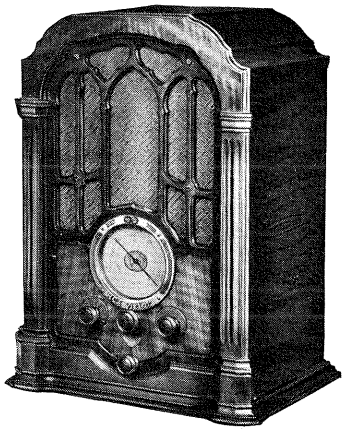
RCA Victor "All-Wave"

Models 140, 141, 141-E and 240

Eight-Tube Superheterodyne Receivers

(External I. F. Transformers)

INSTRUCTIONS



RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

INTRODUCTION

This "all-wave" radio receiver embodies the widely-recognized superheterodyne circuit and is capable of operation through a continuous tuning range of from 540 to 18,000 kilocycles (555 to 16.7 meters). Certain models intended primarily for European destinations are operable through an additional range of from 150 to 410 kilocycles (2000 to 732 meters) for long-wave services. All facilities provided in this instrument for reception beyond the limits of the standardized broadcast band (540 to 1500 kilocycles) are built-in as integral parts of the radio chassis—not simply connected to an existing chassis as a short-wave adaptor—resulting in distinctly superior performance.

To facilitate tuning as far as possible, the complete main tuning range is divided into four overlapping steps, each spread over the full span of the dial. These steps, or frequency bands, together with the long-wave range provided in some models, are quickly interchangeable by means of a switch located on the front of the cabinet. Also contributing to tuning ease and accuracy are the clock-type "full-vision" illuminated dial which is calibrated throughout in frequency, and the associated vernier (double-reduction ball-bearing) tuning drive.

The technically-informed user of this instrument naturally will be interested in its many advanced engineering features. Of chief importance is the use of *tuned-radio-frequency amplification* preceding the heterodyne circuit to minimize extraneous signal interference (image-frequency response, etc.) and to improve the "signal-noise" ratio. Two t-r-f stages are included, one being common to all bands and the second used only in conjunction with the highest-frequency band to compensate for the inherently greater circuit losses obtained in that range. Additional features of note are: (1) Its efficient automatic volume control operating uniformly at all carrier frequencies and (2) its high-powered (Class B) audio-output system utilizing the new "twin-amplifier" Radiotron RCA-53. In general, all of the best practices observed heretofore in modern, high-grade receivers of the standard broadcast type are incorporated in this "all-wave" instrument, thus insuring excellent performance over the entire tuning range.

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and near an electrical outlet.

Tubes—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with these tubes installed. Before making the required external connections, however, it will be advisable to examine the tube installation. as one or more of the tubes, shields or dome terminal clips may have been jarred loose in shipment. Refer to the tube location diagram printed on the instrument label inside the cabinet and ***make certain:***

(1) That all tubes are in the proper sockets and pressed down firmly.

(2) That all shields are rigidly in place over the tubes represented by double circles on the diagram.

(3) That the spring connectors of the short flexible (grid) leads, shown on the diagram, are securely attached to the dome terminals of the proper tubes.

NOTE—The grid lead for the RCA-2B7 Radiotron must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Antenna and Ground—The efficiency of any antenna varies greatly with the frequency of incoming radio waves, a given length being excellent at certain frequencies and comparatively poor at others. For uniform results throughout a wide tuning range such as found in this instrument, therefore, an antenna of adjustable length would be desirable theoretically. From a practical standpoint, however, very good results will be obtained using two antennas of different length, one 24–29 feet for short-wave reception, and the other 50–100 feet for reception in the long-wave, standard broadcast and police bands, the lead-in considered as part of the total length in each case.

The shorter antenna may be used alone if preferred, but probably will not be satisfactory for receiving distant or low-powered stations in the standard broadcast band. Further, no advantage will be gained by its use on the shorter wavelengths unless it can be installed so that the majority of its length is unshielded (not contained in a building of metallic construction) and sufficiently remote from sources of man-made interference (such as housewiring, power lines, street-railways and passing automobiles) to prevent excessive noise. If these conditions cannot be fulfilled, it will be preferable to erect a single antenna of compromise length (100–105 feet overall) which, in addition to providing excellent results in the standard broadcast band, will also favor reception in the short-wave broadcast bands located at 49, 31, 25 and 19 meters.

Best performance of this receiver on the shorter wavelengths can be insured by installation of the recently introduced "World-Wide" antenna system, available from your dealer as a convenient accessory kit. The advantages of this system are two-fold, its use providing: (1) A great improvement in efficiency, as evidenced by increased signal strength —often several times that obtainable with the conventional single-wire type and (2) a considerable decrease in local electrical interference (man-made static) which is apt to be objectionably severe at the higher frequencies. For densely-populated districts, therefore, this system is virtually a necessity.

Good reception in many installations will be obtained without connecting the instrument to an external ground, since the power-line characteristics often render a separate radio ground unnecessary. In any case, however, best results will be insured by grounding the set in the conventional manner to a water-pipe or radiator or to a metallic pipe or stake driven from five to eight feet into the soil. The ground lead when used should be short, preferably not more than 15 feet in length, and connected to a clean portion of the pipe or stake surface by means of an approved ground clamp.

A terminal board is provided at the rear of the receiver chassis for connection to the antenna and ground. Attach the antenna wire or lead-in to the left-hand terminal (marked "ANT") and the ground wire to the right-hand terminal (marked "GND"). Tighten both terminals with a screwdriver to insure permanent electrical connections.

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 instrument-label rating which corresponds to rating symbol on chassis). To insure correct tube 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.

Standard models of both types are connected correctly at the factory for operation at 115–125 volts; models of either type when connected for any other voltage range are so designated *by means of a tag attached to the power cord.* Hence, if the local voltage does not lie within the present range of the instrument, the proper alternative form of connection must be substituted. Consult your power company if you are in doubt as to the specific voltage of the supply. Reconnections when required should be performed by your dealer, to whom complete technical information is available in a separate booklet known as the Service Notes.

After making certain that the instrument has been connected for the proper voltage, attach the power cord to the electrical outlet.

OPERATION

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.

(2) ***Station Selector*** (Upper Middle Knob with Crank)—Scale X (when included) and scales A and B on the illuminated dial are calibrated in kilocycles and traversed by the lower end of the moving pointer. The upper end of the pointer traverses scales C and D which are calibrated in megacycles (affix three ciphers to convert to kilocycles). The scale portions covered by the police bands on scale B and by the standardized short-wave broadcast bands on scales C and D are bracketed and clearly identified; each police band is designated by the letter "P" and each broadcast band by numerals corresponding to the wavelength followed by the letter "M" (meters), such as "49M".

(3) ***Power Switch and Tone Control*** (Lower Middle Knob)—The power switch operates at the counter-clockwise end of the control range. A slight clockwise rotation actuates the switch, causing illumination of the dial—indicative of normal operation. Treble response increases gradually to a maximum with continued clockwise rotation.

(4) ***Volume Control*** (Right-hand Knob)—Sound level (volume) increases with rotation of this control in a clockwise direction.

Procedure—The actual operation is simple and not unlike that of more conventional instruments designed for the reception of standard broadcast programs alone. However, the full possibilities of any short-wave receiver cannot be attained unless the user has a practical knowledge of short-wave transmission behavior and operating schedules. It is therefore recommended that the appended Notes on Short-Wave Reception and the inserted Short-Wave Broadcasting Station List and Program Schedule be studied carefully.

A brief outline of the recommended operating procedure should suffice:

1. Set the Range Switch for the frequency range within which the desired station is included.

2. Turn the Power Switch "on" and the Tone Control fully clockwise—*for full-range reproduction.* Wait a few seconds in order that the tubes may attain the proper temperature before attempting further operation.

3. Advance the Volume Control to a position near the middle of its range and rotate the Station Selector until the dial indicator assumes a position coincident with the listed frequency of the desired station (on that scale which is designated by the letter corresponding to the range switch setting). Then turn the selector *very slowly* over a narrow range on each side of that setting, advancing the Volume Control further in a clockwise direction and repeating the tuning process, if necessary, until the signal is heard.

NOTE—This procedure is important—especially so for short-wave reception. Because of the wide band of frequencies covered by the short-wave ranges, tuning is critical (sharp). A station of suitable strength often will be imperceptible if passed through rapidly or in a haphazard manner.

4. After receiving the signal, turn the Volume Control counter clockwise until the volume is reduced to a low level. Then readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. *This setting minimizes the proportion of background noise (static) and provides the fine quality of reproduction possible with this instrument.*

5. Adjust the Volume Control to the desired volume level.

NOTE—The automatic volume control built into this instrument maintains the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the Volume Control.

6. If less treble response is preferred, rotate the Tone Control counter-clockwise to obtain the most pleasing quality of reproduction; static interference, when excessive, also may be reduced in this manner.

7. When through operating, turn the Tone Control fully counter-clockwise, thus switching "off" the power.

NOTES ON SHORT-WAVE RECEPTION

While the design of this instrument is such that no previous experience or special skill is required for proper operation, its full possibilities can be realized only by those familiar with the general characteristics of transmission on the shorter wave-lengths. The following notes are a summary of extensive data compiled mainly by experimentation and should be found both interesting and helpful. especially to beginners in the field of short-wave reception.

Broadcast transmission at 49 meters is most reliable when received from a distance of 300 miles (500 kilometers) or more, although good reception at distances greater than 1500 miles (2400 kilometers) can be expected only when a large portion of the signal path lies in darkness.

Thirty-one (31) meter stations afford greatest reliability of service to receivers situated at a distance exceeding 800 miles (1300 kilometers). Good reception from distant stations in this band is possible both day and night.

Reception from stations operating in the 25 meter band is most common when a span of 1000 miles (1600 kilometers) or more separates the receiver and transmitter. Such transmission over distances of less than 2000 miles (3200 kilometers) will be received best during daylight hours. The more distant stations, however, can still be heard well after nightfall under favorable conditions.

In the 19 meter band, stations situated at a distance of 1500 miles (2400 kilometers) or greater will be found most satisfactory. Signals in this band will generally be heard during daylight hours—rarely after nightfall or when any appreciable portion of the transmission path is in darkness. Wave-lengths below 19 meters are useful only when transmitted entirely through daylight and over long distances (2000 miles or more); ordinarily they cannot be received after sunset.

Transmitted signals of any wave-length are known to divide into two components—the "ground" wave and the "sky" wave. The former remains close to the earth's surface, providing reliable service only over short distances from the broadcasting station. The sky wave, however, travels into the higher layers of the atmosphere and is reflected back to the earth's surface at an appreciable distance from the station. With short-wave signals, the sky wave usually does not return within the radius covered by the ground wave, resulting in a so-called dead-spot region within which reception is impossible or extremely unsatisfactory. The length of the region wherein such conditions are effective is known as the skip distance, varying greatly from day to night and from summer to winter approximately as shown in Table I.

When attempting to receive distant or foreign stations, the time standards observed at various longitudes throughout the world must be considered. At 8:00 P. M. in New York or 7:00 P. M. in Chicago, it is of the next day—1:00 A. M. in London, 2:00 A. M. in most of Europe and 11:00 A. M. in Australia. On the American continents, therefore, regular evening broadcasts from Europe will be received in the late afternoon and from Australia in the early morning. Special programs, however, are frequently transmitted from European stations at times chosen for evening reception in America.

Although reception on the short wave-lengths is less affected by atmospherics or static and good results may be had in midsummer even during a thunder storm, the reverse is true of man-made interference. Electrical machinery such as trolleys, dial telephones, motors, electric fans, automobiles, airplanes, electrical appliances, flashing signs and oil burners create far more interference to the shorter waves than to frequencies in the standard broadcast band (200 to 555 meters).

While the foregoing statements are valid, many other factors may so influence the transmission of short waves that exceptions are probable in certain locations. Experience in the operation of short-wave receivers in a given location is the best guide as to what to expect in reception at various times.

Table I—Effect of Time of Day and Season of Year on Short-Wave Transmission*

Wave-length (Meters)	Ground-Wave Range		Sky Wave (Mid-Summer) Approximate Range				Sky Wave (Mid-Winter) Approximate Range			
			Noon		Midnight		Noon		Midnight	
	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.
100	90	145	—90	—145	90—600	145—960	90—100	145—160	90—2500	145—4000
49	75	120	100—200	160—320	250—5000	400—8000	200—600	320—960	400—∞	640—∞
31	60	97	200—700	320—1125	1000—∞	1600—∞	500—2000	800—3200	1500—∞	2400—∞
25	50	80	300—1000	480—1600	1500—∞	2400—∞	600—3000	960—4800	2000—∞	3200—∞
19	35	56	400—2000	640—3200	2500—∞	4000—∞	900—4000	1450—6400	X	X
15	15	24	700—4000	1125—6400	X	X	1500—∞	2400—∞	X	X

∞—Unlimited distance. X—Ordinarily cannot be heard.

*Time and season apply to transmitting station. Distances specified are based on relatively high-power transmission and favorable conditions of reception.

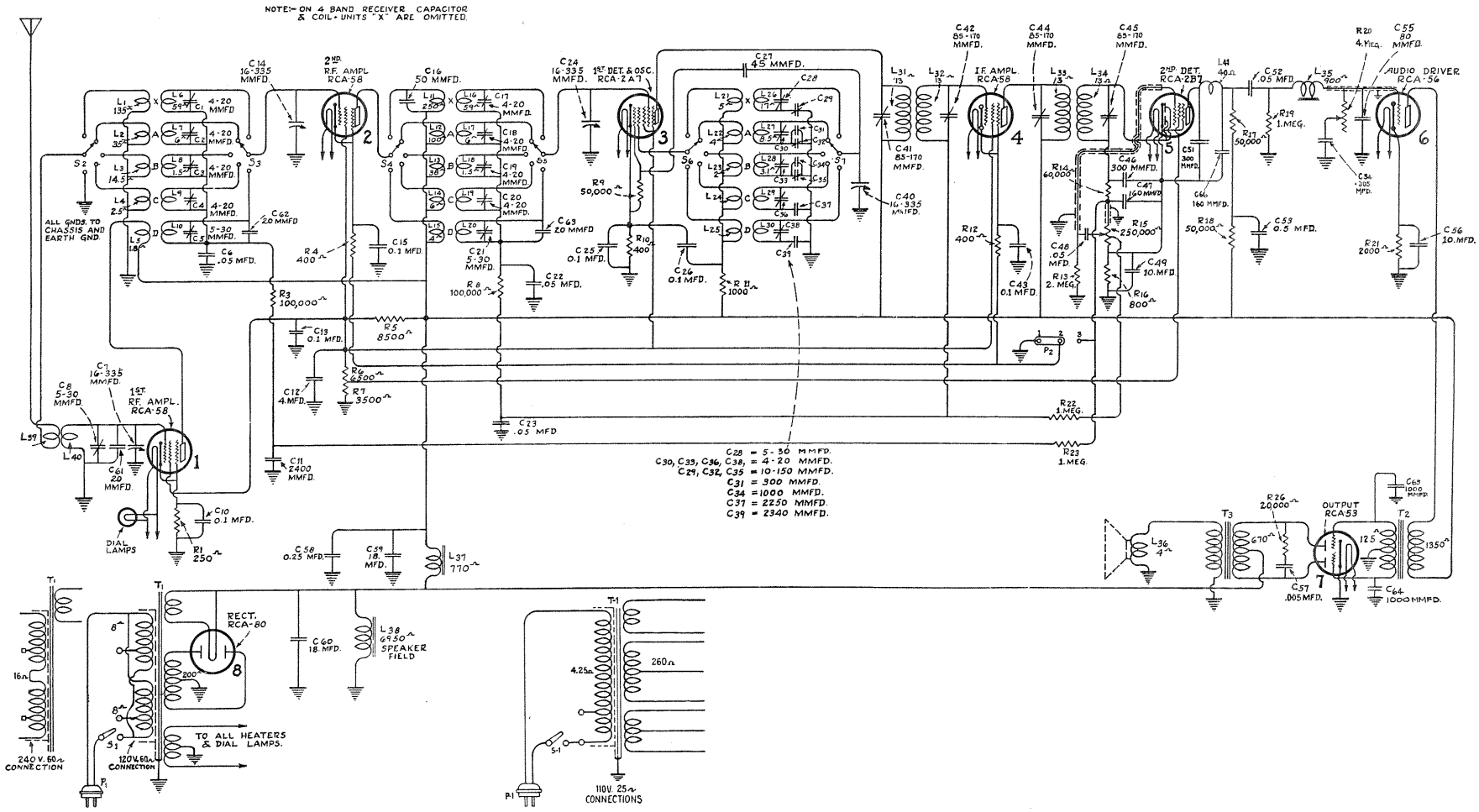


Figure A—Schematic Circuit Diagram

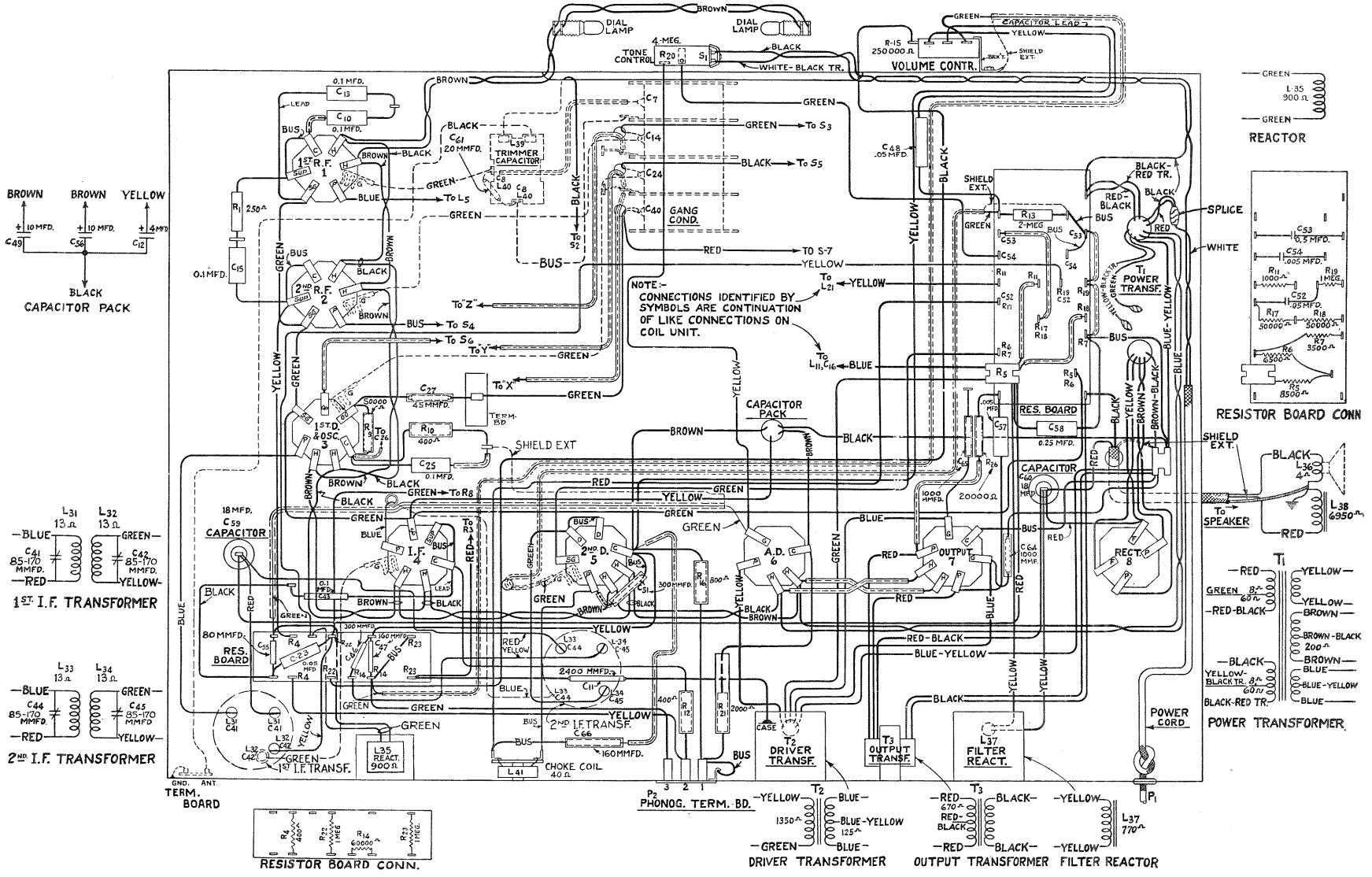


Figure B—Chassis Wiring

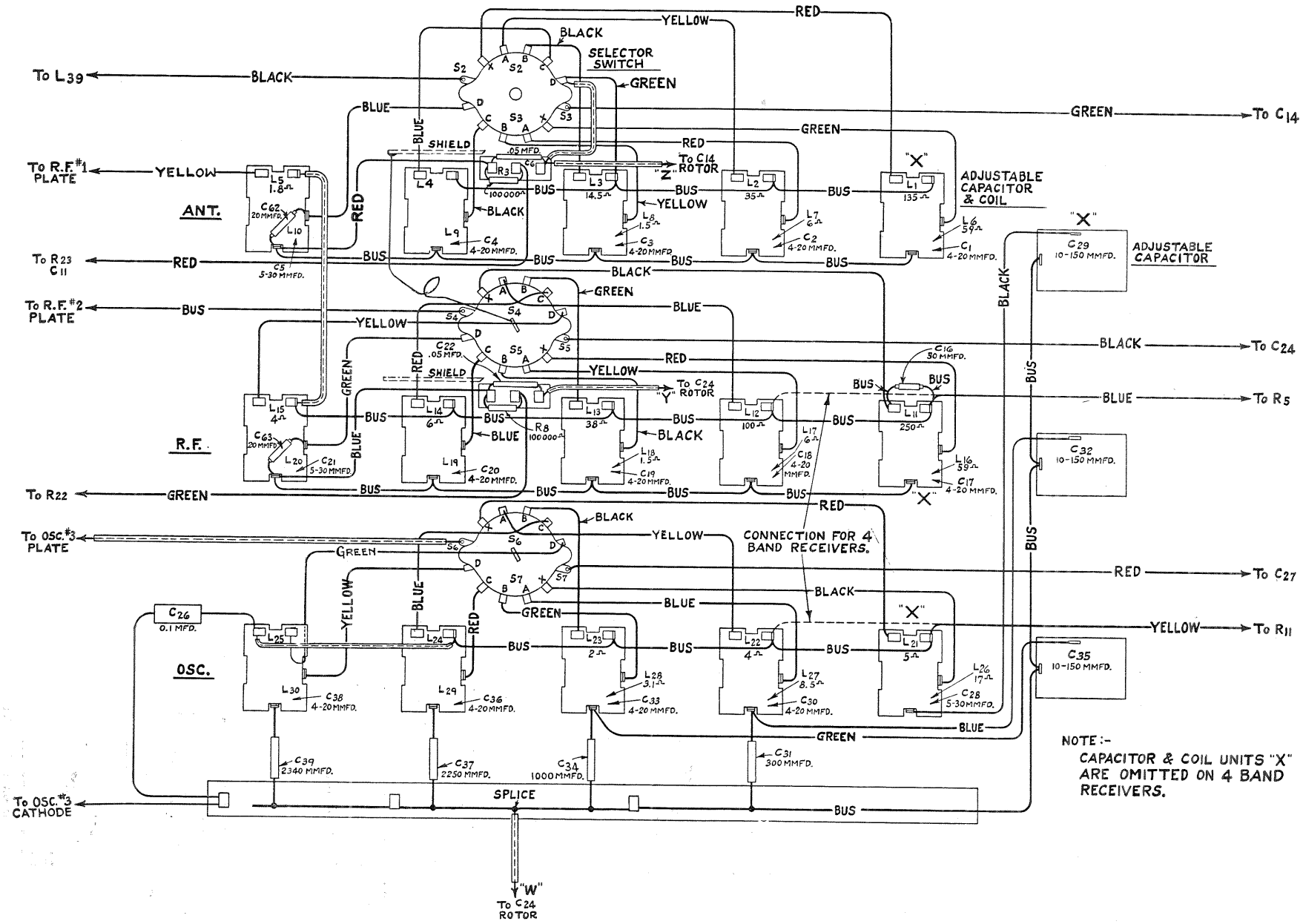


Figure C—Wiring Diagram of Coil Assembly

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

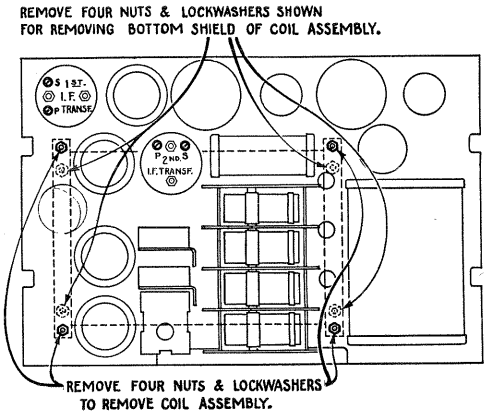


Figure D—Location of nuts and lockwashers holding coil assembly

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 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.

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.

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

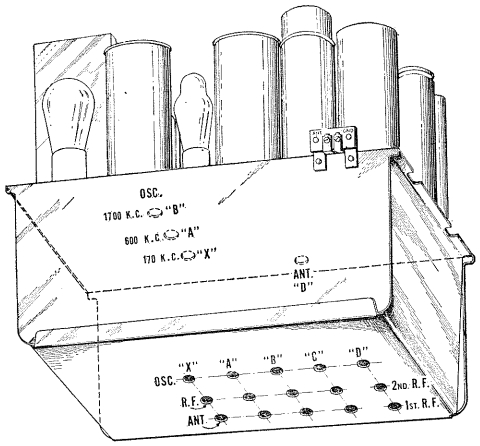


Figure E—Location of line-up capacitors

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.

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.

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.

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) 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—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—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
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—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	.75†
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.	29.50†
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–$\frac{3}{16}$ 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	2.90
6678	Dial—Station selector dial—4-band—Package of 5	2.80
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.

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