

# RCA VICTOR MODELS 125 AND 225

## Six-Tube, Two-Band, A. C. Receivers

### SERVICE NOTES

#### ELECTRICAL SPECIFICATIONS

Voltage and Frequency Ratings .....	{ 105-125 Volts, 50-60 Cycles 105-125 Volts, 25-60 Cycles 105-125/200-250 Volts, 50-60 Cycles
Power Consumption .....	85 Watts
Radiotrons and Functions .....	{ (1) RCA-6A7 Oscillator and First Detector (2) RCA-6D6 I.F. Amplifier (3) RCA-6D6 I.F. Amplifier (4) RCA-6B7 Detector A.F. Amplifier and A.V.C. (5) RCA-41 Power Output (6) RCA-80 Rectifier
Tuning Frequency Ranges .....	540 KC.-1720 KC. and 5400 KC.-18,000 KC.
Alignment Frequencies	460 KC. (I.F.), 600 KC. (Osc.), 1720 KC. (Osc. and Det.) and 18,000 KC. (Osc. and Det.)
Undistorted Output .....	1.75 Watts
Maximum Output .....	3.5 Watts

#### PHYSICAL SPECIFICATIONS

	<i>Model 125</i>	<i>Model 225</i>
Height .....	17 $\frac{7}{8}$ Inches .....	38 Inches
Width .....	14 $\frac{3}{8}$ Inches .....	24 $\frac{3}{8}$ Inches
Depth .....	10 $\frac{5}{8}$ Inches .....	11 $\frac{1}{4}$ Inches

These six-tube, two-band receivers employ identical chassis assemblies, which are designed for frequency coverage of the standard broadcast band and the more important short-wave bands now in use for trans-oceanic broadcast work.

A variable ratio drive is used in combination with an "airplane" type dial to simplify the accurate tuning necessary for proper reception of the short-wave signals. An automatic volume control system is incorporated in the circuits of the receiver which stabilizes

the output when atmospheric fluctuations cause fading. This feature is of prime importance when receiving short-wave signals.

Reproduction of good quality is obtained from a pentode output tube operating into a uniformly efficient loudspeaker. Tone control is provided in the power output stage so that by operating a double throw switch, the high frequency response may be reduced by a predetermined amount.

#### DESCRIPTION OF ELECTRICAL CIRCUIT

The circuit embodied in this receiver is of the superheterodyne type. Its layout is shown schematically in Figure 3. Two ranges of tuning are provided by two separate sets of coils. A tuned transformer is employed to couple the antenna system into the first

detector tube which is an RCA-6A7. This tube also serves, by the coordinate arrangement of its elements, to generate the local oscillation required for superheterodyne operation. The local oscillation is modulated with the incoming signal by the mutual effect of the

tube elements on the electron flow. The difference beat frequency of these two signals is amplified by this same tube and delivered to the i-f amplifier system. There are two Radiotron 6D6 tubes used for i-f amplification. Three transformers intercouple these tubes. The primaries and secondaries of two of these transformers are resonated to the intermediate frequency (460 kc.). The third i-f transformer has no adjustable capacitors; its natural tuning is such as to obtain the desired selectivity and efficiency. Diode detection is performed in an RCA-6B7 tube, a duplex diode pentode. The signal from the i-f system is applied to one of the diodes of the tube, where detection takes place. The remaining diode is tied solidly to ground.

A voltage having the character of an audio wave superimposed upon a constant d-c is developed by the detection process across the manual volume control resistor R14. The d-c portion of this voltage, which is dependent upon the strength of the carrier of the signal being received, is used to automatically regulate the control grid bias voltages of the first-detector and the i-f amplifier stages. Maximum control is used on the detector and first i-f, while a reduced amount of control is applied to the second i-f. A portion of the audio component of the detected

voltage appearing across the manual volume control is carried through the variable arm and a blocking condenser to the control grid of the RCA-6B7, which simultaneously functions to provide audio amplification. The audio signal is conducted from the detector—a-f amplifier—a.v.c. stage to the power-output tube through a resistance-capacitance network. At this point there is provision for changing the audio response of the receiver, so that proper results will be obtained in both the long-wave and the short-wave bands. As shown on the schematic, the switch S7 operates so that for long-wave reception the resistor R25 and condenser C32 are in series with the plate resistor R17, while for short-wave reception the resistor-condenser combination is shorted out. The output tube delivers a high-level high-quality signal to the electro-dynamic loudspeaker through an efficiently designed matching transformer. A two-point tone control consisting of a small capacitor and a single pole switch is connected in the plate circuit of the RCA-41 output tube.

Direct current voltages required are obtained from a full-wave rectifier system. The electro-dynamic speaker receives its magnetization current from the rectifier tube, an RCA-80. It is connected into the circuit so that it will function as a reactor for filtering of the plate currents.

## SERVICE DATA

### (1) Line-Up Adjustments

Maximum efficiency and best quality of performance will only be obtained when the circuits are in proper alignment. "Trimmer" capacitors are provided at accessible locations on the receiver chassis for accurately realigning the circuits when they have deviated from normal. Incorrect alignment is usually evidenced by low sensitivity, poor quality and irregular double-peaked tuning.

It is important in re-adjusting the line-up trimmers to use proper oscillator and indicator apparatus. Certain standard service instruments, which are useful in making these adjustments, have been devised and made available to the service man by the manufacturer of this receiver. They are illustrated and described on page 2.

#### Preliminary Tests

Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal to the circuit (r-f, oscillator or i-f) from the "Full-Range Oscillator," and inserting the "Tuning Wand" into the coils involved. The "Tuning Wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the center of a particular coil, through the opening provided in the top of the shield as shown in Figure 1, the inductance of the coil is lowered, and therefore, the resonant frequency is increased. Placing the other end (iron filing core) into the coil raises the inductance and conversely decreases the resonant frequency. Thus it is apparent, that if the circuits are in exact resonance

with the standard signal of the "Full-Range Oscillator," the insertion of either end of the wand will cause a reduction of receiver output; whereas if the circuits

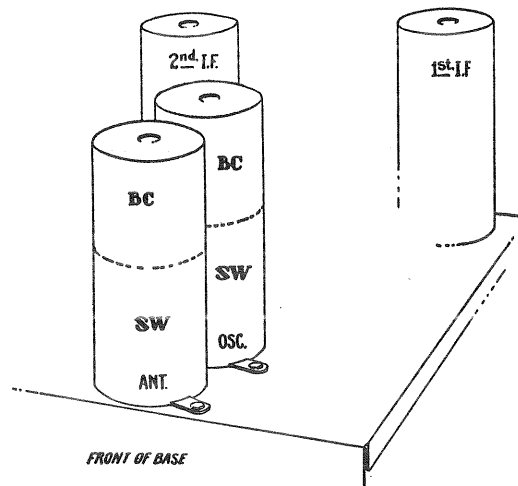


Figure 1—Locations of Coils

are not in tune or resonance with the incoming signal, one end will bring about an increase of the signal, and the other end will cause a decrease. When an increase in signal is obtained with the iron filled end of the wand, an increase of the inductance and decrease in frequency of resonance is indicated. The trimmer condenser associated with the circuit under test will therefore require adjustment so as to increase its capacitance. The reverse occurs when a gain in signal is obtained when using the brass cylinder end of the wand.



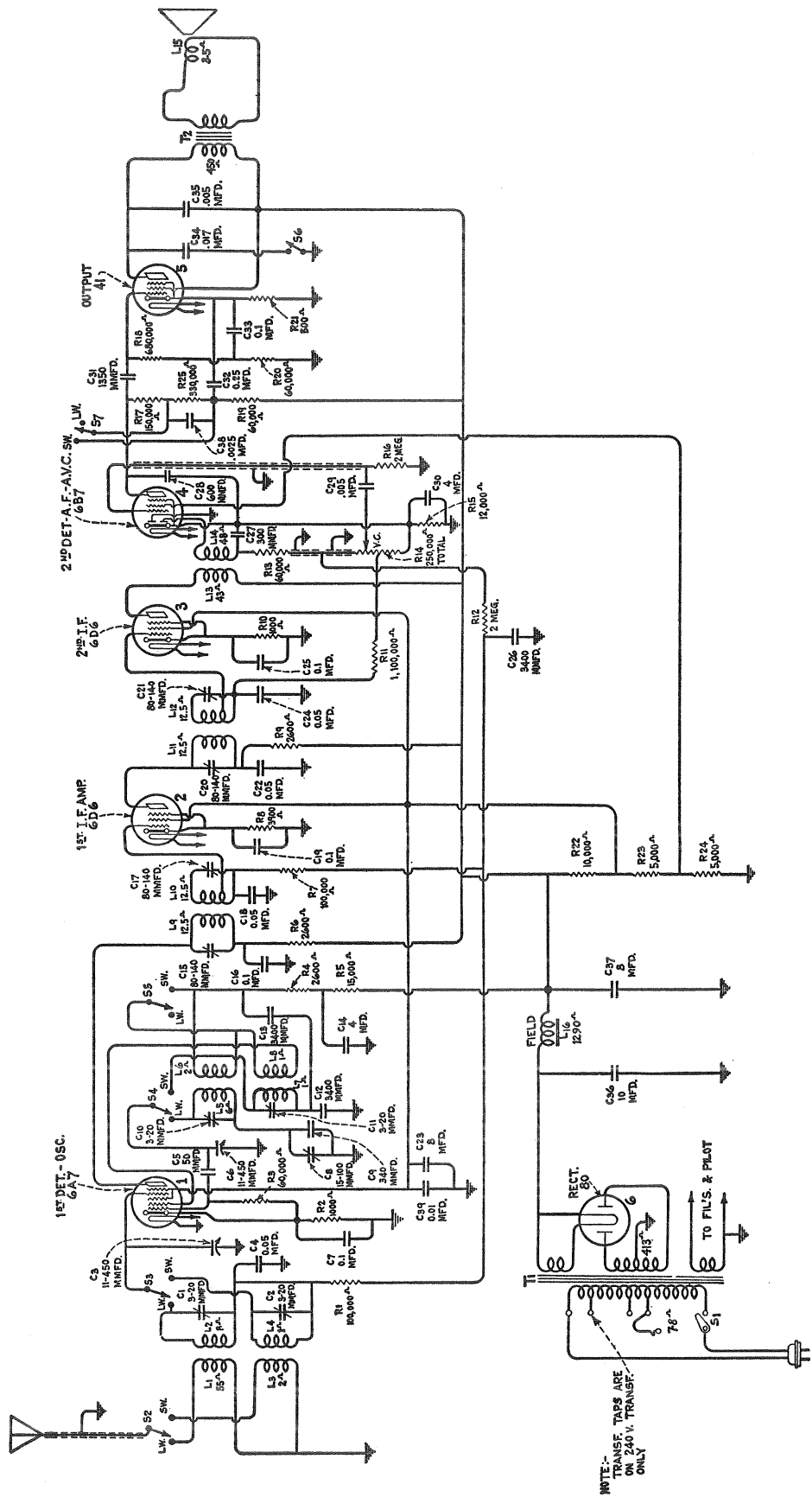


Figure 3—Schematic Circuit Diagram

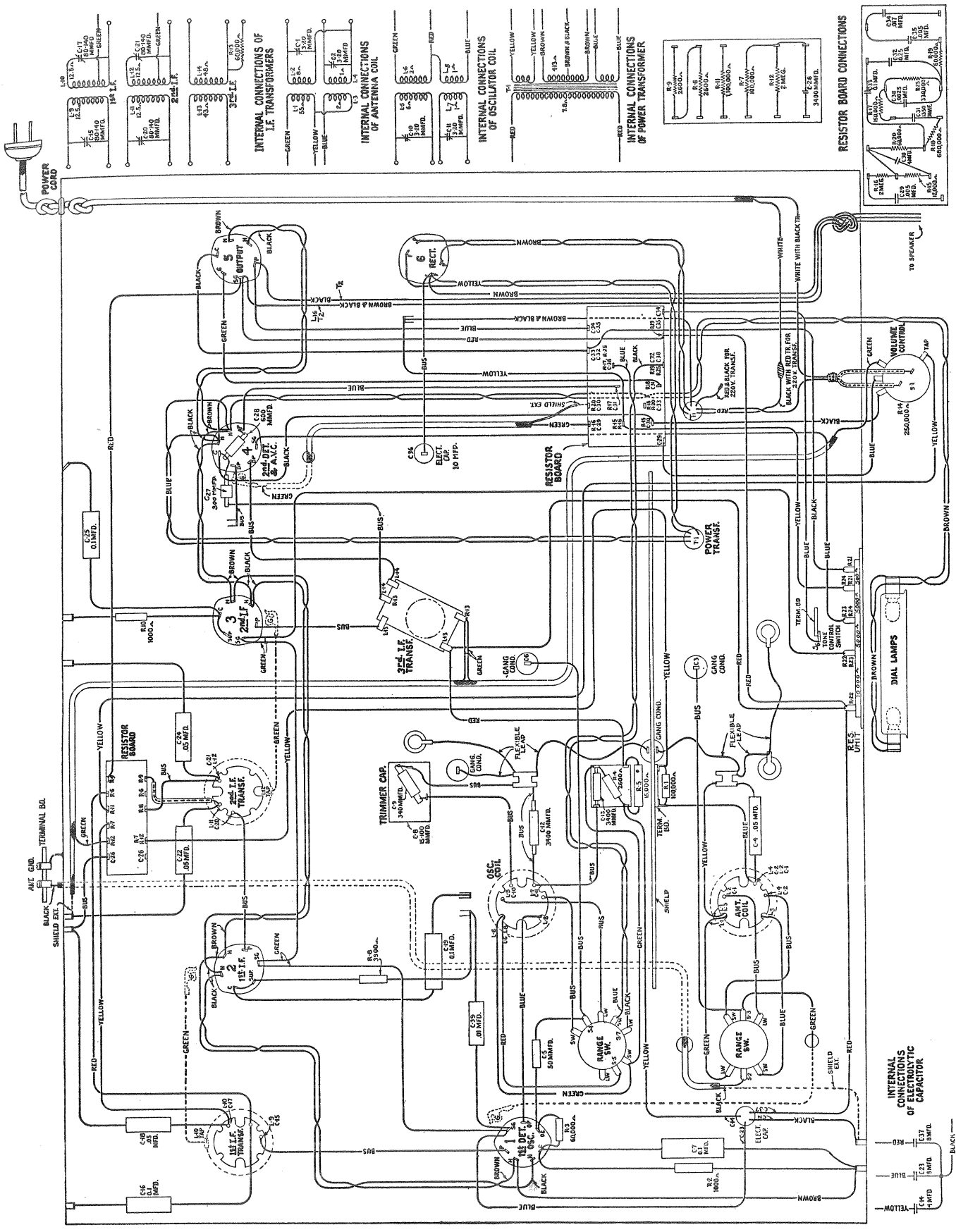


Figure 4—Chassis Wiring Diagram





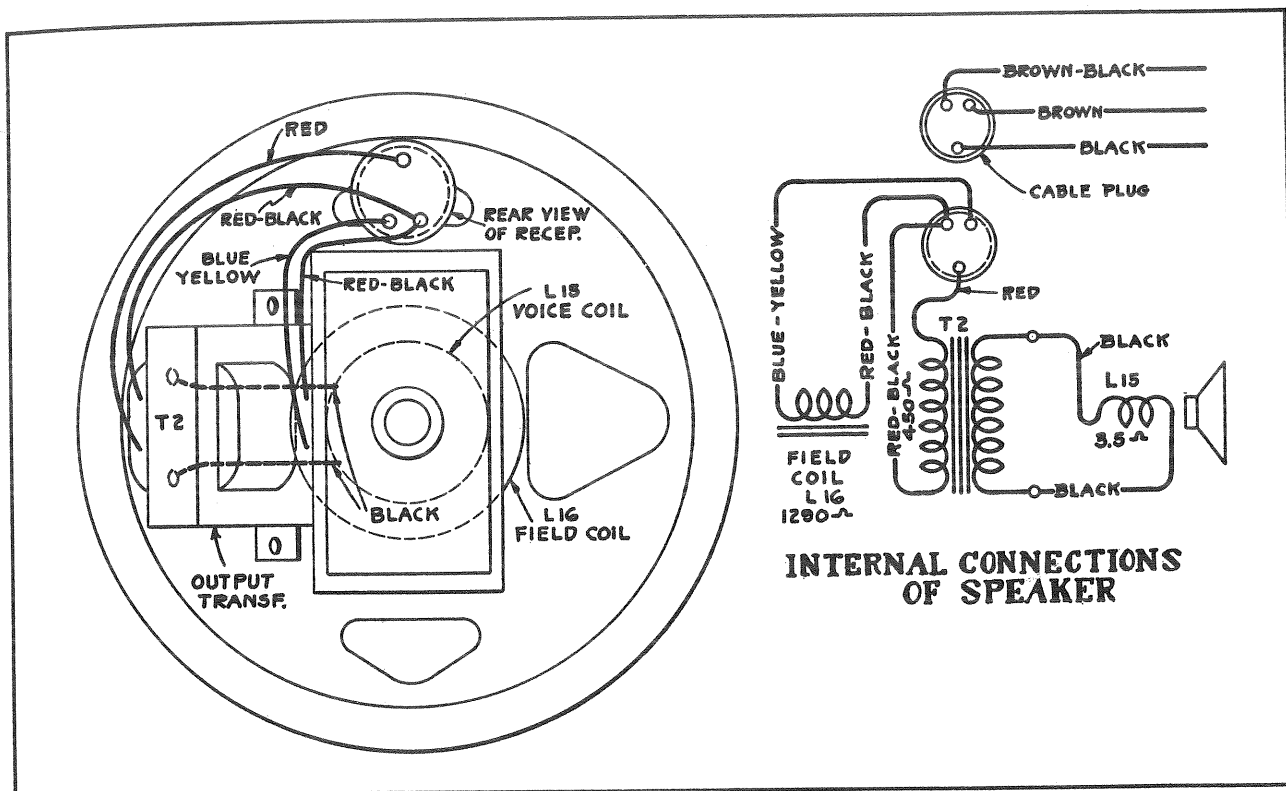


Figure 7—Loudspeaker Wiring—Table Model

## RADIOTRON SOCKET VOLTAGES (Referred to ground)

Maximum Volume Control—No Signal—115 Volts A. C. Input

Radiotron		Plate to Ground Volts, D.C.	Screen Grid to Ground Volts, D.C.	Cathode to Ground Volts, D.C.	Plate Current	Heater Volts
RCA-6A7	Oscillator	185	—	—	4.5	—
	Detector	265	109	9.5	1.6	6.3
RCA-6D6 First I.F.		257	109	11.2	2.2	6.3
RCA-6D6 Second I.F.		265	109	8.3	6.6	6.3
RCA-6B7 Second Det.		80*	109	4.5	0.3	6.3
RCA-41 Power		255	265	18.0	30.0	6.3
RCA-80 Rectifier		345/345	—	—	68.0	5.0

\*Calculated from +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	Stock No.	DESCRIPTION	List Price
<b>RECEIVER ASSEMBLIES</b>					
4880	Bracket—Tone control switch mounting bracket.....	\$0.12	5109	Resistor—12,000 ohms—Carbon type— $\frac{1}{4}$ watt (R15)—Package of 5.....	\$1.00
4427	Bracket—Volume control mounting bracket..	.18	5114	Resistor—15,000 ohms—Carbon type—1 watt (R5).....	.72
4358	Bracket—Electrolytic capacitor bracket for capacitor No. 7790.....	.15	3602	Resistor—60,000 ohms—Carbon type— $\frac{1}{4}$ watt (R3, R19, R20)—Package of 5.....	1.00
4693	Bracket—Electrolytic capacitor bracket for capacitor No. 5101.....	.15	3118	Resistor—100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R1, R7)—Package of 5.....	1.00
3861	Capacitor—Adjustable trimmer capacitor (C8).	.78	5027	Resistor—150,000 ohms—Carbon type— $\frac{1}{4}$ watt (R17)—Package of 5.....	1.00
5094	Capacitor—50 mmfd. (C5).....	.20	5108	Resistor—330,000 ohms—Carbon type— $\frac{1}{4}$ watt (R25)—Package of 5.....	1.00
3981	Capacitor—300 mmfd. (C27).....	.30	5110	Resistor—680,000 ohms—Carbon type— $\frac{1}{4}$ watt (R18)—Package of 5.....	1.00
4811	Capacitor—340 mmfd. (C9).....	.25	4783	Resistor—1,100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R11)—Package of 5.....	1.00
4210	Capacitor—600 mmfd. (C28).....	.25	6242	Resistor—2 megohms—Carbon type— $\frac{1}{4}$ watt (R12, R16)—Package of 5.....	1.00
5115	Capacitor—1350 mmfd. (C31).....	.25	4721	Resistor—Tapped—One 500, one 10,000 and two 5000 ohm sections (R21, R22, R23, R24).....	.88
4439	Capacitor—3400 mmfd. (C12).....	.35	4521	Shield—Antenna, I.F. or oscillator coil shield..	.42
4881	Capacitor—3400 mmfd. (C13, C26).....	.20	3942	Shield—First detector and output Radiotron shield.....	.18
5107	Capacitor—0.0025 mfd. (C38).....	.16	3782	Shield—Second detector Radiotron shield....	.26
4793	Capacitor—0.005 mfd. (C29).....	.20	7487	Shield—I.F. Radiotron shield.....	.25
4868	Capacitor—0.005 mfd. (C35).....	.20	4784	Socket—4-contact Radiotron socket.....	.15
4906	Capacitor—0.017 mfd. (C34).....	.25	4785	Socket—6-contact Radiotron socket.....	.15
4883	Capacitor—0.01 mfd. (C39).....	.20	4786	Socket—6-contact Radiotron socket.....	.15
4836	Capacitor—0.05 mfd. (C4, C18, C24).....	.30	4787	Socket—7-contact Radiotron socket.....	.15
4886	Capacitor—0.05 mfd. (C22).....	.20	4379	Strip—Terminal strip—Engraved "ANT-GND".....	.20
4841	Capacitor—0.1 mfd. (C7, C19, C25, C33)...	.22	5100	Switch—Range switch (S2, S3, S4, S5, S7)...	1.20
4885	Capacitor—0.1 mfd. (C16).....	.28	5052	Switch—Tone control switch (S6).....	.30
3597	Capacitor—0.25 mfd. (C32).....	.40	9512	Transformer—Power transformer—105—125 volts—25—40 cycles.....	6.58
3796	Capacitor—4.0 mfd. (C30).....	.60	9513	Transformer—Power transformer—105—125/210—240 volts—40—60 cycles.....	4.85
7790	Capacitor—10.0 mfd. (C36).....	1.05	9511	Transformer—Power transformer—105—125 volts—50—60 cycles (T1).....	4.78
5101	Capacitor pack—Comprising two 8. mfd. and one 4. mfd. sections (C14, C23, C37).....	2.14	5102	Transformer—First intermediate frequency transformer (L9, L10, C15, C17).....	1.98
5087	Coil—Antenna coil (L1, L2, L3, L4, C1, C2).	1.86	5103	Transformer—Second intermediate frequency transformer (L11, L12, C20, C21).....	1.98
5089	Coil—Oscillator coil (L5, L6, L7, L8, C10, C11).....	1.90	5105	Transformer—Third intermediate frequency transformer (L13, L14, R13).....	1.65
4504	Condenser—2-gang tuning condenser (C3, C6).	2.78	4429	Volume control (R14, S1).....	1.40
5104	Lead—Shielded—Single conductor—From range switch to antenna terminal board....	.30			
5106	Lead—Shielded—2-conductor—From volume control to third I.F. transformer and resistor board.....	.40			
5112	Resistor—1000 ohms—Carbon type— $\frac{1}{4}$ watt (R2, R10)—Package of 5.....	1.00			
4812	Resistor—2600 ohms—Carbon type— $\frac{1}{4}$ watt (R4, R6, R9)—Package of 5.....	1.00			
5113	Resistor—3900 ohms—Carbon type— $\frac{1}{4}$ watt (R8)—Package of 5.....	1.00			



## 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	Stock No.	DESCRIPTION	List Price
	<b>CONDENSER DRIVE ASSEMBLIES</b>		8935	Cone—Reproducer cone (L15)—Package of 5	\$5.25
4450	Dial—Station selector dial—Console model . . .	\$0.52	5118	Plug—3-contact plug—Male section for reproducer cable . . . . .	.25
4474	Dial—Station selector dial—Table model . . . .	.76	5119	Plug—3-contact plug—Female section for reproducer cable . . . . .	.25
4434	Drive—Tuning condenser drive assembly—Complete . . . . .	2.42	9589	Reproducer—Complete . . . . .	8.20
4475	Indicator—Station selector (pointer) indicator—Table model . . . . .	.18	4892	Transformer—Output transformer (T2) . . . .	1.30
4363	Indicator—Station selector (pointer) indicator—Console model . . . . .	.18		<b>MISCELLANEOUS ASSEMBLIES</b>	
4340	Lamp—Dial lamp—Package of 5 . . . . .	.60	6755	Bezel—Station selector dial escutcheon bezel—Table model . . . . .	.50
3943	Screen—Translucent screen for dial light—Package of 2 . . . . .	.18	6840	Bezel—Station selector dial escutcheon bezel—Console model . . . . .	.56
3529	Socket—Dial lamp socket . . . . .	.32	6707	Glass—Station selector dial glass—Table model . . . . .	.20
	<b>REPRODUCER ASSEMBLIES TABLE MODEL</b>		6614	Glass—Station selector dial glass—Console model . . . . .	.30
4915	Cable—3-conductor reproducer cable . . . . .	.50	4449	Knob—Station selector, volume control, band switch or tone control knob—Package of 5 . . . . .	.60
9587	Coil—Field coil, magnet and cone support (L16) . . . . .	2.18	6708	Ring—Spring retaining ring for dial glass—Table model—Package of 5 . . . . .	.44
9588	Cone—Reproducer cone (L15)—Package of 5	3.55	6615	Ring—Spring retaining ring for dial glass—Console model—Package of 5 . . . . .	.34
5118	Plug—3-contact plug—Male section for reproducer cable . . . . .	.25	4446	Screw—Chassis mounting assembly—Comprising four screws, four spacers, eight cushions, four washers and four lockwashers—For table model . . . . .	.28
5119	Plug—3-contact plug—Female section for reproducer . . . . .	.25	5184	Screw—Chassis mounting assembly—Comprising one screw, one spacer, two cushions, one washer and one lockwasher—Package of 4—For console model . . . . .	.28
9586	Reproducer—Complete . . . . .	5.95			
4893	Transformer—Output transformer (T2) . . . .	1.48			
	<b>REPRODUCER ASSEMBLIES CONSOLE MODEL</b>				
4915	Cable—3-conductor reproducer cable . . . . .	.50			
9590	Coil—Field coil, magnet and cone support (L16) . . . . .	4.20			