



RCA Victor

MODELS 96K2, 96T3, 97E, 97KG and 97T

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

TECHNICAL INFORMATION AND SERVICE DATA

—1938 No. 24—

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)..... 540-1,720 kc
"Medium Wave" (B)..... 2.3-7 mc
"Short Wave" (C)..... 7-22 mc

R-F ALIGNMENT FREQUENCIES

"Short Wave" (C)..... 20 mc (osc., ant.)
"Medium Wave" (B)..... 6.1 mc (osc.)
"Standard Broadcast" (A)..... 1,500 kc (osc.)

Six Electric Tuning Positions..... 550-1,500 kc

2 stations between approximately 550- 950 kc

2 stations between approximately 680-1,180 kc

2 stations between approximately 890-1,500 kc

RCA TUBE COMPLEMENT

(1) RCA-6K8..... First-Detector—Oscillator
(2) RCA-6K7..... Intermediate-Frequency Amplifier
(3) RCA-6H6..... Second-Detector and A.V.C.

(4) RCA-6F5..... Audio Voltage Amplifier
(5) RCA-6F6..... Audio Power Amplifier
(6) RCA-5W4..... Full-Wave Rectifier
(7) RCA-6U5 (Models 97E, 97KG and 97T).. Tuning Tube

Pilot Lamps (2 on Models 96K2, 96T3) (3 on Models 97E, 97KG and 97T)..... Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATING

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

96T3, 97T

97E, 96K2, 97KG

Undistorted..... 2.0 watts 2.5 watts

Maximum..... 4.0 watts 4.5 watts

LOUDSPEAKER

Type..... Electrodynamic

Voice-coil impedance..... $\left\{ \begin{array}{ll} 84308-1 & 2.6 \text{ ohms} \\ \text{RL-70F-3} & 2.25 \text{ ohms} \\ \text{RL-63H-3} & 2.25 \text{ ohms} \end{array} \right\}$ at 400 cycles

Mechanical Specifications

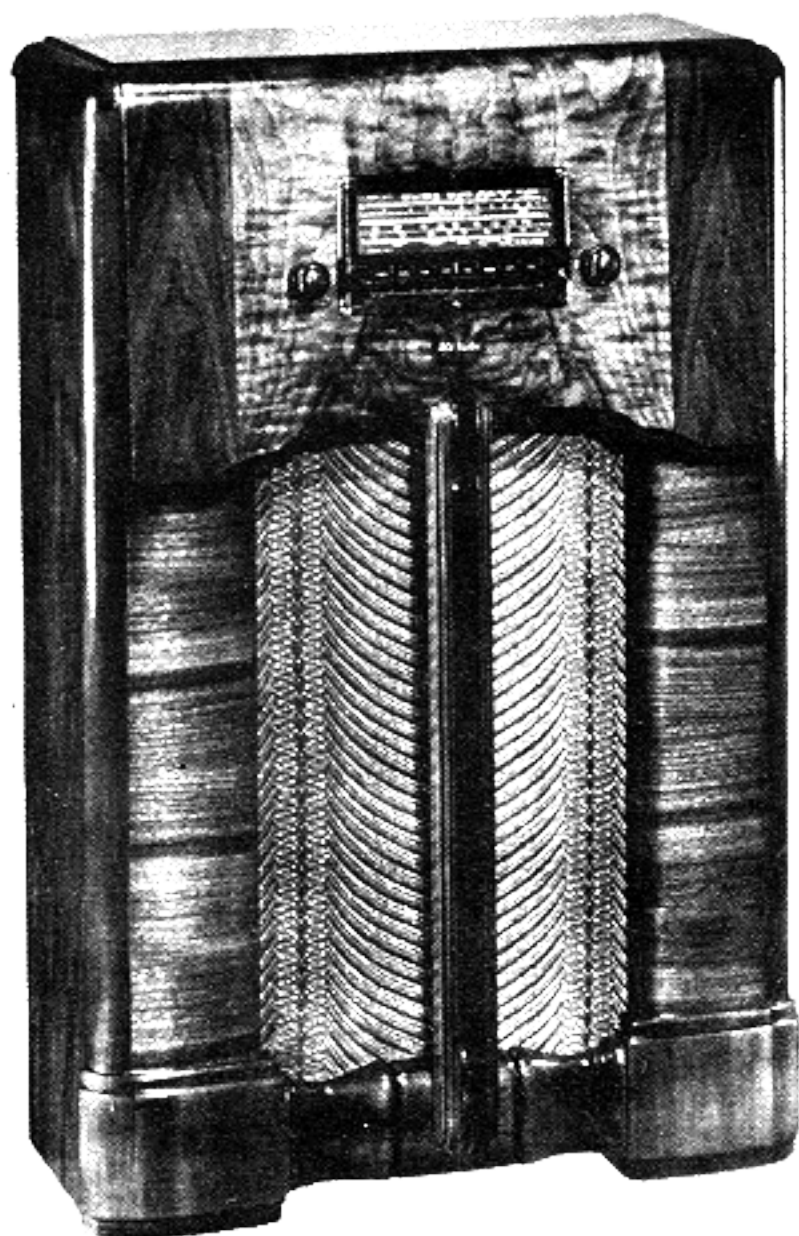
Models	96K2	96T3	97E	97KG	97T
Height (inches).....	37 $\frac{1}{4}$	12 $\frac{1}{2}$	23 $\frac{11}{16}$	35	12 $\frac{15}{16}$
Width (inches).....	22	15 $\frac{1}{2}$	28	32	15 $\frac{5}{8}$
Depth (inches).....	10	9 $\frac{1}{4}$	14 $\frac{13}{32}$	12 $\frac{7}{16}$	8 $\frac{1}{2}$
Net Weight (pounds).....	56	19	42	53	18
Shipping Weight.....	60	23	50	70	23
Chassis Base Dimensions.....	13-in. wide, 6 $\frac{1}{2}$ -in. deep, 2 $\frac{1}{2}$ -in. high				
Over-all Chassis Height.....	6 inches				
Tuning Drive Ratio.....	12 to 1				

General Description

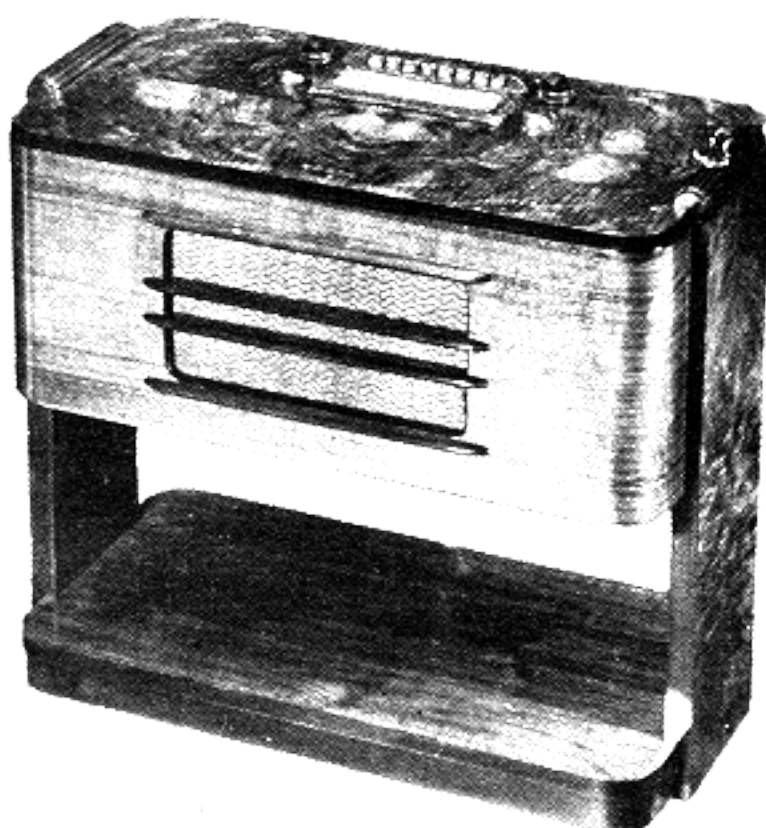
The seven-tube models have a "Magic Eye" tuning tube and illuminated indicator to show when the set is being operated on electric tuning. All models have electric tuning for six stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning

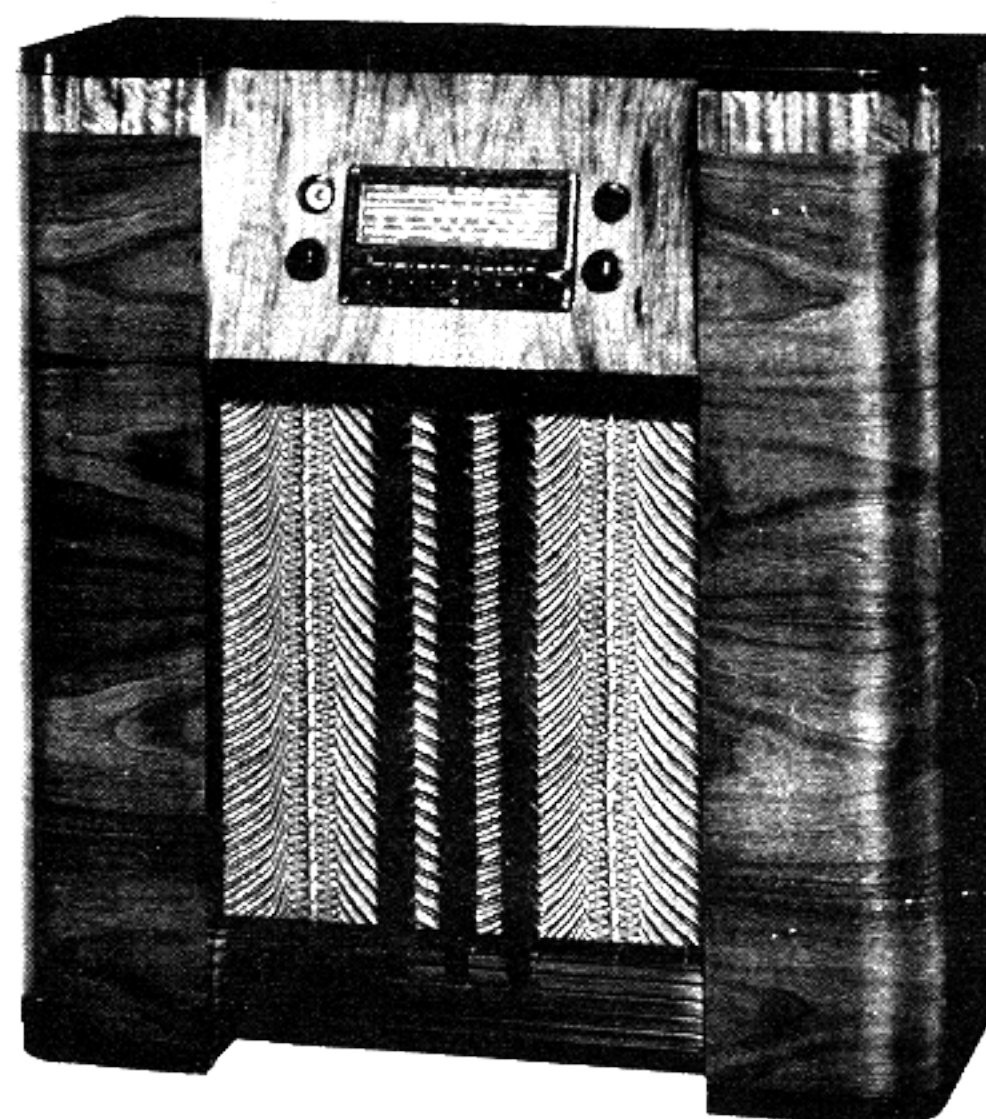
coils; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; aural-compensated volume control; high-frequency tone control; jack and switch for Victrola attachment; straight-line dial; dust-proof electrodynamic loudspeaker.



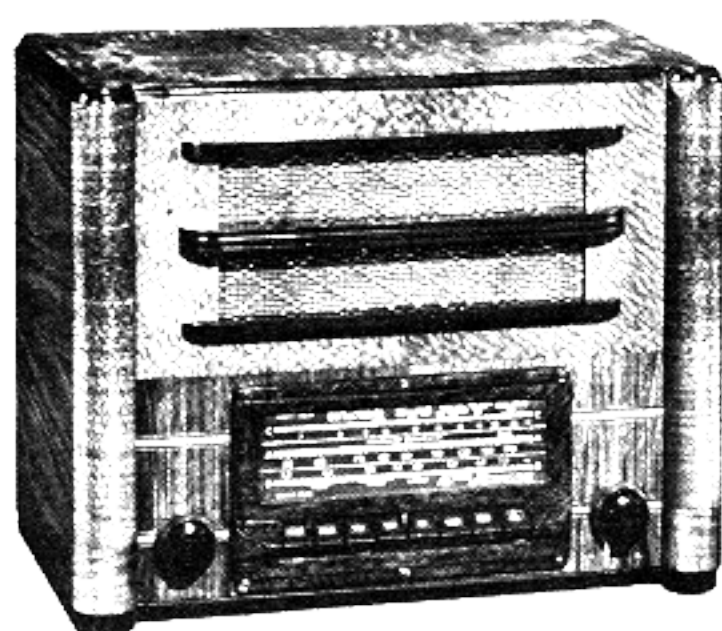
Model 96K2



Model 97E



Model 97KG



Model 96T3

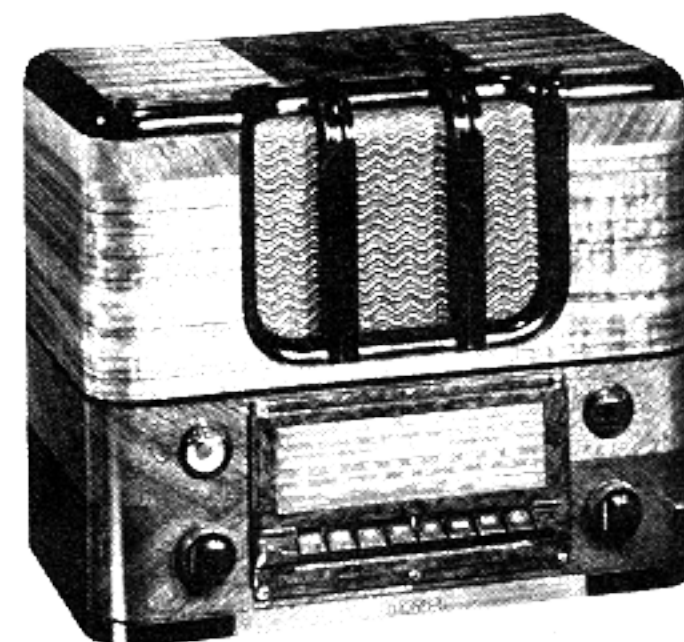
Model 96K2 is a six-tube console with 12-inch speaker.

Model 96T3 is a six-tube table model, with 6-inch speaker.

Model 97E is a seven-tube end-table model, with 8-inch speaker.

Model 97KG is a seven-tube console-grand, with 12-inch speaker.

Model 97T is a seven-tube table model, with 6-inch speaker.



Model 97T

Calibration Scale

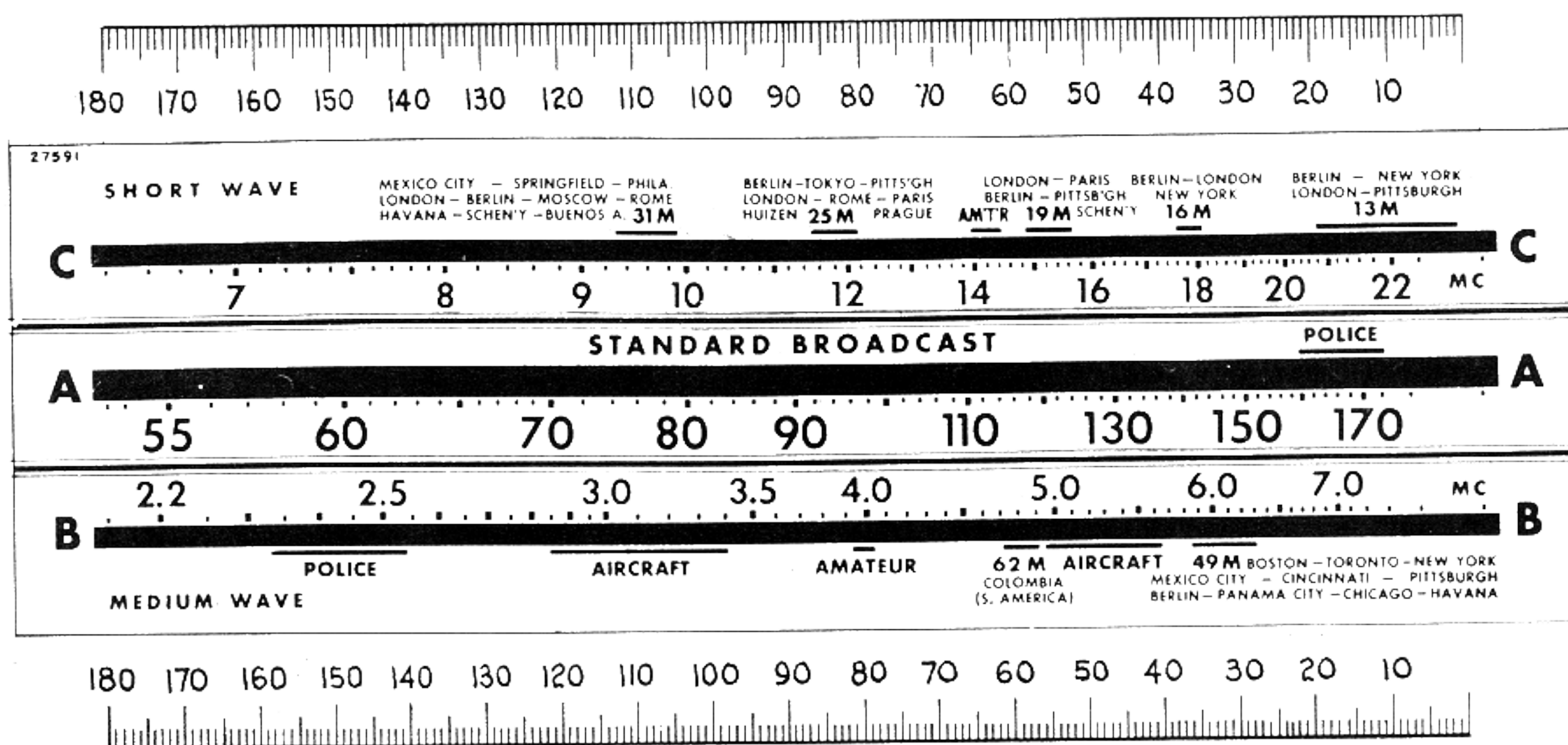


Figure 1—Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example; $28\frac{1}{2}^\circ$ on the calibration scale corresponds to 1,500 kc on "A" band. Read instructions under "Alignment Procedure."

ALIGNMENT PROCEDURE

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord drum.—The tuning dial if fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

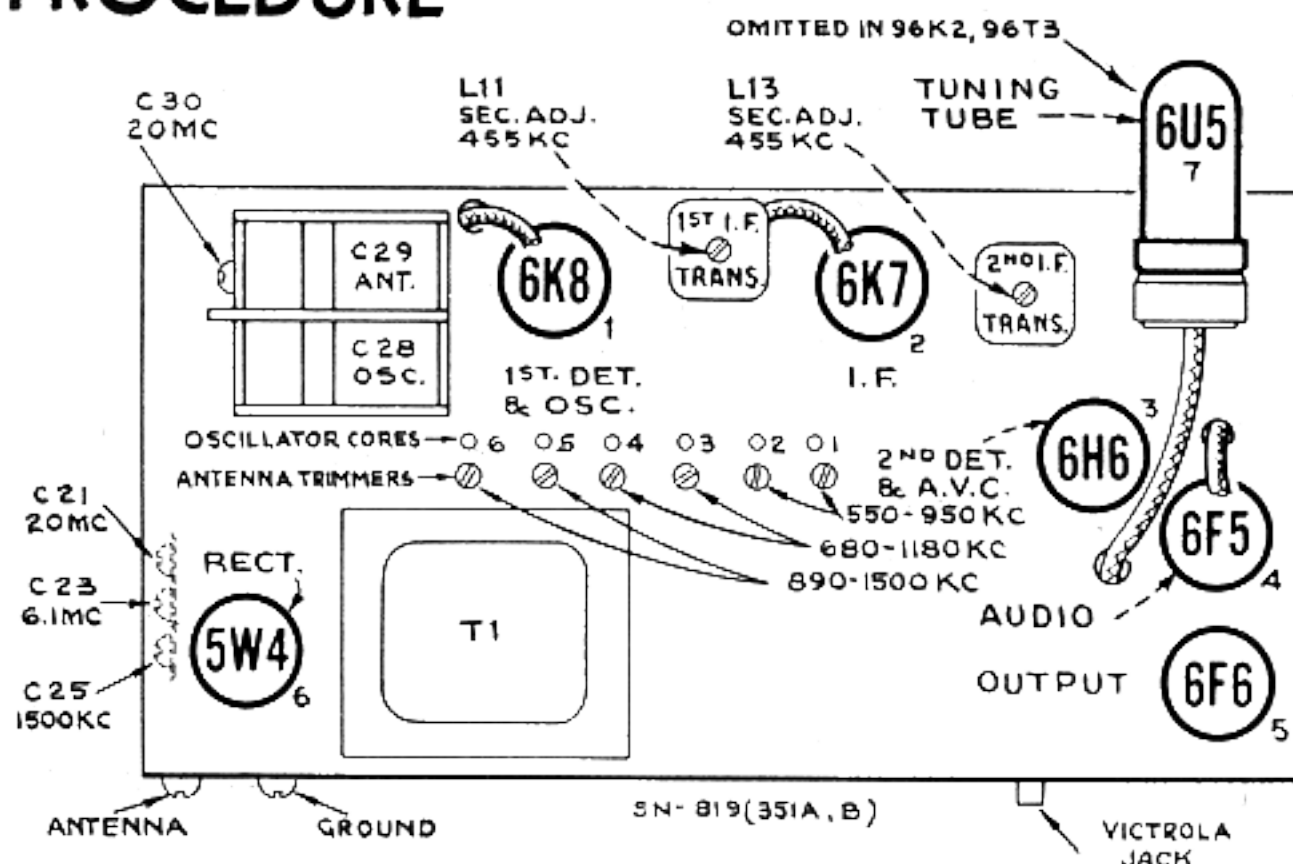


Figure 2—Tube and Trimmer Locations

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

After completion of alignment, seal the i-f core-adjusting screws with household cement.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6K8 det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal, in series with 400 ohms	20 mc	20 mc (23°) "C" band	C21* (osc.) C30** (ant.)
4	Antenna Terminal, in series with 400 ohms	6.1 mc	6.1 mc (31°) "B" band	C23 (osc.)†
5	Antenna Terminal, in series with 200 mmf.	1,500 kc	1,500 kc (28½°) "A" band	C25 (osc.)
6	Follow "Adjustments for Electric Tuning"			

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

** Rock gang slightly and use maximum capacity peak if two peaks can be obtained with C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 28° (19.09 mc), where a weaker signal should be received.

† Use minimum capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by turning to approximately 49° (5.19 mc), at which point a weaker signal should be received.

Note: Oscillator tracks 455 kc above signal on all bands.

ADJUSTMENTS FOR ELECTRIC TUNING

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock

No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers. Use the "Magic Eye" in Models 97E, 97KG, and 97T to ensure sharp peaking. With Model 96T3 or 96K2, use one or two feet of wire as an antenna when making the final adjustments in order to obtain sharp peaking.

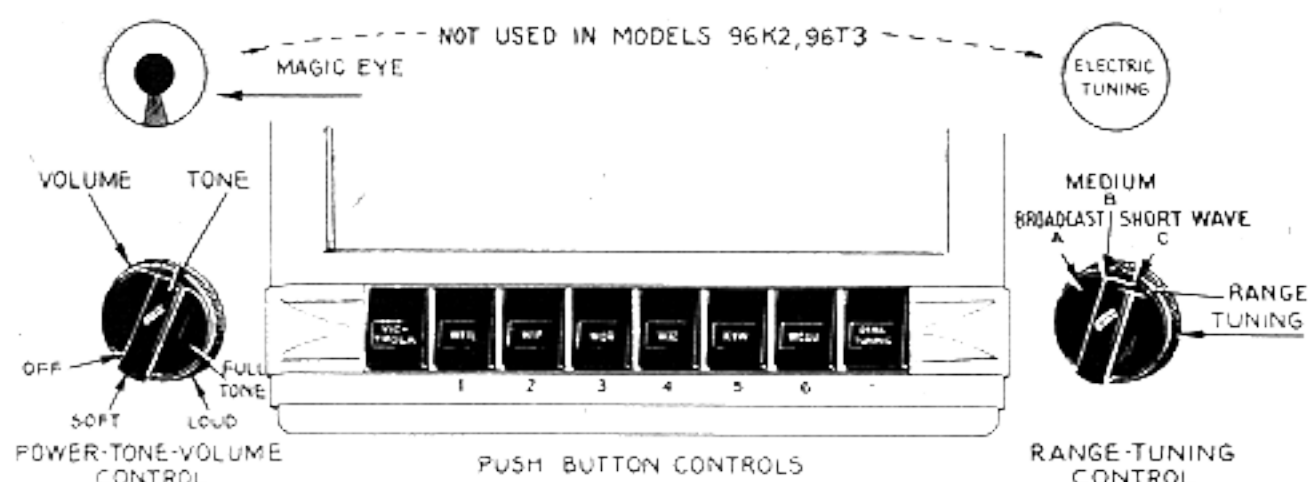


Figure 3—Location of Controls

The left-hand push-button is a Victrola-Attachment switch. The right-hand push-button is for dial tuning.

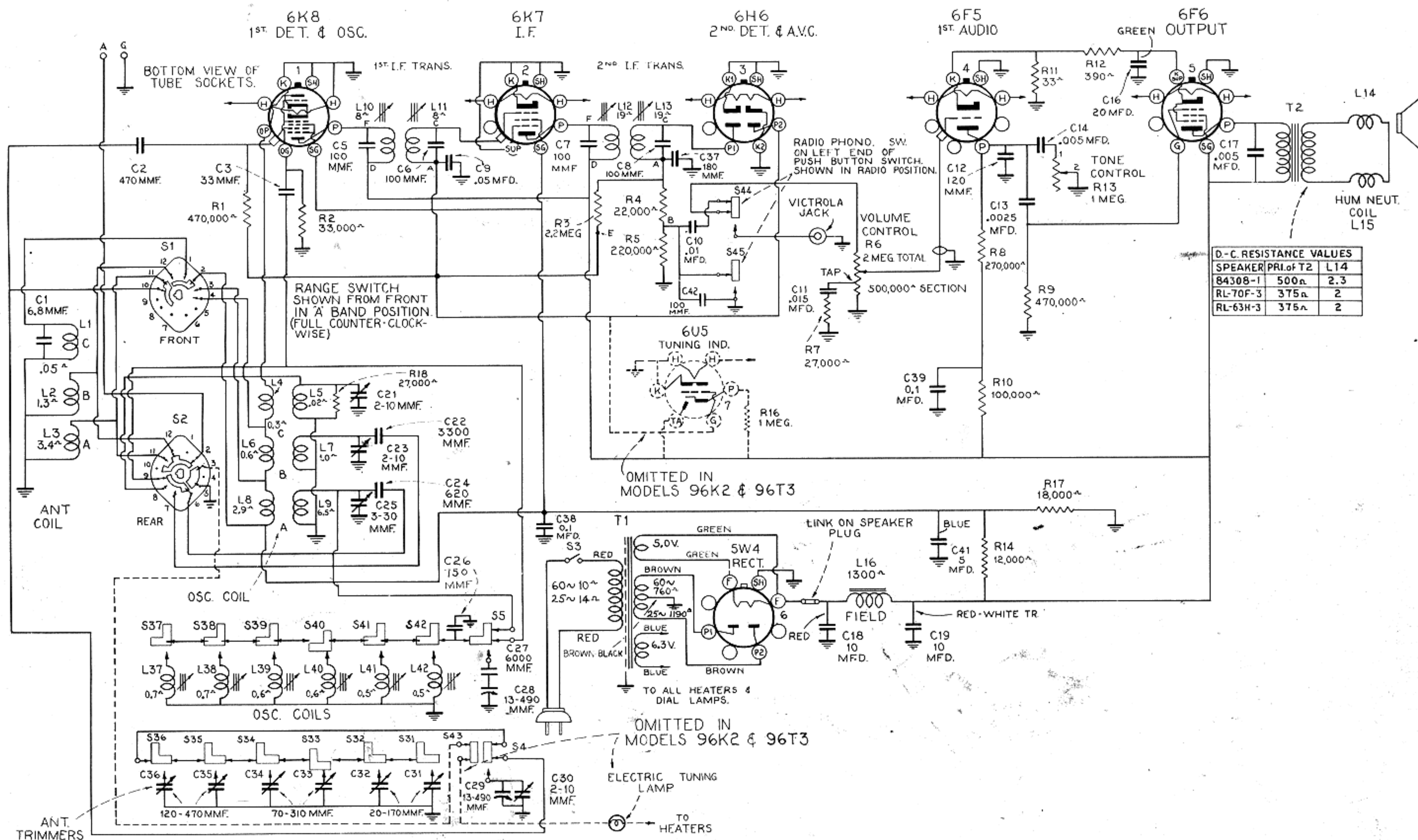


Figure 4—Schematic Circuit Diagram

Precautionary Lead Dress.—

1. Dress power-switch leads against left apron to prevent hum pickup.
2. Dress R1 away from front of chassis.
3. Electric-tuning lamp leads must be dressed in front of range switch.
4. Dress lead from L5 to range switch away from other leads.
5. Dress leads away from antenna coil.
6. Dress other parts and leads away from R14, as it becomes heated.
7. Leads across back of chassis should be dressed under electrolytic to prevent approaching Victrola jack.

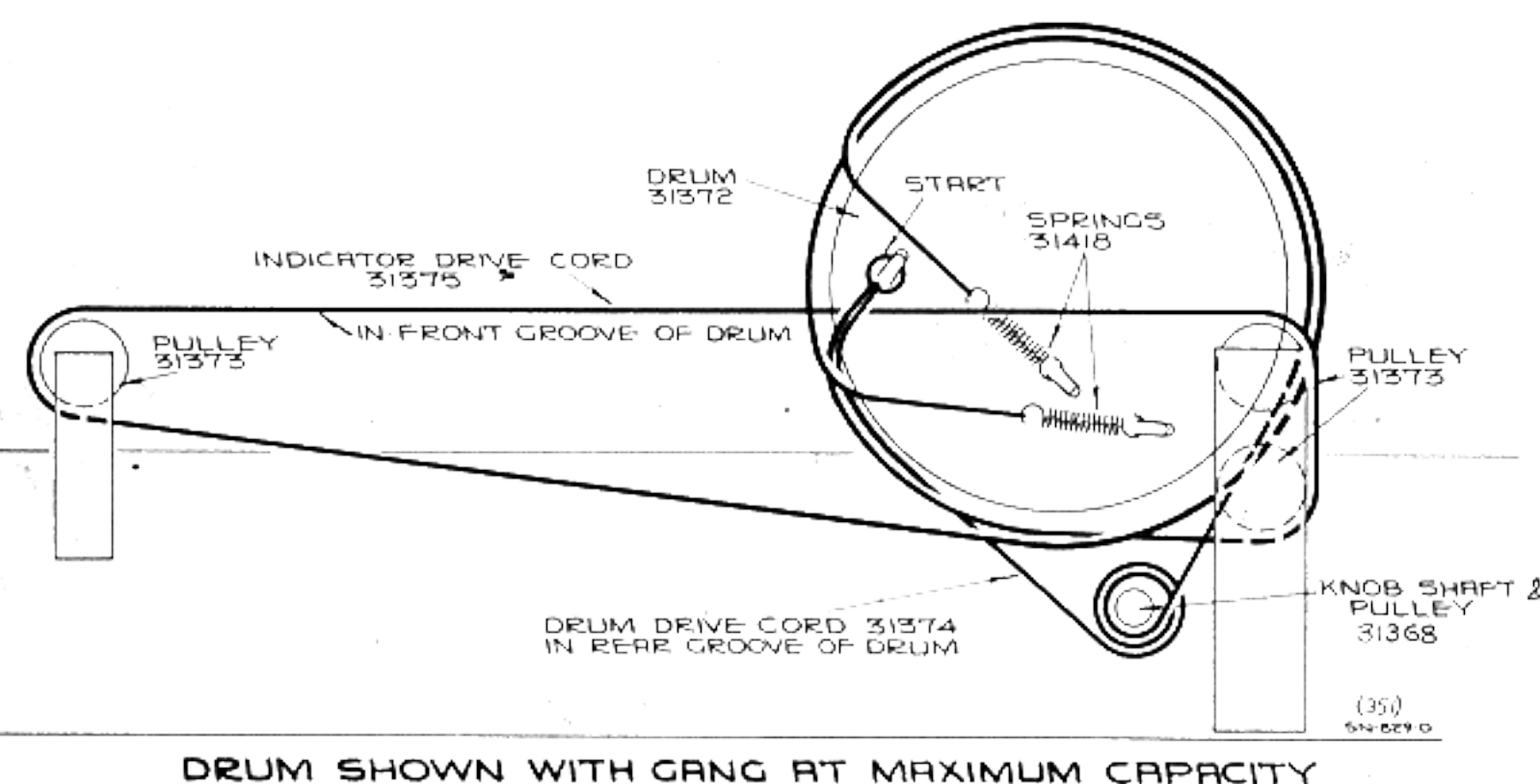
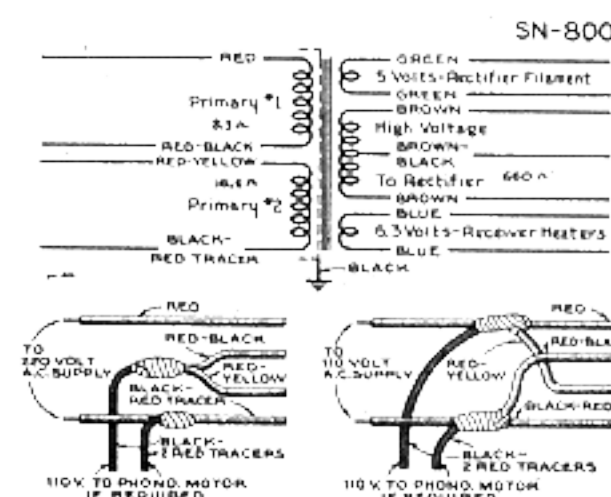
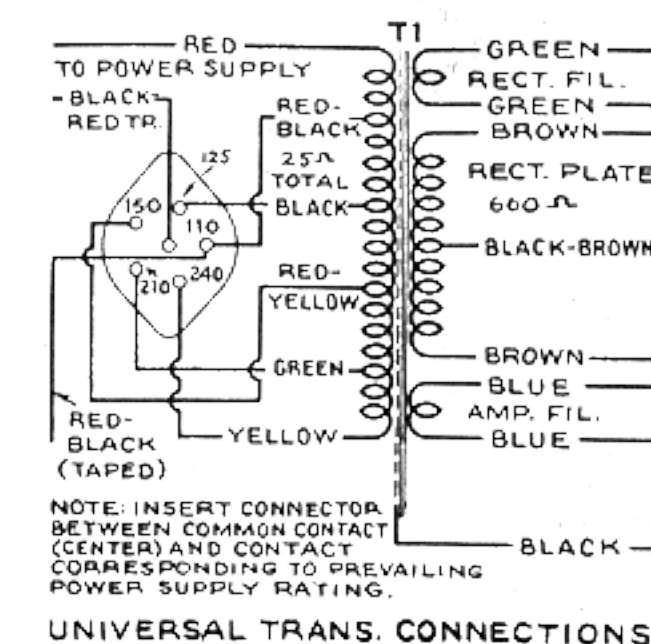
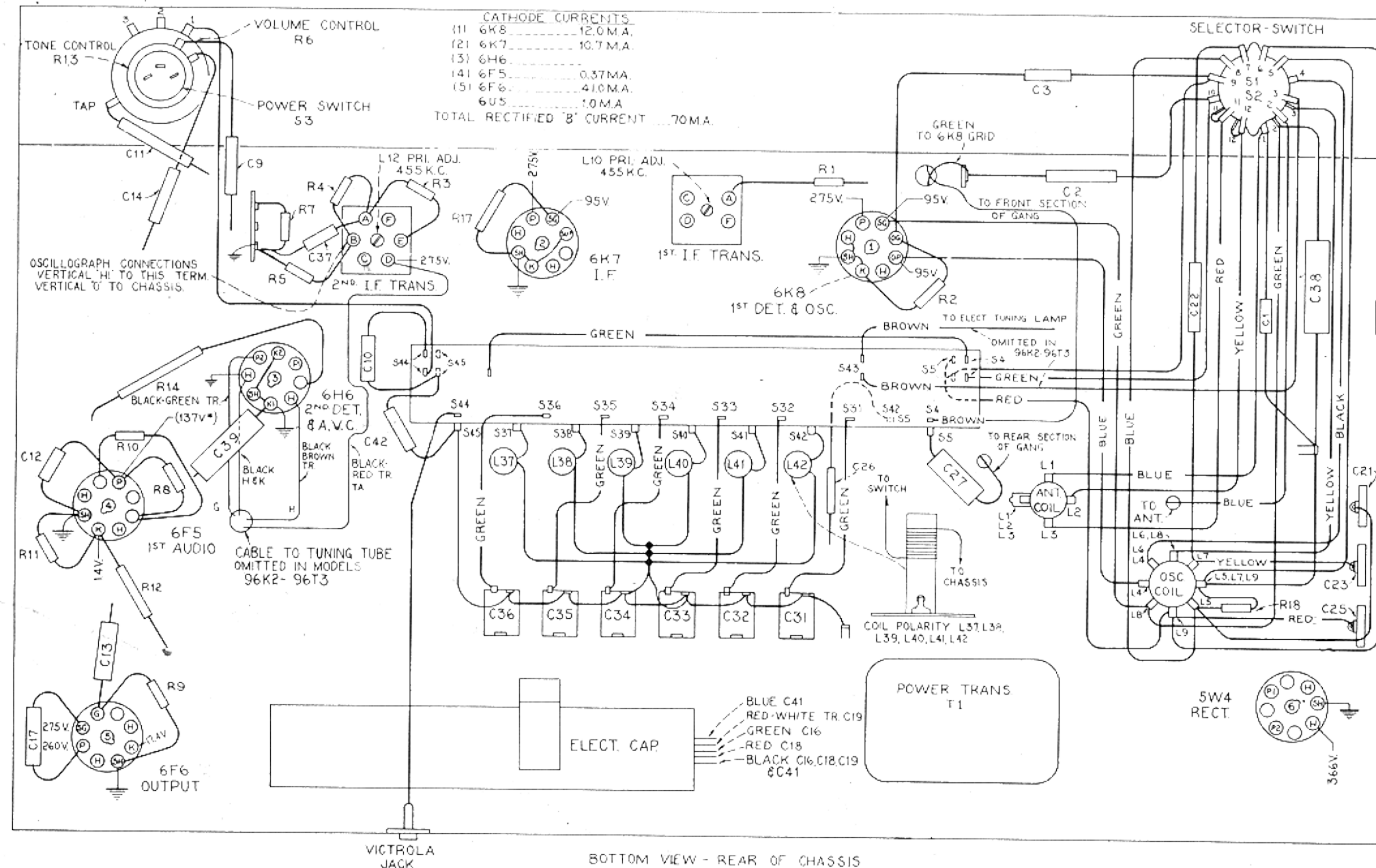
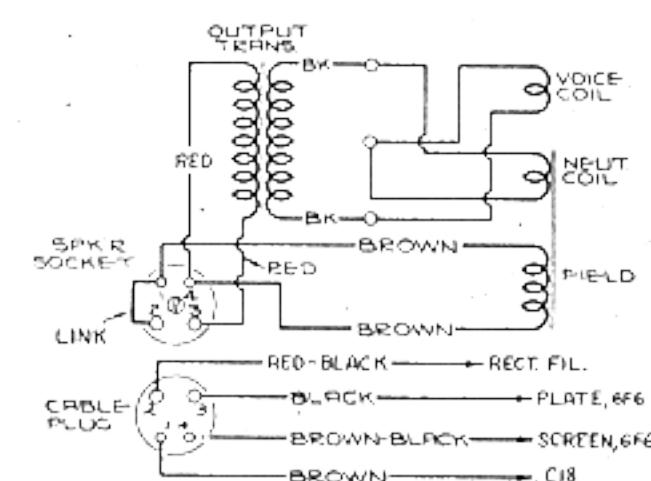


Figure 5—R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within $\pm 20\%$ with 117-volt a-c supply.

* **NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

Figure 6—(At Left) Arrangement of Drive Cords for Tuning Condenser and Dial Indicator



Above — Connections and Colors of Loudspeaker and Cable.

Victrola Attachment.—A jack is provided on the rear of the chassis for connection to a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Loudspeaker.—Centering of the loudspeaker voice coil 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.

REPLACEMENT PARTS

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

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
RECEIVER ASSEMBLIES			31370	Switch—Station selector push-button switch (S4, S5, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45).....	3.85
14517	Board—Antenna ground terminal board.....	.25	30957	Transformer—First i-f transformer (L10, L11, C5, C6).....	1.90
30752	Bracket—Magic Eye bracket and holder — Models 97T, 97KG, and 97E only.....	.25	30903	Transformer—Second i-f transformer (L12, L13, C7, C8).....	1.80
31400	Capacitor—Triple adjustable trimmer two sections 2-10 mmfd., one section 3-30 mmfd. (C21, C23, C25).....	.50	31445	Transformer—Power transformer 100-120 volts, 25-60 cycle (T1).....	7.80
14079	Capacitor—6.8 mmfd. (C1).....	.35	31380	Transformer—Power transformer 100-120 volts, 50-60 cycle (T1).....	6.35
31387	Capacitor—Antenna trimmer capacitor bank 20-470 mmfd. (C31, C32, C33, C34, C35, C36).....	1.30	31446	Transformer—Power transformer 100-120 volts, and 200-240 volts, 50-60 cycle (T1).....	8.05
12948	Capacitor—33 mmfd. (C3).....	.35	SPEAKER ASSEMBLIES		
12720	Capacitor—100 mmfd. (C42).....	.35	Models 96T3 and 97T (Speaker 84308-1)		
30904	Capacitor—100 mmfd. (C5, C6, C7, C8).....	.25	31443	Cone—Speaker cone and voice coil (L14).....	1.40
12724	Capacitor—120 mmfd. (C12).....	.35	31442	Speaker—Complete	4.90
13003	Capacitor—180 mmfd. (C37).....	.35	31444	Transformer—Output transformer (T2).....	1.95
30433	Capacitor—470 mmfd. (C2).....	.35	SPEAKER ASSEMBLIES		
31381	Capacitor—620 mmfd. (C24).....	.45	Models 96K2 and 97KG (Speaker RL-70F-3)		
31435	Capacitor—750 mmfd. (C26).....	.40	13866	Cap—Dust cap for cone center.....	.25
31403	Capacitor—3,300 mmfd. (C22).....	.60	12012	Coil—Field coil (L16).....	2.90
31405	Capacitor—6,000 mmfd. (C27).....	.75	11469	Coil—Hum neutralizing coil (L15).....	.30
5107	Capacitor—.0025 mfd. (C13).....	.20	31275	Cone—Speaker cone and voice coil (L14).....	1.75
4838	Capacitor—.005 mfd. (C14, C17).....	.25	31302	Plug—4-contact male plug.....	.25
14393	Capacitor—.01 mfd. (C10).....	.30	31300	Speaker—Speaker complete.....	10.95
4839	Capacitor—0.1 mfd. (C38, C39).....	.30	14358	Screw—Screw, washer, and lockwasher to hold core in yoke.....	.04
11315	Capacitor—.015 mfd. (C11).....	.20	31301	Transformer—Output transformer (T2).....	1.70
4886	Capacitor—.05 mfd. (C9).....	.20	14357	Washer—Spring washer to hold field coil.....	.06
31371	Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41).....	2.25	SPEAKER ASSEMBLIES		
31382	Chp—Oscillator coil and core mounting clip...	.04	Model 97E (Speaker RL-63H-3)		
31402	Coil—Antenna coil—A, B, and C bands (L1, L2, L3).....	1.15	14356	Board—3-contact speaker terminal board.....	.15
31401	Coil—Oscillator coil—A, B, and C bands (L4, L5, L6, L7, L8, L9).....	2.00	13866	Cap—Cone center dust cap.....	.25
31383	Coil—Oscillator coil—A band (L41, L42).....	.30	12012	Coil—Field coil (L16).....	2.90
31384	Coil—Oscillator coil—A band (L39, L40).....	.30	11469	Coil—Hum neutralizing coil (L15).....	.30
31385	Coil—Oscillator coil—A band (L37, L38).....	.30	31310	Cone—Speaker cone and voice coil (L14).....	1.75
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30).....	2.65	31826	Plug—4-contact male plug for speaker.....	.30
31366	Control—Volume control, tone control, and on-off switch (R6, R13, S3).....	3.00	14358	Screw—Screw, washer, and lockwasher to hold core in yoke.....	.04
31375	Cord—Indicator pointer drive cord.....	.30	31824	Speaker—Complete	10.45
31374	Cord—Variable condenser drum drive cord...	.15	14355	Transformer—Output transformer (T2).....	2.00
30905	Core—Adjustable core and stud for i-f transformer	.35	14357	Washer—Spring washer to hold field coil.....	.06
31386	Core—Adjustable core and stud for oscillator coil Stock Nos. 31383, 31384, and 31385.....	.15	MISCELLANEOUS ASSEMBLIES		
31372	Drum—Variable condenser drive cord drum and calibrator dial.....	.65	31397	Button—Station selector push button.....	.15
31480	Lamp—Dial lamp.....	.20	31456	Cover—8 protective covers for push button markers	.08
5040	Plug—4-contact female plug for speaker cable..	.30	31406	Dial—Station selector dial scale.....	.90
31373	Pulley—Indicator drive cord pulley.....	.08	31543	Disc—"Electric Tuning" indicator disc—Models 97T, 97KG, and 97E only.....	2.75
14671	Resistor—33 ohms, $\frac{1}{4}$ watt (R11).....	.20	31395	Escutcheon—Station selector escutcheon—less dial scale and push buttons.....	1.15
31388	Resistor—390 ohms, 1 watt (R12).....	.22	31407	Escutcheon—"Magic Eye and Electric Tuning" indicator escutcheon—Models 97T, 97KG, and 97E only.....	.60
31389	Resistor—12,000 ohms, wire wound, 5 watts (R14).....	.50	31392	Indicator—Station selector indicator pointer...	.30
30151	Resistor—18,000 ohms, 1 watt (R17).....	.22	31355	Knob—Range switch knob.....	.12
14284	Resistor—22,000 ohms, $\frac{1}{10}$ watt (R4).....	.15	14359	Knob—Station selector knob.....	.20
12738	Resistor—27,000 ohms, $\frac{1}{4}$ watt (R7, R18).....	.20	31391	Knob—Tone control knob.....	.15
12454	Resistor—33,000 ohms, $\frac{1}{4}$ watt (R2).....	.20	30773	Knob—Volume control knob.....	.15
14560	Resistor—100,000 ohms, $\frac{1}{4}$ watt (R10).....	.20	31589	Marker—Station call letter markers for push buttons	.35
12264	Resistor—220,000 ohms, $\frac{1}{4}$ watt (R5).....	.20	31458	Marker—"Dial Tuning" marker for push button	.01
12199	Resistor—270,000 ohms, $\frac{1}{4}$ watt (R8).....	.20	31457	Marker—"Victrola" marker for push button...	.01
12285	Resistor—470,000 ohms, $\frac{1}{4}$ watt (R1, R9).....	.20	31393	Screen—Station selector dial color screen and light diffuser.....	.40
12013	Resistor—1 meg., $\frac{1}{10}$ watt (R16)—Models 97T, 97KG, and 97E.....	.15	11377	Screw—Chassis mounting screws, washers, and lockwashers—Models 96K2, and 97KG only (3 required).....	.03
12679	Resistor—2.2 meg., $\frac{1}{4}$ watt (R3).....	.20	31390	Screw—Chassis mounting screws, washers, and lockwashers—Models 96T3, and 97T only (sufficient for 1 chassis).....	.10
14343	Retainer—Retaining spring for station selector knob shaft.....	.03	11210	Screw—Chassis mounting screws, washers, and lockwashers—Model 97E only (3 required)..	.05
14887	Retainer—Drive cord pulley retainer.....	.01	4982	Spring—Retaining spring for knob Stock No. 14359	.05
4669	Screw—No. 8-32 square head set screw for drum Stock No. 31372.....	.03	14270	Spring—Retaining spring for knob Stock Nos. 31355 and 30773.....	.05
31368	Shaft—Station selector knob shaft and pulley..	.30	30330	Spring—Retaining spring for knob Stock No. 31391	.03
31418	Spring—Indicator, or drum drive cord tension spring	.05	31394	Stop—Indicator pointer slide stop.....	.08
31364	Socket—Dial lamp socket.....	.20			
31365	Socket—"Electric Tuning" indicator lamp insulated socket.....	.30			
13871	Socket—Magic Eye socket—Models 97T, 97KG, and 97E only.....	.45			
14278	Socket—Pickup socket.....	.25			
31251	Socket—Radiotron socket.....	.25			
31398	Switch—Range switch (S1, S2).....	1.25			

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.