



RCA Victor

MODELS 85BK and 85BT

Five-Tube, Three-Band, Battery Operated, Superheterodyne Receivers

TECHNICAL INFORMATION AND SERVICE DATA

SERVICE DIVISION • RCA VICTOR COMPANY LIMITED • MONTREAL

Electrical Specifications

FREQUENCY RANGES

"Standard Broadcast" (A)..... 530—1,720 kc
"Medium Wave" (B)..... 2,100—6,800 kc
"Short Wave" (C)..... 6,800—22,000 kc

R-F ALIGNMENT FREQUENCIES

"Short Wave" (C)..... 20,000 kc (osc.)
"Medium Wave" (B)..... 6,000 kc (osc., ant.)
"Standard Broadcast" (A)... 600 kc (osc.), 1,500 kc (osc.)

Intermediate Frequency..... 460 kc

RADIOTRON COMPLETEMENT

(1) Type 1C6..... First Detector—Oscillator (3) Type 1F6.. Second Det., A-F Amp., and A.V.C.
(2) Type 1A4..... Intermediate Amplifier (4) Type 30..... Audio Driver
(5) Type 19..... Push-Pull Power Output

Pilot Lamps (2)..... Mazda 2.0 volts, .06 ampere

BATTERIES REQUIRED

"A," one plug-in, 2½-volt Air Cell, or one 2-volt storage battery; "B," three 45-volt, heavy-duty, plug-in type B batteries;
"C," one 7½-volt C battery tapped at —1½, —3, and —4½ volts, and three bias cells (Stock No. 12681).

CURRENT CONSUMPTION

"A" at 2 volts (pilot lamps off)..... 0.56 ampere
"A" at 2 volts (pilot lamps on)..... 0.68 ampere
"B" at 135 volts..... 19 milliamperes
Fuse Rating..... ½ ampere

POWER OUTPUT

Undistorted 1.2 watts
Maximum 2.2 watts

LOUDSPEAKER

Type..... Permanent-Magnet Dynamic
Voice Coil Impedance..... 2.2 ohms at 400 cycles

Mechanical Specifications

	MODEL 85 BK	MODEL 85BT
Height	40 inches	12 $\frac{1}{2}$ inches
Width	25 $\frac{5}{8}$ inches	20 $\frac{3}{8}$ inches
Depth	11 $\frac{1}{2}$ inches	9 $\frac{3}{8}$ inches
Weight (net)	54 pounds	26 pounds
Weight (shipping)	67 pounds	31 pounds
Chassis Base Dimensions	12 inches x 7 inches x 2 $\frac{1}{2}$ inches	
Over-all Height of Chassis	8 $\frac{3}{4}$ inches	
Operating Controls	(1) Volume; (2) Tuning (large inner knob) Range Selector (small outer knob); (3) Power Switch—Tone	
Tuning Drive Ratio	20 to 1	

General Description

Each of these receivers employs a similar chassis, the superheterodyne circuit arrangement of which is shown by figure 2. Model 85BK is a console model employing an 8-inch, permanent-magnet dynamic loudspeaker while Model 85BT is a table model employing an 8-inch, permanent-magnet dynamic loud-

speaker. Features of design include magnetite-core i-f transformers and low-frequency "A"-oscillator tracking; automatic volume control; resistance-coupled, first-audio stage and transformer-coupled, audio-driver stage to a push-pull, Class-B, audio-output stage; phonograph terminal board; continuous

high-frequency tone control; super-sensitive, permanent-magnet dynamic loudspeaker with dust screen; low current drain; and a large, easy-to-read, illuminated dial with save-a-drain pilot lamp switch combined with the tuning control.

These receivers may be easily converted to 6-volt operation by employing an RCA Victor CV-8 Pak-O-Powr which, with a 6-volt storage battery, replaces

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 of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress.—(1) Twisted leads from filament switch to power plug must be dressed against bottom of end shield and fastened with tape. (2) Keep leads of C18 as short as possible. (3) Lead from L1 to C5-C6 should be $3\frac{1}{4}$ inches long. (4) Lead from L1-L2 to range switch should be $1\frac{1}{2}$ inches long. (5) Keep lead from range switch to C10-C11 as short as possible. (6) Keep lead from range switch to L6 as short as possible. (7) Yellow lead from 2nd i-f transformer to phonograph terminal board must be dressed away from other wiring.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. The Models R-93 Record Player should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Con-

nect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

The three tuning ranges cover the "Standard broadcast" band and the important short-wave bands at 49, 31, 25, 19, 16, and 13 meters along with channels assigned for police, aviation, and amateur communication.

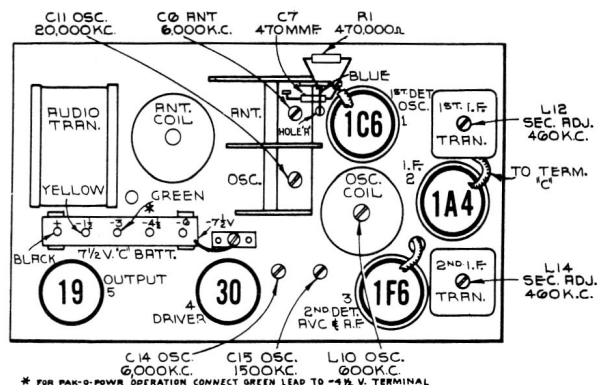


Figure 1—Radiotron, Coil, and Trimmer Locations

Alignment Procedure

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	1A4 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L13 & L14	Symmetrical Curve
2	1C6 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L11 & L12	Symmetrical Curve
3	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C11	Max. (peak)*†
4	Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Osc.	C14	Max. (peak)*
5	Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Ant.	C6	Max. (peak)
6	Ant. Term.	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L10	Max. (peak)
7	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C15	Max. (peak)
8	Ant. Term.	200 Mmfd.	600 kc	Rock thru 600 kc	"A" L-F Osc.	L10	Max. (peak)
9	Ant. Term.	200 Mmfd.	1,500 kc	Rock thru 1,500 kc	"A" H-F Osc.	C15	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.

† After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

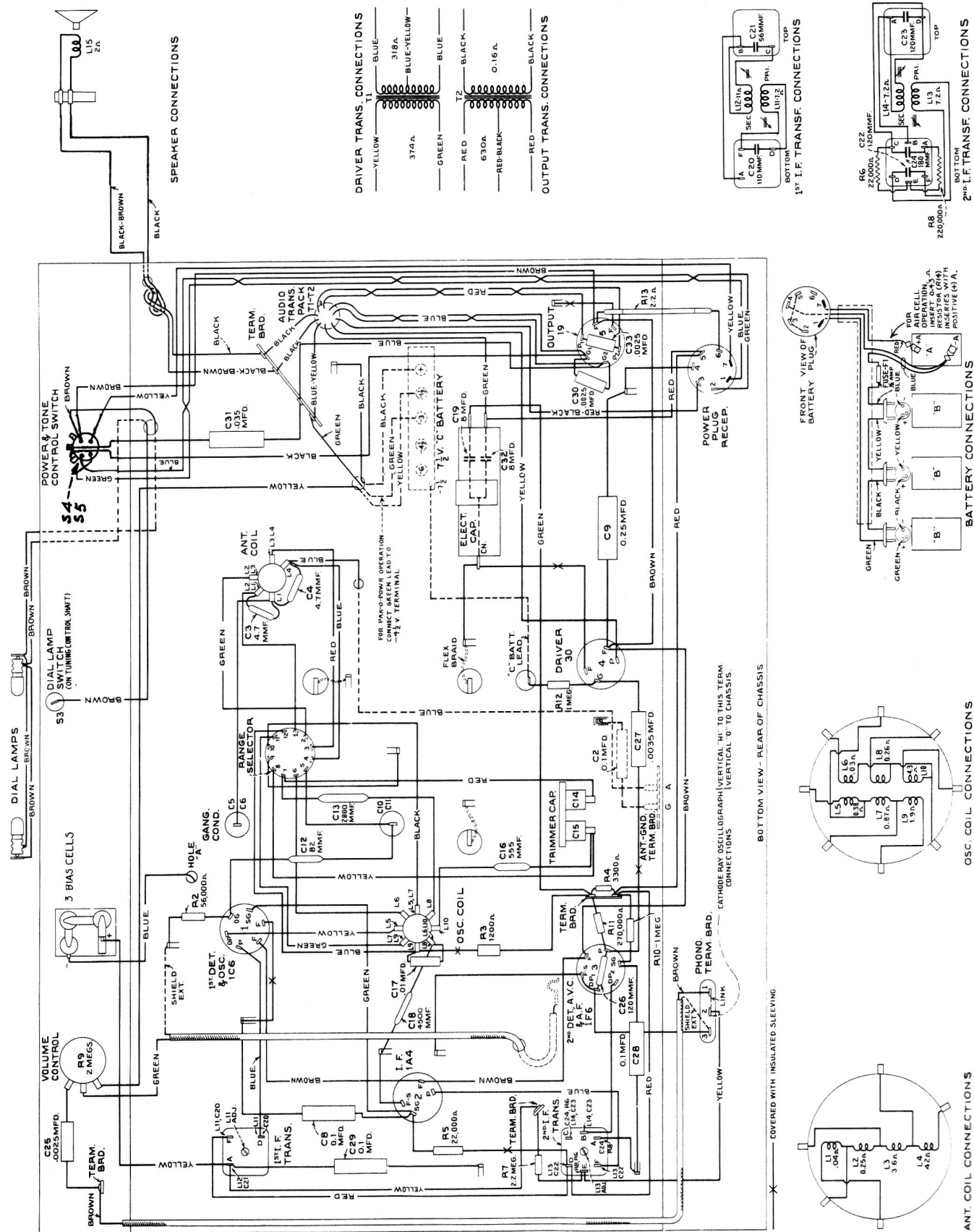
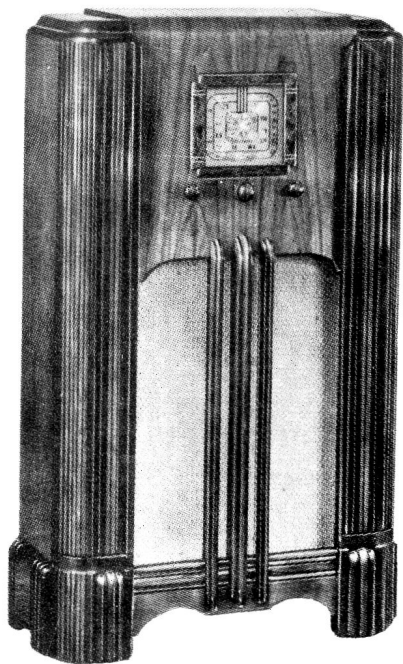
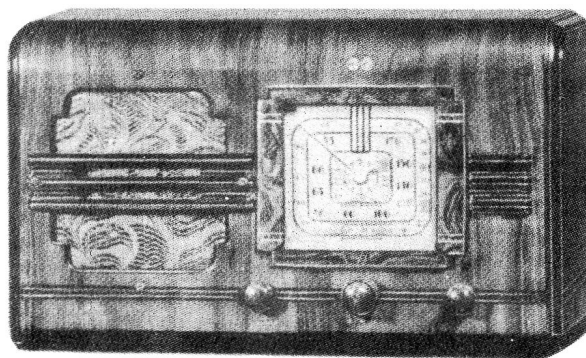


Figure 3—Chassis Wiring Diagram



Model 85BK



Model 85BT

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

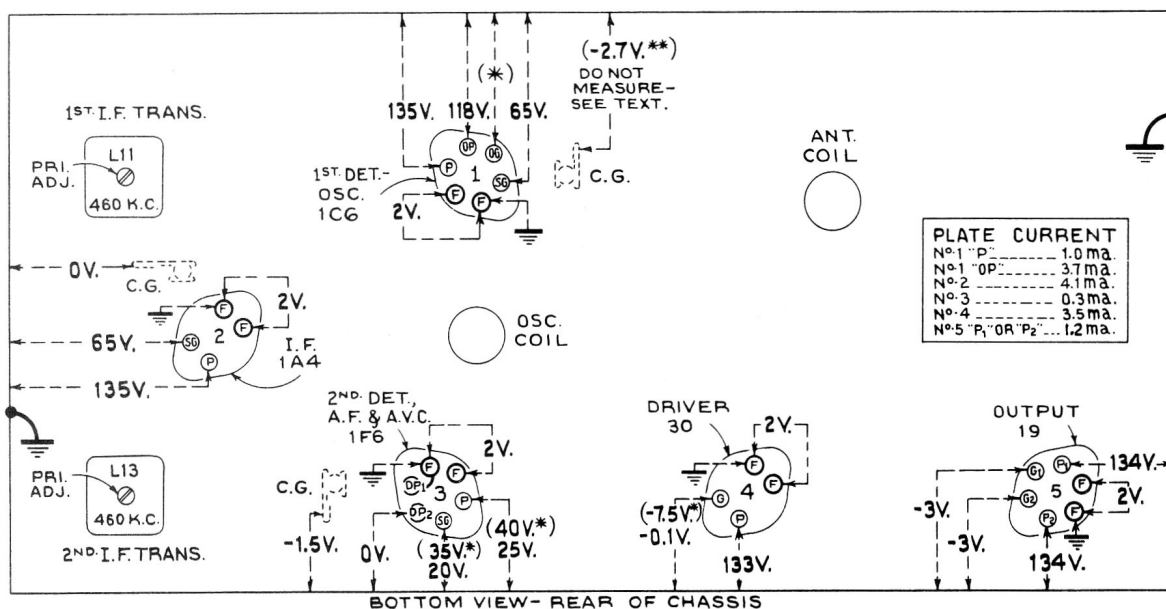


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc—
No signal being received—Volume control minimum

Radiotron Socket Voltages

****CAUTION:** Do not attempt to measure voltage on control grid of the 1C6 with any conventional voltmeter due to presence of bias cells.

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, and terminals to receiver chassis ground on figure 4 will assist in locating cause for faulty operation. Each value as specified should hold within $\pm 20\%$ when the receiver is normally operative at its rated voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10 and 250 volts. Use the nearest range above the specified measured voltage.

Bias Cells—Three bias cells are used only for the purpose of supplying bias potential to the 1C6 first-detector—oscillator tube. These cells should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of the 1C6 tube and noting the plate current reading. Then carefully remove the cells and substitute a battery potential of 2.7 volts in their place and note the new reading on the milliammeter. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 2.7-volt battery), the bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

Operation With CV-8 Pak-O-Powr.—These receivers may readily be operated from an RCA CV-8 Pak-O-Powr, in which case, a six-volt storage battery replaces the "A" and "B" batteries listed under "Batteries required." When using the CV-8, one cell (2 volts) of the storage battery supplies filament voltage to the tubes, while the other two cells (4 volts) supplies power for the CV-8. When installing, the seven prong CV-8 receptacle plugs into the seven prong plug on the rear apron of the receiver chassis

and the four battery leads clip on terminals of the storage battery as follows: Red to + 6 V.; Blue to + 4 V.; Yellow to + 4 V.; and brown (fused lead) to —V. The two four-volt leads (Blue and Yellow) should make separate connections to the same battery strap to avoid vibrator buzz which might otherwise result if these two leads are joined together or touch each other. Observe extreme care that proper connections are made to the battery, as wrong connection will burn out the tubes. The green lead (originally connected to —3 v. on the "C" battery) should be shifted to the —4.5 volt tap. The other "C" battery connections remain unchanged.

The following changes under "Electrical specifications" become effective when employing the CV-8; "A" battery current drain at 6 volts, 1.65 amperes. Fuse rating, 5 amperes. Undistorted output, 1.3 watts. Maximum output, 1.8 watts. Under "Service data," the following voltages apply to the Type 19 power-output tube. Either plate to chassis, 180 volts. Either grid to chassis, —4½ volts. Plate current (either plate), 1.6 ma.

When servicing, the CV-8 chassis should be insulated from the receiver chassis to avoid vibrator buzz.

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
RECEIVER ASSEMBLIES					
14388	Belt-Variable condenser drive-Pkg. of 2.....	\$.20	11452	Resistor-470,000 ohms,carbon type,1/10 watt(R1)..	.15
13216	Board-Antenna and ground terminal board.....	.35	12200	Resistor- 1 megohm,insulated,½ watt (R12).....	.20
12717	Board-Phonograph terminal board.....	.31	13730	Resistor- 1 megohm,carbon type,½ watt (R10)...	.20
14338	Bushing-Variable condenser mounting bushing and screw assembly.....	.23	12679	Resistor- 2.2 megohm,insulated,½ watt (R7).....	.20
12607	Cap-First I.F. transformer shield top.....	.42	14406	Resistor-2.2 ohms, flexible type,3 watts (R13)...	.24
12581	Cap-Second I.F. transformer shield top.....	.50	14350	Screw-No. 8-32x3/16 square head set screw for gear Stock #30085 and drum stock #14345-Pkg. of 10..	.35
12118	Cap-Grid contact cap-Pkg. of 5.....	.21	14374	Shield-Antenna coil shield.....	.35
14383	Capacitor-Adjustable dual trimmer C14,C15.....	.63	12008	Shield-I.F. transformer shield.....	.35
14392	Capacitor-4.7 Mmfd. (C3,C4).....	.35	14375	Shield-Oscillator coil shield.....	.35
13307	Capacitor- 56 Mmfd. (C21).....	.28	3682	Shield-Radiotron shield.....	.31
12813	Capacitor- 82 Mmfd. (C12).....	.35	13311	Shield-Chassis end shield and rubber mounting foot assembly.....	.56
14262	Capacitor-110 Mmfd. (C20).....	.42	14171	Socket-Dial lamp socket.....	.42
12404	Capacitor-120 Mmfd. (C22,C23).....	.36	4794	Socket-4-contact 1A4 or 30 radiotron socket.....	.21
12724	Capacitor-120 Mmfd. (C26).....	.35	4786	Socket-6-contact 1C6,1P6 or 19 radiotron socket..	.21
12406	Capacitor-180 Mmfd. (C24).....	.36	12007	Spring-Retaining spring for core Stock #12006 - Pkg. of 10.....	.50
13052	Capacitor-470 Mmfd. (C7).....	.35	12907	Spring-Tension spring for indicator drive gear Stock #30085-Pkg. of 10.....	.28
12727	Capacitor-555 Mmfd. (C16).....	.49	14342	Spring-Tension spring for idler stock #14341-Pkg. of 10.....	.28
14407	Capacitor-2,800 Mmfd. (C13).....	.84	14402	Switch-Range Switch (S1,S2).....	3.15
12728	Capacitor-4,500 Mmfd. (C18).....	.70	12803	Transformer-Audio transformer pack (T1,T2).....	4.97
5107	Capacitor-.0025 Mfd. (C25,C30,C33).....	.28	14261	Transformer-First I.F. transformer (L11,L12,C20,C21).....	3.50
5005	Capacitor-.0035 Mfd. (C27).....	.28	14283	Transformer-Second I.F. transformer (L13,L14,C22,C23,C24,R6,R8).....	3.85
13138	Capacitor-.01 Mfd. (C17).....	.35	14400	Volume Control (R9).....	1.40
5196	Capacitor-.035 Mfd. (C31).....	.28	14379	Washer-Felt washer for indicator pointer Pkg.of10	.21
4791	Capacitor-0.1 Mfd. (C2,C8,C28,C29).....	.31	REPRODUCER ASSEMBLIES		
4840	Capacitor-0.25 Mfd. (C9).....	.42	S-1777	Cone-Reproducer cone and dust cap (L15).....	1.32
14403	Capacitor Pack-Comprising two section each 8 Mfd. (C19,C32).....	1.75	S-1776	Reproducer-Reproducer.....	8.00
12681	Cell-Bias cell.....	.42	MISCELLANEOUS ASSEMBLIES		
14372	Coil-Antenna coil and shield (L1,L2,L3,L4).....	3.15	4289	Body-Fuse holder female body-Pkg. of 4.....	.21
14373	Coil-Oscillator coil and shield (L5,L6,L7,L8,L9,L10).....	4.13	4286	Bushing-Fuse holder bushing and ferrule-Pkg. of 4.	.21
14397	Condenser-2 gang variable condenser(C5,C6,C10,C11) stock No.14373).....	2.45	S-1709	Cable-Battery cable complete with fuse, fuse holder, one 7-contact female connector, three 2-contact male connectors and two battery clips	2.32
12800	Core-Adjustable core and stud assembly for coil stock No.14373).....	.28	4288	Cap-Fuse holder male cap-Pkg. of 4.....	.21
12006	Core-Adjustable core and stud for I.F.transformer	.31	14289	Clip-Battery clips, one marked "-" and unmarked-Pkg. of 2.....	.28
14399	Dial-Station selector dial scale.....	2.10	12827	Connector-3-contact male connector for battery cable.....	.42
14398	Drive-Variable condenser vernier drive pinion gear and shaft.....	1.61	14409	Connector-7-contact connector for battery cable..	.35
14345	Drum-Variable condenser drive belt drum complete with set screws.....	.70	14396	Escutcheon-Station selector escutcheon and crystal.....	2.10
30085	Gear-Indicator drive gear and hub assembly and pointer stem and gear assembly.....	1.82	3748	Fuse-½ ampere (F1)-Pkg. of 2.....	.21
14405	Holder-Bias cell holder.....	1.05	4290	Insulator-Fuse holder insulating sleeve-Pkg. of 5.	.29
14341	Idler-Station selector drive belt idler.....	.49	14359	Knob-Station selector knob.....	.21
14344	Indicator-Station selector indicator pointer.....	.28	14269	Knob-Volume control,tone control or range switch knob.....	.21
14382	Indicator-Vernier indicator pointer.....	.28	14410	Resistor-0.43 ohms,flexible resistor ½ watt complete with clip (R14).....	.49
4348	Lamp-Dial Lamp.....	.53	4284	Spring-Fuse holder tension spring - Pkg. of 5.....	.21
14404	Plug-7-contact male plug located on rear apron of chassis for battery cable.....	.49	4982	Spring-Retaining spring for knob Stock #14359-Pkg. of 5.....	.35
14340	Pulley-Station selector drive belt pulley and knob shaft.....	.35	14270	Spring-Retaining spring for knob Stock #14269-Pkg. of 5.....	.35
14361	Reflector-Dial reflector and lamp bracket assembly	1.05	S-1779	Tone Control & Power Switch (R50).....	1.40
11283	Resistor- 1,200 ohms, carbon type ½ watt (R3)...	.20	4285	Washer-Fuse holder insulating washer - Pkg. of 10	.31
13737	Resistor- 3,300 ohms, carbon type ½ watt (R4)...	.20			
14284	Resistor- 22,000 ohms, carbon type 1/10 watt(R6)...	.15			
11305	Resistor- 22,000 ohms,insulated,½ watt (R5).....	.20			
5029	Resistor- 56,000 ohms,carbon type,½ watt (R2)...	.20			
11398	Resistor- 220,000 ohms,carbon type,1/10 watt (R8)...	.15			
11453	Resistor-270,000 ohms,carbon type,1/10 watt(R11)...	.15			

Prices quoted above are subject to change without notice.

* NOTE:- When ordering reproducer assemblies, state whether or not reproducer is enclosed in a black dust bag.

When ordering Stock No. S-1777 (with black dust bag) state whether it has a spider, or suspension bracket.