactor—Tone control reactor (L39)	1.30
7483	Reactor—Volume control compensating reactor (L40)	.68
6135	Resistor—270 ohms—Carbon type—¼ watt (R3, R7, R14, R20)—Package of 5	1.00
4240	Resistor—700 ohms—Carbon type—¼ watt (R30)—Package of 5	1.00
4375	Resistor—800 ohms—Carbon type—¼ watt (R29)—Package of 10	2.00
6247	Resistor—850 ohms—Carbon type—¼ watt (R21)—Package of 5	1.00

Stock No.	Description	List Price
4370	Resistor—1,000 ohms—Carbon type—¼ watt (R9, R10, R15, R16, R22, R35)—Package of 10	$2.00
4687	Resistor—1,000 ohms—Carbon type—½ watt (R13)—Package of 10	2.00
3110	Resistor—25,000 ohms—Carbon type—¼ watt (R37)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R32)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R11, R17)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt—Located on third I. F. transformer (R23)—Package of 5	1.00
4368	Resistor—400,000 ohms—Carbon type—¼ watt (R18, R19)—Package of 10	2.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R24, R33)—Package of 5	1.00
3413	Resistor—5,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R36)	.22
5817	Resistor—20,000 ohms—Carbon type—3 watt (R25)	.25
6997	Resistor—Total resistance 14,470 ohms with 160–60–350–7150 and 6750 ohm sections (R38, R39, R40, R41, R42)	.95
7804	Rheostat—Noise suppressor rheostat (R4)	1.30
4453	Shield—First I. F., AVC I. F. or second I. F. Radiotron shield	.32
3683	Shield—Radiotron shield top	.20
4452	Shield—Second detector or AVC Radiotron shield	.35
7800	Shield—Shield for intermediate frequency coils	.45
3859	Socket—4-contact rectifier Radiotron socket	.30
7484	Socket—5-contact AVC Radiotron socket	.35
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact driver Radiotron socket	.40
7796	Switch—Operating switch (S13)	.62
7795	Tone control—Low frequency (R27)	1.30
7797	Tone control—High frequency (R34)	1.35
7794	Transformer—AVC intermediate frequency transformer (L34, L35)	.82
7785	Transformer—Driver transformer (T3)	2.40
7791	Transformer—First intermediate frequency transformer (L29, L30, L31, C33, C34, C35)	2.35
9505	Transformer—Power transformer 105–125-volt, 50–60 cycle (T1)	6.35
9506	Transformer—Power transformer 105–125 volts, 25–40 cycles	8.90
7792	Transformer—Second intermediate frequency transformer (L32, L33, C39, C40, C45, C46)	2.22

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
7793	Transformer—Third intermediate frequency transformer (L36, L37, C49, C50, C52, R23)	$2.50
7786	Transformer pack—Comprising one reactor and interstage transformer (L41, T2)	4.25
7798	Volume control (R31)	2.05
	R. F. UNIT ASSEMBLIES	
4646	Capacitor—4.5 mmfd. (C10)	.20
4416	Capacitor—50 mmfd. (C19)—Package of 5	1.25
3981	Capacitor—300 mmfd. (C8)	.30
4413	Capacitor—360 mmfd. (C28)	.22
4412	Capacitor—1120 mmfd. (C25)	.25
4524	Capacitor—2850 mmfd. (C23)	.35
4615	Capacitor—2850 mmfd. (C20)	.34
4417	Capacitor—0.05 mfd. (C5, C15)	.25
4415	Capacitor—0.1 mfd. (C7, C16)	.30
4645	Capacitor—0.1 mfd. (C9, C31)	.36
3851	Capacitor—Adjustable capacitor (C27, C30)	.78
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4410	Coil—Antenna coil—Band "D" (L1, L2)	.70
7803	Coil—Antenna coil—"B"—"SW" (L3, L4, L7, L8, C1, C3)	1.82
7810	Coil—Antenna coil—"PB"—"LW" (L5, L6, L9, L10, C2, C4)	2.10
7805	Coil—Detector coil—"B-SW" (L13, L14, L17, L18, C11, C13)	2.15
7808	Coil—Detector coil—"PB-LW" (L15, L16, L19, L20, C12, C14)	2.05
4421	Coil—Detector coil—Band "D" (L11, L12)	.70
7807	Coil—Oscillator coil—"B-SW" (L21, L22, L25, L26, C22, C26)	1.62
7809	Coil—Oscillator coil—"PB-LW" (L23, L24, L27, L28, C24, C29)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C17, C21)	4.42
4419	Lead—Shield single-conductor antenna lead	.45
4370	Resistor—1,000 ohms—Carbon type—¼ watt (R5)—Package of 10	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R12)—Package of 5	1.00
4418	Resistor—100 ohms—Flexible type (R2, R6)—Package of 10	1.50
7800	Shield—Antenna, detector or oscillator coil shield	.45
4452	Shield—First detector oscillator coil shield	.35
3683	Shield—Radiotron shield top	.20
4454	Shield—R. F. amplifier Radiotron shield	.44
3529	Socket—Dial lamp socket	.32
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4685	Strip—Terminal strip engraved "ANT-GND"	.20
7802	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12)	4.05

Stock No.	Description	List Price
	CABLE ASSEMBLIES	
7815	Cable—Audio cable	$0.62
7813	Cable—From L. F. tone control, volume control to resistor boards	.72
7812	Cable—Main cable	1.30
7814	Cable—Reproducer cable—4-conductor	.45
	REPRODUCER ASSEMBLIES	
4193	Board—Terminal board	.32
9509	Coil—Field coil, magnet and cone support (L43)	11.46
7000	Cone—Reproducer cone (L42)—Package of 5	9.45
9508	Reproducer complete	17.40
6999	Screen—Dust screen—Package of 6	.12
4506	Transformer—Output transformer and capacitor (T4, C56)	2.85
	MISCELLANEOUS ASSEMBLIES	
4677	Bezel—Metal bezel (escutcheon) for station selector dial	.56
6614	Glass—Station selector dial glass	.30
4425	Knob—Station selector knob—Package of 5	.75
3829	Knob—Volume control, tone control, noise suppressor or range switch knob—Package of 5	1.10
4340	Lamp—Dial lamp—Package of 5	.60
4678	Ring—Station selector dial glass retaining ring—Package of 5	.34
4119	Screw—8-32-¼" headless set screw for knob—Stock Number 4425—Package of 20	.38
4393	Screw—8-32-3/16" headless set screw for knob—Stock Number 3829—Package of 10	.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	.88
4455	Dial—Station selector dial	.60
7799	Drive—Variable tuning condenser drive assembly complete	2.45
4364	Gear—Spring gear assembly complete with hub pinion, gear cover and spring	.96
4361	Indicator—Band indicator—Celluloid-lettered D-C-B-A-X	.12
4363	Pointer—Station selector main pointer—Large	.18
4367	Pointer—Station selector vernier pointer—Small	.15
3993	Screw—No. 6-32-5/16" square head set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4360	Stem—Pointer stem assembly	.35
4378	Stud—Band indicator operating arm stud—Package of 5	.25

MODEL 301
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

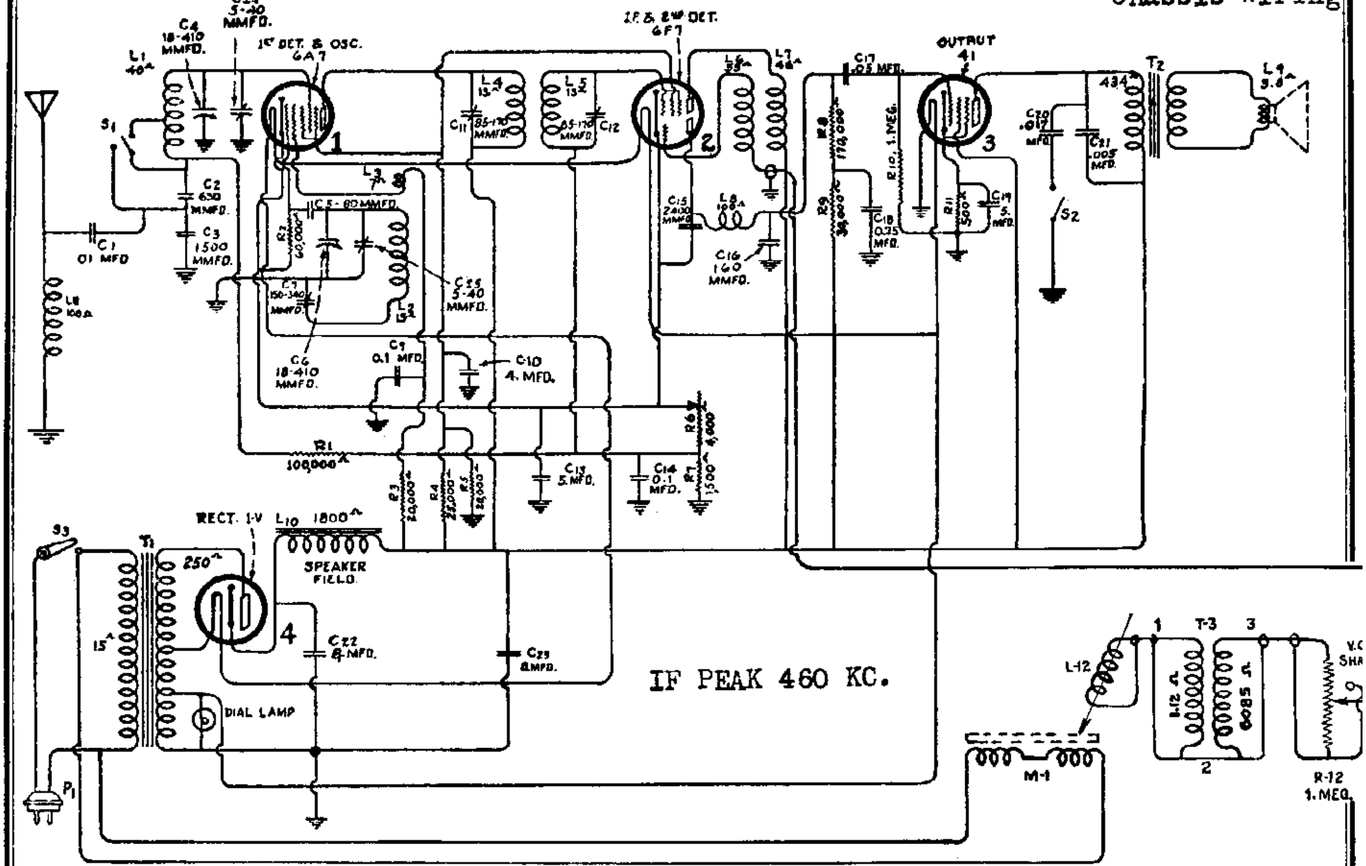


Figure C—Schematic Circuit Diagram

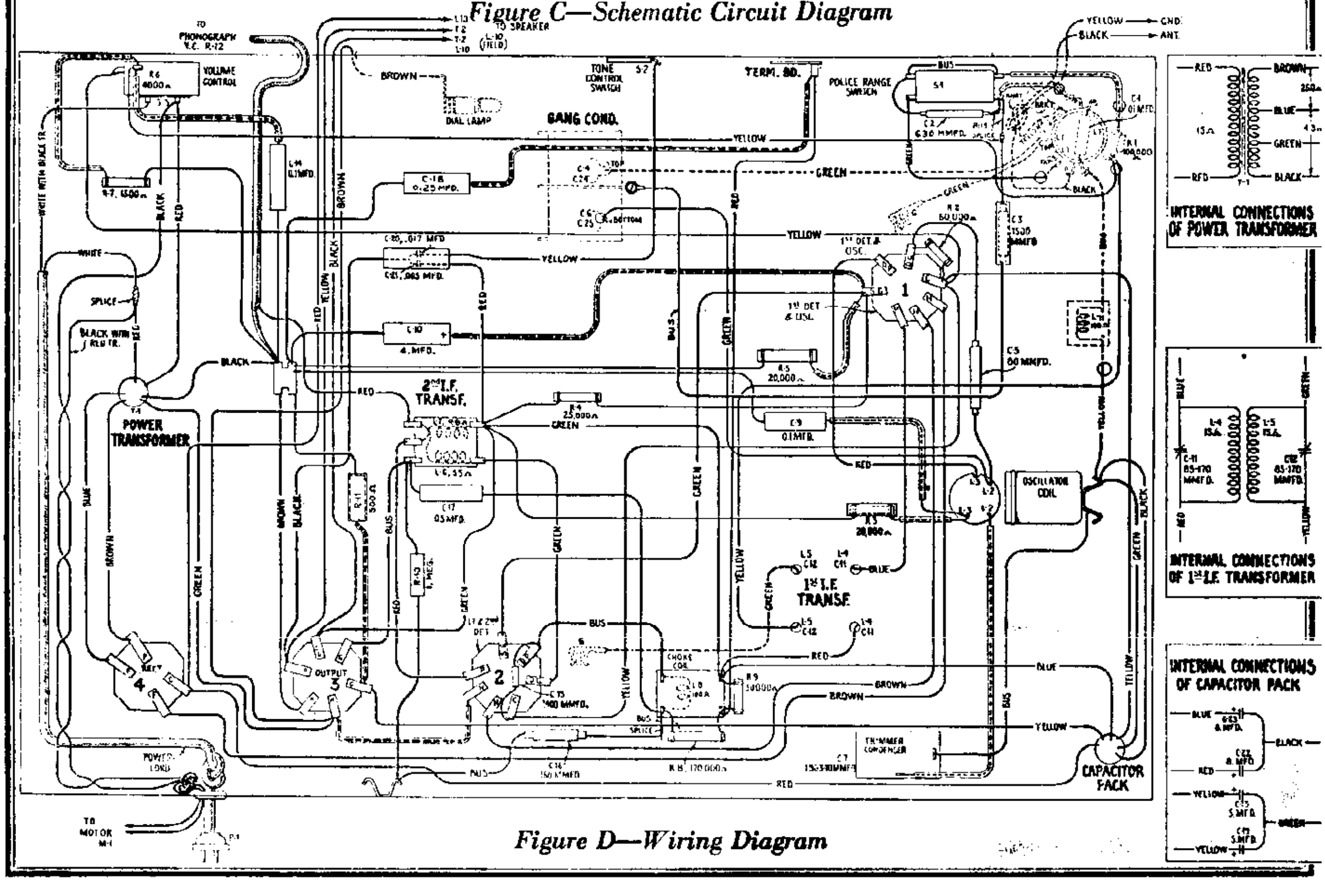


Figure D—Wiring Diagram

MODEL 301
Voltage, Alignment
Pickup Data

RCA-VICTOR CO., INC.
SERVICE DATA

Voltage Rating..105–125 Volts
Frequency Rating..............................25, 50 and 60 Cycles
Power Consumption...45 Watts
Number and Types of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1-V
Undistorted Output..1.9 Watts
Frequency Range.................540–1500 K. C. and 1600–3500 K. C.

This table type combination instrument consists of a four tube super-heterodyne chassis and a new compactly constructed motor board assembly. The receiver incorporates features such as wide tuning range, electro-dynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the super-heterodyne.

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-41.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Figure A shows the pickup details, Figure B the assembly wiring, Figure C the schematic circuit and Figure D the wiring diagram and Figure E the loudspeaker wiring.

RADIOTRON SOCKET VOLTAGES
120 Volt, 60 Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts D. C.	Cathode to Plate, Volts D.C.	Plate Current, M.A.	Heater or Filament, Volts
RCA-6A7	First Detector	1.25	70	235	2.5	6.3
	Oscillator	—	—	180	3.5	
RCA-6F7	I. F.	1.25	70	235	5.5	6.3
	Second Det.	19	—	145*	0.4	
RCA-41	Output	17	240	230	26.5	6.3
RCA-1-V	Rectifier	—	—	335 RMS	50	6.3

* Actual voltage cannot be measured with ordinary voltmeter.

Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

Pickup Service Data

The magnetic pickup and tone-arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature, replacing the rubber pivots and replacing the magnet coil.

Disassembling the Pickup

The pickup may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.
(b) Remove the needle screw and screws "A" and "B."
(c) Remove the pickup assembly from the arm and housing.
(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the fibre terminal board.
(e) If centering the pickup armature is the only adjustment required, such centering can be done without removing the fibre terminal board indicated in (d). The armature is centered by loosening screw F, accessible through the hole shown, and holding the armature with the finger in proper position while screw F is tightened. "Feeling" the armature while deflecting it between its two extremes is the best manner of ascertaining proper centering. When centering, after work has been done or the magnet removed, it is important that the magnet be remagnetized while in place.
(f) If the coil or pivot rubbers are to be replaced, the pickup must be further disassembled. This is done by removing the magnet and then removing screws C and D. The pole piece may now be removed and the old coil and sleeve disassembled. Acetone will be found helpful for dissolving the old cement that holds the coil in place. The new coil, with its sleeve, may now be replaced and cemented in a similar position to that occupied by the old coil. Duco household or Ambroid cement may be used to hold the coil in place. Be careful to center the coil with its paper sleeve before cementing.
(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing the armature from its bracket. The rubbers can then be removed by slipping them from each end of the pivot shaft.

It is important to remember that in all operations after reassembling but before placing in the tone arm, the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.

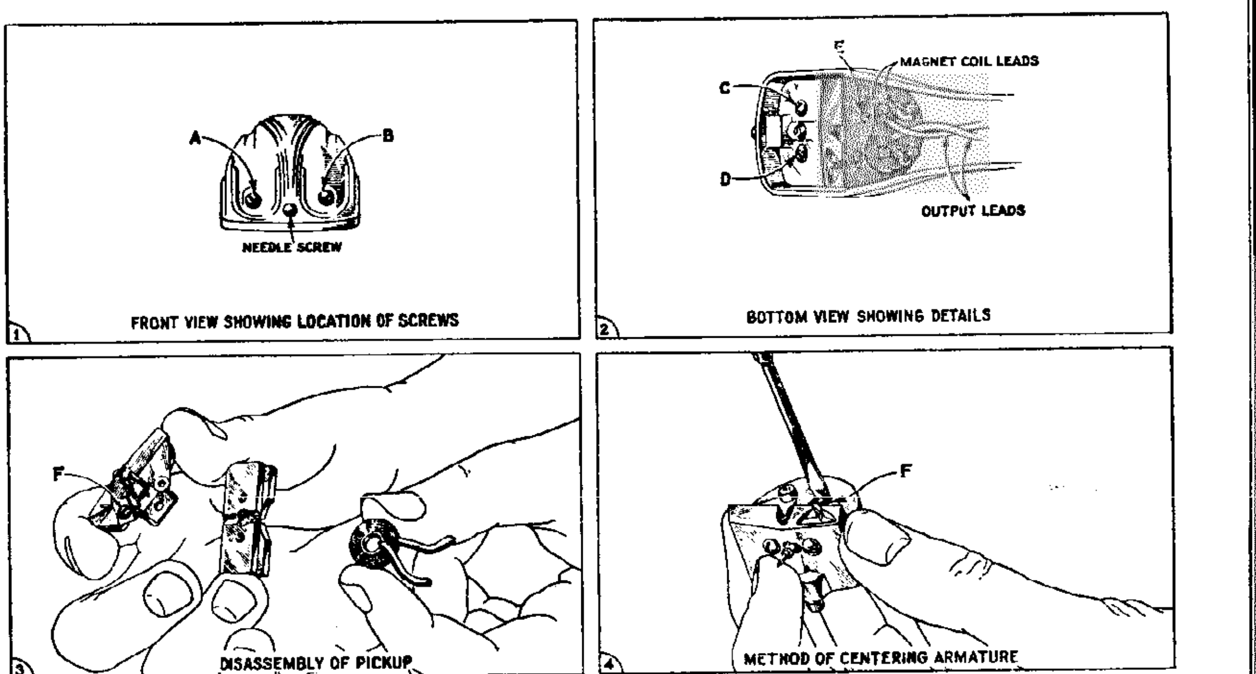


Figure A—Pickup Details

RCA-VICTOR CO., INC.

PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and foolproof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure E shows the main parts of the motor and the points that may require attention.

Operation—The two stator coils are connected in series and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R. P. M., such action may result from one of the following causes:

Difficult to Start—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the spaghetti sleeve being jammed in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.

Slow Speed—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R. P. M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal.

Excessive Vibration and Hum—A small amount of hum when starting decreasing to a negligible amount while running is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) The metal washer should be above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

Removing Rotor from Stator—The rotor which includes the turntable may be removed by loosening the screw shown in Figure E until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the restraining screw securely to eliminate the possibility of rattle in operation.

Power Consumption—The motor consumes 4 watts. It should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

NOTE: The above values of power consumption are average for a 60 cycle motor at 125 volts. At lower voltages the power consumption will be less.

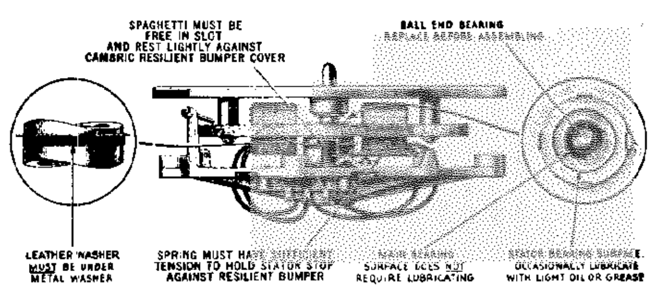


Figure E—Details of Motor

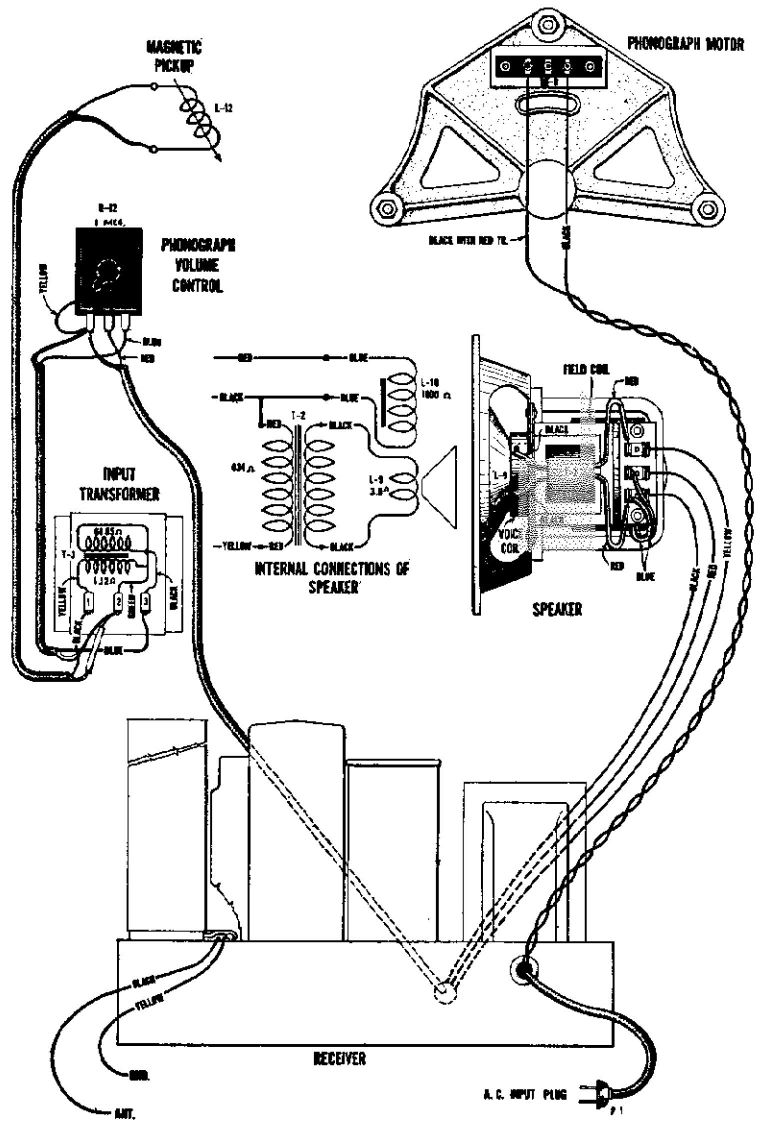


Figure B—Assembly Wiring

MODEL 301
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
3047	Resistor—1500 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—¼ watt (R10)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C5)	.44
3597	Capacitor—0.25 mfd. (C18)	.40
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3641	Capacitor—0.1 mfd. (C9)	.35
3682	Shield—Radiotron shield	.22
3701	Capacitor—0.01 mfd. (C1)	.30
3713	Capacitor—0.05 mfd. (C17)	.32
3857	Coil—Detector choke coil (L8)	.90
3858	Socket—Dial lamp socket and bracket	.26
3859	Socket—4-contact Radiotron socket	.30
3862	Screw—Chassis mounting screw and washer—Package of 4	.24
3865	Capacitor—160 mmfd. (C16)	.30
3869	Resistor—170,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3873	Capacitor—1500 mmfd. (C3)	.30
3877	Capacitor—0.1 mfd. (C14)	.32
3886	Reflector—Dial light reflector	.30
3887	Scale—Dial scale—Package of 5	.60
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	.25
3917	Capacitor—0.25 mfd. (C18)	.40
3932	Capacitor—2400 mmfd. (C15)	.30
3933	Capacitor—630 mmfd. (C2)	.32
4000	Capacitor—Adjustable capacitor (C7)	.78
4018	Coil—Choke coil (L11)	.90
6676	Socket—6-contact socket	.40
6787	Capacitor—Comprising one .005 mfd. and one .017 mfd. capacitors (C20, C21)	.30
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
6660	Condenser—2-gang variable condenser (C4, C6, C24, C25)	2.78
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
6664	Coil—Oscillator coil (L2, L3)	.94
6665	Shield—Oscillator coil shield and mounting bracket	.34
6666	Coil—Antenna coil (L1, C1, R1)	1.08
6667	Volume control (R6, S3)	1.58
6668	Switch—Range switch (S1)	.58
6669	Switch—Tone control switch (S2)	$0.50
6832	Capacitor—4.0 mfd. (C10)	.86
9464	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	3.20
9465	Transformer—Power transformer—105-125 volts—25-40 cycles	4.38
	REPRODUCER ASSEMBLIES	
6788	Transformer—Output transformer (T2)	1.60
8987	Cone—Reproducer cone complete (L9)—Package of 5	5.00
9437	Coil assembly—Comprising field coil, magnet and cone support (L10)	2.72
9467	Reproducer complete	5.15
	TURNTABLE AND MOTOR ASSEMBLIES	
3808	Board—Motor terminal board	.20
4052	Spring—Package of 5	.40
3813	Motor suspension assembly—Comprising one screw, one metal bushing, two rubber bushings, one flat washer, one lockwasher and one nut—3 sets	.56
4083	Washer—Leather washer—Package of 10	.20
4084	Washer—Metal washer—Package of 10	.26
7651	Coil—Stator coil—60 cycle operation	.48
7652	Coil—Stator coil—50 cycle operation	.48
7653	Lamination—Stator laminations—Assembled—60 cycle operation—110 or 220 volts	.66
7654	Lamination—Stator laminations—Assembled—50 cycle operation	.66
7655	Lamination—Rotor lamination assembly—60 cycle operation	1.00
7656	Lamination—Rotor lamination assembly—50 cycle operation	1.00
7657	Base—Motor base and bearing assembly	1.20
7714	Lamination—Rotor laminations—Assembled—60 cycles—220 volts	1.76
7715	Coil—Stator coil—60 cycles—220 volts	.68
9038	Motor complete—105-125 volts—60 cycles	4.20
9039	Motor complete—105-125 volts—50 cycles	4.20
9040	Turntable complete—With spindle for 50 or 60 cycle operation	1.16
10194	Ball—Steel ball bearing—Package of 20	.25
	PICKUP AND ARM ASSEMBLIES	
3811	Screw—Needle holding screw—Package of 10	.46
3812	Armature	.32
6825	Pickup and arm assembly complete	4.82
6826	Coil—Pickup coil (L12)	.64
	MISCELLANEOUS PARTS	
3961	Knob—Phonograph volume control knob—Package of 5	.60
4075	Knob—Range switch or volume control knob—Package of 5	1.00
4086	Knob—Tone control switch knob—Package of 5	1.00
4087	Screw and washer—Chassis mounting screw and washer assembly—Package of 4	.20
6827	Volume control—Phonograph volume control (R12)	1.46
6828	Transformer—Phonograph input transformer (T3)	2.60

RCA-VICTOR CO., INC.

Electrical Specifications

Voltage Rating .... 105–125 Volts
Frequency Rating .... 25, 50 and 60 Cycles
Power Consumption .... 50 and 60 Cycle, 100 Watts; 25 Cycle 105 Watts
Number and Type of Radiotrons 2 RCA-58
1 RCA-2A7 1 RCA-2B7 1 RCA-2A5 1 RCA-80—Total 6.
Tuning Ranges .... 540 K. C.–1500 K. C.—5400 K. C.–15,350 K. C.
Undistorted Output .... 1.75 Watts

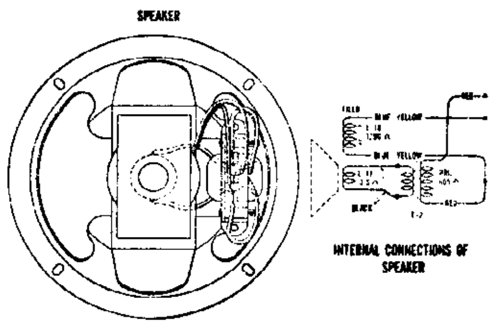


Figure D—Loudspeaker Wiring

This "Selective Short-Wave" combination instrument utilizes the new six tube double band superheterodyne together with the standard two-speed motor board assembly. Excellent quality of record reproduction together with unusual radio performance characterize this instrument.

The receiver is a six-tube two-band A. C. operated Superheterodyne receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier tuning drive using two concentric knobs giving a 10-1 and a 55-1 ratio of speed reduction, a continuously variable tone control, six-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the assembly wiring and Figure D the loudspeaker wiring. Service data on the magnetic pickup is given on one of the following pages.

Line-Up Capacitor Adjustments

In order to properly align this receiver it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor accessible from the rear of the chassis should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as SW in Figure D for a peak, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two peaks. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

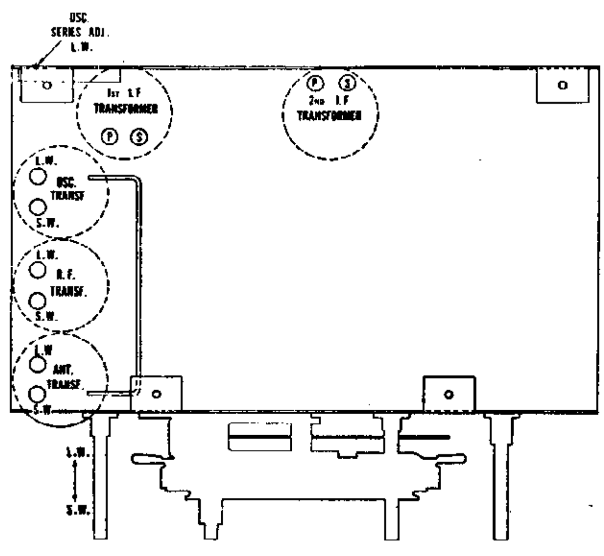


Figure E—Location of Line-Up Capacitors

TUBE SOCKET VOLTAGES (RADIO OPERATION)

115 VOLTS, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

* The voltages and current refer to the detector part of the tube.

MODEL Duo 320
Schematic

RCA-VICTOR CO., INC.

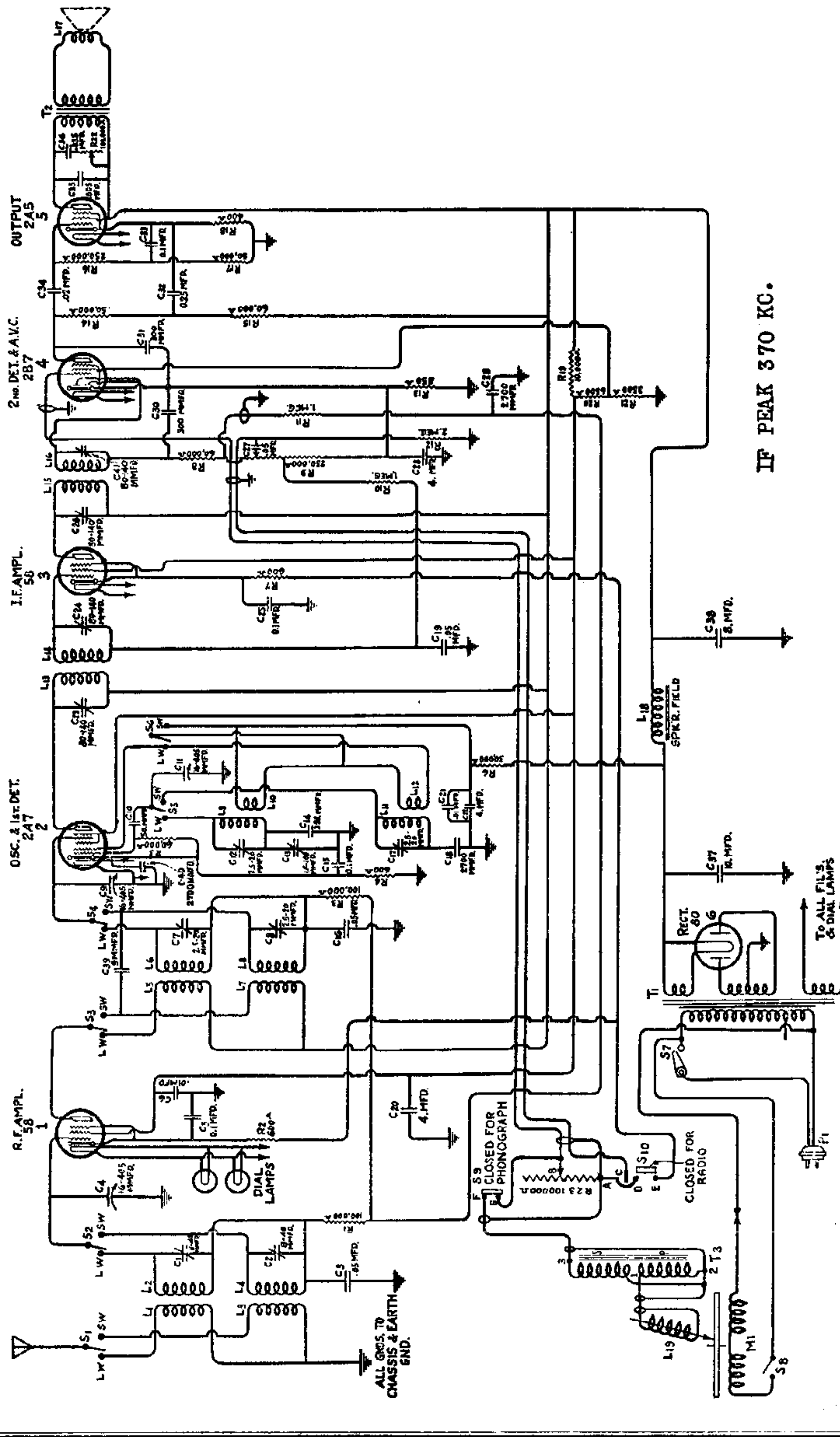


Figure A—Schematic Circuit Diagram

RCA-VICTOR CO., INC.

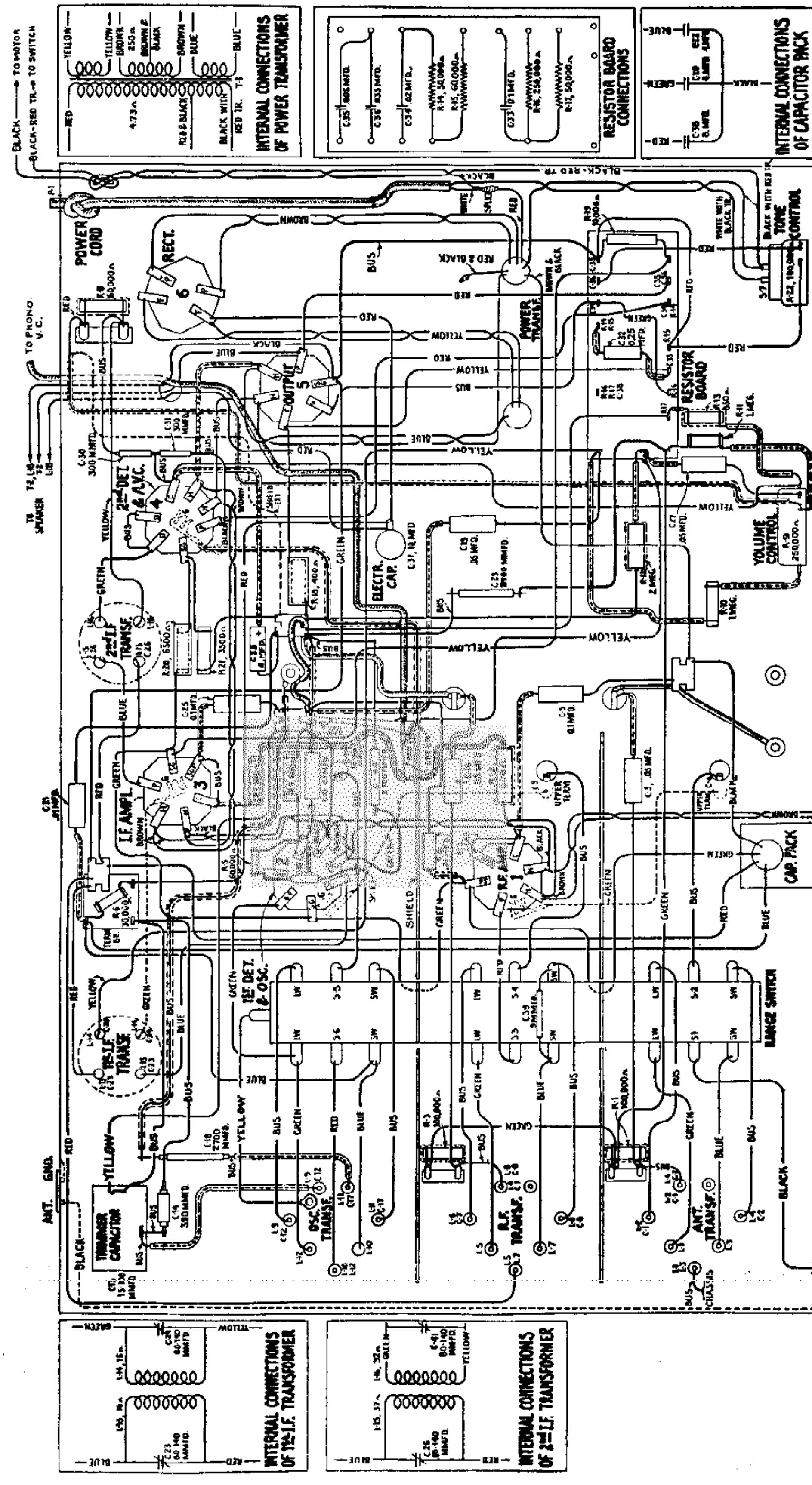


Figure B—Wiring Diagram

MODEL Duo 320
Assembly Wiring

RCA-VICTOR CO., INC.

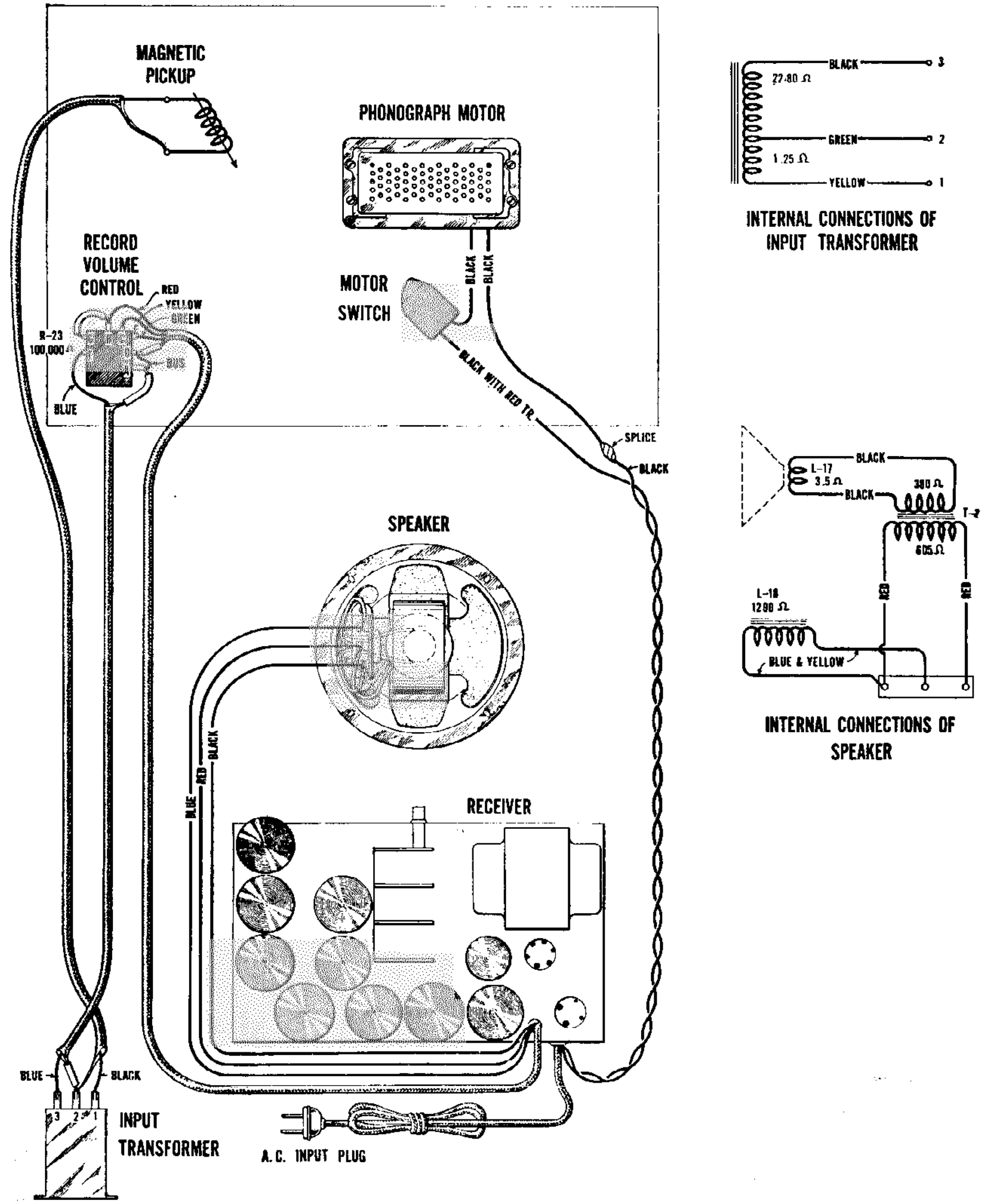


Figure C—Assembly Wiring Diagram

RCA-VICTOR CO., INC.

SERVICE DATA FOR MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure G), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

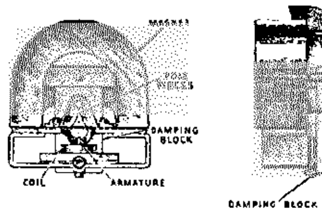


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

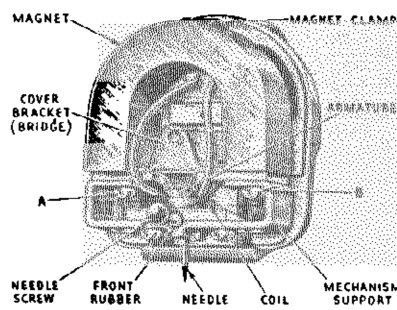


Figure G

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

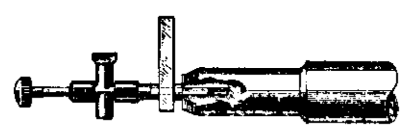


Figure H

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL Duo 320
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R6)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3056	Shield—Second detector Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5	1.00
311P	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5	1.00
3631	Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3639	Capacitor—0.02 mfd. (C34)	.25
3683	Shield—Radiotron shield top	.20
3701	Capacitor—0.01 mfd. (C6, C21)	.30
3702	Capacitor—0.25 mfd. (C32)	.42
3768	Screw—Square head No. 6-32-¼" set screw for condenser drive—Package of 10	.35
3796	Capacitor—4.0 mmfd. (C28)	.60
3849	Capacitor—50 mmfd. (C10)	.30
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor (C13)	.78
3877	Capacitor—0.1 mfd. (C5, C15, C25, C33)	.32
3878	Screw—No. 4-40-$\frac{3}{16}$" screw for fastening station selector pointer—Package of 20	.25
3881	Escutcheon—Volume control escutcheon	.42
3888	Capacitor—0.05 mfd. (C19, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5	1.00
3897	Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5	1.10
3899	Escutcheon—Station selector escutcheon	.42
3901	Capacitor—0.05 mfd. (C3, C16)	.36
3902	Knob—Station selector knob complete	.44
3903	Screw—No. 8-32-$\frac{1}{4}$" headless cup point set screw for station selector knob—Package of 20	.36
3904	Knob—Volume control knob—Package of 5	.88
3905	Screw—Chassis mounting screw assembly—Comprising 4 screws, 4 washers and 4 cushions	.46
3906	Mounting assembly—Variable condenser mounting assembly—Comprising 3 bushings, 3 lockwashers, 3 nuts and 3 washers	.28
3935	Capacitor—340 mmfd. (C14)	.34
3936	Capacitor—3,900 mmfd. (C18, C29, C40)	.68
3937	Capacitor—300 mmfd. (C30, C31)	.34
3938	Capacitor—9 mmfd. (C39)	.25
3939	Resistor—3,500 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3940	Pointer—Station selector pointer—Package of 5	.50
3941	Dial—Station selector dial—Package of 5	1.75
3942	Shield—First detector Radiotron shield	.18
3943	Screen—Translucent screen for dial light—Package of 2	.18
3944	Shield—Antenna, R. F. or oscillator coil shield	.28
3991	Resistor—10,000 ohms—Porcelain type (R19)	.60
6188	Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5	1.00
6571	Capacitor—10 mmfd. (C37)	1.20
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	.50
6676	Socket—6-contact Radiotron socket—Output	.40
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	3.75
6695	Volume control (R9)	1.20
6696	Switch—Range switch (S1, S2, S3, S4)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26)	1.78
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	2.44
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	2.30
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	2.64
6702	Drive—Variable tuning condenser drive assembly complete	1.86
6703	Capacitor pack—Comprising one 8.0 mmfd. and two 4.0 mmfd. capacitors (C20, C22, C38)	2.46
6704	Shaft—Tuning condenser drive assembly shaft	.64
6705	Tone control complete (R22)	1.20
6707	Glass—Station selector dial glass	.20
6708	Ring—Retaining ring for dial glass—Package of 5	.44
6755	Bezel—Metal bezel for station selector dial	.50
7065	Screw driver—For I. F. and R. F. adjustments	.80
7485	Socket—6-contact Radiotron socket	$0.40
7487	Shield—I. F. and R. F. amplifier Radiotron shield	.25
9446	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	5.40
9451	Transformer—Power transformer—105-125 volts—25-40 cycles	5.40
10194	Ball—Steel ball for condenser drive assembly—Pkg. of 20	.25
	PICKUP, PICKUP ARM ASSEMBLIES	
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly—Comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Pkg. of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—Package of 5 sets	1.10
3419	Screw—Pickup cover mounting screw—Package of 10	.40
6335	Pickup—Pickup unit complete	4.00
6346	Back—Pickup housing back	.45
7693	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long-playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MOTOR ASSEMBLIES	
3599	Motor mounting washer assembly—Comprising one screw, one washer and one lockwasher—Package of 3 sets	.30
8989	Motor—Motor complete—105-125 volts—60 cycles	18.52
8990	Motor—Motor complete—105-125 volts—50 cycles	18.52
8991	Motor—Motor complete—105-125 volts—40 cycles	23.36
8992	Motor—Motor complete—105-125 volts—25 cycles	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycles motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycles motor	4.75
8995	Rotor and shaft for 105-125 volts, 50 cycles motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycles motor	4.75
8997	Rotor and shaft for 105-125 volts, 40 cycles motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycles motor	5.50
8999	Rotor and shaft for 105-125 volts, 25 cycles motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycles motor	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws (S8)	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Tone control, range switch, or phonograph volume control knob—Package of 5	.60
3994	Cover—Motor starting switch cover	.26
6757	Volume control—Phonograph volume control (R23, S9, S10)	2.70
6758	Transformer—Phonograph input transformer (T3)	2.70
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
10174	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer (T2)	1.44
9428	Cone—Reproducer cone complete (L17)—Package of 5	5.00
9449	Reproducer complete	5.20
9450	Coil—Field coil magnet and cone support (L18)	2.80

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating..105–125 Volts
Frequency Rating............................25, 30, 50 and 60 Cycles
Power Consumption..30, 50 and 60 Cycle, 105 Watts; 25 Cycle, 110 Watts
Number and Type of Radiotrons..............................2 RCA-58
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges......540 K. C. 1500 K. C. and 5400 K. C.–15,350 K. C.
Undistorted Output.......................................1.75 Watts

This "Selective Short-Wave" combination instrument utilizes the new six tube double band superheterodyne together with the standard two-speed motor board assembly. Excellent quality of record reproduction together with unusual radio performance characterise this instrument.

The receiver is a six-tube two-band A. C. operated Superheterodyne receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier tuning drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, eight-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the assembly wiring and Figure D the location of the line-up capacitors. Service data on the magnetic pickup is given on one of the following pages.

Line-Up Capacitor Adjustments

In order to properly align this receiver it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1400 K. C., the dial indicator at 1400 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor accessible from the rear of the chassis should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 15 on megacycle scale. Adjust the three trimmer capacitors designated as S.W. in Figure D for a peak, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two peaks. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

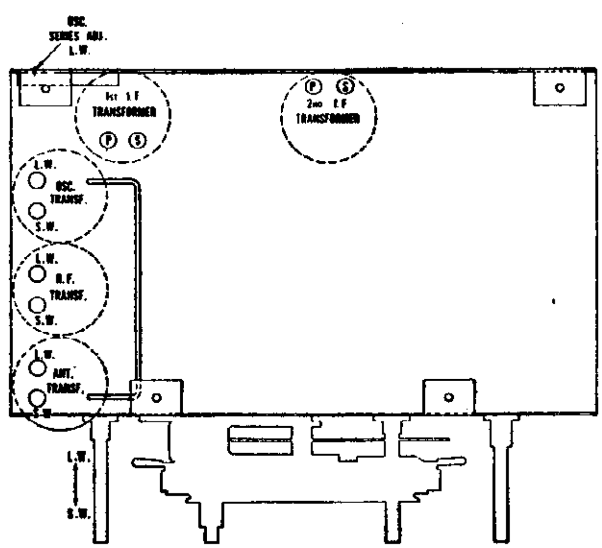


Figure D—Location of Line-Up Capacitors

TUBE SOCKET VOLTAGES (RADIO OPERATION)

115 VOLTS, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

* The voltages and current refer to the detector part of the tube.

MODEL Duo 321
Schematic

RCA-VICTOR CO., INC.

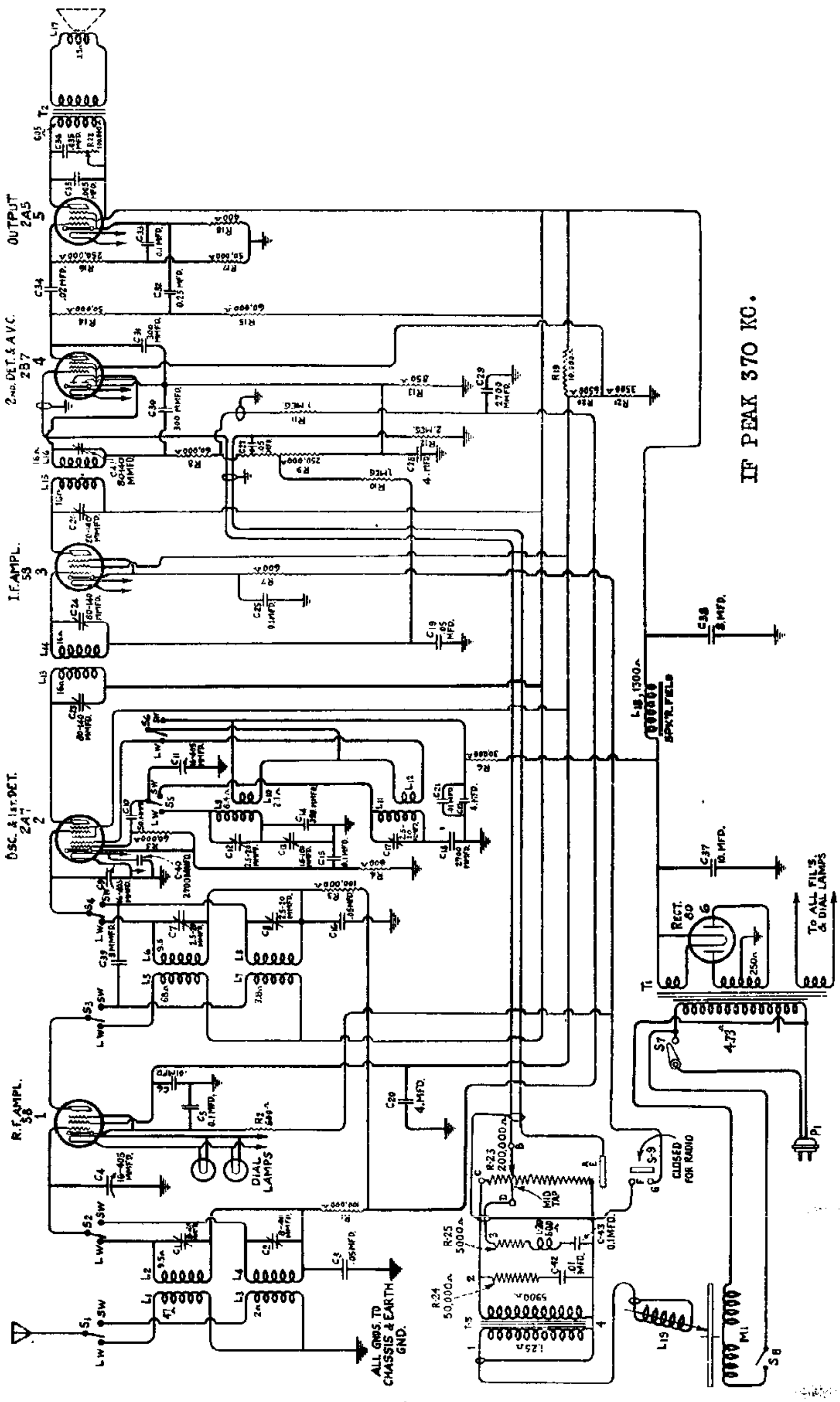


Figure A—Schematic Circuit Diagram

MODEL Duo 321
Chassis Wiring

RCA-VICTOR CO., INC.

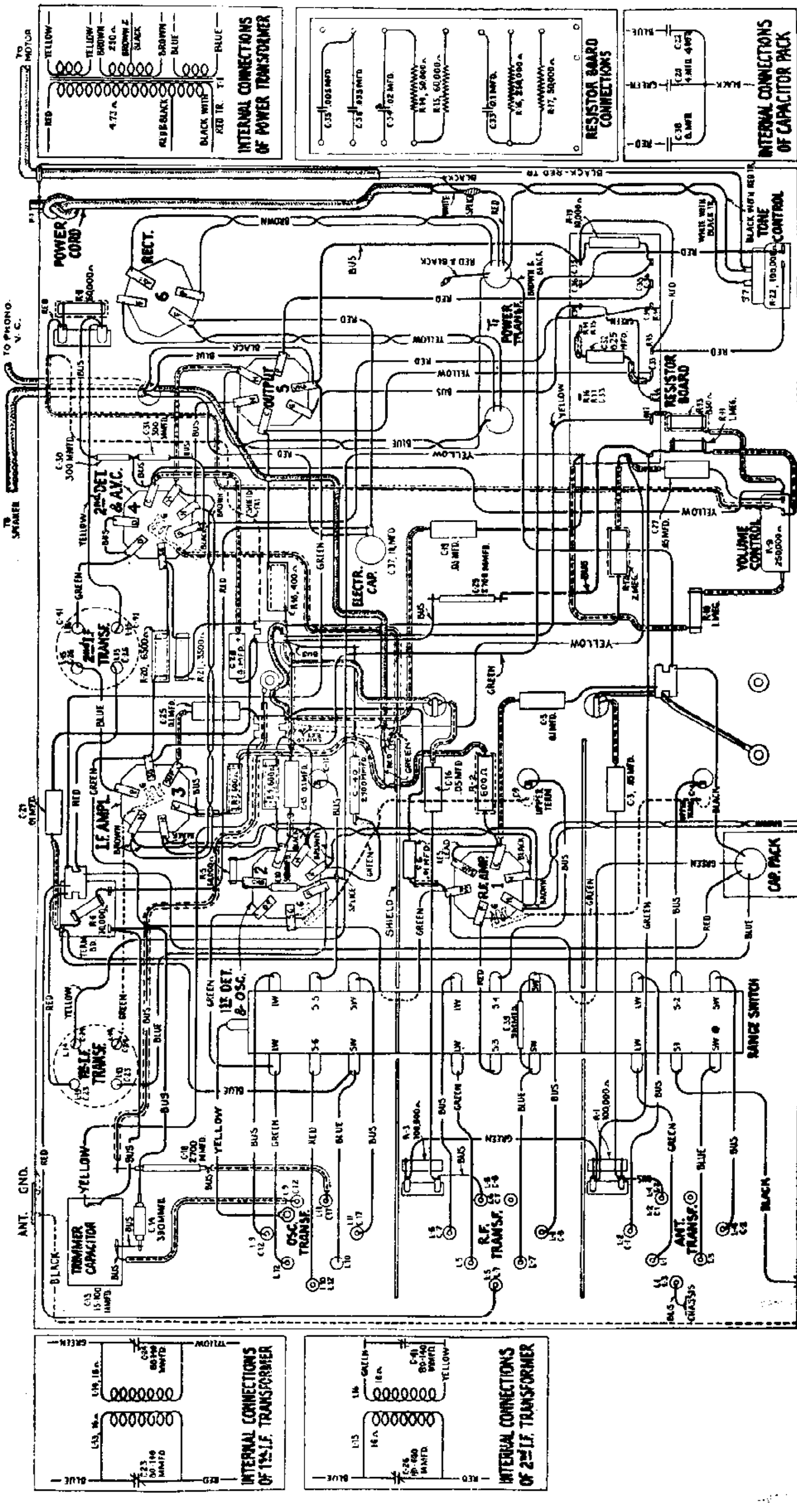


Figure B—Chassis Wiring Diagram

MODEL Duo 321
Assembly Wiring

RCA-VICTOR CO., INC.

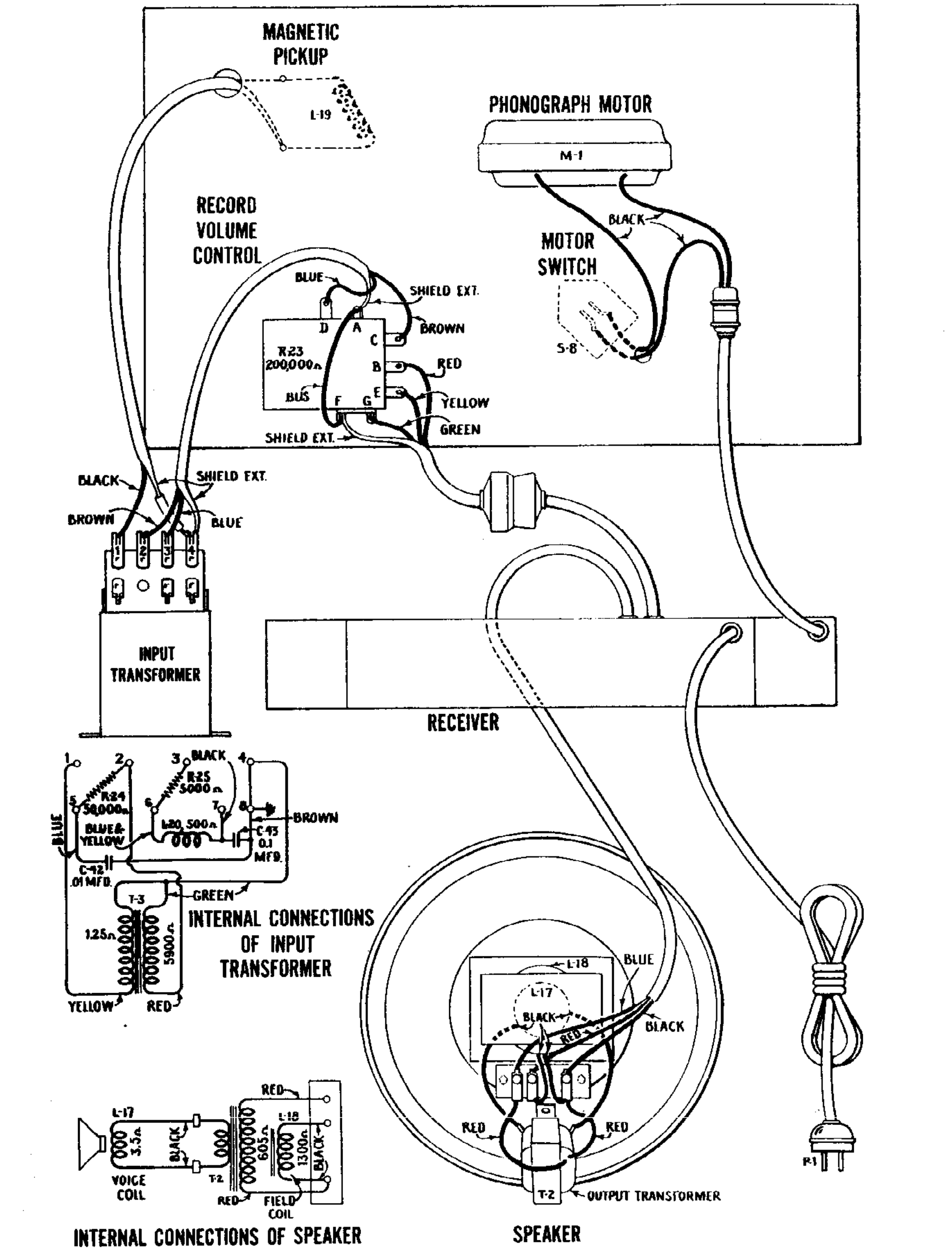


Figure C—Assembly Wiring Diagram

RCA-VICTOR CO., INC.

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure F), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

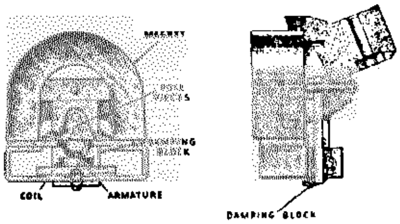


Figure E

(d) Remove screws A and B, Figure F, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure F), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

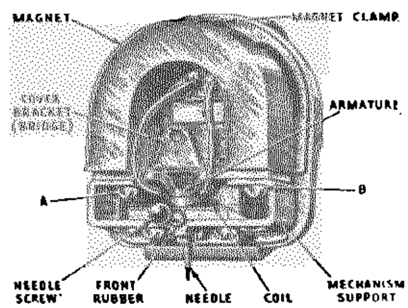


Figure F

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure G, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

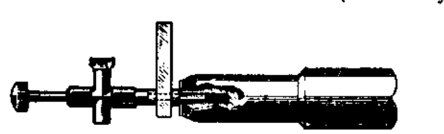


Figure G

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL Duo 321
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

RECEIVER ASSEMBLIES

Stock No.	DESCRIPTION	List Price
2240	Resistor—30,000 ohms—Carbon type—1 watt (R6)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3056	Shield—2nd detector Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R1, R3)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5	1.00
3631	Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3639	Capacitor—.02 mfd. (C34)	.25
3683	Shield—Radiotron shield top	.20
3701	Capacitor—.01 mfd. (C6, C21)	.30
3702	Capacitor—.25 mfd. (C32)	.42
3768	Screw—Square head No. 6-32-¼" set screw for condenser drive—Package of 10	.35
3796	Capacitor—4. mfd. (C28)	.60
3849	Capacitor—50 mmfd. (C10)	.30
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor (C13)	.78
3877	Capacitor—.1 mfd. (C5, C15, C25, C33)	.32
3878	Screw—No. 4-40-$\frac{5}{16}$" screw for fastening station selector pointer—Package of 20	.25
3888	Capacitor—.05 mfd. (C19, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5	1.00
3897	Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5	1.10
3901	Capacitor—.05 mfd. (C3, C16)	.36
3906	Mounting assembly—Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers	.28
3937	Capacitor—300 mmfd. (C30, C31)	.34
3938	Capacitor—9 mmfd. (C39)	.25
3939	Resistor—3,500 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3942	Shield—1st detector Radiotron shield	.18
3943	Screen—Translucent screen for dial light—Package of 2	.18
3944	Shield—Antenna, R. F. or oscillator coil shield	.28
3991	Resistor—10,000 ohms—Porcelain type (R19)	.60
4031	Capacitor—2,700 mmfd. (C18, C29, C40)	.50
4032	Capacitor—390 mmfd. (C14)	.34
4119	Screw—No. 8-32-¼" headless cup point set screw for station selector knob—Package of 20	.38
6188	Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5	1.00
6571	Capacitor—10 mfd. (C37)	1.20
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	.50
6676	Socket—6-contact Radiotron socket—Output	.40
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	3.75
6695	Volume control (R9)	1.20
6696	Switch—Range switch (S1, S2, S3, S4)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26, C41)	1.78
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	2.44
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	2.30
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	2.64
6702	Drive—Variable tuning condenser drive assembly complete	1.86
6703	Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38)	2.46
6704	Shaft—Tuning condenser drive assembly shaft	.64
6705	Tone control complete (R22)	1.20
6841	Dial—Station selector dial—Package of 5	2.74
6842	Pointer—Station selector pointer—Package of 5	.46
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—I. F. and R. F. amplifier Radiotron shield	.25
9446	Transformer—Pow ertransformer—105-125 volts—50-60 cycles (T1)	5.40
9451	Transformer—Power transformer—105-125 volts—25-50 cycles	5.40
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25

PICKUP AND PICKUP ARM ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod—Package of 5	.40
3417	Armature—Pickup armature	$0.72
3419	Screw—Cover mounting screw—Package of 10	.40
3516	Damper assembly—Comprising 1 upper and 1 lower damper 1 upper and 1 lower bearing—For pickup base	.14
3521	Cover—Pickup back cover	.18
3737	Damper—Viscoloid damping block—Package of 5	.65
6346	Back—Pickup housing back	.45
6601	Pickup—Magnetic pickup complete	4.54
6602	Coil—Pickup coil (L19)	.65
7731	Arm—Pickup arm complete less pickup and escutcheon	5.40

TURNTABLE ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.50
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
8948	Turntable—Complete	5.50

MOTOR ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3398	Motor mounting assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—Motor complete—105-125 volts—60 cycle	18.52
8990	Motor—Motor complete—105-125 volts—50 cycle	18.52
8991	Motor—105-125 volts—40 cycles	23.36
8992	Motor—Motor complete—105-125 volts—25 cycle	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105-125 volts—50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105-125 volts—40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105-125 volts—25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50

MISCELLANEOUS PARTS

Stock No.	DESCRIPTION	List Price
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws (S8)	.75
3391	Suspension spring and washer assembly for motor board—Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer, and one nut	.50
3430	Box—Needle box with lid—Package of 2	.90
3994	Cover—Automatic switch brake cover	.26
4075	Knob—Tone control or range switch knob—Package of 5	1.00
4120	Knob—Volume control knob—Package of 5	1.18
4121	Knob—Station selector knob—Package of 5	1.18
4136	Screw—Chassis mounting screw assembly—Comprising four screws, four washers, eight cushions	.62
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6288	Knob—Phonograph volume control knob—Package of 5	1.00
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6766	Volume control—Phonograph volume control (R23, S9)	2.28
6840	Bezel—Metal bezel for station selector dial	.56
6855	Cable—3-conductor cable with spade terminals—Reproducer cable	.44
6856	Cable—3-conductor shielded with male section of connection plug—Phonograph volume control	.85
6857	Cable—2-conductor motor cable	1.24
6858	Transformer—Phonograph input transformer—Comprising one transformer, one reactor, one .01 mfd. and 0.1 mfd. capacitors, one 5,000 and one 50,000 ohm resistor (T3, R24, R25, C42, C43, L20)	2.50
10174	Spring—Automatic brake springs—One set of 4 springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40

REPRODUCER ASSEMBLIES

Stock No.	DESCRIPTION	List Price
6770	Transformer—Output transformer (T2)	2.00
8969	Cone—Reproducer cone (L17)—Package of 5	6.35
9460	Coil assembly—Comprising field coil magnet and cone support (L18)	6.00
9473	Reproducer complete	8.00

RCA-VICTOR CO., INC.

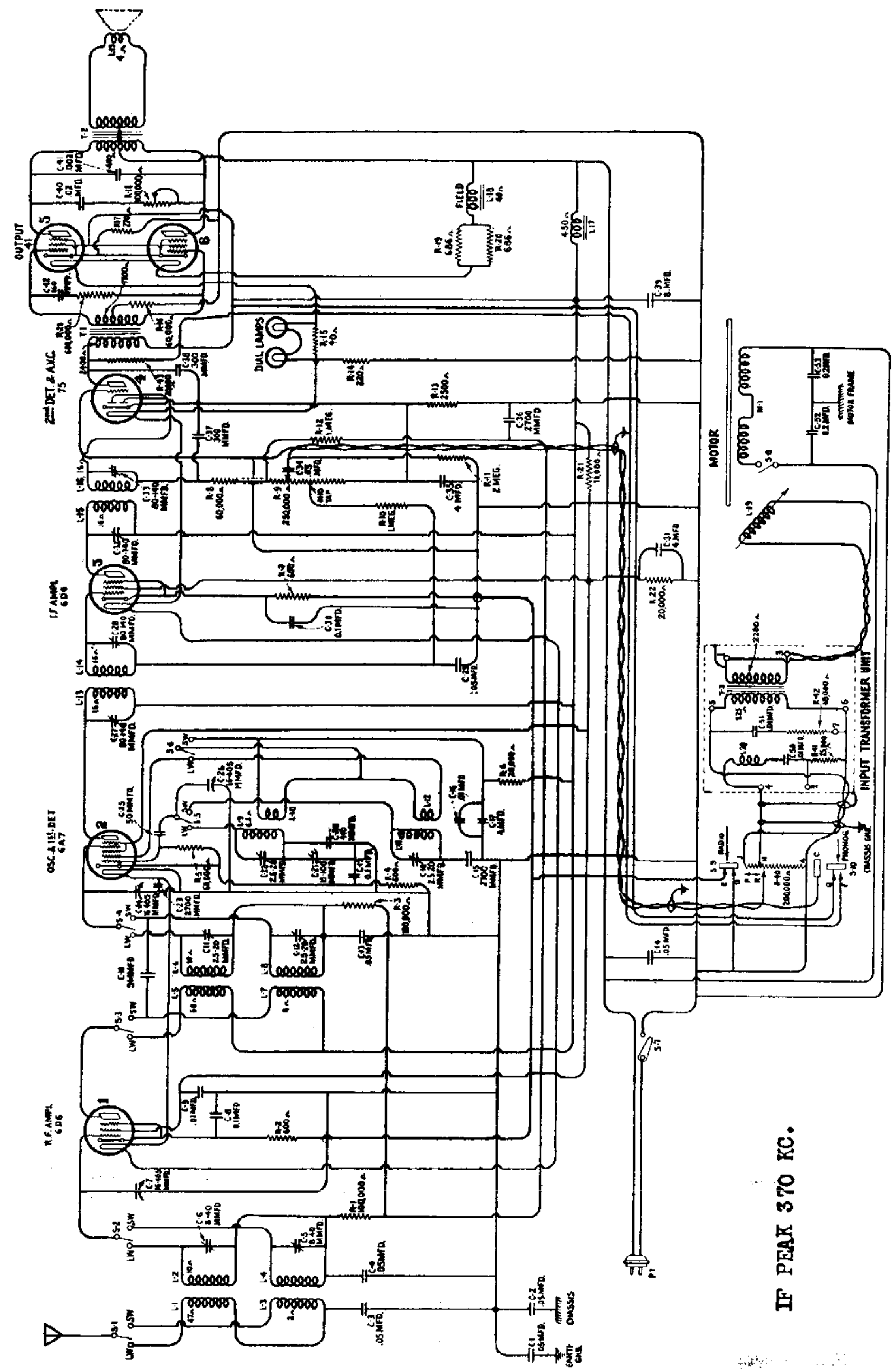


Figure 1—Schematic Circuit Diagram

IF PEAK 370 KC.

MODEL 327
Chassis Wiring

RCA-VICTOR CO., INC.

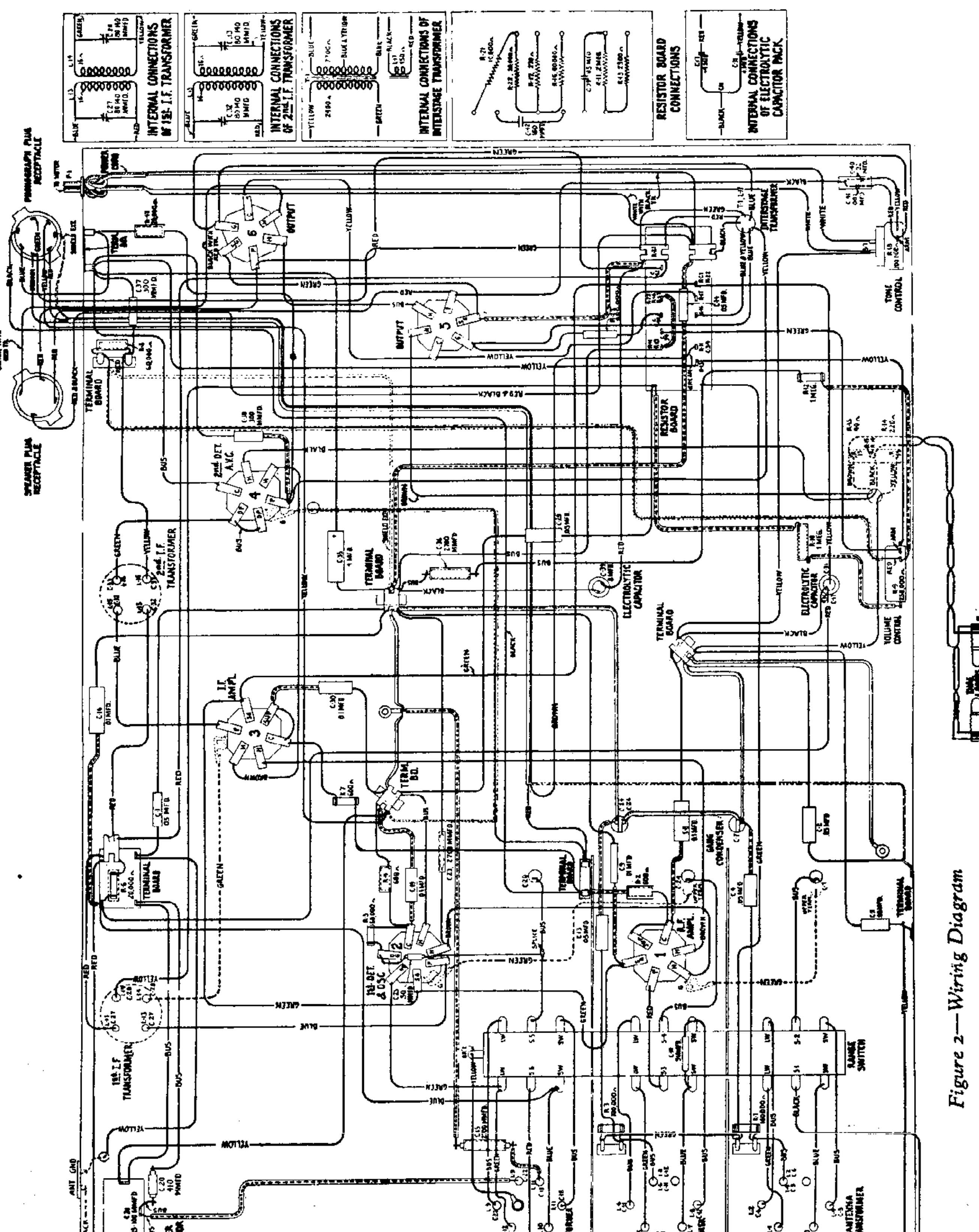


Figure 2—Wiring Diagram

MODEL 327
Voltage
Alignment Data
Assembly Wiring

RCA-VICTOR CO., INC.

SERVICE DATA

CAUTION—*This receiver operates on 220-volt direct current without a transformer between the line and the various parts of the receiver, such as A. C. receivers use. It is therefore extremely important to use the utmost caution when operating the receiver outside of the cabinet. Also a knob must always be placed on the shaft of the main tuning capacitor, as under certain conditions the full line voltage is obtained between this point and ground.*

(1) Line-Up Capacitor Adjustments

To properly align this receiver, it is **essential that a** modulated R. F. oscillator, such as **Stock No. 9050,** an output indicator (Stock No 4317) **and an align-**ment tool (Stock No. 4160) be **available. Figure 4** shows the location of the various **line-up capacitors.**

I. F. Tuning Adjustments

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground, preferably through a series condenser. Connect the output meter across the voice coil of the loudspeaker and **adjust the oscillator** output so that, with the **receiver volume con**trol at maximum, a slight **deflection is** obtained in the output meter.

(c) Adjust the secondary and primary **of the first** and then the second I. F. **transformers until a** maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15 000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as S in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by tuning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustments, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

(3) Service Data on Magnetic Pickup

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

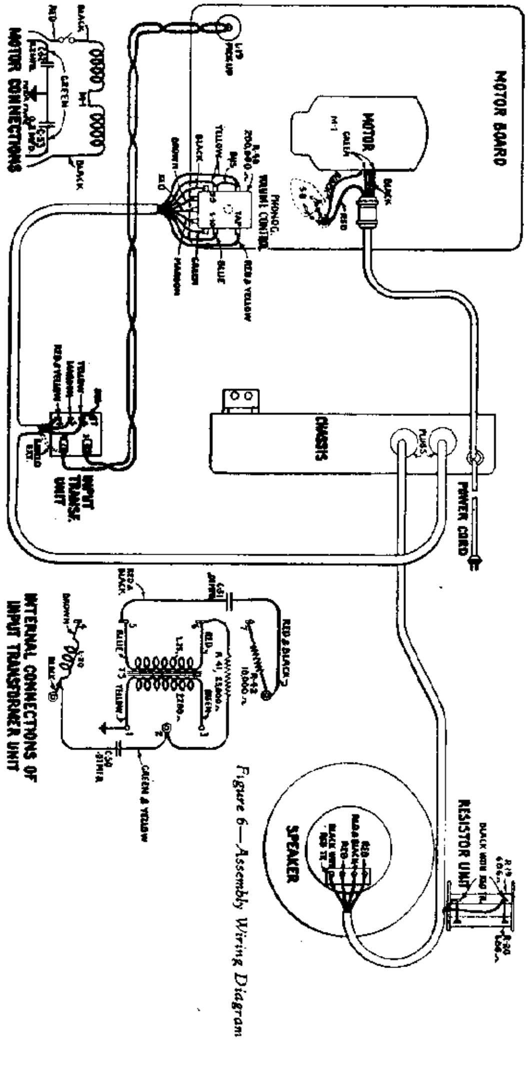


Figure 6—Assembly Wiring Diagram

RADIOTRON SOCKET VOLTAGES

220-Volt, D. C. Line—No Signal

The voltages at the right are those taken while the set is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made.

Radiotron No.		Cathode to B— Volts, D. C.	Screen Grid to B— Volts, D. C.	Plate to B— Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		3.0	90	200	6.0	6.4
RCA-6A7	1st Detector	4.0	90	200	2.6	6.4
	Oscillator	—	—	125	3.3	
RCA-6D6 I. F.		3.0	90	200	6.0	6.4
RCA-75 2nd Detector		1.5	—	200	0.7	6.4
RCA-41 Power		13.0	190	205	25.0	6.4
RCA-41 Power		13.0	190	205	25.0	6.4

MODEL 327
Pickup Data
Trimmer and
Socket Layouts

RCA-VICTOR CO., INC.

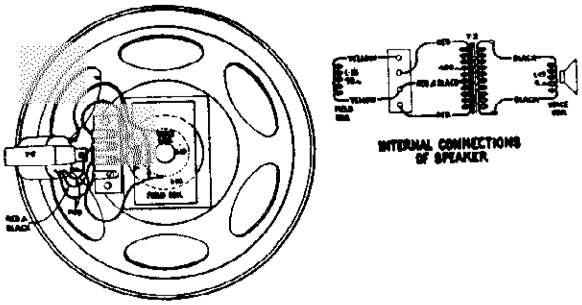


Figure 3—Loudspeaker Wiring

(4) Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure 8), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 8, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is

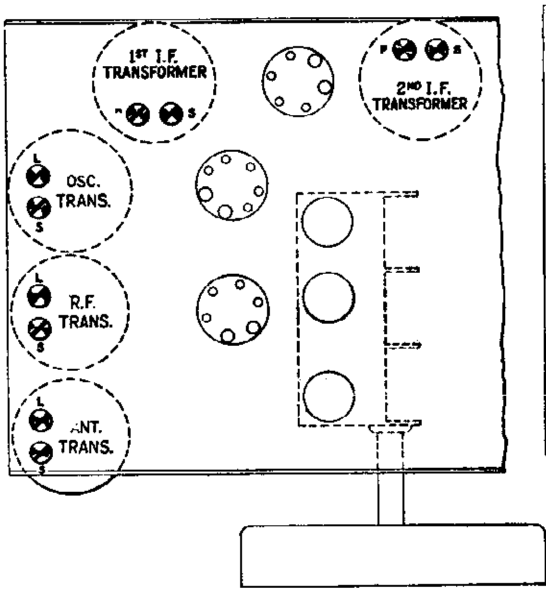
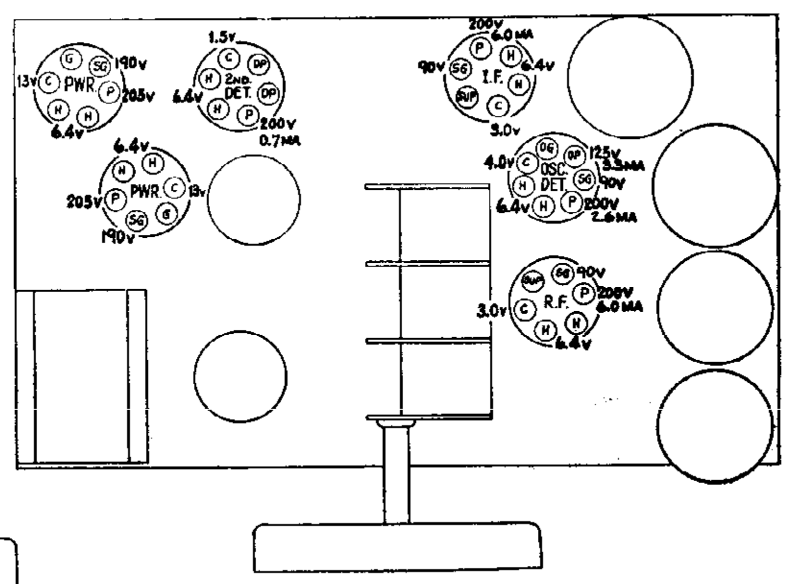


Figure 4—Location of Line-Up Capacitors Viewing bottom of chassis



ALL VOLTAGES ARE TO — B

Figure 5—Radiotron Socket Voltages

inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 8), and sliding the mechanism slightly in relation to the pole pieces.

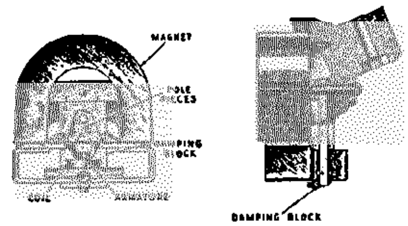


Figure 7

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(5) Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 9, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the

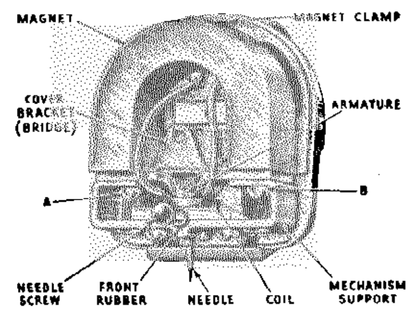


Figure 8

end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious

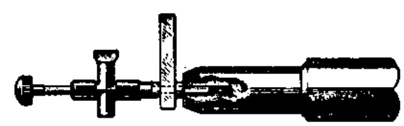


Figure 9

subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
10194	Ball—Steel ball for condenser drive assembly—Package of 20	$0.25
2747	Cap—Contact cap—Package of 5	.50
3938	Capacitor—9 mmfd. (C10)	.25
3849	Capacitor—50 mmfd. (C25)	.30
6314	Capacitor—160 mmfd. (C42)—Package of 5	2.00
4352	Capacitor—300 mmfd (C37, C38)	.25
4297	Capacitor—410 mmfd (C20)	.30
4031	Capacitor—2700 mmfd. (C15, C23, C36)	.50
3701	Capacitor—0.01 mfd. (C9, C16)	.30
4211	Capacitor—0.05 mfd. (C1, C2, C3, C14, C34)	.30
3901	Capacitor—0.05 mfd. (C4, C13)	.36
3888	Capacitor—0.05 mfd. (C29)	.25
3877	Capacitor—0.1 mfd. (C8, C19, C30)	.32
3796	Capacitor—4.0 mmfd. (C35)	.60
6986	Capacitor—8.0 mmfd. (C39)	1.60
3861	Capacitor—Adjustable trimmer capacitor (C21)	.78
6985	Capacitor—Comprising two 4.0 mmfd. capacitors (C17, C31)	1.50
4373	Capacitor pack—Comprising one 0.002 mfd. and one 0.02 mfd. capacitors (C40, C41)	.30
6983	Coil—Antenna coil (L1, L2, L3, L4, C5, C6)	2.68
6700	Coil—Oscillator coil (L9, L10, L11, L12, C18, C22)	2.30
6699	Coil—R. F. coil (L5, L6, L7, L8, C11, C12)	2.44
6694	Condenser—3-gang variable tuning condenser (C7, C24, C26)	3.75
6841	Dial—Station selector dial scale—Package of 5	2.74
4467	Drive—Variable tuning condenser drive assembly complete	2.40
4340	Lamp—Dial lamp—Package of 5	.60
3906	Mounting assembly—Variable condenser mounting assembly—Comprising 3 bushings, 3 lock-washers, 3 nuts and 3 washers—Package of 1 set	.28
3940	Pointer—Station selector indicator—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R4, R7)—Package of 5	1.00
4338	Resistor—2500 ohms—Carbon type—¼ watt (R13)—Package of 10	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5, R8, R16)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3439	Resistor—600,000 ohms—Carbon type—¼ watt (R23)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10, R12)—Package of 5	1.00

Stock No.	Description	List Price
6242	Resistor—2 megohms—Carbon type—¼ watt (R11)—Package of 5	$1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R43)—Package of 5	1.00
4337	Resistor—270 ohms—Carbon type—1 watt (R17)—Package of 10	2.20
6114	Resistor—20,000 ohms—Carbon type—1 watt (R6, R22)—Package of 5	1.10
4339	Resistor—260 ohms—Porcelain type—Tapped at 220 ohms (R14, R15)	.52
3991	Resistor—10,000 ohms—Porcelain type (P21)	.60
3943	Screen—Translucent celluloid screen—For dial lamps—Package of 2	.18
3878	Screw—No. 8 32-⅜ headless cup point set screw for fastening station selector pointer—Package of 20	.25
3768	Screw—Square head No. 6-32-¼ set screw for condenser driver—Package of 10	.35
6704	Shaft—Tuning condenser drive shaft assembly	.64
4145	Shield—First detector and oscillator Radiotron shield	.30
4103	Shield—I. F. amplifier Radiotron shield	.20
3950	Shield—R. F. amplifier Radiotron shield	.26
4216	Shield—Radiotron shield top	.10
4215	Shield—Second detector Radiotron shield	.15
3529	Socket—Dial lamp socket	.32
6676	Socket—6-contact Radiotron socket	.40
7485	Socket—6-contact second detector and AVC Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
6696	Switch—Range switch (S1, S2, S3, S4, S5, S6)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C27, C28)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C32, C33)	1.78
6987	Transformer pack—Audio transformer pack—Comprising one reactor and one inter-stage transformer (T1, L17)	4.50
6705	Tone control (R18, S7)	1.20
6695	Volume control (R9)	1.20
	REPRODUCER ASSEMBLIES	
4600	Cable—Reproducer cable—4-conductor with male section of connector—From receiver to resistors and reproducer	.60
7825	Coil—Field coil, magnet and cone support (L18)	4.38
8969	Cone—Reproducer cone (L19)—Package of 5	6.35
7824	Reproducer complete	8.00
4599	Transformer—Output transformer (T2)	1.34

REPLACEMENT PARTS—Continued

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	MOTOR ASSEMBLIES	
3524	Brush—Motor brush—Package of 2	$0.60
3525	Cap—Brush holder cap for motor brush—Package of 2	.64
4598	Capacitor—Motor capacitor—Two 2.0 mfd. capacitors (C52, C53)	.98
4596	Escutcheon—Speed regulator escutcheon	.36
3487	Governor assembly—Comprising friction disc, two springs and two balls—Assembled and mounted	2.00
3489	Indicator pointer—Speed indicator pointer complete, with mounting screws and washers	1.65
7823	Motor—220-volt D. C. motor complete (M1)	†34.66
3488	Pin—Governor (speed) regulator pin	.30
4597	Screw—Motor mounting screw assembly—Comprising four screws, four spacers, four lockwashers and four nuts	.22
	PICKUP AND ARM ASSEMBLIES	
7821	Arm—Pickup arm complete, less escutcheon and pickup	5.36
3417	Armature—Pickup armature	.72
6346	Back—Pickup housing back	.45
3385	Coil—Pickup coil (L30)	.50
3386	Cover—Pickup cover	.56
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—5 sets	1.10
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
6335	Pickup—Pickup unit complete	4.00
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3419	Screw—Pickup cover mounting screw—Package of 10	.40
	SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 4	.50
6896	Switch—Eccentric automatic switch complete	2.50
3322	Switch—Motor switch (S8)	.75

Stock No.	Description	List Price
	TURNTABLE ASSEMBLIES	
7084	Cover—Turntable cover	[illegible]
7838	Turntable complete	[illegible]
	MISCELLANEOUS ASSEMBLIES	
4677	Bezel—Metal bezel (escutcheon) for station selector dial glass	[illegible]
4594	Box—Needle box	[illegible]
4592	Cable—Phonograph input cable—9-conductor—From chassis to input transformer and volume control	[illegible]
6614	Glass—Station selector dial glass	[illegible]
3829	Knob—Phonograph volume control knob—Package of 5	[illegible]
6989	Knob—Range switch or tone control knob—Package of 5	[illegible]
6991	Knob—Station selector knob—Package of 5	[illegible]
6990	Knob—Volume control knob—Package of 5	[illegible]
3824	Nut—Cap nut for motor board suspension assembly—Package of 4	[illegible]
9050	Oscillator—Test oscillator 90–25,000 K. C.	[illegible]
4601	Plug—4-prong male section of connector plug for reproducer cable	[illegible]
4602	Plug—7-prong male section of connector plug for reproducer cable	[illegible]
4341	Resistor—Porcelain type—686 ohms (R19, R20)	[illegible]
4678	Ring—Retaining ring for dial glass—Package of 5	[illegible]
4342	Screw—Receiver mounting screw assembly—Comprising four bushings, four screws and four washers	[illegible]
4591	Screw assembly—Receiver chassis mounting assembly—Comprising eight cushions, four screws, four washers and four spacers	[illegible]
4160	Screwdriver—Combination insulated screw-driver and socket wrench for I. F. and R. F. adjustments	[illegible]
4593	Socket—4-contact socket for reproducer cable plug	[illegible]
4595	Socket—7-contact socket for phonograph input cable plug	[illegible]
3391	Suspension spring and washer assembly—For motor board—Comprising one bolt, one top spring, one bottom spring, two cup washers, one "C" washer and one nut	[illegible]
4603	Transformer—Input transformer pack—Comprising one input transformer, one choke coil, one 18,000 ohm resistor, one 25,000 ohm resistor and two 0.01 mfd. capacitors (T3, L20, R41, R42, C50, C51)	[illegible]
4590	Volume control—Phonograph volume control (R40, S9, S10)	[illegible]

† Full discount not allowed.

MODEL "All Wave Duo"
340, 340-E
Schematic

RCA-VICTOR CO., INC.

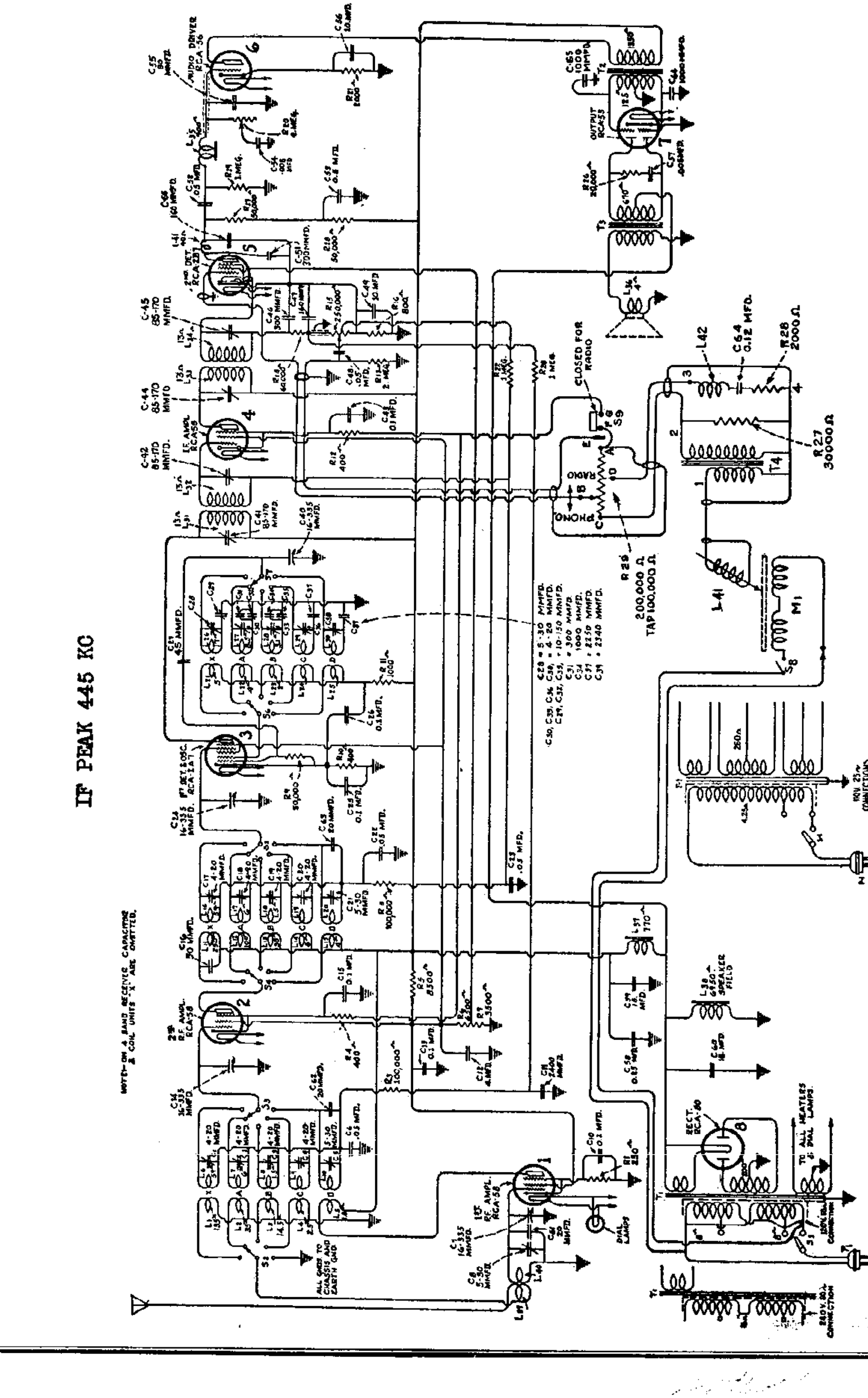


Figure A—Schematic Circuit Diagram

MODEL "All Wave Duo"
340, 340-E
Chassis Wiring

RCA-VICTOR CO., INC.

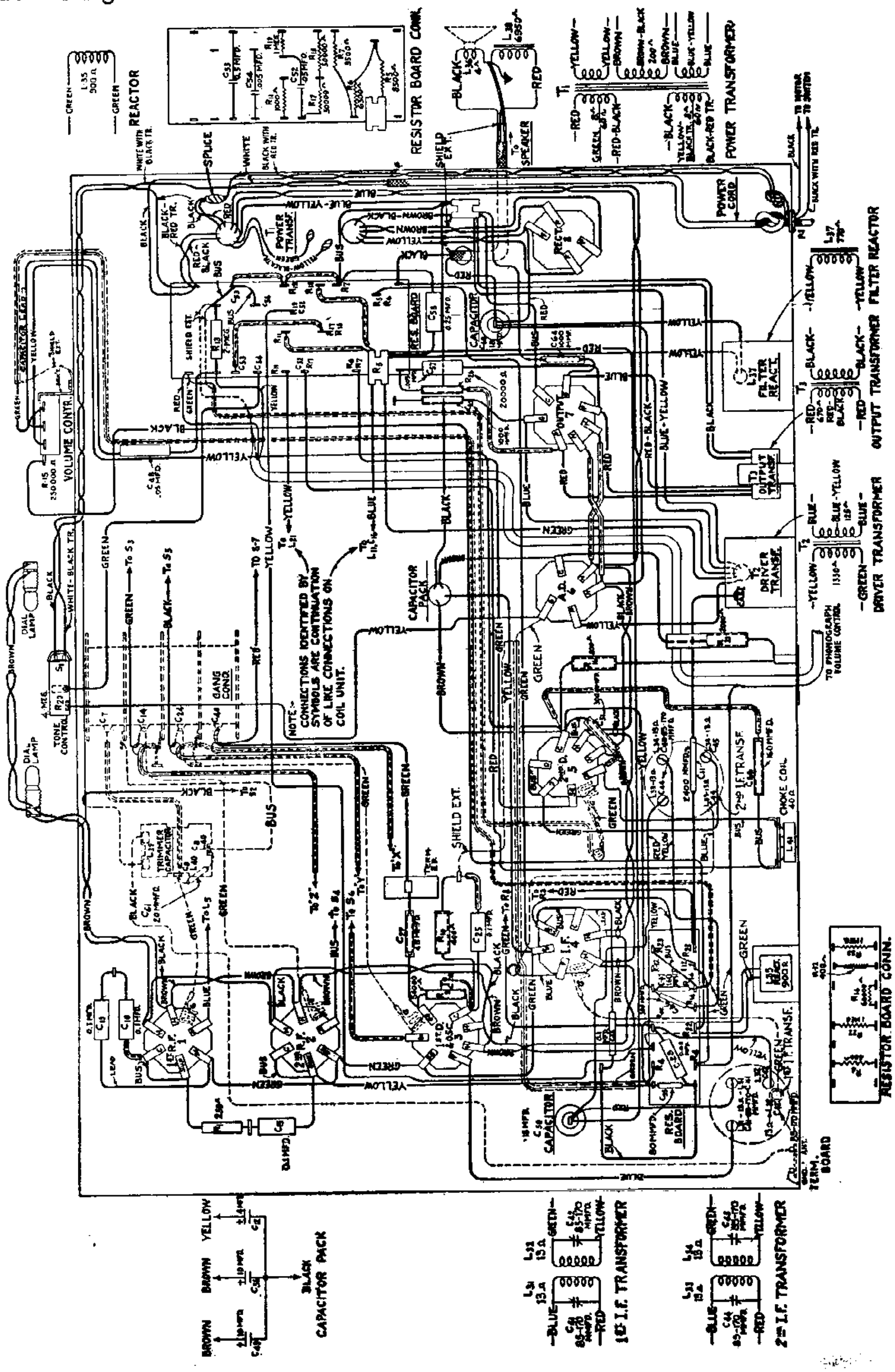


Figure B—Chassis Wiring

RCA-VICTOR CO., INC.

MODEL "All Wave Duo"
340,340-E
Coils Wiring Diagram

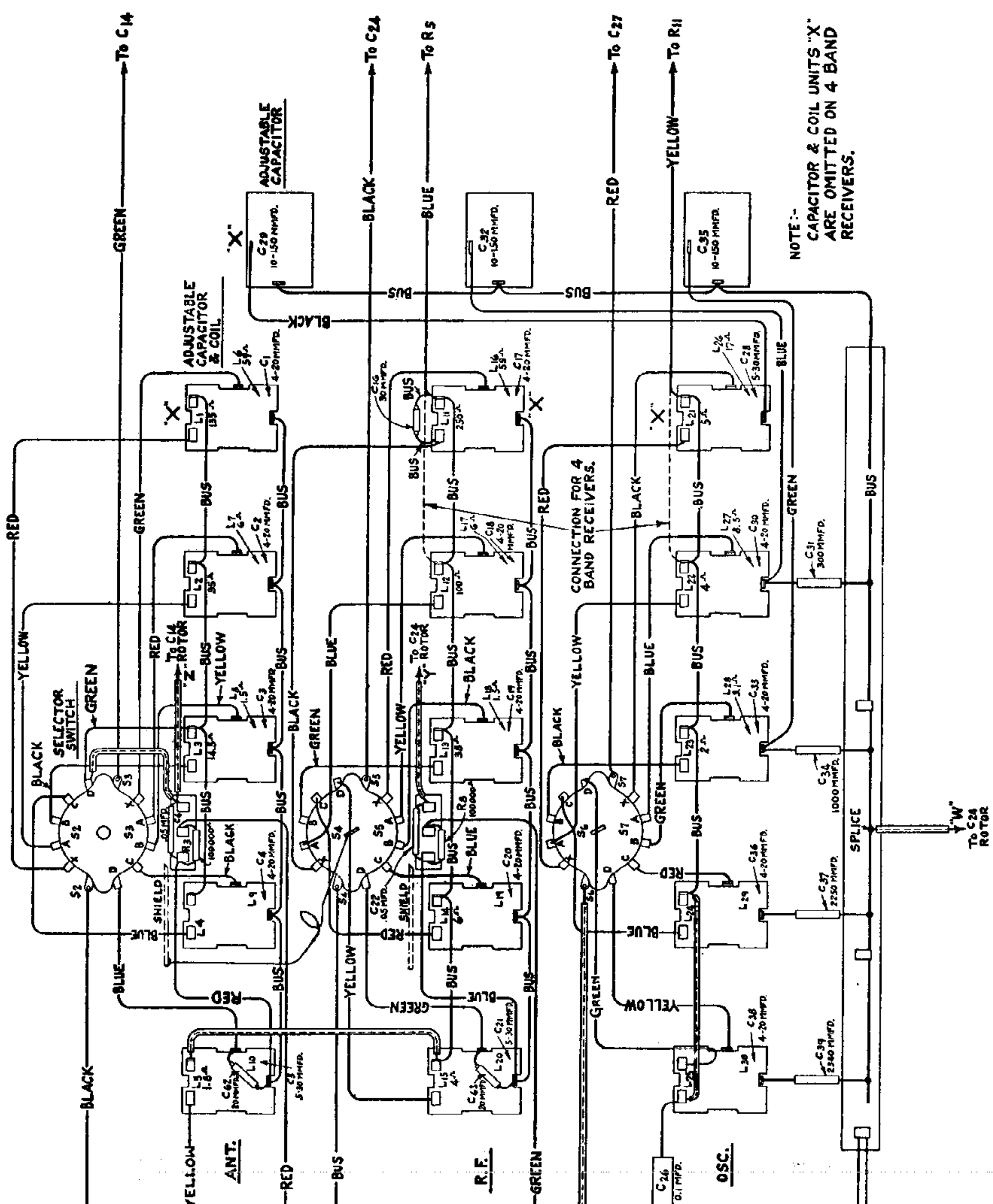


Figure C—Wiring Diagram of Coil Assembly

MODEL "All Wave Duo"
340, 340-E
Assembly Wiring
Voltage, Alignment

RCA-VICTOR CO., INC.

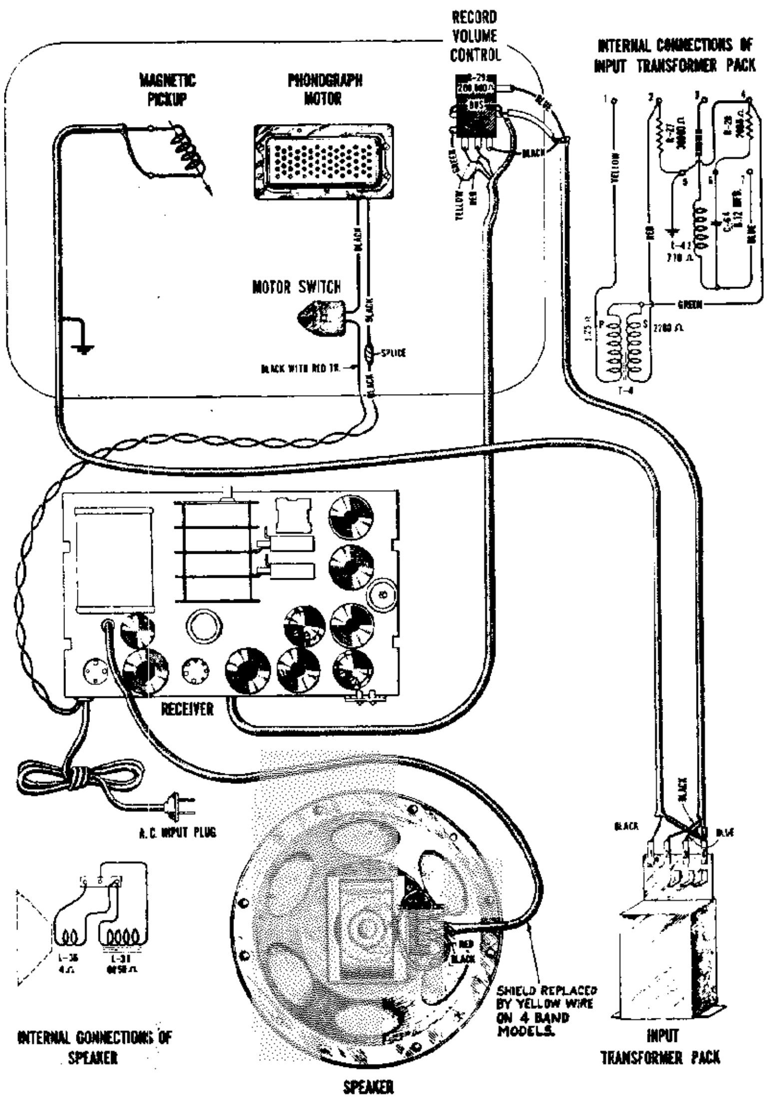


Figure D—Assembly Wiring

SERVICE DATA

Electrical Specifications

Voltage Rating....................105–125 Volts
Frequency Rating....................25, 30, 50 and 60 Cycles
Power Consumption.................... 140 Watts
Type and Number aof Rdiotrons....3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8
Type of Circuit....................Straight Superheterodyne for all frequencies with Class "B" output
Undistorted Output....................6 Watts

This all-wave combination instrument utilizes the new perfected continuous tuning superheterodyne chassis and the standard two speed motor-board assembly. Excellent quality of record reproduction, together with unusual radio performance, characterizes this instrument.

Service data for the magnetic pickup used on the tone arm of the motor-board assembly is given on the following pages. Service data for the radio receiver follows.

The tuning bands for the receiver chassis are as follows:

Selector Switch Position	*Frequency Range (Kilocycles)*	*Wave-Length Range (Meters)*
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–30.0
D	8000–18000	37.5–16.7

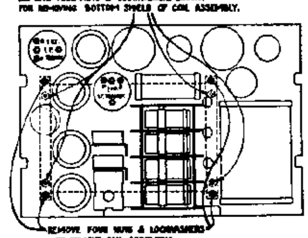


Figure E—Location of nuts and lockwashers holding coil assembly

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss, static and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure E and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure E.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

TUBE SOCKET VOLTAGES (RADIO OPERATION)

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode Volts	Screen Grid to Cathode Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

RCA-VICTOR CO., INC.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300-ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 4160), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

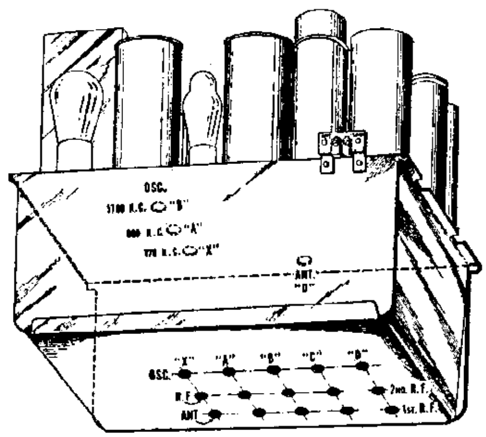


Figure F—Location of line-up capacitors

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300-ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300-ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high-frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low-frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure F for the location of the line-up capacitors.

Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure H shows the proper manner of making the various connections possible for this transformer. Note: The transformer is normally connected for 115–125-volt lines, and a 100-volt motor supplied. The 220-volt connections must not be used unless the motor is also changed. However, 220-volt operation of the standard equipment may be obtained by using the Stock No. 9034 step-down line transformer.

The 25–60 cycle transformer uses only one 105–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure G may be used for 100–115-volt lines.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments to be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note.)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note.)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.

MODEL "All Wave Duo"
340,340-E
Controls Data
Transformer Data

RCA-VICTOR CO., INC.

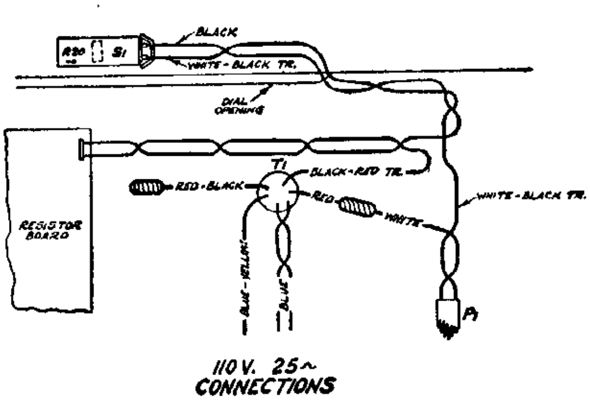


Figure G—100-115 Volt Connection of 25-60 Cycles Transformer

Controls

The four control knobs on the front panel of the cabinet serve the following purposes:

(1) ***Range Switch*** (Left-hand Knob)—This switch converts the receiver for operation within any of the tuning ranges provided. As indicated on the selector dial, the letters on the switch escutcheon signify:

X—*Long-Wave Range*—150 to 410 kilocycles (2000 to 732 meters). This range is included only in certain models of the instrument (see "Introduction").

A—*Standard Broadcast Band*—540 to 1500 kilocycles (555 to 200 meters).

B—*Police Band*—1500 to 3900 kilocycles (200 to 77 meters). Services available within this band include police calls at 1574, 1712 and 2450 kilocycles, amateur radio "phone" communications between 1800 and 2000 kilocycles, and aviation communications (phone) between 2500 and 3500 kilocycles.

C—*Short-Wave Range*—3900 to 10,000 kilocycles (77 to 30 meters). Within the limits of this range are included two of the internationally-assigned short-wave broadcast bands. These are known as the 49 and 31 meter bands. (The portion of this range from 8000 to 10,000 kilocycles, which includes the latter band, is preferably received on range D.)

D—*Short-Wave Range*—8,000 to 18,000 kilocycles (37.5 to 16.7 meters). This range embraces four of the standardized short-wave broadcast bands located at 31, 25, 19 and 16 meters, respectively.

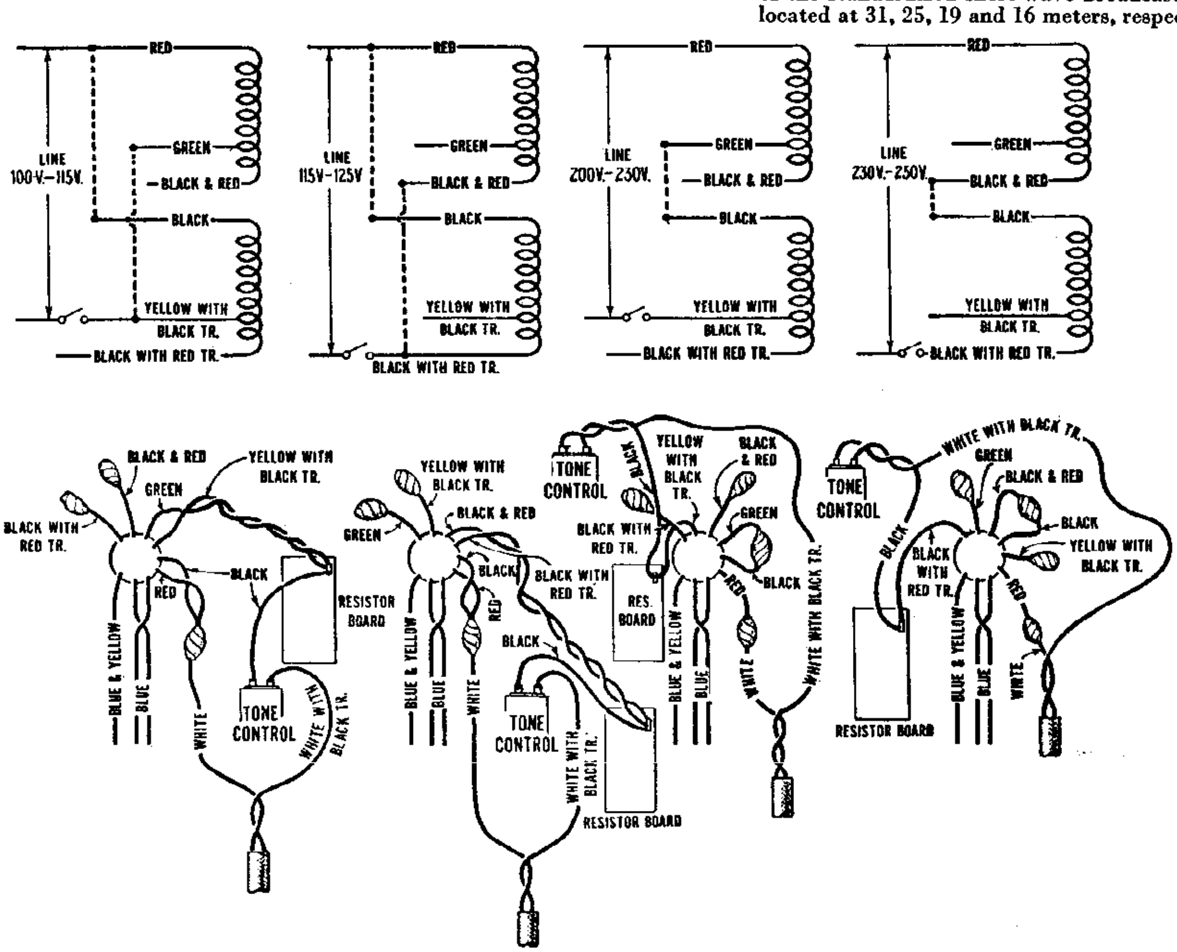


Figure H—Power Transformer Connections (50-60 cycles)

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure K), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

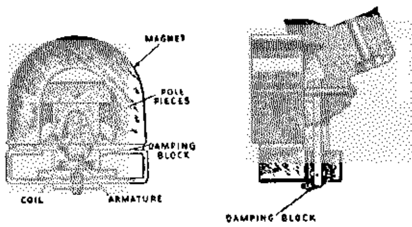


Figure I

(d) Remove screws A and B, Figure J, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure J), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

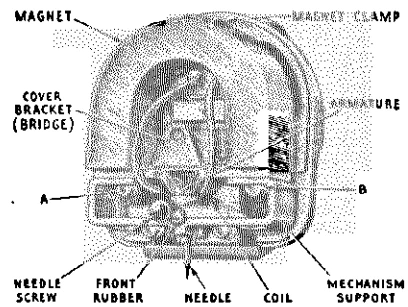


Figure J

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure K, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both side, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

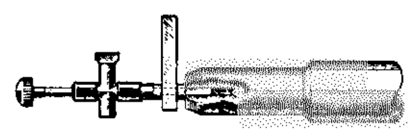


Figure K

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor — 1,000 ohms— Carbon type — ½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Pkg. of 2	.40
3076	Resistor—1 megohm—Carbon type ½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor 50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—½ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3526	Resistor — 2,000 ohms — Carbon type — ½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3616	Capacitor—390 mmfd. (C51)	.34
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor 0.1 mfd. (C10, C15, C25)	.35
3643	Capacitor .005 mfd. (C57)	.25
3711	Capacitor 80 mmfd. (C55)	.40
3719	Socket 7-contact Radiotron socket	.30
3771	Resistor 8,500 ohms Carbon type—3 watt (R5)	.25
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor 400 ohms—Carbon type—½ watt (R4, R10, R12) Package of 5	1.00
3864	Capacitor 390 mmfd. (C46)	.30
3865	Capacitor 160 mmfd. (C47)	.30
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—.05 mfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3932	Capacitor—.0024 mfd. (C11)	.30
3973	Capacitor—1,600 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
4103	Shield—First detector and R. F. Radiotron shield	.20
4104	Shield—I. F. Radiotron shield	.20
4205	Coil—Second detector choke (L41)	.50
4207	Capacitor—0.1 mfd. (C13, C43)	.34
6136	Resistor—3,500 ohms Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor — 2 megohms Carbon type — ½ watt (R13)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6303	Resistor—20,000 ohms Carbon type ½ watt (R26) Package of 5	1.00
6512	Capacitor—.005 mfd. (C54)	.28
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48

Stock No.	DESCRIPTION	List Price
6606	Reactor—Filter reactor (L37)	$1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18 mfd. (C59)	1.10
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	1.00
6626	Capacitor pack—Comprising one 4 mfd., and two 10 mfd. capacitors (C12, C49, C56)	1.86
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000-18,000 kilocycles—4- or 5-band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150-410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly — 150-410 kilocycles — 5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150-410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540-1,500 kilocycles 4- or 5-band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540-1,500 kilocycles 4- or 5-band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540-1,500 kilocycles—4- or 5-band (L22, L27, C30)	1.40
6637	Coil and capacitor—Antenna coil and capacitor assembly—1,500-4,000 kilocycles—4- or 5-band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500-4,000 kilocycles—4- or 5-band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500-4,000 kilocycles—4- or 5-band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000-10,000 kilocycles—4- or 5-band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000-10,000 kilocycles 4- or 5-band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000-10,000 kilocycles—4- or 5-band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly — 8,000-18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly—8,000-18,000 kilocycles—4- or 5-band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	1.10†
6889	Capacitor—18 mfd. (C60)	1.55
6890	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	2.40
6891	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	2.40
6892	Tone control (R20)	1.50
6955	Shield—Second R. F. Radiotron shield	.25
6956	Shield—Radiotron shield top	.15
7065	Screwdriver—For R. F. or I. F. adjustment	.80
7484	Socket 5-contact Radiotron socket	.35

† Full discount not allowed.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
7485	Socket—6-contact Radiotron socket	$0.40
9042	Transformer—Power transformer—105-250 volts—50-60 cycles (T1)	6.84
9046	Transformer—Power transformer—105-125 volts—25-40 cycles	9.22
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	MOTOR ASSEMBLIES	
3398	Motor mounting washer and spring assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—Motor complete 105-125 volts—60 cycle	18.52
8990	Motor—Motor complete 105-125 volts—50 cycle	18.52
8991	Motor—105-125 volts—40 cycle	23.36
8992	Motor—Motor complete 105-125 volts—25 cycle	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105-125 volts, 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105-125 volts, 40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105-125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly, comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3516	Damper and bushing assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup arm base	.14
3521	Cover—Pickup back cover	.18
3728	Coil—Pickup coil (L41)	.50
6346	Back—Pickup housing back	.45
6601	Pickup—Pickup unit complete	4.54
7706	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	4.30
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long-playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86

Stock No.	DESCRIPTION	List Price
3344	Cover—Grease retainer cover—Package of 2	$0.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Pkg. of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch — Automatic brake switch with mounting screws	.75
3391	Suspension spring and washer for motor board—Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer and one nut	.50
3430	Box—Needle box with lid—Package of 2	.90
3829	Knob—Radio or phonograph volume or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	1.08
3876	Cable—3-conductor cable for loudspeaker—4-band	.60
3878	Screws—No. 4-40—¾" fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	.10
3992	Escutcheon—Range switch escutcheon—4-band	.10
3994	Cover—Automatic brake switch cover	.26
4053	Cable — 3-conductor cable — From phonograph volume control to resistor boards	.90
4160	Screwdriver—Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments	1.00
6112	Cushion—Chassis support cushion—Package of 4	.25
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.30
6673	Pointer—Station selector pointer—Pkg. of 5	.64
6677	Dial—Station selector dial—5-band—Pkg. of 5	1.42
6678	Dial—Station selector dial—4-band—Pkg. of 5	1.42
6766	Volume control—Phonograph volume control and switch (R29, S9)	2.28
6767	Transformer—Input transformer—Comprising one 30,000 ohm resistor, one 2,000 ohm resistor, one .12 mfd. capacitor, one compensating reactor and one transformer (T4, R27, R28, C64, L42)	5.62
6768	Cable—3-conductor shielded—From phonograph volume control to input transformer	.40
8837	Support—Metal support for chassis—Pkg. of 4	.48
9050	Oscillator—Test oscillator—150-25,000 K.C.	33.50†
10174	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

† Full discount not allowed.

RCA-VICTOR CO., INC.

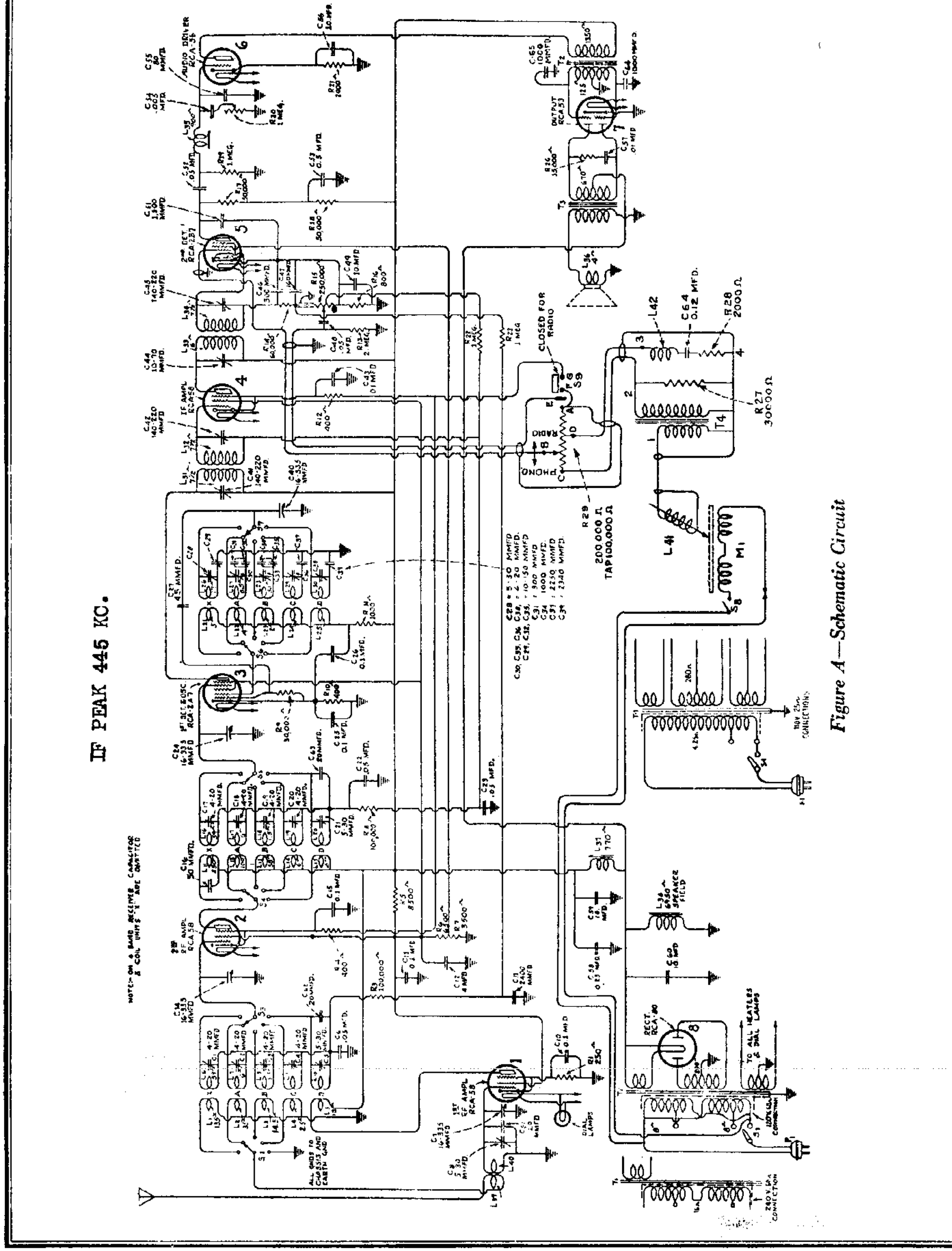


Figure A—Schematic Circuit

MODEL 340, 340-E
Chassis Wiring

RCA-VICTOR CO., INC.

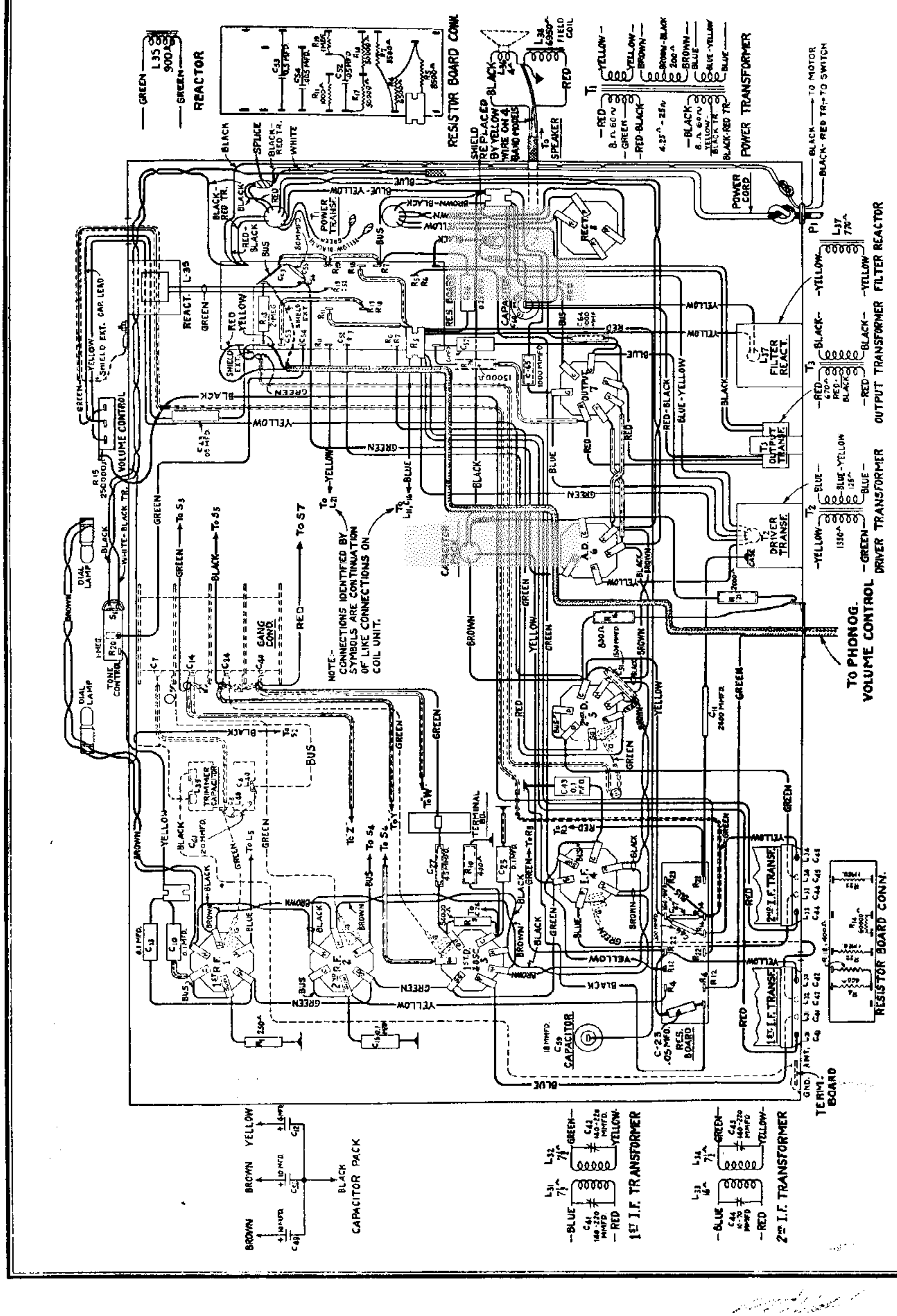


Figure B—Chassis Wiring Diagram

MODEL 340, 340-E
Coils Wiring Diagram

RCA·VICTOR CO., INC.

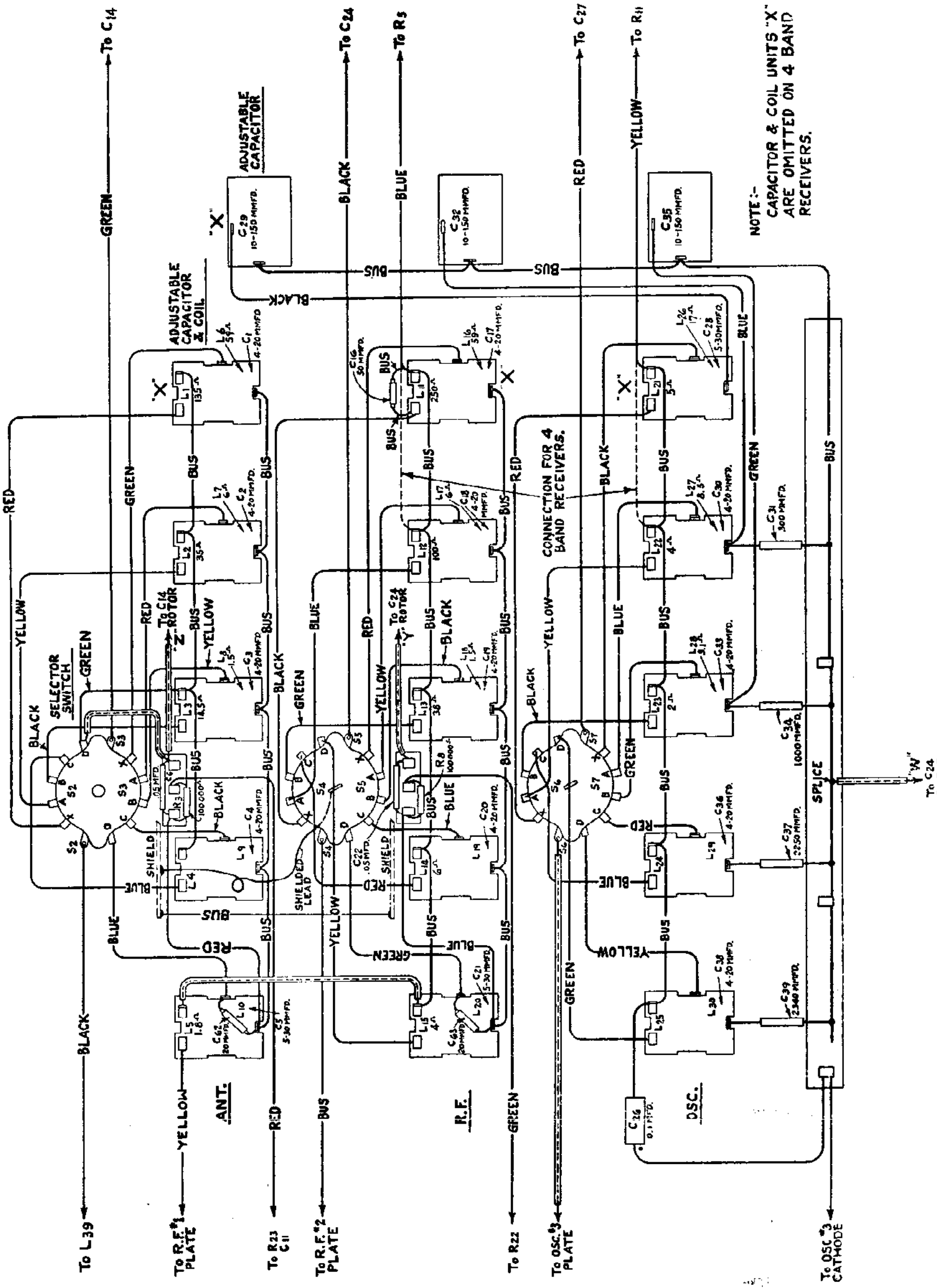


Figure C—Wiring Diagram of Coil Assembly

MODEL 340, 340-E
Assembly Wiring
Voltage, Circuit Data

RCA-VICTOR CO., INC.

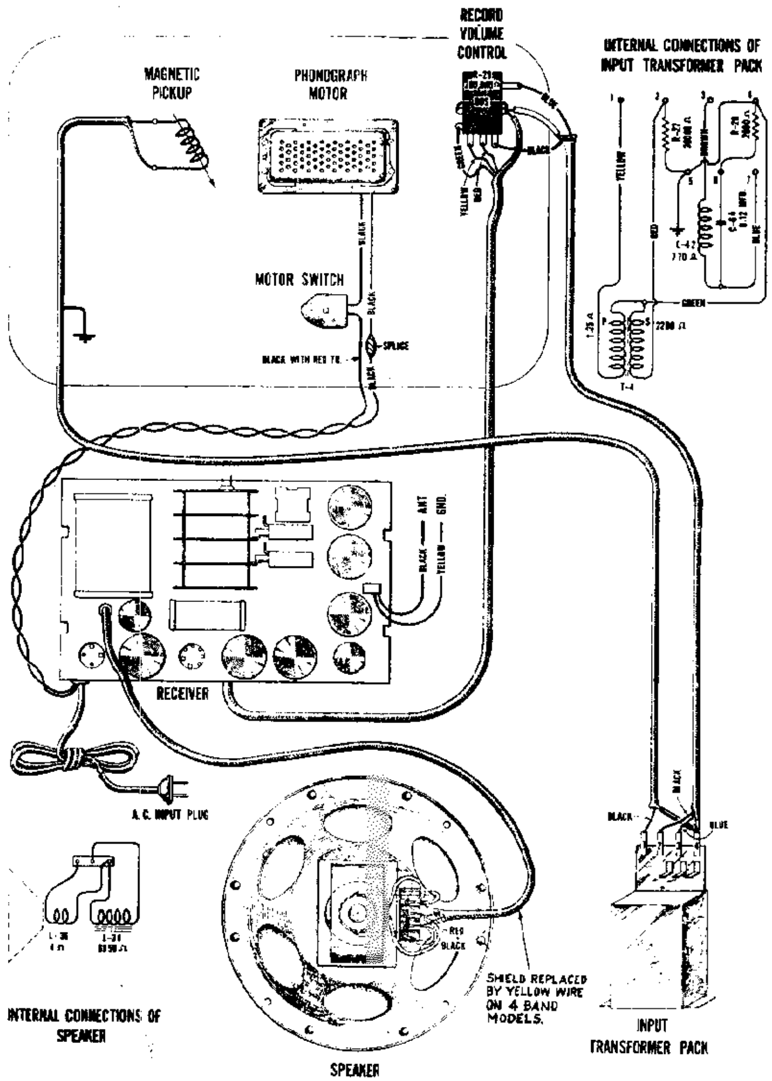


Figure D—Assembly Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating ....105–125 Volts
Frequency Rating.................25, 30, 50 and 60 Cycles
Power Consumption..............................140 Watts
Type and Number of Radiotrons....3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8
Type of Circuit..................Straight Superheterodyne for all frequencies with Class "B" output
Undistorted Output..............................6 Watts

This all-wave combination instrument utilizes the new perfected continuous tuning superheterodyne chassis and the standard two speed motor-board assembly. Excellent quality of record reproduction, together with unusual radio performance, characterizes this instrument.

Service data for the magnetic pickup used on the tone arm of the motor-board assembly is given on the following pages. Service data for the radio receiver follows.

The tuning bands for the receiver chassis are as follows:

Selector Switch Position	*Frequency Range (Kilocycles)*	*Wave Length Range (Meters)*
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–30.0
D	8000–18000	37.5–16.7

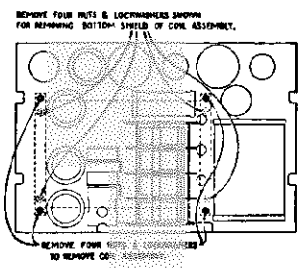


Figure E—Location of nuts and lockwashers holding coil assembly

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss, static and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure E and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure E.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

TUBE SOCKET VOLTAGES (RADIO OPERATION)

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Cathode, Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

MODEL 340, 340-E
Alignment Data

RCA-VICTOR CO., INC.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300 ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 7065), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

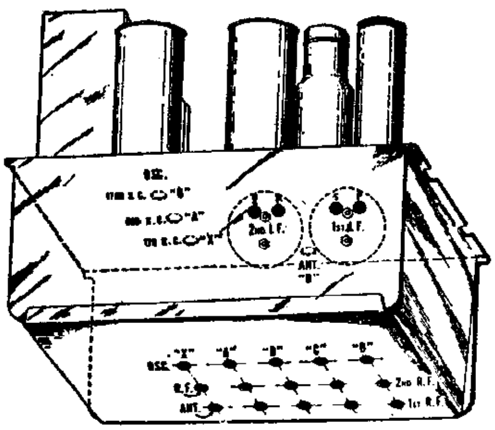


Figure F—Location of line-up capacitors.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with the 300 ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver in the following manner: Connect the 300 ohm resistor between the antenna and ground terminals of the receiver and attach a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure F for the location of the line-up capacitors.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To Be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.

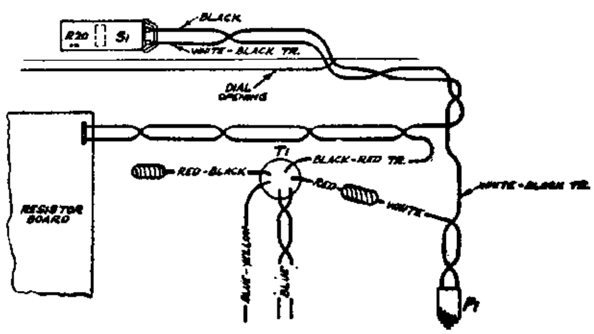
MODEL 340, 340-E
Transformer Data

RCA-VICTOR CO., INC.

Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure H shows the proper manner of making the various connections possible for this transformer. Note: The transformer is normally connected for 115–125-volt lines and a 110-volt motor supplied. The 220-volt connections must not be used unless the motor is also changed. However, 220-volt operation of the standard equipment may be obtained by using the Stock No. 9034 step-down line transformer.

The 25–60 cycle transformer uses only one 105–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure G may be used for 100–115-volt lines.



110 V. 25~ CONNECTIONS *Figure G—100-115 Volt Connection of 25-60 Cycles Transformer*

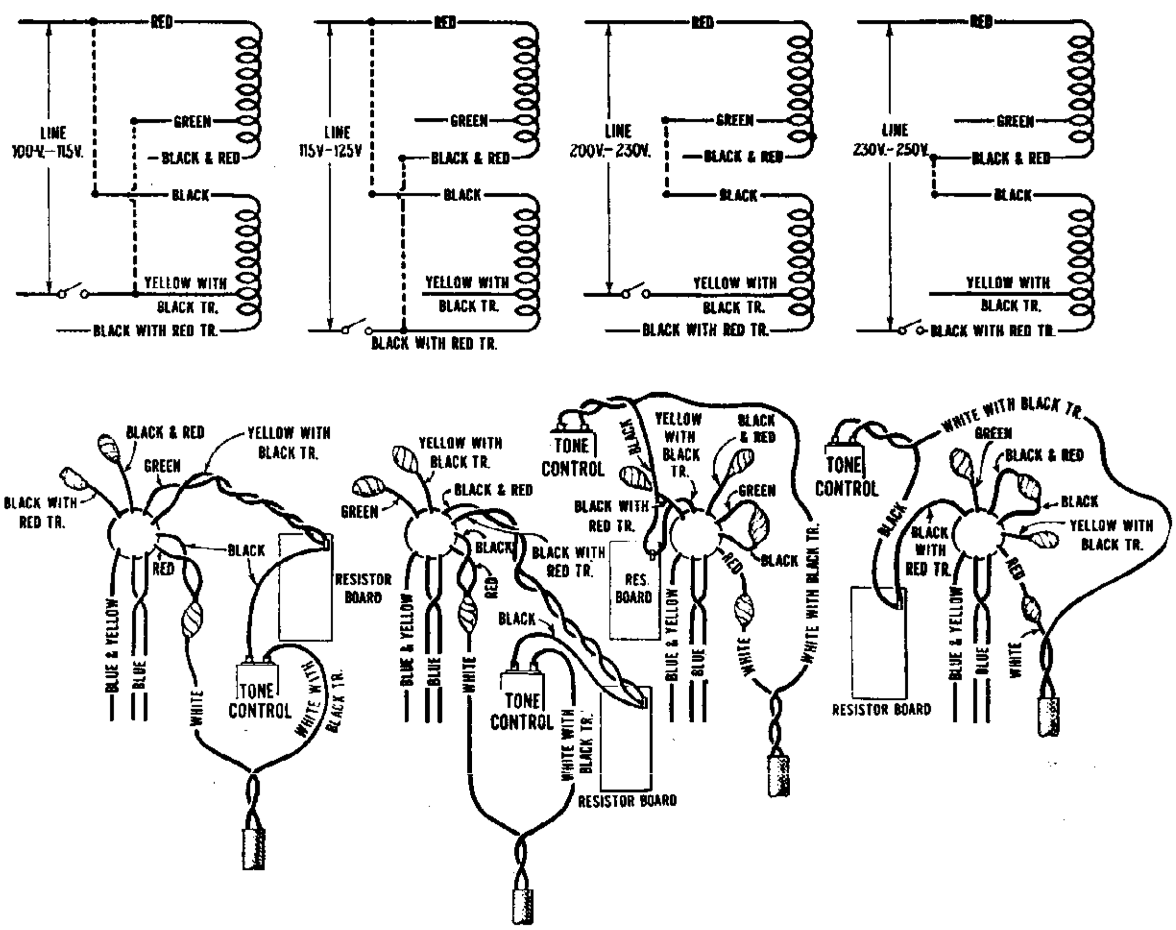


Figure H—Power Transformer Connections (50-60 cycles)

RCA-VICTOR CO., INC.

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure K), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

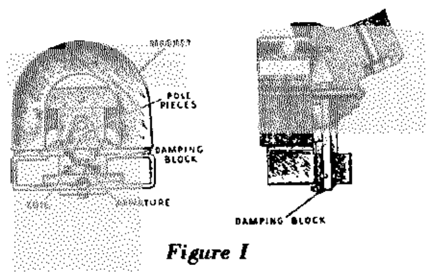


Figure I

(d) Remove screws A and B, Figure J, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure J), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

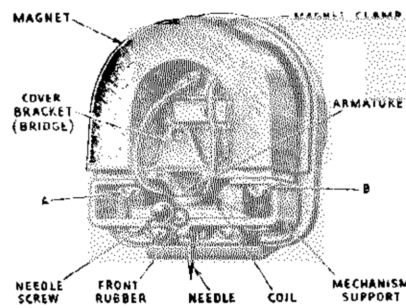


Figure J

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure K, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both side, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

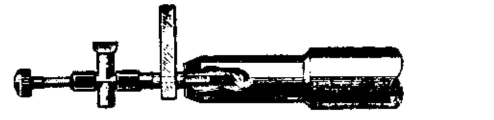


Figure K

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL 340, 340-E
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—½ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3472	Capacitor—.0024 mfd. (C11)	.32
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—400 ohms—Carbon type—½ watt (R16)	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3683	Shield—Radiotron shield top	.20
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3787	Capacitor—.01 mfd. (C57)	.30
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3866	Capacitor—1,500 mmfd. (C51)	.34
3867	Capacitor—0.1 mfd. (C13, C43)	.32
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—.05 mmfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3973	Capacitor—1,000 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
4103	Shield—First detector and R. F. Radiotron shield	.20
4104	Shield—I. F. Radiotron shield	.22
6112	Cushion—Rubber cushions for chassis—Package of 4	.25
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6512	Capacitor—.005 mfd. (C54)	.28
6571	Capacitor—10 mfd. (C60)	1.20
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	$1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6610	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	1.55
6611	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	1.62
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6627	Tone control (R20)	1.44
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L22, L27, C30)	1.40
6637	Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L13, L18, C19)	1.46
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	
7065	Screwdriver—For R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
9842	Transformer—Power transformer—105–250 volt—50–60 cycles (T1)	6.84
9046	Transformer—Power transformer—105–125 volts—25–40 cycles	9.28
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25

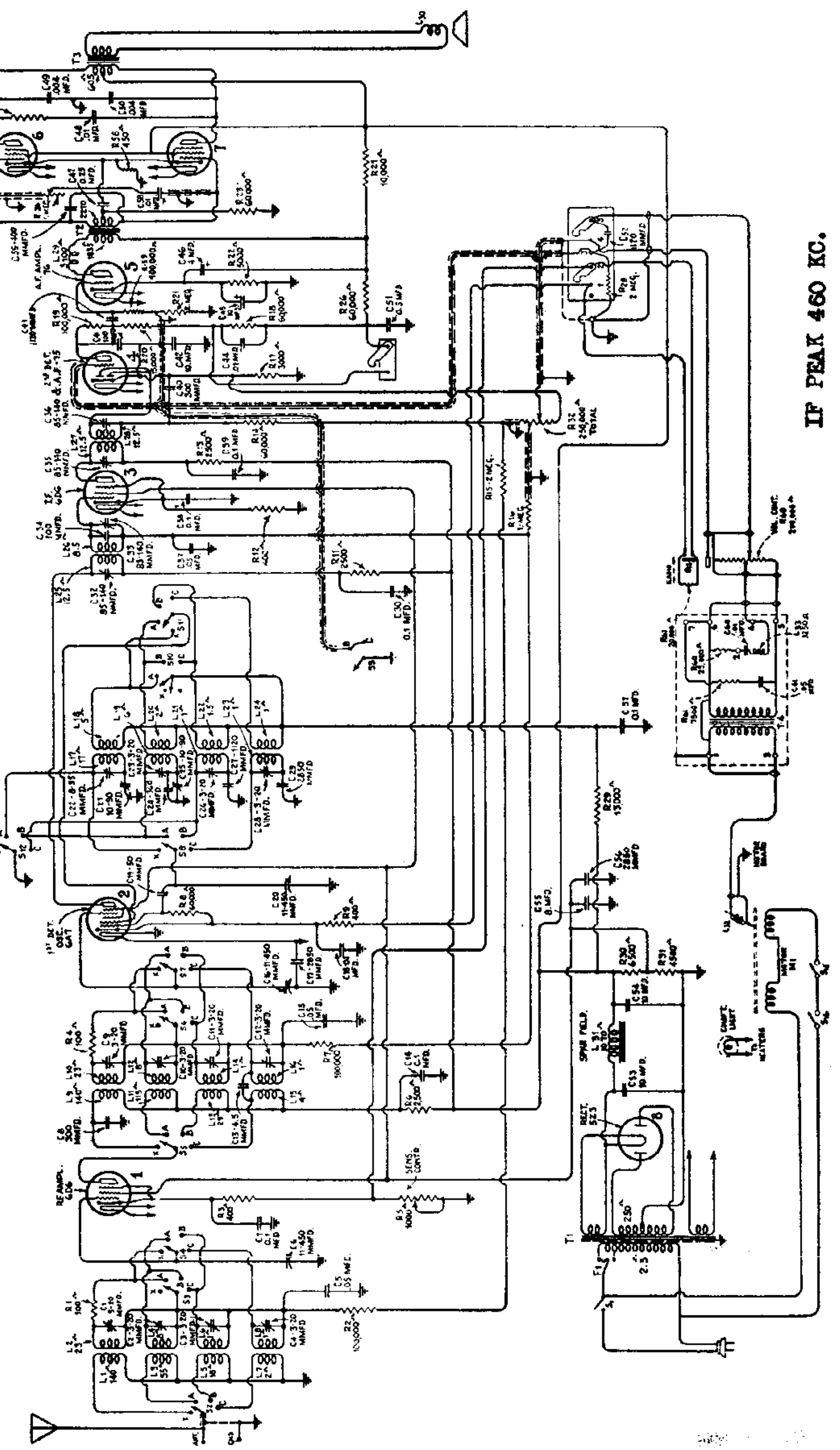
REPLACEMENT PARTS—Continued

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	MOTOR ASSEMBLIES	
3398	Motor mounting washer and spring assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	$0.18
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—Motor complete 105–125 volts—60 cycle	18.52
8990	Motor—Motor complete 105–125 volts—50 cycle	18.52
8991	Motor—105–125 volts—40 cycle	23.36
8992	Motor—Motor complete 105–125 volts—25 cycle	23.36
8993	Rotor and shaft for 105–125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105–125 volts, 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105–125 volts, 40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105–125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly, comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3516	Damper and bushing assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup arm base	.14
3521	Cover—Pickup back cover	.18
3728	Coil—Pickup coil (L41)	.50
6346	Back—Pickup housing back	.45
6601	Pickup—Pickup unit complete	4.54
7706	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	4.30
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3391	Suspension spring and washer for motor board—Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer and one nut	.50
3430	Box—Needle box with lid—Package of 2	.90
3829	Knob—Radio or phonograph volume or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	$1.08
3876	Cable—3-conductor cable for loudspeaker—4-band	.60
3878	Screws—No. 4-40-⅛" fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	.10
3992	Escutcheon—Range switch escutcheon—4-band	.10
3994	Cover—Automatic brake switch cover	.26
4053	Cable—3-conductor cable—From phonograph volume control to resistor boards	.90
6112	Cushion—Chassis support cushion—Package of 4	.25
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.35
6616	Bezel—Metal bezel for station selector dial	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.90
6673	Pointer—Station selector pointer—Package of 5	.64
6677	Dial—Station selector dial—5-band—Package of 5	1.42
6678	Dial—Station selector dial—4-band—Package of 5	1.42
6766	Volume Control—Phonograph volume control and switch (R29, S9)	2.28
6767	Transformer—Input transformer—Comprising one 30,000 ohm resistor, one 2,000 ohm resistor, one .12 mfd. capacitor, one compensating reactor and one transformer (T4, R27, R28, C64, L42)	5.62
6768	Cable—3-conductor shielded—From phonograph volume control to input transformer	.40
8837	Support—Metal support for chassis—Package of 4	.48
10174	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.58
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.28

MODEL 341
Schematic

RCA-VICTOR CO., INC.



MODEL 341
Chassis Wiring

RCA-VICTOR CO., INC.

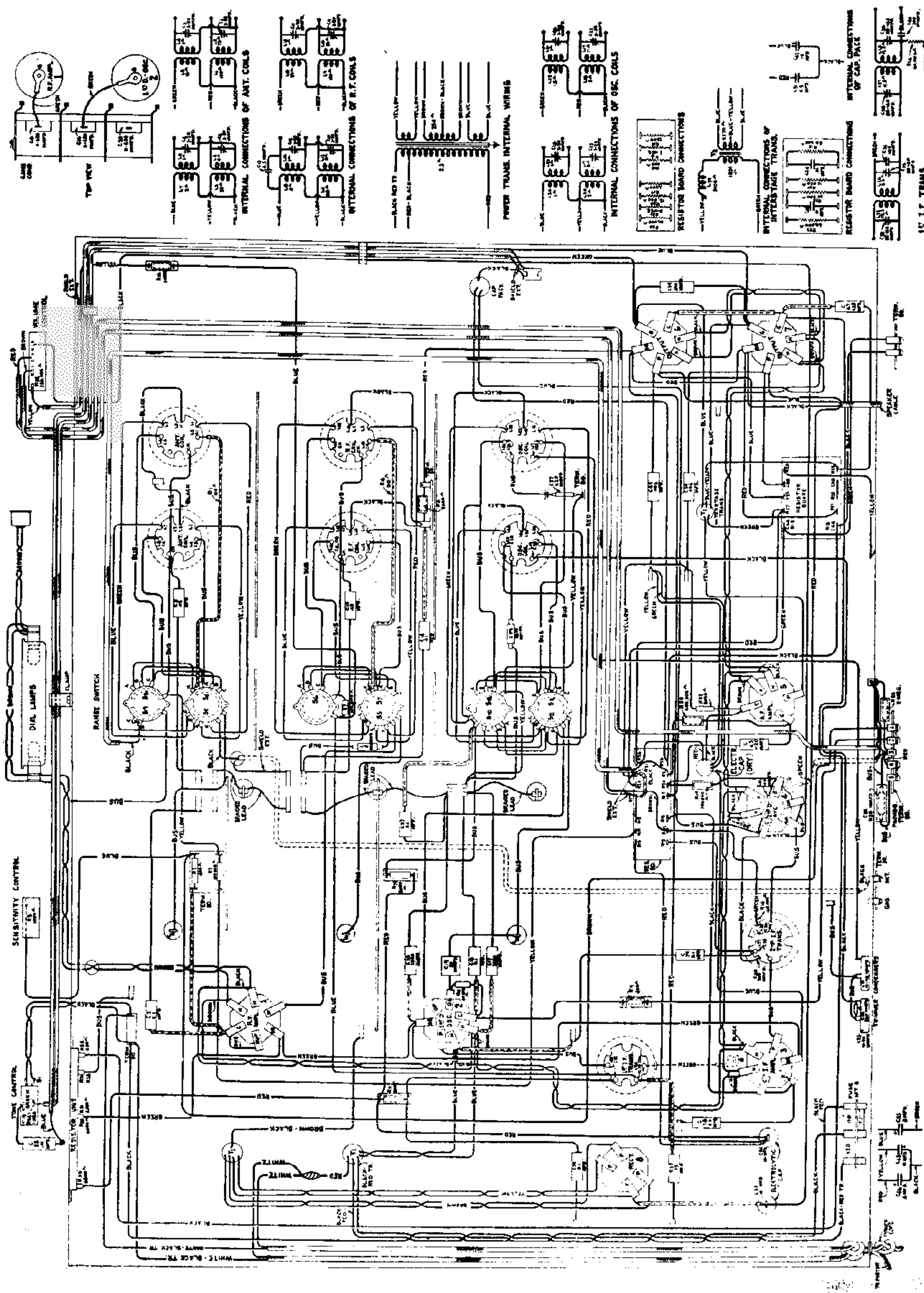


FIGURE 2 - CHASSIS WIRING

MODEL 341
Socket and
Trimmer Layouts

RCA-VICTOR CO., INC.

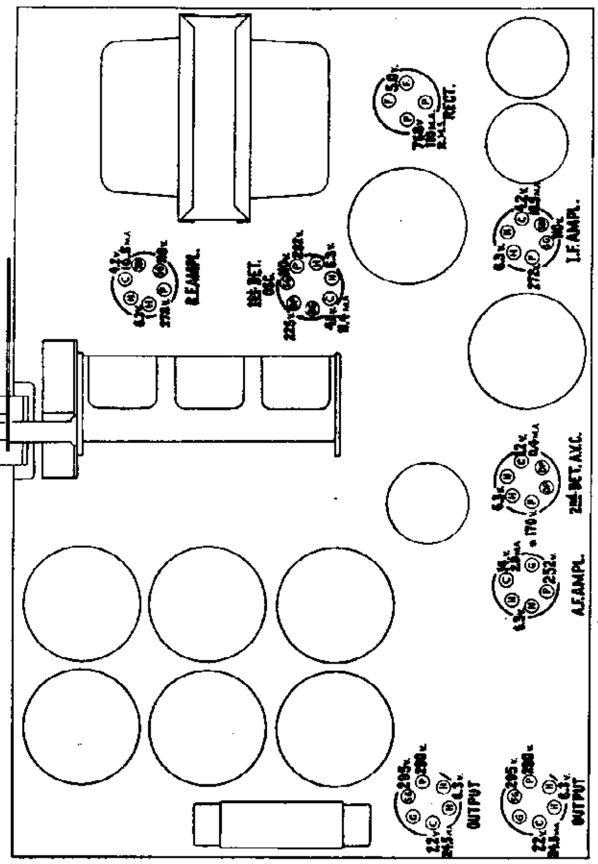


Figure 8- Radiotron Socket Voltages

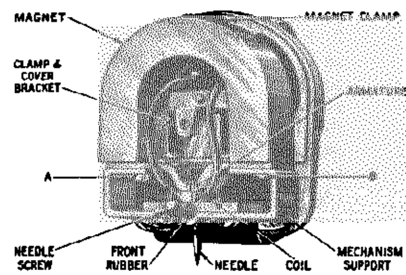


Figure 10—Pickup Nomenclature

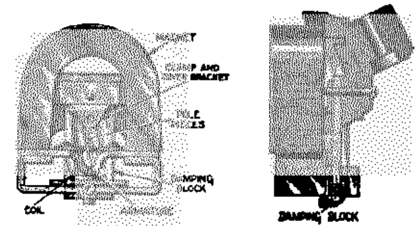


Figure 9—Details of Pickup

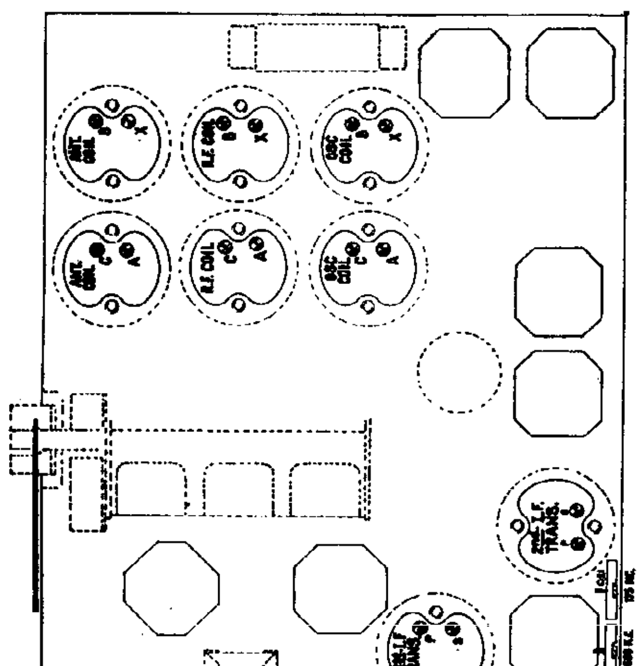


Figure 6—Location of Trimmer Capacitors

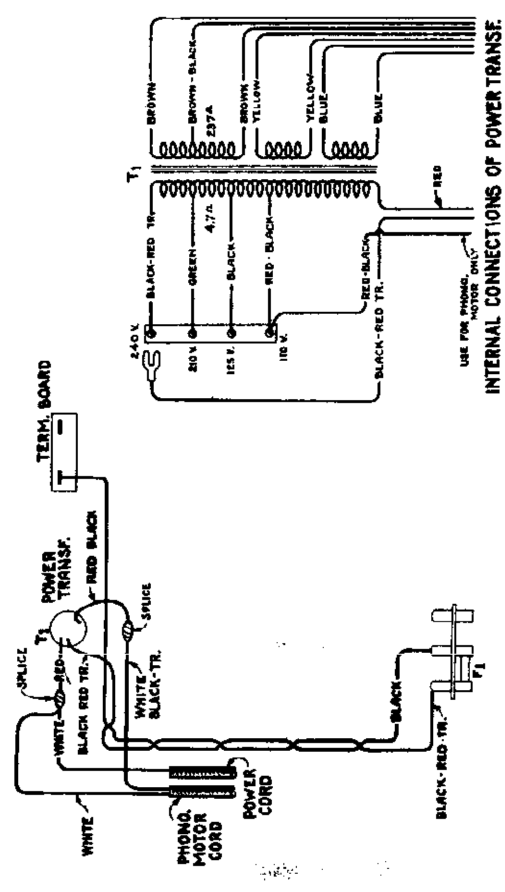


Figure 7—Universal Power Transformer Connections

RCA-VICTOR CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector, A. F. amplifier and automatic volume control, a driver audio stage and a push-pull Pentode output stage. An RCA-5Z3 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figure 1 shows the schematic diagram, Figure 2 the chassis wiring, Figure 3 the loudspeaker wiring and Figure 4 the assembly wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that four different groups of tuned circuits are used, one for each tuning band. A four-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with the tuning capacitor disconnected, falls in the next higher frequency band.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

The output of the I. F. amplifier is then applied to the input electrodes of the RCA-75, which is a combined second detector, A. F. amplifier and automatic volume control. The direct current component of the rectified signal produces a voltage drop across resistor R-32. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F., first detector and I. F. give the automatic volume-control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-75 and thereby regulates the audio output of the entire receiver.

The output of the A. F. section of the RCA-75 is resistance coupled to the grid of the RCA-76, first audio stage, which is transformer coupled to the push-pull output stage.

The output stage uses two RCA-42's, which give a low distortion, high audio output to the loudspeaker. A high-frequency tone control, which consists of a variable resistor and capacitor, is connected across the grids of the output stage. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-5Z3 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

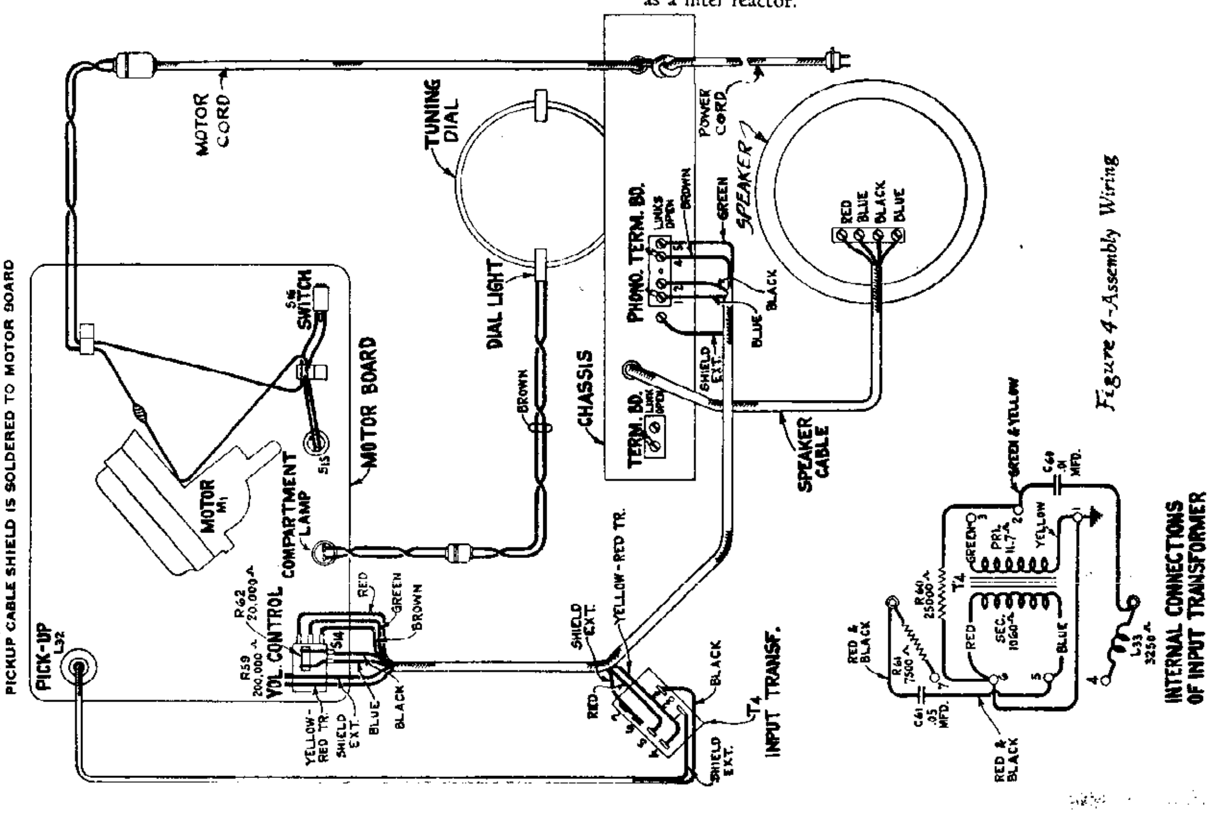


Figure 4-Assembly Wiring

RCA-VICTOR CO., INC.

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To properly align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal: A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 K. C. and the signal tuned in, and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage with two transformers having four adjustable capacitors that may require adjustment. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to to interlocking which always occurs.

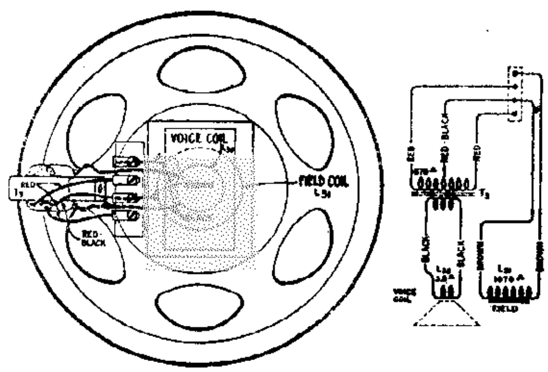


Figure 3—Loudspeaker Wiring

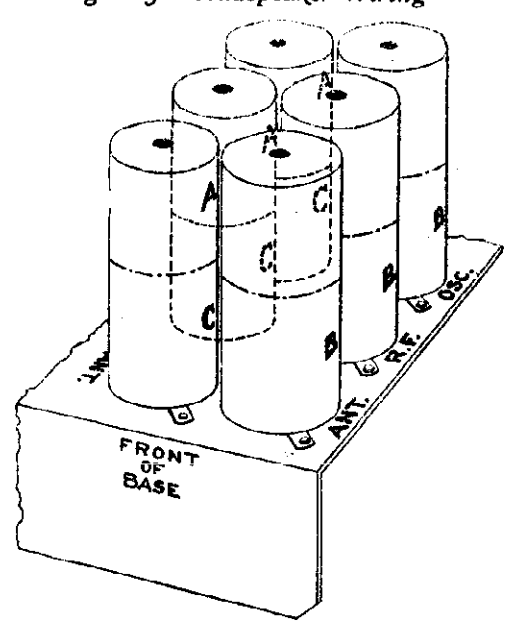


Figure 5—Location of Coils in Shields

RCA-VICTOR CO., INC.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in Bands "A" and "X." Three are required in Bands "B" and "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator across the voice coil of the loudspeaker. The volume and sensitivity controls must be at the maximum position and the input from the oscillator at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of Band "A."

Figure 6 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "A"

(a) Set the band switch at "A."

(b) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, marked 600 K. C., Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (b).

Band "B"

(a) Set the band switch at "B."

(b) Tune the external oscillator to 5,160 K. C. and set the pointer at 5,160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4,240 K. C. on the dial. It will be necessary to increase the external oscillator output for this check.

(d) The antenna and detector trimmers should now be peaked for maximum output.

Band "C"

(a) Set the band switch at "C."

(b) Tune the external oscillator to 18,000 K. C. and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "X"

(a) Set the band switch at "X."

(b) Tune the external oscillator to 410 K. C., set the dial pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K. C. on Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 7 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) FIDELITY LINK

It will be noted that a small link is mounted on the rear apron of the chassis which is open. Closing the link reduces the low frequency output of the receiver.

(6) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 8 shows the voltages at each individual socket contact.

(7) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

(8) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 10), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 10, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization. The magnetizer shown on page 18 is useful for magnetizing pickups.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 10), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be *.009"* on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h), section (8).

(9) REPLACING THE DAMPING BLOCK

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

RCA-VICTOR CO., INC.

MODEL 341
Pickup Data
Record Changer Data

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 11, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Figure 11—Special Soldering-Iron Tip

(f) Turn the dial to each extreme and to its center position and check the backlash of the back gear (closest to reflector). There should be definite backlash in each direction at each of these three positions.

(g) If this backlash is not obtained, loosen the nut on the back of the reflector which holds the shaft of these gears and slide the shaft toward the outer edge of the reflector. The hole is elongated to permit this adjustment.

(h) After making sure there is backlash at the three check points mentioned, turn the outside gear in a clockwise direction 1¼ turns. Hold it at this position and replace the stem gear.

(i) Turn the dial throughout its range. If the gears become noisy, move the gear further toward the reflector edges described in (g).

(j) Replace the dial scale, making sure the hole clears the spindle.

(k) Replace the vernier hand. It should point at zero when the tuning capacitor is fully meshed.

(l) Replace the large hand. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A" when the tuning capacitor is fully meshed.

The above covers the proper manner of making adjustments, assuming all parts are in normal condition. Of course, if any part is defective, it must be replaced. The spring gear may be checked by turning it until the spring is tight and unwinding it slowly. It should unwind 4¼ turns.

(10) AUTOMATIC RECORD CHANGER

The automatic record changer used in this instrument is of simple design and fool-proof construction. Under normal operating conditions service difficulties should be negligible. However, in event adjustments are required, a reference to Figure 12 will disclose the proper method of making all adjustments.

(11) ADJUSTMENT OF DIAL VERNIER MECHANISM

A small vernier indicator is provided for giving a simple means of band spread. Under normal conditions, adjustment of this mechanism will not be required. However, in event the initial adjustment is not satisfactory or adjustment is required because of replacement, the following procedure should be used:

(a) Remove the chassis from the cabinet to a place convenient for work.

(b) Check the tension on the vernier hand by pushing it in a clockwise direction. There should be considerable tension against such a push. If this tension does not exist, the action of the hand may be erratic and possibly fail to return to the same position for a particular station.

(c) Pull off the long hand with a pair of long-nose pliers.

(d) Straighten the lugs that hold the dial in place. Then remove the dial "vernier" hand and stem gear together.

(e) Then remove the "vernier" hand from the stem gear.

PHONOGRAPH

The record reproducing facilities consist of a low impedance magnetic pickup with its associated inertia type tone arm, a compensated volume control, the audio amplifier of the receiver and the loudspeaker of the receiver. The radio receiver is made inoperative by the switch used for changing from radio to record reproduction. The turntable assembly consists of the perfected automatic record changer, which is simple and fool-proof in operation.

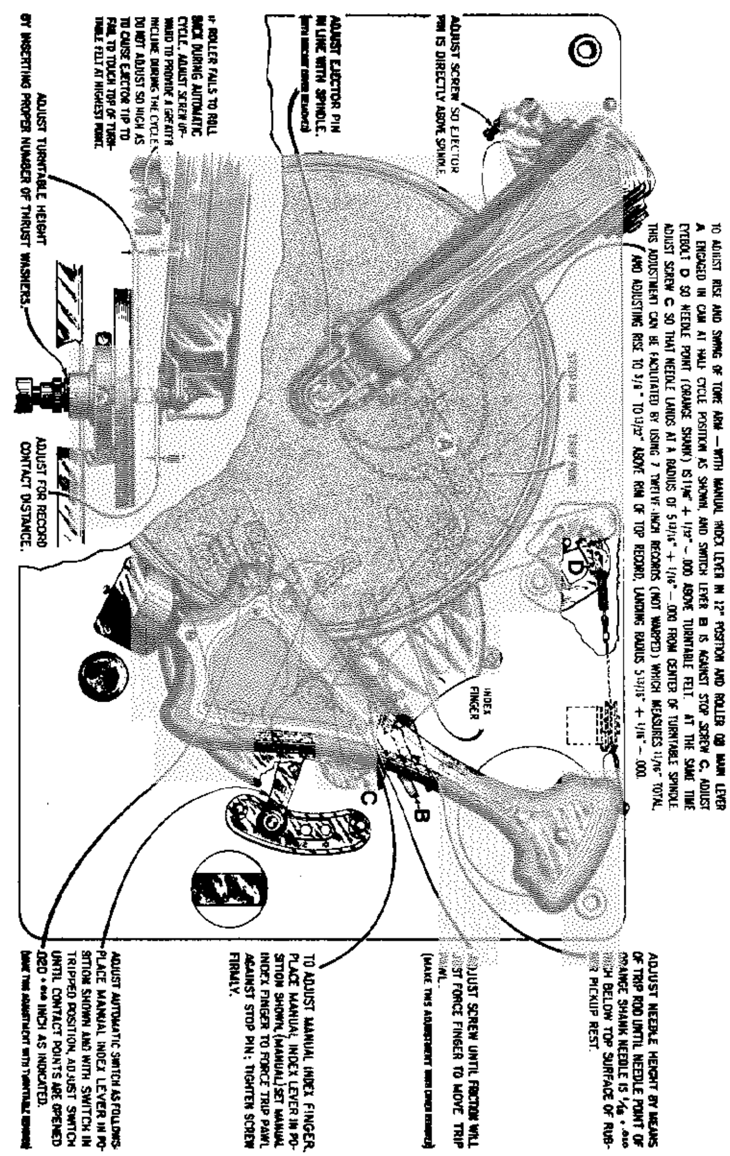


Figure 12—Automatic Record Changer Adjustments

MODEL 341
Voltage
Parts List

RCA-VICTOR CO., INC.

• ELECTRICAL SPECIFICATIONS

Voltage Rating............................105-125 Volts and 105-130/200-250 Volts (Double Range)
Frequency Rating............................25, 30, 50 and 60 Cycles
Power Consumption............................170 Watts, 60 Cycles
Type and Number of Radiotrons
2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-76, 2 RCA-42, 1 RCA-5Z3—Total, 8

Tuning Frequency Range............
- Band X— 140 K. C.– 410 K. C.
- Band A— 540 K. C.– 1720 K. C.
- Band B—1720 K. C.– 5400 K. C.
- Band C—5400 K. C.–18,000 K. C.

Line up Frequencies......175 K. C., 410 K. C., 460 K. C., 600 K. C., 1720 K. C., 5160 K. C., 18,000 K. C.
Maximum Undistorted Output............................4.0 Watts
Maximum Output............................5.0 Watts
Type of Magnetic Pickup............................Low Impedance, Viscoloid
Type of Record Changer............................Record Ejector Type
Capacity of Record Changer............................Eight 10" or seven 12" Records
Turntable Speed............................33⅓ R. P. M. and 78 R. P. M.

This eight-tube, four-band all-wave combination radio-phonograph instrument provides entertainment either from the perfected all-wave radio receiver or from records of all types. Record or radio reproduction is characterized by unusual tone quality. The perfected phonograph enables one to play a number of selections without any attention whatever, due to its automatic record-changing feature.

The eight-tube, four-band Superheterodyne receiver is of the "all-wave" type, having a continuous tuning range extending from 140 K. C. to 18,000 K. C., except for one break between 410 K. C. and 540 K. C. Such a tuning range permits the listener to receive all of the important broadcasting, police, aircraft and amateur call bands throughout the world.

Excellent sensitivity, selectivity and tone quality, together with a high output (4 watts undistorted), Class A amplifier gives the receiver outstanding performance. Operating features include an "airplane" type dial, a double-ratio vernier drive, a visual band indicator, and a special "second hand" on the dial for logging short-wave stations. Other important features include automatic volume control, sensitivity control and a large loudspeaker unit.

RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Line—Maximum Volume and Sensitivity—No Signal

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		4.2	110	272	10.5	6.3
RCA-6A7	Oscillator	—	—	225	11.4	6.3
	1st Detector	4.6	110	282		
RCA-6D6 I. F.		4.2	110	272	10.5	6.3
RCA-75 2nd Detector		1.2	—	170*	0.4	6.3
RCA-76 A. F.		14.0	—	252	2.8	6.3
RCA-42 Power		22.0	295	290	24.5	6.3
RCA-42 Power		22.0	295	290	24.5	6.3
RCA-5Z3 Rectifier		—	—	768/384 R. M. S.	110.0	5.0

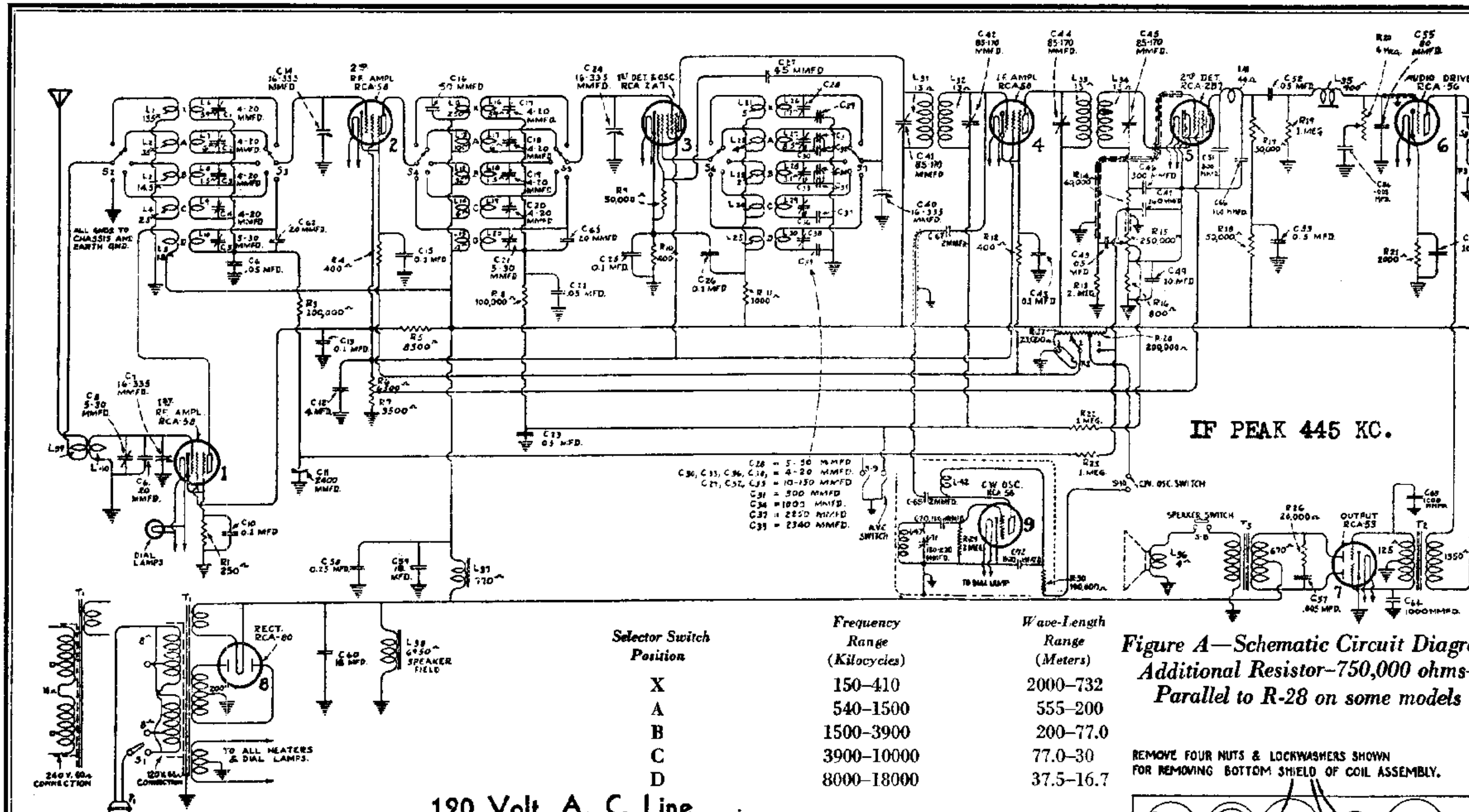
*Cannot be measured with ordinary voltmeter.

REPLACEMENT PARTS

Stock No.	Description	List Price
3861	Capacitor — Oscillator trimmer capacitor (C21, C25)	.78
4633	Capacitor—50 mmfd (C19)	25
4635	Capacitor—100 mmfd. (C41)	.25
3937	Capacitor—300 mmfd. (C8)	.34
4413	Capacitor—360 mmfd. (C24)	.22
4183	Capacitor—400 mmfd (C59)	.26
4412	Capacitor—1120 mmfd. (C27)	.25
4409	Capacitor—1120 mmfd. (C43)	.35
4634	Capacitor—1120 mmfd. (C52)	.35
4524	Capacitor—2850 mmfd. (C29)	.35
4515	Capacitor—2850 mmfd. (C17, C56)	.34
4628	Capacitor—0.004 mfd. (C49, C50)	.28
3787	Capacitor—0.01 mfd. (C48)	.30
4212	Capacitor—0.01 mfd (C44)	.30
4624	Capacitor—0.01 mfd. (C58)	.54
3888	Capacitor—0.05 mfd (C37)	.25
4417	Capacitor—0.05 mfd (C5, C15)	.25
3877	Capacitor—0.1 mfd. (C38)	.32
4415	Capacitor—0.1 mfd. (C18)	.30
4545	Capacitor—0.1 mfd. (C7, C14, C30, C39, C57)	.25
3750	Capacitor—0.25 mfd. (C47)	.36
7790	Capacitor—10 mfd. (C53, C54)	1.05
4619	Capacitor pack—Comprising one 0.5 mfd., one 10 mfd. capacitor (C12, C51)	1.44
4626	Capacitor pack—Comprising one 4 mfd., one 10 mfd and one 8 mfd capacitor (C45, C46, C55)	2.82
7810	Coil—Antenna coil "PB-LW" (L1, L2, L5, L6, C1, C3)	2.10
7803	Coil—Antenna coil "B.S.W." (L3, L4, L7, L8, C2, C4)	1.82
7808	Coil—Detector coil "P.B.-L.W." (L9, L10, L13, L14, C9, C11)	2.05
7805	Coil—Detector coil "B.-S.W." (L11, L12, L15, L16, C10, C12, C13)	2.15
7807	Coil—Oscillator coil "B.S.W." (L19, L20, L23, L24, C23, C28)	1.62
7809	Coil—Oscillator coil "P.B.-L.W." (L17, L18, L21, L22, C22, C26)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C16, C20)	4.42
4616	Tone control (R24, S1)	1.28
4431	Transformer—First intermediate frequency transformer (L25, L26, C32, C33, C34)	2.28
9505	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	6.35
9506	Transformer—Power transformer—105-125 volts—25-40 cycles	8.90
9507	Transformer—Power transformer—105-250 volts—40-60 cycles	6.40
4433	Transformer—Second intermediate frequency transformer (L27, L28, C35, C36, C40, R14)	2.15
4620	Transformer and reactor—Interstage transformer and reactor (T2, L29)	2.98
4519	Volume control (R32)	1.25
4625	Resistor—Wire wound resistor—Comprising one 6500-ohm-4500-ohm and 450 section (R30, R31, R58)	.70
3704	Resistor—400 ohms—Carbon type—¼ watt (R9, R3, R12)—Package of 5	1.00
4338	Resistor — 2500 ohms — Carbon type — ¼ watt (R6, R11, R13)—Package of 10	2.00
4242	Resistor — 3000 ohms — Carbon type — ¼ watt (R17)—Package of 5	1.00
4436	Resistor — 5000 ohms — Carbon type — ¼ watt (R22)—Package of 10	2.00
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R20)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8, R18, R23, R26)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2, R7, R19)—Package of 5	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R59)—Package of 5	1.00
3033	Resistor — 1 megohm — Carbon type — ¼ watt (R16)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R15, R21, R28)—Package of 5	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt (R27)—Package of 5	1.00
4623	Resistor—13,000 ohms—Carbon type—½ watt (R29)—Package of 10	2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R25)	.22
4418	Resistor—100 ohms—Flexible type (R1, R4)—Package of 10	1.50
4618	Rheostat—Sensitivity control (R5)	1.25
9011	Motor—105-125 volts—60 cycles	19.72
9014	Motor—105-125 volts—50 cycles	19.72
9012	Motor—105-125 volts—25 cycles	24.16
9537	Coil—Field coil magnet and cone support (L31)	3.85
8969	Cone—Reproducer cone—Package of 5 (L30)	6.35
9536	Reproducer complete	8.40
4637	Transformer—Output transformer (T3)	1.50
6303	Resistor—20,000 ohms—Carbon type—¼ watt (R62)—Package of 5	1.00
4678	Ring—Dial retaining ring—Package of 5	.34
4613	Screw—8-32-7/16" headless set screw for knob	.25
4557	Shade—Phonograph compartment lamp shade.	.35
4671	Switch—Toggle type—Motor starting switch (S16)	.72
4672	Transformer—Input transformer pack comprising one transformer, one reactor, one 0.01 mfd., one 0.05 mfd capacitor, one 7500-ohm and one 25,000-ohm resistor (T4, L33, C60 C61, R60, R61)	5.42
6766	Volume control—Phonograph volume control (R59, S14)	2.28

MODEL 9-Tube General Purpose A-W. Schematic, Voltage

RCA-VICTOR CO., INC.



Selector Switch Position	Frequency Range (Kilocycles)	Wave-Length Range (Meters)
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–30
D	8000–18000	37.5–16.7

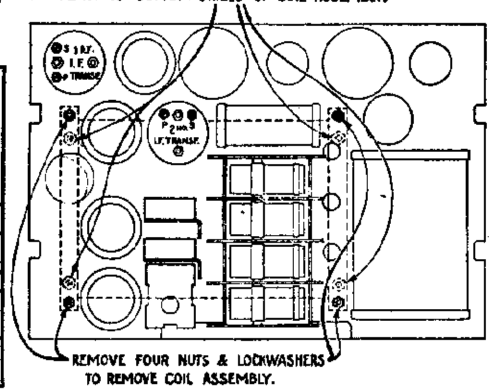
Figure A—Schematic Circuit Diagram—Additional Resistor–750,000 ohms–Parallel to R-28 on some models

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Cathode, Volts	Plate to Cathode, Volts	Plate Current, M. A.	Filament or Heater, Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0
RCA-56, CW-Osc.	**	—	20	0.1	2.6

* Voltages and current apply to detector portion of tube.

** These voltages cannot be measured because of the high resistance of the circuits.

REMOVE FOUR NUTS & LOCKWASHERS SHOWN FOR REMOVING BOTTOM SHIELD OF COIL ASSEMBLY.



REMOVE FOUR NUTS & LOCKWASHERS TO REMOVE COIL ASSEMBLY.

Figure D—Location of nuts and lockwashers holding coil assembly

MODEL 9-Tube General Purpose A-W.
Chassis Wiring

RCA-VICTOR CO., INC.

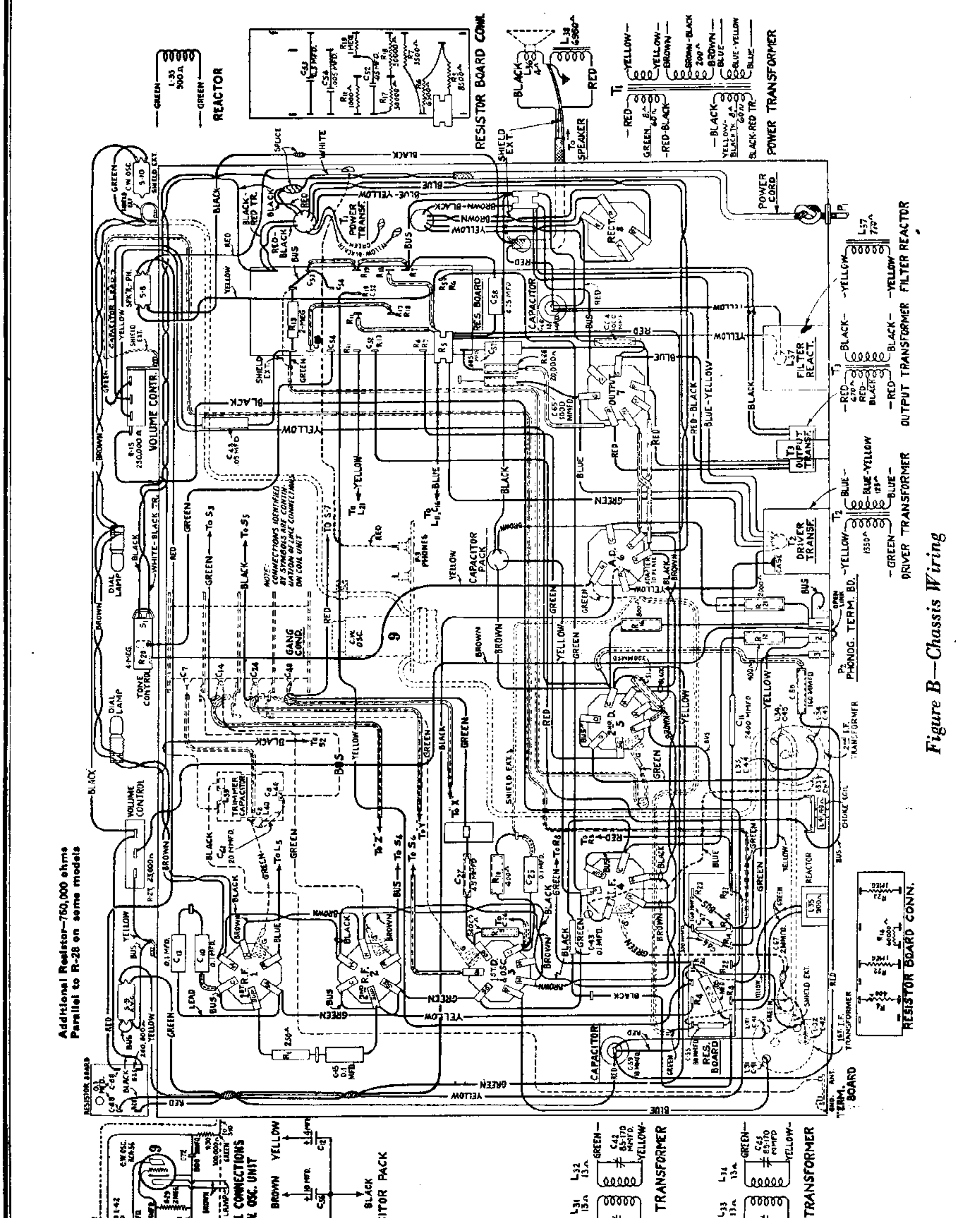


Figure B—Chassis Wiring

RCA-VICTOR CO., INC.

MODEL 9-Tube General Purpose A-W. Coils Wiring Diagram

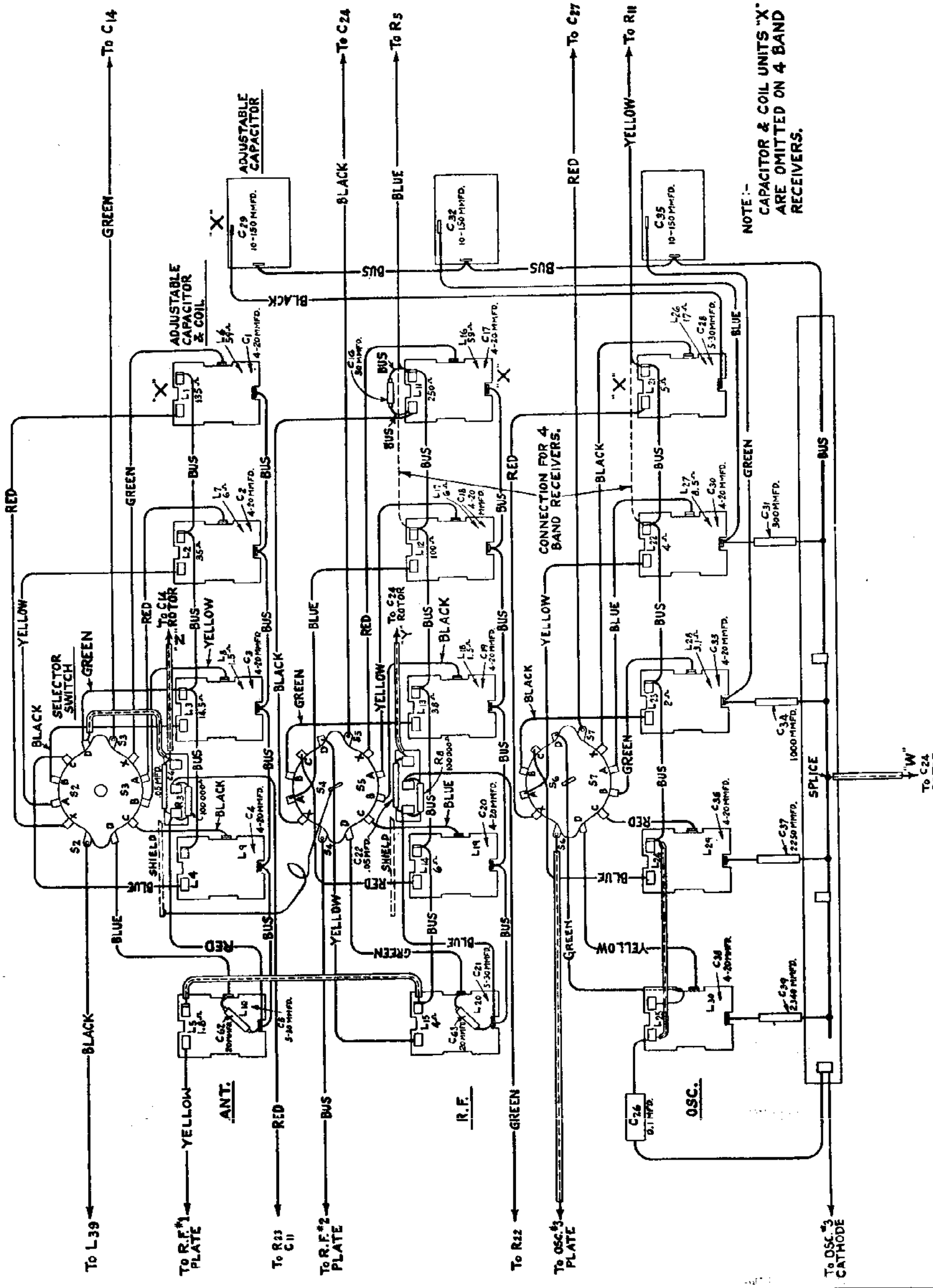


Figure C—Wiring Diagram of Coil Assembly

MODEL 9-Tube General Purpose A-W. Alignment Data

RCA-VICTOR CO., INC.

SERVICE DATA

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing Radiotrons and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and 445 K. C. signals or static.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and makes easier alignment of the oscillator at the higher frequency bands.

In order to receive pure C W signals, an I. F. heterodyne oscillator has been provided. This oscillator is an RCA-56 that operates at a 1000-cycle higher frequency than the I. F. An adjustable capacitor is provided so that the pitch of the heterodyne frequency may be varied throughout the audible range.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300 ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 4160), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300 ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300 ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

The CW oscillator beat frequency may be adjusted by means of the trimmer capacitor shown in Figure E. (It may be necessary to slightly loosen the shielding cover to gain access to this screw.) A weak modulated or telephone signal should be accurately tuned-in with the oscillator "off" The oscillator should then be turned "On" and the trimmer screw adjusted until a 1000 cycle note is obtained.

Line-up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To Be Made
445 K. C.	Any setting that does not bring in station.	Top of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is reaction on the oscillator tuning.

MODEL 9-Tube General Purpose A.W.
Transformer Data
Trimmer Locations

RCA-VICTOR CO., INC.

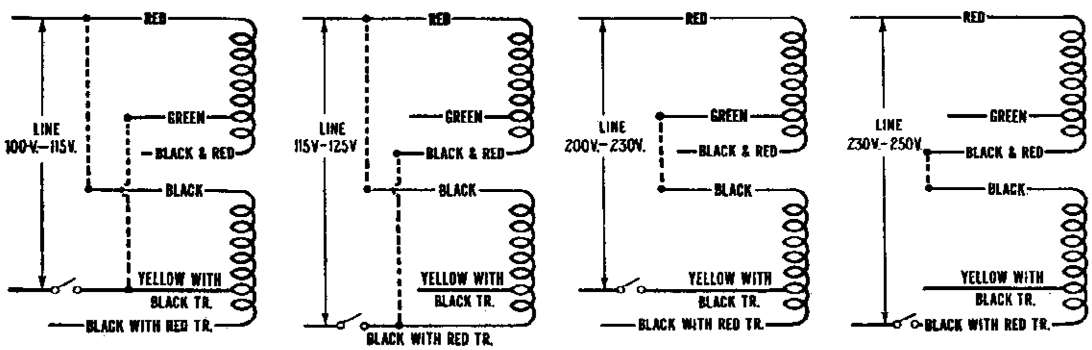
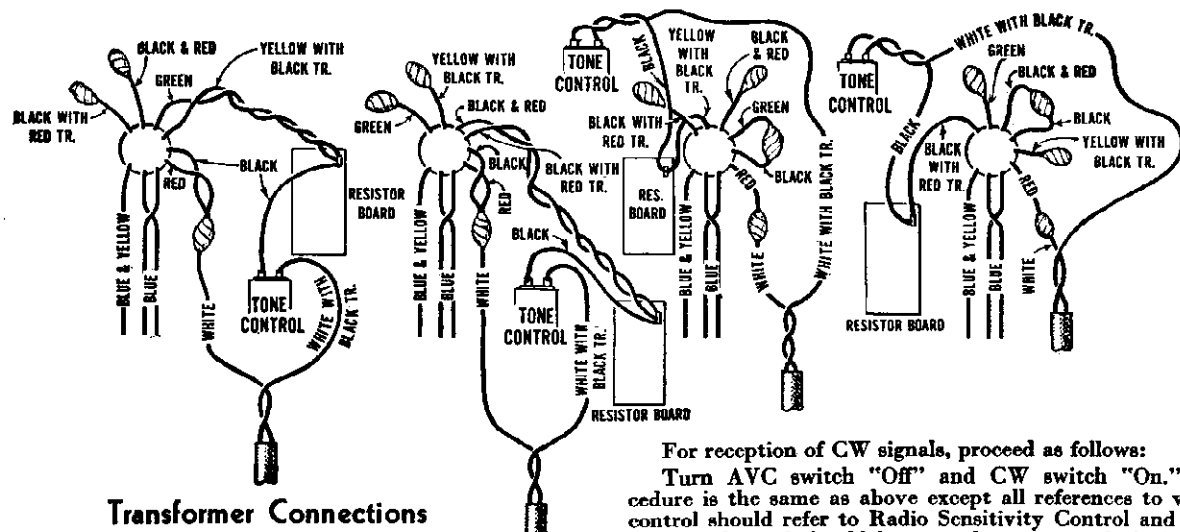


Figure F—Power Transformer Connections (50–60 cycles)



Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure F shows the proper manner of making the various connections possible for this transformer.

(1) **Range Switch (Upper Left-hand Knob)**—This switch converts the receiver for operation within any of the tuning ranges provided. As indicated on the selector dial, the letters on the switch escutcheon signify:

X—*Long-Wave Range*—150 to 410 kilocycles (2000 to 732 meters). Airport band.

A—*Standard Broadcast Band*—540 to 1500 kilocycles (555 to 200 meters).

B—*Police Band*—1500 to 3900 kilocycles (200 to 77 meters). Services available within this band include police calls at 1574, 1712 and 2450 kilocycles, amateur radio "phone" communications between 1800 and 2000 kilocycles, and aviation communications (phone) between 2500 and 3500 kilocycles.

C—*Short-Wave Range*—3900 to 10,000 kilocycles (77 to 30 meters). Within the limits of this range are included two of the internationally-assigned short-wave broadcast bands. These are known as the 49 and 31 meter bands. (The portion of this range from 8000 to 10,000 kilocycles, which includes the 31 meter band, is preferably received on range D.)

D—*Short-Wave Range*—8,000 to 18,000 kilocycles (37.5 to 16.7 meters). This range embraces four of the standardized short-wave broadcast bands located at 31, 25, 19 and 16 meters, respectively.

For reception of CW signals, proceed as follows:

Turn AVC switch "Off" and CW switch "On." Procedure is the same as above except all references to volume control should refer to Radio Sensitivity Control and Audio Volume Control should be near the extreme clockwise position. Each station tuned in will be indicated by a whistle caused by the beating of the CW oscillator frequency with the signal frequency. This feature provides unmistakable signal indication and may also be used when tuning signals other than CW, noting the presence of the signal with the oscillator "On" and tuning the station in finally with the oscillator turned "Off."

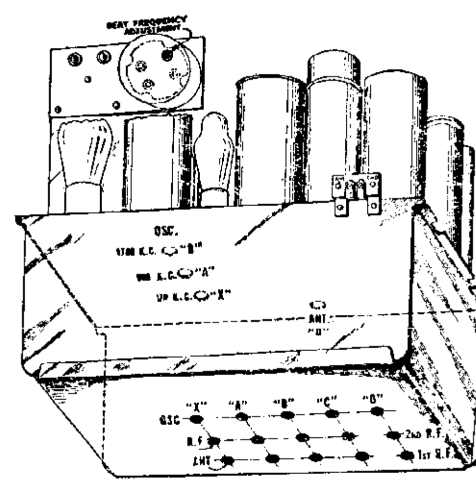


Figure E—Location of line-up capacitors.

MODEL 9-Tube General Purpose A-W. Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26, C68)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14—Package of 5	1.00
3616	Capacitor—300 mmfd. (C51)	.34
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3643	Capacitor—.005 mfd. (C57)	.25
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—6,500 ohms—Carbon type—3 watt (R5)	.25
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—.05 mmfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3932	Capacitor—.0024 mfd. (C11)	.30
3973	Capacitor—1,000 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
4103	Shield—First detector and R. F. Radiotron shield	.20
4104	Shield—I. F. Radiotron shield	.20
4205	Coil—Second detector choke coil (L41)	.50
4207	Capacitor—0.1 mfd. (C13, C43)	.34
4217	Switch—Single pole—Single throw—"CW-OSC" (S10)	1.15
4218	Switch—Double pole—Single throw—"AVC" (S9)	1.00
4219	Switch—Single pole—Double throw—"Speaker-Phone" (S8)	1.90
4220	Resistor—200,000 ohms—Carbon type—1 watt (R28)—Package of 5	1.10
6112	Cushion—Rubber cushions for chassis—Package of 4	.25
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6278	Resistor—750,000 ohms—Carbon type—½ watt (R31)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6512	Capacitor—.005 mfd. (C54)	.28
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6612	Volume control—Audio volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28)	$1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly 540–1,500 kilocycles—4- or 5-band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L22, L27, C30)	1.40
6637	Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	1.10†
6889	Capacitor—18. mfd. (C60)	1.55
6890	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	2.40
6891	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	2.40
6892	Tone control (R20)	1.50
6953	Volume control—Radio sensitivity control (R27)	1.25
6955	Shield—Second R. F. Radiotron Shield	.25
6956	Shield—Radiotron shield top	.15
7065	Screwdriver—For R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
9042	Transformer—Power transformer—105–250 volts—50–60 cycles (T1)	6.84
9046	Transformer—Power transformer—105–125 volts—25–40 cycles	9.22
9050	Oscillator—Test oscillator—150–25,000 K. C.	33.50†
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	MISCELLANEOUS PARTS	
4224	Bezel—Station selector dial bezel	.50
4225	Ring—Dial glass retaining ring—Package of 5	.95
4226	Escutcheon — Engraved — "AVC-on-off" — "Radio Sensitivity" — "Power Tone-off-on" — "Speaker-Phone" — "CW-OSC-off-on"	.85
4227	Escutcheon—Audio sensitivity control escutcheon	.70
4228	Escutcheon—Range switch escutcheon	.35
4229	Knob—Audio volume control tone control or radio sensitivity control knob—Package of 5	1.15
4230	Knob—"AVC" — "CW-OSC" — "Speaker-Phone" and range switch knob—Package of 5	1.15
4231	Knob—Station selector knob—Package of 5	1.15
6614	Glass—Station selector dial glass	.30
6954	Adapter—5-prong adapter	.82
	OSCILLATOR ASSEMBLIES	
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R30)—Package of 5	1.00
3634	Capacitor—160 mmfd. (C70)	.34
3682	Shield—Radiotron shield	.22
4027	Capacitor—800 mmfd. (C72)	.44
4221	Jack—Pinjack—Package of 2	.45
4222	Shield—Coil shield	.28
6242	Resistor—2 megohms—Carbon type—¼ watt (R29)—Package of 5	1.00
6700	Coil—Oscillator coil (L42, L43, C69)	2.30
6899	Capacitor—Adjustable capacitor—120–220 mmfd. (C71)	.70
6951	Cable—3-conductor shielded cable	.32
6952	Cable—Single conductor shielded	.24
7484	Socket—5-contact Radiotron socket	.35
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

† Full Discount not allowed.

RCA-VICTOR CO., INC.

Electrical Specifications

Voltage Rating............................105-125 Volts
Power Consumption (60 Cycle).................175 Watts
Type and Number of Radiotrons......4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range.540 K.C.-1500 K.C.—1400 K.C.-2800 K.C.
Undistorted Output..........................10.0 Watts

This combination instrument utilizes the new perfected automatic record changing mechanism and the twelve-tube Deluxe Super-Heterodyne receiver. Excellent fidelity on both radio and record reproduction is an inherent feature of this instrument. Other features include double tuning range (540 K. C.-1500 K. C. and 1400 K. C.-2800 K. C.), high and low frequency tone control, compensated volume control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

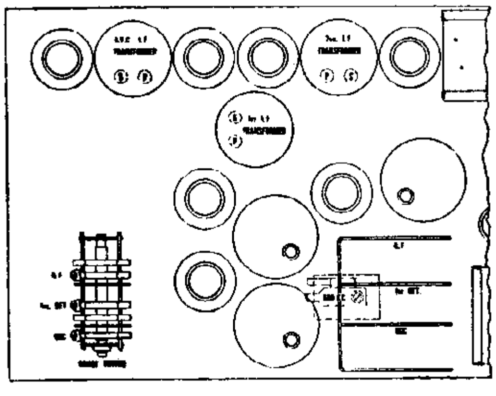


Figure B—Location of Line-up Capacitors

Figure A shows the schematic circuit, Figure B the location of the adjustable capacitors, Figure C the chassis wiring, and Figure D the assembly wiring diagram. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator, such as Stock No. 9050, giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.
(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.
(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.
(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.
(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.
(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure B, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.
(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.
(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.
(e) Refer to Figure B. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

Antenna Connections—It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these will normally be used for the usual antenna and ground connections, while the third one is for use in connection with a shielded antenna system. The tap eliminates the need of the transformer usually used for coupling the shielded line to the radio receiver.

Stock No. 7717 shield kit, which comprises a lightning arrester, transformer assembly, a 200 mmfd. capacitor, and 100 feet of shielded wire, is recommended. When such an antenna system is used, it is necessary to connect the 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the Stock No. 7717 Kit.

Automatic Record Changer—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure E. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.-I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-5Z3 Rect.	990-495 R. M. S.			92 Total	5.0

MODEL Duo 380
Phonograph Data

RCA-VICTOR CO., INC.

OPERATION—PHONOGRAPH

Automatic Operation

Important Precautions—The following precautions must be observed during operation:

1. In loading the turntable, make certain that the first record inserted (last to be played) is flat—that is, essentially free from warpage.

2. Before starting the turntable, make certain that the reject pocket (at the left of the phonograph compartment) is either empty or sufficiently clear to permit proper disposal of records by the automatic mechanism.

3. Never restrain by force the normal motion of any part of the automatic mechanism while it is changing records.

Procedure—The phonograph operating controls are located on the front panel and in the playing compartment as shown in Figures 1 and 2. Proceed as follows:

1. Set the Transfer Switch counter-clockwise for record reproduction.

2. Apply power by turning the Radio Volume Control clockwise from the "off" position. Set the two Tone Controls for full-range reproduction (see paragraph 7 under "Operation—Radio").

3. With the Motor Switch in the "off" position (Record Volume Control fully counter-clockwise), load the turntable with records, as follows:

(a) Set the Index Lever at "Manual." *Always do this before loading or unloading records.*

(b) Place the electric pickup on the rubber rest.

(c) Raise the Record Ejector arm (*very slowly*, at first, until the internal weight has rolled to the rear of the arm, then as rapidly as desired) to its upper position of rest. *Always raise the ejector arm in this manner.*

(d) Select the records to be played. *All records for one loading must be of the same diameter (either ten or twelve inches), close to standard thickness and operable at the same speed (either 78 or 33⅓ R. P. M.).*

CAUTION—***Do not use thin flexible-type records for automatic operation.***

(e) Place the records, one at a time, on the turntable (see paragraph 1 under "Important Precautions"). The spindle should resume its normal height after each record is added. The turntable is fully loaded when the top surface of the uppermost record is nearly flush with the top of the spindle. (It should not be possible to slide off the top record without lifting its edge or depressing the spindle.)

(f) Lower the Record Ejector arm gently onto the spindle.

4. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle or, if preferred, either the *green Chromium* or the full volume (full tone) *Tungstone* needle. Transparent-faced (illustrated) records, however, should not be reproduced with *Tungstone* needles.

NOTE—With care, the orange Chromium needle should play 75, the green Chromium 100, and the Tungstone 100 to 150 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly) as damage to the record grooves would result.*

5. Place the pickup needle on the smooth outer rim of the record, near the first groove. Then move the Index Lever to the position (12 or 10) corresponding to the diameter (inches) of the records on the turntable. Be careful not to move the lever *beyond* the proper index hole. Push the index pin firmly into the hole.

CAUTION—***Never attempt to move the Index Lever from the Manual position when the pickup is on the rubber rest.***

6. Start the turntable by turning the Motor Switch clockwise; then set the Speed Shifter for the speed (78 or 33⅓ R. P. M.) corresponding to the records on the turntable.

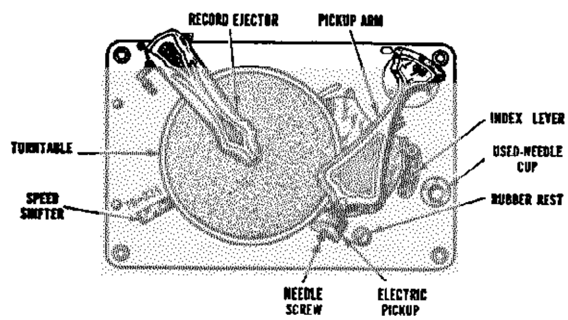


Figure 2

NOTE—The speed shifter should not be moved inward (from the 78 to the 33⅓ R. P. M. position) while the turntable is at rest.

7. Adjust the Record Volume Control to obtain the desired volume.

8. Close the cabinet doors to extinguish the compartment lamp and to render less prominent the mechanical noises incident to record playing and changing. If needle scratch reproduction (particularly noticeable with old records) is considered excessive, turn the *treble* Tone Control slightly counter-clockwise. For most faithful reproduction, however, both Tone Controls should be left in the positions which provide full illumination of the tone color indicator.

NOTE 1—When a record has been played, the ejector arm slides it off into the record pocket and the pickup moves to the outside of the next record. The records on the turntable are thus played consecutively until only one

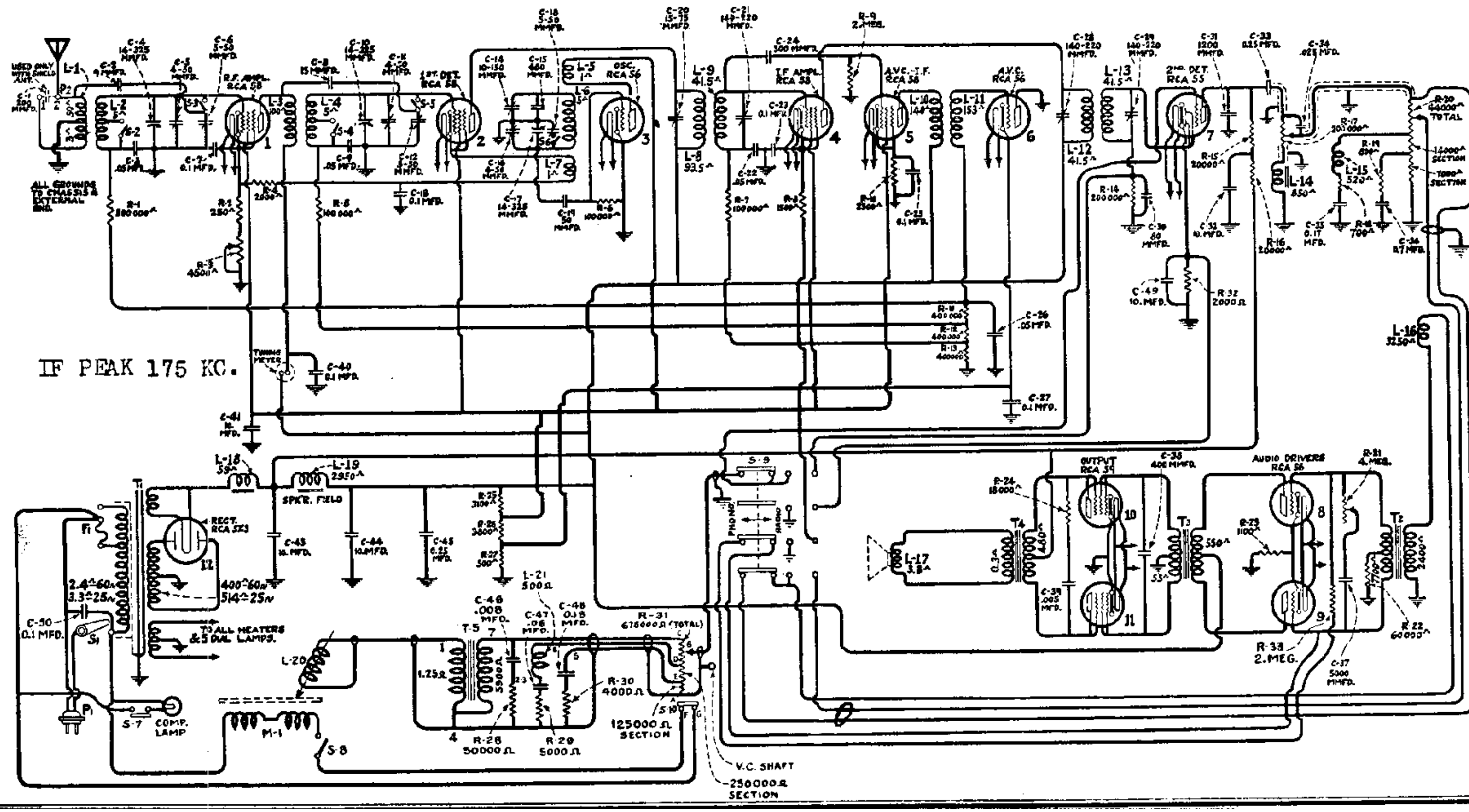
RCA-VICTOR CO., INC.

record remains on the turntable. This record will be played repeatedly until the motor is stopped by means of the Motor Switch.

NOTE 2—After a record has been played and changed, the needle is lowered automatically onto the smooth rim of the next record and is fed by gravity into the starting groove. After the instrument has been leveled with reference to the top of the cabinet, further slight compensation may be necessary, thus: (1) If the needle fails to enter the playing groove, the right-hand side of the instrument must be raised by inserting thin blocks under the front and rear legs on that side; or (2) If the needle slides over several grooves, thus failing to reproduce the beginning of the selection, the left-hand side of the instrument must be similarly raised.

9. To reject a record while playing, lift the pickup arm and move it to the extreme left. Hold the pickup lightly until it is moved by the mechanism.

10. Before reloading or when through operating, turn the Motor Switch to the "off" position, set the index lever at "Manual" and place the pickup on the rubber rest. Never leave the pickup resting on a record (or on the turntable) when not in use. Turn the power switch "off" and close the cabinet doors when discontinuing operation of the instrument.



MODEL Duo 380
Pickup Data

RCA-VICTOR CO., INC.

SERVICE DATA FOR MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure G), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

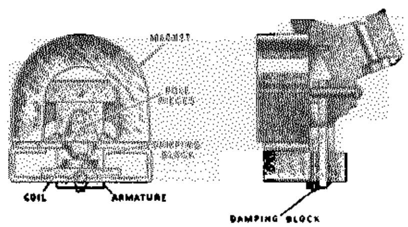


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

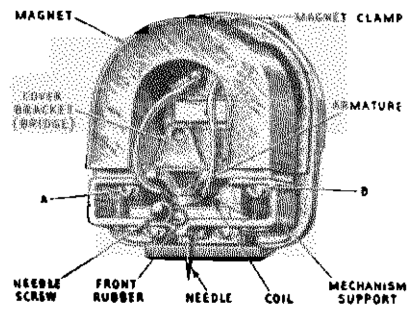


Figure G

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

Figure H

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL Duo 380
Chassis Wiring

RCA-VICTOR CO., INC.

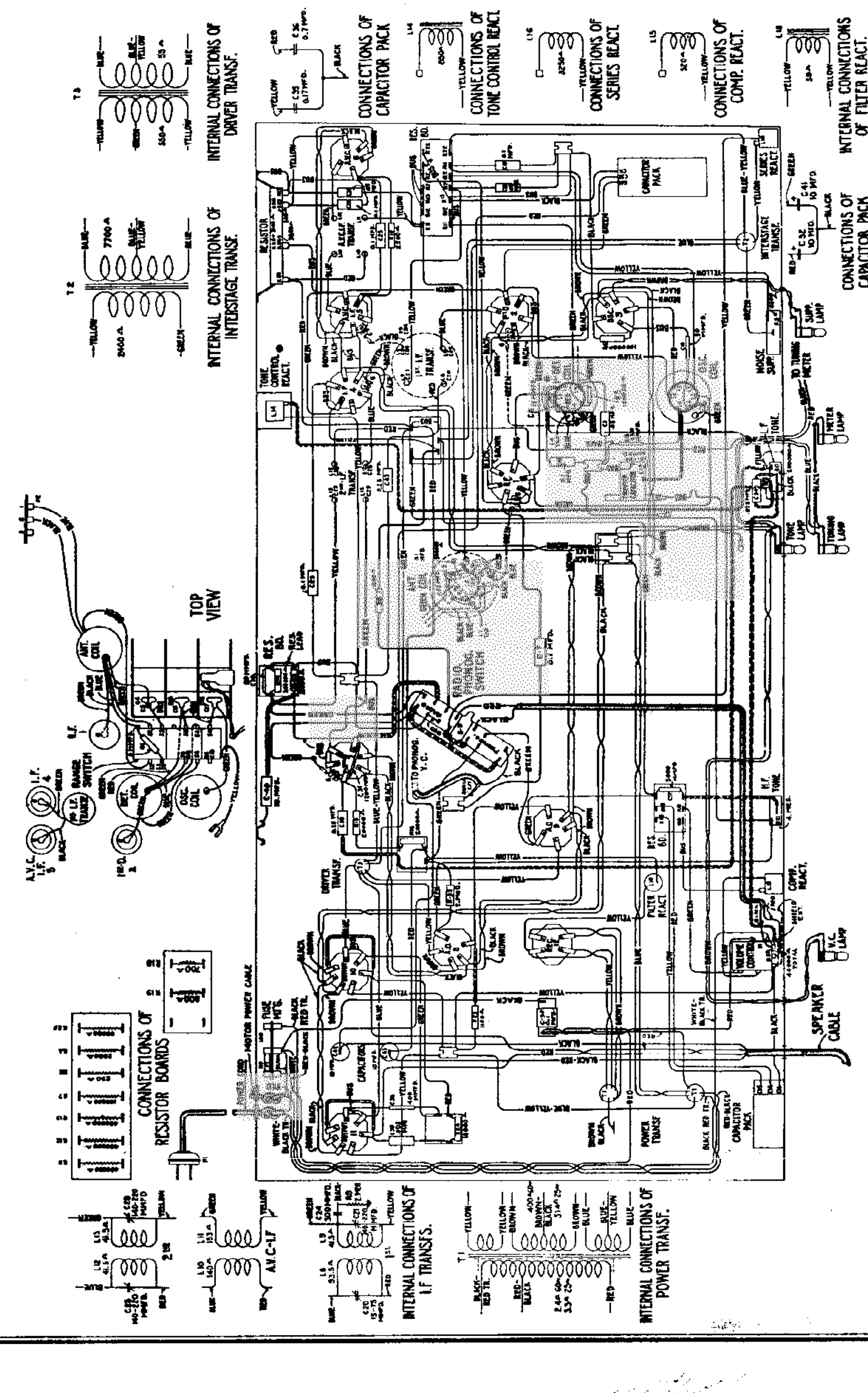


Figure C—Chassis Wiring Diagram

MODEL Duo 380
Parts List

RCA-VICTOR CO., INC.

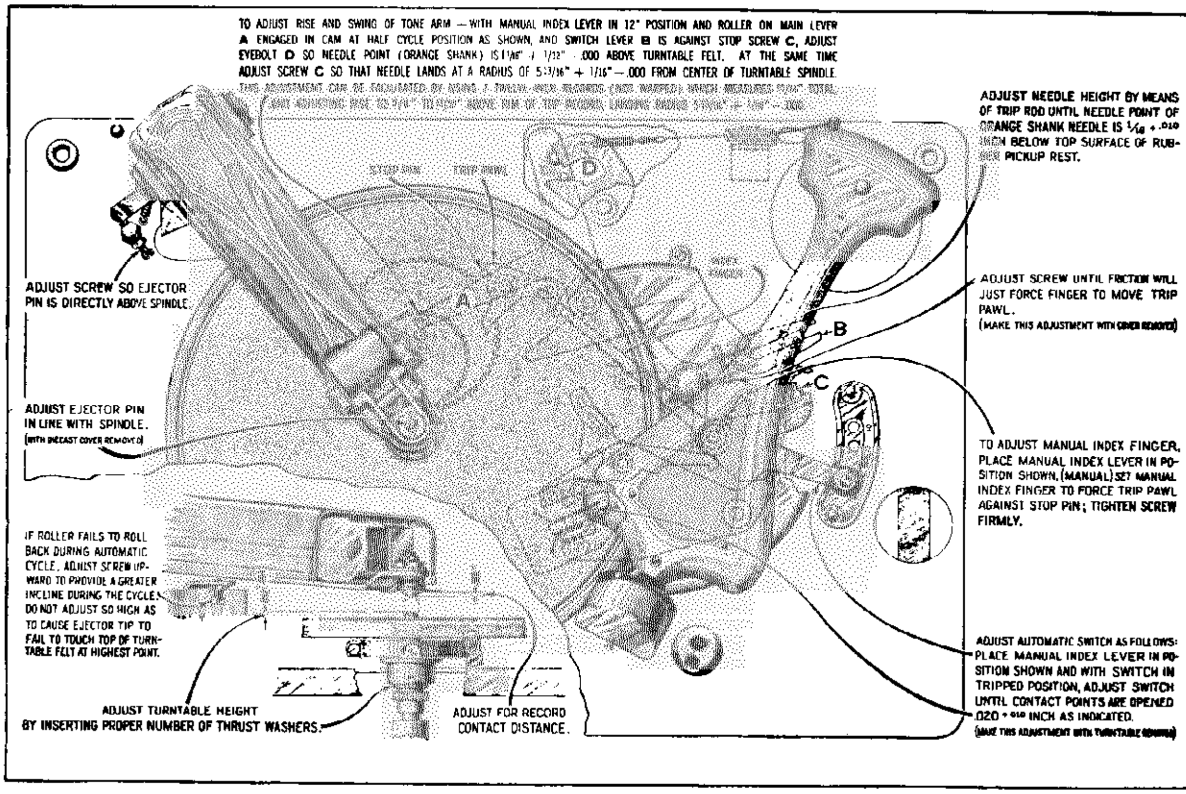


Figure E—Automatic Record Changer Adjustments

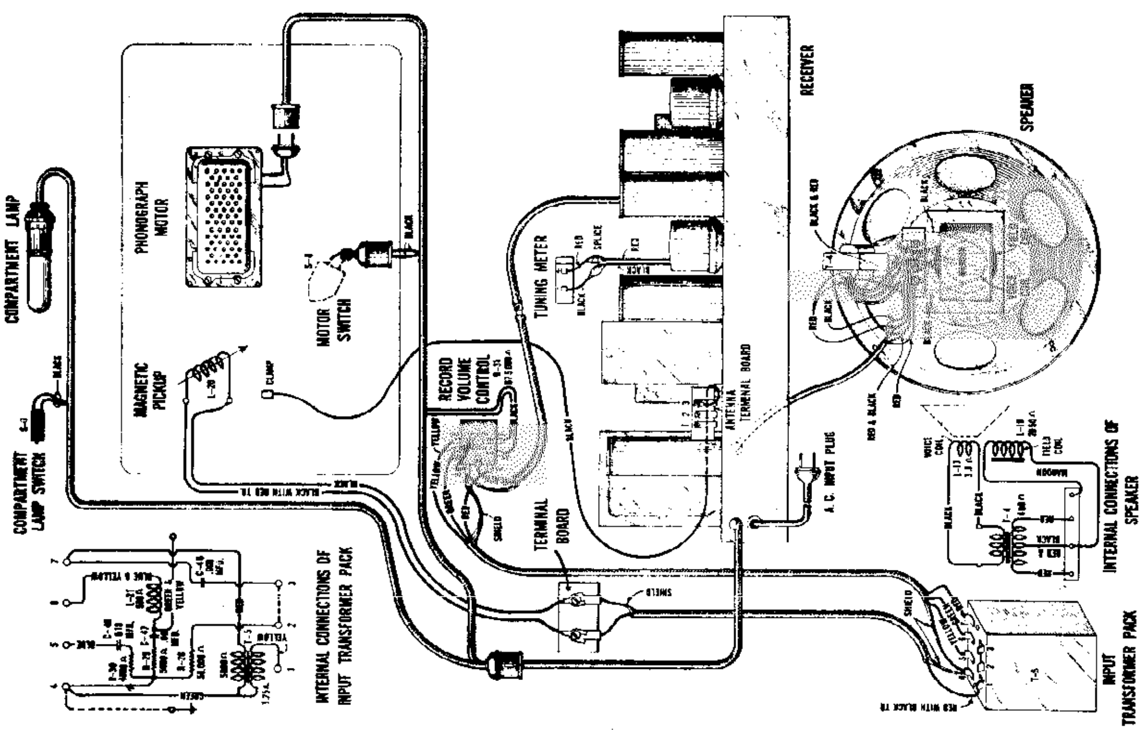


Figure D—Assembly Wiring Diagram

MODEL Duo 380
Assembly Wiring
Record Changer Data

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2730	Resistor—18,000 ohms—Carbon type—1 watt (R24)—Package of 5	$1.10
2747	Cap—Contact cap—Package of 5	.50
3024	Capacitor—9 mmfd. (C2)—Package of 2	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3085	Capacitor—400 mmfd. (C38)	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R6, R7)—Package of 5	1.00
3376	Mount—Fuse mount	.40
3435	Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3460	Capacitor—1,200 mmfd. (C31)	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt (R4, R32)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R19)—Package of 5	1.00
3528	Bracket—Noise suppressor or volume control lamp bracket	.18
3529	Socket—Noise suppressor or volume control lamp socket	.32
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency tone control lamp socket	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil (C3)	.34
3558	Capacitor—50 mmfd. (C19)	.36
3564	Bracket—Station selector dial lamp—Mounting bracket	.25
3565	Socket—Station selector dial lamp socket	.50
3597	Capacitor—0.25 mfd. (C33, C45)	.40
3640	Capacitor—0.05 mfd. (C9, C22, C26)	.25
3641	Capacitor—0.1 mfd. (C7, C13, C23, C25, C27)	.35
3643	Capacitor—0.005 mfd. (C39)	.25
3652	Screw—No. 10-32-¼ set screw for bracket and bushing assembly—Package of 10	.32
3719	Socket—7-contact Radiotron socket	.30
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.30
3747	Capacitor—15 mmfd. (C8)	.36
3749	Capacitor—0.1 mfd. (C40)	.30
3765	Capacitor—0.025 mfd. (C34)	.34
3774	Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms (R25, R26, R27)	.80
3797	Reactor—Volume control compensating reactor (L15)	.64
3798	Resistor—700 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3799	Capacitor—80 mmfd. (C30)	.70
3883	Fuse—2-ampere (F1)—Package of 5	.40
4035	Switch—Radio-Phonograph switch (S9)	2.10
4036	Shield—Low or high frequency tone control light shield	.30
4037	Shield—Antenna, detector or oscillator shield	.55
4038	Shield—Radiotron shield	.30
4039	Shield—Radiotron shield—Second detector shield	.30
4040	Shield—Radiotron tube shield top	.25
4041	Cover—Fuse cover	.25
4042	Reactor—Volume control series reactor (L16)	1.20
4046	Resistor—2-megohm—Carbon type—½ watt (R33)—Package of 5	1.00
4129	Bracket—Bracket and bushing assembly for radio-phonograph switch shaft—Located on receiver chassis	.28
4130	Shield—R. F. Radiotron shield	.30
5817	Resistor—20,000 ohms—Carbon type—3 watt (R15, R16)	.25
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5	1.00
6192	Spring—3-gang tuning condenser drive cord tension spring—Package of 10	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
6277	Capacitor—0.1 mfd.—Located on rectifier socket shield (C50)	.35
6280	Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt (R23)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R22)—Package of 5	$1.00
6298	Cord—3-gang tuning condenser drive cord—Package of 5	.60
6300	Socket—4-contact Radiotron socket	.35
6312	Capacitor—650 mmfd. (C15)—Package of 5	1.50
6316	Resistor—2,500 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
6437	Coil—Oscillator coil (L5, L6, L7)	1.24
6447	Volume control (R20, S1)	1.92
6448	Tone control—Low frequency (R17)	1.04
6449	Tone control—High frequency (R21)	1.06
6450	Rheostat—Noise suppressor rheostat (R3)	1.24
6512	Capacitor—0.005 mfd. (C37)	.28
6537	Switch—Range switch	1.30
6539	Coil—Detector coil (L3, L4)	1.44
6541	Dial—Tuning condenser dial and scale	.75
6561	Coil—Antenna coil (L1, L2, R1, C3)	1.65
6562	Transformer—Audio driver transformer (T3)	3.04
6564	Transformer—First intermediate frequency transformer (L8, L9, C20, C21, C24)	2.30
6565	Transformer—Second intermediate frequency transformer (L12, L13, C28, C29)	2.10
6566	Transformer—Third intermediate frequency transformer (L10, L11)	1.72
6567	Capacitor pack—Comprising one 0.17 mfd., and one 0.7 mfd. capacitors (C35, C36)	.95
6568	Transformer—Interstage audio transformer (T2)	3.10
6571	Capacitor—10 mfd. (C43, C44)	1.20
6572	Reactor—Tone control reactor (L14)	.90
6574	Capacitor pack—Comprising two 10.0 mfd. capacitors (C32, C41)	1.80
6578	Reactor—Filter reactor (L18)	3.22
6797	Capacitor—10.0 mfd. (C49)	1.04
6847	Shield—Rectifier socket shield and capacitor	.65
7062	Capacitor—Adjustable capacitor (C14)	.50
7439	Drum—Dial drum with set screw and three dial mounting nuts	.35
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
7700	Condenser—3-gang variable tuning condenser (C4, C5, C6, C10, C11, C12, C16, C17, C18, S2, S3, S4, S5, S6)	7.44
9468	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	7.75
9469	Transformer—Power transformer—105-125 volts—25-40 cycles	11.75
	CABLE ASSEMBLIES	
6793	Cable—2-conductor shielded—From radio volume control to Radio-Phonograph switch	.30
6794	Cable—Single conductor shielded—From Radio-Phonograph switch to Phonograph volume control (R31)	.38
6795	Cable—Phonograph motor cable—3-conductor with female section of connector plug	1.10
6796	Cable—2-conductor—Compartment lamp cable	.80
6798	Cable—Compartment lamp and switch cable	2.85
6848	Cable—Tapped cable with two connectors—From Phonograph Motor connector to motor starting switch plug and Phonograph volume control	2.12
6849	Cable—Single-conductor shielded cable with male section of connector—From Phonograph volume control to receiver chassis	.38
6850	Cable—Single-conductor shielded cable—From input transformer to terminal board	.50
	MOTOR BOARD ASSEMBLIES	
2893	Spring—Trip lever latch tension spring—Package of 10	.30
2917	Washer—Spring washer, "U" type—Package of 10	.25
3654	Roller—Guide roller assembly—Comprising bracket roller and guide pin	.34

MODEL Duo 380
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS (Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
3666	Spring—Cable lever tension spring—Package of 10	$0.44
3670	Finger—Friction finger	.32
3672	Pin—Manual index lever pin	.42
3673	Screw—Manual index lever adjustment screw and nut—Package of 5	.20
3676	Spring—Cam and gear pawl carrier tension spring—Package of 10	.52
3677	Lever—Cable lever assembly	.40
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4060	Escutcheon—Manual—12-10	.28
4061	Spring—Main spring	.38
4124	Plate—Actuating plate assembly	.50
4127	Spring—Actuating plate spring—Package of 10	.24
6502	Cam—Cam and gear assembly	1.18
6503	Pawl—Trip pawl assembly	.40
6806	Lever—Manual index lever—Less pin	.55
6807	Lever—Trip lever assembly	1.16
6808	Clutch—Trip lever friction clutch	.30
6809	Finger—Manual index finger assembly	.25
6810	Lever—Main spring lever	.44
6846	Lever—Main lever and link assembly	1.45
7710	Cover—Metal cover for trip lever and friction finger assemblies	.28
	MOTOR ASSEMBLIES	
3777	Motor mounting spring washers and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs	.62
9011	Motor—Motor complete—105-125 volts—60 cycles	19.72
9012	Motor—Motor complete—105-125 volts—25 cycles	24.16
9013	Motor—Motor complete—105-125 volts—40 cycles	24.16
9014	Motor—Motor complete—105-125 volts—50 cycles	19.72
	EJECT ARM ASSEMBLIES	
3655	Retainer—Ball retainer with three ball bearings	.45
3656	Bearing—Ejector tip bearing	.48
3657	Tip—Ejector tip	.30
3658	Ball—Ball bearing—Package of 20	.30
3662	Plate—Ejector plate—Package of 5	.95
3665	Screw—Eject arm horizontal adjustment screw and nut—Package of 5	.25
3729	Roller—Counter balance roller—Located inside of eject arm	.45
3930	Cushion—Counter balance cushion and bracket—Located inside of eject arm	.18
4054	Bracket—Eject arm bracket assembly	1.35
4055	Post—Vertical adjustment post—Located on eject arm	.30
4056	Yoke—Eject arm yoke assembly	1.04
4057	Shaft and collar—For eject arm	.24
4058	Collar—Eject arm shaft collar	.18
4067	Spring—Eject arm bracket spring—Package of 10	.30
4125	Spring—Eject arm horizontal action tension spring—60 cycle operation—Package of 10	.42
4126	Spring—Eject arm horizontal action tension spring—For 25 cycle operation—Package of 10	.60
7708	Arm—Eject arm complete	7.74
7709	Cover—Eject arm cover	1.38
	SWITCH ASSEMBLIES	
3322	Switch—Motor switch (S8)	.75
6805	Switch assembly—Automatic switch complete	1.90
10174	Springs—Automatic brake springs—Package of 4	.50
10184	Plate—Automatic brake latch plate—Package of 5	.40

Stock No.	DESCRIPTION	List Price
	PICKUP AND ARM ASSEMBLIES	
3388	Screw—Pickup needle holding screw—Package of 10	$0.60
3728	Coil—Pickup coil (L20)	.50
3737	Damper—Package of 5	.65
4062	Rod—Automatic brake trip rod	.20
4063	Screw—Pickup mounting screw assembly—Comprising one screw, one nut, and one washer—Package of 10	.54
4064	Cable—Pickup arm cable—Package of 5	1.00
4128	Armature—Pickup armature	.96
6811	Pickup—Pickup unit complete	4.30
6812	Cover—Pickup cover	.34
6813	Back—Pickup housing back	.68
6814	Cover—Pickup back cover	.34
6815	Escutcheon—Pickup arm escutcheon with mounting rivets	.64
7707	Arm—Pickup arm complete, less escutcheon, pickup, pickup mounting screw, nut and washer	4.12
	TURNTABLE ASSEMBLIES	
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3344	Cover—Grease retainer cover—Package of 2	.70
3347	Spring—Speed shifter lever spring—Package of 2	.30
4065	Bushing—Speed shifter lever bushing—Package of 4	.82
6816	Ring—Clamp ring assembly—Comprising spring, latch lever, and stud	.42
6817	Sleeve—Sleeve complete with ball race	2.25
6818	Lever—Speed shifter lever	.38
7711	Turntable—Complete	5.10
	MISCELLANEOUS PARTS	
3638	Scale—Tuning meter scale—Package of 5	.60
3763	Motor mounting board spring, washer and stud assembly—Comprising one bolt, two "C" washers, one bottom spring, one top spring, two cup washers, one shakeproof washer, and one nut	.42
3780	Shutter—Noise suppressor shutter	.30
3781	Shutter—Volume control shutter	.30
4043	Switch—Operating switch (S7)	.80
4044	Socket—Compartment lamp socket	1.28
4045	Shade—Compartment lamp shade	.50
4047	Receptacle—Needle receptacle	.55
4066	Rest—Pickup rest	.14
4080	Knob—Range switch knob—Package of 5	.75
4081	Knob—Station selector, volume control or noise suppressor knob—Package of 5	1.08
4082	Knob—High or low frequency tone control, radio-phonograph switch or phonograph volume control knob—Package of 5	1.08
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency escutcheon and color screen	.92
6461	Meter—Tuning meter	2.14
6547	Bezel—Tuning meter bezel	.45
6799	Volume control—Phonograph volume control (R31, S10)	3.00
6800	Transformer—Phonograph input transformer—Comprising one transformer, one .008 mfd., one 0.06 mfd., and one 0.18 mfd. capacitors, one 50,000 ohm, one 4,000 ohm, and one 5,000 ohm resistors, and one choke coil (R28, R29, R30, C46, C47, C48, L21, T5)	6.30
6801	Shaft—Flexible drive shaft for Radio-Phonograph switch	1.15
6802	Bearing and plate assembly—For Radio-Phonograph switch shaft—Located on cabinet	.34
	REPRODUCER ASSEMBLIES	
4131	Mounting assembly for reproducer—Comprising two plates, two bolts, two nuts, and two lockwashers	.44
6569	Transformer—Output transformer (T4)	1.95
6618	Cable—4-conductor—Reproducer cable	.54
8969	Cone—Reproducer cone (L17)—Package of 5	6.35
9031	Coil—Field coil magnet and cone support (L19)	4.90
9472	Reproducer complete	8.50

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption (60 Cycle)..................175 Watts
Type and Number of Radiotrons......4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range.540 K.C.-1500 K.C.—1400 K.C.-2800 K.C.
Undistorted Output..........................10.0 Watts

This combination home recording instrument utilizes the new perfected automatic record changing mechanism and the twelve-tube Deluxe Super-Heterodyne receiver. Excellent fidelity on both radio and record reproduction, together with facilities for recording either programs or voice are inherent features of this instrument. Other features include double tuning range (540 K. C.–1500 K. C. and 1400 K. C.–2800 K. C.), high and low frequency tone control, compensated volume control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

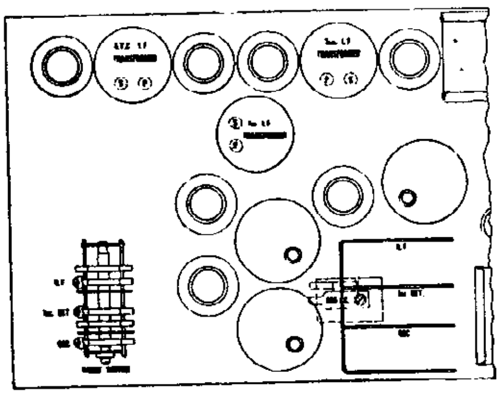


Figure D—Location of Line-Up Capacitors

Figure A shows the schematic circuit, Figure B the chassis wiring, and Figure C the assembly wiring diagram. The Radiotron socket voltages, the line-up procedure, special service hints and the replacement parts are given on the following pages.

R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors:

(a) Procure an R. F. Oscillator, such as Stock No. 9050, giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1250 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure D, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

(e) Refer to Figure D. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

When these adjustments are made, the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to repeat the R. F. and oscillator line-up capacitor adjustments after completing alignment of the I. F. system. The correct method of doing this is given in the preceding section.

Antenna Connections—It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these are used for the normal antenna and ground connections, while the third one is for use in connection with a shielded antenna system. The tap eliminates the need for the transformer usually used for coupling the shielded line to the radio receiver.

Stock No. 7717 shield kit, which comprises a lightning arrester, transformer assembly, a 200 mmfd. capacitor, and 100 feet of shielded wire, is recommended. When such an antenna system is used, it is necessary to connect the 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the Stock No. 7717 Kit.

Automatic Record Changer—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure G. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

MODEL Duo 380-HR
Schematic

RCA-VICTOR CO., INC.

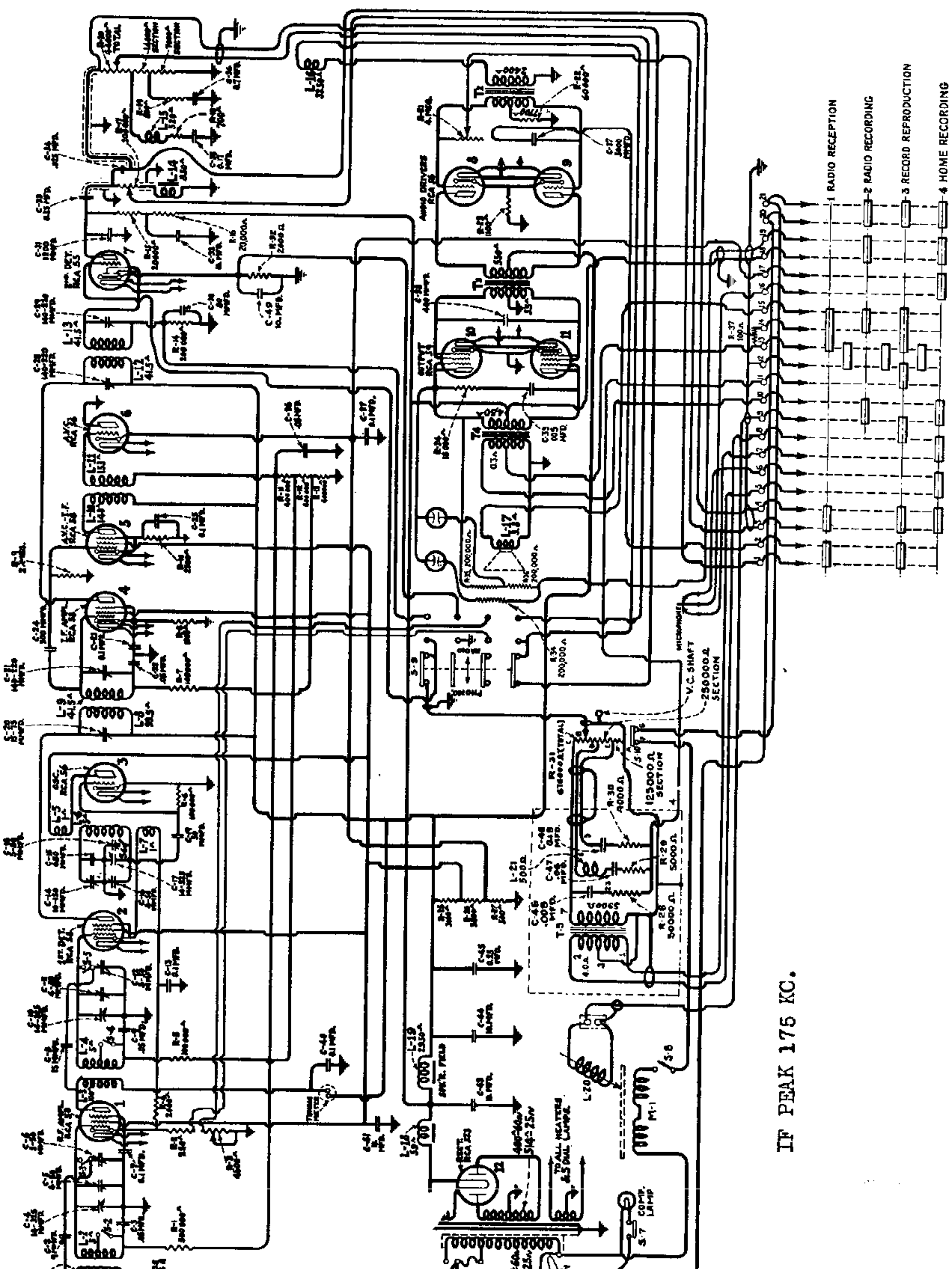


Figure A—Schematic Circuit Diagram

MODEL Duo 380-HR
Chassis Wiring

RCA-VICTOR CO., INC.

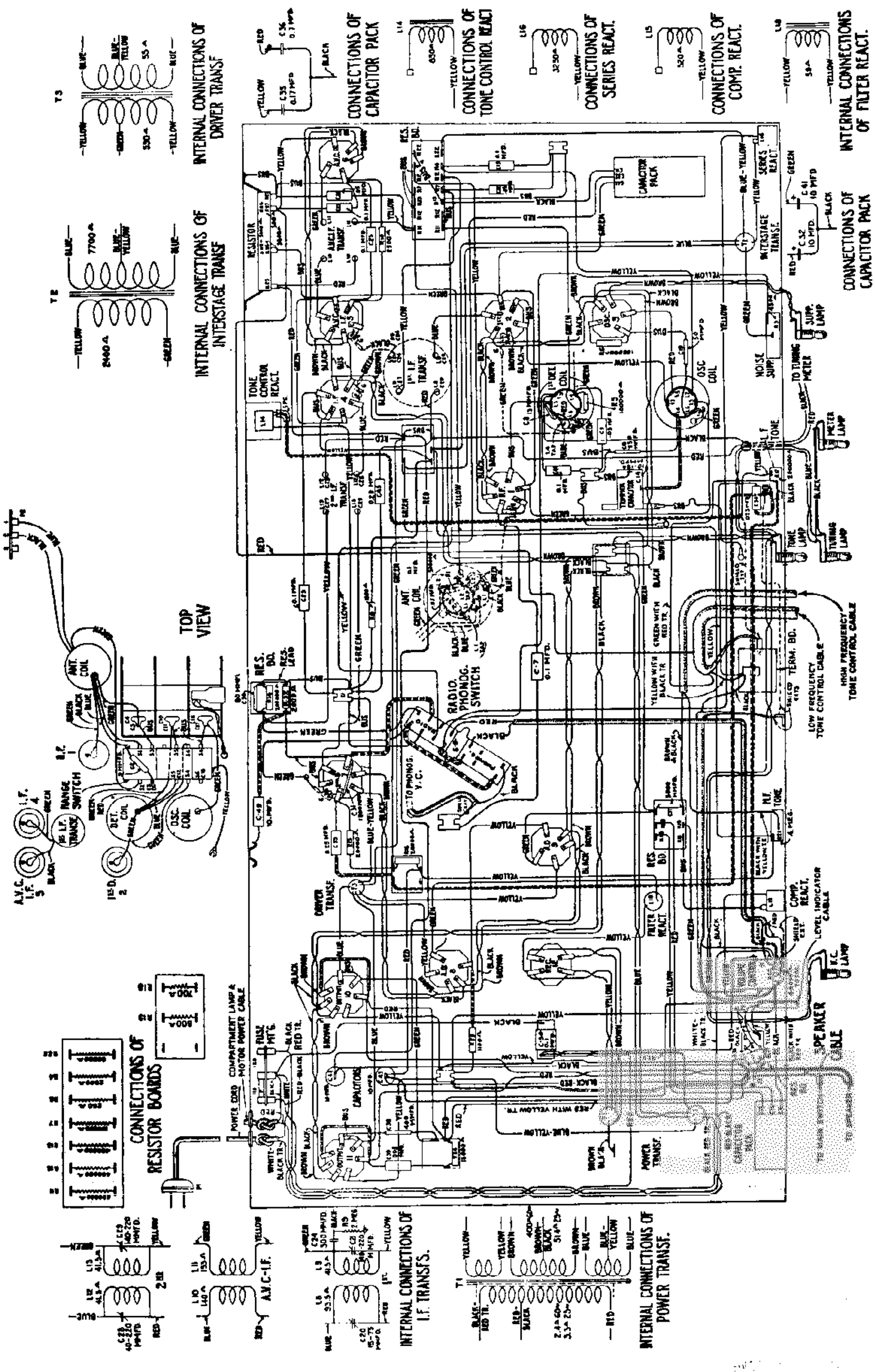
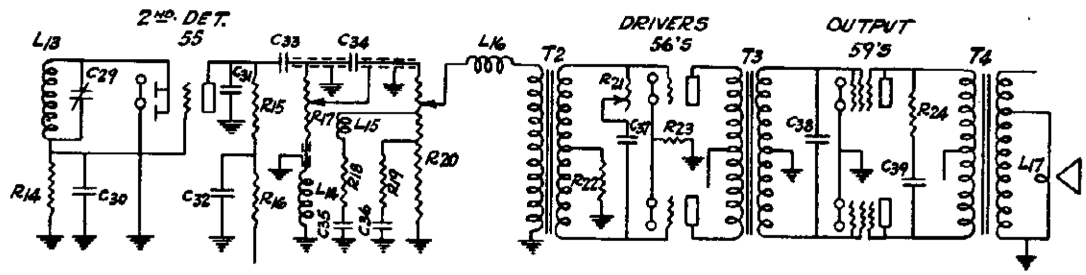


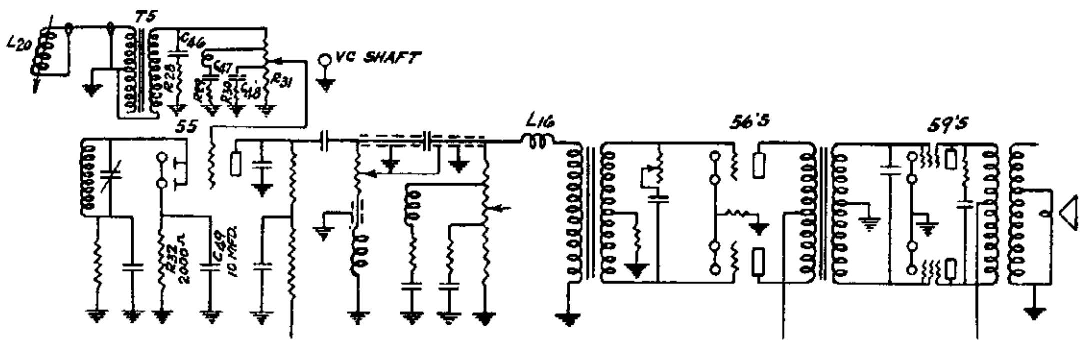
Figure B—Chassis Wiring Diagram

MODEL Duo 380-HR
A-F. Circuits

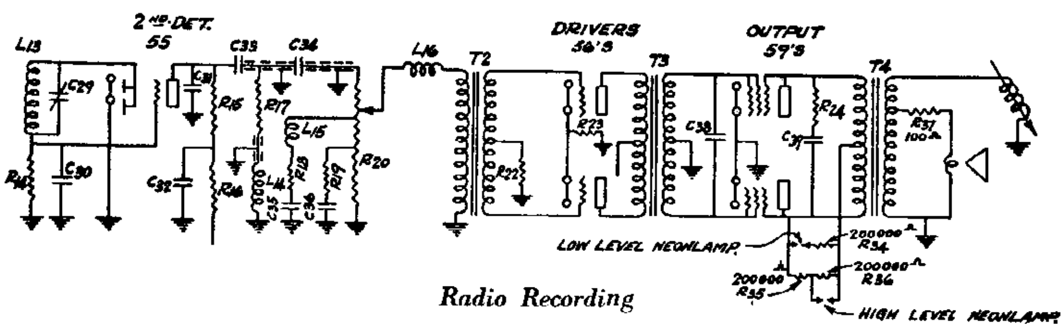
RCA-VICTOR CO., INC.



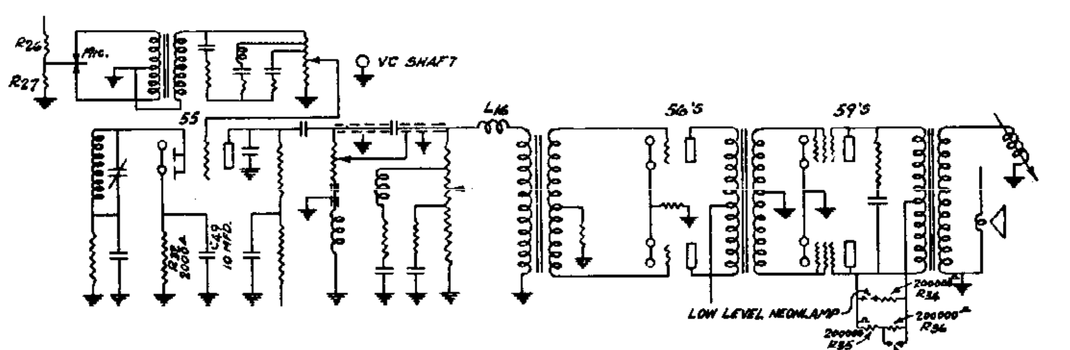
Radio Reproduction



Record Reproduction



Radio Recording



Home Recording

RCA-VICTOR CO., INC.

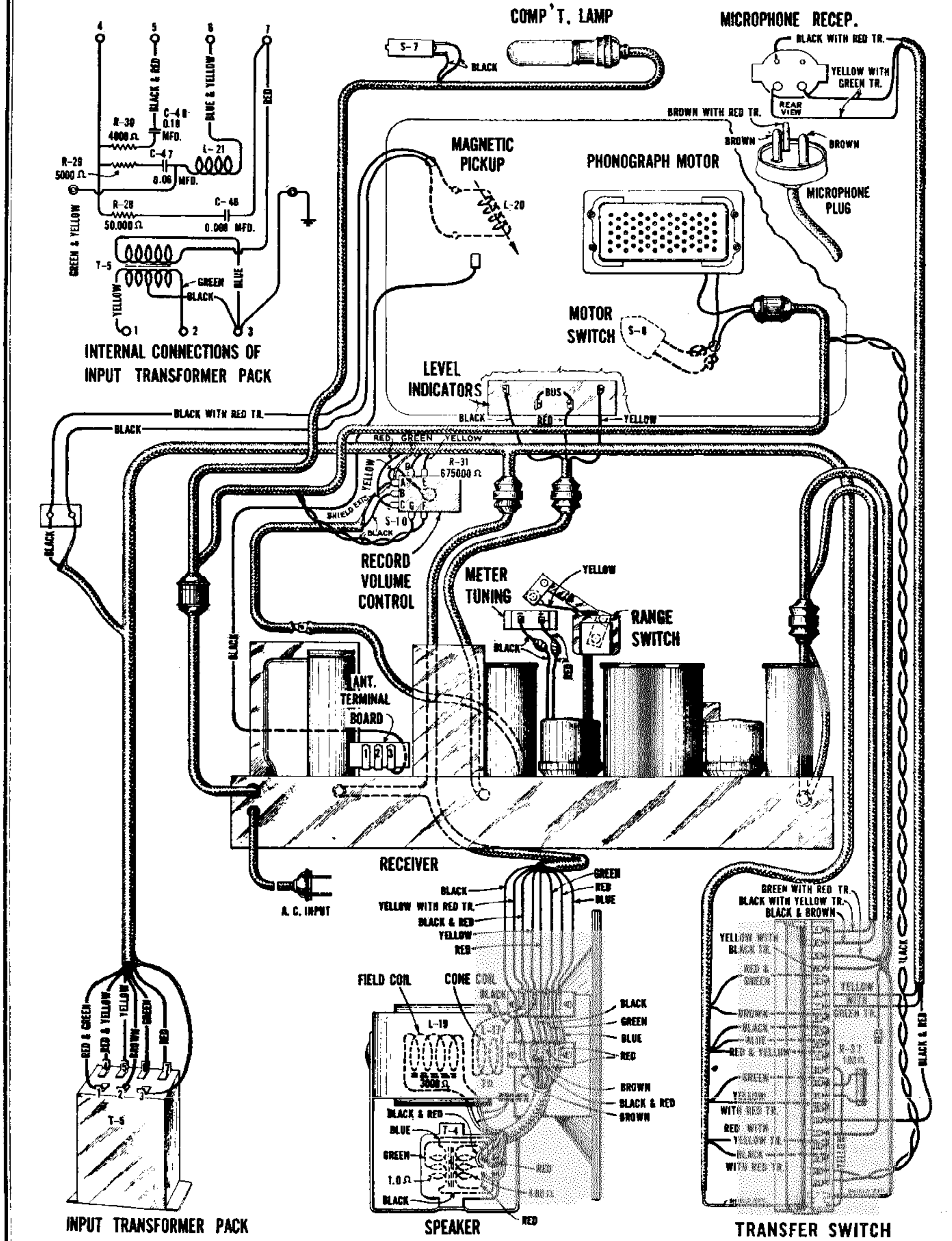


Figure C—Assembly Wiring Diagram

RCA-VICTOR CO., INC.

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure *J*), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

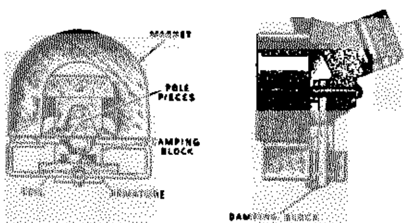


Figure I

(d) Remove screws A and B, Figure *J*, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure *J*), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

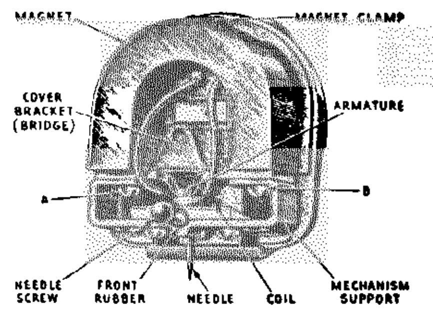


Figure J

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure *K*, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

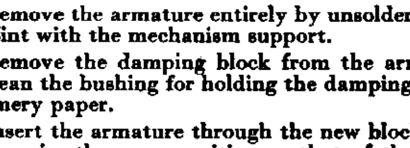


Figure K

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

RCA-VICTOR CO., INC.

OPERATION—PHONOGRAPH

Automatic Operation

Important Precautions—The following precautions must be observed during operation:

1. In loading the turntable, make certain that the first record inserted (last to be played) is flat—that is, essentially free from warpage.

2. Before starting the turntable, make certain that the reject pocket (at the left of the phonograph compartment) is either empty or sufficiently clear to permit proper disposal of records by the automatic mechanism.

3. Never restrain by force the normal motion of any part of the automatic mechanism while it is changing records.

Procedure—The phonograph operating controls are located on the front panel and in the playing compartment as shown in Figures 1 and 2. Proceed as follows:

1. Set the Transfer Switch for "Record Reproduction."

2. Apply power by turning the Radio Volume Control clockwise from the "off" position. Set the two Tone Controls for full-range reproduction (see paragraph 7 under "Operation—Radio").

3. With the Motor Switch in the "off" position (Record Volume Control fully counter-clockwise), load the turntable with records, as follows:

(a) Set the Index Lever at "Manual." *Always do this before loading or unloading records.*

(b) Place the electric pickup on the rubber rest.

(c) Raise the Record Ejector arm (*very slowly*, at first, until the internal weight has rolled to the rear of the arm, then as rapidly as desired) to its upper position of rest. *Always raise the ejector arm in this manner.*

(d) Select the records to be played. *All records for one loading must be of the same diameter (either ten or twelve inches), close to standard thickness and operable at the same speed (either 78 or 33⅓ R. P. M.).*

CAUTION—Do not use thin flexible-type records for automatic operation.

(e) Place the records, one at a time, on the turntable (see paragraph 1 under "Important Precautions"). The spindle should resume its normal height after each record is added. The turntable is fully loaded when the top surface of the uppermost record is nearly flush with the top of the spindle. (It should not be possible to slide off the top record without lifting its edge or depressing the spindle.)

(f) Lower the Record Ejector arm gently onto the spindle.

4. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle or, if preferred, either the *green Chromium* or the full volume (full tone) *Tungstone* needle. Transparent-faced (illustrated) records, however, should not be reproduced with *Tungstone* needles.

NOTE—With care, the orange Chromium needle should play 75, the green Chromium 100, and the Tungstone 100 to 150 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly) as damage to the record grooves would result.*

5. Place the pickup needle on the smooth outer rim of the record, near the first groove. Then move the Index Lever to the position (12 or 10) corresponding to the diameter (inches) of the records on the turntable. Be careful not to move the lever *beyond* the proper index hole. Push the index pin firmly into the hole.

CAUTION—Never attempt to move the Index Lever from the Manual position when the pickup is on the rubber rest.

6. Start the turntable by turning the Motor Switch clockwise; then set the Speed Shifter for the speed (78 or 33⅓ R. P. M.) corresponding to the records on the turntable.

NOTE—The speed shifter should not be moved inward (from the 78 to the 33⅓ R. P. M. position) while the turntable is at rest.

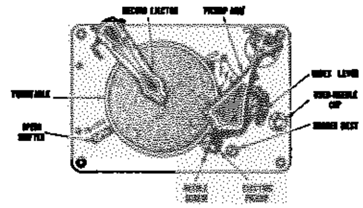


Figure 2

7. Adjust the Record Volume Control to obtain the desired volume.

8. Close the cabinet doors to extinguish the compartment lamp and to render less prominent the mechanical noises incident to record playing and changing. If needle scratch reproduction (particularly noticeable with old records) is considered excessive, turn the *treble* Tone Control slightly counter-clockwise. For most faithful reproduction, however, both Tone Controls should be left in the positions which provide full illumination of the tone color indicator.

NOTE 1—When a record has been played, the ejector arm slides it off into the record pocket and the pickup moves to the outside of the next record. The records on the turntable are thus played consecutively until only one record remains on the turntable. This record will be played repeatedly until the motor is stopped by means of the Motor Switch.

NOTE 2—After a record has been played and changed, the needle is lowered automatically onto the smooth rim of the next record and is fed by gravity into the starting groove. After the instrument has been leveled with reference to the top of the cabinet, further slight compensation may be necessary, thus: (1) If the needle fails to enter the playing groove, the right-hand side of the instrument must be raised by inserting thin blocks under the front and rear legs on that side; or (2) If the needle slides over several grooves, thus failing to reproduce the beginning of the selection, the left-hand side of the instrument must be similarly raised.

9. To reject a record while playing, lift the pickup arm and move it to the extreme left. Hold the pickup lightly until it is moved by the mechanism.

10. Before reloading or when through operating, turn the Motor Switch to the "off" position, set the Index Lever at "Manual" and place the pickup on the rubber rest. Never leave the pickup resting on a record (or on the turntable) when not in use. Turn the power switch "off" and close the cabinet doors when discontinuing operation of the instrument.

Manual Operation

Records may be played individually as follows:

1. Set the Transfer Switch for "Record Reproduction" and apply the power with the Radio Volume Control as directed for automatic operation. Adjust the two Tone Controls for full-range reproduction.

2. Make sure that the Index Lever is at "Manual," that the electric pickup is on its rubber rest, and that the Motor Switch is in the "off" position.

3. Raise the Record Ejector arm to the upper rest position (see paragraph 3 (c) under "Automatic Operation").

4. Place the record on the turntable and insert a needle in the pickup. For needle information, see paragraph 4 under "Automatic Operation."

NOTE—Ordinary steel needles (full volume or full tone) can be used with standard (78 R. P. M.) records, provided a new needle is inserted for each selection. Do not use *Tungstone* needles with either thin flexible type or transparent-faced (illustrated) records.

5. Start the turntable by turning the Motor Switch clockwise, then set the Speed Shifter for the speed corresponding to the record on the turntable. Lower the needle gently onto the smooth outer rim of the record.

6. Adjust the Record Volume Control and close the cabinet doors (see paragraph 8 under "Automatic Operation").

7. After the record has been played, stop the turntable by turning the Motor Switch to the "off" position (motor stops automatically at the end of any record having the *eccentric* final groove). Lift the electric pickup from the record and place it on the rubber rest.

8. When through operating, turn the power "off" and close the cabinet doors.

OPERATION—RECORDING

Recording Precautions

When using the home-recording facilities of this instrument, the following precautions must be observed:

1. Always place a flat (unwarped) 10- or 12-inch record of the commercial variety beneath the home-recording record when recording.

2. To prevent surface slippage, always record with the felt recording pad inserted between the home-recording and standard records. This pad need not be removed for "playing-back" purposes but must never be left on the turntable when automatic operation is intended.

3. Use only the special *home-recording* needle (identified by its yellow shank and blunt-point) for both recording and reproducing. Such needles, however, must not be used for playing other than home-recorded records.

4. For *recording*, the needle pressure on the record must be increased by placing the recording weight on the electric pickup. This weight must be removed for *reproducing* either the home-recorded or any other record.

Radio Recording

To record radio programs, refer to Figures 1 and 2, and proceed as follows:

1. Tune the receiver for the desired radio program as described under "Operation—Radio." Make sure that the Index Lever is at "Manual," that the electric pickup is on its rubber rest, and that the Motor Switch is in the "off" position.

2. Raise the Record Ejector arm to its upper position of rest (see paragraph 3 (c) under "Procedure—Automatic Operation—Phonograph").

3. Place a blank home-recording record on the turntable (see paragraphs 1 and 2 of preceding section "Recording Precautions") and lower the Record Ejector arm.

4. Insert a *home-recording* needle in the electric pickup and place the recording weight on the pickup head.

5. Set the Transfer Switch for "Radio Recording." In this position, the radio program should be heard at reduced volume.

6. Adjust the Radio Volume Control to obtain the correct recording volume as determined by observing the flashing of the two neon-lamp indicators located at the front of the playing compartment. The setting is correct when the left-hand lamp is at or near fixed illumination and the right-hand lamp is either "off" or flashing only at intervals. When both lamps are "off," the volume is too low and when both are flashing continuously, the volume is too high.

7. Start the turntable by turning the Motor Switch "on," then set the Speed Shifter for the desired turntable speed.

NOTE—For best results, always record at 78 R. P. M. If a record of longer duration is desired, recording may be done at 33⅓ R. P. M. Such records should be so marked, and must of course be reproduced at the same speed.

8. Place the needle in the outer groove of the blank record and recording will proceed automatically. During this process, however, watch the volume indicators and adjust the Radio Volume Control (if necessary) to compensate for changes in the program level.

9. Recording may be interrupted at any time by simply lifting the pickup from the record. It may be resumed on the same record if desired, provided care is taken to enter the needle in a *new* groove—that is, one slightly nearer the center than the last recorded groove.

10. Upon completing a recording, lift the electric pickup from the record, turn the Motor Switch "off" and place the pickup on the rubber rest.

Microphone Recording

To record voice or musical entertainment originating in the home, the procedure is essentially the same as for the recording of radio programs except that the microphone is employed. Remove this unit from the cabinet (leaving the cord connected) and place it in an *upright* position on a table or any other horizontal surface conveniently near the sound source.

For best results, special attention must be given to the location and arrangement of the person or persons presenting the program. All sounds to be recorded must be directed toward the *front* of the microphone, never toward the *rear* which is designated by the word "BACK" cast on the pedestal. Further, the microphone should be located at a height approximately the same distance from the floor as the sound source. Such conditions may be fulfilled easily in the case of the average adult (speaker or singer) by placing the microphone on the top of the cabinet.

When recording speech, the microphone should be spaced from three to six inches from the speaker's mouth; the speaker should talk in a normal even tone and enunciate clearly. The microphone should be at a somewhat greater distance (one to two feet) when recording musical vocal selections, the proper spacing naturally being dependent upon the number of singers present. For instrumental music, the most desirable distance between the artists and the microphone will depend upon the type (wind or string), as well as the number of instruments and may be from three to ten feet. In the case of a small

RCA-VICTOR CO., INC.

orchestra, it would be preferable to group the members in a semi-circle with the stringed instruments nearest the microphone and the horns at the rear.

Adjustment of Recording Volume—Before the actual recording is undertaken, it will be advisable to test for the proper volume as follows:

1. Set the Transfer Switch for "Home Recording."

2. Turn the power "on" (Radio Volume Control rotated slightly clockwise). As for radio recording, make certain that the Index Lever is at "Manual," that the electric pickup is on its rubber rest and that the Motor Switch is "off."

3. Raise the Record Ejector arm and load the turntable with a blank home-recording record, first inserting a standard record and the felt recording pad, then lower the Record Ejector arm.

4. Set the Record Volume Control fully clockwise (turntable now should be rotating) and commence the program which is to be recorded.

5. Regulate the distance between the sound source and the microphone, while observing the flashing action of the neon-lamp indicators at the front of the playing compartment, until both lamps are illuminated continuously or at approximately the same intervals.

6. Turn the Record Volume Control counter-clockwise until the right-hand lamp is either "off" or flashing infrequently; however, do not reduce the setting sufficiently to change the action of the left-hand lamp. The instrument is now properly adjusted and the test program may be discontinued while making final preparations for recording.

Procedure—After the recording volume is adjusted, leave the Record Volume Control setting intact permitting the turntable to remain in rotation, and proceed as follows:

1. Insert a *home-recording* needle in the electric pickup and place the recording weight on the pickup head.

2. Set the Speed-Shifter for the desired turntable speed (see note in paragraph 7 under "Radio Recording").

3. Place the needle in the outer groove of the blank record and commence without delay the program to be recorded.

4. When the recording is complete (see paragraph 9 under "Radio Recording"), lift the electric pickup from the record, turn the Motor Switch "off" and place the pickup on its rubber rest.

Reproduction of Home Recordings

Home-recorded records (either radio or microphone recordings) may be reproduced in the manner described for manual operation of standard records under "Operation—Phonograph." Such records, however, must not be employed with the automatic record changer and always must be reproduced with the special *home-recording* needle. Always make certain to remove the recording weight from the electric pickup when "playing-back" recordings.

GENERAL

Fuse—This instrument is protected by a fuse located at the rear of the chassis, under the metal cover marked "Caution: Remove Power Supply Before Removing Cover." If the fuse burns out, check the power supply connections and rating, and have all tubes tested by your dealer before installing a new fuse. This is a special fuse—obtain replacement fuses from your dealer—*do not use any substitute for this fuse.*

In districts where the line voltage is always below 115 (225 for 200–250 volt models), the fuse should be set in the "110" position ("213" position for 200–250 volt models). Always disconnect the power cord from the a-c outlet before removing the fuse cover.

Maintenance—With normal use and handling, trouble-free service is to be expected. The automatic phonograph mechanism and associated parts, however, should be kept clean and well-lubricated. To insure continued efficient operation, it is recommended that the entire instrument be thoroughly inspected and adjusted by an experienced service man once each year.

RADIOTRON SOCKET VOLTAGES (RADIO OPERATION)

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.-I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-5Z3 Rect.	990–495 R. M. S.			92 Total	5.0

RCA-VICTOR CO., INC.

MODEL 380-HR
Neon Lamp and
Switching Data
Record Changer Data

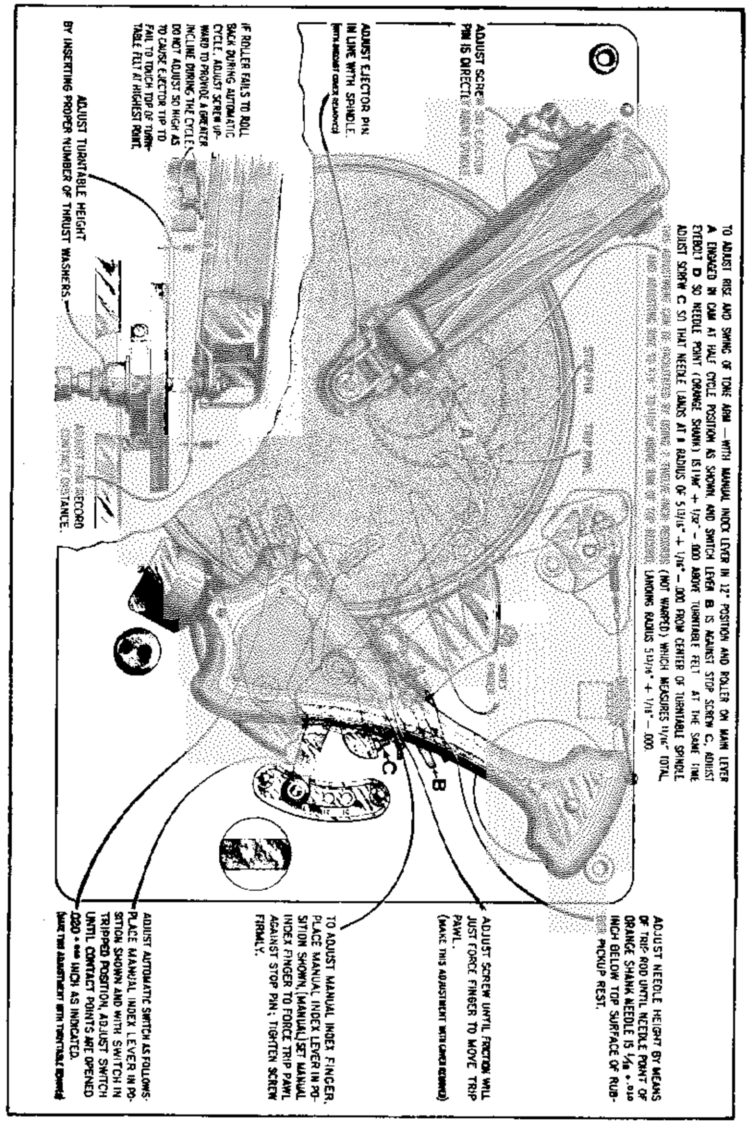


Figure H—Automatic Record Changer Adjustments

Testing Neon Level Indicating Lamps

Two Neon Level Indicating Lamps are provided so that a visual indication of the recording level may be obtained at all times. These lamps normally give long service without attention. However, if failure occurs, and all circuits have been checked and eliminated as possible source of failure, the lamps may be easily checked as indicated in the circuit shown in Figure E. The method for checking involves testing for lighting between certain voltages. The lamps must not light before 52 volts have been applied and must not require a voltage greater than 64 volts to cause them to light. Lamps requiring different voltages from these are defective and must not be used.

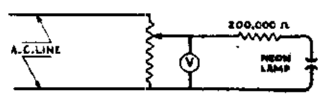


Figure E—Testing Circuit

Transfer Switch Mechanism

The transfer switch used in this model is a special four-position rotory switch located on the front panel and operated in conjunction with a two-position switch located in the chassis. The switches are coupled mechanically by means of a flexible shaft and operate as a single unit.

In event that any part of the switching system is removed, in order to replace or reconnect the assembly, the following procedure should be observed. Refer to Figure F.

(a) Set the two-position switch located in the chassis to its extreme clockwise position, and attach the transfer switch to front panel of the cabinet in proper position as shown. Set the transfer switch at position 1.

(b) Assemble the transfer switch end of the flexible shaft into the switch bracket. Place the "V" link loosely on end of shaft and tighten the pilot screw into its groove.

(c) Assemble the other end of the flexible shaft to the two-position switch (on chassis) so that one set screw points directly back, when facing the chassis from the rear, and the other to the left. Then tighten one set screw.

(d) Set the "V" link, at rear of large switch, so that the lower corner is approximately flush with the lower side of the switch. Tighten one set screw.

(e) Note the position of the pin as it approaches the "V" link when turning transfer switch clockwise toward position 2 and also when the pin approaches the "V" link when turning the transfer switch counter clockwise toward position 3 from position 4. In these positions the pin must contact the "V" at approximately the same points.

(f) Tighten all remaining set screws at each end of the shaft.

It will now be found that the transfer switch turns with maximum smoothness and the two-position chassis switch operates midway between positions 2 and 3 in either direction.

Audio Circuits

Figure G shows the schematic diagrams of the audio circuits that occur at each position of the transfer switch. A reference to these diagrams will enable the serviceman to quickly diagnose trouble in these circuits.

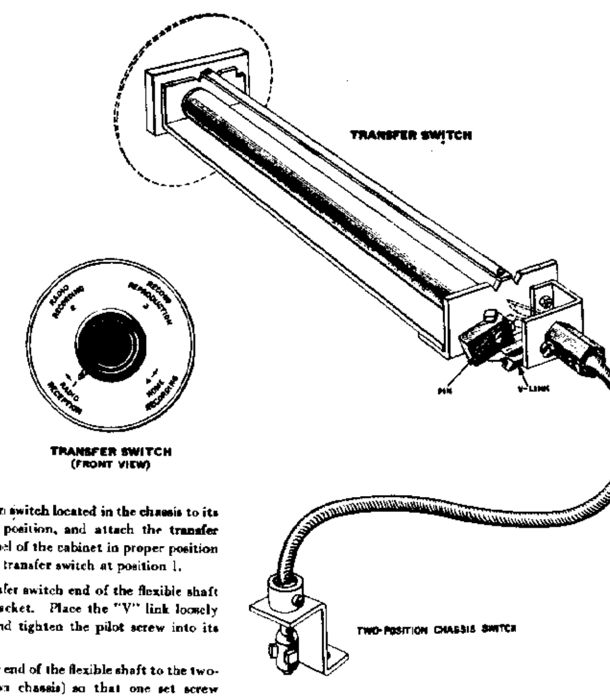


Figure F—Transfer Switch Mechanism

MODEL 380-HR
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2730	Resistor—18,000 ohms—Carbon type—1 watt (R24)—Package of 5	$1.10
2747	Cap—Contact cap—Package of 5	.50
3024	Capacitor 9 mmfd. (C2)—Package of 2	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3085	Capacitor—400 mmfd. (C38)	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R6, R7)—Package of 5	1.00
3376	Mount—Fuse mount	.40
3435	Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3460	Capacitor—1,200 mmfd. (C31)	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt (R4, R32)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R19)—Package of 5	1.00
3528	Bracket—Noise suppressor or volume control lamp bracket	.18
3529	Socket—Noise suppressor or volume control lamp socket	.32
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency tone control lamp socket	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil (C3)	.34
3558	Capacitor—50 mmfd. (C19)	.36
3564	Bracket—Station selector dial lamp—Mounting bracket	.25
3565	Socket—Station selector dial lamp socket	.50
3597	Capacitor 0.25 mfd. (C33, C45)	.40
3640	Capacitor—0.05 mfd. (C9, C22, C26)	.25
3641	Capacitor—0.1 mfd. (C7, C13, C23, C25, C27)	.35
3643	Capacitor—0.005 mfd. (C39)	.25
3652	Screw—No. 10-32-¼ set screw for bracket and bushing assembly—Package of 10	.32
3719	Socket—7-contact Radiotron socket	.30
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.30
3747	Capacitor—15 mmfd. (C8)	.36
3749	Capacitor—0.1 mfd. (C40)	.30
3765	Capacitor—0.025 mfd. (C34)	.34
3774	Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms (R25, R26, R27)	.80
3797	Reactor—Volume control compensating reactor (L15)	.64
3798	Resistor—700 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3799	Capacitor—80 mmfd. (C30)	.70
3883	Fuse—2-ampere (F1)—Package of 5	.40
4013	Capacitor—200 mmfd (C1)	.30
4035	Switch—Radio-Phonograph switch (S9)	2.10
4036	Shield—Low or high frequency tone control light shield	.30
4037	Shield—Antenna, detector or oscillator shield	.55
4038	Shield—Radiotron shield	.30
4039	Shield—Radiotron shield—Second detector shield	.30
4040	Shield—Radiotron tube shield top	.25
4041	Cover—Fuse cover	.25
4042	Reactor—Volume control series reactor (L16)	1.20
4129	Bracket—Bracket and bushing assembly for radio-phonograph switch shaft—Located on receiver chassis	.28
4130	Shield—R. F. Radiotron shield	.30
5817	Resistor—20,000 ohms—Carbon type—3 watt (R15, R16)	.25
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5	1.00
6192	Spring—3-gang tuning condenser drive cord tension spring—Package of 10	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt (R14, R34, R35, R36)—Package of 5	1.00
6277	Capacitor—0.1 mfd.—Located on rectifier socket shield (C50)	.35
6280	Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt (R23)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R22)—Package of 5	1.00
6298	Cord—3-gang tuning condenser drive cord—Package of 5	.60
6300	Socket—4-contact Radiotron socket	.35
6312	Capacitor—650 mmfd. (C15)—Package of 5	1.50
6316	Resistor—2,500 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
6437	Coil—Oscillator coil (L5, L6, L7)	1.24
6447	Volume control (R20, S1)	$1.92
6448	Tone control—Low frequency (R17)	1.04
6449	Tone control—High frequency (R21)	1.06
6450	Rheostat—Noise suppressor rheostat (R3)	1.24
6512	Cpacitor—0.005 mfd. (C37)	.28
6537	Switch—Range switch	1.30
6539	Coil—Detector coil (L3, L4)	1.44
6541	Dial—Tuning condenser dial and scale	.75
6561	Coil—Antenna coil (L1, L2, R1, C3)	1.65
6562	Transformer—Audio driver transformer (T3)	3.04
6564	Transformer—First intermediate frequency transformer (L8, L9, R9, C20, C21, C24)	2.30
6565	Transformer—Second intermediate frequency transformer (L12, L13, C28, C29)	2.10
6566	Transformer—Third intermediate frequency transformer (L10, L11)	1.72
6567	Capacitor pack—Comprising one 0.17 mfd., and one 0.7 mfd. capacitors (C35, C36)	.95
6568	Transformer—Interstage audio transformer (T2)	3.10
6571	Capacitor—10 mfd. (C43, C44)	1.20
6572	Reactor—Tone control reactor (L14)	.90
6574	Capacitor pack—Comprising two 10.0 mfd. capacitors (C32, C41)	1.80
6578	Reactor—Filter reactor (L18)	3.22
6797	Capacitor—10.0 mfd. (C49)	1.04
6847	Shield—Rectifier socket shield and capacitor	.65
7062	Capacitor—Adjustable capacitor (C14)	.50
7439	Drum—Dial drum with set screw and three dial mounting nuts	.35
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
7700	Condenser—3-gang variable tuning condenser (C4, C5, C6, C10, C11, C12, C16, C17, C18, S2, S3, S4, S5, S6)	7.44
9468	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	7.75
9469	Transformer—Power transformer—105-125 volts—25-40 cycles	11.75
	MOTOR BOARD ASSEMBLIES	
2893	Spring—Trip lever latch tension spring—Package of 10	.30
2917	Washer—Spring washer, "U" type—Package of 10	.25
3654	Roller—Guide roller assembly—Comprising bracket roller and guide pin	.34
3666	Spring—Cable lever tension spring—Package of 10	.44
3670	Finger—Friction finger	.32
3672	Pin—Manual index lever pin	.42
3673	Screw—Manual index lever adjustment screw and nut—Package of 5	.20
3676	Spring—Cam and gear pawl carrier tension spring—Package of 10	.52
3677	Lever—Cable lever assembly	.40
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4060	Escutcheon—Manual—12-10	.28
4061	Spring—Main spring—Package of 10	.38
4124	Plate—Actuating plate assembly	.50
4127	Spring—Actuating plate spring—Package of 10	.24
6502	Cam—Cam and gear assembly	1.18
6503	Pawl—Trip pawl assembly	.40
6806	Lever—Manual index lever—Less pin	.55
6807	Lever—Trip lever assembly	1.16
6808	Clutch—Trip lever friction clutch	.30
6809	Finger—Manual index finger assembly	.25
6810	Lever—Main spring lever	.44
6846	Lever—Main lever and link assembly	1.45
7710	Cover—Metal cover for trip lever and friction finger assemblies	.28
	MOTOR ASSEMBLIES	
3777	Motor mounting spring washers and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs	.62
9477	Motor—Motor complete—105-125 volts—60 cycles	25.88
9479	Motor—Motor complete—105-125 volts—25 cycles	36.48
9478	Motor—Motor complete—105-125 volts—50 cycles	25.88
	EJECT ARM ASSEMBLIES	
3655	Retainer—Ball retainer with three ball bearings	.45
3656	Bearing—Ejector tip bearing	.48
3657	Tip—Ejector tip	.30
3658	Ball—Ball bearing—Package of 20	.30
3662	Plate—Ejector plate—Package of 5	.95
3665	Screw—Eject arm horizontal adjustment screw and nut—Package of 5	.25
3729	Roller—Counter balance roller—Located inside of eject arm	.45

RCA-VICTOR CO., INC.

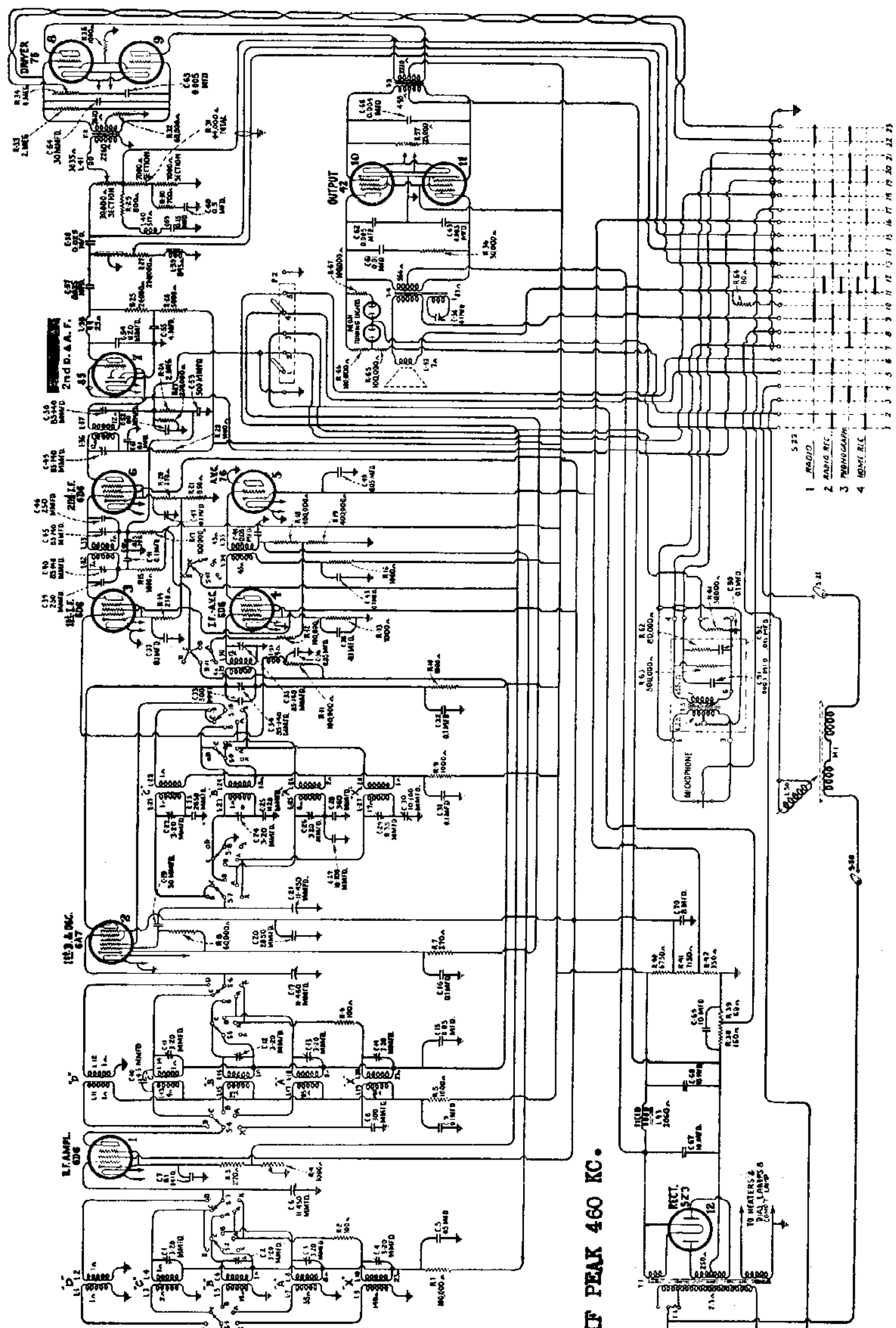


Figure 1—Schematic Circuit Diagram

MODEL Duo 381
RF Assembly Wiring

RCA-VICTOR CO., INC.

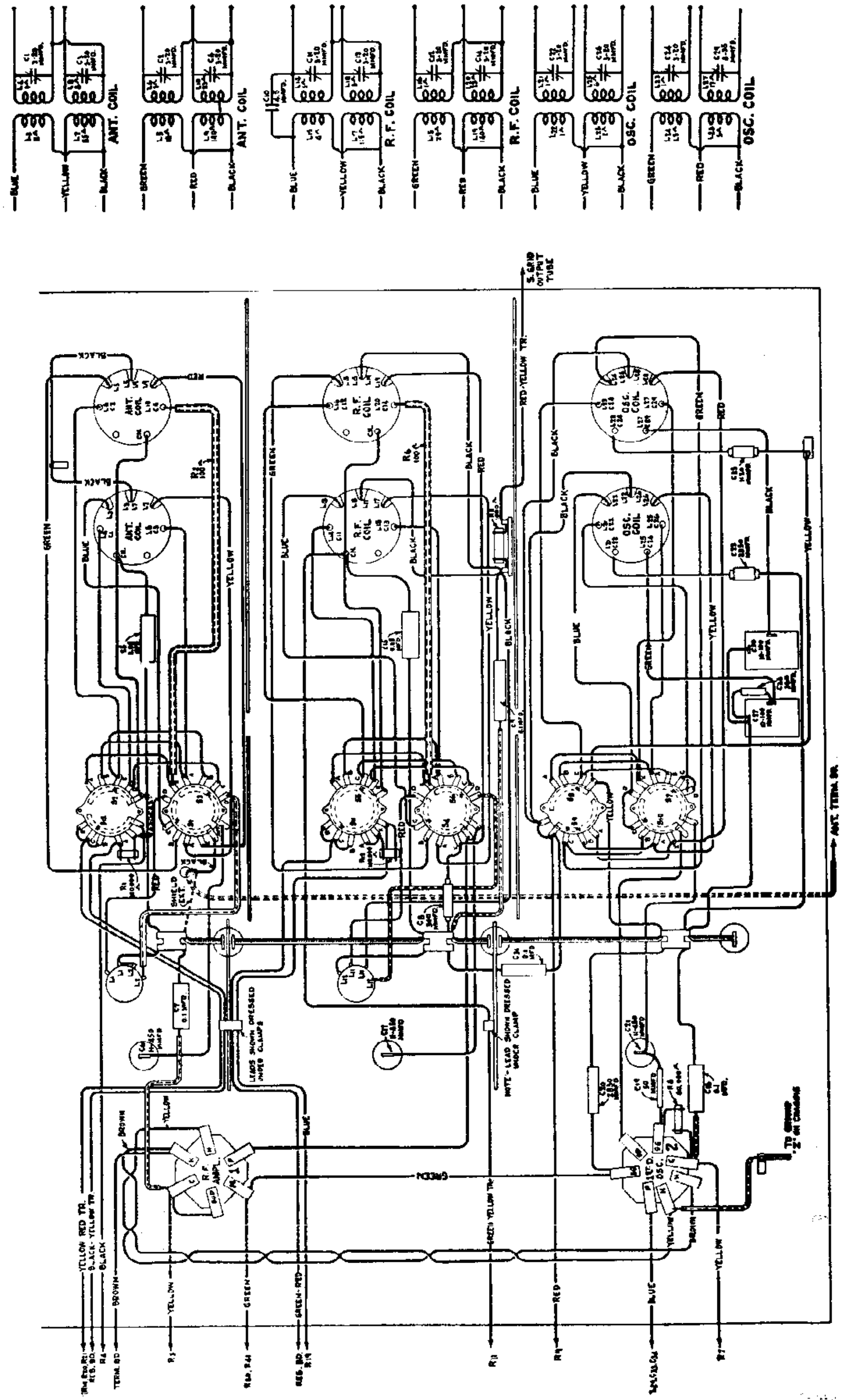


Figure 2—R. F. Assembly Wiring Diagram

RCA-VICTOR CO., INC.

MODEL Duo 381
Chassis Wiring

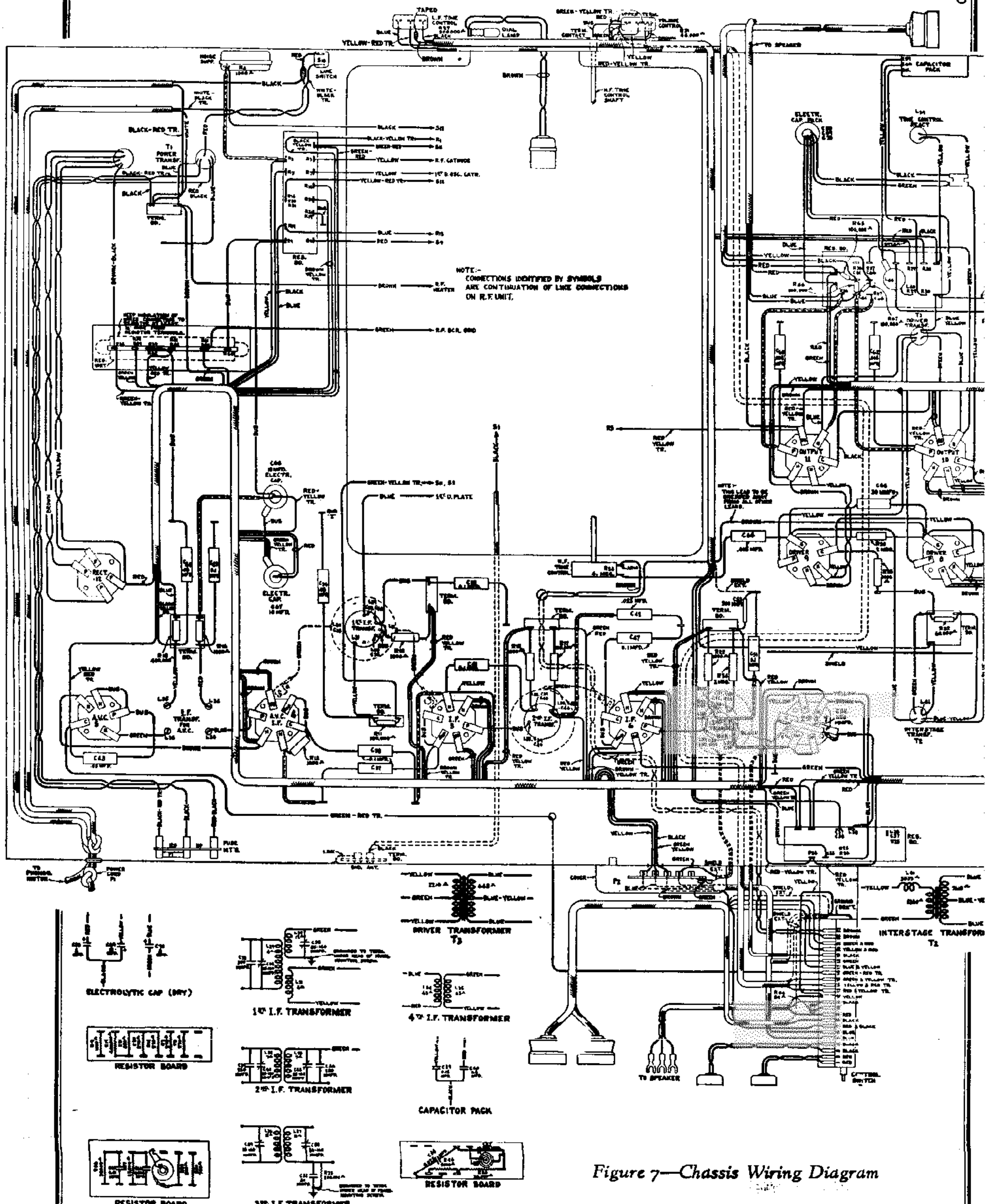
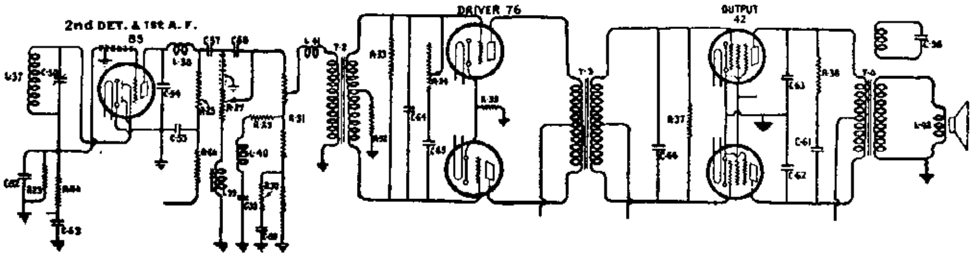


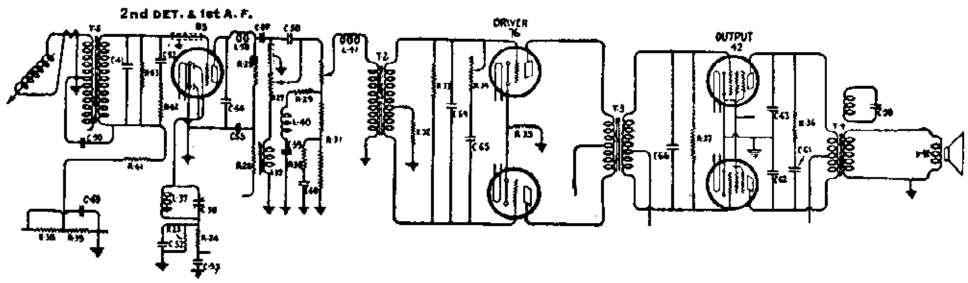
Figure 7—Chassis Wiring Diagram

MODEL Duo 381
A-F. Circuits

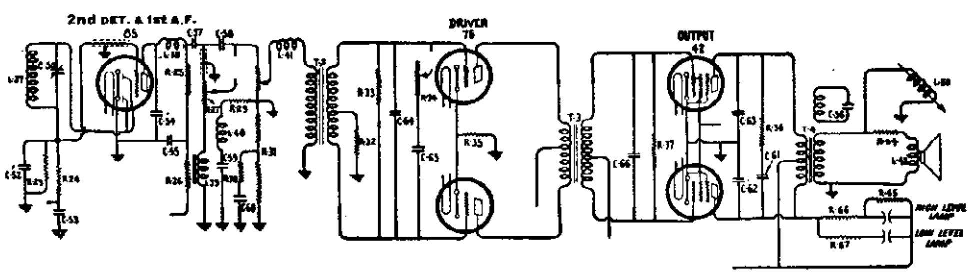
RCA-VICTOR CO., INC.



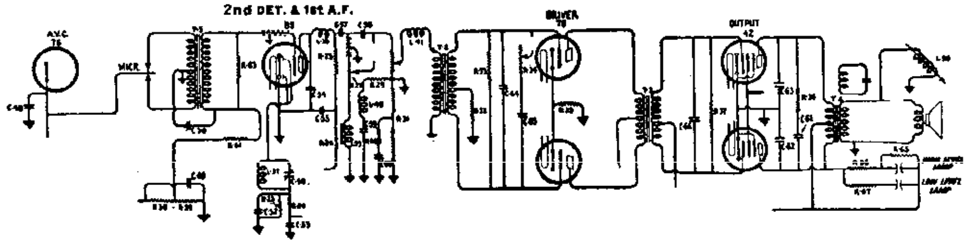
Radio Receiving



Record Reproduction



Radio Recording



Home Recording

Figure 5—Schematic Circuits of Audio Amplifier at each Selector Switch Position

RCA-VICTOR CO., INC.

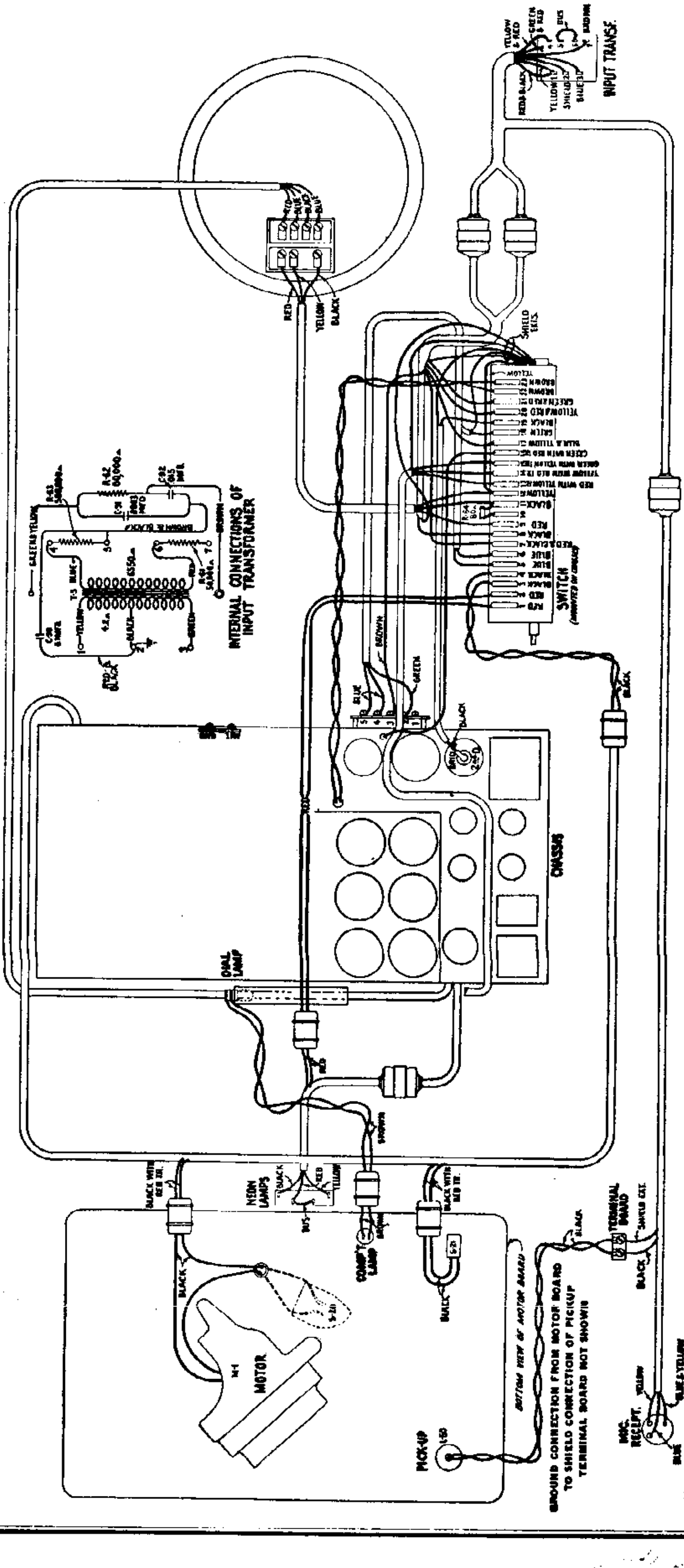


Figure 9—Assembly Wiring Diagram

MODEL Duo 381
Circuit Data
Record Changer Data

RCA-VICTOR CO., INC.

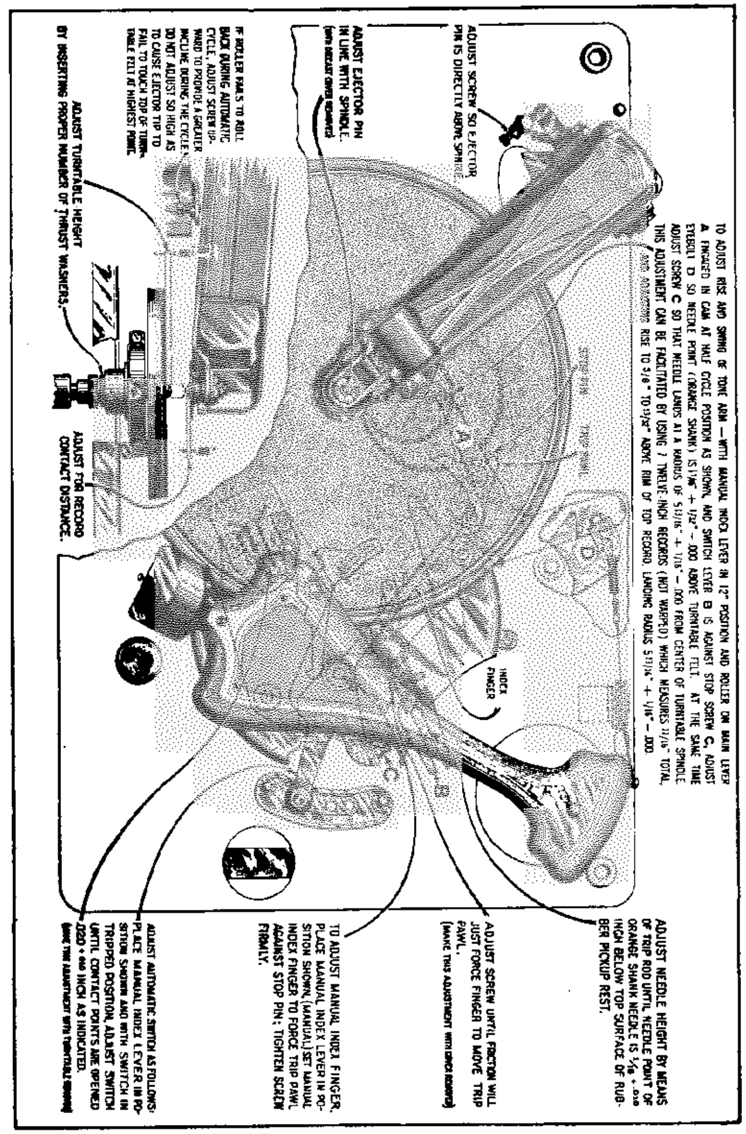


Figure 14—Automatic Record Changer Adjustments

DESCRIPTION OF ELECTRICAL CIRCUIT

RADIO

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector stage, two I. F. stages, a combined second detector, automatic volume control and 1st A. F. amplifier, a push-pull audio driver stage and a push-pull Class A output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering system. In addition, a double channel A.V.C. stage is provided which uses two additional tubes. Figure 1 shows the over-all schematic circuit diagram while Figure 2 shows the R. F. assembly wiring.

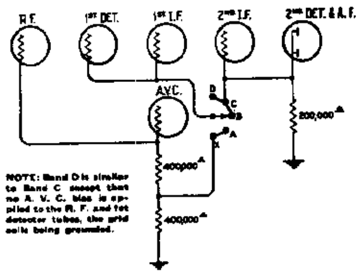


Figure 3—Switching Arrangement of Automatic Volume Control Systems

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang-capacitor connected falls in the next higher frequency band. This gang switch also has additional contacts for performing other functions which will be discussed.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the automatic volume control I. F. amplifier stage. A coupling coil adjacent to the secondary of this transformer is connected directly to the signal I. F. stage, which is in effect parallel to the A. V. C., I. F. stage. Examining the signal amplifier further we find that the output of the first signal I. F. stage is applied through a transformer to the second I. F. stage and thence through a second transformer to the second detector. Both circuits of each transformer are accurately tuned to the I. F. signal, which is 460 K. C.

Further examining the A. V. C., I. F. stage it will be seen that the output of this stage is applied to the A. V. C. tube through an untuned I. F. transformer. The A. V. C. stage, which is an RCA-76, is operated as a straight rectifier, its plate being grounded and only the grid being used. This tube is shielded in the usual manner. A small grid voltage, approximately 5.0 volts, is maintained so that rectification does not occur until the signal level exceeds this grid voltage. When this occurs, a portion of the rectified signal produces a voltage drop across resistors R-18 and R-19. The drop across both of these resistors constitutes the automatic bias voltage for the R. F. stage. The drop across R-19 alone gives the automatic bias voltage for the first detector and first I. F. stage on bands X and A.

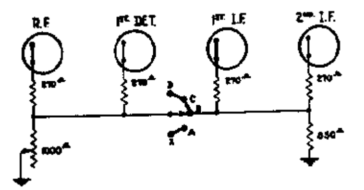


Figure 4—Sensitivity Control Switching Arrangement

Examining the second detector, the diode electrodes provide the detector action while the grid and plate give audio amplification. A portion of the rectified signal also gives a voltage drop across R-23, which is a second automatic volume control system for the receiver. The voltage drop is applied to the second I. F. stage in all bands and to the first detector and first I. F. stage in bands B and C. The change in automatic volume control systems is made by an additional group of contacts on the band selector switch. Figure 3 shows the switching arrangements for changing the A. V. C. system in the various bands.

At this point, an explanation as to why two automatic volume control systems are used and why the sensitivity control is changed in different bands may be in order.

Two automatic volume control systems are used because of the different receiving conditions in the various bands. For example, in the broadcast and long-wave band (X and A) signal levels are very high. Also due to the use of an aurally compensated volume control, a constant input to the second detector must be maintained. From this it is evident that the double channel I. F. automatic volume control is ideal. It maintains a constant input to the second detector and yet does not function on an extremely weak signal. In the short-wave bands, however, conditions are different. Signal strengths are always very low and fluctuate widely. For this reason it is important to have some automatic volume control action below the level at which the double channel system works. This is provided by the tube marked 2nd detector and 1st A. F. which functions on the first detector and two I. F. stages on the short-wave bands. It should be noted that this action is present on the second I. F. stage on all bands. This further flattens the action of the double-channel system in bands X and A.

At this point it is well to examine the sensitivity control, which also changes on different bands. The sensitivity control adjusts the residual bias on the R. F. and first detector stages in bands X and A while it controls the R. F., 1st detector and both I. F. stages on bands B, C, and D. Figure 4 shows the switching arrangement used.

The sensitivity control is changed so that in bands X and A it controls the R. F. and 1st detector while in bands B, C, and D it controls the R. F., 1st detector, 1st I. F. and 2nd I. F. stages. The reason for this is that for a given degree of sensitivity in bands X and A the residual bias will be considerably higher in the R. F. and 1st detector stages than in the bands B, C, and D used. This is to prevent possible overloading of these stages due to the high-signal strengths encountered in bands X and A. Also, in bands B, C, and D, for a given degree of sensitivity the R. F. stage operates at a higher gain, which gives an improved signal to noise ratio. This is caused by the paralleling of the sensitivity control with an 850-ohm resistor in these bands.

Returning to the second detector, we find its output circuit is coupled to the grid circuit of the driver stage through a compensated volume control system, tone control system and transformer. The volume control uses two stages of compensation, which serves to increase the high and low frequencies as the volume is reduced. This compensates for the natural loss in sensitivity of the human ear to the high and low frequencies at low sound levels. A low and a high frequency tone control enables the listener to alter the fidelity of the receiver to his individual taste.

The driver stage, which is a pair of RCA-76 Radiotrons connected in push-pull, is transformer coupled to a pair of RCA-42's which are the output stage. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-38 and R-39, which carries the entire D. C. output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it will have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire

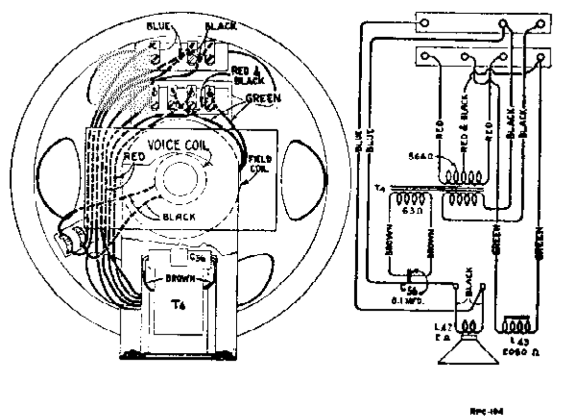


Figure 6—Loudspeaker Wiring

audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

The loudspeaker used is of the large-field ten-inch type. It is fully capable of handling the high-power, high-quality output of the receiver and converting it into faithful sound reproduction.

Figure 6 shows the loudspeaker wiring while Figure 7 shows the chassis wiring diagram. Figure 9 shows the assembly wiring diagram.

PHONOGRAPH AND RECORDING

The record reproducing facilities consist of a low impedance magnetic pickup with its associated inertia type tone arm, a compensated volume control, the audio amplifier of the receiver and the loudspeaker of the receiver. The radio receiver is made inoperative by the switch used for changing to record reproduction.

The recording facilities use the audio amplifier of the radio receiver, the output of which is connected to the magnetic pickup instead of the voice coil of the loudspeaker. The input to the amplifier may be either from the microphone or from the radio receiver, depending on whether radio recording or home recording is desired. It should be noted that when radio recording is being used, the loudspeaker is connected across the output through a resistor so that the program being recorded may be monitored at the same time.

Figure 7 shows schematic circuit diagram of the audio circuits at each of the four selection switch positions.

RCA-VICTOR CO., INC.

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

Equipment

To properly align this receiver, the following equipment must be used. This is a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool, a tuning wand, and a "dummy" Radiotron RCA-76. These parts, which are shown on page 20, have been developed by the

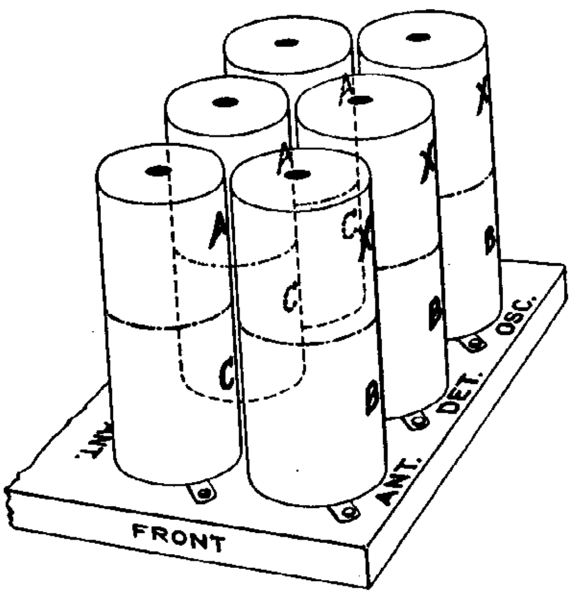


Figure 8—Location of Various Coils in Shields

manufacturer of this receiver for use by service men to duplicate the original factory adjustments. The "dummy" Radiotron, RCA-76, is obtained by removing one heater prong from an otherwise perfect tube.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 8. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in. The A. V. C. tube would be replaced by the "dummy" RCA-76 and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has three I. F. stages, two for the signal and one for the A. V. C., only three transformers having six adjustable capacitors require adjustment. The fourth transformer is in the A. V. C. circuit and is broadly tuned, not requiring adjustments. The transformers are all peaked, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker. Replace the A. V. C. tube in the receiver with the "dummy" RCA-76.

(b) Place the oscillator in operation at 460 K. C.; place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn both the volume and sensitivity controls to their maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 10. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and Oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "X" and "A." Three are required in bands "B" and "C" while none are required in band "D." Band "D" uses the second harmonic of the oscillator while the detector and R. F. coils do not have trimmers.

RCA-VICTOR CO., INC.

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver. The output indicator must be connected across the voice coil of the loudspeaker while the "dummy" RCA-76 must be placed in the A. V. C. socket. The sensitivity and volume controls must be at their maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The Dial Pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64" of the horizontal line at the highest frequency end of band "A."

Figure 10 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) Tune the external oscillator to 410 K. C., set the pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer marked 175 K. C. on Figure 10, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (a).

Band "A"

(a) Tune the external oscillator to 1720 K. C., set the pointer at 1720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 600 K. C. Tune in the 600 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 600 K. C. on Figure 10, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 K. C. as described in (a).

Band "B"

(a) Tune the external oscillator to 5160 K. C., and set the pointer at 5160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 4240 on the dial. It will be necessary to increase the external oscillator output for this check.

(c) The antenna and detector trimmers should now be peaked for maximum output.

Band "C"

(a) Tune the external oscillator to 18,000 K. C., and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

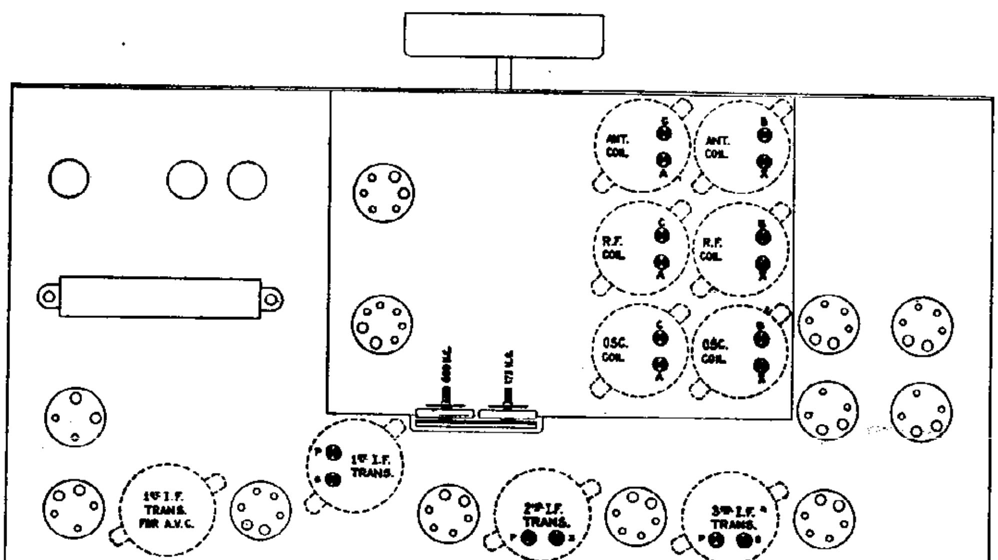


Figure 10—Location of Various Trimmer Capacitors

RCA-VICTOR CO., INC.

(c) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(d) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "D"

No adjustments are required for Band D.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 13 shows the location and voltage at each socket contact.

(6) TESTING NEON LEVEL INDICATING LAMPS

Two Neon Level Indicating Lamps are provided so that a visual indication of the recording level may be obtained at all times. These lamps normally give long service without attention. However, if failure occurs, and all circuits have been checked and eliminated as possible source of failure, the lamps may be

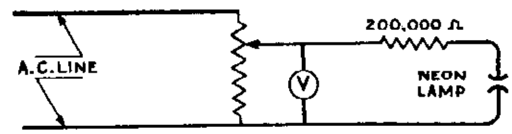


Figure 11—Testing Circuit

easily checked as indicated in the circuit shown in Figure 11. The method for checking involves testing for lighting between certain voltages. The lamps must not light before 52 volts have been applied and must not require a voltage greater than 64 volts to cause them to light. Lamps requiring different voltages from these are defective and must not be used.

RADIOTRON SOCKET VOLTAGES

Maximum Sensitivity—No Signal—120-Volt A. C. Input

Radiotron No.		Cathode to Ground, Volts	Screen Grid to Ground, Volts	Plate to Ground, Volts	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.3	100	231	8.8	6.3
RCA-6A7	Osc.	3.0	—	232	10.9	6.3
	Det.		100	238		
RCA-6D6—1st I. F.		7.0	100	236	3.5	6.3
RCA-6D6—2nd I. F.		7.0	100	236	3.5	6.3
RCA-6D6—A. V. C.-I. F.		6.0	100	236	4.0	6.3
RCA-76—A. V. C.		4.7	—	0	0	6.3
RCA-85—2nd Det.		0	—	60	7.2	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-5Z3—Rectifier		—	—	768–384 RMS	104.0	5.0

Power Transformer connected to 120-volt Tap.

RCA-VICTOR CO., INC.

(7) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a

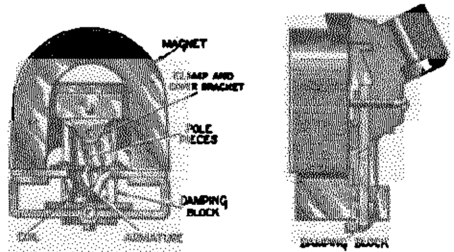


Figure 12—Details of Magnetic Pickup

chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

(8) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 15), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

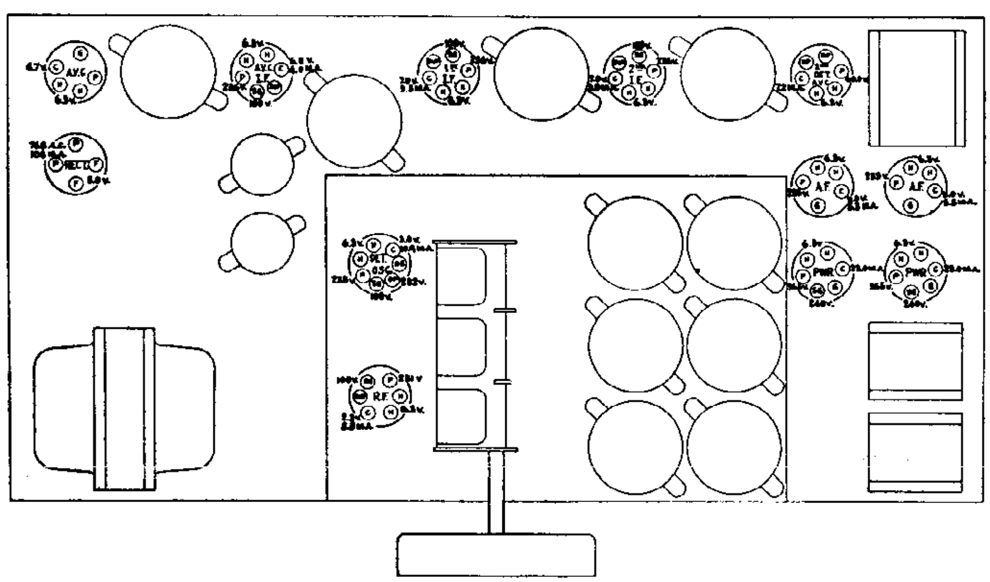
(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 15 and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At



ALL VOLTAGES ARE TO GROUND

Figure 13—Radiotron Socket Voltages

the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have

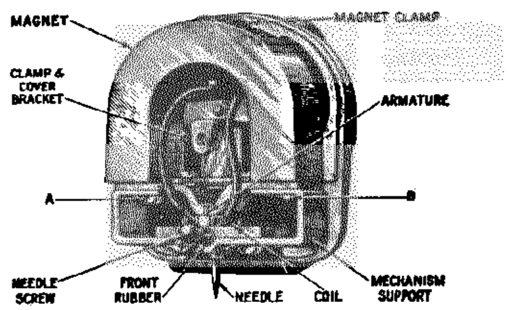


Figure 15—Pickup Nomenclature

the armature centered properly. The adjustment is made by loosening screws A and B (Figure 15), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009″ on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(9) REPLACING THE DAMPING BLOCK

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 16, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place,

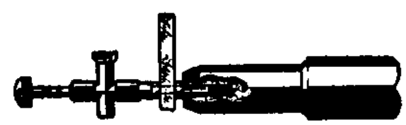


Figure 16—Special Soldering-Iron Tip

as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h), section (8).

(10) AUTOMATIC RECORD CHANGING MECHANISM

The automatic record changer used in this instrument is of simple design and fool-proof construction. Under normal operating conditions service difficulties should be negligible. However, in event adjustments are required, a reference to Figure 14 will disclose the proper method of making all adjustments.

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4372	Bracket—Low frequency tone or volume control mounting bracket	$0.20
4406	Bracket—High frequency tone control mounting bracket	.25
2747	Cap—Contact cap—Package of 5	.50
4407	Capacitor—30 mmfd. (C64)	.25
4405	Capacitor—80 mmfd. (C52)—Package of 5	.85
4376	Capacitor—250 mmfd.—Located on second intermediate frequency transformer (C39, C46)—Package of 5	.80
4404	Capacitor—500 mmfd. (C33, C53)—Package of 5	.85
4409	Capacitor—1120 mmfd. (C54)	.35
4070	Capacitor—.004 mfd. (C66)	.42
3643	Capacitor—.005 mfd. (C62, C63)	.25
6512	Capacitor—.005 mfd. (C65)	.28
3787	Capacitor—.01 mfd. (C61)	.30
3888	Capacitor—.05 mfd. (C36, C44, C48)	.25
3765	Capacitor—.025 mfd. (C42, C58)	.34
4645	Capacitor—.1 mfd. (C32, C41, C43, C51)	.25
3877	Capacitor—.1 mfd. (C37, C38, C47)	.32
4720	Capacitor—.035 mfd. (C57)	.42
7790	Capacitor—10 mfd. (C67)	1.05
7788	Capacitor—18 mfd. (C68)	1.10
7787	Capacitor pack—Comprising one .15 mfd. and one .5 mfd. capacitors (C59, C60)	1.10
7789	Capacitor pack—Comprising one 4., one 8. and one 10. mfd. capacitors (C55, C69, C70)	2.68
4358	Clamp—Electrolytic capacitor clamp	.15
7806	Coil—Second detector plate choke coil (L38)	.30
4371	Cover—Fuse mount cover	.15
4359	Cover—Terminal board cover	.15
10907	Fuse—3-ampere—Package of 5	.40
3376	Mount—Fuse mount 105–125-volt instrument	.40
7784	Reactor—Tone control reactor (L39)	1.30
7483	Reactor—Volume control compensating reactor (L40)	.68
6135	Resistor—270 ohms—Carbon type—¼ watt (R3, R7, R14, R20)—Package of 5	1.00
4240	Resistor—700 ohms—Carbon type—¼ watt (R30)—Package of 5	1.00
4375	Resistor—800 ohms—Carbon type—¼ watt (R29)—Package of 10	2.00
6247	Resistor—850 ohms—Carbon type—¼ watt (R21)—Package of 5	1.00
4687	Resistor—1,000 ohms—Carbon type—¼ watt (R9, R10, R13, R15, R16, R22, R35)—Package of 10	2.00
3110	Resistor—25,000 ohms—Carbon type—¼ watt (R37)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R32)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R11, R17)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt—Located on third I. F. transformer (R23)—Package of 5	1.00
4368	Resistor—400,000 ohms—Carbon type—¼ watt (R18, R19)—Package of 10	2.00

Stock No.	Description	List Price
6242	Resistor—2 megohms—Carbon type—¼ watt (R24, R33)—Package of 5	$1.00
3413	Resistor—5,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R36)	.22
5817	Resistor—20,000 ohms—Carbon type—3 watt (R25)	.25
6997	Resistor—Total resistance 14,470 ohms with 160–60–350–7150 and 6750 ohm sections (R38, R39, R40, R41, R42)	.95
7804	Rheostat—Noise suppressor rheostat (R4)	1.30
4453	Shield—First I. F., AVC—I. F. or second I. F. Radiotron shield	.32
3683	Shield—Radiotron shield top	.20
4452	Shield—Second detector or AVC Radiotron shield	.35
7800	Shield—Shield for intermediate frequency coils	.45
3859	Socket—4-contact rectifier Radiotron socket	.30
7484	Socket—5-contact AVC Radiotron socket	.35
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact driver Radiotron socket	.40
7796	Switch—Operating switch (S13)	.62
7795	Tone control—Low frequency (R27)	1.30
7797	Tone control—High frequency (R34)	1.35
7794	Transformer—AVC intermediate frequency transformer (L34, L35)	.82
7785	Transformer—Driver transformer (T3)	2.40
7791	Transformer—First intermediate frequency transformer (L29, L30, L31, C33, C34, C35)	2.35
9505	Transformer—Power transformer 105–125-volt, 50–60 cycle (T1)	6.35
9506	Transformer — Power transformer 105–125 volts, 25–40 cycles	8.90
7792	Transformer—Second intermediate frequency transformer (L32, L33, C39, C40, C45, C46)	2.22
7793	Transformer—Third intermediate frequency transformer (L36, L37, C49, C50, C52, R23)	2.50
7786	Transformer pack—Comprising one reactor and interstage transformer (L41, T2)	4.25
7798	Volume control—Radio and Phonograph (R31)	2.05
	R. F. UNIT ASSEMBLIES	
4646	Capacitor—4.5 mmfd. (C10)	.20
4416	Capacitor—50 mmfd. (C19)—Package of 5	1.25
3981	Capacitor—300 mmfd. (C8)	.30
4413	Capacitor—360 mmfd. (C28)	.22
4412	Capacitor—1120 mmfd. (C25)	.25
4524	Capacitor—2850 mmfd. (C23)	.35
4615	Capacitor—2850 mmfd. (C20)	.34
4417	Capacitor—0.05 mfd. (C5, C15)	.25
4415	Capacitor—0.1 mfd. (C7, C16)	.30
4645	Capacitor—0.1 mfd. (C9, C31)	.25
3861	Capacitor—Adjustable capacitor (C27, C30)	.78
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4410	Coil—Antenna coil—Band "D" (L1, L2)	.70
7803	Coil—Antenna coil—"B"—"SW" (L3, L4, L7, L8, C1, C3)	1.82

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
7810	Coil—Antenna coil—"PB"—"LW" (L5, L6, L9, L10, C2, C4)	$2.10
7805	Coil—Detector coil—"B-SW" (L13, L14, L17, L18, C11, C13)	2.15
7808	Coil—Detector coil—"PB-LW" (L15, L16, L19, L20, C12, C14)	2.05
4421	Coil—Detector coil—Band "D" (L11, L12)	.70
7807	Coil—Oscillator coil—"B-SW" (L21, L22, L25, L26, C22, C26)	1.62
7809	Coil—Oscillator coil—"PB-LW" (L23, L24, L27, L28, C24, C29)	1.70
7801	Condenser—3-gang variable tuning condenser (C6, C17, C21)	4.42
4419	Lead—Shield single-conductor antenna lead	.45
4687	Resistor—1,000 ohms—Carbon type—¼ watt (R5)—Package of 10	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R12)—Package of 5	1.00
4418	Resistor—100 ohms—Flexible type (R2, R6)—Package of 10	1.50
7800	Shield—Antenna, detector or oscillator coil shield	.45
4452	Shield—First detector oscillator coil shield	.35
3683	Shield—Radiotron shield top	.20
4454	Shield—R. F. amplifier Radiotron shield	.44
3529	Socket—Dial lamp socket	.32
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4686	Strip—Terminal strip engraved "ANT-GND"	.20
7802	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12)	4.05
	CABLE AND PLUG ASSEMBLIES	
4547	Cable — 3-conductor — Recording indicator cable—With female section of connector plug—Stock No. 4153—One end connected to resistor board	.85
4548	Cable—3-conductor with spade terminals—Phonograph chassis cable—One end connected to selector switch, other end to terminal board	.50
4553	Cable—3-conductor—Reproducer cable with spade terminals	.45
4549	Cable—Input transformer cable—3 branches—With 2 male and one female section of connector plugs—Stock Nos. 4571, 4574 and 6123	2.30
4576	Cable—Input transformer—One end connected to selector switch—With two female sections of connector plugs—Stock Nos. 4153 and 4571	1.84
4550	Cable—Microphone cable—One end connected to microphone receptacle—3-conductor with male section of connector plug—Stock No. 4574	1.00
4551	Cable—Recording indicator cable—One end connected to indicator with one male and one female section of connector plug—Stock Nos. 4573 and 6123	1.88

Stock No.	Description	List Price
4552	Cable—2-conductor—Motor power cable—With three female sections of connector—Stock No. 4573	$3.36
4554	Cable—Volume control cable—One end connected to selector switch, other end to volume control and low frequency tone control	.50
4153	Plug—Female section of 4-contact connector plug—Used with following cables—Stock No. 4547 and 4576	.48
4573	Plug—Female section of 2-contact connector plug—Used with dial lamp cord and following cables—Stock Nos. 4551 and 4552	.30
4571	Plug—Female section of 6-contact connector plug—Used with cables—Stock Nos. 4549 and 4576	.65
6123	Plug—Male section of 4-prong connector plug—Used with the following cables—Stock Nos. 4549 and 4551	.30
4577	Plug—Male section of 2-prong connector plug—Connected to terminals Nos. 1, 2, 3 and 4 of selector switch	.30
4574	Plug—Male section of 6-prong connector plug—Used with cables Stock Nos. 4550 and 4549	.48
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	.88
4455	Dial—Station selector dial	.60
7799	Drive—Variable tuning condenser drive assembly complete	2.45
4364	Gear—Spring gear assembly complete with hub pinion, gear cover and spring	.96
4361	Indicator—Band indicator—Celluloid-lettered D-C-B-A-X	.12
4363	Pointer—Station selector main pointer—Large	.18
4367	Pointer—Station selector vernier pointer—Small	.15
3993	Screw—No. 6-32-5/16" square head set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4360	Stem—Pointer stem assembly	.35
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	EJECT ARM ASSEMBLIES	
4713	Arm—Eject arm complete	7.74
3658	Ball—Steel ball bearing—Package of 20	.30
3656	Bearing—Ejector tip bearing	.48
4054	Bracket—Eject arm bracket assembly	1.35
4058	Collar—Eject arm shaft collar and set screw	.18
4714	Cover—Eject arm cover	1.38

RCA-VICTOR CO., INC.

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
3930	Cushion—Counter balance cushion and bracket—Located inside of eject arm	$0.18
3662	Plate—Ejector plate—Package of 5	.95
4055	Post—Vertical adjustment post—Located on eject arm bracket	.30
3655	Retainer—Ball retainer with three balls	.45
3729	Roller—Counterbalance roller—Located inside of eject arm	.45
3665	Screw—Eject arm horizontal adjustment screw and nut—Package of 5	.25
4057	Shaft and collar—For eject arm	.24
4067	Spring—Eject arm bracket spring—Package of 10	.30
4125	Spring—Eject arm horizontal action tension spring—60 cycle operation—Package of 10	.42
4126	Spring—Eject arm—Horizontal action tension spring—For 25 cycle operation—Package of 10	.60
3657	Tip—Ejector tip	.30
4056	Yoke—Eject arm yoke assembly	1.04
	MICROPHONE ASSEMBLIES	
7534	Cord—Microphone cord	.70
6883	Cover—Microphone cover—Two sides	1.96
3216	Cushion—Microphone rubber cushions—Pkg. of 6	.24
6884	Frame—Microphone frame	1.19
7533	Mechanism—Microphone mechanism	6.80
6882	Microphone complete	7.50
4171	Plug—3-contact microphone plug	.30
4158	Socket—Microphone socket	.40
	MOTOR ASSEMBLIES	
9477	Motor—105-125 volts—60 cycles	25.88
9478	Motor—105-125 volts—50 cycles	25.88
9479	Motor—105-125 volts—25 cycles	36.48
4562	Motor mounting spring, washer and stud assembly—Comprising six springs, six cup washers, three spring washers and three studs	.58
	MOTOR BOARD ASSEMBLIES	
4060	Escutcheon — Index escutcheon engraved "Manual 10-21"	.28
3764	Nut—Cap nut for motor board—Package of 4	.40
3672	Pin—Manual index pin	.42
4066	Rest—Pickup rest	.14
3654	Roller—Pickup arm guide roller assembly—Comprising bracket and guide pin	.34
3763	Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, two springs, one "C" washer and one cap nut	.42
	OPERATING MECHANISM ASSEMBLIES	
6502	Cam—Cam and gear assembly	1.18
6808	Clutch—Trip lever friction clutch	.30

Stock No.	Description	List Price
4719	Cover—Metal cover for trip lever and friction finger assembly	$0.28
3670	Finger—Friction finger assembly	.32
6809	Finger—Manual index lever finger assembly	.25
6846	Lever—Main lever and link assembly	1.45
6810	Lever—Main spring lever	.44
6806	Lever—Manual control index lever—Less pin	.55
3677	Lever—Pickup arm cable lever assembly complete—Comprising lever with cable screw spring and nut	.40
6807	Lever—Trip lever and friction clutch assembly	1.16
6503	Pawl—Trip pawl assembly	.40
4124	Plate—Eject arm actuating plate assembly	.50
4563	Screw—Cable lever cable screw and nut—Package of 10	.60
4564	Screw—Manual index lever finger set screw—Package of 10	.20
4567	Screw—Manual index lever assembly—Adjustment screw and nut—Package of 10	.32
4566	Screw—Special screw used to fasten main lever and link assembly bushing—Package of 10	.30
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4127	Spring—Actuating plate tension spring—Package of 10	.24
3666	Spring—Cable lever tension spring—Package of 10	.44
3676	Spring—Cam and gear, pawl carrier tension spring—Package of 10	.52
4061	Spring—Main spring	.38
4565	Spring—Manual index lever finger tension spring—Package of 10	.30
2893	Spring—Trip lever latch plate tension spring—Package of 10	.30
2917	Washer—Spring washer "U" type—Package of 10	.25
	PICKUP AND ARM ASSEMBLIES	
4581	Arm—Pickup arm complete less escutcheon and pickup unit	5.72
4128	Armature—Pickup armature	.96
6813	Back—Pickup housing back	.68
4064	Cable—Pickup arm cable—Package of 5	1.00
4711	Coil—Pickup coil (L50)	.80
4583	Cover—Pickup cover	.34
4709	Cover—Pickup back cover with two mounting screws	.34
3737	Damper—Pickup damper—Package of 5	.65
6815	Escutcheon—Pickup arm escutcheon	.64
4561	Pad—Cork pad—Used when making home recordings	.45
4582	Pickup unit complete	4.30
4062	Rod—Automatic brake trip rod	.20

REPLACEMENT PARTS—(Continued)

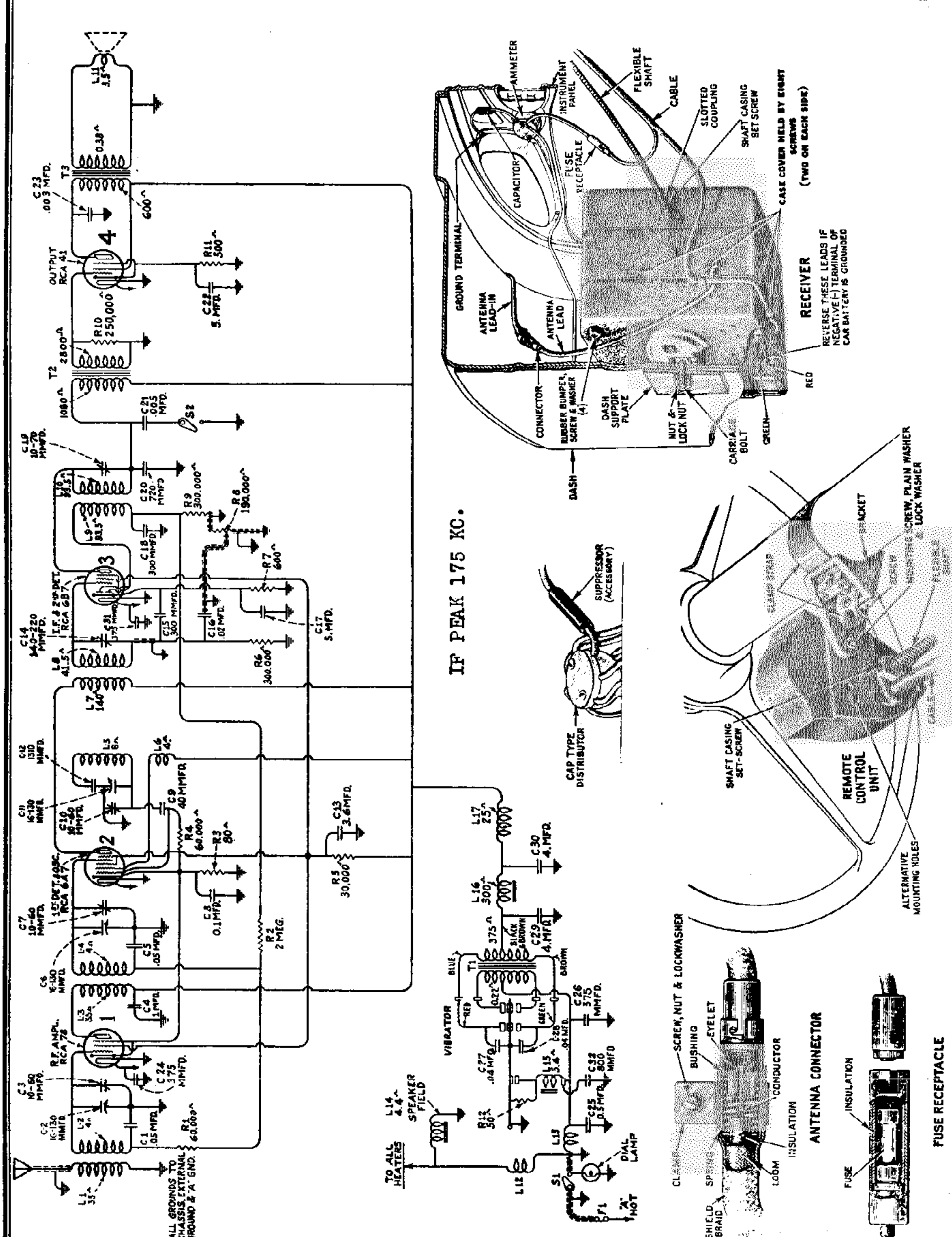
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
4063	Screw assembly—Pickup mounting screw assembly—Comprising one screw, one washer and one nut—Package of 10	$0.54
3388	Screw—Needle holding screw—Package of 10	.60
3419	Screw—Pickup cover holding screw—Package of 10	.40
4157	Weight—Home recording weight	1.72
	RECORDING INDICATOR ASSEMBLIES	
4162	Escutcheon—Recording indicator escutcheon	.34
4161	Lamp—Neon lamp	.56
4164	Screen—Indicator lamp screen	.18
4163	Screw—Screen, escutcheon and terminal board mounting screw assembly—Comprising two screws, two spacers, two nuts and two lockwashers	.20
	REPRODUCER ASSEMBLIES	
4706	Board—Terminal board—Three terminals	.30
4568	Bolt assembly—Reproducer mounting bolt assembly—Comprising one bolt, one lockwasher, one washer and one nut—Package of 10	.55
9542	Coil—Field coil, magnet and cone support (L43)	11.16
7000	Cone—Reproducer cone (L42)—Package of 5	9.45
9541	Reproducer complete	17.32
6999	Screen—Dust screen—Package of 6	.12
7826	Transformer—Output transformer and capacitor (T4, C56)	2.80
	SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 4	.50
6805	Switch assembly—Automatic switch complete	1.90
3322	Switch—Motor switch (S20)	.75
	TURNTABLE ASSEMBLIES	
4065	Bushing—Speed shifter lever bushing—Package of 4	.82
3344	Cover—Grease retainer cover—Package of 2	.70
6818	Lever—Speed shifter lever	.38
3341	Pin—Groov pin—Package of 2	.56
6816	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.42
4708	Turntable complete	5.10
6817	Sleeve—Sleeve complete with ball race	2.25
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3347	Spring—Speed shifter lever spring—Package of 2	.30
3340	Washer—Thrust washer—Package of 2	.56

Stock No.	Description	List Price
	MISCELLANEOUS PARTS	
4556	Base—Phonograph compartment lamp base and socket	$0.55
4546	Bearing—Selector flexible shaft bearing and nut and set screw—Fastened to motor board	.50
4677	Bezel—Metal bezel (escutcheon) for station selector dial	.56
4555	Box—Needle box complete with lid	.40
4559	Bracket and bushing—Selector switch flexible shaft bracket and bushing—Fastened to selector switch	.52
4572	Escutcheon—Selector switch escutcheon	.46
6614	Glass—Station selector dial glass	.30
4425	Knob—Station selector or Radio-phonograph—Recording switch knob—Package of 5	.75
3829	Knob—Volume control, tone control, noise suppressor or range switch knob—Package of 5	1.10
4340	Lamp—Dial lamp—Package of 5	.60
4190	Pointer—Selector switch pointer—Package of 5	.72
4710	Receptacle—Needle receptacle	.35
4091	Resistor—80 ohms—Carbon type—¼ watt—Located on selector switch (R64)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R65, R66, R67)—Package of 5	1.00
4678	Ring—Station selector dial glass retaining ring—Package of 5	.34
4119	Screw—8-32-¼" headless set screw for knob—Stock Number 4425—Package of 20	.38
4393	Screw—8-32-5/16" headless set screw for knob—Stock Number 3829—Package of 10	.25
4191	Screw—10-32-¾" dog point fillister head set screw—Used with flexible shaft bearing—Package of 10	.50
3651	Screw—10-32-⅜" self-locking headless set screw—Used with flexible shaft bearing—Package of 10	.32
3652	Screw—10-32-¼" self-locking set screw for selector switch, flexible shaft bracket and bushing—Package of 10	.32
4580	Screw—6-32-3/16 square head set screw for selector switch flexible shaft—Package of 10	.25
4560	Screw assembly—Receiver chassis mounting screw and washer assembly—Package of 10	.30
4557	Shade—Phonograph compartment lamp shade	.35
4558	Shaft—Selector switch flexible shaft	1.10
4544	Switch—Radio-phonograph, or home recording selector switch (S22)	7.10
4579	Switch—Toggle type—Motor starting switch (S21)	1.55
4545	Transformer — Input transformer pack — Comprising one input transformer, one 50,000 ohm, one 500,000 ohm and one 80,000 ohm resistor, one .0003 mfd. and one 0.1 mfd. and one .015 mfd. capacitors (T5, C90, C91, C92, R61, R62, R63)	5.40

MODEL AR-4229
Schematic
Chassis Details

RCA-VICTOR CO., INC.



MODEL AR-4229
Chassis Wiring

RCA-VICTOR CO., INC.

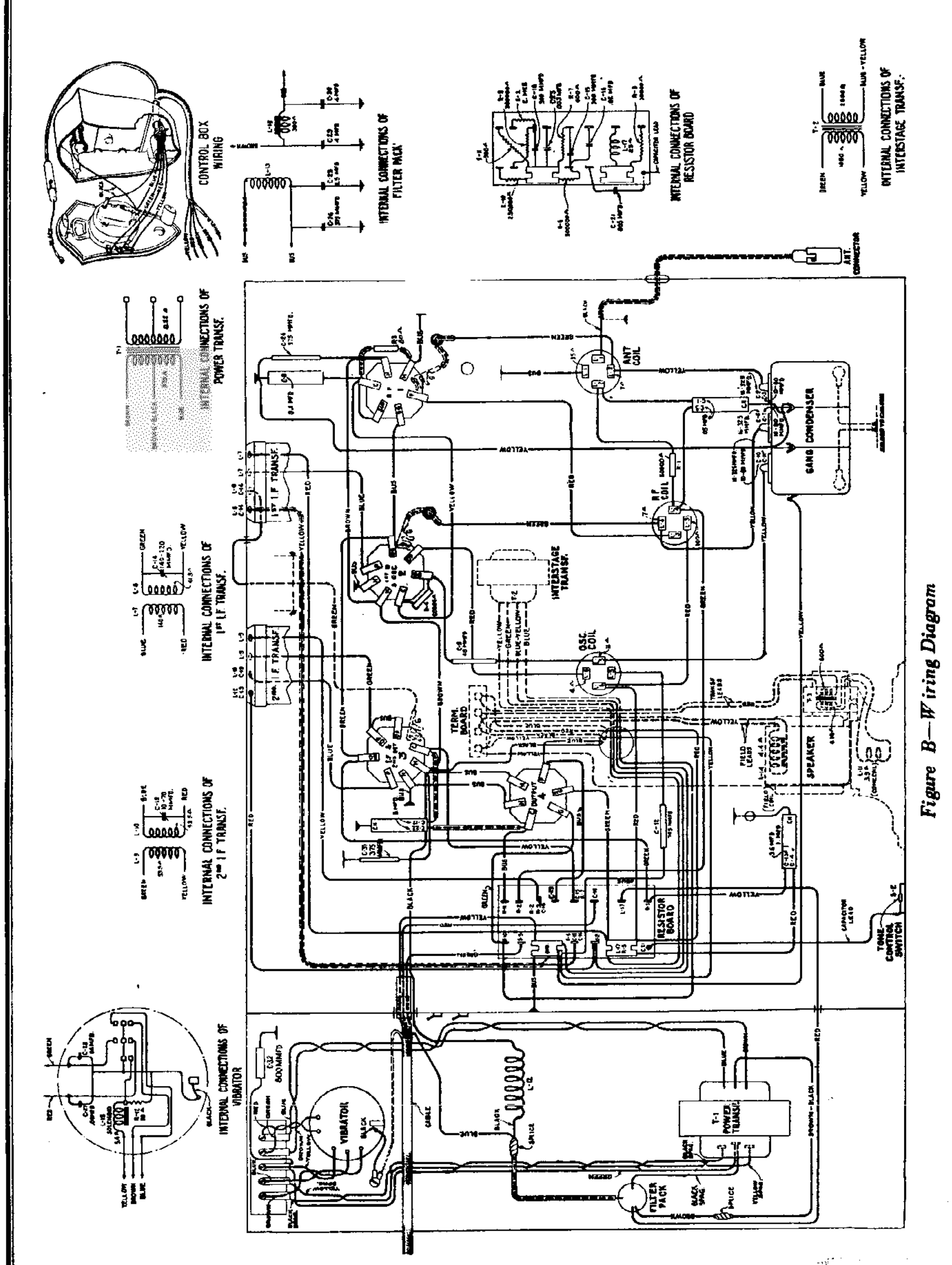


Figure B—Wiring Diagram

MODEL AR-4229
Alignment Data
Voltage

RCA-VICTOR CO., INC.

PART IV—SERVICE DATA

Type and Number of Tubes Used .... 1 RCA-41, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7—Total, 4
Total Battery Current (With 6.3 volts between chassis and A (hot) terminal) 5.35 Amperes
Undistorted Output .... 1.35 Watts
Loudspeaker Field Current .... 1.35 Amperes
Filtered D. C. Voltage from Rectifier .... 227 Volts
Total Plate Current .... 47.5 M. A.

This four tube Superheterodyne Police Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, "B" battery eliminator and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

"B" Battery Eliminator

This receiver uses a vibrator-type Inverter-Rectifier that provides a source of direct current voltage for use as plate and grid supply for all tubes. *This unit is accurately adjusted and sealed at the factory and service adjustments should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 2508 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for these adjustments:

R. F. Adjustment

A satisfactorily accurate and rapid adjustment of the three R. F. line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and tube sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 2508 K. C. and a non-metallic screw driver. Stock No. 9050 oscillator and 7065 screw driver are suitable.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 97, and the oscillator at 2508 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound in the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and tubes as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10" to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 33⅞" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932 or 1933—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

TUBE SOCKET VOLTAGES

6.3 Volt Battery—No Signal

Tube No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.42	83	222	5.25	6.0
RCA-6A7	First Detector	4.42	83	222	11.0	6.0
	Oscillator	4.42	—	223	Total	
RCA-6B7 Second Detector		3.22	84	218	5.25	6.0
RCA-41 Power		13.0	214	200	26.0	6.0

MODEL AR-4229
Parts List

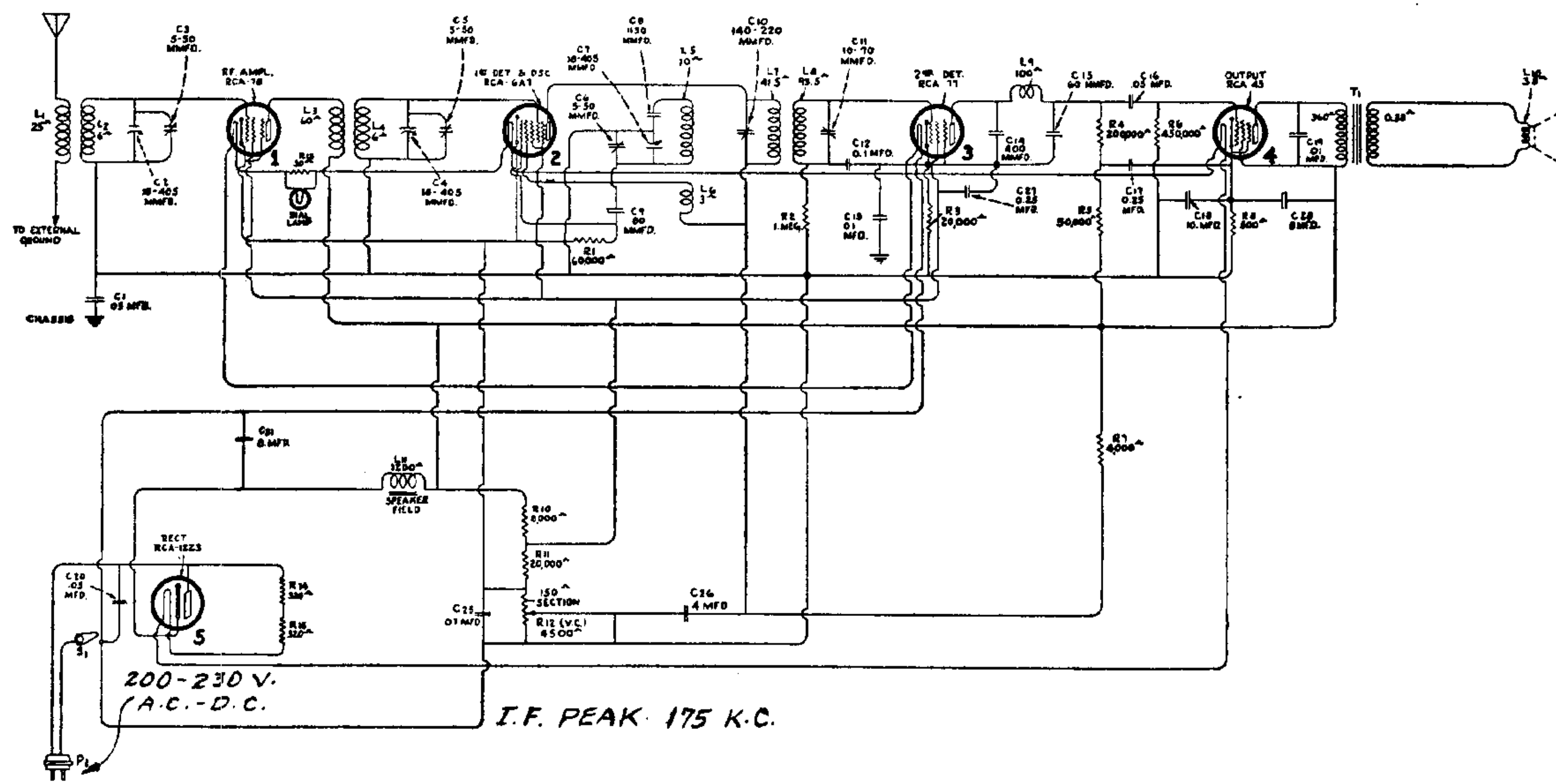
RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3536	Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22)	1.10
3572	Socket—Radiotron 7-contact socket	.38
3584	Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C15, C18)	.34
3617	Capacitor—0.005 mfd. (C21)	.38
3618	Capacitor—0.02 mfd. (C16)	.38
3621	Coil—Choke coil—Located on resistor board (L17)	.35
3623	Shield—Antenna R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3636	Transformer—First intermediate frequency transformer (L7, L8, C14)	1.74
3637	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.65
3641	Capacitor—0.1 mfd. (C8)	.35
3645	Knob—Tone control knob—Package of 5	.90
3695	Capacitor—375 mmfd. (C24, C31)	.22
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3744	Resistor—250,000 ohms Carbon type—¼ watt (R10)—Package of 5	1.00
3745	Capacitor—745 mmfd. (C12)	.34
3746	Capacitor—800 mfd. (C-32)	.34
3920	Capacitor—.003 mfd. (C23)	.25
3921	Mounting screws, washer and bushing assembly—For 3-gang variable tuning condenser—Comprising three spacers, three screws, three washers and three lockwashers	.34
3922	Resistor—300,000 ohms—Carbon type—¼ watt (R6, R9)—Package of 5	1.00
6135	Resistor—270 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt (R2)—Package of 5	1.00
6298	Cord—Tuning condenser drive cord—Package of 5	.60
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6490	Tone control switch	.35
6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitor (C4, C13)	1.08
6493	Drum—Tuning condenser drive drum	.40
6514	Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5)	.28
6515	Cable—Shielded cable with antenna connector	.32
6516	Connector—Fuse connector	.16
6517	Cable—Main cable complete with fuse connector	1.40
6540	Coil—R. F. coil assembly (L3, L4)	.94
6731	Coil—Antenna coil (L1, L2)	.88
6732	Transformer—Interstage audio transformer (T2)	2.00
7485	Socket—Radiotron 6-contact socket	.40
7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30)	4.06
7601	Condenser—3-gang variable tuning condenser	2.84
9049	Transformer—Power transformer (T1)	3.75
	CONTROL BOX ASSEMBLIES	
3649	Key—Volume control and switch key	.18
3650	Screw—Self locking No. 10-32-3/16" fulldog point set screw—Package of 10	.32
3651	Screw—Self locking No. 10-32-3/16" cupped point set screw—Package of 10	.32
3652	Screw—Self locking No. 10-32-¼" cupped point set screw—For flexible drive shaft—Package of 10	$0.32
3690	Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
3718	Bracket—Control box dash mounting bracket	.25
3757	Coupling—Slotted coupling for end of flexible drive shaft—Package of 5	.40
3758	Connector—For control box end of flexible drive shaft—Package of 5	.68
G5021	Knob—Station selector knob—Package of 5	.90
6496	Shaft—Flexible drive shaft complete with connectors—Approximately 24¼" long	1.60
6497	Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33¼" long	1.75
6499	Volume control—Combination volume control and switch (R8)	1.36
6500	Nut—Volume control and switch lock nut	.24
6531	Shaft—Flexible drive shaft complete with connectors—Approximately 12¼" long	.85
6532	Shaft—Flexible drive shaft—Complete with connectors—Approximately 18¼" long	1.24
6784	Scale—Dial scale	.58
G7850	Box—Control box complete	3.70
G7851	Cover—Control box cover	.44
	MISCELLANEOUS PARTS	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
3647	Nut—Cap nut and lock washer—Package of 10	.35
3648	Screw—No. 10-32-⅝" cap screw and lockwasher—Package of 10	.32
3689	Bracket—Receiver mounting bracket, bolt and nut assembly—One set	.30
3791	Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case	.30
3827	Cable—From fuse connector to ammeter	.10
4051	Bumper—Rubber bumper used in mounting receiver chassis—Package of 4	.20
3856	Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10	.30
3884	Clamp—Cable clamp—Package of 10	.20
G5046	Escutcheon—Metal label for control box—Package of 10	.70
G5047	Escutcheon—Metal label for receiver—Package of 10	.50
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor splice-in suppressor	.56
6494	Capacitor—Ammeter capacitor—0.5 mfd.	.46
6495	Capacitor—Generator capacitor—0.5 mfd.	.72
6670	Suppressor—Spark plug suppressor—"Elbow type"	.56
7065	Screwdriver—For R. F. and I. F. adjustments	.80
7621	Antenna—Roof antenna—Paper type (Brown)	1.50
7622	Antenna—Roof antenna—Paper type (Gray)	1.50
7686	Housing—Front section of housing complete with mounting screws	3.48
7689	Vibrator complete	7.84
7699	Housing—Rear section of housing complete with mounting screws	1.92
G9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
3688	Transformer—Output transformer (T3)	1.50
7607	Screen—Metal screen	.44
7608	Coil assembly—Comprising field coil, magnet and cone support (L14)	2.40
9023	Cone—Reproducer cone complete (L11)—Package of 5	5.00

RCA-VICTOR CO., INC.



RADIOTRON SOCKET VOLTAGES

*Measured at 220 Volts A. C., 60 cycles (Maximum Volume Control)

Radiotron No.	Cathode to Control Grid, Volts DC	Cathode to Screen Grid, Volts DC	Cathode to Plate, Volts DC	Plate Current M. A.	Heater Volts
RCA-78 R. F.	3.0	100	165	5.5	6.0
RCA-6A7 Oscillator 1st Detector	—	—	145	1.7	6.0
	3.0	100	145	2.5	—
RCA-77 2nd Detector	Plate and Bias Supply 165 Volts			—	6.0
RCA-43 Power	21.0	140	130	35.0	25.0
RCA-12Z3 Rectifier	220 RMS			—	12.0

*Voltages with 220 Volts D. C. supply will be approximately 10 per cent less than tabulated values

MODEL 23590-2
Alignment Data
Parts List

RCA-VICTOR CO., INC.

Electrical Specifications

Voltage Rating .... 200-230 AC or DC
Frequency Rating (AC) .... 50-60 Cycles
Power Consumption .... AC 60 Cycles-105 Watts—DC-85 Watts
Number and Types of Radiotrons .... 1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-12Z3—Total, 5
Undistorted Output .... 1.5 Watts
Frequency Range .... 540 KC-1500 KC

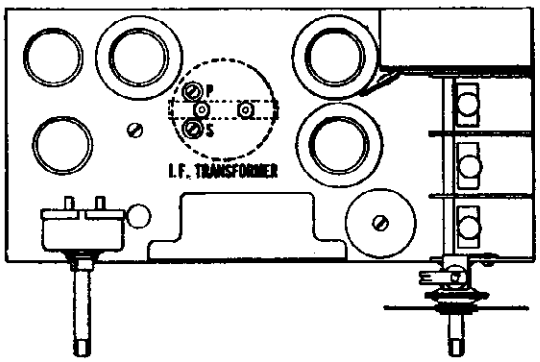


Figure C—Location of Line-Up Capacitors

This receiver is a five-tube Super-Heterodyne designed to operate on AC or DC over the voltage and frequency range indicated. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-12Z3, which is used in a half-wave circuit.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and for the R. F. circuits should be made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 KC and 1400 KC. An output meter and non-metallic screw driver are also necessary. The Stock No. 9050 test oscillator and Stock No. 7065 screw driver are suitable for this purpose. Figure C shows the location of the I. F. capacitors.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 KC, coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

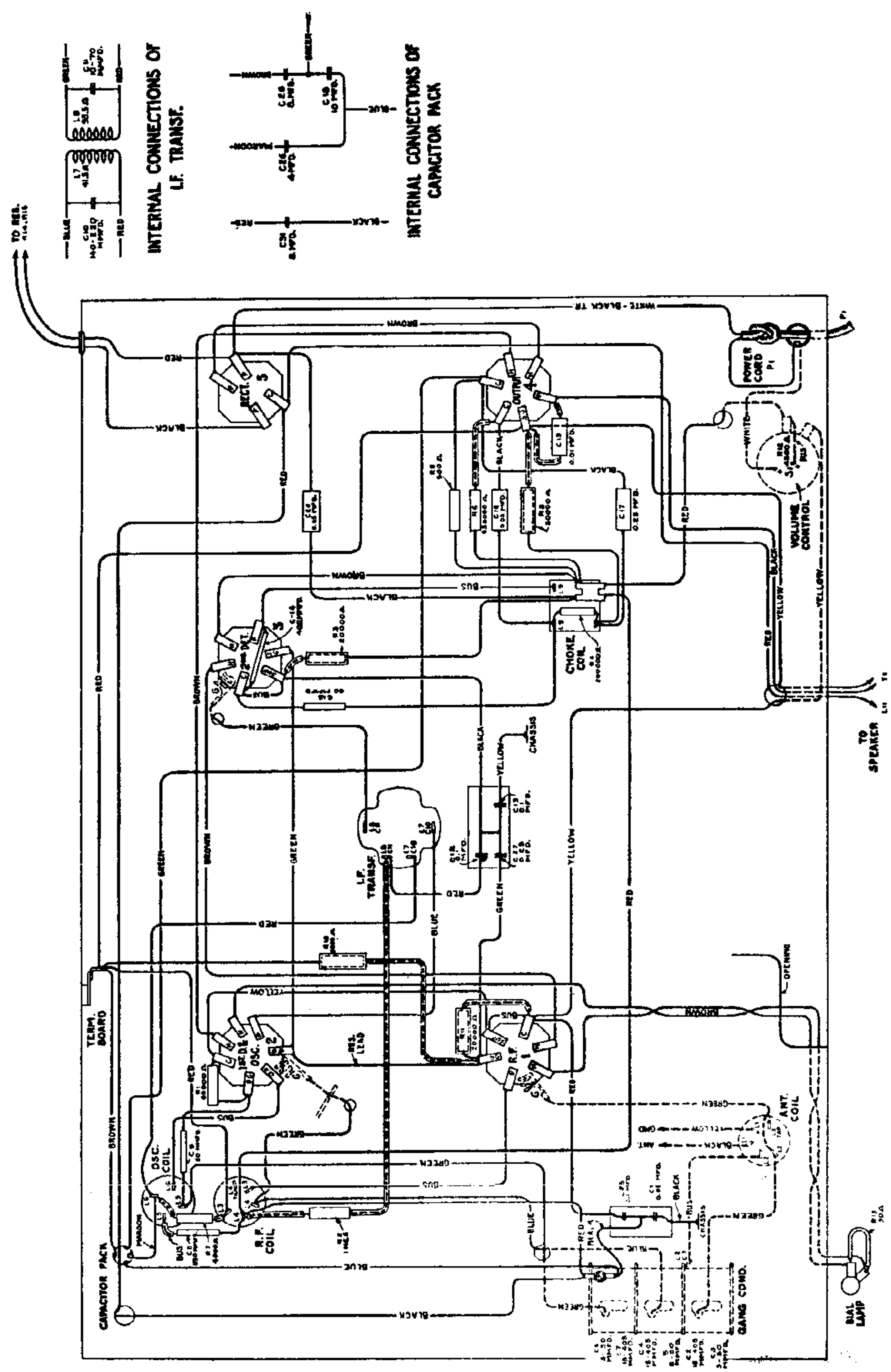
(c) After the I. F. circuits are aligned, the R. F. and oscillator circuits are adjusted at 1400 KC. Prior to making the adjustment, however, the dial should be checked. This is done by making sure the dial indicator reads 530 (indicator in center position) when the tuning capacitor rotor plates are fully meshed with the stator plates. The adjustments are then made in similar manner as that of the I. F. except that the oscillator is set at 1400 KC, its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3710	Capacitor—60 mmfd. (C15)	.36
3711	Capacitor—80 mmfd. (C9)	.40
3712	Capacitor—400 mmfd. (C14)	.40
3754	Capacitor—1150 mmfd. (C8)	.50
3701	Capacitor—0.01 mfd. (C19)	.30
3888	Capacitor—0.05 mfd. (C16)	.25
3916	Capacitor—0.05 mfd. (C20)	.32
3917	Capacitor—0.25 mfd. (C17)	.40
3755	Capacitor—Comprising two 0.1 mfd. and one 0.25 mfd. (C12, C13, C27)	.60
6621	Capacitor—Comprising one 0.05 and one 0.1 mfd. (C1, C25)	.46
6728	Capacitor—Comprising one 4.0 mfd., one 10.0 mfd. and two 8.0 mfd. (C18, C26, C28, C31)	2.94
6726	Coil—Choke coil (L9)	.62
6519	Coil—Antenna coil (L1, L2)	.88
6521	Coil—Oscillator coil (L5, L6)	.60
6520	Coil—R. F. coil (L3, L4)	.94
6723	Condenser—3-gang variable tuning condenser (C2, C3, C4, C5, C6, C7)	4.15
4701	Dial—Tuning condenser dial and drive assembly	1.50
4703	Escutcheon—Station selector escutcheon	.35
4449	Knob—Volume control or station selector knob—Package of 5	.60
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R2)—Package of 5	1.00
6250	Resistor—4000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	$1.00
3700	Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3632	Resistor—500 ohms—Carbon type—1 watt (R8)—Package of 5	1.10
2963	Resistor—8,000 ohms—Carbon type—1 watt (R10)—Package of 5	1.10
6114	Resistor—20,000 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3914	Resistor—30 ohms—Flexible type (R13)	.28
4718	Resistor—205 ohms—Porcelain type—(R15)	.90
3915	Resistor—320 ohms—Porcelain type—(RR14)	.88
3584	Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5	.40
3993	Screw—No. 6-32 square head set screw for condenser dial and drive assembly—Package of 10	.25
7065	Screwdriver—Insulated screwdriver and socket wrench—For I. F., R. F. and oscillator condenser adjustment	1.00
3623	Shield—Antenna R. F. or oscillator coil shield	.30
3950	Shield—Radiotron shield	.26
4700	Socket—Dial lamp socket	.35
3859	Socket—4-contact Radiotron socket	.30
6676	Socket—6-contact Radiotron socket	.40
7485	Socket—6-contact Radiotron socket—Second detector	.40
6727	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.68
4702	Volume control (R12, S1)	1.30
	REPRODUCER ASSEMBLIES	
7845	Coil—Field coil magnet and cone support (L11)	2.50
9492	Cone—Reproducer cone (L10)—Package of 5	3.70
7847	Reproducer complete	6.30
7846	Transformer—Output transformer (T1)	1.65

RCA-VICTOR CO., INC.



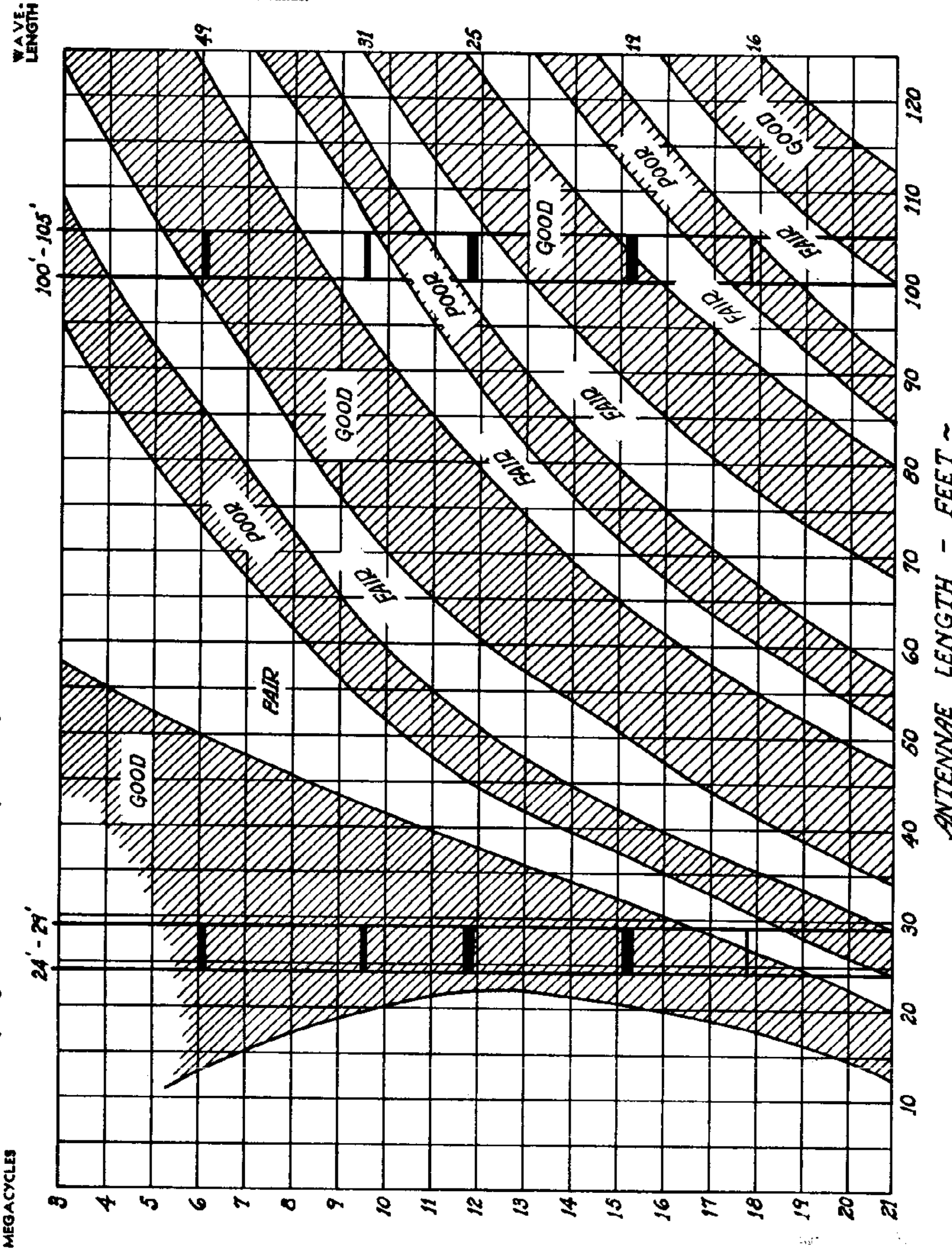
Antenna Length
Chart

RCA-VICTOR CO., INC.

From the chart shown, it can be seen that a wide variation in signal strength can be obtained with various length antennas. This data applies particularly to the six-tube receiver and in general to the eight-tube receivers but does not necessarily apply to competitive instruments. The various degrees of reception are approximately equal for various antenna lengths. For example, the "good" sections give about four times as much sensitivity as the "poor" sections. As this is also an equal gain over noise, proper choice of antenna length can often make the difference between satisfactory and unsatisfactory reception.

In conjunction with the question of the relative merits of a short or long antenna for the frequencies that fall in the "good" sections of each, either length will be equally good, assuming that neither is shielded by buildings of metallic construction or other such objects. If, for example, part of the antenna or lead-in is shielded by the building, then the longer antenna will give better results. Also the longer antenna will give better results in the broadcast band.

The solid black rectangular blocks indicate both the frequencies of, and the antenna lengths recommended particularly for the short-wave broadcast bands.



ANTENNA LENGTH CHART

(Lengths shown are overall, Including Lead-in Wire to Receiver—Ground Wire not to exceed 15 feet.)

RCA-VICTOR CO., INC.

World Wide Antenna Installation Data

General Considerations

To insure the greatest possible benefits from the RCA "World-Wide" Antenna System, three important considerations should be observed during its installation:

(a) Height above ground.
(b) Distance from local sources of noise interference, such as power lines, street railroads and automobile highways.
(c) Direction of span.

Height above Ground — This consideration probably is the most important since it directly affects the strength at which signals will be received. Ordinarily, the antenna will be erected either upon the roof of a building or suspended between that roof and a nearby tree or pole. For the usual dwelling having a roof and framework of non-metallic materials, the height will be measured with respect to the actual surface of the earth. However, if the opposite condition exists, as in the case of a modern apartment house or hotel, effective ground shall be assumed as at the metal roof. For good results, the horizontal wires of the antenna should be at least 30 feet above the effective ground.

Distance from Sources of Interference—Since the antenna system excludes from the receiver all interference signals "picked-up" by the transmission line, the antenna should be erected as far as possible from sources of interference in the immediate locality. The antenna proper may be located up to 500 feet distant from the receiver, adding one or more lengths of transmission line to the length furnished, as required. To maintain the correct *electrical matching*, any excess length of transmission line should not be removed unless two or more full lengths have been added. Where the required length of line is less than one or two full lengths, the excess line should be coiled up neatly at the end nearest the receiver.

Direction of Span—This antenna system exhibits a slight directional effect—that is, the geographical position of the span may have some effect upon the intensity of incoming signals. Wherever possible, therefore, the antenna should point in a direction at right angles to that of the transmission path from favored broadcasting stations. If the antenna must be located near a street railroad or a much-traveled highway, direct "pick-up" of interference signals on the doublets can be minimized by erecting the span to point toward the source of interference.

Mounting Procedure

The actual set-up of the antenna system is very simple and can be performed by practically anyone. Since the means of supporting the antenna will of necessity be different in almost every case, that portion of the installation will not be discussed herein. General recommendations in this respect, however, are contained in Figure 1. Insofar as possible, the intent of such recommendations should be observed, even for different forms of mounting.

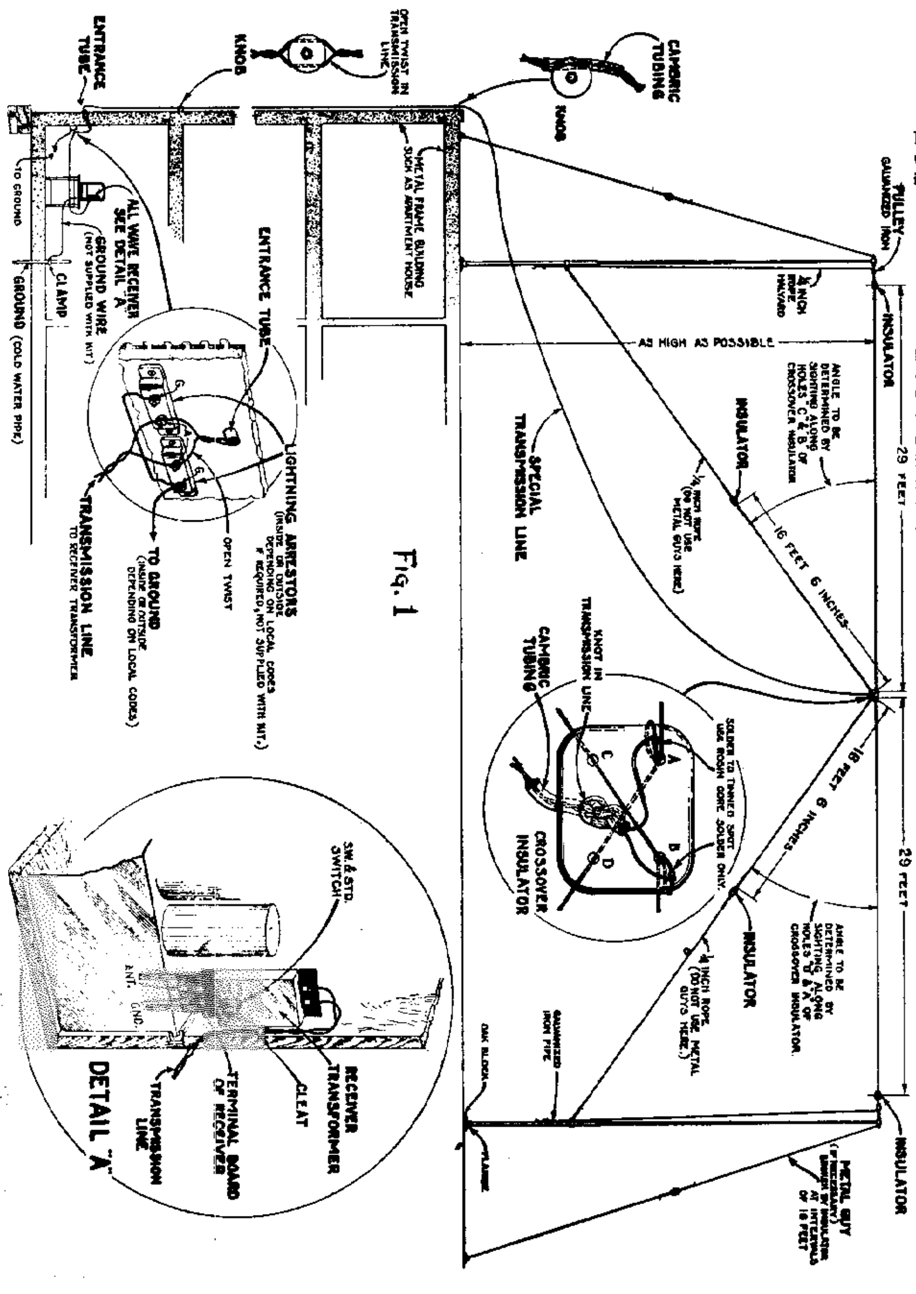
Assembly—As shown in Figure 1, the two doublet antennae which comprise this system are formed by the two stranded wires supplied with the kit. By means of the porcelain crossover insulator, these wires are crossed to produce two horizontal sections, each 29 feet in length, and two angularly-displaced sections, each 16½ feet in length. An extra length of six inches is afforded at each end of both continuous wires for connection to the porcelain strain insulators, both (as noted under "Equipment") being 46½ feet long. In assembling these wires to the crossover insulator, be careful that the actual cross occurs on opposite sides of the insulator.

The transmission line finally should be connected to the antenna wires as indicated by the detail illustration of the crossover insulator in Figure 1. A tinned spot on each wire is provided to identify the points at which the transmission line should be attached. Make certain to insert the piece of cambric tubing at the insulator and to use only rosin-core solder for the connections as recommended. The antenna now may be suspended between the masts or intended points of support.

Connection to Receiver—The opposite end of the transmission line should be led to the receiver, using the porcelain insulator knobs (if required) and the porcelain entrance-tube insulator. Then install the coupling transformer upon the antenna-ground terminal board of the receiver, as shown in Detail A of Figure 1, and attach the transmission line to this transformer. A metal cleat and wood screw are provided to secure the transmission line to the receiver cabinet.

NOTE—For models having no terminal board, it is very important that the transformer be installed as near to the chassis as possible. To insure best noise elimination, this connection should be no longer than one inch. The connection to the antenna also should be kept as short as possible, although it is more important to avoid too close proximity of this wire to grid terminals of the receiver tubes.

Connection to Ground—A ground clamp is supplied for securing a tight and permanent connection of the ground wire from the receiver to a water pipe in the basement or to an external metallic stake driven from five to eight feet into the soil. The ground wire should be No. 14 or larger (rubber-covered) and should follow as short and direct a route as possible. Since the length required will be different for each installation, this wire is not furnished with the kit, but may be obtained locally.



ALTERNATIVE ANTENNA ARRANGEMENTS

In certain installations, space limitations may prevent the use of the full antenna span—approximately 60 feet. Three alternative arrangements, listed in order of preference, are possible:

(a) Reduced overall length through the use of loading coils.
(b) Reduction of the horizontal angle from a straight line span (180 degrees) to any other of not less than 90 degrees.
(c) Vertical suspension.

The first arrangement (a), in which loading coils are inserted to replace lengths removed from the horizontal sections of the antenna as illustrated by Figure 2, is recommended as the preferred alternative. In this manner, the overall span is reduced to approximately 34 feet, without impairing the original tuning characteristics of the system except in the region of 31 meters. The loss encountered within the broadcast band at this wavelength, however, will not be serious.

Using the second alternative (b), the length of the antenna span is decreased by reducing the horizontal angle between the halves of the system (as viewed from above), rather than by shortening the lengths of the horizontal sections. While loading coils are not required, a third support for the antenna at the crossover insulator must be provided, the installation therefore being usually more difficult than for either *straight-line* arrangement. The antenna efficiency naturally will be lowered as the angle is decreased, resulting in a signal-strength loss on all bands of approximately 30 percent at an angle of 90 degrees.

If vertical suspension (c) is employed, much less ground space than for any horizontal form of antenna is necessary. Although somewhat inferior in noise ratio to the horizontal type, the vertical system enjoys an additional advantage of being practically non-directional. Such an installation, however, is usually both difficult and expensive, but can be simplified to a large extent through the use of loading coils.

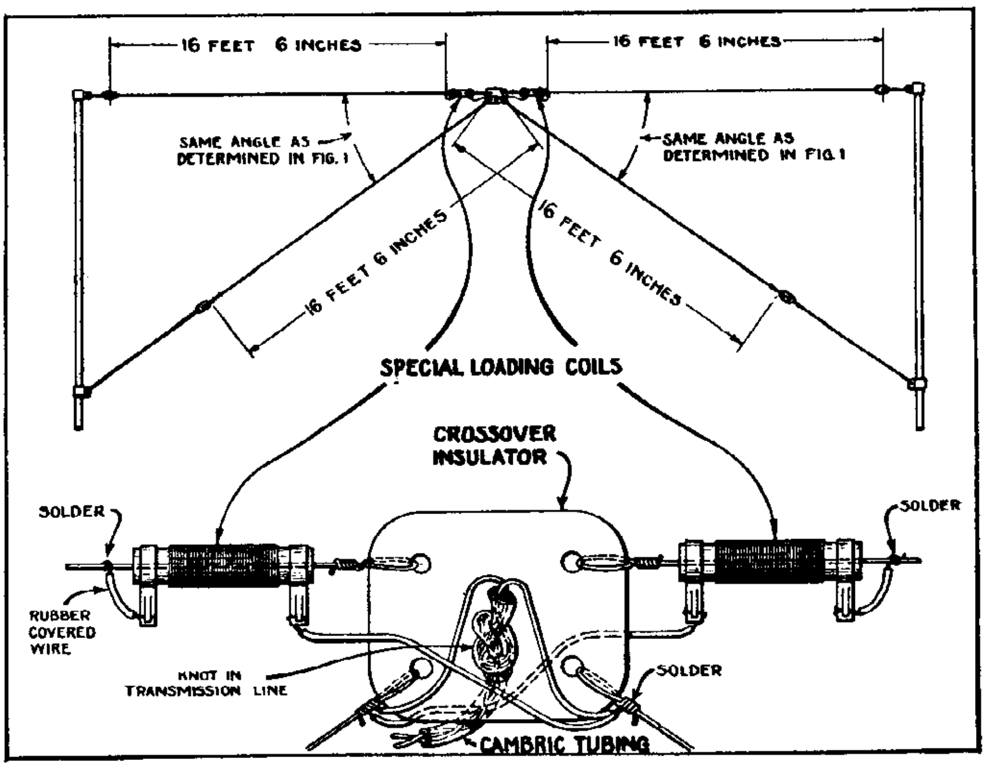


Figure 2

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
4324	Transformer (Coupling transformer and switch assembly)—For replacement purposes only; item to be replaced must be returned with order	$2.50	4327	Insulator (Crossover insulator)—For replacement purposes only; item to be replaced must be returned with order	$0.10
4325	Knob (Switch knob)—Package of 5	1.00	4328	Transmission line (special lead-in—110 feet long)	3.72
4326	Wire (2 rolls stranded wire, each 46½ feet long)	1.16	4329	Transmission line (special lead-in—220 feet long)	7.44
			4330	Transmission line (special lead-in 330 feet long)	11.16

MODEL 2-19
Portable Victrola
Notes

RCA-VICTOR CO., INC.
SERVICE DATA

This instrument is a small portable type mechanical phonograph built into a cabinet resembling a small suitcase. Excellent quality, high output and good mechanical construction are features of this instrument.

LUBRICATION

Premature wear, noisy operation and failure of parts are direct results of failure to clean and lubricate the motor at necessary intervals. The various bearings and gears of the motor should be cleaned and lubricated at least once every six months. In addition to the regular lubrication, all motor parts should be covered with a light film of oil to prevent rusting. Use only Stock No. 7226 Motor Oil and Stock No. 7227 Motor Grease when lubricating this instrument.

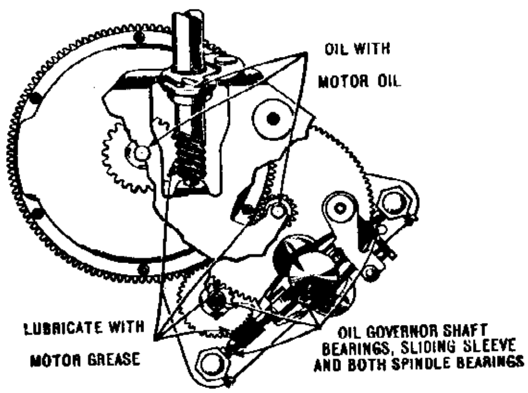


Figure A—Lubrication Diagram

Motor. Figure A shows a view of the motor with the top plate cut away. Before lubricating the parts shown in this illustration, a thorough cleaning with carbon tetrachloride (Carbona) or gasoline is necessary. If necessary disassemble the entire motor for such cleaning.

Tone Arm. The joint between the taper tube and the sound chamber must be free to swing easily without play and be sealed with grease. This bearing is accessible when the three mounting screws are removed. Failure to seal this joint will result in poor quality. Unnecessary friction will cause undue record wear.

MOTOR

The motor used is of simple design and will give excellent performance. If kept clean and properly lubricated, little service attention will be required. The following points may prove useful when it is necessary to effect repairs. *Before doing any work on the motor the machine must be allowed to run down completely.*

Removing Motor from Cabinet. To remove the motor from the cabinet proceed as follows:

(*a*) Unscrew the spindle cap and remove the turntable.

(*b*) Remove the five screws that hold the motor board and lid-support to the cabinet and remove the motor-board assembly.

(*c*) Remove the speed-regulator lever.

(*d*) Remove the three machine screws that hold the motor in place. The motor may then be removed.

Changing Motor Springs. Should a spring break and require replacement the best method to make a repair is to replace the entire spring barrel. While the cost of the spring barrel is greater than that of the spring alone, the saving in labor will usually justify such replacement. Unless the serviceman is experienced in handling springs of this type, the following directions should be followed carefully:

(*a*) Disassemble the motor and remove the spring barrel. Remove the winding gear.

(*b*) Place the gear flat on a piece of metal and file off the ends of the six rivets. Remove the rivets and gear.

(*c*) Place the palm of the right hand over the closed end of the barrel, making sure that the fingers do not protrude beyond the open side. Firmly hold the barrel, open side downward, over a large can or barrel. With the left hand pull the center turns of the spring out. As soon as the spring starts, pull the left hand clear of the can, holding the spring barrel firmly until the spring is entirely clear.

(*d*) *A new coiled spring may prove extremely dangerous if not properly handled. Read these instructions and work very carefully, especially if not experienced in work of this kind.* The new spring is furnished coiled and with a heavy wire clamp holding the spring tightly wound. Pull out about one foot of the spring. Then with the spring flat on a table gently tap the ring until it comes to the edge. Do not push the clamp so close to the edge that it will not hold the spring.

Place the hook end of the spring over the barrel hook. Wind the exposed end into the barrel and then insert the entire spring in the barrel, allowing the clamp to be on the outer edge. Place a block over the entire spring and force the spring into the barrel, thereby releasing the clamp.

(*f*) Place a tablespoonful of spring lubricant between the spring leaves and in the center of the spring.

(*g*) Place the gear in position and rivet it with six rivets to the spring barrel. Use a small punch for flattening the ends of the rivets. Place the gear on a flat surface while re-riveting the barrel to it.

(*h*) Reassemble the motor in the reverse manner of that used to dismantle it.

Winding Shaft Binding. A heavy jar may cause the motor to shift slightly on the motor board and produce binding of the winding shaft against the motor board. Loosening the motor mounting screws and shifting the motor to its proper position (center of slot) will correct this condition.

MODEL 2-19
Portable Victrola
Parts List

RCA-VICTOR CO., INC.

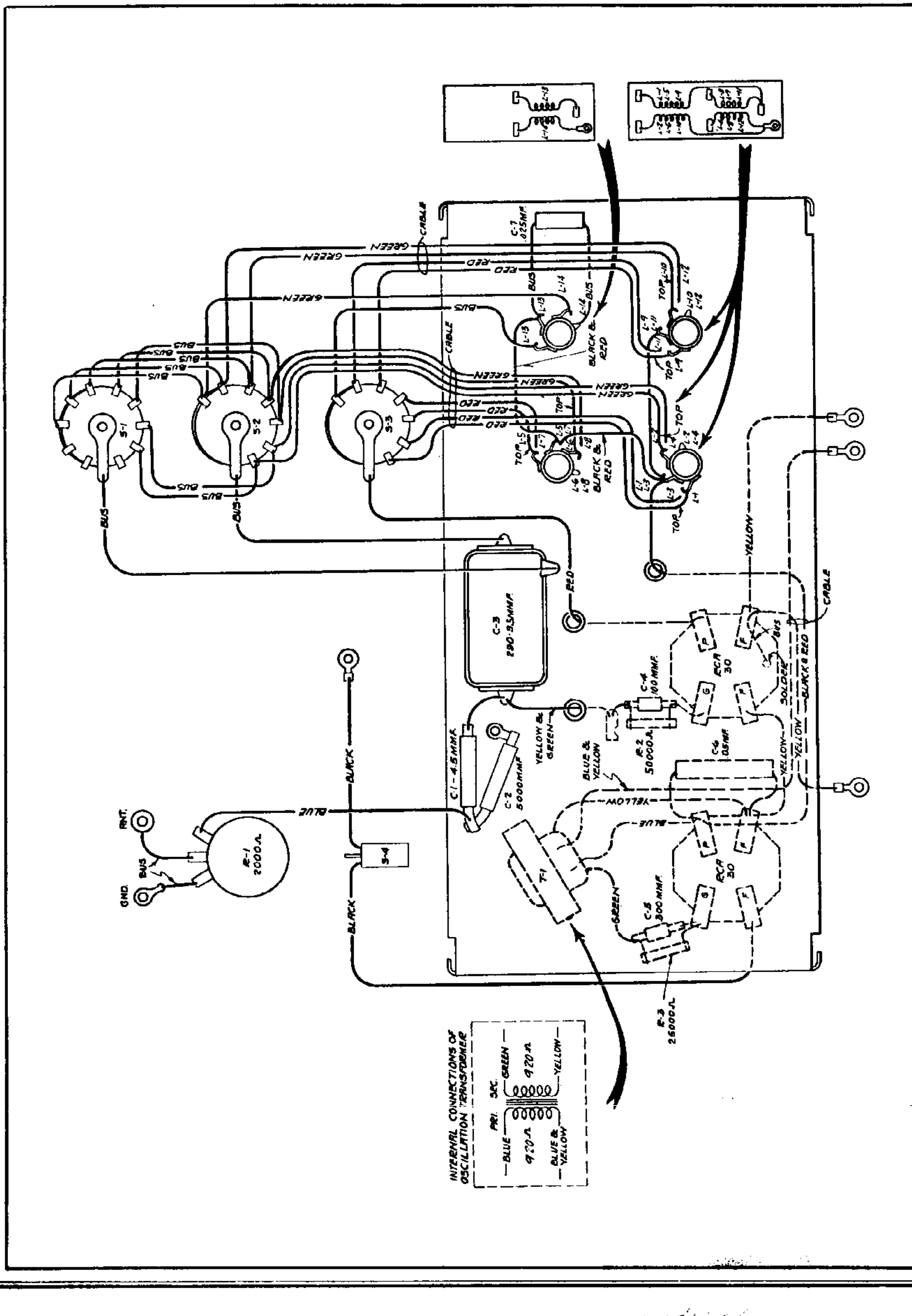
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
2872	Governor ball and spring assembly—Comprising ball, spring mounting screws, and washers—Package of 5	$0.75
2937	Gear—Winding gear and sleeve	.75
2947	Leather—Friction leather for brake—Package of 20	.50
4107	Brake—Turntable brake and bracket	.55
4108	Lever—Speed regulator lever	.45
4109	Cup—Needle cup	.22
4110	Holder—Needle holder	.45
4111	Cap—Turntable spindle cap	.65
4112	Plate—Speed regulator plate	.55
4113	Bracket—Sound box rest bracket	.50
4114	Support—Lid support	.25
4115	Screw and washer—Motor board mounting screw and washer—Package of 3	.25
4116	Catch—Cabinet catch complete with mounting rivets—Package of 2	.40
4117	Strap—Record pocket strap assembly	.16
4118	Screw—Needle holding screw—Package of 10	.65
6837	Key—Winding key	.70
6838	Handle—Carrying handle	.82
6839	Extension—Winding shaft extension	.45
6933	Sound box—Complete with needle screw	1.80
7210	Spindle—Turntable spindle with pins and ball bearing—Less gear	.50
7211	Gear—Turntable spindle gear complete, with set screw	.50
7214	Governor assembly — Comprising governor spindle, disc, sleeve, collar, governor balls and springs	$2.50
7226	RCA Victor motor grease—1 pint can	.40
7227	RCA Victor motor oil—1 pint can	.50
7228	RCA Victor spring lubricant—1 pint can	.65
7719	Board—Motor board with horn—Less hardware and motor—Green	3.90
7720	Arm—Tone arm assembly	3.26
7721	Turntable—Green	1.20
7722	Turntable—Blue	1.20
7723	Board—Motor board and horn—Less hardware and motor—Blue	3.90
7724	Cabinet—Complete with handle and catches—Blue	12.40
7725	Cabinet—Complete with handle and catches—Green	12.70
7726	Pocket—Record pocket—Black	.98
7727	Pocket—Record pocket—Green	.98
7729	Plate—Top plate assembly	3.96
7730	Motor—Motor complete with spindle cap	10.40
8655	Barrel—Spring barrel assembly	2.64
8656	Spring—Mainspring	1.15
8657	Gear—Intermediate gear pinion and shaft	.70
8658	Shaft — Winding shaft — Comprising shaft, collar, pin, ratchet, and washer — Less winding extension	.96
10116	Spring—Brake spring—Package of 10	.60

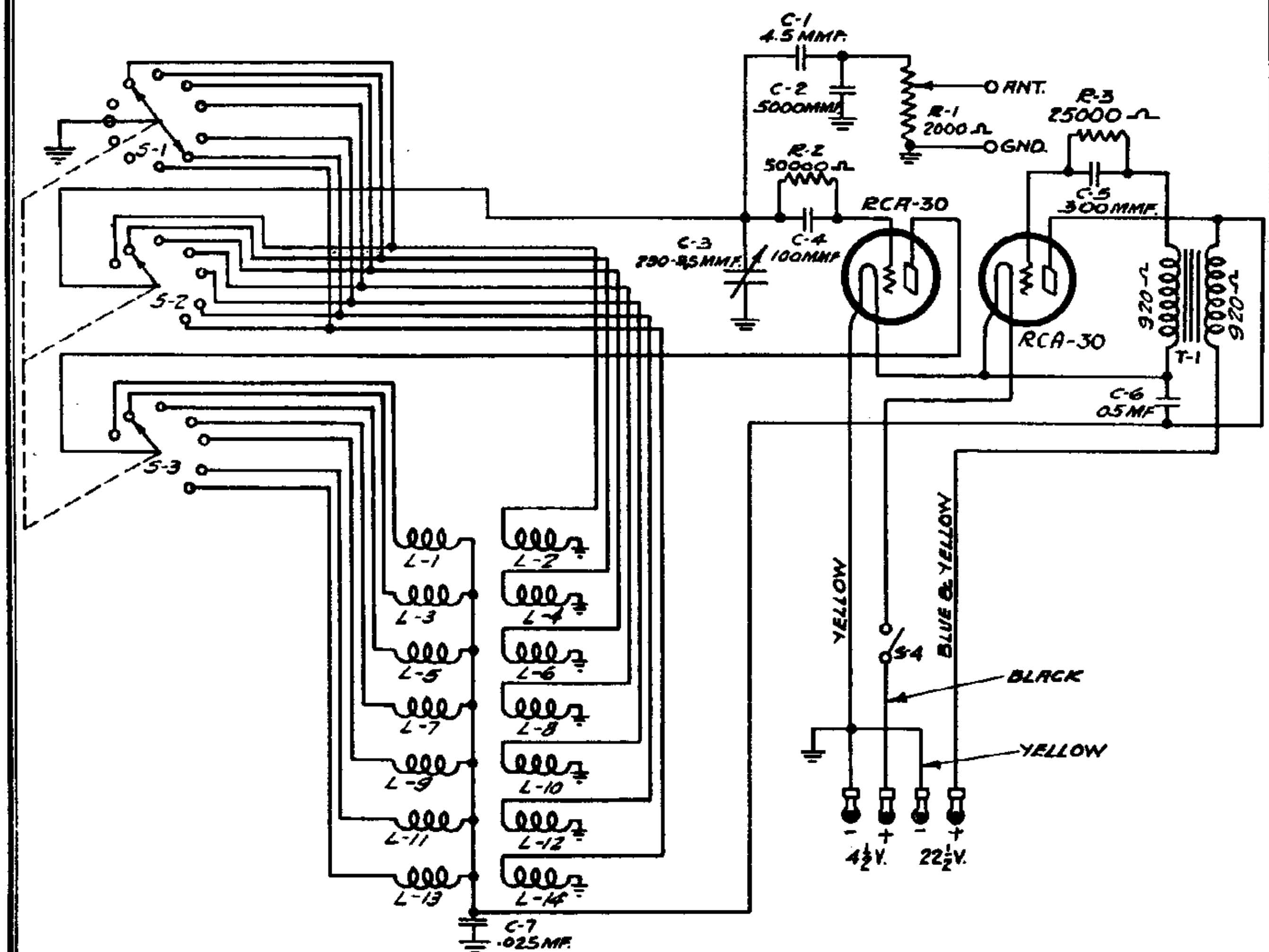
MODEL TMV-97-A
Oscillator
Chassis Wiring

RCA-VICTOR CO., INC.



MODEL TMV-97-A
Schematic
Parts List

RCA-VICTOR CO., INC.



REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
2039	Switch—Single pole, single throw toggle switch	$0.72
2744	Capacitor—4.5 mmfd. capacitor (C1)—Package of 5	1.60
2932	Capacitor—5,000 mmfd. capacitor (C2)	.50
3110	Resistor—25,000 ohm—¼ watt carbon resistor (R3)—Package of 5	1.00
3114	Resistor—50,000 ohm—¼ watt carbon resistor (R2)—Package of 5	1.00
3640	Capacitor—.05 mfd. capacitor (C6)	.25
3765	Capacitor—.025 mfd. capacitor (C7)	.34
3794	Capacitor—100 mmfd. capacitor (C4)	.30
3975	Coil—R. F. oscillation coil (L1, L2, L3, L4)	1.38
3976	Coil—R. F. oscillation coil (L5, L6, L7, L8)	1.38
3977	Coil—R. F. oscillation coil (L9, L10, L11, L12)	1.28
3978	Coil—R. F. oscillation coil (L13, L14)	1.28
3979	Transformer—A. F. oscillation transformer (T1)	$1.94
3980	Condenser—Tuning condenser (C3)	1.40
3981	Capacitor—300 mmfd. capacitor (C5)	.30
3982	Handle—Carrying handle	.60
3983	Switch—Range switch (S1, S2, S3)	3.94
3984	Knob—Moulded knob	.30
3985	Scale—Range switch dial scale	.66
3986	Scale—Attenuator potentiometer dial scale	.66
3987	Potentiometer — Attenuator potentiometer (R1)	1.70
3988	Post—"Antenna-Ground" binding post	.32
3989	Dial—Tuning condenser vernier dial	4.15
3990	Clip—Spring steel clip	.25
6300	Socket—Radiotron socket	.35

MODEL CRD-9
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

NOTE—If the maximum volume, obtained with the volume control in the extreme clockwise position, is insufficient to meet the requirements of a particular installation, the locking device may be re-adjusted as follows: (1) Remove volume control knob by pulling outward; (2) take off rear panel by removing screws at edges; (3) loosen lock nut holding right angled bracket which serves as stop for metal pointer on shaft; (4) turn shaft clockwise until volume is increased to desired level; (5) lock bracket in new position against pointer, by retightening lock nut; and (6) replace rear panel and knob.

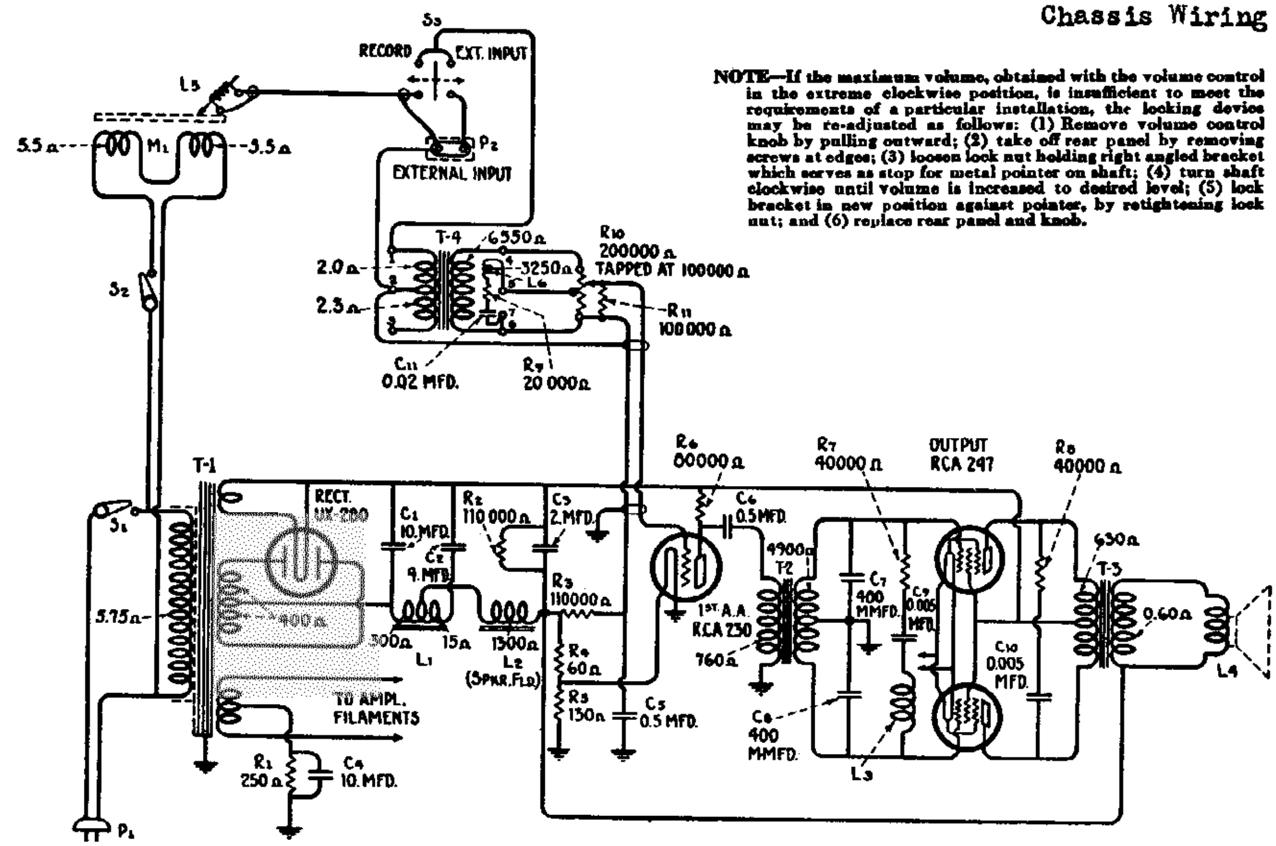


Figure A—Schematic Circuit

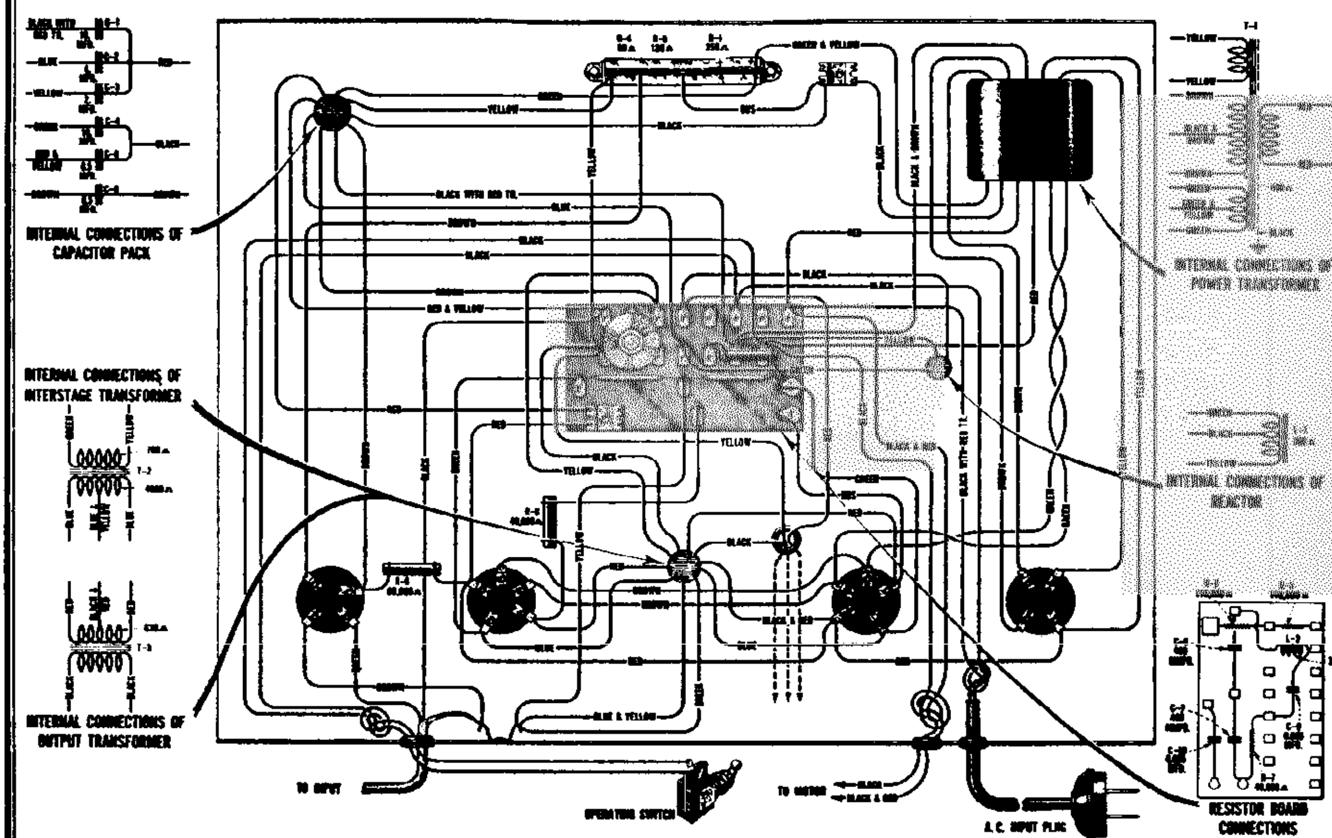


Figure B—Amplifier Wiring

MODEL CRD-9
Assembly Wiring
Parts List

RCA-VICTOR CO., INC.

External Input—To use the demonstrator amplifier and loudspeaker for reproduction from an external source of audio frequency input, proceed as follows:

1. Plug the two wires (which should be equipped with pin terminals) from the external source into the pin jacks located below the Transfer Switch.

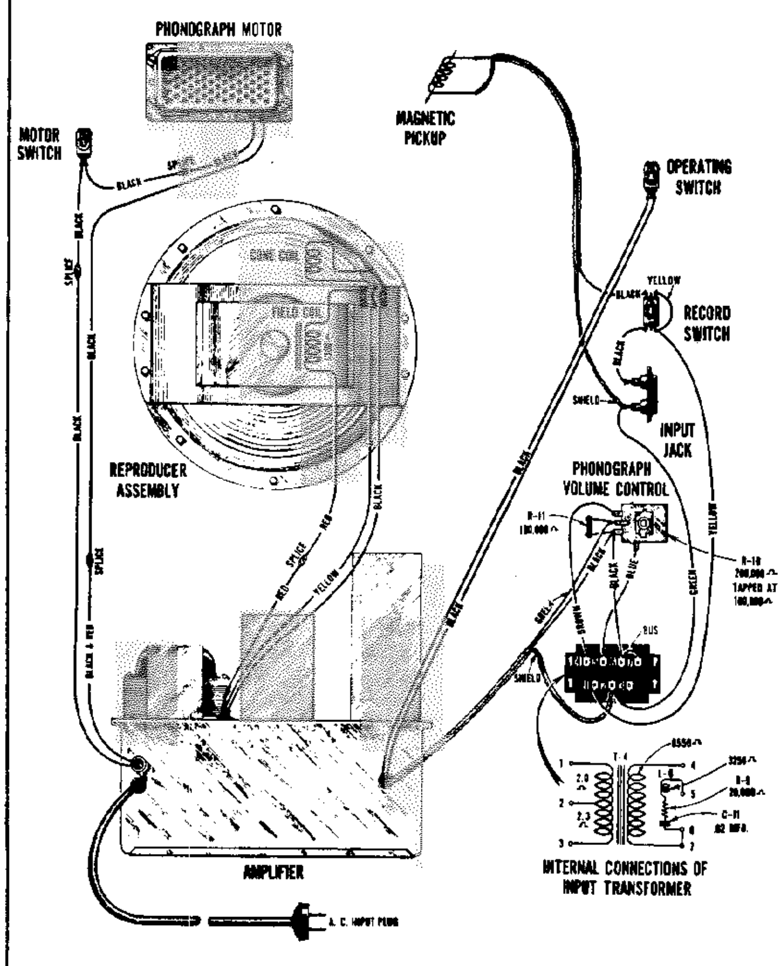
NOTE—The impedance of the external input circuit should match that of the demonstrator input, which is approximately 10 ohms at 1,000 cycles.

2. Set the Power Switch to the "on" position. The Motor Switch should be in the "off" position.
3. Set the Transfer Switch in the downward position. Signals originating in the external input circuit will now be heard through the demonstrator loudspeaker.
4. Adjust the volume to the desired level by means of the demonstrator Volume Control.
5. When through operating, set the Power Switch to the "off" position.

SERVICE DATA

Radiotron No.	Filament to Control Grid	Filament to Screen Grid	Filament to Plate	Plate Current M. A.	Filament Volts
RCA-230—A. F.	4.5	—	260	2.0	2.0
RCA-247—Pwr.	17.0	260	250	30.0	2.5
RCA-247—Pwr.	17	260	250	30.0	2.5
UX-280—Rect.	375 volts each plate—80 M. A. total current				

Stock No.	DESCRIPTION	List Price
	PICKUP, ARM AND TURNTABLE ASSEMBLIES	
3385	Coil—Pickup coil	$0.50
3386	Cover—Pickup cover	.75
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut, and one washer—Package of 10	.60
3388	Screw—Pickup needle holding screw—Package of 10	.80
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.50
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.65
3417	Armature—Pickup armature	.75
3418	Cushions—Pickup rubber cushions—Comprising one damper, two spacer cushions and one damper bushing—Package of 5 sets	1.25
3419	Screw—Pickup cover mounting screw—Package of 10	.50
6335	Pickup—Pickup unit complete	12.00
6346	Back—Pickup housing back	.65
7084	Cover—Suede cover for turntable	.50
7530	Arm—Pickup arm complete—Less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
8968	Turntable complete	2.58
	AMPLIFIER ASSEMBLIES	
2882	Socket—5 contact Radiotron socket complete with insulator	.50
2968	Socket—4 contact Radiotron socket complete with insulator—For Radiotron UX-280	.50
3032	Socket—4 contact Radiotron socket complete with insulator—For Radiotron RCA-230	.50
3045	Resistor—40,000 ohms—Carbon type—1 watt—Package of 5	2.50
3085	Capacitor—400 mmfd.—Located on resistor board	.60
3099	Capacitor—0.005 mfd.—Located on resistor board	.75
3295	Resistor—110,000 ohms—Carbon type—½ watt—Package of 5	2.50
3297	Resistor—80,000 ohms—Carbon type—1 watt—Package of 5	2.50
3475	Switch—Phonograph and amplifier switch—Single pole, single throw—Toggle type	1.28
3476	Cable—Shielded two conductor cable—Approximately 13½ inches long	$0.36
3479	Capacitor — 0.005 mfd. — Located nearest choke coil on resistor board	.80
3481	Coil—Choke coil—Located on resistor board	.70
7270	Reactor—Filter reactor	4.00
7458	Resistor—Flat type—440 ohms—Tapped at 60, 130 and 250 ohms—Complete with mounting rivets	1.10
7568	Transformer assembly—Comprising interstage and output transformer in metal container	4.48
7569	Capacitor pack—Comprising two 10.0 mfd., one 4.0 mfd., one 2.0 mfd. and two 0.5 mfd.	4.68
8900	Transformer—Power transformer	9.00
	MOTOR ASSEMBLIES	
3398	Motor mounting assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer—One set	.75
7389	Rotor and shaft for 105-125 volts—60 cycle motor	9.00
8966	Motor—Motor complete—105-125 volts—60 cycles	18.26
8967	Spindle—Turntable spindle with fibre gear for 60 cycle motor	8.00
	MISCELLANEOUS PARTS	
2761	Jack—Twin jack with mounting screws	5.00
3101	Switch—Phonograph switch—Double pole, single throw—Toggle type—Located on upper left side of cabinet	1.25
3118	Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5	2.00
6288	Knob—Volume control knob—Package of 5	1.50
6292	Switch—Motor switch—Single pole, single throw—Toggle type	1.25
6384	Volume control—Complete with mounting washer and nut	1.60
7054	Cord—Power cord	1.00
	REPRODUCER ASSEMBLIES	
3483	Bolt—Reproducer mounting bolt assembly—Comprising 2 hook bolts, 2 washers, 2 lock washers and 2 nuts	.78
6382	Transformer—Input transformer	3.88
8916	Cone—Reproducer cone—Package of 5	15.00
9423	Coil assembly—Comprising field coil, magnet and cone support	12.15



Radiotrons—*Always set the Power Switch in the "off" position before removing any Radiotron from its socket.*

Figure C—Assembly Wiring

RCA-VICTOR CO., INC.

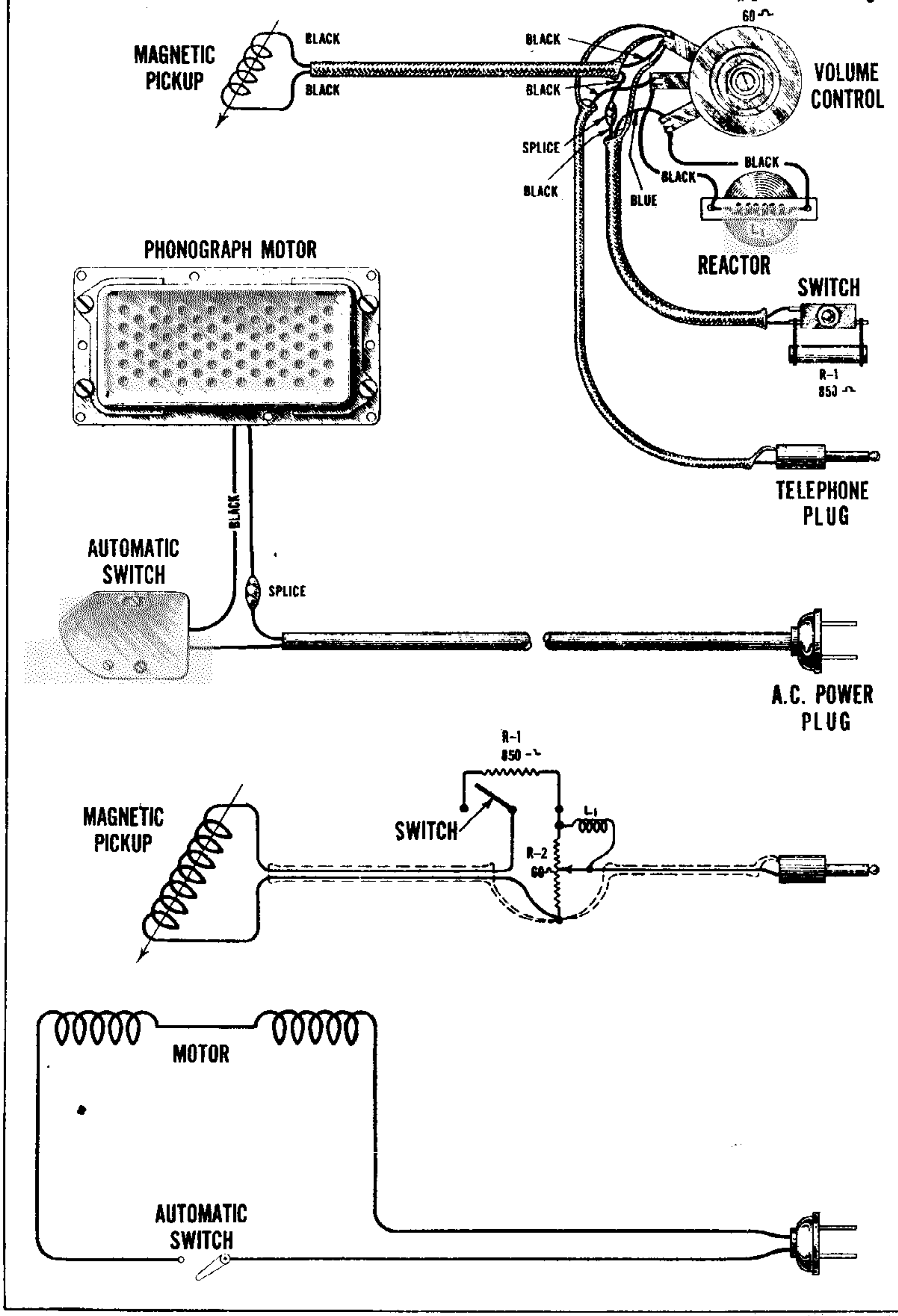


Figure C—Wiring and Schematic Diagrams (PT16A1,A2)

MODEL PT-16-A1
PT-16-A2
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	TURNTABLE—MODEL PT-16A1 AND PT-16A2	
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing for turntable spindle—Package of 5	$0.40
3338	Ring—Clamp ring assembly	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov pin—Package of 2	.56
3342	Spring—Latch spring on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing — Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3838	Lever—Speed shifter lever	.70
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Turntable complete	5.50
	PICKUP AND PICKUP ARM ASSEMBLIES	
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw, nut and washer	.40
3388	Screw—Pickup needle holding screw	.60
3389	Rod—Automatic brake trip rod	.40
3390	Escutcheon—Pickup arm escutcheon	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions	1.10
3419	Screw—Pickup cover mounting screw	.40
3516	Damper—Damper and bushing for pickup arm base	.14
6335	Pickup—Pickup unit complete	4.00
6346	Back—Pickup housing back	.45
7593	Arm—Pickup arm less pickup	6.00
	MOTOR ASSEMBLIES	
3599	Screw—Motor mounting screw and lockwasher—Package of 3 sets	$.30
8989	Motor—105–125 volt—60 cycle motor	18.52
8990	Motor—105–125 volt—50 cycle motor	18.52
8993	Rotor—Rotor and shaft for motor 105–125 volt—60 cycle	7.00
8994	Spindle—Spindle and gear for motor 105–125 volt—60 cycle	4.75
8995	Rotor—Rotor and shaft for motor 105–125 volt—50 cycle	7.00
8996	Spindle—Spindle and gear for motor 105–125 volt—50 cycle	4.75
	MOTOR BOARD ASSEMBLIES	
2779	Pointer—Volume control pointer—Package of 10	.50
2947	Shoe—Leather brake shoe Package of 20	.50
3322	Switch—Automatic brake switch	.75
4098	Cord—Power cord and plug	1.00
4099	Cable—Shielded signal cable and plug	1.25
4100	Volume control—Turntable volume control	2.50
4101	Switch—Single pole—double throw—toggle switch	.75
6247	Resistor—850 ohm—¼ watt—Carbon type resistor—Package of 5	1.00
6288	Knob—Volume control knob—Package of 5	1.00
7387	Reactor—Tone compensating reactor	.85
7691	Support—Pickup support	4.28
10174	Springs—Automatic brake springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate—Package of 5	.40
10241	Box—Needle box with lid—Package of 2	.60

MODELS PT-16-A1, PT-16-A2
PT-17-A1, PT-17-A2
Pickup Data

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating........................105–125 Volts A. C.

Frequency Rating........................50 and 60 Cycles

Power Consumption..........{30 Watts Single Turntable / 60 Watts Double Turntable}

WIRING

The schematic and assembly wiring diagrams are shown in Figure C.

MAGNETIC PICKUP

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

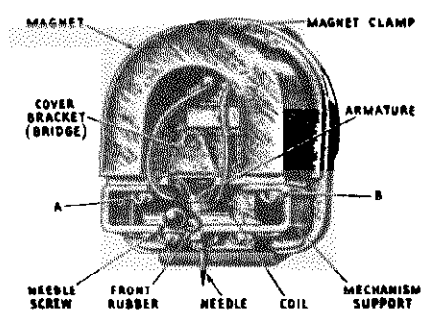


Figure A

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled except for the magnet, which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B, Figure A, and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover now may be replaced over the entire assembly, and the pickup returned to the tone arm.

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

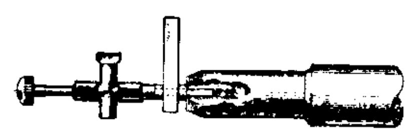


Figure B

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure B, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be assembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h) above.

MODEL PT-17-A1
PT-17-A2
Schematic
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	TURNTABLE—MODEL PT-17A1 AND PT-17A2	
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing for turntable spindle—Package of 5	$0.40
3338	Ring—Clamp ring assembly	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov pin—Package of 2	.56
3342	Spring—Latch spring on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3838	Lever—Speed shifter lever	.70
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Turntable complete	5.50
	PICKUP AND PICKUP ARM ASSEMBLIES	
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw, nut and washer	.40
3388	Screw—Pickup needle holding screw	.60
3389	Rod—Automatic brake trip rod	.40
3390	Escutcheon—Pickup arm escutcheon	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions	1.10
3419	Screw—Pickup cover mounting screw	.40
3516	Damper—Damper and bushing for pickup arm base	.14
6335	Pickup—Pickup unit complete	4.00
6846	Back—Pickup housing back	.45
7593	Arm—Pickup arm less pickup	6.00

Stock No.	DESCRIPTION	List Price
	MOTOR ASSEMBLIES	
3599	Screw—Motor mounting screw and lock-washer—Package of 3 sets	$0.30
8989	Motor—105-125 volt—60 cycle motor	18.52
8990	Motor—105-125 volt—50 cycle motor	18.52
8993	Rotor—Rotor and shaft for motor 105-125 volt—60 cycle	7.00
8994	Spindle—Spindle and gear for motor 105-125 volt—60 cycle	4.75
8995	Rotor—Rotor and shaft for motor 105-125 volt—50 cycle	7.00
8996	Spindle—Spindle and gear for motor 105-125 volt—50 cycle	4.75
	MOTOR BOARD ASSEMBLIES	
2779	Pointer—Volume control pointer—Package of 10	.50
2947	Shoe—Leather brake shoe—Package of 20	.50
3322	Switch—Automatic brake switch	.75
4098	Cord—Power cord and plug	1.00
4099	Cable—Shielded signal cable and plug	1.25
4100	Volume control—Turntable volume control	2.50
4101	Switch—Single pole—double throw—toggle switch	.75
6247	Resistor—850 ohm—½ watt—Carbon type resistor—Package of 5	1.00
6288	Knob—Volume control knob—Package of 5	1.00
7387	Reactor—Tone compensating reactor	.85
7691	Support—Pickup support	4.28
10174	Springs—Automatic brake springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate—Package of 5	.40
10241	Box—Needle box with lid—Package of 2	.60

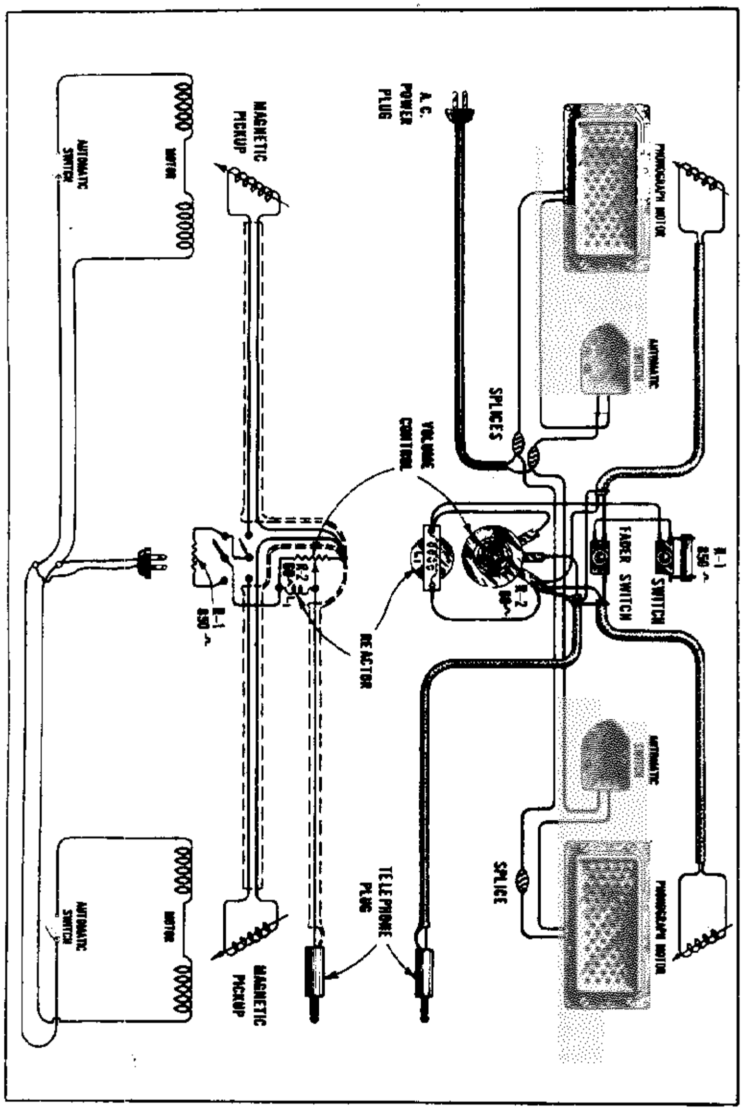


Figure C—Wiring and Schematic Diagrams (PT17A1, A2)

MODEL PT-17-B1
PT-17-B2
Schematic

RCA-VICTOR CO., INC.

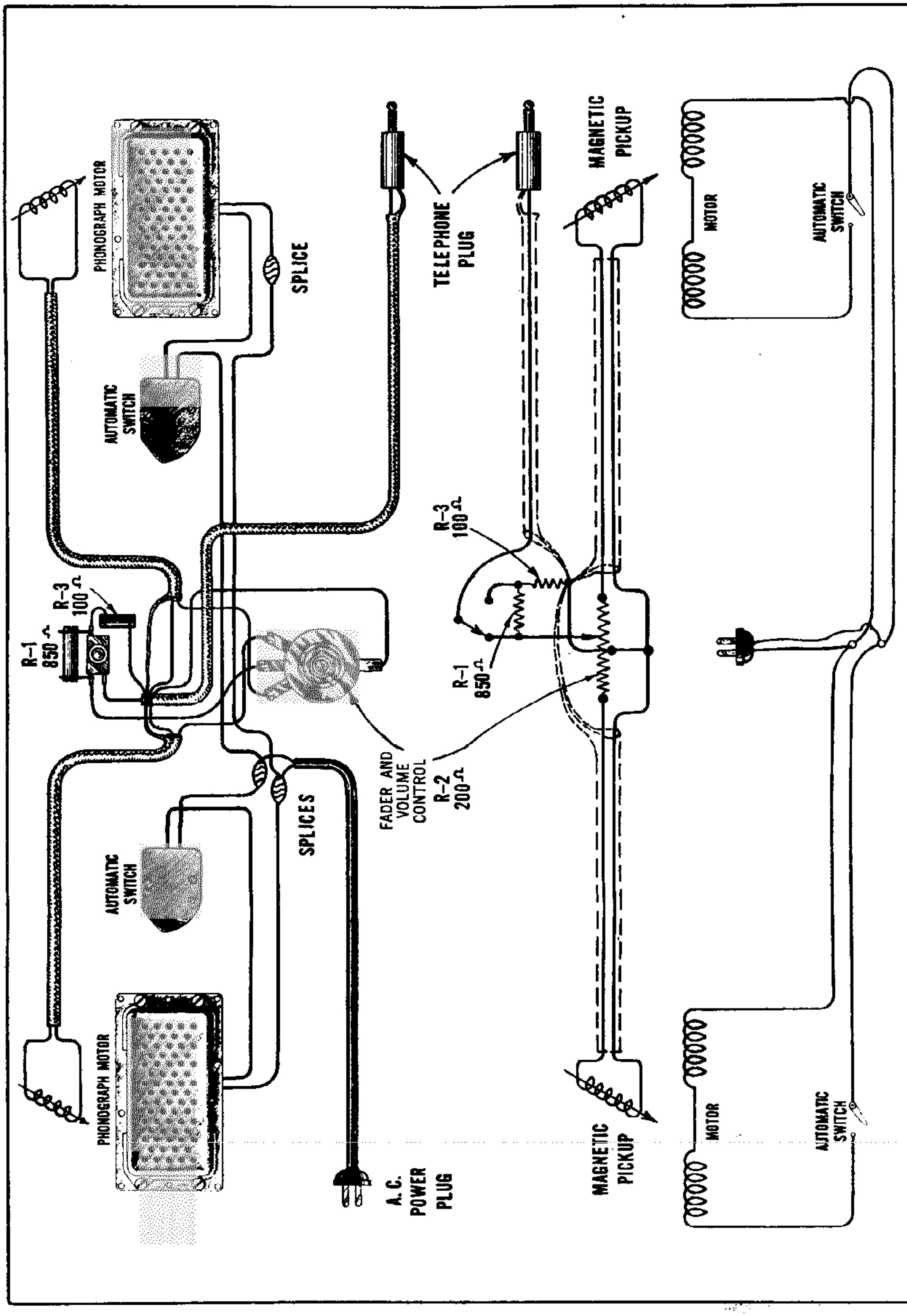


Figure 1—Wiring and Schematic Diagrams (PT17B1, B2)

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating .... 105-125 Volts A. C.
Frequency Rating .... 50 and 60 Cycles
Power Consumption .... { 30 Watts Single Turntable / 60 Watts Double Turntable

WIRING

The schematic and assembly wiring diagrams are shown in Figure 1.

MAGNETIC PICKUP

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

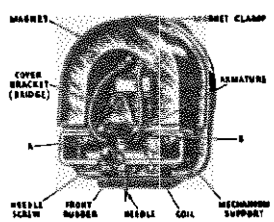


Figure 2

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 2, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled except for the magnet, which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B, Figure 2, and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover now may be replaced over the entire assembly, and the pickup returned to the tone arm.

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

Figure 3

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 3, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be assembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h) above.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	TURNTABLE—MODEL PT-17A1 AND PT-17A2	
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing for turntable spindle—Package of 5	$0.40
3338	Ring—Clamp ring assembly	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groove pin—Package of 2	.56
3342	Spring—Latch spring on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3838	Lever—Speed shifter lever	.70
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Turntable complete	5.50
	PICKUP AND PICKUP ARM ASSEMBLIES	
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw, nut and washer	.40
3388	Screw—Pickup needle holding screw	.60
3389	Rod—Automatic brake trip rod	.40
3390	Escutcheon—Pickup arm escutcheon	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions	1.10
3419	Screw—Pickup cover mounting screw	.40
3516	Damper—Damper and bushing for pickup arm base	.14
6335	Pickup—Pickup unit complete	4.00
6346	Back—Pickup housing back	.45
7593	Arm—Pickup arm less pickup	6.00

Stock No.	Description	List Price
	MOTOR ASSEMBLIES	
3599	Screw—Motor mounting screw and lockwasher—Package of 3 sets	$0.30
8989	Motor—105-125 volt—60 cycle motor	18.52
8990	Motor—105-125 volt—50 cycle motor	18.52
8993	Rotor—Rotor and shaft for motor 105-125 volt—60 cycle	7.00
8994	Spindle—Spindle and gear for motor 105-125 volt—60 cycle	4.75
8995	Rotor—Rotor and shaft for motor 105-125 volt—50 cycle	7.00
8996	Spindle—Spindle and gear for motor 105-125 volt—50 cycle	4.75
	MOTOR BOARD ASSEMBLIES	
2779	Pointer—Volume control pointer—Package of 10	.50
2947	Shoe—Leather brake shoe—Package of 20	.50
3322	Switch—Automatic brake switch	.75
3442	Resistor—100 ohm—¼ watt—Carbon type resistor—Package of 5	1.00
4098	Cord—Power cord and plug	1.00
4099	Cable—Shielded signal cable and plug	1.25
4101	Switch—Single pole—double throw—toggle switch	.75
4715	Volume control—Turntable volume control	3.00
6247	Resistor—850 ohm—¼ watt—Carbon type resistor—Package of 5	1.00
6288	Knob—Volume control knob—Package of 5	1.00
7691	Support—Pickup support	4.28
10174	Springs—Automatic brake springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate—Package of 5	.40
10241	Box—Needle box with lid—Package of 2	.60

RCA-VICTOR CO., INC.

VOLTAGE AMPLIFIER PB23M1

REPLACEMENT OF INPUT TRANSFORMER

Should it become necessary to replace the input transformer in the first stage of the voltage amplifier, care must be used to replace it in such a position that maximum shielding is obtained. The position of the transformer with respect to the amplifier panel which gives minimum hum is the correct position for maximum shielding.

FIDELITY CHARACTERISTICS

In this voltage amplifier the low-frequency booster circuit is located in the plate circuit of the UY-224A, and the voice frequency filter in the cathode circuit of the RCA-56. The voltage amplifier is connected at the factory to operate with 50-inch baffles. The response at 60 cycles is approximately 90% of the 1000-cycle response and at 100 cycles the response is approximately 60 per cent. If it is desired to shift the low-frequency peak either to a lower frequency or higher frequency, or to change the value of the frequency response, proceed as follows:

(a) To shift the peak to 50 cycles, remove the .02 mfd capacitor C-41 from the low-frequency booster circuit by disconnecting the jumper wire between terminals No. 16 and No. 18 on the capacitor pack. Place the .03 mfd capacitor C-40 in the circuit by connecting a jumper between terminals No. 16 and No. 17.

(b) To shift the peak to 40 cycles, connect the capacitors C-40 (.03 mfd) and C-41 (.02 mfd) in parallel by connecting jumpers between terminals No. 16, No. 17 and No. 18.

(c) If 27-inch baffles or doublet baffles are used on the stage, it will be necessary to shift the low-frequency peak to 80 cycles. To do this, disconnect the jumper wires between terminals No. 16, No. 17 and No. 18 on the capacitor pack. Connect a .02 mfd capacitor (Catalog No. 3639) externally between terminals No. 16 and No. 17 on the capacitor pack. This will connect the .02 mfd capacitor in series with the .03 mfd capacitor C-40 to give .012 mfd across L-30.

(d) To increase the value of response at any of the peak values used in the foregoing, remove the 100,000 ohm resistor R-81 connected across reactor L-30, between terminals on the tube shelf connected to terminals No. 7 and No. 16 on the capacitor pack. If a still further increase, to a maximum of approximately 400 per cent, is desired, shunt the plate resistor R-18 (125,000 ohm) with the 100,000 ohm resistor.

(e) To increase the response at 100 cycles, decrease the value of the shunt resistor R-80, and if a decrease in response is desired increase the value of the shunt resistor R-80. If male voices sound boomy it will be necessary to increase the value of the shunt resistor.

RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Line

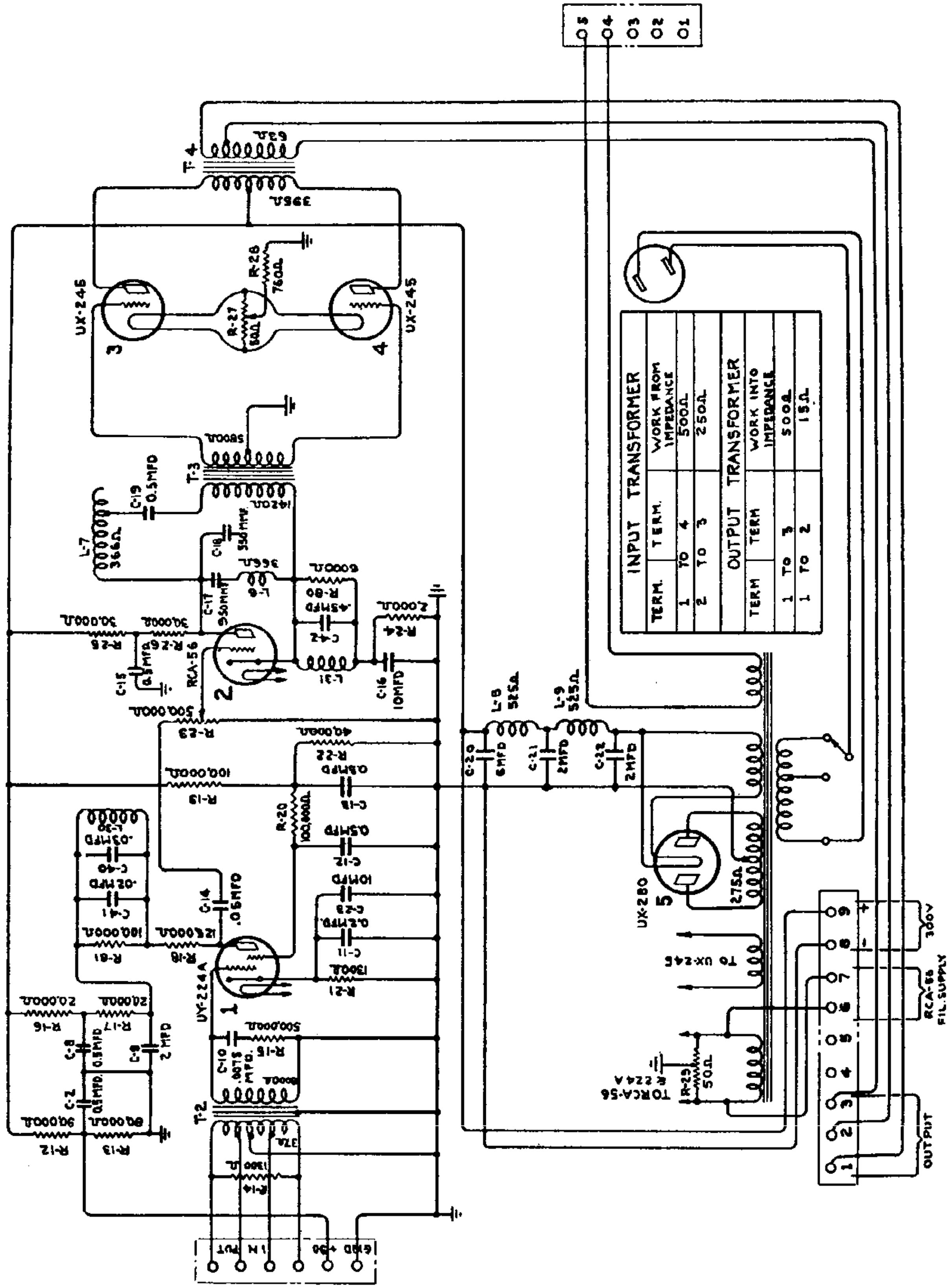
Radiotron	Control Grid Volts	Screen Grid Volts	Plate Volts	Plate Current M. A.	Filament or Heater Volts
UY-224A	1.3	45	185	.7	2.5
RCA-56	6.0	—	130	2.3	2.5
UX-245	48.0	—	250	30.0	2.5
UX-245	48.0	—	250	30.0	2.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
20058	Screws—One set of two special thumb-screws for securing perforated panel	$0.60
20096	Screws—One set of two thumb-screws for fastening input shields	1.00
21630	Switch—Single pole, double throw toggle-type switch—mounted on tube shelf	2.00
21632	Cap—First stage Radiotron control grid cap	.75
22178	Connector—2-contact male connector	.26
22186	Resistor—760 ohm porcelain-type resistor	.90
22195	Resistor—500,000 ohm carbon type resistor—½ watt	.50
22868	Resistor—80,000 ohm carbon type resistor—½ watt	.50
22932	Socket—UX type socket complete with two mounting screws, two lockwashers and two nuts	.60
23000	Capacitor—550 mmfd. fixed capacitor	1.20
23001	Resistor—90,000 ohm carbon type resistor—½ watt	.50
23002	Capacitor—950 mmfd. fixed capacitor	1.20
23003	Resistor—30,000 ohm carbon type resistor—½ watt	.50
23004	Resistor—40,000 ohm carbon type resistor—½ watt	.50
23005	Resistor—20,000 ohm carbon type resistor—½ watt	.50
23006	Resistor—100,000 ohm carbon type resistor—½ watt	.50
23007	Resistor—120,000 ohm carbon type resistor—½ watt	.50
23009	Resistor—1,300 ohm carbon type resistor—½ watt	.50
23014	Potentiometer—50 ohm hum control potentiometer complete with mounting nut	2.50
23015	Capacitor—.0075 mfd. fixed capacitor complete with two mounting screws (CX 43)	2.50
23016	Capacitor—.05 mfd. fixed capacitor (CX 45)	2.00
23017	Socket—UY type socket complete with insulator, two mounting screws, two lockwashers, and two nuts	.65
23018	Knob—Volume control potentiometer push-on-type knob	1.10
23019	Cable—Remote volume control contact switch cable	3.00
23118	Capacitor—.2 mfd. fixed capacitor (CX 75)	1.75
23122	Resistor—2,000 ohm, ¼ watt, carbon resistor	.20
23123	Resistor—1,300 ohm, ¼ watt, carbon resistor	.20
25065	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 77)	25.00
25376	Transformer—Output transformer in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 165)	35.00
25377	Transformer—Interstage transformer in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 166)	25.00
25381	Cushion—One set of two sponge rubber cushions for input transformer (¼" x 1" x 3⅜")	2.25
25382	Cushion—One set of three rubber cushions for input transformers (located in metal container)	5.00
25383	Board—Terminal board engraved "1, 2, 3, 4, 5," complete with five terminals, two mounting screws, two lockwashers, two washers, and two spacers (located under power transformer)	$4.50
25553	Resistor—200 ohm porcelain type resistor	1.40
25587	Transformer—Voltage amplifier input transformer—less container (RT 188)	12.95
27328	Capacitor pack—Capacitor pack comprising three 2 mfd. condensers and one 4 mfd. condenser in metal container complete with four mounting screws, four lockwashers, and four nuts (CP 31)	24.00
27459	Transformer—Power transformer (50–60 cycle) complete with four mounting screws, four lockwashers, and four nuts (RT 168)	50.00
27514	Board—Terminal board complete with nine terminals, two mounting screws, two lockwashers, two washers, and two spacers (located under capacitor pack)	3.95
27515	Board—Terminal board complete with six terminals, two mounting screws, two lockwashers, two washers, and two spacers	3.65
27576	Capacitor pack—Comprising four reactors, two 10 mfd. electrolytic condensers, one 2 mfd. capacitor, five ½ mfd., one .45 mfd., one .03 mfd., and one .02 mfd. capacitors in metal container complete with four mounting screws, four lockwashers, and four nuts	45.00
	VOLUME CONTROL POTENTIOMETER	
22869	Resistor—120,000 ohm, ¼ watt carbon type	.50
23123	Resistor—1,300 ohm, ¼ watt carbon type	.20
23124	Resistor—700 ohm, ¼ watt, carbon type	.20
23125	Resistor—900 ohm, ¼ watt, carbon type	.20
23126	Resistor—1,700 ohm, ¼ watt, carbon type	.20
23127	Resistor—2,200 ohm, ¼ watt, carbon type	.20
23128	Resistor—2,900 ohm, ¼ watt, carbon type	.20
23129	Resistor—4,000 ohm, ¼ watt, carbon type	.20
23130	Resistor—5,300 ohm, ¼ watt, carbon type	.20
23131	Resistor—7,000 ohm, ¼ watt, carbon type	.20
23132	Resistor—9,400 ohm, ¼ watt, carbon type	.20
23133	Resistor—13,000 ohm, ¼ watt, carbon type	.20
23134	Resistor—17,000 ohm, ¼ watt, carbon type	.20
23135	Resistor—22,000 ohm, ¼ watt, carbon type	.20
23136	Resistor—30,000 ohm, ¼ watt, carbon type	.20
23137	Resistor—40,000 ohm, ¼ watt, carbon type	.20
23138	Resistor—53,000 ohm, ¼ watt, carbon type	.20
23139	Resistor—70,000 ohm, ¼ watt, carbon type	.20
23140	Resistor—94,000 ohm, ¼ watt, carbon type	.20
23141	Resistor—2,100 ohm, ¼ watt, carbon type	.20
27534	Potentiometer—Volume control potentiometer complete	16.25

MODEL PB-23-M1
Schematic

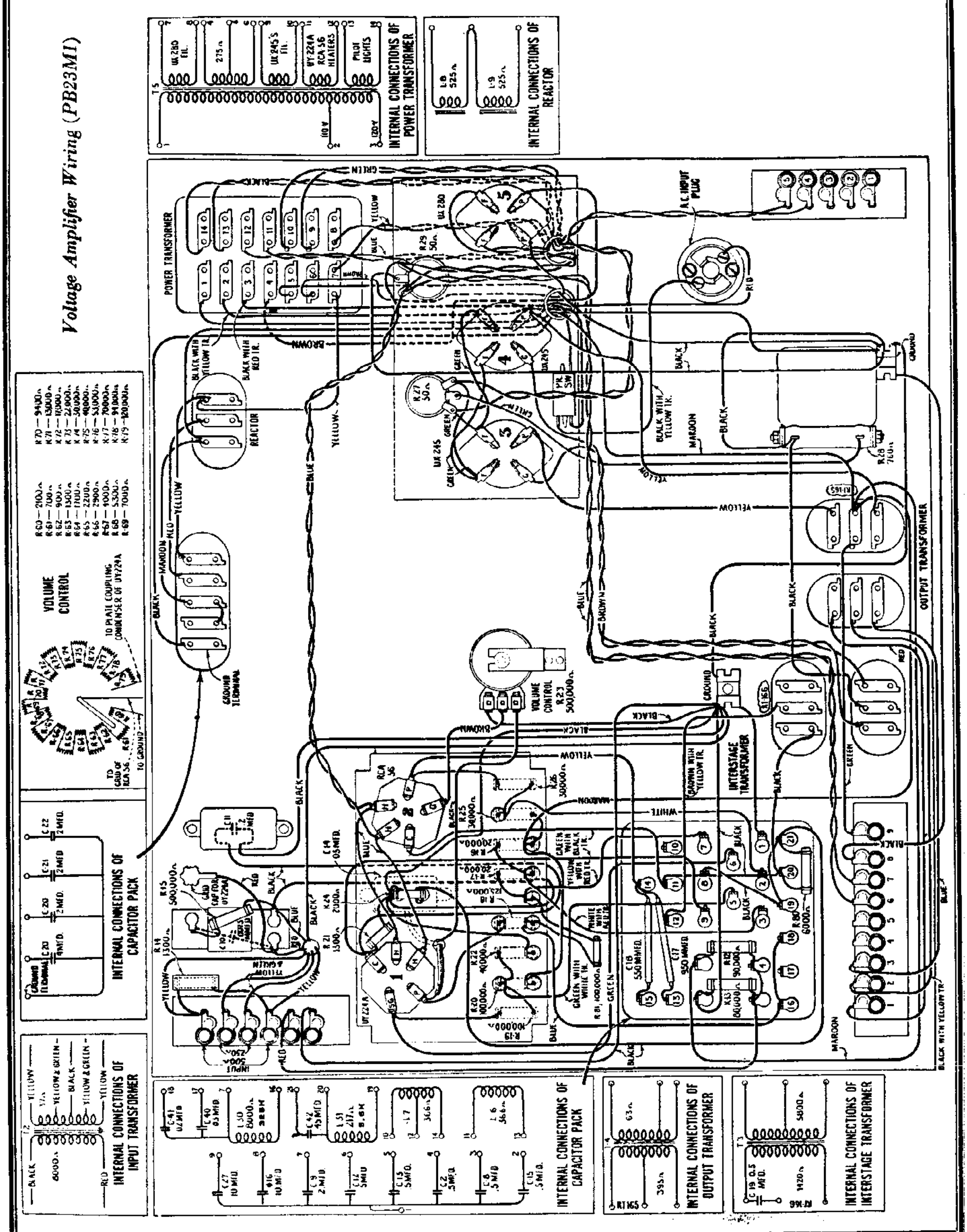
RCA-VICTOR CO., INC.



Schematic Circuit Diagram (PB23M1)

MODEL PB-23-M1
Chassis Wiring

RCA-VICTOR CO., INC.



Supplement No. 3 to RCA Victor Photophone Theatre Reproducing Equipment Type PG-59

(High Fidelity)

(1) PA83C1 AMPLIFIER RACK

The PA83C1 Amplifier rack is similar electrically to the PA83B2. The PA83C1 has heavier front panels than previous models of this amplifier type.

(2) PA83C3 AMPLIFIER RACK—PB82C1 AMPLIFIER UNIT

The frequency response characteristic is a modification of that obtained on previous models. The amplifier is connected at the factory so that more pronounced low frequency response is obtained with the 27-inch baffles. The response is such that no loudspeaker filter is required in the loudspeaker voice coil circuit.

A fuse is connected in series with capacitor C-11 in the PK22 exciter lamp supply unit as a protection to the rectox rectifier and transformer.

Figure 1 shows the rack wiring and schematic diagram of the PA83C3 rack.

(3) FIDELITY CHARACTERISTICS—PB82C1

For 27-inch Baffle

The amplifier unit is connected at the factory so that the response is approximately 160 per cent at 80 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles and then drops off to approximately 40 per cent at 10,000 cycles.

To modify the frequency response characteristic, proceed as follows: See Figure 2.

(a) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(b) Should the operation performed in (a) reduce the extreme low frequency response too much, remove the resistors R-32 and R33 (2 megohms each).

(c) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which is shunted across C-3. Open up by-pass circuit on R-9.

(d) To reduce extreme low frequency response disconnect the resistors R-32 and R-33 (2 megohms each) and connect R-41 and R-42 (½ megohm each) in place of those removed.

For 50-inch Baffle

(a) If 50-inch Baffles are used with the PG-59 equipment, disconnect the resistors R-32 and R-33 (2 megohms each) and also replace C-25 and C-26 (.04 mfd each) by C-19 and C-20 (.07 mfd each). The frequency response characteristic will then be approximately 160 per cent at 60 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles, and 40 per cent at 10,000 cycles.

(b) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(c) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which parallels C-3. Open up the by-pass circuit on R-9.

(d) To reduce the extreme low frequency response, connect resistors R-32 and R-33 (2 megohms each) across the reactors in the grid circuit of the Radiotrons RCA-2A3.

(4) LOUDSPEAKER—PL52C2

The Model PL52C2 Loudspeaker mechanism has a new type of terminal board for the voice coil circuit as shown in Figure 3. The design of these terminals is such that they are more easily accessible for installation and service work.

RCA-VICTOR CO., INC.

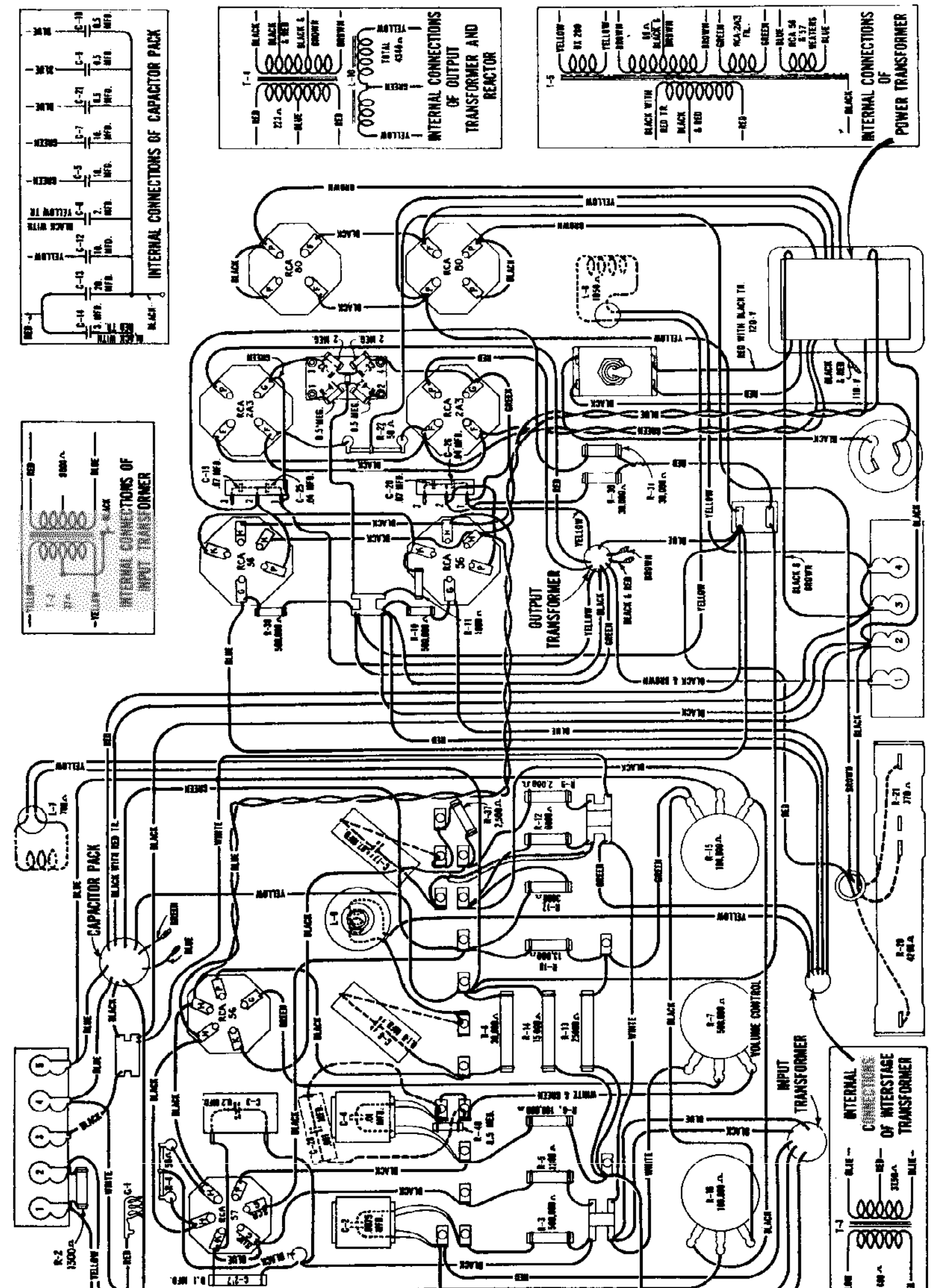


Figure 2—Amplifier Panel Wiring (PB82C1)—Connected for use with 27 inch baffles

MODEL PG-59
Schematic

RCA-VICTOR CO., INC.

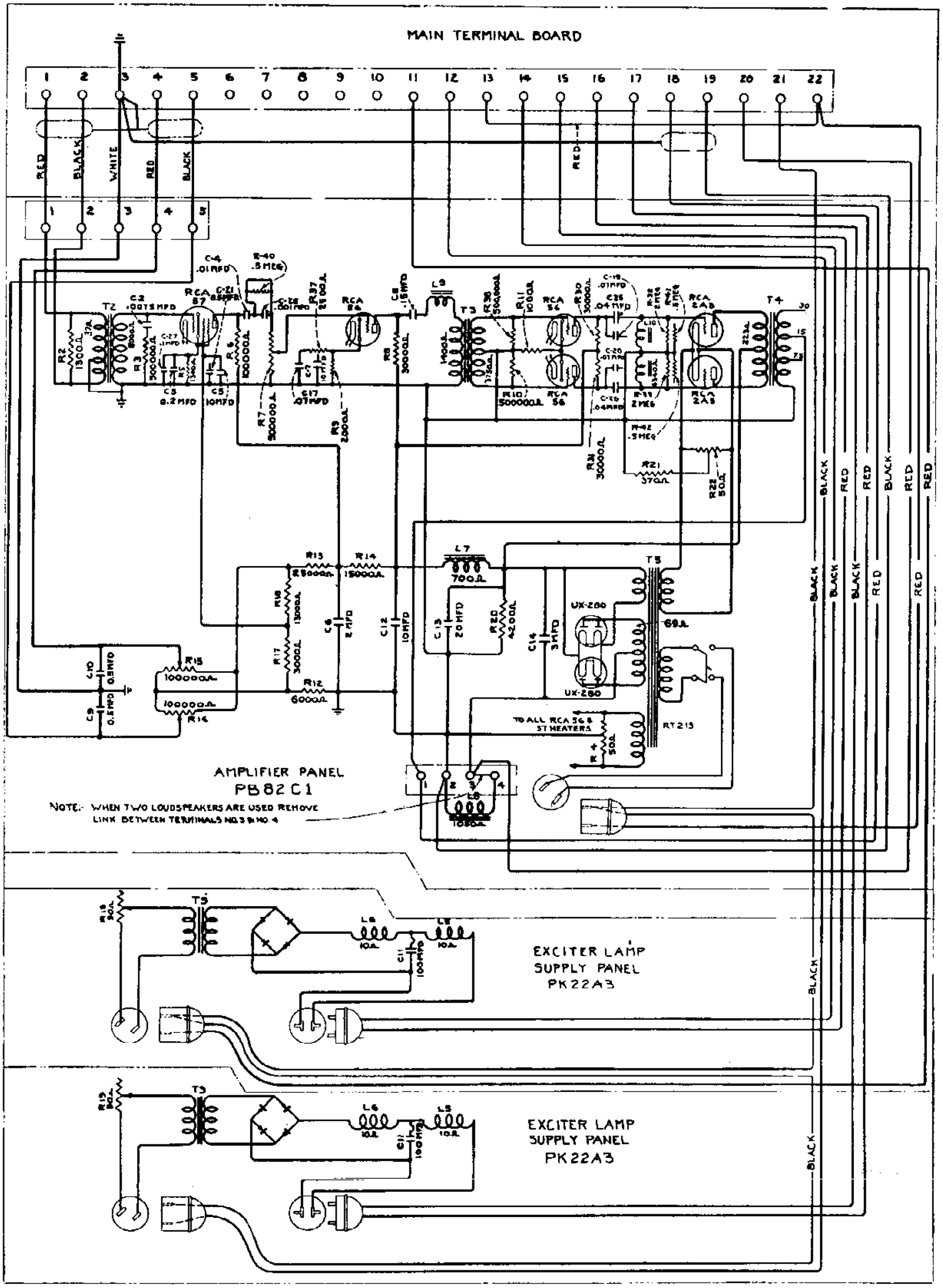
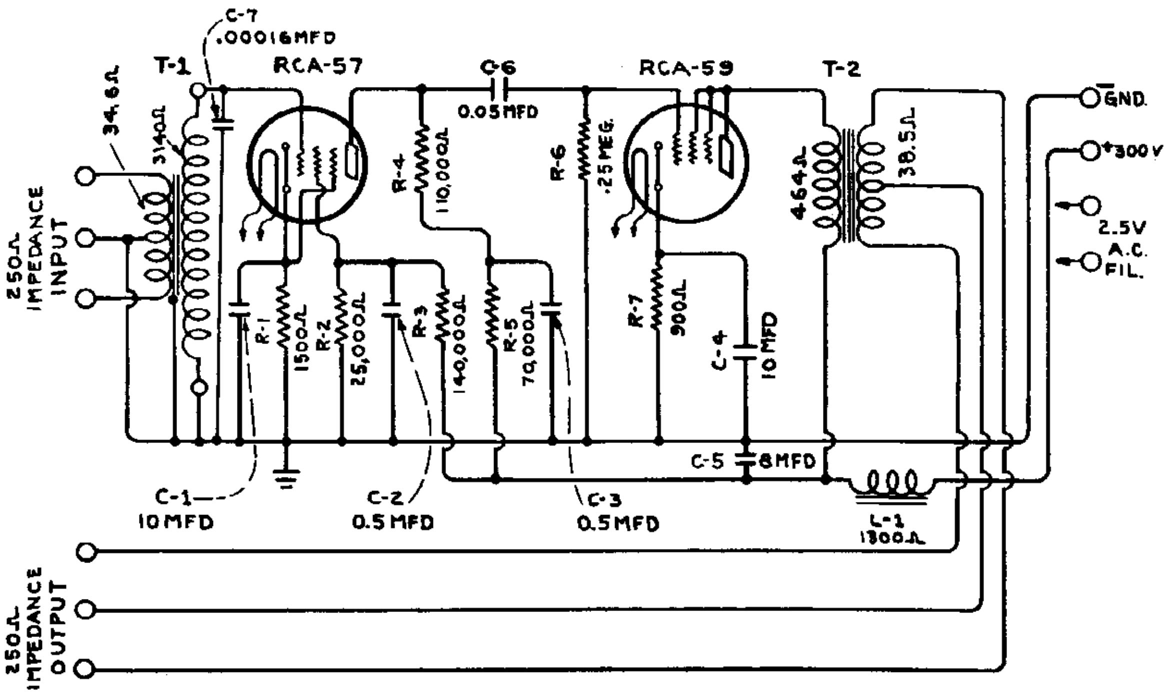


Figure 1—Pack Assembly Wiring (PA83C3)

RCA-VICTOR CO., INC.

PRE-AMPLIFIER PA103A1



Schematic Wiring Diagram

PRE-AMPLIFIER

For program pickup, or where the velocity microphone is used for any purpose except close talking, a pre-amplifier is required for each microphone. The overall gain of this pre-amplifier is 58 DB. The Radiotron voltages for this pre-amplifier are obtained from a PK24B1 power supply unit.

The pre-amplifier is designed to work from a 250-ohm source and into a 250-ohm line.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C. Line

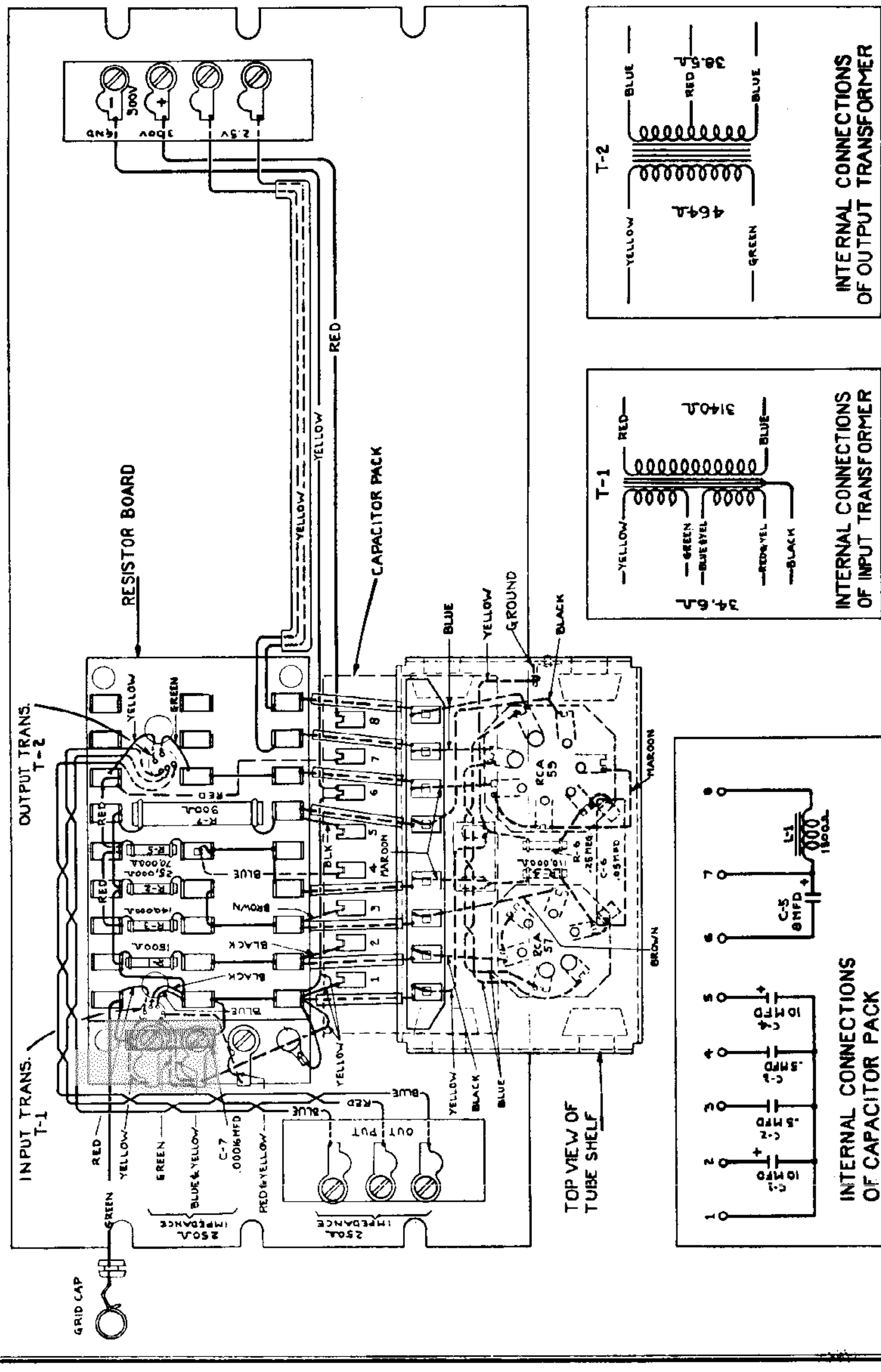
Radiotron	Control Grid Volts	Screen Grid Volts	Plate Volts	Plate Current M. A.	Heater Volts
RCA-57	1.1	40	110	.63	2.5
RCA-59	22.5		245	25.5	2.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	MICROPHONE PRE-AMPLIFIER Model PA103A1	
2747	Cap—Control grid cap	$0.10
3110	Resistor—25,000 ohm, ¼ watt carbon resistor (R2)	.20
3634	Capacitor—160 mmfd. fixed capacitor (C7)	.34
3713	Capacitor—.05 mfd. fixed capacitor (C6)	.32
3744	Resistor—250,000 ohm, ¼ watt carbon resistor (R6)	.20
3853	Resistor—1,500 ohm, ¼ watt carbon resistor (R1)	.20
6241	Resistor—140,000 ohm, ¼ watt carbon resistor (R3)	.20
23094	Latch—Male section of shield cover latch	.35
23176	Resistor—70,000 ohm, ¼ watt carbon resistor (R5)	.20
23177	Resistor—900 ohm, 1 watt carbon resistor (R7)	$0.22
23178	Resistor—110,000 ohm, ¼ watt carbon resistor (R4)	.20
25532	Socket—6-contact Radiotron socket	.40
25626	Socket—7-contact Radiotron socket	.45
25840	Board—Input terminal board complete with three terminals	1.62
25841	Board—Voltage supply terminal board with four terminals	2.00
25842	Board—Output terminal board complete with three terminals	1.56
27586	Transformer—Input transformer complete with three rubber cushions (RT-231)	9.34
27587	Transformer—Output transformer (RT-232)	30.00
27588	Capacitor pack—Comprising two 10 mfd., one 8 mfd., two .5 mfd. capacitors, and one filter reactor in container (C1, C2, C3, C4, C5, L1)	11.76

MODEL PA-103-A1
Panel Wiring

RCA-VICTOR CO., INC.



Pre-Amplifier Panel Wiring (PA103A1)

The RCA Victor Portable Public Address System, Type PG-62 is a complete amplifying system consisting of an amplifier, a microphone, and two loudspeakers. It is designed for use as a sound reinforcing system in auditoriums, theatres and churches or for outdoor gatherings. The equipment is entirely A. C. operated, power for its operation being obtained from any 50 or 60 cycle, 110 volt house lighting receptacle. The maximum undistorted power output of this equipment is 20 watts which is sufficient to meet the average requirements of sound reinforcement in auditoriums with a capacity up to 2,500 seats.

The amplifier consists of two units; the voltage and power amplifier units both mounted in a carrying case. The loudspeakers, two of which are supplied with the equipment, are each mounted in a wooden housing. A special carrying case is provided for the loudspeakers when they are to be transported.

A velocity type microphone, the latest type developed by the RCA Victor engineers, is also furnished as a standard part of the equipment. Provision is made for placing microphone and stand together with the microphone interconnecting cables in the amplifier carrying case when the equipment is to be transported. Figure 1 shows the equipment set up for operation.

All the controls except the power control switch are mounted on the voltage amplifier base and are easily accessible to the operator. The controls consist of the power control switch mounted on the power amplifier base, the microphone volume control, amplifier volume control, the speech clarifying switch and the tone switch. Figure 2 shows the location of the various controls.

Facilities are provided for operating the equipment with a phonograph turntable. If it is desired, phonograph music may be played as a background for the microphone pick-up, the volume of each being controlled independently of each other. In the Universal Amplifier Assembly a microphone selector switch is mounted on the voltage amplifier to permit the use of a carbon type microphone with the equipment.

MODEL PG62C1 EQUIPMENT

Amplifier (Model PA97A2)

Model	*Amplifier*	*Number of Stages*
PB88A3	Voltage	3
PB89A1	Power	2

Loudspeakers

Model	*Field Resistance*
PL71A1	1,350 Ohms
PL71B1	1,950 Ohms

Microphone

Model	*Type*
PB90A1	Velocity

UNIVERSAL AMPLIFIER ASSEMBLY

Voltage Amplifier

Model	*Number of Stages*
PB88A2	3

Power Amplifier

Model	*Number of Stages*
PB89B1	2

PART I—SETTING UP THE EQUIPMENT

(1) TYPE PG-62 EQUIPMENT

The equipment is set up for operation in the following manner:

1. Open the amplifier carrying case and lay the two halves on the floor or a table so that the Radiotrons will be in an upright position. Remove the microphone and microphone stand and support.

2. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. See Figure 2.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Open the loudspeaker carrying case and remove the two loudspeakers. Place the loudspeakers in a position so that the loudspeaker grilles face in the direction in which the sound beams are desired. Interconnect the two loudspeakers with the cable and plug provided. Connect the loudspeakers to the amplifier by means of the four-pole plug provided on the other loudspeaker cord.

4. Assemble the microphone and the microphone stand and support. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

5. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the Rectifier Tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

(2) UNIVERSAL AMPLIFIER

Before the equipment may be set up for operation, certain accessories must be obtained. They are as follows:

1. Microphone, such as the Type PB-90.

2. Microphone stand, such as the table stand, Type PB-96 or the floor stand, Type AZ-4090.

3. One, two, or four loudspeakers having a voice coil impedance of 7½ ohms or 15 ohms each. Each loudspeaker should have its own source of supply for field current. The dry disc rectifier type or the vacuum tube rectifier type is suitable for this purpose.

4. A two conductor loudspeaker cable.

The equipment is set up for operation in the following manner:

1. Insert the Radiotrons in the sockets as shown in Figure 2.

2. Place both the voltage and power amplifiers on a table or on the floor so that the Radiotrons will be in an upright position. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instruments unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Connect the voltage and power amplifiers together by means of the interconnecting cable as shown in Figure 10.

4. Make connections between the loudspeakers and the four pole loudspeaker plug, furnished with the amplifier, as indicated in Figure 3. Insert the loudspeaker plug into the corresponding receptacle on the side of the power amplifier base.

NOTE: If a loudspeaker having a voice coil of 7½ ohms impedance is used, the link between the output transformer and the loudspeaker receptacle should remain connected between terminals 1 and 2, as indicated in Figure 10. If the voice coil impedance is 15 ohms, shift the link so that it connects terminals 2 and 3 on the link terminal board.

5. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

6. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the rectifier tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

PART II—OPERATION

After the equipment has been properly located and connected, it may be operated in the following manner. (Refer to Figure 2.) This operating procedure applies to both the PG-62 equipment and the Universal Amplifier.

1. Apply power by turning the power control switch "on," located on the base of the power amplifier.

RCA-VICTOR CO., INC.

2. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located either directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with both volume controls at maximum, until the position where the least sound is produced in the loudspeakers due to feedback, will allow best operation.

NOTE: The Universal Amplifier Assembly is equipped with a microphone selector switch located on one end of the voltage amplifier. Set this switch in the "Velocity" position when a Velocity Type Microphone is used. When a carbon type microphone is used, set the switch at the "Carbon" position.

Set the Microphone Volume Control, located on the voltage amplifier, at its mid-position. Talk into the microphone at a distance of ten to twenty inches and gradually rotate the Amplifier Volume Control until the desired volume is obtained from the loudspeakers.

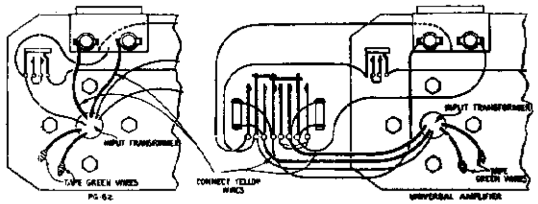


Figure 4—Wiring changes for two microphone operation

3. If voice only is to be picked up by the microphone, set the speech clarifying switch in the "speech" position. For musical pickup, the "music" position will give better reproduction. In either case, the "tone" dial, located on the base of the voltage amplifier, should be adjusted for most pleasing reproduction.

PART III—SPECIAL OPERATION

In some instances, it may be desirable or necessary to use two velocity microphones or more than one power amplifier operated from one voltage amplifier. The following sections cover these special uses of the equipment.

(1) TWO MICROPHONE OPERATION

In general, the use of more than one velocity microphone with either the PG-62 Equipment or Universal Amplifier is not recommended. This would presume a microphone mixer which is undesirable as the overall gain is insufficient to overcome the attenuation in the mixer.

If it is necessary to use two microphones (not more than two) and keep both in the circuit at the same time, using no fading or mixing arrangement, other than the volume controls on the voltage amplifier, the connections and changes in the amplifier wiring are as follows:

PG-62 Equipment

(a) Disconnect and tape the two green leads between the microphone receptacle on the voltage amplifier and input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone receptacle. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

Universal Amplifier

(a) Disconnect and tape the two green leads between the microphone selector switch on the voltage amplifier and the input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone selector switch at the points from which the two green leads were removed. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

(2) MULTIPLE OPERATION OF POWER AMPLIFIERS

The Type PB-88 Voltage Amplifier may be used to operate as many as three Type PB-89 Power Amplifiers. The requirements for such operation are as follows:

(a) In each power amplifier, remove the resistor R-18 (50,000 ohms) and replace with a 100,000 ohm, one-watt resistor, Catalog No. 3058.

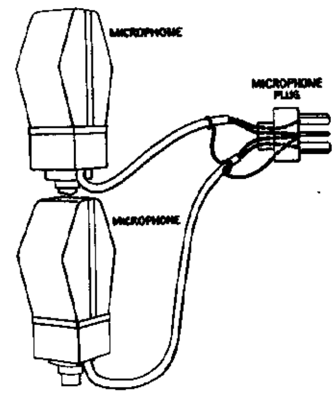


Figure 5—Two microphones wired to one plug

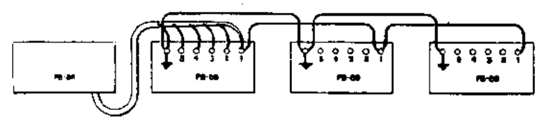


Figure 6—Multiple Operation of Power Amplifier

(b) Connect the power amplifiers to the voltage amplifier as shown in Figure 6.

(c) If the Model PB89A1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 8. If the Model PB89B1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 3.

(d) Each power amplifier must be connected to a source of A. C. 110 volt, 60 cycle power.

PART IV—SERVICE DATA ON AMPLIFIER EQUIPMENT

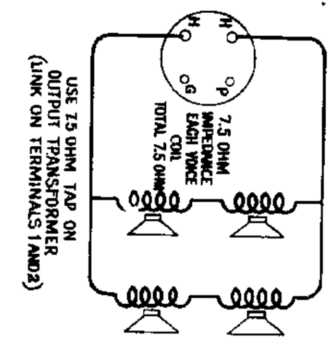
(1) ELECTRICAL DESCRIPTION OF CIRCUIT

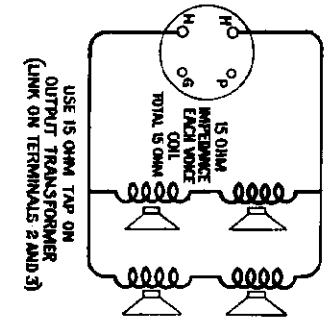
The velocity microphone is coupled to the first stage of the voltage amplifier (RCA-57) by means of an input transformer located on the amplifier base. The link circuit between the microphone transformer and the input transformer is of 250 ohms impedance. A potentiometer is provided in the grid circuit of the RCA-57 to vary the input voltage applied to the grid.

The RCA-57 is resistance coupled to the RCA-56 in the second stage. Another potentiometer is provided in the grid circuit of this RCA-56 to control the output volume of the entire equipment. The RCA-56 is in turn resistance coupled to the RCA-56 in the third stage of the voltage amplifier. The last stage of the voltage amplifier is coupled to the single RCA-59 which is the driver for two Radiotrons RCA-59 in the Class "B" output stage. The output stage supplies power to two loudspeakers through a step-down transformer. This transformer has an output impedance of 15 ohms with a tap at 7½ ohms.

MODEL PG-62-C
Operating Notes
Chassis Views
Loud Speaker Data

RCA-VICTOR CO., INC.





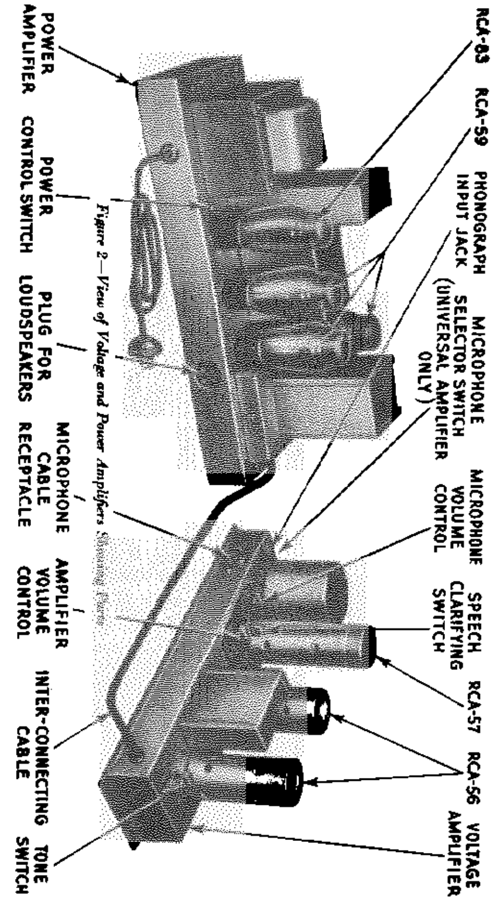
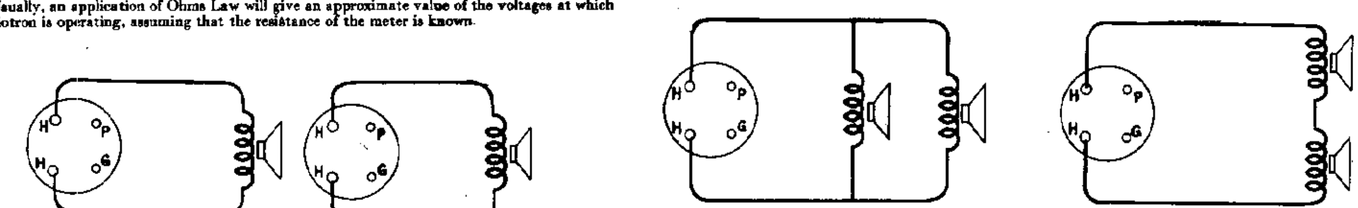


Figure 2—View of Voltage and Power Amplifiers Showing Parts

FIG. 3

LOUD SPEAKER WIRING FOR VARIOUS VOICE COIL IMPEDANCES.



(6) PHASING LOUDSPEAKERS (PG-62 Equipment)

If either of the loudspeaker cones are replaced, the two loudspeakers must be properly phased after the replacement work is done. That is, the motion of both cones must be in the same direction at a given instant when a signal is impressed on them. The following procedure may be used to phase the loudspeakers.

1. Place the two loudspeakers side by side and connect them together by means of the cord and plug provided.

2. Turn the equipment on so that field coils are energized. Apply 6 volts D. C. intermittently to the voice coil terminals at one loudspeaker (black lead and yellow lead on PL71A1 or white lead and red lead on PL71B1). If both cones do not move in the same direction, reverse the voice coil leads to the terminal board of one loudspeaker only.

CAUTION: The loudspeaker fields are at approximately 400 volts above ground. Therefore care must be observed in making tests on the loudspeakers.

(7) DIRECTIONAL BAFFLE LOUDSPEAKER

It is sometimes desirable to use a directional baffle type of loudspeaker with this amplifying equipment. In this case it is necessary to compensate for the difference between the response frequency characteristic of the flat baffle and the directional baffle. The compensation should consist of a .0005 MFD capacitor (Catalog No. 21648) connected in series with the .005 MFD capacitor C-1, and a 250,000 ohm resistor (Catalog No. 23114) shunted across the speech clarifying switch.

The power supply for both the voltage and power amplifiers is obtained from the RCA-83 and a filter system located on the power amplifier base. The field coil of one loudspeaker in the PG-62 Equipment is used as a filter reactor in the power supply system in the power amplifier. In the Universal Amplifier an additional reactor is used in the filter circuit in place of the loudspeaker field mentioned above.

(2) CARBON MICROPHONE CONNECTIONS (Universal Amplifier Only)

The Universal Amplifier Equipment is designed so that it will operate with a double button carbon microphone of 250 ohms impedance. A three-pole plug, similar to that employed with the velocity microphone, should be used. Each button on the microphone should be connected to each of the symmetrical poles on the plug. The remaining pole on the plug should be used to connect to the mid-point of the microphone. When using the carbon microphone, the microphone selector switch should be placed at the "Carbon" position.

(3) PHONOGRAPH CONNECTIONS

An input jack is provided in the grid circuit of the RCA-57 which permits the use of a phonograph turntable RCA Victor Type PT-14, Type PT-15, Type PT-16 or Type PT-17. The instructions for operation of the turntables are included with the phonograph equipment.

(4) WIRING

The schematic wiring diagram for the PG-62 Equipment is shown in Figure 7. The wiring diagram for the complete PG-62 Equipment is shown in Figure 8. Figures 9 and 10 show the schematic and wiring diagrams respectively for the Universal Amplifier.

(5) RADIOTRON SOCKET VOLTAGES

The Radiotron socket voltages given in the following tabulation are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a set analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore, a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the meter is known.

MODEL PG-62-C
Voltage
Parts List

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

115 VOLT A. C. LINE—NO INPUT SIGNAL VOLTAGE

Radiotron No.	Control Grid to Cathode or Filament Volts	Screen Grid to Cathode or Filament Volts	Plate to Cathode or Filament Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-57	1.0	80	145	.25	2.5
2. RCA-56	3.5	—	120	1.2	2.5
3. RCA-56	4.0	—	165	1.6	2.5
4. RCA-59	2.8	—	242	23.0	2.5
5. RCA-59	0	—	390	13.0	2.5
6. RCA-59	0	—	390	13.0	2.5

CAUTION: Whenever the Radiotron RCA-83 rectifier is removed from or installed in its socket, the A. C. power control switch should be in the "off" position.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	PORTABLE AMPLIFIER ASSEMBLY MODEL PA97A2	
	Power Amplifier	
	Models PB89A1 and PB89B1	
2725	Fuse—1½ ampere cartridge fuse—Package of 5	$0.40
21581	Resistor—50,000 ohms—Carbon type—1 watt	.50
21623	Resistor—15,000 ohms—Carbon type—1 watt	.50
22451	Switch—Single pole, single throw—Toggle type	.50
22853	Plug—Four-contact male connector plug (for PB89B1)	.50
23113	Resistor—1,200 ohms—Carbon type—1 watt	.65
23119	Resistor—75 ohms—Carbon type—1 watt	.50
23120	Resistor—5,000 ohms porcelain resistor	2.00
25536	Socket—Four-contact Radiotron socket	.35
25626	Socket—Seven-contact Radiotron socket	.45
25627	Capacitor—4.0 mfd. filter capacitor	1.00
25628	Board—Terminal board complete with five terminals	1.50
25629	Capacitor—0.003 mfd. capacitor	1.30
25630	Capacitor pack—Comprising two 10.0 mfd. capacitors in container	9.30
25631	Reactor—Filter reactor (for PB89A1)	6.15
25633	Cord—Two-conductor power cord and plug	6.70
25634	Reactor—Double filter reactor (RT-200) (for PB89B1)	8.00
27526	Transformer—Power transformer (RT-189)	12.30
27527	Transformer—Audio transformer pack—Interstage and output transformers (RT-190)	15.30
	Voltage Amplifier	
	Models PB88A3 and PB88A4	
3294	Resistor—15 ohms—Flexible type resistor (for PB88A4)	.20
3471	Capacitor—0.025 mfd. capacitor	.32
3555	Capacitor—0.1 mfd. capacitor	.36
7487	Shield—Metal shield for Radiotrons	.25
7488	Cap—Radiotron shield cap for RCA-57 Radiotron	.20
21581	Resistor—50,000 ohms—Carbon type—1 watt	.50
21632	Cap—Control grid cap	.75
22197	Resistor—2,500 ohms—Carbon type—1 watt	.50
22621	Resistor—200,000 ohms—Carbon type—½ watt	.50
22859	Switch—Single pole, single throw—Toggle switch	.65
23004	Resistor—40,000 ohms—Carbon type—½ watt	.50
23006	Resistor—100,000 ohms—Carbon type—½ watt	.50
23007	Resistor—120,000 ohms—Carbon type—½ watt	.50
23008	Resistor—3,000 ohms—Carbon type—½ watt	.50
23011	Resistor—50,000 ohms—Carbon type—½ watt	.50
23115	Resistor—60,000 ohms—Carbon type—½ watt	$ .50
23116	Resistor—4,000 ohms—Carbon type—½ watt	.50
23117	Resistor—100 ohms—Carbon type—¼ watt	.50
25531	Socket—Five-contact Radiotron socket	.35
25615	Transformer—Core and coil for input transformer	10.60
25617	Capacitor—0.05 mfd. capacitor	1.25
25618	Capacitor—0.005 mfd. capacitor	1.40
25619	Rheostat—100,000 ohms—Tone control rheostat	3.70
25620	Switch—Triple pole, double throw—Key type switch	2.60
25621	Receptacle—Three-contact female receptacle	3.60
25622	Jack—Phonograph input jack	1.05
25623	Knob—Moulded knob and pointer	.30
25624	Cushion—One set of four rubber cushions for input transformer	3.00
25625	Cable—Six-conductor braid covered interconnecting cable	5.80
25778	Potentiometer—75,000 ohms—Microphone volume control potentiometer	1.35
25779	Potentiometer—150,000 ohms—Amplifier volume control potentiometer	1.75
25827	Socket—Six-contact Radiotron socket	.60
25828	Cushion—One set of two rubber cushions for socket	.90
27529	Capacitor pack—Comprising four 4.0 mfd. capacitors in container	8.35
	VELOCITY MICROPHONE MODEL PB90A1	
25782	Guard—Front and rear guard for microphone	11.00
25783	Transformer—Microphone transformer	18.00
25784	Cable—30 foot, two-conductor, rubber covered, shielded cable	7.30
25785	Plug—Two-conductor male connector plug	1.75
	LOUDSPEAKER—MODEL PL71A1	
6184	Board—Terminal board complete with three terminals	.10
8969	Cone—Loudspeaker cone with voice coil	1.27
9421	Coil—Field coil—Comprising coil, cone housing and magnet	4.32
25780	Cable—30 foot, four-conductor, rubber covered cable—Complete with four-contact plug	7.30
	LOUDSPEAKER—MODEL PL71B1	
6184	Board—Terminal board complete with three terminals	.10
8969	Cone—Loudspeaker cone with voice coil	1.27
9416	Coil—Field coil comprising coil, cone housing and magnet	4.00
25781	Cable—50 foot, three-conductor, rubber covered, cable—Complete with three-contact plug	11.00

RCA-VICTOR CO., INC.

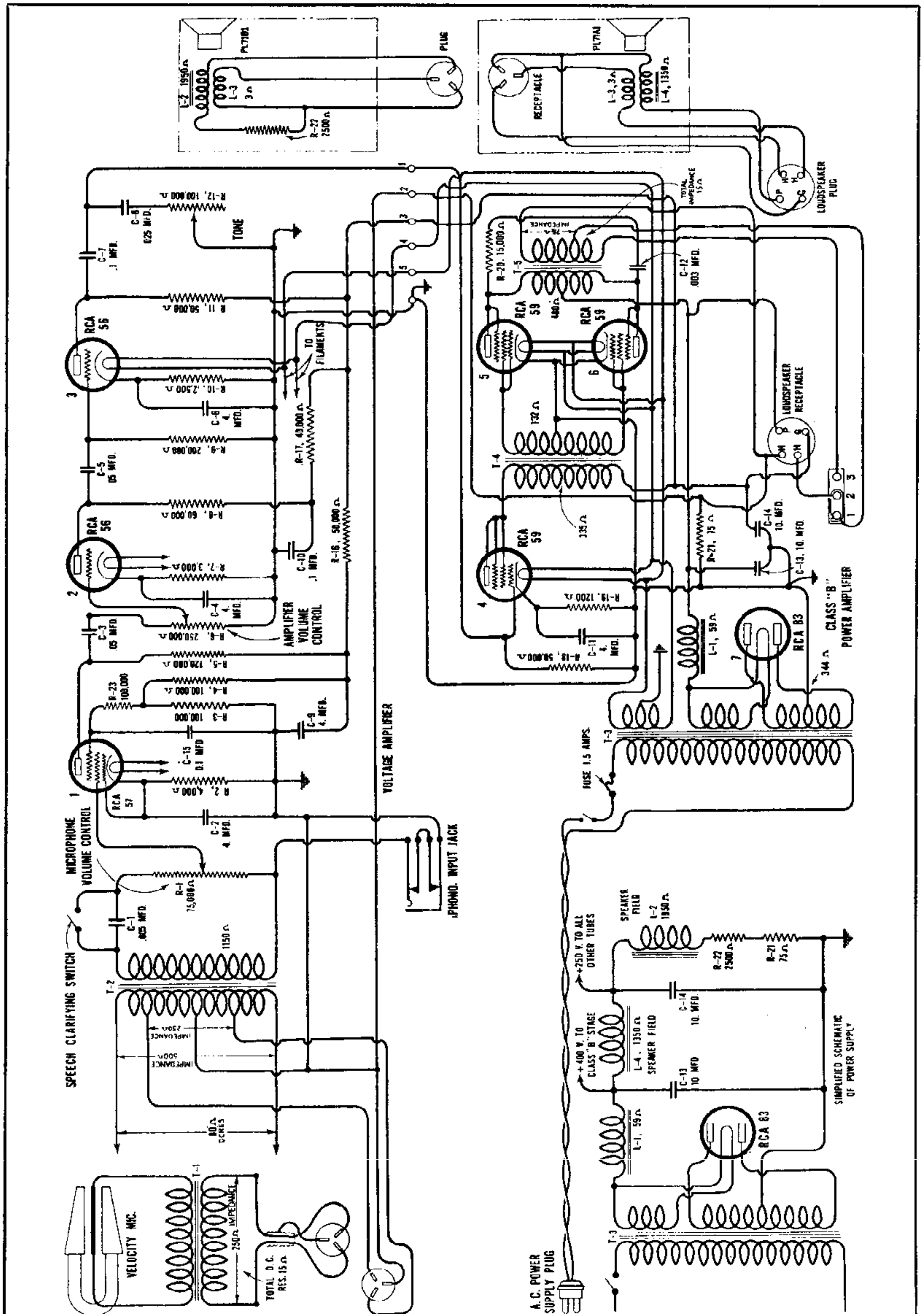


Figure 7—Schematic Circuit Diagram—PG-62 Equipment

MODEL PG-62-C
Chassis Wiring

RCA-VICTOR CO., INC.

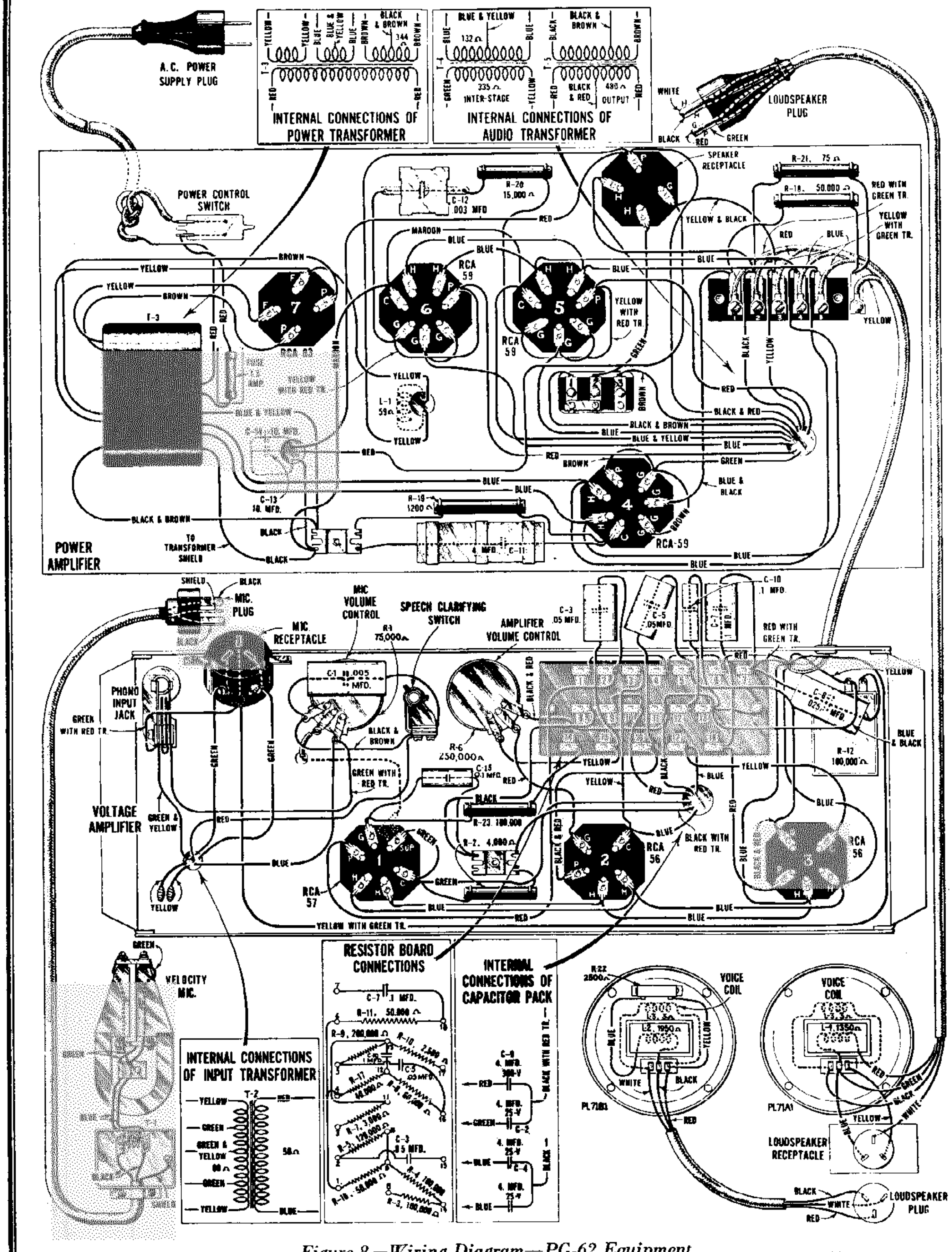


Figure 8—Wiring Diagram—PG-62 Equipment

RCA-VICTOR CO., INC.

MODEL PG-62-C
Universal Amplifier
Schematic

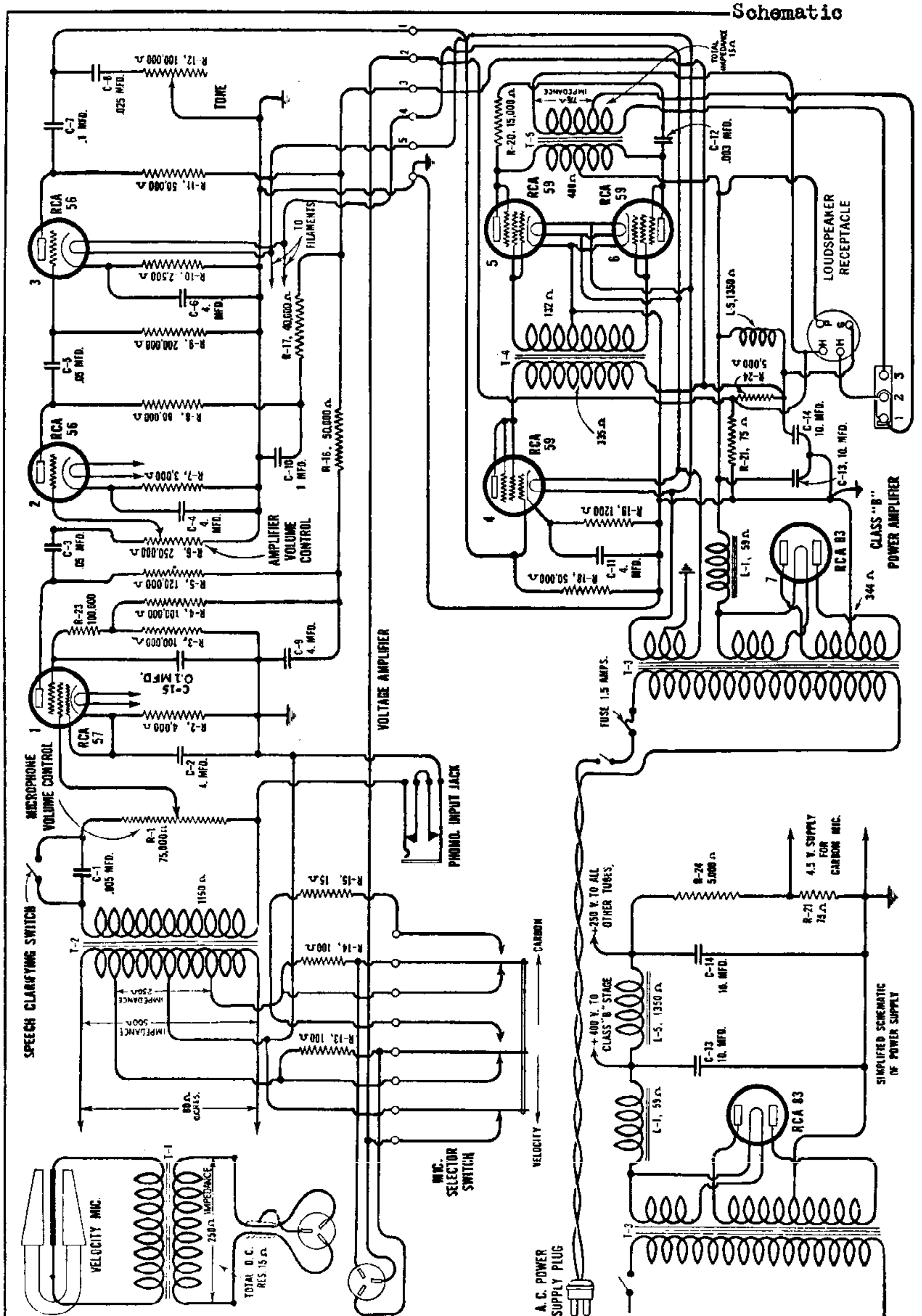


Figure 9—Schematic Circuit Diagram—Universal Amplifier

MODEL PG-62-C
Universal Amplifier
Chassis Wiring

RCA-VICTOR CO., INC.

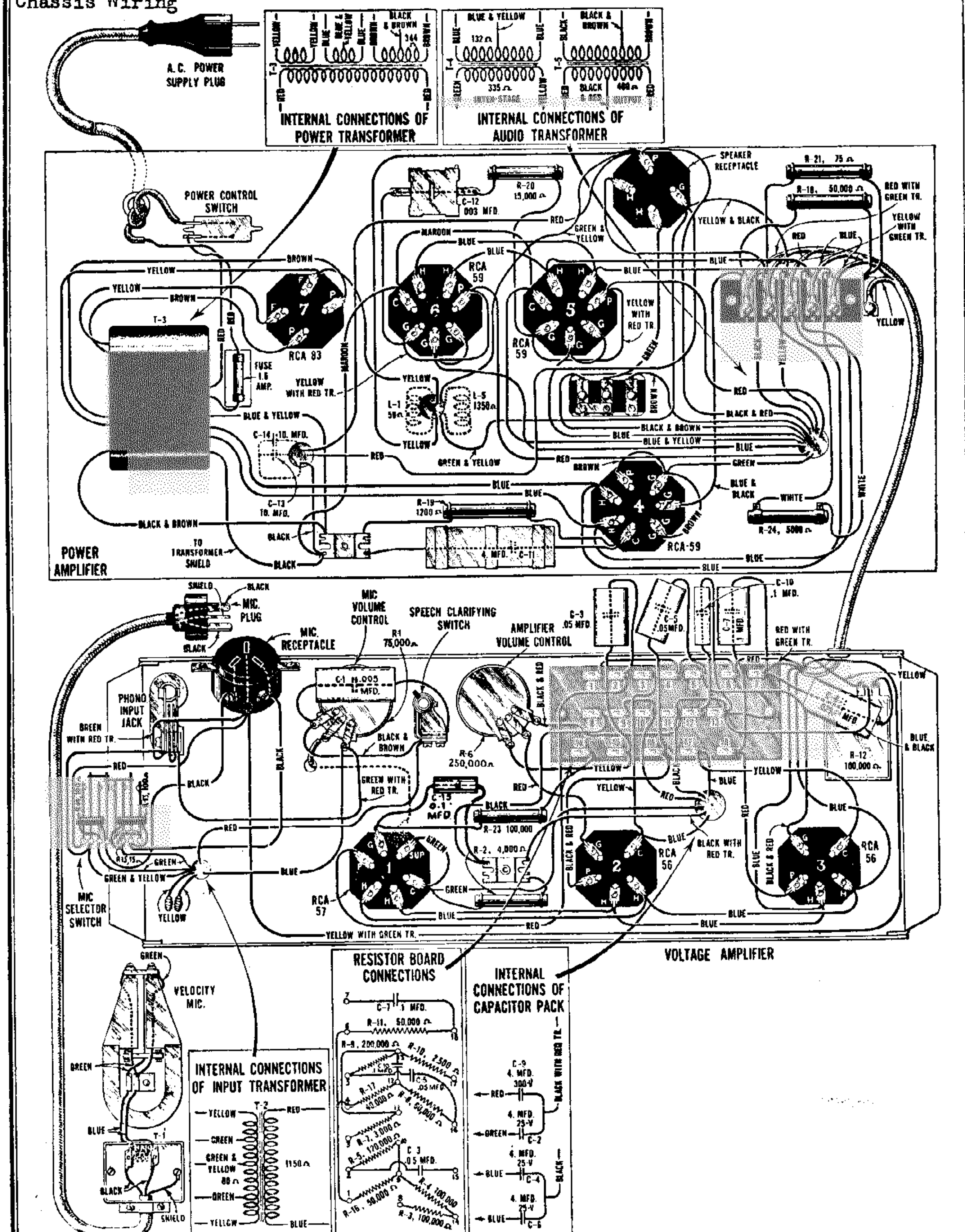


Figure 10—Wiring Diagram—Universal Amplifier

Supplement No. 1 to
RCA Victor Photophone Theatre Reproducing Equipment Type PG-65
(High Fidelity)
SERVICE NOTES

(1) PA96B1 AMPLIFIER RACK

The PA96B1 Amplifier rack is similar electrically to the PA96A1 rack. The PA96B1 rack has heavier front panels than previous models of this amplifier rack.

(2) PA96C1 AMPLIFIER RACK—PB82C1 AMPLIFIER UNIT

The frequency response characteristic is a modification of that obtained on previous models. The amplifier is connected at the factory so that more pronounced low frequency response is obtained with the 50-inch baffles. The response is such that no loudspeaker filter is required in the loudspeaker voice coil circuit.

A fuse is connected in series with capacitor C-11 in the PK23 exciter lamp supply unit as a protection to the rectox rectifier and transformer.

Figure 1 shows the rack wiring and schematic diagram of the PA96C1 rack.

(3) FIDELITY CHARACTERISTIC—PB82C1

For 50-inch Baffle

The amplifier is connected at the factory so that the response is approximately 160 per cent at 60 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles and then drops off to approximately 40 per cent at 10,000 cycles.

To modify the frequency response characteristic, proceed as follows: See Figure 2.

(a) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(b) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which is shunted across C-3. Open up by-pass circuit on R-9.

(c) To reduce extreme low frequency response, connect the resistors R-32 and R-33 (2 megohms each) across the reactors in the grid circuit of the Radiotrons RCA-2A3.

For 27-inch Baffle

(a) If 27-inch baffles are used with the PG-65 equipment, connect resistors R-32 and R-33 (2 megohms each) across the reactors in the grid circuit of the Radiotrons RCA-2A3, and also replace C-19 and C-20 (.07 mfd each) by C-25 and C-26 (.04 mfd each). The frequency response characteristic will then be approximately 160 per cent at 80 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles and then will drop off to approximately 40 per cent at 10,000 cycles.

(b) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(c) Should the operation performed in (b) reduce the extreme low frequency response too much, remove the resistors R-32 and R-33 (2 megohms each).

(d) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which is shunted across C-3. Open up by-pass circuit connected across R-9.

(e) To reduce extreme low frequency response, disconnect the resistors R-32 and R-33 (2 megohms each) and connect R-41 and R-42 (½ megohm each) in place of those removed.

(4) LOUDSPEAKER—PL52C2

The Model PL52C2 Loudspeaker mechanism has a new type of terminal board for the voice coil circuit as shown in Figure 3. The design of these terminals is such that they are more easily accessible for installation and service work.

MODEL PG-65
Rack Assembly Wiring

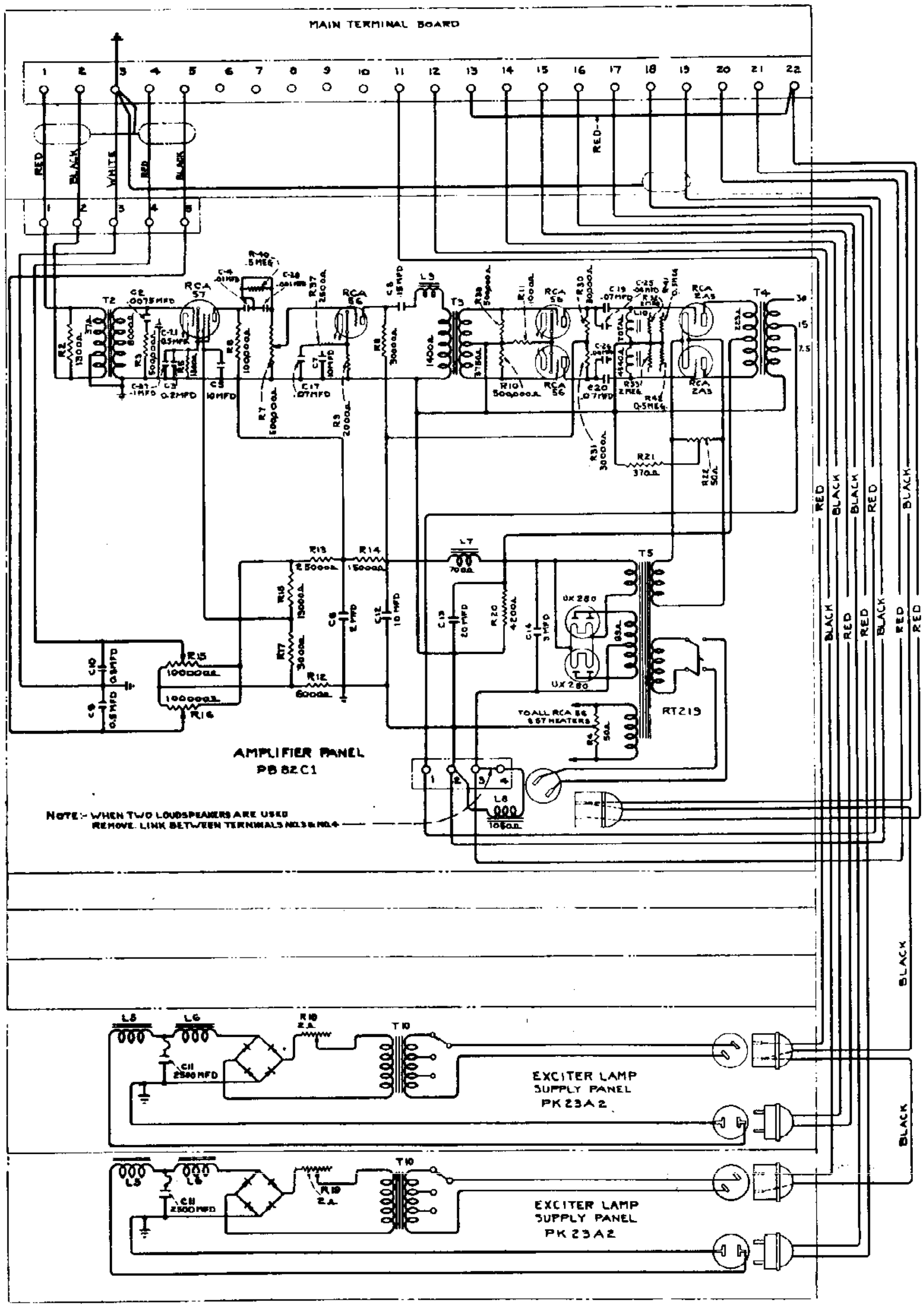


Figure 1—Rack Assembly Wiring (PA96C1)

MODEL PG-65
Panel Wiring

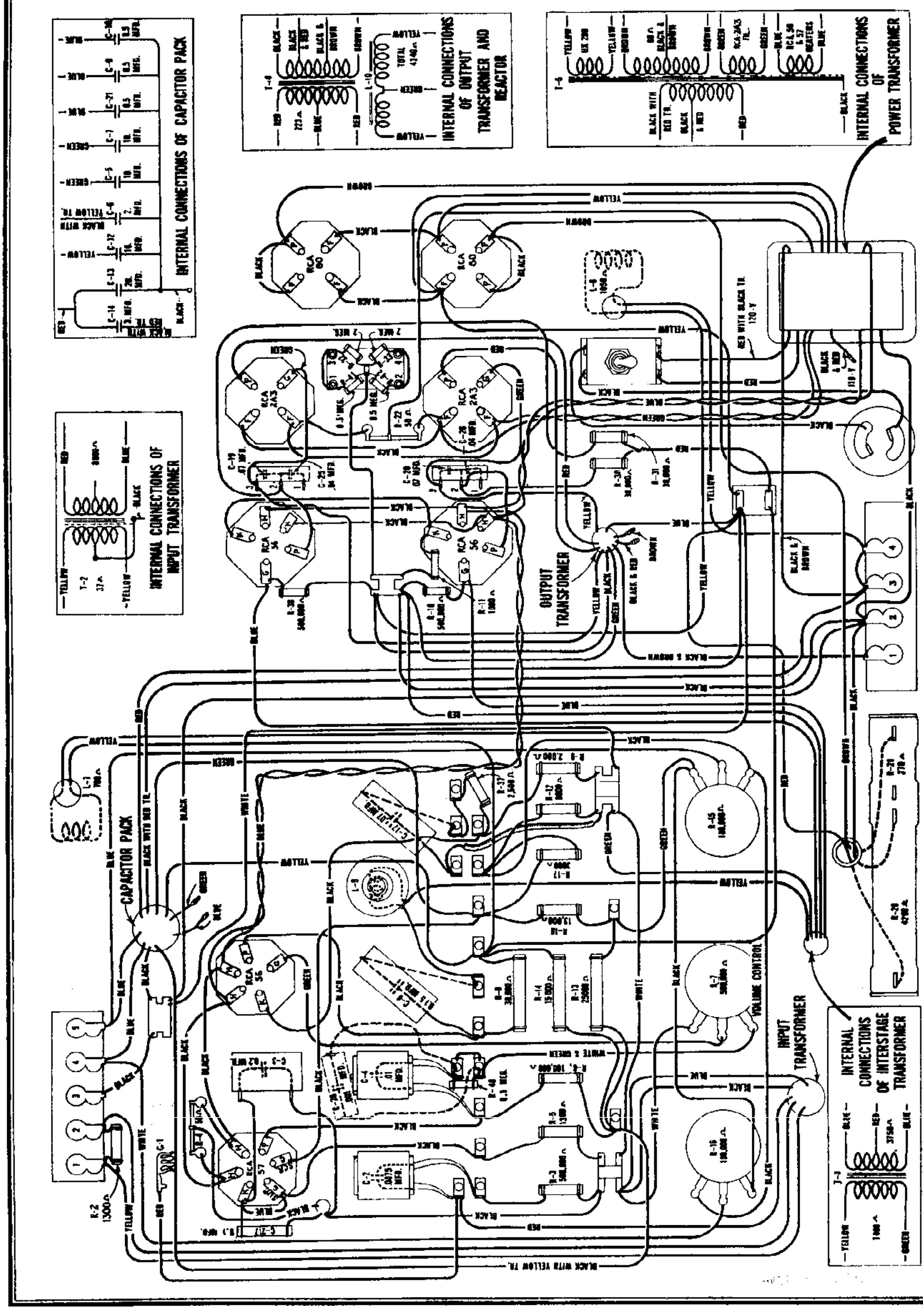


Figure 2—Amplifier Panel Wiring (PB82C1)—Connected for use with 50 inch baffles

RCA-VICTOR CO., INC.

Sealed-Vibrator Test

In order to properly test the new sealed type vibrators, it is essential that certain test specifications be made. The following bench layout and test information will permit proper tests of vibrators for all important qualities except R.F. interference. R.F. interference must be tested by installing the vibrator in the instrument in which it is to be used and making an operating test. No other test for R.F. interference is conclusive.

The bench test set-up shown uses the following material:—

- 2 Six-volt storage batteries
- 3 Transformers, Stock Nos. 9457, 9049, 9430
- 1 Ammeter 0-20 (Low Resistance)
- 1 Voltmeter 0-10
- 1 Voltmeter 0-500 (1000 Ohm per volt)
- 1 7000 Ohm 75-Watt Resistor tapped at 5000 Ohms (10,000 Ohms standard stock size)
- 1 Capacitor, Stock No. 6738
- 1 Bracket

The following tabulation gives the proper transformer, load, resistance and other information for tests:

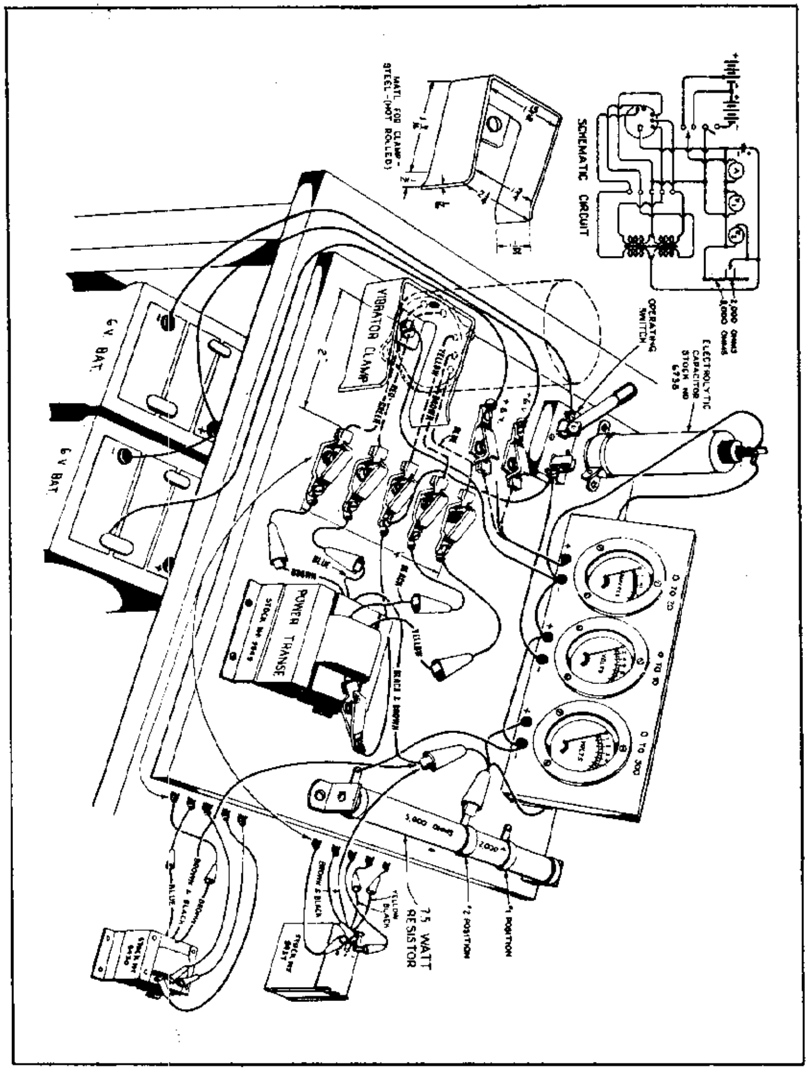
Vibrator Under Test	Transformer To Be Used	Load Resistance (ohms)	Minimum Output Voltage At 6 Volts Input	Maximum Input Current (amperes) 8 Volts
M-34 (7604)	9430	5000	210*	6.25
M-105 (7689)	9049	5000	180*	5.0
M-116 (7694)	9457	7000	240*	5.0

* In event reading is reversed, interchange either green and red or brown and blue vibrator leads.

Using the test set-up shown, proceed as follows:—

1. The vibrator should start every time the circuit is properly connected across the 6-volt section of battery. Check starting by feeling for a slight vibration or listening for vibrator noise.
2. The output voltage should be above the values given in the table.
3. The input current should be below the values given in the table.

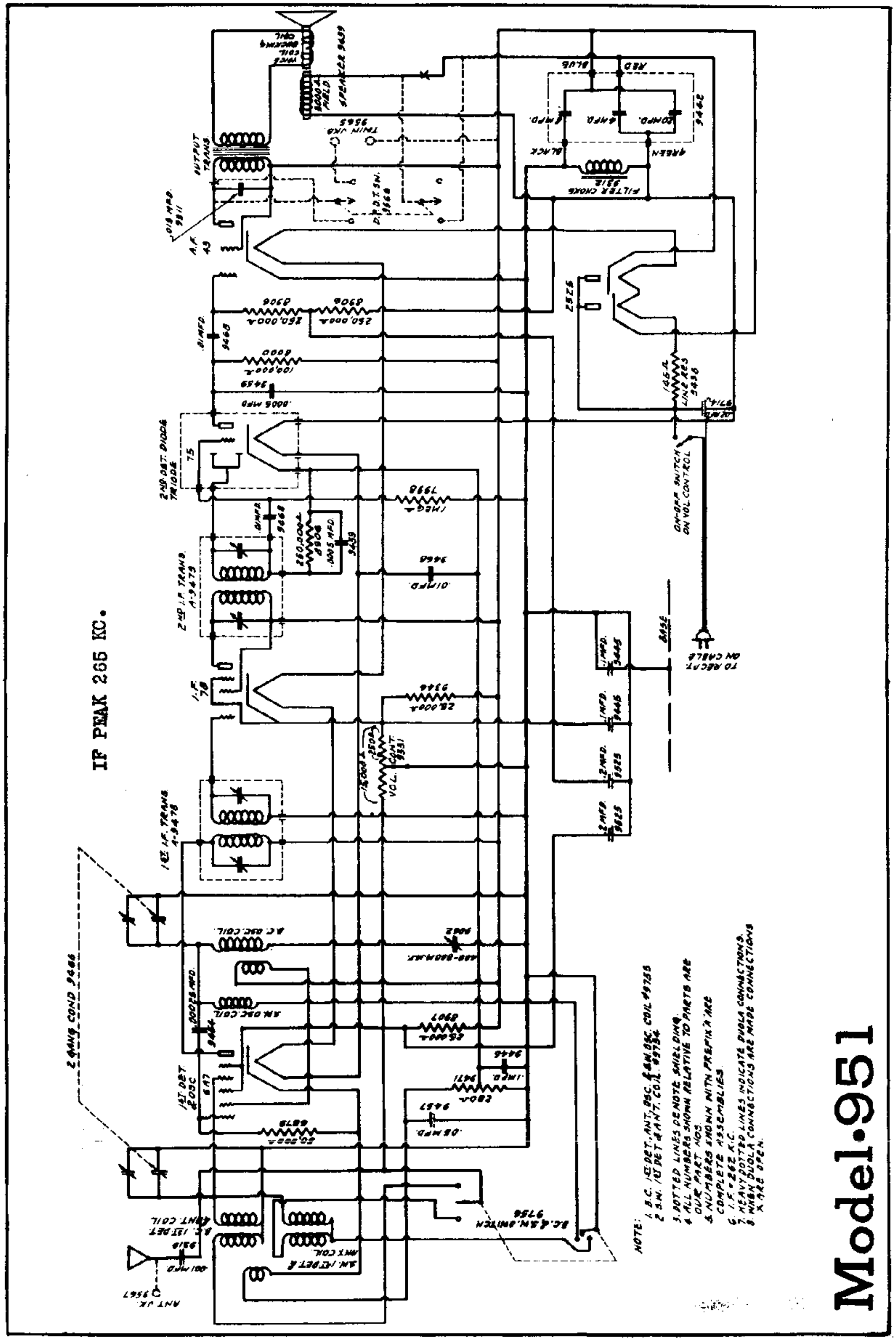
Failure to meet any of these three conditions is sufficient cause for rejection of a unit as defective.



Typical Bench Set-Up for Testing Vibrators

MODEL 951
Schematic

RADOLEK CO.



MODEL 951
Alignment
Voltage

RADOLEK CO.

These service notes pertain to two receivers which are identical with the exception that one model had Duola connections incorporated in it. These connections are shown in the schematic drawing by the dotted lines. Where Duola provisions are provided connections marked "X" on the diagram are open. Receivers with Duola connections may be identified by the Duola switch and two tip jacks located on the back of the chassis. Receivers which do not have the Duola connections do not have the switch (Part #9566) or the tip jacks (Part #9565).

ALIGNMENT: Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

VOLTAGE TABLE

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
25Z5	Rectifier	25						

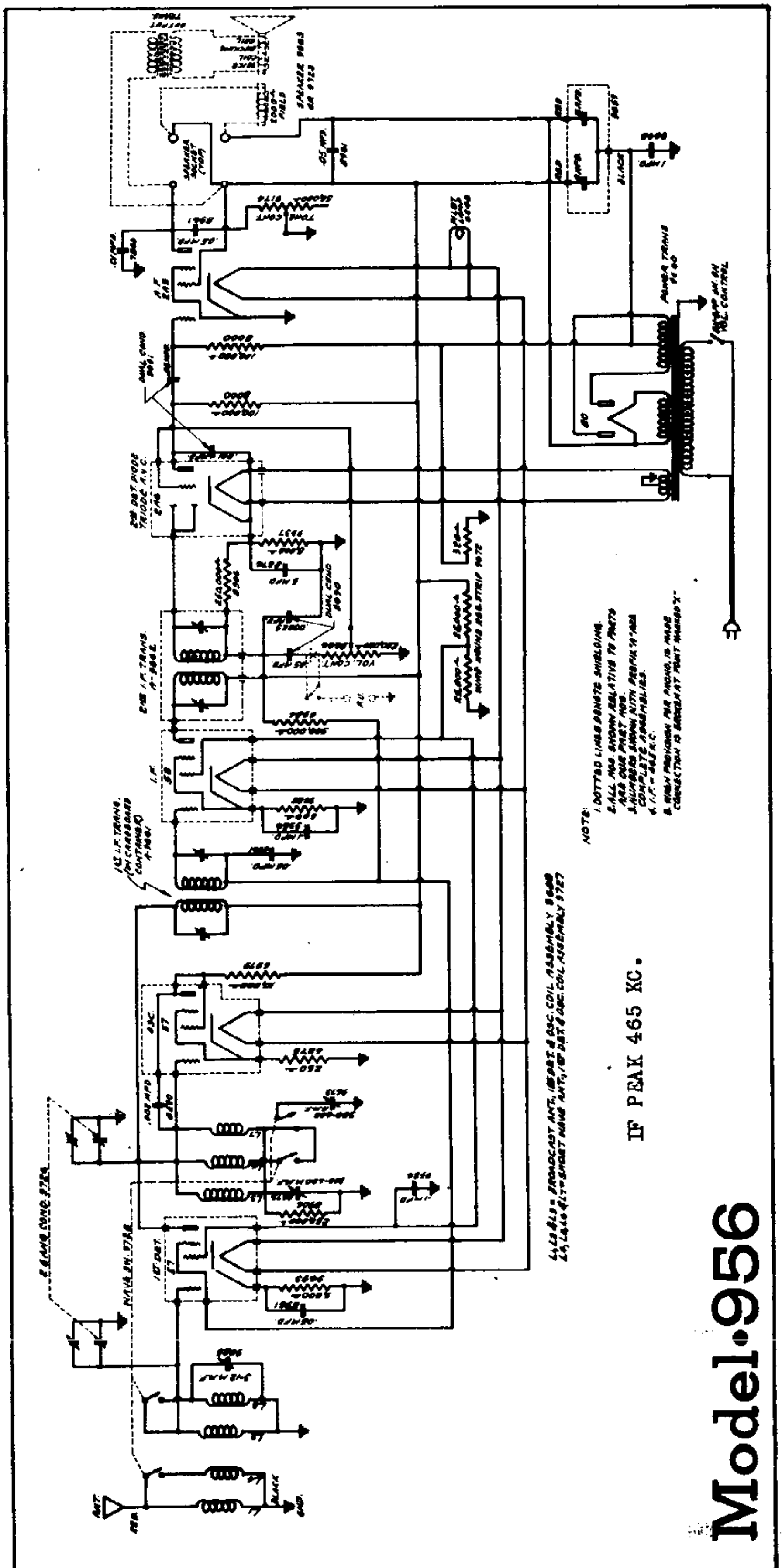
* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

PARTS AND PRICE LIST

PART NUMBER		LIST PRICE
9755	BC Antenna, First Detector, Oscillator & SW Oscillator Coil	$2.14
9754	SW Antenna and First Detector Coil	.74
9478	First IF Transformer	1.38
9479	Second IF Transformer	1.38
9756	Band Selector Switch	.88
9465	Gang Condenser	2.69
9331	Volume Control	1.32
9062	Padding Condenser	.50
9442	Dry Electrolytic Condenser	2.85
9438	Wire Wound Resistor Strip 145 Ohms	.60

RADOLEK CO.



MODEL 956
Alignment
Voltage

RADOLEK CO.

VOLTAGE TABLE:

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I. F.	2.4	230	90	4
2A6 2nd Detector	2.45	160*		3
2A5 A. F.	2.4	218	230	7**
80 Rectifier	4.8	340 ea.plate		

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

Only when the antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

NOTE: Some of the IF intermediate transformers used do not have the brass hex nut and the trimmer screw inside of the brass hex nut, but have two parallel trimmers which are likewise accessible through two holes provided in the top of the I. F. shield can.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

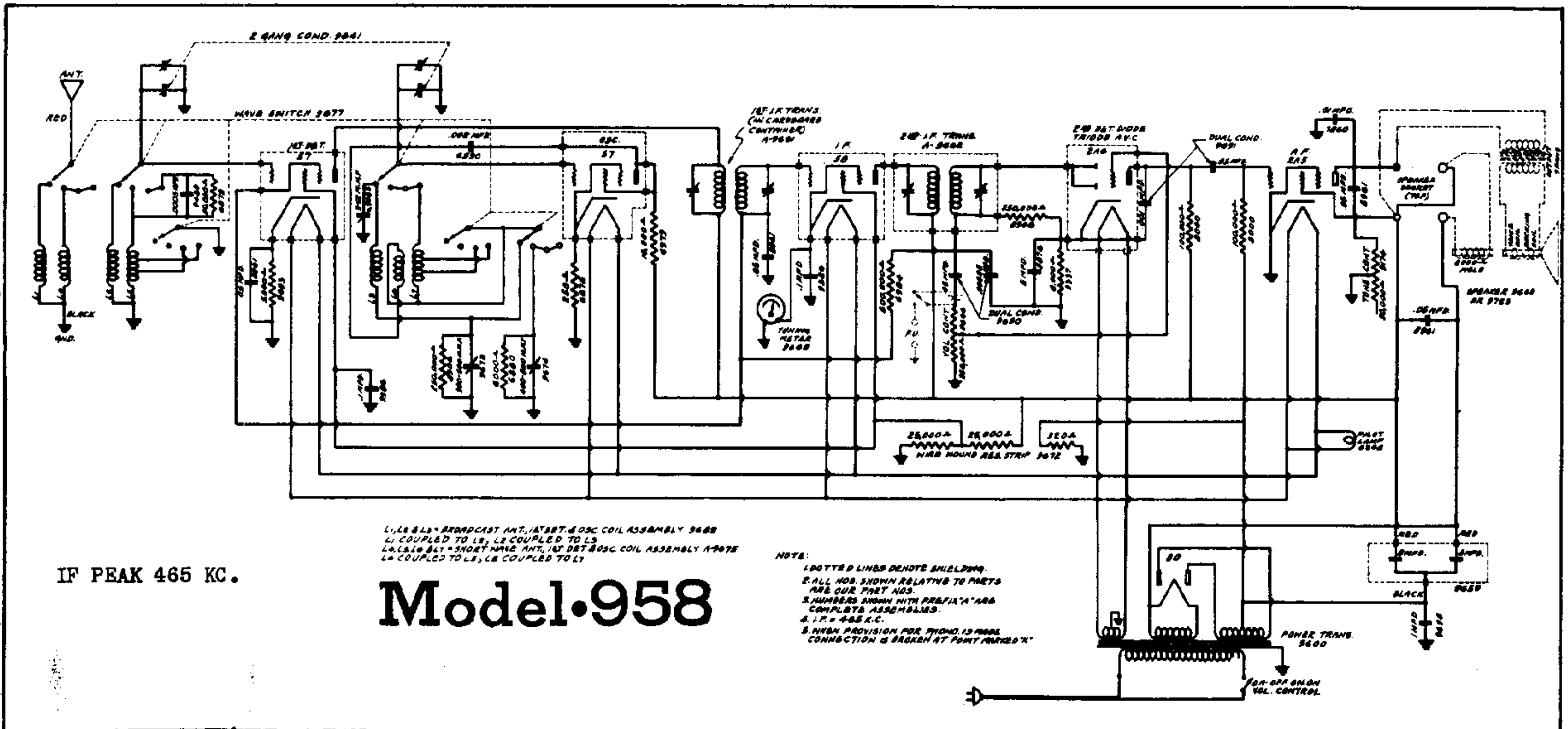
2. Tune the receiver to exactly 1400 kilocycles on the dial, adjust the band selector switch for operation on the broadcast band (1500-540 kilocycles) and set the oscillator to 1400 kilocycles. Then adjust the oscillator variable condenser section trimmer condenser TO BRING THIS SIGNAL IN (maximum output). The oscillator and antenna variable condenser trimmers are mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band, set the oscillator at 600 kilocycles and tune the receiver to approximately 600 kilocycles on the dial. Then adjust the 600 kilocycle padding condenser which is the one located towards the front on the right hand side of the chassis and accessible through the small hole in the chassis for maximum output. It is necessary to rock the condenser slightly to the right and left to obtain the correct position. After aligning the 600 kilocycle padding condenser be sure to recheck the 1400 kilocycle adjustment as the 600 kilocycle alignment may have changed the alignment at 1400 kilocycles.

4. Adjust the short wave switch for operation on 1500 kilocycle to 4500 kilocycle band. Set the oscillator at 4 megacycles and the receiver to 4 megacycles on the dial. Turn the receiver on end and BRING THE 4 MEGACYCLE SIGNAL IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 4 MEGACYCLE TRIMMER located underneath the chassis and adjacent to the band selector switch. Next, tune the receiver to 1600 kilocycles on the dial and set the oscillator frequency to 1600 kilocycles after which adjust the 1600 kilocycle padding condenser which is located on the rear right hand side and accessible through the hole in the chassis for maximum output. It is imperative that after making this adjustment at 1600 kilocycles that the alignment at 4 megacycles be rechecked, as the 1600 kilocycle adjustment may throw the receiver out at 4 megacycles.

MODEL 958
Schematic
Voltage

RADOLEK CO.



TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I.F.	2.4	230	90	4
2A6 Second Detector	2.45	160*		3
2A5 A.F.	2.4	218	230	7**
80 Rectifier	4.8	340 each plate		

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

** Read from grid to chassis.

* Comparative voltage only. The voltmeter when readings are taken at this point is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

MODEL 958
Alignment Data

RADOLEK CO.

TUBE EQUIPMENT: The receiver uses the following tubes:

One (1) type 57 First Detector
One (1) type 57 Oscillator
One (1) type 58 I.F. Amplifier
One (1) type 2A6 Second Detector Diode Triode, AVC.
One (1) type 2A5 Output.

Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the #57 Modulator tube (1st detector), leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the 1st intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second I.F. transformer should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 4 megacycles on the dial and adjust the band selector switch for operation on this band.

   Set the short wave trimmer about one-half the distance between maximum clockwise and counter-clockwise rotation.

   Next set the test oscillator to exactly four megacycles and tune the signal in by adjustingthe oscillator variable condenser trimmer mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band and tune the receiver to 1.6 megacycles on the dial.

   Set the oscillator to exactly 1.6 megacycles.

   Adjust the padding condenser accessible through the hole in the right hand side of the chassis and the closest to the rear of the chassis to obtain maximum output reading. After making this adjustment recheck the alignment at 4 megacycles. It is advisable to recheck the 1.6 and 4 megacycle adjustment several times.

4. Adjust the band selector switch for operation on the broadcast band.

   Tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency.

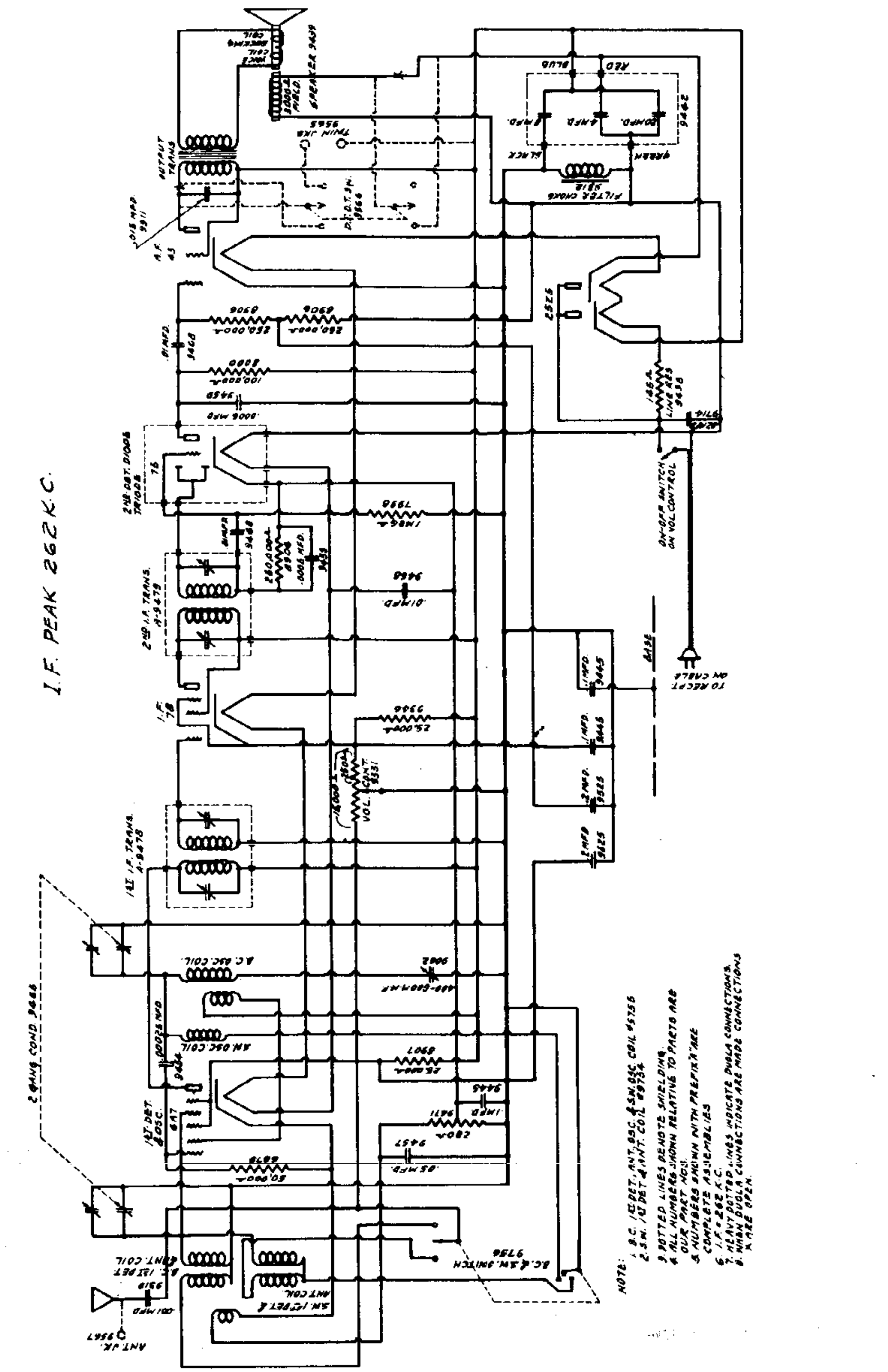
   Turn the receiver on end and adjust the trimmer screw on the small trimmer located adjacent to the short-wave switch underneath the chassis for maximum signal after which adjust the antenna variable condenser trimmer mounted on top of the variable condenser for maximum signal strength.

5. Leave the band selector switch for operation on the broadcast band and tune the receiver to approximately 600 kilocycles and adjust the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser which is located on the righthand side next to the 1.6 megacycle padding condenser for maximum output reading. As this adjustment is quite critical it is necessary to rock the condenser slightly to obtain maximum sensitivity.

   NOTE: Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles and the 600 kilocycle adjustment after aligning at 1400 kilocycles. All short-wave bands are properly aligned after correctly aligning at 4 megacycles.

MODEL 10951
Schematic

RADOLEK CO.



MODEL 10951
Alignment, Voltage

RADOLEK CO.

These service notes pertain to two receivers which are identical with the exception that one model had Duola connections incorporated in it. These connections are shown in the schematic drawing by the dotted lines. Where Duola provisions are provided connections marked "X" on the diagram are open. Receivers with Duola connections may be identified by the Duola switch and two tip jacks located on the back of the chassis. Receivers which do not have the Duola connections do not have the switch (Part #9566) or the tip jacks (Part #9565).

ALIGNMENT: Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

VOLTAGE TABLE

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
25Z5	Rectifier	25						

* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

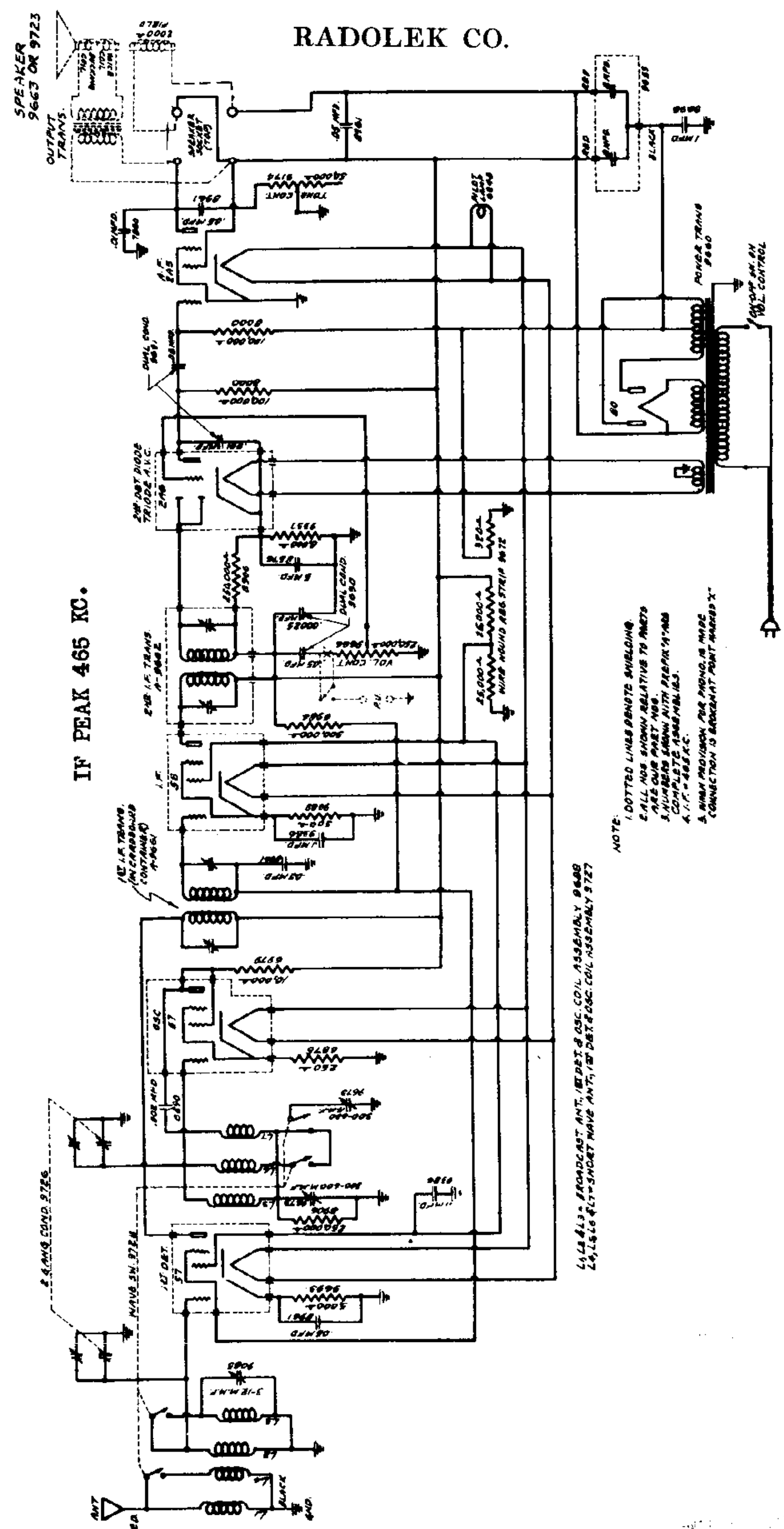
** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

PARTS AND PRICE LIST

PART NUMBER			
9755	BC Antenna, First Detector, Oscillator & SW Oscillator Coil	9319	.001 Mfd. Moulded Condenser
9754	SW Antenna and First Detector Coil	9454	.00025 Mfd. Moulded Condenser
9478	First IF Transformer	9465	.01 Mfd. 400 Volt Condenser
9479	Second IF Transformer	9445	.1 Mfd. 200 Volt Condenser
9658	Power Transformer (110 Volt A.C. only)	9525	.2 Mfd. 200 Volt Condenser
9465	Gang Condenser	9417	.02 Mfd. 400 Volt Condenser
9331	Volume Control	9457	.05 Mfd. 400 Volt Condenser
9062	Padding Condenser	9911	.015 Mfd. 400 Volt Condenser
9442	Dry Electrolytic Condenser	8906	200,000 Ohm 1/3 Watt Resistor
9023	6 Volt Pilot Light (110 Volt D.C. only)	8000	100,000 Ohm 1/3 Watt Resistor
9083	.01 Mfd. Condenser (110 Volt D.C. only)	8907	25,000 Ohm 1/3 Watt Resistor
9569	8 Mfd. Condenser (110 Volt A.C. only)	7998	1 Meg Ohm 1/3 Watt Resistor
9196	25 Mfd. Condenser	6879	50,000 Ohm 1/3 Watt Resistor
9459	.0005 Mfd. Moulded Condenser	9346	25,000 Ohm 1/2 Watt [illegible]

MODEL 10956
Schematic

RADOLEK CO.



MODEL 10956
Alignment,Voltage

RADOLEK CO.

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I. F.	2.4	230	90	4
2A6 2nd Detector	2.45	160*		3
2A5 A. F.	2.4	218	230	7**
80 Rectifier	4.8	340 ea.plate		

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

Only when the antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

NOTE: Some of the IF intermediate transformers used do not have the brass hex nut and the trimmer screw inside of the brass hex nut, but have two parallel trimmers which are likewise accessible through two holes provided in the top of the I. F. shield can.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 1400 kilocycles on the dial, adjust the band selector switch for operation on the broadcast band (1500-540 kilocycles) and set the oscillator to 1400 kilocycles. Then adjust the oscillator variable condenser section trimmer condenser TO BRING THIS SIGNAL IN (maximum output). The oscillator and antenna variable condenser trimmers are mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band, set the oscillator at 600 kilocycles and tune the receiver to approximately 600 kilocycles on the dial. Then adjust the 600 kilocycle padding condenser which is the one located towards the front on the right hand side of the chassis and accessible through the small hole in the chassis for maximum output. It is necessary to rock the condenser slightly to the right and left to obtain the correct position. After aligning the 600 kilocycle padding condenser be sure to recheck the 1400 kilocycle adjustment as the 600 kilocycle alignment may have changed the alignment at 1400 kilocycles.

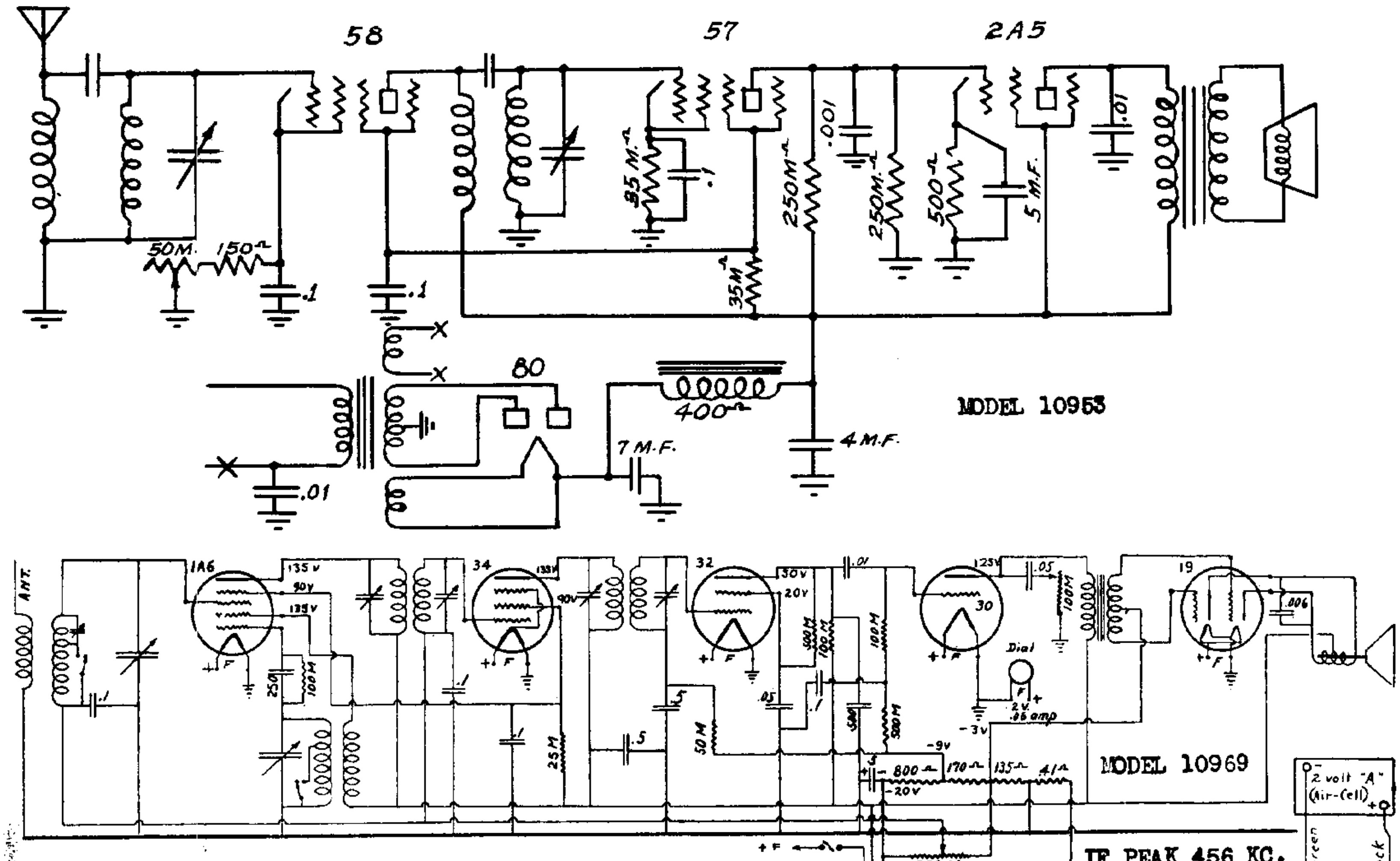
4. Adjust the short wave switch for operation on 1500 kilocycle to 4500 kilocycle band. Set the oscillator at 4 megacycles and the receiver to 4 megacycles on the dial. Turn the receiver on end and BRING THE 4 MEGACYCLE SIGNAL IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 4 MEGACYCLE TRIMMER located underneath the chassis and adjacent to the band selector switch.

Next, tune the receiver to 1600 kilocycles on the dial and set the oscillator frequency to 1600 kilocycles after which adjust the 1600 kilocycle padding condenser which is located on the rear right hand side and accessible through the hole in the chassis for maximum output. It is imperative that after making this adjustment at 1600 kilocycles that the alignment at 4 megacycles be rechecked, as the 1600 kilocycle adjustment may throw the receiver out at 4 megacycles.

9666	Volume Control	8980	Tube Shield
9174	Tone Control	9083	Tube Shield Caps
9767	Dial	9386	.1 Mfd. 200 Volt Condenser
9726	Two Gang Condenser	8961	.05 Mfd. 400 Volt Condenser
9671	Pilot Light Socket	6590	.002 Mfd. 400 Volt Condenser
9660	Power Transformer	7860	.01 Mfd. 400 Volt Condenser
9659	2-8 Mfd. Electrolytic Cond	9690	.00025 Mfd. & .05 Mfd. Dual 400 Volt Cond
8876	5 Mfd. Electrolytic Cond	9691	.05 Mfd. & .001 Mfd. Dual 400 Volt Cond
9673	Padding Condenser	9698	1 Mfd. 100 Volt Condenser
9799	Trimmer Condenser	6976	10,000 Ohm 1/3 Watt Resistor
9672	Wire Wound Resistance Strip	9693	5,000 Ohm 1/3 Watt Resistor
9642	No. 80 Tube Socket	8000	100,000 Ohm 1/3 Watt Resistor
9643	Speaker Socket	8906	250,000 Ohm 1/3 Watt Resistor
9644	2A5 Socket	6875	250 Ohm 1/3 Watt Resistor
9645	2A6 Socket	6984	500,000 Ohm 1/3 Watt Resistor
9646	58 Socket	9337	8,000 Ohm 1/3 Watt Resistor
9647	57 Socket	9089	500 Ohm 1/3 Watt Resistor
9063	Tube Shield Base		

RADOLEK CO.

MODEL 10953
Schematic
MODEL 10969
Schematic,
Service Data

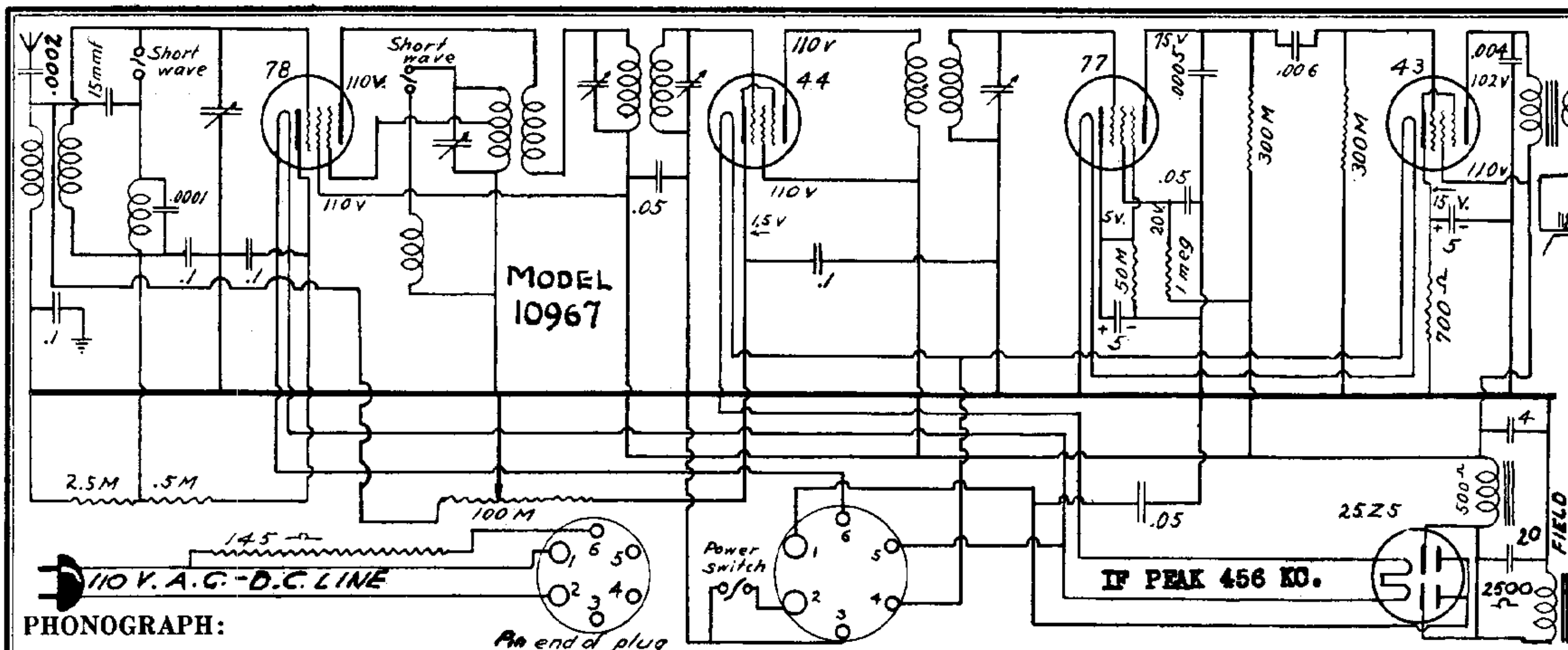


CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.
PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.
SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

MODEL 10962
Schematic, Voltage
MODEL 10967
Schematic, Alignment
Voltage

RADOLEK CO.



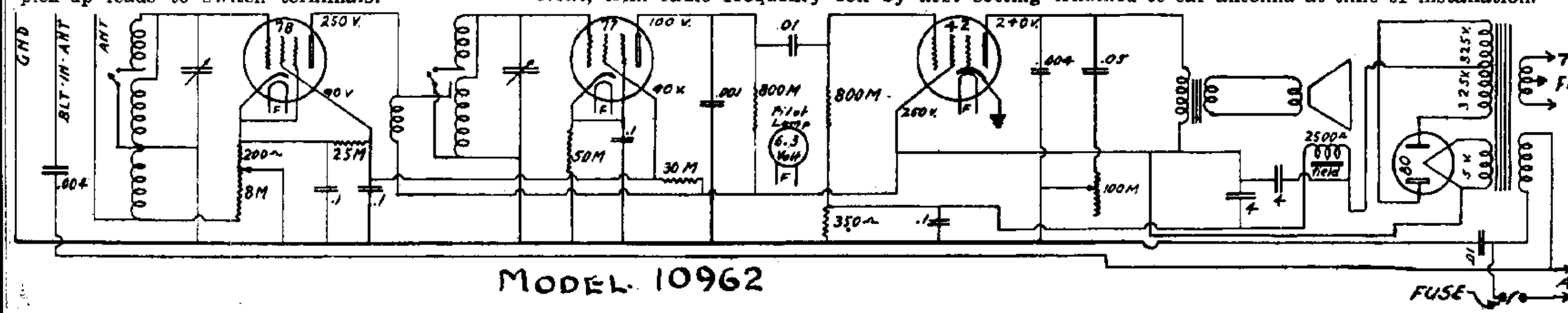
PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

SERVICE NOTES:

To balance set remove from cabinet. Intermediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

If used in automobile, antenna stage should be trimmed to car antenna at time of installation.



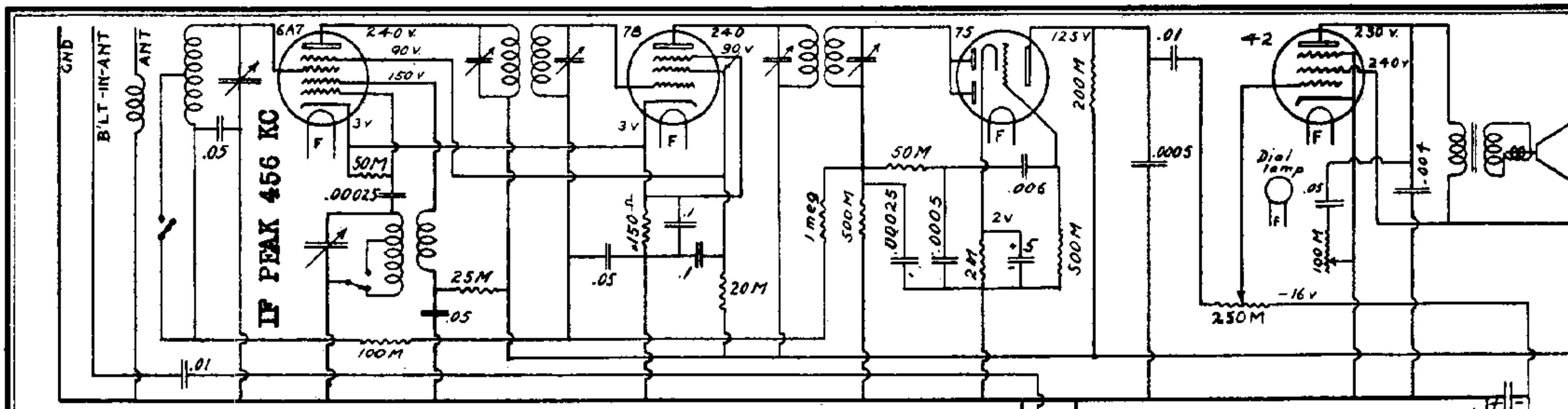
MODEL 10962

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.

RADOLEK CO.

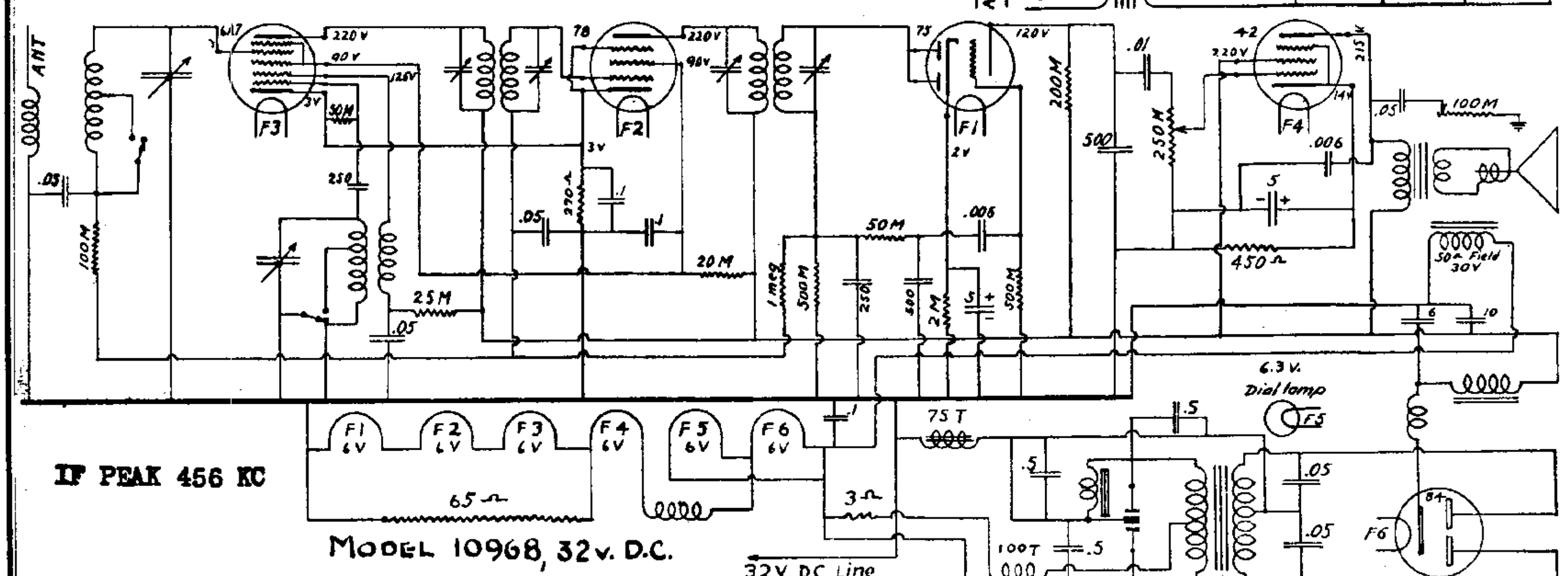
MODEL 10963 (60 Cycles)
MODEL 10964 (25 Cycles)
MODEL 10968 (32 v. DC.)
Schematic, Voltage
Alignment Data



PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.
SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal, Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL 10963 (60 ∿), MODEL 10964 (25 ∿)

IF PEAK 456 KC



IF PEAK 456 KC

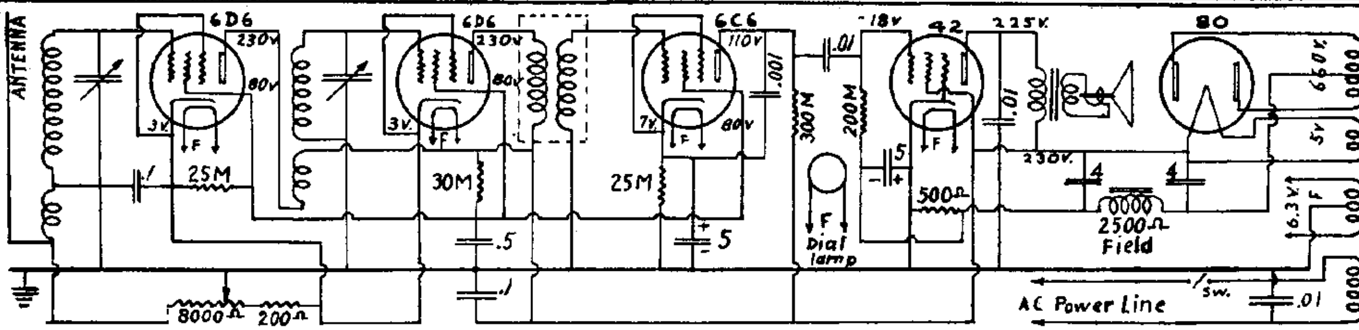
MODEL 10968, 32 v. D.C.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.
SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL 10966
Schematic, Voltage
MODEL 10970
Schematic, Voltage
Alignment Data

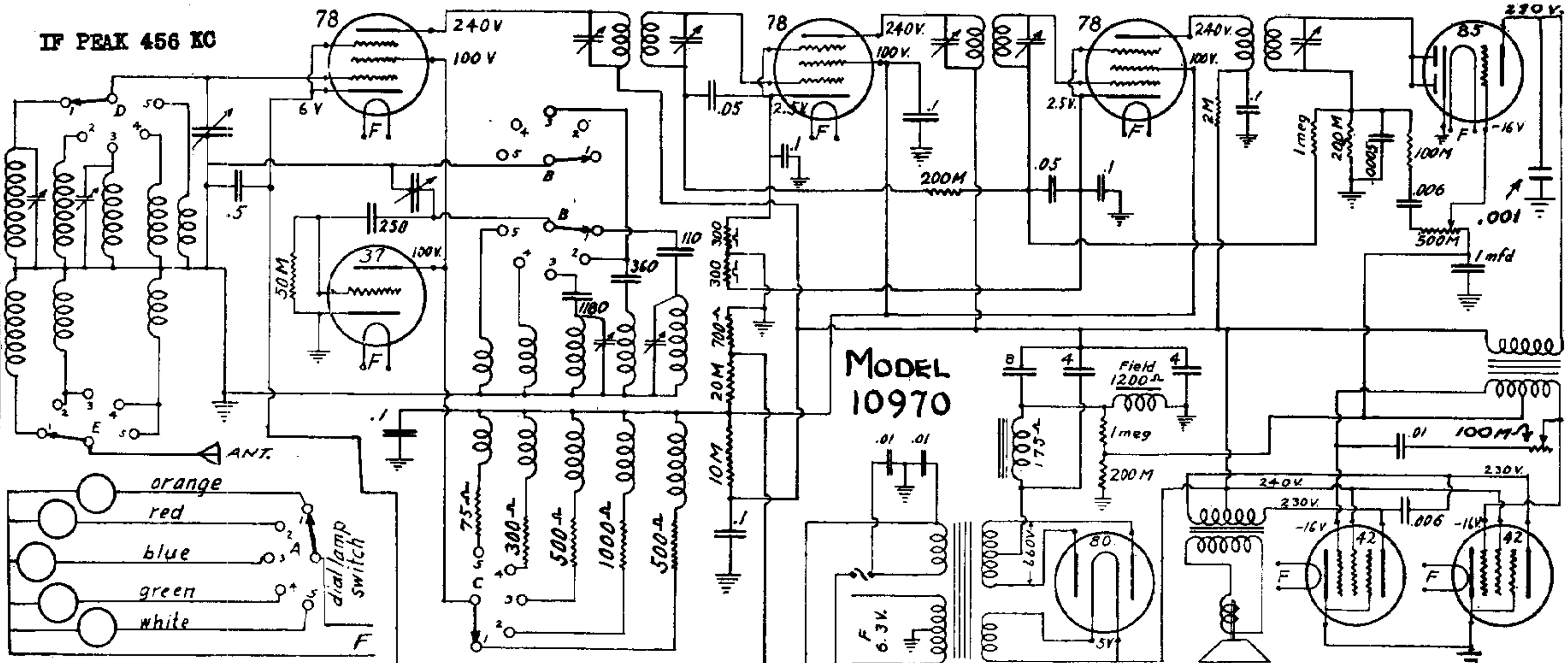
RADOLEK CO.

MODEL 10966



PHONOGRAPH: Mount single pole toggle switch at any convenient point on rear flange of chassis, disconnect 5 mfd. condenser from "cathode" of 6C6 socket and connect it to one side of switch, connect other side of switch to "cathode" of socket and connect phonograph across switch.

IF PEAK 456 KC

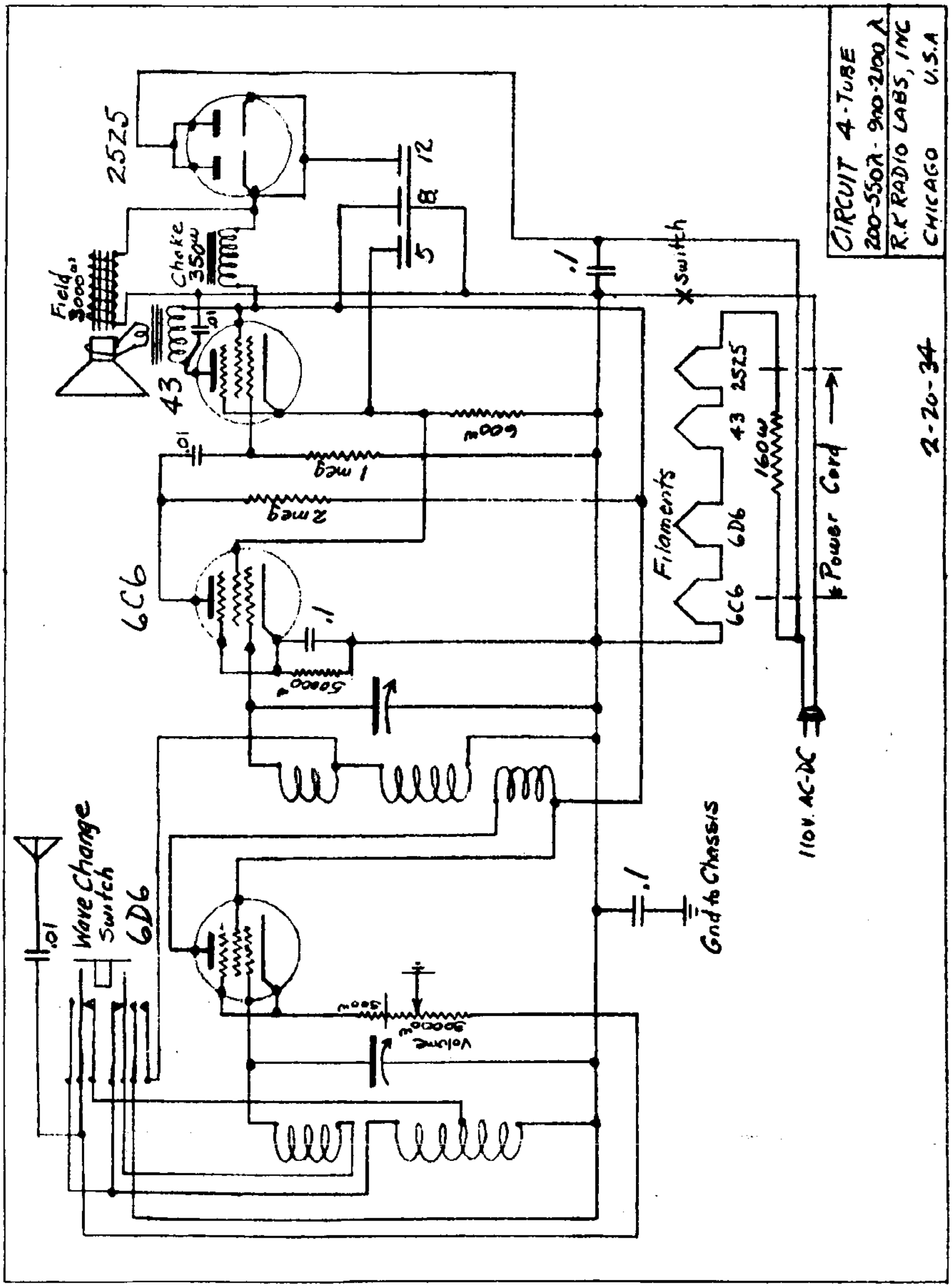


MODEL 10970

The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

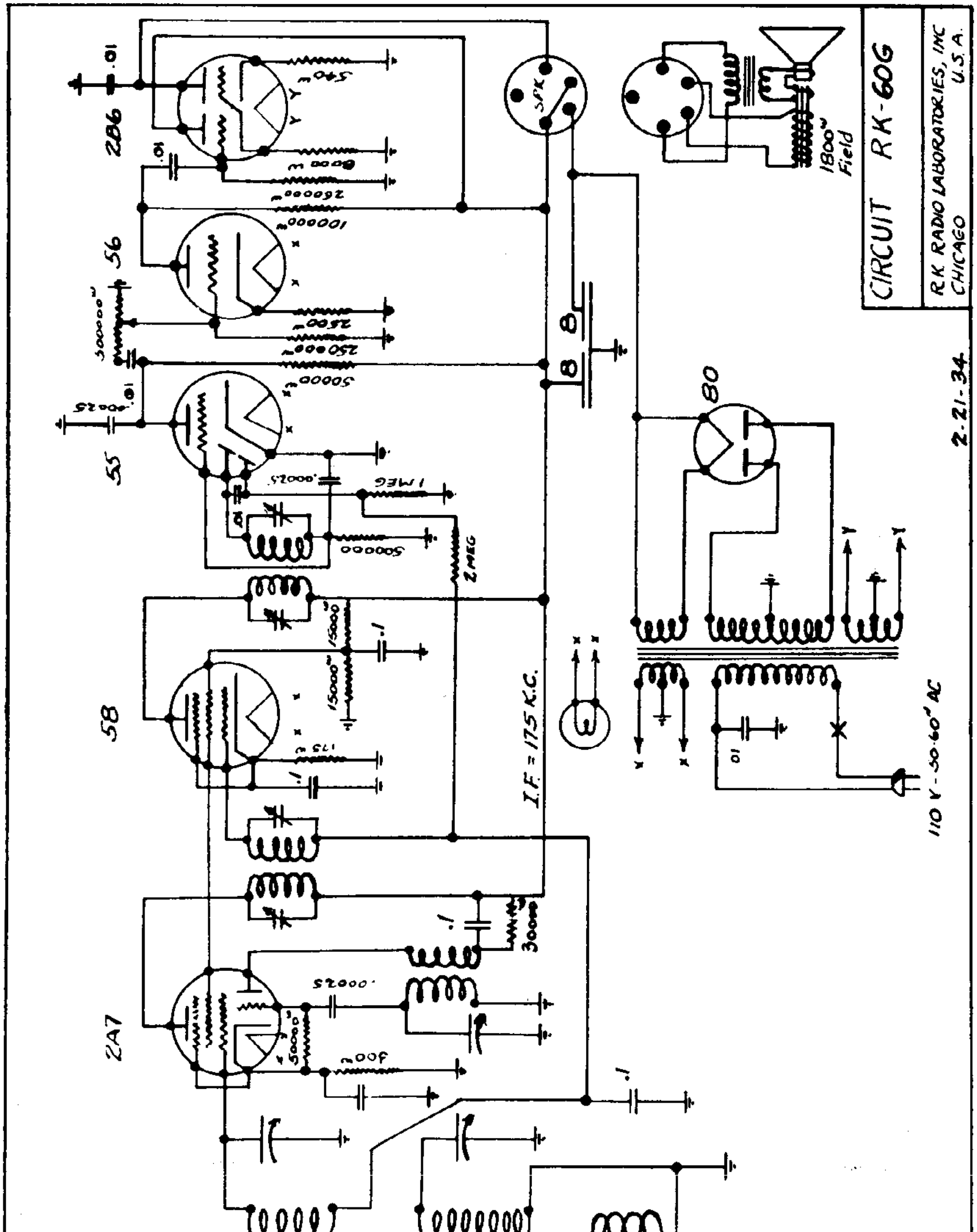
RK RADIO LABORATORIES, INC.

MODEL 4-Tube
Schematic

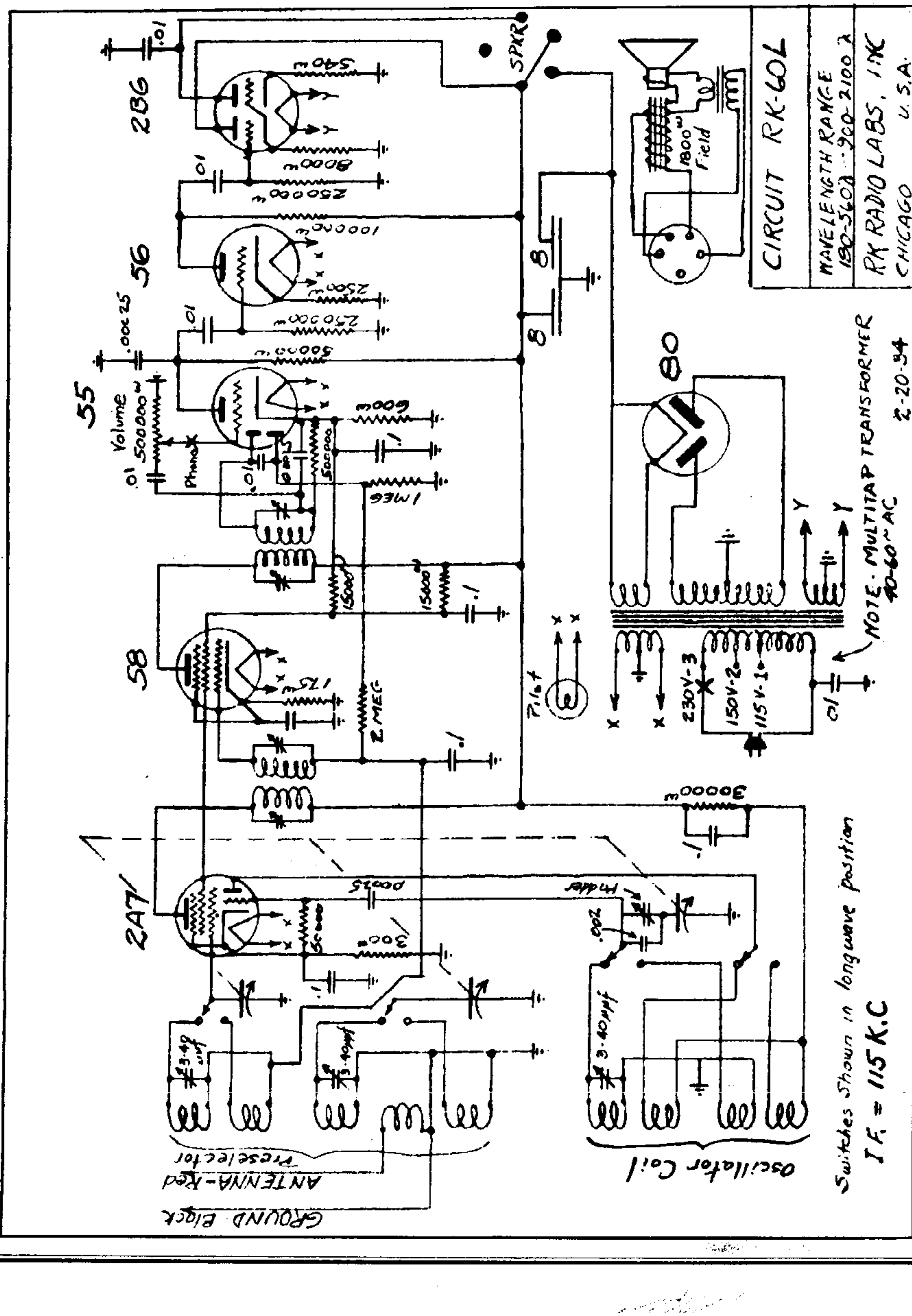


MODEL RK-60 G
Schematic

RK RADIO LABORATORIES, INC.

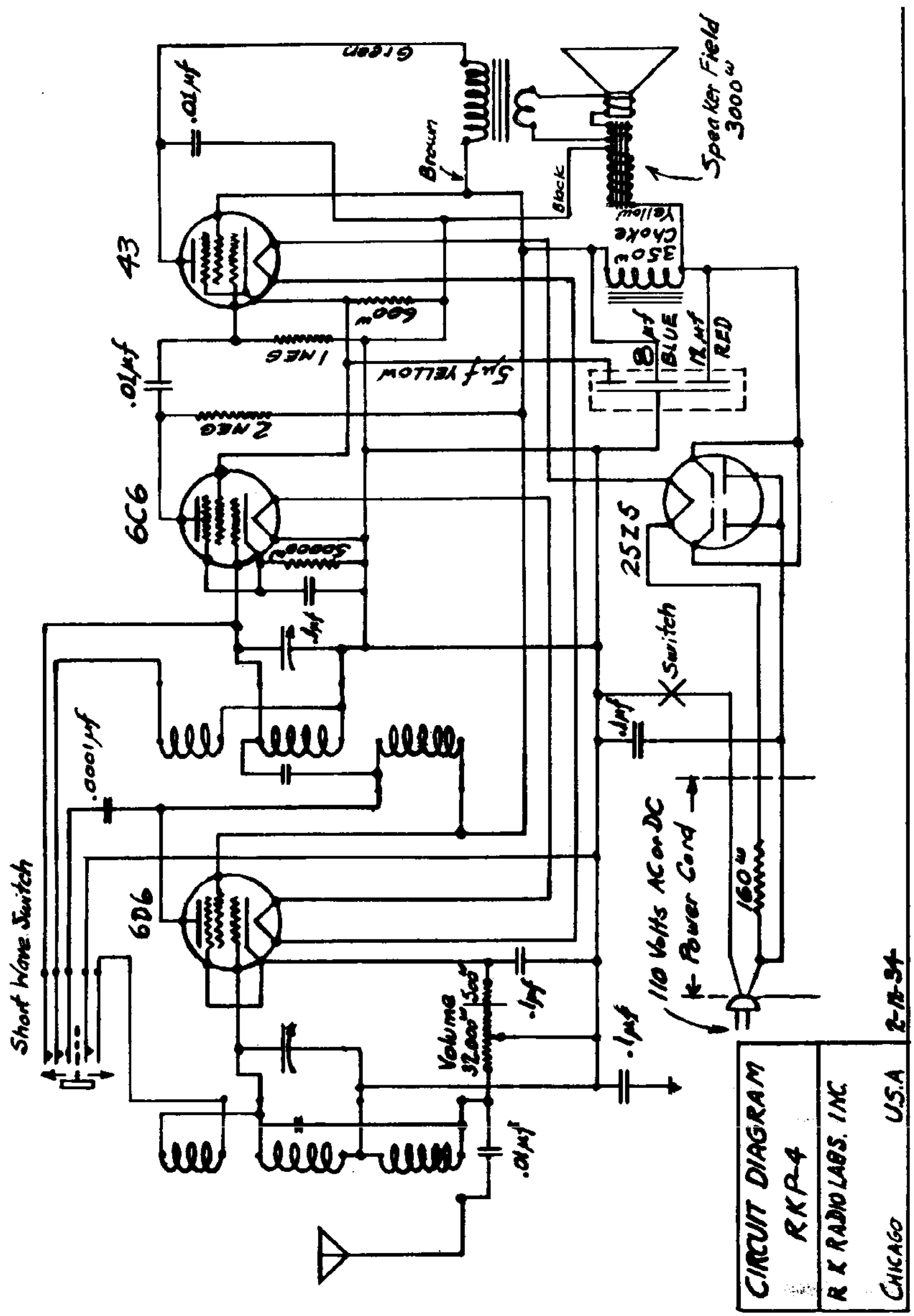


RK RADIO LABORATORIES, INC.



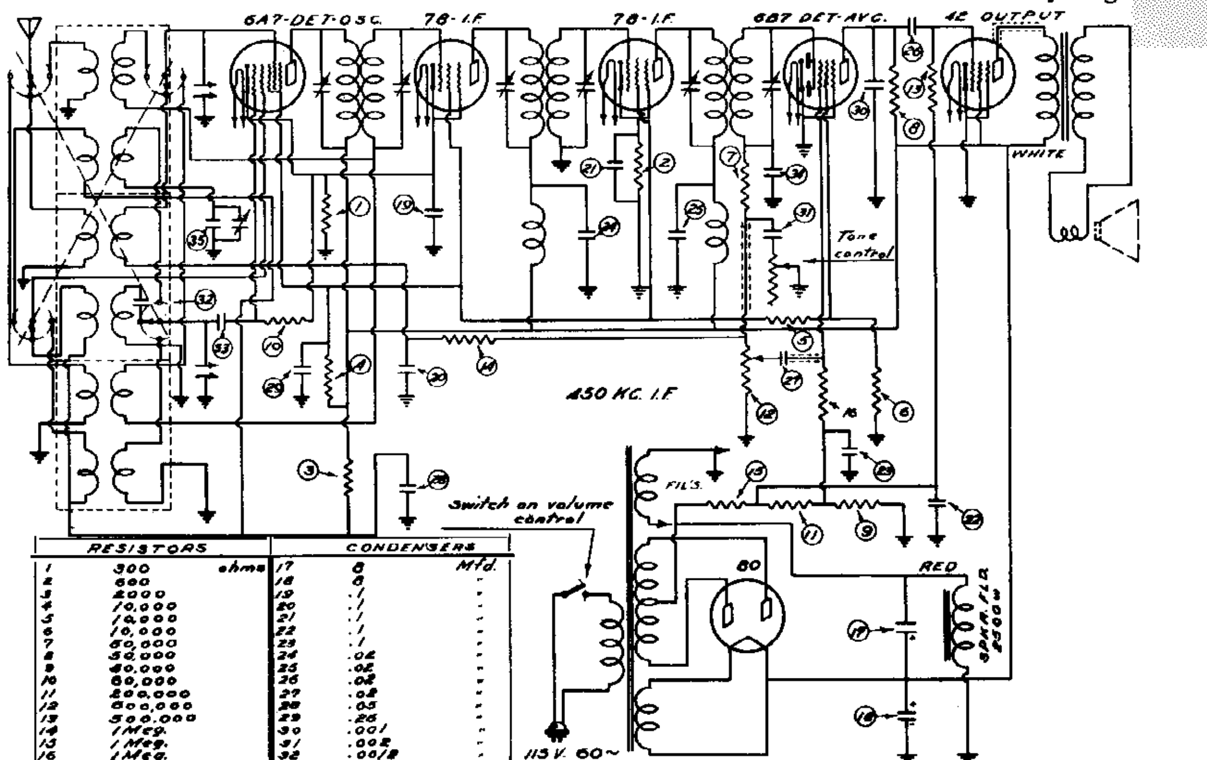
MODEL RKP-4
Schematic

RK RADIO LABORATORIES, INC.



MODEL 10-4
Schematic, Voltage
Socket, Alignment

REMLER COMPANY, LTD.



RESISTORS			CONDENSERS		
1	300	ohms	17	8	Mfd.
2	600		18	8	"
3	2000		19	.1	"
4	10,000		20	.1	"
5	10,000		21	.1	"
6	10,000		22	.1	"
7	60,000		23	.1	"
8	50,000		24	.02	"
9	40,000		25	.02	"
10	60,000		26	.02	"
11	200,000		27	.02	"
12	500,000		28	.05	"
13	500,000		29	.25	"
14	1 Meg.		30	.001	"
15	1 Meg.		31	.002	"
16	1 Meg.		32	.0012	"
			33	.00008	"
			34	.0003	"
			35	.0003	"

INSTALLATION:

This set is designed to operate from a 110 to 125 volt, 50 or 60 cycle alternating current supply.

An outdoor antenna should be used, having a length of from 60 to 100 feet. The antenna should be kept clear of all metal objects, such as pipes and electric circuits. This also applies to the lead-in wire. Shielded wire should not be used for the lead-in. Connect the lead-in to the red wire extending from the back of the set. The ground connection should be made to the black wire. This lead should be as short as possible and preferably connected to a cold water pipe, scraped clean, and a ground clamp used.

Loosen the chassis hold-down screws one turn when installing the set.

The knob on the left controls the volume and also operates the ON and OFF switch.

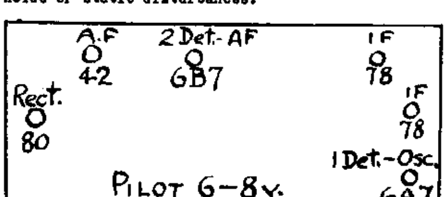
The center knob controls the station selector, or tuning. This knob operates through a DUAL-RATIO reducing mechanism. When pressed in, the ratio is three and a half to one. This position may be used on the broadcast band, or when it is desired to turn quickly from one band to another. When the knob is pulled out, a ratio of seventeen to one is obtained. This position should be used for tuning on the short wave bands.

The dial is divided into three ranges. The outer range is from 540 to 1900 kilocycles, and is calibrated in tens of kilocycles, or broadcast channels. The bands included in this range are: the regular broadcast band from 540 to 1500 K.C., the police band from 1534 to 1712 K.C., and amateurs from 1715 to 1900 K.C. The middle range covers from 1900 to 6400 K.C. This range includes: amateurs 1900 to 2000 K.C., police stations 2308 to 2490 K.C., aviation 2606 to 3485 and 4110 to 5700 K.C., amateurs 3500 to 4000 K.C., and short wave broadcast 6010 to 6150 K.C. This range is calibrated in hundreds of kilocycles.

The inner range covers the higher frequency bands, extending from 6 to 18 megacycles (6000 to 18,000 kilocycles).

The principal short wave broadcast ranges included are: 6 to 6.15 megacycles, 9.5 to 9.6 megacycles, 11.7 to 11.9 megacycles, 15.1 to 15.35 megacycles, and 17.7 to 17.8 megacycles. Amateur phone transmissions may be tuned in from 14 to 14.4 megacycles. This range on the dial is marked in megacycles, which are thousands of kilocycles. The knob on the right controls the range switch and the pointer, which automatically indicates the range position on the dial.

A continuous type tone control is adjustable from the back of the receiver. This may be adjusted to modify the tone or to reduce noise or static disturbances.



SERVICE DATA:

This is a six tube superheterodyne receiver with automatic volume control. The following tubes are used:

6A7 Converter (mixer-oscillator)
78 Super-control amplifier, 1st I.F. stage
78 Super-control amplifier, 2nd I.F. stage
6B7 Diode detector - AF amplifier, AV.C.
42 Power amplifier
80 Full wave rectifier
Dial light 6-8 volt Mazda 50

The oscillator, antenna, and mixer coils are wound on the same form for each band. The short wave coils are mounted directly on the switch together with the trimmer capacities. A variable series trimmer is provided for the broadcast band oscillator circuit. This is accessible from the bottom of the chassis, and is mounted near the broadcast oscillator coil. The I.F. transformers are in the aluminum shields mounted on top of the chassis. The trimmers for these coils may be adjusted from the tops of the shields. The intermediate frequency is 450 kilocycles. Use a week signal or oscillator input when adjusting the trimmers.

In removing the chassis from the cabinet, take the set screw, spring and brass pin from the tuning knob so that it may be removed from the shaft. The switch and volume knobs may be removed by prying with a wooden screw driver with a piece of cardboard against the cabinet.

Voltage readings for servicing purposes follow:

A. C. VOLTAGES:

Line	120 volts
Filaments - 6A7, 78s, 6B7 and 42	6.3 "
Filaments - 80	5.8 "

D. C. VOLTAGES: (No signal)

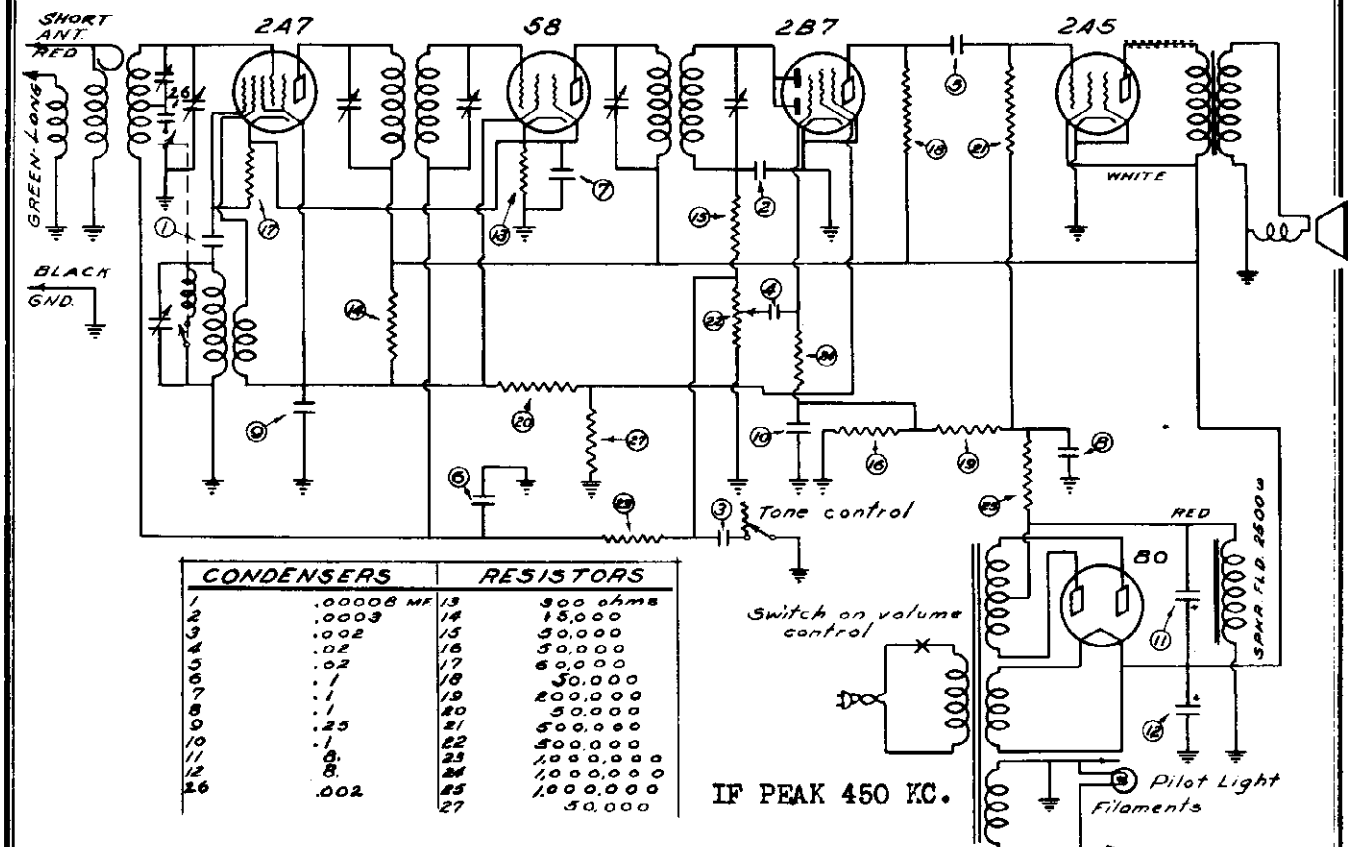
From ground to:

80 Rectifier filament	240 volts
42 Plate	230 "
42 Screen grid	240 "
42 Grid	17 "
6B7 Plate	165 "
6B7 Screen grid	70 "
6B7 Grid	4 "
78 2nd I.F. plate	240 "
78 2nd I.F. screen grid	125 "
78 2nd I.F. cathode	4.5 "
78 1st I.F. plate	240 "
78 1st I.F. screen grid	125 "
78 1st I.F. cathode	6 "
6A7 Plate (mixer)	240 "
6A7 Screen grid	125 "
6A7 Cathode	6 "
6A7 Plate (oscillator)	220 "
Speaker field (red lead)	115 "

Due to current taken by voltmeter used, readings of 6B7 and 42 grid voltages will be less than those above.

MODEL 21-4
Schematic
Voltage, Alignment

REMLER COMPANY, LTD.



CONDENSERS		RESISTORS	
1	.00008 MF	13	300 ohms
2	.0003	14	15,000
3	.002	15	50,000
4	.02	16	50,000
5	.02	17	60,000
6	.1	18	50,000
7	.1	19	200,000
8	.1	20	50,000
9	.25	21	500,000
10	.1	22	500,000
11	8.	23	1,000,000
12	8.	24	1,000,000
26	.002	25	1,000,000
		27	50,000

REMLER MODEL #21-4

This radio receiver is of the superheterodyne type with automatic volume control.

TUBES:

- 2A7 - Converter (mixer - oscillator)
- 58 - I. F. amplifier
- 2B7 - Diode detector - audio amplifier
- 2A5 - Power amplifier
- 80 - Rectifier
- Dial light, 3.8 volt

INSTALLATION:

This set is designed to operate from a power supply of 110 to 125 volts, 50 or 60 cycle alternating current.

Two antenna connections are provided. The red wire should be connected when the antenna is less than 100 feet in length, and the green wire should be used when the antenna is longer. A good ground connection to the black lead is necessary for best results.

CONTROLS:

The knob at left controls the volume and also operates the ON and OFF switch.

The knob in the center is the station selector. The dial is calibrated in kilocycles for both broadcast and short wave bands. The tone control is operated by the knob on the right. The short wave switch is located on the back of the chassis. In the long wave or broadcast position the receiver covers a band from 540 to 1750 kilocycles. When the switch is moved to the right, or short wave position, the receiver covers from 1700 to 4500 kilocycles. This band includes police, amateur and airport stations as indicated on the dial. The lower frequency band for police calls is from 1714 to 1500 kilocycles. This range is covered with the switch moved to the left or normal broadcast position.

SERVICE DATA:

The antenna and mixer coils are in the aluminum shield nearest the back of the chassis. The trimmer condenser, adjustable through the top of the shield, is for trimming the high frequency end of the short wave position. Trimmers for the broadcast band are located on the variable condenser.

The shield nearest the front of the chassis contains the oscillator coil and first I.F. transformer. The trimmers for this transformer are at the top of this shield.

The second I.F. transformer is within the chassis and is trimmed by the condensers mounted thereon. The intermediate frequency is 450 kilocycles.

A. C. VOLTAGES:

Line	-	120 volts
Filaments - 2A7, 58, 2B7 and 2A5		2.5 "
" - 80		5.2 "

D. C. VOLTAGES:

From ground to:

80 Rectifier filament	-	250 volts
2A5 Plate		235 "
2A5 Screen grid		250 "
2A5 Grid		19 "
2B7 Plate		175 "
2B7 Screen grid		45 "
2B7 Grid		5 "
58 Plate		250 "
58 Screen grid		95 "
58 Cathode		5 "
2A7 Plate		250 "
2A7 Screen grid		95 "
2A7 Cathode		5 "
2A7 Triode plate		95 "
Speaker field (red lead)		105

Due to current taken by voltmeter used, readings of 2B7 and 2A5 grid voltages will be less than values shown above.

REMLER COMPANY, LTD.

MODEL 35 Auto
Schematic, Socket Voltage, Installation

INSTALLATION:

The receiver unit is intended to be mounted on the bulkhead of the car by the single mounting stud which requires the drilling of one 1/2 inch hole through the bulkhead. When locating the position of this hole consideration should be given to possible interference of the set with the position of control cables and other apparatus between the dash and the bulkhead and also of the mounting stud with apparatus on the motor side of the bulkhead. Preferably the receiver should be mounted so as to allow long easy curves of the flexible control cables and a short lead connection to the antenna.

The location of antenna leads from factory installed antennas depends on the make and model of the car. Usually this lead is brought down one of the front body pillar posts and will be found coiled up at the end of the dash. Connect this lead to the shielded lead from the receiver and tape the joint. Where the car is not factory equipped with antenna, a roof type or plate type may be installed with lead brought to a convenient place for connection to the set. The lead and antenna should be kept as far as possible from wiring circuits and the metal body.

The flexible control cables for the tuning and volume control are fitted with special ends to lock in the control head. Insert the cable with the slotted end into the left or volume control bushing, and the cable with keyed end into the right, or tuning control bushing. Be sure the cable housing extends into the head at least three-eighths of an inch, then tighten the set screws on the bushings. Next insert the cables into the brackets and couplings on the set. The volume control cable in the lower coupling and the tuning cable in the upper coupling, but do not tighten the set screws on the shafts. Next clamp the control head to the steering column, tape the control cables to the column bracket or some solid object under the dash and tighten the clamps on the cable housings at the set. Now turn the volume knob to the position where it is removable from the key slot, and turn the tuning knob to the left till the pointer is on the white line at the low frequency end of the dial. Rotate the couplings projecting from the set to the left till the condenser is against the stop and the switch on the volume control is in the off position. Now the set screws on the shaft couplings may be tightened.

Plug the dial light into the opening at the rear of the control head. Connect the battery wire, the shielded wire with fuse holder and terminal, to the battery side of the ammeter. This terminal on the ammeter usually has only one wire attached.

IGNITION NOISE SUPPRESSION:

The spark plug suppressors should be connected in series with the plugs at each plug and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached. Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

OPERATION:

The left hand knob on the control head operates both the power switch and the volume control. Turn the knob clockwise to increase volume. The dial should become illuminated when the power is on.

Rotate the station selector, or tuning knob until the desired program is heard, reduce the volume, and readjust the selector to the position where quality is the best. The volume control may now be advanced to the desired volume level. The knob on the right side of the set is the tone control. This may be adjusted to modify the tone or to reduce noise and static disturbances.

SHORT WAVE:

The short wave switch is on the left of the speaker. When this knob is turned to the left the regular broadcast band is covered by the station selector dial as well as the lower frequency police band as noted on the dial. When the switch is turned to the right the selector dial covers from 2200 to 6500 K. C. The positions of the higher frequency police band, the 49 meter short wave broadcast band and the major airport and amateur bands are noted on the inner portion of the dial. Many automobile antenna installations are not suitable for receiving these short wave stations from any great distance. When better results or increased range is desired with the car parked, a fifty or sixty foot portable antenna wire, with the far end raised at least fifteen feet from the ground, may be used.

SERVICE DATA:

Tubes:

- 6A7 Converter (mixer-oscillator)
- 78 Super-control amplifier, 1st I.F. stage
- 78 Super-control amplifier, 2nd I.F. stage
- 75 Diode-detector-A F amplifier, A.V.C.
- 41 Power amplifier
- 84 Full wave rectifier
- T-40 Dial light 6.3 v.

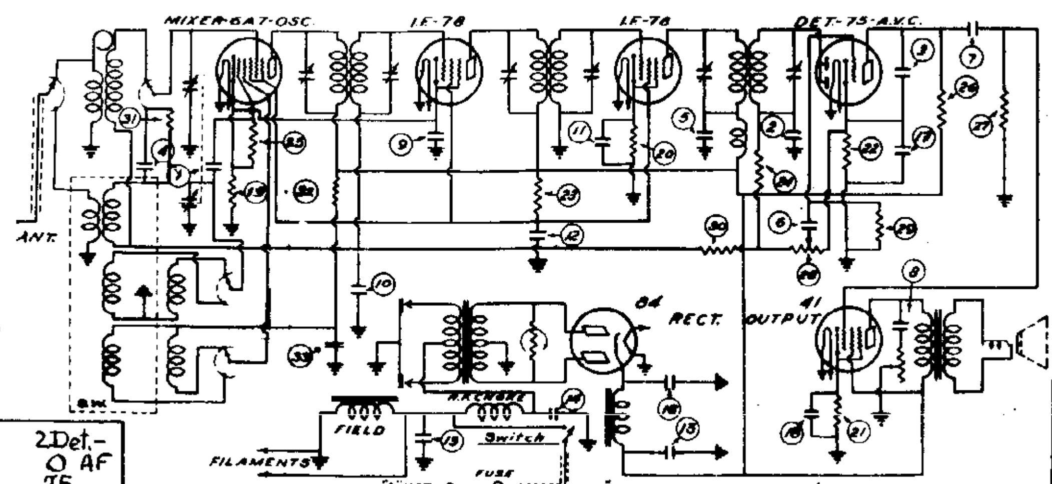
The antenna and mixer coils for the broadcast band are in the shield at the left side of the set. The short wave coils are mounted directly on the short wave switch with the oscillator coil for the broadcast band at the end of the switch. The I.F. transformers are in the aluminum shields adjacent to the antenna-mixer shield. These transformers are peaked at 450 K.C. by the trimmers located at the tops of the shields. Use a weak signal, or oscillator input, and an output meter when aligning the set.

The vibrator type interrupter and transformer are enclosed in the metal box at the right of the receiver. After several hundred hours use the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in plate supply voltage. Vibrator servicing should be done only by a service man with instructions and experience in this work.

Voltages: To chassis - No signal.

Battery, hot side		6 volts
84 Rectifier cathode		250 "
41 Power	screen grid	230 "
41 "	plate	220 "
41 "	cathode	18 "
75 Detector amplifier	plate	125 "
75 " "	cathode	1.5 "
78 2nd I.F. "	plate	230 "
78 2nd I.F. "	screen grid	100 "
78 2nd I.F. "	cathode	3.5 "
78 1st I.F. "	plate	230 "
78 1st I.F. "	screen grid	100 "
78 1st I.F. "	cathode	5 "
6A7 Mixer plate		230 "
6A7 Mixer screen grid		100 "
6A7 Oscillator plate		200 "
6A7 Mixer-oscillator cathode		5 "

Battery current - 6 amperes



IF PEAK 450 KC.

Rear

Osc. 1 Det. O 6A7	IF O 78	IF O 78	2 Det.- O AF 75
		2 AF O 41	Rect. O 84

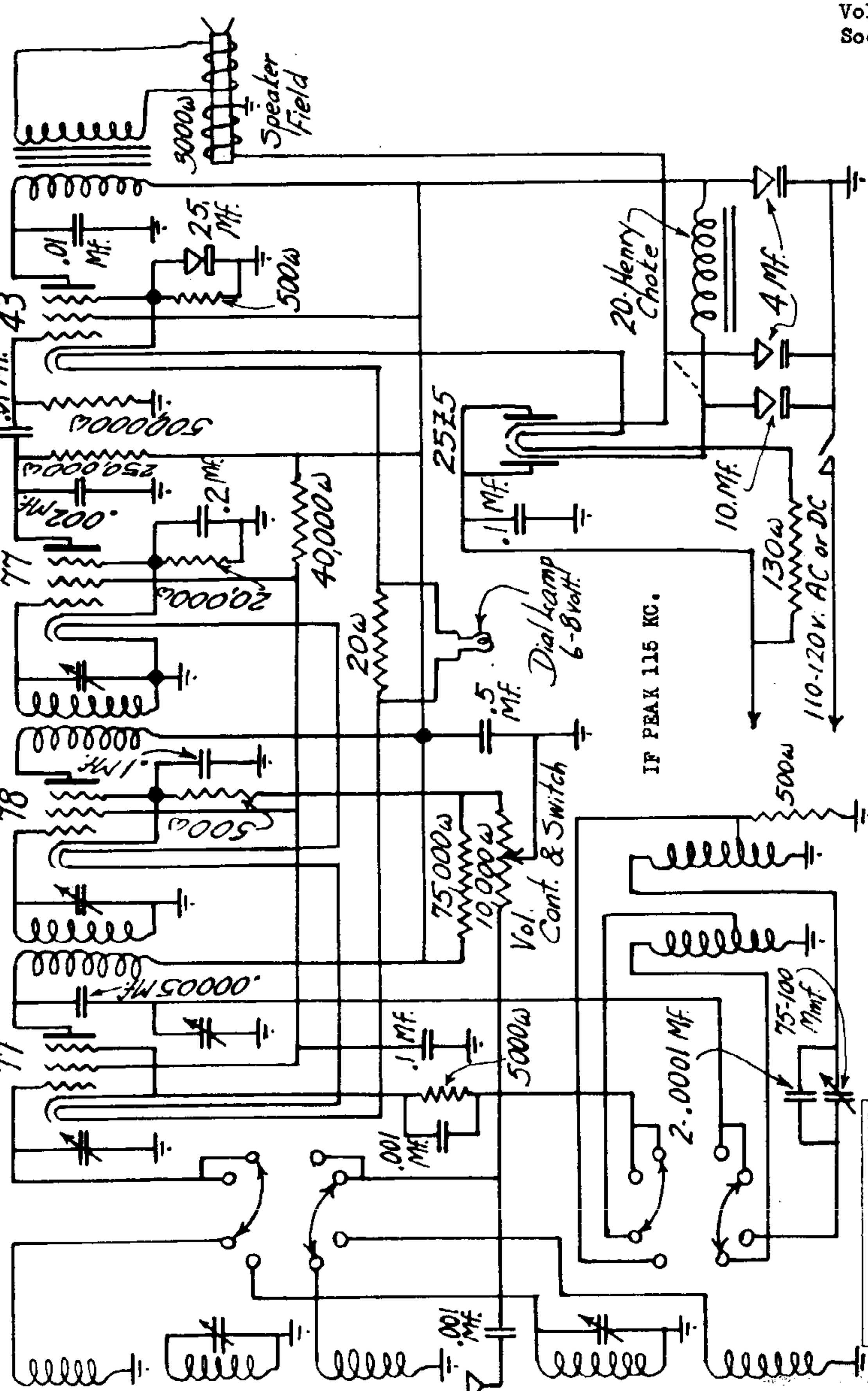
Pilot 6.3 v.

CONDENSERS				RESISTORS			
1	.00005	10	.1 mfd.	19	300 ohm	28	500,000
2	.0005	11	.1	20	600	29	500,000
3	.001	12	.25	21	800	30	1 Meg.
4	.002	13	.5	22	5000	31	25,000
5	.02	14	.5	23	12,000	32	2000
6	.02	15	4.	24	50,000		
7	.02	16	8.	25	60,000		
8	.02	17	10	26	200,000		
9	.1	18	10	27	500,000		
		33	.02				

1934

MODEL BP-5E
Schematic
Voltage
Socket Layout

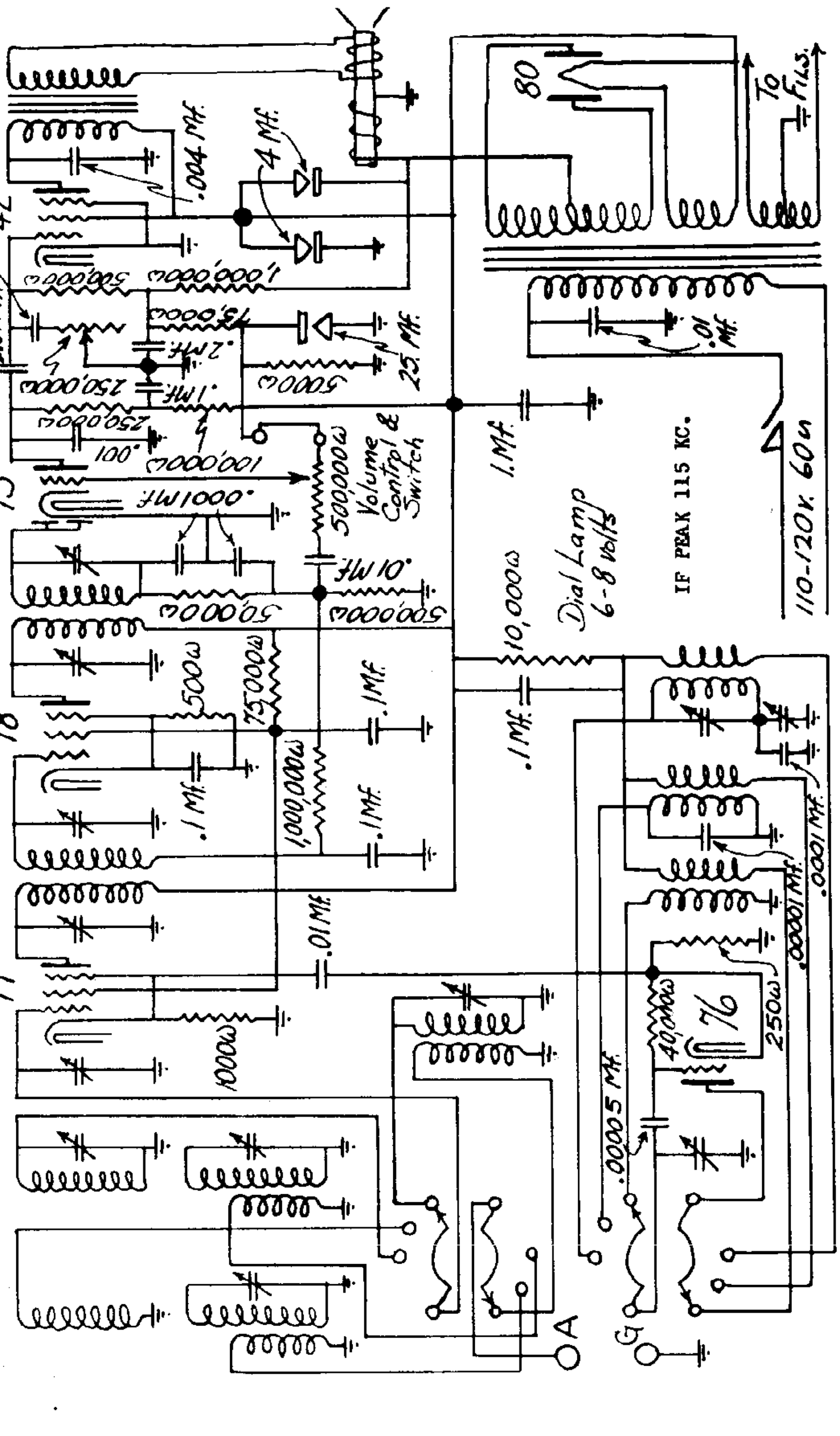
REPUBLIC INDUSTRIES



TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
77	Det-Osc.	118	65	3.6
78	IF	118	65	2.2
77	2nd Det.	52	65	3.2
43	Output	111	118	17

MODEL CS-6
Schematic
Voltage
Socket Layout

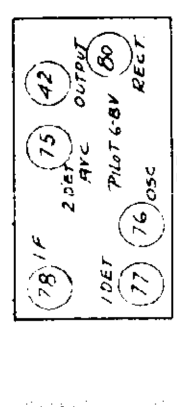
REPUBLIC INDUSTRIES



IF PEAK 115 KC.

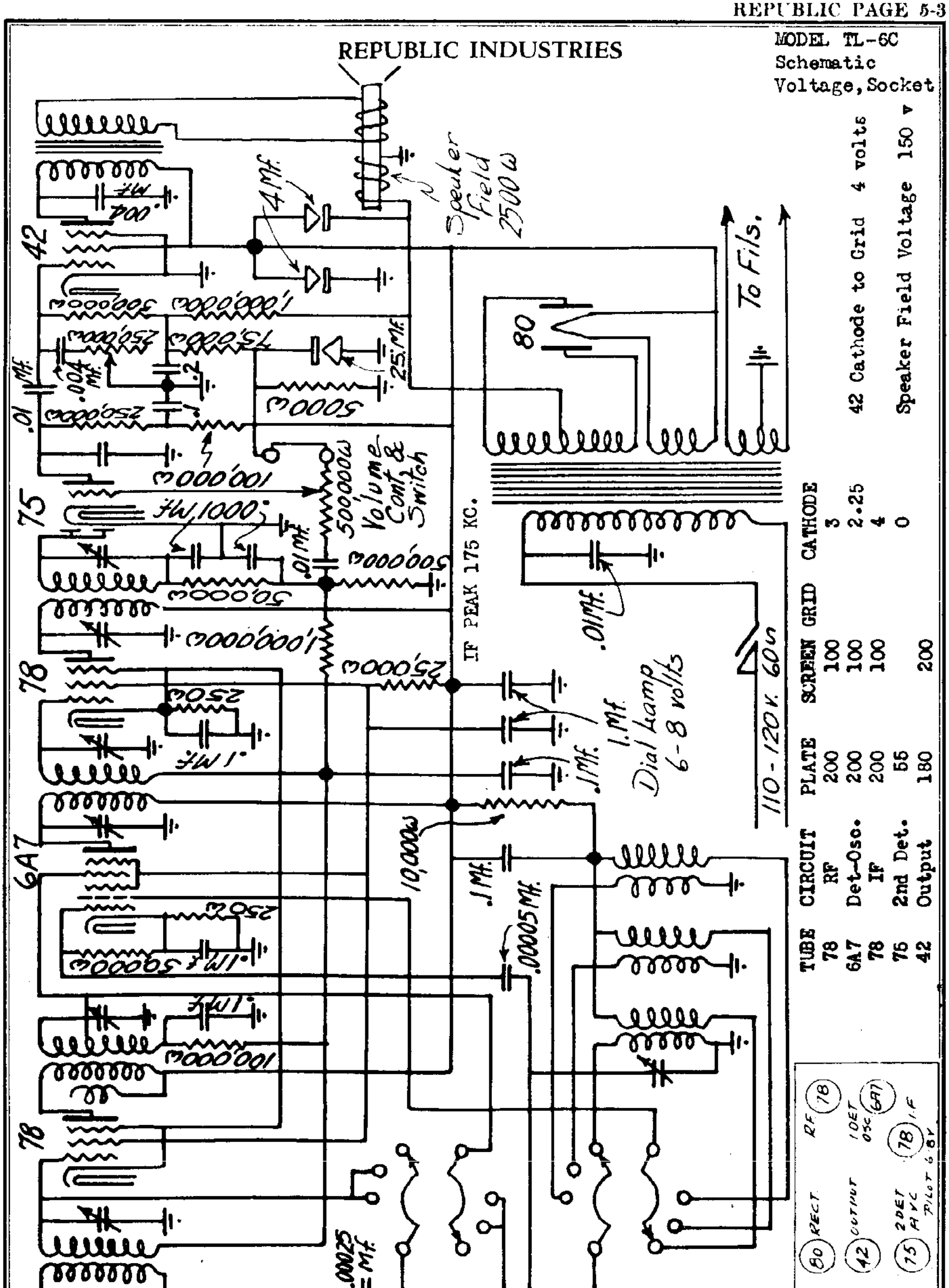
76 Grid to Ground -10 v.
Speaker Field Voltage
147 volts

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
77	1st Det.	195	80	2
76	Oscill.	127		2
78	IF	195	80	2
75	2nd Det.	55	0	0
42	Output	170	195	-5



MODEL TL-6C
Schematic
Voltage, Socket

REPUBLIC INDUSTRIES



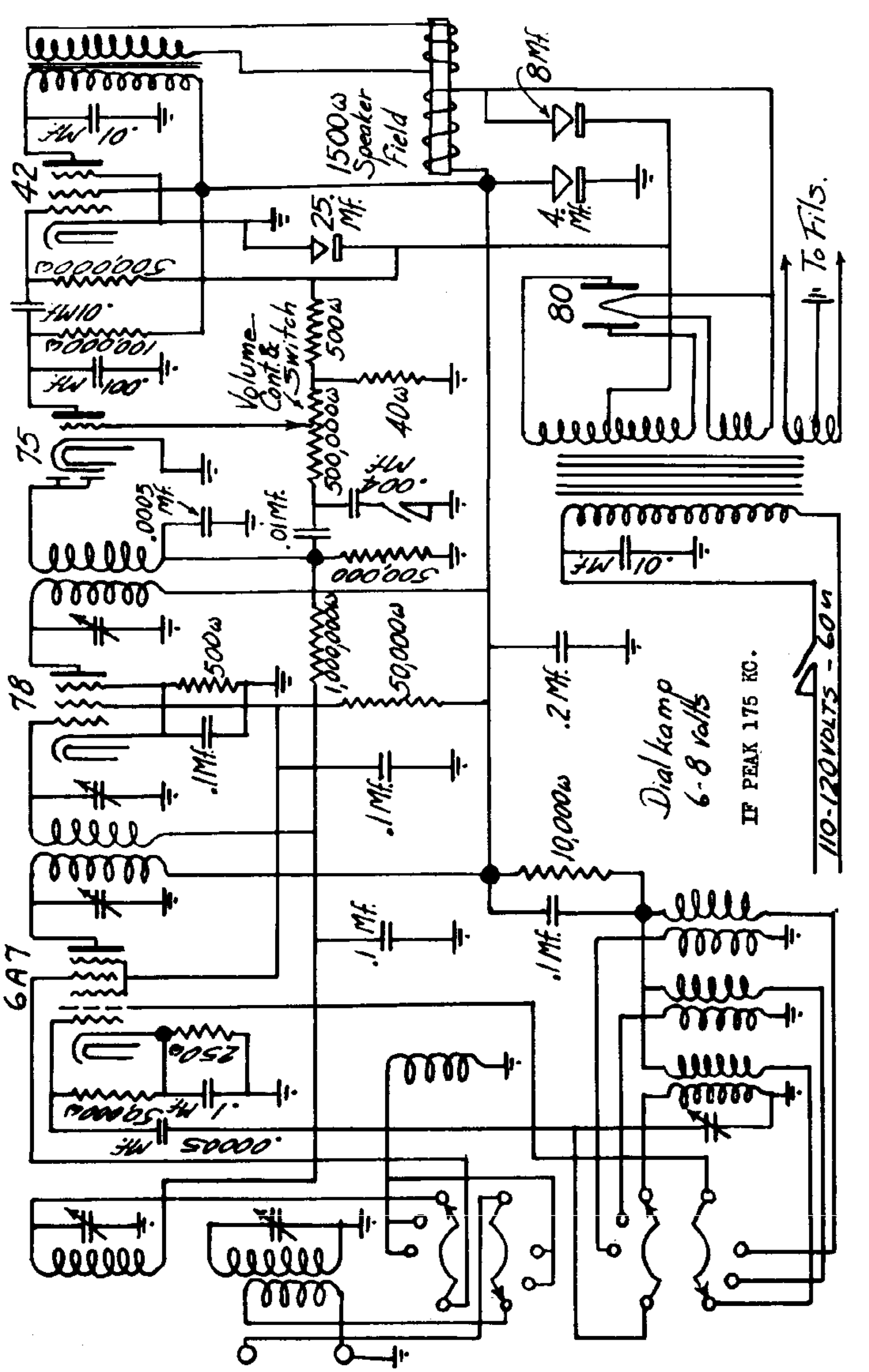
42 Cathode to Grid 4 volts

Speaker Field Voltage 150 v

TUBE	CIRCUIT	PLATE	SCREEN	GRID	CATHODE
78	RF	200	100		3
6A7	Det-Osc.	200	100		2.25
78	IF	200	100		4
75	2nd Det.	55			0
42	Output	180	200		

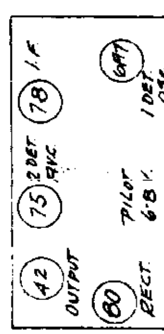
MODEL TR-5B
Schematic
Voltage, Socket

REPUBLIC INDUSTRIES

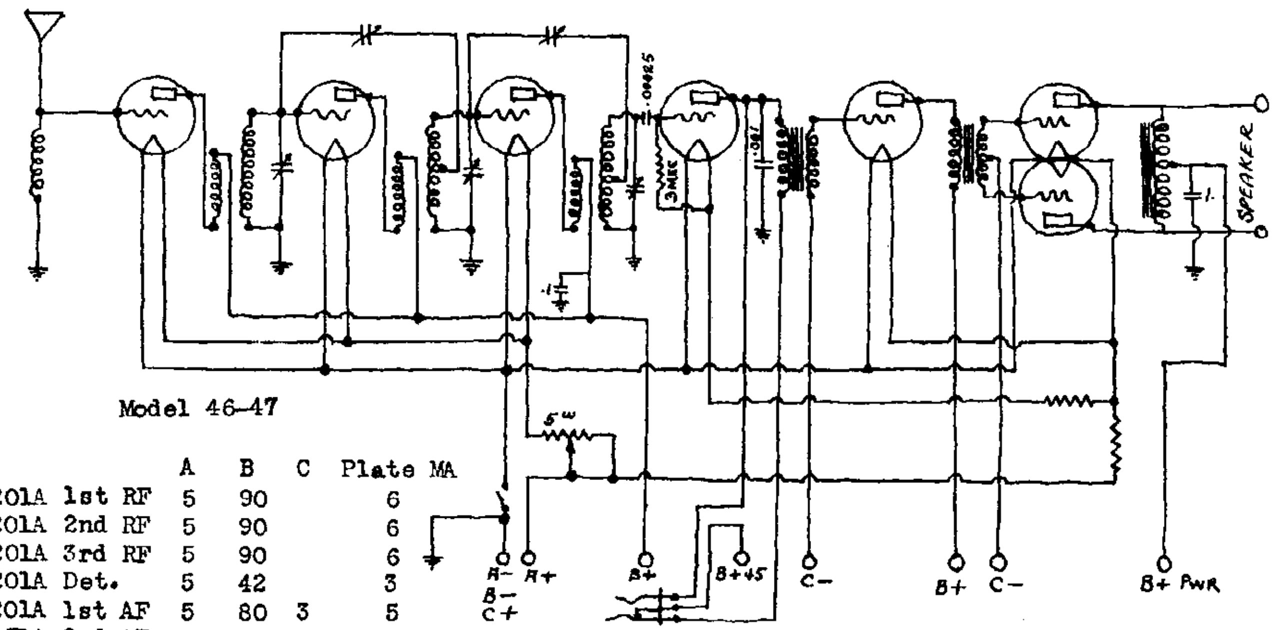


TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
6A7	Det-Osc.	220	90	2.25
78	IF	220	90	3
75	2nd Det.	140	-	0
42	Output	216	220	0

42 Grid to Cathode 11 v.
Speaker Field Voltage
50 volts.

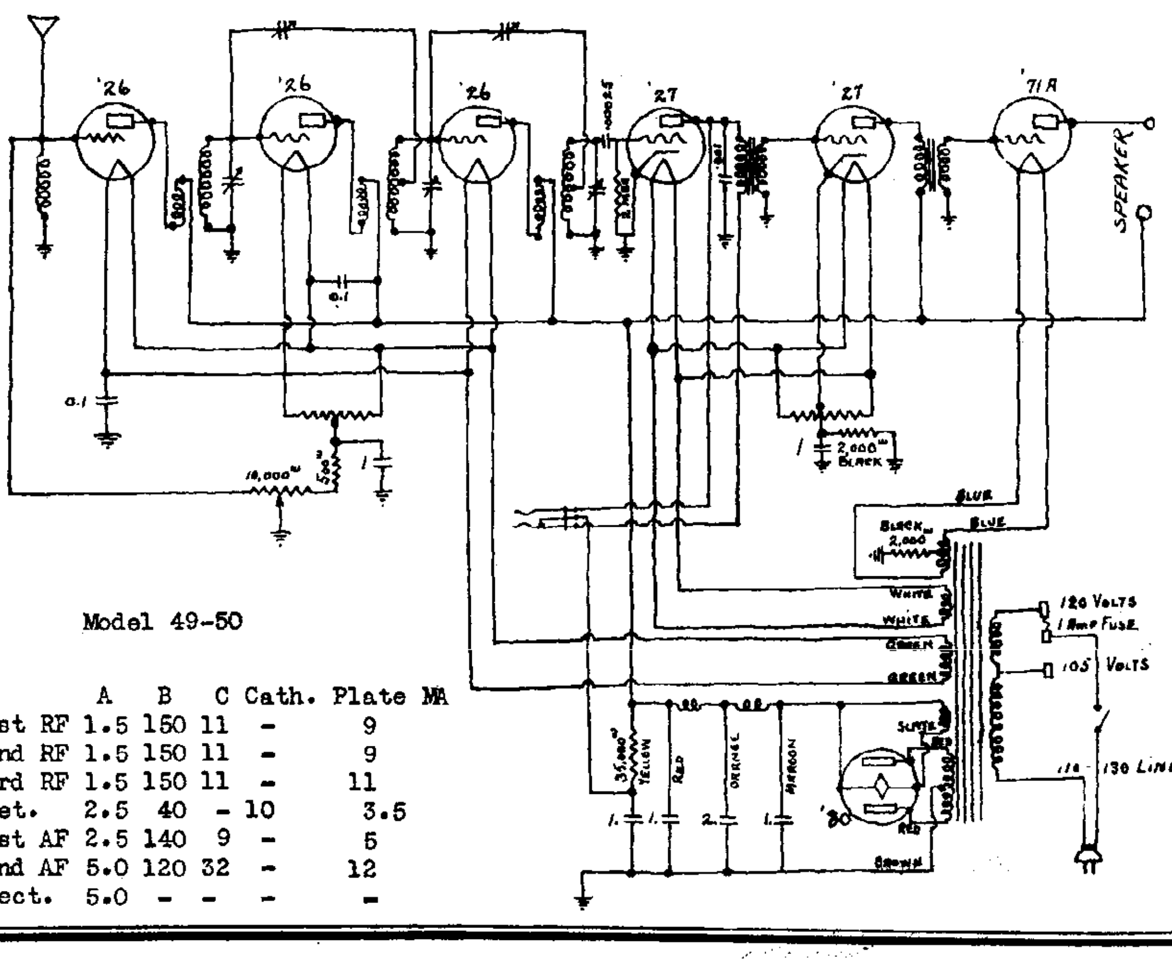


SEARS-ROEBUCK & CO.



Model 46-47

		A	B	C	Plate MA
201A	1st RF	5	90		6
201A	2nd RF	5	90		6
201A	3rd RF	5	90		6
201A	Det.	5	42		3
201A	1st AF	5	80	3	5
171A	2nd AF	5	120	20	11.5
171A	2nd AF	5	120	20	11.5



Model 49-50

		A	B	C	Cath.	Plate MA
226	1st RF	1.5	150	11	-	9
226	2nd RF	1.5	150	11	-	9
226	3rd RF	1.5	150	11	-	11
227	Det.	2.5	40	-	10	3.5
227	1st AF	2.5	140	9	-	5
171A	2nd AF	5.0	120	32	-	12
280	Rect.	5.0	-	-	-	-

General Notes
Alignment

SEARS-ROEBUCK & CO.

GENERAL NOTES ON ALIGNMENT

In the service notes on ALIGNMENT PROCEDURE, directions are to couple the test oscillator to the receiver. Since test oscillators of different makes vary considerably in their design and construction, it is not possible to give specific instructions for coupling any particular test oscillator to the receiver. However, the following general method can be applied with practically any test oscillator.

Most test oscillators have two output leads. One of them is the "hot" lead and the other the ground lead. The ground lead should be connected directly to the receiver chassis, except in the case of AC-DC receivers. The connection then should be made through a .1 mfd condenser since the chassis of such receivers is above ground potential. If the test oscillator has only one lead, this information about the ground lead may be disregarded.

As mentioned in all of the service notes, for IF alignment the test oscillator should be connected through a .1 mfd. condenser directly to the control grid cap of the IF or Translator tubes. It is important to leave the grid clip attached to the cap and to leave the tube shields in place. The oscillator tube of the receiver also should be in its socket.

For RF alignment, whether broadcast or short wave, the "hot" lead of the test oscillator should be coupled to the antenna lead of the receiver. The exact means of coupling will depend upon several factors. Among them are the power of the test oscillator, the sensitivity of the receiver, and the extent to which the receiver is out of alignment. If the test oscillator is quite powerful and the receiver one of high sensitivity, merely placing the test oscillator lead parallel to, and several inches away from the receiver's antenna lead may provide sufficient coupling. In some cases it may be necessary to bring the leads very close to each other, or it may even be necessary to twist the antenna lead and the oscillator lead together for several inches. (Of course, the two leads must be separated by their insulation and not make metallic contact.) As the receiver is brought into alignment, thereby increasing its sensitivity, it will be possible to decrease the amount of coupling between the test oscillator lead and the antenna lead. (Move the leads further apart.) Always use the lowest amount of coupling that still will provide a signal strong enough for working purposes. If the test oscillator has a variable control for its power output, it is better to turn this control to its high position and decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. This procedure will insure the greatest possible accuracy in alignment.

When adjusting the oscillator trimmer condenser, set the variable condenser to the frequency or condenser position indicated in the service notes. Do not change this position while adjusting the trimmer. However, when adjusting the antenna or translator trimmers, the proper method is to continually "rock" the variable condenser a degree or two both sides of the alignment frequency and, at the same time, adjust the trimmer.

PREVENTING ADJUSTMENT AT THE IMAGE FREQUENCY

When adjusting trimmers for short wave alignment, it sometimes will be found that a peak can be obtained at two different positions of the trimmer. Only one of these peaks is the correct one to use. The other is the image response. The proper procedure follows:

Oscillator Trimmer:

Screw the oscillator trimmer all the way in (maximum capacity). Then reduce the capacity until a peak is reached. Now continue to reduce the capacity until a second peak is reached. Almost always, this second peak is considerably louder than the first one. The first peak is the image frequency adjustment, and must be avoided.

Antenna and Translator Trimmers:

Screw the trimmers all the way in and then reduce capacity until a peak is reached. If the capacity is reduced still further, a second peak will be obtained. However, the correct setting is the first one, the one using the greater amount of capacity. Note that this is exactly opposite to the procedure for the oscillator trimmer.

ALIGNMENT PROCEDURE FOR RECEIVERS USING A WAVE TRAP

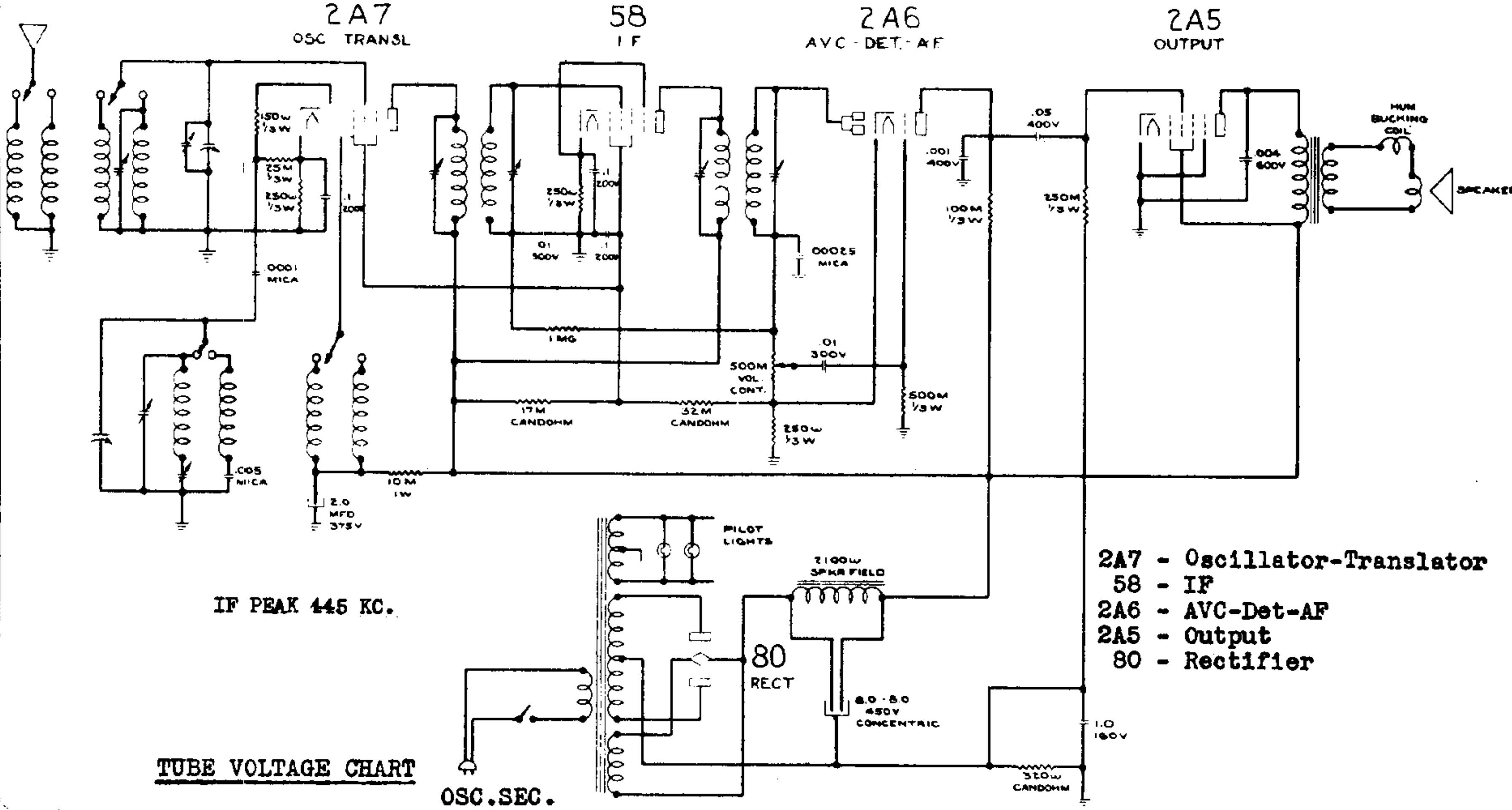
If a wave trap is used in Models 1821, 1827, 1828, 1804, 1805, 1820, 1826 or 1840, it must be disconnected before making any RF alignment adjustments on the receiver. This can be done as follows:

1. Connect a jumper between the yellow and blue leads of the wave trap.

2. Disconnect the white lead of the trap. IN SOME TRAPS A GREEN LEAD IS USED INSTEAD OF A WHITE ONE.

After the receiver has been aligned as instructed in the Service Manual for the particular model, reconnect the wave trap. Do not touch the alignment of the receiver after the trap has been reconnected.

SEARS-ROEBUCK & CO.



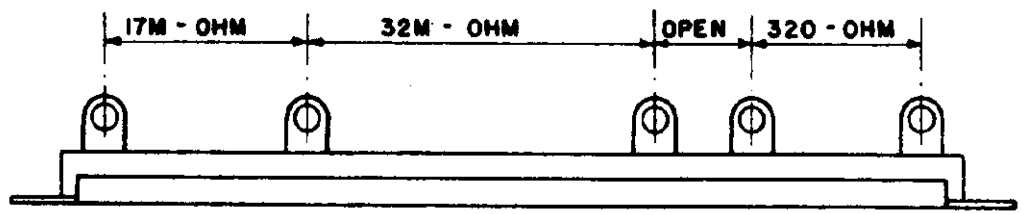
IF PEAK 445 KC.

2A7 - Oscillator-Translator
58 - IF
2A6 - AVC-Det-AF
2A5 - Output
80 - Rectifier

TUBE VOLTAGE CHART

TUBE	PLATE	SCREEN	OSC.SEC. PLATE
2A7 - Osc-Transl	195	90	155
58 - IF	195	90	
2A6 - AVC-Det-AF	115		
2A5 - Output	185	195	

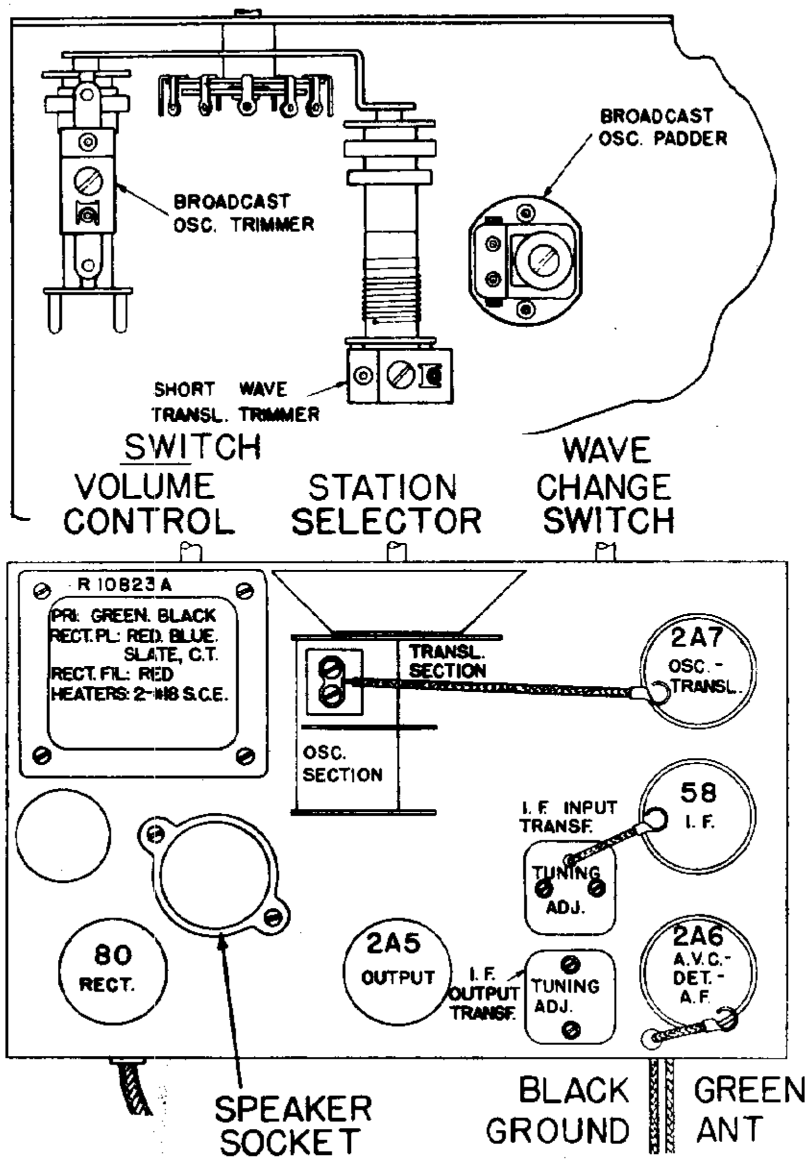
All readings should be taken between the chassis and the respective element of each tube.



CANDOHM RESISTOR

MODEL 1082,1083
Socket Layout
Alignment Data

SEARS-ROEBUCK & CO.



ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low voltage scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 58 IF tube. Leave the clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 2A7 and tune the IF input transformer.

6. Repeat the adjustments in order to secure greater accuracy. Always use as low an output as possible from the test oscillator, in order to render the AVC action of the receiver inoperative.

RF Alignment (Broadcast):

1. Screw the padding condenser to about three quarters of its maximum capacity.

2. Set the test oscillator to 1700 kc and couple its output to the green antenna lead of the receiver.

3. Open the variable condenser plates all the way and adjust the broadcast oscillator coil trimmer for maximum output meter reading.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output. The translator section is the one nearest the dial, as shown in the Service Illustration.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two, and, at the same time, adjust the broadcast oscillator padding condenser for maximum output.

6. Repeat the 1700 kc and 1400 kc adjustments. Always use a low enough output from the test oscillator to render the AVC ineffective.

Short Wave Alignment:

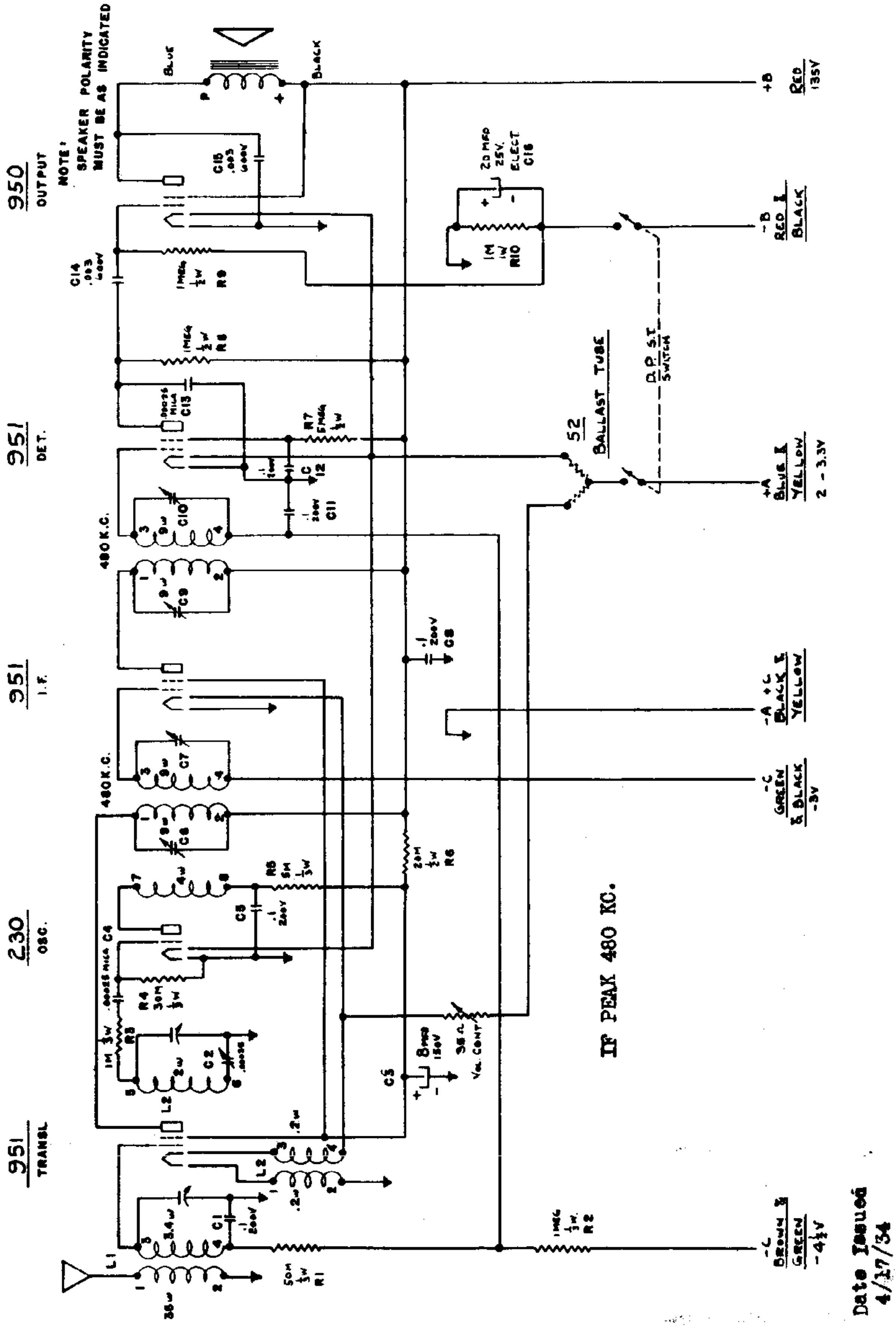
1. Leave the test oscillator loosely coupled to the green antenna lead as for broadcast alignment.

2. Set the test oscillator to 16,400 kc. Its signal should be heard when the condenser plates are all the way out. If the test oscillator cannot be tuned in, wires must be moved to reduce the capacity in the oscillator circuit until this frequency can be reached.

3. Set the test oscillator to 14,000 kc and tune in its signal. Then adjust the short wave translator trimmer for maximum output.

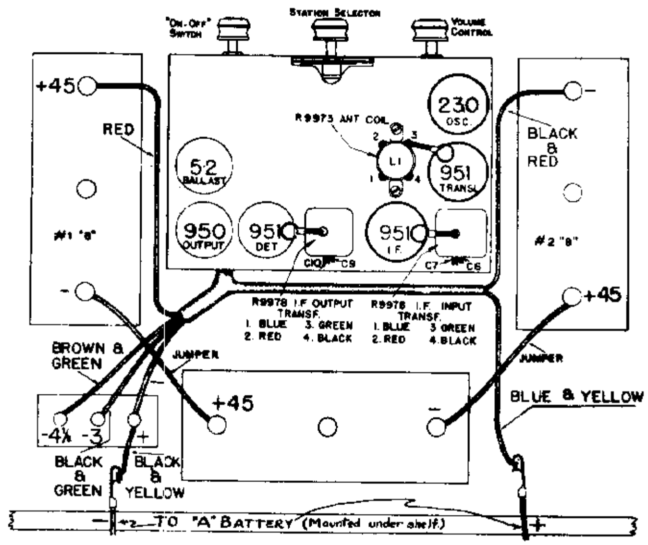
SEARS-ROEBUCK & CO.

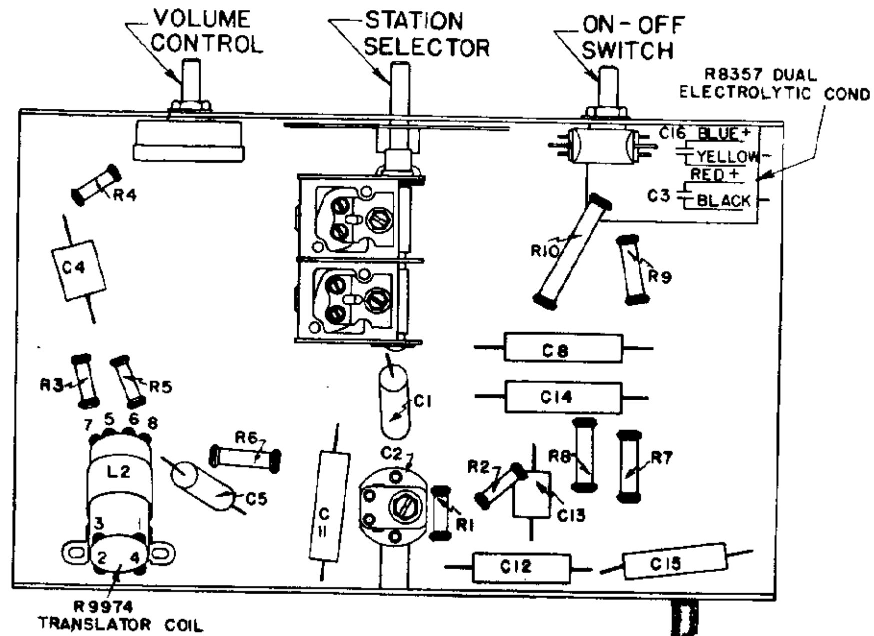
MODEL 1711-A,7090-A
Schematic



MODEL 1711-A,7090-A
Voltage,Socket
Alignment Data
Parts List

SEARS-ROEBUCK & CO.





SILVERTONE Models 1711A and 7090A are battery operated, automatic filament control superheterodynes. The circuit is shown in lock form in Fig. 1 and schematically in Fig. 2.

A type 951 translator tube creates a 480 kc signal in its plate circuit by mixing the incoming broadcast signal with the signal created by the type 230 oscillator. This 480 kc signal is amplified by the 951 IF stage and coupled to the 951 detector. The audio output of the detector is fed to the 950 output tube and then to the magnetic loudspeaker.

Volume is controlled by a 35 ohm rheostat in the IF and translator filament circuit. A type 52 ballast tube automatically adjusts the filament voltage to the proper value (2 volts) even though the A supply has a value anywhere between two and three volts. Always turn the set off before removing or inserting tubes.

When peaking the oscillator and translator stage, procede as follows:

1. Set the test oscillator to 1500 kc and adjust the two trimmers on the variable condenser.

2. Re-set the test oscillator to 1400 kc, retune the variable condenser to this frequency, and adjust the translator trimmer.

3. Tune to 600 kc and adjust the isolantite base padding condenser.

Since these adjustments interact on each other, it is advisable to repeat the complete operation two or three times.

Part No.	Description
R-8308-A	Board - Terminal, triple
R-8380	Cable - Battery
R-9388	Cable - Bat'ery
R-4715	Clamp - An'. & Gnd. leads
R-8718	Clamp - Cable
R-6381	Clip - Grid
R-9973	Coil - Antenna
R-9974	Coil - Oscillator
R-9985	Condenser - Variable
R-8357	Condenser - Dual electrolytic
R-9975	Condenser - Padding
R-6444	Condenser - .1 Mfd, 200 volt
R-7681	Condenser - .003 Mfd. 600 volt
R-4592	Condenser - .00025 Mfd. Mica
R-10097-A	Dial and Indicator
R-9981	Escutcheon
R-9993	Instruction
R-8896	Knob
R-9982	Knob with pointer
R-8363	Resistor - 5 megohms, 1/2 watt
R-5823	Resistor - 1 megohm, 1/2 watt
R-7585	Resistor - 1 megohm, 1/3 watt
R-6637	Resistor - 50 M ohms, 1/3 watt
R-6110	Resistor - 30 M ohms, 1/3 watt
R-5821	Resistor - 20 M ohms, 1/2 watt
R-7226	Resistor - 5 M ohms, 1/2 watt
R-6793	Resistor - 1 M ohms, 1 watt
R-6636	Resistor - 1 M ohms, 1/3 watt
R-8366	Socket - 4 prong
R-8367	Socket - 5 prong
S-9969	Speaker - 8" Utah
S-10120	Speaker - 8" Best
S-10001	Speaker - 8" Utah
R-9978-A	Transformer - IF

TUBE VOLTAGE & CURRENT CHART

Models 1711A and 7090A

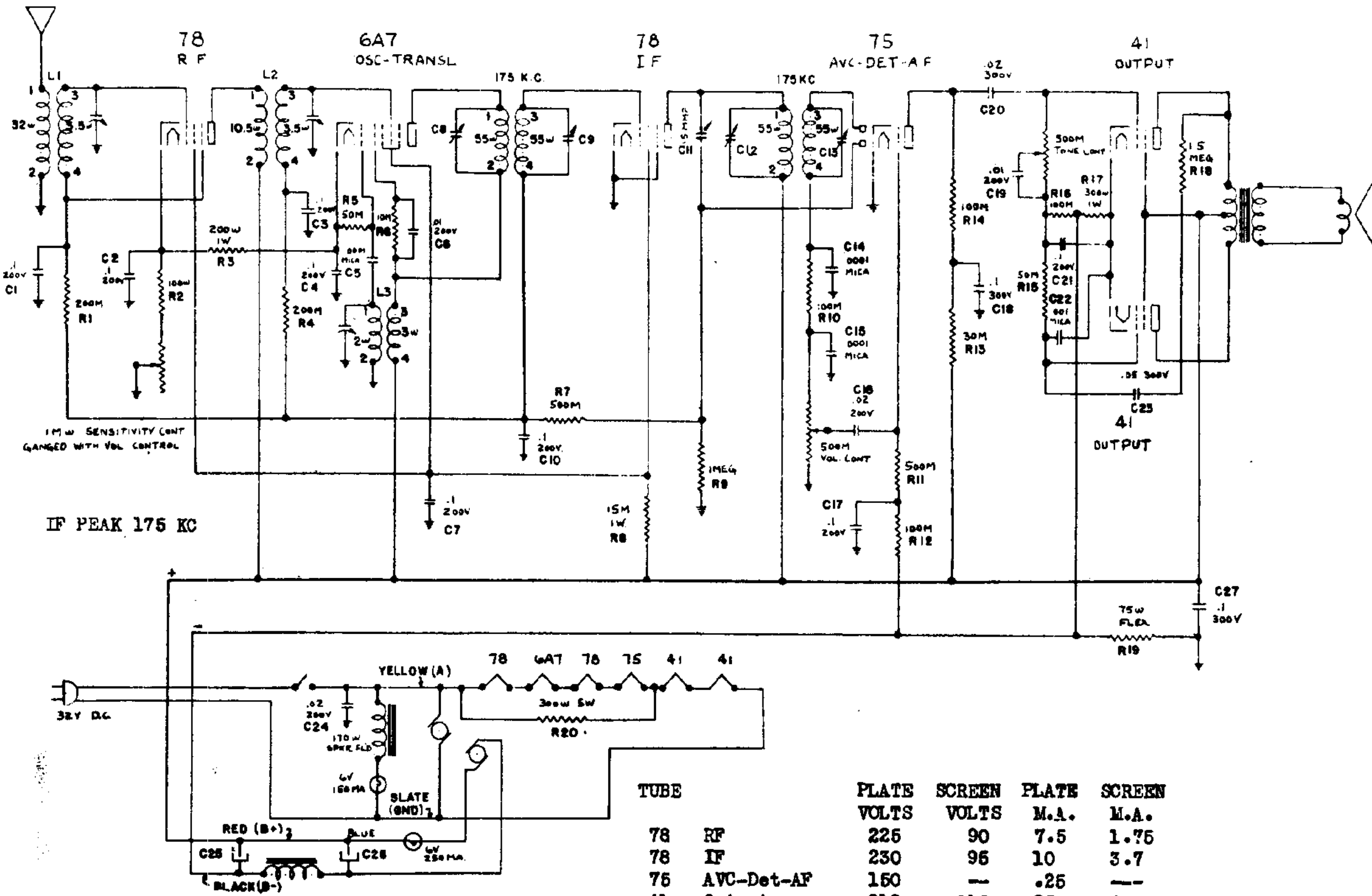
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Osc.	50		2.8	
951 - Transl.	135	65	1.25	1.5
951 - IF	135	65	1.5	2
951 - Det.	25*	5*	.03	.01
950 - Output	135	135	5	1

* Indicates high series resistor

Readings taken with 1000 ohms, per voltmeter. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

MODEL 1715
Schematic
Voltage

SEARS-ROEBUCK & CO.



TUBE		PLATE VOLTS	SCREEN VOLTS	PLATE M.A.	SCREEN M.A.
78	RF	225	90	7.5	1.75
78	IF	230	96	10	3.7
75	AVC-Det-AF	150	—	.25	—
41	Output	212	215	25	4
6A7	Osc.-Transl.	Ep=225v. Eg#2=175v. Eg#3 & #5=90v.			
		Ip=4.5 ma. Ig#2=3 ma. Ig#3 & #5=2.5 ma.			

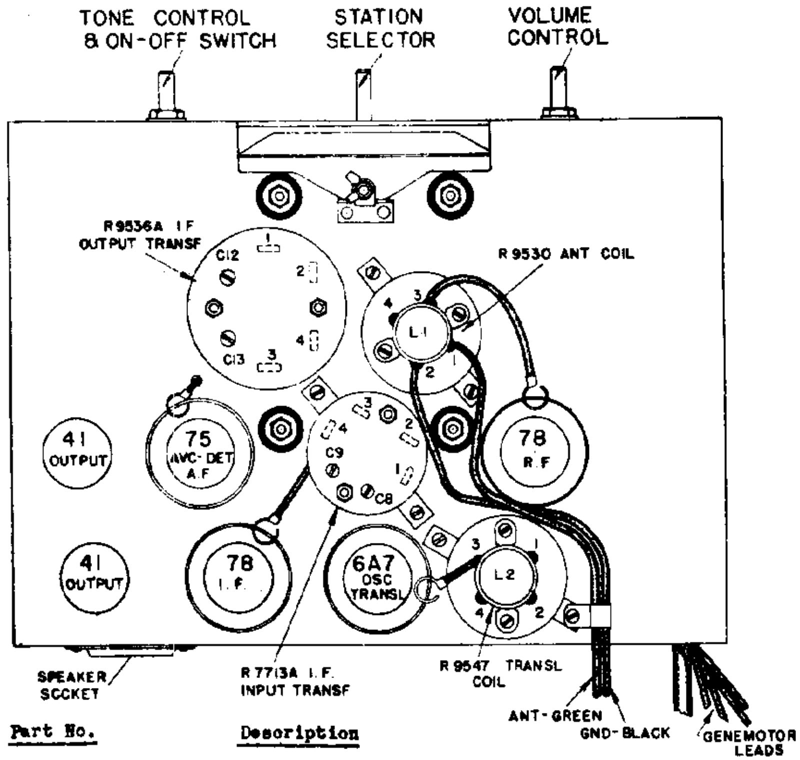
Total B drain=90 ma. Input voltage=37v.

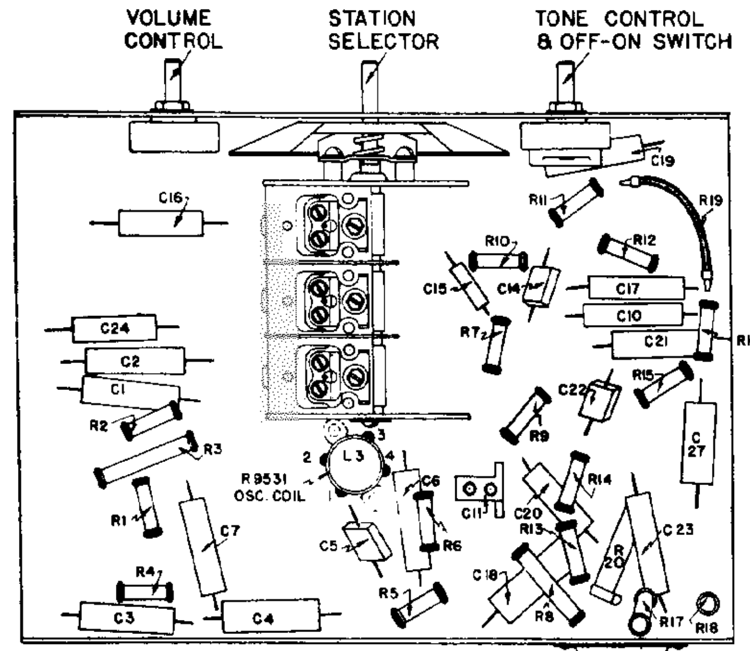
ALL RESISTORS ARE ½ WATT SIZE UNLESS OTHERWISE SPECIFIED.

THE SCHEMATIC MODEL 1715

MODEL 1715
Socket Layout
Trimmers Locations
Parts List

SEARS-ROEBUCK & CO.





Part No.	Description
R-5509A	Board - Terminal
R-8297A	Board - Terminal, double
R-8308A	Board - Terminal, triple
R-7409	Card - Operating
R-7011A	Clip - Antenna lead
R-6381	Clip - Grid
R-7031	Clip - Pilot light
R-9530	Coil - Antenna
R-9531	Coil - Oscillator
R-9547A	Coil - Translator
R-7833	Condenser - Variable
R-6565	Condenser - Tuning, IF input
R-9632	Condenser - Tuning, IF output
R-6138	Condenser - .1 mfd., 300 volt
R-6444	Condenser - .1 mfd., 200 volt
R-7857	Condenser - .05 mfd., 300 volt
R-7680	Condenser - .02 mfd., 300 volt
R-6629	Condenser - .02 mfd., 200 volt
R-8432	Condenser - .01 mfd., 200 volt
R-6759	Condenser - .001 mfd., mica
R-4303	Condenser - .0001 mica
R-8042	Condenser - .000015 mfd. mica
R-8679	Control - Volume
R-8571	Control - Tone
R-6989	Cord - Extension
R-6003G	Dial and indicator
R-8923	Escutcheon
R-9637	Instructions
R-8895	Knob - Large
R-8896	Knob - Medium
R-9769	Lamp - Genemotor "Tell-tale"
R-2288	Lamp - Pilot
R-6324	Pin - Escutcheon
R-7074	Resistor - 1.5 megohms, 1/2 watt carbon
R-5823	Resistor - 1 megohms, 1/2 watt carbon
R-6179	Resistor - 500 M ohms, 1/2 watt carbon
R-5830	Resistor - 200 M ohms, 1/2 watt carbon
R-5819	Resistor - 100 M ohms, 1/2 watt carbon
R-6445	Resistor - 50 M ohms. 1/2 watt carbon
R-7707A	Shield - Oscillator

Part No.	Description
S-9568	Speaker - Complete
S-7776B	Speaker - cone and voice coil
S-9566	Speaker - field coil
S-9567AS	Speaker - transformer
S-7415	Speaker - plug, 5 prong
R-7713	Transformer - IF input, coils and core only
R-7713A	Transformer - IF input complete, less shield
R-9536	Transformer - IF output, coils and core only
R-9536A	Transformer - IF output complete, less shield
R-6235	Tube - Rubber, Genemotor mtg.
R-8156	Resistor - 30 M ohms, 1/2 watt
R-6504	Resistor - 15 M ohms, 1 watt
R-9553	Resistor - 300 ohms, 1 watt
R-7273	Resistor - 200 ohms, 1 watt
R-5830	Resistor - 200 ohms, 1/2 watt
R-6976	Resistor - 100 ohms, 1/2 watt
R-9534	Resistor - 75 ohms, flexible
R-9160	Resistor - 300 ohms, 5 watt
R-6006B	Shaft - Dial drive
R-6018A	Shield - Antenna coil
R-8687A	Shield - Translator coil

SEARS-ROEBUCK & CO.

MODEL 1722,1732 Revised Schematic

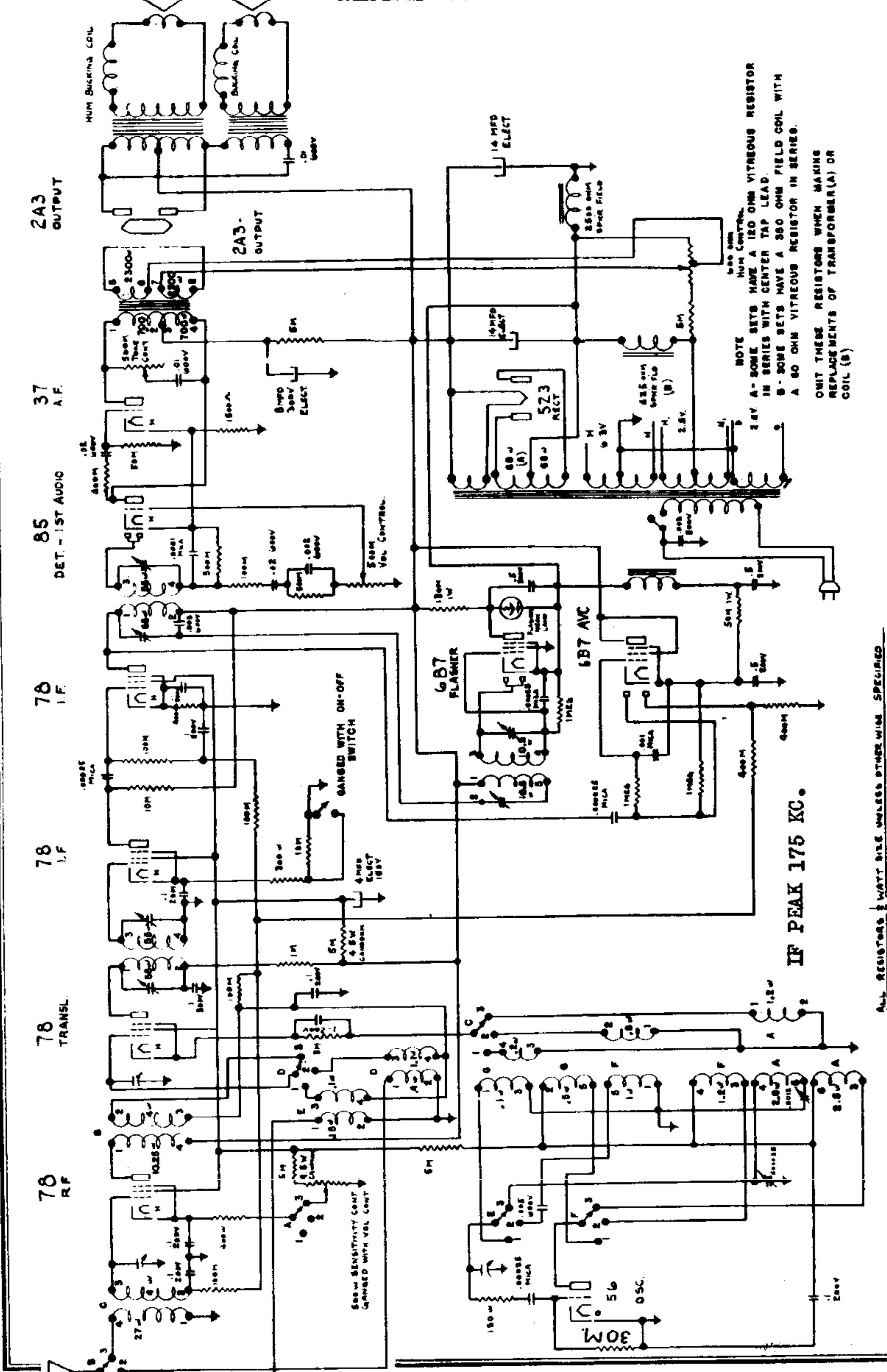


Fig. 2 The Circuit Diagram- Revised Models 1722 & 1732

Date Issued: 5/18/34

MODEL 1722,1732 Revised Voltage,Socket Changes in Circuit

SEARS-ROEBUCK & CO.

TUBE VOLTAGE AND CURRENT CHART

REVISED MODELS 1722 and 1732

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	200	75	6.5	1.5
56 - Osc	60		4.5	
78 - Transl	200	75	2	.2
78 - 1st IF	180 - BC 140 - SW	75	.6-BC 5 - SW	.1 - BC 1.5 - SW
78 - 2nd IF	200	75	6	1.25
85 - Det - AF	150		5	
37 - AF	150		2.75	
6B7 - AVC	60	60	4	1
6B7 - Flasher	7-No signal 90-With signal			
83V - Rect	DC voltage = 350 V. Plate current = 85 m.a. per plate			

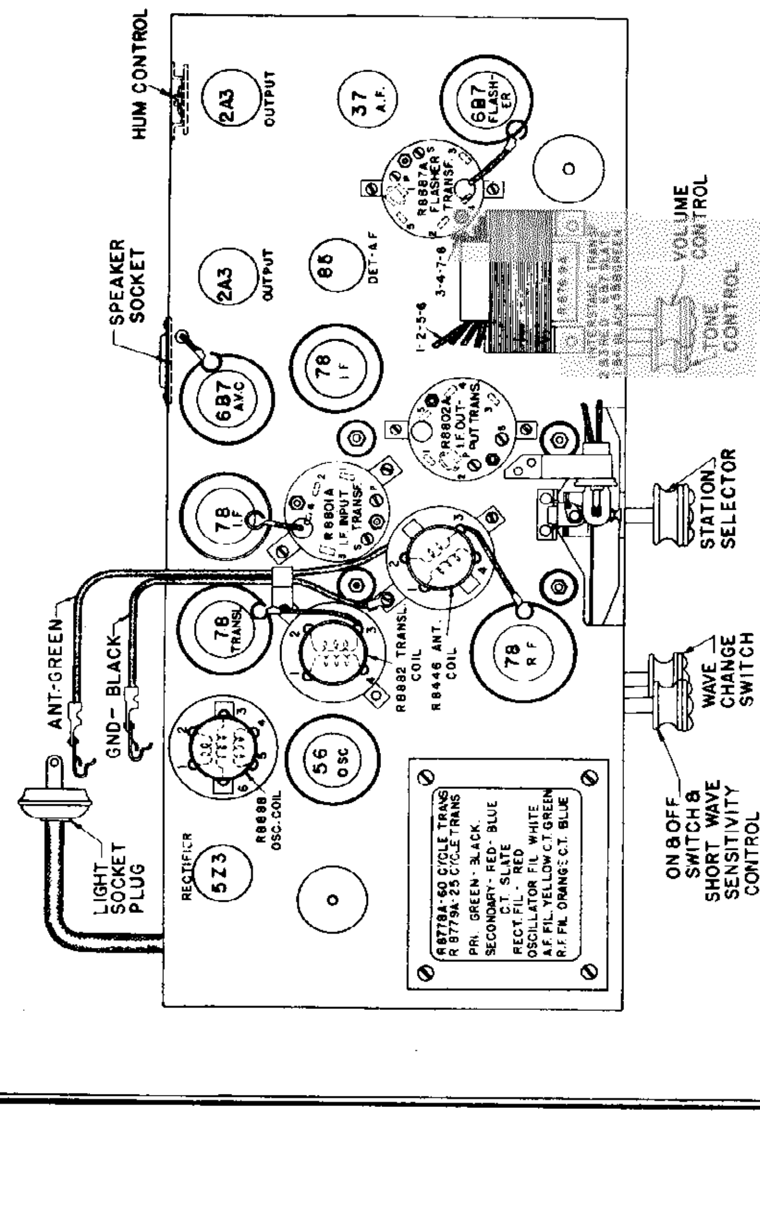


Fig 3 Service Illustration Revised Models 1722 and 1732

In order to increase the short wave sensitivity of the 1722 and 1732 receivers, certain changes were incorporated in the chassis.

1. A 78 resistance-capacity coupled IF stage was added. However, this stage is used on the short wave bands only.

2. The off-on switch was replaced with a duplex switch combining the functions of off-on switch and the switch to short out the added IF stage on the broadcast band. This shorting out of the stage is accomplished by biasing the 78 IF tube so far negative by means of a 30 M ohm cathode resistor that the amplification of the stage is reduced to a 1:1 ratio. For short wave reception, this duplex control is turned all the way on, shorting out the 30 M ohm cathode resistor, leaving only a 300 ohm bias resistor in the circuit.

3. The 37 detector and 37 first audio tubes are replaced by an 85 tube which fills the same functions.

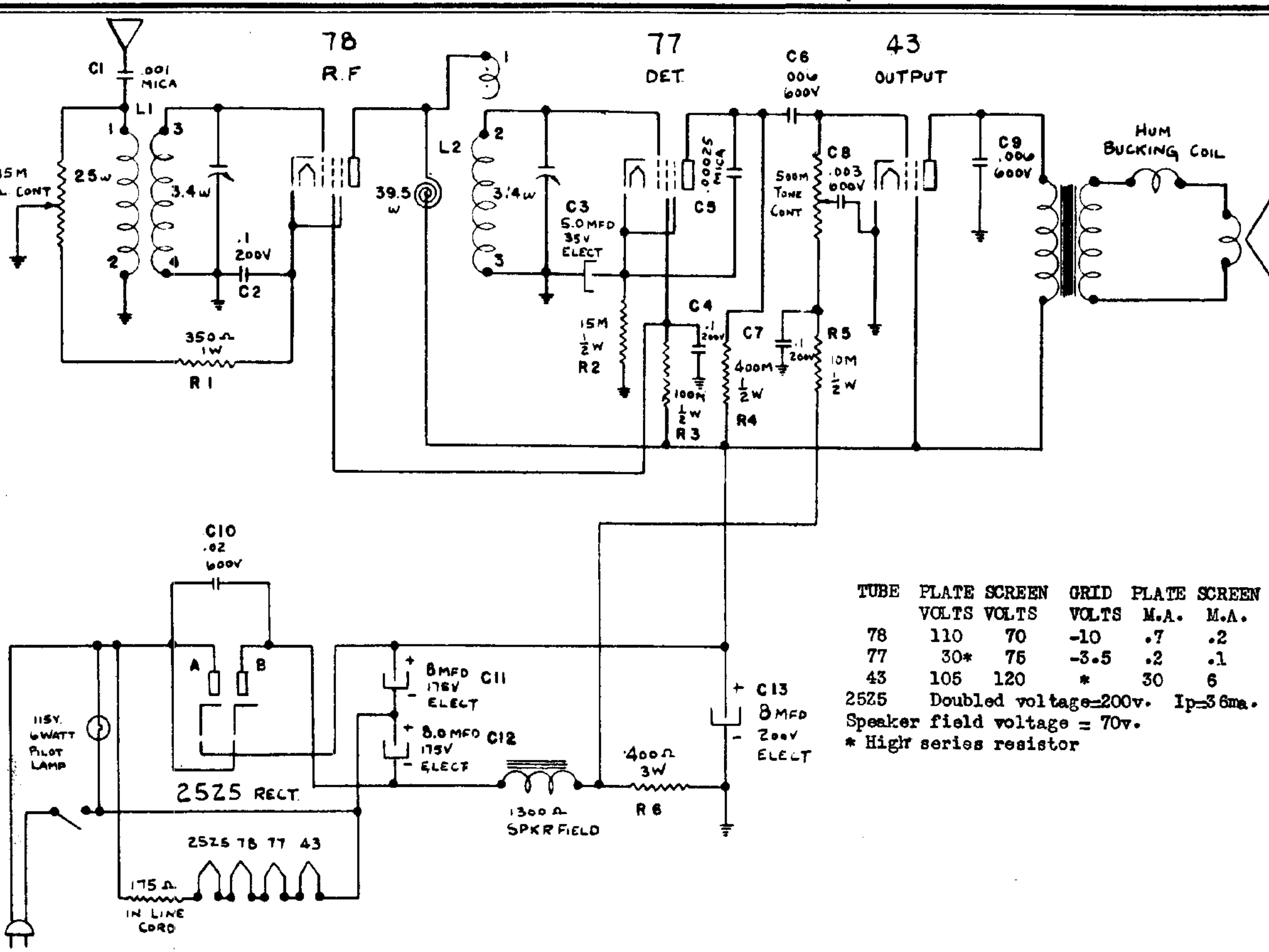
The new block diagram is shown in Fig. 1, the revised schematic in Fig. 2, and the changed top view of the chassis layout in Fig. 3. The rest of the description, explanations, and illustrations given in the original 1722 and 1732 manual, supplement #2, are correct for the revised models.

ADDITIONS TO THE REPLACEMENT PARTS LIST ARE:

PART NO.	DESCRIPTIONS
R-6138	Condenser - .1 mfd. 300 volts
R-6152	Resistor - 10 M ohms - 1/2 watt carbon
R-6154	Resistor - 1 M ohm - 1/2 watt carbon
R-6447	Resistor - 300 ohms - 1/2 watt carbon
R-6571	Switch - off-on - short wave sensitivity

MODEL 1724
Schematic
Voltage

SEARS-ROEBUCK & CO.

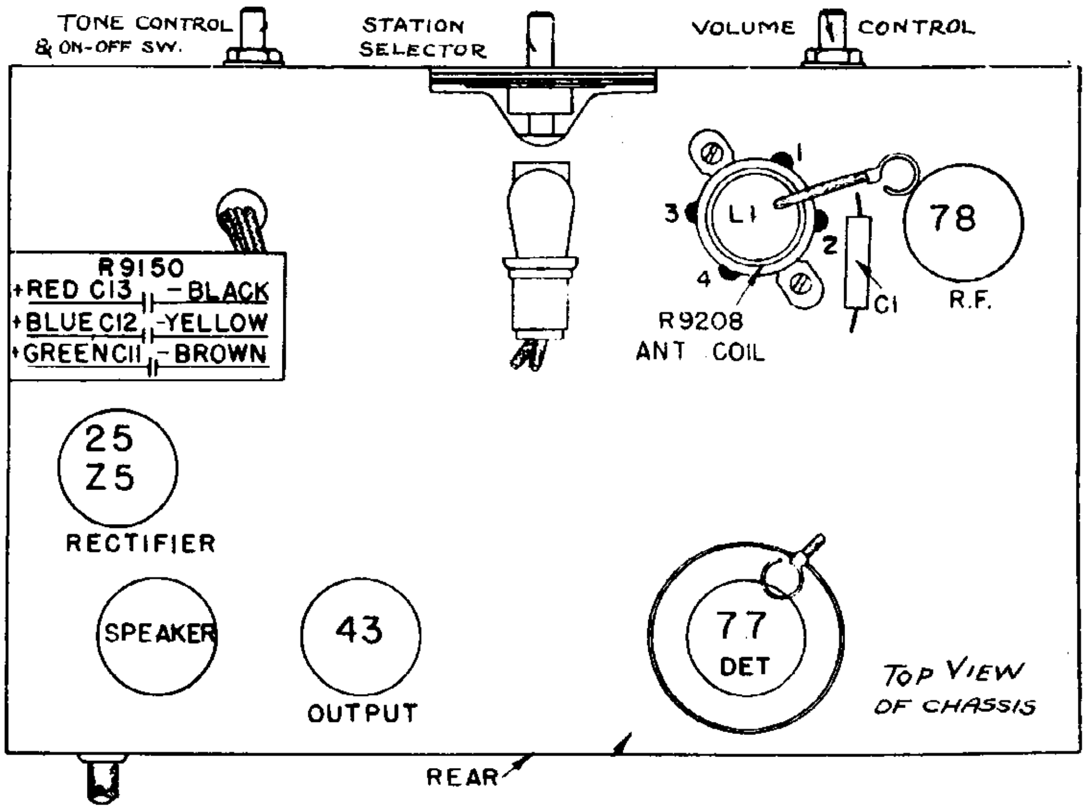


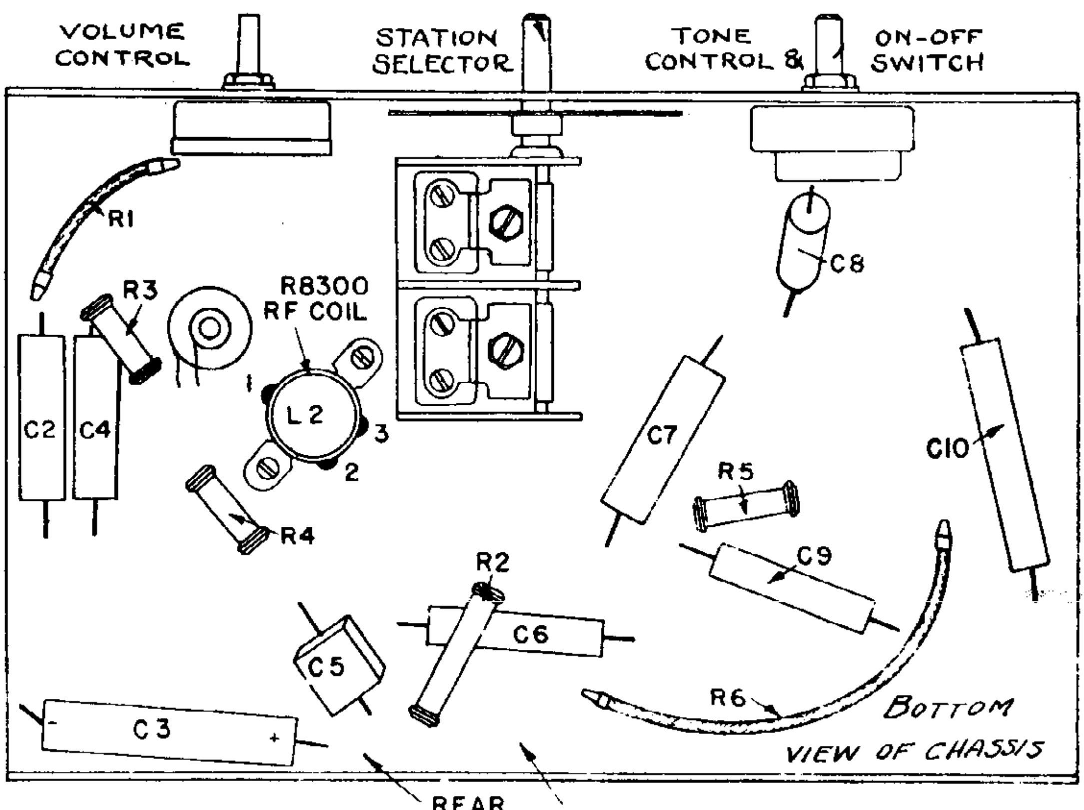
TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78	110	70	-10	.7	.2
77	30*	75	-3.5	.2	.1
43	105	120	*	30	6

2525 Doubled voltage=200v. Ip=36ma.
Speaker field voltage = 70v.
* High series resistor

MODEL 1724
Socket Layout
Chassis

SEARS-ROEBUCK & CO.





SEARS-ROEBUCK & CO.

ELIMINATION OF HUM

in

MODELS 1720, 1725 and 7065

Any trouble due to hum in these models can be eliminated by performing the following operations. The purpose is to add an additional section of filtering to the power supply.

1. Enlarge the hole in the chassis near the power transformer to about 1/4" diameter, as indicated in the illustration.

2. Remove the cover of the power transformer. To do so, it is necessary first to remove the four nuts on the under side of the chassis and then to unscrew the bolts that pass through the laminations. The tone control and switch will have to be demounted in order to get at one of the power transformer nuts.

3. Mount a Part #R10793A choke on top of the power transformer in place of the original transformer cover. Be sure to mount the choke so that its leads can come down through the enlarged hole in the chassis. Also be sure to tighten the bolts well, in order to prevent hum. Then remount the transformer and choke assembly on the chassis and remount the tone control.

4. Make the wiring changes indicated in the illustration. The dotted lines represent the original wiring which is to be changed. The solid lines show the new connections. Note that a new part, a 2 mfd., 440 volt, dry electrolytic condenser, Part #R11114, is added.

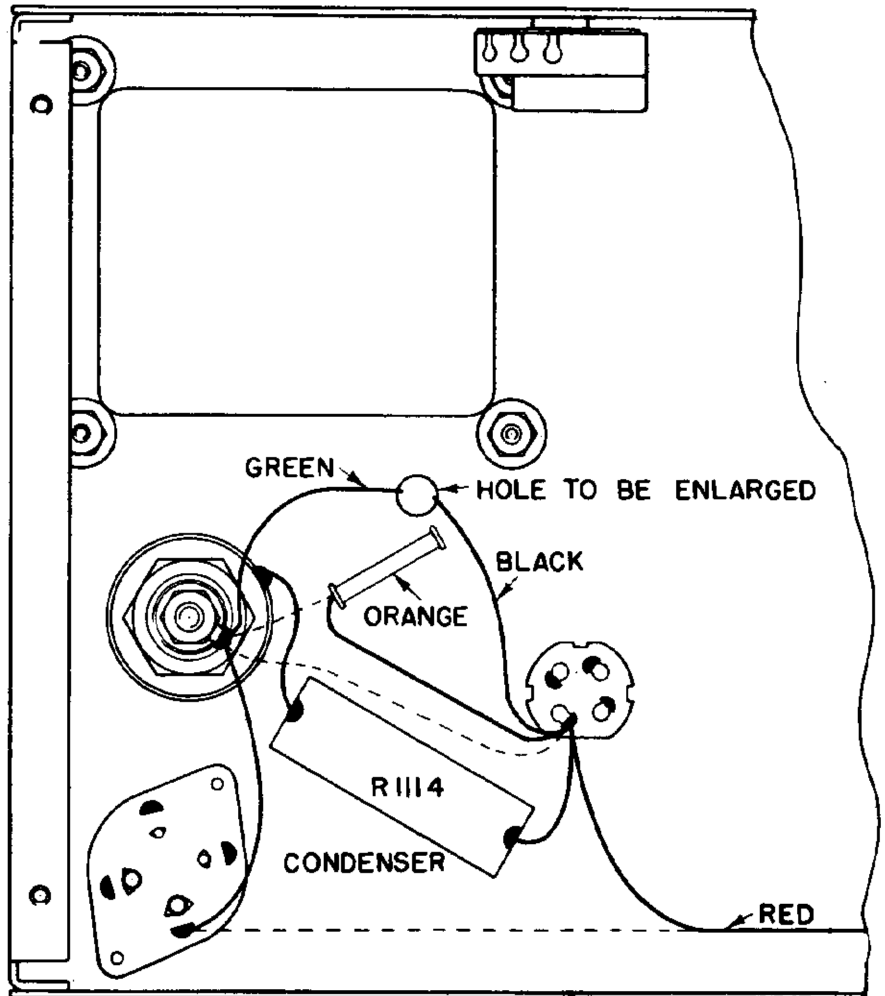
PARTS NEEDED

1 - R10793A - Audio Choke

1 - R11114 - 2 mfd. 440 volt, dry electrolytic condenser.

SPECIAL NOTICE: - The filter system outlined above should be necessary in only a small percentage of the Model #1725 in which the hum condition cannot be corrected by matching the output tubes. Where the condition exists, the trouble is caused by the center tap of the transformer being off. Only in these cases should the filter system be necessary. Dept. 657, Chicago, will ship this filter system out "No Charge", providing the quantity ordered is reasonable.

In ordering, use P-#14326 and mail to Dept. 657, Chicago.



DOTTED LINES INDICATE ORIGINAL WIRING, TO BE REMOVED.
SOLID LINES INDICATE CHANGED WIRING.

Loud Speakers
Repair Notes

SEARS-ROEBUCK & CO.

RADIO SERVICE MANUAL — Date Issued 1/4/34

SPEAKER REPAIRS

Speaker repairs fall into two general classifications; those involving replacement of the cone and voice coil assembly and those involving replacement of the field or hum bucking coil. Although there are many models of speakers, all fall into one of four types.

1. INSIDE suspension of voice coil and cone, and pole plate RIVETED to yoke.

2. INSIDE suspension of voice coil and cone, and cone plate WELDED to yoke.

3. OUTSIDE suspension of voice coil and cone, and pole plate BOLTED to yoke.

4. OUTSIDE suspension of voice coil and cone, and pole plate RIVETED to yoke.

CONE REPLACEMENT OF INSIDE SUSPENSION TYPE SPEAKERS (see Fig. 1)

1. Unsolder the voice coil leads from their terminals.

2. Remove the cone mounting screw.

3. Drill out the cone mounting eyelets or cut off the small head ends with a cold chisel and hammer. If care is used the cardboard mounting rings will not be damaged.

(The 5" Speakers have the cone glued in place instead of being fastened with eyelets. They will have to be torn out).

4. Remove the cone and blow out any dirt or metal chips from the air gap.

5. Replace the new cone and the cardboard mounting rings in their original order.

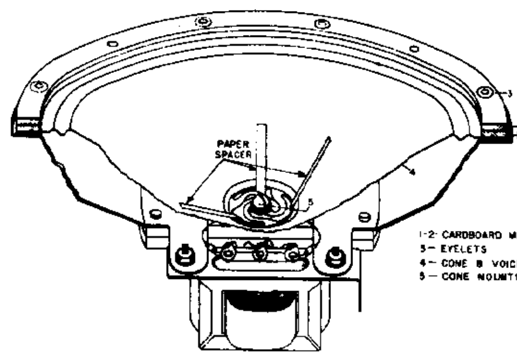
6. Insert three strips about 3" long, 1/8" wide and .01" thick (cut from a calling card) between the voice coil and the pole stem. They should be spaced evenly around the pole stem. Spacers can be obtained from the factory; part No. S-9177 .0075" thick for 5" and 6" speakers; part No. S-7391 - .01" thick for all other speakers.

7. Replace and tighten the cone mounting screw.

8. Replace the eyelets around the edge of the cone, leaving blank any holes that were originally left blank for speaker to baffle mounting screws. The eyeleting tool illustrated is recommended. (Part No. R-8033).

9. Remove the three inserted spacer strips.
10. Solder the voice coil leads to their terminals.
11. If it should happen that the cone is not properly centered after completing the replacement, loosen the cone mounting screw and move the cone around until proper centering is secured. Then re-tighten the screw. Sometimes several attempts are necessary before proper centering can be made.

Fig. 1



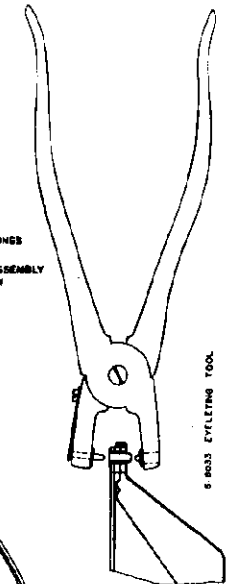
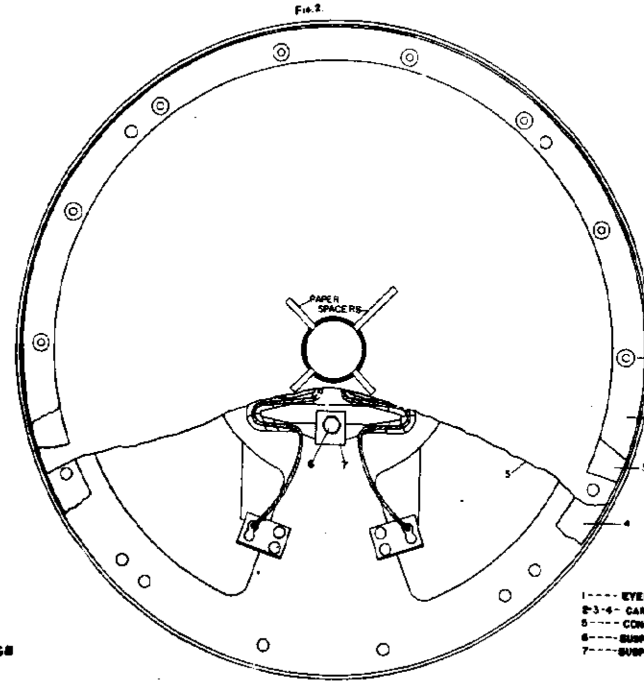


Fig. 2



MODEL 1726-X
Schematic

SEARS-ROEBUCK & CO.

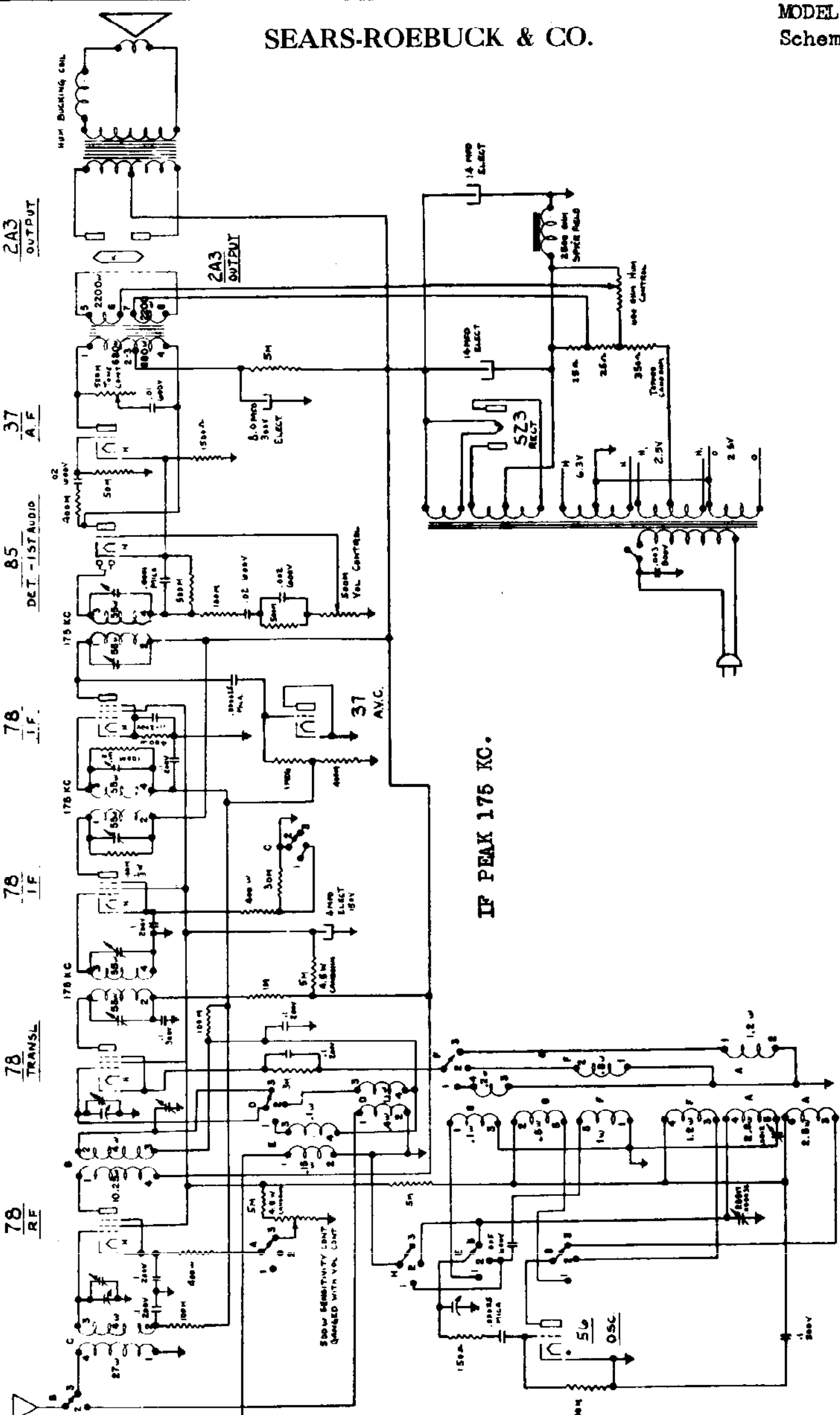


Fig. 2. Circuit Diagram - Model 1726 X

MODEL 1726-X
Voltage
Alignment Data
Parts List

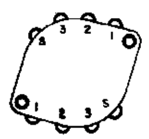
SEARS-ROEBUCK & CO.

When peaking the IF stages, use a signal from the test oscillator just strong enough to give an audible response from the speaker or readable deflection on an output meter.

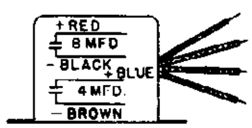
The sensitivity control is connected only in the broadcast position. Current is bled through it and the movable arm picks off a portion of the voltage to bias the cathode of the 78 RF tube. The sensitivity control is mounted on the volume control shaft so that sensitivity is decreased at the same time volume is decreased. Without this dual control, the AVC action would make the receiver sensitivity increase to its maximum value when no station was tuned in. By reducing the sensitivity as well as the volume, this dual control keeps between-station-noise at a minimum.

There is a hum control on the rear of the chassis, under the 2A3 tubes. It should be adjusted to the point of minimum hum with the volume control off. In the event that the point for minimum hum appears to be beyond the limit of movement of the control, the 2A3 tubes should be interchanged. If a balance still can not be had, the 2A3 tubes must be replaced by a pair more nearly matched in their characteristics.

In the event that coil replacement makes it necessary to readjust the trimmer condensers, proceed as follows: Tune in a high frequency station (broadcast) of known frequency. Set the dial very accurately to the station's frequency and adjust the isolantite base oscillator trimmer condenser, mounted on the frequency selecting switch assembly, for maximum volume. Greater accuracy can be had if a weak station is selected, or use only a few feet of wire as the antenna with a .00025 mfd. condenser connected between the antenna and ground clips to take the place of the normal antenna capacity. Then tune in a short wave station at about 14,000 kc and adjust the trimmer of the translator section of the ganged tuning condenser (the middle section). Next, tune in the broadcast station used previously and adjust the antenna trimmer on the ganged tuning condenser and the small bakelite base trimmer mounted on the frequency selecting switch. Then tune in a broadcast station at the low frequency end of the dial and adjust the .0012 oscillator padding condenser for maximum volume. Follow this procedure exactly and, having made the adjustment, do not readjust when changing from the broadcast to the short wave station or vice versa.



POSITION OF LUGS AS VIEWED FROM REAR
FREQUENCY SELECTING SWITCH R 9505

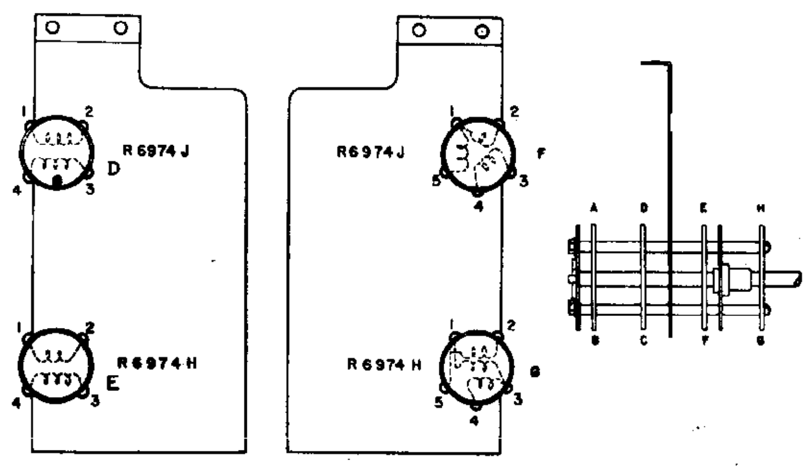


R 8780
ELECTROLYTIC COND.

R-8446	Coil - Antenna
R-8888	Coil - Oscillator
R-8882	Coil - Translator
R-6974H	Coil - Antenna - Oscillator, high range
R-6974J	Coil - Antenna - Oscillator, intermediate
R-2288	Lamp - Pilot
R-8448	Condenser - Variable tuning
R-8448B	Condenser - Variable tuning, complete with drive and dial assembly
R-9513	Condenser - Trimmer, 12 mmf.
R-8817	Condenser - Padding, 35 mmf.
R-7137	Condenser - Padding, .012 mfd.
R-6565	Condenser - IF tuning
R-7236	Condenser - Electrolytic, 14 mfd.
R-8780	Condenser - Electrolytic, dual
R-6138	Condenser - .1 mfd. 300 volts
R-6444	Condenser - .1 mfd. 200 volts
R-6761	Condenser - .02 mfd. 600 volts
R-7070	Condenser - .01 mfd. 600 volts
R-6954	Condenser - .005 mfd. 600 volts
R-6461	Condenser - .003 mfd. 800 volts
R-6933	Condenser - .002 mfd. 600 volts
R-4592	Condenser - .00025 mfd. mica
R-4303	Condenser - .0001 mfd. mica
R-8711	Condenser - .000025 mfd. mica
R-6570	Control - Tone, 500 M ohms
R-9255	Control - Volume and sensitivity
R-5823	Resistor - 1 megohm - 1/2 watt carbon
R-6179	Resistor - 500 M ohms - 1/2 watt carbon
R-5822	Resistor - 400 M ohms - 1/2 watt carbon
R-5819	Resistor - 100 M ohms - 1/2 watt carbon
R-7586	Resistor - 100 M ohms - 1/3 watt carbon
R-6445	Resistor - 50 M ohms - 1/2 watt carbon
R-6156	Resistor - 30 M ohms - 1/2 watt carbon
R-6510	Resistor - 5 M ohms - 1/2 watt carbon
R-6153	Resistor - 3 M ohms - 1/2 watt carbon
R-6154	Resistor - 1 M ohms - 1/2 watt carbon
R-8829	Resistor - 1500 ohms - 1/2 watt carbon
R-6436	Resistor - 400 ohms - 1/2 watt carbon
R-6155	Resistor - 150 ohms - 1/2 watt carbon
R-9081	Resistor - 50 ohms - 1 watt carbon
R-8886	Resistor - Candohm
R-8901	Resistor - Candohm
R-8801	Transformer - IF input and interstage, coils and core only
R-8802	Transformer - IF output, coils and core only
R-8801A	Transformer - IF input - complete less shield
R-8801J	Transformer - IF interstage - complete less shield
R-8802L	Transformer - IF output - complete less shield
R-9494A	Transformer - Audio interstage
R-9498A-	Transformer - 60 cycle power
R-8779A	Transformer - 25 cycle power
R-6235	Tube-Cushion rubber, variable condenser mounting

VOLTAGE AND CURRENT CHART - MODEL 1726X

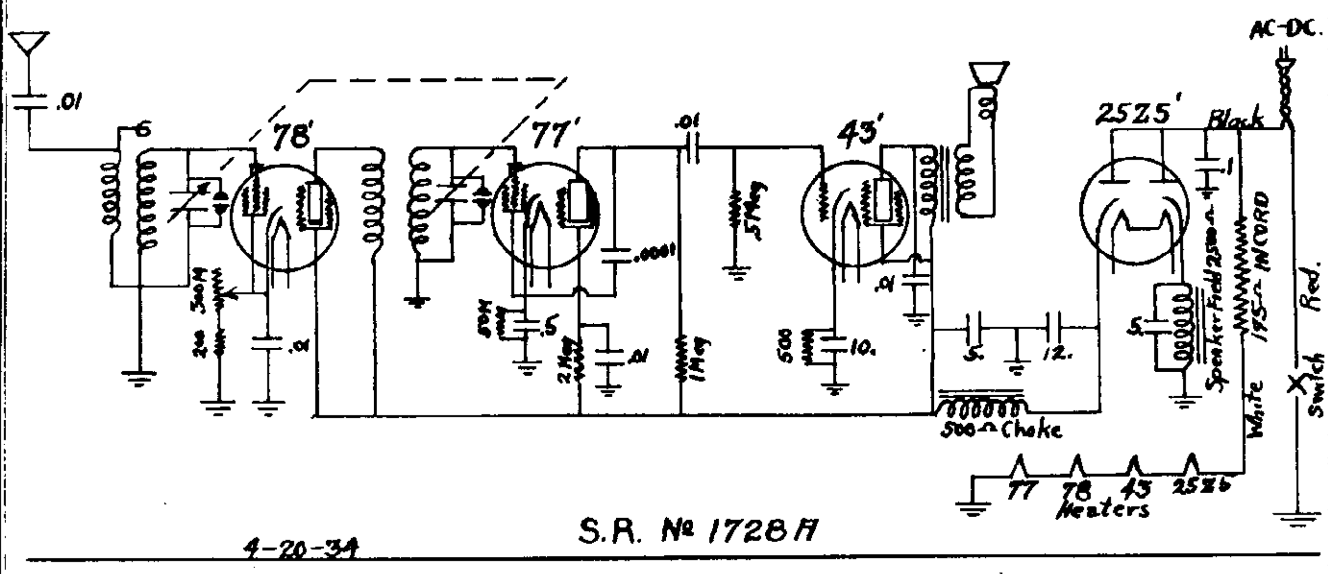
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A. 6-Vol. on 1-Vol. off	SCREEN M. A. 1.5-Vol. on .5-Vol. off
78 - RF	225	85		
78 - Transl	220	85	2	.2
56 - Osc	70		5	
78 - 1st IF	200	75	.4	.2
78 - 2nd IF	225	85	1.25	1
85 - Det - AF	155		5	
37 - AF	155		3	
2A3 - Output	260		60	
5Z3 - Rect	Max. D.C. voltage = 315V. Plate Current = 80 m.a. per plate			



SHORT WAVE ANTENNA-OSCILLATOR COILS MOUNTED UNDER CHASSIS.
COIL NUMBERING & LETTERING CORRESPONDS TO SCHEMATIC.

SEARS-ROEBUCK & CO.

MODEL 1728-A
Schematic
Parts List



GENERAL INFORMATION

This set is of the conventional tuned radio frequency type so designed to operate on 105-120 volts of either AC or DC.

To operate unreel built-in-antenna and lay on floor or throw out window, turn volume all the way up, if on DC reverse plug if set does not start playing in one minute.

The cord of this set, at normal operation of receiver, becomes quite warm which is a natural condition, as there is a rapid heat dissipating resistance in same.

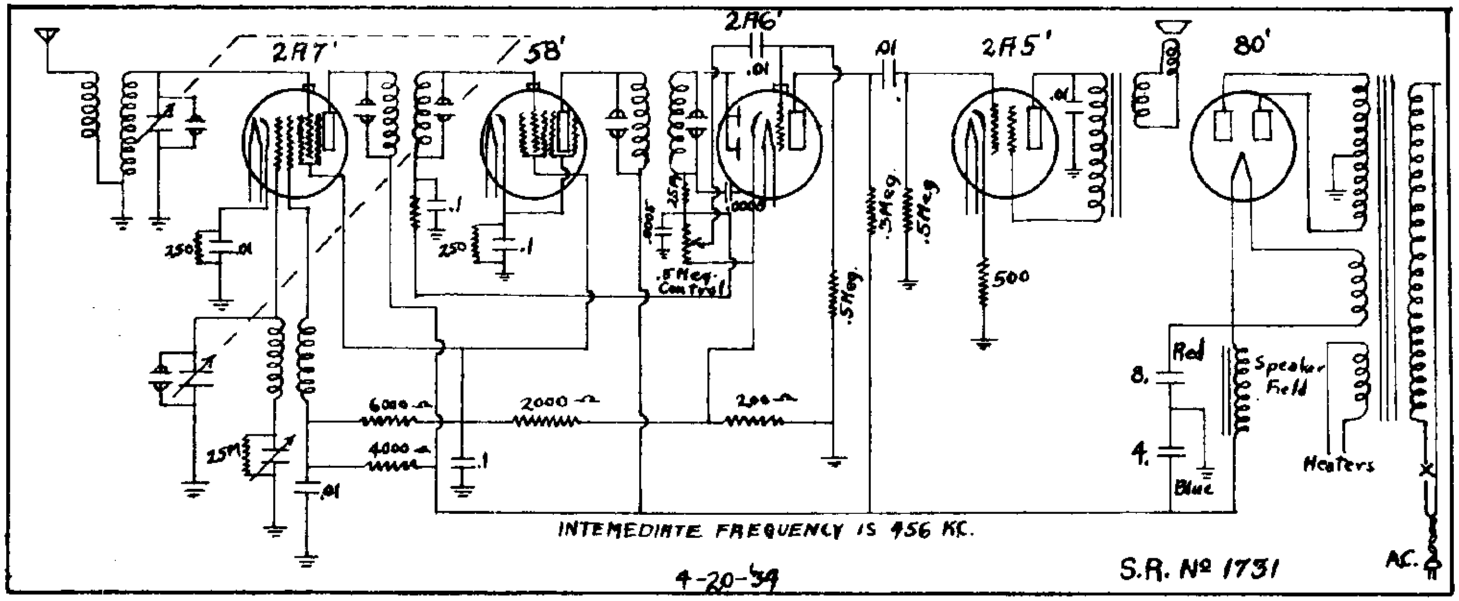
To balance set, first remove chassis from cabinet; second, tune condenser to about 1720 kc and align trimmer condenser on detector stage, then do same to antenna stage until loudest noise level is obtained.

PARTS LIST

No.	
60	Volume control
201	Cabinet
202	Dynamic Speaker
203	Variable condenser
204	Set of coils - complete
204a	Antenna coil - only
204b	R F coil - only
205	Electrolytic condenser
206	AC DC choke
207	Cord ohm 175 ohm
61	Antenna cord
208	Escutcheon- Silvertone or Selector
73	Terminal strip- 3 lug
71	Knob
	Any tube socket (state no. of prongs)
	Any resistor (state ohms and watts)
	Any bypass condenser (state capacity)

MODEL 1731
Schematic
Alignment Data
Parts List

SEARS-ROEBUCK & CO.



GENERAL INFORMATION

This set is a superheterodyne designed to give maximum output of good quality which can be obtained from 5 tubes - and can be operated on 105-120 volt AC at 50-60 cycles only.

To operate, plug in AC and connect colored flexible wire out rear of chassis to approximately 50' of antenna, preferably outside; next, turn on switch and turn volume control nearly up and tune to desired station.

To balance set, first align the IF transformers at 456 kc with gang condenser closed, next turn condenser all way open and align at 1720 kc, then adjust padder condenser at 600 kc, then go back and check at 1720 kc.

PARTS LIST

NO.	
250	Cabinet
251	Dynamic Speaker
253	Variable condenser-2 gang
254	Set of coils- complete
254a	Oscillator coil - only
254b	Antenna coil - only
254c	IF coil - top grid only
254d	IF coil -bottom " "
255	Power transformer
156	8&4 electrolytic condenser
256	Volume control
257	Dial unit complete
258	Candohms
108	Padder condenser 7 plate
261	A C switch
158	Power cord and plug
73	Terminal strip- 3 lug

MODEL 1729
Schematic
Voltage Data

SEARS-ROEBUCK & CO.

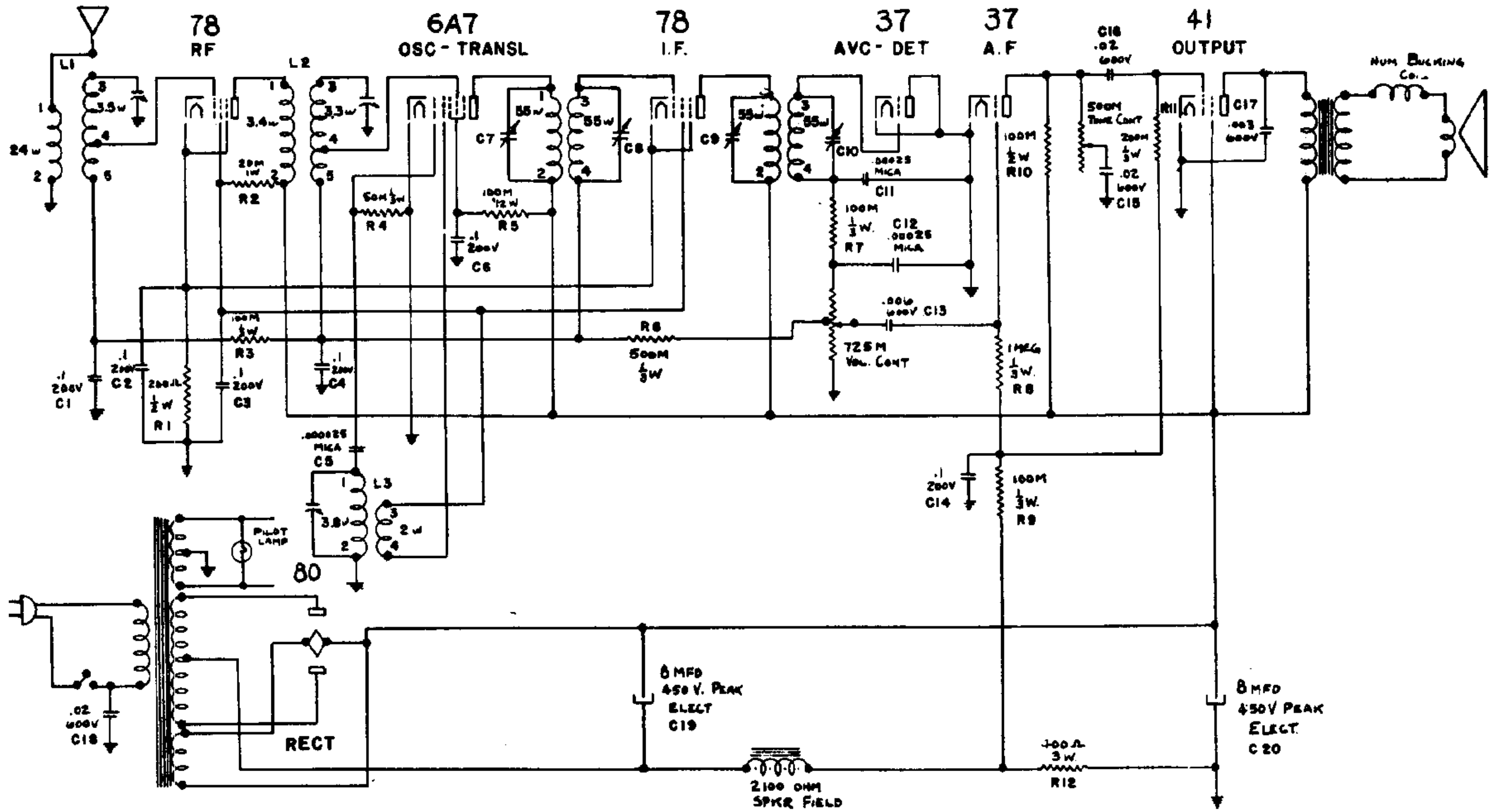
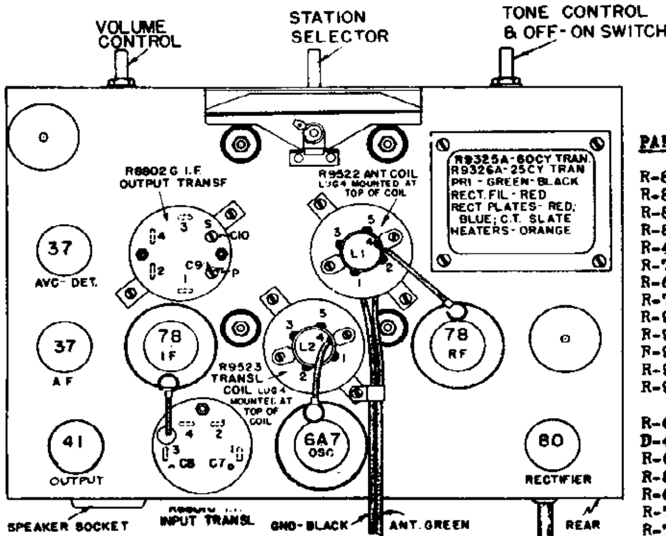


FIG. 2

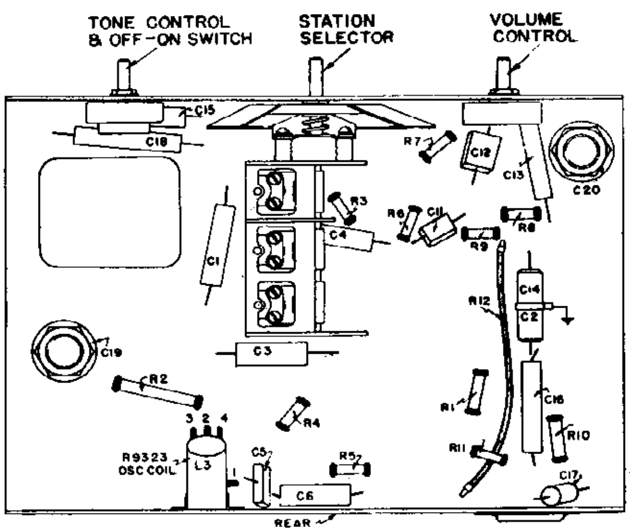
TUBE		PLATE VOLTS	SCREEN VOLTS	PLATE M.A.	SCREEN M.A.
78	RF	225	105	7	1.6
78	IF	225	105	7	1.6
37	AF	165		3.5	
41	Output	220	250	21	3.5
6A7	Osc-Transl.	Ep=225v Eg2=105v Eg3&5=70v			
		Ip=2ma Ig2=2ma Ig3&5=2ma			
80	Rect.	Max.D-C = 370v. Plate current= 28 ma per plate			

MODEL 1729
Socket Layout
Chassis View
Parts List

SEARS-ROEBUCK & CO.



TOP VIEW OF CHASSIS



UNDER VIEW OF CHASSIS

PART NO.	DESCRIPTION
R-8297A	Board - Terminal, double
R-8308A	Board - Terminal, triple
R-8900B	Board - Terminal, five terminal
R-8725	Card - Operating
R-4715	Clamp - Ant. & Gnd. leads
R-7011A	Clip - Ant. lead
R-6381	Clip - Grid
R-7031	Clip - Pilot Light
R-9522	Coil - Antenna
R-9323	Coil - Oscillator
R-9523	Coil - Translator
R-9546	Condenser - Variable
R-9546A	Condenser - Variable, with dial and drive assembly
R-6565	Condenser - IF
D-4758P	Condenser - 8 Mfd. Electrolytic
R-6444	Condenser - .1 Mfd. 200 volt
R-8301	Condenser - .1 Mfd. 200 volt, dual
R-6761	Condenser - .02 Mfd. 600 volt
R-7244	Condenser - .006 Mfd. 600 volt
R-7681	Condenser - .003 Mfd. 600 volt
R-4592	Condenser - .00025 Mfd. Mica
R-8711	Condenser - .000025 Mfd. Mica
R-6571	Control - Tone
R-9296	Control - Volume
R-6989	Cord - Power Supply
R-9333A	Dial and Indicator
R-6923	Escutcheon
R-9528	Instructions
R-8896	Knob - Medium
R-8895	Knob - Small
R-2288	Lamp - Pilot
R-5346B	Lead - Antenna
R-5345D	Lead - Ground
R-5321	Pin - Escutcheon
R-7585	Resistor - 1 megohm, 1/3 watt
R-7228	Resistor - 500 M ohms, 1/3 watt
R-6638	Resistor - 200 M ohms, 1/3 watt
R-7586	Resistor - 100 M ohms, 1/3 watt
R-5819	Resistor - 100 M ohms, 1/2 watt
R-6657	Resistor - 50 M ohms, 1/3 watt
R-5095	Resistor - 20 M ohms, 1 watt
R-6276	Resistor - 200 ohms, 1/2 watt
R-8562	Resistor - 400 ohms, flexible
R-6006B	Shaft - Dial Drive
R-6018A	Shield - Coil
R-8803A	Shield - IF transf.
R-6450	Shield - Electrolytic cond
R-8366	Socket - 4 prong
R-8367	Socket - 5 prong
R-8368	Socket - 6 prong
R-8369	Socket - 7 prong

PART NO.	DESCRIPTION
S-9549A	Speaker - 2250 ohm, 6" dynamic
R-9526	Sticker - Tube layout & license - 60 cycle
R-9527	Sticker - Tube layout & license - 25 cycle
R-9182	Sticker - NRA
R-8801	Transformer - IF input
R-8801G	Transformer - IF input complete, less shield
R-8802	Transformer - IF output
R-8802G	Transformer - IF output complete, less shield
R-9325A	Transformer - 60 cycle power
R-9526A	Transformer - 25 cycle power

MODEL 1730
Schematic
Voltage

SEARS-ROEBUCK & CO.

TUBE	PLATE VOLTS	SCREEN VOLTS	PLATE M.A.	SCREEN M.A.
78 RF	190	95	7	2.5
78 IF	190	95	6	4
85 AVC-Det-AF	30*		2	
41 Output	200	205	15	2.25
6A7 Osc-Transl	Ep=190v. Eg#2=130v. Eg#3&#5=95v. Ip=4.75ma. Ig#2=2.5ma. Ig#3&#5=3.5ma.			

* indicates high series resistance

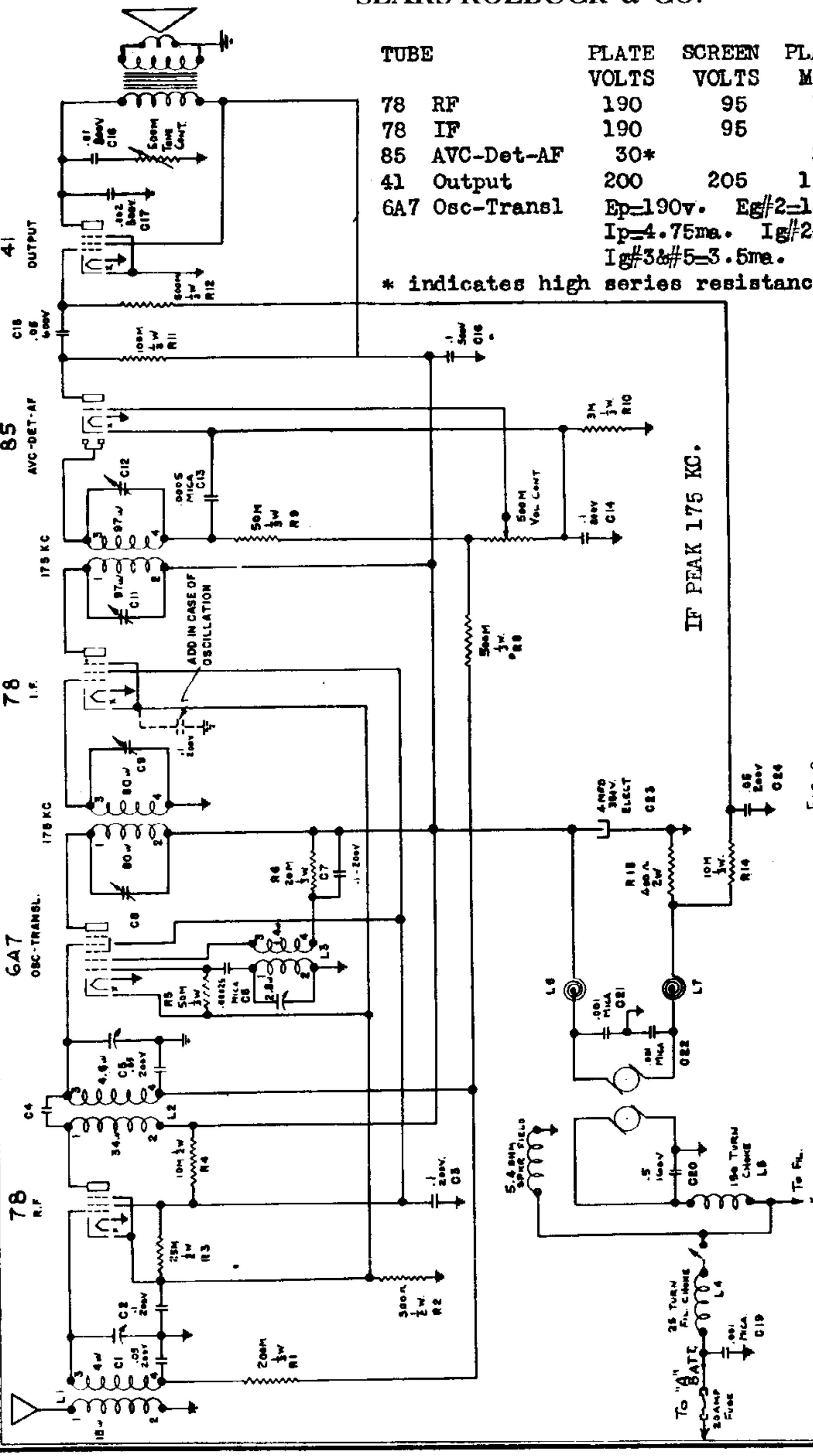


FIG. 2.

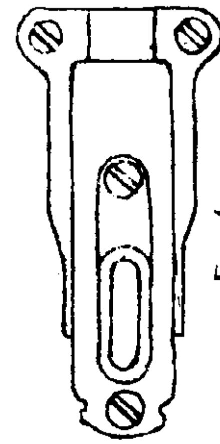


FIG. 4
R10190

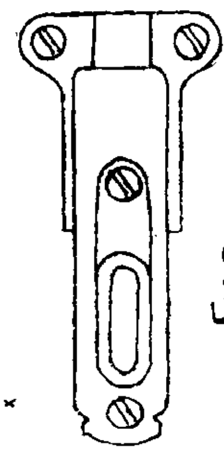


FIG. 3
R10189

MODEL 1730
Socket, Trimmers
Adjustments
Parts List

SEARS-ROEBUCK & CO.

SPECIAL NOTE

When peaking the IF transformers, use a low enough output from the test oscillator to render the AVC action inoperative.

THE RF TUNING ADJUSTMENTS

There are three holes at the back of the chassis, giving access to the variable condenser trimmers. The hole nearest the drive end of the condenser is for the RF section trimmer. The next hole is for the translator, and the third one is for the oscillator.

OSCILLATION

Any trouble from oscillation can be cured by connecting a .1 Mfd. 200 volt condenser, (Part #R-8286), from the IF cathode to ground.

THE REMOTE CONTROL UNIT

A few of the first production remote control units used the type clamp shown in Fig. 3. Later production used the type illustrated in Fig. 4. Should trouble be experienced with controls having the type clamp shown in Fig. 3, due to the volume control cable's jumping out of the control head, the type of clamp shown in Fig. 4 should be substituted, (Part #R-10190).

The following procedure will improve the action of the on-off switch, where necessary.

Remove the volume control drum and turn the volume control counter clockwise to its off position. Then turn it clockwise just enough to take up all of the play, so that any further rotation would tend to turn the switch on. Remove the key from the remote control unit and turn the volume control knurled ring to its locked position. Then turn it, as though to switch it on, the slight amount necessary to take up the play. Then replace the volume control drum on the volume control shaft, maintaining a clockwise tension on the rotatable portion of the drum and tighten the set screws. Study of this operation will reveal that its purpose is to take advantage of all of the play in the mechanism in such a way that an increased length of movement is provided for turning the switch off.

It is of vital importance that no twists occur in the cable during the installation. Careful inspection for this point is necessary because in a cable of this type twists are not very obvious. Also, bends should be as gradual as practicable. Sharp bends greatly increase the stiffness of operation.

If, having followed the foregoing suggestions, trouble still is experienced with the remote control, the unit should be considered defective. Return the entire remote control unit, including the cables and the chassis pulleys, for replacement, to the Colonial Radio Corp., 254 Rano St., Buffalo, N.Y.

ADJUSTING THE STATION SELECTOR DRIVE DRUM

1. Fully mesh the variable condenser plates.

2. Turn the Station Selector knurled ring to its low frequency limit.

3. Place the condenser drive drum on the variable condenser shaft and screw the binding strip to the condenser end plate. If necessary, bend the binding strip in such a way that the drive cable runs in as straight a line as possible from the drum to the point where it emerges from the chassis. However, care must be taken that the cable clamp does not touch any part of the chassis. Should it do so, it would render the rubber mounting of the variable condenser ineffective and microphonics would result. Then tighten the drum set screws.

4. After the set has been installed, and the remote control mounted, the calibration can be set more accurately in the following manner. Tune in a station of known frequency. Remove the dial glass retaining spring and set the dial pointer to the station's frequency. Then replace the retaining spring, making sure that the glass does not shift during the operation.

THE GEN-E-MOTOR

The plate and screen voltages for the receiver, are supplied by a Gen-E-Motor. No attempt should be made to repair this unit. It should be returned to the Pioneer Gen-E-Motor Corp., 466 West Superior St., Chicago, Ill. Return only the unit itself. Do not return the complete housing assembly. To remove the Gen-E-Motor from its housing, proceed as follows.

1. Remove the two screws under the chassis, that mount the loud speaker.

2. Remove the three Parker-Kalon screws from the bottom of the Gen-E-Motor housing, and the two screws that hold the electrolytic condenser can to the housing. The Gen-E-Motor and its housing can then be tipped back from the chassis.

3. Unsolder the leads at the base of the housing, so that the Gen-E-Motor and housing can be completely removed from the chassis.

4. Removal of the two screws in each side of the housing, and unsoldering of the Gen-E-Motor leads under the housing, will permit the Gen-E-Motor to be taken from its housing.

POLARITY CHANGING

The receivers are shipped with the polarity changing screws in the proper position for cars having the negative battery terminal grounded. If the car is one with a grounded positive terminal, the positions of the two screws must be changed, as indicated by the sticker on the case, and as shown in Fig. 5.

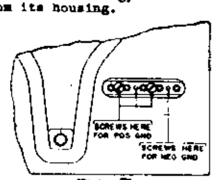
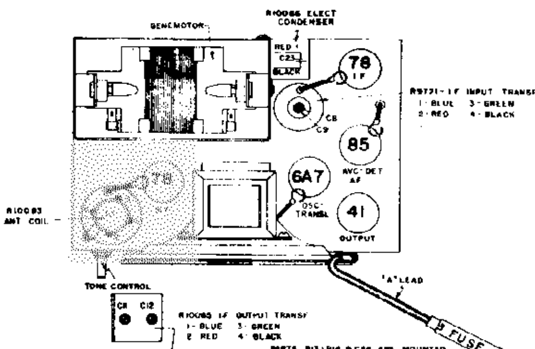
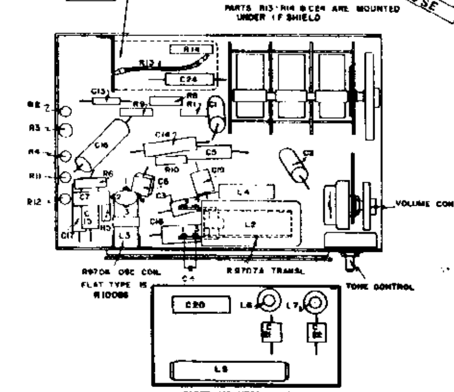


FIG. 5

Part No.	Description
R-8297A	Board - Terminal, double
R-8308A	Board - Terminal, triple
R-8900A	Board - Terminal, 5 terminals
R-9753A	Board - Terminal, 6 terminals
R-6552E	Board - Resistor
R-9754A	Board - Polarity Changing
R-10089	Book - Instruction
R-9588	Bushing - Rubber, Genemotor Mounting
R-9044A	Choke - L4
R-10116A	Choke - L5
R-9757	Choke - L6 & L7
R-6381	Clip - Grid
R-9741	Clip - "A" Lead
R-10083	Coil - Antenna
R-10086	Coil - Oscillator
R-9707	Coil - Translator
R-9990	Condenser - Variable
R-10086	Condenser - Electrolytic
R-8030	Condenser - 1 Mfd. Generator
R-10028	Condenser - .5 Mfd - Ammeter
R-9032	Condenser - .5 Mfd 160 volt
R-10164	Condenser - .1 Mfd 600 volt
R-8286	Condenser - .1 Mfd 200 volt
R-9145	Condenser - .05 Mfd 600 volt
R-6920	Condenser - .05 Mfd 200 volt
R-7354	Condenser - .05 Mfd 200 volt
R-9776	Condenser - .01 Mfd 800 volt
R-10093	Condenser - .002 Mfd 800 volt
R-6759	Condenser - .001 Mfd Mica
R-6760	Condenser - .0005 Mfd Mica
R-4598	Condenser - .00025 Mfd Mica
R-10091	Control - Remote, Complete with Pulleys Cables
R-9711	Control - Tone (500 M ohms)
R-10172	Control - Volume (500 M ohms)
R-9717	Connector - "A" lead & fuse container
R-9751	Fuse - 20 amp
R-9587	Genemotor
R-9744	Grommet - "A" lead
R-8870A	Lead- Antenna
R-9579B	Lead - "A" Ammeter end
R-9578A	Lead - "A" Chassis end
R-10153	List - check

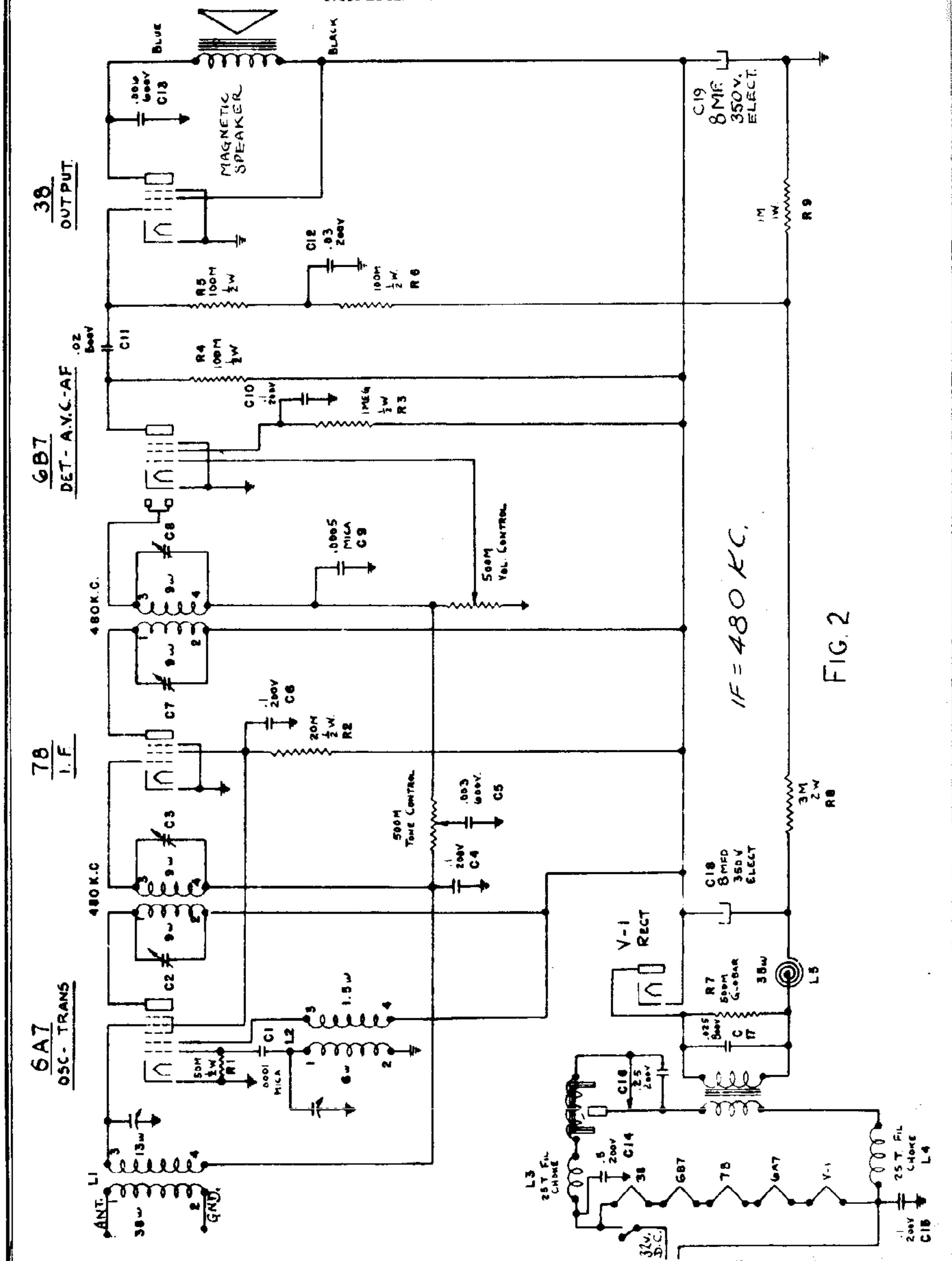
Part No.	Description
R-7085	Resistor - 25 M ohms, 1/2 watt carbon
R-6640	Resistor - 20 M ohms, 1/3 watt carbon
R-6152	Resistor - 10 M ohms, 1/2 watt carbon
R-7587	Resistor - 10 M ohms, 1/3 watt carbon
R-6972	Resistor - 3 M ohms, 1/3 watt carbon
R-10078	Resistor - 400 ohms, 1/3 watt carbon
R-6447	Resistor - 300 ohms, 1/2 watt carbon
R-8419	Resistor - 400 ohms, flexible
R-10066	Screw - Polarity changer
R-10084A	Shield - Antenna Coil
R-9591	Shield - Translator Coil
R-9360	Shield - Tube
R-8092	Socket - 6 Prong
R-8072	Socket - 7 Prong
S-9967	Speaker - Complete
S-9968A	Speaker - Cone & Voice Coil Assembly
S-9994	Speaker - Clamping ring
S-10152	Speaker - Field Coil
S-9968	Speaker - eyelets
S-9959	Speaker - Felt ring
S-10144A	Speaker - Transformer
R-9960	Sticker - Polarity Changer
R1-10032	Suppressor - Spark Plug
R2-10042	Suppressor - Distributor
R-9729	Stud - Set Mounting
R-9786	Template - set mounting
R-10064A	Transformer - I F input
R-10065A	Transformer - I F output
R-9739	Washer - lock set mounting
R-9740	Washer - Flat, set mounting
R-9719	Nut - Set Mounting
R-8219	Nut - Acorn
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-6638	Resistor - 200 M ohms, 1/3 watt carbon
R-7588	Resistor - 100 M ohms, 1/3 watt carbon
R-6637	Resistor - 60 M ohms, 1/3 watt carbon





MODEL 1733
Schematic

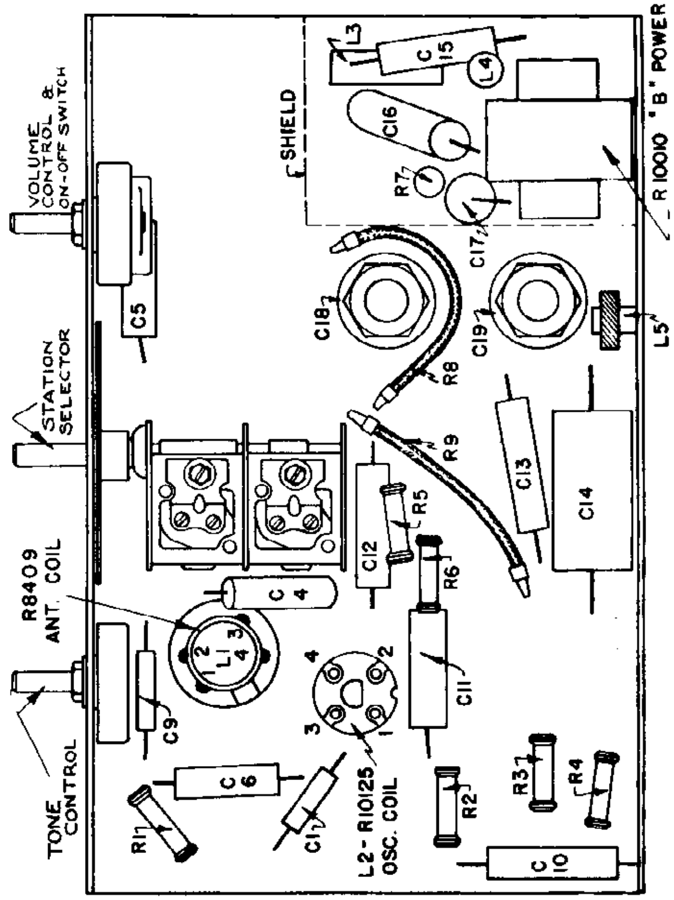
SEARS-ROEBUCK & CO.

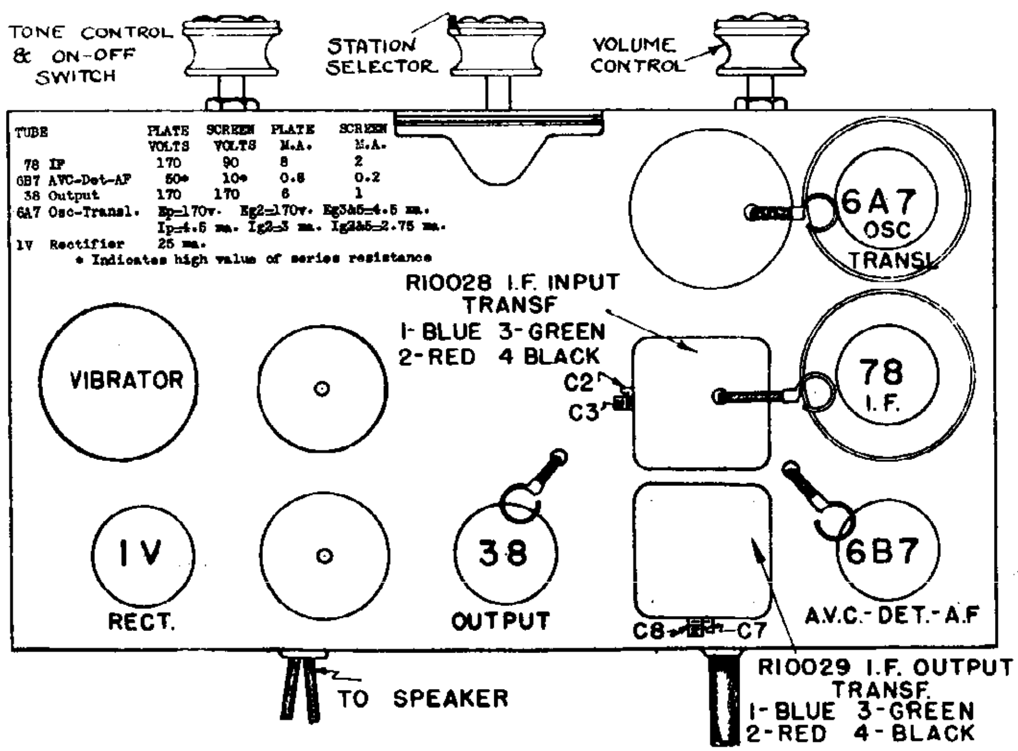


MODEL 1733
Voltage, Socket
Chassis, Parts List

SEARS-ROEBUCK & CO.

PART NO.	DESCRIPTION
R-7901-A	Board - Fuse
R-5509-A	Board - Terminal
R-8297-A	Board - Terminal, double
R-8308-A	Board - Terminal, triple
R-8900-D	Board - Terminal, 5 terminals
R-9044-A	Choke (L3 & L4)
R-9757	Choke (L5)
R-6381	Clip - Grid
R-8409	Coil - Antenna
R-10125	Coil - Oscillator
R-8412	Condenser - Variable
R-8488	Condenser - 8 Mfd. electrolytic
R-6451	Condenser - .5 Mfd. 200 volt
R-9817	Condenser - .25 Mfd. 200 volt
R-6444	Condenser - .1 Mfd. 200 volt
R-6630	Condenser - .03 Mfd. 200 volt
R-10018	Condenser - .025 Mfd. 600 volt
R-6761	Condenser - .02 Mfd. 600 volt
R-7244	Condenser - .006 Mfd. 600 volt
R-7681	Condenser - .003 Mfd. 600 volt
R-6760	Condenser - .0005 Mfd. Mica
R-4303	Condenser - .0001 Mfd. Mica
R-6571	Control - Tone
R-6570	Control - Volume
R-6989	Cord - Power
R-10012-A	Dial and Indicator
R-8406	Escutcheon
R-7688	Fuse - 10 Amp.
R-8895	Knob - Small
R-8896	Knob - Medium
R-10012	Indicator
R-10020	Instructions
R-5823	Resistor - 1 Megohm, 1/2 watt carbon
R-5819	Resistor - 100 M ohms, 1/2 watt carbon
R-6445	Resistor - 50 M ohms, 1/2 watt carbon
R-5821	Resistor - 20M ohms, 1/2 watt carbon
R-9745	Resistor - Globar (R7)
R-9254	Resistor - 1 M ohms, flexible
R-10016	Resistor - 3 M ohms, flexible
R-6450	Shield - Electrolytic cond.
R-7615-A	Shield - Coil
R-10011-A	Shield - Power Transf.
R-8366	Socket - 4 Prong
R-8367	Socket - 5 prong
R-8368	Socket - 6 prong
R-8369	Socket - 7 prong
R-10009	Socket - Vibrator
S-9969	Speaker - 6" Magnetic
R-10028-A	Transformer - IF input
R-10029	Transformer - IF output
R-10010	Transformer - Power
R-10008	Tubes - Rubber, vibrator mounting
R-10014	Vibrator
R-10007	Washer - Rubber vibrator mounting



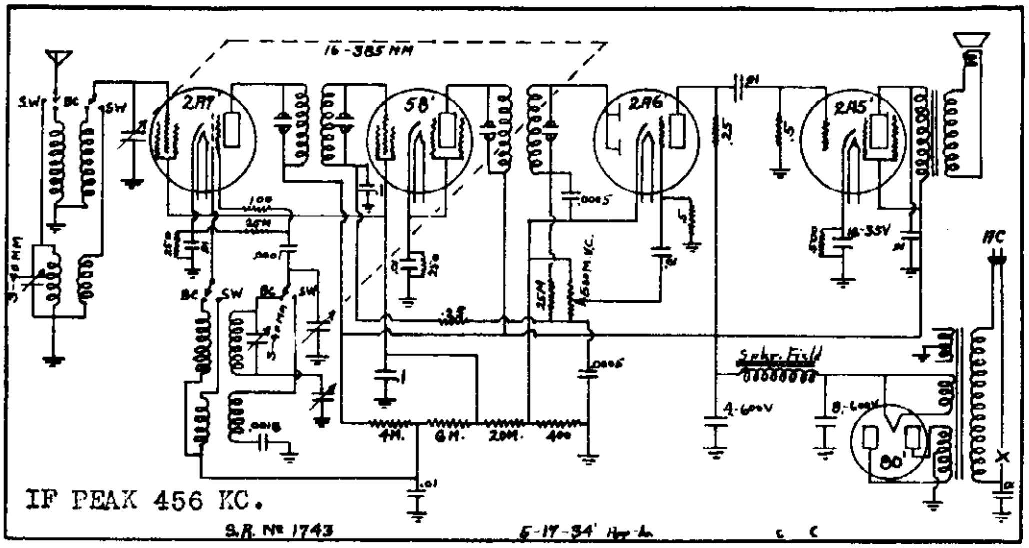


TUBE	PLATE VOLTS	SCREEN VOLTS	PLATE M.A.	SCREEN M.A.
78 IF	170	90	8	2
6B7 AVC-Det-AF	50*	10*	0.8	0.2
38 Output	170	170	6	1
6A7 Osc-Transl.	Ep=170v. Eg2=170v. Eg3&5=4.5 ma. Ip=4.5 ma. Ig2=3 ma. Ig3&5=2.75 ma.			
1V Rectifier	25 ma.			

* Indicates high value of series resistance

SEARS-ROEBUCK & CO.

MODEL 1743
Schematic
Alignment, Parts



GENERAL INFORMATION

Silvertone Model 1743A is a set so designed to get maximum efficiency from five tubes, and minimum trouble.

Model 1743A is a superheterodyne operating from 105-120 volts AC - 60 cycles only- Also furnished for 25 cycle.

This set covers from 1720 KC to 540 KC regular broadcast including 1712 KC police and 15 - 55 meters short wave which covers major foreign stations.

The circuit uses 1-2A7 1st detector and oscillator; 1-58 IF; 1-2A6 second detector and first audio; 1-2A5 power output and 1-80 rectifier

To align receiver proceed as follows:

1. Peak the two IF transformers, applying a 456 note at the 2A7 grid.
2. Turn variable condenser wide open, peaking oscillator stage at 1712 KC- then peak RF and antenna stage.
3. Adjust low frequency with gang tuned to 600 KC, to maximum peak.
4. Go back and check trimmers on gang condenser at 1400 KC.

PARTS LIST-MODEL 1743A

No.	
450	Dynamic Speaker
451	Variable condenser
452	Volume control w/switch
453	Short wave switch
454	Airplane Dial complete
455	Power Transformer
456	Set of coils-complete
456a	RFE Antenna coil-S.W.
456b	RFE Oscillator "
456c	RF Antenna BC
457D	456 KC IF units
156	8&4 mfd condenser
307	10 mfd 25v electrolytic
308	Terminal strip - 5 lug
310	.0018 Mica condenser
309	.01 mfd 800v cond. in can
108	Padder condenser 7 plate
158	Power cord & plug
	Any tube socket (state no.of prongs)
	Any resistor (state ohms & watts)
	Any by pass-not listed above(state capacity)

MODEL 1760 (Type 1)
Schematic

SEARS-ROEBUCK & CO.

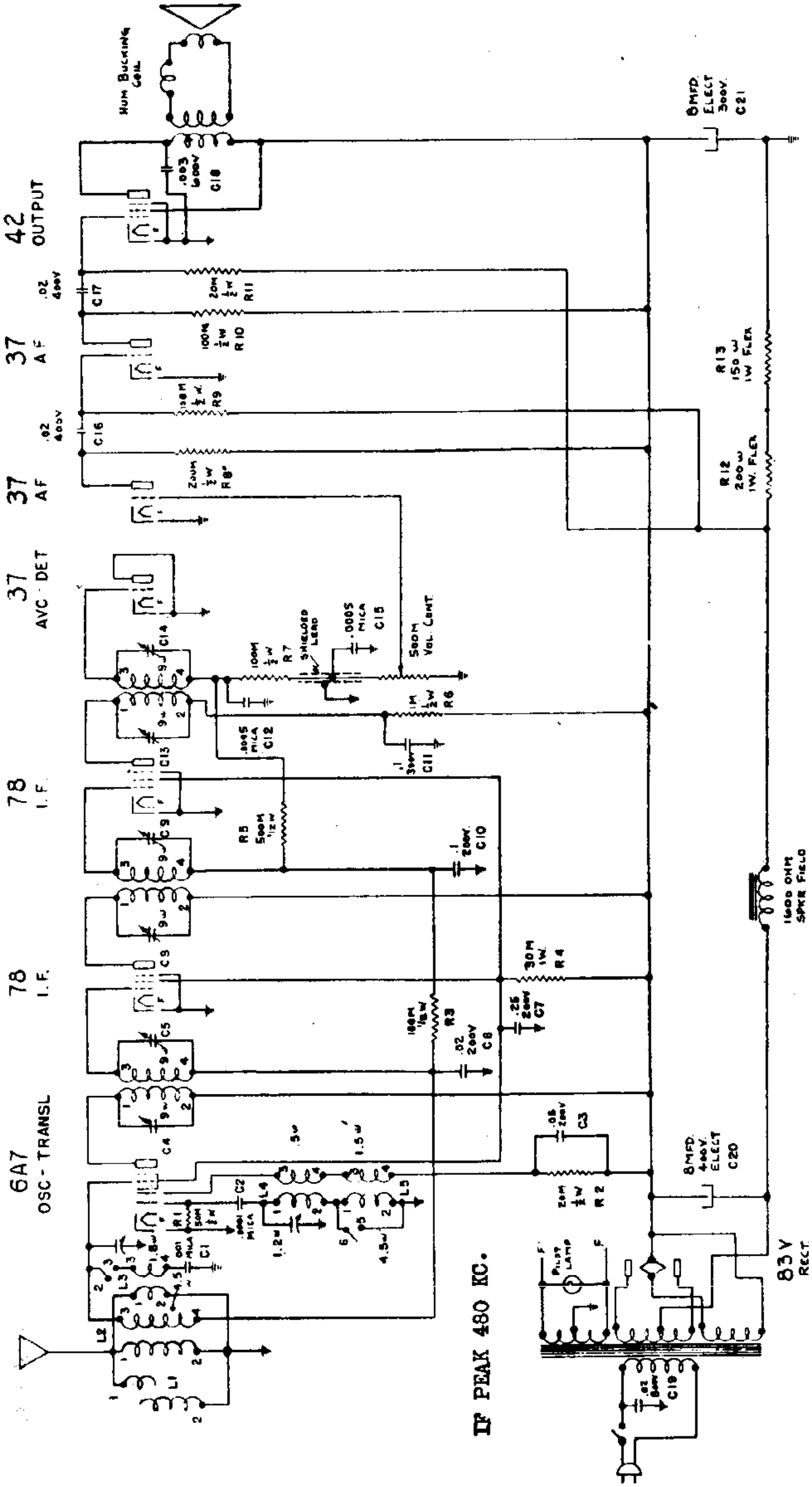


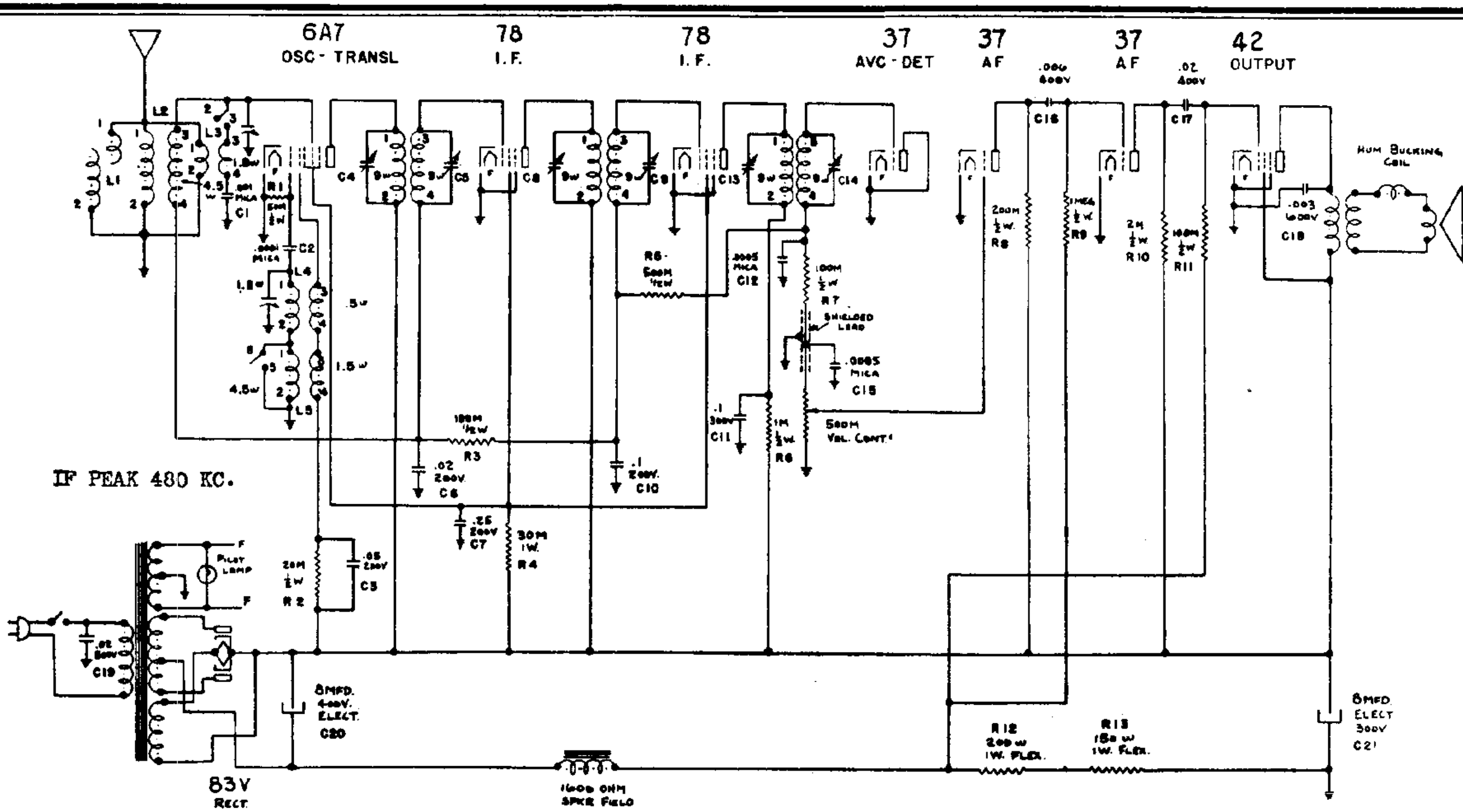
FIG. 2.

For Voltage Data for both types, see next page

Chassis using this circuit are rubber-stamped 206. If trouble from hum be encountered in this type chassis, it can be converted to the other circuit by changing C-16, R-9, R-10 and R-11.

MODEL 1760 (Type 2)
Schematic
Voltage

SEARS-ROEBUCK & CO.

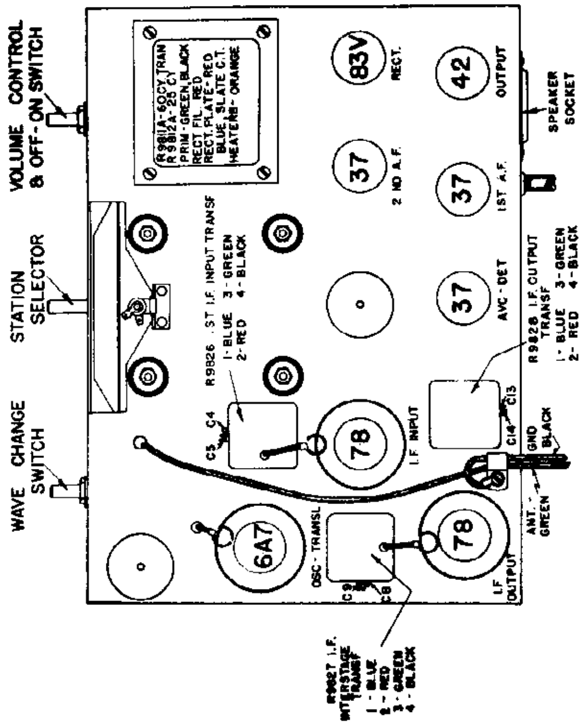


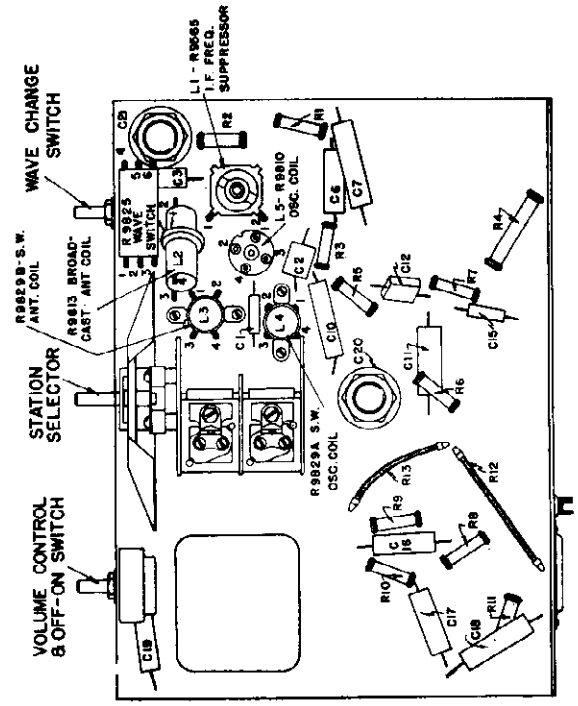
Chassis using this circuit are rubber-stamped 206A or 206B FIG. 3

TUBE		PLATE VOLTS	SCREEN VOLTS	PLATE M.A.	SCREEN M.A.
78	1st IF	245	100	6.5	2
78	2nd IF	240	100	6.5	2
37	1st AF	20		1.25	
37	2nd AF	235		3.5	
42	Output	235	245	23.0	6
6A7	Osc-Transl.	Ep=245v Eg2=175v Eg3&5=80v. Ip=4.25ma Ig2=2.5ma. Ig3&5=1.75ma.			
83V	Rectifier	Max.D-C=360v. Plate current=29ma per plate			

MODEL 1760
Socket Layout
Chassis
Parts List

SEARS-ROEBUCK & CO.



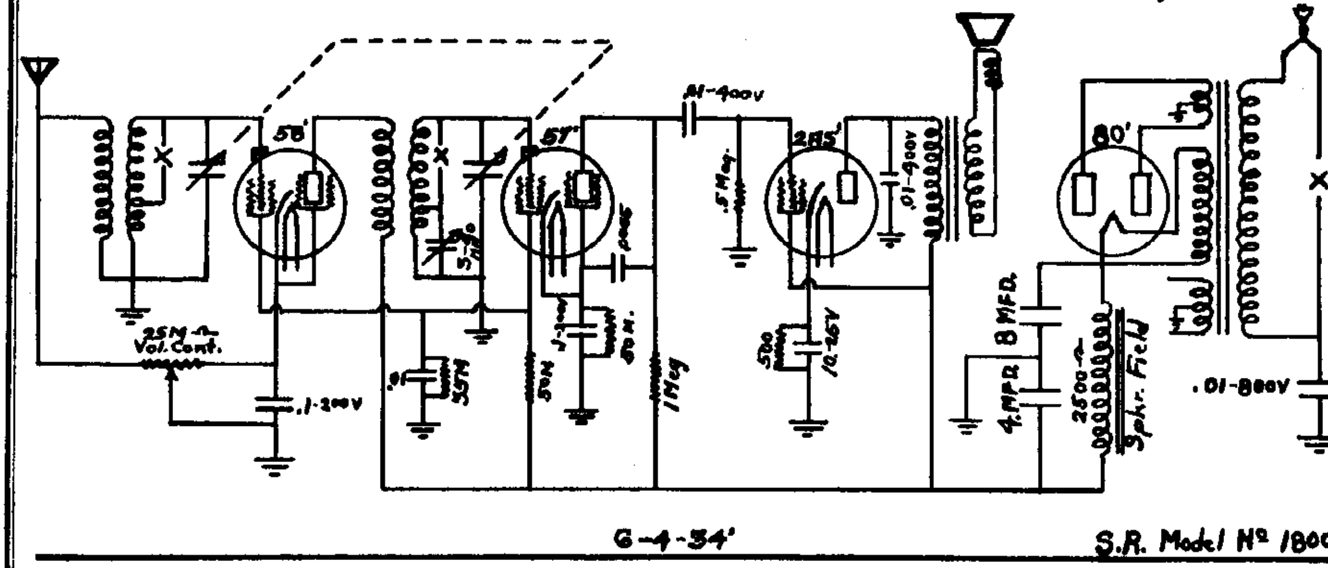


PART NO.	DESCRIPTION
R-8297A	Board - Terminal, double
R-8308A	Board - Terminal, triple
R-9832	Card - Operating
R-4715	Clamp - Ant. & Gnd. leads
R-6381	Clip - Grid
R-6381M	Clip - Grid with 7" lead
R-9810	Coil - Oscillator
R-9829A	Coil - Oscillator, short wave
R-9813	Coil - Antenna
R-9829B	Coil - Antenna, short wave
R-9565	Coil - Ant. Wave trap
R-9816	Condenser - Variable
R-9816A	Condenser - Variable with Drive and Dial Assembly
B-4758P	Condenser - 8 mfd. electrolytic
R-9817	Condenser - .25 mfd. 200v.
R-6444	Condenser - .1 mfd. 200v.
R-6138	Condenser - .1 mfd. 300v.
R-7354	Condenser - .05 mfd. 200v.
R-9899	Condenser - .02 mfd. 800v.
R-9818	Condenser - .02 mfd. 400v.
R-6629	Condenser - .02 mfd. 200v.
R-7244	Condenser - .006 mfd. 600v.
R-6571	Control - Volume
R-6989	Cord - Power Supply
R-9819A	Dial and Indicator
R-8889	Escutcheon
R-9831	Instructions
R-8893	Knob - Large
R-8896	Knob - Medium
R-2288	Lamp - Pilot
R-5346B	Lead - Antenna
R-5345D	Lead - Ground
R-5823	Resistor - 1 megohm, 1/2 watt carbon
R-6179	Resistor - 500M ohms, 1/2 watt carbon
R-5830	Resistor - 200M ohms, 1/2 watt carbon
R-5819	Resistor - 100M ohms, 1/2 watt carbon
R-6445	Resistor - 50M ohms, 1/2 watt carbon

PART NO.	DESCRIPTION
S-9814	Speaker - 8", 1600 ohm
S-7776B	Speaker - Cone & Voice Coil
S-9846	Speaker - field coil
S-7893	Speaker - hum bucking coil
S9840A	Speaker - Transformer
R-7414	Speaker - plug, 4 prong
R-9825	Switch - Wave
R-9826	Transformer - IF input
R-9827	Transformer - Interstage
R-9828	Transformer - IF output
R-9811A	Transformer - 60 cycle power
R-9812A	Transformer - 25 cycle power
R-6689	Resistor - 30M ohms, 1 watt
R-5821	Resistor - 20M ohms, 1/2 watt
R-6073	Resistor - 2M ohms, 1/2 watt
R-6154	Resistor - 1M ohms, 1/2 watt
R-9822	Resistor - 200 ohms, flexible
R-9823	Resistor - 150 ohms, flexible
R-6652A	Shaft assembly
R-6450	Shield - Electrolytic
R-6749	Shield - Tube, top
R-8366	Socket - 4 prong
R-8367	Socket - 5 prong
R-8368	Socket - 6 prong
R-8369	Socket - 7 prong

SEARS-ROEBUCK & CO.

MODEL 1800
Schematic
Notes, Parts List



GENERAL INFORMATION

This set is designed to operate on 105 to 120 volts AC - 50-60 cycles - also furnished in 25 cycles.

The circuit is of the conventional TRF type, covering the regular broadcast band including police, and short wave from 70 to 200 meters.

An antenna approximately 40' long outside is recommended, but very good results may be obtained with 20' to 25' inside.

Below are listed a few suggestions as to service -

A - to align set, proceed as follows-

1- Tune gang condenser way open and turn compensator adjustment screws to maximum noise level or loudest police signal - 1712 KC.

2- Check again with condenser tuned to 1400 KC.

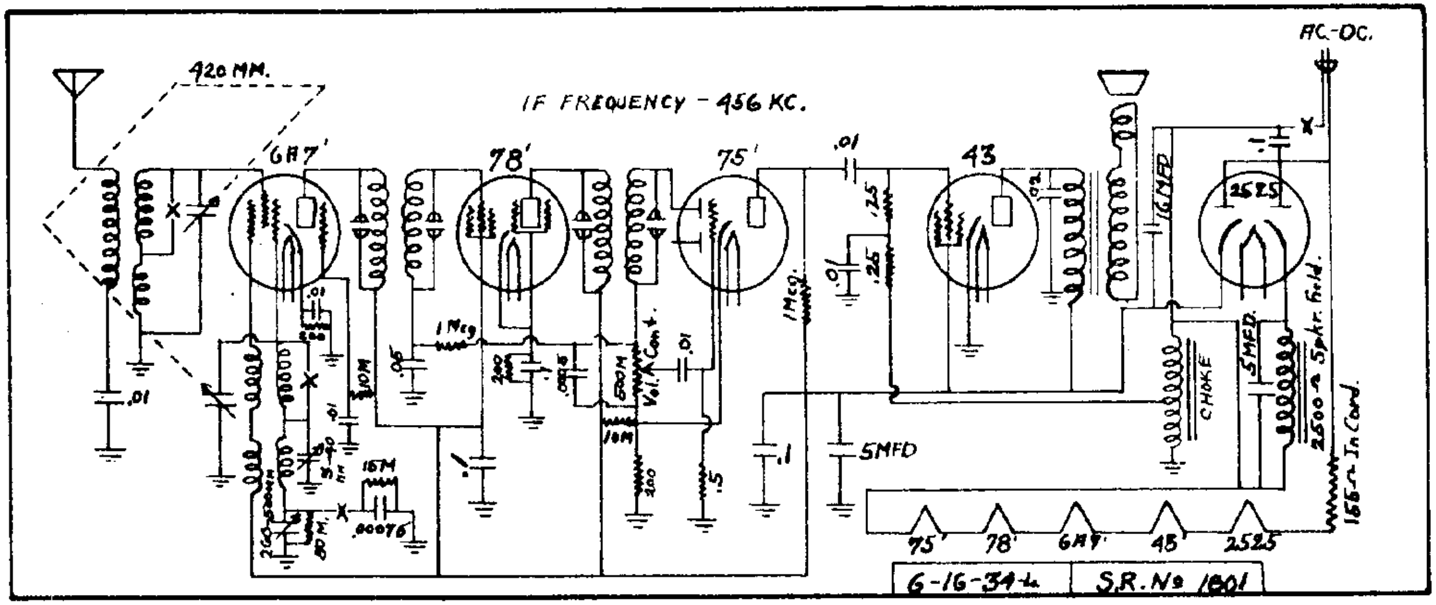
3- Short Wave - open variable condenser about half way and tune small padder condenser to maximum noise level-rocking variable condenser across midpoint while doing so.

PARTS LIST - S.R.#1800

No.	
73	Terminal strip -3 lug
105	Volume control
152	Dynamic Speaker
153	Variable condenser-2 gang
154	Power transformer
155	Dial scale unit
156	8&4 mfd electrolytic cond.
158	Power cord and plug
159	Knobs
160	Escutcheon plates
165	Set of coils complete
165a	Antenna coil
165b	Interstage coil
307	10 mfd-25v electrolytic
312	4 pole 2 position short wave switch
	Any tube socket (state no. of prongs)
	Any resistor (state ohms & watts)
	Any bypass condenser (state capacity)

MODEL 1801
Schematic
Alignment
Parts List

SEARS-ROEBUCK & CO.



GENERAL INFORMATION

This set is a superheterodyne designed to operate on AC - DC - 110 volts, 25 to 60 cycles.

To operate, unreel antenna and lay along floor or drop cut of window. Turn volume control all the way up and tune in signals. If set does not start operating in two minutes, reverse the plug in wall receptacle.

To rebalance set, proceed as follows:

1 - Align IF transformers at 456 KC, applying 456 note at 6A7 control grid.

2 - Turn variable condenser all the way open - adjust compensators on variable condenser to 1712 KC.

3 - Tune to some weak signal about 1400 KC and readjust the Detector Section only.

4 - Tune set to some signal at 600 KC and while rocking condenser across 600 KC signal, adjust the BC low frequency padder.

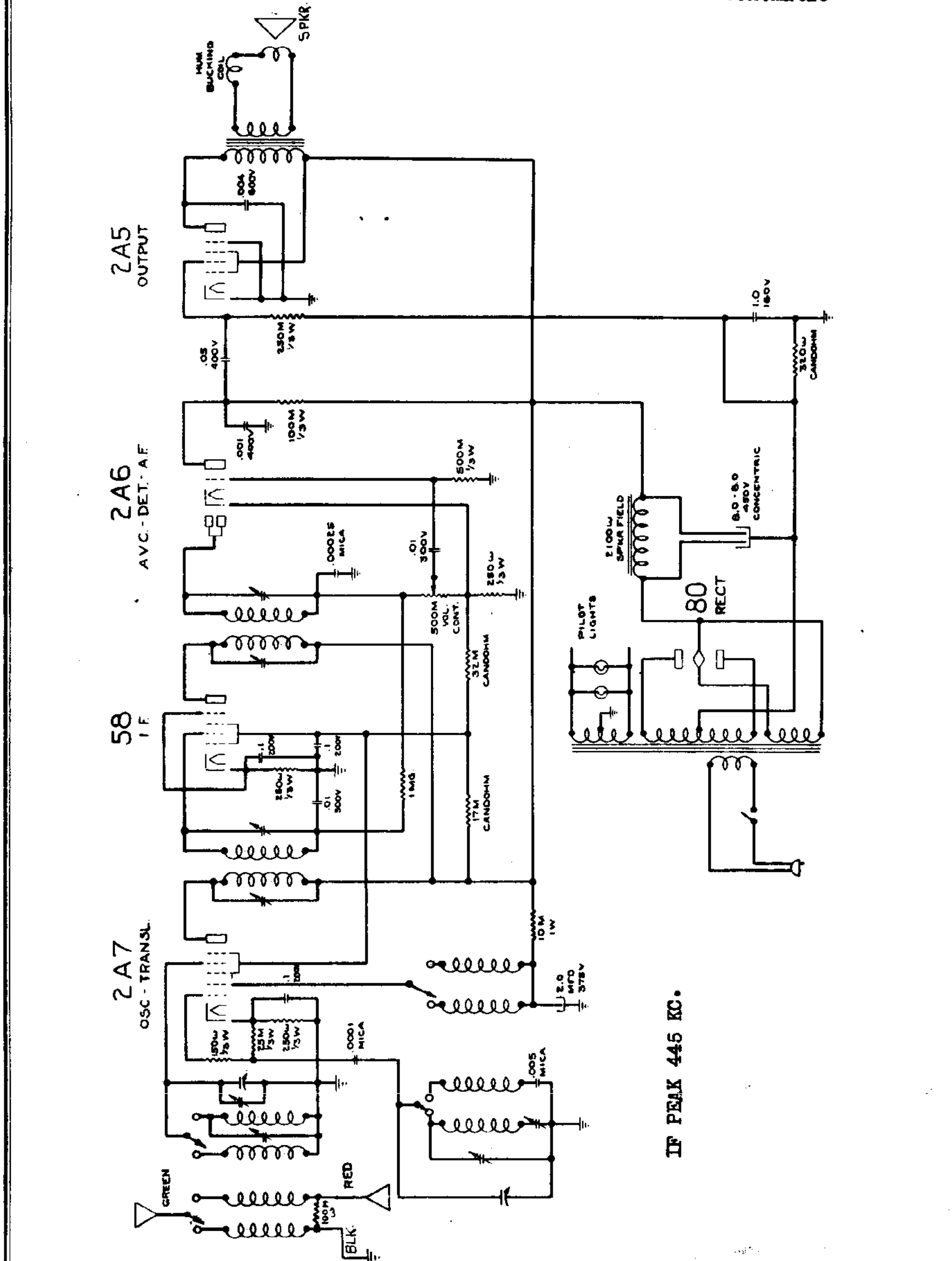
To rebalance Short Wave - tune to some signal about center of dial and while rocking variable condenser back and forth adjust 3-40 mm condenser to loudest peak.

PARTS LIST - S.R.# 1801

No.	
52	Variable condenser-2 gang
61	Antenna cord
74	Terminal strip- 7 lug
101	Dynamic speaker
103	Choke
104	155 ohm Cordohm
106	Electrolytic condenser
108	Padder condenser
256	500 ohm Volume control
312	4 Pole 2 position short wave switch
350	Set of coils - complete

SEARS-ROEBUCK & CO.

MODEL 1802-A, 1803-A, 1807
Schematic



MODEL 1802-A, 1803-A, 1807
SEARS-ROEBUCK & CO.
Voltage, Alignment, Socket Layout

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low voltage scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 58 IF tube. Leave the clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 2A7 and tune the IF input transformer.

6. Repeat the adjustments in order to secure greater accuracy. Always use as low an output as possible from the test oscillator, in order to render the AVC action of the receiver inoperative.

RF Alignment (Broadcast):

1. Screw the padding condenser to about three quarters of its maximum capacity.

2. Set the test oscillator to 1750 kc and couple its output to the green antenna lead of the receiver.

3. Open the variable condenser plates all the way and adjust the broadcast oscillator coil trimmer for maximum output meter reading.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output. The translator section is the one nearer the dial, as shown in the Service Illustration.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padding condenser for maximum output.

6. Repeat the 1750 kc and 1400 kc adjustments. Always use a low enough output from the test oscillator to render the AVC ineffective.

Short Wave Alignment:

1. Leave the test oscillator loosely coupled to the green antenna lead as for broadcast alignment.

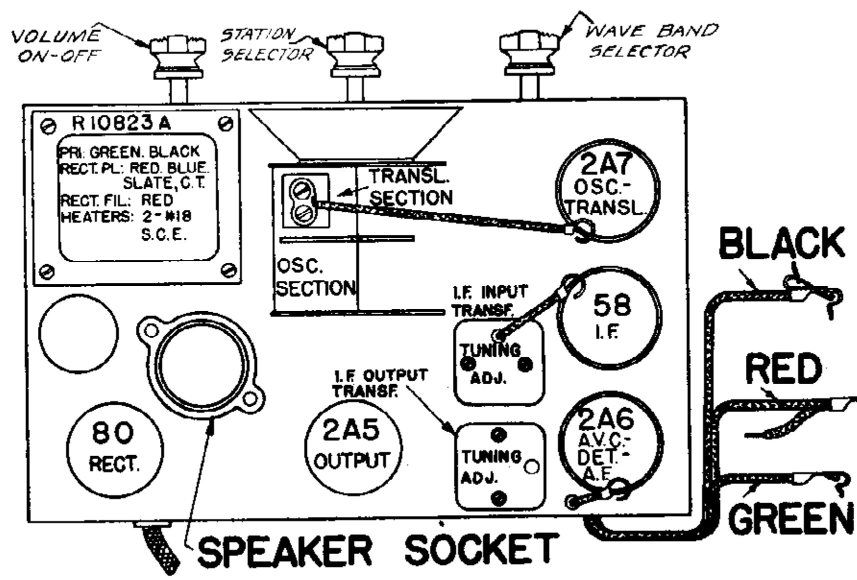
2. Set the test oscillator to 16000 kc. Its signal should be heard when the variable condenser plates are all the way out. If the test oscillator cannot be tuned in, the grid and plate wires to the short wave oscillator coil and to the oscillator socket should be moved as far away as possible from the metal of the chassis to reduce distributed capacity.

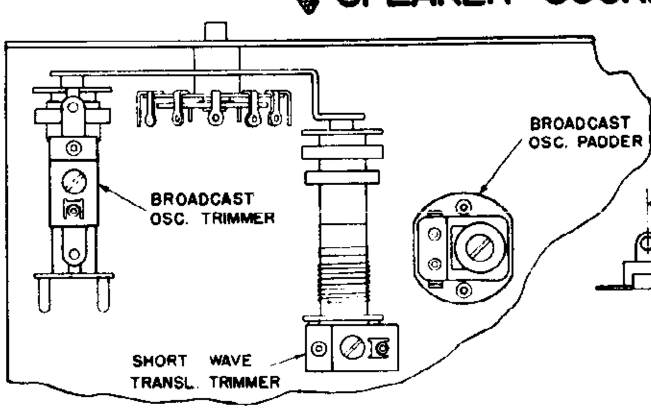
3. Set the test oscillator to 14000 kc and tune in its signal. Then adjust the short wave translator trimmer for maximum output.

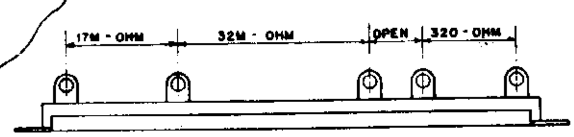
TUBE VOLTAGE CHART

All readings should be taken between the chassis and the respective element of each tube.

TUBE	PLATE	SCREEN	OSC. SECTION PLATE
2A7 - Osc-Transl	- 195	90	155
58 - IF	- 195	90	
2A6 - AVC-Det-AF	- 115		
2A5 - Output	- 185	195	



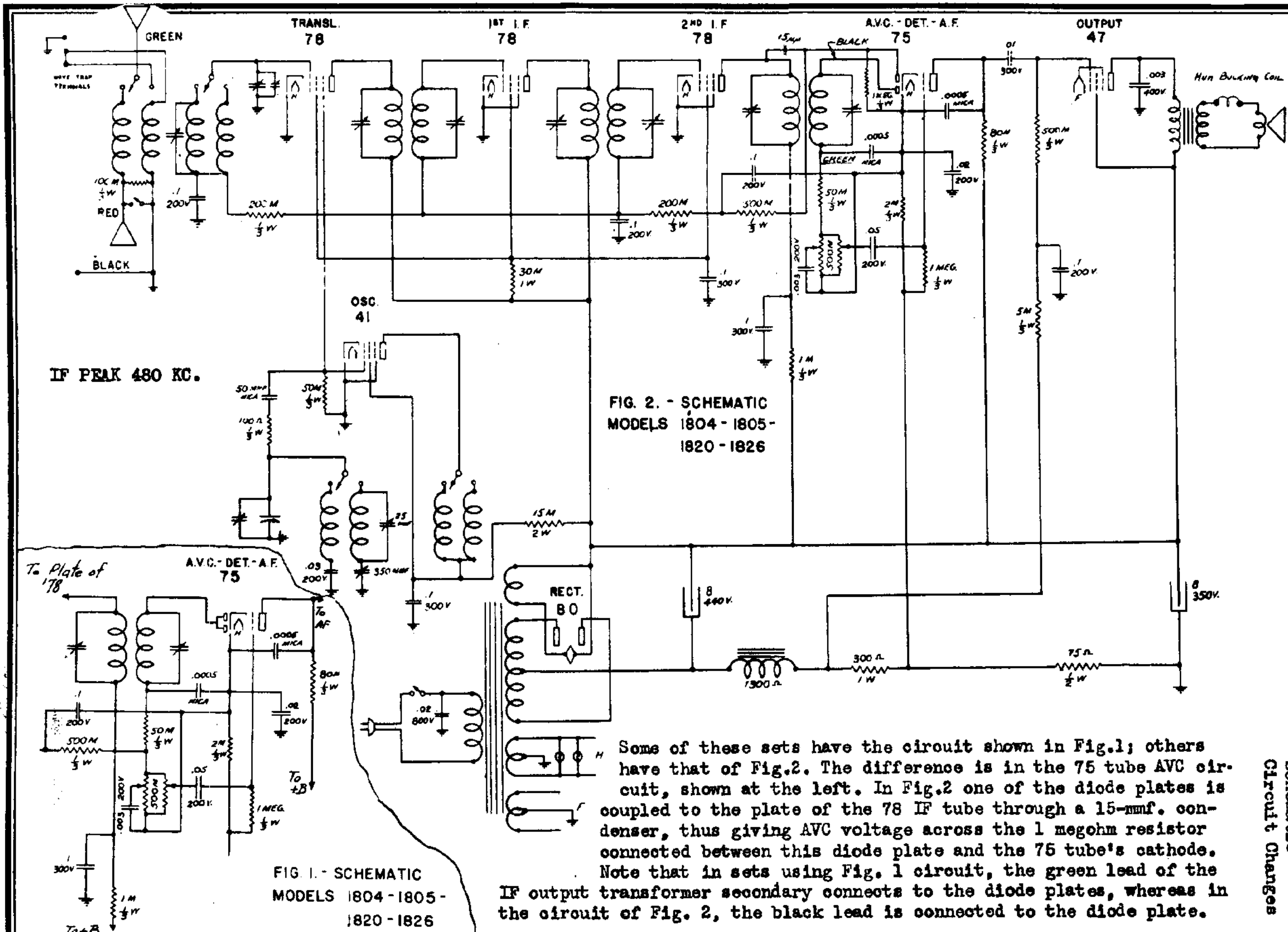




R 10861
CANDOHM RESISTOR

MODEL 1804, 1805, 1820, 1826
Schematic
Circuit Changes

SEARS-ROEBUCK & CO.



IF PEAK 480 KC.

FIG. 2. - SCHEMATIC
MODELS 1804-1805-
1820-1826

FIG. 1. - SCHEMATIC
MODELS 1804-1805-
1820-1826

Some of these sets have the circuit shown in Fig.1; others have that of Fig.2. The difference is in the 75 tube AVC circuit, shown at the left. In Fig.2 one of the diode plates is coupled to the plate of the 78 IF tube through a 15-mmf. condenser, thus giving AVC voltage across the 1 megohm resistor connected between this diode plate and the 75 tube's cathode. Note that in sets using Fig. 1 circuit, the green lead of the IF output transformer secondary connects to the diode plates, whereas in the circuit of Fig. 2, the black lead is connected to the diode plate.

MODEL 1804, 1805, 1820, 1826

SEARS-ROEBUCK & CO.

Wavetrap Data, Voltage Alignment, Socket Layout Parts List

WAVE TRAP CONNECTIONS

In locations near the coast where code interference from ship stations may be experienced, a wave trap can be added. (Part #R11099.)

Some of the receivers have the terminal board shown in Fig. 3 mounted at the rear of the chassis. The wave trap, which may be mounted on the side of the cabinet, should be connected as shown in Fig. 3. In receivers not having this terminal board provided, the wave trap may be added as follows:

1. Unsolder both ends of the green wire which runs from the Wave Switch to one of the lugs on the broadcast antenna coil.

2. Solder the yellow wire of the wave trap to the switch lug in place of the original green wire.

3. Connect the blue wire of the wave trap to the lug of the broadcast antenna coil in place of the original green wire.

4. Connect the white wire of the wave trap to the chassis.

To adjust the wave trap, proceed as follows:

1. With the wave switch in the broadcast position, fully mesh the variable condenser plates.

2. If the interfering signal can be picked up, adjust the two tuning condensers of the wave trap until the interfering signal disappears.

3. If the frequency of the interfering signal is known, the adjustment can be made more quickly and accurately by means of a test oscillator. Set the oscillator to the interfering frequency and couple its output to the antenna lead. The oscillator should be adjusted to give high output. Then adjust the wave trap until the oscillator signal disappears. Usually the frequency of the interfering signal is very close to 500 kc and this frequency should be used if the interference is not heard at the time of the service call.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the low! speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator through a .1 mfd. condenser to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connection to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

RF Alignment (Broadcast):

1. Set the test oscillator to 1785 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. This trimmer condenser is mounted on the terminal board of the broadcast oscillator coil, as shown in the Service Illustrations.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustrations.

5. Repeat the adjustment of the oscillator trimmer at 1785 kilocycles.

6. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the antenna section of the variable condenser for maximum output. In some of the receivers this trimmer has been removed from the variable condenser, in which case this step in the alignment procedure may be omitted.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.

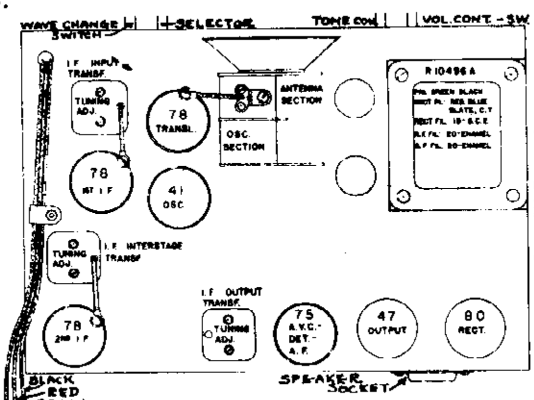
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.

3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave antenna coil to secure accurate alignment on this frequency. Should it become necessary to shift turns, the translator trimmer will have to be readjusted at 16 megacycles after the turns have been shifted.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE VOLTAGE	SCREEN VOLTAGE
78 - Translator	-	270	110
41 - Oscillator	-	100	100
78 - First IF	-	270	110
78 - Second IF	-	260	110
75 - AVC-Det-AF	-	188	
47 - Output	-	260	270



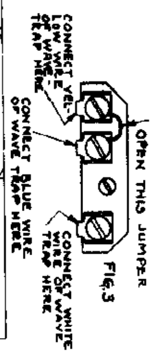
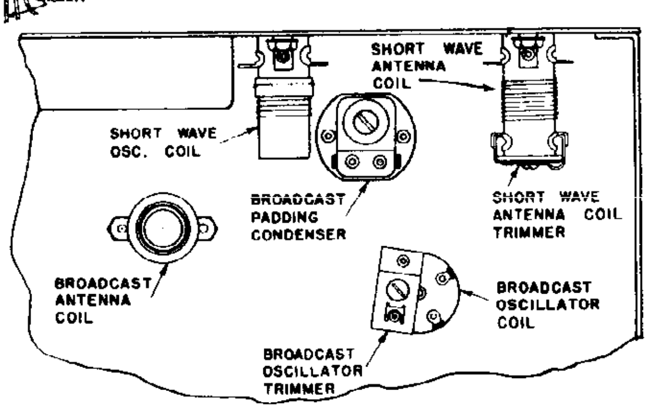


FIG. 3

R10446	Coil - Antenna
R10599	Coil - Oscillator
R9829F	Coil - Antenna, short wave
R9829E	Coil - Oscillator, short wave
R10453	Condenser - Variable
R10453A	Condenser - Variable, complete with drive assembly and dial for models 1820 and 1826
R10453B	Condenser - Variable, complete with drive assembly and dial for models 1804 and 1806
D4758P	Condenser - Electrolytic, 8 mfd.
R8488	Condenser - Electrolytic, 8 mfd.
R10197	Condenser - Trimmer, 25 mmf.
R9975	Condenser - Padding, 350 mmf.
R6138	Condenser - .1 mfd. 300 volts
R6444	Condenser - .1 mfd. 200 volts
R7354	Condenser - .06 mfd. 200 volts
R6630	Condenser - .03 mfd. 200 volts
R6629	Condenser - .02 mfd. 200 volts
R10456	Condenser - .02 mfd. 800 volts in metal case
R6462	Condenser - .01 mfd. 300 volts
R10478	Condenser - .003 mfd. 400 volts
R10495	Condenser - .003 mfd. 200 volts
R6760	Condenser - .0005 mfd. mica
R8621	Condenser - .00006 mfd. mica
R10457	Control - Tone, 500 M ohms
R10458	Control - Volume, 500 M ohms
R7585	Resistor - 1 megohm, 1/3 watt carbon
R7228	Resistor - 500 M ohm, 1/3 watt carbon
R6638	Resistor - 200 M ohm, 1/3 watt carbon
R7586	Resistor - 100 M ohm, 1/3 watt carbon
R10920	Resistor - 80 M ohm, 1/3 watt carbon
R6637	Resistor - 50 M ohm, 1/3 watt carbon
R6689	Resistor - 30 M ohm, 1 watt carbon
R7684	Resistor - 15 M ohm, 2 watt carbon
R7226	Resistor - 5 M ohm, 1/3 watt carbon
R6634	Resistor - 2 M ohm, 1/3 watt carbon
R6636	Resistor - 1 M ohm, 1/3 watt carbon
R9533	Resistor - 300 ohms, 1 watt carbon
R8922	Resistor - 100 ohms, 1/3 watt carbon
R10500	Resistor - 75 ohms, 1/2 watt carbon
S10566	Speaker - Model 1804
S10509	Speaker - Model 1805, 1820, 1826
R10467	Switch - Wave
R10501B	Transformer - IF input
R10469B	Transformer - IF interstage
R10470A	Transformer - IF output
R10496A	Transformer - Power, 60 cycle
R10497A	Transformer - Power, 25 cycle

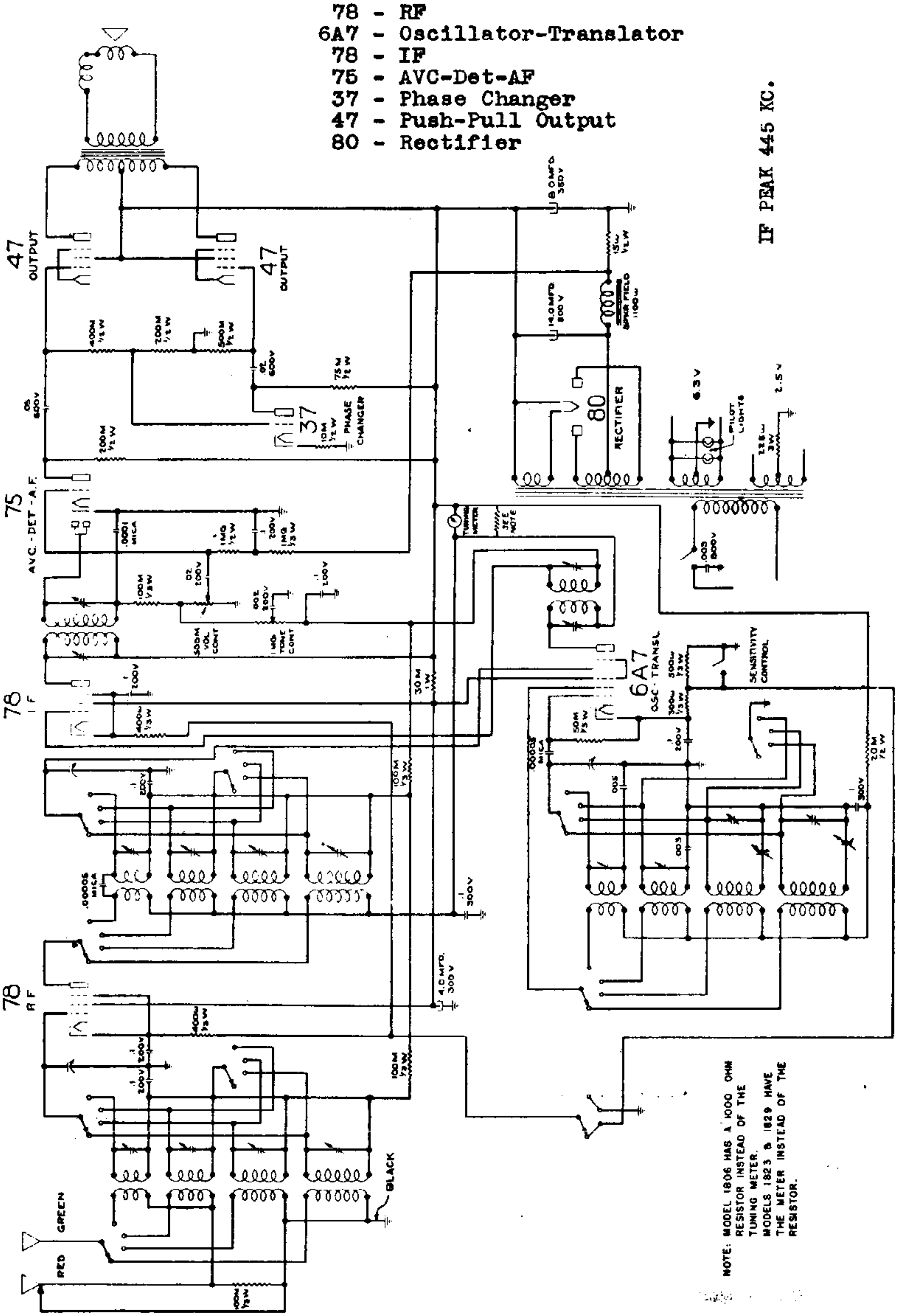


MODEL 1806,1823,1829
Schematic

SEARS-ROEBUCK & CO.

78 - RF
6A7 - Oscillator-Translator
78 - IF
75 - AVC-Det-AF
37 - Phase Changer
47 - Push-Pull Output
80 - Rectifier

IF PEAK 445 KC.



NOTE: MODEL 1806 HAS A 1000 OHM RESISTOR INSTEAD OF THE TUNING METER. MODELS 1823 & 1829 HAVE THE METER INSTEAD OF THE RESISTOR.

MODEL 1806,1823,1829
Alignment, Voltage
Socket Layout

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 6A7 tube and tune the IF input transformer.

6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment; #1 Band (Broadcast):

1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1520 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 translator trimmer for maximum output.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator padder for maximum output.

6. Repeat the 1520 kc and 1400 kc adjustments for greater accuracy.

#2 Band:

1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.

2. Set the test oscillator to 4250 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.

4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 translator trimmer for maximum output.

5. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #2 oscillator padder for maximum output.

6. Repeat the 4250 kc and 4000 kc adjustments for greater accuracy.

#3 Band:

1. Set the test oscillator to 10 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #3 oscillator trimmer for maximum output. As shown in the Service Illustrations, this trimmer is mounted inside of its coil, under the chassis.

3. Set the test oscillator to 9 megacycles and tune in its signal. Then adjust the #3 antenna trimmer and the #3 translator trimmer for maximum output.

4. Set the test oscillator to 4.6 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, since they will have been affected by shifting of the turns.

#4 Band:

1. Set the test oscillator to 19 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.

3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 translator trimmer for maximum output.

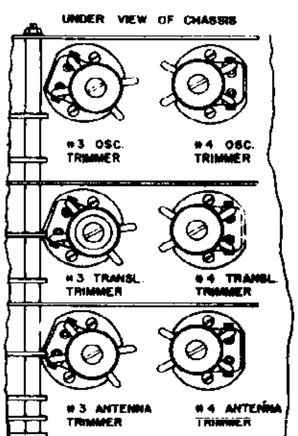
4. Set the test oscillator to 9 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

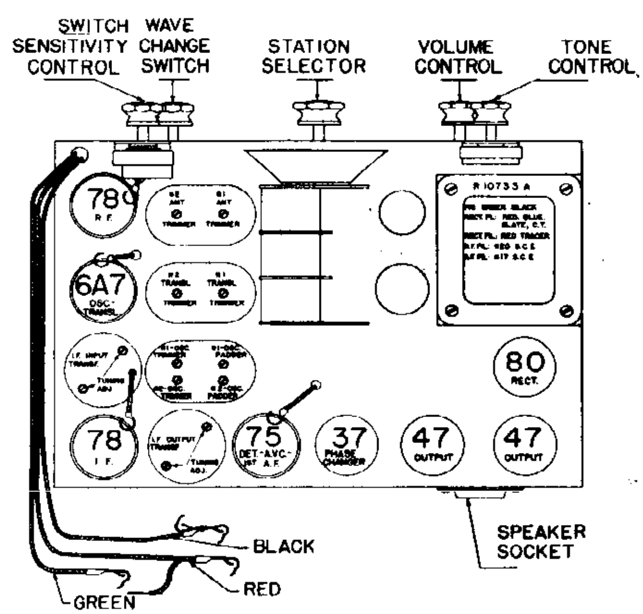
5. If turns have been shifted, repeat the 19 megacycle and 18 megacycle adjustments since they will have been affected by shifting of the turns.

TUBE VOLTAGE CHART

TUBE		PLATE	SCREEN	OSC.SECTION PLATE	CATHODE
78 - RF	-	220	90		3.1
6A7 - Osc-Transl	-	220	90	160	2.6
78 - IF	-	235	90		3
75 - AVC-Det-AF	-	75			0
37 - Phase Changer	-	125			9
47 - Output	-	230	235		16

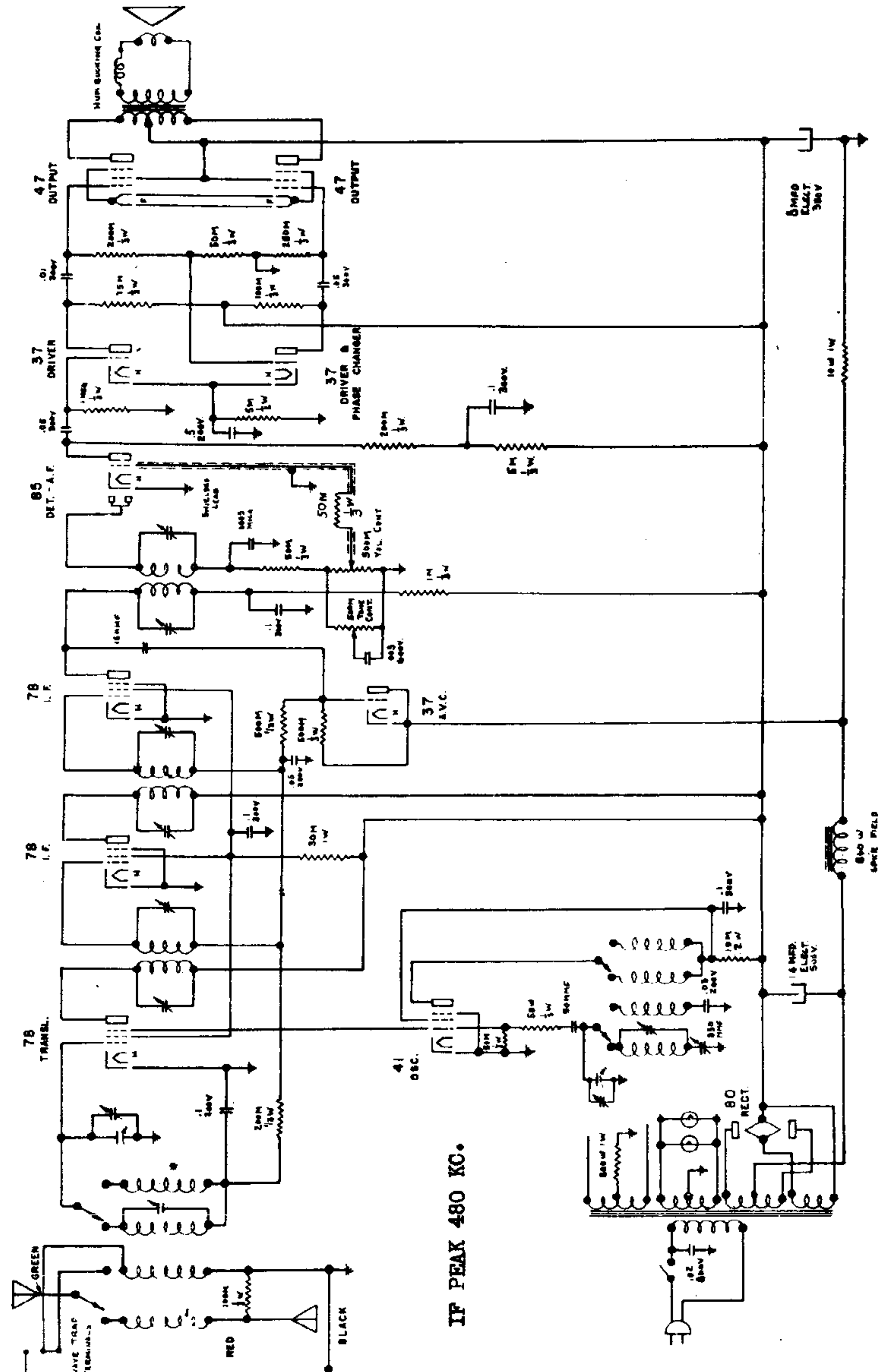
All readings are to be taken between the chassis and the respective element of each tube.





SEARS-ROEBUCK & CO.

MODEL 1821,1827
Schematic



SCHEMATIC - MODELS 1821 - 1827

MODEL 1821,1827
Alignment,Voltage
Socket,Parts List

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator through a .1 mfd. condenser to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 460 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connection to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

RF Alignment (Broadcast):

1. Set the test oscillator to 1785 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. This trimmer condenser is mounted on the terminal board of the broadcast oscillator coil, as shown in the Service Illustrations.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustrations.

5. Repeat the adjustment of the oscillator trimmer at 1785 kilocycles.

6. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the antenna section of the variable condenser for maximum output. In some of the receivers this trimmer has been removed from the variable condenser, in which case this step in the alignment procedure may be omitted.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.

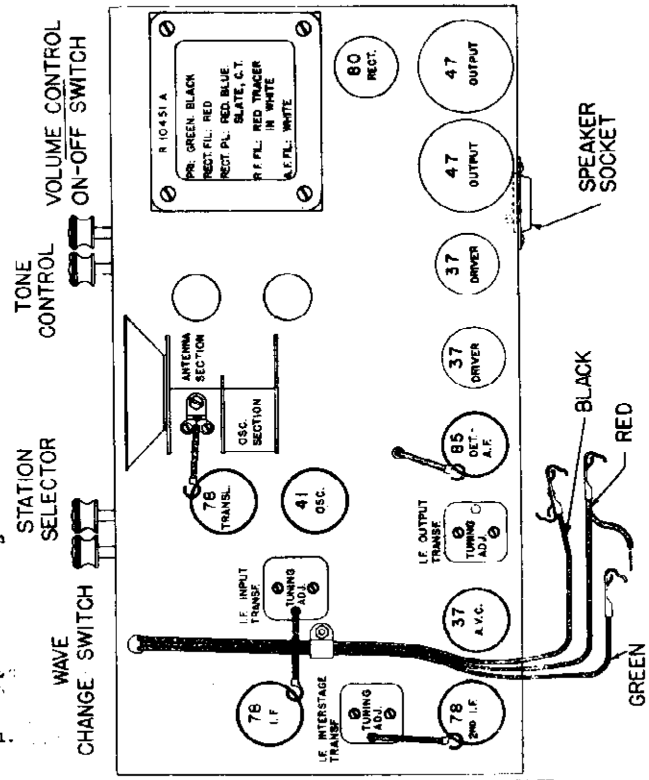
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.

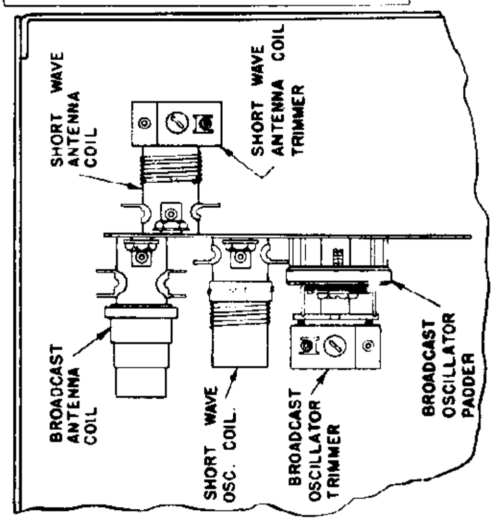
3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave antenna coil to secure accurate alignment on this frequency. Should it become necessary to shift turns, the translator trimmer will have to be readjusted at 16 megacycles after the turns have been shifted.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBES		PLATE VOLTAGE	SCREEN VOLTAGE
78 - Translator	-	245	85
41 - Oscillator	-	115	115
78 - First IF	-	245	85
78 - Second IF	-	235	85
37 - AVC	-	Used as diode with no applied DC voltage	
85 - Det-AF	-	20	
37 - Driver	-	140	
37 - Driver and Phase Changer	-	110	
47 - Output	-	240	245



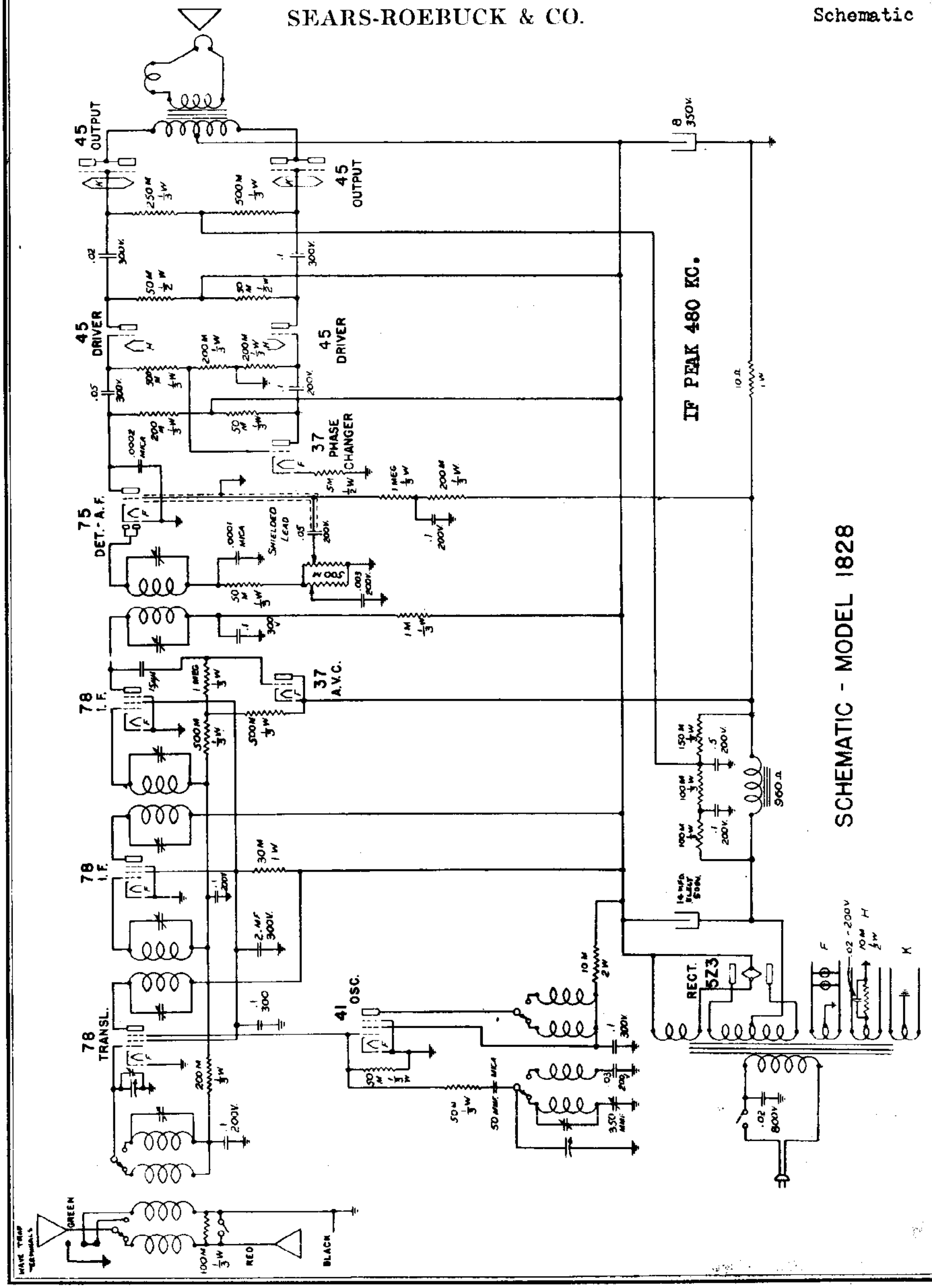


SILVERTONE - - MODELS 1821, 1827

Part No.	Description	Price per 100
R8297A	Board - Terminal, double	1.34
R8308A	Board - Terminal, triple	1.78
R9446A	Board - Terminal, 4 terminals	2.15
R10468B	Transformer - IF input	47.61
R10469B	Transformer - IF interstage	47.70
R10470A	Transformer - IF output	46.44
R10451A	Transformer - Power, 60 cycles	223.86
R10452A	Transformer - Power, 25 cycles	359.69
R10446	Coil - Antenna	15.80
R10399	Coil - Oscillator	9.29
R9829F	Coil - Antenna, short wave	25.29
R9829G	Coil - Oscillator, short wave	20.70
R10453	Condenser - Variable	81.83
R10453A	Condenser - Variable with dial and drive assembly	170.49
R7236	Condenser - Electrolytic, 14 mfd.	40.63
R8488	Condenser - Electrolytic, 8 mfd.	28.00
R10197	Condenser - Trimmer, 25 mmf.	3.59
R9975	Condenser - Padding, 350 mmf.	10.55
R6451	Condenser - .5 mfd. 200 volts	10.24
R6138	Condenser - .1 mfd. 300 volts	10.95
R6444	Condenser - .1 mfd. 200 volts	5.74
R7957	Condenser - .05 mfd. 300 volts	4.74
R7354	Condenser - .05 mfd. 200 volts	4.65
R6630	Condenser - .03 mfd. 200 volts	4.49
R10456	Condenser - .02 mfd. 600 volts	5.81
R6462	Condenser - .01 mfd. 300 volts	4.52
R10455	Condenser - .003 mfd. 300 volts	3.44
R6760	Condenser - .0005 mfd. mica	4.56
R6621	Condenser - .00005 mfd. mica	4.60
R6042	Condenser - .000015 mfd. mica	4.56
R10457	Control - Tone, 500 M ohms	20.69
R10458	Control - Volume, 500 M ohms	26.01
R7585	Resistor - 1 megohm, 1/3 watt carbon	5.91
R7228	Resistor - 500 M ohms, 1/3 watt carbon	5.25
R7584	Resistor - 250 M ohms, 1/3 watt carbon	5.25
R6638	Resistor - 200 M ohms, 1/3 watt carbon	5.91
R7586	Resistor - 100 M ohms, 1/3 watt carbon	5.91
R10464	Resistor - 75 M ohms, 1/3 watt carbon	5.26
R6637	Resistor - 50 M ohms, 1/3 watt carbon	5.25
R6689	Resistor - 30 M ohms, 1 watt carbon	6.58
R10465	Resistor - 10 M ohms, 2 watt carbon	7.23
R7226	Resistor - 5 M ohms, 1/3 watt carbon	5.25
R6510	Resistor - 5 M ohms, 1/2 watt carbon	6.58
R6636	Resistor - 1 M ohms, 1/3 watt carbon	5.25
R9533	Resistor - 300 ohms, 1 watt carbon	5.91
R6632	Resistor - 50 ohms, 1/3 watt carbon	6.05
R8739	Resistor - 10 ohms, 1 watt, flexible	5.25

MODEL 1828
Schematic

SEARS-ROEBUCK & CO.



MODEL 1828
Voltage, Alignment
Socket, Parts List

SEARS-ROEBUCK & CO.

To adjust the wave trap, proceed as follows:

1. With the wave switch in the broadcast position, fully mesh the variable condenser plates.

2. If the interfering signal can be picked up, adjust the two tuning condensers of the wave trap until the interfering signal disappears.

3. If the frequency of the interfering signal is known, the adjustment can be made more quickly and accurately by means of a test oscillator. Set the oscillator to the interfering frequency and couple its output to the antenna lead. The oscillator should be adjusted to give high output. Then adjust the wave trap until the oscillator signal disappears. Usually the frequency of the interfering signal is very close to 500 kc and this frequency should be used if the interference is not heard at the time of the service call.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator through a .1 mfd. condenser to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connection to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

RF Alignment (Broadcast):

1. Set the test oscillator to 1785 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. This trimmer condenser is mounted on the terminal board of the broadcast oscillator coil, as shown in the Service Illustration.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustration.

5. Repeat the adjustment of the oscillator trimmer at 1785 kilocycles.

6. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the antenna section of the variable condenser for maximum output. In some of the receivers this trimmer has been removed from the variable condenser, in which case this step in the alignment procedure may be omitted.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.

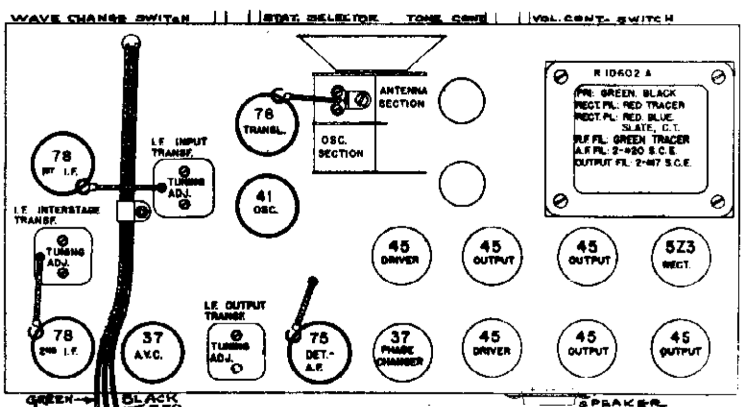
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.

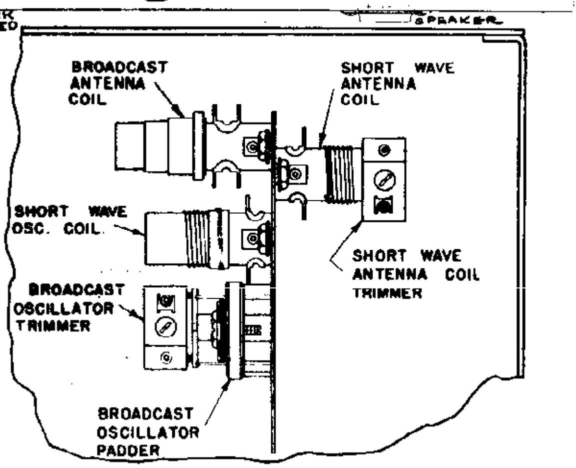
3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave antenna coil to secure accurate alignment on this frequency. Should it become necessary to shift turns, the translator trimmer will have to be readjusted at 16 megacycles after the turns have been shifted.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

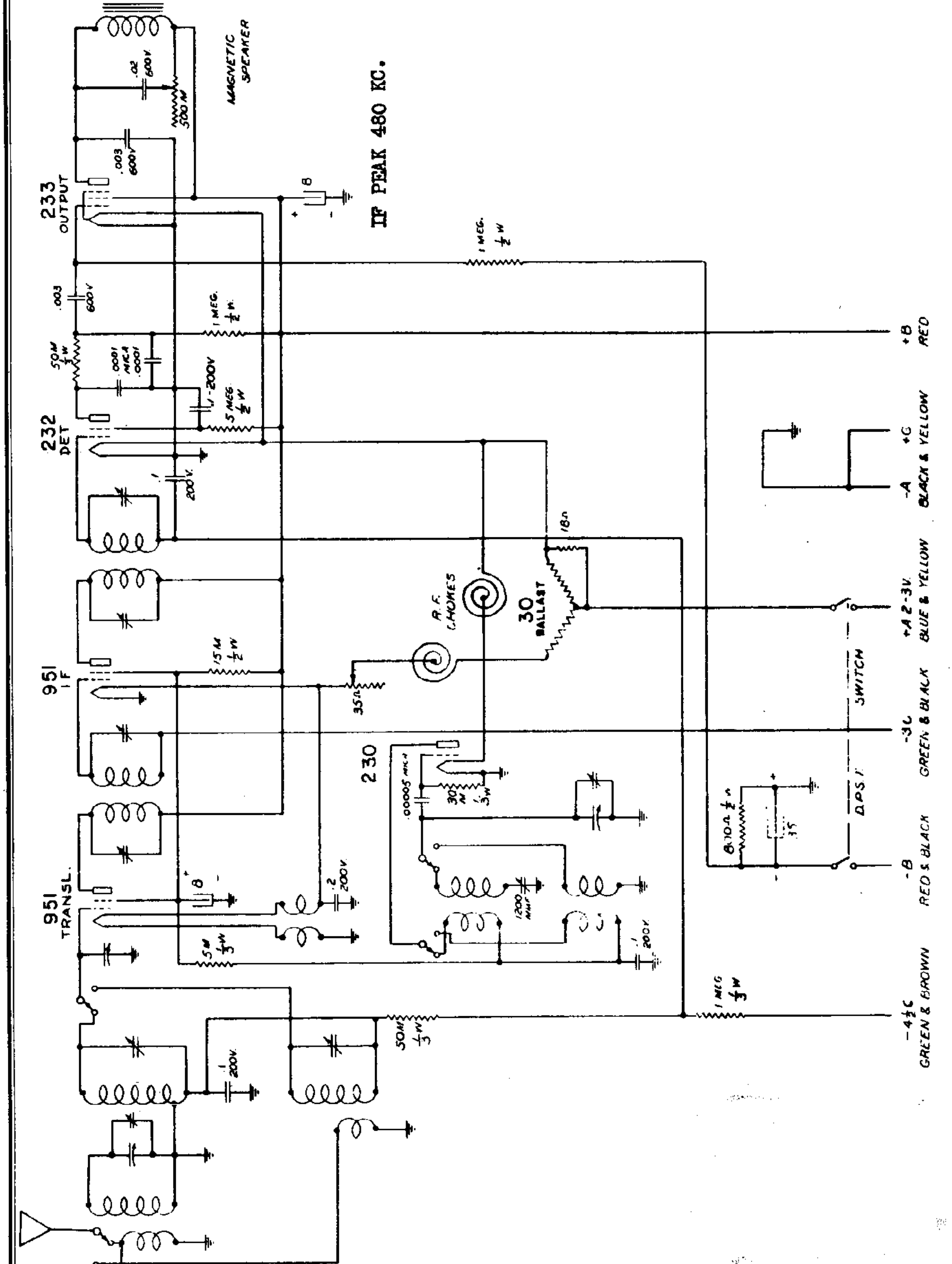
TUBE		PLATE VOLTAGE	SCREEN VOLTAGE
78 - Translator	-	255	80
41 - Oscillator	-	120	120
78 - First IF	-	255	80
78 - Second IF	-	250	80
37 - AVC	-	Used as diode with no applied DC voltage.	
75 - Det-AF	-	105	
37 - Phase Changer	-	130	
45 - Drivers	-	150	
45 - Output	-	250	





R10446	Coil - Antenna
R10399	Coil - Oscillator
R9829F	Coil - Antenna, short wave
R9829G	Coil - Oscillator, short wave
R10453	Condenser - Variable
R10453A	Condenser - Variable, with drive assembly
R7236	Condenser - Electrolytic, 14 mfd.
R8488	Condenser - Electrolytic, 8 mfd.
R10197	Condenser - Trimmer, 25 mmf.
R9975	Condenser - Padding, 350 mmf.
R8217	Condenser - Electrolytic, 2 mfd.
R6451	Condenser - .5 mfd. 200 volts
R6138	Condenser - .1 mfd. 300 volts
R6444	Condenser - .1 mfd. 200 volts
R7354	Condenser - .05 mfd. 200 volts
R7857	Condenser - .05 mfd. 300 volts
R6630	Condenser - .03 mfd. 200 volts
R6629	Condenser - .02 mfd. 200 volts
R7680	Condenser - .02 mfd. 300 volts
R10456	Condenser - .02 mfd. 800 volts,
R10495	Condenser - .003 mfd. 200 volts
R7139	Condenser - .0002 mfd. mica
R4303	Condenser - .0001 mfd. mica
R6621	Condenser - .00005 mfd. mica
R8042	Condenser - .000015 mfd. mica
R10457	Control - Tone, 500 M ohms
R10458	Control - Volume, 500 M ohms
R6969	Cord - AC line
R10429A	Dial diffusing disk
R10478	Escutcheon
R10982	Folder - Short wave
R7585	Resistor - 1 megohm, 1/3 watt carbon
R7228	Resistor - 500 M ohms, 1/3 watt carbon
R7584	Resistor - 250 M ohms, 1/3 watt carbon
R6638	Resistor - 200 M ohms, 1/3 watt carbon
R9778	Resistor - 150 M ohms, 1/3 watt carbon
R7586	Resistor - 100 M ohms, 1/3 watt carbon
R6637	Resistor - 50 M ohms, 1/3 watt carbon
R6445	Resistor - 50 M ohms, 1/2 watt carbon
R6689	Resistor - 30 M ohms, 1 watt carbon
R6152	Resistor - 10 M ohms, 1/2 watt carbon
R10465	Resistor - 10 M ohms, 2 watt carbon
R6510	Resistor - 5 M ohms, 1/2 watt carbon
R6636	Resistor - 1 M ohms, 1/3 watt carbon
R6632	Resistor - 50 ohms, 1/3 watt carbon
R8739	Resistor - 10 ohms, 1 watt flexible
S10590S	Speaker
R10467	Switch - Wave
R10468B	Transformer - IF input
R10469B	Transformer - IF interstage
R10470A	Transformer - IF output
R10602A	Transformer - Power, 60 cycle
R10603A	Transformer - Power, 25 cycle
R10441	Shield - Tube, cap
R8315	Socket - 4 prong
R8253	Socket - 5 prong
R8367	Socket - 5 prong, speaker
R8092	Socket - 6 prong
R10549	Socket - Pilot light

SEARS-ROEBUCK & CO.



MODEL 1850,1851
Voltage,Alignment
Socket,Parts List

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid of the IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 460 kc. and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment: (Broadcast)

1. Set the test oscillator to exactly 1600 kc.

2. Couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

3. Turn the dial pointer to exactly 1600 kc. and adjust the oscillator trimmer for maximum output. The oscillator trimmer is on the variable condenser section furthest from the dial.

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the translator and antenna trimmers for maximum output. The translator trimmer is accessible through the hole in the top of the translator coil shield as shown in the Service Illustration. The antenna trimmer is the one on the variable condenser section nearest the dial.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Repeat the 1600 kc. and 1400 kc. adjustments.

Short Wave Alignment:

1. Set the test oscillator to 15 megacycles and tune in its signal.

2. Adjust the short wave translator trimmer for maximum output.

3. If necessary, shift the end turns (enamelled wire) of the short wave translator coil to secure accurate alignment and maximum output.

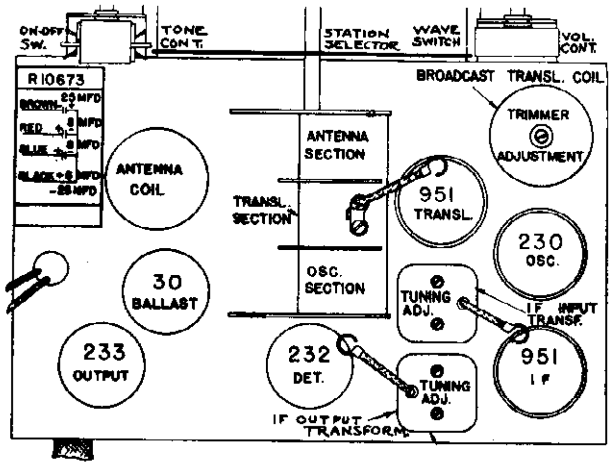
4. Re-adjust the translator trimmer at 15 megacycles.

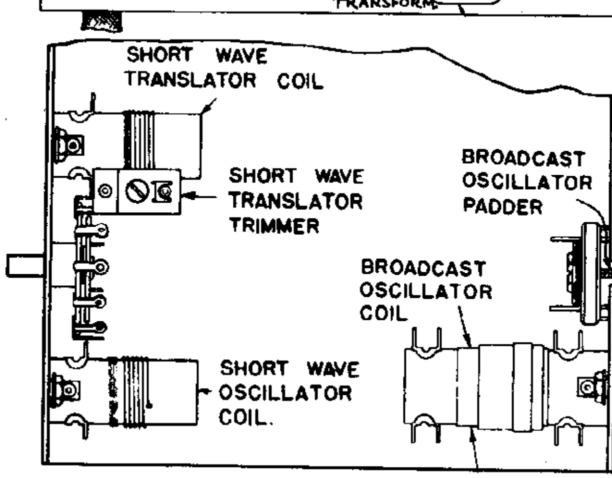
TUBE VOLTAGE CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	CONTROL GRID VOLTAGE
951 - Translator	182	70	-.1
230 - Oscillator	60		-.6
951 - IF	182	70	-.8
232 - Detector	22.5*	5*	-.1
233 - Output	115	182	-.1

NOTE: All control grid readings are lower than the actual applied voltage due to high series resistance in the circuit.

* - Indicates low reading due to high series resistance in circuit.





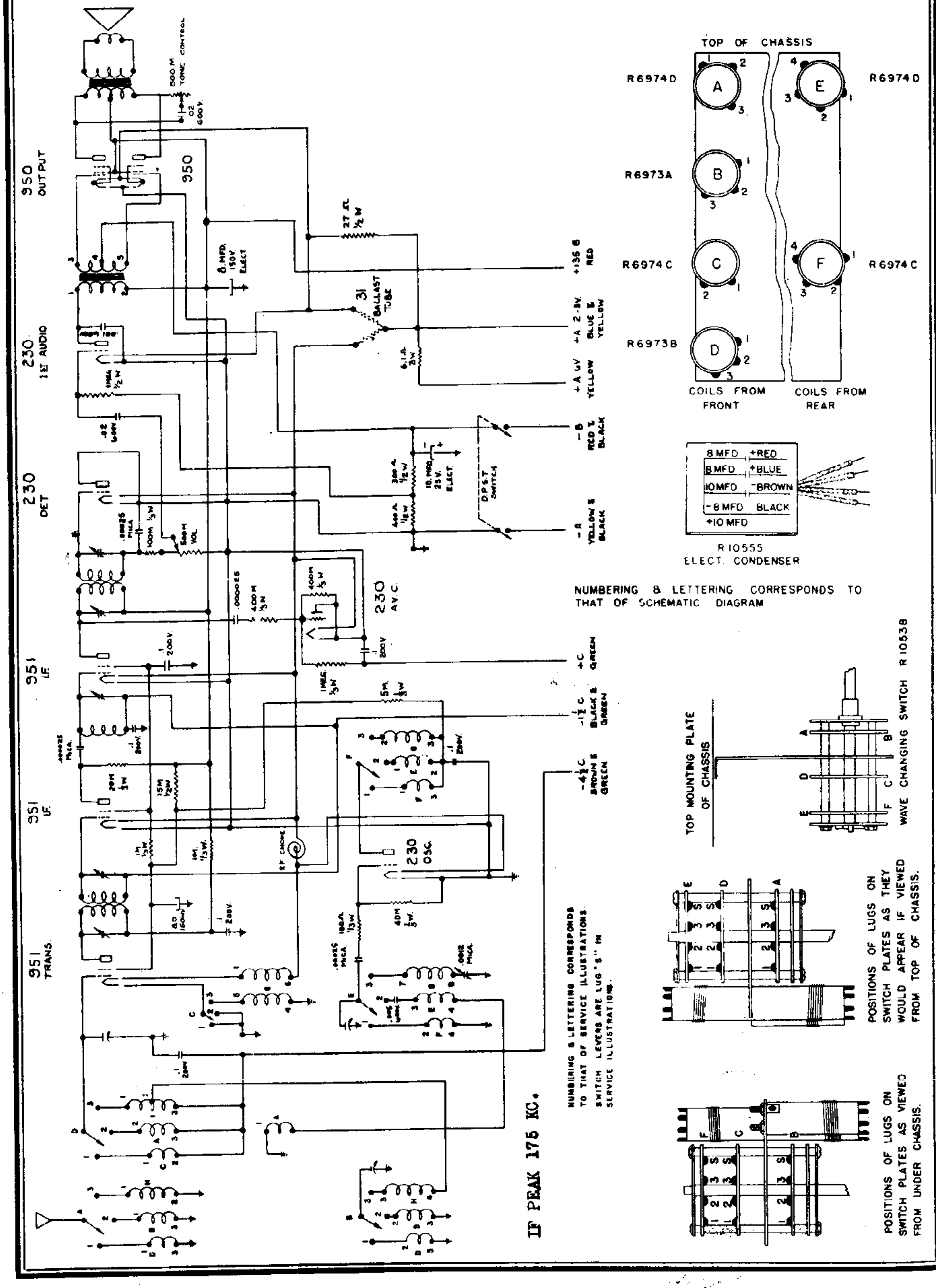
SILVERTONE MODELS 1850 and 1851

Part No.	Description
R5509A	Board - Terminal, double
R6308A	Board - Terminal, triple
R9446A	Board - Terminal, 4 terminals
R10662	Bushing - Rubber, chassis mounting
R10719	Cable - Battery, model 1850
R10720	Cable - Battery, model 1851
R10770	Card - Operating
R8352	Choke - RF
R5941	Clamp - Battery cable
R4715	Clamp - Antenna and ground leads
R7011A	Clip - Antenna and ground leads
R11043	Clip - Grid
R10670	Coil - Antenna, broadcast
R10674	Coil - Oscillator, broadcast
R10671	Coil - Translator, broadcast
R10931A	Coil - Antenna, short wave
R10931B	Coil - Oscillator, short wave
R10672	Condenser - Variable
R10672A	Condenser - Variable, complete with dial and drive assembly
R10673	Condenser - Electrolytic, block
R9426	Condenser - Padding
R10197	Condenser - Trimmer
R6380	Condenser - .2 mfd. 200 volts
R6444	Condenser - .1 mfd. 200 volts
R6751	Condenser - .02 mfd. 600 volts
R7681	Condenser - .005 mfd. 600 volts

Part No.	Description
R6110	Resistor - 30 M ohms, 1/3 watt carbon
R7291	Resistor - 15 M ohms, 1/2 watt carbon
R7296	Resistor - 5 M ohms, 1/3 watt carbon
R7441	Resistor - 600 ohms, 1/2 watt carbon
R10696	Resistor - 18 ohms, 1/2 watt, flexible
R10606	Ring - Glass clamping
R10445A	Shaft - Dial drive assembly
R6396	Shield - Tube, base
R10440	Shield - Tube, top
R10441	Shield - Tube, cap
R10654	Shield - Coil, base
R10653	Shield - Coil, top
R8315	Socket - 4 prong
R8953	Socket - 5 prong
S10120	Speaker - for model 1850
S10673A	Speaker - for model 1851
R10718	Switch - Filament
R10467	Switch - Wave
R10716A	Transformer - IF input
R10717	Transformer - IF output
R4303	Condenser - .0001 mfd. mica
R8621	Condenser - .00005 mfd. mica
R10648	Control - Tone
R10712	Control - Volume
R10530A	Disk - Drive with bushing
R10503	Escutcheon
R10982	Folder - Short wave
R10504	Glass - Escutcheon
R10635B	Indicator and mounting ring assembly
R10769	Instruction leaflet
R10479	Knob - Station Selector
R10706	Knob
R11027	Knob - With dot
R5346D	Lead - Antenna, green
R5345E	Lead - Ground, black
R10499B	Pointer
R6363	Resistor - 5 megohm, 1/2 watt carbon
R5823	Resistor - 1 megohm, 1/2 watt carbon
R7565	Resistor - 1 megohm, 1/3 watt carbon
R6657	Resistor - 50 M ohms, 1/3 watt carbon

MODEL 1854
Schematic

SEARS-ROEBUCK & CO.



MODEL 1854
Alignment, Voltage
Socket Layout

SEARS-ROEBUCK & CO.

The type 31 Ballast tube maintains the filament voltage at its proper value (2 volts). This will be so whether a 2 volt air cell, a dry cell "A" block or a 6 volt storage battery is used. It is important that the receiver be turned off before removing any tubes. Otherwise the voltage across the remaining tubes will rise, with the possibility of damaging them.

Although the receiver will afford good reception after the "B" batteries have fallen to a lower value, for best results they should be replaced when the total voltage, under load, falls to 100 volts.

THE 230 AVC CIRCUIT

A portion of the IF signal at the plate of the second IF tube is impressed through the .000025 mfd. condenser and the 400 M ohm resistor, upon the 230 AVC tube. This tube is used as a rectifier or diode, with plate connected to filament. During the positive half cycles of the signal voltage, diode current flows through the 400 M ohm resistor which is connected between grid and plate of the 230 AVC tube, creating a voltage drop across it. This voltage is effectively in series with the "C" battery, being connected to it through the 1 megohm resistor which is in the circuit between the 230 grid and the "C4" lead. Any increase in signal strength increases the current through the 230 AVC tube, increases the drop across the 400 M ohm resistor and therefore increases the total value of "C" bias. This increased "C" bias is impressed upon the control grids of the translator and IF tubes, decreasing their amplification. Since increases in signal strength are offset by decreases in tube amplification, the output of the second IF tube tends to remain at a constant value.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the second IF tube. Leave the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the first IF tube and adjust the inter-stage tuning condenser. This condenser is the Isolantite base one mounted on the back plate of the chassis alongside of the Candohm resistor.

6. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

7. Repeat all of the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

Broadcast (#1 Band) Alignment:

1. Set the test oscillator to exactly 1600 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the dial pointer to exactly 1600 kc and adjust the oscillator trimmer for maximum output. The oscillator trimmer is the bakelite base condenser mounted on the back of the variable condenser end plate.

4. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the translator and antenna trimmers for maximum output. The translator trimmer is the one on the middle section of the variable condenser. The antenna trimmer is the one on the variable condenser section nearest the dial.

5. Set the test oscillator to 600 kc. Tune in its signal and slowly rotate the variable condenser back and forth a degree or two, and at the same time adjust the padder until maximum output is obtained. The padder is the Isolantite base condenser mounted on the end plate of the variable condenser.

6. Since the adjustments are inter-acting to an extent, it is advisable to repeat the entire operation. Always use as low an output from the test oscillator as possible.

Short Wave (#2 Band) Alignment:

1. Set the test oscillator to 4000 kc and couple it loosely to the set's antenna lead, with the antenna connected.

2. Turn the wave band switch to the #2 position and tune in the oscillator signal.

3. If the calibration is out, shift turns (enamelled wire) on coil "E" until the proper calibration is obtained. The end plate may be removed from the chassis in order to gain access to the coils.

4. The turns of coils "A" and "B" may be shifted, if necessary, to obtain alignment and maximum output.

5. Check the calibration and alignment at 2000 kc. If they are not correct at this frequency, the 4000 kc adjustment should be repeated to obtain a compromise adjustment for the two frequencies.

6. Cement the coil turns in place.

Short Wave (#3 Band) Alignment:

1. Set the test oscillator to 15 megacycles.

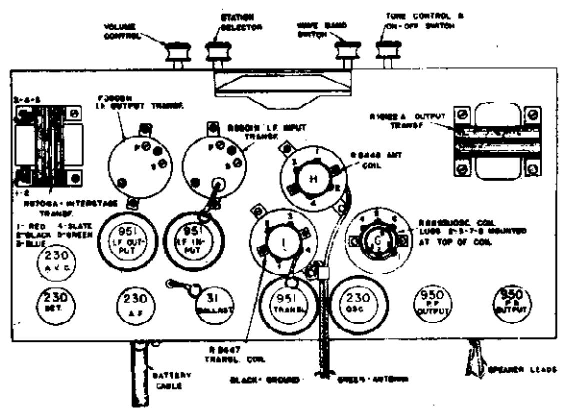
2. Couple its output loosely to the receiver's antenna lead, with the antenna connected. Turn the wave band switch to the #3 position and tune in the oscillator signal.

3. Obtain maximum output and proper calibration by shifting the leads of coils "C", "D" and "F".

4. Tune the test oscillator and the receiver to 6000 kc and shift turns on coils "C", "D" and "F" until maximum sensitivity and proper calibration are obtained.

5. Repeat operation #3 at 15 megacycles.

A loop of #14 wire with its ends soldered together to form a short circuited ring, fastened to a bakelite handle will prove useful for determining whether the end turns of the short wave coils need to be moved toward or away from the other turns. If sensitivity is increased when the loop of wire is slowly inserted inside of a short wave coil, it is an indication that the turns of the coil should be moved apart. If the sensitivity is decreased, it indicates either that the coil adjustment is correct, or that the turns should be moved closer together.



TUBE VOLTAGE CHART

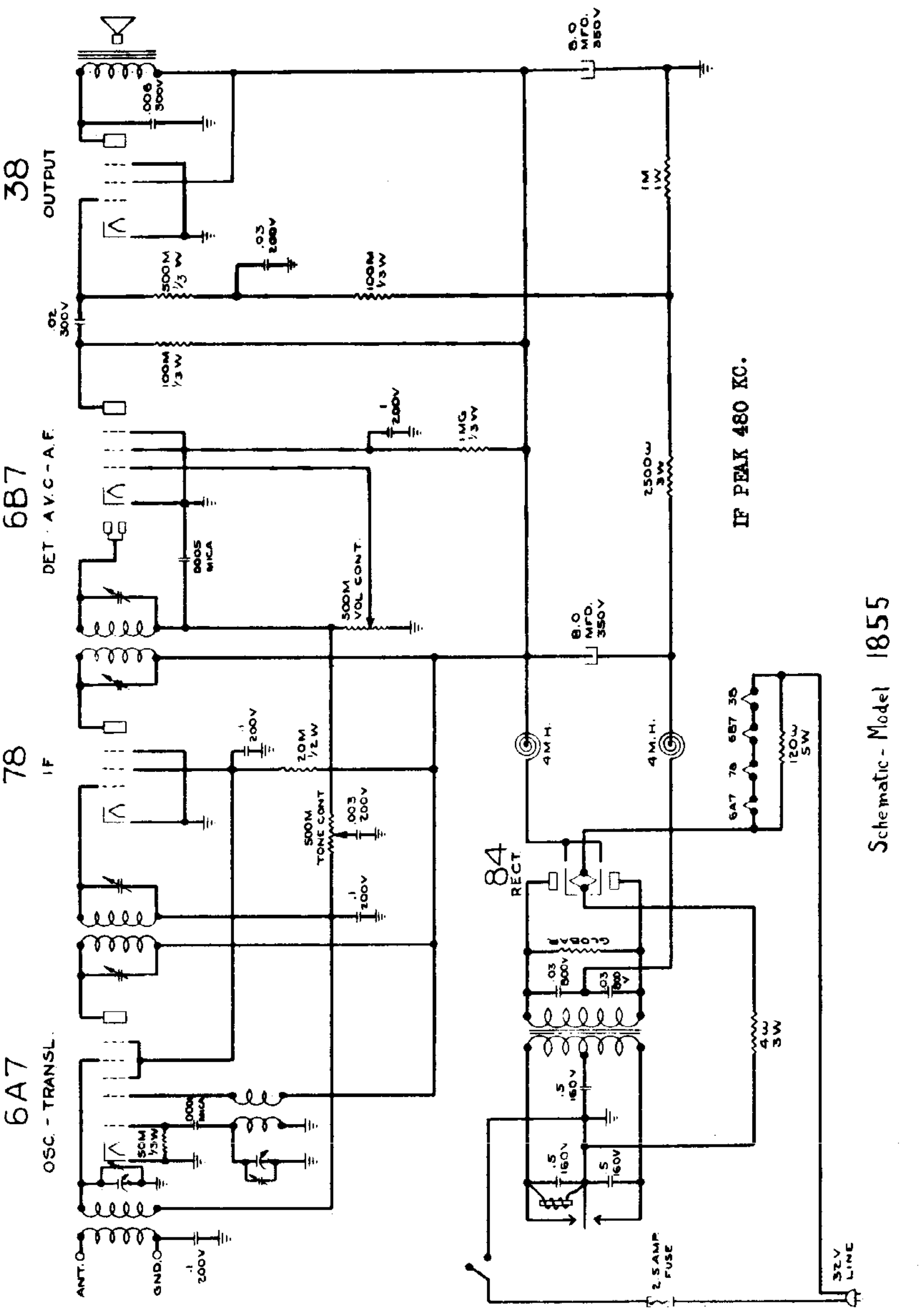
All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE VOLTAGE	SCREEN VOLTAGE	CONTROL GRID VOLTAGE
951 Translator	-	120	58.5	-1.2
230 Oscillator	-	44		-2.35
951 1st IF	-	69	57	- .3
951 2nd IF	-	120	57	- .3
230 Detector	-	Used as diode with no applied DC voltage.		
230 AVC	-	Used as diode with no applied DC voltage.		
230 1st Audio	-	120		*
950 Output	-	120	120	-15

* - Extremely low readings due to high series resistance in circuit.

Actual Translator control grid voltage is -4.5 volts.
Actual IF control grid voltage is -1.5 volts.

SEARS-ROEBUCK & CO.



MODEL 1855
Voltage, Alignment
Socket, Parts List

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube. Leave the grid clip attached to the cap.

4. Set the test oscillator to 480 kc. and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment:

1. Set the test oscillator to exactly 1750 kc. Couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

2. Turn the dial to exactly 1750 kc. and adjust the oscillator trimmer for maximum output. The oscillator trimmer is the one on the variable condenser section, furthest from the dial.

3. Set the test oscillator to 1500 kc and tune in its signal. Adjust the antenna trimmer for maximum output.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube. Supply voltage 32 volts.

TUBES	PLATE	SCREEN	OSC. PLATE	OSC. GRID	CONTROL GRID
6A7-Osc-Transl -	165	85	165	-3.6	-.4
78-IF -	165	85			-.4
6B7-AVC-Det-AF -	75	20			-.2
38-Output -	165	165			-.5*

* - Extremely low readings due to high series resistance in circuit.

The cover of the power supply unit is fitted with contact fingers to insure good contact with the rest of the power supply case. It is important that this cover makes tight electrical contact with the case to prevent noisy operation due to electrical disturbances from the vibrator.

The resistor marked "Globar", in the schematic, is a special resistor whose value varies with the voltage. When the receiver is first turned on, the output voltage tends to become very high until the tubes heat sufficiently to draw their normal load. Under these conditions, the Globar resistance drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the Globar resistance increases greatly so that it no longer constitutes a load on the power supply.

Unlike the earlier Model 1733, the polarity of the power cord plug is not of importance.

The antenna coil is not grounded to the chassis, so that the receiver depends entirely upon the installation ground for its ground connection. Accordingly, the best ground possible should be installed.

The polarity of the speaker must be correct. The blue lead connects to the speaker terminal marked "P". The black lead connects to the "+" terminal.

THE 6B7 - AVC-Detector-AF

The 480 kc signal from the IF stage is impressed between the cathode and the diode plates of the 6B7. in series with the 500 M ohms of the volume control. Diode current flows, creating a voltage drop across the control with the grounded end positive with respect to the other end. Since the control grid returns of the 6A7 and 78 tubes are connected to the ungrounded end of the volume control, the negative bias across it is impressed upon the control grids of these tubes. Any increase in signal strength increases the diode current and the drop across the volume control, increases the negative control grid bias and so reduces tube amplification. Since increases in signal strength tend to be offset by decreases in tube amplification, the input to the detector remains substantially at a constant value.

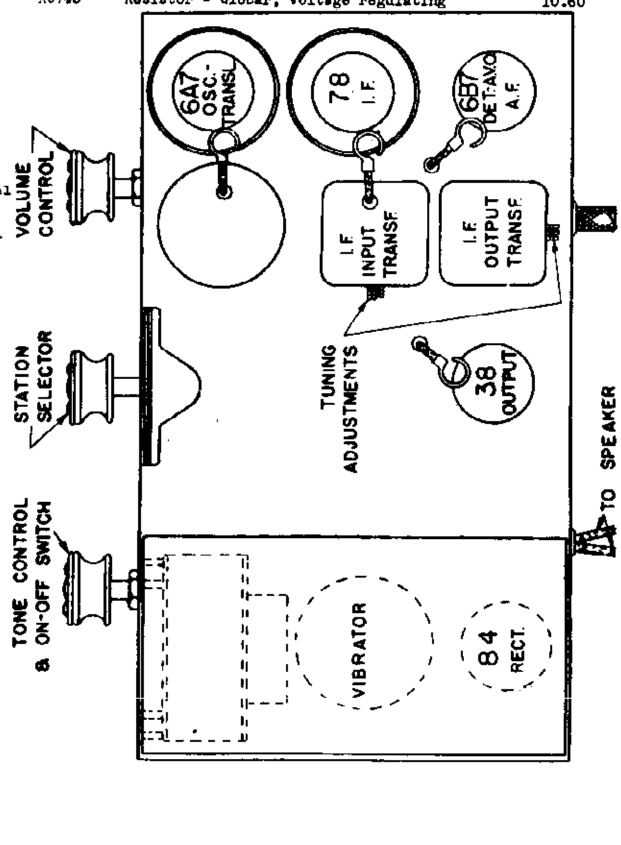
The audio component across the volume control is picked off by the movable arm and fed to the control grid of the pentode portion of the tube. It is there amplified and then coupled to the 38.

REPLACEMENT PARTS AND PRICE LIST

FOR

SILVERTONE MODEL 1855

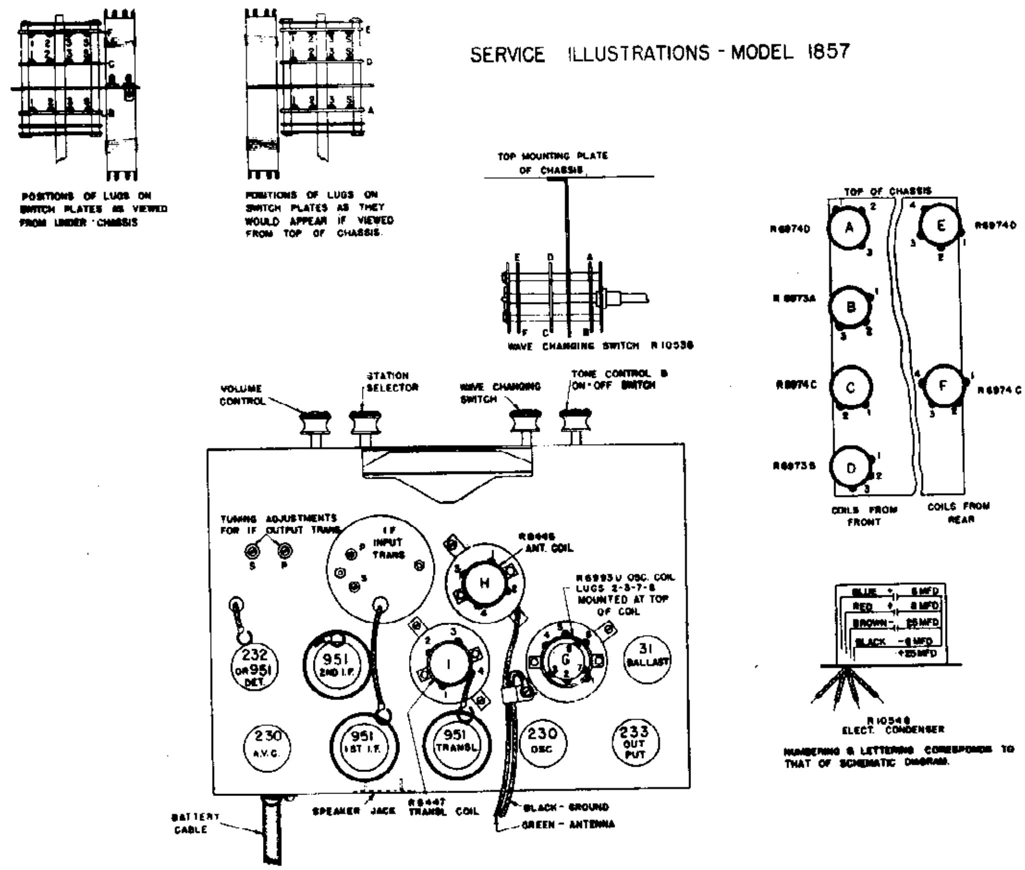
Part No.	Description	Price per 100
R8297A	Board - Terminal, double	1.34
R8308A	Board - Terminal, triple	1.78
R7901A	Board - Fuse	5.85
R10028A	Transformer - IF input	40.44
R10029	Transformer - IF output	39.80
R10892A	Transformer - Power	100.56
R10125	Coil - Oscillator	9.33
R9757	Coil - Choke	5.74
R6412	Condenser - Variable	73.55
R8488	Condenser - Electrolytic, 8 mfd. 350 volts	28.00
R9032	Condenser - .5 mfd. 160 volts	8.04
R5444	Condenser - .1 mfd. 200 volts	5.74
R10887	Condenser - .03 mfd. 800 volts	5.58
R6630	Condenser - .03 mfd. 200 volts	4.49
R7680	Condenser - .02 mfd. 300 volts	4.46
R10893	Condenser - .006 mfd. 200 volts	3.38
R10495	Condenser - .003 mfd. 200 volts	3.25
R6760	Condenser - .0005 mfd. mica	4.56
R4303	Condenser - .0001 mfd. mica	7.97
R6571	Control - Tone	34.81
R6570	Control - Volume, 500 M ohms	23.60
R6989	Cord - Extension	15.76
R10012A	Dial and indicator	12.87
R8406	Escutcheon	7.69
R10547	Fuse - 2½ amp.	3.04
R10012	Indicator	4.40
R10898	Instruction leaflet	1.55
R10705	Knob - Small	4.65
R10704	Knob - Small with dot	4.90
R10479	Knob - Medium	4.75
R5346D	Lead - Antenna	3.57
R5345A	Lead - Ground	6.78
R8700A	Lead - Speaker, black	3.36
R8809A	Lead - Speaker, blue	3.36
R7585	Resistor - 1 megohm, 1/3 watt carbon	5.91
R7228	Resistor - 500 M ohms, 1/3 watt carbon	5.25
R7586	Resistor - 100 M ohms, 1/3 watt carbon	5.91
R6637	Resistor - 50 M ohms, 1/3 watt carbon	5.25
R5821	Resistor - 20 M ohms, 1/2 watt carbon	8.54
R10896	Resistor - 2500 ohms, 3 watt	8.65
R9254	Resistor - 1000 ohms, flexible	5.25
R10895	Resistor - 120 ohms, 5 watt	8.65
R10295	Resistor - 4 ohms	9.04
R9745	Resistor - Globar, voltage regulating	10.60

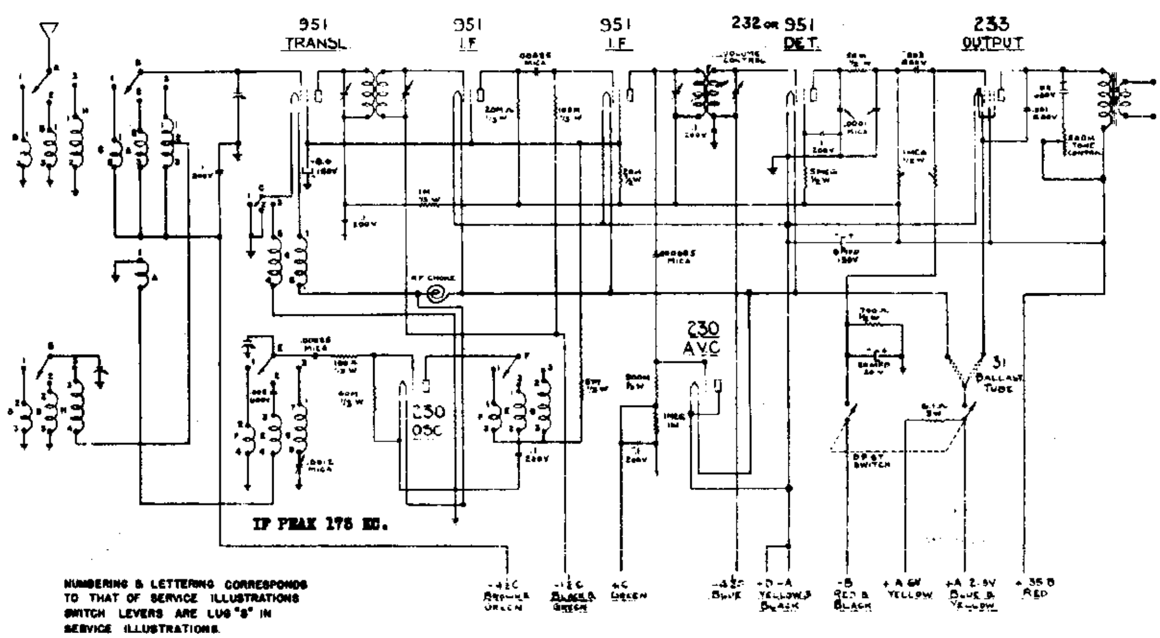


MODEL 1857
Schematic
Socket Layout

SEARS-ROEBUCK & CO.

SERVICE ILLUSTRATIONS - MODEL 1857





NUMBERING & LETTERING CORRESPONDS TO THAT OF SERVICE ILLUSTRATIONS SWITCH LEVERS ARE LUG "S" IN SERVICE ILLUSTRATIONS.

SCHEMATIC - MODEL 1857

MODEL 1857
Alignment, Voltage
Parts List

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

1. Connect one lead of the test oscillator to the chassis.

2. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser to the grid of the 1st IF tube. Leave the grid clip attached to the cap.

3. Set the oscillator to 175 kc and tune the 2nd IF output transformer. The locations of the tuning adjustments are shown in the illustration.

4. Connect the oscillator, through the .1 mfd. condenser, to the grid of the translator tube and tune the IF input transformer.

5. Repeat the adjustments for the IF output transformer and then for the IF input transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

Broadcast (#1 Band) Alignment:

1. Set the test oscillator to exactly 1600 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the dial pointer to exactly 1600 kc and adjust the oscillator trimmer for maximum output. The oscillator trimmer is the bakelite base condenser mounted on the back of the variable condenser end plate.

4. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the translator and antenna trimmers for maximum output. The translator trimmer is the one on the middle section of the variable condenser. The antenna trimmer is the one on the variable condenser section nearest the dial.

5. Set the test oscillator to 600 kc. Tune in its signal and slowly rotate the variable condenser back and forth a degree or two, and at the same time adjust the padder until maximum output is obtained. The padder is the Isolantite base condenser mounted on the end plate of the variable condenser.

6. Since the adjustments are inter-acting to an extent, it is advisable to repeat the entire operation. Always use as low an output from the test oscillator as possible.

Short Wave (#2 Band) Alignment:

1. Set the test oscillator to 4000 kc and couple it loosely to the set's antenna lead, with the antenna connected.
2. Turn the wave band switch to the #2 position and tune in the oscillator signal.

3. If the calibration is out, shift turns (enamelled wire) on coil "E" until the proper calibration is obtained. The end plate may be removed from the chassis in order to gain access to the coils.

4. The turns of coils "A" and "B" may be shifted, if necessary, to obtain alignment and maximum output.

5. Repeat operations #3 and #4 at 2000 kc. If the alignment and calibration are not correct at this frequency, the 4000 kc adjustment should be repeated to obtain a compromise adjustment.

6. Cement the coil turns in place.

Short Wave (#3 Band) Alignment:

1. Set the test oscillator to 15 megacycles.

2. Couple its output loosely to the receiver's antenna lead, with the antenna connected. Turn the wave band switch to the #3 position and tune in the oscillator signal.

3. Obtain maximum output and proper calibration by shifting the leads of coils "C", "D" and "F".

4. Tune the test oscillator and the receiver to 6000 kc and shift turns on coils "C", "D" and "F" until maximum sensitivity and proper calibration are obtained.

5. Repeat operation #3 at 15 megacycles.

A loop of #14 wire with its ends soldered together to form a short circuited ring, fastened to a bakelite handle will prove useful for determining whether the end turns of the short wave coils need to be moved toward or away from the other turns. If sensitivity is increased when the loop of wire is slowly inserted inside of a short wave coil, it is an indication that the turns of the coil should be moved apart. If the sensitivity is decreased, it indicates either that the coil adjustment is correct, or that the turns should be moved closer together.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE VOLTAGE	SCREEN VOLTAGE	CONTROL GRID VOLTAGE
951 Translator	-	122	55	-1.2
230 Oscillator	-	45		-2.75
951 1st. IF	-	115	55	- .3
951 2nd. IF	-	122	55	- .2
951 Detector	-	*	*	-4.5
230 AVC	-	No applied DC voltage		
233 Output	-	120	122	*

* - Extremely low readings due to high series resistance in circuit

Actual 233 control grid voltage is approximately 13 volts.
Actual IF control grid voltage is -1.5 volts.
Actual Translator control grid voltage is -4.5 volts.

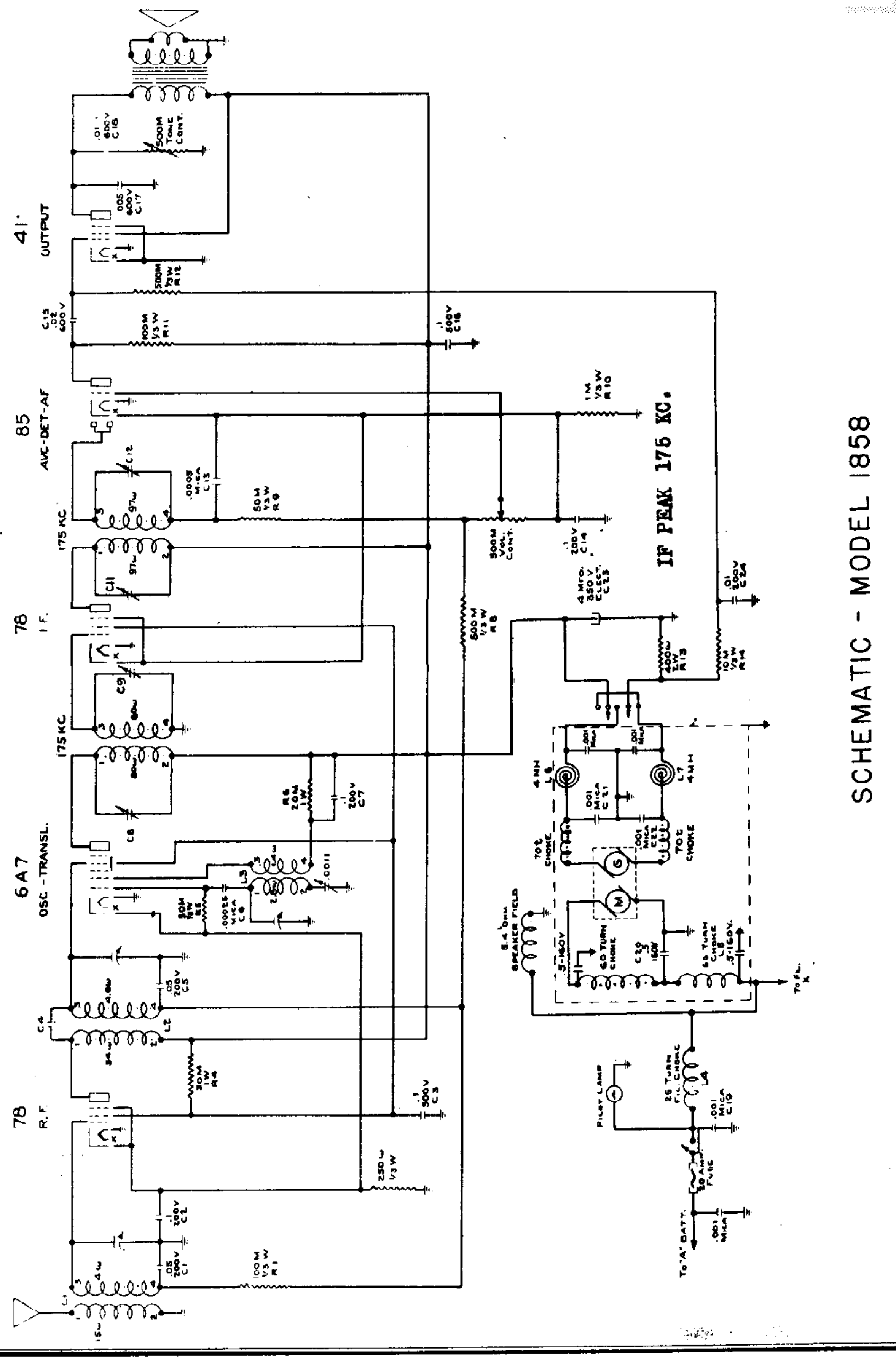
REPLACEMENT PARTS AND PRICE LIST

FOR

SILVERTONE MODEL 1857

Part No.	Description	Price per 100
R8297A	Board - Terminal, double	1.34
R8308A	Board - Terminal, triple	1.78
R9446A	Board - Terminal, 4 terminals	2.15
R7243	Bushing - Fibre, wave switch and volume control	1.44
R10562	Bushing - Rubber, chassis mounting	1.71
R7067	Cable - Battery	21.69
R6415	Transformer - IF input	15.75
R6415S	Transformer - IF input, complete less shield	51.83
R6401F	Transformer - IF output, (Volume control)	56.34
R10697A	Transformer - Speaker	46.42
R4794	Washer - Insulating, tone control	.76
R8088	Washer - Insulating, tone control	.19
R6446	Coil - Antenna	19.25
R6447	Coil - Translator	15.44
R6993U	Coil - Oscillator	45.64
R10528	Coil - IF output transformer	10.94
R6973A	Coil - Antenna, intermediate range	16.53
R6973B	Coil - Antenna, high range	16.25
R6974D	Coil - Oscillator-translator, intermediate range	29.98
R6974C	Coil - Oscillator-translator, high range	23.25
R6667	Collar - Stop, volume control	2.13
R11014	Collar - Stop, gang switch	1.71
R10545	Condenser - Variable	140.25
R10545A	Condenser - Variable, complete with dial and drive assembly	233.67
R7137	Condenser - .0012 mfd. padding	16.26
R9513	Condenser - Trimmer, bakelite base, mounted on variable condenser end plate	6.56
R10546	Condenser - Dry electrolytic	71.38
R5565	Condenser - IF input, tuning	17.20
R5139	Condenser - IF output, tuning	21.81
R6444	Condenser - .1 mfd. 200 volts	5.74
R6761	Condenser - .02 mfd. 600 volts	3.06
R6954	Condenser - .005 mfd. 600 volts	5.38
R7681	Condenser - .003 mfd. 600 volts	4.63
R6952	Condenser - .001 mfd. 600 volts	4.38
R4592	Condenser - .00025 mica	8.28
R4303	Condenser - .0001 mica	7.97
R8711	Condenser - .000025 mica	5.60
R10629	Control - Tone, 500 M ohms	37.25
R6401F	Control - Volume, (IF output transformer)	56.34
R7076	Resistor - Candohm	7.75
R8363	Resistor - 5 megohm, 1/2 watt carbon	5.25
R6690	Resistor - 1 megohm, 1 watt carbon	5.90
R5823	Resistor - 1 megohm, 1/2 watt carbon	8.54
R7228	Resistor - 500 M ohms, 1/3 watt carbon	5.25
R7586	Resistor - 100 M ohms, 1/3 watt carbon	5.91
R6637	Resistor - 50 M ohms, 1/3 watt carbon	5.25
R6115	Resistor - 40 M ohms, 1/3 watt carbon	6.57
R6640	Resistor - 20 M ohms, 1/3 watt carbon	5.25
R5821	Resistor - 20 M ohms, 1/2 watt carbon	8.54
R7226	Resistor - 5 M ohms, 1/3 watt carbon	5.25
R6636	Resistor - 1 M ohms, 1/3 watt carbon	5.25
R8364	Resistor - 700 ohms, 1/2 watt carbon	5.25
R8922	Resistor - 100 ohms, 1/3 watt carbon	5.25
R10505	Ring - Glass clamping	.60
R10623	Ring - Felt	.94
R5085	Screw - Escutcheon	.54
R10534A	Shaft - Volume control	2.55
R10535A	Shaft - Dial drive assembly	6.80
R6018A	Shield - Coil	6.05
R6573	Shield - IF transformer	4.24
R10442	Shield - Tube, base	.89
R10440	Shield - Tube, top	2.65
R10441	Shield - Tube, cap	1.50
R11016	Spacer - Wood	.80
R8366	Socket - 4 prong	2.19
R8367	Socket - 5 prong	2.25
S6520B	Speaker	354.89
R10538	Switch - Wave band selector	52.50
R10538B	Switch - Wave band selector, complete with coil assembly	237.78

SEARS-ROEBUCK & CO.



SCHEMATIC - MODEL 1858

MODEL 1858
Alignment, Voltage Socket, Parts List

SEARS-ROEBUCK & CO.

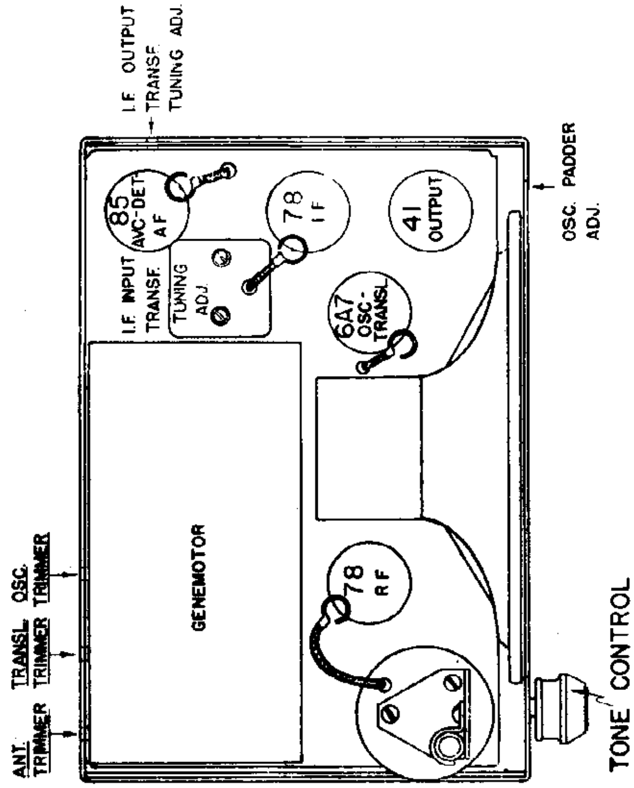
SILVERTONE - - MODEL 1858

* * *

The Silvertone Model 1858 is a five tube automobile radio receiver almost identical with the Model 1730 described in Service Manual Supplement #25. As an examination of the schematic will show, practically the only circuit difference is in the filtering of the Genemotor. The chief mechanical difference is that the pilot light lead of the Model 1858 is contained in the same covering as the drive cables. The mechanical and general information contained in the Model 1730 manual will apply equally as well to the Model 1858.

The tubes and their functions are:

78 - RF
6A7 - Oscillator-Translator
78 - IF
85 - AVC-Detector-AF
41 - Output



ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis. The location of its tuning adjustments is shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment:

1. Connect the test oscillator to the antenna lead through a .00025 mfd. condenser.

2. Open the variable condenser plates to the point where the rotor plates just mesh with the stator plates.

3. Set the test oscillator to exactly 1500 kc and adjust the oscillator trimmer for maximum output.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time adjust the padder until maximum output is obtained.

5. Repeat operations 1 to 4.

6. Set the test oscillator to 1400 kc and tune in its signal.

7. Adjust the antenna and translator trimmers for maximum output.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE	PLATE	SCREEN	OSC. SECTION GRID	OSC. SECTION PLATE	CONTROL GRID	CATHODE
78 - RF	- 210	77			.1	3.7
6A7- Osc-Transl	- 210	77	-.2	155	.1	3.7
78 - IF	- 210	77			0	4.8
85 - AVC-Det-AF	- 58				.1	4.8
41 - Output	- 200	210			-.5*	

* - Extremely low reading due to high series resistance in circuit.

Part No.	Description	Price per 100
R7587	Resistor - 10 M ohms, 1/3 watt carbon	5.25
R6636	Resistor - 1 M ohms, 1/3 watt carbon	5.25
R10268	Resistor - 250 ohms, 1/3 watt carbon	5.25
R8066	Resistor - 400 ohms, 2 watt, flexible	4.60
R10056	Screw - Polarity changer	.72
R10084A	Shield - Antenna coil	6.89
R9591	Shield - Translator coil	7.70
R9360	Shield - Tube	2.63
R8092	Socket - 6 prong	2.46
R8072	Socket - 7 prong	2.78
S9967A	Speaker - Complete	233.96
S9988A	Speaker cone and voice coil assembly	57.48
S9994	Speaker clamping ring	1.36
S10152	Speaker field coil	56.89
S9968	Speaker eyelets	.09
S9959	Speaker felt ring	.93
S10144A	Speaker transformer	43.17
R9960	Sticker - Polarity changer	.99
R1-10032	Suppressor - Spark plug	9.86
R2-10032	Suppressor - Distributor	9.86
R9729	Stud - Set mounting	1.64
R9736	Template - Set mounting	.99
R10435A	Transformer - IF input	46.01
R10065A	Transformer - IF output	52.53

REPLACEMENT PARTS AND PRICE LIST

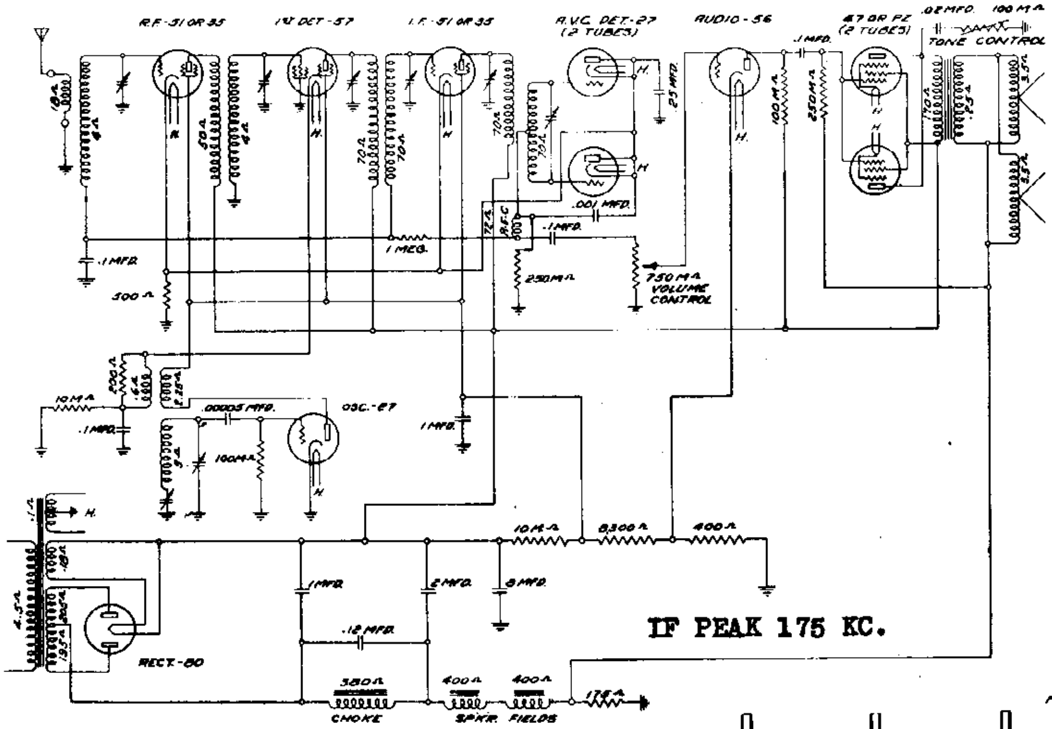
FOR

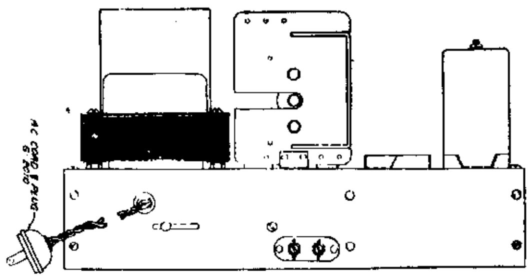
SILVERTONE - MODEL 1858

Part No.	Description	Price per 100
R8297A	Board - Terminal, double	1.34
R10134A	Board - Terminal, 4 terminals	1.70
R9753A	Board - Terminal, 6 terminals	2.70
R9754A	Board - Polarity changing	4.73
R11018	Book - Instruction	9.06
R9588	Bushing - Rubber, Genemotor mounting	1.28
R10862A	Choke - Primary of Genemotor	8.73
R9044A	Choke - Filament circuit	8.93
R9757	Choke - Pancake type, Genemotor secondary	5.74
R2179A	Choke - RF, 70 turn, Genemotor secondary	9.81
R11043	Clip - Grid	.19
R9741	Clip - "A" lead	2.04
R10314	Coil - Antenna	17.30
R10348	Coil - Oscillator	9.33
R10344	Coil - Translator	24.74
R10211	Condenser - Variable	118.55
R10086	Condenser - Electrolytic	32.56
R9426	Condenser - Padding	13.75
R8030	Condenser - 1 mfd. generator	19.90
R10025	Condenser - .5 mfd. ammeter	16.74
R9032	Condenser - .5 mfd. 160 volts	8.04
R10164	Condenser - .1 mfd. 600 volts	5.06
R8286	Condenser - .1 mfd. 200 volts	4.80
R8920	Condenser - .05 mfd. 200 volts	4.50
R6761	Condenser - .02 mfd. 600 volts	5.06
R7070	Condenser - .01 mfd. 600 volts	4.50
R8921	Condenser - .01 mfd. 200 volts	3.39
R10822	Condenser - .005 mfd. 600 volts	3.48
R5759	Condenser - .001 mfd. mica	5.68
R6760	Condenser - .0005 mfd. mica	4.56
R4592	Condenser - .00025 mfd. mica	8.28
R10091	Control - Remote, with 32" cables	200.33
R10680	Control - Remote, with 22" cables	195.05
R9711	Control - Tone, 500 M ohms	19.69
R10178	Control - Volume, 500 M ohms	26.95
R9717	Connector - "A" lead and fuse container	1.74
R10423A	Cover - Power supply case	19.94
R9587	Genemotor	476.76
R9744	Grommet - "A" lead	1.15
R7692	Knob	3.20
R8870A	Lead - Antenna	13.86
R9578B	Lead - "A", ammeter end	12.72
R9578A	Lead - "A", chassis end	25.07
R9719	Nut - Set mounting	.49
R8219	Nut - Acorn	1.45
R7228	Resistor - 500 M ohms, 1/3 watt carbon	5.25
R7596	Resistor - 100 M ohms, 1/3 watt carbon	5.91
R6657	Resistor - 50 M ohms, 1/3 watt carbon	5.25
R6689	Resistor - 30 M ohms, 1 watt carbon	6.58
R5095	Resister - 20 M ohms, 1 watt carbon	6.58
R9739	Washer - Lock, set mounting	.15
R9740	Washer - Flat, set mounting	1.52

MODEL 7043,7044
Schematic, Socket
Alignment Data

SEARS-ROEBUCK & CO.





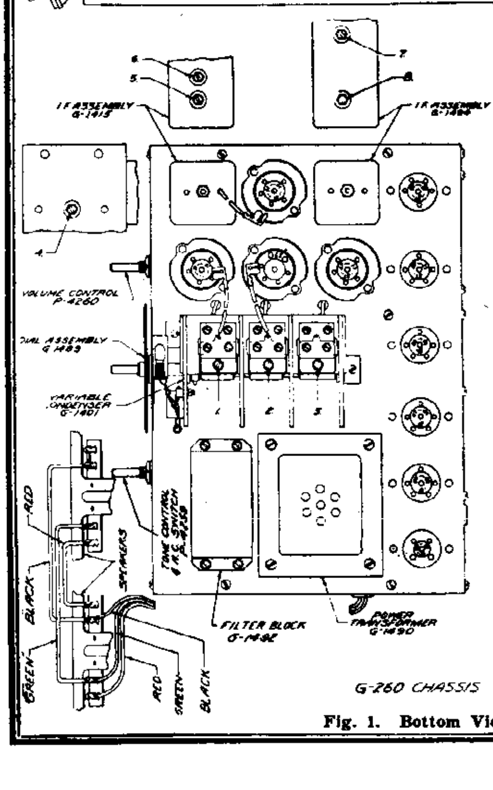


Fig. 1. Bottom View

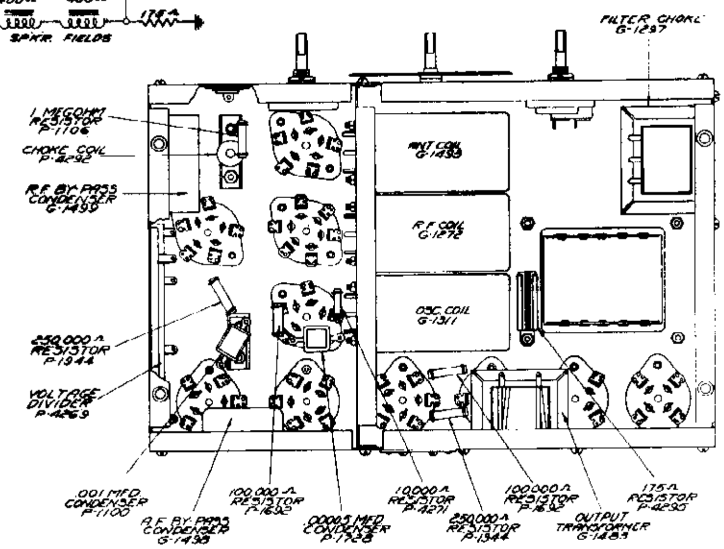


Fig. 3. Top View

First, let us explain the location of the various trimmers. Diagram of the top view, shows each trimmer numbered. You should be acquainted intimately with each adjustment. A Customer would not have to change their settings very much to ruin the sensitivity of the receiver. Further, if a readjustment is going to be necessary, it is imperative to know which circuit is being adjusted when a trimmer is being turned. No. 1 is the antenna trimmer, No. 2 first detector trimmer, No. 3 oscillator gang trimmer, No. 4 oscillator padding trimmer, No. 5 second detector grid trimmer, No. 6 second detector plate trimmer, No. 7 intermediate frequency grid trimmer, No. 8 intermediate frequency plate trimmer.

To readjust the trimmers on these superheterodyne receivers it will be necessary that a good design of 175 k.c. oscillator be employed and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screw driver when making any of these adjustments. First, connect the 175 k.c. oscillator output leads from the con-

MODEL 7043,7044
Voltage,Parts List
Resistance Test

SEARS-ROEBUCK & CO.

trol grid cap of the first detector tube, to ground. Do not remove any of the tubes from the sockets and it is not necessary to disconnect the grid cap clip from the first detector tube. Reset trimmers No. 5, No. 6, No. 7 and No. 8 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k.c. and when trimmers No. 5, No. 6, No. 7 and No. 8 are set and tuned for maximum output, they will be correctly adjusted.

Next, disconnect the 175 k.c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator or tune in a broadcast signal around 1400 k.c., then reset trimmer No. 2 and No. 1, respectively, for maximum output. This adjustment will track the first detector and r.f. stages.

To check the calibration of the receiver, whether it be high or low, trimmer No. 3 (oscillator) should be reset until a station of known high frequency is brought in at the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal, at about 1400 k.c., should be chosen, the setting of the trimmer at 1400 k.c. is more critical than it would be at 600 k.c.

The next adjustment is important and not easily explained in writing so pay close attention to the following instructions. We will now balance the oscillator to the r.f. and first dector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c. then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer) at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, as previously explained, and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

P-1038	Dial light . . . .
P-1106	1,000,000 resistor . . . .
P-1118	Mounting washers . . . .
P-1253	Fixed condenser (Green dot). . .
P-1459	Tube shield base . . . .
P-1472	Tube shield. . . . .
P-1581	Mounting screws. . . . .
P-1595	Tube sockets (type 80) . . . . .
P-1597	Tube sockets (type 27) . . . . .
P-1682	Tube sockets (type 51) . . . . .
P-1683	Tube sockets (type 47) . . . . .
P-1692	100,000 ohm resistor . . . . . .
P-1728	Fixed condenser (White dot). . .
P-1944	250,000 ohm resistor . . . . . .
P-4037	Knobs (Large). . . . .
P-4047	Knobs (Small). . . . .
P-4229	Antenna ground post. . . . . . .
P-4246	Spkr. diaphragm. . . . .
P-4256	Escutcheon plate . . . .
P-4259	Tone control and switch. . . . .
P-4260	Volume control . . . .
P-4262	Tube sockets (type 56) . . . . .
P-4263	Tube sockets (type 57) . . . . .
P-4269	Voltage dividing resistor. . . .
P-4271	10,000 ohm resistor. . . . . . .
P-4292	R. F. choke. . . . .
P-4295	Pentode bias resistor. . . . . .
G-1269	Ant. Osc. and R. F. coil shields
G-1272	R. F. coil (less shield) . . . .
G-1311	Osc. Coil (less shield). . . . .
G-1415	1st I. F. transformer. . . . . .
G-1429	Filter choke . . . .
G-1483	Output transformer . . . .
G-1484	Speaker voice coil . . . .
G-1488	Osc. trimmer condenser . . . . .
G-1489	Dial and scale assembly. . . . .
G-1490	Power trans.,110 V. 60 Cy. . . .
G-1490A	Power trans.,110 V. 25 Cy. . . .
G-1490B	Power trans.,220 V. 60 Cy. . . .
G-1492	Filter pack,110 V. 60 Cy . . . .
G-1492A	Filter pack,110 V. 25 Cy . . . .
G-1493	Ant. coil (less shield). . . . .
G-1494	2nd I. F. transformer. . . . . .
G-1498	Bypass condenser (AF). . . . . .
G-1499	Bypass condenser (RF). . . . . .
G-1501	Speaker complete . . . .

CIRCUIT RESISTANCE ANALYSIS

Model 260 Socket to ground

Stage	Grid	Cathode	Heater	Plate	Screen G	Suppr. G	Space G
R. F.	Infinity	500	.1	18,400	8,700	...	......
1st.Det.	4.0	10,000	.1	18,800	8,700	.08	......
Oscillator	100,000	.08	.1	8,700	.....	...	......
I. F.	Infinity	510	.1	18,600	.....	...	......
A.V.C. Det.	230,000	510	.1	510	.....	...	......
A.V.C. Det.	230,000	510	.1	510	.....	...	......
Audio	750,000	422	.1	110,000	.....	...	......
Output	275,000	......	.1	19,000	.....	...	18,800
Output	275,000	......	.1	19,000	.....	...	18,800
Rectifier	....	......	18,800	1,580	.....	...	......

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

VOLTAGE ANALYSIS

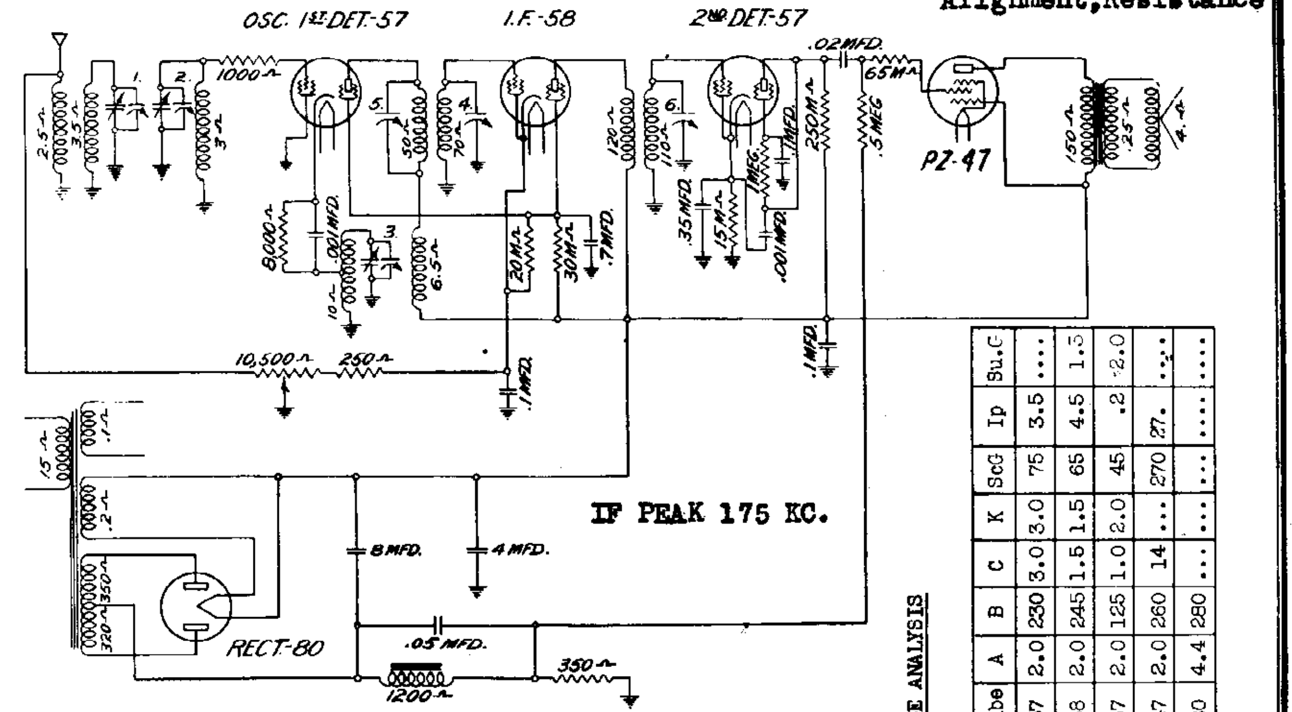
Model 260

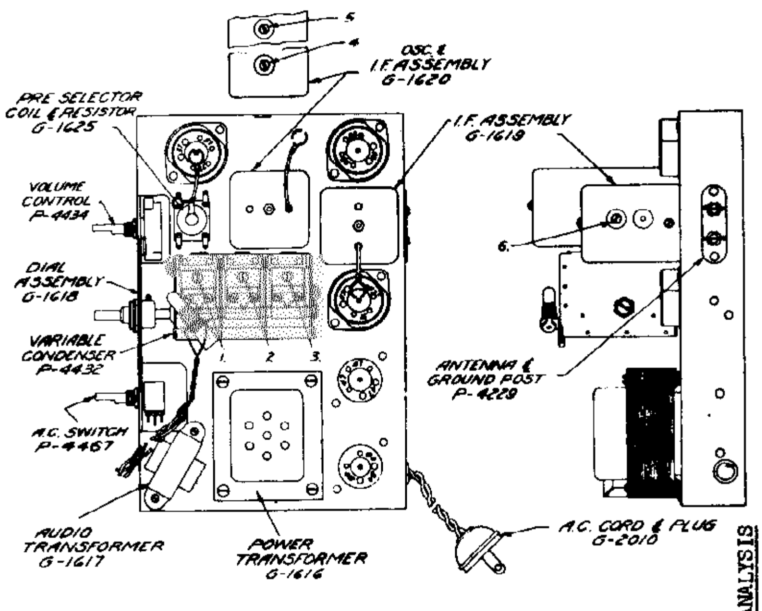
No.	Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volts	Cath. Volts	Screen Volts	Ip Norm.	Misc.
1	R. F.	51 or.35	2.15	250	.4	4.	80	4.	.....
2	1st Det.	57	2.25	137	4.5	5.	83	.5	Suppressor Grid 4.5
3	Osc.	27	2.25	107	0	0	0	8.	.....
4	I.F.	51 or 35	2.25	244	.4	4.	76	1.7	.....
5	AVC Det.	27	2.25	0	2.5	4.5	0	0	.....
6	AVC Det.	27	2.25	0	2.5	4.5	0	0	.....
7	1st Audio	56	2.25	178	2.	4.	0	1.5	.....
8	Pentode.	47	2.25	235	16.	0	0	25.	Pentode Sp. C Grid 245
9	Pentode	47	2.25	235	16.	0	0	25.	Pentode Sp. C Grid 245
10	Rect.	80	4.9	140	0	0	0	98.	.....

Vol. control "full on".
Tested with Weston model 565 analyzer.
Line: 115 Volts.

MODEL 7048
Schematic, Voltage Alignment, Resistance

SEARS-ROEBUCK & CO.





VOLTAGE ANALYSIS

No.	Stage	Tube	A	B	C	K	ScG	Ip	Su.G
1	Autodyne	57	2.0	230	3.0	3.0	75	3.5	....
2	I.F.	58	2.0	245	1.5	1.5	65	4.5	1.5
3	2nd. det.	57	2.0	125	1.0	2.0	45	.2	2.0
4	Output	47	2.0	260	14	...	270	27.	....
5	Rectifier	80	4.4	280	...	...	...	....	....

Vol. control "full on".
Line: 115 volts.

CIRCUIT RESISTANCE ANALYSIS

Socket to Ground

Stage	Grid	Cath-ode	Heater	Plate	Screen G	Suppr. G	Space G
Auto-dyne	1,000	8,000	.1	50,000	20,000	.1	......
I.F.	70	270	.1	50,000	20,000	*270.	......
2nd.Det	110	15,000	.1	300,000	Infin-ity	15,000	......
Output	570,000	......	.1	50,000	......	......	50,000
Recti-fier	......	......	50,000	1,900	......	......	......

Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohmmeter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.
*NOTE: On first few thousand sets the I.F. Suppressor Grid Resistance read .1 ohm and was connected to ground.

First connect the 175 K. C. Oscillator to the first detector grid and adjust trimmers Nos. 4, 5 and 6 for maximum output as indicated by the loud speaker, or preferably by a regular output meter; next hook up the broadcast oscillator to the antenna and ground binding posts of the set and adjust number 3 (oscillator gang trimmer) at 1500 K. C., for calibration. This is accomplished by using a broadcast oscillator at 1500 K. C. if the calibration of the broadcast oscillator is known to be accurate or by tuning in a broadcasting station, using "crystal control" at a known frequency between 1400 and 1500 K. C., then adjust number 3 trimmer until the receiver's dial reading is exactly the same as the frequency of the broadcasting station; next readjust trimmers number 2 and 1 for maximum output at a point between 1400 and 1500 K. C., since adjusting at these high frequencies is more accurate and critical. No oscillator padding trimmer is employed on this receiver. The special shape of the oscillator tuning condenser rotor makes such a padding trimmer unnecessary.

Loud Speakers
Cone Replacement Data

SEARS-ROEBUCK & CO.

CONE REPLACEMENT OF OUTSIDE TYPE SUSPENSION SPEAKERS (Fig.2).

1. Unsolder the voice coil leads from their terminals.

2. Remove the suspension mounting screws.

3. Drill out the cone mounting eyelets or cut off the small head ends with a cold chisel and hammer. If care is used, the cardboard mounting rings will not be damaged.

4. Remove the cone and blow out any dirt or metal chips from the air gap.

5. Re-assemble the cone, suspension, and cardboard mounting rings in their original order. Leave the suspension mounting screws loose enough so that the suspension can be shifted about.

6. Insert four strips about 3" long, 1/8" wide and .01" thick (cut from a calling card) between the inside of the voice coil and the pole stem. They should be evenly spaced around the pole stem. Spacers can be obtained from the factory. Part No. S-9177 for 5" and 6" speakers. Part No. S-7391 for all other speakers.

7. Replace the eyelets around the edge of the cone, leaving blank any holes that were originally left blank for speaker to baffle mounting screws. The eyeleting tool illustrated is recommended (Part No. R-8033).

8. Solder the voice coil leads to their terminals.

9. Tighten the suspension screws.

10. Remove the four spacer strips.

11. If it should happen that the cone is not properly centered after the replacement, loosen the suspension mounting screws and move the cone around until proper centering is secured. Sometimes several attempts are necessary before proper centering can be had.

REPLACING THE FIELD COIL IN SPEAKERS HAVING
THE POLE PLATE RIVETED TO THE YOKE (Fig.3).

1. It is always advisable to remove the cone first, as previously outlined, to avoid damaging it and to facilitate the work of field coil replacement.

2. Make a sketch of the coil connections, paying attention to the polarity, i.e.,note whether the start or finish of a winding connects to a particular terminal. This is important since incorrect polarity in speakers with hum bucking coils will increase the hum instead of eliminating it.

3. Drill out the pole-plate-to-yoke-rivets, or cut off the small head ends with a cold chisel and hammer. In some speakers the rivets are aluminum; in others steel. It probably will be easier to drill the steel ones than to cut them off.

4. Dis-assemble the yoke and pole plate and replace the defective coil. Be sure to replace any cardboard spacer rings in their original position.

5. Re-assemble the yoke and pole plate, using nuts and bolts instead of the rivets used originally.

6. Replace the cone and voice coil as outlined previously.

REPLACING THE FIELD COIL IN SPEAKERS HAVING
THE POLE PLATE BOLTED TO THE YOKE. (Fig. 4).

The procedure is the same for this type of speaker as for the type with riveted pole plate and yoke, except that the bolts are unscrewed instead of rivets removed. Be sure to keep the pole plate and yoke in the same relative positions as they were in originally, so that the pole stem will remain properly centered in the pole plate.

REPLACING THE FIELD COIL IN SPEAKERS HAVING
THE POLE PLATE WELDED TO THE YOKE.

1. Remove the cone and voice coil assembly as outlined previously.

2. It will be necessary to break the welds with a cold chisel and hammer, but before doing so, drill four holes through the pole plate and yoke for the bolts and nuts which will replace the welds. Drilling the holes before breaking the welds and making the holes only large enough to pass the bolts will insure proper centering of the pole stem in the pole plate.

FIG. 3.

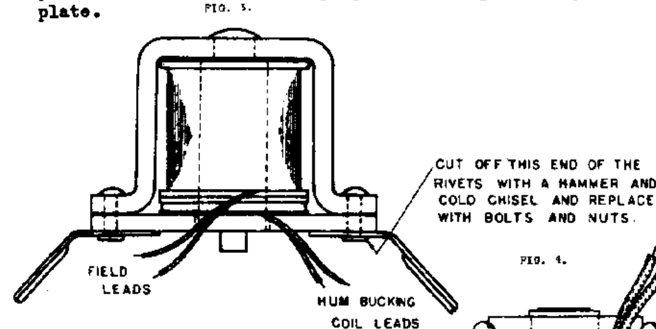
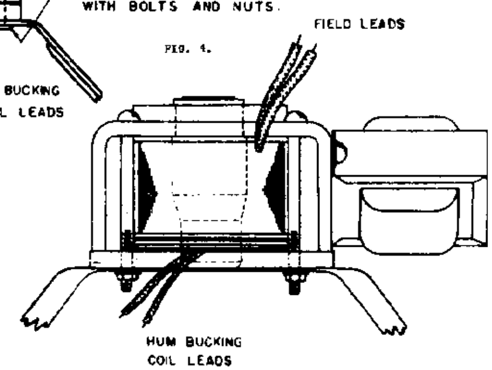
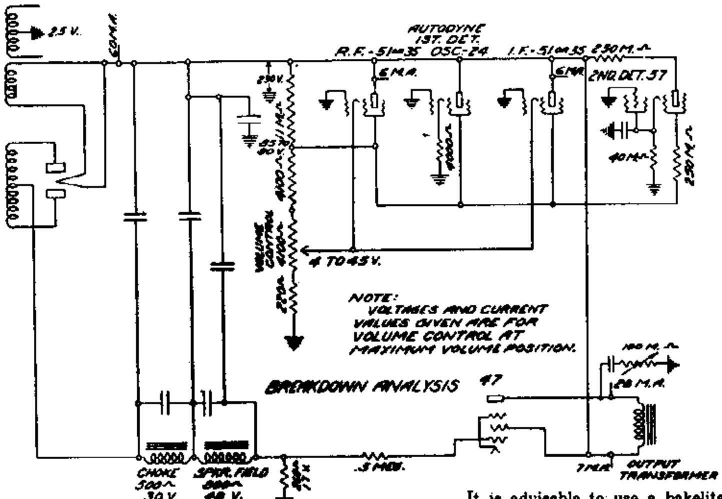


FIG. 4.



SEARS-ROEBUCK & CO.

MODEL 7049
Schematic, Socket
Trimmer Data



READJUSTING TRIMMERS

The most important advice we can give you in regard to the adjustment of trimmers would be "don't make 'em." It has been proven conclusively to us that the Factory adjustment of these trimmers will not vary even when the set is severely jarred or dropped. However, if a customer were to tamper with their settings, a readjustment may have to be made. First, let us explain the location of the various trimmers. Diagram No. 3, top view of the series 220 chassis, shows each trimmer numbered. You should be acquainted intimately with each adjustment. A customer would not have to change the settings very much to ruin the sensitivity of the receiver. Further, if a re-adjustment appears to be necessary, it is imperative to know which circuit is being adjusted when a trimmer is being turned.

It is advisable to use a bakelite screwdriver when making any of these adjustments.

First, connect the 175 k. c. oscillator output leads from the control grid cap of the super-autodyne tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid cap clip from the tube. Reset trimmers numbers 5, 6 and 7 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k. c., and when trimmers number 5, 6 and 7 are set for maximum output, they will be correctly adjusted and should be sealed.

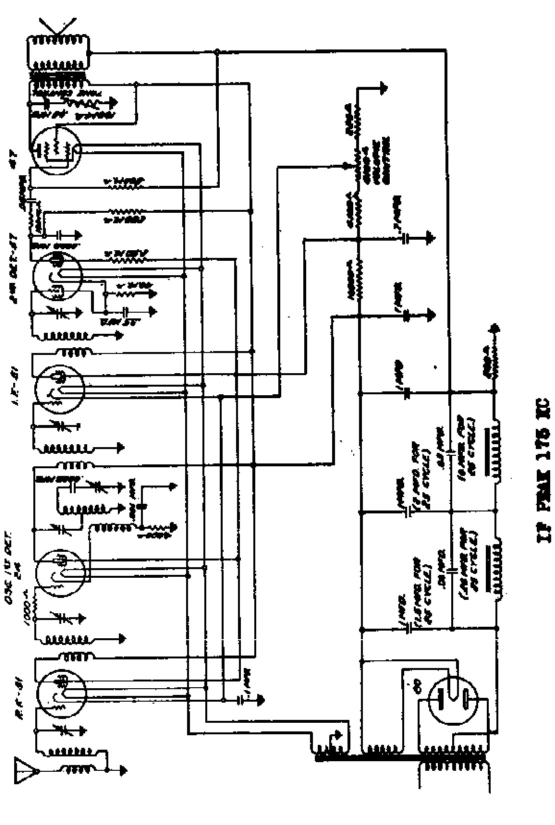
Next, disconnect the 175 k. c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator, or tune in a broadcast signal around 1400 k. c., then reset trimmers numbers 2 and 1 respectively for maximum output. This adjustment will track the super-autodyne grid circuit of the R. F. stage.

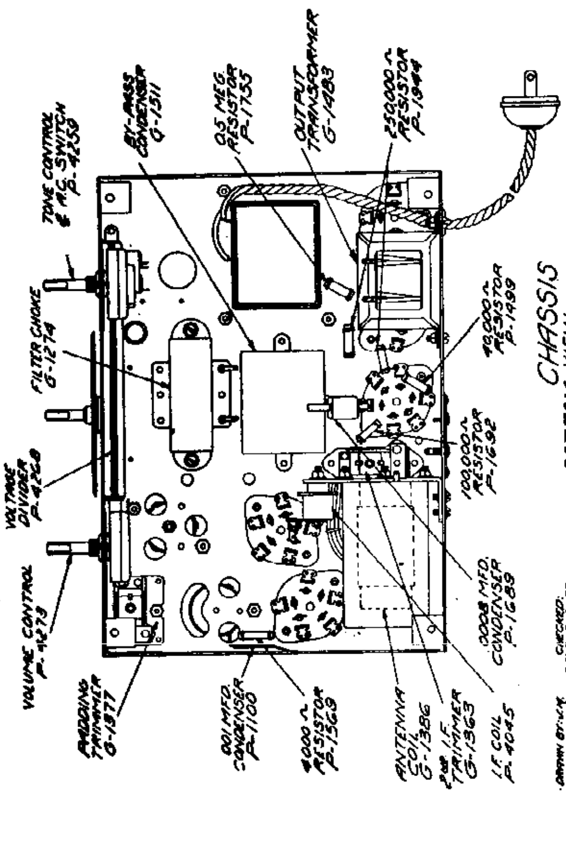
To check the calibration of the receiver, whether it be high or low, trimmer number 3 should be reset until a station of known high frequency is brought in on the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k. c. should be chosen. The setting of the trimmer at 1400 k. c. is more critical than it would be at 600 k. c.; calibration, therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instruction. We will now balance the oscillator to the r. f. and first detector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.





MODEL 7049
Resistance Test Data
Voltage Data, Socket

SEARS-ROEBUCK & CO.

CIRCUIT RESISTANCE ANALYSIS

Socket to ground

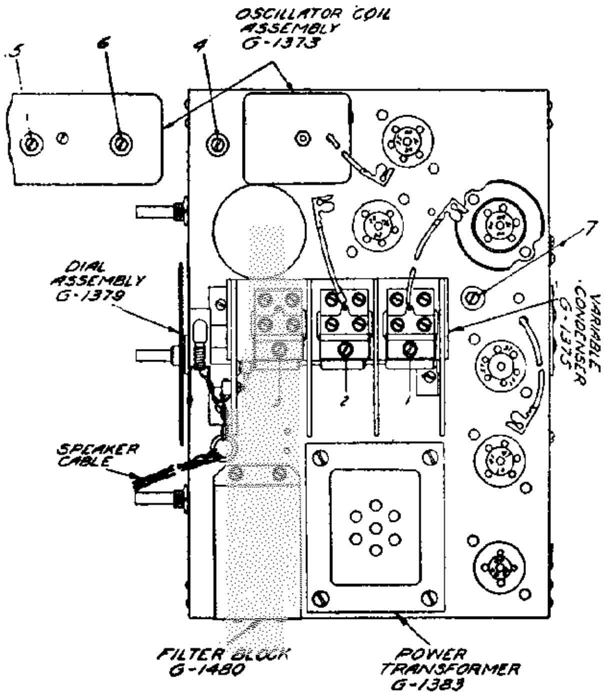
Stage	Grid	Cathode	Heater	Plate	Screen G	Suppr. G	Space G
R.F. .	4.5	220	.1	19,500	8,400	......	......
Auto-dyne.	1,000	5,000	.1	19,500	8,400	......	......
I.F. .	60	220	.12	19,500	8,400	......	......
2nd. det .	70	40,000	.1	270,000	260,000	40,000	......
Output	500,000	......	.1	19,600	....	......	19,400
Rectifier.	....	......	19,500	..1,870	....	......	......

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

VOLTAGE ANALYSIS

No.	Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid	Cath. Volts	Screen Volts	Ip. Norm.	Misc.
1	R.F .	51	2.15	245	3.4	3.1	81	5.	
2	Auto-dyne 1st. Det.	24	2.15	240	4.4	5.0	85	1.6	
3	I.F .	51	2.15	245	4.4	3.5	84	7.	
4	2nd. Det.	57	2.25	106	1.8	3.	43	.1	Suppressor Grid 3
5	Output.	47	2.25	245	15.	0.	0	31.	Pent-space Charge-Grid 250
6	Rect.	80	4.8	300	0.	0.	0	68.	

Vol. control "full on".
Tested with Weston model 565 analyzer.
Line: 115 Volts.



Number 1 is the antenna trimmer.

Number 2 is the gang condenser trimmer tuning the grid of the Super-autodyne.

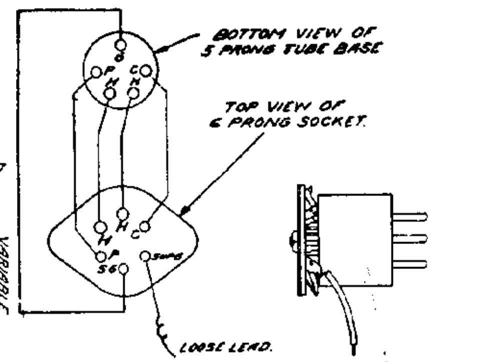
Number 3 is the gang condenser trimmer tuning the plate (or oscillator of the super-autodyne).

Number 4 is the oscillator padding trimmer.

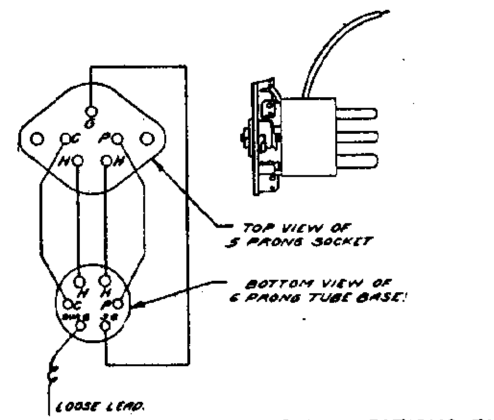
Number 5 is the Super-autodyne plate trimmer.

Number 6 is the I. F. grid trimmer.

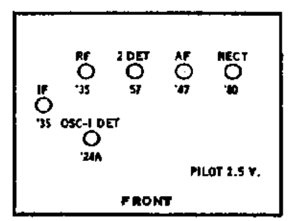
Number 7 is the second detector grid trimmer.



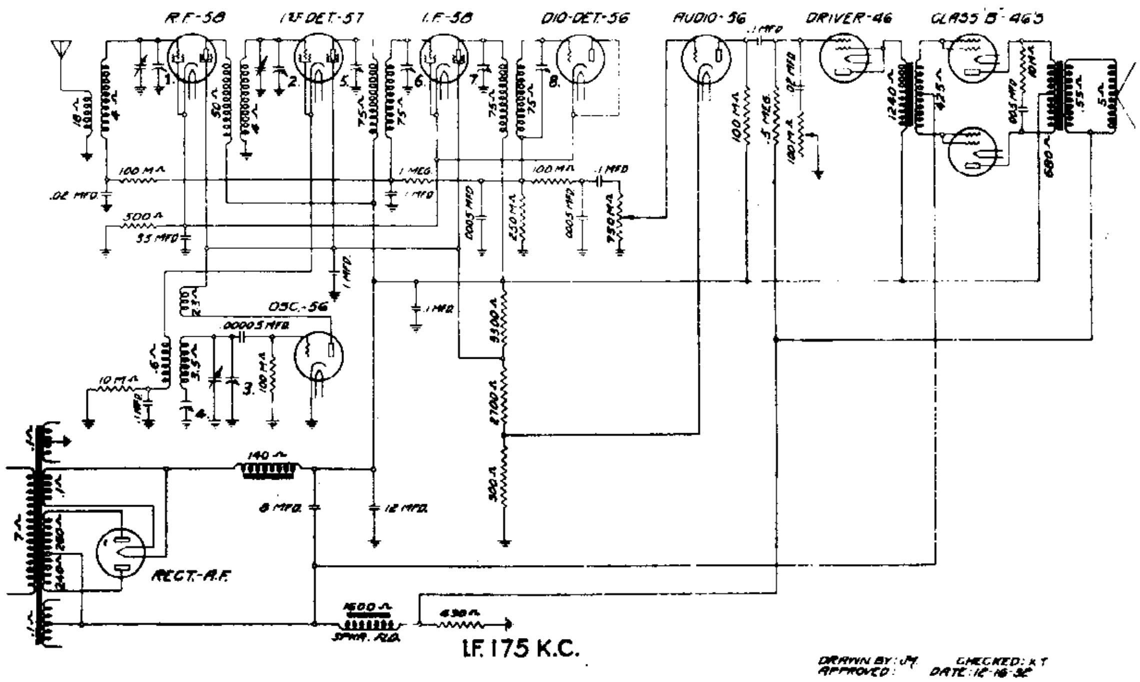
SKETCH OF CONNECTIONS FOR ADAPTER TO PLUG INTO ANALYZER.



SKETCH OF CONNECTIONS FOR ADAPTER TO PLUG INTO SET



SEARS-ROEBUCK & CO.

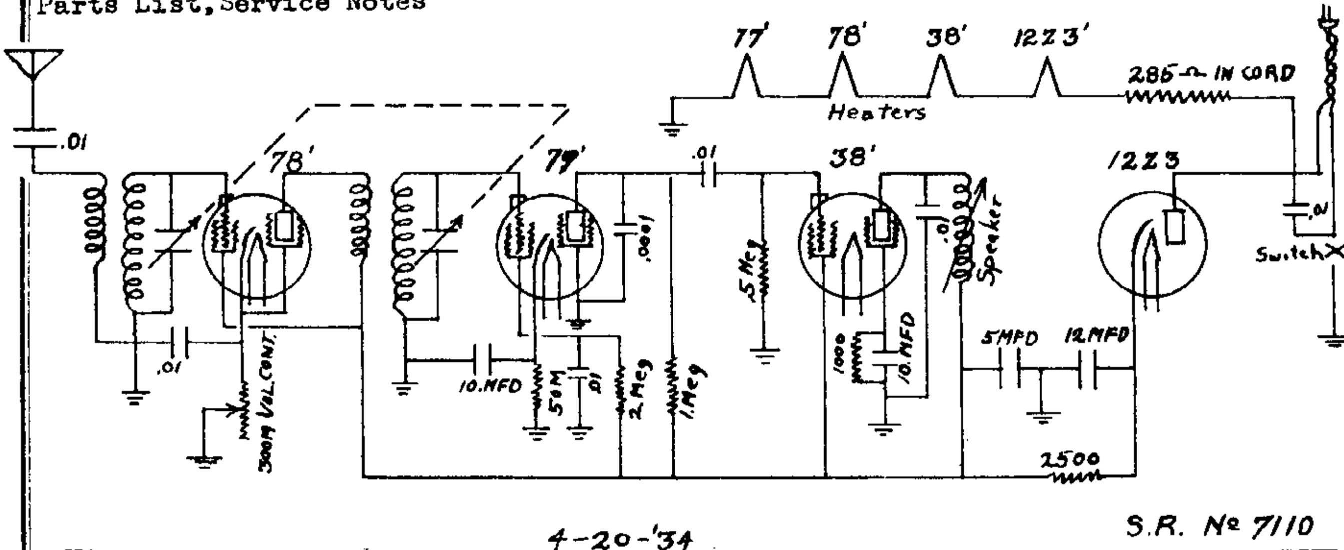


RESISTANCE ANALYSIS

TUBE	STAGE	GRID	CATHODE	HEATER	PLATE	SCREEN	SUPPRESSOR
58	RF	Infinity	500	.1	6300	3000	500
57	1 Det.	4.C	10,000	.1	6300	3000	10,000
56	Oscil.	100,000	0	.1	3000	--	--
58	IF	Infinity	500	.1	6300	3000	500
56	2 Det.AVC	250,000	500	.1	500	--	-
56	AF	750,000	300	.1	100,000	--	-
46	Driver	500,000	-	.1	7600	7600	-
46	Class "B"	2400	-	.1	6700	2400	-
46	Class "B"	2400	-	.1	6700	2400	-
80	Rectifier	---	-	6500	2400	--	-

MODEL 7110
Schematic
Parts List, Service Notes

SEARS-ROEBUCK & CO.



GENERAL INFORMATION

This set is designed to operate on 105-120 volts AC or DC from 25 to 60 cycles. The cord of the set will become quite warm in operation. This is a normal condition, the voltage reducing resistor being an integral part of the line cord for rapid dissipation of heat.

The set is of the conventional tuned radio frequency type and is so developed as to give a minimum of trouble and a maximum of enjoyment.

It is recommended that the aerial be used that is supplied with the set. However, if a longer aerial is used, it is advisable to rebalance the antenna stage of the set to the aerial used. To accomplish this, remove the set from the cabinet and set the dial at about 20 on the scale. Turn the compensator screw on the rear section of the variable condenser back and forth until maximum signal strength is obtained.

This set is designed to oscillate across a major portion of the broadcast band. This regeneration is controllable by reducing the volume of the set. Oscillation in a set of this type increases the sensitivity from ten to twenty times.

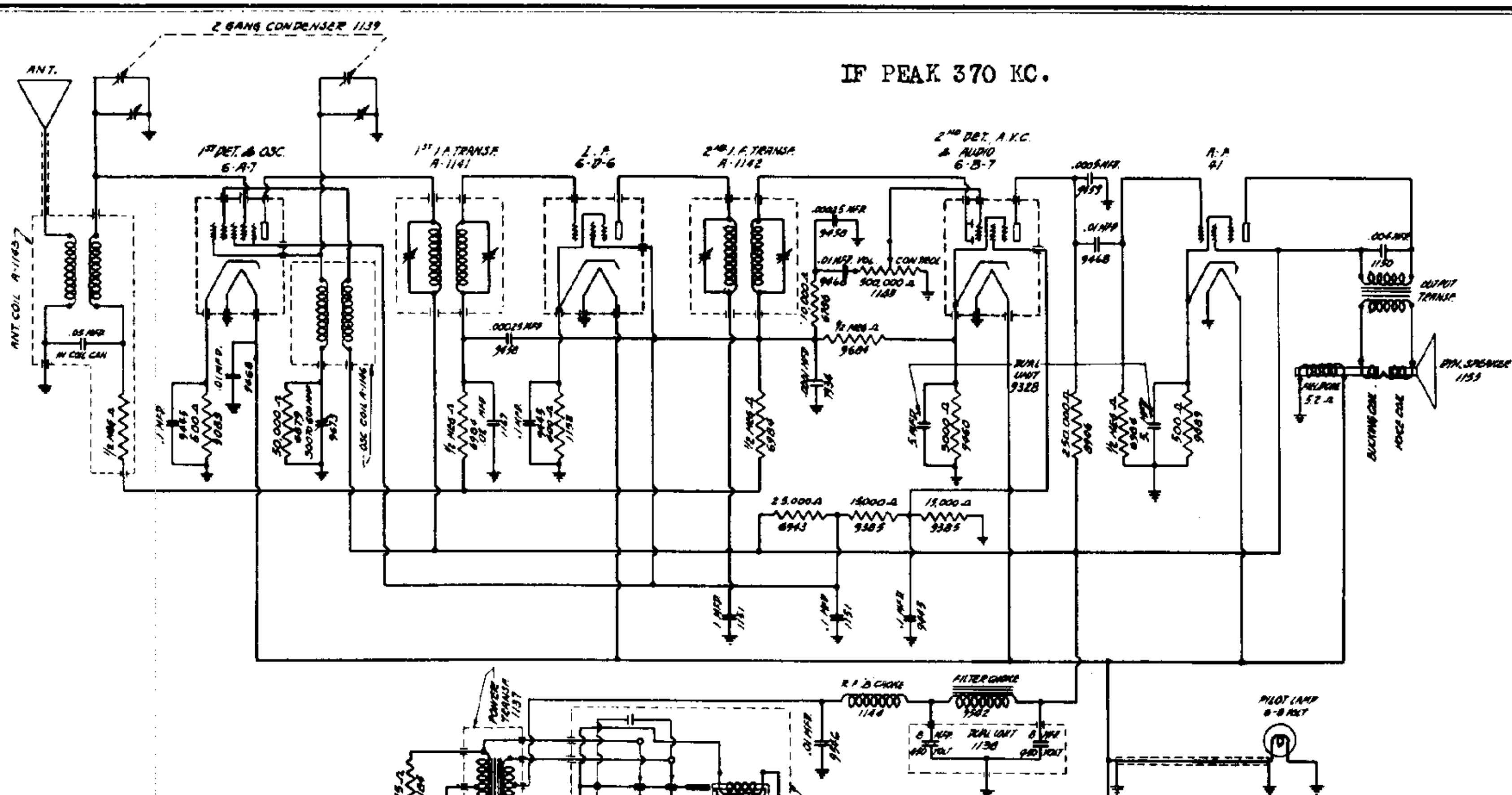
PARTS LIST

No.	
51	Magnetic speaker
52	Variable condenser 2 gang
53	Set of coils - complete
53a	Antenna coil - only
53b	R F Coil - only
54	Cabinet
55	Cordohm 285 ohm
60	Volume control
61	Antenna cords
70	Electrolytic condenser
71	Knob
73	Terminal strip- 3 lug
77	Name Plate - Silvertone or Selector
	Any tube socket (state no. of prongs)
	Any resistor -(state ohms and watts)
	Any bypass condenser (state capacity)

MODEL 7117,1859-A
Schematic
Voltage

SEARS-ROEBUCK & CO.

IF PEAK 370 KC.



NOTE:
1. DOTTED LINES DENOTE SHIELDING
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES
4. I.F. = 370 K.C.

VOLTAGE TABLE

Battery Voltage - 6 Volt
Volume Control - Full on

TYPE OF TUBE	POSITION OF TUBE	FIL. VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO. 3 & 5
6A7	Modulator & Oscillator	6	250	2.5	100	10	250	100
6D6	I. F. Amplifier	6	250	1.	100			
6B7	Second Detector Diode AVC & 1st Audio Triode	6	35##	3	50			
41	Output	6	230	16	250			

##Triode Plate. Comparative Voltage only. Thevoltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

MODEL 7117,1859-A
Alignment Data
Parts List,Installation

SEARS-ROEBUCK & CO.

ALIGMMENT PROCEDURE: It should rarely be necessary to realign the intermediate transformers or the variable condenser. As a matter of fact, this should only be necessary when an intermediate transformer, oscillator or R. F. coil has become defective and require replacement. For properly aligning either the intermediate transformer or condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 370 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer which is accessible from the top of the I. F. transformer up and down until maximum reading is obtained on the meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner.

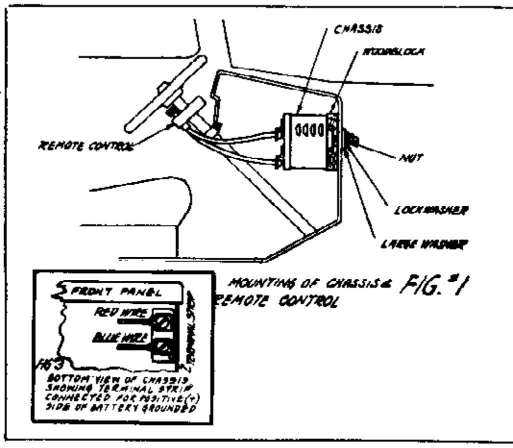
4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER: To align the variable condenser and padding condenser it is necessary that the receiver chassis be removed from the set housing. After the receiver chassis has been removed connect the remote control flexible drive shafts in their respective couplers, and set the dial needle on the dial face so that the dial calibration is correct.

1. Connect the high output side of theoscillator to the antenna and the ground to the receiver chassis.

2. Tune the receiver to exactly 1500 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1500 KILOCYCLE SIGNAL (TO MAXIMUM OUTPUT) BY ADJUSTING THE OSCILLATOR VARIABLE CONDENSER TRIMMER MOUNTED ON TOP OF THE VARIABLE CONDENSER. THEN ADJUST THE OTHER VARIABLE CONDENSER TRIMMER FOR MAXIMUM OUTPUT. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency, then adjust the 600 padding condenser which is located on the right hand side and accessible through the hole in the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment, using the position where greatest output is obtained.



MOUNTING OF CHASSIS & REMOTE CONTROL FIG. #1

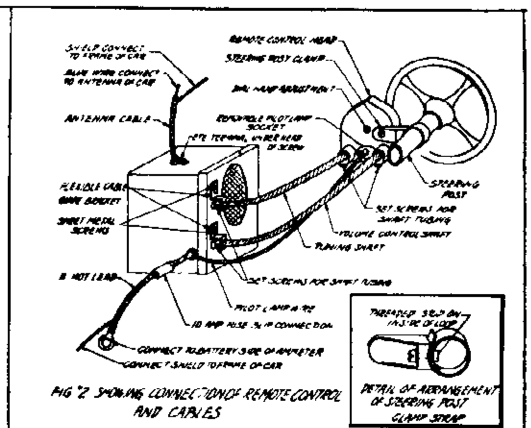


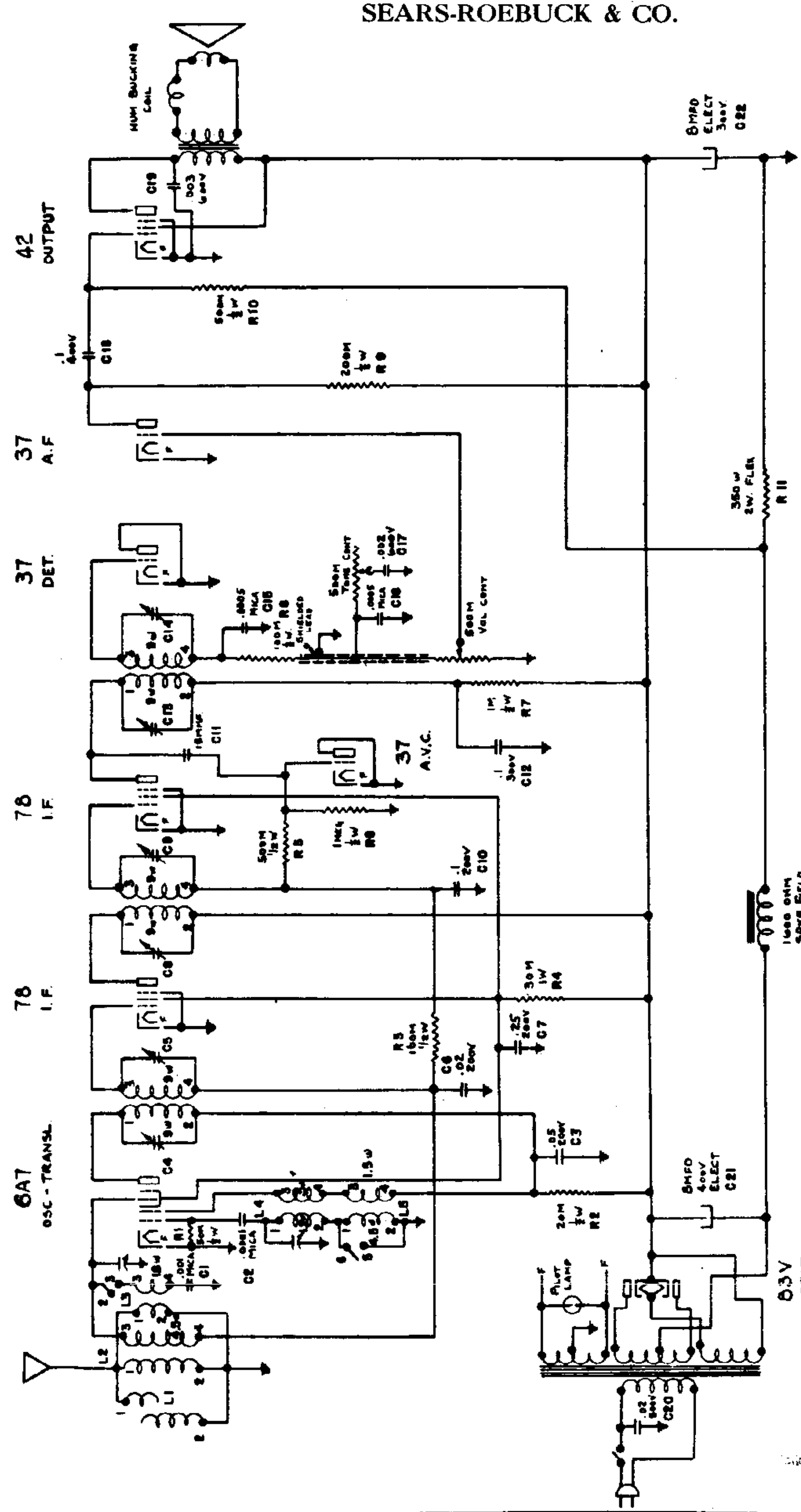
FIG 2 SHOWING CONNECTION OF REMOTE CONTROL AND CABLES

Always determine the polarity of the car battery post which is grounded to the automobile chassis before installing the receiver. When shipped from the factory the receiver is properly connected as illustrated (Fig. 3) for installation in automobiles which have the positive (+) battery post grounded to the car frame. If the negative (-) battery post is grounded, the position of the red and blue leads as shown on the terminal strip diagram must be reversed. As the terminal strip is located underneath and toward the right front corner of the receiver chassis it is necessary to remove the chassis from the set housing to make this change. This is accomplished by removing the sheet metal screw that grounds the antenna shield lead to the housing top, the twelve (12) machine screws around the edge of the housing front, the single machine screw on the bottom of the housing and then grasping the front panel of the housing and pulling outward. Using the receiver in an automobile with improper terminal strip polarity connections will result in damage to the vibrator unit, transformer or electrolytic condenser.

PART NUMBER	
1143	Antenna Coil
1146	Oscillator Coil
1141	First I. F. Transformer
1142	Second I. F. Transformer
1155	Dynamic Speaker
9673	Padding Condenser
1139	Two Gang Condenser
1145	Volume Control
9328	Electrolytic Condenser 2 x 5 Mfd.
9458	.00025 Mfd. Moulded Condenser
9459	.0005 Mfd. Moulded Condenser
7934	.0001 Mfd. Moulded Condenser
9445	.1 Mfd. 200 Volt Condenser
1148	.5 Mfd. 200 Volt Condenser
9468	.01 Mfd. 400 Volt Condenser
9546	.01 Mfd. 600 Volt Condenser
1150	.004 Mfd. 600 Volt Condenser
1151	.1 Mfd. 400 Volt Condenser
1167	.02 Mfd. 200 Volt Condenser
1164	75 Ohm Wire Wound 1 Watt Resistor
6943	25,000 Ohm 1 Watt Resistor
6879	50,000 Ohm 1/3 Watt Resistor
9385	15,000 Ohm 1/3 Watt Resistor
9089	500 Ohm 1/3 Watt Resistor
1152	400 Ohm 1/3 Watt Resistor
6875	250 Ohm 1/3 Watt Resistor
9460	3,000 Ohm 1/3 Watt Resistor
6786	10,000 Ohm 1/3 Watt Resistor
6984	500,000 Ohm 1/3 Watt Resistor
8906	250,000 Ohm 1/3 Watt Resistor
9581	10 Ampere Fuse
1159	"A" Battery Cable complete with fuse
1140	Vibrator
1137	Power Transformer
1138	2 x 8 Mfd. Condenser Block
9539	R. F. "A" Choke
1144	R. F. "B" Choke
9598	.5 Mfd. Generator Condenser

MODEL 7118,1708-A
Schematic
Voltage

SEARS-ROEBUCK & CO.



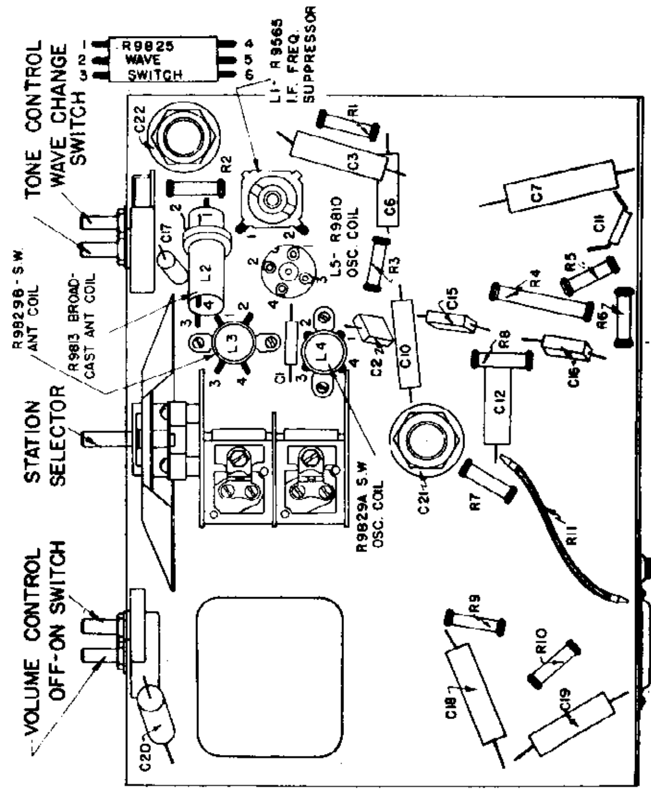
TUBE	PLATE VOLTS	SCREEN VOLTS	PLATE M.A.	SCREEN M.A.
78 1st IF	245	100	6.5	2
78 2nd IF	245	100	6.5	2
37 AF	20		1.25	
42 Output	235	245	23	6

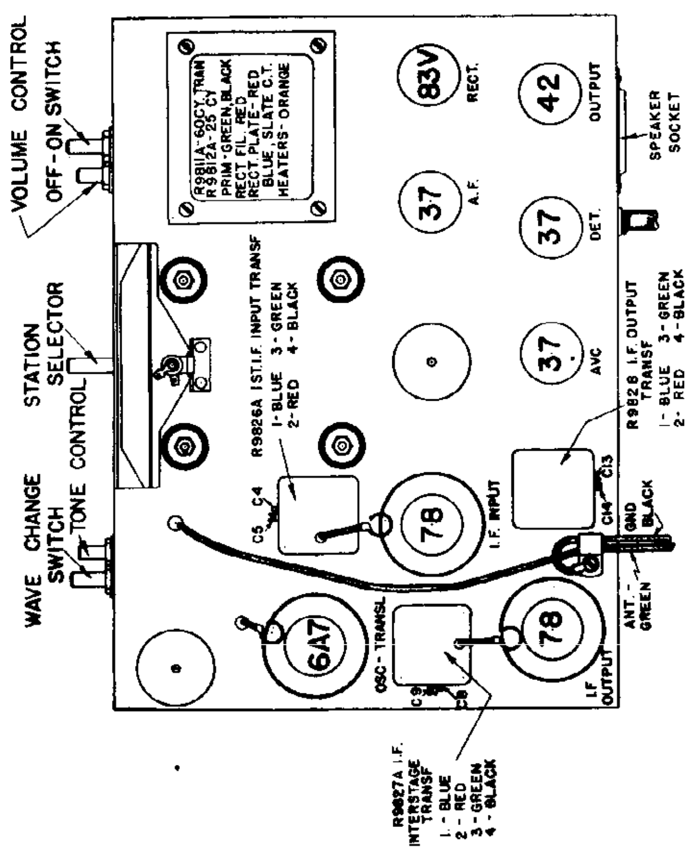
6A7 Osc-Transl. Ep=245v. Eg2=175v. Eg3&5=80v.
Ip=4.25ma. Ig2=2.5ma. Ig3&5=1.75ma.

83V Rectif. Max.D-C=360v Ip=29ma per plate

MODEL 7118,1708-A
Socket Layout
Chassis,Parts List

SEARS-ROEBUCK & CO.

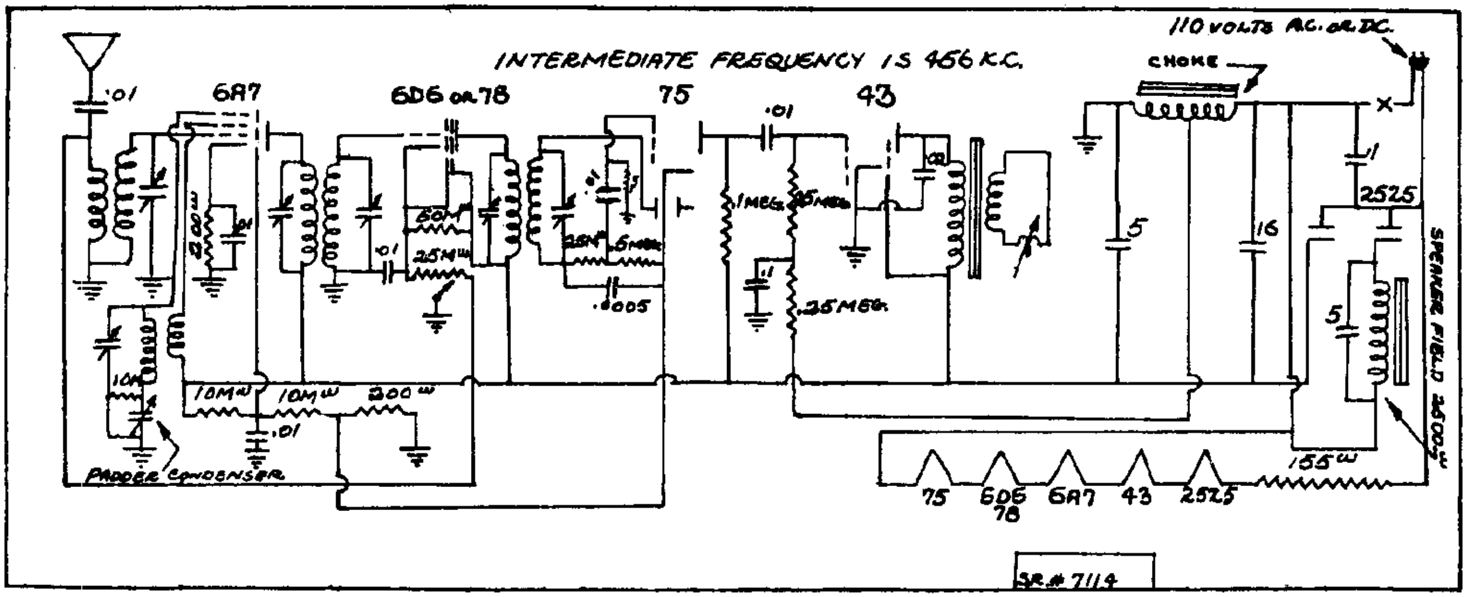




Part No.	Description
R-8297-A	Board - Terminal, double
R-8508-A	Board - Terminal, triple
R-9949	Card - Operating
R-4715	Clamp - Ant. & gnd. leads
R-7011-A	Clip - Ant. lead
R-6381	Clip - Grid
R-9813	Coil - Antenna
R-9810	Coil - Oscillator
R-9565	Coil - Int. Freq. suppressor
R-9829-B	Coil - Ant. S.W.
R-9829-A	Coil - Osc. S.W.
R-9816	Condenser - Variable
R-9816-A	Condenser - Variable complete with drive assembly and dial
D-4758-P	Condenser - 8 Mfd. electrolytic
R-8483	Condenser - 8 Mfd. electrolytic
R-9817	Condenser - .25 mfd. 200 volt
R-8931	Condenser - .1 Mfd. 400 volt
R-6138	Condenser - .1 Mfd. 300 volt
R-6444	Condenser - .1 Mfd. 200 volt
R-7354	Condenser - .05 Mfd. 200 volt
R-9899	Condenser - .02 Mfd. 600 volt
R-6629	Condenser - .02 Mfd. 200 volt
R-7681	Condenser - .003 Mfd. 600 volt
R-6933	Condenser - .002 Mfd. 600 volt
R-6759	Condenser - .001 Mfd. Mica
R-6760	Condenser -.0005 Mfd. Mica
R-4303	Condenser - .0001 Mfd. Mica
R-8042	Condenser - .000015 Mfd.
R-6570	Control - Tone & Volume
R-6989	Cord - Power
R-9819-A	Dial and Indicator
R-8889	Escutcheon
R-9819	Indicator
R-9948	Instruction leaflet
R-8893	Knob - Large
R-8896	Knob - Medium
R-2288	Lamp - Pilot
R-5346-B	Lead - Antenna
R-5345-D	Lead - Ground
R-5823	Resistor - 1 meg. 1/2 watt carbon
R-6172	Resistor - 500 M ohms 1/2 watt carbon
R-5830	Resistor - 200 M ohms 1/2 watt carbon
R-6064	Shield - Chassis bottom
R-6450	Shield - Elec. Cond.
R-8366	Socket - 4 prong
R-8367	Socket - 5 prong
R-8368	Socket - 6 prong
R-8369	Socket - 7 prong
S-9814	Speaker, complete
S-7776-B	Speaker Cone and Voice Coil
S-7893	Speaker hum bucking coil
S-9846	Speaker field coil
S-7769	Speaker clamping ring
S-7770	Speaker clamping ring
S-9840-AS	Speaker Transformer
S-7414	Speaker plug
R-7609	Switch - Filament
R-9825	Switch - Wave
R-9826-A	Transformer - IF input
R-9827-A	Transformer - IF interstage
R-9828	Transformer - IF output
R-9811-A	Transformer - 60 cycle power
R-9812-A	Transformer - 25 cycle power
R-5819	Resistor - 100 M ohms 1/2 watt
R-6445	Resistor - 50 M ohms 1/2 watt
R-6689	Resistor - 30 M ohms 1 watt
R-5821	Resistor - 20 M ohms 1/2 watt
R-6154	Resistor - 1 M ohms 1/2 watt
R-9947	Resistor - 350 ohms, 2 watt,
R-9882	Screw - Dial pointer
R-7559	Screw - Escutcheon
R-6652-A	Shaft - Dial drive
R-6748-A	Shield - Tube, bottom
R-6749	Shield - Tube, top

MODEL 7114
Schematic
Alignment Data
Parts List

SEARS-ROEBUCK & CO.



GENERAL INFORMATION

This set is a superheterodyne designed to operate on alternating or direct current of any commercial frequency.

To operate, unreel the aerial to its full length and lay on the floor or drop out of a window. Turn the volume control all the way on. If after a few minutes the set does not function, reverse the plug in the wall socket.

The cord of this set becomes quite warm when the set is in operation. This is a natural condition as the voltage reducing resistor is woven in this cord.

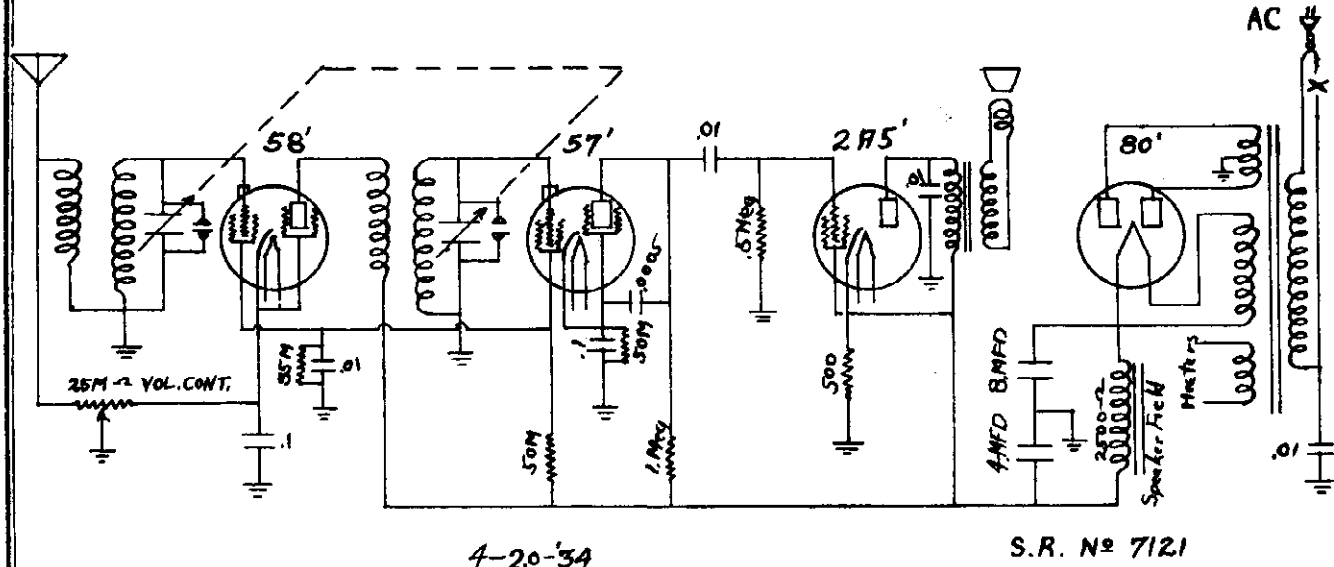
To rebalance the set, first align the I.F. transformers at 456 kc. Then with the variable condenser turned to zero, adjust the trimmers on the variable to 1712 kc. Now tune the set to some frequency around 1400 kc and readjust the detector section only to maximum output. The padder condenser (which is located beneath the chassis) is now readjusted at 600 kc. Tune the set to some signal around 600kc and with a No.4 Spintite adjust the padder condenser for maximum output, at the same time rocking the variable condenser back and forth to follow the signal.

PARTS LIST

No.	
52	Variable condenser 2 gang
61	Antenna Cord
74	Terminal Strip-7lug
101	Dynamic Speaker
102	Set of Coils
102A	Osc. Coil
102B	R.F. Coil
102C	IF Transformer
103	Choke
104	Cordohm -155 ohm
105	Volume Control
106	Electrolytic condenser
107	Cabinet

MODEL 7121
Schematic
Notes, Parts List

SEARS-ROEBUCK & CO.



GENERAL INFORMATION

This set is designed to operate on 105-120 volts, 50-60 cycle, A.C. only.

The set is of conventional tuned radio frequency type, developed to give best results with a minimum of trouble.

An antenna approximately 40' outside is recommended, but it is possible to operate this set on 20-25' inside.

Below are listed a few suggestions as to service:

1. Hum-
   a. Defective filter condenser
   b. Bad tubes
   c. Defective bypass condenser
   d. Open resistor
2. Weak -
   a. Poor tubes
   b. Set out of balance
   c. Shorted bypass condenser
3. Poor tone -
   a. Speaker off center or dirt in voice coil
   b. Defective filter condenser
   c. Poor or defective tubes

This set is designed to oscillate about one-third to half way up the band starting from the police signals - this can be controlled with the volume control.

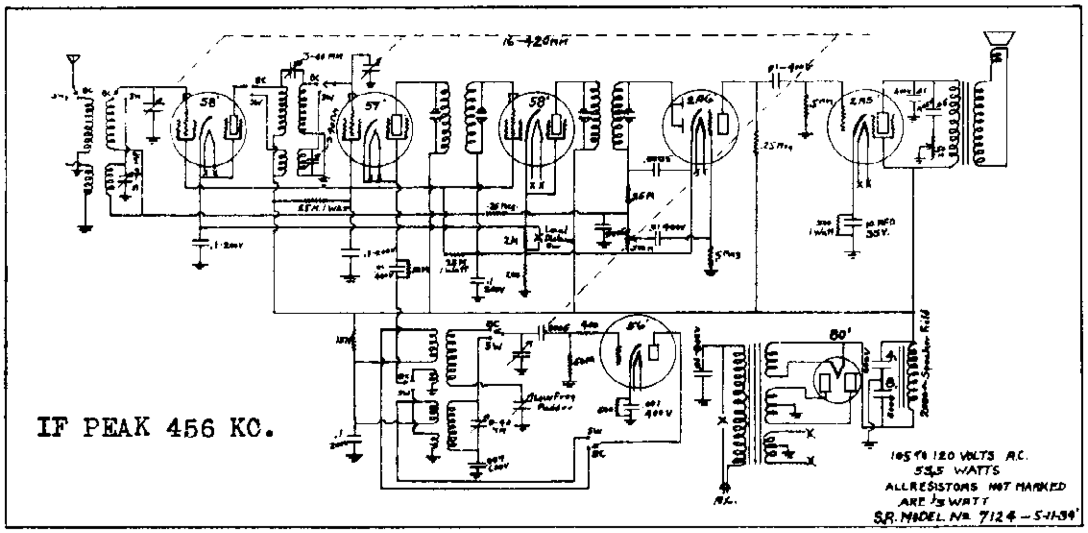
To rebalance set - turn variable condenser all the way open and tune trimming condensers until loudest noise level or if tuned to a police signal at 1720 kc can be heard. Then tune to some weak signal at 1400 k.c. and check trimmers again.

PARTS LIST

No.	
73	Terminal strip-3 lug
150	Cabinet
152	Dynamic Speaker
153	Variable condenser 2 gang
154	Power Transformer
155	Dial scale unit
105	Volume control
156	8&4 electrolytic condenser
157	Set of coils - complete
157a	Antenna coil - only
157b	R.F. coil - only
158	Power cord and plug
159	Knobs
160	Escutcheon plate
	Any tube socket (state number of prongs)
	Any resistor (state ohms and watts)
	Any bypass condenser (state capacity)

SEARS-ROEBUCK & CO.

MODEL 7124
Schematic
Alignment, Parts



GENERAL INFORMATION

This set is designed to operate on 105-120 volts, A.C. The regular band covers from 1712 KC-550 KC and short wave from 15-55 meters.

To align set on broadcast, remove 56 oscillator tube, trim Intermediate Frequency Transformers at 456 KC from an oscillator, feeding same into 57, first detector grid. Secondly, open gang condenser wide open and adjust trimmer condensers on top to maximum noise level, then adjust low frequency padder at approximately 600 KC; after doing this go back and recheck at 1700 KC.

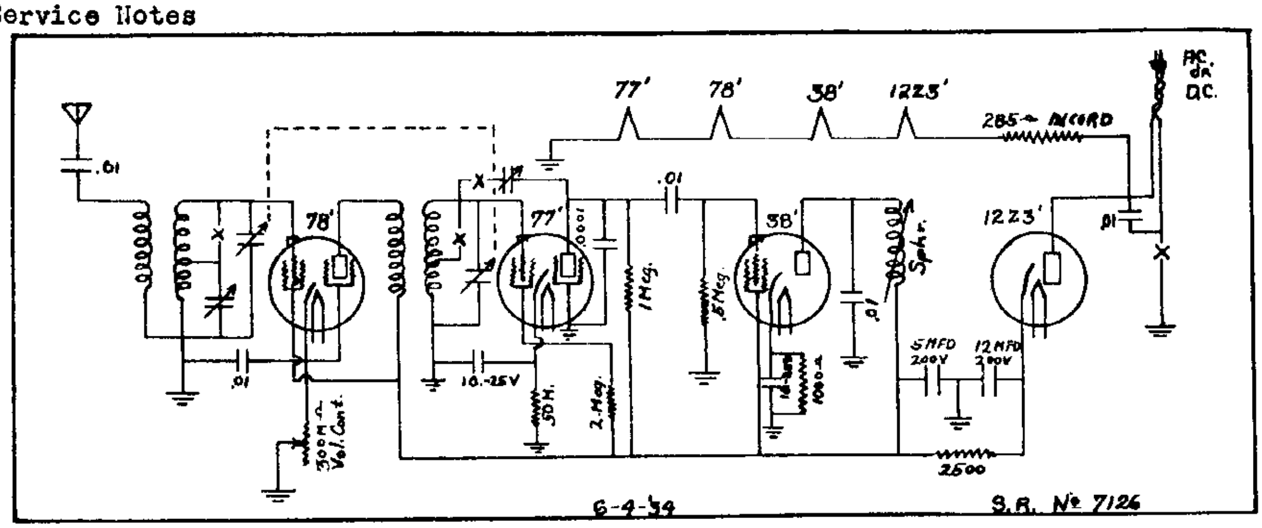
To adjust short wave, turn switch left and tune gang condenser to 31 meters on dial and trim small padders underneath to maximum noise level or some station, checking oscillator coil padder with gang condenser tuned at different points.

PARTS LIST - MODEL SR 7124

No.	
301	Dynamic Speaker 8"
302	Power Transformer
156	8&4 Electrolytic cond.
303	Variable condenser 3 gang
304	Set of coils complete
304a	RF antenna coil only
304b	RF Int. " "
304c	RF Osc. " "
304d	456 KC IF " "
304e	SW & BC Int. " "
304f	" " " Ant. " "
304g	" " " Osc. " "
305	Airplane Dial complete
256	Vol. control-500M ohm
306	Tone control-50M "w/s
261	A.C. Switch
158	Power cord & plug
307	10 mfd 25v Electrolytic
108	Padder condenser 7 plate
308	Short wave switch
73	Terminal strip-3 lug
74	" " 7 "
309	.01 mfd 600v condenser-in can
310	.0018 mica condenser
	Any tube socket (state No. of prongs)
	Any resistor (state ohms & watts)
	Any by pass condenser (state capacity)

MODEL 7126
Schematic, Parts
Service Notes

SEARS-ROEBUCK & CO.



GENERAL INFORMATION

This set is designed to operate on 105-120 volts AC or DC from 25 to 60 cycles. The cord of the set will become quite warm in operation. This is a normal condition, the voltage reducing resistor being an integral part of the line cord for rapid dissipation of heat.

The set is of the conventional tuned radio frequency type and is so developed as to give a minimum of trouble and a maximum of enjoyment.

It is recommended that the aerial be used that is supplied with the set. However, if a longer aerial is used, it is advisable to rebalance the antenna stage of the set to the aerial used. To accomplish this, remove the set from the cabinet and set the dial to about 20 on the scale. Turn the compensator screw on the rear section of the variable condenser back and forth until maximum signal strength is obtained.

To align Short Wave, open variable condenser about half way and adjust the two short wave padders, one underneath and one on top of chassis, to maximum noise level.

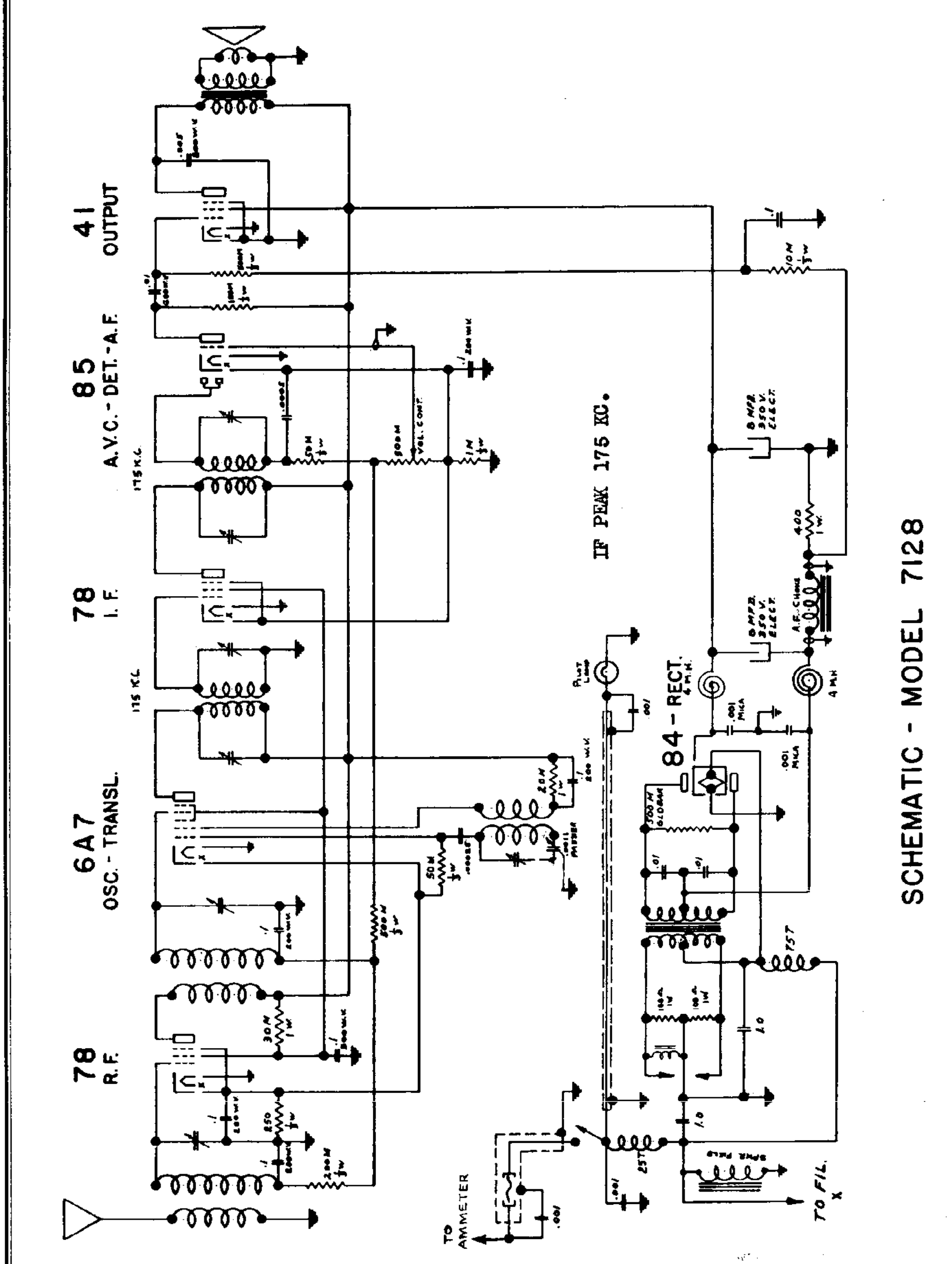
This set is designed to oscillate across a major portion of the broadcast band. This regeneration is controllable by reducing the volume of the set. Oscillation in a set of this type increases the sensitivity from ten to twenty times.

PARTS LIST - S.R.# 7126.

No.	
51	Magnetic speaker
52	Variable condenser
55	Cordohm 285 ohm
56	Complete set of coils
56a	Antenna coil - only
56b	Interstage coil - only
60	Volume control - 300 ohm
61	Antenna cord
70	Electrolytic condenser
71	Knobs
72	Short wave switch knob
73	Terminal strip - 3 lug
77	Name Plate- Silvertone or Selector
312	4 Pole 2 position short wave switch
	Any tube socket (state no. of prongs)
	Any resistor (state ohms and watts)
	Any bypass condenser (state capacity)

SEARS-ROEBUCK & CO.

MODEL 7128
Schematic



MODEL 7128
Alignment, Voltage
Socket, Parts List

SEARS-ROEBUCK & CO.

SILVERTONE - MODEL 7128

The SILVERTONE Model 7128 is a six tube superheterodyne automobile radio receiver. It uses a full wave vibrator and tube rectifier to supply the "B" voltage.

The tubes and their functions are:

78 - RF
6A7 - Oscillator-Translator
78 - IF
85 - AVC-Det-AF
41 - Output
84 - Rectifier

The resistor marked "Globar" in the schematic, is a special voltage regulating resistor. Its value varies with the voltage applied to it. When the receiver is first turned on, the output voltage from the power supply tends to become very high until the tubes heat sufficiently to draw their normal load. Under these conditions, the Globar resistance drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the Globar resistance increases greatly so that it no longer constitutes a load on the power supply.

The voltage drop across the volume control, due to the 85 diode current, is used for AVC voltage.

The general information given in Service Manual Supplement #25, for the Model 1730, will apply as well for the Model 7128.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis. The location of its tuning adjustments is shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment:

1. Connect the test oscillator to the antenna lead through a .00025 mfd. condenser.

2. Set the test oscillator to exactly 1500 kc.

3. Turn the variable condenser plates all the way out. Then slip a piece of card about the thickness of a postal card between the stator and the short end of the rotor plates in such a way that the plates cannot be meshed. Turn the rotor plates sufficiently to clamp the piece of paper between them and the stator. With the plates in this position, adjust the oscillator trimmer for maximum output.

4. Adjust the antenna and translator trimmers for maximum output.

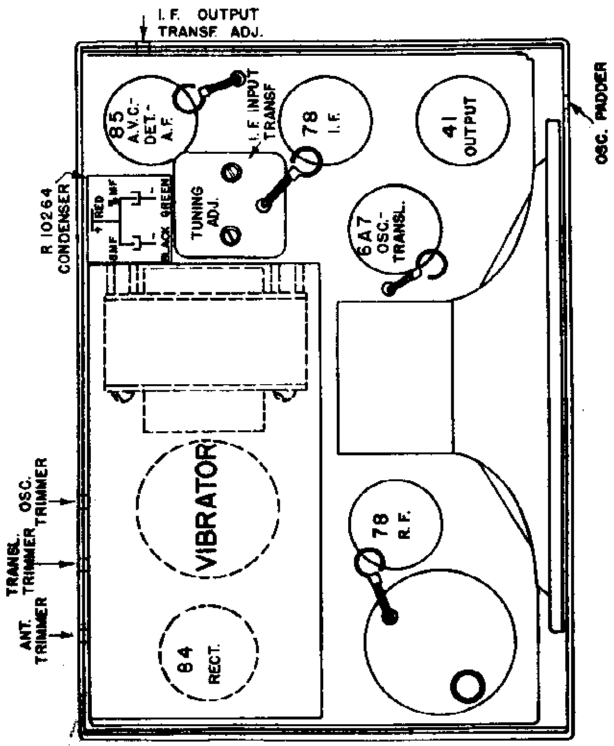
5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator padder until maximum output is obtained.

6. Repeat the trimmer adjustments at 1500 kc.

TUBE VOLTAGE CHART

All readings are to be taken between chassis and the respective element of each tube.

TUBE	PLATE	SCREEN	OSC.SEC. PLATE	CATHODE
78 - RF	205	75		3.7
6A7 - Osc-Transl	205	75	140	3.7
78 - IF	205	75		4.5
85 - AVC-Det-AF	35			
41 - Output	195	205		
84 - Rectifier				205

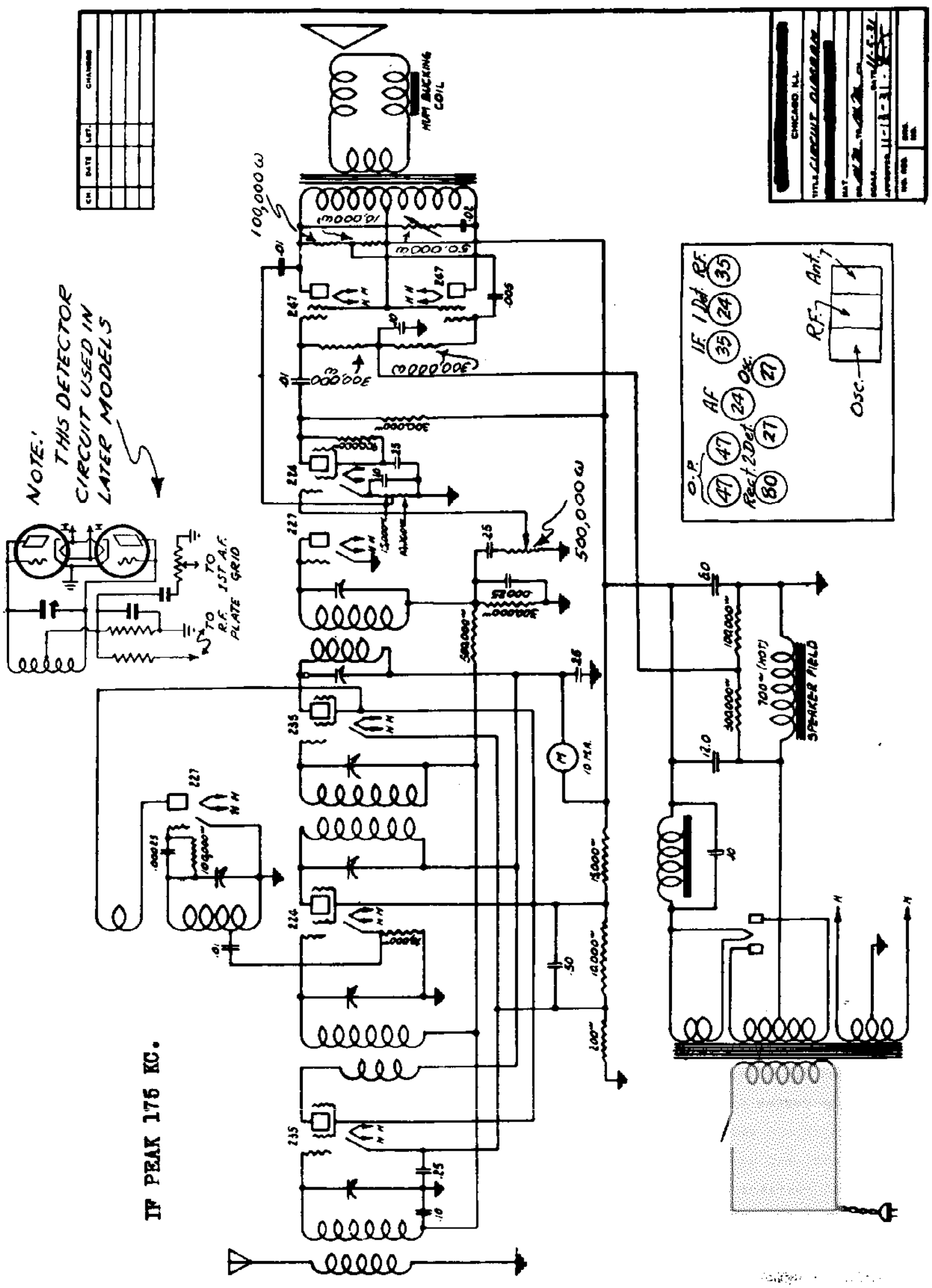


REPLACEMENT PARTS AND PRICE LIST

PART NO.	DESCRIPTION	PRICE PER 100
R8297A	Board - Terminal, double	1.34
R8308B	Board - Terminal, double	1.26
R8308A	Board - Terminal, triple	1.78
R9753B	Board - Terminal, 6 terminals	3.05
R10273	Booklet - Instruction	2.40
R9734A	Cable - Flexible, drive	26.82
R9734E	Cable and casing - Variable condenser drive	71.43
R10064A	Transformer - IF input	44.27
R10065A	Transformer - IF output	52.53
R10263A	Transformer - Power supply	118.31
R9044A	Choke - Single layer	8.93
R10095B	Choke - Triple layer	10.41
R11043	Clip - Grid	.19
R9741	Clip - "A" lead	2.04
R10314	Coil - Antenna	17.30
R10348	Coil - Oscillator	9.33
R10344	Coil - Translator	24.74
R9757	Coil - Choke, pancake type	5.74
R10272A	Coil - Choke, audio	24.90
R10349A	Condenser - Variable, assembly	153.57
R10264	Condenser - 8 mfd. dual, electrolytic	68.25
R10069	Condenser - 1 mfd. 25 volts	13.34
R8030	Condenser - 1 mfd. Generator	19.90
R10025	Condenser - .5 mfd. Ammeter	16.74
R6444	Condenser - .1 mfd. 200 volts	5.74
R9286	Condenser - .1 mfd. 200 volts	4.80
R8581	Condenser - .1 mfd. 300 volts	4.40
R7070	Condenser - .01 mfd. 600 volts	4.50
R9776	Condenser - .01 mfd. 800 volts	4.46
R10431	Condenser - .005 mfd. 800 volts	3.73
R6759	Condenser - .001 mfd. mica	5.68
R6760	Condenser - .0006 mfd. mica	4.56
R4592	Condenser - .00025 mfd. mica	8.28
R9426	Condenser - Padding	13.75
R9710	Control - Volume, 500 M ohms	30.19
R10274	Control - Remote, head	119.46
R7228	Resistor - 500 M ohms, 1/3 watt carbon	5.25
R6638	Resistor - 200 M ohms, 1/3 watt carbon	5.91
R7586	Resistor - 100 M ohms, 1/3 watt carbon	5.91
R6637	Resistor - 50 M ohms, 1/3 watt carbon	5.25
R6689	Resistor - 30 M ohms, 1 watt carbon	6.58
R6095	Resistor - 20 M ohms, 1 watt carbon	6.58
R7587	Resistor - 10 M ohms, 1/3 watt carbon	5.25
R6636	Resistor - 1 M ohms, 1/3 watt carbon	5.25
R8522	Resistor - 400 ohms, 1 watt carbon	5.25
R10268	Resistor - 250 ohms, 1/3 watt carbon	5.25
R8436	Resistor - 100 ohms, 1 watt, flexible	5.25
R9745	Resistor - 500 M ohms, Globar, voltage regulating	10.60

MODEL 114
Schematic
Circuit Change
Socket Layout

SENTINEL RADIO CORP.



MODEL 114
Alignment Data
Voltage, Parts List

SENTINEL RADIO CORP.

VOLTAGE TABLE

Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table given below is taken at 115 volts line with a Model 547 Weston set checker. It must be remembered that the voltage readings taken vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10% plus or minus is permissible.

Tube Voltages

Type of tube	Position of Tube	Filament Volts	B Volts	C Volts	Normal Plate M.A.	Screen Volts
227	Oscillator	2.4	62.5		4.75	
235	Radio Frequency	2.4	240	2.15	2.75	27
224	1st Detector	2.4	230	4.35	.5	65
235	Intermediate	2.4	237	2.15	2.75	72
227	2nd Detector	2.4				
247	Pentode	2.4	220	8.**	32.5	250
247	Pentode	2.4	220	8.**	32.5	250
280	Rectifier	4.9			47.5 ea.plate	
224	1st Audio	2.4	100	2.1*	.5	35*

115 V. line   Volume Control Full On

*These readings are only comparative and are not true voltages applied. The volt meter, when the readings are taken at these points, is in series with a very high resistance.

**To read the 247 bias, read between 247 grid and ground.

ALIGNMENT OF RECEIVER:

Because of the construction and thorough impregnation of the intermediate coils, the intermediate stages should rarely need retracking. Only when an intermediate coil has become defective due to an open or burned out winding, should it be necessary to readjust the intermediate trimmers. Should this occur, it is necessary that an oscillator be used and the intermediate trimmers be adjusted at 175 kilocycles. To align the intermediate stages, connect the high side of the oscillator output to the grid circuit of the first detector, which is done by disconnecting the grid cap of the 224 first detector and connecting the high side of the test oscillator to the control grid of this tube. The ground side of the test oscillator should be connected to the ground post on the chassis. Set the oscillator at 175 kilocycles and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Be sure that the output from the oscillator is not so large that it will overload the second detector. If during the alignment the meter goes off scale, reduce the output of the test oscillator or adjust the receiver volume control.

The trimmers of the intermediate coils are accessible through the small holes in the bottom of the chassis. There are two trimmers to each intermediate coil. Align the grid trimmer of the first intermediate coil. After a maximum reading is obtained by adjusting the grid trimmer on the first intermediate, adjust the primary for maximum reading and then recheck the grid side to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate coils. After both intermediate coils are properly aligned the adjustment of the intermediate stage is complete and they should not be further disturbed.

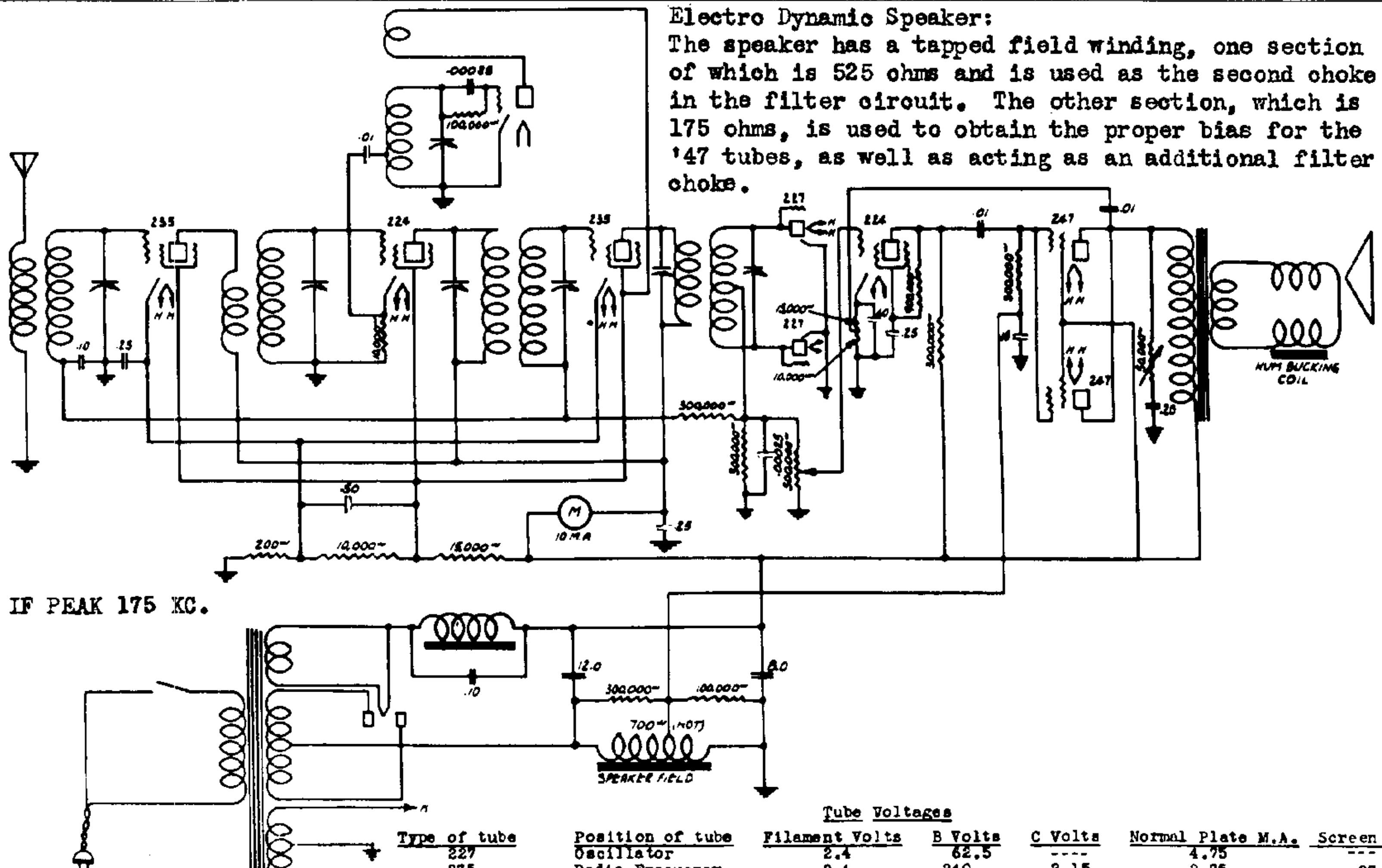
Replace the grid cap on the first detector and connect the oscillator output leads to the antenna and ground posts of the receiver and set the oscillator at 1435 kilocycles. Then tune the receiver to 1435 kilocycles on the dial. It is important that the receiver be tuned to this point. If the receiver is out of the cabinet it will be necessary to use some temporary indicator so that the position 1435 kilocyles on the the dial may be accurately located. (This indicator should be set so that when the variable condensers are at the maximum capacity stop the indicator points to the last line on the dial at the low frequency end.) Then track the variable condensers by adjusting the trimmer condensers in the following order: Oscillator, antenna and radio frequency - (reading from the front of the receiver toward the back, the variable condenser sections are: Oscillator, antenna and radio frequency). After the variable condensers have been properly tracked at 1435 kilocycles, adjust the oscillator to 1295 kilocycles. Tune the receiver to this frequency. Check alignment of the condensers at this point by bending the end plate of the rotors in and out, noting the change in reading on the output meter. If when the plates are bent in the reading is increased, it is an indication that that particular section requires more capacity and the end plate should be permanently bent in at this point; or, if when the end plate is bent away the reading is increased, the end plate should be bent away permanently, as it is an indication that that particular section requires less capacity at that particular point. The variable condensers should be checked in this manner at 1295, 880, 650 and 550 kilocycles. These points have been chosen so as to take advantage of the slots in the end plates of the variable condensers. This procedure of bending plates should rarely be necessary on the oscillator section, as the plates of the oscillator section are especially designed to properly track over the broadcast spectrum, providing the antenna and radio frequency stages are correctly aligned.

7269	200 ohm bias resistor
7038	10,000 ohms 1st detector cathode, 247 plate and 1st audio cathode resistor
7040	100,000 ohms osc. grid, 247 plate, and field shunt resistor
7178	15,000 ohms series screen resistor
7042	900,000 ohms 2nd detector screen resistor
7187	500,000 ohms series bias resistor
7310	300,000 ohms field shunt, 247 grid and 224 plate resistors
7864	Volume control and switch
7037	Tone control resistor
7331	Tone control condenser .05 mfd.
7618	.01 mfd. condenser
7029	.00025 mfd. osc. grid cond. & 2nd detector grid bias resistor bypass
7457	Dynamic speaker
7534	Power transformer for 110 V. 25 cycle
7880	Meter
7501	Power transformer
7051	8 mfd. elec. condenser
7078	12 mfd. elec. condenser
7445	Filter choke
7620	.1 mfd. condenser
7255	Bypass condenser block
7422	Variable condenser

SENTINEL RADIO CORP.

LODEL 118
Schematic
Voltage

Electro Dynamic Speaker:
The speaker has a tapped field winding, one section of which is 525 ohms and is used as the second choke in the filter circuit. The other section, which is 175 ohms, is used to obtain the proper bias for the '47 tubes, as well as acting as an additional filter choke.



IF PEAK 175 KC.

Tube Voltages

Type of tube	Position of tube	Filament Volts	B Volts	C Volts	Normal Plate M.A.	Screen Volts
227	Oscillator	2.4	62.5	----	4.75	---
235	Radio Frequency	2.4	240	2.15	2.75	27
224	1st Detector	2.4	230	4.35	.5	65
235	Intermediate	2.4	237	2.15	2.75	72
227	2nd Detector	2.4	---	----	----	--
227	2nd Detector	2.4	---	----	----	--
247	Pentode	2.4	220	8.**	32.5	250
247	Pentode	2.4	220	8.**	32.5	250
280	Rectifier	4.9	---	----	47.5 ea.plate	---
224	1st Audio	2.4	100	2.1*	.5	35*

115 V. line Volume Control Full On

*These readings are only comparative and are not true voltages applied. The volt meter, when the readings are taken at these points, is in series with a very high resistance.

**To read the 247 bias, read between 247 grid and ground.

MODEL 118
Alignment Data
Socket, Parts List

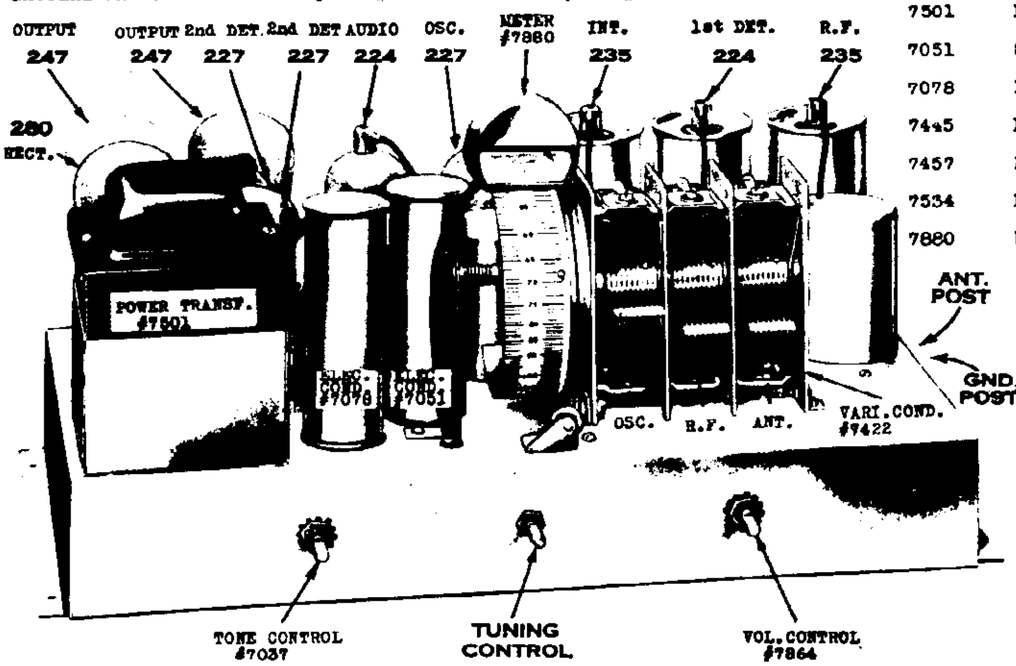
SENTINEL RADIO CORP.

ALIGNMENT OF RECEIVER:
Because of the construction and thorough impregnation of the intermediate coils, the intermediate stages should rarely need retracking. Only when an intermediate coil has become defective due to an open or burned out winding, should it be necessary to readjust the intermediate trimmers. Should this occur, it is necessary that an oscillator be used and the intermediate trimmers be adjusted at 175 kilocycles. To align the intermediate stages, connect the high side of the oscillator output to the grid circuit of the first detector, which is done by disconnecting the grid cap of the 224 first detector and connecting the high side of the test oscillator to the control grid of this tube. The ground side of the test oscillator should be connected to the ground post on the chassis. Set the oscillator at 175 kilocycles and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Be sure that the output from the oscillator is not so large that it will overload the second detector. If during the alignment the meter goes off scale, reduce the output of the test oscillator or adjust the receiver volume control.

The trimmers of the intermediate coils are accessible through the small holes in the bottom of the chassis. There are two trimmers to each intermediate coil. Align the grid trimmer of the first intermediate coil. After a maximum reading is obtained by adjusting the grid trimmer on the first intermediate, adjust the primary for maximum reading and then recheck the grid side to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate coils. After both intermediate coils are properly aligned the adjustment of the intermediate stage is complete and they should not be further disturbed.

Replace the grid cap on the first detector and connect the oscillator output leads to the antenna and ground posts of the receiver and set the oscillator at 1435 kilocycles. Then tune the receiver to 1435 kilocycles on the dial. It is important that the receiver be tuned to this point. If the receiver is out of the cabinet it will be necessary to use some temporary indicator so that the position 1435 kilocycles on the dial may be accurately located. (This indicator should be set so that when the variable condensers are at the maximum capacity stop the indicator points to the last line on the dial at the low frequency end.) Then track the variable condensers by adjusting the trimmer condensers in the following order: Oscillator, antenna and radio frequency - (reading from right to left the variable condenser sections are: Oscillator, radio frequency and antenna). After the variable condensers have been properly tracked at 1435 kilocycles, adjust the oscillator to 1295 kilocycles. Tune the receiver to this frequency. Check alignment of the condensers at this point by bending the end plate of the rotors in and out, noting the change in reading on the output meter. If when the plates are bent in the reading is increased, it is an indication that that particular section requires more capacity and the end plate should be permanently bent in at this point; or, if when the end plate is bent away the reading is increased, the end plate should be bent away permanently, as it is an indication that that particular section requires less capacity at that particular point. The variable condensers should be checked in this manner at 1295, 800, 650 and 550 kilocycles. These points have been chosen so as to take advantage of the slots in the end plates of the variable condensers. This procedure of bending plates should rarely be necessary on the oscillator section, as the plates of the oscillator section are especially designed to properly track over the broadcast spectrum, providing the antenna and radio frequency stages are correctly aligned.

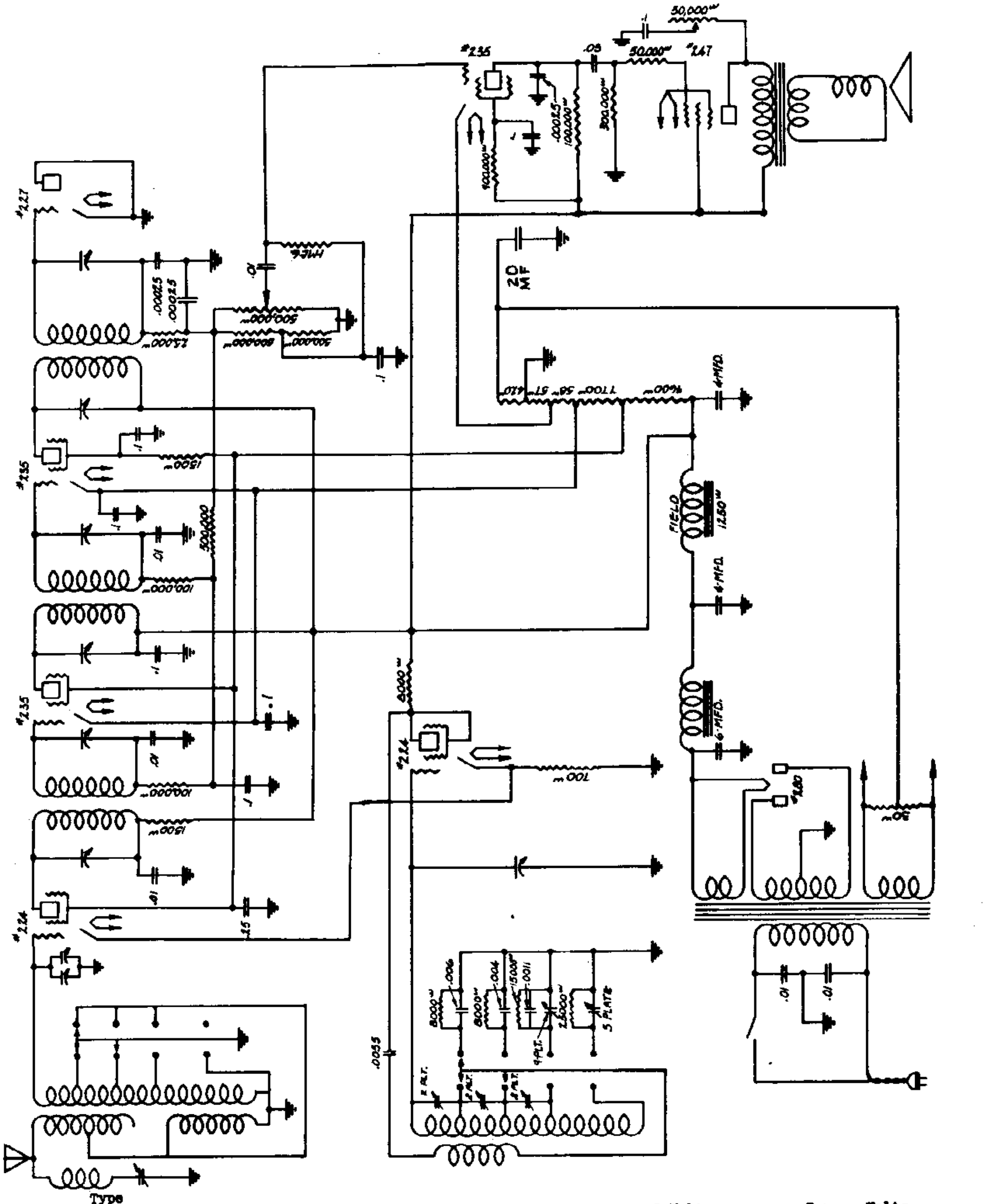
7501	Power transformer
7051	8 mfd. elec. condenser
7078	12 mfd. elec. condenser
7445	Filter choke
7457	Dynamic speaker
7534	Power transformer for 110 V. 25 cycle
7880	Meter



7269	200 ohm bias resistor	7310	300,000 ohms field shunt,
7038	10,000 ohms 1st detector cathode, 247 plate and 1st audio cathode resistor	7864	Volume control and switch
7040	100,000 ohms osc. grid, 247 plate, and field shunt resistor	7037	Tone control resistor
7178	15,000 ohms series screen resistor	7331	Tone control condenser .05 mfd.
7042	900,000 ohms 2nd detector screen resistor	7618	.01 mfd. condenser
7187	500,000 ohms series bias resistor	7029	.00025 mfd. osc. grid cond.
7255	Bypass condenser block	7620	.1 mfd. condenser
7422	Variable condenser	SE-269	Pilot light

SENTINEL RADIO CORP.

MODEL 125
Schematic
Voltage



Type of Tube	Position of Tube	Filament Volts	B Volts	C Volts	Screen Volts
224	Modulator	2.35	250	10	100
224	Oscillator	2.35	160	12.5	160
235	First I. F.	2.35	250	7	100
235	Second I. F.	2.35	250	7	100
227	Detector	2.35	---	----	---
235	First Audio	2.35	125*	5	25*
247	Audio	2.35	230	16.5	250
280	Rectifier	4.85	34 MA each plate		

These readings are only comparative and are not true voltages applied. The voltmeter, when the readings are taken at these points, is in series with a very high resistance.

MODEL 261,521
Battery Data
Parts List

SENTINEL RADIO CORP.

In the first models of the automobile radio the B- and hot "A" leads were connected as shown in diagram "A". In the present model these leads are as shown in diagram "B". All other connections are identical, as shown on the schematic drawing. Connecting the black lead in the cable, designated as B- in the instruction sheet, to the hot 6 volt post of the eliminator will supply the hot 6 volts and provide an "off and on" switch for the B eliminator as well as the receiver itself. In this way no other connection between the hot 6 volt lead of the eliminator and battery should be made and no switch for the hot lead to the eliminator is necessary; the set switch controlling both the B eliminator and receiver.

When using B batteries, the black lead should be connected to the B- of the batteries but under no circumstance should a separate lead from the B- terminal of the batteries be run to the chassis of the car or the shielded cable. In other words do not ground the B- terminal of the B batteries.

The only difference in the tube equipment between the early and present models is the output tube. The first model utizized a #41 output tube and the present model a #89 tube. Complete complement of tubes is:

One (1) Type 36	One (1) Type 85
Two (2) Type 39	One (1) Type 89

DIAGRAM "A"

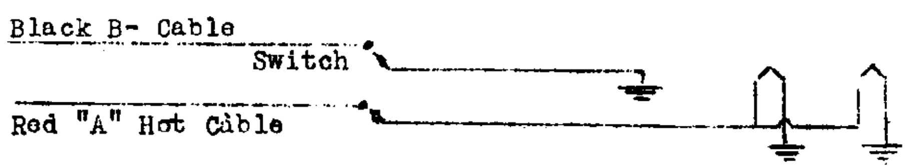
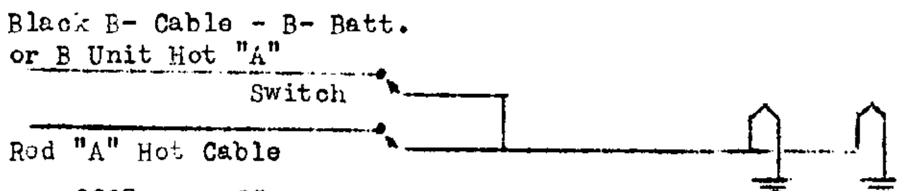


DIAGRAM "B"

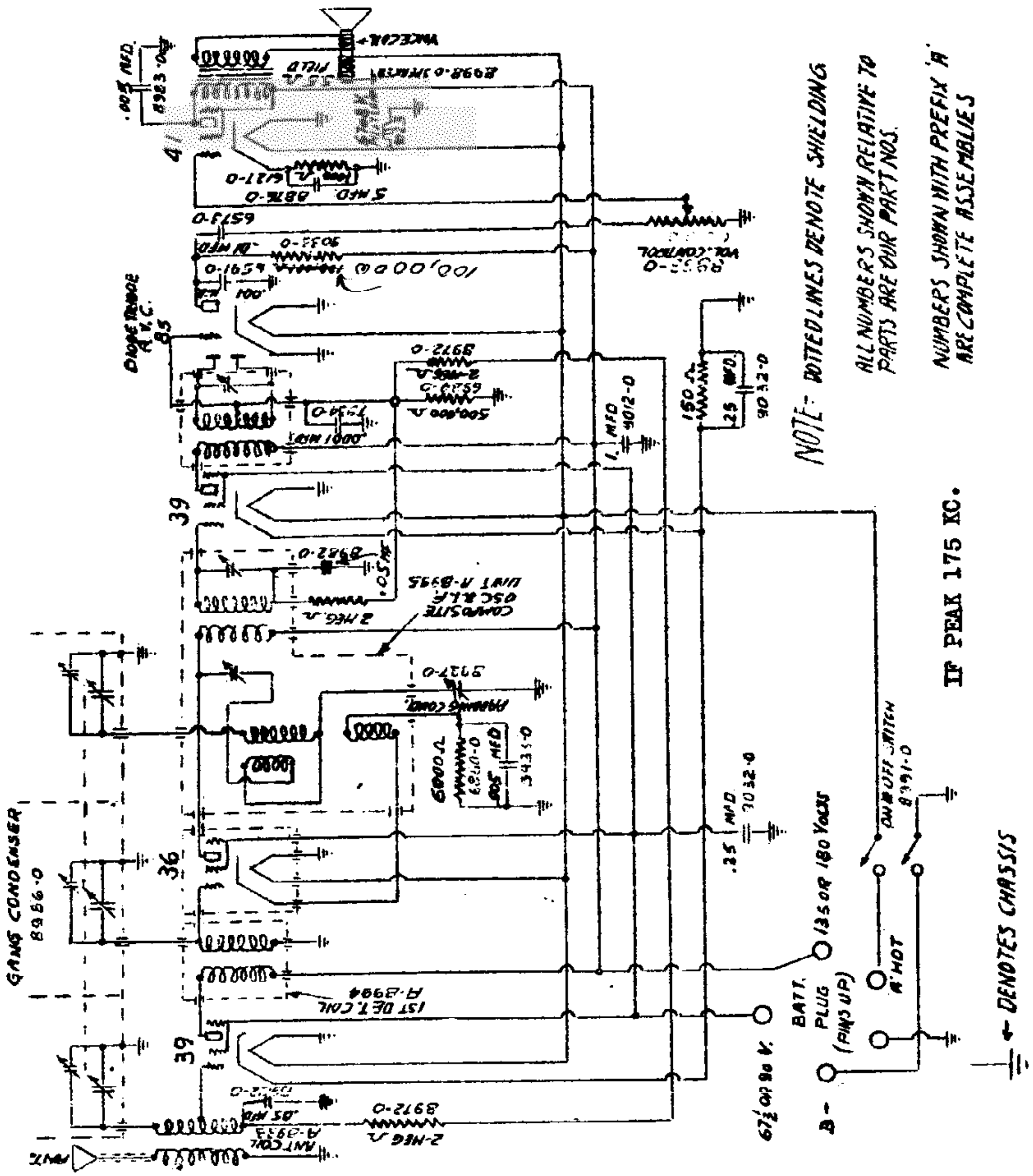


8982	.05 MFD. Condenser
8933	.005 MFD. 400 volt condenser
8927	Padding condenser
8961	.05 MFD. 400 volt condenser
7934	.0001 MFD. moulded condenser
6591	.0001 MFD. condenser 85 plate bypass
7860	.01 MFD. 400 volt coupling condenser
8876	5 MFD. dry electrolytic cathode bypass
9032	.25 MFD. 200 volt cathode 7 screen bypass
9012	1 MFD. condenser
8983	.003 MFD. plate bypass condenser
8972	2 megohm resistor
6880	6000 ohm resistor
9033	100,000 ohm 85 tube plate resistor
8065	1,000 ohm 41 tube cathode resistor
6924	500,000 ohm resistor
9018	150 ohm cathode resistor 1/3 watt

SENTINEL RADIO CORP.

WIRING DIAGRAM

PART # 20040



MODEL 261,521
Alignment Data

SENTINEL RADIO CORP.

The intermediate frequency transformers are tuned to 175 kilocyles. An oscillator which is accurately set to this frequency and which has an attenuator in its output to control the output can be used. It is of course best to start by retuning the intermediate stage before touching other adjustments. The outpnt of the intermediate frequency generator is connected one side to the grid of the 1st detector (236 tube) after removing the grid cap from this tube. The ground of the oscillator is connected to the chassis base. With the frequenoy set at 175 K.C.(accurately) the tuning adjustments of the 1st and 2nd I.F. transformers are adjusted to peak resonance. It is very important to use a long bakelite screw-driver for these adjustments. In adjusting, the successive tuning condensors are gone-over several times readjusting the output of the oscillator or the receiver's volume control as required. With the I.F. transformers properly tuned and sealed, the R.F. and oscillator circuits may next be adjusted.

The grid cap of the 1st detector is replaced and a generator or oscillator having frequencies of 1400 and 600 kilocyles is set up and connected to the aerial and ground of the receiver.

Do not attempt to align condenser without a shield. It is extremely important that a shield corresponding to the can be placed around the antenna coil and gang condenser in making adjustments on the r.f. and oscillator circuits, otherwise due to the change in these circuits caused by this shielding a very inaccurate adjustment will be obtained. This shielding may consist of a piece of steel bent to the shape of the corner of the can fitting around the edge of the base from the speaker to the rear right hand corner and extending as high as the speaker with holes in it corresponding to the condenser trimmer locations or a regular can and cover with such holes provided. This shield or can and cover must be in secure and in proper location and not disturbed during these adjustments From this it is easily seen why if an attempt is made to check the alignment out of the can on this receiver a different or changed adjustment will be had as against the factory setting, which is made with the shielding in place.

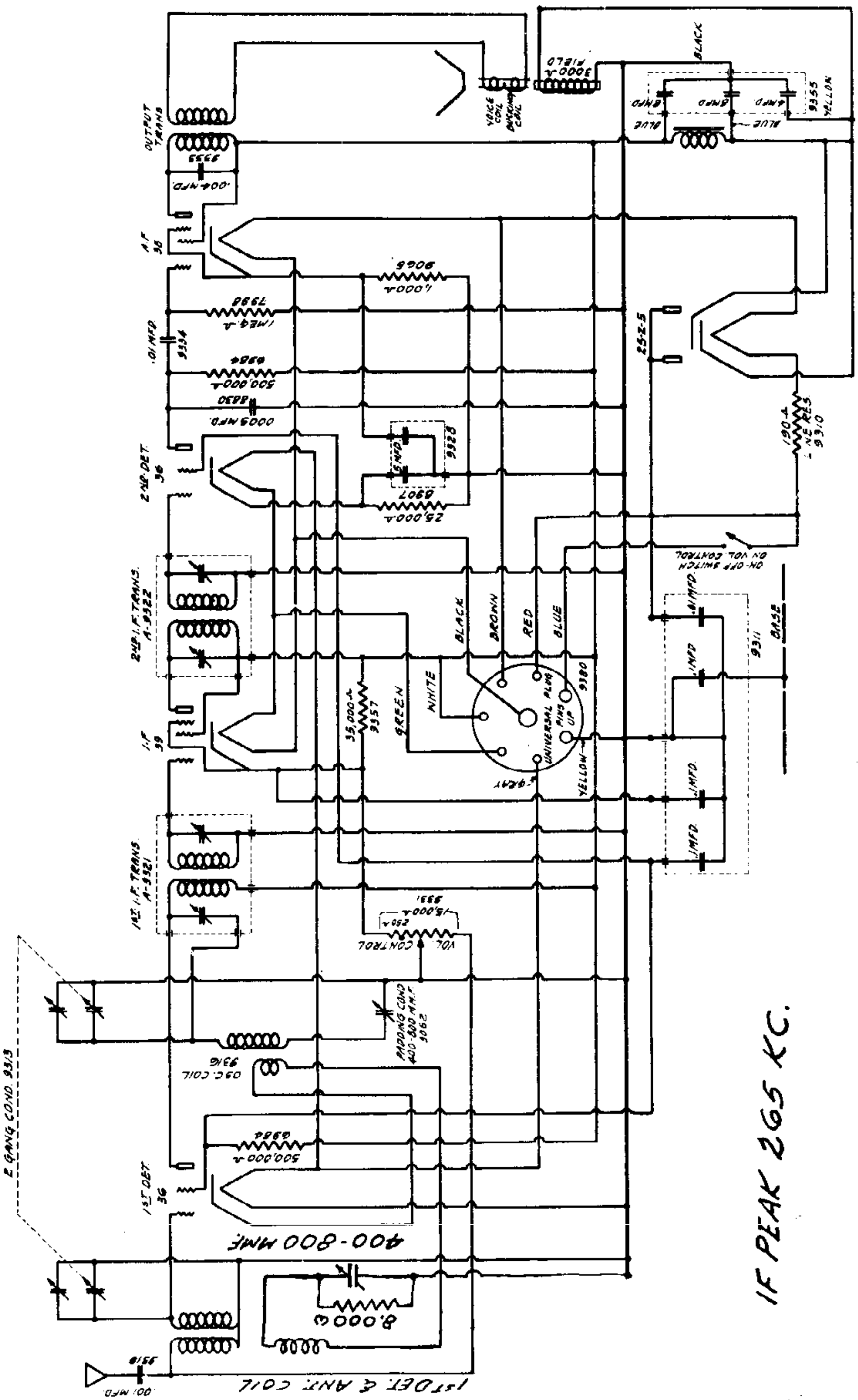
With the above shielding in place and tubes which are to be used in chassis, the procedure of circuit alignment is as follows:

Set the generator frequency at 1400 K.C. Set the tuning dial to 15 on the scale, open trimmers slightly on antenna (top) and 1st detector (middle) sections of gang condenser. Then without disturbing dial setting adjust oscillator (bottom) trimmer on gang to greatest signal. After this has been properly set adjust one at a time the antenna and 1st detector trimmers for maximum signals. If these operations are properly set as above, the receiver circuits are correct for the high frequency adjustment. Next change the generator frequency to 600 kilocycles and turn the tuning dial of the receivor to resonate with this signal.. This will come in around 82 on the dial. When the 600 kilocycle point is located on the dial next adjust the oscillator low frequency padding condenser, which is at the bottom rear edge of chassis base in right corner. The screw on this condenser is adjusted in and out as the receiver dial is slowly moved across the 600 K.C. resonant point until greatest signal strength is obtained. The combination of the best padding condenser setting with the dial setting giving the greatest signal output is the correct padding condenser adjustment. No change in the gang condenser trimmers adjustment should be made during the 600 K.C. adjustment.

DIAL LIGHT. If the dial light burns out be sure and replace with one of same type 6.3 volts 1000 hrs.

MODEL 550
Schematic

SENTINEL RADIO CORP.



ELECTRO DYNAMIC SPEAKER: The speaker has a DC field resistance of 3000 ohms.

MODEL 550
Voltage
Alignment Data

SENTINEL RADIO CORP.

FIVE TUBE AC-DC SUPERHETERODYNE
(110 V. AC-DC, 6 V. Storage Batteries & 32 V. DC)

VOLTAGE TABLE: Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table #1 is taken at 115 volts (AC) line with the volume control in the full on position. It must be remembered that the voltage readings vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10% plus or minus is permissible. THE VOLTAGES WILL BE APPROXIMATELY AS GIVEN FOR EITHER DC OR AC OPERATION.

TUBE VOLTAGES — Table #1

Type of Tube	Position of Tube	Filament Volts	Plate Volts	Screen Volts	C Volts
36	Composite Oscillator & Modulator	5.5	108	21*	2.5
39	Intermediate Frequency	5.6	108	108	2.5
36	Detector	5.7	27*	21*	2.5
38	Output	5.8	103	108	1.5*
25z5	Rectifier	29.0	52.5 MA		

The voltage table #2 is for 6 volt battery operation with a B eliminator which is especially designed for the model #561 receiver. The voltages as given will be correct for 32 volt DC operation in conjunction with a B eliminator of the recommended factory type. It will be found that on certain types of eliminators which do not have sufficient output or a low 6 volt battery, the readings will be lower than that given in the voltage table.

TUBE VOLTAGES — Table #2

Type of Tube	Position of Tube	Filament Volts	Plate Volts	Screen Volts	C Volts
36	Composite Oscillator & Modulator	5.8	112	25*	2.5
39	Intermediate Frequency	5.8	112	112	2.9
36	Detector	5.8	28*	25*	2.0
38	Output	5.8	108	112	1.5*
25Z5	Rectifier	52.5 MA			

* These readings for both Table #1 and #2 are only comparative and are not true voltages applied. The voltmeter, when readings are taken at these points, is in series with a very high resistance.

IMAGE SUPPRESSION: Occasionally in some locations interference in the form of whistles or stations which are tuned in on dial settings other than the station's frequency may be encountered. This is a rare occurrence and is called image interference caused by two signals whose frequencies differ by twice the intermediate frequency. This should not be confused with heterodyne whistles which are caused by two stations being received whose frequencies are the same nor by local stations whose frequencies are close to some out-of-town stations frequency which might result in reception from both stations. To overcome this possibility of image interference an image suppression circuit is incorporated in the receiver. The image adjusting condenser is mounted on the back of the chassis below the first IF transformer shield and is accessible through the hole in the chassis. If a whistle or interfering station is received on a frequency other than its fundamental, tune the receiver to this interference and adjust the image suppression condenser until the interference disappears or until the interference is at the minimum point. UNLESS THERE IS AN ACTUAL IMAGE INTERFERENCE DO NOT ATTEMPT TO ADJUST THE IMAGE SUPPRESSION CIRCUIT.

INTERMEDIATE FREQUENCY ALIGNMENT: Only when an intermediate transformer has become defective, due to an open or burned out winding, should it be necessary to readjust the intermediate stages. Should this occur it is necessary that an oscillator be used with some type of output measuring device so as to correctly tune the transformers. To align the intermediate transformers connect the high side of the oscillator output to the control grid of the 36 oscillator modulator tube leaving the grid cap disconnected from the tube. The ground side of the test oscillator should be connected to the gang condenser frame and MUST NOT OTHERWISE BE GROUNDED. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. BE SURE THAT OUTPUT OF THE OSCILLATOR IS NOT SO HIGH AS TO OVERLOAD THE DETECTOR. IF DURING THE ALIGNMENT THE DETECTOR OVERLOADS REDUCE THE OUTPUT OF THE OSCILLATOR. Align the first intermediate transformer by turning the intermediate frequency trimmer screw up and down until maximum reading is obtained on the output motor. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate transformer. After both intermediate transformers are adjusted the alignment of the intermediate stage is complete and the trimmer should not be further disturbed, and the grid cap should be connected to the grid of the 36 tube.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if an antenna or oscillator coil requires replacement it will be necessary to realign the variable condenser. The front section of the variable condenser (looking at the front of the receiver) is the oscillator section, the other section tunes the antenna stage. Tune the receiver to 1720 kilocycles on the dial and set the oscillator at this frequency. BE SURE THAT OUTPUT OF THE OSCILLATOR IS NOT SO HIGH AS TO OVERLOAD THE DETECTOR. IF DURING THE ALIGNMENT THE DETECTOR OVERLOADS REDUCE THE OUTPUT OF THE OSCILLATOR. Next ad-

SENTINEL RADIO CORP.

MODEL 550
Alignment Data
Parts List

just the trimmer screws of the oscillator and antenna sections which are mounted on top of the variable condensers so as to obtain maximum output reading. It will be found that the oscillator section trimmer condenser will in most cases have to be adjusted to minimum capacity and in some instances it may be necessary to remove the trimmer screw entirely. After the trimmers have been correctly adjusted, at this frequency, tune the receiver to 600 kilocycles and adjust the oscillator to 600 K.C. Next, adjust the oscillator padding condenser (which is located directly below the variable condenser and accessible through the hole in the front of the chassis) to obtain maximum reading on the output meter. If the above is correctly followed the receiver will now track correctly over the entire band from 1720 KC to 550 KC. It is always advisable to align the receiver, whenever possible, with the tubes that are to be used in the set.

32 VOLT FARM LIGHTING SYSTEMS: When the current supply is DC, the 32 volt mains plug must be inserted correctly into the 32 volt DC mains receptacle, otherwise the set will not operate because of reversed polarity. If, after inserting the mains plug into the receptacle, the receiver does not operate for approximately one minute or one and a half minutes, remove the mains plug and turn it half way around and insert it into the receptacle. When operating the receiver on DC it will be found that in most instances the nois interference is greater than when the receiver is used on AC current. DC appliances such as motors, fans, etc., as a general rule cause more interference than similar AC equipment. Unfortunately this interference can only be eliminated at the source of the interference. When operating the receiver on 32 volt DC and using a B eliminator, be sure to keep the set aerial wire as far away from the DC line as possible, to avoi noise pick up from the 32 volt DC line. By connecting the antenna wire to an outside aerial in the event the noise interference is excessive, the interference can generally be minimized, as the increased volume obtained with the longer aerial permits lower minimum volume control setting and a consequent apparent redu tion in noise interference. It is not recommended that the 6 volt cable and 6 volt B eliminator be used c the 32 volt system by tapping in at 6 volt as the current consumption will be too large, nor is it recommended that B batteries be used as the life of the battery will be limited. To reduce the drain on the batteries if they are used, it is recommended that only 90 volts of battery be connected to the receiver.

PARTS PRICE LIST

FOR THE

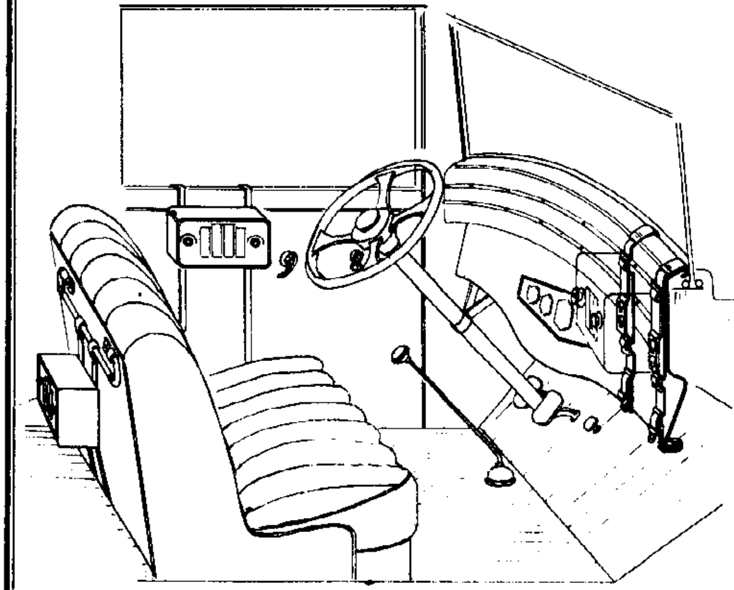
AC-DC FIVE TUBE SUPERHETERODYNE

PART NUMBER		PART NUMBER	
8923	39 Tube Socket	9357	35,000 " "
8922	36 " "	7998	1 Meg. Ohm Resistor
9307	38 " "	9337	8,000 Ohm Resistor
9308	Rectifier Tube Socket	9405	110-V Cable
9313	Gang Condenser	9342	Knobs
9062	Padding Condenser	9340	Cabinet less back
9316	Oscillator Coil	9423	Wood Cabinet
9317	Antenna and 1st Detector Coil	9369	Cabinet Back
9321	1st IF Transformer	9411	Antenna Wire and Spool
9322	2nd IF Transformer	7690	Rubber Feet Pads
9310	Wire Wound Resistance Strip 190 ohms	9399	6 Volt B Battery Eliminator
9312	Filter Choke	9408	32 Volt B Battery Eliminator
9315	Dynamic Speaker	9420	220 Volt Line Adapter
9311	By-pass Condenser Block (.1-.1-.1-01 M.F.D.)	9153	Car Antenna
9355	Elec. Condenser Block (8 x 8 & 4 M.F.D.)	9131	Spark Plug Suppressor
9328	" " " (5 x 5 M.F.D.)	9132	Generator Suppressor
9333	.004 M.F.D. Condenser	9133	Generator By-pass Condenser
9334	.01 M.F.D. Condenser	9412	23 Ohm Resistor for 32-Volt Cable
8830	.0005 M.F.D. Mica Condenser	9406	32 Volt Adapter Cable Complete
9319	.001 M.F.D. Mica Condenser	9397	6-Volt Adapter Cable Complete
9331	Volume Control	9380	Set Cable Plug
8907	25,000 Ohm Resistor	9402	Bkt. Assem. Complete
9065	1,000 " "	9393	Web Strap Buckle
6984	500,000 " "	9390	Long Web Strap Only

MODEL 550

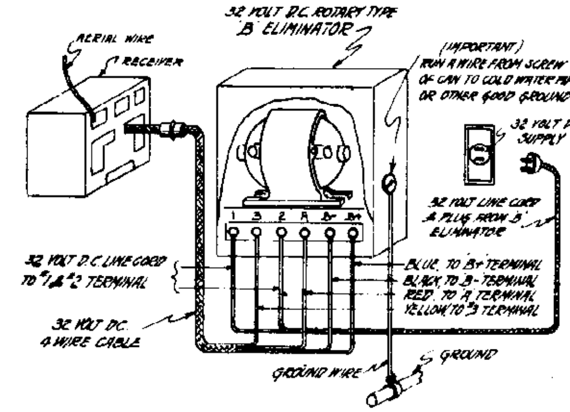
Installation and Connection Details

SENTINEL RADIO CORP.



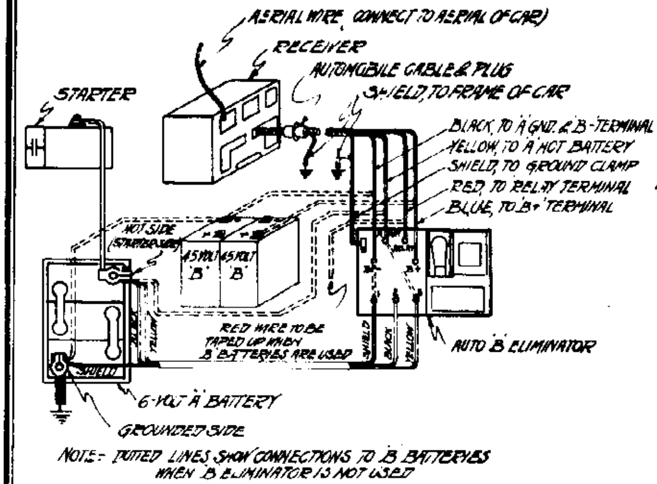
SKETCH SHOWING VARIOUS MOUNTING OF RECEIVER

FIG. 1



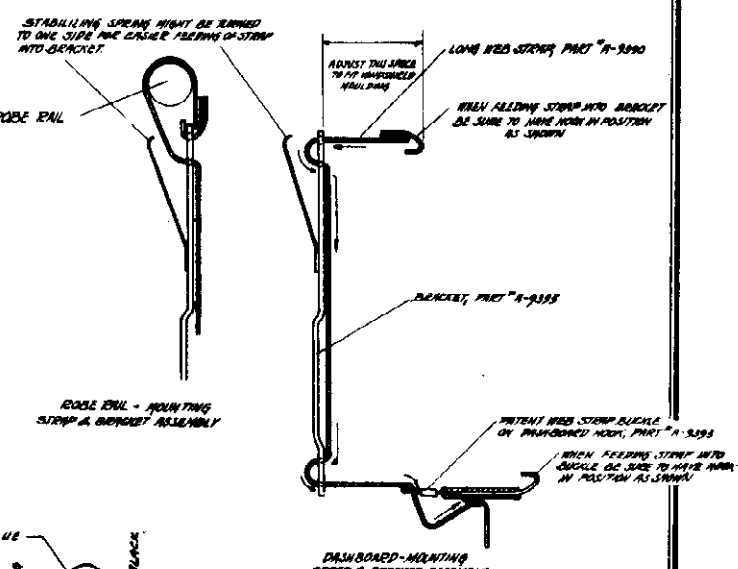
NOTE:- IF B BATTERIES ARE USED INSTEAD OF 'B' ELIMINATOR, CONNECT THEM TO SET CABLE WIRES AS SHOWN IN DOTTED LINES IN FIG. #2. THE YELLOW AND BLACK CABLE WIRES ARE CONNECTED TO LINE CORD & PLUG FOR 32 VOLT SOCKET CONNECTION.

FIG #3 SKETCH SHOWING CABLE CONNECTIONS TO 'B' ELIMINATOR FOR 32 VOLT D.C. OPERATION



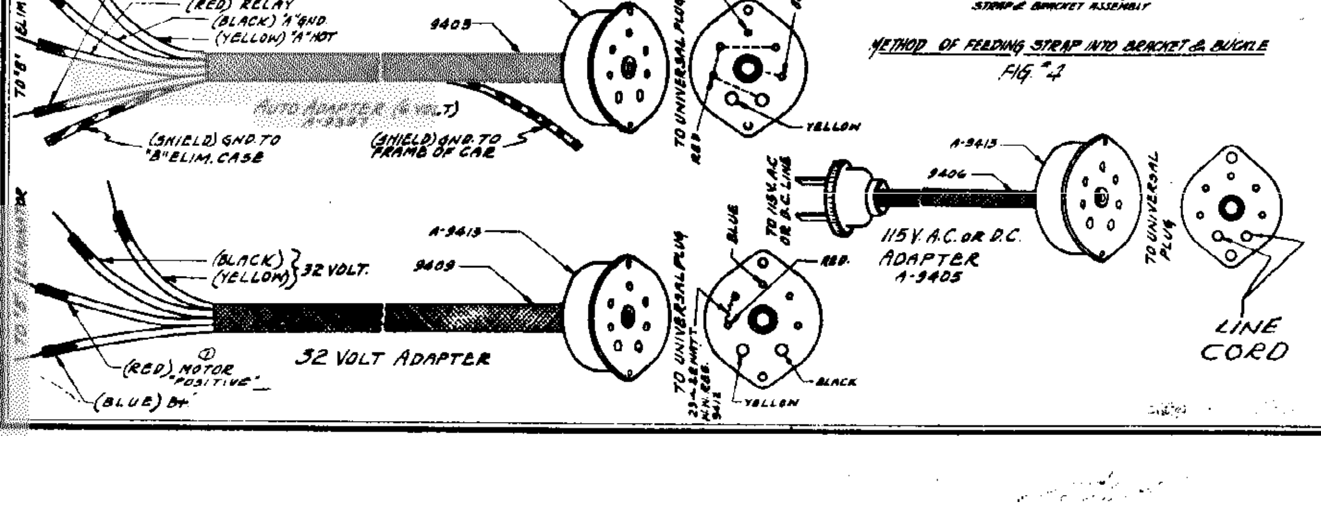
NOTE:- DOTTED LINES SHOW CONNECTIONS TO 'B' BATTERIES WHEN 'B' ELIMINATOR IS NOT USED

FIG. #2 SKETCH SHOWING CABLE CONNECTIONS TO 'B' ELIMINATOR OR 'B' BATTERIES FOR 6 VOLT 'A' AUTO OPERATION



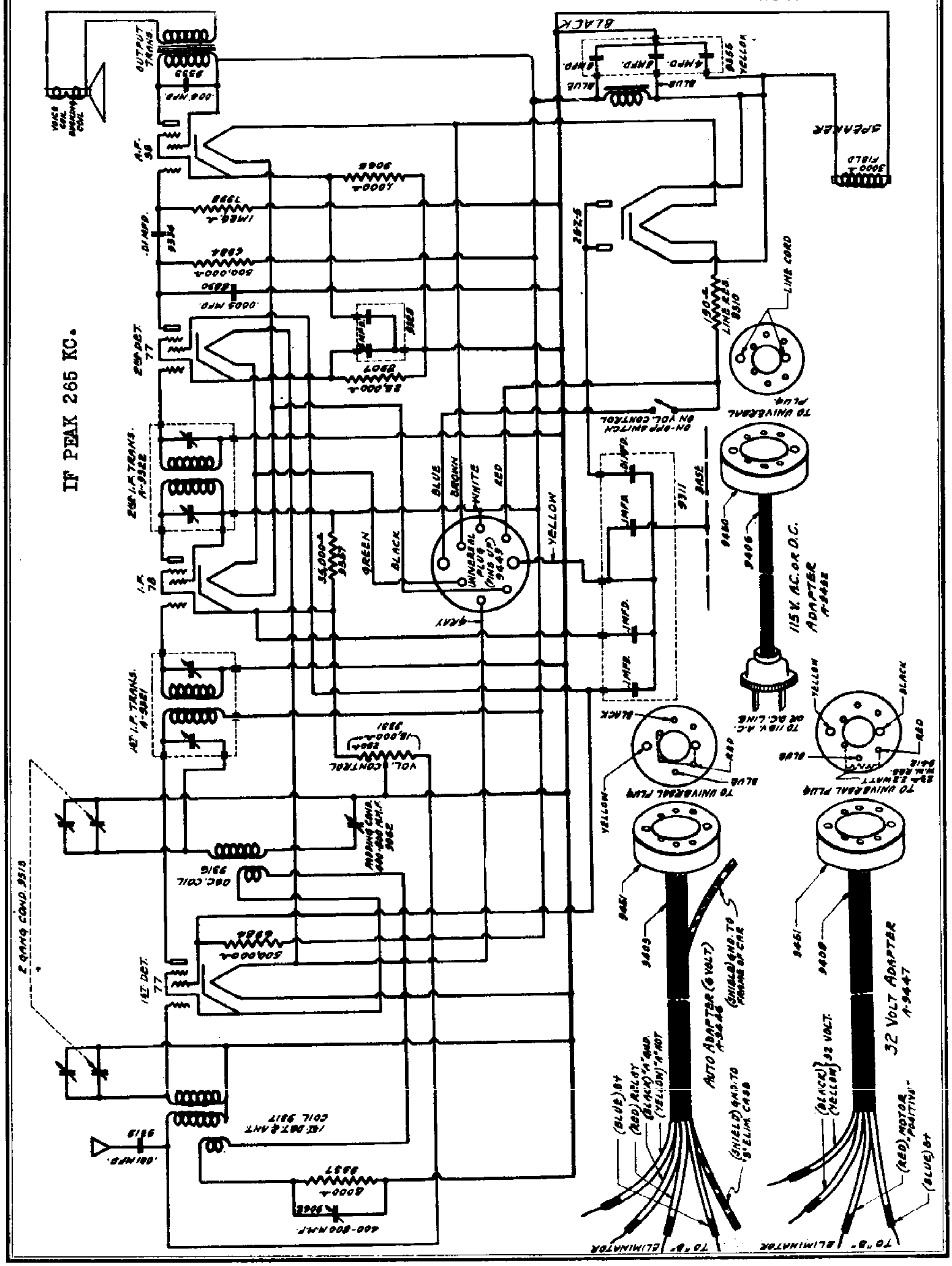
METHOD OF FEEDING STRAP INTO BRACKET & BUCKLE

FIG. #4



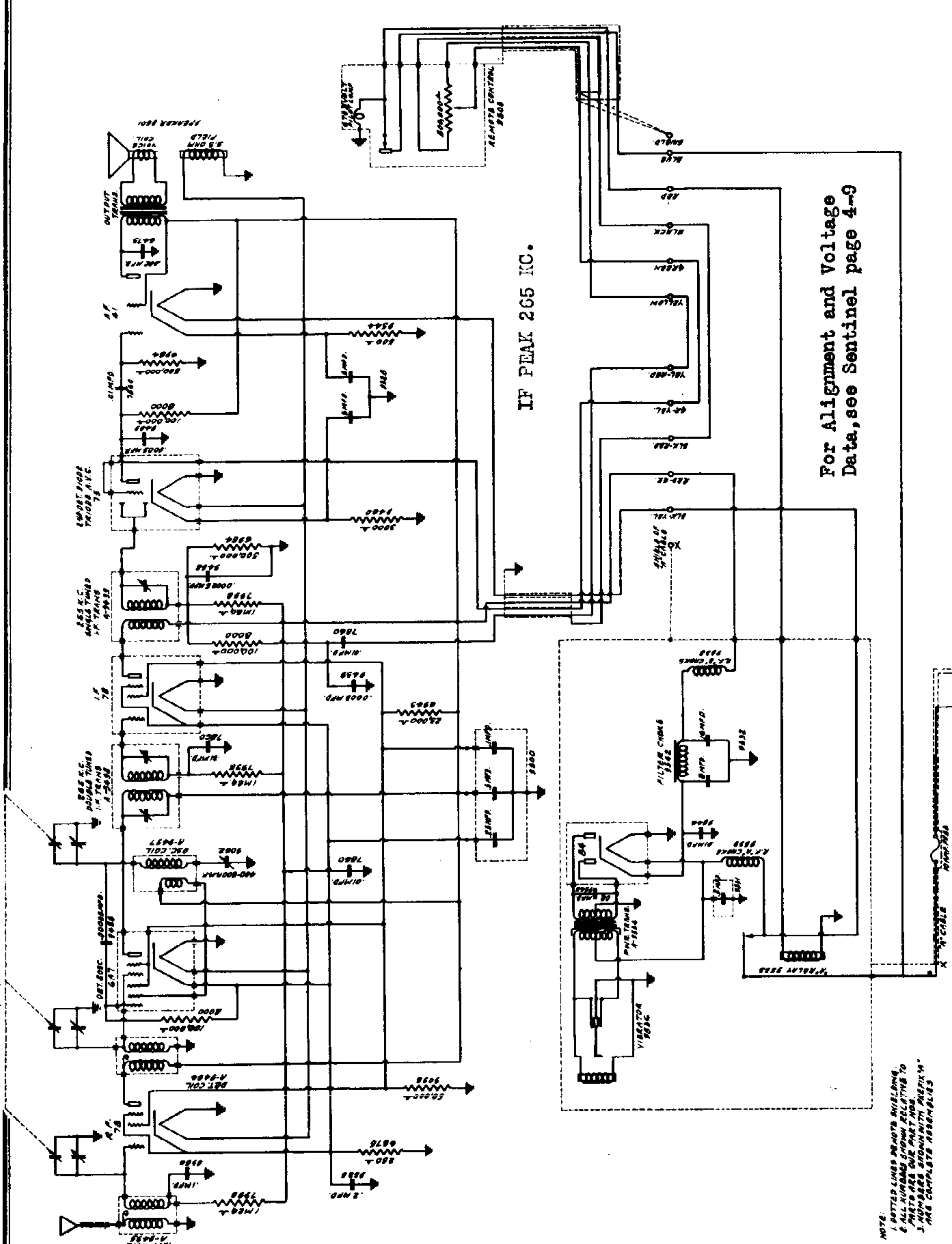
MODEL 560 (2nd Type)
Schematic

SENTINEL RADIO CORP.



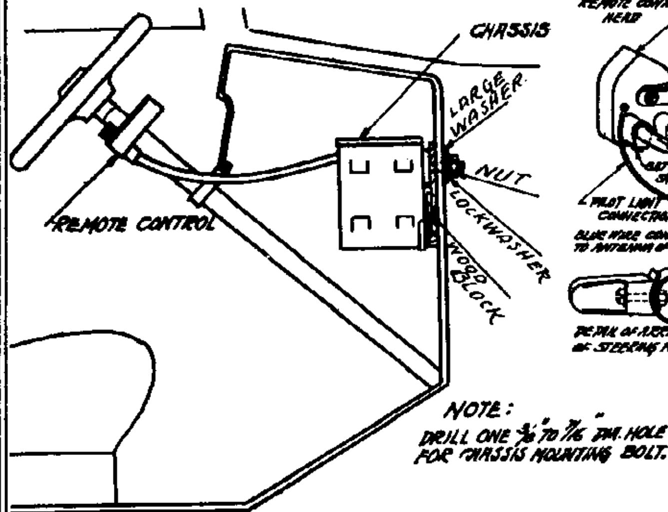
MODEL 600 Auto
Schematic

SENTINEL RADIO CORP.



MODEL 602
Installation Notes

SENTINEL RADIO CORP.



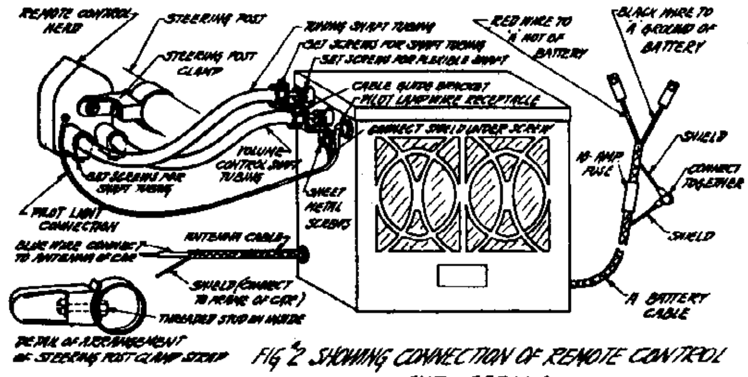


FIG 2 SHOWING CONNECTION OF REMOTE CONTROL AND CABLES

RECEIVER MOUNTING: The receiver, speaker and "B" eliminator are all contained in a single unit in one steel housing and requires the drilling of but one hole in the bulkhead for mounting. The receiver should be so mounted that the remote control shaft will reach the steering post in as straight a line as possible so as to eliminate any unnecessary bend in the cable. Care should be exercised in choosing the receiver location to avoid interference with the foot pedal, hand brake, clutch pedal and possible interference with the legs of the driver or passenger. A paper drilling template is provided to aid in finding the best location. When the location has been decided on, drill a 3/8" to 7/16" diameter hole in the motor bulkhead after which the wooden spacer block should be placed on the set mounting bolt and the bolt pushed through the hole in the bulkhead with the wooden spacer block on the driving compartment side. (Fig. No. 1). Place the steel washer, lockwasher and mounting bolt nut (in the order named) on the mounting bolt drawing up the nut loosely. Next, lift the receiver in position so that the square head of the mounting bolt will slip into the lower slotted end of the set mounting plate. Gently lowering the receiver will force the mounting bolt head to the top of the mounting plate slot. The receiver and the mounting bolt will be rigidly locked in position by drawing the mounting bolt up tight. On some installations because of insufficient room under the bulkhead it may be necessary to push the square head of the mounting bolt to the top of the mounting plate and then push the bolt through the hole drilled in the bulkhead.

REMOTE CONTROL: The remote control head, the steering post strap and clamp, the volume control and tuning control shaft tubing and the cable guide brackets are shipped unassembled. No difficulty will be had in properly assembling if the proper procedure is followed in the order given.

1. Mount the two cable guide brackets which are held in position with the two self tapping sheet metal screws, placing the pilot light shield lead under the head of one of these screws (see Fig. 2).

Push the flexible shaft of the volume control tubing through the volume control guide bracket into the volume control coupler mounted on the set until it touches the stop.

Then tighten the two flexible shaft set screws in the volume control coupler firmly.

Next, place the volume control shaft tubing so that it extends about 1/4" beyond the guide bracket. Do not permit tubing to touch the coupler. After correctly locating, screw the two guide bracket coupler set screws firmly, but do not force these set screws too tightly otherwise the drive shaft will bind. The tuning control flexible shaft should be mounted in the tuning coupler and the tuning control shaft tubing in the guide bracket in the same manner. Do not put the tuning control flexible shaft in the volume control coupler and vice-versa. Looking at the back of the remote control head the lefthand shaft tubing is the tuning control and the right hand one the volume control (Fig. 2). Looking at the side of the receiver the righthand coupler is the volume control and the lefthand coupler is the tuning control.

2. Loosen the two shaft tubing screws (Fig. 2) underneath the remote control head and insert the slotted end of each shaft tubing in their proper place in the remote control head, after which the set screw should be firmly tightened. If the shaft tubing is properly spaced from

MODEL 602
Installation Notes
Part 2.

SENTINEL RADIO CORP.

the couplers,the volume control and tuning control will move freely. If improperly spaced the shaft tubing may rub on the couplers or may rub in the remote control head thereby making the volume control and tuning control work hard.

3. The steering post clamp strap and clamp bracket should now be mounted on the steering post. The steering post clamp strap has four holes, one of which is threaded. The other three holes are provided so that the clamp may be used on any of the various size steering posts.

The remote control head may be located on the left or righthand side of the steering post column or on the dashboard by using the proper one of the three threaded clamp screw holes on the back of the remote control head. To mount on the lefthand side of the steering post use the lefthand threaded hole, for righthand mounting use the righthand threaded hole and for dashboard mounting the top threaded hole.

Form the clamp with the threaded stud on the inside by placing it around the steering post. Place the slotted end of the clamp against the clamp strap so that the hole in the clamp lines up with the two holes in the strap (Fig. 2.) Push the clamp strap through the hole in the clamp and screw the clamp screw into the threaded strap stud sufficiently tight so that it will be locked firmly in position. The remote control head may now be mounted on the steering post clamp by pushing the machine screw through the hole at the end of the clamp and screwing this machine screw through the threaded hole in the back of the remote control head.

4. The remote control drive is now completely mounted. It is possible that the dial calibration will not be correct. To properly align the dial turn the tuning control knob in the counter clockwise direction until the stop on the variable condenser is reached. This will be indicated by increased tension on the knob. Do not force the dial otherwise the dial needle will jump and the dial calibration will be inaccurate.

PILOT LIGHT: A six to eight volt Mazda type miniature size pilot light is used in the remote control head. The pilot light lead from the remote control head must be inserted in the pilot light receptacle located on the side of the set housing adjacent to the volume control shaft tubing guide bracket. The shielded lead of the pilot light lead should be connected underneath the head of one of the guide bracket mounting screws. To replace the pilot light remove the two control knobs by pulling outward on the knobs. Next, the three small head machine screws on the front of the remote control which hold the front cover of the control box in place should be removed. The cover of the remote control head may now be lifted off the control box and the pilot light socket then becomes accessible.

ANTENNA: A good antenna is very important. An inefficient or insufficient aerial will result in unsatisfactory reception. Most late model cars are factory equipped with an antenna built in the roof of the car. This is generally the most satisfactory type of aerial. If the car is not equipped with a roof type aerial, one may be installed or use may be made of the various aerial kits now available such as plates that are mounted underneath the running board or the strap type aerial which can be fastened between the front and rear axles. THE CLOSER TO THE GROUND THE STRAP OR PLATE TYPE ANTENNA IS SUSPENDED THE GREATER ITS EFFICIENCY.

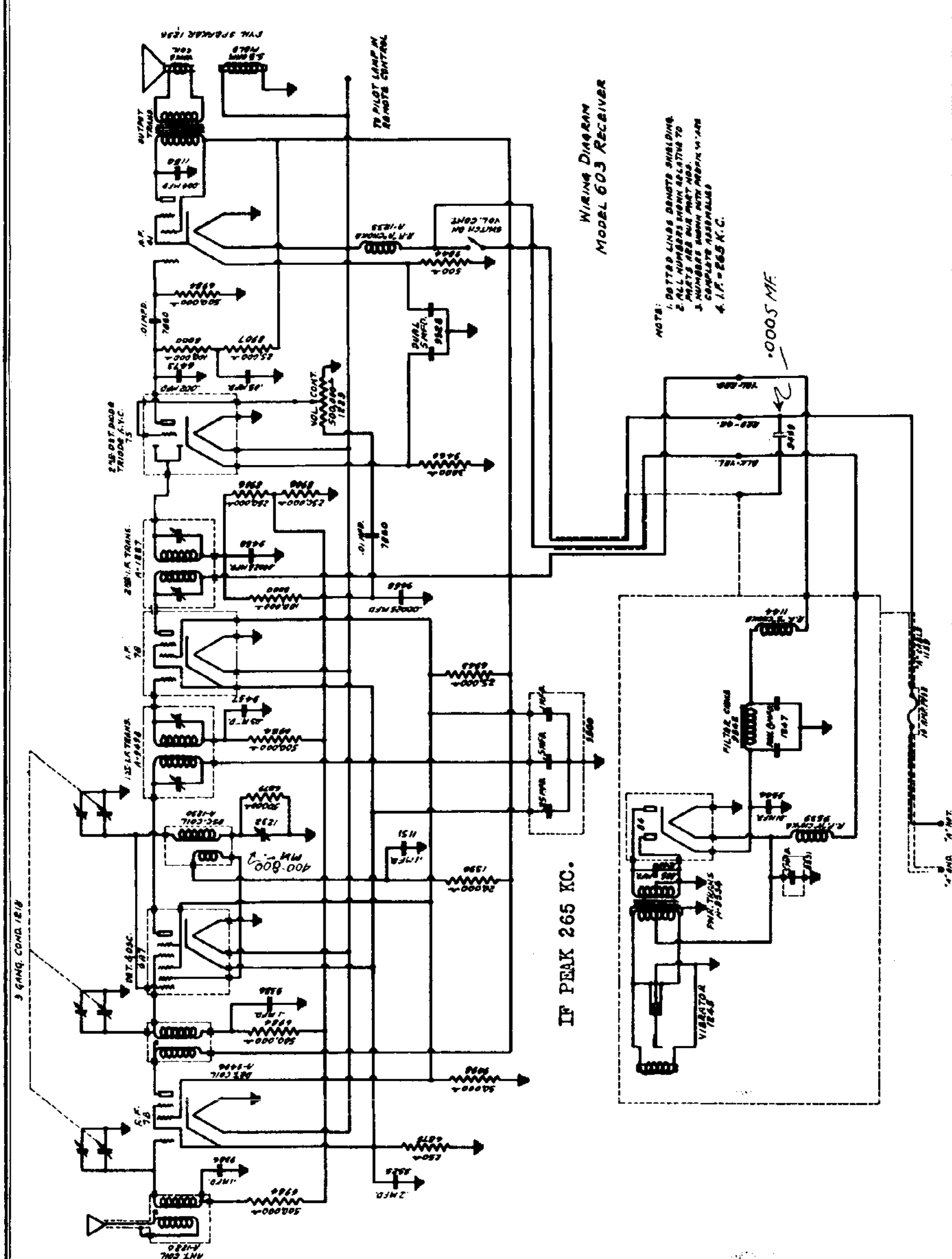
"B" ELIMINATOR: The "B" eliminator unit which contains the No. 84 rectifier tube is mounted below the receiver and is held in position in the set housing by three machine screws which are accessible from the bottom of the set housing. To replace the rectifier tube it is necessary that the "B" unit be removed from the set housing. To do this unscrew the three "B" unit machine screws in the bottom and the six screws that hold the small detachable plate on the lower back of the set housing. After this plate is removed, the set cable wires which are now accessible should be disconnected from the "B" eliminator terminal strip mounted on the eliminator unit, after which the eliminator may be pulled out of the set housing. Next, remove the cover of the eliminator by unscrewing the six machine screws which hold this in place. After the cover has been taken from the top of the "B" unit the complete mechanism of the "B" eliminator can be lifted out of the eliminator housing and the "B" eliminator tube replaced. Care should be taken when reinstalling the "B" unit in the set housing so that the set cable wires are properly connected to the "B" eliminator terminal strip. Excessive vibration of the "B" unit may be corrected by substituting a new vibrator rubber cover. When changing the rubber cover be sure to place the vibrator unit back in the "B" unit with the vibrator leads toward the "B" eliminator transformer. Continuous blowing of the fuse is indicative of a possible defective "B" unit transformer, a defective vibrator or a defective No. 84 tube. UNDER NO CIRCUMSTANCES ATTEMPT TO ADJUST THE VIBRATOR UNIT. IF THE UNIT BECOMES DEFECTIVE IT SHOULD BE REPLACED WITH A GOOD ONE ONLY. R.F. hash indicated by a constant static-like background noise, which is apparent over the entire tuning range (with the set aerial disconnected) may be due to a defective No. 84 tube or a loose "B" unit cover. If the set antenna lead is run in close proximity with the set "A" leads or the battery "A" hot lead, it is possible to pick up this form of interference. Rerouting the set antenna lead will correct this.

TUBES: The receiver utilizes the following tubes:

One (1) Type 78 - Amplifier Tube
One (1) Type 6A7 - Detector & Oscillator Tube
One (1) Type 78 - I. F. Tube
One (1) Type 75 - Second Detector Diode & AVC Tube
One (1) Type 41 - Output Tube
One (1) Type 84 - Rectifier Tube

The tube locations are shown in the diagram attached to the set housing cover. Always be sure that the tubes and their tube shields are firmly pressed down in their sockets. The tubes are readily accessible for removal or for checking by taking off the cover of the metal cabinet. To do this it is only necessary to unscrew the six machine screws which hold the cover to the cabinet and lift the cover off the cabinet. NOTE: In some installations, because of the location of the receiver it may be necessary to remove the set from the motor bulkhead to check the tubes. The tubes used are sturdily constructed and especially designed for use in automobile receivers and under normal conditions will give satisfactory service for a long period of time. Occasionally a tube may become faulty shortly after being placed in service and is generally indicated by low volume or distorted tone. Whenever this condition exists the tubes should be tested and the defective tubes or tube replaced. If the receiver becomes microphonic it can generally be traced to the 6A7, 75 or 41 tube.

SENTINEL RADIO CORP.



MODEL 603

Alignment, Voltage

Parts List

SENTINEL RADIO CORP.

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the oscillator frequency at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the intermediate transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two types of intermediate transformer trimmers have been used in this model receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one intermediate trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is not necessary to remove the receiver chassis from the set housing to align the gang condenser. Regardless of whether or not the receiver is or is not mounted in the set housing the alignment procedure is the same. Three holes are provided in the left hand side of the set housing for the gang condenser trimmers and one in the front of the set housing for the 600 kilocycle padding condenser.

1. Properly connect the remote control head and shafts and adjust the dial needle on the dial face so that the dial calibration is correct.

2. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

3. Tune the receiver to exactly 1400 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE OSCILLATOR GANG CONDENSER TRIMMER. Looking at the side of the receiver and reading from top to bottom the trimmer condensers are the antenna, R. F. and oscillator sections. Next, adjust the R. F. and antenna sections of the gang condenser for maximum sensitivity

4. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser, which is located on and accessible through the hole in the front of the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment using the position of greatest output.

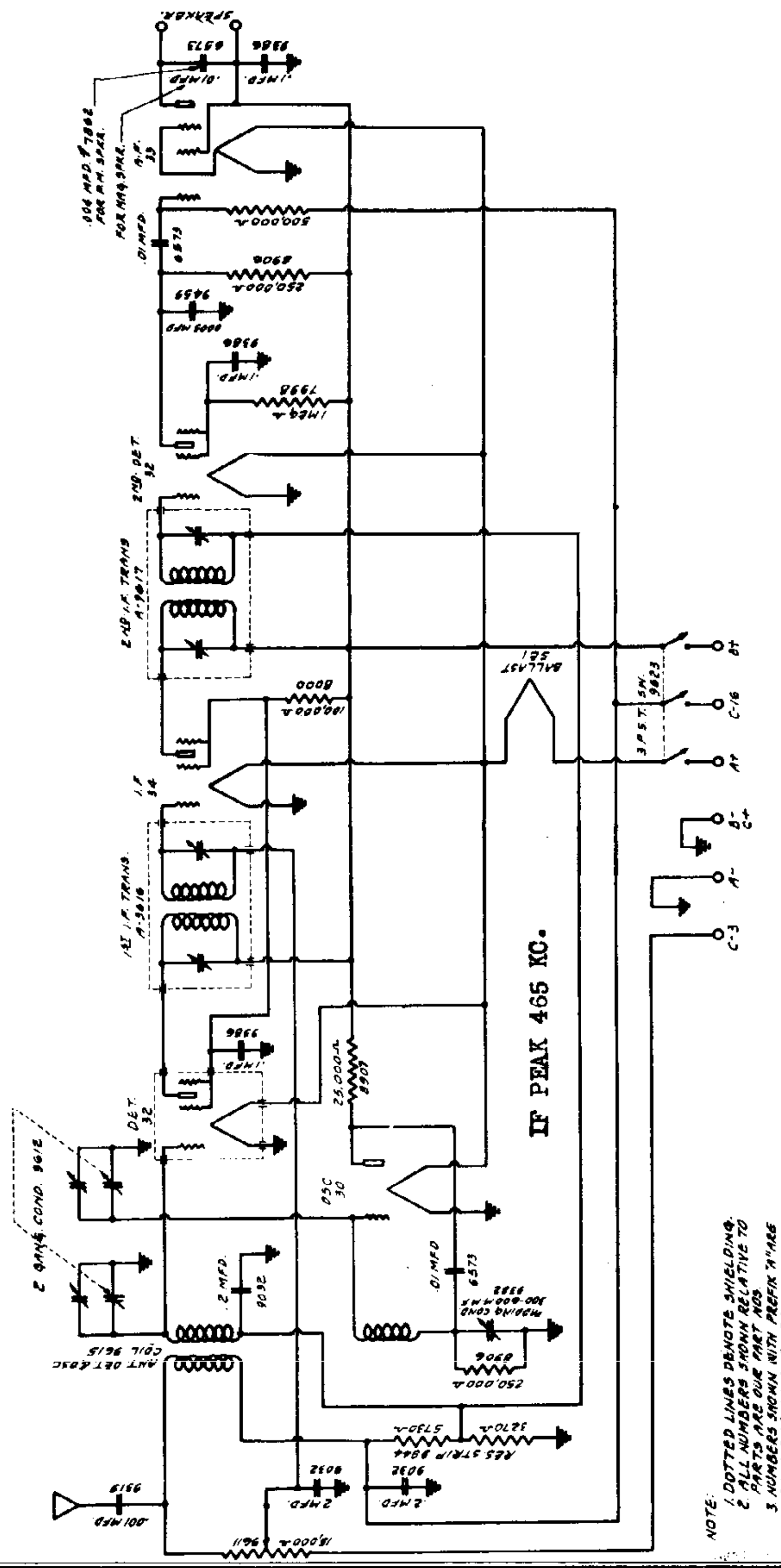
TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	TUBE VOLTAGES PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO. 1	GRID NO. 2	GRID NO. 3	GRID No. 5
78	Radio Frequency	6	210	4	80				
6A7	Oscillator & Modulator	6	210	4		35	140	80	80
78	Intermediate Frequency	6	210	4	80				
75	2nd Detector Diode & AVC	6	100	1.5					
41	Output	6	200	8	210				
84	Rectifier	6	260##	235					

A. C. each plate
Total "A" current - 6.0 amperes
Read all voltages from socket to chassis

PART NUMBER		LIST PRICE	PART NUMBER		LIST PRICE
1226	Antenna Coil	$1.77	9453	6A7 Tube Socket	$ .13
9496	Detector Coil	.99	1255	Set Housing Back	.25
1230	Oscillator	1.01	1284	Set Housing Cover	.55
9498	1st I. F. Transformer	1.49	1223	Set Housing	3.52
1227	2nd I. F. Transformer	2.03	9581	10 Ampere Fuse	.06
1236	Dynamic Speaker	7.00	1159	"A" Battery complete with Fuse and Receptacle	.90
1158	Antenna Lead	.34			
1244	Set Cable	.60	9063	Tube Shield Retainer Base	.05
9098	50,000 Ohm 1/2 Watt Resistor	.19	1361	Tube Shield	.11
6943	25,000 Ohm 1 Watt Resistor	.21	1253	R. F. "A" Choke	.28
6984	500,000 Ohm 1/3 Watt Resistor	.19	1229	Volume Control with Switch	1.22
8000	100,000 Ohm 1/3 Watt Resistor	.19	109	"B" Eliminator	15.00
9460	3,000 Ohm 1/3 Watt Resistor	.19	1246	Vibrator Rubber Case	.40
9544	500 Ohm 1 Watt Resistor	.21	1245	Vibrator	5.50
6875	250 Ohm 1/3 Watt Resistor	.19	9534	Power Transformer	2.75
8906	250,000 Ohm 1/3 Watt Resistor	.19	9542	Filter Choke	.85
8907	25,000 Ohm 1/3 Watt Resistor	.19	9539	R. F. "A" Choke	.40
1336	20,000 Ohm 1/2 Watt Resistor	.19	1144	R. F. "B" Choke	.32
1232	Padding Condenser	.55	1247	2x 8 Mfd. Condenser Block	2.75
1218	Three Gang Condenser	4.10	9531	.5 Mfd. Bypass Condenser	.58
9500	Bypass Condenser (1-.1,1-.25, 1-.5 Mfd.)	1.29	9546	.01 Mfd. 600 Volt Condenser	.18
			1248	.005 Mfd. 1000 Volt Condenser	.23
7860	.01 Mfd. 400 Volt Condenser	.17	9559	.0005 Mfd. Moulded Condenser	.21
9386	.1 Mfd. 200 Volt Condenser	.18	9529	No. 84 Tube Socket	.13
6473	.002 Mfd. 400 Volt Condenser	.17	9513	"B" Eliminator Housing Case	.55
9525	.2 Mfd. 200 Volt Condenser	.24	9514	"B" Eliminator Housing Case Cover	.35
9203	.1 Mfd. 400 Volt Condenser	.20			
1150	.004 Mfd. 400 Volt Condenser	.18	1249	"B" Terminal Strip with Screws	.60
9328	Dry Electrolytic Condenser (2-5 Mfd.)	1.15	1240	Remote Control Complete	9.00
			1458	Tuning Control Ring	.77
9133	Generator .5 Mfd. Condenser	.55	1459	Volume Control Ring	.77
9597	Spark Plug Suppressor	.55	1460	Dial Light Assembly	.44
9598	Distributor Suppressor	.55	1460A	Pilot Light Bulb	.44
9600	Wood Mounting Block	.16	1461	Condenser Pulley Assembly	1.20
7717	Housing Carriage Bolt 3/8" x 3"	.10	1462	Vol. Control Pulley Assembly	1.00
7718	Hex Nut for 3/8" Carriage Bolt	.05	1463	Drive Cable Assembly	2.30

MODEL 660
Schematic

SENTINEL RADIO CORP.



MODEL 660
Alignment Data
Parts List

SENTINEL RADIO CORP.

Whenever this condition is encountered be sure to try other 32 and 34 tubes. Oscillation may also be encountered when the speaker leads come too close to the first detector tube or the antenna, or if the shielding on the I.F. grid leads is loose or pushed back. Sometimes with some tubes oscillation may occur if the pad condenser across the speaker is removed or open. Low battery voltages will be indicated by low volume, signal fading and also motorboating may occur. Motorboating may be corrected by bypassing the "B" batteries from B plus to B minus with a .5 or 1 Mfd. condenser. Be sure to use a condenser that has a DC continuous working rating of not less than 200 volts. An insufficient aerial will reduce the volume and range of the receiver materially. If reception is weak and the tubes and batteries are good, try increasing the overall antenna length. Always keep the aerial as short as possible consistent with satisfactory reception.

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the No. 30 Modulator tube. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.

4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser:

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the chassis.

2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.

3. Adjust the variable condenser trimmer screws for maximum output reading.

4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

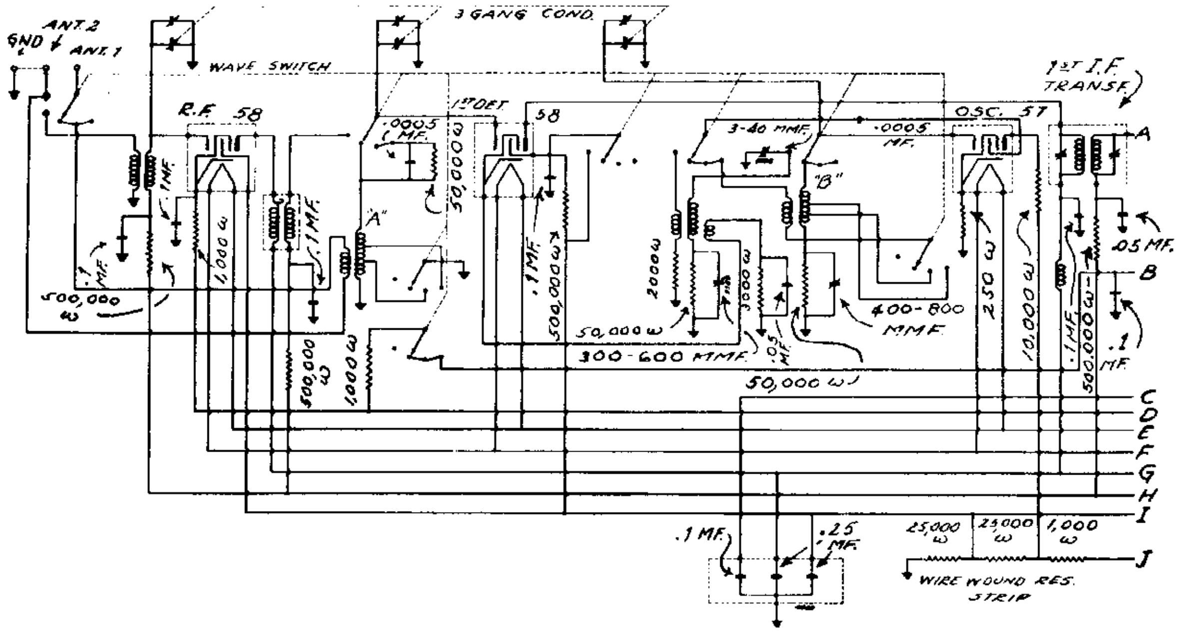
When making this adjustment be sure to rock the variable condenser slightly to the right and left using the position where the greatest output reading is obtained.

PARTS AND PRICE LIST

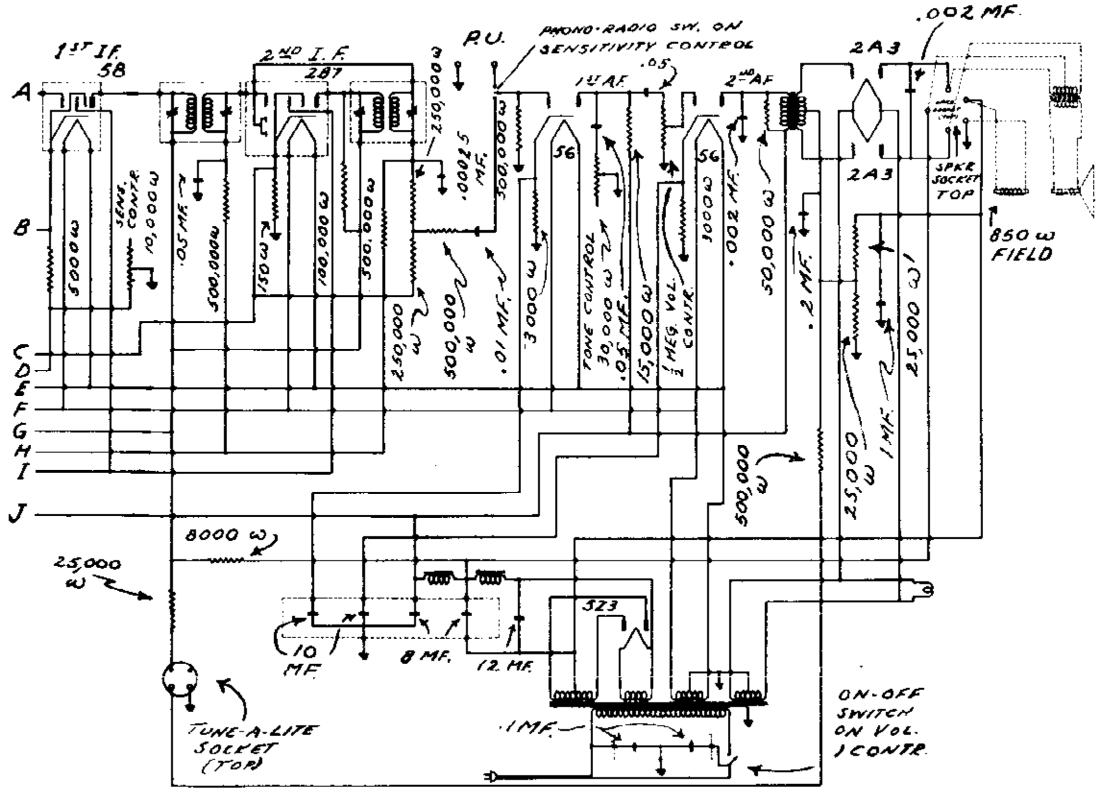
PART NUMBER		LIST PRICE
9870	No. 5E1 Tube Socket	$ .11
9619	No. 30 Tube Socket	.11
9620	No. 32 Tube Socket	.11
9621	No. 34 Tube Socket	.11
9622	No. 33 Tube Socket	.11
9221	Tube Shield Base	.20
9222	Tube Shield	.19
9612	Two Gang Condenser	2.54
9615	Antenna, Detector & Oscillator Coil	1.38
9616	1st I. F. Transformer	1.90
9617	2nd I. F. Transformer	1.90
9382	Padding Condenser	.50
9614	Tuning Dial	.55
9611	Volume Control	.91
9623	3 P. S. T. Switch	1.40
9613	Battery Cable	1.02
9625	Wire Wound Resistor Strip	.36
8906	250,000 Ohm 1/3 Watt Resistor	.19
8907	25,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
7998	1 Meg Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
9319	.001 Mfd. Moulded Condenser	.22
9459	.0005 Mfd. Moulded Condenser	.21
9386	.1 Mfd. 200 Volt Condenser	.18
6573	.01 Mfd. 200 Volt Condenser	.17
9032	.2 Mfd. 200 Volt Condenser	.23
7862	.004 Mfd. 400 Volt Condenser	.17
9718	Knob	.14
9717	Knob with arrow	.14

MODEL 1040
Schematic

SENTINEL RADIO CORP.



NOTE:
1. DOTTED LINES DENOTE SHIELDING
2. COIL "A" COUPLED TO COIL "B"
3. IF PEAK = 466 KC.



MODEL 1040
Voltage
Alignment Data

SENTINEL RADIO CORP.

Line Voltage	:	115
Volume Control	:	Full on
Sensitivity	:	Maximum Sensitivity
Band Selector Switch	:	1500 KC-540 KC Band

TUBE		FIL.	PLATE	SCREEN	CATHODE
58	RF	2.2	155*	80	4
58	1st Detector	2.2	155*	80	6
58	1st IF	2.2	155*	80	7
2B7	2nd IF	2.25	155*	80	1
57	Oscillator	2.3	150	150	
56	1st AF	2.3	185*		12
56	2nd AF	2.4	235		12
2A3	Push-Pull Output	2.4	245		45**
2A3	Push-Pull Output	2.4	245		45**
5Z3	Rectifier	5	5Z3		

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis, unless otherwise specified.

** Read from grid to chassis.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 58 first detector leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut (accessible through the hole in top of IF transformer shield) of the first intermediate transformer trimmer screw up and down until maximum reading is obtained on the output meter. The adjust the trimmer screw located inside of the brass hex nut in the same manner.

NOTE: Some receivers utilize the brass hex trimmer nut and inside trimmer screw whereas other receivers of the same type have two parallel trimmer screws accessible through the two small holes in the top of the IF shields. In either case the procedure is the same. The second and third IF transformers are adjusted in the same manner as the first IF transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser and padding condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The variable condenser sections reading from front to rear are: Antenna, RF & Oscillator.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Place the band selector switch for operation on the 1.5 to 4 megacycle band. Tune the receiver to 3.4 megacycles on the dial and adjust the oscillator to this frequency. Bring the 3.4 aligning signal in (maximum output) by adjusting the oscillator section variable condenser trimmer.

3. Tune the receiver to exactly 1.7 on the dial and set the oscillator at this frequency. THE 1.7 MEGACYCLE SIGNAL MUST BE BROUGHT IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 1.7 MEGACYCLE PADDING CONDENSER WHICH IS LOCATED ON THE FRONT OF THE CHASSIS BELOW THE DIAL. After making the 1.7 megacycle adjustment be sure to recheck the 3.4 megacycle adjustment. It is suggested that the 1.7 and 3.4 adjustments be rechecked several times.

NOTE: This completes the short wave adjustments. Should the dial calibration be too far off, the cause may be due to using the wrong oscillator frequency or dial setting.

4. Set the oscillator to 1400 kilocycles, tune the receiver to 1400 kilocycles on the dial and place the band selector switch for operation on the 1500-540 kilocycle band. Turn the receiver on its right side with the power transformer down and BRING IN (to maximum output) the 1400 kilocycle signal by adjusting the 1400 kilocycle trimmer which is mounted below the chassis on the short wave switch assembly. Next, adjust the antenna and RF variable condenser trimmers located on the top of the variable condenser for maximum output.

5. Leave the band selector switch for operation on the 1500 to 540 kilocycle band and set the oscillator frequency and tuning dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left adjust the 600 kilocycle padding condenser located towards the front on the left hand side of the chassis for maximum output. after which recheck the alignment at 1400 kilocycles and then the alignment at 600 kilocycles.

SENTINEL RADIO CORP.

MODEL 1040
Parts List

BANDS: The frequency range of the four available bands are:

Band #1 - from 24 Megacycles to 9.8 Megacycles
Band #2 - from 9.8 Megacycles to 4 Megacycles
Band #3 - from 4 Megacycles to 1.5 Megacycles
Band #4 - from 1500 Kilocycles to 540 Kilocycles

PARTS & PRICE LIST

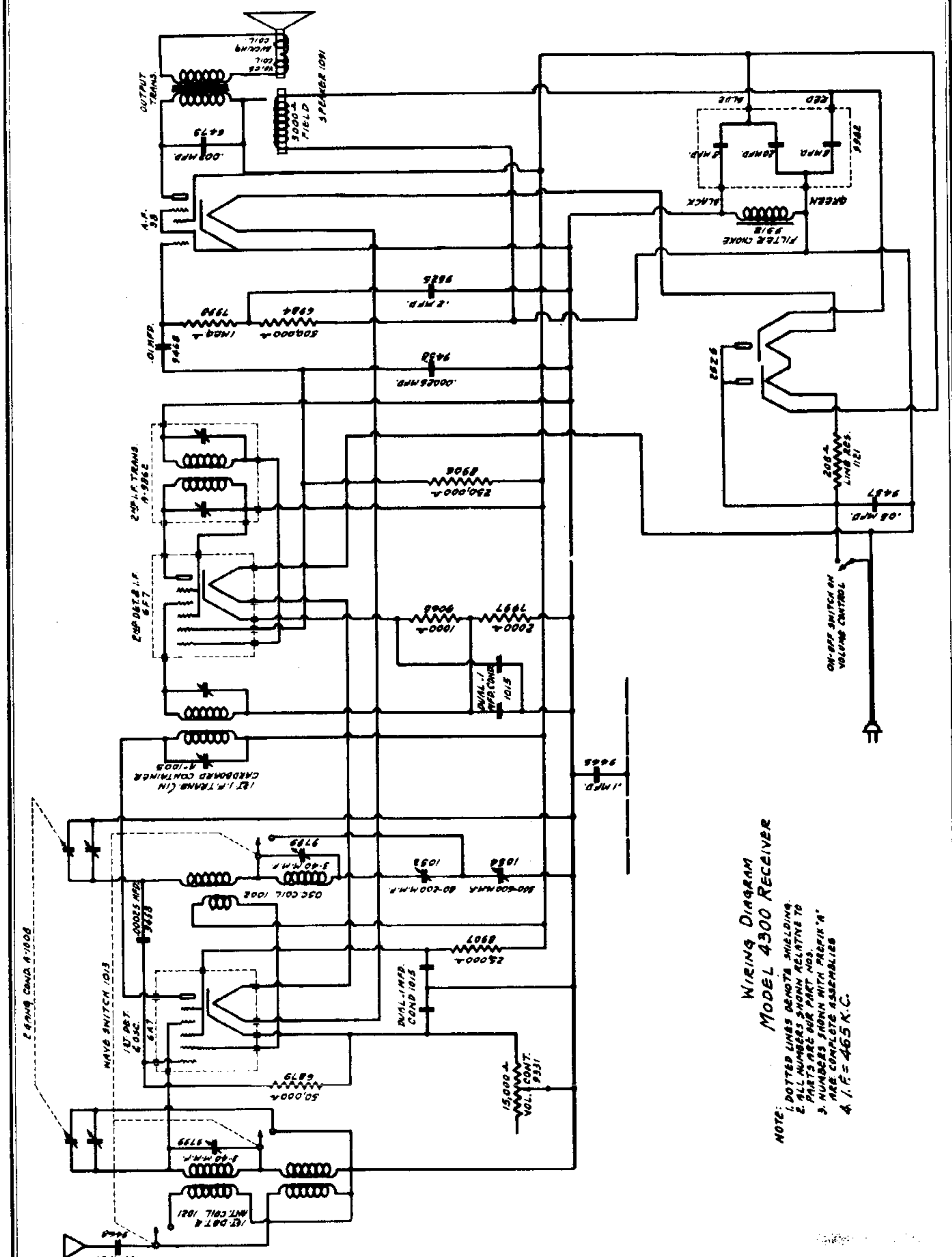
PART NUMBER

9839 BC Antenna Coil
9838 BC R.F. Coil
9840 BC Oscillator Coil
9842 SW Oscillator Coil
9843 SW Antenna & 1st Detector Coil
9835 1st & 2nd IF Transformer
9662 Third IF Transformer
9800 R.F. Choke
9812 Gang Condenser
9275 Tuning Dial & Drive Complete
9986 Tuning Dial Wave Band Screen Disc Assembly
9806 Tuning Dial Wave Band Clock Spring
9688 Tuning Dial Wave Band Bronze Cord
9687 Tuning Dial Wave Band Drive Pulley (on band selector,
9710 110 Volt 50-60 Cycle Power Transformer
9747 Universal 115 to 230, 25-60 Cycle Power Transformer
9709 Chbke
9312 Choke
9748 Audio Transformer
9746 Wire Wound Resistor Strip
9195 Bypass Condenser (2-.1 Mfd.)
7843 Bypass Condenser (2-.25-.1 Mfd.)
9382 Padding Condenser
9062 Padding Condenser
9799 Trimmer Condenser
8979 Tube Shield Base
8980 Tube Shield
9080 Tube Shield Caps
9290 SW Trimmer Wor, Drive Tuning Rod
9287 SW Trimmer Disc Assembly
9279 Wave Switch
9296 Volume Control
9295 Tone Control

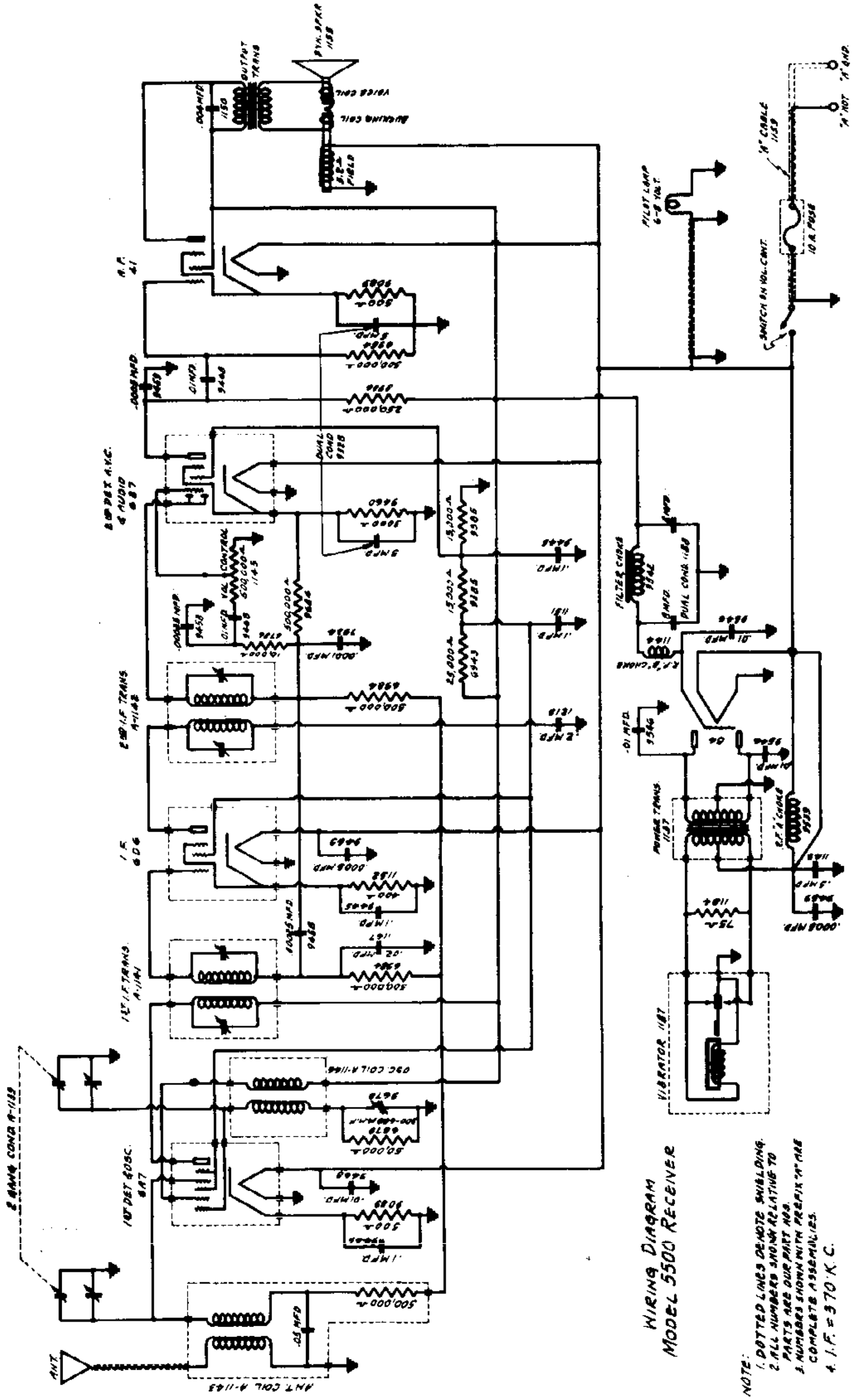
9834 Sensitivity Control
9845 Tune-A-Lite
9846 Tune-A-Lite Socket
6916 Pilot Lamp Socket
9738 Electrolytic Condenser (2-8 & 2-10 Mfd.
9739 Wet Electrolytic Condenser (12 Mfd.)
9970 8000 Ohm Wire Wound Resistor
9459 .0005 Moulded Condenser
9458 .00025 Moulded Condenser
9698 1 Mfd. 100 Volt Condenser
9032 .2 Mfd. 200 Volt Condenser
9386 .1 Mfd. 200 Volt Condenser
8961 .05 Mfd. 400 Volt Condenser
6590 .002 Mfd. 200 Volt Condenser
9203 .1 Mfd. 400 Volt Condenser
7860 .01 Mfd. 400 Volt Condenser
6979 10,000 Ohm 1 Watt Resistor
9460 3,000 Ohm 1/3 Watt Resistor
9346 25,000 Ohm 1/2 Watt Resistor
8906 250,000 Ohm 1/3 Watt Resistor
6879 50,000 Ohm 1/3 Watt Resistor
6984 500,000 Ohm 1/3 Watt Resistor
6769 15,000 Ohm 1/2 Watt Resistor
9018 150 Ohm 1/3 Watt Resistor
9065 1,000 Ohm 1/3 Watt Resistor
9693 5,000 Ohm 1/3 Watt Resistor
6875 250 Ohm 1/3 Watt Resistor
8000 100,000 Ohm 1/3 Watt Resistor
7997 2,000 Ohm 1/3 Watt Resistor
9117 Knobs
9113 Knobs
9768 Triple Binding Post Strip (A-1, A-2, Gnd.
6576 Phono Tip Jacks

MODEL 4300
Schematic

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.



WIRING DIAGRAM
MODEL 5500 RECEIVER

NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 370 K.C.

MODEL 5500
Voltage
Alignment Data
Parts List

SENTINEL RADIO CORP.

VOLTAGE TABLE
Battery Voltage - 6 Volt
Volume Control - Full on

TYPE OF TUBE	POSITION OF TUBE	FIL. VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO. 2.	GRID NO. 3 & 5
6A7	Modulator & Oscillator	6	220	3	80	5	220	80
6D6	I. F. Amplifier	6	220	2.5	80			
6B7	Second Detector Diode AVC & 1st Audio Triode	6	35##	3.	40			
41	Output	6	215	13	220			
84	Rectifier	6	460-AC	230				

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: It should rarely be necessary to realign the intermediate transformers or the variable condenser. As a matter of fact, this should only be necessary when an intermediate transformer, oscillator or R. F. coil has become defective and require replacement. For properly aligning either the intermediate transformer or condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 370 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer which is accessible from the top of the I. F. transformer up and down until maximum reading is obtained on the meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER: To align the variable condenser and padding condenser it is necessary that the receiver chassis be removed from the set housing. After the receiver chassis has been removed connect the remote control flexible drive shafts in their respective couplers, and set the dial needle on the dial face so that the dial calibration is correct.

1. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

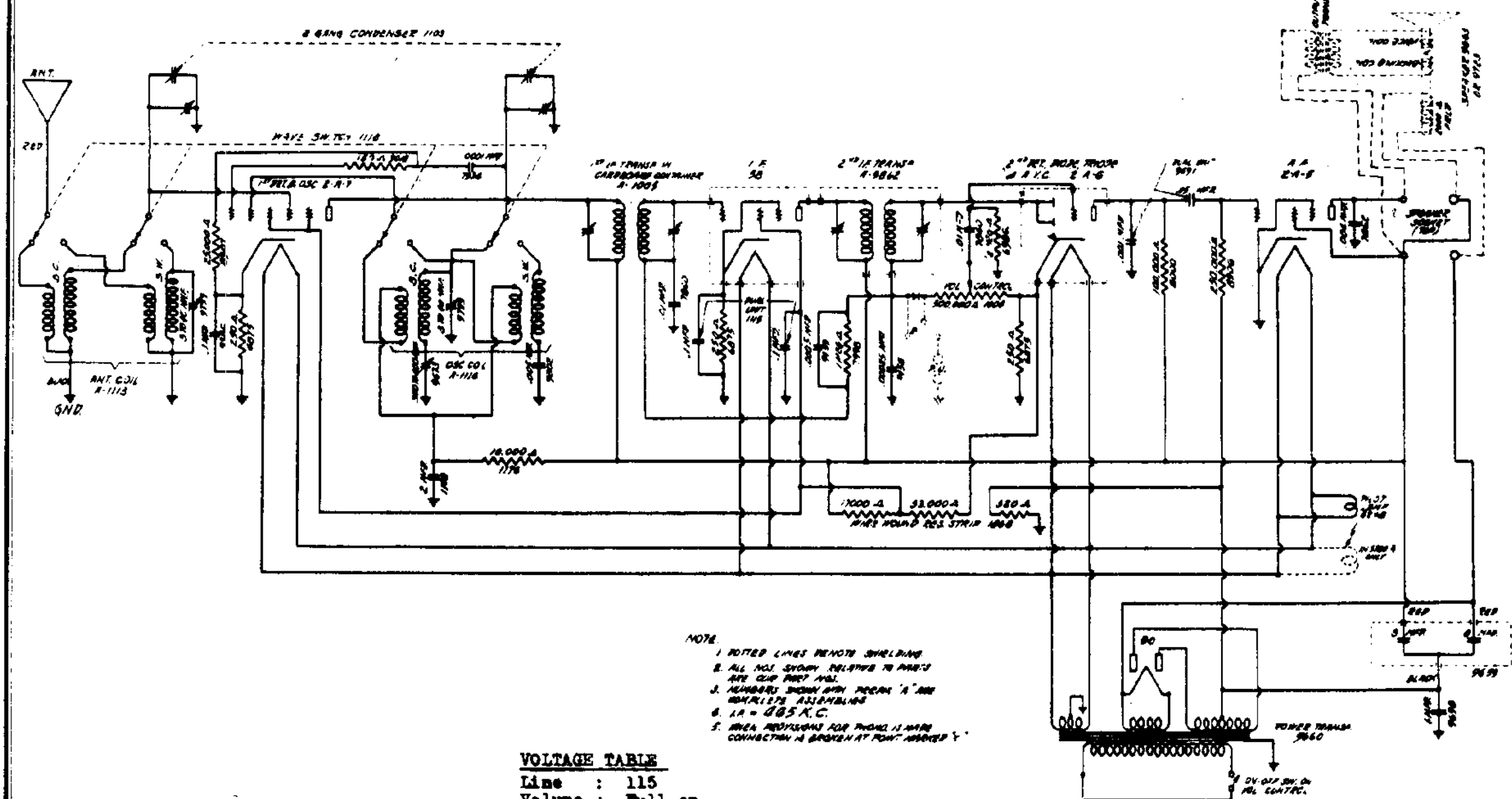
2. Tune the receiver to exactly 1500 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1500 KILOCYCLE SIGNAL (TO MAXIMUM OUTPUT) BY ADJUSTING THE OSCILLATOR VARIABLE CONDENSER TRIMMER MOUNTED ON TOP OF THE VARIABLE CONDENSER. THEN ADJUST THE OTHER VARIABLE CONDENSER TRIMMER FOR MAXIMUM OUTPUT. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency, then adjust the 600 padding condenser which is located on the right hand side and accessible through the hole in the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment, using the position where greatest output is obtained.

1143	Antenna Coil
1146	Oscillator Coil
1141	First I. F. Transformer
1142	Second I. F. Transformer
1277	Dynamic Speaker
9673	Padding Condenser
1139	Two Gang Condenser
1145	Volume Control
1128	Set Housing
1127	Set Housing Front Cover
1156	Set Housing Front Cover Grille
1163	Wood Mounting Block
7717	Carriage Bolt 3/8"
7708	Carriage Bolt Steel Washer
7716	Carriage Bolt Lock Washer
1171	Cable Guide Bracket Assembly
1158	Antenna Lead
1166	Tube Shield
9581	10 Ampere Fuse
1159	"A" Battery Cable compete with fuse
1187	Vibrator
1137	Power Transformer
1188	2 x 8 Mfd. Condenser Block
1276	R. F. "A" Choke
9598	.5 Mfd. Generator Condenser
1212	Spark Plug Suppressor
1214	Distributor Suppressor
1213	Six Cylinder Suppression Kit
1278	Remote Control Head Complete Assembly
9959	Remote Control Tuning Knob with Key
9958	Remote Control Volume Knob
9954	Remote Control Head Clamp
9955	Remote Control Clamp Strap
1210	Remote Control Tuning Shaft Tubing 18"
1209	Remote Control Tubing Flexible Drive Shaft 18"
1210	Remote Control Volume Shaft Tubing 18"
1211	Remote Control Volume Flexible Drive Shaft 18"
9961	Remote Control Head Glass
9328	Electrolytic Condenser 2 x 5 Mfd.
9456	.00025 Mfd. Moulded Condenser
9459	.0005 Mfd. Moulded Condenser
7934	.0001 Mfd. Moulded Condenser
9445	.1 Mfd. 200 Volt Condenser
1148	.5 Mfd. 200 Volt Condenser
9468	.01 Mfd. 400 Volt Condenser
1150	.004 Mfd. 600 Volt Condenser
1151	.1 Mfd. 400 Volt Condenser
1167	.02 Mfd. 400 Volt Condenser
1219	.2 Mfd. 400 Volt Condenser
1248	.005 Mfd. 1000 Volt Condenser
1184	75 Ohm Wire Wound 1 Watt Resistor
6943	25,000 Ohm 1 Watt Resistor
8000	100,000 Ohm 1/3 Watt Resistor
1280	35,000 Ohm 1/3 Watt Resistor
9089	500 Ohm 1/3 Watt Resistor
1152	400 Ohm 1/3 Watt Resistor
8907	25,000 Ohm 1/3 Watt Resistor
9460	3,000 Ohm 1/3 Watt Resistor
6786	10,000 Ohm 1/3 Watt Resistor
6984	500,000 Ohm 1/3 Watt Resistor
6943	25,000 Ohm 1 Watt Resistor

SENTINEL RADIO CORP.

MODEL 5700,5721
Schematic
Voltage



VOLTAGE TABLE
Line : 115
Volume : Full on

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO.1	GRID NO.2	GRID NO. 3 & 5
58	I. F. Amplifier	2.45	205	80	2			
2A7	Oscillator & 1st Detector	2.45	205		2.5	1.5	160	80
2A6	Second Detector Diode AVC and Triode	2.45	100##		1			
2A5	Output	2.45	190	205	.8###			
80	Rectifier	4.85						

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied.

Read all voltages from socket to chassis unless otherwise specified.

Read from grid to chassis.

MODEL 5700, 5721
Alignment Data
Parts List

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE: Only when an IF transformer, antenna or oscillator coil is replaced should it ever be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is absolutely necessary that a good accurate calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 tube leaving the grid cap disconnected. The ground side of the oscillator should be connected to the receiver chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the intermediate transformer brass hext adjusting nut located on top of the intermediate transformer can up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside the brass hex nut for maximum output.

4. Adjust the second I. F. transformer in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is essential that the following instructions be carefully adhered to in the order given otherwise the receiver will be insensitive and the dial calibration will be inaccurate.

1. Connect the high side of the oscillator output to the set antenna lead and the oscillator ground to the receiver chassis.

2. Place the band selector switch for operation on the 16 to 5.2 megacycle band.

3. Set the oscillator frequency to exactly 15 megacycles and adjust the receiver dial to exactly 15 megacycles. Then BRING IN THE 15 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE trimmer condenser of the oscillator gang condenser section. The oscillator trimmer condenser is mounted on top of the rear section of the variable condenser. The front section of the variable condenser tunes the antenna stage.

4. Place the band selector switch for operation on the 1715 to 535 kilocycle band, set the oscillator to exactly 1400 kilocycles and tune the receiver dial to 1400 kilocycles. BRING IN THIS 1400 KILOCYCLE SIGNAL BY ADJUSTING THE SMALL TRIMMER CONDENSER which is located underneath near the center and towards the front of the chassis.

5. Next adjust the antenna variable gang condenser section trimmer condenser for maximum output (front section).

6. Leave the receiver operating on the same band and set the oscillator frequency to approximately 600 kilocycles and adjust the dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left, adjust the 600 kilocycle padding condenser which is located below the speaker and accessible through the front of the chassis for maximum output.

7. Recheck the 1400 kilocycle adjustment.

8. Place the band selector switch for operation on the 16 to 5.2 megacycle band and tune the dial to exactly 15 megacycles and set the oscillator frequency to 15 megacycles. Then adjust the trimmer condenser which is located underneath and toward the center of the right hand side of the chassis for maximum output.

This completes the alignment procedure and it is suggested that all the adjustments be rechecked.

BAND SELECTOR SWITCH: Two different frequency bands are available, the frequency range being:

1715 to 535 Kilocycles- 175 to 560.75 Meters
16 to 5.2 Megacycles- 18.7 to 57.7 Meters

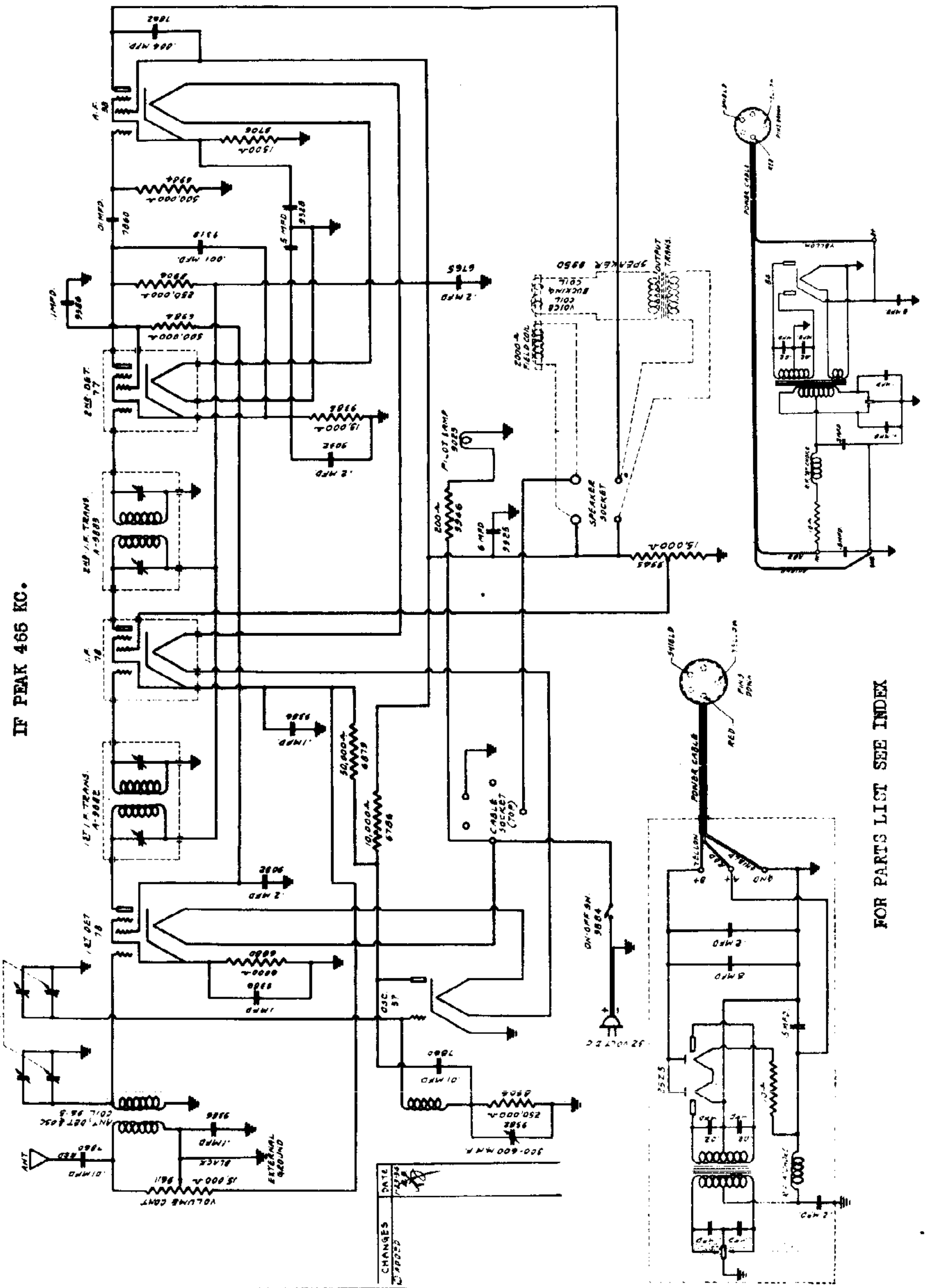
PARTS & PRICE LIST

PART NUMBER			
1113	Antenna Coil	6875	250 Ohm 1/3 Watt Resistor
1114	Oscillator Coil	9018	150 Ohm 1/3 Watt Resistor
1005	First I. F. Transformer	8907	25,000 Ohm 1/3 Watt Resistor
9862	Second I. F. Transformer	1176	10,000 Ohm 1/3 Watt Resistor
1118	Wave Switch	9698	1 Mfd. 100 Volt Condenser
1103	Gang Condenser	9386	.1 Mfd. 200 Volt Condenser
1104	Volume Control	7862	.004 Mfd. 400 Volt Condenser
9660	Power Transformer	7860	.01 Mfd. 400 Volt Condenser
9659	2-8 Mfd. Electrolytic Condenser	1115	2x.1 Mfd. 200 Volt Condenser
9673	Padding Condenser	9691	.05 Mfd. & .001 Mfd, 400 Volt Condenser
9799	Trimmer Condenser	1108	2 Mfd. Dry Electrolytic Condenser
9671	Pilot Light Socket	9307	.005 Mfd. Moulded Condenser
6248	2.5 Volt Pilot Light Socket	9458	.00025 Mfd. Moulded Condenser
1104	Tuning Dial	7934	.0001 Mfd. Moulded Condenser
1068	Wire Wound Resistor Strip	9459	.0005 Mfd. Moulded Condenser
6984	500,000 Ohm 1/3 Watt Resistor	8980	Tube Shield
7997	1 Meg Ohm 1/3 Watt Resistor	1179	Large Knob
8000	100,000 Ohm 1/3 Watt Resistor	1180	Knob with dot
8906	250,000 Ohm 1/3 Watt Resistor	9759	Small Knob

SENTINEL RADIO CORP.

MODEL 6101, 6102
Schematic

IF PEAK 465 KC.



FOR PARTS LIST SEE INDEX

MODEL 6101, 6102
Service Notes
Voltage
Alignment Data

SENTINEL RADIO CORP.

This receiver is designed to operate on 32 volt battery plants only and must not be used on 36 volt battery plants without a voltage regulator. Generally, it is not advisable to operate the receiver while the generator is charging the battery due to the fact that considerable radio interference (static noise) may be encountered. This is not a reflection on the receiver, but is due to interference caused by the power plant generator, itself. Some generators have built-in traps to eliminate this interference and when so constructed this particular type of plant generator will not cause interference. If excessive static noise is encountered be sure that it is not caused by the 32 volt plant generator.

THIRTY-TWO VOLT POWER UNIT: Two power units have been furnished with the six tube 32 volt receiver, one unit utilizes a 25Z5 tube and the other an 84 tube. Diagrams for both of these units are shown on the receiver circuit diagram. It will be noted from the parts and price list that all parts with the exception of the power transformer and tube sockets are interchangeable. When ordering these parts be sure to order by part number.

NOTE: The dynamotor type unit supplied with the five tube 32 volt receiver cannot be used with the six tube receiver nor can the power units (utilizing the 84 or 25Z5 tube) furnished with the six tube receiver be used with the five tube 32 volt set.

The 32 volt power unit is shipped unmounted and must be placed in the sound-proof celotex compartment. In the console models this is located below the receiver mounting board and in the table models it is located above the chassis. To install the power unit in the sound-proof box remove the wood screws which hold the celotex back to the box, then place the power unit on the rubber mounting blocks provided inside of this box so that the unit is floating free on these rubber insulators. It is very important that the unit does not touch the side of the box. If excessive vibration is noticed be sure to check the power unit installation, as excessive vibration will result if it is not properly mounted on all of the rubber supports or if it is permitted to touch the side of the celotex housing.

PILOT LIGHT: A type T-3½ #40 6.3 volt pilot light is used. The pilot light is readily accessible for removal from the rear of the cabinet.

ANTENNA AND GROUND: Under ordinary conditions an aerial from twenty-five to seventy-five feet in length including lead-in will prove ample. In some locations which are located a considerable distance from broadcast stations it may be necessary to use a longer aerial than this to obtain satisfactory daylight reception. Never place the aerial lead-in in close proximity to the 32 volt lighting lines, as considerable static noise may be picked up if the antenna lead-in is run parallel to the 32 volt power lines for any distance.

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the ground lead.
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.
4. The second I. F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser:

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the ground lead.
2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.
3. Adjust the variable condenser trimmer screws for maximum output reading.
4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

When making this adjustment be sure to rock the variable condenser to the right and left using the position where the greatest reading is obtained.

VOLTAGE TABLE

Line Voltage : 32 Volts
Volume Control: Full On

TUBE		FIL.	PLATE	SCREEN	CATHODE
78	1st Detector	6.5	160	70	5
37	Oscillator	6.5	100		20
78	I.F.	6.5	160	70	25
77	2nd Detector	6.5	65*	25*	25
38	Output	6.5	150	160	15
25Z5	Rectifier or 84 Rectifier				

* Comparative voltage only.
Read voltage from socket to receiver chassis.

SENTINEL RADIO CORP.

PARTS LIST FOR MODEL 6101

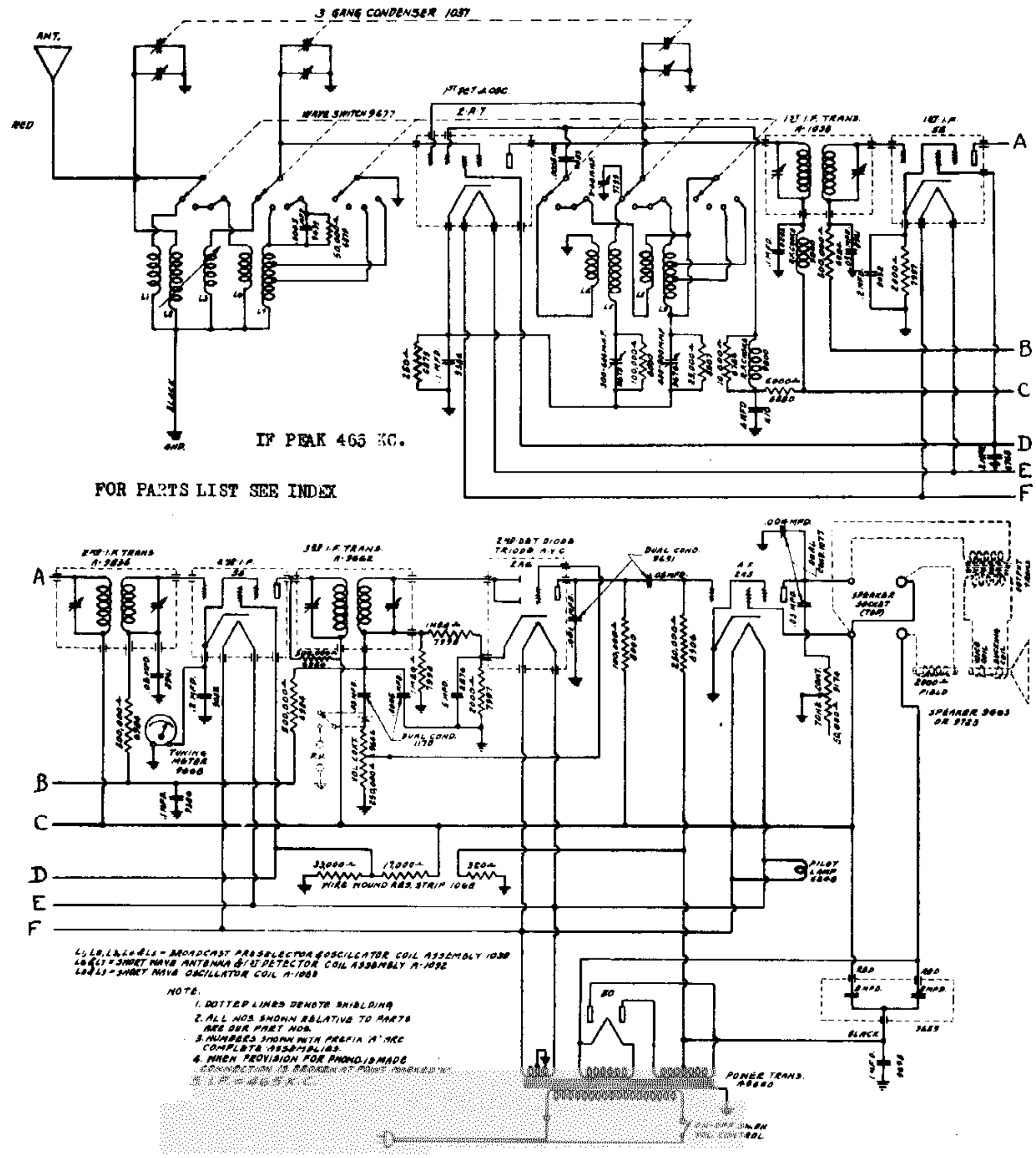
PART NUMBER		LIST PRICE
9422	78 Tube Socket	$ .13
9421	77 Tube Socket	.13
9519	37 Tube Socket	.13
9307	38 Tube Socket	.13
9872	Cable Socket	.13
9557	Speaker Socket	.13
9612	Two Gang Condenser	2.75
9880	Tuning Dial	.55
9881	Pilot Light Socket	.11
9023	Pilot Light	.39
9946	Wire Wound Resistor Strip 15,000 Ohms	.39
9945	Wire Wound Resistor Strip 200 Ohms	.55
9884	Off and On Switch	.61
9611	Volume Control	.91
9382	Padding Condenser	.50
8980	Tube Shield	.11
9082	Tube Shield Cap	.04
9925	6 Mfd. Electrolytic Condenser	1.43
9328	Dual 5 Mfd. Electrolytic Condenser	.72
9882	First I. F. Transformer	1.98
9883	Second I. F. Transformer	1.98
9615	Antenna, Detector & Oscillator Coil	1.43
6765	.2 Mfd. 400 Volt Condenser	.30
9032	.2 Mfd. 200 Volt Condenser	.23
9386	.1 Mfd. 200 Volt Condenser	.18
7860	.01 Mfd. 400 Volt Condenser	.17
7862	.004 Mfd. 400 Volt Condenser	.17
9319	.001 Mfd. Moulded Condenser	.21
8906	250,000 Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
6786	10,000 Ohm 1/3 Watt Resistor	.19
9706	1,500 Ohm 1/3 Watt Resistor	.19
6880	6,000 Ohm 1/3 Watt Resistor	.19
9385	15,000 Ohm 1/3 Watt Resistor	.19
107	32 Volt Power Unit complete with 25Z5 Tube	22.50
107A	32 Volt Power Unit complete with 84 Tube	22.50
9907	Three Conductor Power Cable with Plug	1.10
9918	Bottom Rubber Cushion	.08
9919	Side Rubber Cushion	.17
9895	Celotex Housing	2.20
8701	Vibrator	8.25
8702	.5 Mfd. Condenser	.98
8703	.02-.02 Mfd. Condenser	.83
8704	.1-.1 Mfd. Condenser	1.38
8705	8 Mfd. Condenser	2.25
8706	1 Mfd. Condenser	.55
8707	Cord & Plug	2.35
8708	RF A Choke	.66
8709	Transformer used with 25Z5 Tube	6.00
8710	Transformer used with 84 Tube	7.00
8711	5 Ohm Resistor	.83

PARTS LIST FOR MODEL 6317

PART NUMBER		LIST PRICE
1039	Broadcast, Antenna, Preselector & Oscillator Coil	$ 2.75
1083	Short Wave Oscillator Coil	.73
1092	Short Wave Antenna & First Detector Coil	.75
1038	First I. F. Transformer	2.20
9835	Second I. F. Transformer	2.20
9662	Third I. F. Transformer	2.05
9800	R. F. Choke	.83
1037	Three Gang Condenser	4.25
1079	Dial	.61
9677	Wave Band Switch	3.58
9651	Wave Band Indicator Assembly	1.10
9287	Short Wave Trimmer Disc. Assembly	.39
9682	Short Wave Trimmer Worm Tuning Rod	.88
9673	Padding Condenser	.50
9674	Padding Condenser	.50
9799	Trimmer Condenser	.15
9659	Electrolytic Condenser Dual 8 Mfd.	2.80
8876	Electrolytic Condenser 5 Mfd.	.72
1110	Electrolytic Condenser 4 Mfd.	1.14
9660	Power Transformer	4.02
9663	Dynamic Speaker 6"	9.79
9723	Dynamic Speaker 8"	12.00
9666	Volume Control	1.27
9174	Tone Control	.94
9668	Tuning Meter	2.75
1068	Wire Wound Resistor Strip	.96
9671	Pilot Lamp Socket	.09
6248	2.5 Volt Pilot Lamp Bulb	.17
8980	Tube Shield	.11
9082	Tube Shield Cap	.04
9459	.0005 Mfd. Moulded Condenser	.21
9698	1 Mfd. 100 Volt Condenser	.56
9203	.1 Mfd. 400 Volt Condenser	.21
9386	.1 Mfd. 200 Volt Condenser	.19
8961	.05 Mfd. 400 Volt Condenser	.18
1077	.03 Mfd. & .004 Mfd. 400 Volt Condenser	.62
1170	.0005 Mfd. & .05 Mfd. 400 Volt Condenser	.34
9691	.001 Mfd. & .05 Mfd. 400 Volt Condenser	.39
6765	.2 Mfd. 400 Volt Condenser	.26
9032	.2 Mfd. 200 Volt Condenser	.25
6984	500,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
8907	25,000 Ohm 1/3 Watt Resistor	.19
6875	250 Ohm 1/3 Watt Resistor	.19
7997	2,000 Ohm 1/3 Watt Resistor	.19
6786	10,000 Ohm 1/3 Watt Resistor	.19
7998	1 Meg Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
6880	6,000 Ohm 1/3 Watt Resistor	.19
6576	Phono Jacks	.14
6123	S.P.D.T. Phono-Radio Switch	.55
9889	Tuning Control Knob	.22
9889	Tone Control Knob	.22
9887	Short Wave Switch Control Knob	.22
9886	Volume Control Knob	.22
9888	Short Wave Trimmer Knob	.22

MODEL 6315, 6317, 6321
Schematic

SENTINEL RADIO CORP.



MODEL 6315, 6317, 6321
Voltage
Alignment Data

SENTINEL RADIO CORP.

BAND SELECTOR SWITCH: The receiver is designed for operation onfour different frequency bands. The frequency range of these bands are:

Band No. 1 - from 10 Megacycles to 24 Megacycles
Band No. 2 - from 4 Megacycles to 10 Megacycles
Band No. 3 - from 1.5 Megacycles to 4 Megacycles
Band No. 4 - from 1500 Kilocycles to 540 Kilocycles

VOLTAGE TABLE

Line Voltage : 115
Volume Control: Full on
Wave Band : Broadcast

TUBE	Fil.	Plate	Screen	Cathode Volts	Grid No.1	Grid No.2	Grid No. 3 & 5
2A7 Oscillator 1st Detector	2.45	220		2.2	3.5	200	90
58 First I. F. Amplifier	2.45	220	90	6			
58 Second I. F. Amplifier	2.45	220	90	3.5			
2A6 Second Detector	2.45	120##		1			
2A5 Output	2.45	210	220				
80 Rectifier	4.89						

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: Only when an antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 First Detector tube, leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second and third I. F. transformers should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser and padding condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Place the band selector switch for operation on the 1.5 to 4 megacycle band. Tune the receiver to exactly 1.7 megacycles onthe dial, set the short wave trimmer about half the distance between maximum clockwise and counter-clockwise rotation and adjust the oscillator frequency to exactly 1.7 megacycles.

Next, bring this 1.7 megacycle signal in to maximum output by adjusting the padding condenser accessible through the hole in the right hand side and closest to the rear of the chassis.

3. Leave the band selector switch for operation on the 1.5 to 4 megacycle band and tune the receiver to exactly 3.4 megacycles on the dial.

Next, set the test oscillator to exactly 3.4 megacycles and tune the signal in by adjusting the oscillator variable condenser trimmer mounted on top of the variable condenser. The middle section of the variable condenser is the oscillator section. Recheck the 1.7 megacycle adjustment after making the adjustment at 4 megacycles. For best results it is always advisable to check each adjustment several times. NOTE: This completes the short wave adjustment.

4. Adjust the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Turn the receiver on end and bring this 1400 kilocycle signal in to maximum output by adjusting the trimmer screw on the small trimmer, which is located adjacent to the short wave switch underneath the chassis.

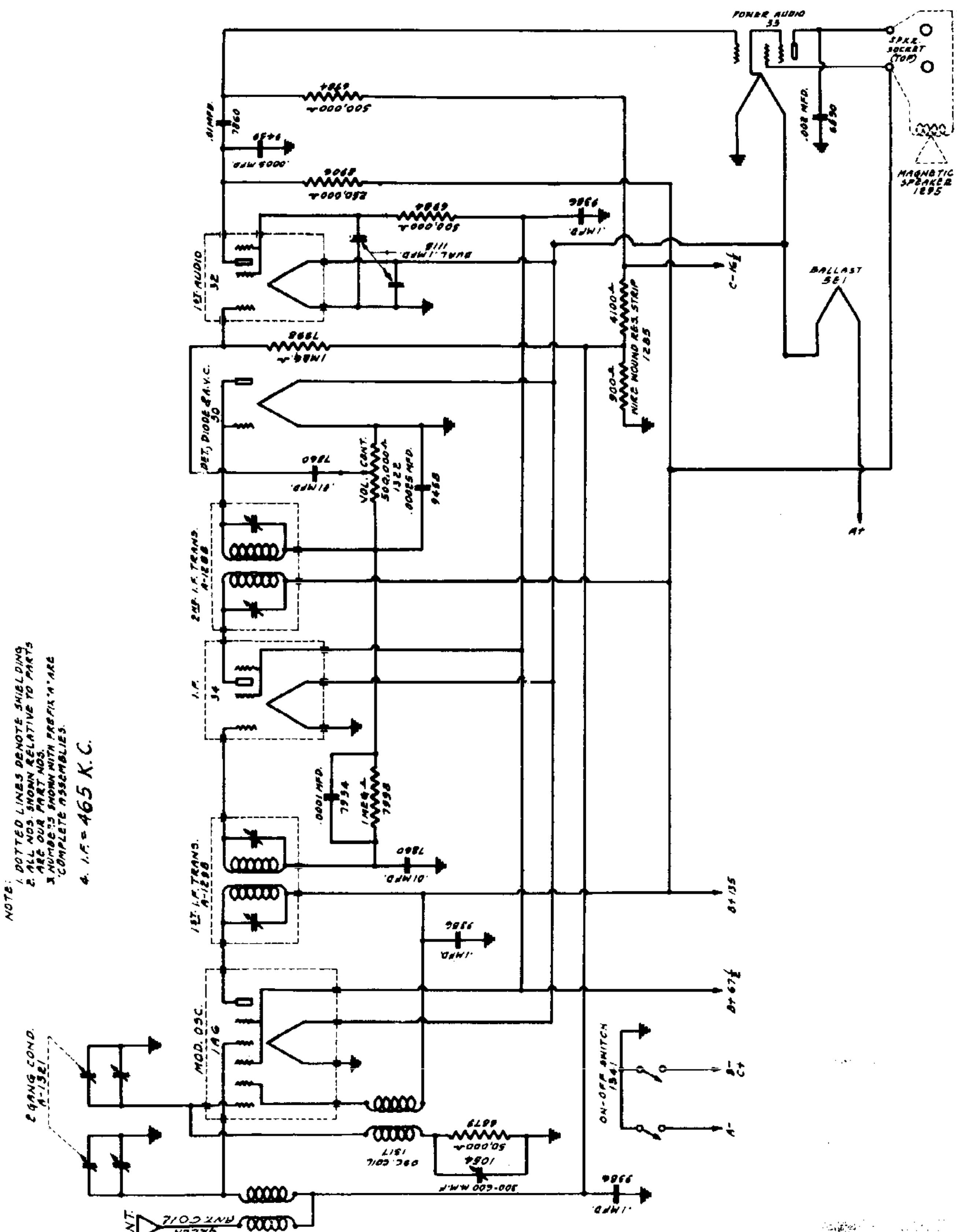
Next, adjust the antenna and preselector variable condenser section trimmers mounted on top of the variable condenser for maximum signal output. (These are the front and rear gang sections).

5. Leave the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver and oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser which is located on the right hand side and towards the front of the chassis for maximum output reading. This adjustment is quite critical and it is necessary to rock the condenser slightly to the right and left to obtain maximum sensitivity.

Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles.

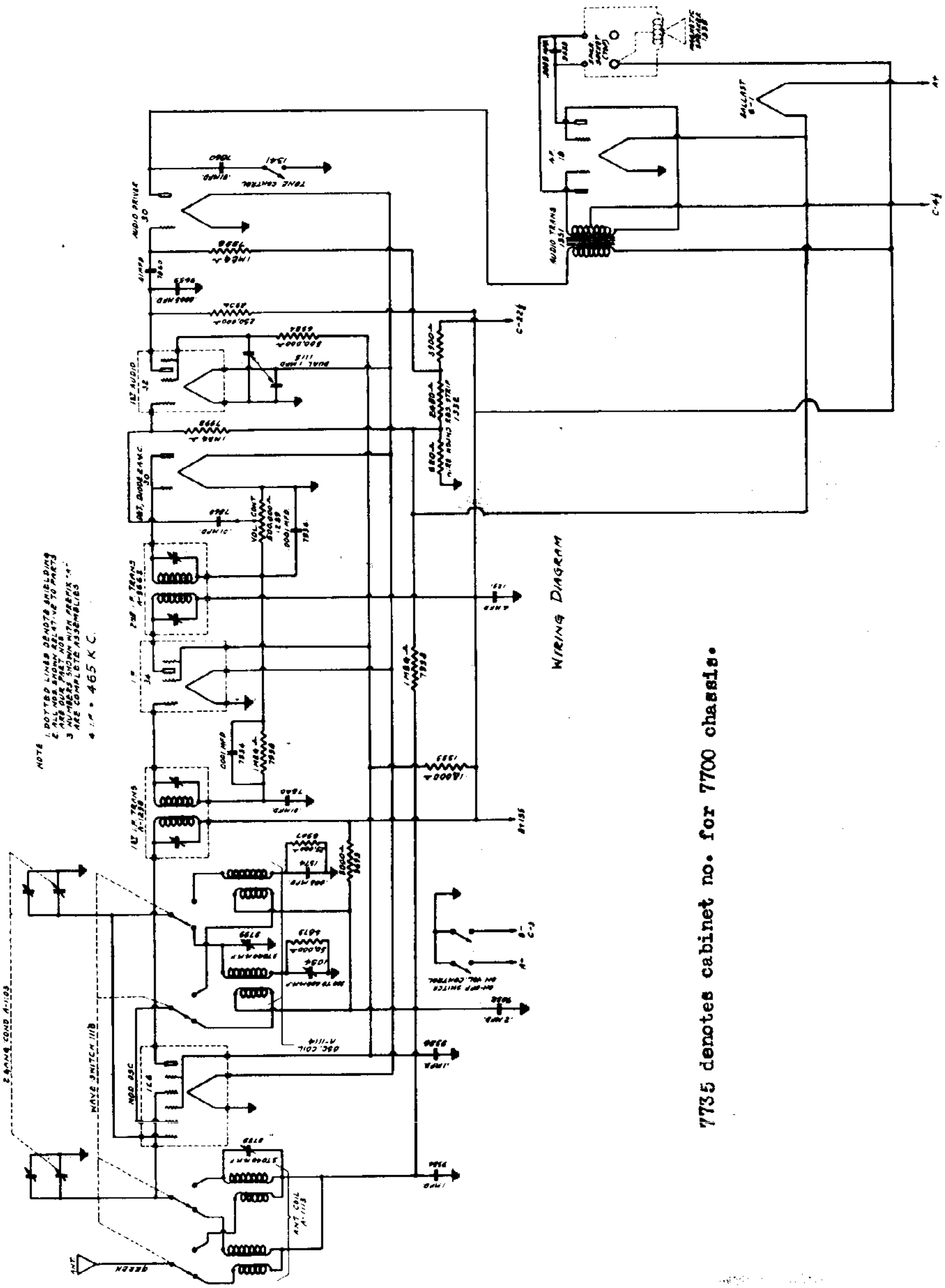
MODEL 6200, 6234, 6241
Schematic

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 7700, 7732, 7741
Schematic



7735 denotes cabinet no. for 7700 chassis.

MODEL 7700, 7732, 7741
Voltage, Parts List
Alignment Data

SENTINEL RADIO CORP.

1. Connect the high side of the oscillator output to the control grid of the 1C6 tube leaving the grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the first intermediate transformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two type intermediate transformer trimmers have been used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning to follow the procedure carefully, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the receiver antenna lead and the ground to the chassis.

2. Place the band selector switch for operation on the short wave band, tune the receiver to exactly 15 megacycles on the dial and set the test oscillator frequency to exactly 15 megacycles. THEN TUNE IN THE 15 MEGACYCLE SIGNAL BY ADJUSTING THE TRIMMER MOUNTED ON TOP OF THE OSCILLATOR SECTION OF THE GANG CONDENSER TO MAXIMUM OUTPUT.

Looking at the front of the receiver the oscillator section is the rear section of the gang condenser.

3. Set the band selector switch for operation on the broadcast band, adjust the test oscillator frequency to 1400 kilocycles and set the receiver dial to exactly 1400 kilocycles. NEXT, BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER LOCATED UNDERNEATH AND NEAR THE CENTER FRONT OF THE CHASSIS.

4. After making this adjustment tune the dial to 1720 kilocycles and set theoscillator frequency to 1720 kilocycles. If the 1720 kilocycle signal cannot be received reduce the 1400 kilocycle trimmer capacity until the 1720 kilocycle signal is brought in.

5. Next, set the receiver dial and test oscillator to exactly 1400 kilocycles, and adjust the trimmer located on the front section of the gang condenser for maximum sensitivity.

6. Leave the band selector switch for operation on the broadcast band, tune the receiver and set the oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser,which is located on and accessible through the small hole in the front of the chassis, for maximum sensitivity. As this adjustment is quite critical it is necessary to rock the condenser slightly to the right and left to find the point of greatest sensitivity.

7. Place the band selector switch for operation on the short wave band, adjust the test oscillator frequency to exactly 15 megacycles and set the receiver dial to 15 megacycles. Turn the receiver on its back with the dial up and adjust the trimmer, which is mounted on the top of the coil underneath and near the right hand side of the chassis, for maximum output. Be sure to rock the condenser slightly to the right and left when making this adjustment.

This completes the alignment procedure. It is recommended that all of the adjustments be gone over again Generally it will be found that improved results can be obtained if this is done.

VOLTAGE TABLE
"A" Battery - 3 Volt Dry Cell
"B" Battery - 3 45 Volt "B" Batteries
"C" Battery - 1 22½ Volt Battery

TUBE		FIL.	PLATE	SCREEN	GRID NO.2	GRID NO 3 & 5
1C6	Oscillator & 1st Detector	2.1	135		115	67½
30	Second Detector	2.1				
34	I. F.	2.1	135	67½		
32	1st Audio	2.1	37.5##	20##		
30	Driver	2.1	135			
19	Output	2.1	135 each plate			

Comparative voltage only
Read all voltages from socket to chassis

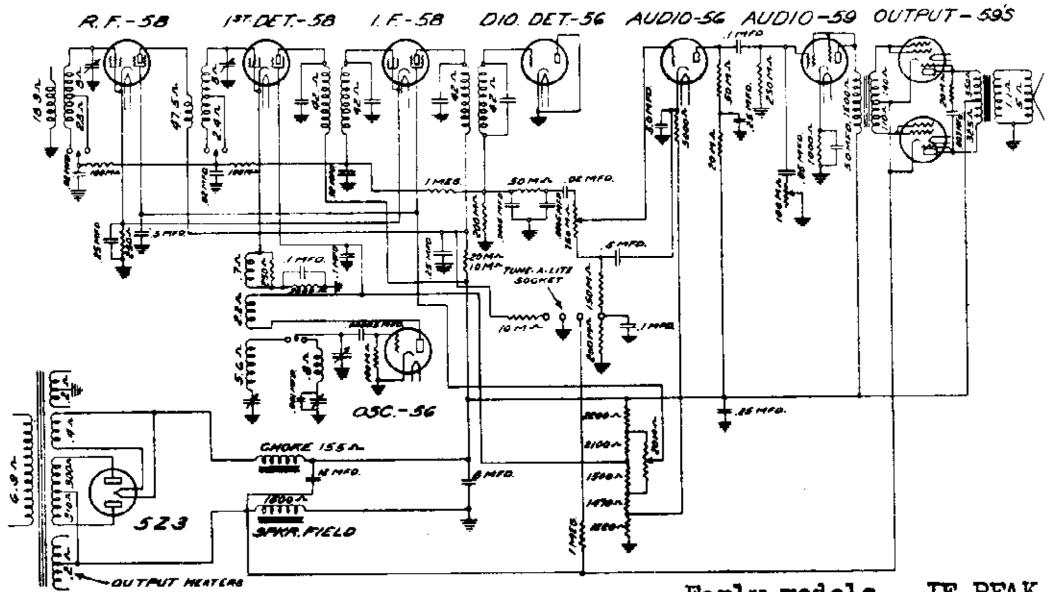
Total "B" Drain - .023 Amperes
Total "A" Drain - .620 Amperes

When making tube voltage checks use batteries that deliver full voltage with the receiver turned on.

PART NUMBER		LIST PRICE	PART NUMBER		LIST PRICE
1113	Antenna Coil	$1.63	1333	18,000 ohm 1/2 Watt Resistor	$ .19
1114	Oscillator Coil	1.63	9693	5,000 ohm 1/3 watt Resistor	.19
1298	1st I. F Transformer	2.05	8907	25,000 ohm 1/3 Watt Resistor	.19
9662	2nd I. F. Transformer	2.05	1292	6 Conductor Battery Cable	.68
1331	Audio Transformer	1.40	1289	Volume Control with D.P.S.T. Switch	1.24
1291	4 Mfd. Wet Electrolytic Condenser	.85	1341	Tone Control Switch	.40
1115	Dual .1 Mfd. 200 Volt Condenser	.35	1370	One Color Tuning Dial	.30
7860	.01 Mfd. 400 Volt Condenser	.17	1338	Two Color Tuning Dial	.35
9032	.2 Mfd. 200 Volt Condenser	.23	1103	Two Gang Condenser	3.93
9459	.0005 Mfd. Mica Mould Condenser	.21	1361	Tube Shield	.15
7934	.0001 Mfd. Mica Mould Condenser	.21	9988	Tube Shield	.11
1374	.003 Mfd. Mica Mould Condenser	.21	1053	Padding Condenser	.50
1332	Wire Wound Resistor Strip	.35	1054	Padding Condenser	.55
7998	1 Meg Ohm 1/3 Watt Resistor	.19	9799	Trimmer Condenser	.15
6984	500,000 Ohm 1/3 Watt Resistor	.19	6-1	Voltage Regulator Tube	3.00
8906	250,000 Ohm 1/3 Watt Resistor	.19	1179	Knob, Large	.15
6879	50,000 Ohm 1/3 Watt Resistor	.19	1180	Knob, Small with Dot	.17

MODEL 4801,4802
Schematic,Voltage
Parts List

SILVER - MARSHALL MFG. CO.



I.F. = 175 K.C.

Early models - IF PEAK 465 KC.
Later models - IF PEAK 175 KC.

		Ef	Ep	Eg	Ek	Esg	Esug	Ip
58	RF	1.9	180	.2	2	72	0	3.7
58	1st Det	1.9	230	1.2	6.5	100	0	2.6
56	Osc.	1.9	105	.1	0			5.5
58	IF	1.9	180	.2	2	72	0	3.5
56	Diode Det.	1.9	0	.3	0			0
56	1st AF	1.9	103	.1	42			1.3
59	2nd AF	2.1	190	3.5	19	190	190	16.5
59	Class B1	2.1	350	0	108	350	0	7
59	Class B2	2.1	350	0	108	350	0	7
5Z3	Rect.	4.5	390*					43*

* - per plae
* - Per Plate
Vol.Cont. - Full On
Line - 110 volts

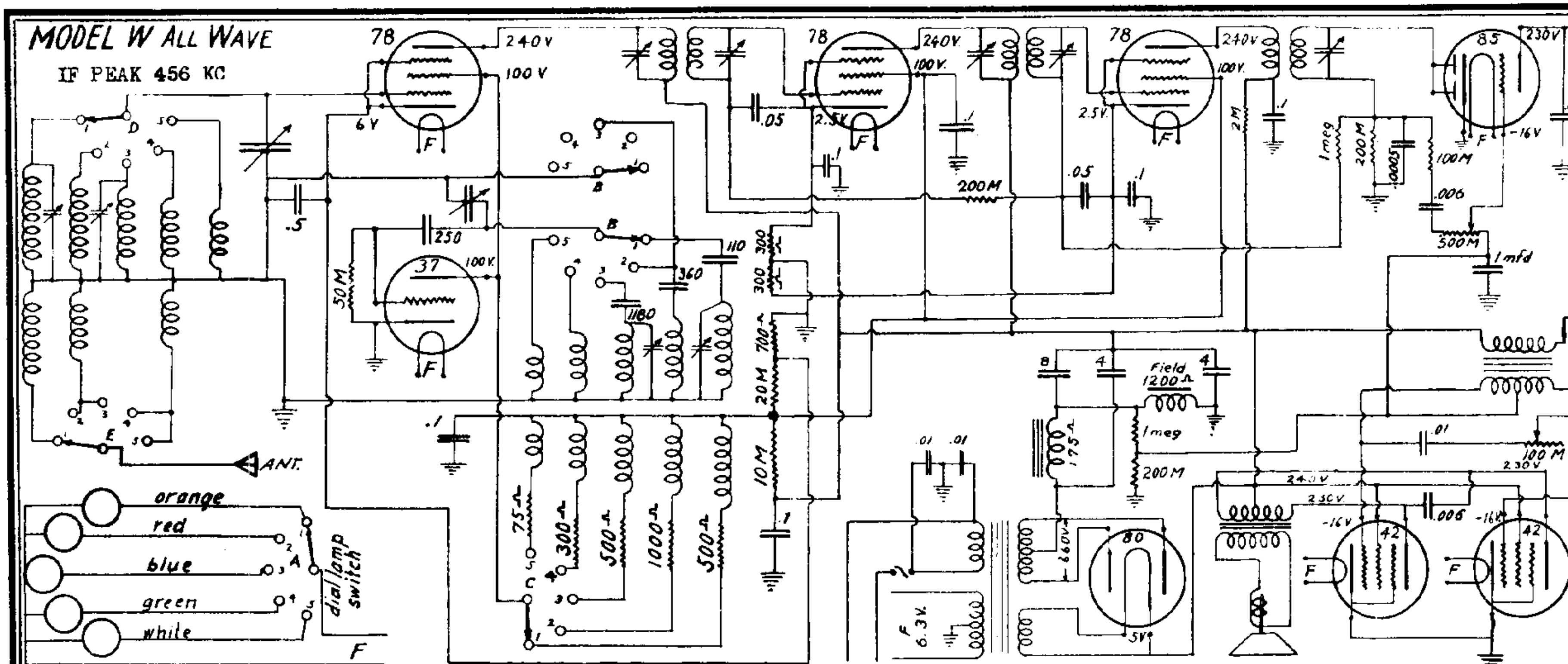
PART NUMBER	DESCRIPTION	LIST PRICE
P-1038	Pilot Light.	$ .45
P-1100-A	.001 Mfd. Condenser.	.25
P-1108	10,000 Resistor, 1 Watt.	.25
P-1381	.0005 Mfd. Condenser	.50
P-1685	2,000 Ohm Resistor	.25
P-1728	.00005 Mfd. Condenser.	.40
P-1999	10,000 Ohm Resistor.	.25
P-4168	Blinder.	.10
P-4182	Felt Washer.	.05
P-4200	5,000 Ohm Resistor	.30
P-4259	Tone Control and Switch.	1.75
P-4260	Volume Control	1.25
P-4262	56 Sockets	.25
P-4264	58 Sockets	.25
P-4391	Field Coil	2.50
P-4485	Tube Shield.	.15
P-4486	Tube Shield Caps	.10
P-4487	Tube Shield Case	.10
P-4514	12 Mfd. - 8 Mfd. Dual Electrolytic	2.85
P-4585	Dual 5 Mfd. Condenser.	1.50
P-4595	1 Meg. Resistor.	.25
P-4597	250 Ohm Resistor	.25
P-4640	.25 Mfd. Condenser	.20
P-4644	.05 Mfd. Condenser	.20
P-4646	.02 Mfd. Condenser	.25
P-4659	50,000 Ohm Resistor.	.25
P-4662	100,000 Ohm Resistor	.25
P-4664	200,000 Ohm Resistor	.25
P-4701	.10 Mfd. Condenser	.30
P-4761	.5 Mfd. Condenser.	.40
P-4890	Small Knobs.	.25
P-4891	Large Knobs.	.25
P-4894	Escutcheon Plate	.80
P-4905	59 Sockets	.15
P-4909	20,000 Ohm Resistors	.25
P-4911	.25 Mfd. Condensers.	.35
P-4914	5Z3 Socket	.15
P-4915	Tune-A-Lite.	3.00
P-4917	Tune-A-Lite Socket	.25
P-4919	Switch - Wave Change	1.00
P-4923	Noise Control.	1.00
P-4924	Tune-A-Lite Bracket.	.15
P-4925	Canopy Mtg. Studs.	.10
P-4929	Tune-A-Lite Blinder.	.15
P-4930	20,000 Ohm Resistor.	.25
P-4931	250,000 Ohm Resistor	.25
P-4932	150,000 Ohm Resistor	.25
P-4933	1,000 Ohm Resistor	.25
P-4934	.003 Mfd. Condenser.	.25
P-4937	Wing Bolts	.10
P-4952	Wing Nuts.	.05
P-4957	Diaphragm.	.50
G-1281	Primary Coil Assembly (R.F. Coil).	.75
G-1282	Primary Coil Assembly (Ant. Coil).	.40
G-1378	Single Insulated Trimmer	.75
G-1401	Gang Condenser	5.00
G-1403	Trimmer Assembly	.75
G-1488	Padding Condenser.	.75
G-1600	Voice Coil and Spider.	.65
G-1669	Filter Choke Assembly.	1.75
G-1708	10" Speaker.	6.00
G-1776	Power Transformer Assembly	4.50
G-1776-A	Power Transformer 25 Cycle	6.25
G-1776-B	Power Transformer 220 Volt	5.00
G-1777	Output Transformer Assembly.	2.00
G-1778	Input Transformer.	2.50
G-1779	R.F. Units	4.00
G-1792	1st. I.F. Transformer	2.50
G-1793	I.F. Coil and Dowel Assembly (G-1792).	1.25
G-1794	2nd. I.F. Transformer.	2.00
G-1795	Dial Assembly.	.90
G-1797	Canopy	1.00
G-1803	R.F. Coil Assembly	.80
G-1804	Oscillator Coil Assembly	.90

MODEL W All Wave
Schematic, Voltage
Alignment Data
MODEL X
Schematic
Voltage

SIMPLEX RADIO CO.

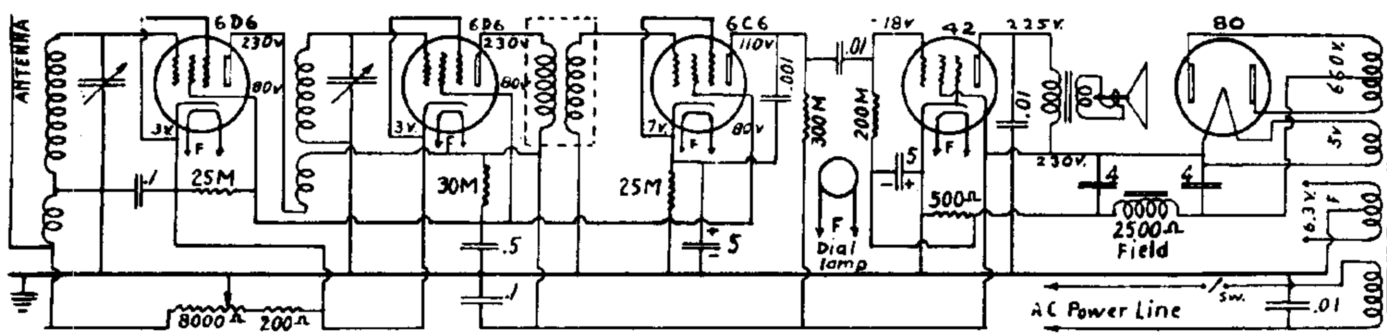
MODEL W ALL WAVE

IF PEAK 456 KC



The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

Model X

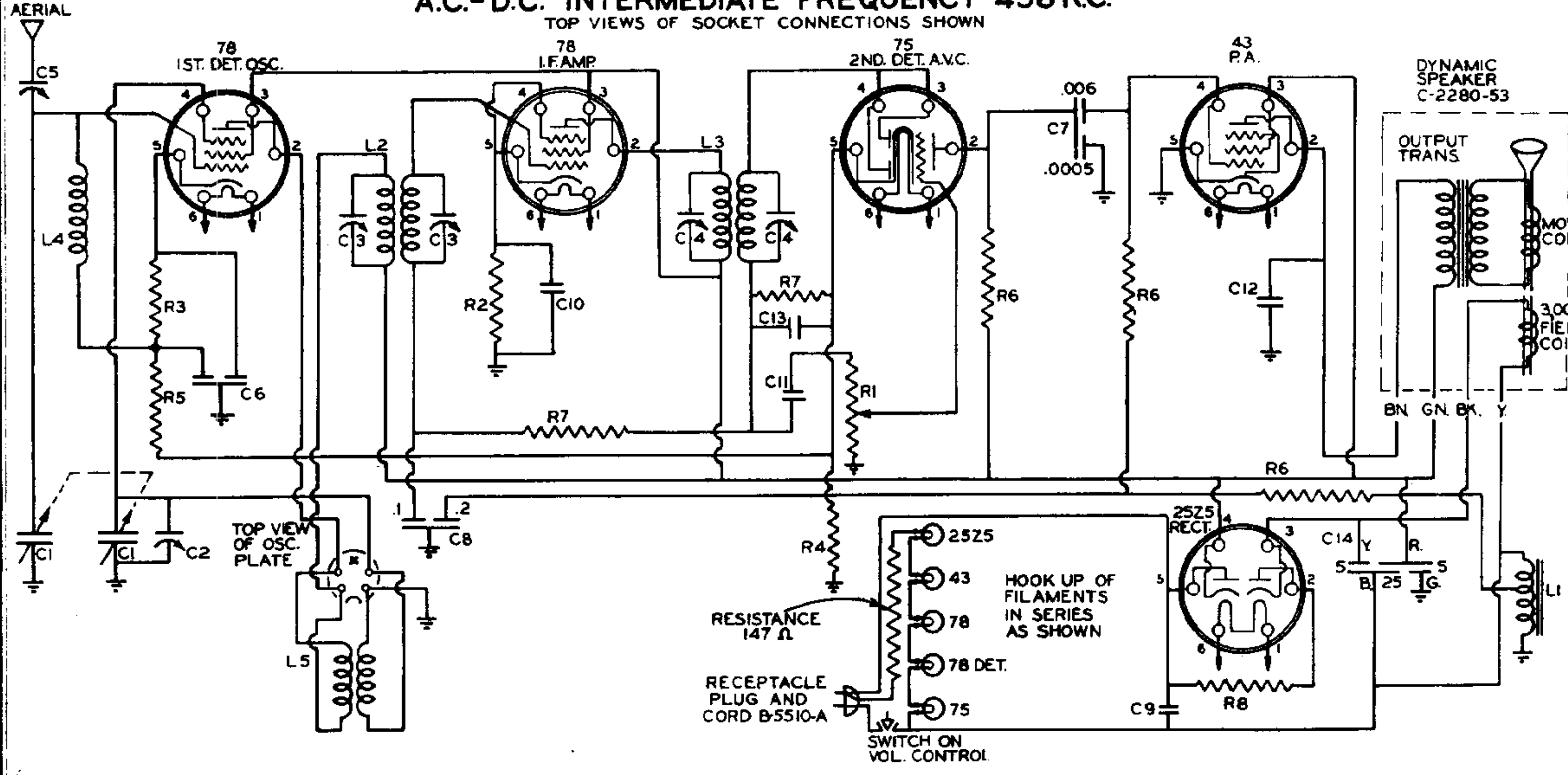


PHONOGRAPH: Mount single pole toggle switch at any convenient point on rear flange of chassis, disconnect 5 mfd. condenser from "cathode" of 6C6 socket and connect it to one side of switch, connect other side of switch to "cathode" of socket and connect phonograph across switch.

SPARKS-WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON MODEL 53 SUPERHETERODYNE
A.C.-D.C. INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF SOCKET CONNECTIONS SHOWN



C1	VARIABLE CONDENSER	B-5509	C8	.1-.2 MFD. 100 V.
C2	ADJUSTABLE CONDENSER		C9	.025 MFD. 400 V.
C3	NO. 1 I.F. TRIMMER	A-11474	C10	.1 MFD. 100 V.
C4	NO. 2 I.F. TRIMMER	A-9553	C11	.006 MFD. 400 V.
C5	ANTENNA TRIMMER	A-11484	C12	.01 MFD. 200 V.
C6	.05-.05 MFD. 100 V.	A-11092-1	C13	.0005 MFD. MOLDED
C7	.006-.0005 MFD. 400 V.	A-11092-2	C14	5-25-5 MFD. ELECTROLYTIC

A-11092-6	R1	500,000 Ω VOL. CONTROL	A-11480
A-11086-4	R2	400 Ω WIREWOUND	B-5243-30
A-11130-1	R3	290 Ω WIREWOUND	B-5243-36
A-11130-4	R4	100 Ω WIREWOUND	B-5243-37
A-11130-7	R5	2,200 Ω WIREWOUND	B-5243-13
A-9578-14	R6	300,000 Ω .25 W.	B-5737-3
A-11093-1	R7	500,000 Ω .25 W.	B-5737-5
	R8	50 Ω WIREWOUND	B-6061-1

NOTE: Part No. of Condenser C13 in late Model 53 Chassis is changed from A-9578-14 to A-9578.

L1	TAPPED CHOKE	A-9566
L2	NO. 1 I.F. TRANSFORMER	A-11476
L3	NO. 2 I.F. TRANSFORMER	A-11477
L4	PRE-SELECTOR COIL	A-11486
L5	OSCILLATOR COIL	A-11475

MODEL 53 AC-DC
Voltage
Chassis View

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE AUGUST 28, 1934

Sparton Model 53 A. C.-D. C. Superheterodyne Schematic Diagram and Voltage Resistance Chart

VOLTAGE-RESISTANCE CHART

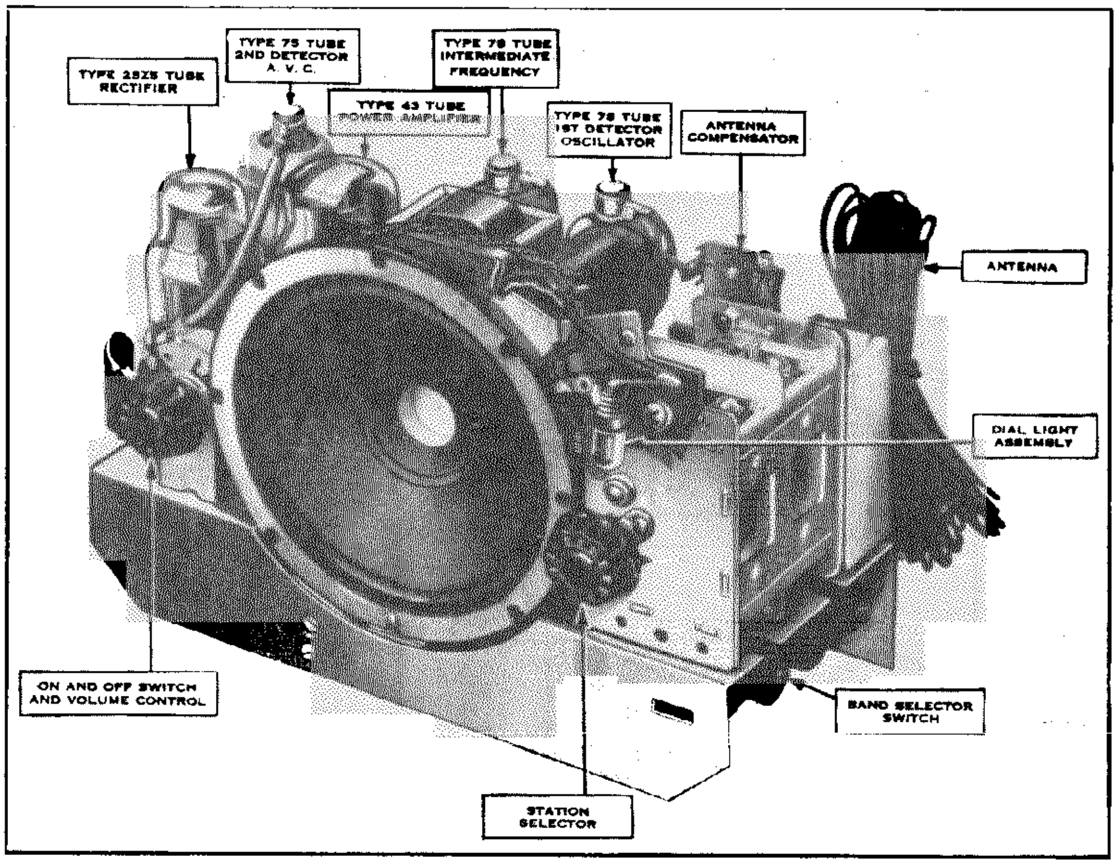
Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st Detector-Oscillator	Volts	28	105	105	**	18	28	15
		Ohms	700	30,000	30,000	**	2500	700	2100
78	I-F Amplifier	Volts	28	105	105	3.7	3.7	28	**
		Ohms	700	30,000	30,000	350	350	700	1,000,000
75	2d Detector-A.V.C.	Volts	28	**	**	**	**	28	**
		Ohms	700	450,000	500,000	500,000	100	700	500,000
43	Power Amplifier	Volts	28	98	105	**	**	28	—
		Ohms	700	25,000	25,000	500 000	0	700	—
25Z5	Rectifier	Volts	28	118	105	70	118	28	—
		Ohms	700	800	25,000	3500	750	700	—

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

**Cannot be measured with Weston No. 665, Type 1.



MODELS 53 AND 57 CHASSIS

Note: Model 53 Chassis is not equipped with dial light assembly or band selector switch.

SPARKS-WITHINGTON CO.

(Original) Effective September 28, 1934

Detailed Alignment Instructions for SPARTON Models 53 and 57

Foreword: Before attempting to realign the circuits of the above SPARTON models, the service man should read carefully the information contained in the preceding pages of Bulletin No. 3-E, especially the paragraphs pertaining to the use of a test oscillator, output meter, method of adjusting the various trimming and padding condensers, and the bending of split condenser plate sections.

The use of quality test equipment is highly recommended, and a good test oscillator becomes a virtual necessity when aligning the all-wave or short-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. **EQUIPMENT NEEDED.**

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 172.5 to 1710 kilocycles.

B. Output meter.

C. Part A-9631 adjusting wrench.

2. **STEP BY STEP PROCEDURE FOR COMPLETE ALIGNMENT OF MODELS.**

Note: For proper alignment of these chassis, the procedure should be followed in the same order as given.

A. **Alignment of Model 53.**

(1) Turn on receiver and test oscillator, and allow both to operate several minutes before attempting to adjust any condensers.

(2) Connect "antenna" of test oscillator to grid cap of Type 78 First Detector-Oscillator Tube, and "ground" of test oscillator to chassis frame of receiver. Connect output meter (condenser in series) from plate of Type 43 Tube to ground. (See Fig. 1, Page 1, Bulletin No. 3-E.)

Note: It is advisable to read carefully the operating instructions included with test oscillator. A blocking condenser must be in series with the test oscillator antenna lead to prevent damage to the oscillator. If the oscillator construction or equipment does not include this, use a .1 MFD or .2 MFD fixed condenser.

(3) Tune test oscillator to obtain a signal of 456 kilocycles.

(4) Turn the Station Selector of the receiver so that the condenser plates are all of the way out.

(5) Retard the volume control of the receiver as much as possible and still obtain a ½ to ¾ full scale deflection of the output meter. The gain control of the test oscillator should be advanced to obtain sufficiently strong signals.

(6) Adjust condensers C_1 (reached from the bottom of the chassis) and C_2 (reached from the back of the chassis). These are the first and second intermediate frequency adjustable condensers, respectively.

(7) Set the Station Selector Knob pointer at 540 kilocycles with the variable condenser rotor plates flush with the stator plates.

(8) Disconnect "antenna" lead of test oscillator from grid cap of first detector oscillator tube and connect to the antenna terminal of the chassis.

(9) Tune test oscillator to obtain a signal of 1500 kilocycles.

(10) Tune the station selector of the receiver to 1500 kilocycles.

(11) Without disturbing the 1500 kilocycles setting of either the test oscillator or the receiver, adjust condenser C_3 and the antenna compensator C_4 for a maximum deflection of the output meter.

(12) Tune the test oscillator and receiver to 900 kilocycles for calibration check.

(13) Tune test oscillator and receiver to 600 kilocycles, and again check the calibration.

(14) Operation of the receiver should also be checked at 1710 kilocycles and 550 kilocycles.

Note: If the test oscillator is crystal-controlled for a frequency of 172.5 kilocycles, harmonics of this frequency may be used to check the dial calibrations at the following readings: 690, 862.5, 1035, 1207.5, 1380, and 1552.5 kilocycles. The end plates of the oscillator section of the two-gang condenser may be bent if necessary to correct dial readings.

(15) The condenser C_4 (antenna compensator) may require readjustment to permit best performance of the receiver after it has been connected to the antenna with which it will be used.

B. **Alignment of Model 57.**

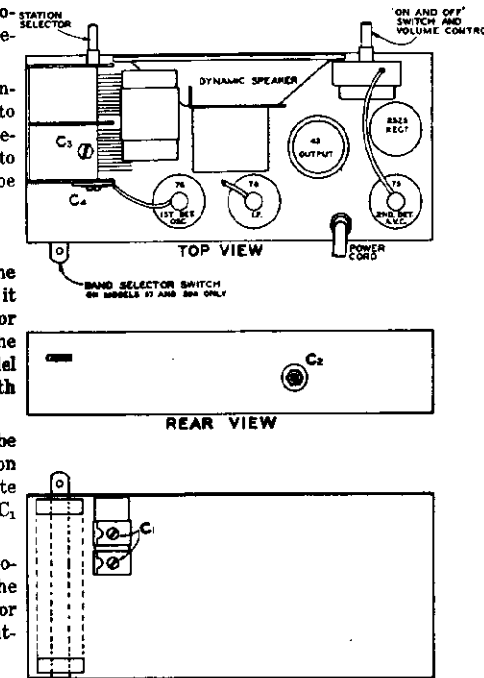
Note: The Model 57 is similar to the Model 53 with the exception that it is equipped with the band selector switch and dial light assembly. The alignment procedure for this model is the same as that for the 53 with the following exceptions:

(1) The band selector switch should be moved to the broadcast position (pushed in) when the intermediate frequency adjustable condenser C_1 and C_2 are adjusted.

(2) When the rotor plates of the two-gang condenser are flush with the stator plates, the station selector knob pointer should be on the right-hand edge of the symbol "S".

(3) After the alignment procedure has been completed, the band selector switch should be moved to the short-wave position (pulled out). With the band selector switch in this position, a test oscillator frequency of 1500 kilocycles should be heard through the receiver when the station selector dial knob is turned to the low-frequency end of the dial between 540 and 600 kilocycles (between 54 and 60).

Note: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration. The condenser C_4 of the Model 57 will also have to be readjusted after the receiver is connected to the regular antenna.



C1 — FIRST INTERMEDIATE FREQUENCY ADJUSTABLE CONDENSER.
C2 — SECOND INTERMEDIATE FREQUENCY ADJUSTABLE CONDENSER.
C3 — OSCILLATOR TRIMMING CONDENSER.
C4 — ANTENNA COMPENSATING CONDENSER.

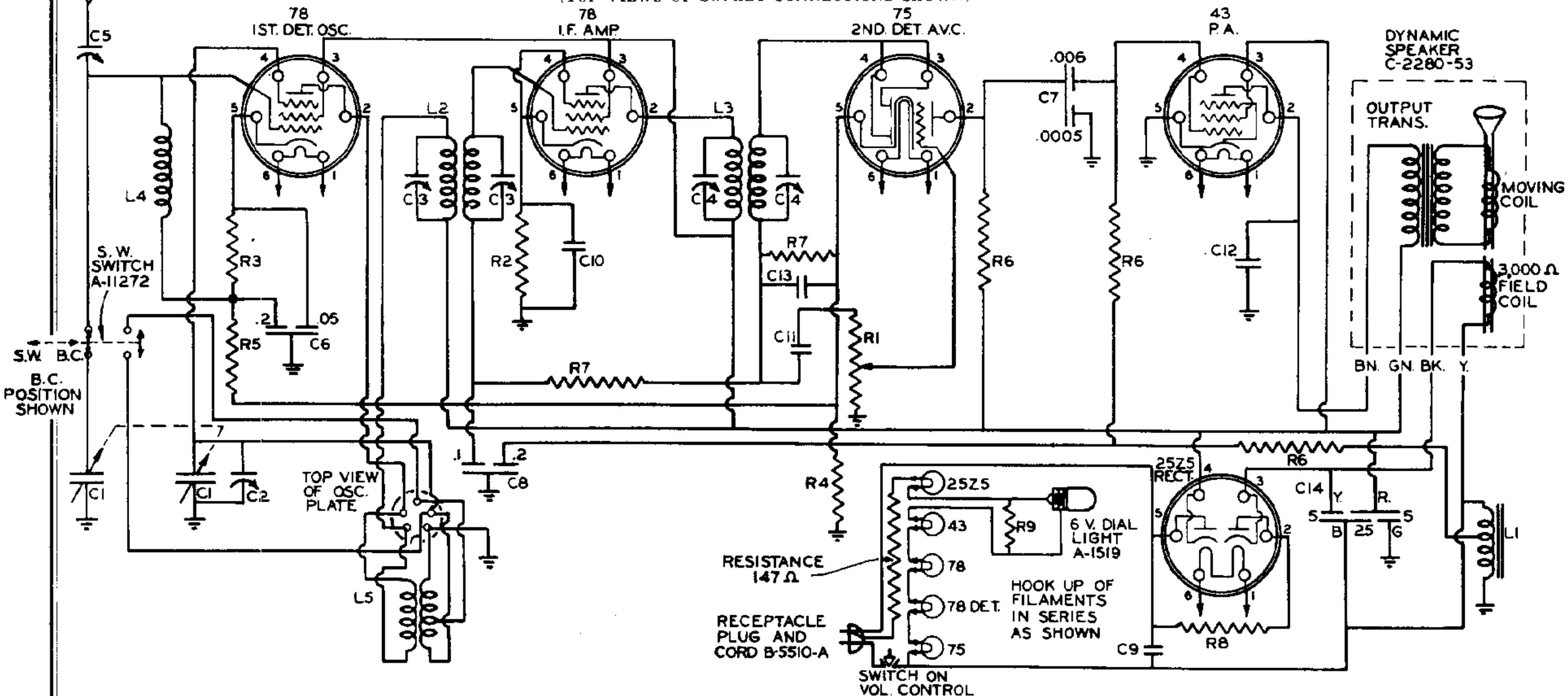
FIG. 5. CHASSIS DIAGRAM FOR SPARTON MODELS 53 AND 57.

MODEL 57 AC-DC
Schematic

SPARKS-WITHINGTON CO.

SPARTON MODEL 57 SUPERHETERODYNE
SCHEMATIC DIAGRAM
A. C.-D. C. INTERMEDIATE FREQUENCY 456 KILOCYCLES

(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



C1	VARIABLE CONDENSER	B-5509	C8	.1-.2 MFD. 100 V.	A-11092-6	R1	500,000 Ω VOL. CONTROL
C2	ADJUSTABLE CONDENSER		C9	.025 MFD. 400 V.	A-11086-4	R2	400 Ω WIREWOUND
C3	NO.1 I.F. TRIMMER	A-11474	C10	.1 MFD. 100 V.	A-11130-1	R3	290 Ω WIREWOUND
C4	NO.2 I.F. TRIMMER	A-9553	C11	.006 MFD. 400 V.	A-11130-4	R4	100 Ω WIREWOUND
C5	ANTENNA TRIMMER	A-11499	C12	.01 MFD. 200 V.	A-11130-7	R5	2,200 Ω WIREWOUND
C6	.05-.2 MFD. 100 V.	A-11092-7	C13	.0005 MFD. MOLDED	A-9578-14	R6	300,000 Ω .25 W.
C7	.006-.0005 MFD. 400 V.	A-11092-2	C14	5-25-5 MFD. ELECTROLYTIC	A-11093-1	R7	500,000 Ω .25 W.
						R8	50 Ω WIREWOUND
						R9	25 Ω WIREWOUND

R1	500,000 Ω VOL. CONTROL	A-11480
R2	400 Ω WIREWOUND	B-5243-30
R3	290 Ω WIREWOUND	B-5243-36
R4	100 Ω WIREWOUND	B-5243-37
R5	2,200 Ω WIREWOUND	B-5243-13
R6	300,000 Ω .25 W.	B-5737-3
R7	500,000 Ω .25 W.	B-5737-5
R8	50 Ω WIREWOUND	B-6061-1
R9	25 Ω WIREWOUND	A-9647

NOTE: Part No. of Condenser C-13 in late Models 57 chassis is changed from A-9578-14 to A-9578.

L1	TAPPED CHOKE	A-9566
L2	NO.1 I.F. TRANSFORMER	A-11476
L3	NO.2 I.F. TRANSFORMER	A-11477
L4	PRE SELECTOR COIL	A-9601
L5	OSCILLATOR COIL	A-11504

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE AUGUST 30, 1934

Sparton Model 57 A. C.-D. C. Superheterodyne Schematic Drawing and Voltage-Resistance Chart

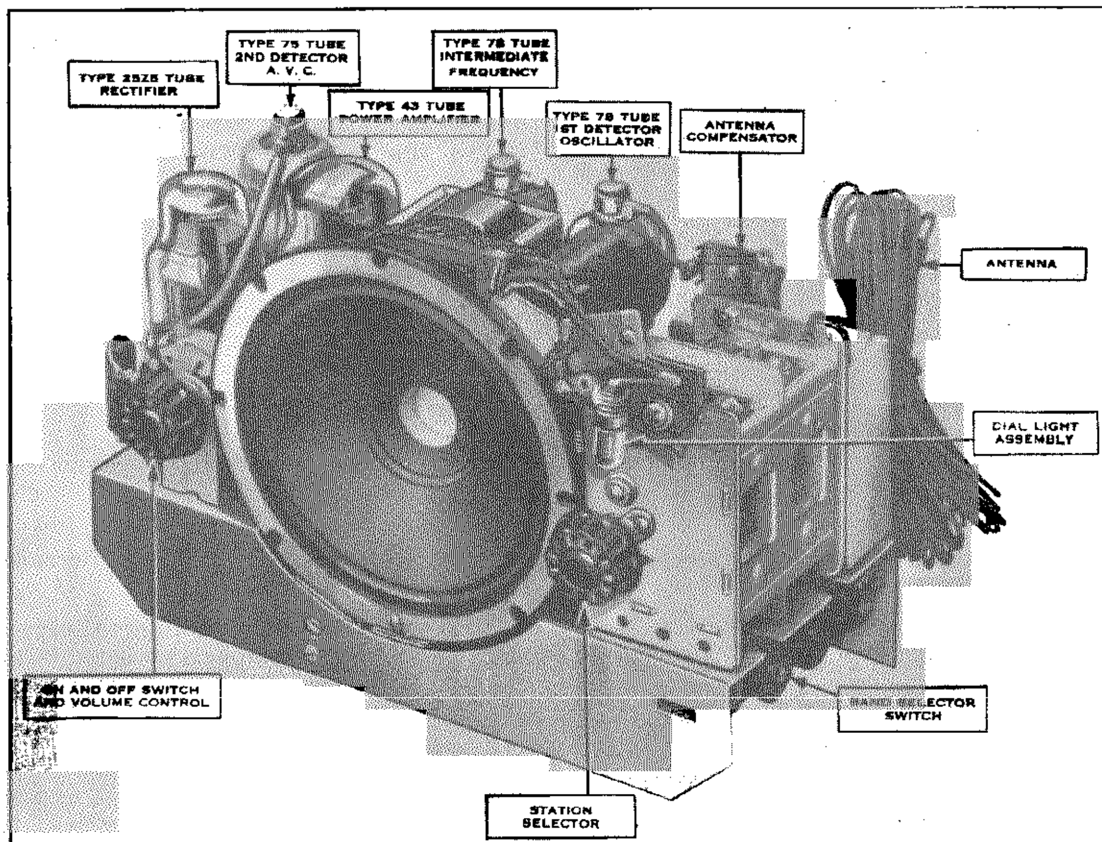
VOLTAGE-RESISTANCE CHART

Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st Detector-Oscillator	Volts	31	115	115	**	22	31	15
		Ohms	700	70,000	70,000	**	2500	700	2100
78	I-F Amplifier	Volts	31	115	115	4	4	31	**
		Ohms	700	50,000	50,000	300	300	700	1,000,000
75	2d Detector-A.V.C.	Volts	31	**	**	**	**	31	**
		Ohms	700	500,000	500,000	500,000	100	700	500,000
43	Power Amplifier	Volts	31	107	115	**	**	31	——
		Ohms	700	50,000	50,000	500,000	0	700	——
25Z5	Rectifier	Volts	31	118	115	95	116	31	——
		Ohms	700	850	45,000	3500	900	700	

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
**Cannot be measured with Weston No. 665, Type 1.



MODEL 57 CHASSIS

Vacuum Tubes
Chart and Data

SPARKS-WITHINGTON CO.

(First Revision) Effective August 24, 1934

Chart of Special SPARTON Radio Tubes

Present Type Number	Replaces Discontinued Types or Type Numbers	USED IN SPARTON MODELS
181	C-171 C-181	AC-7 AC-62 AC-63
401	C-373 C-401 Kellogg-401	AC-5 AC-7 AC-62 AC-63
482-A	C-182-A	AC-7 AC-63 600-DC 620-DC 750-DC AC-62 301-DC 610-DC 740-DC 931-DC
482-B	182-B C-182	591 593 930 931
483	C-183	235 420 591 600 620 930 410 589 593 610 737 931
484-A	C-484-A	301-DC 610-DC 740-DC 931-DC 600-DC 620-DC 750-DC
485	484 C-484 C-485	69 89 101 110 235 570 591 610 740 930 79 89-A 103 111 301 574 593 620 750 931 79-A 99 109 111-A 564 589 600 737 870
486	C-686	39 49
50 (Standard Type)	250 450 585 586 C-585 C-586	35 89 103 111-A 574 69 89-A 109 301 740 79 99 110 564 750 79-A 101 111 570 870

IMPORTANT

SPARTON types 482-A, 482-B and 483 should not be replaced by type '45. Difference in filament voltage will burn out type '45.

SPARTON types 482-B and 483 should never be mixed in a power amplifier. Always use two type 482-B or two type 483. These tubes should be used in SPARTON Models as listed in the above chart.

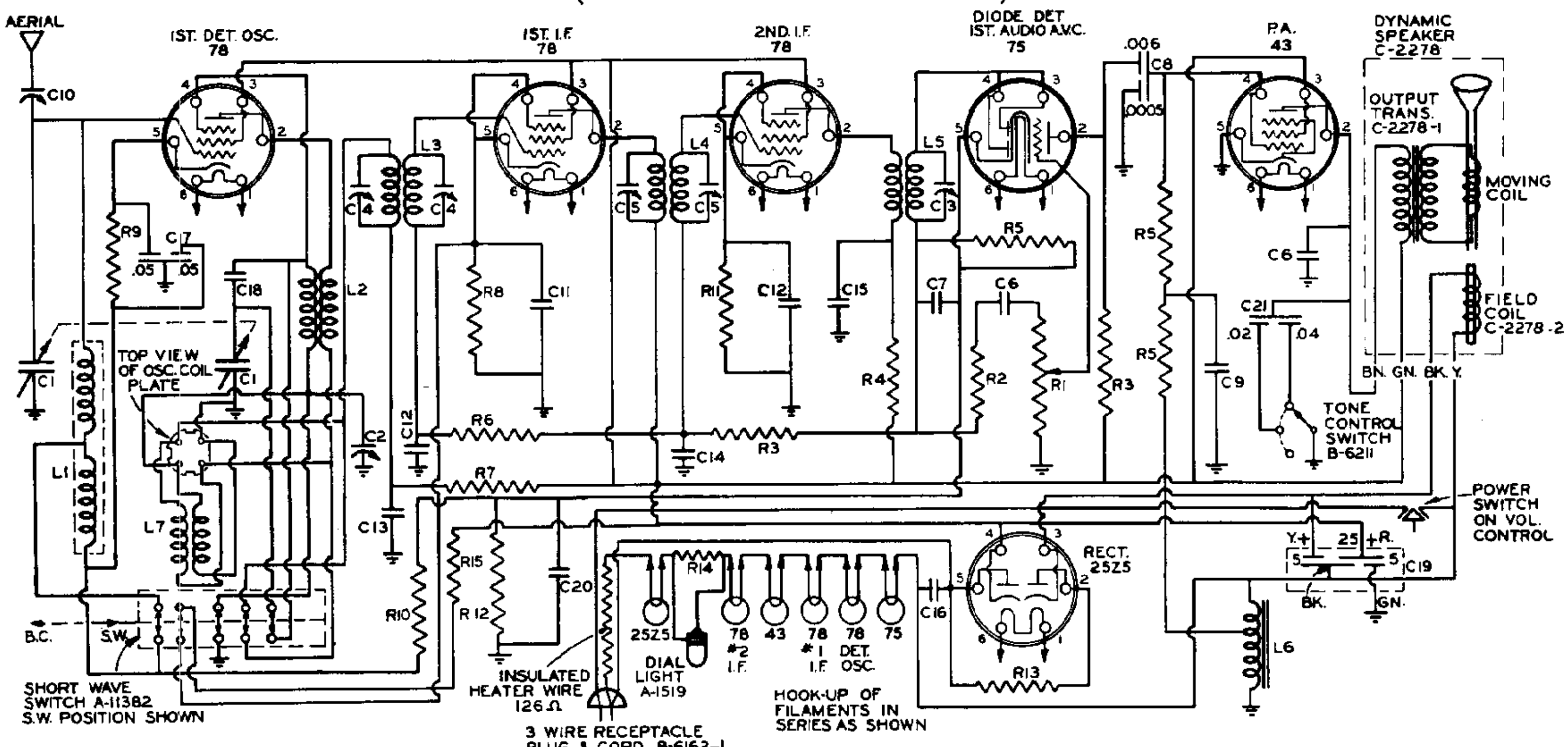
SPARTON types 484-A and 485 should not be replaced by type '27. Difference in characteristics causes overload on both transformer and tube.

NOTE: Best results with SPARTON Equasonne Models are obtained by mixing high and low reading type 485 tubes in the R-F Amplifier unit.

MODEL 65,66
Schematic
MODEL 65T,66T
Note

SPARKS-WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON MODELS 65 AND 66 SUPERHETERODYNE
A.C.-D.C. INTERMEDIATE FREQUENCY 456 K.C.
(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



C1	VARIABLE CONDENSER	B-6153
C2	B.C. OSCILLATOR TRIMMER	A-10972
C3	ADJUSTABLE CONDENSER	A-10973
C4	ADJUSTABLE CONDENSER	A-10977
C5	ADJUSTABLE CONDENSER	A-11034
C6	.006 MFD. 400 V.	A-11130-4
C7	.0005 MFD. MOLDED	A-11095-1
C8	.006-.0005 MFD. 400 V.	A-11092-2
C9	.5 MFD. 100 V.	A-11130-2
C10	ANTENNA TRIMMER	A-11071
C11	.1 MFD. 100 V.	A-11086-1
C12	.05 MFD. 100 V.	A-11086-2
C13	.05 MFD. 200 V.	A-11087-1
C14	.1 MFD. 100 V.	A-11089-1
C15	.05 MFD. 200 V.	A-11086-3
C16	.025 MFD. 400 V.	A-11086-4
C17	.05-.05 MFD. 100 V.	A-11092-1
C18	.0005 MFD. MOLDED	A-9578-14
C19	5-25-5 MFD. ELECTROLYTIC	A-11093
C20	.1 MFD. 100 V.	A-11130-1
C21	.04-.02 MFD 200 V.	A-9612-1

R1	250,000 Ω	VOL. CONTROL	A-11069
R2	50,000 Ω	.25 W.	B-5458-27
R3	500,000 Ω	.25 W.	B-5458-28
R4	3,000 Ω	.25 W.	B-5458-19
R5	300,000 Ω	.25 W.	B-5458-29
R6	100,000 Ω	.25 W.	B-5458-30
R7	15,000 Ω	.5 W.	B-4114-23
R8	1,700 Ω	.25 W.	B-5458-15
R9	290 Ω	WIREWOUND	B-5243-36
R10	2,200 Ω	WIREWOUND	B-5243-13
R11	230 Ω	WIREWOUND	B-5243-34
R12	100 Ω	WIREWOUND	B-5243-37
R13	50 Ω	2 W.	B-6061-2
R14	25 Ω	WIREWOUND	A-9647
R15	60,000 Ω	.25 W.	B-5458-33

L1	PRE-SELECTOR COIL	A-11045
L2	FOREIGN BAND OSC. COIL	A-11047
L3	#1 I.F. TRANSFORMER	A-11039
L4	#2 I.F. TRANSFORMER	A-11040
L5	#3 I.F. TRANSFORMER	A-11041
L6	CHOKE COIL	A-11038
L7	BROADCAST OSC. COIL	A-11068

Models 65T and 66T are equipped with a power transformer and must be used ONLY on A.C.

NOTE: Late Model 65 and 66 chassis have an adjustable condenser C3 connected across the primary of No. 3 I. F. Transformer L5. Part No. of C3 Adjustable Condenser is changed from A-10973 to A-11474. Also Resistor R11 is changed to .25 watt 2200 ohms (B-5458-1) and Resistor R15 is changed to .25 watt 50,000 ohms (B-5458-31). Also Part No. of No. 3 I. F. Transformer L5 is changed from A-11041 to A-11535.

MODEL 65,66
Voltage
Chassis View

SPARKS-WITHINGTON CO.

Sparton Models 65 and 66 A. C.-D. C. Superheterodyne Schematic Diagram and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

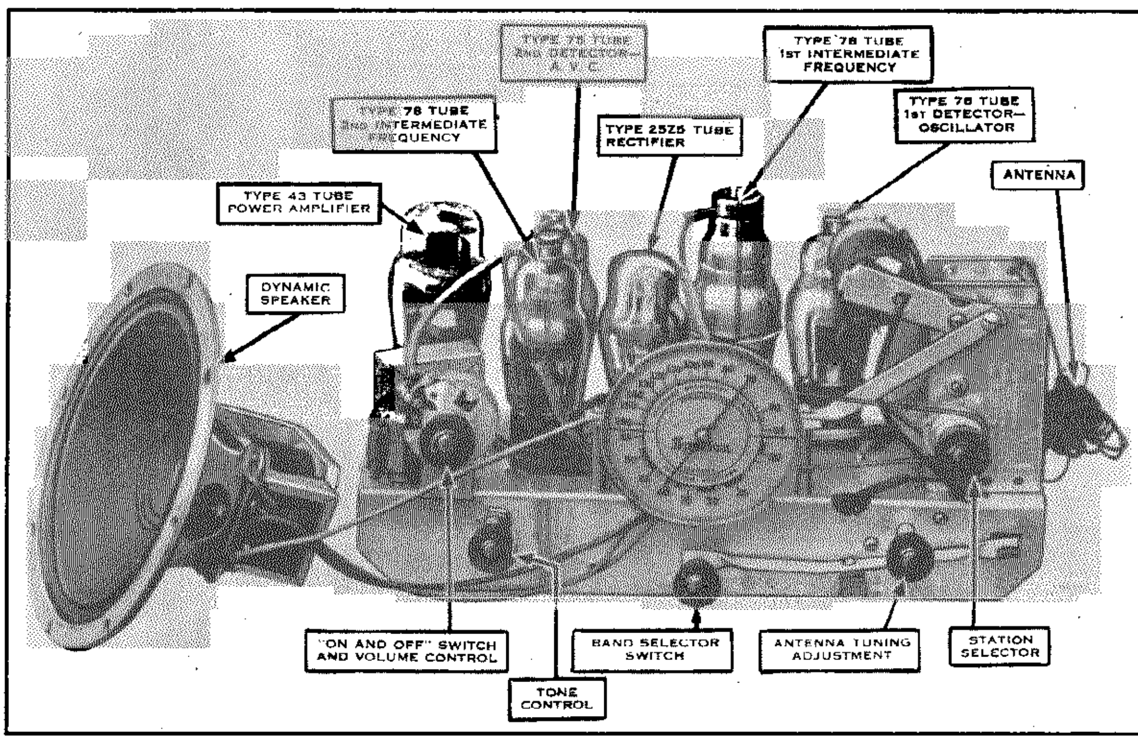
Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st Detector-Oscillator	Volts	29	80	105	0	17.5	29	17.5
		Ohms	700	*	*	0	2500	700	2400
78	1st I-F Amplifier	Volts	29	105	105	7.5	7.5	29	0
		Ohms	700	*	*	1700	1700	700	800,000
78	2nd I-F Amplifier	Volts	29	75	105	2.7	2.7	29	0
		Ohms	700	*	350,000	250	250	700	800,000
75	2nd Det.-A.V.C.	Volts	29	**	**	**	.64	29	0
		Ohms	700	500,000	500,000	500,000	100	700	250,000
43	Power Amplifier	Volts	29	95	105	**	**	29	—
		Ohms	700	*	*	750,000	0	700	—
25Z5	Rectifier	Volts	29	28	105	74	30	29	—
		Ohms	700	800	*	3000	800	700	—

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

*Zero, provided correct meter polarity is used. **Cannot be measured with Weston No. 665, Type 1.



MODELS 65 AND 66 CHASSIS

SPARKS-WITHINGTON CO.

(Original) Effective August 14, 1934

Detailed Alignment Instructions for SPARTON Models 65, 65-T, 66 and 66-T

Note: Models 65 and 66 are A. C.-D. C. receivers; Models 65-T and 66-T are equipped with a power transformer and must be used on A. C. only.

Foreword: Before attempting to realign the circuits of the above SPARTON models, the service man should read carefully the information contained in the preceding pages of this bulletin, especially the paragraph pertaining to the use of a test oscillator, an output meter, method of adjusting the various trimming and padding condensers, and the bending of split condenser plate sections.

The use of quality test equipment is highly recommended, and a good test oscillator becomes a virtual necessity when aligning the all-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. EQUIPMENT REQUIRED.

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 172.5 to 15,000 kilocycles.

B. Output meter.

C. Sparton Part A-9631 Adjusting Wrench.

2. STEP BY STEP PROCEDURE FOR COMPLETE ALIGNMENT OF MODELS.

Note: For proper alignment of these chassis, the procedure should be followed in the same order as given.

A. Alignment of Broadcast Band.

(1) The dial pointer should be exactly parallel with the horizontal lines on the scale when the selector rotor plates are completely in mesh with the stator plates. The pointer may be reset, if necessary, by first loosening the nut on the planetary drive and drum, then resetting the pointer, and then tightening the nut.

(2) Turn on receiver and test oscillator, and allow both to operate several minutes before attempting to align any condensers.

(3) **Warning:** Before connecting test oscillator to receiver, be sure to read carefully the operating instructions included with the test oscillator.

Connect "antenna" of test oscillator to grid cap of type 78 first detector oscillator tube, and "ground" of test oscillator to chassis frame of receiver.

(4) Tune test oscillator to obtain signal of 456 kilocycles.

(5) Turn volume control of receiver on full, and place Band Selector Switch in Broadcast Position. Make sure condenser plates are turned all the way out.

(6) Adjust I-F condensers (C_1, C_2, and C_3). See Fig. 6.

(7) Disconnect "antenna" leads of test oscillator tube and connect to the antenna terminal of the chassis.

(8) Tune test oscillator to obtain a signal of 1500 kilocycles.

(9) Tune station selector of receiver to 1500 kilocycles. Also adjust antenna tuning condenser (C_A).

Note: Do not disturb the 1500 kilocycle setting of either the test oscillator or the receiver.

(10) Adjust oscillator trimmer condenser (C_O).

(11) Check calibration of receiver by setting the test oscillator to obtain a signal of 172.5 kilocycles. Harmonics of this frequency should be picked up at the following readings on the dial: 690, 862.5, 1035, 1207.5, 1380 and 1552.5 kilocycles.

The end plates of the oscillator section of the two gang condenser may be bent if necessary to correct dial readings.

Note: An allowance of 20 kilocycles at 900 kilocycles and 15 kilocycles at 600 kilocycles is permitted.

B. Alignment of Short-Wave Band.

(1) **Adjust Band Selector Switch to Short Wave Position.**

(2) Adjust test oscillator to obtain a wave length of 20 meters (15 megacycles) and tune receiver to this wave length. Adjust for resonance with antenna tuning condenser (C_A). Calibration should check within 1½ meters. Push or pull the wires that are near the oscillator coil to correct any greater variation in calibration.

(3) Adjust test oscillator to obtain a wave length of 50 meters (6 megacycles) and tune receiver to this wave length. Adjust for resonance with antenna tuning condenser (C_A). Calibration should check within 1½ meters. If the error in calbration exceeds this amount, recheck the preceding adjustments.

Note: All adjustments should be re-checked to assure accuracy and stability of adjustment and calibration.

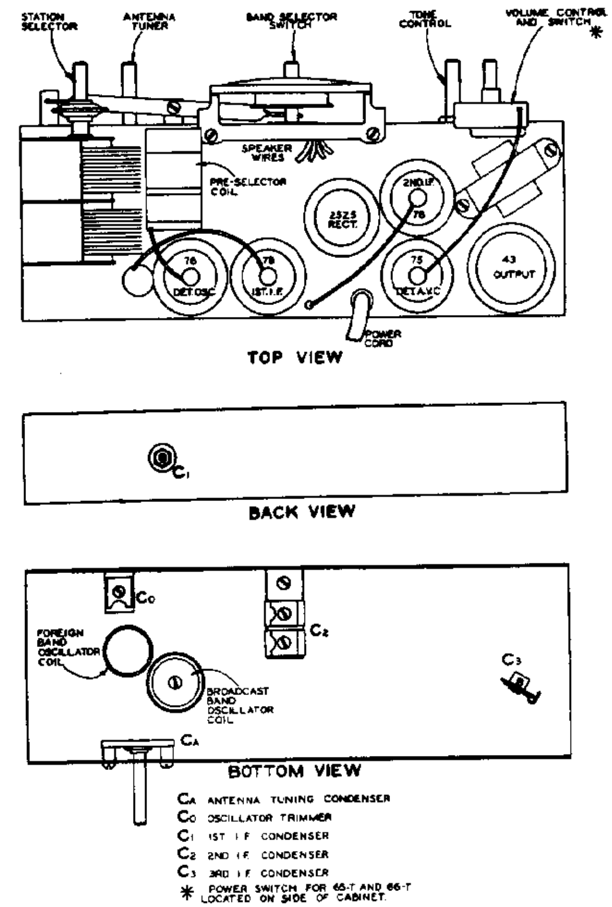


Fig. 6. CHASSIS DIAGRAM FOR SPARTON MODELS 65, 65-T, 66 AND 66-T

(Original) Effective August 29, 1934

Detailed Alignment Instructions for SPARTON Models 67, 68 and 691

Foreword: Before attempting to realign the circuits of the above SPARTON models, the service man should read carefully the information contained in the preceding pages of this bulletin, especially the paragraphs pertaining to the use of a test oscillator, an output meter, method of adjusting the various trimming and padding condensers, and the bending of split condenser plate sections.

The use of quality test equipment is highly recommended, and a good test oscillator becomes a virtual necessity when aligning the all-wave or short-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. EQUIPMENT REQUIRED.

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 172.5 to 15,000 kilocycles.

B. Output meter.

C. Sparton Part A-5732 or A-8737 adjusting wrench.

2. STEP BY STEP PROCEDURE FOR COMPLETE ALIGNMENT OF MODELS.

Note: For proper alignment of these chassis, the procedure should be followed in the same order as given.

A. Alignment of Intermediate-Frequency Stages.

(1) Turn on receiver and test oscillator, and allow both to operate several minutes before attempting to align any condensers.

(2) Connect "antenna" of test oscillator to grid cap of type 6A7 first detector-oscillator tube, and "ground" of test oscillator to chassis frame of receiver. Connect output meter as in Fig. 1, page 1, Bulletin No. 3-E.

Note: It is advisable to read carefully the operating instructions included with test oscillator.

(3) Tune test oscillator to obtain a signal of 345 kilocycles.

(4) Turn the volume control of receiver on full, and place Band Selector Switch in Broadcast Position.

(5) Adjust I. F. condensers C_7 and C_8. (See Fig. 7.)

(6) The dial pointer should point to the lowest calibrated frequency mark on the broadcast section of the kilocycle scale (dial division between 55 and horizontal line). **If the dial pointer reads incorrectly, it may be reset by first loosening the nut on the planetary drive and drum (back of the Station Selector knob), then resetting the pointer while holding the rotor plates completely in mesh with the stator plates, and then tightening the nut.**

B. Alignment of Broadcast Band.

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect to the antenna terminal of the chassis.

(2) Tune test oscillator and receiver to frequency of 1500 kilocycles.

(3) Adjust Condenser C_6.

(4) Adjust Condensers C_2 and C_4.

(5) Tune test oscillator and receiver to 600 kilocycles.

(6) Adjust condenser C_9 for maximum output.

Note: Slight readjustments of the station selector and condenser C_9 may be required to obtain the greatest deflection on the output meter. A variation of 5 kilocycles from the value of 600 kilocycles is permitted in this procedure.

(7) Check calibration of receiver by tuning the test oscillator to obtain a signal of 172.5 kilocycles. Harmonics of this frequency should be picked up at the following readings of the dial: 690, 862.5, 1035, 1207.5, 1380, and 1552.5 kilocycles.

The end plates of the oscillator section of the two gang condenser may be bent if necessary to correct dial readings.

C. Alignment of Short-Wave Band.

(1) Turn the Band Selector Switch to the Short-Wave Position.

(2) Tune the station selector to 1500 kilocycles in the broadcast band.

(3) Tune test oscillator to obtain a signal of 20 meters wave length (15 megacycles).

(4) Without changing the station selector setting of 1500 kilocycles, adjust condenser C_5. The station selector should show the same reading of 1500 kilocycles when the receiver is tuned to signals of 1500 kilocycles or to 20 meters (15000 kilocycles.)

(5) With the test oscillator tuned to 20 meters, adjust condensers C_1 and C_3.

(6) Tune the test oscillator to obtain a wave length of 50 meters (6 megacycles) and tune receiver to this wave length for calibration check.

(7) Tune test oscillator to obtain a wave length of 33.3 meters (9 megacycles) and tune receiver to this wave length for calibration check.

(3) Tune test oscillator to obtain a wave length of 20 meters (15 megacycles) and tune receiver to this wave length for calibration check.

Note: All adjustments should be re-checked to assure accuracy and stability of adjustment and calibration.

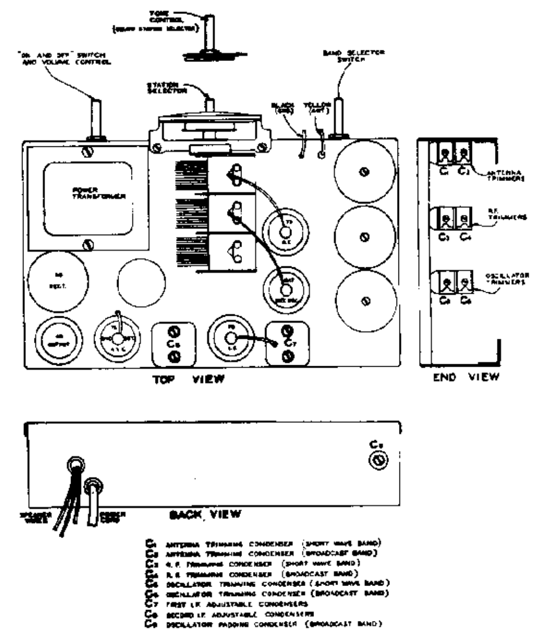


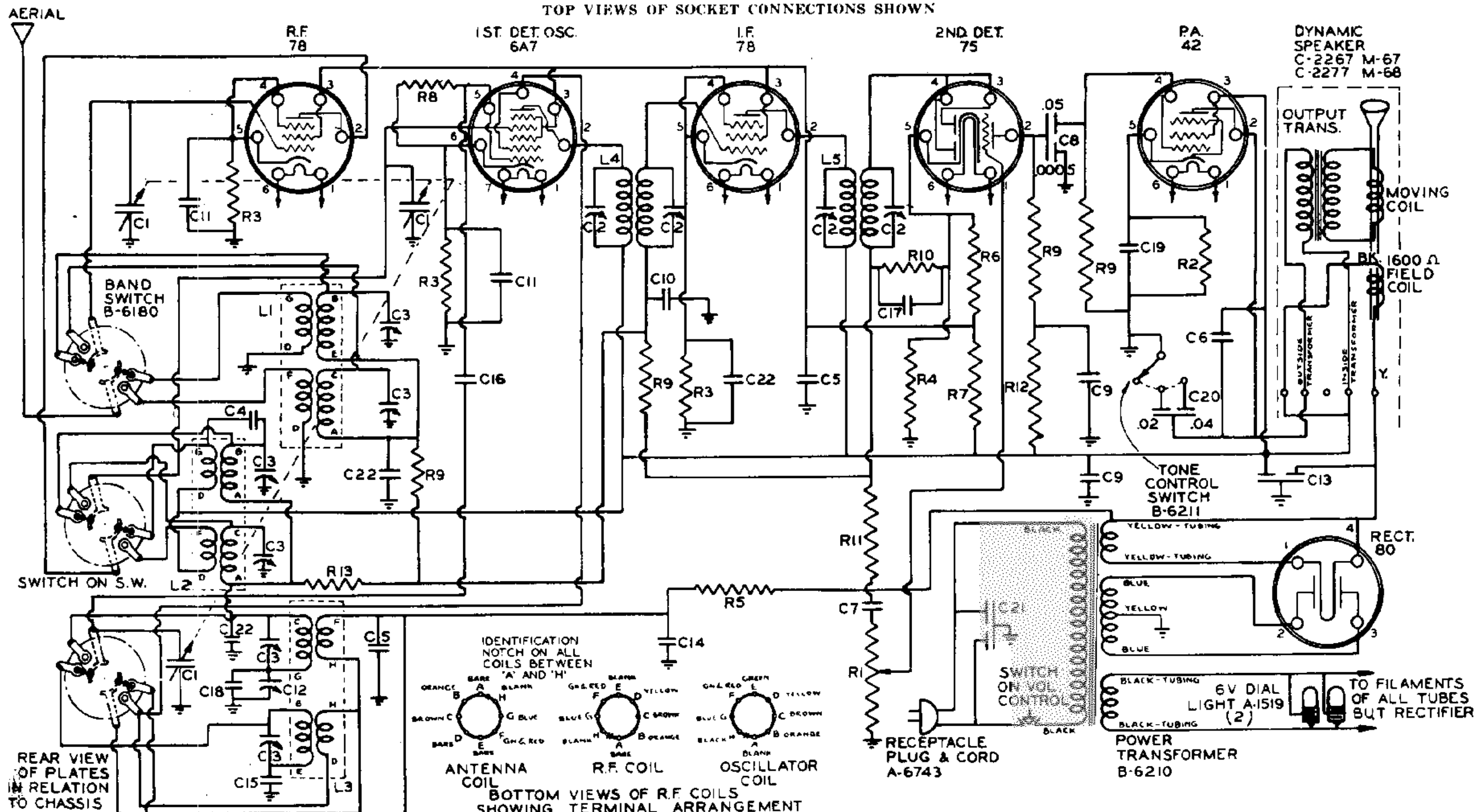
FIG. 7. CHASSIS DIAGRAM FOR SPARTON MODELS 67, 68, AND 691

MODEL 67, 68, 691
Schematic

SPARKS-WITHINGTON CO.

SPARTON MODELS 67, 68 AND 691 SUPERHETERODYNE
INTERMEDIATE FREQUENCY 345 K. C.

TOP VIEWS OF SOCKET CONNECTIONS SHOWN



C1	VARIABLE CONDENSER	B-6212
C2	I.F. TRIMMERS (WITH COILS)	
C3	R.F. TRIMMERS (DOUBLE)	A-11455
C4	8-9 MMF.	A-11261
C5	.01 MFD. 400 V.	A-11130-5
C6	.006 MFD. 400 V.	A-9916
C7	.025 MFD. 400 V.	A-11409
C8	.05-.0005 400 V.	A-11408
C9	.2 MFD. 600 V.	A-11473-4
C10	.2 MFD. 200 V.	A-11473-2
C11	.1 MFD. 200 V.	A-11473-1

C12	100-300 MMF PADDER	A-7809-5
C13	8-8 MFD. ELECTROLYTIC	A-11223-1
C14	4 MFD. ELECTROLYTIC	A-11224-1
C15	.0032 MFD. MOLDED	A-7038-8
C16	.00005 MFD. MOLDED	A-5175-1
C17	.0005 MFD. MOLDED	A-5175-2
C18	.00025 MFD. MOLDED	A-9578-5
C19	10 MFD. 25 V.	A-10377
C20	.04-.02 MFD. 400 V.	A-11407
C21	.006-.006 MFD.	A-7878
C22	.05 MFD. 200 V.	A-11410
C23	R.F. TRIMMERS	A-11289

R1	250,000 Ω	VOL. CONTROL & SWITCH		A-11245
R2	500 Ω	WIREWOUND		B-5243-38
R3	600 Ω	WIREWOUND		B-5243-19
R4	230 Ω	WIREWOUND		B-5243-21
R5	30,000 Ω	1 W.		B-4540-12
R6	20,000 Ω	1 W.		B-4540-5
R7	10,000 Ω	3 W.		B-4539-3
R8	50,000 Ω	.25 W.	(CARBON)	B-5458-31
R9	250,000 Ω	.25 W.		B-5737-1
R10	500,000 Ω	.25 W.		B-5737-5
R11	50,000 Ω	.25 W.		B-5737-4
R12	100,000 Ω	.25 W.		B-5737-2
R13	4,000 Ω	.25 W.		B-5737-7

L1	NO. 1 R.F. COIL	A-11231
L2	NO. 2 R.F. COIL	A-11232
L3	OSCILLATOR COIL	A-11233
L4	NO. 1 I.F. TRANSFORMER	A-6314-1
L5	NO. 2 I.F. TRANSFORMER	A-6314-2

MODEL 67,68,691
Voltage
Chassis View

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE AUGUST 1, 1934

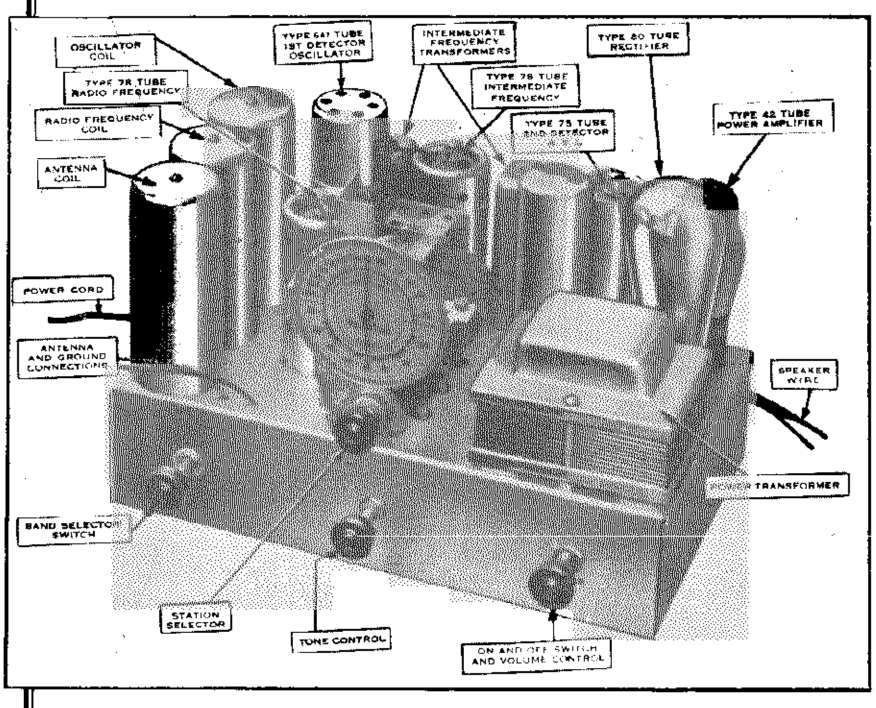
Sparton Models 67, 68, and 691 A. C. Superheterodyne Schematic Diagram and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

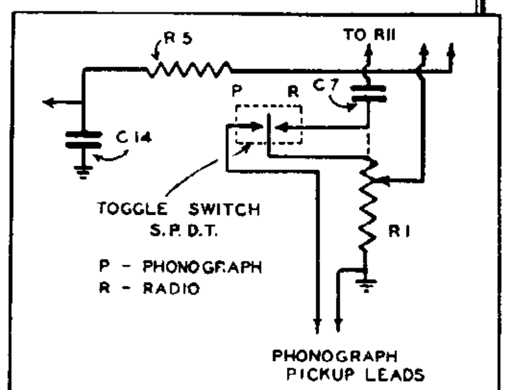
Line Voltage — 119
Position of Tone Control — Full
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R-F Amplifier	Volts	6.1	275	135	6.3	6.3	0	—	**
		Ohms	0	29,000	20,000	650	650	0	—	1,000,000
6A7	1st Detector-Oscillator	Volts	6.1	275	135	135	**	6.4	0	**
		Ohms	0	28,000	20,000	60,000	55,000	650	0	1,000,000
78	I-F Amplifier	Volts	6.1	275	135	6.3	6.3	0	—	**
		Ohms	0	29,000	20,000	650	650	0	—	1,000,000
75	2d Detector-A.V.C.	Volts	6.1	120	0	0	1.6	0	—	**
		Ohms	0	600 000	600,000	600,000	270	0	—	250,000
42	Power Amplifier	Volts	6.1	260	280	0	19.5	0	—	—
		Ohms	0	27,000	27,000	250,000	500	0	—	—
80	Rectifier	Volts	440	405	410	440	—	—	—	—
		Ohms	28,000	1,250	1,350	28,000	—	—	—	—

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
**Cannot be measured with Weston No. 665, Type 1.



MODELS 67, 68, AND 691 CHASSIS

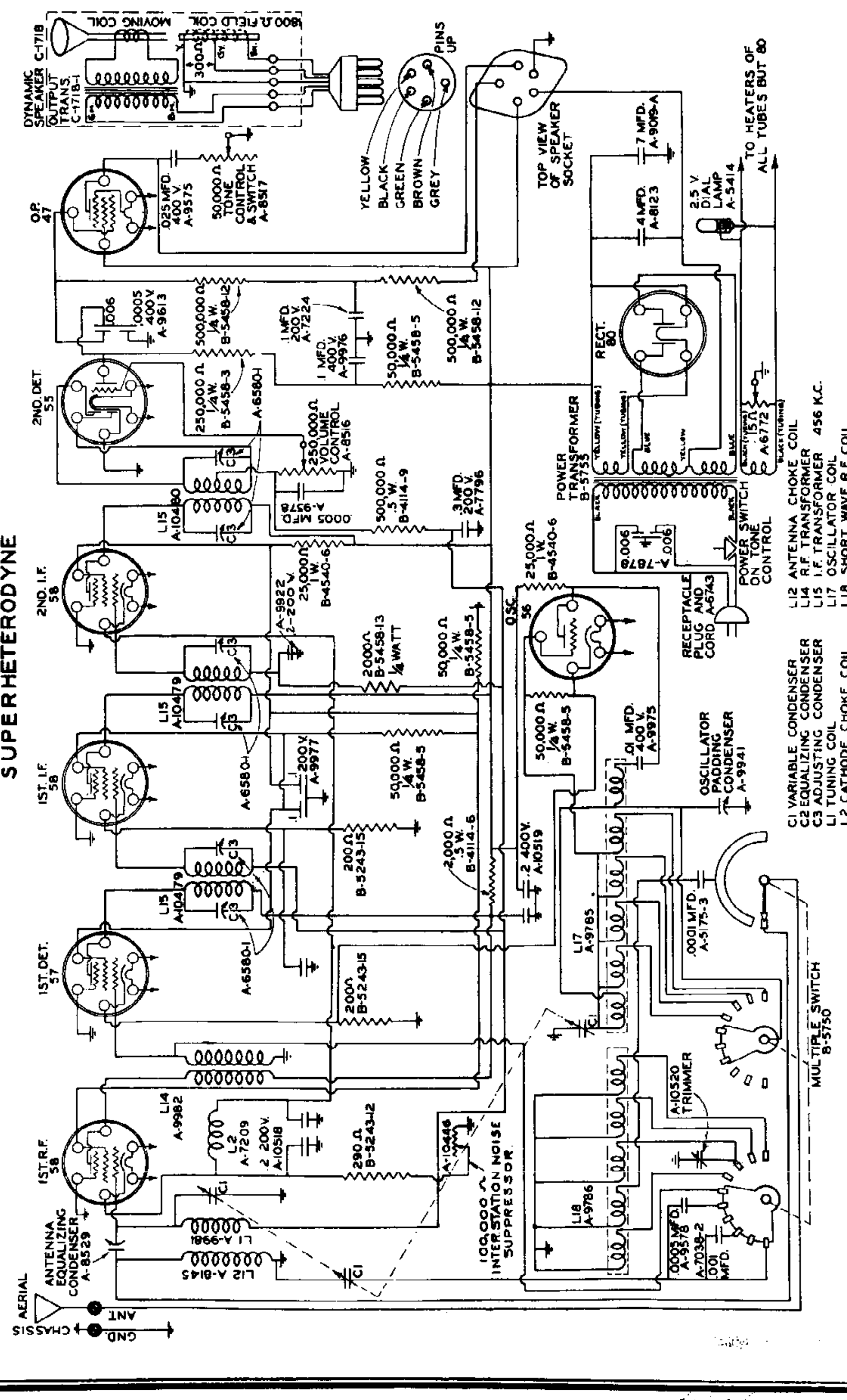


CIRCUIT FOR PHONOGRAPH PICK-UP

Break connection between Condenser C7 and Volume Control R1 (see Schematic Diagram) and install toggle switch (SPARTON Part A-11561 may be used). Toggle switch may be mounted by drilling a ½" hole in the back of the chassis, 4 inches from the right hand side and 1 inch up from the bottom.

SPARKS-WITHINGTON CO.

MODEL 75A, 475A, 478A
Schematic



CHANGES IN MODELS 75-A, 475-A and 478-A SCHEMATIC DIAGRAM

Effective March 27, 1934

Resistor 8,000 ohms, B-5458-23 and condenser .006 mfd., A-9916, added to cathode circuit of Type 57 1st Detector tube. See diagram under Voltage Analysis and Continuity Chart.

IF PEAK 456 KC.

MODEL 75A,475A,478A
Voltage
Notes

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE FEBRUARY 15, 1934

Sparton Models 75-A, 475-A and 478-A Superheterodyne Schematic Diagram, Voltage Analysis and Continuity Chart

VOLTAGE ANALYSIS AND CONTINUITY CHART

Line Voltage 120

Position of Volume Control—Full with Antenna Disconnected

Position of Inter-Station Noise Suppressor—Full

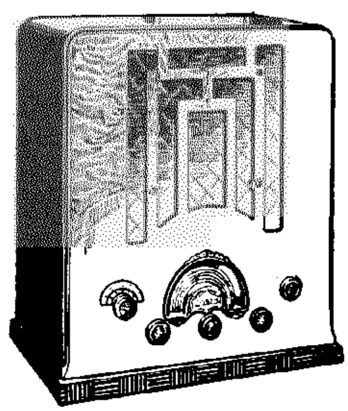
Position of Band Selector Switch—Broadcast

Position of Tone Control—Full

Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
58	R-F Stage	245.	6.5	120.	—4.9	77,000	50,000	750,000	290
57	1st Detector	245.	—	52.	—1.9	77,000	100,000	12	200
56	Oscillator	105.	—	--	—1.9	100,000	—	50,000	200
58	1st I-F Stage	255.	5.0	52.	—1.0	75,000	100,000	750,000	200
58	2nd I-F Stage	255.	6.0	120.	—4.5	75,000	50,000	750,000	290
55	Diode Det.-A.V. C.	—	—	—	—	250,000	—	—	0
55	Triode Audio	15.	0.75	—	—	375,000	—	250,000	0
47	Power Stage	245.	21.0	255.	—20.0	75,000	75,000	1,000,000	7.5
80	Rectifier	355†	—	—	—	—	—	—	—

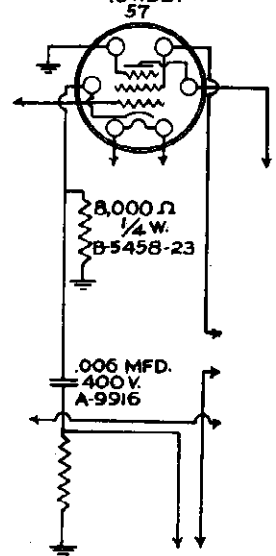
NOTES: Allow 15% + or — on all measurements.
All heater voltages: 2.5, except 80 Rectifier filament: 5.0 volts.

†As read on 800 volt scale of A-C meter in Jewell 444 Set Analyzer.



SPARTON MODEL 75-A

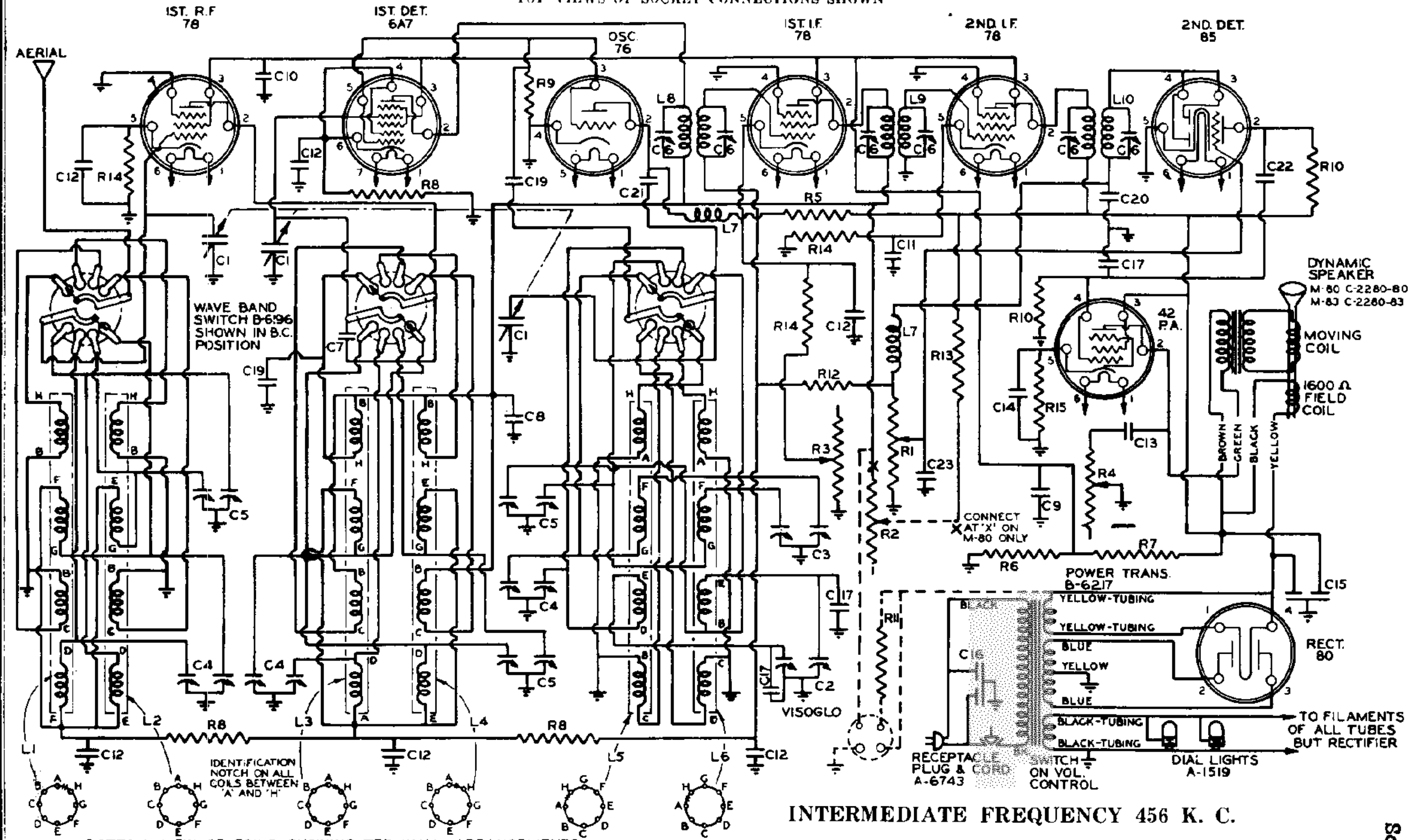
NOTE: SPARTON MODEL 475-A has Model 75-A chassis and Model 74 cabinet.
SPARTON MODEL 478-A has Model 75-A chassis and Model 478 cabinet.



NOTE: The 8,000 ohm Resistor (B-5458-23) and .006 mfd. condenser (A-9916) are included in the Type 57 1st Detector circuit as above in all chassis having light brown color tuning scales.
These receivers will have —3.0 volts on Type 57 Control Grid instead of —1.9 and 8,000 ohms cathode resistance to ground instead of 200 ohms as shown in the above table.

MODEL 80,83,84, 85X,86X
Schematic

SPARKS-WITHINGTON CO.



INTERMEDIATE FREQUENCY 456 K. C.

C1 VARIABLE CONDENSER		B-6218
C2 OSC PADDER	10 PLATE	A-10846-1
C3 OSC. PADDER	7 PLATE	A-10846-2
C4 R.H. TRIMMER		A-11454
C5 L.H. TRIMMER		A-11455
C6 I.F. TRIMMER	IN COILS	
C7 8 TO 9 MFD.		A-11261
C8 .2 MFD.	400 V	A-11473-3
C9 .2 MFD.	200 V.	A-11130-6
C10 .1 MFD.	200 V	A-11089-2
C11 .1 MFD.	100 V.	A-11089-1
C12 .1 MFD.	100 V	A-11130-1
C13 .025 MFD.	600 V	A-11130-8
C14 10 MFD.	25 V.	A-10377
C15 8-8 MFD.		A-11223-1
C16 .006-.006 MFD.		A-7878
C17 .001 MFD	MOLDED	A-9578-10
C19 .0001 MFD.	MOLDED	A-11095-3
C20 .0005 MFD.	MOLDED	A-9578
C21 .00005 MFD.	MOLDED	A-11095-2
C22 .01 MFD.	400 V.	A-11130-5
C23 .00025 MFD.	MOLDED	A-11095-4

R1 250,000 Ω	VOL. CONTROL		A-11297
R2 5,000 Ω	VOLT. REGULA.		A-11381
R3 100,000 Ω	I.N SUPPRESS.		A-10446
R4 100,000 Ω	TONE CONTROL		A-11334
R5 20,000 Ω	1 W		B-4540-14
R6 25,000 Ω	10 W.		B-5029-1
R7 15,000 Ω	10 W.		B-5029-2
R8 1,000 Ω	.25 W.		B-5458-11
R9 50,000 Ω	.25 W		B-6458-5
R10 500 000 Ω	.25 W		B-5737-5
R11 1,000,000 Ω	.25 W.		B-5737-6
R12 250,000 Ω	.25 W.		B-5737-1
R13 5,000 Ω	WIREWOUND		B-6061-5
R14 400 Ω	WIREWOUND		B-5243-41
R15 500 Ω	WIREWOUND		B-5243-42

L1 NO. 1 ANTENNA COIL	A-11211
L2 NO. 2 ANTENNA COIL	A-11212
L3 NO. 1 R.F. COIL	A-11213
L4 NO. 2 R.F. COIL	A-11214
L5 NO. 1 OSCILLATOR COIL	A-11215
L6 NO. 2 OSCILLATOR COIL	A-11216
L7 16 M.H. CHOKE	A-3506
L8 NO. 1 I.F. TRANSFORMER	A-6313-3
L9 NO. 2 I.F. TRANSFORMER	A-6313-4
L10 NO. 3 I.F. TRANSFORMER	A-6313-5

NOTE: Export Model 86-X has Power Transformer (Part B-6271), equipped with primary voltage taps for operation at 125, 150 and 250 volts A. C. line. See schematic diagram and notes (Fig. 1) for Model 85-X.

MODEL 80,83,84,
85X,86X
Voltage,Chassis View
Service Notes

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE AUGUST 10, 1934

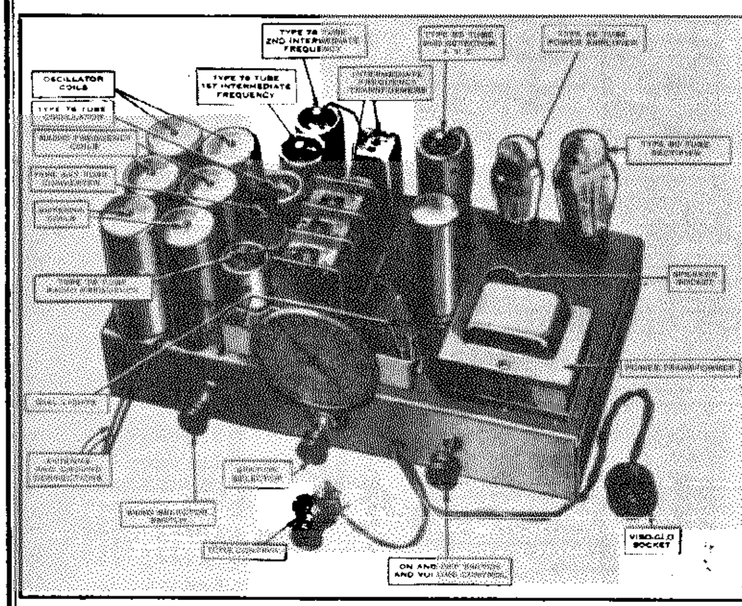
Sparton Models 80, 83, 84, 85-X and 86-X Superheterodyne Schematic Diagram and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

Line Voltage — 120
Position of Tone Control — Full
Position of Viso-Glo Regulator — Full
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Broadcast
Position of Inter-Station Noise Suppressor — Full

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R-F Amplifier	Volts	*	220	110	0	2.5	*	——	0
		Ohms	0	40,000	25,000	0	400	0	——	500,000
6A7	Converter	Volts	*	220	110	3.8	**	3.8	*	0
		Ohms	0	40,000	25,000	45,000	45,000	900	0	500,000
76	Oscillator	Volts	*	175	**	0	6	*	——	——
		Ohms	0	55,000	45,000	0	0	0	——	——
78	1st I-F Amplifier	Volts	*	220	110	0	3.8	*	——	0
		Ohms	0	40,000	25,000	0	400	0	——	500,000
78	2d I-F Amplifier	Volts	*	280	110	0	3.3	*	——	0
		Ohms	0	40,000	25,000	0	400	0	——	0
85	2d Detector-A.V.C.	Volts	*	**	**	**	0	*	——	0
		Ohms	0	500,000	250,000	250,000	0	0	——	0
42	Power Amplifier	Volts	*	270	285	0	20	*	——	——
		Ohms	0	40,000	40,000	500,000	450	0	——	——
80	Rectifier	Volts	450	400	400	450	——	——	——	——
		Ohms	40,000	100	100	40,000	——	——	——	——

NOTES: Voltage and resistance readings are for schematic diagram shown. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
*Zero or 6.0 volts A. C., depending on twist of filament hook-up wire. When Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7 Tube) should read 6.0, and vice versa.
**Cannot be measured with Weston No. 665, Type 1.



MODELS 80, 83, 84, 85-X, AND 86-X CHASSIS

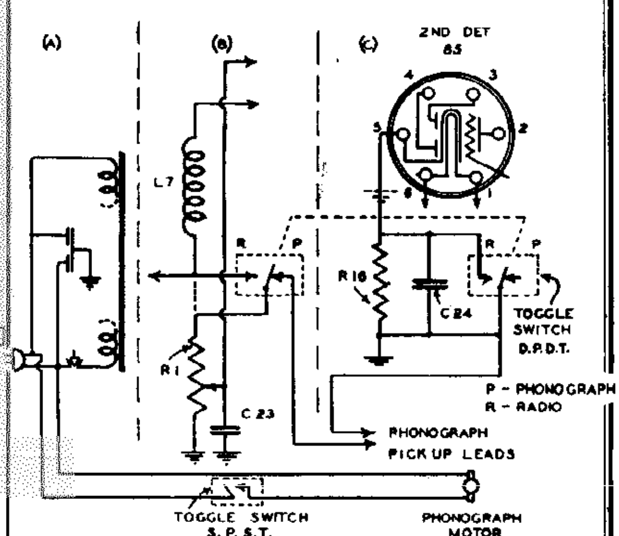


FIG. 1

THE MODEL 85-X PHONOGRAPH COMBINATION has the circuit changes shown in Fig. 1 in addition to the regular schematic diagram. The dotted lines in Sections (B) and (C) are shown solid in the regular schematic diagram and toggle switch (D. P. D. T.), condenser C24 and resistor R16 are added. Section (A) shows connections of toggle switch, Part A-5905, and phonograph motor on Model 85-X.

A PHONOGRAPH PICK-UP may be used with the Models 80, 83, 84 and 85-X by incorporating the toggle switch (D.P.D.T.), Part A-11561, condenser C24 (10 MFD., Part A-10377), resistor R-16 (5,000 ohms, ¼ watt, Part B-5458-16), and the circuit changes shown in Fig. 1, Sections (B) and (C) only. The toggle switch may be mounted by drilling a ½-inch hole in the back of the chassis, 4 inches from the left hand side and 1 inch up from the bottom.

(Original) Effective September 28, 1934

Detailed Alignment Instructions for SPARTON All-Wave Models 80, 83, 84, 85-X, 86-X, and 104

Note: The Models 80, 83, 84, 85-X and 86-X employ an eight-tube chassis. The Model 104 employs a ten-tube chassis.

The Model 85-X is a radio-phonograph combination and the Model 86-X is an export receiver equipped with a special power transformer permitting operation on line voltages of 125, 150, and 250 volts A. C.

The alignment procedure is the same for all of the above models.

Foreword: Before attempting to realign the circuits of the above SPARTON models, the service man should read carefully the information contained in the preceding pages of Bulletin No. 3-E, especially the paragraphs pertaining to the use of a test oscillator, output meter, method of adjusting the various trimming and padding condensers, and the bending of split condenser plate sections.

The use of quality test equipment is highly recommended and a good test oscillator becomes a virtual necessity when aligning the all-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers. Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. EQUIPMENT REQUIRED

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 172.5 to 20,000 kilocycles.

B. Output meter.

C. Part A-7613 adjusting wrench.

2. STEP BY STEP PROCEDURE FOR COMPLETE ALIGNMENT OF MODELS

Note: For proper alignment of these chassis, the procedure should be followed in the same order as given.

In the following procedure, the broadcast band will be termed Band No. 1; the first short-wave band (green section of the dial), Band No. 2; the second short-wave band (red section of the dial), Band No. 3; the third short-wave band (blue section of the dial), Band No. 4. The dial pointer should be exactly parallel with the horizontal lines of the kilocycle scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the two set screws which hold the dial drum to the condenser shaft, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale. Then tighten set screws.

A. Alignment of Intermediate-Frequency Stages.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Connect "antenna" of test oscillator to grid cap of Type 6A7 First Detector (Converter) Tube, and "ground" of test oscillator to chassis frame of receiver. Connect output meter "low tap" across voice coil of speaker. (See Fig. 1, Page 1, Bulletin No. 3-E).

Note: It is advisable to read carefully the operating instructions included with the test oscillator.

(3) Tune test oscillator to obtain a signal of 456 kilocycles.

(4) Turn the volume control of receiver on full, retard inter-station noise suppressor so that the receiver will be least sensitive, and place band selector switch in broadcast position (Band No. 1).

(5) Adjust I. F. Condensers C_3, C_2, and C_1, in the order given (see Fig. 8).

B. Alignment of Broadcast Band.

(1) Disconnect "antenna" leads of test oscillator from grid cap of first detector (converter) tube and connect to the antenna terminal of the chassis.

(2) Tune test oscillator to obtain a signal of 1350 kilocycles.

(3) Tune the station selector of the receiver to 1350 kilocycles, and without disturbing the setting of the test oscillator or the station selector, adjust condensers C_{12}, C_8, and C_4, in the order given.

(4) Tune test oscillator and receiver to 600 kilocycles and adjust condenser C_{18}.

(5) Retune test oscillator and receiver to 1350 kilocycles and check the adjustments of condensers C_{12}, C_8, and C_4.

(6) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Band No. 2 (1.2 to 3.6 Megacycles).

(1) Turn the band selector switch to the first short-wave band (green section of the dial).

(2) Tune test oscillator and receiver to 3,000 kilocycles and adjust Condensers C_{13}, C_9, and C_5, in the order give.

(3) Tune test oscillator and receiver to 1650 kilocycles and adjust condenser C_{17}.

(4) Retune the test oscillator and receiver to 3,000 kilocycles and check the adjustments of Condensers C_{13}, C_9, and C_5.

D. Alignment of Band No. 3 (3.1 to 8.0 Megacycles).

Caution: On the third and fourth bands (second and third short-wave bands) care must be taken to adjust the various condensers to the **fundamental** of the signal and not to the **image**. The image frequency is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band with the Inter-station Noise Suppressor turned full on, allowing maximum sensitivity of the receiver. If a "dead spot" appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

On Band No. 4 this type of misalignment may be more easily detect by turning the set to full sensitivity and with the test oscillator generating a frequency of 15,000 kilocycles, tune the dial to approximately 15,900 kilocycles. If a strong signal is found at approximately this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 1500 kilocycles would be 1500 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal on this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

(1) Turn band selector switch to the second short-wave position (red section of the dial).

(2) Tune test oscillator and receiver to 7,200 kilocycles and adjust condensers C_{14}, C_{10}, and C_6, in the order given.

(3) Tune test oscillator and receiver to 3,600 kilocycles and adjust condenser C_{18}.

(4) Retune test oscillator and receiver to 7,200 kilocycles and check the adjustments of condensers C_{14}, C_{10}, and C_6.

D. Alignment of Band No. 4 (7.5 to 20 Megacycles).

(1) Turn the band selector switch to the third short-wave position (blue section of the dial).

(2) Tune the test oscillator and receiver to 15,000 kilocycles and adjust condensers C_{15}, C_{11}, and C_7 in the order given.

(3) Tune test oscillator and receiver to 9,000 kilocycles and adjust condenser C_{19}.

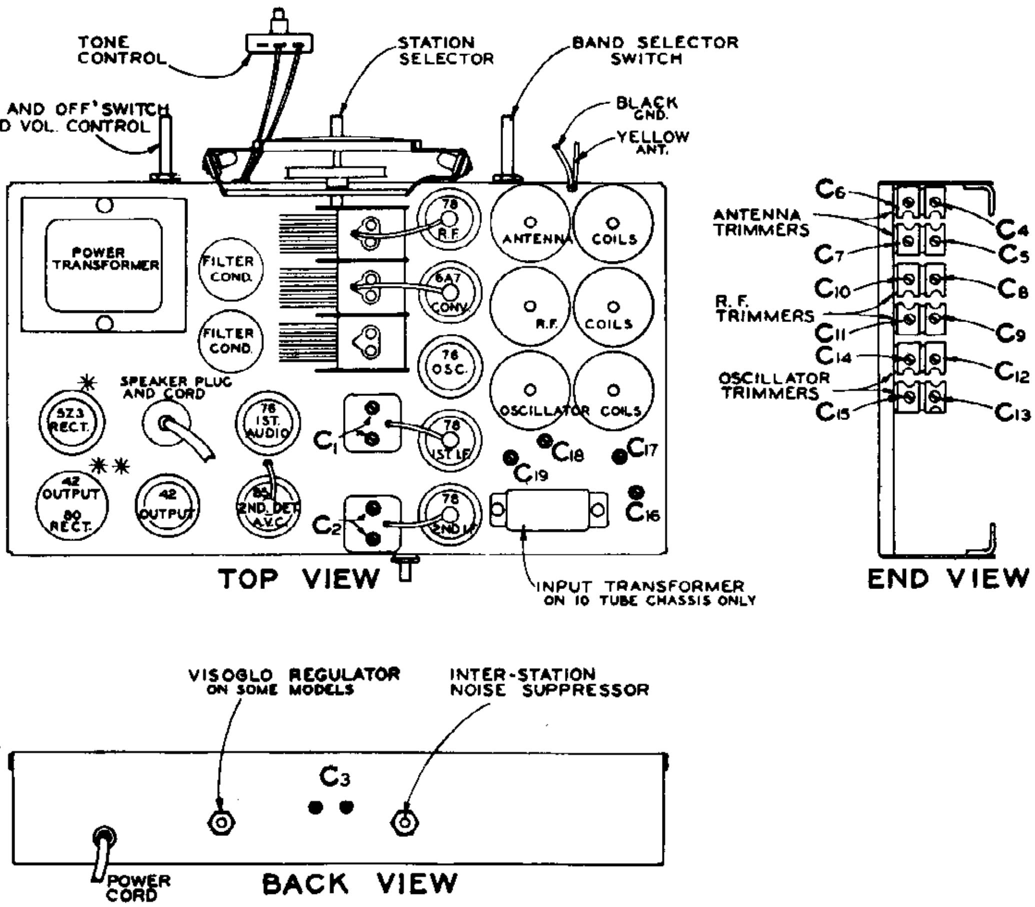
(4) Retune test oscillator and receiver to 15,000 kilocycles and check the adjustments of condensers C_{15}, C_{11}, and C_7.

(5) The calibration of the receiver should also be checked at a frequency of 12,000 kilocycles.

Note: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

MODELS 80,83,84,85X, 86X,104
Trimmer Locations
Frequency Tables

SPARKS-WITHINGTON CO.



*Type 76 First Audio and Type 5Z3 Rectifier are used on the ten-tube chassis (Model 104) only.

**Type 42 output tube is used in this position on the Model 104 only, and the type 80 rectifier is used on the eight-tube chassis Models 80, 83, 84, 85-X and 86-X only.

INTERMEDIATE-FREQUENCY ADJUSTABLE CONDENSERS

C_1 — FIRST I. F. (ADJUST AT 456 K. C.)
C_2 — SECOND I. F. (ADJUST AT 456 K. C.)
C_3 — THIRD I. F. (ADJUST AT 456 K. C.)

RADIO-FREQUENCY INPUT TRIMMERS (ANTENNA TRIMMERS)

C_4 — BAND NO. 1. (ADJUST AT 1350 K. C.)
C_5 — BAND NO. 2. (ADJUST AT 3000 K. C.)
C_6 — BAND NO. 3. (ADJUST AT 7200 K. C.)
C_7 — BAND NO. 4. (ADJUST AT 15000 K. C.)

RADIO-FREQUENCY OUTPUT TRIMMERS (R. F. TRIMMERS)

C_8 — BAND NO. 1. (ADJUST AT 1350 K. C.)
C_9 — BAND NO. 2. (ADJUST AT 3000 K. C.)
C_{10} — BAND NO. 3. (ADJUST AT 7200 K. C.)
C_{11} — BAND NO. 4. (ADJUST AT 15000 K. C.)

OSCILLATOR TRIMMING CONDENSERS

C_{12} — BAND NO. 1. (ADJUST AT 1350 K. C.)
C_{13} — BAND NO. 2. (ADJUST AT 3000 K. C.)
C_{14} — BAND NO. 3. (ADJUST AT 7200 K. C.)
C_{15} — BAND NO. 4. (ADJUST AT 15000 K. C.)

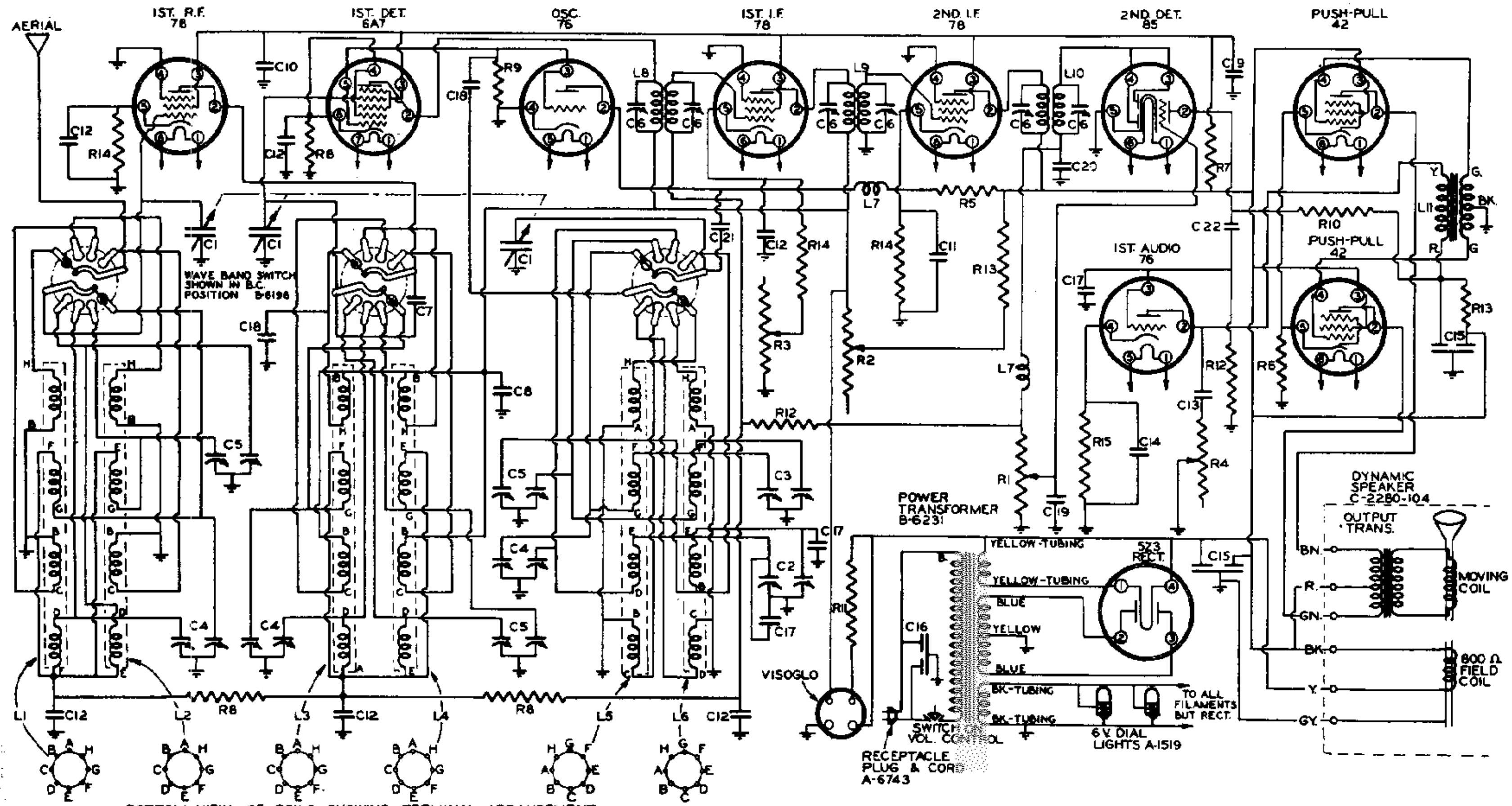
OSCILLATOR PADDING CONDENSERS

C_{16} — BAND NO. 1. (ADJUST AT 600 K. C.)
C_{17} — BAND NO. 2. (ADJUST AT 1650 K. C.)
C_{18} — BAND NO. 3. (ADJUST AT 3600 K. C.)
C_{19} — BAND NO. 4. (ADJUST AT 9000 K. C.)

FIG. 8 CHASSIS DIAGRAM FOR SPARTON MODELS 80, 83, 84, 85-X, 86-X AND 104

SPARKS-WITHINGTON CO.

SPARTON MODEL 104 SUPERHETERODYNE
SCHEMATIC DIAGRAM
INTERMEDIATE FREQUENCY 456 KILOCYCLES
(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



- C1 VARIABLE CONDENSER B-6218
- C2 OSC. PADDER 10 PLATE A-10846-1
- C3 OSC. PADDER 7 PLATE A-10846-2
- C4 R.H. TRIMMER A-11454
- C5 L.H. TRIMMER A-11455
- C6 I.F. TRIMMER IN COILS
- C7 8 TO 9 MFD. A-11261
- C8 .2 MFD. 400 V. A-11473-3
- C9 .2 MFD. 200 V. A-11130-6
- C10 .1 MFD. 200 V. A-11089-2
- C11 .1 MFD. 100 V. A-11089-1
- C12 .1 MFD. 100 V. A-11130-1
- C13 .025 MFD. 600 V. A-11130-8
- C14 10 MFD. 25 V. A-10377
- C15 8-8 MFD. A-11223-1
- C16 .006-.006 MFD. A-7878
- C17 .001 MFD. MOLDED A-9578-10
- C18 .0001 MFD. MOLDED A-11095-3
- C19 .00025 MFD. MOLDED A-11095-4
- C20 .0005 MFD. MOLDED A-9578
- C21 .00005 MFD. MOLDED A-11095-2
- C22 .01 MFD. 400 V. A-11130-5

- R1 250,000 Ω VOL. CONTROL A-11297
- R2 5,000 Ω VOLT. REGULA. A-11381
- R3 100,000 Ω NOISE SUPP. A-10446
- R4 100,000 Ω TONE CONT. A-11334
- R5 10,000 Ω 1 W. B-4540-9
- R6 250 Ω WIREWOUND B-6061-4
- R7 15,000 Ω 10 W. B-5029-2
- R8 1,000 Ω .25 W. B-5458-11
- R9 50,000 Ω .25 W. B-5458-5
- R10 500,000 Ω .25 W. B-5737-5
- R11 1,000,000 Ω .25 W. B-5737-6
- R12 250,000 Ω .25 W. B-5737-1
- R13 3,000 Ω WIREWOUND B-6061-3
- R14 400 Ω WIREWOUND B-5243-41
- R15 2,000 Ω .25 W. B-5458-32

- L1 NO. 1 ANTENNA COIL A-11211
- L2 NO. 2 ANTENNA COIL A-11212
- L3 NO. 1 R.F. COIL A-11213
- L4 NO. 2 R.F. COIL A-11214
- L5 NO. 1 OSC. COIL A-11215
- L6 NO. 2 OSC. COIL A-11216
- L7 16 M.H. CHOKE A-3506
- L8 NO. 1 I.F. TRANSFORMER A-6313-3
- L9 NO. 2 I.F. TRANSFORMER A-6313-4
- L10 NO. 3 I.F. TRANSFORMER A-6313-5
- L11 AUDIO TRANSFORMER A-11434-1

MODEL 104
Voltage
Chassis View, Notes

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE SEPTEMBER 11, 1934

Sparton Model 104 A. C. Superheterodyne Schematic Diagram and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

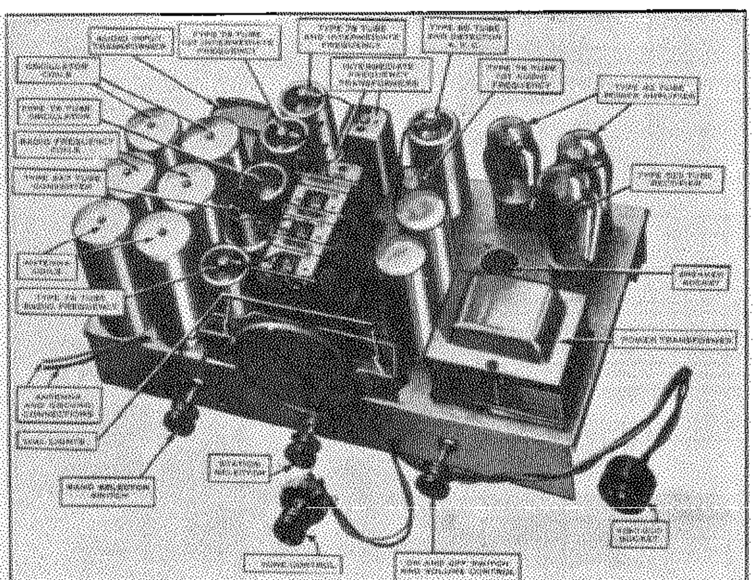
Line Voltage — 120
Position of Viso-Glo Regulator — Full
Position of Tone Control — Full
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Broadcast
Position of Inter-Station Noise Suppressor — Full

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R. F. Amplifier	Volts	*	195	95	0	3.2	*	—	0
		Ohms	0	45,000	25,000	0	400	0	—	500,000
6A7	Converter	Volts	*	195	95	3.8	**	3.8	*	0
		Ohms	0	45,000	25,000	900	45,000	900	0	500,000
76	Oscillator	Volts	*	150	**	0	*	—	—	—
		Ohms	0	50,000	45,000	0	0	—	—	—
78	1st I. F. Amplifier	Volts	*	195	95	0	3.2	*	—	0
		Ohms	0	45,000	25,000	0	400	0	—	500,000
78	2nd I. F. Amplifier	Volts	*	250	95	0	3.2	*	—	0
		Ohms	0	35,000	25,000	0	0	0	—	0
85	2nd Detector-A. V. C.	Volts	*	**	**	**	0	*	—	0
		Ohms	0	500,000	250,000	250,000	0	0	—	250,000
76	1st A. F. Amplifier	Volts	*	**	8.8	0	*	—	—	—
		Ohms	0	40,000	250,000	1,750	0	—	—	—
42	Power Amplifier	Volts	*	245	250	0	18	*	—	—
		Ohms	0	35,000	38,000	1200	250	0	—	—
42	Power Amplifier	Volts	*	245	250	0	18	*	—	—
		Ohms	0	35,000	38,000	1200	250	0	—	—
5Z3	Rectifier	Volts	365	330	330	365	—	—	—	—
		Ohms	3800	50	50	3800	—	—	—	—

NOTES: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer, No. 665, Type 1.

*Zero or 5.8 volts, depending on twist of filament hook-up wire. If Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7 or Prong No. 5 of Type 76) should read 5.8 volts, and vice versa.

**Cannot be measured with Weston No. 665, Type 1.



MODEL 104 CHASSIS

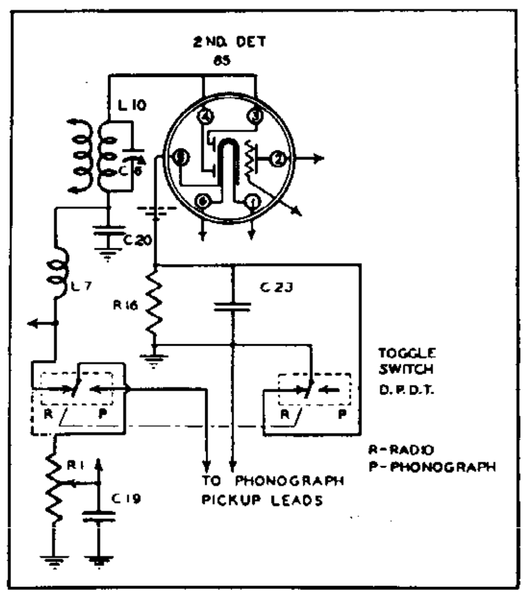


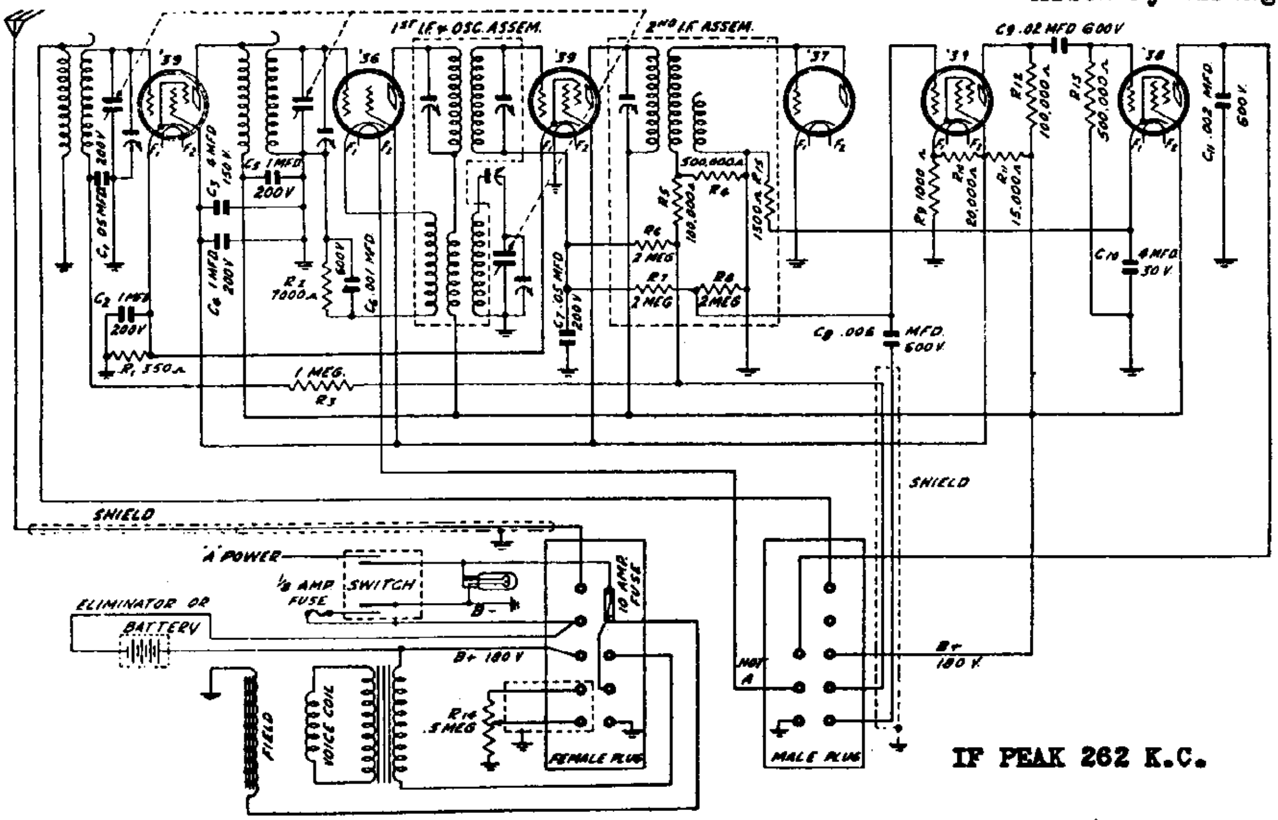
DIAGRAM OF CONNECTIONS FOR PHONOGRAPH PICKUP

Parts required: 1 Toggle Switch (D. P. D. T.), Part A-11561; 1 Condenser (C23), Part A-10377, 10 MFD., 25 V.; 1 Resistor (R-16), Part B-5458-16, 5000 ohms, ¼ watt.

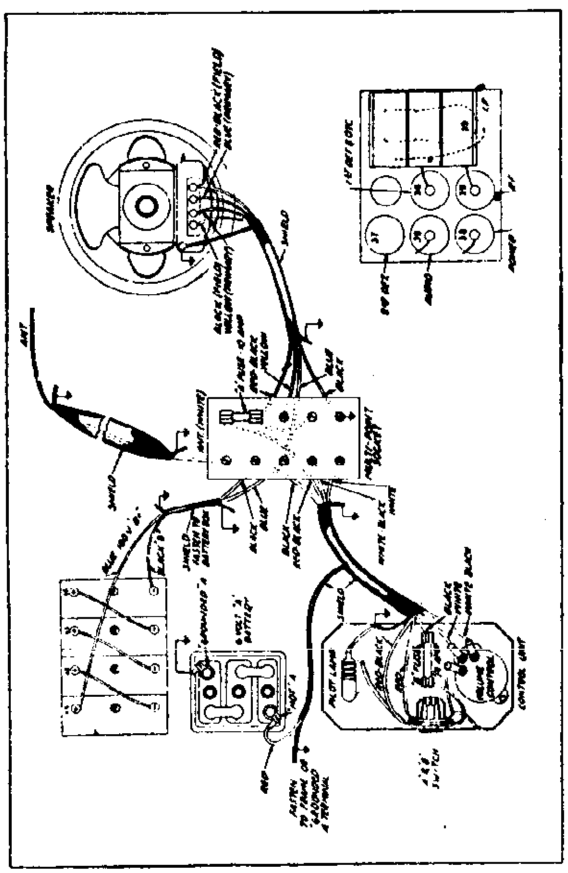
Dotted line between R1 and L7 and dotted ground at Prong No. 5 of Type 85 tube indicate original connections. See schematic diagram on back of sheet. Toggle switch may be mounted by drilling ½" hole in back of chassis 4 inches from left hand side and 1 inch up from bottom.

STAR

MODEL 062
Schematic
Voltage
Assembly Wiring



IF PEAK 262 K.C.



VOLTAGE DATA

Tube	Plate	Screen	Grid	Plate M.A.
R.F.	177	80	3	3.6
1st Det.	173	76	7*	.9*
I.F.	177	80	3	3.6
2nd Det.	0	0	0	0
1st A.F.	54	77	6	1.2
Output	159	165	15.5	10.0

* Will vary with dial setting.

MODEL 6-U
Schematic

STAR

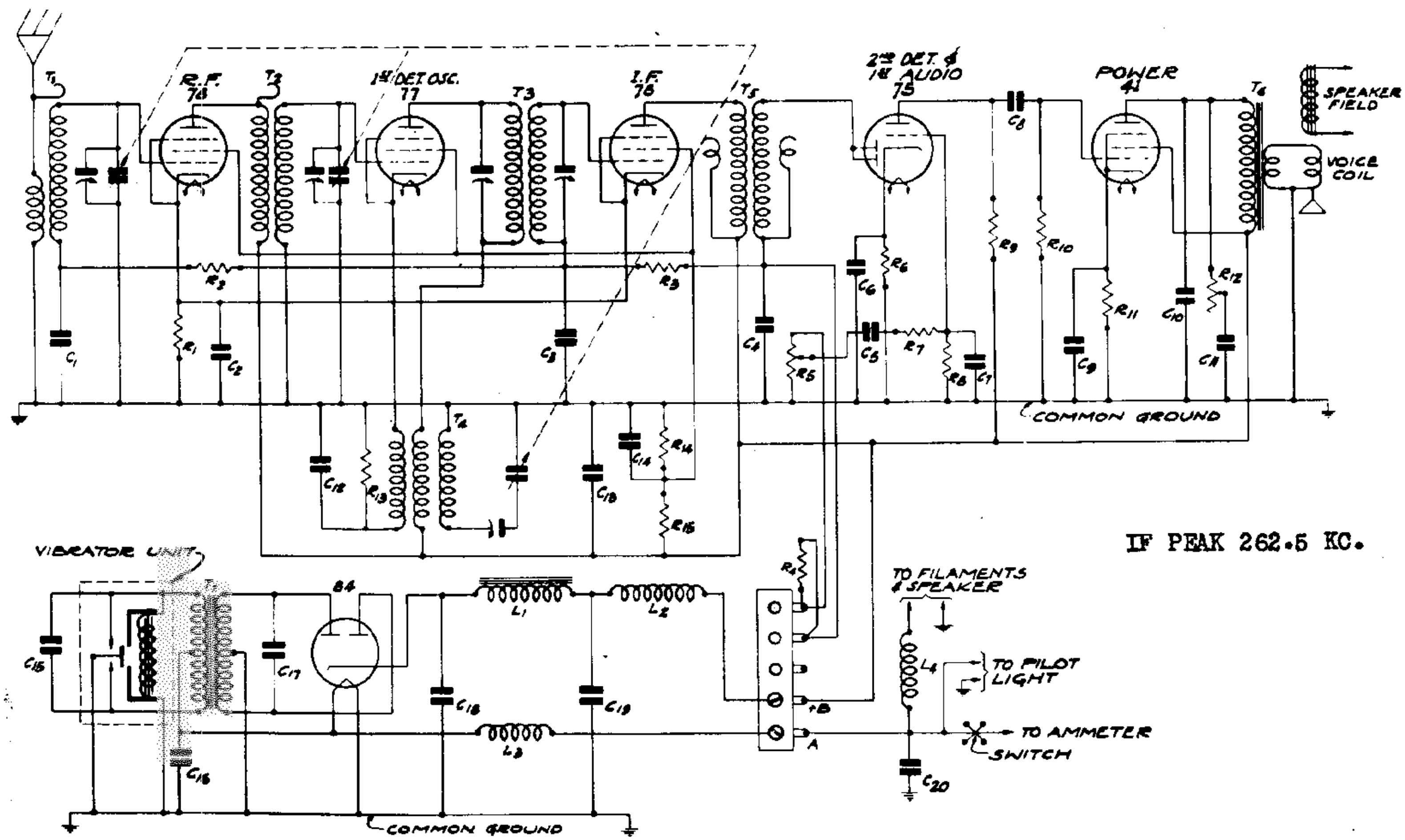
T_1 ANTENNA COIL (P-5039)
T_2 R.F. INTERSTAGE COIL (P-5065)
T_3 } 1ST I.F. & OSCILLATOR
T_4 } COIL (P-5063)
T_5 2ND I.F. COIL (P-5022)
T_6 OUTPUT TRANS. (P-50632)
T_7 POWER TRANS. (P-50633)

L_1 FILTER CHOKE (P-50637)
L_2 R.F. "B" CHOKE (P-5174)
L_3 ELIMINATOR "A" CHOKE (P-5175)
L_4 R.F. "A" CHOKE (P-5167)

R_1 260 OHMS
R_2 1.0 MEGOHM
R_3 2.0 "
R_4 200,000 OHM
R_5 250,000 OHM VOL. CONTROL
R_6 6,000 OHM
R_7 100,000 OHM
R_8 1.0 MEGOHM
R_9 250,000 OHM
R_{10} 250,000 OHM
R_{11} 800 OHM
R_{12} 150,000 OHM TONE CONTROL
R_{13} 4,000 OHM
R_{14} 20,000 OHM
R_{15} 15,000 OHM

C_1 0.050 M.F. 200V. TUBULAR
C_2 0.500 M.F. (BLOCK RED-WH.)
C_3 0.050 M.F. (BLOCK GR.-WH.)
C_4 0.00025 M.F. MICA
C_5 0.050 M.F. 200V. TUBULAR
C_6 12.000 M.F. ELECTROLYTIC IN BLOCK WITH C_9
C_7 0.00025 M.F. MICA
C_8 0.050 M.F. (BLOCK GR.)
C_9 12.000 M.F. ELECTROLYTIC IN BLOCK WITH C_6
C_{10} 0.003 M.F. (BLOCK YELLOW)
C_{11} 0.020 M.F. 600V. TUBULAR
C_{12} 0.001 M.F. MICA
C_{13} 0.500 M.F. (BLOCK BLUE)
C_{14} 0.100 M.F. (BLOCK BROWN)
C_{15} 0.500 M.F. 120V. TUBULAR
C_{16} 1.000 M.F. 120V. TUBULAR
C_{17} 0.010 M.F. 1600V. TUBULAR
C_{18} 10.000 M.F. BLOCK WITH C_{19}
C_{19} 10.000 M.F. BLOCK WITH C_{18}
C_{20} 0.500 M.F. 120V. TUBULAR

COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK

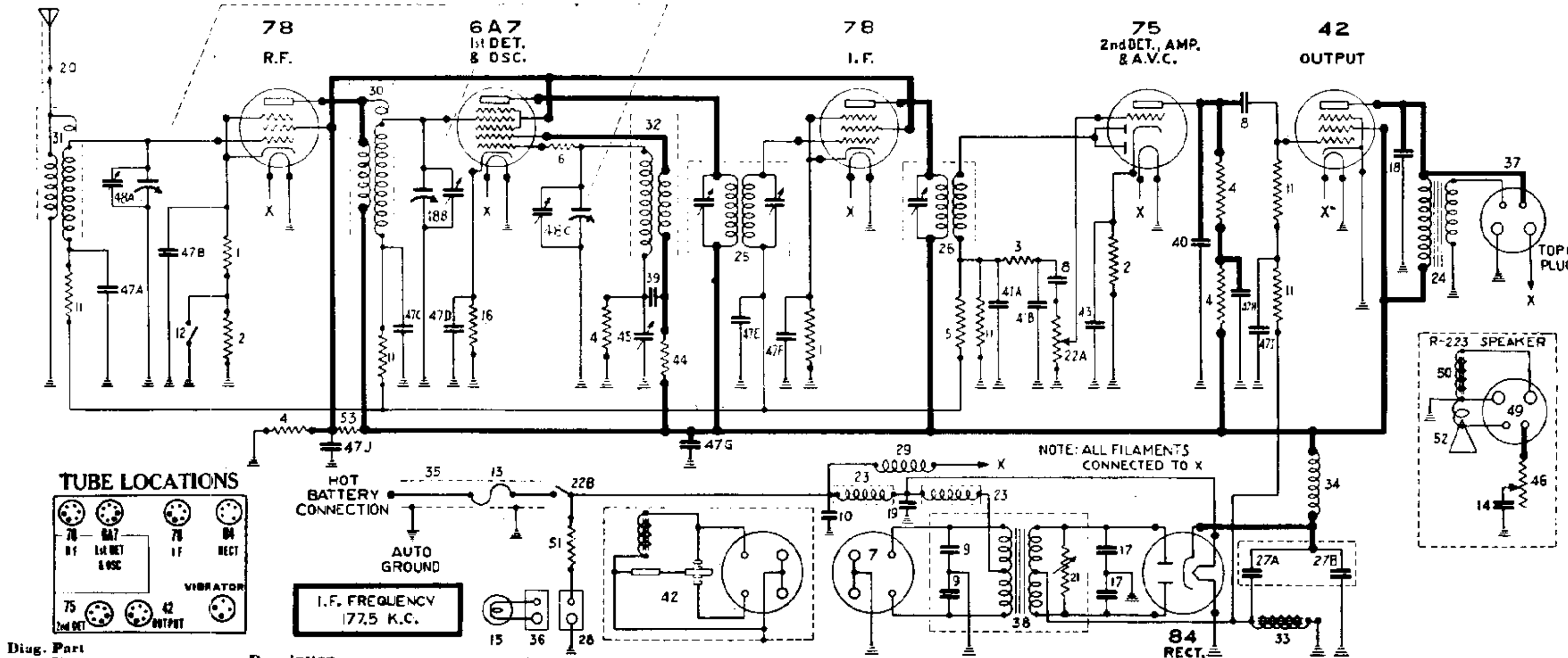


IF PEAK 262.5 KC.

MODEL 1171, 1172
Chassis R-117
Schematic, Socket
Parts List

STEWART-WARNER CORP.

STEWART-WARNER 1171 & 1172 AUTO RADIO (R-117 CHASSIS)



Diag. No.	Part No.	Description
1	67257	500 ohm ¼ watt carbon resistor
2	67580	6000 ohm ¼ watt carbon resistor
3	81152	10,000 ohm ¼ watt carbon resistor
4	81645	50,000 ohm ¼ watt carbon resistor
5	81682	1.1 megohm ¼ watt carbon resistor
6	81727	1000 ohm ¼ watt carbon resistor
7	81837	Vibrator socket (Standard 4 prong)
8	83007	.02 Mfd. 600 volt paper condenser
9	83058	.25 Mfd. 100 volt paper condenser
10	83063	.5 Mfd. 100 volt paper condenser
11	83082	260,000 ohm ¼ watt carbon resistor
12	83179	Local-distance switch (SPST)
13	83207	15 ampere fuse
14	83217	.04 Mfd. 600 volt paper condenser
15	83278	6 volt pilot light bulb (1171 only) (See No. 84058 for Model 1172)
16	83293	300 ohm ¼ watt carbon resistor
17	83352	.015 Mfd. 600 volt paper condenser
18	83706	.006 Mfd. 600 volt paper condenser
19	83714	1.5 Mfd. 100 V. shielded paper condenser
20	83723	Antenna lead and plug
21	83725	0-500,000 ohm special Globar resistor
22-A	83728	500,000 ohm volume control } In one unit.
22-B		On-Off Switch } In one unit.
23	83730	Vibrator R.F. Choke
24	83731	Output Transformer
25	83732	First I.F. Transformer
26	83733	Second I.F. Transformer
27-A	83734	Dual 8 Mfd. 350 Volt Dry
27-B		Electrolytic Condenser
28	83739	2 prong Pilot Light Socket
29	83742	Filament R.F. Choke
30	83746	R.F. (B) Coil and shield
31	83747	Antenna (A) coil and shield
32	83748	Oscillator (0) coil and shield
33	83760	Filter Choke
34	83770	B supply R.F. Choke
35	83777	Battery Lead and Fuse Housing
36	83778	Pilot Light Cable and Plug
37	83779	Speaker Cable and Plug
38	83780	Power Transformer
39	83783	.00011 mfd. Molded Mica Cond
40	83784	.0011 mfd. Molded Mica Condenser
41A, 41B	83785	Dual .0005 mfd. Molded Mica Condenser
42	83800	Plug-in Vibrator
43	83803	12 mfd. 25 V. Dry Electrolytic Condenser
44	83804	40,000 ohm, ¼ watt Carbon Resistor
45	83805	Oscillator Padding Trimmer
46	83812	35,000 ohm Tone Control Variable Resistor
47A	83831	.05 mfd. 100 volt Paper Condenser (In one Unit. Common terminal grounded to can.)
47B	83831	.05 mfd. 100 volt Paper Condenser
47C	83831	.05 mfd. 100 volt Paper Condenser
47D	83831	.05 mfd. 100 volt Paper Condenser
47E	83831	.05 mfd. 100 volt Paper Condenser
47F	83831	.05 mfd. 100 volt Paper Condenser
47G	83831	.1 mfd. 400 volt Paper Condenser
47H	83831	.1 mfd. 400 volt Paper Condenser
47I	83831	.25 mfd. 100 volt Paper Condenser
47J	83831	.25 mfd. 300 volt Paper Condenser
48A, 48B, 48C	83834	Three gang Variable Condenser with mtg. Plate and Shaft Coupling
49	83843	Male Speaker Plug and Bracket
50	83850	Speaker Field Coil and Housing (5.5 ohms)
51	84175	35 ohm Flexible Resistor. Note: Early Model 1171 sets used 15 ohm Resistor. No Resistor used in Model 1171
52	84021	Diaphragm & Shell Assem. (R-223 Spkr.)
	84058	6 to 8 volt Dial Light Bulb (1172 only)
53	84095	15,000 ohm, 2 watt Carbon Resistor

(See other side for other parts)

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description
83144	Spark Plug Suppressor
83145	Distributor Suppressor
83242	Back Cover and Casing Bracket Screws
83727	Back Cover
83836	Front Cover and Speaker Grill Cloth
83838	Case Assembly, less Covers
83861	Tuning Knob (1171 only)
83862	Volume Control Key (1171 only)
83904	Generator and Ammeter Condenser
84106	Volume Control Knob (1172 only)

MODEL 1171,1172
Voltage Data
Alignment Data

STEWART-WARNER CORP.

The Stewart-Warner 6 Tube Superheterodyne Model No. R-117 Chassis is used in the Model 1171 and 1172 Auto Radio receivers. These two sets are identical with the exception of the remote control head and the flexible shafts.

The Model 1171 remote control uses a key to operate the volume control and a knob for tuning while the 1172 control uses a different type of head with knobs for both the volume control and tuning. Sets with serial numbers below 15000 are Models 1171's, while those above 15000 are 1172's.

The only difference in the chassis used is the omission of the dial light dimming resistor (diagram No. 51) in the 1172 sets.

DIAL CALIBRATION

In the Model 1171, the dial can be calibrated by tuning in a station of known frequency and then setting the pointer to give the correct reading by turning the adjusting screw which is located on the middle of the back of the remote control head. In the Model 1172, the dial is calibrated by turning the tuning knob after the pointer has stopped at the last dial division. Turning the knob in a clockwise direction, after the pointer reaches 15.4, will lower the dial reading, while turning it counter clockwise after the pointer is at 5.3, will increase the dial reading.

CIRCUIT DESCRIPTION

In the R-117 Chassis, the incoming signal is tuned and amplified by the 78 R. F. amplifier tube and then it is further amplified and its frequency is converted to 177.5 K. C. in the 6A7 combination first detector and oscillator tube.

The 177.5 K. C. signal is amplified by the I. F. stage, using a 78 type tube and is then rectified by the diodes of the 75 second detector tube. The rectified current produces a modulated D. C. voltage drop across the diode load resistor No. 11. The audio frequency modulation is impressed across the 500,000 ohm volume control from where is goes to the triode section of the 75 which acts as an audio amplifier.

The modulated drop across resistor No. 11 is filtered and applied to the grids of the 78 and 6-A-7 tubes to provide A.V.C. action.

LOCAL-DISTANCE SWITCH

A local-distance switch is provided in the R. F. stage to reduce the sensitivity in locations where there is excessive noise in tuning between stations. When this switch is in the open or "local" position, a high bias is placed on the 78 R. F. tube by means of the 6000 ohm resistor No. 2. This resistor is shorted out when the switch is thrown to the distance position (with white dot showing) thus reducing the bias to its normal value.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 21 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer and keeps the voltage below the danger point until the tubes warm up 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.

ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper alignment of the R. F. and I. F. stages 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 42 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect to the 42 plate is the terminal of the tone control which is wired to the speaker plug.

During all alignment adjustments, keep the volume control full on and the local-distance switch in the "distance" position.

I. F. ALIGNMENT

The I. F. trimmers are located on the top of the I. F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K. C. and connected from the 6-A-7 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Adjust all three I. F. trimmers to give maximum output reading.

The first I. F. transformer has a double trimmer consisting of a slotted screw for one trimmer and a hex nut around it for the other. In adjusting the second I. F. transformer single trimmer, it is desirable to use a bakelite screwdriver 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

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage. Adjust the receiver to approximately 1400 K. C. and carefully tune the service oscillator to give maximum receiver output. Adjust the output of the 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. The trimmer on the other condenser section (oscillator section) should not be touched unless the set does not calibrate properly.

ALIGNING THE PADDING CIRCUIT

The low-frequency oscillator padding trimmer located on the side of the chassis does not require adjustment in most cases. However, if the set does not align properly at the low frequency end proceed as follows: Remove the chassis from the case. To do this it is necessary to unsolder the braided shield from the outside of the case at the antenna plug opening and then remove the screws holding the chassis to the case. Set the test oscillator to exactly 600 K. C. and tune the set **to the signal.** Adjust the padding trimmer which is mounted on the side of the chassis **while turning the gang condenser back and forth** over a small range. The correct setting is the one which gives maximum output. If the pointer is not exactly at 6.0 (600 K. C.) for maximum output, re-adjust the pointer calibration to get the proper reading. After adjusting the padding trimmer check up the alignment and calibration at 1400 K. C.

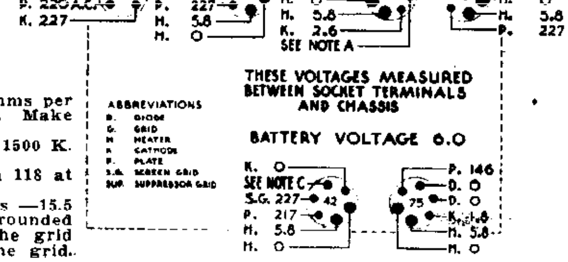
ADJUSTMENT OF OSCILLATOR TRIMMER

If the receiver is badly out of calibration, particularly at the high frequency end, the following procedure should be followed.

Set the test oscillator to **exactly 1400 K. C.** Turn the tuning knob until the dial pointer indicates 14.0 (1400 K. C.) and then adjust the oscillator trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R. F. alignment.

SOCKET VOLTAGES

LOCAL-DISTANCE SWITCH IN DISTANCE POSITION
BOTTOM VIEW OF CHASSIS



7-18-34

IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The oscillator grid voltage varies from 0 at 1500 K. C. to —5.0 at 530 K. C.

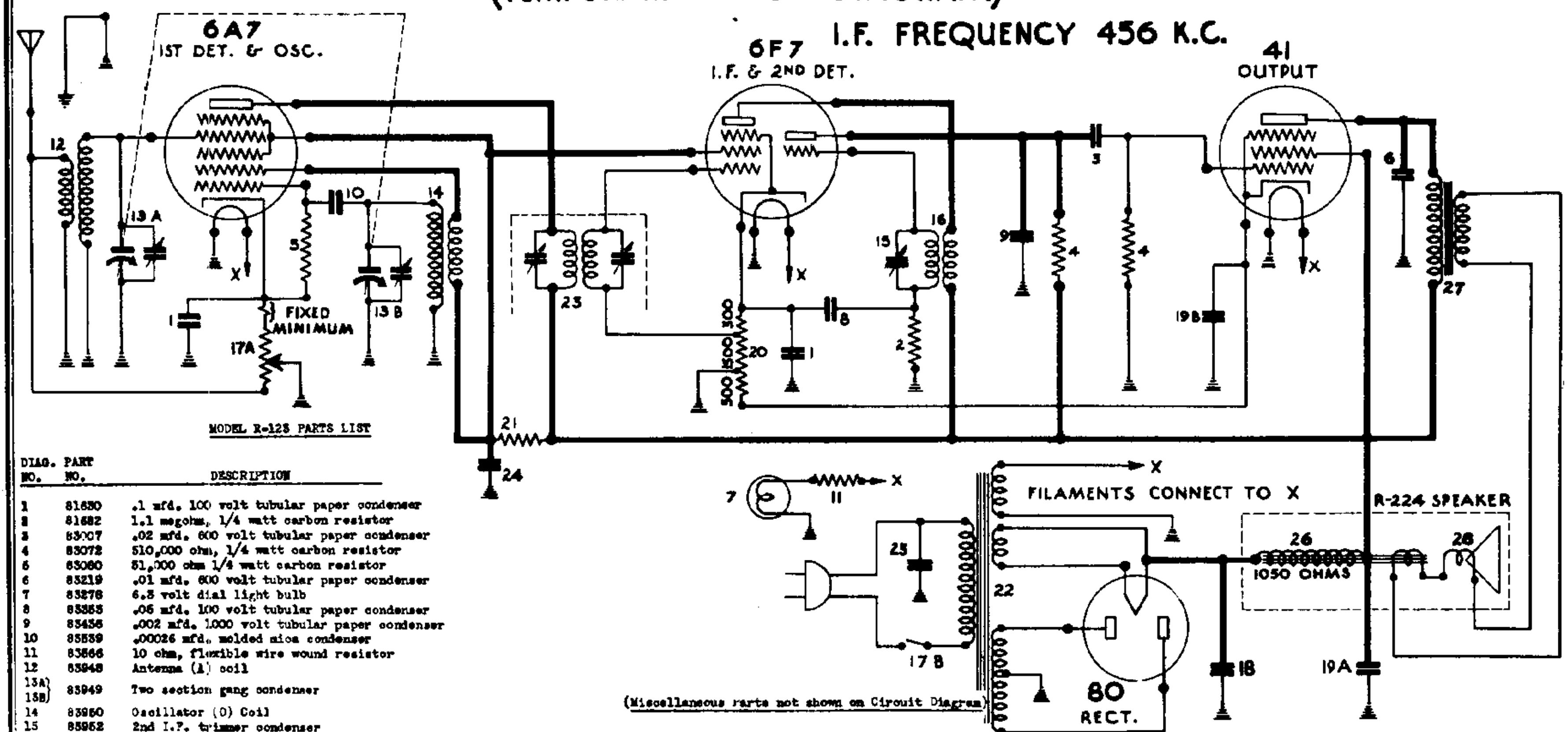
NOTE B: The oscillator anode voltage may vary from 118 at 1500 K. C. to 128 at 530 K. C.

NOTE C: The actual bias on the grid of the 42 tube is —15.5 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.

MODELS 1231 to 1239
Chassis R-123
Schematic, Socket
Parts List

STEWART-WARNER CORP.

STEWART-WARNER MODEL R-123 CHASSIS (RECEIVER MODELS 1231 to 1239)
(TEMPORARY CIRCUIT DIAGRAM)



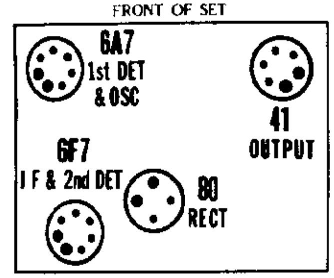
MODEL R-123 PARTS LIST

DIAG. NO.	PART NO.	DESCRIPTION
1	81630	.1 mfd. 100 volt tubular paper condenser
2	81682	1.1 megohm, 1/4 watt carbon resistor
3	83007	.02 mfd. 600 volt tubular paper condenser
4	83072	510,000 ohm, 1/4 watt carbon resistor
5	83080	51,000 ohm 1/4 watt carbon resistor
6	83219	.01 mfd. 600 volt tubular paper condenser
7	83276	6.3 volt dial light bulb
8	83353	.05 mfd. 100 volt tubular paper condenser
9	83436	.002 mfd. 1000 volt tubular paper condenser
10	83539	.00026 mfd. molded mica condenser
11	83566	10 ohm, flexible wire wound resistor
12	83948	Antenna (A) coil
13A, 13B	83949	Two section gang condenser
14	83950	Oscillator (O) Coil
15	83952	2nd I.F. trimmer condenser
16	83953	2nd I.F. transformer coil
17A, 17B	83959	7500 ohm volume control with 350 ohm fixed minimum / line switch — In one unit
18	83960	6 mfd. 400 volt wet electrolytic condenser
19A, 19B	83962	5 mfd. 350 V. dry electro.cond. / 10 mfd. 25 V. dry electro.cond. — In one unit (Model R-123-A only. Also see No. 84399)
20	83963	300, 1500 and 500 ohm tapped bias resistor
21	83964	25,000 ohm, 2 watt carbon resistor
22	83966	Power transformer, 115 volts, 60 cycles (Model R-123-A) (See No. 84400 & 84402 for other voltages and frequencies)
23	83973	1st I.F. transformer
24	83974	.1 mfd. 200 volt tubular paper condenser
25	83976	.02 mfd. 1000 volt shielded paper condenser
26	83987	Field coil and housing (1050 ohms)
27	84009	Output transformer
28	84010	Diaphragm & Shell assembly
	84400	Power transformer, 115 volts, 25 to 133 cycles (Model R-123-B)
	84402	Power trans. 100 to 240 volts, 40 to 133 cycles (Model R-123-W)
	84399	5 mfd. 350 V. Dry Electro.Cond. / 10 mfd. 25 V. Dry Electro.Cond. — In one shielded unit. For R-123-B & W only.

(Miscellaneous parts not shown on Circuit Diagram)

PART NO.	DESCRIPTION
17615	Volume Control Mtg. Lock Washer (3/8")
316.2	Tuning Dial set screw
67034	Volume Control Mtg. Nut (3/8"-32)
67263	#6 x 1/4" Self Tapping Screw
81834	Six prong tube socket
81837	Four prong tube socket
81949	Seven prong tube socket
83562	Chassis Mtg. Screw (#10 x 7/8" Self Tapping)
83574	Dial Light Socket and Bracket
83578	Escutcheon Mtg. Wood Screw (#1 x 1/4" R.H.)
83587	Front Plate Mtg. Screw (#8 x 1-1/4" Ornamental Head)
83624	#8 x 1/4 Self Tapping Screw
83941	Tuning Dial and Bushing
83945	Volume Control Dial & Bracket
83970	Escutcheon Plate
84015	Knob Washer (paper 5/8" O.D.)
84016	Rubber Washer (3/4" O.D.)
84017	Knob (Model 1231)
84130	Metal Front Grill (Model 1235 only)
84343	Knob (Model 1235 & 1236)
84541	Wave trap (to eliminate code interference)

TUBE LOCATIONS
FRONT OF SET



Wave Trap Installation Data

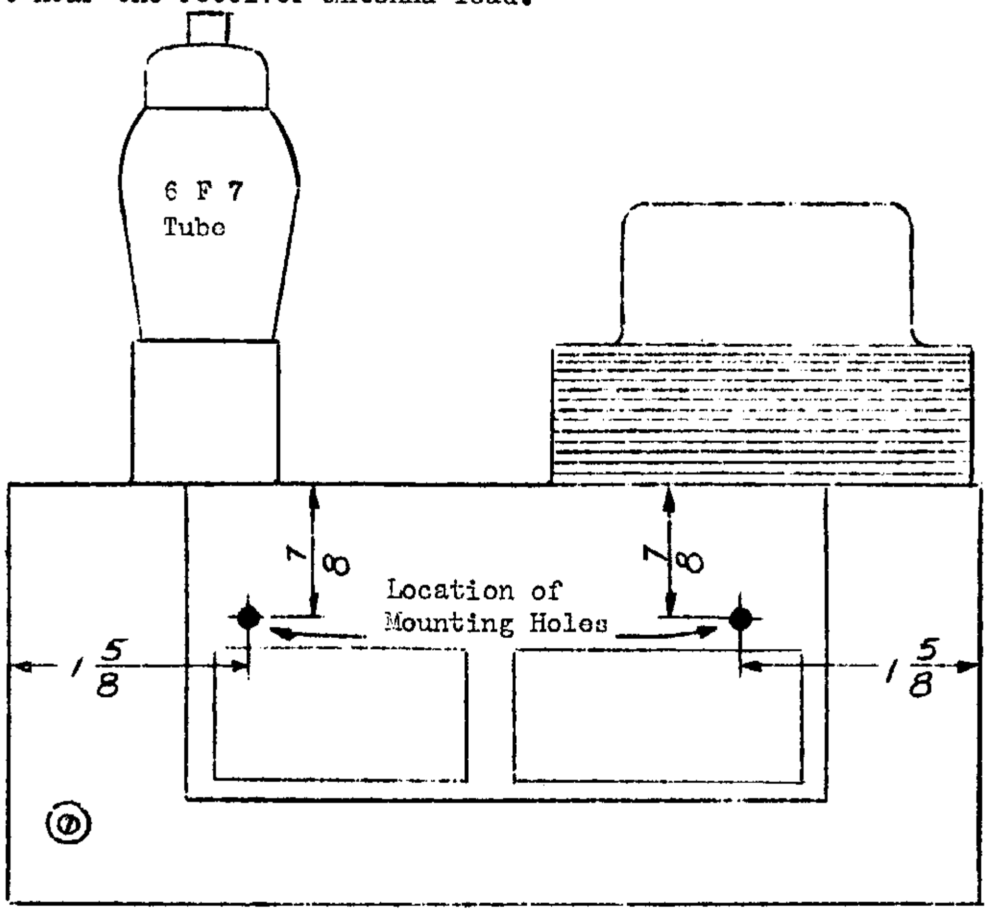
STEWART WARNER CORP.

INSTRUCTIONS FOR INSTALLATION OF WAVE TRAP

This wave trap is designed to be used with any Stewart-Warner chassis using an intermediate frequency of 456 kilocycles. The trap will reduce or prevent code interference caused by powerful code stations which operate at or near this frequency.

It is made for easy installation by any service man. In the Model R-123, two holes for mounting it are provided on the rear of the chassis so that the wave trap may be attached by means of the two self-tapping screws which are included in the kit. These holes are normally covered by the paper name plate, but they can easily be found by punching through the paper sticker with a point at the positions shown on the diagram.

On all other models, the trap should be screwed to the inside of the cabinet near the receiver antenna lead.



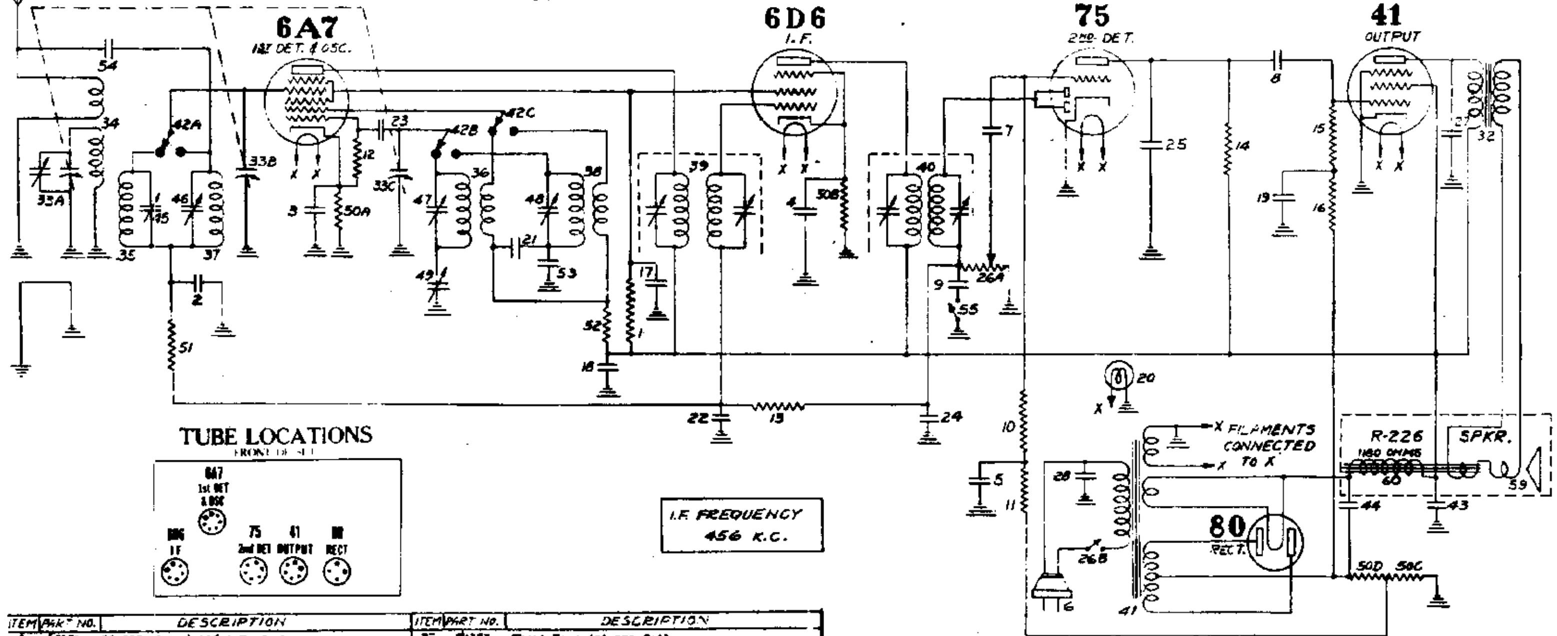
After mounting the trap, connect the blue antenna wire from the set to one of the wave trap leads and connect the antenna lead-in to the other wave trap lead.

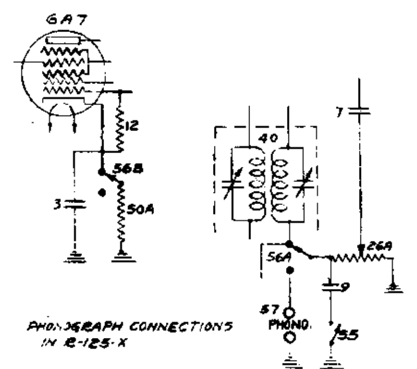
Usually the wave trap will not require adjustment, but if some particular code station continues to cause excessive interference after installing the trap, it can be adjusted to diminish the unwanted signal. To make this adjustment, turn the slotted screw extending from the back of the wave trap with a screwdriver. Turn it slowly, first in one direction and then in the other, until the interfering signal disappears or has minimum volume.

STEWART WARNER CORP.

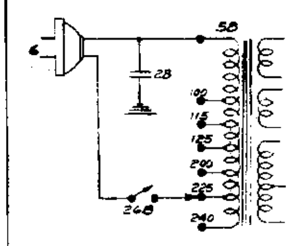
MODELS 1251 to 1259
Chassis R-125 Series
Chassis R-125A & 125X
Schematic, Parts List
Circuit Changes

STEWART-WARNER MODEL R-125 CHASSIS (RECEIVER MODELS 1251 to 1259)
(TEMPORARY CIRCUIT DIAGRAM)





PHONOGRAPH CONNECTIONS IN R-125-X



PRIMARY CONNECTIONS FOR UNIVERSAL POWER TRANS. IN R-125-X.

ITEM	PART NO.	DESCRIPTION
1	62183	30,000 ohm. ± 10% 1 W. Carbon resistor
2	81630	.1 mfd. 100 volt paper condenser
3	81630	1 mfd. 100 volt paper condenser
4	81630	.1 mfd. 100 volt paper condenser
5	81630	.1 mfd. 100 volt paper condenser
6	81974	Line Cord and plug
7	83007	.02 mfd. 600 volt paper condenser
8	83007	.02 mfd. 600 volt paper condenser
9	83011	.004 mfd. 600 volt paper condenser
10	83072	510,000 ohm. ± 20% ½ watt carbon resistor
11	83072	510,000 ohm. ± 20% ½ watt carbon resistor
12	83080	51,000 ohm, ± 20% ½ watt carbon resistor
13	83082	260,000 ohm. ± 20% ½ watt carbon resistor
14	83082	260,000 ohm. ± 20% ½ watt carbon resistor
15	83082	260,000 ohm. ± 20% ½ watt carbon resistor
16	83082	260,000 ohm. ± 20% ½ watt carbon resistor
17	83214	.25 mfd. 250 volt paper condenser
18	83214	.25 mfd. 250 volt paper condenser
19	83219	.01 mfd. 600 volt paper condenser
20	83278	6.3 volt dial light bulb
21	83352	.015 mfd. ± 10% 600 volt paper condenser
22	83353	.05 mfd. 100 volt paper condenser
23	83539	.00026 mfd. ± 25% molded mica condenser
24	83539	.00026 mfd. ± 25% molded mica condenser
25	83539	.00026 mfd. ± 25% molded mica condenser
26A) 26B)	83551	500,000 ohm volume control) Line switch) in one unit
27	83706	.006 mfd. 600 volt paper condenser
28	83976	.02 mfd. 1000 volt paper condenser
32	84153	Output transformer (Part of R-226 Speaker)
33A) 33B) 33C)	84174	Three gang variable condenser
34	84175	Broadcast Antenna coil (also see No. 84229)
35	84178	Broadcast detector coil (also see No. 84229)
36	84180	Broadcast oscillator coil
37	84183	Short Wave Antenna Coil
38	84185	Short wave oscillator coil
39	84187	1st I.F. Transformer
40	84188	2nd I.F. Transformer
41	84189	Power Transformer (115 volts 60 cycles) (R-125-A only) (also see item 58)
42A) 42B) 42C)	84191	Range Switch
43	84192	16 mfd. 350 volt wet Electrolytic condenser
44	84193	16 mfd. 350 volt wet Electrolytic condenser
45	84194	R.F. trimmer condenser (3 to 23 mmfd.)
46	84194	R.F. trimmer condenser (3 to 23 mmfd.)
47	84194	R.F. trimmer condenser (3 to 23 mmfd.)
48	84194	R.F. trimmer condenser (3 to 23 mmfd)
49	84195	Oscillator Padding trimmer (300-600 mmfd.)
50A) 50B) 50C) 50D)	84196	(300 ohm ± 10% resistor) (300 ohm ± 10% resistor) (25 ohm ± 10% resistor) (275 ohm ± 10% resistor) in one unit
51	84198	110,000 ohm. ± 20% ½ watt carbon resistor
52	84199	16,000 ohm. ± 20% ½ watt carbon resistor
53	84200	.004 mfd. ± 5% molded mica condenser
54	84220	Antenna Coupling condenser (20 mmfd.)
	84229	Broadcast Pre-Selector Coil Assembly (consists of No. 84175 and 84178 coils)
55	84420	Tone Control Switch
56A) 56B)	84404	Phonograph Switch (D.P.D.T.) (R-125-X only)
57	84407	Phonograph terminal strip (R-125-X only)
58	84406	Power Transformer (100 to 240 volts) 25 to 133 cycles) (R-125-X only)

Form 4888 7-16-34 Printed in U. S. A.

STEWART-WARNER CORPORATION CHICAGO U. S. A.

ITEM	PART NO.	DESCRIPTION
59	84504	Diaphragm & Shell Assem.-for R-226 Speaker) for service
60	84505	Field Coil & Housing Assem-for R-226 Speaker) only

NAME: CIRCUIT DIAGRAM (R-125-A & X)

DATE ISSUED: 6-19-34

Stewart-Warner

R-125

R.M. Komm 6-27-34

MODELS 1251 to 1259
Chassis R-125 Series
Alignment Data

STEWART WARNER CORP.

RADIO SERVICE NOTES - MODEL R-125 CHASSIS (RECEIVER MODELS 1251 TO 1259)

NO. 3 - ALIGNMENT OF MODEL R-125 CHASSIS

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R-125 cannot be properly aligned by ear or "on the air." An output meter and a high grade modulated service oscillator are absolutely essential. The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C. and a short wave range extending to 4000 K.C. or more. This oscillator must provide a wide range of signal output -- very weak for proper alignment of the various bands so that the A.V.C. circuit will not be actuated and very strong for use when the receiver is badly out of adjustment or for shortwave alignment where harmonics are used.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

PRELIMINARY STEPS.

To align the R-125 chassis, proceed as follows:

1. Remove the chassis from the cabinet.

2. Connect the output metal across the primary of the output transformer on the dynamic speaker. (Center and blue terminals)

3. Turn the volume control to maximum volume position.

4. For all adjustments use an all-bakelite aligning tool which has only a small meter screwdriver tip.

5. At all times during alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that the output meter reads near the center of the scale.

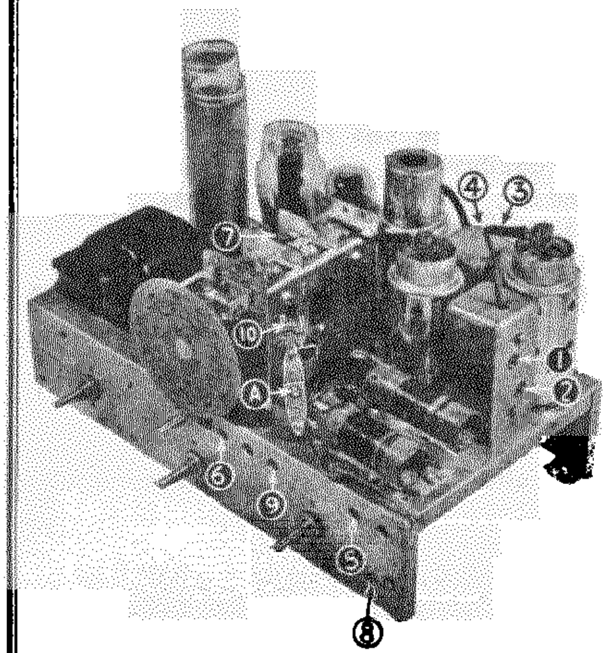
6. Refer to the diagram for the location of trimmer condensers.

VERY IMPORTANT: In aligning all but the I.F. stages it is absolutoly necessary to have a 400 to 500 ohm resistor in series with the antenna lead to the oscillator. Do not omit this resistor or the alignment will be incorrect!

I.F. ALIGNMENT

1. Set the test oscillator to exactly 456 K.C. Connect the output leads of oscillator from the 6A7 control grid to ground and set the range switch (right hand knob) to the broadcast position (clockwise). Carefully adjust the I.F. transformer trimmers No. 1,2,3, and 4 for maximum output meter deflection. Repeat the four adjustments since the adjustment of each trimmer has some effect on the others.

STEWART WARNER CORP. MODELS 1251 to 1259
Chassis R-125 Series
Trimmer Locations
Alignment Data, Part 2



LOCATION OF MODEL R-125

ALIGNING TRIMMERS

1)
2) 1st I.F. transformer trimmers

3)
4) 2nd I.F. transformer trimmers

5 Broadcast oscillator shunt trimmer
6 Broadcast detector shunt trimmer
7 Broadcast Pre-selector shunt trimmer
8 Broadcast oscillator padding trimmer
9 Short Wave oscillator shunt trimmer
10 Short Wave detector shunt trimmer

BROADCAST BAND ALIGNMENT

1. Check the position of the dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 530 K.C. Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. Whenever possible, use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided that it is properly calibrated. To calibrate the set turn its dial to the exact frequency setting of the signal (either a station or the oscillator) then carefully adjust trimmer No. 5 (broadcast oscillator shunt trimmer) until the signal is tuned in with maximum volume at its correct frequency setting.

4. Connect a 400 or 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. This resistor must remain connected for all broadcast and short wave adjustments in order to secure proper alignment of the antenna stage. Ground the receiver chassis and connect the oscillator ground load to the chassis.

5. Set the test oscillator to approximately 1400 K.C. and carefully tune the receiver to the signal. Adjust trimmer No. 6 (broadcast detector shunt trimmer) and trimmer No. 7 (broadcast pre-selector shunt trimmer) for maximum output meter reading. Retune the receiver and check the adjustments. Do not touch trimmer No. 5 since this will change the calibration.

6. Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal. Adjust trimmer No. 8 (broadcast oscillator padding

trimmer) to get maximum output meter deflection. Retune the receiver dial to a peak and readjust the trimmer. Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. This procedure must be followed or the receiver will not be properly aligned.

7. With a 1400 K.C. test oscillator signal, check alignment of trimmers No. 6 and 7.

SHORT WAVE BAND ALIGNMENT.

1. Turn the receiver range switch to the short wave band position (counter-clockwise).

2. Set the test oscillator to give a 16,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic of 8,000 K.C., the third harmonic of 5333 K.C., or the fourth harmonic of 4000 K.C., all of which will give a 16,000 K.C. signal.

3. To calibrate this point turn the receiver dial to 16 M.C. on the inner dial scale and adjust Trimmer No. 9 (shortwave oscillator shunt trimmer) to give maximum output. Generally two peaks will be found. Align on the peak secured with the trimmer screw farthest out. Then adjust trimmer No. 10 (shortwave detector shunt trimmer) to a peak. After this is done, try detuning No. 10 in either direction and retune the receiver dial. If this gives a higher output, continue detuning No. 10 and retuning the dial until the maximum output meter reading is reached. If this procedure results in a lower output, detune the trimmer in the opposite direction and retune the dial, etc.

IMPORTANT: The antenna coupling condenser marked "A" in the diagram is adjusted to a definite capacity at the factory and should not require any further adjustment. Therefore do not adjust trimmer "A" unless it is found that trimmer No. 10 will not peak or if maximum output is obtained with No. 10 either all the way out or all the way in. If it is necessary to adjust trimmer "A" turn its adjusting screw all the way in and then turn it out just far enough to give a satisfactory peak on No. 10 when trimmer No. 10's adjusting screw is almost all the way out.

Always readjust No. 10 after adjusting trimmer "A".

4. Tune the receiver to about 15.1 M.C. and check for the image signal which should be weaker than the 16.0 M.C. signal. If the image is as strong as the signal it shows that trimmer No. 10 is not properly adjusted. No signal at 15.1 M.C. but one at 16.9 M.C. shows that trimmer No. 9 is aligned on the image frequency and thus both No. 9 and 10 must be readjusted at the proper frequency.

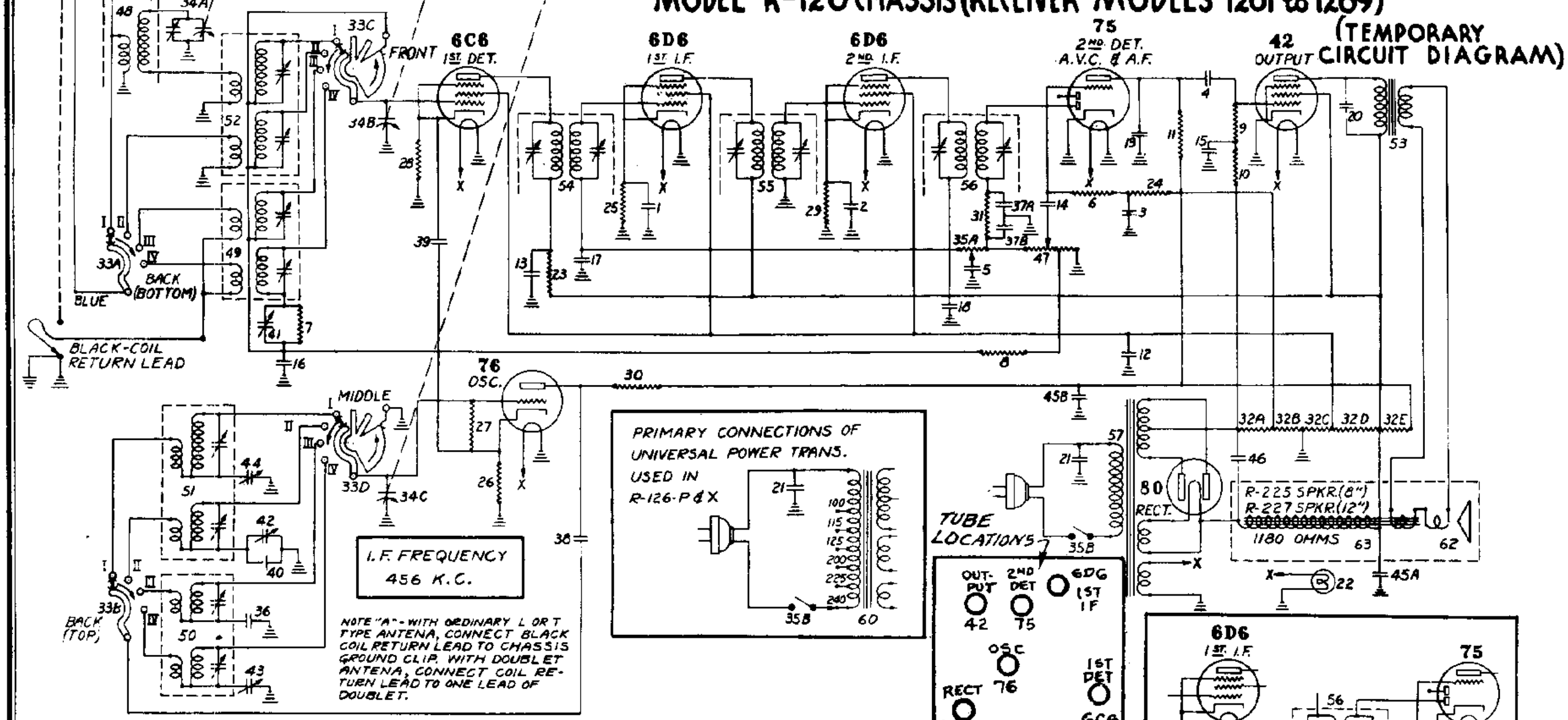
Note: After completing the alignment, all of the trimmers except the padding and I.F. trimmers should be locked in place with Ambroid or some similar type cement in order that they will not be jarred out of adjustment.

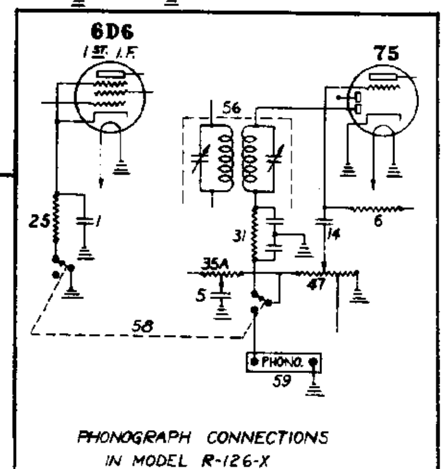
Schematic, Socket Changes, Parts List

STEWART WARNER CORP.

MODELS 1261 to 1269
Chassis R-126 Series
Chassis R-126-A, -P & -X

MODEL R-126 CHASSIS (RECEIVER MODELS 1261 to 1269) (TEMPORARY CIRCUIT DIAGRAM)





ITEM NO.	PART NO.	DESCRIPTION
1	#1630	.1 mfd. 100 volt paper condenser
2	#1630	.1 mfd. 100 volt paper condenser
3	#1630	.1 mfd. 100 volt paper condenser
4	#3007	.02 mfd. 600 volt paper condenser
5	#3011	.004 mfd. 600 volt paper condenser
6	#3072	510,000 ohm ±20%, ¼ watt carbon resistor
7	#3082	260,000 ohm ±20%, ¼ watt carbon resistor
8	#3082	260,000 ohm ±20%, ¼ watt carbon resistor
9	#3082	260,000 ohm ±20%, ¼ watt carbon resistor
10	#3082	260,000 ohm ±20%, ¼ watt carbon resistor
11	#3082	260,000 ohm ±20%, ¼ watt carbon resistor
12	#3214	.25 mfd. 250 volt paper condenser
13	#3219	.01 mfd. 600 volt paper condenser
14	#3219	.01 mfd. 600 volt paper condenser
15	#3352	.015 mfd. 600 volt paper condenser
16	#3353	.05 mfd. 100 volt paper condenser
17	#3353	.05 mfd. 100 volt paper condenser
18	#3440	.1 mfd. 400 volt paper condenser
19	#3539	.00026 mfd. molded mica condenser
20	#3706	.006 mfd. 600 volt paper condenser
21	#3976	.02 mfd. 1000 volt shielded paper cond.
22	#4058	Dial Light bulb (6 to 8 volt)
23	#4199	16,000 ohm ± 20%, ¼ watt carbon resistor
24	#4235	1.1 megohm ±20%, 1/4 watt carbon resistor
25	#4236	2,500 ohm, ±10%, 1/4 watt carbon resistor
26	#4237	510 ohm ± 20%, 1/4 watt carbon resistor
27	#4238	11,000 ohm ±20%, 1/4 watt carbon resistor
28	#4239	6,100 ohm ±20%, 1/4 watt carbon resistor
29	#4240	4,000 ohm ±10% 1/4 watt carbon resistor
30	#4241	31,000 ohm ±20%, 1/2 watt carbon resistor
31	#4242	31,000 ohm ±20%, 1/4 watt carbon resistor
32A, 32B, 32C, 32D, 32E	#4273	225 ohm ±10%, resistor; 20 ohm ±10%, resistor; 10,000 ohm ±10%, resistor; 13,500 ohm ±10%, resistor; 8000 ohm ± 10%, resistor — Tapped Voltage Divider
33A, 33B, 33C, 33D	#4274	Range Switch
34A, 34B, 34C	#4275	3 gang variable condenser
35A, 35B	#4279	300,000 ohm variable tone control; Line switch — In one unit.
36	#4280	.006 mfd. ± 10% molded Mica condenser
37A, 37B	#4281	Dual .00026 mfd. molded mica condenser
38	#4282	.001 mfd. ±10% molded mica condenser
39	#4282	.001 mfd. ±10% molded mica condenser
40	#4282	.001 mfd. ±10% molded mica condenser
41	#4283	Short wave padding trimmer condenser
42	#4283	Short wave padding trimmer condenser
43	#4283	Short wave padding trimmer condenser
44	#4284	Broadcast padding trimmer condenser
45A, 45B	#4286	8 mfd. 450 volt dry electrolytic cond.; 2 mfd. 400 volt dry electrolytic cond. — In one unit
46	#4288	14 mfd. 475 volt wet electrolytic condenser
47	#4289	500,000 ohm volume control (Tap at 125,000 ohms from ground)
48	#4290	Broadcast Antenna Coil
	#4295	Dual coil trimmer condenser (part of coil assembly)
49	#4298	Band #3 Antenna Coil and trimmer cond.; Band #4 Antenna Coil and trimmer cond. — In one unit. See #4295
50	#4302	Band #3 Oscillator Coil and trimmer; Band #4 Oscillator Coil and trimmer — In one unit. See #4295
51	#4305	Broadcast Oscillator Coil and trimmer; Band #2 Oscillator Coil and trimmer — In one unit. See #4295
52	#4306	Broadcast detector coil and trimmer; Band #2 Antenna Coil and trimmer — In one unit. See #4295
53	#4312	Output transformer (on R-225 & R-227 Speakers)
54	#4320	1st I.F. Transformer
55	#4321	2nd I.F. Transformer
56	#4322	3rd I.F. Transformer
57	#4324	Power transformer (115 volts 60 cycle) (R-126-A only) See #4410 for 100-240 volts Used in R-126 P & X
58	#4404	Phonograph toggle switch (R-126-X only)
59	#4407	Phonograph terminal strip (R-126X only)
60	#4410	Power transformer (100 to 240 volts, 25 to 133 cycles Used on R-126P & X only
61	#4412	Phonograph terminal strip (R-126P only)
62	#4504	Diaphragm shell assembly — For R-225 8 inch speaker — For service only
63	#4505	Field coil and housing — For R-225 8 inch speaker — For service only
62	#4506	Diaphragm shell assembly — For R-227 12 inch speaker — For service only
63	#4507	Field coil and housing — For R-227 12 inch speaker — For service only

CIRCUIT DIAGRAM (R-126-A, P & X)

6-30-34

Stewart-Warner

MODELS 1261 to 1269
Chassis 126 Series
Alignment Data

STEWART WARNER CORP.

RADIO SERVICE NOTES - MODEL R-126 CHASSIS (RECEIVER MODELS 1261 TO 1269)

NO. 3 - ALIGNMENT OF MODEL R-126 CHASSIS

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R-126 cannot be properly aligned by ear or "on the air". An output meter and a high grade modulated service oscillator are absolutely essential. The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C. and a short wave range extending to 4000 K.C. or more. This oscillator must provide a wide range of signal output -- very weak for proper alignment of the various bands so that the A.V.C. circuit will not be actuated and very strong for use when the receiver is badly out of adjustment or for short wave alignment where harmonics are used.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

PRELIMINARY STEPS

To align the R-126 chassis, proceed as follows:

1. Remove the chassis from the cabinet.

2. Connect the output meter across the primary of the output transformer on the dynamic speaker. (Center and blue terminals)

3. Turn the volume control to maximum volume position.

4. For all adjustments use an all-bakelite aligning tool which has only a small metal screw driver tip.

5. At all times during alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that output meter reads near the center of the scale.

6. Refer to the diagram for location of trimmer condensers.

VERY IMPORTANT: In aligning all but the I.F. stages it is absolutely necessary to have a 400 to 500 ohm resistor in series with the antenna lead to the oscillator. Do not omit this resistor or the alignment will be incorrect!

I.F. ALIGNMENT

1. Set the test oscillator to exactly 456 K.C. Connect the output leads of oscillator from the 6C6 control grid to ground and set the range switch (lower center knob) to the broadcast position (dial pointer on black dial scale). Carefully adjust the I.F. transformer trimmers No. 1,2,3,4,5 and 6 for maximum output meter deflection. Repeat the six adjustments since the adjustment of each trimmer has some effect on the others.

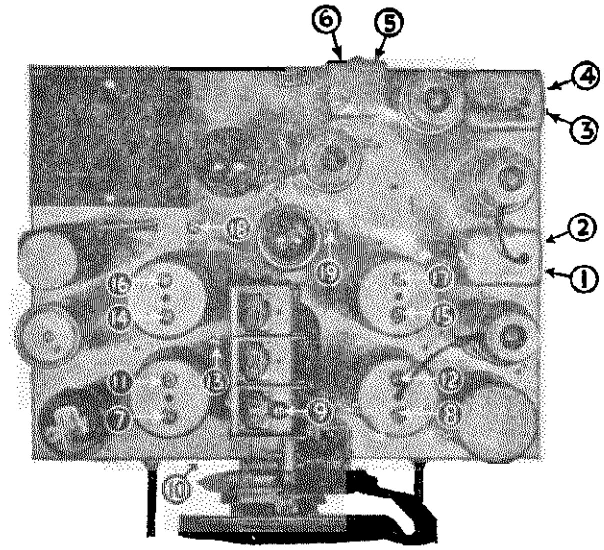
BROADCAST BAND ALIGNMENT

1. Check the position of the dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 530 K.C. Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.

STEWART WARNER CORP. MODELS 1261 to 1269
Chassis R-126 Series
Alignment Data, Part 2

LOCATIONS OF MODEL R-126

ALIGNING TRIMMERS



1), 2) 1st. I.F. transformer trimmers

3), 4) 2nd. I.F. transformer trimmers

5), 6) 3rd. I.F. transformer trimmers

7 Broadcast oscillator shunt trimmer
8 Broadcast detector shunt trimmer
9 Broadcast pre-selector shunt trimmer
10 Broadcast oscillator padding trimmer
11 1st. Shortwave Band oscillator shunt trimmer
12 1st. Shortwave Band detector shunt trimmer
13 1st. Shortwave Band oscillator padding trimmer
14 2nd. Shortwave Band oscillator shunt trimmer
15 2nd. Shortwave Band detector shunt trimmer
16 3rd. Shortwave Band oscillator shunt trimmer
17 3rd. Shortwave Band detector shunt trimmer
18 3rd. Shortwave Band oscillator padding trimmer
19 3rd. Shortwave Band detector padding trimmer

2. Turn the range switch (lower center knob) to the maximum counter-clockwise position, which is the broadcast setting.

3. Whenever possible, use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided that it is properly calibrated. To calibrate the set, turn its dial pointer to the exact frequency setting of the signal (either a station or the oscillator). Carefully adjust trimmer No. 7 (broadcast oscillator shunt trimmer) until the signal is tuned in with maximum volume at its correct frequency setting.

4. Connect a 400 or 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. <u>This resistor must remain connected for all broadcast and short wave adjustments in order to secure proper alignment of the antenna stage.</u> Ground the receiver chassis and connect the oscillator ground lead to the chassis.

5. With the test oscillator adjusted to approximately 1400 K.C. carefully tune the receiver to the signal. Adjust trimmer No. 8 (broadcast detector shunt trimmer) and No. 9 (broadcast pre-selector shunt trimmer) for maximum output meter reading. Retune the receiver and check the adjustments. Do not touch trimmer No. 7 since this will change the calibration.

6. Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal. Adjust the broadcast oscillator padding trimmer No. 10 to get maximum output meter deflection. Then retune the receiver dial to a peak and readjust the trimmer. Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. <u>This procedure must be followed or the receiver will not be properly aligned.</u>

7. With a 1400 K.C. test oscillator signal, check alignment of trimmers No. 8 and 9.

MODELS 1261 to 1269
Chassis R-126 Series
Alignment Data, Part 3

STEWART WARNER CORP.

FIRST SHORT WAVE BAND ALIGNMENT

1. Turn receiver range switch to the first short wave band position (dial pointer on red dial scale).

2. Adjust the oscillator to exactly 4000 K.C.

3. To calibrate this point set the receiver dial pointer to 4000 K.C. on the red dial scale and adjust trimmer No. 11 (first shortwave band oscillator shunt trimmer) to a peak. If there are two peaks, the proper one is the one with the trimmer screw farthest out. Then tune trimmer No. 12 (first short wave band detector shunt trimmer) to a peak. Try detuning No. 12 in either direction and retune the receiver dial. If this gives a higher output meter reading, continue detuning No. 12 and retuning the dial until the maximum output meter reading is reached. If this procedure results in a lower output detune the trimmer in the opposite direction, retune the receiver, etc.

4. To check the above adjustment, leave the test oscillator set at 4.0 M.C. and increase its output. Then tune in the image signal at about 3.1 M.C. on the receiver dial. This image signal should be weak compared to the correct signal at 4.0 M.C. If it is almost as strong as the 4.0 M.C. signal, it is a sign that trimmer No. 12 is not properly adjusted and it will be necessary to repeat the procedure for aligning this trimmer. If no signal can be heard at 3.1 M.C. even with greatly increased oscillator output, tune the set at 4.9 M.C. A signal heard at this point shows that trimmer No. 11 is aligned on the image frequency and so both No. 11 and 12 must be readjusted at the proper signal frequency.

5. Set the test oscillator to about 1750 K.C. and tune the receiver to the signal. Adjust trimmer No. 13 (first shortwave band oscillator padding trimmer) for maximum output. Then retune the receiver dial to a peak and again adjust the trimmer. Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased.

6. Check the alignment of trimmer 12 with a 4000 K.C. signal.

SECOND SHORT WAVE BAND ALIGNMENT

1. Turn the receiver range switch to the second short wave band position (dial pointer on green dial scale).

2. Adjust the test oscillator to exactly 12,000 K.C. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.

3. To calibrate, set the receiver dial pointer to 12 M.C. on the green dial scale and then adjust trimmer No. 14 (second shortwave band oscillator shunt trimmer) for maximum output. Generally two peaks will be found. Align on the one with the trimmer screw farthest out. Adjust trimmer No. 15 (second shortwave band detector trimmer) to a peak. After this is done, try to increase the output meter reading by detuning trimmer No. 15 and retuning the dial.

4. Tune the receiver to about 11.1 M.C. and check for reception of the image which should be weaker than the 12.0 M.C. signal. If the image is almost as strong as the correct signal, it shows that trimmer No. 15 has not been properly adjusted. If the signal cannot be heard at 11.1 M.C., but can be received at 12.9 M.C., then trimmer No. 14 is aligned on the image frequency and No. 14 and 15 must be realigned at the proper signal frequency.

THIRD SHORT WAVE BAND ALIGNMENT

1. Turn the receiver range switch to the third short wave band (pointer on purple dial scale).

2. Set the test oscillator to give a 20,000 K.C. signal. If your oscillator cannot reach this freqiency, use the 2nd harmonic of 10,000 K.C., the third harmonic of 6666 K.C., the fourth harmonic of 5000 K.C., or the fifth harmonic of 4000 K.C., all of which will give a 20,000 K.C. signal.

3. To calibrate this point, turn the receiver dial pointer to 20 M.C. on the purple dial scale and adjust trimmer No. 16 (third shortwave band oscillaton shunt trimmer) to give maximum output. If there are two peaks, align on the one with the trimmer screw farthest out. Then adjust trimmer No. 17 (third shortwave band detector shunt trimmer) to a peak. After this is done, try to increase the output meter reading by detuning No. 17 and retuning the receiver dial.

4. Tune the receiver to about 19.1 M.C. and check for the image signal which should be weaker than the 20.0 M.C. signal. If the image is almost as strong as the signal, it indicates that trimmer No. 17 has not been properly adjusted. No signal at 19.1 M.C. but one at 20.9 M.C. shows that trimmer No. 16 is aligned on the image frequency and thus both No. 16 and 17 must be readjusted.

5. Adjust test oscillator to 12,000 K.C., or use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12000 K.C. signal.

Calibrate this point by setting the dial pointer to 12.0 M.C. on the purple scale and adjusting trimmer No. 18 (third shortwave band oscillator padding trimmer) to give maximum output. Retune the dial and then adjust trimmer No. 19 (third shortwave band detector padding trimmer) to a peak. Retune the dial and readjust No. 19. Repeat this procedure of adjusting No. 19 and retuning the dial until it does not increase the output meter reading.

6. Check the reception of the image signal at 11.1 M.C. If the image is almost as strong as the 12 M.C. signal but was found to be satisfactory at 19.1 M.C. with a 20,000 K.C. signal, No. 18 or 19 are aligned on the wrong peak and should be readjusted.

7. Check adjustment of No. 17 with a 20,000 K.C. signal.

NOTE: To prevent the trimmers from being jarred out of adjustment, use Ambroid or some similar cement to fasten the trimmer screws in position after completing the alignment. This should be done to all adjusting screws except the padding and I.F. trimmers.

MODELS 1271 to 1279
Chassis 127 Series
Alignment Data, Part 1

STEWART WARNER CORP.

RADIO SERVICE NOTES - MODEL R-127 CHASSIS (RECEIVER MODELS 1271 TO 1279)

NO. 3 - ALIGNMENT OF MODEL R-127 CHASSIS

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R-127 cannot be properly aligned by ear or "on the air". An output meter and a high grade modulated service-oscillator are absolutely essential. The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C., and a short wave range extending to 4000 K.C. or more. This oscillator must provide a wide range of signal output -- very weak for proper alignment of the various bands so that the A.V.C. circuit will not be actuated and very strong for use when the receiver is badly out of adjustment or for shortwave alignment where harmonics are used.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

PRELIMINARY STEPS

To align the R-127 chassis proceed as follows:

1. Remove the chassis from the cabinet.

2. Connect the output meter across the primary of the output transformer on the dynamic speaker. (Center and blue terminals)

3. Turn the volume control to maximum volume position.

4. For all adjustments use an all-bakelite aligning tool which has only a small metal screw driver tip.

5. At all times during alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that output meter reads near the center of the scale.

6. Refer to the diagram for the location of the trimmer condensers.

VERY IMPORTANT: In aligning all but the I.F. stages it is absolutely necessary to have a 400 to 500 ohm resistor in series with the antenna lead to the oscillator. Do not omit this resistor or the alignment will be incorrect!

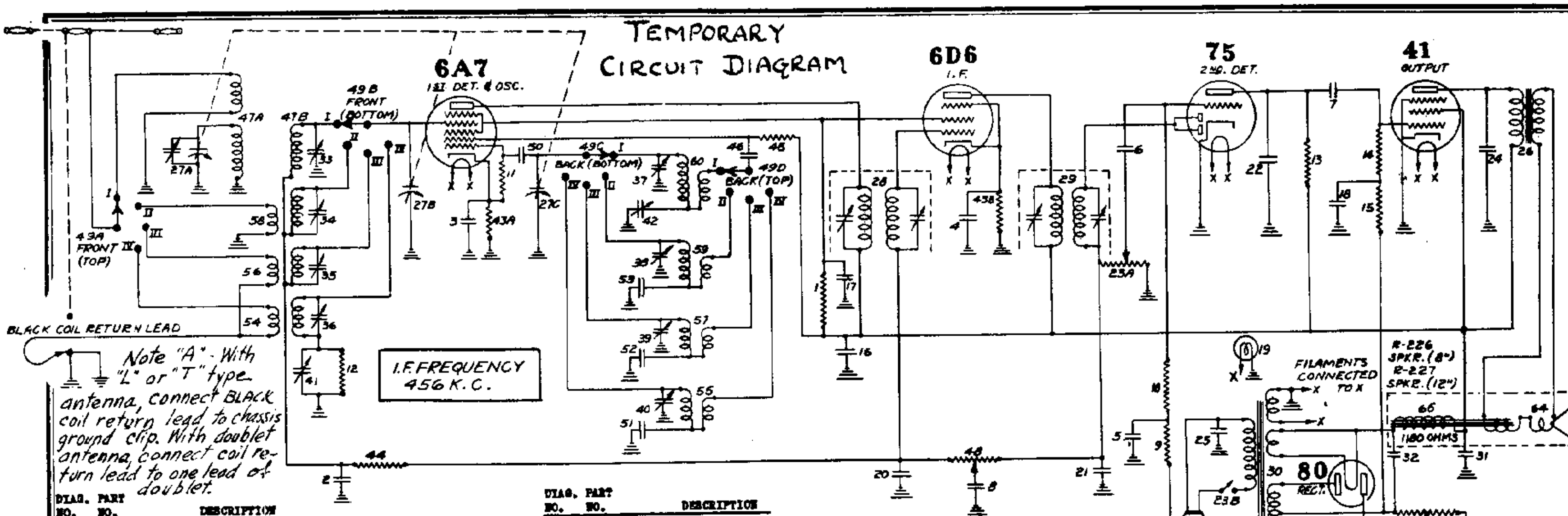
I.F. ALIGNMENT

1. Set the test oscillator to exactly 456 K.C. Connect the output leads of oscillator from the 6A7 control grid to ground and set the range switch (right hand knob) to the broadcast position (fully clockwise). Carefully adjust the I.F. transformer trimmers No. 1,2,3, and 4 for maximum output meter deflection. Repeat the four adjustments since the adjustment of each trimmer has some effect on the others.

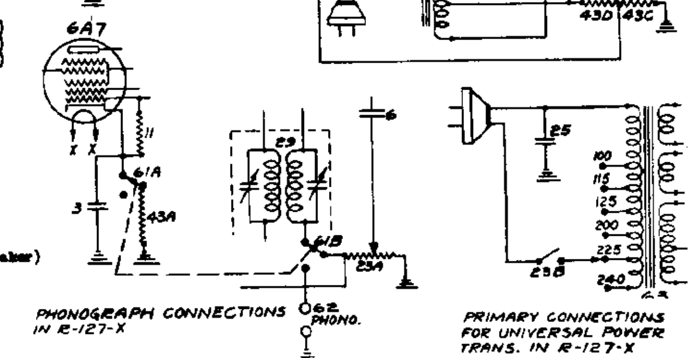
STEWART WARNER CORP.

MODELS 1271 to 1279
Chassis R-127 Series
Chassis R-127-X
Schematic, Socket
Circuit Changes
Parts List

TEMPORARY CIRCUIT DIAGRAM



Note "A" - With "L" or "T" type antenna, connect BLACK coil return lead to chassis ground clip. With doublet antenna, connect coil return lead to one lead of doublet.

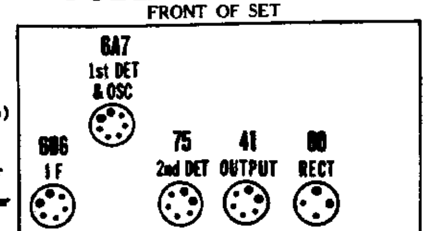


DIAG. NO.	PART NO.	DESCRIPTION
1	62188	50,000 ohm, 1 watt carbon resistor
2	81630	.1 mfd. 100 volt paper condenser
3	81630	.1 mfd. 100 volt paper condenser
4	81630	.1 mfd. 100 volt paper condenser
5	81630	.1 mfd. 100 volt paper condenser
6	83007	.02 mfd. 600 volt paper condenser
7	83007	.02 mfd. 600 volt paper condenser
8	83011	.004 mfd. 600 volt paper condenser
9	83072	510,000 ohm. 1/4 watt carbon resistor
10	83072	510,000 ohm. 1/4 watt carbon resistor
11	83080	51,000 ohm. 1/4 watt carbon resistor
12	83082	260,000 ohm 1/4 watt carbon resistor
13	83082	260,000 ohm 1/4 watt carbon resistor
14	83082	260,000 ohm 1/4 watt carbon resistor
15	83082	260,000 ohm 1/4 watt carbon resistor
16	83214	.25 mfd. 250 volt paper condenser
17	83214	.25 mfd. 250 volt paper condenser
18	83219	.01 mfd. 600 volt paper condenser
19	83276	6.3 volt dial light bulb
20	83383	.05 mfd. 100 volt paper condenser
21	83559	.00025 mfd. molded mica condenser
22	83559	.00025 mfd. molded mica condenser
23A, 23B	83561	500,000 ohm volume control / Line Switch (In one Unit)
24	83708	.005 mfd. 600 volt paper condenser
25	83976	.02 mfd. 1000 volt shielded paper condenser
26	84153	Output transformer (for R-226, 8 inch speaker) (see No. 84312 for 12" speaker)
27A, 27B, 27C	84174	3-gang variable condenser
28	84187	1st I.F transformer
29	84188	2nd I.F transformer
30	84189	Power transformer (110 volts 60 cycle) (R-127-A only) (see No. 84408 for Universal transformer)
31	84192	16 mfd. 350 volt wet electrolytic condenser
32	84193	16 mfd. 350 volt wet electrolytic condenser
33	84194	R.F. trimmer condenser (3 to 23 mmfd.)
34	84194	R.F. trimmer condenser (3 to 23 mmfd.)
35	84194	R.F. trimmer condenser (3 to 23 mmfd.)
36	84194	R.F. trimmer condenser (3 to 23 mmfd.)
37	84194	R.F. trimmer condenser (3 to 23 mmfd.)
38	84194	R.F. Trimmer condenser (3 to 23 mmfd.)
39	84194	R.F. trimmer condenser (3 to 23 mmfd.)
40	84194	R.F. trimmer condenser (3 to 23 mmfd.)
41	84195	Trimmer Condenser (300-600 mmfd.)
42	84195	Trimmer Condenser (300-600 mmfd.)
43A	84196	300 ohm resistor (In One Unit)
43B	84196	300 ohm resistor (In One Unit)
43C	84196	25 ohm resistor (In One Unit)
43D	84196	275 ohm resistor (In One Unit)
44	84198	110,000 ohm ½ watt carbon resistor
45	84199	16,000 ohm ½ watt carbon resistor
46	84200	.004 mfd. molded mica condenser
47A, 47B	84229	Broadcast Pre-Selector Coil Assembly
	84312	Output transformer (for R-227 12" speaker)
48	84368	500,000 ohm variable tone control
49A, 49B, 49C, 49D	84369	Range Switch
50	84370	.0001 mfd. molded mica condenser
51	84371	.0004 mfd. molded mica condenser
52	84372	.005 mfd. molded mica condenser
53	84373	.0015 mfd. molded mica condenser
54	84377	#4 band antenna coil
55	84380	#4 band oscillator coil
56	84381	#3 band antenna coil
57	84383	#3 band oscillator coil
58	84385	#2 band antenna coil
59	84387	#2 band oscillator coil
60	84389	Broadcast oscillator coil
61A, 61B	84406	Phonograph Switch (D.P. D.T.) (R-127-X only)
62	84407	Phonograph Terminal Strip (R-127-X only)
63	84408	Power Transformer (100 to 240 Volts, 25 to 133 Cycles) (R-127-X only)
64	84504	Diaphragm & Shell assembly (For R-226 - 8" speaker)
65	84505	Field Coil & Housing (For R-226 - 8" speaker)
64	84506	Diaphragm & Shell Assembly (For R-227 - 12" speaker)
65	84507	Field Coil and housing (For R-227 - 12" speaker)

MODEL R-127 CHASSIS (RECEIVER MODELS 1271 to 1279)

TUBE LOCATIONS

FRONT OF SET



MODELS 1271 to 1279
Chassis R-127 Series
Alignment Data, Part 2

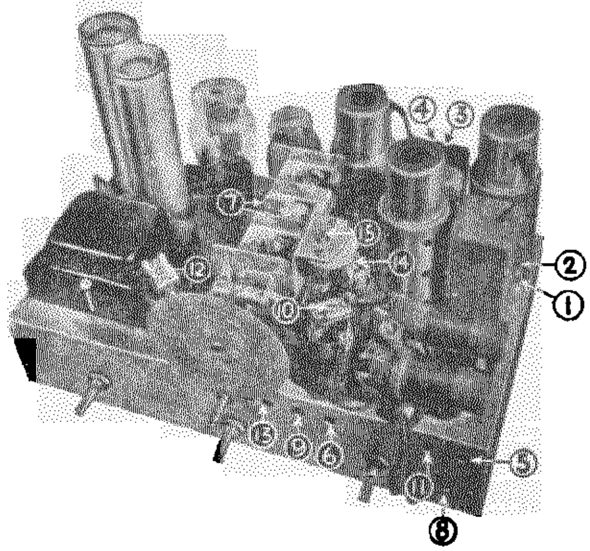
STEWART WARNER CORP.

LOCATION OF MODEL R-127
ALIGNING TRIMMERS

1), 2) 1st I.F. transformer trimmers

3), 4) 2nd I.F. transformer trimmers

5 Broadcast oscillator shunt trimmer
6 Broadcast detector shunt trimmer
7 Broadcast Pre-selector shunt trimmer
8 Broadcast oscillator padding trimmer
9 1st Short wave band oscillator shunt trimmer
10 1st Short wave band detector shunt trimmer
11 2nd Short wave band oscillator shunt trimmer
12 2nd Short wave band detector shunt trimmer
13 3rd Short wave band oscillator shunt trimmer
14 3rd Short wave band detector shunt trimmer
15 3rd Short wave band detector padding trimmer



BROADCAST BAND ALIGNMENT

1. Check the position of the dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 5.3 (530 K.C.). Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. Whenever possible, use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided it is accurately calibrated. To calibrate the set, turn its dial to the exact frequency setting of the signal (either a station or the oscillator). Then carefully adjust trimmer No. 5 (broadcast oscillator shunt trimmer) until the signal is tuned in with maximum volume at its correct frequency setting.

4. Connect a 400 or 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. This resistor must remain connected for all broadcast and short wave adjustments in order to secure proper alignment of the antenna stage. Ground the receiver chassis and connect the oscillator ground lead to the chassis.

5. With the test oscillator adjusted to approximately 1400 K.C., carefully tune the receiver to the signal. Adjust trimmer No. 6 (broadcast detector shunt trimmer) and No. 7 (broadcast pre-selector shunt trimmer) for maximum output meter reading. Retune the receiver and check the adjustments. Do not touch trimmer No. 5 since this will change the calibration.

STEWART WARNER CORP.

MODELS 1271 to 1279
Chassis R-127 Series
Alignment Data, Part 3

6. Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal. Adjust trimmer No. 8 (broadcast oscillator padding trimmer) to get maximum output meter deflection. Then retune the receiver dial to a peak and readjust the trimmer. Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. This procedure must be followed or the receiver will not be properly aligned.

7. With a 1400 K.C. test oscillator signal, check alignment of trimmers No. 6 and 7.

FIRST SHORT WAVE BAND ALIGNMENT

1. Turn receiver range switch to the first short wave band position, which is the third position of the right hand knob when turning it in a clockwise direction.

2. Adjust the oscillator to exactly 4000 K.C.

3. To calibrate this point set the receiver dial to 4.0 megacycles on the red dial scale and adjust trimmer No. 9 (first shortwave band oscillator shunt trimmer) to a peak. If there are two peaks, the proper one is the one with the trimmer screw farthest out. Then tune No. 10 (first shortwave band detector shunt trimmer) to a peak. Try detuning No. 10 in either direction and retune the receiver dial. If this gives a higher output meter reading, continue detuning No. 10 and retuning the dial until the maximum output meter reading is reached. If this procedure results in a lower output detune the trimmer in the opposite direction and retune the receiver to secure the maximum output.

4. To check the above adjustment, leave the test oscillator set at 4.0 M.C. and increase its output. Then tune in the image signal at about 3.1 M.C. on the receiver dial. This image signal should be weak compared to the correct signal at 4.0 M.C. If it is almost as strong as the 4.0 M.C. signal, it is a sign that trimmer No. 10 is not properly adjusted and it will be necessary to repeat the procedure for aligning this trimmer. If no signal can be heard at 3.1 M.C. even with greatly increased oscillator output, tune the set to 4.9 M.C. A signal heard at this point, shows that trimmer No. 9 is aligned on the image frequency and so both No. 9 and 10 must be readjusted at the proper signal frequency.

SECOND SHORT WAVE BAND ALIGNMENT

1. Turn the receiver range switch to the second short wave band position, which is the second position in a clockwise direction.

2. Adjust the test oscillator to exactly 12,000 K.C. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.

3. To calibrate this point turn the receiver dial to 12 M.C. on the green dial scale and then adjust trimmer No. 11 (second short wave band oscillator shunt trimmer). Generally, there will be two peaks, so align on the one with the trimmer screw farthest out. Adjust trimmer No. 12 (second shortwave detector shunt trimmer) to a peak. After this is done, try to increase the output meter deflection by detuning trimmer No. 12 and retuning the receiver dial. Continue detuning No. 12 and retuning the dial until the maximum output meter reading is reached.

MODELS 1271 to 1279
Chassis R-127 Series
Alignment Data, Part 4

STEWART WARNER CORP.

4. Tune the receiver to about 11.1 M.C. and check for reception of the image signal which should be weaker than the 12.0 M.C. signal. If the image is almost as strong as the 12 M.C. signal, it shows that No. 12 is not adjusted properly. If the signal cannot be heard at 11.1 M.C., but can be received at 12.9 M.C., then trimmer No. 11 is aligned on the image frequency and No. 11 and 12 must be realigned at the proper signal frequency.

THIRD SHORT WAVE BAND ALIGNMENT

1. Turn the receiver range switch to the third shortwave band position, which is the furthest counter-clockwise position.

2. Set the test oscillator to give a 20,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic of 10,000 K.C., the third harmonic of 6666 K.C., the fourth harmonic of 5000 K.C., or the fifth harmonic of 4000 K.C., all of which will give a 20,000 K.C. signal.

3. To calibrate this point turn the receiver dial to 20 M.C. on the purple dial scale and adjust Trimmer No. 13 (third shortwave band oscillator shunt trimmer) to give maximum output. Generally there will be two peaks, so align on the one with the trimmer screw farthest out. Then adjust trimmer No. 14 (third short wave band detector shunt trimmer) to a peak. After this is done, try to increase the output meter deflection by detuning No. 14 and retuning the receiver dial. Continue detuning No. 14 and retuning the dial until the maximum output meter reading is reached.

4. Tune the receiver to about 19.1 M.C. and check for the image signal which should be weaker than the 20.0 M.C. Signal. If the image is almost as strong as the 20 M.C. signal, it shows that No. 14 is not adjusted correctly. No signal at 19.1 M.C. but one at 20.9 M.C. shows that trimmer No. 13 is aligned on the image frequency and thus both No. 13 and 14 must be readjusted.

5. Adjust test oscillator to 12,000 K.C., or use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal. Carefully tune the dial to the signal at about 12 M.C. on the purple dial scale. Adjust trimmer No. 15 (third shortwave band detector padding trimmer) for maximum output meter reading and then retune the dial. Repeat this procedure of adjusting the trimmer and retuning the dial until it does not increase the output meter reading.

6. Check reception of the image signal at 11.1 M.C. If the image is almost as strong as the 12 M.C. signal, but was found to be satisfactory at 19.1 M.C. with a 20,000 K.C. signal, No. 15 should be readjusted.

7. Check the adjustment of No. 14 with a 20,000 K.C. signal.

NOTE: To prevent the trimmers from being jarred out of adjustment use Ambroid or some similar cement to fasten the trimmer screws in position after completing the alignment. This should be done to all trimmers except the padding and I.F. trimmers.

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 60
Specifications
Schematic

Stromberg-Carlson No. 60 Type Radio Receivers

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	540—1570 k. c. and 5.5 to 15.5 mc.
Type and Number of Tubes	1 No. 6D6, 1 No. 6A7, 1 No. 6B7, 1 No. 37, 2 No. 41, 1 No. 80
Voltage Rating	105-125 volts
Frequency Rating	50-60 Cycles
Power Consumption Rating	80 Watts

CIRCUIT DESCRIPTION

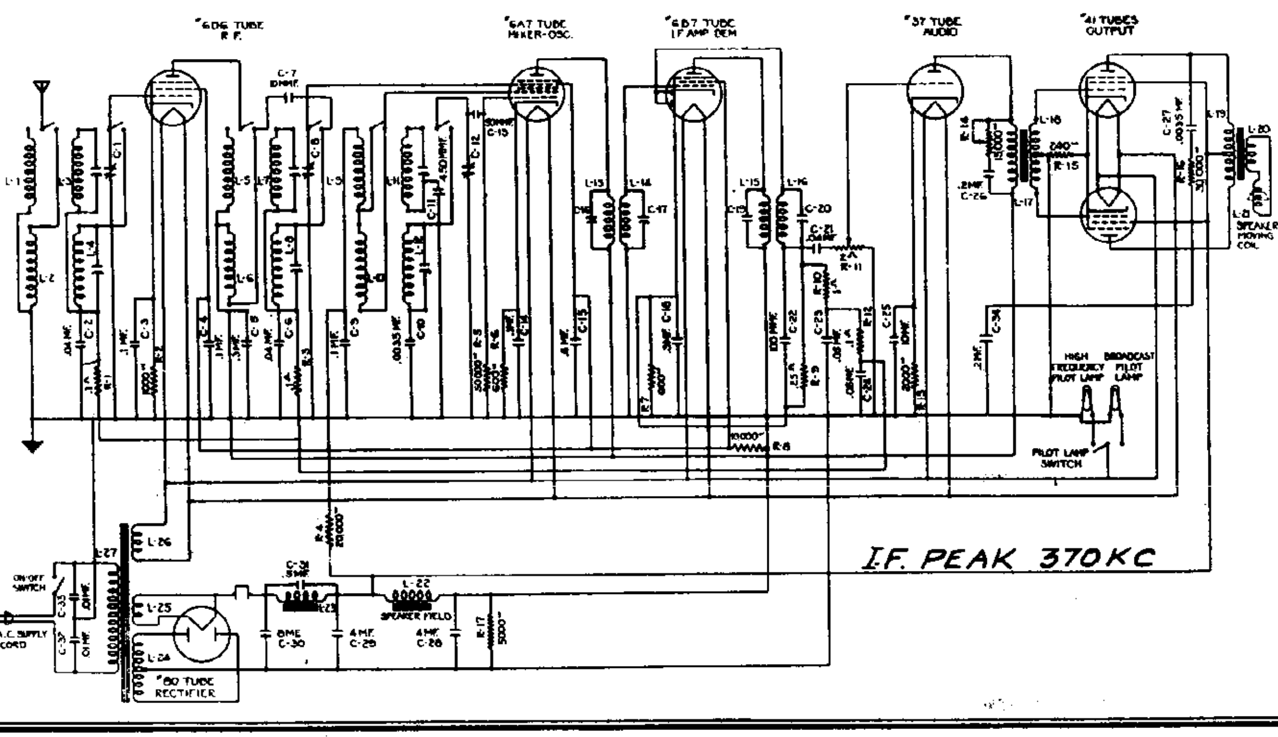
These receivers are seven tube A. C. operated Superheterodynes with two tuning ranges; standard broadcast and short-wave broadcast. See P-24418 Instructions for Installation and Operation to details of controls, installation and operating procedure.

The No. 6D6 tube is used as the R. F. amplifier. The No. 6A7 tube is used for the oscillator-mixer. The No. 6B7 tube serves as the I. F. amplifier, A. V. C., and demodulator. The No. 37 tube is the first audio amplifier and the two No. 41 tubes function as the power output stage. The No. 80 is the rectifier in the power supply circuit.

NORMAL VOLTAGE READINGS

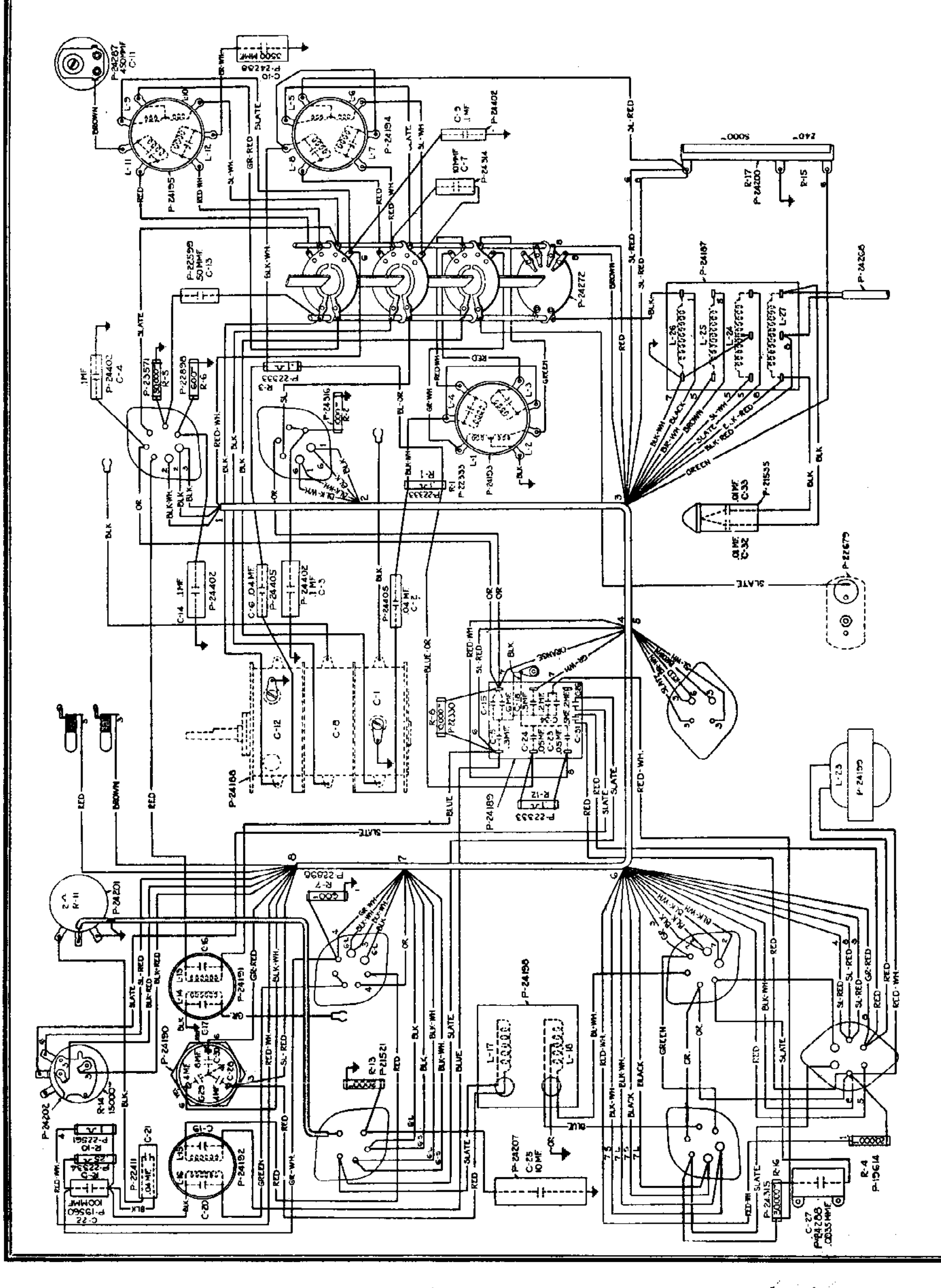
These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes and speaker plug in place. The set is therefore in operation when the measurements are made. Fig. 2 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket. Tune Receiver to 1500 k. c.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. The Volume Control should be set all "On" (clockwise) before measuring voltages. See page 2.



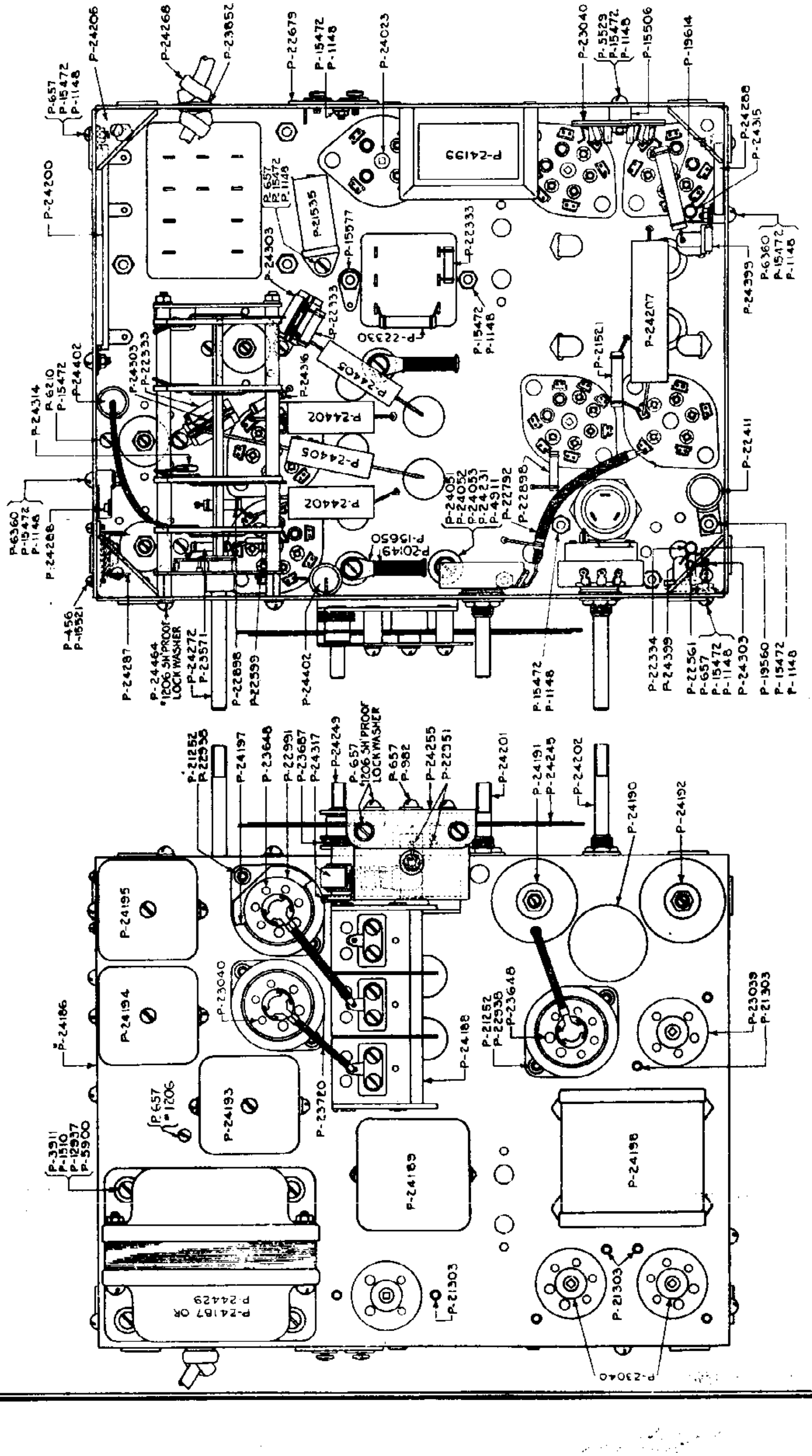
MODEL 60
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.



STROMBERG-CARLSON TEL. MFG. CO.

MODEL 60
Chassis Views



MODEL 60
Socket Layout
Voltage
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

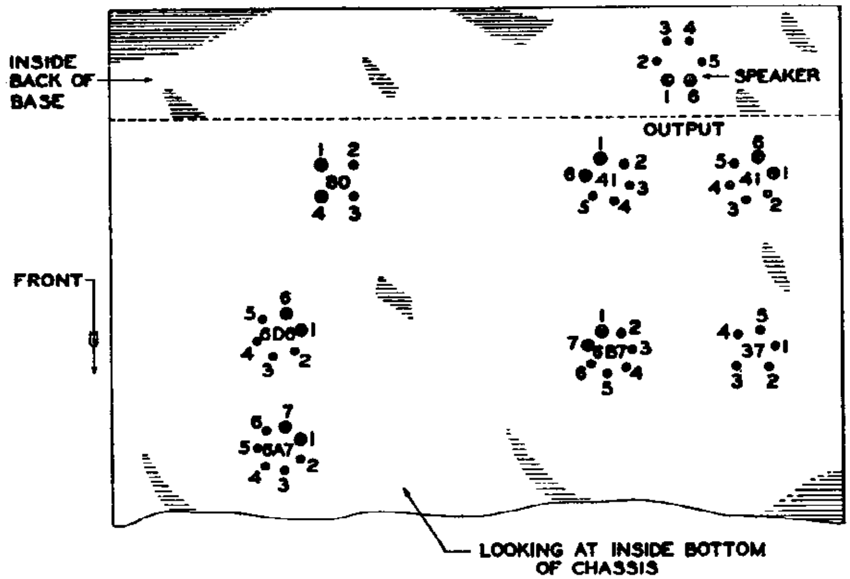


Fig. 2. Terminal Layout for Voltage Measurement Chart.

Tube	*Circuit*	*Cap.*	*Terminals of Sockets* 1	2	3	4	5	6	7	*Heater Voltages Between Terminal Nos.*
6D6	R. F. Amp.	G 0	H 0	P 145	S 85	Sup. 5.5	K 5.5	H 0	—	1–6—*6.5* volts
6A7	Mixer-Osc.	Mix. G 0	H 0	Mix. P 145	S 85	Osc. P. 175	Osc. G —20	K 5.5	H 0	1–7—*6.5* volts
6B7	I. F., Dem.	G 0	H 0	P 145	S 85	D 0	D 0	K 3	H 0	1–7—*6.5* volts
37	1st Audio	—	H 0	P 140	G 0	K 8	H 0	—	—	1–5—*6.5* volts
41's	Output	—	H 0	P 250	S 250	G 0	K 16	H 0	—	1–6—*6.5* volts
80	Rectifier	—	F 270	P *298*	P *298*	F 270	—	—	—	1–4—*4.9* volts
Speaker Socket			245	145	270	270	250	245		

A. C. voltages are indicated by italics

REPLACEMENT PARTS

Piece Number		List Prices
P-24187	Power Transformer, 105-125 volts, 50-60 cycles	$ 6.35
P-24429	Power Transformer, 210-250 volts, 50-60 cycles	10.00
P-24245	Dial Assembly	1.00
P-24249	Drive Assembly	.15
P-23687	Washer	.01
P-24255	Escutcheon Assembly	1.20
P-24189	By-Pass Capacitor Assembly	3.55
P-24191	Transformer Assembly, 1st I. F.	2.15
P-24192	Transformer Assembly, 2nd I. F.	2.15
P-22679	Ant. and Ground Binding Post Assembly	.15
P-24268	Power Cord	.75
P-22991	Tube Shield Base	.05
P-24197	Tube Shield	.17
P-24023	Tube Socket, 4 Pin	.17
P-23039	Tube Socket, 5 Pin	.17
P-23040	Tube Socket, 6 pin	.17
P-23648	Tube Socket, 7 pin	.17
P-24198	Audio Transformer Assembly	3.70
P-24199	Choke Coil Assembly	1.80
P-24200	Voltage Divider Resistor	.60

Piece Number		List Prices
P-24201	Volume Control Potentiometer	.85
P-24202	Treble Control and On-Off Switch	1.15
P-24317	Pilot Lamp Socket	.15
P-24272	Range Switch Assembly	4.15
P-21535	Capacitor Assembly, 2—.01 Mfd.	.80
P-22411	Capacitor Assembly, .04 Mfd.	.80
P-24402	Capacitor, .1 Mfd.	.45
P-24405	Capacitor, .04 Mfd.	.45
P-24190	Electrolytic Capacitor, 8 Mfd., 4 Mfd., 4 Mfd.	3.40
P-24207	Electrolytic Capacitor, 10 Mfd.	.80
P-22898	Resistor, 600 Ohms, Type D	.37
P-24316	Resistor, 1,000 Ohms, Type D	.37
P-23571	Resistor, 50,000 Ohms, Type D	.37
P-22333	Resistor, .1 Megohm, Type D	.37
P-22334	Resistor, .25 Megohm, Type D	.37
P-22561	Resistor, 1 Megohm, Type D	.37
P-21521	Resistor, 2,000 Ohms, Type C	.37
P-22330	Resistor, 10,000 Ohms, Type C	.37
P-24315	Resistor, 30,000 Ohms, Type C	4.75
P-19614	Resistor, 20,000 Ohms, Type B	.55
P-24288	Moulded Capacitor, 3,500 MMFD	4.75
P-24416	Knob (Large)	.30
P-24417	Knob (Small)	.20

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 68
Specifications
List of Parts

Engineering Data
Stromberg-Carlson No. 68 All-Wave Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	A—520 to 1500 kc.; B—1400 to 4200 kc.; C—3.7 to 10.5 mc.; D—8.9 to 25 mc.
Type and Number of Tubes	2 No. 6D6, 1 No. 6A7, 1 No. 6B7, 1 No. 5Z3, 3 No. 42, 1 No. 76, 1 No. 85
Voltage Rating	105-125 Volts
Frequency Rating	50-60 Cycles
Power Consumption Rating (Maximum line voltage)	160 Watts
Intermediate Frequency	370 kc.

CIRCUIT DESCRIPTION

This receiver is a ten tube A. C. operated all-wave superheterodyne having four tuning ranges. See P-24689, Installation and Operating Instructions, for installation and operating procedure.

One No. 6D6 tube is used as an R. F. amplifier, the No. 6A7 tube is used as a modulator, and the No. 76 acts as the oscillator in the Tuner Unit. In the Amplifier Chassis the other No. 6D6 acts as the I. F. amplifier. The No. 6B7 is in the A. V. C. circuit, while the No. 85 acts as demodulator and first audio amplifier. One No. 42 operates as a second or driver audio stage and the other two constitute the power output stage. The No. 5Z3 is the rectifier in the power supply.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes in place. The Receiver is therefore in operation when the measurements are made. Fig. 1 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 119 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. See page 2.

REPLACEMENT PARTS

Piece Number	Description of Part	Required Per Receiver	List Price Each
24685	Capacitor Assembly (25 to 60 cycle)	1	$15.00
24558	Capacitor Assembly (50 to 60 cycle)	1	10.00
24676	Capacitor Assembly (By-Pass)	1	5.00
23970	Capacitor Assembly	1	1.60
23965	Transformer Assembly (Audio)	1	4.55
24687	Power Transformer (25 to 60 cycle)	1	15.00
24422	Power Transformer (50 to 60 cycle)	1	10.00
24424	Transformer Assembly (IF)	1	4.00
24425	Transformer Assembly (IF)	1	4.00
24426	Transformer Assembly (IF)	1	4.00
24677	Transformer Assembly (IF)	1	4.00
23959	Choke Assembly	1	2.50
24025	Transformer Assembly (Audio)	1	2.40
23967	Transformer Assembly (Audio Output)	1	2.20
23649	Tube Socket (8 Prong)	2	.17
23648	Tube Socket (7 Prong)	2	.17
23040	Tube Socket (6 Prong)	7	.17
23039	Tube Socket (5 Prong)	1	.17
23038	Tube Socket (4 Prong)	1	.17
21984	Fuse Block	1	.20
23150	Fuse 2- Ampere	1	.12
24574	Condenser (Illini) .0095 M. F.	1	1.00
21334	Condenser (Illini) .001 M. F.	1	.60
22411	Capacitor Assembly .04 M. F.	1	.80
21535	Capacitor Assembly .01 M. F.	1	.80
23619	Coil Assembly .9 M. H.	3	.60
17350	Switch (Base Control)	1	.75
24268	Cord (Power)	1	.75
19259	Cord (Power receptacle to tuner)	1	1.30
24674	Cable (Output)	1	1.75
22329	Resistor 6,500 Ohm	1	.37
18704	Resistor 15,000 Ohm	1	.37
22834	Resistor .25 Meg.	1	.37
23571	Resistor 50,000 Ohm	1	.37
24073	Resistor 25,000 Ohm	1	.37
22333	Resistor—Type D, .1 Meg.	5	.37
22335	Resistor—Type D, .5 Meg.	1	.37
24316	Resistor—Type D, .1000 Ohm	1	.37
22871	Resistor—Type D, 2 Meg.	1	$ .37
18696	Resistor—Type B, 1,000 Ohm	1	.55
19614	Resistor—Type B, 2,000 Ohm	1	.55
22328	Resistor—Type C, 4,000 Ohm	1	.37
21521	Resistor—Type C, 2,000 Ohm	2	.37
22830	Resistor—Type C, 10,000 Ohm	1	.37
23568	Resistor—Type D, 450 Ohm	1	.37
23844	Resistor—Type D, 300 Ohm	3	.37
23966	Resistor—Voltage Divider	1	1.85
24340	Switch (Range)	1	7.00
24561	Capacitor 5 MMF	2	.20
24402	Capacitor .1 M. F.	4	.45
24668	Coil Assembly .115 M. H.	1	.60
24460	Capacitor .0025 M. F.	1	3.75
24579	Cable (Output)	1	4.00
24465	Binding Post (Antenna and Ground)	1	.40
24423	Coil Assembly 1.5 M. H.	1	1.15
24575	Capacitor .015 M. F.	1	1.25
24402	Capacitor .1 M. F.	4	.45
24166	Capacitor 25 MMF	1	.25
24560	Capacitor 50 MMF	1	.25
24352	Capacitor (IF Tuning Condenser)	1	.40
24580	Capacitor (Electrolytic)	1	1.40
24346	Potentiometer (Volume Control)	1	1.40
22593	Potentiometer (Tone Control)	1	1.85
24358	Bracket Assembly	1	.20
24362	Dial Disc. Assembly	1	.40
24366	Dial Plate	1	.45
24290	Bearing	1	.03
24372	Shaft Assembly	1	.25
24371	Dial	1	.75
24375	Dial Thrust Bearing	1	.04
24376	Tuning Meter	1	2.75
24317	Pilot Lamp Sockets	7	.15
24505	Front Dial Lens (Glass)	1	.25
24380	Dial Lens Clips	4	.02
24388	Dial Pointer	1	.05
24773	Loud Speaker	1	13.50

MODEL 68
Schematic
Voltage

STROMBERG-CARLSON TEL. MFG. CO.

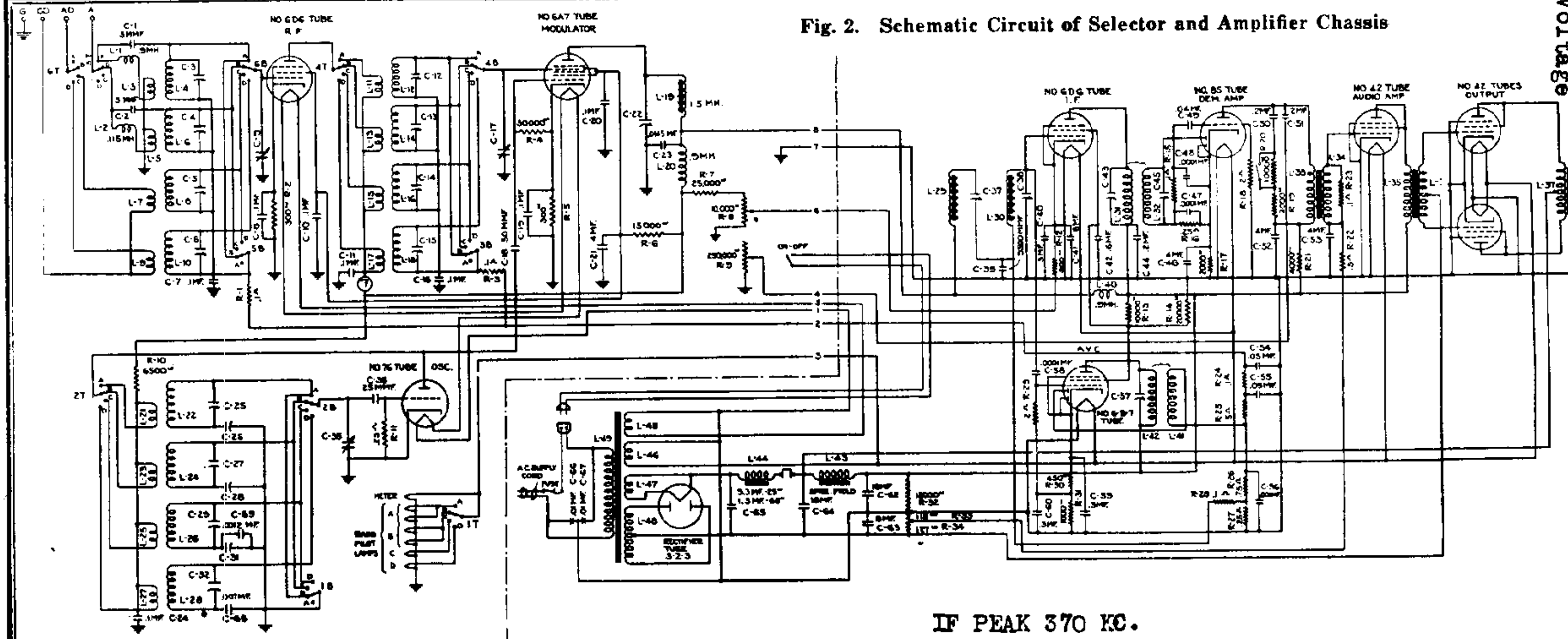


Fig. 2. Schematic Circuit of Selector and Amplifier Chassis

IF PEAK 370 KC.

Terminals of Sockets; Heater Voltages Between Terminal Nos. at 119 volts

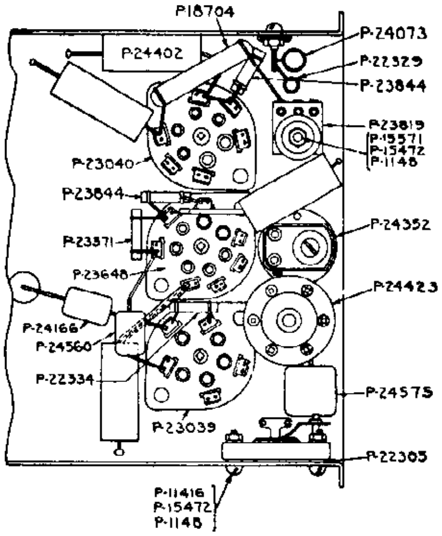
Tube		2	3	4	5	6	7	8	Heater Terminals	Heater Volts
6D6	RF	+175	+89	+2.39	+2.38		---	---	1-6	6.4*
6A7	Mod.	+180	+89	+89	-8.6	+2.0	---	---	1-7	6.4*
76	Osc.	+152	-25	0		---	---	---	1-5	6.4*
6D6	IF	+181	+100	+2.6	+2.6		---	---	1-6	6.3*
6B7	AVC	+181	+100	0	+8.65	+8.65	---	---	1-7	6.3*
85	1 AF	+150	+0.1	+10	+10		---	---	1-6	6.35*
42	2 AF	+170	+170	-.22	0		---	---	1-6	6.3*
42	Output	+378	+378	-37	0		---	---	1-6	6.3*
5Z3	Rect.	484	484		---	---	---	---	1-4	4.8*
Speaker Socket		+181	+382	+382	+382	---	---	---		
Connector Socket		0	6.3*	0	19.2*	0	0	+180		

*=A-C voltages

Set tuned to 1000 kc., "A" band. Volume Control on full

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 68
Socket Layout
Chassis Views



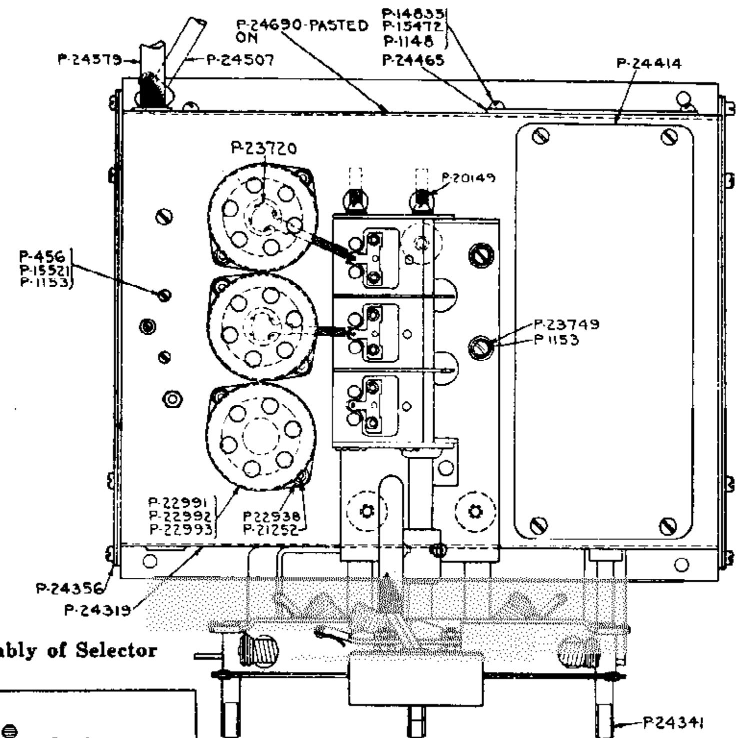


Fig. 5. Chassis Assembly of Selector

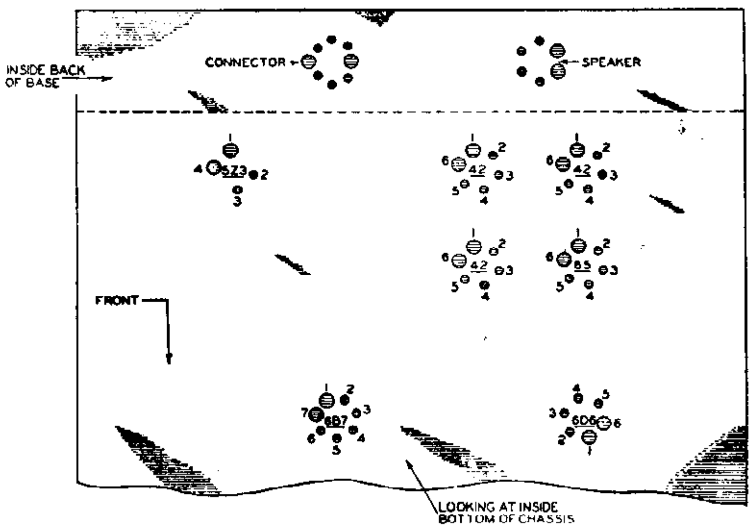
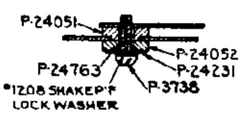
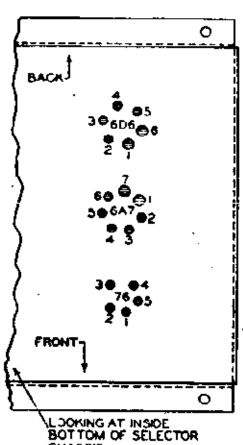
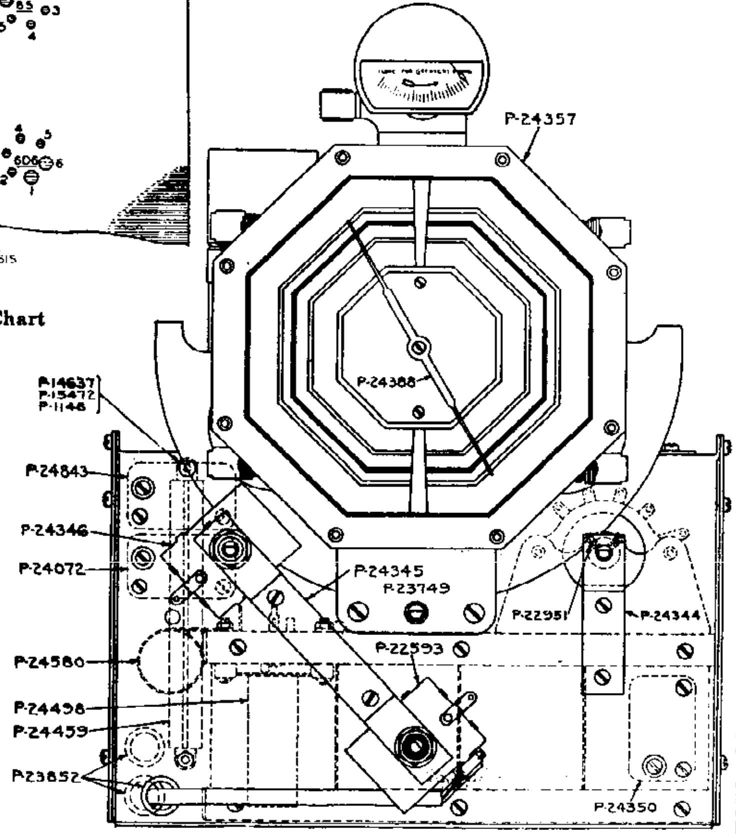


Fig. 1. Terminal Layout for Voltage Measurement Chart



SEC. A-A





MODEL 68
Chassis Wiring of Selector

STROMBERG-CARLSON TEL. MFG. CO.

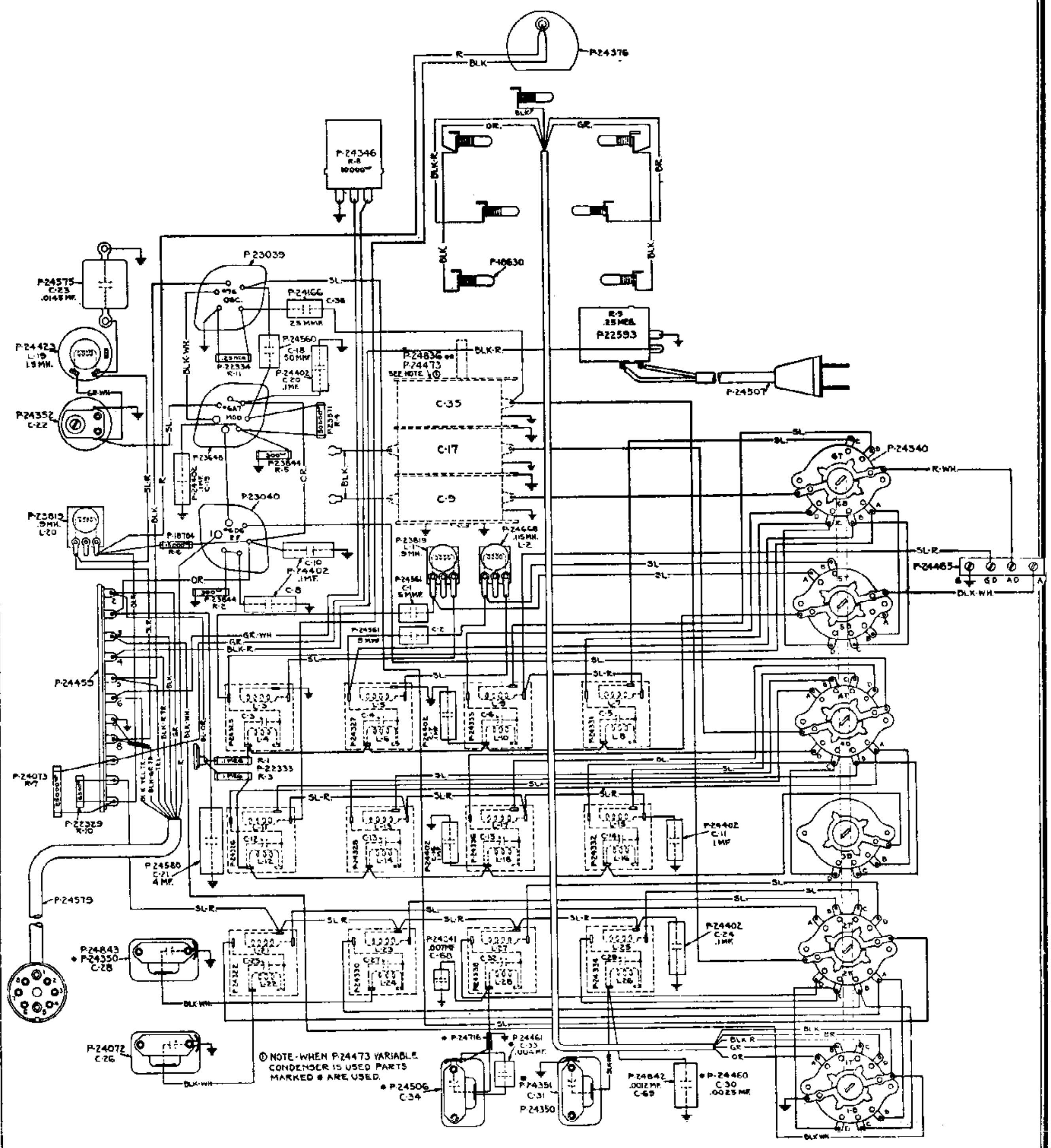


Fig. 3. Wiring Diagram of Selector

MODEL 68
Chassis Wiring of Amplifier

STROMBERG-CARLSON TEL. MFG. CO.

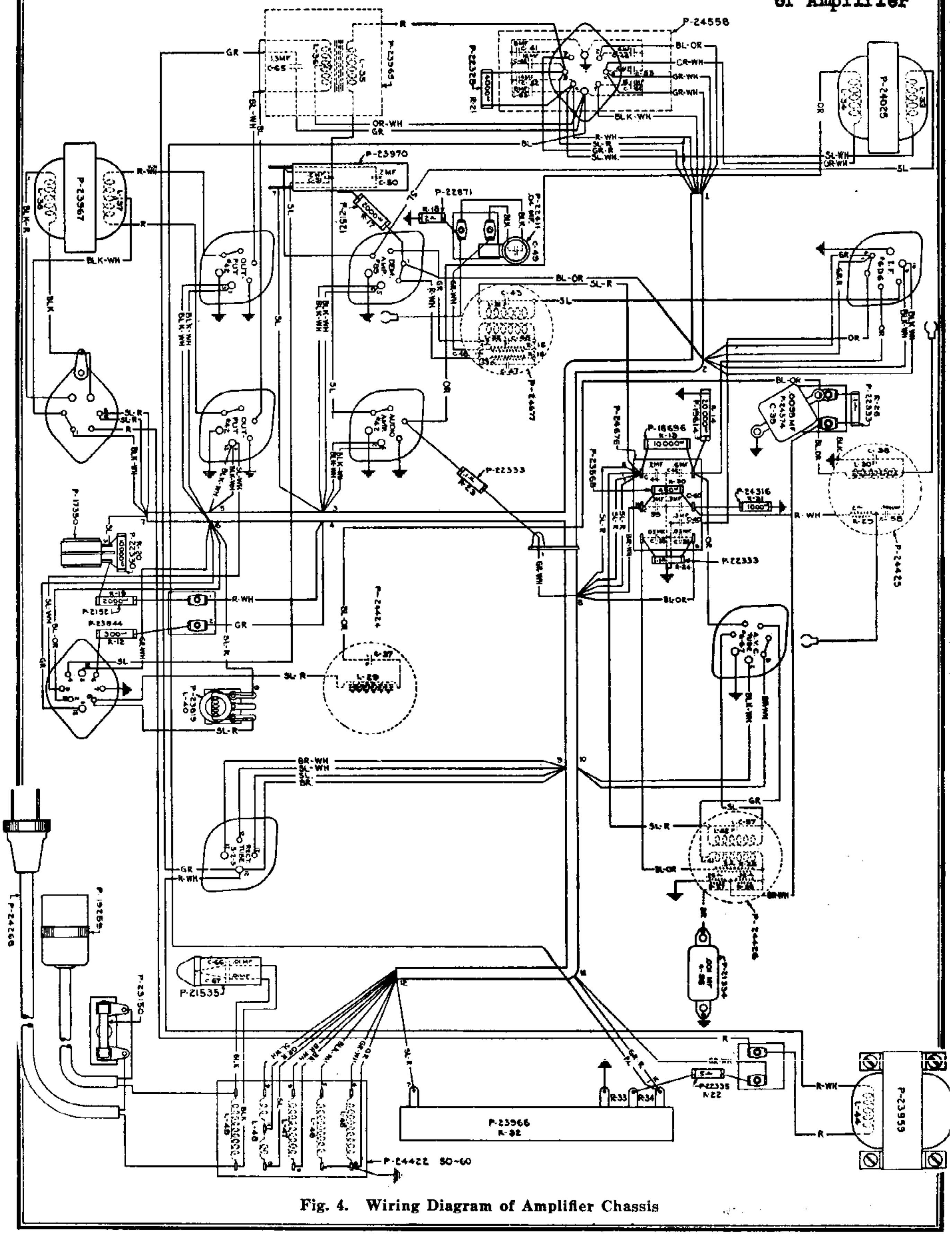


Fig. 4. Wiring Diagram of Amplifier Chassis

MODEL 68
Amplifier
Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

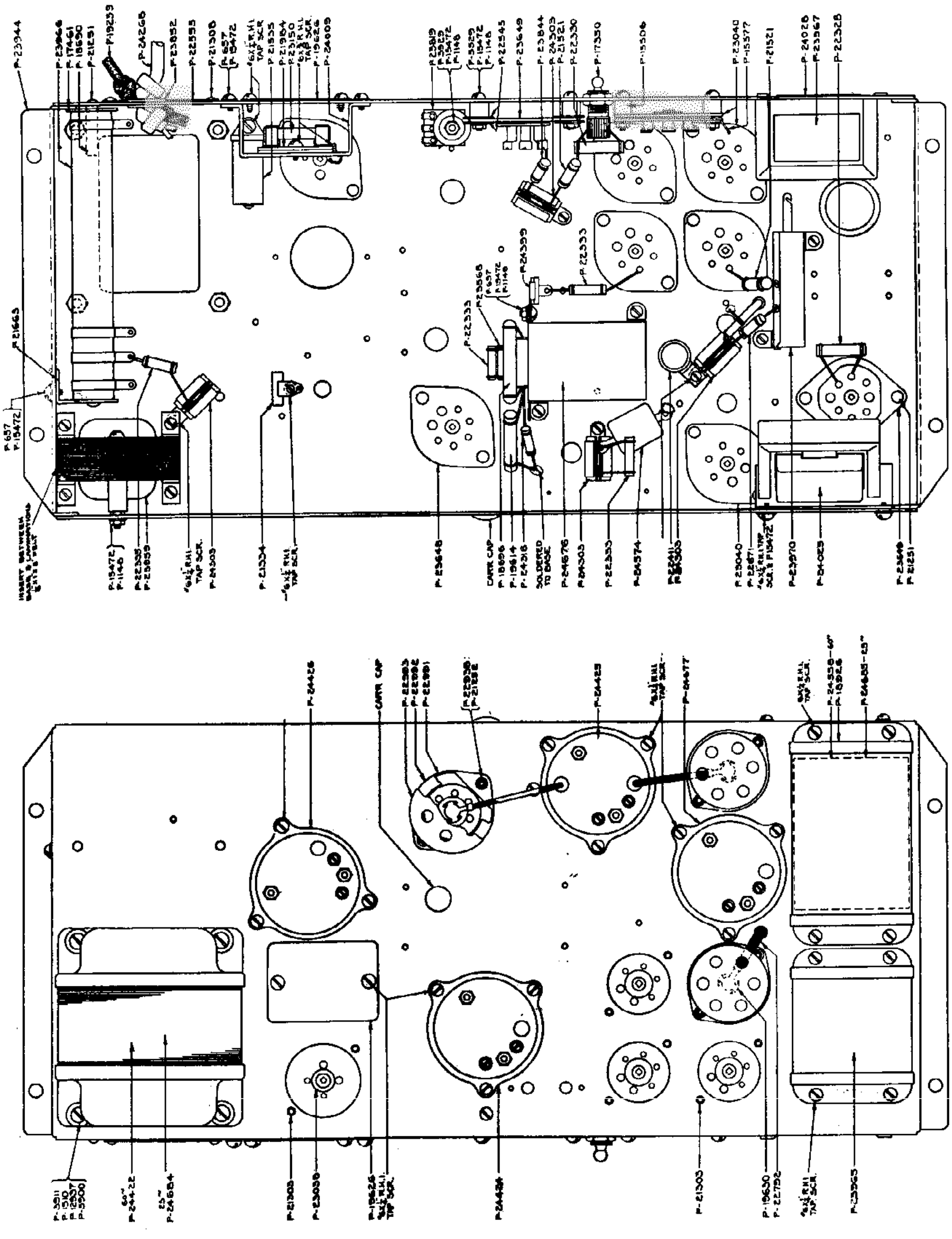


Fig. 6. Chassis Assembly of Amplifier

STROMBERG-CARLSON TEL. MFG. CO.

Stromberg-Carlson No. 69 All-Wave Selector

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne Frequency Changer
Tuning Ranges (in Selector)	B—1430 to 4200 kc.; C—3.7 to 10.5 mc.; D—9 to 25 mc.
Type and Number of Tubes	1 No. 6D6 1 No. 6A7, 1 No. 76, 1 No. 84
Voltage Rating	105-125 Volts
Frequency Rating	50-60 Cycles
Power Consumption Rating	28 Watts
Frequency of Signal Output to Receiver	545 Kc.

CIRCUIT DESCRIPTION

The No. 69 All-Wave Selector contains the frequency changer circuits of a superheterodyne system which connected to the input (Ant. and Gnd. connections) of a good standard broadcast receiver gives an extension of the tuning range from 1500 kilocycles to 25 megacycles. Thus all frequencies between 550 kilocycles and 25 megacycles can be readily tuned. See P-24692 Installation and Operating Instructions for details of controls, installation and operating procedures.

The No. 6D6 tube is used as the R. F. Amplifier. The No. 6A7 tube is used as the Modulator. The No. 76 tube is used as the Oscillator. The No. 84 tube is the Rectifier in the self-contained power supply.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes in place. The Selector is therefore in operation when the measurements are made. Fig. 2 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. See page 2.

IF PEAK 545 KC.

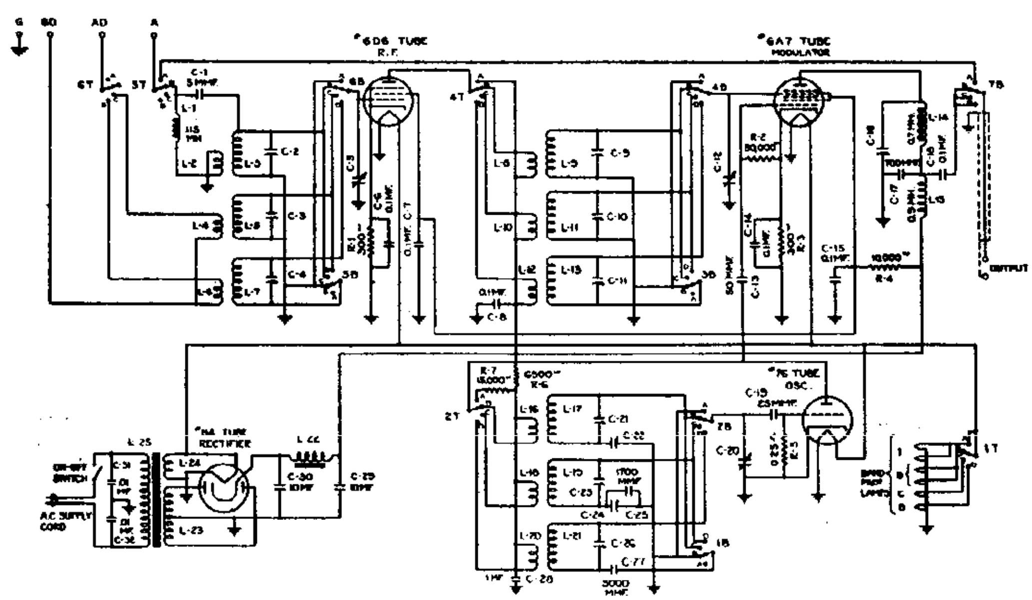


Fig. 1. Schematic Circuit

MODEL 69

Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

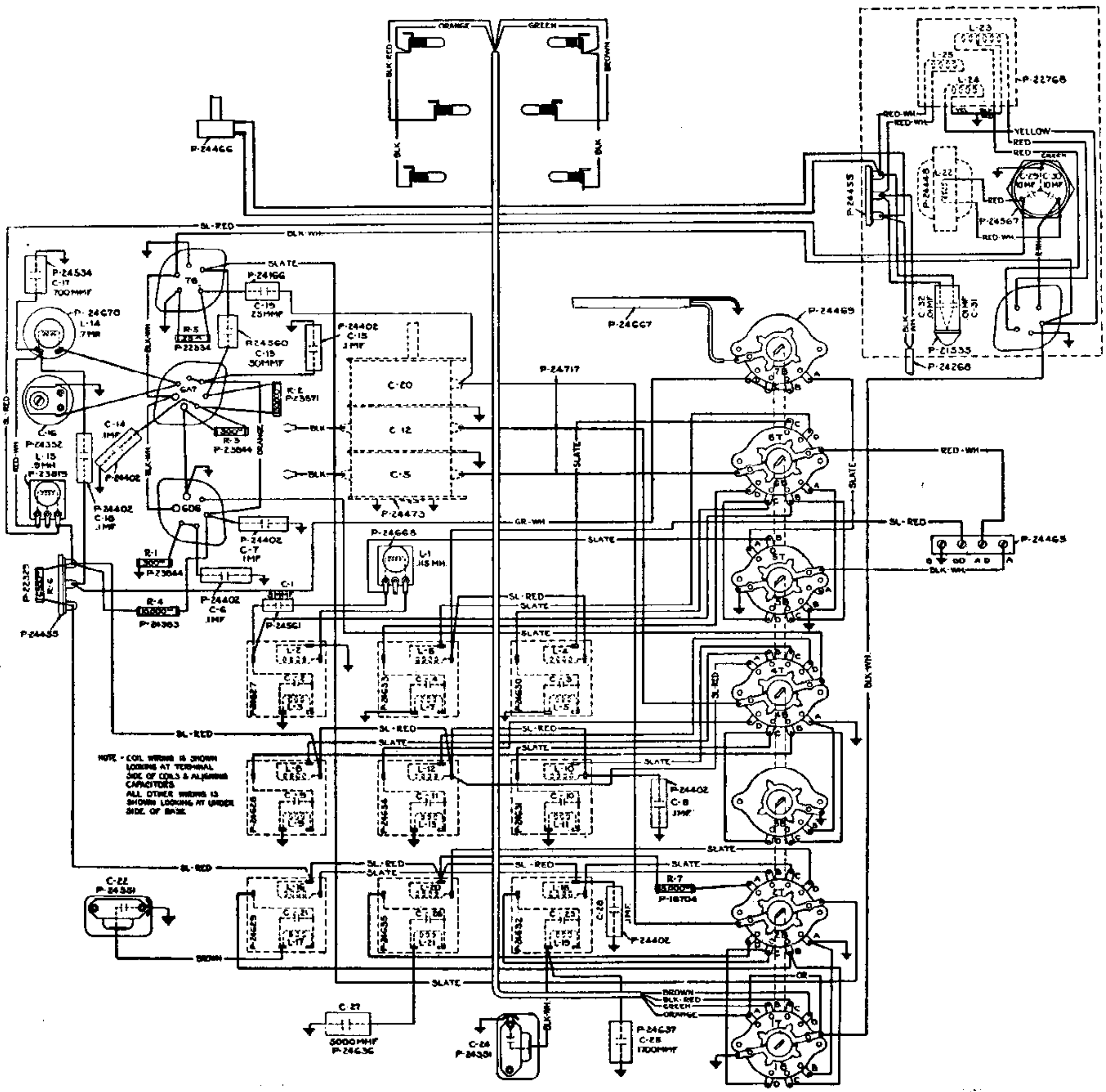


Fig. 3. Wiring Diagram.

MODEL 69
Socket Layout
Voltage
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

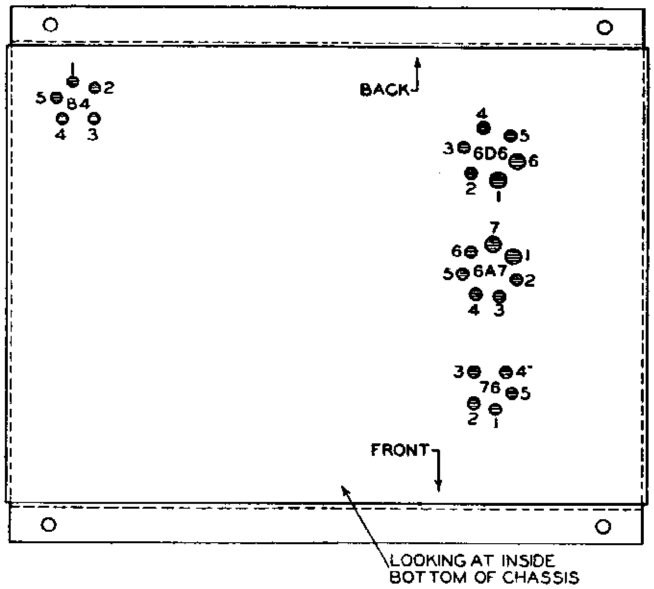


Fig. 2. Terminal Layout for Voltage Measurement Chart.

Tube	*Circuit*	*Cap.*	*Terminals of Socket* 1	2	3	4	5	6	7
6D6	R. F. Amp.	G 0	H 0	P 191	S 103	Sup. 2.9	K 2.9	H A. C. 6.3	—
6A7	Modulator	Mod. G 0	H A. C. 6.3	Mod. P 191	S 103	G2 103	G1 Approx. —1	K 3.1	H 0
76	Oscillator	—	H 0	P 160	G —14	K 0	H A. C. 6.3	—	—
84	Rectifier	—	H 0	P A. C. 178	P A. C. 178	K 207	H A. C. 6.3	—	—

Measured on Range B at 2400 Kc.—Line voltage 120 volts A. C.

REPLACEMENT PARTS

Piece Number	Part	Required Per Receiver	List Price Each
24469	Switch Range	1	$ 7.75
24627	Coil Assembly (Antenna Range B)	1	2.00
24628	Coil Assembly (R. F. Range B)	1	2.00
24629	Coil Assembly (Oscillator Range B)	1	2.00
24630	Coil Assembly (Antenna Range C)	1	2.00
24631	Coil Assembly (R. F. Range C)	1	2.00
24632	Coil Assembly (Oscillator Range C)	1	2.00
24633	Coil Assembly (Antenna Range D)	1	2.00
24634	Coil Assembly (R. F. Range D)	1	2.00
24635	Coil Assembly (Oscillator Range D)	1	2.00
24637	Capacitor .0017 MF	1	.35
24561	Capacitor 5 MMF	1	.20
24636	Capacitor .005 MF	1	.60
24402	Capacitor .1 MF	2	.45
24668	Coil Assembly .115 MH	1	.60
18704	Resistor 15,000 Ohms	1	.52
24361	Variable Condenser (Only)	1	4.00
24362	Dial Disc Assembly	1	.40
24366	Dial Plate	1	.45
24367	Dial Reflector Assembly	1	2.00
24669	Dial	1	.75
24290	Bearing	1	.03
24474	Shaft Assembly	1	.25
24317	Pilot Lamp Sockets	6	.15
15602	Dial Eyelets	8	.01
24388	Dial Pointer	1	.05
24505	Lenses (Glass)	1	.25

Piece Number	Part	Required per Receiver	List Price Each
24380	Clips (Lens)	4	$ .02
3x¼"	Screws (R. H. Br. Wood) (Clips)	4	.01
22768	Transformer (Power) 60-cycle	1	4.25
24567	Capacitor Electrolytic	1	3.00
24448	Choke Assembly	1	2.00
21535	Capacitor Assembly	1	.80
22973	Tube Sockets (5 prong) Rectifier Tube	1	.15
23039	Tube Socket (5 prong) Oscillator Tube	1	.17
23040	Tube Socket (6 prong) Amplifier Tube	1	.17
23648	Tube Socket (7 prong) Modulator Tube	1	.17
24466	Switch (On-Off)	1	.60
24465	Binding Post (Antenna and Ground)	1	.40
24670	Coil Assembly .7 MH	1	1.25
23819	Coil Assembly .9 MH	1	.60
24667	Cord Output	1	2.50
22329	Resistor 6,500 Ohm	1	.37
22334	Resistor .25 Megohm	1	.37
23571	Resistor 50,000 Ohm	1	.35
23844	Resistor 300 Ohm	2	.37
24583	Resistor 10,000 Ohm	1	.35
24402	Capacitor .1 MF	5	.45
24560	Capacitor 50 MMF	1	.25
24166	Capacitor 25 MMF	1	.25
24351	Capacitor Aligner	2	1.00
24352	Capacitor Aligner	1	.40
24534	Capacitor 700 MMF	1	.35

STROMBERG-CARLSON TEL. MFG. CO.

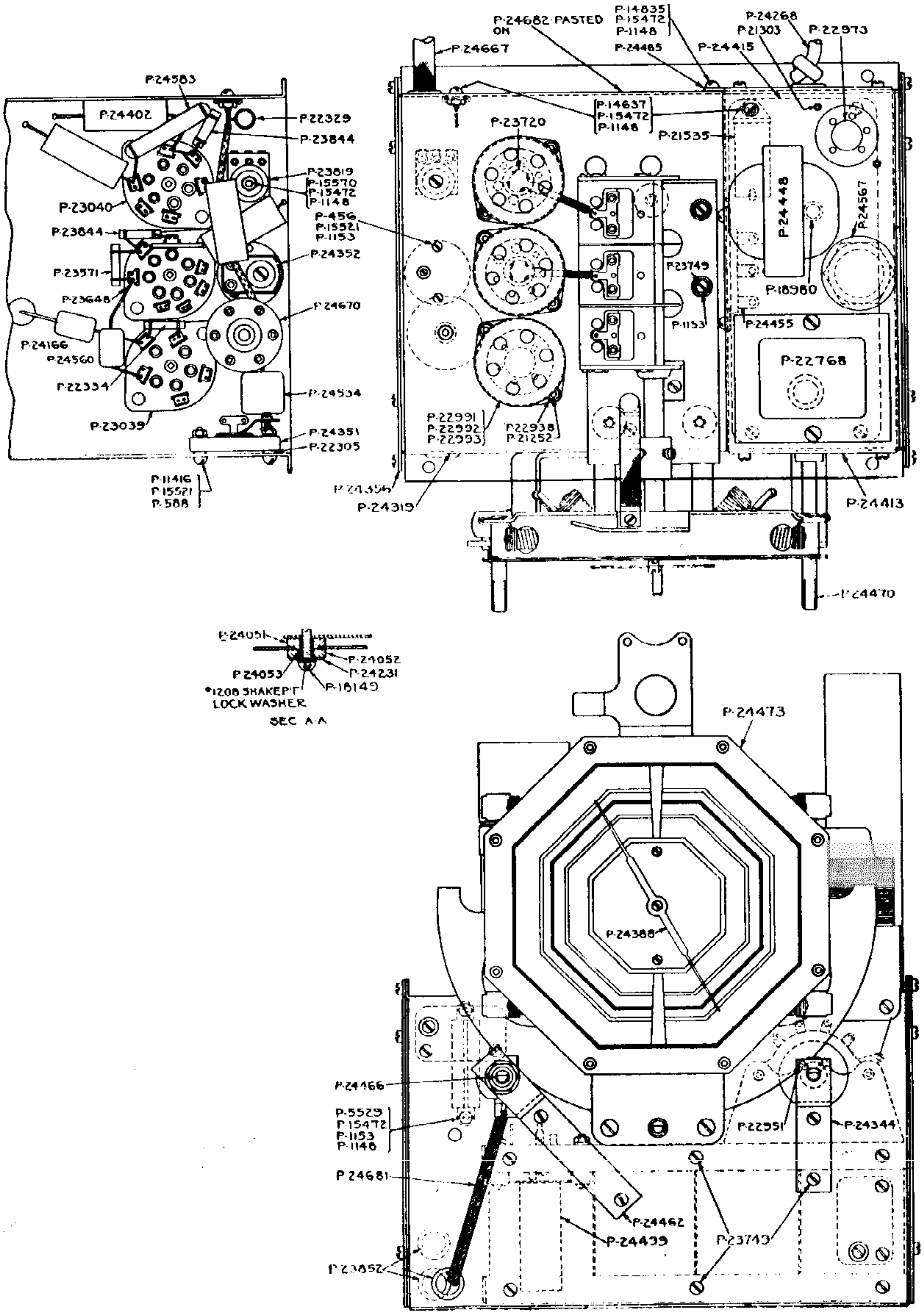
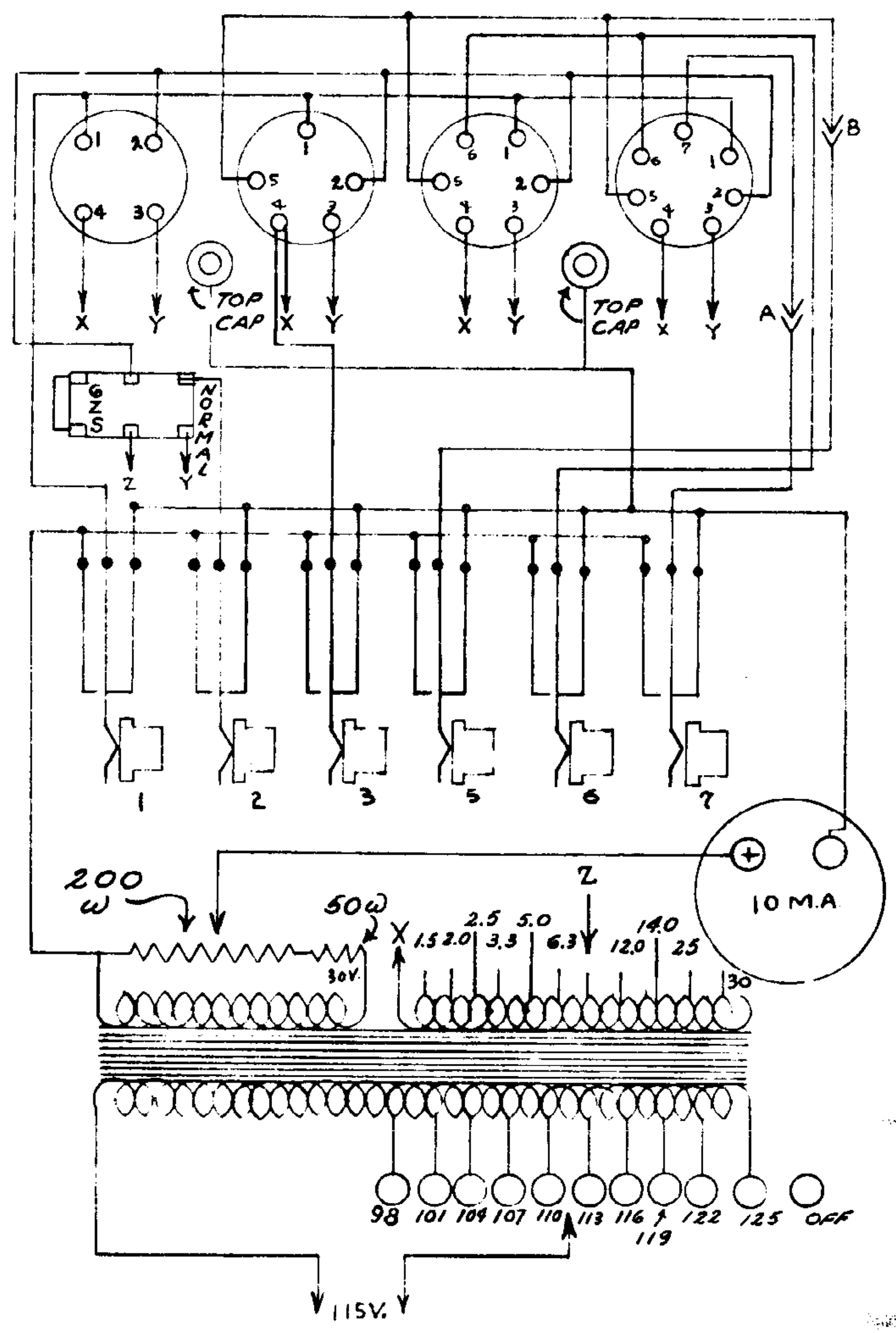


Fig. 4. Chassis Assembly.

SUPREME INSTRUMENTS CORP.

Switch A Normally closed, open for 12 Z5 Tube
Switch B Normally closed, open for 12 A5 Tube



SUPREME INSTRUMENTS CORP.
GREENWOOD, MISS

May 21st 1934

782A

Schematic Diagram
Model 35

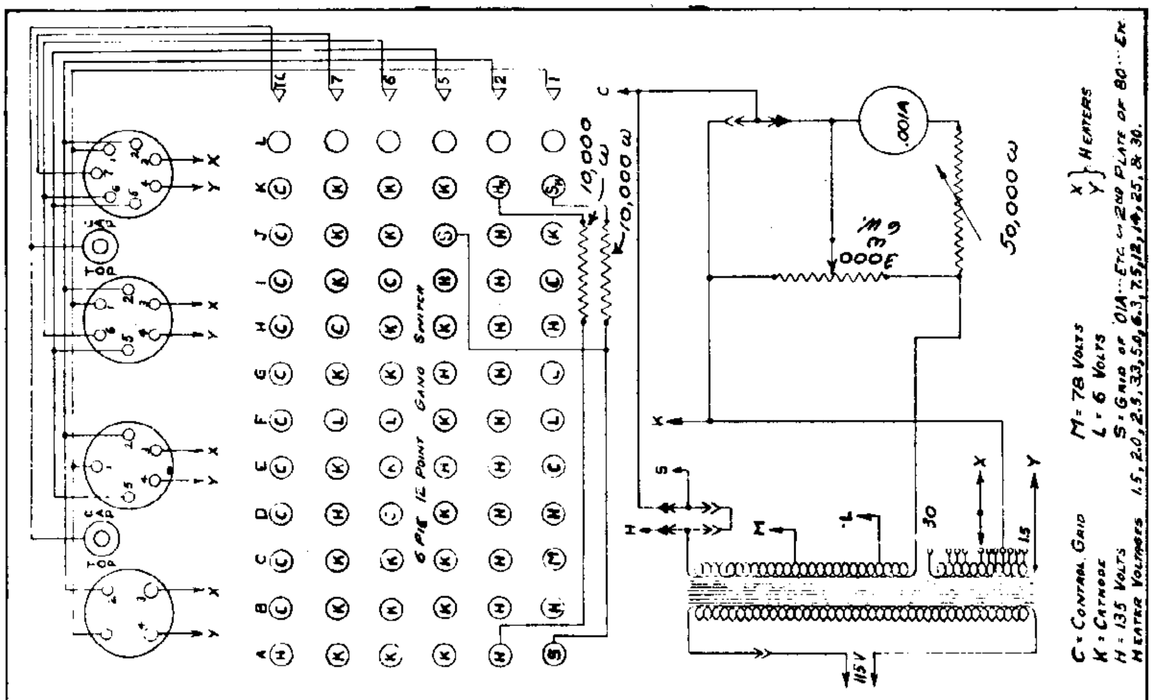
DRAWN & TRACED

CHECKED

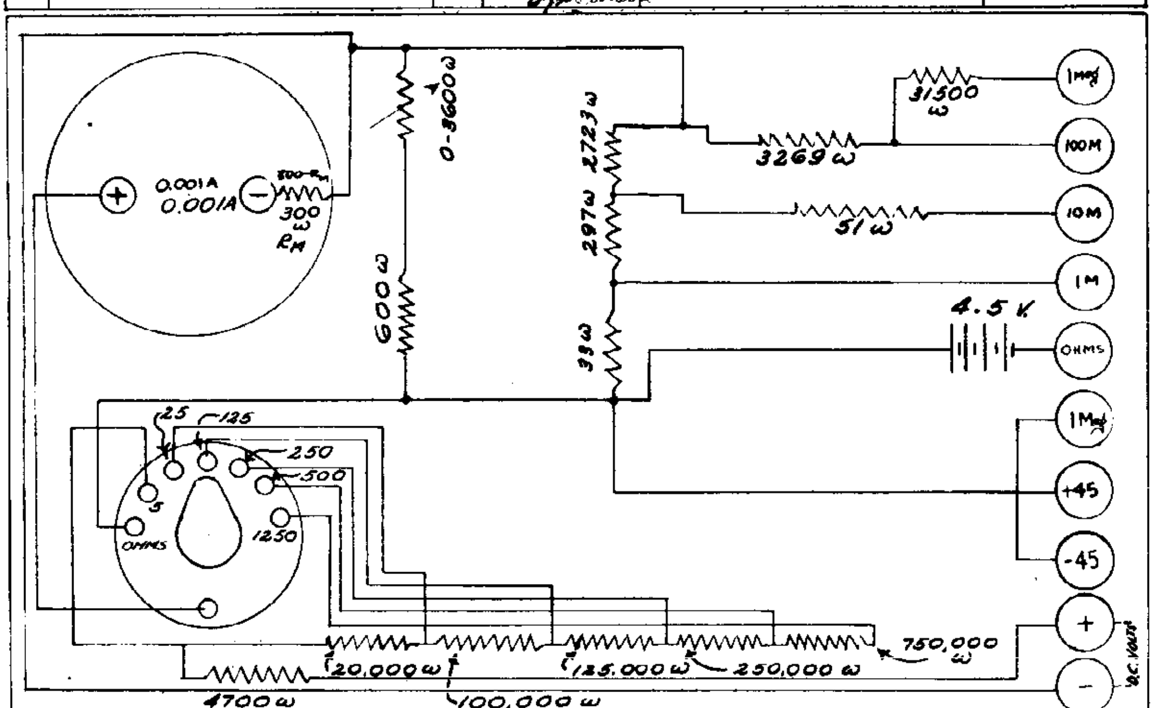
APPROVED

MODEL 55
MODEL 111
Schematics

SUPREME INSTRUMENTS CORP.

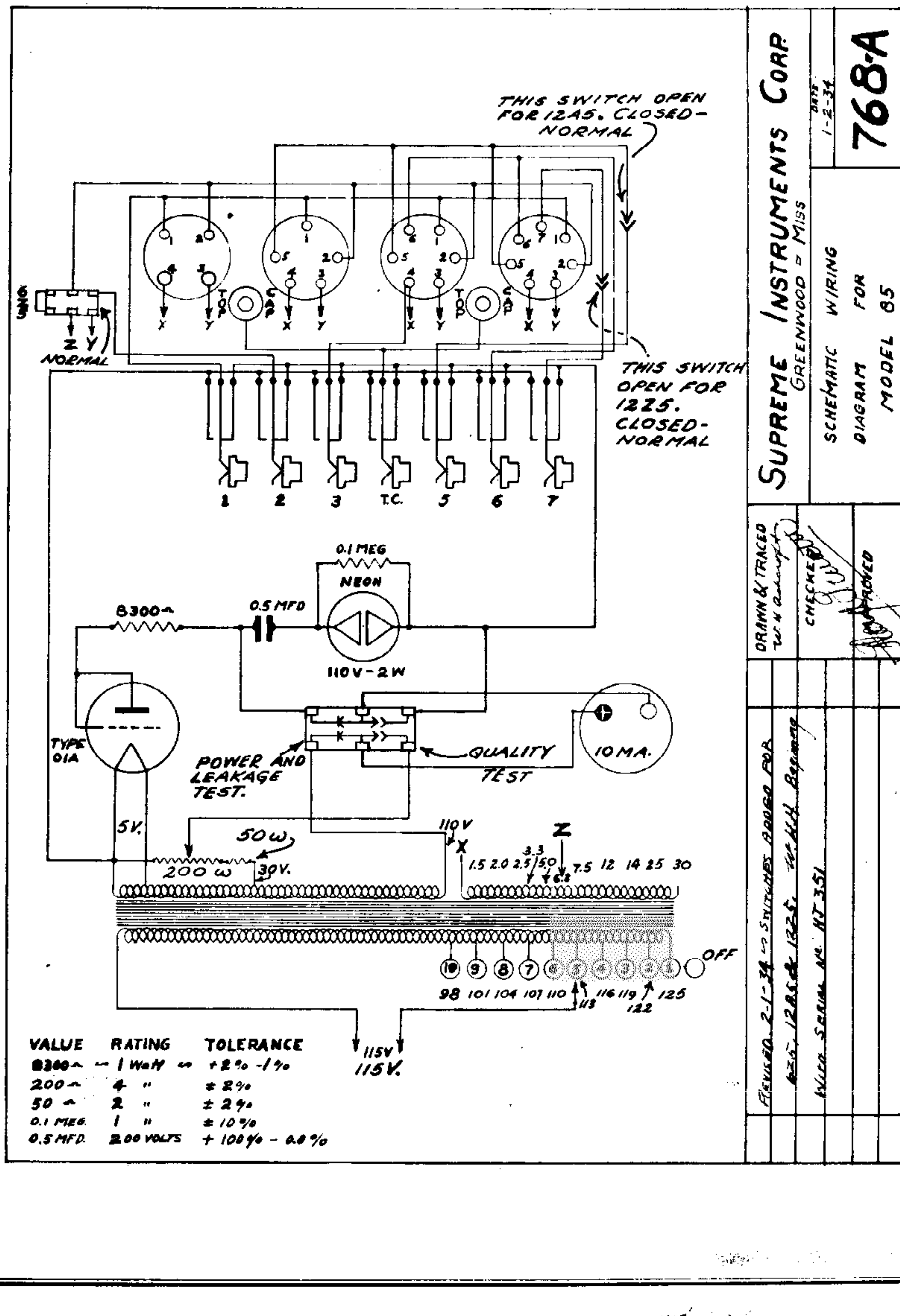


DRAWN & TRACED	SUPREME INSTRUMENTS CORP GREENWOOD, MISS
CHECKED	SCHEMATIC WIRING DIAGRAM FOR MODEL 55
APPROVED	DATE 1-16-34 — 772-A



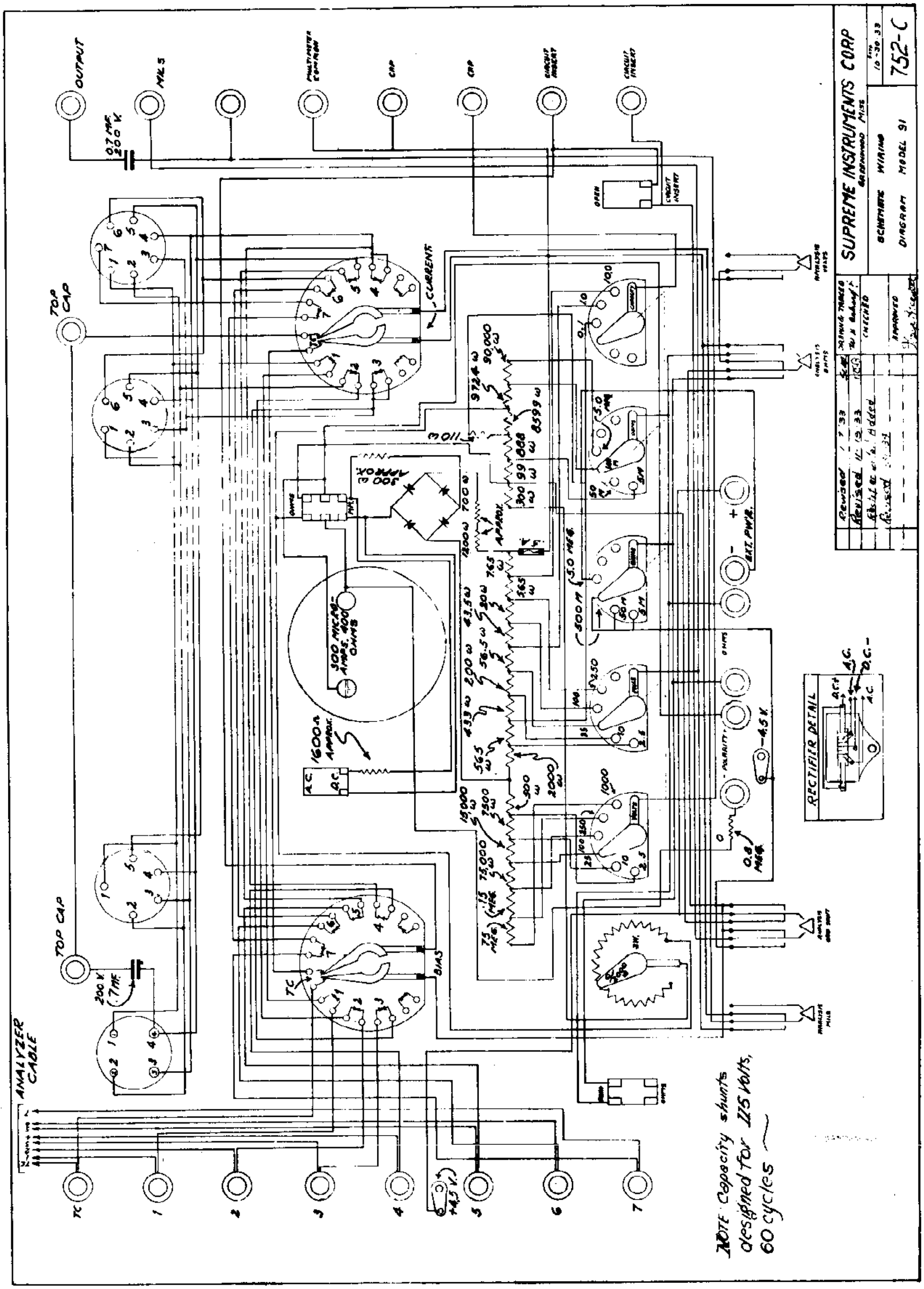
DRAWN & TRACED	SUPREME INSTRUMENTS CORP GREENWOOD, MISS
CHECKED BY	Schematic Wiring Diagram Model 111
APPROVED	Oct 25, 1933 — 733A

SUPREME INSTRUMENTS CORP.

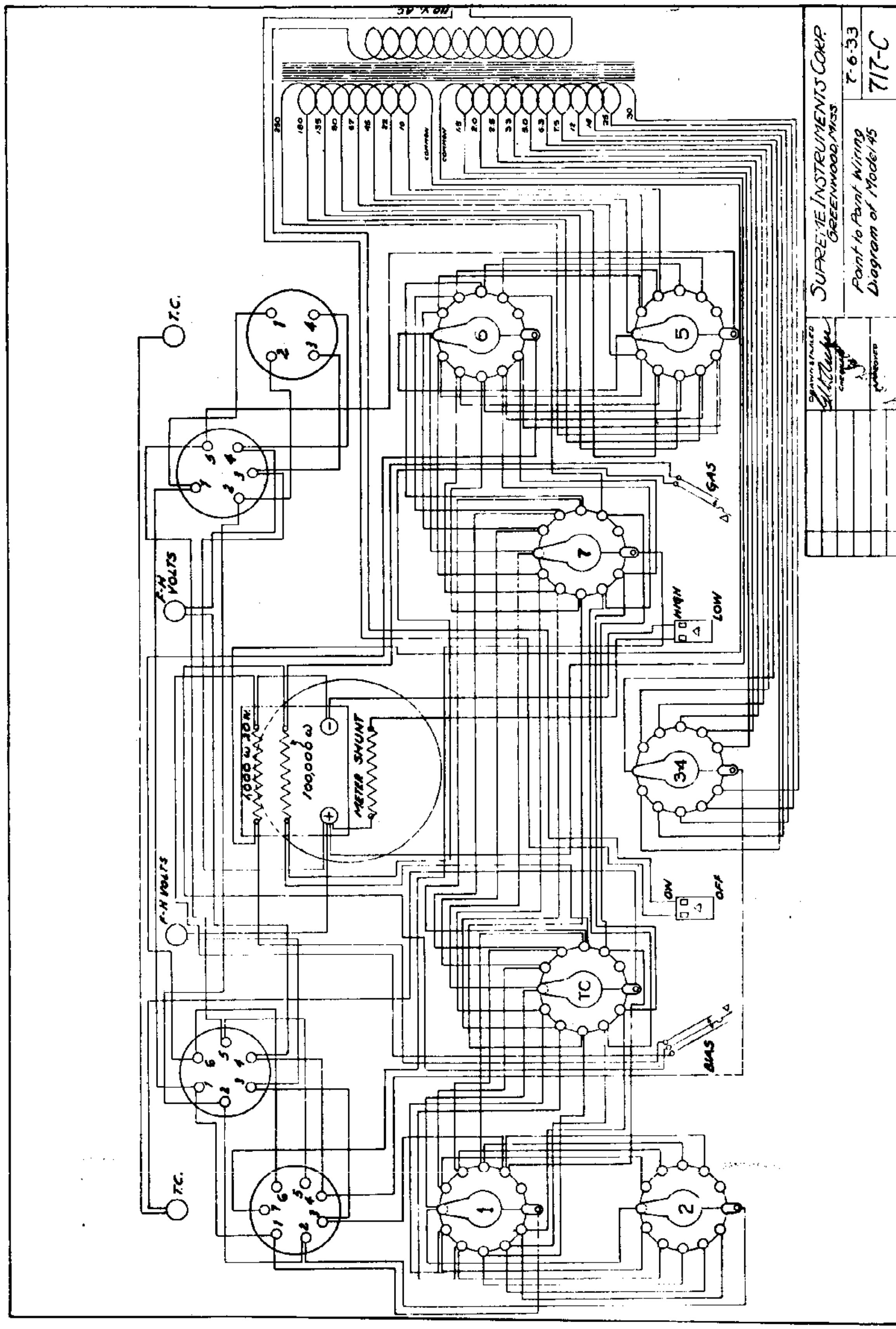


MODEL 91
Schematic

SUPREME INSTRUMENTS CORP.

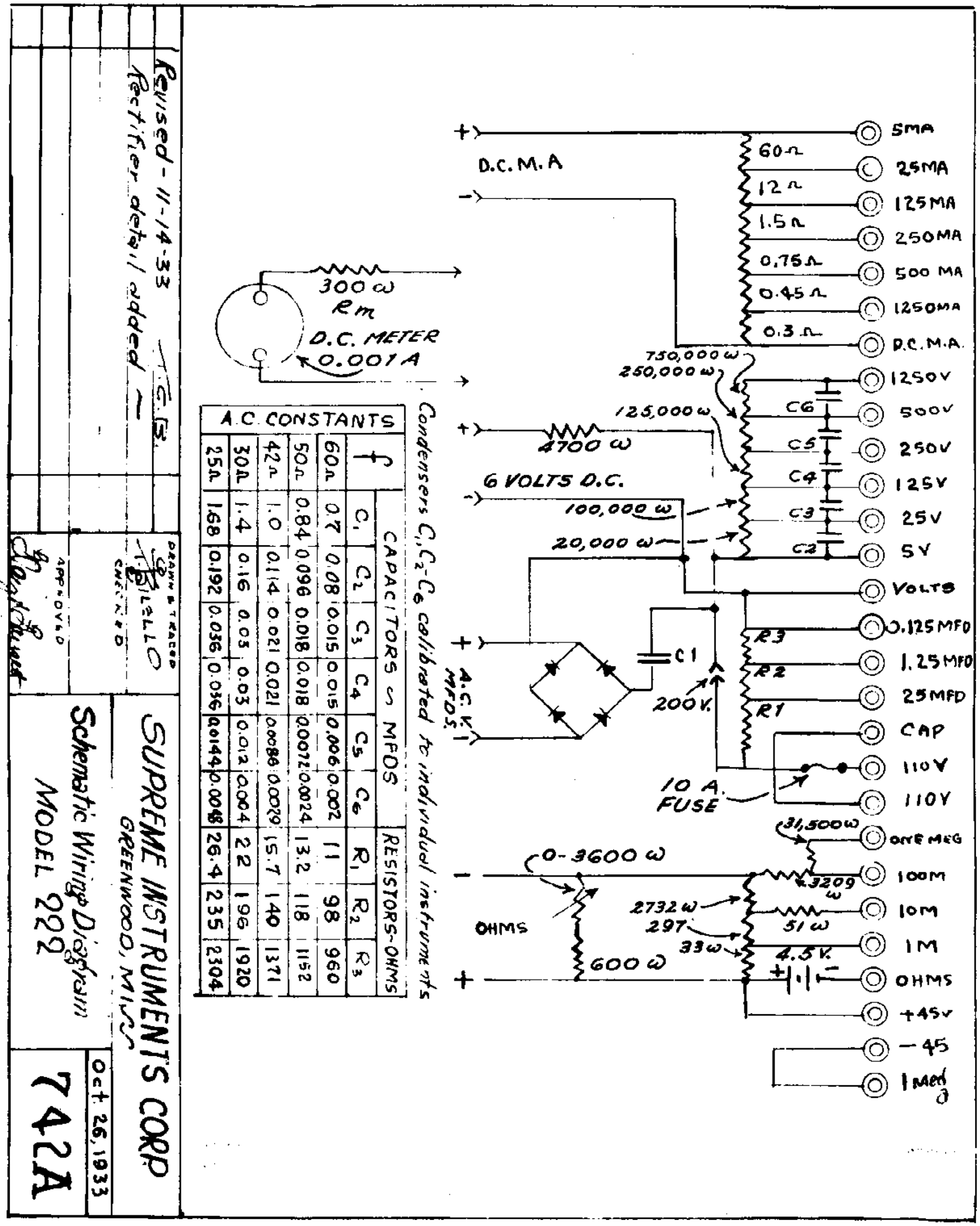


SUPREME INSTRUMENTS CORP.



MODEL 222
Schematic

SUPREME INSTRUMENTS CORP.

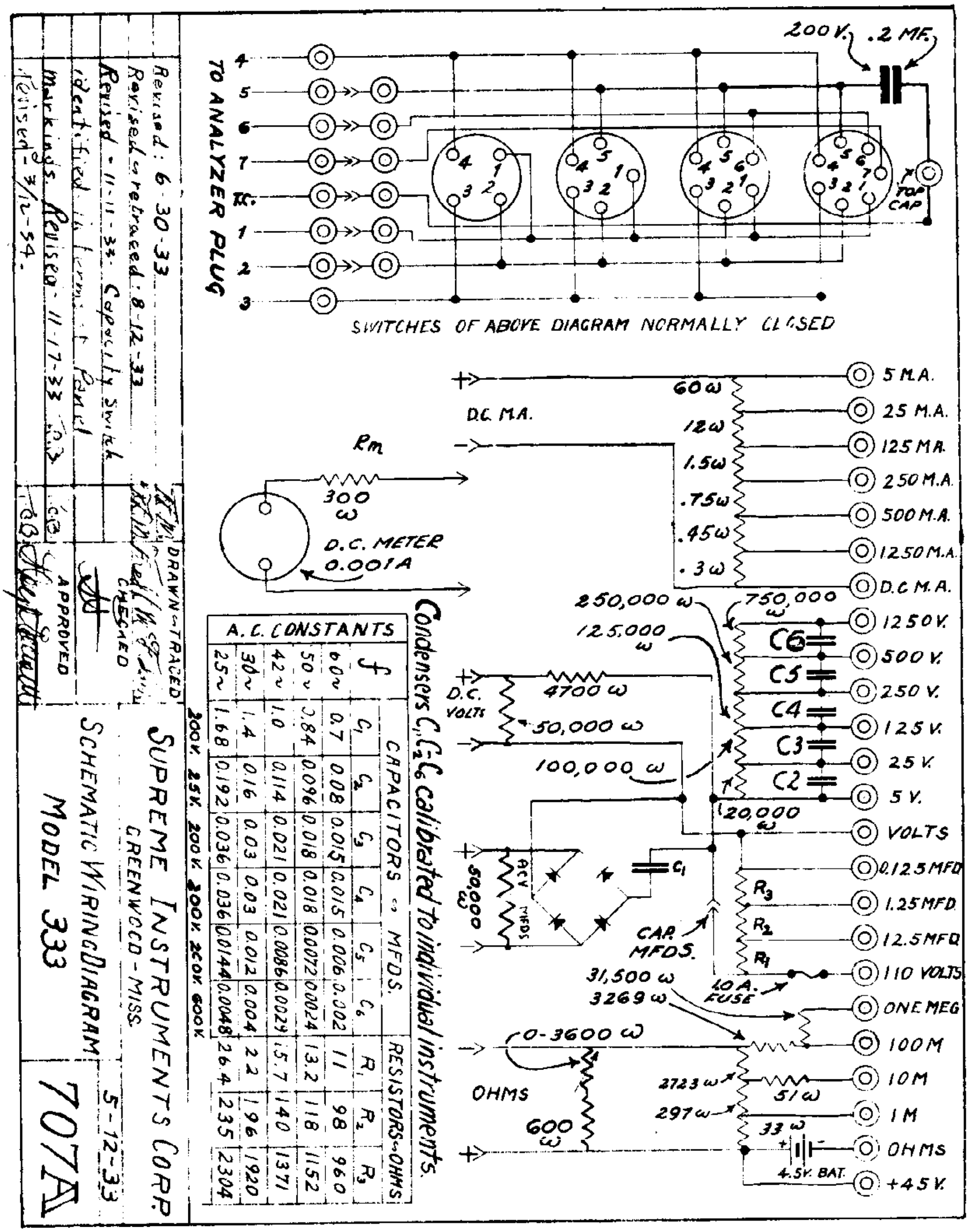


A.C. CONSTANTS

f	C_1	C_2	C_3	C_4	C_5	C_6	R_1	R_2	R_3
	CAPACITORS ~ MFDS						RESISTORS-OHMS		
60Ω	0.7	0.08	0.015	0.015	0.006	0.002	11	98	960
50Ω	0.84	0.096	0.018	0.018	0.0072	0.0024	13.2	118	1152
42Ω	1.0	0.114	0.021	0.021	0.0086	0.0029	15.7	140	1371
30Ω	1.4	0.16	0.03	0.03	0.012	0.004	22	196	1920
25Ω	1.68	0.192	0.036	0.036	0.0144	0.0048	26.4	235	2304

MODEL 333 Revised Schematic

SUPREME INSTRUMENTS CORP.

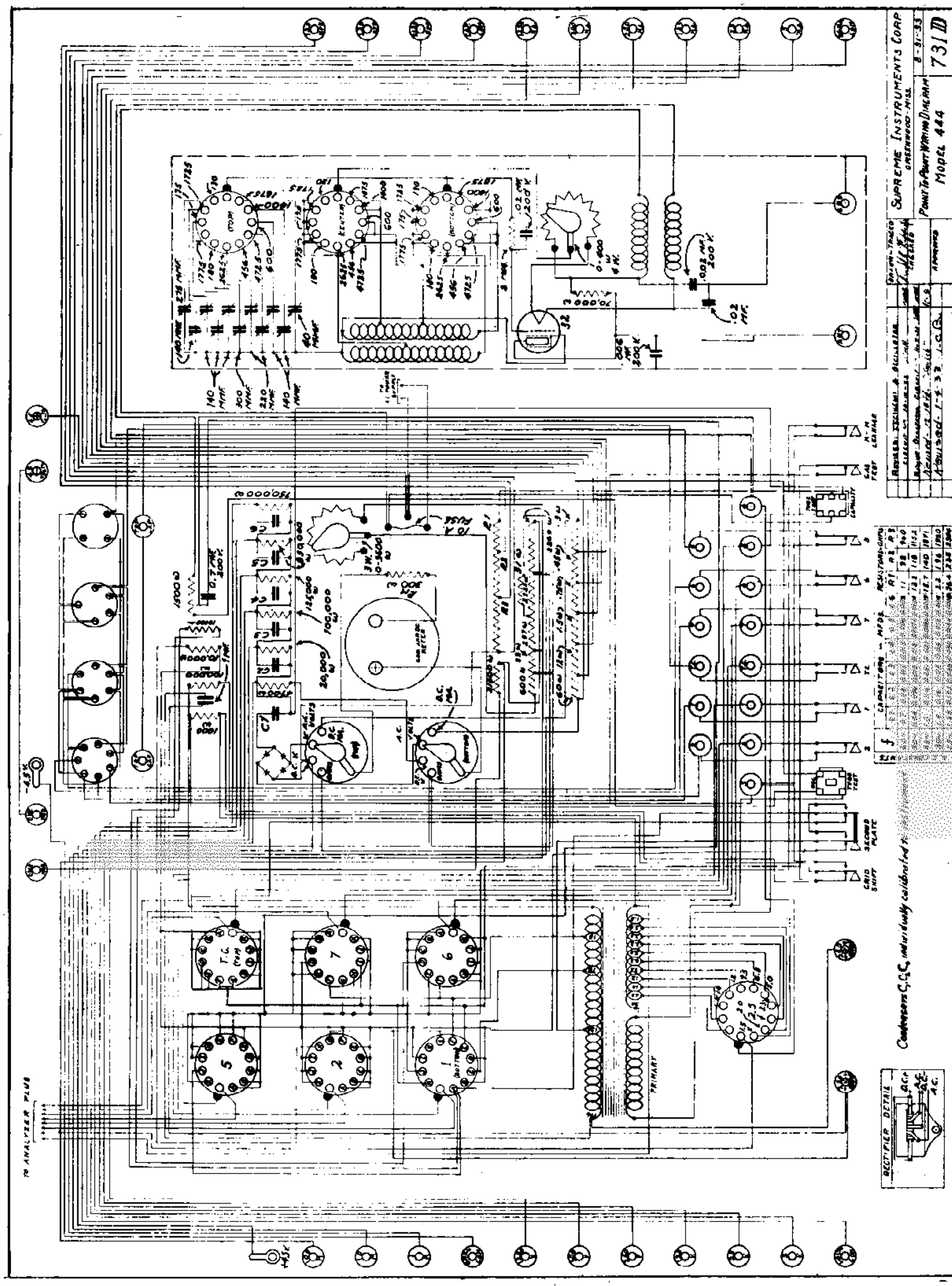


A. C. CONSTANTS

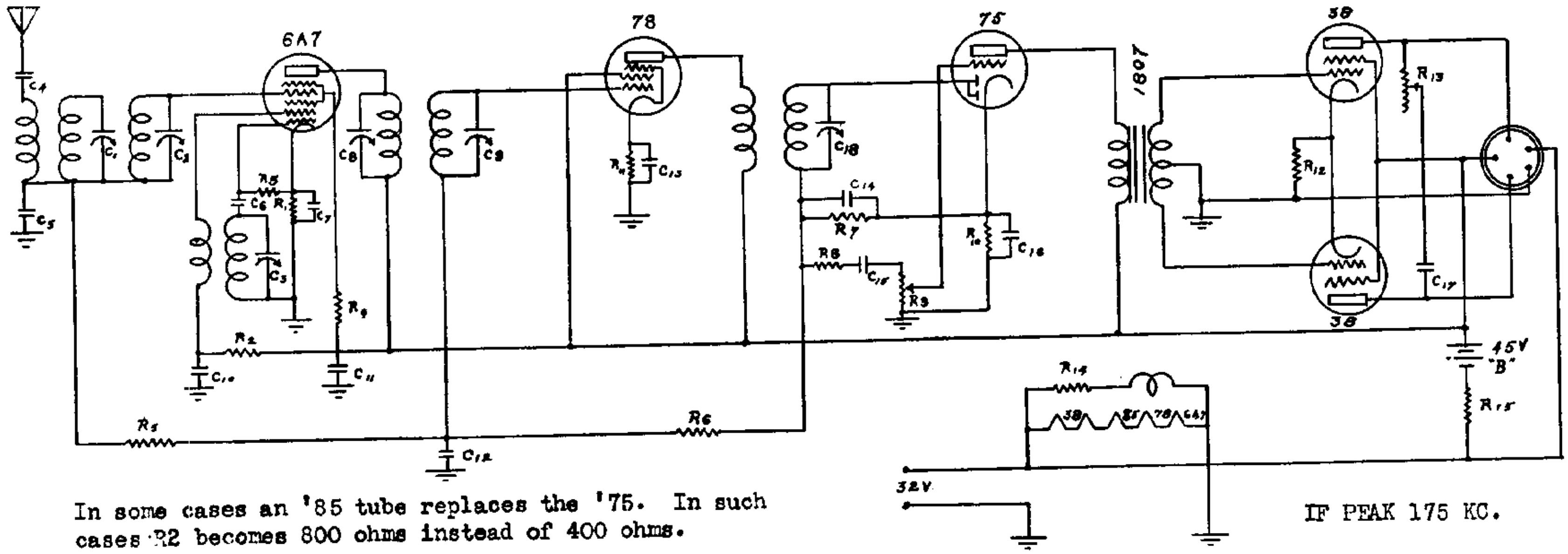
f	C_1	C_2	C_3	C_4	C_5	C_6	R_1	R_2	R_3
	CAPACITORS in MFDS.						RESISTORS in OHMS		
60~	0.7	0.08	0.015	0.015	0.006	0.002	11	98	960
50~	0.84	0.096	0.018	0.018	0.0072	0.0024	13.2	118	1152
42~	1.0	0.114	0.021	0.021	0.0086	0.0029	15.7	140	1371
30~	1.4	0.16	0.03	0.03	0.012	0.004	22	196	1920
25~	1.68	0.192	0.036	0.036	0.0144	0.0048	26.4	235	2304
	200V.	25V.	200V.	200V.	200V.	600V.			

MODEL 444
Schematic

SUPREME INSTRUMENTS CORP.



L. TATRO PRODUCTS CORP.



In some cases an '85 tube replaces the '75. In such cases R2 becomes 800 ohms instead of 400 ohms.

IF PEAK 175 KC.

Circuit Diagram "L'Tatro" Radio

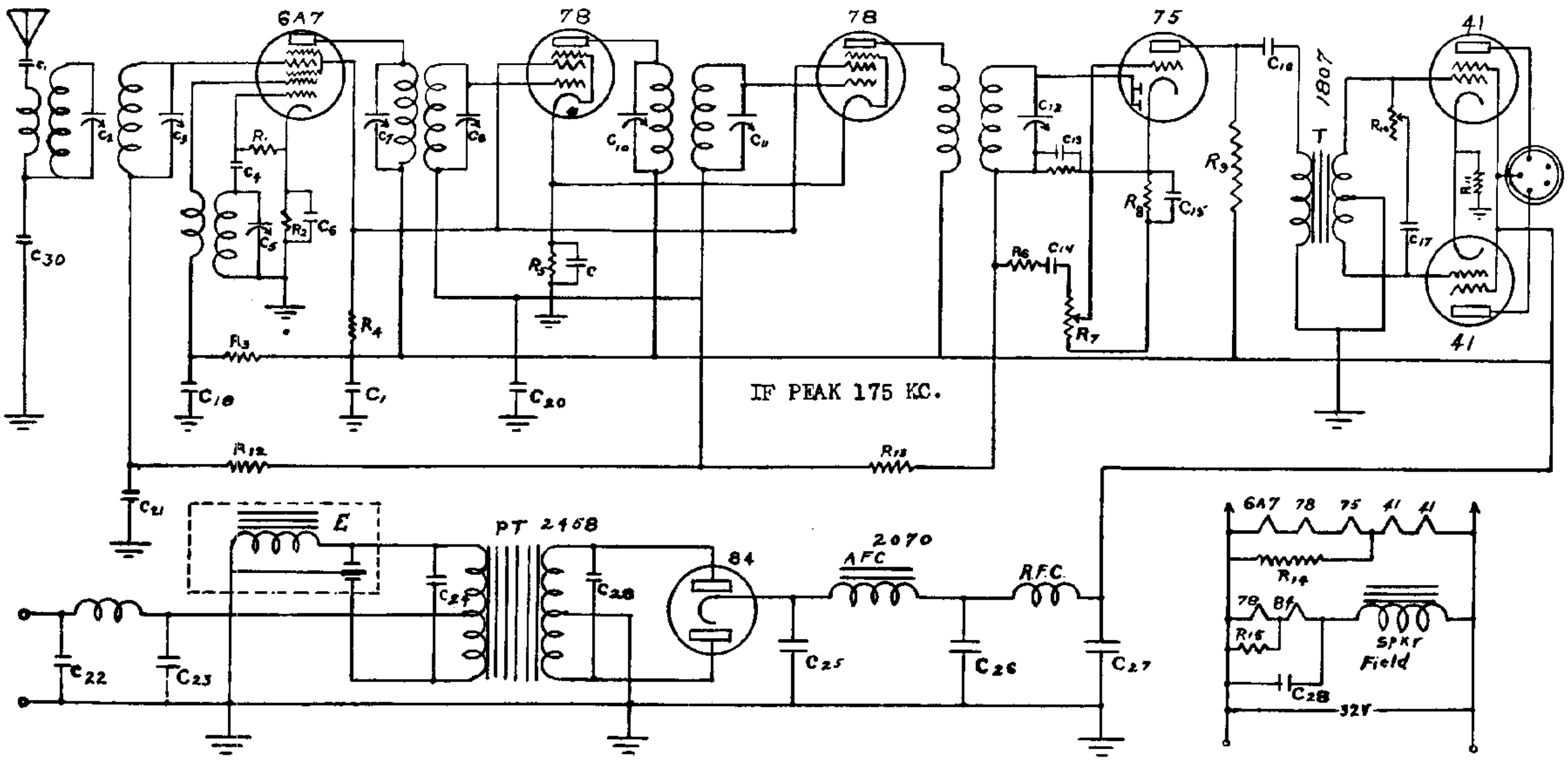
Models AK54 - - AM54 [Mayor and Senator]

C1, C2 and C3 tuning condensers; C8, C9 and C18 I. F. trimmers; C4 .0025 Mfd; C5, C12 .05 Mfd; C6 100 MMfd; C7, C10, C11, C13 .1 Mfd.; C14 .0005 Mfd; C15 .025 Mfd; C16 10 Mfd 6 volt electrolytic; C17 .005 Mfd.

R1 250 ohms; R2 20,000 ohms; R3 50,000 ohms; R4 38,000 ohms; R5 and R6 1 meg; R7 250,000 ohms; R8 30,000 ohms; R9 ½ meg volume control; R10 5000 ohms; R11 400 ohms; R12 800 ohms; R13 ½ meg tone control; R14 200 ohms (10 watt); R15 25 ohms (10 watt).

MODEL L-74, N-74
(Lieut. Governor & Governor)
Schematic, Voltage

L. TATRO PRODUCTS CORP.



Tube	Plate	Screen	Cathode	Anode Grid
6A7	198	80	2.4	140
78*	198	80	7.0	...
75	194	..	1.5	...
41*	193	198	16.5	...

*Two tubes used; same reading on both.

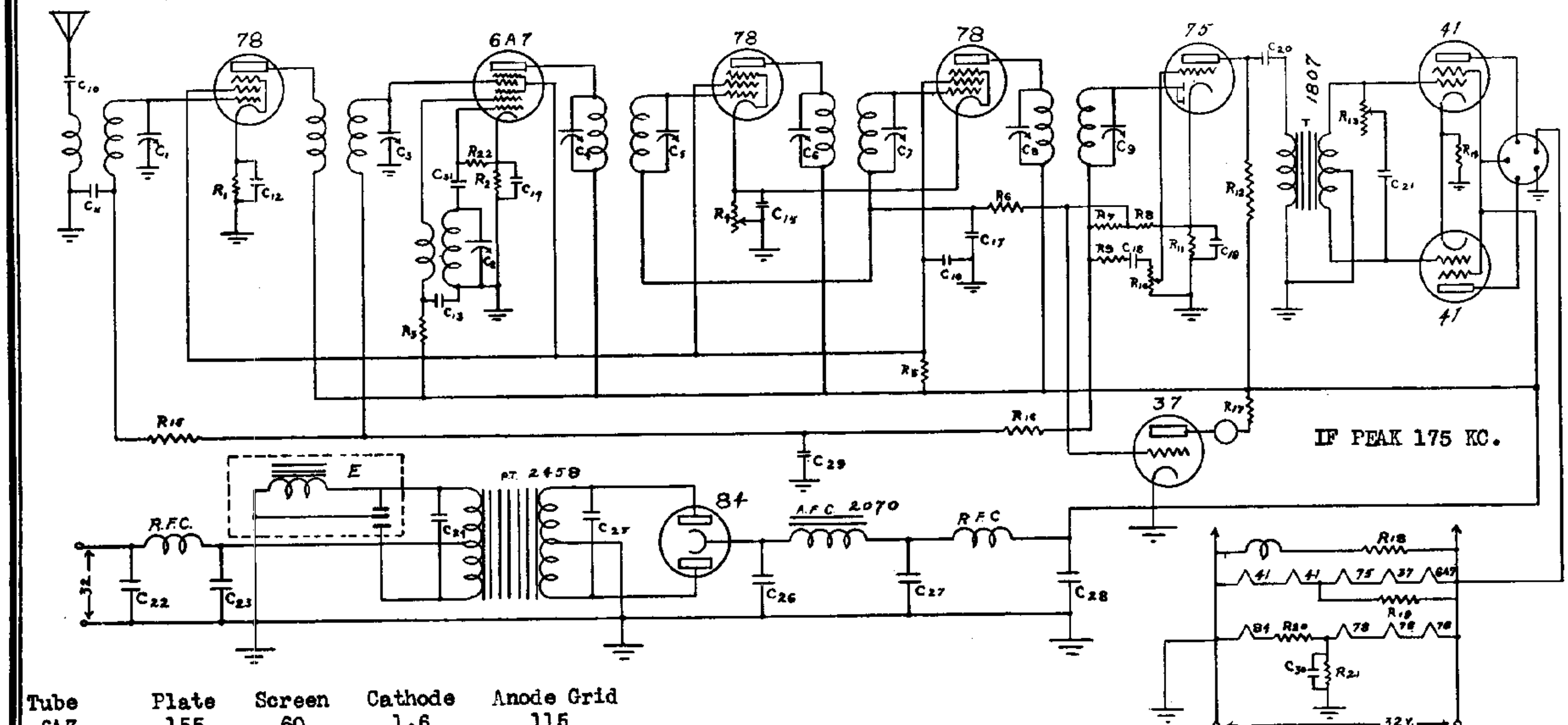
Circuit Diagram "L'Tatro Radio

Models L74 - - N74 [Lieut. Governor and Governor]

C2, C3 and C5 tuning condensers; C7, C8, C10, C11 and C12 I. F. trimmers; C1, C17 .0025 Mfd; C4 100 Mmfd; C13 .0005 Mfd; C14 .015; C15 10 Mfd; C16, C18, C19 .1 Mfd; C20, C21 .05 Mfd; C22 20 Mfd. 40 volt non-polarized; C23 1 Mfd. special high frequency; C24, C28 special high frequency condensers; C25 8 Mfd; C26 16 Mfd; C27 .1 special; C28 10 Mfd. 14 volt non-polarized; C30 .1 omitted on late models. Note: C19 in above diagram is located between C18 and C20 and should be connected above R4.

R1 50,000 ohms; R2 250 ohms; R3 20,000 ohms; R4 38,000 ohms; R5 2500 ohms; R6 100,000 ohms; R7 ½ meg volume control; R8 5000 ohms; R9 100,000 ohms; R10 ½ meg tone control; R11 450 ohms; R12 250,000 ohms; R13 1 meg; R14 200 ohms 10 watt; R15 30 ohms 10 watt. R9 and C10 are omitted on late models, with primary of transformer to high potential. Resistor parallel to C13 is ¼ meg.

L. TATRO PRODUCTS CORP.



Tube	Plate	Screen	Cathode	Anode Grid
6A7	155	60	1.6	115
78 IF *	155	60	3.1	...
78 RF °	155	60	3.0	...
75	198	..	1.6	...
37	65	..	0	...
41*	198	204	20.0	...

* Two tubes used; 78's in IF ° 78 in RF

Diagram "L'Tatro" Radio

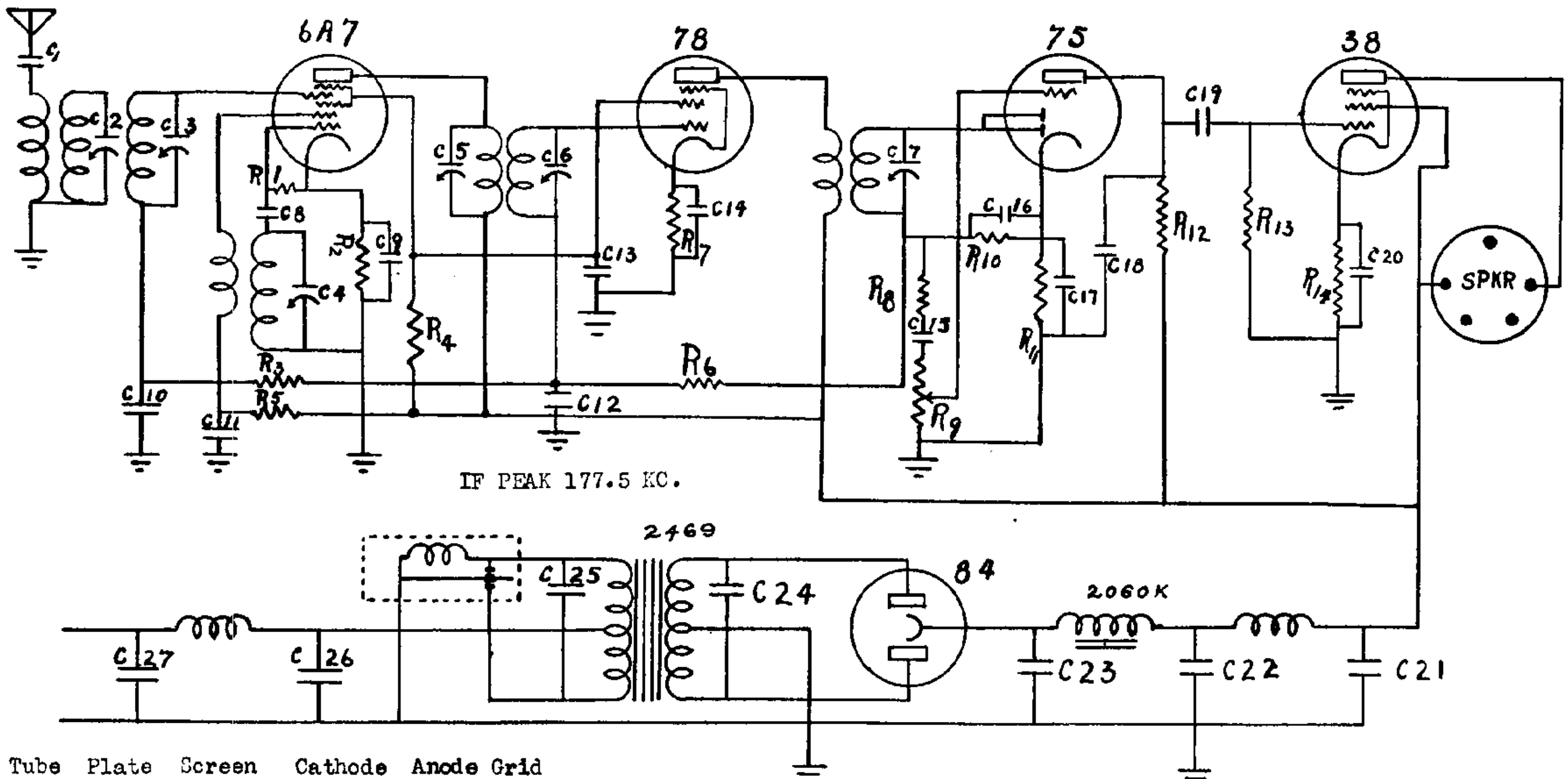
Model 094 [President]

C1, C2 and C3 tuning condensers; C4, C5, C6, C7, C8 and C9 I. F. trimmers; C10 and C21 .0025 Mfd; C11, C13, C17 .05 Mfd. condensers; C12, C14, C15, C16, C20 .1 Mfd; C18 .015 Mfd; C19 10 Mfd. 6 volt; C22 20 Mfd. 40 volt non-polarized; C23 special high frequency 1 Mfd; C24, C25 special high frequency condensers; C26 8 Mfd; C27 16 Mfd; C28 special .1 Mfd; C30 high frequency .1 Mfd; C31 100 Mfd.

R1 1500 ohms; R2 250 ohms; R3 20,000 ohms; R4 20,000 ohms with 800 ohms limiting section; R5 38,000 ohms; R6, R7, R8, R15, R16 250,000 ohms; R9, R12 100,000 ohms; R10 ½ meg volume control; R11 5000 ohms; R13 ½ meg tone control; R14 450 ohms; R18, R19 200 ohms; R20 25 ohms; R21 125 ohms. R 21 should parallel the three 78 tubes in above diagram.

MODEL P-54
(Recorder)
Schematic, Voltage

L. TATRO PRODUCTS CORP.



Tube	Plate	Screen	Cathode	Anode Grid
75	108	...	1.05	...
38	158	165	15.5	...
78	163	100	3.0	...
6A7	163	100	2.9	120

Readings taken between chassis and points indicated with 1000-ohm-per-volt meter. Filament, 6.3-6.4 volts.

Circuit Diagram "L'Tatro" Radio

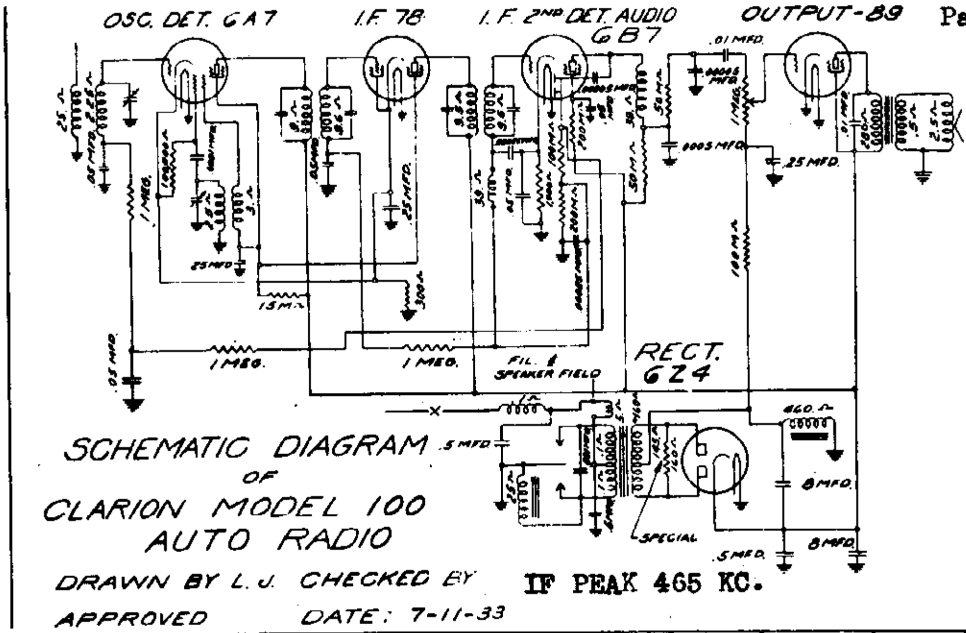
Model P54 [Recorder]

C2, C3 and C4 are tuning condensers; C5, C6 and C7 I. F. trimmers; C1 .0025 Mfd; C8 100 MMfd; C9, C11, C12, C13, C14 and C21 .1 Mfd; C10 and C19 .05 Mfd; C15 .015 Mfd; C16 and C18 .0005 Mfd; C17 and C20 10 Mfd. electrolytic; C22 and C23 8 Mfd. electrolytic; C24 and C25 special buffer condensers; C26 1 Mfd. high frequency; C27 10 Mfd. non-polarized electrolytic.

R1 50,000 ohms; R2 250 ohms; R3 1 meg; R4 38,000 ohms; R5 20,000 ohms; R6 ¼ meg; R7 450 ohms; R8 100,000 ohms; R9 ½ meg volume control; R10 ¼ meg; R11 5000 ohms; R12 500.000 ohms; R13 1 meg; R14 1250 ohms.

MODEL 100-AR
Schematic
Voltage
Parts List

TRANSFORMER CORP. OF AMERICA



IF PEAK 465 KC.

No.	Stage	Tube	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-0	Eg-0	Ip-0
1	Osc.- Det . .	6A7	6	185	.1	3	83		4.6	81	.05	1.7
2	I. F.	78	6	185	.1	3	102	0	7.5			
3	I. F. 2nd Det. Audio .	6B7	6	58	.05	2.3	45		2.2	d .1		
4	Output. . . .	89	6	190	.05	0	194	0	18			
5	Rectifier . .	6Z4	6	$^{p}208$		185			$^{p}18$			

O - Oscillator.
Volume Control - Full On.
Battery Voltage - 6 Volts.

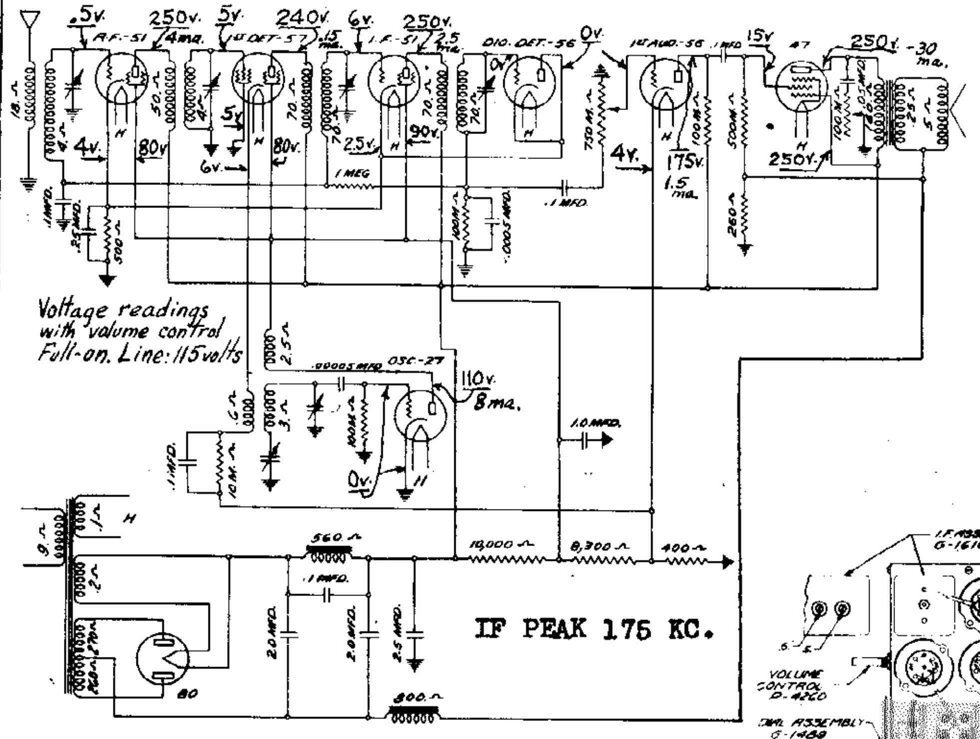
p - Per Plate.
d - Diode Plate.

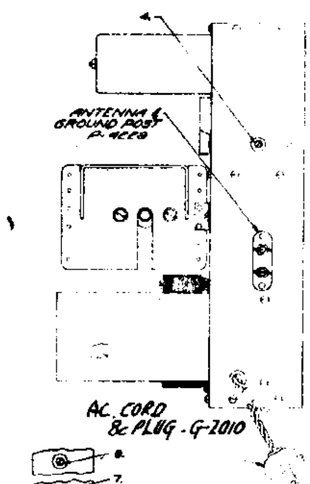
G-1705	Speaker Complete	. . . . .
G-1727	"B" Choke	. . . . .
G-1746	Vibrator Complete	. . . . .
G-1748	Output Transformer	. . . . .
G-1751	Voice Coil and Cone	. . . . .
G-1753	Dial Drive and Head	. . . . .
G-1754	Male Cable Tuning	. . . . .
G-1755	Female Cable Tuning	. . . . .
G-1756	Perforated Mtg. Strap for Control Head	
G-1756-C	Threaded Mtg. Strap for Control Head	.
G-1763	I. F. Transformer (1st and 2nd)	. . . .
G-1788	Key Knob and Shaft	. . . . .
P-1083	Lock Washer, Small	. . . . .
P-1381	.0005 Condenser	. . . . .
P-1728	.00005 Mfd. Condenser	. . . . .
P-1756	Threaded Mounting Strap	. . . . .
P-4372	.00025 Condenser	. . . . .
P-4446	.001 Mfg. Condenser	. . . . .
P-4504	1,000 Ohm Resistor	. . . . .
P-4590	.0001 Condenser	. . . . .
P-4595	1 Megohm Resistor	. . . . .
P-4602	Grommet, Small	. . . . .
P-4640	.25 Mfd. Condenser	. . . . .
P-4644	.05 Mfd. Condenser	. . . . .
P-4645	.01 Mfd. Condenser	. . . . .
P-4659	50,000 Ohm Resistor	. . . . .
P-4662	100,000 Ohm Resistor	. . . . .
P-4664	200,000 Ohm Resistor	. . . . .
P-4713	15,000 Ohm Resistor	. . . . .
P-4732	Socket 6A7	. . . . .
P-4733	Socket 78	. . . . .
P-4744	Tuning Condenser	. . . . .
P-4761	.5 Mfd. Condenser	. . . . .
P-4763	Vibrator - Unit only	. . . . .
P-4764	Rubber Vibrator Box and Cover	. . . . .
P-4765	Vibrator, Special Resistor	. . . . .
P-4767	Electrolytic Condenser	. . . . .
P-4769	Volume Control	. . . . .
P-4771	Socket 6B7	. . . . .
P-4772	Socket 89	. . . . .
P-4773	Socket 6Z4	. . . . .
P-4774	Generator Condenser	. . . . .
P-4775	Spark Plug Suppressor	. . . . .
P-4776	Distributor Suppressor	. . . . .
P-4777	Mounting Studs	. . . . .
P-4778	Mounting Nuts	. . . . .
P-4787	Bushing and Drive Set Screws	. . . . .
P-4788	Shaft Bushings	. . . . .
P-4791	Wing Nuts	. . . . .
P-4792	Chassis Mounting Screw	. . . . .
P-4793	Grommet, Large	. . . . .
P-4795	Fuse Assembly	. . . . .
P-4796	Fuse - 10 Ampere	. . . . .
P-4797	Mounting Washers	. . . . .
P-4799	"A" Choke	. . . . .
P-4804	Untuned Choke	. . . . .
P-4807	Terminal Strip	. . . . .
P-4811	Vibrator Transformer	. . . . .
P-4812	Choke (Unshielded)	. . . . .
P-4822	Dial Bezel	. . . . .
P-4823	Dial Pointer	. . . . .
P-4826	Dial Light Bracket	. . . . .
P-4829	Dial Scale	. . . . .
P-4832	Knob Tuning	. . . . .
P-4833	Knob Springs	. . . . .
P-4835	Dial Glass	. . . . .
P-4843	Antenna Oscillator Coil	. . . . .
P-4849	Mounting Strap Nuts	. . . . .
P-4855	150 Ohm Resistor	. . . . .

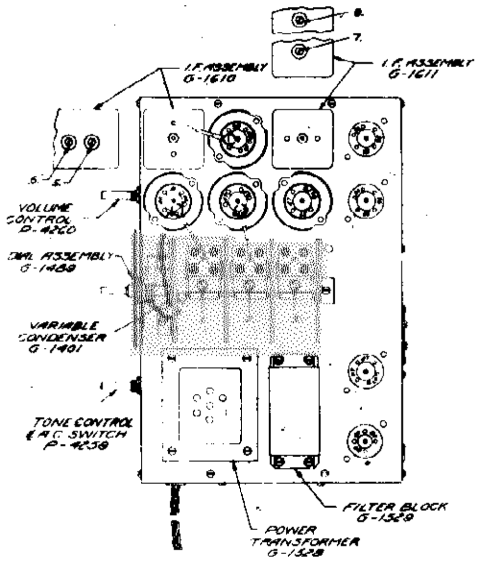
MODEL 241
Schematic, Socket

TRANSFORMER CORP. OF AMERICA

Alignment Data
Point-to-Point







To adjust the trimmers, connect your 175 K. C. oscillator to the first detector type 57 grid cap, and in the following order: Readjust trimmers numbers, five, six, seven and eight for maximum output, next, disconnect the 175 K.C. oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator or tune in a broadcast signal from a known frequency crystal controlled station at 1400 K. C., then reset trimmers, two and one respectively for maximum output. This adjustment will track the first detector and r. f. stage.

To check the calibration of the receiver, whether it be high or low, trimmer, number three (oscillator) should be reset until a station of known high frequency is brought in at the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcast station signal. In this adjustment a signal at about 1400 K. C. should be chosen The setting of the trimmers at 1400 K. C. is more critical than it would be at 600 K. C., therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instructions: We now balance the oscillator to the r. f. and first detector stages. Tune the external broadcast test oscillator and the receiver both to 600 K. C., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer) at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 K. C. and recheck trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, as previously explained, and check on trimmers No. 2 and No. 1 to make sure that the adjustment of No. 4 has not reduced the sensitivity.

CIRCUIT RESISTANCE ANALYSIS

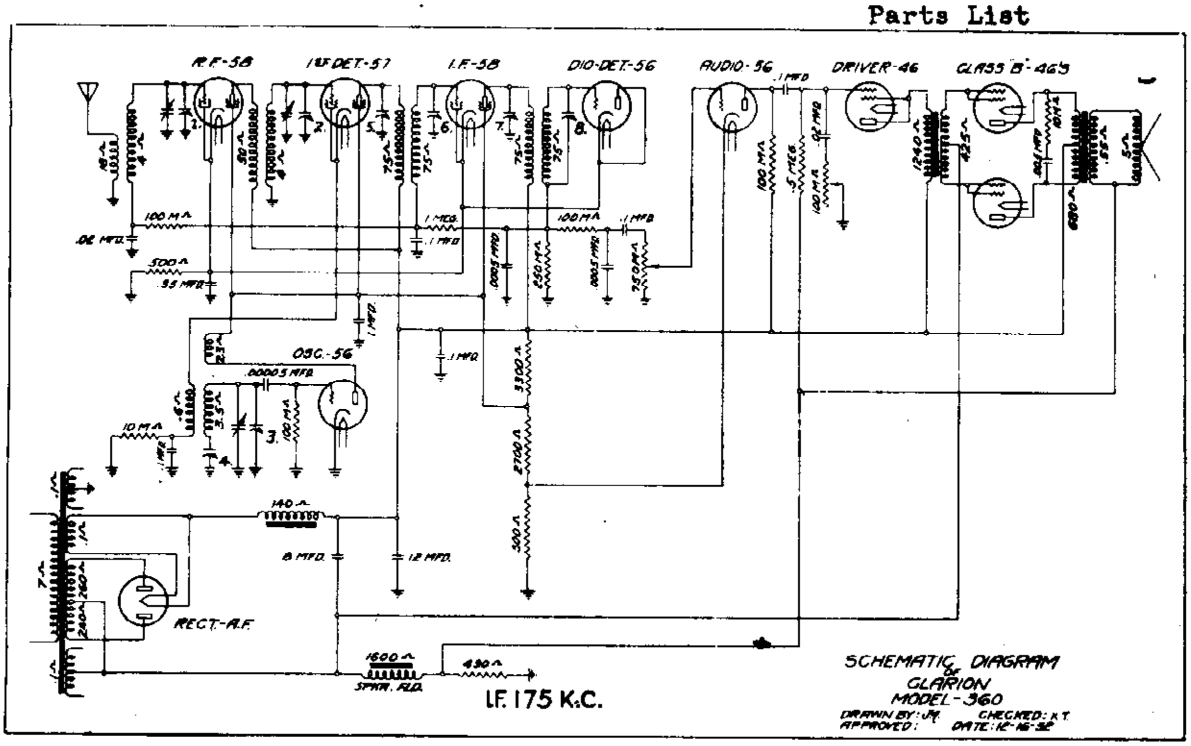
Model 241 Socket to ground

Stage	Grid	Cathode	Heater	Plate	Screen G	Suppr. G	Space G
51 R.F.	Infinity	500	.08	18,700	8,700	....	......
57 1st.det.	4.2	10,000	.08	18,700	8,700	.06	......
51 I.F.	Infinity	500	.07	18,700	8,700	....	......
27 Oscillator	100,000	.06	.07	8,750	......	....	......
56 Dio det.	100,000	500	.07	500	......	....	......
56 A.F.	750,000	400	.07	118,000	......	....	......
47 Pentode	750,000	......	.07	18,800	......	....	18,700
80 Rectifier	......	......	18,800	1,320	......	....	......

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohmmeter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

TRANSFORMER CORP. OF AMERICA

MODEL 360
Schematic, Point-to-Point
Parts List



P-1038	Pilot Light. . . . .
P-1106	1 Megohm Resistor. . . . . .
P-1381	.0005 MFD. Cond. . . . . . .
P-1459	Tube Shield Base . . . . . .
P-1472	Tube Shield. . . . .
P-1692	100,000 Ohm Resistor . . . .
P-1728	.00005 MFD. Cond . . . . . .
P-1755	.5 Megohm Resistor . . . . .
P-1944	250,000 Ohm Resistor . . . .
P-4168	Blinder. . . . .
P-4229	Ant. Grnd. Post. . . . . . .
P-4256	Escutcheon . . . .
P-4259	Tone Control and Switch. . .
P-4260	Volume Control . . . .
P-4262	#56 Socket . . . .
P-4263	#57 Socket . . . .
P-4264	#58 Socket . . . .
P-4271	10,000 Ohm Resistor. . . . .
P-4297	#46 Socket . . . .
P-4368	10,000 Ohm Resistor (1 Watt)
P-4370	.005 MFD. Cond . . . .
P-4373	Speaker Diaphragm. . . . . .
P-4393	Large Knob . . . .
P-4394	Small Knob . . . .
P-4398	.1 MFD. Cond . . . .
P-4447	.02 MFD. Cond. . . . .
P-4485	Tube Shield. . . . .
P-4486	Tube Shield Cap. . . . . . .
P-4487	Tube Shield Base . . . . . .
P-4514	Electrolytic Cond. . . . . .
P-4519	A.F. Socket. . . . .
P-4526	490 Ohm Resistor . . . . . .
P-4533	Voltage Divider. . . . . . .
P-4534	Voltage Divider. . . . . . .
G-1272	R.F. Coil. . . . .
G-1401	Variable Cond. . . . .
G-1415	I.F. Transformer (1st) . . .
G-1488	Trimmer Condenser. . . . . .
G-1489	Dial and Scale Assembly. . .
G-1493	Antenna Coil . . . .
G-1508	Speaker. . . . .
G-1562	Oscillator Coil. . . . . . .
G-1600	Voice Coil . . . .
G-1660	Output Transformer . . . . .
G-1661	I.F. Transformer (2nd) . . .
G-1662	Power Transformer. . . . . .
G-1662A	Power Transformer (25 cycle)
G-1662B	Power Transformer (220 volt)
G-1664	Input Transformer. . . . . .
G-1669	Filter Choke . . . .
G-1671	Bypass Pack. . . . .

CIRCUIT RESISTANCE ANALYSIS

Model 360 Socket to ground.

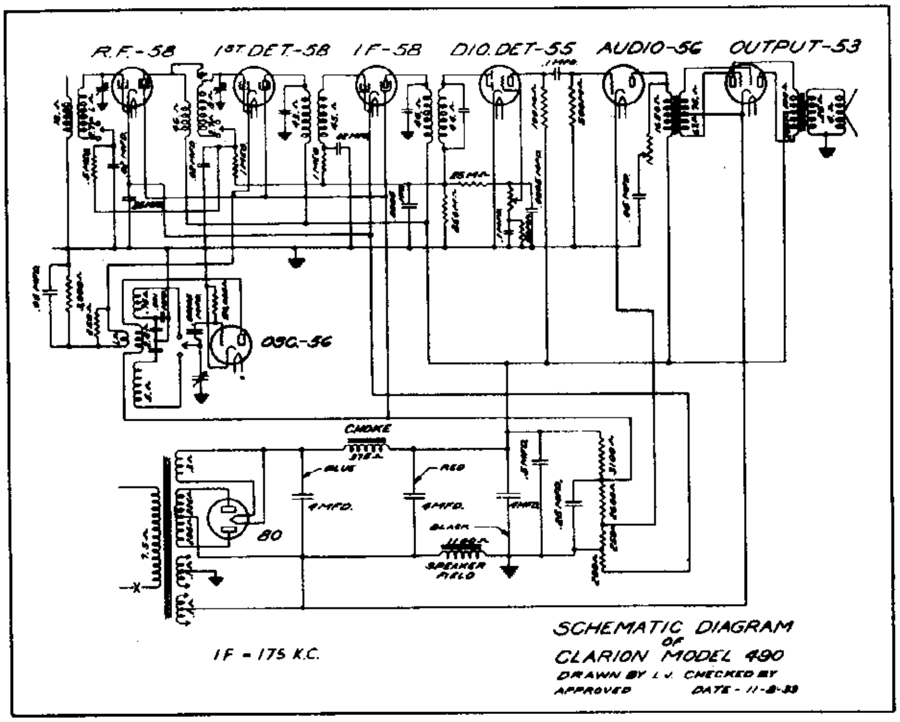
STAGE	GRID	CATH-ODE	HEATER	PLATE	SCREEN G	SUPPR. G
R.F.	Infinity	500	.1	6,300	3,000	500
1st Det. . .	4.0	10,000	.1	6,300	3,000	10,000
Oscillator .	100,000	0	.1	3,000	.....	......
I.F.	Infinity	500	.1	6,300	3,000	500
A.V.C. Det .	250,000	500	.1	500	.....	......
Audio. . . .	*750,000	300	.1	100,000	.....	......
Driver . . .	500,000	......	.1	7,600	7,600	......
Class "B". .	2,400	......	.1	6,700	2,400	......
Class "B". .	2,400	......	.1	6,700	2,400	......
Rectifier. .	....	......	6,500	2,400	.....	......

* VOLUME CONTROL FULL ON.

NOTE: Readings of one megohm and over are given as "infinity". The first three significant figures only, are interpreted from the ohmmeter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

MODEL 490
Schematic
Voltage,Parts List

TRANSFORMER CORP. OF AMERICA



VOLTAGE ANALYSIS OF MODEL 490 USING A 1000 OHM PER VOLTMETER

TUBE	STAGE	Ef	Ep	Eg	Ek	Esg	Esug	Ip
58	R.F.	2.3	190	.3	2.9	83	0	6.
58	1st DET.	2.3	190	.3	7.	78	0	2.
56	OSCILL.	2.3	83	.3	0			4.5
58	I.F.	2.3	190	.3	2.9	83	0	5.5
55	DIODE	2.3	36	.2	0	.2**		2.
56	A.F.	2.3	198	.2	10			5.
53	OUTPUT	2.5	292*	0	0			12.*
80	RECT.	4.5	292*					37.*

*Per Plate
** Diode Voltage

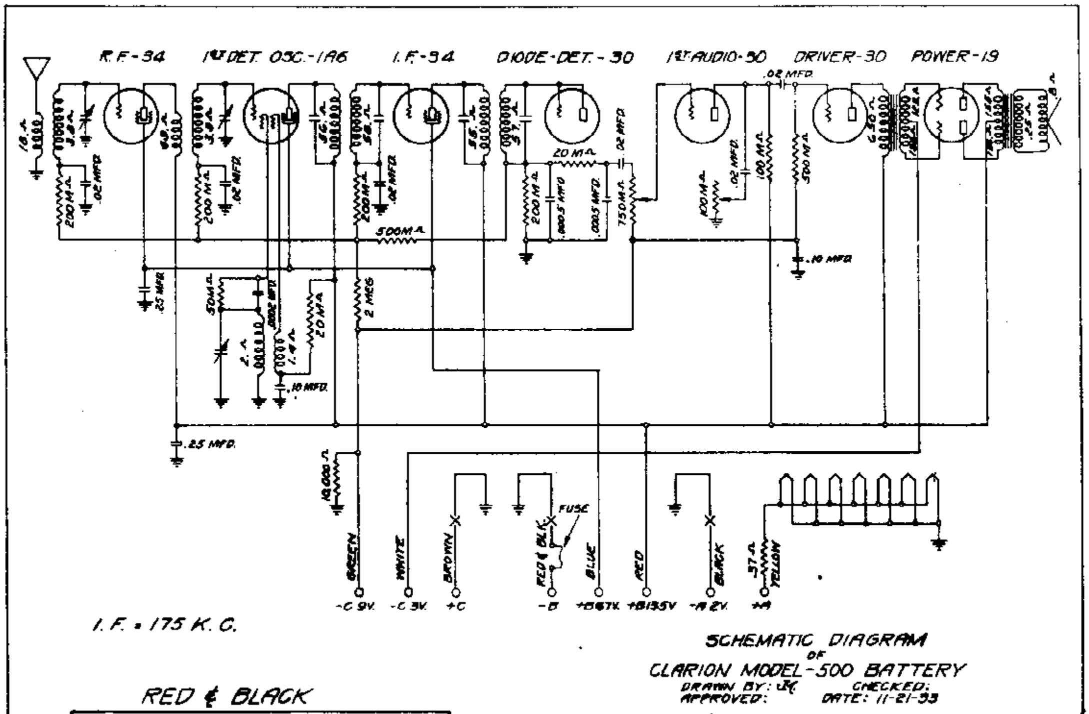
LINE VOLTAGE 107 VOLUME CONTROL - FULL ON

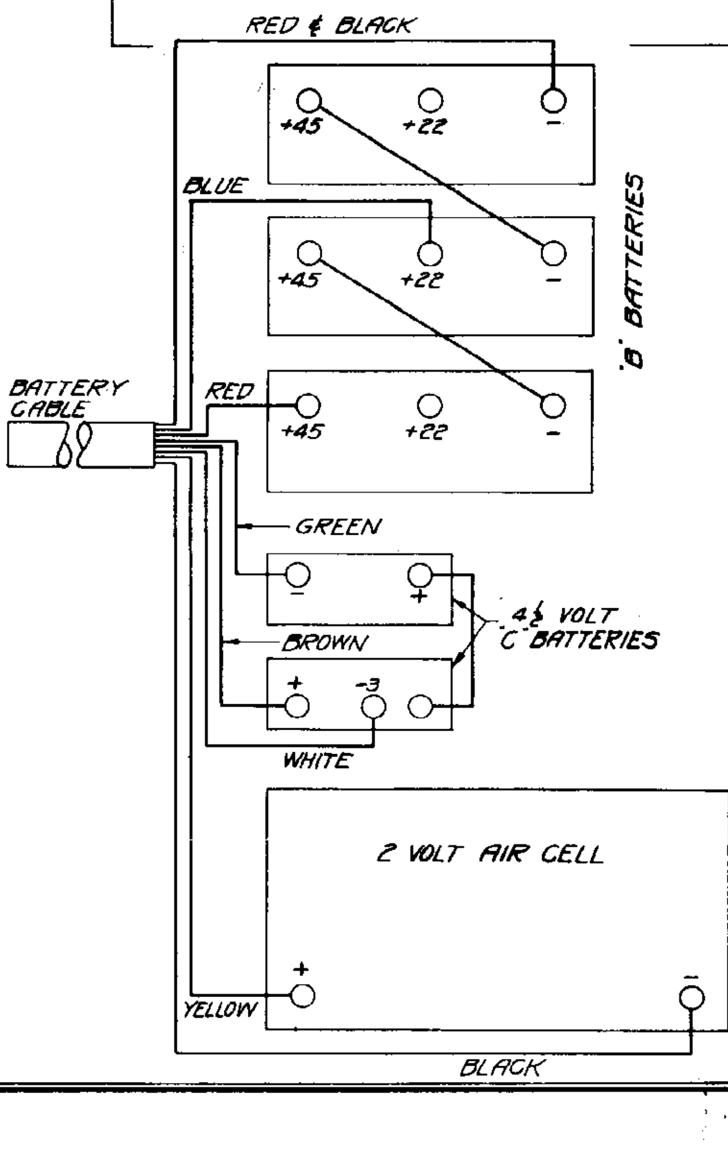
P-1015	Contact spring. . . . .
P-1038	Pilot light . . . .
P-1100A	.001 mfd. . . . .
P-1381	.0005 mfd. condenser. . . . . .
P-1595	Socket #80. . . . .
P-1728	.00005 mfd. condenser . . . . .
P-1860	Pilot light bracket . . . . . .
P-14229	Antenna and ground post . . . .
P-4262	#56 socket. . . . .
P-4264	#58 socket. . . . .
P-4400	Grid clips. . . . .
P-4485	Tube shield . . . .
P-4486	Tube shield cap . . . .
P-4488	Escutcheon plate. . . . .
P-4595	1 meg.resistor. . . . .
P-4597	250 ohm resistor. . . . .
P-4640	.25 mfd. condenser. . . . . . .
P-4644	.05 mfd. condenser. . . . . . .
P-4646	.02 mfd. condenser. . . . . . .
P-4659	50,000 ohm resistor . . . . . .
P-4662	100,000 ohm resistor. . . . . .
P-4663	500,000 ohm resistor. . . . . .
P-4701	.1 mfd. condenser . . . .
P-4869	25,000 ohm resistor . . . . . .
P-4910	3,000 ohm resistor. . . . . . .
P-4935	Field coil. . . . .
P-4961	8-4 mfd. electrolytic . . . . .
P-4965	Voltage divider . . . .
P-4969	.5 mfd. condenser . . . .
P-4970	100 Ohm resistor. . . . .
P-4971	Diaphragm . . . .
P-4972	Knobs . . . .
P-4975	Short wave switch . . . .
P-4976	55 socket . . . .
P-4977	53 socket . . . .
P-4978	Tone control. . . . .
P-4979	Volume control. . . . .
G-1274	Choke assembly. . . . .
G-1281	Coil and dowel (used in G-1803)
G-1282	Coil and dowel (used in G-1826)
G-1488	Padding condenser . . . .
G-1600	Voice coil and spider . . . . .
G-1709	10" speaker . . . .
G-1793	I. F. coils (used in G-1843). .
G-1794	Large I. F. transformer . . . .
G-1803	R. F. coil. . . . .
G-1805	Variable condenser. . . . . . .
G-1806	Dial assembly . . . .
G-1807	Power transformer . . . .
G-1812	Input audio transformer . . . .
G-1813	Output audio transformer. . . .
G-1843	Small I. F. transformer . . . .
G-1844	Oscillator coil . . . .
G-1846	Antenna coil. . . . .
G-1847	I. F. coils (used in G-1794). .

MODEL 500

TRANSFORMER CORP. OF AMERICA

Schematic, Batt. Data
Parts List

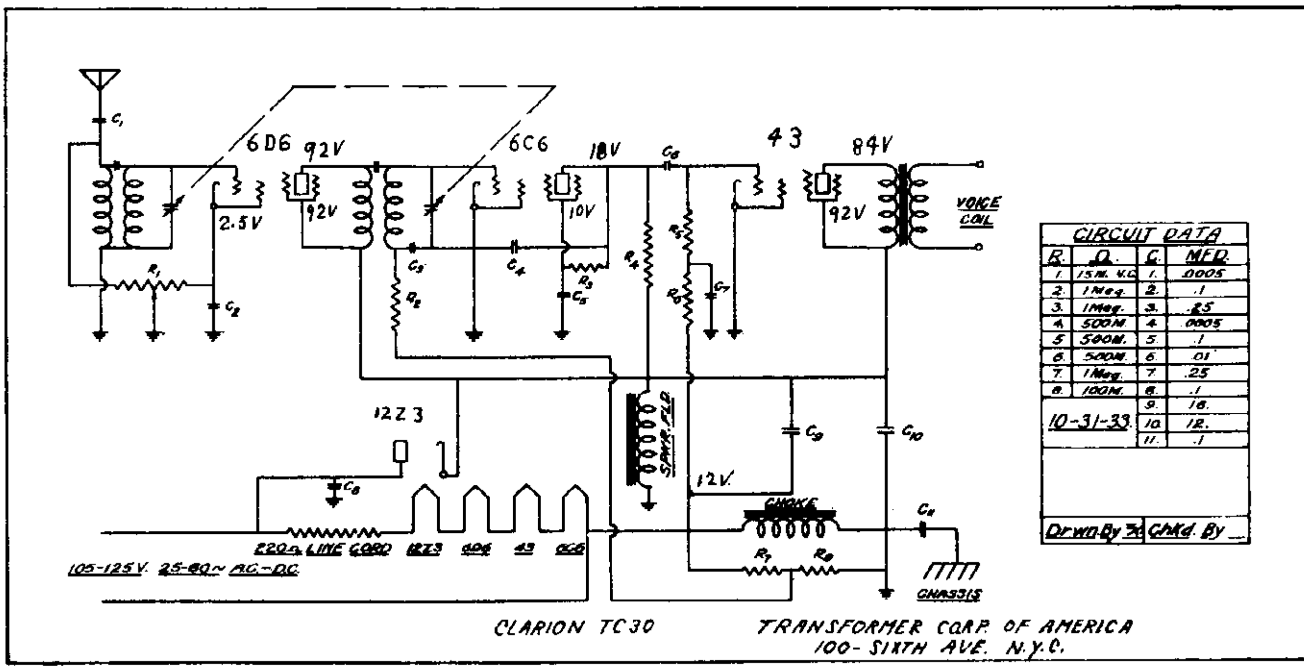




1	P-1381	.0005 Condenser	. . . .
1	P-1802	Ornamental Head Screw	.
1	P-1886	Hex. Head Cap Screws.	.
1	P-4486	Tube Shield Cap	. . . .
1	P-4640	.25 Mfd. Condenser.	. .
1	P-4646	.02 Mfd. Condenser.	. .
1	P-4659	50,000 Ohm Resistor	. .
1	P-4661	10,000 Ohm Resistor	. .
1	P-4662	100,000 Ohm Resistor.	.
1	P-4663	500,000 Ohm Resistor.	.
1	P-4664	200,000 Ohm Resistor.	.
1	P-4701	.10 Mfd. Condenser.	. .
1	P-4728	Tube Shield	. . . . . .
1	P-4729	Tube Shield Base.	. . .
1	P-4730	I.F. Unit	. . . .
1	P-4731	I.F. Unit	. . . .
1	P-4853	Escutcheon Plate.	. . .
1	P-4890	Small Knob.	. . . . . .
1	P-4891	Large Knob.	. . . . . .
1	P-4909	20,000 Ohm Resistor	. .
1	P-4998	Gang Condenser.	. . . .
1	P-4999	Volume Control.	. . . .
1	P-5000	Tone Control.	. . . . .
1	P-5001	3 Point Switch.	. . . .
1	P-5004	Speaker	. . . .
1	P-5014	Fuse Base	. . . .
1	P-5015	Battery Cable	. . . . .
1	P-5016	#34 Socket.	. . . . . .
1	P-5017	#1A6 Socket	. . . . . .
1	P-5018	#30 Socket.	. . . . . .
1	P-5019	#19 Socket.	. . . . . .
1	P-5020	2 Meg. Resistor	. . . .
1	P-5021	.0002 Condenser	. . . .
1	P-5022	Dial.	. . . .
1	P-5037	1/4 Amp. Fuse	. . . . .
1	G-1835	Oscillator Coil	. . . .
1	G-1836	Antenna Coil.	. . . . . .
1	G-1837	R.F. Coil	. . . .
1	G-1838	Driver Transformer.	. .
1	G-1839	Output Audio.	. . . . .

MODEL TC-30
Schematic
Parts List

TRANSFORMER CORP. OF AMER. (New Co.)



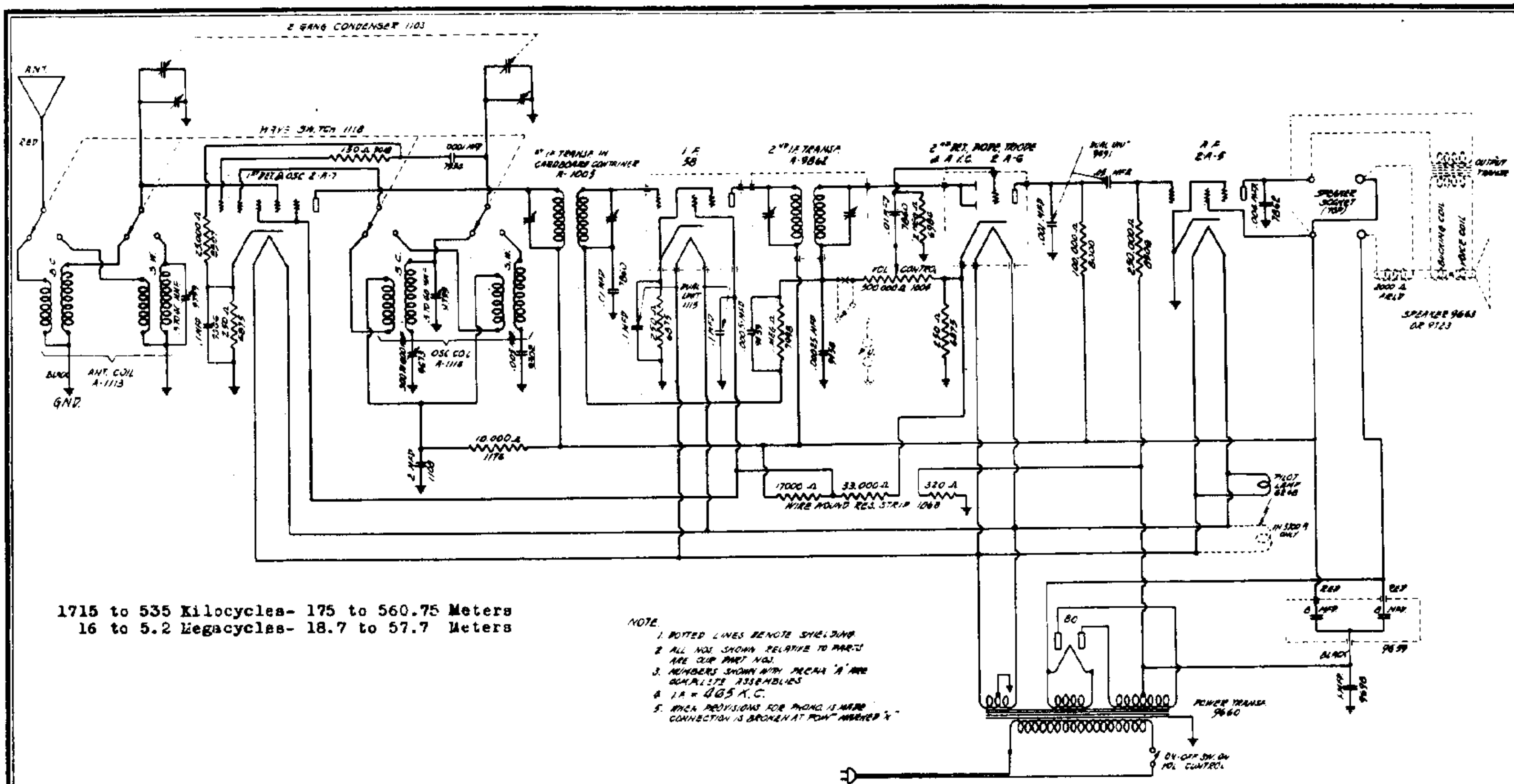
CLARION TC 30

REPLACEMENT PARTS

Stock No.	Part No.	Description of part	List price
TWR500I0	R2-3-7	I megohm resistor	.I2
TWR50020	R4-5-6	500,000 resistor..................	.I2
TWR50030	R8	I00,000 resistor..................	.I2
Twr50050	CI-4	.0005 Fixed condenser	.I6
TWR50060	C2-5-8-II	.I - 200 volt condensor	.I2
TWR50070	C3-7	.25 - 200 volt condensor	.I6
TWR50080	C6	.0I - 400 volt condensor	.I2
TWR50090	C9-I0	I2 x I6 filter condenser	I.20
Twr50I00		220 ohm line cord	.68
TWR50II0		Two gang condenser	2.00
TWR50I30		Antenna coil	.40
TWR50I20		R.F. coil	.40
TWR50I40		Speaker	4.20
TWR50I50		Knobs	.20
TWR50I60	RI	Volume control	.96

ALIGNMENT- Connect a test oscillator to the antenna wire of the receiver and set the oscillator and receiver to I400 K.C. Adjust either trimmer on the tuning condenser for maximum output.

TRANSFORMER CORP. OF AMER. (New Co.Schematic,Voltage



1715 to 535 Kilocycles- 175 to 560.75 Meters
16 to 5.2 Megacycles- 18.7 to 57.7 Meters

VOLTAGE TABLE
Line : 115
Volume : Full on

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO.1	GRID NO.2	GRID NO. 3 & 5
58	I. F. Amplifier	2.45	205	80	2			
2A7	Oscillator & 1st Detector	2.45	205		2.5	1.5	160	80
2A6	Second Detector Diode AVC and Triode	2.45	100##		1			
2A5	Output	2.45	190	205	.8###			
80	Rectifier	4.85						

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied.

Read all voltages from socket to chassis unless otherwise specified.

Read from grid to chassis.

TRANSFORMER CORPORATION OF AMERICA
100 SIXTH AVE N.Y.C.

MODEL TC-20, TC-21
Alignment Data
Parts List

TRANSFORMER CORP. OF AMER. (New Co.)

ALIGNMENT PROCEDURE: Only when an IF transformer, antenna or oscillator coil is replaced should it ever be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is absolutely necessary that a good accurate calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 tube leaving the grid cap disconnected. The ground side of the oscillator should be connected to the receiver chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the intermediate transformer brass hext adjusting nut located on top of the intermediate transformer can up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside the brass hex nut for maximum output.

4. Adjust the second I. F. transformer in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is essential that the following instructions be carefully adhered to in the order given otherwise the receiver will be insensitive and the dial calibration will be inaccurate.

1. Connect the high side of the oscillator output to the set antenna lead and the oscillator ground to the receiver chassis.

2. Place the band selector switch for operation on the 16 to 5.2 megacycle band.

3. Set the oscillator frequency to exactly 15 megacycles and adjust the receiver dial to exactly 15 megacycles. Then BRING IN THE 15 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE trimmer condenser of the oscillator gang condenser section. The oscillator trimmer condenser is mounted on top of the rear section of the variable condenser. The front section of the variable condenser tunes the antenna stage.

4. Place the band selector switch for operation on the 1715 to 535 kilocycle band, set the oscillator to exactly 1400 kilocycles and tune the receiver dial to 1400 kilocycles. BRING IN THIS 1400 KILOCYCLE SIGNAL BY ADJUSTING THE SMALL TRIMMER CONDENSER which is located underneath near the center and towards the front of the chassis.

5. Next adjust the antenna variable gang condenser section trimmer condenser for maximum output (front section).

6. Leave the receiver operating on the same band and set the oscillator frequency to approximately 600 kilocycles and adjust the dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left, adjust the 600 kilocycle padding condenser which is located below the speaker and accessible through the front of the chassis for maximum output.

7. Recheck the 1400 kilocycle adjustment.

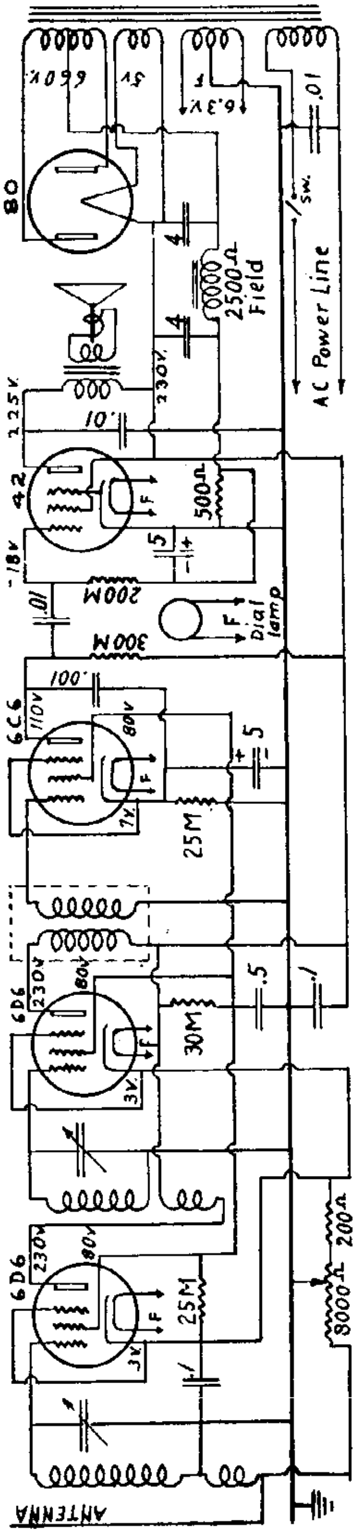
8. Place the band selector switch for operation on the 16 to 5.2 megacycle band and tune the dial to exactly 15 megacycles and set the oscillator frequency to 15 megacycles. Then adjust the trimmer condenser which is located underneath and toward the center of the right hand side of the chassis for maximum output.

This completes the alignment procedure and it is suggested that all the adjustments be rechecked.

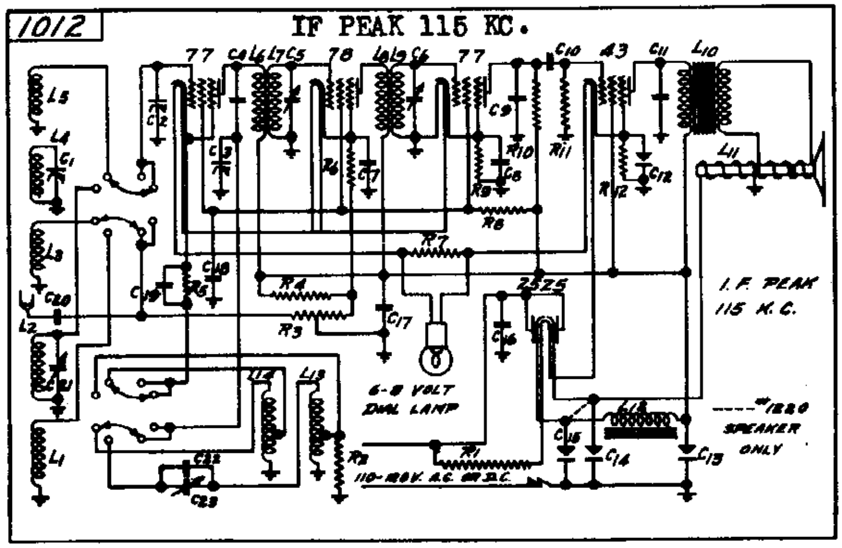
PARTS & PRICE LIST

PART NUMBER		LIST PRICE
1113	Antenna Coil	$ 1.63
1114	Oscillator Coil	1.63
1005	First I. F. Transformer	2.10
9862	Second I. F. Transformer	2.10
1118	Wave Switch	.75
1103	Gang Condenser	3.02
1104	Volume Control	1.24
9660	Power Transformer	4.02
9659	2-8 Mfd. Electrolytic Condenser	2.80
9673	Padding Condenser	.50
9799	Trimmer Condenser	.15
9671	Pilot Light Socket	.09
6248	2.5 Volt Pilot Light Socket	.17
1104	Tuning Dial	.28
1068	Wire Wound Resistor Strip	.96
6984	500,000 Ohm 1/3 Watt Resistor	.19
7997	1 Meg Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
6875	250 Ohm 1/3 Watt Resistor	.19
9018	150 Ohm 1/3 Watt Resistor	.19
8907	25,000 Ohm 1/3 Watt Resistor	.19
1176	10,000 Ohm 1/3 Watt Resistor	.19
9698	1 Mfd. 100 Volt Condenser	.56
9386	.1 Mfd. 200 Volt Condenser	.19
7862	.004 Mfd. 400 Volt Condenser	.17
7860	.01 Mfd. 400 Volt Condenser	.17
1115	2x.1 Mfd. 200 Volt Condenser	.35
9691	.05 Mfd. & .001 Mfd. 400 Volt Condenser	.39
1108	2 Mfd. Dry Electrolytic Condenser	.99
9307	.005 Mfd. Moulded Condenser	.55
9458	.00025 Mfd. Moulded Condenser	.21
7934	.0001 Mfd. Moulded Condenser	.21
9459	.0005 Mfd. Moulded Condenser	.21
8980	Tube Shield	.11
1179	Large Knob	.15
1180	Knob with dot	.17
9759	Small Knob	.14

TRANSFORMER CORP. OF AMER. (New Co.)



Model TC-40

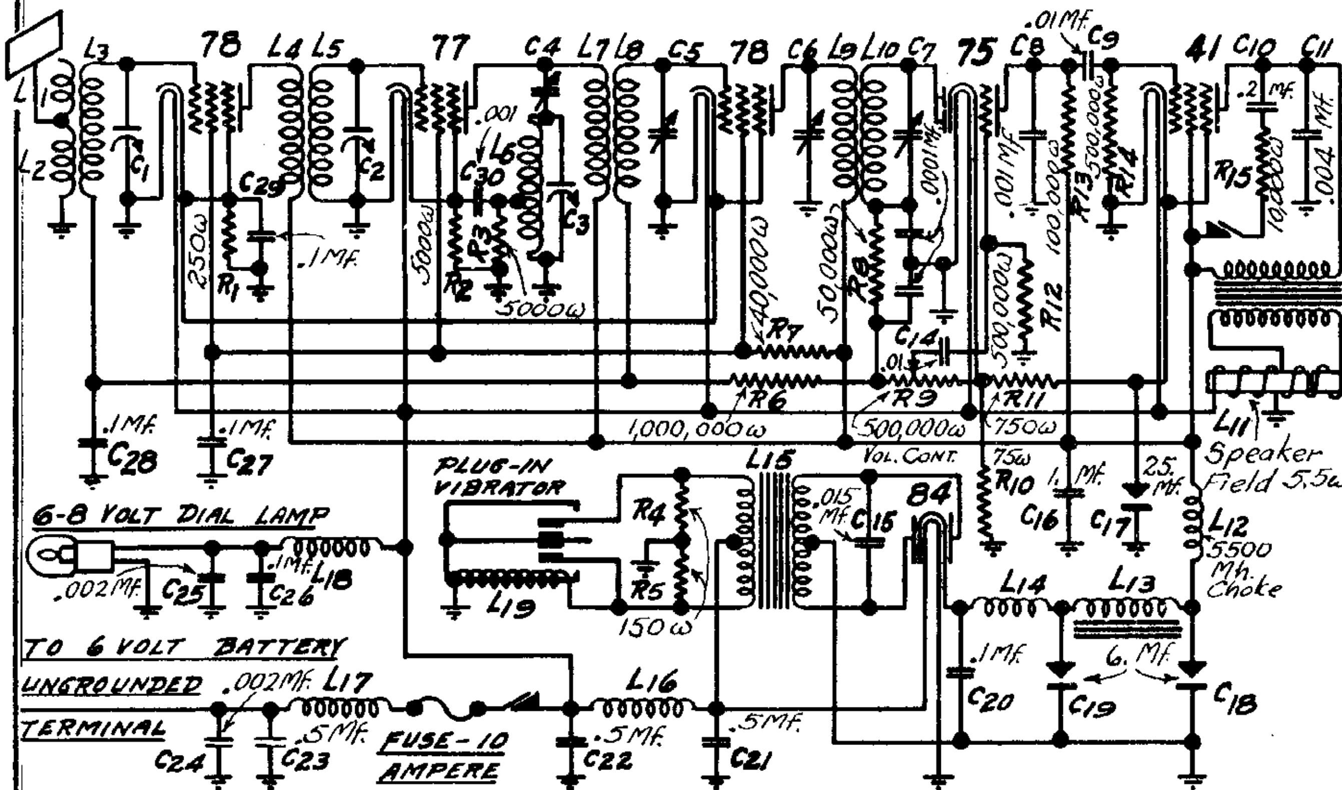


CODE	PART NO.	RESISTORS
R1	1125	150 Ohm Resistor in Power Cord A.P.
R2	1063	500 Ohm Long Wave Oscillator Resistor
R3	1296	10,000 Ohm Volume Control & Switch
R4	922	75,000 Ohm I.F. Cathode Resistor
R5	919	5,000 Ohm Oscillator Feed Resistor
R6	1065	500 Ohm I.F. Cathode Bias Resistor
R7	1506	20 Ohm Pilot Light Shunt Resistor
R8	921	40,000 Ohm R.F. & I.F. Screen Feed Resistor
R9	941	20,000 Ohm Second Detector Cathode Bias Resistor
R10	924	250,000 Ohm Second Detector Plate Load Resistor
R11	925	500,000 Ohm 43 Grid Bias Resistor
R12	1063	500 Ohm 43 Cathode Bias Resistor
		CONDENSERS
C1	855	371 MMFD. First Preselector Section of 3 Gang
C2	855	371 MMFD. Second Preselector Section of 3 Gang
C3	855	336 MMFD. Oscillator Section of 3 Gang
C4	264	.00005 MFD. Oscillator Plate Feed Condenser
C5	1521	75-150 MMFD. First I.F. Trimmer
C6	1523	75-150 MMFD. Second I.F. Trimmer
C7	272A	.1 MFD. 200 Volt I.F. Cathode By-Pass
C8	185A	.2 MFD. 200 Volt Second Detector Cathode By-Pass
C9	662	.002 MFD. Mica Second Detector Plate Filter
C10	269A	.01 MFD. 400 Audio Feed Condenser
C11	269A	.01 MFD. 400 Volt Output Plate Filter
C12	926	25 MFD. 25 Volt 43 Cathode By-Pass
C13	1296	4 MFD. 150 W.V. Dry Electrolytic
C14	1295	4 MFD. 150 W.V. Dry Electrolytic
C15	1298	10 MFD. 150 W.V. Dry Electrolytic
C16	272A	.1 MFD. 200 Volt Line By-Pass Condenser
C17	267A	.5 MFD. 200 Volt B. Supply By-Pass Condenser
C18	272A	.1 MFD. 200 Volt R.F. & I.F. Screen By-Pass
C19	265	.001 MFD. Mica Oscillator Coupling Condenser
C20	265	.001 MFD. Mica Antenna Series Condenser
C21	972	2 Plate L.W. Preselector Trimmer
C22	339	2-.0001 MFD. Mica L.W. Oscillator Series Condenser
C23	1522	75-100 MMFD. L.W. Oscillator Series Trimmer
		INDUCTANCES
L1	1475	L.W. Preselector Primary 800 Turns #36 S.S.E.
L2	1475	Long-Wave Preselector Secondary 490 Turns #36 S.S.E.
L3	847	Broadcast Preselector Primary 176 Turns #36 S.S.E.
L4	847	Broadcast First Secondary 133 Turns #36 S.S.E.
L5	847	Broadcast Second Secondary 128 Turns #36 S.S.E.
L6	1470	Microhenry First I.F. Primary
L7	1470	25,000 Microhenry First I.F. Secondary
L8	1473	25,000 Microhenry Second I.F. Primary
L9	1473	25,000 Microhenry Second I.F. Secondary
L10		#43 Output Transformer 917 Rola 1220 Quam
L11		3000 Ohm Speaker Field 917 Rola 1220 Quam
L12	940	20 Henry Choke
L13	1476	L.W. Oscillator 390 Turns #36 S.S.E. Tapped 20 Turns
L14	1470	Broadcast Oscillator 106 Turns #36 S.S.E. Tapped 30 Turns

Model TC-52

MODEL TC-50
Schematic
Voltage
Alignment Data

TRANSFORMER CORP. OF AMER. (New Co.)



IF PEAK 175 KC.

R-F. ADJUSTMENT: Remove chassis from case, couple the output of a modulated oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 KC.

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Adjust trimming condensers, starting with C3, C2 and then C1, until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments. Greater accuracy can be obtained with an output meter.

I-F. ADJUSTMENT: The four I-F. trimming condensers are adjusted at 175 KC.

Connect a modulated oscillator set at 175 KC. between the first detector grid and ground. Connect output meter.

Adjust the tuning condenser so that no signal except the I-F. oscillator is heard at maximum volume, With the volume control set at maximum, reduce the output of the oscillator until a small deflection is obtained. Unless this is done, the AVC action will make correct adjustments impossible.

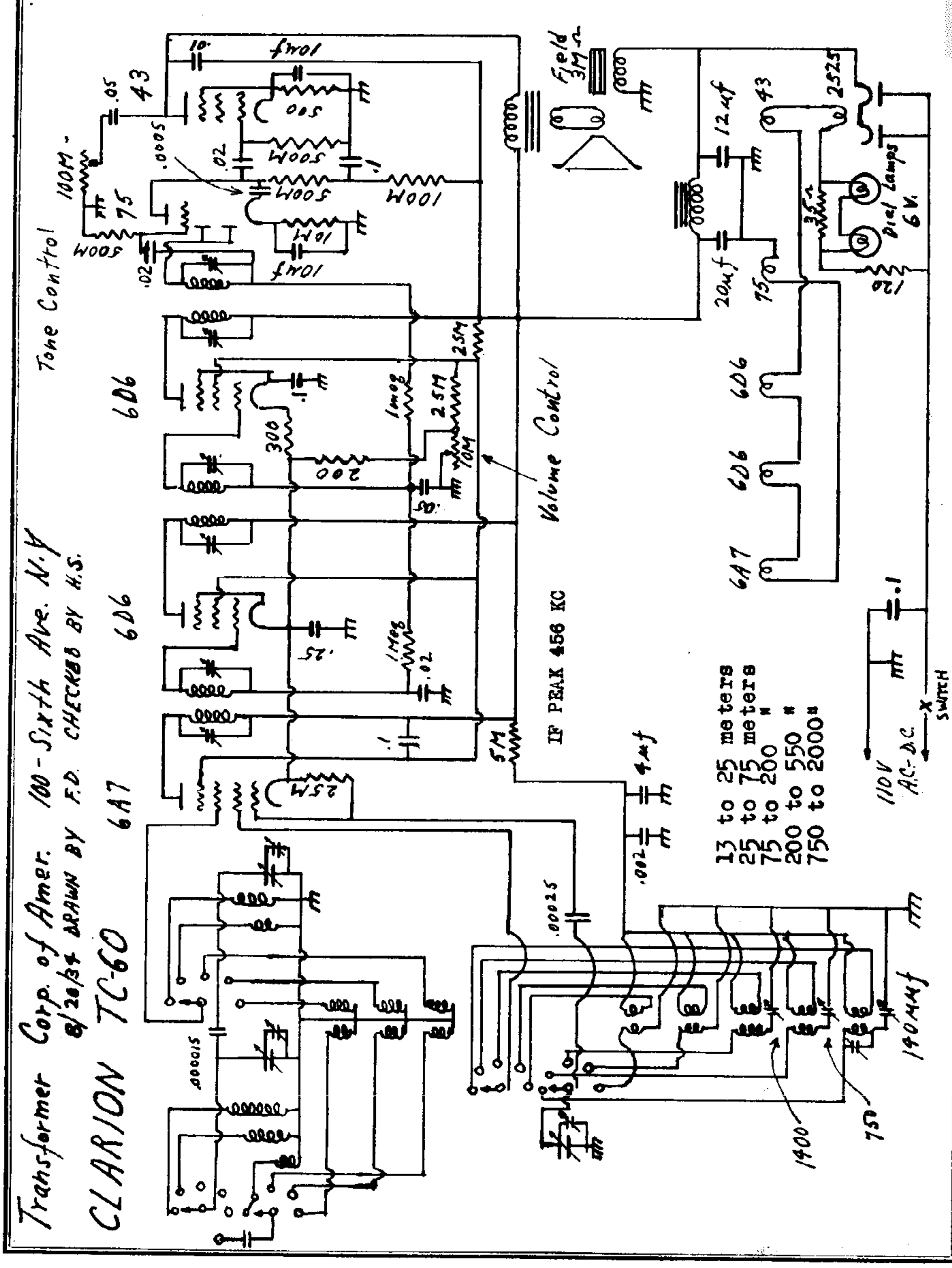
Trim in order C4, C5, C6 and C7. Repeat adjustments and then follow with the R-F. adjustments.

SOCKET VOLTAGES

	TUBE	CATHODE-PLATE	CATHODE-SCREEN	CATHODE-GRND.	PLATE CUR.
R-F.	78	180	85	2	4 MA.
Det-Osc.	77	180	85	4	6.3 "
I-F.	78	180	85	2	4
2Det.AVC.	75	125	—	2	1
Output	41	175	180	15	17

Heater Voltage 5.5 volts.

TRANSFORMER CORP. OF AMER. (New Co.)



MODEL TC-60
Alignment Data
Parts List

TRANSFORMER CORP. OF AMER. (New Co.)

The action of the A.V.C. will defeat the purpose of an output meter if used in the normal manner. To obviate this, the oscillator output should be turned to as low a setting as will cause a reading on the output meter with the volume control on the set turned to maximum. This will allow the out meter to function correctly. Adjust the test oscillator to 456 K.C. and connect to the grid cap of the 6A7 tube and adjust the trimmers on the three I.F. stages. (There are two adjustments in each coil; a screw and a nut.)

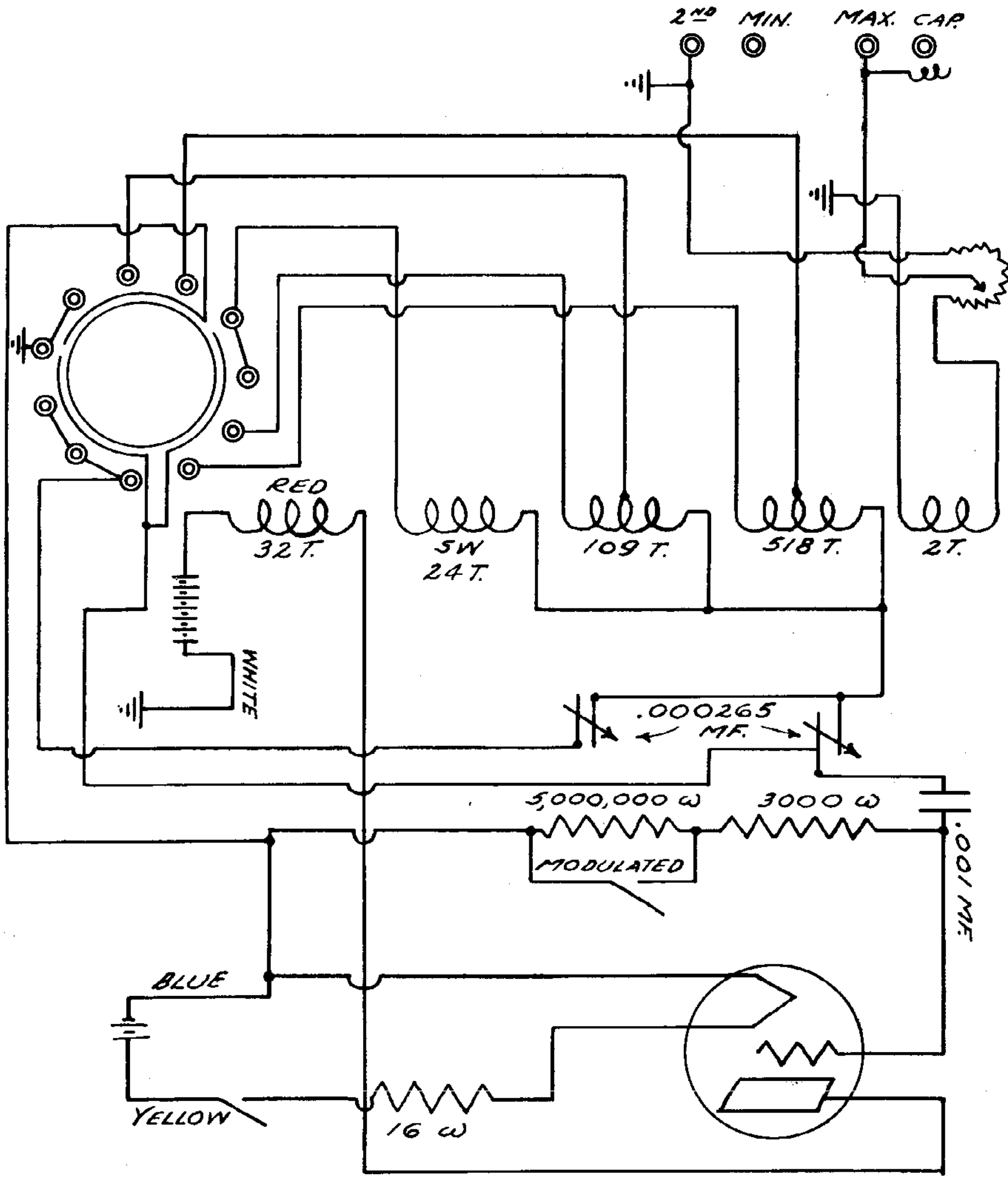
R.F. ALIGNMENT-Connect oscillator to antenna wire on set and adjust oscillator to 1400 K.C. Set receiver dial to 1400 K.C. and wave band switch to the broadcast position. Adjust output of oscillator as outlined under I.F. alignment. Adjust trimmers on sections 1 and 2 for maximum output. Then adjust section 3 of the variable condenser for maximum output. The oscillator padder condenser is the center one of three located on the back of the chassis. In the event that the oscillator section does not track through the broadcast band; this trimmer should be adjusted.

No adjustments are necessary on the other wave bands. All the coils are correctly matched so that they will be in alignment if the above adjustments are correctly made.

PART NO.	LIST PRICE PARTS LIST	PRICE
TCG-1001	3000 ohm 5" speaker single 43 trans	$ 5.20
TCG-1002	BROADCAST Oscillator and I st I.F. coil	2.95
TCG-1003	Second I.F. Transformer	1.95
TCG-1004	Third I.F. Transformer	1.95
TCG-1005	LONG wave oscillator loading coil	.70
TCG-1006	Broadcast and long wave preselector	2.50
TCG-1007	S.W. antenna Coil 13-25 Meter band	.55
TCG-1008	S.W. " " 25-75 " "	.55
TCG-1009	S.W. " " 75-200 " "	.55
TCG-1010	S.W. Oscilator " 13-25 " "	.55
TCG-1011	S.W. " " 25-75 " "	.55
TCG-1012	S.W. " " 75-200 " "	.55
TCG-1013	200 Filter choke	1.20
TCG-1014	3 gang variable condenser	3.60
TCG-1015	3000 ohm vol. cont. with switch	1.10
TCG-1016	100,000 tone control	.75
TCG-1017	3 gang 6 circuit 5 position wave change switch	2.10
TCG-1018	20-12 mfd. 100 w.v. filter cond.	1.95
TCG-1019	4 mfd. 100 wv Filter cond.	.80
TCG-1020	Dual 10 mfd. By-pass cond.	1.20
TCG-1021	.25 mfd. 200V Tubular cond.	.24
TCG-1022	.1 mfd. 200V Tubular Cond.	.16
TCG-1023	.05 " " " "	.14
TCG-1024	.02 " " " "	.13
TCG-1025	.01 " " " "	.13
TCG-1026	.006 " 400V " "	.13
TCG-1027	Moulded Mica cond. 000015,002, and .0005 mfd.	..20
TCG-1028	Trimmer cond. 3-30 mmf.	.20
TCG-1029	Triple Padding cond. strip, 140-600-1500 mmf.	1.60
TCG-1030	Line resistor 155 ohms tapped at 20 ohms	1.20
TCG-1031	500 ohm 1/2 watt Carbon Resistor	.25
TCG-1032	1/3 Watt carbon resistor any value	.19

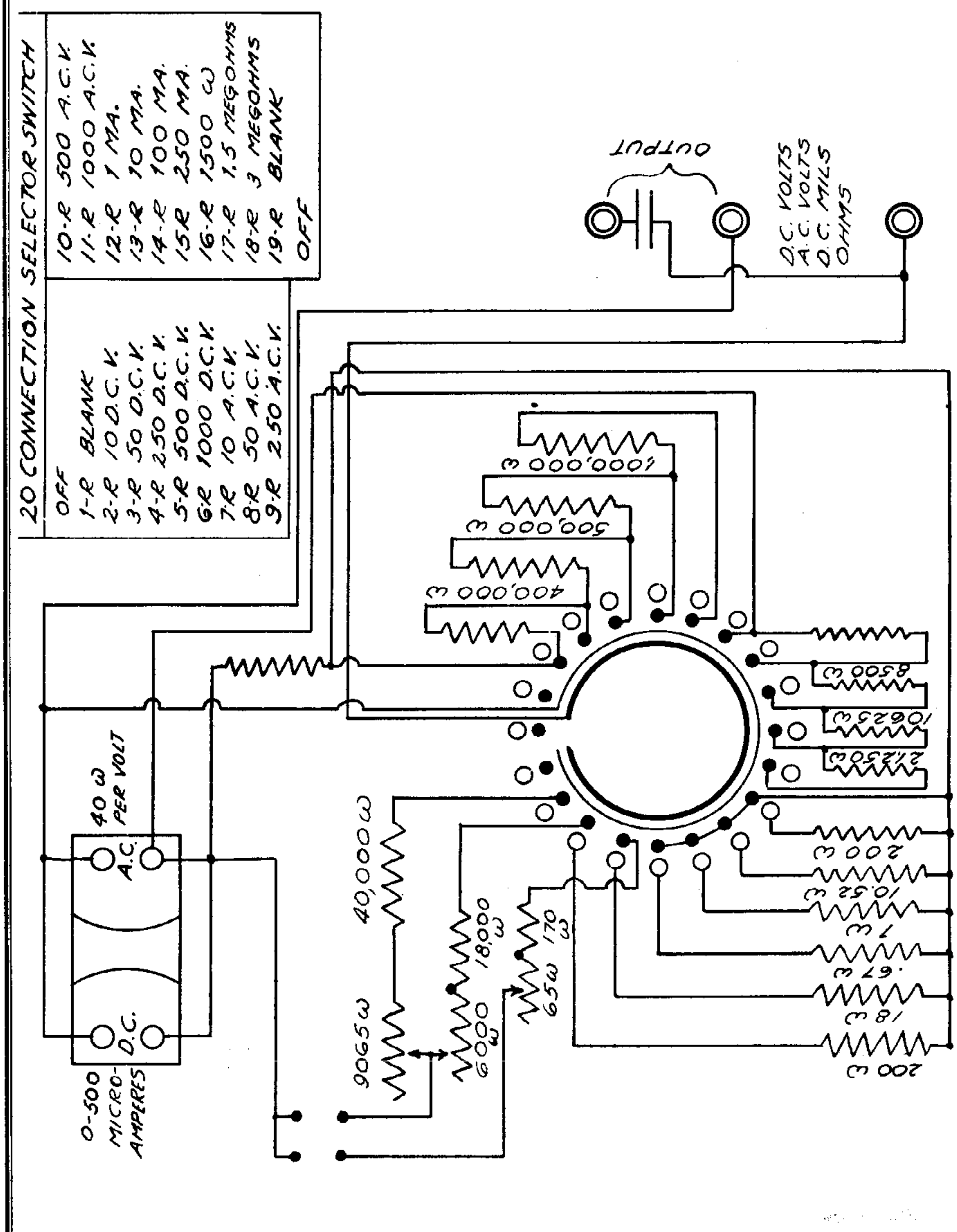
MODEL 1151
Oscillator
Schematic

TRIPLETT ELECTRICAL INSTRUMENT CO.



MODEL 1200
Tester
Schematic

TRIPLETT ELECTRICAL INSTRUMENT CO.

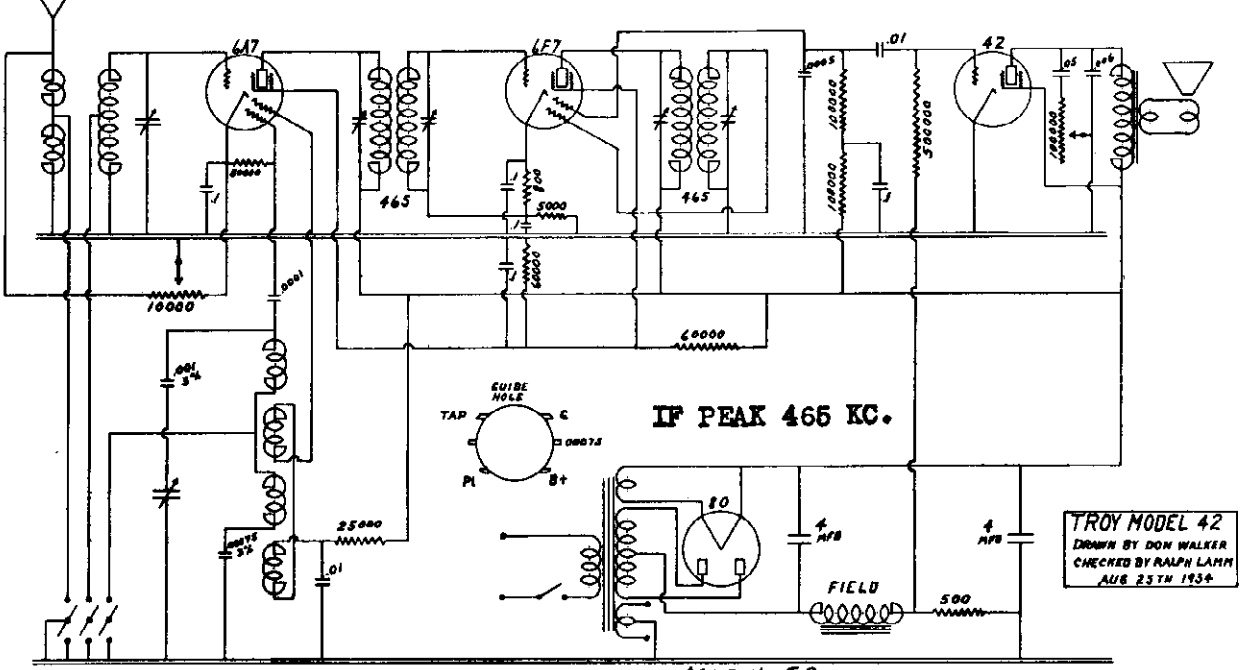


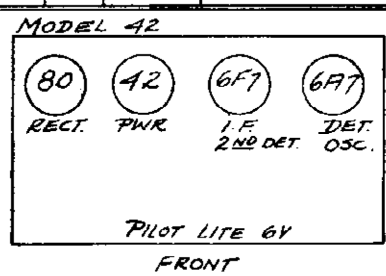
MODEL 42
MODEL 52
Schematics
Socket Layouts

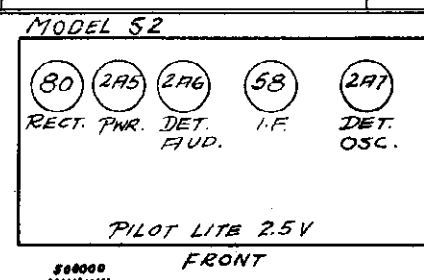
TROY RADIO MFG. CO.

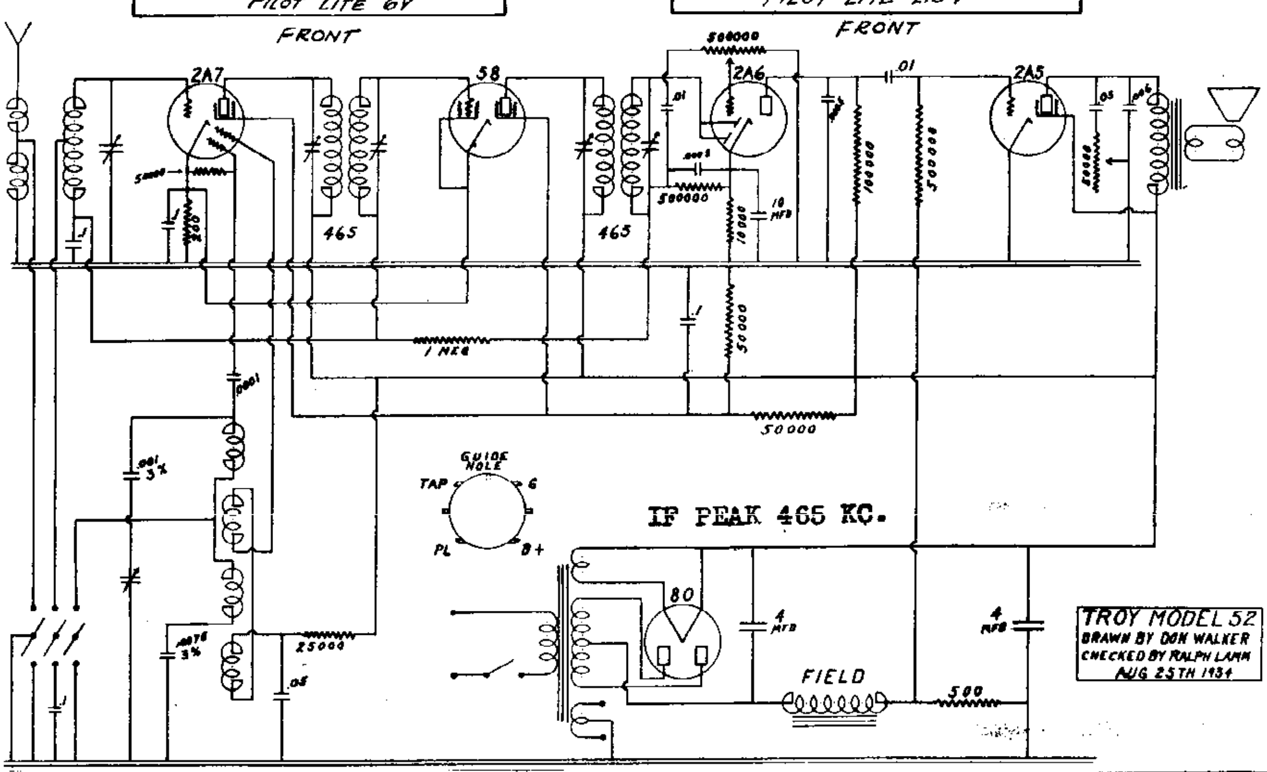
TROY 4 and 5 TUBE SUPERS

(2 Bands, 75-550 Meters)



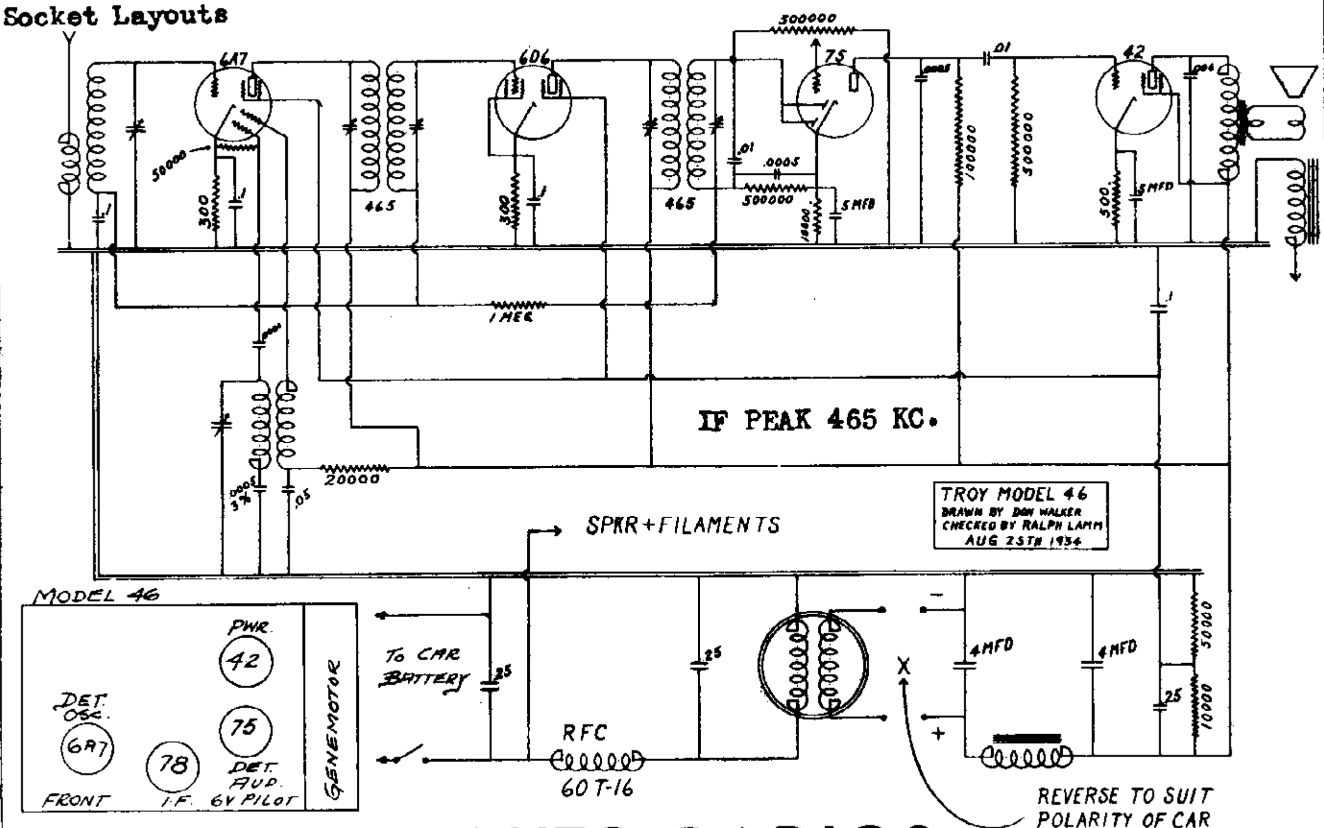






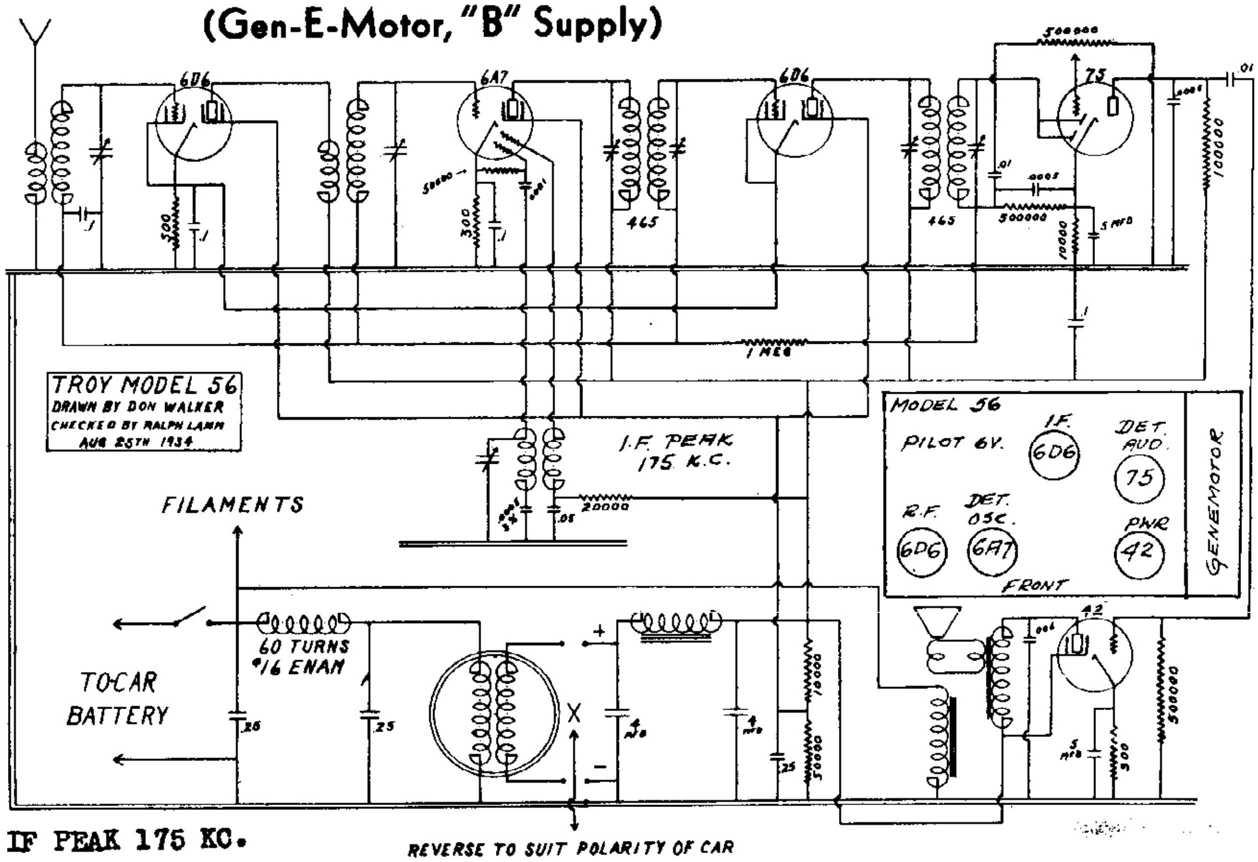
MODEL 46
MODEL 56
Schematics
Socket Layouts

TROY RADIO MFG. CO.



TROY SUPER AUTO RADIOS

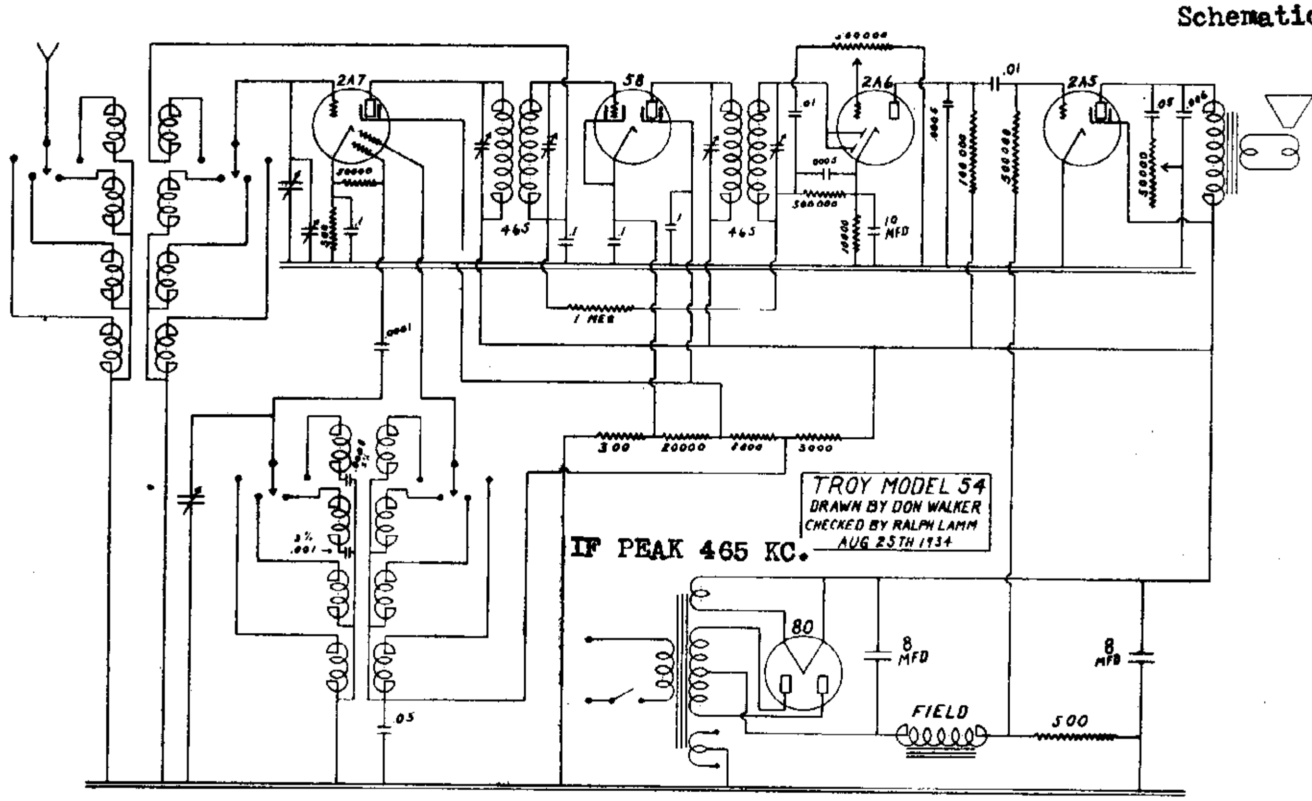
(Gen-E-Motor, "B" Supply)



IF PEAK 175 KC.

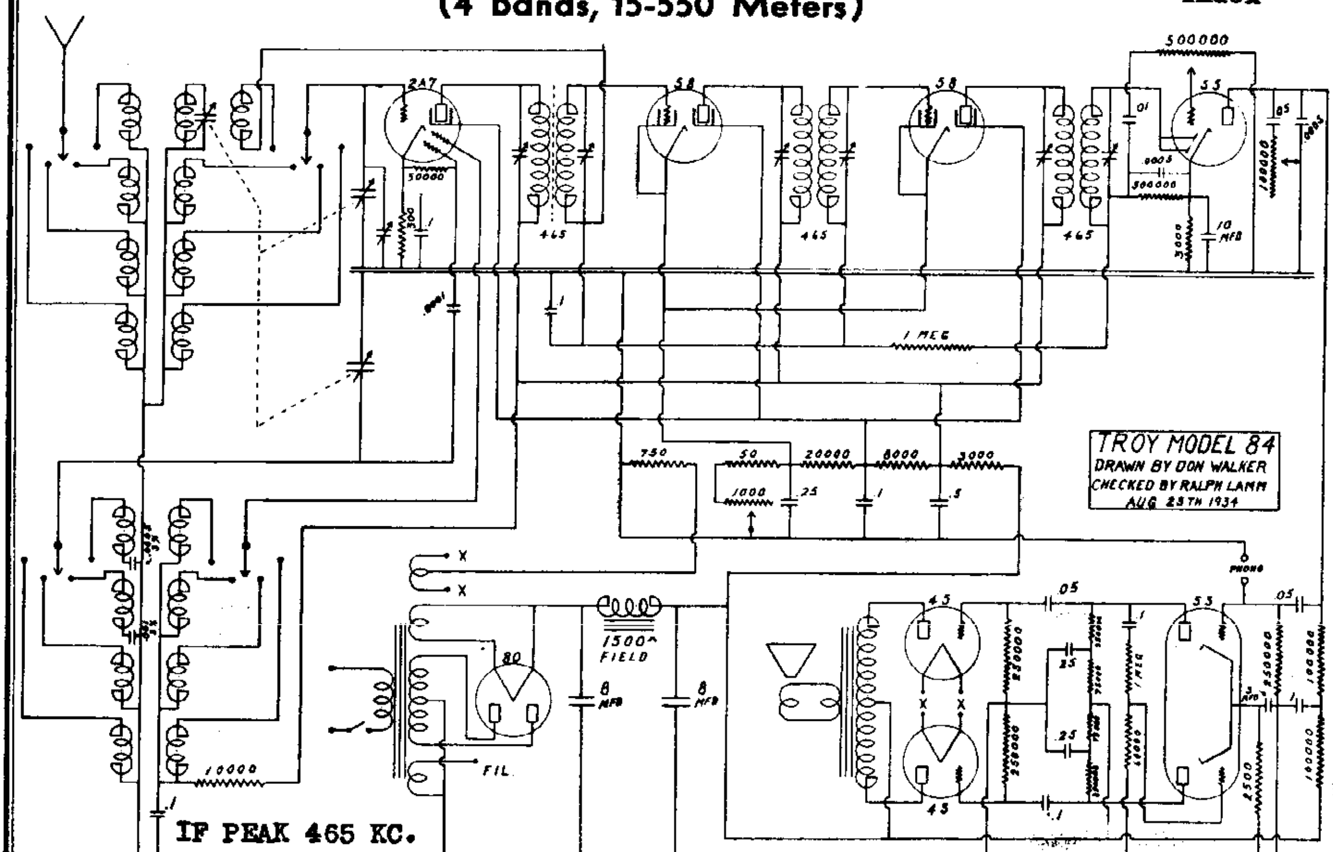
MODEL 54
MODEL 84
Schematic

TROY RADIO MFG. CO.



TROY ALL WAVE SUPERS
(4 Bands, 15-550 Meters)

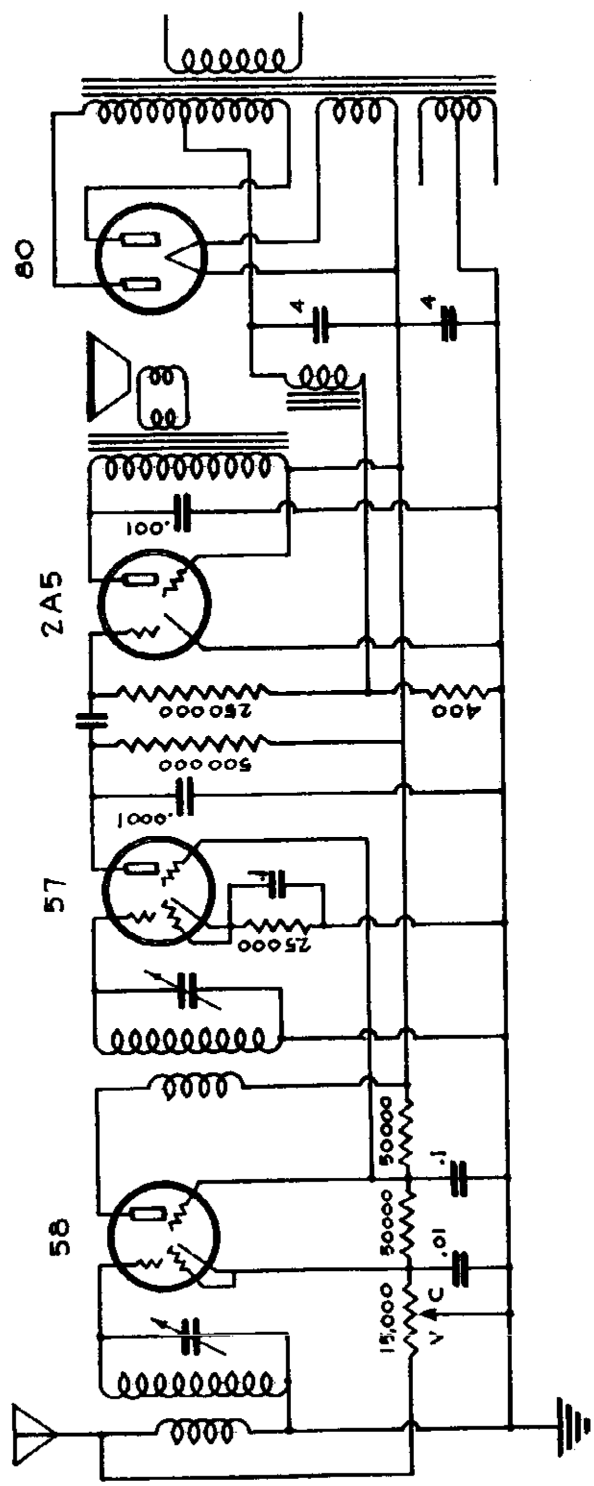
For Socket Layout, see Index

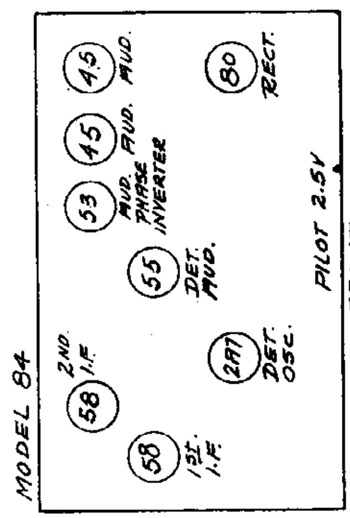


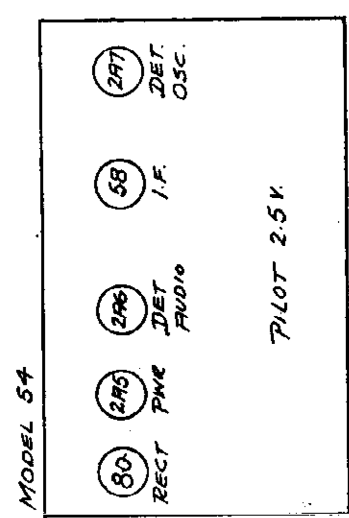
MODEL 4-Tube TRF
Schematic
MODELS 54,84
Socket Layouts

TROY RADIO MFG. CO.

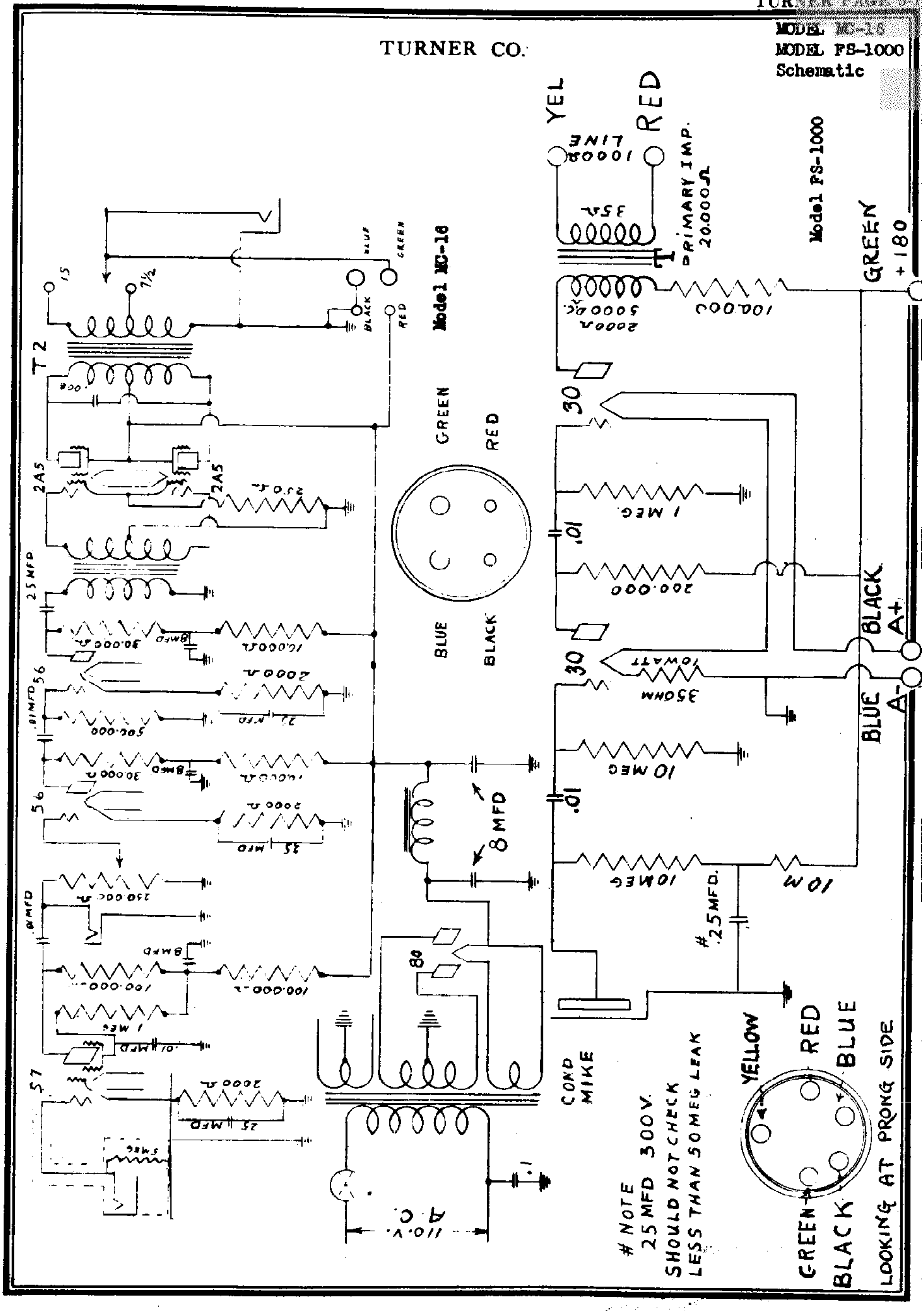
4 TUBE T. R. F.





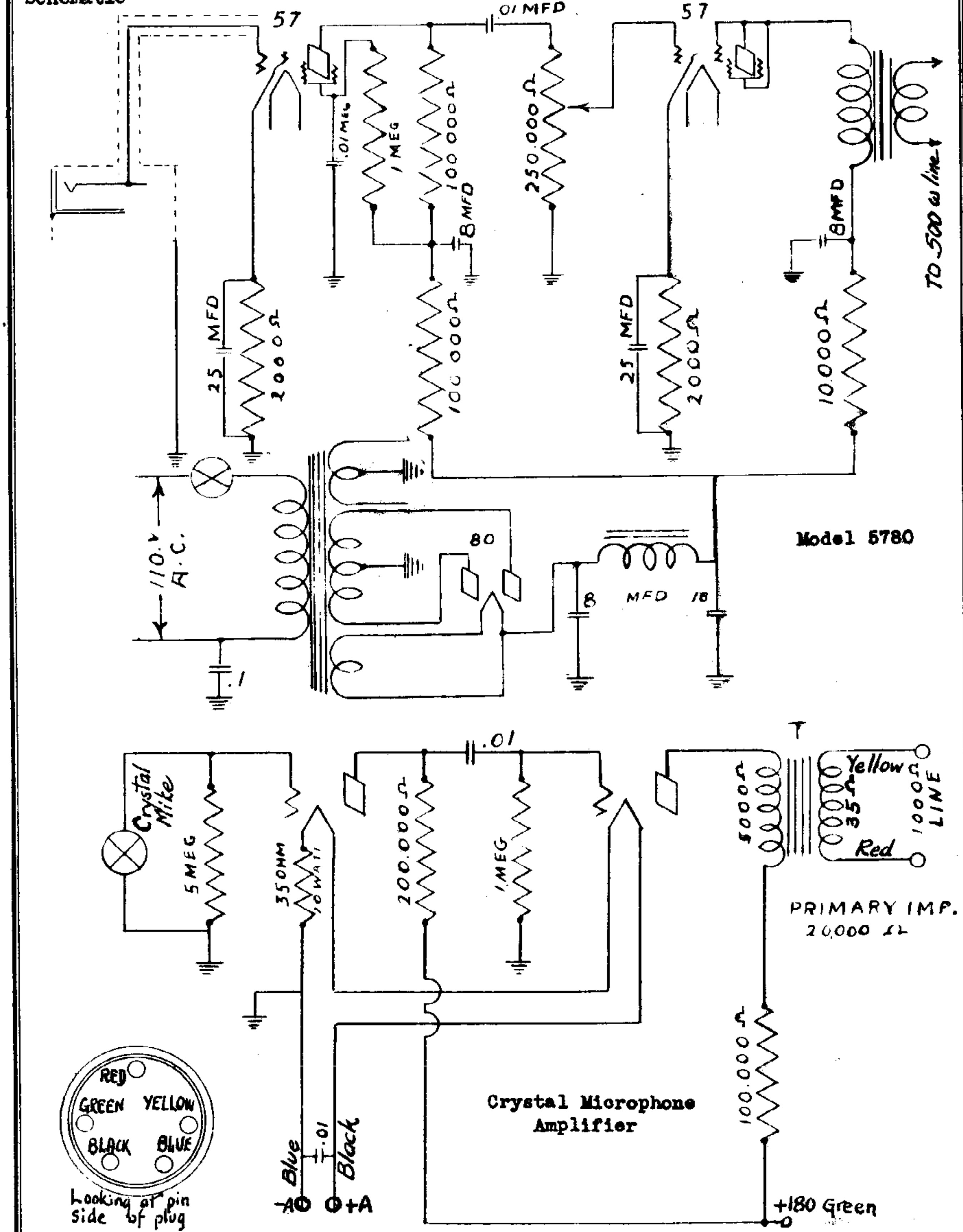


MODEL MC-16
MODEL FS-1000
Schematic



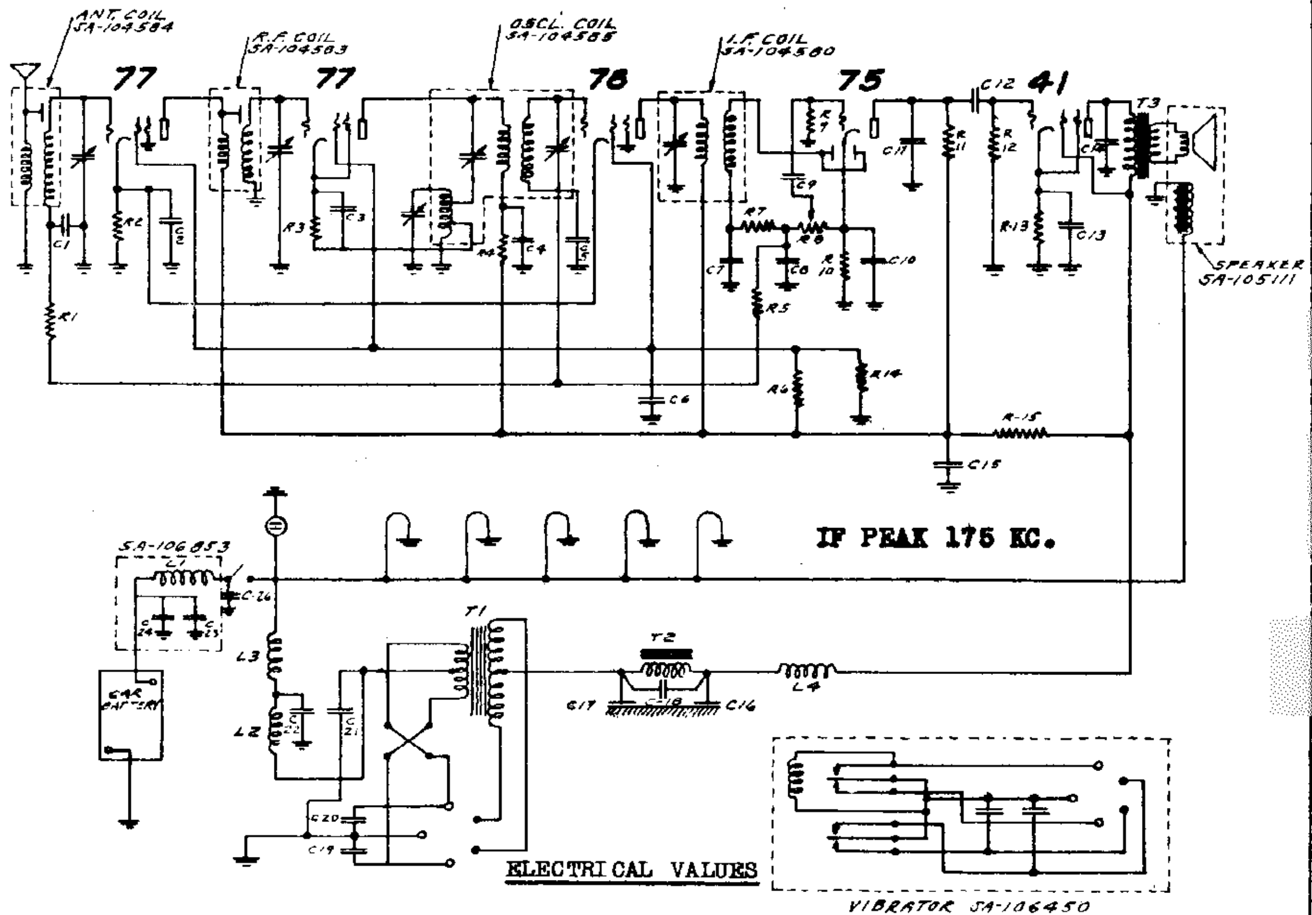
MODEL 5780
MODEL Crystal-
Microphone Amplifier
Schematic

TURNER CO



MODEL 45-A, 45-C
Schematic
Color Code

UNITED AMERICAN BOSCH CORP.



ELECTRICAL VALUES

R-1 100,000 ohms 1/4 watt
R-2 750 ohms 1/4 watt
R-3 7500 ohms 1/4 watt
R-4 2000 ohms 1/4 watt
R-5 1/2 meg. 1/4 watt
R-6 40,000 ohms 1/4 watt
R-7 50,000 ohms 1/4 watt
R-8 1/2 meg. Volume Control
R-9 1 meg. 1/4 watt
R-10 5,000 ohms 1/4 watt
R-11 1/4 meg. 1/4 watt
R-12 1/2 meg. 1/4 watt
R-13 600 ohms 1/2 watt
R-14 75,000 ohms 1/4 watt
R-15 4,000 ohms 1 watt
R-16 ---
R-17 ---
R-18 ---
R-19 ---
R-20 ---
C-1 .05 - 2 ply
C-2 .25 - 2 ply
C-3 .002 - 4 ply
C-4 .05 - 3 ply
C-5 .05 - 2 ply
C-6 .05 - 3 ply
C-7 .0001 mfd. mica
C-8 .0001 mfd. mica
C-9 .005 - 3 ply
C-10 .25 - 2 ply
C-11 .003 - 4 ply
C-12 .005 - 3 ply
C-13 10 mfd. electrolytic
C-14 .005 - 3 ply
C-15 .05 - 3 ply
C-16 8 mfd. electrolytic
C-17 8 mfd. electrolytic
C-18 .1 mfd. - 2 ply
C-19 .05 mfd. - 2 ply
C-20 .05 mfd. - 2 ply
C-21 .5 mfd. 200 V. in can
C-22 .5 mfd. 200 V. in can
C-23 .5 mfd. mica
C-24 .001 mfd. mica
C-25 ---
C-26 .0001 mica
L-1 R.F. Choke coil
L-2 Choke coil
L-3 R.F. Choke coil
L-4 R.F. Choke coil
T-1 Power Transformer
T-2 Choke coil
T-3 Output Transformer

STANDARD WIRE COLOR CODE

Plate ....Blue
"B" plus .... Red
Grid .... Green
Screen .... Green and White
Cathode .... Black
A.V.C. .... Red & Yellow or White
"B" minus .... Black and White
Ground .... Black and Red
Overhead grid .... Green rubber

STANDARD VOLUME CONTROL WIRING

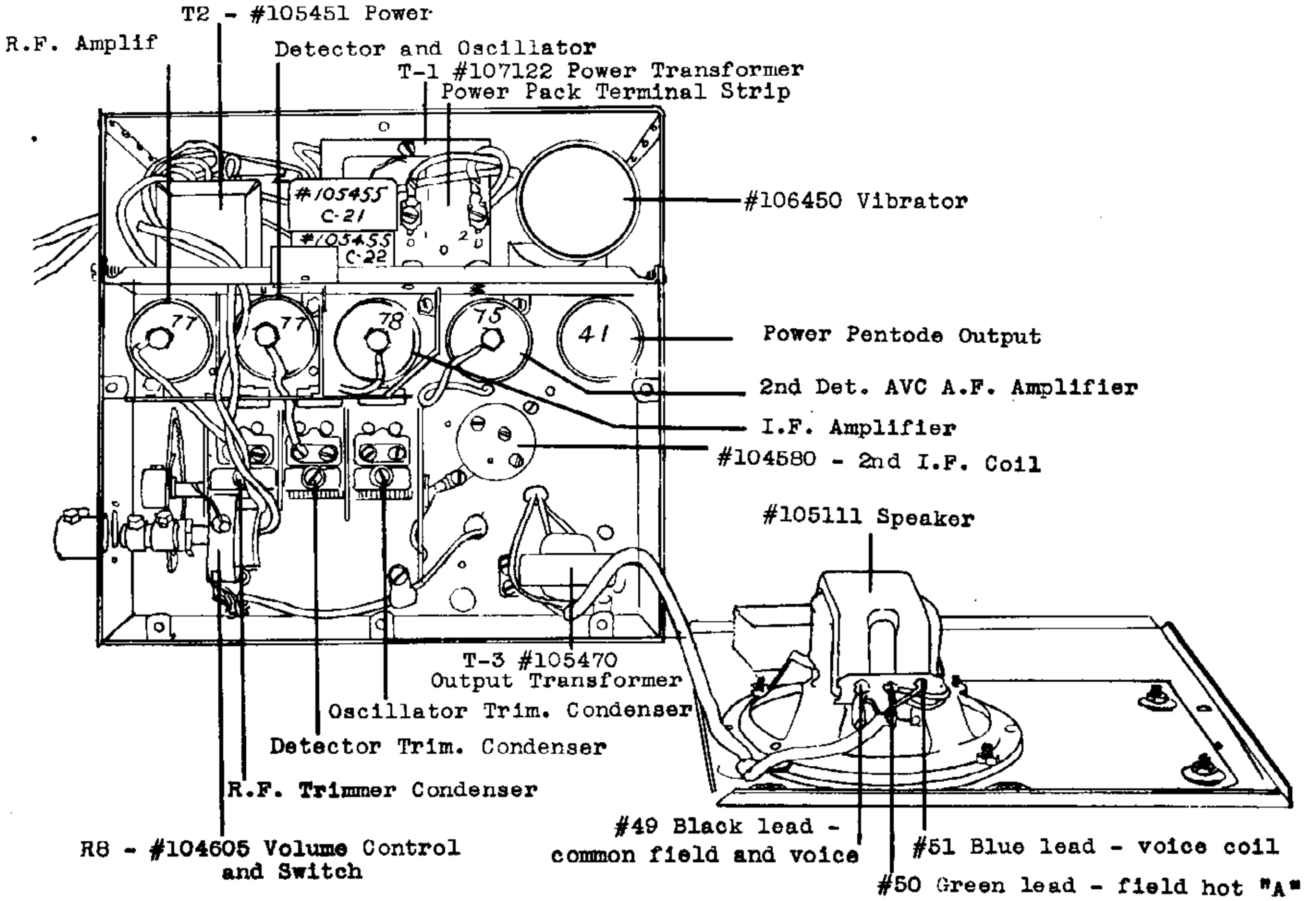
Arm .... Green
Low Side .... Black
High .... Red and White

R.M.A. RESISTOR COLOR CODE

BODY	TIP	DOT
0 - BLACK	0 - BLACK	.0 - BLACK
1 - BROWN	1 - BROWN	0 - BROWN
2 - RED	2 - RED	00 - RED
3 - ORANGE	3 - ORANGE	000 - ORANGE
4 - YELLOW	4 - YELLOW	0000 - YELLOW
5 - GREEN	5 - GREEN	00000 - GREEN
6 - BLUE	6 - BLUE	000000 - BLUE
7 - PURPLE	7 - PURPLE	
8 - GREY	8 - GREY	
9 - WHITE	9 - WHITE	

MODEL 45-A, 45-C
Alignment Data

UNITED AMERICAN BOSCH CORP.



ADJUSTING AND ALIGNING INSTRUCTIONS

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless a coil or I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows:

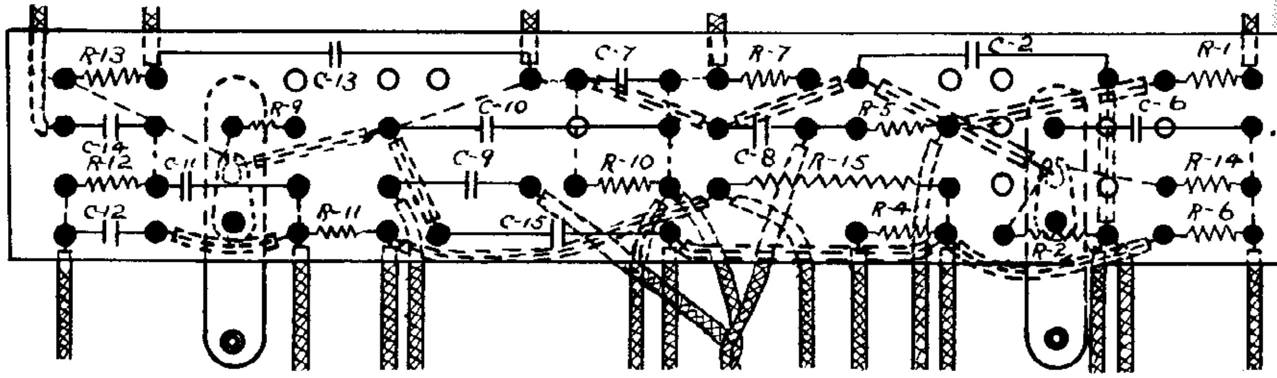
1. Connect output meter across voice coil of speaker terminals #49 and #51 (Fig. #1).
2. Set test oscillator at 175 kilocycles (using .1 mfd. antenna condenser).
3. Connect test oscillator lead to grid of the first I. F. tube.
4. Adjust condenser on primary of second I. F. transformer on top of set to peak on output meter.
5. Connect test oscillator lead to grid of first detector tube.
6. Adjust condenser on primary of first I. F. transformer (under set) to peak.
7. Adjust condenser on secondary of first I.F. transformer to peak. (There are two small holes on side of housing for adjustment #6 and #7.)

The above procedure lines up the I. F. stages properly and our attention can now be turned to the oscillator and R. F. adjustments, which are made as follows:

1. Set test-oscillator at 1500 kilocycles (using .1 mfd. antenna condenser).
2. Connect test-oscillator lead to grid of first detector.
3. Set gang condenser at 1500 kilocycles as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to thickness of approximately .015".
4. Peak oscillator trimmer on end of condenser gang.
5. Set test-oscillator at 1400 kilocycles.
6. Connect test-oscillator to antenna lead (using .0002 mfd. antenna condenser).
7. Peak other two condensers on gang.
8. Do not touch oscillator trimmer at 1400 kilocycles setting of gang.

This set should now be fully aligned and normal sensitivity prevail.

UNITED AMERICAN BOSCH CORP.



TESTING

(d) SPEAKER: Check field supply with voltohmmeter at speaker, reading between points #49 and #50 (Fig. #1) on speaker terminals (5.8 volts or over). Unsolder blue lead from speaker (#51) and test across terminals #49 and #51 for continuity of voice coil. (Reading full scale ohmmeter.)

(e) SECONDARY OUTPUT TRANSFORMER: After unsoldering blue lead from terminal (#51 Fig. #1), test with ohmmeter between blue lead and terminal #49 (full scale reading - ohmmeter).

(f) CHASSIS: After checking the components listed above, test the voltages as they appear on voltage chart and Fig. #4. The resistance measurements as found in "Resistance Chart" and Fig. #5. If any particular reading obtained is very different from the chart reading, the trouble is located in the portion of the circuit associated with the points at which this discrepancy occurs. Referring to circuit diagram and location drawings (Figs. #1, #2, #3), each part making up the circuit may be individually tested until the faulty part is specifically located.

RESISTORS

	Ohms	Body	Tip	Dot
106879	Resistor strip assembly			
105247	7,500	Purple	Green	Red
105265	750	Purple	Green	Brown
101211	600	Blue	Black	Brown
105249	5,000	Green	Black	Red
105278	100,000	Brown	Black	Yellow
105245	2,000	Red	Black	Red
105246	1/2 meg.	Green	Black	Yellow
105251	40,000	Yellow	Black	Orange
105276	50,000	Green	Black	Orange
105281	1 meg.	Brown	Black	Green
105279	1/4 meg.	Red	Green	Orange
105277	75,000	Purple	Green	Orange
106531	4,000	Yellow	Black	Red
104605	Volume control with switch			

CONDENSERS

105300	Suppressor condenser for generator
102495	Condenser .1 mfd - 2 ply
106386	Condenser .05 mfd - 2 ply, short
106844	Variable condenser, complete
103852	Condenser .002 - 4 ply
102493	Condenser .05 - 2 ply
102492	Condenser .05 - 3 ply
106917	Condenser assembly
106878	Electrolytic condenser
106853	Condenser and choke coil assembly
105455	Condenser for assembly 106853
103775	Condenser .001 mica
105568	Condenser .5 - 2 ply
105000	Variable condenser
102497	Condenser .25 - 2 ply
102492	Condenser .05 - 3 ply
106417	Condenser .001 mica
103659	Condenser .005 - 3 ply
105743	Condenser .003 - 4 ply
105741	Electrolytic condenser 10 mfd.

MAIN ASSEMBLIES

106836	Chassis and power pack assembly
106891	Control unit for Model 45A

CONTROL UNIT PARTS (45A)

104986	Dial plate
105090	Knob (volume control)
104977	Knob (tuning)
105088	Frame assembly
106893	Flexible shaft (volume control)
106892	Flexible shaft (tuning)
104892	Thumb screw - dial light assembly
104997	Dial scale
105114	Set screw - flexible cable
105151	Spring
78692	Felt washer
105179	Stud - dial scale and bracket
108	Lock washer for thumb screw
104337	Screw - mounting
81809	Nut - mounting
104392	Washer - mounting
62872	Lock washer - mounting
105958	Dial light cable assembly
106809	Lamp

COILS

105452	R.F. Choke coil (power pack)
105854	R.F. Choke coil (power pack)
104580	I.F. Coil complete (chassis)
104583	R.F. Coil complete (chassis)
104584	Antenna coil
104585	Detector and oscillator coil complete
105451	Choke coil assembly
106853	Condenser and choke coil assembly
105824	Choke coil for condenser and choke assembly

CABLES AND CABLE ASSEMBLIES

106544	Dial light cable assembly
105432	Antenna cable
106543	Battery cable assembly
105160	Speaker cable

TRANSFORMERS

105470	Output transformer
107122	Power transformer

MODEL 45-A,45-C
Chassis View
Data

UNITED AMERICAN BOSCH CORP.

The tubes employed in this circuit are as follows:

1 type 77 radio frequency amplifier.
1 type 77 detector oscillator.
1 type 78 intermediate frequency amplifier.
1 type 75 second detector, A.V.C. and audio amplifier.
1 type 41 output tube.

The antenna is coupled to the first stage by means of a transformer. The R.F. stage is coupled to the oscillator by means of a transformer. Resistance coupling is employed between the audio portion of the type 75 tube and the output tube. The first I.F. transformer is doubly tuned and the second I.F. transformer has a tuned primary.

Automatic volume control is provided by utilizing the potential drop in the collector circuit of the type 75 tube. The A.V.C. is made a part of the D.C. grid circuits of the R.F. amplifier and the I.F. amplifier. The intermediate frequency employed is 175 kilocycles.

An electro-dynamic speaker is used with this set. This speaker has a field resistance of 4 ohms and a voice coil resistance of 3.9 ohms.

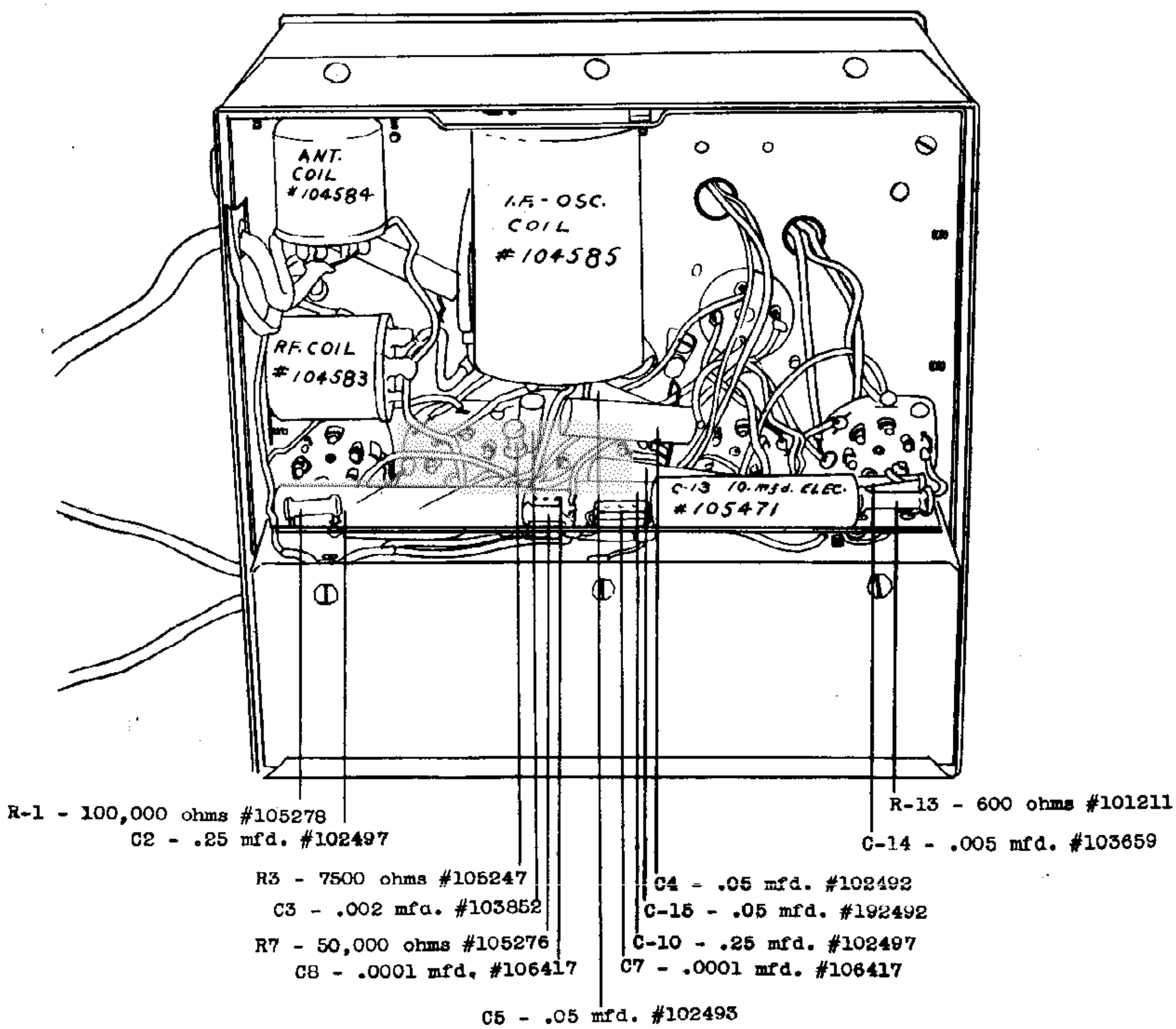


Figure #2

MODEL 45-A, 45-C
Voltage Resistance Chart

UNITED AMERICAN BOSCH CORP.

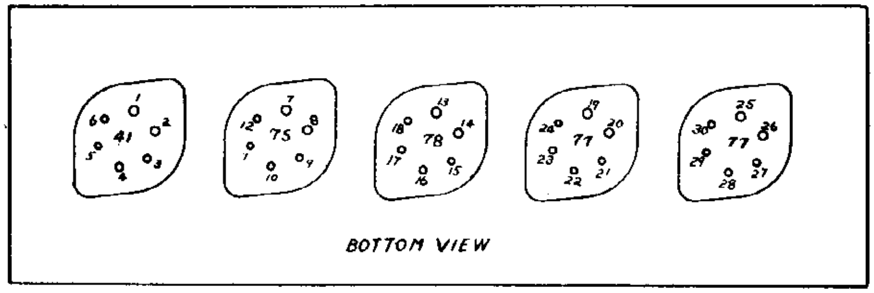


Figure #4

41 Power	75 2nd Det. Audio Amplifier & AVC.	78 IF Amplifier	77 Det. Osc.	77 RF Amplifier
1 - Fil.	7 - Fil.	13 - Fil.	19 - Fil.	25 - Fil.
2 - Fil.	8 - Fil.	14 - Fil.	20 - Fil.	26 - Fil.
3 - Plate	9 - Plate	15 - Plate	21 - Plate	27 - Plate
4 - Screen	10 - Di Plate	16 - Screen	22 - Screen	28 - Screen
5 - Grid	11 - Di Plate	17 - Suppressor	23 - Suppressor	29 - Suppressor
6 - Cathode	12 - Cathode	18 - Cathode	24 - Cathode	30 - Cathode

VOLTAGE CHART

Voltages read from ground to following points with Weston Model 564 Voltohmmeter (six volt storage battery used).

2 - 5.5 V.	8 - 5.5 V.	14 - 5.5 V.	20 - 5.5 V.	26 - 5.5 V.
3 - 178 V.	9 - 112 V.	15 - 155 V.	21 - 155 V.	27 - 155 V.
4 - 187 V.	12 - 1.1 V.	16 - 62 V.	22 - 62 V.	28 - 62 V.
6 - 1.3 V.		18 - 3.5 V.	24 - 42 V.	30 - 3.5 V.

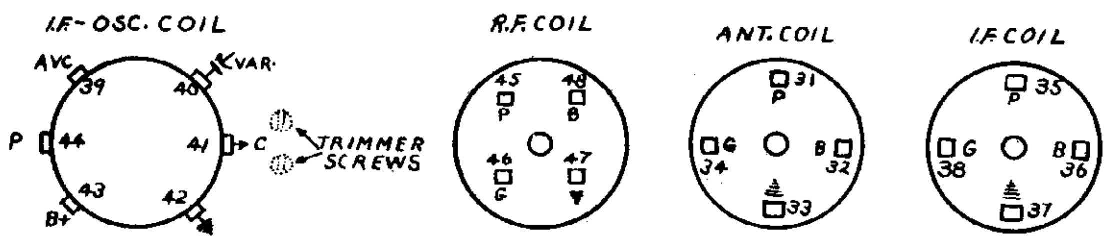


Figure #5

RESISTANCE CHART

Antenna Coil

#31 - 32 Primary - 22 ohms
#33 - 34 Secondary - 3 ohms

Output Transformer

Primary - 400 ohms

I. F. Coil

#35 - 36 Primary - 95 ohms
#37 - 38 Secondary - 85 ohms

R. F. Coil

#45 - 48 Primary - 70 ohms
#46 - 47 Secondary - Full scale

Socket Readings to Ground

6 - 600 ohms
12 - 5400 ohms
24 - 8000 ohms
30 - 750 ohms

"B" Plus Terminal

#4 to ground about 100,000 ohms (shows kick of cond. discharge on contact).

Det. Osc. Coil

(#39 to grid cap 78) I.F. Primary - 75 ohms
(#43 - #44) I.F. Secondary - 70 ohms
(40-42) Oscillator

"B" voltage 185 under set load (with 6 V. storage battery).
Total drain on car battery 4.5 amps.
Output 2.5 watts.
Intermediate frequency 175 K.C.

MODEL 79-C
Chassis View

UNITED AMERICAN BOSCH CORP.

Condenser Block Assy.#106526

C2 - .25 #102497 (Black)
C3 - .25 #102497 (Black & White)
C5 - .05 #102492 (Red & White)
C9 - .002 #103852
C10 - .5 #102499 (Black & Red)
C11 - .25 #102496 (Red)
C12 - .005 #103659 (Blue)
C13 - .1 #102495 (Green & White)
C14 - .005 #103659
(See Fig. #3)

R8 Volume & Switch #106514

C22 - .5 #107001

C26 - .1 #106805

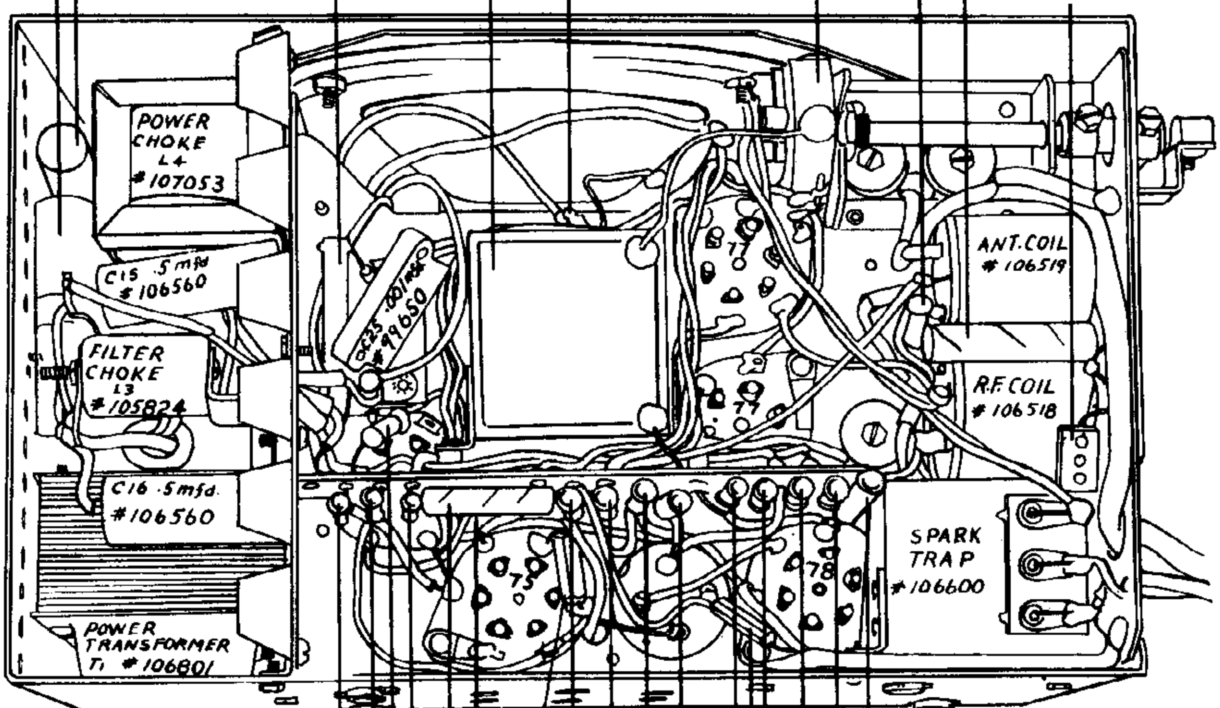
R16 - 4000 #106531

R1 - 100,000 #105278

C1 - .05 #102493

C29 - 100 Mmf. #106417

46

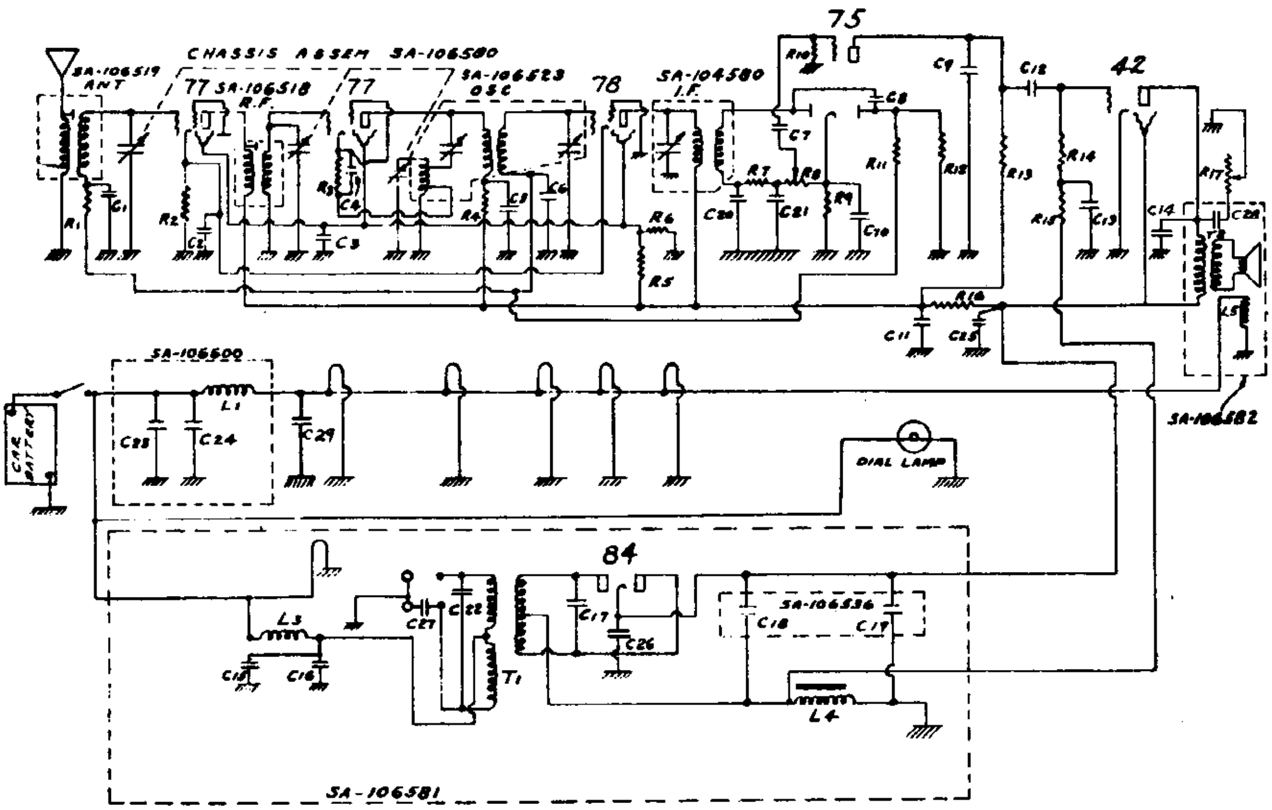


C4 - .002 #103852
R15 - 250,000 #105279
R3 - 7500 #105247
R9 - 5000 #105249
R4 - 2000 #105245
R14 - 250,000 #105279
R5 - 40,000 #105251
R10 - 1 Meg. #105281
C20 - 100 Mmf. #106417
C7 - .005 #103659
R6 - 75,000 #105277
R13 - 100,000 #105278
R2 - 500 #105264
R12 - 500,000 #105246
R11 - 500,000 #105246
R7 - 50,000 #105276
C8 - 100 Mmf. #106417

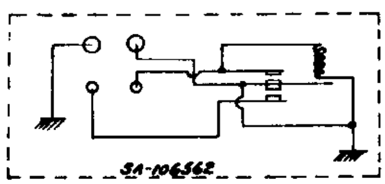
Fig. #2

MODEL 79-C
Schematic
Notes

UNITED AMERICAN BOSCH CORP.



IF PEAK 175 KC.



ELECTRICAL VALUES

R-1 100,000 ohms 1/4 watt
R-2 500 ohms 1/4 watt
R-3 7500 ohms 1/4 watt
R-4 2000 ohms 1/4 watt
R-5 40,000 ohms 1/4 watt
R-6 75,000 ohms 1/4 watt
R-7 50,000 ohms 1/4 watt
R-8 .5 M. volume control
R-9 5000 ohms 1/4 watt
R-10 1 meg. 1/4 watt
R-11 .5 meg. 1/4 watt
R-12 .5 meg. 1/4 watt
R-13 100,000 ohms 1/4 watt
R-14 1/4 meg. 1/4 watt
R-15 1/4 meg. 1/4 watt
R-16 4000 ohms 1 watt
R-17 500,000 ohms Tone Control

C-1 .05 - 2 ply
C-2 .25 - 2 ply
C-3 .25 - 2 ply
C-4 .002 - 4 ply
C-5 .05 - 3 ply
C-6 .05 - 2 ply
C-7 .005 - 3 ply
C-8 100 mmf. mica
C-9 .002 - 4 ply
C-10 .5 - 2 ply
C-11 .25 - 3 ply
C-12 .005 - 3 ply
C-13 .1 - 2 ply
C-14 .005 - 3 ply
C-15 .5 - 2 ply
C-16 .5 - 2 ply
C-17 .008 - 1600 V.
C-18 6 mf. (450)

C-19 10 mf. (450)
C-20 100 mmf. mica
C-21 100 mmf. mica
C-22 .5 - 2 ply
C-23 .001 mica
C-24 .5 - 2 ply
C-25 .001 mica
C-26 .1 - 3 ply
C-27 .001 mica
C-28 .05 - 3 ply
C-29 100 mmf. mica
T-1 Power Transformer
T-2 Output Transformer
L-1 Filter Choke
L-3 Filter Choke
L-4 Power Choke
L-5 Field Coil

Automatic volume control is provided by utilizing the potential drop in the collector circuit of the type 75 tube. The A.V.C. is made a part of the D.C. grid circuits of the R.F. and I.F. amplifiers.

An electro-dynamic speaker is used with this set. This speaker has a field resistance of 5.6 ohms and a voice coil resistance of approximately 3 ohms.

A tone control is provided in the plate circuit of the output tube. This consists of a condenser and variable resistor in series.

MODEL 79-C
Voltage
Resistance Chart

UNITED AMERICAN BOSCH CORP.

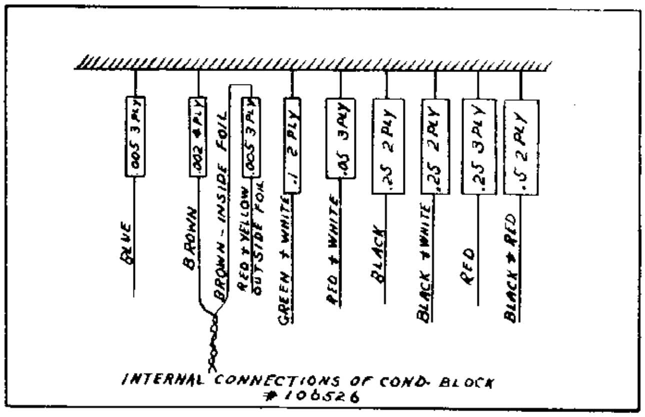


Fig. #3

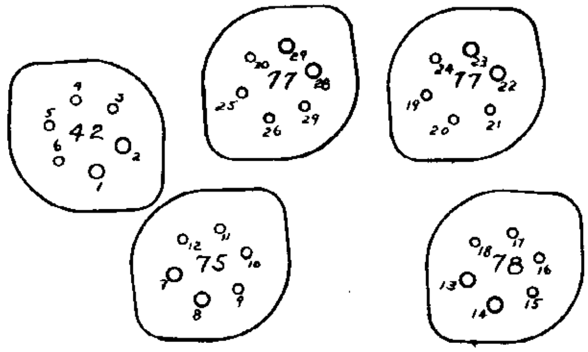


Fig. #4

42 Power	75 2nd Det. AVC	78 I. F.	77 Det. Osc.	77 R. F.
#1 - Fil.	#7 - Fil.	#13 - Fil.	#19 - Suppressor	#25 - Suppressor
#2 - Fil.	#8 - Fil.	#14 - Fil.	#20 - Screen	#26 - Screen
#3 - Cathode	#9 - Cathode	#15 - Cathode	#21 - Plate	#27 - Plate
#4 - Grid	#10 - Di Plate	#16 - Suppressor	#22 - Fil.	#28) - Fil.
#5 - Screen	#11 - Di Plate	#17 - Screen	#23 - Fil.	#29)
#6 - Plate	#12 - Plate	#18 - Plate	#24 - Cathode	#30 - Cathode

VOLTAGE CHART

Voltage readings from ground to following points with Weston Model 564 Voltohmmeter (.6 volt storage battery used).

42 A.F.	75 2nd Det.	78 I. F.	77 Det. Osc.	77 R.F.
#1 - 5.5 V.	#7 - 5.5	#13 - 5.5	#20 - 81	#26 - 81
#5 - 225	#9 - 1.3	#15 - 3.0	#21 - 183	#27 - 185
#6 - 205	#12 - 116	#17 - 81.	#23 - 5.5	#29 - 5.5
"B" - 12.5		#18 - 187	#24 - 4 to 6	#30 - 3.1

RESISTANCE CHART

(All measurements made with ohmmeter)

Antenna Coil

42-44 Primary - 21 ohms
43-45 Secondary- 2.5 ohms

I. F. Coil

31-34 Primary - 100 ohms
32-33 Secondary- 85 ohms

R. F. Coil

49-50 Primary - 80 ohms
51-52 Secondary- Full scale

"B" Plug Terminal to Ground

About 130,000 ohms (shows kick of condenser discharge on contact).

Output Transformer

Primary -- 500 ohms

Detector Osc. Coil

(37-39) - Osc. grid coil - 5 ohms
(40 to grid cap of 78) - Primary I.F. - 70 ohms
(35 to 36) - Secondary I. F. - 70 ohms

Sockets (All readings to ground)

9 - 5500 ohms
24 - 7500 ohms
30 - 550 ohms

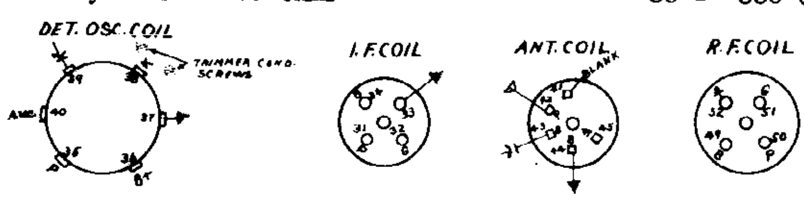


Fig. #5

UNITED AMERICAN BOSCH CORP.

ALIGNMENT INSTRUCTIONS

All the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows and refer to Fig. #1.

(A) I.F. ADJUSTMENT

(Use .1 mfd. antenna condenser)

1. Connect test oscillator to grid of 1st I.F. (78) tube.
2. Adjust small I.F. coil (between 78 and 75 tube) to maximum output.
3. Connect test oscillator to grid of 1st detector (77) tube.
4. Adjust condensers on coil in left hand corner of receiver for maximum output.
5. Repeat the above operations for accuracy.

(B) OSCILLATOR ADJUSTMENT

(Use .1 mfd. condenser on grid - .002 mfd. on antenna)

1. Connect test oscillator to grid of 1st detector (77) tube. Set at 1500 K.C.
2. Set gang to 1500 K.C. as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to thickness of approximately .015 of an inch.
3. Peak oscillator condenser on end of gang.
4. Connect test oscillator to antenna lead.
5. Peak other two condensers on gang.
6. Check sensitivity at several points on dial scale.

The set is now fully aligned and normal sensitivity prevails.

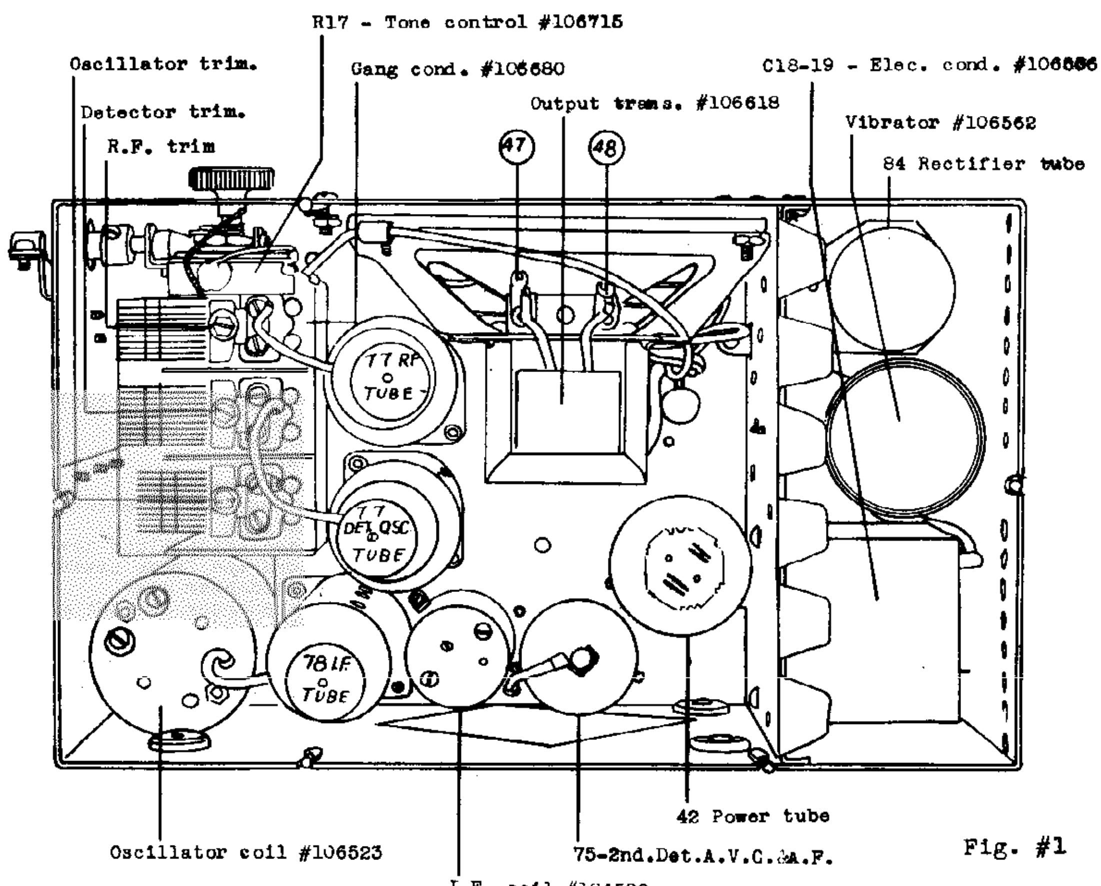


Fig. #1

MODEL 79-C
Parts List

UNITED AMERICAN BOSCH CORP.

Part No.	Description
	CONTROL UNIT PARTS
106541	Flexible volume control shaft
106542	Flexible tuning shaft
107433	Knob for tuning
107268	Control unit knob with key (volume control)
106797	Control unit dial scale
105627	Control unit dial glass
107470	Control unit dial indicator
107333	Control unit dial frame
105597	Control unit mounting bracket
106809	Dial lamp
107424	Dial light cable assembly (barrel type)
107550	Dial light cable assembly (spring type)
105608	Spare key
105607	Control unit mounting strap assembly
	CABLE ASSEMBLIES
107317	Battery cable assembly
106544	Dial light cable assembly
105432	Antenna cable assembly
107320	Battery cable
107318	Battery cable (chassis end)

RESISTORS

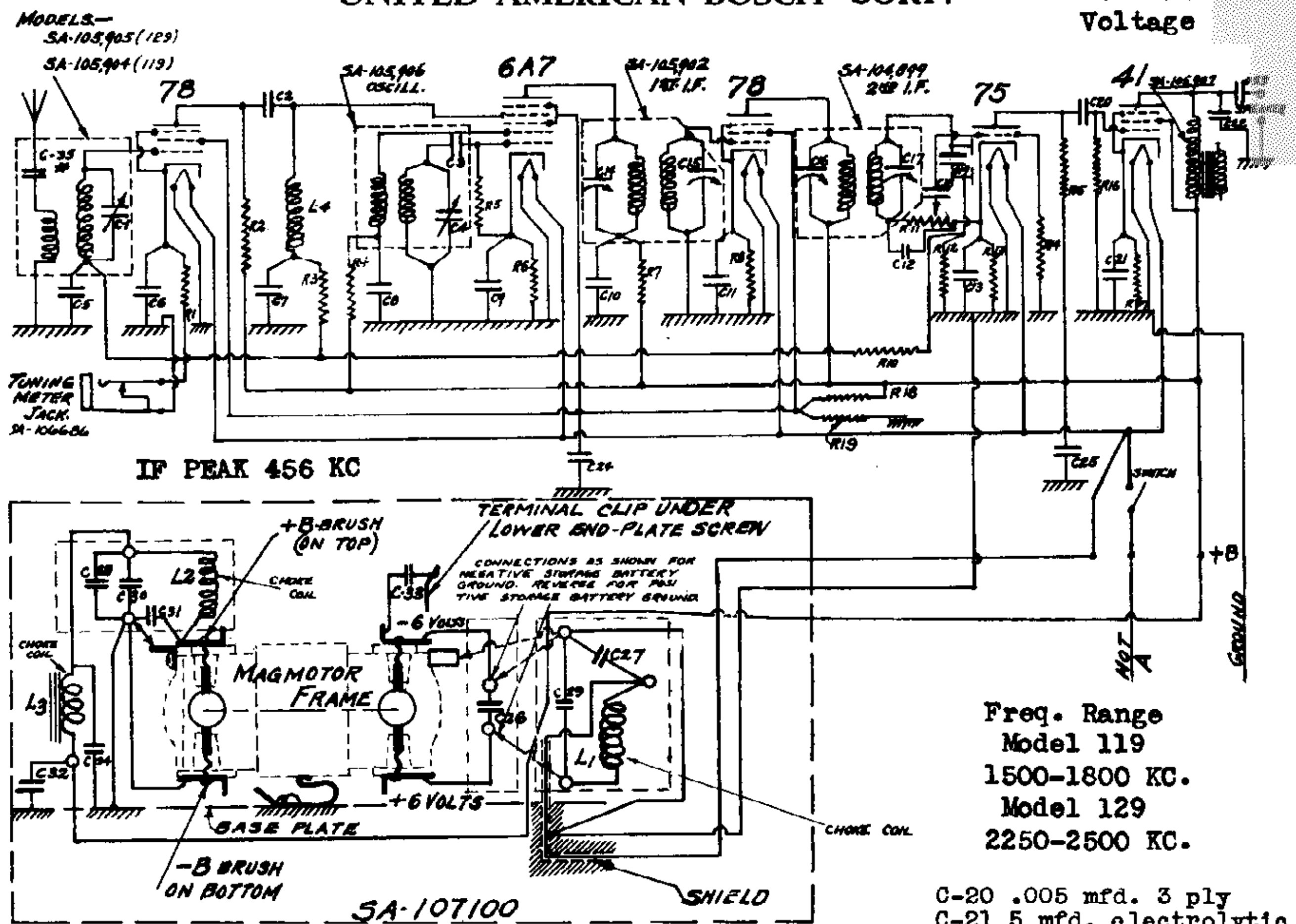
Part No.	Ohms	Body	Tip	Dot
106531	4,000	Yellow	Black	Red
105278	100,000	Brown	Black	Yellow
105264	500	Green	Black	Brown
105246	.5 meg.	Green	Black	Yellow
105276	50,000	Green	Black	Orange
105281	1 meg.	Brown	Black	Green
105249	5,000	Green	Black	Red
105279	1/4 meg.	Red	Green	Orange
105247	7,500	Purple	Green	Red
105245	2,000	Red	Black	Brown
105251	40,000	Yellow	Black	Orange
105277	75,000	Purple	Green	Orange

Part No.	Description
	SUPPRESSORS
106755	Spark plug suppressor
106754	Coil suppressor
105300	Suppressor condenser for generator
	TRANSFORMERS
106801	Power transformer
106618	Speaker transformer
	TUBE SOCKETS & TUBE SHIELDS
103424	Tube shield
104615	Tube socket
104616	Tube socket - 5 prong
103513	Tube socket - 6 prong
	TUBES
ER 75	2nd Det., A.V.C. and A.F. amplifier
ER 77	Detector and oscillator
ER 42	Power output tube
ER 78	I.F. amplifier
ER 84	Rectifier
	BRACKETS, CLIPS AND CLAMPS
100644	Cable clamp
106564	Drive shaft bracket
106565	Drive shaft casing clamp
79381	Clamp for power transformer leads
99623	Terminal clip
100263	Grid clip
100478	Terminal clip
	COILS
105824	Choke coil
106523	Oscillator coil assembly
104580	I.F. coil assembly
107053	Choke coil on base assembly
106519	Antenna coil assembly
106518	R.F. coil assembly
106713	Speaker field coil
	CONDENSERS
105300	Suppressor condenser for generator
106804	Condenser (.008 plus or minus 10%)
106805	Condenser - .1 - 3 ply
103775	Condenser - mica .001
102493	Condenser .05 - 2 ply
106417	Condenser .0001 mica
106600	Condenser and choke assembly
99650	Condenser .001 mica
106536	Electrolytic condenser
107001	Condenser and clip assembly
102499	Condenser for above .5 - 2 ply
106526	Condenser assembly (block)
102497	Condenser .25 - 2 ply
102492	Condenser .05 - 3 ply
103852	Condenser .002 - 4 ply
102499	Condenser .5 - 2 ply
102496	Condenser .25 - 3 ply
103659	Condenser .005 - 3 ply
102495	Condenser .1 - 2 ply
102402	Condenser on speaker .05 - 3 ply
106417	Condenser .001 mfd. mica
	MISCELLANEOUS
105363	Spark plug nipple
106807	Paper template (drilling)
107271	Housing assembly (front half)
106671	Bottom cover assembly
106546	Top cover and nameplate assembly
107205	Screen and baffle assembly
106517	Pin for variable condenser insulation bushing
106715	Tone control
106716	Tone control knob
106510	Dust shield
107060	Housing assembly (rear half)
106573	Base assembly (power pack)
106562	Vibrator unit
101856	Insulation plate assembly
106545	Base assembly (chassis)
106680	Variable condenser assembly
106514	Volume control
106524	Tube shield cap assembly
106728	Insulation between oscillator coil and base
93965	Cover assembly (chassis end) insulation strip
107181	Speaker screen
106513	Speaker baffle
103423	Tube shield base
106617	Diaphragm assembly, complete
106498	Speaker housing
101856	Speaker insulation plate assembly
106492	Speaker core and frame assembly
106508	Variable condenser gear
106509	Variable condenser bracket assembly for drive
106983	Fuse (25 amperes) in battery cable
100730	Antenna plate
105429	Battery cable fuse body
105425	Battery cable fuse body cap
105430	Fuse body insulator - battery cable
105427	Battery cable fuse body spring
106506	Volume control bracket
106495	Speaker transformer bracket
106684	Tone control bracket

Police Motorcycle Radio — **MODEL 119, 129**

UNITED AMERICAN BOSCH CORP.

Schematic
Voltage



Freq. Range
Model 119
1500-1800 KC.
Model 129
2250-2500 KC.

R-1 300 ohms 1/4 watt
R-2 20,000 ohms 1/2 watt
R-3 100,000 ohms 1/4 watt
R-4 20,000 ohms 1/4 watt
R-5 100,000 ohms 1/4 watt
R-6 300 ohms 1/4 watt
R-7 2000 ohms 1/4 watt
R-8 300 ohms 1/4 watt
R-9 -----
R-10 .5 meg. 1/4 watt
R-11 .5 meg. volume control
R-12 2 meg. 1/4 watt
R-13 5000 ohms 1/4 watt
R-14 1 meg. 1/4 watt
R-15 .25 meg. 1/4 watt
R-16 .5 meg. 1/4 watt
R-17 750 ohms 1/4 watt
R-18 10,000 ohms 1/2 watt
R-19 100,000 ohms 1/2 watt

C-1 70-140 mmf air
C-2 .0001 mfd. mica
C-3 .0001 mfd. mica
C-4 70-140 mmf air
C-5 .05 - 2 ply
C-6 .05 - 2 ply
C-7 .05 - 2 ply
C-8 .05 - 2 ply
C-9 .05 - 2 ply
C-10 .05 - 2 ply
C-11 .05 - 2 ply
C-12 .0001 mfd mica
C-13 5 mfd electrolytic
C-14 7-80 mmf mica
C-15 7-80 mmf mica
C-16 7-80 mmf mica
C-17 7-80 mmf mica
C-18 .005 mfd. 3 ply
C-19 .0001 mfd. mica

C-20 .005 mfd. 3 ply
C-21 5 mfd. electrolytic
C-22 .005 - 3 ply
C-23 .25 mfd. 3 ply
C-24 .25 mfd. 2 ply
C-25 .25 mfd. 3 ply
C-26 .0001 mfd.
C-27 .001 mfd.
C-28 .05 mfd. 3 ply
C-29 .1 mfd. 2 ply
C-30 .001 mfd.
C-31 .001 mfd.
C-32 4.0 mfd.
C-33 .001 mfd.
C-34 4.0 mfd.
C-35 .0004 mfd. mica

L-1 -----
L-2 .15 milli-henry
L-3 200 ohms D.C.
L-4 Choke coil

OPERATING VOLTAGES AND TUBE COMPLEMENT

Tube Type	Tube Function	Plate Voltage	Screen Voltage	Voltage Cathode to Ground	Heater Voltage
78	R.F. Amp.	45	95	2.3	6.0
6A7	Det., Osc.	170	95	2.3	6.0
78	I.F. Amp.	175	95	2.3	6.0
75	Det., A.V.C., A.F. Amp.	73		0.6	6.0
41	A.F. Amp.	165	175	13	6.0

NOTE: The above readings were taken from the various socket points to ground using a Weston Model 663 volt-ohmmeter which has a resistance as a voltmeter of 1000 ohms per volt full scale. For meters of other ratings, these voltages may not be as indicated.

MODEL 119,129
Installation Data UNITED AMERICAN BOSCH CORP.

INSTALLATION

In order to mount this receiver on a motorcycle, certain fittings are required. The fittings recommended are contained in a kit supplied by the Indian Motorcycle Company and known as the "Indian Radio Support and Antenna Kit Assembly" (#92344).

Contained in this kit are complete instructions covering the mounting of this receiver on a motorcycle, using the parts in the kit.

When installing the receiver, the shielded cable must be passed in front of the handlebars, (this is very important), then downward past the front head lug and along the frame front tube under the tank to the battery. The cable should be attached to the tubes of the frame by clips.

CONNECTIONS

The power supply unit contained in the receiver is arranged for operation on a motorcycle where the negative side of the battery is grounded. In cases where the receiver is to be used on a motorcycle where the positive side of the battery is grounded, it will be necessary to reverse the red and black wires inside of the power supply unit. With the negative side of the storage battery grounded, the red wire should be connected to the "+" terminal and the black wire should be connected to the "-" terminal. With the positive side of the storage battery grounded, the red wire should be connected to the "-" terminal and the black wire should be connected to the "+" terminal.

The terminal of the battery cable marked "hot" should be connected to the ungrounded side of the storage battery. The other terminal should be connected to the grounded side of the storage battery. A fuse is contained in a spring-bayonet cartridge located in the battery cable near the receiver. The fuse is the standard type used for automotive purposes and is rated at 10 amperes. To replace the fuse, force the rubber tube covering the fuse container along the cable toward the receiver until the end of the fuse cartridge can be grasped and removed. The rubber tube should be held firmly to keep the cartridge from receding into the tube while the fuse is being replaced so that the two halves of the cartridge can be conveniently refitted.

All screws, nuts, and washers must be firmly set and all electrical connections are to be tight and clean even to the possible necesitty of removing a slight amount of paint to accomplish this.

"B" POWER SUPPLY UNIT

The "B" power for operation of the receiver is supplied by the American-Bosch magmotor. This magmotor unit is turned on and off simultaneously with the receiver and receives its energy from the storage battery of the motorcycle.

The magmotor is essentially a dynamotor, the armature having two windings, one to supply the driving force for rotating the armature and the other for generating the desired "B" power. The armature is fitted with a commutator at each end. The brushes which contact the commutators look alike, but the material of those operating at the 6-volt end is quite different from that of those operating at the high voltage end. If, for any reason, the brush holders are removed from the frame, they must be returned to their original positions when re-assembled. Failure to do this will cause shortened commutator life and improper operation of the magmotor unit.

The magmotor is provided with a permanent magnet, rather than field coils, for excitation. This makes possible the extreme compactness of the unit and also conserves the battery energy. Should it be necessary to remove the magnet during service operations, some marking should be made on adjacent sides of the frame and magnet so that the magnet can be returned to its original position and not inverted. If it is assembled in an inverted position, the polarity of the output will be reversed and the radio receiver will not function. A large soft iron "keeper" should be placed across the poles of the magnet when it is removed in order to conserve the magnetism. It is well to remagnetize the magnet after re-assembling the magmotor in order that it may give completely satisfactory service. If the magnet is not remagnetized, the output of the magmotor will be reduced.

The armature shaft rotates in ball bearings which are carried in the endplates. An oil cup is provided in the top edge of each of the endplates. Six (6) drops of Bosch Oil US-506, or a light mineral oil should be put in each cup at the expiration of each 1000 hours use. The term "light mineral oil" applies to the so-called household oils sold in small spout cans by the large refiners of petroleum products. This light mineral oil should not be confused with the light household oils of the "sperm" variety so widely advertised. These "sperm" oils must not be used on the light ball bearings of the magmotor - to do so will gum the bearings and cause unsatisfactory operation.

UNITED AMERICAN BOSCH CORP.

TUNING

The receiver as delivered will be tuned to the station frequency requested. Due to unavoidable differences between the frequency adjustment made at the factory and that of the station, it will be necessary to re-align the tuning condensers slightly. One of the following methods of procedure should be followed depending on whether or not a tuning meter is available. The method of tuning using a tuning meter is preferable since more accurate adjustment is possible.

A. With Tuning Meter: With the receiver installed on the motorcycle and turned on, plug the tuning meter into the jack provided for the purpose. If the station desired is not heard, drive the motorcycle (with the radio set in operation), toward the broadcasting station. When the station is heard stop the motorcycle and proceed as follows:

(1) Remove both small circular cover plates from the top of the receiver housing, thus exposing the tuning adjustment screws.

(2) Loosen the brass lock nuts (which can be seen through the two holes), using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(3) Insert a screw driver into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control is toward the operator), and adjust this condenser until maximum deflection of the tuning meter in the direction indicated by the arrow on the dial is obtained for the station being heard.

(4) Repeat operation "3" with the right hand condenser.

(5) Lock the condensers with the 7/16" socket wrench and replace the circular cover plates.

B. Without Tuning Meter: With the receiver installed on the motorcycle and turned on, drive the machine toward the broadcasting station. When the station is heard faintly, stop the motorcycle and proceed as follows:

(1) Remove both small circular cover plates from the top of the receiver housing, thus exposing the tuning adjustment screws.

(2) Loosen the brass lock nuts (which can be seen through the two holes), using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(3) Insert a screw driver into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control knob is toward the operator), and adjust this condenser until the station is heard loudest.

(4) Reduce the volume with the volume control.

(5) Repeat operations "3" and "4" with the right hand condenser.

(6) Lock the condensers with the 7/16" socket wrench and replace the circular cover plates.

Alignment by the above operations will be approximate only. To obtain the exact alignment required for successful operation, proceed as follows:

Drive the motorcycle with the receiver operating at maximum volume to a "dead" spot, or to a place sufficiently remote from the transmitter to produce a weak signal. In such a location repeat operations "1", "2", "3", "5" and "6" under "B". Under no circumstances should the volume of the signal be reduced by adjusting the volume control knob. Keep the volume control in its maximum position. Do not neglect to lock the condensers with the socket wrench after alignment and before replacing the cover plates.

When these tuning operations have been properly executed, the receiver installation on the motorcycle is then ready for suppression of ignition interference and subsequently ready for service.

IGNITION NOISE SUPPRESSION

Shielded ignition cable, spark plug suppressors, spark plug shields, and bypass condensers are furnished as auxiliary equipment with the Models 119 and 129 receivers. These items are necessary for the suppression of ignition interference.

In attempting to suppress ignition interference, the following must be observed:

(1) Damp the oscillations at the spark plugs and across distributor caps by putting resistors (suppressors) in the cables at these points.

(2) Prevent the cables, spark plugs, etc., from radiating to the antenna by enclosing them in grounded metal shields.

(3) Minimize the effect of auxiliary or secondary radiating systems by a judicious choice of grounding points and by making ground connections in the proper way. A ground connection for high frequency currents cannot be made by running wires between the cable shield to be grounded and the engine block or the frame of the machine. The cable shield to be grounded must be brought down against the surfaces of the frame and clamped or soldered in place as required by the circumstances. The choice of ground points is commonly accomplished by trial and error—experience with the phenomena governing such circuits being extremely helpful.

Before proceeding with the work of suppressing ignition noise, the ignition system of the motorcycle should be checked thoroughly to make certain that all high-tension leads make good connections at their terminals, that the spacing of the spark plug electrodes is the minimum amount consistent with good motor performance, that the gap between the distributor electrode and the rotor electrode is a minimum, that all leaky high-tension cables are replaced, etc.

The specific procedure for suppressing ignition noise with either two or four cylinder motorcycles and with either battery or magneto ignition is as stated below:

A. Two-Cylinder Motorcycle - Battery Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Connect .5 mfd. bypass condenser from the generator to ground.

(4) Disconnect the lead between coil and breaker and replace with a shielded lead running directly from the coil to the breaker (length approximately 10").

(5) Ground the housing of the ignition coil to the frame.

(6) Install a spark plug shield on each spark plug whenever possible.

B. Two-Cylinder Motorcycle - Magneto Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Connect .5 mfd. bypass condenser from the generator to ground.

(4) Install a spark plug shield on each spark plug whenever possible.

C. Four-Cylinder Motorcycle - Battery Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Install suppressor in series with the lead to the center contact of the distributor as close as possible to the distributor.

(3) Replace each spark plug lead with a shielded cable.

(4) Ground the spark plug cables in the tube which carries them over the motor.

(5) Connect .5 mfd. bypass condenser from the generator to ground.

(6) Install a spark plug shield on each spark plug.

(7) Connect .5 mfd. bypass condenser from the "hot" side of the ignition coil to ground.

D. Four-Cylinder Motorcycle - Magneto Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

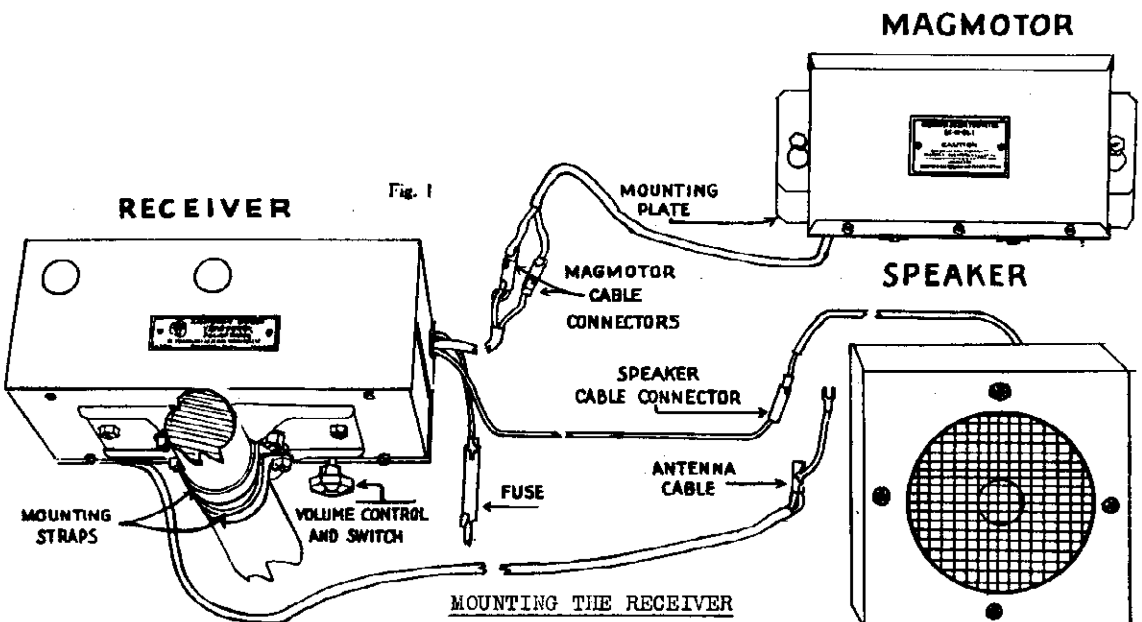
(3) Ground the spark plug cables in the tube which carries them over the motor.

(4) Connect .5 mfd. bypass condenser from the generator to ground.

(5) Install a spark plug shield on each spark plug.

MODEL 139,149
Installation Data

UNITED AMERICAN BOSCH CORP.



MOUNTING THE RECEIVER

A mounting plate is provided for the receiver which fastens to the steering column with two large straps. This plate should be placed on the upper side of the steering column below the instrument panel with the large ends of the keyhole slots at the top. The nuts on the small carriage bolts fastening the straps to the mounting plate should be securely tightened so that the mounting plate will not slip on the steering column. The two screws in the bushings in the receiver housing should then be loosened and the receiver placed on top of the mounting plate with the heads of the screws entering the keyhole slots in the mounting plate. The screws should be allowed to engage the narrow portions of the keyhole slots and the screws should then be tightened securely so that the receiver is held rigidly in place. (See Figure #1).

For cases where mounting on the steering column is not feasible, a bulkhead mounting plate has been provided which is fastened to the bulkhead with three carriage bolts. The adapter plate which is provided for use in conjunction with the mounting plate should be attached with screws to the opposite side of the receiver housing from that through which the volume control shaft projects. It should be placed so that the small ends of the keyhole slots are at the top. The receiver should then be placed on the mounting plate so that the screws in the bushings on the mounting plate enter the keyhole slots in the adapter plate. When the screws engage the small portions of the keyhole slots they should be tightened so that the receiver unit will be held securely

MOUNTING THE MAGMOTOR

The magmotor or the "B" power supply unit is provided with a mounting plate which is fastened to the operator's side of the bulkhead with three carriage bolts. The two screws in the bushings in the mounting plate should be loosened and the power supply unit placed so that these screws enter the keyhole slots in the bracket fastened to the back of the housing. When the screws engage the small portions of the keyhole slots, they should be tightened so that the unit will be held securely in place.

MOUNTING THE SPEAKER

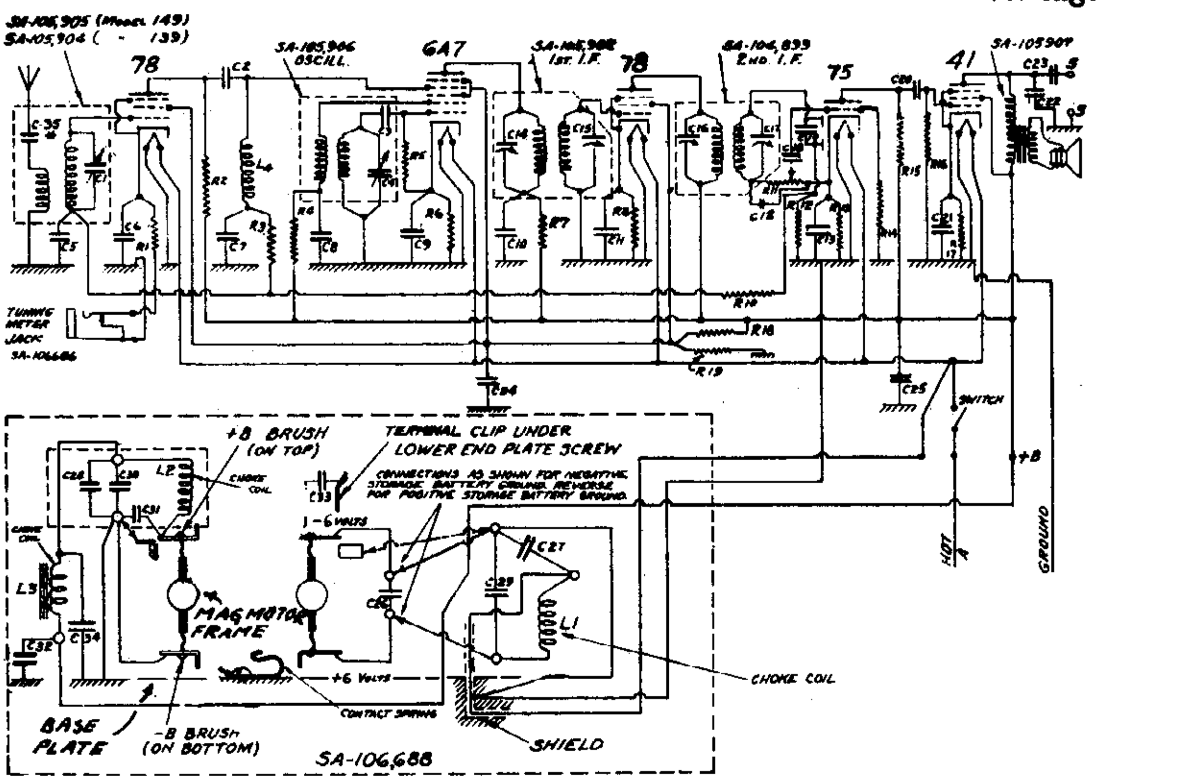
Two studs are provided on the speaker unit which fasten it to the bulkhead in a position where it will not interfere with the operation of the vehicle but where it will permit a good signal to be heard.

CONNECTIONS

The power supply unit, as provided, is arranged for operation in a motor car where the negative side of the battery is grounded. In cases where this unit is to be used in a motor car where the positive side of the battery is grounded, it will be necessary to reverse the red and black wires inside of the unit. With the negative side of the storage battery grounded, the red wire should be connected to the "+" terminal and the black wire should be connected to the "-" terminal. With the positive side of the storage battery grounded, the red wire should be connected to the "-" terminal and the black wire should be connected to the "+" terminal.

A duplex cable is provided between the receiver and the power supply unit. The two sections of this cable should be connected together. A battery cable containing a fuse is provided. The terminal marked "hot" should be connected to the ungrounded side of the storage battery. The other terminal should be connected to the grounded side of the storage battery. The other shielded cable which enters the receiver housing at the same point as the battery cable and the power supply cable should be connected to the loud speaker. At the other end of the receiver housing a black cotton covered cable is provided which should be connected to the antenna lead-in. Refer to Figure #1 for these cable connections. The antenna lead-in should be shielded and the shield soldered to the bayonet connection beyond the junction.

UNITED AMERICAN BOSCH CORP.



Frequency range:

IF PEAK 456 KC

Model 139 - 1500 to 1800 kilocycles
Model 149 - 2250 to 2500 kilocycles

ELECTRICAL VALUES

C-1	70-140 mmf. air	C-21	5 mfd. electrolytic	R-1	300 ohms 1/4 watt
C-2	.0001 mfd. mica	C-22	.005 mfd. 3 ply	R-2	20,000 ohms 1/2 watt
C-3	.0001 mfd. mica	C-23	.25 mfd. 3 ply	R-3	100,000 ohms 1/4 watt
C-4	70-140 mmf. air	C-24	.25 mfd. 2 ply	R-4	20,000 ohms 1/4 watt
C-5	.05 mfd. 2 ply	C-25	.25 mfd. 3 ply	R-5	100,000 ohms 1/4 watt
C-6	.05 mfd. 2 ply	C-26	.0001 mfd.	R-6	300 ohms 1/4 watt
C-7	.05 mfd. 2 ply	C-27	.001 mfd.	R-7	2,000 ohms 1/4 watt
C-8	.05 mfd. 2 ply	C-28	.05 mfd. 3 ply	R-8	300 ohms 1/4 watt
C-9	.05 mfd. 2 ply	C-29	.1 mfd. 2 ply	R-9	----
C-10	.05 mfd. 2 ply	C-31	.001 mfd.	R-10	.5 meg. 1/4 watt
C-11	.05 mfd. 2 ply	C-32	4 mfd.	R-11	.5 meg. volume control
C-12	.0001 mfd. mica	C-33	.001 mfd.	R-12	2 meg. 1/4 watt
C-13	5 mfd. electrolytic	C-34	4 mfd.	R-13	5,000 ohms 1/4 watt
C-14	7-80 mmf. mica	C-35	.0004 mfd. mica	R-14	1 meg. 1/4 watt
C-15	7-80 mmf. mica	C-38	.001 mfd.	R-15	.25 meg. 1/4 watt
C-16	7-80 mmf. mica			R-16	.5 meg. 1/4 watt
C-17	7-80 mmf. mica	L-1	Magmotor choke coil	R-17	750 ohms 1/4 watt
C-18	.005 mfd. 3 ply	L-2	.15 milli-henry	R-18	10,000 ohms 1/2 watt
C-19	.0001 mfd. mica	L-3	200 ohms D.C.	R-19	100,000 ohms 1/2 watt
C-20	.005 mfd. 3 ply	L-4	Choke coil		

SOCKET VOLTAGES

Tube Type	Tube Function	Plate Voltage	Screen Voltage	Voltage Cathode to Ground	Heater Voltage
78	R.F. Amp.	45	95	2.3	6.0
6A7	Det., Osc.	170	95	2.3	6.0
78	I.F. Amp.	175	95	2.3	6.0
75	Det., A.V.C., A.F. Amp.	73		0.6	6.0
41	A.F. Amp.	165	175	13	6.0

NOTE:- These readings were taken from the various socket points to ground using a Weston Model 663 volt-ohmmeter which has a resistance as a voltmeter of 1000 ohms per volt full scale. For meters of other ratings, these voltages may not be as indicated.

MODEL 139,149
Testing Data

UNITED AMERICAN BOSCH CORP.

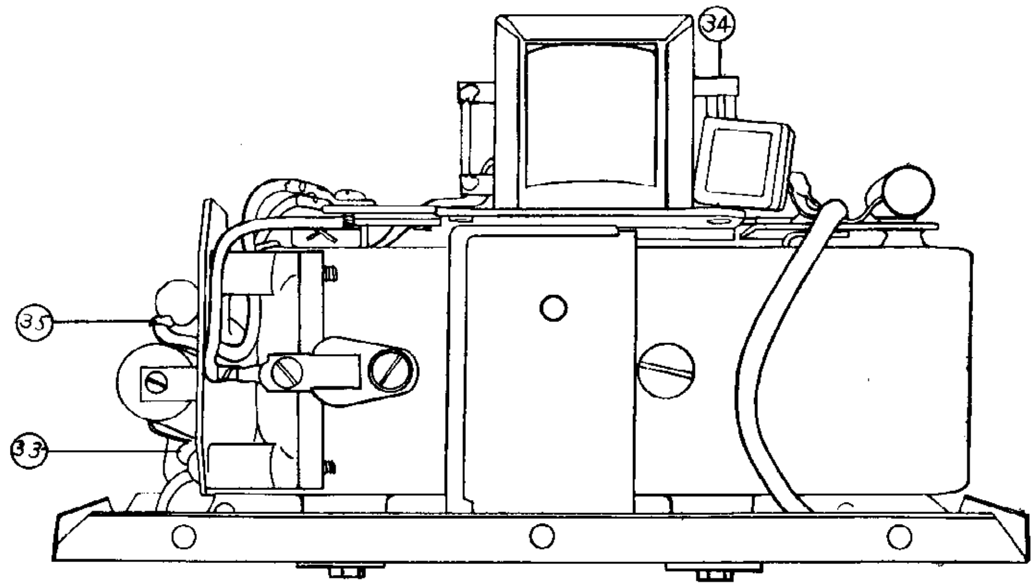


Fig. 4

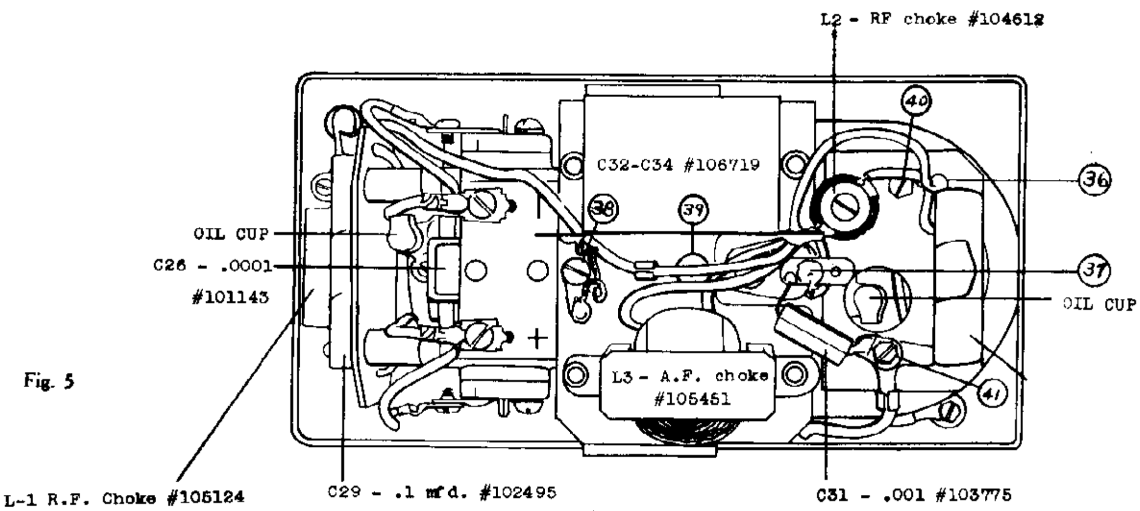


Fig. 5

TESTING

(a) ANTENNA: Substitute a piece of insulated wire 6 to 8 feet long and lay on ground; if reception is normal, the regular antenna is at fault and should be checked for grounds, opens, etc. (Somewhat better reception should be expected with wire antenna than with car antenna.)

(b) TUBES: Remove and test, or substitute known good tubes, one at a time.

(c) SPEAKER: Disconnect speaker cable from chassis by means of bayonet connector. Test across terminals of speaker with volt-ohmmeter for continuity of voice coil. Reading of 4.5 ohms should be obtained on ohmmeter.

(d) SECONDARY OF OUTPUT TRANSFORMER: With speaker cable disconnected, test with ohmmeter between terminal #1 and ground. Reading of 0.5 ohms should be obtained on ohmmeter.

(e) CHASSIS: After checking the components listed above, test the voltages as they appear on voltage chart and the resistance measurements as found in "Chassis Resistance Chart". If any particular reading obtained is very different from the chart reading, the trouble is located in the portion of the circuit associated with the points at which this discrepancy occurs. Referring to the circuit diagram and location drawings, each part making up the circuit may be individually tested until the faulty part is specifically located.

f) MAGMOTOR: See section giving complete magmotor service information.

UNITED AMERICAN BOSCH CORP.

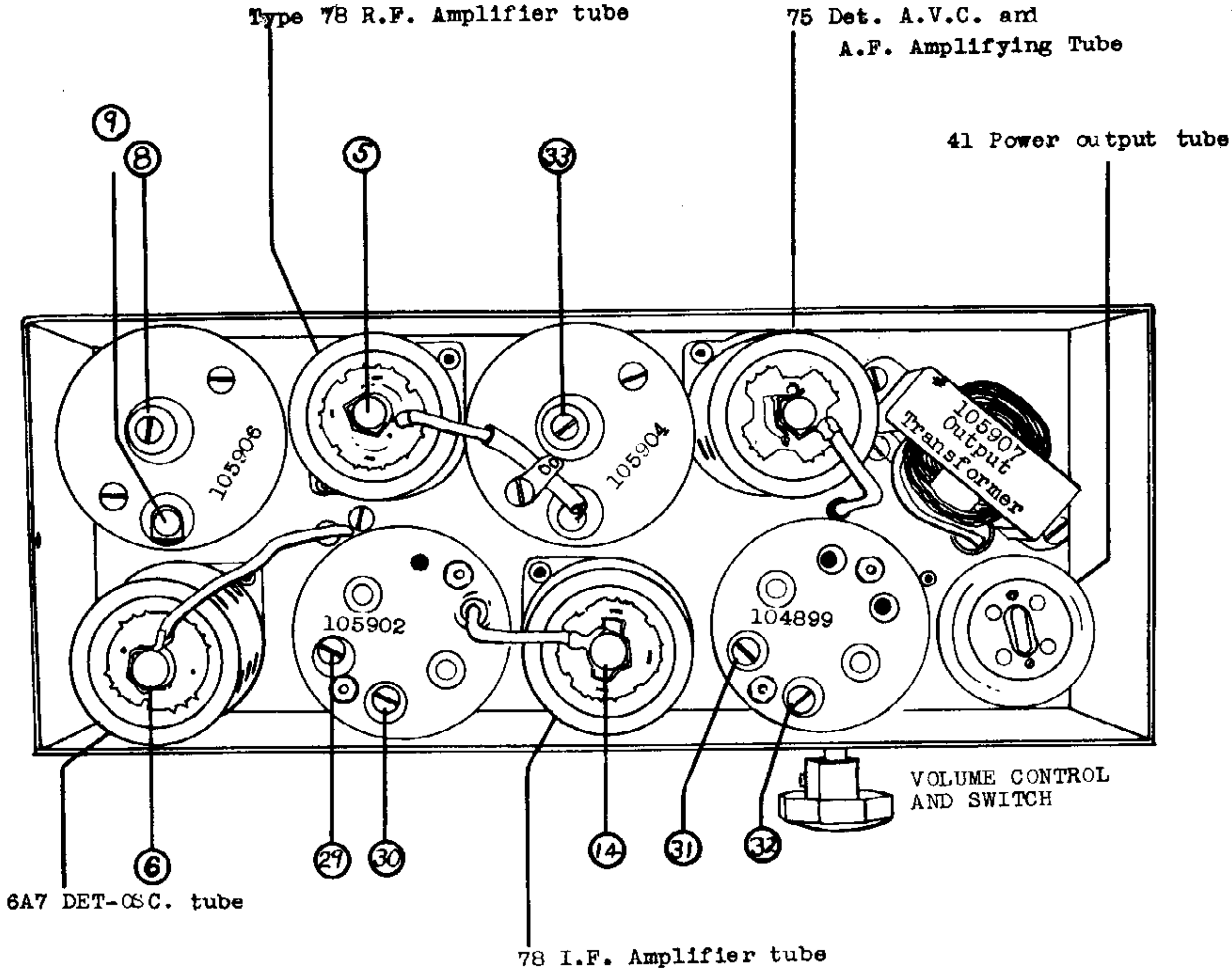


Fig. 2

ALIGNMENT INSTRUCTIONS

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless an I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows: See Fig. #2.

1. Connect output meter across terminals of speaker voice coil.
2. Set test oscillator at 456 kilocycles.
3. Connect test oscillator lead to grid of I.F. amplifier tube, type 78. (Point #14).
4. Adjust condenser on primary of second I.F. transformer, (Point #31) to peak on output meter.
5. Adjust condenser on secondary of second I.F. transformer, (Point #32) to peak on output meter.
6. Connect test oscillator lead to grid of detector-oscillator tube, type 6A7 (Point #6)
7. Adjust condenser on primary of first I. F. transformer (Point #29) to peak on output meter.
8. Adjust condenser on secondary of first I. F. transformer, (Point #30) to peak on output meter.

The above procedure lines up the I. F. stages properly, so that all that remains is to tune the oscillator and preselector circuits to the frequency of the station it is desired to receive. This has been covered in the section headed - TUNING

MODEL 139,149
Tuning Data

UNITED AMERICAN BOSCH CORP.

TUNING

The radio receiver as delivered will be tuned to the station frequency requested. Due to unavoidable differences between the frequency adjustment made at the factory and that of the station, it will be necessary to realign the tuning condensers slightly. One of the following methods of procedure should be followed depending upon whether or not a tuning meter is available. The method of tuning using a tuning meter is preferable since more accurate adjustment is possible.

A. With Tuning Meter.

With the receiver in the motor car, and connected to the car antenna and battery, turn the receiver fully on and allow it to get into operation which will be indicated by a slight hum heard in the speaker. Plug the tuning meter into the jack in the receiver housing. If the station desired is not heard, drive the machine (with the radio set in operation), toward the broadcasting station. When the station is heard, stop the motor car and proceed as follows:

(a) Loosen the brass condenser lock nuts (which can be seen through the two holes in the top cover of the housing) using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(b) With a screw driver inserted into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control is toward the operator), adjust this condenser until maximum deflection of the tuning meter in the direction indicated by the arrow on the dial is obtained on the station being heard.

(c) Repeat operation "b" with the right hand condenser.

(d) Lock the condensers with the 7/16" socket wrench.

B. Without Tuning Meter.

With the receiver in the motor car, and connected to the car antenna and battery, turn the receiver fully on and allow it to get into operation which will be indicated by a slight hum heard in the speaker.

If the station desired is not heard, drive the machine (with radio set in operation) toward the broadcasting station. When the station is heard faintly, stop the motor car and proceed as follows:

(a) Loosen the brass condenser lock nuts (which can be seen through the two holes in the top cover of the housing) using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(b) With a screw driver inserted into the slot in the shaft of the left hand condenser, when the receiver is in a position such that the volume control knob is toward the operator, adjust this condenser until the station is heard loudest.

(c) Reduce the volume by rotating the volume control knob on the face of the receiver housing counter-clockwise.

(d) Repeat operations (b) and (c) with the right hand condenser.

(e) Lock the condensers with the 7/16" socket wrench.

Alignment by the above operations will be only approximate. To attain the exact alignment required for successful operation proceed as follows:

(a) Drive the motor car (with radio operating with volume control on full) to a "dead" spot or to a place sufficiently remote from the transmitter to produce a weak signal. In such a location repeat operations "a", "b", "d" and "e". In this case under no circumstances should the volume of the signal be reduced by adjusting the volume control knob. Keep the volume control in its maximum position. Do not neglect to lock the condensers with the socket wrench after alignment and before replacing cover plates.

UNITED AMERICAN BOSCH CORP.

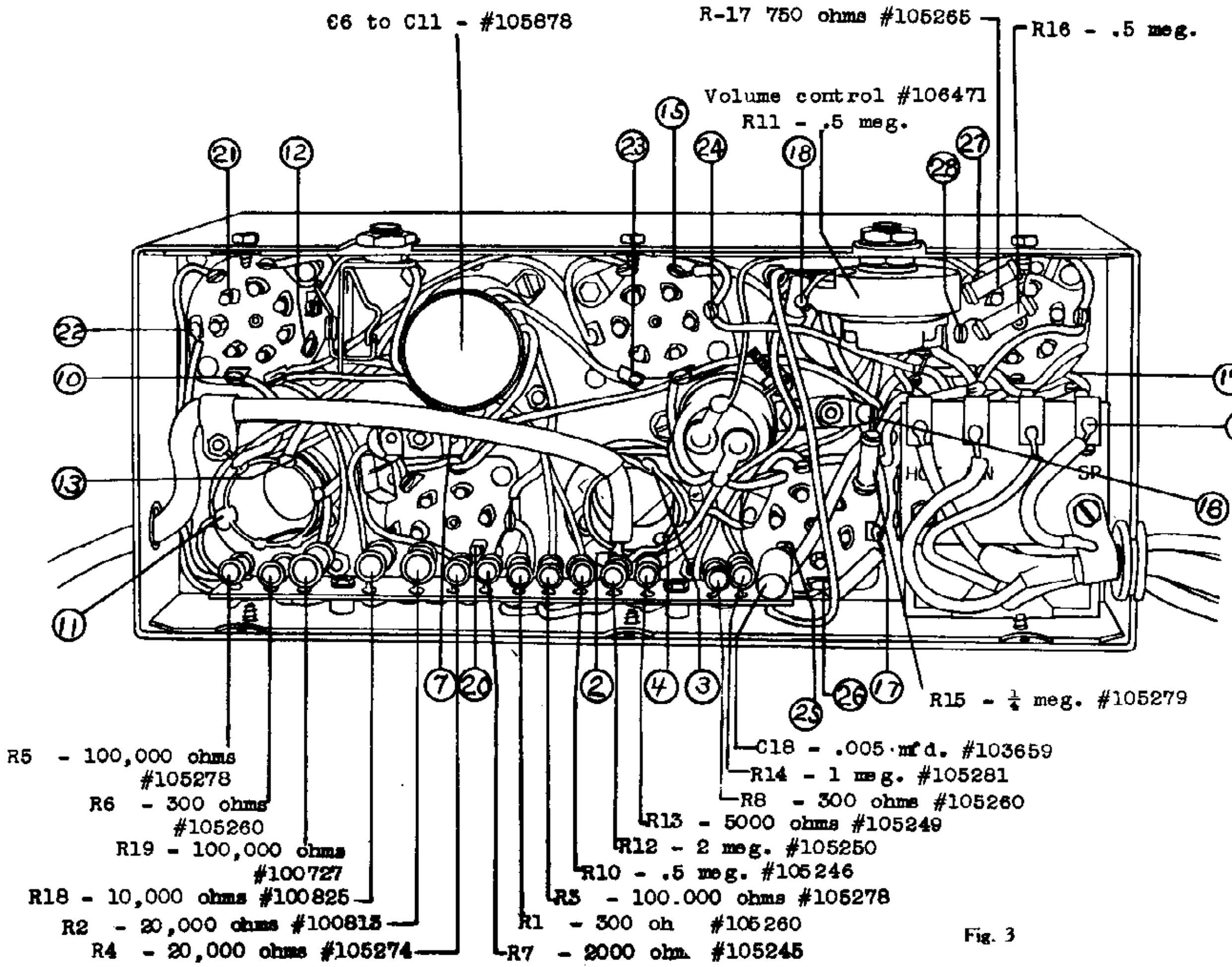


Fig. 3

CHASSIS RESISTANCE CHART

All measurements made with Weston Model 663 volt-ohmmeter.

(Refer to Figs. 2 and 3)

SECTION OF CIRCUIT	MEASURE BETWEEN POINTS	OHMMETER READING
Antenna Coil - Primary	#2 & #3	0.5 ohms
Antenna Coil - Secondary	#4 & #5	2 ohms
R.F. Choke Coil	#6 & #7	3 ohms
Oscillator Coil - Primary (Grid)	#9 & GND	1 ohms
Oscillator Coil - Secondary (Plate)	#10 & #11	2 ohms
First I.F. Transformer - Primary	#12 & #13	23 ohms
First I.F. Transformer - Secondary	#14 & GND	23 ohms
Second I.F. Transformer - Primary	#15 & #16	23 ohms
Second I.F. Transformer - Secondary	#17 & #18	23 ohms
Output Transformer - Primary	#19 & #16	580 ohms
*R.F. Amplifier - Type 78 - Cathode to Ground	#20 & GND	300 ohms
Det.-Oscillator - Type 6A7 - Cathode to Ground	#21 & GND	300 ohms
Det.-Oscillator - Type 6A7 - Osc. Grid to Ground	#22 & GND	100,000 ohms
I.F. Amplifier - Type 78 - Cathode to Ground	#23 & GND	300 ohms
I.F. Amplifier - Type 78 - Screen Grid to Ground	#24 & GND	100,000 ohms
Second Det. & Amp. - Type 75 - Cathode to Ground	#25 & GND	5,000 ohms
Second Det., & Amp.-Type 75-A.V.C. Collector to Ground.	#26 & GND	2,000,000 ohms
Second Det., & Amp.- Type 75 - Collector to Ground	#17 & GND	500,000 ohms
Power Amplifier - Type 41 - Cathode to Ground	#27 & GND	750 ohms
Power Amplifier - Type 41 - Grid to Ground	#28 & GND	500,000 ohms
B+ Terminal to Ground	#16 & GND	110,000 ohms

* This measurement should not be made with the tuning meter connected in the circuit.

MODEL 139,149
Magmotor Notes

UNITED AMERICAN BOSCH CORP.

MAGMOTOR SERVICE INFORMATION

LUBRICATION

The armature shaft rotates in ball bearings which are carried in the end plates. An oil cup is provided in the top edge of each of the end plates. Six drops of Bosch oil US-506, or a light mineral oil should be put in each cup at the expiration of each 1000 hours of use. See Fig. 5 for the location of the oil cups. The term "light mineral oil" applies to the so-called household oils sold in small spout cans by the large refiners of petroleum products. This light mineral oil should not be confused with the light household oils of the "sperm" variety so widely advertised. These "sperm" oils must not be used on the light ball bearings of the magmotor - to do so will gum the bearings and cause unsatisfactory operation.

BALL BEARINGS

The ball bearings are held in place by means of set screws located in the top of each end plate. There are two set screws in each end plate, the top one locking the lower one in place. Extreme care must be observed when these set screws are tightened since screwing them down too tighgly will distort the ball bearings sufficiently to increase the friction in the bearings with a resultant increase in current drain from the storage battery. The set screws should be carefully tightened while the magmotor is connected to the receiver and while the armature is rotating. An ammeter should be inserted in the battery circuit so that the current drain may be observed. When the set screws have been properly tightened with the magmotor connected to the receiver, the current drain should be approximately 3.0 amperes. Both of the set screws must be removed when dismantling the unit.

BRUSHES

The magmotor has four brushes, two in the input or motor end and two in the output or generator end. The brushes in the input or motor end are made of copper graphite and can be distinguished by their copper color from the brushes in the output or generator end which are made of pure carbon. Under no circumstances must these brushes be interchanged. The brushes should be replaced after 3000 hours of operation. To use the brushes more than 3000 hours will result in their wearing down so that they make intermittent contact with the commutators, producing excessive sparking and resulting in damage to the commutators. To remove the brushes, first remove the brush holder by removing the screws which fasten the holders to the magmotor frame. Then melt the solder on the brush holder terminal clip so that the flexible wire connection to the brush is loosened and while the solder is molten pull the brush out of the holder. It is very important that the proper grade of brushes are used and no brushes should be used except those furnished by the United American Bosch Corporation.

DISMANTLING AND ASSEMBLING THE MAGMOTOR

In order to inspect and service the armature it is necessary to remove the armature from the magmotor frame. To do this the following procedure should be observed:

(a) Disconnect the red and black wires connected to the polarity terminal plate and also the two green wires connected to the brushes on the sides of the magmotor.

(b) Remove the filter assembly mounted on the brass plate fastened to the top of the magmotor by removing the two screws #38 and #39 in Fig. #5.

(c) Remove the other filter assembly fastened to the top of the magmotor by removing the two self-tapping screws #40 and #41 shown in Fig. #5.

(d) Remove the filter assembly on the end of the magmotor by removing the four end plate fastening screws.

(e) Remove the two upper ball bearing set screws and loosen the two lower set screws in the end plates.

(f) Remove the end plate to which the filter assembly is attached.

(g) Withdraw the armature.
All parts of the power unit are now available for inspection.

To assemble the unit, reverse the sequence of operations given above. Make certain that the wires to the low voltage side are connected as they were originally and use extreme care in tightening the ball bearing set screws (see the special instructions for adjusting the ball bearing set screws).

MAGNETIZING

The magnet should retain its original magnetic strength for an indefinite period but there are factors that may cause dissipation of the magnetism as, for example, the removal of the armature. A reduction in the magnetism will cause the magmotor to operate at a higher speed to deliver the same voltage which will result in a greatly reduced life. For this reason it is well to remagnetize the magnet after any work has been done on the power unit especially if the armature has been removed.

The unit should be completely assembled when the magnetizing is done in order to obtain the proper field excitation. This can be done on a standard Bosch or American-Bosch magnetizing stand.

Should it be necessary to remove the magnet during the service operations, some marking should be made on adjacent sides of the frame and magnet so that the magnet can be returned to its original position and not inverted. If it is assembled in an inverted position, the polarity of the output will be reversed and the receiver will not function.

CONDENSERS AND CHOKE COILS

The position in which the condensers and choke coils are placed has a direct bearing on the efficiency of the magmotor and if it is necessary to replace any of these parts, it is of the utmost importance that they be placed in exactly the same positions as the parts removed. The leads must also be of the same length and gauge, or larger and must be placed in the same position as the ones removed.

COMMUTATORS

When the armature has been removed for inspection, and the commutators are found to be dirty, they may be cleaned by using a clean cloth saturated with gasoline or if necessary, by using very fine sandpaper. If the commutators are badly worn and pitted, it will be necessary to turn them down in a lathe. Extreme care should be observed in performing this operation, removing only enough material to provide a good surface.

TESTING

(Refer to Figs. 4 and 5)

With voltage of 6.6 volts measured between point #33 and ground, the "B" voltage, measured between Point #34 and ground with the receiver connected, should be approximately 175 volts.

If the magmotor armature fails to rotate when the cable connections have been made properly and the switch in the chassis has been turned on, the continuity of the circuit through the motor portion of the magmotor should be checked with an ohmmeter in accordance with the following resistance chart:

If the magmotor armature rotates but no "B" voltage is obtained between #34 and ground, the continuity of the circuit through the generator portion of the magmotor and the associated filters, should be checked with an ohmmeter in accordance with the following resistance chart:

MAGMOTOR RESISTANCE CHART

All measurements made with Weston Model 663 Volt-ohmmeter. (Refer to Figs. 4 & 5)

SECTION OF CIRCUIT	MEASURE BETWEEN POINTS	OHMMETER READING
Complete Motor Circuit	#33 and GND	1 ohm
"A" circuit R.F. choke	#33 and #35	Full scale
Complete Generator Circuit	#34 and GND	800 ohms
"B" Circuit A.F. Choke	#34 and #36	220 ohms
"B" Circuit R.F. Choke	#36 and #37	Full scale

Whenever possible, a direct comparison should be made with a magmotor which is definitely known to be in good operating condition in order to avoid the misinterpretation of variations of readings due to variations in storage battery voltages, load conditions, meter accuracies. etc.

UNITED AMERICAN BOSCH CORP.

ADJUSTMENT INSTRUCTIONS OF MODEL 260

I. F. Adjustment - The intermediate frequency amplifier is tuned to 517.5 K. C. With this frequency supplied from an approved standard signal generator, place the output terminals of the generator on the input to the 3rd I. F. amplifier tube, i. e. high side on the grid cap and low side on metal frame of receiver. Tune the adjustment screw of the diode transformer for maximum deflection of the output meter (connected across the voice coil terminals of the loud speakers). A sensitivity of approximately 50,000 microvolts should be indicated. Next, connect the signal generator terminals to the 2nd I. F. tube. Tune the adjustment screws of the 3rd I. F. transformer for maximum deflection of the output meter. A sensitivity of 3,000 microvolts should be indicated. Next, connect the signal generator to the 1st I. F. tube and tune the adjustments of the 2nd I. F. transformer for maximum. A sensitivity of 100 microvolts should be indicated. Next, connect the signal generator to the 1st detector tube and tune the first I. F. transformer. A sensitivity of 10 microvolts should be indicated. Leaving signal generator on 1st detector, recheck all the I. F. stages.

R. F. Adjustment - (a) Broadcast Band

Check position of pointer to make sure it is at the marking line just beyond the 540 K. C. calibration mark when variable condenser plates are fully engaged. Then adjust set to the 1400 K. C. marking on scale. Adjust signal generator to 1400 K. C. and connect its output terminals through a dummy antenna to antenna and ground connections. With about 1,000 microvolts from signal generator (to make for ease of finding signal) adjust the broadcast oscillator trim condenser (B. C. Osc. Coil - Trimmer) as indicated in Figure #1. Reduce signal generator input as signal is tuned in so as to keep within a useful deflection of the output meter. When signal is tuned in, adjust the screws marked R. F. TRIMMER and ANT-TRIMMER in Figure #1. These last two need not be touched throughout further adjustments of the radio set. Next, place the set at the 600 K. C. marking with signal generator likewise and adjust the screw of the B. C. OSC. COIL LAGGING condenser until the signal is tuned in. Return the pointer to 1400 K. C., the signal generator likewise, and make the slight readjustment of the B. C. OSC. TRIM condenser for good accuracy of calibration.

When all the adjustments as described are correctly made, the following sensitivity should be maintained for a standard output of 100 milliwatts on a carrier input modulated 30% at 400 cycles.

Frequency	(KC)	1400	1000	600
Sensitivity	(MV)	3	5	7

(b) Green Band (1600 - 3500 K. C.)

By means of wavechange switch, place pointer on this band. Place pointer on 3.5 mark, set the signal generator to 3500 K. C. and with sufficient input to receiver from standard signal generator, tune the screw adjustment labelled GREEN BAND TRIMMER until the signal is a maximum. Then place pointer to the 1.6MC mark, adjust signal generator to 1600 K. C. and tune the screw marked GREEN BAND LAGGING CONDENSER until the signal output is a maximum.

Return set and signal generator to 3.5MC and readjust GREEN BAND TRIMMER the slight amount necessary. Check the sensitivity. The following readings should obtain for 100 milliwatts output.

Frequency	(KC)	3500	2400	1600
Sensitivity	(MV)	5	5	5

NOTE: Each oscillator coil is provided with means of adjusting its inductance. This comprises a copper vane placed in the field of the coil and made movable by means of a screw adjustment. On the green, red and blue bands, the adjustment may be made through holes in the side plate adjacent to the oscillator trimmer condensers. While primarily a factory adjustment, these vanes may be used for adjustment in the field where it has been found necessary to make repairs to an oscillator coil. The method is as follows: Having gone through the adjustment of the GREEN BAND as described above, it is found that the sensitivity, particularly in mid-scale (2.4 megacycles) is not up to standard; say, for example, it indicates a sensitivity of 20 microvolts.

MODEL 260
Alignment Data
Socket and
Trimmer Layout

UNITED AMERICAN BOSCH CORP.

Give the vane adjustment screw two turns in a clockwise direction and repeat the adjustments given above at 3.5MC, 1.6MC, and back to 3.5MC. Then tune set and signal generator to 2400 K.C. and observe sensitivity. If this has improved, the adjustment is in the correct direction and a few more trials should be made exactly as described until the correct sensitivity is obtained. If on the other hand a poorer sensitivity is obtained at 2400 K. C., return setting two turns to its original position and repeat procedure making vane adjust in counterclockwise direction, until correct sensitivity is obtained.

It should be mentioned again that this tedious procedure is never necessary unless an oscillator coil has in some way become damaged. In the factory, special test equipment is provided which makes for quick adjustment of inductances to the correct value before the coil is mounted in the radio set.

(c) Red Band (4000 - 9000 K. C.)

Adjustments in this band are made exactly as described for the green band except that the appropriate trimmer and lagging condensers are used. In Figure #1, reference is made to RED BAND TRIMMER and RED BAND LAGGING CONDENSER. Sensitivity should be in the neighborhood of 5 microvolts across the scale.

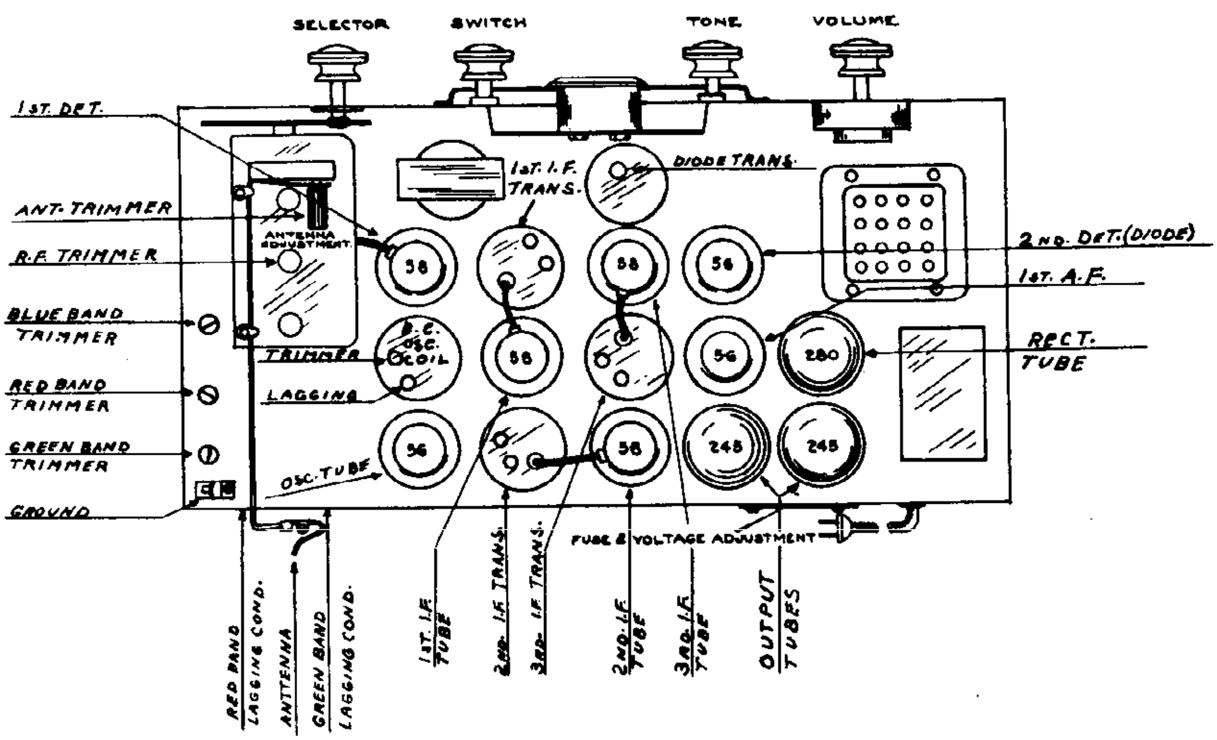
(d) Blue Band (10,000 - 20,000 K. C.)

Adjustments in this band should be made starting at the highest frequency end, say 18 MC if obtainable on signal generator. A frequency not lower than 15 MC is desirable. At this highest frequency, set pointer on radio set to calibration and tune BLUE BAND TRIMMER until signal is correctly received. Then place the signal generator at 10 MC and tune radio set until signal is received. If this tuning point deviates from the correct calibration point, the vane regulating the oscillator coil inductance may be reset and the tuning process repeated until scale is adjusted to calibration and the correct sensitivity is obtained. Care should be taken to see that the adjustment is made for the signal itself and not the image. That is, a 15 MC signal should be tuned in at 15 on dial and its image, with more input from standard signal generator, at 14 MC. Five microvolts across scale corresponds to the correct sensitivity.

MODEL 260

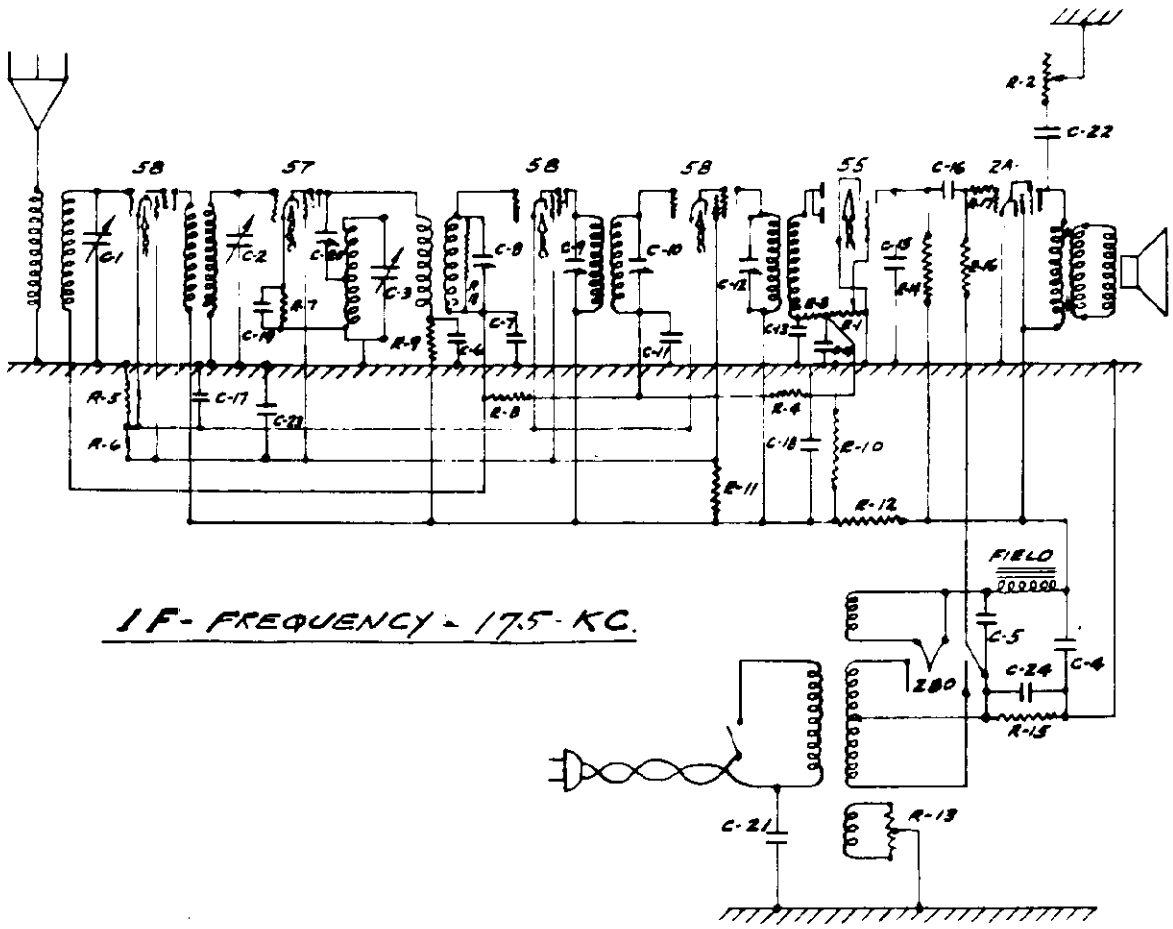
FIG. 1

I.F. 517.5 KC



UNITED AMERICAN BOSCH CORP.

IMPORTANT UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND MUST BE ACCURATE WITHIN $\pm \frac{.010}{.010}$ · WORK TO DIMENSIONS · DO NOT SCALE DRAWING · FINISH WHERE INDICATED · NO BURRS



1 F - FREQUENCY - 175 - KC.

R-1	500,000 VARIABLE	SA-104,437
R-2	550,000 "	SA-104,443
R-3	50,000 OHMS	SA-100,512
R-4	500,000 "	SA-100,194
R-5	500 "	SA-99583
R-6	30,000 "	SA-101,722
R-7	7500	SA 104,824
R-8	1 MEG.	SA-100,815
R-9	2000 OHMS.	SA-100,826
R-10	40,000 "	SA-99,957
R-11	15,000 "	SA-101,404
R-12	3500 "	SA-105,161
R-13	5 " [illegible]	SA 99412
R-14	100,000 OHMS	SA 100,727
R-15	350 "	SA-102,564
R-16	500,000. "	SA-100,194
R-17	100,000 "	SA-100,727
R-18	20,000 "	SA-105274
C-1		
C-2	VAR. COND	SA-105,184
C-3		
C-4	4 MFD.	SA-105,166
C-5	8 MFD.	
C-6	.01-3 PLY	SA-104,459
C-7	.05-2 PLY	SA-104,459
C-8	140-220 MMF	SA-105,108
C-9	140-220 MMF	SA-105,109
C-10	140-220 MMF	SA-105,109
C-11	.05-2 PLY	SA-104,459
C-12	7-80 MMF.	SA-105,126
C-13	.0001 MICA.	SA-101,143
C-14	.0001 MICA.	SA-101,143
C-15	.00025 MICA.	SA-99781
C-16	.005-3 PLY	SA-104,459
C-17	.25-2 PLY	SA-104,459
C-18	.25-3 PLY	SA-102,492
C-19	.002-MICA	SA-100,198
C-20	140-220 MMF	SA-105,108
C-21	.01-4 PLY	SA-103,695
C-22	.05-3 PLY	SA-102,492
C-23	.25-2 PLY	SA-104,459
C-24	20 MFD	SA-105,165

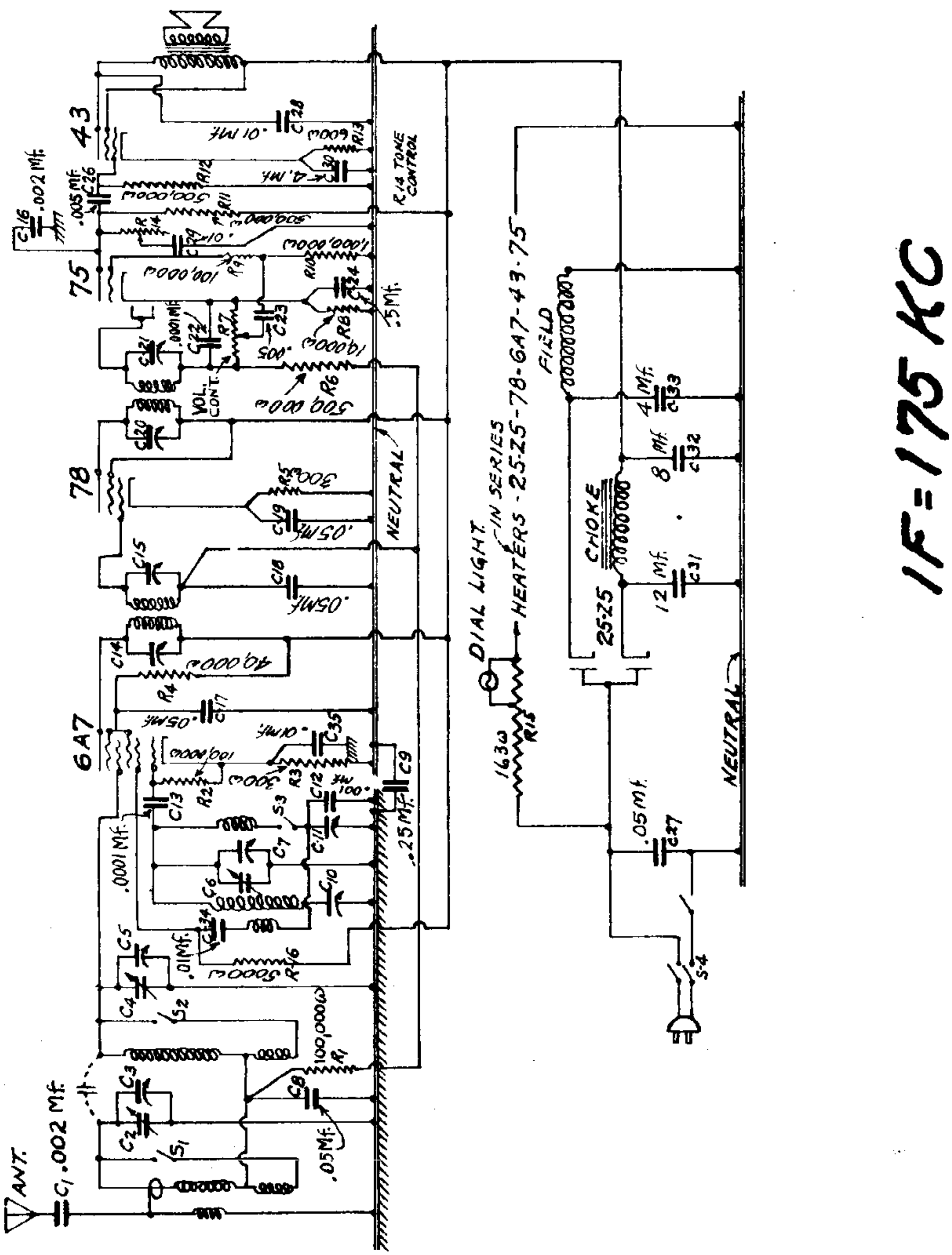
MATERIAL AND SPECIFICATION	LENGTH PER 1000 PCS	WEIGHT PER 1000 PCS.	FIRST MADE FOR
			MOD. 307
			SA-105 110

WIRING DIAGRAM

UNITED AMERICAN BOSCH CORPORATION FACTORY: SPRINGFIELD, MASS.				SCALE	THE SERVICE STAGE FOR THIS PART IS SERVICE No.	DI-105,164
DATE	DR BY	CH. BY	APPROVED BY EG		NOT A WORKING DRAWING UNTIL APPROVED BY EG.	ED. /
5-3-33	E.E.S.	[illegible]	AHF			

MODEL 357
Schematic

UNITED AMERICAN BOSCH CORP



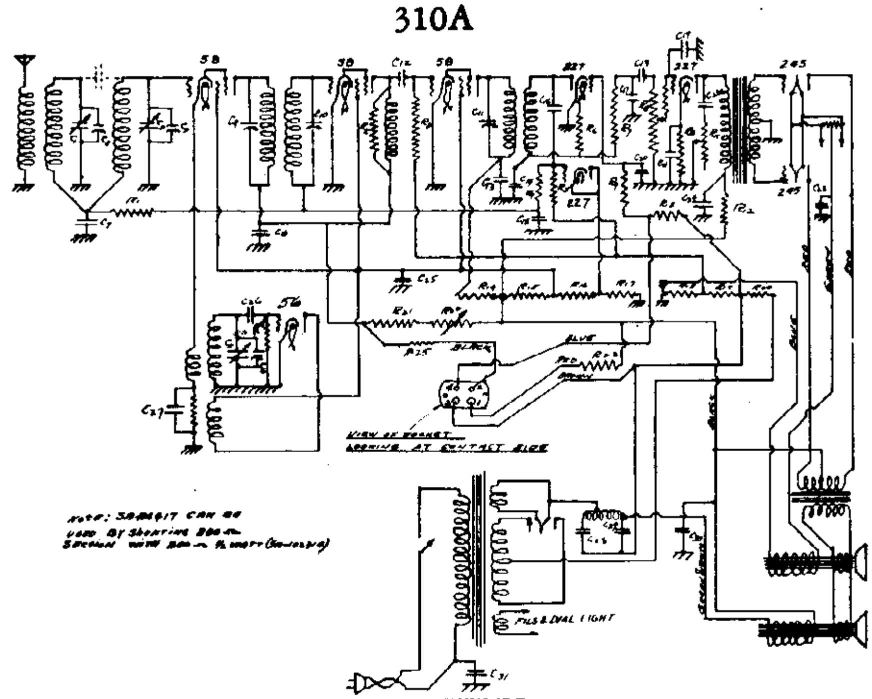
IF = 175 KC

SCHEMATIC DIAGRAM OF MODEL 357

UNITED AMERICAN BOSCH CORP.

SERVICE INSTRUCTIONS FOR MODEL

310A



SCHEMATIC WIRING DIAGRAM - MODEL 310-A

ELECTRICAL VALUES

R1	100,000 ohms
R2	20,000 ohms
R3	100,000 ohms
R4	1/2 megohm
R5	1 megohm
R6	1/2 megohm
R7	20,000 ohms
R8	1/2 meg. Volume control
R9	1/4 megohm
R10	3,000 ohms
R11	1/2 meg. Tone control
R12	10,000 ohms
R13	1/4 megohm
R14	1,000 ohms
R15	12,000 ohms
R16	8,000 ohms
R17	6,000 ohms
R18	30 ohms
R19	70 ohms
R20	300 ohms
R21	10,000 ohms
R22	10,000 ohms (vari.)
R23	2 megohms
R24	100,000 ohms
R25	20,000 ohms
C1, C2, C3, C4, C5, C6	Variable gang with trimmers
C7	.04 - 3 ply
C8	.05 - 3 ply
C9	7 - 70 mmf
C10	7 - 70 mmf
C11	7 - 70 mmf
C12	500 mmf
C13	.05 - 3ply
C14	100 mmf
C15	.05 - 2 ply
C16	100 mmf
C17	100 mmf
C18	.05 - 2 ply
C19	100 mmf
C20	.25 2 ply
C21	8 mf - 200 V
C22	.05 - 3 ply
C23	.05 - 3 ply
C24	1 mf - 450 V
C25	.5 - 3 ply
C26	100 mmf
C27	.05 - 2 ply
C28	8 mfd)
C29	8 mfd)
C30	4 mfd)
C31	.01 - 4 ply

RESISTOR COLOR CODE

1,000 ohms	Brown	Black	Red
20,000 ohms	Red	Black	Orange
100,000 ohms	Brown	Black	Yellow

3,000 ohms	Orange	Black	Red
300 ohms	Orange	Black	Brown
8,000 ohms	Gray	Black	Brown
10,000 ohms	Brown	Black	Orange
12,000 ohms	Brown	Red	Orange
6,000 ohms	Blue	Black	Red

MODEL 310-A
Socket, Voltage
Parts List

UNITED AMERICAN BOSCH CORP.

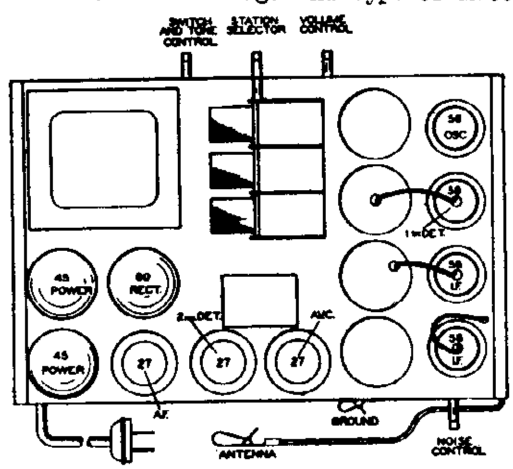
SOCKET VOLTAGES

	Osc. 56	1st Det. 58	1st IF 58	2nd IF 58	AVC 27	2nd Det. 27	AF 27	AF 2-45	Rect. 80
Filament	2.48	2.49	2.50	2.50	2.50	2.50	2.52	2.52	5.1
Plate	100	#110-180	#110-180	280	44	-	210	290	-
Screen	-	100	100	100	-	-	-	-	-
Cathode	-	4.2	-	-	-	-	18	49	-
# Bias	-	3	3	3	-	* 0-12	-	-	-

* Depending upon setting of noise control.

Due to high resistance in grid circuit, this voltage cannot be measured at the socket therefore, readings shown here were taken at "C Stick."

NOTE: These values are readings of a high resistance volt meter from each socket terminal to ground. The filament voltages are, of course, an exception. Cathode readings are given for those tubes having the grid at ground. The valves are only approximate and will vary with the line voltage and type of meter employed.



RESISTORS

100196 2 meg. ohms
100815 1 meg. ohms
100194 500,000 ohms
100195 250,000 ohms
100813 20,000 ohms
100727 100,000 ohms
100825 10,000 ohms
102821 3000 ohms
100823 2000 ohms
99412 Mid Tap
104437 Volume control
104443 Tone control with switch
105054 Var. resistance (noise adjustment)
104418 Tapped resistor
104417 Tapped resistor

MAIN ASSEMBLIES

105043 Chassis complete with tubes and shields
105072 Twin speakers with baffle board
105071 Speaker with output transformer
103731 Speaker only
105075 Cabinet

MISC. PARTS

104421 Power transformer
105055 Cable (speaker to chassis)
104402 Knob
105074 Tuning lamp
104948 Dial plate
105985 Tuning light plate

COILS

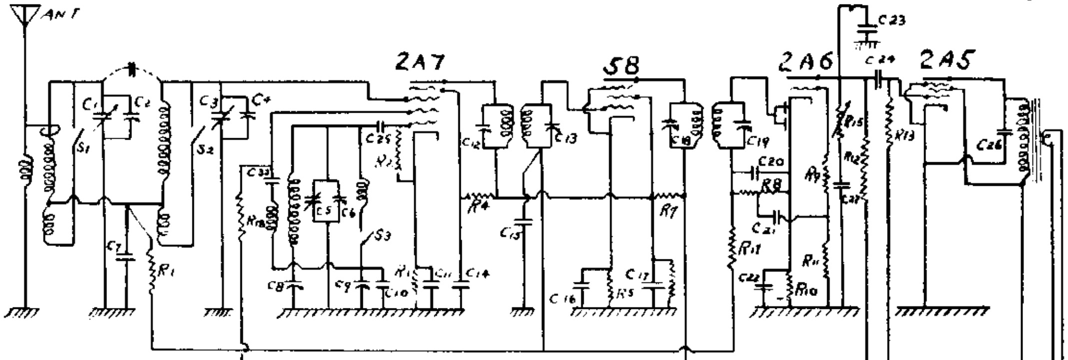
104439 2nd. I. F. coil
104438 1st I. F. coil
104440 Oscillator coil
104429 Ant. coil
104441 Pre. Selector coil
103584 Choke coil (small)
105053 Choke coil (large)
105061 Input transformer
104442 Output transformer

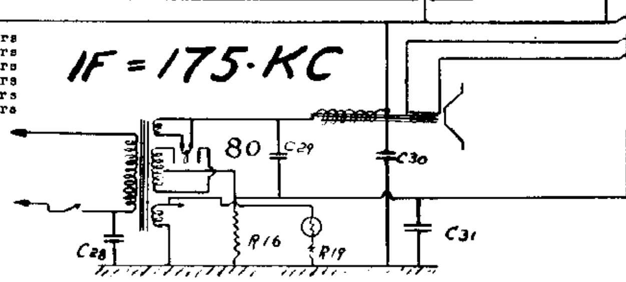
CONDENSERS

104422 Filter condenser
105046 1 mfd. 450 V
103037 8 mfd. 200 V
102498 .5 mfd. 3-ply
102949 .04 mfd. 3-ply
102493 .05 mfd. 2-ply
102492 .05 mfd. 3-ply
103695 .01 mfd. 4-ply
100880 .0005 Mica
101143 .0001 Mica
102497 .25 2-ply

MODEL 352
Schematic
Socket, Voltage

UNITED AMERICAN BOSCH CORP.

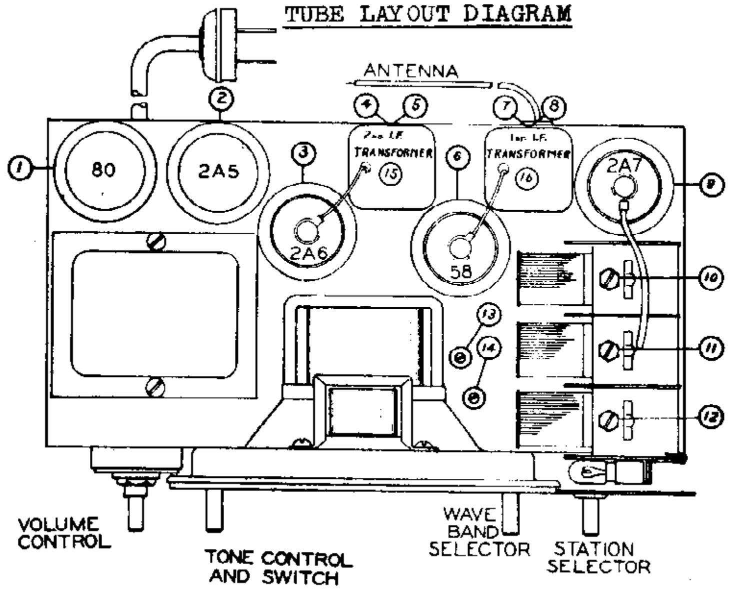




C1 Variable condenser gang w/ trimmers
C2 Variable condenser gang w/ trimmers
C3 Variable condenser gang w/ trimmers
C4 Variable condenser gang w/ trimmers
C5 Variable condenser gang w/ trimmers
C6 Variable condenser gang w/ trimmers
C7 .05 - 2 ply condenser
C8 Trimmer condenser
C9 Trimmer condenser
C10 .001 Mica condenser
C11 .05 - 2 ply condenser
C14 .05 - 2 ply condenser
C15 .05 - 2 ply condenser
C16 .05 - 2 ply condenser
C20 .0001 Mica condenser
C21 103659
C21 .005 - 3 ply condenser
C22 .5 - 2 ply condenser
C23 .002 - 4 ply condenser
C24 .005 - 3 ply condenser
C25 .0001 Mica condenser
C26 .01 - 3 ply condenser
C27 .01 - 3 ply condenser
C28 .01 - 4 ply conde..ser
C29 Filter condenser assembly 8,6 & 20 mfd.
C30 Filter condenser assembly 8,6 & 20 mfd.
C31 Filter condenser assembly 8,6 & 20 mfd.
C32 .01 - 3 ply condenser

R1 100,000 ohms 1/4 watt resistor
R2 50,000 ohms 1/4 watt resistor
R3 750 ohms 1/4 watt resistor
R4 50,000 ohms 1/4 watt resistor
R5 750 ohms 1/4 watt resistor
R6 40,000 ohms 1/2 watt resistor
R7 20,000 ohms 1 watt resistor
R8 Volume control
R9 100,000 ohms 1/4 watt resistor
R10 5,000 ohms 1/4 watt resistor
R11 1 meg. 1/4 watt resistor
R12 250,000 ohms 1/4 watt resistor
R13 250,000 ohms 1/4 watt resistor
R15 Tone control
R16 400 ohms 1 watt resistor
R17 1/2 meg. 1/4 watt resistor
R18 20,000 ohms 1/4 watt resistor

TUBE LAYOUT DIAGRAM



NOMENCLATURE

#1 Rectifier tube
#2 Power pentode tube
#3 2nd det. AVC & AF tube
#4 I.F. trimmer condenser
#5 I.F. trimmer condenser
#6 I.F. tube
#7 I.F. trimmer condenser
#8 I.F. trimmer condenser
#9 Det. osc. tube
#10 Osc. trimmer condenser
#11 Preselector trim con.
#12 Antenna trim condenser
#13 S. W. osc. lag cond.
#14 B. C. osc. lag cond.
#15 2nd I. F. transformer
#16 1st I. F. transformer

SOCKET VOLTAGES

Tube	Stage	Fil.	Plate	Screen	Cathode	Grid	
2A7	1st Det.	2.4	75	30	0.8		Line voltage 115
	Osc.		60				Power in watts 50
58	I. F.	2.4	250	75	2.0		Bias 2A5 (across resistor) 15 volts
2A6	2nd Det.	2.4	95		1.5		
2A5	Pentode	2.5	235	250	0	7.5	
80	Rectifier	4.7					

MODEL 352
Alignment
Parts List

UNITED AMERICAN BOSCH CORP.

GENERAL DESCRIPTION

The American-Bosch Model 352 is a five-tube superheterodyne dual wave receiver. This model is for 110 volt, 60 cycle operation.

The tuning of this receiver is divided between two illuminated scales. The BLACK scale covers the standard broadcast band (550 to 1500 kilocycles) and the RED scale covers the short wave band including the frequencies between 1600 kilocycles and 4200 kilocycles.

ALIGNING

To align the 352 chassis, it is essential to use a high grade modulated oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. A top view of the chassis is shown on page R100b and should be carefully studied before the actual work is started.

ALIGNING THE I. F. (175 KC)

1. Set volume control on full.
2. Tone control should be on bass position.
3. Short circuit antenna and ground leads to prevent local stations from interferring with subsequent alignment operations.
4. Connect output meter across voice coil of loud speaker (speaker impedence is 3.5 ohms).
5. Set test oscillator to 175 KC and adjust its output to produce measurable reading on output meter when test oscillator is connected between frame of the chassis and the grid of 58 I. F. tube #6.
6. Adjust #4 and #5 to maximum output, reducing signal oscillator output as stage is brought into resonance.
7. Connect test oscillator to grid of 2A7 (#9) and adjust #7 and #8 to maximum output.

ALIGNING B.C. OSC. AND R.F.

1. Set wave change switch to broadcast or BLACK scale position.
2. Connect test oscillator to grid of first detector tube 2A7 (#9) and adjust test oscillator to 1400 KC.
3. Set dial scale to maximum mark beyond 550 KC calibration point when gang is entirely closed.
4. Set scale at 1400 KC and adjust #10 to maximum output. NOTE: Two peaks will be heard as trimmer condenser is tuned. The second peak from maximum capacity should be used.
5. Connect test oscillator to antenna through 100. mmf. condenser and with scale still set at 1400 KC adjust condensers #10, 11 and 12 to maximum output.
6. Set scale and test oscillator to 600 KC and adjust #14 simultaneously changing this adjustment and the tuning control of chassis for maximum output. This type of adjustment is known as "max-max" and is obtained in the following manner:

   Tune receiver with left hand by means of tuning knob and adjust #14 in either direction and then without changing it, tune the receiver through a maximum, noting the value of output meter reading. Change #14 further in same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of #14, continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #14 are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few moments.

7. With test oscillator and scale set at 1400 KC readjust #10, 11 and 12, since previous operation may have altered oscillator trimmer setting.
8. Check sensitivity across band.

ALIGNING S. W. OSC.

1. Set wave change switch to short wave or RED band position.
2. Set test oscillator to 1800 KC and adjust #13 and tuning control to a "max-max" as per instructions given under Broadcast Band Alignment.
3. Check sensitivity across band.

PARTS LIST RS 352

Part No.	Description of Parts
	RESISTORS
105278	100,000 ohms 1/4 watt
105276	50,000 ohms 1/4 watt
105265	750 ohms 1/4 watt
105410	40,000 ohms 1/2 watt
102546	20,000 ohms 1 watt
105249	5,000 ohms 1/4 watt
105261	1 meg. 1/4 watt
105279	250,000 ohms 1/4 watt
103062	400 ohms 1 watt
105246	1/2 meg. 1/4 watt
105274	20,000 ohms 1/4 watt
	MAIN AND SMALL ASSEMBLIES
105711	Speaker complete
106452	Chassis complete with tubes and tube shields
105676	Dial scale assembly
106584	Resistor strip assembly
105708	1st I. F. coil assembly
105709	2nd I. F. assembly
105791	Antenna coil assembly
105756	Preselector coil assembly
105753	Oscillator coil assembly
106170	Speaker field coil assembly
	MISCELLANEOUS PARTS
98713	Dial lamp
105702	Speaker bracket
103257	Shield
97906	Plug for line cable
105648	Knobs
101869	Felt foot
105317	Name plate
105316	Dial plate
106303	Cabinet
105182	Grid lead assembly
106242	Switch (dual wave)
105144	Rubber bushing for condenser gang mounting
105947	Spring ring
105936	Tube shield for 58 tube
100377	Spacer for insulation plate assembly
104249	Insulation plate assembly on transformer
106549	Dial lamp bracket assembly
106592	Spacer for resistor strip
106134	Plug button for I. F. coils
105563	Volume control
105560	Tone control
	TRANSFORMERS
105659	Power transformer
106171	Speaker output transformer

Part No.	Description of Parts
	CONDENSERS
105771	Variable condenser gang with trimmers
106386	.05 - 2 ply condenser
105704	Trimmer condenser
101775	.001 Mica condenser
102493	.05 - 2 ply condenser
101143	.0001 Mica condenser
103650	.005 - 3 ply condenser
102499	.5 - 2 ply condenser
103852	.002 - 4 ply condenser
106279	.01 - 3 ply condenser
105931	.01 - 4 ply condenser
106340	Filter condenser assembly 8, 6 and 20 mfd.
106277	.01 - 3 ply condenser
	WASHERS
99545	Insulation washer for antenna cable
108	Lock washer for power transformer
80589	Volume control lock washer
105145	Condenser mounting rubber washer
95702	Condenser mounting plain washer
53544	#8 Shakeproof lock washer
	SCREWS
97704	Trimmer condenser fastening screw
104587	Fastening screw for speaker coil and condenser assemblies
95988	Screw for oscillator coil
101951	Name plate fastening screw
101700	Speaker bracket fastening screw
101865	Condenser mounting fastening screw
102441	Set screw for dial scale assembly
95996	Resistor strip fastening screw
	NUTS
105039	Nut for volume control and dual wave switch
105798	Nut for power transformer
68826	Hex nut for screw 104587

PARTS LIST RS 354

5 tube dual wave - 220 volts, 25 cycles

Part No.	Description of Parts
106489	Chassis assembly complete
106061	Power transformer

All other parts are the same as RS 352.

UNITED AMERICAN BOSCH CORP.

The adjustment of the receiver may be divided into five divisions: (1) adjustment of the I. F. amplifier (2) adjustment of the broadcast band (black) (3) adjustment of the 1500-4000 K. C. band (green) (4) adjustment of the 3500-9000 K. C. band (red) and (5) adjustment of the 8000-20,000 band (blue).

The procedure is as follows:

(A) I. F. Adjustment

(1) Set signal generator to ~~476~~ K. C. with attenuator well ahead (20,000mv).

(2) Introduce signal to grid of second I. F. amplifier (see diagram).

(3) Adjust small screws in front side of third I. F. transformer for loudest signal, reducing attentuator as required. Final sensitivity about 5000 microvolts.

(4) Decrease signal generator attenuator to about 1000mv and introduce signal to grid of first I. F. amplifier.

(5) Adjust alignment screws of second I. F. transformer for loudest signal, reducing attenuator as stage is brought into resonance. Final sensitivity about 300 microvolts.

(6) Decrease signal generator attenuator to about 50 microvolt setting, and introduce signal to grid of first detector.

(7) Repeat alignment procedure on 1st I. F. transformer (see diagram) until best adjustment is obtained. Sensitivity about 20 microvolts.

(B) R. F. Adjustment

(1) Set signal generator to 1500 K. C. with input from signal generator to grid of first detector. Place pointer of radio set to 1.5 mark on dial. Adjust screw of trim condenser in top of right rear shield container until signal is tuned in. This screw is usually designated by a red color code. Having obtained tune at this point set signal generator to 600 K. C. and set pointer to .6 mark on station indicator and adjust other screw in the shield container until the signal is tuned in. Now return to the 1500 K. C. point with set and signal generator and make the slight resetting of the first named screw to obtain accurate adjustment to scale reading.

(2) Connect signal generator to antenna lead, making sure the antenna equivalent (200 mmf) is in the circuit.

(3) Continue setting of 1500 K. C. Adjust alignment condensers on variable condenser gang (1st and 2nd sections from front of set) for loudest signal. Check sensitivity, and calibration at several points on dial. Set should come correctly to kilocycles settings of important broadcasting stations, and its sensitivity on the signal generator should be within the limits specified here.

K. C. - - -	1500	1000	600
M. V. - - -	5	5	10

MODEL 360
Alignment Data

UNITED AMERICAN BOSCH CORP.

Having placed the broadcast band in correct setting, we are now ready to adjust the short wave bands. In order to attempt this a reliable signal generator is required Examples are the Ferris Instrument Co. type 10B, General Radio 603-A, R. C. A. type TMV-18. Do not try to make adjustments on the short wave bands by means of harmonic obtained from a set tester designed for use only on 500 to 1500 K. C. band. Such a procedure will usually end in getting so far off correct adjustment as to require factory service.

(C) Adjustment of the Green Band

Place signal generator on 3600 K. C. and pointer of radio set at the 3.6 mark on the dial.

Adjust trim condenser in right hand front shield container until signal is tuned in. This trim condenser is usually red color coded. Place signal generator on 1600 K.C. and adjust dial scale pointer of set to 1.6 mark. Adjust opposite condenser in shield container to best signal. Return to 3600 K. C. and repeat adjustment. In adjusting to the 3600 K. C. point it is possible to obtain two settings for different positions of the trim condenser in the shield container. This denotes merely the plus and minus frequency between oscillator and signal generator which will give the correct I. F. frequency. The correct setting of the trim condenser is the one wherein the screw is turned furthest out. In any event, an incorrect setting will always be denoted by lack of sensitivity when the set and signal generator are tuned to 2500 K. C. (mid-band). This check is usually quite valuable. The sensitivities should be as follows:

K. C. - - -	3600	2400	1600
M. V. - - -	10	10	5

(D) Adjustment of the Red Band

Place signal generator on 8000 K. C. marking and tune receiver in region of 8.0 on scale. Note where signal is received. Next place signal generator on its 4000 K. C. setting and tune set to 4.0 on scale. Adjust oscillator lag condenser (rear unit on right hand side plate) until signal is received. Return set and signal generator to 8000 K. C. and observe pointer setting and sensitivity. Slight deviations from calibration can be compensated by manipulating the stiff wires connecting the oscillator coil to the switch.

(E) Adjustment of the Blue Band

Place signal generator at 20,000 K. C. or if this is not available, then adjust to highest possible frequency, which preferably should be at least 15,000 K. C. Tune set to this frequency and note where signal generator is received on the dial scale. Then place signal generator on 10,000 K. C. and adjust oscillator lag condenser (front unit on side plate) until signal generator is tuned in at 10 on dial scale. Now return both signal generator and radio set to the high frequency setting. Located on the under side of the base and adjacent to the switch and high frequency selector coils are two trim condensers which are used for correct adjustment at this high frequency. Increase setting of attenuator until signal generator can be tuned in at two points on dial (say 20 and 19). Then with set pointer at 20 adjust these trim condensers for best signal decreasing signal generator attenuator as signal becomes better tuned. At correct adjustment a very loud signal will be obtained at 20 while a feeble signal or none at all is observed at 19. This is a practical illustration of the effectiveness of pre-selection as outlined in the first part of this description.

The adjustment instructions just given apply to a Model 360 receiver which is in reasonable operating condition, but in some manner has been thrown out of adjustment. Obviously, before the radio technician can go thru with the adjustments given here, he must assure himself that defective tubes, injured parts, such as punctured condensers, shorted variable condensers, open resistors, scratched high frequency coils, etc. are not such as to cause the set to be inoperative on one or more bands of frequencies.

UNITED AMERICAN BOSCH CORP.

SERVICE INSTRUCTIONS FOR ADJUSTMENT OF MODEL 370

The Model 370 is a dual band receiver with the following frequency coverages: On the broadcast band, printed in black, 540 to 1712 kc.; this includes not only the American broadcast band but also certain of the police transmitters. On the short-wave police band, ship to shore transmitters, and the short-wave broadcast at 6000 kc.

The Model 370 is a 7-tube superheterodyne receiver comprising a combination first detector oscillator, two stages of intermediate frequency amplification, diode rectification and automatic volume control, an audio amplifier tube on control by the signal, an audio frequency driver stage, and a push pull power output stage. Selectivity is provided by a double tuned antenna selector and three double tuned intermediate frequency transformers, comprising a total of eight selective circuits.

The tube complement of the Model 370 follows:

1 Type 2A7, oscillator and first detector
1 Type 58, first intermediate frequency amplifier
1 Type 2B7, second intermediate frequency amplifier, detector and a.v.c.
1 Type 58, controlled audio amplifier
1 Type 53, driver stage
1 Type 53, push pull output stage
1 Type 83V, rectifier

The adjustment of the receiver will be described under three headings - (A) intermediate frequency amplifier, (B) broadcast band (black), (C) short wave band (red).

Alignment procedure should always be in the order given below:

(A) INTERMEDIATE FREQUENCY AMPLIFIER ADJUSTMENT

(1) Set signal generator or alignment oscillator to 265 kc. and adjust its output to produce a measurable signal on the output meter when the generator is connected to the control grid cap of the second i.f. (2B7).

(2) Set volume control at maximum volume position, tone control at bass and wave change switch so that the black scale or broadcast band is in operation.

(3) With signal generator connected between frame of the receiver and grid cap of the second i.f. amplifier, adjust small screws in front side of their i.f. transformer for loudest signal, adjusting attenuator of signal generator as required. Note: If calibrated output meter and accurate signal generator are being used, the sensitivity should be approximately 8000 microvolts for an output voltage of .6 volts measured across the moving coil of the speaker. This corresponds to 100 milliwatt standard output.

Note: Signal generators may vary as much as 50% in accuracy of attenuation and for this reason, the sensitivity data should be regarded as an approximate guide to correct performance.

(4) Decrease signal generator output to about 500 microvolts and connect signal generator to control grid cap of first i.f. amplifier tube (58).

(5) Adjust alignment screws of second i.f. transformer for loudest signal, reducing output of signal generator as stage is brought into resonance. This adjustment is made by using a small screw driver inserted thru the hole provided in the dial scale. Final sensitivity should be about 300 microvolts.

(6) Decrease signal generator output to about 50 microvolts and connect signal generator to control grid cap of first detector tube (2A7).

(7) Adjust alignment screws of first i.f. transformer until loudest signal is obtained, reducing attenuator as stage is brought into resonance. Readjust second and third i.f. transformer alignment screws to assure perfect alignment of the entire amplifier. This should be done without removing signal generator lead from first detector. Over-all sensitivity of the i.f. amplifier should be approximately 51 microvolts.

(B) BROADCAST BAND ADJUSTMENT

(1) Rotate tuning control until gang condenser is fully closed. The pointer should now be in line with the fine black mark approximately 1/8" beyond the 550 kc. calibration mark (5.5 on dial). The travel of the pointer from this mark to the position which it occupies when the condenser is fully open, should be 3-1/16 inches. When the indicator mechanism is so adjusted that this travel is obtained alignment of preselector and oscillator circuits will then assure the best calibration.

(2) Set signal generator to 1400 kc. with input connected to grid cathode of first detector tube (2A7).

(3) Adjust tuning control until point is at 1400 kc. calibration mark. Adjust screw of the oscillator section of the gang condenser (see diagram), until maximum output is obtained. Sensitivity should be about 50 microvolts.

(4) Connect signal generator to antenna ground terminal using an antenna equivalent of 200 mmf. condenser in series with antenna lead to signal generator.

(5) Adjust all trimmer screws of the gang condenser to a maximum. Sensitivity should be approximately 10 microvolts.

(6) Set signal generator to 600 kc. with connections made to antenna and ground terminals.

(7) Tune in signal by means of tuning control and then adjust both tuning control and broadcast band oscillator lagging adjustment simultaneously for a maximum. Note: This type of adjustment is known as "max-max" and is obtained in the following manner:

MODEL 370
Alignment Data

UNITED AMERICAN BOSCH CORP.

Tune receiver with left hand by means of tuning knob and adjust oscillator lag condenser with right hand. Make slight change in oscillator lag condenser in either direction and then, without changing it, tune the receiver thru a maximum noting the value of output meter reading obtained. Change oscillator lag condenser further in the same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of the oscillator lag condenser. Continue this type of trial and error adjustment until no improvement can be made when either tuning control or oscillator lag condenser are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation required only a few moments.

(8) Recheck 1400 kc. adjustment since oscillator lagging procedure may have slightly detuned oscillator. Check sensitivity at various settings along broadcast band. Sensitivity should be approximately 10 microvolts or less.

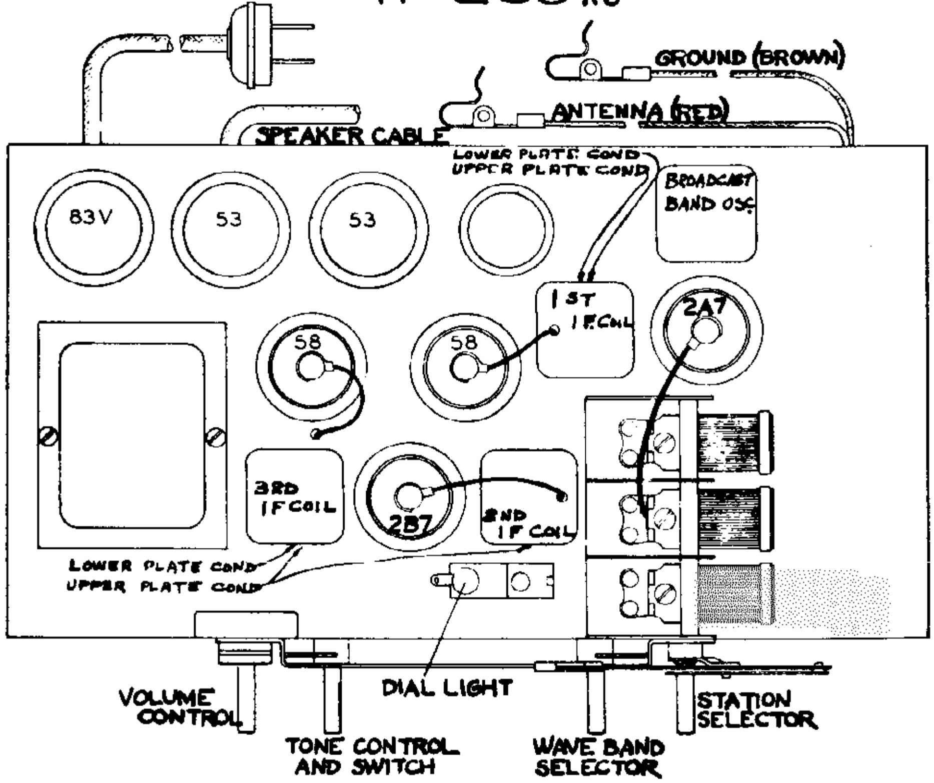
(C) SHORT WAVE ADJUSTMENT

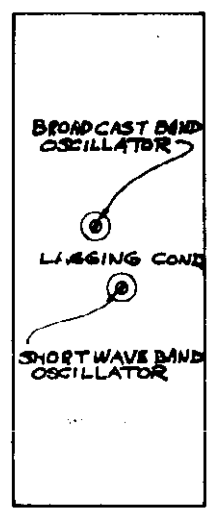
(1) Set signal generator at 2400 kc. with output connected to antenna and ground terminals.

(2) Change wave band switch to red band, tune in signal at 2400 kc. and "max-max" oscillator as described above, using short-wave oscillator lagging condensers as shown on diagram.

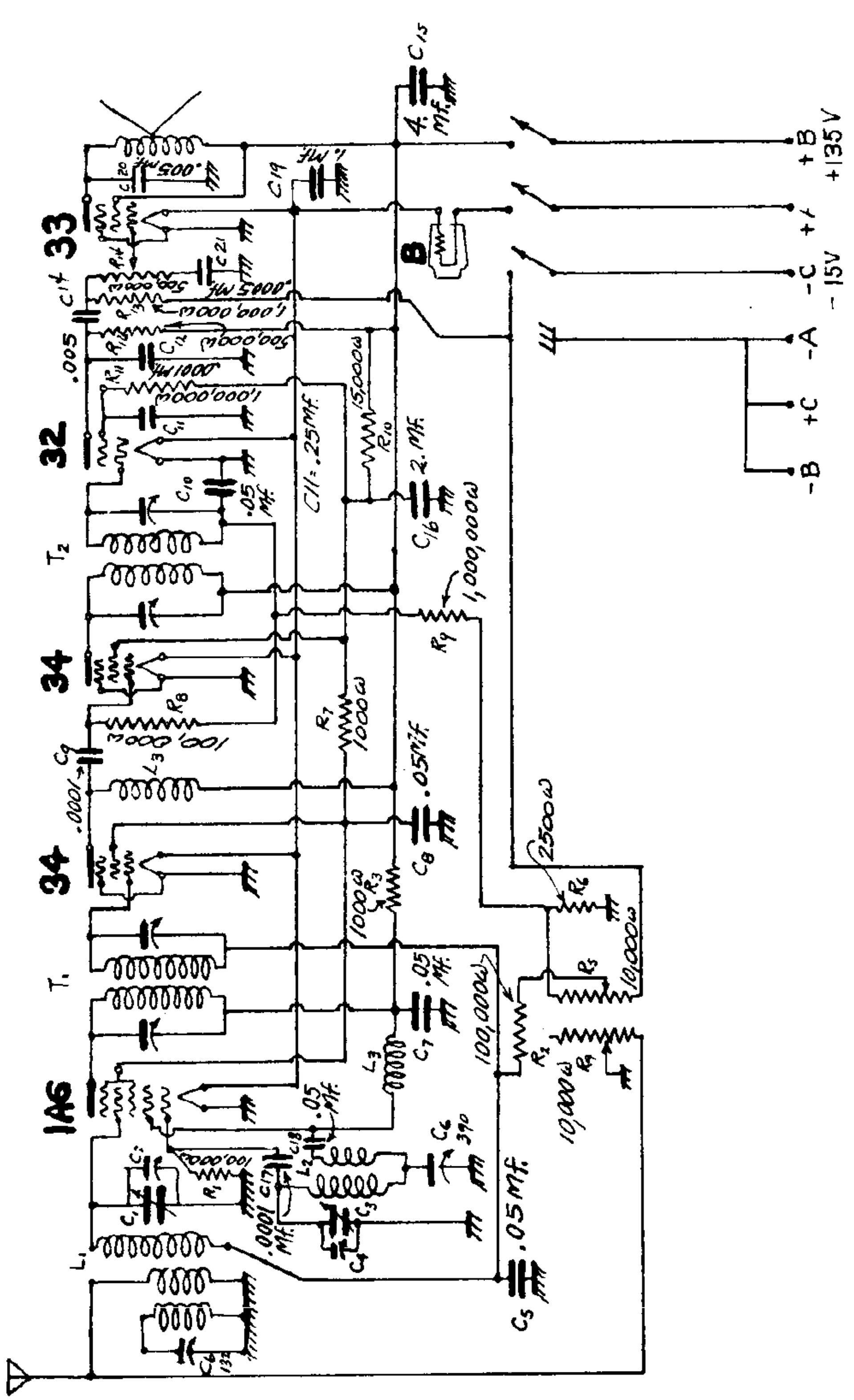
(3) Check sensitivity of entire short-wave band which should be 50 microvolts or less.

IF-265 KC





UNITED AMERICAN BOSCH CORP

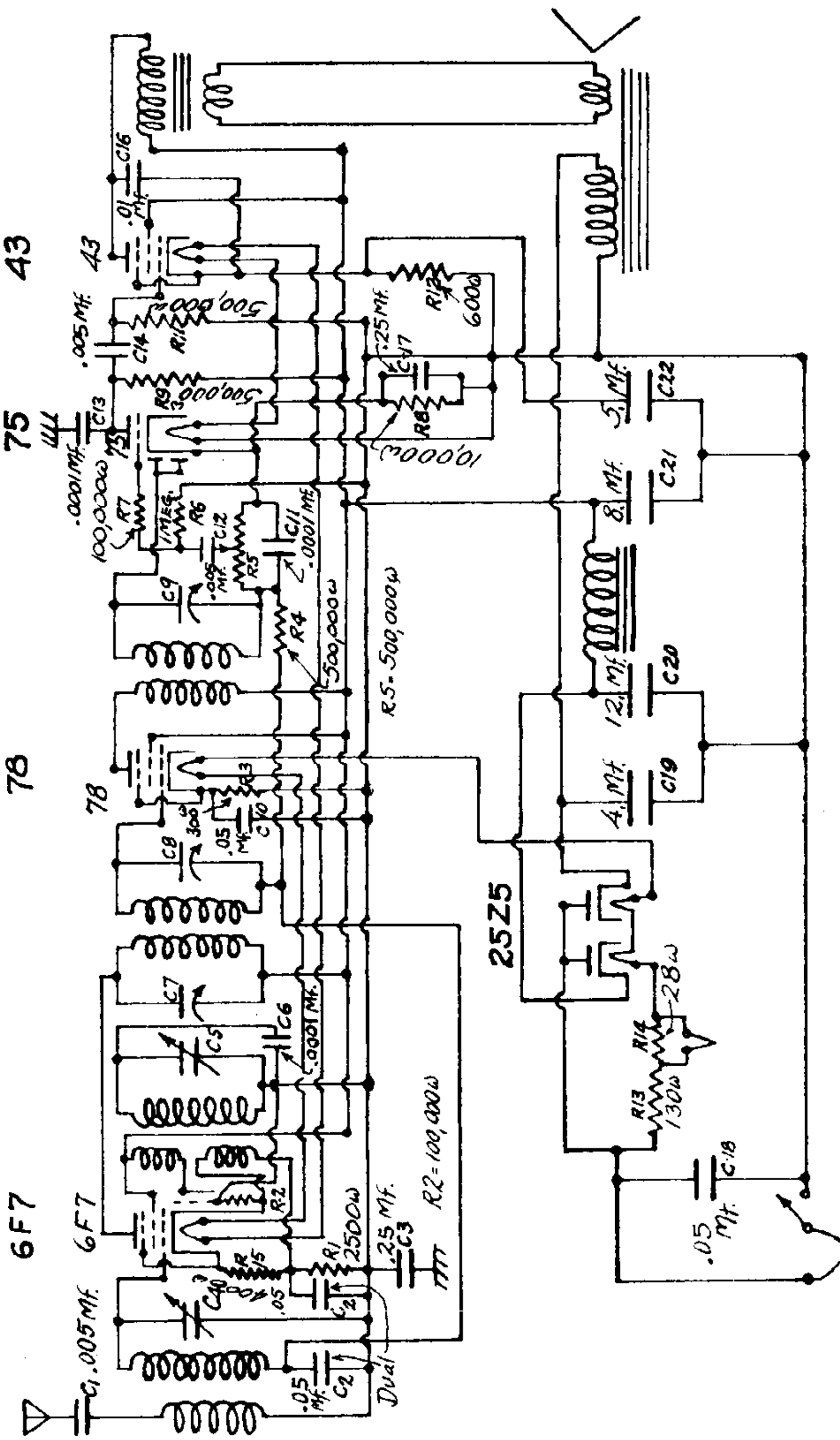


456 KC IF

SCHEMATIC DIAGRAM OF MODEL 376

MODEL 402
Schematic

UNITED AMERICAN BOSCH CORP

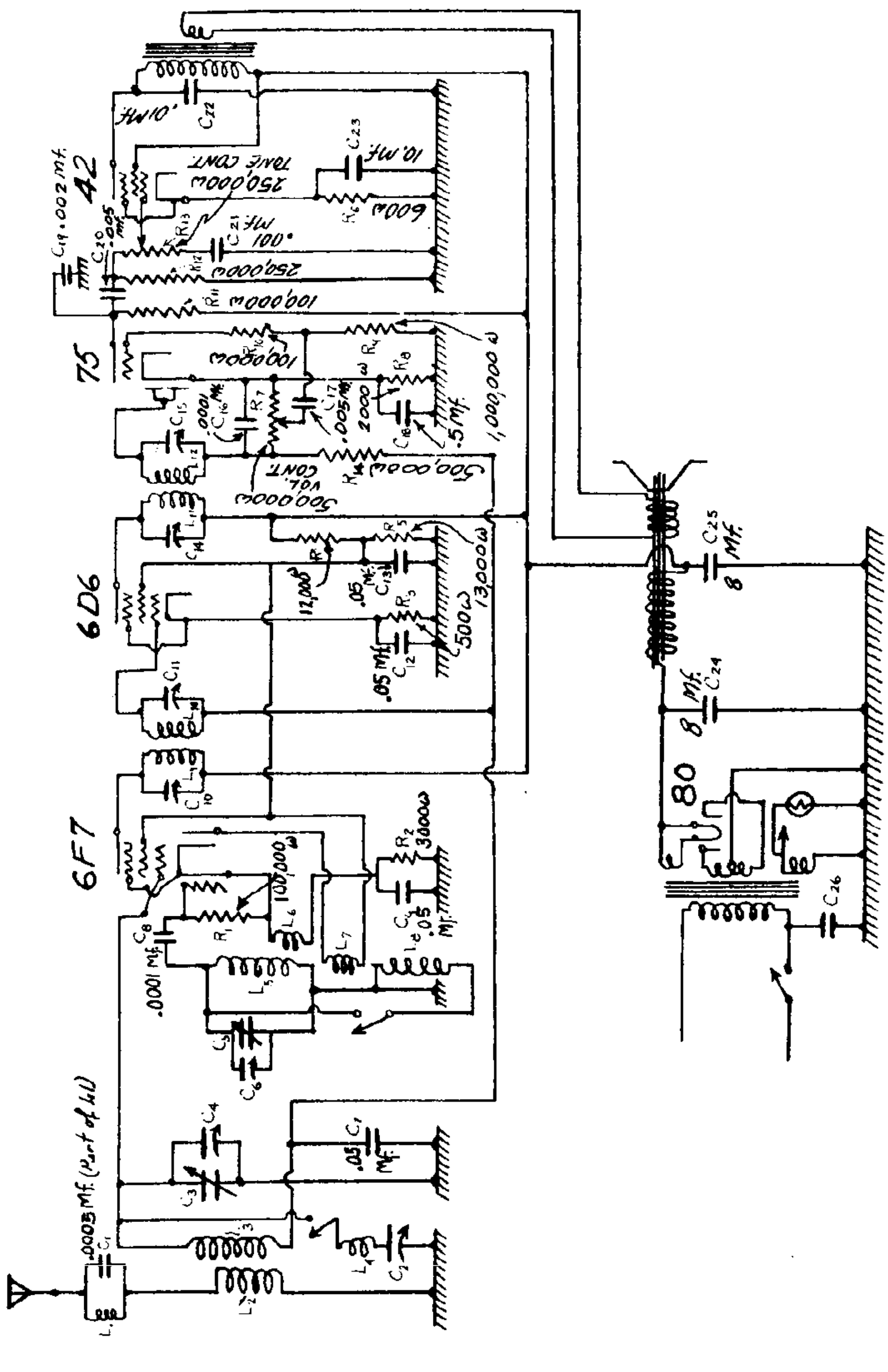


INTERMEDIATE FREQUENCY - 456 K.C.

SCHEMATIC DIAGRAM OF MODEL 402

UNITED AMERICAN BOSCH CORP

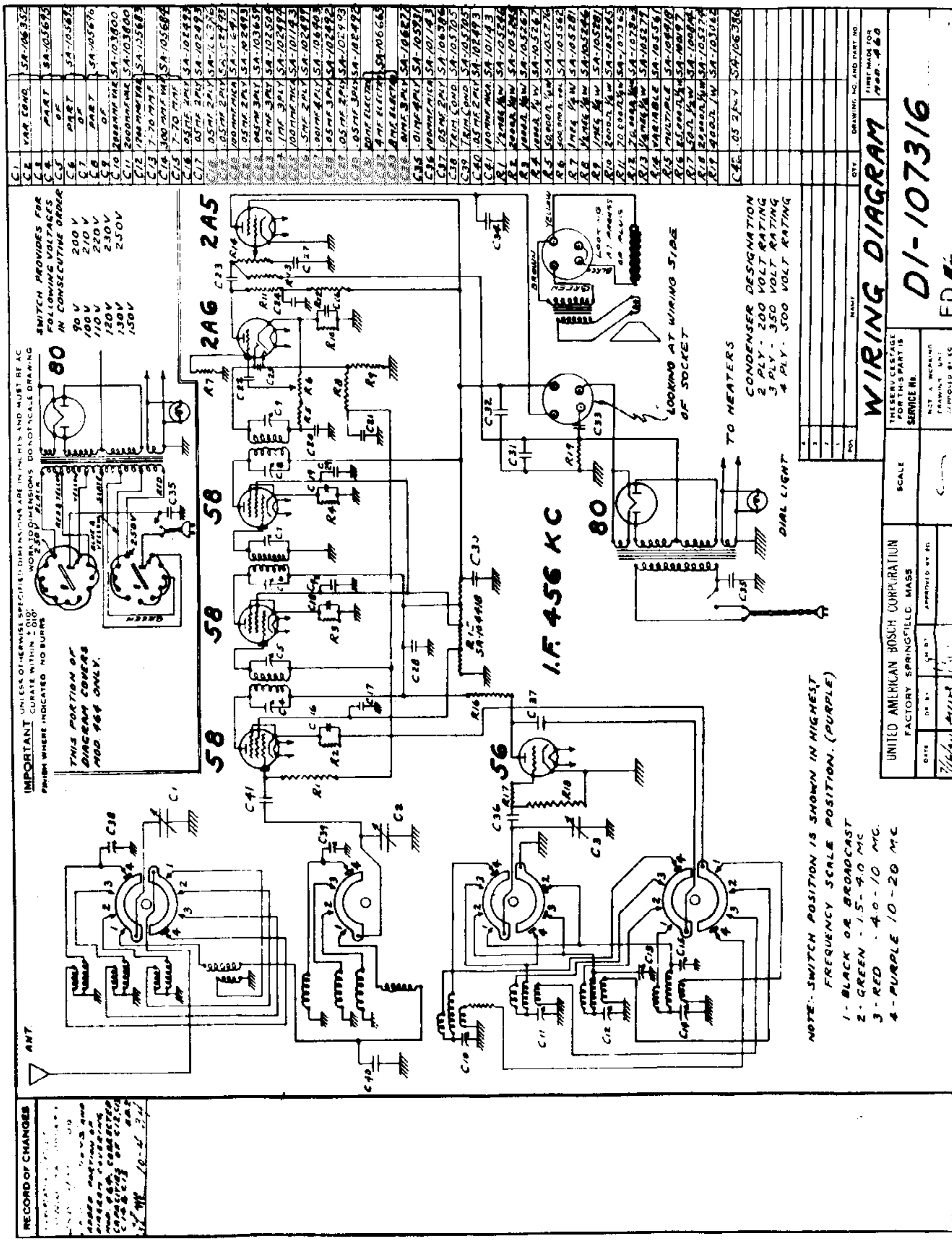
SCHEMATIC DIAGRAM OF MODEL 420



I.F. = 456 K.C.

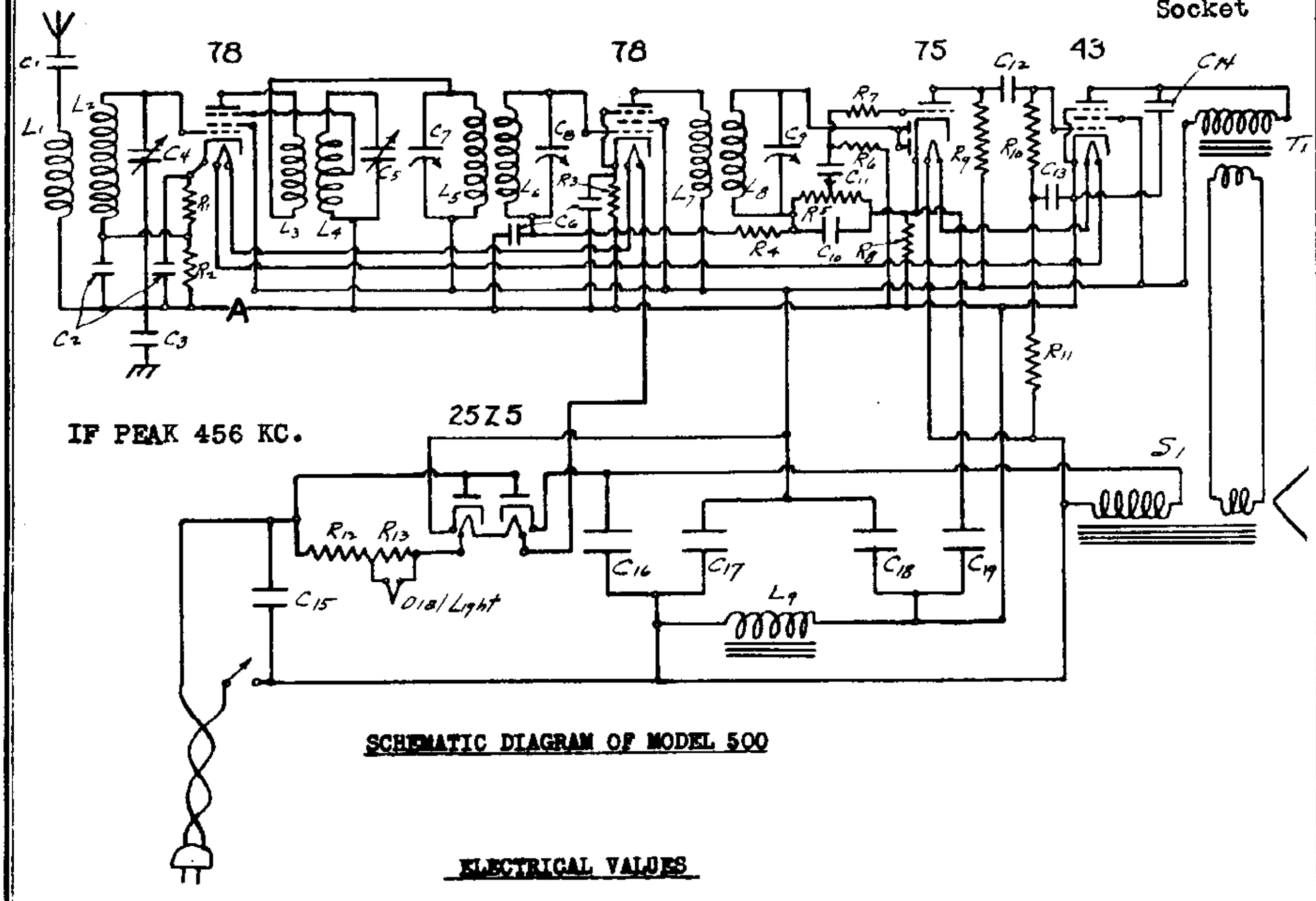
MODEL 460
Schematic

UNITED AMERICAN BOSCH CORP



MODEL 500
Schematic
Socket

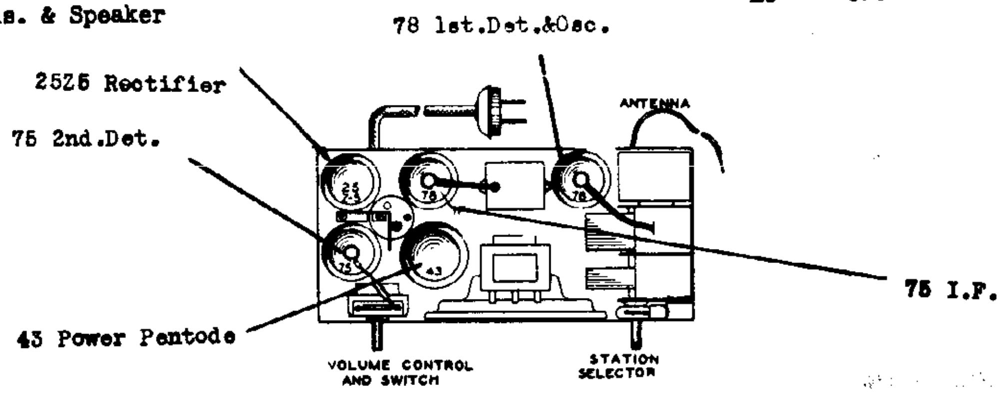
UNITED AMERICAN BOSCH CORP.



SCHEMATIC DIAGRAM OF MODEL 500

ELECTRICAL VALUES

R1	500	C1	.005 - 3 ply	C14	.01 - 4 ply
R2	2500	C2	.05 Dual	C15	.01 - 4 ply
R3	100	C3	.25 - 2 ply	C16	4 mf. 150V
R4	500,000	C4	(2-gang cond.	C17	16 mf. 150V
R5	500,000 var.	C5	(with trimmers	C18	4 mf. 150V
R6	1 meg.	C6	.05 Dual	C19	5 mf. 150V
R7	100,000	C7	(Mica I.F.	L1, L2	Ant. Coil
R8	5000	C8	(Trimmers	L3, L4, L5, L6	Det. Osc. Assy.
R9	250,000	C9	Mica Trimmers	L7, L8	2nd I.F. Assy.
R10	500,000	C10	.0001 Mica	L9	Choke
R11	250,000	C11	.005 - 3 ply		
R12	150	C12	.006 - 3 ply		
R13	35	C13	.25 - 2 ply		
T1	Output trans.				
S1	Trans. & Speaker				



MODEL 500
Voltage
Alignment Data

UNITED AMERICAN BOSCH CORP.

VOLTAGE READINGS

Note: Since no circuits are directly connected to the metal chassis as in the usual A. C. radio sets, it is necessary to measure voltages to the negative side of the circuit designated as "A" on the wiring diagram. A high resistance voltmeter must be used or readings will be inaccurate.

The following voltage readings were taken with the receiver supplied by 115 volts 60 cycle alternating current. Voltage readings will be slightly lower when D. C. is used and will vary with the type of meter used.

1. (Rectifier 25Z5)	Voltage across C16	120 V
	" " C12	120 V
	" " Heater	25 V
2. (Power tube 43)	" Screw to point A	105 V
	" Plate " " "	96 V
	" Bias across L9	15 V
	" Heater	25 V
3. (Second Detector 76)	" Plate to point A	37 V
	" Bias cathode to A	.5 V
	" Heater	6 V
4. (Intermediate 78)	" Screen to point A	103V
	" Plate to point A	105V
	" Bias Cathode point A	1.3V
	" Heater	6V
5. (Osc. Det. 78)	" Screen to point A	105 V
	" Plate " " A	105 V
	" Grid bias Cathode to coil lug across R.	2.8 V
	" Suppressor bias cathode to pointA	16.5 V
	Heater	6 V

The heater voltages may vary considerably because the series connection maintains constant current rather than constant voltage.

Alignment Instructions - Model 500

I. F. Adjustment 456 K. C.

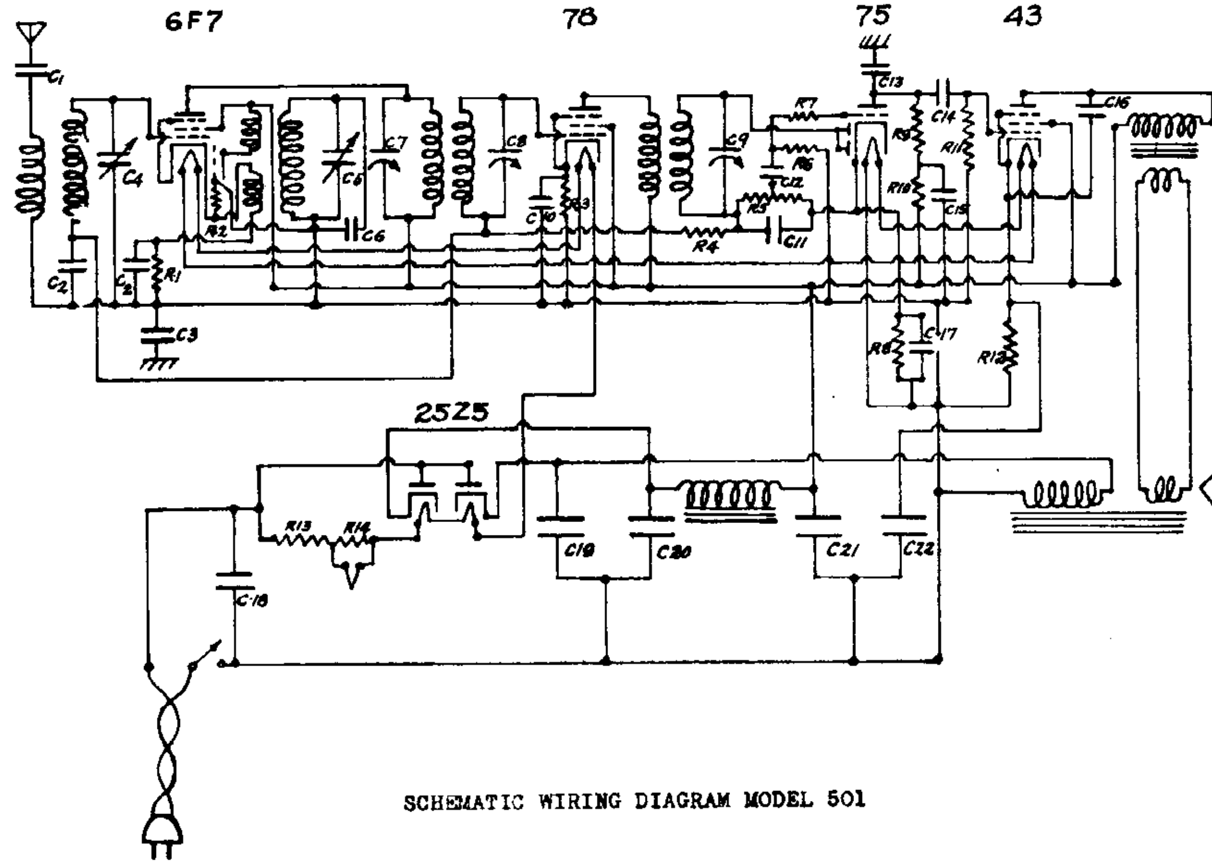
Note: The signal generator or alignment oscillator should have no external ground connection of the low potential side of its output either to ground or to the power line and the low potential output terminal may be connected to the frame of the receiver. An external ground of the receiver frame will result in a loud hum making alignment impossible.

1. Connect volume indicator across moving coil of speaker (speaker impedance is 4.5 ohms)
2. Set volume control at maximum
3. Connect signal generator to grid of I. F. tube (78) and adjust the trim condenser in the top of the small I. F. housing which is located above the chassis between the tubes, to maximum output.
4. Connect signal generator to grid of 1st detector and adjust both condensers to a maximum output. These adjustments are made by means of slotted screws at the rear of the housing,at center of set.

Oscillator and R. F. Adjustment

1. Connect R. F. signal generator to antenna wire thru 100 mf mica condenser. Antenna should be hanked.
2. Set dial scale to maximum mark beyond the 550 kilocycle calibration point when gang is entirely closed.
3. Trim both condenser sections to a maximum with the signal generator and scale set at 1500 kilocycles.

UNITED AMERICAN BOSCH CORP.



SCHEMATIC WIRING DIAGRAM MODEL 501

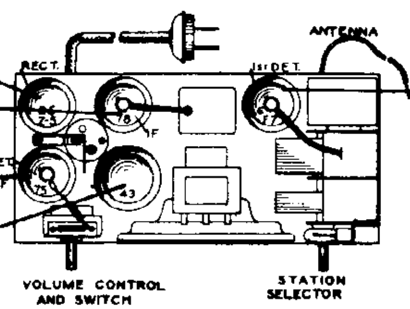
25Z5 Rect.

78 I.F.

75 2nd.Det.A.V.C.& A.F.

43 Power Pentode

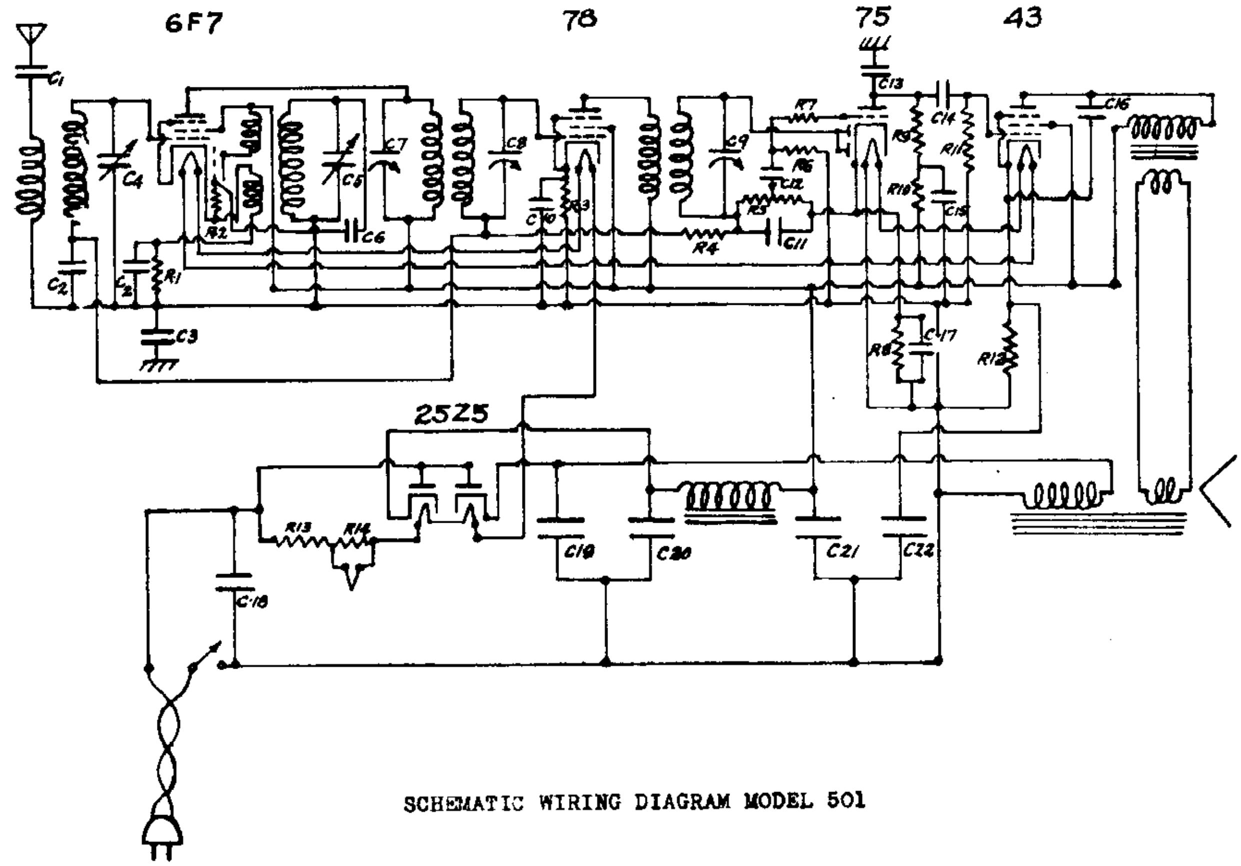
6F7 Det.Osc.



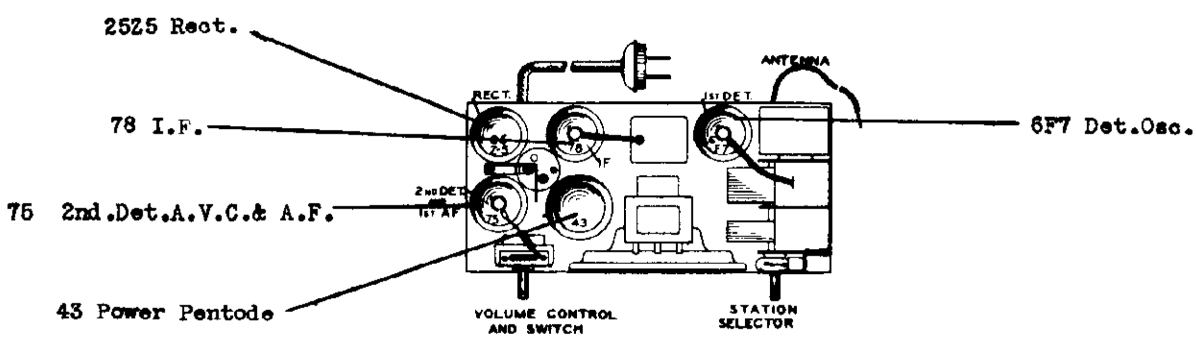
ELECTRICAL VALUES

R1	1500 ¼ W	R13	130	C11	.0001 Mica.
R2	100000 "	R14	28	C12	.005 - 3 Ply
R3	300 "	C1	.005 - 3 Ply	C13	.0001 Mica.
R4	500000 "	C2	.05 Dual	C14	.005 - 3 Ply
R5	500000 Var.	C3	.25 - 2 Ply	C15	.25 - 2 Ply
R6	1 Meg. ¼ W	C4)	2 gang cond.	C16	.01 - 4 Ply
R7	100000 "	C5)	With trim.	C17	.25 - 2 Ply
R8	10000 "	C6	.0001 Mica.	C18	.01 - 4 Ply
R9	500000 "	C7	Mica. I. F.	C19	4 Mfd. 150 V
R10	50000 "	C8	Trimmers	C20	12 " "
R11	500000 "	C9	"	C21	8 " "
R12	600 ½ W	C10	.05 - 2 Ply	C22	5 " 25 V

UNITED AMERICAN BOSCH CORP.



SCHEMATIC WIRING DIAGRAM MODEL 501



ELECTRICAL VALUES

R1	1500 ¼ W		R13	130		C11	.0001 Mica.
R2	100000 "		R14	28		C12	.005 - 3 Ply
R3	300 "		C1	.005 - 3 Ply		C13	.0001 Mica.
R4	500000 "		C2	.05 Dual		C14	.005 - 3 Ply
R5	500000 Var.		C3	.25 - 2 Ply		C15	.25 - 2 Ply
R6	1 Meg. ¼ W		C4)	2 gang cond.		C16	.01 - 4 Ply
R7	100000 "		C5)	With trim.		C17	.25 - 2 Ply
R8	10000 "		C6	.0001 Mica.		C18	.01 - 4 Ply
R9	500000 "		C7	Mica. I. F.		C19	4 Mfd. 150 V
R10	50000 "		C8	Trimmers		C20	12 " "
R11	500000 "		C9	"		C21	8 " "
R12	600 ½ W		C10	.05 - 2 Ply		C22	5 " 25 V

MODEL 501 AC-DC
Voltage
Parts List

UNITED AMERICAN BOSCH CORP.

MODEL 501

I - A.C.MEASUREMENT

Stage	Tube	Fil	Plate	Screen	Cathode
1 Det.	6.F7	6.0	115	115	12
Osc.			115		
I.F.	78	6.0	115	115	2.8
2 Det.	75	5.9	30	-	0.7
Amp.					
Power	43	22	115	115	17
Rect.	25Z5	25	125	-	-

Line Voltage	115	Dynamic Field	108 Volts
Power in Watts	47	Filter Choke Drop	8.8 Volts
Dial Lamp Volts	6.0		
Res. Strip Volts	47		

II - D.C.MEASUREMENT

Stage	Tube	Fil	Plate	Screen	Cathode
1 Det.	6.F7	6.2	102	102	8.7
Osc.			102		
I.F.	78	5.9	102	102	2.5
2 Det.	75	5.8	27	-	0.6
Amp.					
Power	43	24	102	102	13
Rect.	25Z5	27	110	-	-

Line Volts	115	Resistance Strip Volts	47
Dial Lamp Volts	6	Dynamic Field Volts	115

ESSENTIAL PARTS LIST

RESISTORS

105260	300 Ohm. ¼ Watt
101211	600 " ¼ "
105268	1500 " ¼ "
105272	10,000 " ¼ "
105278	100,000 " ¼ "
105246	500,000 " ¼ "
105281	1 Meg " ¼ "
105308	Volume Control
105319	Power Resistor Strip

CONDENSERS

101143	.0001 Mica
103659	.005 MF 3 Ply
103695	.01 MF 4 Ply
102493	.05 MF 2 Ply
105327	.05 MF Dual
102497	.25 MF 2 Ply
105728	Variable Condenser
105722	Filter Condenser

COILS

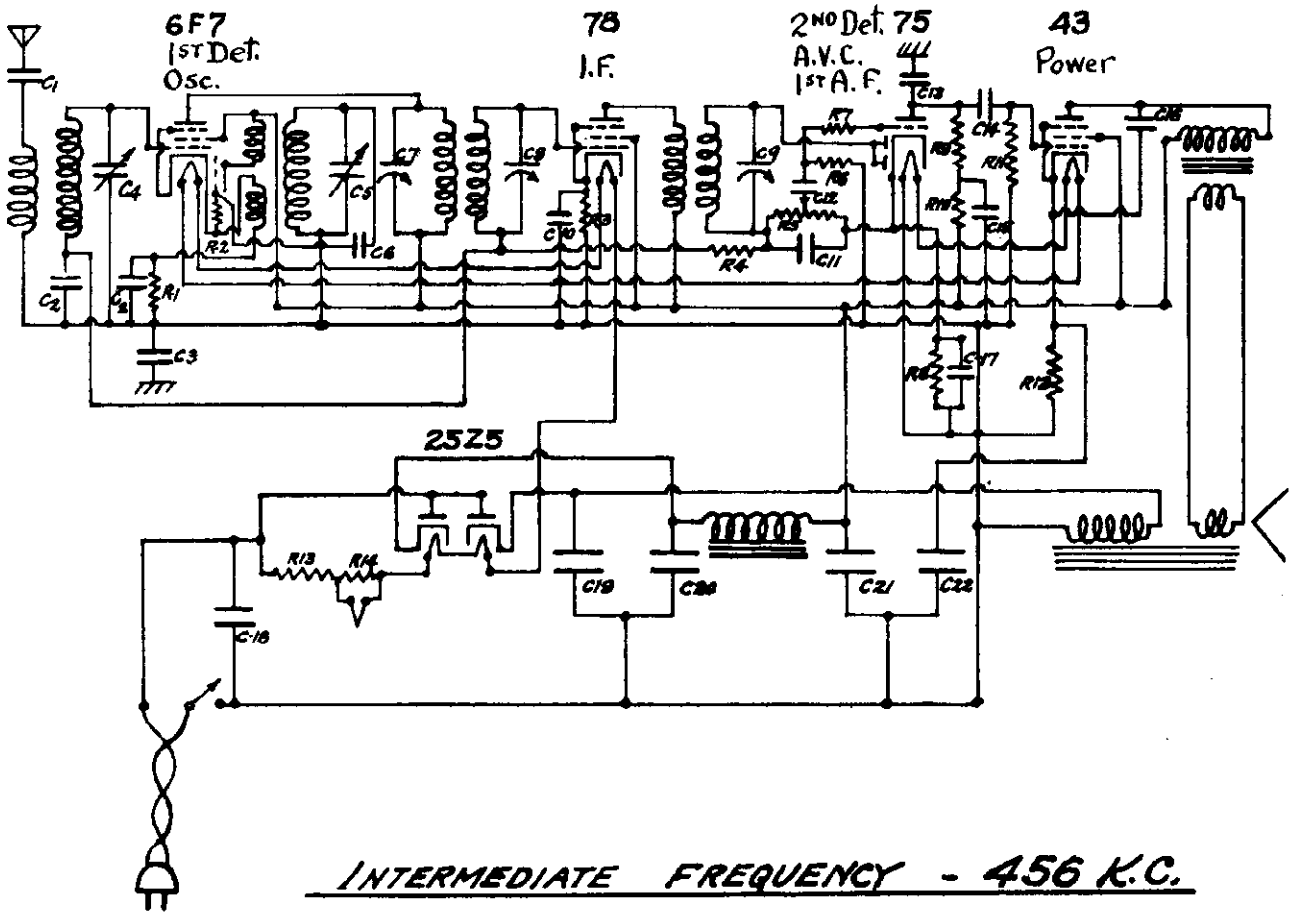
105725	Antenna Coil
105721	Oscillator Coil
105721	First I.F. Coil
105318	Second I.F. Coil
105724	Choke Coil

MISC. PARTS

105726	Speaker Assembly
105343	Line Cable
105732	Dial Scale Assembly
105336	Dial Lamp Socket
95572	Dial Lamp
105344	Antenna Cable

MODEL 502
Schematic
Socket

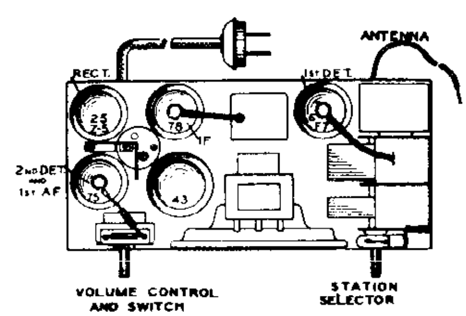
UNITED AMERICAN BOSCH CORP.



INTERMEDIATE FREQUENCY - 456 K.C.

ELECTRICAL VALUES

R1	1500 ohms ¼ watt
R2	100000 " " "
R3	300 " " "
R4	500000 " " "
R5	500000 variable
R6	1 meg ohms ¼ watt
R7	100000 " " "
R8	10000 " " "
R9	500000 " " "
R10	50000 " " "
R11	500000 " " "
R12	600 " ½ "
R13	130
R14	28
C1	.005 3 Ply
C2	.05 Dual
C3	.25 2 Ply
C4)	Two gang cond.
C5)	with trimmers
C6	.0001 mica
C7)	
C8)	Mica I.F.
C9)	Trimmers
C10	.05 2 Ply
C11	.0001 Mica
C12	.005 3 Ply
C13	.0001 Mica
C14	.005 3 Ply
C15	.25 2 Ply
C16	.01 4 Ply
C17	.25 2 Ply
C18	.01 4 Ply
C19	4 M.F. 150 V.
C20	12 M.F. 150 V.
C21	8 M.F. 150 V.
C22	5 M.F. 25 V.



MODEL 502
Voltage
Parts List

UNITED AMERICAN BOSCH CORP.

I - A.C. MEASUREMENT

Stage	Tube	Fil	Plate	Screen	Cathode
1 Det.	6.F7	6.0	115	115	12
Osc.			115		
I.F.	78	6.0	115	115	2.8
2 Det.	75	5.9	30	-	0.7
Amp.					
Power	43	22	115	115	17
Rect.	25Z5	25	125	-	-

Line Voltage	115	Dynamic Field	108 Volts
Power in Watts	47	Filter Choke Drop	8.8 Volts
Dial Lamp Volts	6.0		
Res. Strip Volts	47		

II - D.C. MEASUREMENT

Stage	Tube	Fil	Plate	Screen	Cathode
1 Det.	6.F7	6.2	102	102	8.7
Osc.			102		
I.F.	78	5.9	102	102	2.5
2 Det.	75	5.8	27	-	0.6
Amp.					
Power	43	24	102	102	13
Rect.	25Z5	27	110	-	-

Line Volts	115	Resistance Strip Volts	47
Dial Lamp Volts	6	Dynamic Field Volts	115

To replace tubes it is necessary to remove the chassis from the cabinet. Remove the screws which fasten the back. Remove the knobs and the screws holding the bottom of the chassis in place. The chassis may then be moved back from the front of the cabinet until the tubes are accessible.

CAUTION: Disconnect the receiver from the power supply before touching the chassis, tubes, or any metal parts inside the cabinet.

Resistors

105260 500 ohms ½ Watt
101211 600 ohms ½ Watt
105272 10,000 ohms ½ Watt
105276 50,000 ohms ½ Watt
105278 100,000 ohms
105268 1,500 ohms ½ Watt
105246 ½ meg. ohms
105281 1 meg. ohms
105308 Vol. Control & Switch

Condensers

102493 .05 - 2 Ply
105527 .05 Dual
101143 .0001 Mica
103659 .005
103695 .01 - 4 Ply
102497 .25 - 2 Ply
105722 (Electrolytic)

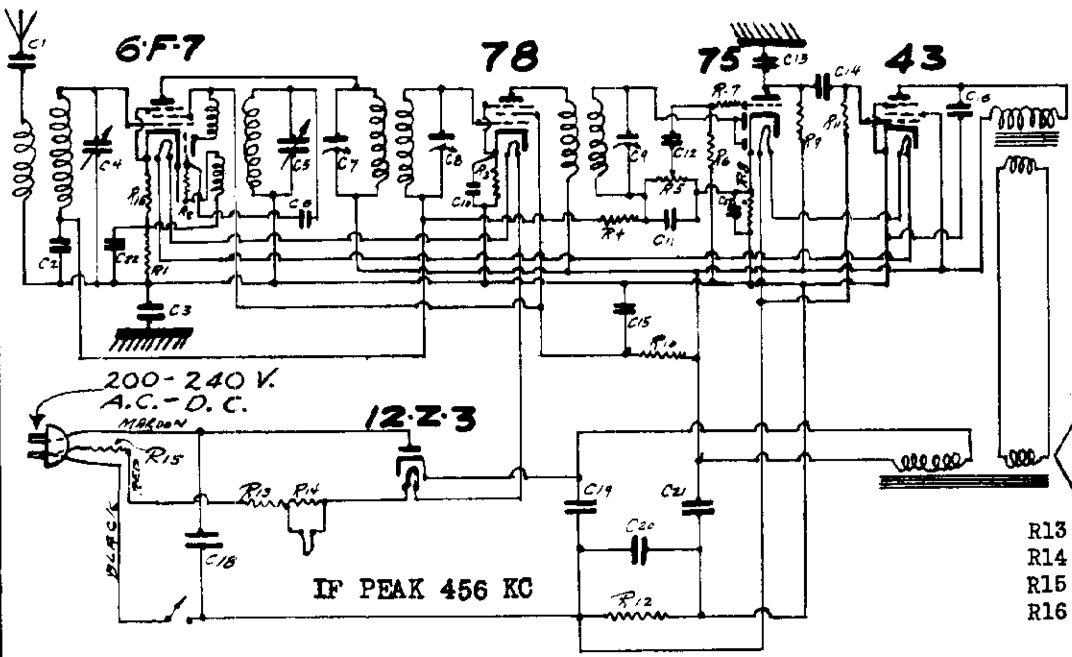
Coils

105725 Antenna Coil
105721 I.F., Det., & Osc. Coil
105318 2nd I.F. Coil
105724 Choke Coil Assy.

Misc. Parts

105535 Knob
105321 Speaker Baffle
101869 Felt Feet
105334 Name Plate
106318 Dial Plate
105729 Chassis Assy.
106507 Cabinet
105726 Speaker
105732 Dial Scale Assy.
95572 Dial Lamp
105336 Dial Lamp Socket Assy.
105723 Condenser Gang

UNITED AMERICAN BOSCH CORP.



IF PEAK 456 KC

ELECTRICAL VALUES

R1	2500 ohms ¼ watt	C10	.05 mfd. 2-ply
R2	100000 " " "	C11	.0001 mfd. mica
R3	500 " " "	C12	.005 mfd. 3-ply
R4	500000 " " "	C13	.0001 mfd. mica
R5	500000 " variable	C14	.005 mfd. 3-ply
R6	1 megohm ¼ watt	C15	.05 " 2-ply
R7	100000 ohms ¼ watt	C16	.005 " 3-ply
R8	10000 " " "	C17	.25 " 2-ply
R9	500000 " " "	C18	.01 " 4-ply
R10	3000 " ½ "	C19	8 mfd. 300 volts
R11	250000 " ¼ "	C20	20 " 25 volts
R12	400 " 2 "	C21	8 mfd. 300 volts
		C22	.05 mfd. 2-ply
		C1	.005 mfd. 3-ply
		C2	.05 " 2-ply

R13 130)
R14 28) metal clad resis.
R15 390 " line cord
R16 4000 ohms ¼ watt

C3 .25 mfd. 2-ply
C4) Two gang cond.
C5) with trimmers.
C6 .0001 mfd. mica
C7) Mica
C8) I. F.
C9) Trimmers

Resistors

Part No.	
102177	400 ohms 2 watts
105264	500 " ¼ "
105283	4000 " ¼ "
105270	2500 " ¼ "
102821	3000 " ½ "
105277	10000 " ¼ "
105278	100000" ¼ "
105279	250000" ¼ "
105246	500000" ¼ "
105281	1 megohm ¼ "
105308	Vol. Control and switch

Condensers

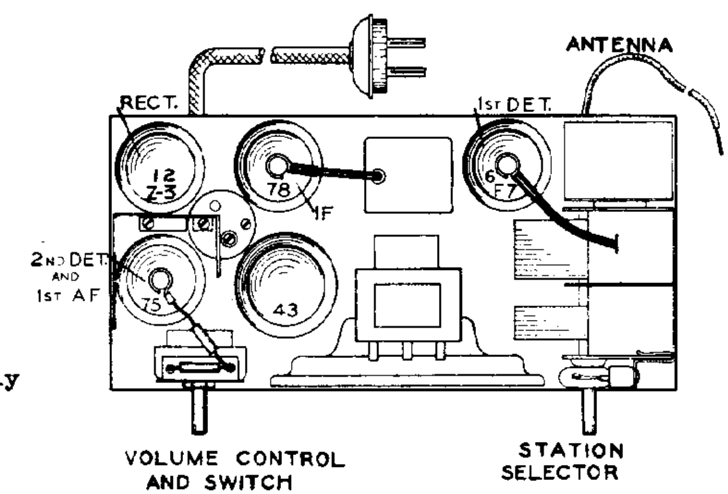
103695	.01 mfd. 4-ply paper
106386	.05 " 2-ply "
102497	.25 " 2-ply "
103659	.005 " 3-ply "
101143	.0001 " mica
106487	electrolytic filter
106621	variable condenser assembly

Coils

Part No.	
105725	Antenna coil assembly
106484	I.F., Det., and osc. coil
105318	2nd I. F. coil

Misc. Parts

105335	Knob
105321	Speaker Baffle
101869	Felt Foot
105334	Nameplate
106318	Dial-plate
106623	Chassis Assembly
106307	Cabinet
106485	Speaker
106381	Dial scale assembly
104916	Dial Lamp
105336	Dial Lamp Socket Assembly



MODEL 503
Voltage
Notes

UNITED AMERICAN BOSCH CORP.

SERVICE INSTRUCTIONS FOR AMERICAN-BOSCH VIBRO-POWER RECEIVER

MODEL 503

INTRODUCTION

The Model 503 is an extremely compact five-tube, automatic volume control superheterodyne which may be operated from any (200 to 240 Volt) A.C. or D.C. supply service.

An important feature of this receiver is its extended tuning range (540 to 1,650 kilocycles). This range includes not only the complete broadcast band, but also many of the important state and city police assignments.

INSTALLATION

The Model 503 is supplied with an attached antenna of the proper length which when fully extended, will provide adequate pick-up unless the receiver is operated in a shielded building.

No ground connection is provided and an external ground from the chassis must not be used, as this may result in damage to the receiver.

If insufficient signal is received with the aerial indoors it may be connected to a conventional single-wire outdoor antenna of from 40 to 100 feet in length. The latter should be as high as possible, and not too close to other aerials or to electric light or power wires.

A lightning arrester is usually required by the electrical code on an outdoor antenna. This arrester may be connected between any point on the "lead-in" and any grounded object, such as a water pipe or a length of pipe driven into moist earth. The connection is best made with a standard copper ground clamp.

When used with alternating current, to complete the installation it is only necessary to insert the attachment plug in any convenient electric light socket or outlet.

When used with direct current the attachment plug must be inserted in the outlet in a definite manner. If after the receiver has been connected to a direct current source, it fails to function and its loud speaker has absolutely no background of sound, reverse the attachment plug in the outlet.

Information regarding your power supply may be obtained from your local electric light company.

OPERATION

VOLUME CONTROL AND SWITCH: Two operating controls appear on the front panel. The left-hand knob is the combination switch and volume control. In the extreme counter-clockwise position of the knob (turned to the left) the receiver is "off". When the control is turned in a clockwise direction (to the right) the receiver is switched "on" and the scale is illuminated.

Further movement of the knob increases the volume to any desired point. When locating weak or distant stations it is advisable to advance the control to the "fully on" position.

Automatic Volume Control is provided within the receiver and prevents any noticeable change in volume from fading signals. All stations are tuned in with practically the same room volume. "Blasting" from powerful locals is eliminated when tuning, and the operation of the receiver is greatly simplified.

STATION SELECTOR: The right-hand knob is the tuning control. It operates the illuminated tuning dial which is calibrated in channel markings and corresponds to the kilocycle markings given for stations in newspapers and log books, except that for convenience in tuning and conservation of space on the dial, the last cypher has been dropped. For example, a station on 700 kilocycles is received at 70 on the scale.

I. VOLTAGE MEASUREMENTS WHEN USING 220 VOLT A. C. LINE

Stage	Tube	Fil.	Plate	Screen	Cathode
1st Det.	6F7	6.0	130	112	12.5
Osc.			112		
I. F.	78	6.0	130	112	3.8
2nd Det. Amp.	75	6.0	50*	-	.5
Power	43	25	112	130	x21 (bias across 400 ohms)
Rectifier	12Z3	12	Voltage across plate to cathode 248 volts		

Line Voltage	220	Resistor Strip Volts	40
Power in Watts	80	Resistor Cord Volts	117
Dial Lamp Volts	6.0	Dynamic Field	95

All above voltage measurements taken with reference to "neutral" line marked "AA" on diagram. *Voltmeter of 1000 ohms per volt must be used especially for type 75 tube plate. This bias measured from junction R12, C22 and junction R11, R12. Since filaments in series run constant current, filament voltages may vary considerably from those given above without affecting receiver operation.

II. VOLTAGE MEASUREMENTS WHEN USING 220 VOLT D. C. LINE

Stage	Tube	Fil.	Plate	Screen	Cathode
1st Det.	6F7	6.0	108	95	9.9
Osc.			95		
I. F.	78	6.0	108	95	2.8
2nd Det. Amp.	75	6.0	*45		
Power	43	25	96	108	17.5
Rectifier	12Z3	12	Voltage across plate to cathode 221 volts		

Line Voltage	220	Resistor Strip Volts	45
Power in Watts	80	Resistor Cord Volts	120
Dial Lamp Volts	6.0	Dynamic Field	81

TUBES

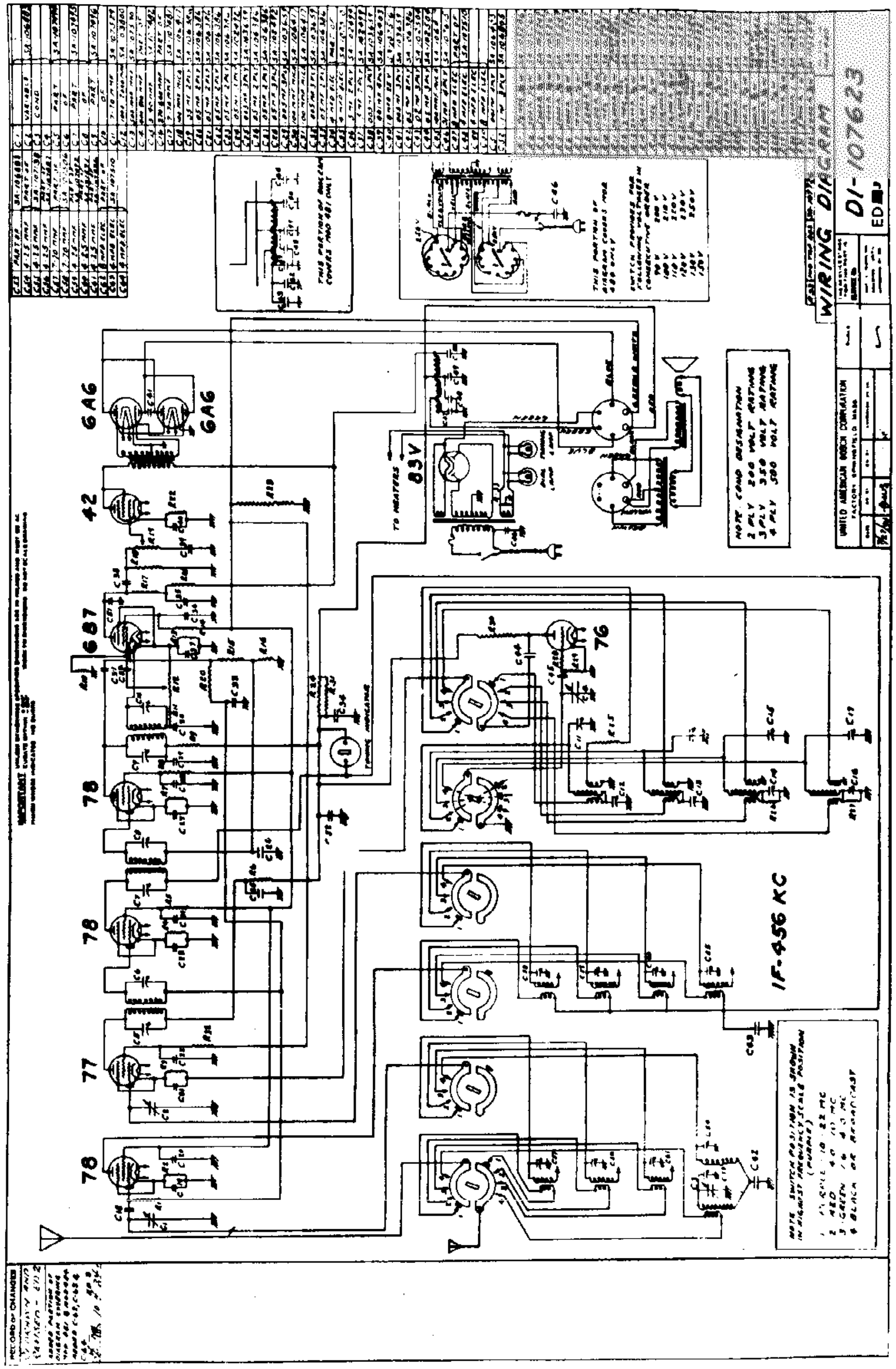
The receiver employs five tubes of the following types;

1 type 6F7 detector oscillator
1 type 78 intermediate frequency amplifier
1 type 75 second detector, A. V. C., and audio amplifier
1 type 43 power pentode
1 type 12Z3 rectifier

To replace tubes it is necessary to remove the chassis from the cabinet. Remove the screws which fasten the back. Remove the knobs and the screws holding the bottom of the chassis in place. The chassis may then be moved back from the front of the cabinet until the tubes are accessible.

CAUTION: Disconnect the receiver from the power supply before touching the chassis, tubes, or any metal parts inside the cabinet.

UNITED AMERICAN BOSCH CORP



MODEL 4054
Schematic
Socket

UNITED MOTORS SERVICE

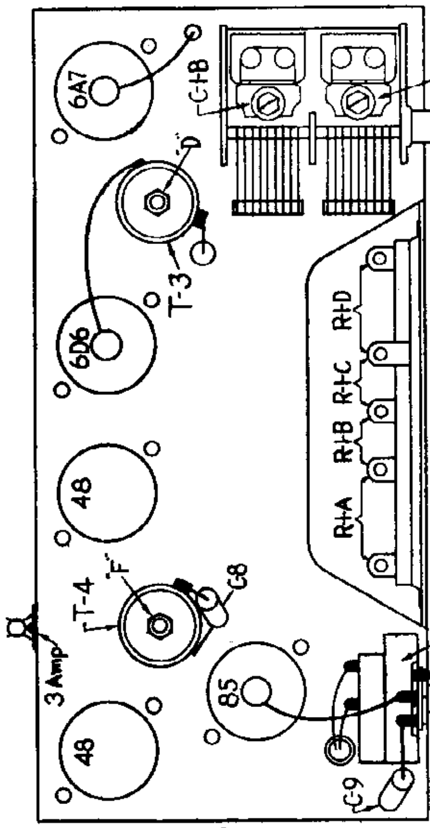


FIG. 2 PARTS LOCATING DIAGRAM (TOP)

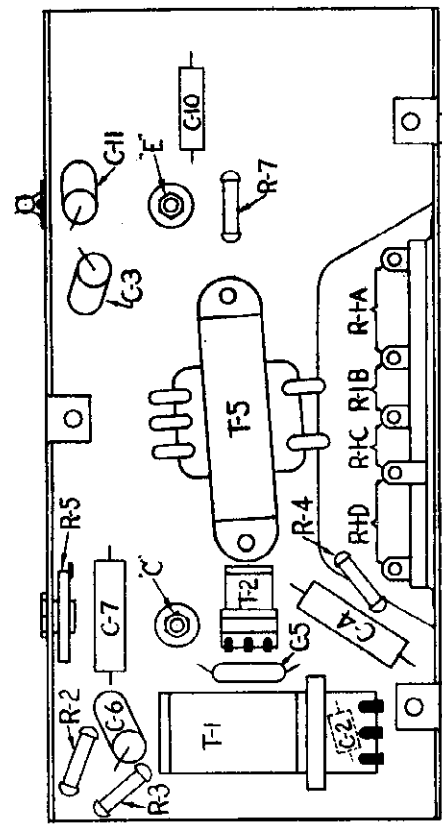
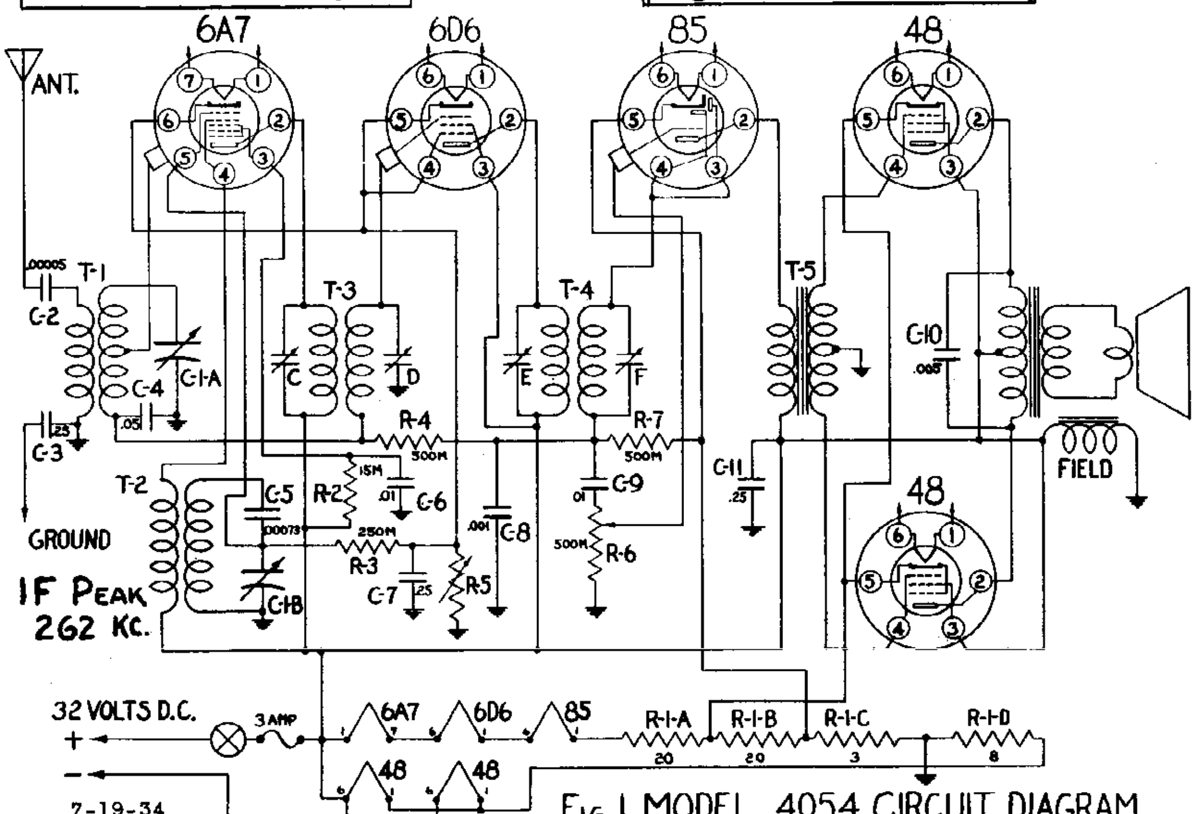


FIG. 3 PARTS LOCATING DIAGRAM (BOTTOM)



7-19-34

FIG. 1 MODEL 4054 CIRCUIT DIAGRAM

MODEL 4054
Alignment
Voltage

UNITED MOTORS SERVICE

R-5 RESISTOR ADJUSTMENT

The R-5 resistor shown on figure 3 is a cathode bias resistor variable from 50 to 200 ohms. This resistor controls the residual bias on the 6A7 and 6D6 tubes and must be carefully adjusted. This may be accomplished by tuning the set to an extremely weak station and adjusting R-5 for maximum volume in the speaker.

CIRCUIT GROUND

If an external ground is used it must be connected to the green wire on chassis to guard against short circuits when used on 32 Volt systems with positive grounds.

PEAKING

All of the adjustable condensers, commonly called "trimmer" condensers are very accurately adjusted at the factory and will not need any further adjustment unless they are tampered with in the field or a defective coil has been replaced. DO NOT attempt to change the setting of any trimmer condensers unless it is definitely known that the adjustment is necessary. If re-alignment is found necessary, the only way the circuits can be properly adjusted is with the use of an oscillator and output meter. Connect the output meter to the plate prong of one of the type 48 output tubes and to the chassis frame. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a 1/10 mfd. condenser in series with the lead to the chassis frame.

PEAKING I.F. STAGES AT 262 K.C.

(a) Connect the output of the oscillator to the grid cap of the 6A7 tube (leave 6A7 grid lead clip in place) and to the chassis frame.

(b) Turn the condenser gang until the plates are entirely out of mesh

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer located on the top of the 1st I.F. Coil, designated as "D" on figure 3. Then peak the trimmer located on the bottom of the same coil designated as "C" on figure 2. Due to the detuning effect the primary winding exerts over the secondary, it will then be necessary to reset trimmer "D" for maximum output.

(e) Peak the I.F. trimmer located on the top of the 2nd I.F. coil, designated as "F" on figure 3. Then peak the trimmer located on the bottom of the same coil designated as "E" on figure 2. Then reset trimmer "F" on top of the coil making all adjustments for maximum output.

NOTE: In the event that the I.F. stages are badly out of alignment at 262 K.C. the operation outlined in paragraphs (d) and (e) should be repeated.

Peaking Gang Condenser at 1400 K.C.

(a) In order that the 1400 K.C. position of the condenser plates can be accurately determined the chassis must be placed back in the cabinet. The dial pointer should be placed on the sleeve of the condenser gang and the condenser plates turned until they are entirely out of mesh. The pointer should then be moved to the 1750 K.C. position approximately 1/8" below bottom of the numerals "170" (which is slightly off the end of the dial) care being taken to see that the condenser plates are not moved. The tuning knob should be turned until the dial pointer sets on 1400 K.C. This will set the condenser plates in the proper position for aligning at 1400 K.C.

(b) Coil up the antenna lead to within a foot of the chassis and set the oscillator at 1400 K.C. Feed the oscillator output into the antenna wire. This may be done by connecting the shielding on the oscillator output lead to the chassis frame and by simply wrapping a few turns of the portion of the antenna wire nearest the chassis around the oscillator output lead. This will ordinarily provide sufficient coupling between the test oscillator and the antenna circuit of the set. A direct connection with the antenna wire can be made by inserting a pin into the wire close to the chassis.

(c) Peak the oscillator trimmer condenser shown as C-1-B on figure 2 until the oscillator output can be heard in the speaker. Then the trimmer C-1-A located on the adjacent section of the gang condenser, making all adjustments for maximum deflection on the output meter scale.

NOTE: To avoid A.V.C. action and to insure sharp peaking of all trimmers, reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

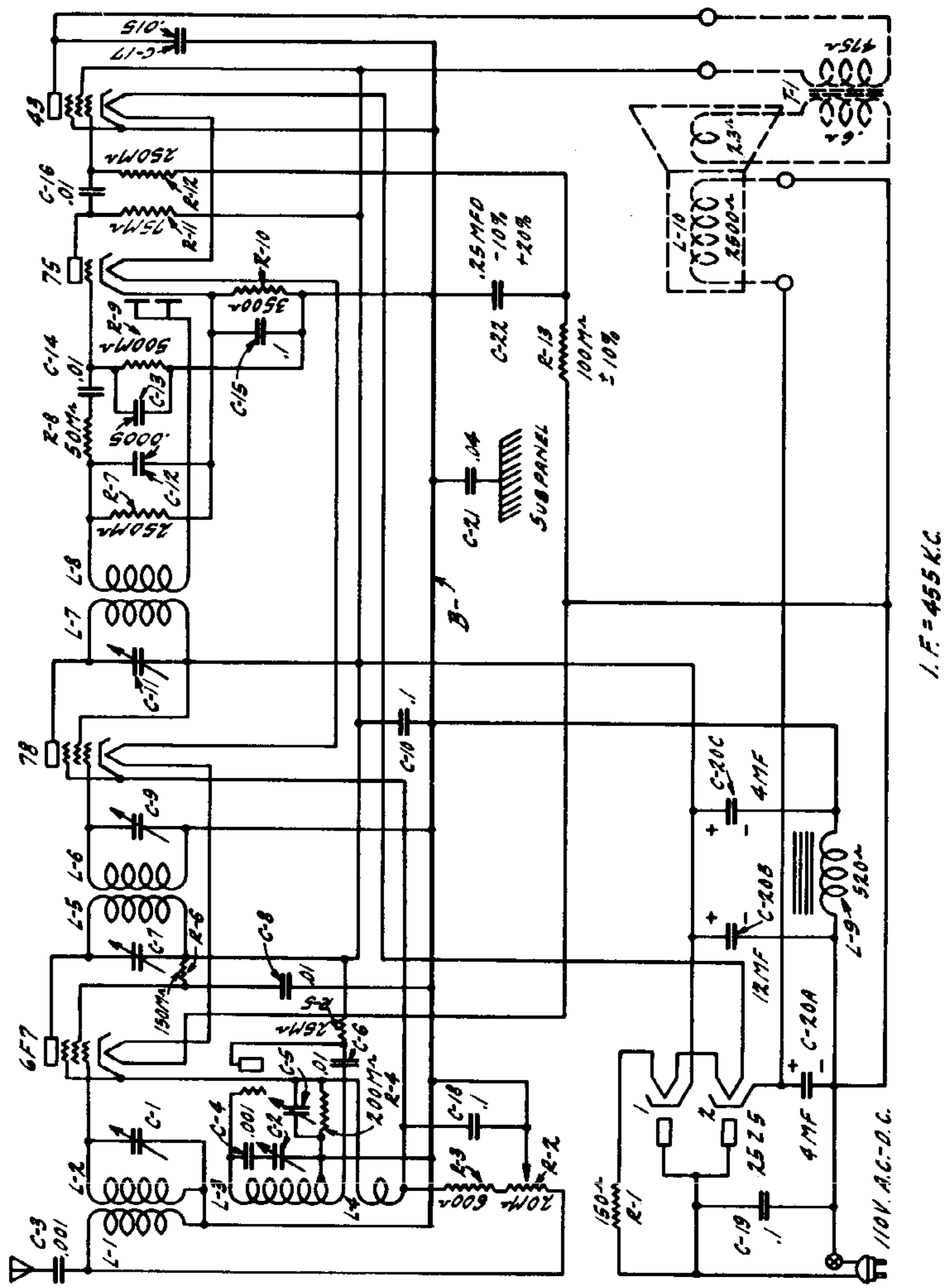
VOLTAGE CHART

All readings are taken from each of the tube socket connections to the chassis frame. The socket contact numbers are in accordance with those found on the circuit diagram.

TUBE	#1	#2	#3	#4	#5	#6	#7	Cap
6A7	32	32	18.5	32	0	.5	26	0
6D6	19.5	32	32	.5	.5	26	--	0
85	13.5	29	0	0	.9	19.7	--	0
48	6	31.5	32	0	6.5	32	--	--
48	6	31.5	32	0	6.5	32	--	--

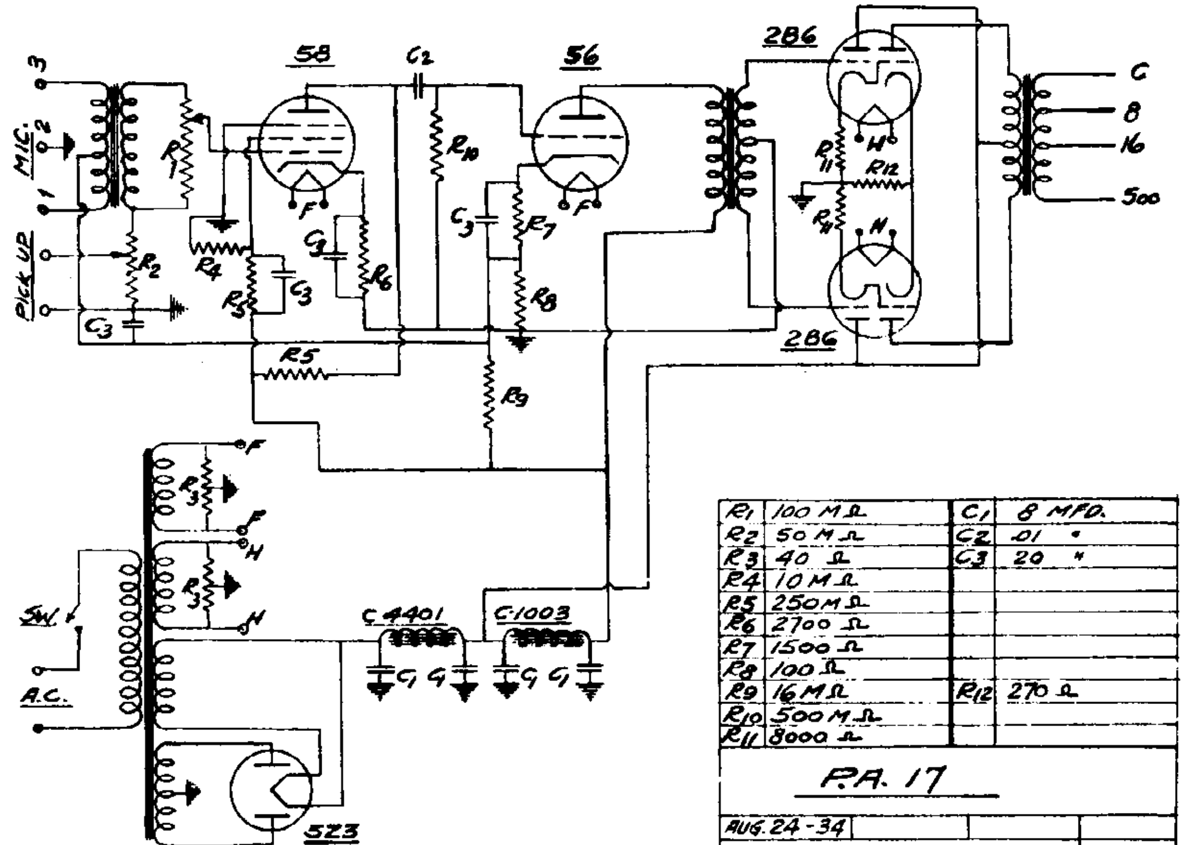
MODEL 3092
Chassis 513
Schematic

U. S. RADIO & TELEVISION CORP.



MODEL PA-17
MODEL PA-42
Schematic

WEBSTER CO.

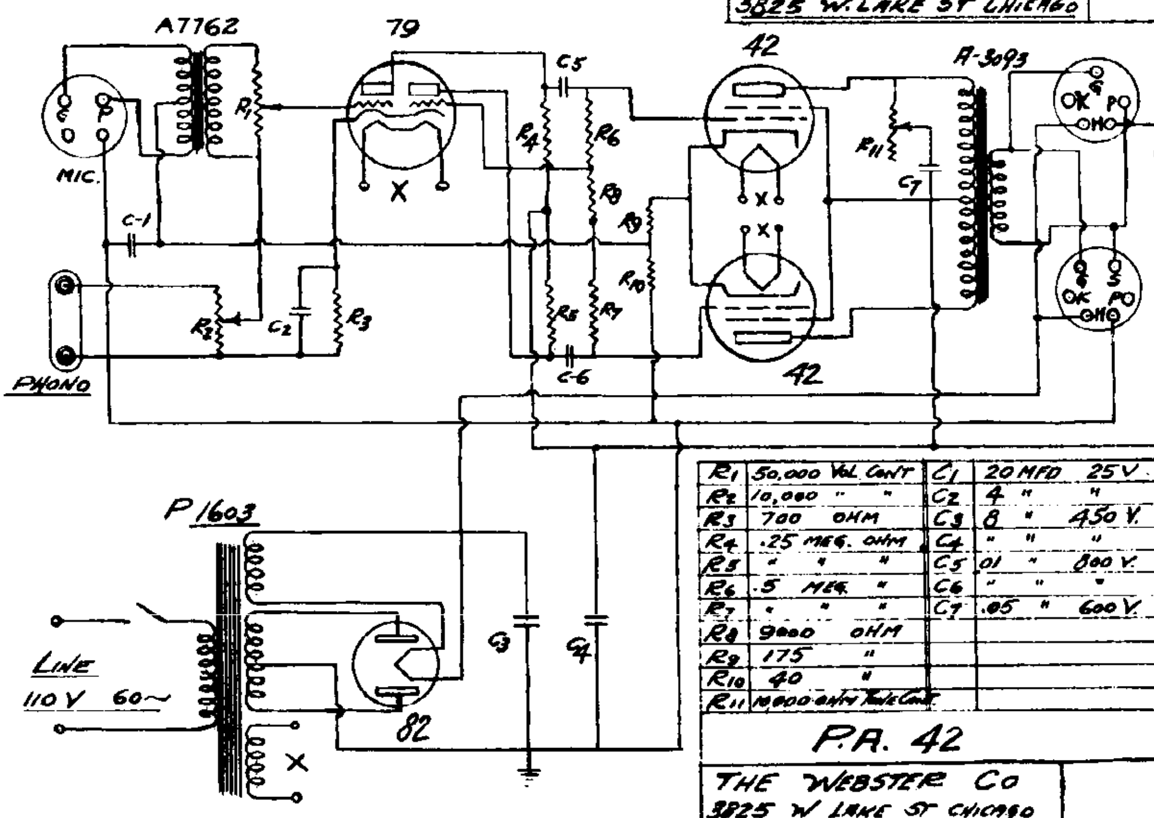


R1	100 MΩ	C1	8 MFD.
R2	50 MΩ	C2	.01 "
R3	40 Ω	C3	20 "
R4	10 MΩ		
R5	250 MΩ		
R6	2700 Ω		
R7	1500 Ω		
R8	100 Ω		
R9	16 MΩ	R12	270 Ω
R10	500 MΩ		
R11	8000 Ω		

P.A. 17

AUG. 24-34

THE WEBSTER Co
3825 W. LAKE ST CHICAGO



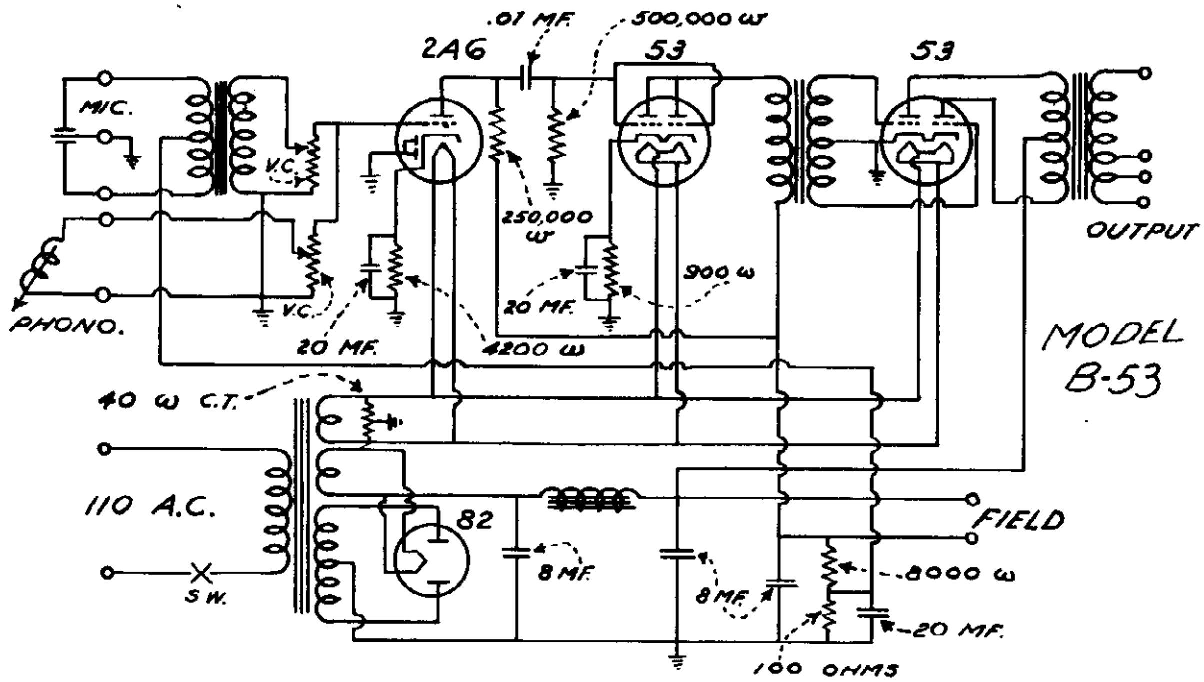
R1	50,000 Vol. Cont	C1	20 MFD	25 V.
R2	10,000 " "	C2	4 "	"
R3	700 OHM	C3	8 "	450 V.
R4	.25 MEG. OHM	C4	" "	"
R5	" " "	C5	.01 "	800 V.
R6	.5 MEG. "	C6	" "	"
R7	" " "	C7	.05 "	600 V.
R8	9000 OHM			
R9	175 "			
R10	40 "			
R11	10000 OHM Tone Cont			

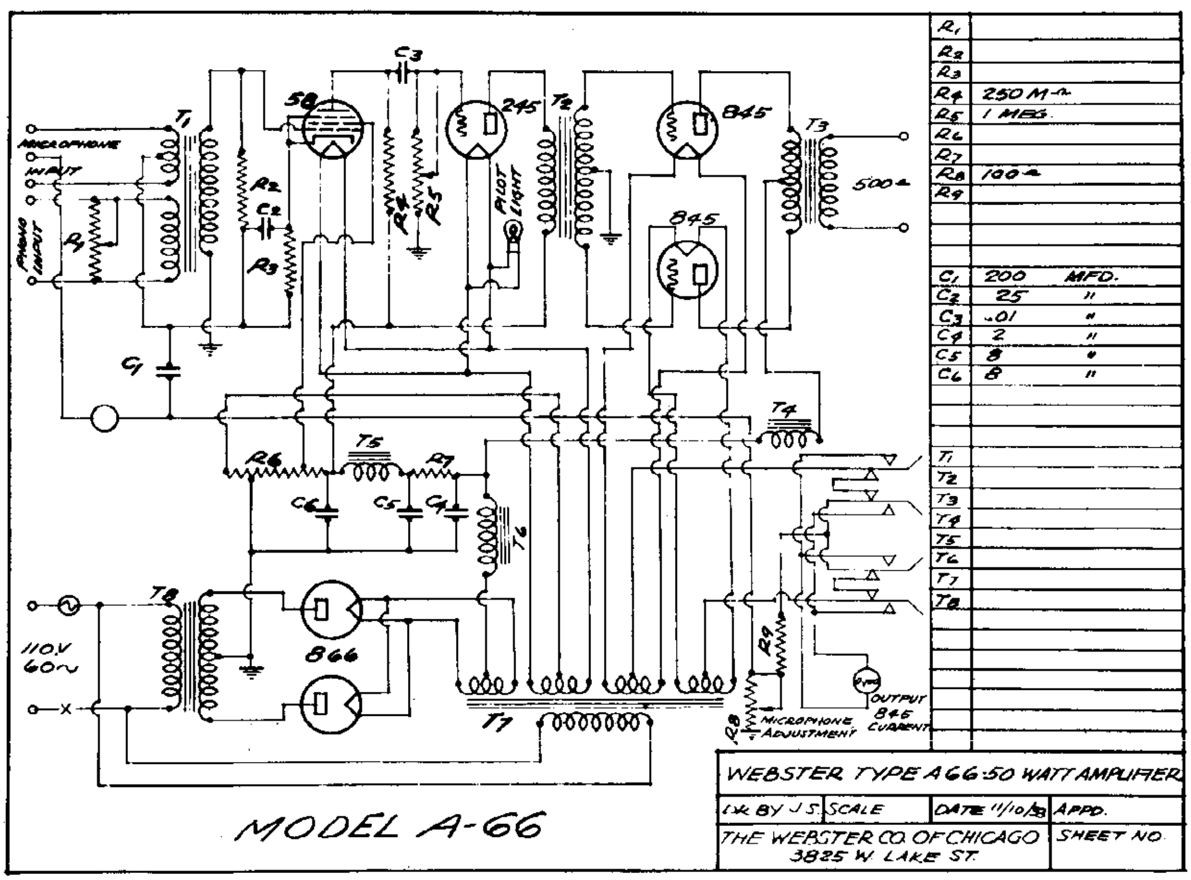
P.A. 42

THE WEBSTER Co
3825 W LAKE ST CHICAGO

MODEL A-66
MODEL B-53
Schematic

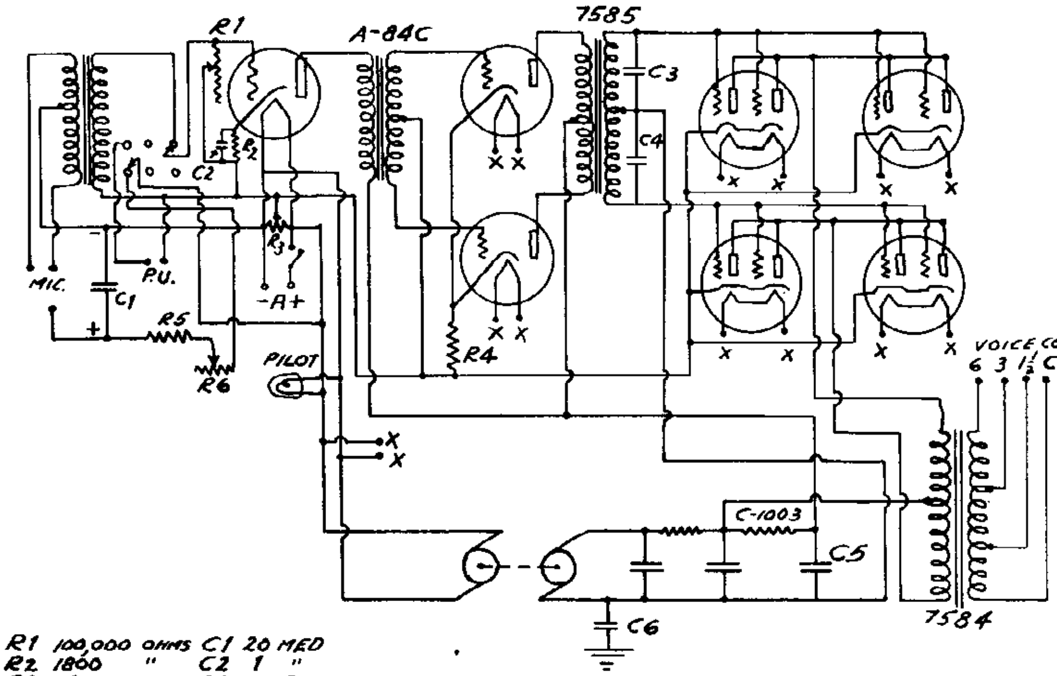
WEBSTER CO.





MODEL B-79
MODEL WR-85
Schematic

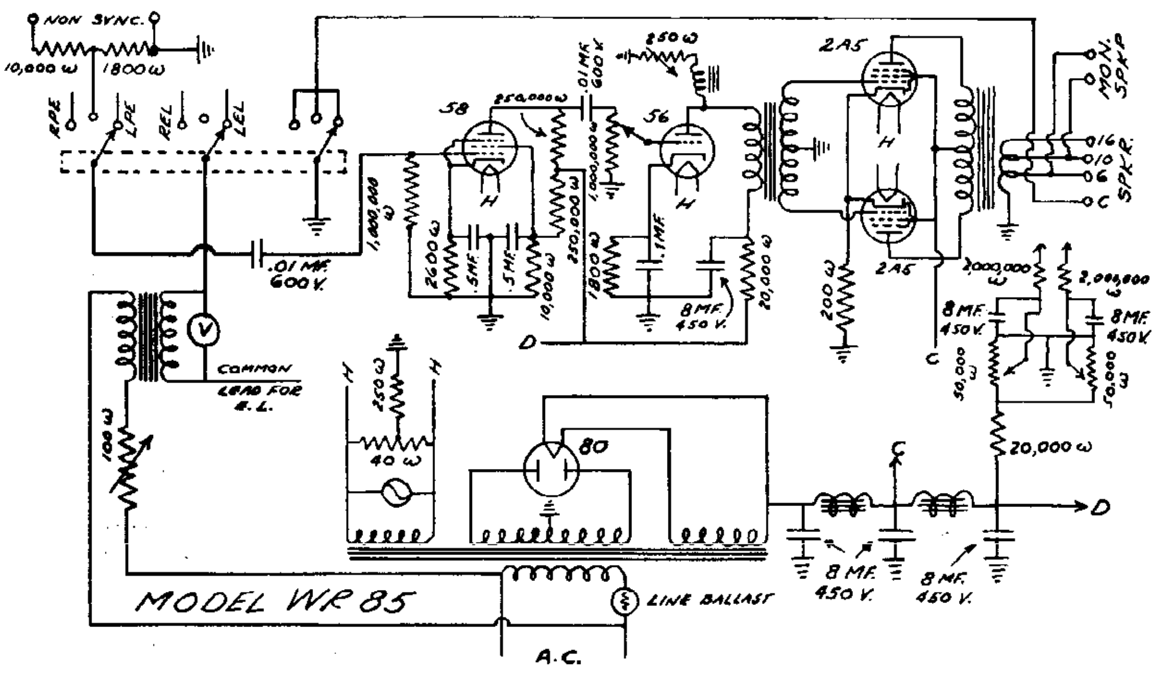
WEBSTER CO.



R1	100,000 OHMS	C1	20 MFD
R2	1800 "	C2	1 "
R3	40 "	C3	.0015 "
R4	1350 "	C4	.0015 "
R5	150 "	C5	8 "
R6	200 "	C6	1 "

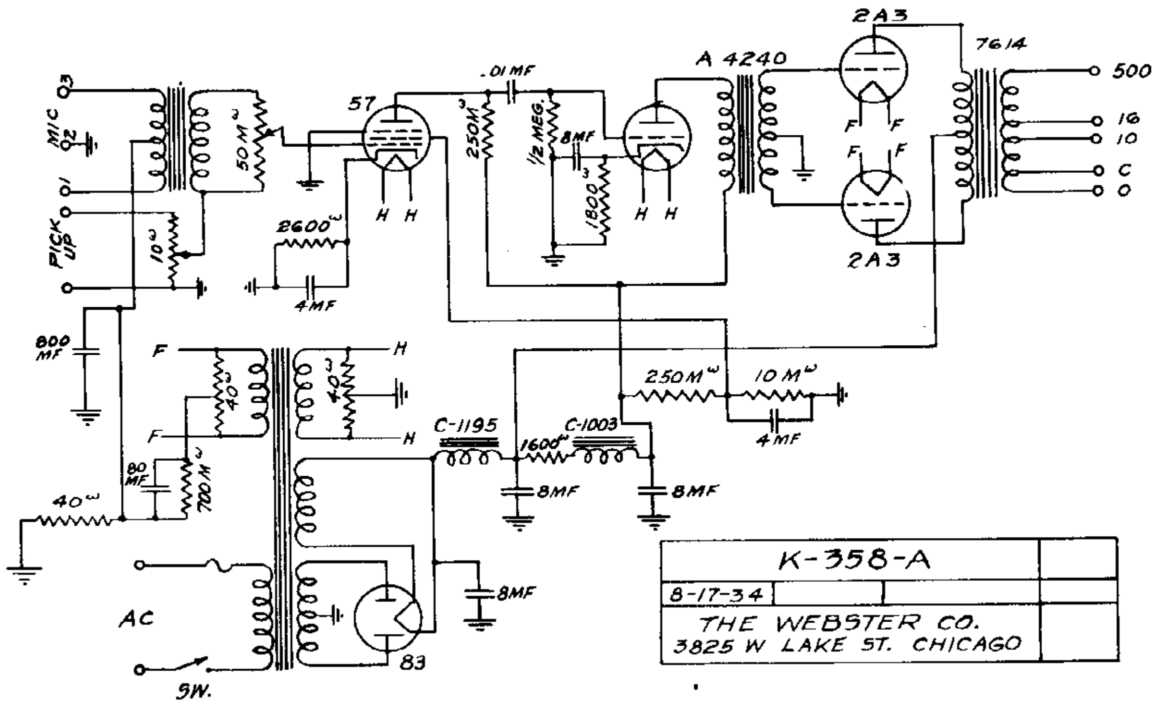
B-79 MOBILE SYSTEM

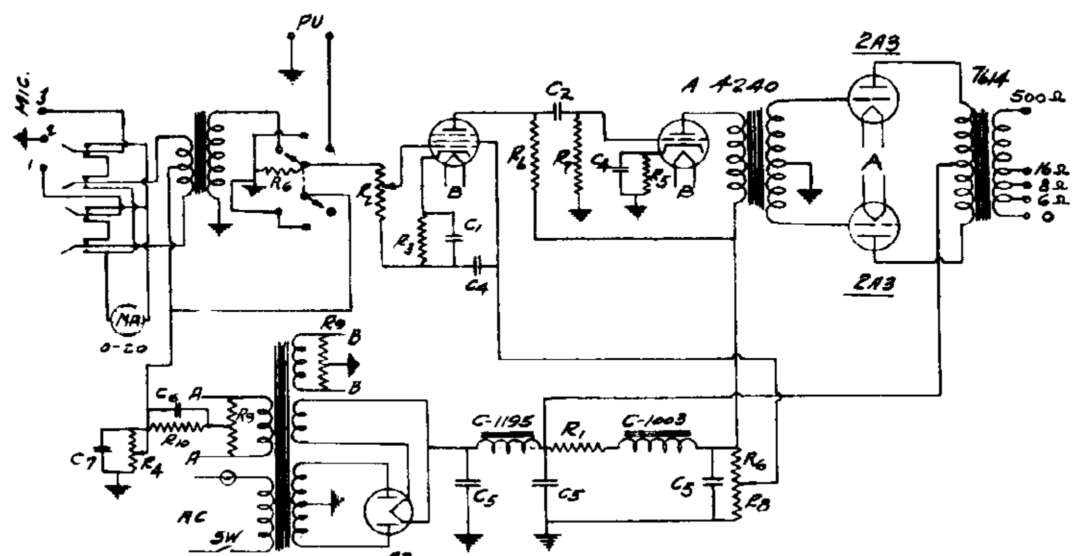
THE WEBSTER Co.
3825 W LAKE ST. CHICAGO



MODEL K-358-A
MODEL K-359-A
Schematic

WEBSTER CO.





R1	16000 Ω	R10	700 Ω
R2	50 M Ω		
R3	2700 Ω	C1	4 MFD
R4	100 Ω	C2	.01 "
R5	1000 Ω	C3	
R6	250 M Ω	C4	4 MFD
R7	1/2 MEG	C5	8 "
R8	10 M Ω	C6	80 MFD
R9	40 Ω	C7	800 "

K-359 A
8-18-34
THE WEBSTER Co
3825 W LAKE ST CHICAGO

WELLS-GARDNER & CO., INC.

MODEL O-C Series
Schematic
Parts List

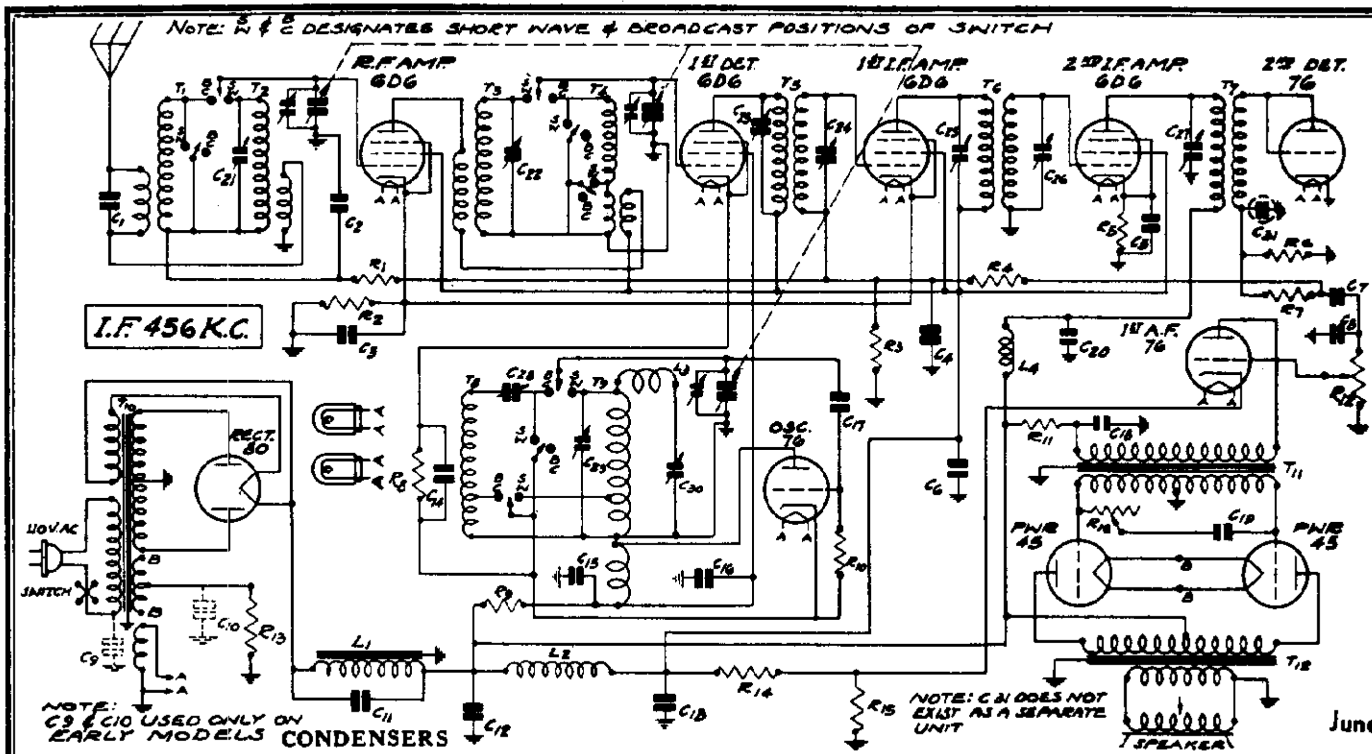


Fig. 1—Schematic Circuit Diagram

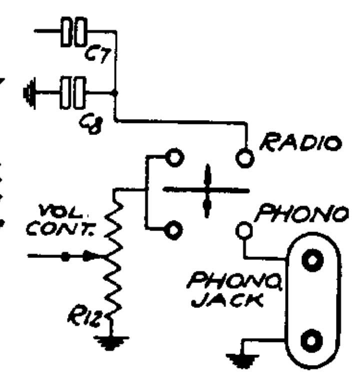


Fig. 5—Phonograph Connections

June, 1934

CONDENSERS

Part No.	Code	Capacity	Volts	Type
P-80919	C1	250 mmfd.		Moulded
P-80862	C2	.05 mfd.	200V.	Tubular
P-80888	C3	.25 mfd.	200V.	Tubular
P-80862	C4	.05 mfd.	200V.	Tubular
P-80862	C5	.05 mfd.	200V.	Tubular
P-80888	C6	.25 mfd.	200V.	Tubular
P-80862	C7	.05 mfd.	200V.	Tubular
P-81005	C8	35 mmfd.	600V.	Moulded
*P-80997	C9	.01 mfd.	600V.	Condenser in metal can
*P-80888	C10	.25 mfd.	200V.	Tubular
P-80985	C11	.15 mfd.	200V.	Tubular
P-81039	C12	16.0 mfd.	400V.	Wet Electrolytic
P-81018	C13	6.0 mfd.	150V.	Dry Electrolytic
	C16	2.0 mfd.	300V.	
	C18	2.0 mfd.	300V.	
P-80862	C14	.05 mfd.	200V.	Tubular
P-80864	C15	.10 mfd.	200V.	Tubular
P-81005	C17	35 mmfd.	600V.	Moulded
P-80863	C19	.004 mfd.	600V.	Tubular
P-81041	C20	.10 mfd.	400V.	Tubular
P-2102	C21	3-40 mmfd.		Ant. S.W. Trimmer
P-2102	C22	3-40 mmfd.		1st Det. S.W. Trimmer
P-2103	C23	200± 50 mmfd.		Dual Trimmer
	C24	200± 50 mmfd.		Part of I.F. Assem.
P-2103	C25	200± 50 mmfd.		Dual Trimmer
	C26	200± 50 mmfd.		Part of I.F. Assem.
P-1685	C27	70± 30 mmfd.		3rd I.F. Coil Trimmer
P-2112	C28	300-500 mmfd.		600 K.C. Trimmer
P-2102	C29	3-40 mmfd.		Osc. S.W. Trimmer
P-1685	C30	70± 30 mmfd.		6000 K.C. Trimmer
P-81027		Three Gang Condenser		

RESISTORS

Part No.	Code	Resistance	Watts	Type
P-A95204	R1	200,000 ohm	.2	Carbon
P-98023	R2	150 ohm	.5	Flex. Wire Wound
P-A95105	R3	1 megohm	.2	Carbon
P-A95205	R4	2 megohm	.2	Carbon
P-98024	R5	400 ohm	.5	Flex. Wire Wound
P-A94304	R6	300,000 ohm	.2	Carbon
P-A95104	R7	100,000 ohm	.2	Carbon
P-A94252	R8	2,500 ohm	.2	Carbon
P-98022	R9	30,000 ohm	2.0	Carbon
P-A95104	R10	100,000 ohm	.2	Carbon
P-C94303	R11	30,000 ohm	1.0	Carbon
P-96005	R12	2 megohm		Volume Control and Switch
P-98006	R13	780 ohm	3.0	Armored Wire Wound
	R14	6000 ohm	1.4	
	R15	460 ohm	.2	
P-97003	R16	3 megohm		Tone Control

*Used in Early Models only.

Part No.	Item
P-50638	Power Transformer 115V. 60 cycles T 10
P-50639	Power Transformer 115V. 25 cycles T 10
P-50640	Power Transformer 115-230V. 40-60 cycles T 10
P-50641	Power Choke L 1
P-50642	Audio Output Transformer T 12
P-50643	Audio Input Transformer T 11
P-5176	Antenna R.F. Trans. T 1 and T 2 less can
P-5177	Interstage R.F. Trans. T3 and T4 less can
P-5178	Oscillator Coil Assembly T8 and T9 less can
P-5186	3rd I. F. Coil T7 less can
P-40433	Cans for the above coils
P-5184	1st I.F. Coil & Can Assembly T5
P-5185	2nd I.F. Coil & Can Assembly T6
P-5190	H. F. Oscillator Tracking Coil L3
P-5151	I.F. Plate Isolating Reactor L4
P-70702	A.C. Cord & Plug
P-1421	Single Insulated Terminal Strip
P-1441	Double Insulated Terminal Strip
P-2060	Small Knob
P-2062	Large Knob
P-30342A	Grid Cap only
P-30456	Small Pointer
P-20912	Large Double End Pointer
P-2012	Pilot Light Bulb
P-10272	Rubber Mounting Feet
P-10320	Glass Crystal
P-20875	Crystal Retaining Ring
P-2152	8" Dynamic Speaker Mantel L2
P-1968	10" Dynamic Speaker Console L2
P-2101	Three Position Band Change Switch
P-20905	Condenser Shield
	8" Black Drive Cord (V.C. or T.C. Ind.)
	29" Black Drive Cord (Cond. Drive)
P-2126	Pilot Lamp Socket & Clip Assembly
P-20911	Bottom Shield
P-1011A	Phono-Radio Switch
P-1193	Phono Jack
P-2025	No. 80 Socket
P-1643	No. 45 Socket
P-2022	No. 76 Socket
P-1885	No. 6D6 Socket
P-1637	Speaker Socket
P-40434	Tube Shield—Aluminum (for earlier models)
P-40424	Tube Shield Base—Aluminum (for earlier models)

MODEL O-C Series
Socket, Voltage
Alignment Data

WELLS-GARDNER & CO., INC.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth

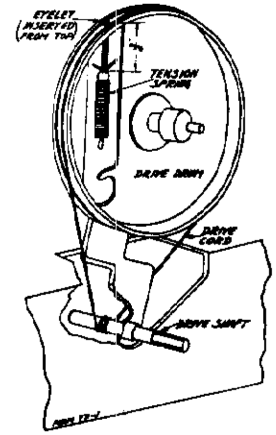


Fig. 4—Drive Cord Replacement

turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¼" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

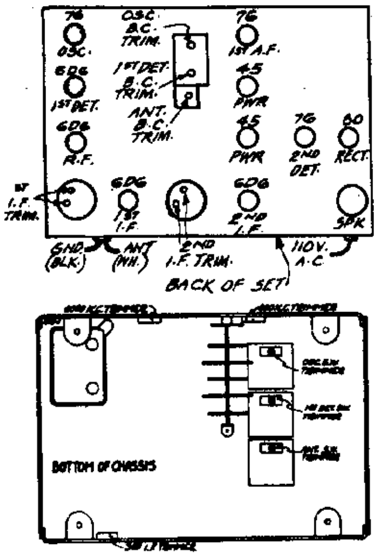


Fig. 2—Tube Arrangement & Location of Trimmers

Voltages at Sockets
LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fil. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M.A.
6D6	R. F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I. F.	6.3	95	95	2.8	7.0
6D6	2nd I. F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate

Phono Connections

Phonograph connections can be made as shown in Fig. 5. A single pole double throw switch and double pin jack are required. These should be mounted on the back panel of the chassis close to the 2nd detector. The connections are made by opening the diode circuit at the point shown in the illustration and completing the connections to the switch and pin jacks as indicated. A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control of the set will regulate the phono volume.

Change in Early Models

In the early models of this receiver the side of the trimmer condenser C27 which is shown in Fig. 1 as connected to ground was connected to the B+ side of the 3rd I. F. coil primary.

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

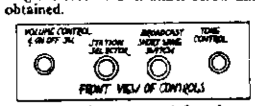


Fig. 3—Arrangement of Controls

D. C. Resistance of Windings

Following are the D.C. resistances of the various windings in the chassis.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5176	S.W. and B.C. Antenna R.F. Transformer Primaries (in series)	T1 T2	27.9
	B.C. Antenna R.F. Transformer Secondary	T1	5.0
	S.W. Antenna R.F. Transformer Secondary	T2	Small
P-5177	S.W. and B.C. Interstage R.F. Transformer Primaries (in series)	T3 T4	2.7
	B.C. Interstage R.F. Transformer Secondary	T4	4.4
	S.W. Interstage R.F. Transformer Secondary	T3	Small
P-5178	S.W. Oscillator Grid Coil	T9	Small
	S.W. Oscillator Plate Coil	T9	.25
	B.C. Oscillator Grid Coil	T8	3.5
P-5190	S.W. Oscillator Tracking Coil	L3	1.27
P-5184	1st I.F. Coil Primary	T5	5.0
	1st I.F. Coil Secondary	T5	5.0
P-5185	2nd I.F. Coil Primary	T6	5.0
	2nd I.F. Coil Secondary	T6	5.0
P-5186	3rd I.F. Coil Primary	T7	9.3
	3rd I.F. Coil Secondary	T7	26.3
P-50643	Audio Input Transformer Primary	T11	2200.
	Audio Input Transformer Secondary Center Tap to Outside	T11	2600.
	Audio Input Transformer Secondary Center Tap to Inside	T11	2008.
P-50642	Audio Output Transformer Primary Center Tap to Outside	T12	360.
	Audio Output Transformer Primary Center Tap to Inside	T12	320.
	Audio Output Transformer Secondary	T12	.44
P-1968	Speaker Voice Coil		3.0
	Speaker Field Coil	L2	9000.
P-50641	Filter Choke	L1	150.
P-50638	Power Transformer 115V. 60 Cycles Pri.	T10	5.3
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Outside	T10	120.
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Inside	T10	110.
	Power Transformer 115V. 60 Cycles Sec. (80 Fil.)	T10	Small
	Power Transformer 115V. 60 Cycles Sec. (AA Fil.)	T10	Small
	Power Transformer 115V. 60 Cycles Sec. (BB Fil.)	T10	Small

MODEL 5-E Series
Schematic, Socket
Parts List

WELLS-GARDNER & CO., INC.

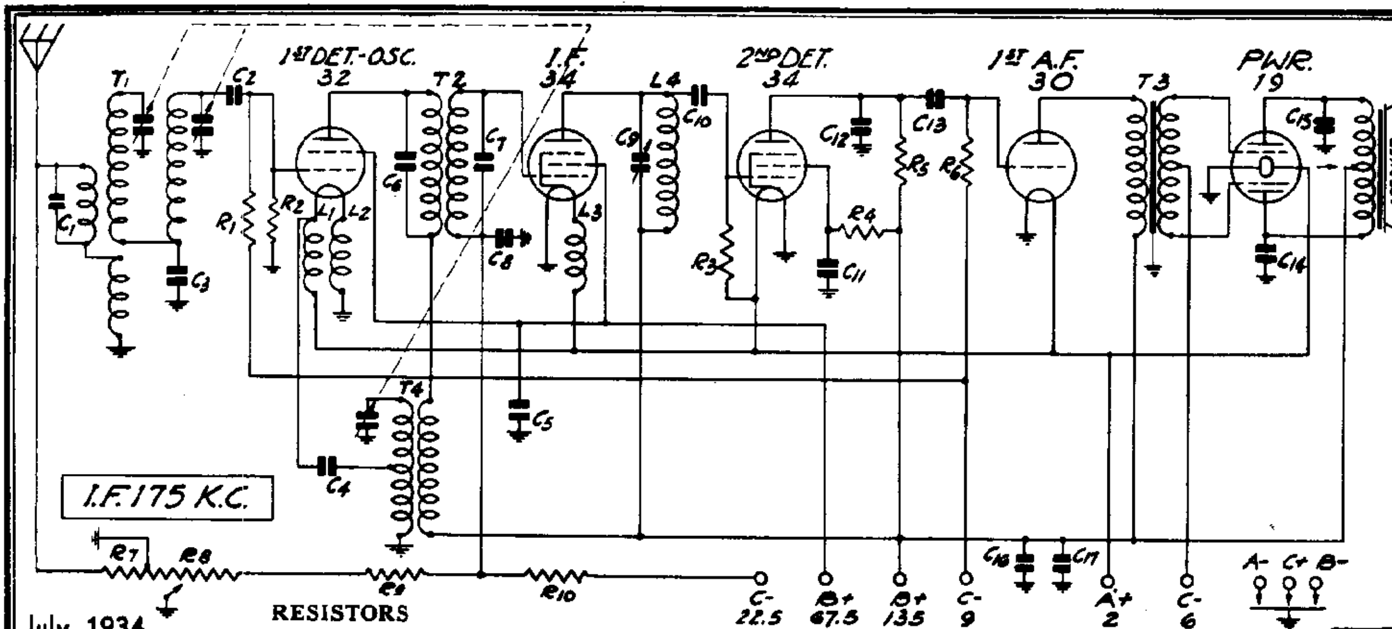


Fig. 1—Schematic Circuit Diagram.

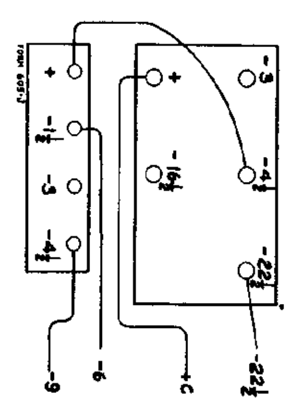


Fig. 3—Optional "C" Battery Connections

July, 1934

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A94505	R1	5 Megohm	0.2	Carbon
P-A94105	R2	1 Megohm	0.2	Carbon
P-A94205	R3	2 Megohm	0.2	Carbon
P-B94104	R4	100,000 Ohm	0.5	Carbon
P-B94403	R5	40,000 Ohm	0.5	Carbon
P-A95105	R6	1 Megohm	0.2	Carbon
P-96001	R7 / R8	3,000 Ohm / 60,000 Ohm		Volume Control
P-A94901ww	R9	900 Ohm	0.2	Wire Wound
P-A94652	R10	6,500 Ohm	0.2	Carbon
*P-A94106	R1	10 Megohm	0.2	Carbon
*P-A94205	R2	2 Megohm	0.2	Carbon

*These resistors were used on first models.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81812	C1	200 mmf		Wire—Part of Ant. Assem
P-81801	C2	35 mmf		Wire—Part of Ant. Assem.
P-80862	C3	0.05 mf	200V	Tubular
P-80862	C4	0.05 mf	200V	Tubular
P-80862	C5	0.05 mf	200V	Tubular
P-81806	C6	70 mmf		Wire
P-81804	C7	45 mmf		Wire
P-80862	C8	0.05 mf	200V	Tubular
P-1685	C9	70 + 30 mmf		I. F. Trimmer
P-81800	C10	50 mmf		Wire
P-81045	C11	0.25 mf	200V	Tubular
P-80863	C12	0.004 mf	600V	Tubular
P-80898	C13	0.006 mf	600V	Tubular
P-80969	C14 / C15	0.01 mf / 0.01 mf	400V / 400V	Dual Tubular
P-80864	C16	0.1 mf	200V	Tubular
P-80968	C17	4.0 mf	150V	Electrolytic
P-81036	3 Gang Condenser			

MISCELLANEOUS

Part No.	ITEM
P-2131	No. 32 Socket
P-1645	No. 34 Socket
P-1644	No. 30 Socket
P-1888	No. 19 Socket
P-1640	Speaker Socket
P-20406-A	Tube Shield for 34 and 32 Tubes
P-20786	Tube Shield Base
P-50586-D	Audio Input Transformer T3
P-5168	Double Tuned Ant. Trans. Assem. Comp. with resistors and condensers T1 less can
P-40432	Can for above Assem.
P-5199	1st I.F. Coil and Can Assem. T2
P-5187	Oscillator Coil and Can Assem. T4
P-5188	2nd I.F. Coil and Can Assem. L4
P-5172	Double Filament Reactor L1, L2
P-5189	Single Filament Reactor L3
P-30342-A	Grid Cap Only
P-2060	Knob, plain
P-2122	Knob, Arrow Indicator
P-1441-A	Double Insulated Terminal Strip
P-1786	Five Lug Terminal Strip
P-1831	On-Off Switch
P-20711	Gang Condenser Shield
P-10272	Rubber Chassis Cushions
P-70703	Antenna and Ground Wire
P-70749	"B" Battery Wire Assem.
P-70771	"A" Battery Wire Assem.
P-70772	"C" Battery Wire Assem.
P-2124	Speaker 6"
P-2125	Speaker 8"

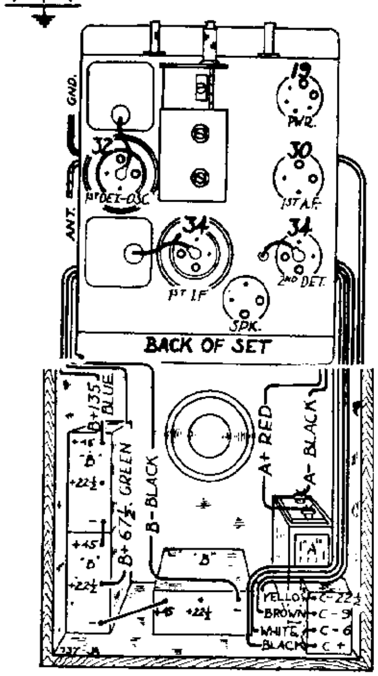


Fig. 2—Tube Arrangement and Battery Connections.

WELLS-GARDNER & CO., INC.

Circuit

This receiver is designed to operate from a battery power supply the values of which are shown in Fig. 1. All of the tubes used are of the 2 volt type. The receiver is designed to operate at a very low current drain from the batteries and still have a very satisfactory quality of output.

The circuit has a preselector stage incorporating 2 tuned circuits for image rejection. This couples into the type 32 first detector-oscillator tube through a combination of inductive coupling in T1 and capacitive coupling through C3. In Fig. 1 the two coils to the right of the 32 1st detector tube are the primary and secondary of the 1st I. F. transformer while below this tube are the oscillator coils. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency of 175 K. C. above the frequency to which the R. F. circuit is tuned.

One stage of I. F. amplification is employed using a 34 tube. Fixed condensers tune the primary and secondary of the first I. F. transformer. A second I. F. unit of the impedance coupled type is provided in which the inductance L4 is tuned by a trimmer condenser C9. The volume control is of the variable antenna input and I. F. bias type. Referring to Fig 1 it will be noted that one end of the volume control strip is connected to the antenna and the other end is connected to resistor R9. Also note that the volume control strip is tapped. Bias voltage for the 34 I. F. tube is obtained from a potentiometer consisting of resistors R9, R10 and the 60,000 ohm section of the volume control R8 which resistors are connected across the 22½ volt "C" battery.

As the slider of the volume control is moved away from the antenna end, the signal input to the antenna stage is increased. The bias voltage of the I. F. tube is not affected until the tap is reached. As the slider moves from this point to the end of the strip the I. F. bias is decreased, thus increasing the sensitivity. When this happens the plate current goes up and more battery current is used.

A 34 tube is used as the 2nd detector or demodulator. Demodulation takes place in the grid circuit of this tube.

Resistance coupling is used between the 2nd detector and the 1st audio stage which uses a 30 tube. The 1st audio stage is transformer coupled to the output stage. Class "B" amplification is employed in the output stage which uses a type 19 tube. This consists of two output tubes in one envelope. A magnetic reproducer is used.

A 3 pole switch controls all three sources of battery supply.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

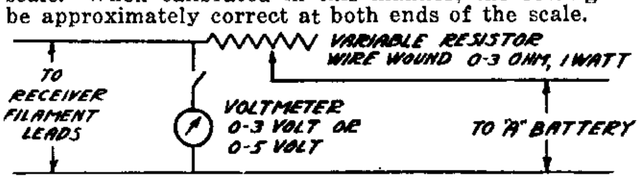


Fig. 4—Using Voltage Regulator with 3 Volt "A" Battery

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment at this frequency, therefore, is required.

D. C. Resistance of Windings

Following are the D.C. resistances of the various windings in the chassis.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5168	Double Tuned Ant. Coil Pri.	T1	19.2
	Double Tuned Ant. Coil Sec. (Preselector)	T1	3.2
	Double Tuned Ant. Coil Sec. (1st Det.)	T1	3.2
P-5199	1st I.F. Coil Pri.	T2	90.0
	1st I.F. Coil Sec.	T2	116.0
P-50586-D	Audio Input Trans. Pri.	T3	1010.
	Audio Input Trans. Sec. Cent. Tap to outside end	T3	648.
	Audio Input Trans. Sec. Cent. Tap to inside end	T3	588.
P-5187	Oscillator Coil, Grid Winding	T4	4.1
	Oscillator Coil, Plate Winding	T4	10.4
P-5172	Double Filament Reactor Assem.	L1	.61
	Double Filament Reactor Assem.	L2	.61
P-5189	Single Filament Reactor Assem.	L3	.61
P-5188	2nd I.F. Reactor Coil	L4	52.1
P-2124	6" Magnetic Speaker, Center Tap to outside end		272.
	6" Magnetic Speaker, Center Tap to inside end		225.
P-2125	8" Magnetic Speaker (same as P-2124)		

VOLTAGES AT SOCKETS

Volume Control at Maximum—Antenna Shorted to Ground
B+135 Volts
Voltages to Chassis

Type of Tube	Function	Across Filament	Plate to Cath.	Screen to Cath.	Grid to Cath.	Normal Plate M. A.
32	1st Det. & Osc.	2.0	135	67.5	7.5 (1) (2)	2.5
34	I. F.	2.0	135	67.5	2.5 (3)	2.8
34	2nd Det.	2.0	50	40 (1)	0	1.8
30	1st Audio	2.0	135		9 (4)	3.0
19	Output	2.0	135		6	1.8 Total

(1) With 250,000 ohm meter.
(2) Subject to variation due to oscillatory current.
(3) With 25,000 ohm meter.
(4) As read at "C" battery.

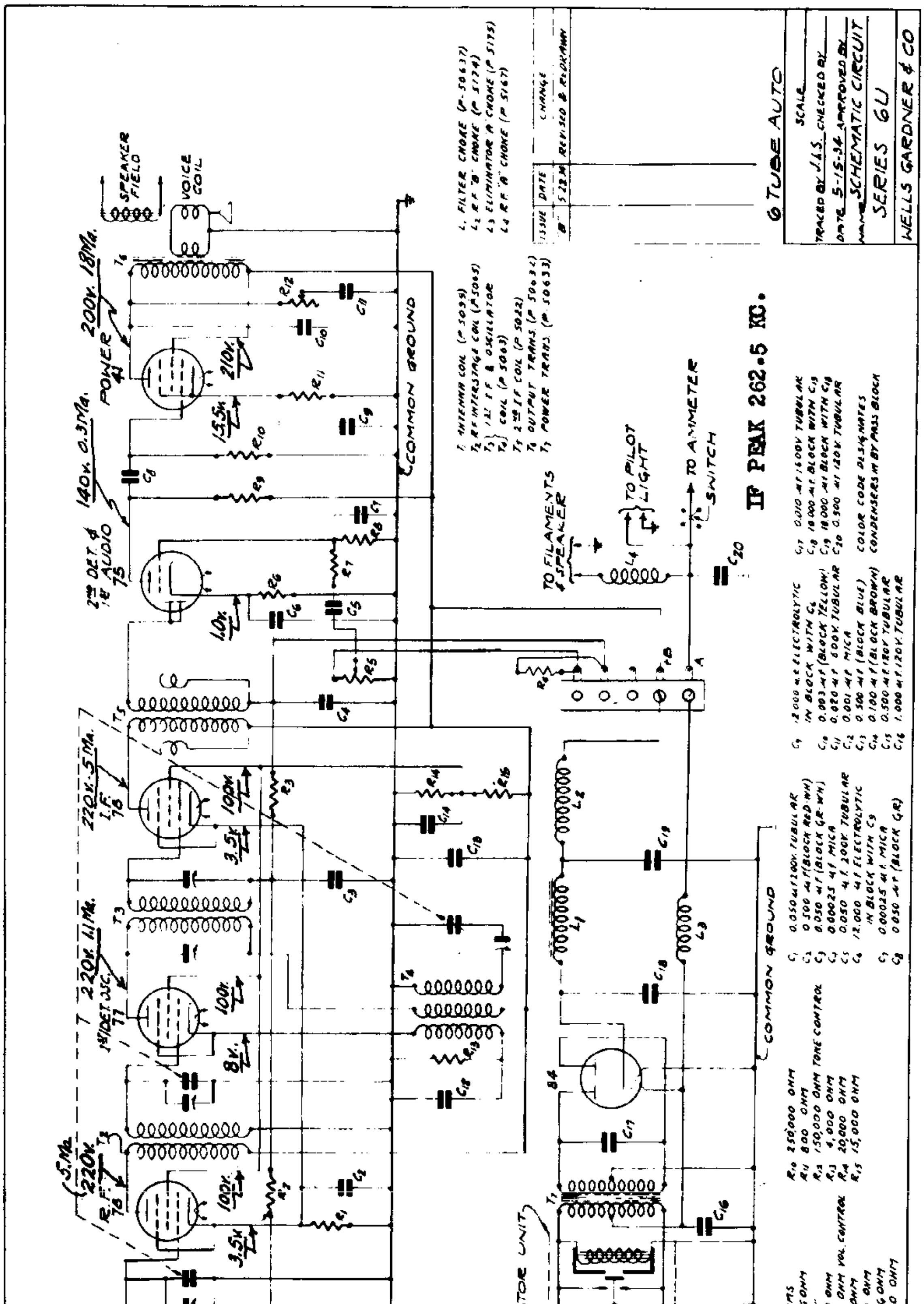
Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

MODEL 6-U Series
Schematic

WELLS-GARDNER & CO., INC.



MODEL 6-U Series
Alignment Data
Wiring Instructions

WELLS-GARDNER & CO., INC.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

Do not take the chassis out of the box. First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximum output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency mark. **This is the large point, 5 points below the 55 mark.**

Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator R. F. and antenna trimmer condensers on the **gang tuning condenser for maximum output, adjusting the oscillator section first.** See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser **is mounted on the end of the gang condenser.** See Fig. 2.

A **non-metallic screwdriver** is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is **obtained. Then turn the rotor slowly back and forth over this setting, at the same time** adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

Completing the Wiring Connections

Battery Cable

The battery connection is made at the ammeter. In the case of vibrator equipped sets no attention need be paid to polarity. The connection at the end of this cable is secured to one of the posts on the back of the ammeter in the instrument panel. This cable should preferably be connected to the post which will not show the discharge caused by the receiver.

The battery cable is made up in two pieces which are joined together by the fuse receptacle. The latter houses the fuse and fuse shield. The two parts of the cable are connected together by a bayonet pin connection.

Dynamotor "B" Unit Sets

In sets equipped with Dynamotor "B" Units there is a connection which may have to be changed depending on which side of the car battery is grounded. This unit is shipped from the factory correctly wired up for cars that have the positive side of the battery grounded, as shown in Fig. 9. If the negative side of the car battery is grounded, the connections to the terminal strip on the Dynamotor unit must be reversed, as shown in the same illustration.

Sensitivity Control Jumper

Referring to Figs. 8 and 9 it will be noted that there is a terminal strip in the chassis with terminals marked Nos. 1, 2 and 3 as shown. The receiver is shipped from the factory with a wire jumper in terminals Nos. 2 and 3. When connected in this manner, the sensitivity of the receiver is correct for ordinary conditions of reception as met with in a city or at reasonable proximity to the broadcasting stations. If the receiver is used in the country or at a great distance from the broadcasting stations, this jumper should be inserted in terminals Nos. 1 and 2. This connection increases the sensitivity of the receiver, providing for better reception of distant stations. However, at the same time the receiver will appear to be somewhat noisier owing to the fact that the pickup of noise signals will also be increased.

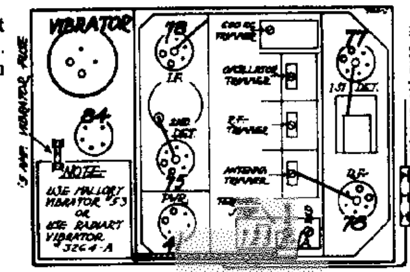


Fig. 8—Location of Tubes—Vibrator Sets

After the wiring has all been completed and the chassis and cables are permanently installed try out the set and adjust the antenna trimmer. The location and types of the tubes are shown in Figs. 8 and 9. The types of vibrators in vibrator equipped sets are also shown.

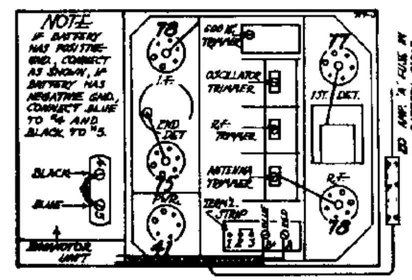


Fig. 9—Location of Tubes—Dynamotor Sets

Adjusting Antenna Trimmer

To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. Remove the cover of the chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Figs. 8 and 9. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws as these have all been properly set at the factory with precision instruments.

Calibrating the Receiver

To calibrate the receiver, tune in a station of known frequency. At the back of the control unit is the calibration screw—see Fig. 5. Insert a screw driver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

WELLS-GARDNER & CO., INC.

Mounting the Chassis

The chassis is mounted in back of the dash as shown in Figs. 1 and 2. The first step is to inspect the dash to determine at which point there is space available. Lift the chassis box up and temporarily hold it in the proposed position. In Figs. 1 and 2 is shown the position at which the chassis is generally mounted. However, there are many other possible locations, depending on the considerations as mentioned below and the space available.

In general, the chassis will be mounted in the vertical position, that is, with the long dimension vertical as illustrated and as mentioned above, since this method of mounting is the most convenient. It may, however, be mounted horizontally. If mounted in this manner, the speaker must face downward. *Never install a chassis with the speaker facing upward due to the fact that dirt and water may get in and ruin the speaker.*

Other points to consider in choosing the chassis location are as follows: Mount the chassis box in such a way that the cover may be readily removed for inspection of tubes. Mount the chassis box as high as possible to avoid interference with the feet of the people in the front compartment. If mounted at the extreme left or right of the dash, the speaker should face inward for acoustical reasons. Mount the chassis box in such a way as to avoid interference with the car controls, including pedals, gear shift lever, cowl ventilator, etc. If there is a great deal of room available on the dash, consideration should also be given to the length and position of the flexible shafts.

Next secure the dash mounting plate to the chassis box by means of the four screws provided. Note that there are six tapped holes on the chassis box for this purpose. For vertical mounting use the four tapped holes which permit the slot at the bottom of the mounting plate to extend below the chassis box—see Figs. 3 and 4. For horizontal mounting the mounting plate may be secured to the right hand set of four tapped mounting holes or the left hand set of four, whichever is the most convenient. As indicated in Fig. 3, for vertical mounting, holes "A" in dash mounting plate shall be used, and for horizontal mounting, holes "B" shall be used.

Now place the chassis box, with plate attached, in position on the dash and with a center punch locate the lower mounting hole at approximately the position in the slot as shown in Fig. 3. Then remove the box and by means of the template provided, or by using the dimensions shown in Fig. 3, locate the two upper mounting holes. Next drill the three ¼" holes required.

Three 4" square head mounting bolts are supplied. Take two of these, which will be used for the upper part of the mounting plate and screw on nut "A" (see Fig. 4). The nut should be just

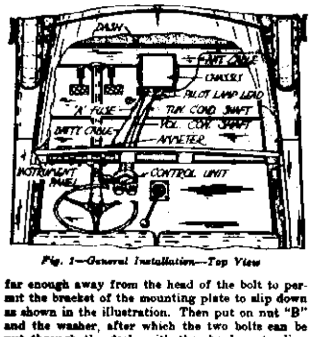


Fig. 1—General Installation—Top View

far enough away from the head of the bolt to permit the bracket of the mounting plate to slip down as shown in the illustration. Then put on nut "B" and the washer, after which the two bolts can be put through the dash, with the shanks extending into the engine compartment, as shown in Fig. 4. A washer, lockwasher, and nut are then put on these bolts from the front of the dash to hold them in place.

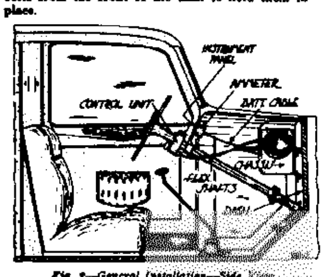


Fig. 2—General Installation—Side View

The distance "X" between nuts "A" and "B" determines how far out the chassis is mounted from the dash. When there is a lot of apparatus on back of the dash, such as wires, tubing, etc., the chassis will have to set out far enough to clear it. However, in most cars, there is no interfering apparatus and therefore the distance "X" will be zero.

Then put a washer on the third mounting bolt and put this bolt through the lower mounting hole *with the head on the engine side of the dash,* as shown in the illustration. Put on a washer, lockwasher, and nut "D" and tighten it up. Then put on nut "E" with a washer as shown. Nut "E" should be screwed down until it is up against nut "D," when distance "X," as explained above, is zero.

All tubes and the vibrator (vibrator equipped sets) should be in the sockets and the flexible drive shaft brackets should be attached to the chassis box before the chassis is mounted—see article on Attachment of Flexible Shafts.

The dash mounting plate with chassis attached is slipped over the three mounting bolts. The two upper brackets on the plate slip down in back of nut "A" as shown in Fig. 4 and the slot at the bottom of the plate slips over the shank of the lower mounting bolt in back of nut "E." The plate will then hang with the bottom farther away from the dash than the top. A washer, lockwasher, and nut "F" are then put on the lower mounting bolt. Nut "F" is screwed on until the mounting plate is tight up against the washer in back of nut "E." In this position, the bracket at the top of the mounting plate should butt up against nut "A" and be tight. Also the mounting plate will be approximately parallel with the dash.

Mounting the Control Unit

The control unit is mounted on the steering column under the steering wheel as shown in Figs. 1 and 2. It is generally mounted in the right hand position as shown in Figs. 1 and 2. It may also be mounted in the left hand or top position at the preference of the customer, see Fig. 5 (A).

For right hand mounting the supporting arm is screwed to the back of the control unit as shown in Fig. 5 (C). For left hand and top mountings use the correct tapped hole as indicated in the same illustration.

To attach the control unit, first remove the supporting arm by taking out the supporting arm screw—see Fig. 5 (C). Now note that there are several holes in the strap. These are for different sizes of steering columns. Wrap the strap around the column and put the strap screw through the strap nut as shown in Fig. 5 (C). Do not tighten up the screw until the flexible shafts are attached.

Next attach the two flexible shafts to the control unit as explained in the next article. Then reattach the supporting arm to the control unit proper.

Attaching the Flexible Drive Shafts

After the chassis is mounted and the control unit is temporarily mounted, the flexible drive shafts may be attached. Two 30" shafts are supplied unless otherwise specified. These shafts may also be had in 14" and 20" lengths. *These shafts are provided with special ends and cannot be cut to length.*

The flexible drive shafts should always be installed with a minimum amount of bending. Always keep the radius of the bend as large as possible. The larger the radius of the bend, the easier the shaft will turn.

If the shafts are not already secured to the control unit proceed as follows: First loosen the set screw in the volume control shaft housing at the back of the control unit. The volume control shaft may be identified by a brass fitting at both ends. The longer of these two fittings has a key slot and is inserted into the control unit as shown in Fig. 5 (B). Insert the shaft far enough so that the key knob engages and may be inserted all the way. The set screw tightened down and the set screw in the housing tightened down on the shaft casing.

To secure the flexible shafts to the chassis, first attach the two brackets to the chassis box by means

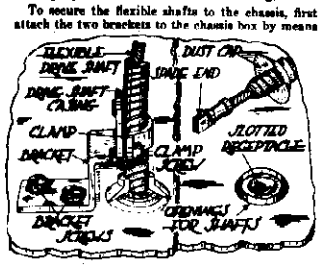


Fig. 6—Details of Flexible Shaft Attachment

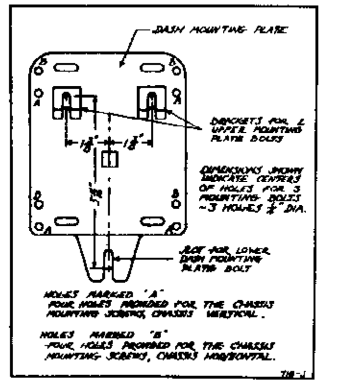


Fig. 3—Dash Mounting Plate

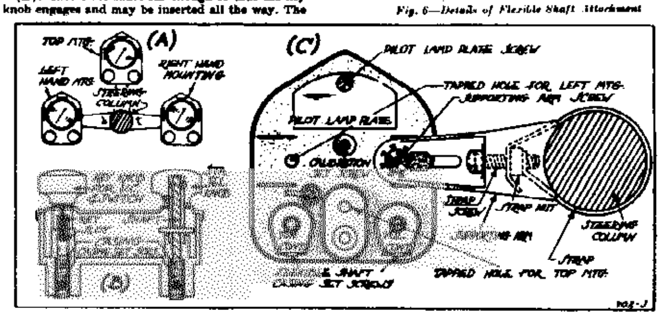


Fig. 5—Details of Control Unit Mounting

set screw in the housing at the back of the control unit is then tightened down on the shaft casing.

To insert the tuning condenser shaft in the control unit, first remove the station selector knob. Then loosen the two set screws on the shank extending from the front of the control unit. Also loosen the set screw in the tuning shaft housing at the back of the control unit. Then insert the end of the flexible shaft with no fitting into the tuning condenser shaft housing until the end of this shaft is flush with the end of the shank and tighten the two set screws. The knob may then be replaced, the

of the screws furnished and as shown in Fig. 6. Before tightening up the bracket screws, center the opening through the clamp with the opening for the spade end of the shaft in the chassis. Then tighten the screws.

Both shafts are provided with spade ends which are readily inserted into the slotted receptacles provided in the chassis—see Fig. 6. Before inserting the flexible shafts, slip the rubber dust caps with $\frac{5}{16}$" holes over the shaft casings. After the shafts are inserted the clamps are tightened down on the shaft casings by means of the clamp screws as shown in the illustration.

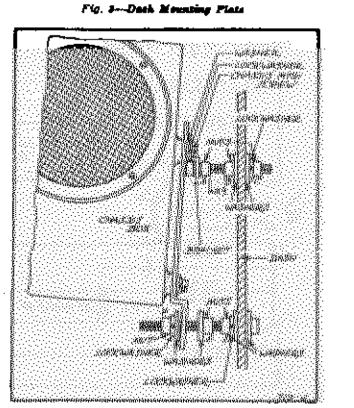
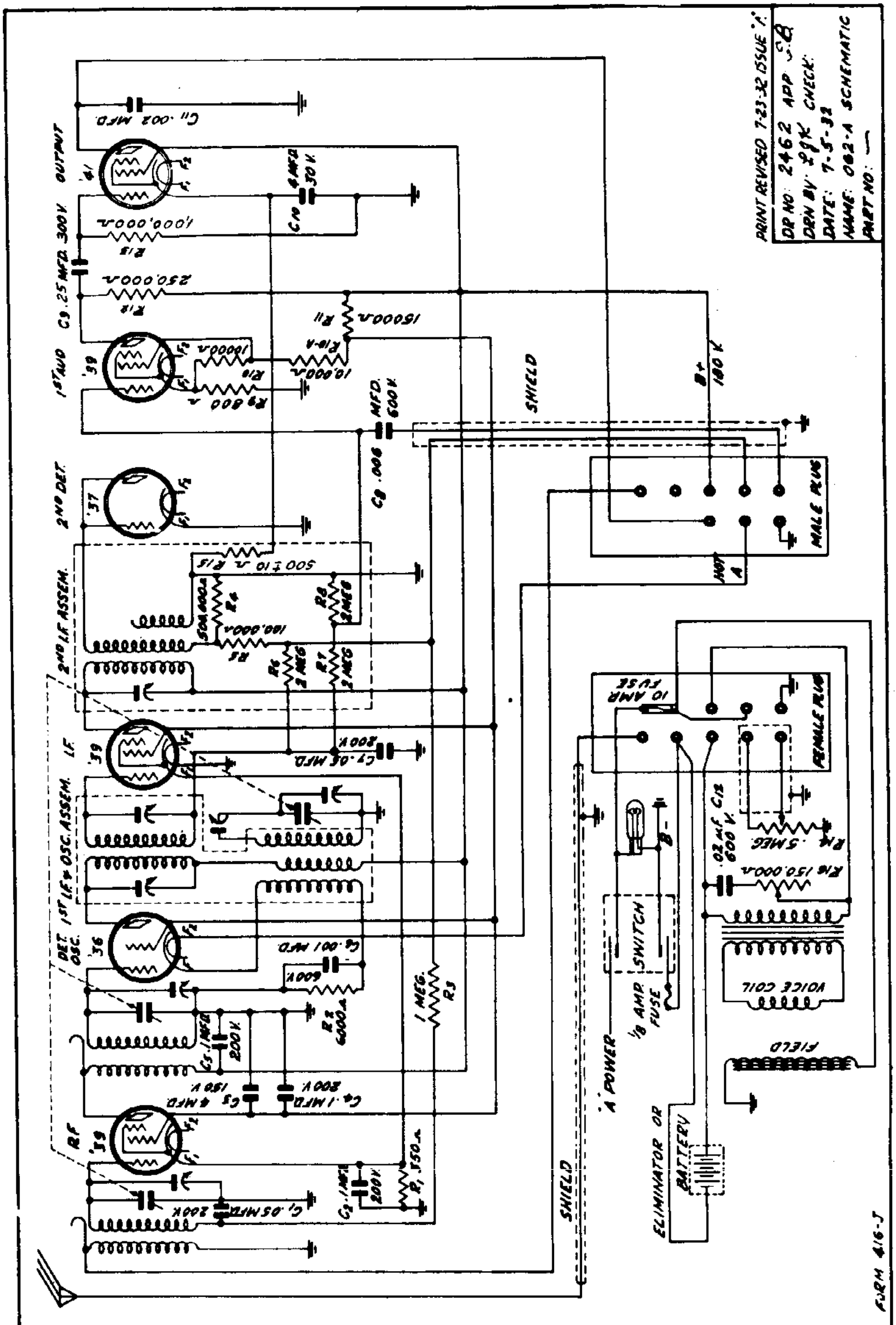


Fig. 4—Details of Chassis Mounting on Dash

MODEL 062-A
Schematic

WELLS-GARDNER & CO., INC.



WELLS-GARDNER & CO., INC.

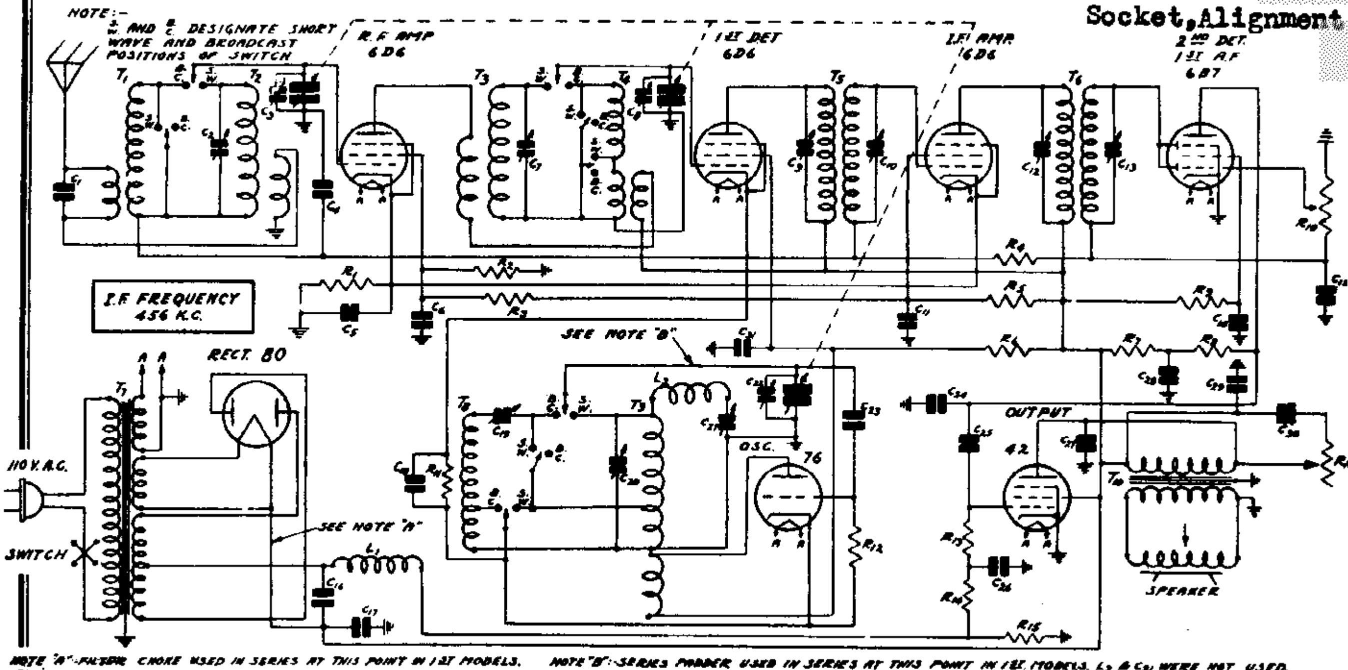


Fig. 1—Schematic Circuit Diagram

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Attenuate the signal so that A. V. C. action is not obtained.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to the trimmer condensers are covered over by a small cover plate which is held in position by a screw. Loosen these screws until the cover plates can be swung around.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Attenuate the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the pointer screw and set the pointer at the 1500 K. C. mark on broadcast band scale. Retighten pointer screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

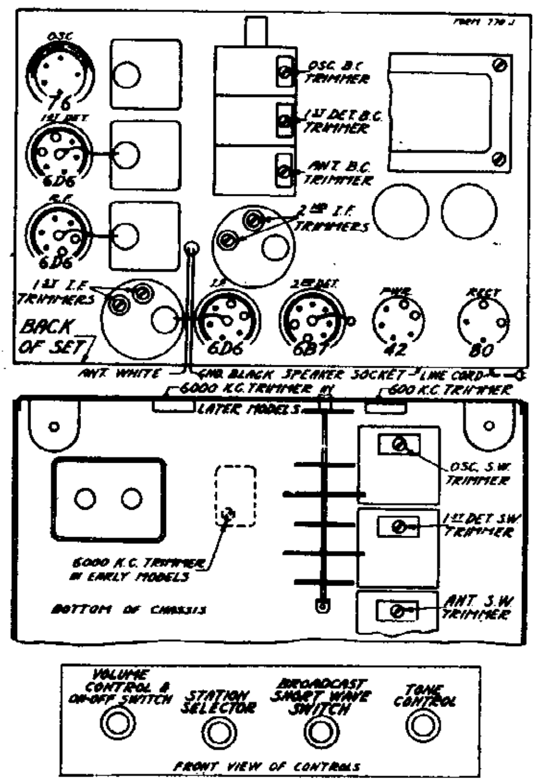


Fig. 2—Tube Arrangement and Location of Trimmers

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over

MODEL 7-D Series
Voltage, Parts List
Circuit Changes

WELLS-GARDNER & CO., INC.

this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be attenuated to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2.

Next set the signal generator for 15,000 K. C. Turn the rotor until the dial pointer is at the 15,000 K. C. mark on the short wave portion of the dial scale. Then adjust the antenna and 1st detector short wave trimmers until maximum output is obtained.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C trimmer. In the first models of this receiver, this condenser was located at the point shown in Fig. 2 in dashed lines. In the later models it is reached through a hole in the front panel of the chassis as shown in the same illustration. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained. In the early models this adjustment is broad while in the later models it is more critical.

Caution

The can of electrolytic condenser C16 is not at ground potential. Therefore in any work on the chassis, care should be taken not to touch this can and any other grounded point such as the other electrolytic condenser can.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 3.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 3. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Voltages at Sockets
LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Control Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	246	100	3.6(1)	5.3
6D6	1st Det.	6.3	237	97	8.0(2)	3.4
76	Osc.	6.3	115		0	4.8
6D6	I. F.	6.3	246	130	3.6(1)	8.3
6B7	2nd Det.	6.3	50(3)	40(3)	0	2.7
42	Power	6.3	230	245	17.0(4)	33.0
80	Rectifier	5.0				37.0 per plate

(1) Cathode to ground
(2) Subject to variation
(3) Read with 1,000,000 ohm meter
(4) As read across R15

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

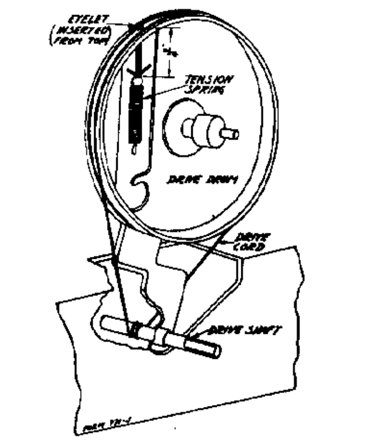


Fig. 3—Drive Cord Replacement

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 3.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 3. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

Changes in Early Models

There are two points at which the early models of this receiver differ from the present models. These points are indicated in Fig. 1 and described below.

Power Unit

In the early models a separate filter choke was used in series at the point indicated in note A in Fig. 1. The values of the two filter condensers C16 and C17 were less than as used at present. The values of the old and new condensers are shown in the parts list. A different power transformer was also used with the early filter system and this is likewise shown in the parts list.

The two power transformers are not interchangeable and care must be taken in ordering for replacement purposes to order the correct one. The original chassis can be identified by the separate filter choke.

Short Wave Oscillator

Referring to Fig. 1 it will be noted that there is a tracking coil L2 and a trimmer condenser C21 connected in series between the short wave oscillator coil and ground. In the first models of this receiver these two units, which are required for tracking the short wave oscillator, are not used. Instead a series padding condenser was used at the point in the circuit indicated by note B in Fig. 1.

At the time this change was made a change was also made in the oscillator assembly and care must be taken in ordering for replacement purposes to order the correct one. Early models with the original oscillator assembly have no spot of paint or a green spot of paint on the 80 socket rivet. Later models with the new oscillator assembly and new tracking system have a red spot of paint on the 80 socket rivet.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty-cycle power supply. However, the reverse is not true, the sixty-cycle receiver cannot be operated from a twenty-five cycle power supply.

A 110-220 Volt, 40-60 cycle Power Transformer is also available for this model.

REPAIR PARTS LIST FOR 7 TUBE BROADCAST AND SHORT WAVE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

Part No.	Item	List Price
P-1441	Double Mounting Strip	.10
P-1421	Single Mounting Strip	.10
P-2060	Knob Small	.20
P-2062	Knob Large	.20
P-10337	Small Tone & Volume Control Disc	.10
P-20912	Pointer, Large	.20
P-2072	Pilot Light Bulb 6-8 volt	.15
P-10272	Rubber Mounting Feet	.10
P-10830	Glass Crystal	.15
P-20873	Crystal Retainer Ring	.10
P-2890	6" Speaker Mantel Sets L1 - 1250 ohm	6.00
P-2891	8" Speaker Console Sets L1 - 1250 ohm	6.75
	8" Black Drive Cord (V. C. or T. C. Ind.)	.05
	29" Black Drive Cord (Cond. Drive)	.10
P-2136	Pilot Lamp Socket & Clip Assembly	.10
P-2131	Broadcast-Short Wave Switch	1.85

Part No.	Item	List Price
P-1885	No. 6D6 Socket	$ .15
P-2022	No. 76 Socket	.15
P-1944	No. 6B7 Socket	.15
P-1884	No. 42 Socket	.15
P-2025	No. 80 Socket	.15
P-1637	Speaker Socket	.10
P-40445	Tube Shield for 6D6 & 6B7 Tubes	.15
P-40444	Tube Shield for 76 Tube	.15
P-40443	Tube Shield Bases	.10
*P-50634	Power Transformer 115 Volts, 60 Cycles	3.00
*P-50635	Power Transformer 115 Volts, 25 Cycles	4.30
*P-50636	Power Transformer 115-230 Volts, 40-60 Cycles	3.25
†P-50646	Power Transformer 115 Volts, 60 Cycles	3.25
†P-50647	Power Transformer 115 Volts, 25 Cycles	4.50
†P-50648	Power Transformer 115-230 Volts, 40-60 Cycles	3.75
*P-50637	Filter Reactor	.85
P-50599 A	Output Transformer T 10	1.15
P-5176	Antenna R.F. Trans. less can T1 & T2	1.60
P-5177	Inter-Stage R. F. Trans. less can T3 & T4	1.75
*P-5178	Oscillator Coil Assembly Less can T8 & T9	1.70
†P-5179	Oscillator Coil Assembly Less can T9 & T9	1.70
P-49433	Cans for the above Assemblies	.15
†P-5190	High Frequency Oscillator Tracking Coil L2	.35
P-5175	1st I. F. Assembly Complete with Can T5	2.15
P-5180	2nd I. F. Assembly Complete with Can T6	1.75
P-30342-A	Grid Cap Only	.10
P-70702	AC Cord & Plug	.70
P-1504	8 Terminal Mounting Strip	.10

Part No.	Code	Resistance	Watts	Type	List Price
P-98016	R1	280 ohm	.2	Flex. Wire Wound	$ .15
P-B93303	R2	30,000 ohm	.5	Carbon	.20
P-B94602	R3	6,000 ohm	.5	Carbon	.15
P-A95205	R4	2.0 megohm	.2	Carbon	.15
P-98030	R5	16,000 ohm	1.5	Armored wire wound	.65
	R6	25,000 ohm	1.0		
P-A94303	R7	20,000 ohm	.2	Carbon	.15
P-B94603	R8	60,000 ohm	.5	Carbon	.15
P-B94254	R9	250,000 ohm	.5	Carbon	.15
P-96014	R10	500,000 ohm		Vol. Control & Switch	1.06
P-A94252	R11	2,500 ohm	.2	Carbon	.15
P-A94104	R12	100,000 ohm	.2	Carbon	.15
P-A95504	R13	500,000 ohm	.2	Carbon	.20
P-A94104	R14	100,000 ohm	.2	Carbon	.15
P-98015	R15	235 ohm	2.0	Flex. Wire Wound	.15
P-97011	R16	150,000 ohm		Tone Control	.75

Part No.	Code	Capacity	Volts	Type	List Price
P-80919	C1	.00025 mfd.		Moulded	$ .20
P-2102	C2	3-40 mmfd.		Ant. S.W. Trimmer	.15
	C3	(See 3 Gang Cond.)		Gang Trimmer	
P-80862	C4	.05 mfd.	200V.	Tubular	.15
P-80886	C5	.25 mfd.	200V.	Tubular	.25
P-80890	C6	.05 mfd.	400V.	Tubular	.20
P-2102	C7	3-40 mmfd.		1st Det.S.W. Trim.	.15
	C8	(See 3 Gang Cond.)		Gang Trimmer	
P-1306-B	C9	90±30 mmfd.		Dual Trimmer Part of I. F. Assem.	
	C10	90±30 mmfd.			
P-81034	C11	.25 mfd.	300V.	Tubular	.30
P-1306-B	C12	90±30 mmfd.		Dual Trimmer Part of I. F. Assem.	
	C13	90±30 mmfd.			
P-81040	C14	.25 mfd.	400V.	Tubular	.35
P-80977	C15	.0001 mfd.		Moulded	.20
†P-81043	C16	18.0 mfd.	300V.	Electrolytic Wet	1.30
*P-80916	C16	8.0 mfd.	450V.	Electrolytic Wet	1.25
*P-81032	C17	8.0 mfd.	500V.	Electrolytic Wet	1.30
†P-81042	C17	14.0 mfd.	400V.	Electrolytic Wet	1.45
P-80862	C18	.05 mfd.	200V.	Tubular	.15
P-2112	C19	300-500 mmfd.		600 K.C. Trimmer	.45
P-2102	C20	3-40 mmfd.		Osc. S.W. Trimmer	.15
†P-1685	C21	70±30 mmfd.		6000 K.C. Trimmer	.35
	C22	(See 3 Gang Cond.)		Gang Trimmer	
P-81005	C23	.000035 mfd.		Moulded	.15
P-80914	C24	.002 mfd.	600V.	Tubular	.20
P-80981	C25	.01 mfd.	400V.	Tubular	.20
P-81044	C26	.05 mfd.	400V.	Tubular	.15
P-80914	C27	.002 mfd.	600V.	Tubular	.20
P-81033	C28	.25 mfd.	400V.	Tubular	.35
P-80887	C29	.1 mfd.	400V.	Tubular	.20
P-80890	C30	.05 mfd.	400V.	Tubular	.20
P-80887	C31	.1 mfd.	400V.	Tubular	.20
P-81027-B		3 Gang Condenser			3.35
*P-2113		600-1200 mmfd.		6000 K.C. Trimmer	.61

* Used in early Models. See Article on changes in this Manual
† Used in Later Models. See Article on changes in this Manual

MODEL 9-B Series
Schematic, Socket

WELLS-GARDNER & CO., INC.

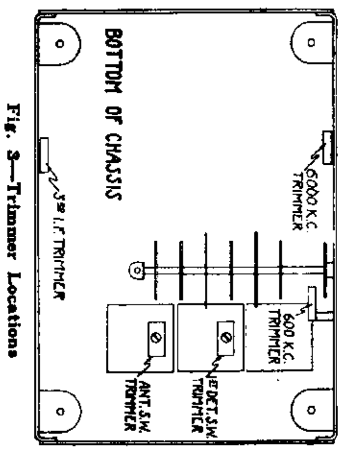
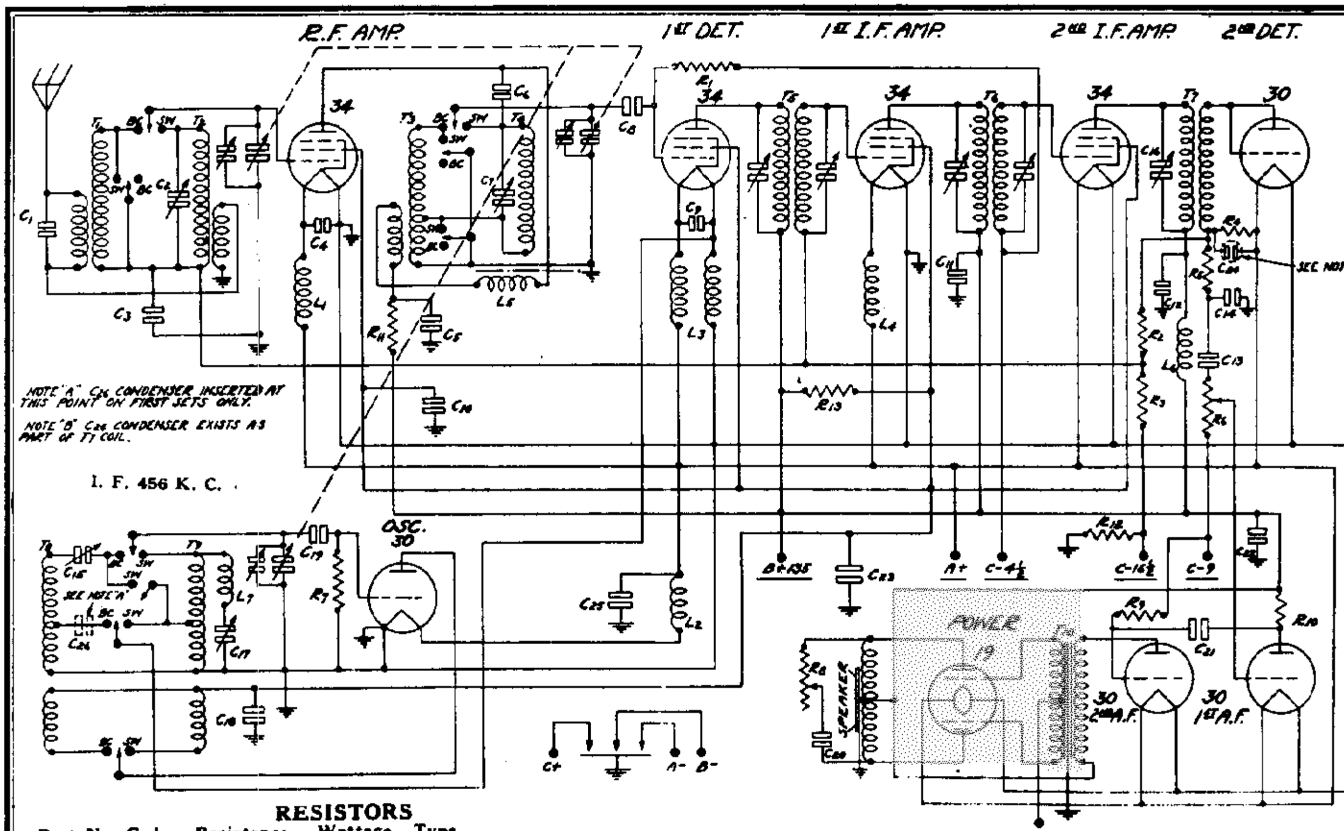
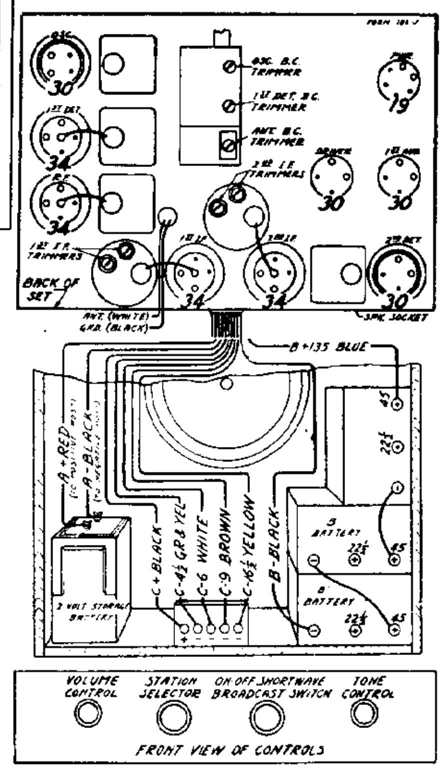


Fig. 3—Trimmer Locations



I. F. 456 K. C.



RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95305	R1	3 Megohm	.2	Carbon
P-A95305	R2	3 Megohm	.2	Carbon
P-A94805	R3	8 Megohm	.2	Carbon
P-A94304	R4	300,000 Ohm	.2	Carbon
P-A95104	R5	100,000 Ohm	.2	Carbon
P- 96016	R6	2 Megohm		Volume Control
P-A94104	R7	100,000 Ohm	.2	Carbon
P- 97013	R8	45,000 Ohm		Tone Control
P-A94105	R9	1 Megohm	.2	Carbon
P-A94104	R10	100,000 Ohm	.2	Carbon
P-A95102	R11	1,000 Ohm	.2	Carbon
P-A95153	R12	15,000 Ohm	.2	Carbon
P-B94652	R13	6,500 Ohm	.2	Carbon
*P- 97011		150,000 Ohm		Tone Control
*P-A95603		60,000 Ohm	.2	Carbon

* These parts were used on first models only—see article on "Changes in Early Models."

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80919	C1	250 mmf.		Moulded
P- 2102	C2	3-40 mmf.		Trimmer
P-81076	C3	.05 mf.	200V	Tubular
P-81076	C4	.05 mf.	200V	Tubular
P-81076	C5	.05 mf.	200V	Tubular
P-81094	C6	.006 mf.	600V	Tubular
P- 2102	C7	3-40 mmf.		Trimmer
P-81800	C8	50 mmf.		Wire Capacitor
P-81076	C9	.05 mf.	200V	Tubular
P-81102	C10	.25 mf.	140V	Tubular
P-81110	C11	.25 mf.	200V	Tubular
P-81076	C12	.05 mf.	200V	Tubular
P-81076	C13	.05 mf.	200V	Tubular
P-80977	C14	100 mmf.		Wire Capacitor
P- 2112	C15	300-500 mmf.		Trimmer
P- 1685	C16	40—100 mmf.		Trimmer
P- 1685	C17	40—100 mmf.		Trimmer
P-81076	C18	.05 mf.	200V	Tubular
P-81005	C19	35 mmf.		Moulded
P-81071	C20	.05 mf.	400V	Tubular
P-81094	C21	.006 mf.	600V	Tubular
P-82001	C22	4.0 mf.	150V	Electrolytic
	C23	8.0 mf.	150V	Electrolytic
	C24	Part of 3rd I. F. Coil Assembly T7		
P-81102	C25	.25 mf.	140V	Tubular
*P-81076	C26	.05 mf.	200V	Tubular
P-81027		3 Gang Condenser		

MODEL 9-B Series
Service Notes, Parts

WELLS-GARDNER & CO., INC.

Replacing Drive Cord

Lift off the pilot light assembly.

Detach the large pointer by removing the center screw.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 6.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 6. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 6.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 6. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly.

Changes in Early Models

The condenser, C26 was used only on the early models of this receiver. Another change was in the tone control circuit. In the early models R8 was a 150,000 ohm resistor paralleled by a 60,000 ohm resistor. However, in the later models this arrangement was replaced by a single 45,000 ohm resistor to provide greater sensitivity in tone control.

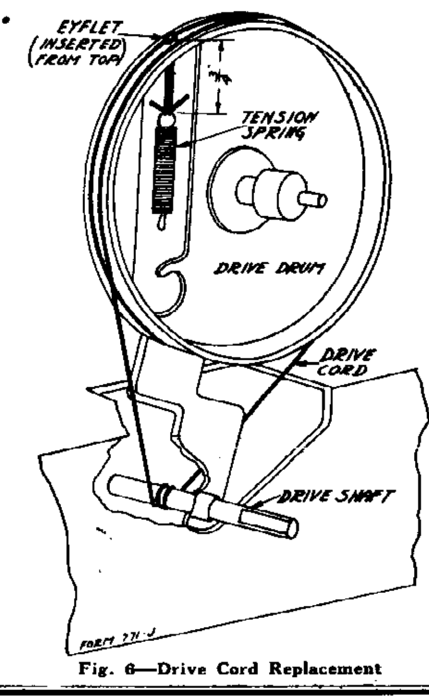


Fig. 6—Drive Cord Replacement

Circuit

This model is a broadcast and short wave receiver with a coverage of 530 to 1730 K. C. on the broadcast band and 5.8 to 16.0 M. C. on the short wave band. Dual band coverage is accomplished by means of dual sets of R. F. and oscillator coils and a 4 section three position selector switch. The various circuits made and broken, as this switch is thrown, are indicated in the schematic circuit diagram Fig. 1.

Referring to the antenna transformer in Fig. 1, T1 is the broadcast transformer and T2 the short wave transformer. The two primaries are connected in series. With the switch in the short wave position, the short wave secondary is connected to the grid circuit of the 34 R. F. amplifier tube and the broadcast secondary is short circuited. When the switch is in the broadcast position, the short wave secondary circuit is opened up and the broadcast secondary is connected to the grid circuit of the tube. The secondary being used is tuned by the R. F. section of the three gang condenser. A separate variable trimmer condenser C2 is used for the short wave secondary.

Bias voltage for the 34 R. F. and 1st I. F. tubes is obtained from a high resistance potentiometer composed of resistors R2, R3 and R4, which are connected across the 16½ volt "C" battery and the 2 volt "A" source. See Fig. 1. The grid circuit of this tube is connected between resistors R2 and R3.

The output of the R. F. 34 tube is fed through another R. F. transformer with tuned secondary into a second 34 tube which functions as the first detector. The first detector section of the three gang condenser is used for tuning this circuit. This interstage R. F. transformer consists of two portions shown as T3 and T4 on the diagram. T4 is the short wave coupling coil and T3 is the broadcast transformer.

The short wave coupling coil is connected to the plate circuit of the 34 R. F. amplifier thru an interstage plate reactor, L5, in conjunction with a by-pass condenser, C6. The standard wave transformer, T3, functions as a simple R. F. coupling the same as that of T1. A separate trimmer condenser C7 is used for the short wave coil.

A type 30 tube is employed in a separate oscillator circuit. Referring to the diagram, T8 is the broadcast oscillator coil and T9 is the short wave oscillator coil. The coil being used is tuned by the oscillator section of the three gang condenser and these circuits are always resonant at 456 K. C. above the frequency to which the R. F. amplifier is tuned. When the switch is in the broadcast position, the connections are completed to the broadcast oscillator coil and the short wave oscillator coil is opened up. When the switch is in the short wave position, the connections are completed to the short wave coil and the broadcast coil is connected between ground and the short tap in order to render it ineffective. A 600 K. C. padding condenser C15 is used in conjunction with the broadcast oscillator and a 6,000 K. C. padder C17 is used for the short wave oscillator circuit.

REPAIR PARTS LIST FOR 9 TUBE BATTERY OPERATED BROADCAST AND SHORT WAVE SUPERHETERODYNE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

MISCELLANEOUS

Part No.	ITEM
P-5176	Antenna R. F. Trans. T1, T2 less can........................
P-5236	Interstage R. F. Trans. T3, T4 less can........................
P-5224	Oscillator Coil T8, T9 less can........................
P-5186	3rd I. F. Assembly T7........................
P-40433	Cans for the above assemblies........................
P-5179A	1st I. F. Coil and Can Assembly T5........................
P-5185	2nd I. F. Coil and Can Assembly T6........................
P-5189	Filament Reactor L1........................
P-5189	Filament Reactor L2........................
P-5235	Double Filament Reactor L3........................
P-5189	Filament Reactor L4........................
P-5228	S. W. R. F. Interstage Plate Reactor L5........................

MODEL 9-B Series
Voltage
Alignment Data

WELLS-GARDNER & CO., INC.

Condenser Alignment

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings of these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION—Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 3 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 3. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K. C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 3 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read from Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Gnd.	Control Grid to Ground	Screen to Gnd.	Normal Plate M. A.
34	R. F.	2.0	135	4.5 (1)	80	2.8
34	1st Det.	2.0	135	4.5 (1)	80	3.0
30	Osc.	2.0	80			2.8
34	1st I. F.	2.0	135	4.5 (1)	80	2.8
34	2nd I. F.	2.0	135	4.5	80	2.8
30	2nd Det.	2.0				
30	1st Audio	2 0	95	9.0 (2)		0.35
30	2nd Audio	2.0	135	9.0 (3)		3.0
19	Output	2.0	135	6.0		1.3

(1) Computed figure—cannot be read because of high resistance cir.
(2) Volume Control at minimum.
(3) As read at battery.

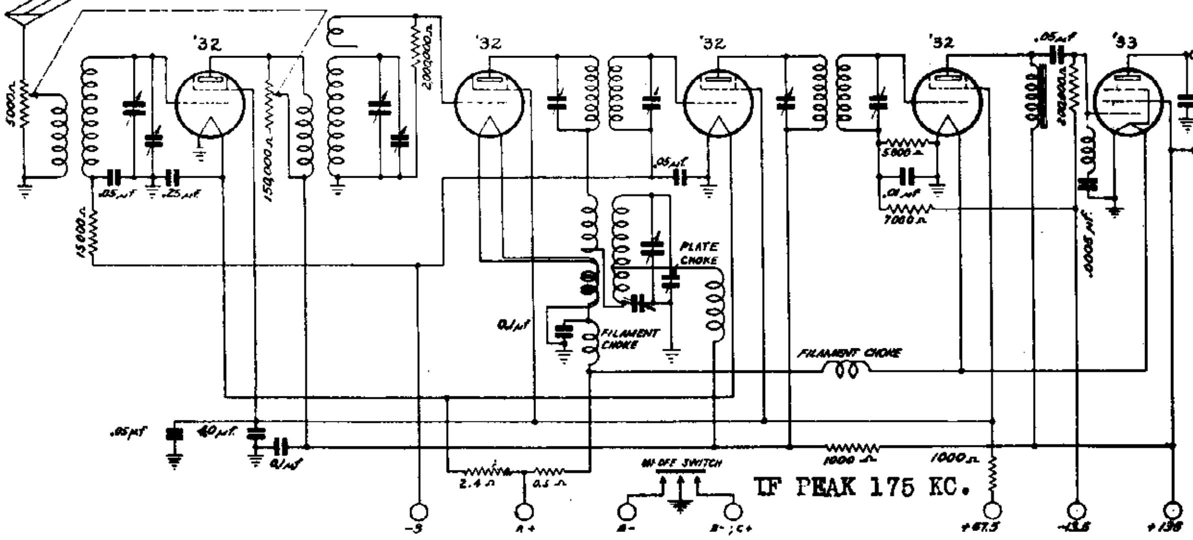
D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

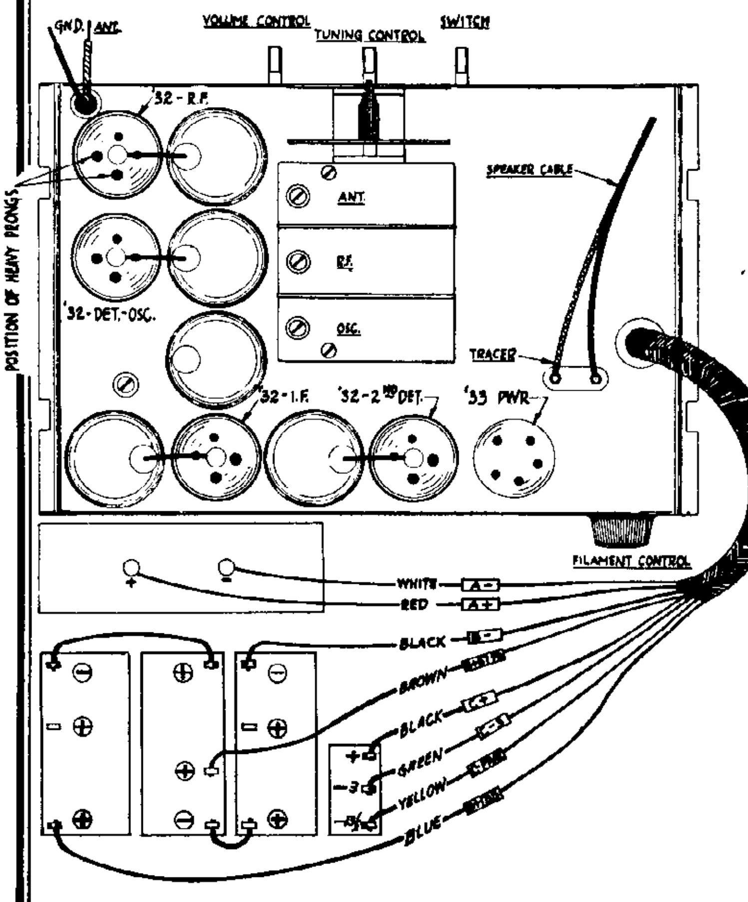
Part No.	Item	Code	D. C. Resistance in Ohms
P-5176	B. C. Antenna R. F. Transformer, Primary	T1	28.0
	B. C. Antenna R. F. Transformer, Secondary	T1	5.0
	S. W. Antenna R. F. Transformer, Primary	T2	0.25
	S. W. Antenna R. F. Transformer, Secondary	T2	Small
P-5236	B. C. Interstage R. F. Transformer, Primary	T3	5.25
	B. C. Interstage R. F. Transformer, Secondary	T3	5.0
	S. W. Interstage R. F. Transformer, Secondary	T4	Small
P-5224	B. C. Oscillator Grid Coil	T8	2.4
	B. C. Oscillator Plate Coil	T8	3.5
	S. W. Oscillator Grid Coil	T9	1.0
	S. W. Oscillator Plate Coil	T9	Small
P-5179-A	1st I. F. Coil Primary	T5	12.0
	1st I. F. Coil Secondary	T5	13.0
P-5185	2nd I. F. Coil Primary	T6	5.5
	2nd I. F. Coil Secondary	T6	5.5
P-5186	3rd I. F. Coil Primary	T7	12.0
	3rd I. F. Coil Secondary	T7	30.0
P-50586-B	Audio Transformer Primary	T10	910.0
	Audio Transformer Secondary, Center tap to outside	T10	590.0
	Audio Transformer Secondary, Center tap to inside	T10	530.0
P-5189	Filament Reactor	L1	0.65
P-5189	Filament Reactor	L2	0.65
P-5235	Double Filament Reactor (each)	L3	0.3
P-5189	Filament Reactor	L4	0.65
P-5228	S. W. R. F. Interstage Plate Reactor	L5	28.0
P-5227	I. F. Isolating Reactor	L6	1.6
P-2179	Speaker Voice Coil, Center tap to outside		300.0
	Speaker Voice Coil, Center top to inside		250.0

MODEL 92,93
Schematic
Socket,Voltage

WELLS - GARDNER & CO.



TURN THE VOLUME CONTROL ALL THE WAY ON, CONNECT THE ANTENNA AND GROUND LEADS TOGETHER AND TURN THE GANG CONDENSER PLATES ALL THE WAY OUT. CHECK BATTERY VOLTAGES.



TUBE	CIRCUIT	VOLTAGE
R.F. '32	Filament	2.
	Screen Grid	65.
	Plate	127.
	Control Grid	1.4
1st Det. & Oscillator '32	Filament	2.
	Screen Grid	65.
	Plate	85.
	Control Grid	No Reading
I.F. '32	Filament	2.
	Screen Grid	65.
	Plate	125.
	Control Grid	5. *
2nd Det '32	Filament	2.
	Screen Grid	67.
	Plate	127.5
	Control Grid	3.2
Audio '33	Filament	2.
	Screen Grid	132.5
	Plate	117.5
	Control Grid	7.5 **

*This includes filament voltage.
**250 v. Scale.

The measurement of grid bias voltages is not recommended as this causes an abnormal rise in plate current which is injurious to the tube. When the receiver does not function properly and the trouble is apparently due to incorrect grid bias on any tube or tubes, the cause of the incorrect bias may be determined by applying the proper continuity test.

CAUTION: Do not attempt to take voltage measurements or test the '33 pentode tube with a set analyzer which is not designed to test that type of tube. A special adaptor is necessary. The latest type analyzers only are designed to test pentode tubes. The UY socket in an analyzer which is used to test '24, '35, and '27 tubes cannot be used to test '33 pentode tubes. A break-in adaptor and the external binding posts of the set analyzer may be used to take voltage measurements when an adaptor is not available.

Comparison of the voltage measurements taken and those shown in the chart below will show any irregularities. The cause of any variation may be determined by applying the proper continuity test. REMEMBER:—Voltage measurements will vary slightly with different sets of tubes, and also with different chassis. Unless the voltages are radically different than normal, they may be considered satisfactory.

The voltages shown in the chart were taken with a 1000 ohm per volt voltmeter; voltage measurements taken with a voltmeter having a different resistance will, of course, differ from those shown.

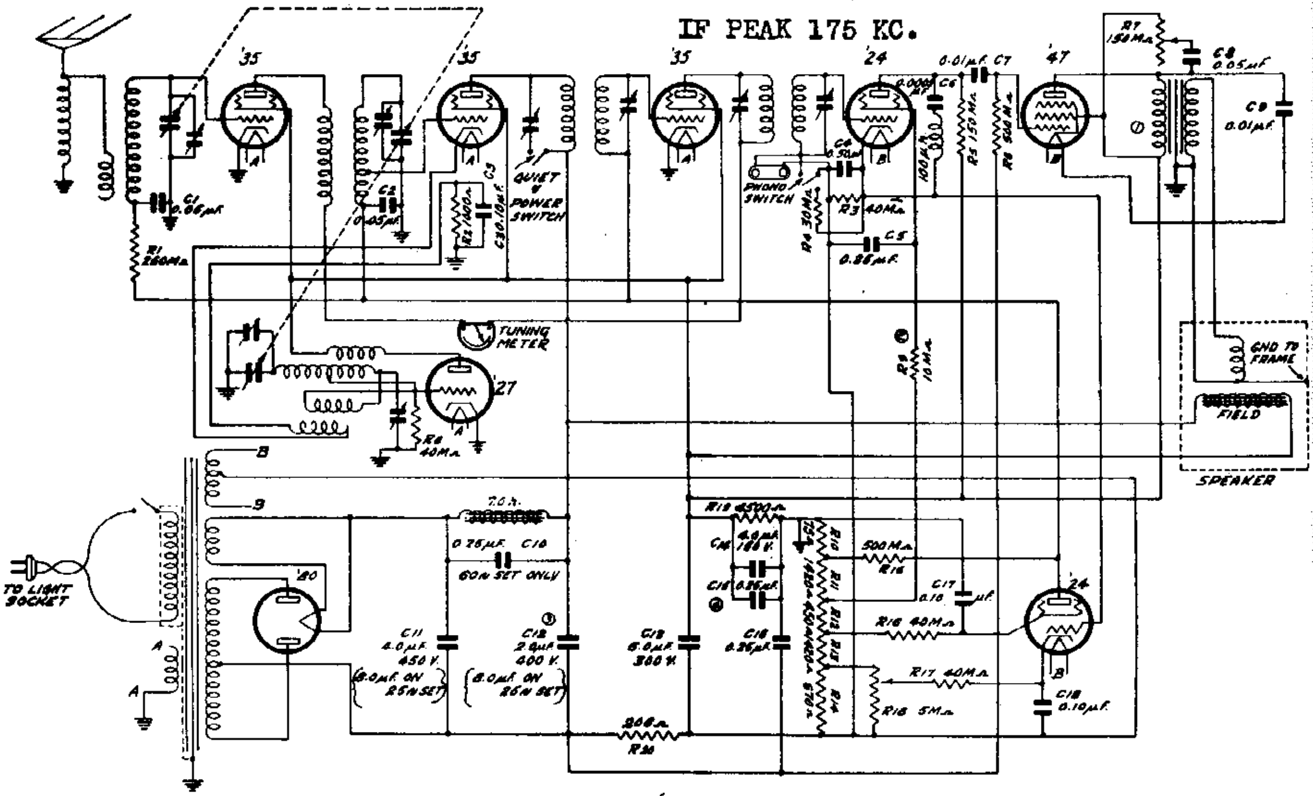
The .006 mfd. condenser connected from the plate of the pentode tube to ground is there for two reasons,—one, to prevent any I.F. or harmonic of the intermediate frequency from getting into the speaker and possibly coupling back into the antenna to cause a squeal; two, to put the proper amount of capacity across the speaker winding to produce a pleasing tone quality. This condenser may be varied to any value from .002 mfd. to .006 mfd. without losing its effectiveness in preventing the I.F. from getting into the speaker.

MODEL 40,40-A
Schematics

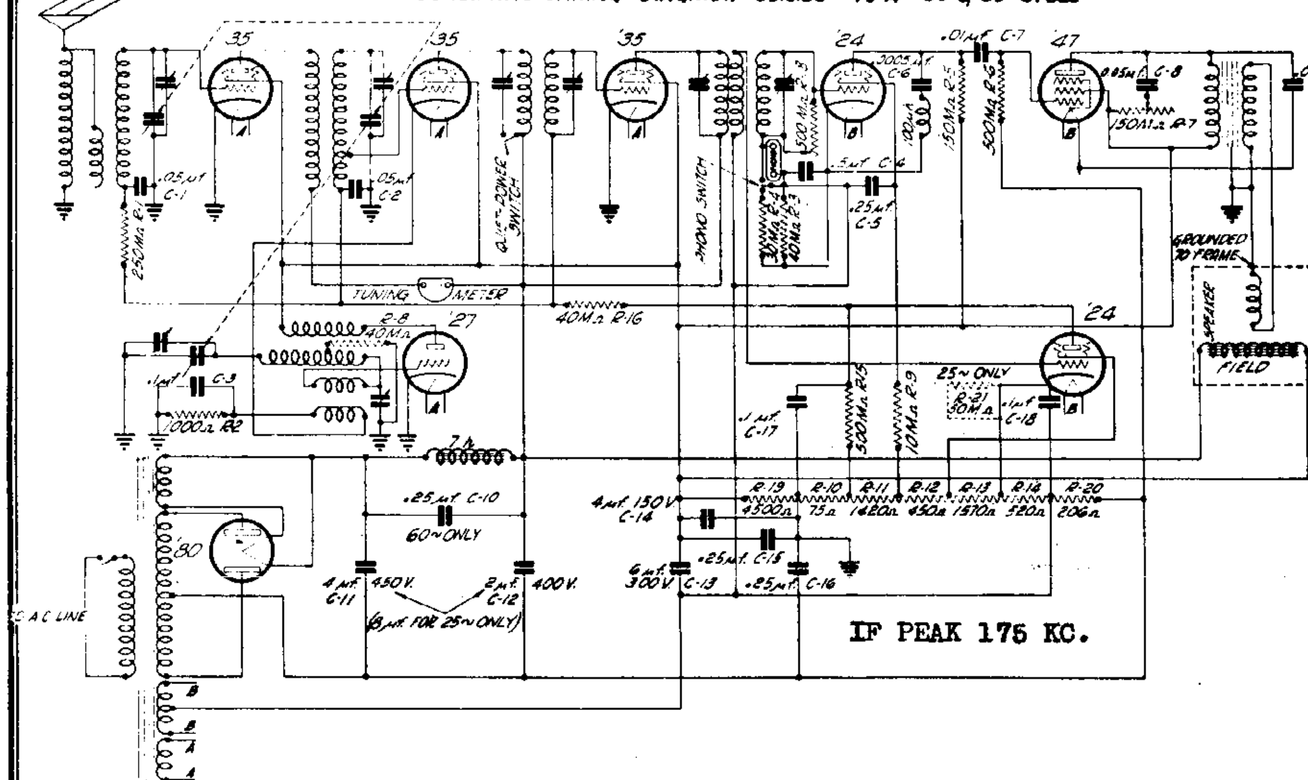
WELLS - GARDNER & CO.

SCHEMATIC WIRING DIAGRAM SERIES 40 - 60~ & 25~

IF PEAK 175 KC.



SCHEMATIC WIRING DIAGRAM SERIES 40-A 60 & 25 CYCLE



IF PEAK 175 KC.

MODEL 40, 40-A
Alignment Data
Socket, Voltage

WELLS - GARDNER & CO.

A modulated test oscillator and an output meter MUST be used when aligning this receiver to insure accurate alignment. It is important that the oscillator deliver a signal at exactly 175 K.C. in addition to frequencies in the broadcast band.

The adjustable condensers which tune the primaries and secondaries of the I.F. transformers are adjusted by inserting a screw driver through the holes in the chassis base directly below the I.F. transformer assemblies.

A trimmer condenser is mounted over each section in the gang and is adjusted by turning the screw located under the hole in the top of the gang shield.

The oscillator 600 K.C. tracking condenser is on the back of the chassis near the "QUIET-POWER" switch.

Make each adjustment in the order given below or the receiver may be thrown further out of alignment and it will then be a difficult task to align it properly.

The receiver and test oscillator must be well grounded and the output kept within the range of the output meter at all times.

All shields must be in place when making the adjustments.

INTERMEDIATE CIRCUITS.—Tune the test oscillator to exactly 175 K.C., and connect its output to the grid of the first detector tube after removing the clip on the tip of the tube. Connect the output meter across the secondary of the speaker coupling transformer and then adjust all four condensers which tune the intermediate transformers, for the greatest deflection on the output meter. Check the settings of all four condensers to make certain the maximum output has been obtained.

When the above instructions have been followed remove the test oscillator coupling and replace the grid clip on the tip of the first detector tube.

GANG CONDENSERS.—Turn the gang condenser plates all the way in and see that the dial pointer is on the first dial division point below 550 K.C.

Tune the test oscillator to 1,400 K.C., turn the dial to read 1,400 K.C., and then adjust each gang condenser trimmer for maximum output.

OSCILLATOR.—Tune the test oscillator to 600 K.C., and tune the receiver to the signal. Disconnect the output meter and then rotate the adjusting screw on the oscillator 600 K.C. tracking condenser. Rock the gang condenser back and forth across the signal at the same time, and listen closely until the maximum volume is obtained. The tracking condenser is then properly adjusted and remains fixed thereafter.

The gang condenser trimmers only must then be adjusted again at 1,400 K.C. for maximum output.

The receiver should be accurately aligned if the above instructions have been followed and no further adjustments need be made.

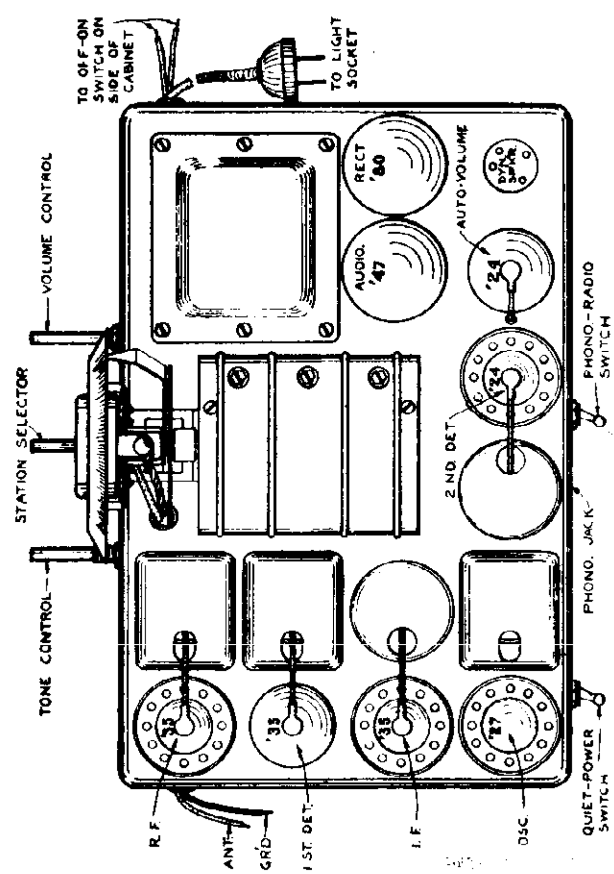
The blue lead on the filter block is common for condensers C4, C5, and C18, and the black lead is common for condensers C3, C15, C16, and C17. The second detector plate filter choke is also contained in the block and is connected by two yellow leads, C8, (white-red leads) and C10 (red leads) are connected as shown in Fig. 1 schematic wiring diagram.

Voltages at Sockets

The voltages shown in the chart were taken with a 1,000 ohm per volt voltmeter; voltage measurements taken with a voltmeter having a different resistance will, of course, differ from those shown.

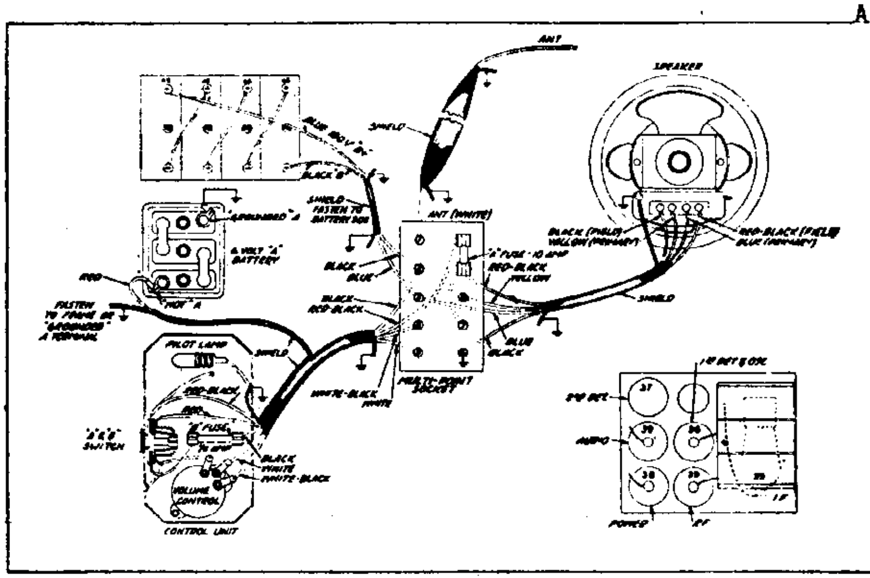
Turn the volume control all the way on, connect the antenna and ground leads together and turn the gang condenser plates all the way out. Check the line voltage.

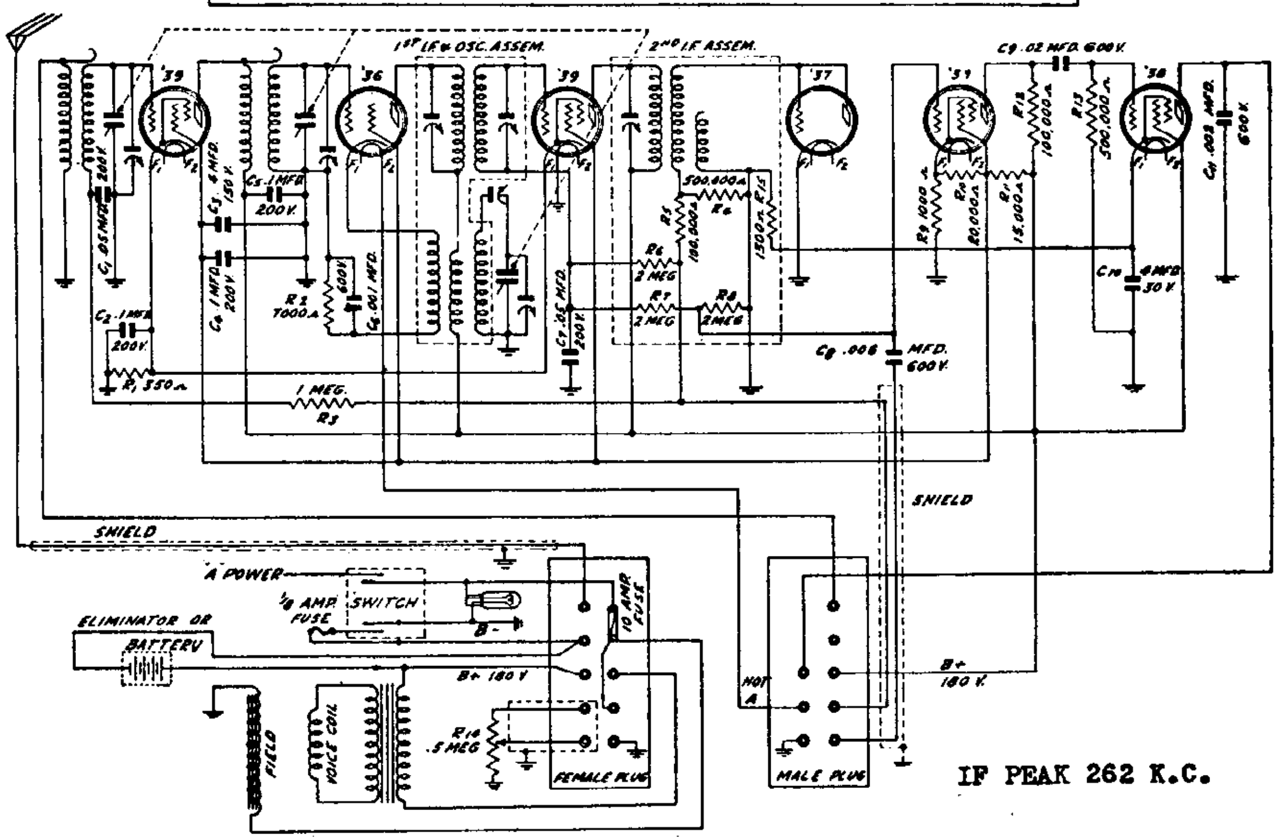
Tube	Circuit	LINE VOLTAGE				
		90 V.	100 V.	110 V.	120 V.	130 V.
R. F. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
1st Det. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
I. F. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
Oscillator '27	Plate	70	78	85	92	100
2nd Det. '24	Screen-Grid Plate	66 127	73 134	80 141	87 148	94 155
A. V. C. '24	Grid Screen-Grid	14 24	15.5 26	17 28	18.5 30	20 32
Audio '47	Accelerating-Grid Plate	199 171	221 190	244 210	267 230	289 250
Rectifier '80	Current (both plates) Plate to Plate Volt.	67 MA 512	75 MA 569	82 MA 625	89 MA 682	96 MA 739



MODEL 062
Schematic
Voltage
Assembly Wiring

WESTERN AUTO SUPPLY CO.





IF PEAK 262 K.C.

VOLTAGE DATA

Tube	Plate	Screen	Grid	Plate MA.
R-F.	177	80	3	3.6
1st Det.	173	76	7*	.9*
I-F.	177	80	3	3.6
2nd Det.	0	0	0	0
1st A-F.	54	77	6	1.2
Output	159	165	15.5	10.0

* Will vary with dial setting.

MODEL 6-U
Schematic

WESTERN AUTO SUPPLY CO.

C_1	0.050 mf 200V. TUBULAR	
C_2	0.500 mf (BLOCK RED-WH)	
C_3	0.050 mf (BLOCK GR-WH)	
C_4	0.00025 mf MICA	
C_5	0.050 mf 200V. TUBULAR	
C_6	12.000 mf ELECTROLYTIC IN BLOCK WITH C_9	
C_7	0.00025 mf MICA	
C_8	0.050 mf (BLOCK GR)	
C_9	12.000 mf ELECTROLYTIC IN BLOCK WITH C_6	
C_{10}	0.003 mf (BLOCK YELLOW)	
C_{11}	0.020 mf 600V. TUBULAR	
C_{12}	0.001 mf MICA	
C_{13}	0.500 mf (BLOCK BLUE)	
C_{14}	0.100 mf (BLOCK BROWN)	
C_{15}	0.500 mf 180V. TUBULAR	
C_{16}	1.000 mf 120V. TUBULAR	
C_{17}	0.010 mf 1600V TUBULAR	
C_{18}	18.000 mf BLOCK WITH C_{19}	
C_{19}	18.000 mf BLOCK WITH C_{18}	
C_{20}	0.500 mf 120V. TUBULAR	

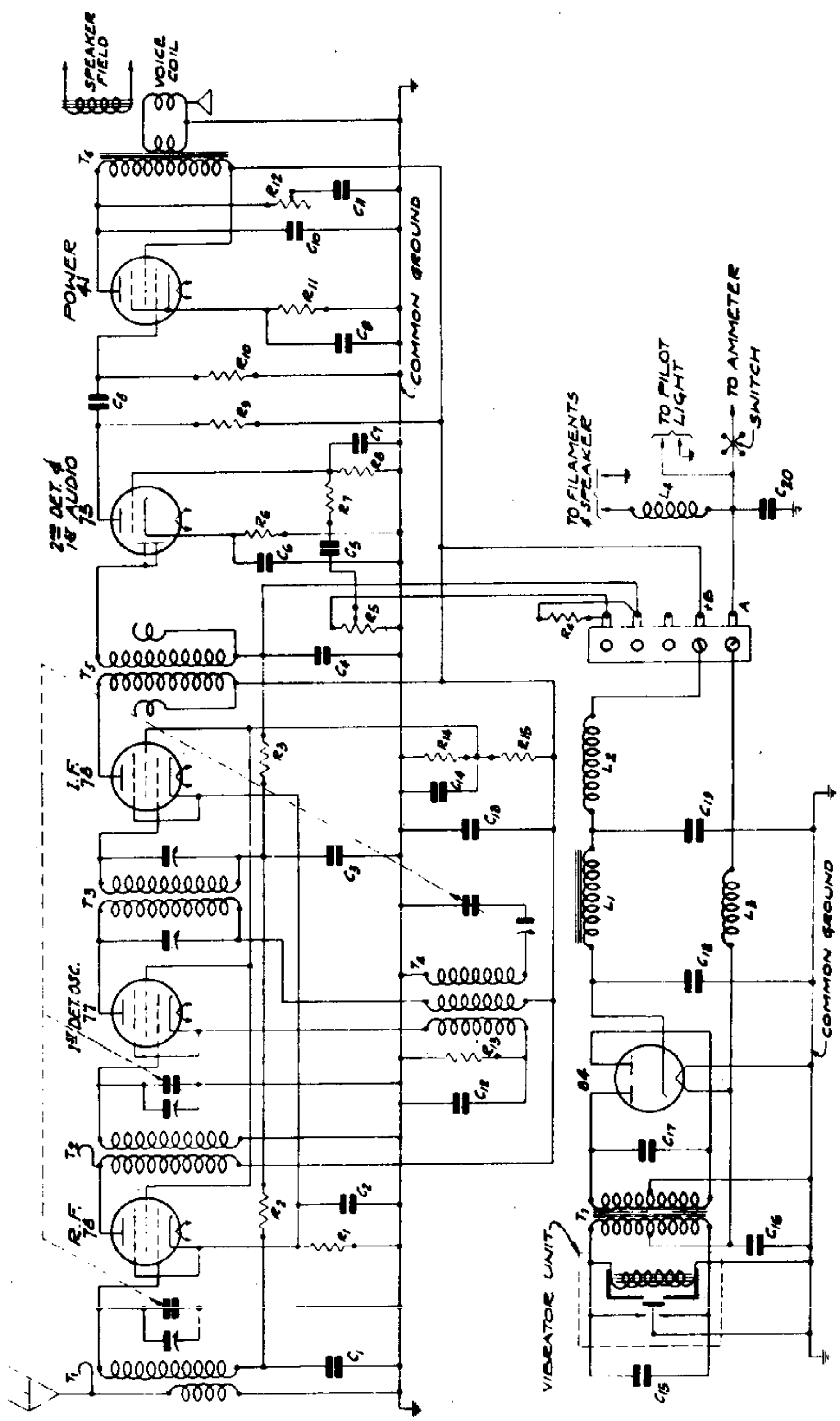
COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK

IF PEAK 262.5 KC.

T_1 ANTENNA COIL (P-5039)
T_2 R.F. INTERSTAGE COIL (P-5045)
T_3, T_4 1ST I.F. & OSCILLATOR COIL (P-5063)
T_5 2ND I.F. COIL (P-5022)
T_6 OUTPUT TRANS. (P-50632)
T_7 POWER TRANS. (P-50633)

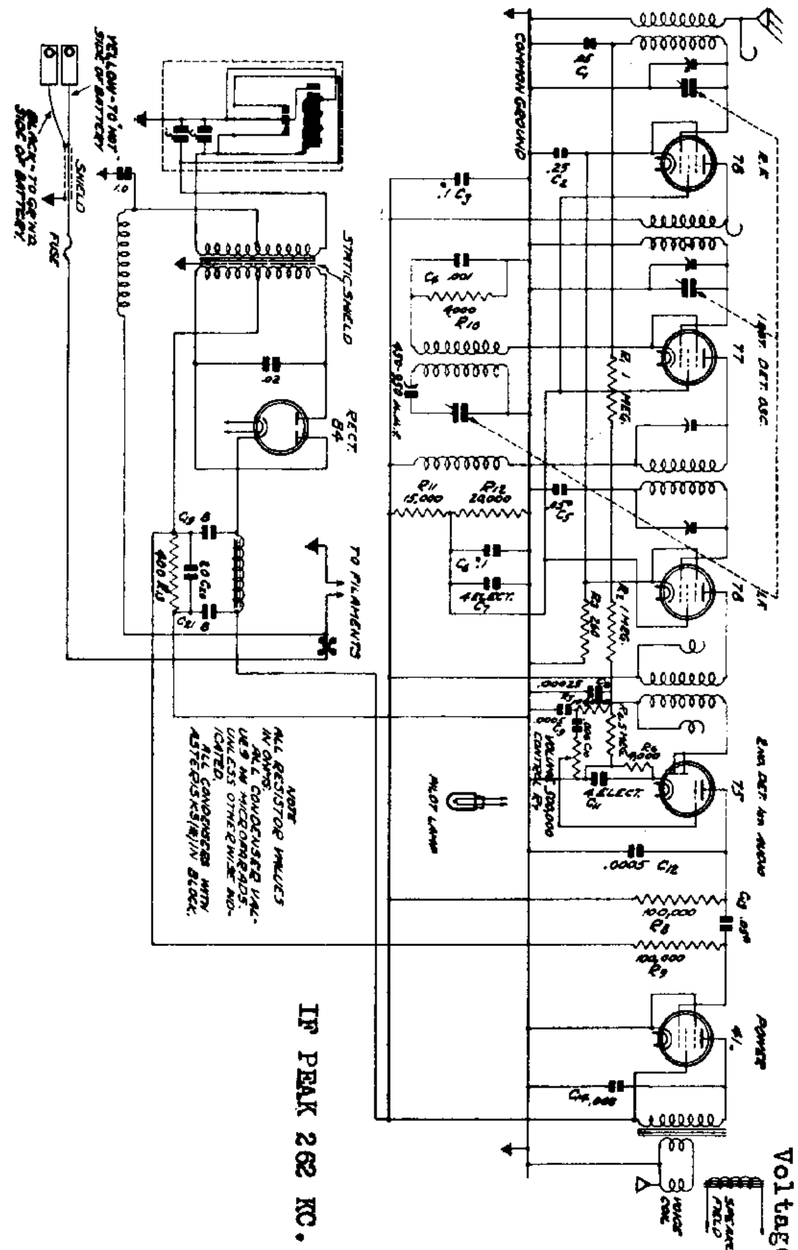
L_1 FILTER CHOKE (P-50637)
L_2 R.F. "B" CHOKE (P-5174)
L_3 ELIMINATOR "A" CHOKE (P-5175)
L_4 R.F. "A" CHOKE (P-5167)

R_1 260 OHMS
R_2 1.0 MEGOHM
R_3 2.0 "
R_4 200,000 OHM
R_5 250,000 OHM VOL. CONTROL
R_6 6,000 OHM
R_7 100,000 OHM
R_8 1.0 MEGOHM
R_9 250,000 OHM
R_{10} 250,000 OHM
R_{11} 800 OHM
R_{12} 150,000 OHM TONE CONTROL
R_{13} 4,000 OHM
R_{14} 20,000 OHM
R_{15} 15,000 OHM



MODEL Z6Z1
Schematic
Voltage

WESTERN AUTO SUPPLY CO.



IF PEAK 262 KC.

Circuit

The circuit consists of an antenna stage, a 78 R.F. stage, a 77 1st detector-oscillator stage, a 78 I.F. stage, a 75 dual diode-triode tube, which functions as a diode 2nd-detector and triode 1st audio stage, and a single 41 output stage. An 84 full wave rectifier is used in the power unit. The intermediate frequency is 262 K.C. The diode current establishes a drop across a resistor which is used as additional bias voltage for the R.F. and I.F. tubes giving automatic volume control action. Noise suppression between stations is obtained by the resistor in the cathode circuit of the 75 tube, the drop across which must be overcome before rectification in this tube begins. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

A vibrator interrupts the current through the primary of the power transformer in the power unit. This, together with the turns ratio in this transformer, results in the high voltage AC being present in the secondary of the transformer. The full wave rectifier tube, filter choke, and filter condensers convert this high voltage AC into high voltage DC for the plate and screen circuits.

Current for the receiver is obtained from the car storage battery. In Fig. 11 is shown the condenser block internal wiring.

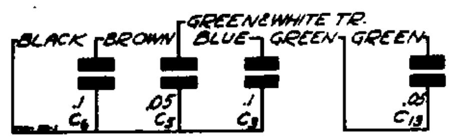


Fig. 11—Condenser Block—Internal Wiring

Voltages at Sockets

In the following chart are given the voltages at the sockets with all the tubes in, all units connected, and the set in operating condition, but with no signal being received. The antenna should be grounded.

A thousand ohm-per-volt meter of 0-250 volt range is required for the plate and screen voltages. Lower ranges will be necessary for the grid and heater voltages. It is not absolutely necessary to have a high resistance meter for the heater or "A" battery reading.

These voltages will vary with variations in receivers, tubes, test equipment used, and "B" eliminator output voltage.

Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78	R. F.	6.1	182	80	3.(1)	7.0
77	1st Det. and Osc.	6.1	178	77	5.(2)	1.3(2)
78	I. F.	6.1	182	80	3.(1)	7.0
75	2nd Det. 1st Audio	6.1	70(3)		1.4(1)	.35
41	Output	6.1	172.5	176.5	12.5(4)	16.0
84	Rect.	6.1	205			17.5 per plate

(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode
(4) Read Across 400-Ohm Resistor, R13

WESTERN AUTO SUPPLY CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Rattle

If rattle is experienced when a signal is being received, it is, in practically all cases, due to mechanical vibration at some point in the chassis. Inspect the chassis and look for a loose tube shield or a loose part at some point which can rattle against another part. When the vibrating part is found, secure it in place in some manner. This can generally be done with a wedge made of a piece of paper, cardboard or wood. Rattle may, in some instances, be due to a loose cover. If this is the case, remove the cover and bend the edge of the chassis box outward between the screw holes so that the cover will fit tightly when it is put on.

If the Receiver Fails to Operate

"A" Fuse—Check the "A" line fuse in the cable.

"A" Line Open—See if power is being supplied to the speaker, tube heaters, and "B" eliminator.

"B" Eliminator Not Working—See if the "B" eliminator is in proper working order by checking the high voltage points at the tube plate terminals (see Fig. 10).

Antenna and Lead—See if antenna is properly connected to lead-in wire and antenna lead from set. Be sure antenna system is not grounded at any point.

All Tubes Not Inserted—See if all tubes are inserted as per Fig. 8.

Defective Tubes—Try out a new set of tested tubes.

Grid Caps Not Connected—See if all grid caps are properly connected to top of top grid connection tubes.

Variable Condenser Plates Shorted—Check condenser sections in chassis carefully for foreign particles or rotor stator rubbing.

CHASSIS PARTS

Part No.	Description	List Price
P-1780	No. 75 Tube Socket	$0.10
P-1761	No. 77 Tube Socket	.10
P-1762	No. 78 Tube Socket	.10
P-1665	No. 41 Tube Socket	.10
P-1803	No. 84 Tube Socket	.10
P-1805	Single Pin Jack	.10
P-1799	Tube Shield Assembly	.25
P-20656	Chassis Box	4.00
P-20657	Chassis Box Cover	1.10
P-70740	Shielded Antenna Lead	.40
P-70744	Shielded "A" Battery Lead	1.15
P-1926	Interrupter with Condensers in Rubber Boot and Metal Case	6.35
P-10260	Cardboard Baffle	.20
P-1924	15 Amp. Fuse	.10
P-1774	Electrodynamic Speaker	3.75
P-20585	Cond. Drive Gear	.25
P-1801	Volume Control and Drive Bracket	.30
P-20635	Cond. Drive Pinion	.15
P-20677	Pinion Adjustment Plate	.10
P-20614	Lock Lever	.10
P-20458	Tension Spring	.10
P-30419	Entry Plate Assembly	.10
P-1830	Dial Gear and Strip Assembly	.40
P-1816	Celluloid Dial Strip only	.15
P-1810	Pilot Lamp Socket and Spring Clip	.10
P-1563	6-8 Volt Pilot Lamp	.25
P-10263	Rubber Tube Bumper—Square	.10
P-10210	Rubber Tube Bumper—Round	.10
P-10213	Rubber Band for Tube	.10
P-50569	Filter Choke Assembly	1.60
P-50895	Power Trans. Assembly	2.90
P-5099	Antenna R. F. Transformer—Less Can	1.20
P-5063	Interstage R. F. Transformer—Less Can	1.00
P-5105	Second I. F. Transformer and Can Assembly	.95
P-5096	First I. F. and Oscillator Transformer and Can Assembly	2.70
P-5097	Single Solenoid "A" Choke	.25
P-40431	Antenna R. F. Can	.15
P-1826	Interstage R. F. Can	.10

Resistors

Part No.	Code No.	Resistance	Type	List Price
P-A95105	R-1	1 Megohm	Carbon	$0.25
P-A95105	R-2	1 Megohm	Carbon	.25
P-B94261	R-3	260 ohm	Carbon	.35
P-A95504	R-4	.5 Megohm	Carbon	.25
P-A95104	R-5	100,000 ohm	Carbon	.25
P-A94402	R-6	4,000 ohm	Carbon	.20

Part No.	Code No.	Resistance	Type	List Price
P-91066	R-7	0-500,00 ohm	Volume Control and Switch	$1.15
P-A95104	R-8	100,000 ohm	Carbon	.25
P-A95104	R-9	100,000 ohm	Carbon	.25
P-A94402	R-10	4,000 ohm	Carbon	.20
P-B94153	R-11	15,000 ohm	Carbon	.25
P-B94203	R-12	20,000 ohm	Carbon	.25
P-C94401	R-13	400 ohm	Carbon	.20

Condensers

Part No.	Code No.	Capacity	Voltage	Type	List Price
P-80862	C-1	.05 mfd.	200 V.	Tubular	$0.30
P-80888	C-2	.25 mfd.	200 V.	Tubular	.35
P-80821-B	C-4	.001 mfd.	600 V.	Molded	.25
P-80937	C-7 C-11	4.0 mfd. 4.0 mfd.		Electrolytic Block in can	1.25
P-80919	C-8	.00025 mfd.	600 V.	Molded	.20
P-80945	C-9	.0005 mfd.	600 V.	Molded	.15
P-80898	C-10	.006 mfd.	600 V.	Tubular	15
P-80945	C-12	.0005 mfd.	600 V.	Molded	.15
P-80966	C-14	.008 mfd.	600 V.	Tubular	20
P-80962A	.02 mfd.	800 V.	Tubular Condenser		.25
P-80978A	1. mfd.	120 V.	Tubular Condenser		.45
P-80976A	Dual .5 mfd.	120 V.	Tubular Condenser In Paper Box		.80
P-80956	C-19 C-20 C-21	8.0 mfd. 20.0 mfd. 8.0 mfd.	225 V. 25 V. 225 V.	Electrolytic Block in Can	2.25
P-80955	C-3 C-5 C-6 C-13	.1 mfd. .05 mfd. .1 mfd. .05 mfd.	300 V. 200 V. 200 V. 300 V.	Bypass Block in Can	1.35
P-1539	600 K. C. Trimmer Condenser				.45
P-80957	Three-Gang Variable Condenser				3.00

CONTROL UNIT PARTS

(When Separate Control Unit Is Used)

Part No.	Description	List Price
P-1816	Celluloid Dial Strip	$0.15
P-1825	Dial Gear and Strip Assembly	.40
P-20509B	Control Unit Swivel	.15
P-20510A	Steering Post Apron	.30
P-20511	Steering Post Clamp	.15
P-20693	Control Box Cover	.35
P-20635	Cond. Drive Pinion	.15
P-70746	Pilot Lamp Cable only	.40
P-1415A	Pilot Lamp Socket and Clip	.15
P-1563A	6-8 Volt Pilot Lamp	.25
P-30426	Ornamental Plug	.10
P-30414	Key	.15

MODEL WR-20
Schematic
Socket
Voltage

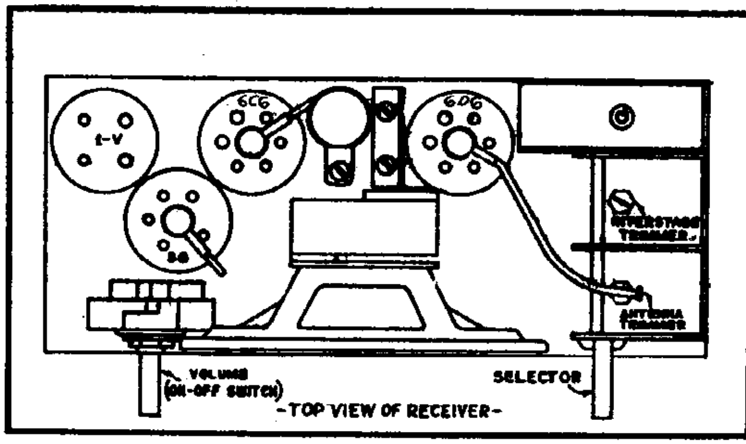
WESTINGHOUSE ELEC. SUPPLY CO.

Universal Compact

Operates on either AC or DC

110-120 Volts, 25-60 Cycles

Adaptable for 220-Volt Current with use of 220-Volt Resistor



-TOP VIEW OF RECEIVER-

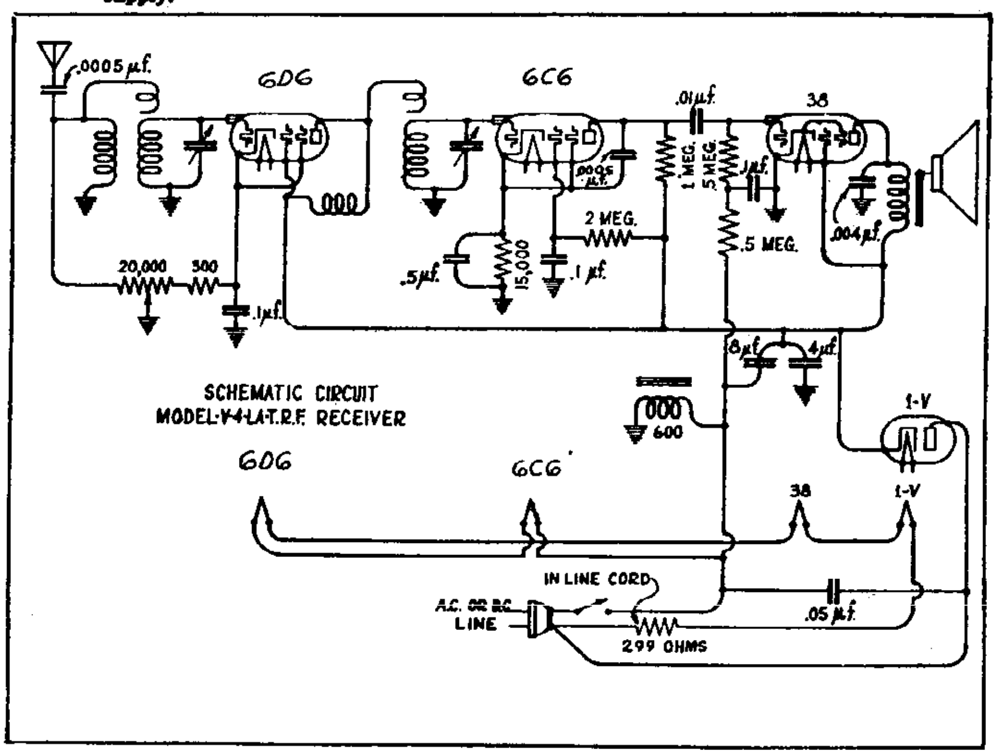
Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC., and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

Chassis	*To— Plate*	*Screen*	*Cathode*
77—Detector	10- 15	9- 12	1- 2
78—R.F. Amplifier	105-115	105-115	2- 3
38—Output Pentode	105-115	105-115	——

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.



Circuit Wiring Diagram

MODEL WR-21
Schematic
Socket, Voltage

WESTINGHOUSE ELEC. SUPPLY CO.

Voltage Readings:

Readings should be taken with Volume Control fully on. Tuning control set for 550 K.C., and antenna outside the set. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

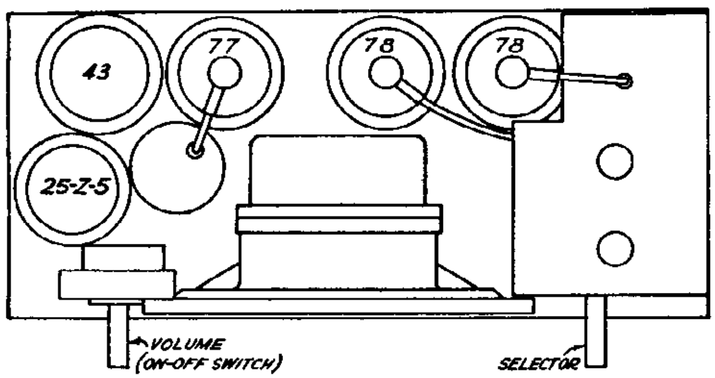
Using	300-volt scale Plate to Ground	300-volt scale Screen to Ground	30-volt scale Cathode to Ground
78—Detector Oscillator ..	98	98	1.6
78—I. F. Amplifier........	98	98	2.8
77—2nd Detector	35	25	1.5
43—Power Amplifier	92	98	..
25Z5—Rectifier	..	..	98

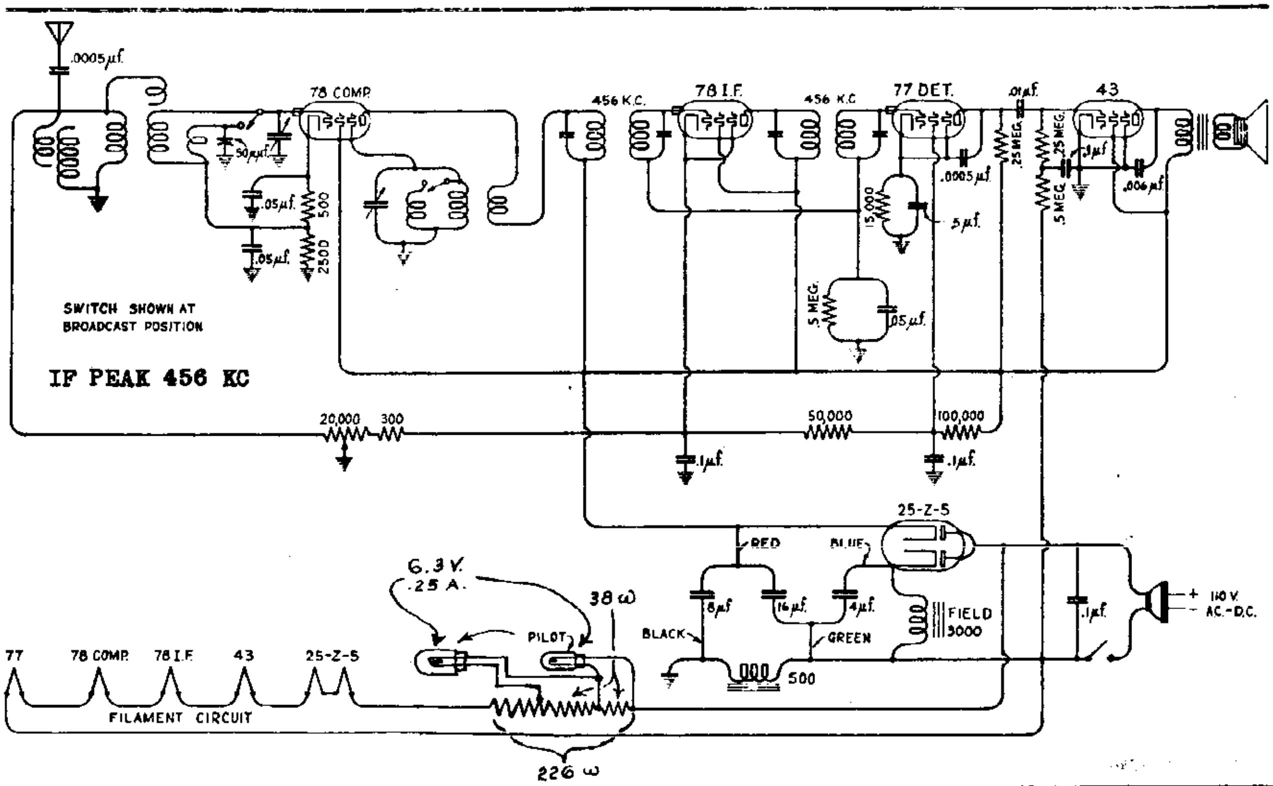
A.C.-D.C. . . 100-135 Volts . . 25-70 Cycles
Also Available for 220 Volts.

Broadcast	Short Wave
540—1500 Kilocycles	1500—3000 Kilocycles
550— 200 Meters	200— 100 Meters

Voltage across speaker field 100 volt.

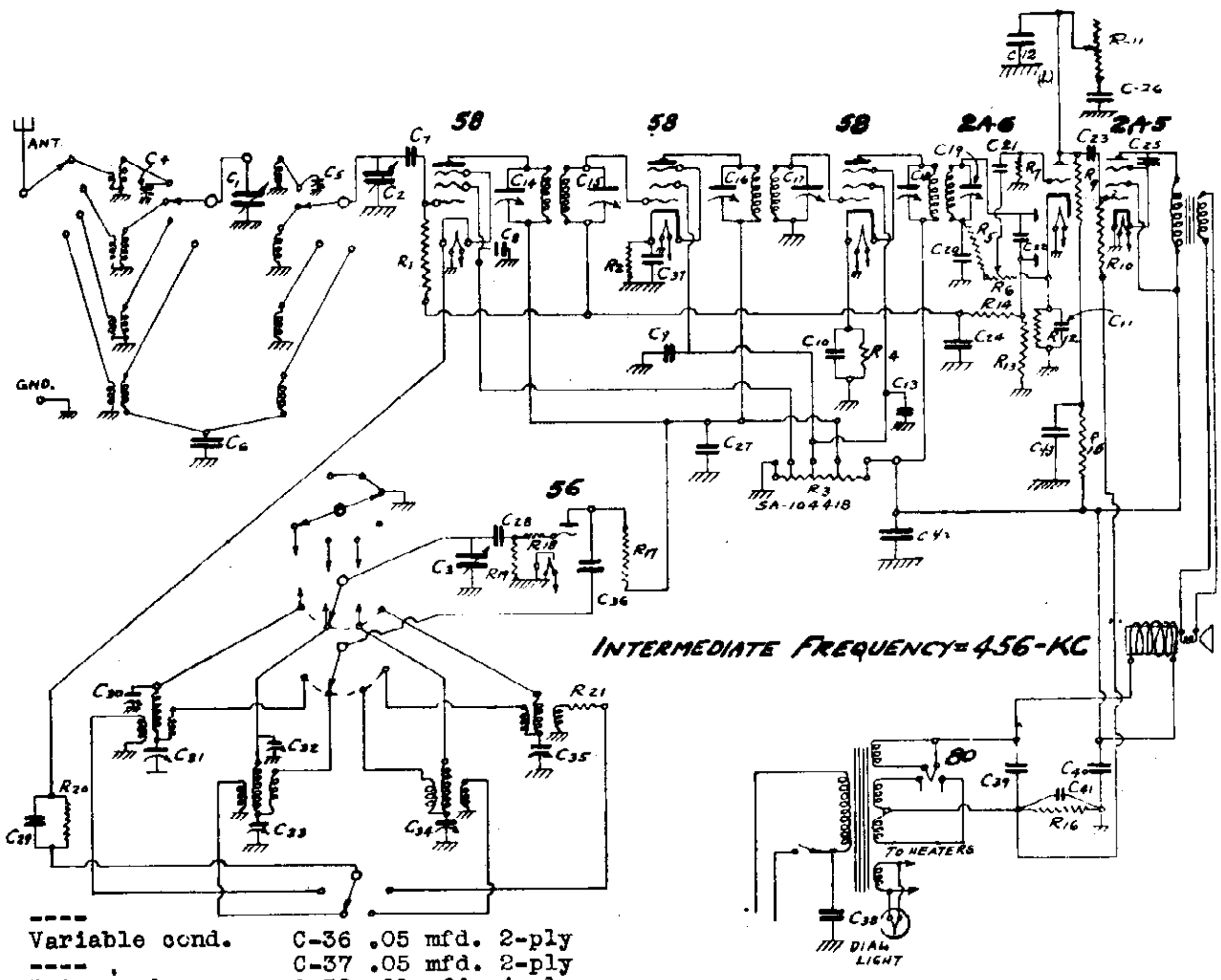
Bias for 43 tube is measured across filter choke and should be 15 to 18 volts.





WESTINGHOUSE ELEC. SUPPLY CO.

Schematic



C-1 ----
C-2 Variable cond.
C-3 ----
C-4 Trim condenser
C-5 Trim condenser
C-6 .05 mfd. 2-ply
C-7 100 mmf mica
C-8 .05 mfd. 2-ply
C-9 .05 mfd. 2-ply
C-10 .05 mfd. 2-ply
C-11 .5 mfd. 2-ply
C-12 .001 mica
C-13 .05 mfd. 2-ply
C-14 30 - 100 mmf mica
C-15 30 - 100 mmf mica
C-16 30 - 100 mmf mica
C-17 30 - 100 mmf mica
C-18 30 - 100 mmf mica
C-19 30 - 100 mmf mica
C-20 100 mmf mica
C-21 .005 mfd. 3-ply
C-22 100 mmf mica
C-23 .005 mfd. 3-ply
C-24 .05 mfd. 2-ply
C-25 .005 mfd. 3-ply
C-26 .01 3-ply
C-27 .05 mfd. 3-ply
C-28 100 mmf mica
C-29 .05 mfd. 2-ply
C-30 7 - 70 mmf
C-31 300 mmf variable
C-32 7 - 70 mmf
C-33 1200 mmf variable
C-34 2000 mmf variable
C-35 2000 mmf variable
C-36 .05 mfd. 2-ply
C-37 .05 mfd. 2-ply
C-38 .01 mfd. 4-ply
C-39 8 mfd. electro
C-40 4 mfd. electro
C-41 20 mfd. electro
C-42 .05 mfd. 3-ply
C-43 .1 mfd. 3-ply

R-1 1/2 meg. 1/4 watt
R-2 1000 ohms 1/4 watt
R-3 Multiple
R-4 1000 ohms 1/4 watt
R-5 50,000 ohms 1/4 watt
R-6 500,000 ohms vol.
R-7 1 meg. 1/4 watt
R-9 250,000 ohms 1/4 watt
R-10 250,000 ohms 1/4 watt
R-11 Variable
R-12 5000 ohms 1/4 watt
R-13 1 meg. 1/4 watt
R-14 1/2 meg. 1/4 watt
R-15 50,000 ohms 1/4 watt
R-16 400 ohms 1 watt
R-17 25,000 ohms 1/2 watt
R-18 50 ohms 1/2 watt
R-19 20,000 ohms 1/4 watt
R-20 2000 ohms 1/4 watt
R-21 200 ohms 1/4 watt

STANDARD RESISTOR COLOR CODE

BODY	TIP	DOT
0-BLACK	0-BLACK	.0-BLACK
1-BROWN	1-BROWN	0-BROWN
2-RED	2-RED	00-RED
3-ORANGE	3-ORANGE	000-ORANGE
4-YELLOW	4-YELLOW	0000-YELLOW
5-GREEN	5-GREEN	00000-GREEN
6-BLUE	6-BLUE	000000-BLUE
7-PURPLE	7-PURPLE	
8-GREY	8-GREY	
9-WHITE	9-WHITE	

MODEL WR-23, WR-24
Voltage, Socket
Alignment, Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

SERVICE TECHNICAL DATA

SOCKET VOLTAGES

Stage	Tube	Fil.	Plate	Screen	Cathode	Grid
1st Det.	58	2.65	220	40	2.8	--
1st IF	58	2.65	220	95	2.0	--
2nd IF	58	2.65	240	95	2.7	--
Osc.	56	2.65	75	--	0	--
2nd Det.	2A6	2.65	90	--	1.4	25
Output	2A5	2.65	235	240	0	--
Rectifier	80	4.8	---	---	-	--

Bias on 2A5 (across 400 ohms) - 22 volts
Output of rectifier 360 volts

Line volts - 115
Power 60 watts

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed.

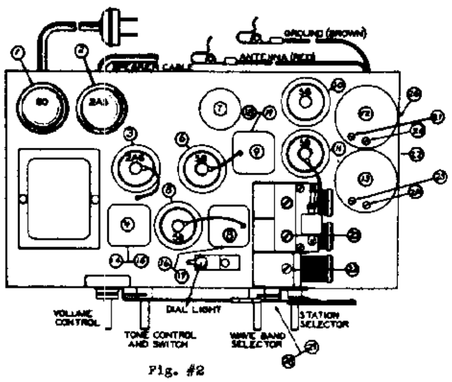


Fig. #2

- #1 type 80 rectifier
- #2 type 2A5 output pentode
- #3 type 2A6 2nd det. A.V.C. and 1st A. F.
- #4 3rd I. F. coil
- #5 type 58 I. F. tube
- #6 type 58 I. F. tube
- #7 Filter condenser
- #8 2nd I. F. coil
- #9 1st I. F. coil
- #10 type 56 osc. tube
- #11 type 58 1st det. tube
- #12 broadcast osc. coil
- #13 2nd band osc. coil
- #14 3rd I. F. trim cond.
- #15 3rd I. F. trim cond.
- #16 2nd I. F. trim cond.
- #17 2nd I. F. trim cond.
- #18 #19 1st I. F. trim cond.
- #20 Broadcast osc. trim cond.
- #21 Broadcast osc. lag. cond.
- #22 #23 Presector trim cond.
- #24 2nd band trim. cond.
- #25 2nd band lag. cond.
- #26 3rd band lag. cond.
- #27 4th band lag. cond.
- #28) 4th band selector trim cond.
- #29) underneath chassis

ALIGNING THE CHASSIS

To properly align the Model WR-23 and 24 chassis, it is essential to use a high grade modulated oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Fig. 2 and should be carefully studied before the actual work is started.

(A) ALIGNING THE I. F. (456 K. C.)

1. Set test oscillator to 456 K. C.
2. Connect test oscillator to grid of second I. F. tube #5 and adjust #14 and #15 to maximum output, reducing test oscillator as required.
3. Connect test oscillator to grid of first I. F. amplifier #9 and adjust #16 and #17 to maximum output.
4. Connect test oscillator to grid of first detector #11 and adjust #18 and #19 to maximum output.
5. Recheck the above four operations for accuracy.

(B) ALIGNING THE R. F.

1. Set test oscillator to 1500 KC and connect to grid of first detector #11. Place pointer of radio to 1.5 mark on dial. Adjust #20 until signal is tuned in. This adjusting screw is usually designated by a red color dot. Having obtained tune at this point set test oscillator to 600 KC and tune station selector to .6 mark on dial. Adjust #21 until the signal is tuned in. Now return to 1500 KC point with set and test oscillator and make the resetting of #20 to obtain accurate adjustment to scale reading.
2. Connect test oscillator to antenna lead, making sure the equivalent (200 mmf) is in the circuit.
3. Continue setting of 1500 KC. Adjust #22 and #23 for maximum output. Check sensitivity and calibration at several points on dial. Set should come correctly to kilocycle settings of important broadcasting stations.

(C) ALIGNING THE 2ND BAND

1. Set test oscillator to 3600 KC and indicator of radio at 3.6 mark on dial.
2. Adjust #24 until signal is tuned in. This trim condenser is usually marked with a red color dot. Set test oscillator at 1600 KC and tune set to 1.6 mark. Adjust #25 to maximum output. Return to 3600 KC and repeat adjustment. In adjusting the 3600 KC point it is possible to obtain two settings for different position of the trim condenser. This denotes merely the plus and minus frequency between oscillator and test oscillator which will give the correct I. F. frequency. The correct setting of the trim condenser is the one wherein the screw is turned furthest out. In any event, an incorrect setting will always be denoted by lack of sensitivity when the set and test oscillator are tuned to 2500 KC (mid-band).

(D) ALIGNING THE 3RD BAND

1. Set test oscillator to 8000 KC marking and tune receiver in region of 8.0 on dial scale. Note when signal is received. Next set test oscillator to 4000 KC setting and tune set to 4.0 on dial scale. Adjust #26 on right side of chassis until signal is heard.
2. Retune set and test oscillator to 8000 KC and observe pointer setting and sensitivity. Slight deviations from calibration can be compensated by manipulating the stiff wires connecting the oscillator coil to switch.

(E) ALIGNING THE 4TH BAND

1. Set test oscillator to 20,000 KC or if this is not available, then adjust to highest possible frequency, which preferably should be at least 15,000 KC. Tune set to this frequency and note where set oscillator is received on dial scale. Then place test oscillator on 10,000 KC and adjust #27 on right of chassis until test oscillator is tuned at 10. on dial scale. Now return both test oscillator and radio set to high frequency. Located underneath the base and adjacent to the switch and high frequency selector coils are two trim condensers #28 and #29 which are used for correct adjustment at this high frequency.

Increase setting of test oscillator until signal generator can be tuned in at two points on dial (say 20 and 19). Then with pointer of set at 20 adjust #28 and #29 for maximum output decreasing test signal as signal becomes better tuned. At correct adjustment a very loud signal will be obtained at 20 on dial while a feeble signal or none at all is observed at 19. This is a practical illustration of the effectiveness of preselection as outlined in the first part of this description.

SERVICE PARTS LIST

PART NUMBER	DESCRIPTION
	MAIN ASSEMBLIES
WR-07200	Chassis assembly
WR-07361	Cabinet assy. (Mod. WR-23)
WR-07364	Cabinet assy. (Mod. WR-24)
WR-05750	Speaker assembly (large)
WR-05576	Speaker assembly (small)
WR-05781	Power transformer
	COILS
WR-05695	1st and 2nd IF coil
WR-05696	3rd IF coil
WR-05684	Oscillator coil (black)
WR-05683	Oscillator coil (green)
WR-05689	Oscillator coil (red)
WR-05687	Oscillator coil (blue)
WR-05690	Preselector coil (black-antenna)
WR-05691	Preselector coil (black-input)
WR-05685	Preselector coil (green)
WR-05686	Preselector coil (red)
WR-05688	Preselector coil (blue)
WR-01858	Field coil
WR-02551	Output transformer
	CONDENSERS
WR-05706	Trimmer condenser
WR-02493	.05 mfd. 2-ply
WR-01143	100 mmf. mica
WR-02499	.5 mfd. 2-ply
WR-06405	.001 mfd. mica
WR-05659	.005 mfd. 3-ply
WR-06277	.01 mfd. 3-ply
WR-02492	.05 mfd. 3-ply
WR-05931	.01 mfd. 4-ply
WR-02494	.1 mfd. 3-ply
WR-06665	Filter condenser

MISCELLANEOUS PARTS

WR-02262	Diaphragm assembly (small)
WR-02263	Diaphragm assembly (large)
WR-98713	Dial lamp
WR-07195	Dial scale
WR-07136	Dial plate
WR-07228	Knobs
WR-05561	Tone control
WR-05562	Volume control
WR-05707	Wave change switch
WR-05118	Dial gear assembly
WR-07072	Variable cond. gang assembly
WR-03424	Long tube shield
WR-06355	Condenser drive disc assembly
WR-C7052	Condenser drive arm assembly
WR-06364	Condenser drive spring
WR-06943	Condenser drive bracket assy.
WR-06946	Cond. drive gear and shaft assy.
WR-07056	Dial indicator link
WR-07063	Indicator
WR-07052	Lever assembly
WR-03199	Dial light bracket assembly
WR-01711	Line cable and plug

RESISTORS

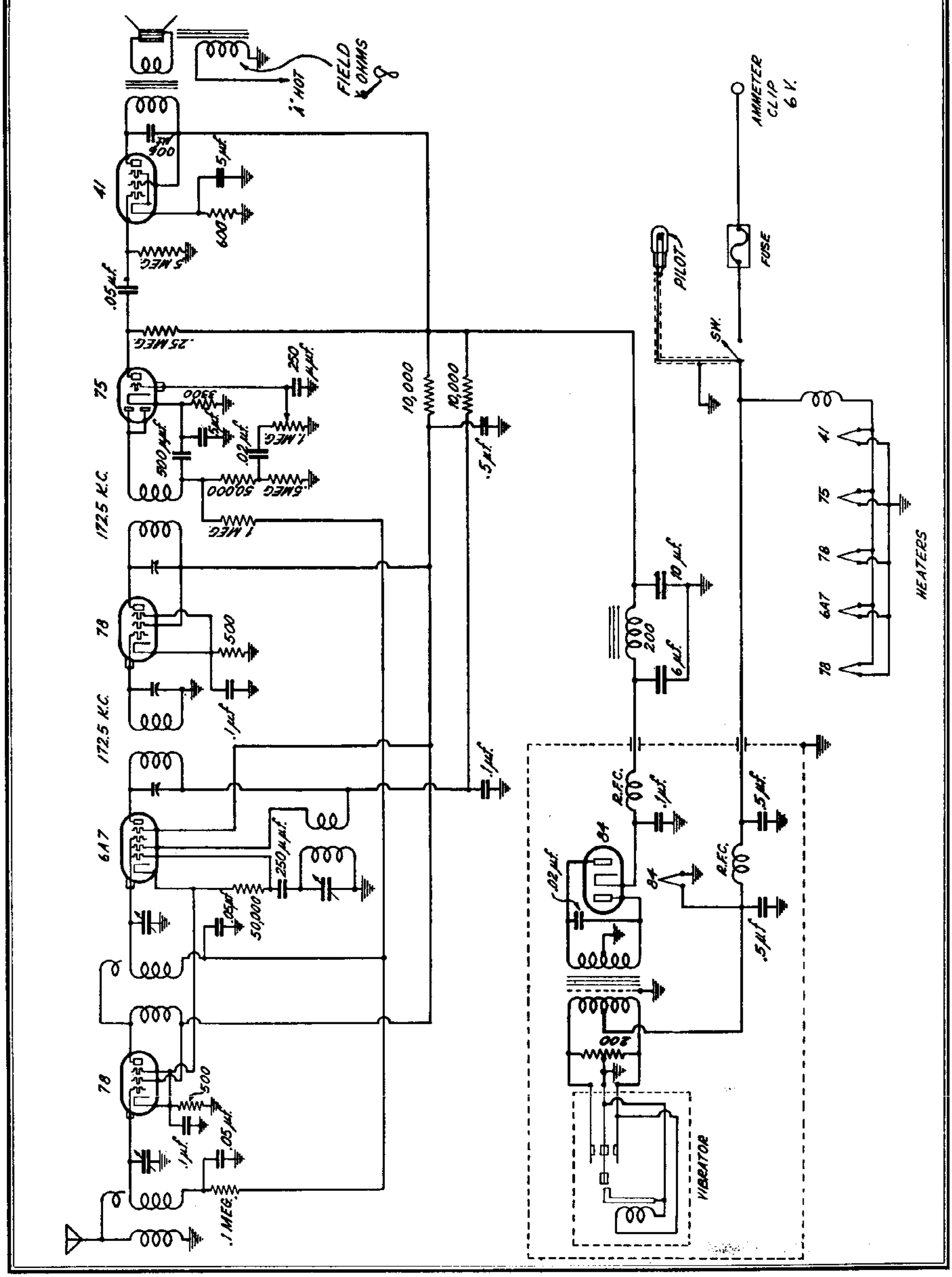
WR-05246	.5 meg. 1/4 W
WR-05267	10,000 1/4 W
WR-04418	Multiple
WR-05267	1000 1/4 W
WR-05278	50000 1/4 W
WR-05281	1 meg. 1/4 W
WR-05279	1/4 meg. 1/4 W
WR-05249	5000 1/4 W
WR-03062	400 1 W
WR-00197	25000 1/2 W
WR-00814	50 1/2 W
WR-05274	20000 1/4 W
WR-05245	2000 1/4 W
WR-05258	200 1/4 W

SOCKETS

WR-03513	6-prong socket
WR-03686	4-prong socket
WR-03514	5-prong socket

MODEL WR-25
Schematic

WESTINGHOUSE ELEC. SUPPLY CO.



MODEL WR-25
Alignment
Voltage,Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

ADJUSTMENTS

The receiver was carefully adjusted and tested by experts at the factory, and should reach the customer in perfect condition. Under no circumstances should these adjustments be disturbed unless it is absolutely necessary as in the repairing of a damaged set. This should be done by an experienced Auto Radio Service man only.

Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ k.c. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two I.F. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

Radio Frequency and Oscillator

To align the R.F. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350-1450 k.c. Set the dial to the frequency selected. Adjust trimmers on the variable condenser beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the R.F. sections may be aligned on broadcast.

Tune in a weak station between 1350 and 1450 k.c. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

Voltage Analysis:

Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

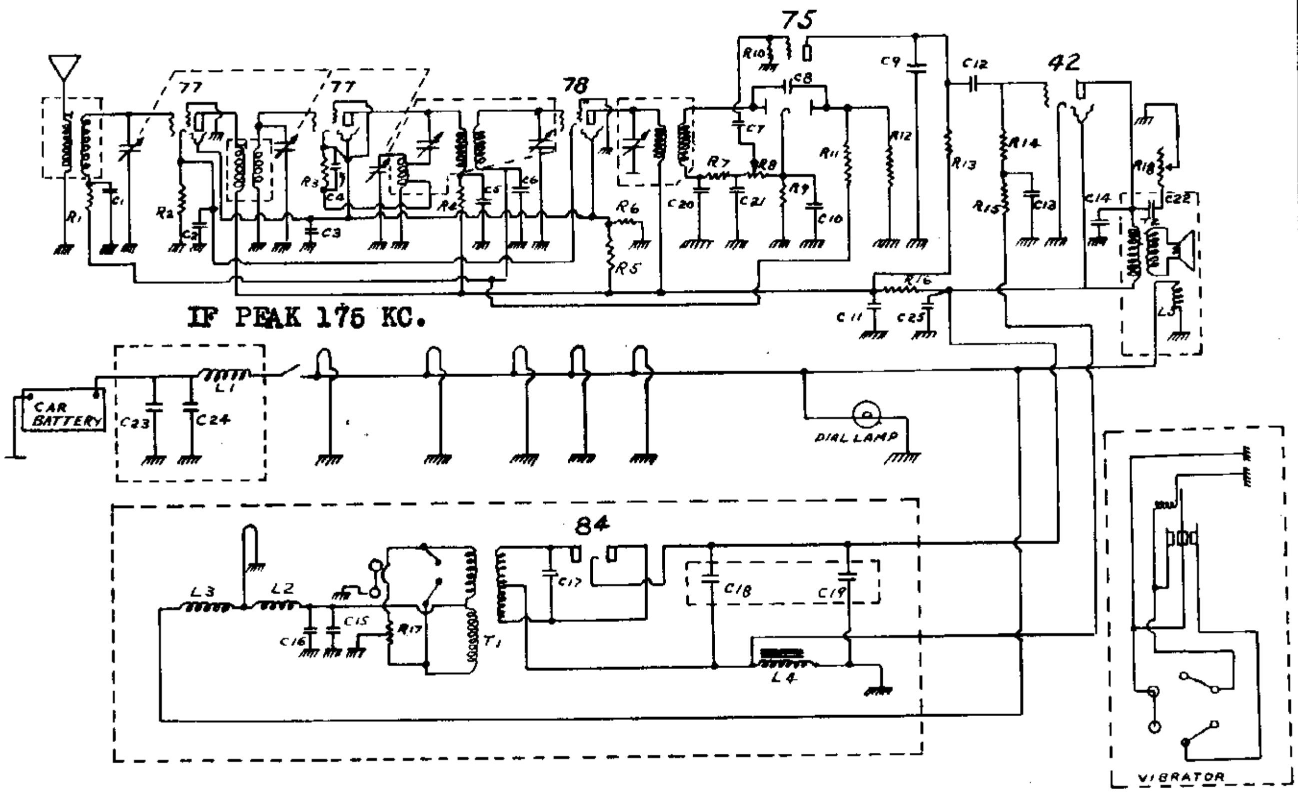
Battery volts—6. Volts across heaters—6 scant. Volts across speaker field—6 scant.

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. plate*
78	110	110	6	6	—
6A7	170	110	6	—	170
75	110	—	1.3	—	—
78	110	110	3.5	3.5	—
41	210	220	15	—	—

Part No.	*Description*
ZT-92	Antenna Coil
ZT-93	Interstage Coil
ZT-94	Composite I.F. and Oscillator Coil
ZT-95	Output I.F. Coil
ZT-99	Power Transformer
ZT-96	"B" Filter Choke
NT-53	"B" R.F. Choke
ZT-98-A	"A" R.F. Choke, multiple layer
ZC-123	Filter Condenser, 10 x 6 mfd.
IC-43	5 Mfd. Electrolytic Condenser
EC-19	.5 Mfd. Tubular Condenser
ZR-104	10,000 Ohm 2 Watt Wire Wound Resistor
	Any Carbon Resistor
	Any Mica Condenser
	Any Socket
KL-6	Pilot Light Bulb
WR-92	Volume control, complete with switch
ZV-3	Vibrator
ZS-66	Speaker
NZ-54	Spark Plug Suppressor
NZ-54-A	Distributor Suppressor
NZ-55	Generator Condenser

WESTINGHOUSE ELEC. SUPPLY CO.

SERVICE INSTRUCTIONS
WESTINGHOUSE MOTOR CAR RADIO
MODEL WR-26



ELECTRICAL VALUES

C1 .05 mfd. 2 ply
C2 .25 mfd. 2 ply
C3 .25 mfd 2 ply
C4 .002 mfd. 4 ply
C5 .05 mfd. 3 ply
C6 .05 mfd. 2 ply
C7 .005 mfd. 3 ply
C8 100 mmfd. mica
C9 .002 mfd. 4 ply
C10 .5 mfd. 2 ply
C12 .005 mfd. 3 ply
C13 .1 mfd. 2 ply
C14 .005 mfd. 3 ply
C15 .5 mfd. 2 ply
C16 .5 mfd. 2 ply
C17 .02 mfd. 4 ply
C18 6. mfd.
C19 10. mfd.
C20 10 mmfd. mica
C21 100mmfd. mica
C22 .05 mfd. 3 ply
C23 .001 mica
C24 .5 mfd. 2 ply
C25 .001 mica

R1 100,000 ohms 1/4 W.
R2 500 ohms 1/4 W.
R3 7500 ohms 1/4 W.
R4 2000 ohms 1/4 W.
R5 40,000 ohms 1/4 W.
R6 75,000 ohms 1/4 W.
R7 50,000 ohms 1/4 W.
R8 1/2 meg. Vol. Control
R9 5000 ohms 1/4 W.
R10 1 meg. 1/4 W.
R12 1/2 meg. 1/4 W.
R13 100,000 ohms 1/4 W.
R14 250,000 ohms 1/4 W.
R15 250,000 ohms 1/4 W.
R16 4,000 ohms 1 W.
R17 200 Center tapped
R18 1/2 meg. Tone Control
T1 Power Trans.
T2 Output Trans.
L1 Filter Choke
L2 Filter Choke
L3 Filter Choke
L4 Power Choke
L5 Field Coil

MODEL WR-26 SOCKET VOLTAGES
(Car Battery 6 Volts Under Load)

Tube	Use	Fil.	Plate	Screen	Cathode	Bias
77	RF	5.3	179	79	2.9	
77	Det. Osc.	5.3	178	79	4.3 to 8.4	
78	IF	5.3	179	79	2.9	
75	2nd Det. AVC	5.3	113			
42	AF	5.3	201	217	1.2	13.0

The above readings were taken from ground or metal of chassis to socket terminals and will vary slightly with different types of voltmeters used.

MODEL WR-26
Socket, Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

Alignment Data

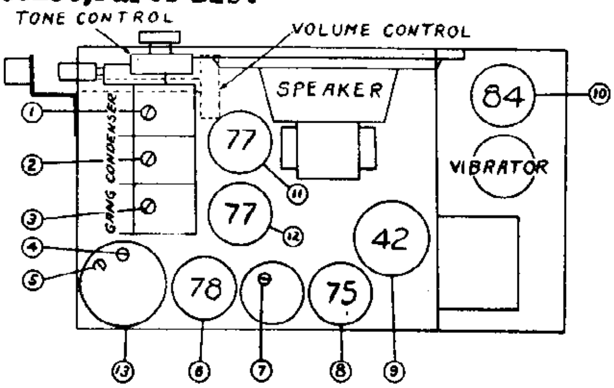


Fig. #2

#1 RF Trimmer Condenser
#2 1st Det. Trimmer Cond.
#3 Osc. Trimmer Condenser
#4) #5) 1st IF Trimmer Cond.
#6 IF Amplifier
#7 2nd IF Trimmer Cond.
#8 2nd Det. AVC & AF Amplifier
#9 Power Output
#10 Rectifier
#11 RF Amplifier
#12 Det. and Osc.
#13 1st IF & Osc.Coil

All of the adjustable condensers commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless a coil or I. F. transformer is changed or the adjustments have been tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a high-grade test oscillator and output meter is available, then proceed as follows:

1. Connect output meter across voice coil of speaker.
2. Set volume control on full.
3. Set tone control to bass position.
4. Connect dial light.

(A) I. F. Adjustment

1. Connect a .1 mfd. condenser in series with antenna lead of test oscillator.
2. Set test oscillator to 175 K. C.
3. Connect test oscillator to grid of 1st I. F. tube #6 (see Fig. #2) and adjust #7 to maximum output.
4. Connect test oscillator to grid of 1st Det. #12 and adjust condensers #4 and 5 to maximum output.
5. Repeat the above adjustments for accuracy.

(B) Oscillator Adjustment

1. Set test oscillator to 1500 K. C.
2. Connect test oscillator leads to grid of 1st Det. #12.
3. Set gang condenser to 1500 K. C. as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to the thickness of a thin cardboard strip or approximately .015".
4. Peak oscillator condenser #3 on end of gang.

(C) R. F. Adjustment

1. Set test oscillator to 1400 K. C.
2. Change antenna condenser in oscillator lead from .1 mfd. to .0002 mfd., and connect test oscillator to antenna lead of set.
3. Set condenser gang at 1400 K. C.
4. Peak condensers #1 and 2 on gang.
5. Do not touch oscillator trimmer #3 at 1400 K. C. setting of gang.

SERVICE PARTS LIST WR-26 MOTOR CAR RADIO

RESISTORS

	Ohms	Body	Tip	Dot
WR-05277	75,000	Purple	Green	Orange
WR-05251	40,000	Yellow	Black	Orange
WR-05245	2,000	Red	Black	Red
WR-05247	7,500	Purple	Green	Red
WR-05279	250,000	Red	Green	Yellow
WR-05249	5,000	Green	Black	Green
WR-05281	1 meg.	Brown	Black	Green
WR-05278	100,000	Brown	Black	Yellow
WR-05276	50,000	Green	Black	Orange
WR-05246	500,000	Green	Black	Yellow
WR-05264	500	Green	Black	Brown
WR-06531	4,000	Yellow	Black	Red
WR-06527	Resistor strip assembly			
WR-06537	Mid tap resistor			

CONDENSERS

WR-06558	Electrolytic cond.-power pack.
WR-06680	Variable condenser assembly...
WR-06536	Condenser- power pack base ...
WR-06526	Condenser assembly block .....
WR-06560	Condenser in can ....
WR-06600	Condenser & choke assembly ...
WR-02493	Condenser .05 - 2 ply ....
WR-06417	Condenser .0001 mfd. mica ....
WR-99650	Condenser .001 mfd. mica .....
WR-03659	Condenser .005 - 3 ply ....

Part No.	Description of Parts
WR-03852	Condenser .002 4 ply ....
WR-02497	Condenser .25 2 ply ....
WR-02499	Condenser .5 2 ply ....
WR-02496	Condenser .25 3 ply ....
WR-02495	Condenser .1 2 ply ....
WR-03775	Condenser .001 mica ....
WR-02492	Condenser .05 3 ply- speaker .
WR-06560	Condenser- power pack base ...
WR-03864	Condenser .002 4 ply ....
WR-03660	Condenser .005 3 ply ....
WR-02303	Condenser .05 3 ply ....
WR-02508	Condenser .1 3 ply ....
WR-01883	Condenser .25 2 ply ....
WR-02322	Condenser .5 2 ply ....
WR-02386	Condenser .25 3 ply ....

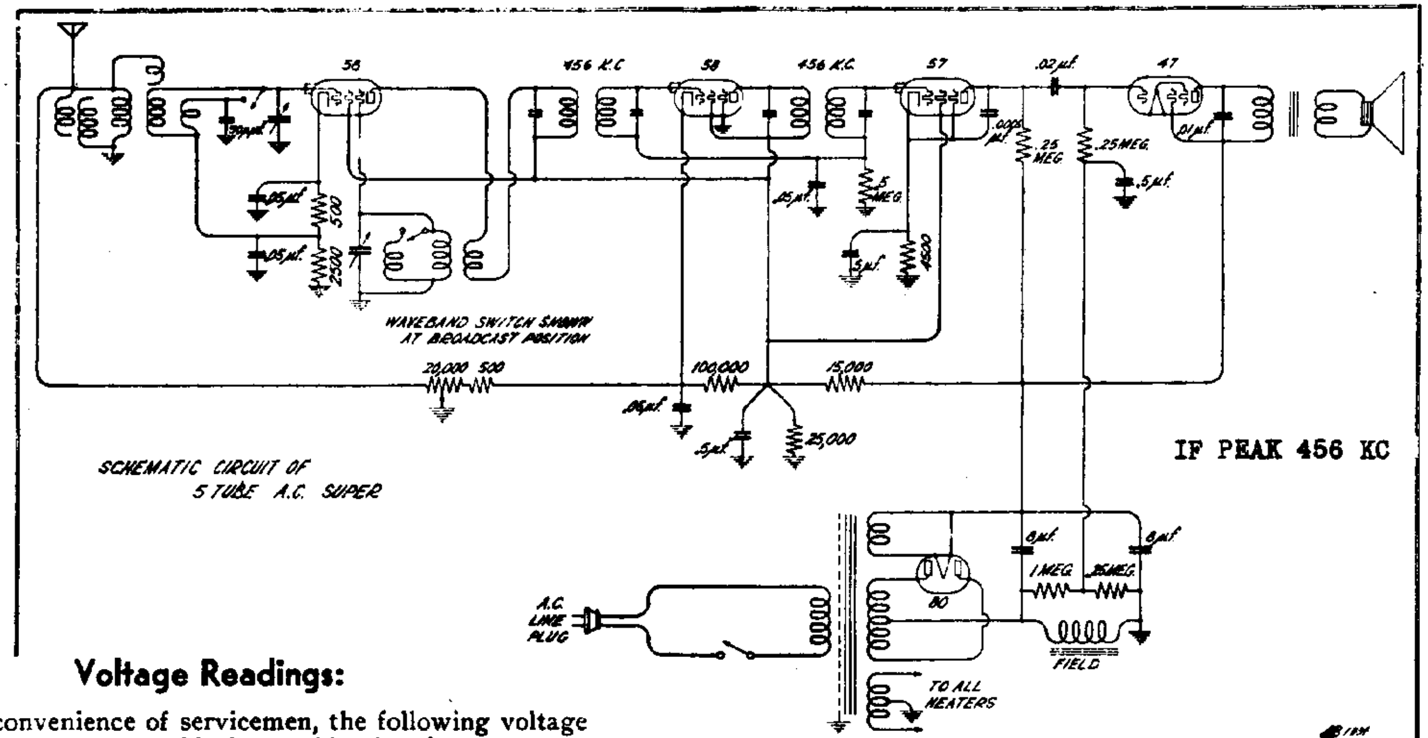
COILS

WR-05824	Choke coil- power pack ....
WR-05452	R.F. choke coil - power pack..
WR-06523	Oscillator coil assembly .....
WR-04580	I. F. coil assembly-chassis ..
WR-06519	Antenna coil assembly ....
WR-06518	R.F. coil assembly ....
WR-06713	Speaker field coil ....

TRANSFORMERS

WR-06535	Transformer- power pack ......
WR-06618	Output transformer ....
WR-07053	Iron core filter choke ....

WESTINGHOUSE ELEC. SUPPLY CO.



Voltage Readings:

For the convenience of servicemen, the following voltage readings will serve as a guide in trouble shooting.

Readings are to be taken with all the tubes in their places, volume control turned on full and antenna wire grounded to chassis.

The D.C. Voltmeter used should be 1000 ohms per volt, or over. Line volts 117 A.C.

	Fil.	Ground to Plate	Ground to Screen	Ground to Cathode	Ground to Suppressor
58 Osc. 1st Det.	2.4 A.C.	80 D.C.	80 D.C.	2. D.C.	....
58 Osc. I. F. Amplifier	2.4 A.C.	80 D.C.	80 D.C.	11. D.C.	....
57 2nd Det.	2.4 A.C.	75 D.C.	80 D.C.	4.5 D.C.	4.5 D.C.
47 Output	2.4 A.C.	245 D.C.	255 D.C.	....	....
80 Rectifier	5.0				

Voltage across speaker field, 90.

Above voltages were taken with a high resistance voltmeter of 1000 ohms per volt and may vary somewhat with different sets and with the resistance of the voltmeter.

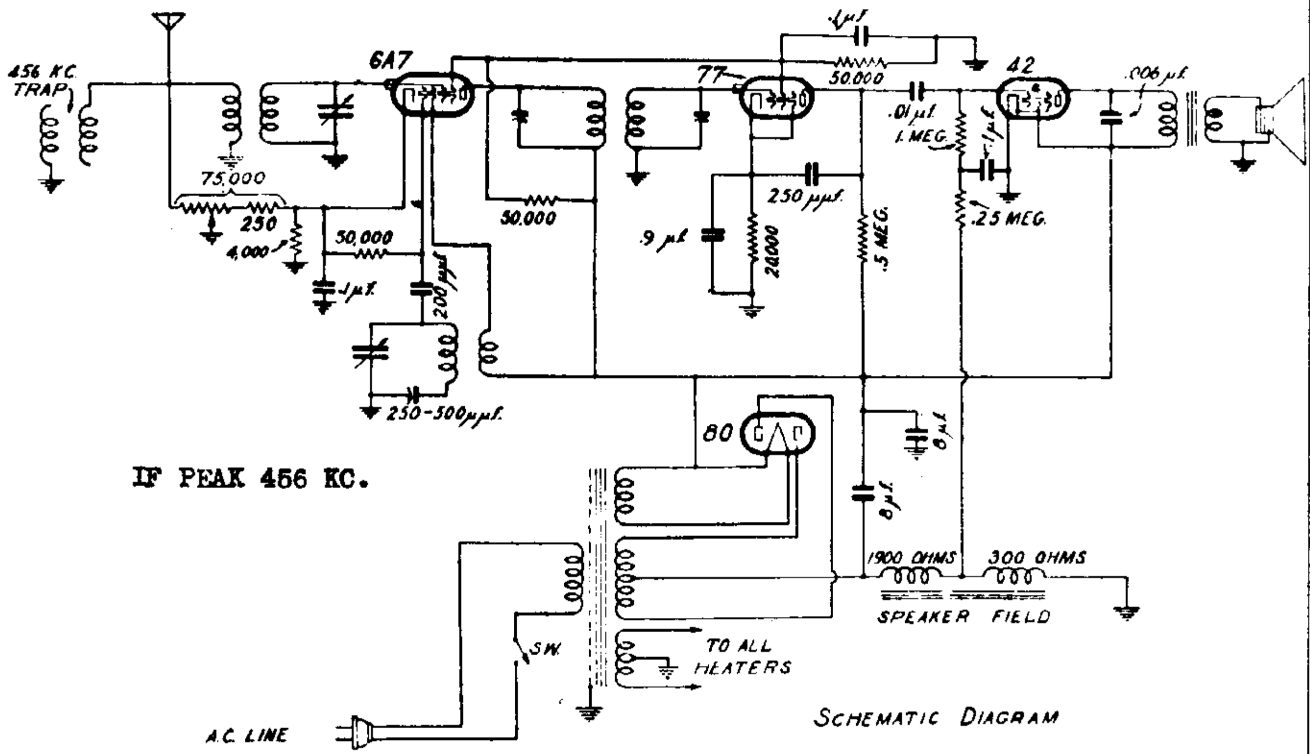
FIVE-TUBE BROADCAST AND SHORT-WAVE SUPERHETERODYNE

110-120 Volts . . A.C. . . 60 Cycles

Broadcast	Short Wave
540—1500 Kilocycles	1500—3000 Kilocycles
550— 200 Meters	200— 100 Meters

MODEL WR-27
Schematic
Voltage

WESTINGHOUSE ELEC. SUPPLY CO.



IF PEAK 456 KC.

SCHEMATIC DIAGRAM

VOLTAGE READINGS

Readings of voltages should be taken with the Volume Control turned on fully (all the way to the right). D-C, measurements must be read with a high resistance voltmeter (1000 ohms per volt) and an A-C. voltmeter must be used on the a-c. circuit readings.

The d-c. voltages are measured from the points indicated to ground.

TUBE	PLATE	ANODE GRID	CONTROL GRID	SCREEN GRID	SUPPR. GRID	CATHODE
6A7	214	214	-	62	-	2
77	70	-	-	62	4	4
42	194	-	-13*	215	-	-
80	-	-	-	-	-	-

* Measured from ground to tap on speaker field winding

Voltage across field, 100 volts d-c.
Voltage across '80 filament, 5 volts a-c.
Voltage across all other heaters or filaments, 6.2 volts a-c.
The above voltages, with minor variations, should be obtained with an a-c. line input of 117.5 volts.

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR-28, WR-29
Voltage, Socket
Alignment Data

SERVICE TECHNICAL DATA

SOCKET VOLTAGES

Stage	Tube	Filament	Plate	Screen	Cathode
Rectifier	80	4.85	382		
Power Output	42	6.1	234	245	18
2nd Detector	75	6.1	126		0.87
1st I.F.	6D6	6.1	245	99	5.6
2nd I.F.	6D6	6.1	245	96	5.6
Oscillator	6A7	6.1	236-136	87	4.7

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed. Line voltage = 112.

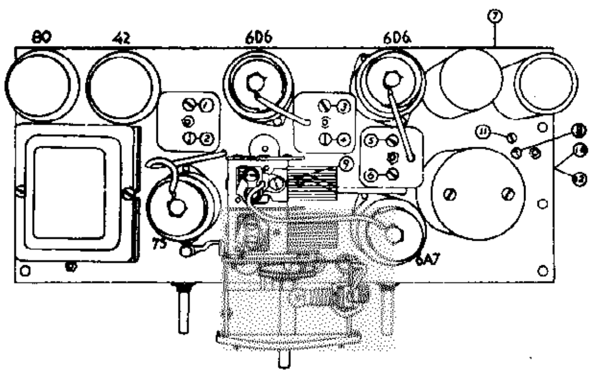


Figure #1

#1 I. F. trimmer condenser
#2 I. F. trimmer condenser
#3 I. F. trimmer condenser
#4 I. F. trimmer condenser
#5 I. F. trimmer condenser
#6 I. F. trimmer condenser
#7 Wave trap tuning condenser
#8 B. B. oscillator trim condenser
#9 Selector trim condenser
#10 B. B. oscillator lag. condenser -top screw
#11 S. W. B. oscillator trim condenser
#12 S. W. B. oscillator lag. condenser (bottom screw)

CIRCUIT DESCRIPTION

The Models WR-28-29 are six tube, dual wave-band receivers, designed to operate over the frequency ranges from 1570 to 540 kilocycles and 15,500 to 5,700 kilocycles. The circuits comprise an R. F. selector circuit, a combination first detector oscillator, two stages of intermediate frequency amplification (456 KC) with double tuned circuits coupling each stage, a combination second detector, A.V.C. and first audio stage, a power output stage and a rectifier tube.

The wave change switch serves to change the electrical circuits to the wave band desired and in addition operates to illuminate the particular dial scale in use.

ALIGNING THE CHASSIS

To properly align the Models WR-28-29 chassis, it is essential to use a high grade modulated oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be very weak or it will cause the A. V. C. to function making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align the chassis, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Fig. #1 and should be carefully studied before the actual work is started.

A- I. F. ADJUSTMENT

1. Set test oscillator to 456 K. C.

2. Connect A. C. voltmeter (output meter) across voice coil of speaker.

3. Connect test oscillator to grid of 2nd I.F. tube (6D6 in rear of condenser gang) and frame of chassis.

4. Adjust #1 and #2 to maximum output on output meter.

5. Connect test oscillator to grid of 1st I.F. tube (6D6 - rear right hand tube).

6. Adjust #3 and #4 to maximum output.

7. Connect test oscillator to grid of 1st detector (6A7).

8. Adjust #5 and #6 to maximum output.

This completes the I. F. adjustment.

B - R. F. ADJUSTMENT
(Broadcast Band)

1. Connect test oscillator to antenna and ground leads. Set wave change switch to broadcast band position as indicated by the dial light. Set station selector to 540 K. C.

2. With test oscillator still adjusted to 456 K. C., increase signal strength of test oscillator until signal is heard in loud speaker.

3. Adjust #7 (through small hole in right hand rear panel of chassis) until signal disappears or goes through a null. If signal disappears, increase signal output from test oscillator and readjust #7 until a definite minimum is obtained. The purpose of this adjustment is to correctly adjust a wave trap installed to block direct transmission of 456 K. C. (usually ship telegraph signals) from antenna to first detector.

4. Set test oscillator and station selector to 1400 K. C.

MODEL WR-28, WR-29
Schematic
Alignment, Part 2

WESTINGHOUSE ELEC. SUPPLY CO.

5. Adjust #8 to maximum output.

6. Adjust #9 to maximum output.

7. Set test oscillator and station selector to 600 K. C.

8. Adjust #10 to maximum output (top screw)

9. Set test oscillator and station selector to 1400 K. C. and readjust #8 and #9 for correct calibration.

C - R. F. ADJUSTMENT (Short Wave Band)

1. Set wave change switch to short wave band position.

2. Set test oscillator and station selector to 15,000 K. C.

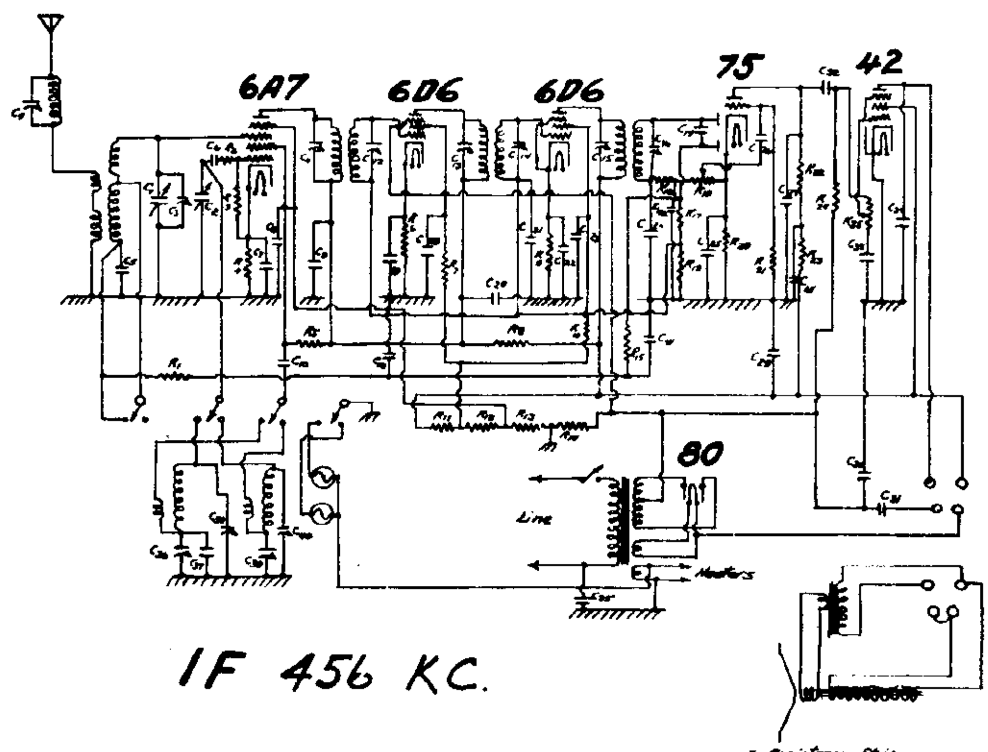
3. Adjust #11 until signal is tuned in.

4. Adjust R. F. trimmer condenser (mounted underneath chassis on R. F. coil) to maximum output.

5. Set test oscillator and station selector to 6000 K. C.

6. Adjust #12 to maximum output (bottom screw)

7. Set test oscillator and station selector to 15,000 K. C. and readjust #11 and R. F. trimmer underneath chassis for correct calibration. This completes the lining up process.

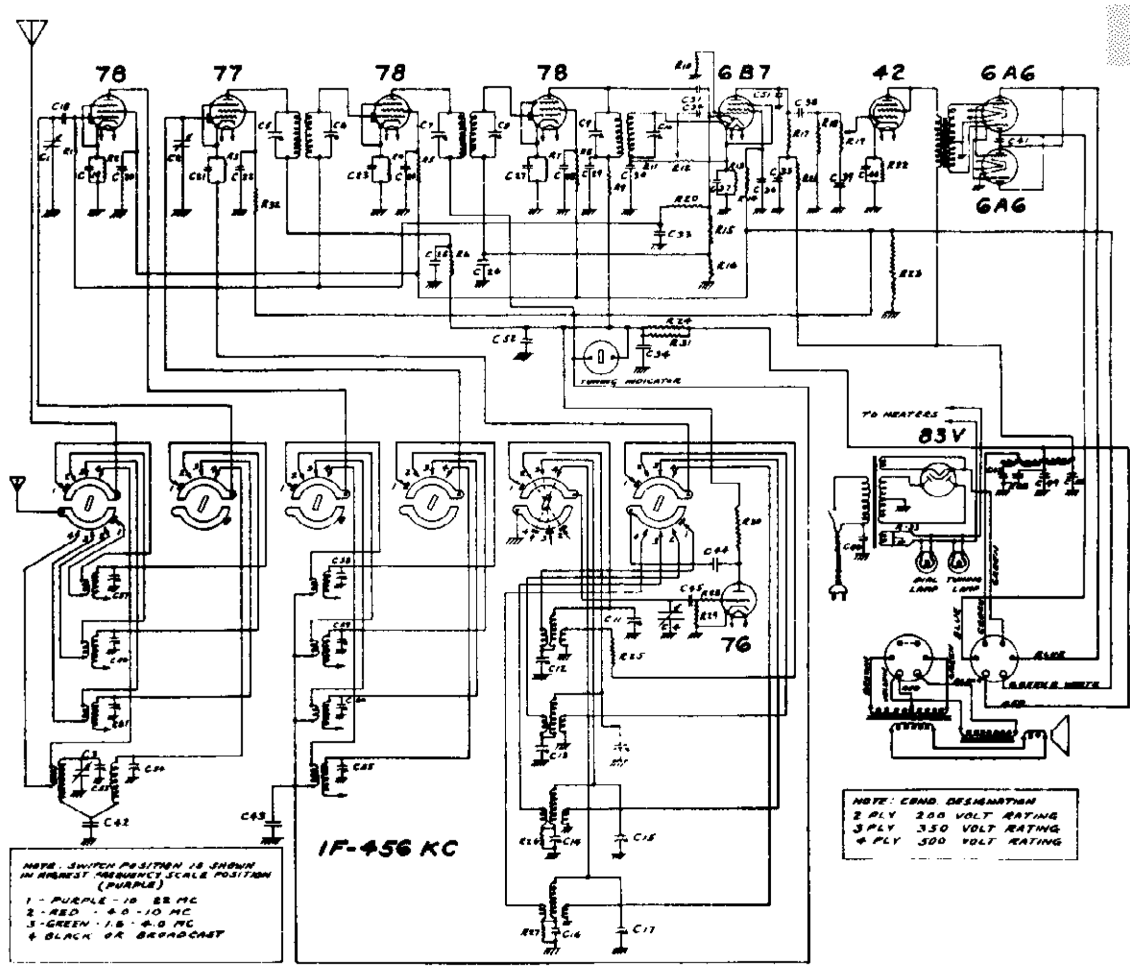


SCHEMATIC WIRING DIAGRAM

ELECTRICAL VALUES

C-1	Var. gang with trimmer	C-24	.0001 mica	R-3	50,000 ohms 1/4 watt
C-2	Var. gang with trimmer	C-25	.5 - 2 ply	R-4	500 ohms 1/4 watt
C-3	Var. gang with trimmer	C-26	.005 - 3 ply	R-5	20,000 ohms 1/2 watt
C-4	600 mmf. variable	C-27	.001 - 4 ply	R-6	1,000 ohms 1/4 watt
C-5	.05 mf - 2 ply	C-28	8 - electrolytic	R-7	5,000 ohms 1/4 watt
C-6	.0001 mica	C-29	4 - electrolytic	R-8	1,000 ohms 1/4 watt
C-7	.05 - 2 ply	C-30	20- electrolytic	R-9	1,000 ohms 1/4 watt
C-8	.05 - 2 ply	C-31	8 - electrolytic	R-10	5,000 ohms 1/4 watt
C-9	.05 - 3 ply	C-32	.005 - 3 ply	R-11	11,200 ohms
C-10	.02 - 3 ply	C-33	.001 - 4 ply	R-12	1,800 ohms
C-11	I.F. coil	C-34	.01 - 4 ply	R-13	12,000 ohms
C-12	I.F. coil	C-35	.01 - 4 ply	R-14	300 ohms
C-13	I.F. coil	C-36	425 mmf. variable	R-15	1 meg - 1/4 watt
C-14	I.F. coil	C-37	1500 mmf. mica	R-16	50,000 ohms - 1/4 watt
C-15	I.F. coil	C-38	Trimmer condenser	R-17	1 meg - 1/4 watt
C-16	I.F. coil	C-39	425 mmf. variable	R-19	.5 meg. variable
C-17	.0001 mica	C-40	Trimmer condenser	R-20	2,000 ohms 1/4 watt
C-18	.05 - 2 ply	C-41	.05 - 3 ply	R-21	1 meg. 1/4 watt
C-19	.05 - 2 ply	C-42	.0001 - mica	R-22	75,000 ohms - 1/4 watt
C-20	.05 - 2 ply	C-43	.05 - 3 ply	R-23	50,000 ohms - 1/4 watt
C-22	.05 - 2 ply	C-44	4-40 mmf. variable	R-24	.25 meg. 1/4 watt
C-23	.05 - 2 ply	R-1	.1 meg. 1/4 watt	R-25	.25 meg. variable
		R-2	50 ohms 1/4 watt		

WESTINGHOUSE ELEC. SUPPLY CO.



SCHEMATIC WIRING DIAGRAM

ELECTRICAL VALUES

C-1 Variable condenser
C-2 Variable condenser
C-3 Variable condenser
C-4 Variable condenser
C-5 I.F. coil
C-6 I.F. coil
C-7 I.F. coil
C-8 I.F. coil
C-9 I.F. coil
C-10 I.F. coil
C-11 7-70 mmf.
C-12 1000-2000 mmf.
C-13 500-1000 mmf.
C-14 400-800 mmf.
C-15 3-40 mmf.
C-16 270-600 mmf.
C-17 7-70 mmf.
C-18 100 mmf. mica
C-19 .05 - 2 ply
C-20 .05 - 2 ply
C-21 .05 - 2 ply
C-22 .05 - 2 ply
C-23 .05 - 2 ply
C-24 .05 - 3 ply
C-25 .005 - 3 ply
C-26 .05 - 2 ply
C-27 .05 - 2 ply
C-28 .05 - 3 ply
C-29 .005 - 3 ply
C-30 100 mmf. mica
C-31 100 mmf. mica
C-32 .005 - 3 ply
C-33 .05 - 2 ply
C-34 4 mfd. electrolytic
C-35 4 mfd. electrolytic
C-36 .5 - 2 ply
C-37 .5 - 2 ply
C-38 .005 - 3 ply
C-39 .001 - 4 ply
C-40 20 mfd. 25 V.
C-41 .005 - 3 ply
C-42 .05 - 2 ply
C-43 .02 - 3 ply
C-44 .02 - 3 ply
C-45 100 mmf. mica
C-46 .01 - 4 ply
C-47 8 mfd. electrolytic
C-48 4 mfd. electrolytic
C-49 4 mfd. electrolytic
C-50 8 mfd. electrolytic
C-51 .001 - 4 ply
C-52 .1 - 3 ply
C-53 Variable condenser gang
C-54 4-25 mmf.
C-55 4-25 mmf.
C-56 4-25 mmf.
C-57 7-70 mmf.
C-58 7-70 mmf.
C-59 4-25 mmf.
C-60 4-25 mmf.
C-61 4-25 mmf.
R-1 1/2 meg. 1/4 watt
R-2 300 ohms 1/4 watt
R-3 5,000 ohms 1/4 watt
R-4 1,000 ohms 1/4 watt
R-5 5,000 ohms 1/4 watt
R-6 1,000 ohms 1/4 watt
R-7 1,000 ohms 1/4 watt
R-8 5,000 ohms 1/4 watt
R-9 1,000 ohms 1/4 watt
R-10 1 meg. 1/4 watt
R-11 50,000 ohms 1/4 watt
R-12 1/2 meg. volume control
R-13 2,000 ohms 1/4 watt
R-14 50,000 ohms 1/4 watt
R-15 1 meg. 1/4 watt
R-16 250,000 ohms 1/4 watt
R-17 50,000 ohms 1/4 watt
R-18 250,000 ohms 1/4 watt
R-19 1/4 meg. tone control
R-20 1 meg. 1/4 watt
R-21 100,000 ohms 1/4 watt
R-22 2,500 ohms 1/2 watt
R-23 1,800 ohms 30 watt
R-24 5,000 ohms 1 watt
R-25 100 ohms 1/4 watt
R-26 5,000 ohms 1/4 watt
R-27 2,000 ohms 1/4 watt
R-28 50 ohms 1/4 watt
R-29 20,000 ohms 1/4 watt
R-30 20,000 ohms 1 watt
R-31 5,000 ohms 1 watt
R-32 5,000 ohms 1/4 watt
R-33 Mid tap resistor

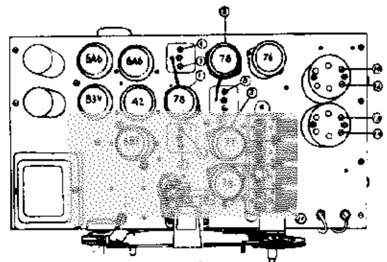
MODEL WR-30
Voltage, Socket
Alignment Data
Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

SERVICE TECHNICAL DATA

Stage	Tube	Filament	Plate	Screen	Cathode
Rectifier	83V	5.0			340
Audio power output	6A6	6.0	305		
Audio power output	6A6	6.0	305		
Audio driver	42	6.0	280	280	30
2nd Det., AVC, 1st audio	6B7	6.0	12	55	3.8
I.F. amplifier	78	6.0	240	100	4.5
I.F. amplifier	78	6.0	250	100	4.5
R.F. amplifier	78	6.0	240	100	2.5
1st Detector	77	6.0	240	100	4.5
Oscillator	76	6.0	95		

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed. Line voltage - 115.



#1 2nd I.F. tube
#2 1st I.F. tube
#3 1st detector tube
#4 I.F. trimmer condenser
#5 I.F. trimmer condenser
#6 I.F. trimmer condenser
#7 I.F. trimmer condenser
#8 I.F. trimmer condenser
#9 I.F. trimmer condenser
#10 B.B. oscillator trim. condenser (Red code)
#11 B.B. preselector trim. condenser
#12 B.B. oscillator lag. condenser
#13 2nd band oscillator trim. condenser (Green code)
#14 2nd band oscillator lag. condenser

SERVICE PARTS LIST - WR-30

Part No.	Description
	MAIN ASSEMBLIES
WR-07685	Chassis assembly
WR-07594	Speaker
WR-07698	Cabinet
	COILS
WR-07494	I.F. coil assembly #1
WR-07495	I.F. coil assembly #2
WR-07496	I.F. coil assembly #3
WR-07504	Choke coil assembly
WR-03554	Choke coil assembly
WR-07481	Oscillator coil assembly (Broadcast)
WR-07482	Oscillator coil assembly (Green band)
WR-07483	Oscillator coil assembly (Red band)
WR-07484	Oscillator coil assembly (Blue band)
	CONDENSERS
WR-07682	Variable condenser assembly
WR-07510	Condenser assembly - electrolytic
WR-07516	Condenser assembly - electrolytic
WR-07530	Trimmer condenser assembly
WR-03800	Trimmer condenser assembly
WR-07529	Trimmer condenser assembly
WR-07615	Condenser assembly - buffer
WR-06386	Condenser .05 - 2 ply
WR-02499	Condenser .05 - 2 ply
WR-06417	Condenser .0001 mica
WR-06403	Condenser .01 - 3 ply
WR-03659	Condenser .005 - 2 ply
WR-02504	Condenser .02 - 3 ply
WR-02494	Condenser .1 - 3 ply

RESISTOR

Part No.	Ohms	Body	Tip	Dot
WR-07508	Resistor strip assembly			
WR-07509	Resistor strip assembly			
WR-05278	10,000	Brown	Black	Orange
WR-05276	50,000	Green	Black	Orange
WR-05267	1,000	Black	Black	Red
WR-05249	5,000	Green	Black	Red
WR-05281	1 meg.	Brown	Black	Green
WR-05245	2,000	Red	Black	Red
WR-07572	5,000	Green	Black	Red
WR-05260	300	Orange	Black	Brown
WR-07614	100	Brown	Black	Brown
WR-05274	20,000	Red	Black	Orange
WR-02345	20,000	Red	Black	Orange
WR-07726	50	Green	Black	Black
WR-01423	2,500	Red	Green	Red
WR-05279	250,000	Red	Green	Yellow

Part No.	Description
	TUBE SOCKETS & TUBE SHIELD
WR-03514	Tube socket - 5 prong
WR-03513	Tube socket - 6 prong
WR-05694	Tube socket - 7 prong
WR-03686	Tube socket - 4 prong
WR-03424	Tube shield - long
WR-03257	Tube shield - short
WR-05624	Tube socket - 7 prong
	MISCELLANEOUS PARTS
WR-07105	Power transformer
WR-07584	Tone control
WR-07565	Volume control
WR-07506	Switch assembly (wave change)
WR-07708	Dial lamp bracket assembly
WR-06809	Dial lamp
WR-07640	Knob - tone control switch
WR-07643	Knob - large for variable condenser
WR-07641	Knob - small for variable condenser
WR-07642	Knob - volume control
WR-05952	Antenna cable assembly
WR-01711	Cable assembly - line
WR-07564	Input transformer
WR-07583	Resistance
WR-07636	Dial scale assembly
WR-07630	Indicator dial scale
WR-07627	Guide - dial scale
WR-07136	Dial plate
WR-07647	Indicator plate
WR-07683	Tuning indicator

A - ALIGNING THE I.F. (456 KC)

1. Set test oscillator to 456 KC.

2. Connect output meter across voice coil of speaker.

3. Connect test oscillator to grid of 2nd I.F. tube (#1).

4. Adjust #4 and #5 to maximum output as indicated on output meter.

5. Connect test oscillator to grid of 1st I.F. tube (#2).

6. Adjust #6 and #7 to maximum output.

7. Connect test oscillator to grid of 1st detector tube (#3).

8. Adjust #8 and #9 to maximum output.

B - ADJUSTMENT OF BROADCAST OR 1st BAND

Note: Because of set sensitivity it is difficult to make an accurate R.F. adjustment unless the set sensitivity is reduced. This is easily accomplished by cutting out the amplification of an I. F. stage. To do this, remove grid clip on tube #1, and connect to this tube the grid clip previously connected to tube #2. Remove tube #2 from its socket.

1. Set test oscillator and station selector to 1400 KC.

2. Connect test oscillator to grid of 1st detector tube (#3).

3. Adjust #10 (Red color coded) until signal is tuned in.

4. Connect test oscillator to antenna and ground leads of chassis.

5. Adjust #11 and the two alignment condensers underneath the chassis located directly in front of the small shield containers housing the broadcast selector coils, until signal is correctly tuned in.

6. Set test oscillator and station selector to 600 KC.

7. Adjust #12 to maximum output.

8. Return to 1400 KC setting and readjust #10 for correct calibration.

C - ADJUSTMENT OF 2nd BAND

1. Adjust wave change switch to 2nd band position and set station selector to 3600 KC.

2. Set test oscillator to 3600 KC.

3. Adjust #13 (Green color coded) until signal is tuned in.

4. Adjust trim condensers, located underneath chassis and mounted on the small coils at the extreme right end, to maximum output.

5. Set test oscillator and station selector to 1800 KC.

6. Rotate #14 until signal is at maximum.

7. Return test oscillator and station selector to 3600 KC setting and readjust #13 for correct calibration.

D - ADJUSTMENT OF 3rd BAND

1. Set wave change switch to 3rd band position and set test oscillator and station selector to 9000 KC. On bottom of chassis fastened to the back plate is the 3rd band oscillator coil in its shield container. This coil is directly in back of the wave change switch. A Green wire twisted around a Green and White wire will be noticed. This twist serves to make the slight adjustment necessary to bring this band to correct calibration. If set is not on calibration, an increase or decrease of the twist will serve to readjust the calibration. This adjustment will serve for about one-half a scale division either way. If set is initially off more than this, it indicates a serious fault in the oscillator circuit such as poor or incorrect connections, open resistor, defective oscillator tube or other major fault.

Assuming that the correction can be made, the set is now placed on its proper marking and adjustment is made of the preselector trim condensers for this wave band. These condensers are two in number and are mounted integral with the preselector coils. The coils are part of the main switch assembly and are located between the 2nd band (furthest left on under side) and the highest frequency selector coils which are located under the isolantite trim condensers.

2. Adjust test oscillator and station selector to 5000 KC setting.

3. Adjust 3rd band lagging condenser to maximum output. This condenser is located on the back plate to the right of the 3rd band oscillator coil mentioned above.

4. Return to 9000 KC setting and check the previous setting.

E - ADJUSTMENT OF 4th BAND

1. Set wave change switch to the 4th band position and adjust test oscillator and station selector to 20,000 KC.

2. Adjust oscillator trim condenser (lower left hand unit on back of chassis) for maximum output.

3. Then adjust trim condensers for further maximum output. These condensers are two isolantite base units mounted integral with the switch assembly.

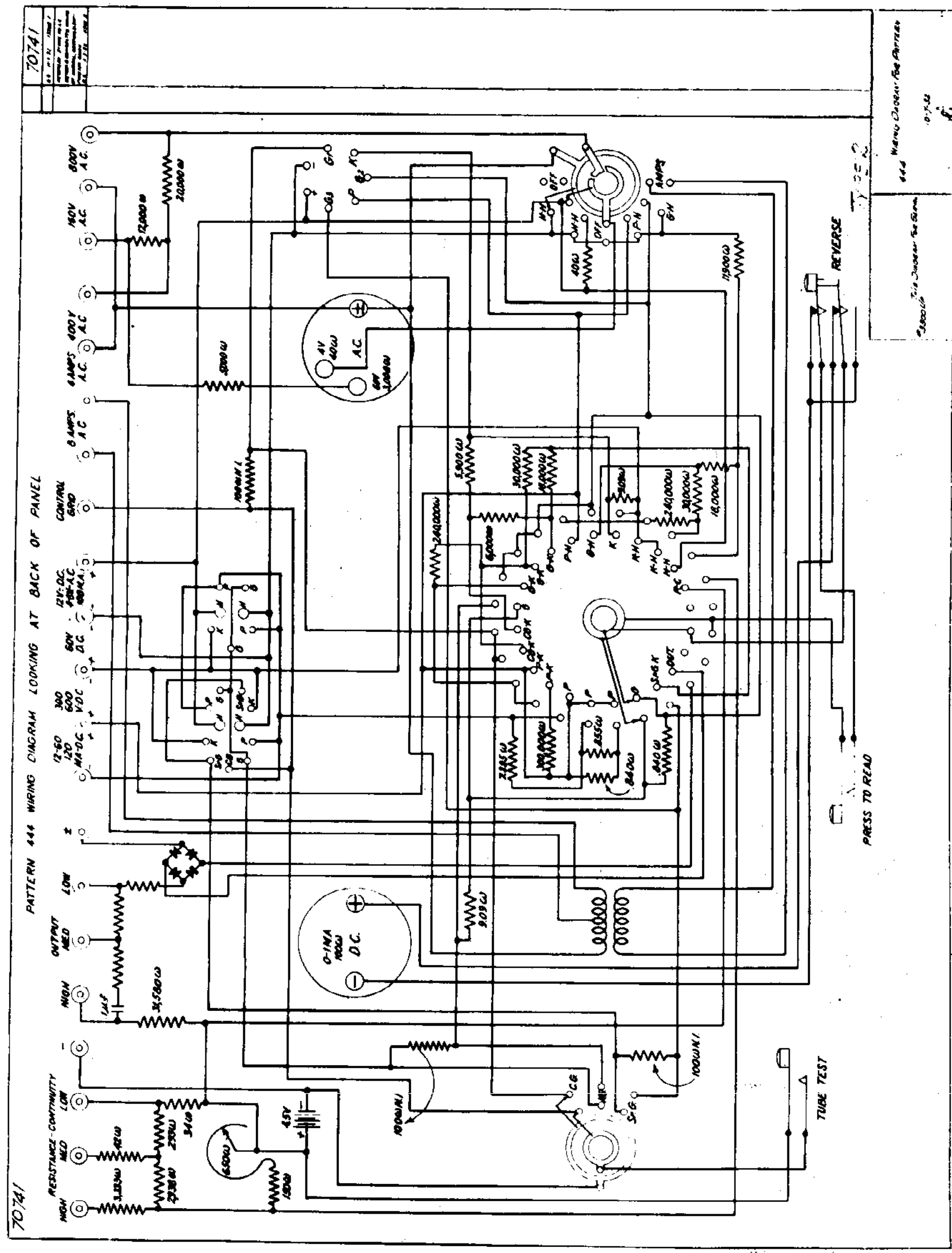
4. Set test oscillator and station selector to 12,000 KC.

5. Adjust oscillator lag condenser (upper left hand corner of rear plate) until signal is tuned in.

6. Return test oscillator and station selector to 20,000 KC and check setting.

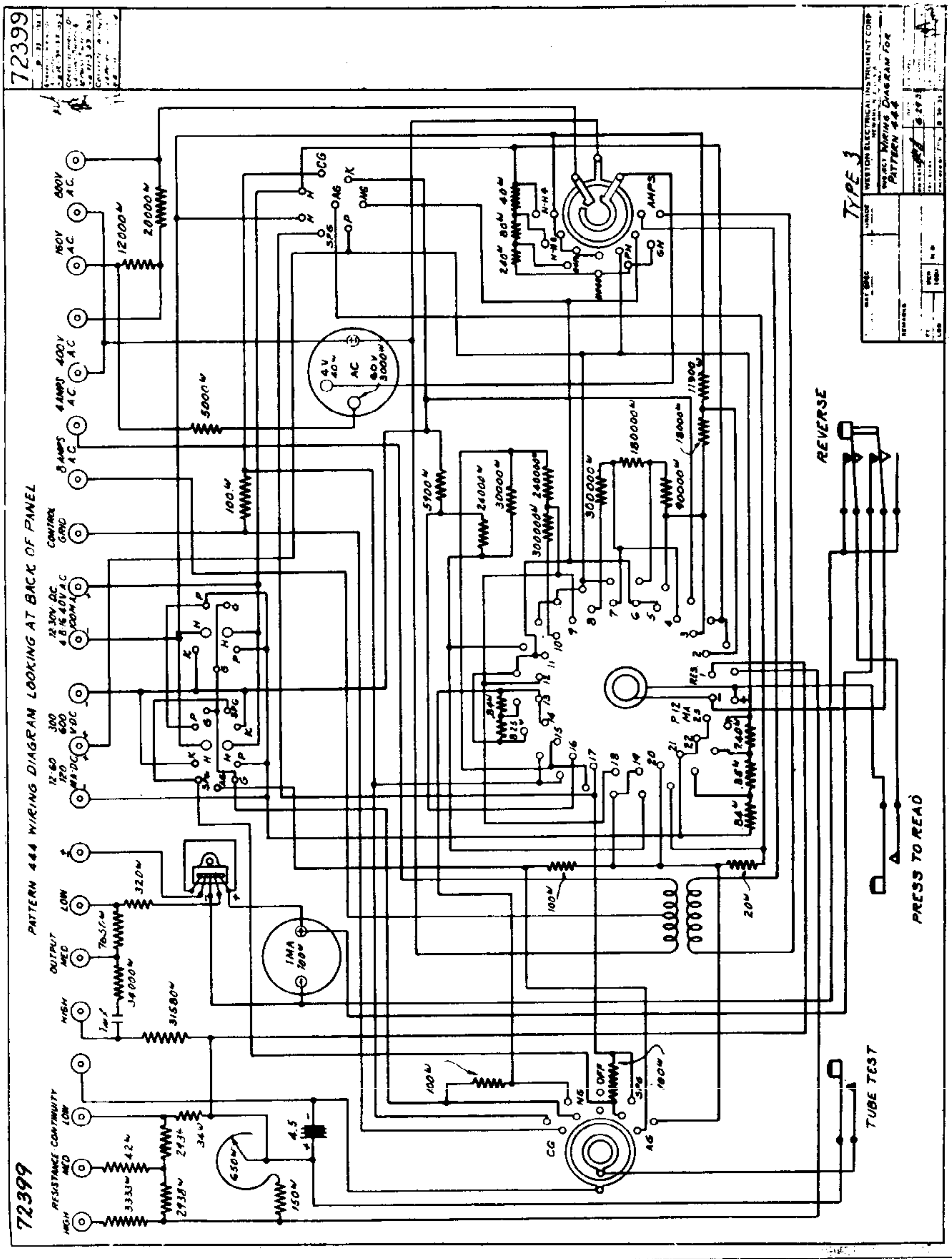
MODEL 444
Type 2
Schematic

WESTON ELECTRICAL INSTRUM'T CORP.



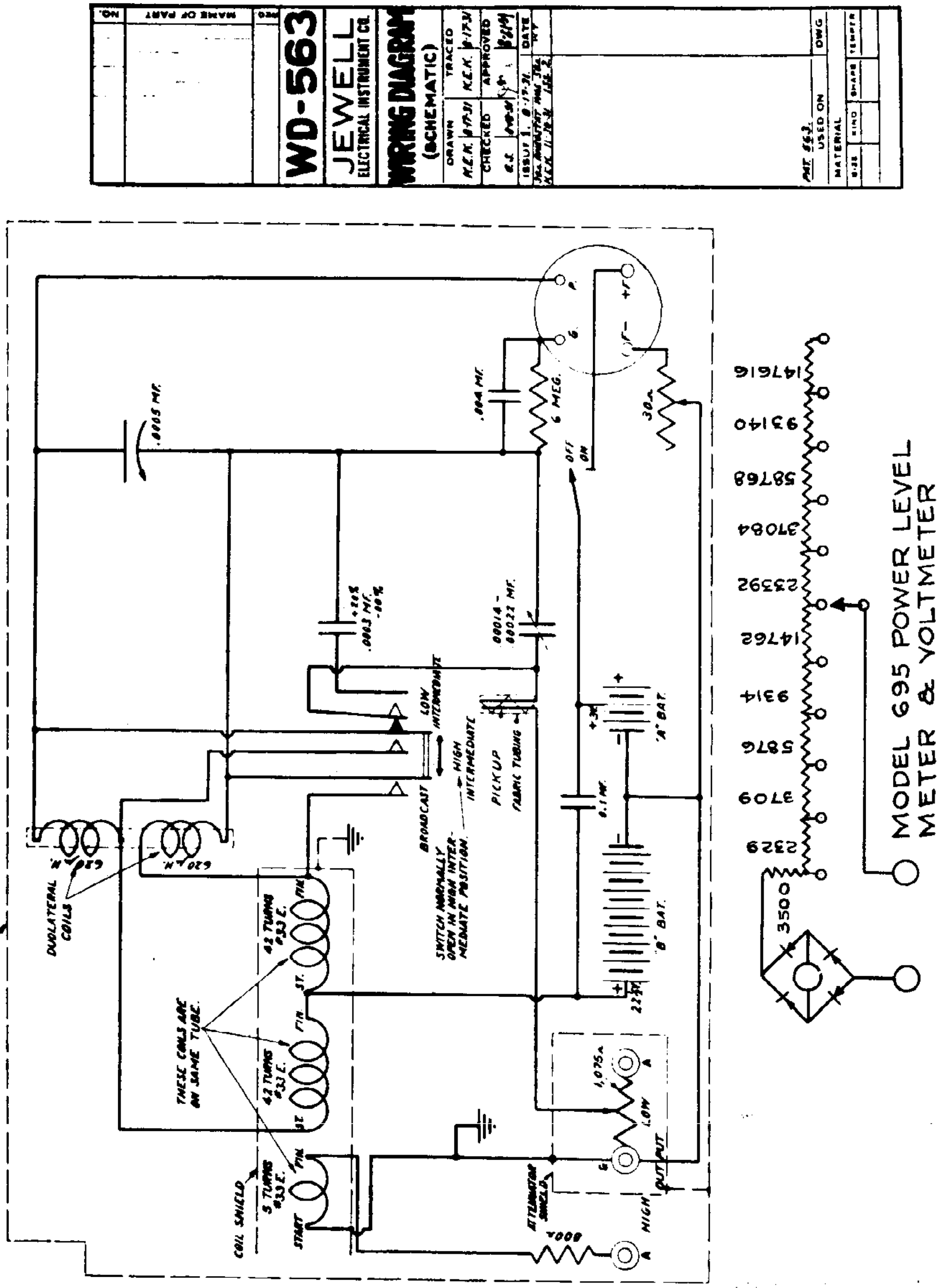
MODEL 444
Type 3
Schematic

WESTON ELECTRICAL INSTRUM'T CORP.



MODEL 563 (Type 2)
MODEL 695
Schematics

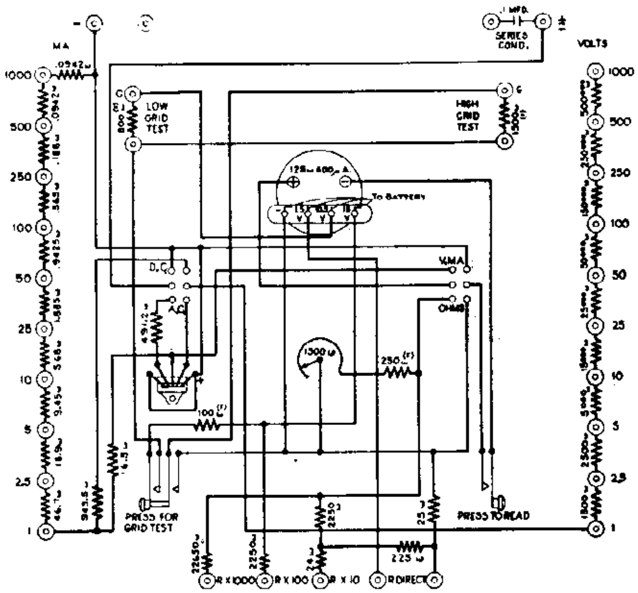
WESTON ELECTRICAL INSTRUM'T CORP.

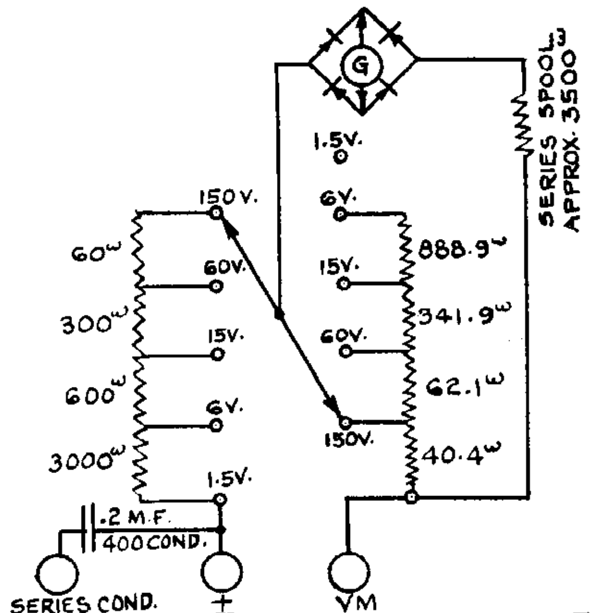


MODEL 571
MODEL 665
Schematics

WESTON ELECTRICAL INSTRUMENT CORP.

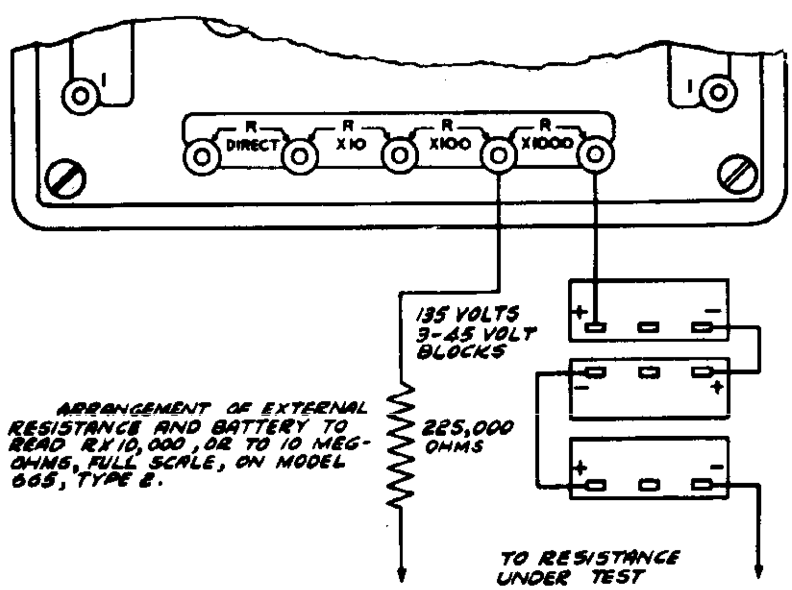
INTERNAL CONNECTION DIAGRAM
OF
MODEL 665 TYPE 2 SELECTIVE ANALYZER





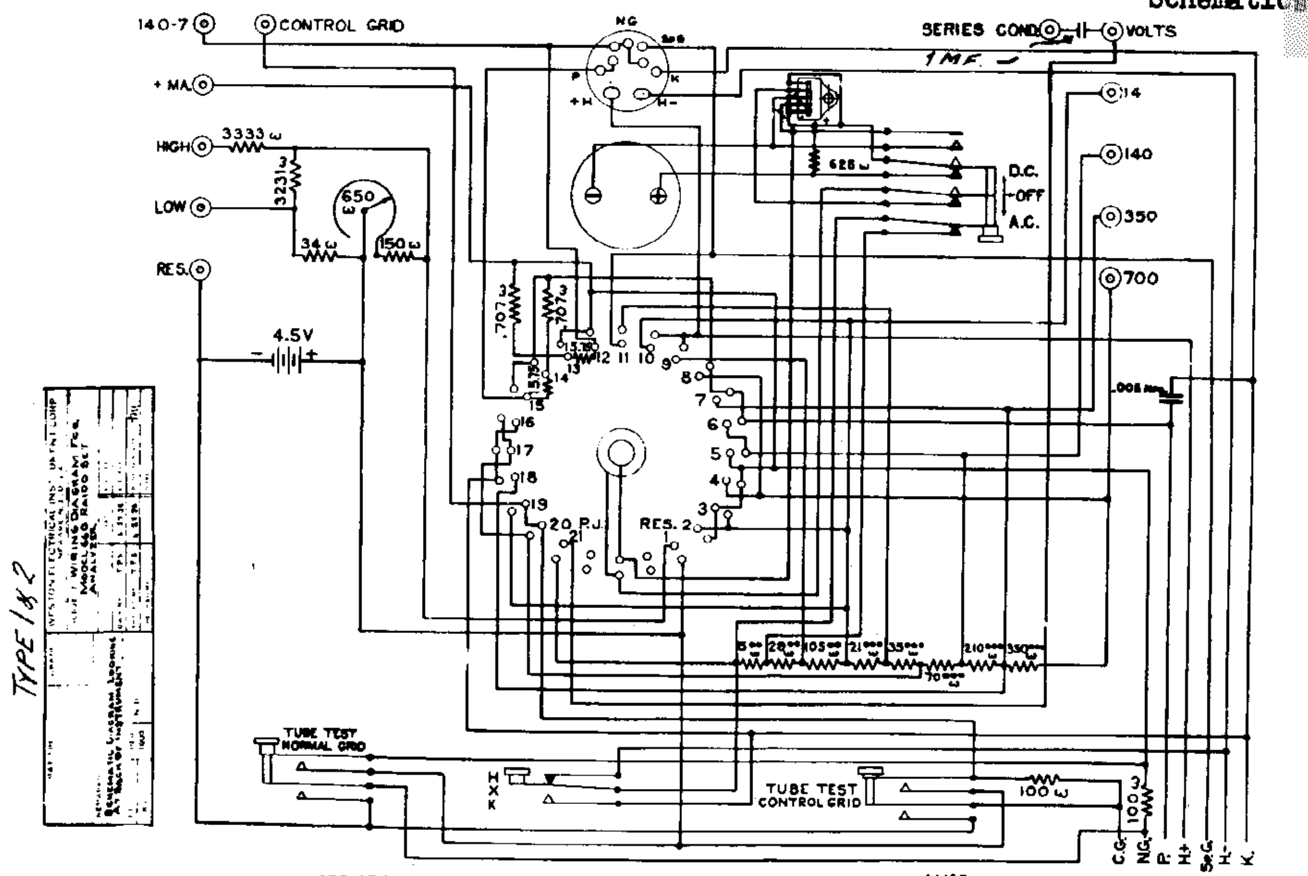
MODEL 571 OUTPUT METER

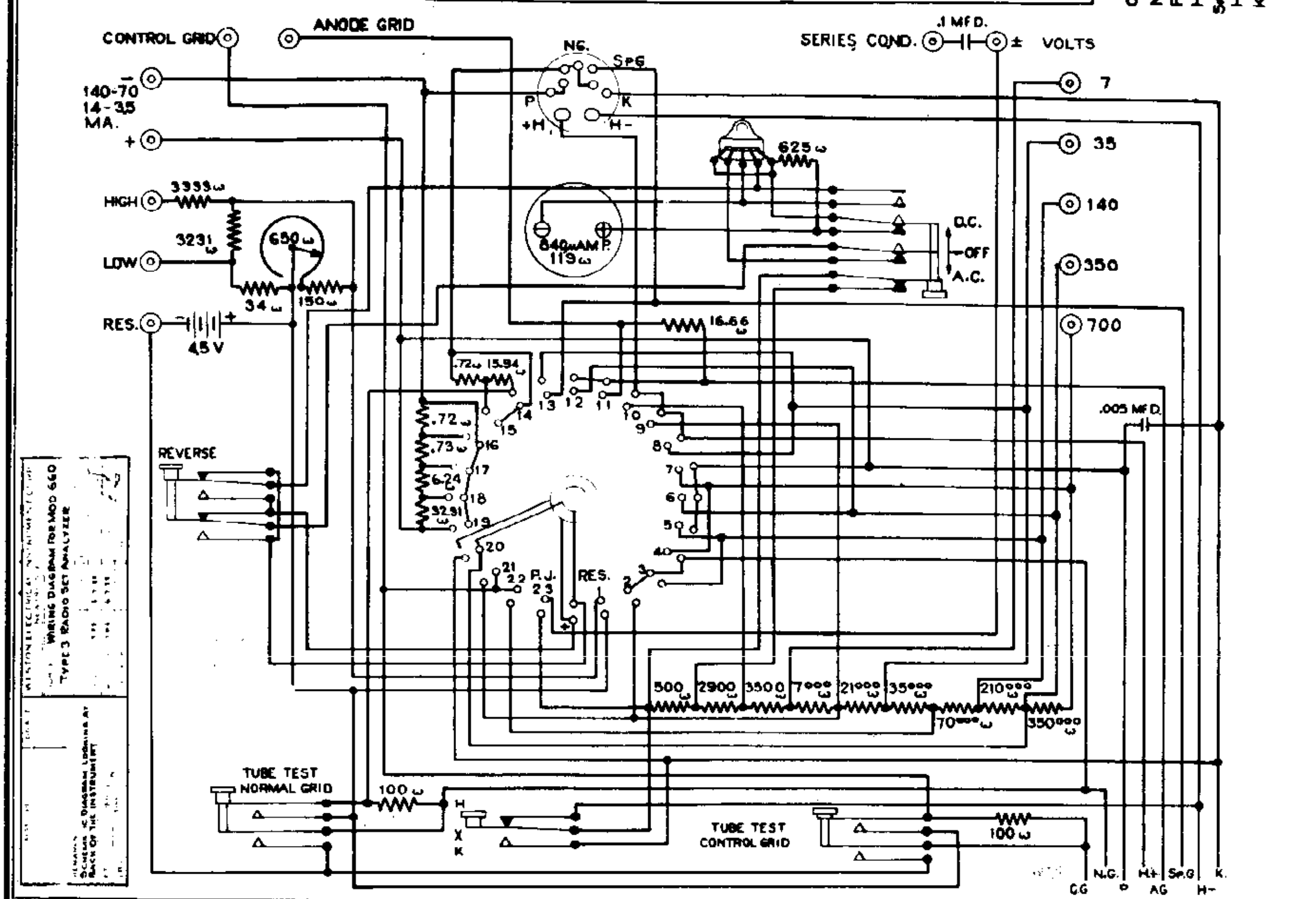
PROCEDURE FOR INCREASING RESISTANCE RANGE TO 10 MEGOHMS



WESTON ELECTRICAL INSTRUM'T CORP.

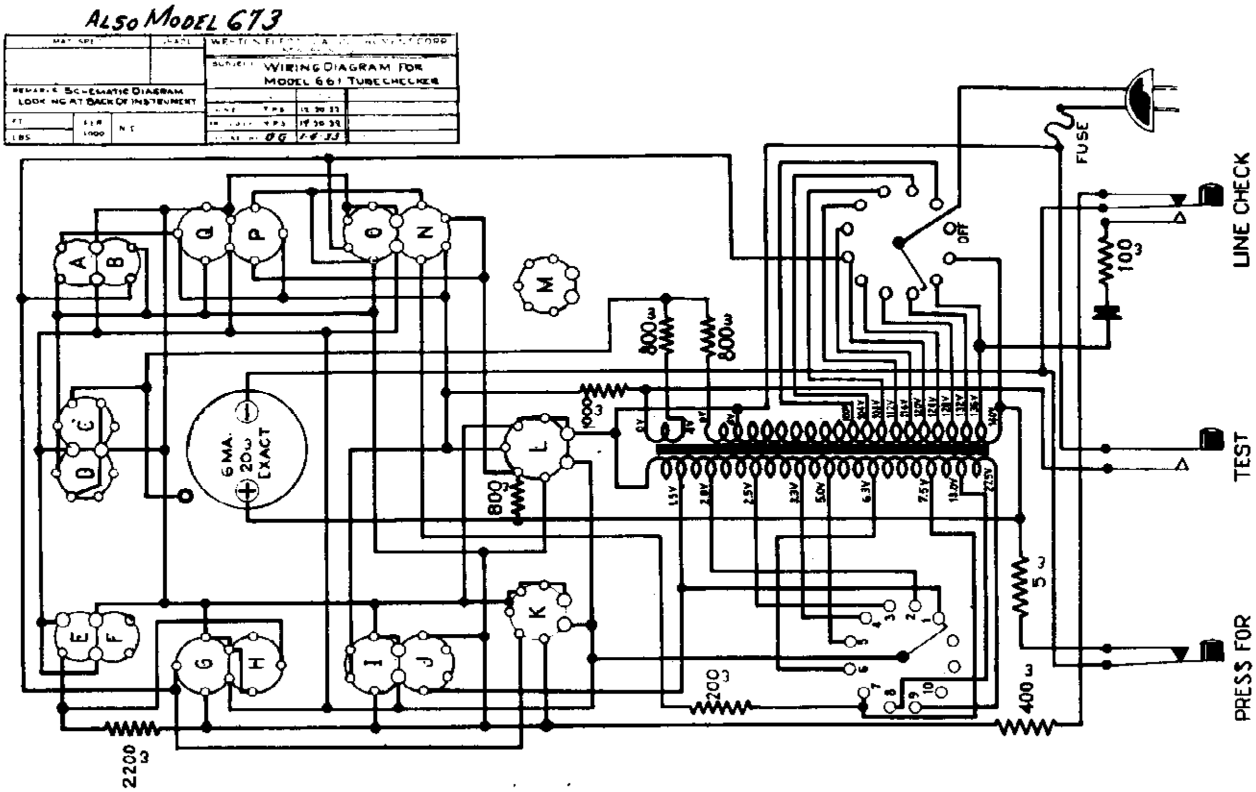
MODEL 660
Type 3
Schematics

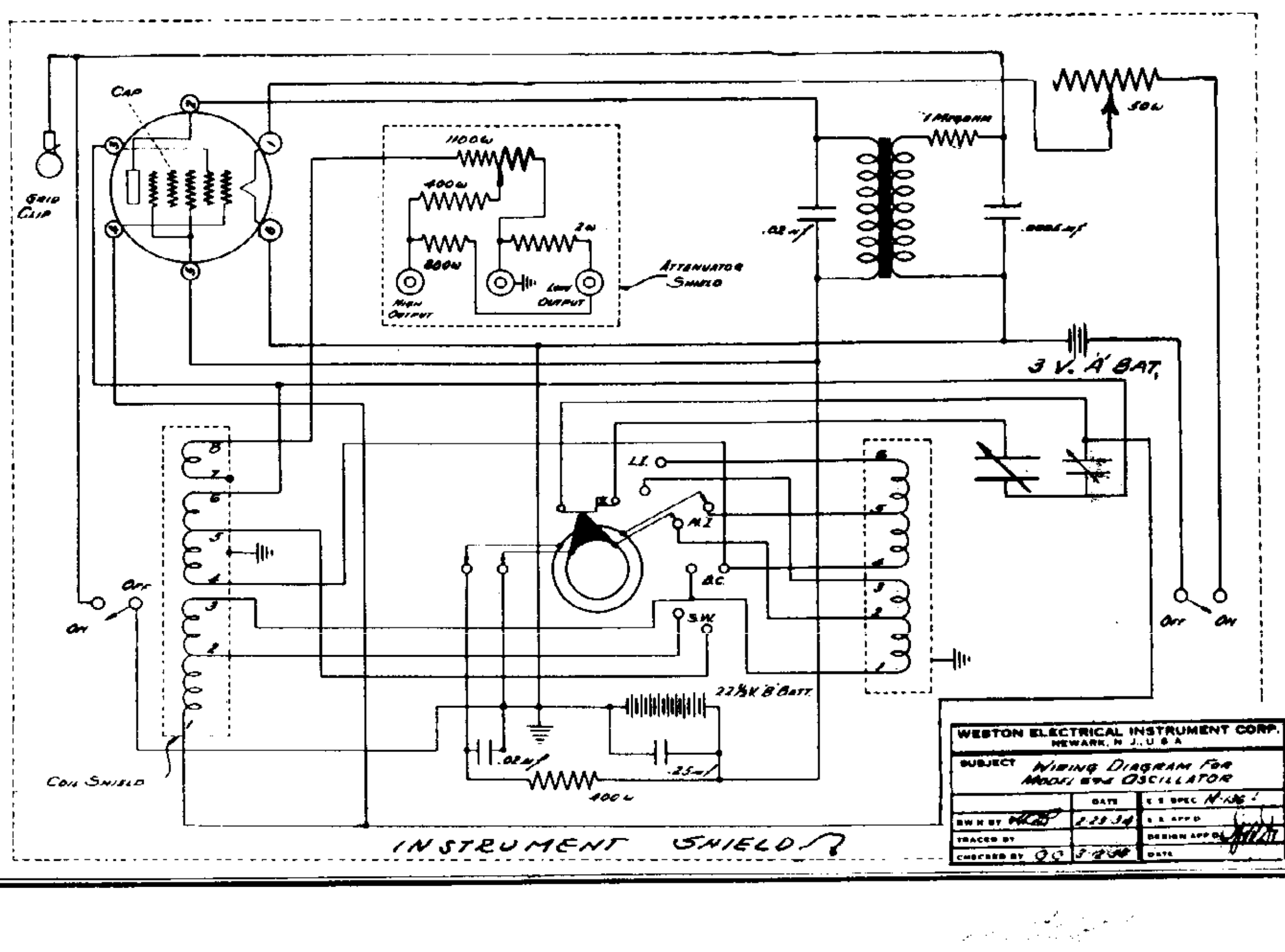




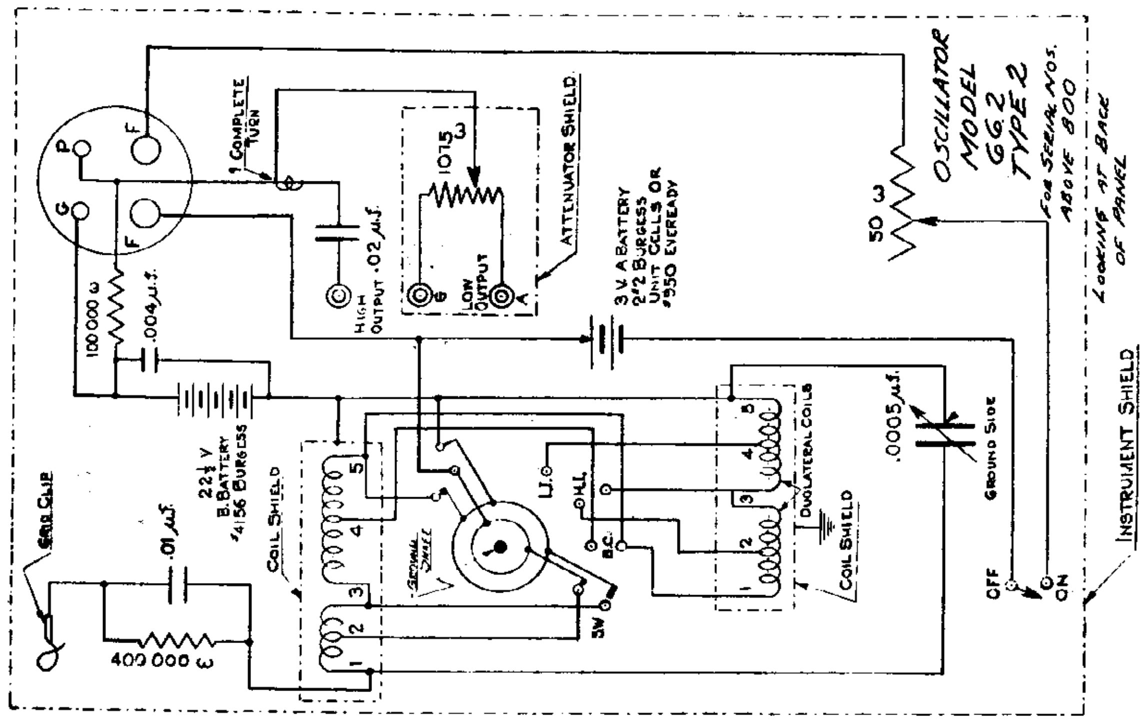
MODEL 661, 673
MODEL 694
Schematics

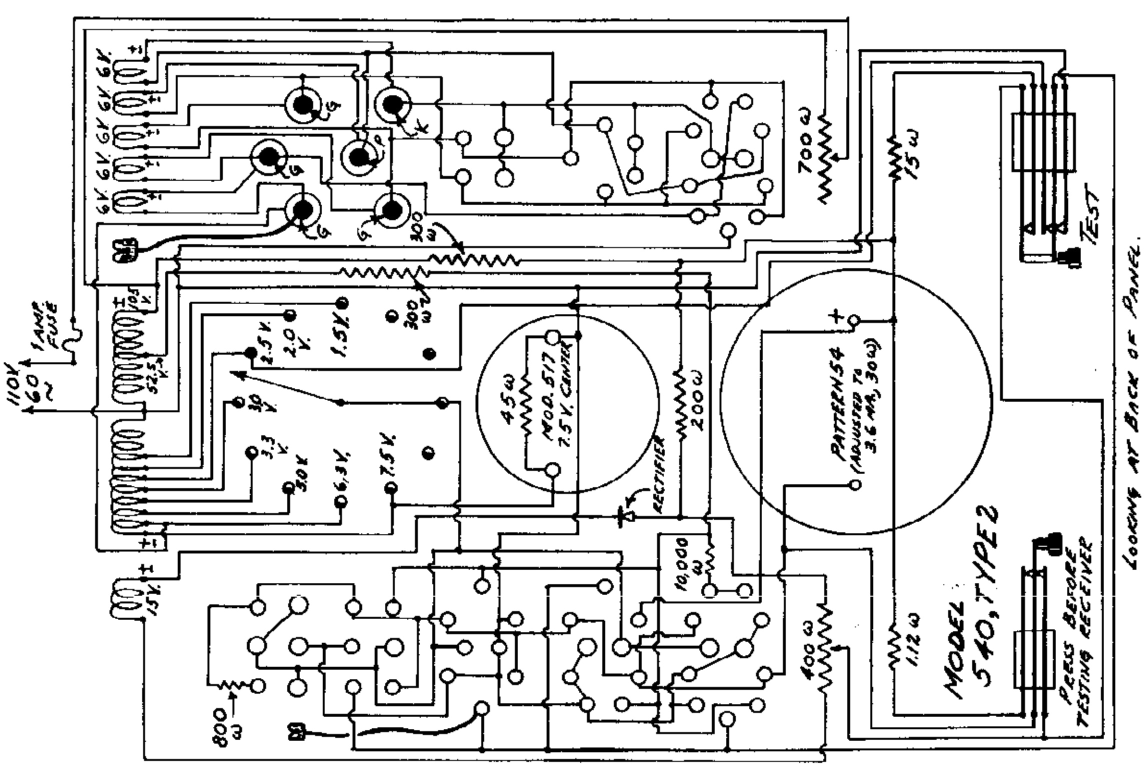
WESTON ELECTRICAL INSTRUM'T CORP.





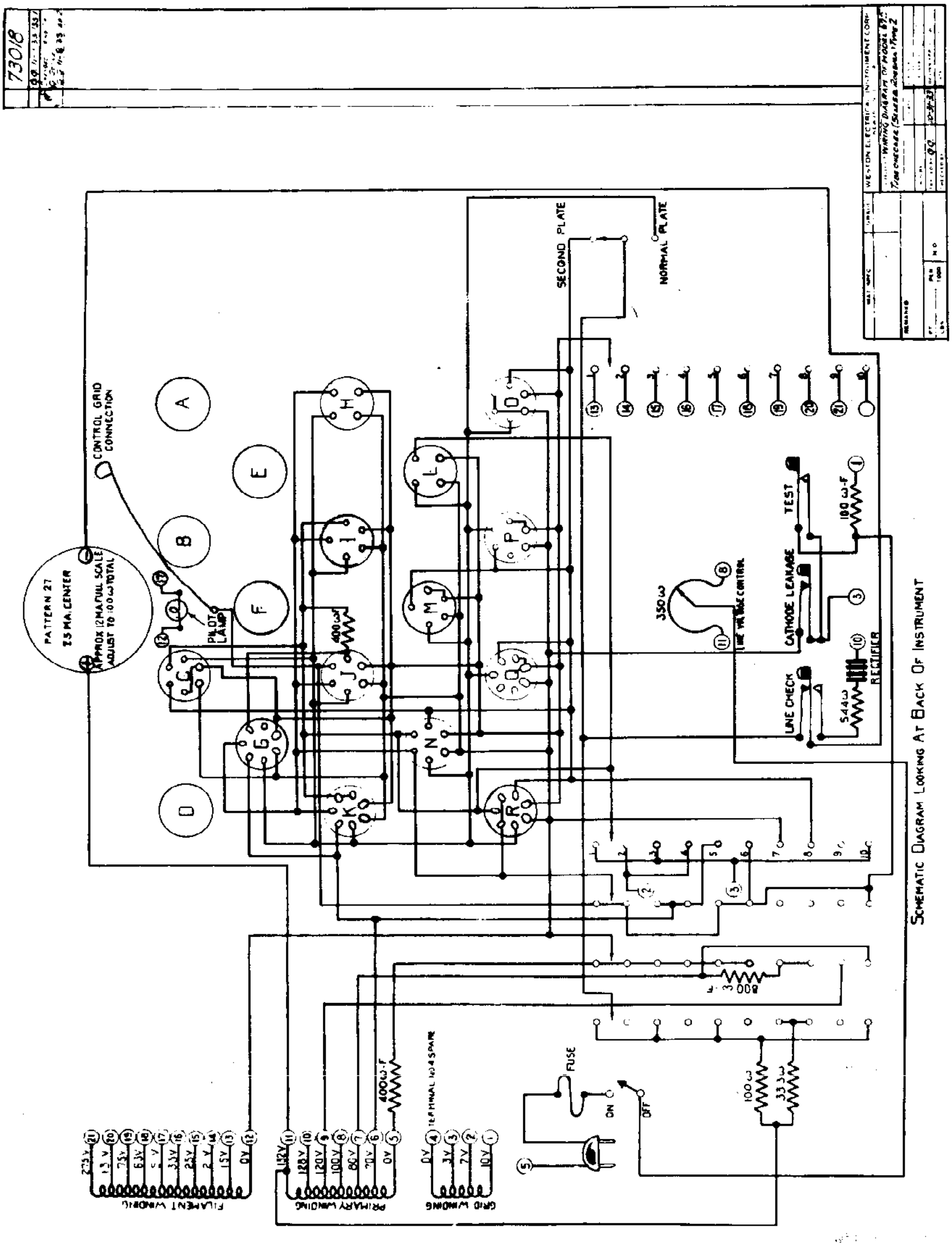
WESTON ELECTRICAL INSTRUM'T CORP.



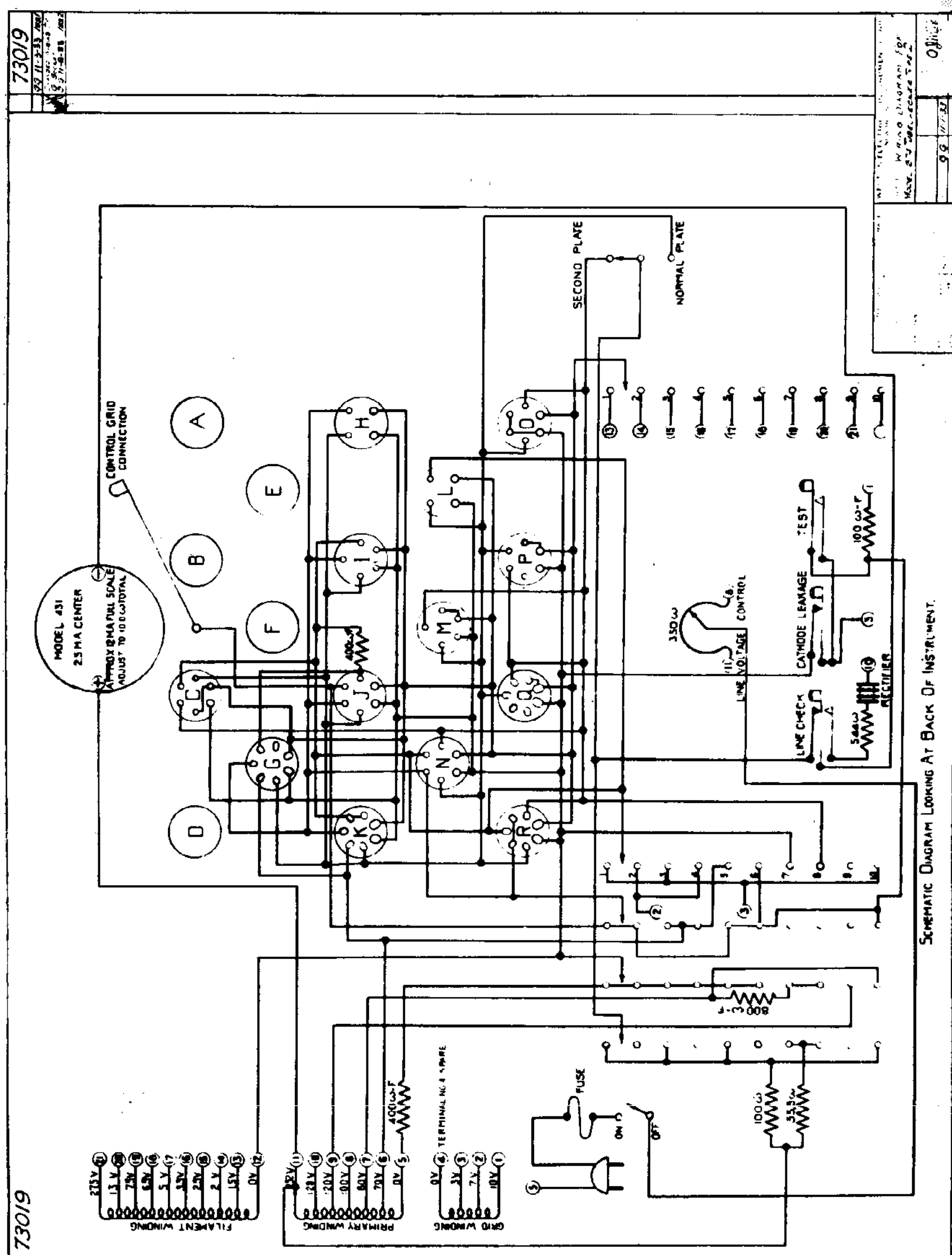


MODEL 672, Type 2
Schematic

WESTON ELECTRICAL INSTRUM'T CORP.

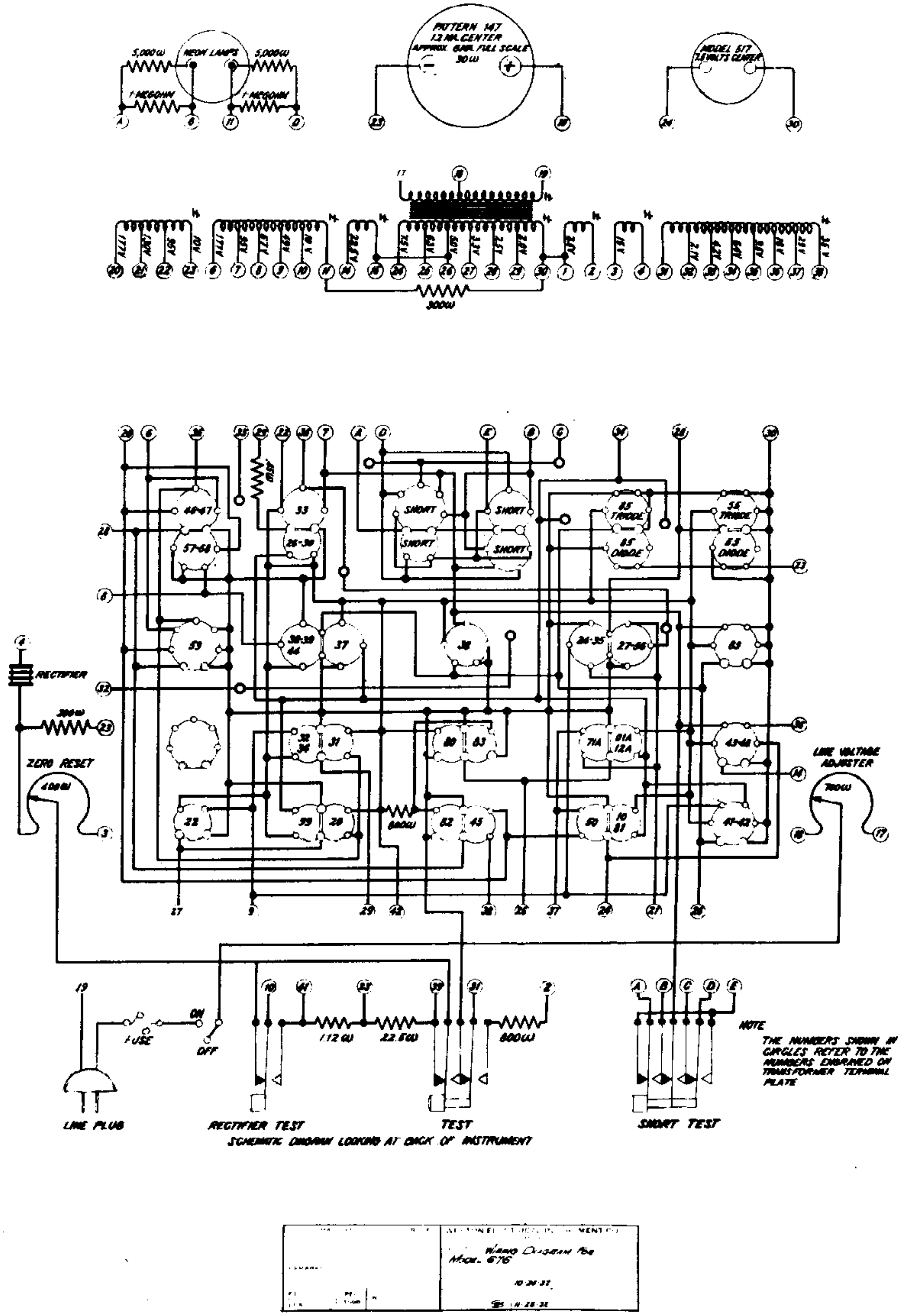


WESTON ELECTRICAL INSTRUMENT CORP.



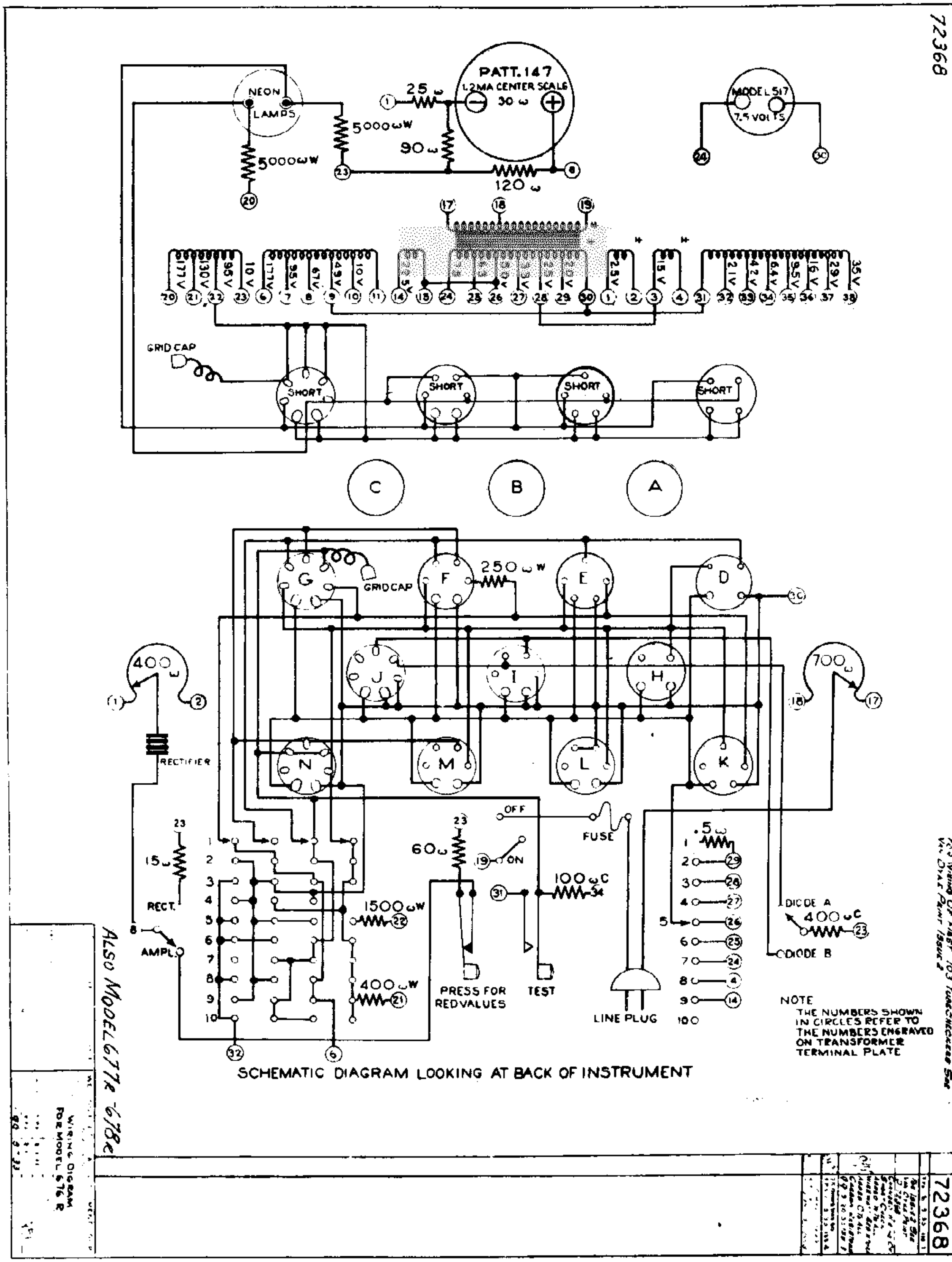
MODEL 676
Schematic

WESTON ELECTRICAL INSTRUM'T CORP.



MODEL 676-R, 677-R, 678-R
Schematic

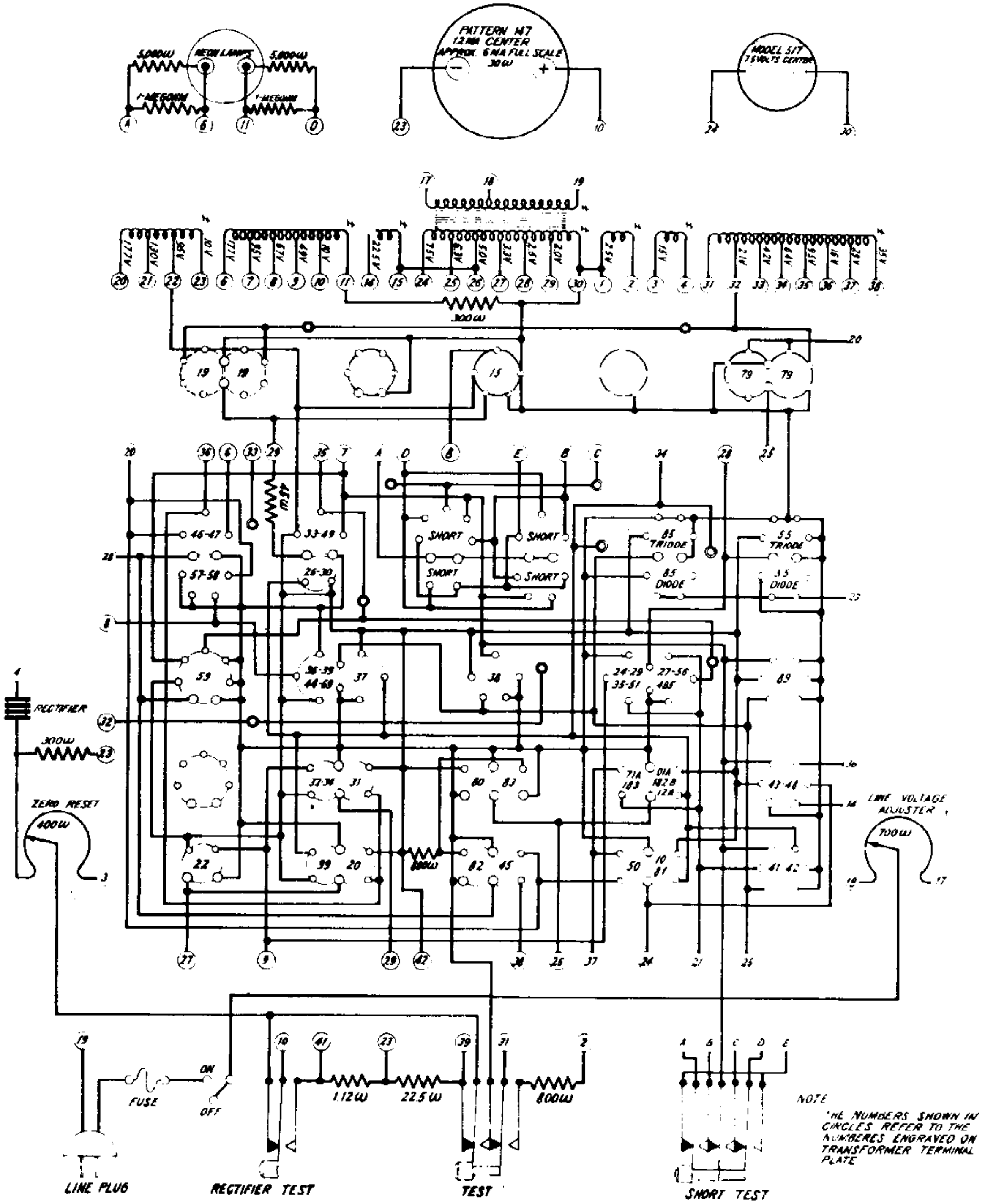
WESTON ELECTRICAL INSTRUM'T CORP.



SCHEMATIC DIAGRAM LOOKING AT BACK OF INSTRUMENT

MODEL 677, 678
Schematic

WESTON ELECTRICAL INSTRUM'T CORP.



SCHEMATIC DIAGRAM LOOKING AT BACK OF INSTRUMENT

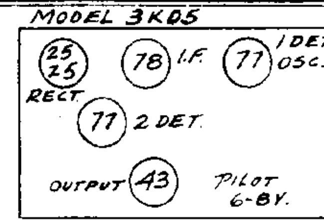
MODEL 3KD5
Schematic
Voltage
Socket

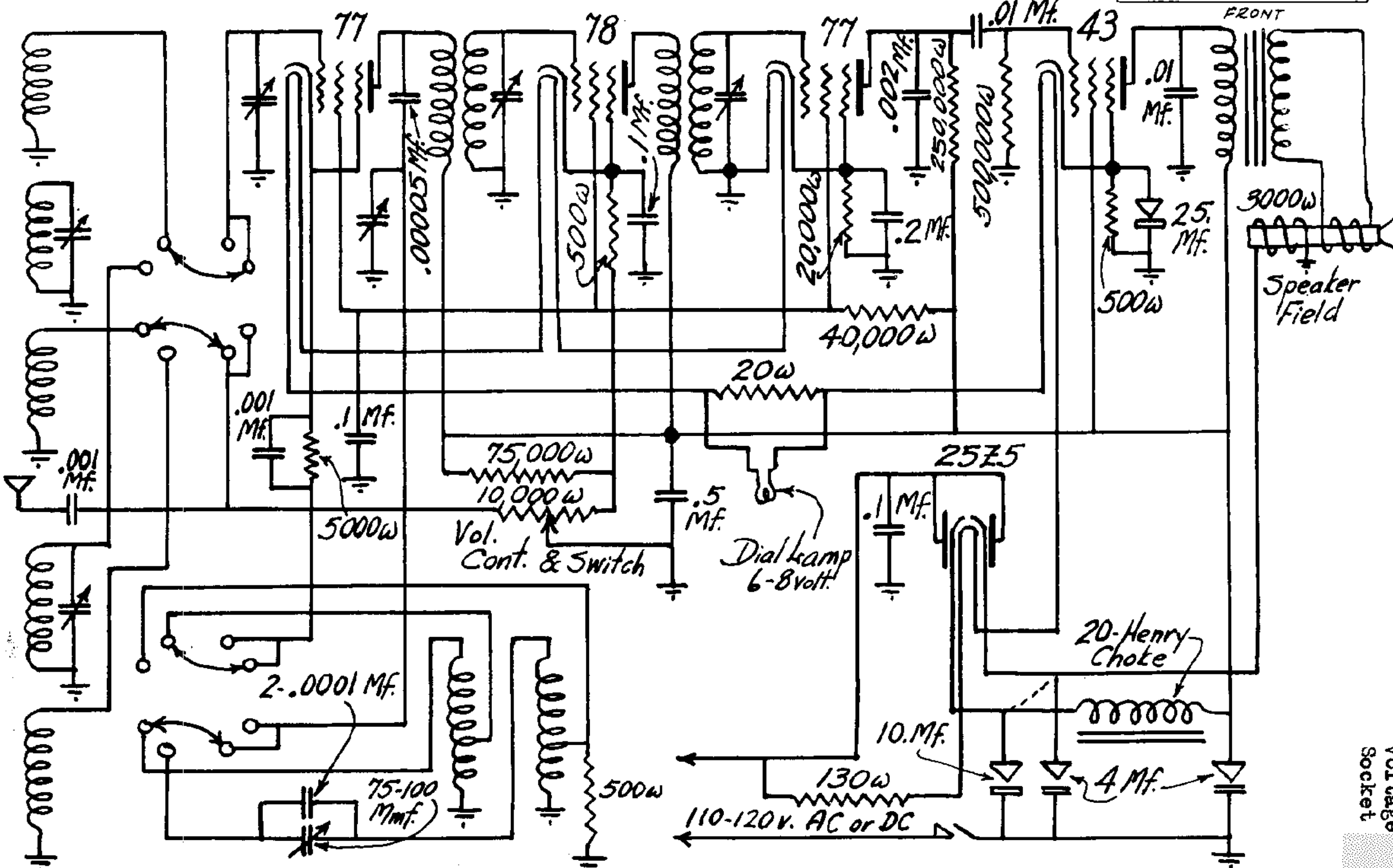
WILCOX-GAY CORP.

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
77	Det-Osc.	113	65	3.5
78	IF	118	65	2.2
77	2nd Det.	52	65	3.2
43	Output	111	118	17

Speaker Field Voltage 135 v.

IF PEAK 115 KC.



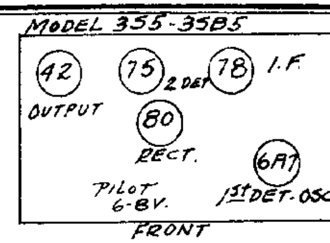


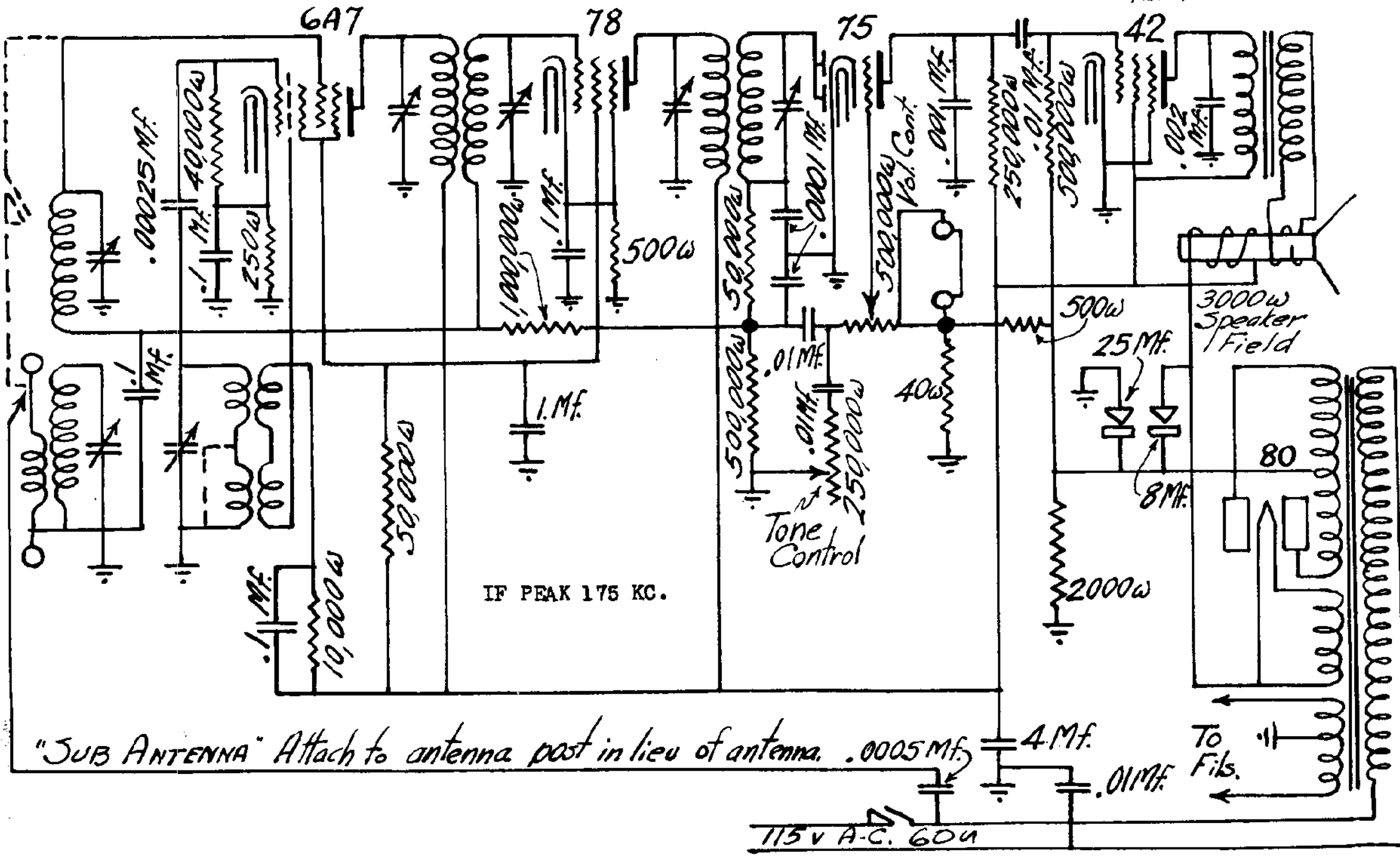
MODEL 3SB5
Schematic
Voltage
Socket

WILCOX-GAY CORP.

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
6A7	Det-Osc.	240	84	4
78	IF	240	82	4
75	2nd Det.	104		0
42	Output	232	240	0

42 Grid to Cathode 10 volts
Speaker Field 125 volts





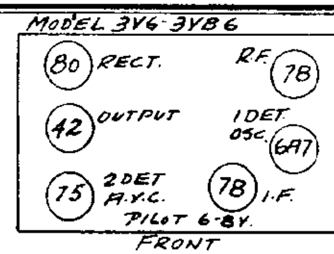
MODEL 3VB6
Schematic
Voltage
Socket

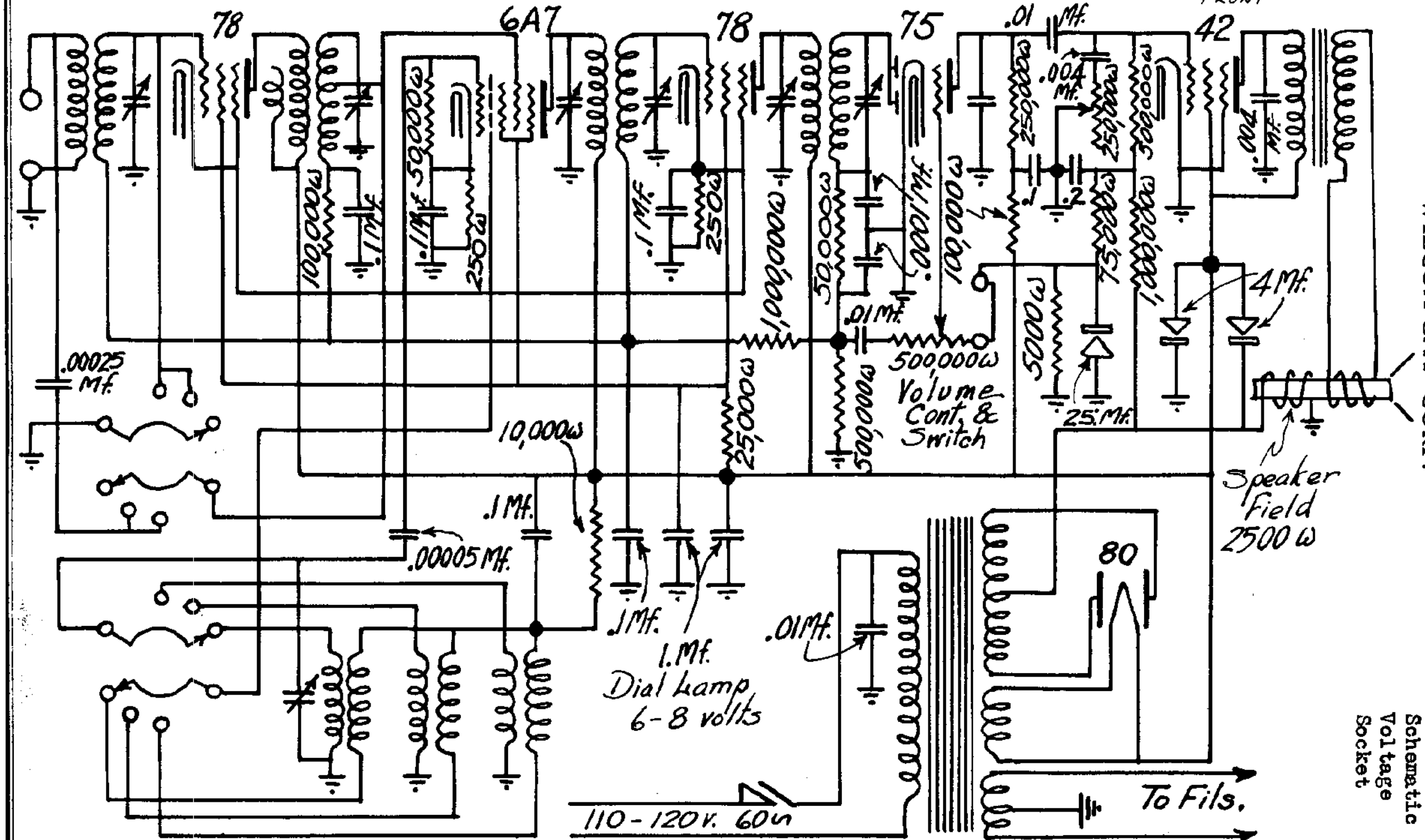
TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
78	RF	200	100	3
6A7	Det-Osc.	200	100	2.25
78	IF	200	100	4
75	2nd Det.	55		0
42	Output	180	200	

42 Cathode to Grid 4 volts

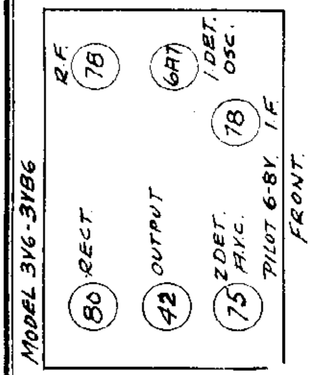
Speaker Field Voltage 150 v.

IF PEAK 175 KC.



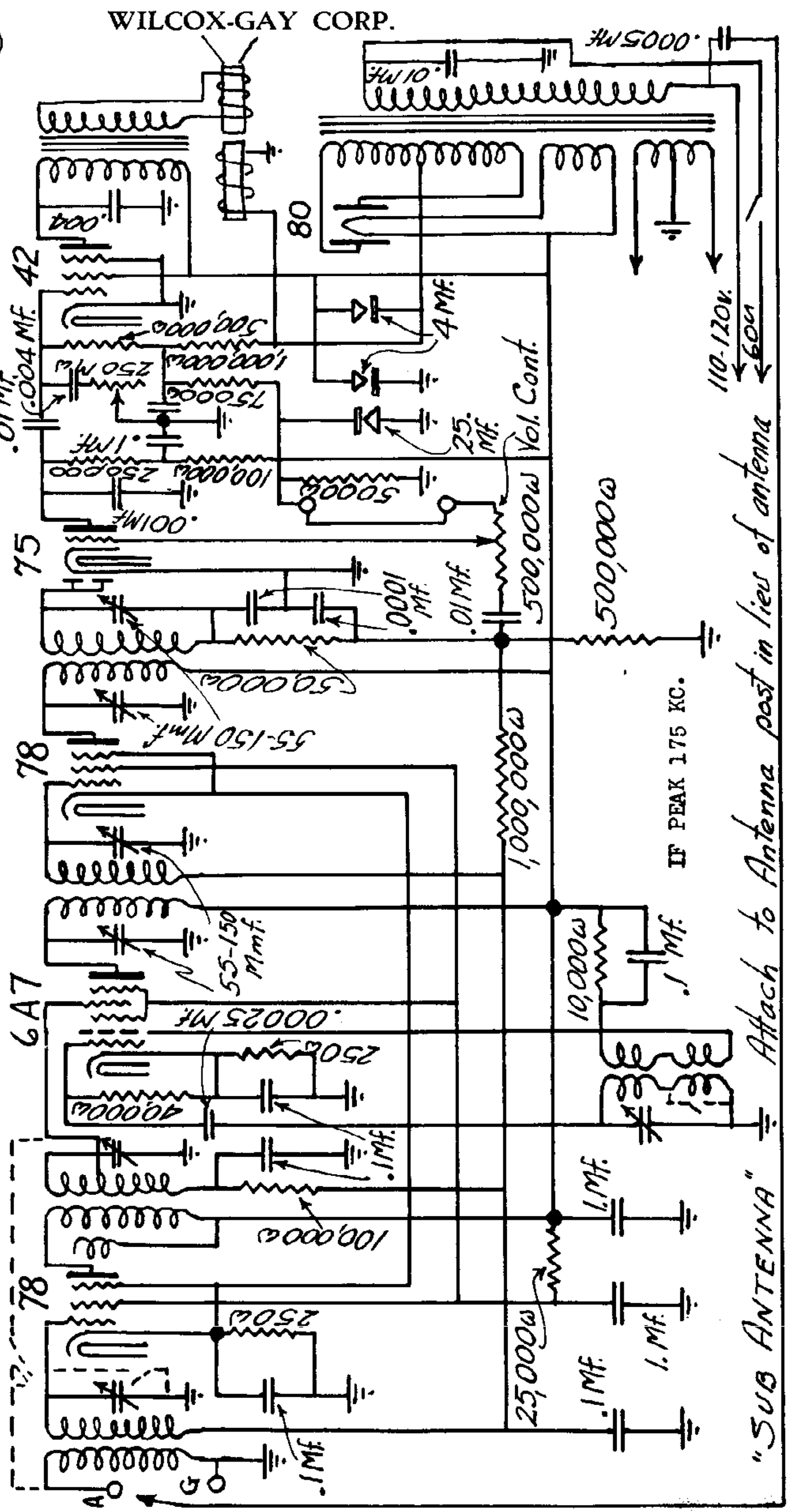


MODEL 3V6 (BC & SW)
MODEL 3VA6 (BC Only)
Schematic, Socket Voltage



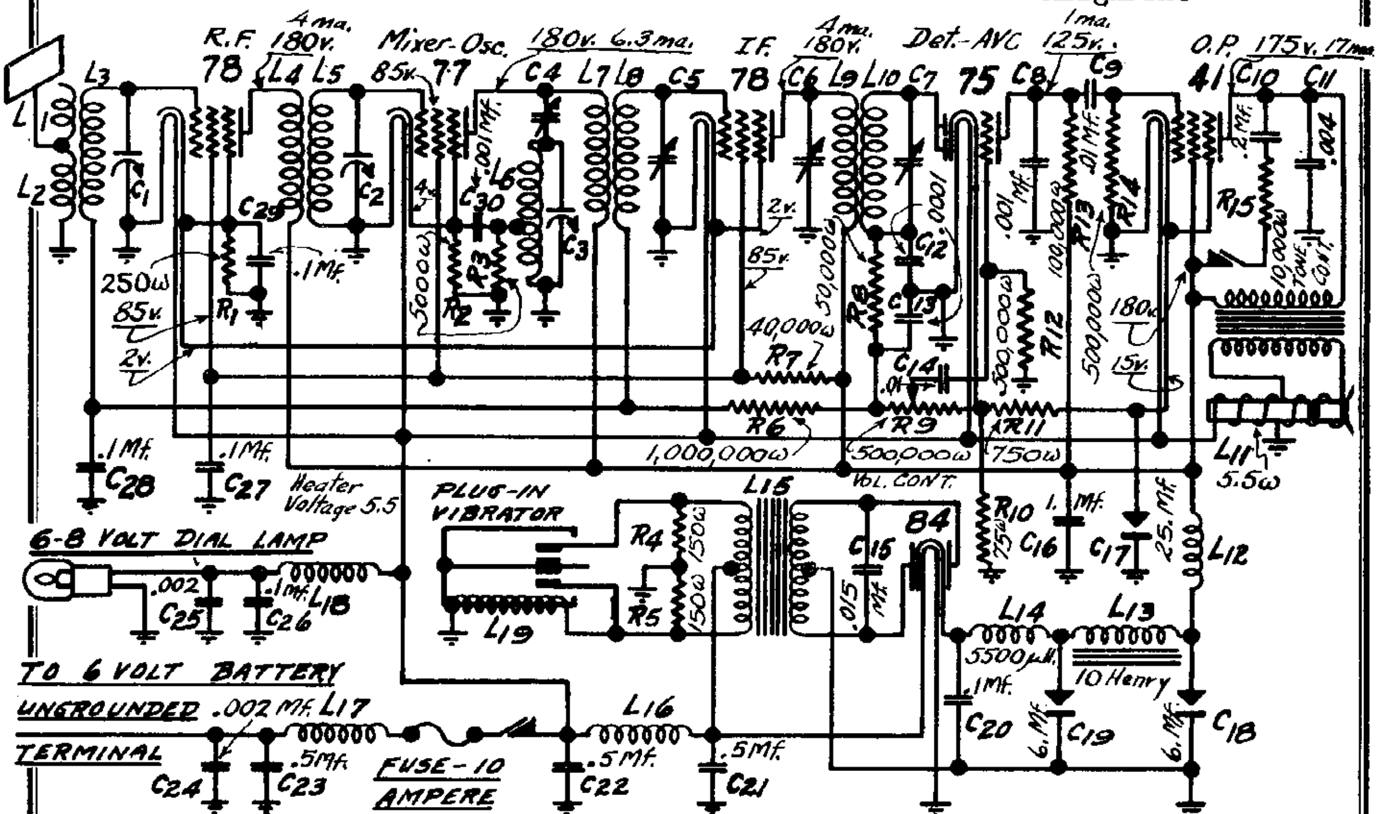
42 Cathode to Ground 4 v.
Speaker Field Voltage 150 volts

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
78	RF	200	100	3
6A7	Det-Osc.	200	100	2.25
78	IF	200	100	4
75	2nd Det.	55	-	0
42	Output	180	200	



MODEL 4B6, Road Mate
Schematic, Voltage
Alignment

WILCOX-GAY CORP.



The three R. F. trimming condensers are adjusted at 1400 K. C.. Proceed as follows: Procure a modulated oscillator giving a signal at 1400 K.C..

Remove the chassis from case, couple the output of the oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 K.C..

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Then adjust the trimming condensers starting with C 3, C 2 and then C 1 until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments.

A more accurate adjustment can be made with an output meter.

I. F. Adjustment:

The four I. F. trimming condensers are adjusted at 175 K.C.. Proceed as follows:

Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

Connect the oscillator output between the first detector grid and ground. Connect output meter.

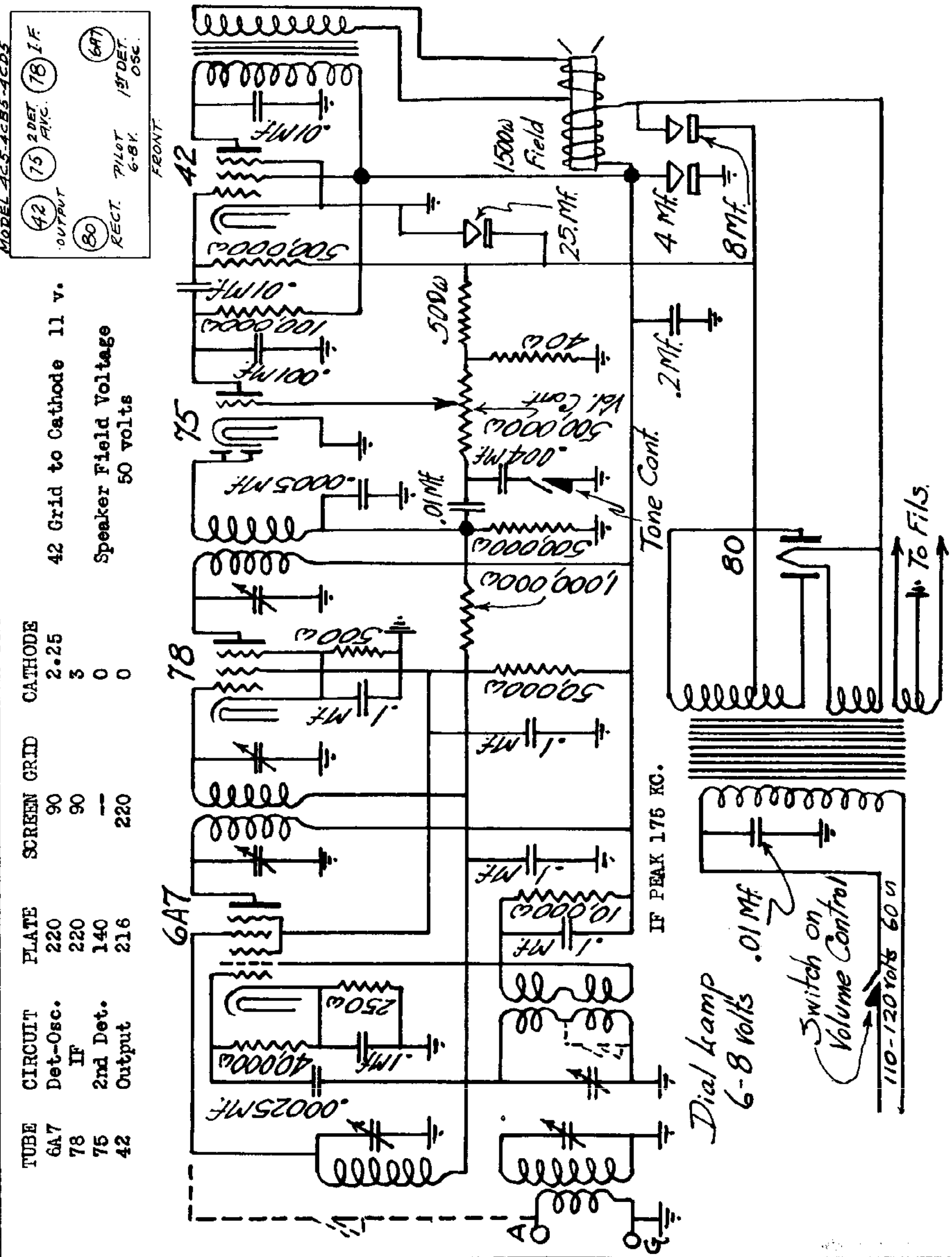
IF PEAK 175 KC.

Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator output until a small deflection is obtained. Unless this is done the action of the AVC will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

MODEL 4C5,4CB5 (BC & SW)
MODEL 4CA5 (BC Only)
Schematic,Voltage,Socket

WILCOX-GAY CORP.



TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
6A7	Det-Osc.	220	90	2.25
78	IF	220	90	3
75	2nd Det.	140	—	0
42	Output	216	220	0

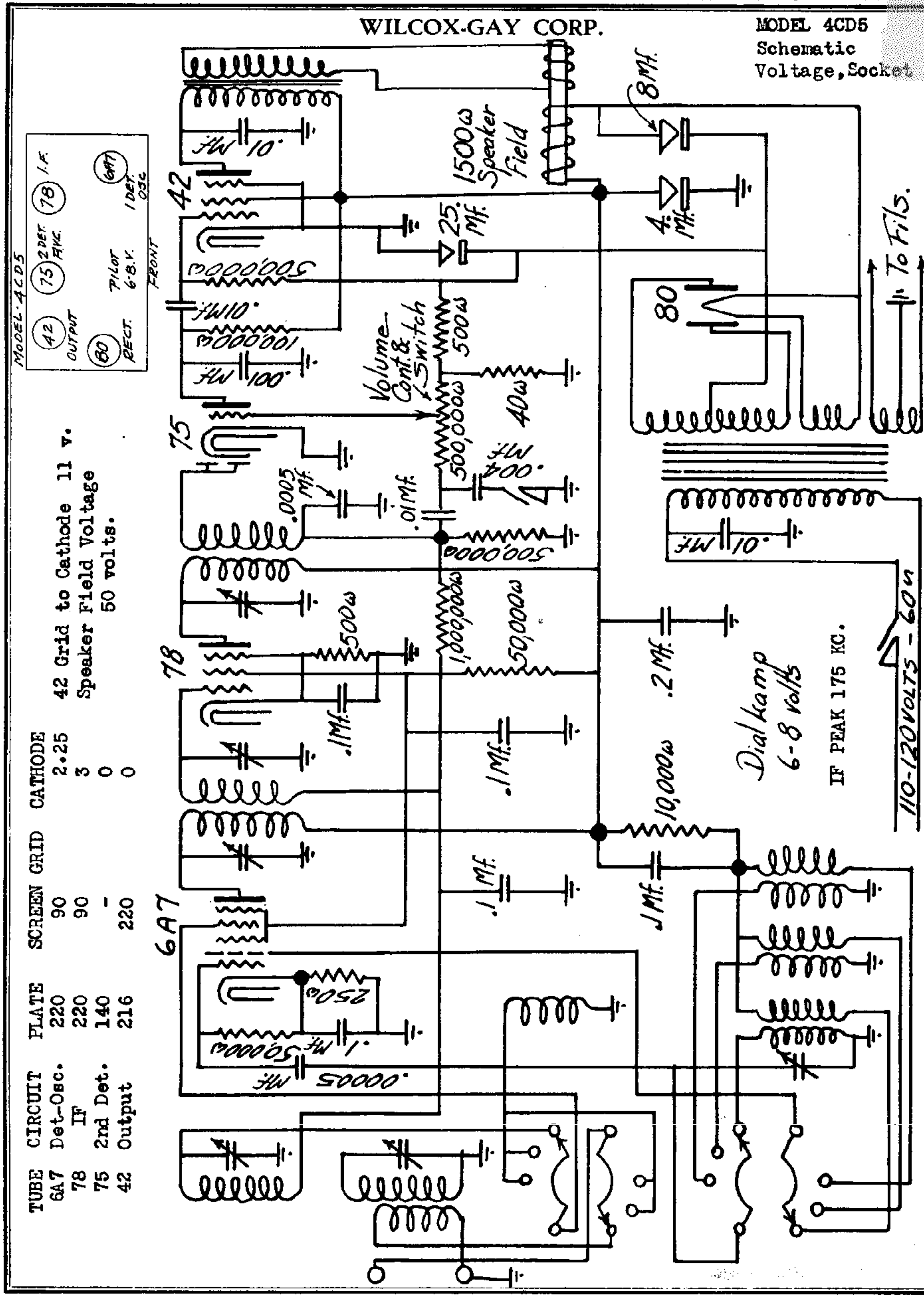
42 Grid to Cathode 11 v.

Speaker Field Voltage
50 volts

IF PEAK 175 KC.

WILCOX-GAY CORP.

MODEL 4CD5
Schematic
Voltage, Socket



TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
6A7	Det-Osc.	220	90	2.25
78	IF	220	90	3
75	2nd Det.	140	-	0
42	Output	216	220	0

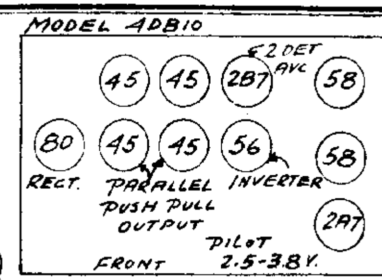
42 Grid to Cathode 11 v.
Speaker Field Voltage
50 volts.

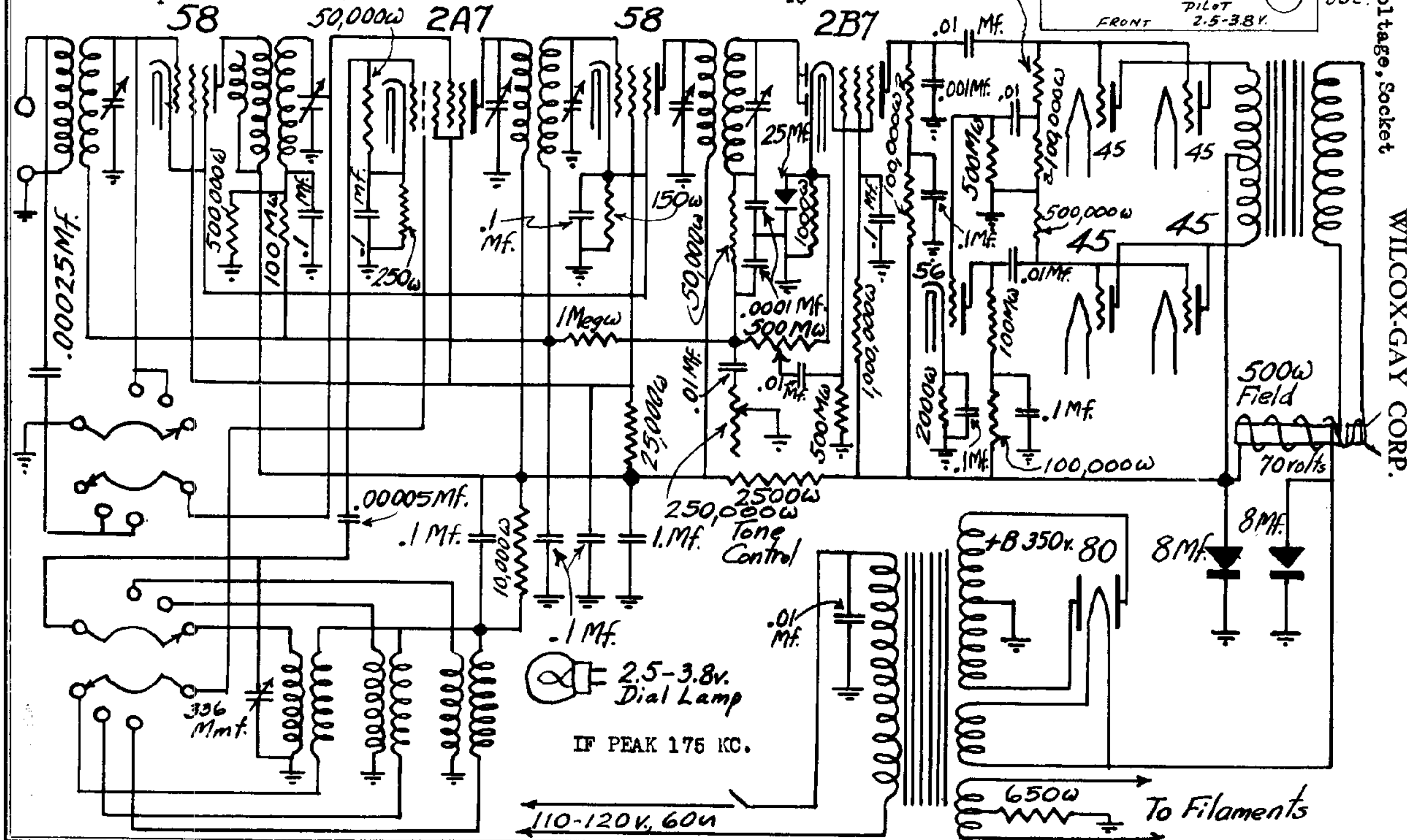
IF PEAK 175 KC.

MODEL 4DB10
Schematic, Voltage, Socket

WILCOX-GAY CORP.

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN TO GROUND	CATHODE TO GROUND
58	RF	265	120	-
2A7	Det-Osc.	265	120	-
58	IF	265	120	-
2B7	2nd Det.	115	35	-
56	Inverter	60	-	-
45	Output	340	-	45

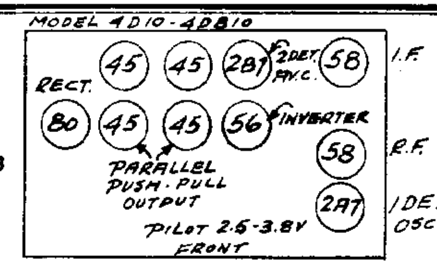


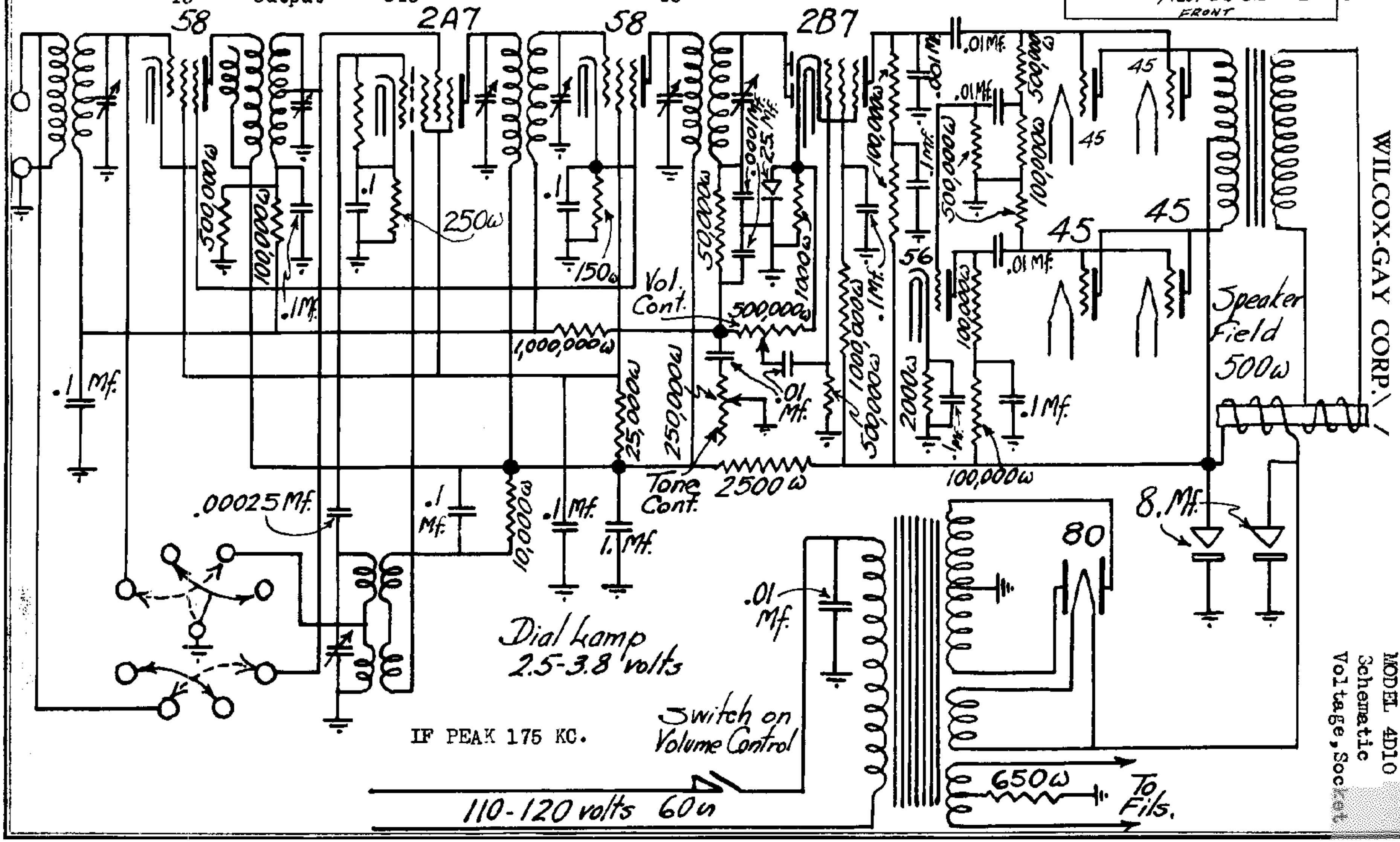


MODEL 4D10
Schematic
Voltage, Socket

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
58	RF	265	120	-
2A7	Det-Osc.	265	120	-
58	IF	265	120	-
2B7	2nd Det.	115	35	-
56	Inverter	60	-	-
45	Output	340	-	45

+B 350 volts
Speaker Field 70 volts

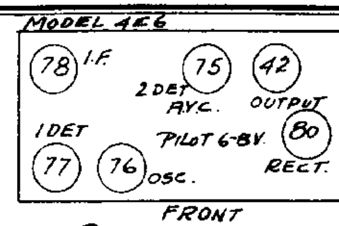




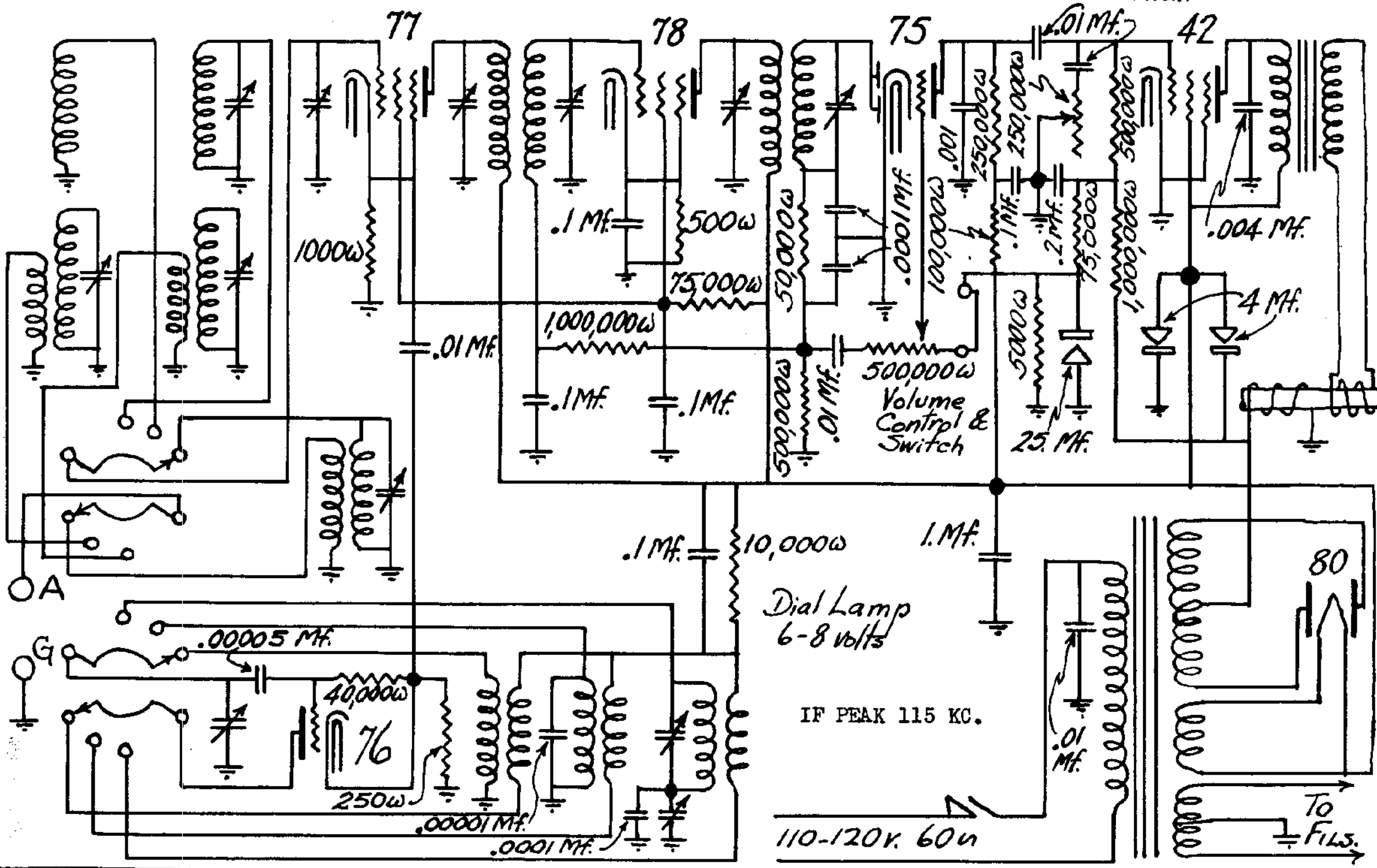
MODEL 4E6
Schematic
Voltage
Socket

TUBE	CIRCUIT	PLATE	SCREEN GRID	CATHODE
77	1st Det.	195	80	2
76	Oscill.	127		2
78	IF	195	80	2
75	2nd Det.	55	0	0
42	Output	170	195	-5

76 Grid to Ground -10 v.
Speaker Field Voltage
147 volts



WILCOX-GAY CORP.

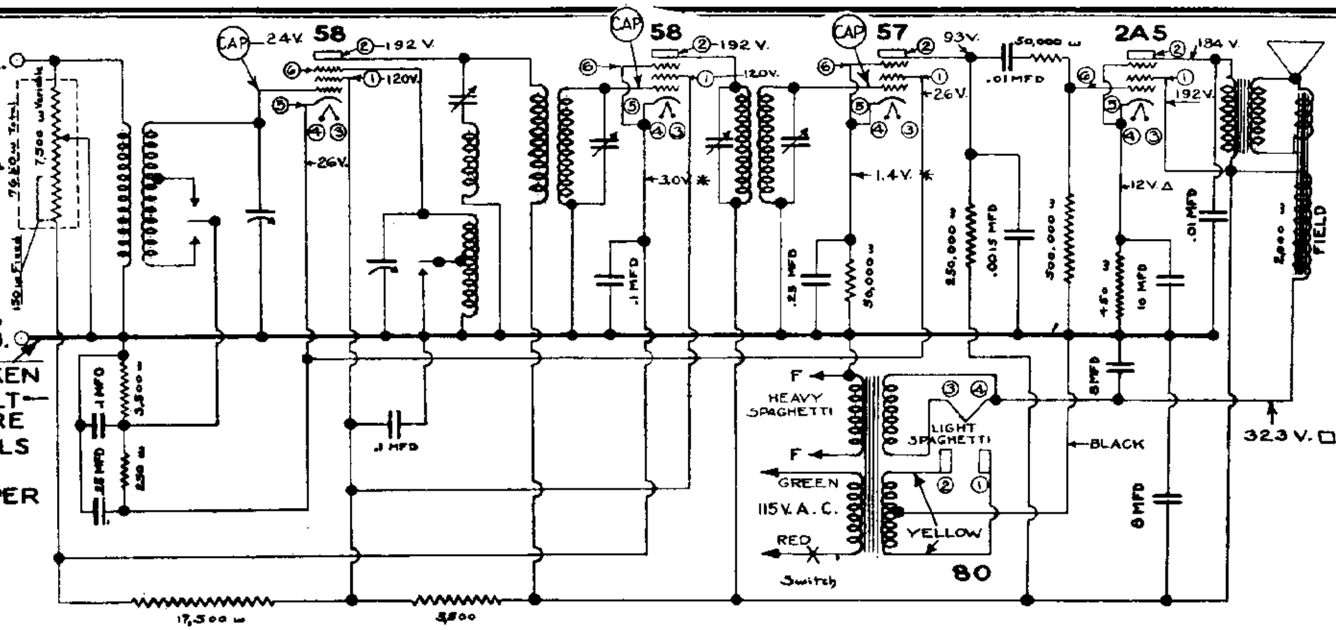


MODEL 450
Schematic
Socket, Voltage

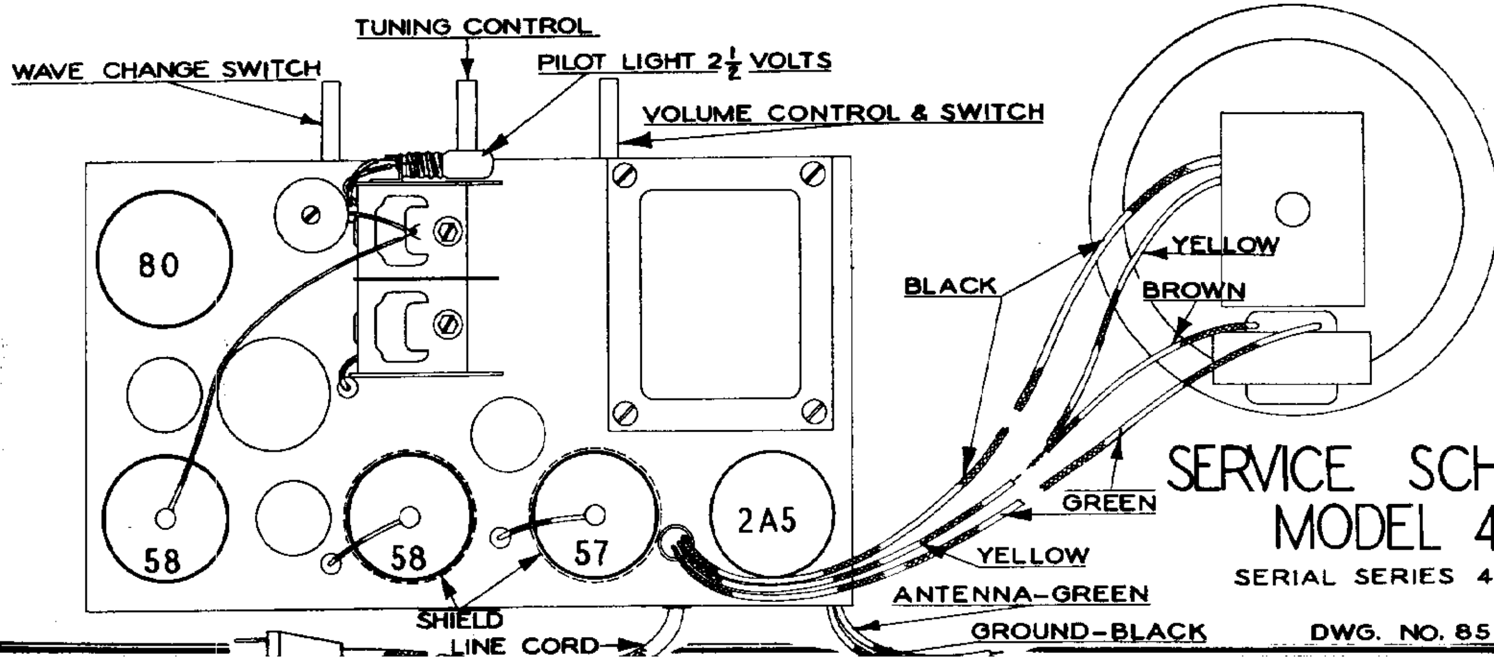
THE RUDOLPH WURLITZER CO.

NUMBERS IN CIRCLES INDICATE TUBE ELEMENTS IN ACCORDANCE WITH R.C.A. RADIOTRON PINBASE LAYOUT.

Above Serial #4,402,001-A changes are as follows:
58 Tubes changed to 6D6
57 Tube changed to 6C6
2A5 Tube changed to 41
Pilot lamp changed to 6v.



NOTE—ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
300 V. SCALE UNLESS OTHERWISE SPECIFIED.
□ INDICATES 600 V. SCALE.
Δ INDICATES 120 V. SCALE.
✱ INDICATES 10 V. SCALE.
LINE = 115 V. 60 CYCLE. INTERMEDIATE FREQUENCY = 456 K.C.



SERVICE SCHEMATIC MODEL 450

SERIAL SERIES 4,400,001 AND UP

DWG. NO. 85

MODEL 450
Alignment Data
Parts List

THE RUDOLPH WURLITZER CO.

The Model 450 is a five tube dual band superheterodyne covering the broadcast band and an additional short-wave band of from 1440 to 3500 kc. The circuit used embodies a 58 oscillator-modulator, a 58 I. F. amplifier operating at 456 kc., a 57 plate circuit second detector, and a 2A5 output audio stage. The volume control functions to increase the bias on the I. F. 58 and decrease the signal from the antenna to effect a decrease in volume. In all ganging operations this control must be advanced to its maximum position (clockwise), and THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER must be used.

The I.F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I.F. amplifier to be at fault. In that event:-

(a) Attach the output meter from screen to plate of the 2A5 tube.

(b) Attach the local oscillator tuned to 456 kc. to the antenna lead of the receiver and,

(c) Adjust the I.F. trimmers (screw adjustments, accessible when the name plate is removed) for maximum indication on the output meter.

There are no adjustments to be made on the short-wave band.

TO CALIBRATE THE 450

With the band switch in the broadcast position (clockwise), set the dial to the position where a station (or oscillator) of known frequency, about 1400 kc., should come in.

(a) Adjust oscillator trimmer (screw adjustment, top-rear of gang condenser) until desired signal is received.

The calibration will fall within reasonable limits over the balance of the tuning range with no further adjustments.

TO ALIGN THE 450

With the band switch in the broadcast position (clockwise), set the dial to approximately 1400 kc.

(a) Attach the output meter from screen to plate of the 2A5 tube.

(b) Attach the local oscillator tuned to the set to the green antenna lead and,

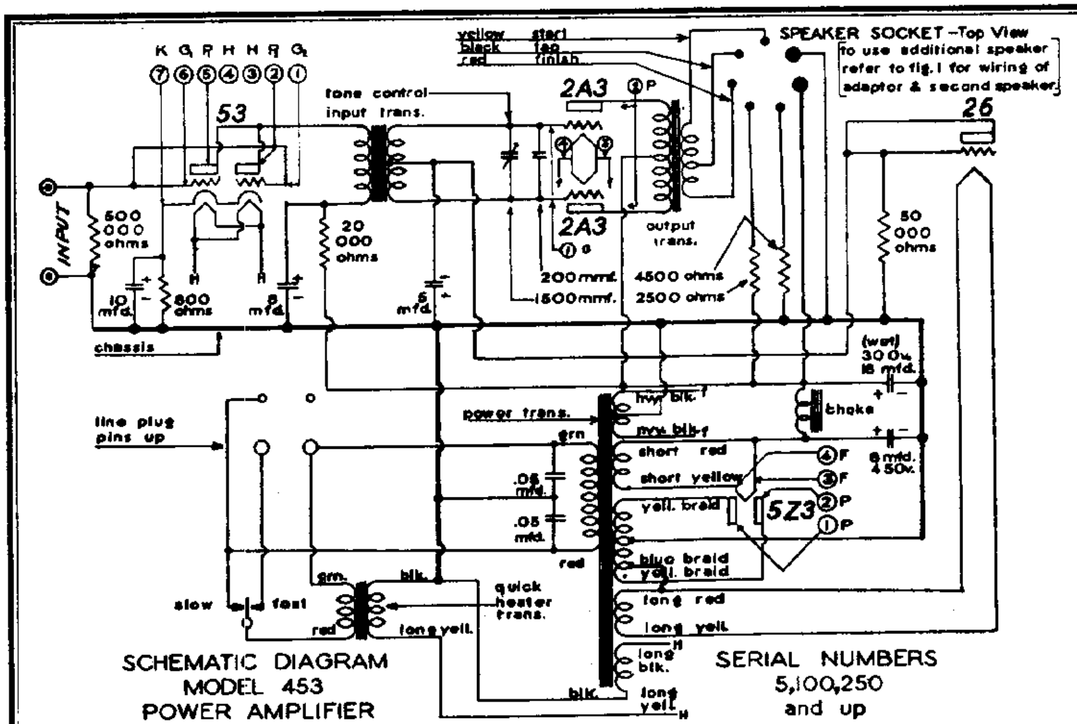
(c) Adjust the R. F. trimmer (screw adjustment, top, front of gang condenser) for maximum indication on output meter.

The alignment will fall within reasonable limits over the balance of the tuning range with no further adjustments.

44-4176 Coil, Antenna Assembly (1)
44-4177 Coil, Oscillator Assembly (1)
44-4164 Coil, I. F. Assembly (2)
44-3715 Condenser, 8 & 8 & 10 Mfd. (1)
44-3344 Condenser .1 & .25 Mfd. 200 Volt (2)
44-3820 Condenser .1 Mfd. 200 Volt (1)
44-3838 Condenser .01 Mfd. 600 Volt (1)
44-4233 Condenser .01 Mfd. 600 Volt (1)
44-4234 Condenser .0015 Mfd. 600 Volt (1)
44-4179 Condenser I. F. Tuning Assembly (1)
44-4162 Condenser 4 Gang & Dial Assembly (1)
  44-4237 Dial Scale & Hub Assembly (1)
44-4167 Control, Volume & Line Switch (1)
44-4186 Lamp Bracket & Socket Assembly (1)
  44-767 Dial Lamp (1)
44-2238 Line Cord (1)
44-4190 Resistor (1) Voltage Divider
44-4187 Resistor 450 Ohm 1 Watt (1)

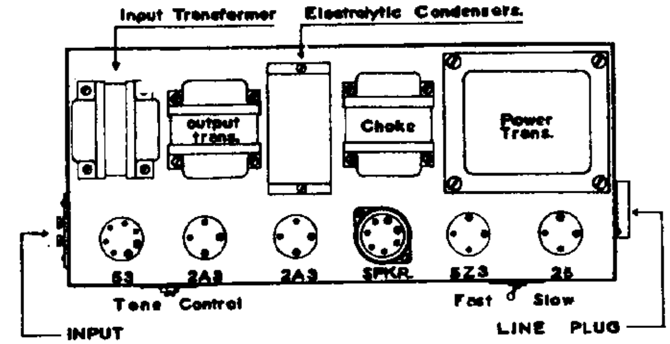
44-4182 Resistor ½ Meg Ohm ¼ Watt (1)
44-4183 Resistor ¼ Meg Ohm ¼ Watt (1)
44-4184 Resistor 50,000 Ohm ¼ Watt (1)
44-3751 Socket 4 Prong (1)
44-3866 Socket 6 Prong (4)
44-4166 Switch, Short Wave (1)
44-2663 Speaker Assembly, Jensen (1)
  44-3835 Field Coil (1)
  44-3834 Output Transformer (1)
  44-3836 Cone & Voice Coil Assembly (1)
  Above Speaker for Table Model
44-4285 Speaker Assembly, Magnavox (1)
  44-4157 Field Coil (1)
  44-4155 Output Transformer (1)
  44-4158 Cone & Voice Coil Assembly (1)
  Above Speaker for Console Model
44-4168 Transformer, Power 60 Cy. 110 Volt (1)
44-4280 Transformer, Power 25 Cy. 110 Volt (1)
44-4170 Transformer, Power 60 Cy. 230 Volt (1)

THE RUDOLPH WURLITZER CO.

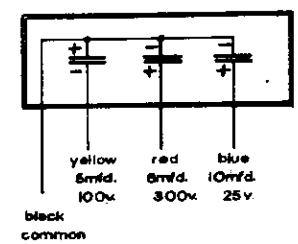


SCHEMATIC DIAGRAM
MODEL 453
POWER AMPLIFIER

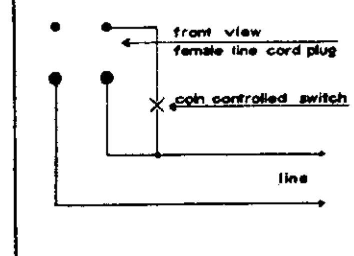
SERIAL NUMBERS
5,100,250
and up



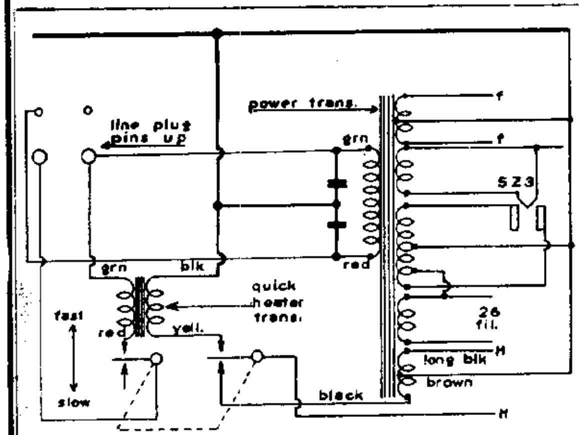
TOP VIEW — MODEL 453



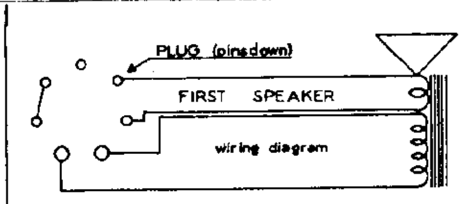
Detail of 4681 Electrolytic Cond.

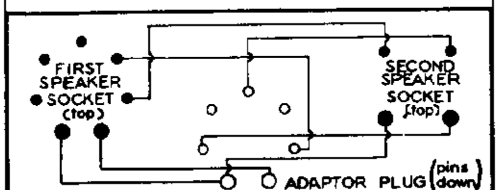


Detail of Line Cord Plug Connections.



QUICK HEATER TRANSFORMER CIRCUIT
SERIAL NUMBERS 5,100,001
to 5,100,249





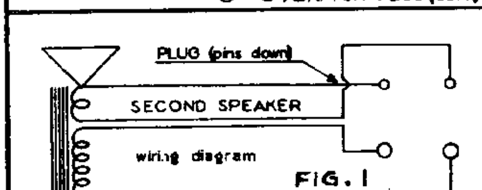


FIG. 1

NOTES

Measure all D.C. voltages from chassis with a 1000 ohm per volt meter, with the line at 120 volts 60 cycle.

Numbers in circles indicate tube elements in accordance with RCA-Cunningham Pinbase Layouts.

Average A.C. Voltages.		Average D.C. Voltages	
5Z3 filament	5.0	2A3 plates	300
2A3 filament	2.7	2A3 grids	-57
26 filament	1.4	53 plates	200
53 heater	2.5	53 cathode	4.2

Amplifier Power Consumption 130 watts.

SERVICE SCHEMATIC

SIMPLEX POWER AMPLIFIER

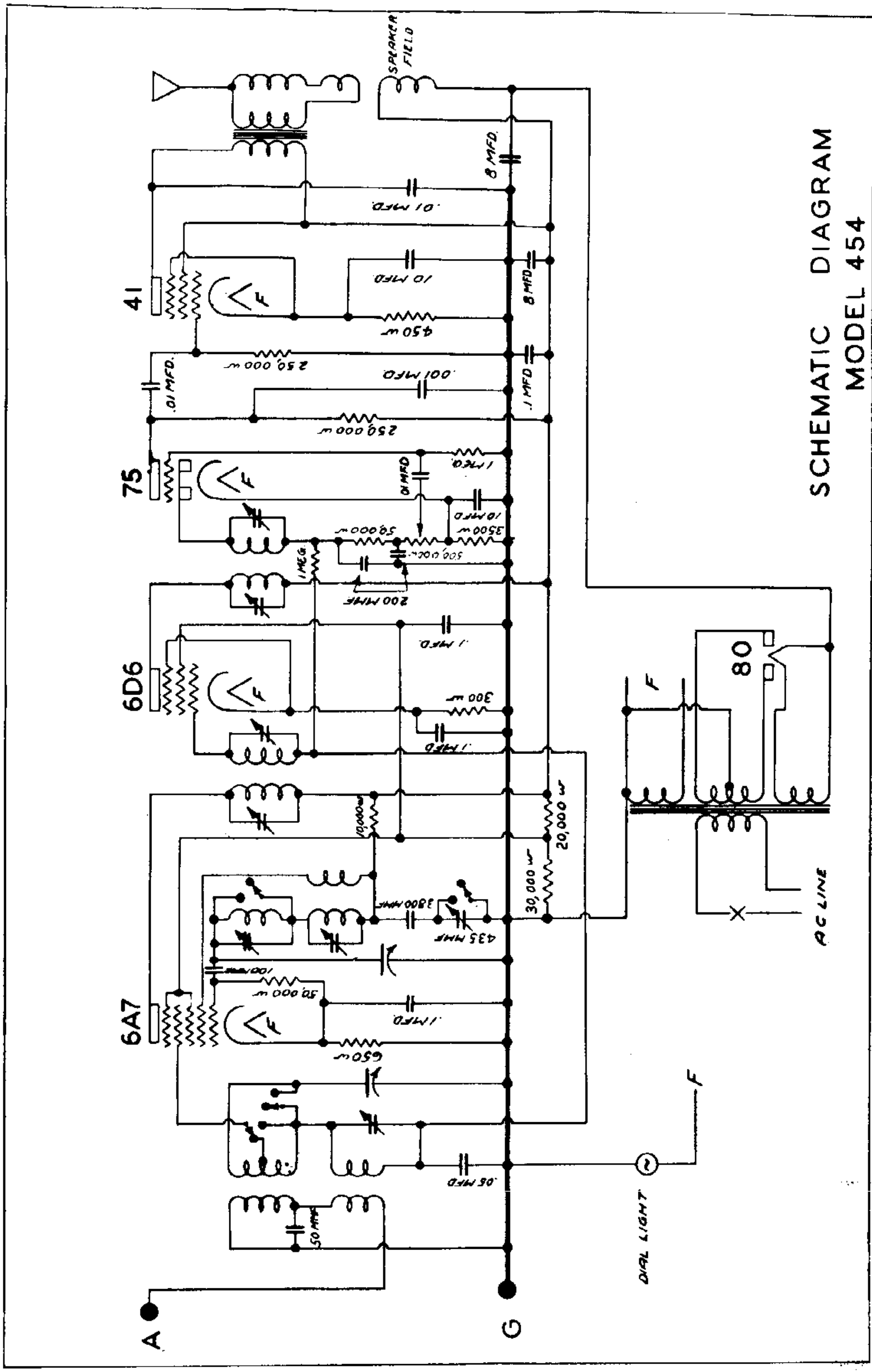
MODEL 453

7-16-34

W. A. HAYES

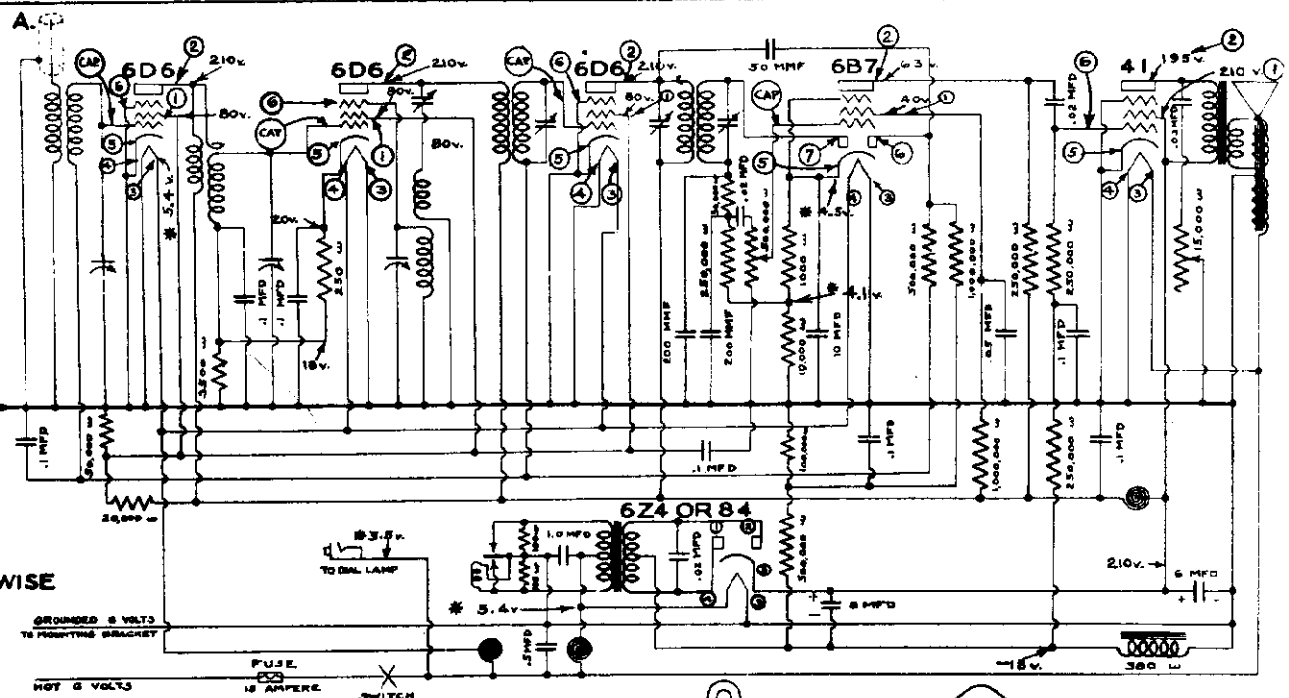
MODEL 454
Schematic

THE RUDOLPH WURLITZER CO.

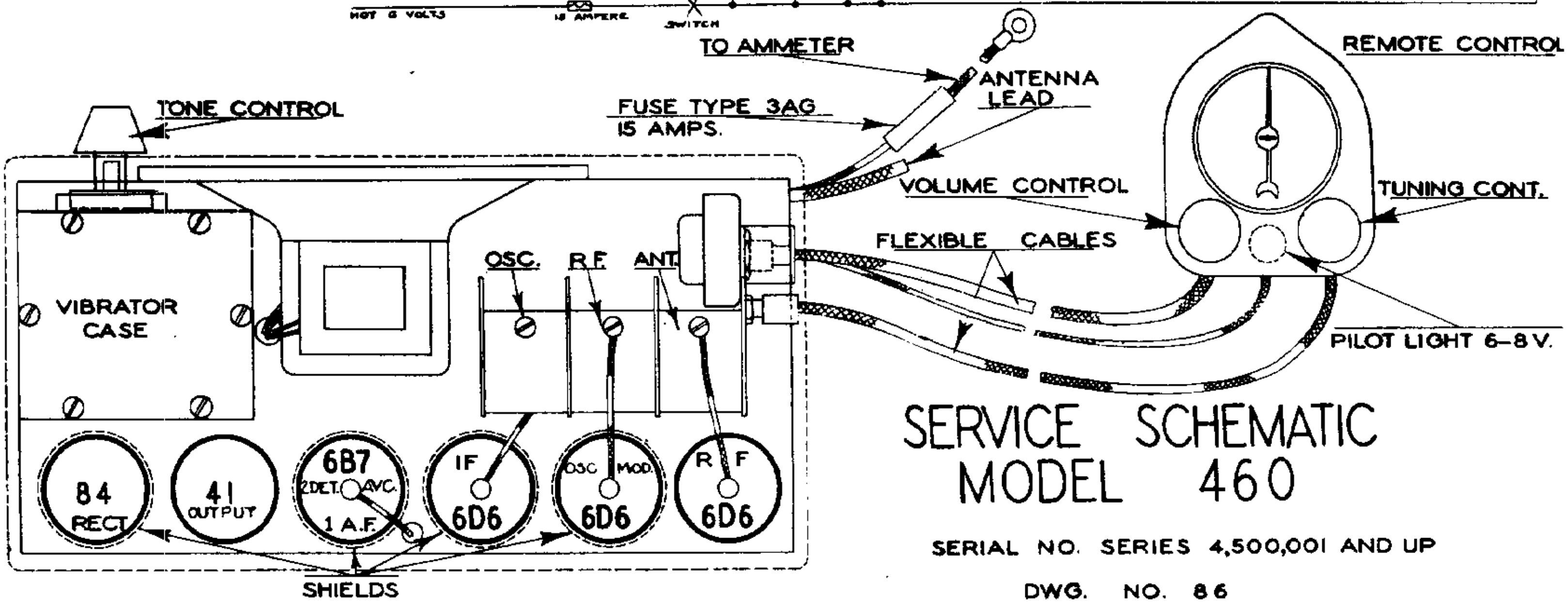


THE RUDOLPH WURLITZER CO.

NUMBERS IN CIRCLES INDICATE TUBE ELEMENTS IN ACCORDANCE WITH R.C.A. RADIOTRON PINBASE LAYOUT.



NOTE–ALL VOLTAGES TAKEN FROM THIS POINT ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER. 300v. SCALE UNLESS OTHERWISE SPECIFIED.
✱ INDICATES 10v. SCALE
INTERMEDIATE FREQ. 175 K.C.



SERVICE SCHEMATIC MODEL 460

SERIAL NO. SERIES 4,500,001 AND UP

DWG. NO. 86

MODEL 460
Alignment Data

THE RUDOLPH WURLITZER CO.

The Model 460 is a 6 tube superheterodyne, completely self-contained, for operation from a 6 volt d.c. source. A cable drive remote control head is used, one cable operating the volume control and switch and the other cable operating the tuning condenser.

The circuit comprises a stage of R.F. amplification, an oscillator-modulator, and a stage of I.F. amplification at 175 kc., each using a 6D6 tube. A 6B7 is used as a diode second detector-A.V.C. and first audio stage and a 41 is used in the audio output stage. The power supply, an integral part of the chassis, uses an 85 or a 6Z4 as a full wave rectifier for the B supply. The filter choke is in the negative side of the B supply, and the voltage drop across it, after being filtered, furnished the C supply for the set.

The pentode section of the 6B7 is used as the first audio stage, resistance coupled into the 41. One of the diode plates of the 6B7 is used for the diode second detector and the other diode plate is used in the diode A.V.C. circuit. An inspection of Drawing #86 will indicate that under no-signal conditions, the cathode of the 6B7 is considerably more positive than the A.V.C. diode plate. As a result no current will flow through the A.V.C. diode until the signal applied to this diode plate is greater than the bias on the 6B7 cathode. The advantage of the circuit is two--fold, greater volume on weak signals and more uniform volume on all signals than straight diode A.V.C. provides.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER and turn both the volume and tone controls to their maximum positions (clock-wise).

TO ALIGN (or gang) THE I.F. CIRCUITS

(1) Attach the output meter from screen to plate of the 41 tube.
(2) Feed the signal from the local oscillator tuned to exactly 175 kc. into the receiver at the control grid of the oscillator-modulator 6D6.
(3) Adjust the I.F. trimmers for maximum indication on the output meter, ALWAYS KEEPING THE SIGNAL INPUT LOW.
(a) The first I.F. trimmers are mounted in the end of the first I.F. transformer located between the gang condenser and the chassis pan. The nut adjusts the primary trimmer.
(b) The second I.F. trimmers are mounted in the end of the second I.F. transformer, located under the chassis pan directly below the speaker field. The nut adjusts the primary trimmer.

TO CALIBRATE THE OSCILLATOR

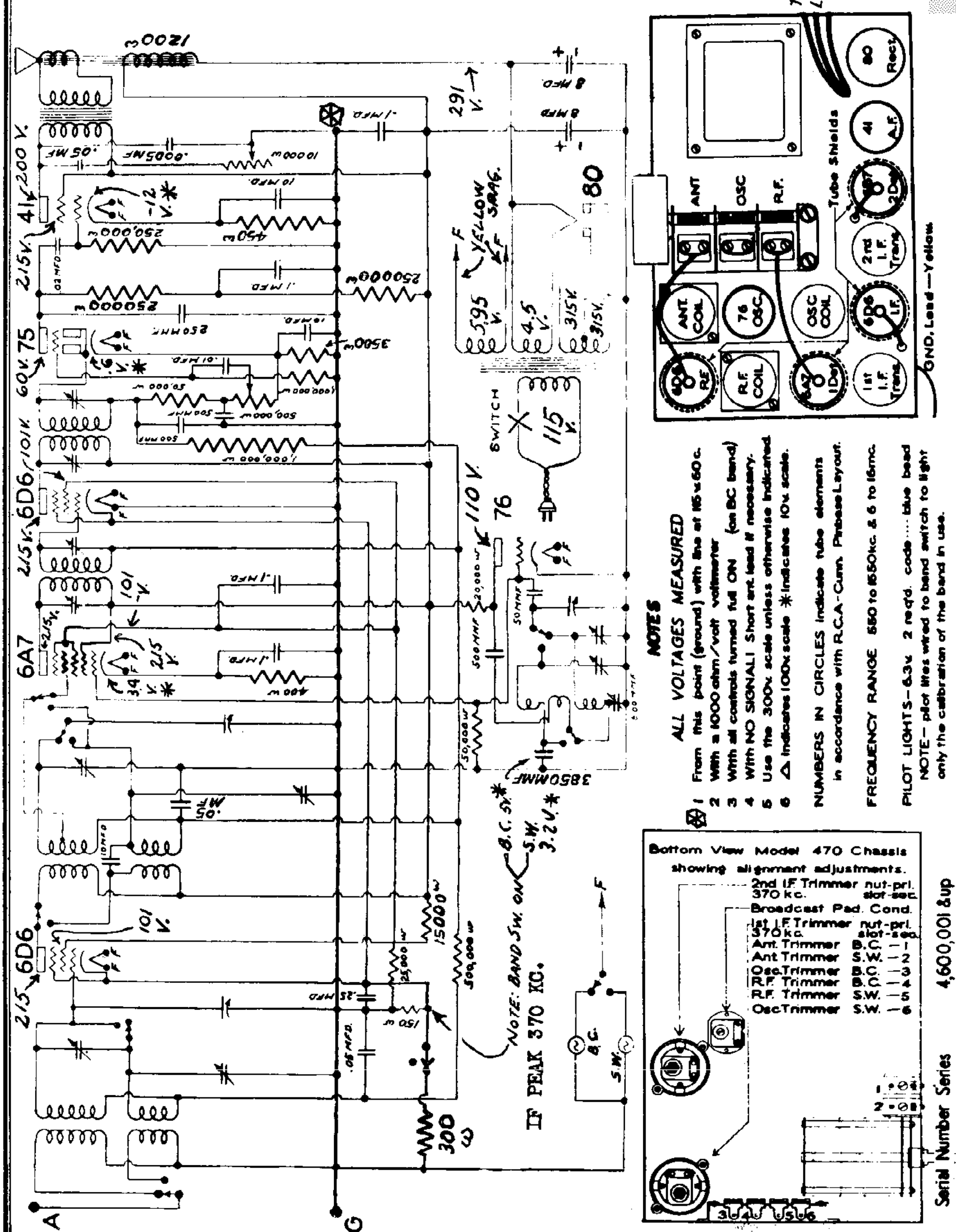
(1) Set the dial pointer to 53 with the plates entirely enmeshed.
(2) Set the dial pointer to the position where a station or (oscillator) of known frequency, about 1500 kc., should be received and adjust oscillator trimmer (screw adjustment, top of gang condenser, inside end) until the desired signal is heard.
(3) Set the dial pointer to the position where a station (or oscillator) of known frequency, about 1100 kc., should be received and correct calibration (if necessary) by bending the rotor plates of the inside gang condenser section.
(4) Repeat operation 3 at, or near, 850 kc.
(5) Repeat operation 3 at, or near, 700 kc.
(6) Repeat operation 3 at, or near, 580 kc.

TO ALIGN (or gang) THE R.F. CIRCUITS

(1) Attach the output meter from screen to plate of the 41 tube.
(2) Attach the local oscillator to the antenna lead and KEEP THE SIGNAL INPUT LOW.
(3) With the receiver and oscillator tuned to resonance at, or near, 1500 kc. adjust the antenna and R.F trimmers (screw adjustments, top of gang condenser, outside and middle sections) until maximum output is obtained.
(4) With the receiver and oscillator tuned to resonance at, or near, 1100 kc. bend the rotor plates of the outside and middle gang condenser sections to obtain maximum output.
(5) Repeat operation 4 at, or near, 850 kc.
(6) Repeat operation 4 at, or near, 700 kc.
(7) Repeat operation 4 at, or near, 580 kc.

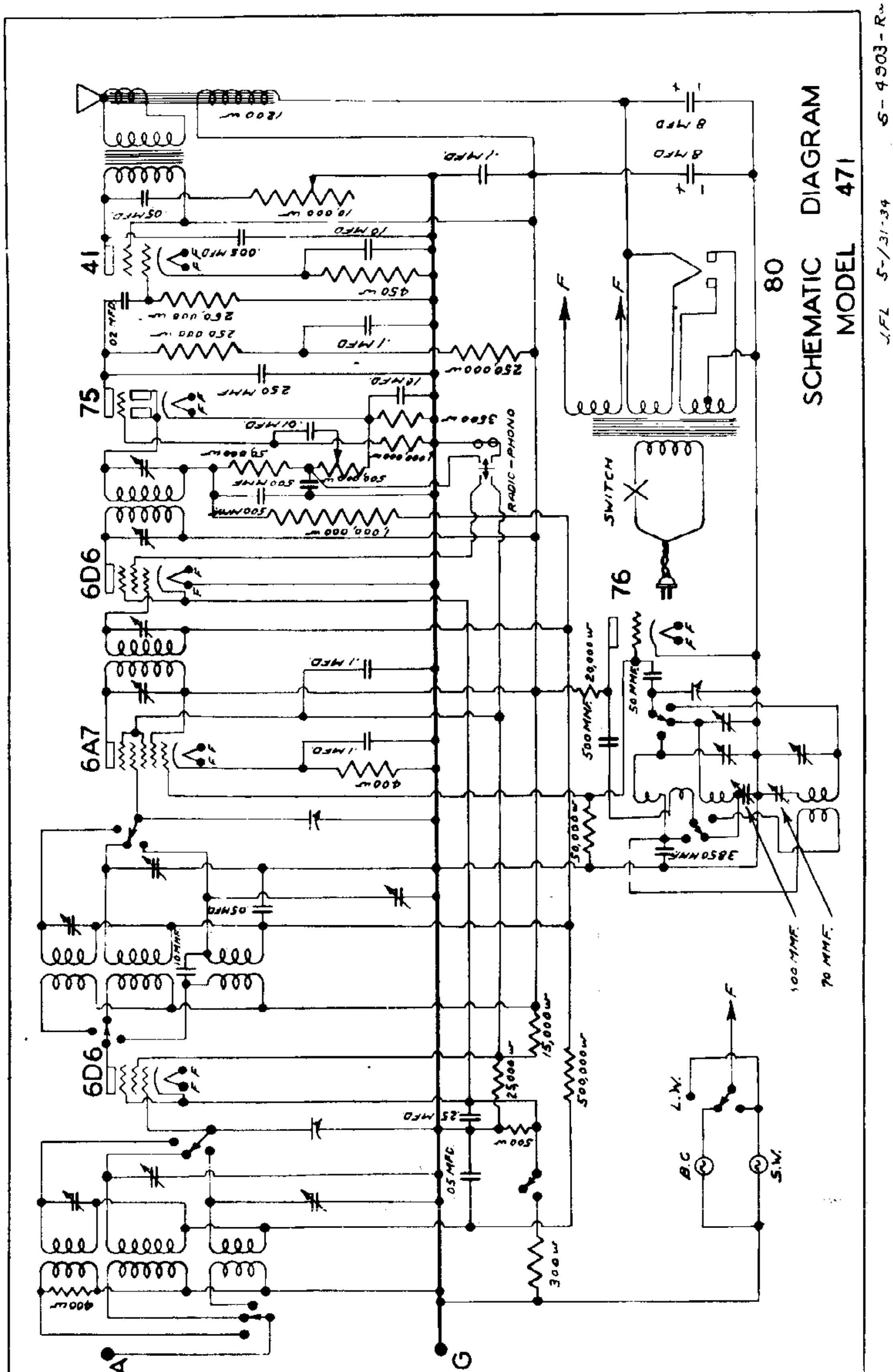
NOTE--RE OPERATION 2, CALIBRATION PROCEDURE: If more than one position of the oscillator trimmer enables the desired signal to be received REDUCE THE INPUT TO THE RECEIVER until one, and only one position of the oscillator trimmer will enable the desired signal to be received.

THE RUDOLPH WURLITZER CO.

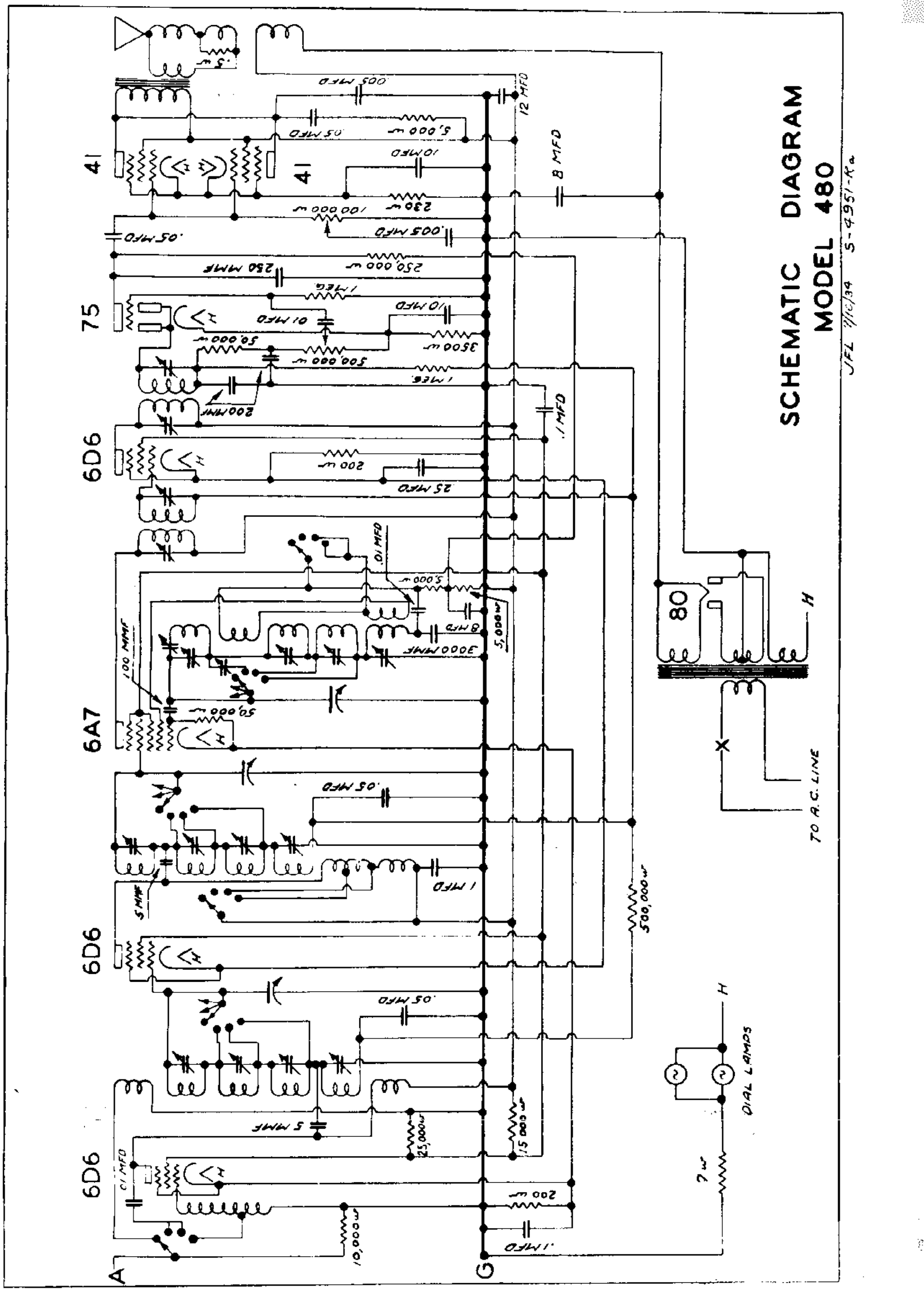


MODEL 471
Schematic

THE RUDOLPH WURLITZER CO.



THE RUDOLPH WURLITZER CO.



MODEL Lyric C-4, M-4
Notes, Alignment Data

THE RUDOLPH WURLITZER CO.

The only difference between the Lyric Models C-4 and M-4 is the placement of the volume control and gang condenser. On the Model C-4 the volume control is mounted on a bracket at the left, and the gang condenser on the right. On the Model M-4 the volume control is mounted below the gang condenser on the right. Hereinafter these models are referred to indiscriminately as Model C/M-4. The early Model C/M-4 is a single (broadcast) band receiver. The later models have an additional short wave band, approximately 1500 to 4000 kc., which is selected by a toggle switch at the right rear of the chassis pan. There are no calibration or alignment adjustments to make on this band. For short wave reception the switch must be thrown toward the end of the chassis pan. For Broadcast reception, toward the center of the chassis pan.

Connect the output meter (when used) from screen to plate of 43 tube.

Advance the volume control to its maximum position (clockwise).

In all ganging operations USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER. Do this by reducing the input, NOT BY RETARDING THE VOLUME CONTROL.

The C/M-4 uses the 6B7 as a reflexed I.F.--A.F. amplifier, and the I.F. trimmer adjustments are very critical. For this reason, and because these adjustments are carefully made at the factory, the alignment of the I.F. trimmers is not recommended. If, however, the I.F. amplifier is definitely at fault--the following procedure should be followed:-

(1) Attach the output meter from screen to plate of 43 tube.

(2) Attach antenna lead to local oscillator tuned to 456 kc.

(3) KEEPING THE INPUT FROM THE LOCAL OSCILLATOR AS LOW AS POSSIBLE, adjust the I.F. trimmers for maximum reading on the output meter.

(A) The first I.F. trimmer is located under the chassis pan, adjustable through a hole in the chassis pan, near right center, directly in front of the first I.F. transformer. The slot adjustment is the primary trimmer. The nut (¼" hex) adjustment is the secondary trimmer.

(B) The second I.F. trimmer is located under the chassis pan, adjustable through a hole in the chassis pan, left center, near volume control.

TO CALIBRATE THE C/M-4

(1) Throw the toggle switch (if any) to the broadcast position.

(2) Set the gang condenser to the position where a station (or oscillator) of known frequency, about 1500 kc., should be received.

(3) Adjust the oscillator trimmer (screw adjustment, top of gang condenser, front end) until desired signal is heard. The calibration of the rest of the dial will fall within reasonable limits without further adjustment.

TO ALIGN (or gang) THE C/M-4

(1) Throw the toggle switch (if any) to the broadcast position.

(2) Connect the output meter from screen to plate of the 43 tube.

(3) Turn condenser to approximately 1400 kc., connect antenna lead to local oscillator tuned to set, and check setting of volume control.

(4) Adjust R. F. trimmer (screw adjustment, rear end, top of gang condenser) until output meter indicates maximum output. KEEP SIGNAL INPUT LOW. The alignment of the balance of the tuning range will fall within reasonable limits with no further adjustments.

ALIGNMENT PROCEDURE FOR LYRIC C-4 & M-4

THE RUDOLPH WURLITZER CO.

The Lyric Model P-5 is a five tube superheterodyne of the universal type with the heaters of the tubes connected in series. A 456 kc. I. F. amplifier is used and a series (acceptor) wave trap is shunted across the primary of the antenna coil to minimize the pick-up of stations operating at, or very near, the I. F.

The circuit used includes, a 6A7 electron coupled oscillator-first detector, and a 75 duplex diode hi-mu triode in the second detector-first A. F. circuit. Diode type A. V. C. is employed.

The first I. F. transformer is fitted with an adjustable tickler to control the sensitivity of the receiver. This tickler is mounted on a small wooden dowel protruding from the center, bottom, of the transformer and is connected between the cathode and suppressor of the 78 I. F. tube. To increase the sensitivity of this receiver, pull out on the dowel. To decrease the sensitivity of, (or to stabalize), this receiver, push the dowel in.

A socket is provided at which the autodaptor may be connected, thus enabling the P-5 to be operated from a 6 volt D. C. source.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER. DO THIS BY REDUCING THE INPUT, NOT BY RETARDING THE VOLUME CONTROL.

The I. F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier to be at fault. In that event:-

(1) Attach the output meter from screen to plate of the 43 tube.

(2) Attach the local oscillator, tuned to 456 kc., to the antenna lead.

(3) Adjust the I. F. trimmers for maximum indication on the output meter.

(A) The first I. F. trimmer is a dual unit, located on the rear of the chassis pan. The nut adjustment is the secondary trimmer.

(B) The second I. F. trimmer is a dual unit located on the top of the chassis pan near the volume control. The nut adjustment is the primary trimmer.

(4) Adjust the wave trap trimmer for MINIMUM indication (dip) on the output meter.

(A) This trimmer is a single unit at the extreme left end, on the rear of the chassis pan.

TO CALIBRATE THE P-5

(1) Set the condenser to the point where a station (or oscillator) of known frequency, about 1400 kc., should be received.

(2) Adjust the oscillator trimmer (screw adjustment top, front of gang condenser) until desired signal is heard. The calibration will then fall within reasonable limits with no further adjustment.

TO ALIGN (or gang) THE R. F. CIRCUIT

(1) Attach output meter from screen to plate of the 43 tube.

(2) Turn condenser to 1400 kc.

(3) Attach antenna lead to local oscillator tuned to resonance with receiver,.

(4) Adjust R. F. trimmer (screw adjustment top, rear of gang condenser) for maximum indication on the output meter. The alignment of the R. F. stage will fall within reasonable limits with no further adjustments.

ALIGNMENT PROCEDURE FOR MODEL P-5

MODEL SA-5
Alignment Data

THE RUDOLPH WURLITZER CO.

The Model SA-5 is a 5 tube superheterodyne covering the broadcast band and utilizing a band pass filter between the antenna and the first detector, a 2A7 electron coupled oscillator-first detector circuit, a 175 kc., I. F. amplifier, and a 2A6 duplex diode hi-mu triode second detector-first A. F. circuit. Diode type A.V.C. is employed.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER. DO THIS BY REDUCING THE INPUT, NOT BY RETARDING THE VOLUME CONTROL.

The I. F. trimmers are carefully adjusted at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier to be at fault. In that event:-

(1) Attach the output meter from screen to plate of the 2A5 tube.

(2) Attach local oscillator tuned to exactly 175 kc. to the control grid of the 2A7, providing a D. C. from this point to ground.

(3) Adjust the I. F. trimmers for maximum indication on the output meter. These I. F. trimmers are mounted on a strip extending from near the 2A7 socket toward the center of the chassis pan. A recheck of each trimmer adjustment, to insure perfect alignment of the I. F. stages, is recommended.

TO CALIBRATE THE SA-5

(1) Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc, should be received. Adjust the oscillator trimmer (screw adjustment, top center of gang condenser) until desired signal is heard.

(2) Set the dial to the point where a station (or oscillator) of known frequency, about 1000 kc., should be received and bend the rotor plates, when necessary, to correct the calibration.

(3) Repeat operation 2 at, or near, 800 kc.

(4) Repeat operation 2 at, or near, 600 kc.

TO ALIGN (or gang) THE R. F. CIRCUITS

(1) Set the dial to 1400 kc.

(A) Attach the output meter from screen to plate of the 2A5 tube.

(B) Attach local oscillator and tune to resonance with receiver.

(C) Adjust antenna trimmer (screw adjustment top, rear of gang condenser) for maximum indication on output meter.

(D) Adjust R. F. trimmer (screw adjustment top, front of gang condenser) for maximum indication on output meter.

(2) Set dial to 1000 kc.

(A) Adjust local oscillator to resonance with receiver.

(B) Bend rotor plates (front and rear gang condenser sections) for maximum indication on output meter.

(3) Repeat operation 2 at 800 kc.

(4) Repeat operation 2 at 600 kc.

THE RUDOLPH WURLITZER CO.

In all ganging operations USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER. Do this by reducing the input, NOT BY RETARDING THE VOLUME CONTROL.

The I. F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier to be at fault. In that event:-

1. Feed the signal from the local oscillator tuned to exactly 175 kc. into the set at the control grid 2A7, using some type of coupling device that will provide D. C. path from control grid to ground.

2. Attach the output meter from screen to plate of the 2A5 tube.

3. KEEPING THE SIGNAL AS LOW AS POSSIBLE, adjust the I. F. trimmers to give a maximum indication on the output meter. These I. F. trimmers will be found under the chassis pan, mounted on a strip extending from near the 2A7 socket to the center of the chassis pan. After having carefully adjusted these trimmers for maximum output, a final check should be made by going over each adjustment a second time to insure perfect alignment.

TO CALIBRATE THE SA-6

1. Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc., should come in. Adjust oscillator trimmer (screw adjustment top rear of gang condenser) until the desired signal is heard.

2. Set the dial to the point where a station (or oscillator) of known frequency, about 1000 kc. should come in. Then bend the rotor segments (about half engaged with the stator plates at this dial setting) to correct the calibration. If the dial reading is higher than the actual frequency, bend the segments away from the stator, and vica-versa,

3. Repeat operation two at, or near, 800 kc.

4. Repeat operation two at, or near, 600 kc.

This completes the calibration procedure.

TO ALIGN (or gang) THE R. F. CIRCUIT

1. Set dial to 1400 kc.

(A) Attach the output meter from screen to plate of the 2A5 tube.

(B) Attach the lead from local oscillator to the antenna post of the receiver, and adjust the oscillator to resonance with the receiver.

(C) KEEPING THE SIGNAL AS LOW AS POSSIBLE, adjust the antenna trimmer (screw adjustment, top of gang condenser, front end) for maximum indication on the output meter. Then-adjust the R. F. trimmer (screw adjustment, top center of gang condenser) for maximum indication on output meter.

2. Set dial to 1000 kc.

(A) Adjust the local oscillator for resonance with the receiver.

(B) Bend the segments of the rotor plates on the front and center sections of the gang condenser to give maximum indication on the output meter.

3. Repeat operation two at 800 kc.

4. Repeat operation two at 600 kc.

This completes the alignment procedure.

MODEL SA-91-A
Alignment Data

THE RUDOLPH WURLITZER CO.

BALANCING

Caution: When balancing radio frequency or IF circuits, be sure that the volume control is turned to the full "On" position and the output of the test oscillator adjusted to give a very weak signal. This is necessary to minimize the automatic volume control action and to permit the most accurate adjustment.

INTERMEDIATE FREQUENCY CIRCUITS

The intermediate frequency amplifier of this receiver operates at 175 kc. and an accurately calibrated test oscillator generating this frequency is necessary for ganging.

Current from the test oscillator should be fed into the set by removing the control grid cap on the type 57 detector modulator tube, and connecting the oscillator output terminals between the chassis pan and the control grid cap of this tube.

The IF transformers are tuned by adjusting the screws under the removable name plate on the rear of the chassis.

To align the RF circuits the test oscillator should first be set to some known frequency between 1400 and 1500 kc. and the set tuned so that the dial pointer indicates this frequency. The trimmer condenser of the oscillator section of the variable condenser (front section) should then be tuned until the test signal is received with greatest output.

There are two possible adjustments on the trimmer condensers at which this signal may be received; the proper adjustment is that at which the trimmer is set to minimum capacity; that is, the adjustment at which the trimmer plate is farthest out. When this has been done the trimmer condensers of the second and third variable condensers are to be set to give maximum output.

The set should next be balanced at approximately 1250, 950, 700 and 550 kc. in the order mentioned as follows:

The test oscillator is set to some known frequency, approximately that recommended above, and the set adjusted for maximum output by bending the adjustable sections of the rotor end plates of the variable condensers. In doing this, the plates or the oscillator section should be bent first and those of the remaining sections bent after the oscillator is adjusted.

AUTOMATIC VOLUME CONTROL

The detector and automatic gain control functions are performed by the diode section of the type 55 tube which rectifies the energy sent to it by the intermediate frequency amplifier. The DC component of this energy passes through a net work of high resistances and by-pass condensers to the control grids of the RF and IF tubes to control the amount of amplification in these stages.

An increase in signal strength results in an opposite action decreasing the amount of RF and IF amplification. The audio component of the signal rectified by the diode, is passed through the manual volume control which also serves as a part of the diode resistance net work. The adjustment of this control sets the amount of energy passed on to the audio amplifier for further amplification.

THE RUDOLPH WURLITZER CO.

The Model SU-5 is a dual wave superheterodyne receiver covering the broadcast band (550 to 1500 kc.), and a short wave band of from 1580 to 3700 kc.
Connect the line cord lead marked with a red dot to the grounded side of the line. Connect the output meter from screen to plate of the 43 tube.
Advance the tone and volume controls to their maximum positions (clockwise).
In all ganging operations USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER, do this by reducing the input, NOT BY RETARDING THE VOLUME CONTROL.
The I. F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier is at fault, in that event:-
(1) Attach the output meter to the 43 tube.
(2) Attach antenna lead to a local oscillator tuned to 456 KC.
(3) KEEPING THE SIGNAL INPUT AS LOW AS POSSIBLE, adjust the two I. F. trimmers to give maximum indication on output meter.
(A) The first I. F. trimmer is on the rear of the chassis directly under the first I. F. transformer, between the 6A7 and 78 tubes. The slot adjustment is the primary trimmer. The hex nut adjustment is the secondary trimmer.
(B) The second I. F. trimmer is located on the top of the chassis pan, left end, near the volume control. The adjustments are the same as on the first I. F. trimmer.
UNDER NO CIRCUMSTANCES SHALL THE SINGLE TRIMMER AT THE EXTREME RIGHT REAR OF THE CHASSIS (usually marked with red) BE ADJUSTED.

TO CALIBRATE BROADCAST BAND:-

(1) Turn the band switch to the broadcast position (clockwise).
(2) Set the dial pointer to the position where a station (or oscillator) of known frequency, about 1400 kc., should come in.
(3) Adjust oscillator trimmer (screw adjustment, top of gang condenser, front-dial-end) until desired signal is heard.
The calibration of the rest of the dial will fall within reasonable limits with no further adjustment.

TO ALIGN (or gang) THE BROADCAST BAND:-

(1) Connect the output meter to the 43 tube.
(2) Set dial to approximately 1400 kc., connect antenna lead to local oscillator tuned to set, and check settings of volume and tone controls.
(3) Adjust R. F. trimmer (screw adjustment, top of gang condenser, rear end) until output meter indicates maximum output. KEEP SIGNAL INPUT LOW! The alignment over the balance of the tuning range will fall within reasonable limits without further adjustment.

TO CALIBRATE THE SHORT WAVE BAND:-

(1) Turn the band switch to the short wave position (counter-clockwise).
(2) Set the dial pointer to the position where a station (or oscillator) of known frequency about 3700 kc., should come in.
(3) Adjust the short wave oscillator trimmer (screw adjustment, under chassis pan-adjustable through hole in chassis pan top front, right corner near gang condenser) until desired signal is heard. The calibration of the rest of the dial will fall within reasonable limits without further adjustment.

TO ALIGN (or gang) THE SHORT WAVE BAND:-

(1) Connect the output meter to 43 tube.
(2) Set dial to approximately 3600 kc. (3.6 MC.), connect antenna lead to local oscillator tuned to set and check settings of tone and volume controls.
(3) Adjust short wave R. F. trimmer (screw adjustment, rear of antenna coil mounting bracket, between 6A7 and 78 tubes) until the output meter indicates maximum output. KEEP THE SIGNAL INPUT LOW! The alignment over the balance of the tuning range will fall within reasonable limits without further adjustment.

ALIGNMENT PROCEDURE FOR LYRIC SU-5

MODEL SW-88
Alignment Data

THE RUDOLPH WURLITZER CO.

The Model SW-88 is an eight tube superheterodyne designed to receive modulated signals whose carrier frequency is between 550 and 22,000 kc. This tuning range is divided into four bands.

1st.	Scale	550	1500	kc.	546	200 m.	Broadcast.
2nd.	Scale	1450	3700	kc.	207	81.1 m.	Police Calls.
3rd.	Scale	3500	9000	kc.	85.7	33.3 m.	Domestic S.W.
4th.	Scale	8500	22000	kc.	35.3	13.6 m.	Foreign S.W.

The desired band is selected by a four position wave change switch mounted directly below the tuning control. This switch knob also controls the sliding mask behind the dial scale, allowing only the calibration of the band in use to be illuminated.

The Model SW-88 uses a 57 first detector, a 56 oscillator whose output is inductively coupled into the cathode circuit of the first detector, two stages of I.F. amplification(at 485 kc.) using 58 tubes, a 56 diode second detector and A.V.C. tube, a 57 first audio, and a 2A5 in the audio output stage.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER, AND TURN THE VOLUME & TONE CONTROLS TO THEIR MAXIMUM POSITIONS (clockwise).

The I.F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I.F. amplifier to be at fault,in that event:-

(1) Attach the output meter from plate to screen of 2A5 tube.

(2) Feed the signal from the local oscillator tuned to exactly 485 kc. into the receiver at the control grid of the first detector, providing a D.C. path from the point to ground.

(3) Adjust the I.F. trimmers to give maximum indication on the output meter. There are three I.F. transformers, each with two screw adjustments. On the early models these adjustments are on the bottom of the transformers, accessible from the under side of the chassis. On the later models these adjustments are on the top of the transformers.

(4) NEXT-feed the 485 kc. signal in at the antenna post,replace the first detector grid cap, and adjust the wave trap condenser for MINIMUM indication on the output meter. This adjustment is a ¼" hex nut on a two plate trimmer under the chassis,below the gang condenser, near the band switch.

TO CALIBRATE THE SW-88

(1) Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc.,should come in.

(A) Set Band switch to band 1 (top scale).

(B) Adjust oscillator trimmer (screw adjustment, top-rear of gang condenser) until desired signal is heard. There will be two peaks in adjusting this trimmer. The peak obtained with the loosest trimmer setting is correct.

(2) Repeat operation 1 at,or near,550 kc., using band 1.

(A) Adjust oscillator pad (fourth adjustment from right, on rear of chassis pan) until desired signal is heard.

(3) Repeat operation 1 at, or near,1450 kc.,using band 2.

(A) Adjust oscillator pad (third adjustment from right on rear of chassis pan) until the desired signal is heard.

(4) Repeat operation 1 at, or near, 3500 kc.,using band 3.

(A) Adjust oscillator pad (second adjustment from right on rear of chassis pan) until the desired signal is heard.

(5) Repeat operation 1 at, or near, 8500 kc.,using band 4.

(A) Adjust oscillator pad (extreme right adjustment on rear of chassis pan) until the desired signal is heard.

TO ALIGN (or gang) THE R.F. CIRCUITS

(1) Set the dial to 1400 kc., using band 1.

(A) Attach oscillator, tuned to set, to antenna post.

(B) Attach output meter from screen to plate of 2A5 tube.

(C) Adjust R. F. trimmer (screw adjustment, top-front-of gang condenser) for maximum output. KEEP SIGNAL INPUT LOW!

(2) Set the dial to 3700 kc., using band 2.

(A) Tune the oscillator to the receiver and adjust R.F. trimmer (extreme left adjustment on rear of chassis pan) for maximum output. KEEP SIGNAL INPUT LOW!

(3) Set the dial to 9000 kc., using band 3.

(A) Tune the oscillator to the receiver and adjust R.F. trimmer (second adjustment from left on rear of chassis pan)

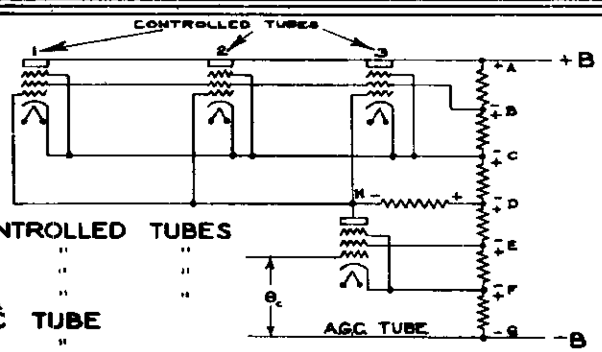
Note 1-In case the local oscillator will not reach the higher alignment frequencies, harmonics of lower frequencies may be used.

CORRECTION--The 9000 kc. R.F. trimmer is erroneously shown connected to switch point 4 in the Model SW-88 Service Schematic, Drawing No. 83. This trimmer should be wired to point 3, and point 4 should be left open.

ALIGNMENT PROCEDURE FOR MODEL SW-88

THE RUDOLPH WURLITZER CO.

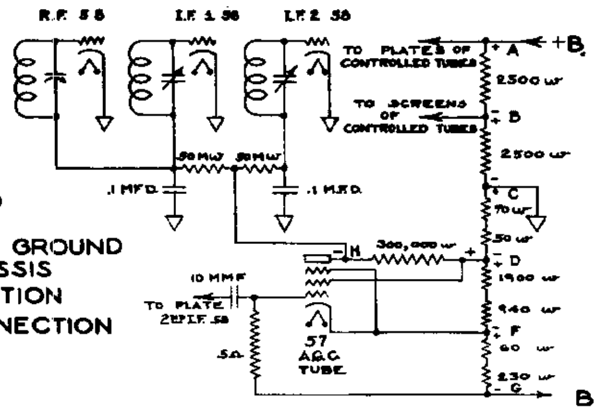
FIG. 1



C-A E_r CONTROLLED TUBES
C-B E_s " "
C-D E_c " "
D-H AVC E_c " "
F-D E_r AGC TUBE
F-E E_s " "
F-G E_c " "
θ_c CONTROL VOLTAGE FOR AGC TUBE

FUNCTIONAL SCHEMATIC
THERMIONIC VOLTMETER TYPE
AUTOMATIC GAIN CONTROL (H)

FIG. 2

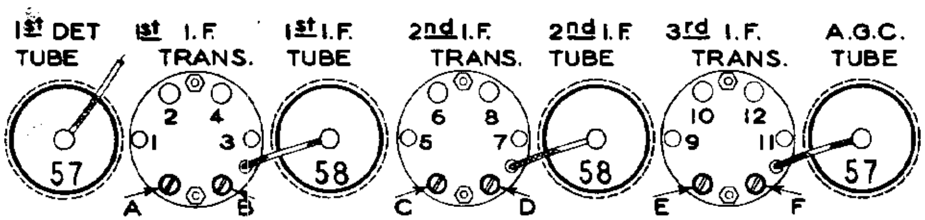


LEGEND

- INDICATES GROUND TO CHASSIS
- CONNECTION
- NO CONNECTION
- Ω MEGOHM
- MΩ KILOHM
- ω OHM

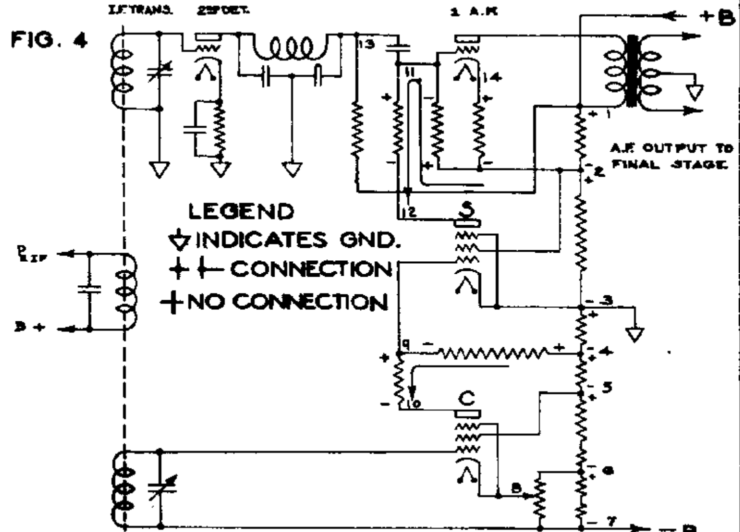
A.V.C. CIRCUITS MODEL SA-133

FIG. 3



I.F. AMPLIFIER SECTION MODEL SA-133

FIG. 4

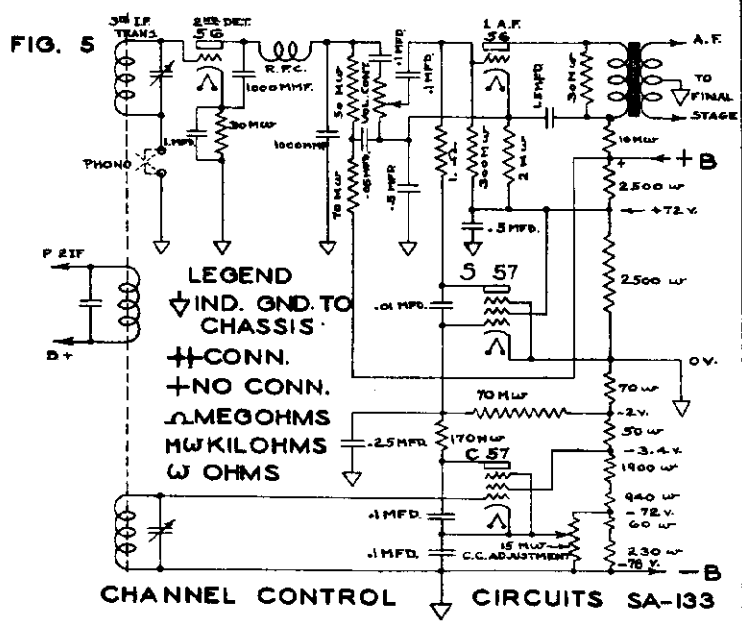


LEGEND

- INDICATES GND.
- CONNECTION
- NO CONNECTION

FUNCTIONAL SCHEMATIC
CHANNEL CONTROL SYSTEM

FIG. 5



LEGEND

- IND. GND. TO CHASSIS
- CONN.
- NO CONN.
- Ω MEGOHMS
- MΩ KILOHMS
- ω OHMS

CHANNEL CONTROL CIRCUITS SA-133

MODEL SA-133
Alignment Data

THE RUDOLPH WURLITZER CO.

The difficulty in correctly aligning the I.F. stages is a result of the design of the I. F. transformers. In order to obtain a high degree of selectivity without sacrificing tone quality these transformers have been designed to provide a very narrow resonance curve with an essentially flat top. This is accomplished by over-coupling these transformers enough to get "double-bumps" the correct distance apart. With these transformers over-coupled it is impossible to correctly align them, therefore, it is necessary to decouple each I. F. transformer while it is being aligned. This is accomplished by shunting one winding with a 20,000 ohm resistor and aligning the other winding.

In the event that the I.F. stages require realignment the following procedure should be followed.

(1) Attach the output meter from plate to plate of the 2A5 tubes.
(2) Remove the silencing tube of the channel control circuit
(3) Attach the local oscillator tuned to exactly 175 kc. to the control grid of the first detector, using some type of coupling device that provides a d.c. path to ground. IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER.
(4) Attach a resistor across the secondary of the first I.F. transformer (by inserting the leads in holes 3 & 4--See Figure 3, Drawing #82-B) and adjust screw A for MAXIMUM indication on the output meter.
(5) Remove the resistor from the secondary of the first I.F. transformer and place it across the primary (holes 1 & 2) and adjust screw (B) for MAXIMUM indication on the output meter. LEAVE THIS RESISTOR WHERE IT IS FOR THE BALANCE OF THE ALIGNMENT PROCEDURE.
(6) With a second resistor repeat operation 4, (holes 7 & 8, screw (C).
(7) With this second resistor repeat operation 5, (holes 5 & 6, screw (D).
(8) With a third resistor repeat operation 4,(holes 11 & 12, screw (E).
(9) With this third resistor repeat operation 5, (holes 9 & 10, screw (F).
(10) Adjust the channel control pad (screw adjusting trimmer under chassis pan near third I.F. transformer, (adjustable through hole in chassis pan bottom cover) for MINIMUM (dip) indication on the output meter. This dip is not very pronounced, and unless extreme care is exercised it may be passed over without being noticed. Note--Be sure the resistor leads make good contact when inserted in holes in transformers.

TO CALIBRATE THE SA-133

(1) Adjust the dial mechanism (if necessary) so that with the plates entirely enmeshed the dial will indicate 525 kc.
(2) Set the dial to the point where a station(or oscillator) of known frequency, about 600 kc., should be received and adjust the oscillator pad (screw adjustment under hole in chassis pan between oscillator section on gang condenser shields) until desired signal is heard.
(3) Set the dial to the point where a station(or oscillator) of known frequency, about 1400 kc., should be received and adjust the oscillator trimmer (screw adjustment, top of gang condenser, third from front) until desired signal is heard.
(4) Re-check operations 2 & 3.
(5) Check the calibration at, or near, 1200 kc. and correct (if necessary) by bending outer oscillator section rotor plates.
(6) Repeat operation 5 at, or near, 950 kc.
(7) Repeat operation 5 at, or near, 650 kc.
(8) A thorough re-check of the foregoing 7 operations to insure perfect calibration is recommended. If the alignment procedure to this point has been performed correctly the calibration will be accurate to within 2kc. at all points on the dial.

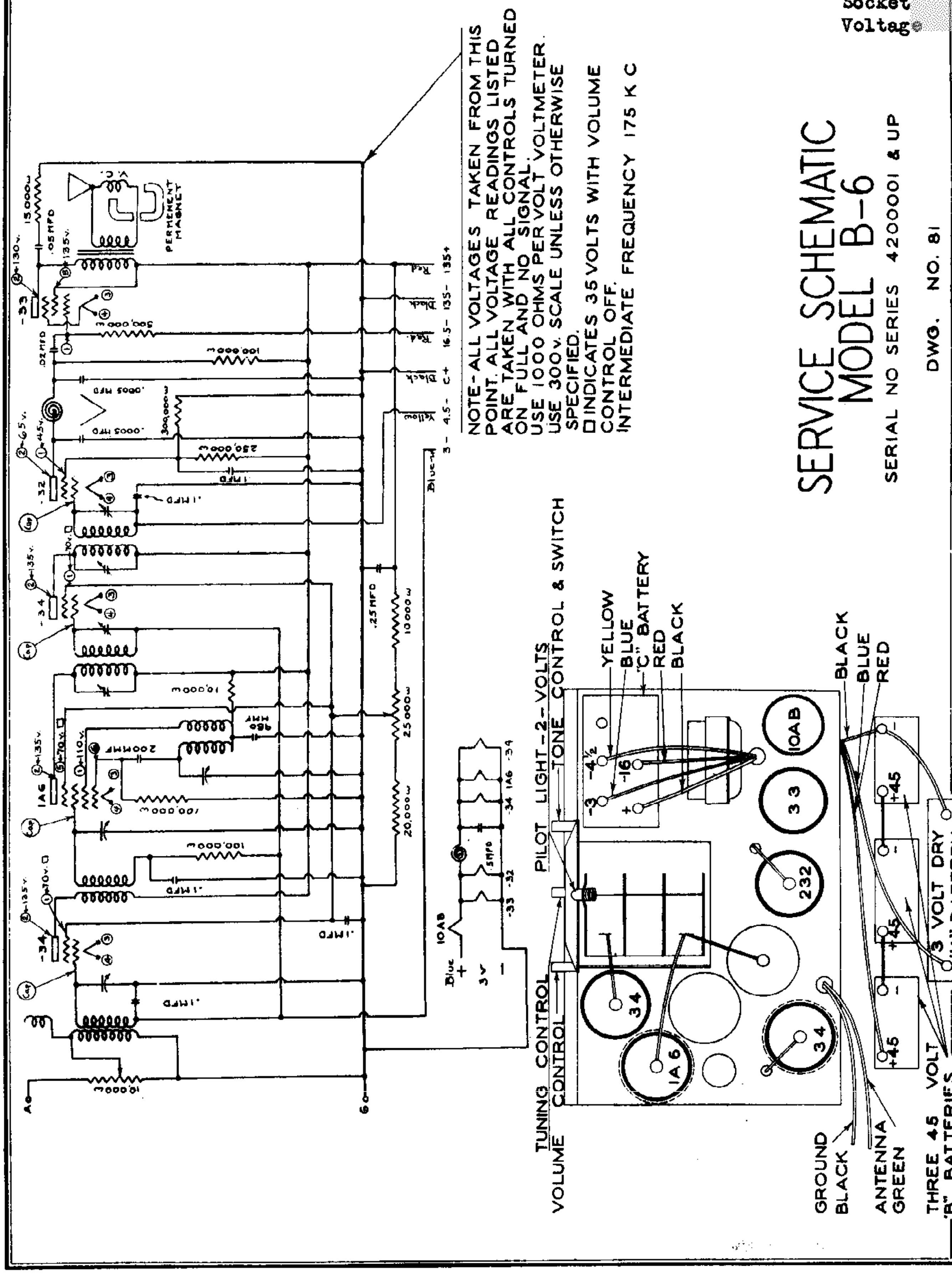
TO ALIGN THE R. F. CIRCUITS OF THE SA-133

(1) Attach the output meter from plate to plate of the 2A5 tubes.
(2) Attach the local oscillator to the antenna and tune to to set at each test frequency.
(3) At 1400 kc., adjust the antenna, link, and R.F trimmers (screw adjustments, top of gang condenser--see Drawing #82) for maximum indication on the output meter USING THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION.
(4) At 1200 kc. bend the plates of the antenna, link and R.F rotors to give maximum indication on the output meter.
(5) Repeat operation 4 at 950 kc.
(6) Repeat operation 4 at 650 kc.
(7) Repeat operation 4 at 570 kc.
(8) Re-check operations 3-8 inclusive to insure perfect alignment.
(9) REMOVE RESISTORS FROM THE I.F. TRANSFORMERS.
(10) Remove the output meter and local oscillator, attach antenna, set dial to a point where no signal is being received and turn channel control counter-clockwise just far enough to silence the static and other inter-station noises.

The Model SA-133 is now ready for operation.

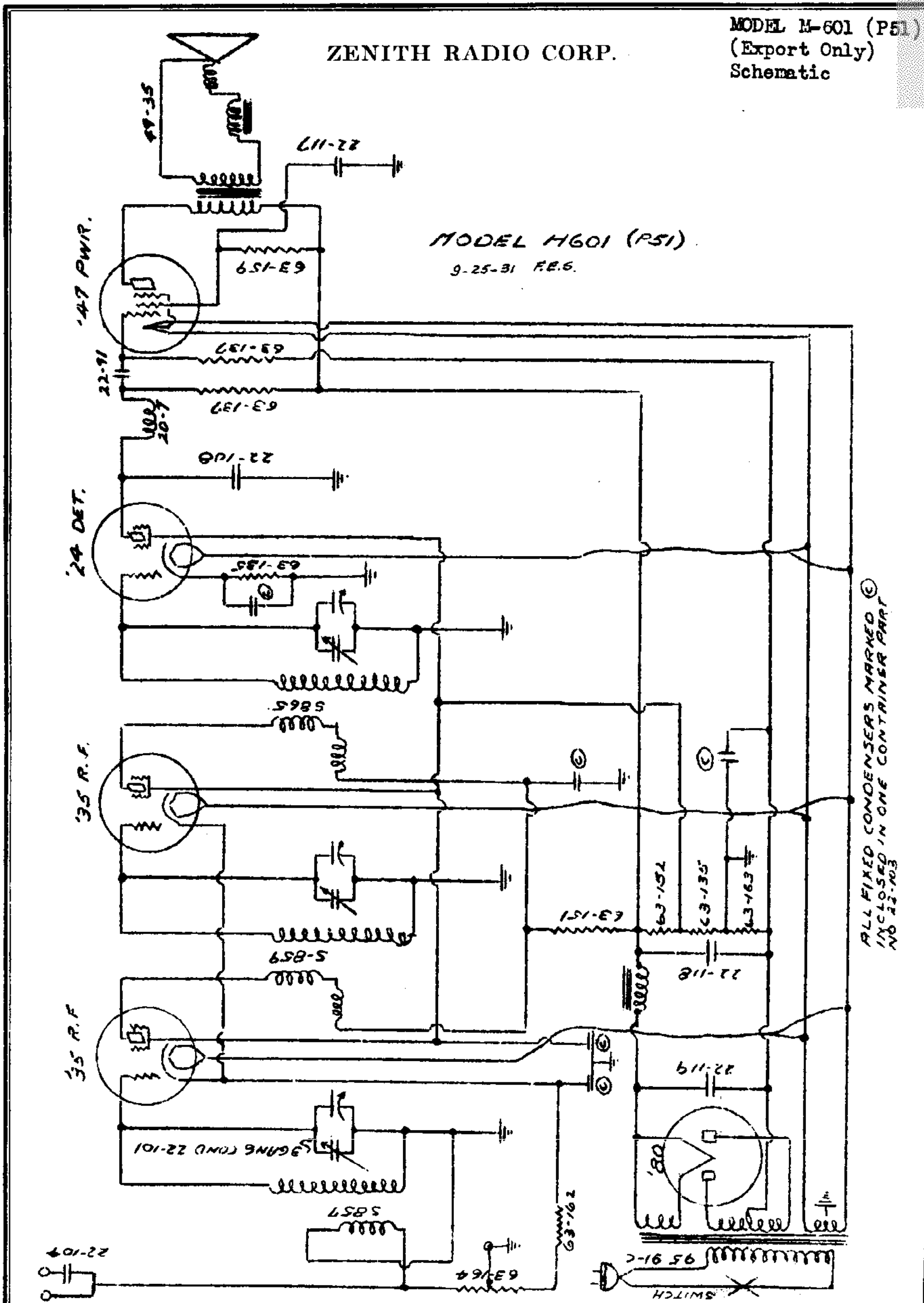
MODEL B-6
Schematic
Socket
Voltage

THE RUDOLPH WURLITZER CO.



ZENITH RADIO CORP.

MODEL M-601 (P51)
(Export Only)
Schematic



MODEL M-601 (P51)
Parts List

ZENITH RADIO CORP.

Variable Condenser Assembly

22-101	Three gang condenser	
S-861	Dial drum assembly	
S-769	Pilot lamp bracket and socket	
100-18	2½ volt lamp	
11-2	Pulley string	
80-69	Dial string tension spring	

Fixed Condensers

22-91	.03 mfd. condenser	(audio coupling)
S-392	Antenna series condenser	
22-103	Five section bypass condenser	
22-108	.002 mfd. condenser	(bypass)
22-117	.5 " "	"
22-118	6. " "	(electrolytic low voltage)
22-119	6. " "	(" high ")

Resistors

63-135	25M ohm resistor	(Red, Green end,Or ange Dot)
63-137	250M " "	(" " " Yellow ")
63-151	15M " "	(Brown " " Orange ")
63-152	43M " "	(Yellow Orange " ")
63-159	4M " "	(" Black end Red ")
63-162	100 " "	(Flat wire wound black ")
63-163	320 " "	" " " Red ")
63-164	Volume control	

Coils

S-857	1st R.F.coil (antenna)	(Coil Only)
S-859	2nd " " " (intermediate)	(" ")
S-865	3rd " " " (detector)	(" ")
20-8	R.F.choke	

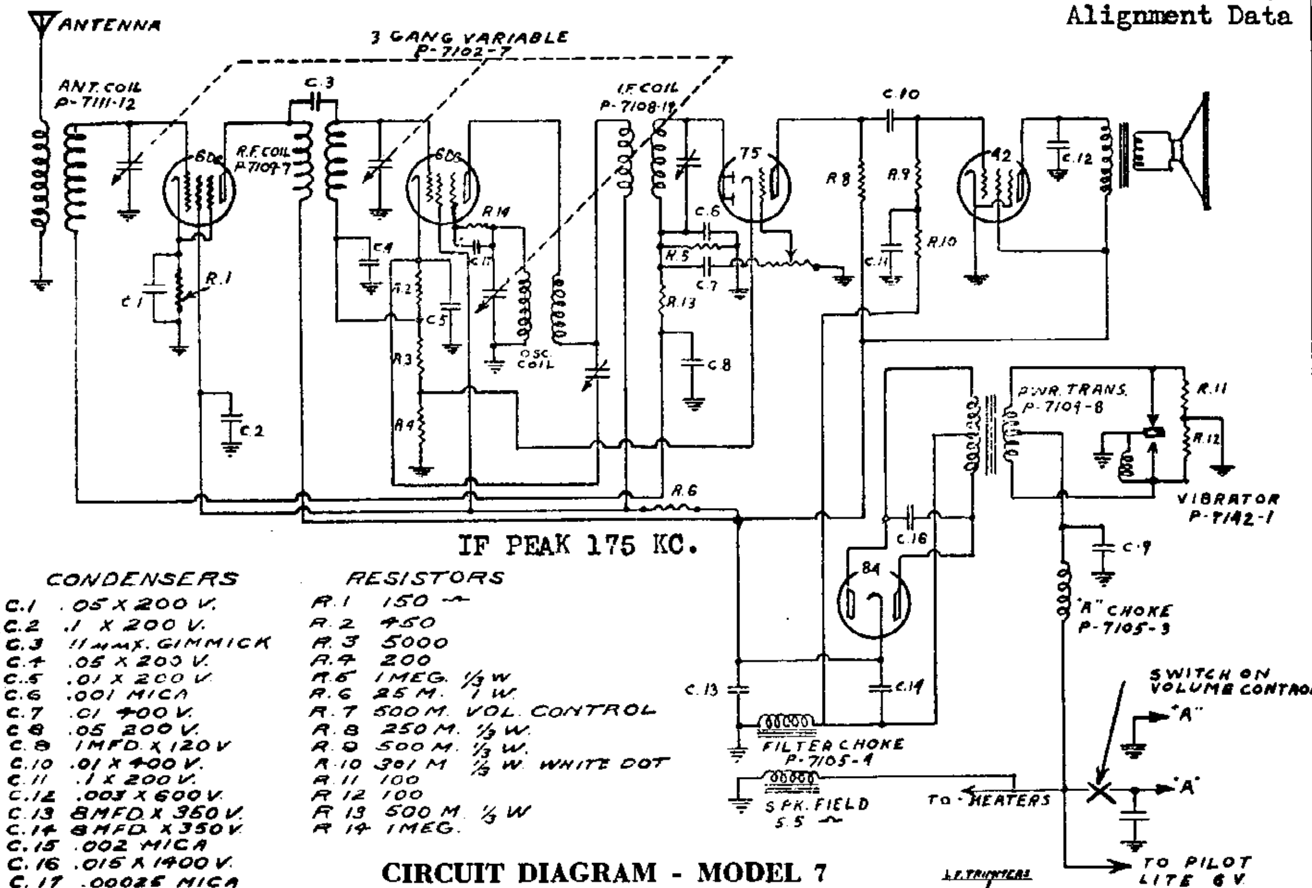
Shields

126-59	R.F. coil shield can
126-68	Condenser shield
MS-163	Tube shield
S-771	Coil mounting base

Miscellaneous

26-20	Calibrated dial strip	
46-50	Knobs for switch & volume control	
46-51	Knob for dial	
49-34	Dynamic speaker	
57-269	Escutcheon plate	
78-34	Four prong socket	
78-35	Five " "	
78-39	" " Pentode socket	
83-226	Speaker terminal strip	
85-29	Off & On switch	
95-91	Power transformer	(60 cycle)
95-92	" "	(25 ")

ZENITH RADIO CORP.



IF PEAK 175 KC.

CONDENSERS

C.1 .05 X 200 V.
C.2 .1 X 200 V.
C.3 11 MMF. GIMMICK
C.4 .05 X 200 V.
C.5 .01 X 200 V.
C.6 .001 MICA
C.7 .01 400 V.
C.8 .05 200 V.
C.9 1 MFD. X 120 V
C.10 .01 X 400 V.
C.11 .1 X 200 V.
C.12 .003 X 600 V.
C.13 8 MFD. X 350 V.
C.14 8 MFD. X 350 V.
C.15 .002 MICA
C.16 .015 X 1400 V.
C.17 .00025 MICA

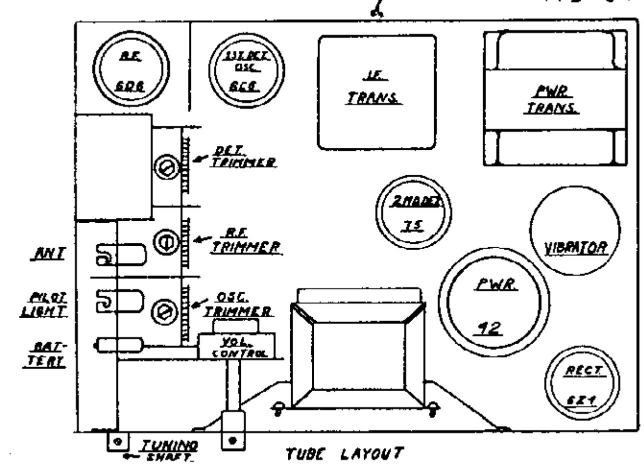
RESISTORS

R.1 150 Ω
R.2 450
R.3 5000
R.4 200
R.5 1 MEG. 1/3 W
R.6 25 M. 1 W.
R.7 500 M. VOL. CONTROL
R.8 250 M. 1/3 W.
R.9 500 M. 1/3 W.
R.10 301 M 1/3 W. WHITE DOT
R.11 100
R.12 100
R.13 500 M. 1/3 W
R.14 1 MEG.

CIRCUIT DIAGRAM - MODEL 7

NOTE:
C.1, C.2, C.4, C.5 IN ONE UNIT. PART 7145-4
C.13, C.14 IN ONE UNIT PART 7119-4
R.1, R.2, R.3, R.4 IN ONE UNIT. PART 7106-14
R.11, R.12, IN ONE UNIT. PART 7106-6

TUBE	POSITION	Ef	Ek	Eg^1	Eg^2	Eg^3	Ep
6D6	R.F.	5.9	1.5	0.	98	1.5	240
6C6	DET.-OSC.	5.9	17.	15.	98	—.5	98
75	1st AUD.	5.9	.5	0	—	—	80
42	PWR.	5.9	0	—5	240	0	220
84	RECT.	5.9	240	—	—	—	—



TUBE LAYOUT

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers I. F. transformer, part number 7108-19 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.

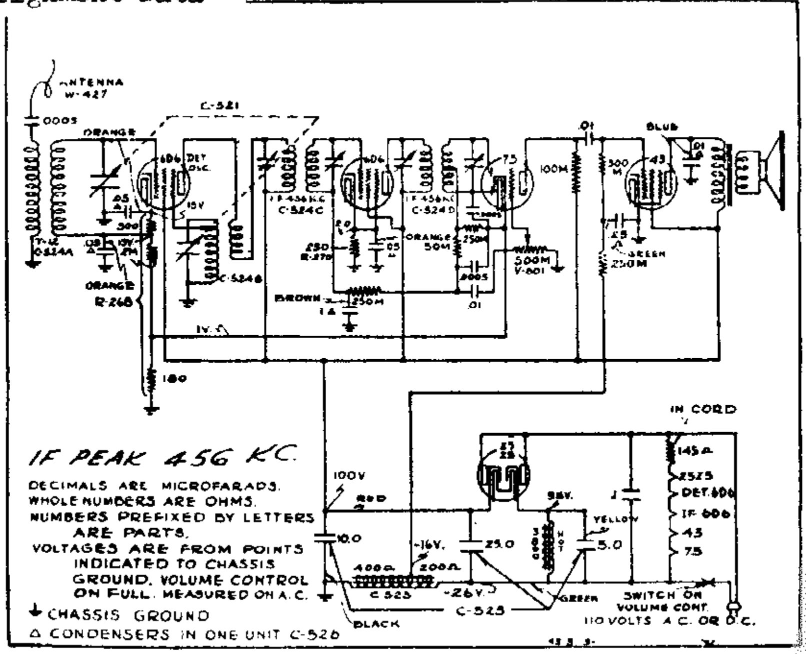
Note: The I. F. transformer has two trimmers, both of which are adjustable through the rear of the case.

FREQUENCY ALIGNMENT:

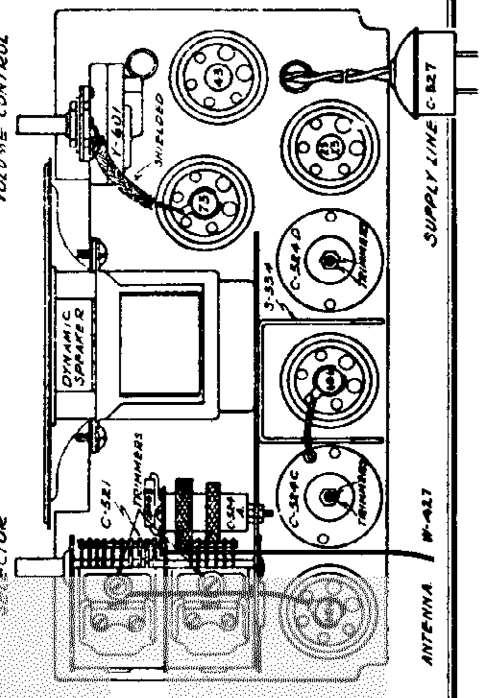
1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust con-condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R. F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

MODEL 701
MODEL 702
Schematic, Socket
Alignment Data

ZENITH RADIO CORP.



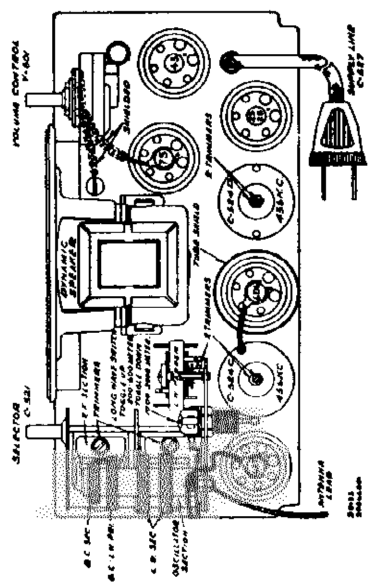
Schematic circuit diagram Model 701 AC-DC Superheterodyne, with automatic volume control



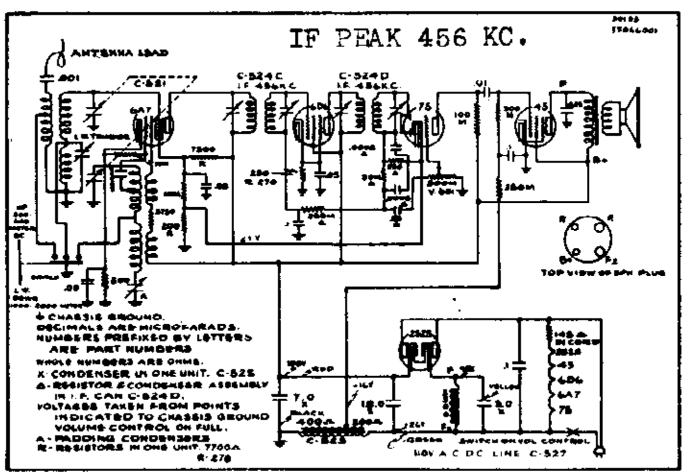
Should it be necessary, at any time, to rebalance this set the procedure is as follows: Attach a 456 kilocycle oscillator to the grid of the 6D6 tube in back of the variable condenser and adjust the trimming condensers of the I. F. transformers to maximum deflection on an output meter connected across the primary of the speaker input transformer. While adjusting these trimmers, the variable condenser should be at the maximum capacity position—at the extreme right of its rotation.

Next disconnect the antenna wire and connect an oscillator in series with a 75 mmf. condenser to the antenna coil. Rotate the condenser plates to the minimum capacity position—extreme left turn, and adjust the trimmer condenser of the rear section of the variable condenser to resonance with an oscillator set at 1725 kilocycles, then adjust the condenser of the front section of the variable condenser to resonance. Align at 1400—1200—1000—800—600—530 kilocycles, bend slotted plates of variable condenser if necessary.

MODEL 701



MODEL 702



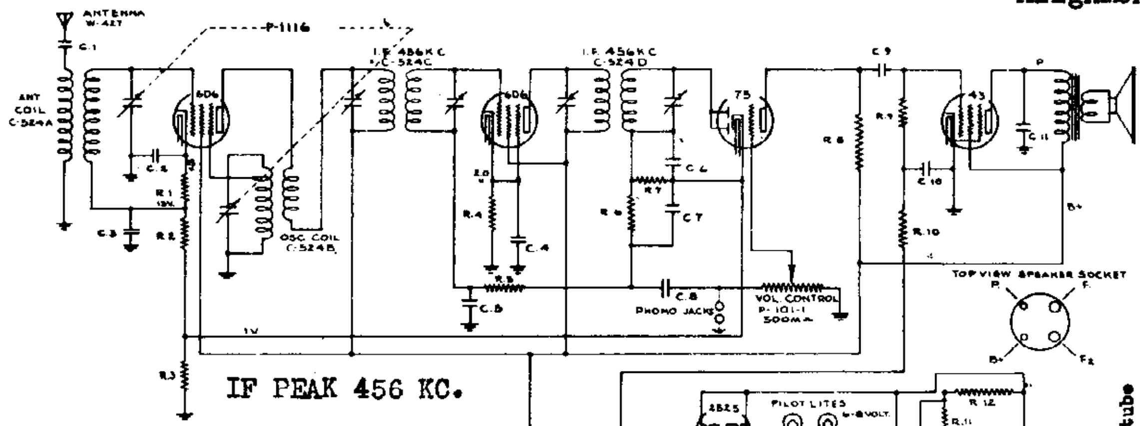
Schematic Circuit Diagram and Aligning Instructions Model 702 AC-DC Superheterodyne 200-600 Meters: 1000-2000 Meters

Should it be necessary, at any time, to rebalance this set the procedure is as follows: Attach a 456 kilocycle oscillator to the grid of the 6A7 tube in back of the variable condenser and adjust the trimming condensers of the I. F. transformers to maximum deflection on an output meter connected across the primary of the speaker input transformer. While adjusting these trimmers, the variable condenser should be at the maximum capacity position—at the extreme right of its rotation.

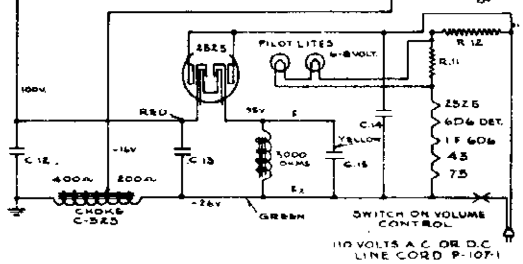
With switch lever up in 200-600 meter position, disconnect the antenna wire and connect an oscillator in series with a 250 mfd. condenser to the antenna coil, rotate the condenser plates to the minimum capacity position, extreme left turn, and adjust trimmer condenser of the oscillator and rear section of the variable to resonance with the oscillator set at 200 meters, adjust the front section to resonance at 215 meters, align at 250—300—400—500 meters and bend slotted plates of variable condenser if necessary. To adjust long wave, 1000-2000 meters, with switch lever down, set variable at maximum capacity, extreme right turn, and tune generator to maximum output, then peak long wave padder (hexagon nut of L. W. Padder), at the same time tuning oscillator until maximum output is attained. Attach oscillator leads to grid of 6A7 ground, set variable condenser at minimum capacity, extreme left turn, and adjust oscillator to resonance with set. Remove oscillator lead from grid of 6A7 and attach to antenna lead, then adjust long wave R.F. trimmer to maximum output (set screw adjustment of L. W. Padder). Do not disturb either oscillator or variable condenser while making this adjustment.

MODEL 801
Schematic, Socket
Alignment Data

ZENITH RADIO CORP.



IF PEAK 456 KC.



LEGEND

RESISTORS

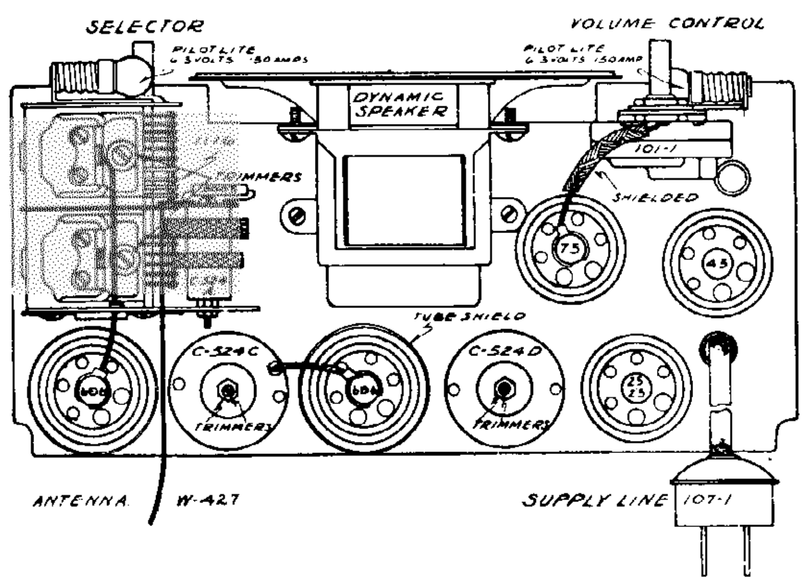
Nº	VALUE	
R. 1 -	300	*
R. 2 -	2M	*
R. 3 -	180	*
R. 4 -	250 R-270	
R. 5 -	250M	
R. 6 -	50M	
R. 7 -	250M	
R. 8 -	100M	
R. 9 -	300M	
R. 10 -	250M	
R. 11 -	40Ω 300MA. 0.36W P-106-1	
R. 12 -	126 IN CORD P-107-1	

CONDENSERS

Nº	VALUE	
C. 1 -	.0005	MICA
C. 2 -	.05	200V
C. 3 -	.05	200V
C. 4 -	.05	200V
C. 5 -	.1	200V
C. 6 -	.0005	MICA
C. 7 -	.0005	MICA
C. 8 -	.01	400V
C. 9 -	.01	400V
C. 10 -	.1	200V.
C. 11 -	.025	300
C. 12 -	5.0 MFD.	C-525D
C. 13 -	25.0 MFD.	*
C. 14 -	.1	400V
C. 15 -	5.0 MFD	*

NOTE:-
* R.1, R.2 & R.3 IN ONE UNIT PART NUMBER R-268.
* C. 13 AND C. 15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A.C. CURRENT

MODEL 801



INTERMEDIATE FREQUENCY 456 K. C.

I.F. ALIGNMENT

1. To peak I.F. transformers, connect oscillator set at 456 kilocycles to the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

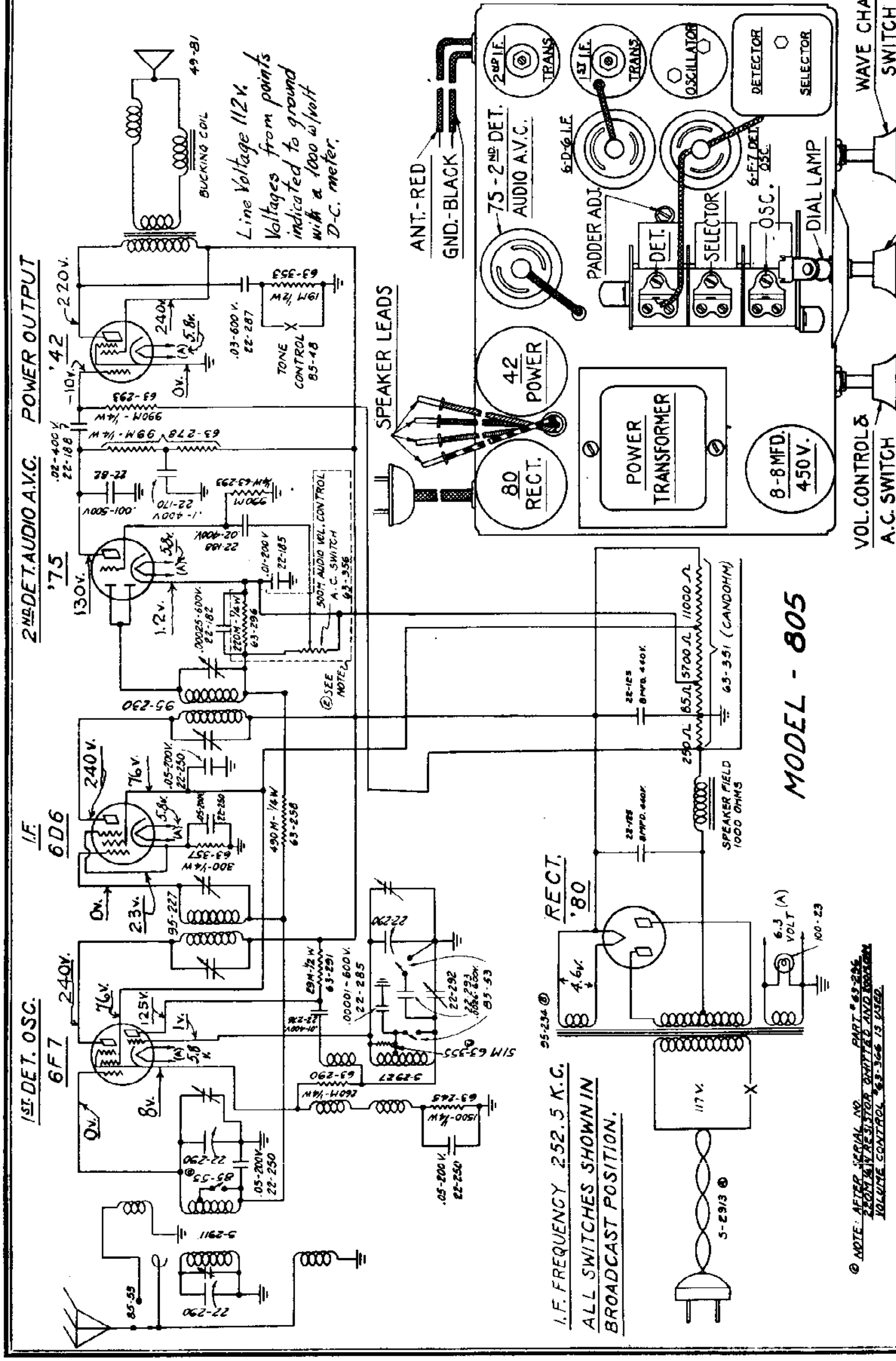
Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

BROADCAST BAND ALIGNMENT

1. Disconnect antenna wire and connect oscillator in series with a 75 mmfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer). Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

MODEL 805,845
Schematic
Socket Layout
Voltage,Alignment

ZENITH RADIO CORP.

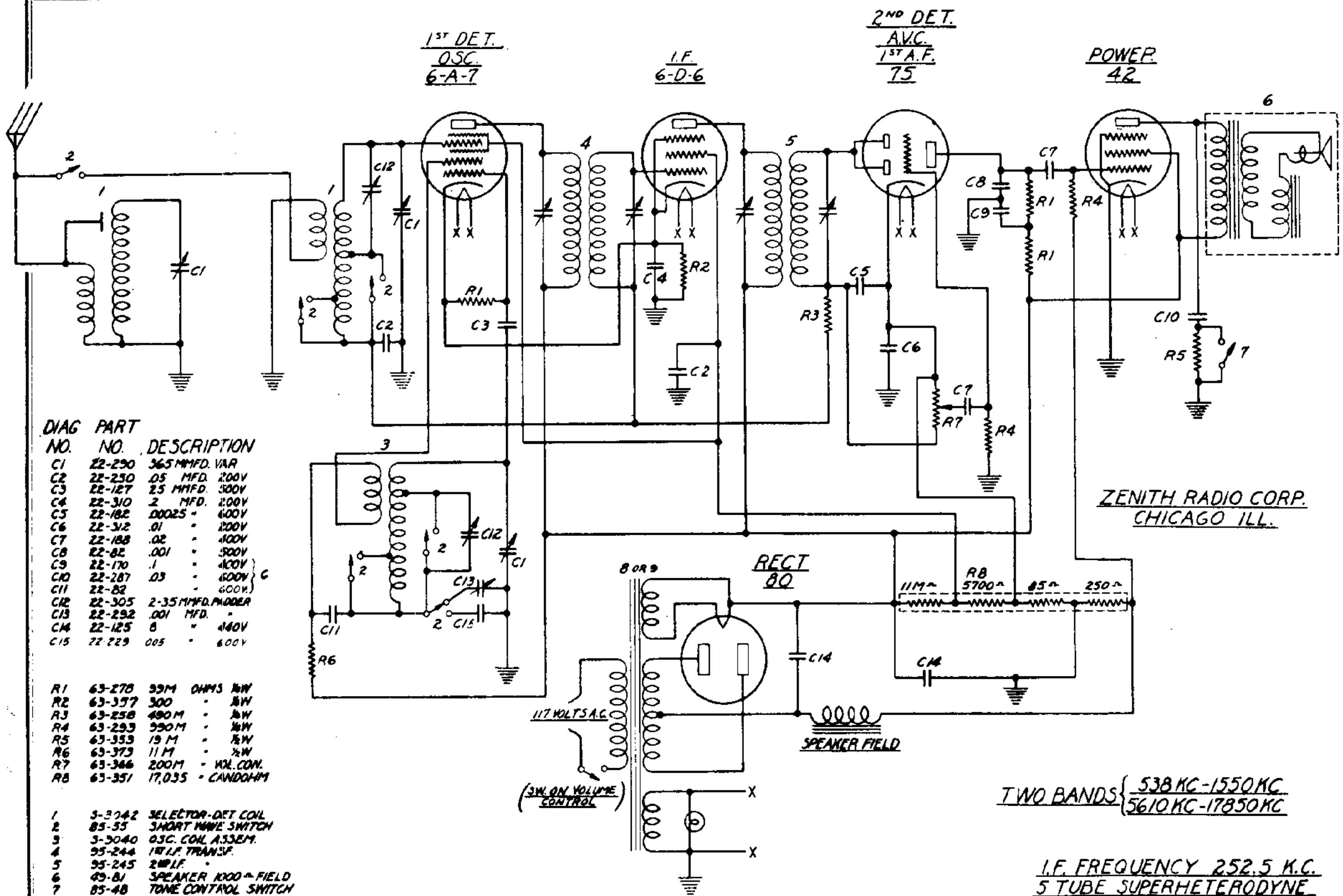


Balance I. F. transformers at 252.5 K.C.; trimmers on gang at 1500 K.C.; and oscillator padder at 600 K.C., with wave switch on broadcast position. No adjustments necessary on short wave bands.

ZENITH RADIO CORPORATION
CHICAGO, ILL. U.S.A.

5-TUBE SUPERHETERODYNE
CHASSIS 5502

ZENITH RADIO CORP.



ZENITH RADIO CORP.
CHICAGO ILL.

TWO BANDS { 538 KC - 1550 KC; 5610 KC - 17850 KC

I.F. FREQUENCY 252.5 K.C.
5 TUBE SUPERHETERODYNE
CHASSIS NOS. 5504 & 5505

DIAG NO.	PART NO.	DESCRIPTION
C1	22-290	365 MMFD. VAR
C2	22-230	.05 MFD. 200V
C3	22-127	25 MMFD. 300V
C4	22-310	2 MFD. 200V
C5	22-182	.00025 " 600V
C6	22-312	.01 " 200V
C7	22-188	.02 " 400V
C8	22-82	.001 " 900V
C9	22-170	.1 " 400V } C
C10	22-287	.03 " 600V } C
C11	22-82	" 600V } C
C12	22-305	2-35 MMFD. PADDER
C13	22-292	.001 MFD. "
C14	22-125	8 " 440V
C15	22-229	.005 " 600V
R1	63-278	33M OHMS ¼W
R2	63-357	300 " ½W
R3	63-258	490M " ¼W
R4	63-293	990M " ¼W
R5	63-353	19 M " ½W
R6	63-373	11 M " ½W
R7	63-366	200M " VOL. CON.
R8	63-351	17,035 " CANDOHM
1	3-3042	SELECTOR-DET. COIL
2	85-55	SHORT WAVE SWITCH
3	3-3040	OSC. COIL ASSEM.
4	95-244	1ST I.F. TRANSF.
5	95-245	2ND I.F. "
6	49-81	SPEAKER 1000 Ω FIELD
7	85-48	TONE CONTROL SWITCH
8	95-234	POWER TRANSF. 50-60 CYCLE
9	95-229	" " 25 CYCLE

MODELS 806-807-S847-850

MODELS 806,807, S847,850
Voltage, Socket
Alignment Data

ZENITH RADIO CORP.

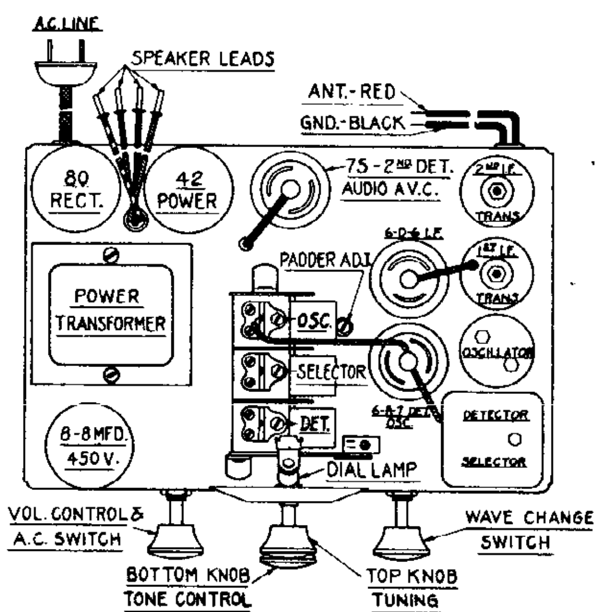
TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6A7	1st Det.	5.8	5.2	0	80	-	260
	Osc.			.6	-	-	210
6D6	I.F.	5.8	5.2	0	80	5.2	260
75	2nd Det.	5.8	1.5	0	-	-	135
42	PWR.	5.8	0	-.7	260	-	245
80	RECT.	4.8	-	-	-	-	-

Line Voltage 112 — Antenna and Ground Disconnected

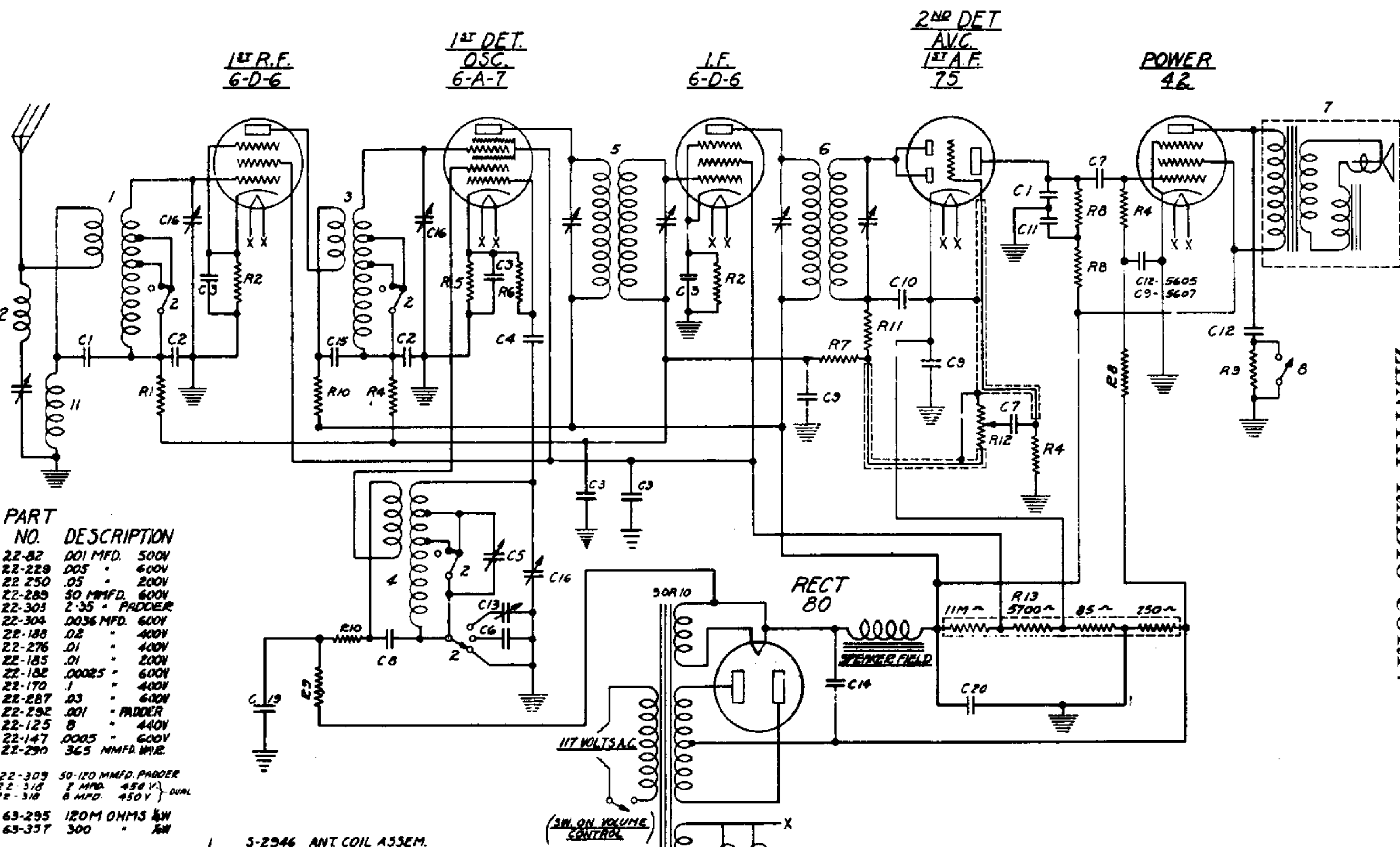
All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except filaments).
F - Filament; K - Cathode; gl - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

Alignment

1. Balance I.F. transformers at 252.5 K.C. with test oscillator connected to control grid of 6A7 and ground.
2. Connect test oscillator to antenna and ground leads.
3. Adjust broadcast padder (located nest to gang on top of chassis) for correct dial reading at 600 K.C.
4. Adjust trimmer on oscillator section of gang for correct dial reading at 15 M.C. Adjust detector trimmers (located between gang and coil shield on top of chassis) for maximum signal.
5. Adjust oscillator trimmer (located on right side underneath chassis) for correct dial reading at 1400 K.C. - also adjust preselector and detector trimmers on gang for maximum signal.
6. Readjust broadcast padder for correct dial setting.



ZENITH RADIO CORP.



DIAG NO.	PART NO.	DESCRIPTION
C1	22-82	.001 MFD. 500V
C2	22-228	.005 " 600V
C3	22 250	.05 " 200V
C4	22-289	50 MMFD. 600V
C5	22-303	2-35 " PADDER
C6	22-304	.0036 MFD. 600V
C7	22-188	.02 " 400V
C8	22-276	.01 " 400V
C9	22-185	.01 " 200V
C10	22-182	.00025 " 600V
C11	22-170	.1 " 400V
C12	22-287	.03 " 600V
C13	22-292	.001 " PADDER
C14	22-125	8 " 440V
C15	22-147	.0005 " 600V
C16	22-290	365 MMFD. MAX.
C18	22-309	50-120 MMFD. PADDER
C19	22-318	2 MFD. 450V } DUAL
C20	22-318	8 MFD. 450V } DUAL
R1	63-295	120M OHMS ¼W
R2	63-357	300 " ½W
R4	63-271	1 MEGOHM ¼W
R5	63-362	400 OHMS ¼W
R6	63-280	49M " ¼W
R7	63-258	490M " ¼W
R8	63-278	99M " ¼W
R9	63-353	19M " ½W
R10	63-373	11M " ¼W
R11	63-355	51M " ¼W
R12	63-366	200M " VOL. CON.
R13	63-351	17,035 " CANDOHM

1	S-2946	ANT. COIL ASSEM.
2	85-47	SHORT WAVE SWITCH
3	S-2945	DET. COIL ASSEM.
4	S-2947	OSC. " "
5	95-227	1ST I.F. TRANSF
6	95-230	2ND I.F. "
7	49-81	SPEAKER 1000 ~ FIELD
8	85-48	TONE CONTROL SWITCH
9	95-234	POWER TRANSF. 50-60 CYCLE
10	95-229	" " 25 CYCLE
11	20-71	ANT. CHOKE
12	20-75	WAVE TRAP CHOKE

MODELS - 808-809-860-861

I.F. FREQUENCY 252.5 K.C.
6 TUBE SUPERHETERODYNE
CHASSIS NOS. 5605 AND 5607

ZENITH RADIO CORP.
CHICAGO ILL.

MODELS 808,809,
860,861
Voltage,Socket
Alignment Data

ZENITH RADIO CORP.

5605

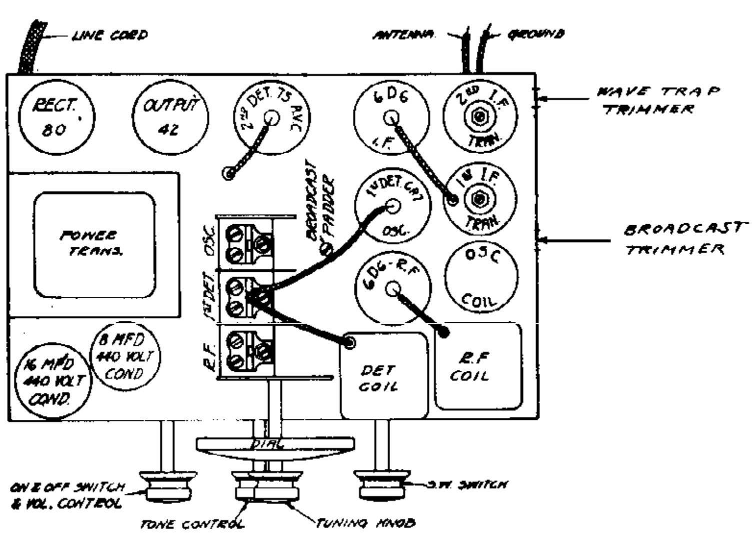
TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.6	2.4	0	70	2.4	200
6A7	1St. Det.	5.6	3	0	70	-	250
	Osc.			3.6	-	-	230
6D6	I.F.	5.6	2.6	0	70	2.6	250
75	2nd.Det. 1st Audio	5.6	1.4	0	-	-	148
42	PWR.	5.6	0	-.6	250	-	250
80	RECT.	4.6	-	-	-	-	300

Line Voltage 112 Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except heaters).
F - Filament; K - Cathode; g1 - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

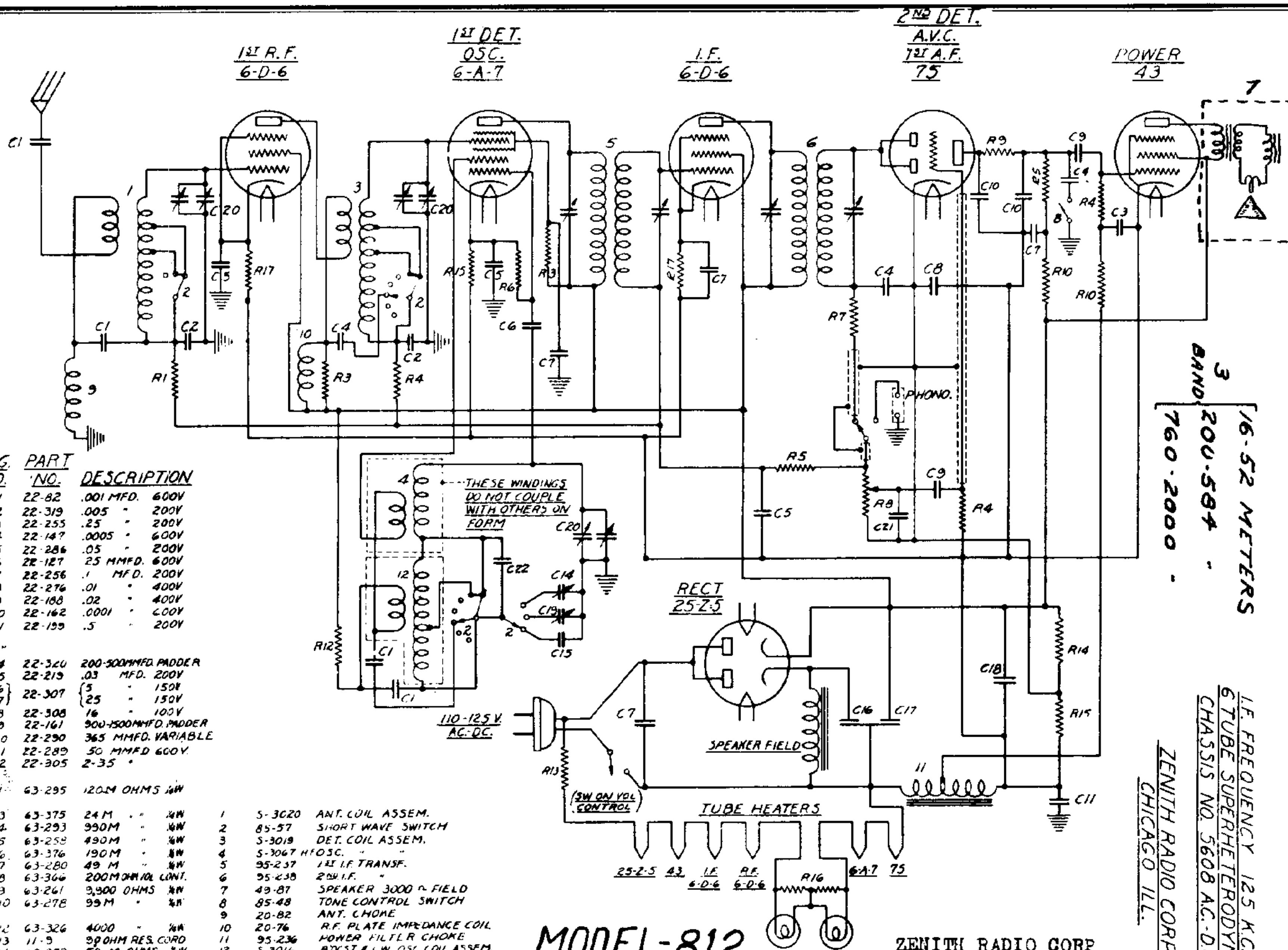
Alignment

1. Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
2. Adjust wave trap padder (located underneath chassis at rear right side) for weakest signal with 252.5 K.C. oscillator connected to aerial and ground.
3. Turn wave band switch clockwise to the highest frequency band. Connect 15,000 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
4. Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R. F. and 1st detector trimmers on three-gang condenser for loudest signal.
5. Adjust oscillator standard broadcast padder through hole in top center of chassis for correct dial reading at 600 K.C.



TUBE-POSITION

ZENITH RADIO CORP.



DIAG. NO.	PART NO.	DESCRIPTION
C1	22-82	.001 MFD. 600V
C2	22-319	.005 " 200V
C3	22-255	.25 " 200V
C4	22-147	.0005 " 600V
C5	22-286	.05 " 200V
C6	22-127	25 MMFD. 600V
C7	22-256	.1 MFD. 200V
C8	22-276	.01 " 400V
C9	22-188	.02 " 400V
C10	22-162	.0001 " 600V
C11	22-199	.5 " 200V
C14	22-320	200-500MMFD. PADDER
C15	22-219	.03 MFD. 200V
C16	22-307	5 " 150V
C17	22-307	25 " 150V
C18	22-308	16 " 100V
C19	22-161	900-1500MMFD. PADDER
C20	22-290	365 MMFD. VARIABLE
C21	22-289	50 MMFD 600V.
C22	22-305	2-35 "
R1	63-295	120M OHMS ¼W
R3	63-375	24 M " ¼W
R4	63-293	990M " ¼W
R5	63-258	490M " ¼W
R6	63-376	190M " ¼W
R7	63-280	49 M " ¼W
R8	63-366	200M OHM VOL CONT.
R9	63-261	9,900 OHMS ¼W
R10	63-278	99M " ¼W
R12	63-326	4000 " ¼W
R13	11-9	90 OHM RES. CORD
R14	63-372	50 M OHMS ¼W
R15	63-244	500 " ¼W
R16	63-374	50 " 2W
R17	63-362	400 " ¼W

1	S-3020	ANT. COIL ASSEM.
2	85-57	SHORT WAVE SWITCH
3	S-3019	DET. COIL ASSEM.
4	S-3067	H.F. OSC. " "
5	95-237	1ST I.F. TRANSF.
6	95-238	2ND I.F. "
7	49-87	SPEAKER 3000 Ω FIELD
8	85-48	TONE CONTROL SWITCH
9	20-82	ANT. CHOKE
10	20-76	R.F. PLATE IMPEDANCE COIL
11	95-236	POWER FILTER CHOKE
12	S-3016	B'DCST & L.W. OSC COIL ASSEM.

MODEL-812

ZENITH RADIO CORP
September 14, 1934

MODEL 812
Voltage, Socket
Alignment Data

ZENITH RADIO CORP.

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.7	4.2	5	96	5	98
6A7	1st Det.	5.7	2.3	2	50	-	96
	Osc.			0	-	-	96
6D6	I. F.	5.7	4.1	5	96	5	96
75	2nd Det.	5.7	1.1	5	-	-	25
43	PWR.	24	0	-5	96	-	90
25Z5	RECT.	24	Spkr.Fld. 80	-	-	-	-

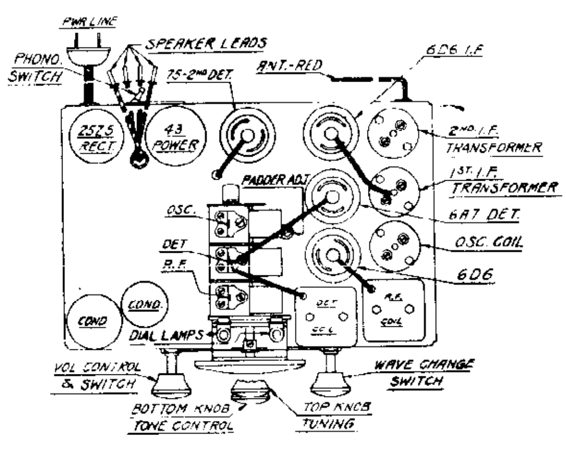
Line Voltage 112 Antenna and Ground Disconnected

All voltages measured from B-(negative side of C18) using a 1000 ohm per volt D.C. meter (except heaters).
F - Filament; K - Cathode; g1 - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

Alignment

1. Balance intermediate transformers at 125 K.C. with service oscillator connected to grid of first detector and chassis.
2. Rotate wave-band switch clockwise to the short-wave position. Connect service oscillator to antenna and ground leads and set for 18750 K.C. Balance oscillator trimmer on gang for correct dial reading at 16 meters.
3. Turn wave-band switch to center or standard broadcast position. Adjust padder condenser (located on top center of chassis next to gang) for correct dial reading at 500 meters (600 K.C.).
4. Balance oscillator trimmer (located underneath chassis at right center) for correct dial reading at 210 meters (1440 K.C.). Balance R.F. and 1st detector trimmers on gang to resonance
5. Turn switch counter-clockwise to long-wave position. Adjust oscillator padder (located underneath chassis at rear right side) for correct dial reading at 2000 meters (150 K.C.).

NOTE: If howls are encountered on short-wave band the oscillator trimmer on gang is too tight.

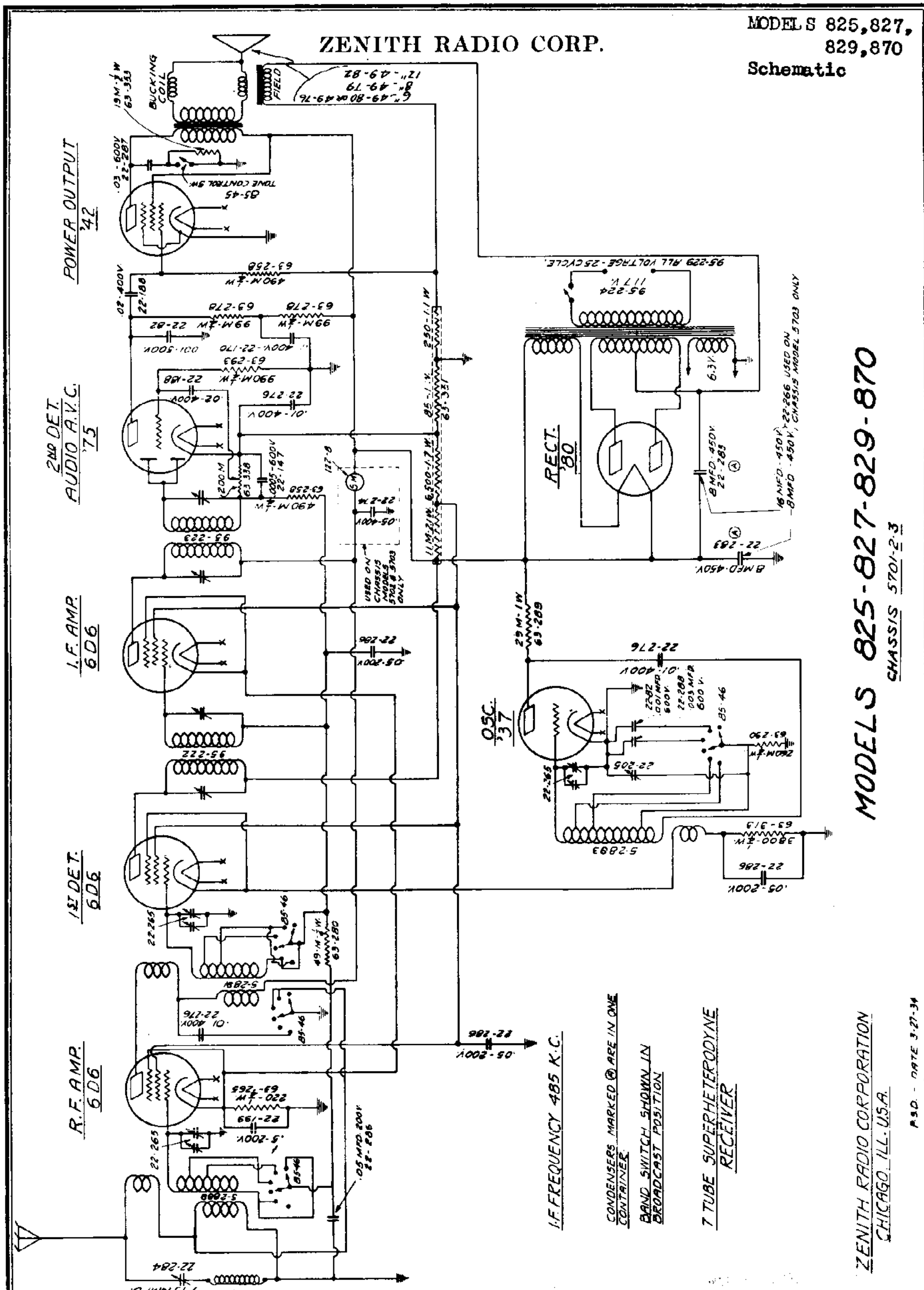


MODEL 812
Chassis 5608

Tube Position

MODELS 825,827,
829,870
Schematic

ZENITH RADIO CORP.



MODELS 825,827,
829,870
Voltage, Socket
Alignment Data

ZENITH RADIO CORP.

SOCKET VOLTAGES 5701 - 2 - 3 CHASSIS

TYPE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.4	2.8	0	2.8	74	230
6D6	1st. Det.	5.4	7.8	0	7.8	74	230
37	Osc.	5.4	0	38	-	-	130
6D6	I.F.	5.4	2.8	0	2.8	74	230
74	2nd. Det.	5.4	1	0	-	-	125
42	PWR.	5.4	0	4	0	230	215
80	Rect.	4.2	-	-	-	-	235

Line Voltage 112 V. Aerial and Ground disconnected.

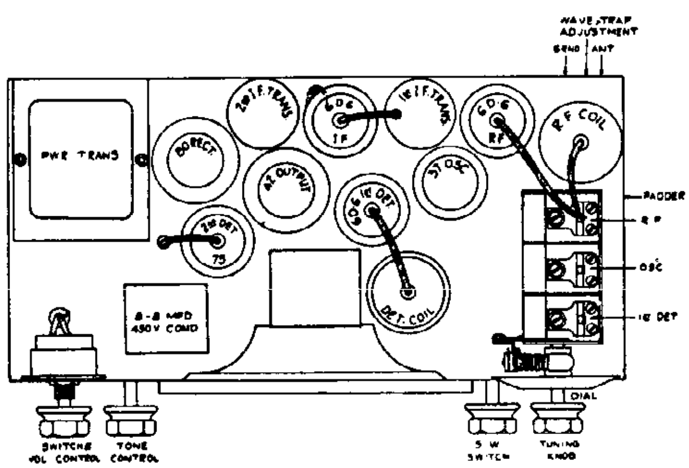
F - Filament K - Cathode G1 - Control Grid

G2 Suppressor Grid G3 - Screen Grid P - Plate

All measurements taken from points indicated to ground with 1000 ohms per volt D.C. meter (except filaments).

Balance I.F. transformers at 485 K.C., trimmers on condenser gang at 1500 K.C. and oscillator padder at 600 K.C.

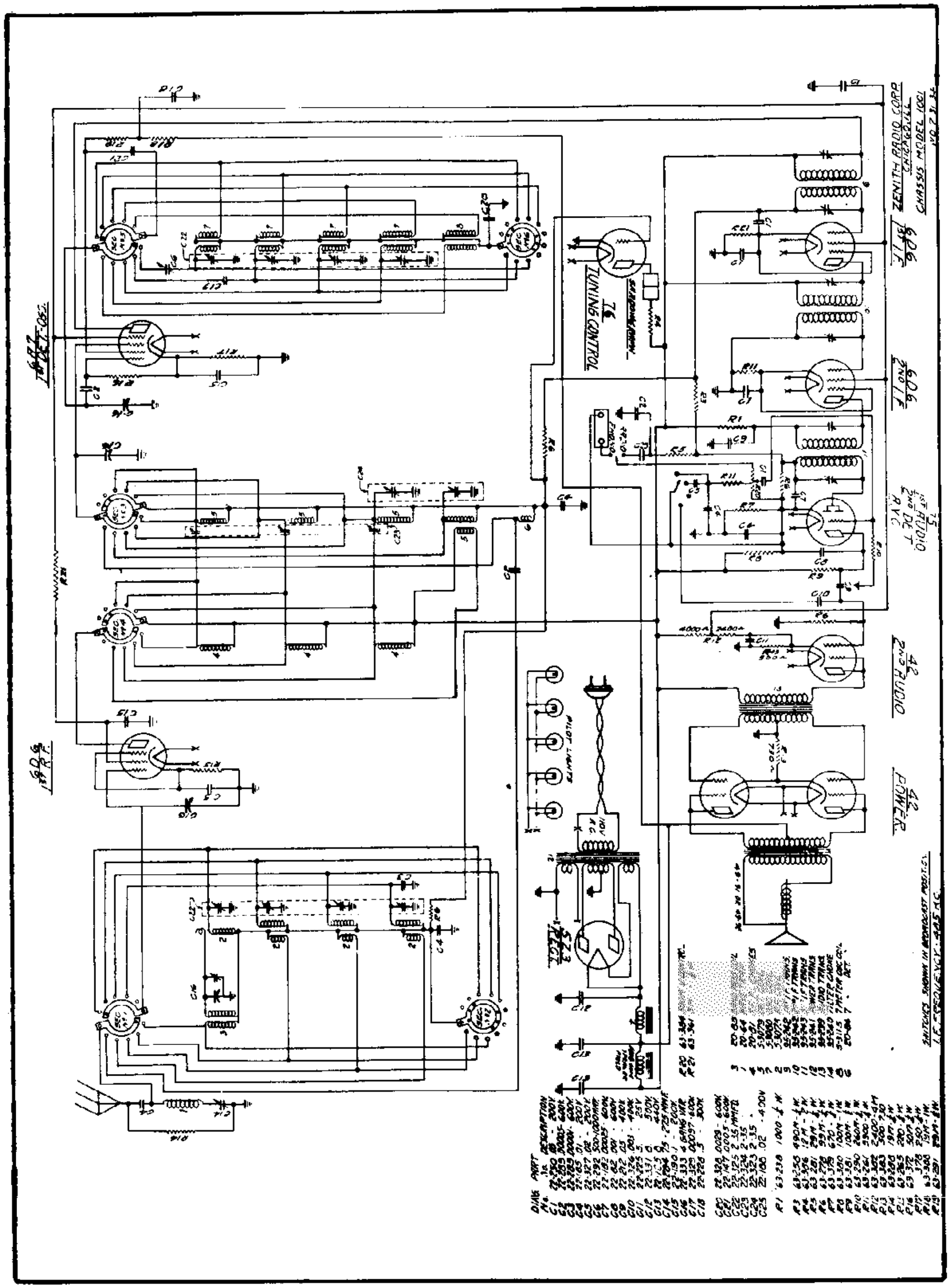
The screw adjustment at the right hand rear of chassis is a wave trap for the elimination of code interference at the I.F. frequency. Connect 485 K.C. oscillator on antenna and adjust for weakest signal.



Tube Layout

ZENITH RADIO CORP.

MODELS 835,880
Chassis 1001,1001-A
Schematic



MODELS 835,880
Chassis 1001,1001-A
Voltage, Socket, Alignment, Notes

ZENITH RADIO CORP.

Service Bulletin

MODELS 835 · 880 — CHASSIS 1001 · 1001A

SERVICE NOTES

Dial Slips or Binds. Tighten lugs on planetary drive. See that both pointers are free. Make sure gang is squarely lined up with dial.

Off Calibration. Check for loose set screws on dial assembly to condenser shaft. Black pointer may be loose on shaft. Check alignment as outlined in Alignment Procedure.

Poor Tone. Defective tubes in audio. One side of push-pull circuit faulty. Check audio and output transformers. See A.V.C. blocking.

Insensitive. Out of alignment, weak tubes or defective by-pass condenser.

Shadowgraph Inoperative. Weak 76 tube, burnt out shadowgraph, open resistor in 76 plate circuit.

Distortion at Medium Volume. Defective 75 tube, defective volume control. Separate green volume control-lead and speaker-lead close to grid of 42 tube.

Insensitive on Any Short Wave Band. Check alignment, make sure R.F.circuit is not aligned to image frequency. Change 6A7 tube. Change position of fixed condensers adjacent to rear section of wave change switch. Location of these condensers in relation to each other and their distance from the chassis will effect dial calibration and sensitivity, especially on the Blue Band.

Stops Oscillating Around 9 M.C. Change 6A7 tube, leakage in 50 mmfd. or .0029 mfd. condenser.

A.V.C. Blocks. Shorted resistor on antenna choke. C-14 padder shorted. Grounded R.F. grid circuit.

Oscillates on Broadcast. Check alignment. Push brown wire away from 6A7 socket. Grounded cathode on 1st I.F. or grounded to 600 K.C. padder. Check for open by-pass condenser.

Noisy. Shorting plates in gang condenser. Poor contact in band switch. Loose shields or shield bases. Static shields may be touching leads under gang condenser.

Overheats. Check pilot light and heater circuits for partial short or ground.

Flutters. Rearrange leads under chassis especially around 6A7.

Oscillates on Short Wave Bands. Make sure brown R.F. grid return lead is pushed away from 6A7 socket. Check for ground on any A.V.C.lead. Open by-pass condenser.

Tone Control Inoperative. Resin joint or poor contact on tone control switch. Defective condensers in tone control circuits.

Continuous Audio Whistle. Rearrange leads in audio circuit.

Alignment

Separate coils are used for each band. Mounted on the coils are individual trimmers that align each band, independent of the other bands.

Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground. Adjust I.F. trimmers on rear of I.F. transformers for strongest signal.

Connect 485 K.C. service oscillator to antenna and ground. Turn dial to 540 K.C. on broadcast band and adjust wave trap trimmer on right rear side of chassis for weakest signal.

Broadcast - Black Band

Set service oscillator at 1400 K.C., remaining attached to antenna ground posts. Turn dial to some point and adjust #1 trimmer (top one on oscillator coil) to resonance. Adjust #1 R.F. trimmer (top one on R.F. coil); #1 detector trimmer (through hole in chassis base) and band pass trimmer (top front section of gang) all to resonance.

Set service oscillator at 600 K.C. Adjust padder (located in center rear of chassis) for correct dial reading.

Recheck 1400 K.C. alignment.

Orange Band

Set service oscillator at 4 M.C.(still attached to antenna and ground) and adjust trimmer #2 (2nd from top) on oscillator coil for correct dial reading. Adjust #2 R.F. trimmer (2nd from top on R.F. coil) and #2 detector trimmer (center hole through chassis) to resonance.

Brown Band

Loosen #3 detector trimmer (top one on detector coil). Set service oscillator at 10.5 M.C. Adjust #3 oscillator trimmer (third from top on oscillator coil) for correct dial reading. Adjust #3 R.F. trimmer (third from top of R.F.coil) and #3 detector trimmer (rear one through hole in top of chassis). Adjust #3 detector trimmer on coil to resonance.

Blue Band

Tighten #4 detector trimmer (bottom one on detector coil). Set service oscillator at 21 M.C. Adjust #4 oscillator trimmer (bottom one on oscillator coil) for correct dial reading. Adjust #4 R.F. trimmer (lower one on R.F. coil) and #4 detector trimmer (lower one on detector coil) to resonance.

It is very easy to mistake the image frequency for the fundamental on this band. Rotate dial and if shadowmeter narrows at any point, especially at 15 M.C., the band should be rebalanced.

Green Band

There are no adjustments to be made on this band.

Parts and Prices

Chassis 1001 — MODELS 835, 880, 881 and 1101

Dial Assembly

26-66	Complete Dial and Drive Assembly	$7.50
26-67	Dial Scale only	.75
33-57	Dial Retaining Frame	.35
59-28	Large Z Pointer	.10
59-29	Split Second Pointer	.10
192-4	Dial Glass	.20
93-217	Dial Glass Cushion Washer	.10
76-161	Planetary Drive Assembly	2.00
32-3	Pulley Drive Belt	.15

Coils & Chokes

20-64	Wave Trap	.35
20-81	R. F. Plate Choke	.65
20-84	7-Meter Detector Coil Assembly	.10
20-85	Band Pass Coil Assembly	.60
95-242	1st and 2nd I. F. Coil Assembly	1.50
95-243	3rd I. F. Coil Assembly	1.50
S-3078	R. F. Coil Assembly	2.75
S-3079	Detector Coil Assembly	2.50
S-3080	Oscillator Coil Assembly	2.75
S-3115	7-Meter Oscillator Coil Assembly	.40

Miscellaneous

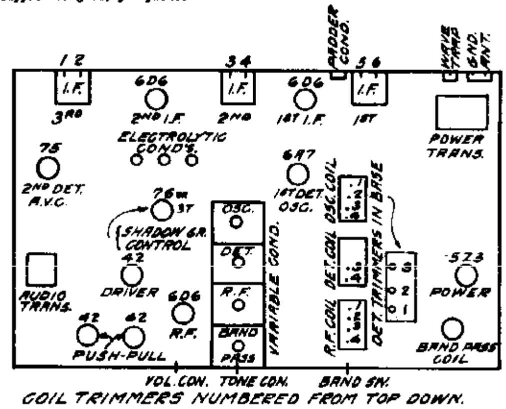
44-7	Phono Connector Jack (Export Models Only)	.15
46-94	Band Selector Switch Knob	.25
46-95	Tone and Volume Knobs	.25
46-96	Tuning Knob - Large	.25
46-97	Tuning Knob - Small	.20
49-91	10" Dynamic Speaker (Model 835)	10.00
	Cone and Voice Coil for 49-91	3.00
	Output Transformer for 49-91	2.00
	Field Coil for 49-91	2.00
49-92	12" Dynamic Speaker (Models 880, 881)	14.50
	Cone and Voice Coil for 49-92	3.25
	Output Transformer for 49-92	2.50
	Field Coil for 49-92	2.60
57-455	Dial Escutcheon Plate for Models 880, 881	.75
78-100	Tube Socket - 6D6	.10
78-101	" " 75	.10
78-102	" " 42	.10
78-106	" " 6A7	.10
78-109	" " 76	.10
78-110	" " 5Z3	.10
85-56	Phono Switch	.35
85-58	Band Selector Switch	4.00
85-60	4-position Tone Switch	.60
95-239	Push Pull Input Transformer	2.00
95-240	Power Filter Choke	2.00

SOCKET VOLTAGES

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R. F.	5.9	1.7	0	65	1.7	235
6A7	1st. Det.	5.9	2.5	0	95	-	235
	OSC.			-1	-	-	165
6D6	1st. I. F.	5.9	8	0	95	8	235
6D6	2nd. I. F.	5.9	8	0	95	8	230
75	2nd. Det. 1st. Aud.	5.9	1.5	0	-	-	155
37 or 76	Shadow-Met. Amp.	5.9	0	-1	-	-	98
42	2nd. Aud.	5.9	21	0	-	-	230
42	P&R.	5.9	33	0	-	-	340
42	P&R.	5.9	33	0	-	-	340
5Z3	Rect.	4.6	-	-	-	-	-

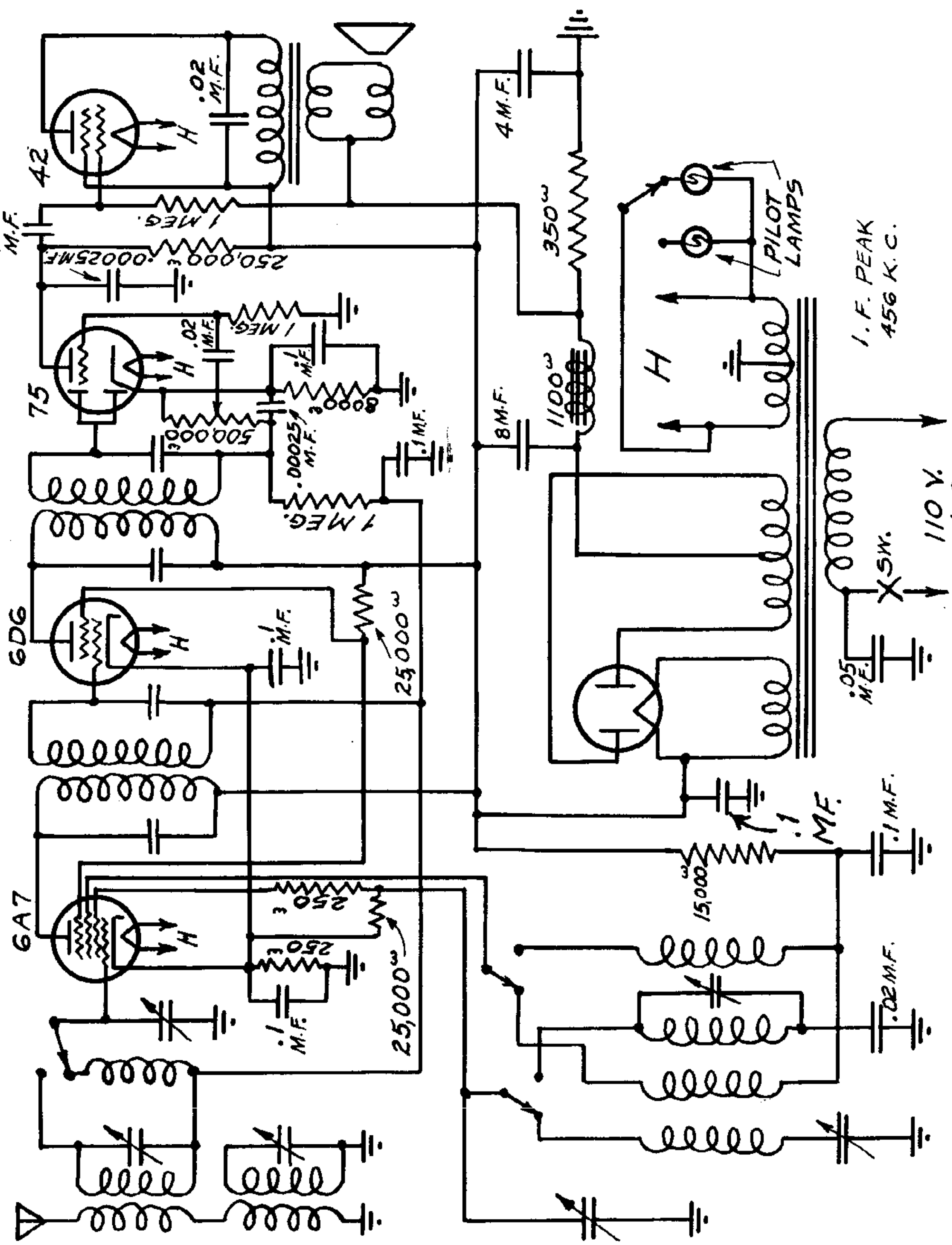
Line Voltage 112 Volts — Antenna and Ground Disconnected.

f - filament; k - cathode; g1 - control grid; g 2 - screen grid; g3 - suppressor grid; p - plate.



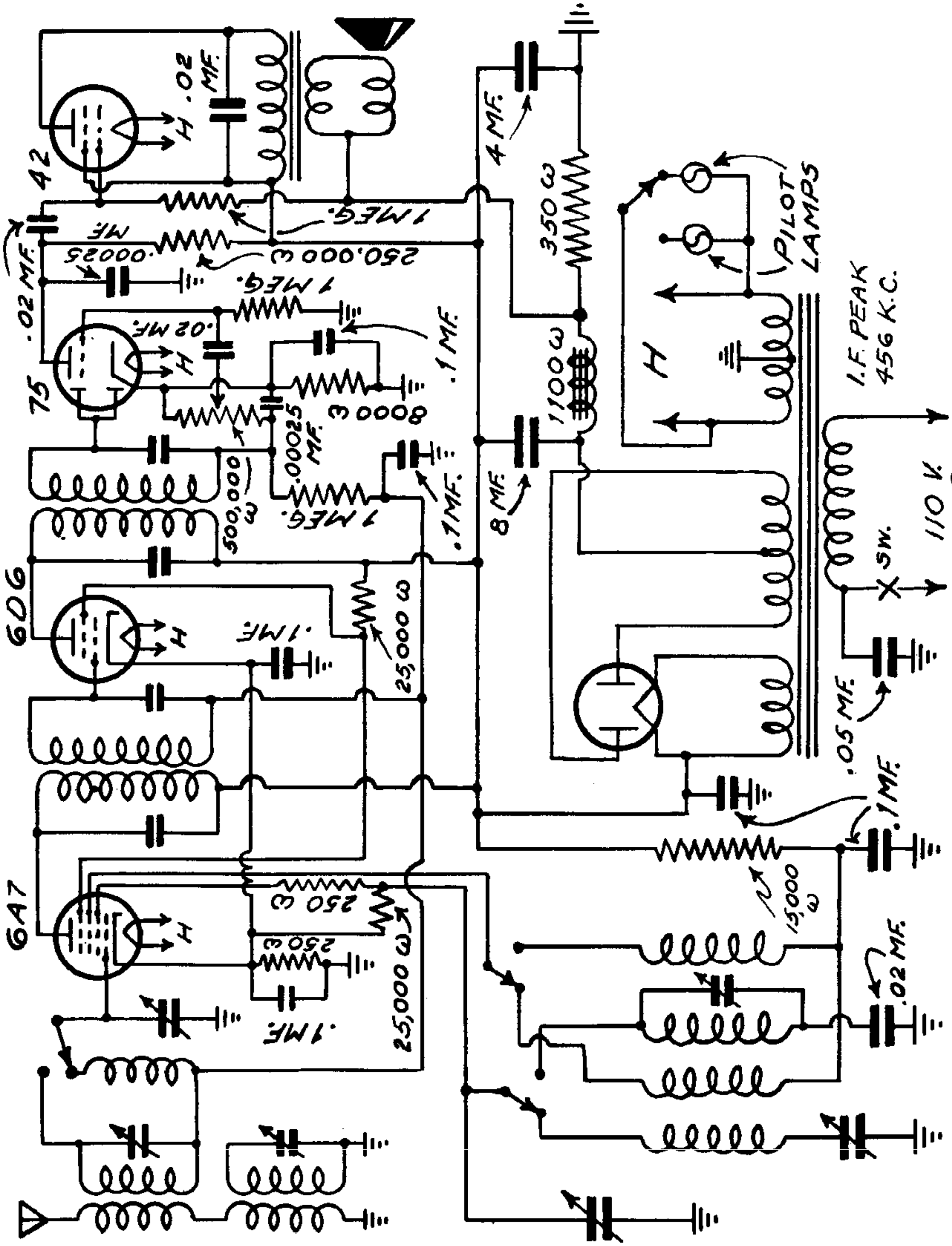
COIL TRIMMERS NUMBERED FROM TOP DOWN.

ADMIRAL

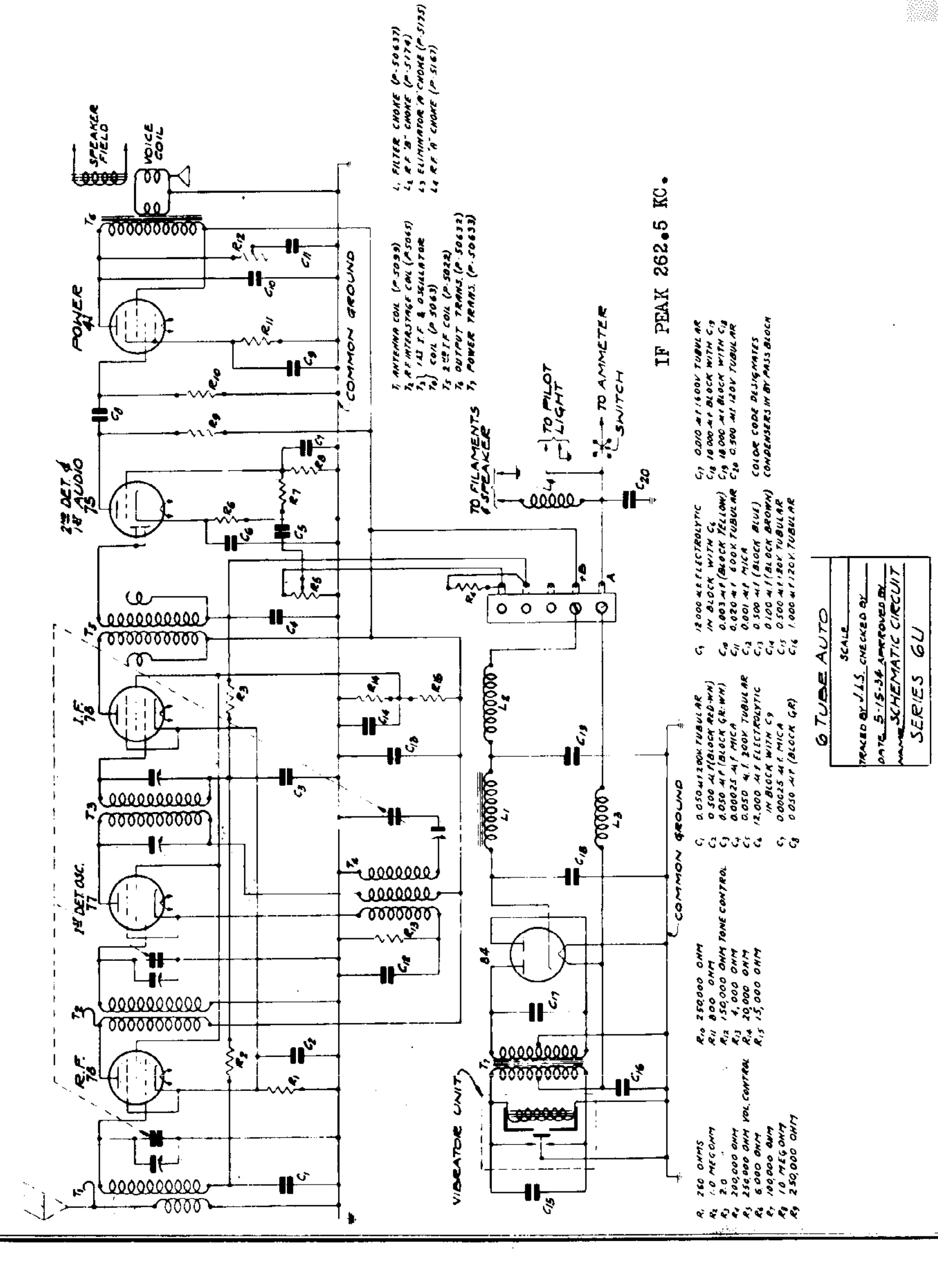

42
H
.02 M.F.
.02 M.F.
1 MEG.
250,000 ω
.00025 MF
75
H
.02 M.F.
1 MEG.
.1 M.F.
8000 ω
500,000 ω
.00025 M.F.
.1 M.F.
1 MEG.
6D6
H
.1 M.F.
25,000 ω
6A7
H
250 ω
250 ω
.1 M.F.
25,000 ω
4 M.F.
350 ω
1100 ω
8 M.F.
H
PILOT LAMPS
I. F. PEAK 456 K. C.
110 V. A.C.
SW.
.05 M.F.
.1 M.F.
.1 M.F.
15,000 ω
.02 M.F.

MODEL A-31
Schematic

AIR CASTLE

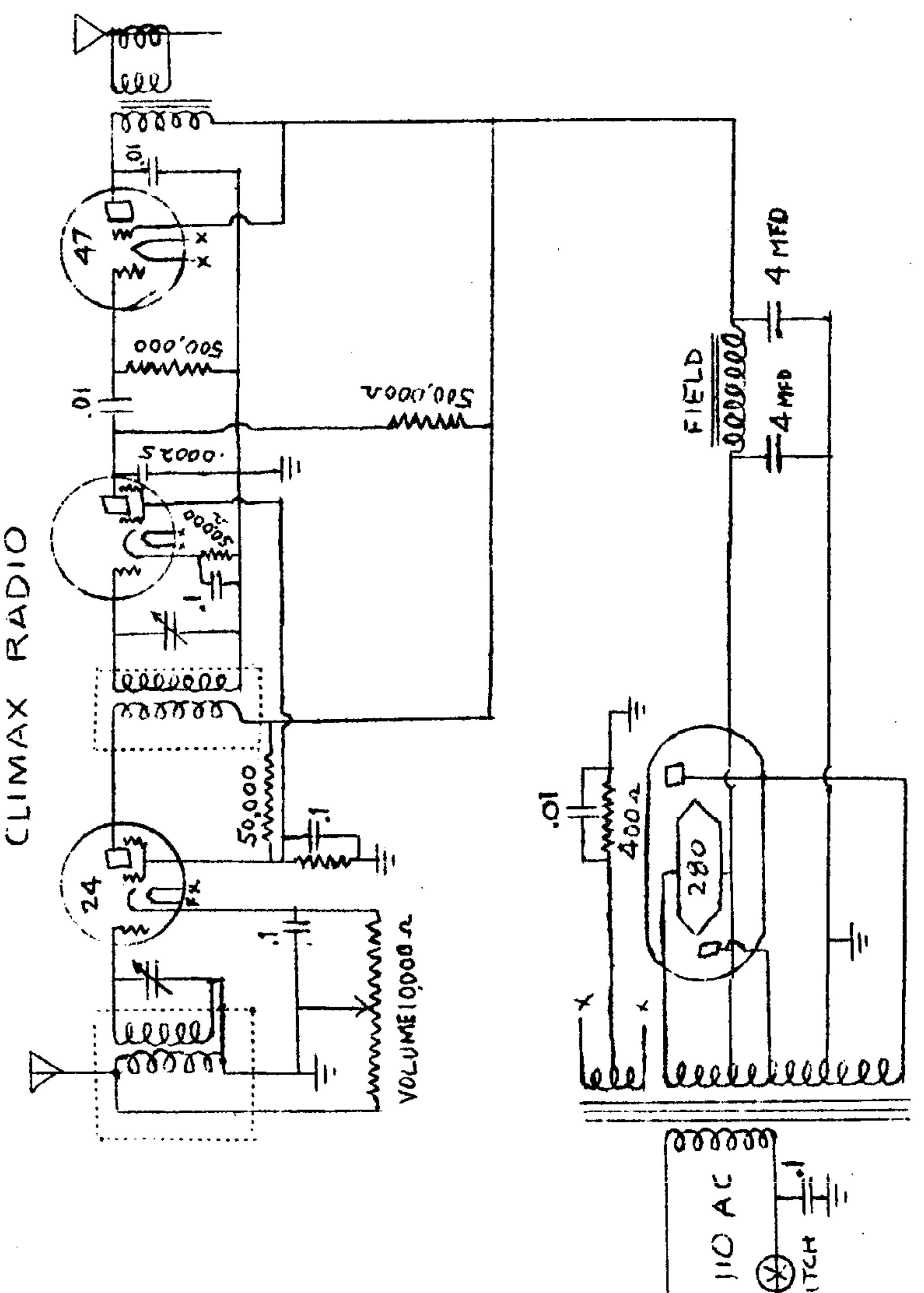


BLACKHAWK


R.F. 78
1ST DET OSC. 77
I.F. 78
2ND DET. & 1ST AUDIO 75
POWER 41
84
SPEAKER FIELD
VOICE COIL
COMMON GROUND
VIBRATOR UNIT
TO FILAMENTS & SPEAKER
TO PILOT LIGHT
TO AMMETER
SWITCH
IF PEAK 262.5 KC.
T1 ANTENNA COIL (P-5039)
T2 R.F. INTERSTAGE COIL (P-5065)
T3, T4 1ST I.F. & OSCILLATOR COIL (P-5063)
T5 2ND I.F. COIL (P-5022)
T6 OUTPUT TRANS. (P-50632)
T7 POWER TRANS. (P-50633)
L1 FILTER CHOKE (P-50637)
L2 R.F. "B" CHOKE (P-5174)
L3 ELIMINATOR "A" CHOKE (P-5175)
L4 R.F. "A" CHOKE (P-5167)
R1 260 OHMS
R2 1.0 MEGOHM
R3 2.0
R4 200,000 OHM
R5 250,000 OHM VOL. CONTROL
R6 6,000 OHM
R7 100,000 OHM
R8 10 MEGOHM
R9 250,000 OHM
R10 250,000 OHM
R11 800 OHM
R12 150,000 OHM TONE CONTROL
R13 4,000 OHM
R14 20,000 OHM
R15 15,000 OHM
C1 0.050 MF 200V. TUBULAR
C2 0.500 MF (BLOCK RED-WH)
C3 0.050 MF (BLOCK GR-WH)
C4 0.00025 MF MICA
C5 0.050 MF 200V TUBULAR
C6 12.000 MF ELECTROLYTIC IN BLOCK WITH C9
C7 0.00025 MF MICA
C8 0.050 MF (BLOCK GR)
C9 12.000 MF ELECTROLYTIC IN BLOCK WITH C6
C10 0.003 MF (BLOCK YELLOW)
C11 0.020 MF 600V TUBULAR
C12 0.001 MF MICA
C13 0.500 MF (BLOCK BLUE)
C14 0.100 MF (BLOCK BROWN)
C15 0.500 MF 120V. TUBULAR
C16 1.000 MF 120V. TUBULAR
C17 0.010 MF 1600V TUBULAR
C18 10.000 MF BLOCK WITH C19
C19 18.000 MF BLOCK WITH C18
C20 0.500 MF 120V TUBULAR
COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK
6 TUBE AUTO
SCALE
TRACED BY J.L.S. CHECKED BY
DATE 5-15-34 APPROVED BY
NAME SCHEMATIC CIRCUIT
SERIES 6U

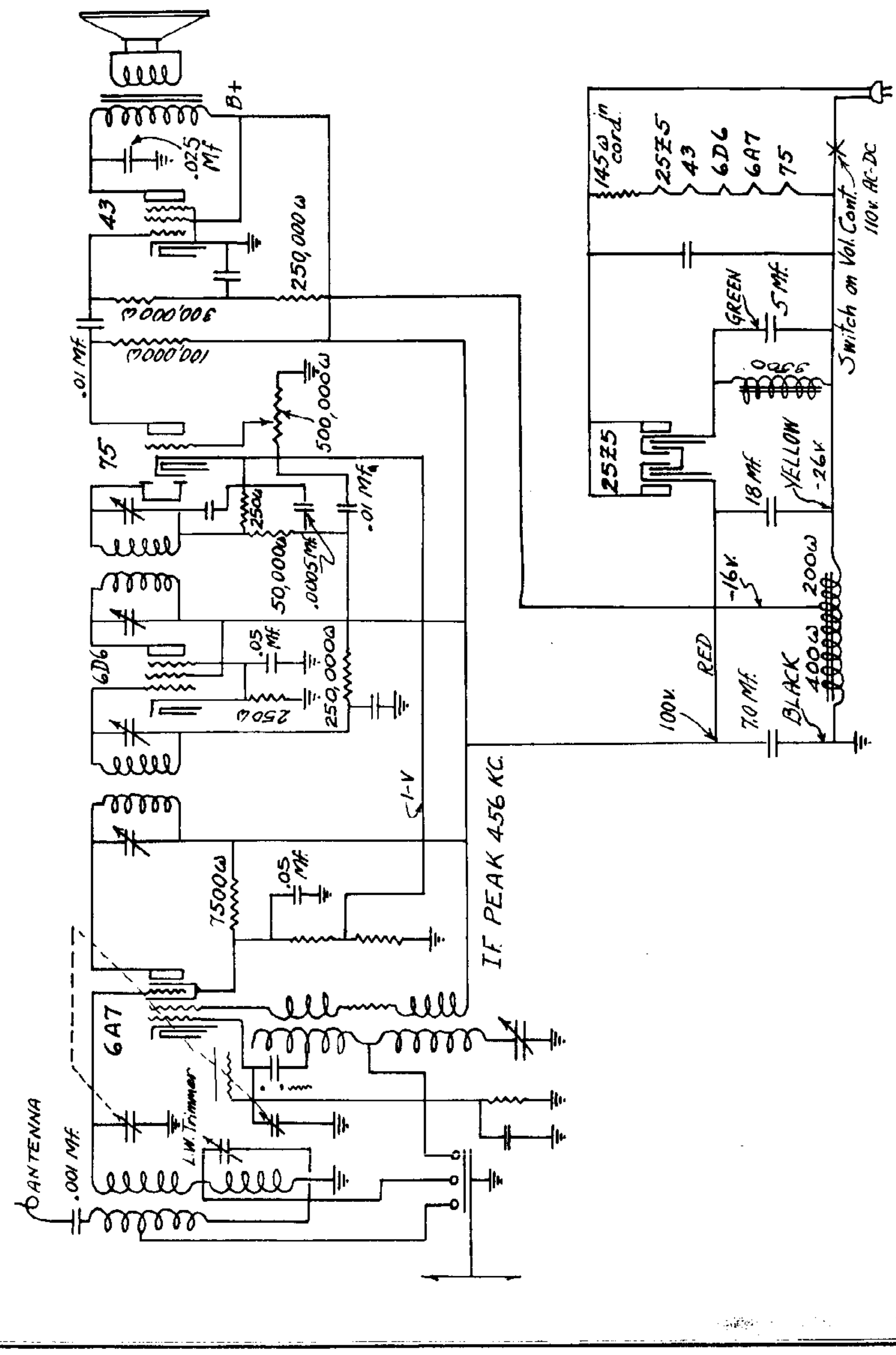
MODEL 424

CLIMAX



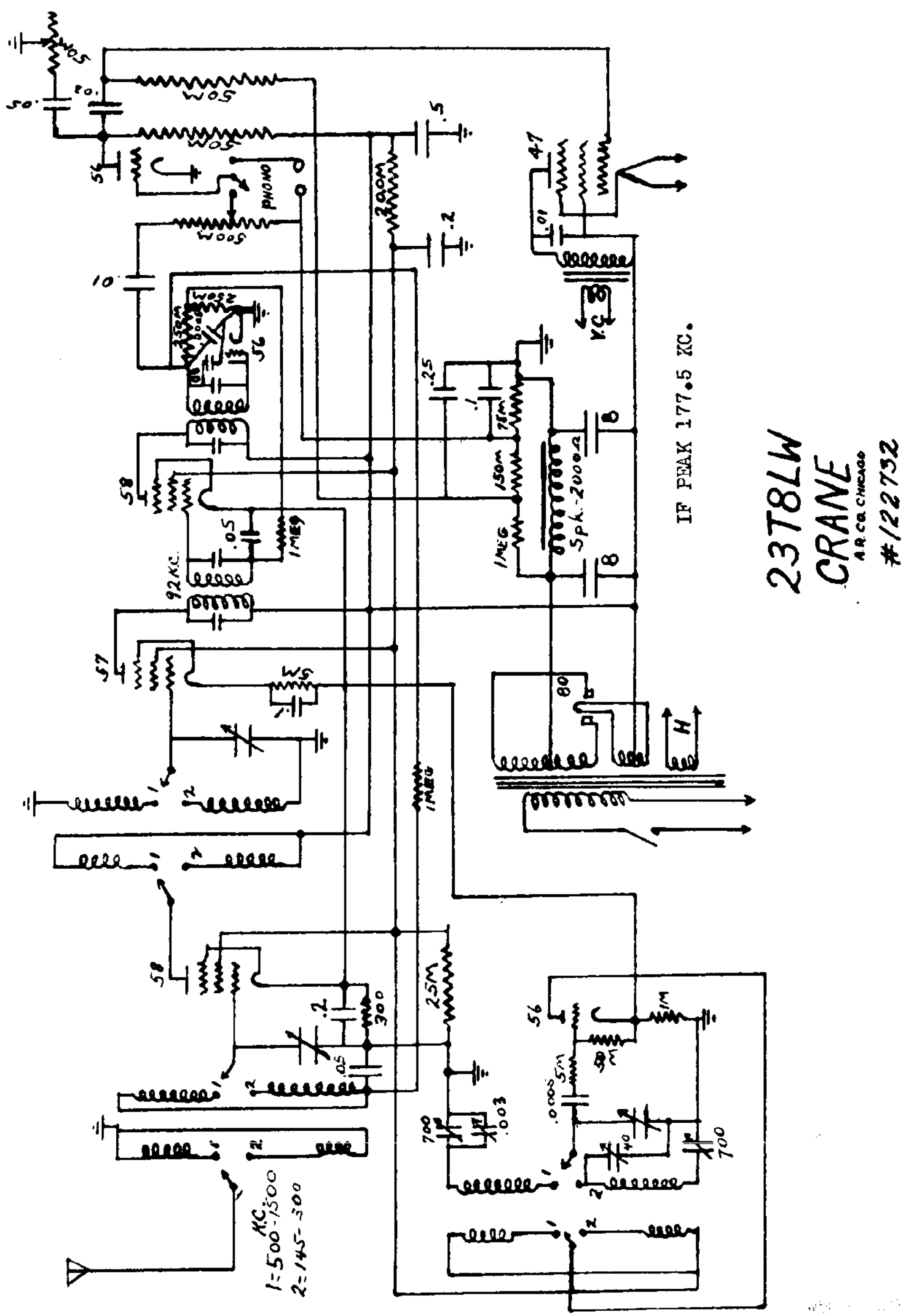
MODEL 150
200-2000 Meters
Schematic

COMMONWEALTH RADIO MFG. CO.

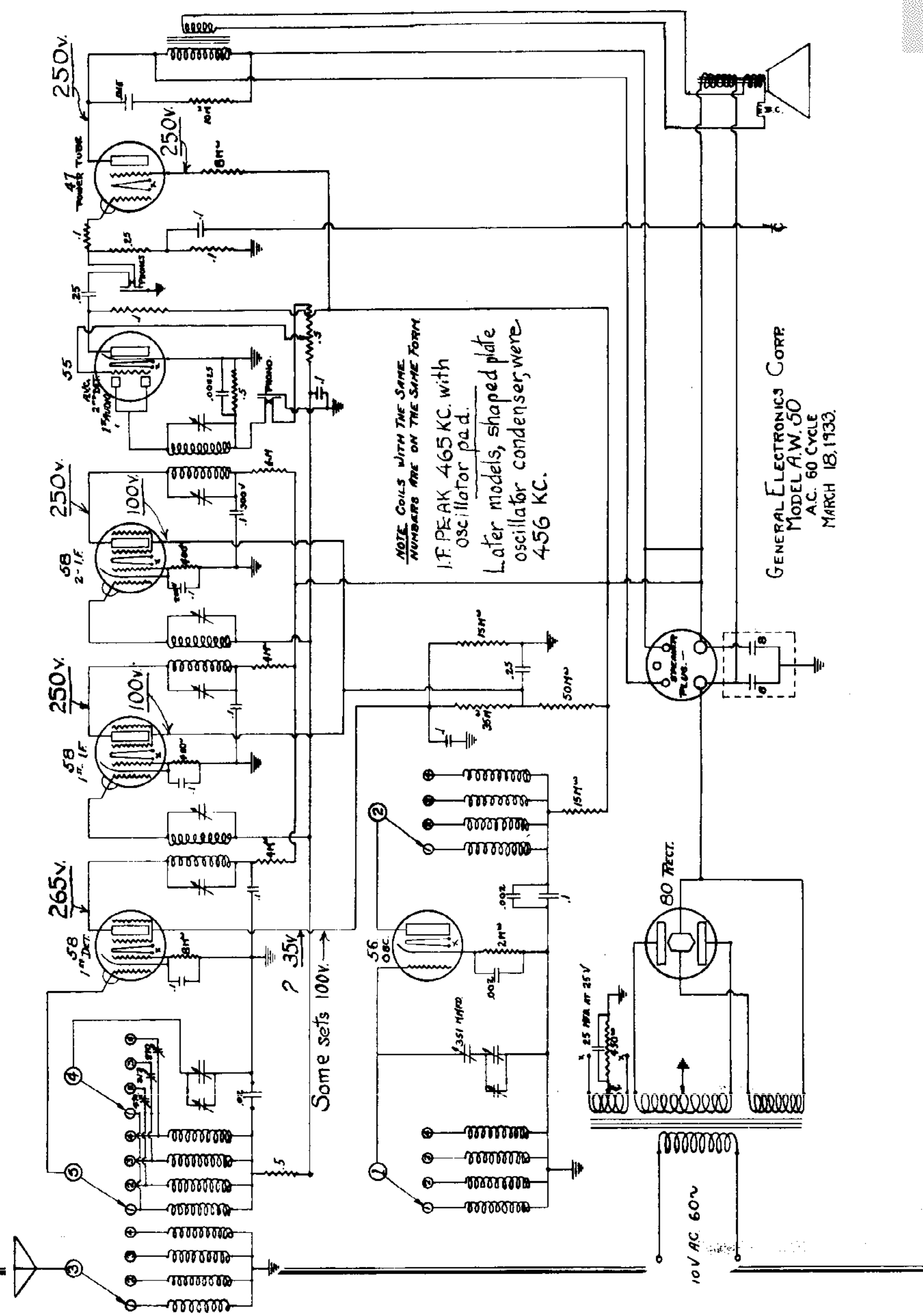


MODEL 23-T8-LW
Schematic

CRANE

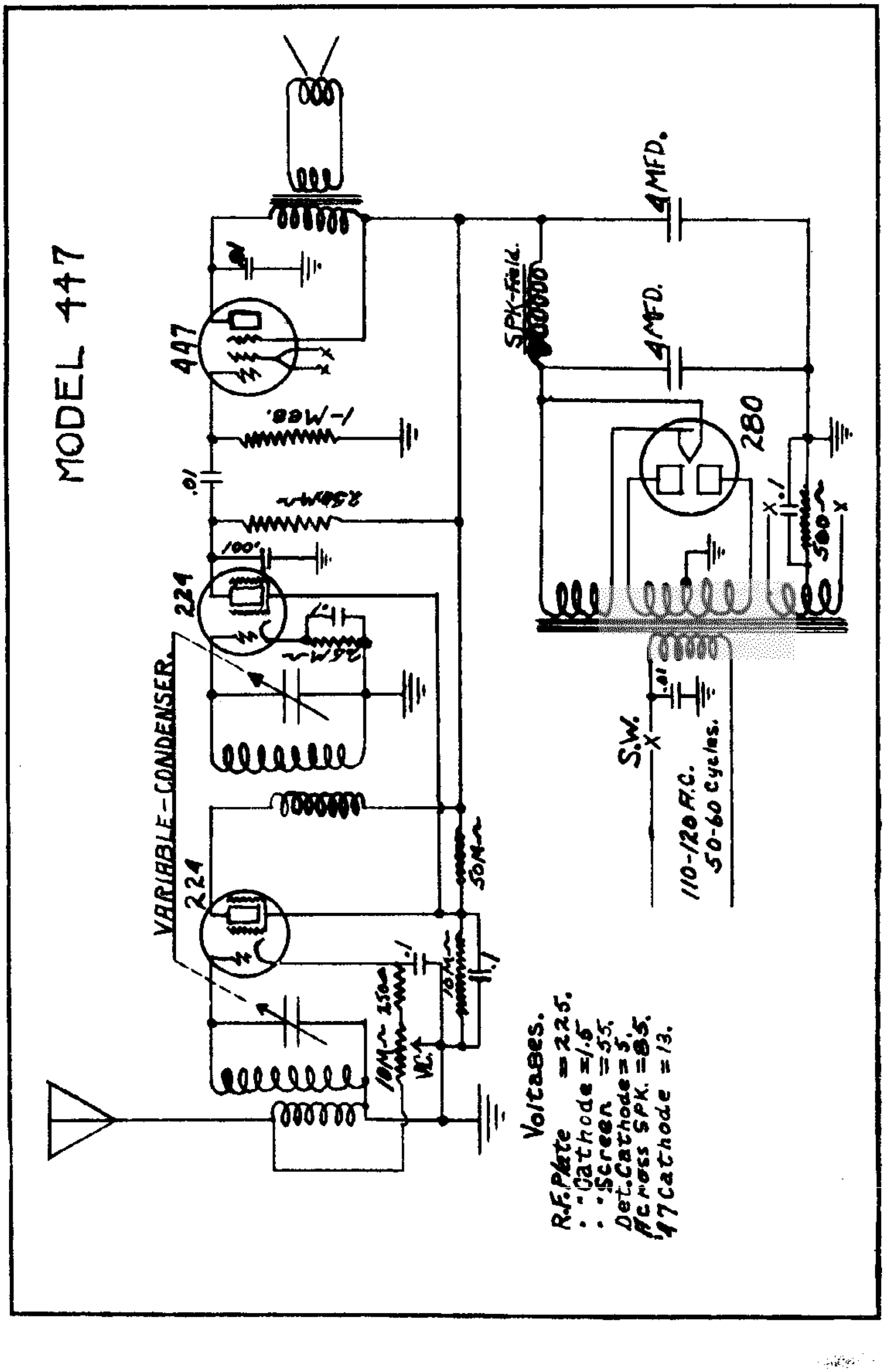


GENERAL ELECTRONICS CORP.

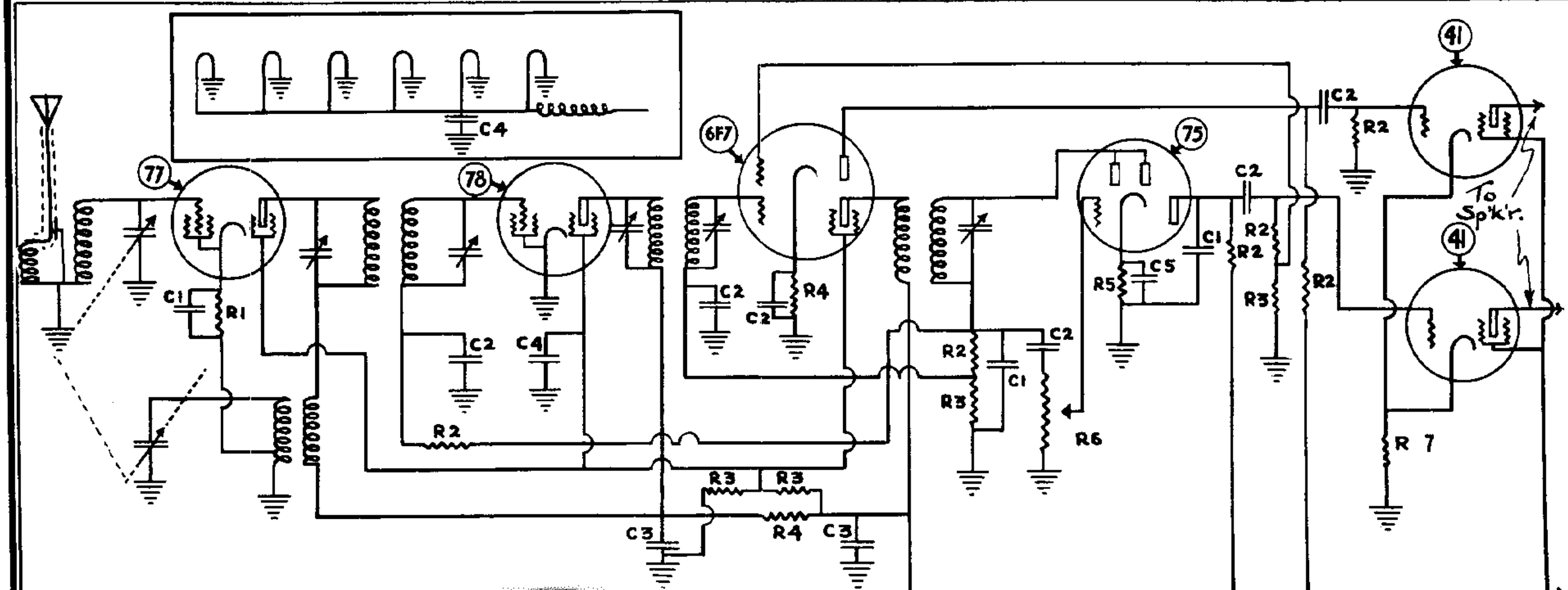


MODEL 447, J-104,
401-A
Schematic

JACKSON RADIO & TELEVISION CO.



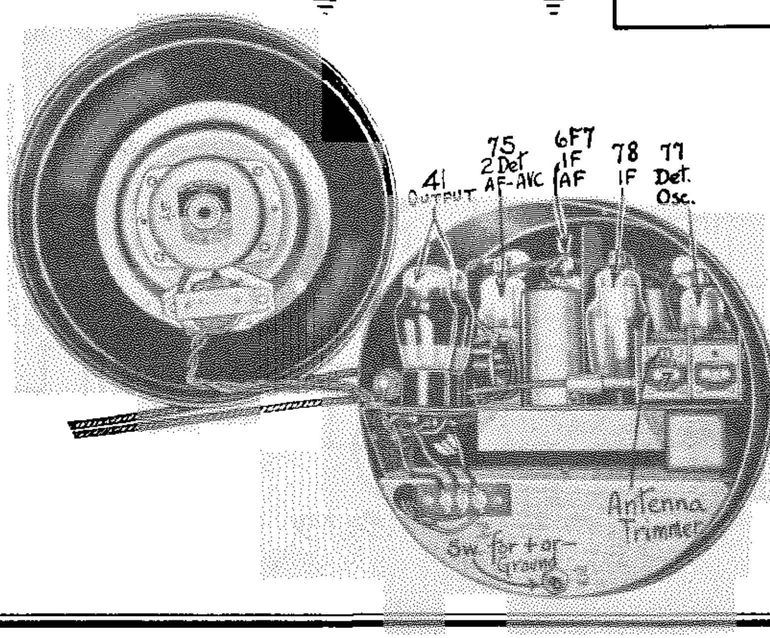
KARADIO CORP.



Tube 75 can be replaced with an 85 if greated delayed A V C is desired—Audio Amplification will be decreased when 85 is used.

R-1— 7,000 ohms—¼ watt
R 2—200,000 ohms—¼ watt
R 3— 50,000 ohms—¼ watt
R 4— 250 ohms—¼ watt
R 5— 2,000 ohms—¼ watt
R 6—250,000 ohms Potentiometer
R 7— 700 ohms—½ watt

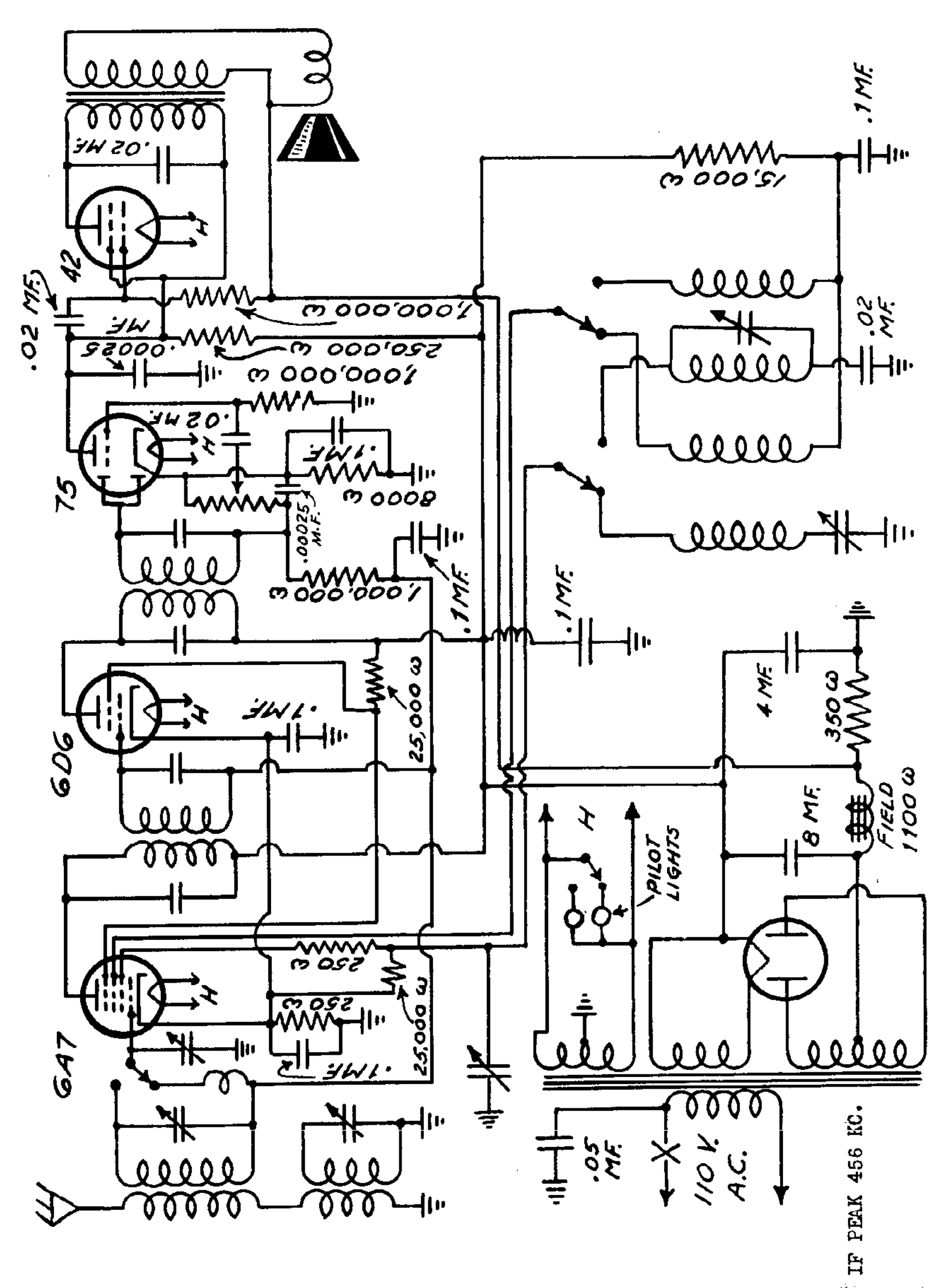
C 1—.001 Mfds.—200 V.
C 2—.1 Mfds.—200 V.
C 3—.1 Mfds.—400 V.
C 4—.25 Mfds.—200 V.
C 5—25 Mfds.— 8 V.



Model 56 KARADIO

MODEL A-31
Schematic

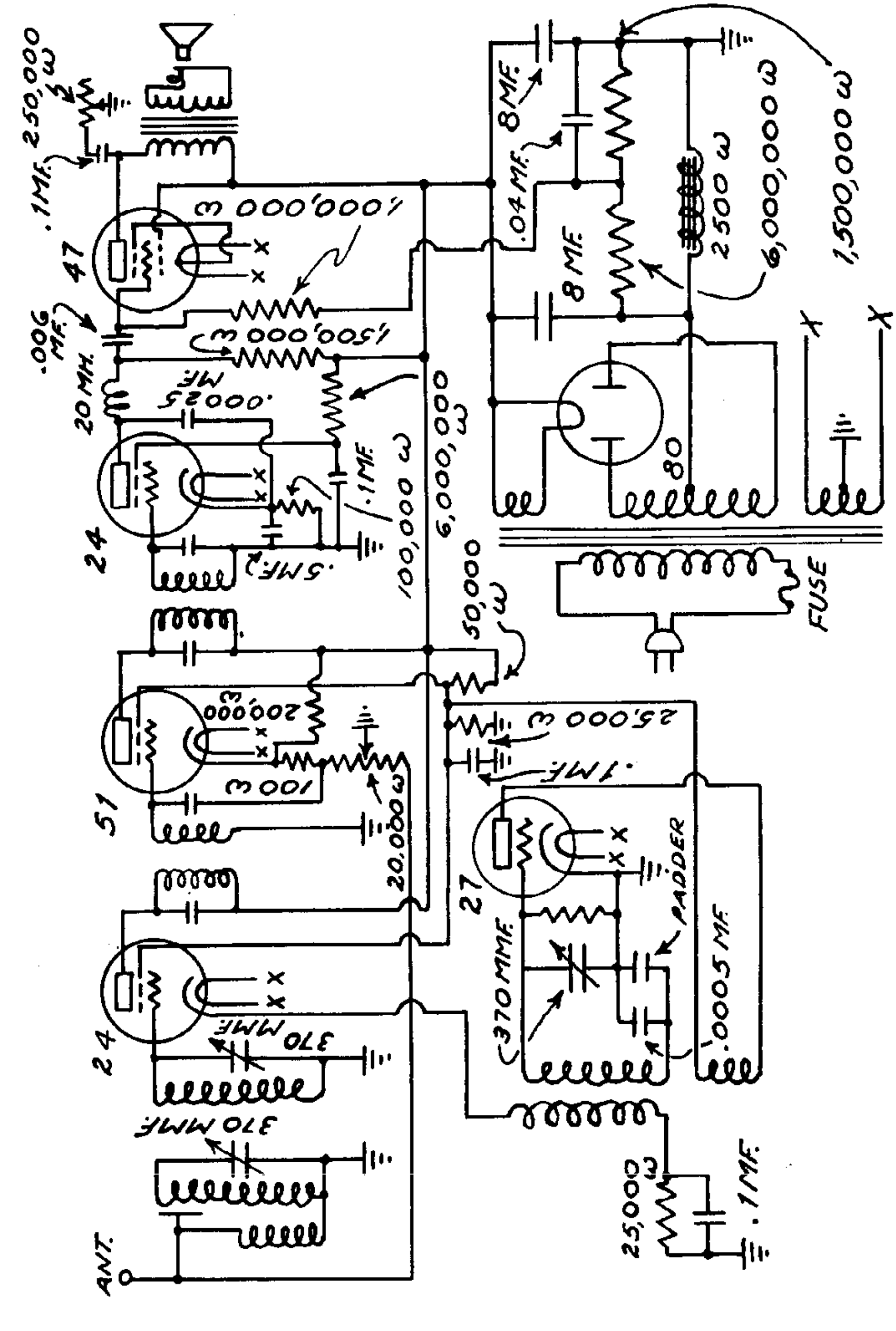
KNIGHT



IF PEAK 456 KC.

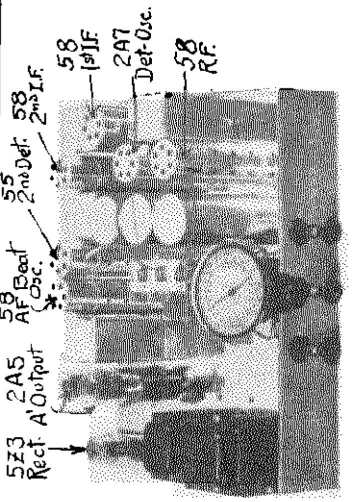
MODEL Suprex Six
Schematic

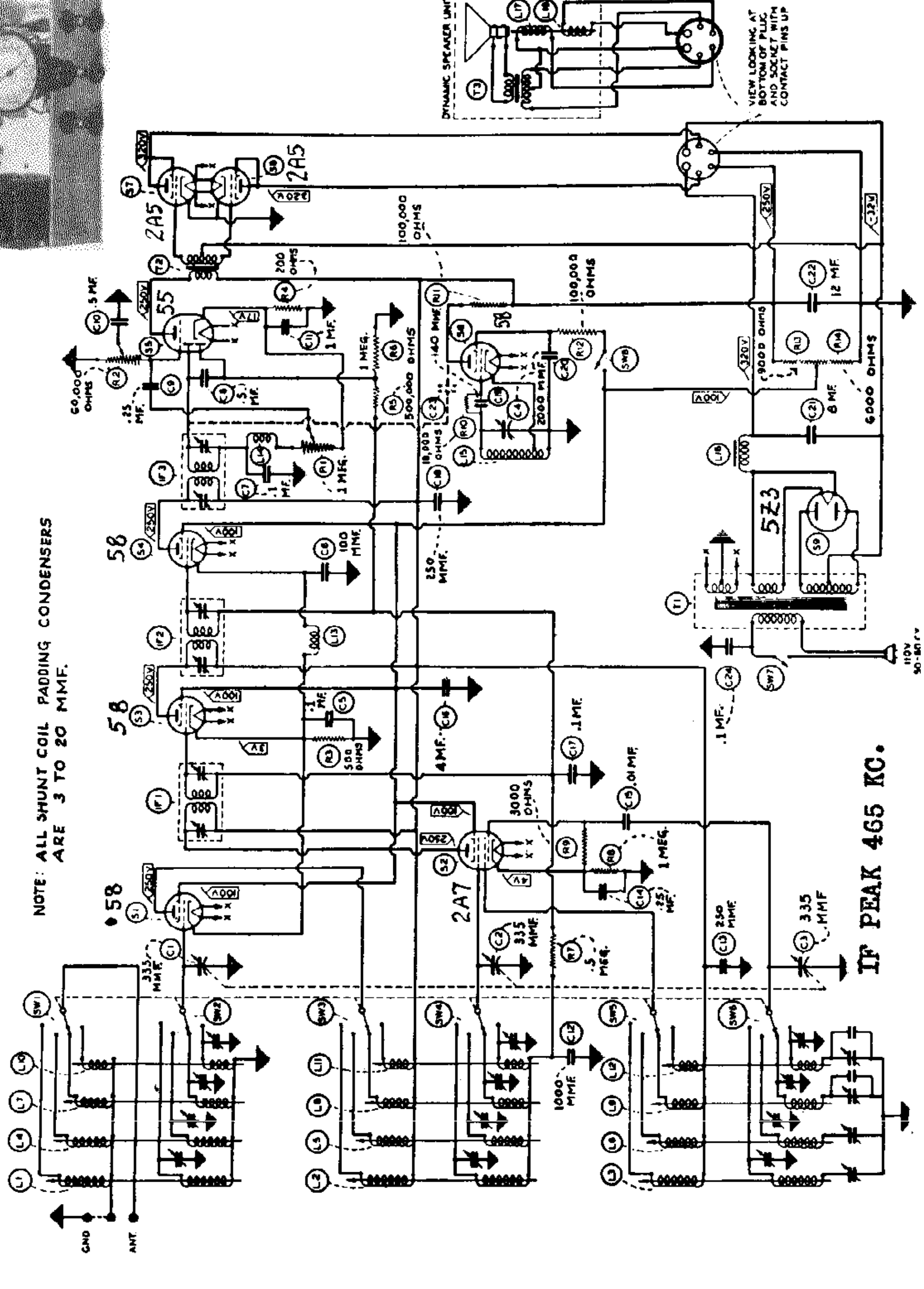
LEAR-WUERFUL CO.



MODEL World-Wide Nine
Schematic
Socket

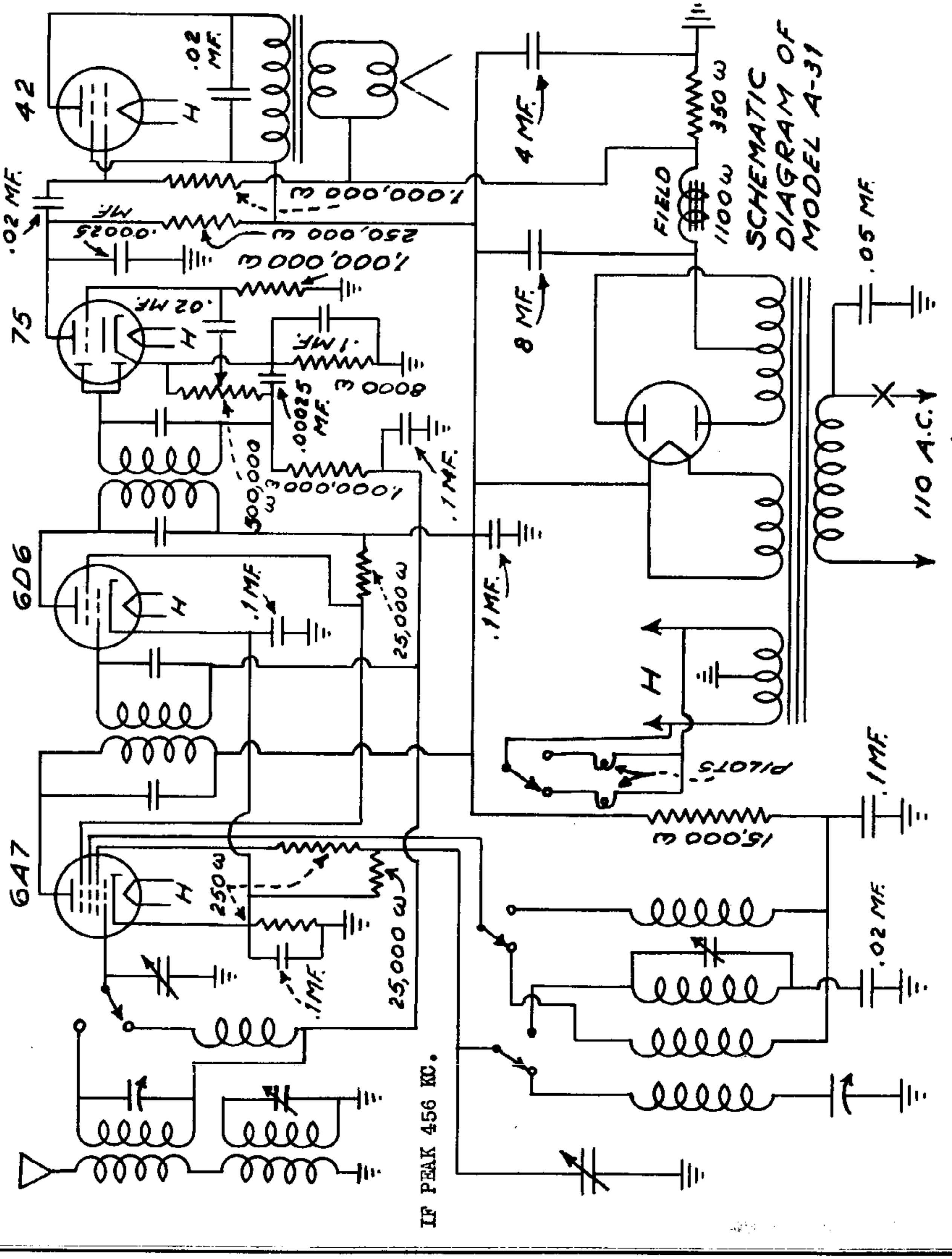
McMURDO SILVER, INC.





Courtesy "Short Wave Radio"

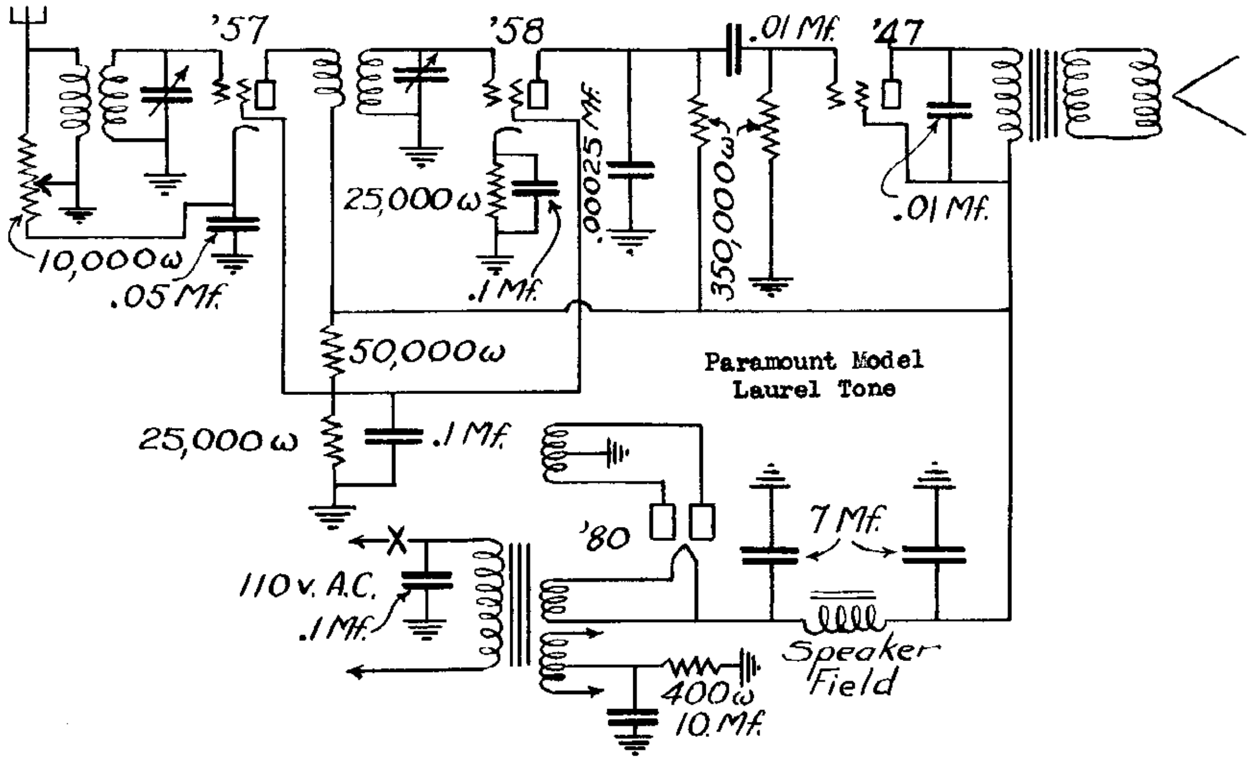
MONARCH



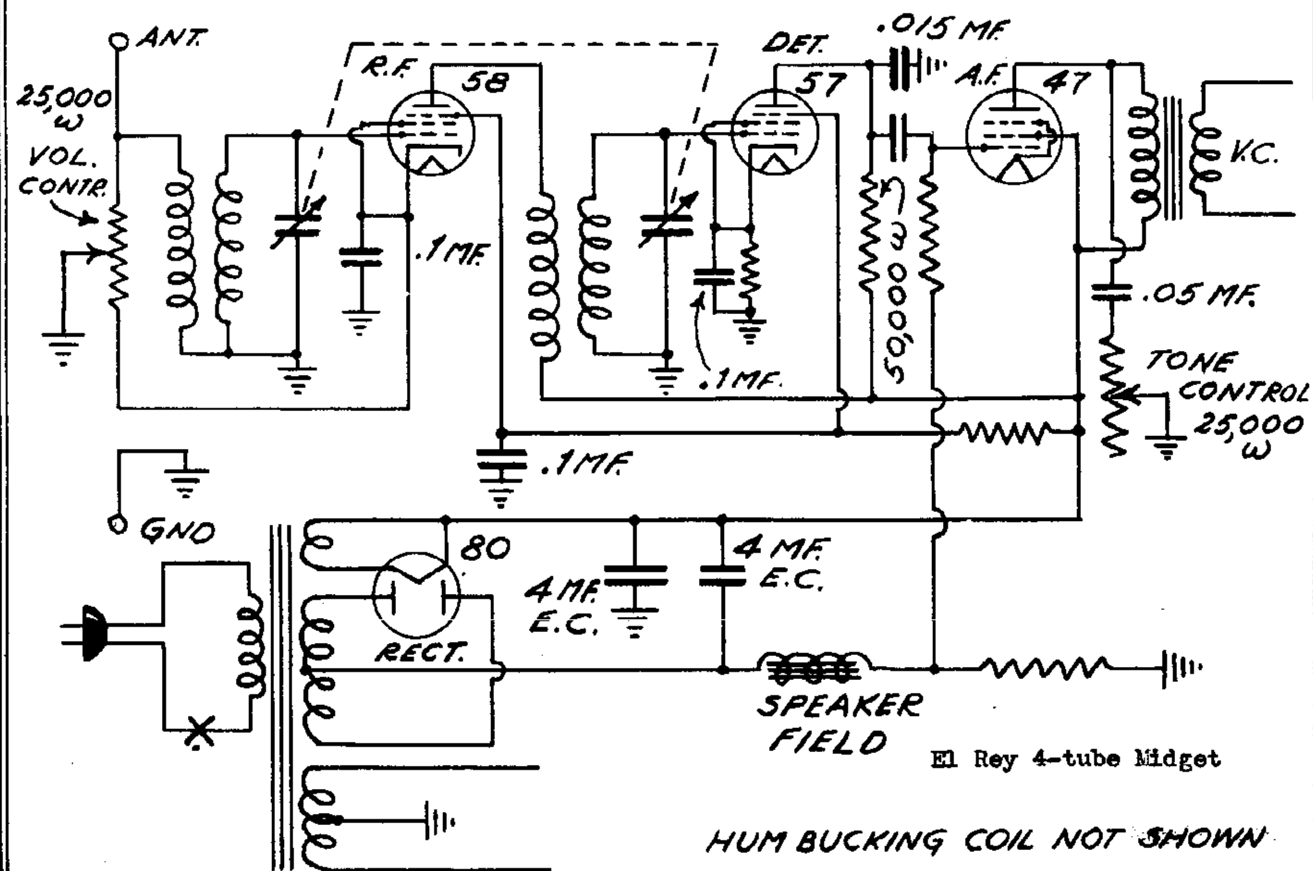
IF PEAK 456 KC.

MODEL Laurel Tone
MODEL 4-Tube Midget
Schematic

PARAMOUNT RADIO CO.
EL-REY RADIO MFG. CO.



Paramount Model
Laurel Tone

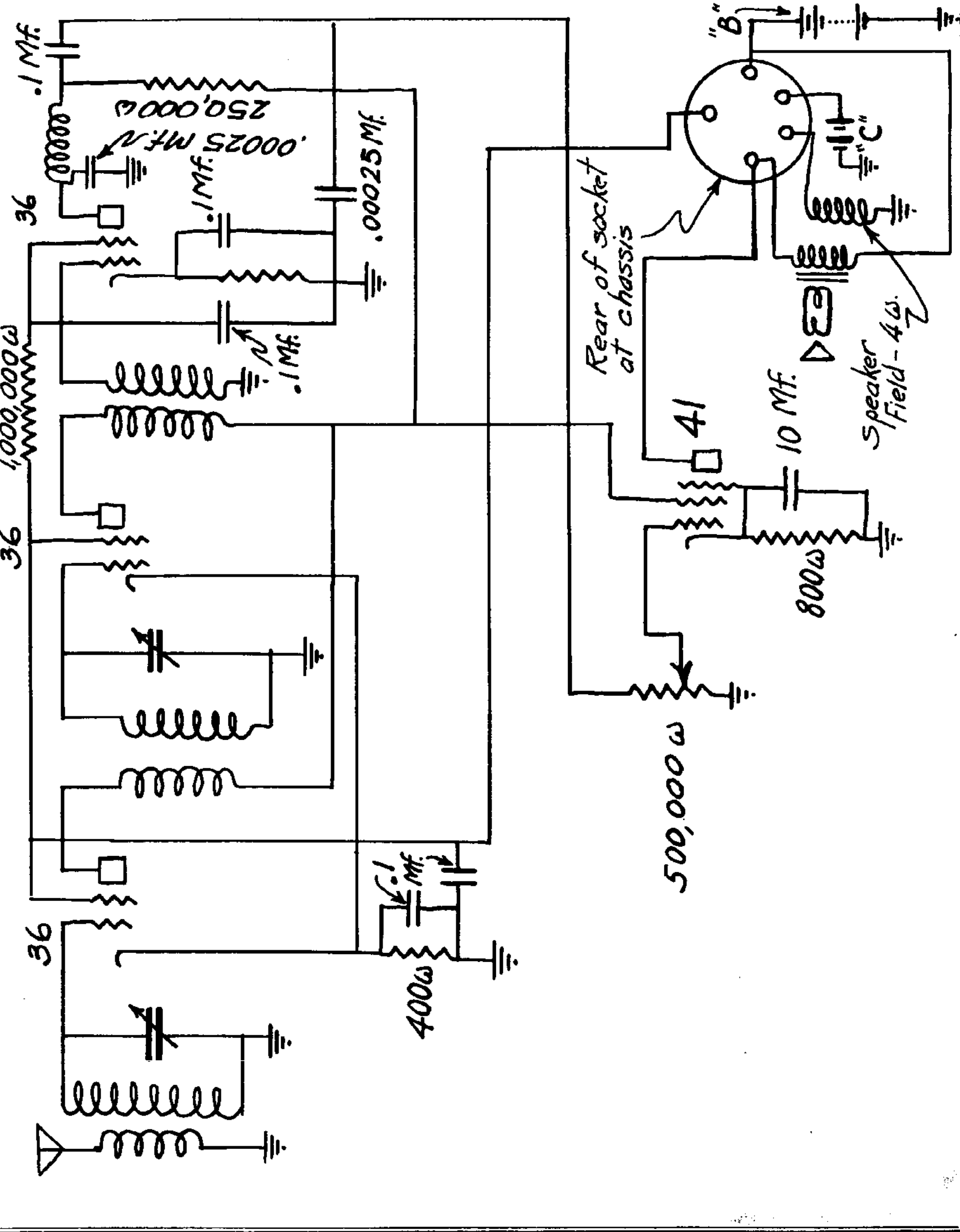


El Rey 4-tube Midget

HUM BUCKING COIL NOT SHOWN

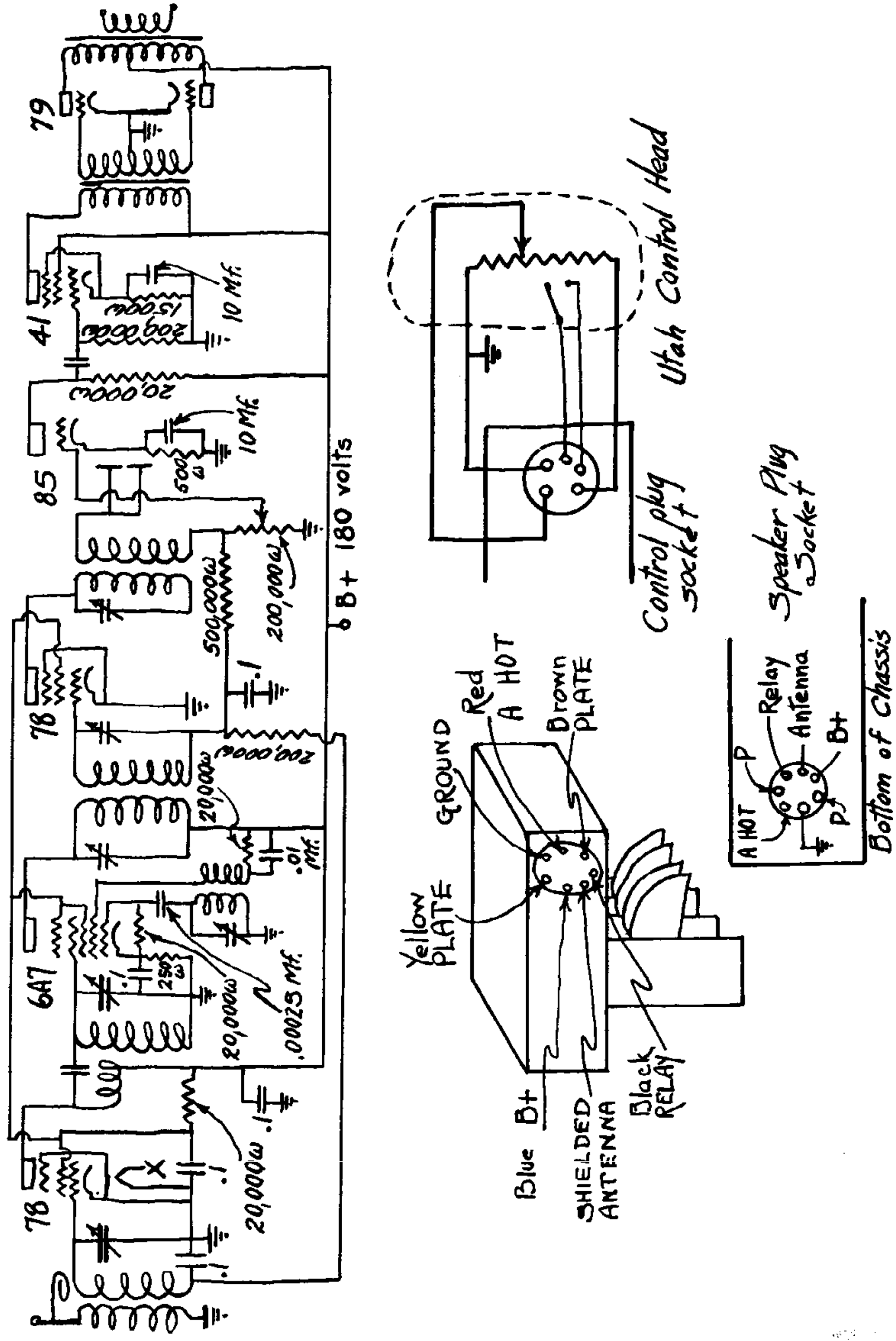
MODEL 4-Tube Receiver
Schematic

PERFECTONE, INC.

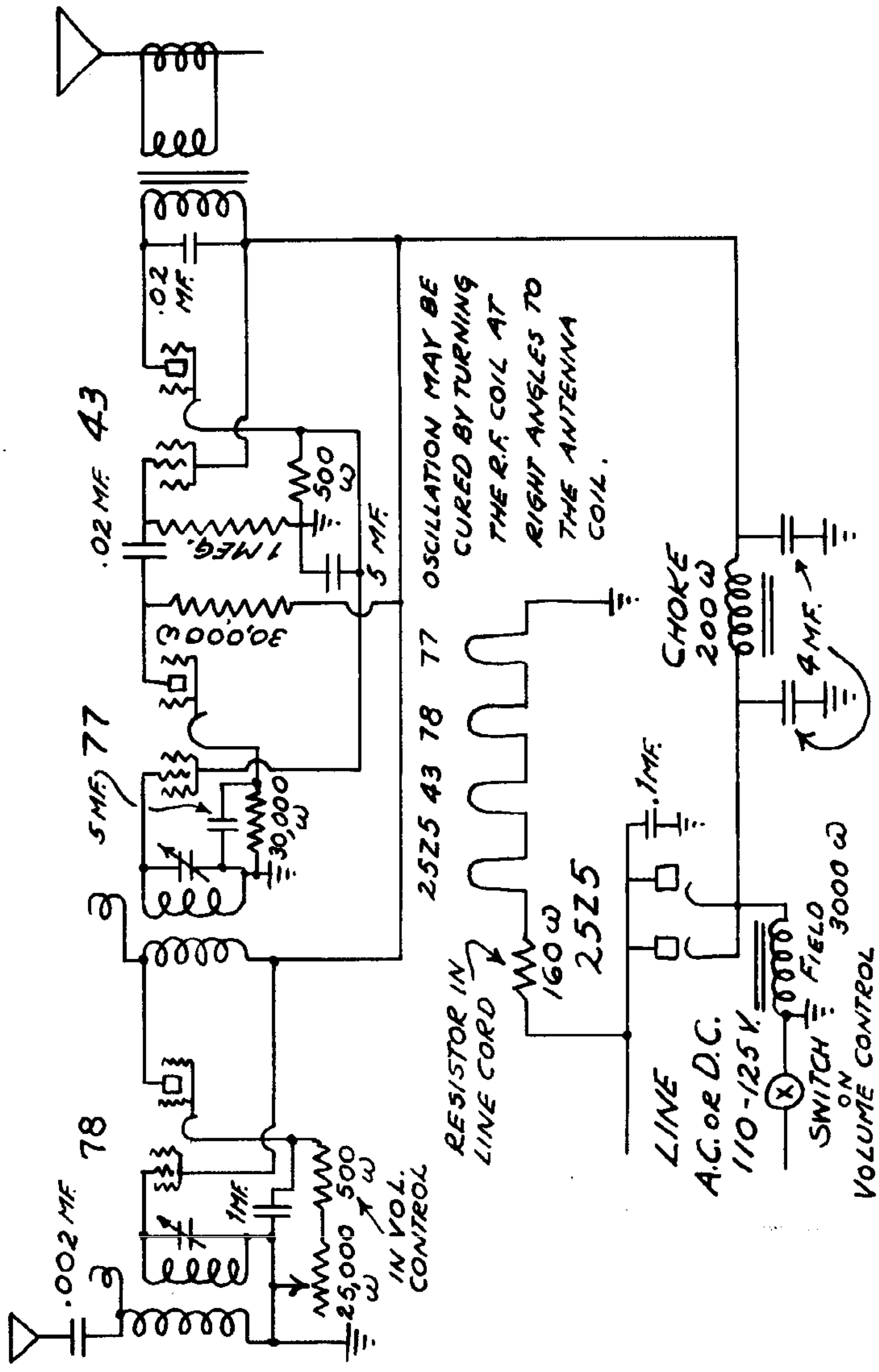


MODEL 55 Auto
Schematic
Data

ROOTS AUTO RADIO MFG. CORP.

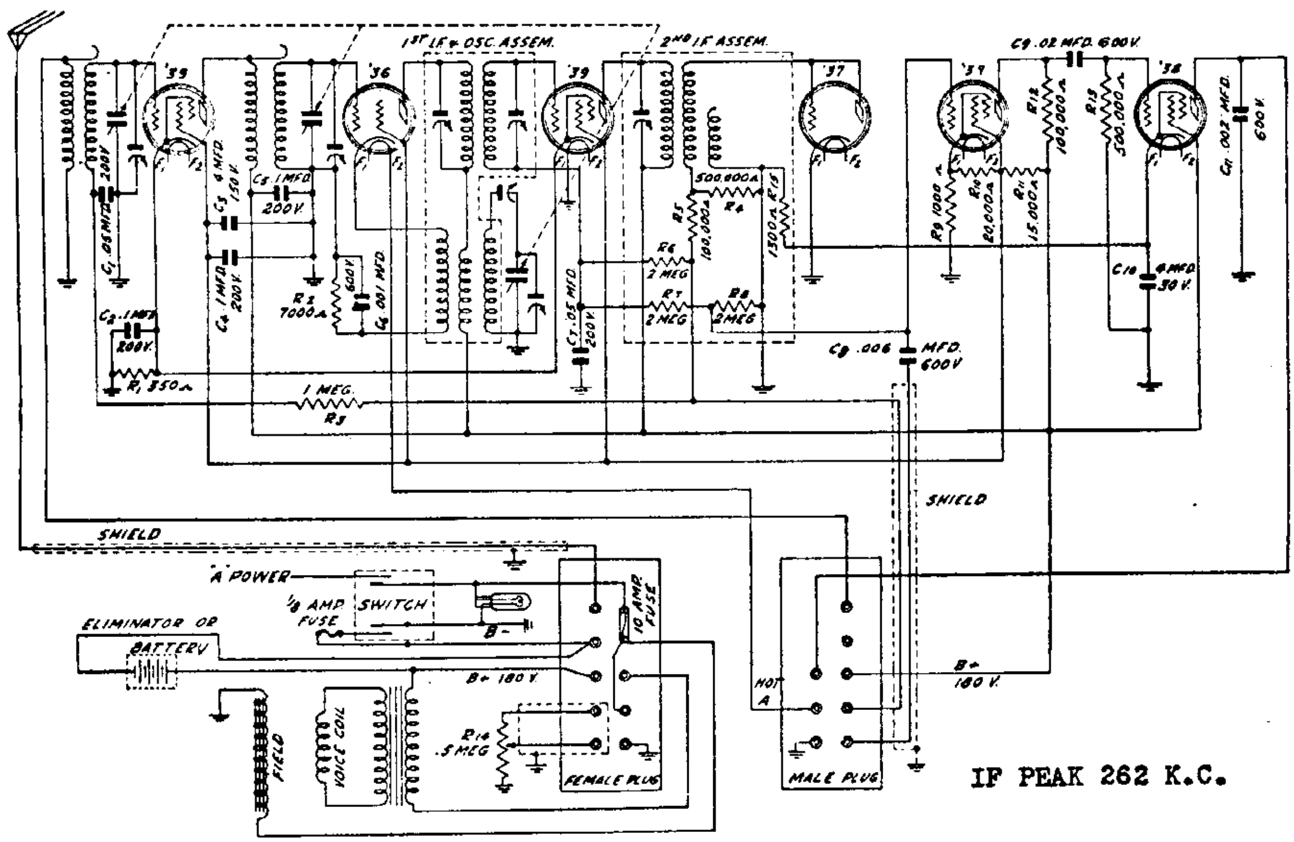


ROYAL

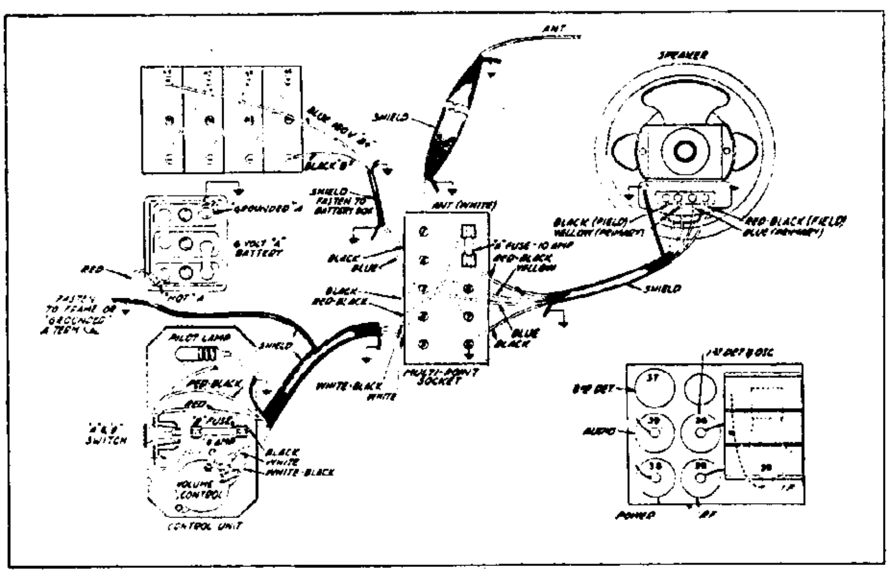

OSCILLATION MAY BE CURED BY TURNING THE R.F. COIL AT RIGHT ANGLES TO THE ANTENNA COIL.
.002 MF.
78
1MF.
500 ω
25,000 ω
IN VOL. CONTROL
5 MF.
77
30,000 ω
.02 MF.
1 MEG.
30,000 ω
5 MF.
43
500 ω
.02 MF.
2525 43 78 77
RESISTOR IN LINE CORD
160 ω
2525
.1 MF.
LINE
A.C. OR D.C.
110-125 V.
SWITCH ON VOLUME CONTROL
FIELD 3000 ω
CHOKE 200 ω
4 MF.

MODEL 062
Schematic
Voltage
Connections

SOLAR



IF PEAK 262 K.C.



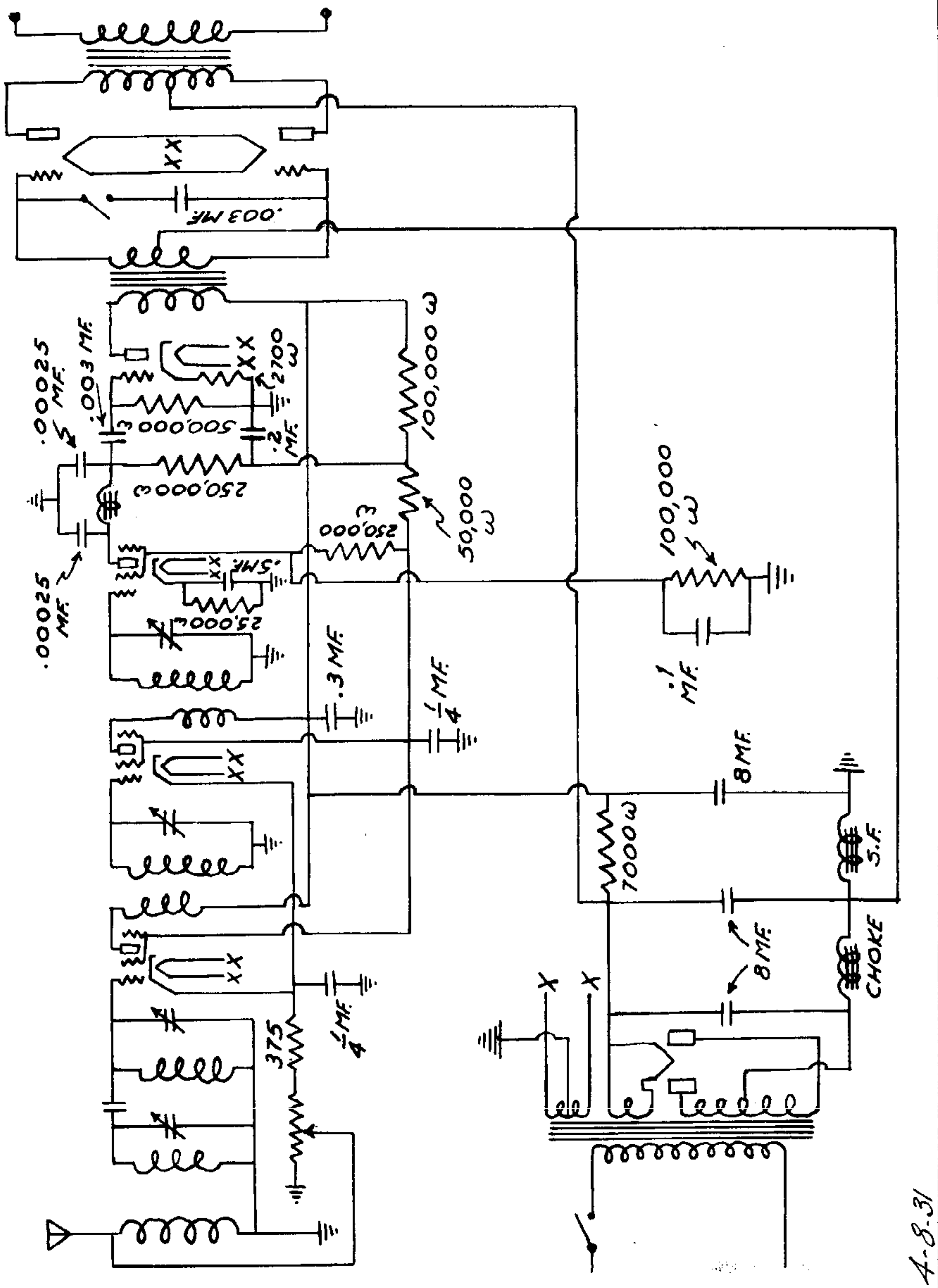
VOLTAGE DATA

Tube	*Plate*	*Screen*	*Grid*	*Plate MA.*
R-F.	177	80	3	3.6
1st Det.	173	76	7*	.9*
I-F.	177	80	3	3.6
2nd Det.	0	0	0	0
1st A-F.	54	77	6	1.2
Output	159	165	15.5	10.0

* Will vary with **dial setting.**

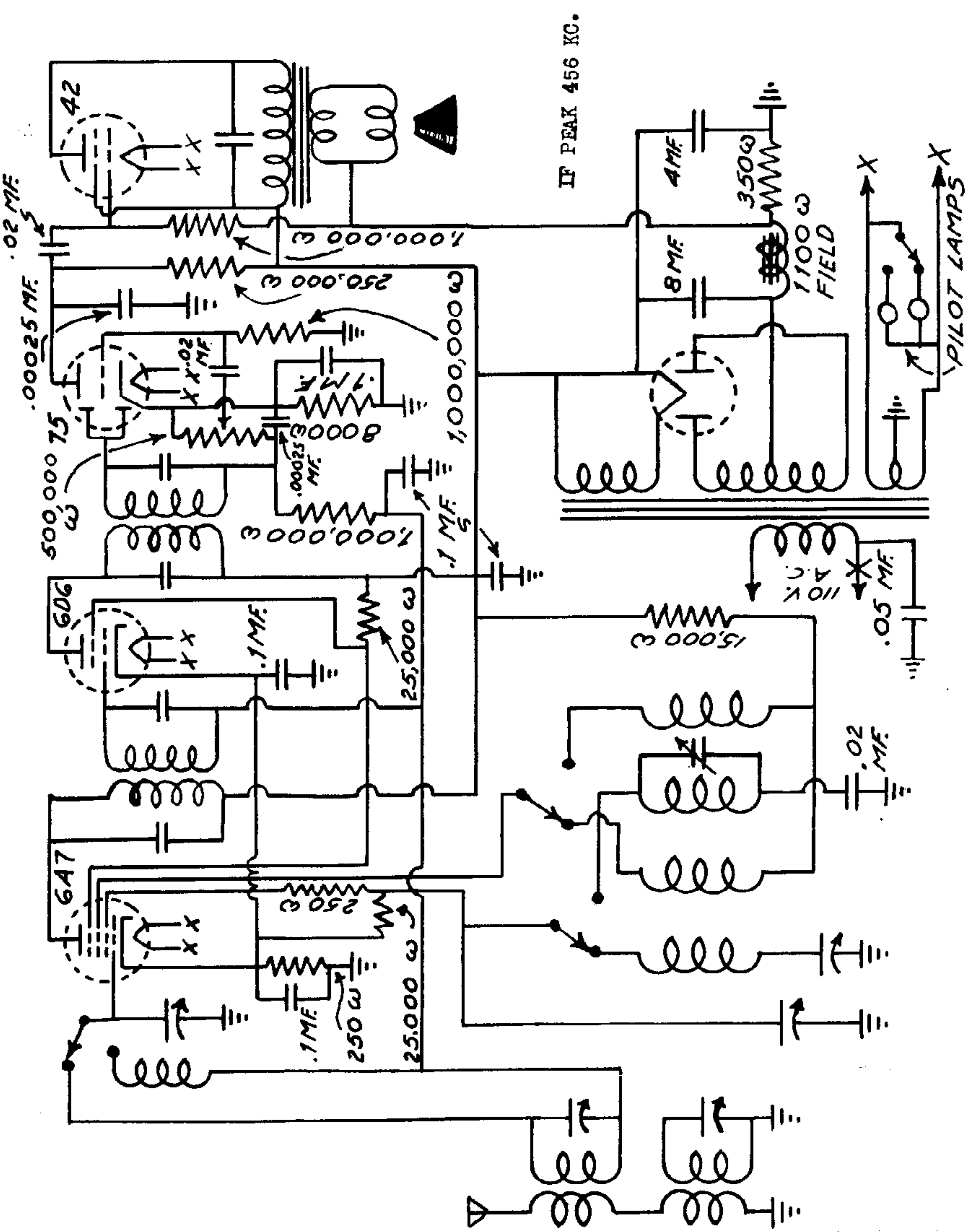
MODEL C-108
Clock Model
Schematic

STORY & CLARK RADIO CORP.



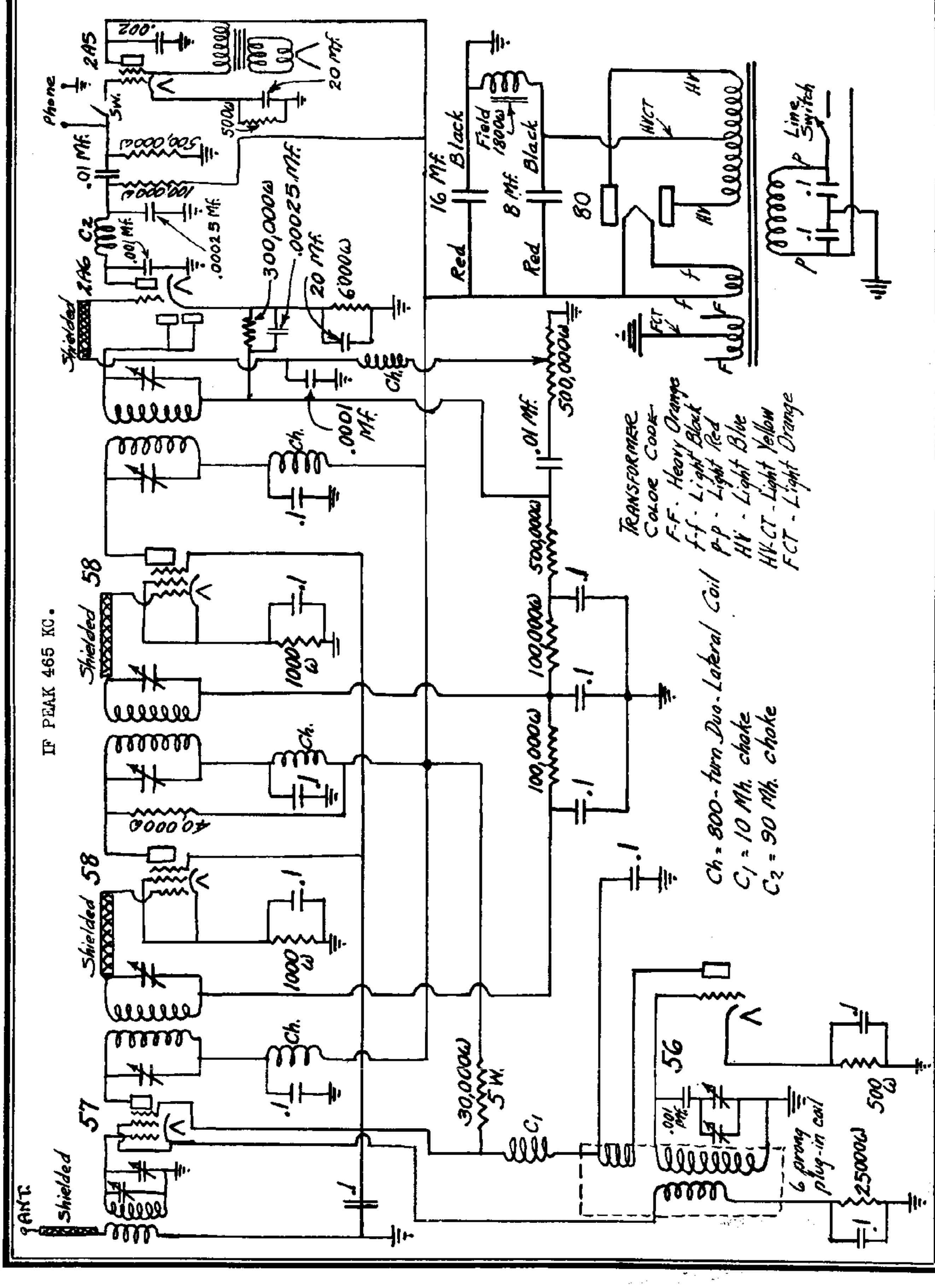
MODEL A-31
Schematic

SUPERTONE



MODEL Superba
Schematic
Color Code

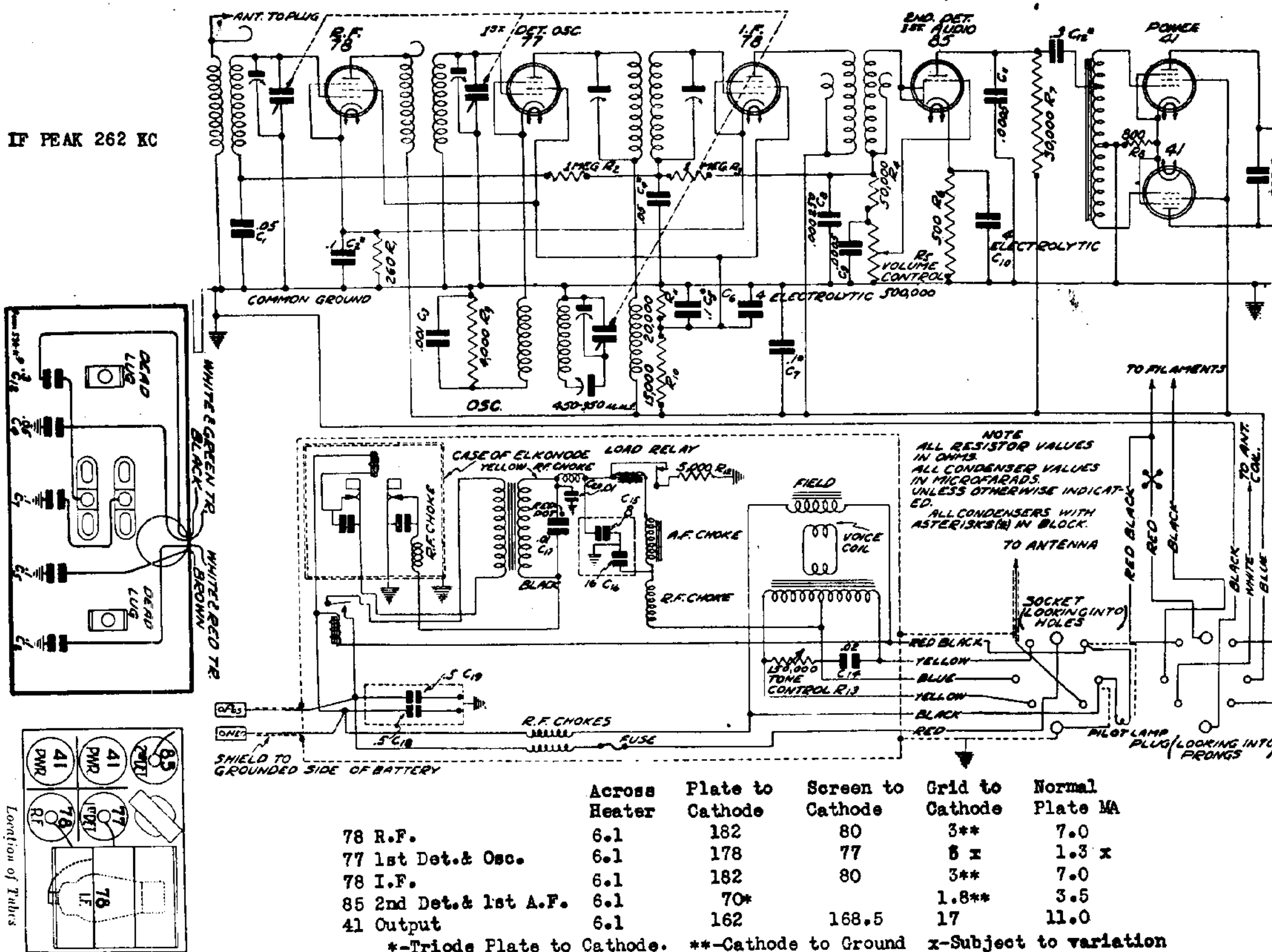
SUPERTONE PRODUCTS CO., INC.



MODEL 06-W
Schematic
Voltage, Socket

TROPIC - AIRE

IF PEAK 262 KC



Condenser Block—Internal Wiring

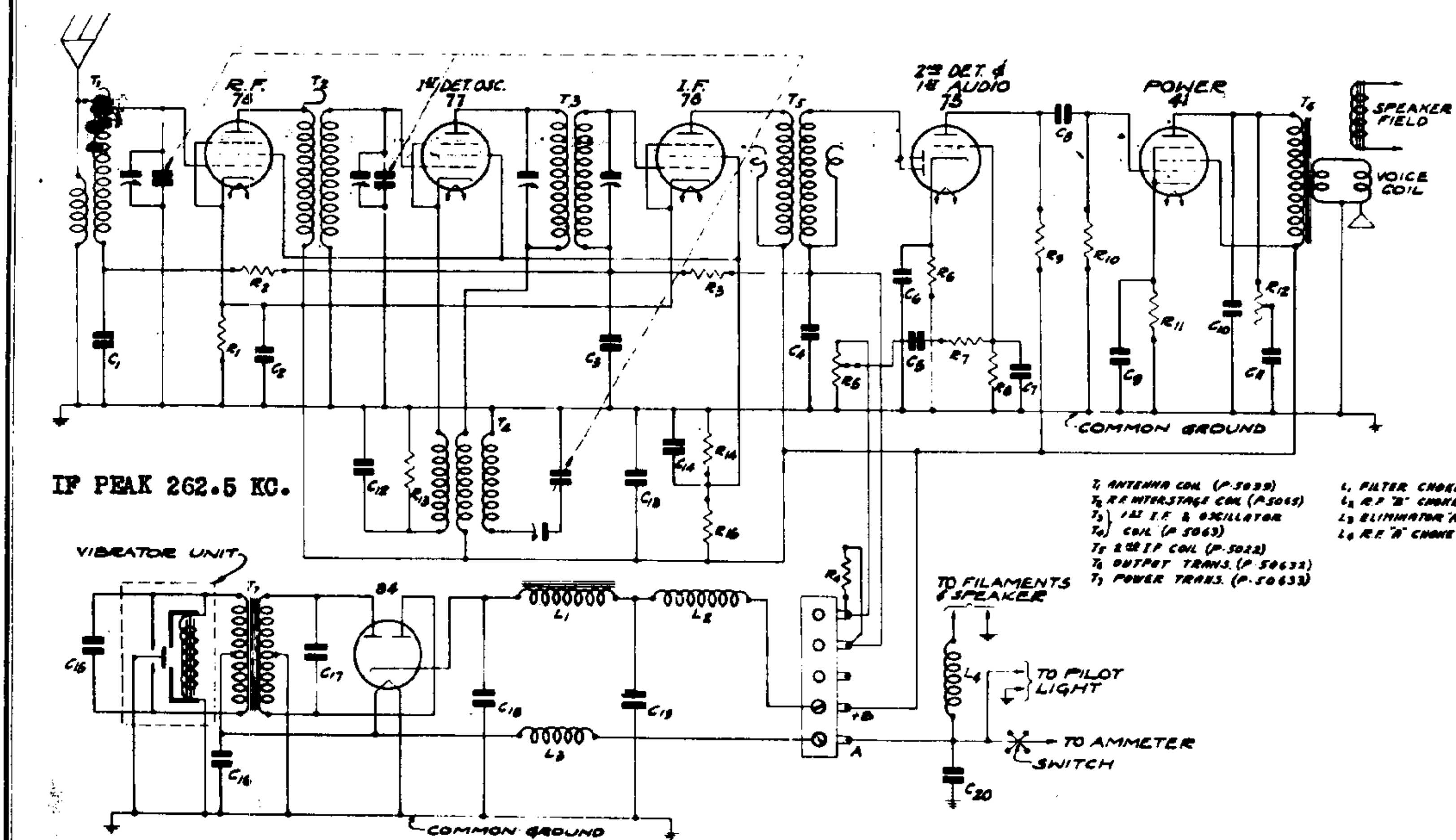
Location of Tubes

	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78 R.F.	6.1	182	80	3**	7.0
77 1st Det.& Osc.	6.1	178	77	5 x	1.3 x
78 I.F.	6.1	182	80	3**	7.0
85 2nd Det.& 1st A.F.	6.1	70*		1.8**	3.5
41 Output	6.1	162	168.5	17	11.0

*-Triode Plate to Cathode. **-Cathode to Ground x-Subject to variation
NOTE:- All voltages are at 185 volts input from "B" Eliminator

MODEL 6-U
Schematic

TRUEVALUE



T_1 ANTENNA COIL (P-5039)
T_2 R.F. INTERSTAGE COIL (P-5065)
T_3 } 1st I.F. & OSCILLATOR
T_4 } COIL (P-5063)
T_5 2nd I.F. COIL (P-5022)
T_6 OUTPUT TRANS. (P-50632)
T_7 POWER TRANS. (P-50633)

L_1 FILTER CHOKE (P-50637)
L_2 R.F. "B" CHOKE (P-5174)
L_3 ELIMINATOR "A" CHOKE (P-5175)
L_4 R.F. "A" CHOKE (P-5167)

R_1 260 OHMS
R_2 1.0 MEG OHM
R_3 2.0 "
R_4 200,000 OHM
R_5 250,000 OHM VOL. CONTROL
R_6 6,000 OHM
R_7 100,000 OHM
R_8 1.0 MEG OHM
R_9 250,000 OHM

R_{10} 250,000 OHM
R_{11} 800 OHM
R_{12} 150,000 OHM TONE CONTROL
R_{13} 4,000 OHM
R_{14} 20,000 OHM
R_{15} 15,000 OHM

C_1 0.050 M.F. 200V. TUBULAR
C_2 0.500 M.F. (BLOCK RED-WH)
C_3 0.050 M.F. (BLOCK GR-WH)
C_4 0.00025 M.F. MICA
C_5 0.050 M.F. 200V. TUBULAR
C_6 12.000 M.F. ELECTROLYTIC IN BLOCK WITH C_9
C_7 0.00025 M.F. MICA
C_8 0.050 M.F. (BLOCK GR)

C_9 12.000 M.F. ELECTROLYTIC IN BLOCK WITH C_6
C_{10} 0.003 M.F. (BLOCK YELLOW)
C_{11} 0.020 M.F. 600V. TUBULAR
C_{12} 0.001 M.F. MICA
C_{13} 0.500 M.F. (BLOCK BLUE)
C_{14} 0.100 M.F. (BLOCK BROWN)
C_{15} 0.500 M.F. 180V. TUBULAR
C_{16} 1.000 M.F. 120V. TUBULAR

C_{17} 0.010 M.F. 1600V. TUBULAR
C_{18} 10.000 M.F. BLOCK WITH C_{19}
C_{19} 10.000 M.F. BLOCK WITH C_{18}
C_{20} 0.500 M.F. 120V. TUBULAR

COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK