RCA VICTOR MODELS 6T and 6K

Six-Tube, Two-Band, A-C, Superheterodyne Receivers

TECHNICAL INFORMATION

Electrical Specifications

FREQUENCY RANGES

"Standard broadcast" (A) ..... 540-1,820 kc.

"Short wave" (B) ..... 1,820-6,600 kc.

ALIGNMENT FREQUENCIES

"Standard broadcast" (A) ..... 600 kc. (osc.), 1,700 kc. (osc., ant.)

"Short wave" (B) ..... None required

Intermediate Frequency ..... 460 kc.

RADIOTRON COMPLEMENT

(1) RCA-6A8 ..... First Det.—Oscillator
(2) RCA-6K7 ..... Intermediate Amplifier
(3) RCA-6H6 ..... Second Det.—A.V.C.
(4) RCA-6F5 ..... Audio Voltage Amplifier
(5) RCA-6F6 ..... Power Output
(6) RCA-5Z4 ..... Full-wave Rectifier

Pilot Lamps (3) ..... Mazda No. 46, 6.3 volts, 0.25 amperes

POWER SUPPLY RATINGS

Rating A ..... 105-125 volts, 50-60 cycles, 80 watts
Rating B ..... 105-125 volts, 25-60 cycles, 80 watts
Rating C ..... 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

POWER OUTPUT RATING

Undistorted ..... 2.0 watts
Maximum ..... 4.5 watts

LOUDSPEAKER

Type ..... Electrodynamic
Voice Coil Impedance ..... 2.2 ohms at 400 cycles

Mechanical Specifications

CABINET DIMENSIONS	Model 6T	Model 6K
Height	19 inches	37½ inches
Width	13⅜ inches	23 inches
Depth	8¾ inches	11 inches
Weights (Net)	22 pounds	43 pounds
Weights (Shipping)	27 pounds	55 pounds

Chassis Base Dimensions ..... 12 inches x 7 inches x 2½ inches

Over-all Chassis Height ..... 7½ inches

Operating Controls ..... (1) Power Switch—Tone, (2) Tuning, (3) Volume, (4) Range Selector

Tuning Drive Ratio ..... 10 to 1

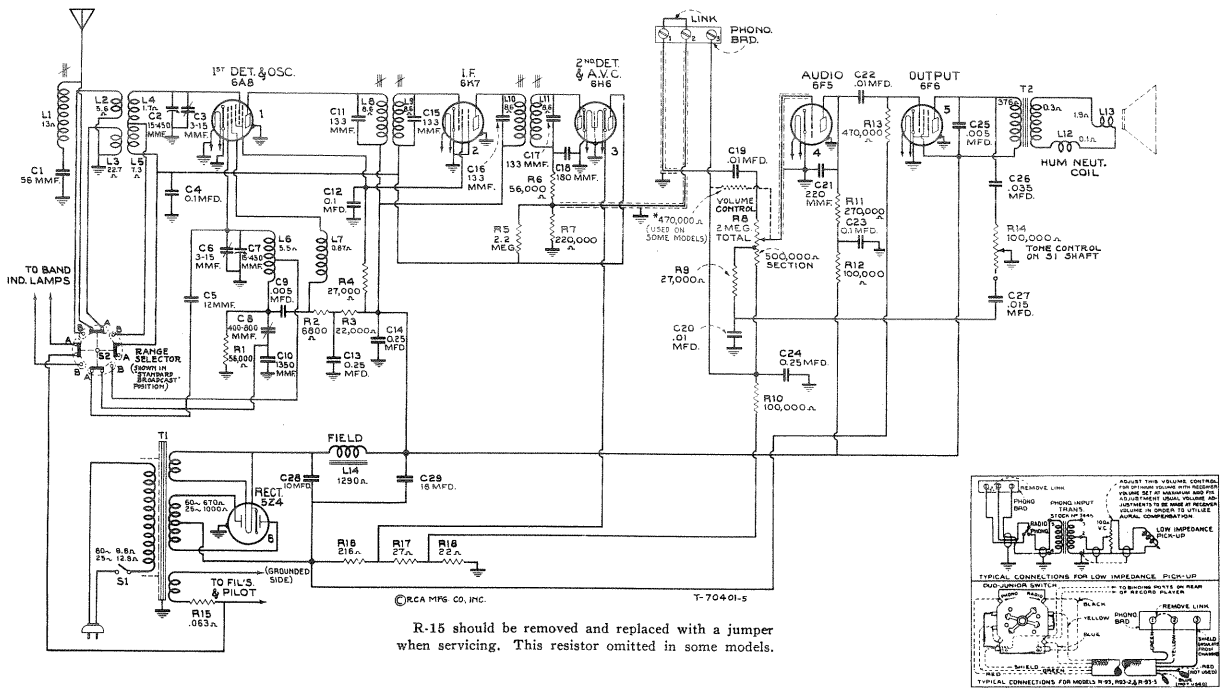
General Features

These receivers employ the same chassis and have many distinctive features. Model 6T employs an 8-inch dynamic loudspeaker and Model 6K employs a 12-inch dynamic loudspeaker. The superheterodyne circuit is used with such features of design as: magnetite core adjusted i-f transformers, improved core adjusted antenna wave-trap, aural compensated volume control, continuously variable tone control with music-voice switch, automatic volume control, resistance coupled audio system, phonograph terminal board, band selective illumination of dial scales, and a dust-proof loudspeaker.

Tuning is continuous through the "Standard broadcast" and "Short wave" bands (including 49 meters). The "Short wave" position of this extensive range also includes channels assigned for police, amateur, and aviation communication. Trimming adjustments are located at accessible points. Their number is reduced to the least that is consistent with efficient operation. The tuning dial ratio of ten to one permits ease of tuning, especially in the "Short wave" band.

Circuit Arrangement

The first detector and oscillator functions are accomplished in a single tube, an RCA-6A8. The input of this tube is coupled to the antenna through a tuned transformer. A shunt (magnetite core adjusted) wave-trap is connected across the primary of this transformer to prevent signals of intermediate frequency (460 kc) from being introduced into the first stage as interference. The two-section gang condenser, which tunes the antenna transformer secondary and the heterodyne oscillator coil, has adjustable



R-15 should be removed and replaced with a jumper when servicing. This resistor omitted in some models.

Figure 1—Schematic Circuit Diagram

(* 470,000-ohm resistor not required when replacing volume control with Stk. No. 13144)

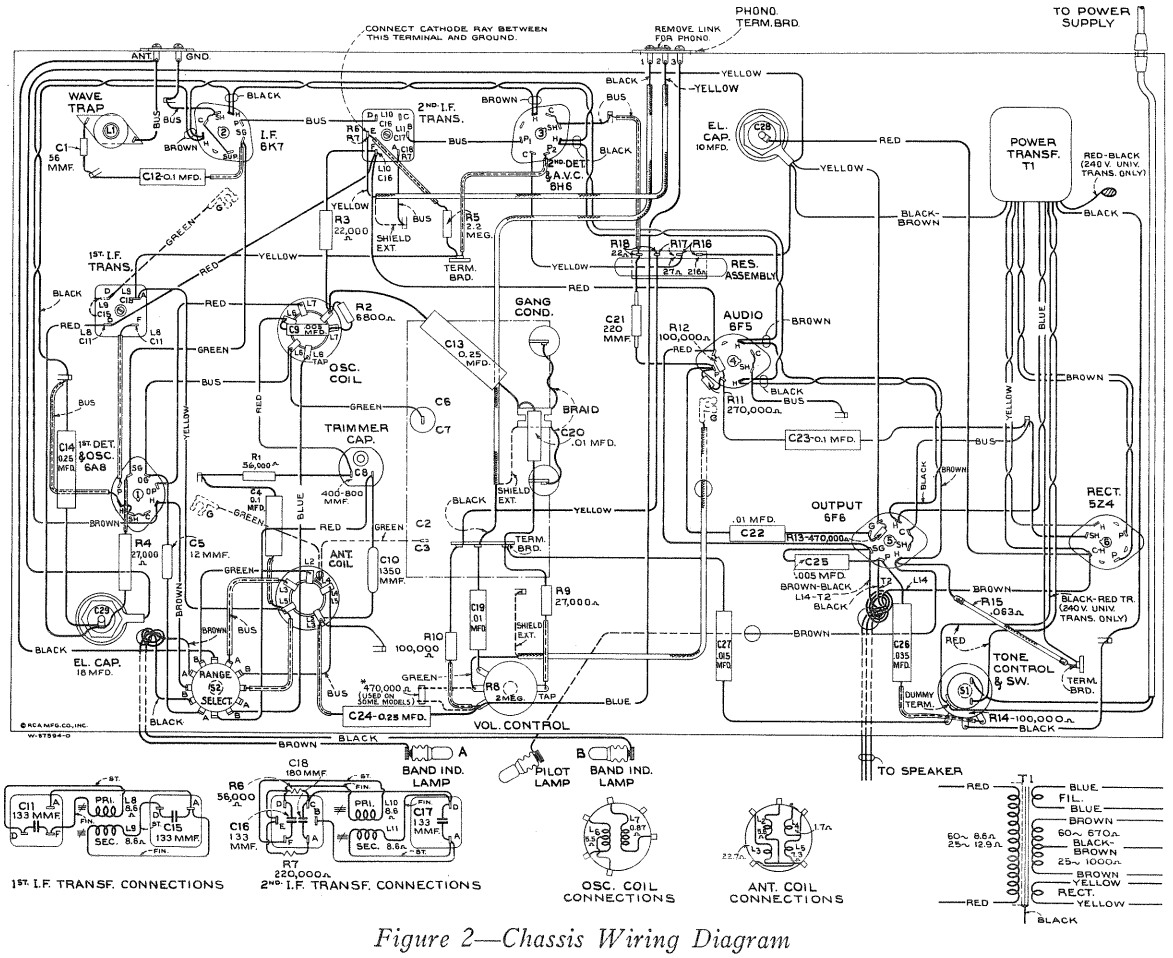


Figure 2—Chassis Wiring Diagram

trimmers for obtaining exact alignment. Each of these coils is tapped so that the range switch increases the range of tuning by decreasing the amount of inductance.

The intermediate-frequency stage is coupled to the RCA-6A8 and to the RCA-6H6 by means of tuned transformers. These transformers resonate with fixed capacitors and are adjusted by molded magnetite cores to tune to **460 kc.**

The modulated signal, as obtained from the output of the i-f system, is detected by one of the diodes of the RCA-6H6 tube. Audio frequency secured by this process is passed on to the control grid of the RCA-6F5 for amplification before final reproduction. The d-c voltage, which results from detection of the signal, is used for automatic volume control. This voltage, which develops across resistor R7, is applied as automatic control grid bias to the first detector and i-f tubes through a suitable resistance filter. The second diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This auxiliary diode, under such conditions, draws current which flows through resistors R5 and R7, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias diode ceases to draw current and the a.v.c. diode takes over the biasing function.

Manual volume control is effected by means of an acoustically tapered potentiometer connected as a variable coupling element between the output of the second detector and the first audio control grid. After amplification by the RCA-6F5, the audio signal is transmitted by resistance-capacitance coupling to the input of the RCA-6F6 power-output stage, which, in turn, is transformer-coupled to the dynamic speaker.

Continuously variable tone control is effected by means of capacitor C26 and variable resistor R14 shunting the plate circuit of the output tube. Extreme clockwise rotation of this tone control disconnects the resistor R14 from the circuit and places an additional capacitor C27 in shunt with capacitor C20, thereby reducing the low-frequency response of the amplifier. This point is known as the "Speech" position and provides optimum intelligibility of speech.

The power-supply system consists of an RCA-5Z4 rectifier tube which is supplied from an efficiently designed power transformer and which works into a suitable filter. The various potentials required for the plate, screen, control grid, and cathode circuits are obtained from the output of the filter. The electrodynamic loudspeaker field coil is used as a filter reactor.

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings

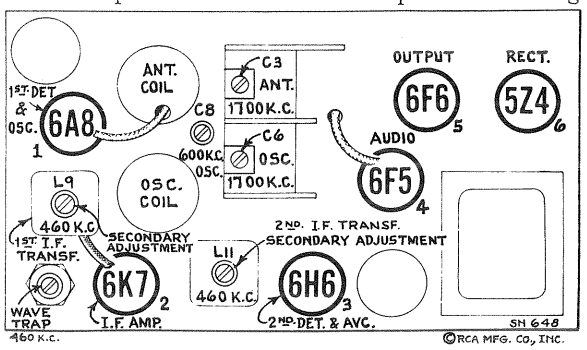


Figure 3—Radiotron, Coil, and Trimmer Locations

of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as R3, L2, C1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only. Ratings of less than one ohm are generally omitted.

Alignment Procedure

There are three alignment trimmers provided in the antenna transformer and oscillator coil tuned circuits. The i-f transformer adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. The manufacturer of this receiver has available, for sale through its distributors and dealers, a complete assortment of such service equipment as may be needed for the alignment operation.

A test oscillator, such as the **RCA Stock No. 9595,** is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator such as the **RCA Stock No. 4317 Neon Output Indicator.**

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

I-F Core Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 7. Each circuit must be aligned to a basic frequency of **460 kc.** To do this, attach the output indicator across the loudspeaker voice coil.

Connect the output of the test oscillator to the control grid of the RCA-6A8 through a **.05 mfd.** capacitor. Connect the test oscillator ground terminal to the ground terminal of the receiver chassis. Range selector should be in "Short wave" position. Tune the oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point, within its range, where no interference is encountered either from local broad-

cast stations or from the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two magnetite core screws of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two magnetite core screws of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment.

Wave-Trap Adjustment

Attach the output of the test oscillator to the receiver "Antenna" terminal through a **200 mmfd. (important)** capacitor. The ground connections remain connected together. Leave the test oscillator adjusted to **460 kc** and range selector in "Short wave" position as before. Then adjust the wave-trap screw to the point which causes maximum suppression of the 460 **kc** signal.

R-F Trimmer Adjustments

Calibrate the tuning dial by setting the pointer to a horizontal position (**53** on "Standard broadcast" scale) with the two-gang tuning condenser in full mesh. The output indicator should be left connected to the system. Connections for the test oscillator remain the same as for "Wave-trap adjustment." Adjust the test oscillator to **1,700 kc** and set the receiver tuning control to a dial reading of **1,700 kc.** Leave the volume control of the receiver at its maximum position. Make sure that the range selector is at its broadcast position. Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the two trimmers, **C6** and **C3,** of the oscillator and antenna transformer coils (mounted on the variable condenser) so that each produces maximum (peak) receiver output. After this maximum has been accurately obtained, shift the test oscillator to **600 kc.** Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then, adjust the receiver oscillator series trimmer, **C8,** simultaneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at **1,700 kc** should then be repeated to correct for any change which may have been caused by the oscillator series trimmer adjustment.

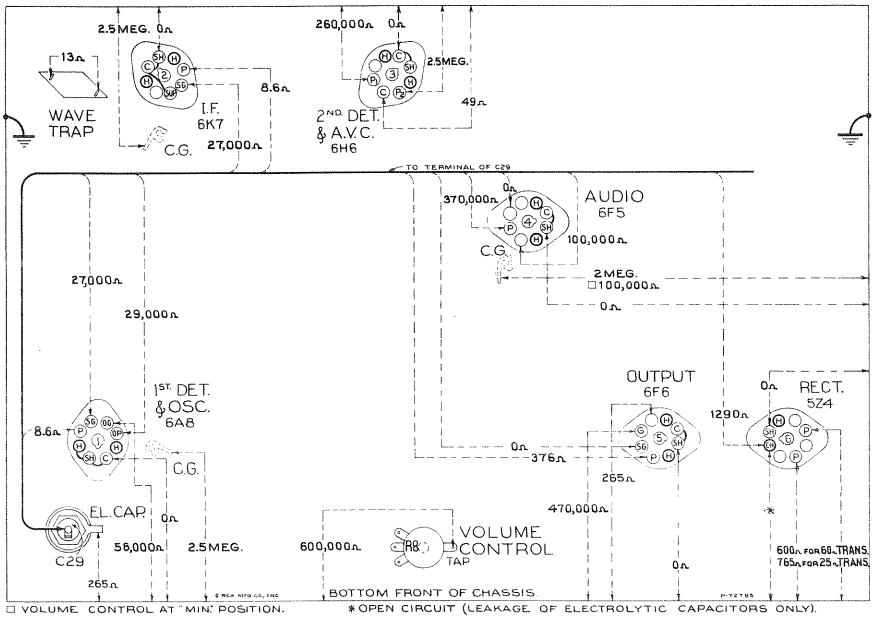


Figure 4—Resistance Diagram

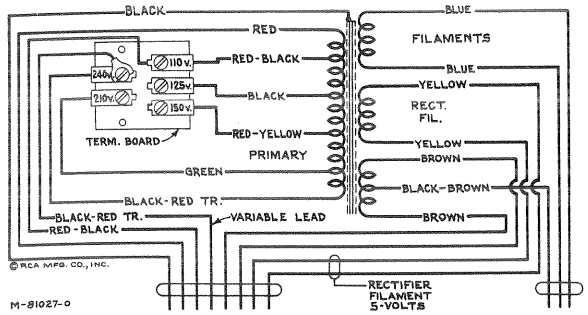
Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh—Volume control maximum

Resistance Measurement

The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals, and receiver chassis ground, on figure 4, have been carefully selected so as to facilitate a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within $\pm 20\%$. Variations in excess of this limit will usually be indicative of trouble in circuit under test. Resistance values were measured with the Radiotrons in sockets; tuning condenser in full mesh, and volume control set at maximum except where otherwise noted. In all cases of measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

Phonograph Attachment

A terminal board is provided for connecting a phonograph into the audio amplifying circuit. Typical



Primary Resistance—24.5 ohms Total
Secondary Resistance—668 ohms Total

Figure 5—Universal Transformer

methods of connecting a low-impedance pick-up, or the RCA Victor Models R-93, R-93-2, and R-93S Record Players are shown on the schematic diagram (figure 1).

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers

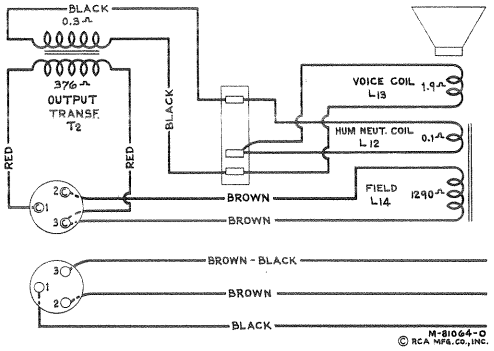


Figure 6—Loudspeaker Wiring

after first removing the front paper dust cover. This may be removed either permanently by cutting it away with a sharp knife, or by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

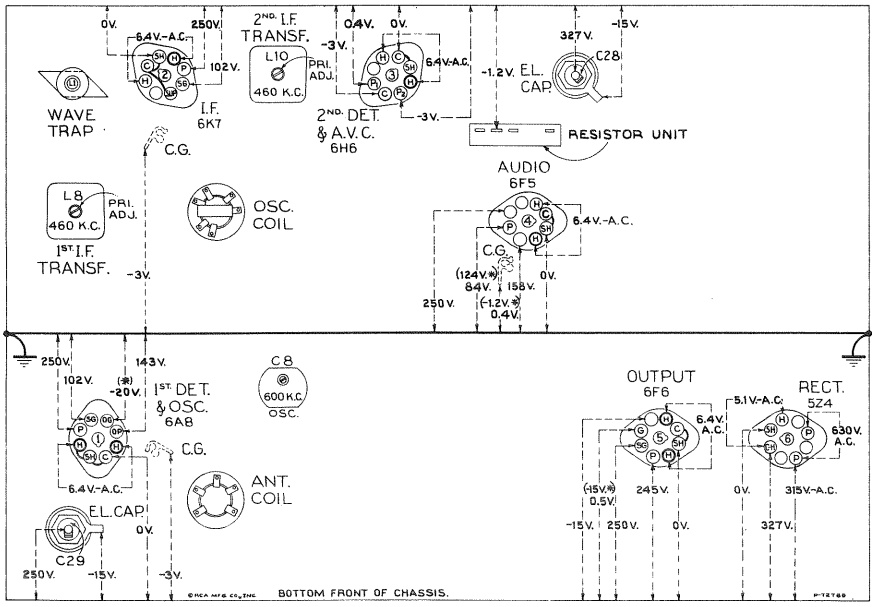


Figure 7—Radiotron Socket Voltages, Coil and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc. ("Standard broadcast")—No signal being received—Volume control minimum

Radiotron Socket Voltages

Note: *Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.*

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground on figure 7 will assist in locating cause for faulty operation. Each value as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. These voltages were measured with receiver tuned to approximately 1,000 kc, no signal being received, and volume control set at minimum. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, 500, and 1,000 volts. Use the nearest range above the voltage to be measured. A-c voltages were measured with a corresponding a-c meter.

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	
5237	Bushing — Variable condenser mounting bushing assembly—Package of 3	$0.43
12511	Cap—Grid contact cap—Package of 5	.15
11465	Capacitor—Adjustable capacitor (C8)	.48
12659	Capacitor—12 Mmfd. (C5)	.20
12661	Capacitor—56 Mmfd. (C1)	.20
12946	Capacitor—133 Mmfd. (C11, C15, C16, C17)	.20
12406	Capacitor—180 Mmfd. (C18)	.26
12662	Capacitor—220 Mmfd. (C21)	.20
12660	Capacitor—1,350 Mmfd. (C10)	.28
4868	Capacitor—.005 Mfd. (C9, C25)	.20
11315	Capacitor—.015 Mfd. (C27)	.20
12670	Capacitor—.035 Mfd. (C26)	.20
4858	Capacitor—.01 Mfd. (C19, C20, C22)	.25
4841	Capacitor—0.1 Mfd. (C4, C23)	.22
11414	Capacitor—0.1 Mfd. (C12)	.20
4840	Capacitor—0.25 Mfd. (C13, C24)	.30
5170	Capacitor—0.25 Mfd. (C14)	.25
11240	Capacitor—10 Mfd. (C28)	1.08
5212	Capacitor—18 Mfd. (C29)	1.16
12648	Coil—Antenna coil less shield (L2 L3, L4, L5)	1.35
12649	Coil—Oscillator coil less shield (L6, L7)	1.20
12643	Condenser—2-gang variable tuning condenser (C2, C3, C6, C7)	3.46
5119	Connector—3-contact female speaker cable connector	.25
12006	Core—Adjustable core and stud for I.F. transformer, Stock Nos. 12652 and 12653	.22
12664	Core—Adjustable core and stud for wave trap, Stock No. 12654	.22
12658	Dial—Station selector dial	.65
12656	Drive—Variable condenser drive shaft and pinion	.58
12655	Gear—Large gear located on variable condenser shaft	.34
12657	Indicator—Station selector indicator	.20
5226	Lamp—Dial lamp—Package of 5	.70
12663	Mask—Dial light diffuser, complete with red and green colored screen	.30
12647	Range Switch (S2)	.68
11454	Resistor—6,800 ohm, carbon type, ¼ watt—Package of 5 (R2)	1.00
8070	Resistor—22,000 ohm, carbon type, ½ watt—Package of 5 (R3)	1.00
11400	Resistor—27,000 ohm, carbon type, ¼ watt—Package of 5 (R9)	1.00
12011	Resistor—27,000 ohm, carbon type, 1 watt—Package of 5 (R4)	1.10
5029	Resistor—56,000 ohm, carbon type, ¼ watt—Package of 5 (R1)	1.00
11282	Resistor—56,000 ohm, carbon type, 1/10 watt—Package of 5 (R6)	.75
12263	Resistor—100,000 ohm, insulated, ¼ watt —Package of 5 (R12)	1.00
3118	Resistor—100,000 ohm, carbon type, ¼ watt—Package of 5 (R10)	1.00
11398	Resistor—220,000 ohm, carbon type, 1/10 watt—Package of 5 (R7)	.75
11453	Resistor—270,000 ohm, carbon type, 1/10 watt—Package of 5 (R11)	.75
11452	Resistor—470,000 ohm, carbon type, 1/10 watt—Package of 5 (R13)	.75
11626	Resistor—2.2 megohm, carbon type, ¼ watt—Package of 5 (R5)	1.00
12004	Resistor—Voltage divider resistor — Comprising one 216 ohm, one 27 ohm and one 22 ohm sections (R16, R17, R18)	.45
12008	Shield—First or second I.F. transformer shield	.28
12650	Shield—Antenna coil shield	.22
12735	Shield—Dial lamp shield—Package of 5	.25
12607	Shield—First I.F. transformer shield top	.30
12651	Shield—Oscillator coil shield	.22
12581	Shield—Second I.F. transformer shield top	.36
11199	Socket—Dial lamp socket	.14
11195	Socket—5-contact 5Z4 radiotron socket	.15
11198	Socket—7-contact 6F5, 6H6 or 6K7 radiotron socket	.15
11196	Socket—8-contact 6A8 or 6F6 radiotron socket	.15
12007	Spring—Retaining spring for core Stock No. 12006 and 12664—Package of 10	.36
12668	Tone Control and Switch (R14, S1)	1.22
13106	Transformer—First I.F. transformer, complete (L8, L9, C11, C15)	1.60
11999	Transformer—Power transformer, 105-125 volt, 50-60 cycle (T1)	3.80
12132	Transformer—Power transformer, 105-125 volt, 25-50 cycle (T1)	5.48
12133	Transformer—Power transformer, 100-250 volt, 40-60 cycle (T1)	6.25
13107	Transformer—Second I.F. transformer, complete (L10, L11, C16, C17, C18, R6, R7)	2.06
12654	Trap—Wave trap (L1)	.75
13144	Volume Control (R8)	1.00
	REPRODUCER ASSEMBLIES	
12641	Board—3-contact reproducer terminal board	.15
12640	Bracket — Output transformer mounting bracket and clamp	.18
12012	Coil—Field coil (L14)	1.85
11469	Coil—Neutralizing coil (L12)	.20
12642	Cone—Reproducer cone and dust cap (L13) (Model 6T)	.94
12667	Cone—Reproducer cone and dust cap (L13) (Model 6K)	1.00
5118	Connector—3-contact male speaker cable connector	.25
12666	Cover—Speaker cover (Model 6K)	.65
9696	Reproducer complete (Model 6K)	6.90
9699	Reproducer complete (Model 6T)	6.38
11253	Transformer—Output transformer (T2)	1.56
11886	Washer—Spring washer to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
12639	Escutcheon—Station selector escutcheon and crystal	1.02
12638	Knob—Station selector knob — Package of 5	.58
11582	Knob—Tone control knob—Package of 5	.50
11347	Knob—Volume control or range switch knob—Package of 5	.75
11586	Screw—Receiver mounting screw No. 14x1 in.—Package of 10	.22
11349	Spring—Retaining spring for knob, Stock Nos. 11347, 11582, and 12638—Package of 5	.25

Prices quoted above are subject to change without notice.

First Edition