RCA VICTOR MODEL 103

Four-Tube, Two-Band, Superheterodyne A. C. Receiver

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Frequency Ratings	25–60 or 50–60 Cycles
Power Consumption	40 Watts at 115 Volts
Number and Type of Radiotrons	1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1V—Total 4
Tuning Frequency Ranges	540–1500 K. C. and 1600–3500 K. C.
Intermediate Frequency	460 K. C.
Maximum Undistorted Output	1.9 Watts
Maximum Output	3 Watts
Line-up Frequencies	460 K. C., 600 K. C. and 1400 K. C.

PHYSICAL SPECIFICATIONS

Over-All Dimensions

Height	13⅜ Inches
Width	11½ Inches
Depth	7¼ Inches
Weight	Approximately 14 Pounds
Weight Packed for Shipment	Approximately 16 Pounds
Number of Controls	Four

GENERAL DESCRIPTION

This receiver is a four-tube Superheterodyne, incorporating such special features as an electro-dynamic loudspeaker, wide range of tuning, a two-position tone control and illuminated dial. Unusually efficient performance is obtained from the characteristics of the Superheterodyne circuit, including high sensitivity, good selectivity and pleasing tone quality. Four operating controls of the knob type, all appearing on the front of the cabinet, are provided.

DESCRIPTION OF ELECTRICAL CIRCUIT

The first stage is a combined detector and oscillator using an RCA Radiotron 6A7. The two functions are obtained through means of individual tuned circuits. On the detector tuning coil a tap is made, so that a portion of the coil can be short-circuited by switch contacts and thus extend the tuning of the receiver to the higher frequency range. The oscillator second harmonic is used to produce the intermediate frequency for the upper tuning range. The oscillator circuit is arranged to have the low-frequency trimmer capacitor attached in series with the inductance, permitting accuracy in its adjustment to be easily secured, and to give a more uniform sensitivity over the tuning range.

In the following stage, the I. F. amplification and final detection take place in the dual-purpose RCA 6F7. The input section of this tube constitutes a screen-grid I. F. amplifier, with the output elements arranged to perform as a triode detector.

One RCA-41, a Pentode type, is employed in the audio output stage.

The rectifying unit consists of an RCA-1-v, a cathode-type, half-wave tube. Its high voltage is supplied from the power transformer secondary, which is a single winding tapped at various points for furnishing heater current to all Radiotrons of the receiver. The heater of the RCA-41 stage and the pilot lamp are supplied by one section of the secondary winding; and the remaining three heaters are connected series to receive supply from a 19-volt section of the same winding.

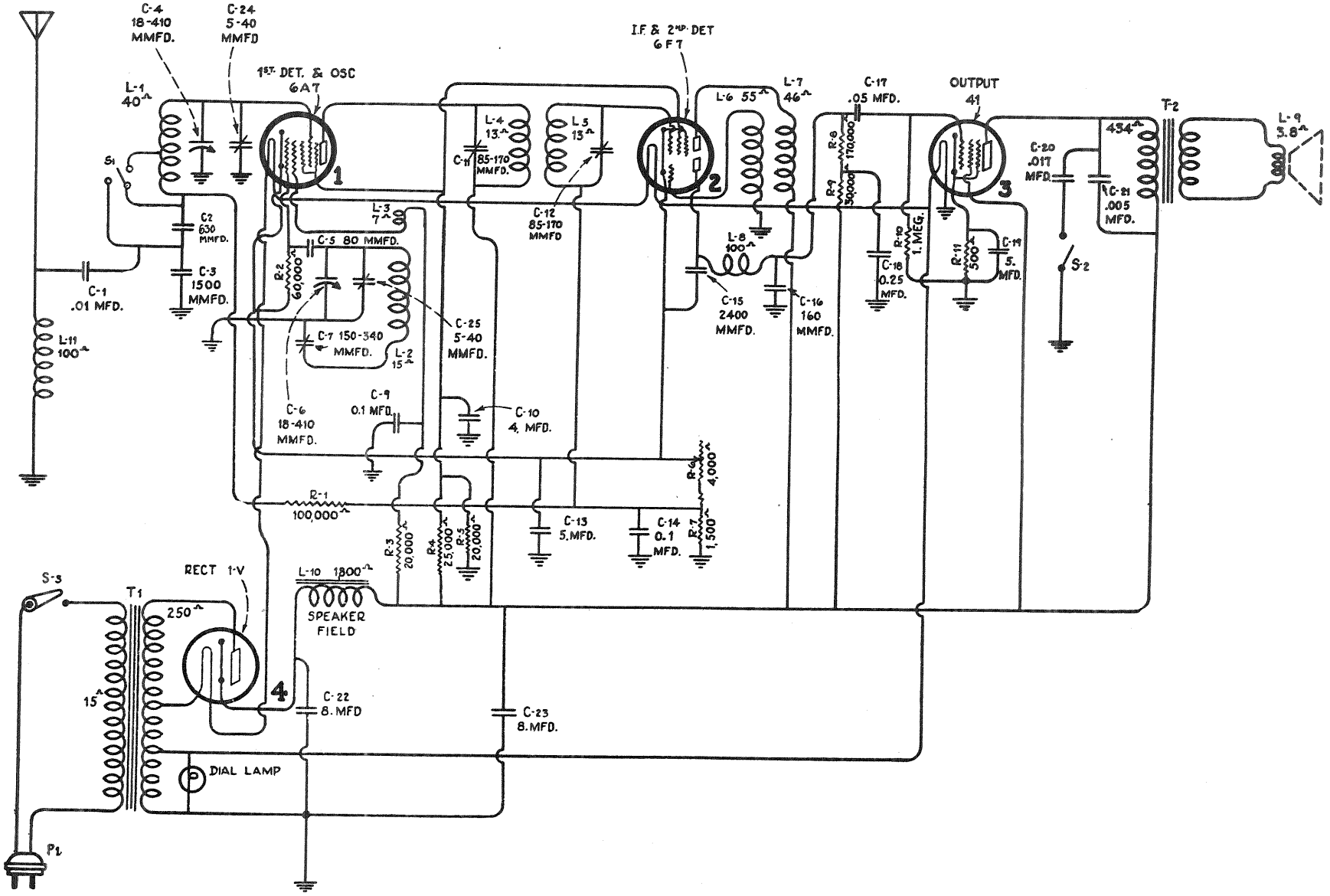

Figure 1—Schematic Circuit Diagram

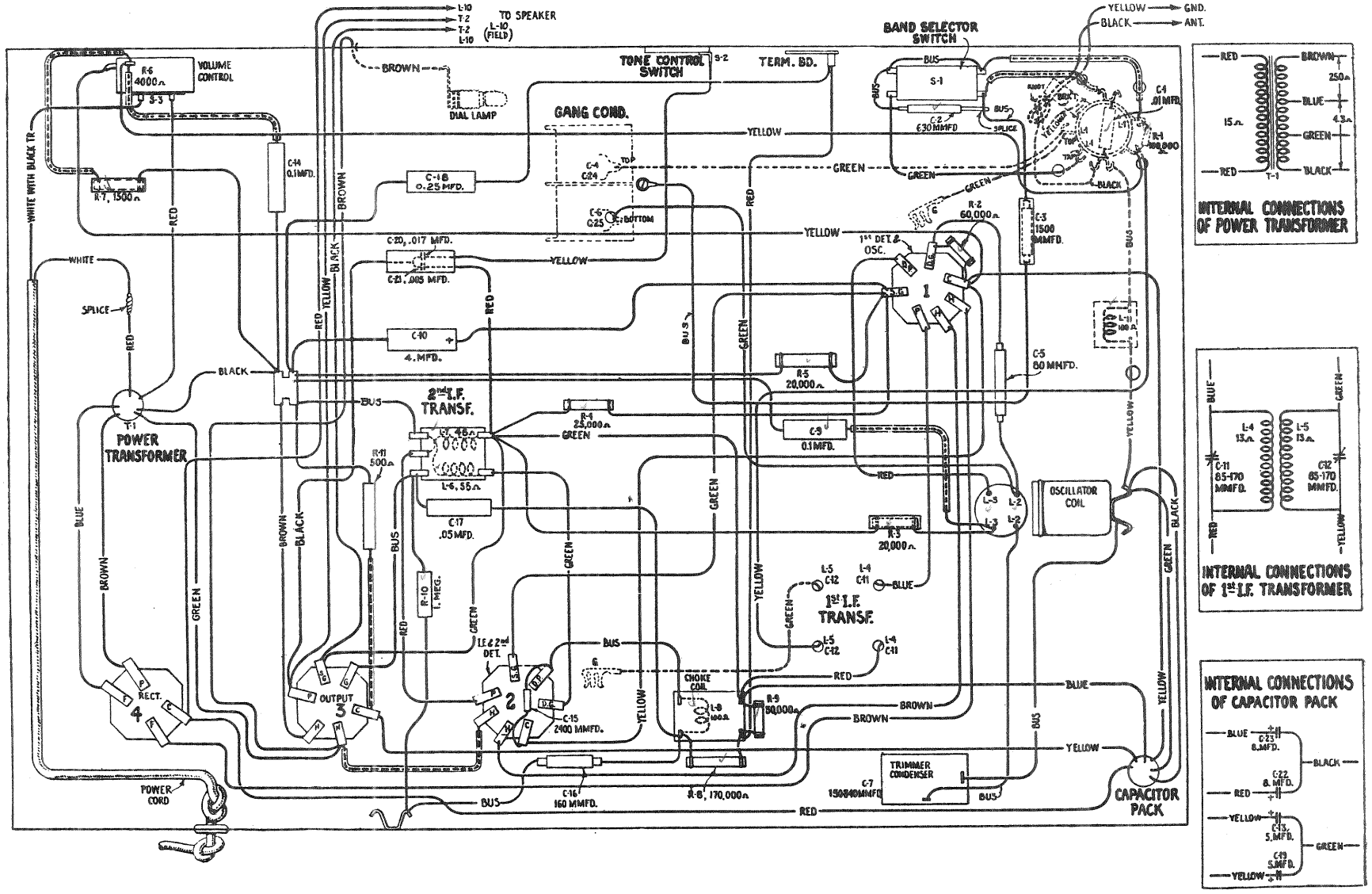

Figure 2—Chassis Wiring Diagram

SERVICE DATA

(1) ALIGNMENT PROCEDURE

Locations of the alignment condensers are indicated on Figure 3. There are five adjustments necessary. Before attempting to align the receiver, the antenna must be disconnected to obviate any interference that may be caused by pickup on a local station. The adjusting should then be performed in order as follows:

(a) *First I. F. Transformer*—Connect the output of an external oscillator, which is set to produce a 460 KC. signal, from the RCA-6A7 detector grid to chassis-ground. Tune the primary and secondary trimmers C-11 and C-12, respectively, for maximum receiver output.

(b) *Receiver Oscillator and Detector*—Two adjustments are provided. The first is accomplished by feeding a 1400 KC. signal from an external oscillator into the antenna-ground terminals. Set the tuning dial at 1400, and adjust the two trimmers of the tuning condenser for maximum receiver output. For the second oscillator adjustment, a signal of 600 KC. is required from the external source, fed into the antenna-ground connections. The trimmer for this frequency appears on the rear of the chassis. Adjust this trimmer, simultaneously rocking the tuning condenser through the signal, until maximum receiver output is obtained. Reading of the dial should fall within reasonable limits of accuracy at the 600 KC. point.

(2) VOLTAGE READINGS

In Figure 3, voltage values from tube contacts to ground are shown. They are the actual operating values and should be checked with the tubes in place. The table of Figure 4 lists the operating voltages and currents, referred to cathode, and measurable by means of a socket adaptor or set analyzer.

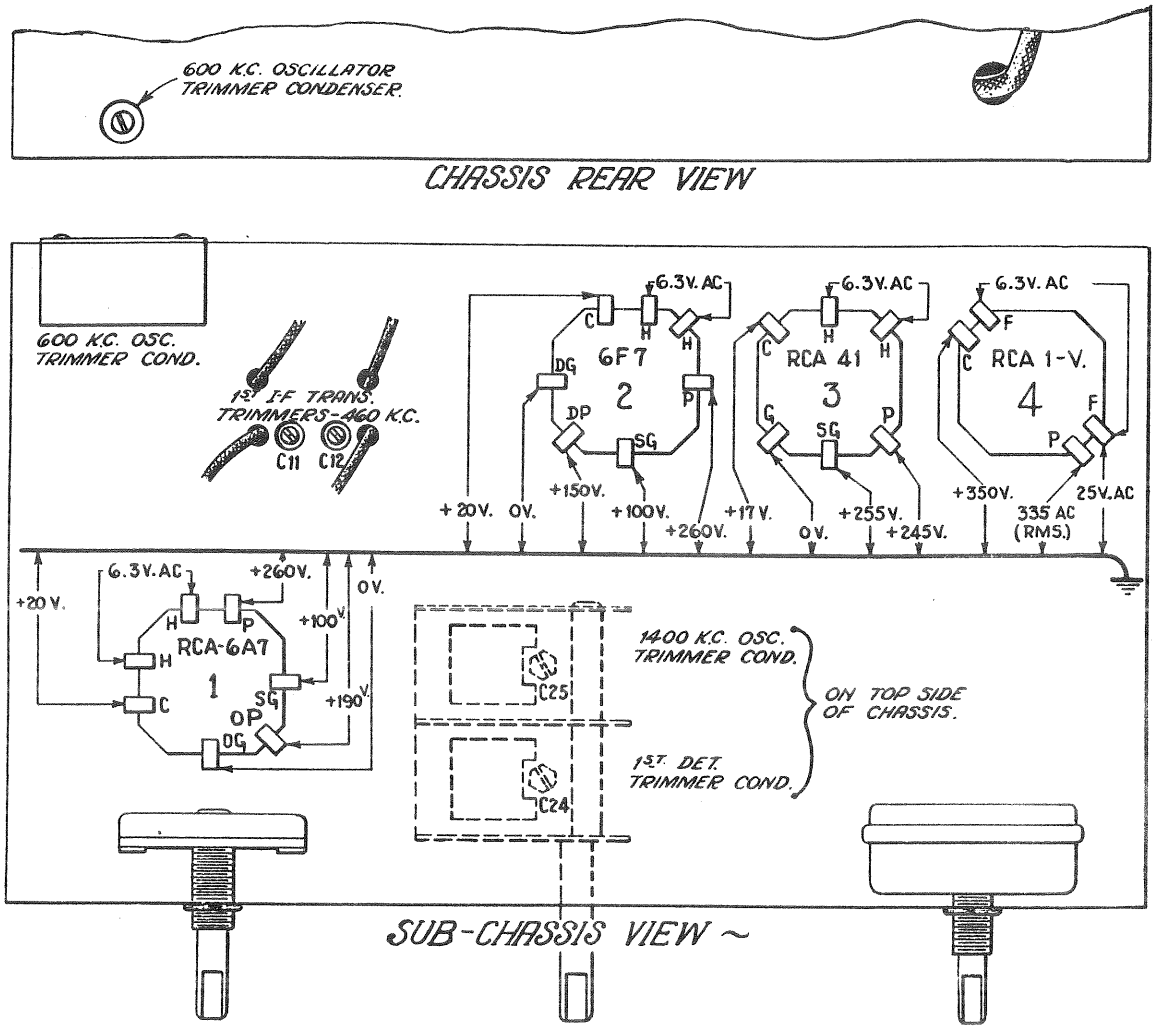

Figure 3—Line-Up Capacitor Locations and Miscellaneous Voltages at Radiotron Sockets, 120-Volt, 60-Cycle Line—Volume Control at Maximum—No Signal

RADIOTRON SOCKET VOLTAGES—BETWEEN ELEMENTS

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 Detector	19.0	—	145*	0.4	
RCA-41 Output		17.0	240	230	26.5	6.3
RCA-1-V Rectifier		—	—	335 R.M.S.	50.0	6.3

*Actual voltage cannot be measured with ordinary voltmeter.

Figure 4—Voltage Analysis Table

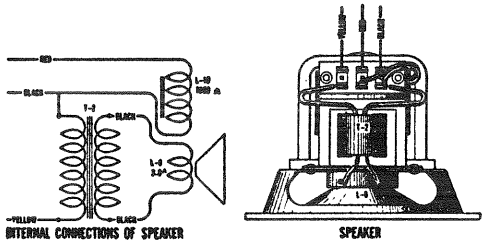

Figure 5—Loudspeaker Wiring

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 capacitor (C7)	.78
4887	Capacitor—0.0025 mfd. (C15)	.18
3701	Capacitor—0.01 mfd. (C1)	.30
4886	Capacitor—0.05 mfd. (C17)	.20
4885	Capacitor—0.1 mfd. (C14)	.28
4835	Capacitor—0.1 mfd. (C9)	.28
3597	Capacitor—0.25 mfd. (C18)	.40
3459	Capacitor—80 mmfd. (C5)	.44
3865	Capacitor—160 mmfd. (C16)	.30
3933	Capacitor—630 mmfd. (C2)	.32
3873	Capacitor—1500 mmfd. (C3)	.30
6832	Capacitor—4.0 mfd. (C10)	.85
6787	Capacitor—Comprising one 0.005 mfd. and one 0.017 mfd. capacitors (C20, C21)	.30
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
6666	Coil—Antenna coil (L1, C1, R1)	1.08
4018	Coil—Choke coil (L11)	.90
3857	Coil—Detector choke coil (L8)	.90
6664	Coil—Oscillator coil (L2, L3)	.94
6660	Condenser—2-gang variable condenser (C4, C6, C24, C25)	2.78
4890	Dial—Station selector dial	.58
4085	Knob—Station selector knob—Package of 5	.60
4884	Insulator—Radiotron Socket Insulator	.10
4132	Knob—Volume control, tone control or range switch knob—Package of 5	.55
3886	Reflector—Dial light reflector	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3047	Resistor—1,500 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	$0.25
3077	Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3869	Resistor—170,000 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R10)—Package of 5	1.00
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
4087	Screw—Chassis mounting screw and washer—Package of 4	.22
6665	Shield—Oscillator coil shield and mounting bracket	.34
4104	Shield—Radiotron shield	.20
3858	Socket—Dial lamp socket and bracket	.26
4784	Socket—4-contact Radiotron socket	.15
4785	Socket—6-contact Radiotron socket	.15
4787	Socket—7-contact Radiotron socket	.15
6668	Switch—Range switch (S1)	.58
6669	Switch—Tone control switch (S2)	.50
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
9466	Transformer—Power transformer—200–250 volts—50–60 cycles	3.28
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
6667	Volume control (R6, S3)	1.58
	REPRODUCER ASSEMBLIES	
9548	Coil assembly—Comprising field coil, magnet and cone support (L10)	3.08
9588	Cone—Reproducer cone (L9)—Package of 5	3.55
9547	Reproducer complete	5.45
4803	Transformer—Output transformer	1.45