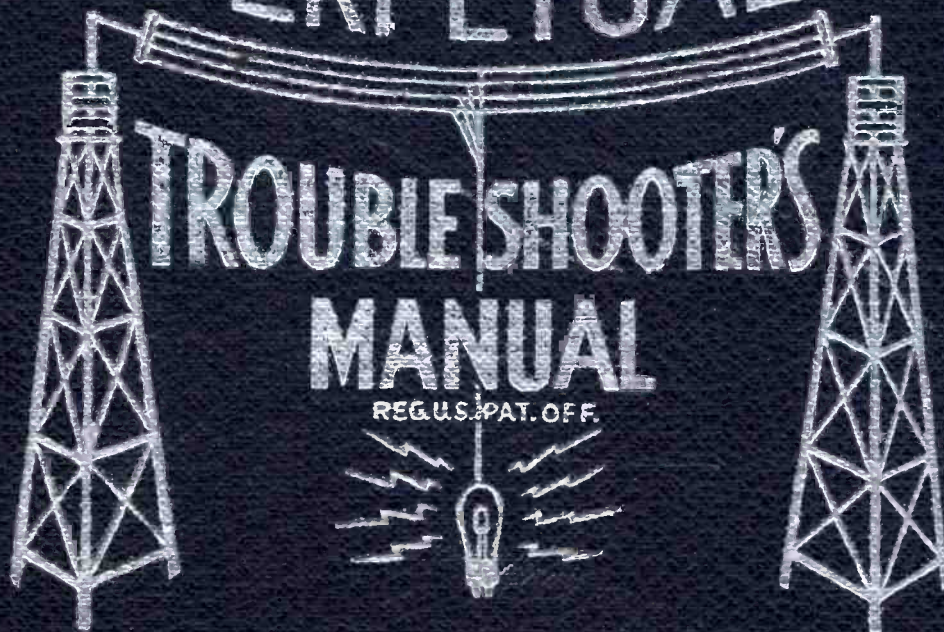


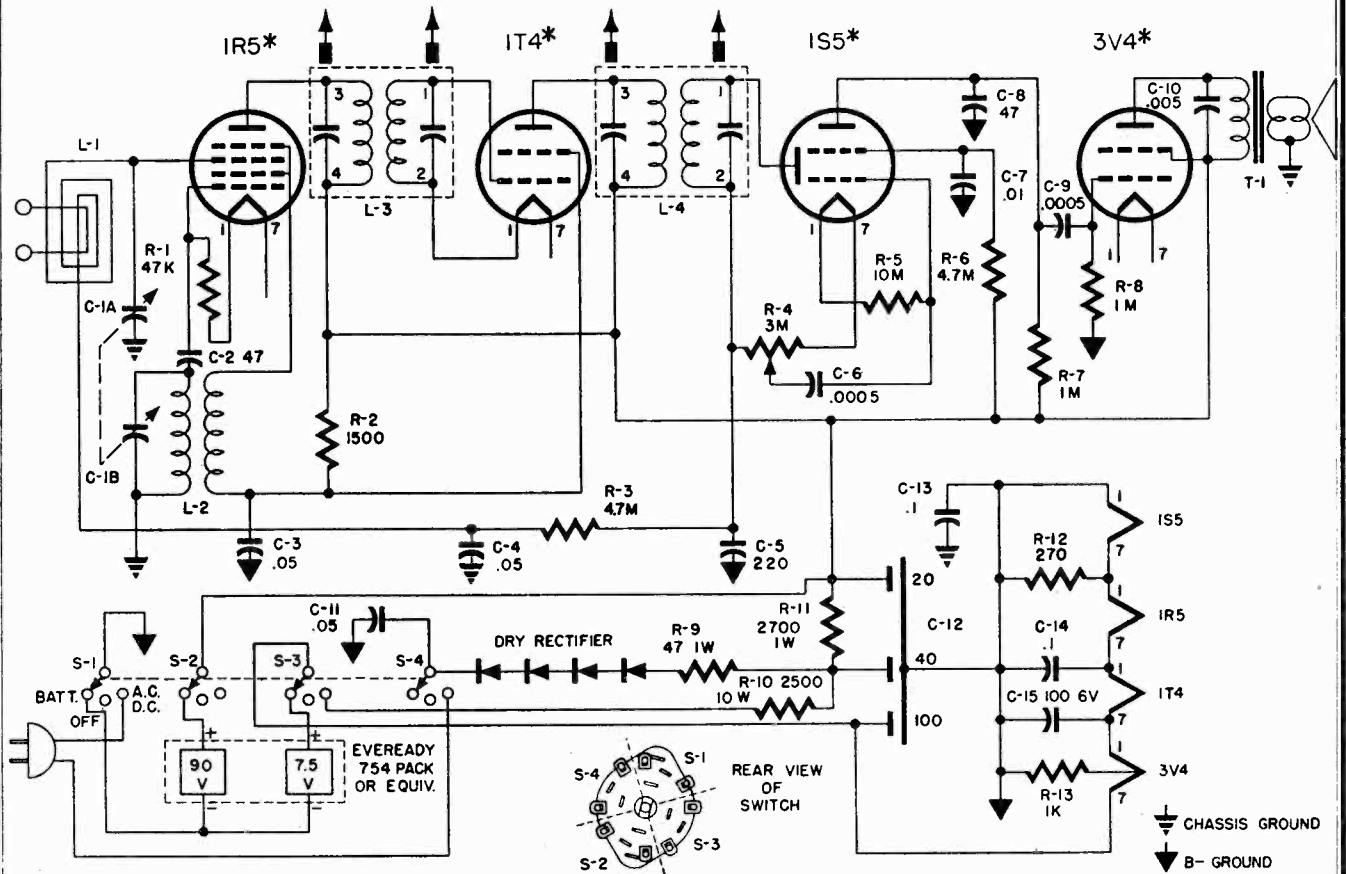
**VOLUME XVII**

**PERPETUAL**

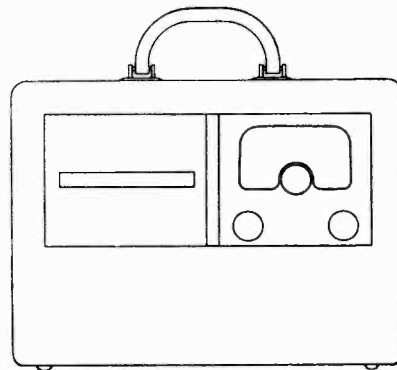


**JOHN F. RIDER**





\* SUPPRESSOR GRIDS TIED INTERNALLY AND NOT SHOWN IN SCHEMATIC IF PEAK 455 KC

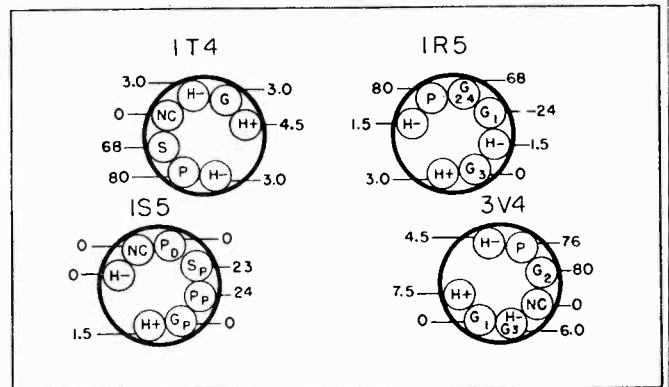


**STAGE GAIN MEASUREMENTS**

- Standard Output . . . 50 mw
- Dummy Antenna . . . .01 mfd.
- Volume Control . . . Maximum
- Converter grid to 1st I.F. grid . . . 51 X at 1000 KC
- Converter grid to 1st I.F. grid . . . 65 X at 455 KC
- 1st I.F. grid to 2nd detector . . . 55 X at 455 KC
- Overall audio gain . . . .014V at 1S5 grid — 100 mw output 400 cycles

**D.C. Resistance Measurements**

- |                             |  |                            |
|-----------------------------|--|----------------------------|
| <b>1st I.F. Coil</b>        |  | <b>Oscillator Coil</b>     |
| Primary . . . . . 20 ohms   |  | Primary . . . . . 3 ohms   |
| Secondary . . . . . 20 ohms |  | Secondary . . . . . 7 ohms |
| <b>2nd I.F. Coil</b>        |  |                            |
| Primary . . . . . 15 ohms   |  |                            |
| Secondary . . . . . 15 ohms |  |                            |



**TUBE VOLTAGE CHART**

NOTE: VOLTAGES TAKEN FROM B- WITH V.T.V.M.—NO SIGNAL

MODEL 471

PACKARD-BELL COMPANY

SERVICE DATA — MODEL 471

REPLACEABLE PARTS LIST — MODEL 471

PART NO.	REF. SYMBOL	DESCRIPTION	PART NO.	REF. SYMBOL	DESCRIPTION
23502H	C-1A	Capacitor, variable	73059	R-5	Resistor, carbon: 10 megohm, ½ watt, 20%
	C-2A		73057	R-6	Resistor, carbon: 4.7 megohm, ½ watt, 20%
23912	C-2	Capacitor, ceramic: 47 mmfd. 20%	73053	R-7	Resistor, carbon: 1 megohm, ½ watt, 20%
23909	C-3	Capacitor, tubular: .05 - 400V	73053	R-8	Resistor, carbon: 1 megohm, ½ watt, 20%
23917	C-4	Capacitor, tubular: .05 - 200V	73086	R-9	Resistor, carbon: 47 ohms, 1 watt, 10%
23915	C-5	Capacitor, ceramic: 220 mmfd. - 20%	73917	R-10	Resistor, carbon: 2500 ohms, 10 watts, 5%
23908	C-6	Capacitor, tubular: .0005 - 600V	73128	R-11	Resistor, carbon: 2700 ohms, 2 watts, 10%
23922	C-7	Capacitor, tubular: .01 - 400V	73018	R-12	Resistor, carbon: 270 ohms, ½ watt, 10%
23912	C-8	Capacitor, ceramic: 47 mmfd. 20%	73025	R-13	Resistor, carbon: 1000 ohms, ½ watt, 10%
23903	C-9	Capacitor, tubular: .0005 - 600V	86015	S-1	Switch, A.C. D.C. Batt. Off.
23904	C-10	Capacitor, tubular: .005 - 600V	89414A	T-1	Transformer, output
23909	C-11	Capacitor, tubular: .05 - 400V	21085		Cabinet
24007A	C-12	Capacitor, electrolytic: 40-20 150 V 100 12V	32011		Cord, A. C.
23919	C-13	Capacitor, tubular: .1 - 200V	38067		Dial
23919	C-14	Capacitor, tubular: .1 - 200V	41013		Escutcheon, name plate
24040	C-15	Capacitor, electrolytic, 100 mmfd. 6V	48005		Grommet, fibre
23922	L-1	Coil, loop	52001A		Knob
29210	L-2	Coil, oscillator	55001B		Crystal
29009	L-3	Coil, 1st I.F.	66018		Plug, battery
29009	L-4	Coil, 2nd I.F.	87028		Pointer
73945	R-1	Resistor, carbon: 47K ½ watt, 10%	72001		Rectifier, selenium
73027	R-2	Resistor, carbon: 1500 ohms, ½ watt 10%	79013		Socket, A.C.
73057	R-3	Resistor, carbon: 4.7 megohm ½ watt 20%	79024		Socket, tube
25005A	R-4	Control, volume: 3 megohms	83300		Speaker

Electrical Rating:  
Line Voltage . . . . . 105 to 120 volts, 50-60 cycle, A.C. D.C.  
Power Consumption . . . . . 11 watts

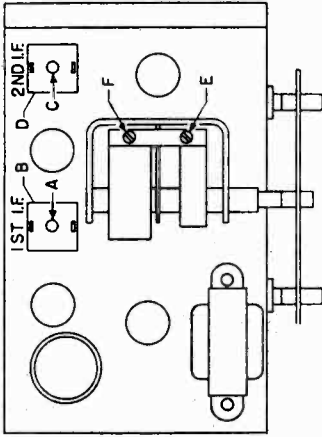
Tuning Frequency Range:  
540 to 1620 KC

Intermediate Frequency  
455 KC

Electrical Power Output:  
Maximum . . . . . 2 watts

Loudspeaker:  
Type . . . . . Permanent Magnet  
Outside Cone Diameter . . . . . 6"  
Voice Coil Impedance . . . . . 3.2 ohms at 400 cycles  
Magnet Rating . . . . . 2.5 oz. Alnico No. 5

TRIMMER LOCATIONS



ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAX. OUTPUT
1	Conv. Grid 01 Mfd. Dum. Ant.	455 KC	1620 KC	I.F. Trimmers A, B, C, D
2	Conv. Grid 01 Mfd. Dum. Ant.	1620 KC	1620 KC	Oscillator Trimmer E
3	*Standard Test Loop	1500 KC	1500 KC	Ant. Trimmer F
4	*Standard Test Loop	600 KC	600 KC	Loop
5	Repeat Step No. 3			

NOTE: Hazeltine Test Loop No. 1150 or equivalent.

ALIGNMENT PROCEDURE

Alignment procedure consists of the four steps outlined in the Alignment Procedure Chart.

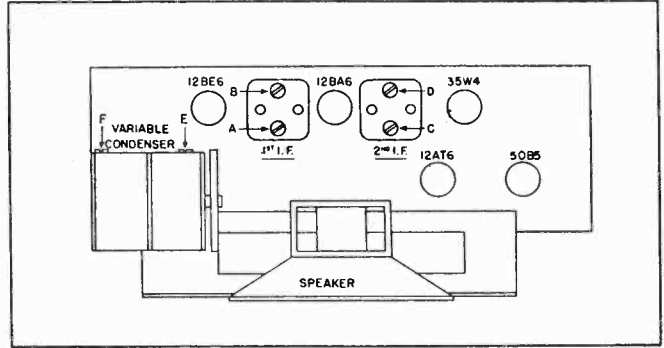
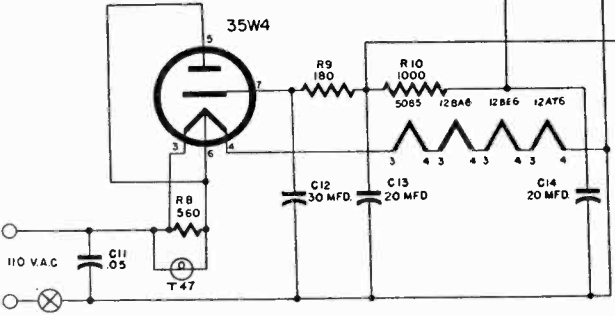
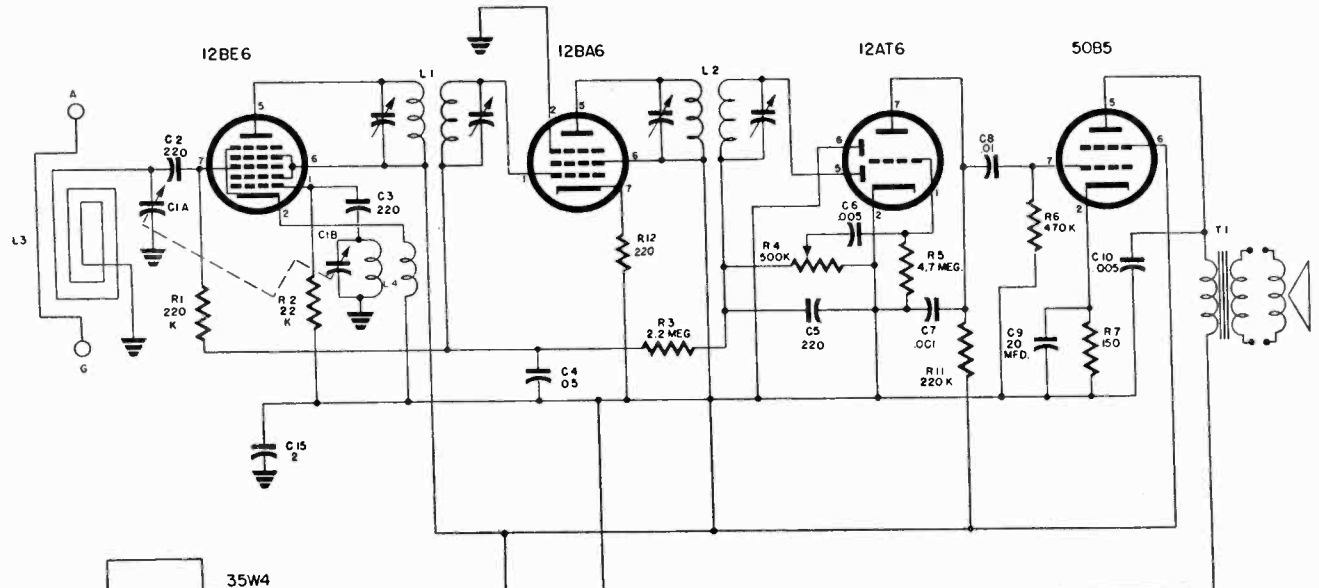
Connect the test oscillator leads to the mixer grid and B— in series with a .01 mfd. capacitor (dummy load) for step No. 1, I.F. alignment.

Upon completion of the I.F. alignment, the variable condenser should be rocked to assure that the I.F.s have not been aligned to the image frequency.

The procedure outlined in steps 2 to 4 utilizes a standard test loop\*

Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

\*NOTE: Hazeltine Test Loop No. 1150 or equivalent



TRIMMER LOCATIONS

**ALIGNMENT PROCEDURE**

Alignment procedure consists of four steps outlined in the Alignment Procedure Chart.

For step No. 1, I.F. alignment, connect the leads of a test oscillator to the mixer grid and the common return through an .01 mfd. capacitor (dummy load). Upon completion of this step, "rock" the variable condenser to assure that the I.F.'s have been aligned to the correct frequency. Output should remain constant at any setting of the variable condenser.

Steps 2 to 4 employ a Hazeltine Standard Test Loop No. 1150, or a reasonable substitute. Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

**IMPORTANT NOTICE:** Make certain that each step is done with a minimum input signal.

**ALIGNMENT CHART**

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAX. OUTPUT
1	Mixer Grid & Grd. .01 Mfd. Cap.	455 KC	540 KC	Trimmers A, B, C & D
2	Standard* Test Loop	1620 KC	1620 KC	Trimmer E to 1620 KC
3	Standard* Test Loop	1500 KC	1500 KC	Trimmer F
4	Standard* Test Loop	600 KC	600 KC	Variable Plates

NOTE: Hazeltine Standard Test Loop No. 1150 or a reasonable substitute.

**Electrical Rating**

Line Voltage . . . . . 110-120 volts, 50-60 cycle AC  
 Power Consumption . . . . . 28 watts

**Tuning Frequency Range**

Standard Broadcast . . . 540 to 1620 KC

**Intermediate Frequency**

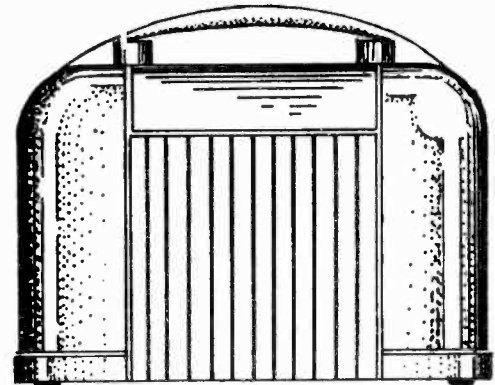
455 KC

**Electrical Power Output**

Maximum . . 1.75 watts

**Loudspeaker**

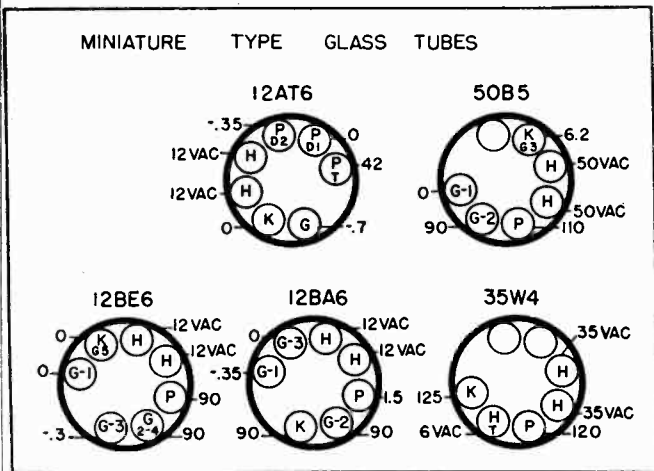
Type . . . Permanent Magnet  
 Outside Cone Diameter . . . 5"  
 Voice Coil Impedance . . . . . 3.2 ohms at 400 cycles  
 Magnet Rating . . . 1 oz. Alnico 5





REPLACEABLE PARTS LIST

PART NO.	SYMBOL	DESCRIPTION	PART NO.	SYMBOL	DESCRIPTION
23522	C-1	Capacitor, variable, 2 gang	73077	R-9	Resistor, 180 ohm, 1 w, 10%
23228	C-2	Capacitor, 220 mmfd.	73071	R-10	Resistor, 1000 ohm, 1 w, 10%
	C-3		73049	R-11	Resistor, 220 K, ohms, 1/2 w, 20%
	C-5		73017	R-12	Resistor, 220 ohm, 1/2 w, 10%
	C-11		54002	T-47	Lamp, dial
23009	C-4	Capacitor, .05 mfd. 400 V	89411	T-1	Transformer, output
23004	C-6	Capacitor, .005 mfd. 600 V	18098A		Bracket, Dial
	C-10		21048	571	Cabinet, plastic (specify color)
23001	C-7	Capacitor, .001 mfd. 600 V	21049	572	Cabinet, wood (specify finish)
23006	C-8	Capacitor, .01 mfd. 600 V	28022		Clip, dial
24032	C-9	Capacitor, electrolytic, 30X20X20-150 V 20-25V	32011		Cord, A. C. (specify color)
	C-12		38079	571	Dial, paper
	C-13		38080	572	Dial, paper
	C-14		47001	572	Grille
23018	C-15	Capacitor, 2 mfd. 200 V	49004G	572	Handle, plastic (10% inch)
29014B	L-1	Coil, 1st I.F.	4900IF	572	Handle, plastic (9% inch)
29015B	L-2	Coil, 2nd I.F.	49002D	571	Handle, metal
29317	L-3	Coil, loop	49008N	571	Handle, insert
29206	L-4	Coil, oscillator	52015B	572	Knob, 1/2" shank (specify col.)
73041	R-2	Resistor, 22 K ohms, 1/2 w, 20%	52032	571	Knob, 1/4" shank (specify col.)
73055	R-3	Resistor, 2.2 megohms, 1/2 w, 20%	55002	571	Crystal, dial
25014	R-4	Control, volume, 500 K	55013	572	Crystal, dial
73057	R-5	Resistor, 4.7 megohms, 1/2 w 20%	67021		Pointer, dial
73051	R-6	Resistor, 470 K, 1/2 w, 20%	69013A		Pulley, dial
73081	R-7	Resistor, 150 ohm, 1 w, 10%	79033		Socket, dial lamp
73022	R-8	Resistor, 560 ohm, 1/2 w, 10%	83004	571	Speaker
			83202	572	Speaker



TUBE VOLTAGE CHART

SPECIAL SERVICE INFORMATION

\*Stage Gain Measurements  
 Dummy Antenna . . . 200 mmf.  
 Standard Output . . . 50 mw.  
 Volume Control . . . maximum  
 Ant. terminal to converter grid . . . 27X at 1000 kc.  
 Converter grid to 1st I.F. grid . . . 75X at 455 kc.  
 1st I.F. grid to 2nd detector . 650X at 5 watts 400 cps.

\*NOTE: Measurements with A.C. V.T.V.M. AVC shorted out.

Oscillator Cathode Voltages

117 AC line voltage  
 1620 KC . . . 2.0 volts A.C.\*  
 1200 KC . . . 1.9 volts A.C.\*  
 750 KC . . . 1.7 volts A.C.\*  
 540 KC . . . 1.5 volts A.C.\*

\*NOTE: Measurements made with A.C. V.T.V.M. Input loading above 10 megohms.

D.C. Resistance Measurements

1st I.F. Coil  
 primary . . . . 21 ohms secondary . . . . 21 ohms

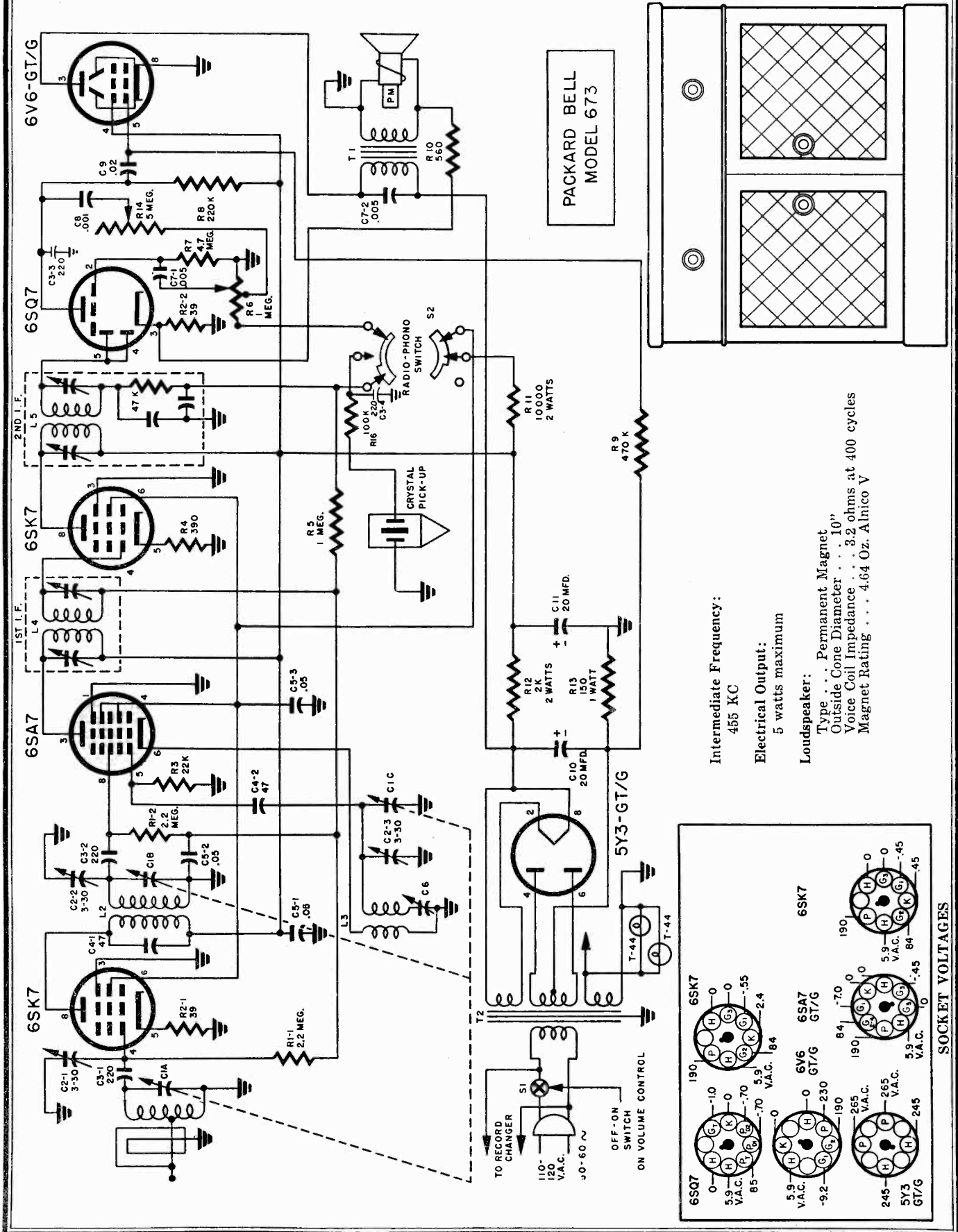
2nd I.F. Coil  
 primary . . . . 21 ohms secondary . . . . 21 ohms  
 Oscillator Coil  
 secondary . . . . 6 ohms primary . . . . .75 ohms

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to ground buss. A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to ground buss.

Volume control maximum, no signal, 117 volts A.C. line voltage. All voltages shown are positive D.C. unless otherwise noted.

PACKARD-BELL COMPANY

MODEL 673

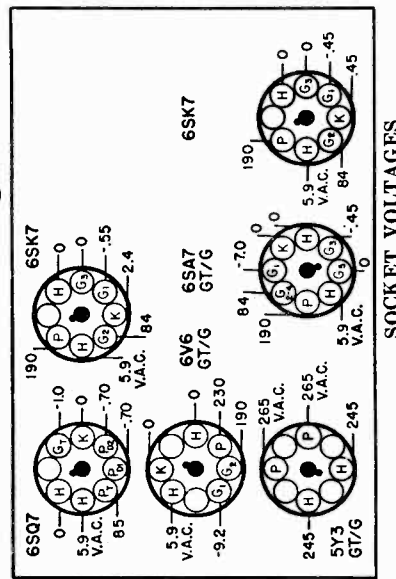


PACKARD BELL  
MODEL 673

Intermediate Frequency:  
455 KC

Electrical Output:  
5 watts maximum

Loudspeaker:  
Type . . . Permanent Magnet  
Outside Cone Diameter . . . 10"  
Voice Coil Impedance . . . 3.2 ohms at 400 cycles  
Magnet Rating . . . 4.64 Oz. Alnico V



SOCKET VOLTAGES

SPECIAL SERVICE INFORMATION

D.C. Resistance Measurements:  
1st & 2nd I.F. Coils

D.C. Resistance Measurements:  
1st & 2nd I.F. Coils  
Primary . . . 17 ohms

Oscillator Coil  
Primary . . . . . 1 ohm  
Secondary . . . . . 6 ohms

R.F. Coil  
Primary . . . . . 58 ohms  
Secondary . . . . . 4.2 ohms

NOTE: To obtain the true reading of the secondary of the 2nd I.F. Coil, it must be removed from the can.

This is so because of the 47K resistor inside the can.

NOTICE: The D.C. Resistance measurements on all coils are subject to a 20% tolerance due to the variation of winding methods.

STAGE GAIN MEASUREMENTS:

Measurements taken with volume and tone controls maximum.

Switch in RADIO position.

AVC shorted out.

Standard Output . . . 50 milliwatts

Dummy Antenna . . . 200 Mmf.

Antenna to R.F. Grid . . . 6X at 1000 KC  
R.F. Grid to Converter Grid . . . 7X at 1000 KC  
Converter Grid to 1st I.F. Grid . . . 46X at 455 KC  
1st I.F. Grid to 2nd Detector . . . 62X at 455 KC  
Overall Audio Gain . . . 320X at .5 watts 400 cycles

OSCILLATOR CATHODE VOLTAGES:

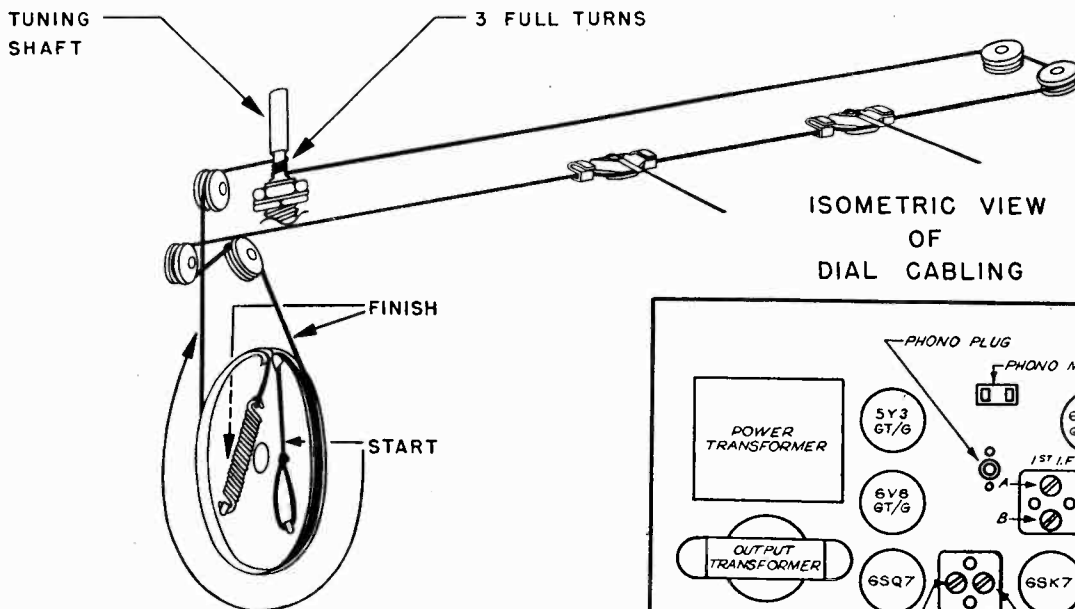
Measured at 120 volts AC line voltage with AC vacuum tube voltmeter input loading above 10 megohms.

1500 KC . . . 2.25 volts AC

1000 KC . . . 2.15 volts AC

800 KC . . . 2.3 volts AC

600 KC . . . 2.5 volts AC



ALIGNMENT PROCEDURE

Alignment Procedure consists of the 5 steps outlined in the Alignment Procedure Chart.

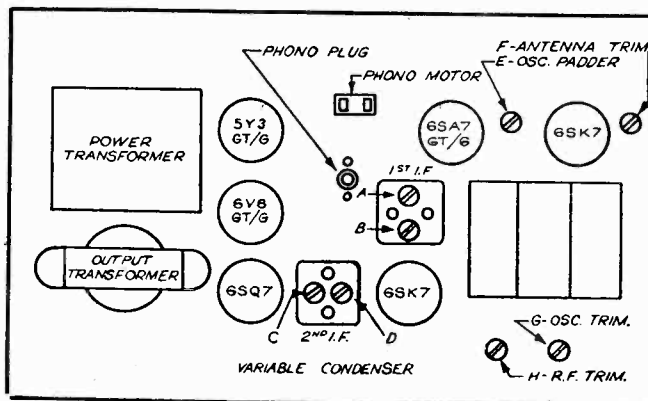
Connect the test oscillator leads to the mixer grid and ground in series with an .01 Mfd. capacitor (dummy load) for step No. 1, I.F. Alignment. Upon completion of this step "Rock" the variable condenser to assure that the I.F.s have been aligned to the correct frequency. Output should remain constant for any setting of variable capacitor.

Use the Hazeltine Standard Test Loop No. 1150, or a reasonable substitute, for the balance of the alignment. Place the test loop about two feet from the receiver loop in a vertical position.

It will be noted that all alignment trimmers are accessible without removing the chassis from the cabinet.

IMPORTANT NOTICE: Make certain that each alignment is done with a minimum input signal.

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis. — A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to chassis. — Volume and tone controls maximum. — Switch in Radio position. — No signal. — All voltages shown are positive D.C. unless otherwise noted.



TRIMMER LOCATION

ALIGNMENT CHART

CONNECT TEST OSC. STEP	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAX. OUTPUT
1 Mixer Grid & Grd. (.01 Mfd. Cap.)	455KC	540 KC	Trimmers A, B, C & D
2 Standard Test Loop*	1620 KC	1620 KC	Trimmer G to 1620 KC
3 Standard Test Loop*	600 KC	Rock Variable	Padder E
4 Standard Test Loop*	1500 KC	1500 KC	Trimmers F & H
5 Repeat Steps 2, 3, & 4			

NOTE: Hazeltine Test Loop No. 1150 (or a reasonable substitute)

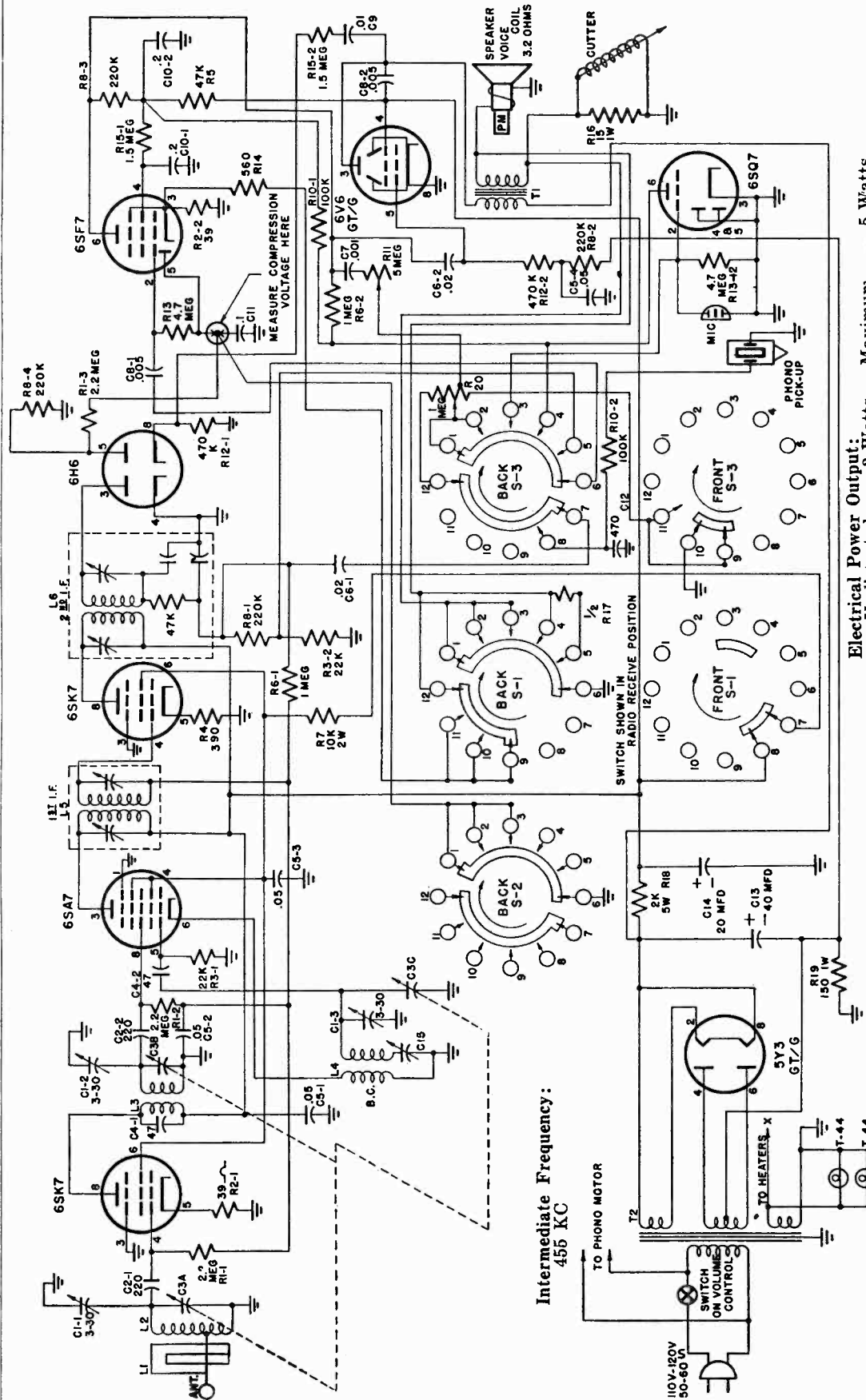


PACKARD-BELL COMPANY

MODEL 673

TABLE OF REPLACEABLE PARTS

PART NO.	REF. SYMBOL	DESCRIPTION	PART NO.	REF. SYMBOL	DESCRIPTION
19010		Bushing, drive	73041	R3	Resistor, carbon: 22,000 ohms, 10%, 1/2 watt
21036G		Cabinet	73020	R4	Resistor, carbon: 390 ohms, 10%, 1/2 watt
23500C	C1A, B & C	Capacitor, variable: 3 gang	73053	R5	Resistor, carbon: 1 meg., 20%, 1/2 watt
23401	C2-1	Capacitor, trimmer: 3-30 Mmfd.	25010B	R6 & S1	Control, volume: 1 meg. tapped at 200,000 ohms; with A.C. switch
23406	C2-2	Capacitor, trimmer: 3-30 Mfd.	73057	R7	Resistor, carbon: 4.7 meg. 20%, 1/2 watt
23228	C3-1	Capacitor, mica: 220 Mfd. 20%	73049	R8	Resistor, carbon: 220,000 ohms, 20%, 1/2 watt
23225	C3-2	Capacitor, mica: 47 Mmfd. 20%	73051	R9	Resistor, carbon: 470,000 ohms, 20%, 1/2 watt
23009	C4-1	Capacitor, paper: .05 Mfd. 400 V	73022	R10	Resistor, carbon: 560 ohms, 10%, 1/2 watt
	C4-2		73125	R11	Resistor, carbon: 10,000 ohms, 10%, 2 watt
23402	C5-1	Capacitor, padder: 300-800 Mmfd.	73214	R12	Resistor, carbon: 2000 ohms, 10%, 2 watt
23004	C5-2	Capacitor, paper: .05 Mfd. 600 V	73081	R13	Resistor, carbon: 150 ohms, 10%, 1 watt
	C5-3		25506B	R14	Control, tone: 5 meg.
23001	C6	Capacitor, paper: .001 Mfd. 600 V	73911	R15	Resistor, wire wound: 50 ohms, 10 watt
23007	C7-1	Capacitor, paper: .02 Mfd. 600 V	73047	R16	Resistor, carbon: 100,000 ohms, 20%, 1/2 watt
24001-3	C7-2	Capacitor, electrolytic: 20 Mfd. 450 V	77014E		Shaft, dial
24003	C10	Capacitor, electrolytic: 20 Mfd. 350 V	78028		Shield, light
29310A	L1	Loop antenna, high impedance	79002		Socket, tube: 8 prong octal, wafer type
29102A	L2	Coil, R.F.	79004		Socket, antenna
29205A	L3	Coil, oscillator	79005		Socket, phono
29004D	L4	Coil, 1st I.F.: 455 KC	79007		Socket, A. C.
29007	L5	Coil, 2nd I.F.: 455 KC	79010B		Socket, dial lamp: bayonet base
32003C		Cord, A.C.: 8'	83703		Speaker, permanent magnet: 10"
34002D		Cover, volume control	84001B		Spring, dial cord
38034A		Dial scale	84003A4		Spring, knob
40002		Dial drive cord	84015		Spring, conical: changer mounting
52001A		Knob, plastic	86008		Switch, rotary: wafer type, single section, phono-radio
54001		Dial lamp, bayonet base: 250 MA	89409C	T1	Transformer, output
58008		Record changer	89010A	T2	Transformer, power
59001		Needle, phono: permanent			
63008A		Crystal, pickup (Shure P-94)			
65032		Plate, front			
66004		Plug, speaker & phono			
66005		Plug, antenna			
66008		Plug, A.C.			
67004		Pointer slide			
67014		Pointer, wire			
73055	R1-1	Resistor, carbon: 2.2 meg. 20%, 1/2 watt			
	R1-2				
73008	R2-1	Resistor, carbon, 39 ohms, 10%, 1/2 watt			
	R2-2				



Intermediate Frequency:  
455 KC

Electrical Power Output:  
Undistorted . . . 3 Watts      Maximum . . . 5 Watts

**Loudspeaker:**

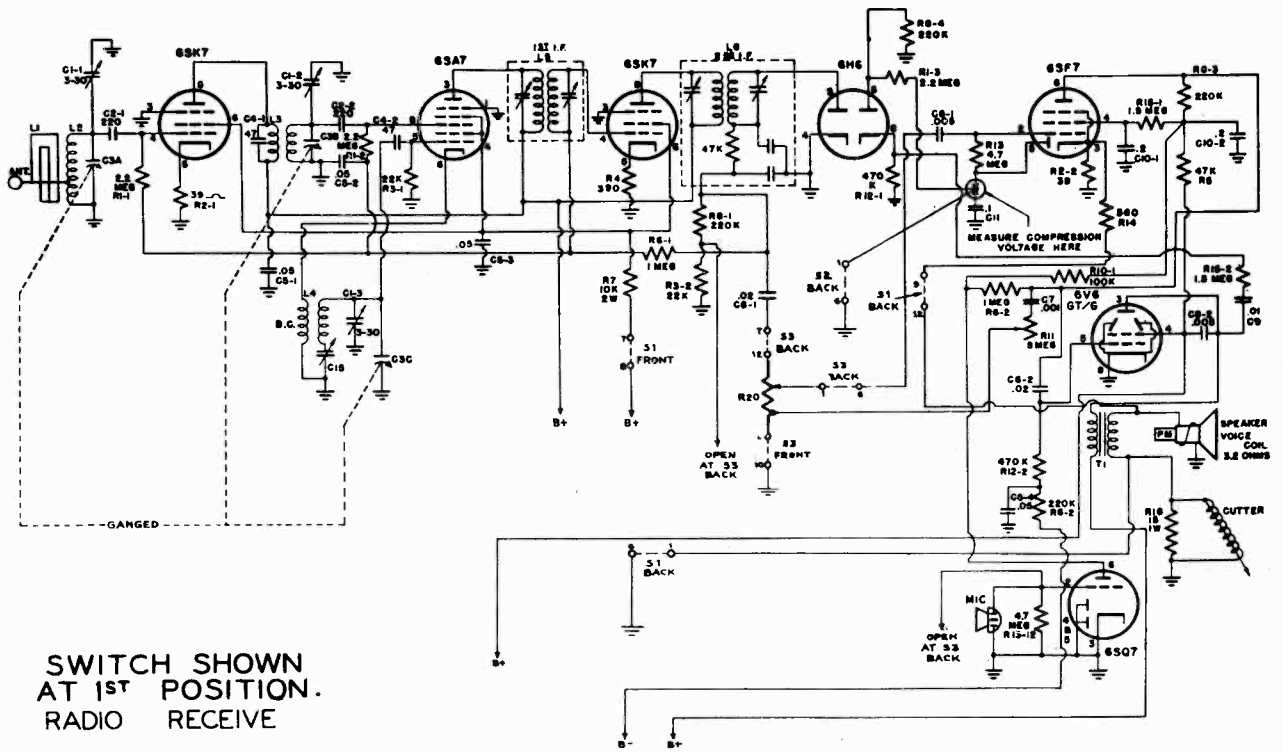
Type . . . Permanent Magnet  
Outside Cone Diameter . . . 10"  
Voice Coil Impedance . . . 3.2 ohms at 400 cycles  
Magnet Rating . . . 4.6 Oz. Alnico 5

**Electrical Rating:**

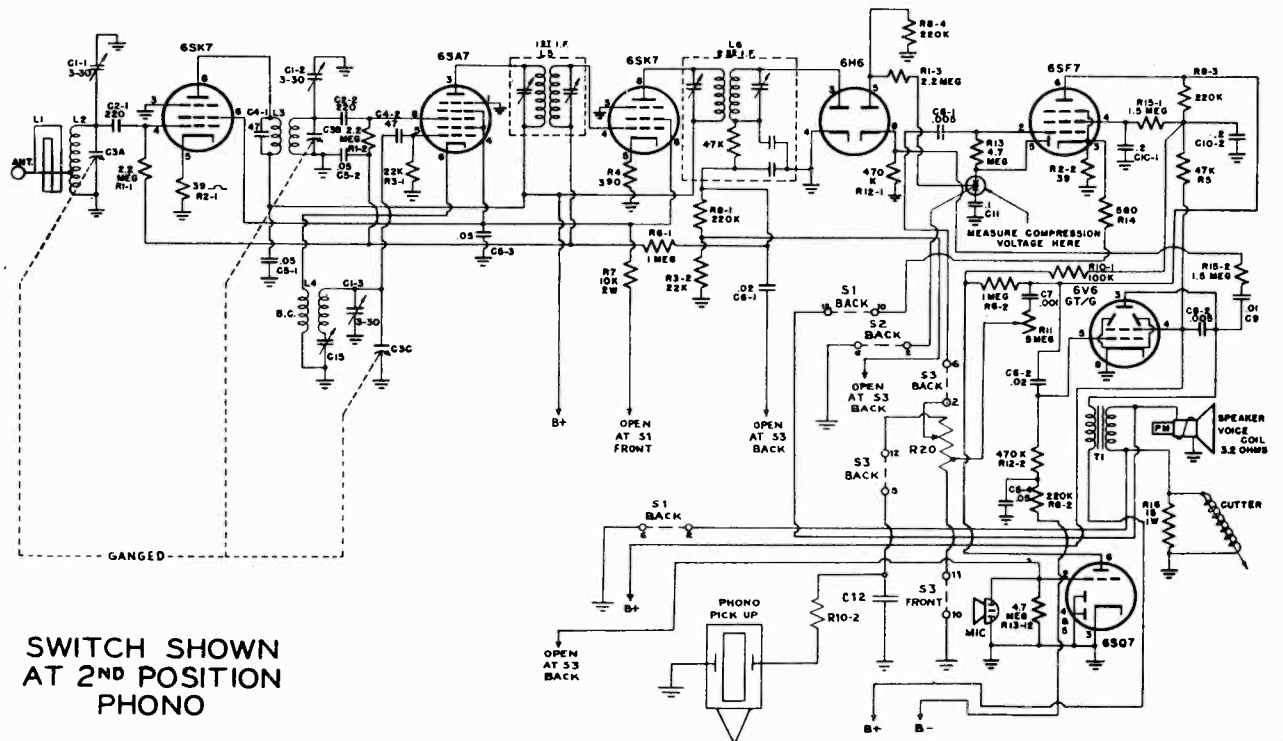
Line Voltage . . . 110-120 volts, 50-60 cycle A.C.  
Power Consumption . . . 80 Watts  
Tuning Frequency Range:  
540 to 1620 KC

**Tubes:**

Tube	Function
6SK7	R.F. Amplifier
6SA7	Frequency Converter
6SK7	I.F. Amplifier
6SF7	1st Audio Amplifier
6V6-GT/G	Power Amplifier
5Y3-GT/G	Rectifier
6H6	2nd Detector-Compressor Rectifier
6SQT	Microphone Amplifier



SWITCH SHOWN  
AT 1ST POSITION.  
RADIO RECEIVE



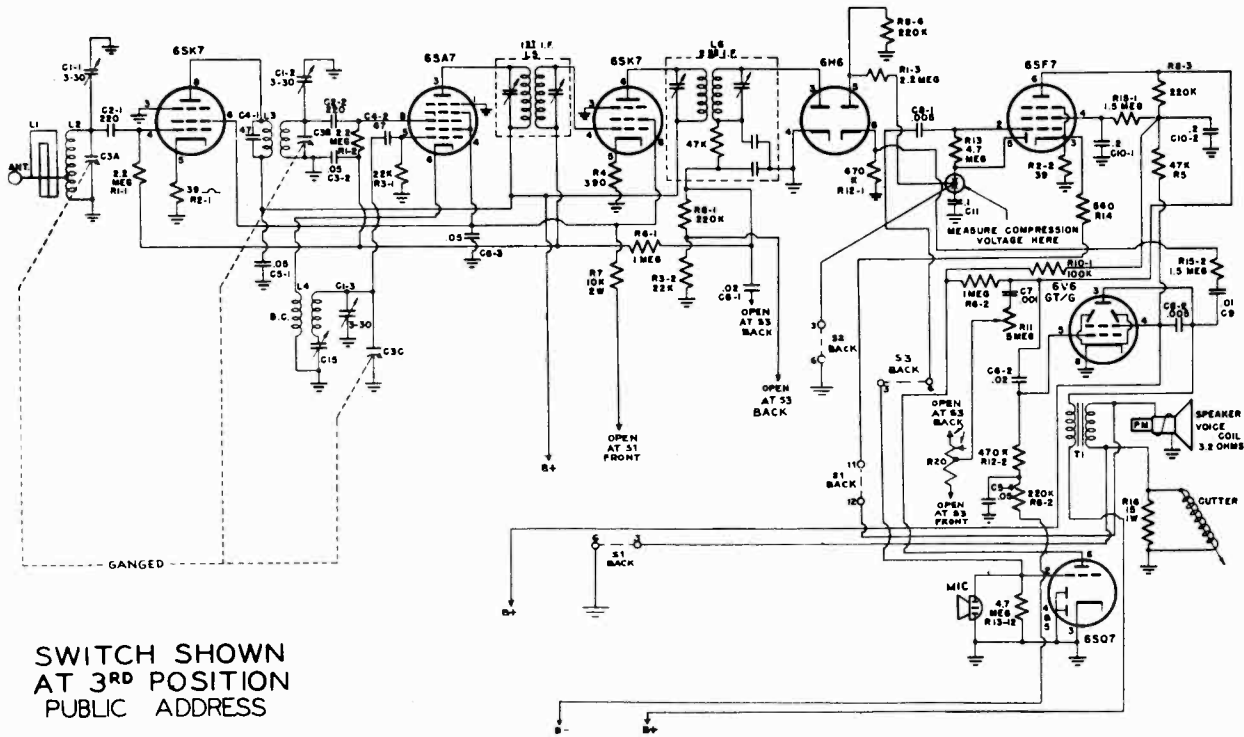
SWITCH SHOWN  
AT 2ND POSITION  
PHONO



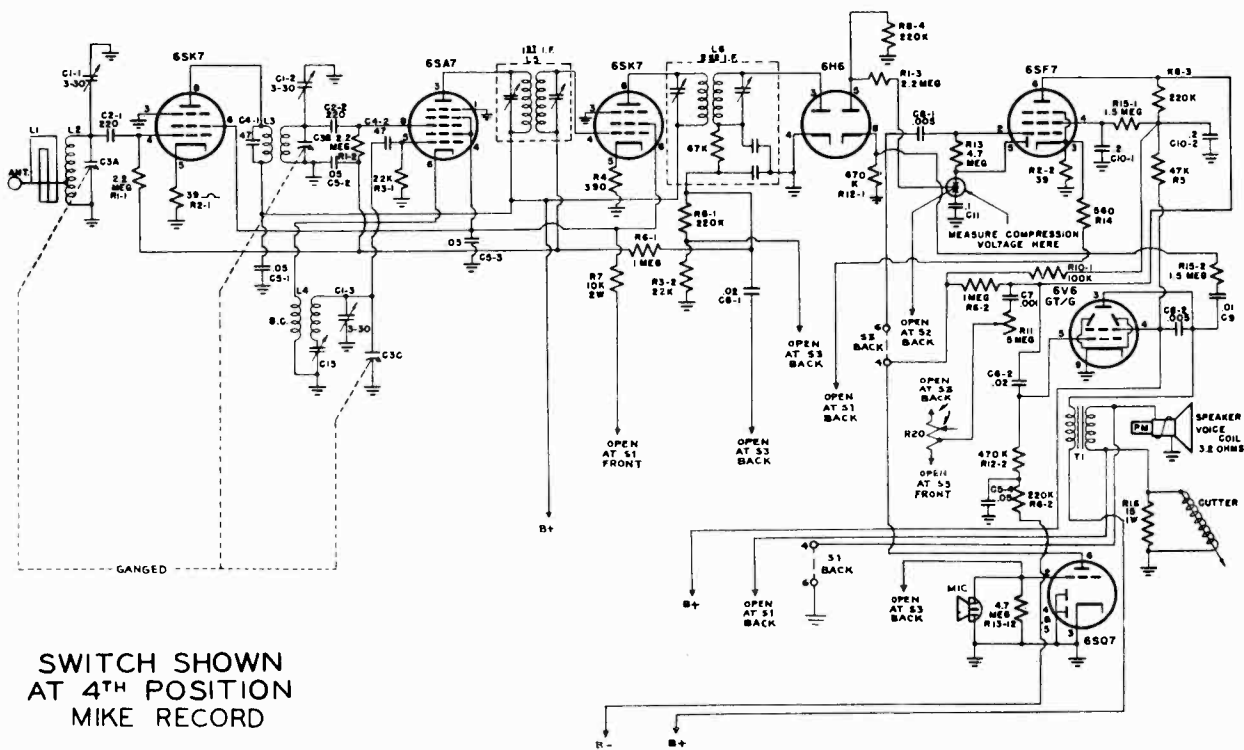
# "clarified schematics"

MODEL 861 Phonocord

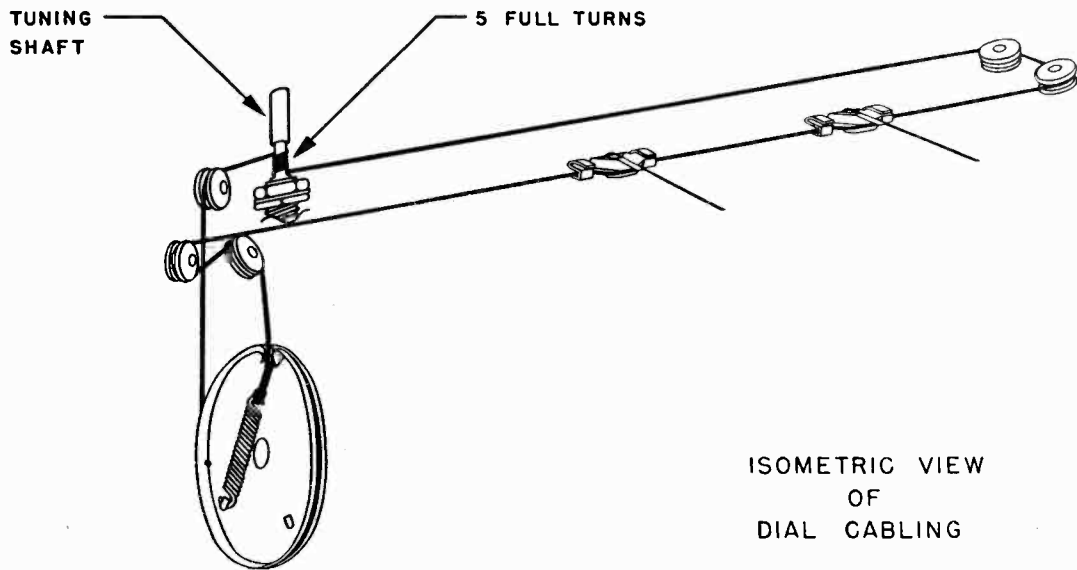
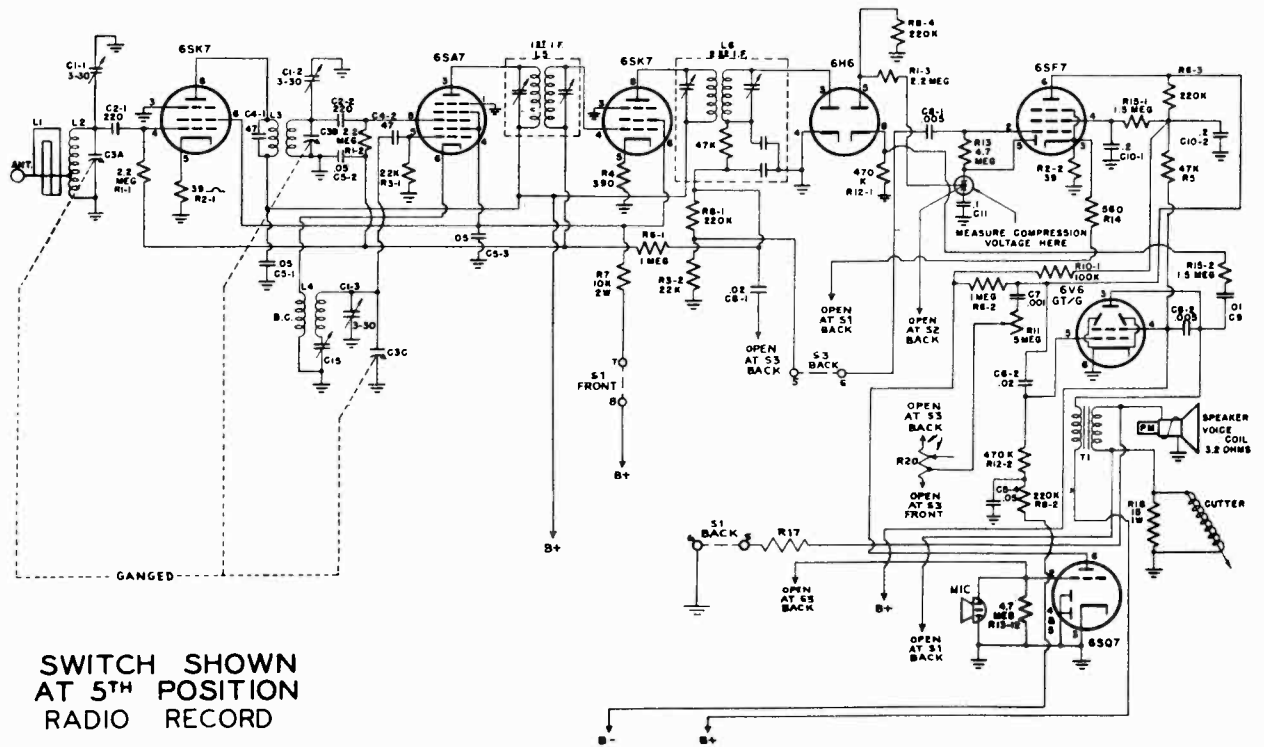
PACKARD-BELL COMPANY



SWITCH SHOWN AT 3RD POSITION PUBLIC ADDRESS



SWITCH SHOWN AT 4TH POSITION MIKE RECORD



**SPECIAL SERVICE INFORMATION**

**Stage Gain Measurements:**

Measurements taken with volume and time controls maximum. — AVC shorted out.

Standard Output . . . 50 milliwatts

Dummy Antenna . . . 200 Mmf.

Antenna Grid to R.F. Grid . . . 7X at 1000 KC

R.F. Grid Converter Grid . . . 7.5X at 1000 KC

Converter Grid to 1st I.F. Grid . . . 56X at 455 KC

1st I.F. Grid to 2nd Detector . . . 57X at 455 KC

Overall Audio Gain . . . 320X at .5 watts 400 cycles

**OSCILLATOR CATHODE VOLTAGES:**

Measured at .117 volts AC line voltage with AC vacuum tube voltmeter input loading above 10 megohms.

1600 KC . . . 2.15 volts AC

1000 KC . . . 2.0 volts AC

600 KC . . . 2.2 volts AC

**D.C. Resistance Measurements:**

1st & 2nd I.F. Coils:

Primary . . . 17 ohms

Secondary . . . 17 ohms\*

\*NOTE: To obtain the true reading of the secondary of the 2nd I.F. Coil, it must be removed from the can. This is so because of the 47K resistor inside the can.

Oscillator Coil:

Primary . . . 1 ohm

Secondary . . . 6 ohms

Antenna Coil:

Start to finish . . . 12.2 ohms

Start to tap . . . 10.5 ohms

R.F. Coil:

Primary . . . 58 ohms

Secondary . . . 4.2 ohms

NOTICE: The D.C. Resistance measurements on all coils are subject to a 20% tolerance due to the variation of winding methods.

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis.—A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to chassis.—Volume and tone controls maximum.—Switch in Radio Receive position.—No signal.—117V A.C. line. All voltages shown are positive D.C. unless otherwise noted.



**ALIGNMENT PROCEDURE**

Alignment Procedure consists of the 5 steps outlined in the Alignment Procedure Chart.

Connect the test oscillator leads to the mixer grid and ground in series with an .01 Mfd. capacitor (dummy load) for step No. 1, I.F. Alignment. Upon completion of this step "Rock" the variable condenser to assure that the I.F.s have been aligned to the correct frequency. Output should remain constant for any setting of the variable condenser.

Use the Hazeltine Test Loop No. 1150 or a reasonable substitute for the balance of the alignment. Place the test loop about two feet from the receiver loop in a vertical position.

It will be noted that all alignment trimmers are accessible without removing the chassis from the cabinet.

IMPORTANT NOTICE: Make certain that each alignment step is done with a minimum input signal.

**ALIGNMENT CHART**

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	ADJUST POINTER FOR MAX. SETTING	ADJUST FOR MAX. OUTPUT
1	Mixer Grid & Grd. (.01 Mfd. Cap.)	455 KC	540 KC	Trimmers A, B, C & D
2	Standard Test Loop*	1620 KC	1620 KC	Trimmer E to 1620 KC
3	Standard Test Loop*	600 KC	Rock Variable	Trimmer H to 600 KC
4	Standard Test Loop*	1500 KC	1500 KC	Trimmers F & H
5	Repeat Steps 2, 3 & 4			

\*NOTE: Hazeltine Test Loop No. 1150 (or a reasonable substitute).

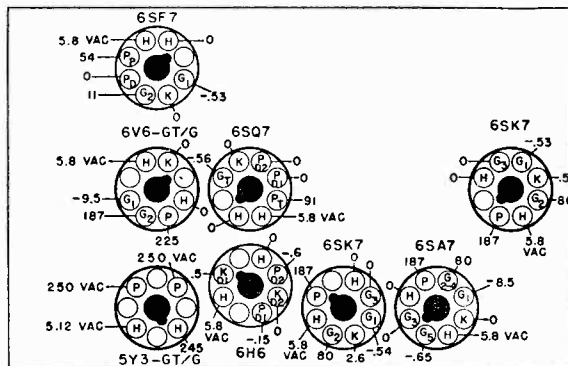


FIGURE 1—SOCKET VOLTAGES

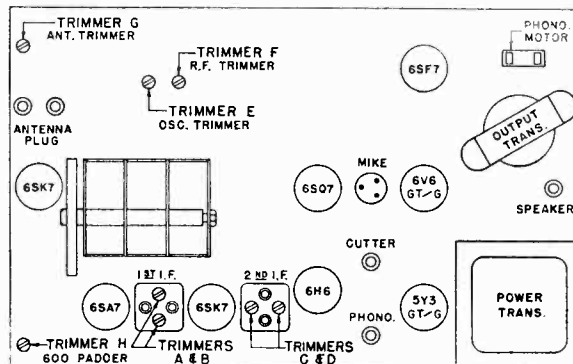


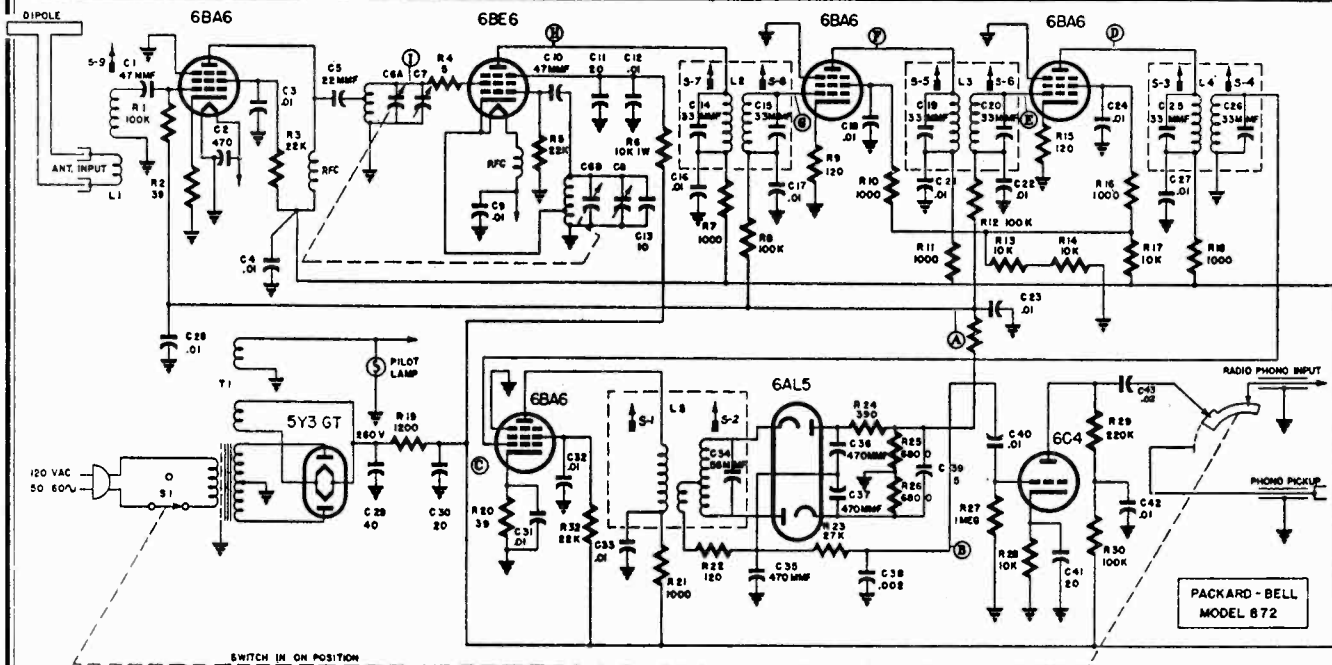
FIGURE 2—TRIMMER LOCATION



## PACKARD-BELL COMPANY

MOLEL 861 Phonocord

73057	R13-1	Resistor, carbon: 4.7 megohms, 20%, ½ watt	10505 10506 21040		Assembly, switch arm Assembly, pointer Cabinet
73022	R13-2				
	R14	Resistor, carbon: 560 ohms, 10%, ½ watt	21040-1 21040-2		Cabinet back, cardboard: right Cabinet back, cardboard: center
73054	R15-1	Resistor, carbon: 1.5 megohms, 20%, ½ watt	21040-3 21040-4 21040-5		Cabinet back, cardboard: left Cabinet back, cardboard: upper center
	R15-2				Strip, leatherette: motor board
73903	R16	Resistor, wire wound: 15 ohms, 10%, 1 watt	21051A-1 21051A-2		Cabinet, mic cord holder: side Cabinet, mic cord holder: bottom
73910	R17	Resistor, wire wound: ½ ohm, 10%, 1 watt	23001	C1-1 C1-2	Capacitor, trimmer: 3-30 Mmf.
73902	R18	Resistor, wire wound: 2,000 ohms, 10%, 5 watt	23406 23915	C1-3 C2-1	
73081	R19	Resistor, carbon: 150 ohms, 10%, ½ watt	23500C	C2-2	Capacitor, ceramic: 220 Mmf. 20%
25010B	R20	Control, volume: 1 megohm, tapped at 200,000 ohms, with A.C. switch	23912	C3A, B & C C4-1	Capacitor, variable Capacitor, ceramic or mica: 47 Mmf., 20%
77016		Shaft, dial		C4-2	
78008		Shield, microphone plug	23009	C5-1	Capacitor, paper: .05 Mfd., 400 volt
78028		Shield, dial, light		C5-2	
79002		Socket, tube: 8 prong octal, wafer type		C5-3 C5-4	
79004		Socket, microphone	23007	C6-1	Capacitor, paper: .02 Mfd., 600 volt
79005		Socket, phonograph		C6-2	
79007		Socket, phono motor	23001	C7	Capacitor, paper: .001 Mfd., 600 volt
79010B		Socket, dial lamp: bayonet base	23004	C8-1	Capacitor, paper: .005 Mfd., 600 volt
83703		Speaker, permanent magnet: 10"	23006	C8-2	
84003A		Spring, knob	23020	C9	Capacitor, paper: .01 Mfd., 600 volt
84028		Spring, dial cord		C10-1 C10-2	Capacitor, paper: .2 Mfd., 400 volt
86009A		Switch, rotary: 3 deck	23019	C11	Capacitor, paper: .1 Mfd. 400 volt
86802		Switch, micro: used on automatic cutter stop	23916	C12	Capacitor, ceramic or mica: 470 Mmf., 20%
89409C	T1	Transformer, output	24003	C13	Capacitor, electrolytic: 20 Mfd., 350 volt
89016	T2	Transformer, power	24030	C14	Capacitor, electrolytic: 40 Mfd., 450 volt
65038A		Plate, rear			Capacitor, padder: 300-800 Mmf.
66004		Plug, pin type: Speaker, phono & antenna	23402 28016	C15	Clamp, mic base
67025		Pointer support	92194	L1	Loop, antenna: (19.5 feet of 300 ohm twin lead)
67023		Pointer wire			
68117		Instruction book	29400A	L2	Coil, antenna
68073		PhonOcord album	29102B	L3	Coil, R.F.
69001		Pulley, dial	29205B	L4	Coil, oscillator
69003A		Pulley, dial	29004D	L5	Coil, 1st I.F.: 455 KC
73055	R1-1	Resistor, carbon: 2.2 Megohm, 20%, ½ watt	29007	L6	Coil, 2nd I.F.: 455 KC
	R1-2		32003C		Cord, A.C.: 8'
	R1-3		34002D		Cover, volume control
73008	R2-1	Resistor, carbon: 39 ohms, 10%, ½ watt	36024		Cutter cartridge
	R2-2		38038		Dial, glass: stationized
73041	R3-1	Resistor, carbon: 22,000 ohms, 10%, ½ watt	38046 40002		Dial, glass: export Dial drive cord
	R3-2		50079B		Insulator, switch arm
73020	R4	Resistor, carbon: 390 ohms, 10%, ½ watt	52014BG 52032BG		Knob, plastic: bar type Knob, plastic: round type
73045	R5	Resistor, carbon: 47,000 ohms, 10%, ½ watt	54001 57004		Dial lamp .250 MA Microphone with cable
73053	R6-1	Resistor, carbon: 1 megohm, 20%, ½ watt	57005 57006		Microphone handle Microphone base
	R6-2		58004D		Automatic Record Changer
73125	R7	Resistor, carbon: 10,000 ohms, 10%, 2 watt	59001 59002		Needle, phono Needle, cutter
73049	R8-1	Resistor, carbon: 220,000 ohms, 20%, ½ watt	65028A 65032 65033A		Plate, mounting Plate, front Plate, dial
	R8-2				
	R8-3				
	R8-4				
73047	R10-1	Resistor, carbon: 100,000 ohms, 20%, ½ watt			
	R10-2				
25506B	R11	Control, tone: 5 megohms			
73051	R12-1	Resistor, carbon: 470,000 ohms, 20%, ½ watt			
	R12-2				
66008		Plug, A.C.			
66013		Plug, microphone			
67026		Pointer slide			

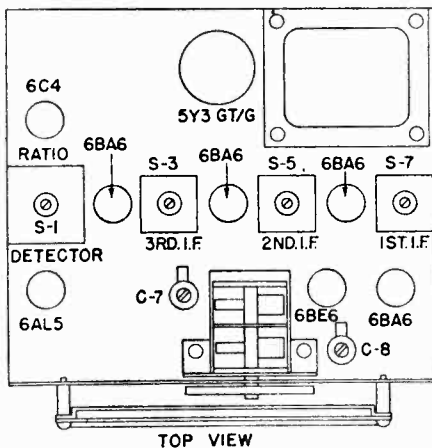
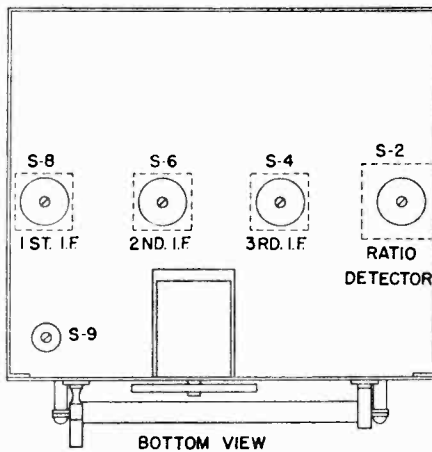


IF PEAK 10.7 MC

NOTE: \* As slug S-2 (Bottom of Ratio Detector Coil) is turned back and forth, a direct-current voltage of positive or negative polarity should be observed if detector is functioning properly. Adjust for zero (center) output.

\*\* A resistive shunt consisting of 1000 ohms in series with 100 mmf should be used. Connect shunt from point "C" (on schematic) to ground and adjust slug S-3. Move shunt from point "C" to point "D" and adjust slug S-4. Same procedure for 1st I.F. and converter.

For steps 6, 7, and 8, the tuner should be set to the required frequency.



STEP	CONNECT TO	TEST OSC. SETTING	METER CONNEX. TO	ADJUSTMENT
1	"C" Driver Grid	10.7 Mc	A	Slug S-1 Max. Output
2	"C" Driver Grid	10.7 Mc	B	*Slug S-2 Zero Center Output
3	"E" 2nd I.F. Grid	10.7 Mc	A	**Slugs S-3 S-4 Max. Output
4	"G" 1st I.F. Grid	10.7 Mc	A	Slugs S-5, S-6 Max. Output
5	"I" Conv. Grid	10.7 Mc	A	Slugs S-7, S-8 Max. Output
6	Antenna	108. Mc	A	Trimmer C-8 Max. Output
7	Antenna	105 Mc	A	Trimmer C-7 Max. Output
8	Antenna	96 Mc	A	Slug S-9 Max. Output

**Stage Gain Measurements:**

Stage gains are measured by connecting the VTVM to AVC (point A) and preceding backwards stage by stage and calculating gain of desired stage.

Audio Gain . . . 10X at 400 cycles  
 Ratio Detector Sensitivity . . . 100,000 microvolts on driver grid results in approximately 3.0 volts as measured at AVC point.

Second I.F. Gain . . . 20X at 10.7 Mc

First I.F. Gain . . . 20X at 10.7 Mc

Converter Gain . . . This measurement can not be made accurately. The gain is approximately 5X at 100 Mc

R.F. Gain . . . 5X at 100 Mc

Antenna Gain . . . 1.2X at 100 Mc

**Oscillator Cathode Voltages:**

This measurement should not be made as it is impossible to connect a meter to the cathode without disturbing the proper functioning of the oscillator circuit. Fortunately, oscillators either operate or do not function at all at these frequencies. Make usual overall sensitivity measurements to determine if oscillator is functioning.

**D.C. Resistance Measurements.**

All three I.F. Coils are identical

Primary . 0.6 ohms Secondary 0.6 ohms

**Ratio Detector Coil**

Primary . 1.2 ohms Secondary 0.2 ohms

**R. F. Coils**

These coils are wound with heavy wire and have only a few turns. Their resistances are extremely low and will read zero on any ohm-meter test.

**Brief Description of Ratio Detector and I. F. Amplifier**

The ratio detector is an improved FM detector in that it is insensitive to amplitude variations and thus requires no limiter stages. It requires much less signal for normal operation and permits lower gain in the I. F. stages which results in improved circuit stability.

The I. F. Amplifier Stages are overcoupled and permit reception of even the weakest stations without impairment of performance.

**Electrical Rating:**

Line Voltage . . . 110-120 volts 50-60 cycle A.C.

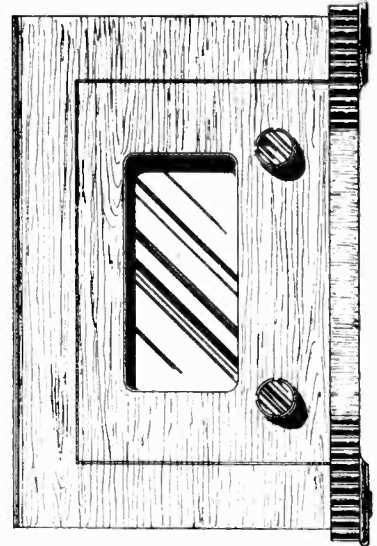
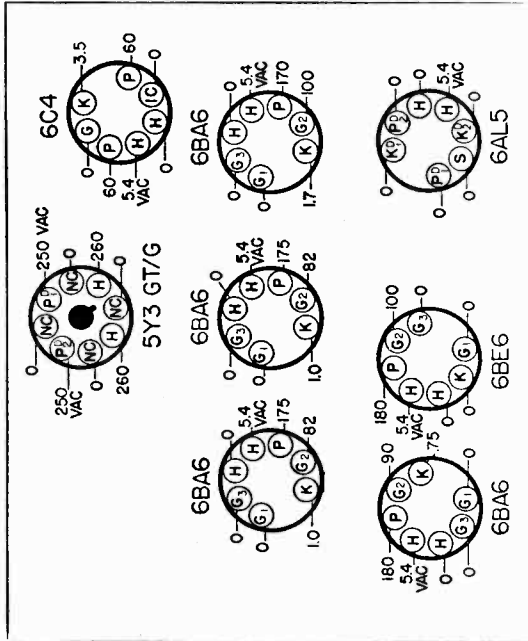
Power Consumption . . 52 watts

**Tuning Frequency Range:**

Frequency Modulation Band . . 88-108Mc

**Intermediate Frequency:**

10.7 Mc

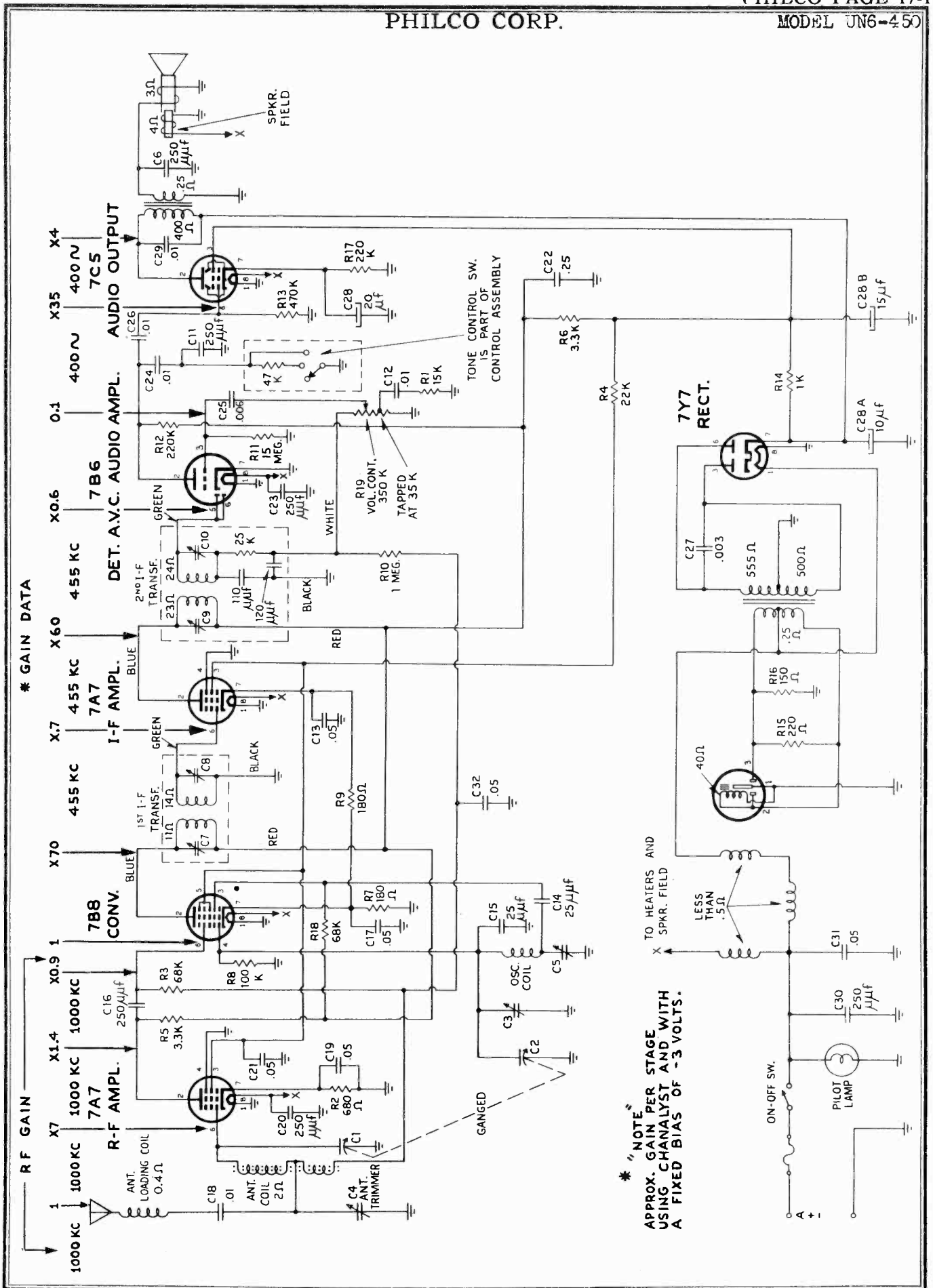


MODEL 872

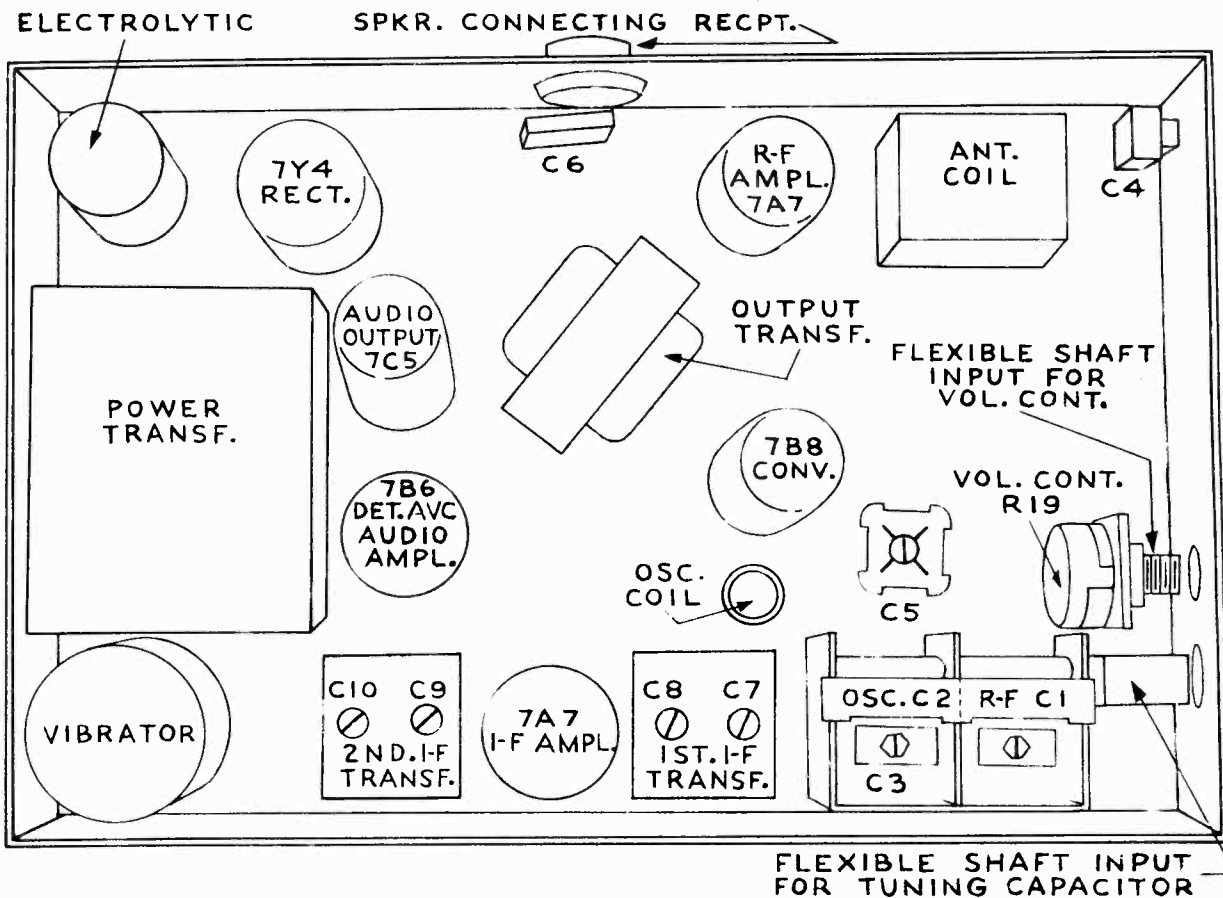
## PACKARD-BELL COMPANY

## REPLACEABLE PARTS LIST

NO.	SYMBOL	DESCRIPTION	NO.	SYMBOL	DESCRIPTION
23912	C-1	Capacitor, mica, 47 mmf. NPO to N750	73047	R-1	Resistor, 100K ohms, ½ w, 20%
	C-10			R-8	
23229	C-2	Capacitor, mica 470 mmf. 20%		R-12	
	C-35			R-30	
	C-36			R-31	
	C-37				
23023	C-3	Capacitor, tubular, .01 mf. 500V	73008	R-2	Resistor, 39 ohm, ½ w, 10%
	C-4		73041	R-3	Resistor, 22K, ohm, ½ w, 10%
	C-9			R-5	
	C-12			R-20	
	C-16			R-32	
	C-17				
	C-18				
	C-21		73073	R-6	Resistor, 10 K, 1 w, 10%
	C-22			R-13	
	C-23			R-14	
	C-24				
	C-27		73025	R-7	Resistor, 1000 ohm, ½ w, 10%
	C-28			R-10	
	C-31			R-11	
	C-32			R-16	
	C-33			R-18	
	C-40			R-21	
	C-42				
23911	C-5	Capacitor, ceramic, 22 mmf. 20% N750	73014	R-9	Resistor, 120 ohm, ½ w, 10%
23519	C-6A, B	Capacitor, Variable		R-15	
23408	C-7	Trimmer, Variable, 3-12 mmf.		R-22	
	C-8		73125	R-17	Resistor, 10K ohm, 2 w, 10%
24012	C-11	Capacitor, electrolytic, 20 mf. 350V	73916	R-19	Resistor, 1200 ohm, 5w, 10%
	C-30		73042	R-23	Resistor, 27K ohms, ½ w, 10%
24006	C-41	Capacitor, Elect. 25 mfd., 25 V	73020	R-24	Resistor, 390 ohms, ½ w, 10%
23909	C-13	Capacitor, Ceramic, 10 mmf. 20% NPO to N750	73035	R-25	Resistor, 6800 ohms, ½ w, 10%
	C-14	Capacitor, enclosed in I.F. cans		R-26	
	C-15		73053	R-27	Resistor, 1 megohm, ½ w, 20%
	C-19		73037	R-28	Resistor, 10K, ½ w, 10%
	C-20		73049	R-29	Resistor, 220K, ½ w, 10%
	C-25		86003B	S-1	Switch, FM, AC, phono
	C-26		89016B	T-1	Transformer, power
24011	C-29	Capacitor, electrolytic, 40 mf. 350 V	32003C		Cord, A.C. 8'
	C-34	Capacitor, enclosed in can	38065		Dial
23002	C-38	Capacitor, tubular, .002 mf. 600 V	40115		Drive
24038	C-39	Capacitor, electrolytic, 5 mf. 50 V	52008G	BG	Knob
23007	C-43	Capacitor, tubular, .02 mf. 400 V	52032	BG	Knob
29321		Antenna, dipole assy.	54001	T-47	Lamp, pilot
29405	L-1	Coil, Antenna	66001		Plug, pin
29207		Coil Oscillator	66004		Plug, pin
29017	L-2	Coil, I.F. 10.7 Mc.	67016A		Pointer, dial
	L-3		69003B		Pulley, dial
	L-4		78033		Shield, socket ext.
	L-5		79009		Socket, dial lamp
29018		Coil, ratio Detector	79023		Socket, loop
			79043		Socket, cable ext.
			79044		Socket, coil form







### I.F. ALIGNMENT

REMOVE THE TOP COVER OF THE RECEIVER TO GET AT THE ADJUSTMENTS.

CONNECT AN OUTPUT METER ACROSS VOICE COIL OF SPEAKER.

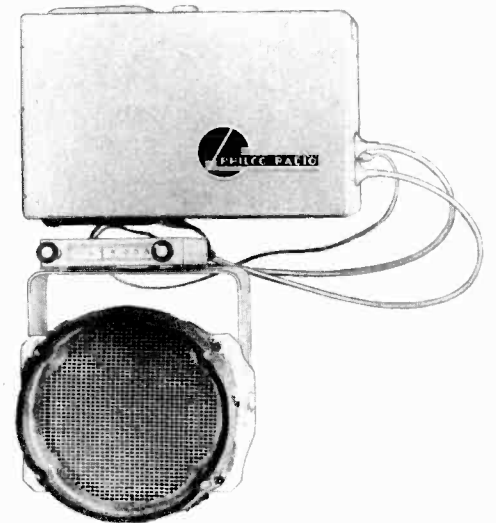
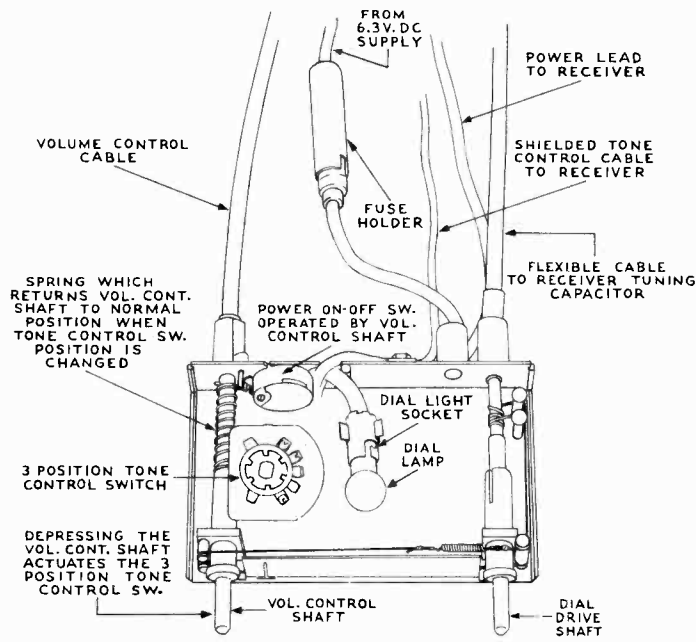
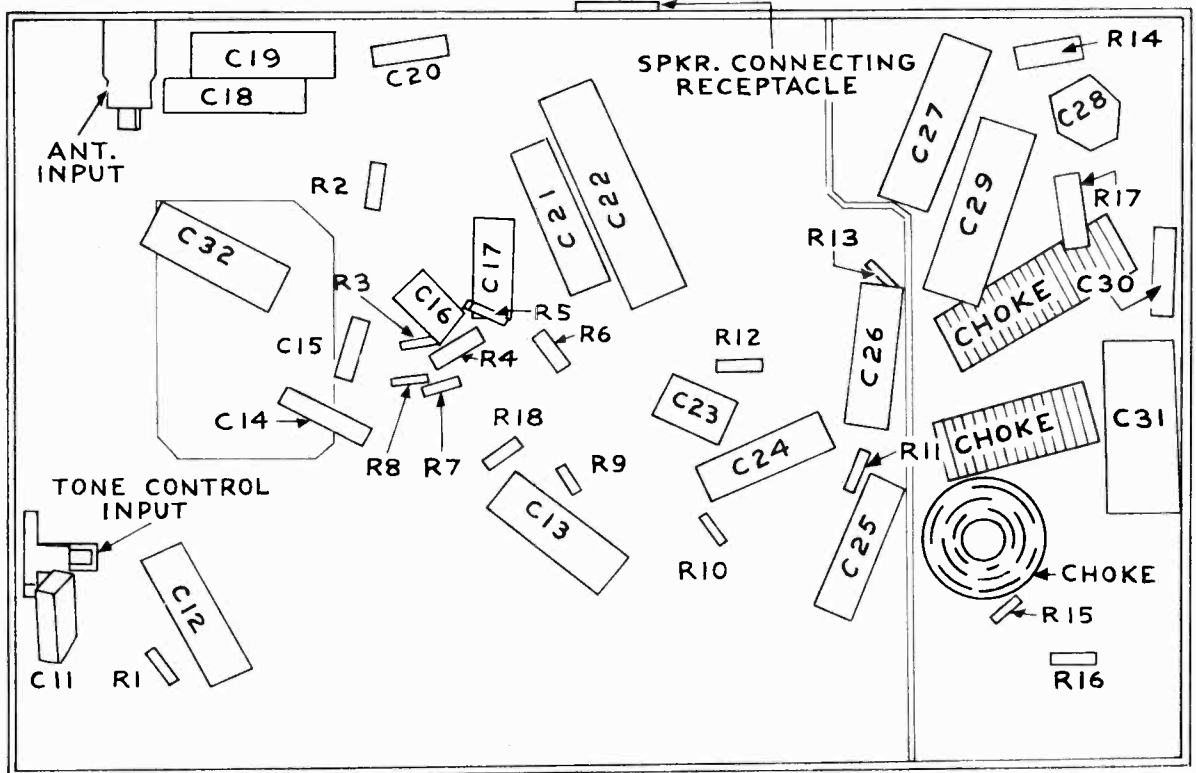
WITH THE TUNING CAPACITOR FULLY MESHED APPLY THROUGH A .05  $\mu$ f CAPACITOR TO THE ANTENNA TERMINAL A 455 KC SIGNAL STRONG ENOUGH TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. KEEP THE VOLUME AT MAXIMUM AND ADJUST I.F. TRIMMER C10, C9, C8 AND C7 FOR MAXIMUM OUTPUT.

### R.F. OSC. ADJUSTMENTS

TUNE THE SIGNAL GENERATOR AND RECEIVER TO 1500 KC AND APPLY THE SIGNAL THROUGH A 50  $\mu$ ut CAPACITOR TO THE ANTENNA TERMINAL. ADJUST OSCILLATOR TRIMMER C3 FOR MAXIMUM.

TUNE THE SIGNAL GENERATOR AND RECEIVER TO 1400 KC AND ADJUST ANTENNA TRIMMER C4 FOR MAXIMUM. THIS TRIMMER SHOULD BE READJUSTED AFTER THE RECEIVER HAS BEEN INSTALLED IN THE CAR.

TUNE THE SIGNAL GENERATOR AND RECEIVER TO 600 KC AND ADJUST OSCILLATOR PADDER C5 FOR MAXIMUM WHILE ROCKING THE TUNING CAPACITOR. REPEAT THE OSC. AND R.F. ADJUSTMENTS.

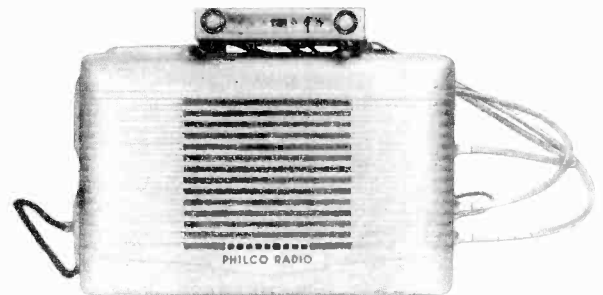
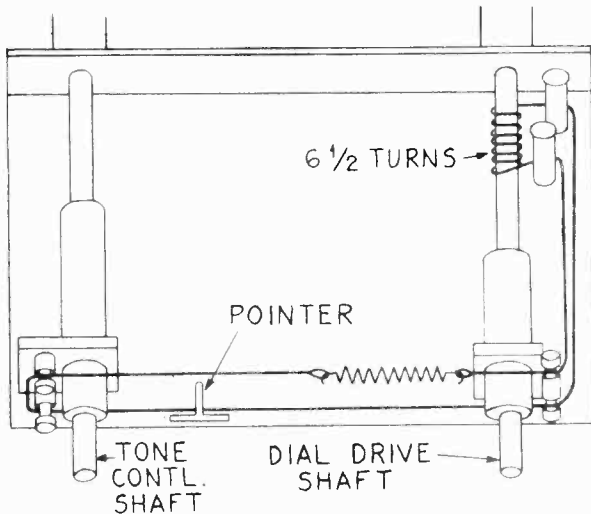
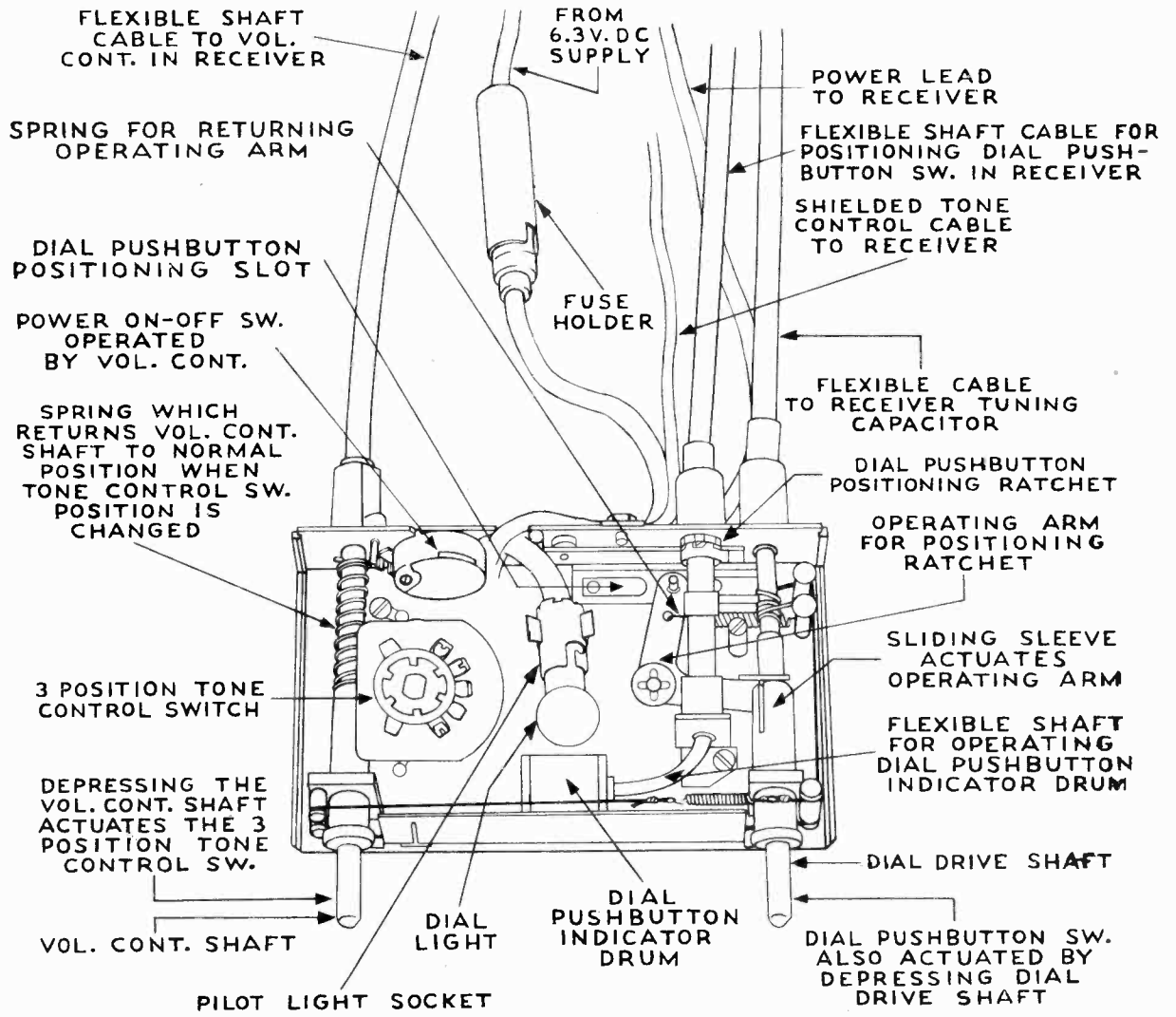


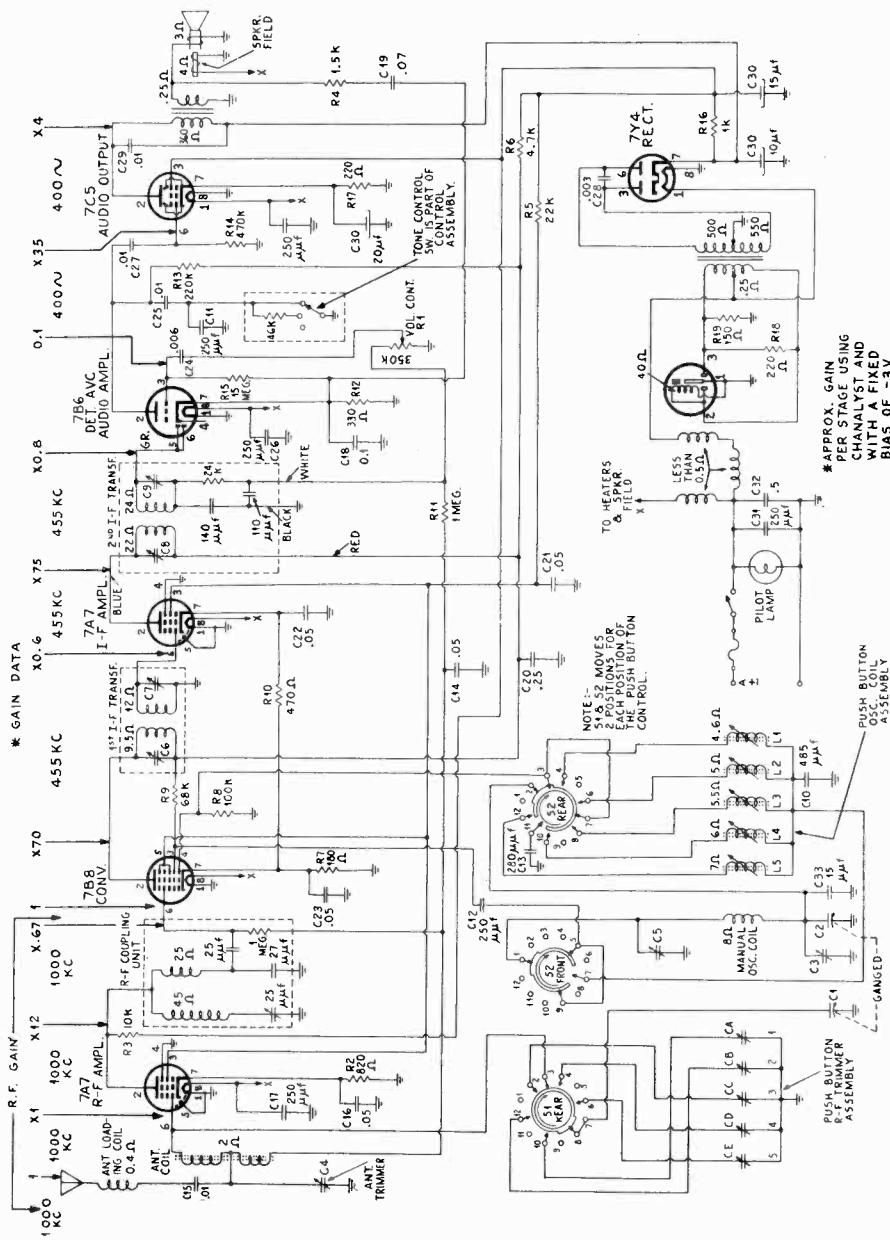
## PHILCO CORP.

MODEL UN6-450

TUBE	PIN	VTVM	20,000 P.V.	1,000 P.V.	RESISTANCE
7A7					
RF Ampl	1	0	0	0	0
	2	140	140	140	Over 5 megs
	3	85	85	85	Over 5 megs
	4	0	0	0	0
	5	0	0	0	0
	6	-0.3	0	0	1 meg
	7	3.3	3.3	3.3	750 $\Omega$
	8	6.3	6.3	6.3	0.2 $\Omega$
7B3					
Conv	1	0	0	0	0
	2	145	145	145	Over 5 megs
	3	65	65	44	Over 5 megs
	4	-6.5	-5	-0.4	100 K
	5	82	82	82	Over 5 megs
	6	-0.3	-0.1	0	1 meg
	7	2	2	2	180 $\Omega$
	8	6.3	6.3	6.3	0.2 $\Omega$
7A7					
IF Ampl	1	0	0	0	0
	2	145	145	145	Over 5 megs
	3	85	85	78	Over 5 megs
	4	0	0	9	0
	5	0	0	0	0
	6	0	0	0	15 $\Omega$
	7	3	3	3	350 $\Omega$
	8	6.3	6.3	6.3	0.2 $\Omega$
7B6					
Det.AVC	1	0	0	0	0
Audio	2	84	84	46	Over 5 megs
Ampg	3	-0.5	-0.3	-0.2	15 megs
	4	-	-	-	-
	5	-0.3	-0.3	-0.2	300 K
	6	-0.3	-0.3	-0.2	300 K
	7	0	0	0	0
	8	6.3	6.3	6.3	0.2 $\Omega$
7C5					
Audio	1	0	0	0	0
Output	2	205	205	205	Over 5 megs
	3	200	200	200	Over 5 megs
	4	-	-	-	-
	5	-	-	-	-
	6	0	0	0	400 K
	7	7.5	7.5	7.5	220 $\Omega$
	8	6.3	6.3	6.3	0.2 $\Omega$
7Y4					
Rect	1	6.3	6.3	6.3	0.2 $\Omega$
	2	-	-	-	-
	3	AC	AC	AC	500 $\Omega$
	4	-	-	-	-
	5	-	-	-	-
	6	AC	AC	AC	555 $\Omega$
	7	225	225	225	Over 5 megs
	8	0	0	0	0

NOTE: All voltage and resistance measurements made with respect to chassis ground, and with a supply voltage of 6.3 V.D.C.







ALIGNMENT INSTRUCTIONS FOR PHILCO  
MODEL UN6-500

MAKE SURE THE DIAL-PUSHBUTTON SWITCH IS IN THE DIAL POSITION BEFORE ATTEMPTING TO ALIGN THIS RECEIVER.

LOOSEN THE DIAL LOCKING SCREW ABOUT HALFWAY. THIS SCREW IS LOCATED BELOW THE OSCILLATOR AND ANTENNA TRIMMER ADJUSTMENT HOLES.

NEXT ROTATE THE PUSHBUTTON SWITCH UNTIL IT LOCKS IN POSITION. THIS WILL BE THE MANUAL TUNING POSITION.

REMOVE SPEAKER FROM TOP OF CASE AND CONNECT AN OUTPUT METER TO THE VOICE COIL.

WITH THE TUNING CONDENSER FULLY MESHED, APPLY THROUGH A .05 MF CONDENSER TO THE ANTENNA TERMINAL, A 455 KC SIGNAL, STRONG ENOUGH TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. KEEP THE VOLUME CONTROL AT MAXIMUM, AND ADJUST I.F. TRIMMERS C9, C8, C7 and C6 FOR MAXIMUM OUTPUT.

NEXT ADJUST C34 FOR MINIMUM.

RF-OSC. ADJUSTMENTS

TUNE THE SIGNAL GENERATOR AND RECEIVER TO 1500 KC. APPLY THE SIGNAL THROUGH A 50 P F CONDENSER TO THE ANTENNA TERMINAL. ADJUST OSCILLATOR TRIMMER C3 FOR MAXIMUM.

TUNE THE SIGNAL GENERATOR AND RECEIVER TO 1400 KC AND ADJUST ANTENNA TRIMMER C400-6 FOR MAXIMUM. THIS TRIMMER SHOULD BE READJUSTED AFTER THE RECEIVER HAS BEEN INSTALLED IN THE CAR.

TUNE THE SIGNAL GENERATOR AND RECEIVER TO 600 KC AND ADJUST OSCILLATOR PADDER C5 FOR MAXIMUM WHILE ROCKING TUNING CONDENSER. REPEAT THE OSC. R.F. ADJUSTMENTS.

PUSH BUTTON ADJUSTMENTS FOR  
PHILCO MODEL UN6-500

BEFORE ADJUSTING PUSHBUTTONS MAKE SURE THE DIAL-PUSHBUTTON SWITCH IS SYNCHRONIZED WITH THE DIAL-PUSHBUTTON CONTROL. (SEE PRELIMINARY ALIGNMENT INSTRUCTIONS.) AFTER SYNCHRONIZATION, TIGHTEN DIAL LOCKING SCREW SO THAT DIAL-PUSHBUTTON SWITCH WILL BE ABLE TO MOVE WHEN DIAL-PUSHBUTTON KNOB IS DEPRESSED.

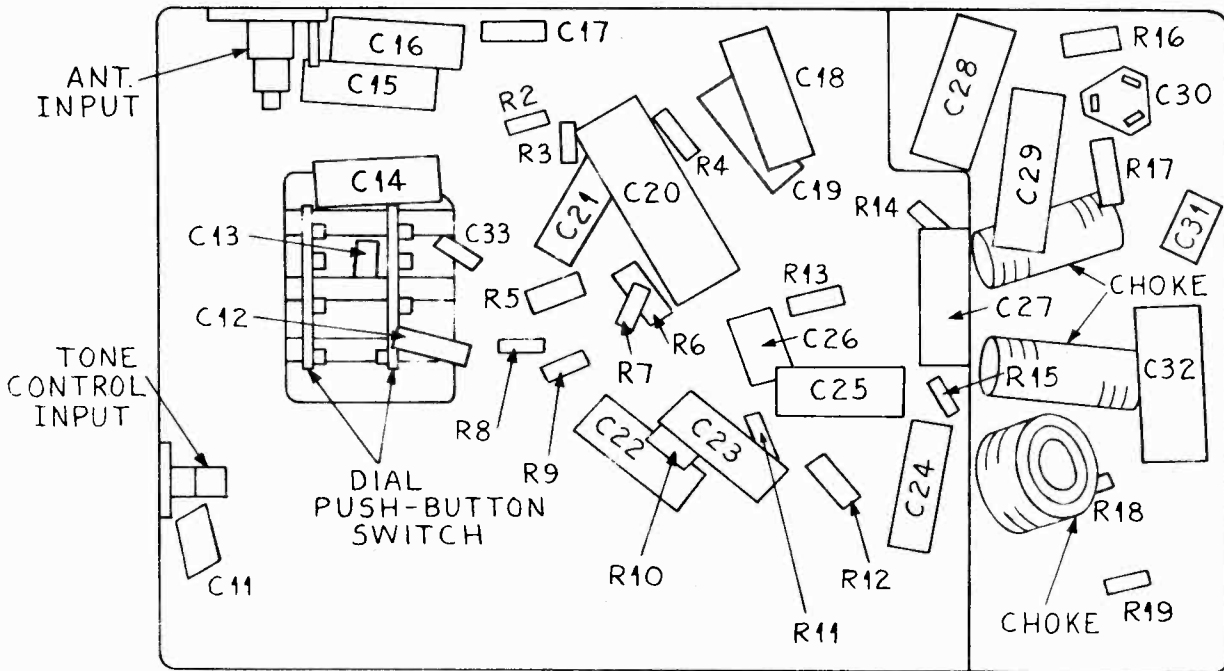
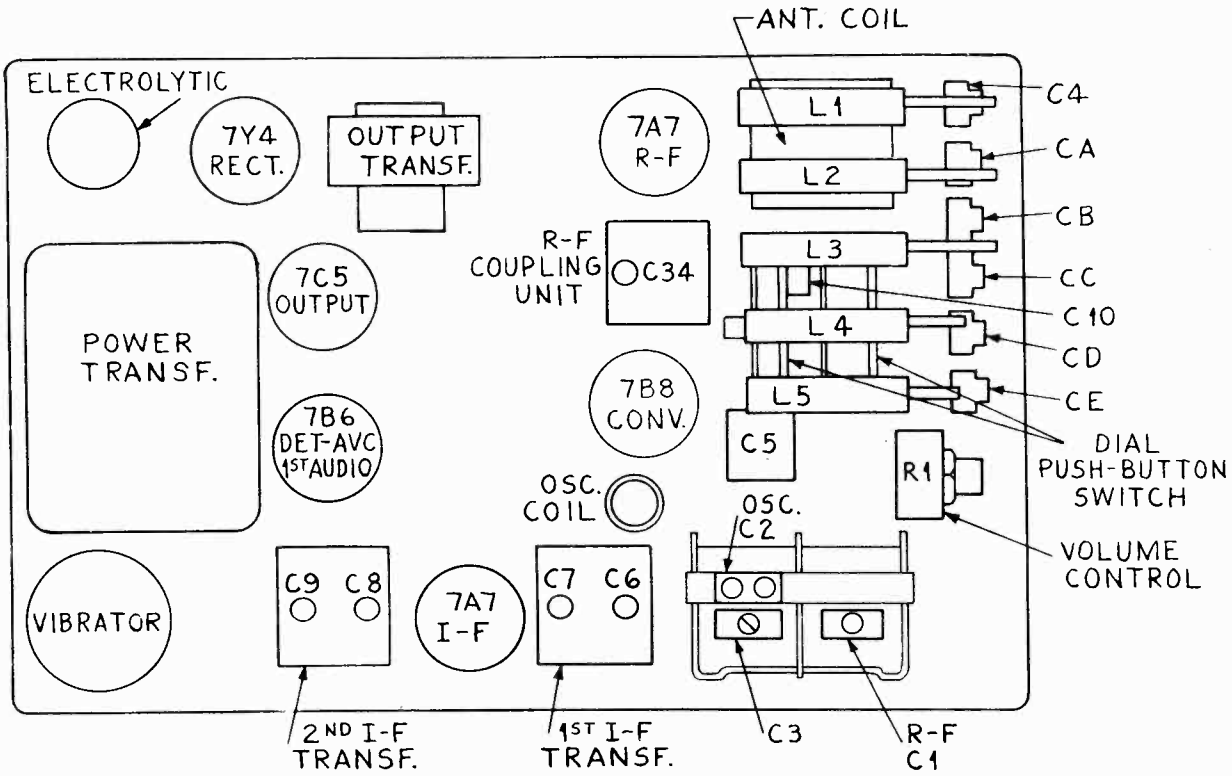
ALLOW THE RECEIVER TO WARM UP FOR AT LEAST 15 MINUTES BEFORE MAKING PUSH BUTTON ADJUSTMENTS

REMOVE THE TWO SCREWS HOLDING THE METAL PLATE ON THE END OF THE RECEIVER.

POSITION ONE OF THE PUSHBUTTON SWITCH IN THE HIGHEST FREQUENCY POSITION. SELECT WITH MANUAL TUNING A STATION IN THE RANGE OF POSITION ONE. PLACE THE PUSH BUTTON CONTROL ON POSITION 1 AND ADJUST THE OSCILLATOR TUNING SLUG L1 UNTIL THE STATION IS TUNED IN. THEN ADJUST THE ANTENNA TRIMMER CA FOR POSITION 1 FOR MAXIMUM.

REPEAT THE ABOVE PROCESS FOR THE OTHER FOUR POSITIONS.

AFTER INSTALLATION IN THE CAR, THE ABOVE ADJUSTMENTS SHOULD BE RECHECKED.

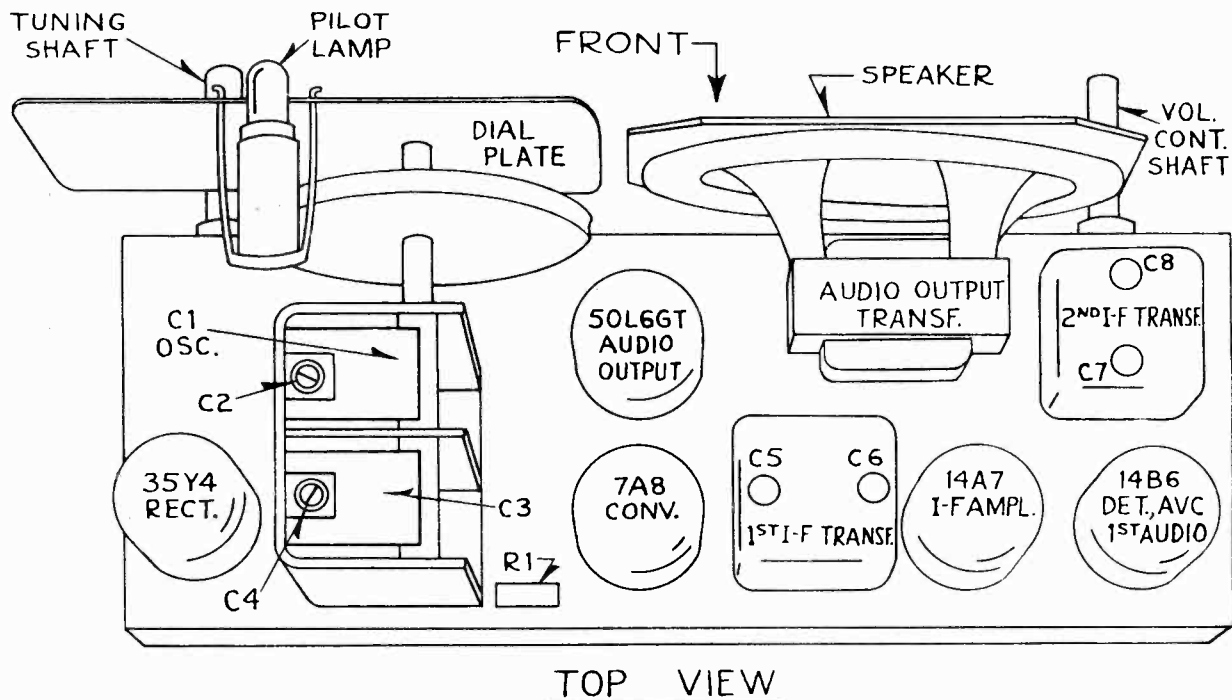


## PHILCO CORP.

MODEL UN6-500

TUBE	PIN	VTVM	20,000 OHMS	1,000 OHMS	RESISTANCE
			PER VOLT	PER VOLT	
7A7	1	0	0	0	0
RF AMPL	2	165	165	165	OVER 5 MEGS
	3	90	90	90	OVER 5 MEGS
	4	0	0	0	0
	5	0	0	0	0
	6	-0.3	0	0	1.2 MEGS
	7	4	4	4	800 OHMS
	8	6	6	6	0.2 OHMS
7B8	1	0	0	0	0
CONV	2	165	165	165	OVER 5 MEGS
	3	72	72	72	OVER 5 MEGS
	4	-4.7	-3.4	0	100 K
	5	88	88	88	OVER 5 MEGS
	6	-0.3	0	0	2 MEGS
	7	2	2	2	180 OHMS
	8	6	6	6	0.2 OHMS
7A7	1	0	0	0	0
IF AMPL	2	165	165	165	OVER 5 MEGS
	3	88	88	88	OVER 5 MEGS
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	13 OHMS
	7	4	4	4	650 OHMS
	8	6	6	6	0.2 OHMS
7B6	1	0	0	0	0
DET.AVC	2	94	94	52	OVER 5 MEGS
AUDIO	3	-0.6	-0.2	-0.1	15 MEGS
AMPL	4	0.1	0	0	330 OHMS
	5	-0.4	-0.2	0	350 K
	6	-0.4	-0.2	0	350 K
	7	0.1	0	0	330 OHMS
	8	6	6	6	0.2 OHMS
7C5	1	0	0	0	0
AUDIO	2	200	200	200	OVER 5 MEGS
OUTPUT	3	195	195	195	OVER 5 MEGS
	4	-	-	-	-
	5	-	-	-	-
	6	0.4	0.1	0	500 K
	7	8	8	8	220 OHMS
	8	6	6	6	0.2 OHMS
7V4	1	6	6	6	0.2 OHMS
RECT	2	-	-	-	-
	3	AC	AC	AC	600 OHMS
	4	-	-	-	-
	5	-	-	-	-
	6	AC	AC	AC	550 OHMS
	7	215	215	215	OVER 5 MEGS
	8	0	0	0	0

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A SUPPLY VOLTAGE OF 6.3 V. DC

I.F. ALIGNMENT

CONNECT THE OUTPUT METER TO THE CENTER TERMINAL (LOW) AND THE LEFT TERMINAL (HIGH) OF THE THREE LUG TERMINAL STRIP MOUNTED ON THE REAR OF THE CHASSIS.

CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE LOOP MODEL 1150 AND COUPLE IT LOOSELY TO THE RECEIVER LOOP.

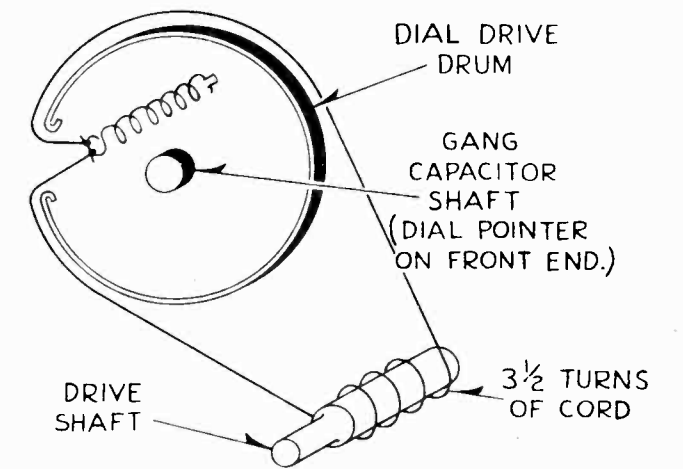
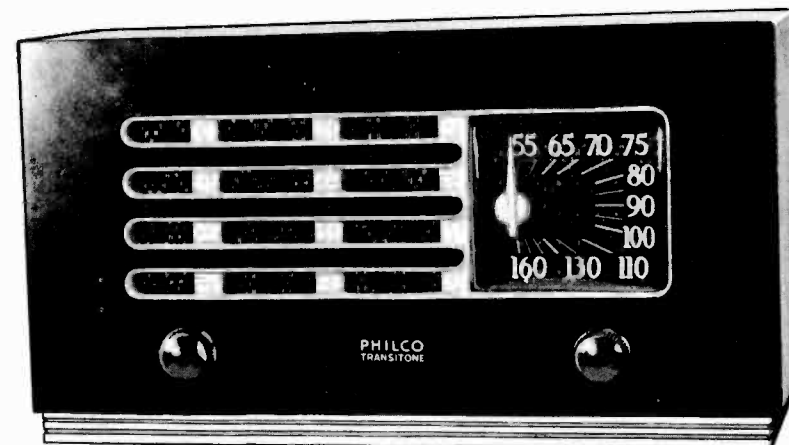
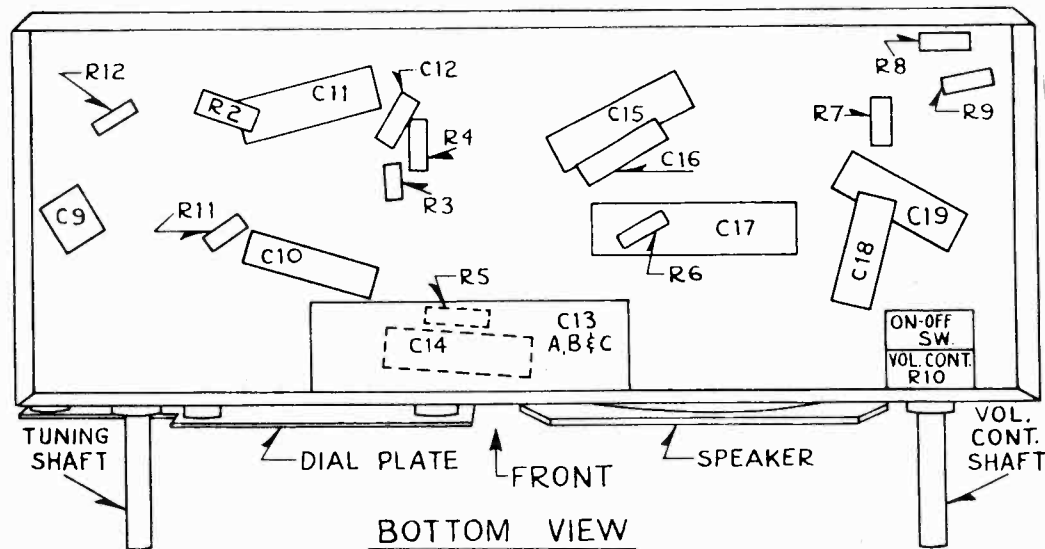
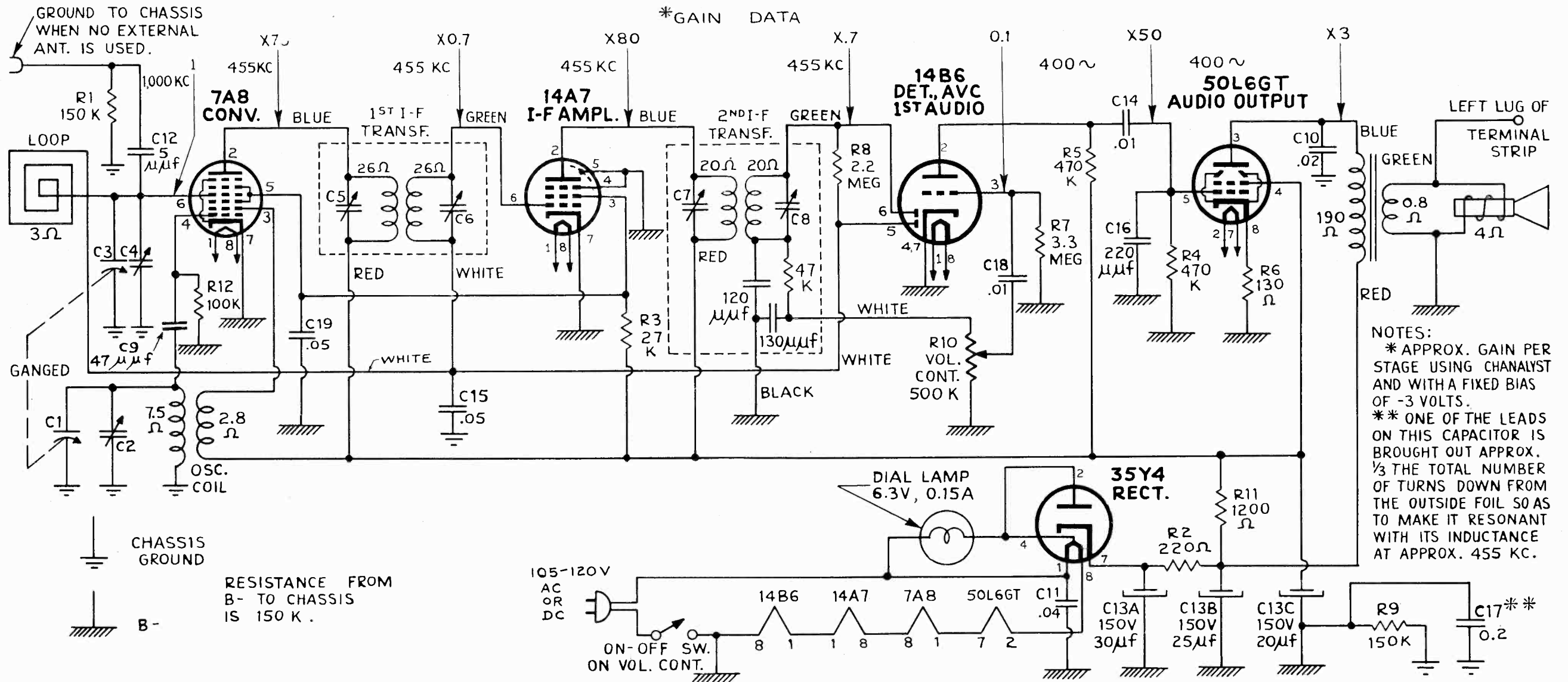
SET THE SIGNAL GENERATOR TO 455 KC AND FULLY MESH THE RECEIVER TUNING CAPACITOR. KEEP THE RECEIVER VOLUME CONTROL AT MAXIMUM AND THE OUTPUT OF THE SIGNAL GENERATOR SUFFICIENT TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. ADJUST FOR MAXIMUM I.F. TRIMMERS C8, C7, C6 AND C5, IN THAT ORDER.

R.F. OSC. ADJUSTMENT

KEEPING THE SAME SETUP AS USED FOR I.F. ALIGNMENT, SET THE SIGNAL GENERATOR AND RECEIVER TO 1600 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT.

SET THE SIGNAL GENERATOR AND RECEIVER TO 1400 KC AND ADJUST R.F. TRIMMER C4 FOR MAXIMUM OUTPUT.

PHILCO CORP.

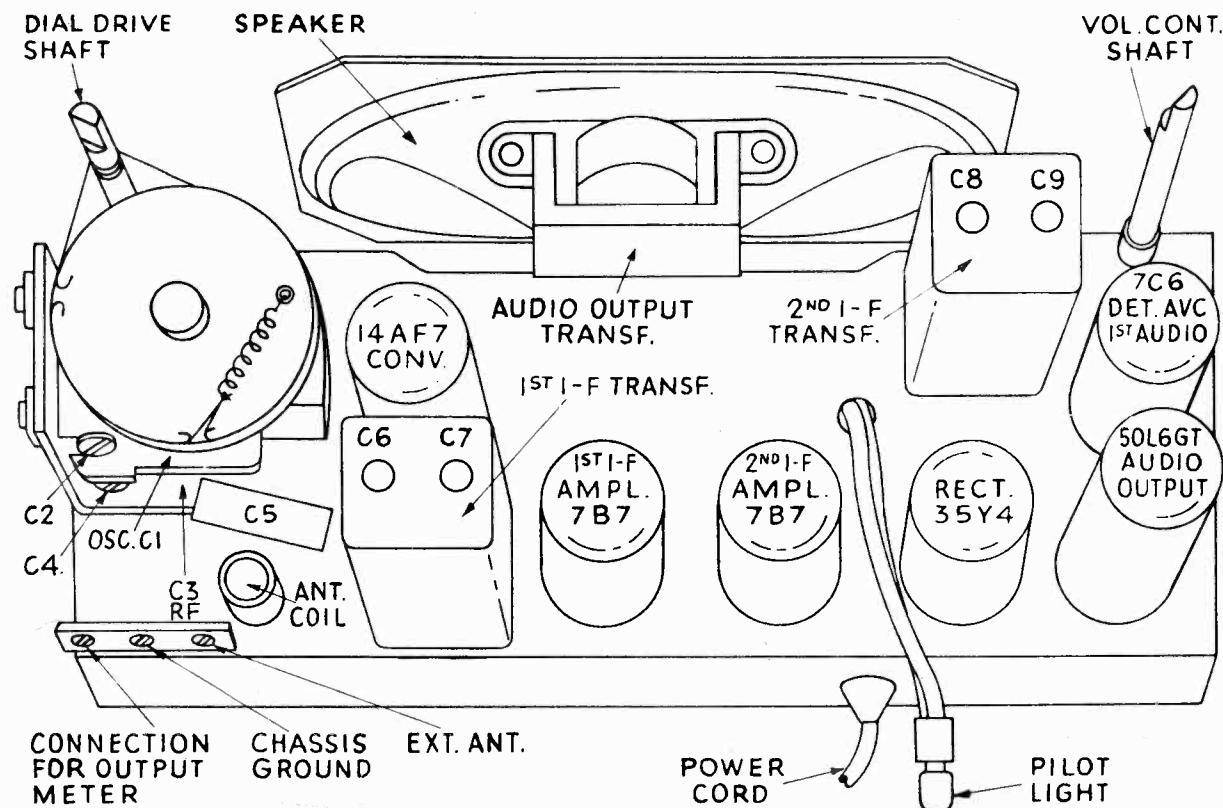


NOTE:  
TUNING CAPACITOR IN MAX. CAPACITY POSITION.



TUBE	PIN	VTVM	20,000 OHM FV	1,000 OHM FV	RESISTANCE
7A8 CONV.	1	AC	AC	AC	45 OHM
	2	+92	+92	+92	OVER 5 MEG
	3	+92	+92	+92	OVER 5 MEG
	4	-14	-12	-6	100 K
	5	+42	+42	+42	OVER 5 MEG
	6	-1	-0.8	-0.4	2.4 MEG
	7	0	0	0	0
	8	AC	AC	AC	35 OHM
14A7 I.F. AMPL.	1	AC	AC	AC	20 OHM
	2	+92	+92	+92	OVER 5 MEG
	3	+42	+42	+42	OVER 5 MEG
	4	0	0	0	0
	5	0	0	0	0
	6	-1	-0.8	-0.4	2.4 MEG
	7	0	0	0	0
	8	AC	AC	AC	35 OHM
14B6 DET. AVC. 1st AUDIO	1	AC	AC	AC	20 OHM
	2	+50	+50	+20	OVER 5 MEG
	3	-1	-0.8	-0.4	3 MEG
	4	0	0	0	0
	5	-1	0.8	0.4	2.4 MEG
	6	-0.8	0.6	0.2	450 K
	7	0	0	0	0
	8	0	0	0	0
50L6GT AUDIO OUTPUT	1	+50	+50	+20	OVER 5 MEG
	2	AC	AC	AC	100 OHM
	3	+100	+100	+100	OVER 5 MEG
	4	+92	+92	+92	OVER 5 MEG
	5	0	0	0	0
	6	-1	-0.8	-0.4	2.4 MEG
	7	AC	AC	AC	35 OHM
	8	+6	+6	+6	130 OHM
35Y4 RECT.	1	AC	AC	AC	130 OHM
	2	AC	AC	AC	125 OHM
	3	-14	-12	-6	100 K
	4	AC	AC	AC	125 OHM
	5	+92	+92	+92	OVER 5 MEG
	6	0	0	0	0
	7	+120	+120	+120	OVER 5 MEG
	8	AC	AC	AC	90 OHM

NOTE: ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO B- AND WITH A LINE VOLTAGE OF 116 V.A.C.



ALIGNMENT INSTRUCTIONS FOR PHILCO MODEL 48-460 CODE 121

IF ALIGNMENT

REMOVE RECEIVER FROM CABINET AND CONNECT THE OUTPUT METER TO THE LEFT TERMINAL (HIGH) AND THE CENTER TERMINAL (LOW) OF THE THREE LUG TERMINAL STRIP MOUNTED ON THE REAR OF THE CHASSIS.

CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE LOOP MODEL 1150 AND COUPLE IT LOOSELY TO THE RECEIVER LOOP.

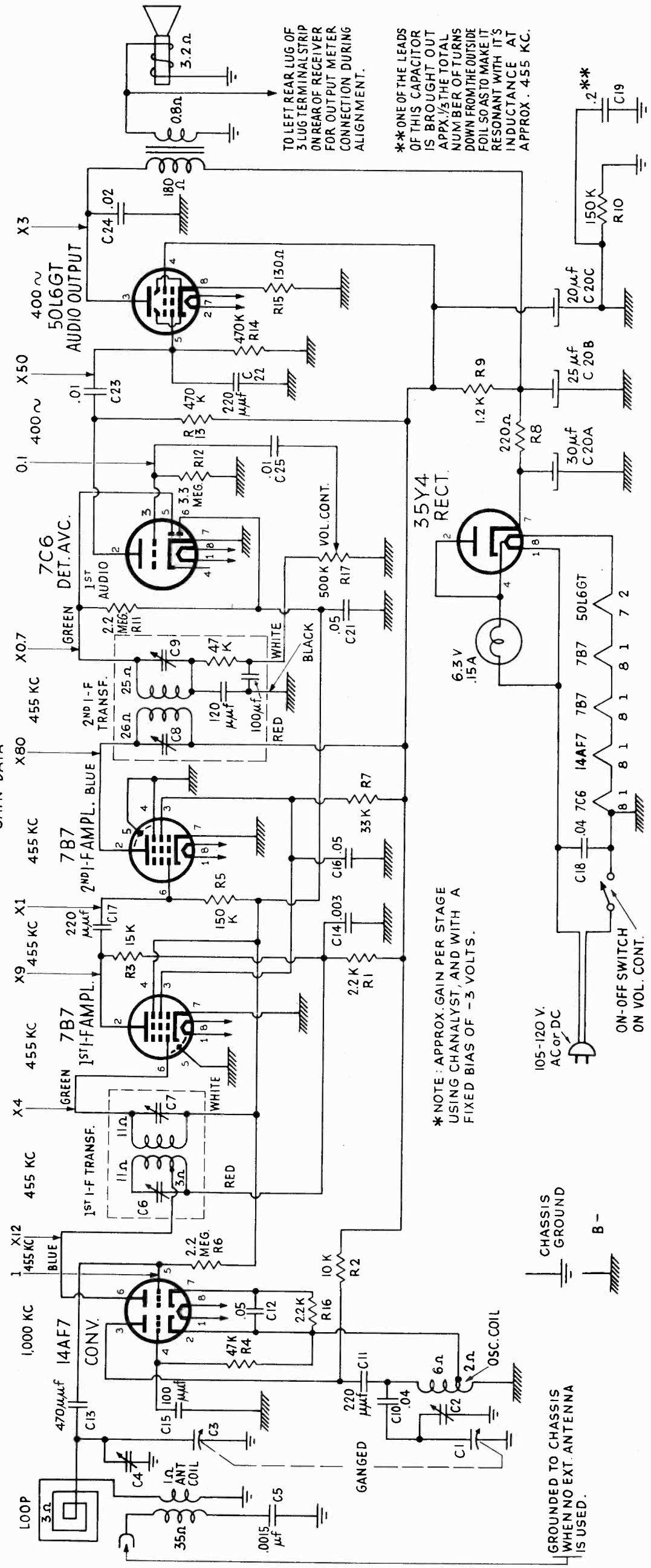
SET THE SIGNAL GENERATOR TO 455 KC AND FULLY MESH THE RECEIVER TUNING CAPACITOR. KEEP THE RECEIVER VOLUME AT MAXIMUM AND THE OUTPUT OF THE SIGNAL GENERATOR SUFFICIENT TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. ADJUST FOR MAXIMUM I.F. TRIMMERS C9, C8, C7, AND C6.

RF OSC. ADJUSTMENT

REPLACE THE RECEIVER IN CABINET. KEEPING THE SAME SETUP AS USED FOR IF ALIGNMENT, SET THE SIGNAL GENERATOR AND RECEIVER TO 1600 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT.

SET THE SIGNAL GENERATOR AND RECEIVER TO 1400 KC AND ADJUST RF TRIMMER C4 FOR MAXIMUM OUTPUT.

\* GAIN DATA



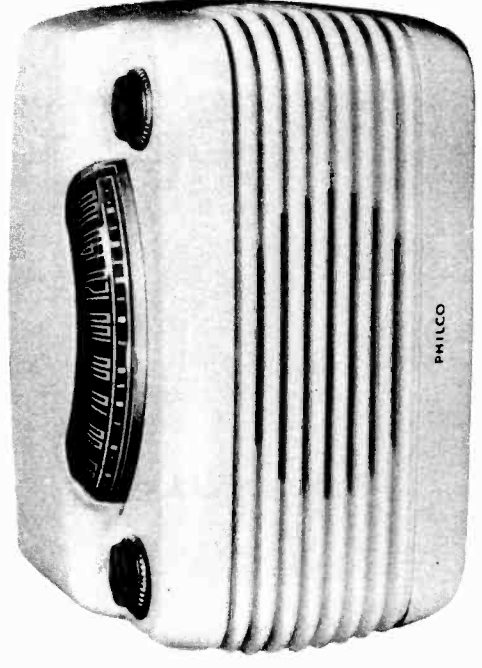
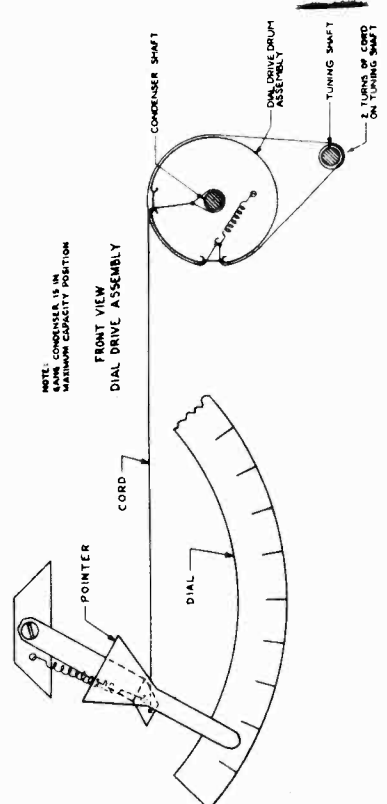
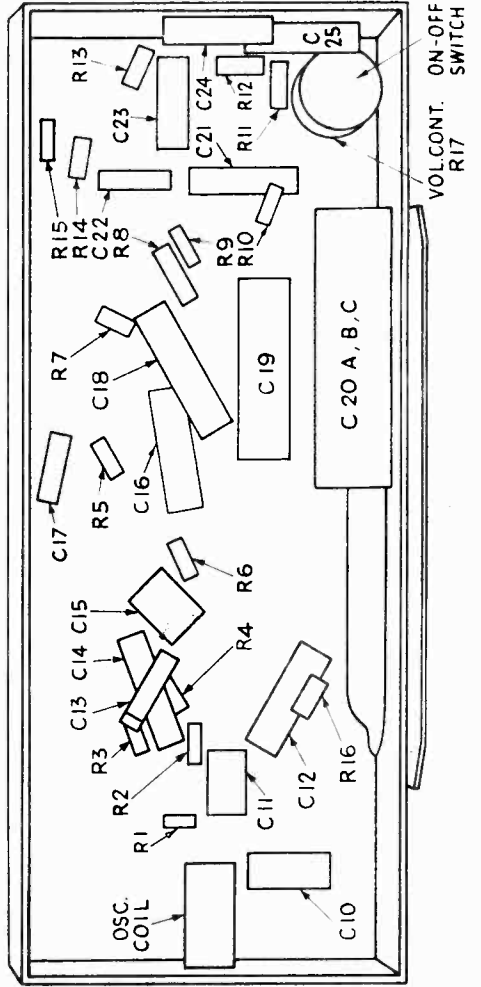
TO LEFT REAR LUG OF 3 LUG TERMINAL STRIP ON REAR OF RECEIVER FOR OUTPUT METER CONNECTION DURING ALIGNMENT.

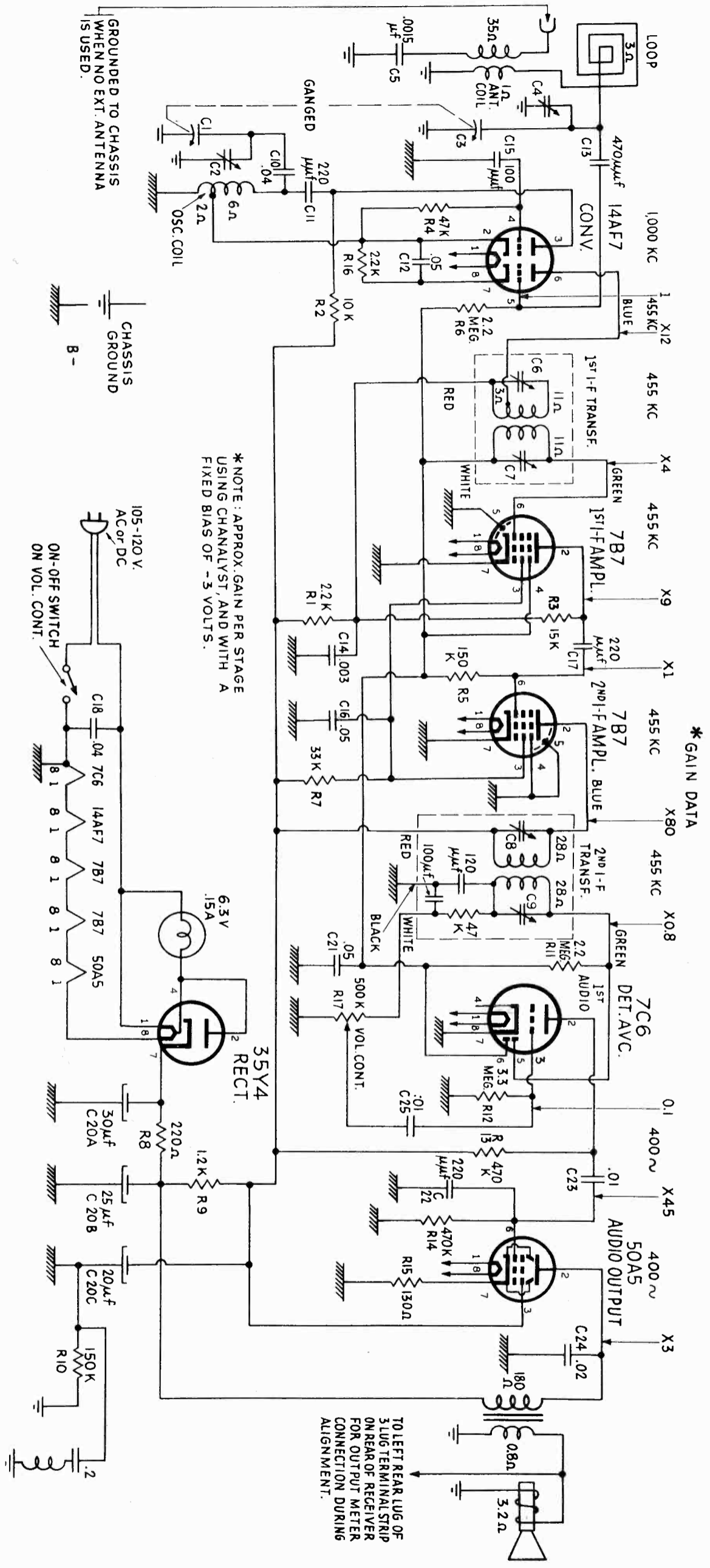
\*\*ONE OF THE LEADS OF THIS CAPACITOR IS BROUGHT OUT APPX. 1/3 THE TOTAL NUMBER OF TURNS DOWN FROM THE OUTSIDE FOIL SO AS TO MAKE IT RESONANT WITH ITS INDUCTANCE AT APPROX. 455 KC.

\*NOTE: APPROX. GAIN PER STAGE USING CHANNELYST, AND WITH A FIXED BIAS OF -3 VOLTS.



GROUND TO CHASSIS WHEN NO EXT. ANTENNA IS USED.





GROUND TO CHASSIS WHEN NO EXT. ANTENNA IS USED.

CHASSIS GROUND B-

105-120 V. AC or DC ON-OFF SWITCH ON VOL. CONT.

## PHILCO CORP.

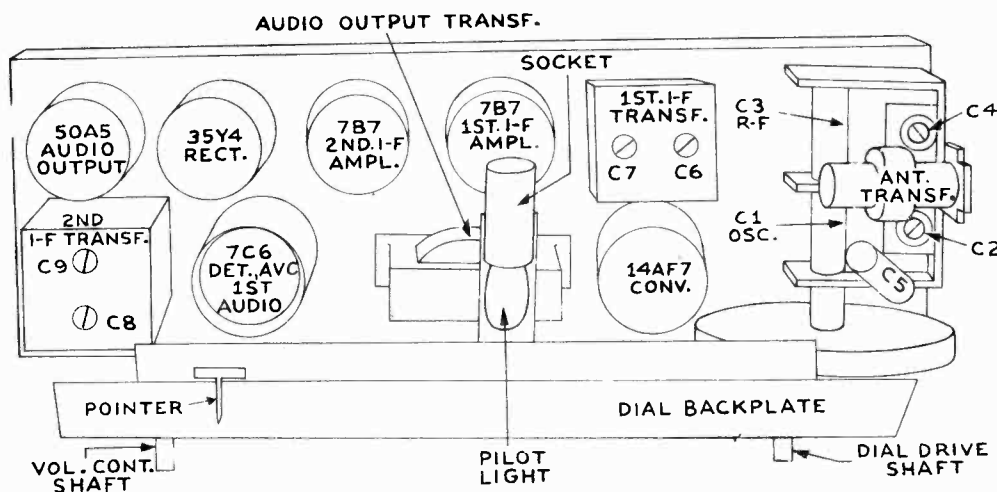
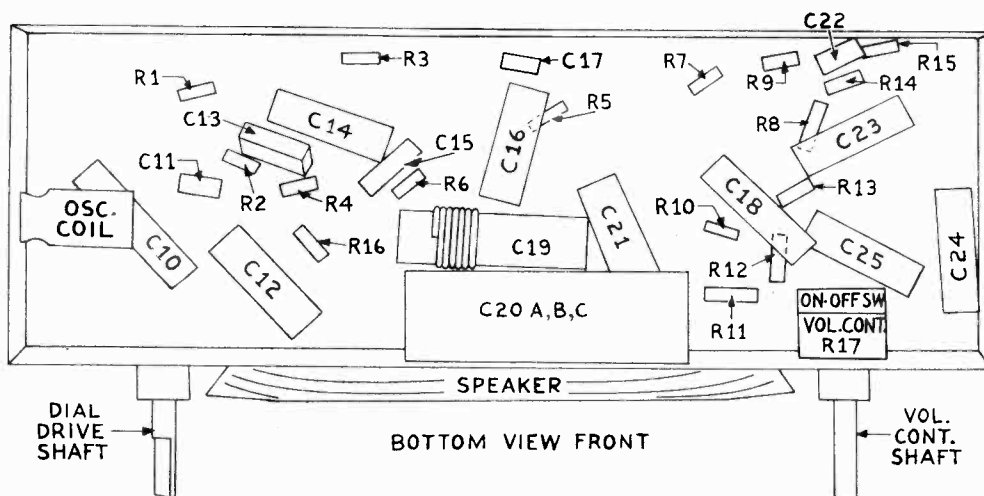
MODEL 48-460

Code 121

## PHILCO MODEL 48-460 CODE 121

TUBE	PIN	VTVM	20,000 OHM PV	1,000 OHM 1V	RESISTANCE
14AF7 CONV.	1	AC	AC	AC	22 OHM
	2	0	0	0	2 OHM
	3	60	60	56	OVER 500 K
	4	-2.5	-2.5	-2.2	50 K
	5	-0.8	0	0	4.5 MEG
	6	80	80	80	OVER 500 K
	7	3.5	3.4	3.2	2 K
	8	AC	AC	AC	10 OHM
7B7 1st IF AMPL.	1	AC	AC	AC	25 OHM
	2	30	30	28	OVER 500 K
	3	40	40	38	OVER 500 K
	4	-0.8	-0.6	-0.3	2.5 MEG
	5	0	0	0	0
	6	-0.8	-0.6	-0.3	2.5 MEG
	7	0	0	0	0
	8	AC	AC	AC	20 OHM
7B7 2nd IF AMPL.	1	AC	AC	AC	34 OHM
	2	84	84	84	OVER 500 K
	3	40	40	38	OVER 500 K
	4	0	0	0	0
	5	0	0	0	0
	6	-0.8	-0.6	-0.2	2.8 MEG
	7	0	0	0	0
	8	AC	AC	AC	26 OHM
7C6 DET. AVC 1st AUDIO	1	AC	AC	AC	8 OHM
	2	48	48	16	OVER 500 K
	3	-0.5	-0.4	-0.2	3 MEG
	4	0	0	0	0
	5	-0.5	-0.4	-0.2	525 K
	6	-0.8	-0.6	-0.3	2.8 MEG
	7	0	0	0	0
	8	0	0	0	0
50L6GT AUDIO OUTPUT	1	--	--	--	--
	2	AC	AC	AC	85 OHM
	3	100	100	100	OVER 500 K
	4	88	88	88	OVER 500 K
	5	0	0	0	500 K
	6	--	--	--	--
	7	AC	AC	AC	34 OHM
	8	6	6	6	130 OHM
35Y4 RECT.	1	AC	AC	AC	115 OHM
	2	AC	AC	AC	112 OHM
	3	88	88	88	OVER 500 K
	4	AC	AC	AC	112 OHM
	5	0	0	0	0
	6	88	88	88	OVER 500 K
	7	118	118	118	OVER 500 K
	8	AC	AC	AC	85 OHM

NOTE: ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO B- AND WITH A LINE VOLTAGE OF 116 V.A.C.



### I.F. ALIGNMENT

REMOVE THE RECEIVER FROM CABINET AND CONNECT THE OUTPUT METER TO THE LEFT TERMINAL (HIGH) AND THE CENTER TERMINAL (LOW) OF THE THREE LUG TERMINAL STRIP MOUNTED ON THE REAR OF THE CHASSIS.

CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE LOOP MODEL 1150 AND COUPLE IT LOOSELY TO THE RECEIVER LOOP.

SET THE SIGNAL GENERATOR TO 455 KC AND FULLY MESH THE RECEIVER TUNING CAPACITOR. KEEP THE RECEIVER VOLUME CONTROL AT MAXIMUM AND THE OUTPUT OF THE SIGNAL GENERATOR SUFFICIENT TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. ADJUST FOR MAXIMUM I.F. TRIMMERS C9, C8, C7 AND C6.

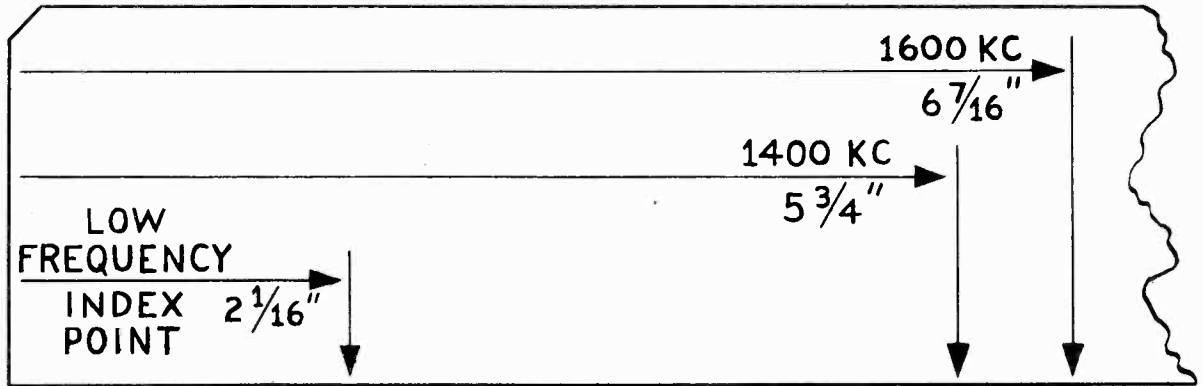
### R.F. OSC. ADJUSTMENT

KEEPING THE SAME SETUP AS USED FOR I.F. ALIGNMENT, SET THE SIGNAL GENERATOR AND RECEIVER TO 1600 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT.

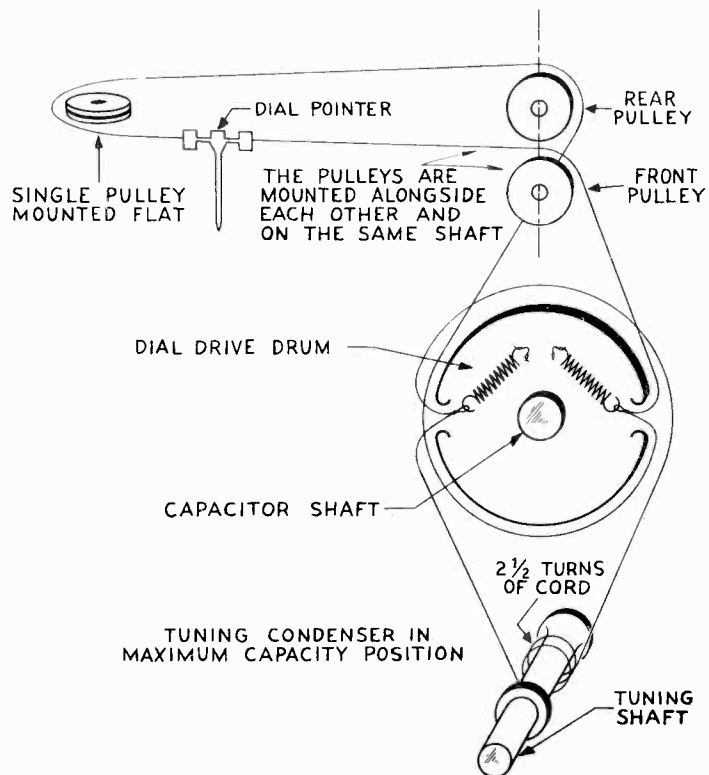
SET THE SIGNAL GENERATOR AND RECEIVER TO 1400 KC AND ADJUST R.F. TRIMMER C4 FOR MAXIMUM OUTPUT.



### DIAL CALIBRATION SCALE



MEASURED FROM LEFT FRONT OF DIAL BACKPLATE



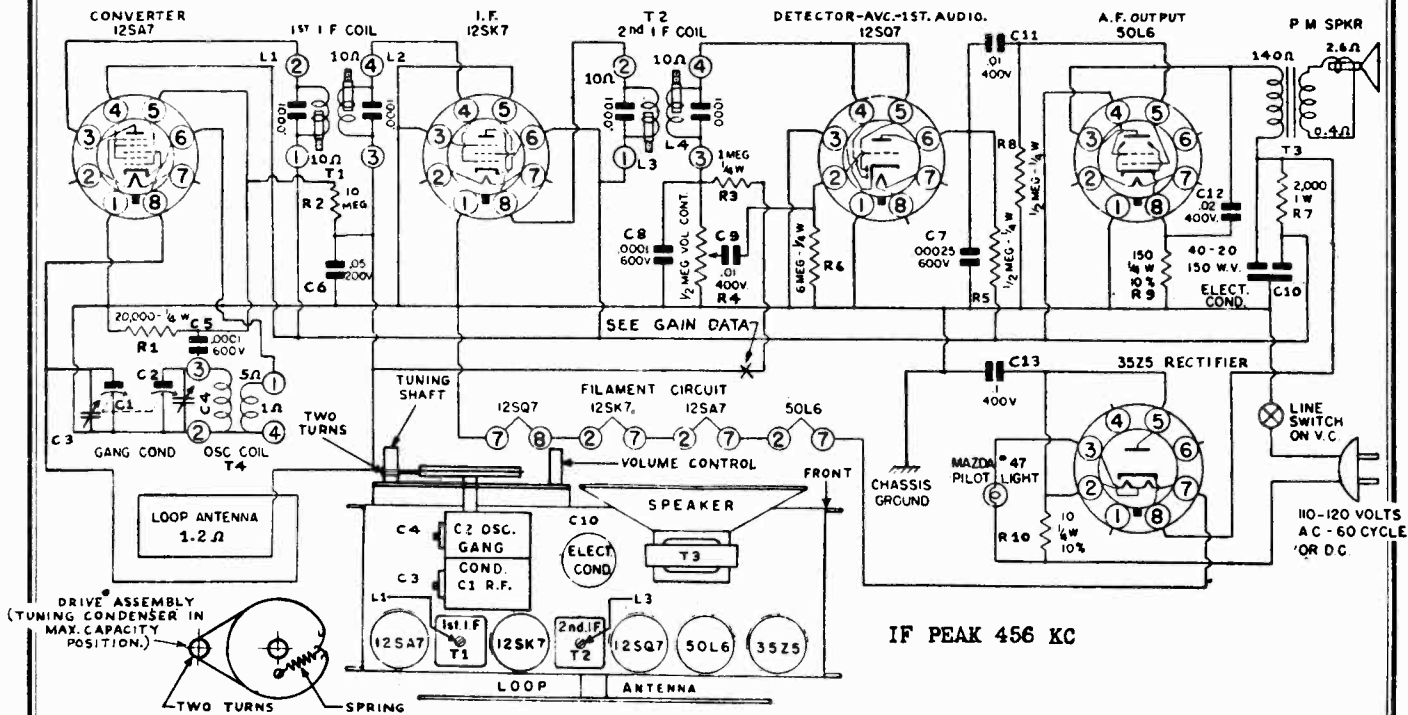
## PHILCO CORP.

MODEL 48-461

Code 121

TUBE	PIN	VTVM	20,000 OHM PV	1,000 OHM PV	RESISTANCE
14AF7 CONV	1	AC	AC	AC	22 OHM
	2	0	0	0	2 OHM
	3	+60	+60	+56	OVER 500 K
	4	-2.5	-2.5	-2.2	50 K
	5	-0.8	0	0	4.5 MEG
	6	+80	+80	+80	OVER 500 K
	7	+3.5	+3.4	+3.2	2 K
	8	AC	AC	AC	10 OHM
7B7 1st I.F. AMPL.	1	AC	AC	AC	28 OHM
	2	+30	+30	+28	OVER 500 K
	3	+40	+40	+38	OVER 500 K
	4	-0.8	-0.6	-0.3	2.5 MEG
	5	0	0	0	0
	6	-0.8	-0.6	-0.3	2.5 MEG
	7	0	0	0	0
	8	AC	AC	AC	20 OHM
7B7 2nd I.F. AMPL.	1	AC	AC	AC	34 OHM
	2	+84	+84	+84	OVER 500 K
	3	+40	+40	+38	OVER 500 K
	4	0	0	0	0
	5	0	0	0	0
	6	-0.8	-0.6	-0.2	2.8 MEG
	7	0	0	0	0
	8	AC	AC	AC	26 OHM
7C6 Det. AVC 1st AUDIO	1	AC	AC	AC	8 OHM
	2	+48	+48	+16	OVER 500 K
	3	-0.5	-0.4	-0.2	3 MEG
	4	0	0	0	0
	5	-0.5	-0.4	-0.2	525 K
	6	-0.8	-0.6	-0.3	2.8 MEG
	7	0	0	0	0
	8	0	0	0	0
50A5 AUDIO OUTPUT	1	AC	AC	AC	90 OHM
	2	+100	+100	+100	OVER 500 K
	3	+88	+88	+88	OVER 500 K
	4	+105	+105	+105	OVER 500 K
	5	--	--	--	--
	6	0	0	0	500 K
	7	+5.5	+5.5	+5.5	130 OHM
	8	AC	AC	AC	32 OHM
35Y4 RECT.	1	AC	AC	AC	120 OHM
	2	AC	AC	AC	116 OHM
	3	+88	+88	+88	OVER 500 K
	4	AC	AC	AC	116 OHM
	5	0	0	0	0
	6	--	--	--	--
	7	+118	+118	+118	OVER 500 K
	8	AC	AC	AC	90 OHM

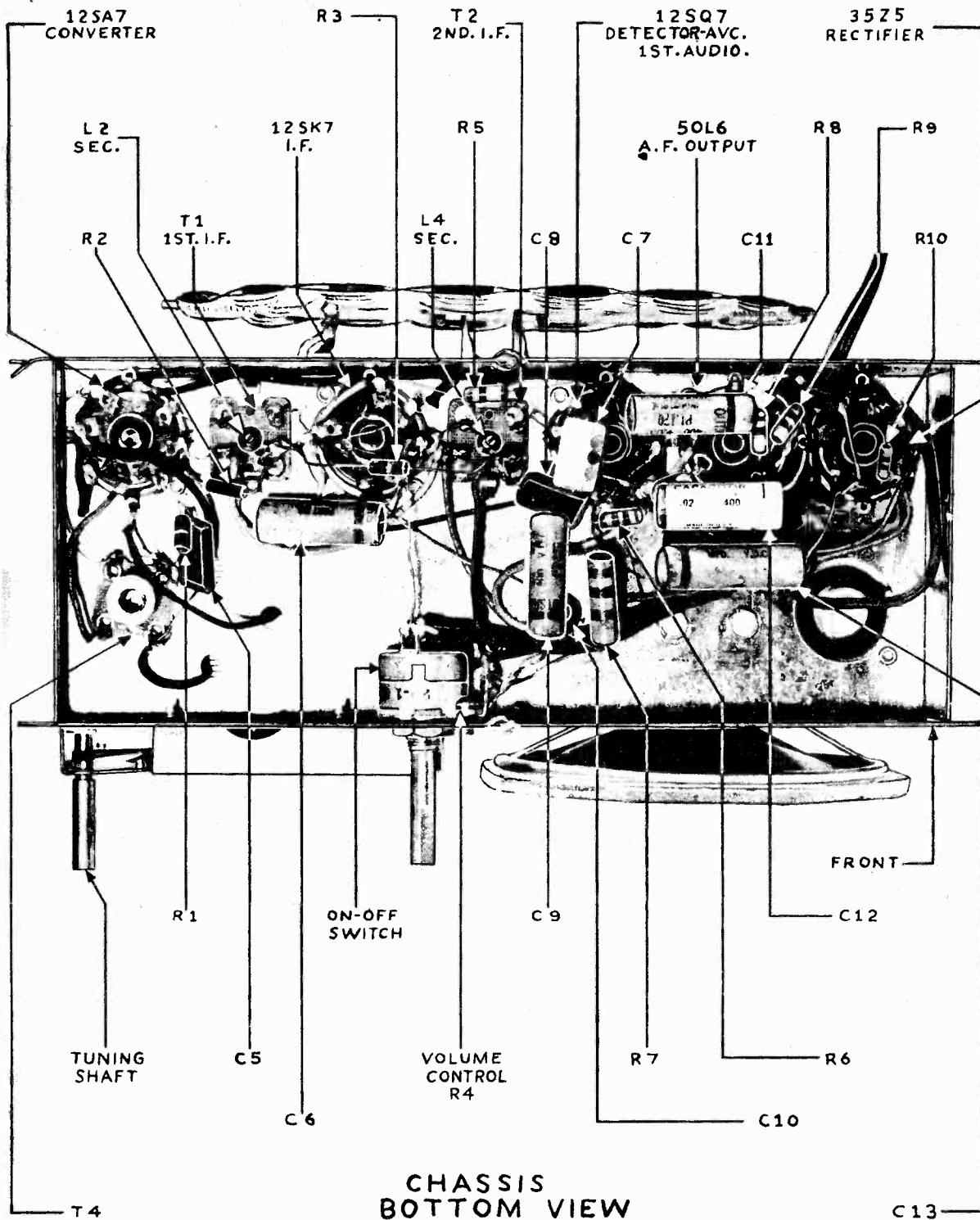
NOTE: ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO B-  
AND WITH A LINE VOLTAGE OF 116 V.A.C.



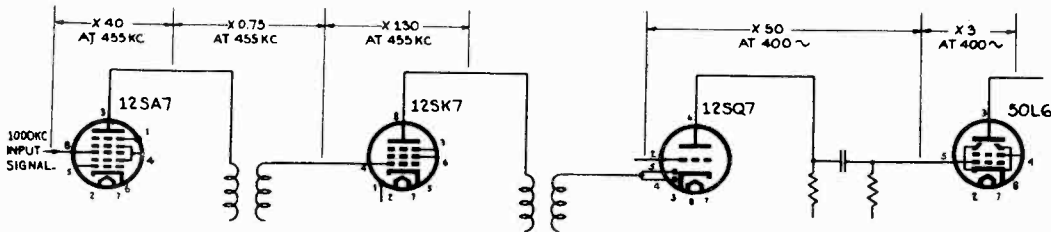
ALIGNMENT

The chassis must be removed from the cabinet in order to align this receiver. Connect the output meter across the voice coil. Connect the signal generator to the standard Hazeltine Loop Model 1150, and couple loosely to the receiver loop. Set the receiver volume control at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 456 Kc and adjust the i-f trimmers for maximum meter deflection in the following sequence: L4, L3, L2, L1. Set the generator and receiver to 1600 Kc and adjust the oscillator trimmer C4 for maximum output. Set the generator and receiver to 1400 Kc and adjust the loop trimmer C3 for maximum output.

TUBE	PIN	VTVM	D-C VOLTAGE		RESISTANCE	TUBE	PIN	VTVM	D-C VOLTAGE		RESISTANCE
			20,000 OHMS PER VOLT	1000 OHMS PER VOLT					20,000 OHMS PER VOLT	1000 OHMS PER VOLT	
12SA7	1	0	0	0	0	50L6	4	-0.5	-0.4	-0.2	400,000
	2	0	0	0	24		5	-0.5	-0.4	-0.2	400,000
	3	+80	+80	+78	INFINITE		6	+46	+42	+40	INFINITE
	4	+80	+80	+78	INFINITE		7	0	0	0	14
	5	-9.5	-9.5	-4.8	20,000		8	0	0	0	0
	6	0	0	0	1		1	0	0	0	0
	7	0	0	0	40		2	0	0	0	40
	8	-1.5	-0.8	-0.2	1,200,000		3	+120	+120	+120	INFINITE
12SK7	1	0	0	0	0	35Z5	4	+80	+80	+78	INFINITE
	2	0	0	0	12		5	0	0	0	460,000
	3	0	0	0	0		6	0	0	0	INFINITE
	4	-1.5	-0.6	-0.2	1,200,000		7	0	0	0	90
	5	0	0	0	0		8	+4.5	+4.5	+4.5	160
	6	+80	+80	+78	INFINITE		1	0	0	0	INFINITE
	7	0	0	0	26		2	0	0	0	120
	8	+80	+80	+78	INFINITE		3	0	0	0	120
12SQ7	1	0	0	0	0	8	4	0	0	0	INFINITE
	2	-0.5	-0.4	-0.2	8,000,000		5	0	0	0	120
	3	0	0	0	0		6	0	0	0	120
							7	0	0	0	90
							8	+120	+120	+120	INFINITE

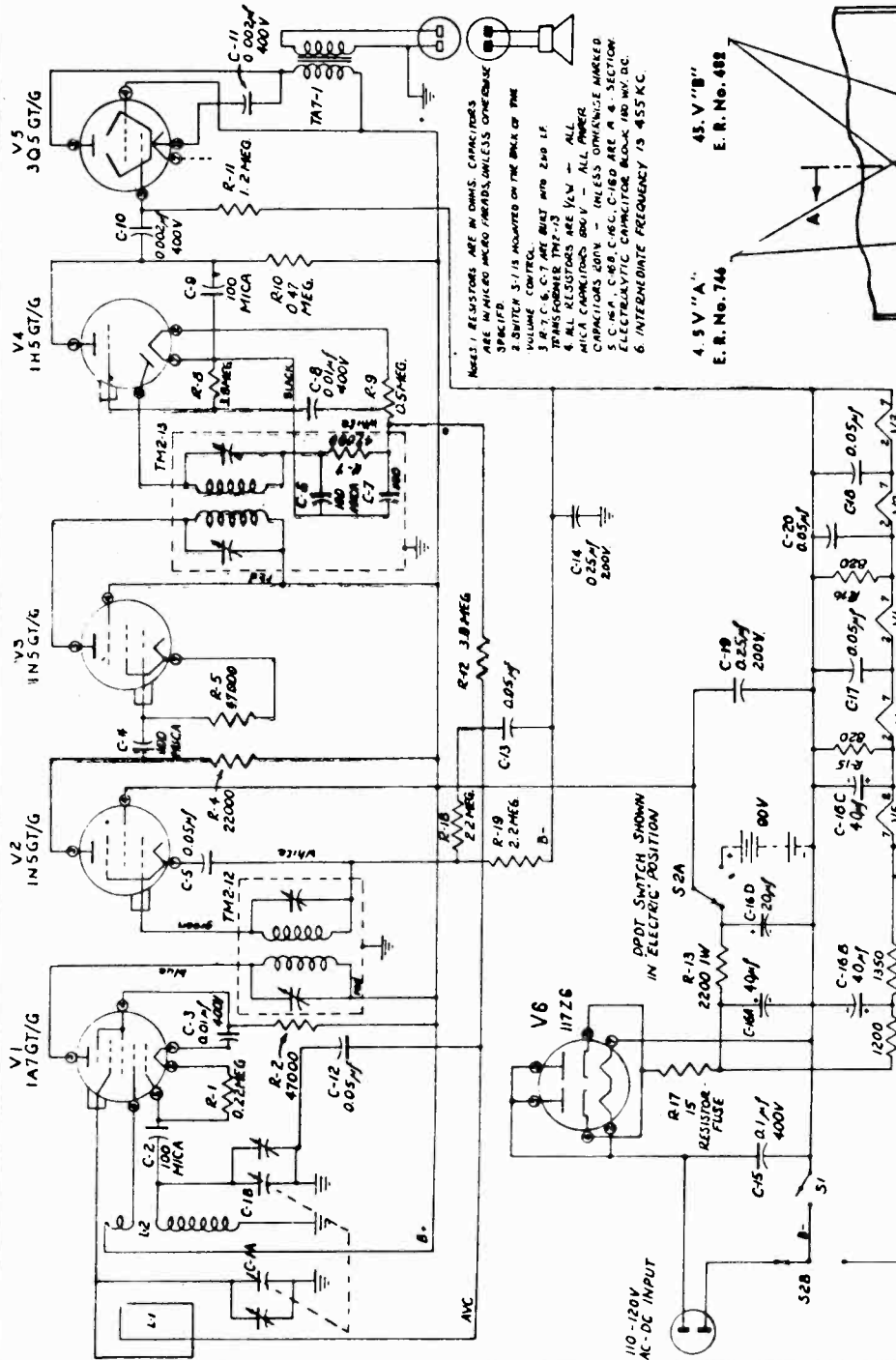


CHASSIS  
BOTTOM VIEW

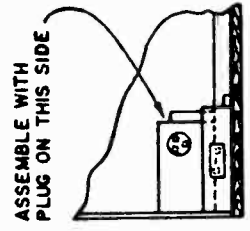
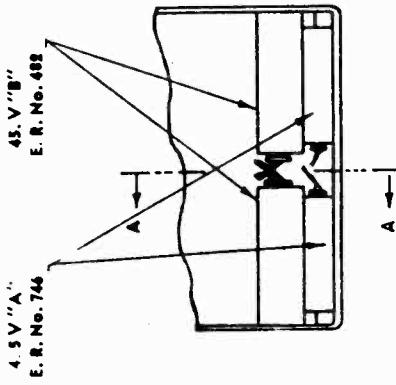


APPROXIMATE  
GAIN PER STAGE  
DATA  
IN MAKING GAIN PER STAGE  
MEASUREMENTS, CIRCUIT WAS  
OPENED AT POINT X TO STOP  
AVC ACTION, AND A 3-VOLT  
BATTERY CONNECTED BETWEEN  
THIS POINT AND GROUND





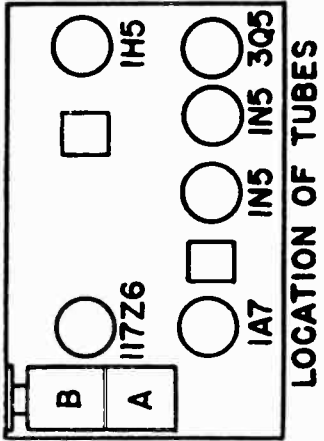
- NOTE 1: RESISTORS ARE IN OHMS, CAPACITORS ARE IN MICRO MFD/MS, UNLESS OTHERWISE SPECIFIED.  
 2. SWITCH S1 IS MOUNTED ON THE BACK OF THE VOLUME CONTROL.  
 3. R-7, C-6, C-7 ARE BUILT INTO THE TRANSFORMER T1.  
 4. ALL RESISTORS ARE 1/2W - ALL MICA CAPACITORS ARE 50V - UNLESS OTHERWISE MARKED.  
 5. CAPACITORS C-16, C-16B ARE IN SECTION 6.  
 6. INTERMEDIATE FREQUENCY IS 455 KC.



SECTION A-A

NOTE: BE SURE TO REMOVE BOLT FROM BOTTOM OF CABINET BEFORE ATTEMPTING TO INSERT BATTERIES

POSITION OF BATTERIES



LOCATION OF TUBES



**Alignment:** No attempt should be made to re-align this receiver until it has been determined that a poor tube, or some local condition is not responsible for the faulty reception.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section (B) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad. An output meter may be clipped directly across the voice coil lugs.

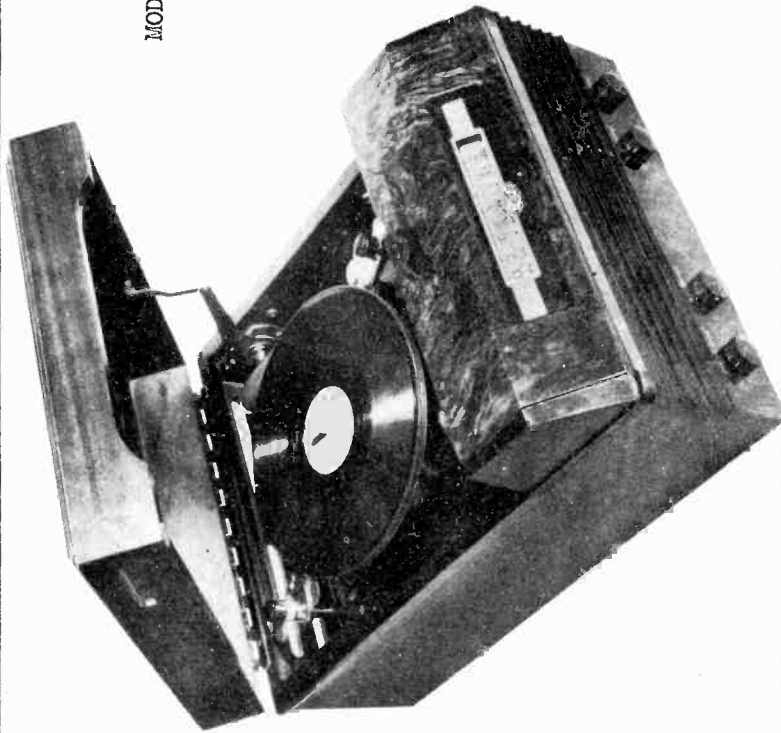
To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (A) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (B) (on rear section) for maximum response. With tuning capacitor plates fully meshed, the receiver should tune to 532 kc; however, no adjustment is required at this point. For checking purposes, four fine marks are engraved on the dial plate. These represent, in order, the pointer position with capacitor plates fully meshed, and the pointer setting for 600, 1000 and 1550 kc.

supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (B) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (A) (on rear section) for maximum response.

**Batteries:** The batteries comprise: two 4½ volt "A" units, Eveready type 746 or equivalent, and two 4.5 volt "B" units, Eveready type 482 or equivalent.

They should be mounted in the compartment provided in the bottom of the cabinet, as shown in sketch. Batteries should be removed when they are dead or if the set is not to be used on battery operation for several months.

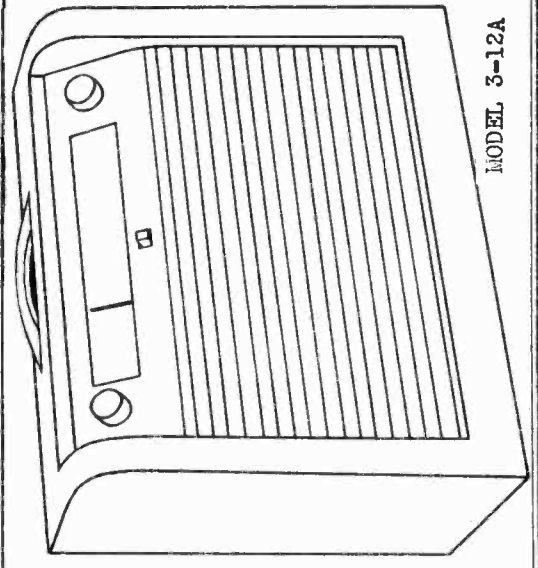
MODEL 3-20A



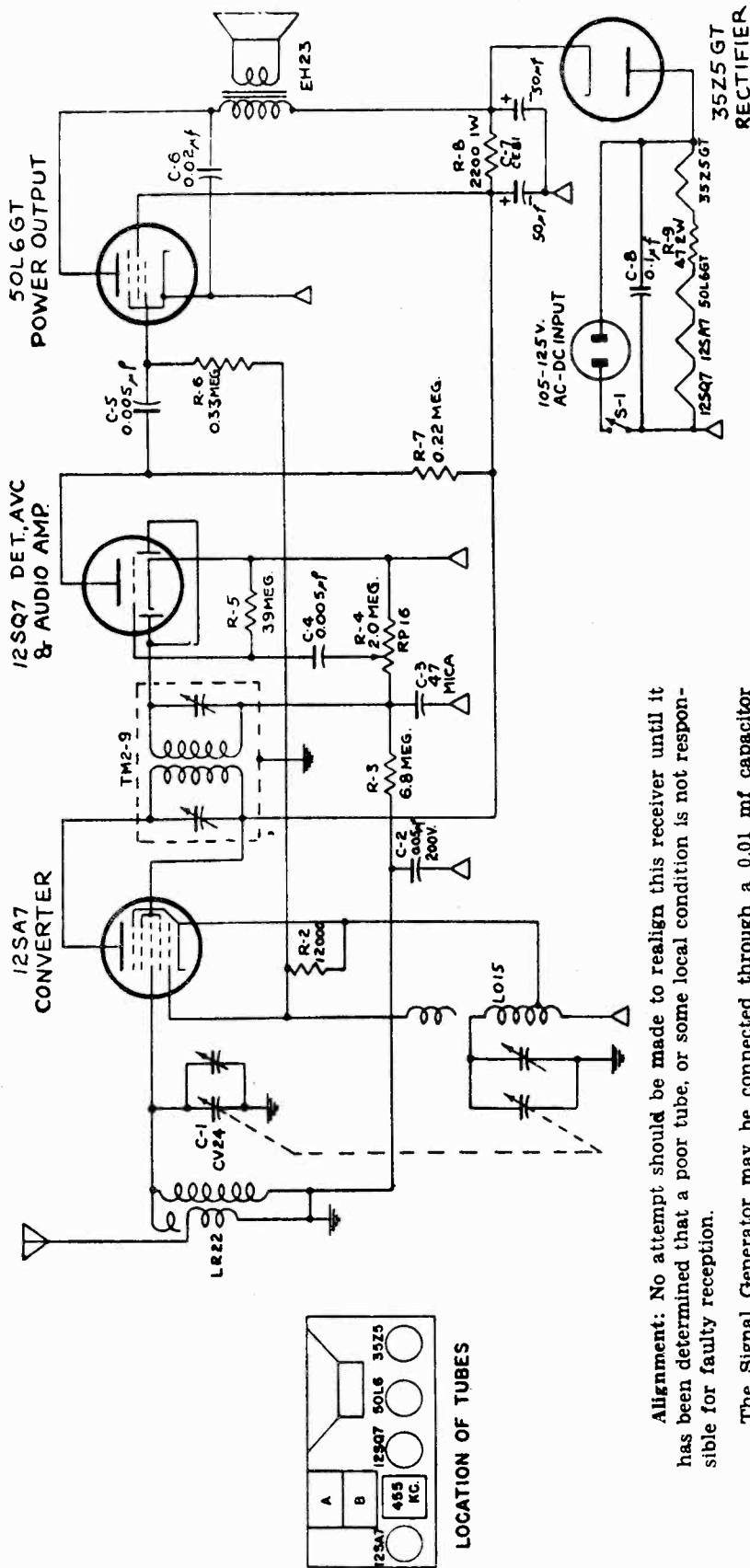
**Alignment:** No attempt should be made to re-align this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section A of tuning capacitor. Connect ground clip of generator to a convenient B-minus point (such as the case of the electrolytic capacitor, or one of the switch terminals on the back of the volume control). An output meter may be clipped directly across the voice coil lugs. Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-



MODEL 3-12A



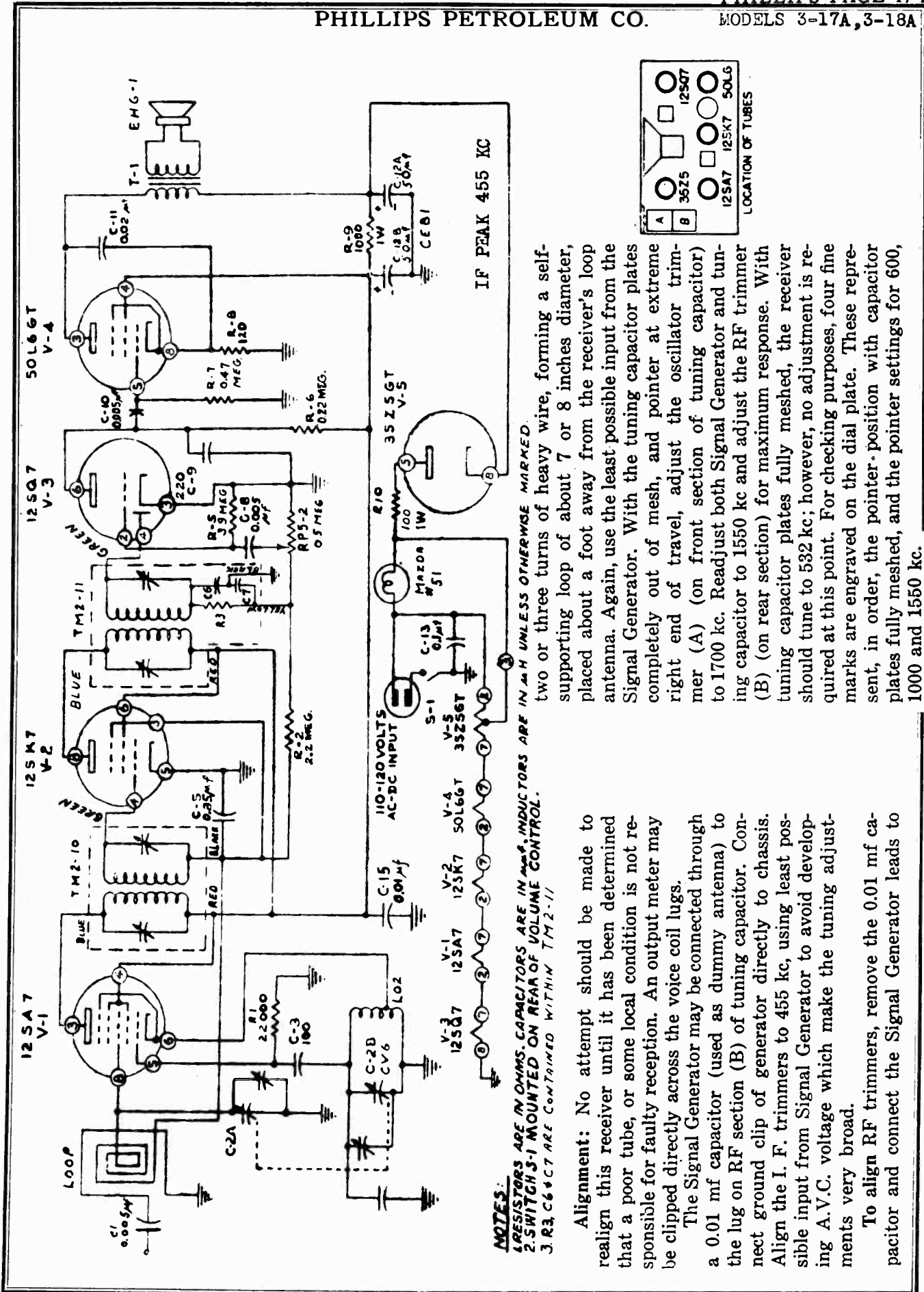
- NOTES:**
1. RESISTORS ARE IN OHMS AND ARE 1/2 WATT; CAPACITORS ARE 400V AND IN  $\mu f$  UNLESS OTHERWISE SPECIFIED.
  2. SWITCH S-1 IS MOUNTED ON REAR OF VOLUME CONTROL.
  3. SYMBOL  $\Delta$  DENOTES B- AND SYMBOL  $\nabla$  DENOTES CHASSIS.
  4. I.F. FREQUENCY IS 455Kc.
  5. TUNING RANGE IS 532Kc. to 1700Kc.

IF PEAK 455 KC

**Alignment:** No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug of RF section of tuning capacitor. Connect ground clip of generator to a convenient B-minus point such as one of the switch terminals on the back of the volume control. An output meter may be clipped directly across the voice coil lugs. Align the IF trimmers to 455 kc using least possible input from signal generator to avoid developing A. V. C. voltage which would make the tuning adjustments very broad.

To align RF trimmer, remove the 0.01 mf capacitor and connect the signal generator hot lead to a 68 mmf mica condenser. Connect the dummy antenna thus formed to the antenna lug on the antenna coil (lug to which the antenna hank is soldered). Again, use the least possible input from the signal generator. With the tuning capacitor plates completely out of mesh, and pointed at extreme clockwise position, adjust the oscillator trimmer on front section of tuning capacitor to 1700 kc. Readjust both signal generator and tuning capacitor to 1550 kc and adjust the RF trimmer on rear section for maximum response.



IF PEAK 455 KC

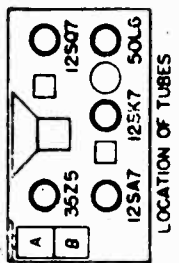
**NOTES:**  
 1. RESISTORS ARE IN OHMS. CAPACITORS ARE IN M.F. INDUCTORS ARE IN M.H. UNLESS OTHERWISE MARKED.  
 2. SWITCH S-1 MOUNTED ON REAR OF VOLUME CONTROL.  
 3. R3, C6 & CT ARE CONTAINED WITHIN TM2-11

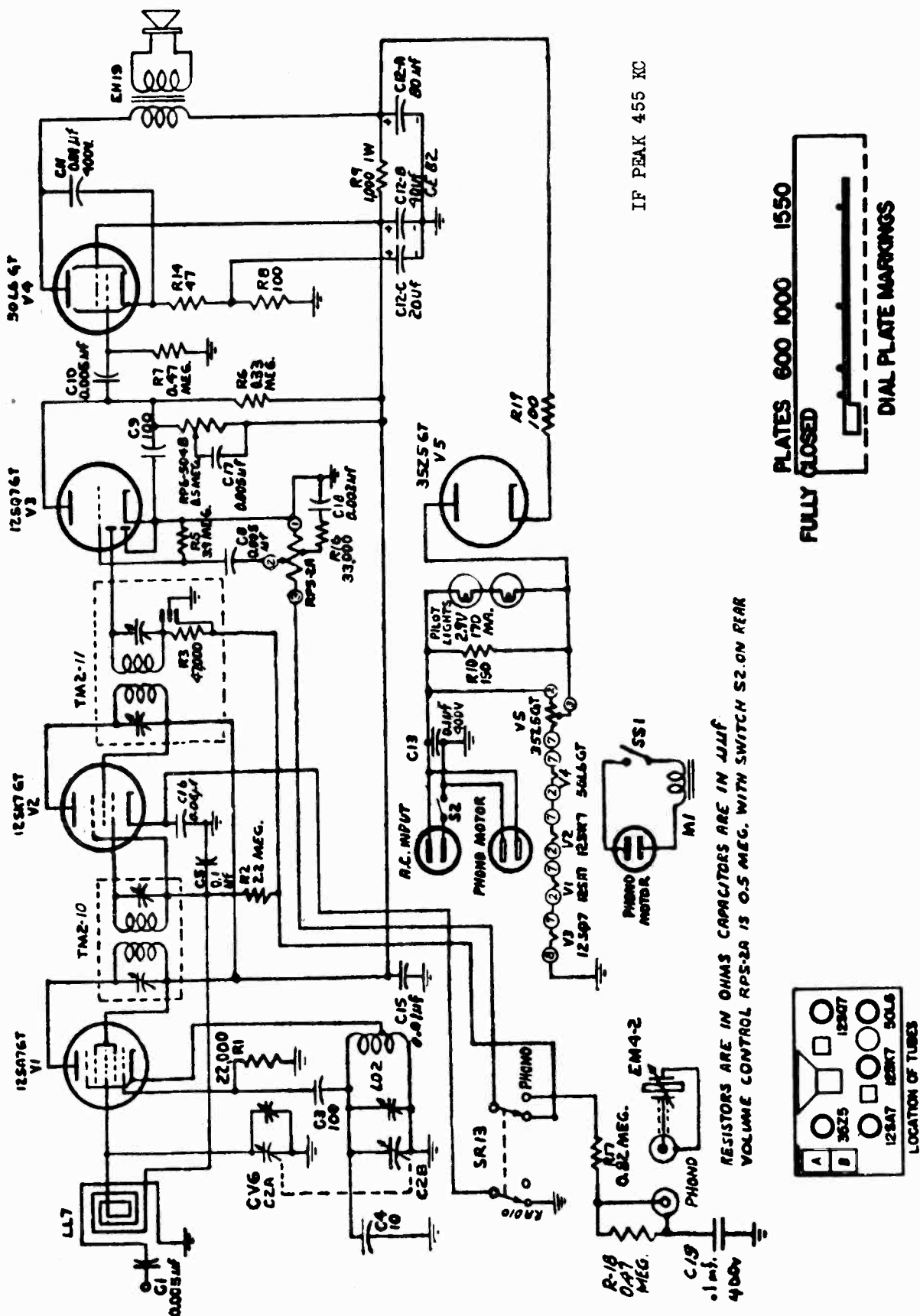
**Alignment:** No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. An output meter may be clipped directly across the voice coil lugs.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section (B) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developments very broad.

To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to

two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (A) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (B) (on rear section) for maximum response. With tuning capacitor plates fully meshed, the receiver should tune to 532 kc; however, no adjustment is required at this point. For checking purposes, four fine marks are engraved on the dial plate. These represent, in order, the pointer position with capacitor plates fully meshed, and the pointer settings for 600, 1000 and 1550 kc.

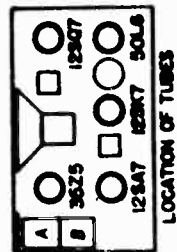


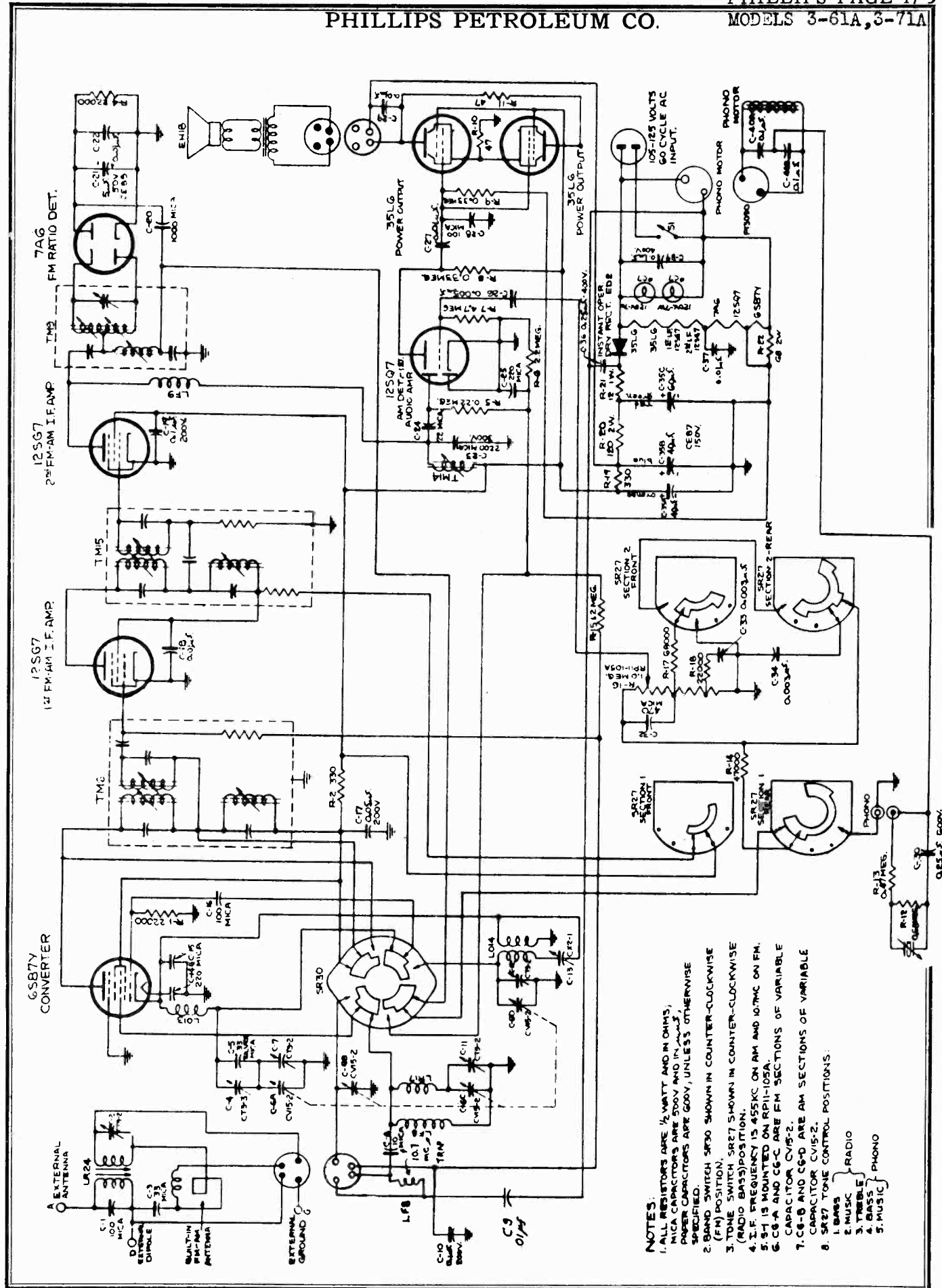


IF PEAK 455 KC



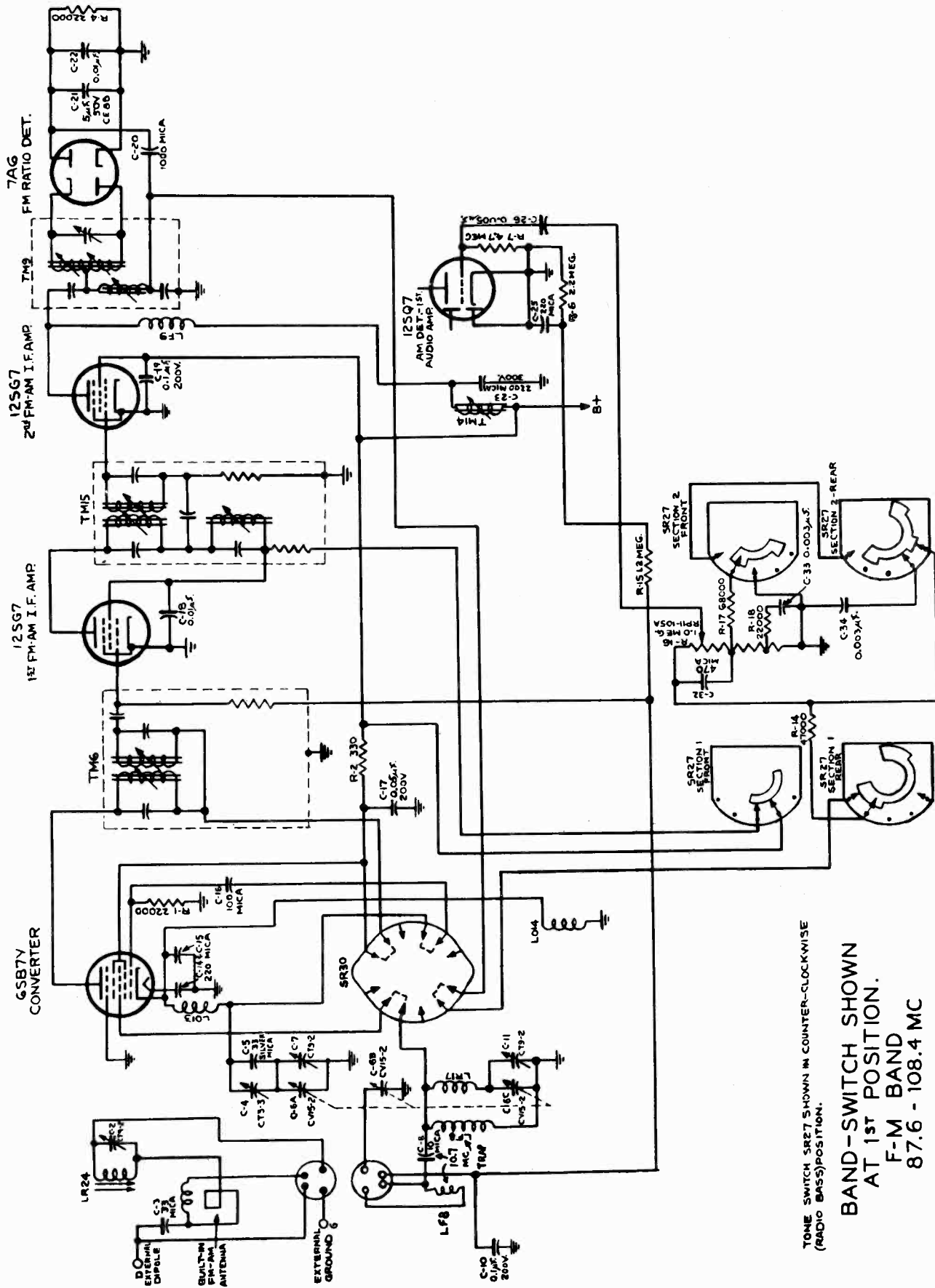
RESISTORS ARE IN OHMS CAPACITORS ARE IN μUF  
VOLUME CONTROL RPS-2A IS 0.5 MEG. WITH SWITCH S2 ON REAR





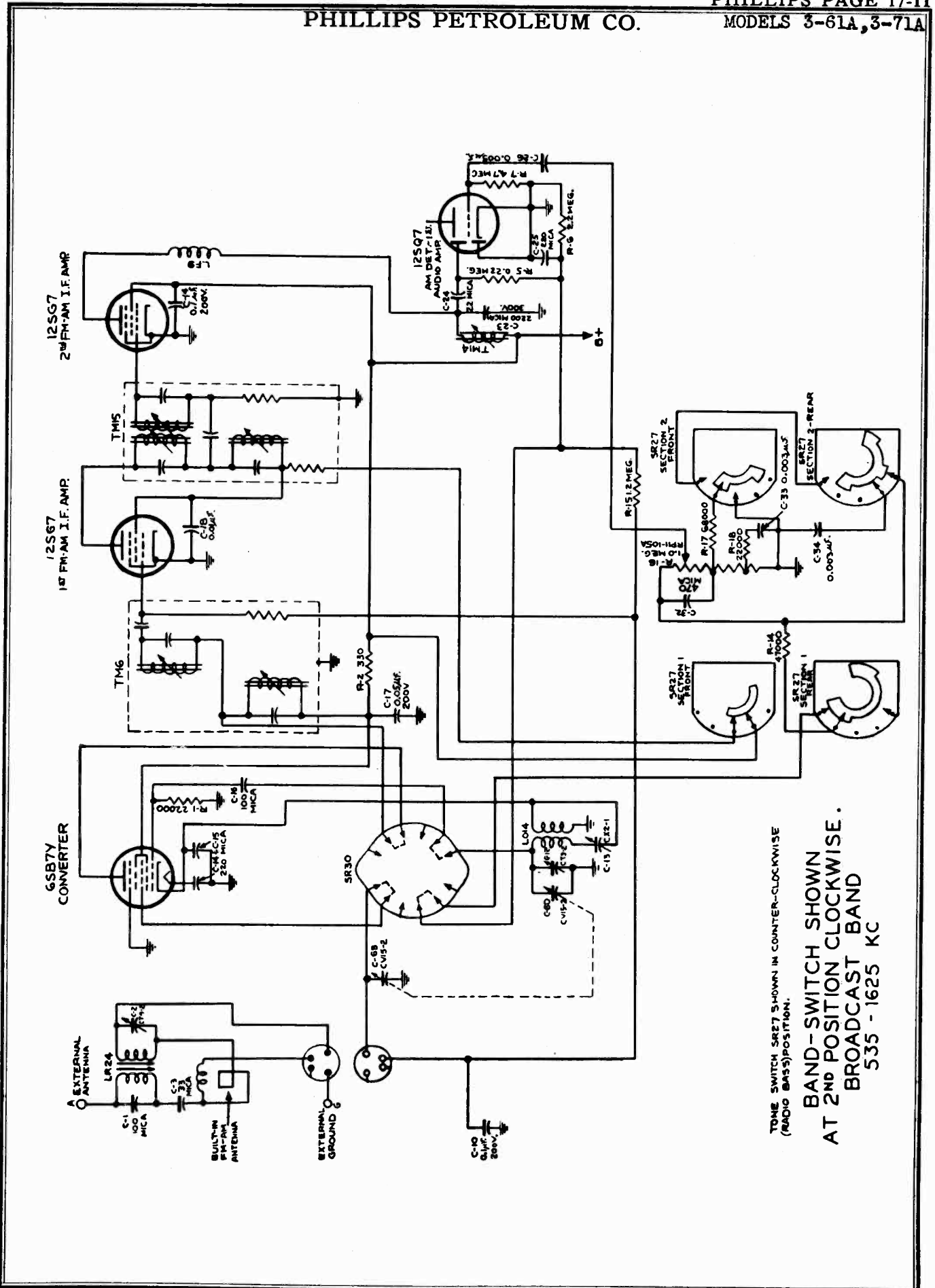
NOTES:  
 1. ALL RESISTORS ARE 1/2 WATT AND IN OHMS, MICA CAPACITORS ARE 500V AND IN MICAS, PAPER CAPACITORS ARE GOVY, UNLESS OTHERWISE SPECIFIED.  
 2. BAND SWITCH SR30 SHOWN IN COUNTER-CLOCKWISE (FM) POSITION.  
 3. TONE SWITCH SR27 SHOWN IN COUNTER-CLOCKWISE (RADIO BASS) POSITION.  
 4. I.F. FREQUENCY IS 455KC ON AM AND 10.7MC ON FM.  
 5. SR1 IS MOUNTED ON RP11-105A.  
 6. C6-A AND C6-C ARE FM SECTIONS OF VARIABLE CAPACITOR CV15-2.  
 7. C6-B AND C6-D ARE AM SECTIONS OF VARIABLE CAPACITOR CV15-2.  
 8. SR27 TONE CONTROL POSITIONS:  
 1. RADIO  
 2. MUSIC  
 3. TREBLE  
 4. BASS  
 5. MUSIC } PHONO

# "clarified schematics"



TONE SWITCH SR27 SHOWN IN COUNTER-CLOCKWISE  
 (RADIO BAND) POSITION.  
 BAND - SWITCH SHOWN  
 AT 1ST POSITION.  
 F-M BAND  
 87.6 - 108.4 MC





6SR27 TONE SWITCH SHOWN IN COUNTER-CLOCKWISE (RADIO BASS) POSITION.  
AT 2ND POSITION CLOCKWISE.  
BROADCAST BAND  
535 - 1625 KC

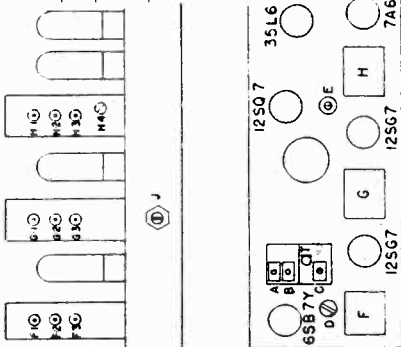
**ALIGNMENT PROCEDURE:**

Dummy Antenna	Signal Generator Connection	Signal Generator Frequency	Band Switch Position	Radio Dial Setting	Adjust	Remarks
0.01 MFD	Terminal T	455 KC AM	Broadcast	1625 KC	E G-1 F-1	Adjust for maximum output Repeat for fine adjustment
0.01 MFD	Pin 4 of 12SG7 2nd FM-AM IF with FM Signal Gen.	10.7 MC FM	FM	108 MC	H-2	Adjust for maximum output (Broad adjustment)
0.01 MFD	"	10.7 MC FM	FM	108 MC	H-4	Adjust for maximum output
0.01 MFD	"	10.7 MC AM	FM	108 MC	H-1 or H-3	Adjust whichever is required for minimum output
						Repeat last two steps for fine adjustment until settings for maximum FM output coincide with settings for minimum AM output.
0.01 MFD	Pin 8 of .6SB7Y Converter	10.7 MC FM	FM	108 MC	G-3 — G-2	Adjust for maximum output
0.01 MFD		"	FM	108 MC	F-3 — F-2	Adjust for maximum output
						Repeat last two steps for fine adjustment
100 MMFSD	"A" Post on Cabinet	600 KC AM	Broadcast	535 KC	Pointer	Adjust pointer to reference mark
				600 KC	J and Core on Ant. Coil in Cab.	Adjust for maximum output
"	"	1550 KC AM	"	1550 KC	B and trimmer on Ant. Coil	Adjust for maximum output
300 OHM Resistor	"	92 MC FM	FM	92 MC	D	Adjust for maximum output
"	"	106 MC FM	FM	106 MC	A and C	Adjust for maximum output

**Alignment:** No attempt should be made to realign this receiver until it has been determined that a poor tube or some local condition is not responsible for faulty reception. The following is a list of the minimum equipment necessary to realign this receiver.

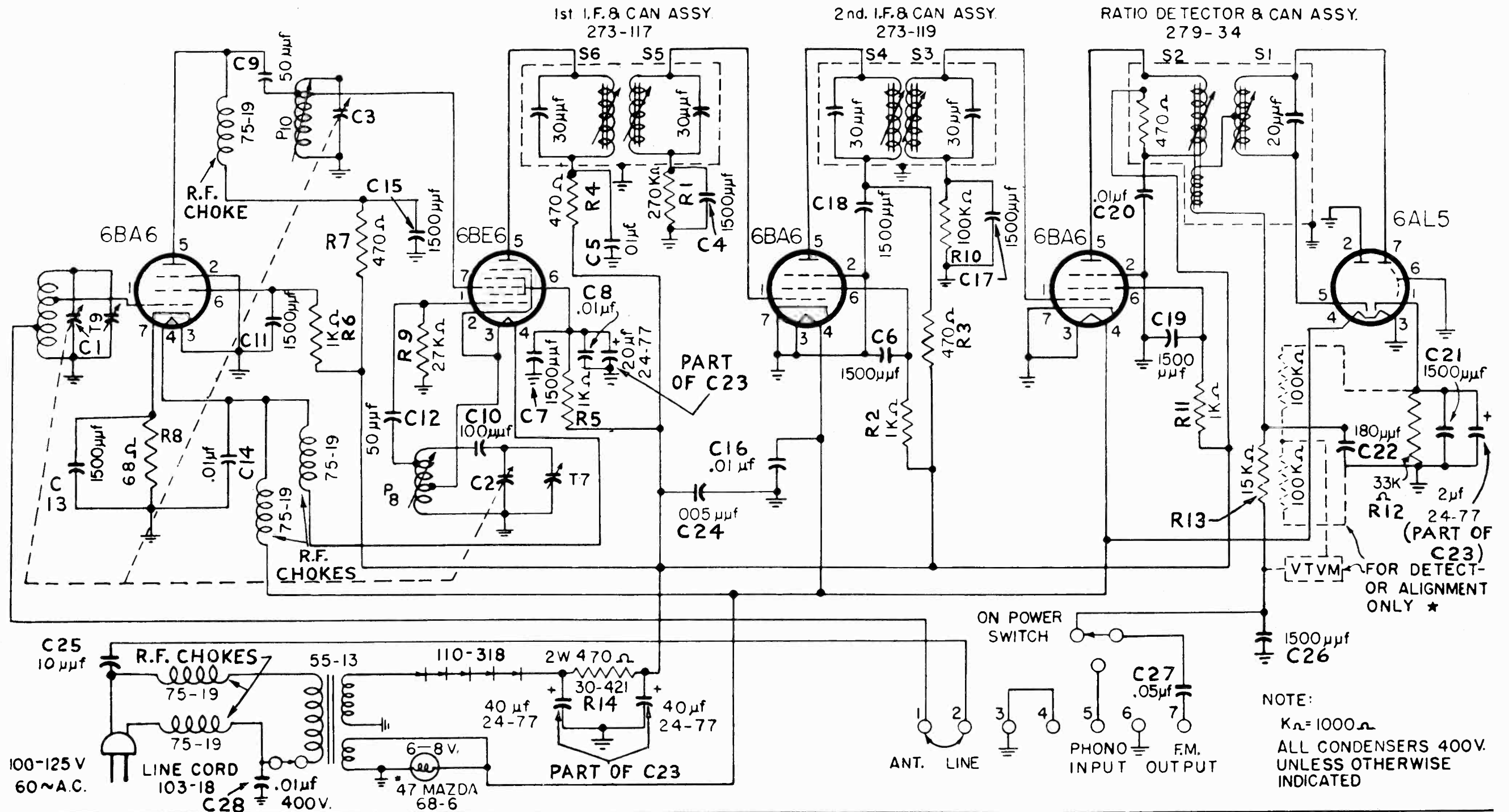
In the following alignment procedure the high side of the signal generator is connected to the terminal indicated in the "Signal Generator Connection" column below. The ground side of the signal generator is connected directly to the chassis. The output meter should be connected across the voice coil of the speaker for all measurements.

- 1—AM signal generator covering 455 KC, 600 KC, 1550 KC and 10.7 MC
  - 2—FM signal generator covering 10.7 MC, 92 MC and 106 MC
  - 3—Output meter, rectifier type, approximately 0 to 2 volts RMS
  - 4—Dummy antennas
  - 0.01 MFD Capacitor
  - 100MMFSD Micra Capacitor
  - 300 Ohm Resistor
- In adjusting the radio frequency trimmers and padders it is advisable to "rock" the variable capacitor gang slightly across the signal being delivered by the signal generator until that particular signal has been accurately peaked.



PILOT RADIO CORP.

MODEL T601  
Pilotuner

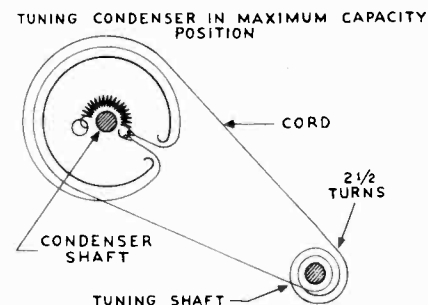


DRAWN BY J.C. CHECKED BY J.P. DATE 12-27

PILOT RADIO CORP. LONG ISLAND CITY, N.Y. U.S.A.

DWG. NO. 90-58 MODEL NO. T601

- S<sub>1</sub> RATIO DETECTOR SEC. 10.7 MC
- S<sub>2</sub> RATIO DETECTOR PRI. 10.7 MC
- S<sub>3</sub> 2ND I.F. SEC. 10.7 MC
- S<sub>4</sub> 2ND I.F. PRI. 10.7 MC
- S<sub>5</sub> 1ST I.F. SEC. 10.7 MC
- S<sub>6</sub> 1ST I.F. PRI. 10.7 MC
- T<sub>7</sub> OSC. TRIMMER 106 MC
- P<sub>8</sub> OSC. PADDER 90 MC
- T<sub>9</sub> ANT. TRIMMER 106 MC
- P<sub>10</sub> R.F. PADDER 90 MC



TO ALIGN RECEIVER USE FREQUENCIES AS INDICATED ON LEFT. ADJUST ALL TRIMMERS FOR MAX. D.C. OUTPUT ACROSS 33KΩ RESISTOR IN 6AL5 CIRCUIT.  
 \*TO ALIGN SECONDARY OF RATIO DETECTOR CONNECT METER AS INDICATED IN SCHEMATIC AND ADJUST S<sub>1</sub> FOR ZERO OUTPUT.

NOTE:  
 K<sub>n</sub> = 1000Ω  
 ALL CONDENSERS 400V.  
 UNLESS OTHERWISE INDICATED

ALIGNMENT CHART

(Follow sequence as indicated)

CIRCUIT ALIGNED	STEP	RCVR. DIAL POINTER	FREQ.	SIGNAL GEN. CONNECTIONS	METER	METER CONNECTIONS	TRIMMER OR SLUG ADJUSTMENT	PROCEDURE
IF	1	88 mc	10.7 mc	Through .01 mfd. cap. to grid of 6BE6	VTVM	Across two 100K resistors indicated by dotted lines in schematic	S2, S1, S4, S3, S6, S5	Adjust for maximum output
	2			Repeat Step No 1				
Ratio Detector	3	88 mc	10.7 mc	Same as No. 1	VTVM	From: Junction of two 100K resistors TO: Audio output of ratio detector. Connections indicated by dotted lines in schematic	S1	Adjust meter to zero (Check proper zero set) Meter should register reverse polarity when slug is rotated through zero output.
	4	90 mc	90 mc	Through carbon 300 ohm resistor to Ant. Terminal	VTVM	Same as Step No. 1	P8	Same as Step No. 1
Oscillator	5	106 mc	106 mc	Same as No. 4	VTVM	Same as No. 1	T7	Same as No. 1
	6			Repeat Steps No. 4 & 5				
RF	7	90 mc	90 mc	Same as No. 4	VTVM	Same as No. 1	P10	Same as No. 1
	8	106 mc	106 mc	Same as No. 4	VTVM	Same as No. 1	T9	Same as No. 1

SENSITIVITY



Approximately 25 Microvolts for  $\frac{1}{2}$  watt output when coupled to an audio amplifier consisting of a triode and power pentode. Perfect Quieting.

AUDIO RESPONSE

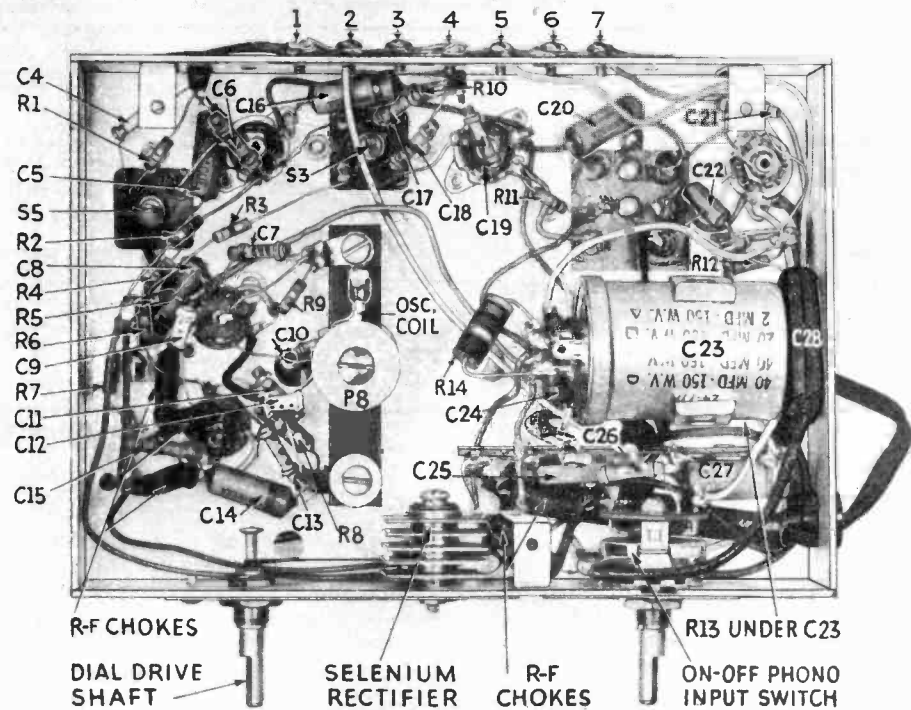
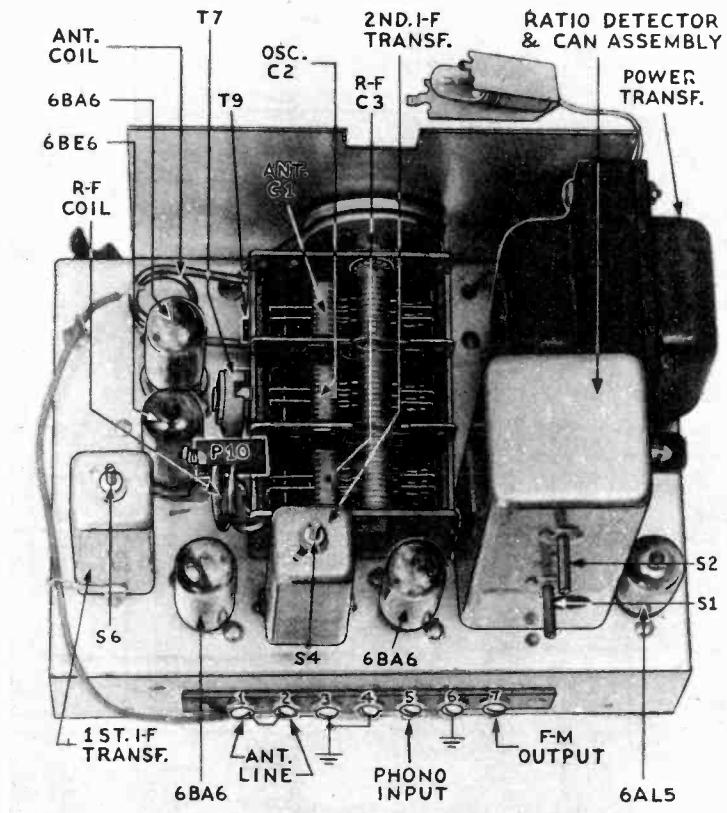
All frequencies up to 12000 cycles. Less de-emphasis than required by transmitter standards, in order to equalize possible deficiencies in the frequency response of audio amplifiers in old AM receivers.

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MODEL T601  
Pilotuner

PAGE 17-4 PILOT  
MODEL T601  
Pilotuner

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## PILOT RADIO CORP.

MODEL T601  
Pilotuner

## PILOTUNER MODEL T-601

TUBE	PIN	VTVM	20,000 P.V.	1.000 P.V.	RESISTANCE
6AB6 RF Ampl	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	AC	AC	AC	0.2 $\Omega$
	5	98	98	98	Over 1 meg
	6	98	98	98	Over 1 meg
	7	0.8	0.8	0.8	70 $\Omega$
6BE6 Conv	1	-1.5	-0.4	-0.2	28 K
	2	0	0	0	0
	3	0	0	0	0
	4	AC	AC	AC	0.2 $\Omega$
	5	98	98	98	Over 1 meg
	6	92	92	92	Over 1 meg
	7	0	0	0	0
6BA6 IF Ampl	1	0	0	0	270 K
	2	0	0	0	0
	3	0	0	0	0
	4	AC	AC	AC	0.2 $\Omega$
	5	94	94	94	Over 1 meg
	6	94	94	94	Over 1 meg
	7	0	0	0	0
6BA6 IF Ampl	1	0	0	0	100 K
	2	0	0	0	0
	3	0	0	0	0
	4	AC	AC	AC	0.2 $\Omega$
	5	94	94	94	Over 1 meg
	6	94	94	94	Over 1 meg
	7	0	0	0	0
6AL5 Ratio Detector	1	1	0.6	0.4	33 K
	2	0	0	0	0
	3	0	0	0	0
	4	AC	AC	AC	0.2 $\Omega$
	5	0.5	0.3	0.2	Infinite
	6	0	0	0	0
	7	0.5	0.3	0.2	Infinite

NOTE: Selenium rectifier D.C. voltage output in 125 V.

NOTE: All voltage and resistance measurements made with respect to chassis ground and with a line voltage of 116 V.A.C.

NOTE: All values are positive unless indicated otherwise.

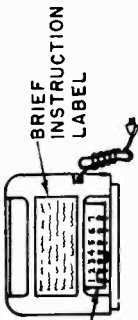
**MODEL T601  
Pilotuner**

**PILOT RADIO CORP.**

**GENERAL**

The FM PILOTUNER is a complete, superheterodyne frequency modulation unit, consisting of 5 miniature tubes and a selenium rectifier. It contains its own power supply, designed for AC operation only. However, it does not contain a loudspeaker and audio system. Therefore, the FM PILOTUNER must be connected and operated through your own radio receiver, or separate phonograph, record player or amplifier system. All installation connections from and to the FM PILOTUNER are made to the terminals on the back of the cabinet, numbered from 1 to 7.

**TERMINAL CONNECTIONS**



A brief resume of the installation instructions is printed on the label attached to the back of the cabinet. For complete explanation, follow the detailed instructions contained in this booklet.

**ANTENNA CONNECTIONS**

The choice of antenna to be used for the best FM reception depends on many factors: your location, the type of building, power and distance of the FM station. The three main types of antennas are explained below. Test your FM PILOTUNER and choose the one most practical for your use.

**A. For local, high-powered FM stations:** The PILOTUNER when shipped from the factory, is equipped with a permanent built-in antenna that will be satisfactory for good reception of most local FM stations. This built-in antenna is connected internally through a wire link between terminals No. 1 and No. 2. For best results when using this built-in antenna, keep the electric line cord extended to its full length and separated from the connector cable of the PILOTUNER.



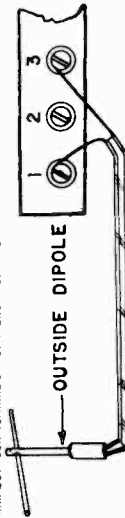
**WIRE LINK**

**B. For local weak-powered FM stations:** Improved reception of weak FM stations may be obtained, in some localities, by disconnecting the wire link between terminals No. 1 and No. 2, and attaching a 4 ft. length of wire to terminal No. 1. Keep this wire stretched out at full length in order to secure the maximum signal pickup.



**4 FT. WIRE**

**C. For distant FM stations:** In a few cases, an outside FM dipole antenna may be found to be necessary when the FM PILOTUNER is operated at a great distance from the broadcasting station, or under unusual operating conditions. The outside dipole antenna (equipped with a 300 ohm flat lead-in) should be connected to terminals No. 1 and No. 3, after the wire link between terminals No. 1 and No. 2 has been disconnected.



**OUTSIDE DIPOLE**

**CONNECTIONS FROM PILOTUNER TO RADIO RECEIVER**

A 5 ft. shielded cable is furnished with the FM PILOTUNER to facilitate connecting the tuner to your radio receiver, or separate phonograph, record player or amplifying system. One end of this cable is provided with spade lugs for easy connection to the terminals at the back of the PILOTUNER.



Attach the center wire of one end of the connector cable to terminal No. 7; attach the outside shielded wire of the same end of the connector cable to terminal No. 8.



Now, the FM PILOTUNER is ready for attachment to your radio receiver. The method of connecting the PILOTUNER will depend on whether the radio receiver is a combination set with phonograph, a radio with phonograph outlet only, or a radio without phonograph or phonograph outlet.

**A. Combination Radio Receiver with Phonograph:** Locate the phonograph terminal at the back of your radio receiver chassis. Usually, it will be marked PHONO or TELEVISION. There are, in general, three different types of phonograph terminals on standard receivers, as follows:



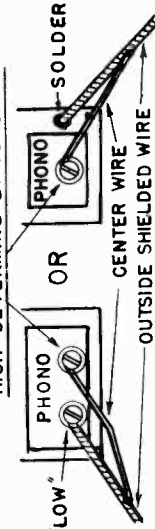
**1. Screw-type Photo Terminal:**

Disconnect any wires attached to this type of phono terminal, and mark them for future reference.

**SCREW TYPE**

Attach center wire of the free end of the PILOTUNER connector cable to the "high" side of the phono terminal. You can determine the "high" side by touching each of the screws of the phono terminal with the radio receiver in operation, and the selector switch on PHONO position; the "high" side will cause speaker hum. Then, attach the outside shielded wire of the end of the PILOTUNER cable to the "low" or grounded side of the phono terminal. If there is only one screw on the phono terminal of your radio receiver, it will be the "high" side.

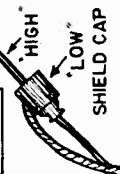
**"HIGH" - DETERMINE BY TOUCHING**



Therefore, connect the outside shielded wire of the PILOTUNER connector cable firmly, preferably by soldering, to the radio receiver chassis.

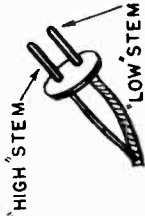
**2. One-hole Plug Phono Terminal:**

Remove plug from phono terminal. Disconnect wires attached to the plug, and mark for future reference.



Connect center wire of PILOTUNER connector cable firmly, preferably by soldering, into center stem of plug ("high" side), and then connect outside shielded wire of connector cable firmly to the outside shield cap of plug ("low" side). Replace plug into single-hole phono terminal.

**3. Two-hole Plug Phono Terminal:**



Remove plug from phono terminal. Disconnect wires attached to the plug and mark for future reference. Connect center wire of PILOTUNER connector cable firmly, preferably by soldering, into one stem of the plug ("high" side), and outside shielded wire of connector cable into other stem of plug ("low" side). Replace two-hole plug into phono terminal.

**B. Radio receiver with Phono Outlet only (no Phonograph):**

Connection of the PILOTUNER will be made similar to the instructions outlined in paragraph III A above, except that no phonograph leads have to be disconnected.

**C. Receiver without Phonograph or Phono Outlet**

**THIS INSTALLATION MUST BE MADE BY A COMPETENT RADIO SERVICE TECHNICIAN SINCE IT IS NECESSARY TO WIRE THE PILOTUNER DIRECTLY INTO THE CIRCUIT OF YOUR RADIO RECEIVER.**

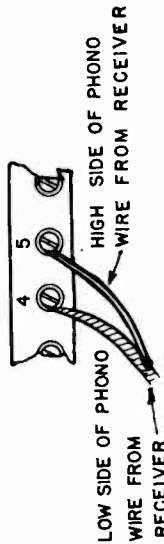
**IV. CONNECTIONS FROM PILOTUNER TO SEPARATE PHONOGRAPH, RECORD PLAYER OR AMPLIFIER SYSTEM**

Connection of the PILOTUNER is possible in accordance with instructions outlined in paragraphs III A, 1, 2 and 3 above, provided there is a phono terminal available. However, if there is no phono terminal, this type of installation must be made by a radio service technician, following the instructions given in paragraph III C, above.

**CONNECTIONS FROM RADIO RECEIVER PHONOGRAPH TO PILOTUNER**

If you disconnected any wires from the phonograph terminal of your radio receiver, in order to connect the FM PILOTUNER (paragraph III A, 1, 2 and 3, above), locate these wires which you marked for future reference.

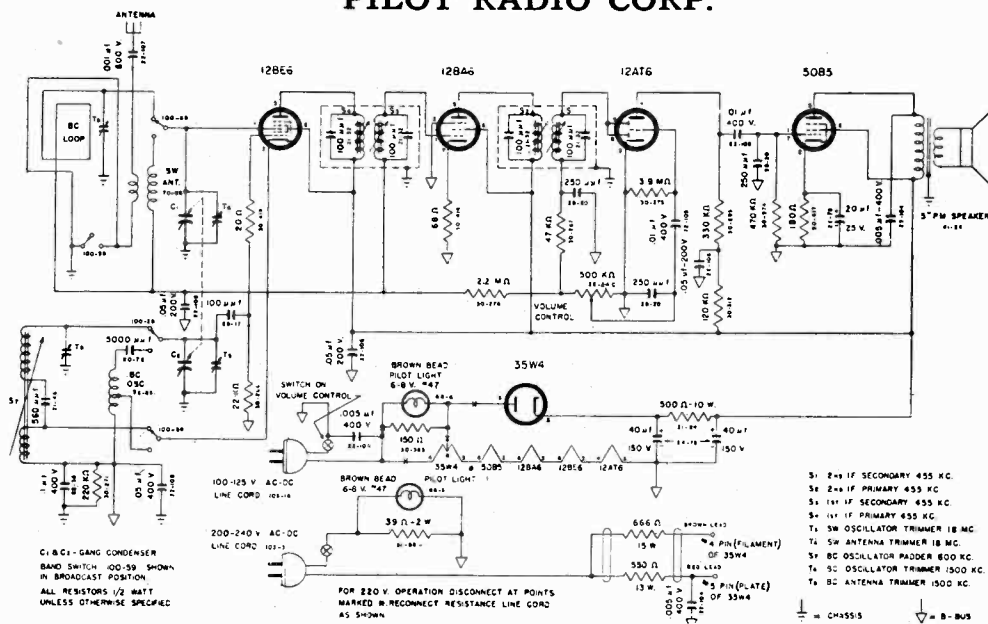
Attach the "high" side of the phonograph wire from your radio receiver to terminal No. 5 of the PILOTUNER, and attach the "low" side of the phonograph wire from your radio receiver to terminal No. 4 of the PILOTUNER. The phonograph of your combination radio will operate normally when the ON-OFF switch of the PILOTUNER is in the OFF position.





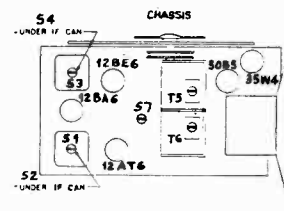
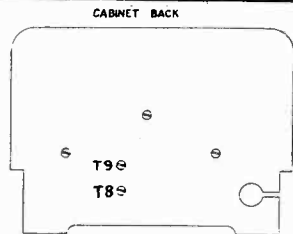
PILOT RADIO CORP.

MODEL T700



ALIGNMENT CHART

Steps	Circuit Aligned	RECEIVER		SIGNAL GENERATOR		Dummy Antenna	Slug or Trimmer to be adjusted
		Band Switch	Dial Pointer	Frequency	Connection		
1	IF	BC	low end of dial	455 kc	grid of 12BE6	0.1 mfd	S1, 2, 3, 4
2	SW	SW	18 mc	18 mc	antenna clip	400 ohm carbon resistor	first: osc. T5; then: ant. T6
3	BC	BC	600 kc	600 kc	antenna clip	200 mmfd mica condenser	Rock in for Max. Reading with S7
4	BC	BC	1500 kc	1500 kc	antenna clip	200 mmfd mica condenser	first: osc. T8; then: loop T9
5	Repeat Steps No. 3 and No. 4						



Alignment should be attempted only if a low range A.C. meter, a signal generator, and insulated alignment tools are at your disposal. The A.C. meter is used as an output meter. The signal generator must cover a frequency range from 450 kc to 24 mc.

It is essential that the signal generator be connected to the points indicated in the alignment chart through the proper dummy antenna.

A good ground connection, secured between the groundpost of the signal generator and the chassis, is necessary.

The output of the signal generator must always be kept at its lowest possible value. This is to prevent the automatic volume control of the receiver from interfering with accurate alignment.

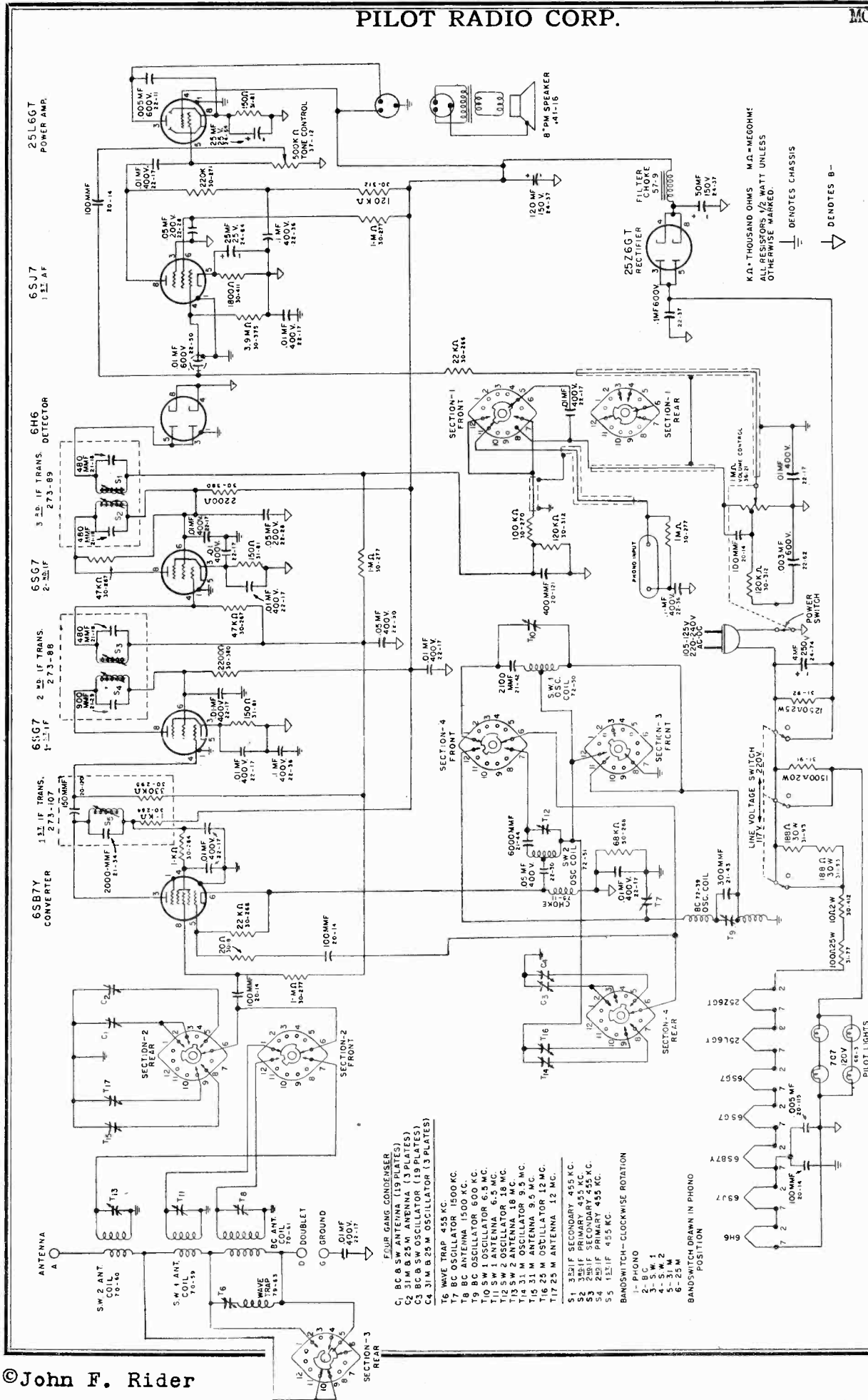
During alignment, the line voltage feeding the receiver power supply should be kept at approximately 117 volts or 225 volts depending on the rating of your receiver.

The locations of adjustment screws are indicated clearly on the schematic diagram. Alignment adjustments should be made only in the sequence given in the chart.

For all alignments, connect the output meter across the voice coil. With the volume control turned fully clockwise, tune for a maximum reading.





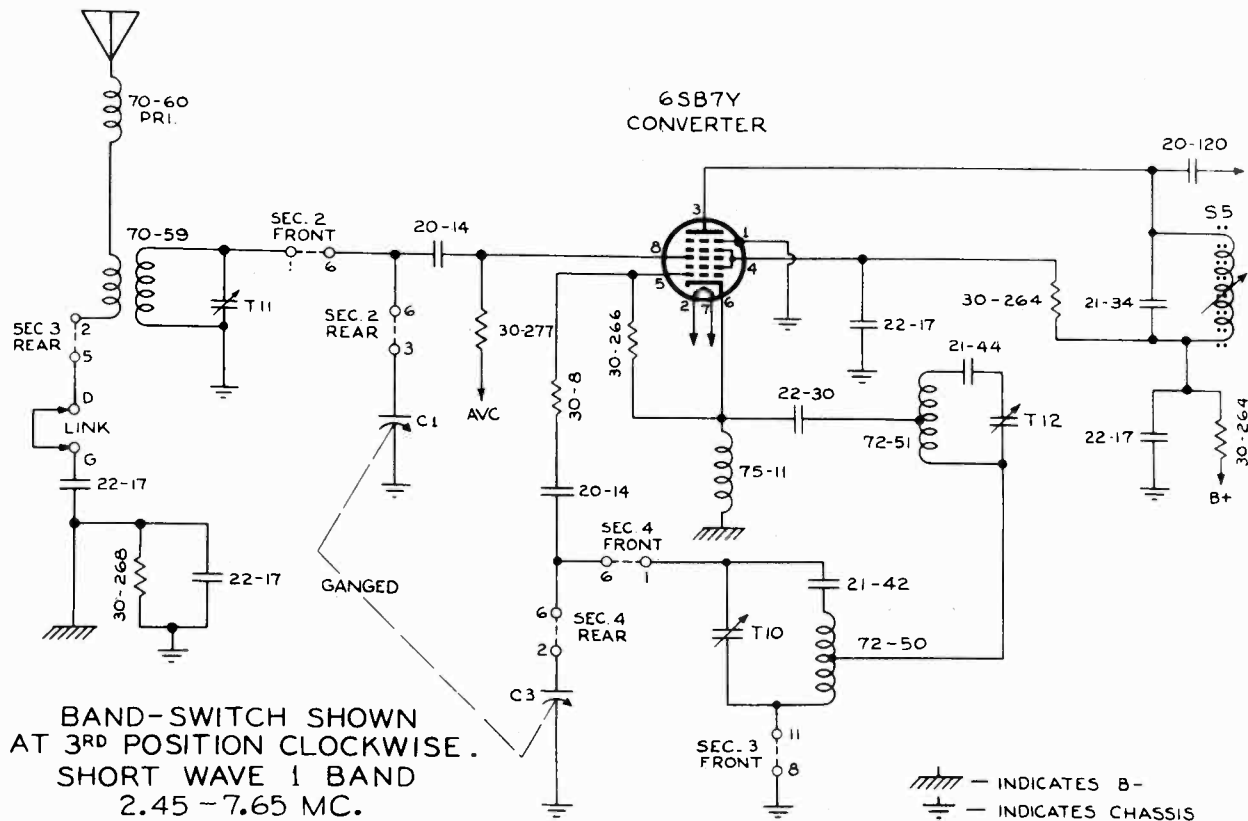
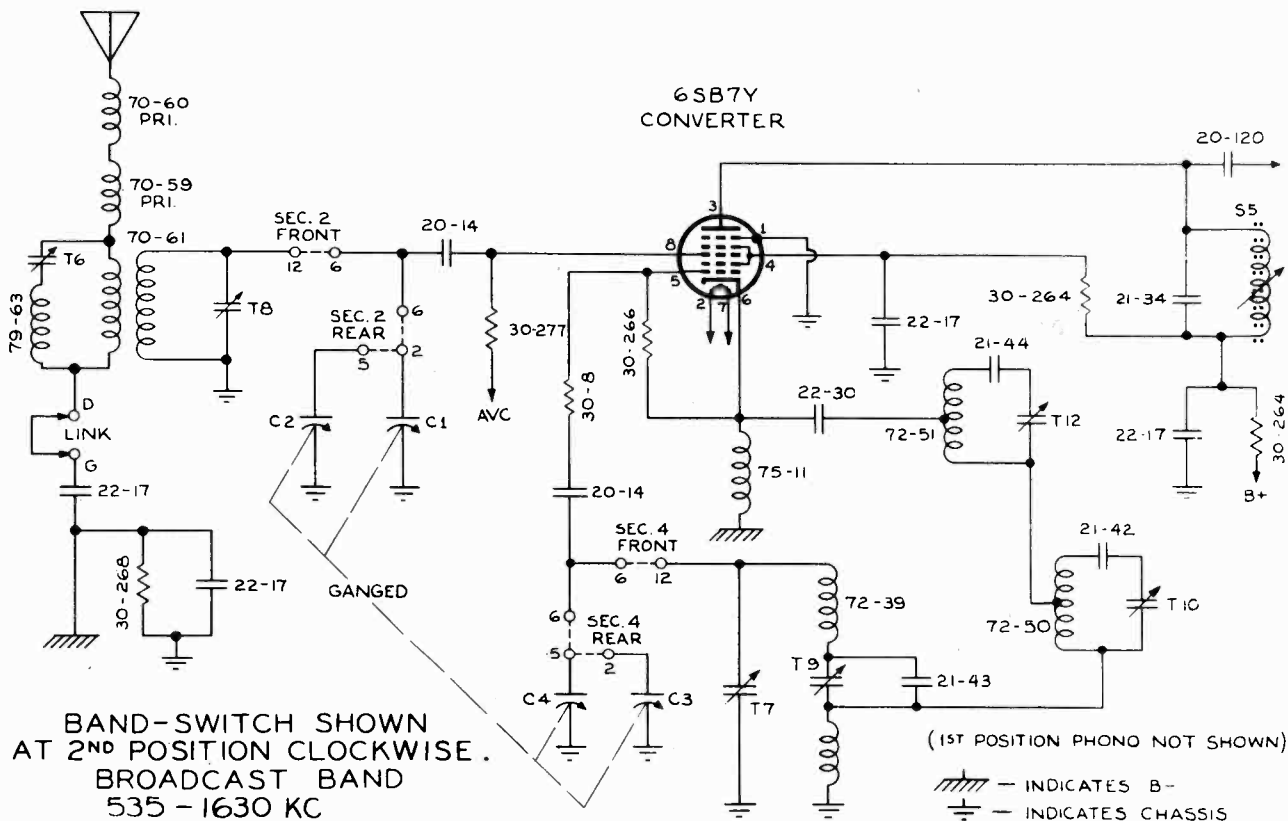


K.A.—THOUSAND OHMS M.O.—MEG OHMS  
ALL RESISTORS 1/2 WATT UNLESS  
OTHERWISE MARKED.

▷ DENOTES B-

- C1, C2, C3 SW ANTENNA (19 PLATES)
  - C4, C5 SW OSCILLATOR (19 PLATES)
  - C6, C7 SW OSCILLATOR (13 PLATES)
  - T6 WAVE TRAP 455 KC 600 KC
  - T7 BC OSCILLATOR 600 KC
  - T8 BC OSCILLATOR 600 KC
  - T9 SW 1 OSCILLATOR 6.5 MC
  - T10 SW 1 ANTENNA 6.5 MC
  - T11 SW 2 OSCILLATOR 18 MC
  - T12 SW 2 ANTENNA 18 MC
  - T13 SW 1 OSCILLATOR 9.5 MC
  - T14 SW 1 ANTENNA 9.5 MC
  - T15 SW 3 OSCILLATOR 12 MC
  - T16 SW 3 ANTENNA 12 MC
  - S1 25Z6GT SECONDARY 455 KC
  - S2 25Z6GT PRIMARY 455 KC
  - S3 25Z6GT SECONDARY 455 KC
  - S4 25Z6GT PRIMARY 455 KC
  - S5 13T1F 455 KC
- BANDSWITCH—CLOCKWISE ROTATION
- 1—PHONO
  - 2—S.W. 1
  - 3—S.W. 2
  - 4—S.W. 3
  - 5—S.W. 4
  - 6—S.W. 5
- BANDSWITCH DRAWN IN PHONO POSITION

MODEL T741





## ALIGNMENT CHART

(FOLLOW SEQUENCE AS INDICATED)

STEP	CIRCUIT ALIGNED	RECEIVER		SIGNAL GENERATOR		TRIMMER OR SLUG TO BE ADJUSTED	PROCEDURE
		BAND SWITCH	DIAL POINTER	FREQUENCY	CONNECTION		
1	IF	BC	At low frequency end of dial	455 KC	Through .1 mfd. condenser to front section of gang	#1, 2, 3, 4 and 5	Adjust for maximum output
2	IF Trap	BC	At low frequency end of dial	455 KC	Through 200 mmf. cond. to antenna post "A" with "D" tied to "G"	#6 (beneath chassis)	Adjust for minimum output
3	Broadcast RF	BC	150 on dial	1500 KC	"	1. #7 (osc.) 2. #8 (ant.)	Adjust for maximum output
4		BC	60 on dial	600 KC	"	#9 (osc. padder)	Adjust for maximum output while rocking var. cond.
5		BC	REPEAT STEPS 3, 4 and 3				
6	Inter-nat'l SW1	Inter-nat'l SW1	6.5 MC on dial	6.5 MC	Through 400 ohm. resistor to antenna post "A" with "D" tied to "G"	1. #10 (osc.) 2. #11 (ant.)	Adjust for maximum output
7	Inter-nat'l SW2	Inter-nat'l SW2	18.0 MC on dial	18.0 MC	"	1. #12 (osc.) 2. #13 (ant.)	Adjust for maximum output
8	31 Meter Band-spread	31 Meter Band-spread	9.5 MC on dial	9.5 MC	"	1. #14 (osc.) 2. #15 (ant.)	Adjust for maximum output
9	25 Meter Band-spread	25 Meter Band-spread	12.0 MC on dial	12.0 MC	"	1. #16 (osc.) 2. #17 (ant.)	Adjust for maximum output

Alignment should be attempted only if a low range A.C. meter, a signal generator, and insulated alignment tools are at your disposal. The A.C. meter is used as an outputmeter. The signal generator must cover a frequency range from 450 kc to 24 mc.

It is essential that the signal generator be connected to the points indicated in the alignment chart through the proper dummy antenna.

A good ground connection, secured between the groundpost of the signal generator and the chassis, is necessary.

The output of the signal generator must always be kept at its lowest possible value. This is to prevent the automatic volume control of the receiver from interfering with accurate alignment.

During alignment, the line voltage feeding the receiver power supply should be kept at approximately 117 volts or 225 volts, depending on position of line switch.

The locations of adjustment screws are indicated clearly on the schematic diagram. Alignment adjustments should be made only in the sequence given in the chart.

For all alignments, connect the outputmeter across the voice coil. With the volume control turned fully clockwise, tune for a maximum reading.

## TUNING RANGE

Band (1) — Phonograph — (Must have record player attached)

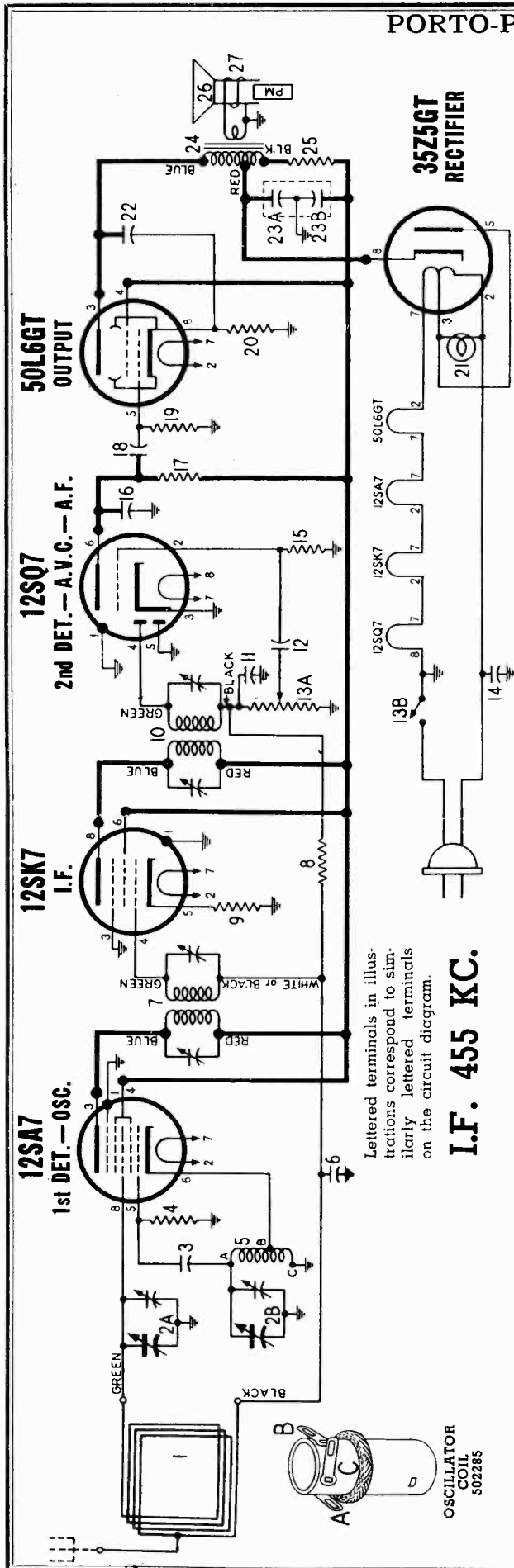
Band (2) — Standard Broadcast — (535-1630 kc or 184 to 561 meters)

Band (3) — International Shortwave Band 1 — (2.45 to 7.65 mc or 39.2 to 122.3 meters)

Band (4) — International Shortwave Band 2 — (7.35 to 22.5 mc or 13.3 to 40.8 meters)

Band (5) — 31 Meter Bandsread — (9.46 to 9.74 mc or 30.8 to 31.7 meters)

Band (6) — 25 Meter Bandsread — (11.53 to 12.12 mc or 24.8 to 26 meters)



Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

I.F. 455 KC.

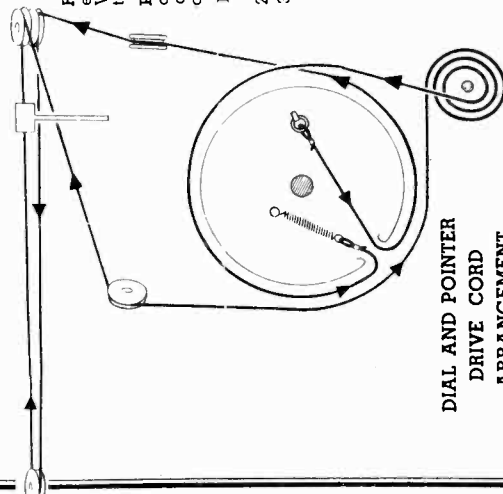
STAGE GAIN MEASUREMENT PROCEDURE

**REQUIRED INSTRUMENTS:** The amount of amplification or "gain" of each of the stages of this receiver may be measured with an A.C. Vacuum Tube Voltmeter or a "channel" type instrument containing a tuned and calibrated amplifier.

**PROCEDURE:** It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

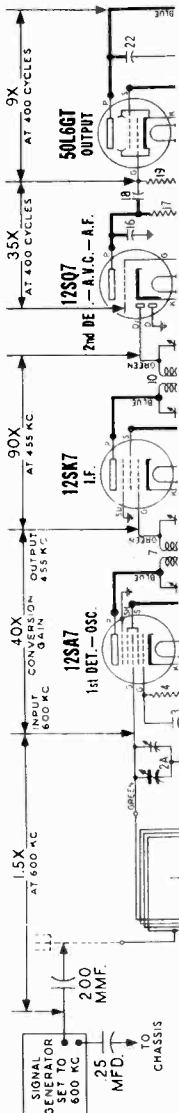
1. Be sure that R.F. and I.F. stages are carefully and accurately aligned by utilizing the alignment procedure given above.
2. Connect Signal Generator as shown below.
3. The values of stage gain which are given here were measured with a fixed bias of 3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to A.V.C. at

4. Set Signal Generator for operation at 600 Kc with 400 cycle modulation and carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.
6. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

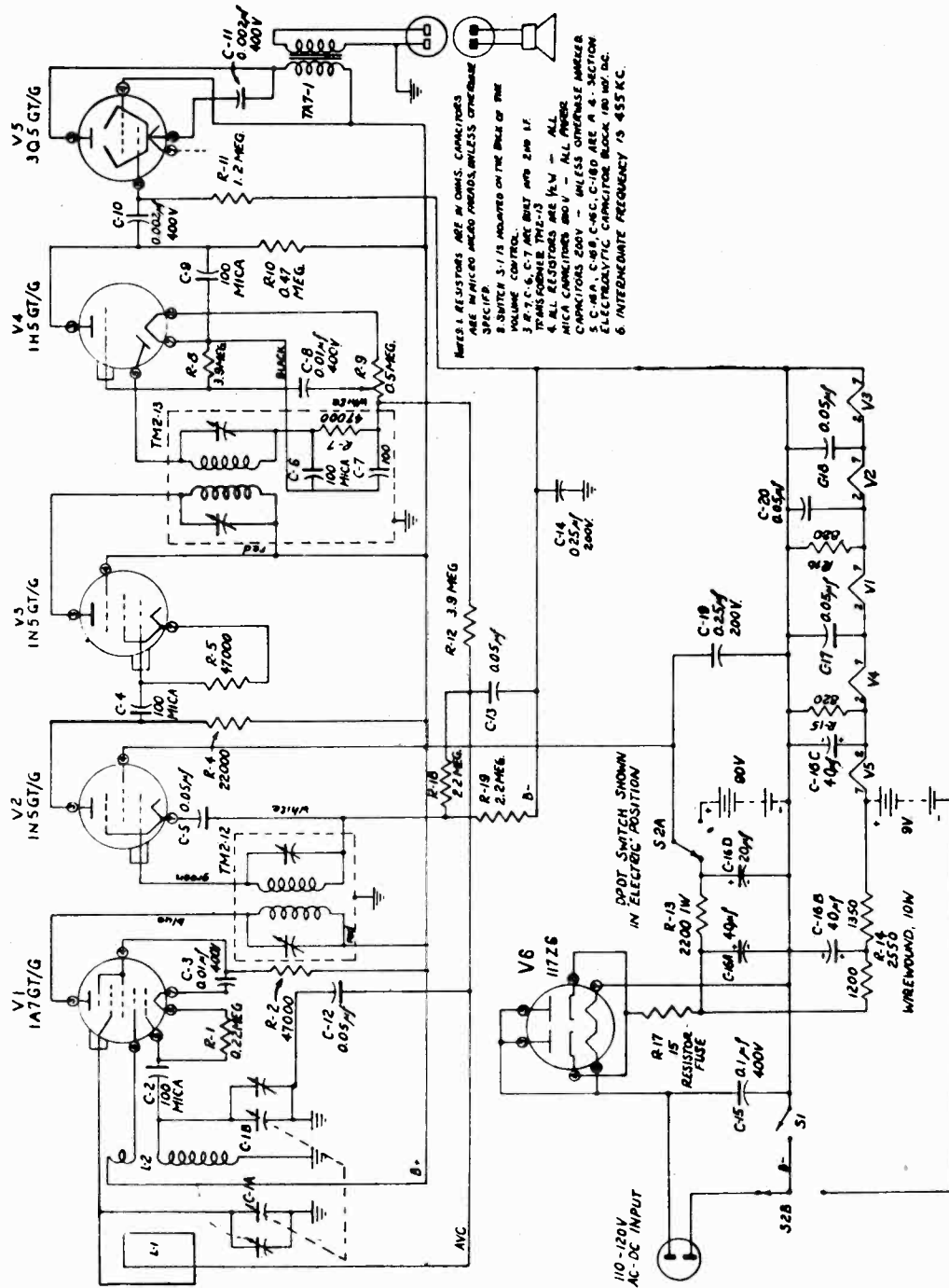
- To string dial cord, set gang condenser to fully open position and use following parts:
- 114955 Clip on end of cord
  - 117057 Cord (5 feet)
  - 119087 Ring for dial cord
  - 161384 Tension Spring



**DIFFERENCES** in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.





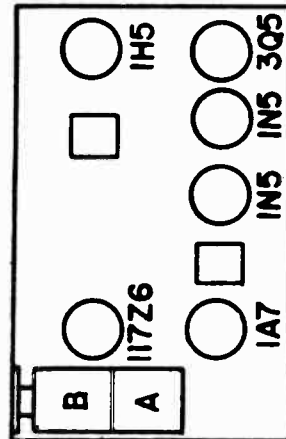
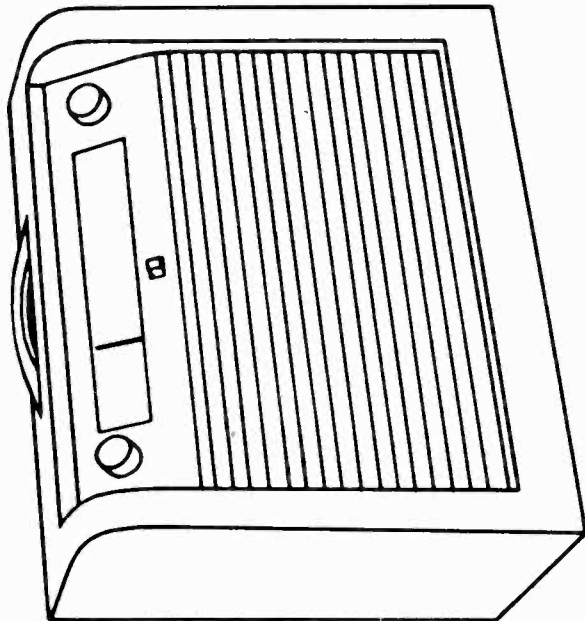


NOTES: 1. RESISTORS ARE IN OHMS, CAPACITORS ARE IN MICRO MICRO FARADS, UNLESS OTHERWISE SPECIFIED.  
 2. SWITCH S-1 IS MOUNTED ON THE BACK OF THE VOLUME CONTROL.  
 3. R-7, C-6, C-7 ARE BUILT UP 2ND LF.  
 4. TRANSFORMERS T-1, T-2, T-3 ARE 12500.  
 5. ALL RESISTORS ARE 1/4W - ALL POWER CAPACITORS 200V - UNLESS OTHERWISE MARKED.  
 6. C-18A, C-18B, C-18C, C-18D ARE A 4-SECTION ELECTROLYTIC CAPACITOR BLOCK 100 MFD. D.C.  
 7. INTERMEDIATE FREQUENCY IS 455 KC.

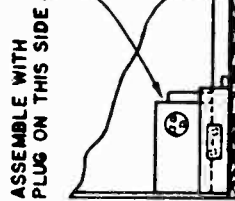
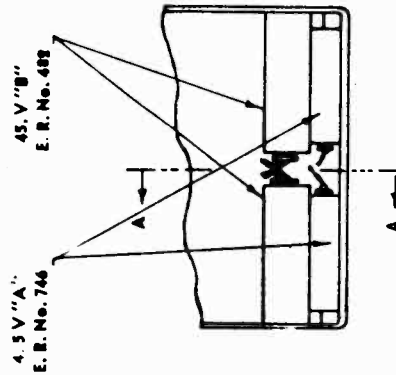
The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section A of tuning capacitor. Connect ground clip of generator to a convenient B-minus point (such as the case of the electrolytic capacitor, or one of the switch terminals on the back of the volume control). An output meter may be clipped directly across the voice coil lugs. Align the I.F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (B) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (A) (on rear section) for maximum response.

**Alignment:** No attempt should be made to re-align this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception.



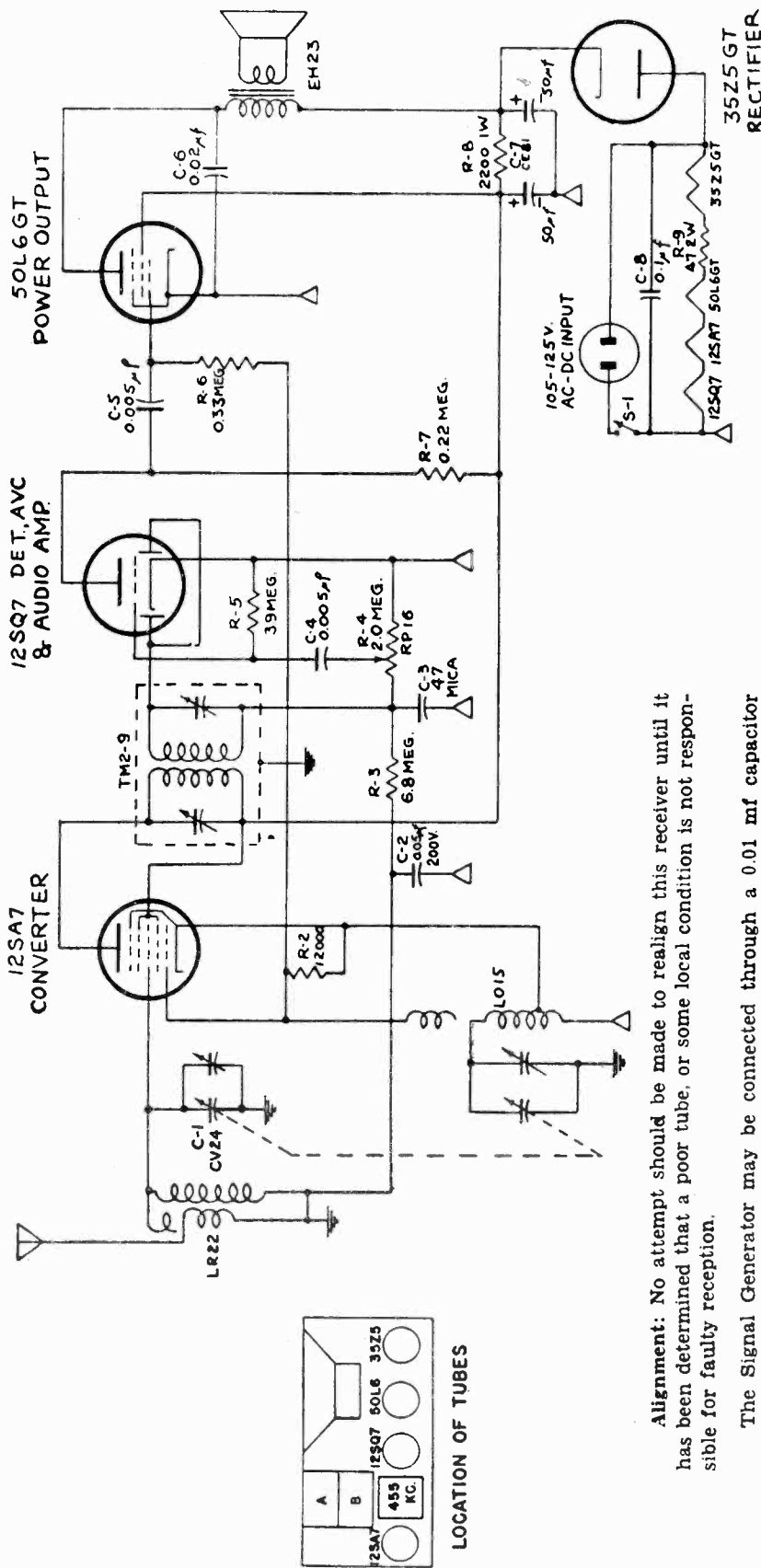
LOCATION OF TUBES



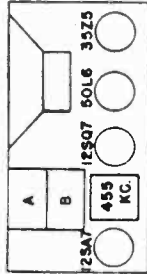
SECTION A-A

NOTE: BE SURE TO REMOVE BOLT FROM BOTTOM OF CABINET BEFORE ATTEMPTING TO INSERT BATTERIES

POSITION OF BATTERIES



**NOTES:**  
 1. RESISTORS ARE IN OHMS AND ARE  $\frac{1}{2}$  WATT; CAPACITORS ARE 400V AND IN  $\mu$ F UNLESS OTHERWISE SPECIFIED.  
 2. SWITCH S-1 IS MOUNTED ON REAR OF VOLUME CONTROL.  
 3. SYMBOL  $\Delta$  DENOTES B- AND SYMBOL  $\nabla$  DENOTES CHASSIS.  
 4. I. F. FREQUENCY IS 455 Kc.  
 5. TUNING RANGE IS 532 Kc. TO 1700 Kc.

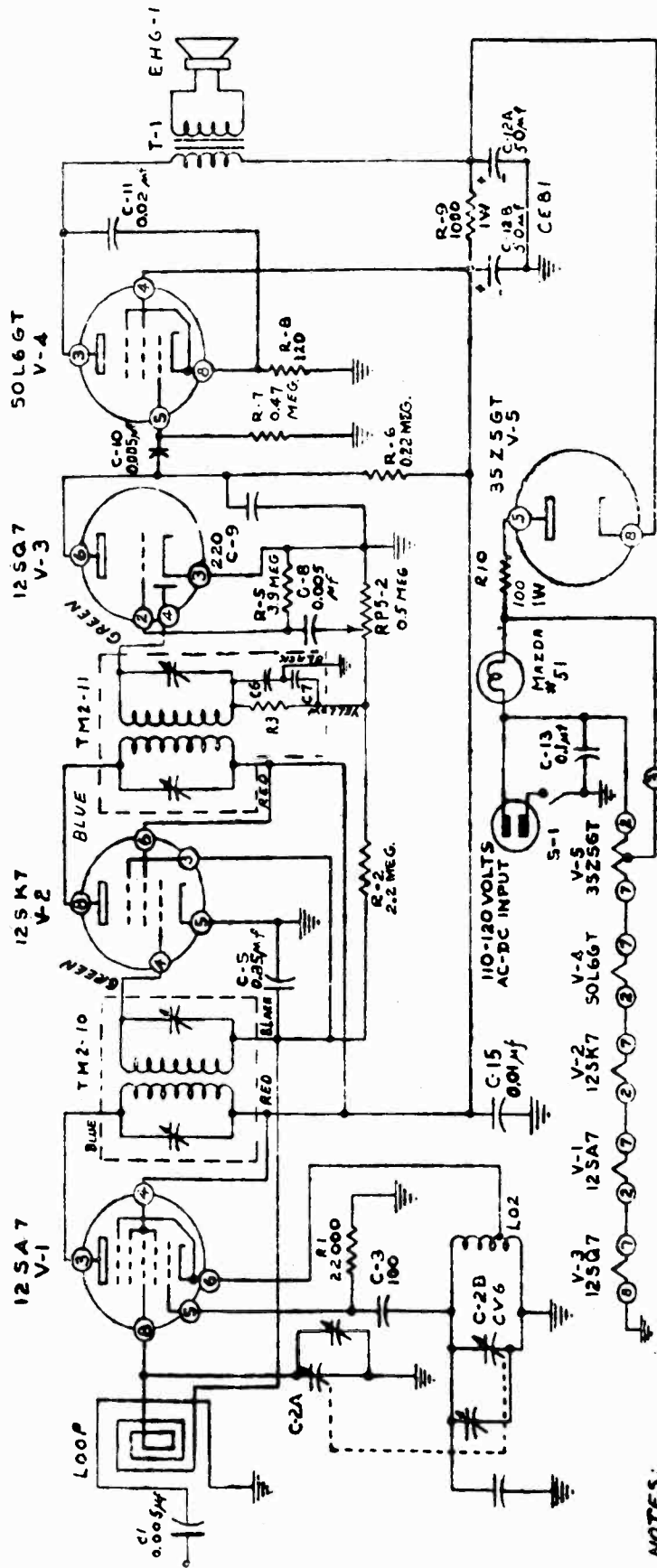


LOCATION OF TUBES

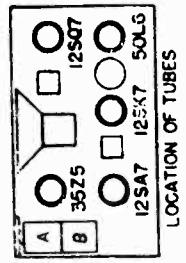
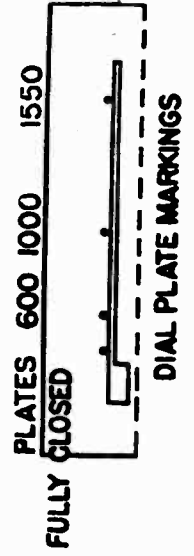
**Alignment:** No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug of RF section of tuning capacitor. Connect ground clip of generator to a convenient B-minus point such as one of the switch terminals on the back of the volume control. An output meter may be clipped directly across the voice coil lugs. Align the IF trimmer to 455 kc using least possible input from signal generator to avoid developing A. V. C. voltage which would make the tuning adjustments very broad.

To align RF trimmer, remove the 0.01 mf capacitor and connect the signal generator hot lead to a 68 mmf mica condenser. Connect the dummy antenna thus formed to the antenna lug on the antenna coil (lug to which the antenna hank is soldered). Again, use the least possible input from the signal generator. With the tuning capacitor plates completely out of mesh, and pointed at extreme clockwise position, adjust the oscillator trimmer on front section of tuning capacitor to 1700 kc. Readjust both signal generator and tuning capacitor to 1550 kc and adjust the RF trimmer on rear section for maximum response.

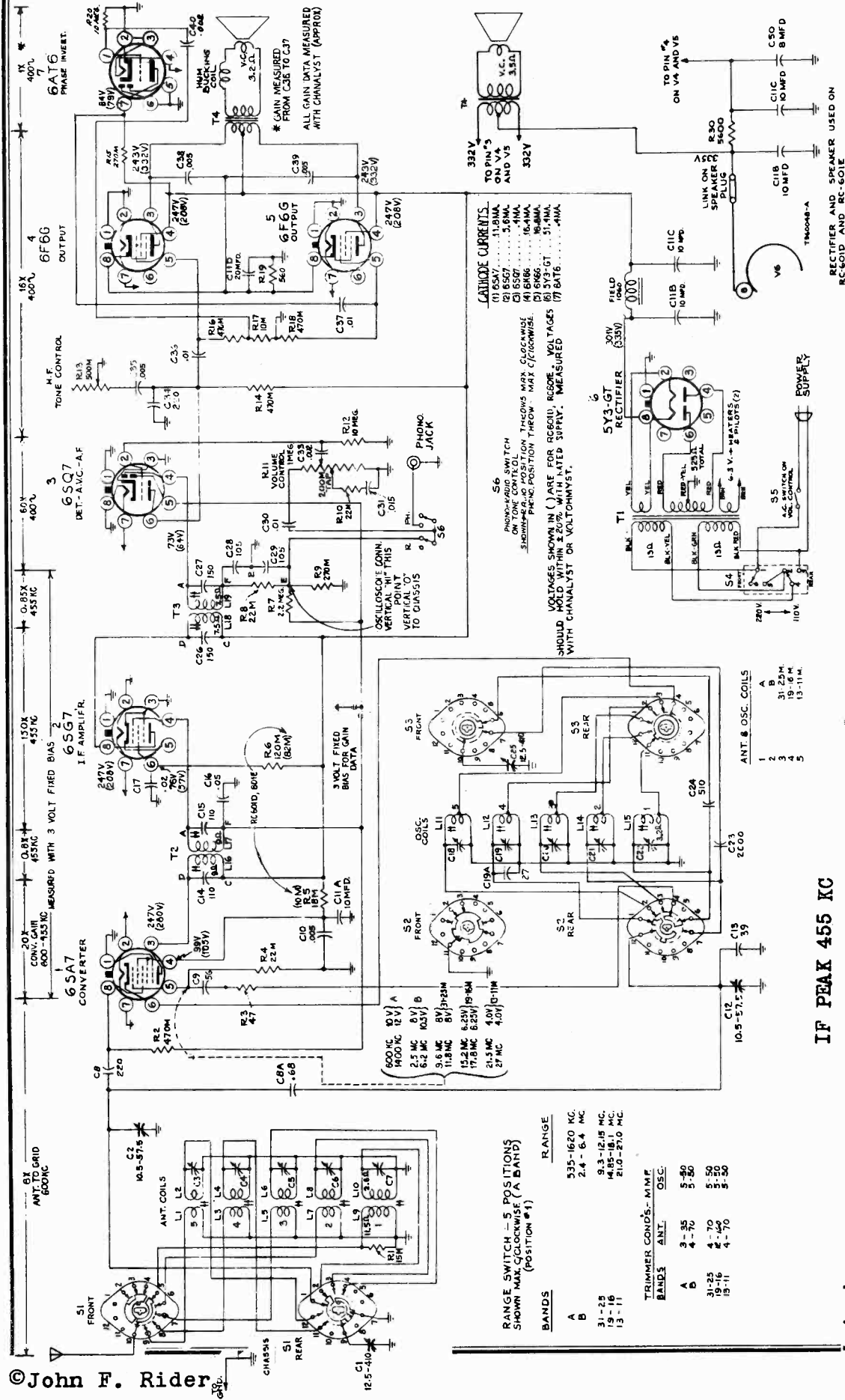


**NOTES:**  
 1. RESISTORS ARE IN OHMS. CAPACITORS ARE IN µM.F. INDUCTORS ARE IN M.H. UNLESS OTHERWISE MARKED.  
 2. SWITCH S-1 MOUNTED ON REAR OF VOLUME CONTROL.  
 3. R3, C6 & CT ARE CONTAINED WITHIN TM2-11



RADIO CORP. OF AMERICA

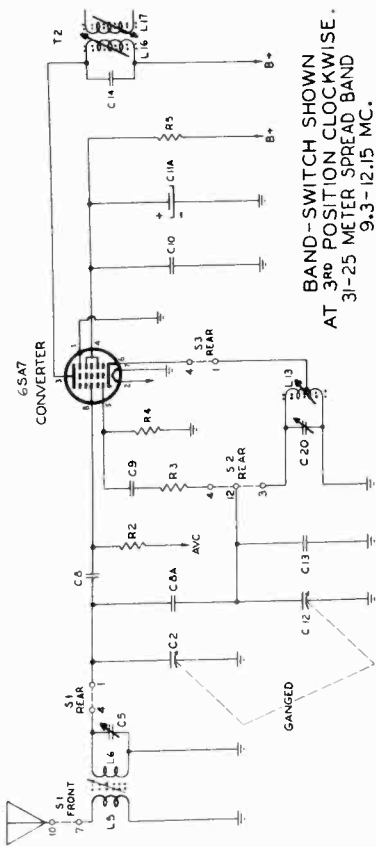
MODELS Q122, Q122a  
Chassis RC601, RC601a



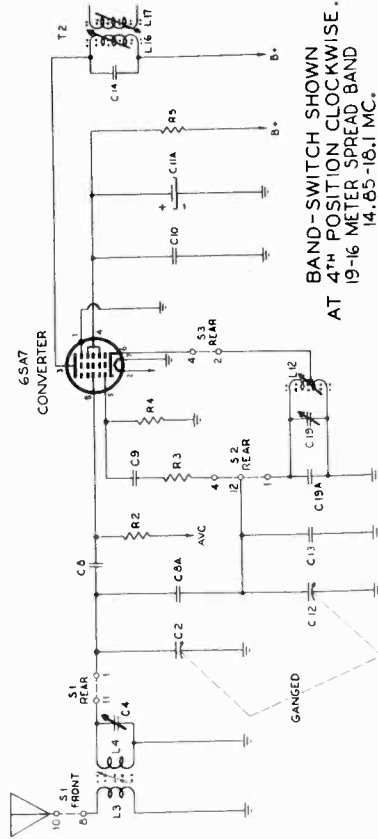
©John F. Rider

**NOTE:** In some sets and on some replacement units, the power transformer color code may vary from that shown. On universal transformers (Rating C), the primary No. 1 start may be red; primary No. 1 finish red/black; primary No. 2 start red/yellow; primary No. 2 finish black/red. On the 25 and 60 cycle transformers (Ratings A and B), the primary start and finish may be red. Secondaries of the three transformers would be: rectifier filament, green/red; high-voltage, brown; high-voltage center tap, black/brown; amplifier filament, blue. In case of doubt, identify windings by resistance or voltage measurements.

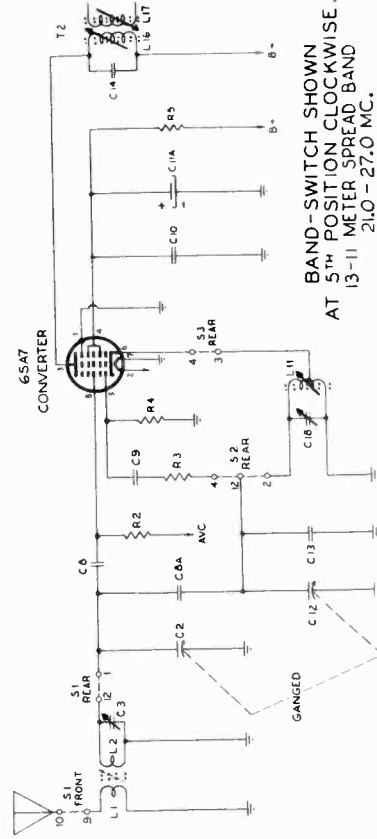
Schematic Diagram, Q122, Q122a



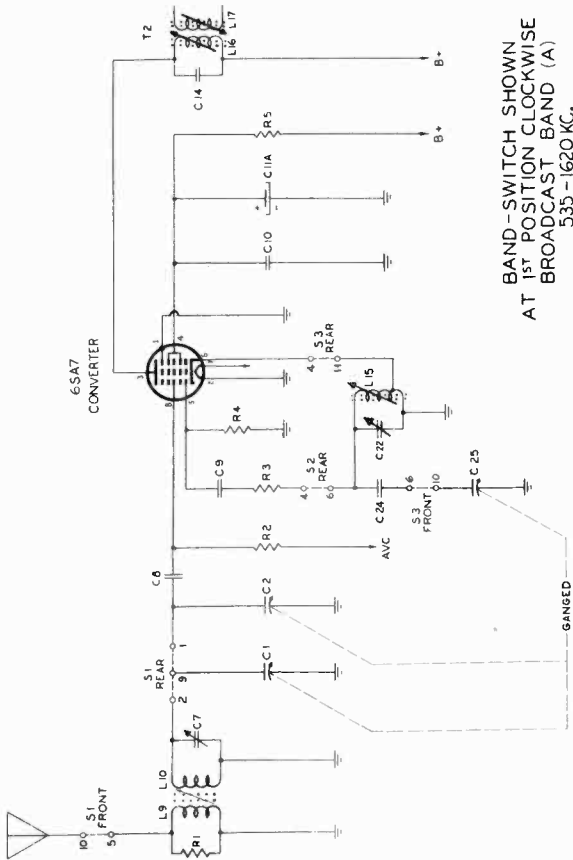
BAND-SWITCH SHOWN  
AT 3<sup>RD</sup> POSITION CLOCKWISE.  
31-25 METER SPREAD BAND  
9.3-12.15 MC.



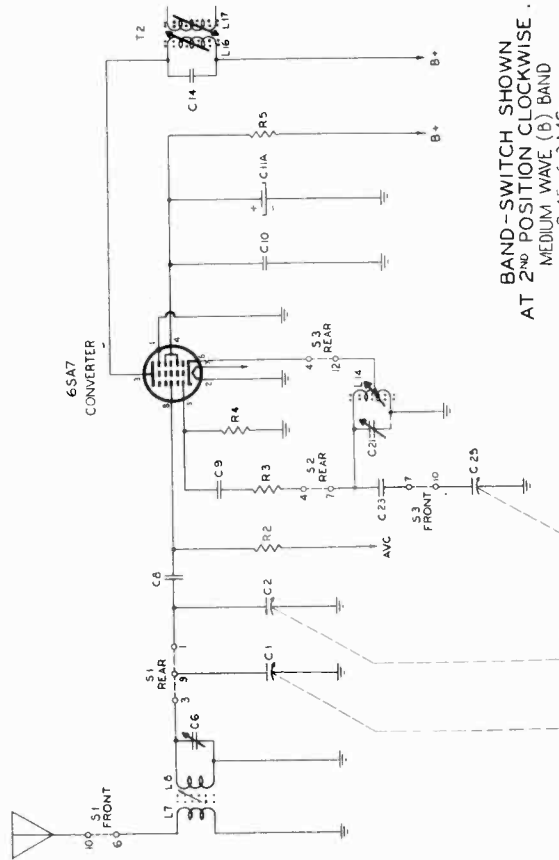
BAND-SWITCH SHOWN  
AT 4<sup>TH</sup> POSITION CLOCKWISE.  
19-16 METER SPREAD BAND  
14.65-16.1 MC.



BAND-SWITCH SHOWN  
AT 5<sup>TH</sup> POSITION CLOCKWISE.  
13-11 METER SPREAD BAND  
21.0-27.0 MC.



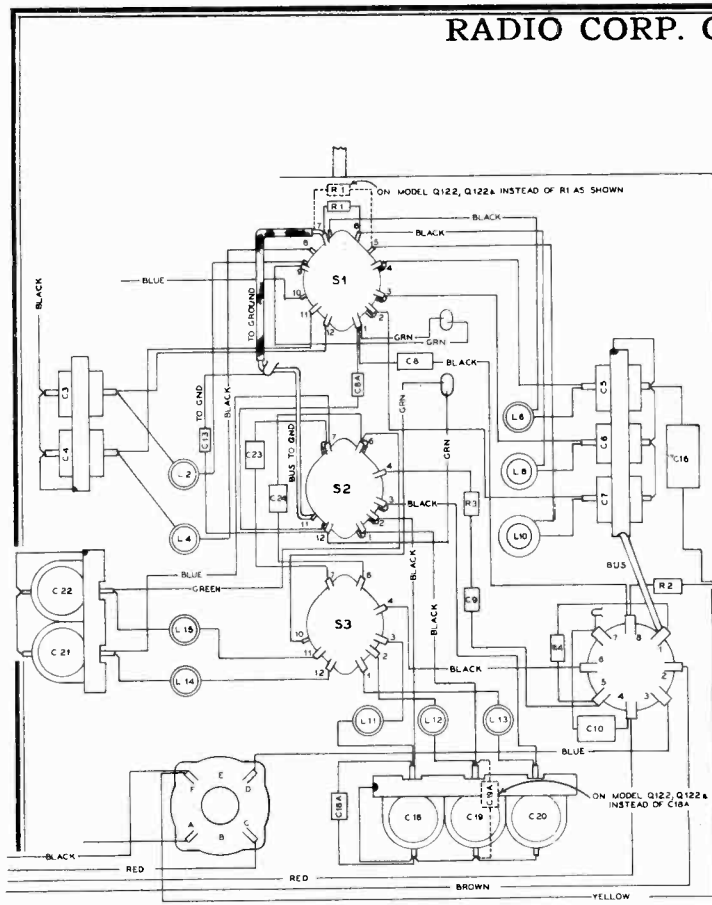
BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION CLOCKWISE  
BROADCAST BAND (A)  
555-1620 KC.



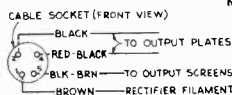
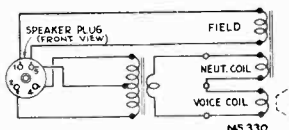
BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
MEDIUM WAVE (B) BAND  
2.45-6.3 MC.

RADIO CORP. OF AMERICA

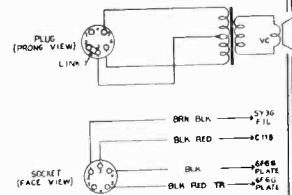
MODELS Q122, Q122a,  
Q122X, Q122Xa



R. F. Wiring Diagram (Bottom View)

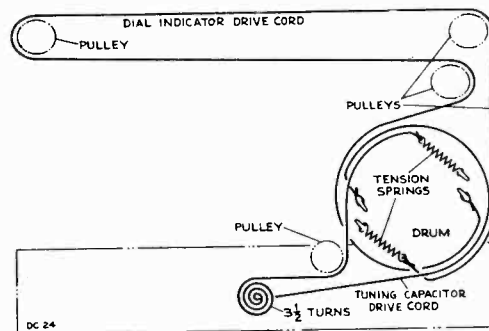


RC 601, RC 601A



RC 601D, RC 601E

Loudspeaker Connections



Dial-Indicator and Drive Mechanism

Frequency Ranges, Q-122, Q-122a

Standard Broadcast ("A" Band).....	540—1600 kc. (556—187 m)
Medium Wave ("B" Band) .....	2.45—6.3 mc. (122—47.7 m)
"31-25 Meter" Spread Band .....	9.5 — 12 mc. (31.6—25 m)
"19-16 Meter" Spread Band .....	15.1 — 18 mc. (19.8—16.6 m)
"13-11 Meter" Spread Band .....	21.4 — 27 mc. (14 —11.1 m)

Models Q-122X, Q-122Xa, will have in place of the "B" Band, and the "13-11 Meter" Band:

Long Wave ("X" Band) .....	140—375 kc. (2,140—800 m)
"49-40 Meter" Spread Band .....	6.—7.3 mc. (50—41 m)

Intermediate Frequency ..... 455 kc.

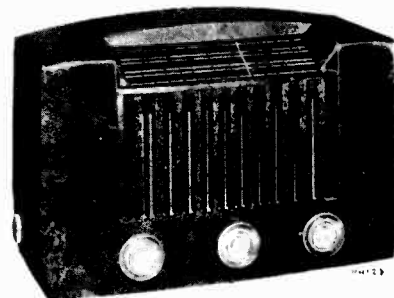
Loudspeaker

Chassis No. RC 601, RC 601A .....	92517-1
Type (Electrodynamic) .....	6 1/2"
V-C Impedance (400 c.p.s.) .....	3.4 ohms

<b>Power Output Rating</b>	<b>Undistorted</b>	<b>Maximum</b>
Q122, Q122X .....	4.2 watts	5.0 watts
Q122a, Q122Xa .....	5.2 watts	5.4 watts

Chassis No. RC 601D, RC 601E .....	92570-1
Type (PM) .....	6 1/2"
V-C Impedance (400 c.p.s.) .....	3.4 ohms

Pilot Lamps ..... 2 type 44 6.3 volts, 0.25 amp



Q122, Q122X

Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A .....	105-125	50-60	65
Rating B .....	105-125	25-60	65
Rating C .....	105-125, 200-250	50-60	65

(Shipped in 225-250 volt position)

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

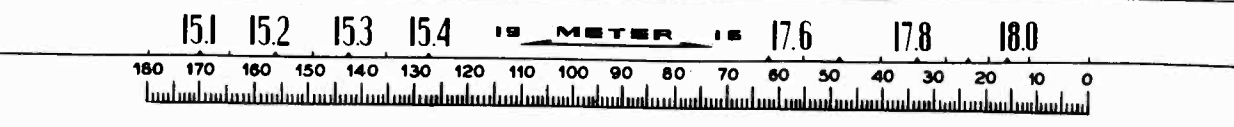
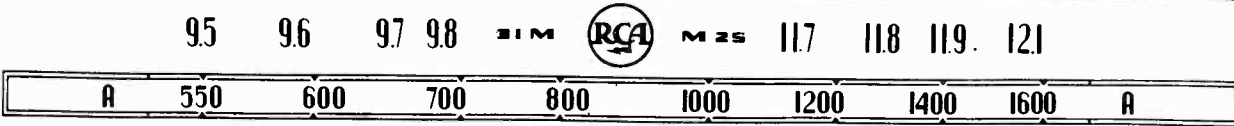
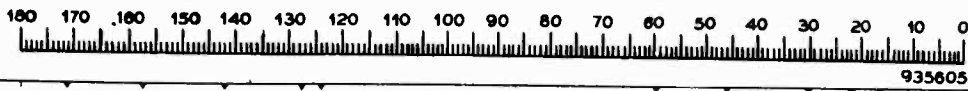
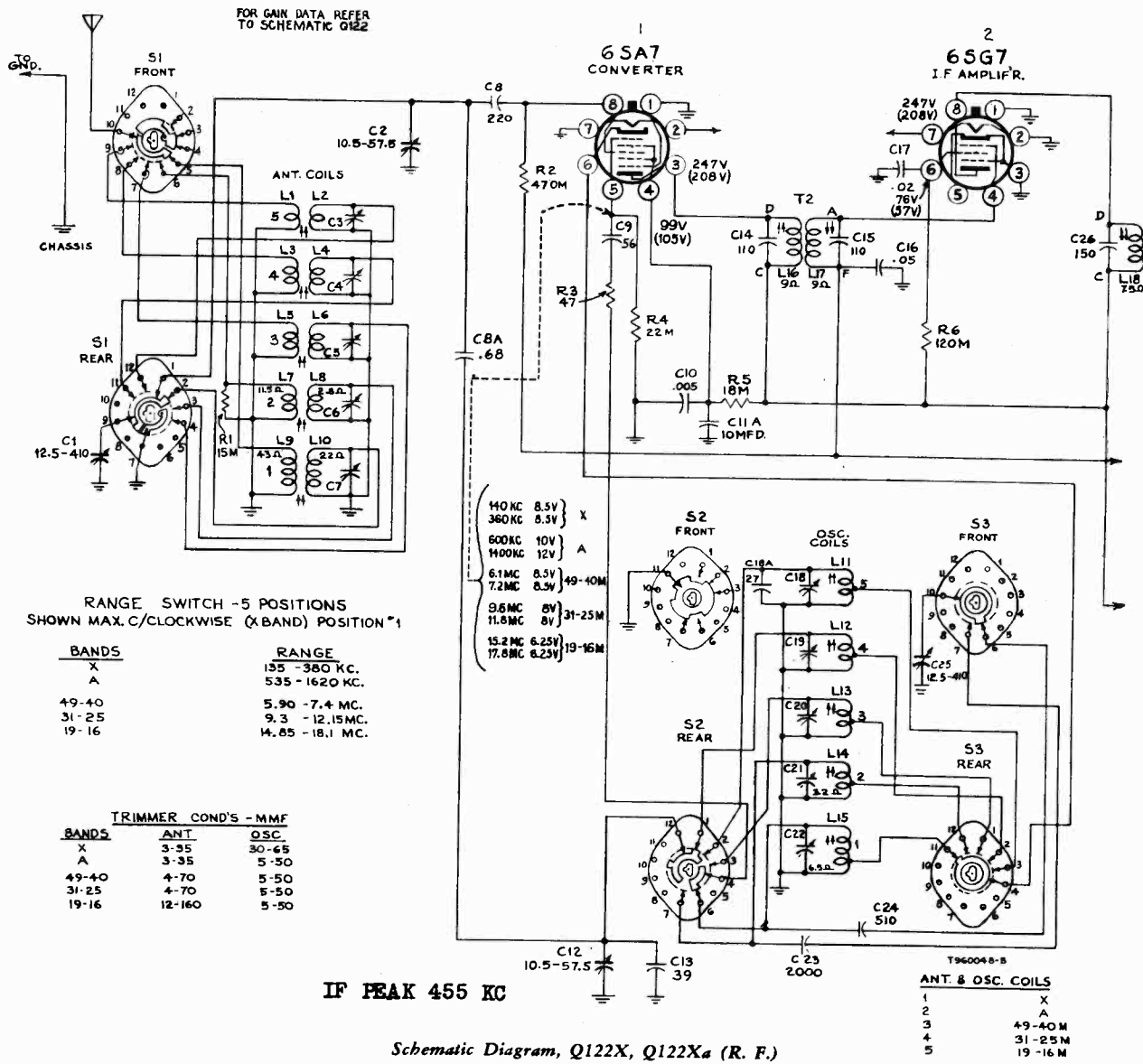
When phonograph is in use the volume control on the radio should be at minimum and, if necessary, tune set off frequency from any very strong station.

Chassis No. RC 601 and chassis RC 601A differ from RC 601E and RC 601D in that they are equipped with an electrodynamic speaker. Other than the frequency ranges covered, trimmer locations, and power supply filtering, the chassis are identical.



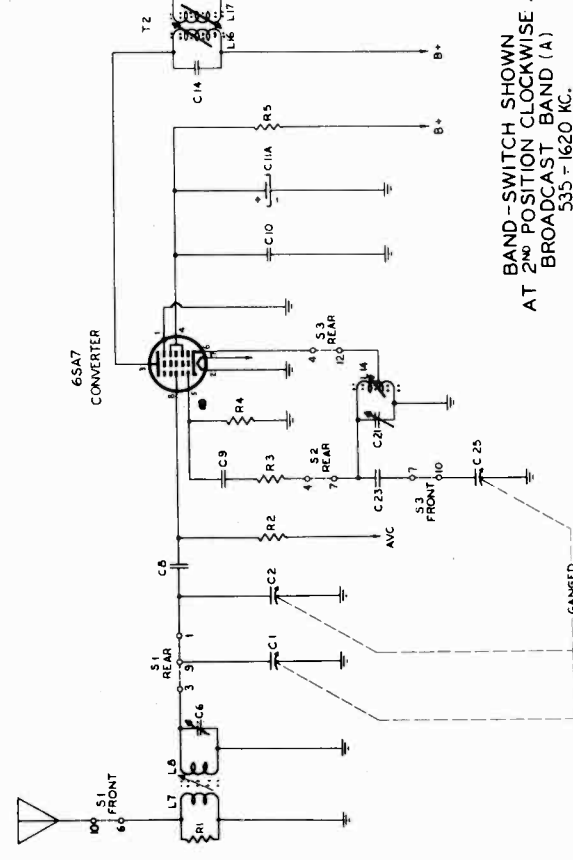
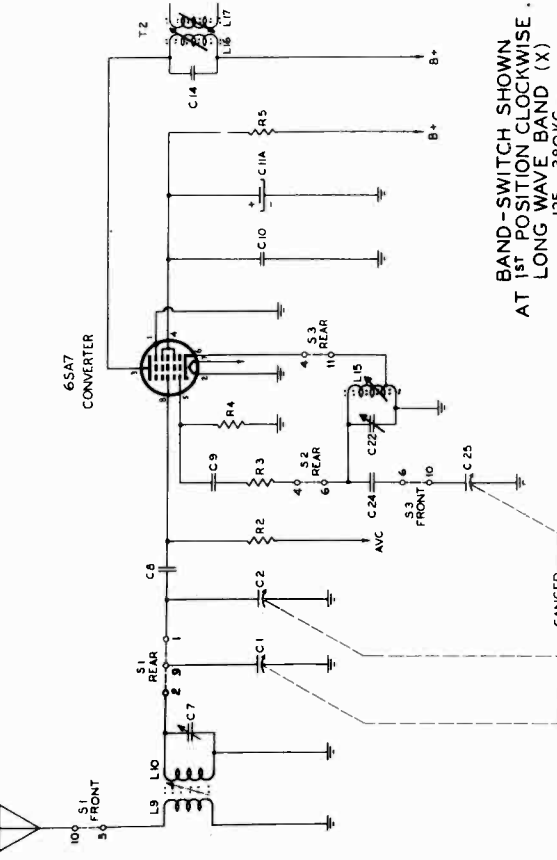
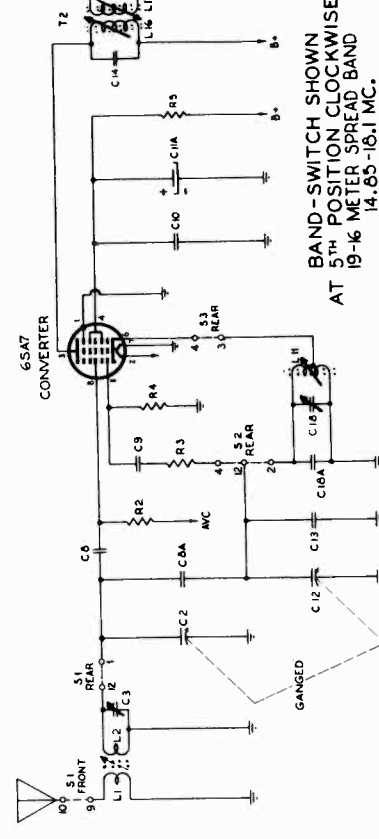
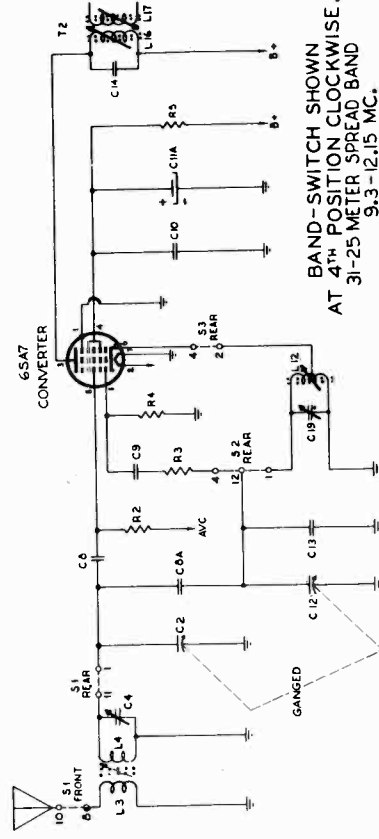
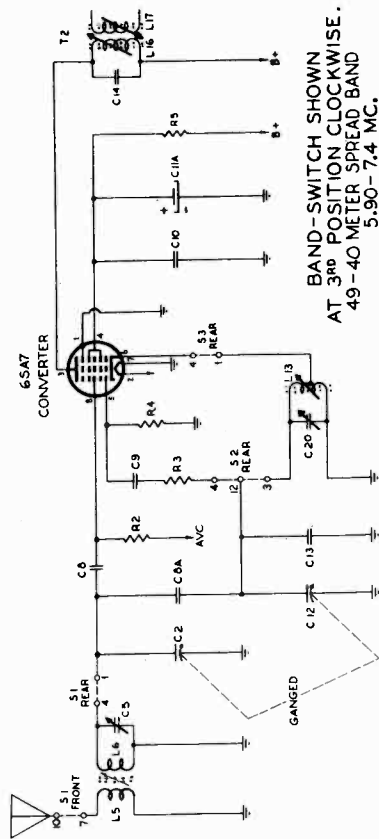
MODELS Q122X, Q122Xa  
Chassis RC601D, RC601E

RADIO CORP. OF AMERICA



Reduced Reproduction of Receiver Dial, Q122X, 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 top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



MODELS Q122, Q122a,  
Q122X, Q122Xa

RADIO CORP. OF AMERICA

ALIGNMENT CHART Q122

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn Radio dial to—	Adjust the following for max. peak output
1	6SQ7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L19, L18 2nd I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L17, L16, 1st I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (180°)	C22 osc. C7 ant.
4		600 kc		600 kc (148°)	L15 osc. L10 ant.
5	Repeat Steps 3 and 4 until aligned				
6	Antenna terminal in series with 300 ohms	6.2 mc	"B" Band	6.2 mc (14°)	C21 osc. C6 ant.
7		2.6 mc		2.6 mc (152°)	L14 osc. L8 ant.
8	Repeat Steps 6 and 7				
9	Antenna terminal in series with 300 ohms	11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C20 osc.* C5 ant. Rock in**
10		9.5 mc		9.5 mc (170°)	L13 osc. L6 ant.
11		17.75 mc	"19-18 Meter" Band	17.75 mc (40°)	C19 osc.* C4 ant. Rock in**
12		15.2 mc		15.2 mc (155°)	L12 osc. L4 ant.
13		26.25 mc	"13-11 Meter" Band	26.25 mc (42°)	C18 osc.* C3 ant. Rock in**
14		21.25 mc		21.25 mc (180°)	L11 osc. L2 ant.

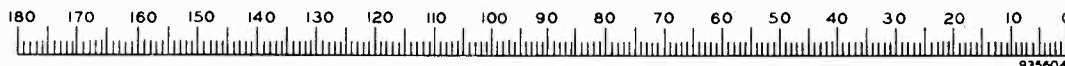
Critical Lead Dress

- The green and black leads to the Volume Control should be tightly twisted and dressed down towards the chassis away from the 110/220 volt switch and away from the A.C. switch leads.
- The A.C. switch leads should be twisted and dressed up away from all other leads.
- The capacitor (C33) from the terminal board to Pin #2 of the 6SQ7 socket should be dressed down against the chassis. The capacitor leads to be cut as short as possible.
- The capacitor (C30) from the terminal board on the front apron to the high side of the Volume Control should be dressed against the front apron.
- The capacitor (C31) from the terminal board on the front apron to the low side of the Volume Control should be dressed against the front apron.
- The capacitor (C8) from Pin #8 of the 6SA7 socket to the range switch should be dressed away from the chassis, range switch and coils.
- The capacitor and resistor assembly C9 and R3 should be dressed mid-way between the coils L13 and L9 and dressed away from all parts and leads.
- The capacitor (C16) from the terminal board, on end apron, to the trimmer strip, should be dressed against the end apron.
- The resistor (R5) should be dressed away from the flywheel.
- All leads and parts to the 6SA7 socket should have sufficient length to insure flexibility of socket.
- All resistor and capacitor leads should be as short as possible.
- All leads from the coils to range switch should be dressed away from each other and other parts.
- All leads from the trimmer to range switch should be dressed away from coils and other parts.
- The blue lead from terminal "E" of the 2nd I-F Transformer to S6 phono radio switch should be dressed close to the rear apron and under the clamps.
- The capacitor (C38) from Pin #3 of the 6F6G socket to Pin #8 should be dressed down against the chassis base.
- The capacitor (C39) from Pin #3 of the 6F6G socket to Pin #8 should be dressed away from the socket and speaker cable.
- All excess power transformer leads should be dressed against the chassis and away from the tube sockets.
- Slack in speaker cable to be as short as possible.
- The resistor (R12) from Pin #1 to Pin #2 of the 6SQ7 socket should be as short as possible.
- The capacitor (C35) from R13 tone control to Pin #7 of the 6F6G socket should be dressed away from the phono plug.
- The resistor (R20) from Pin #1 to Pin #2 of the 6AT6 socket should be as short as possible.
- All leads from range switch to stator section of gang should be dressed away from each other and should center in the cut-out.
- Gang straps should be dressed to clear the rotor.
- The leads to Pin #2, and #4 of the 6SA7 socket should be dressed down against the chassis and behind the trimmer strip.
- The lead from Pin #3 of the 6SA7 socket to terminal "D" of the 1st I-F Transformer should be dressed down against the chassis and between the oscillator coils and trimmer strip.
- The lead from terminal "F" of the 1st I-F Transformer to the terminal board on end apron should be dressed behind the trimmer strip.
- Brown and black leads to the electrolytic capacitor should be dressed away from green and black Volume Control leads.
- Pilot lamp lead should be dressed against the chassis under all other leads to 110/220 volt switch.

Oscillator tracks above signal on all bands.

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

**Use of Wave Trap.**—Should interference from a powerful nearby station require the use of a wave trap, install a Stock No. 32553 trap as indicated in tube layout diagram. Connect coil lug to antenna connection, ground connection is made to chassis through coil mounting foot. Adjust capacitor to resonance with interfering station.



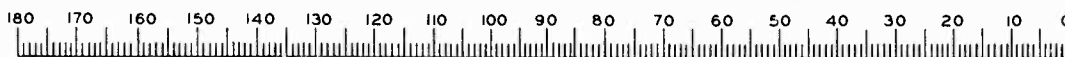
214 216 218 220 13 METER 11 26.0 26.2 26.4 26.8

A 550 600 700 800 1000 1200 1400 1600 A

15.1 15.2 15.3 15.4 19 METER 16 17.6 17.7 17.8 18.0

B 120 M 2.5 2.6 2.8 3.0 90 M 3.5 4.0 4.5 60 M 5.0 5.5 6.0 49 M 6.35 B

95 96 97 98 31 METER 25 11.7 11.8 11.9 12.1



Reduced Reproduction of Receiver Dial, Q122, 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 top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

RADIO CORP. OF AMERICA

MODELS Q122, Q122a,  
Q122X, Q122Xa

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

**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 oscillator output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord-Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the 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 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.

To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

**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.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

**Spread-Band Alignment.**—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test-oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave sta-

tions of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

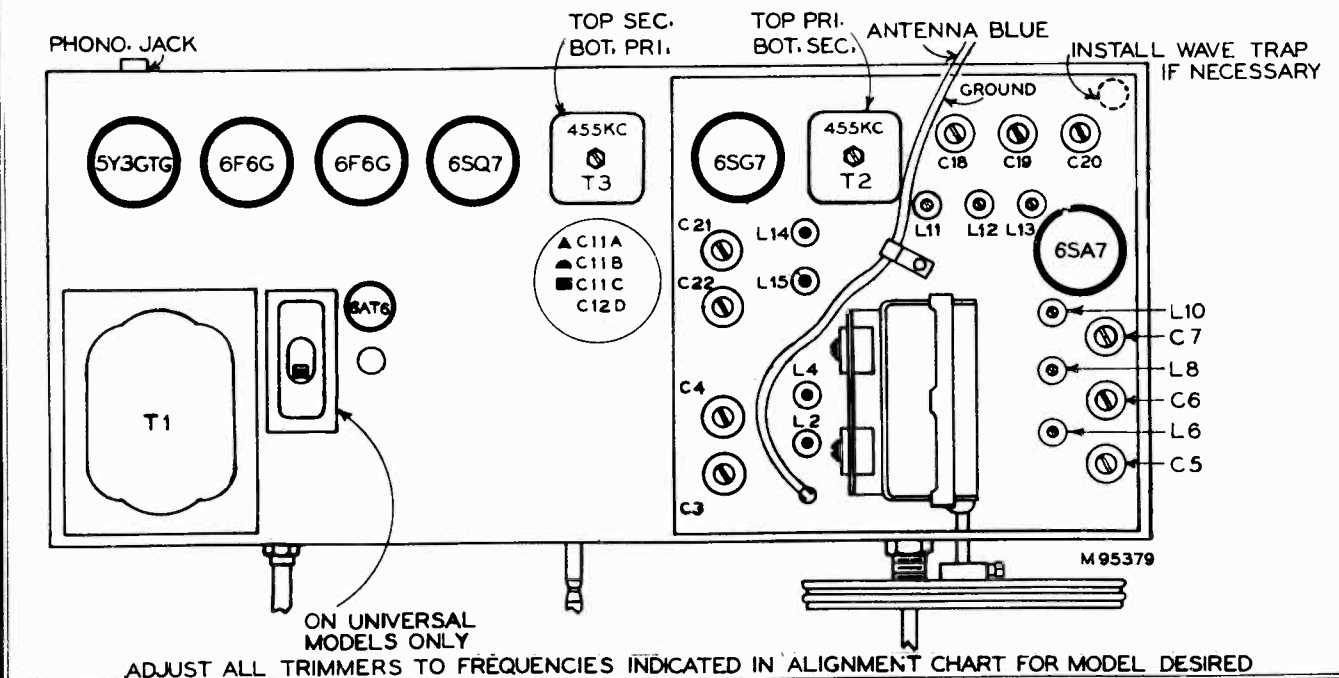
ALIGNMENT CHART Q122X

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn Radio dial to—	Adjust the following for max. peak output
1	6SG7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L19, L18 2nd I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L17, L16, 1st I-F trans.
3	Antenna terminal in series with 200 mmfd.	360 kc	"X" Band	360 kc (18°)	C22 osc. C7 ant.
4		160 kc		160 kc (134°)	L15 osc. L10 ant.
5	Repeat Steps 3 and 4				
6	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (19°)	C21 osc. C6 ant.
7		600 kc		600 kc (148°)	L14 osc. L8 ant.
8	Repeat Steps 6 and 7				
9	Antenna terminal in series with 300 ohms	7.2 mc	"49-40 Meter" Band	7.2 mc (45°)	C20 osc. C5 ant.
10		6.1 mc		6.1 mc (142°)	L13 osc. L6 ant.
11		11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C19 osc.* C4 ant. Rock in**
12		9.5 mc		9.5 mc (170°)	L12 osc. L4 ant.
13	17.75 mc	"19-16 Meter" Band	17.75 mc (40°)	C18 osc.* C3 ant. Rock in**	
14	15.2 mc		15.2 mc (156°)	L11 osc. L2 ant.	

Oscillator tracks above signal on all bands.

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

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



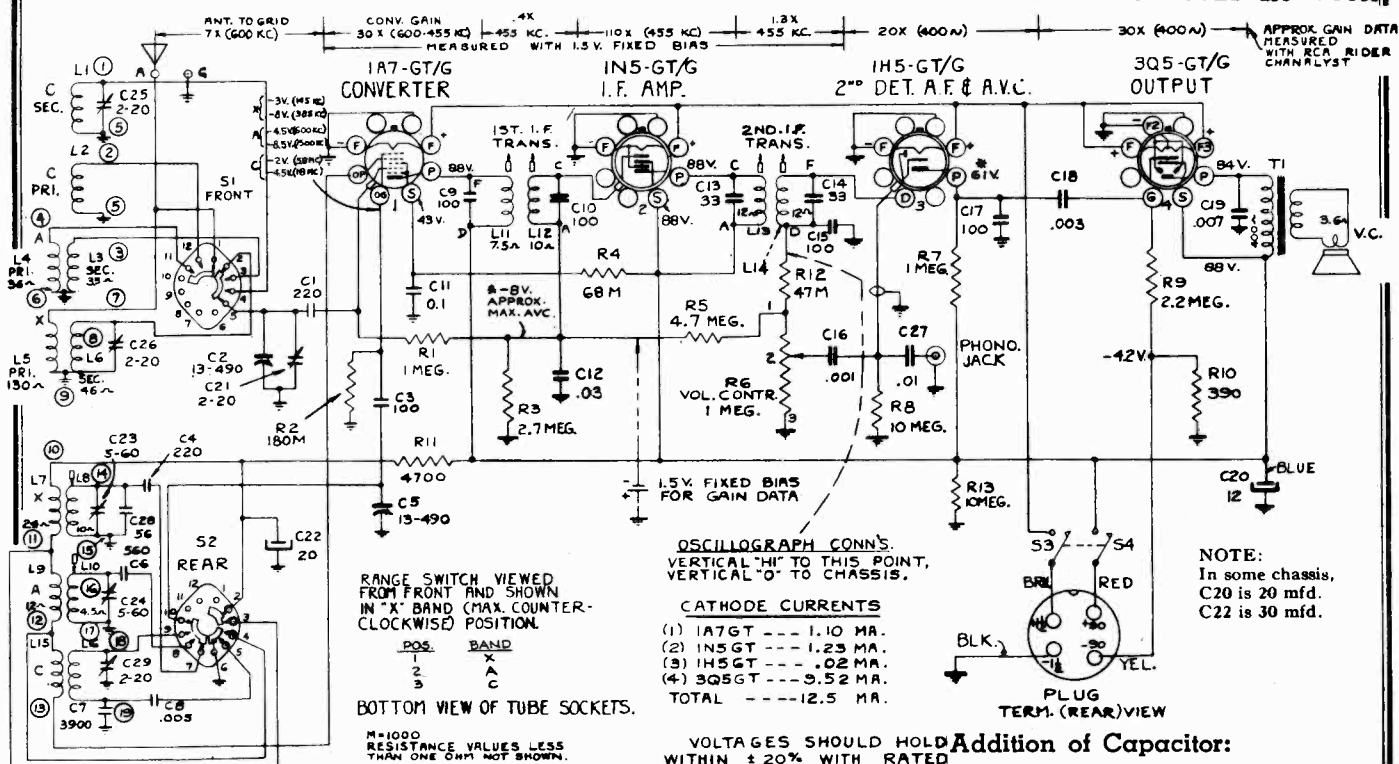
## RADIO CORP. OF AMERICA

MODELS Q122, Q122a,  
Q122X, Q122Xa

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b> RC 601—Q122, RC 601A—Q122X RC 601D—Q122a, RC 601E—Q122Xa		
35640	Bracket—Drive cord pulley support bracket complete with one (1) pulley	*70944	Core—Adjustable core and stud for 31 meter band antenna coil; for Models Q122, Q122a, "B" band antenna coil and for Models Q122X, Q122Xa, 49 meter band antenna coil
35639	Bracket—Drive cord pulley support bracket complete with three (3) pulleys	*70941	Core—Adjustable core and stud, for Models Q122X, Q122Xa, 49 meter band and for Models Q122, Q122a, 13 meter band antenna coil
35642	Calibrator—Drive drum calibrator	35627	Drum—Drive drum
*71587	Capacitor—Molded paper, .005 mmfd., 600 volts (C10)	70429	Grommet—Rubber grommet to mount tube socket (2 req'd)
*71088	Capacitor—Molded, 0.68 mmfd. (C8a)	*70930	Grommet—Rubber grommet to mount tuning condenser (4 req'd)
*70933	Capacitor—Mica trimmer comprising 2 sections of 3-35 mmfd., and 1 section of 4-70 mmfd. (for Models Q122X, Q122Xa) (C5, C6, C7)	35638	Flywheel—Tuning shaft flywheel
*70932	Capacitor—Mica trimmer comprising 2 sections of 4-70 mmfd. and 1 section of 3-35 mmfd. (for Model Q122, Q122a) (C5, C6, C7)	5040	Plug—4 contact female plug for speaker cable (Q122, Q122X)
*70745	Capacitor—Mica trimmer comprising 1 section of 12-160 mmfd. and 1 section of 4-70 mmfd. (for Models Q122, Q122a) (C3, C4)	12493	Plug—5 contact female plug for speaker cable (Q122a, Q122Xa)
*70754	Capacitor—Mica trimmer comprising 1 section of 4-70 mmfd. and 1 section of 12-160 mmfd. (for Models Q122X, Q122Xa) (C3, C4)	35630	Pulley—Drive cord idler pulley—located between range switch and tuning shaft
*70778	Capacitor—Ceramic trimmer, dual 5-50 mmfd. (for Model Q122, Q122a) (C18, C19)	35641	Pulley—Drive cord pulley
*70798	Capacitor—Ceramic trimmer comprising 1 section of 30-65 mmfd. and 1 section of 5-50 mmfd. (for Models Q122X, Q122Xa) (C21, C22)	30732	Resistor—47 ohms, 1/2 watt (R3)
*70931	Capacitor—Ceramic trimmer, triple 5-50 mmfd. (C20, C21, C22 for Q122, Q122a; C18, C19, C20 for Q122X, Q122Xa)	*90381	Resistor—560 ohms, 1 watt (R19)
*70935	Capacitor—Ceramic, 27 mmfd. (C19A for Q122; C18A for Q122X, Q122Xa)	72218	Resistor—5600 ohms, 4 watt (R30) (Q122a, Q122Xa)
*70934	Capacitor—Ceramic, 39 mmfd. (C13)	3078	Resistor—10,000 ohms, 1/2 watt (R17)
*71924	Capacitor—Ceramic, 56 mmfd. (C9)	36714	Resistor—15,000 ohms, 1/2 watt (R1)
*71933	Capacitor—Mica, 180 mmfd. (C24 for Q122X, Q122Xa)	39158	Resistor—18,000 ohms, 2 watt (R5)
71014	Capacitor—Mica, 220 mmfd. (C8, C34)	30492	Resistor—22,000 ohms, 1/2 watt (R4, R8, R10)
*71932	Capacitor—Mica, 510 mmfd. (C24 for Q122, Q122a; C23 for Q122X, Q122Xa)	30180	Resistor—120,000 ohms, 1/2 watt (R6)
*53538	Capacitor—Mica, 2000 mmfd. (C23 for Q122, Q122a)	30651	Resistor—270,000 ohms, 1/2 watt (R9, R15)
*71136	Capacitor—Molded paper, .002 mfd., 200 volts (C33, C40)	30648	Resistor—470,000 ohms, 1/2 watt (R2, R14, R16, R18)
*71593	Capacitor—Molded paper, .005 mfd., 600 volts (C35)	30649	Resistor—2.2 megohms, 1/2 watt (R7)
*72220	Capacitor—Molded paper, .005 mfd., 1000 volts (C38, C39)	30992	Resistor—10 megohms, 1/2 watt (R12, R20)
*71585	Capacitor—Molded paper, .01 mfd., 200 volts (C30)	14350	Screw—#8-32 square head set screw for drive drum
*71588	Capacitor—Molded paper, .01 mfd., 600 volts (C36, C37)	*70832	Shaft—Tuning knob shaft
*71135	Capacitor—Molded paper, .015 mfd., 200 volts (C31)	31364	Socket—Lamp socket
*71591	Capacitor—Molded paper, .02 mfd., 600 volts (C17)	35787	Socket—Phono input socket
*71586	Capacitor—Molded paper, .05 mfd., 200 volts (C16)	*70827	Socket—Tube socket
33014	Capacitor—Electrolytic comprising 3 sections of 10 mfd., 450 volts and 1 section of 20 mfd., 25 volts (C11a, C11b, C11c, C11d)	36500	Socket—Tube socket, miniature
*70830	Clip—Core and stud retaining clip	31319	Socket—Tube socket with mounting plate
*70726	Clip—Spring clip to hold adjustable core and stud	31418	Spring—Indicator cord or drive cord spring
*70923	Coil—Antenna coil—13 meter band (L1, L2 for Q122, Q122a)	35622	Support—Flywheel support bracket
*70920	Coil—Oscillator coil—13 meter band (L11 for Q122, Q122a)	*70732	Switch—Range switch (S1, S2, S3)
*70924	Coil—Antenna coil—19 meter band (L3, L4 for Q122, Q122a; L1, L2 for Q122X, Q122Xa)	32827	Switch—Voltage change switch (S4)
*70823	Coil—Oscillator coil—19 meter band (L12 for Q122, Q122a; L11 for Q122X, Q122Xa)	*70917	Transformer—First I-F transformer (T2, L16, L17, C14, C15)
*70925	Coil—Antenna coil—31 meter band (L5, L6 for Q122, Q122a; L3, L4 for Q122X, Q122Xa)	*70918	Transformer—Second I-F transformer (T3, L18, L19, C26, C27, C28, C29)
*70825	Coil—Oscillator coil—31 meter band (L13 for Q122, Q122a; L12 for Q122X, Q122Xa)	35588	Transformer—Power transformer, 117 volts, 25 cycles (T1)
*70928	Coil—Antenna coil—49 meter band (L5, L6 for Q122X, Q122Xa)	32852	Transformer—Power transformer, 117 volts 60 cycles (T1)
*70921	Coil—Oscillator coil—49 meter band (L13 for Q122X, Q122Xa)	32852	Transformer—Power transformer, 117/235 volts, 60 cycles (T1)
*70927	Coil—Antenna coil—"A" band (L9, L10 for Q122, Q122a; L7, L8 for Q122X, Q122Xa)	33726	Washer—"C" washer for tuning shaft and idler pulley
*70789	Coil—Oscillator coil—"A" band (L15 for Q122, Q122a; L14 for Q122X, Q122Xa)		<b>SPEAKER ASSEMBLY</b> 92517-1J RC 601, RC 601A
*70926	Coil—Antenna coil—"B" band (L7, L8 for Q122, Q122a)	70578	Cone—Cone and voice coil assembly
*70829	Coil—Oscillator coil—"B" band (L14 for Q122, Q122a)	5118	Plug—4 prong male speaker plug
*70929	Coil—Antenna coil—"X" band (L9, L10 for Q122X, Q122Xa)	70583	Speaker—6 1/2" EM speaker complete with cone and voice coil less output transformer and plug
*70922	Coil—Oscillator coil—"X" band (L15 for Q122X, Q122Xa)	70584	Transformer—Output transformer (T4)
*70727	Condenser—Variable tuning condenser (C1, C2, C12, C25)		NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
*70828	Control—Tone control and radio-phono switch (R13, S6)		<b>SPEAKER ASSEMBLY</b> 92570-1J RC 601D, RC 601E
*70826	Control—Volume control and power switch (R11, S5)	72520	Cone—Cone and voice coil assembly
32634	Cord—Drive cord (approx. 29" overall length)	71560	Plug—5 prong male speaker plug
34662	Cord—Indicator drive cord (approx. 54" overall length)	72425	Speaker—6 1/2" PM speaker complete with cone and voice coil less output transformer and plug
*70831	Core—Adjustable core and stud for I-F transformers	72426	Transformer—Output transformer (T4)
*70940	Core—Adjustable core and stud for Models Q122, Q122a, 13 meter band oscillator coil		NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
*70937	Core—Adjustable core and stud for 19 meter band oscillator coil		<b>MISCELLANEOUS</b>
*70939	Core—Adjustable core and stud for "A" band oscillator coil	*70834	Back—Cabinet back
*70943	Coil—Adjustable core and stud for 19 meter band and "A" band antenna coils	*70833	Board—Baffle board and grille cloth
*70945	Core—Adjustable core and stud for Models Q122X, Q122Xa, "X" band antenna coil	Y1351	Cabinet—Plastic cabinet for Q122, Q122X, Q122a, Q122Xa
*70942	Core—Adjustable core and stud for Models Q122X, Q122Xa, "X" and oscillator coil	*71089	Decal—Trade mark decal for Q122, Q122a
*70938	Core—Adjustable core and stud for 31 meter band oscillator coil and for Models Q122, Q122a, "B" band oscillator coil	*70981	Dial—Glass dial scale for Q122, Q122a
		*70982	Dial—Glass dial scale for Q122X, Q122Xa
		35647	Frame—Dial back plate complete less indicator and dial
		*70839	Grommet—Rubber grommet for chassis mounting
		37396	Grommet—Rubber grommet for speaker mounting
		70580	Indicator—Station selector indicator
		*70837	Knob—Range switch knob for Q122, Q122a
		*70838	Knob—Range switch knob for Q122X, Q122Xa
		*70835	Knob—Tone control knob
		*70836	Knob—Tuning or volume control knob
		11891	Lamp—Dial lamp
		14270	Spring—Retaining spring for knobs

RADIO CORP. OF AMERICA

MODEL QB55X,  
Chassis RC-563K



RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "X" BAND (MAX. COUNTER-CLOCKWISE) POSITION.

POS.	BAND
1	X
2	A
3	C

BOTTOM VIEW OF TUBE SOCKETS.

OSCILLOGRAPH CONNS. VERTICAL "HI" TO THIS POINT, VERTICAL "O" TO CHASSIS.

CATHODE CURRENTS

- (1) 1A7GT --- 1.10 MA.
- (2) 1N5GT --- 1.23 MA.
- (3) 1H5GT --- .02 MA.
- (4) 3Q5GT --- 3.52 MA.
- TOTAL --- 12.5 MA.

NOTE: In some chassis, C20 is 20 mfd. C22 is 30 mfd.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH RATED BATTERY SUPPLY.

\*MEASURED WITH CHANALYST OR VOLTOMYST

Addition of Capacitor:

A capacitor (.05 mfd. C30) has been added between terminal #6 of S2 rear and chassis. The bus wire which connected terminal #6 of S2 to chassis is omitted. This prevents momentary grounding of +B when the range switch is turned.



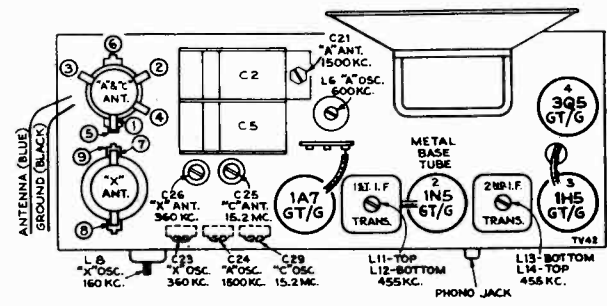
Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

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 oscillator output as low as possible to avoid AVC action.

Calibration Scale: Alignment calibration check points are indicated on the "Dial Cord Assembly and Alignment Check Points" drawing.

Before alignment, with the tuning condenser at maximum capacity (fully meshed) set the dial pointer 1 3/4 in (4.8mm) from the left hand edge of the dial back plate as indicated on the drawing.



Critical Lead Dress:

1. All leads from the antenna coils (on top of chassis) to range switch should be dressed away from the coil windings.
2. The black lead from L1—terminal #1 to S1-#4 should be dressed around rear of range switch away from chassis base.
3. Condenser C1 on top of chassis should be dressed away from chassis base.
4. The green leads connecting the gang to the range switch should be dressed away from all other leads and away from chassis base.
5. The oscillator grid coupling condenser (C3) should be dressed perpendicular to the chassis base.
6. Dress all parts and leads away from terminal "D" of the 2nd. IF transformer.
7. All B+ (red) leads should be dressed close to chassis base.

Steps	Connect high side of test osc. to.—	Tune test osc. to.—	Turn Radio dial to.—	Adjust following for max. peak output.—
1	1N5GT I.F. grid cap in series with .01 mfd.	455 kc.	"A" Band Quiet point at low freq. end. †	L14 and L13 2nd I.F. trans.
2	1A7GT 1st det. grid cap in series with .01 mfd. †			L12 and L11 1st I.F. trans. †
3	Ant. lead in series with 200 mmfd.	1500 kc.	1500 kc. mark	Preset L10 (osc.) screw 3/4 in. out. C24 osc. C21 ant.
4		600 kc.	600 kc. mark	L10**
5		Repeat Steps 3 and 4		
6		360 kc.	360 kc. mark	Preset L8 (osc.) screw 3/4 in. out. C23 osc. C26 ant.
7	Ant. lead in series with 300 ohms.	160 kc.	160 kc. mark	L8**
8		Repeat Steps 6 and 7		
9		15.2 mc.	15.2 mc. mark	C29 osc.* C25 ant.**

\*Use minimum capacity peak if two peaks can be obtained.  
\*\*Rock gang slightly for peak output.  
†Do not readjust L14 or L13 when test oscillator is applied to 1A7-GT/G grid.

Phonograph Attachment

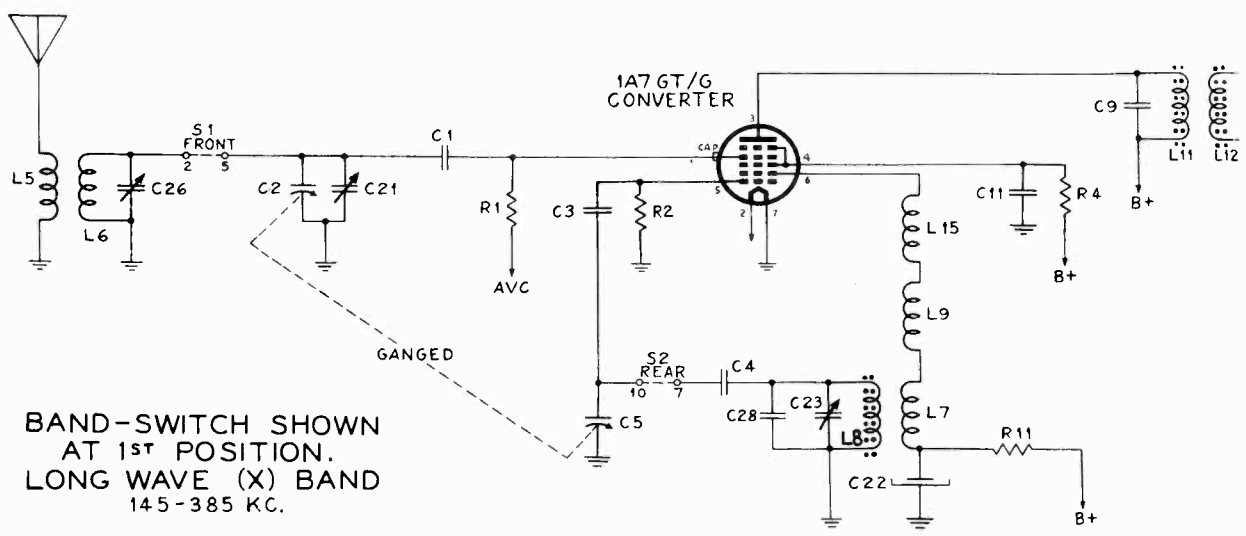
A jack is provided on the rear of chassis for connecting a Phonograph Attachment to the audio amplifying circuit. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When Phonograph is not in use its plug should be disconnected.

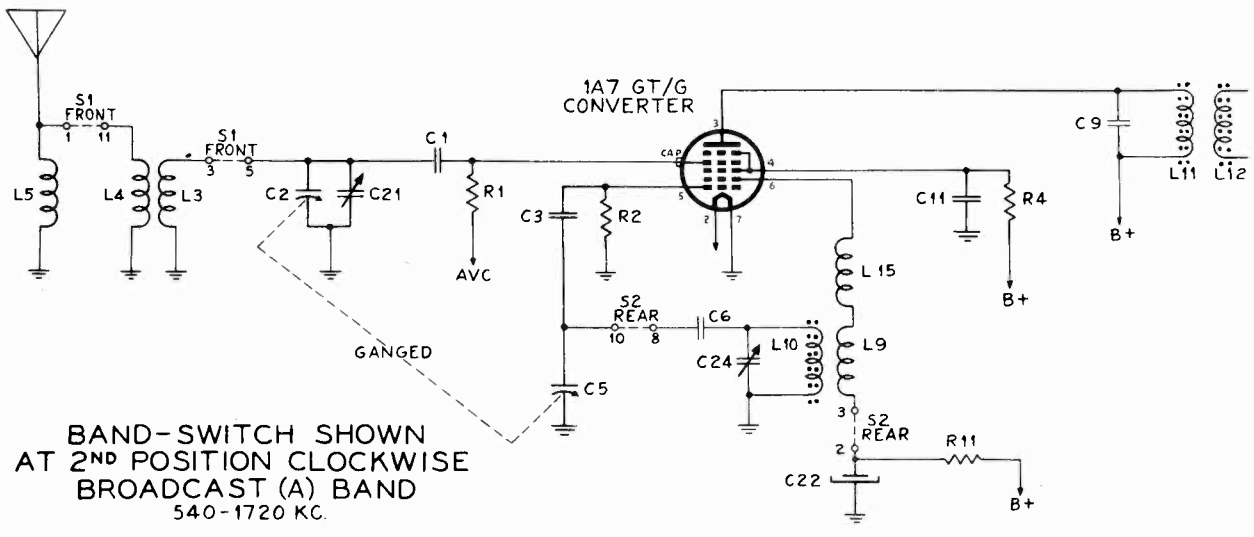
When Phonograph is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.

MODEL QB55X

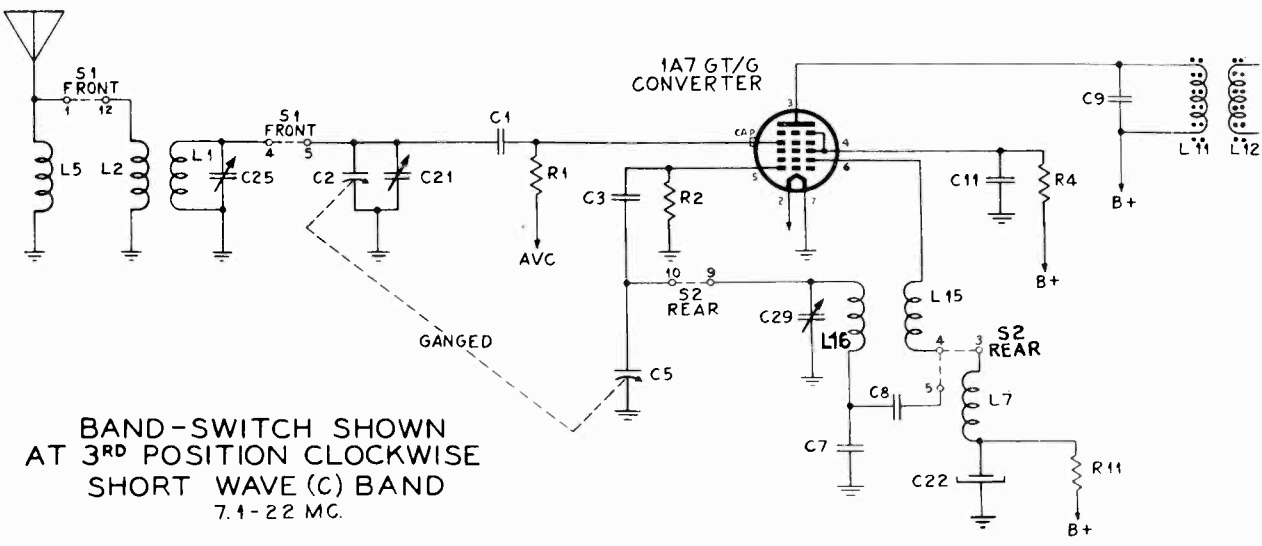
RADIO CORP. OF AMERICA



BAND-SWITCH SHOWN AT 1<sup>ST</sup> POSITION. LONG WAVE (X) BAND 145-385 KC.

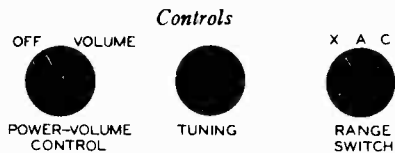
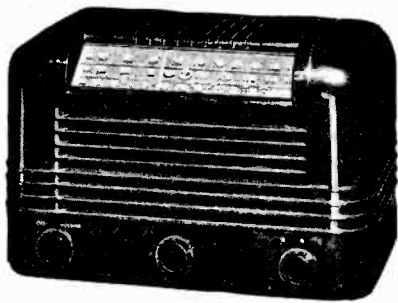


BAND-SWITCH SHOWN AT 2<sup>ND</sup> POSITION CLOCKWISE BROADCAST (A) BAND 540-1720 KC.



BAND-SWITCH SHOWN AT 3<sup>RD</sup> POSITION CLOCKWISE SHORT WAVE (C) BAND 7.1-22 MC.





**Specifications**

**Frequency Ranges**  
 Long Wave ("X" Band)..... 145-385 kc (2069-779m)  
 Standard Broadcast ("A" Band)..... 540-1,720 kc (555-174m)  
 Short Wave ("C" Band)..... 5.8-18 mc. (51.7-16.6 meters).

**Intermediate Frequency**..... 455 kc

**Batteries Required**  
 1—RCA-VSO22 Battery Pack or equivalent  
 Or: 1—1½ Volt "A" Battery and 2—45 Volt "B" Batteries

A four wire cable with plug is provided for making connection to the RCA-VSO22 battery pack or equivalent. When separate batteries are used, an adapter extension cable is necessary.

**Battery Drain**  
 "A"..... 0.25 amp.  
 "B"..... 12.5 ma.

**Power Output**  
 Undistorted..... 0.20 watt  
 Maximum..... 0.26 watt

**Loudspeaker (92510-1)**  
 Type..... 5-inch permanent-magnet dynamic  
 Voice-coil impedance..... 4 ohms at 400 cycles

**Cabinet Dimensions (inches)**  
 Height..... 7¾ inches  
 Width..... 12½ inches  
 Depth..... 6¾ inches

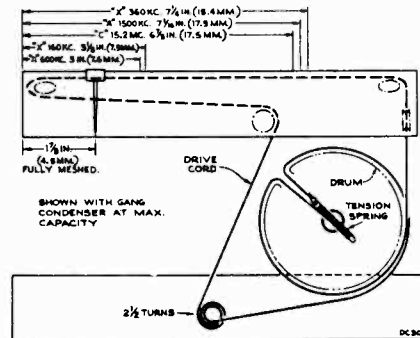
**QB55X (RC-563K)**

**Capacitor Substitutions:**

In some chassis the electrolytic capacitor differs from that described in the service note: The 12 mfd. section (C20 BLUE) may be 20 mfd. and the 20 mfd. section (C22 RED) may be 30 mfd. The color coding is the same as that of the specified part (Stock No. 32548).  
 In some chassis C12 (.025 mfd.) is .03 mfd. and C18 (.0025 mfd.) is .003 mfd.

**Change in Parts List:**

**CHASSIS ASSEMBLIES**  
 Delete:  
 37588 Core—Adjustable core and stud for oscillator coil.  
 12007 Spring—Oscillator coil core and stud retaining spring.



*Dial Cord Assembly and Alignment Check Points*

**NOTE:**

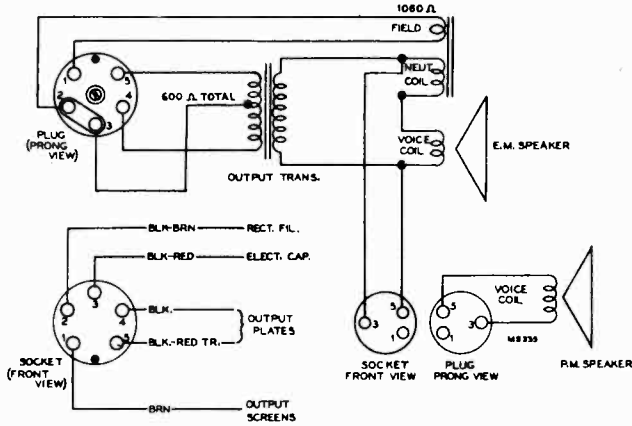
Model CV-112X Electrifier (RS-111A) may be employed to operate this instrument from 117 or 234 volt 50-60 cycle power supply. For this type of operation the receiver power cable plug is inserted in the socket provided on the Electrifier. Refer to RCA Model QB5 or Supplementary Information No. 11 for complete information on CV-112X Electrifier.

**Replacement Parts**

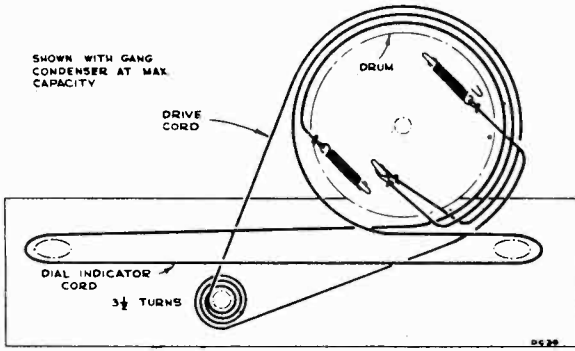
STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b> RC-563K		
32830	Capacitor—Mica trimmer, dual 2-20 mmf. (C25, C26)	30787	Resistor—47,000 ohms, ¼ watt (R12)
33788	Capacitor—Mica trimmer, comprising two sections of 5-60 mmf. and 1 section of 2-20 mmf. (C23, C24, C29)	14138	Resistor—68,000 ohms, ¼ watt (R4)
39622	Capacitor—Mica, 56 mmf. (C28)	11959	Resistor—180,000 ohms, ¼ watt (R7)
*72810	Capacitor—Mica, 100 mmf. (C3, C15, C17)	30652	Resistor—1 megohm, ¼ watt (R1, R2)
39636	Capacitor—Mica, 220 mmf. (C1)	30649	Resistor—2.2 megohms, ¼ watt (R9)
71014	Capacitor—Mica, 220 mmf. (C4)	72788	Resistor—2.7 megohms, ¼ watt (R3)
*72841	Capacitor—Mica, 560 mmf. (C6)	30931	Resistor—4.7 megohms, ¼ watt (R5)
72637	Capacitor—Mica, 3900 mmf. (C7)	30992	Resistor—10 megohms, ¼ watt (R8, R13)
70600	Capacitor—Tubular, .001 mfd., 400 volts (C16)	36897	Shaft—Tuning knob shaft
70603	Capacitor—Tubular, .003 mfd., 400 volts (C18)	70377	Shield—Shield for INSGT tube
70606	Capacitor—Tubular, .005 mfd., 400 volts (C8)	33742	Socket—Phono input socket
70608	Capacitor—Tubular, .007 mfd., 400 volts (C19)	31251	Socket—Tube socket, wafer
70610	Capacitor—Tubular, .01 mfd., 400 volts (C27)	31319	Socket—Tube socket, cushion mounted
70613	Capacitor—Tubular, .03 mfd., 400 volts (C12)	31418	Spring—Drive cord tension spring
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C11)	12007	Spring—Oscillator coil's core and stud retaining spring
32548	Capacitor—Electrolytic, comprising 1 section of 12 mfd., 150 volts and 1 section of 20 mfd., 150 volts (C20, C22)	*72657	Switch—Range switch (S1, S2)
32706	Coil—Antenna coil, "A" and "C" band (L1, L2, L3, L4)	35636	Transformer—First I.F. transformer (L11, L12, C9, C10)
32823	Coil—Antenna coil, "X" band (L5, L6)	36122	Transformer—Second I.F. transformer (L13, L14, C13, C14)
33786	Coil—Oscillator coil, "X" band (L7, L8)	38300	Transformer—Output transformer (T1)
32148	Coil—Oscillator coil, "A" band (L9, L10)	33726	Washer—"C" washer for tuning knob shaft
33787	Coil—Oscillator coil, "C" band (L15, L16)		
38287	Condenser—Variable tuning condenser (C2, C5, C21)		<b>SPEAKER ASSEMBLIES</b> 92510-1
38406	Control—Volume control and power switch (R6, S3, S4)	70413	Speaker—5" P.M. speaker complete with cone and voice coil
32634	Cord—Drive cord (approx. 49" overall length)		<b>NOTE:</b> If stamping on speaker does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	<b>NOTE:</b> Before assembling, stretch to full length.		
35788	Core—Adjustable core and stud for oscillator coil		<b>MISCELLANEOUS ASSEMBLIES</b>
36237	Drum—Drive drum	Y947	Cabinet—Brown plastic cabinet
70429	Grommet—Rubber grommet for mounting tube socket	36890	Clamp—Dial clamp, left hand
16058	Grommet—Rubber grommet for mounting tuning condenser (4 required)	36891	Clamp—Dial clamp, right hand
37068	Indicator—Station selector indicator	36103	Decal—Power switch decal
*72656	Plate—Dial back plate complete with four (4) pulleys less dial	*72659	Decal—Range switch decal
30568	Plug—4 prong male plug for battery cable	*72658	Dial—Glass dial scale
36230	Pulley—Drive cord pulley	36886	Knob—Range switch or volume control knob
30498	Resistor—390 ohms, ¼ watt (R10)	36722	Knob—Tuning knob
30494	Resistor—4700 ohms, ¼ watt (R11)	30900	Spring—Retaining spring for knobs

MODEL QU62,  
Chassis RC602B

RADIO CORP. OF AMERICA



Loudspeaker Connections



Dial-Indicator and Drive Mechanism

Critical Lead Dress

1. Dress C47 and R16 against chassis.
2. Dress R23 against chassis.
3. Dress C48 on power transformer side of terminal board.
4. All resistor and capacitor leads should be as short as practical.
5. Twist electrolytic capacitor leads and dress between chassis and electrolytic capacitor.
6. Twist all A.C. leads and keep close to chassis and away from other component parts and wires.
7. Dress blue treble tone control (R18) lead along intersection of chassis and rear apron and under electrolytic capacitor.
8. Keep tuning indicator and pilot lamp leads away from 6SQ7 tube.
9. Dress C35 against RF plate assembly.
10. Dress C25 and R7 and C24 midway between range switch and RF coil.
11. Keep coil leads to switch and trimmers with minimum slack but not stretched tight.
12. Flexibility of RF plate assembly must be maintained.
13. Dress black lead from phono-radio switch to range switch close to chassis.
14. Dress C13A away from RF shield.
15. Dress C34 against RF plate assembly.
16. Keep all gang leads as short as practical.
17. A loop must be maintained in ground braid connecting RF plate assembly to chassis.
18. Dress blue lead to antenna terminal against RF shield.



Specifications

Frequency Range

Standard Broadcast ("A" Band).....	540-1600 kc (556-187 m)
Medium Wave ("B" Band).....	2.45-6.3 mc (122-47.7 m)
"31-25 Meter" Spread Band.....	9.5-12 mc (31.6-25 m)
"19-16 Meter" Spread Band.....	15.1-18 mc (19.8-16.6 m)
"13-11 Meter" Spread Band.....	21.4-27 mc (14-11.1m)

Intermediate Frequency..... 455 kc

Loudspeakers (2)

Type 92569-4 (RL103-4).....	12 in. PM
Type 92566-3 (RL70N1).....	12 in. EM
V-C Impedance (400 c.p.s.).....	2.2 ohms

Power Output Rating

Undistorted.....	10 watts
Maximum.....	12 watts

Tuning Drive Ratio..... 22:1

Cabinet Dimensions (Inches).....	Height 36	Width 38 1/4	Depth 17
Overall Chassis Dimensions.....	7 1/4	15 3/4	9 1/4

Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating D	(See below)	60†	150
110 position—100 min.—115 max.		Note: Shipped in 240-volt position. To change, remove round cover on top of transformer case and move link to required position.	
125 position—115 min.—135 max.			
150 position—135 min.—165 max.			
210 position—190 min.—230 max.			
240 position—220 min.—260 max.			

CAUTION: Remove power cord from line receptacle before changing link position.

†This instrument may be operated from 50 cycle power supply if the record changer is modified—refer to 960001 Service Data.

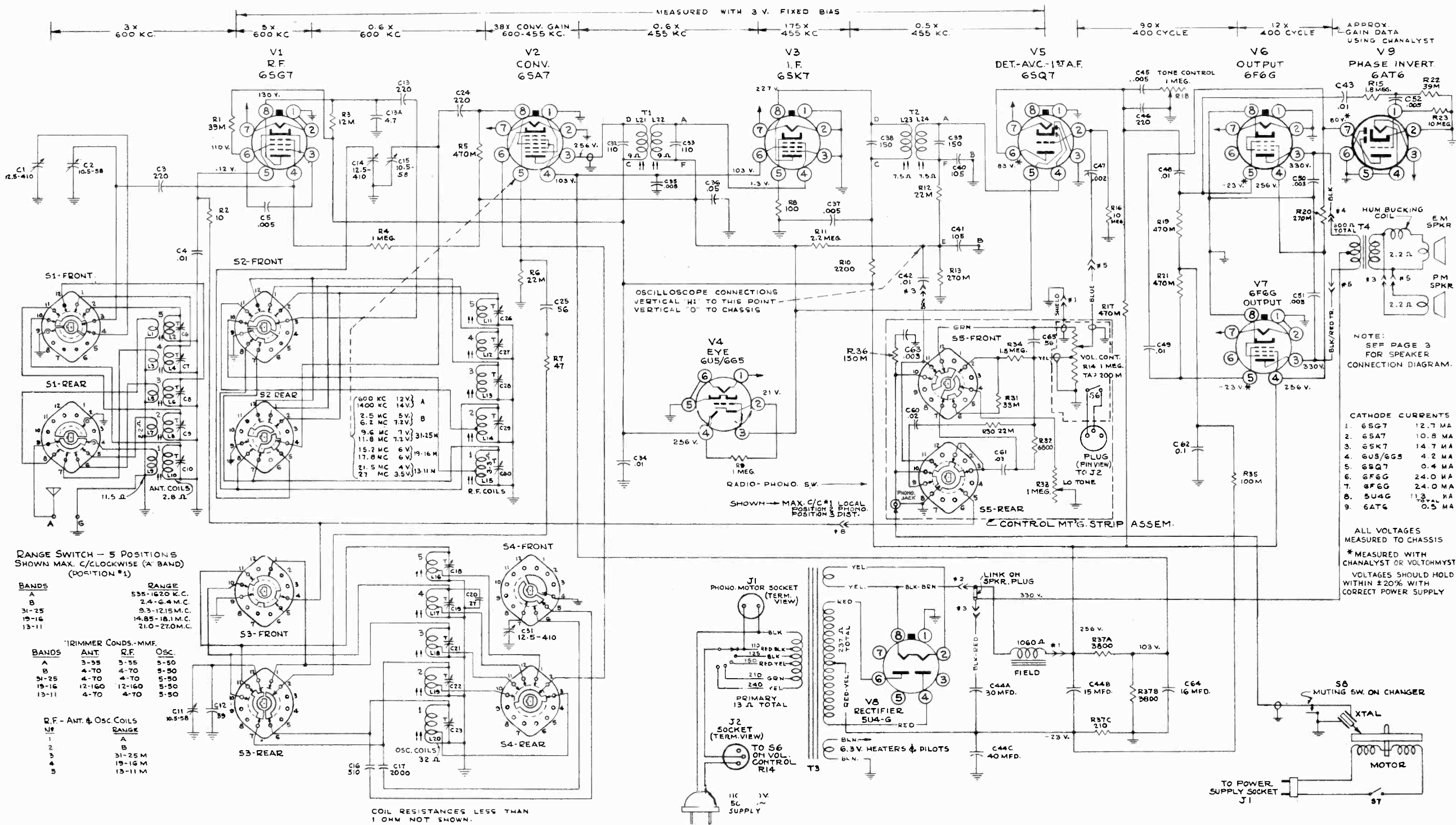
Record Changer..... Type 960001-4  
Capacity..... ten 12 in. or twelve 10 in. records

Lamps

Dial lamps.....	2 Type 51, 6.3 volts 0.20 amp.
Vol. Cont. lamp.....	1 Type 47, 6.3 volts 0.15 amp.
Band Indicator lamp.....	1 Type 55, 6.3 volts 0.40 amp.
Rec. Changer Comp. lamp.....	1 Type 55, 6.3 volts 0.40 amp.

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MODEL QU62, Chassis RC602B



APPROX. GAIN DATA USING CHANALYST

OSCILLOSCOPE CONNECTIONS VERTICAL "HI" TO THIS POINT VERTICAL "O" TO CHASSIS

NOTE: SEE PAGE 3 FOR SPEAKER CONNECTION DIAGRAM.

CATHODE CURRENTS

1. 6SG7	12.7 MA
2. 6SA7	10.8 MA
3. 6SK7	14.7 MA
4. 6U5/6G5	4.2 MA
5. 6SQ7	0.4 MA
6. 6F6G	24.0 MA
7. 6F6G	24.0 MA
8. 5U4G	11.3 MA
9. 6AT6	0.5 MA

ALL VOLTAGES MEASURED TO CHASSIS \*MEASURED WITH CHANALYST OR VOLTOHMYST VOLTAGES SHOULD HOLD WITHIN ±20% WITH CORRECT POWER SUPPLY

RANGE SWITCH - 5 POSITIONS SHOWN MAX. C/CLOCKWISE (A BAND) (POSITION #1)

BANDS	RANGE
A	535-1620 K.C.
B	2.4-6.4 M.C.
31-25	9.3-12.15 M.C.
19-16	14.85-18.1 M.C.
13-11	21.0-27.0 M.C.

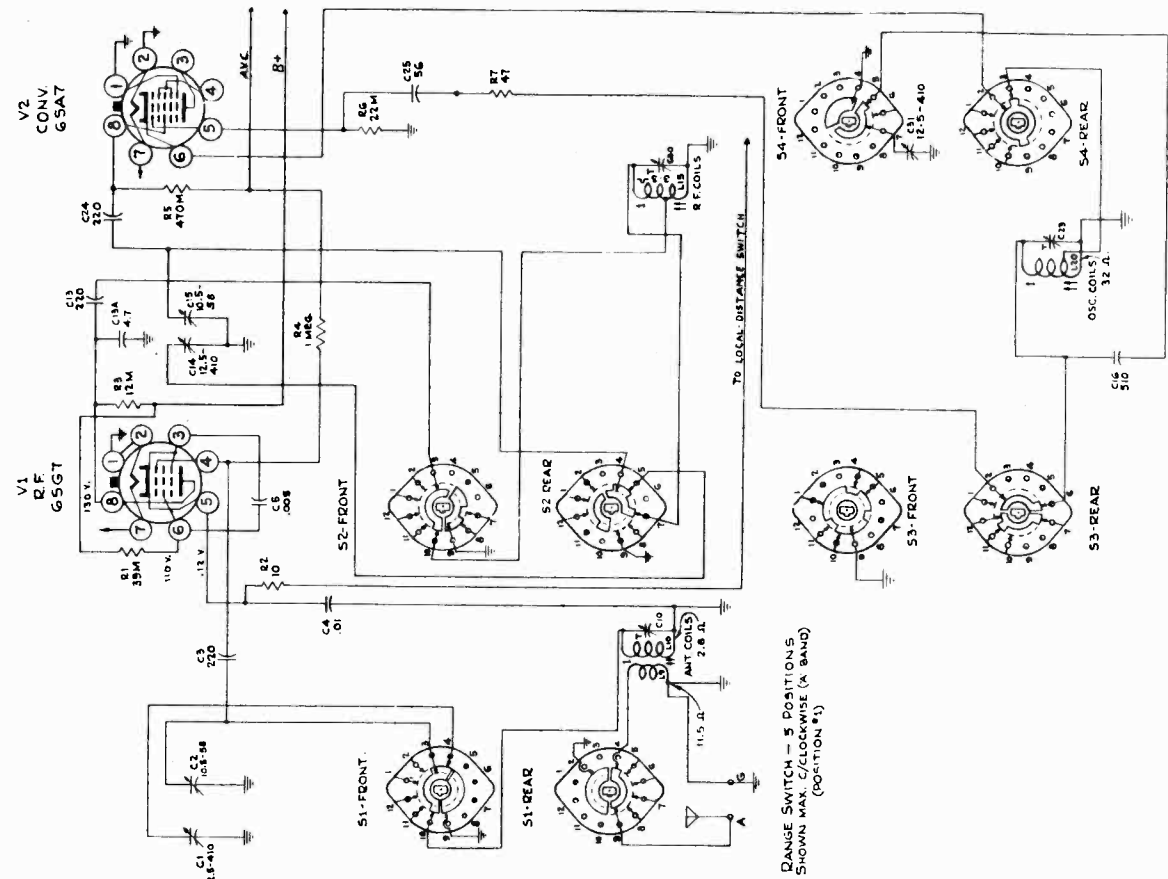
TRIMMER CONDS.-MMF.

BANDS	ANT.	R.F.	OSC.
A	3-35	3-35	5-50
B	4-70	4-70	5-50
31-25	4-70	4-70	5-50
19-16	12-160	12-160	5-50
13-11	4-70	4-70	5-50

R.F. - ANT. & OSC. COILS

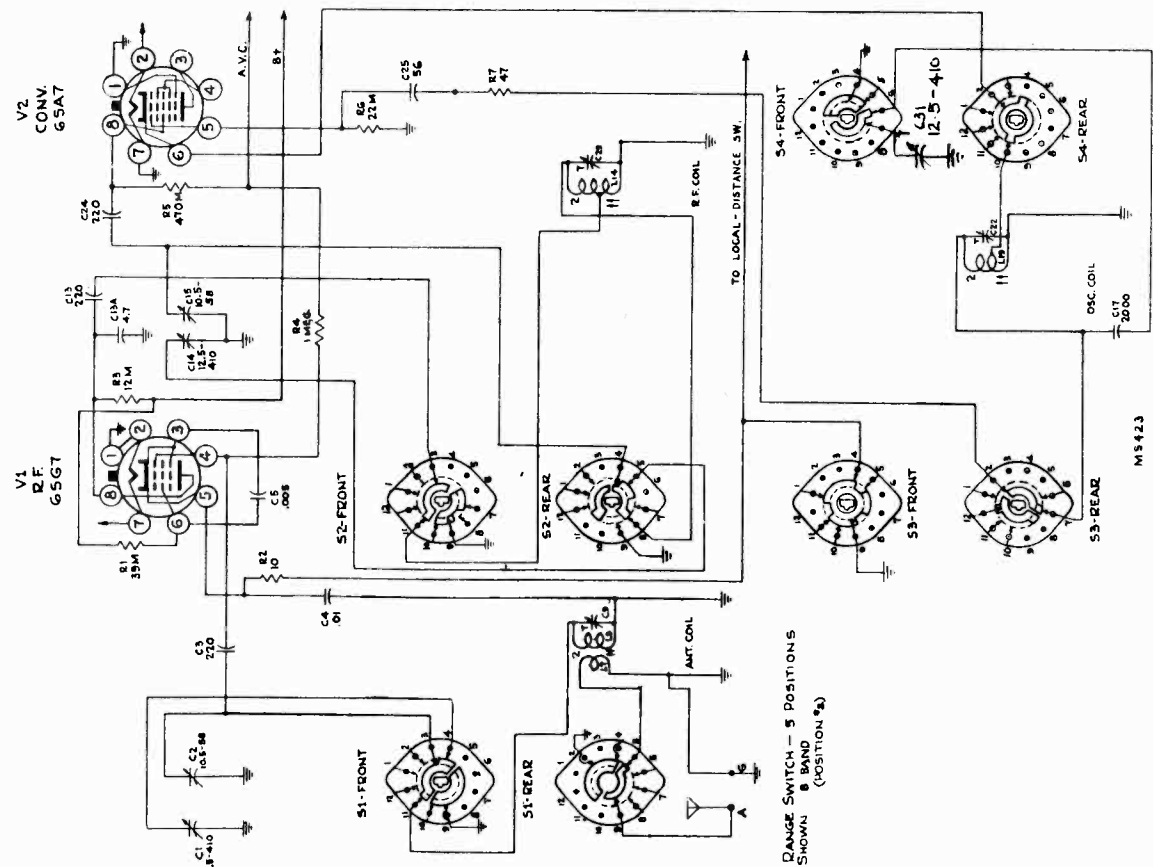
WIRE	RANGE
1	A
2	B
3	31-25 M
4	19-16 M
5	13-11 M

COIL RESISTANCES LESS THAN 1 OHM NOT SHOWN.



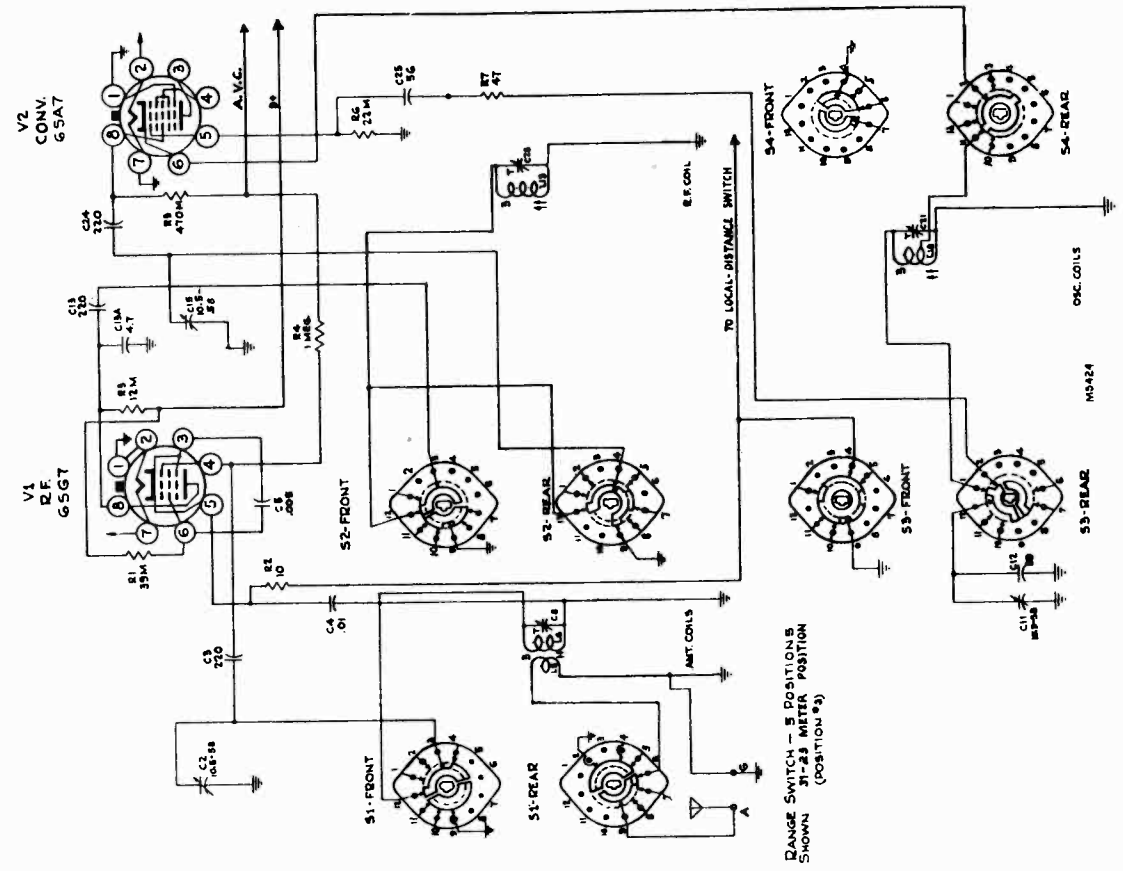
R. F. Section  
Simplified Schematic Diagram

NOTE: Circuits not in use are either disconnected or grounded thru the range switch contacts but are not illustrated.



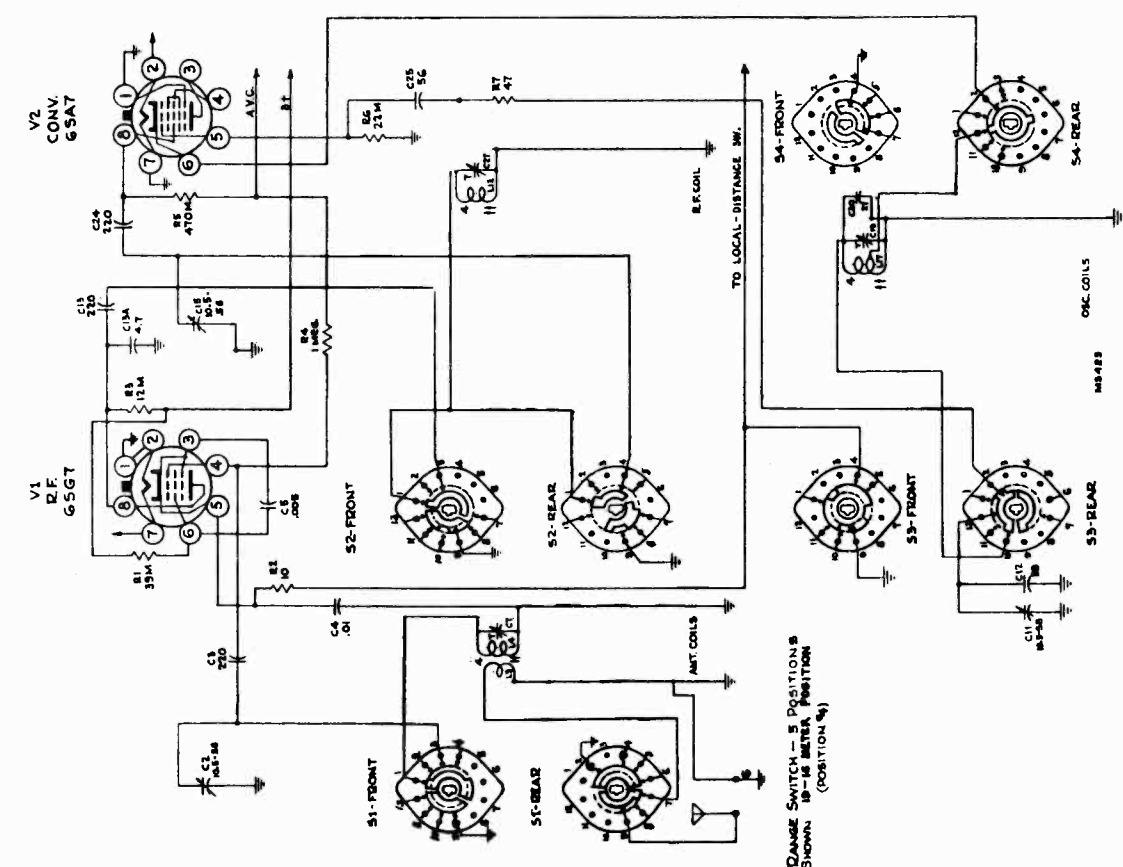
R. F. Section  
Simplified Schematic Diagram

NOTE: Circuits not in use are either disconnected or grounded thru the range switch contacts but are not illustrated.



R. F. Section  
Simplified Schematic Diagram

NOTE: Circuits not in use are either disconnected or grounded thru the range switch contacts but are not illustrated.

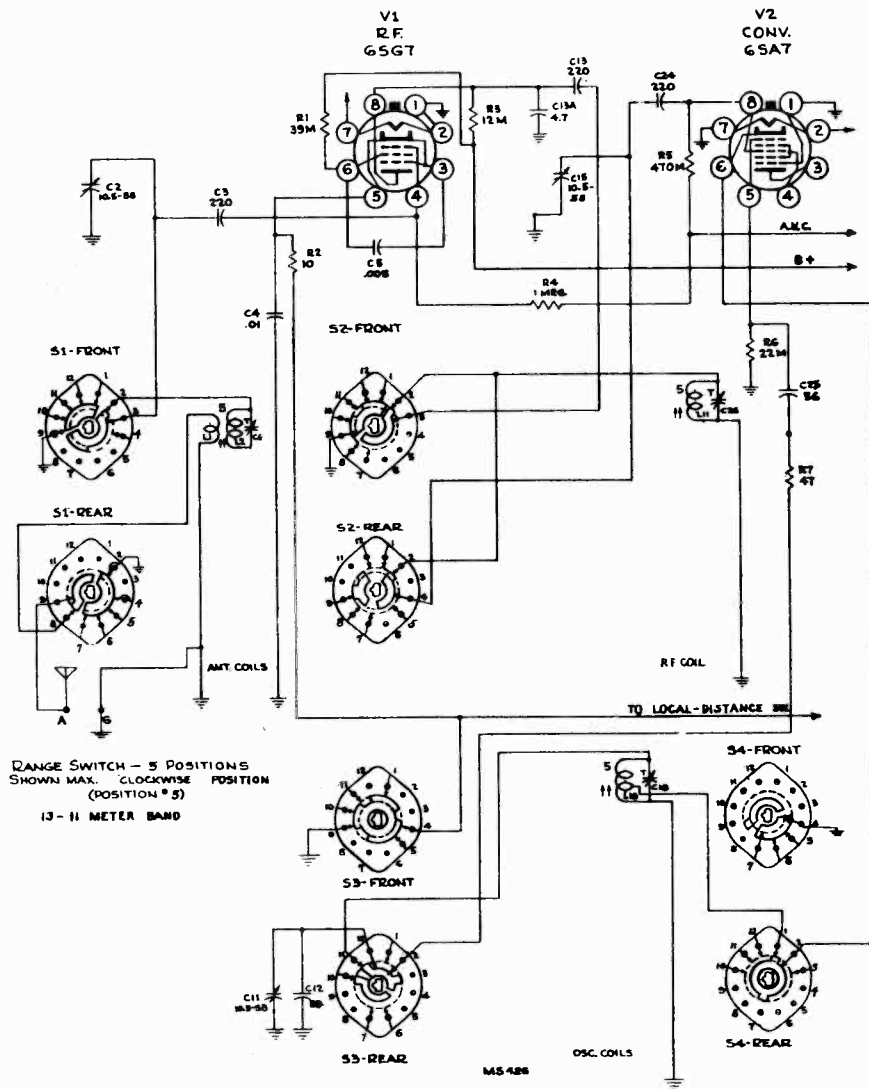


R. F. Section  
Simplified Schematic Diagram

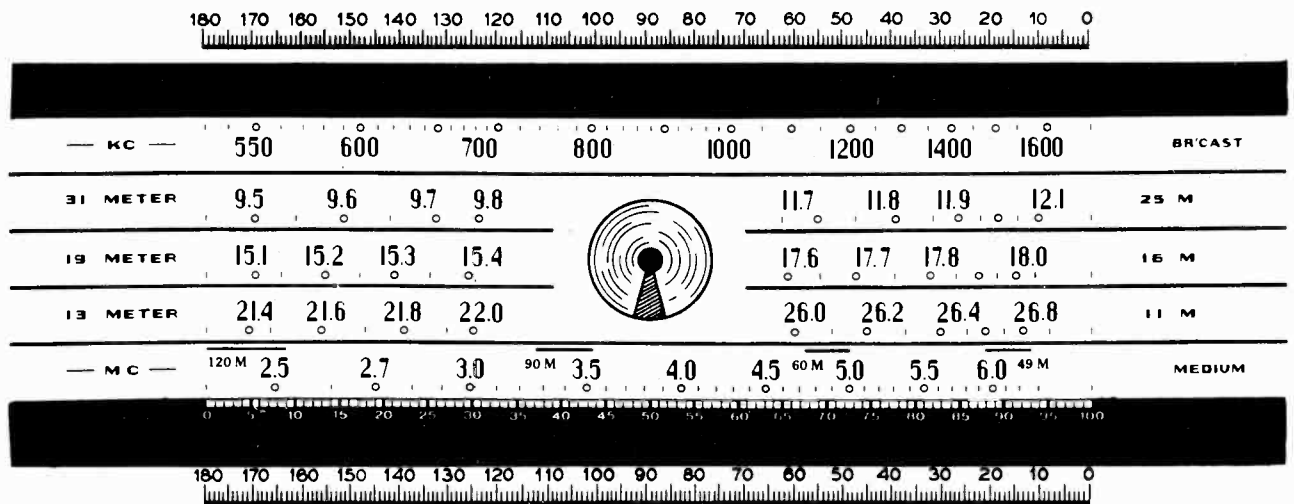
NOTE: Circuits not in use are either disconnected or grounded thru the range switch contacts but are not illustrated.

RADIO CORP. OF AMERICA

MODEL QU62



R. F. Section  
Simplified Schematic Diagram



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 top calibration scale. For example 148° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

# RADIO CORP. OF AMERICA

## Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

**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 oscillator output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord-Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the 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 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.

To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

**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.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

**Spread-Band Alignment.**—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

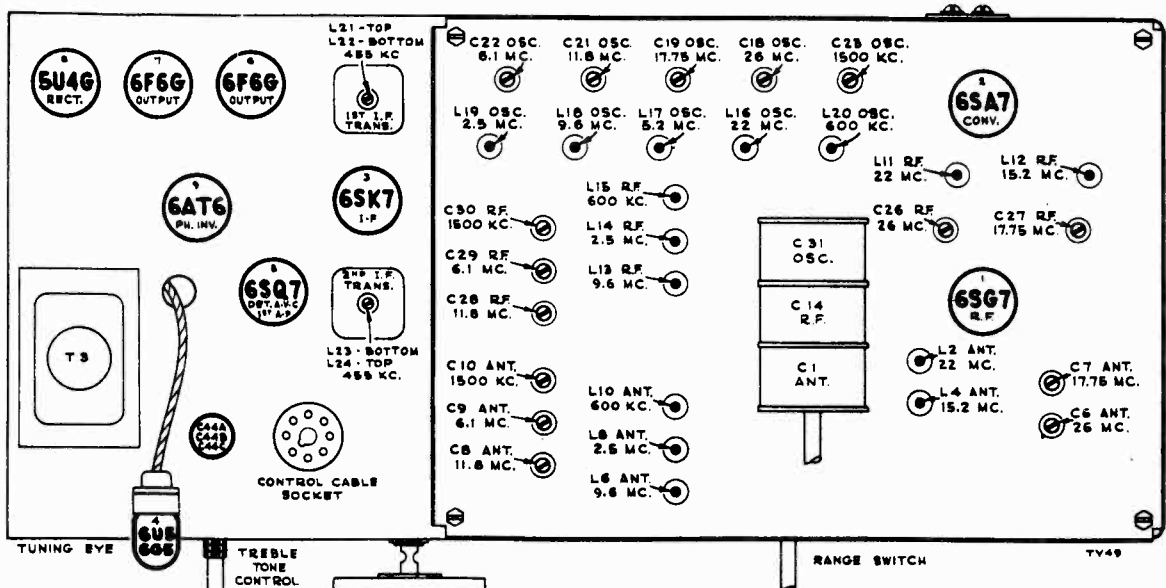
1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings of this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test-oscillator is employed in spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

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

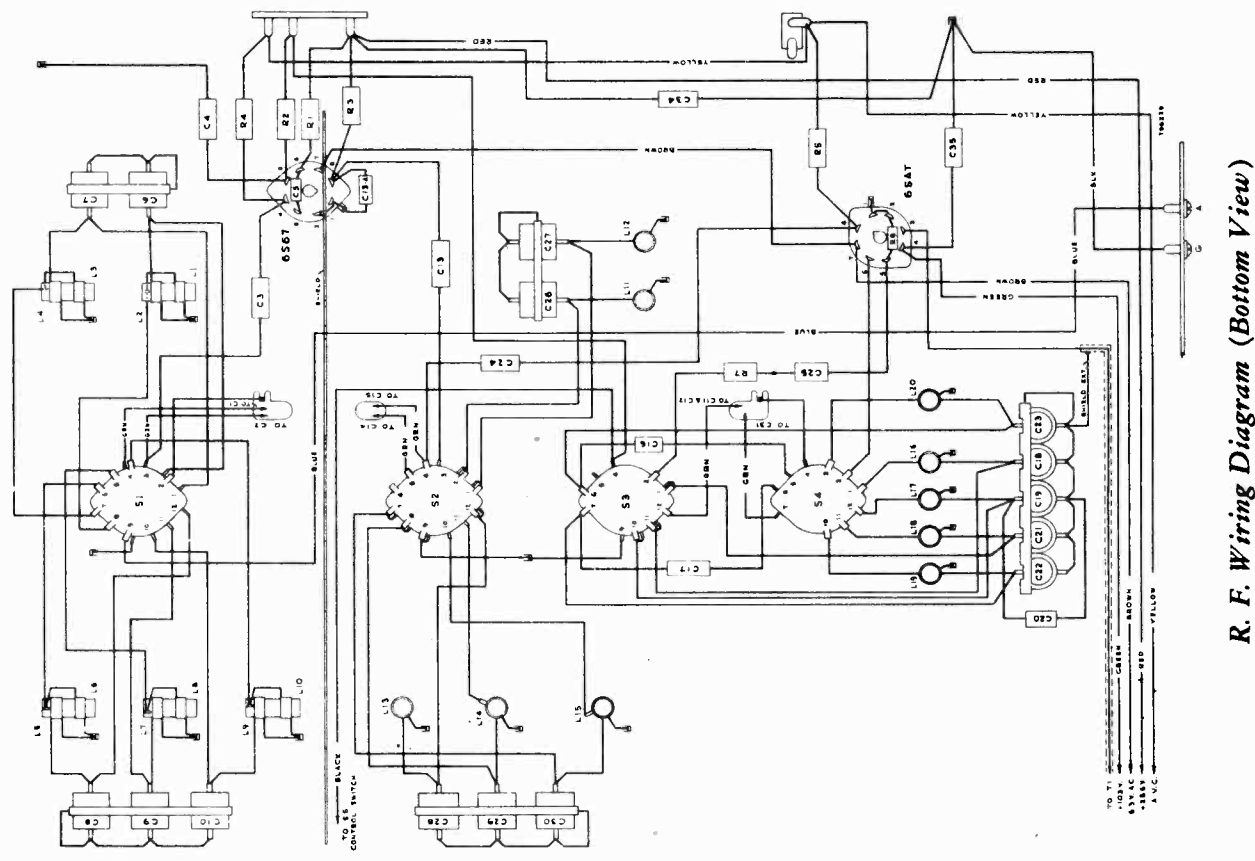
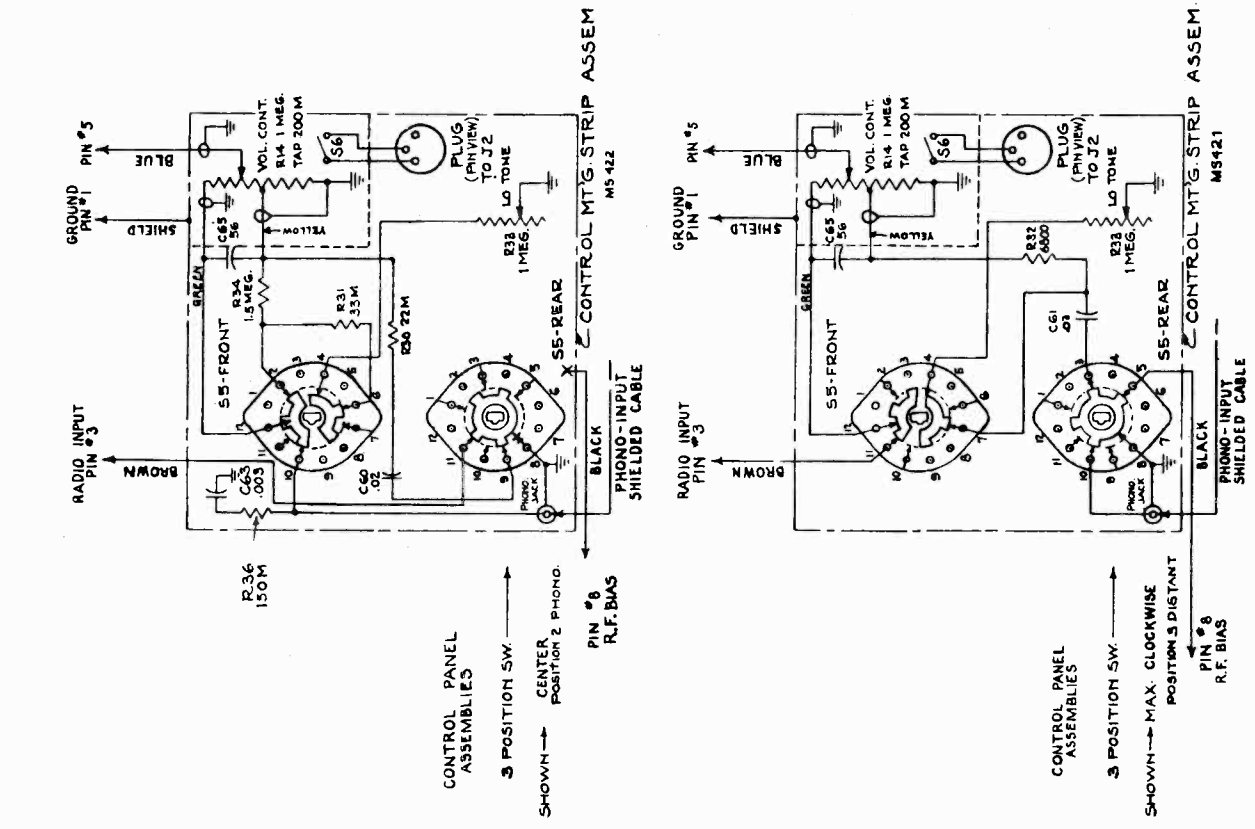
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn radio dial to—	Adjust the following for max. peak output
1	6SG7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L23, L24 2nd. I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L21, L22 1st. I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (19°)	C23 osc. C30 rf. C10 ant.
4		600 kc			600 kc (148°)
5	Repeat Steps 3 and 4				
6	Antenna terminal in series with 300 ohms	6.2 mc	"B" Band	6.2 mc (14°)	C22 osc.* C29 rf. C9 ant.
7		2.6 mc			2.6 mc (152°)
8	Repeat Steps 6 and 7				
9		11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C21 osc.* C28 rf.** C8 ant.
10		9.5 mc			9.5 mc (170°)
11	Antenna terminal in series with 300 ohms	17.75 mc	"19-16 Meter" Band	17.75 mc (40°)	C19 osc.* C27 rf.** C7 ant.
12		15.2 mc			15.2 mc (155°)
13		26.25 mc	"13-11 Meter" Band	26.25 mc (42°)	C18 osc.* C26 rf.** C6 ant.
14		21.25 mc			21.25 mc (180°)

Oscillator tracks above signal on all bands.  
 \*Use minimum capacity peak if two peaks can be obtained.  
 †These adjustments are pre-set and should not require re-adjustment except when components of the tuning section are changed.  
 \*\*Rock in—use maximum capacity peak if two peaks can be obtained.





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R. F. Wiring Diagram (Bottom View)

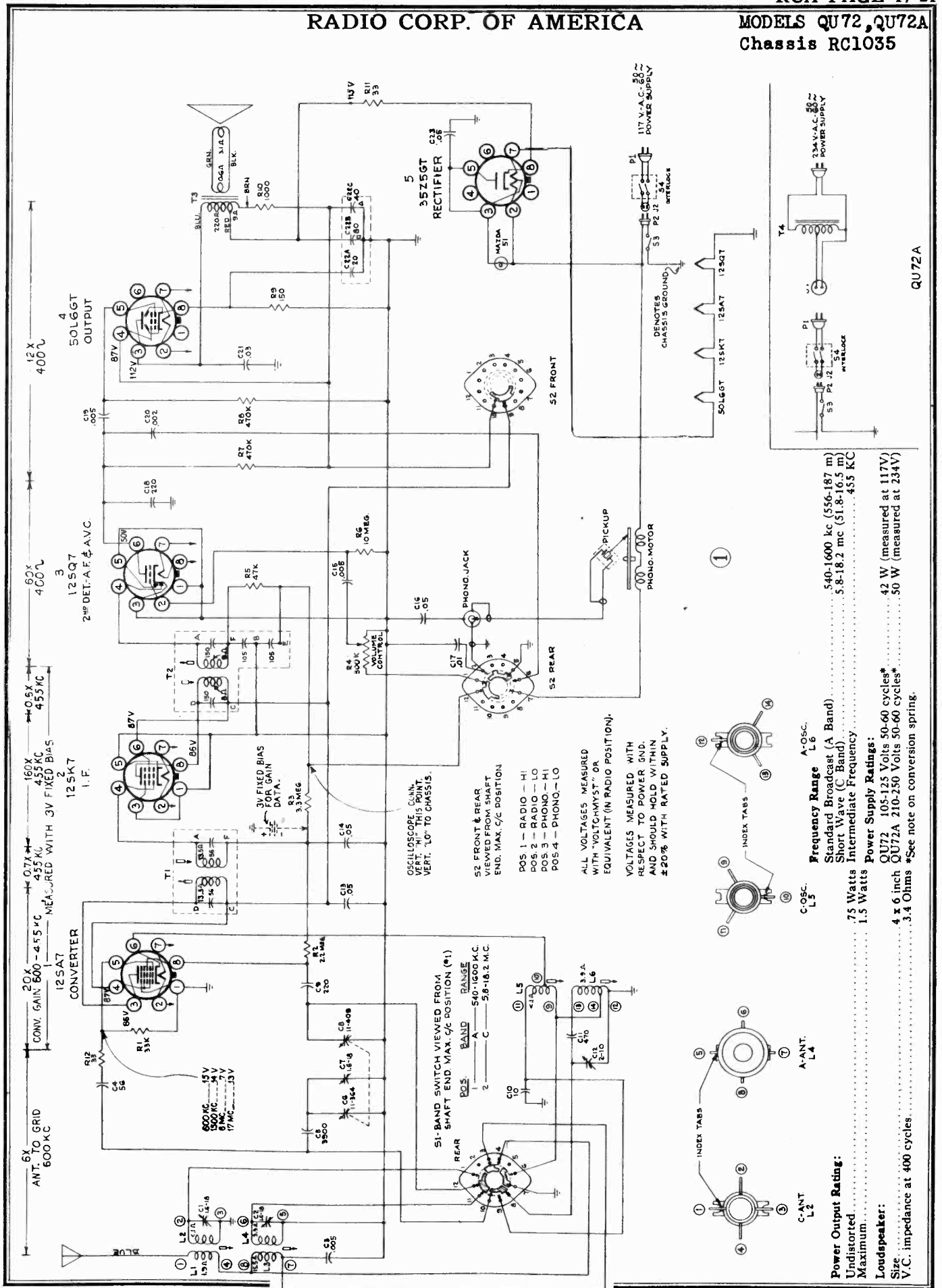


## Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b> RC-602B		
12930	Board—"Antenna-Ground" terminal board	30648	Resistor—470,000 ohms, 1/2 watt (R5, R17, R19, R21)
*72016	Bracket—Bracket (L.H.) complete with one (1) Drive cord pulley	*72014	Resistor—Voltage divider, comprising 1 section of 3800 ohms, 6 watts, 1 section of 3800 ohms, 3 watts and 1 of 210 ohms, 2.75 watts (R37a, R37b, R37c)
*72015	Bracket—Bracket (R.H.) complete with two (2) Drive cord pulleys	30652	Resistor—1 megohm, 1/2 watt (R4, R9)
70840	Cable—Bronze cable for band indicator mechanism	11769	Resistor—1.8 megohm, 1/2 watt (R15)
71086	Capacitor—Ceramic, 4.7 mmf. (C13A)	30640	Resistor—2.2 megohms, 1/2 watt (R11)
70965	Capacitor—Ceramic trimmer, comprising 5 sections of 5-50 mmf. (C18, C19, C21, C22, C23)	30992	Resistor—10 megohms, 1/2 watt (R16, R23)
70935	Capacitor—Ceramic, 27 mmf. (C20)	70976	Screen—Band indicator screen—green
70934	Capacitor—Ceramic, 39 mmf. (C12)	14350	Screw—#8-32 square head set screw
71924	Capacitor—Ceramic, 56 mmf. (C25)	33438	Screw—Thumb screw for tuning tube clip
39636	Capacitor—Mica, 220 mmf. (C3, C13, C24, C46)	6647	Shade—Lamp shade
71932	Capacitor—Mica, 510 mmf. (C16)	*72013	Shaft—Tuning knob shaft and flywheel
72526	Capacitor—Mica, 2000 mmf. (C17)	31364	Socket—Lamp socket (clip opening toward lamp)
70931	Capacitor—Mica trimmer, comprising 1 section of 3-35 mmf. and 2 sections of 4-70 mmf. (C8, C9, C10, C28, C29, C30)	34909	Socket—Lamp socket (clip opening toward lead)
70745	Capacitor—Mica trimmer, comprising 1 section of 12-160 mmf. and 1 section of 4-70 mmf. (C6, C7)	70827	Socket—Tube socket—octal
70754	Capacitor—Mica trimmer, comprising 1 section of 4-70 mmf. and 1 section of 12-160 mmf. (C26, C27)	9914	Socket—Tube socket for 6AT6
71592	Capacitor—Moulded, .002 mfd., 200 volts (C47)	71554	Socket—Tuning tube socket
71087	Capacitor—Moulded, .003 mfd., 1000 volts (C50, C51)	70978	Spring—Band indicator disc spring
72221	Capacitor—Moulded, .005 mfd., 200 volts (C52)	31970	Spring—Tension spring for drive cords
71587	Capacitor—Moulded, .005 mfd., 600 volts (C5, C35, C37)	*72020	Switch—Range switch (S1, S2, S3, S4)
71593	Capacitor—Moulded, .005 mfd., 600 volts (C45)	70917	Transformer—First I.F. transformer T1 (L21, L22, C32, C33)
*72529	Capacitor—Moulded, .01 mfd., 100 volts (C43)	70918	Transformer—Second I. F. transformer T2 (L23, L24, C38, C39, C40, C41)
71585	Capacitor—Moulded, .01 mfd., 200 volts (C42)	34183	Transformer—Power transformer, 110/125/150/210/240 volts, 60 cycle (T3)
72219	Capacitor—Moulded, .01 mfd., 600 volts (C4, C34, C48, C49)	71143	Washer—"C" washer for actuating disc
*72527	Capacitor—Moulded, .05 mfd., 100 volts (C36)	34373	Washer—"C" washer for tuning shaft
*72528	Capacitor—Moulded, 0.1 mfd., 100 volts (C62)		<b>SPEAKER ASSEMBLY</b> 92569-4W (RL 103-4)
*72019	Capacitor—Electrolytic, 16 mfd., 450 volts (C64)	32852	Cap—Dust cap
36599	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts, 1 section of 15 mfd., 350 volts and 1 section of 40 mfd., 25 volts (C44a, C44b, C44c)	36145	Cone—Cone complete with voice coil
70726	Clip—Retaining clip for coils' core and studs	5118	Plug—3 contact male plug for speaker
30716	Clip—Tuning tube clip	*72223	Speaker—12" P.M. speaker complete with cone and voice coil less plug
70923	Coil—Antenna coil, 13-11 meter band (L1, L2)	71145	Suspension—Metal cone suspension
70924	Coil—Antenna coil, 19-16 meter band (L3, L4)		<b>SPEAKER ASSEMBLY</b> 92566-3W (RL 70N1)
70925	Coil—Antenna coil, 31-25 meter band (L5, L6)	32852	Cap—Dust cap
70926	Coil—Antenna coil, "B" band (L7, L8)	11469	Coil—Neutralizing coil
70927	Coil—Antenna coil, "A" band (L9, L10)	12079	Coil—Field coil, 1060 ohms
70964	Coil—R. F. coil, 13-11 meter band (L11)	36145	Cone—Cone complete with voice coil
70963	Coil—R. F. coil, 19-16 meter band (L12)	5119	Plug—3 contact female plug for speaker
70962	Coil—R. F. coil, 31-25 meter band (L13)	71560	Plug—5 prong male plug for speaker
70960	Coil—R. F. coil, "B" band (L14)	36204	Speaker—12" E.M. speaker complete with cone and voice coil less output transformer and plugs
70959	Coil—R. F. coil, "A" band (L15)	71145	Suspension—Metal cone suspension
70920	Coil—Oscillator coil, 13-11 meter band (L16)	37997	Transformer—Output transformer (T4)
70823	Coil—Oscillator coil, 19-16 meter band (L17)		NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
70825	Coil—Oscillator coil, 31-25 meter band (L18)		<b>CONTROL PANEL ASSEMBLIES</b>
70829	Coil—Oscillator coil, "B" band (L19)	39622	Capacitor—Mica, 56 mmf. (C65)
70789	Coil—Oscillator coil, "A" band (L20)	*72532	Capacitor—Moulded, .003 mfd., 200 volts (C63)
70957	Condenser—Variable tuning condenser (C1, C2, C11, C14, C15, C31)	*72530	Capacitor—Moulded, .02 mfd., 100 volts (C60)
*72012	Control—H. F. tone control (R18)	*72531	Capacitor—Moulded, .03 mfd., 100 volts (C61)
*72913	Cord—Drive cord (approx. 30" overall length)	*72328	Control—L.F. tone control (R33)
*72913	Cord—Indicator cord (approx. 66" overall length)	*72330	Control—Volume control and power switch (R14, S6)
70969	Core—Adjustable core and stud for "A" band R.F. coil	31480	Lamp—Volume control lamp—Mazda #47
70939	Core—Adjustable core and stud for "A" band oscillator coil	31567	Plug—3 prong male plug for control cable
70970	Core—Adjustable core and stud for 13-11 meter band R.F. coil	35383	Plug—8 prong male plug for control cable
70943	Core—Adjustable core and stud for 19-16 meter band antenna coil	14659	Resistor—6800 ohms, 1/2 watt (R32)
70941	Core—Adjustable core and stud for 13-11 meter band antenna coil	30492	Resistor—22,000 ohms, 1/2 watt (R30)
70937	Core—Adjustable core and stud for 19-16 meter band R.F. and oscillator coils, and 13-11 meter band oscillator coil	30685	Resistor—33,000 ohms, 1/2 watt (R31)
70944	Core—Adjustable core and stud for 31-25 meter band antenna coils, "B" band antenna coil	30493	Resistor—150,000 ohms, 1/2 watt (R36)
70938	Core—Adjustable core and stud for "A" band antenna coils, 31-25 meter band oscillator and R. F. coils and "B" band oscillator coil	31449	Resistor—1.5 megohms, 1/2 watt (R34)
70977	Disc—Band indicator actuating disc	35787	Socket—Phono input socket
*72011	Drum—Band indicator actuating drum	72329	Switch—Local-distance-phonograph switch (S5)
31273	Drum—Condenser drive drum		<b>MISCELLANEOUS ASSEMBLIES</b>
*72017	Frame—Dial frame and back plate less dial, tube clip, indicator disc, spring, indicator and "C" washer	36462	Clamp—Dial clamp
37396	Grommet—Rubber grommet for mounting R. F. assembly (4 required)	X1624	Cloth—Grille cloth
*72018	Indicator—Station selector indicator	*72902	Decal—Control panel decal
5117	Lamp—Band indicator lamp—Mazda #55	71089	Decal—Trade mark decal
11765	Lamp—Dial lamp—Mazda #51	*72326	Dial—Glass dial scale
18469	Plate—Bakelite mounting plate for electrolytic #36599	*72901	Hinge—Lid hinge—invisible type (4 required)
30868	Plug—2 Contact female plug for motor cable (J1)	*72900	Hinge—Lid hinge—spring type (4 required)
31572	Plug—3 contact female plug for power switch cable (J2)	71905	Knob—Local distance and phono switch knob
12493	Plug—5 contact female plug for speaker cable	70836	Knob—Tone control, range switch or tuning knob
35630	Pulley—Drive cord pulley (1 1/2" dia.)	*72331	Knob—Volume control knob
35641	Pulley—Drive cord pulley (1 3/4" dia.)	5117	Lamp—Record changer compartment lamp—Mazda #55
34761	Resistor—10 ohms, 1/2 watt (R2)	70546	Mounting—One set of hardware consisting of four upper springs, four lower springs and four clamp nuts to mount record changer
30732	Resistor—47 ohms, 1/2 watt (R7)	6647	Shade—Compartment lamp shade
34765	Resistor—100 ohms, 1/2 watt (R8)	14270	Spring—Retaining spring for knobs
34767	Resistor—2200 ohms, 1/2 watt (R10)		
71085	Resistor—12,000 ohms, 2 watts (R3)		
30492	Resistor—22,000 ohms, 1/2 watt (R6, R12)		
71084	Resistor—39,000 ohms, 1 watt (R1)		
30147	Resistor—39,000 ohms, 1/2 watt (R22)		
3252	Resistor—100,000 ohms, 1/2 watt (R35)		
30651	Resistor—270,000 ohms, 1/2 watt (R13, R20)		

RADIO CORP. OF AMERICA

MODELS QU72, QU72A  
Chassis RC1035



©John F. Rider

Frequency Range  
Standard Broadcast (A Band) ..... 540-1600 kc (556-187 m)  
Short Wave (C Band) ..... 5.8-18.2 mc (51.8-16.5 m)  
Intermediate Frequency ..... 455 KC

Power Supply Ratings:  
QU72 105-125 Volts 50-60 cycles\*  
QU72A 210-250 Volts 50-60 cycles\*  
4 x 6 inch  
3.4 Ohms \*See note on conversion spring.

Power Output Rating:  
Undistorted  
Maximum  
Loudspeaker:  
Size .....  
V.C. impedance at 400 cycles .....

75 Watts  
1.5 Watts  
C-Osc. L5  
A-Osc. L6  
A-ANT. L4  
C-ANT. L2

OSCILLOSCOPE CONN.  
VERT. "HI" THIS POINT.  
VERT. "LO" TO CHASSIS.

S2 FRONT & REAR  
VIEWED FROM SHAFT  
END, MAX. C/C POSITION

POS 1 - RADIO - HI  
POS 2 - RADIO - LO  
POS 3 - PHONO - HI  
POS 4 - PHONO - LO

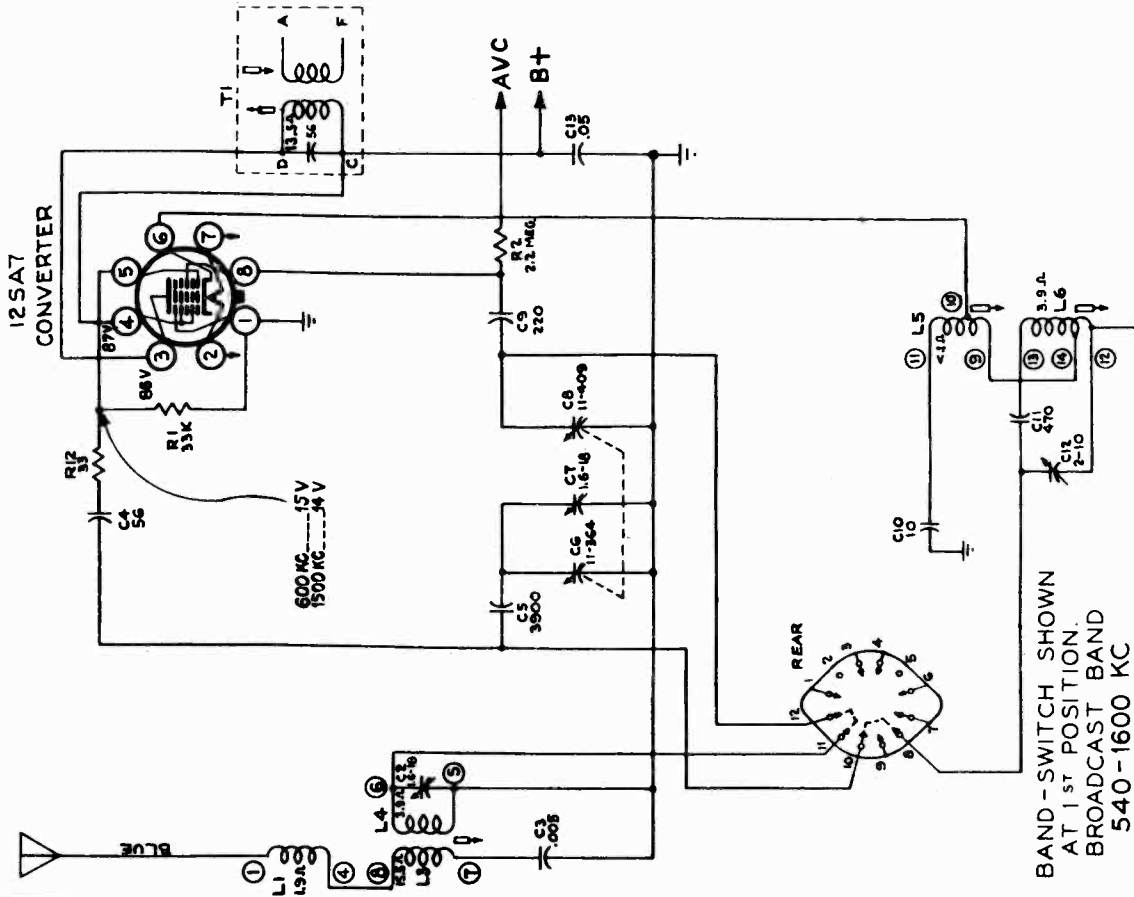
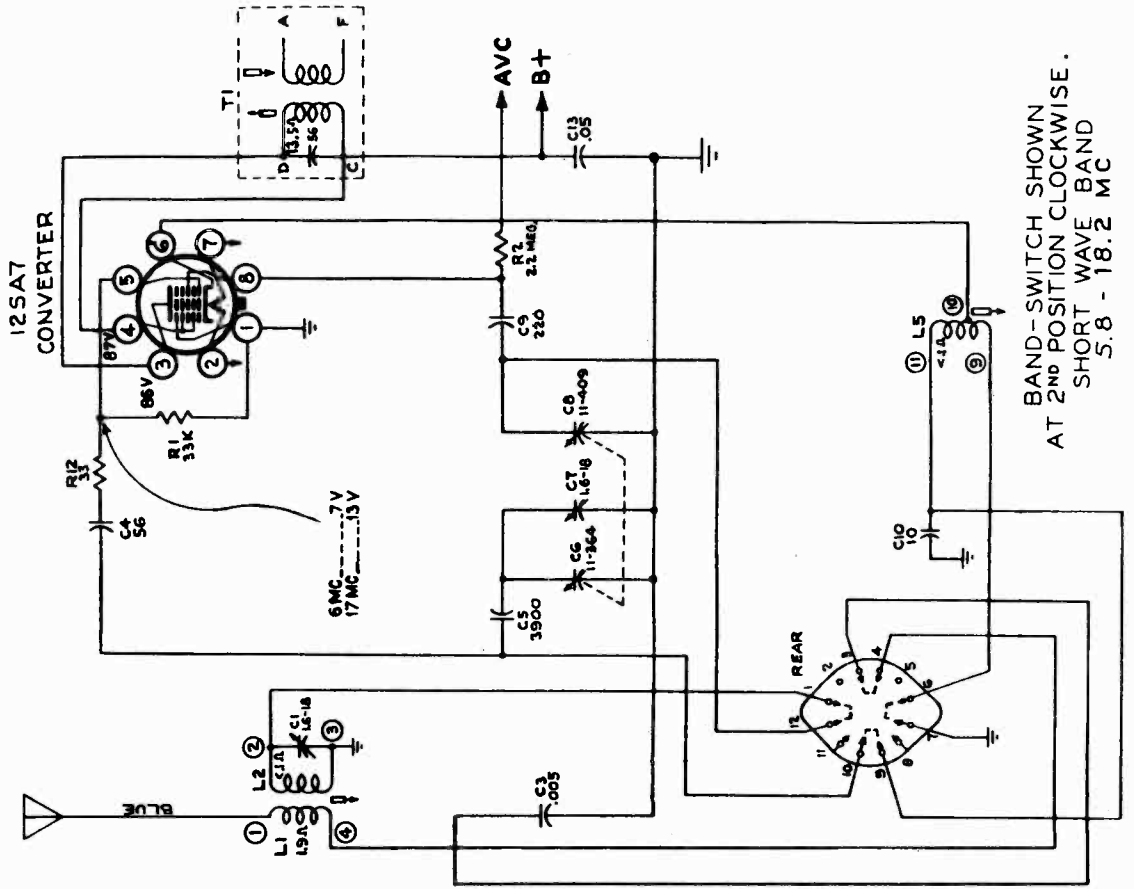
ALL VOLTAGES MEASURED  
WITH "VOLT-HYST" OR  
EQUIVALENT (IN RADIO POSITION).  
VOLTAGES MEASURED WITH  
RESPECT TO POWER GND.  
AND SHOULD HOLD WITHIN  
±20% WITH RATED SUPPLY.

QU72A

# "clarified schematics"

MODELS QU72, QU72A

RADIO CORP. OF AMERICA



### Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscilloscope are shown on the Schematic Circuit Diagram.

**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 oscillator output as low as possible to avoid a-v-c action.

**Alignment.**—With the gang condenser in full mesh, the pointer should be set  $3\frac{1}{2}''$  from the left edge of the dial back plate. This point corresponds to the first mark on the dial scale to the left of "550" kc. on "A" band. To find any calibration point it is necessary to draw a line on the dial scale drawing through the desired freq., so that the line passes through the same reading on the top and bottom rule scales. For instance, 1300 kc. on "A" band will correspond to a dial indicator setting of  $7\frac{1}{4}''$  from the LEFT EDGE of the dial back plate. Move the indicator the desired distance by turning the tuning knob. ONCE THE INDICATOR HAS BEEN SET AT FULL MESH, MOVE THE INDICATOR ONLY BY TURNING THE TUNING KNOB.

**Dial Indicator Adjustment.**—After the set has been aligned, replace it in the cabinet. Turn the tuning knob until the condenser is in full mesh. The indicator should now be under the first mark on the dial scale face to the left of "550" kc on "A" band. If it is not, the calibration should be rechecked.

**Alignment.**—The most satisfactory method of aligning or checking the short-wave range is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil, L5, so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce inaccuracy on the band dial. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

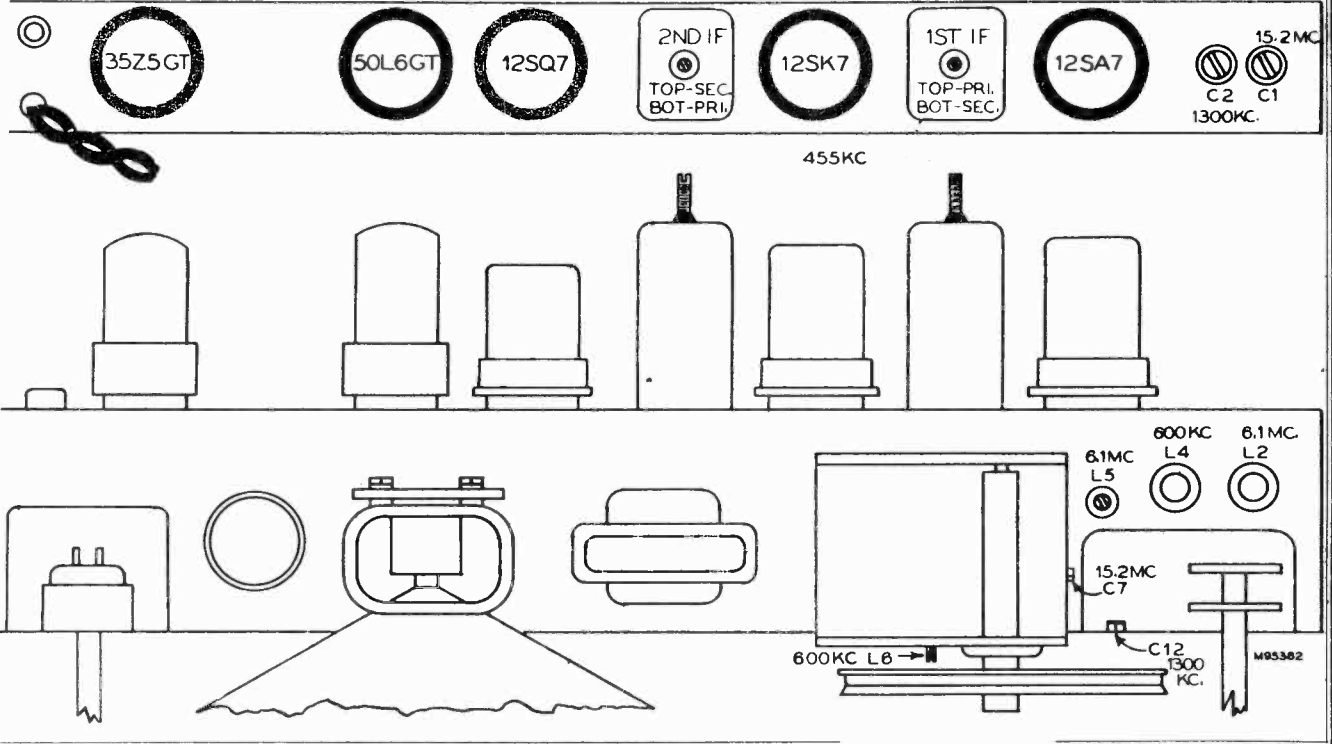
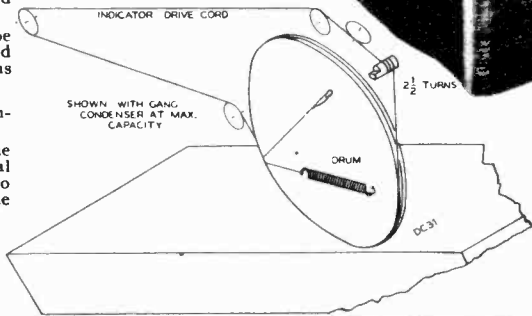
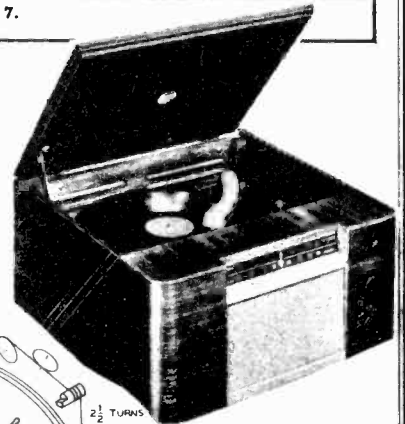
1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil should be retouched so that the stations come in at the correct points on the dial.

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

**\*Caution:** This is an AC-DC type chassis with one side of the power line connected to the metal base, which is also—B. Connection from the signal generator must have a large (.1 MFD) capacitor in the ground side to prevent damage to the generator attenuator, unless the power source to the receiver is isolated from ground.

Step	Connect high side of test-osc. to—	Tune test osc. to—	Range Switch	Turn radio dial to	Adjust for max. peak output—
1	12SK7 IF grid in series with .01 mfd.	455 kc	"A"	Quiet point, low end of dial	T2—Top core T2—Bot. core
2	12SA7 IF grid in series with .01 mfd.				T1—Bot. core T1—Top core
3	Ant. lead in series with 300 Ω	15.2 mc	"C"	15.2 mc	C7—Osc. C1—Ant.
4		6.1 mc			L5—Osc. L2—Ant.
5	Repeat steps 3 and 4.				
6	Ant. lead in series with 200 mmfd.	1300 kc	"A"	1300 kc	C12—Osc. C2—Ant.
7		600 kc			L6—Osc. L4—Ant.
8	Repeat steps 6 and 7.				



TOP VIEW QU72

Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
<b>CHASSIS ASSEMBLIES</b> RC 1035		<b>PICKUP AND ARM ASSEMBLIES</b> RMP 124	
*72277	Capacitor—Mica trimmer, dual, 1.6-18 mmf. (C1, C2)	*72284	Arm—Pickup arm shell only
70367	Capacitor—Mica trimmer, 2-10 mmf. (C12)	*72288	Arm—Pivot arm and shaft
72615	Capacitor—Mica, 10 mmf. (C10)	*72285	Base—Pickup arm mounting base
39622	Capacitor—Mica, 56 mmf. (C4)	*72289	Bracket—Pickup arm mounting bracket
39636	Capacitor—Mica, 220 mmf. (C9, C18)	*72592	Cable—Shielded pickup cable complete with pin plug
72814	Capacitor—Ceramic, 470 mmf. (C11)	39851	Crystal—Crystal cartridge
72637	Capacitor—Mica, 3900 mmf. (C5)	38452	Guard—Needle guard
*72839	Capacitor—Molded paper, .002 mfd., 400 volts (C20)	*72290	Pin—Pivot pin to hold mounting bracket to pivot arm
71699	Capacitor—Molded paper, .005 mfd., 400 volts (C3, C15, C19)	31048	Plug—Pin plug for pickup cable
*72838	Capacitor—Molded paper, .01 mfd., 400 volts (C17)	70341	Nut—Mounting nut and washer for sapphire
72815	Capacitor—Molded paper, .03 mfd., 400 volts (C21)	34311	Ring—Mounting base retaining ring
72837	Capacitor—Molded paper, .05 mfd., 400 volts (C13, C14, C16; C23)	39863	Sapphire—Sapphire and holder
72281	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts, 1 section of 40 mfd., 150 volts and 1 section of 20 mfd., 25 volts (C22A, C22B, C22C)	37763	Screw—#2-56 x 1/2" screw to mount guard (2 required)
72276	Coil—Antenna coil, "C" band (L1, L2)	4388	Screw—#6-32 x 3/16" set screw to hold pivot pin
*72275	Coil—Antenna coil, "A" band (L3, L4)	*72286	Spacer—One set of spacers for pickup arm bracket
72274	Coil—Oscillator coil, "C" band (L5)	*72774	Spring—Pivot arm tension spring
*72273	Coil—Oscillator coil, "A" band (L6)	<b>MOTOR AND TURNTABLE ASSEMBLIES</b> Stamped 970472-1	
*72278	Condenser—Variable tuning condenser (C6, C7, C8)	39533	Clip—Retaining clip for idler wheel
38410	Control—Volume control and power switch (R4, S3)	39531	Clip—Retaining clip for turntable spindle
32634	Cord—Drive cord (approx. 49" overall length)	30870	Connector—2 prong male plug for motor cable
70384	NOTE: Before assembling, stretch to full length	*70121	Motor—117 volt 60 cycle motor complete with mounting plate and turntable
71851	Drum—Drive drum	39530	Plate—Idler wheel plate
72283	Grommet—Rubber grommet for mounting tube socket	39528	Spindle—Turntable spindle
	Grommet—Rubber grommet for mounting tuning condenser or speaker	39534	Spring—Idler wheel tension spring
*72544	Indicator—Station selector indicator	*72840	Turntable—Finished turntable only
70301	Insulator—Phono input socket insulator	39529	Wheel—Idler wheel
11765	Lamp—Dial lamp, Mazda No. 51	<b>SPEAKER ASSEMBLIES</b> 922258-2	
*72272	Plate—Dial back plate complete with drive cord pulleys	71058	Speaker—4" x 6" P.M. speaker complete with cone and voice coil
30868	Plug—2 contact female plug for motor cable	<b>NOTE:</b> If stamping on speaker does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.	
30870	Plug—2 prong male plug for interlock switch (P2)	<b>MISCELLANEOUS ASSEMBLIES</b>	
30789	Resistor—33 ohms, 1/2 watt (R12)	70398	Clamp—Dial clamps (1 set)
71290	Resistor—33 ohms, 1 watt (R11)	*72685	Decal—Control panel decal
30880	Resistor—150 ohms, 1/2 watt (R9)	*72684	Decal—Trade mark decal
71916	Resistor—1000 ohms, 1 watt (R1)	*72683	Dial—Glass dial scale
30685	Resistor—33,000 ohms, 1/2 watt (R10)	*72292	Knob—Control knob
30787	Resistor—47,000 ohms, 1/2 watt (R5)	*72293	Mounting—One set of hardware to mount pick-up arm
30648	Resistor—47,000 ohms, 1/2 watt (R7, R8)	30868	Plug—2 contact female plug for interlock switch (J2)
30649	Resistor—270,000 ohms, 1/2 watt (R2)	*72600	Spring—Conversion spring (60 to 50 cycle operation)
31417	Resistor—3.2 megohms, 1/2 watt (R3)	14270	Spring—Retaining spring for knob
30992	Resistor—10 megohms, 1/2 watt (R6)	72745	Switch—Interlock switch, slide type D.P.D.T. (S4)
*72282	Shaft—Tuning knob shaft	*72546	Transformer—Step-down transformer, 210-25 volt 50 60 cycle primary, 117 volt 50, 60 cycle secondary (T4)
34449	Socket—Lamp socket		
35787	Socket—Phono input socket		
37605	Socket—Tube socket, moulded		
31319	Socket—Tube socket, wafer		
70390	Spring—Drive cord spring		
*72280	Switch—Radio-phonograph switch (S2)		
*72279	Switch—Range switch (S1)		
72545	Transformer—First I. F. transformer (T1)		
70918	Transformer—Second I. F. transformer (T2)		
72296	Transformer—Output transformer (T3)		
33726	Washer—"C" washer for tuning knob shaft		

**Turntable Spindle:**

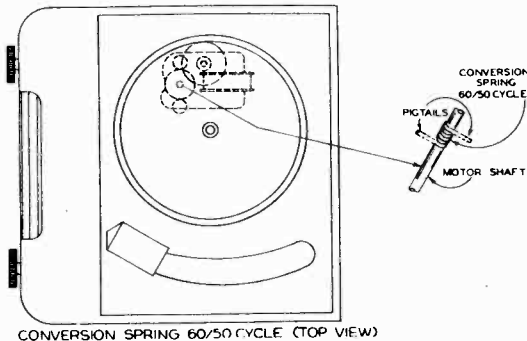
When lubrication is required, apply one or two drops of Gargoyle 600W to the bearing.

**Drive Wheel:**

Apply one or two drops of any good grade of S.A.E. No. 10 oil to the bearing felt.

**CAUTION:**

Exercise extreme care to prevent getting any oil on the rubber tire or on the motor shaft. Oil on these parts will cause slippage with resultant irregular turntable speed.



On instruments having motors stamped 970472-1, it is possible to convert these instruments to 117 volt 50 cycle operation. A conversion spring, stock number 72689, is placed over the motor shaft, as shown in the illustration, increasing the diameter of the shaft, and compensating for the decreased motor speed at 50 cycles. These springs may be supplied with the instrument to aid in installation. After the spring has been placed on the shaft, clip the pigtails so they do not interfere with the drive wheel.

**REPLACEMENT OF SAPPHIRE**

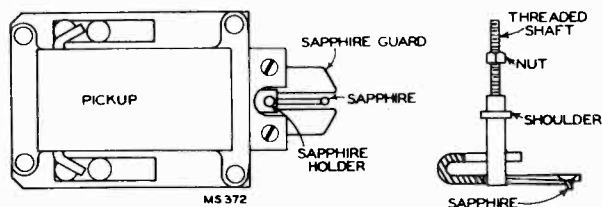
**CAUTION:** Never bend the sapphire support wire.

The nut on the sapphire holder assembly may be locked by a light cement (such as Glyptal). Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.

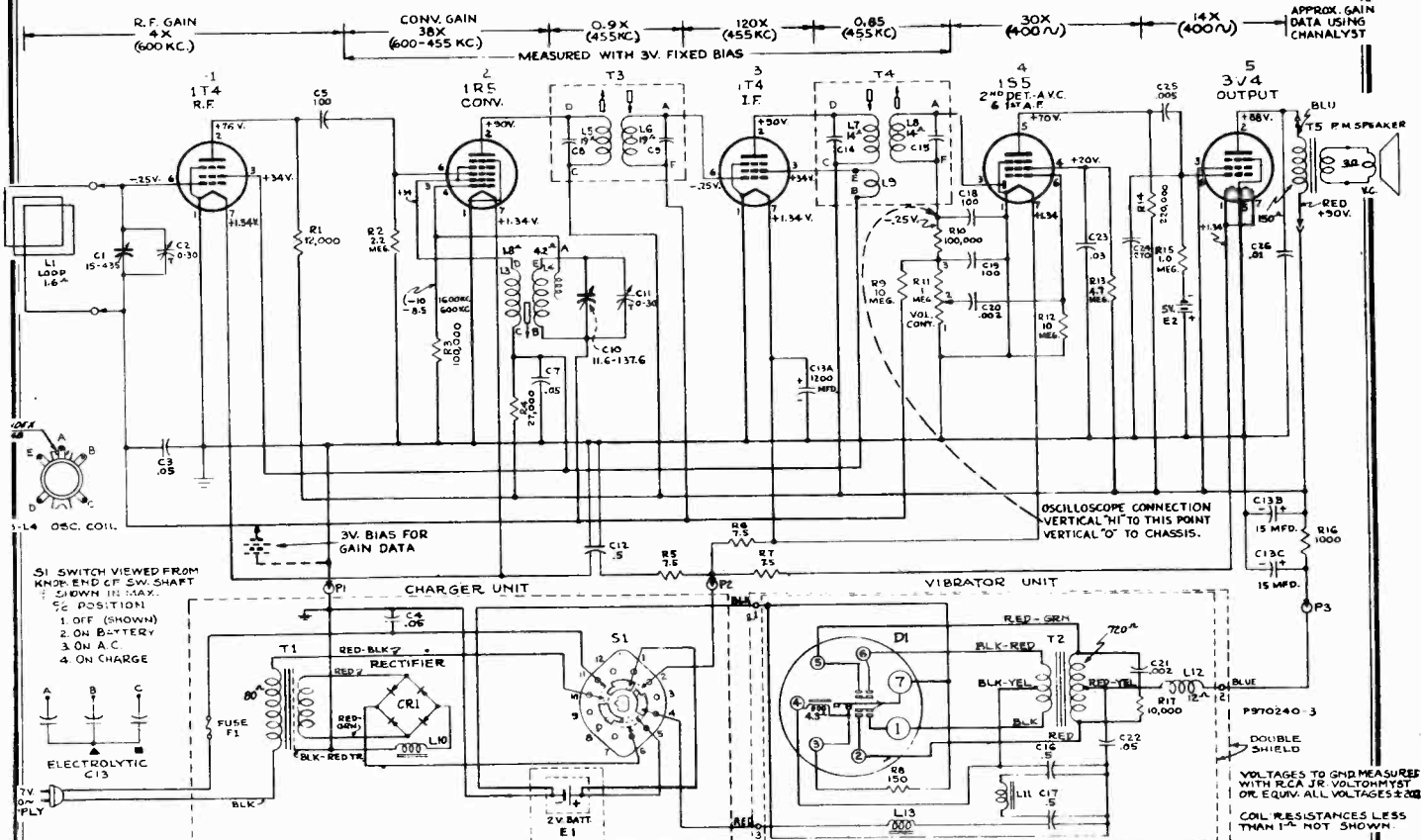
Use of a drop or two of acetone will facilitate the removal of the nut and shaft if cement has been used. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020") beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.



RADIO CORP. OF AMERICA

MODEL 65BR9,  
Chassis RC1045



Alignment Procedure

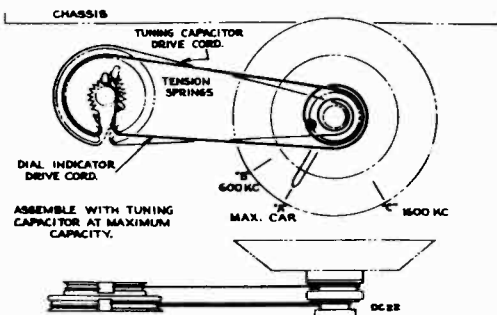
**Cathode Ray Alignment** is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

**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 oscillator output as low as possible to avoid AVC action.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	High side of loop (Green lead) in series with 0.1 mfd.	455 kc	Gang at max. cap.	L7, L8, 2nd I.F. trans L5, L6, 1st I.F. trans.
2	220 mmf. in series with a single turn loop 4x8 in., approx. 3 in. from receiver loop. (Bottom shield cover in place and chassis in cabinet)	1600 kc	1600 kc "C"	C11 Osc. C2 R.F.
3		600 kc	600 kc "B"	L4 Osc. Rock in
4		1600 kc	1600 kc "C"	C11 Osc.

**Note.**—In alignment, if possible, it is advisable to utilize an external source of "B" voltage. This will facilitate accessibility of the various trimmers.



**Calibration.**—It is not necessary to refer to the dial scale for calibration. Three reference marks on the dial backing are used. With the gang completely meshed, the pointer should be set at "A" as shown in the diagram. For alignment purposes, 600 kc. will then fall at "B", and 1600 kc. will be at "C"

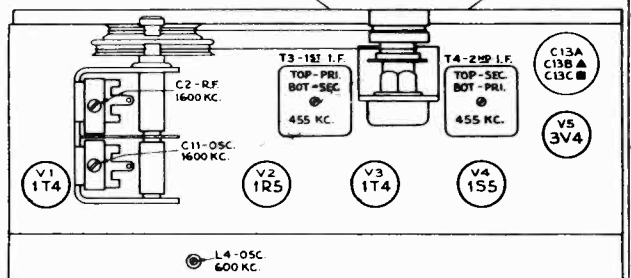
**Operation.**—This set operates on battery, or 117 Volt, 60 cycle AC (Battery in set, and in good condition). Provision is made so that when the set is operating on "AC" the battery is receiving a slight charge. In the "Charge" position, the rate of charge is much higher. A completely discharged battery will recharge in about 24 hours on "Charge". It is possible to overcharge the battery in the "AC" position, so it is advisable to play the receiver on "Battery" until slightly discharged whenever the battery has become fully charged on "AC"

**Battery Charging.**—With the cabinet back removed, two balls (1 red and 1 green) may be seen through an opening in the battery compartment cover. Both balls at top—battery full charged—Green ball sinks when battery is 20% discharged. Both balls at bottom—battery 90% discharged. Re-charge by connecting set to 115 volt 60 cycle power supply and set power switch to "CHG". Do not overcharge—check fuse if battery does not charge—do not allow battery to remain in discharged condition.

**Water level.**—Water Level should be checked frequently and distilled water or tap water, if it is used for cooking and drinking, added if required to bring liquid level up to the indicator line visible through the opening in the battery compartment cover. To add water; Remove line cord from power supply, remove cabinet back, remove thumb nuts and battery compartment cover, pull the battery out sufficiently to expose the red fill cap (pull on strap at bottom of battery), do not strain battery leads. Unscrew the red fill cap and add sufficient water to bring liquid level up to the indicator line.

**Caution.**—The liquid is dilute sulphuric acid, it is destructive to clothing and will burn the hands—do not spill.

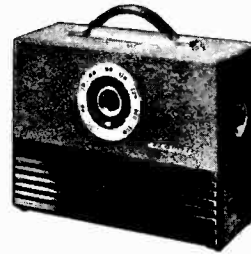
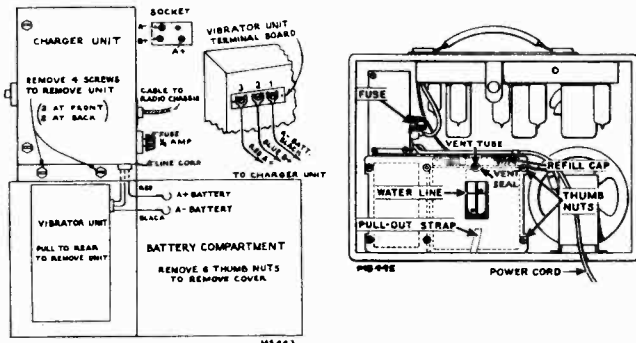
Replace the red refill cap, push battery back into place and attach the back to the metal box, making sure during this assembly that the vent compression seal is in place and slides over the battery vent tube. Then tighten up the thumb nuts and replace the back on the receiver.





MODEL 65BR9

RADIO CORP. OF AMERICA



CRITICAL LEAD DRESS

1. Dress all filament leads next to chassis.
2. Dress loop leads away from tuning drum and battery.
3. Dress output transformer leads away from rear section of gang.
4. Dress r.f. plate lead away from r.f. grid circuit.
5. Dress a.v.c. lead away from 2nd IF transformer and associated components.
6. Dress converter plate lead away from chassis and away from output twisted leads.
7. Dress 1st audio plate lead up and away from other wiring.
8. Dress C5 away from chassis.

Caution.—Do not plug this set into a D.C. source as serious damage may result. The 1/4 amp. fuse will normally protect the circuit against such damage.

All leads between the battery and the terminals should be free of corrosion, and making good contact. Hum in the set may be caused by high resistance connections.

The receiver will operate on the battery alone with the power cord disconnected and the switch at "AC". Such operation places an extra load on the battery and should not be used.

The power unit may be tested without being connected to the radio chassis. Connect an 8,000 ohm, 5 watt resistor between B+ and chassis ground, connect a 7 ohm, 10 watt resistor between A+ and chassis ground. On BATTERY the B+ voltage should be approx. 103 volts, and the A+ voltage should be approx. 2.05 volts. (At end of cable from charger unit) With the unit attached to 117 V. 60 cycle AC and the switch on "AC" the voltage should be slightly higher.

Specifications

Frequency Range	540-1,600 kc
Intermediate Frequency	455 kc
Batteries Required	2 Volt Willard ER-34-2 Wet Battery
Tube Complement	
(1) RCA—1T4	R.F. Amplifier
(2) RCA—1R5	Converter
(3) RCA—1T4	I.F.—Amplifier
(4) RCA—1S5	2nd Det. AVC. & A.F.—Amplifier
(5) RCA—3V4	Power Output
Power Output Maximum	.23 watt
Loudspeaker	5" P.M. 3.4 ohms at 400 cycles
Cabinet Dimensions	Height... 10 1/4", Width... 14", Depth... 5"
Fuse	1/4 amp.
Type 3AG	1/4 amp.
Current consumption (Chassis)	2.05 V. input to charger.
"A"	300 ma.
"B"	13 ma.

Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
<b>CHASSIS ASSEMBLIES RC-1045</b>		34027	Board—3 contact terminal board (screw type) for vibrator lead-in
45233	Capacitor—Ceramic, 100 mmf. (C5, C18, C19)	70643	Capacitor—Tubular, .002 mfd., 200 volts (C21)
71540	Capacitor—Ceramic, 270 mmf. (C24)	72076	Capacitor—High-frequency, 0.5 mfd., 120 volts (C16, C17)
72315	Capacitor—Tubular, .002 mfd., 200 volts (C20)	70615	Capacitor—Tubular, .05 mfd., 400 volts (C4, C22)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C25)	72321	Clip—Battery leads clip terminal
70613	Capacitor—Tubular, .03 mfd., 200 volts (C23)	70392	Cord—Power cord
70615	Capacitor—Tubular, .05 mfd., 400 volts (C7, C3)	72083	Escutcheon—Dial and escutcheon
72076	Capacitor—High frequency, 0.5 mfd., 120 volts (C12)	72093	Escutcheon—"Pull-AC Plug" escutcheon
72077	Capacitor—Electrolytic comprising 2 sections of 15 mfd., 150 volts and 1 section of 1200 mfd., 1 1/2 volts (C13A, C13B, C13C)	72087	Escutcheon—Switch escutcheon
72827	Capacitor—Tubular, .01 mfd., 400 volts (C26)	71595	Foot—Rubber foot for cabinet (4 required)
72318	Cell—Bias Cell (E2)	72104	Fuse—0.25 ampere (F1)
72072	Coil—Oscillator Coil (L3, L4)	72106	Grommet—Rubber grommet to protect power cord
72073	Condenser—Variable tuning condenser (C1, C2, C10, C11)	72320	Handle—Carrying handle
38405	Control—Volume control (R11)	48551	Holder—Fuse holder
32634	Cord—Drive cord (approx. 19" overall length)	72094	Knob—Knob for "Pull-AC" plug
32634	Cord—Indicator cord (approx. 20" overall length)	72088	Knob—Switch knob
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)	72084	Knob—Tuning knob
72319	Holder—Bias Cell Holder	72085	Knob—Volume control knob
72075	Indicator—Station selector indicator	72086	Loop—Antenna loop (L1)
72776	Pin—Contact pin for loop leads	72978	Monogram—"RCA Victor" metal monogram
72081	Plate—Dial back plate	72098	Packing—One set of cushioning for battery
30868	Plug—2 contact female plug for speaker cable	72097	Packing—One set of cushioning for vibrator
72317	Plug—3 prong male plug and shell for power input cable	72102	Reactor—Iron core reactor (L10, L11, L13)
72074	Pulley—Driven pulley	72322	Reactor—Wound on 1 megohm resistor (L12)
72076	Pulley—Tuning drive pulley	72103	Rectifier—Dry disc (CR1)
71580	Resistor—7.5 ohms, 1/2 watt (R5, R6, R7)	72090	Reflector—Reflector for dial escutcheon
34766	Resistor—1000 ohms, 1/2 watt (R16)	30880	Resistor—150 ohms, 1/2 watt (R8)
30436	Resistor—12,000 ohms, 1/2 watt (R1)	3078	Resistor—10,000 ohms, 1/2 watt (R17)
30400	Resistor—27,000 ohms, 1/2 watt (R4)	72082	Socket—3 contact female
3252	Resistor—100,000 ohms, 1/2 watt (R3, R10)	72108	Socket—Vibrator socket
14583	Resistor—220,000 ohms, 1/2 watt (R14)	4982	Spring—Retaining spring for tuning knob
30652	Resistor—1 megohm, 1/2 watt (R15)	30900	Spring—Retaining spring for volume control or switch knob
30649	Resistor—2.2 megohm, 1/2 watt (R2)	72089	Spring—Switch escutcheon spring
30931	Resistor—4.7 megohm, 1/2 watt (R13)	72100	Switch—Power switch (S1)
30992	Resistor—10 megohm, 1/2 watt (R9, R12)	73041	Strap—Leather strap, including socket and button to secure back
72080	Retainer—Retainer for drive pulley	72099	Transformer—Charger transformer (T1)
72078	Sleeve—Volume control sleeve	72109	Transformer—Vibrator transformer (T2)
51955	Socket—Tube socket, miniature	72107	Vibrator—Plug-in vibrator (D1)
71037	Socket—Tube socket, miniature, floating	72091	Window—Tuning window
72540	Spring—Indicator or drive cord spring	<b>SPEAKER ASSEMBLIES (92572-2)</b>	
71399	Transformer—First I.F. Transformer (T3, L5, L6, C8, C9)	30870	Plug—2 prong male plug for speaker
71400	Transformer—Second I.F. Transformer (T4, L7, L8, L9, C14, C15)	72201	Speaker—5" PM speaker complete with cone and voice coil less transformer and plug
<b>MISCELLANEOUS</b>		71159	Transformer—Output transformer (T5)
73042	Back—Cabinet back complete (includes back pull Z brackets, air vent grommet and metal grommet).	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.	
72216	Battery—Wet battery (E1)		



RADIO CORP. OF AMERICA MODELS 65F, Chassis RC1004E,  
6V-42, Chassis RS1000

**Alignment Procedure**

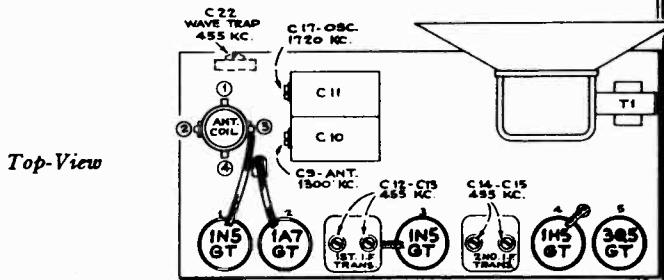
**Cathode Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the diagram.

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

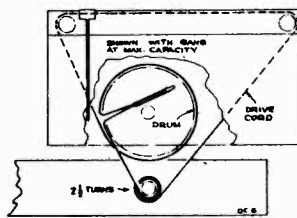
**Test Oscillator.**—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output as low as possible to avoid AVC action.

**Pre-Setting Dial.**—With gang condenser in full mesh, the pointer should be set at the left-hand end dial calibration mark.

Step	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I-F grid in series with .01 mfd.	455 kc	Quiet point between 550 and 750 kc	C14, C15 (2nd I-F Trans.)
2	1A7GT grid in series with .01 mfd.			C12, C13 (1st I-F Trans.)
3		1,720 kc	Tuning condenser rotor plates all out	C17 (osc.)
4	Antenna terminal in series with 200 mmfd.	1,300 kc	1,300 kc signal	C9 (ant.)
5		455 kc	Quiet point between 550 and 750 kc	Adjust C22 for minimum output on strong 455 kc signal



Top-View

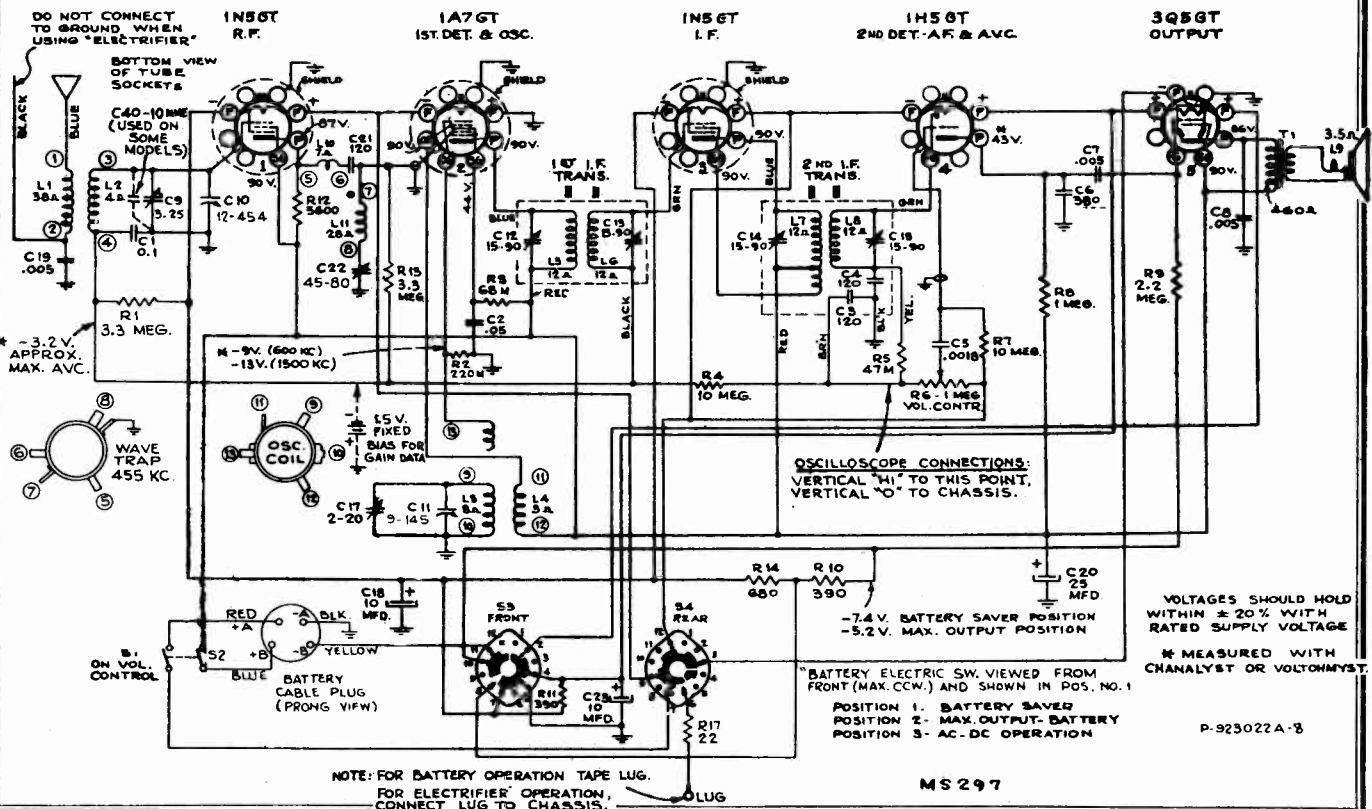
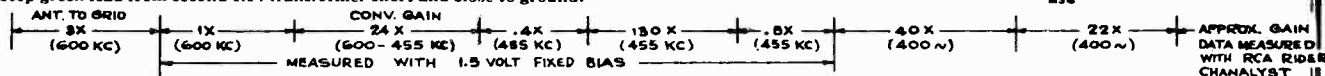
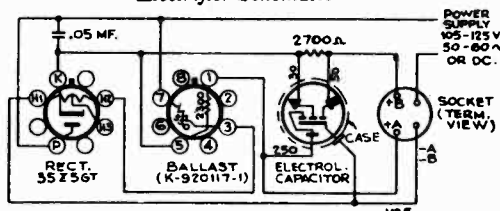


Dial Cord Assembly

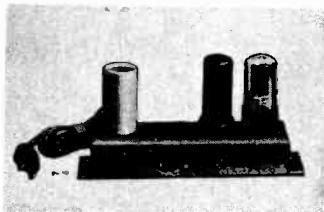
**Precautionary Lead Dress.—**

1. The lead from the 3Q5 plate to output transformer should be dressed under clip, and away from audio input leads.
2. All filament wires should be dressed close to chassis.
3. Keep AVC lead connecting C1 (0.1 mfd. filter) to antenna coil away from the 1A7GT plate.
4. Keep blue plate leads coming from I.F. transformers short and close to chassis.
5. Keep yellow leads connected to oscillator coil away from trap coil.
6. Keep grid lead of 1N5GT RF tube away from 1A7GT grid.
7. Keep green lead from second I.F. transformer short and close to ground.

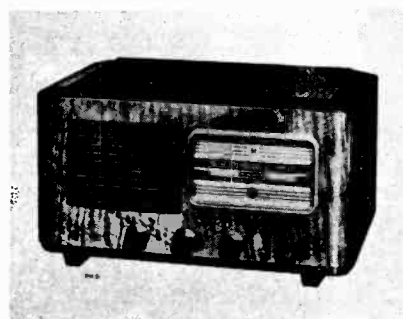
**Electrifier Schematic**



CV-42  
Electrifier



Model  
65F



**Specifications**

**Circuit Description.**—Superheterodyne with one stage of radio frequency amplification, automatic volume control and class "A" beam power output. Battery operation, with optional AC-DC socket power attachment available. Model 65F can be operated on 105-125 volts AC, 50-60 cycles, or 105-125 DC, by means of an RCA CV-42 Electrifier.

**Frequency Range**..... 540-1,720 kc

**Intermediate Frequency**..... 455 kc

**Maximum Power Output**..... 0.3 watt

**Loudspeaker (5 inch)** 92515-1

**Voice coil impedance at 400 cycles**..... 3.4 ohms

**Power Supply**

**Battery**..... RCA VS022 or equivalent

**Battery Drain**

"A" 1½ volt section..... 0.3 ampere

"B" 90 volt section..... 10 m a. (Switch in "Battery Saver Position")  
14 m a. (Maximum Output Position)

**Power Consumption**

With CV-42 Electrifier Unit (switch in "Electric" position).... 22.5 watts

**Cabinet Dimensions (inches)**..... 18 x 9¼ x 10¼

**IMPORTANT**

Remove any external ground connections when using the Electrifier.

**CAUTION:** Turn power switch off (counter-clockwise) when installing or replacing tubes or batteries.

**RECEIVER IS SHIPPED READY FOR BATTERY OPERATION. FOR ELECTRIFIER OPERATION, REMOVE TAPE FROM LUG AT REAR OF CHASSIS AND CONNECT LUG TO 65F RECEIVER CHASSIS.**

*On a DC power supply, if no reception is obtained, reverse the plug in the outlet and retune. On an AC supply, reversal of the plug may reduce hum. CAUTION! Do not touch Radio Chassis unless power plug is removed from socket.*

**Replacement Parts**

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
<b>CHASSIS ASSEMBLIES (RC-1004E)</b>		<b>SPEAKER ASSEMBLIES Stamped 92515-1K</b>	
38675	Arm—"On-Off" indicator arm	70381	Speaker—5" P.M. speaker less output transformer
39604	Capacitor—Mica, 10 mmf. (C40)	70991	Transformer—Output transformer
39640	Capacitor—Mica, 330 mmf. (C6)		Stamped 92515-1P
38672	Capacitor—Mica trimmer, consisting of 1 section of 120 mmf. and 1 section of 45-80 mmf. (C21, C22)	70381	Speaker—5" P.M. speaker less output transformer
70712	Capacitor—Tubular, .0018 mfd., 700 volts (C5)	70992	Transformer—Output transformer
70627	Capacitor—Tubular, .005 mfd., 1200 volts (C7, C8, C19)		Stamped 92515-1F
70615	Capacitor—Tubular, .05 mfd., 200 volts (C2)	70381	Speaker—5" P.M. speaker less output transformer
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C1)	70993	Transformer—Output transformer
36718	Capacitor—Electrolytic, 10 mfd., 10 volts (C18, C23)		Stamped 92515-1F
38705	Capacitor—Electrolytic, 25 mfd., 90 volts (C20)	70381	Speaker—5" P.M. speaker less output transformer
38344	Coil—Antenna coil (L1, L2)	70993	Transformer—Output transformer
38345	Coil—Oscillator coil (L3, L4)		<b>NOTE:</b> If stamping on speaker in instrument does not agree with above speaker numbers, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
70378	Coil—Wave trap (L10, L11)		<b>MISCELLANEOUS ASSEMBLIES</b>
38599	Condenser—Variable tuning condenser (C9, C10, C11, C17)	36462	Clamp—Clamp for glass window
36080	Control—Volume control and power switch (R6, S1, S2)	72785	Decal—Control marker decal
34662	Cord—Drive cord (approx. 59" overall length)	72796	Dial—Glass dial scale
35069	Fastener—Push fastener for dial plate	36886	Knob—Power switch knob
36090	Indicator—Station selector indicator	36722	Knob—Volume control or tuning knob
38350	Lever—Indicator arm actuating lever	30900	Spring—Retaining spring for knob
38673	Plate—Dial back plate complete with drive cord pulleys and indicator arm	38679	Window—Glass window for dial
30550	Plug—4 prong male plug for battery cable		<b>CV-42 ELECTRIFIER</b>
32289	Pulley—Drive cord pulley	38702	Ballast—Plug-in ballast tube resistor
39930	Resistor—22 ohms, 1 watt (R17)	38701	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts, 1 section of 30 mfd., 150 volts, and 1 section of 250 mfd., 10 volts
30498	Resistor—390 ohms, ¼ watt (R10, R11)	30847	Capacitor—.05 mfd., 400 volts
12262	Resistor—680 ohms, ¼ watt (R14)	28451	Cover—Insulating cover for electrolytic capacitor
30734	Resistor—5600 ohms, ¼ watt (R12)	35069	Fastener—Push fastener for bottom cover
30787	Resistor—47,000 ohms, ¼ watt (R5)	28452	Plate—Bakelite mounting plate for electrolytic capacitor
14138	Resistor—68,000 ohms, ¼ watt (R3)	38702	Resistor—Ballast tube resistor
14583	Resistor—220,000 ohms, ¼ watt (R2)	30730	Resistor—2,700 ohms, ½ watt
30652	Resistor—1 megohm, ¼ watt (R8)	31027	Socket—Power output socket
30649	Resistor—2.2 megohms, ¼ watt (R9)	31251	Socket—Tube or ballast resistor socket
12928	Resistor—3.3 megohms, ¼ watt (R1, R13)	38702	Tube—Ballast tube resistor
30992	Resistor—10 megohms, ¼ watt (R4, R7)		
36897	Shaft—Tuning knob shaft		
70377	Shield—Tube shield for 1N5GT and 1H5GT tubes		
31251	Socket—Tube socket		
31418	Spring—Drive cord tension spring		
38349	Spring—Indicator arm return spring		
38670	Switch—"Battery-Electric" power switch (S3, S4)		
70379	Transformer—First I.F. transformer (L5, L6, C12, C13)		
70380	Transformer—Second I.F. transformer (L7, L8, C3, C4, C14, C15)		
33726	Washer—"C" for tuning knob shaft		

RADIO CORP. OF AMERICA MODELS 66X11, Ch. RC1046A; 66X12, Ch. RC-1046; 66X13, 66X14, 66X15, Ch. RC1046B

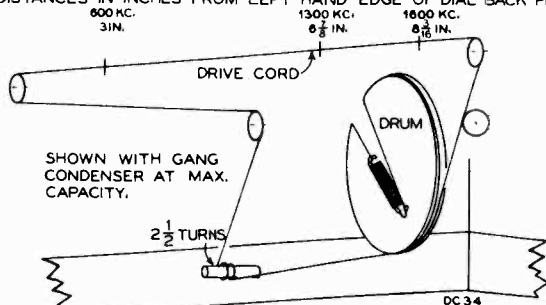
Alignment Procedure

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "—B." Keep the output signal as low as possible to avoid AVC action.

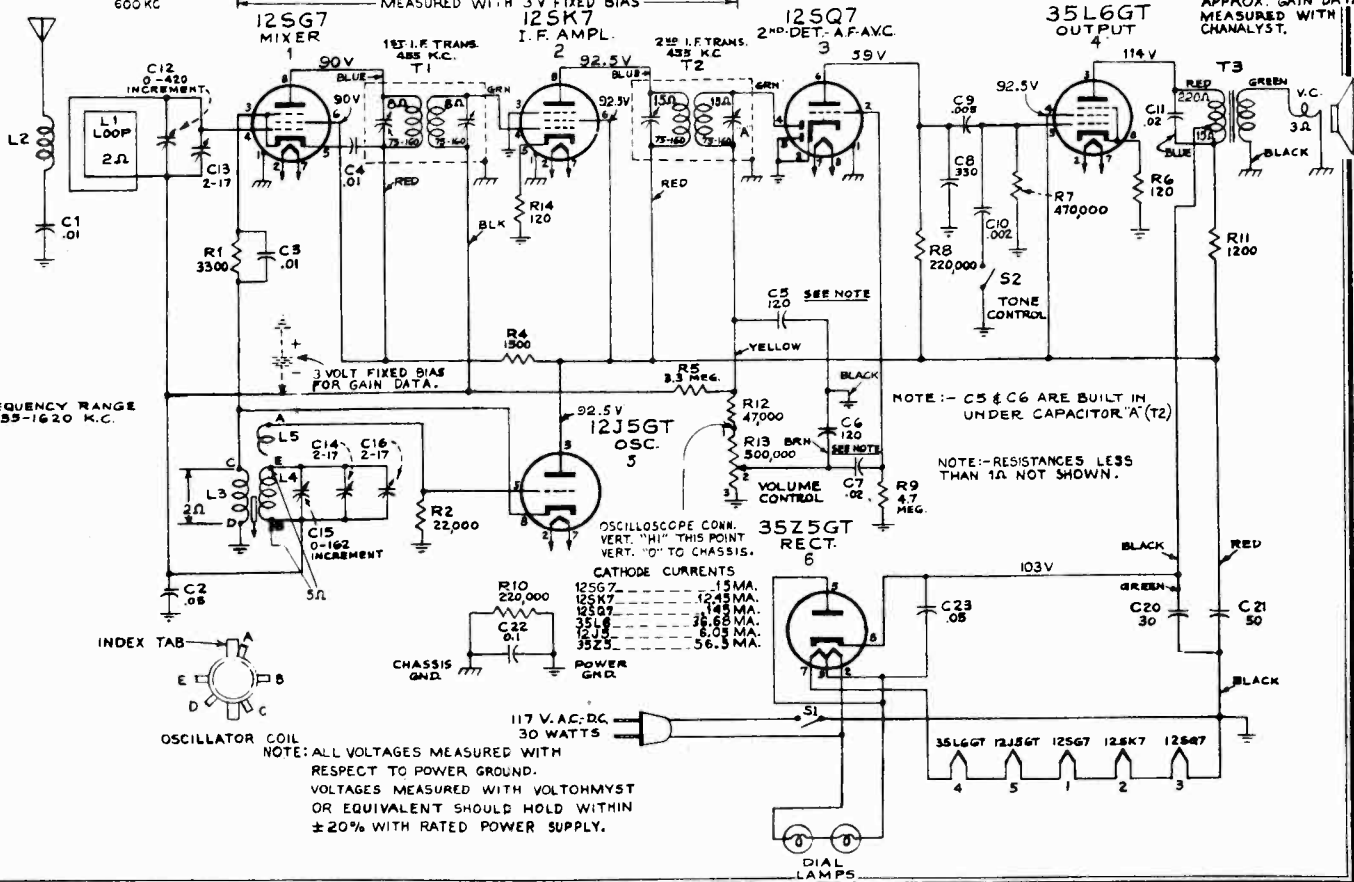
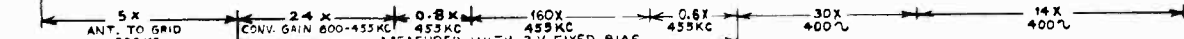
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	Stator of C-12 in series with .01 mfd.	455 kc	Quiet-point 1,600 kc end of dial	Sec. and pri. 2nd I-F trans.
2				Sec. and pri. 1st I-F trans.
3	Ant. lead in series with 200 mmfd.	1,600 kc	1,600 kc	C14 (osc.)*
4		1,300 kc	1,300 kc	C13 ant.
5		600 kc	600 kc	L4 (osc.) Rock in
6	Repeat steps 3, 4 and 5.			

\*Left hand osc. trimmer should be pre-set approx. 1/4 turn from tight.

DISTANCES IN INCHES FROM LEFT HAND EDGE OF DIAL BACK PLATE

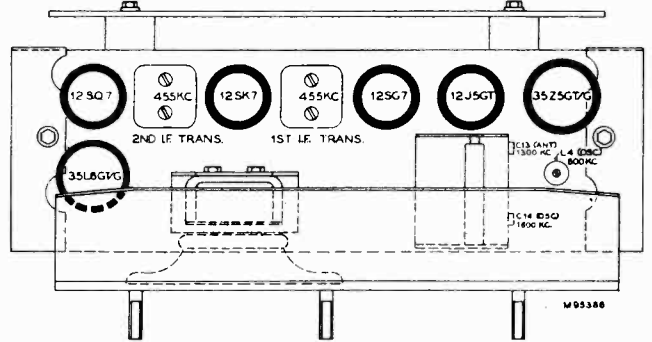


DIAL INDICATOR AND DRIVE MECHANISM



Output Meter.—Connect leads between speaker voice coil and chassis. Turn volume control to maximum clockwise, tone control to maximum highs (clockwise).

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates closed). Adjust indicator pointer to 2 1/4" from left hand edge of dial back plate.



Critical Lead Dress

1. Dress output plate bypass capacitor (C-11 .02 mf) against chassis.
2. Dress 35L6GT plate lead (red) against chassis and away from volume control, leads and terminals.
3. Dress audio coupling capacitor (C-7 .02 mf) away from 35L6GT heater leads.
4. Dress tone control lead against front apron.
5. Dress 2nd i-f yellow and brown leads away from output plate bypass capacitor (C-11, .02 mf.) and away from all heater leads.
6. Dress lead to speaker voice coil away from tuning shaft "C" washer.
7. Dress tone control capacitor (C-10, .002 mf.) away from oscillator coil.
8. Dress all uninsulated leads away from each other and away from chassis to prevent short circuits.
9. Dress blue and green leads of both i-f transformers back in shields leaving exposed lengths as short as possible.

FREQUENCY RANGE 535-1620 K.C.

NOTE:—C5 & C6 ARE BUILT IN UNDER CAPACITOR "A" (T2)

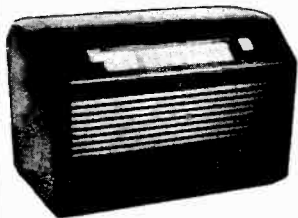
NOTE:—RESISTANCES LESS THAN 1Ω NOT SHOWN.

CATHODE CURRENTS

12SG7	15 MA.
12SK7	12.45 MA.
12SQ7	14.5 MA.
35L6	36.68 MA.
12J5	8.05 MA.
35Z5	56.5 MA.

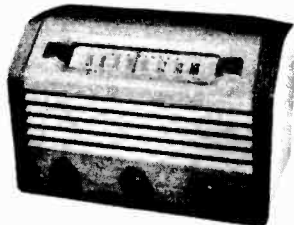
NOTE: ALL VOLTAGES MEASURED WITH RESPECT TO POWER GROUND. VOLTAGES MEASURED WITH VOLTHOMYST OR EQUIVALENT SHOULD HOLD WITHIN ±20% WITH RATED POWER SUPPLY.

Models 66X11, 66X12, 66X13, RADIO CORP. OF AMERICA  
66X14, 66X15



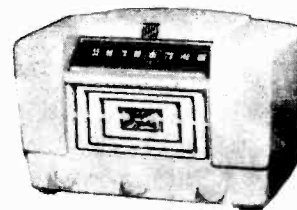
66X14—(Wood Blonde)  
66X15—(Wood Mahogany)

← 66X13—(Wood Walnut)



Circuit Description

The superhetrodyne circuit is used, incorporating separate mixer, and oscillator stages; one stage of intermediate frequency amplification, a combined second detector-AVC-first audio stage, a beam power output stage, and a half wave rectifier. A loop antenna with provisions for an external antenna is used. A new standard two section variable capacitor of the cut plate type is used. The oscillator coil has a movable powdered iron core for inductance adjustment. Both I.F. transformers are compression tuned and AVC is applied to both the R.F. and I.F. stages. Optimum signal to noise ratio and I.F. stability is obtained by low initial bias on 1st detector and degenerative cathode resistor in the I.F. stage.



66X11—(Brown Plastic)  
66X12—(Ivory Plastic)

Specifications

Frequency Range.....	540-1600 kc
Intermediate Frequency.....	455 kc
Power Output	
Undistorted.....	1.0 watt
Maximum.....	1.5 watts
Tube Complement	
(1) RCA-12SG7.....	Converter
(2) RCA-12SK7.....	I.F. Amplifier
(3) RCA-12SQ7.....	2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-35L6GT.....	Power Output
(5) RCA-12J5GT.....	Oscillator
(6) RCA-35Z5GT.....	Rectifier

Loudspeaker (92572-2)

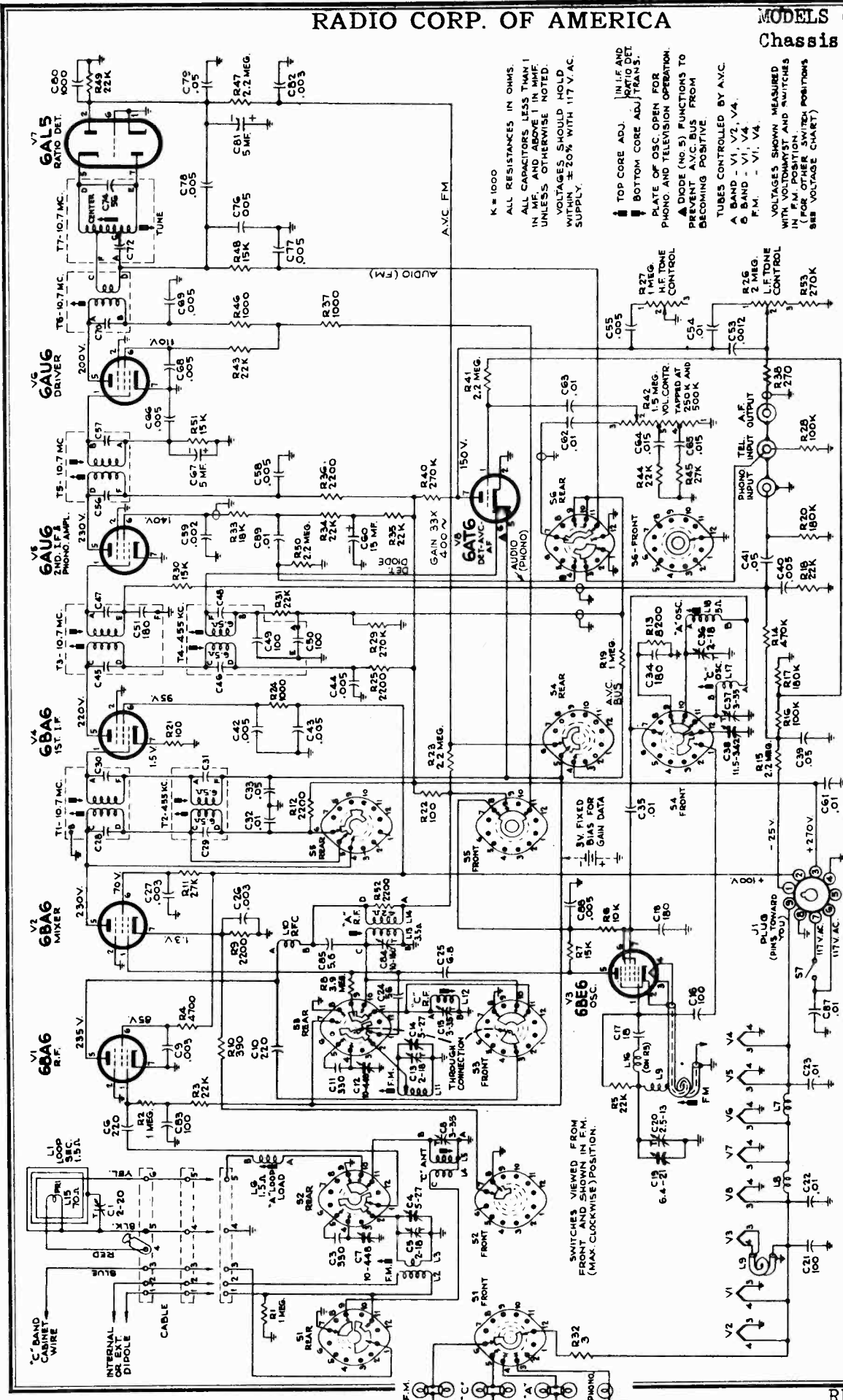
Type.....	5-inch PM
V. C. Impedance.....	3.2 ohms at 400 cycles
Cabinet Dimensions	Height Width Depth
66X11 (Brown Plastic).....	8 <sup>3</sup> / <sub>16</sub> " 13 <sup>3</sup> / <sub>16</sub> " 7 <sup>1</sup> / <sub>2</sub> "
66X12 (Ivory Plastic).....	8 <sup>3</sup> / <sub>16</sub> " 13 <sup>3</sup> / <sub>16</sub> " 7 <sup>1</sup> / <sub>2</sub> "
66X13 (Wood—Walnut).....	9 <sup>1</sup> / <sub>16</sub> " 14 <sup>1</sup> / <sub>2</sub> " 7 <sup>1</sup> / <sub>2</sub> "
66X14 (Wood—Blonde).....	9 <sup>1</sup> / <sub>16</sub> " 14 <sup>1</sup> / <sub>2</sub> " 7 <sup>1</sup> / <sub>2</sub> "
66X15 (Wood—Mahogany).....	9 <sup>1</sup> / <sub>16</sub> " 14 <sup>1</sup> / <sub>2</sub> " 7 <sup>1</sup> / <sub>2</sub> "
Power Supply Rating	
105-125 volts, AC, 50 or 60 cycles, or DC.....	30 watts
Pilot Lamp.....	2 type 1490 3.2 volts, 0.16 amp.
Tuning Drive Ratio.....	20.8:1

Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b>		<b>SPEAKER ASSEMBLIES</b>
	RC-1046—66X12		92572-2
	RC-1046A—66X11		
	RC-1046B—66X13, 66X14, 66X15	72201	Speaker—5" P.M. speaker complete with cone and voice coil
72571	Capacitor—Mica, 330 mmf. (C8)		<b>SPEAKER ASSEMBLIES</b>
70601	Capacitor—Tubular, .002 mfd., 200 volts (C10)		92510-1D
70606	Capacitor—Tubular, .005 mfd., 400 volts (C9)		92510-1F
70610	Capacitor—Tubular, .01 mfd., 400 volts (C1, C3, C4)		92510-1M
70611	Capacitor—Tubular, .02 mfd., 400 volts (C7, C11)		92510-1R
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2, C23)		92510-1W
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C22)	70413	Speaker—5" P.M. speaker complete with cone and voice coil
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C20, C21)		
*72604	Coil—Oscillator coil (L3, L4, L5, C15)		<b>NOTE:</b> If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
*72607	Condenser—Variable tuning condenser (C12, C13, C14, C16)		<b>MISCELLANEOUS ASSEMBLIES</b>
36228	Control—Tone control (S2)	*72646	Back—Cabinet back for 66X11
38410	Control—Volume control and power switch (R13, S1)	*72647	Back—Cabinet back for 66X12
34662	Cord—Drive cord (approx. 56" overall length)	*72829	Back—Cabinet back for 66X13
*72798	Dial—Dial scale (polystyrene) for 66X13, 66X14, and 66X15	*72830	Back—Cabinet back for 66X14
*72603	Drum—Drive drum	*72897	Back—Cabinet back for 66X15
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)	*72648	Baffle—Baffle board for 66X11 and 66X12
*72799	Indicator—Station selector indicator for 66X13, 66X14, and 66X15	Y1400	Cabinet—Brown plastic cabinet for 66X11
*72606	Indicator—Station selector indicator for 66X11 and 66X12	Y1401	Cabinet—Ivory plastic cabinet for 66X12
71116	Lamp—Dial lamp—Type No. 1490	36890	Clamp—Dial clamp—L.H.—for 66X11 and 66X12
*72697	Loop—Antenna loop complete (L1, L2)	36891	Clamp—Dial clamp—R.H.—for 66X11 and 66X12
*72765	Nut—Speed nut to fasten dial logotype for 66X13, 66X14, and 66X15 (2 required)	*72802	Clamp—Dial clamp (1 set) for 66X13, 66X14, and 66X15
*72601	Plate—Dial back plate complete with four (4) pulleys less dial for 66X12	*72652	Dial—Glass dial scale for 66X11 and 66X12
*72797	Plate—Dial back plate complete with four (4) pulleys less dial for 66X13, 66X14, 66X15	37831	Fastener—Push fastener for backs for 66X11 and 66X12
*72896	Plate—Dial back plate complete with four (4) pulleys less dial for 66X11	71595	Feet—Rubber feet for 66X13, 66X14 and 66X15 cabinets (4 required)
72602	Pulley—Drive cord pulley	X1650	Grille—Grille cloth for 66X13, and 66X15
30189	Resistor—120 ohms, 1/2 watt (R6, R14)	X1651	Grille—Grille cloth for 66X14
38896	Resistor—1200 ohms, 1 watt (R11)	*72651	Holder—Jewel holder for 66X11 and 66X12
30654	Resistor—1500 ohms, 1/2 watt (R4)	*72650	Jewel—Decorative polystyrene jewel for cabinet front for 66X11, and 66X12
30733	Resistor—3300 ohms, 1/2 watt (R1)	71821	Knob—Control knob—maroon—for 66X11, 66X13, and 66X15
40492	Resistor—22,000 ohms, 1/2 watt (R2)	*72645	Knob—Control knob—ivory—for 66X12
30787	Resistor—47,000 ohms, 1/2 watt (R12)	*72800	Knob—Control knob—brown—for 66X14
14583	Resistor—220,000 ohms, 1/2 watt (R8, R10)	*72649	Motif—Decorative motif cabinet top for 66X11 and 66X12
30648	Resistor—370,000 ohms, 1/2 watt (R7)	*72803	Motif—Decorative motif for cabinet for 66X13, 66X14 and 66X15
31417	Resistor—3.3 megohms, 1/2 watt (R5)	71126	Nut—Speed nut for fastening motif for 66X11 and 66X12
30931	Resistor—4.7 megohms, 1/2 watt (R9)	72765	Nut—Speed nut for fastening motif for 66X13, 66X14, and 66X15
71798	Screw—No. 8—32 x 3/8", square head set screw for drive drum	30900	Spring—Retaining spring for knobs
*72608	Shaft—Tuning knob shaft	*72804	Window—Dial window for 66X13, 66X14, and 66X15
*72605	Socket—Lamp socket		
37605	Socket—Tube socket		
31418	Spring—Drive cord spring		
70411	Transformer—First I.F. transformer (T1)		
70412	Transformer—Second I.F. transformer (T2) (C5, C6)		
36800	Transformer—Audio transformer (T3)		
33726	Washer—Washer for tuning shaft		

RADIO CORP. OF AMERICA

MODELS 612V1, 612V3,  
Chassis RK121, RS123



K = 1000  
 ALL RESISTANCES IN OHMS.  
 ALL CAPACITORS LESS THAN 1  
 IN MF. AND ABOVE 1 IN MMF.  
 UNLESS OTHERWISE NOTED.  
 VOLTAGES SHOULD HOLD  
 WITHIN ±20% WITH 117 V. AC.  
 SUPPLY.  
 TOP CORE ADJ. IN I.F. AND  
 RATIO DET. TRANS.  
 BOTTOM CORE ADJ. TRANS.  
 PLATE OF OSC. OPEN FOR  
 PHONO AND TELEVISION OPERATION.  
 DIODE (NO. 5) FUNCTIONS TO  
 PREVENT A.V.C. BUS FROM  
 BECOMING POSITIVE  
 TUBES CONTROLLED BY A.V.C.  
 A BAND - V1, V2, V4.  
 S BAND - V1, V4.  
 F.M. - V1, V4.  
 VOLTAGES SHOWN MEASURED  
 WITH VOLTMETER AND SWITCHES  
 IN (FOR OTHER SWITCH POSITIONS  
 SEE VOLTAGE CHART)

Note:— On some instruments C40 was  
 .01 mfd. Gain data on A band schematic  
 Fig. 11.

IF PEAKS AM 455 KC  
 FM 10.7 MC

Fig. 1. Complete schematic for Radio Chassis—Range Switch shown in F.M. position. For separate schematic  
 of range switch positions see figures 11, 12 and 14. See fig. 2 for power amplifier.





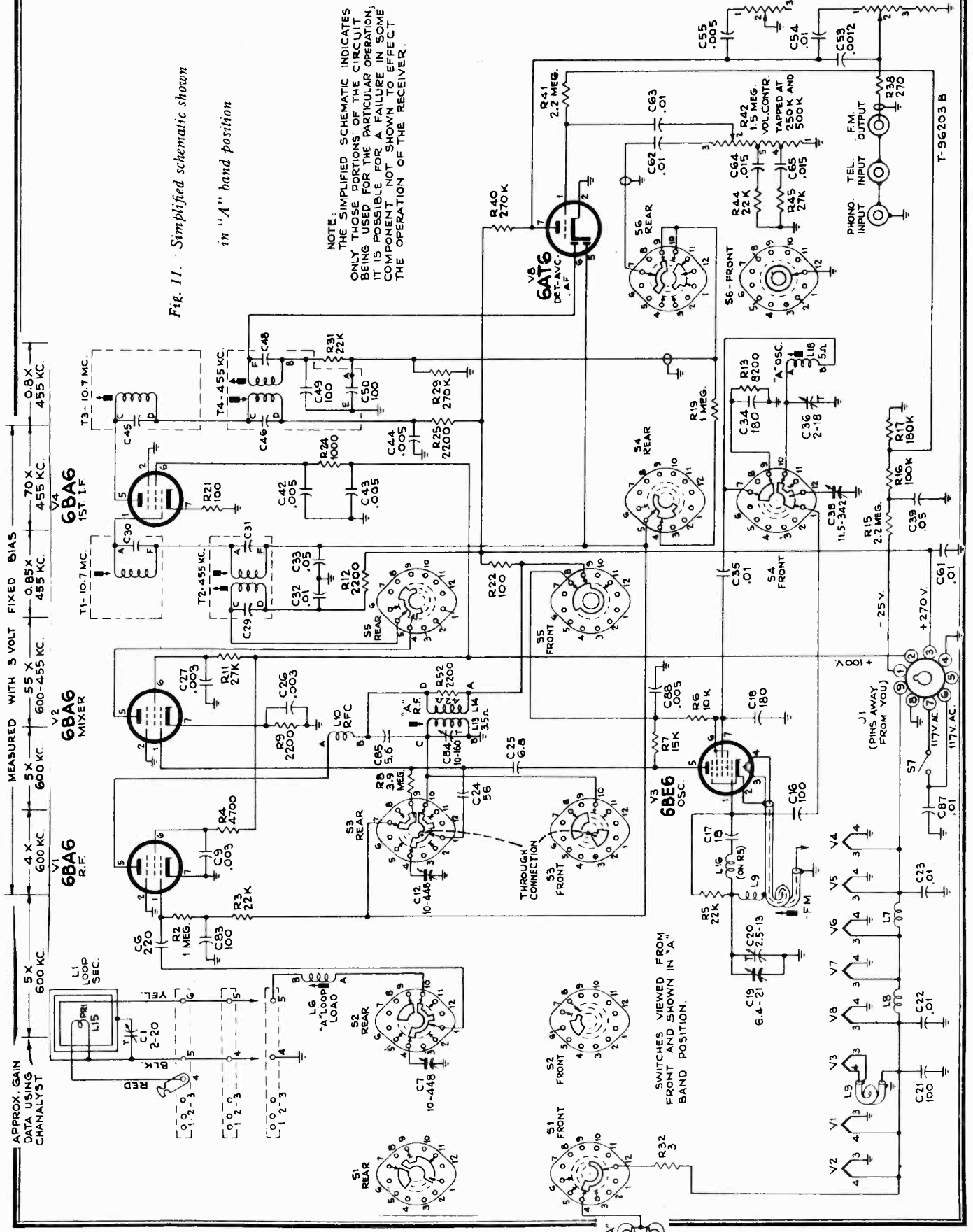


Fig. 11. Simplified schematic shown in "A" band position



**RADIO CHASSIS UNIT RK121 VOLTAGE CHART**

Tube Type	Pin #	Phono.	B.C.	S.W.	F.M.
V1	Plate	5	260	225	235
	SCG	6	95	110	90
	Plate	5	260	255	240
V2	SCG	6	90	100	70
	Cathode	7	6	6.5	1.8
	Plate	5	0	160	155
V3	Grids 2-3-4	6, 7	0	155	140
	Grid 1	1	-5.2 (1600 KC)	-10.5 (9.5 MC)	-6.6 (108 MC)
	Grid 1	1	-2.7 (550 KC)	-15.5 (16.2 MC)	-6 (100 MC)
V4	Grid 1	1	...	...	-0 (88 MC)
	Plate	5	245	250	230
	SCG	6	110	120	105
V5	Cathode	7	1.4	1.2	1.4
	Plate	5	255	245	240
	SCG	6	145	140	140
V6	Plate	5	0	0	0
	SCG	6	0	0	0
	Plate	7	150	150	150

**AMPLIFIER UNIT RS123 VOLTAGE CHART**

Tube	Pin #	Phono.	B.C.	S.W.	F.M.
V2	Plate	3	230	...	...
	Cathode	8	36	...	...
	Plate	3	375	...	...
V3	SCG	4	270	...	...
	Grid	5	-25	...	...
	Grid	5	-25	...	...
V4	Same as V3				

'B' Voltage Measured from Rectifier Fil. (5U4G) to Gnd. 380V.

Voltages were measured with Volt Ohmyst with the Radio Chassis RK121 connected.

All voltages are measured in respect to ground.

Cathode Currents with Band Switch in FM Position	
V1	RF Amp. 14 ma. V7 Ratio Det.
V2	Mixer 4.7 ma. V8 Det.-Avc.-AF
V3	Osc. 15.9 ma. Power amp. RS123
V4	First IF. 12.4 ma. V1 Rectifier Total 140 ma.
V5	2nd IF.-Phono. Amp. 5.6 ma. V2 Phase Inverter 2.15 ma.
V6	Driver FM 13.7 ma. V3, V4 Power output 27 ma.

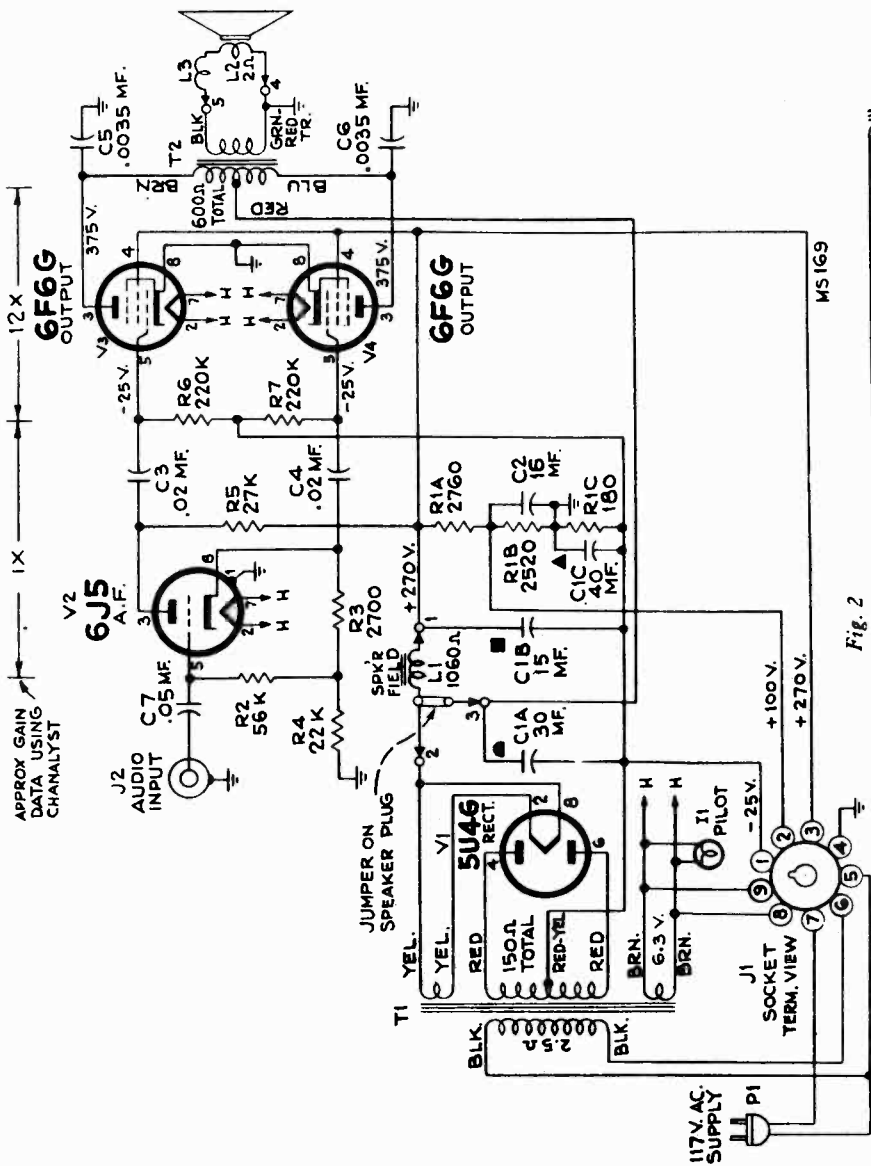


Fig. 2

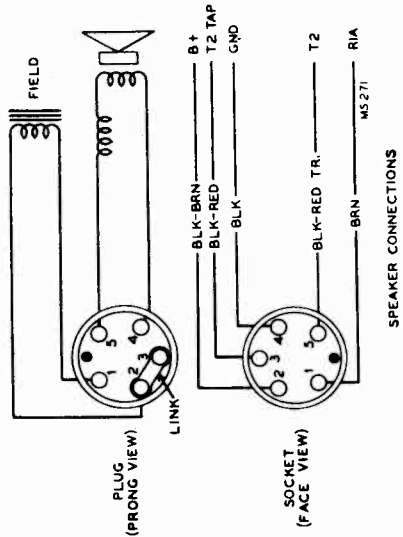


Fig. 4

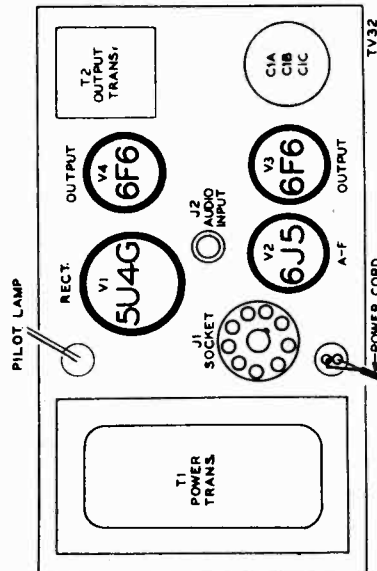


Fig. 3



**ALIGNMENT PROCEDURE**

Before aligning set, completely mesh the gang and set the dial pointer on the mechanical maximum calibration point at the extreme left hand end of the dial.

When making a complete alignment follow in proper sequence the tabulated form below.

If only a portion of the circuit is to be aligned select the portion required, followed by the remaining steps in the chart. Any adjustments made on the FM 10.7 mc. IF's make it necessary to realign the AM 455 kc. IF's.

For "A" and "C" band alignment use output meter across voice coil keeping Test Oscillator output as low as possible to prevent AVC action.

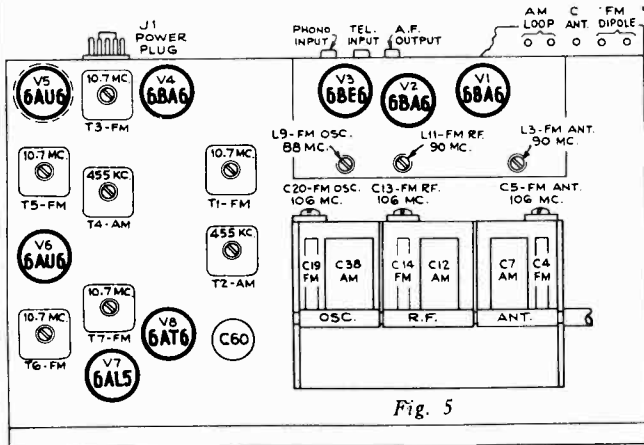


Fig. 5

**FM RATIO DETECTOR ALIGNMENT**

SET RANGE SWITCH TO FM POSITION

Steps	Connect High Side of Test Osc. To—	Tune the Osc. To—	Turn Vol. Cont. To—	Adjust
1.	Connect a 680 ohm resistor between lugs D and E of the ratio detector transformer T7. Connect DC probe of a voltohyst to the negative lead of the 5 mfd. Electrolytic capacitor C81. The common lead of the meter to chassis.			
2.	Driver grid pin 1, of 6AU6 (V6) in series with a .01 MFD capacitor.	10.7 MC 30% Mod. 400 Cycles AM	Maximum Volume	Driver transformer T6 for maximum DC voltage across C-81
3.	Remove Meter Leads and disconnect the 680 ohm resistor from D and E on T7. Connect two 68,000 ohm resistors (within 1% of each other) in series, across C81. Connect the common lead of the Volt-hyst to the center point of the 68,000 ohm resistors and the DC probe to contact No. 7 on rear of Switch wafer S6. Use the 30 volt scale.			
4.	Same as Step 2	Same as Step 2	Volume Control Maximum	†T7 Bottom core for Zero DC Balance on Volt-hyst ††T7 top core for minimum audio output. (Output meter across voice coil)
5.	Reconnect voltohyst as in step 1, omitting the 680 ohm resistor.			
6.	Repeat step 2 omitting 680 ohms.			
7.	Remove all connections.			

†Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

††The zero DC balance and the minimum AF output should occur at the same point: if such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the voltohyst, and an output meter connected across the voice coil for the point at which both zero DC and minimum output occurs.

Note:—Two or more points may be found which will satisfy the condition required in step 4. T7 top core should be correctly adjusted when approximately 1/8 inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum AF and minimum DC is reached.

**CRITICAL LEAD DRESS**

(Make lead dress before alignment)

1. Lead from pin 5, tube V2, to terminal "C" on transformer T1 should be dressed close to chassis.
2. Leads to terminals "C" and "D" on transformer T2 should be dressed close together.
3. The following capacitors must be dressed close to the chassis with leads kept as short as possible: C32, C33, C66, C69, C79, and C80.
4. All FM coil connections must be soldered in exact place as the original. (One-sixteenth inch difference in length may be excessive).
5. Lead from pin 7, tube V8, must be dressed away from lead to terminal "D" of transformer T7.
6. ALL wiring in the receiver is critical as to length and placement. It is therefore important when servicing, that extreme care should be taken so as not to disturb more of the wiring than absolutely necessary.

Note: Keep tuning capacitor rotor grounding brushes clean and making good contact.

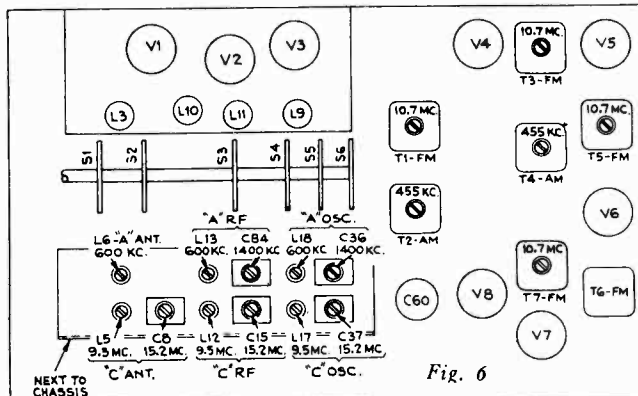


Fig. 6

**ANT.—RF.—IF. ALIGNMENT**

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust
1.					

**"FM" IF Alignment**

1.	Connect the DC probe of a voltohyst to the negative lead of the 5 MFD electrolytic capacitor C 81, and the common lead of the meter to chassis ground				
2.	Mixer grid pin #1 of 6BA6, (V2) in series with a .01 MFD capacitor (Adjust test osc. output for 6-10 volts developed across C81) (Range switch in FM position) (Use very short lead)	To RF Tube shelf ground near mixer tube (use very short leads)	10.7 MC 30% modulated at 400 cycles AM.	Max. cap. (Fully meshed)	*T5, T3, T1 top and bottom cores alternately loading primary & secondary of each transformer with 680 ohms while the opposite side of the same transformer is being adjusted. Adjust all transformers for maximum voltage across C81.

**"AM" IF Alignment**

3.	Mixer grid pin #1 of (V2) in series with a .01 MFD Capacitor. (Turn band switch to "A" or "C" band)	To chassis ground	455KC	High Freq. end of Dial	**Top and bottom Cores of T2 and T4. (For maximum voltage across voice coil)
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**ANT—RF—IF—ALIGNMENT (Continued)**

Steps	Connect the High Side of the Test Osc. to— <b>"C" Band OSC.—RF.—ANT. Alignment</b>	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust
4.	"C" Band Ant. Terminal #3  Through a dummy Ant. comprising a 150 ohm resistor in series with a 25 to 30 mmf capacitor	To Chassis ground	15.5 MC	15.5 MC	Osc.—C37*** RF.—C15 Ant.—C8 (For maximum voltage across voice coil)
5.			9.5 MC	9.5 MC	Osc.—L17*** RF.—L12 Ant.—L5 (For maximum voltage across voice coil)
6.	Repeat steps 4 and 5 for accurate alignment				

**"A" Band OSC.—RF.—ANT.**

7.	High Side (Red Lead) of Loop Primary with link open	To Chassis ground	1400 KC	1400 KC	Osc.—C36 RF.—C84 Ant.—C1 (For maximum voltage across voice coil)
8.	Through a Dummy Ant. comprising a 200 mmf. Capacitor		600 KC	600 KC	Osc.—L18 RF.—L13 Ant.—L6 (For maximum voltage across voice coil)
9.	Repeat steps 7 and 8 for Max. output.				

**"FM" Band OSC.—RF.—ANT. Alignment**

10.	FM antenna terminal #1 in series with a 120 ohm resistor	To FM antenna terminal #2 in series with a 120 ohm resistor	106 MC	106 MC	Osc.—C20 for maximum voltage across C81.
11.			88 MC	88 MC	**** Osc.—L9 for maximum voltage across C81.
12.	Repeat steps 3 and 4 for exact calibration.				
13.			106 MC No Carrier		***** RF, C13 for maximum voltage across C81 (Noise Voltage)
14.			90 MC No Carrier		**** RF, L11 for maximum voltage across C81. (Noise Voltage)
15.	Repeat steps 13 and 14 for maximum output.				
16.	Same as step 10	Same as step 10	106 MC	106 MC	Ant. C5 for maximum voltage across C81.
17.	Same as step 10	Same as step 10	90 MC	90 MC	Ant. L3 for maximum voltage across C81.
18.	Repeat steps 9 and 10 for maximum output.				
19.	Disconnect dummy antenna and adjust Ant. trimmer C1 on loop when set is installed in cabinet.				

\*This method is known as alternate loading which involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680 ohm resistor while the plate winding is being peaked.

When the windings are loaded, it is necessary to increase the 10.7 MC input since the gain will decrease and the voltage across C81 will be less.

\*\*It is necessary to alternately load the primary and secondary of each 455 KC I. F. transformer with 10,000 ohms while the opposite side of the same transformer is being adjusted.

\*\*\*To guard against the possibility of alignment of L17 and C37 to image frequencies, tune the test oscillator to 15.5 MC and turn the radio dial to 15.5 MC. Then adjust the test oscillator to 16.41 MC (image frequency). By increasing the test oscillator output, a signal should be heard.

Tune the test oscillator to 9.5 MC and turn the radio dial to 9.5 MC, then adjust the test oscillator to 10.41 MC (image frequency). By increasing the test oscillator output, a signal should be heard. (If these image frequencies cannot be heard, the set is incorrectly aligned, therefore repeat steps 4 and 5).

\*\*\*\*Two points may be found to fulfill the requirements. Use the one with the longest threaded end extending out of the transformer.

\*\*\*\*\*Two points can be found having the greatest noise voltage developed. Use the one with the greater capacity (tighter adjustment).

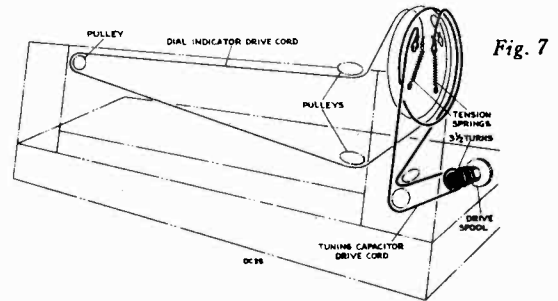


Fig. 7

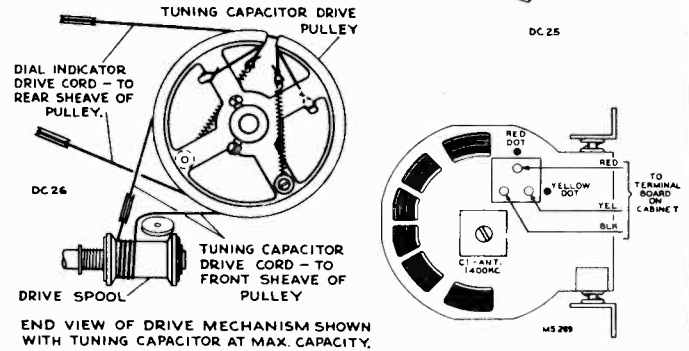


Fig. 8

Fig. 9  
Loop antenna

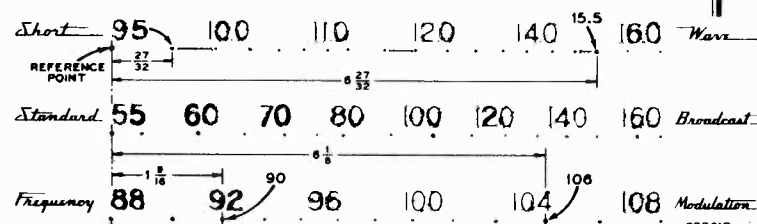


Fig. 10  
Dial scale drawing

**Circuit diagram breakdown description**

In order to have the instrument function in all of the positions of the band switch, a number of extra tubes and parts are required. We have attempted to simplify the circuits by including simplified schematics showing only the parts actually required for the instrument to operate in the position to which the switch is turned.

It can be noted by examining the different simplified schematics, that a few of the circuits deviate from the conventional form.

Tube V8 performs the function of 2nd Det., AVC and AF amp. in "A" and "C" bands only. Diode #5 of V8 functions as a device to prevent the AVC bus from becoming positive.

Tubes V6 and V7 are used only in the FM positions; V6 as a driver and V7 as an FM demodulator as described under the heading of Ratio Detector.

MODELS 612V1, 612V3

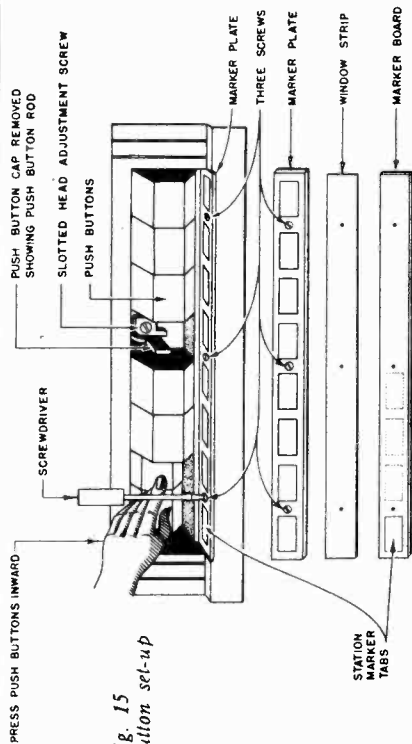


Fig. 15  
Push-Button set-up

### Push-Button Adjustment

The push-buttons should be adjusted for eight favorite stations after the receiver is operating, and has had a 5 or 10 minute warm-up period.

Any standard broadcast or frequency modulation stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Remove the first PUSH-BUTTON (Just pull) and note the adjustment screw beneath.
2. Loosen the adjustment screw.
3. Manually tune very accurately for the desired station.
4. Push the PUSH-BUTTON rod in till it is against stop.
5. Tighten adjustment screw.
6. Make adjustment for the other buttons, setting up and checking each for the chosen station in a similar manner.
7. Recheck all PUSH-BUTTONS and reset if found necessary.

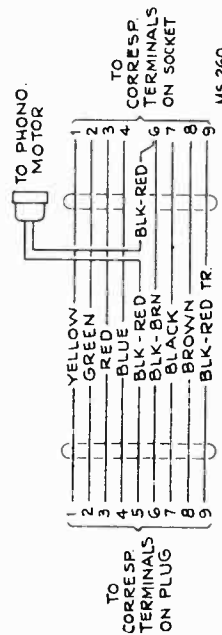


Fig. 15  
Power Cable

Some instrument may not have the color code as indicated, therefore use continuity method to check cable assembly.

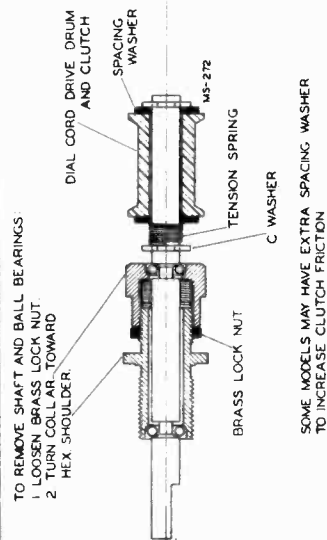


Fig. 17  
Tuning Shaft and Clutch Assembly

NOTE: THE SIMPLIFIED SCHEMATIC INDICATES ONLY THOSE PORTIONS OF THE CIRCUIT WHICH ARE NECESSARY TO UNDERSTAND THE OPERATION OF THE RECEIVER. IT IS POSSIBLE FOR A FAILURE IN SOME COMPONENT NOT SHOWN TO AFFECT THE OPERATION OF THE RECEIVER.

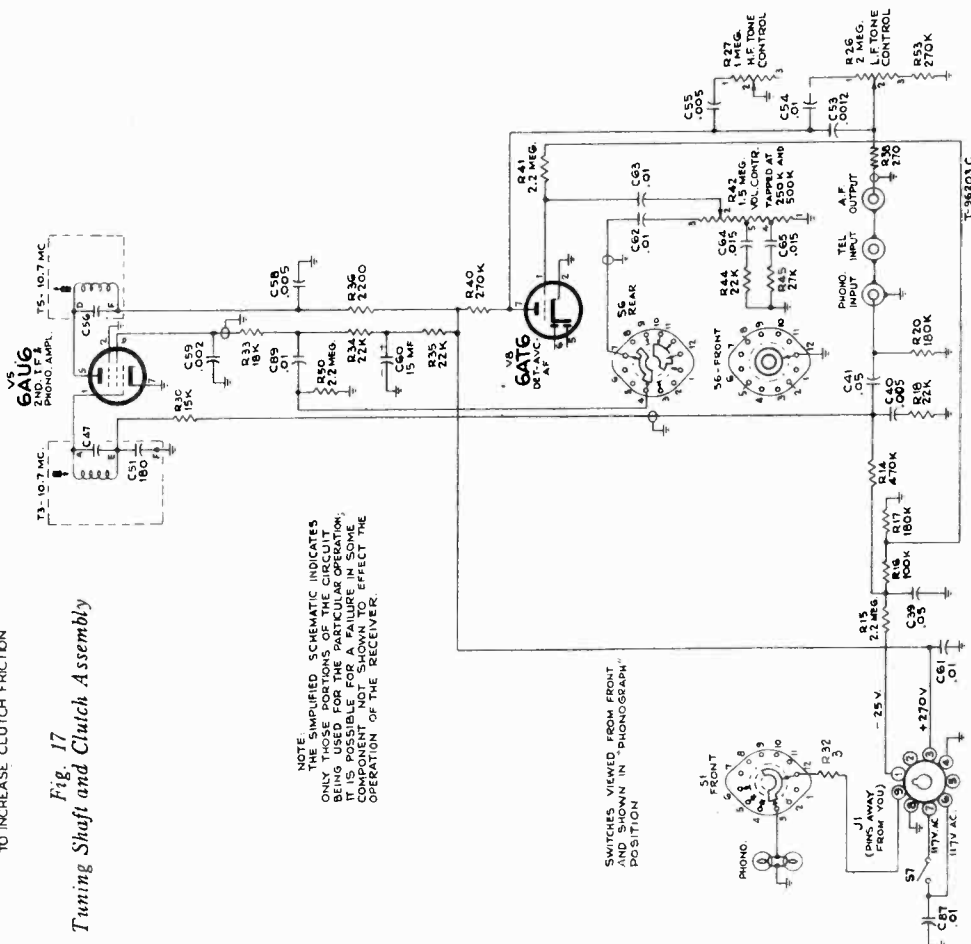


Fig. 14. Schematic shown for phonograph reproduction.

RADIO CORP. OF AMERICA

MODELS 612V1, 612V3

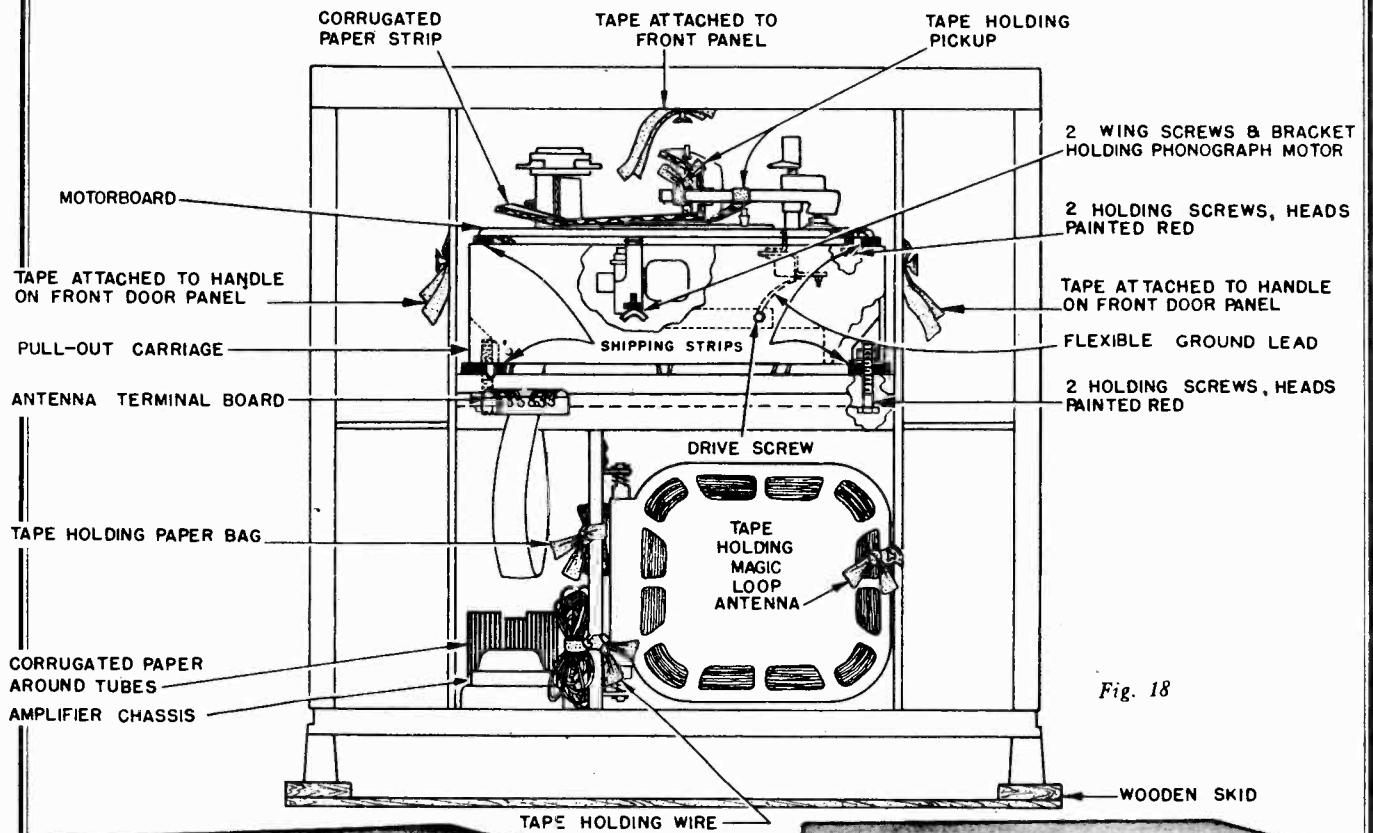
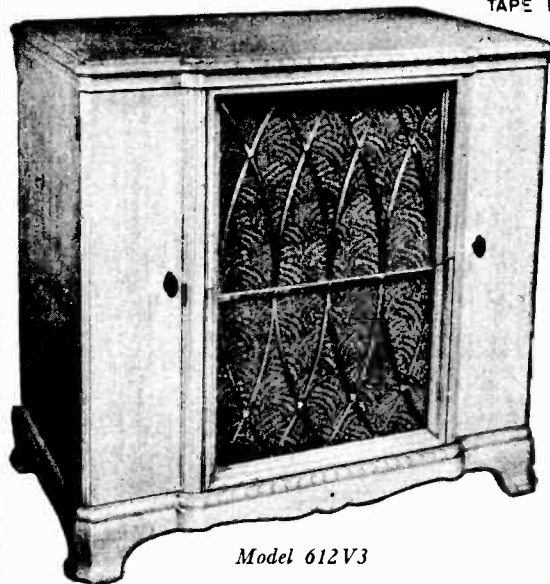
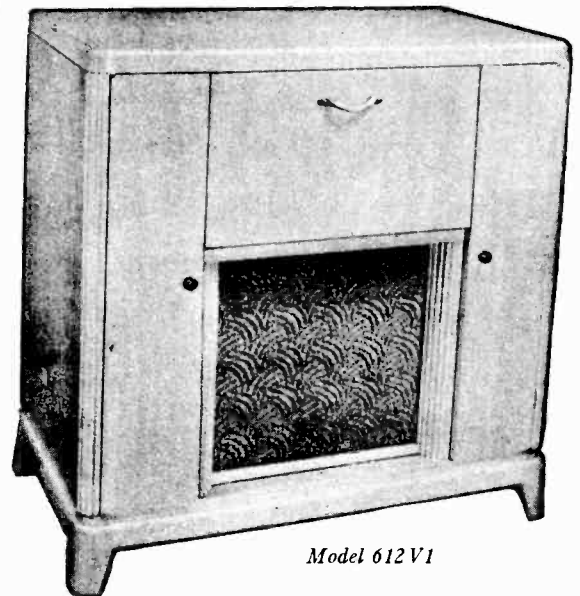


Fig. 18

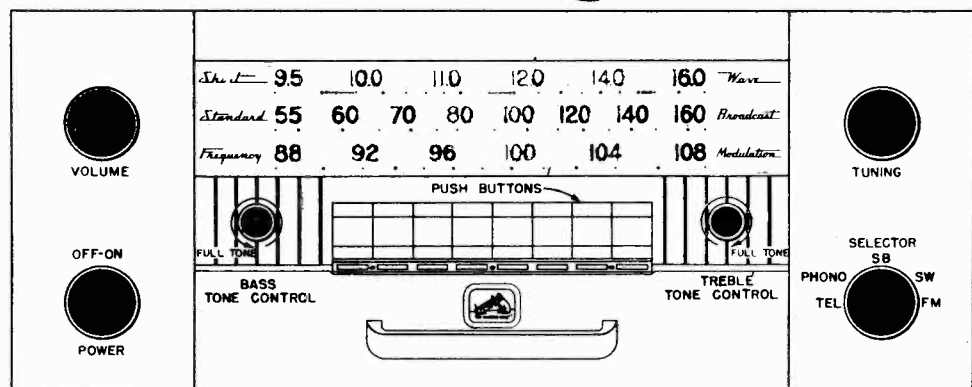


Model 612V3



Model 612V1

Fig. 20 Control Panel





MODELS 612V1, 612V3

**Frequency Range**  
 Broadcast..... 540-1600 kc  
 Shortwave "C" Band..... 9.2-16.0 mc  
 Frequency Modulation..... 88-108 mc  
**Intermediate Frequency AM**  
 Intermediate Frequency FM..... 455 kc  
**Intermediate Frequency FM**  
 Intermediate Frequency FM..... 10.7 mc

**Tube Complement of RK-121**  
 1. RCA 6BA6..... RF Amplifier  
 2. RCA 6BA6..... Mixer  
 3. RCA 6BE6..... Oscillator  
 4. RCA 6BA6..... 1st IF  
 5. RCA 6AU6..... 2nd IF and Phono. Amp.  
 6. RCA 6AU6..... Driver  
 7. RCA 6AL5..... Ratio Detector  
 8. RCA 6AT6..... AM-DET-AVC-AF

**Tube Complement of RS-123**  
 1. RCA 5U4G..... Rectifier  
 2. RCA 6J5..... Phase Inverter  
 3. RCA 6F6G..... Power Output  
 4. RCA 6F6G..... Power Output

**Undistorted Power Output**..... 10 watts  
**Maximum Power Output**..... 11 watts  
**Loudspeaker**  
 Type..... 12 inch Electrodynamic  
 Voice coil impedance..... 2.2 ohms at 400 cycles  
 7—Pilot Lamps..... No. 51  
 1—Pilot Lamp..... No. 44

**Overall Radio Chassis Dimensions**  
 Height..... 17 1/2"  
 Width..... 9"  
 Depth..... 6"

**Tuning Drive Ratio**..... 10 to 1  
**Total Power Consumption**..... Approx. 170 watts

**For information on Record Changer refer to Service Data on RP176.**

**Models—612V1 Mahogany and Walnut..... RP176B**  
 —612V1 Blonde..... RP176A  
 —612V3 Mahogany and Walnut..... RP176  
 —612V3 Blonde..... RP176A

**NOTE:—The difference between the three RP models is color of Motor Board Parts only, mechanical construction is the same.**

at terminal 3. The external dipole antenna is now the antenna for FM and SW bands.

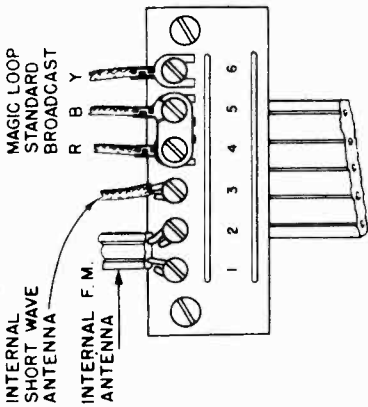
Figure 21 (C) shows the additional change for connecting the Standard Broadcast band to make use of the external RCA Television Antenna. The link across terminals 4 and 5 is changed to terminals 4 and 3. The external antenna is now effective on all bands. Tighten terminals and be sure that the red, black and yellow leads (R.B.Y.) to terminals 4, 5 and 6 are still in place and securely connected.

Figure 21 (D) shows connections for a separate outdoor antenna on SW and SB reception, and the external dipole on FM. This outdoor antenna should consist of a wire 30 to 60 feet or so in length mounted in a convenient location as high as possible. Connect lead-in from the antenna to terminal 3 on the antenna terminal board. This outdoor antenna is effective on SB and SW bands. If this connection makes the SB signal too strong, causing overload and distortion, replace the link across terminals 4 and 5 as in Figure 21 (A) and (B). This link across antenna is now effective on SW only

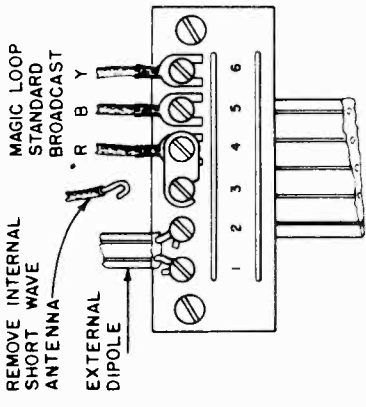
**EXTERNAL ANTENNAS**—If reception is not satisfactory on one or more of the three bands, using the built-in cabinet antennas, an external antenna may be used. The Magic Loop Antenna will usually provide sufficient pickup on the Standard Broadcast band, but if an external dipole is installed to improve reception on Frequency Modulation it may be used for Standard Broadcast and Short Wave as well. Connections are made to the antenna terminal board in the back of the cabinet. External antennas may be erected indoors or outdoors and should be oriented in direction for requirements of best reception. RCA Television Antenna, Stock No. 225 or 226, or the equivalent with 300-ohm transmission line is recommended for an external antenna.

Figure 21 (A) shows the Antenna Terminal Board with connections for internal cabinet antennas.

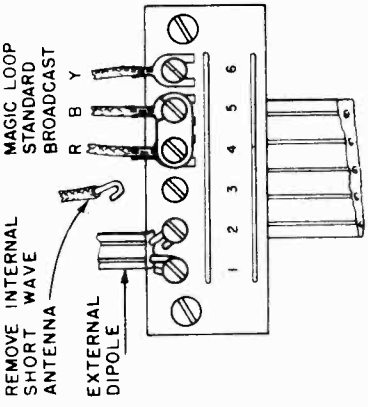
Figure 21 (B) shows connections for the RCA Television Antenna replacing those for the internal FM antenna on terminals 1 and 2, and the internal SW antenna disconnected



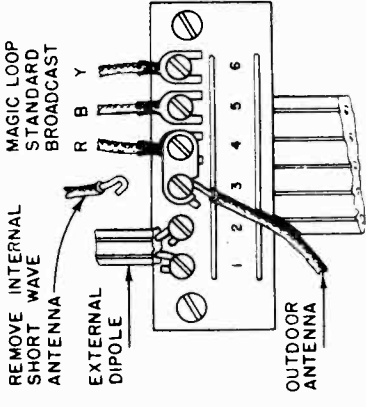
(A) INTERNAL ANTENNAS



(C) EXTERNAL DIPOLE ON ALL BANDS



(B) EXTERNAL DIPOLE ON FM & SW. MAGIC LOOP ON STANDARD BROADCAST BAND.



(D) EXTERNAL DIPOLE ON F.M. OUTDOOR ANTENNA OTHER BANDS

Fig. 21 Antenna Terminal Board



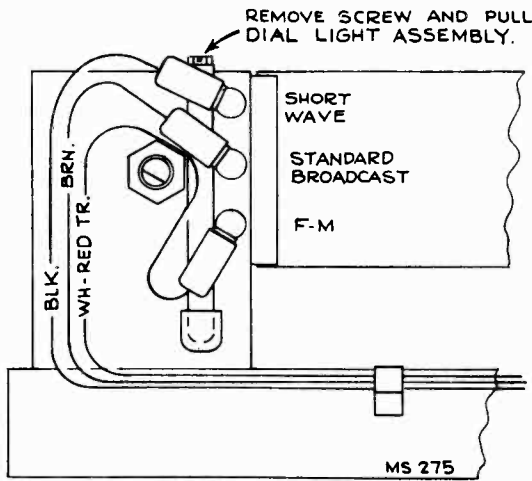


Fig. 22

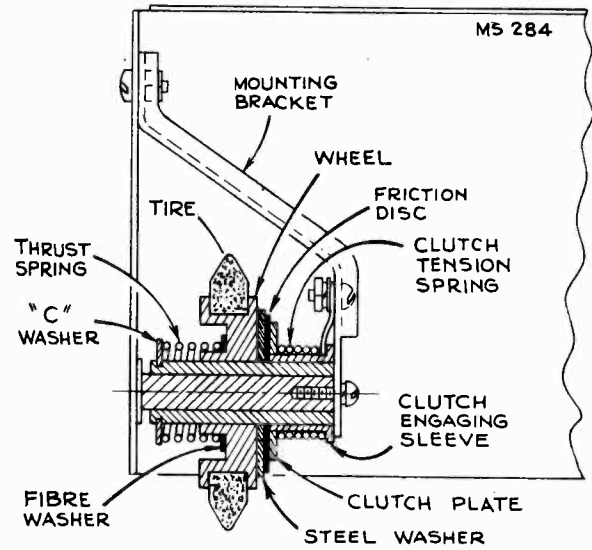


Fig. 23  
Friction clutch used on early models only.

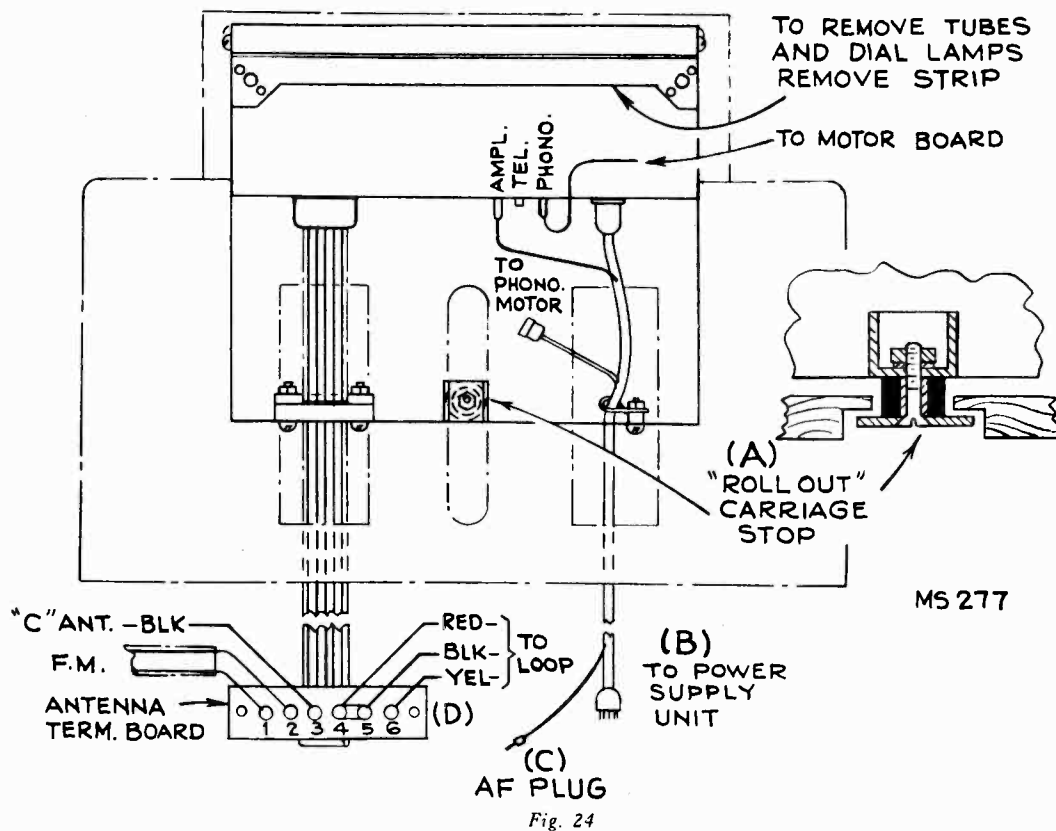


Fig. 24

**Removal of dial lamps**

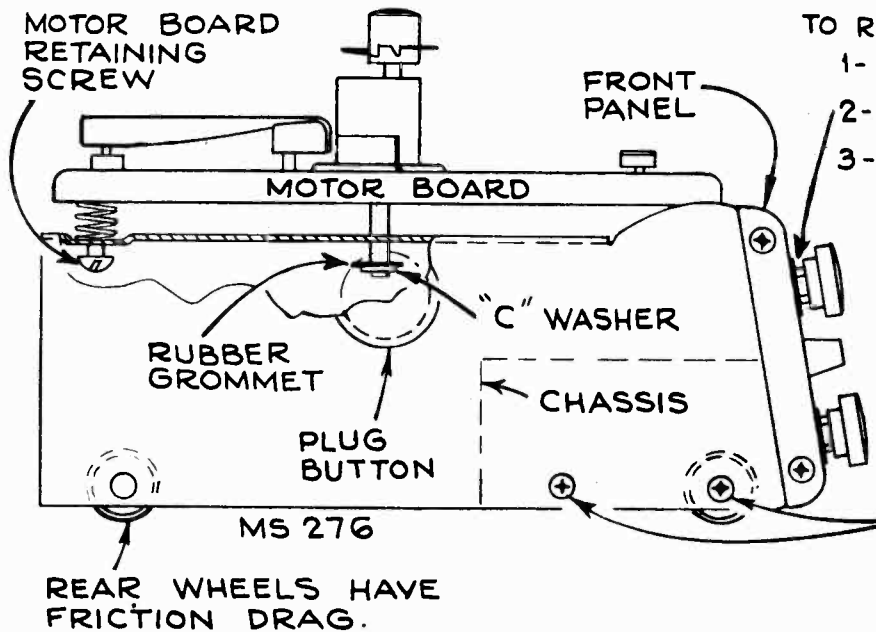
1. Remove plug buttons on side of "Roll-out" (Fig. 25).
2. Remove "C" washer on record player (Fig. 25).
3. Raise record player (Fig. 26).
4. Remove tube strip (Fig. 24).
5. Loosen screw and pull dial light strip (Fig. 22).

**Removal of Tubes**

Use the same procedure as for removal of dial lamps excluding item, #5.

**Removal of "Roll-out" carriage**

1. Remove "Roll-out" stop (A) (Fig. 24).  
(Access to nut can be made up through slot in bottom of carriage platform in rear of cabinet).
2. Pull out power cable plug (B) (Fig. 24) at power supply, also loosen cable clamps.
3. Remove audio plug (C) (Fig. 24).
4. Remove antenna wires and antenna terminal strip (D) (Fig. 24).
5. Pull "Roll-out" carriage out through front of cabinet.



- TO REMOVE FRONT PANEL
- 1- PULL 6 KNOBS.
  - 2- REMOVE 4 "T" NUTS.
  - 3- REMOVE 2 PHILLIPS SCREWS AT EACH END OF PANEL.

- TO REMOVE CHASSIS FROM ROLL OUT CARRIAGE, REMOVE 2 PHILLIPS SCREWS AT EACH SIDE OF CARRIAGE.

Fig. 25

Caution:—

Do not attempt to remove chassis while the "Roll-out" carriage is in the cabinet. Remove the entire carriage from the cabinet to prevent damaging cabinet finish.

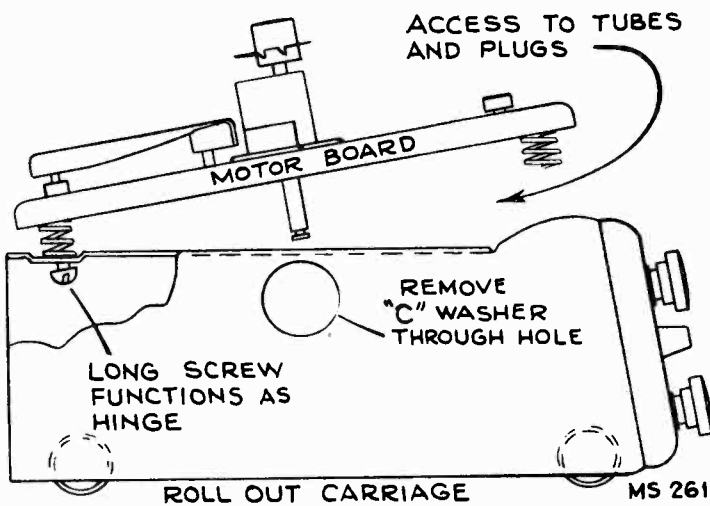


Fig. 26

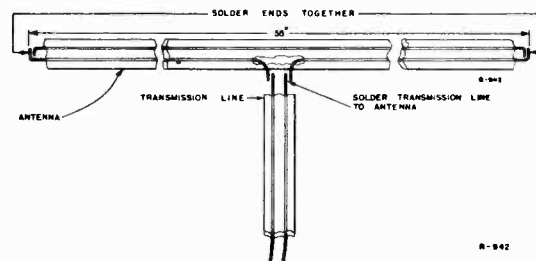


Fig. 27  
Sketch showing folded dipole installed in cabinet.

To remove record player

1. Remove plug buttons and "C" washer (Fig. 25).
2. Tilt motor board (Fig. 26).
3. Pull AC and phono plugs (Fig. 24).
4. Remove retaining screws (Fig. 26).
5. Lift motor board out.

To remove front panel and chassis from "Roll-out"

1. Remove entire "Roll-out" carriage from cabinet.
2. Pull six control knobs (Fig. 25).
3. Remove four "T" nuts (Fig. 25) (Do not break fiber washers).

4. Remove two cross-recess head screws at each end of panel (Fig. 25).
5. Remove two cross-recess head screws at each end of carriage (Fig. 25).
6. Lift chassis out through front of carriage.

Friction clutch on rear wheel of "Roll-out" carriage (used on early models only)

No adjustment has been provided to govern the friction in the clutch on the rear wheels of the "Roll-out" carriage. If the drag becomes too great add a small amount of grease to friction disc (Fig. 23).

RADIO CORP. OF AMERICA

MODELS 612V1, 612V3

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
<b>RADIO CHASSIS ASSEMBLIES</b> RK 121		<b>AMPLIFIER ASSEMBLIES</b> RS 123	
*71064	Arm—Push arm and cam for tuning condenser	70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C5, C6)
3058	Ball—Steel ball (3/32" dia.) for tuning condenser drive	*70632	Capacitor—Tubular, .02 mfd., 600 volts (C3, C4)
10705	Ball—Steel ball 3/32" dia. for tuning condenser drive	72596	Capacitor—Tubular, .05 mfd., 200 volts (C7)
*71051	Ball—Steel ball for manual tuning shaft	31323	Capacitor—Dry electrolytic, 10 mfd., 150 volts (C2)
*71038	Board—5 contact terminal board for antenna lead-in	30599	Capacitor—Electrolytic comprising 1 section of 30 mfd., 450 volts, 1 section of 15 mfd., 350 volts and 1 section of 40 mfd., 25 volts (C1, C1B, C1C)
*71811	Bracket—Idler bracket less pulleys	18460	Insulator—Mounting insulator for electrolytic capacitor
*71043	Bracket—L.H. dial plate support bracket	11765	Lamp—Pilot lamp (Mazda 51)
*71042	Bracket—R.H. dial plate support bracket	12403	Plug—Speaker cable plug
*71791	Cable—Antenna cable (5 conductor molded)	*71060	Resistor—Comprising 1 section of 180 ohms, 3.5 watts, 1 section of 2520 ohms, 3.97 watts and 1 section of 2760 ohms, 9.3 watts (R1C, R1B, R1A)
*71809	Capacitor—Adjustable, .6-18 mmf. (C9, C4)	30730	Resistor—2700 ohms, 1/2 watt (R3)
*71804	Capacitor—Adjustable, 1.0-18 mmf. (C5, C13)	30492	Resistor—22,000 ohms, 1/2 watt (R4)
*71803	Capacitor—Adjustable, 2.5-13 mmf. (C20)	30490	Resistor—27,000 ohms, 1/2 watt (R5)
*71808	Capacitor—Adjustable, 3-35 mmf. (C16, C37)	30650	Resistor—50,000 ohms, 1/2 watt (R2)
*71930	Capacitor—Ceramic, 5.6 mmf. (C85)	14583	Resistor—220,000 ohms, 1/2 watt (R6, R7)
30043	Capacitor—Ceramic, 6.8 mmf. (C25)	35787	Socket—Audio input socket (J2)
*71807	Capacitor—Adjustable, 10-160 mmf. (C8, C15)	31304	Socket—Pilot lamp socket
71924	Capacitor—Ceramic, 56 mmf. (C24)	30650	Socket—9 prong power socket (J1)
45233	Capacitor—Ceramic, 100 mmf. (C16, C21, C83)	14583	Socket—Tube socket
30644	Capacitor—Mica, 180 mmf. (C18)	*71061	Transformer—Output transformer (T2)
*71922	Capacitor—Ceramic, 180 mmf. (C34)	37048	Transformer—Power transformer, 117 volt, 50, 60 cycles (T1)
*71920	Capacitor—Ceramic, 220 mmf. (C6, C10)		
*71919	Capacitor—Ceramic, 330 mmf. (C3, C11)		
*71929	Capacitor—Ceramic, 1000 mmf. (C80)		
*72117	Capacitor—Tubular, .0012 mfd., 400 volts (C53)		
*71927	Capacitor—Tubular, .002 mfd., 400 volts (C59)		
*71921	Capacitor—Tubular, .003 mfd., 200 volts (C9, C26, C27, C82)		
*71926	Capacitor—Tubular, .005 mfd., 200 volts (C40, C42, C43, C66, C76, C77, C78)		
71553	Capacitor—Tubular, .005 mfd., 400 volts (C44, C55, C58, C68, —C69, C88)		
71588	Capacitor—Moulded paper, .01 mfd (C87)	13807	Cap—Dust cap
70631	Capacitor—Tubular, .01 mfd., 600 volts (C61)	71147	Clamp—Clamp to hold metal cone suspension (2 required)
*71925	Capacitor—Tubular, .01 mfd., 400 volts (C32, C35, C54, C62, C89)	*71146	Coil—Field coil—1060 ohms
*71923	Capacitor—Tubular, .01 mfd., 200 volts (C22, C23, C63)	11460	Coil—Neutralizing coil
*72120	Capacitor—Tubular, .015 mfd., 200 volts (C64, C65)	36145	Cone—Cone complete with voice coil
*71551	Capacitor—Tubular, .05 mfd., 200 volts (C33, C39, C41, C70)	31530	Plug—5 prong male plug for speaker
*72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C67, C81)	*71144	Speaker—12" EM speaker complete with cone and voice coil
33870	Capacitor—Electrolytic, 15 mfd., 300 volts (C60)		
*71046	Clamp—Dial clamp (2 required)		
*71850	Coil—Antenna coil—"C" band (L4, L5)		
*71042	Coil—Filament choke coil (L7, L8)		
*71937	Coil—F.M. oscillator coil (L9)		
*71938	Coil—F.M. R.F. coil (L1)		
*71040	Coil—F.M. antenna coil (L2, L3)	*71864	Antenna—Di-pole antenna
*71855	Coil—Loop loading coil—"A" band (L6)	*72598	Back—Cabinet back (half-length) for Model 612V1
*71852	Coil—Oscillator coil—"B" band (L8)	*72599	Back—Cabinet back (full-length) for Model 612V1
*71853	Coil—Oscillator coil—"C" band (L17)	*72579	Back—Cabinet back (half-length) for Model 612V3 (2 required)
*71857	Coil—R.F. coil—"A" band (L13, L14)	*72580	Back—Cabinet back (full-length) for Model 612V3
*71939	Coil—R.F. choke coil (L10)	11688	Bottom—Bottom cover
*71854	Coil—R.F. coil—"C" band (L12)	30639	Bracket—Pilot lamp bracket
38405	Control—H.F. tone control (R27)	*71874	Bushing—Bushing and washer for large knobs (4 required)
38401	Control—L.F. tone control (R26)	*71884	Button—Push button
*71596	Control—Volume control (R42)	*72447	Cable—Shielded audio cable—complete with two pin plugs
32634	Cord—Indicator drive cord (Approx. 42" overall length)	*71863	Cable—5 wire moulded antenna lead-in cable
32634	Cord—Manual drive cord (Approx. 30" overall length)	13103	Cap—Pilot lamp cap
	NOTE: Before assembling, stretch to full length	30684	Capacitor—Mica trimmer, 2-20 mmf. (C1)
	NOTE: Before assembling, stretch to full length	*71892	Catch—Door catch
*71941	Coupling—F.M. coupling unit (L16, C17, R5)	X1617	Cloth—Grille cloth for 612V1 walnut or mahogany
*71652	Dial—Glass dial scale—Short wave	X1620	Cloth—Grille cloth—upper—for 612V3 mahogany or walnut
*71653	Dial—Glass dial scale—standard broadcast	X1621	Cloth—Grille cloth—lower—for 612V3 mahogany or walnut
*71805	Dial—Glass dial scale—F.M.	X1624	Cloth—Grille cloth for 612V1 blonde
35844	Drum—Drive drum	X1628	Cloth—Grille cloth—upper—for 612V3 blonde
*71806	Drive—Drive drum	X1629	Cloth—Grille cloth—lower—for 612V3 blonde
*71806	Drive—Drive drum	*71010	Decal—Trade mark decal
*71801	Gear—18 tooth gear fastened to range switch shaft	*71066	Decal—Trade mark decal "Victoria"
*71047	Guide—Indicator slide guide	*71800	Disc—Kit containing disc, rubber sleeve and spacer to prevent rollout mechanism from tilting
*71851	Grommet—Rubber grommet to mount socket (4 req'd)	*72119	Escutcheon—Escutcheon only less screen, window and marker strips for blonde instruments
*71700	Grommet—Rubber grommet to mount cradle (6 req'd)	*71877	Escutcheon—Escutcheon only less screen, window and marker strips for mahogany instruments
*71832	Indicator—Station selector indicator	*71876	Escutcheon—Escutcheon only less screen, window and marker strips for walnut instruments
11765	Lamp—Dial lamp—Mazda 51	*71878	Frame—Mounting frame and bracket
11891	Lamp—Pilot lamp—Mazda 44	*71043	Grille—Metal grille—upper—for 612V3
*71062	Pinion—Pinion and shaft for tuning condenser	*71044	Grille—Metal grille—lower—for 612V3
*71063	Plate—Bearing plate for tuning condenser pinion	72763	Handle—Rollout mechanism pullout handle
*71044	Plate—Dial back plate only less window, dials, support, indicator slide, indicator and pulleys	30610	Hinge—L.H. door hinges (top and bottom) for 612V1
*71048	Pulley—Indicator cord pulley and idler pulley	30817	Hinge—R.H. door hinges (top and bottom) for 612V1
*71050	Pulley—Manual tuning shaft cord pulley	*71045	Hinge—Door hinge for 612V3 (4 required)
*71036	Receptacle—0 prong male plug for power cable (J1)	*71764	Hinge—Drop door hinge (2 required) for 612V1
*71037	Receptacle—Television, audio and phono nput jack	*71890	Knob—Door knob (2 required) for 612V1
*72323	Resistor—3 ohms, 1/2 watt (R32)	*71883	Knob—Tone control knob—for walnut or mahogany instruments
34765	Resistor—100 ohms, 1/2 watt (R21, R22)	72761	Knob—Tone control knob—for blonde instruments
10929	Resistor—270 ohms, 1/2 watt (R1)	*72118	Knob—Volume control, power switch, selector switch or tuning knob—blonde instruments
30498	Resistor—300 ohms, 1/2 watt (R10)	71821	Knob—Volume control, power switch, selector switch or tuning knob—walnut or mahogany instruments
34766	Resistor—1000 ohms, 1/2 watt (R24, R37, R46)	11765	Lamp—Pilot lamp—Mazda 51
34767	Resistor—2200 ohms, 1/2 watt (R9, R12, R25, R36, R52)	*71862	Loop—Antenna loop complete
30494	Resistor—4700 ohms, 1/2 watt (R4)	*71909	Marker—Call letter marker
14250	Resistor—8200 ohms, 1/2 watt (R13)	72765	Nut—Speed nut to fasten transparent screen and back plate (2 required)
*71914	Resistor—10,000 ohms, 1 watt (R6)	*71870	Plate—Backing plate for screen
36714	Resistor—15,000 ohms, 1/2 watt (R30, R46, R51)	*71881	Plate—Call letter marker plate
*71915	Resistor—15,000 ohms, 1 watt (R7)	72764	Plate—Backing plate for pullout handle (1 set)
3219	Resistor—18,000 ohms, 1/2 watt (R33)	30868	Plug—2 contact female plug for power cable
*71989	Resistor—22,000 ohms, 1 watt (R43)	*71067	Plug—0 contact female plug for interconnecting cable
30492	Resistor—22,000 ohms, 1/2 watt (R3, R18, R31, R34, R35, R44, R49)	32641	Plug—3 prong male plug for loop cable
30490	Resistor—27,000 ohms, 1/2 watt (R11, R45)	*71068	Plug—0 prong male plug for interconnecting cable
3252	Resistor—100,000 ohms, 1/2 watt (R16, R28)	31048	Plug—Pin plug for audio cable
11959	Resistor—180,000 ohms, 1/2 watt (R17, R20)	*71946	Pull—Door pull for 612V3
30651	Resistor—270,000 ohms, 1/2 watt (R29, R40, R53)	*71891	Pull—Drop support door pull for 612V1
30648	Resistor—470,000 ohms, 1/2 watt (R14)	*71867	Retainer—Rubber retainer (1/4" O.D. x 1/4" I.D. x 1/4" to mount record changer (2 required)
30652	Resistor—1 megohm, 1/2 watt (R1, R2, R80)	*71878	Screen—Transparent screen
30649	Resistor—2.2 megohms, 1/2 watt (R15, R44, R47, R50)	36422	Socket—3 contact female socket for loop cable
70592	Resistor—3.9 megohms, 1/2 watt (R8)	*71870	Spring—Braking spring for right rear wheel
*71917	Resistor—22 megohms, 1/2 watt (R23)	38873	Spring—Braking spring for left rear wheel
*71798	Screw—#8-32 x 1/4" square head set screw	*71869	Spring—Conical spring to mount record changer (4 required)
*71965	Screw—Push arm locking screw	30900	Spring—Retaining spring for knobs
*71800	Shaft—Coupling shaft for range switch flexible shaft	*71865	Spring—Spring to hold flexible cable from mechanism
*71641	Shaft—Flexible shaft for range switch knob	*71880	Strip—Backing strip for call letter marker plate
*71812	Shaft—Manual tuning shaft less spring and pulley	*71889	Support—Drop support for door (2 required)
*71833	Socket—Lamp socket—R.H.	70545	Support—Loop support complete with mounting brackets and spring (2 required)
*71834	Socket—Lamp socket—L.H.	*71871	Tire—Rubber tire for rear wheels
*71931	Socket—Pilot lamp socket	*71872	Tire—Rubber tire for front wheels
*71850	Socket—Tube socket complete with base and shield	*71875	Washer—Washer to fasten front wheels
72510	Socket—Tube socket—mixture	*71887	Washer—Spring washer for rubber retainer (2 required)
*71049	Spring—Coil spring for manual tuning shaft	*71887	Wheel—Front wheel for rollout frame (2 required)
*71036	Spring—Drive cord spring	*71886	Wheel—Left rear wheel complete with braking mechanism
33622	Spring—Tuning condenser push arm return spring	*71885	Wheel—Right rear wheel complete with braking mechanism
*71645	Support—Glass support (rubber) (2 required)	*71882	Window—Window for call letter markers
*71040	Switch—Power switch (S7)		
*71802	Switch—Range switch (S1, S2, S3, S4, S5, S6)		
*71934	Transformer—Ratio Det. transformer (T7, C72, C74)		
*71935	Transformer—Driver transformer (T6, C70)		
*71845	Transformer—First I.F. transformer (F.M.) (T1, C28, C30)		
*71847	Transformer—Second I.F. transformer (F.M.) (T3, C45, C47, C51)		
*71849	Transformer—Third I.F. transformer (F.M.) (T5, C56, C57)		
*71846	Transformer—First I.F. transformer (A.M.) (T2, C29, C31)		
*71848	Transformer—Second I.F. transformer (A.M.) (T4, C46, C48, C49, C50)		
37435	Washer—"C" washer to hold gear on coupling shaft		
31068	Washer—Idler pulley spring washer and spring washer for drive cord pulley		
2017	Washer—Spring washer for manual tuning shaft and for range switch flexible shaft		
*71810	Window—Dial window		

MODEL 711V2, Chassis  
RK117, RS123

RADIO CORP. OF AMERICA

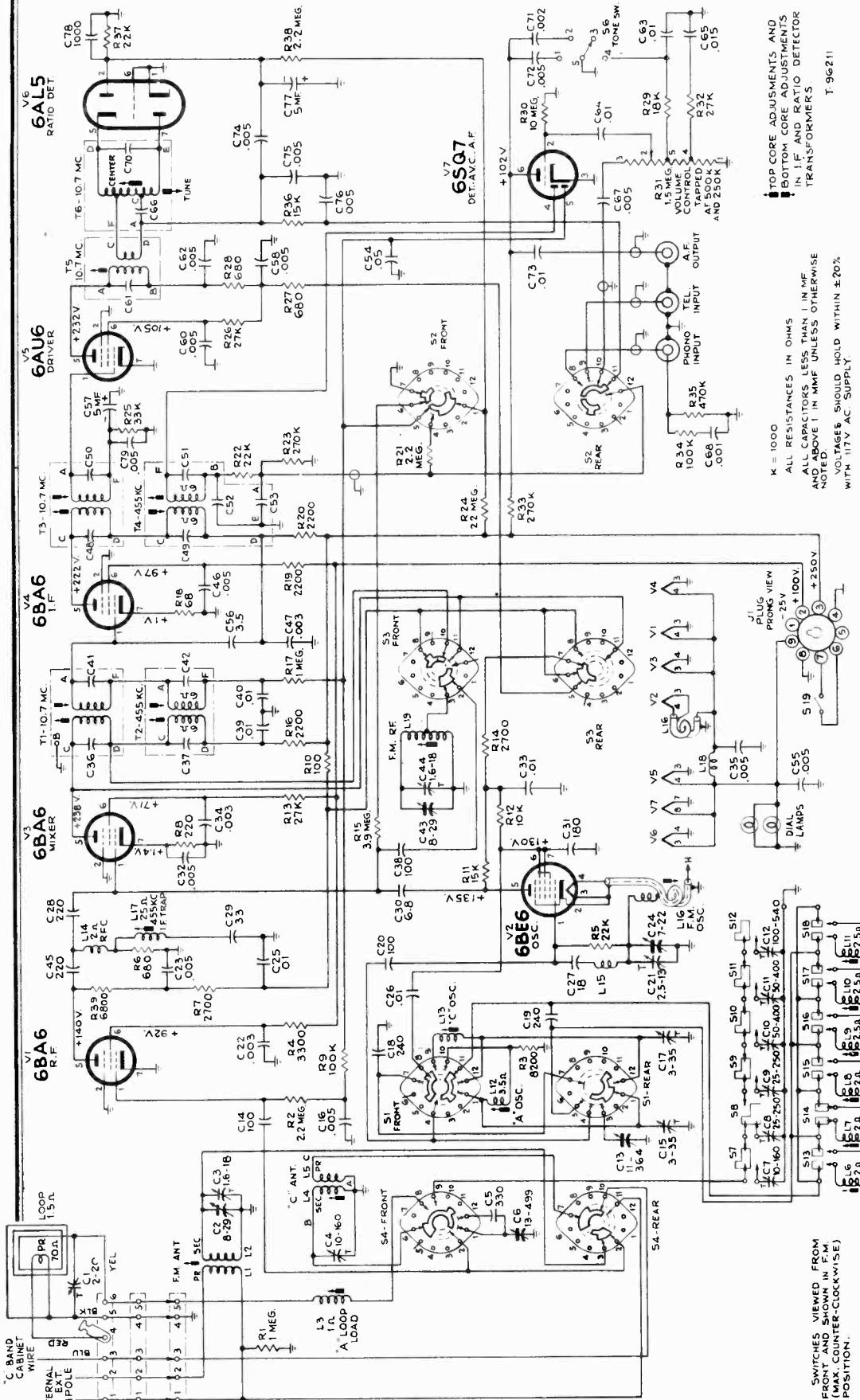


Figure 7—Complete Schematic of Radio Chassis—Range Switch Shown in FM Position.

For separate schematic of range switch positions see figures 11, 12, 13 and 15. See figure 8 for power amplifier.

NOTE: Antenna link closed for loop operation on Broadcast ("A") Band.

<b>Loudspeaker (92567-2)</b>	
Type	12-inch Electrodynamic
Voice Coil Impedance	2.2 ohms at 400 cycles
Undistorted Power Output	10 watts
Maximum Power Output	11 watts
Total Maximum Power Consumption at 125 volts, 60 cycles	170 watts
<b>Frequency Range</b>	
Broadcast	540-1,600 kc
Short Wave	9.2-16 mc
Frequency Modulation	88-108 mc
Intermediate Frequency—AM	455 kc
Intermediate Frequency—FM	10.7 mc

RADIO CHASSIS UNIT RK117 VOLTAGE CHART

Tube	Type	Element	Pin	Phono.	B.C.	S.W.	FM
V1	6BA6	Plate	5	148	148	154	140
		Scg	6	98	96	97	92
		Plate	5	0	130	130	135
V2	6BE6	Grids 2, 3, 4	6-7	0	140	140	130
		Grid 1	1	—	550 kc	9.5 mc	88 mc
		Grid 1	1	—	-24 v	-10 v	-11 v
					1600 kc	15.5 mc	108 mc
					-14 v	-16.2 v	-12 v
V3	6BA6	Plate	5	250	244	246	238
		Scg	6	67	69	72	71
V4	6BA6	Plate	5	238	230	230	222
		Scg	6	100	98	98	97
V5	6AU6	Plate	5	—	—	—	232
		Scg	6	—	—	—	105
V6	6AL5	—	—	—	—	—	—
V7	6SQ7	Plate	6	106	102	102	102

AMPLIFIER UNIT RS123 VOLTAGE CHART

Tube	Type	Element	Pin	Phono.	B.C.	S.W.	FM
V1	5U4G	Fil.		380	—	—	—
V2	6J5	Plate	3	205	—	—	—
		Cathode	8	54	—	—	—
V3	6F6G	Plate	4	360	—	—	—
		Scg	5	250	—	—	—
V4	6F6G	—	—	—	—	—	—

All voltages were measured in respect to ground, using a VoltOhmyst.

CATHODE CURRENTS WITH BAND SWITCH IN THE FM POSITION

Tube	Current	Power Amp.
V1 R-F Amplifier	14.1 ma.	V7 Del. Avc. A-F ..... 0.5 ma.
V2 Osc.	12.3 ma.	Power Amp. RS-123
V3 Mixer	6.5 ma.	V1 Rectifier total ..... 140 ma.
V4 I-F Amplifier	13.5 ma.	V2 Phase inverter .... 2.15 ma.
V5 Driver FM	15.4 ma.	V3 Power amp. .... 27 ma.
V6 Ratio Detector	.....	V4 Power amp. .... 27 ma.

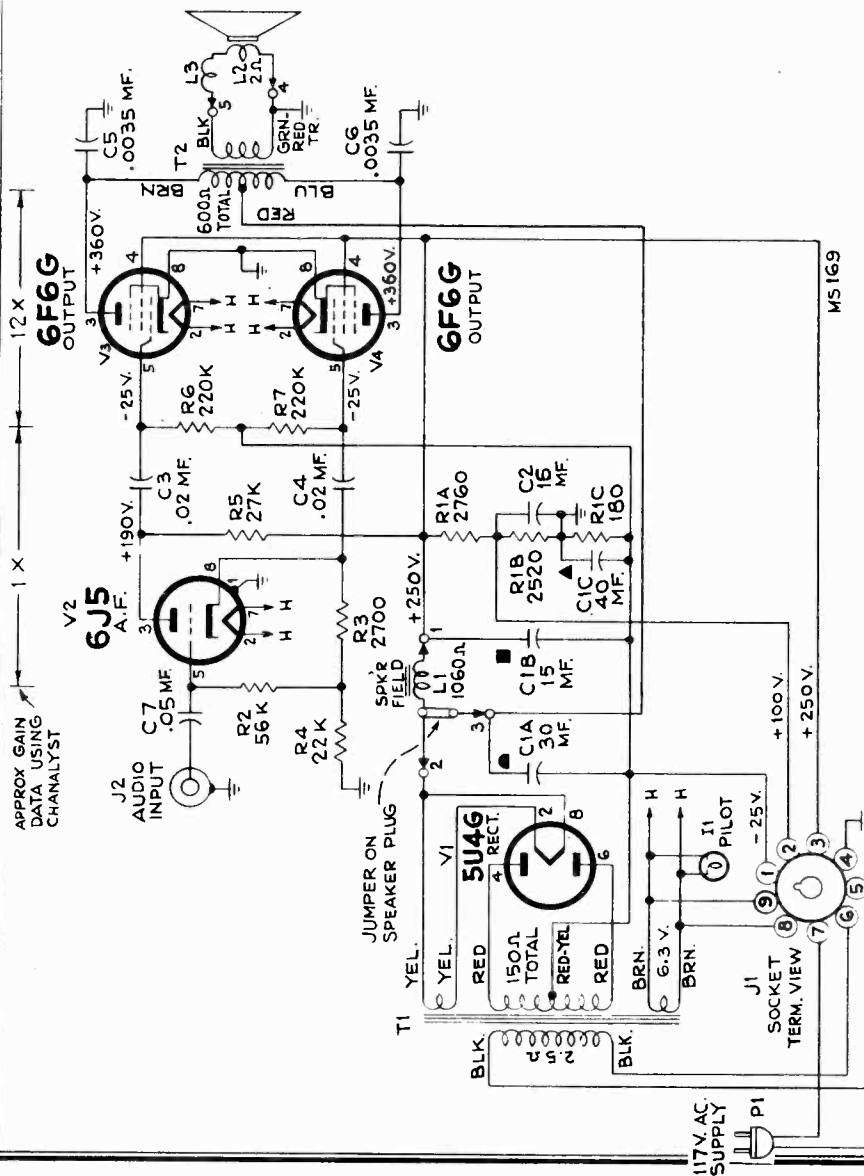
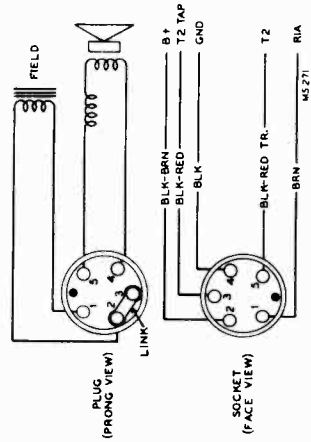


Figure 8—Power Amplifier RS-123



SPEAKER CONNECTIONS

Figure 10

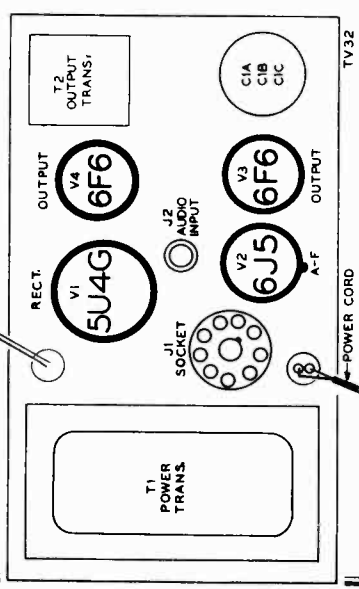
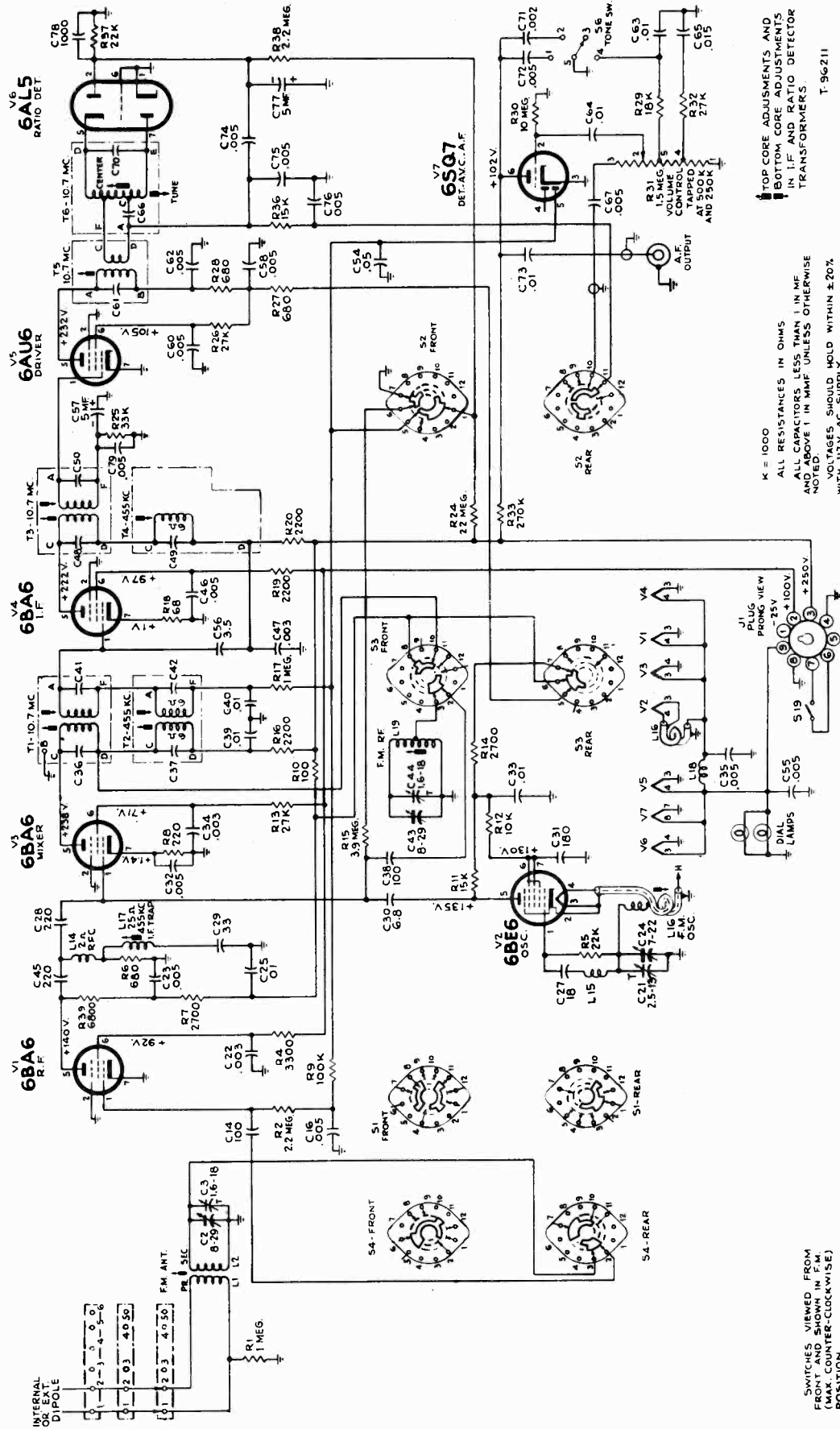


Figure 9—Top View of RS-123

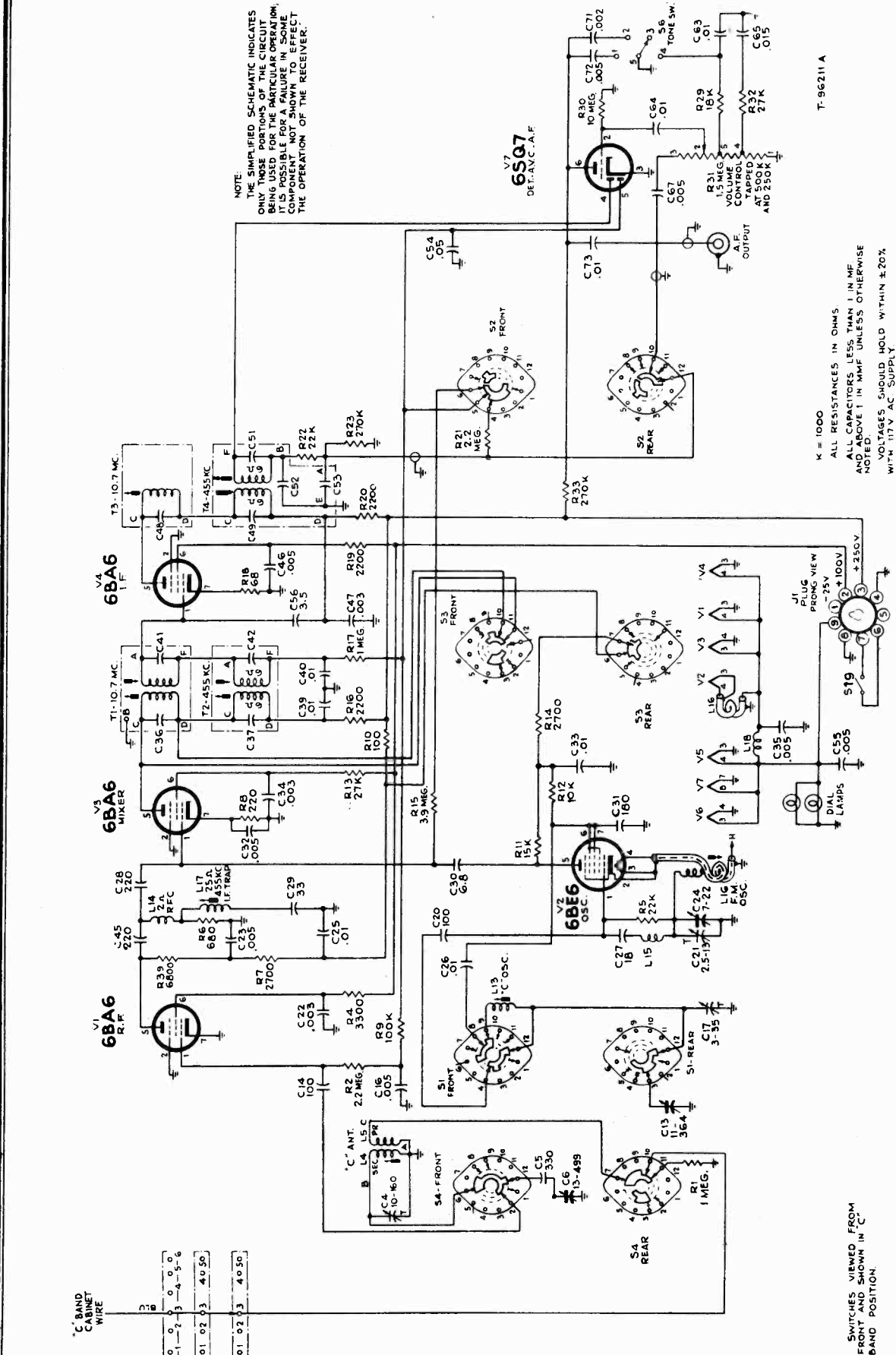


TOP CORE ADJUSTMENTS AND BOTTOM CORE ADJUSTMENTS IN I.F. AND RATIO DETECTOR TRANSFORMERS.

K = 1000  
 ALL RESISTANCES IN OHMS  
 ALL CAPACITORS LESS THAN 1 IN MF AND ABOVE 1 IN MMF UNLESS OTHERWISE NOTED.  
 VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V AC SUPPLY.

Simplified Schematic Shown in F-M Band

SWITCHES VIEWED FROM FRONT AND SHOWN IN F.M. BAND POSITION (CLOCKWISE POSITION).



NOTE:  
THE SIMPLIFIED SCHEMATIC INDICATES ONLY THOSE PORTIONS OF THE CIRCUIT BEING USED FOR THE PARTICULAR OPERATION; IT IS POSSIBLE FOR A FAILURE IN SOME COMPONENT NOT SHOWN TO AFFECT THE OPERATION OF THE RECEIVER.

T-96211A

K = 1000  
ALL RESISTANCES IN OHMS.  
ALL CAPACITORS LESS THAN 1 IN MF AND ABOVE 1 IN MMF UNLESS OTHERWISE NOTED.  
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V AC SUPPLY.

\*C BAND CABINET WIRE

0	1	2	3	4	5	6
01	02	03	04	05	06	07
01	02	03	04	05	06	07

SWITCHES VIEWED FROM FRONT AND SHOWN IN "C" BAND POSITION.

Figure 11—Simplified Schematic Shown in "C" Band Position Only. (See Note above.)



NOTE:  
THE SIMPLIFIED SCHEMATIC INDICATES ONLY THOSE PORTIONS OF THE CIRCUIT BEING USED FOR THE PARTICULAR OPERATION; IT IS POSSIBLE FOR A FAILURE IN SOME COMPONENT NOT SHOWN TO AFFECT THE OPERATION OF THE RECEIVER.

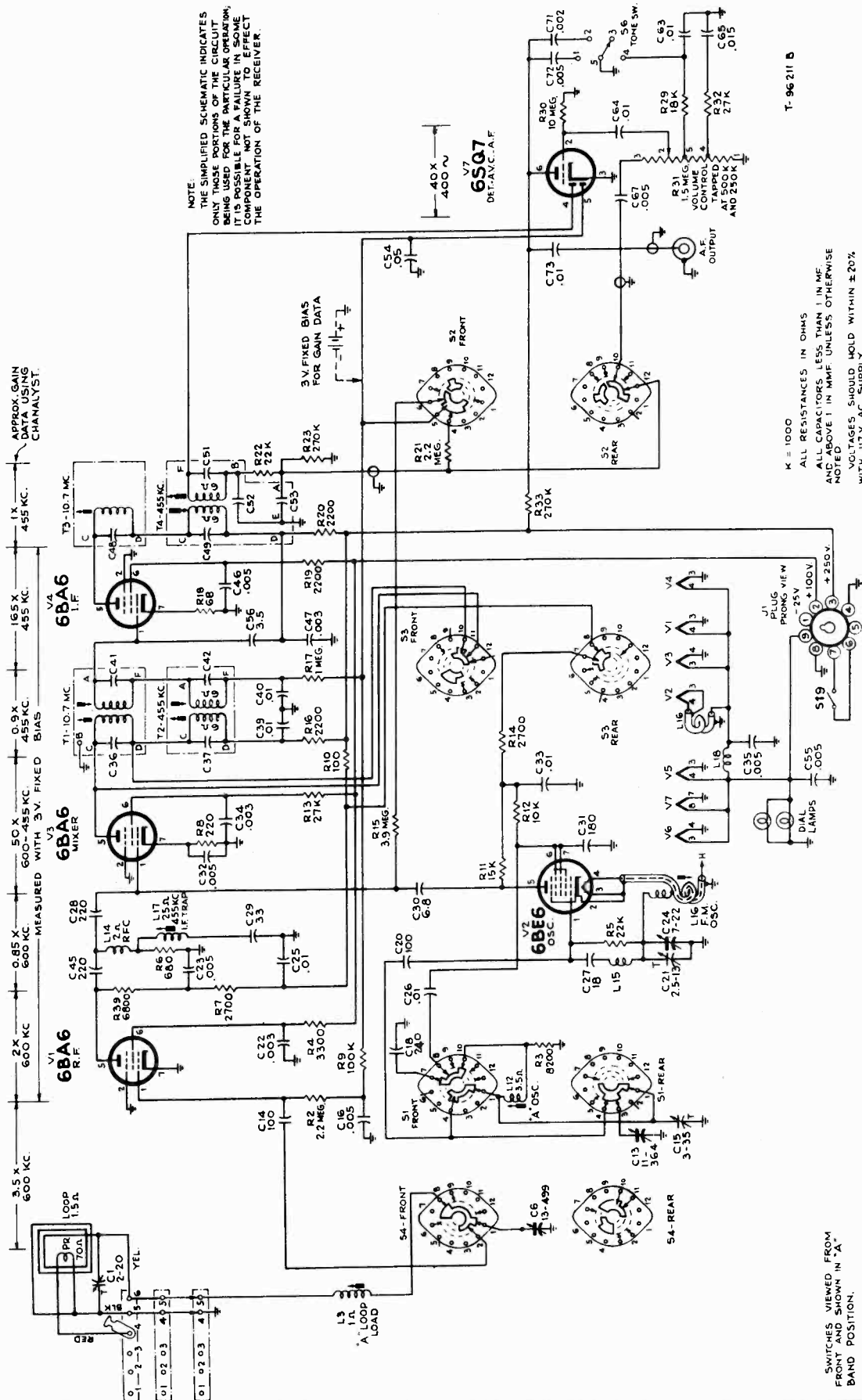


Figure 12—Simplified Schematic Shown in Broadcast ("A") Band Position Only. (See Note above.)

NOTE: Antenna link closed for loop operation (see page 11 for external antenna connections).



**CRITICAL LEAD DRESS**

(Any lead dress should be made before alignment.)

1. The lead from terminal 9, switch S4, front, to terminal on switch S7, must be dressed between the main base and R-F shelf.
2. The leads from terminals 10 and 11, switch S3, front, must be dressed together and away from the chassis.
3. Capacitor C56 must have shortest possible lead on the end connecting to pin 1 of tube V4.
4. The following capacitors must be dressed close to the chassis, with leads kept as short as possible: C40, C47, C54, C62 and C78.
5. All FM coil connections must be soldered in the exact place as the original coil. (One-sixteenth inch difference in length may be excessive.)
6. All wiring in the receiver is critical as to length and placement, any changes tend to impair the operation of the set.

**FM Alignment**

Before aligning set, completely mesh the gang and set the dial pointer at the mechanical maximum calibration point at the extreme left-hand end of the dial.

When making a complete alignment follow in proper sequence the tabulated form below.

If only a portion of the circuit is to be aligned select the portion required and follow with the remaining steps in the chart.

Any adjustments made on the FM 10.7 mc I-F's make it necessary to adjust the AM 455 kc I-F's.

**"FM" RATIO DETECTOR ALIGNMENT**  
SET RANGE SWITCH TO FM POSITION

Steps	Connect High Side of Osc. to—	Tune Osc. to—	Turn Vol. Cont. to—	Adjust
1	Connect a 680-ohm resistor between lugs D and E of the ratio detector transformer T6. Connect d-c probe of a VoltOhmyst to the negative lead of the 5 mfd electrolytic capacitor C77. The common lead of the meter to chassis.			
2	Driver grid pin 1, of 6AU6 (V5) in series with a .01 mfd capacitor	10.7 mc 30% mod. 400 cycles AM	Maximum volume	Driver transformer T5 for maximum d-c voltage across C77
3	Remove meter leads and disconnect the 680-ohm resistor from D and E on T6. Connect two 68,000-ohm resistors (within 1% of each other) in series, across the 22,000-ohm ratio detector load resistor R37. Connect the common lead of the VoltOhmyst to the center point of the 68,000-ohm resistors and the d-c probe to terminal "A" of the ratio detector transformer T6. Use the 30-volt meter range.			
4	Same as step 2	Same as step 2	Maximum volume	*T6 bottom core for zero d-c balance on VoltOhmyst **T6 top core for minimum audio output (Output meter across voice coil)
5	Reconnect VoltOhmyst as in step 1, omitting the 680-ohm resistor.			
6	Repeat step 2, omitting 680 ohms.			
7	Remove all connections.			

\* Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

\*\* The zero d-c balance and the minimum A-F output should occur at the same point; if such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the VoltOhmyst, and an output meter connected across the voice coil for the point at which both zero d-c and minimum output occurs.

NOTE.—Two or more points may be found which will satisfy the condition required in step 4. T7 top core should be correctly adjusted when approximately 1/8 inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum A-F and minimum d-c is reached.

**"FM" R-F-I-F ALIGNMENT**

**RANGE SWITCH IN FM POSITION**

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. to—	Radio Dial Tuned to—	Adjust
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd electrolytic capacitor C77, and the common lead of the meter to chassis ground.				
2	Mixer grid pin #1 of 6BA6 (V3) in series with a .01 mfd capacitor (Adjust test osc. output for 6-10 volts developed across C-77) (Range switch in FM Position)	To RF tube shelf ground	10.7 MC 30% modulated at 400 cycles AM	Max. cap. (Fully meshed)	*T3 and T1 top and bottom cores alternately loading primary and secondary of each transformer with 680 ohms while the opposite side of the same transformer is being adjusted. Adjust all transformers for maximum voltage across C77.
3	FM antenna terminals #1 in series with a 120-ohm resistor	To FM antenna terminal #2 in series with a 120-ohm resistor	106 mc	106 mc	OSC, C21 for maximum voltage across C77.
4			90 mc	90 mc	**OSC, L16 for maximum voltage across C77.
5	Repeat steps 3 and 4 for exact calibration.				
6			106 mc	106 mc	R-F, C44 for maximum voltage across C77.
7	Same as steps 3 and 4		90 mc	90 mc	**R-F, L19 for maximum voltage across C77.
8	Repeat steps 6 and 7 for maximum output.				
9	Same as step 3	Same as step 3	106 mc	106 mc	Ant. C3 for maximum voltage across C77.
10	Same as step 3	Same as step 3	90 mc	90 mc	**Ant. L2 for maximum voltage across C77.
11	Repeat steps 9 and 10 for maximum output.				

\* This method is known as alternate loading, which involves the use of a 680-ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680-ohm resistor while the plate winding is being peaked.

When the windings are loaded, it is necessary to increase the 10.7 mc input, since the gain will decrease and the voltage across C77 will be less.

\*\* Two positions of the cores in L2, L19, L16 will satisfy the condition indicated, but for greatest sensitivity, the core position for L2 and L19 chosen, should be the one which results in the adjusting stud projecting the lesser distance.

For oscillator L16 the reverse is true and the coil should be aligned with the stud projecting the greater distance.

### AM Alignment

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

**Output Meter Alignment.**—Connect the meter across voice coil, and turn the receiver volume control to maximum.

Steps	Connect the High Side of the Test Osc. To	Tune Test Osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following
1	Mixer grid #1 pin of 6BA6—V3 in series with .01 mfd capacitor	455 kc	"BC" Band	Low Freq. end of Dial	*Top and bottom cores of T2 and T4. (For maximum voltage across voice coil.)
2	High Side of loop Primary in series with a .01 mfd capacitor (Link open)	455 kc	"BC" Band	Low Freq. end of Dial	Adj. I-F Trap L17 for minimum voltage across voice coil.
3	High Side of Loop Primary Through a Dummy Ant. comprising a 200-ohm resistor in series with a 25 to 30-mmf capacitor (Link open)	1400 kc	"BC" Band	1400 kc	Osc.—C15 Ant.—C1. (For maximum voltage across voice coil.)
4		600 kc	"BC" Band	600 kc	Osc.—L12 Loop Load L3. (For maximum voltage across voice coil.)
5	Repeat steps 3 and 4 for maximum output.				
6	"C" Band Ant. Terminal #3 Through a dummy Ant. comprising a 150-ohm resistor in series with a 25 to 30-mmf capacitor	15.2 mc	"C" Band	15.2 mc	** Osc.—C17 Ant.—C4
7		9.5 mc	"C" Band	9.5 mc	Osc.—L13 Ant.—L4
8	Repeat steps 6 and 7 for accurate alignment.				
9	Install and connect chassis in cabinet, with Antenna link closed. Tune in a radiated oscillator signal at 1,400 kc and peak the "A" band ant. trimmer C1 (on loop).				

\* It is necessary to alternately load the primary and secondary of each 455-kc I-F transformer with 10,000 ohms while the opposite side of the same transformer is being adjusted.

\*\* To guard against the possibility of alignment of L13 and C17 to image frequencies, tune the test oscillator to 15.2 mc and turn the radio dial to 15.2 mc. Then adjust the test oscillator to 16.11 mc (image frequency). By increasing the test oscillator output, a signal should be heard.

Tune the test oscillator to 9.5 mc and turn the radio dial to 9.5 mc, then adjust the test oscillator to 10.41 mc (image frequency). By increasing the test oscillator output, a signal should be heard.

(If these image frequencies cannot be heard, the set is incorrectly aligned, therefore repeat steps 6 and 7.)

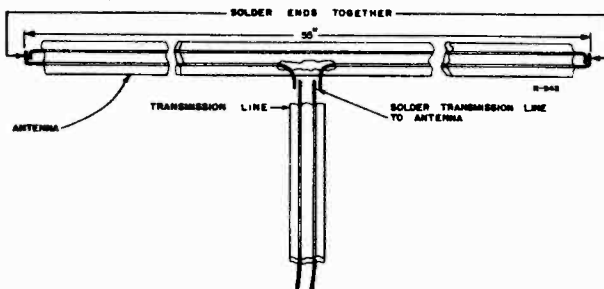


Figure 2—Sketch Showing Folded Dipole Installed in Cabinet

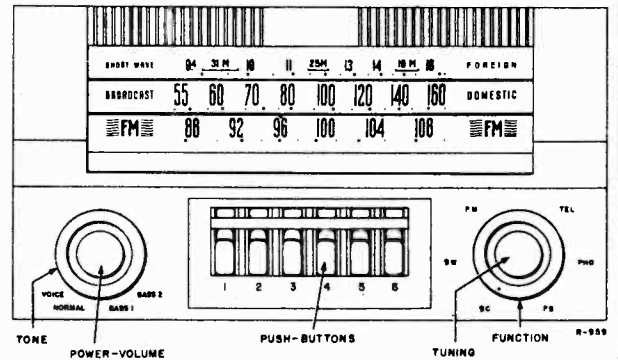


Figure 3—Radio Control Panel

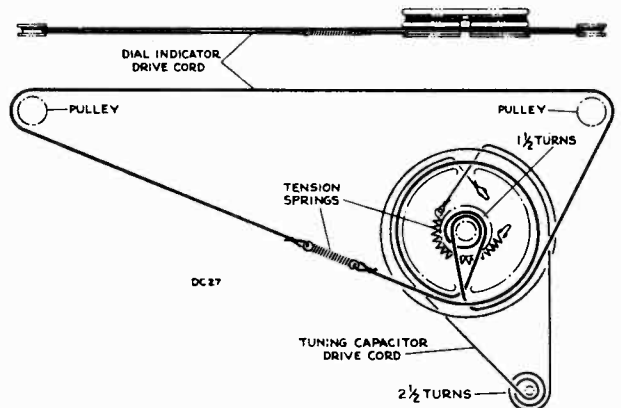


Figure 4—Dial Indicator and Drive Mechanism

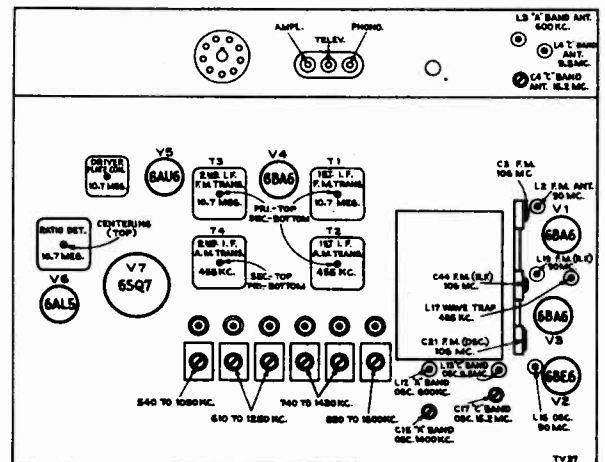


Figure 5—Chassis, Top View, Showing Adjustments

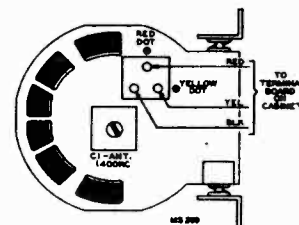


Figure 6—Loop Antenna

### Push-Button Adjustment

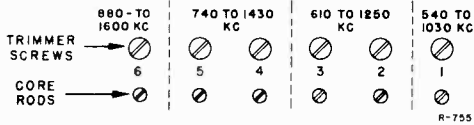


Figure 1—Push-Button Adjustment  
(Looking from Rear of Chassis)

The push-buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or align-

ment tool such as RCA Stock No. 70180. Allow about five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust core rod No. 1 to receive the first station. To secure the best adjustment, rotate the loop for least pickup, and adjust core rod No. 1 for peak output.
5. Adjust trimmer screw No. 1 for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.
7. Repeat adjustments for best results.

On the 880 to 1,600 kc push-button, the higher frequency stations may be received with core rod No. 6 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

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

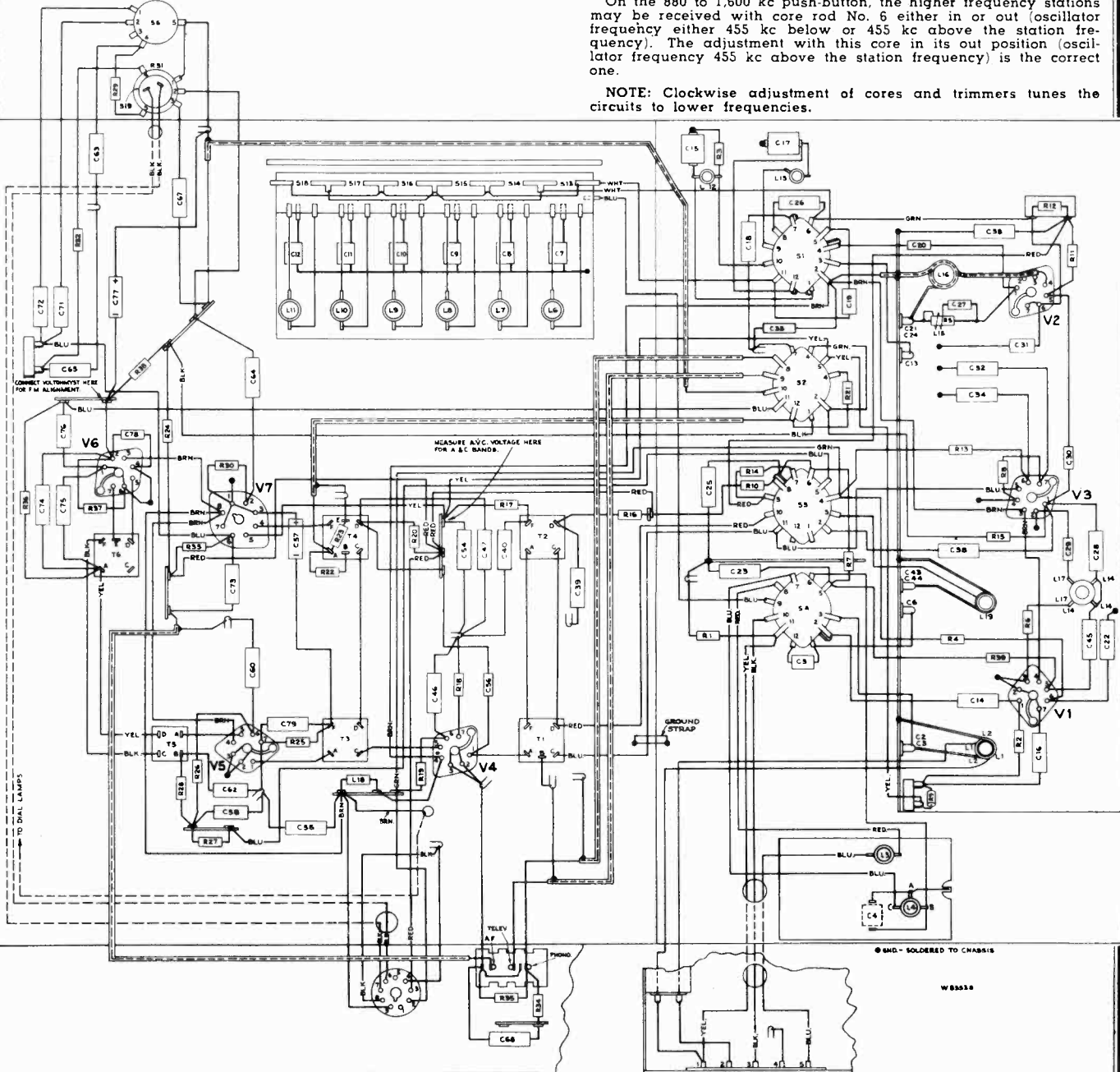


Figure 14—Radio Chassis Wiring Diagram

NOTE: In some instances the color coding of the wiring may be different.

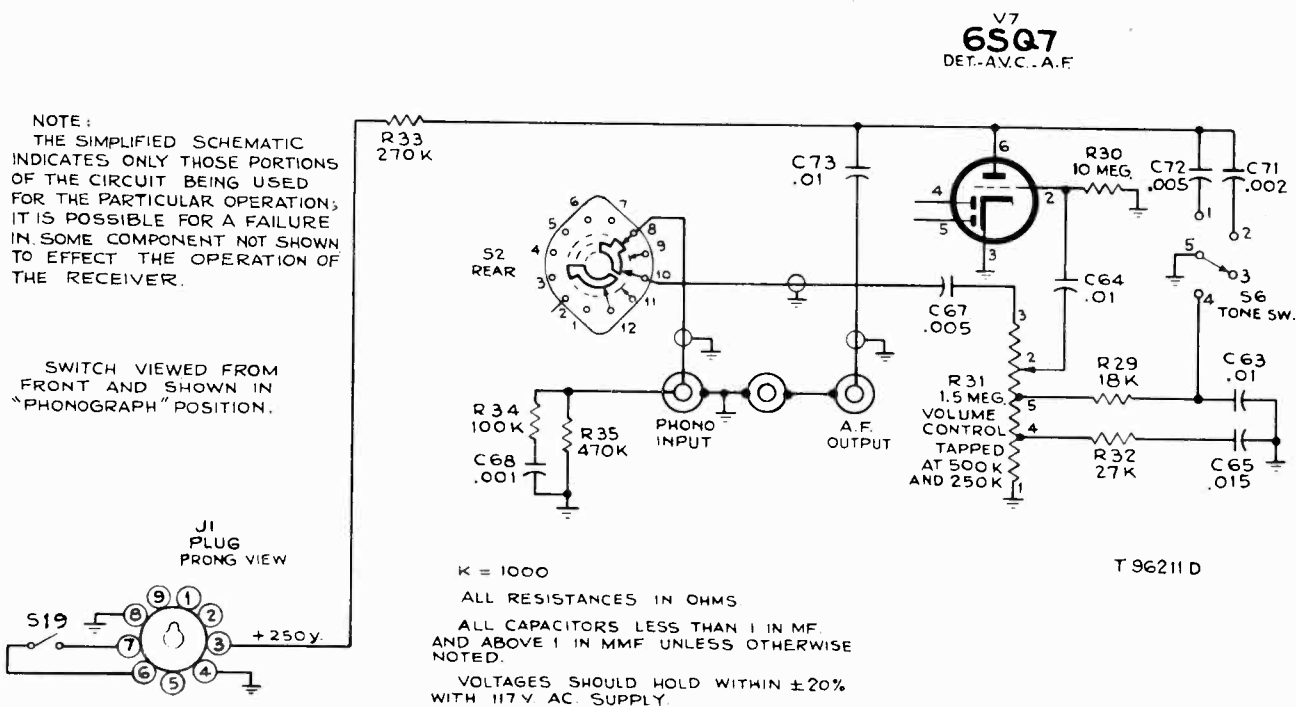


Figure 15—Schematic Shown for Phonograph Reproduction Only.

NOTE: Oscillator plate voltage is removed when the band switch is turned to the phono. or television position.

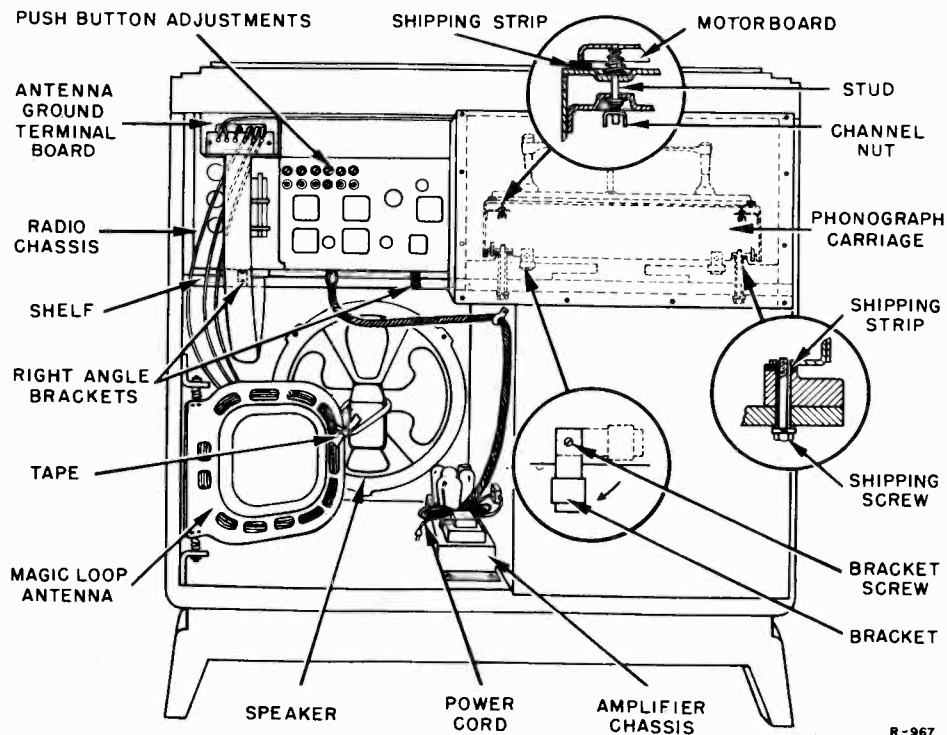


Figure 16—Back View of Cabinet

To remove chassis, remove knobs, loosen all interconnecting cables and remove screws holding right angle mounting brackets to metal mounting strips, then lower chassis.

To remove "Roll-out" loosen all interconnecting cables, turn bracket as indicated in circle in the above drawing, pull out through the front.

MODEL 711V2

RADIO CORP. OF AMERICA

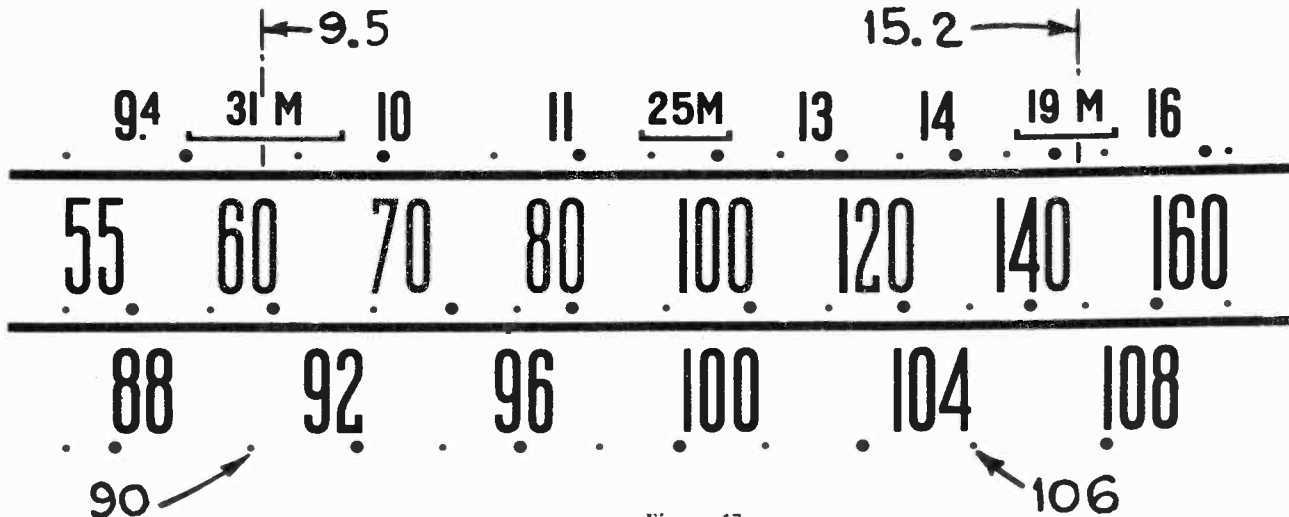


Figure 17

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

**External Antennas.**—If reception is not satisfactory on one or more of the three bands, using the built-in cabinet antennas, an external antenna may be used. The Magic Loop Antenna usually provides sufficient pickup on the Standard Broadcast band, but if an external dipole is installed to improve reception on Frequency Modulation it may be used for Standard Broadcast and Short Wave as well. Connections are made to the antenna terminal board in the back of the cabinet. External antennas may be erected indoors or outdoors and should be oriented in direction for best reception. RCA Television Antenna, Stock No. 225 or 226, or the equivalent with 300-ohm transmission line is recommended for an external antenna.

Figure 18 (A) shows the Antenna Terminal Board with connections for internal cabinet antennas.

Figure 18 (B) shows connections for the RCA Television Antenna replacing those for the internal FM antenna on terminals 1 and 2, and the internal SW antenna disconnected at terminal 3. The external dipole antenna is now the antenna for FM and SW bands.

Figure 18 (C) shows the additional change for connecting the Standard Broadcast band to make use of the external RCA Television Antenna. The link across terminals 4 and 5 is changed to terminals 4 and 3. The external antenna is now effective on all bands. Tighten terminals and be sure that the red, black and yellow leads (R.B.Y.) to terminals 4, 5 and 6 are still in place and securely connected.

Figure 18 (D) shows connections for a separate outdoor antenna on SW and SB reception, and the external dipole on FM. This outdoor antenna should consist of a wire 30 to 60 feet or so in length mounted in a convenient location as high as possible. Connect lead-in from the antenna to terminal 3 on the antenna terminal board. This outdoor antenna is effective on SB and SW bands. If this connection makes the SB signal too strong, causing overload and distortion, replace the link across terminals 4 and 5 as in Figure 18 (A) and (B). This outdoor antenna is now effective on SW only.

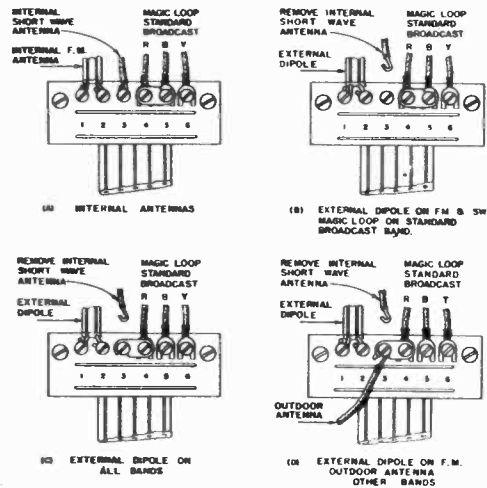


Figure 18—Antenna Terminal Board



### Replacement Parts

STOCK No.	DESCRIPTION
	HEAD END UNIT #2 RK 117
71638	Board—5 contact terminal board for antenna lead-in
72047	Capacitor—Mica trimmer, 1.6-18 mmf. (C3, C44)
72046	Capacitor—Adjustable, 2.5-13 mmf. (C21)
72790	Capacitor—Ceramic, 3.5 mmf. (C56)
72037	Capacitor—Mica trimmer, 3-35 mmf. (C15, C17)
39043	Capacitor—Ceramic, 6.8 mmf. (C30)
71807	Capacitor—Adjustable, 10-160 mmf. (C4)
33111	Capacitor—Ceramic, 33 mmf. (C29)
39396	Capacitor—Ceramic, 100 mmf. (C14, C20, C38)
71933	Capacitor—Mica, 180 mmf. (C31)
71920	Capacitor—Ceramic, 220 mmf. (C28, C45)
72789	Capacitor—Mica, 240 mmf. (C18, C19)

STOCK No.	DESCRIPTION
72793	Capacitor—Mica, 330 mmf. (C5)
71923	Capacitor—Ceramic, 1000 mmf. (C78)
72049	Capacitor—Mica trimmer, comprising 1 section of 100-540 mmf., 2 sections of 50-400 mmf., 2 sections of 25-250 mmf. and 1 section of 10-160 mmf. (C7, C8, C9, C10, C11, C12)
72792	Capacitor—Tubular, .001 mfd., 200 volts (C68)
71927	Capacitor—Tubular, .002 mfd., 400 volts (C71)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C22, C34)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C47)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C16, C32, C35, C46, C67, C74, C75, C76, C79)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C23, C58, C60, C62)



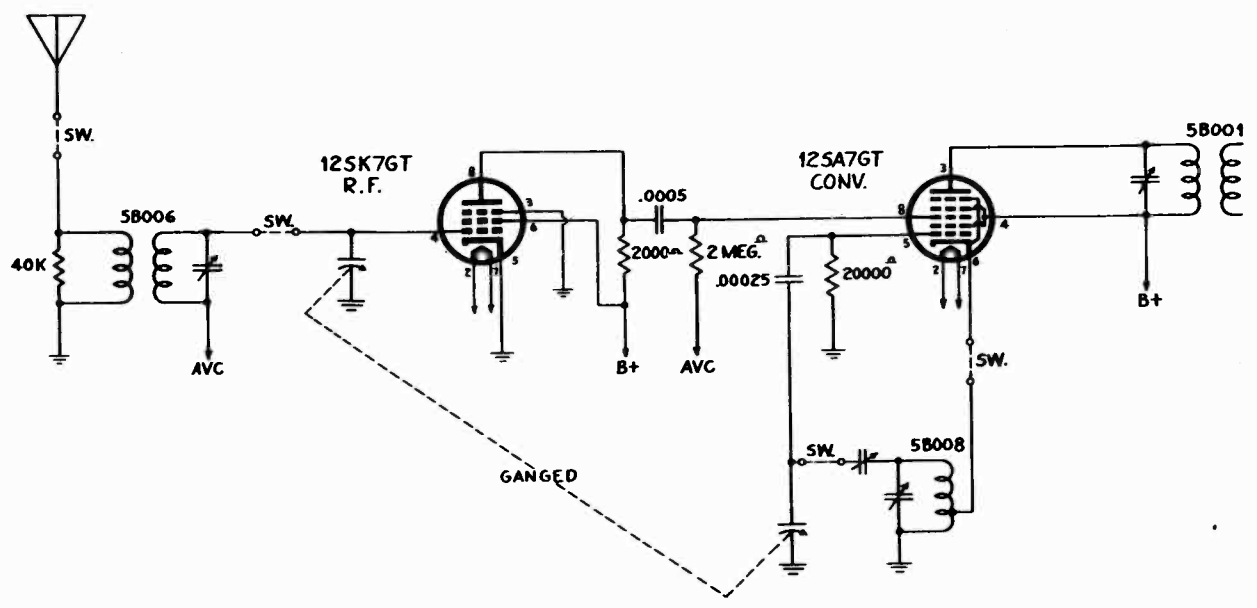




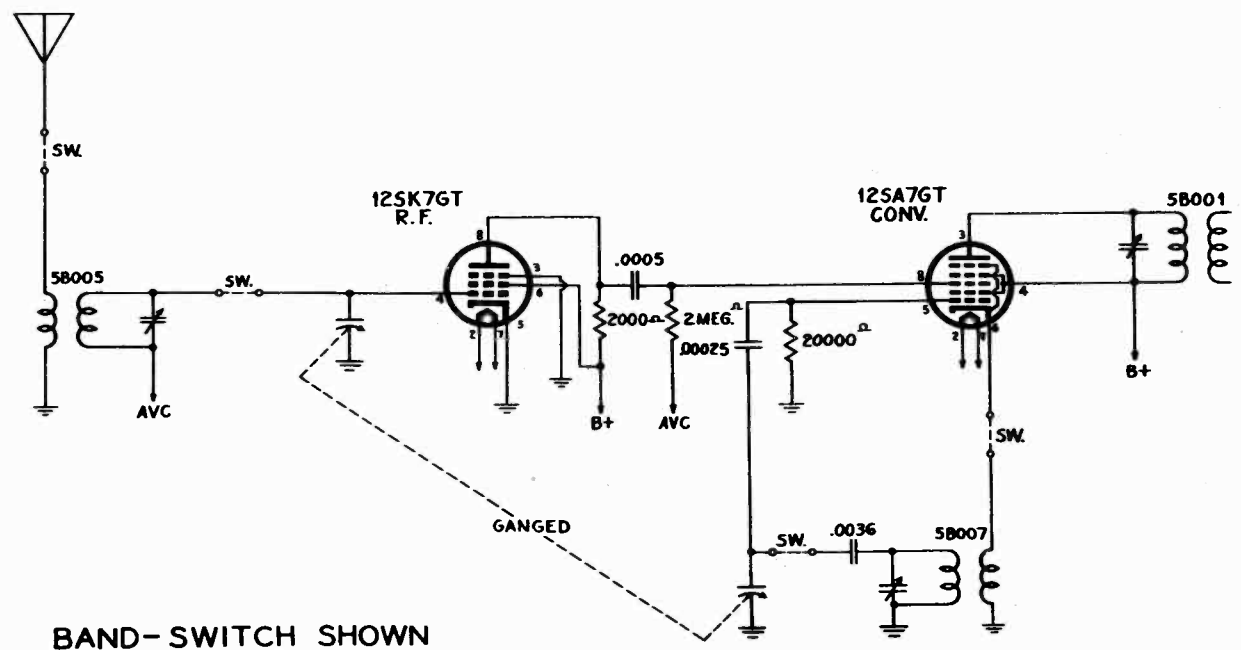


# "clarified schematics"

MODEL 6 tube kit

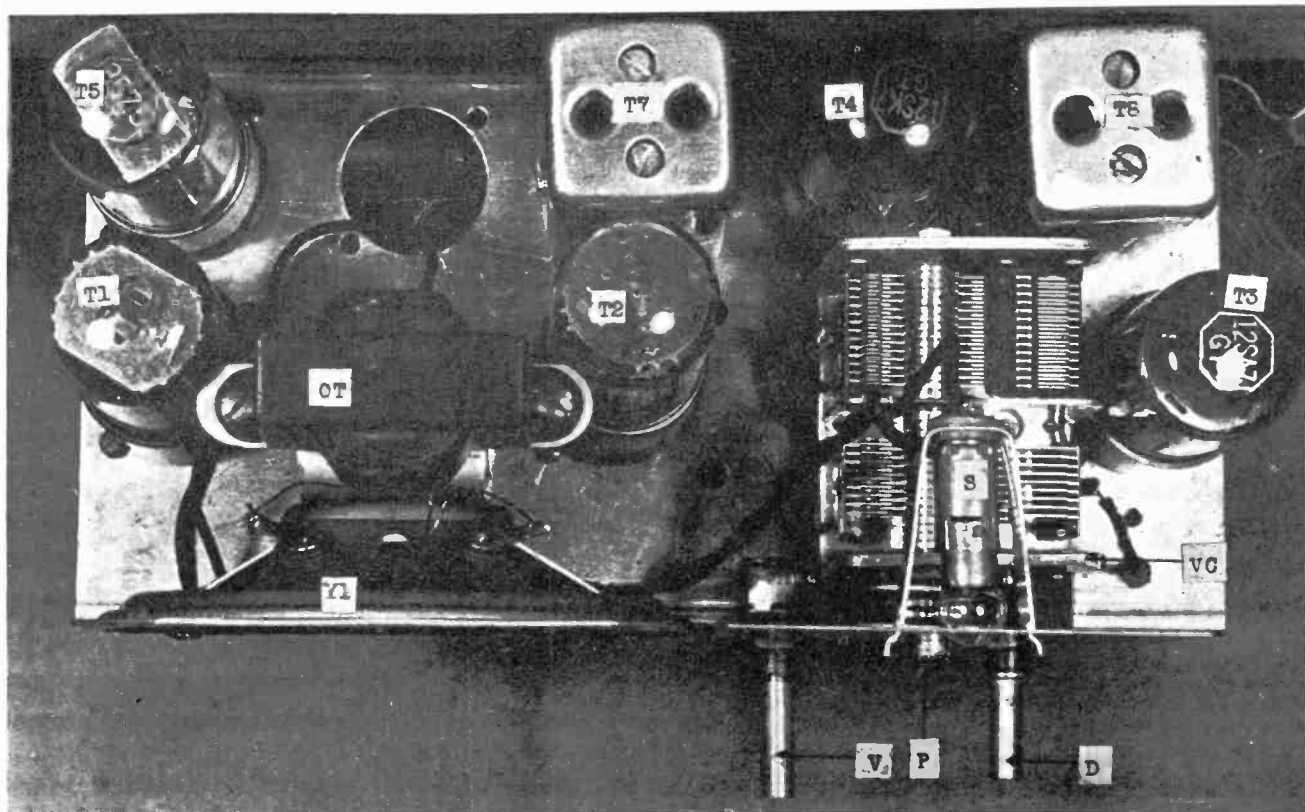


BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION  
BROADCAST BAND  
550-1600 KC.



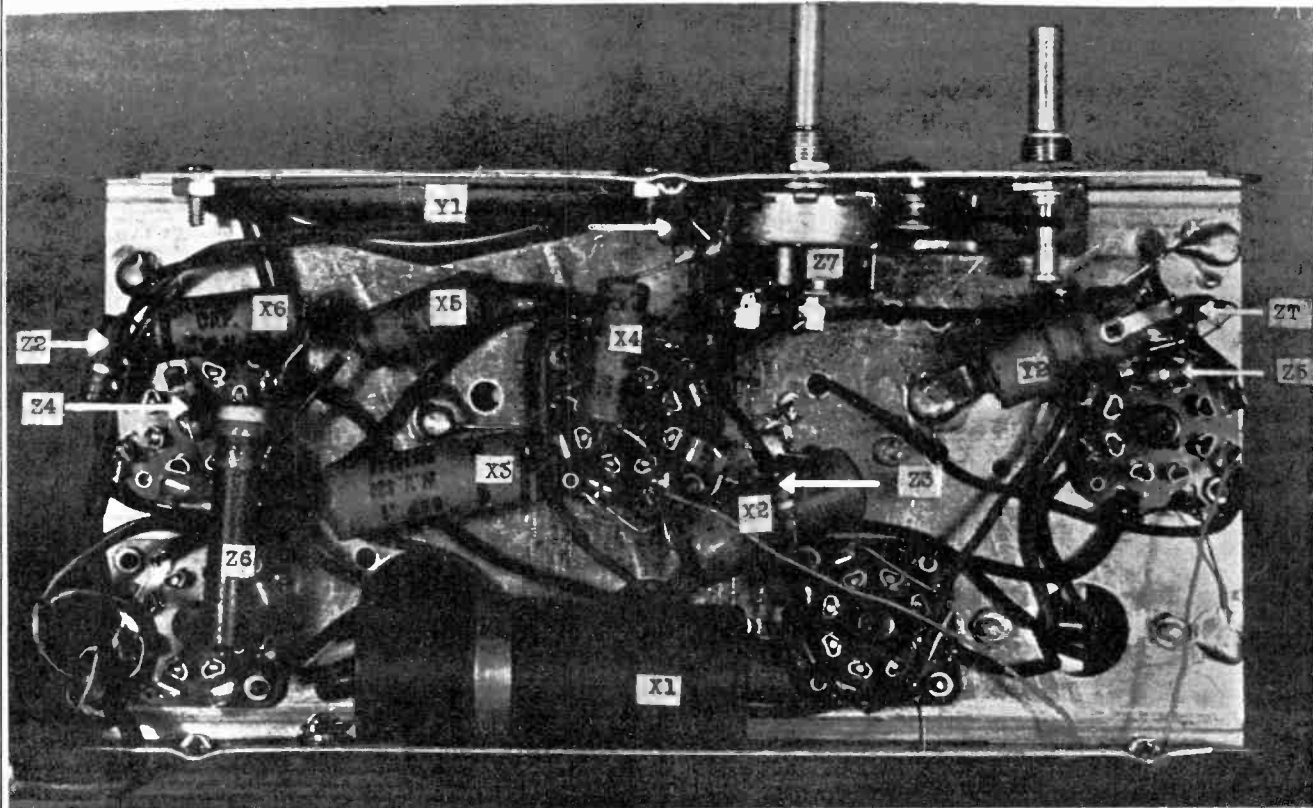
BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION  
SHORT WAVE BAND  
5.5-180 MC.





PHOTOGRAPH OF TOP VIEW OF RADIO KIT MODEL S-5C

LEGEND: T1, Tube 50L6; T2, Tube 12SQ7; T3, Tube 12SA7; T4, Tube 12SK7; T5, Tube 35Z5; OT, Output Transformer; VC, Variable capacitor; Y1, Speaker; V, Volume Control; D, Dial Drive; P, Pointer; S, Pilot light socket; T7, Output I F trans.; T8, Input I F trans.



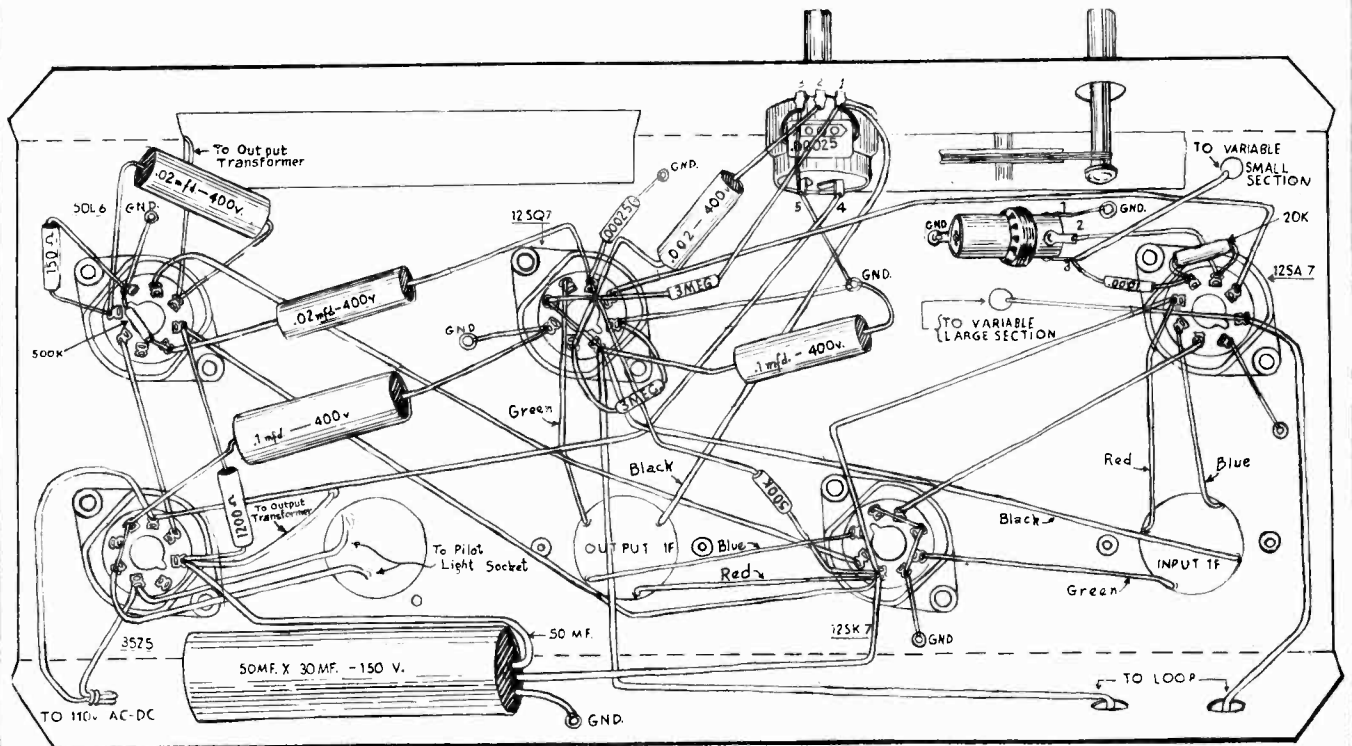
PHOTOGRAPH OF BOTTOM VIEW OF RADIO KIT MODEL S-5C

LEGEND X1, 50 mfd X 30 mfd 150 volts; X2, .1 mfd 400 volts; X3, .1 mfd 400 volts; X4, .002 mfd 400 volts; X5, .02 mfd 400 volts; X6, .02 mfd 400 volts; Z1, .0001 mfd 400 volts; Y1, Speaker; Y2, Oscillator; Z2, 150 ohms; Z3, 3 megohms; Z4, .5 megohms; Z5, 20,000 ohms; Z6, 1,200 ohms; Z7, Volume control.

RADIO KITS, INC.

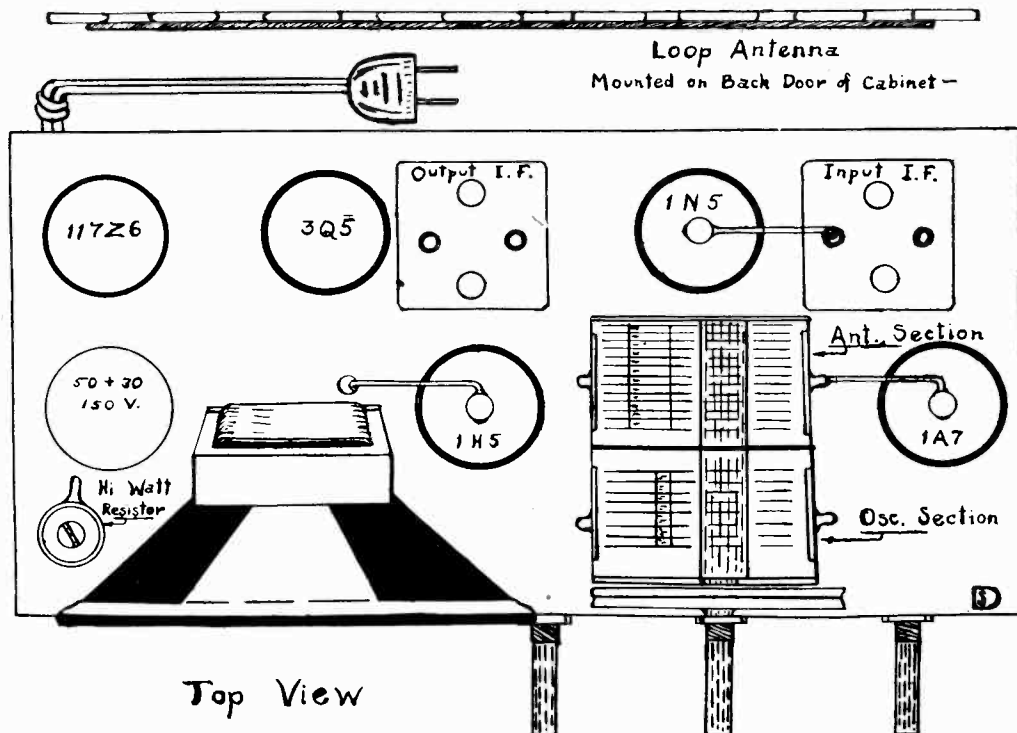
MODEL S5C

MODEL 210



PICTORIAL DIAGRAM OF MODEL S-5C

Model 210



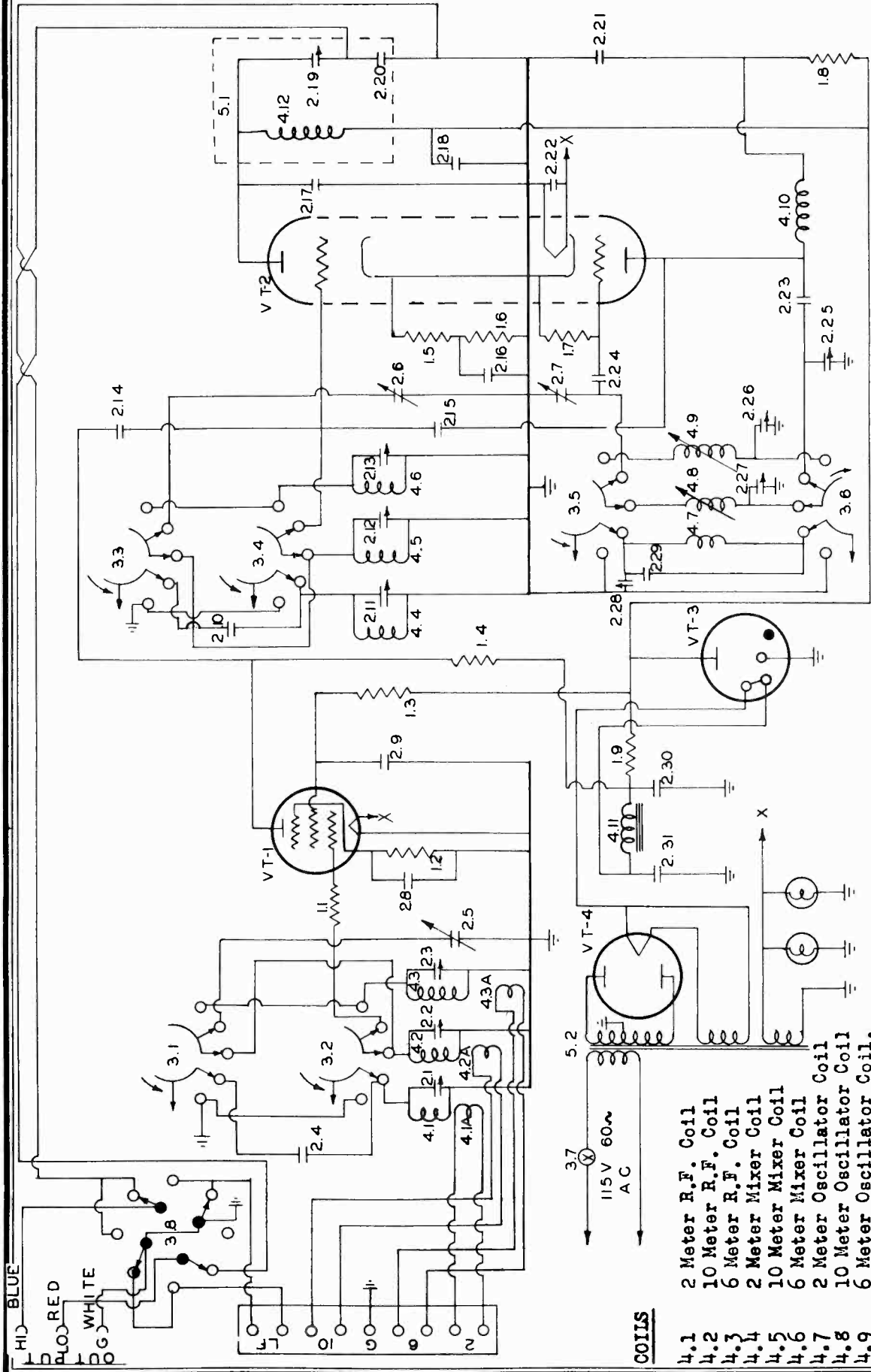
Top View











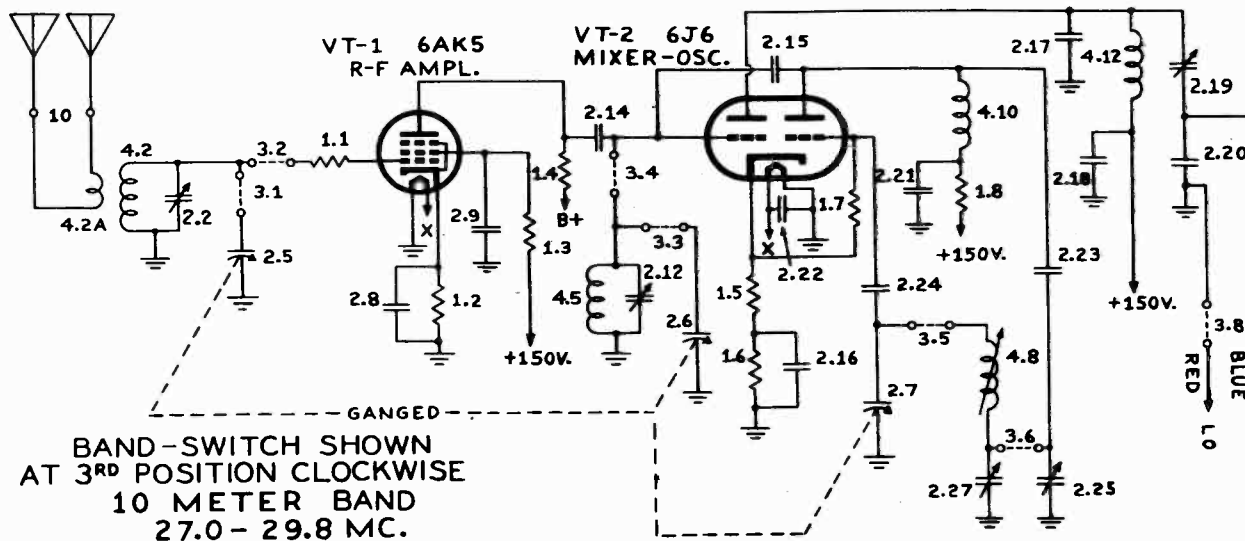
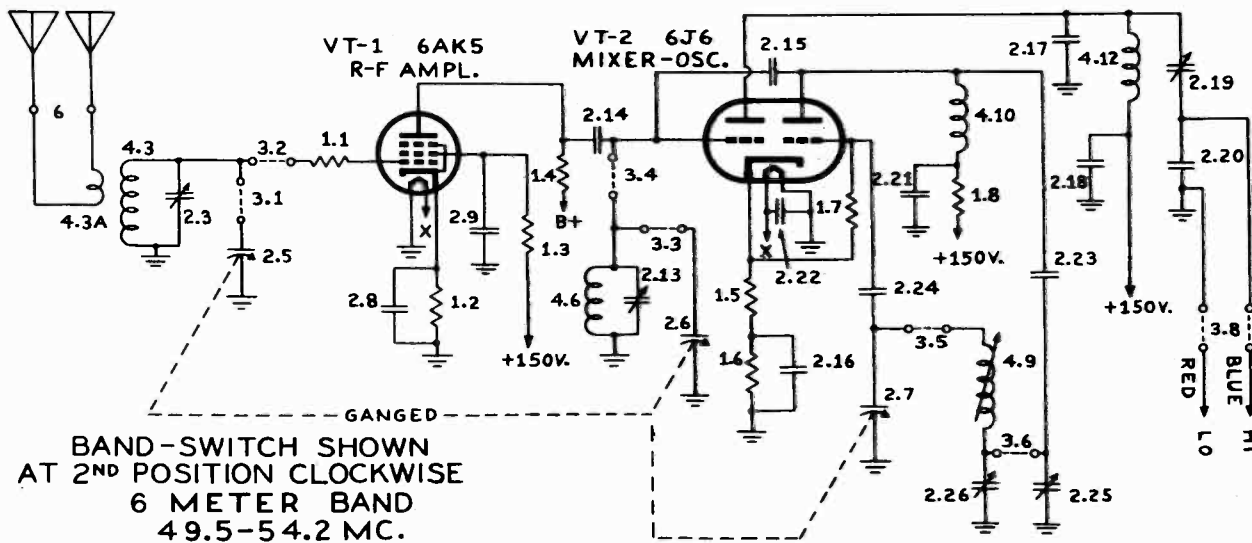
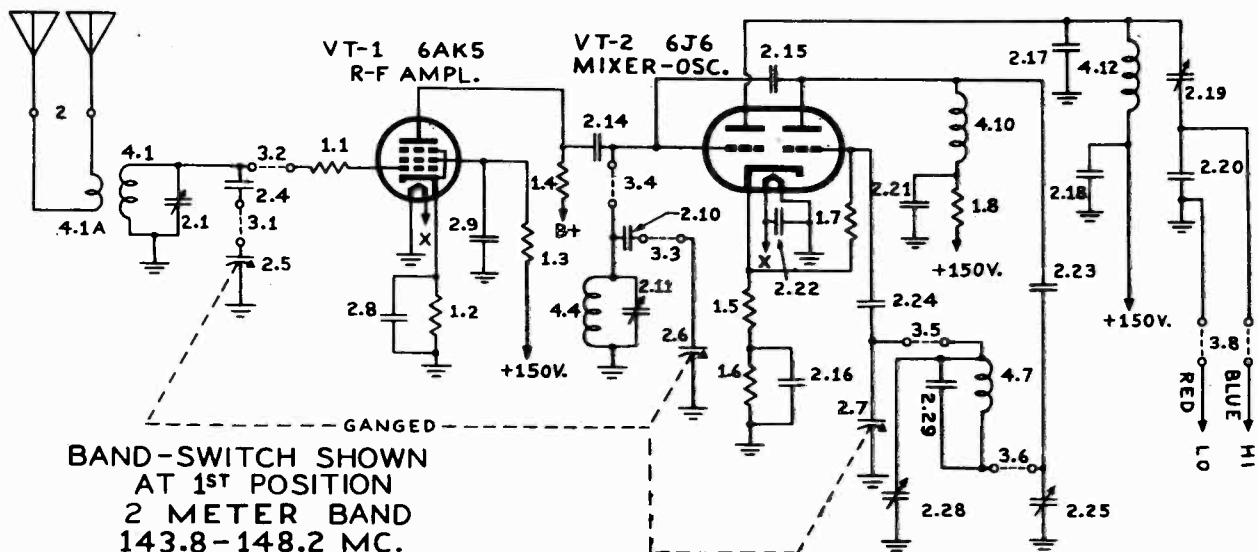
**COILS**

- 4.1 2 Meter R.F. Coil
- 4.2 10 Meter R.F. Coil
- 4.3 6 Meter R.F. Coil
- 4.4 2 Meter Mixer Coil
- 4.5 10 Meter Mixer Coil
- 4.6 6 Meter Mixer Coil
- 4.7 2 Meter Oscillator Coil
- 4.8 10 Meter Oscillator Coil
- 4.9 6 Meter Oscillator Coil
- 4.10 Oscillator Plate Choke
- 4.11 Power Supply Filter Choke
- 4.12 7 mc I.F. Coil

**TRANSFORMERS**

- 5.1 7 mc I.F. Transformer
- 5.2 Power Transformer

# "clarified schematics"



1.1 Introduction

The VHF-152A Frequency Converter has been designed for use with a conventional communication type receiver to extend its range to cover the 11, 10, 6 and 2 meter amateur bands. The unit consists of an RF amplifier, a mixer, and a high frequency oscillator. The function of the unit is to convert the very high frequencies received by it to a new fixed frequency of 7 megacycles which is fed to the receiver and amplified and detected in the normal manner. This system of receiving may be described as a double heterodyne system. Its advantages are: high image rejection, since the image is 14 megacycles from the signal; and high selectivity which is provided by the selective low frequency intermediate frequency amplifier of the receiver. The auxiliary controls on the receiver, such as the beat frequency oscillator, the noise limiter, and RF and audio gain controls, function in the normal manner, as does the signal strength meter if the receiver is equipped with one. The RME-45 and RME-84 Receivers are admirably suited for use with the VHF-152A Converter.

1.2 Specifications

- Power Supply: 115 volts, 50-60 cycles, single phase\*
- Power Consumption: 40 watts at 115 volts
- Output Frequency: 7 mc (7000 kc) (Nominal)
- Overall Cabinet Dimensions: Length 12 inches Width 11 inches Depth 11 inches
- Weight: 19.5 pounds
- Frequency Range: 27.0 - 29.8 mc  
                           49.5 - 54.2 mc  
                           143.8 -148.2 mc

\*NOTE: On special order the VHF-152A may be obtained with a special power transformer suitable for operation on 115-230 volts 25-60 cycles.

1.3 Tube Complement

Type	Use	Schematic Symbol
1. 6AK5	RF Amplifier	VT-1
2. 6J6	Mixer-Oscillator	VT-2
3. 5Y3	Voltage Regulator	VT-3
4. 5Y3G	Rectifier	VT-4

2.1 Inspection

The VHF-152A Converter should be carefully checked on receipt for any mechanical damage that may have resulted in transit. If any such damage is found, a claim should be filed with the carrier. No claim can be filed at the shipping point and Radio Mfg. Engineers, Inc. cannot be responsible for any damage incurred while in the hands of the carrier.

2.2 External Connections

To place the VHF-152A in operation the line cord should be plugged into a suitable power source. The standard model is designed for operation on 110-120 volt 50-60 cycle AC line only. Use of the VHF-152A on any other voltage or frequency may result in damage.

The output cable (Fig. 2) should be connected to the antenna terminal of the receiver. The cable has two shielded leads and a ground lead each ending in a terminal lug. On receivers which have provision for doublet operation, such as the RME-45 and the RME-84, the blue coded lead must be connected to the antenna terminal farthest from the ground terminal. This is the hot side of the converter output. The red lead, or low side, must be connected to the antenna terminal nearest to the ground terminal. The ground braid should be connected to the receiver ground. On receivers not equipped for doublet operation, the blue lead should be connected to the antenna terminal and the red and ground (shield) leads should be connected to the receiver ground. This lead is coded white. Unless the above instructions are followed, the changeover switch (Par. 3.3) will not operate properly.

If an RME-DB-20 Preselector is used ahead of the receiver, the connections will be made as above except that the converter output cable connects in the same manner to the DB-20 antenna terminals instead of to the receiver.

### 2.3 Precautions

**IMPORTANT** - Attempted operation of the VHF-152A on any voltage or frequency other than that for which it is designed will result in damage to the unit. The operator must be sure that the supply is correct before plugging in the converter.

### 2.4 Antennas

On frequencies of 30 megacycles and above, the use of a resonant antenna is mandatory. For this reason the VHF-152A is provided with separate antenna connection for each frequency band. On the terminal strip on the rear apron (Fig. 2) are four sets of two terminals each. These terminals are marked "2" for the 144-148 mc band; "6" for the 50-54 mc band, and "10" for the 27-29.7 mc band. The input impedance for each band has been designed to be 300 ohms so that the owner may make use of the 300 ohm twin lead line now available. The remaining set of two terminals marked "LF" are for connecting the low frequency antenna used with the receiver. This pair of terminals is connected through to the receiver when the antenna changeover switch (Par. 3.3) is turned to "OUT". For information regarding antenna design and dimensions reference should be made to the ARRL Amateur Handbook, available at all Radio Supply Stores.

## SECTION III Operation and Circuit Details

### 3.1 Introduction

The VHF-152A operates in conjunction with a communication type receiver tuned to approximately 7 mc. The accuracy of setting the receiver will effect the accuracy of calibration of the VHF-152A by the same amount. That is to say if the low frequency receiver is off 100 kilocycles, the calibration of the VHF-152A will also be off by 100 kilocycles. It should be noted that the operator is not bound to use the output frequency of exactly 7.0 mc. If interference is encountered he may move the receiver tuning slightly to a clear channel, realizing that the VHF-152A calibration will change by the same amount the low frequency receiver was moved. If it is necessary to move the receiver frequency so far that the calibration is affected, he may recalibrate by following instructions in Section IV. It is not recommended that the output frequency be moved more than 50 kc higher or lower than 7.0 mc because of tracking troubles that may be encountered. In the factory the I.F. is left aligned at 6950 kc.



In double heterodyne receiving systems spurious signals may be received which are harmonics of the receiver local oscillator. On the VHF-152 two such signals may be received. One signal will be heard at 29.8 mc, which is outside the 27-29.7 mc band. Another may be heard at 52.2 mc. If it is found that this spurious signal falls on a real signal which is desired, the spurious signal may be moved by changing the receiver tuning slightly.

### 3.2 Line Switch

The equipment is turned on by means of the line switch on the right hand side of the control panel (Fig. 1).

### 3.3 Changeover Switch

On the left side of the control panel (Fig. 1) is the changeover switch. When this switch is turned to "IN", the output of the VHF-152A is fed to the receiver input terminals. At the same time the low frequency antenna terminals are grounded to prevent 7 mc signals from feeding through the VHF-152A to the receiver. When the changeover switch is turned to "OUT" the output of the VHF-152A is grounded and the low frequency "LF" (Fig. 2) antenna terminals are connected through to the receiver. Thus by turning the changeover switch to "OUT" the receiver functions normally.

### 3.4 Band Switch

In the center of the control panel (Fig. 1) is the band change switch. This switch has three positions marked: 144-148, 50-54, and 27-29.7, and is used to switch the VHF-152A to the desired range.

### 3.5 RF Stage Peaking

When the VHF-152A leaves the factory, the stages are peaked to maximum sensitivity. It may be found that some antennas may reflect a reactance into the RF stage that will detune it slightly. With the antenna for a certain band connected the RF padder for that band may be peaked up by listening to a signal. Figure IV shows the location of the RF padders for each band. To get at the padders it is necessary to remove the bottom cover plate.

### 3.6 IF Stage Peaking

The IF transformer on the VHF-152A (Fig. 3) is peaked at the factory at 6.95 mc. Different receivers connected to the output may change this tuning slightly. The owner should check the peaking of this transformer with the receiver connected. Peaking is accomplished by turning the screw on the top of the can. The screw should be adjusted for maximum gain as indicated by a received signal or maximum background noise if a signal is not available.

## SECTION IV

### Maintenance and Service

#### 4.1 Introduction

No maintenance of importance is required on the VHF-152A. It is suggested that dust that may accumulate in the cabinet be blown out periodically

The owner may, if he has an accurate signal source available, recalibrate his converter as discussed in succeeding paragraphs. It should be born in mind that the calibration of the converter is affected by the setting of the companion receiver (Par. 3.1). Therefore, before attempting to recalibrate the converter, the calibration of the receiver should be checked.

The VHF-152A will drift somewhat during the first three minutes after being turned on and to a much less extent during the next ten or twenty minutes. It is recommended that no attempt be made to recalibrate or align the equipment until it has reached a stable temperature.

All calibrating and alignment should be done with the receiver connected and the changeover switch (Par. 3.3) in the "IN" position.

If the receiver has a carrier level meter such as is on the RME-45, this meter is used as a tuning indicator when peaking the circuits. If the receiver is not equipped with a meter, it will be necessary to connect an audio output meter to the receiver for a tuning indicator. When using an audio output meter, it is necessary to remove the AVC from the receiver.

#### 4.2 IF Coil Alignment

As pointed out in Paragraph 3.1, the VHF-152A is calibrated and aligned for an output frequency of 6.95 mc. The output tuning is controlled by the screw on the top of the aluminum can on the top of the chassis (Fig. 3). The transformer may be peaked with a 6.95 mc signal fed into the mixer grid or with a signal tuned in on the converter. Connection to the mixer grid is most easily made on the stator of the center section of the tuning condenser. In either case, the transformer is adjusted to maximum sensitivity as indicated by the meter on the receiver.

#### 4.3 Calibration

Calibration of the VHF-152A should not be attempted unless it is definitely established that the calibration is off.

Calibration is controlled by the oscillator padders (Fig. 4). These padders are made accessible by removal of the cabinet bottom plate. Beneath this plate is a second aluminum plate in which are padder access holes. All calibrating and aligning should be done with this cover on, the proper padder for each band may be determined by referring to Figure IV.

High beat is used on all bands. That is to say, the oscillator is always 7 mc (approximately) above the received signal. As in the case of all super heterodyne receivers, if sufficient input is used each signal may be received at two points differing by twice the IF frequency. With a signal being received, the padder setting that gives the highest oscillator frequency is the proper setting.

The two low frequency ranges have iron core oscillator coils. The screws for adjusting the inductance of these coils is accessible on the top of the chassis. Unless the screws have been disturbed, adjustment should never be necessary.

#### 4.4 RF Alignment

When the calibration is correct, the RF circuits should be aligned. Figure 4 shows the location of the RF amplifier and mixer grid padders for each band. Each of these padders should be adjusted for maximum sensitivity as indicated by the meter on the receiver.

When using a signal generator in aligning the VHF-152A a 300 ohm resistor should be inserted between the signal generator and the antenna terminals in order that the low impedance of the signal generator will not swamp the RF circuit and cause a misalignment of this circuit. Best results will be obtained when the RF circuit is aligned with the antenna connected. See paragraph 3.5.

#### 4.5 Voltage Charts

As an aid in trouble shooting on the VHF-152A the following chart of voltages at various points in the circuit is tabulated below. Voltage readings should be made with a voltmeter of at least 2000 ohms per volt resistance. Variation of  $\pm 15\%$  may be expected. All voltages are measured from the point indicated to ground unless otherwise indicated.

<u>Circuit</u>	<u>Volts</u>
RF Plate	170
RF Screen	115
RF Cathode	2.0
Mixer Plate	150
Osc. Mixer Cathode	5
Osc. Plate	60 (From cold side of choke)
Osc. Grid*	-3.0 (2 Meters), -4.7 (6 Meters), -5.5 (10 Meters)

\* Note: Measured between Osc. grid and cathode with a 2.5 mh choke in series with voltmeter lead to grid.

#### No. Component

##### RESISTORS

	2.15	1.5 $\mu$ fd. $\pm 25\%$ $\mu$ fd. Ceramic
	2.16	1000 $\mu$ fd. $\pm 20\%$ Mica
1.1	22 ohm 1/2 watt $\pm 20\%$ carbon	2.17 25 $\mu$ fd. $\pm 10\%$ Ceramic
1.2	220 ohm 1/2 watt $\pm 10\%$ carbon	2.18 .01 $\mu$ fd. 600 volt paper
1.3	15K ohm 1/2 watt $\pm 10\%$ carbon	2.19 100 $\mu$ fd. Mica Padder
1.4	18K ohm 2 watt $\pm 10\%$ carbon	2.20 1000 $\mu$ fd. 500 V. Mica
1.5	55 ohm 1/2 watt $\pm 20\%$ carbon	2.21 1000 $\mu$ fd. 20% 500 volt
1.6	1000 ohm 1/2 watt $\pm 10\%$ carbon	2.22 1000 $\mu$ fd. 20%
1.7	4.7K ohm 1/2 watt $\pm 10\%$ carbon	2.23 25 $\mu$ fd. 10% Ceramic Neg. Temp. Coeff.
1.8	18 K ohm 2 watt $\pm 10\%$ carbon	2.24 25 $\mu$ fd. 10% Ceramic Neg. Temp. Coeff.
1.9	3.5K ohm 10 watt-wire wound	2.25 3-13 $\mu$ fd. Ceramic Padder Neg. Temp. Coeff.

##### CAPACITORS

	2.26	4-25 $\mu$ fd. Ceramic Padder Neg. Temp. Coeff.
	2.27	4-25 $\mu$ fd. Ceramic Padder Neg. Temp. Coeff.
	2.28	3-13 $\mu$ fd. Ceramic Padder Neg. Temp. Coeff.
2.1	30 $\mu$ fd. Mica Padder	2.29 25 $\mu$ fd. Ceramic Padder Neg. Temp. Coeff.
2.2	10 $\mu$ fd. Mica Padder	2.30 10 $\mu$ fd. Electrolytic 450 volt
2.3	10 $\mu$ fd. Mica Padder	2.31 10 $\mu$ fd. Electrolytic 450 volt
2.4	15 $\mu$ fd. Ceramic $\pm 5\%$	

##### SWITCHES

2.5	Tuning Condenser R.F. Section	3.1	R.F. Switch Section, Ceramic
2.6	Tuning Condenser Mixer Section	3.2	R.F. Switch Section, Ceramic
2.7	Tuning Condenser Oscillator	3.3	Mixer Switch Section, Ceramic
2.8	2000 $\mu$ fd. 20% Mica	3.4	Mixer Switch Section, Ceramic
2.9	1000 $\mu$ fd. 20% 500 volt	3.5	Oscillator Switch Section, Ceramic
2.10	15 $\mu$ fd. 5% Ceramic	3.6	Oscillator Switch Section, Ceramic
2.11	30 $\mu$ fd. Mica Padder	3.7	AC Line Switch SPST
2.12	10 $\mu$ fd. Mica Padder	3.8	Changeover Switch 4PDT
2.13	10 $\mu$ fd. Mica Padder		
2.14	100 $\mu$ fd. $\pm 10\%$ Ceramic		

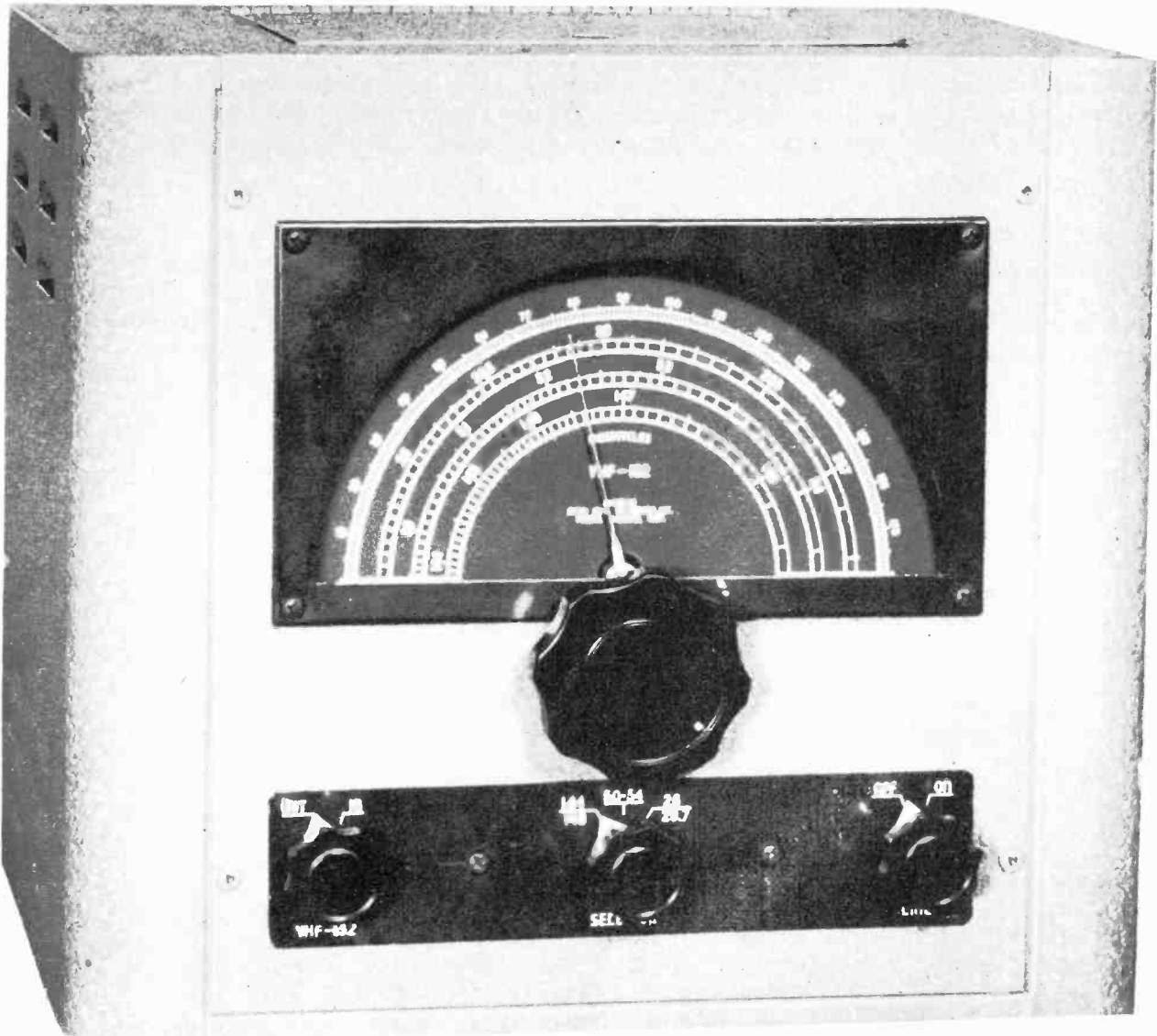


FIG.1

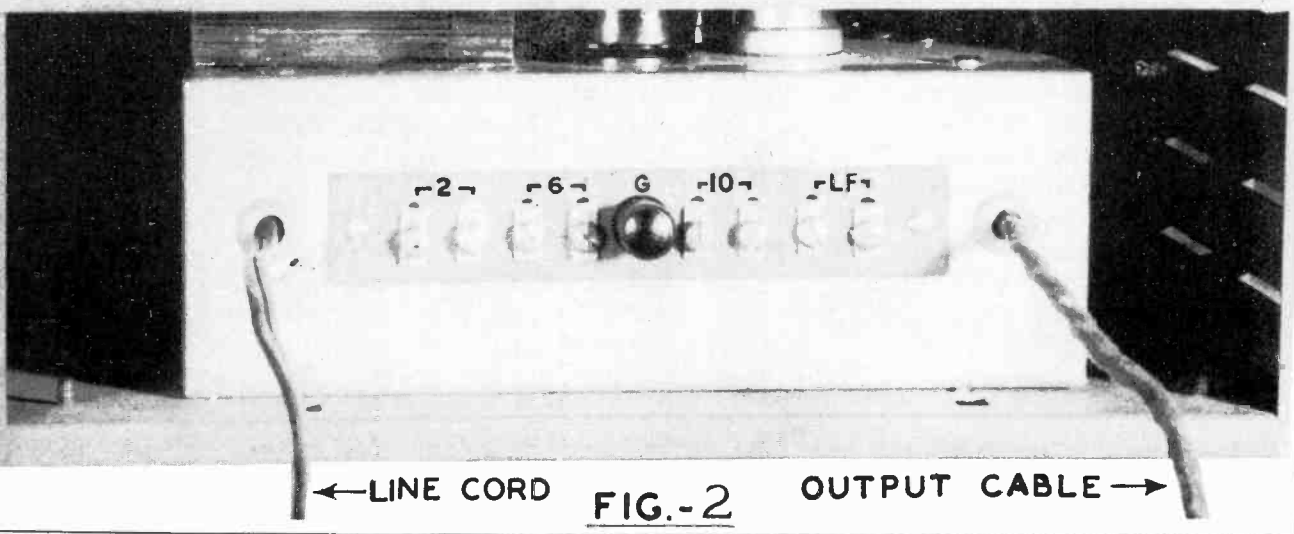


FIG.-2

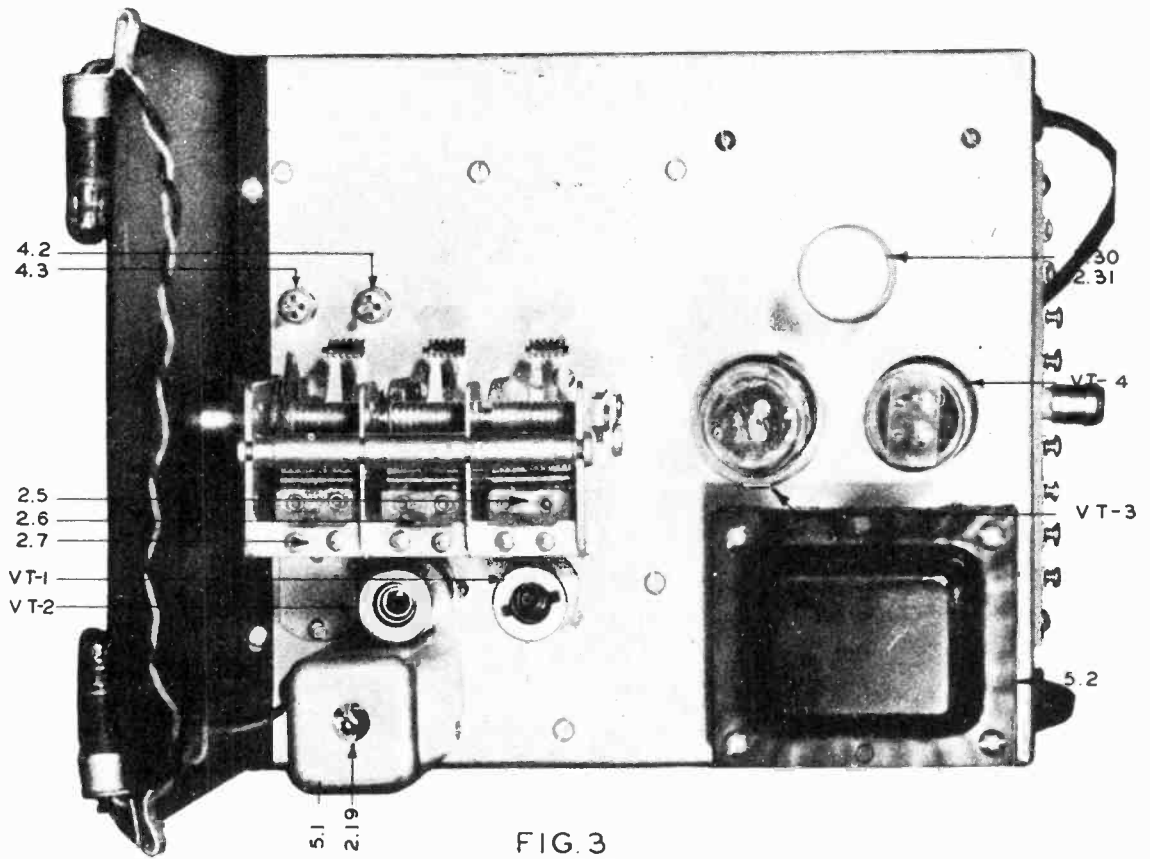


FIG. 3

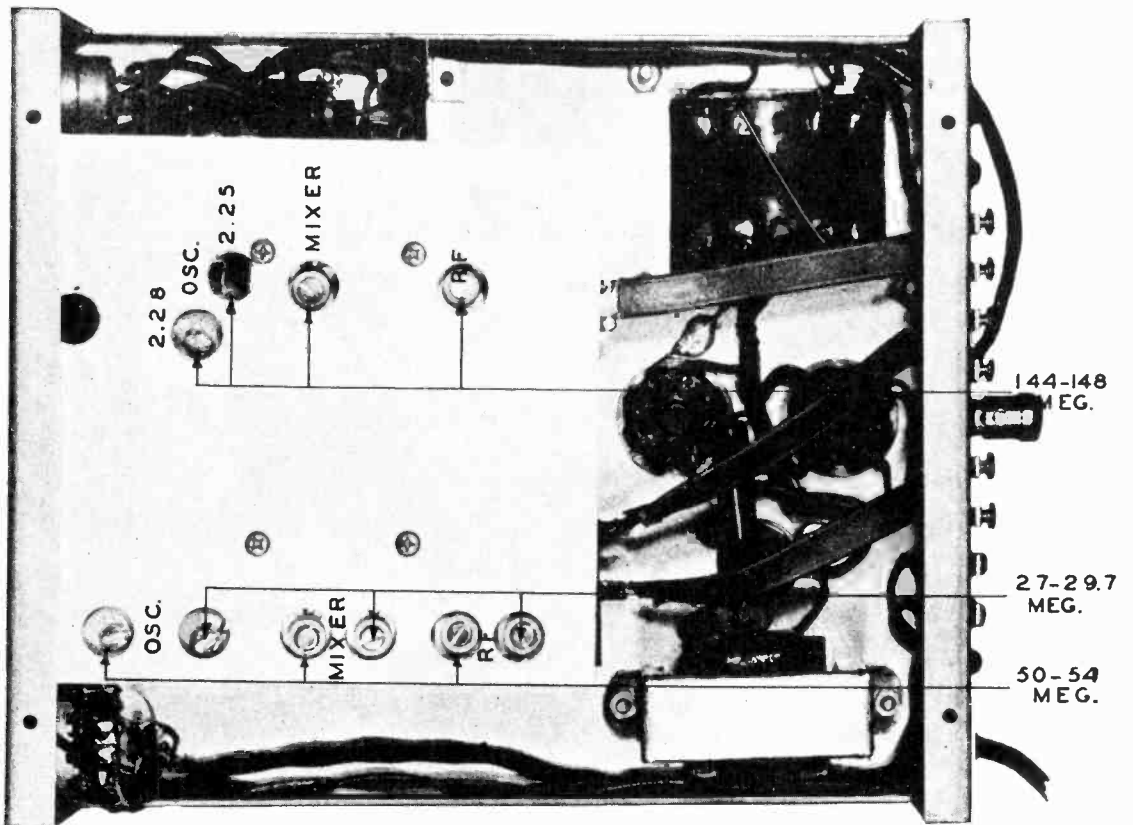


FIG. 4

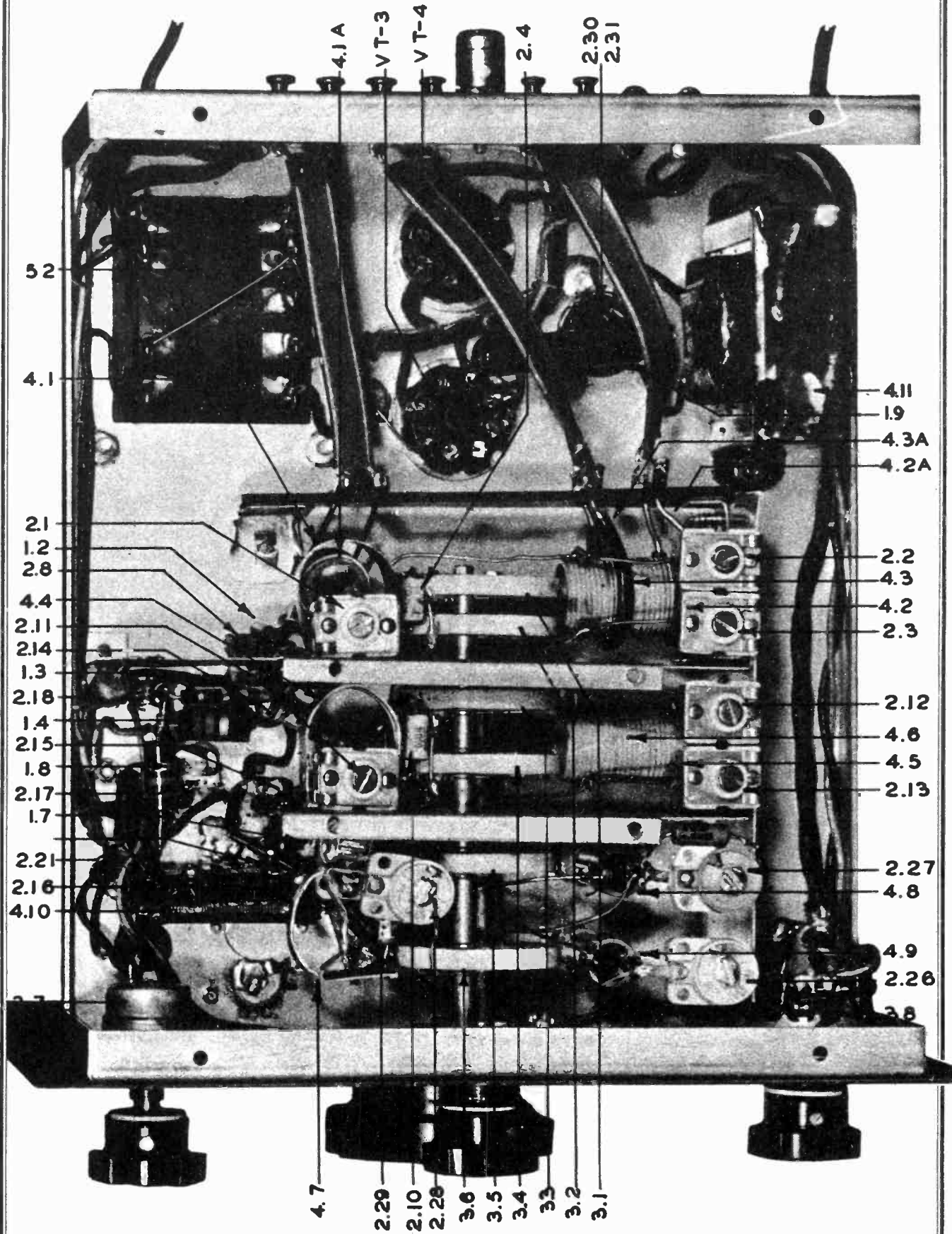


FIG. 5



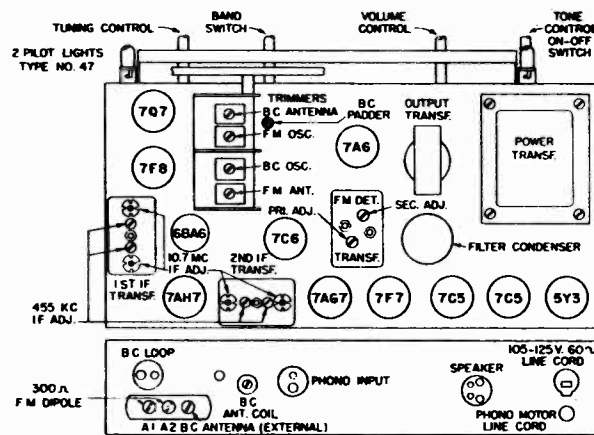






## RADIO WIRE TELEVISION

MODELS M70, M71



Tube and Trimmer Locations.

**ALIGNMENT PROCEDURE FOR A.M.:**

Set band switch to AM. Connect output meter across voice coil. Turn Volume Control on full volume.

1. Connect generator to tuning condenser stator (BC Antenna) in series with .01 mfd.; tune generator to 455 Kc.; tune radio to quiet point on high frequency end of dial, and adjust 1st and 2nd IF transformers (455 Kc.) for maximum peak output.

2. Connect generator to antenna terminal in series with 200 mmf. Turn tuning control to extreme full mesh position of tuning condenser. Set pointer to line located just below 55 calibration on Bcst. Band. Tune receiver to 60 on dial; tune generator to 600 Kc. Adjust BC padder, BC Ant. Coil Inductance ( $\frac{1}{2}$  screw on rear of chassis) for maximum output.

3. Tune receiver to 160 on dial; tune generator to 1600 Kc. Adjust BC. Osc. and BC. Ant. trimmers for maximum output. Repeat 2 and 3 for best alignment.

**ALIGNMENT PROCEDURE FOR F.M.:**

*Note: Points A, B, C, D, E, and F, are noted on circuit diagram.*

Only a highly skilled technician with the correct equipment can properly align this receiver.

1. Set Band Switch to FM.
2. Connect vacuum tube voltmeter (VTVM) across points B and C.
3. Connect 10.7 Mc. signal generator through .01 mfd. condenser to point A and ground.
4. Adjust primary of FM Detector Transformer for maximum VTVM reading.
5. Connect VTVM across points B and D
6. Adjust secondary of FM Detector Transformer for zero VTVM reading.

7. Connect 10.7 Mc. Signal Generator to point F and ground.

8. Connect VTVM across points B and C.

9. Rotate 10.7 Mc. adjustment screw of 2nd IF Transformer Secondary maximum number of turns counterclockwise.

10. Adjust primary of 2nd IF Transformer for maximum VTVM reading. Decrease signal generator output as IF transformers are adjusted to keep VTVM reading between 2 and 3 volts.

11. Adjust secondary of 2nd IF transformer, keeping reading between 2 and 3 volts.

12. Connect 10.7 Mc generator to point E and ground. Rotate 10.7 Mc adjustment screw of 1st IF Transformer Secondary maximum number of turns counter clockwise. Adjust primary of 1st IF Transformer for maximum VTVM reading, decreasing signal generator output to keep VTVM reading between 2 and 3 volts.

13. Adjust secondary of 1st IF Transformer for maximum VTVM reading, keeping the voltage between 2 and 3.

**DO NOT READJUST IF TRANSFORMERS AGAIN.**

14. Connect 106 Mc. Signal Generator to FM antenna terminals. If generator impedance is low, put one 150-ohm carbon resistor in series with each of the generator leads. Tune receiver dial to 106 Mc.

15. Adjust FM Oscillator Trimmer for maximum VTVM reading.

16. Adjust FM Antenna Trimmer for maximum VTVM reading.

## RADIO WIRE TELEVISION

## MODELS M70, M71

## MODEL M70A

## MODELS M70, M71 PARTS LIST:

- C 1—1500 mmf.,  $\pm 300$  mmf.  
 C 2—2 mmf., 20%  
 C 3—25 mmf., 10%  
 C 4—1500 mmf.,  $\pm 300$  mmf.  
 C 5—1500 mmf.,  $\pm 300$  mmf.  
 C 6—500 mmf., 20%  
 C 7—.02 mfd., 400V.  
 C 8—1500 mmf.,  $\pm 300$  mmf.  
 C 9—1500 mmf.,  $\pm 300$  mmf.  
 C10—100 mmf., 20%  
 C11—.1 mfd., 200V.  
 C12—1500 mmf.,  $\pm 300$  mmf.  
 C13—.01 mfd., 400V.  
 C14—100 mmf., 20%  
 C15—1500 mmf.,  $\pm 300$  mmf.  
 C16—1500 mmf.,  $\pm 300$  mmf.  
 C17—.05 mfd., 200V.  
 C18—.05 mfd., 200V.  
 C19—.02 mfd., 200V.  
 C20—.005 mfd., 600V.  
 C21—250 mmf., 20%  
 C22—.01 mfd., 400V.  
 C23—250 mmf., 20%  
 C24—12 mfd., 350V.  
 C25—.01 mfd., 200V.  
 C26—.01 mfd., 400V.  
 C27—.02 mfd., 400V.  
 C28—.003 mfd., 20%  
 C29—.05 mfd., 400V.  
 C30—.05 mfd., 400V.  
 C31—250 mmf., 20%  
 G32—4 mfd., 250V.  
 C33—.5 mfd., 200V.  
 C34—.002 mfd., 600V.  
 C35—.002 mfd., 600V.
- C36—40 mfd., 400V.  
 C37—40 mfd., 400V.  
 C38—.05 mfd., 400V.  
 C39—500 mfd.,  $\pm 100$  mfd.  
 C40—1500 mmf.,  $\pm 300$  mmf.  
 C41—1500 mmf.,  $\pm 300$  mmf.  
 C42—1500 mmf.  $\pm 300$  mmf.  
 C43—1500 mmf.  $\pm 300$  mmf.  
 C44—47 mmf., 10%  
 C45—1500 mfd.  $\pm 300$  mmf.  
 C46—100 mmf. 20%  
 C47—.02 mfd., 400V.  
 R 1—470K,  $\frac{1}{4}$ W., 20%  
 R 2—22K,  $\frac{1}{4}$ W., 20%  
 R 3—47 ohm,  $\frac{1}{4}$ W., 20%  
 R 4—470 ohm,  $\frac{1}{4}$ W., 20%  
 R 5—1K,  $\frac{1}{4}$ W., 20%  
 R 6—470K,  $\frac{1}{4}$ W., 20%  
 R 7—15K, 1W., 20%  
 R 8—22K,  $\frac{1}{4}$ W., 20%  
 R 9—2200 ohm,  $\frac{1}{4}$ W., 20%  
 R10—2.2 meg.,  $\frac{1}{4}$ W., 20%  
 R11—100 ohm,  $\frac{1}{4}$ W., 20%  
 R12—500K, Variable Volume Control,  
 tapped at 50K.  
 R13—10K,  $\frac{1}{4}$ W., 20%  
 R14—1 meg. variable tone control  
 w/s PST.  
 R15—10 meg.,  $\frac{1}{4}$ W., 20%  
 R16—220K,  $\frac{1}{4}$ W., 20%  
 R17—470K,  $\frac{1}{4}$ W., 20%  
 R18—100 ohm,  $\frac{1}{4}$ W., 20%  
 R19—220K,  $\frac{1}{4}$ W., 20%  
 R20—470K,  $\frac{1}{4}$ W., 20%  
 R21—220K,  $\frac{1}{4}$ W., 20%  
 R22—100K,  $\frac{1}{4}$ W., 20%

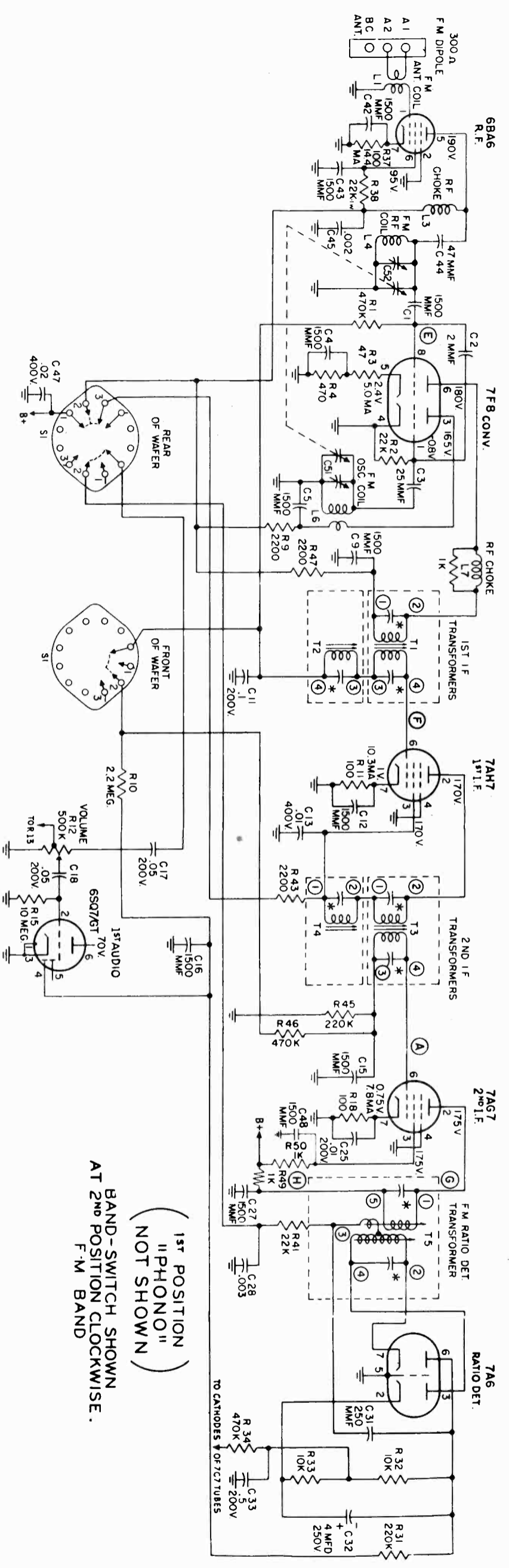
- R23—470K,  $\frac{1}{4}$ W., 20%  
 R24—100K,  $\frac{1}{4}$ W., 20%  
 R25—2200 ohm,  $\frac{1}{4}$ W., 20%  
 R26—10 ohm,  $\frac{1}{4}$ W., 20%  
 R27—2200 ohm,  $\frac{1}{4}$ W., 20%  
 R28—220K,  $\frac{1}{4}$ W., 20%  
 R29—220K,  $\frac{1}{4}$ W., 20%  
 R30—100 ohm,  $\frac{1}{4}$ W., 20%  
 R31—220K,  $\frac{1}{4}$ W., 20%  
 R32—10K,  $\frac{1}{4}$ W., 20%  
 R33—10K,  $\frac{1}{4}$ W., 20%  
 R34—470K.  
 R35—2200 $\Omega$  wirewound 10W 10%  
 R36—220 $\Omega$  2W 20%  
 R37—100 $\Omega$   $\frac{1}{4}$ W 20%  
 R38—22K 1W 20%  
 R39—2.2 meg.  $\frac{1}{4}$ W 20%  
 R40—47K  $\frac{1}{4}$ W 20%  
 AM-FM I.F. Input Transformer  
 (\*ZC2.208)  
 AM-FM I.F. Output Transformer  
 (\*ZC2.214)  
 FM Ratio Det. Transformer  
 (\*ZC2.209)  
 RF Choke (\*LA2.210).  
 FM Antenna Coil—\*LA-2.241.  
 RF Plate choke—\*LA-2.242.  
 FM-RF Coil—\*LA-2.243.  
 FM osc. coil—\*LA-2.222.  
 Bst. Loop.  
 Bst. Antenna coil—\*LA-13.997.  
 Bst. Osc. coil—\*LA-2.221.  
 FM Dipole.  
 Power transformer—\*TA-18.043.  
 Audio output transformer—\*ZA-15.019.

## MODEL M70A PARTS LIST:

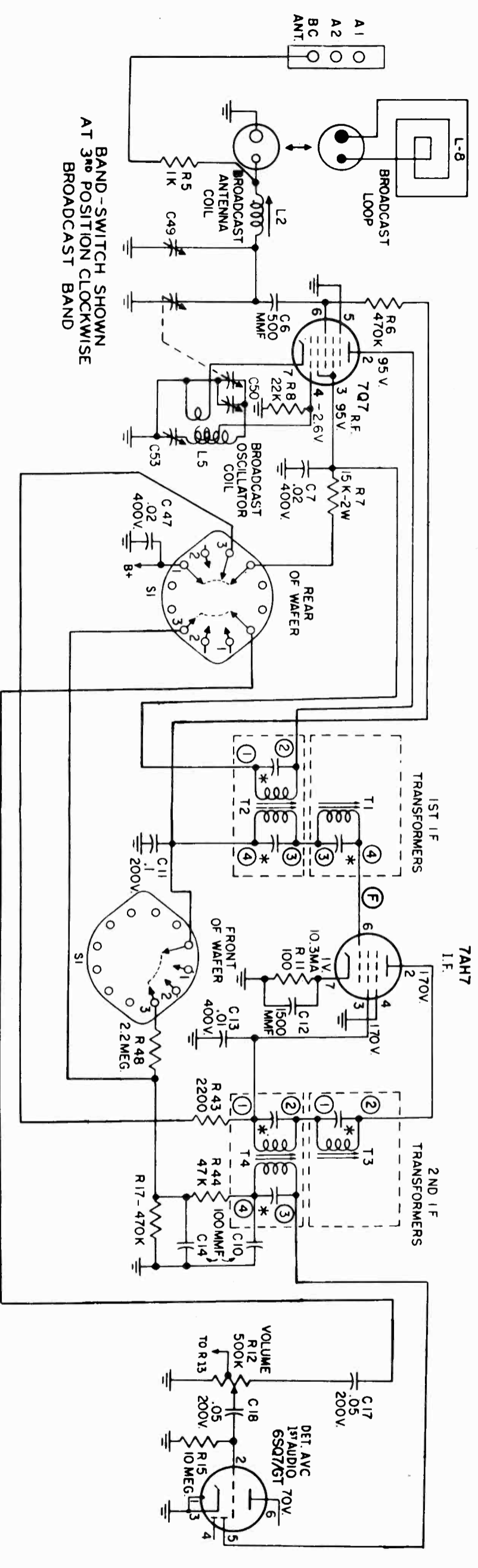
- C 1—1,500 mmfd.,  $\pm 300$  mmfd.  
 C 2—2 mmfd., 20%  
 C 3—25 mmfd., 10%  
 C 4—1,500 mmfd.,  $\pm 300$  mmfd.  
 C 5—1,500 mmfd.,  $\pm 300$  mmfd.  
 C 6—500 mmfd., 20%  
 C 7—.02 mfd., 400 V.  
 C 8—.05 mfd., 400 V.  
 C 9—1,500 mmfd.,  $\pm 300$  mmfd.  
 C10—100 mmfd., 20%  
 C11—.1 mfd., 200 V.  
 C12—1,500 mmfd.,  $\pm 300$  mmfd.  
 C13—.01 mfd., 400 V.  
 C14—100 mmfd., 20%  
 C15—1,500 mmfd.,  $\pm 300$  mmfd.  
 C16—1,500 mmfd.,  $\pm 300$  mmfd.  
 C17—.05 mfd., 200 V.  
 C18—.05 mfd., 200 V.  
 C19—.02 mfd., 200 V.  
 C20—.005 mfd., 600 V.  
 C21—250 mmfd., 20%  
 C22—.01 mfd., 400 V.  
 C23—250 mmfd., 20%  
 C24—12 mfd., 350 V.  
 C25—.01 mfd., 200 V.  
 C26—Var. cond. (AM-FM) \*C-6.012  
 C27—1,500 mmfd.,  $\pm 300$  mmfd.  
 C28—.003 mfd., 20%  
 C29—.05 mfd., 400 V.  
 C30—.05 mfd., 400 V.  
 C31—250 mmfd., 20%  
 C32—4 mfd., 250 V.  
 C33—.5 mfd., 200 V.  
 C34—.002 mfd., 600 V.  
 C35—.002 mfd., 600 V.  
 C36 & C37—40 mfd. x 40 mfd.,  
 electrolytic, 400 V.  
 C38—.05 mfd., 400 V.  
 C39—1,500 mmfd.,  $\pm 300$  mmfd.  
 C40—1,500 mmfd.,  $\pm 300$  mmfd.  
 C41—1,500 mmfd.,  $\pm 300$  mmfd.  
 C42—1,500 mmfd.,  $\pm 300$  mmfd.  
 C43—1,500 mmfd.,  $\pm 300$  mmfd.
- C44—47 mmfd., 10%  
 C45—.002 mfd., 400 V.  
 C46—100 mmfd., 20%  
 C47—.02 mfd., 400 V.  
 C48—1,500 mmfd.,  $\pm 300$  mmfd.  
 C49—Trimmer, compression,  
 3-35 mmfd.  
 C50—Trimmer, compression,  
 3-35 mmfd.  
 C51—Trimmer, ceramic, 1.5-7 mmfd.  
 C52—Trimmer, compression,  
 1.6-18 mmfd.  
 C53—Padder condenser,  
 275-1,000 mmfd.  
 R 1—470K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R 2—22K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R 3—47 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R 4—470 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R 5—1K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R 6—470K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R 7—15K $\Omega$ , 2W., 20%  
 R 8—22K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R 9—2,200 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R10—2.2 Meg $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R11—100 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R12—5 Meg $\Omega$  Volume Control  
 (Audio Taper) tapped at  
 50K $\Omega$  \*RA-9.069  
 R13—10K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R14—1 Meg $\Omega$  Tone Control, with  
 power switch \*RA-9.070  
 R15—10 Meg $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R16—220K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R17—470K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R18—100 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R19—220K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R20—470K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R21—220K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R22—100K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R23—470K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R24—100K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R25—2,200 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R26—10 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R27—2,200 $\Omega$ ,  $\frac{1}{4}$ W., 20%
- R28—220K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R29—220K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R30—100 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R31—220K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R32—10K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R33—10K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R34—470K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R35—2,200 $\Omega$ , 10W., wirewound, 10%  
 R36—220 $\Omega$ , 2W., 20%  
 R37—100 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R38—22K $\Omega$ , 1W., 20%  
 R39—2.2 Meg $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R40—47K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R41—22K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R42—100K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R43—2,200 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R44—47K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R45—220K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R46—470K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R47—2,200 $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R48—2.2 Meg $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R49—1K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 R50—1K $\Omega$ ,  $\frac{1}{4}$ W., 20%  
 T 1—FM I.F. Trans., 10.7 Mc. \*ZB-2.276  
 T 2—AM I.F. Trans., 455 Kc. \*ZB-2.275  
 T 3—FM I.F. Trans., 10.7 Mc. \*ZB-2.276  
 T 4—AM I.F. Trans., 455 Kc. \*ZB-2.275  
 T 5—FM Ratio Detector Trans-  
 former, 10.7 Mc. \*ZC-2.278  
 T 6—Output Trans. \*ZB-15.019  
 T 7—Power Trans. \*TA-18.053  
 S 1—Band Switch \*SA-12.060  
 L 1—FM Antenna Coil \*LA-2.241  
 L 2—Antenna Coil, Broadcast \*LA-2.273  
 L 3—R.F. Plate Choke \*LA-2.279  
 L 4—R.F. Coil, FM \*LA-2.243  
 L 5—Oscillator Coil, Broadcast \*LA-2.221  
 L 6—Oscillator Coil, FM \*LA-2.222  
 L 7—R.F. Choke, Conv. Plate \*LA-2.242  
 L 8—Loop, Broadcast \*LC-5.018  
 Antenna, FM, Folded Dipole  
 (300 $\Omega$ ) \*LA-5.010  
 Pilot Lamp, No. 47, 6-8 V.



"Clarified Schematics"  
RADIO WIRE TELEVISION



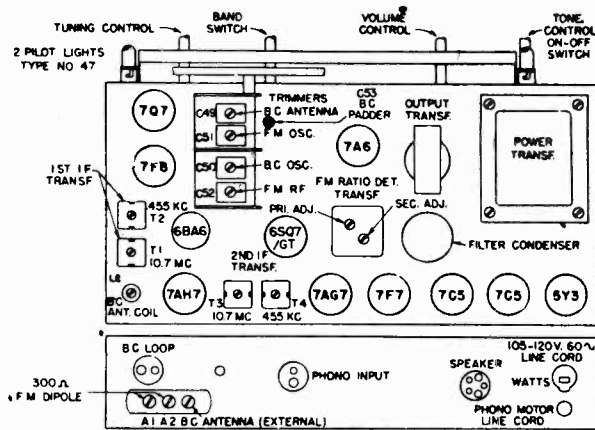
(1st POSITION "PHONO" NOT SHOWN)  
BAND-SWITCH SHOWN AT 2nd POSITION CLOCKWISE.  
F.M. BAND





## RADIO WIRE TELEVISION

MODEL M70A



Tube and Trimmer Locations.

## ALIGNMENT PROCEDURE FOR A.M.:

Equipment Required:

- a) Broadcast Band Signal Generator.
- b) Output Meter.

1. Set band switch to AM. Advance volume control to full volume setting.
2. Connect output meter across voice coil.
3. Connect the Signal Generator across the broadcast band antenna section of the variable condenser. The "high" side of the Generator should connect to the stator section and the "ground" side to the frame or chassis. Adjust the Signal Generator to 455 kc and with the receiver switched on, adjust the first and second I.F. transformers for peak output as shown on the output meter. The signal injected into the receiver should be as small in magnitude as possible, consistent with a useful deflection on the output meter.
4. Connect the "high" side of the Generator to the antenna terminal with a 200 mmf condenser inserted in series. Connect the "ground" side of the Generator to the chassis. Tune receiver to 60 on the dial, adjust Signal Generator to 600 kc. Adjust the BC padder and the BC antenna coil for maximum deflection on the output meter. Use a weak signal.
5. Tune receiver to 160 on the dial. Adjust Signal Generator to 1600 kc. Adjust BC oscillator and BC antenna trimmers for maximum output.
6. Repeat operations 4 and 5.

## ALIGNMENT PROCEDURE FOR F.M.:

Note: Points A, B, C, D, E, F, G, and H are noted on circuit diagram.

Points B, C, and D have been brought out to the unused contacts of the speaker socket at the rear of the chassis.

Equipment Required:

- a) High frequency Signal Generator with 88-108 Mc tuning range.
- b) Signal Generator capable of delivering .1 V at 10.7 mc.
- c) Audio output meter.
- d) D.C. vacuum tube voltmeter with zero center scale.

## a. Ratio Detector Alignment:

1. Connect V.T.V.M. across points "B" and "C" (A.V.C. Voltage).
2. Feed 10.7 mc unmodulated R.F. signal into 7AG7 grid (point A) through .01  $\mu$ fd. condenser. This signal should be .1 volt.
3. Adjust primary of Ratio Detector (T-5) for maximum voltage indication on V.T.V.M.
4. Connect zero centered V.T.V.M. across points "B" and "D".
5. Adjust secondary of Ratio Detector (T-5) for zero indication.
6. Tune 10.7 mc Signal Generator higher in frequency (about 200 kc) until maximum voltage reading is obtained on V.T.V.M.; note this voltage, then tune signal generator lower in frequency until maximum voltage of the opposite polarity is obtained. Note this voltage, then if necessary re-adjust primary of the Det. (T-5) until the detector voltages are about equal on either the high or low side of 10.7 mc.

## b. 10.7 I.F. Alignment:

1. Shunt a 1,000-ohm carbon resistor across the primary of the detector (T-5) (Points G and H).
2. Connect output meter across speaker voice coil.
3. Volume and tone controls at maximum clockwise position.
4. Connect 10.7 mc (modulated 30% signal generator through .01  $\mu$ fd. condenser across point "F" and ground.
5. Adjust secondary, then primary of (T-3) for maximum audio output. (Reduce input signal to maintain output at .5-watt level.)
6. Connect 10.7 mc 30% modulated signal generator across point "E" and ground.
7. Adjust secondary, then primary of (T-1) for maximum audio output. (Reduce input signal to maintain output at .5-watt level.)
8. Remove 1000-ohm shunting resistor from across primary of (T-5).

## c. Oscillator and R.F. Alignment:

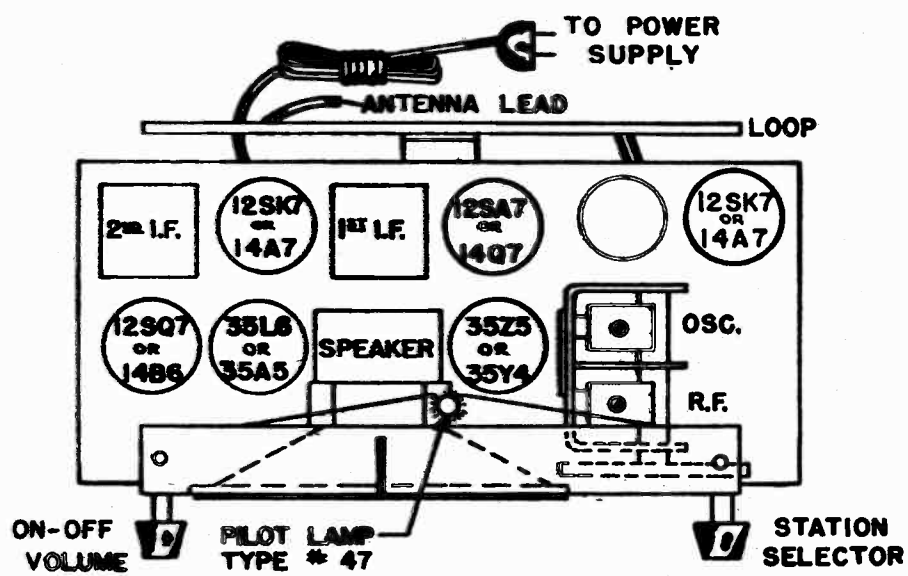
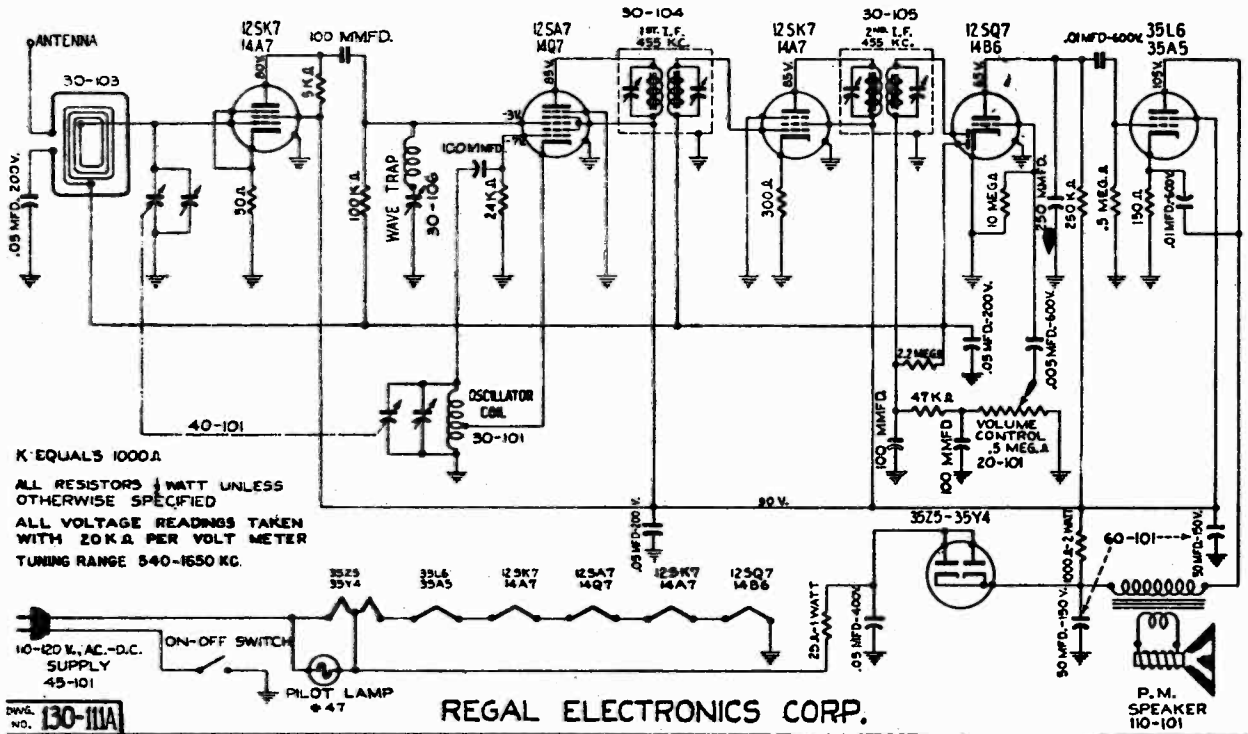
1. Connect V.T.V.M. across "B" and "C" (A.V.C. voltage).
2. Connect 108 mc signal generator to FM antenna terminals. If generator impedance is low, put one .150-ohm carbon resistor in series with each of the generator leads. Tune receiver dial to 108 mc.
3. Adjust FM oscillator trimmer (C-51) for maximum V.T.V.M. reading.
4. Adjust FM R.F. trimmer (C-52) for maximum V.T.V.M. reading. During alignment reduce input signal to maintain A.V.C. voltage at 2 V.
5. Repeat steps 3 and 4.
6. Feed a 90 mc signal into antenna terminals (as in C-2), tune receiver dial to signal.
7. Adjust spacing of FM R.F. coil (L-4) for maximum V.T.V.M. reading at 90 mc. During alignment reduce input signal to maintain A.V.C. voltage at 2 V.
8. Repeat steps 2 and 4 if necessary.

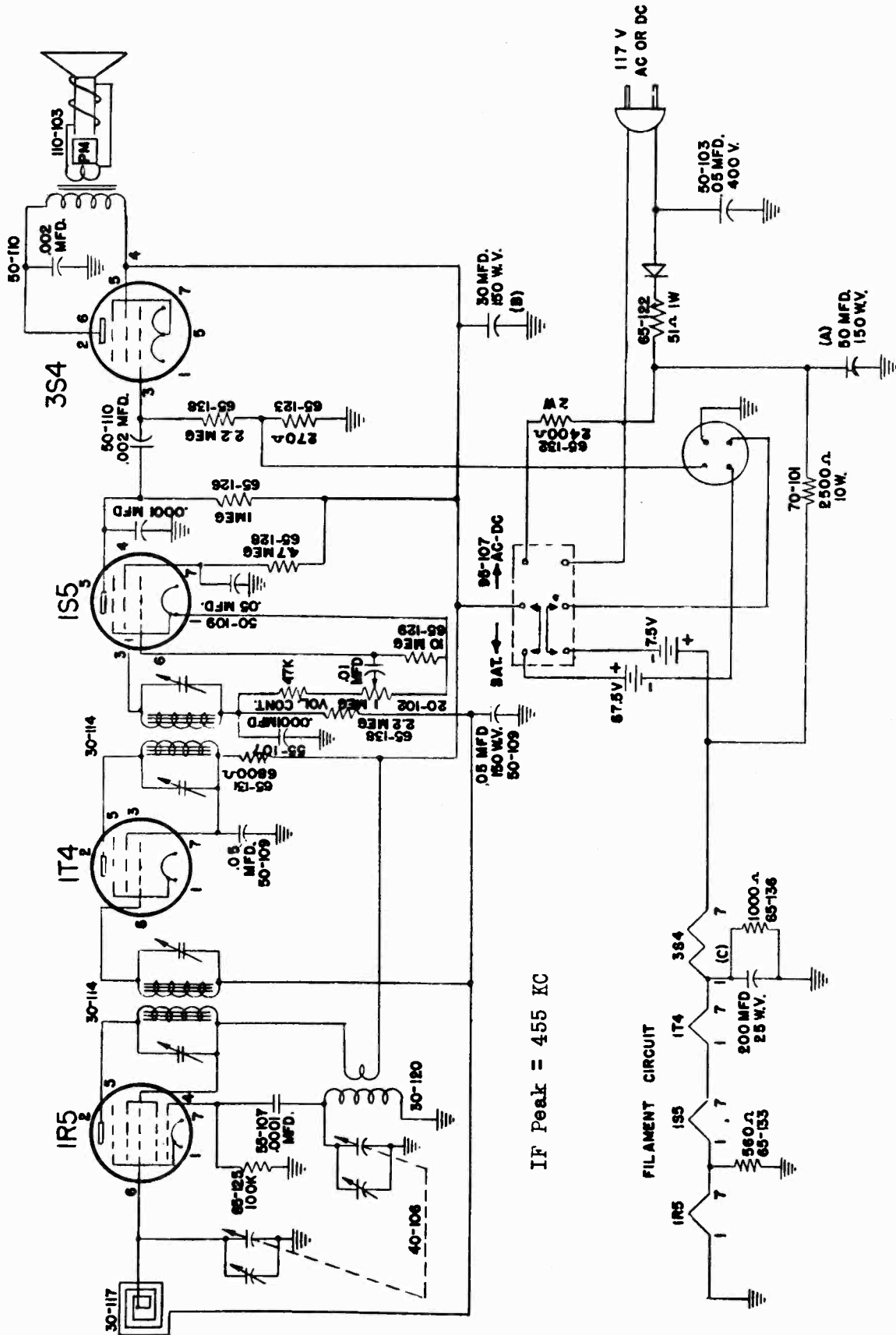


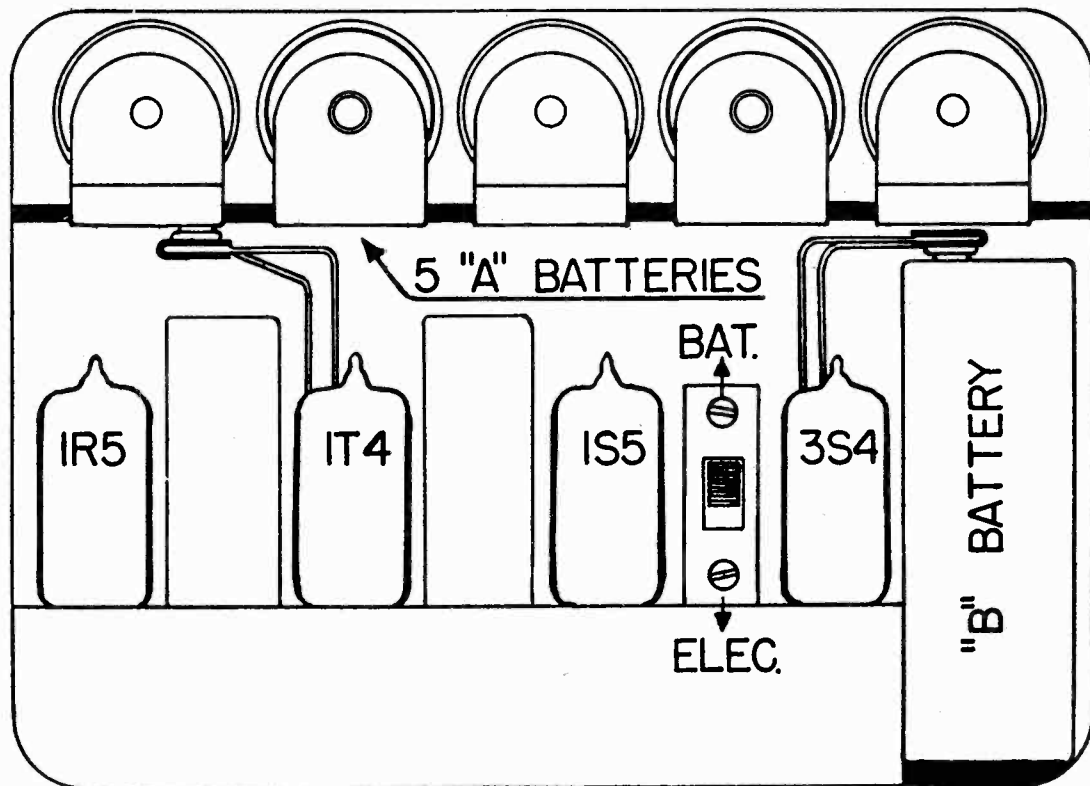


REGAL ELECTRONICS CORP.

MODEL 700







### REMOVAL OF SET

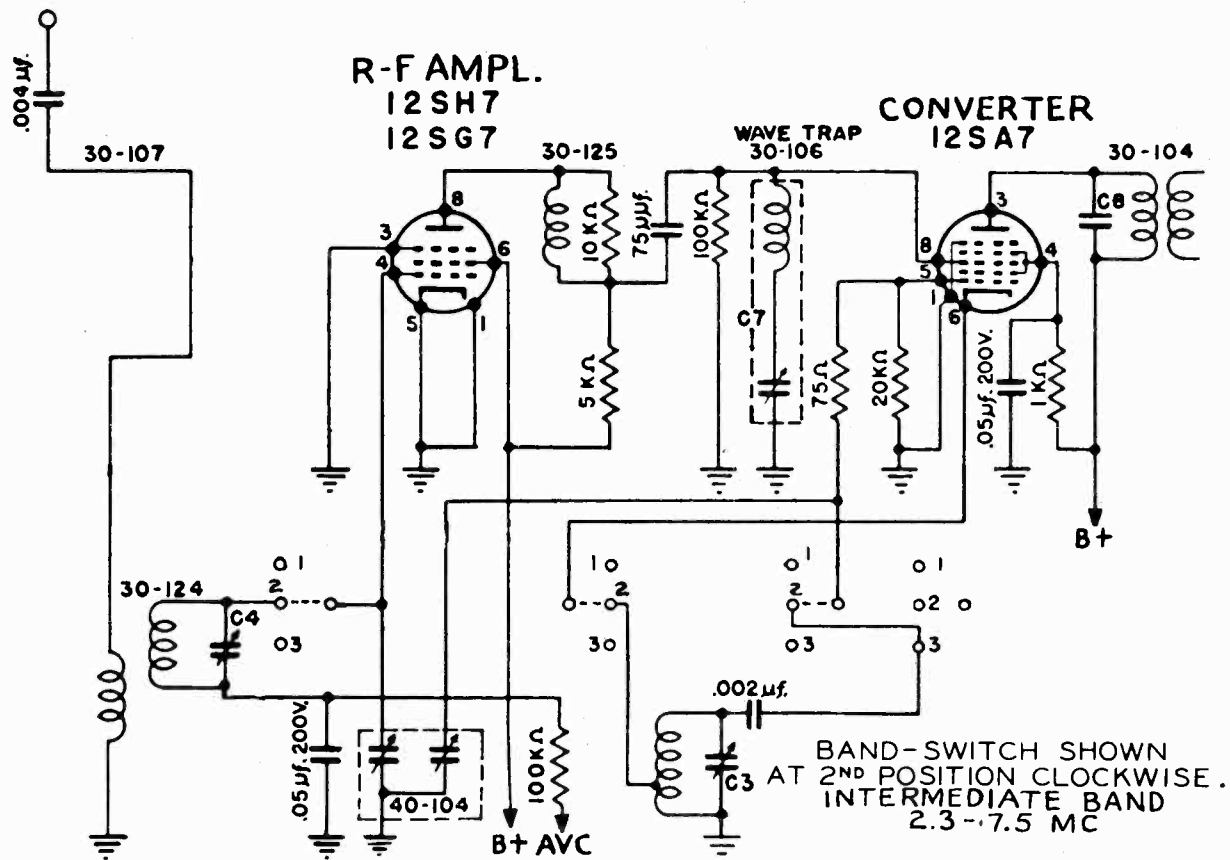
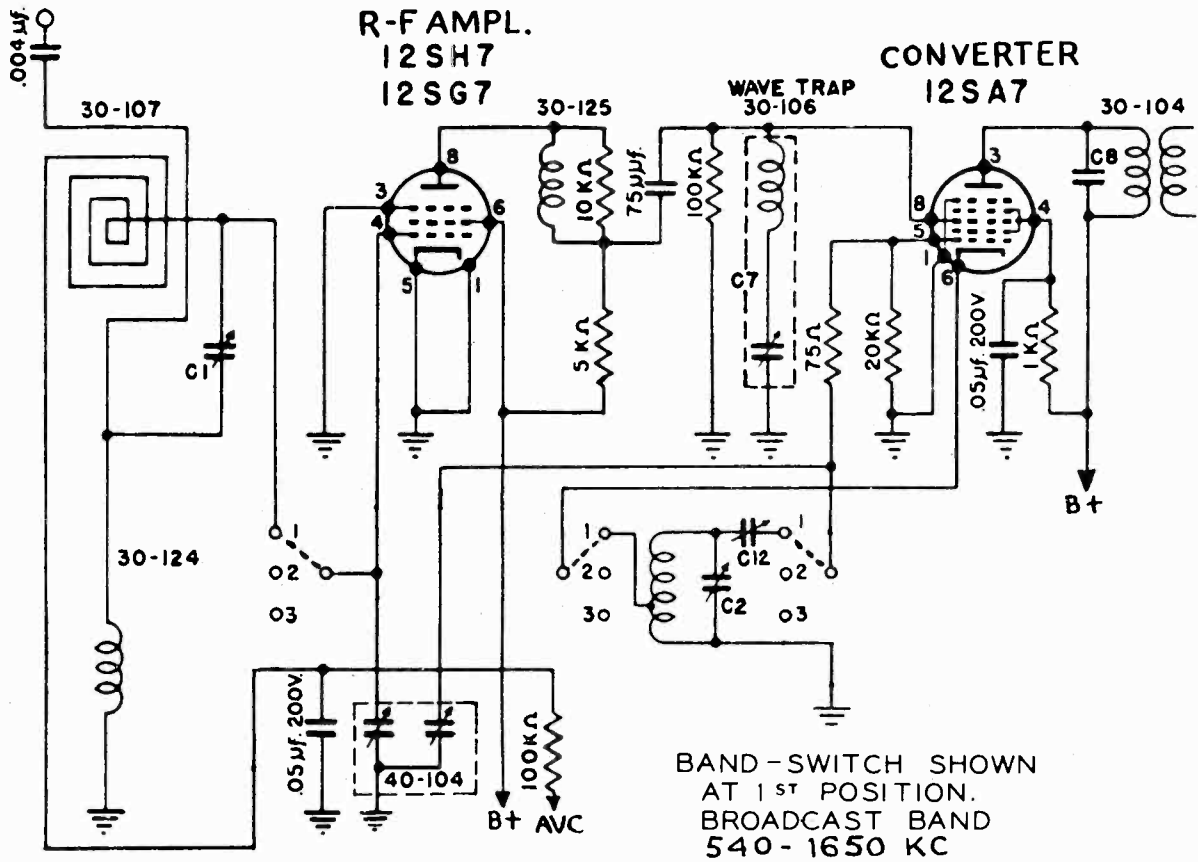
First remove chassis from its present case by first removing "B" batteries and also "A" battery tray. Remove 2 screws on baffle inside case. Remove screw from bottom of cabinet. Carefully slide out chassis. Take the new case and with chassis outside the case note that one of the wires from the Regalloop in front cover is color coded. Solder this wire to the lug on top of variable condenser, right hand side looking at it from rear. This is the oscillator section. The remaining wire from the Regalloop should be soldered to the lug on the terminal strip mounted on the variable condenser mounting bracket.

### ALIGNMENT OF RECEIVER TO MATCH REGALOOOP

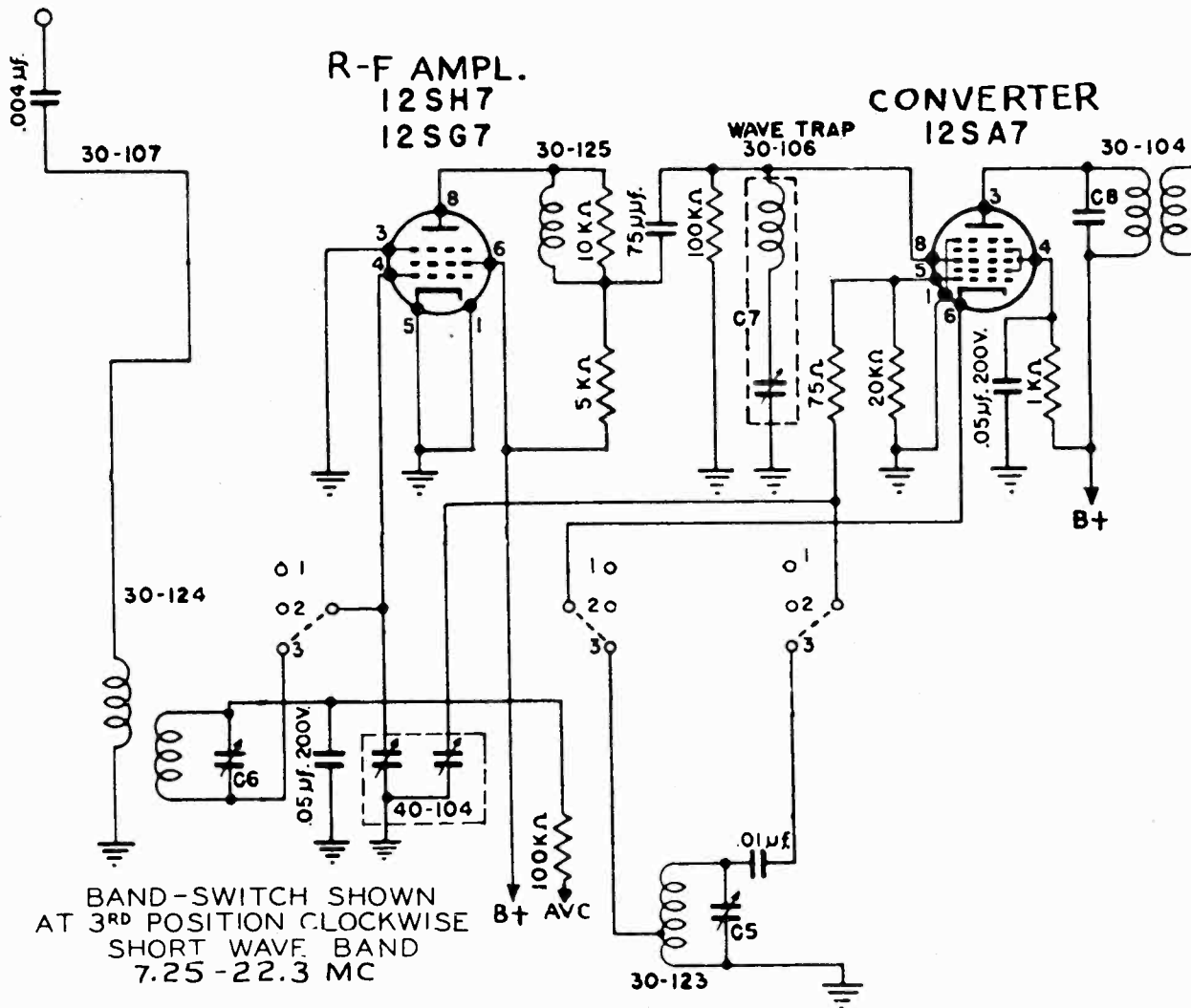
Use a signal generator and output meter. Connect output meter to voice coil leads on speaker. Make a loop consisting on one or two turns of wire and connect ends to signal generator, and place "loop" near enough to the Regalloop (located in front cover) to effect a signal transfer. Set signal generator to 1650 KC. Open variable condenser all the way so that rotor plates are entirely out of stator plate assembly. Use a non-metalic screw driver and adjust oscillator trimmer for maximum output. Now set signal generator to 1500 KC—tune receiver to 1500 KC and adjust the remaining R.F. trimmer for maximum output.

Your chassis is now tuned to the Regalloop in the new case. Place the chassis back in the case and install batteries.





# "clarified schematics"



BAND-SWITCH SHOWN  
AT 3<sup>RD</sup> POSITION CLOCKWISE  
SHORT WAVE BAND  
7.25 - 22.3 MC

The Model 1749 is a 6 tube 3 band super-heterodyne which will give reception over a wide range, including standard broadcast, intermediate short wave, and foreign short wave, and the foreign short wave frequency is 7.25 to 22.3 megacycles or 41.5 to 13.5 meters. This receiver covers the following meter bands, 13, 16, 19, 25, 31, 39, 49, 60, 90, and 125.

The tuning range of the broadcast frequency is 540 to 1650 kilocycles, or 560 to 182 meters. The intermediate short wave frequency is 2.3 to 7.5 megacycles, or 130.0 to 40.0 meters,

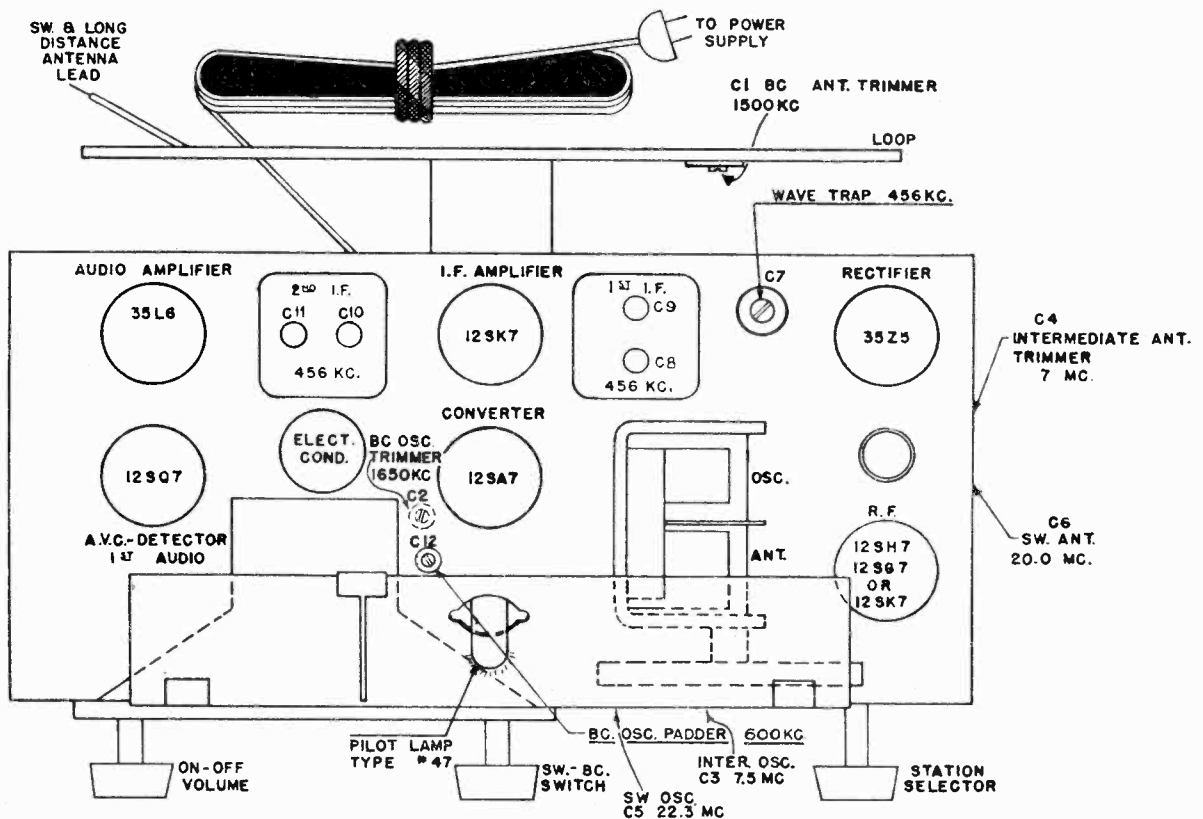
ALIGNMENT INSTRUCTIONS

SET VOLUME CONTROL AT MAXIMUM VOLUME AND OUTPUT FROM SIGNAL GENERATOR NO HIGHER THAN IS NECESSARY TO OBTAIN OUTPUT READING

TUNING RANGE BROADCAST 540-1650 INTERMEDIATE 2.25-7.5 SHORTWAVE 7.25-22.3

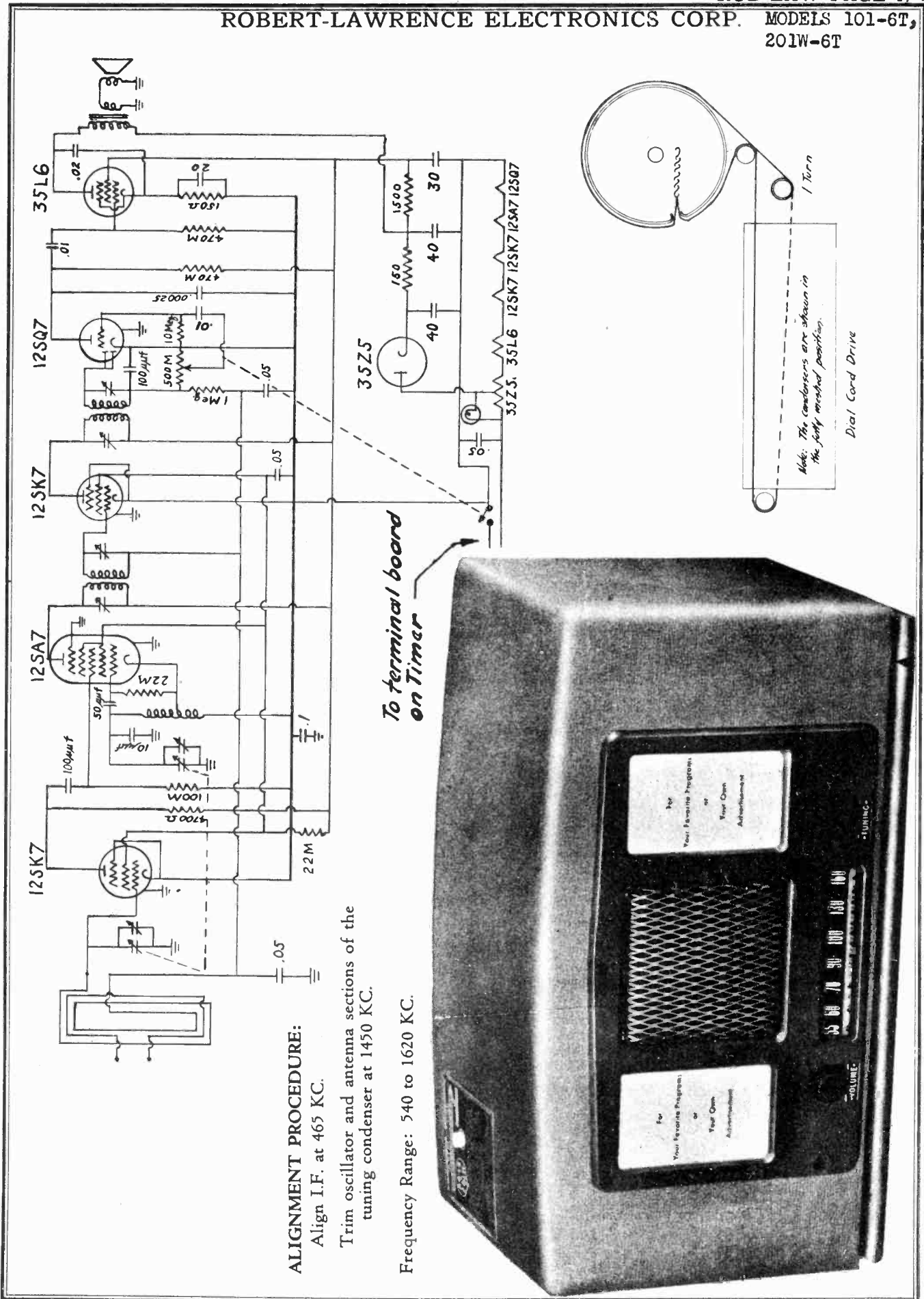
DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	BAND SWITCH POSITION	SIGNAL GEN FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
.1 MFD	RF SECTION OF VARIABLE CONDENSER	BC	455 KC	1650 KC	ACROSS VOICE COL	C8, C9 C10, C11	ADJUST FOR MAXIMUM
.1 MFD	" "	BC	455 KC	600 KC	" "	C7	" " MINIMUM
200 MMFD	ANTENNA LEAD	BC	1650 KC	1650 KC	" "	C2	" " MAXIMUM TRIMMER UNDER CHASSIS
200 MMFD	" "	BC	1500 KC	1500 KC	" "	C1	" " "
200 MMFD	" "	BC	600 KC	600 KC	" "	C12	ROCK GANG & ADJUST FOR MAXIMUM OUTPUT RECHECK C1 & C2 ADJUSTMENTS AS GIVEN
400 $\Lambda$	" "	INTERMEDIATE	7.5 MC	7.5 MC	" "	C3	ADJUST FOR MAXIMUM
400 $\Lambda$	" "	INTERMEDIATE	7.0 MC	7 MC	" "	C4	ROCK GANG & ADJUST FOR MAXIMUM OUTPUT
400 $\Lambda$	" "	SW	22.3 MC	22.3 MC	" "	C5	ADJUST FOR MAXIMUM
400 $\Lambda$	" "	SW	20 MC	20 MC	" "	C6	ROCK GANG & ADJUST FOR MAXIMUM OUTPUT

IF TWO PEAKS CAN BE OBTAINED USE ONE WITH TRIMMER SCREW FURTHER OUT









**ALIGNMENT PROCEDURE:**  
Align I.F. at 465 KC.

Trim oscillator and antenna sections of the tuning condenser at 1450 KC.

Frequency Range: 540 to 1620 KC.

*To terminal board  
on Timer*

*Note: The condensers are shown in the fully wetched position.*

*Dial Card Drive*

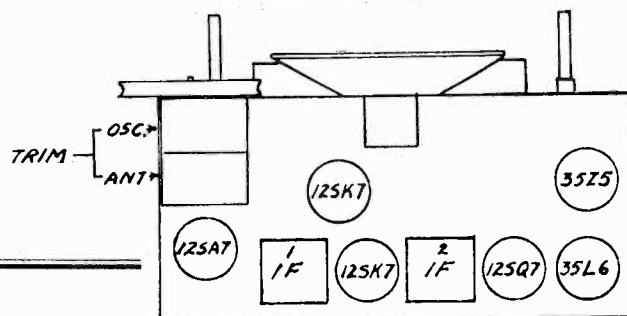
## Voltage Readings

No.	Tube	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
1	125K7	0V.	38V.DC	0V.	-7V.DC	0V.	27V.DC	24V.AC	94V.DC
2	125A7	0V.	12V.AC	105V.DC	27V.DC	-2.5V.DC	0V.	24V.AC	-3V.DC
3	125K7	0V.	38V.DC	0V.	-7V.DC	0V.	27V.DC	52V.AC	100V.DC
4	125K7	0V.	-7V.DC	0V.	-2.3V.DC	-2.3V.DC	55V.DC	12V.AC	0V.
5	35L6	0V.	85V.AC	108V.DC	102V.DC	0V.	0V.	52V.AC	5.5V.DC
6	35Z5	0V.	115V.AC	110V.AC	0V.	110V.AC	115V.DC	85V.AC	125V.DC

1. DC Voltage measurements are at 20,000 ohms per volt;  
AC Voltages are at 1,000 ohms per volt.
2. Measured values are from socket pin to common negative.
3. Line voltage kept at 115 Volts.
4. Volume Control at maximum, no signal applied.

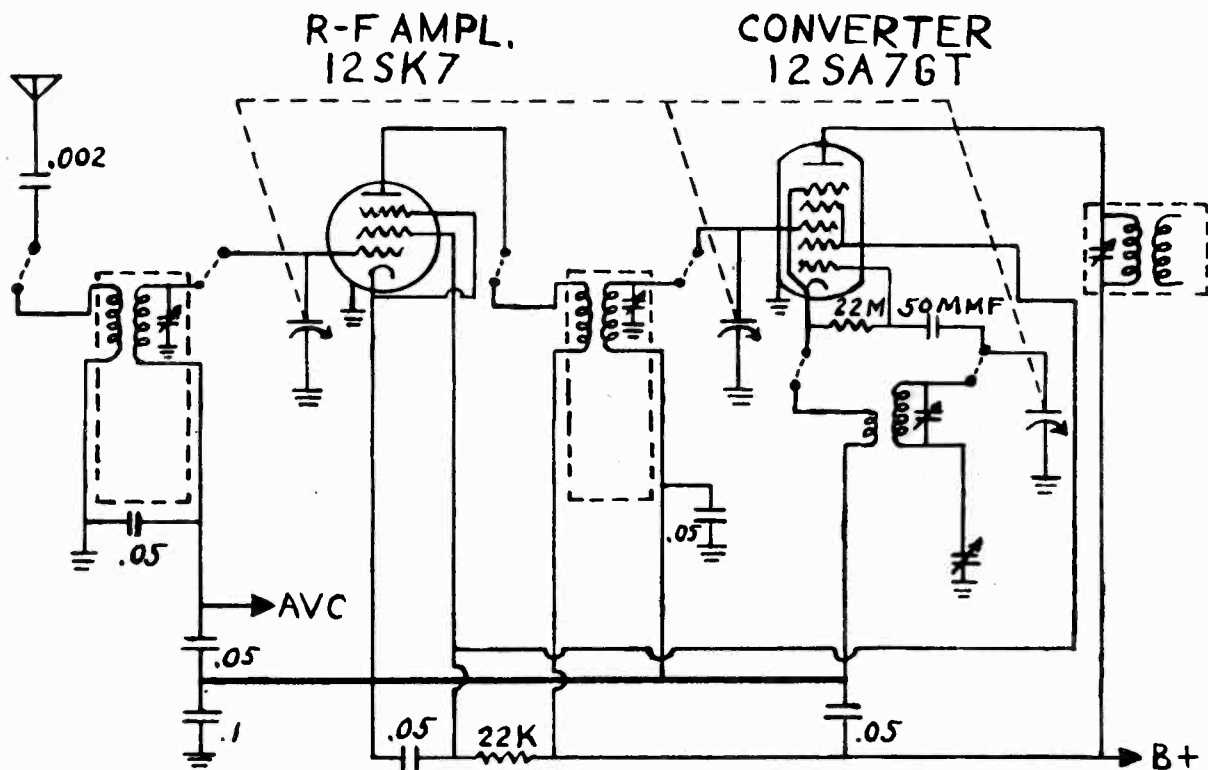
## Resistance Readings

No.	Tube	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
1	125K7	Inf.	40Ω	0Ω	1.5Meg	0Ω	75KΩ	28Ω	55KΩ
2	125A7	Inf.	14Ω	50KΩ	75KΩ	25KΩ	0.8Ω	26Ω	100KΩ
3	125K7	Inf.	39Ω	0Ω	1.5KΩ	0Ω	75KΩ	50Ω	50KΩ
4	125Q7	Inf.	10Meg	0Ω	0.5Meg	0.5Meg	60KΩ	15Ω	0Ω
5	35L6	Inf.	85Ω	50KΩ	50KΩ	0.5Meg	0Ω	50Ω	150Ω
6	35Z5	Inf.	110Ω	110Ω	Inf.	110Ω	50KΩ	85Ω	50KΩ

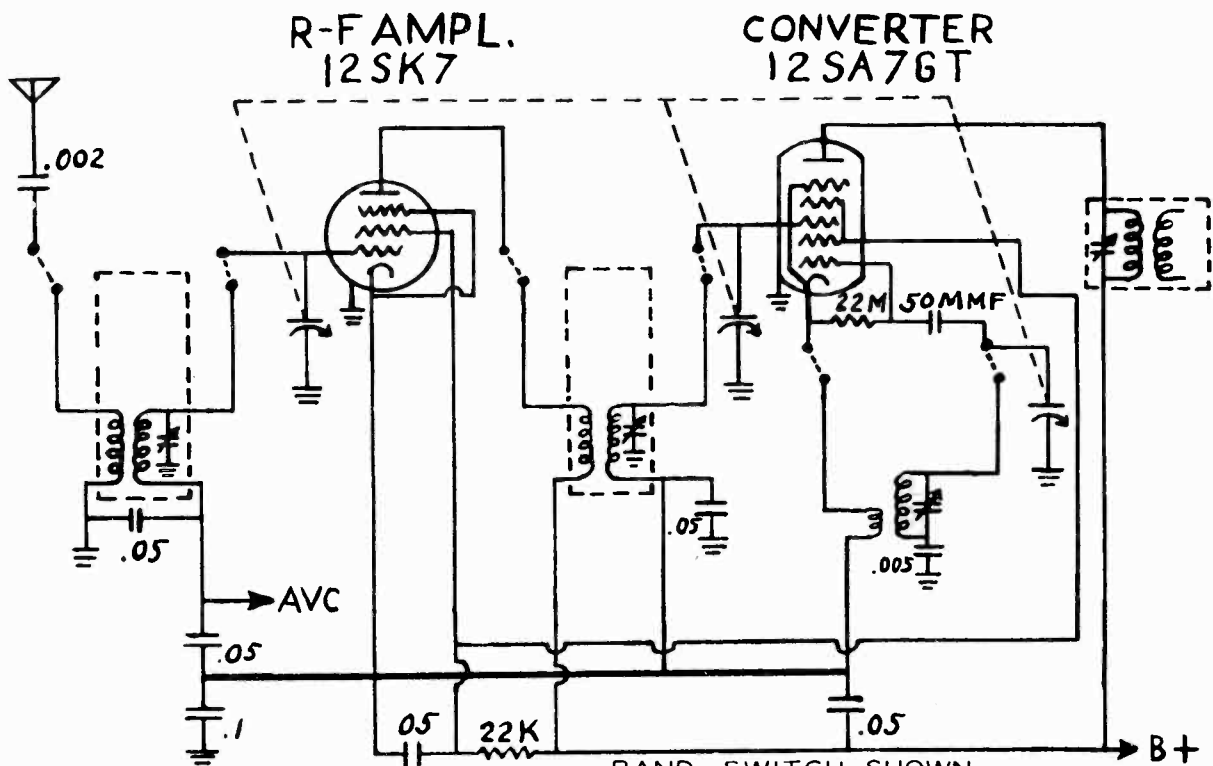




# "clarified schematics"



BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION.  
BROADCAST BAND  
545 - 1600 KC



BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION.  
SHORT WAVE BAND  
5.5 - 16 MC

### Voltage Readings

No.	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7	0V.	50V. AC	0V.	-3V DC	0V.	30V. DC	37V. AC	98V. DC
2	12SA7	0V.	24V. AC	99V. DC	30V. DC	-3V. DC	0V.	13V. AC	0V.
3	12SK7	0V.	36V. AC	0V.	-3V. DC	0V.	30V. DC	24V. AC	98V. DC
4	12SQ7	0V.	-45V. DC	0V.	-45V. DC	-45V. DC	50V. DC	0V.	13V. AC
5	35L6	0V.	85V. AC	105V. AC	100V. DC	0V.	0V.	50V AC	0V.
6	35Z5	115V. AC	110V. AC	110V. AC	110V. AC	115V. DC	0V.	122V. DC	85V. AC

1. DC Voltage measurements are at 20,000 ohms per volt; AC voltages are at 1000 ohms per volt.
2. Measured values are from socket pin to common negative.
3. Line voltage kept at 115 Volts.
4. Volume control at maximum, no signal applied

### Resistance Readings

No.	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7	Inf.	53Ω	0Ω	1.5 Meg	0Ω	70KΩ	40Ω	44KΩ
2	12SA7	Inf.	30Ω	44KΩ	70KΩ	21KΩ	1.4Ω	15Ω	5Ω
							*0.4Ω		*0.1Ω *S.W.
3	12SK7	Inf.	40Ω	0Ω	1.5 Meg	0Ω	70KΩ	28Ω	44KΩ
4	12SQ7	Inf.	10 Meg	0Ω	540KΩ	540KΩ	50KΩ	0Ω	13Ω
5	35L6	Inf.	85Ω	40KΩ	42KΩ	420KΩ	0Ω	53Ω	150Ω
6	35Z5	Inf.	115Ω	Inf.	115Ω	40KΩ	Inf.	40KΩ	88Ω

