



# RCA Victor

## MODELS 86T3 and 87T1

Six- and Seven-Tube, Three-Band, A-C, Superheterodyne Receivers

## TECHNICAL INFORMATION AND SERVICE DATA

- 1937 No. 35 -

SERVICE DIVISION • RCA MANUFACTURING COMPANY, INC. • CAMDEN, N. J., U. S. A.

*A Service of the Radio Corporation of America*

### Electrical Specifications

#### FREQUENCY RANGES

"Standard Broadcast" (A)..... 540-1,740 kc  
"Medium Wave" (B)..... 2,300-7,000 kc  
"Short Wave" (C)..... 7,000-22,000 kc

Intermediate Frequency..... 460 kc

#### RADIOTRON COMPLEMENT

(1) RCA-6A8..... First Detector—Oscillator  
(2) RCA-6K7..... Intermediate Amplifier  
(3) RCA-6H6..... Second Detector and A.V.C.

Pilot Lamps (2)..... Mazda No. 46, 6.3 volts, 0.25 amp.

#### POWER SUPPLY RATINGS

Rating A..... 105-125 volts, 50-60 cycles, 75 watts  
Rating B..... 105-125 volts, 25-60 cycles, 75 watts  
Rating C..... 105-125/200-250 volts, 50-60 cycles, 75 watts

#### POWER OUTPUT

Undistorted..... 2.2 watts  
Maximum..... 4.5 watts

#### R-F ALIGNMENT FREQUENCIES

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

(4) RCA-6F5..... Audio Voltage Amplifier  
(5) RCA-6F6..... Audio Power Amplifier  
(6) RCA-5W4..... Full-Wave Rectifier  
(7) RCA-6U5 (Model 87T1 only)..... Tuning Tube

#### LOUDSPEAKER

Type..... 6-inch Electrodynamic  
V.C. Impedance.....  $\left\{ \begin{array}{l} 84091-1 \\ 84001-3 \end{array} \right\}$  2.6 ohms at 400 cycles  
 $\left\{ \begin{array}{l} 84091-2 \\ 84001-6 \end{array} \right\}$  4.7 ohms at 400 cycles

### Mechanical Specifications

#### Models

	86T3	87T1
Height (inches).....	18 $\frac{1}{2}$	10 $\frac{15}{16}$
Width (inches).....	12 $\frac{11}{16}$	19 $\frac{1}{16}$
Depth (inches).....	8 $\frac{15}{16}$	8 $\frac{15}{16}$
Net Weight (pounds).....	18 $\frac{1}{2}$	18 $\frac{1}{2}$
Shipping Weight (pounds).....	23 $\frac{1}{2}$	23
Chassis Base Dimensions.....	9 $\frac{1}{2}$ inches x 7 $\frac{1}{2}$ inches x 2 $\frac{1}{2}$ inches	
Over-all Chassis Height.....	7 $\frac{3}{16}$ inches	
Operating Controls.....	(1) Power Switch—Tone; (2) Tuning (large knob), Range Selector (small knob, left to right "A," "B," "C"); (3) Volume	
Tuning Drive Ratio.....	20 to 1	

### General Description

These receivers employ a three-band superheterodyne circuit as shown in the Schematic Circuit Diagram. Model 86T3 is an upright table model; Model 87T1 is a chest-type table model. Both employ 6-inch electrodynamic loudspeakers. Model 87T1 incorporates a "Magic Eye" tuning indicator. Features of design include magnetite-core adjusted

i-f transformers and low-frequency "A" oscillator tracking; automatic volume control; phonograph terminal board; aural-compensated volume control; continuous tone control; dust-proof electrodynamic loudspeakers; and an edge-illuminated straight-line dial.

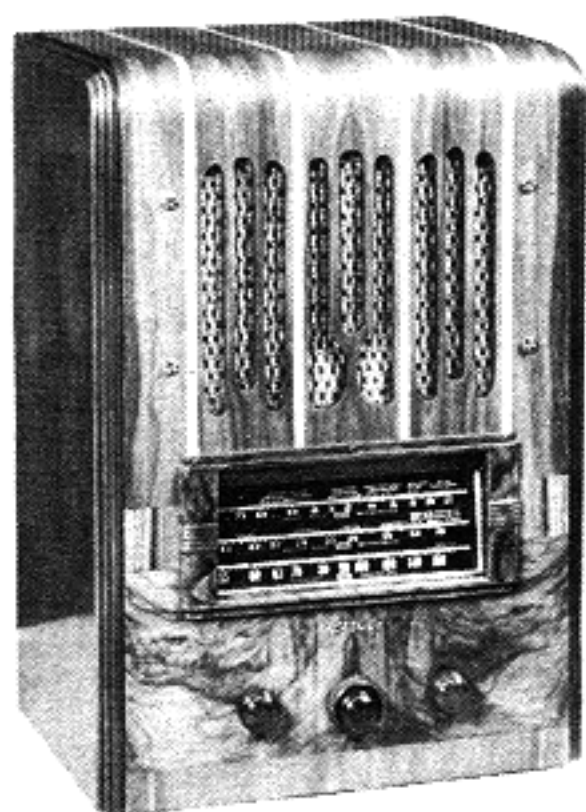
## Service Data

**Loudspeaker.**—Centering of the loudspeaker is made in the usual manner with three narrow celluloid or 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. A dust cover should be cemented in place with ambroid upon completion of adjustment.

**Phonograph Attachment.**—A terminal board is provided for connecting a phonograph into the audio amplifying

circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Open link between terminals 1 and 2 on terminal board. Connect yellow wire in Radio-Record switch cable to terminal 1, green 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.

**Precautionary Lead Dress.**—(1) Keep leads from C1 as short as possible. (2) Dress yellow and green leads from range selector to oscillator coil between front apron and range selector. Maintain original length and size of the following: (3) bus lead from antenna coil L1 to range selector and (4) lead from oscillator coil to chassis.



Model 86T3



Model 87T1

## Alignment Procedure

With the gang tuning-condenser plates in full-mesh position, adjust the pointer to the low-frequency (end) calibration mark on the dial scale. The pointer is soldered in place on the drive cable.

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 2.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 4. 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 opera-

tions. 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.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L12 and L13	Max. (peak)
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L10 and L11	Max. (peak)
3	Ant. Term.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C11	Max. (peak)*
4	Ant. Term.	300 Ohms	6,000 kc	"B"	6,000 kc	"B" Ant.	C2	Max. (peak)†
5	Ant. Term.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C7	Max. (peak)‡
6	Ant. Term.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" L-F Osc.	L8	Max. (peak)
7	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C10	Max. (peak)
8	Ant. Term.	200 Mmfd.	600 kc	"A"	600 kc	"A" L-F Osc.	L8	Max. (peak)
9	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C10	Max. (peak)

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

† After this adjustment, check for image signal by shifting receiver dial to 5,080 kc.

‡ Use maximum capacity peak if two peaks can be obtained. After this adjustment, check for image signal by shifting receiver dial to 20,920 kc.

Note that the heterodyne oscillator tracks above the signal frequency on bands "A" and "B," and below the signal frequency on band "C."



## Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket  
Cathode Terminals Under Conditions Similar to  
Those of Voltage Measurements

- |                                     |          |
|-------------------------------------|----------|
| (1) RCA-6A8—1st Det.—Osc.....       | 12.5 ma. |
| (2) RCA-6K7—I-F Amp.....            | 7.2 ma.  |
| (3) RCA-6H6—2nd Det. and A.V.C..... | —        |
| (4) RCA-6F5—A-F Amp.....            | 0.27 ma. |
| (5) RCA-6F6—Output.....             | 38.5 ma. |
| (6) RCA-5W4—Rectifier.....          | 59 ma.** |
| (7) RCA-6U5—Tuning Tube.....        | 1.2 ma.  |

\*\* Cannot be measured at socket.

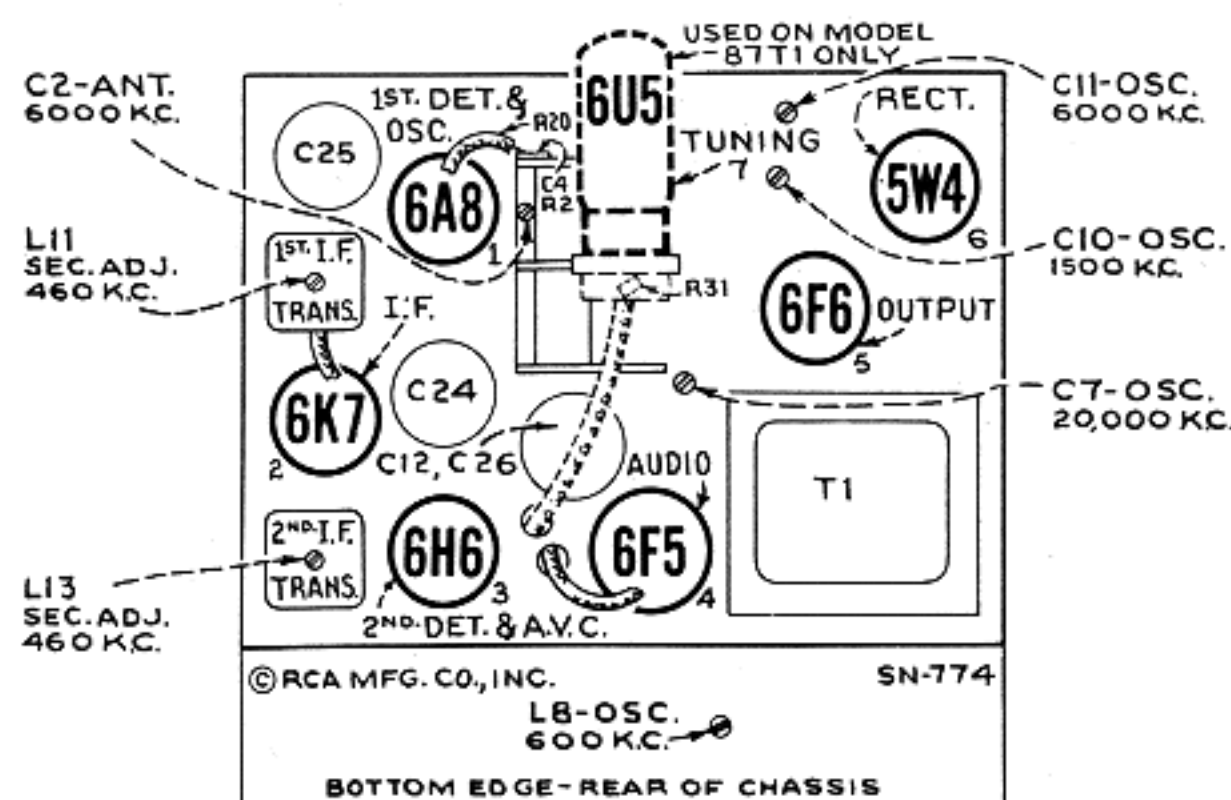


Figure 1—Radiotron, Component Part, and Trimmer Locations

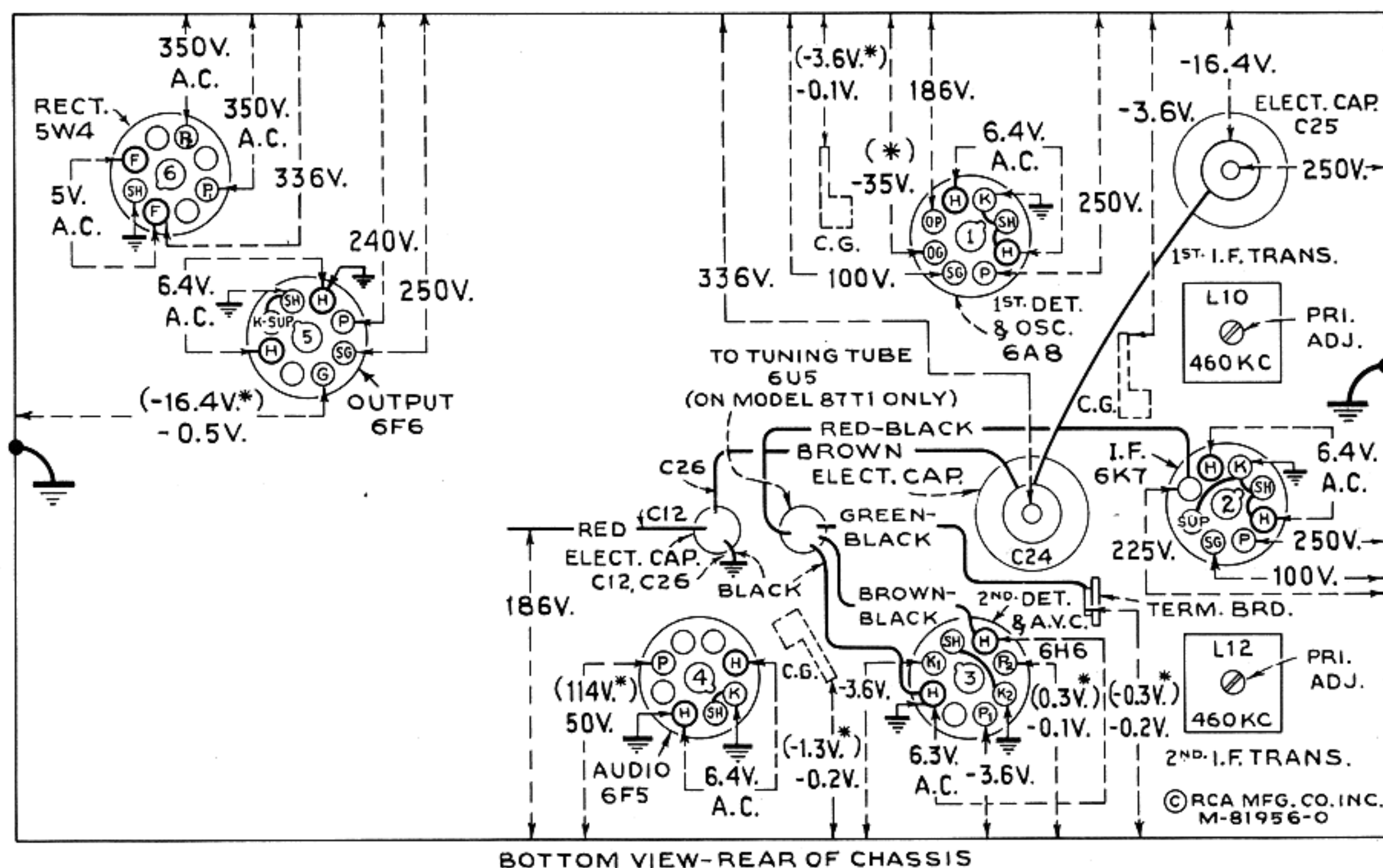


Figure 2—Radiotron Socket Voltages and Trimmer Locations

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

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

Voltage values as specified should hold within  $\pm 20\%$  when the receiver is normally operative at its rated line 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, 50, 250 and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

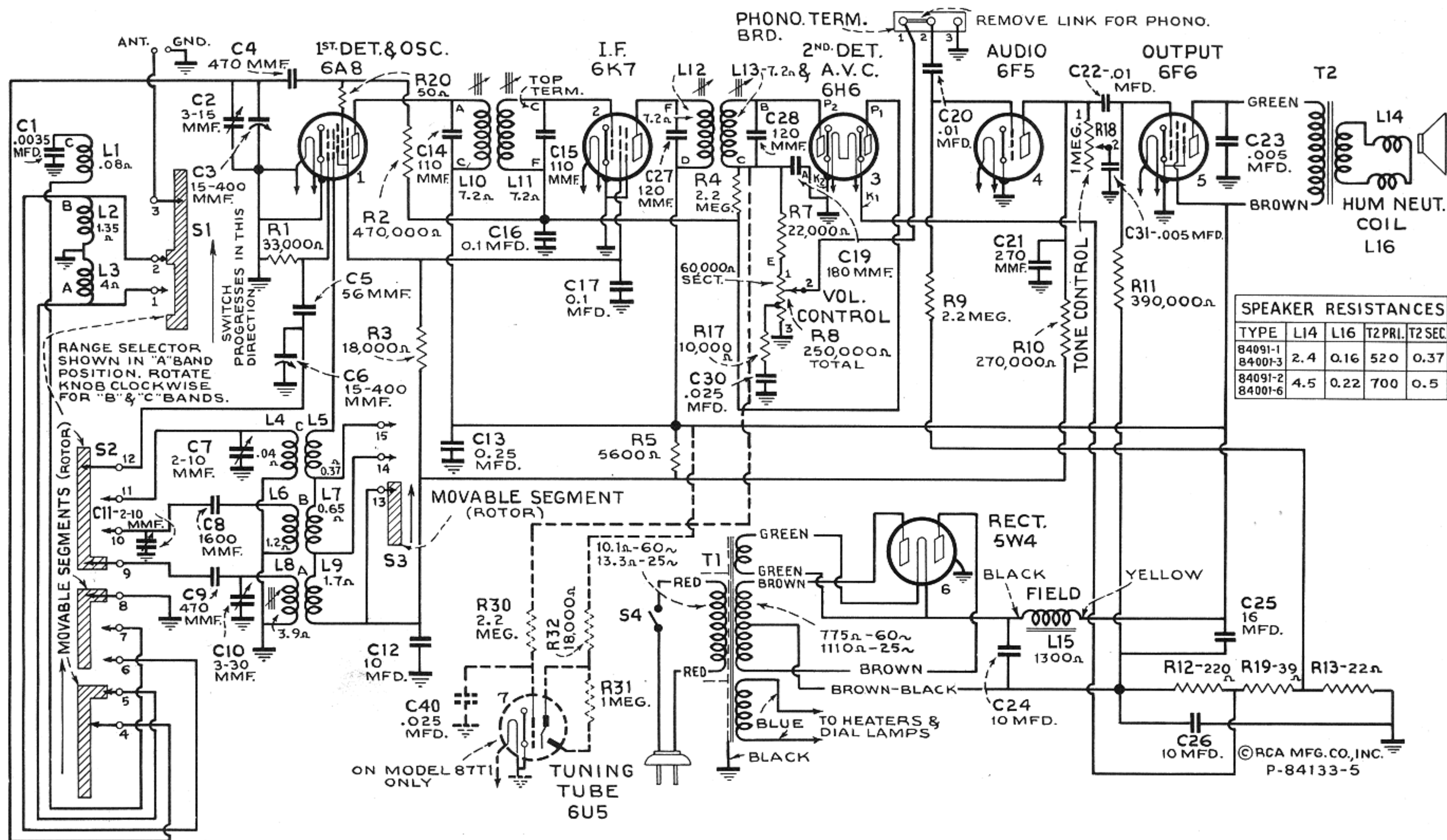


Figure 3—Schematic Circuit Diagram

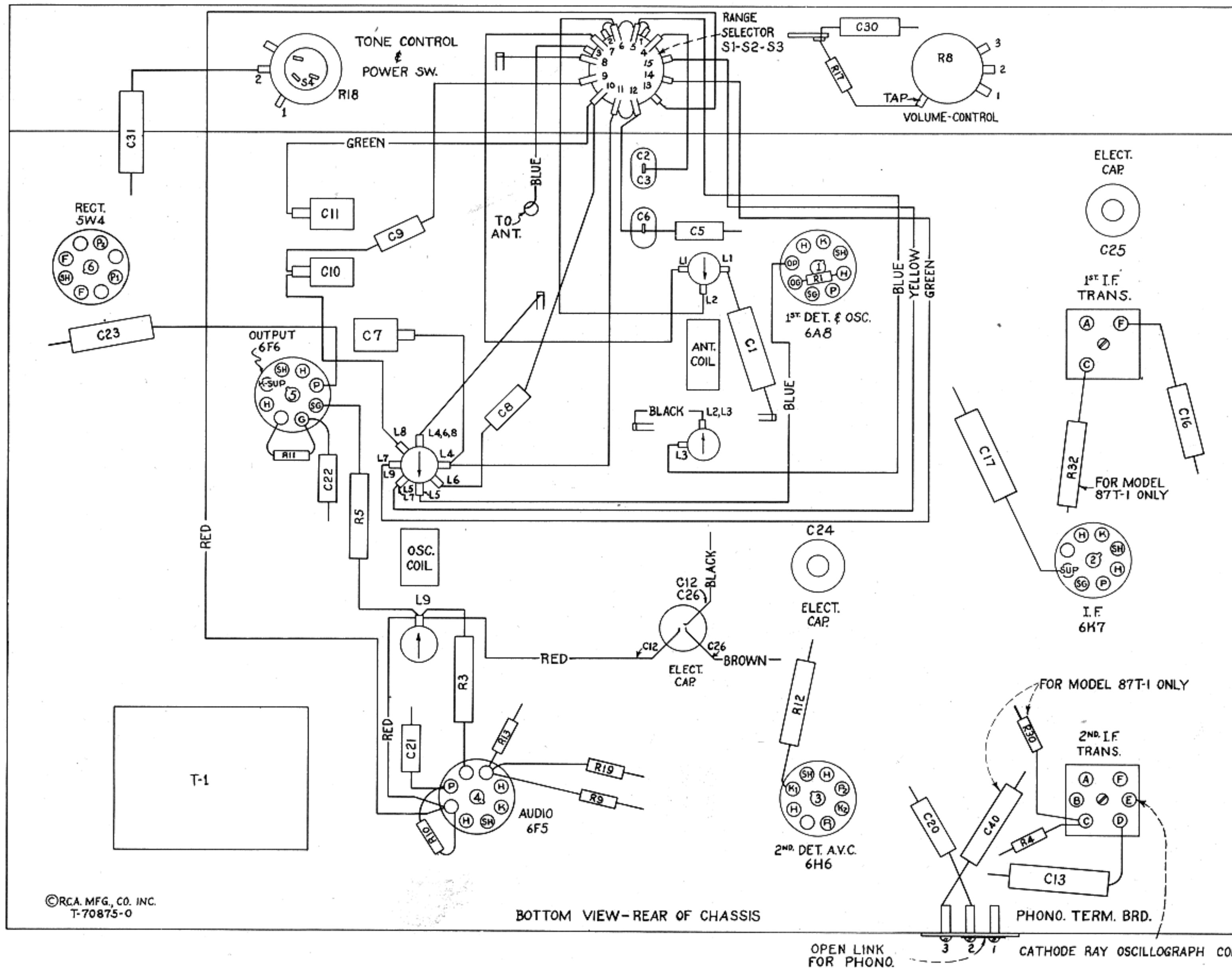


Figure 4—Component Part Location and R-F Wiring Diagram



# REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
<b>RECEIVER ASSEMBLIES</b>			
14380	Arm—Hub and arm for operating band indicator shutter—fastens on range switch shaft	13005	Resistor—390,000 ohms, carbon type, 1/10 watt (R11)
14352	Belt—Station selector drive belt	11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R2)
13216	Board—Antenna and ground terminal board	12013	Resistor—1 meg., carbon type, 1/10 watt (R31) (Model 87T1 only)
12717	Board—Phonograph terminal board	12679	Resistor—2.2 meg., insulated, 1/2 watt (R4, R9)
12607	Cap—Top shield cap for first I.F. transformer	11626	Resistor—2.2 meg., carbon type, 1/2 watt (R30) (Model 87T1 only)
12581	Cap—Top shield cap for second I.F. transformer	30582	Retainer—Band-indicator disc retainer
11350	Cap—Grid contact cap	14343	Ring—Retaining ring for range switch shaft
12723	Capacitor—56 Mmfd. (C5)	14350	Screw—No. 8-32 x 3/16 in. square-head set screw for drum, Stock No. 30584, arm, Stock No. 14380, and pulley, Stock No. 30587
14262	Capacitor—110 Mmfd. (C14, C15)	14340	Shaft—Drive pulley and knob shaft—fastens on range switch shaft
12404	Capacitor—120 Mmfd. (C27, C28)	12008	Shield—I.F. transformer shield can
12406	Capacitor—180 Mmfd. (C19)	11196	Socket—8-contact Radiotron socket
12488	Capacitor—270 Mmfd. (C21)	14114	Socket—Dial-lamp socket
30433	Capacitor—470 Mmfd. (C4, C9)	13871	Socket—Tuning-tube socket complete—less cable (Model 87T1 only)
30592	Capacitor—1,600 Mmfd. (C8)	12007	Spring—Retaining spring for core, Stock No. 12006
30303	Capacitor—.0035 Mfd. (C1)	30585	Spring—Tension spring for pointer cord
4838	Capacitor—.005 Mfd. (C23, C31)	30588	Spring—Tension spring for idler pulley
14393	Capacitor—.01 Mfd. (C20, C22)	30576	Switch—Range switch (S1, S2)
4870	Capacitor—.025 Mfd. (C30, C40) (C40 — Model 87T1 only)	30574	Tone control and power switch (R18, S4)
4839	Capacitor—0.1 Mfd. (C16, C17)	14376	Transformer—First I.F. transformer (L10, L11, C14, C15)
12484	Capacitor—0.25 Mfd. (C13)	14308	Transformer—Second I.F. transformer (L12, L13, C19, C27, C28, R7)
11203	Capacitor—10 Mfd. (C12)	30571	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
30577	Capacitor Pack—Comprising two sections each 10 Mfd. (C24, C26)	30617	Transformer—Power transformer, 105-125 and 200-250 volts, 50-60 cycle (T1)
5212	Capacitor—16 Mfd. (C25)	30575	Volume Control (R8)
4358	Clamp—Mounting clamp for capacitor pack, Stock No. 30577	<b>REPRODUCER ASSEMBLIES</b>	
30578	Coil—Antenna coil (L1, L2, L3)	14614	Cone—Reproducer cone and dust cap (for speaker marked 84091-1 or 84001-3) (L14)
30579	Coil—Oscillator coil (L4, L5, L6, L7, L8, L9)	14934	Cone—Reproducer cone and dust cap (for speaker marked 84091-2 or 84001-6) (L14)
30573	Condenser—2-gang variable tuning condenser (C2, C3, C6)	14613	Reproducer complete (marked 84001-3 or 6 but interchangeable with speaker marked 84091-1 or 2)
30580	Condenser—3-gang mica trimmer—two sections each 2-10 Mmfd., one section 3-30 Mmfd. (C7, C10, C11)	14615	Transformer—Output transformer (for speaker marked 84091-1 or 84001-3) (T2)
30586	Cord—Station-selector indicator pointer cord	14935	Transformer—Output transformer (for speaker marked 84091-2 or 84001-6) (T2)
12800	Core—Adjustable core and stud for oscillator coil	<b>MISCELLANEOUS ASSEMBLIES</b>	
12006	Core—Adjustable core and stud for I.F. transformer	30595	Bracket—Tuning-tube mounting bracket and clip (Model 87T1 only)
30589	Dial—Station-selector dial scale	30593	Escutcheon—Dial escutcheon and crystal (Model 86T3 only)
30581	Disc—Band indicator disc with celluloid window	30594	Escutcheon—Dial and tuning-tube escutcheon and crystal (Model 87T1 only)
30572	Drive—Vernier drive shaft and pinion gear for variable condenser	14359	Knob—Station selector knob
30584	Drum—Station-selector drive-cord drum with set screws	14269	Knob—Tone control, volume control, or range switch knob
30583	Indicator—Station-selector indicator pointer and holder assembly	14267	Screw—Chassis-mounting screw and washer assembly
5226	Lamp—Dial lamp	14270	Spring—Retaining spring for knob, Stock No. 14269
30587	Pulley—Drive-belt pulley for condenser shaft	4982	Spring—Retaining spring for knob, Stock No. 14359
14636	Pulley—Drive-belt idler pulley		
14525	Resistor—22 ohms, carbon type, 1/2 watt (R13)		
30590	Resistor—39 ohms, carbon type, 1/2 watt (R19)		
14653	Resistor—50 ohms, flexible type, 1/10 watt (R20)		
30591	Resistor—220 ohms, insulated wire wound, 1.1 watt (R12)		
11298	Resistor—5,600 ohms, carbon type, 1 watt (R5)		
14559	Resistor—10,000 ohms, insulated, 1/2 watt (R17)		
30151	Resistor—18,000 ohms, insulated, 1 watt (R3, R32) (R32 — Model 87T1 only)		
14284	Resistor—22,000 ohms, carbon type, 1/10 watt (R7)		
12454	Resistor—33,000 ohms, insulated, 1/2 watt (R1)		
11323	Resistor—270,000 ohms, carbon type, 1/2 watt (R10)		