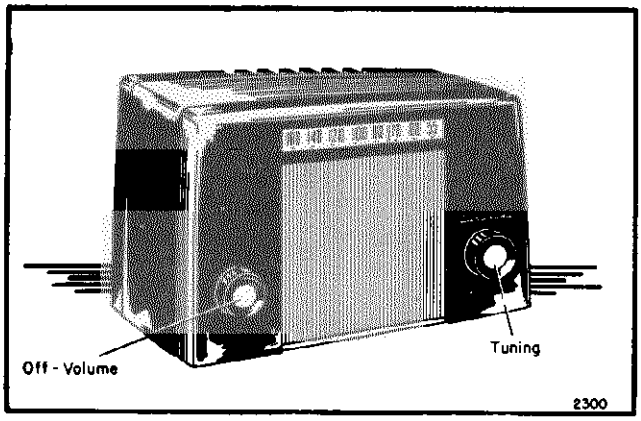
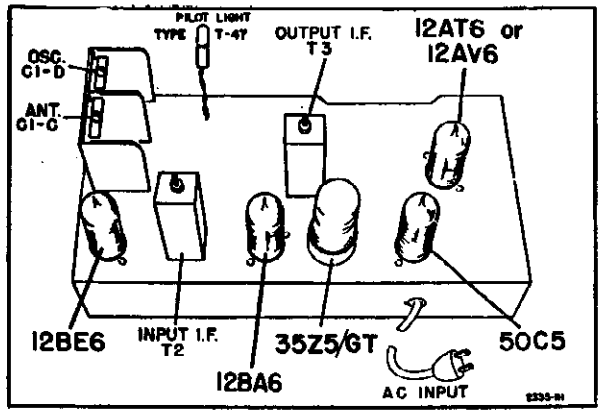
MODEL 15RA2-43-8230A



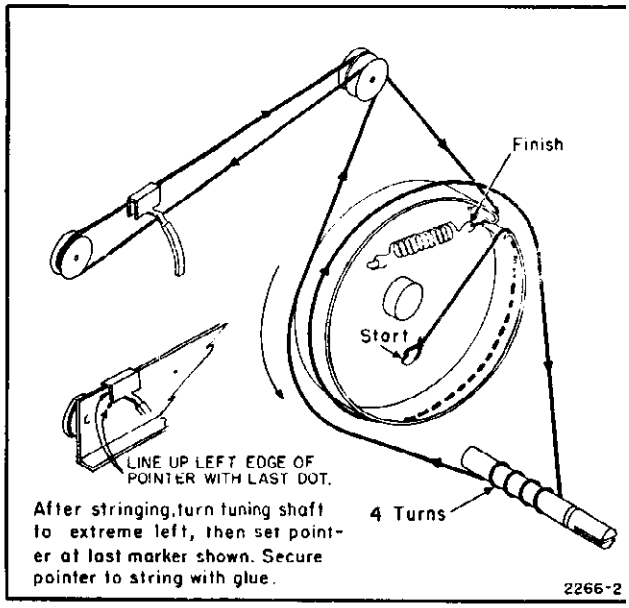
SERVICE DATA

POWER SUPPLY.....115 volts, DC or 50-60 cycle AC, 24 watts.
FREQUENCY RANGE.....540 to 1600 Kc.
INTERMEDIATE FREQ...455 Kc.
SELECTIVITY.....At 1000 Kc., 60 Kc. at 1000 x sign
SENSITIVITY.....150 u. v. per meter.
POWER OUTPUT.....0.8 watt undistorted, 1.0 watt max
LOUD SPEAKER.....4" round PM., v. c. impedance 3 ohms.
TUBE COMPLEMENT.....

12BE6, Converter.	AVC, Audio.
12BA6, I-F Amplifier.	50C5, Output Amplifie
12AV6 or 12AT6, Detector,	35Z5, Rectifier.



Chassis View



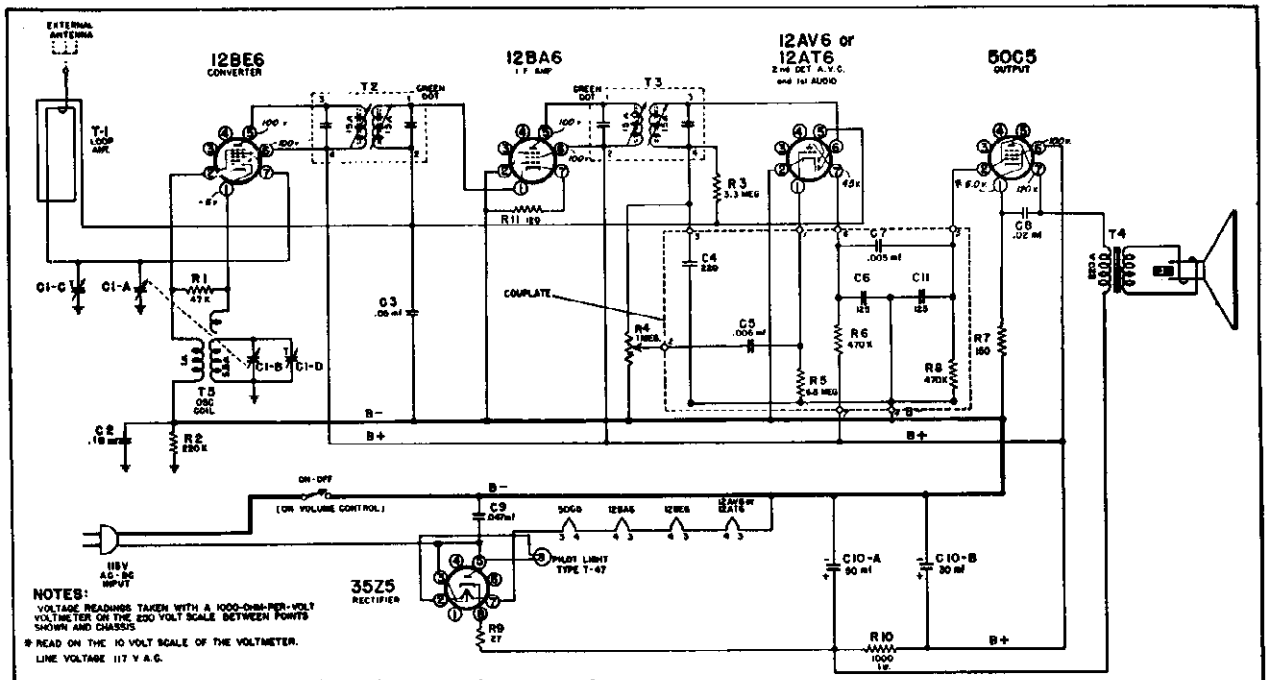
Dial Stringing Diagram

ALIGNMENT PROCEDURE

SIGNAL GENERATOR				*TUNER SETTING*	*ADJUST FOR MAXIMUM OUTPUT*	*INPUT FOR 50 MILLIWAT OUTPUT*
Frequency	*Coupling Capacitor*	*Connection to Radio*	*Ground Connection*			
455 kc.	.1 mf.	12BE6, Pin 7	HEAVY BUSS LEAD ACROSS CENTER OF CHASSIS	Capacitor full open (plates out of mesh)	Top and bottom Cores in output and input I.F. cans	65 microvolts
1620 kc.	.1 mf.	12BE6, Pin 7		Capacitor full open (plates out of mesh)	Oscillator trimmer C1-D on gang	70 microvolts
535 kc.	.1 mf.	12BE6, Pin 7		Capacitor fully closed	Check for adequate range	70 microvolts
1400 kc.	———	Lay Generator lead near back of cabinet		Tune in 1400 kc. signal	Antenna trimmer C1-C on gang	200 to 400 microvolts
400 cycles	.1 mf.	12AT6, Pin 1		———	———	.06 volts

MODEL 15RA2-43-8230A

SCHEMATIC DIAGRAM WITH VOLTAGES



NOTE: Capacitor C2 may be either .18 mf. or .09 mf.

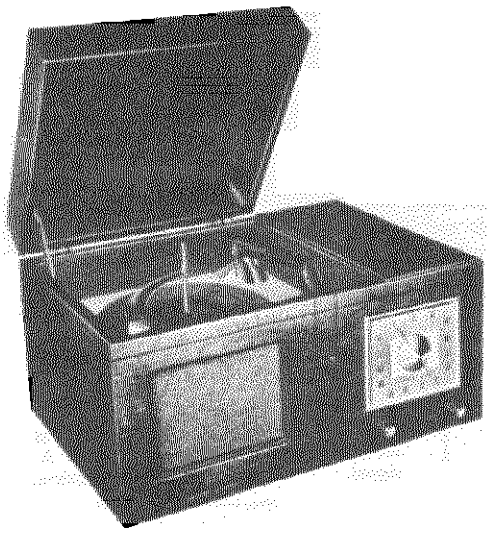
256I-A

PARTS LIST

Use Only Genuine Factory Replacement Parts

Ref. No.	Part No.	Description	Qty. Used In Set
		Condensers	
C1A, B	8A-17377	Gang tuning condenser	1
C1C, D		Trimmers on gang	
C2	8D-11251	.09 mfd x 400 volts, paper	1
C2	8D-11111	.18 mfd x 400 volts, paper	1
C3	8D-10770	.05 mfd x 200 volts, paper	1
C4-5-6-7-11, and R5-6-8	201-19303	Couplate	1
C8	8D-10774	.02 mfd x 400 volts, paper	1
C9	8J-16081	.047 mfd x 400 volts, molded	1
C10A, B	8C-17391	Electrolytic condenser	1
		Resistors	
R1	9B1-82	47K ohms, ½ watt, 10%	1
R2	9B1-27	220K ohms, ½ watt, 20%	1
R3	9B1-34	3.3 megohms, ½ watt, 20%	1
R4	10A-18650	Volume control (1 megohm) and switch	1
R5-6-8		See couplate	....
R7	9B1-52	150 ohms, ½ watt, 10%	1
R9	9B1-43	27 ohms, ½ watt, 10%	1
R10	9B2-62	1000 ohms, 1 watt, 10%	1
R11	9B1-51	120 ohms, ½ watt, 10%	1
		Transformers and Coils	
T1	13E-18653	Loop antenna	1
T2-3	13B-17731	Input I.F. transformer	1
T4	12C-17595 or	Audio output transformer	1
T4	12C-19302	Audio output transformer	1
T5	13D-17583	Oscillator coil	1
		Miscellaneous	
	18A-18656	4" PM speaker	1
	15B-10440	8-prong, tube socket	1
	15C-16007	7-prong, tube socket	4
	2M-17589 or	Tube shield base	2
	2M-19187	Tube shield base	2
	2H-17588 or	Tube shield	2
	2H-19188	Tube shield	2
	2M-17580	I.F. locking clip	2
	2D-15432-3	Loop mounting bracket	1
	23A-10344	Line cord lock	1
	14M-10088-4	AC line cord and plug	1
		Dial Parts	
	3A-18612	Tuning shaft	1
	2D-17584	Support bracket	1
	40A-17591	Bushing	1
	29E-17592	Spring washer	1
	43D-17609	Tinnerman clip	1
	29C-10630	"C" washer	1
	53A-18547	Dial string (approx 40")	1
	49A-11324	Take-up spring	1
	2C-18618	Slide plate,. L. H.	1
	2C-18618-1	Slide plate, R. H.	1
	25B-18643	Rubber bumper	4
	2C-18616	Dial cross bar	1
	3M-18614	String guide	2
	47A-18613	Pilot light assembly	1
	46A-10793	Pilot light bulb	1
	2G-18615	Dial pointer	1
	55A-16384	Red tubing for pointer	1
		Cabinet Parts	
	5C-16147-75	Bakelite cabinet	1
	5B-18657-68	Knob	4
	6D-16383	Dial scale	1
	2M-16401	Spring clip	1
	2M-18654	Grill trim strip	1
	2M-18652	Speaker grille	1
	23J-18651	Cardboard baffle	1
	23K-18658	Black crinoline cloth	1
	23M-18617	Bottom cover	1
	42A-14448	Chassis bolts	4

Please specify PART *number and chassis model number when ordering replacements.*



GENERAL DESCRIPTION

Your new radio-phonograph is a 5 tube (including rectifier tube) receiver and 3-speed automatic record changer housed in a beauti mahogany wood cabinet. Controls are provided on the front for sele ing radio or phonograph operation, for tuning and volume. Contr are provided on the phonograph for selecting speed and operation the record changer (for details see Instruction card placed on rec changer turntable).

Special features of the radio receiver include a built-in loop anten automatic volume control, beam power output tube, and a perman magnet dynamic speaker. Provision has been made for connection an external antenna. It is designed for reception of radio stations the standard broadcast band between 540 and 1600 kilocycles.

The Automatic Record Changer is designed to play standard 78 R fine groove 45 RPM, or long play 33 1/3 RPM records of stand commercial dimensions. The playing capacity at a single loading is 12" records either standard or long play, twelve 10" records eit standard or long play, or any mixture of ten 10" or 12" records of same type. The changer can also accommodate a full stack of tw 7" long play (33 1/3 RPM) or twelve 7" fine groove (45 RPM) reco

ELECTRICAL SPECIFICATIONS

POWER SUPPLY:
117 volts A.C. 60 cycles.

FREQUENCY RANGE
Broadcast 540-1600 Kc.

INTERMEDIATE FREQUENCY:
455Kc.

ANTENNA:
High impedance loop.

TUNING:
2 section, solid mounted gang condenser.

SPEAKER:
5 inch PM Dynamic.

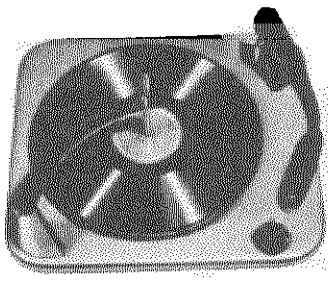
POWER CONSUMPTION:
60 watts

POWER OUTPUT:
Undistorted—.8 watts
Maximum — 1 watt

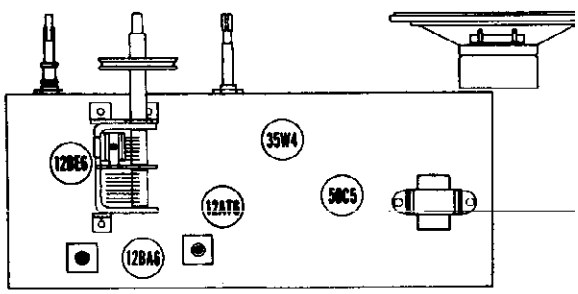
SENSITIVITY—(Measured with signal injection at external antenna terminal and for 50 milliwatt output):
50 microvolts average

SELECTIVITY:
51 Kc. broad at 1000 times signal, measured at 1000 Kc.

TUBE COMPLEMENT AND FUNCTION:
1 12BE6 Converter
1 12BA6 I.F. Amplifier
1 12AT6 Detector—A.V.C.—Audio Amplifier
1 50C5 Audio Output
1 35W4 Rectifier



RECORD CHANGER



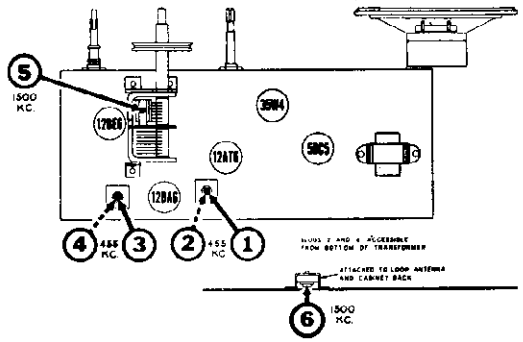
TUBE LOCATIONS

MODEL 15RA37-43-9230A

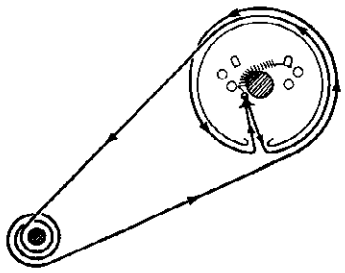
ALIGNMENT PROCEDURE

1. During the alignment of this receiver, the Pointer will have to be set to a specific frequency. Since the dial scale is mounted on the front of the cabinet, and the fact that the mass of the record changer may have an effect in the calibration, adjustment of the oscillator and antenna trimmers should be performed with the chassis mounted in the cabinet.
2. To remove the chassis, for I. F. Alignment, proceed as follows: Take off cabinet back by removing screws around edges and disconnecting the two antenna leads from the chassis. Next, take off knobs and pointer by grasping firmly and pulling forward. Now, take out the two chassis mounting screws at bottom of cabinet. Chassis can be withdrawn from cabinet.
3. Connect an output meter across the speaker voice coil.
4. For I. F. alignment only, connect ground lead of signal generator to B— lug (see voltage chart for convenient B— connection). CAUTION: If your signal generator is designed with an AC-DC power supply, connect the ground lead to B— through a .25 Mfd. condenser.
5. Since the oscillator and antenna alignment is performed with the chassis in the cabinet, it will be necessary to couple the signal generator to the receiver by connecting its output to several turns of wire formed in a circular shape so that it may be placed adjacent and parallel to the receiver loop antenna.
6. With the gang condenser fully meshed, (Tuning control turned to a fully counter-clockwise position) the dial pointer should be in a horizontal position at low end of dial, parallel to the bottom edge of dial scale. If it is set incorrectly, merely hold tuning control shaft steady and move pointer to correct position.
7. Set volume control at maximum volume position and use a weak signal from the signal generator.

RANGE	SIGNAL GENERATOR		DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST SLUGS OR TRIMMERS
	FREQUENCY SETTING	CONNECTION AT RADIO			
I.F. 455 KC	455 KC	High side to trimmer No. 5. Ground lead as in step 4 above.	.02 Mfd. Condenser	Any point where it does not affect the signal.	(2nd I.F.) #1 & #2 for maximum output
	455 KC	High side to trimmer No. 5. Ground lead as in step 4 above.	.02 Mfd. Condenser	Any point where it does not affect the signal.	(1st I.F.) #3 & #4 for maximum output
Reinstall chassis in cabinet, replace pointer and mounting screws for chassis and loop.					
BROADCAST 540—1600 KC	1500 KC	Connect directly to coupling turn as described in step 5 above.	NONE	1500 KC	(Oscillator) Trimmer #5 for maximum output
	1500 KC	Connect directly to coupling turn as described in step 5 above.	NONE	Tune to 1500 KC generator signal	(Antenna) Trimmer #6 for maximum output



DIAL CORD ARRANGEMENT



To string dial cord, turn the main drive drum to maximum counter-clockwise position and use following parts:

114955 Clip on end of cord
117057 Cord (2 feet)
505161 Tension Spring

To reinstall pointer on gang condenser shaft, see paragraph 6 in introduction to Alignment Procedure.

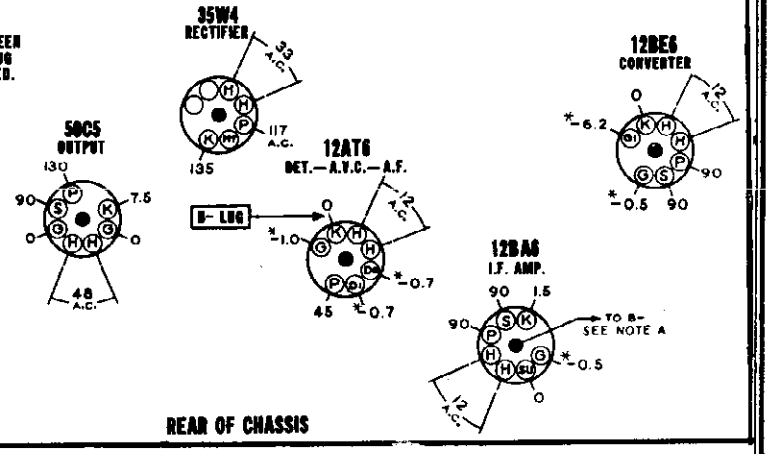
SOCKET VOLTAGES

1. All measurements made with a voltmeter having a sensitivity of 20,000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.
2. Terminals on loop antenna are shorted together to minimize noise signal pickup.
3. Dial tuned to 540 Kc.
4. Volume control set to maximum with no signal.

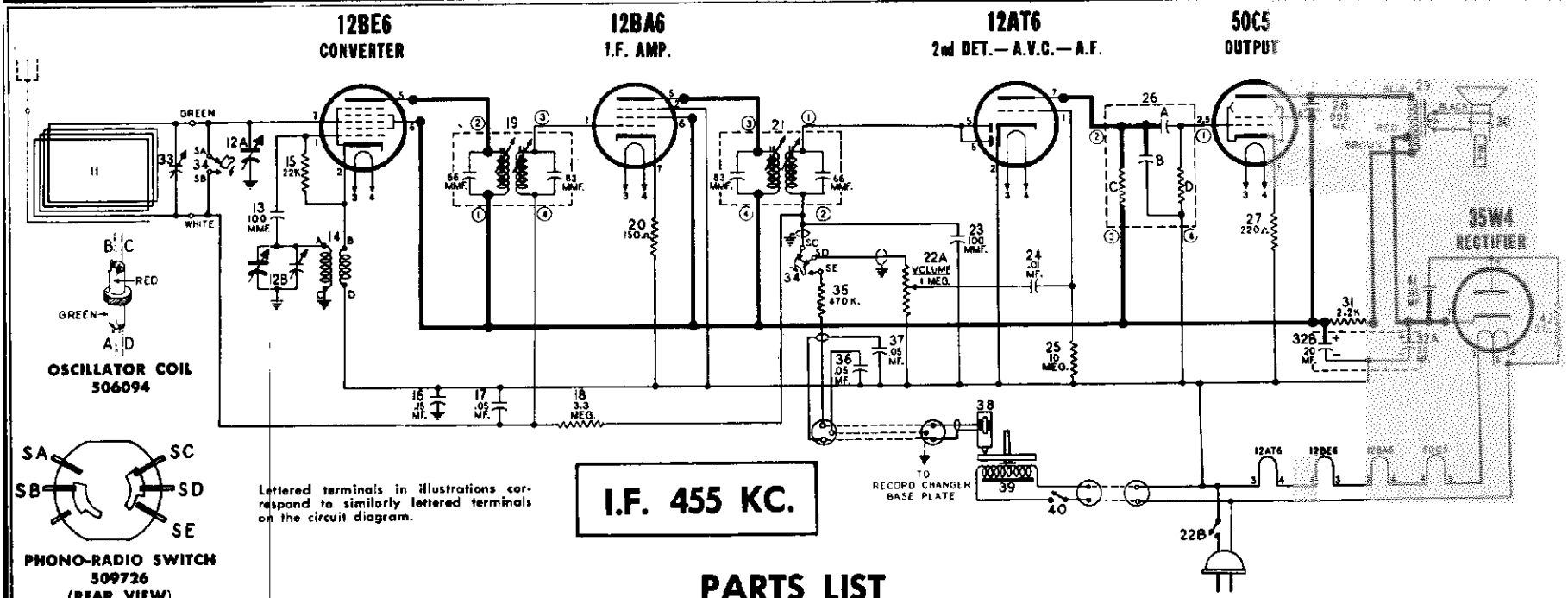
NOTE A: The center stud of this tube must be connected to B- to reduce capacity coupling between pins. Oscillation may result if this connection is omitted.

117 VOLT 60 CYCLE A. C. POWER SUPPLY USED FOR THESE MEASUREMENTS. ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG UNLESS OTHERWISE INDICATED.

BOTTOM VIEW OF CHASSIS



REAR OF CHASSIS



PHONO-RADIO SWITCH
509726
(REAR VIEW)

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

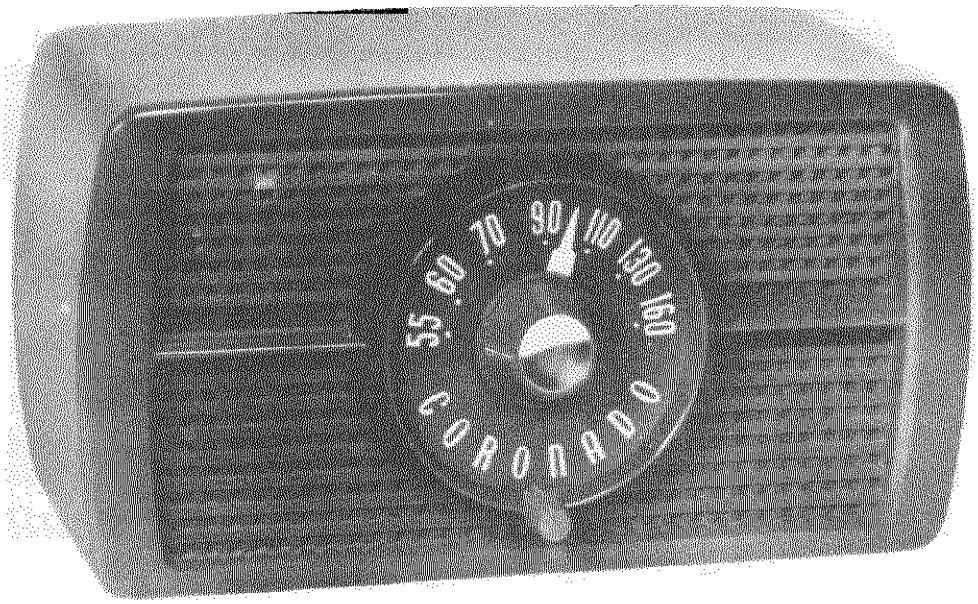
I.F. 455 KC.

PARTS LIST

DIAGRAM NO.	DESCRIPTION	PART NO.
	CONDENSERS	
12-A, B	Condenser—variable gang	509727
13	Condenser—mica 100 Mmfd. 500 volt	512503
16	Condenser—.15 Mfd. 400 volt	512040
17	Condenser—.05 Mfd. 400 volt	512028
23	Condenser—mica 100 Mmfd. 500 volt	512503
24	Condenser—.01 Mfd. 400 volt	512010
26-A	Condenser—ceramic .005 Mfd. 450 volt (Part of Audio Coupling Unit)	505858
26-B	Condenser—ceramic 250 Mmfd. 450 volt (Part of Audio Coupling Unit)	505858
28	Condenser—.005 Mfd. 600 volt	512006
32-A, B	Condenser—electrolytic A—30 Mfd. 150 V. B—20 Mfd. 150 V.	508147
33	Condenser—trimmer, 3-35 Mmfd.	509899
36, 37	Condenser—.05 Mfd. 400 volt	512028
41	Condenser—.05 Mfd. 600 volt	512030
	RESISTORS	
15	Resistor—carbon 22,000 Ohms ½ watt	510161
18	Resistor—carbon 3.3 Meg. ½ watt	510194
20	Resistor—carbon 150 Ohms ½ watt	510122
22-A, B	Volume Control 1 Meg. (with OFF-ON switch)	509436
25	Resistor—carbon 10 Meg. ½ watt	510197
27	Resistor—carbon 220 Ohms ½ watt	510125
31	Resistor—carbon 2,200 Ohms 1 watt	510243
35	Resistor—carbon 470,000 Ohms ½ watt	510185
42	Resistor—carbon 27 Ohms ± 10% ½ watt	510108
	COILS & TRANSFORMERS	
11	Loop Antenna (includes Condenser 33)	509747
14	Coil—oscillator	506094
19	Transformer—1st I.F.	505867
21	Transformer—2nd I.F.	505867
29	Transformer—output	509739
	OTHER ELECTRICAL PARTS	
26-A to D	Audio coupling unit A—Condenser—ceramic .005 Mfd. 450 volt B—Condenser—ceramic 250 Mmfd. 450 volt C—Resistor—carbon 470,000 Ohms ⅕ watt D—Resistor—carbon 470,000 Ohms ⅕ watt	505858
30	Speaker—P.M. dynamic (5")	509741
34	Switch—phono-radio	509726
38	Crystal cartridge	509896

DESCRIPTION	PART NO.
MISCELLANEOUS	
Cabinet	509730
Cord—dial drive (2 ft. required) per ft.	117057
Clip for mounting I.F. transformer	505101
Clip—Retainer on end of dial cord	114955
Clip—retains escutcheon	160832
Clip—retains tuning sleeve	506431
Dial scale	509744
Hinge for lid per pair	509732
Inserts for 45 R.P.M. records pkg. of 12	508533
Knob—"OFF-VOL.-ON"	509745
Knob—"PHONO-RADIO"	509746
Knob—tuning	508476
Lid for cabinet	509721
Lid support	509820
Needle	509897
Nut, locking; for needle	509898
Plug—(2 pin) for phono. motor A.C. power	511031
Plug—(3 pin) for phono. pick-up cable	508878
Pointer	509743
Record changer	509742
Screw—8 x 7/8" chassis mounting	18785
Sleeve—tuning	509723
Spring—dial cord tension	505161
Socket—miniature (7 pin)	507364
Socket—(2 pin) for phono. motor cable	511182

MODELS 15RA33-43-8245A,
15RA33-43-8246A



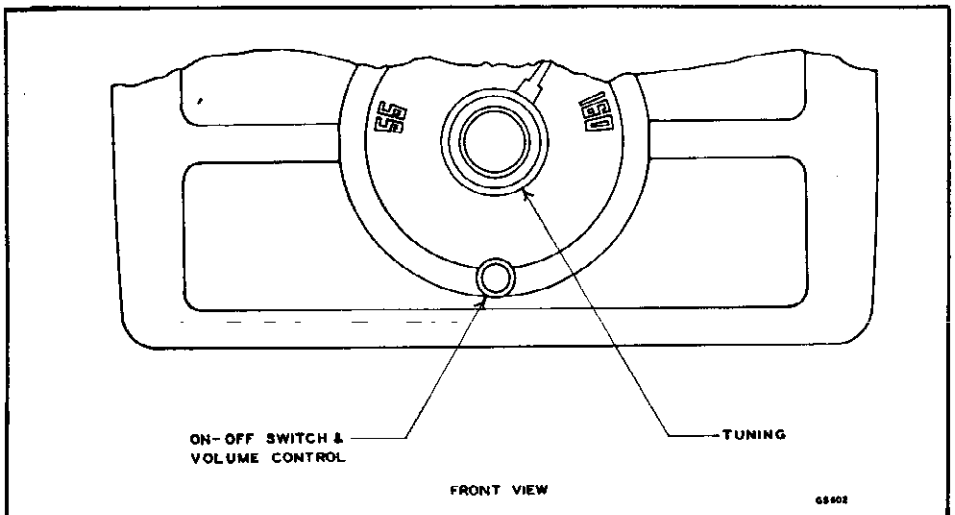
G S 604

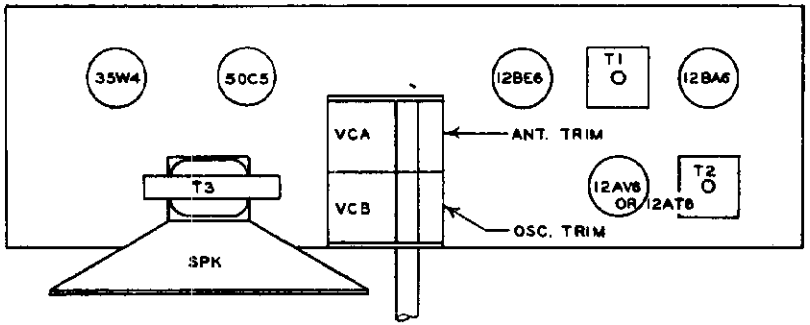
SPECIFICATIONS

Power Supply	117 volts 60 cycle AC, 117 volts DC, 29 watts
Frequency Range	535 KC to 1630 KC
Intermediate Frequency	455KC
Antenna	Built-in Loop
Tuning	Variable Capacity
Speaker	4", P.M. voice coil impedance 3.2 ohms
Power Output	0.8 watt undistorted, 1.8 watts maximum
Sensitivity	400 uv/m average for 50 milliwatts output
Selectivity	55 KC broad at 1000 times, signal at 1000KC

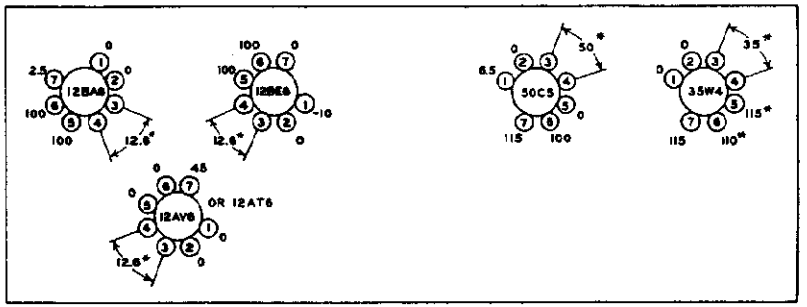
Tubes used are as follows:

12BE6 Oscillator-Converter
12AV6 or 12AT6 AVC, Detector, and Audio
12BA6 I.F. Amplifier
50C5 Power Output
35W4 Power Rectifier





CHASSIS LAYOUT TOP VIEW



ALL DC VOLTAGES IN REFERENCE TO COMMON GROUND
*AC EXCEPT WHEN USED ON DC POWER LINE

VOLTAGE CHART CHASSIS BOTTOM VIEW

ALIGNMENT PROCEDURE

The following procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent AVC action from interfering with proper alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is 0.4 volts, using a signal which is modulated 400 c.p.s.

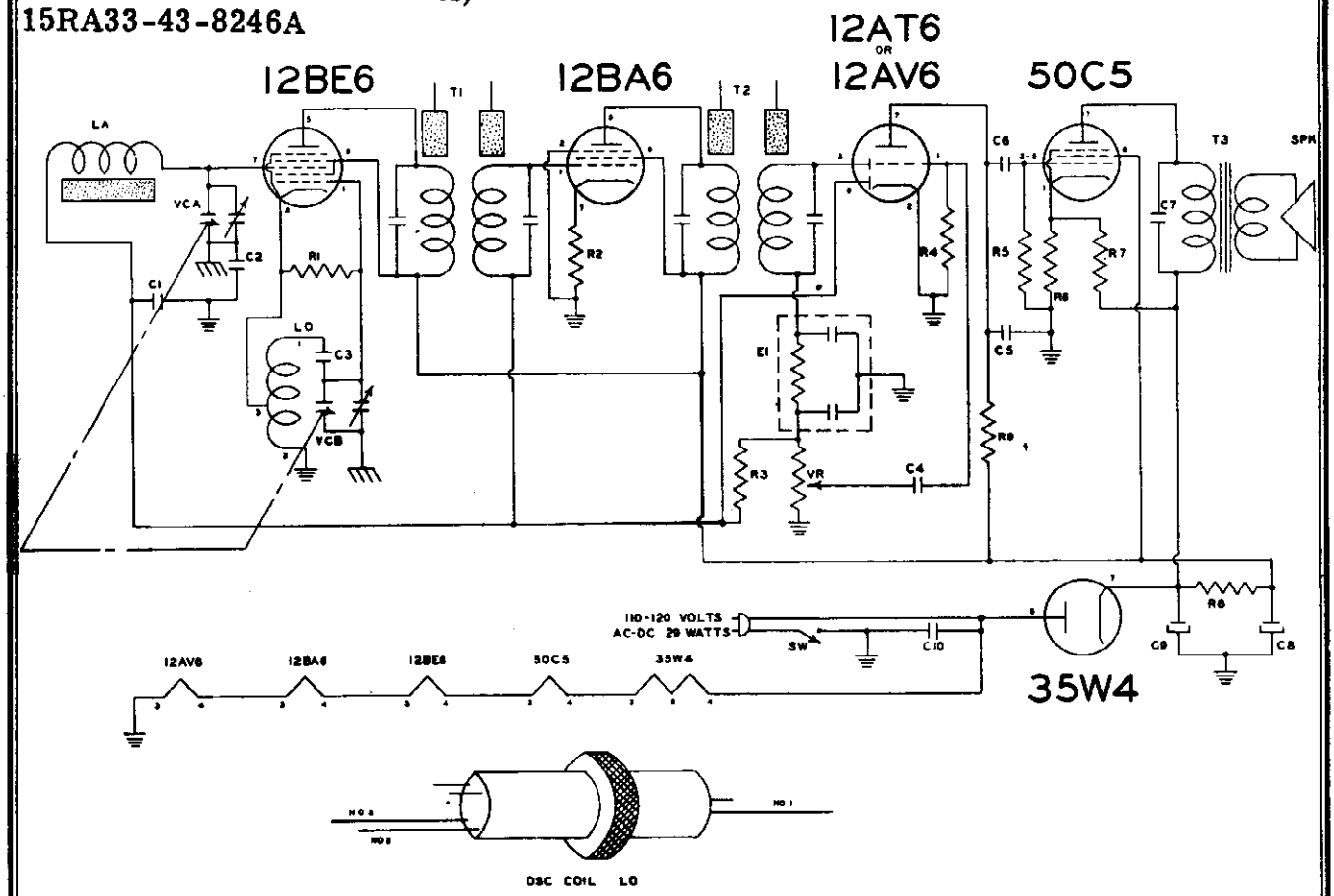
Adjust all trimmers for maximum output. Repeat the alignment procedure given below as a final check.

CAUTION: This is an AC/DC receiver, and when aligning the set it is necessary to isolate the signal generator or the receiver from the line by use of a transformer, or to place a .2 MFD condenser in each test lead of the signal generator.

	SIGNAL GENERATOR		POSITION OF	ADJUST FOR MAXIMUM
Frequency	Dummy Antenna	Connection to Radio	VARIABLE	OUTPUT
455 KC	.1 MFD	12BE6 Grid Stator VCA	Fully Open	T1 & T2
1625 KC		12BE6 Grid Stator VCA	Fully Open	VCB Oscillator
1400 KC		Loosely Coupled to Loop	Tune in Signal Generator	VCA Antenna

Connect low side of signal generator to common negative.

MODELS 15RA33-43-8245A, 15RA33-43-8246A



PARTS VALUES FOR T68 GAMBLE'S AC/DC CADET

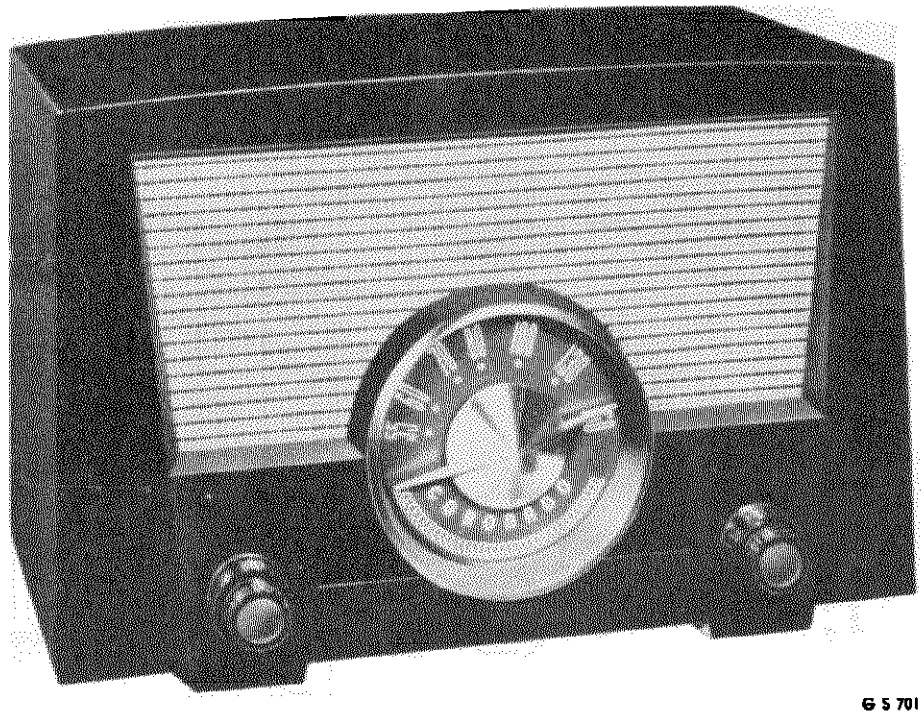
CIRCUIT COMPONENTS

SYMBOL	PART NO.	DESCRIPTION	VALUE	RATING
VCA-VCB	VCT68	Condenser, 2 gang		
C1	CO52	Condenser, paper	.05 MFD	200 volts
C2	C12	Condenser, paper	.1 MFD	200 volts
C3	C026	Condenser, paper	.02 MFD	600 volts
C4-C6-C7	C0056	Condenser, paper	.005 MFD	600 volts
C5	C2505M	Condenser, mica	250 MMFD	500 volts
C8	C40-20-1.5	Condenser, electrolytic	20 MFD	150 volts
C9	C40-20-1.5	Condenser, electrolytic	40 MFD	150 volts
C10	C054	Condenser, paper	.05 MFD	400 volts
R1	R223.5	Resistor	22K ohm	1/2 watt
R2	R391.5	Resistor	390 ohm	1/2 watt
R3	R105.5	Resistor	1 megohm	1/2 watt
R4	R106.5	Resistor	10 megohm	1/2 watt
R5-R9	R474.5	Resistor	470K ohm	1/2 watt
R6	R121.5	Resistor	120 ohm	1/2 watt
R7	R1032	Resistor	10K ohm	2 watt
R8	R1021	Resistor	1000 ohm	1 watt
E1	CR1	Diode filter unit	2X100 MMFD-47K ohm	
VR	VRT67G	Volume control	1 megohm	
LA	LAT68A	Antenna rod & back		
LO	LOT67	Oscillator coil		
T1-T2	T111-31-A	I.F. transformer		
T3	E-81645-T	Output transformer		
SW	VRT67G	Switch S.P.S.T. on volume control		
SPK	SPKT67	4" P.M. speaker		

MECHANICAL PARTS

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
M-1801	Chassis	H-1805	Ground lug	P-1704AR	Pointer knob, red
M-1802	Chassis cover	H-81644-6	Miniature tube socket	P-1704AI	Pointer knob, ivory
H-1601	Trimount 5/8"	W-1802	Line cord and plug	P-1704R	Round knob, red
H-1802	Trimount 1/4"	SR-3P	Strain relief	P-1704I	Round knob, ivory
T111-31-B	I.F. mounting clip	P-1801R	Cabinet, red	M1807	Dial pointer
		P-1801IG	Cabinet, ivory, green dial		

FOR PRICES SEE CORRESPONDING KEY NO. IN PRICE LIST



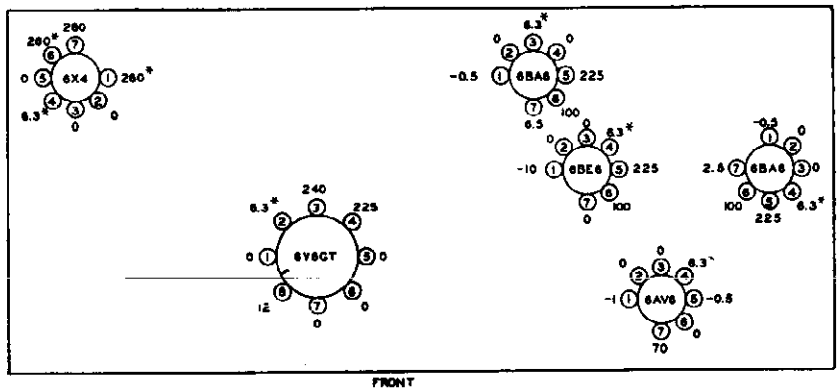
G 5 701

SPECIFICATIONS

Power Supply	117 volts A. C., 60 cycle only, 45 watts
Frequency Range	540 KC to 1630 KC
Intermediate Frequency	455 KC
Antenna	FERRI-ROD LOOP
Tuning	Variable Capacity
Speaker	5" x 7" P.M., voice coil impedance 3.2 ohms
Power Output	4 watts undistorted, 4.5 watts maximum
Sensitivity	200 uv/m for 500 milliwatts output
Selectivity	40 KC broad at 1000 times, signal at 1000 KC

Tubes used are as follows:

6BA6 R.F. Amplifier	6AV6 AVC, Detector, and Audio
6BE6 Oscillator-Converter	6V6GT Power Output
6BA6 I.F. Amplifier	6X4 Power Rectifier



* INDICATES AC

ALL VOLTAGES IN REFERENCE TO COMMON GROUND

ALL VOLTAGE READINGS TAKEN WITH VTVM

BOTTOM VIEW

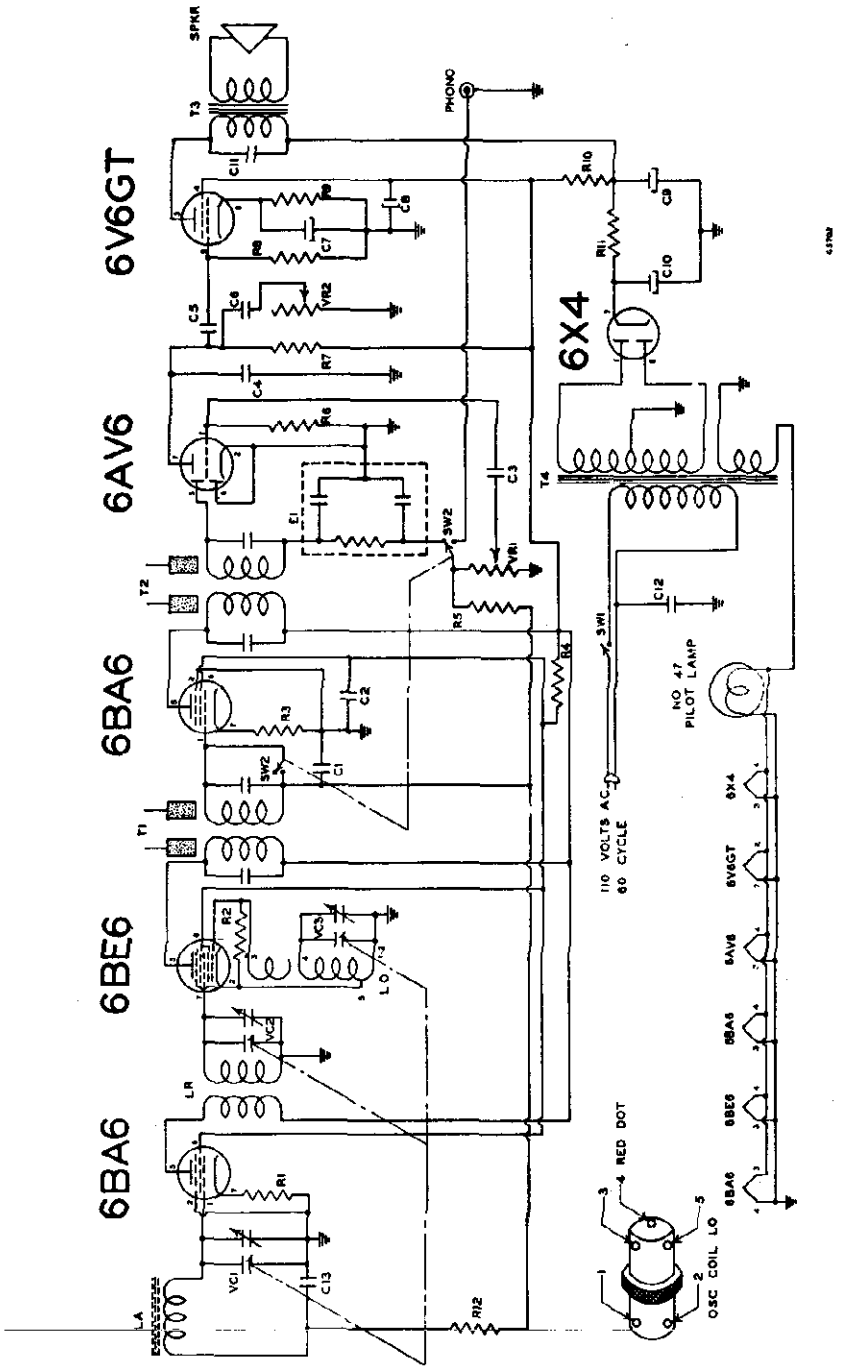
VOLTAGE CHART

MODEL 15RA33-43-8635, Westerner

OPERATION

Caution: This set is for use on 117 volt A.C. 60 cycle only. To operate radio, be sure Radio-Phono switch on the back of the set is switched to side marked RADIO. Turn on radio with small outer left-hand knob and allow set to warm up for approximately one minute. Tune in desired station with right-hand knob, adjust volume to desired level with small outer left-hand knob, and select most pleasing tone with large inner left-hand knob.

To operate phonograph: Plug phono lead from phono turn table into receptacle on the back of the radio marked PHONO. Set Radio-Phono switch on the back of the radio to side marked PHONO. Switch radio set on with small outer left-hand knob, and allow set to warm up for approximately one minute. Start record player, and adjust volume to desired level with small outer left-hand knob and select most pleasing tone with large inner left-hand knob.



ALIGNMENT PROCEDURE

The following procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and with the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with proper alignment.

With the output meter connected across the voice coil of the speaker, and the signal generator modulated at 400 c.p.s., adjust all trimmers for maximum output using the alignment procedure given below:

	SIGNAL GENERATOR		POSITION OF TUNING CONDENSER	ADJUST FOR MAXIMUM OUTPUT
Frequency	Dummy Antenna	Connection to Radio		
455 KC	.1 MFD	VC2 stator section	Fully open	T1 & T2
1630 KC	.1 MFD	VC2 stator section	Fully open	OSC Trimmer
1400 KC	Radiation Loop	None	Tune in Sig. Gen.	R.F. & ANT. Trimmers

Connect low side of signal generator to common negative.

PARTS VALUES FOR WESTERNER 15RA33-43-8365

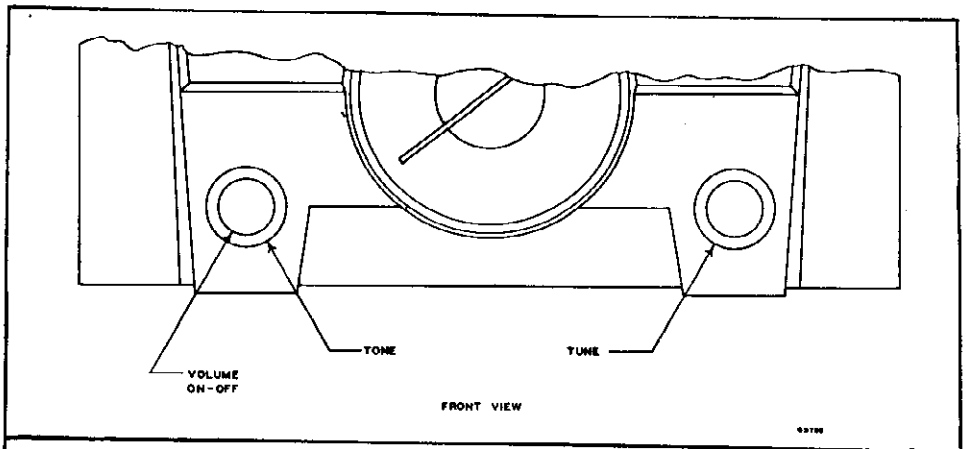
CIRCUIT COMPONENTS

SYMBOL	PART NO.	DESCRIPTION	VALUE	RATING
VC1,2,3,	VCT69	Condenser, 3 gang		
C1,C13	CO52	Condenser, paper	.05 MFD	200 volts
C2	CO54	Condenser, paper	.05 MFD	400 volts
C3,C6,C11	COO56	Condenser, paper	.005 MFD	600 volts
C4	C2505M	Condenser, mica	250 MMFD	500 volts
C5	CO26	Condenser, paper	.02 MFD	600 volts
C7	C20-T69	Condenser, electrolytic	20 MFD	25 volts
C8	C20-T69	Condenser, electrolytic	20 MFD	350 volts
C9	C20-T69	Condenser, electrolytic	20 MFD	350 volts
C10	C20-T69	Condenser, electrolytic	20 MFD	350 volts
C12	CO476M	Condenser, paper, plastic case	.047 MFD	600 volts
R1	R182.5	Resistor	1800 ohm	1/2 watt
R2	R223.5	Resistor	22 K ohm	1/2 watt
R3	R391.5	Resistor	390 ohm	1/2 watt
R4	R1232	Resistor	12 K ohm	2 watt
R5,R12	R105.5	Resistor	1 megohm	1/2 watt
R6	R106.5	Resistor	10 megohm	1/2 watt
R7,R8	R474.5	Resistor	470 K ohm	1/2 watt
R9	R3311	Resistor	330 ohm	1 watt
R10	R1021	Resistor	1000 ohm	1 watt
R11	R4711	Resistor	470 ohm	1 watt
VR1	VRT69	Volume Control	1 megohm	
VR2	VRT69	Tone Control	1 megohm	
E1	CR1	Diode filter unit	2 x 100 MMFD-47 K ohm	
LA	LAT69	Antenna rod & back		
LR	LRT69	R.F. Coil		
LO	T64LO	Oscillator Coil		
T1-T2	T111-31-A	I.F. transformer		
T3	L3595	Output transformer		
T4	XL-60	Power transformer		
SW1	VRT69	Switch S.P.S.T. on volume control		
SW2	SS-3	Switch D.P.D.T. for phono		
SPKR	SPKT69	Speaker P.M. 5 x 7		

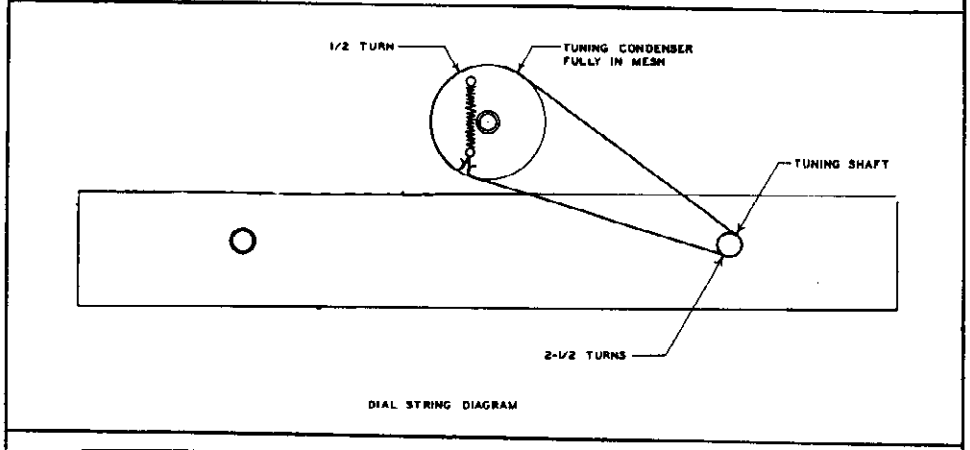
MODEL 15RA33-43-
8635, Westerner

MECHANICAL PARTS

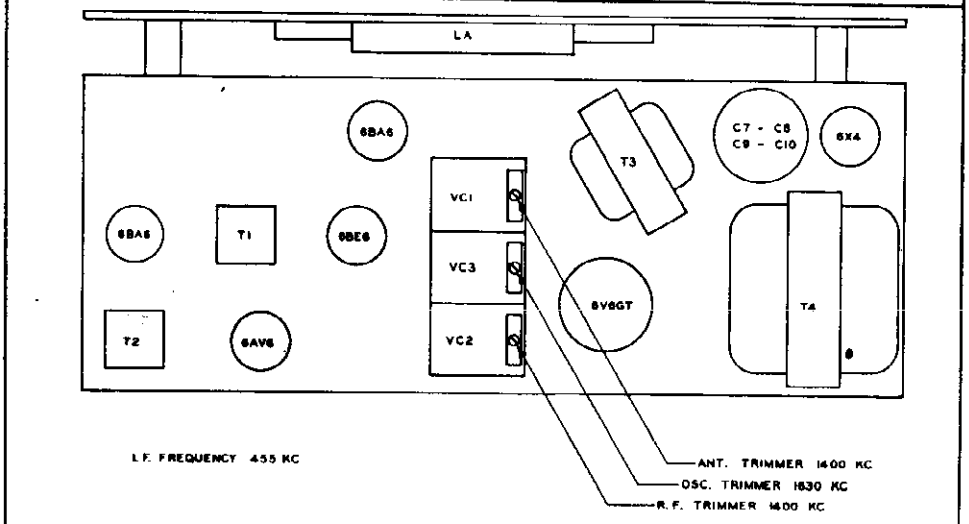
PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
M-1901	Chassis	P-1903	Knob, round insert, walnut	H-81641-29	#29 terminal board
M-1902	Bracket, dial	H-81644-9	Pilot light socket	H-1903	Shaft, tuning
TIII-31-B	I.F. mounting clip	H-81644-6	Miniature tube socket	H-1902	Bushing, tuning shaft
P-1904	Dial pointer	H-81644-5	Octal tube socket, wafer	H-1601	Trimount 5/8"
P-1906	Dial scale	H-81644-7	Phono socket	W-1802	Line cord and plug
H-1904	Dial spring	H-81641-3	#3 terminal board	SR-3P	Strain relief
P-1905	Escutcheon	H-81641-4	#4 terminal board	P-1908	Baffle, speaker
P-1902	Knob, round hub, walnut			M-1903	Angle bracket
				P-1901	Cabinet, walnut



FRONT VIEW

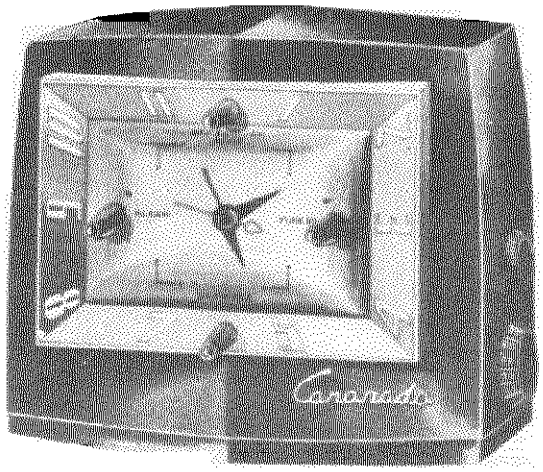


DIAL STRING DIAGRAM



CHASSIS LAYOUT TOP VIEW

MODEL 35RA40-43-824



ELECTRICAL SPECIFICATION

Power Supply:—117 Volts AC, 60 Cycles.
Frequency Range:—540-1650 Kilocycles.
Intermediate Frequency:—455 Kilocycles.
Antenna:—Air loop mounted on rear of chassis.
Tuning:—Two gang, direct drive variable condenser.
Speaker:—4-inch PM round, 3.2 ohm Voice Coil.
Power Consumption:—32 watts.
Power Output:—.85 watts undistorted, 1.25 watts maximum.
Sensitivity:—50 Microvolts for 50 Milliwatt Output.
Selectivity:—59 KC broad at 1000 times signal at 1000 KC.

GENERAL DESCRIPTION

This Clock Radio is an AC operated five-tube radio (including rectifier tube). It employs a Sessions Electric Clock Movement for switching AC power to the radio at any pre-set time.

The *"Radio" Switch* removes power from the unit entirely when in the "OFF" position, connects power to the receiver in the "ON" position, and switches power to the receiver through the clock contacter position.

The *"Sleep" Switch* is a time operated device which closes the line to the receiver for the period for which the adjustment is made. The "Sleep" Switch is in parallel with the clock switch.

TUBE COMPLIMENT

12BE6 — Converter
12AT6 — 2nd Detector, 1st Aud Amp. and AGC
12BA6 — I.F. Amplifier
50C5 — Audio Output
35W4 — Power Rectifier

(NOTE: Appliance outlet is rated for 1000 watts)

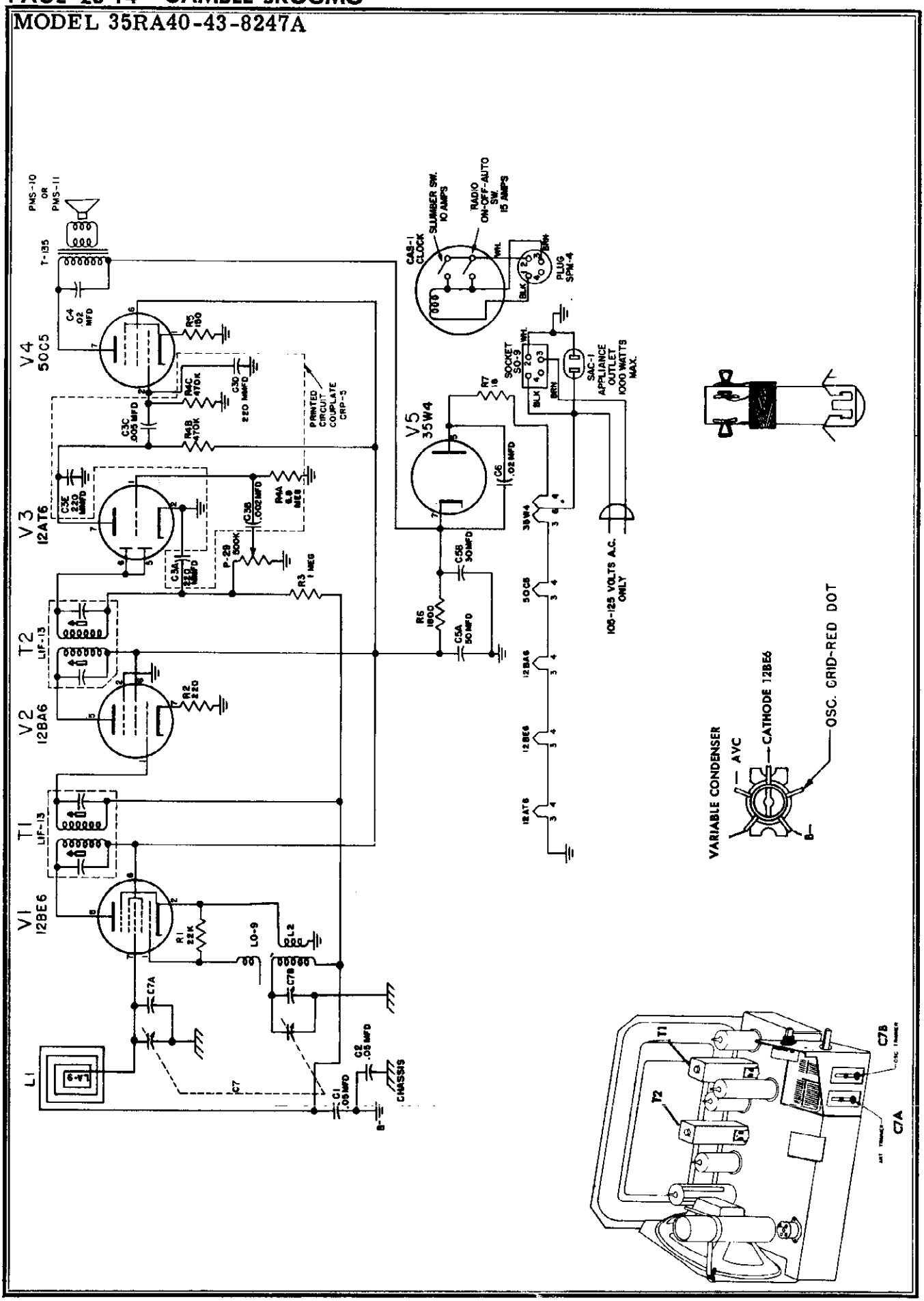
ALIGNMENT PROCEDURE

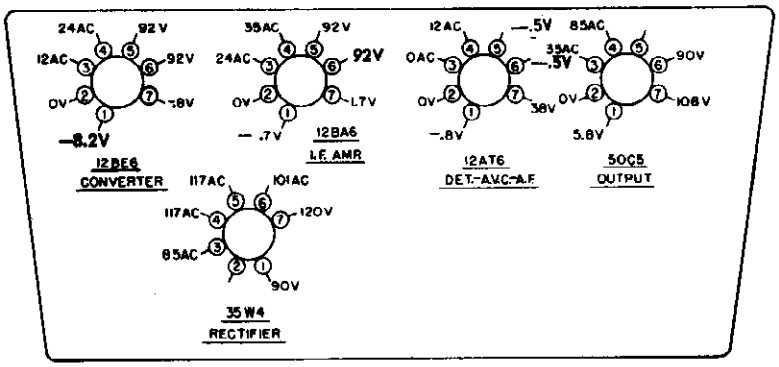
- OUTPUT METER ACROSS VOICE COIL
- VOLUME CONTROL MAXIMUM
- REDUCE INPUT AS NEEDED
- ALL GROUND CONNECTIONS TO B—

Frequency	*Dummy Antenna*	*Connection to Radio*	*Position of Variable*	*Adjust for Maximum Output*
455 KC	05	Pin 7 — 12BE6 Converter Grid	Rotor Open (Plates Out of Mesh)	T2 — Pri. and Sec.
455 KC	05	Pin 7 — 12BE6 Converter Grid	Rotor Open (Plates Out of Mesh)	T1 — Pri. and Sec.
1650 KC	05	Pin 7 — 12BE6 Converter Grid	Rotor Open (Plates Out of Mesh)	C7B — Osc. Trimmer
1500 KC	Several Turns Around Loop Ant.		1500 KC	C7A — Ant. Trimmer

REPEAT STEPS 3 and 4

MODEL 35RA40-43-8247A





VOLTAGE READINGS TAKEN WITH VTVM FROM PINS DESIGNATED TO B—

Line Voltage — 117 volts A.C. Full Volume — No signal

PARTS LIST

Schematic Symbol No.	*Description*	*Part No.*
R 1	22k Ohms ½ W. 10%—Carbon Resistor	RC-223-2
R 2	220 Ohms ½ W. 10%—Carbon Resistor	RC-221-2
R 3	1 Meg Ohm ½ W. 10%—Carbon Resistor	RC-105-2
R 5	150 Ohms ½ W. 10%—Carbon Resistor	RC-151-2
R 6	1800 Ohms 1 W. 20%—Carbon Resistor	RC-182-4
R 7	18 Ohms ½ W. 10%—Carbon Resistor	RC-180-2
C 1	.05 Mfd. 400 V. — Paper Capacitor	CP-4-15
C 2	.05 Mfd. 200 V. — Paper Capacitor	CP-2-15
C 4	.02 Mfd. 400 V. — Paper Capacitor	CP-4-12
C5A & C5B	30-50 Mfd. 150 V. — Electrolytic Condenser with Mtg. Strap	CET-19
C 6	.02 Mfd. 600 V. — Paper Capacitor	CP-6-12

Schematic Symbol No.	*Description*	*Part*
CV 8	2-Gang Variable Condenser	CV
P 29	Potentiometer—Volume Control ½ Meg.	P-2
LO-9	Broadcast Oscillator Coil	LO
T 135	Audio Output Transformer	T-1
T 1 & T 2	I.F. Transformer	LI
L 1	Antenna Loop	LA
V 1	Tube—12BE6—Oscillator and Mixer	12
V 2	Tube—12BA6—I.F. Amplifier	12
V 3	Tube—12AT6—Detector and 1st Audio Amplifier	12
V 4	Tube—50C5—Power Amplifier	50
V 5	Tube—35W4—Rectifier	35

FOR PRICES SEE CORRESPONDING KEY NO. IN PRICE LIST

SERVICING OF SESSIONS MOVEMENT

The Sessions Electric Clock Movement used in this unit will be repaired no charge within the warranty period in the event of failure due to defects in workmanship and material, provided the unit has been subject to normal use

Service stations have been established that are qualified to repair these movements upon delivery to them. The entire clock assembly first must be removed, as these stations positively will not service any clocks that are st mounted on the radio unit.

SEE INSTRUCTIONS ON NEXT PAGE

MODEL 35RA40-43-8247A

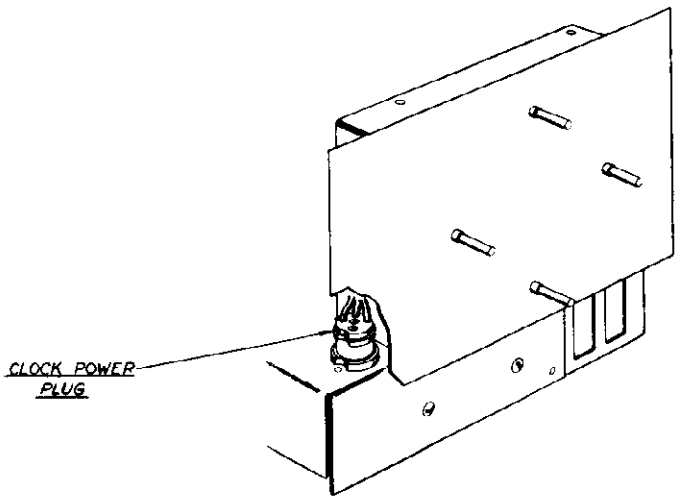


Figure 1

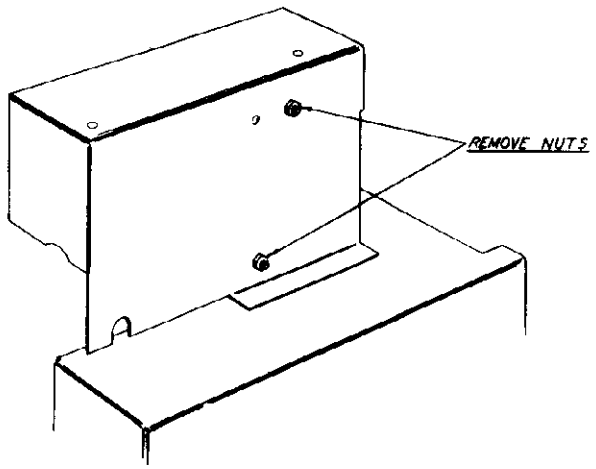


Figure 2

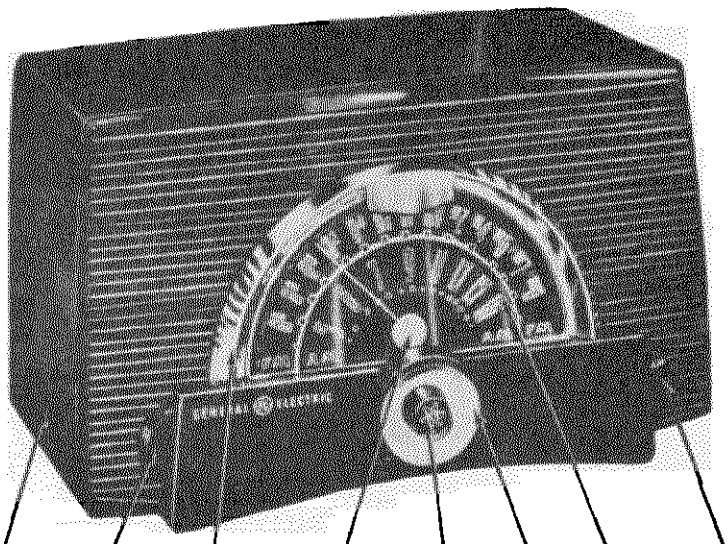
TO TAKE CLOCK MOVEMENT OUT OF CABINET PROCEED AS FOLLOWS:

Remove the following:

1. Line cord from AC receptacle.
2. Tuning and volume control knobs. Also the four small knobs on the clock setting controls.
3. Chassis from cabinet.
4. Clock power plug which fits into receptacle on top of chassis (Fig. 1).
5. Two nuts fastening clock to bracket (Fig. 2).

MISCELLANEOUS

Part No.	
PMS 10 or PMS 11	4" PM Speaker
KM 52	Tuning Knob
KM 53	Volume Control Knob
CV8	Two-Gang Variable Condenser



CABINET RAU-355 | VOLUME RDK-211 | ESCUTCHEON RDE-080 | POINTER RDP-065 | TONE RDK-266 | TUNING RDK-265 | DIAL RDS-111 | BAND SWITCH RDK-267

SPECIFICATIONS

CABINET

Material	plastic
Color	mahogany
Height	8 1/16 inches
Width	13 1/2 inches
Depth	7 3/8 inches

ELECTRICAL

Voltage	105–125 AC or DC
Frequency on AC	50 to 60 cps
Wattage	40 watts

TUNING RANGE

AM	540–1600 kc
FM	88–108 mc

INTERMEDIATE FREQUENCIES

AM	455 kc
FM	10.7 mc

POWER OUTPUT

Undistorted	1.0 watt

LOUDSPEAKER

Type	permanent magnet
Size	5 1/4 inches
Voice Coil Impedance at 400 cps	3.2 ohms

ANTENNA

AM	built-in loop
FM	power line antenna or 300 FM ant.

GENERAL

Model 409 is a table model receiver providing reception on the AM band (540 to 1600 kc) and the FM band (88–108 mc). The receiver is housed in a mahogany colored plastic cabinet.

The receiver has a built-in FM power-line antenna. To operate the receiver from the built-in FM power line antenna it is necessary to connect the power-line antenna wire to FM antenna terminal.

Note: To remove the dial scale it is necessary to remove the escutcheon to gain access to the dial scale mounting screws. Remove the escutcheon by pushing forward on the escutcheon mounting studs from inside of the cabinet.

TUBES

V1—R.F. Amplifier	6BJ6
V2—F.M. Converter—A.M.-F.M. Oscillator	12AT7
V3—1st F.M., I.F. Ampl. A.M. Conv.	12AU6
V4—2nd F.M., 1st A.M.-I.F. Ampl.	12BA6
V5—F.M. Limiter	12AU6
V6—F.M. Discriminator, A.M. Detector and Audio Amp.	19T8
V7—Audio Output	35C5

VOLTAGE CHECKS

1. A.M.-I.F. Sensitivity

100 microvolts at 455 kc. 30% mod. with 400 cycles at the grid (pin 1) of V3 for ½ watt audio output.

A.M.-R.F. Sensitivity

100 microvolts per meter at 580 kc. 30% mod. with 400 cycles for ½ watt audio output.

75 microvolts per meter, at 975 kc. 30% mod. with 400 cycles for ½ watt audio output.

75 microvolts per meter at 1500 kc. 30% mod. with 400 cycles for ½ watt audio output.

2. The following voltages are required at the point of input designated to produce one volt d-c at the test point on the rear of the chassis. This test point is connected to the limiter grid (V5 pin 1) through a 470,000 ohm resistor. The one volt d-c can only be measured with a vacuum tube voltmeter.

F.M.-I.F. Sensitivities at 10.7 Mc Unmod.

(a) 50,000 microvolts at V4 grid (pin 1) for 1 volt d-c at the test point.

(b) 1,000 microvolts at V3 grid (pin 1) for 1 volt d-c at the test point.

(c) 100 microvolts at V2 grid (pin 7) for 1 volt d-c at test point.

Note pin 7 of V2 must be disconnected from the r-f tuner gang before attempting to measure the sensitivity at the converter grid (V2 pin 7).

F.M.-R.F. Sensitivity

For F.M.-R.F. alignment the input impedance of the signal generator should match the 300 ohm input impedance of the receiver.

25 microvolts at 88 megacycles for 1 volt d-c at the test point.

20 microvolts at 98 megacycles for 1 volt d-c at the test point.

30 microvolts at 108 megacycles for 1 volt d-c at the test point.

3. Audio Gain

0.1 volt at 400 cycles applied across the volume control with the volume control set at maximum should give approximately ½ watt output.

4. Oscillator Grid Bias

The d-c voltage developed across R2002 should be approximately 8 volts at 1000 kc and 3 volts at 98 megacycles as measured with a vacuum tube voltmeter.

5. Hum Measurement

On A.M. with the volume control set at a minimum, the hum measured across the speaker leads should not exceed 7 millivolts.

On F.M. with the limiter grid pin 1 of V5 connected to chassis through a 0.1 mf capacitor and the volume control set at a maximum, the hum should not exceed 15 millivolts measured across the speaker leads.

TO INDEX THE DIAL POINTER

The vertical mark on the front of the cabinet under the dial scale represents 98 mc on the F.M. scale. When the pointer is set to this point the receiver should be tuned to 98 mc on the F.M. band. At 98 mc the pointer should be vertical and equidistant from either end of its travel. The pointer will be horizontal at either end of its rotation.

Insert the chassis into the cabinet with the dial scale removed. Connect a 98 mc signal to the F.M. antenna terminals. With the band switch switched to F.M. tune the receiver to give maximum d-c output at the limiter grid test point on the rear of the chassis. Reduce the signal input so that the output at the limiter grid measures about 1 volt as measured by a vacuum tube voltmeter. Set the pointer onto the shaft opposite the 98 mc mark on the cabinet.

If a 98 mc sweep signal is used tune the gang condenser for maximum amplitude of the response curve, of Fig. A on the scope, at the limiter grid test point. Keep input low to prevent limiting which will cause the response curve to flatten off.

CAUTION

ALWAYS USE AN ISOLATION TRANSFORMER IN THE RECEIVER POWER LINE WHEN SERVICING OR ALIGNING THIS RECEIVER TO

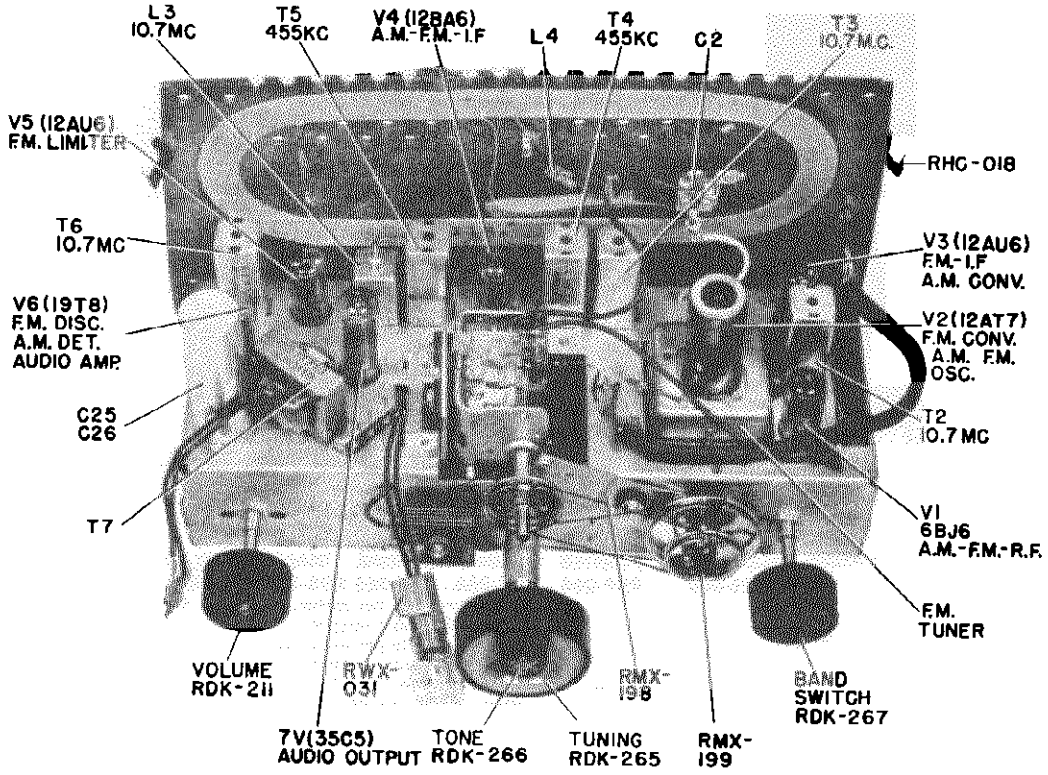


FIG. 1. TOP VIEW

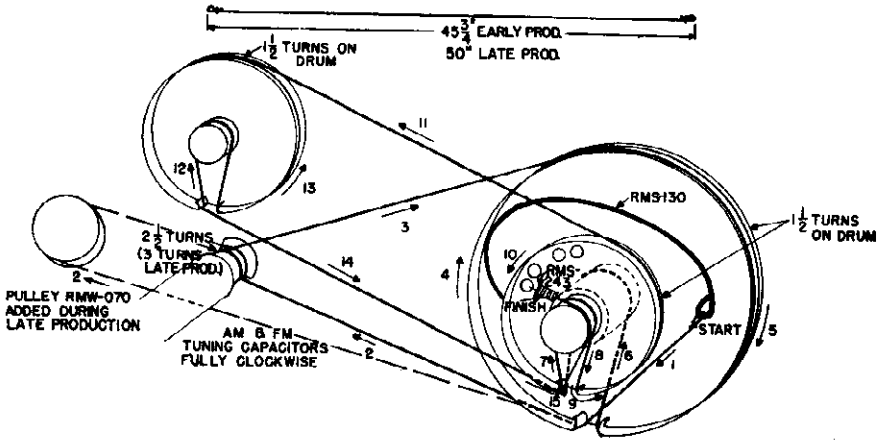


FIG. 2. DIAL STRINGING

DIAL STRINGING

The cord should be strung with both the AM and the FM drums in their full clockwise position. When the dial stringing is completed it may be necessary to slip the cord slightly around the AM drum to make sure that both the AM capacitor and the FM capacitor are fully open or fully closed at the same time.

Steps 1, 2, 3, 4, and 5 are on the large FM drum as shown. Step 6 takes the dial cord around the axle between the drums as shown. Step 7 the cord comes through the notch on the small FM drum and around the axle in front of the small FM drum. Steps 8, 9, and 10 go around the small FM drum. Steps 11, 12, and 13 go around the AM drum as shown. Step 15 the cord goes through the notch in the small FM drum around the axle in front of the small FM drum and connects to the tension spring as shown.

A.M. METER ALIGNMENT NOTES

1. Connect an output meter across the speaker leads to indicate maximum output during A.M. alignment.

2. Turn the volume control to maximum clockwise position and reduce signal input so that output meter does not indicate more than ½ watt output during A.M. alignment.

3. For alignment of the antenna trimmer C2 it is necessary to inductively couple the signal generator output to the loop antenna by connecting a four turn, six inch diameter loop of wire across the generator output terminals and locating the loop about one foot from the radio loop. The position of loop should not be changed during alignment to prevent possible errors in peak readings.

4. Set the band switch in A.M. position.

F.M. METER ALIGNMENT NOTES

5. Connect a vacuum tube voltmeter between the test point on the rear of the chassis and chassis to read the d-c voltage developed at the limiter grid during F.M.–I.F. and R.F. alignment. Dress the V.T.V.M. leads away from the r-f end of the

chassis to prevent regeneration. Reduce the signal input so that the V.T.V.M. reads approximately 1 volt d-c.

6. Connect a vacuum tube voltmeter across the volum control to read the discriminator output.

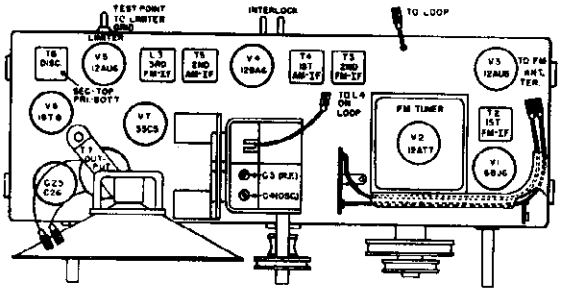


Fig. 3. TOP VIEW

7. To align the primary of T6 (discriminator) detune the signal generator slightly either side of 10.7 mc until maximum d-c volts is read across the volume control then adjust the primary of T6 for max.

8. For F.M.–R.F. alignment the output impedance of the signal generator should be 300 ohms to properly match the input impedance of this receiver.

9. The cover on the F.M. tuner must be in place during F.M.–R.F. alignment.

10. Set the band switch to the F.M. position.

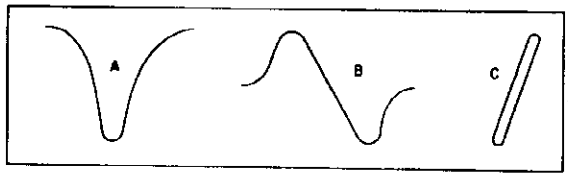


Fig. 4. ALIGNMENT CURVES

METER ALIGNMENT CHART

STEP NO.	SIGNAL GENERATOR FREQUENCY	SIGNAL INPUT POINT BETWEEN	TUNING CAPACITOR SETTING	ADJUST	SEE NOTE NO.
		A.M.—I.F. ALIGNMENT			
1	455 kc, 30% mod. with 400 cycles	Pin 1 of V4 (12BA6) thru .02 mf. and chassis	Fully closed	Primary and secondary cores of T5 for maximum output meter reading	1, 2, 4
2		Pin 1 of V3 (12AU6) thru .02 mf. and chassis		Primary and secondary cores of T4 for maximum output meter reading	
		A.M.—R.F. ALIGNMENT			
3	1620 kc, 30% mod. with 400 cycles	Pin 1 of V1 (6BJ6)	Fully open (min. cap.)	(C4) oscillator trimmer for maximum output meter reading	1, 2, 4
4	1500 kc, 30% mod. with 400 cycles		For maximum output meter reading	R-f trimmer (C-3) for maximum output meter reading while rocking gang condenser	
5		Inductively coupled to the loop. See note 3		Adjust antenna trimmer (C2) on loop for maximum	1, 2, 3, 4
		F.M.—I.F. ALIGNMENT			
6	10.7 mc unmodulated	Pin 1 of V4 (12BA6) thru 100 mmf. and chassis	Fully closed	Core of L3 for maximum d-c reading at test point on rear of chassis	5, 10
7		Pin 1 of V3 (12AU6) thru 100 mmf. and chassis		Cores of T3 for maximum d-c volts at test point on rear of chassis	
8		Stator of C2001 thru .02 mf. thru hole in bottom of F.M. tuner cover		Cores of T2 for maximum d-c volts at test point on rear of chassis	
		F.M. DISCRIMINATOR (T6) ALIGNMENT			
9	10.7 mc unmodulated	Pin 1 of V4 (12BA6) thru 100 mmf. and chassis	Fully closed	T6 secondary core for zero output across volume control (R16)	6, 10
10	Detune for maximum d-c at R16. See note 7			T6 primary core for maximum d-c volts across the volume control (R16)	6, 7, 10
		F.M.—R.F. ALIGNMENT			
11	108.5 mc	At F.M. antenna terminals with built-in F.M. antenna disconnected	Fully open (min. cap.)	F.M. oscillator trimmer C2004 for maximum d-c volts at test point on rear of chassis	5, 8, 9, 10
12				F.M.–R.F. trimmer C2002 for maximum d-c volts at test point on rear of chassis while rocking signal generator frequency	

A.M. VISUAL ALIGNMENT NOTES

1. Connect the vertical plates of the scope from the junction of R9 and R11 to chassis for steps 1 through 4 of the AM Visual alignment.
2. Set band switch to AM position.
3. Rock the gang condenser when making the r-f adjustments as in step 4.
4. When adjusting the loop trimmer C2 the loop and back should be in their correct position with respect to the chassis.
5. For alignment of the r-f trimmers as in step 4 the signal should be inductively coupled to the loop by connecting a four turn six inch loop of bell wire across the signal generator terminals. The position of this loop with respect to the radio loop should not be changed during alignment to prevent possible error in comparative readings.

F.M. VISUAL ALIGNMENT NOTES

6. Set band switch to F.M. position.
7. When connecting the input to the receiver always make the chassis connection as close as possible to the point of input. Dress cables away from the r-f end of the chassis to prevent regeneration.
8. Connect the Vertical plates of the scope through meg to pin 3 of V6 (19T8) and to chassis to view the discriminator response curve.
9. Connect the Vertical plates of the scope to the limiter test point on the rear of the chassis and to chassis to view the response curve during F.M.–I.F. and R.F. alignment.
10. During F.M. alignment keep the signal input low to prevent limiting.
11. The termination impedance of the signal generator should be 300 ohms to properly match the input impedance of this receiver.

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12. In some cases tuning of the converter grid will cause "pulling in" of the oscillator and will change the oscillator frequency. If peaking of C3 or C2002 for max causes the curve to move off the screen it may be necessary to recalibrate the oscillator as in steps 3 or 11.

VISUAL ALIGNMENT CHART

STEP NO.	SIGNAL GENERATOR FREQUENCY	SIGNAL INPUT POINT BETWEEN	TUNING CAPACITOR SETTING	ADJUST	SEE NOTE NO.
		A.M.—I.F. ALIGNMENT			
1	455 kc F.M. modulated ±20 kc at 60 CPS	Pin 1 of V4 (12BA6) thru .02 mf. cap and chassis	Fully closed	Cores of T5 for curve of Fig. 4A with max. amplitude and symmetry	1, 2
2		Pin 1 of V3 (12AU6) thru .02 mf. cap and chassis		Cores of T4 for curve of Fig. 4A with max. amplitude and symmetry	
		A.M.—R.F. ALIGNMENT			
3	1620 kc A.M. modulated with 60 CPS	Pin 1 of V1 (6BJ6) thru .02 mf. and chassis	Fully open minimum capacity	Oscillator trimmer (C4) for steepest slope of straight line trace on scope. See Fig. 4C	1, 2, 12
4	1500 kc F.M. modulated ±20 kc at 60 CPS	Inductively coupled to loop. See note	Adjust for max. amplitude of response curve	Adjust r-f trimmers C3 and C2 on loop for maximum amplitude and symmetry. See Fig. 4A	1, 2, 3, 4, 5, 12
		F.M.—I.F. ALIGNMENT			
5	10.7 mc F.M. modulated ±300 kc at 60 CPS	Pin 1 of V4 (12BA6) thru 100 mmf. and chassis	Closed	Secondary core of T6 for curve of Fig. 4B	6, 7, 8
6				Primary core of T6 for max. amplitude and symmetry of curve of Fig. 4B	6, 7, 8, 10
7		Pin 1 of V3 (12AU6) thru 100 mmf. and chassis		Core of L3 for max. amplitude and symmetry of curve of Fig. 4A	6, 7, 9, 10
8				Cores of T3 for maximum amplitude and symmetry of curve of Fig. 4A	
9		Stator of C2001 thru 100 mmf. and chassis hole in tuner cover		Primary and secondary cores of T2 for maximum amplitude and symmetry of curve of Fig. 4A	
10				Retouch primary and secondary cores of T6 for maximum amplitude and symmetry of curve of Fig. 4B	6, 7, 8, 10
		F.M.—R.F. ALIGNMENT			
11	108.5 mc A.M. modulated at 60 CPS	At F.M. antenna terminals (built in F.M. antenna disconnected)	Fully open minimum capacity	Oscillator trimmer C2004 for steepest slope of straight line trace of Fig. 4C	6, 7, 9, 10, 11, 12
12	108 mc		For maximum amplitude of curve	C2002 for maximum amplitude and symmetry of curve of Fig. 4A	

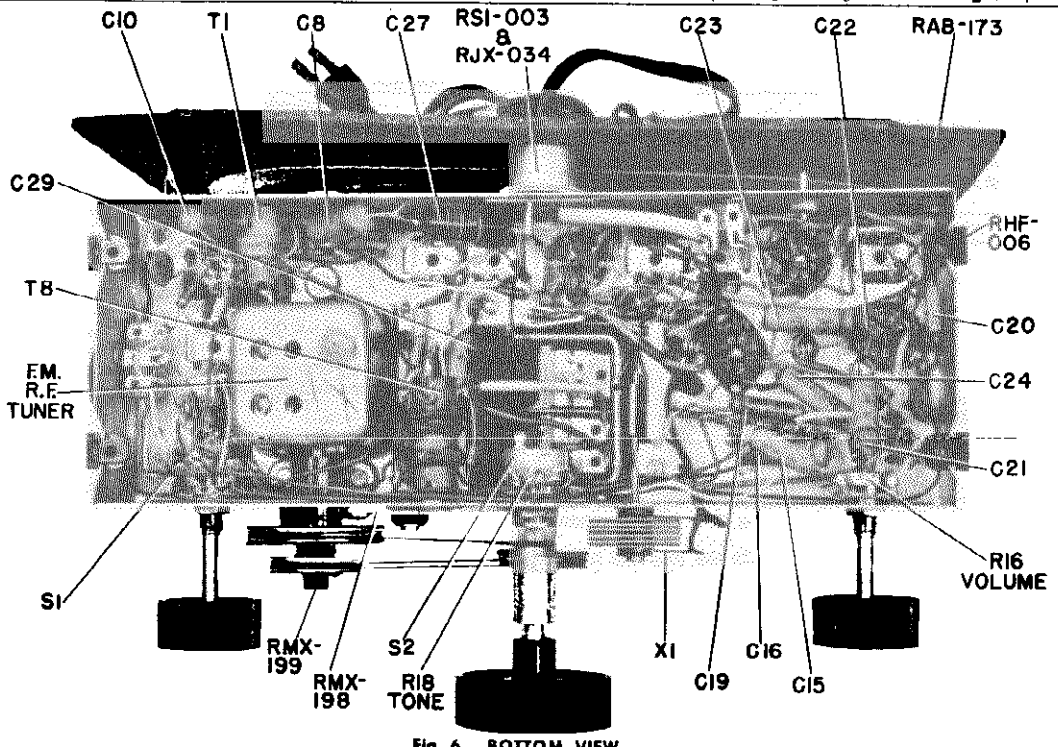


Fig. 4. BOTTOM VIEW

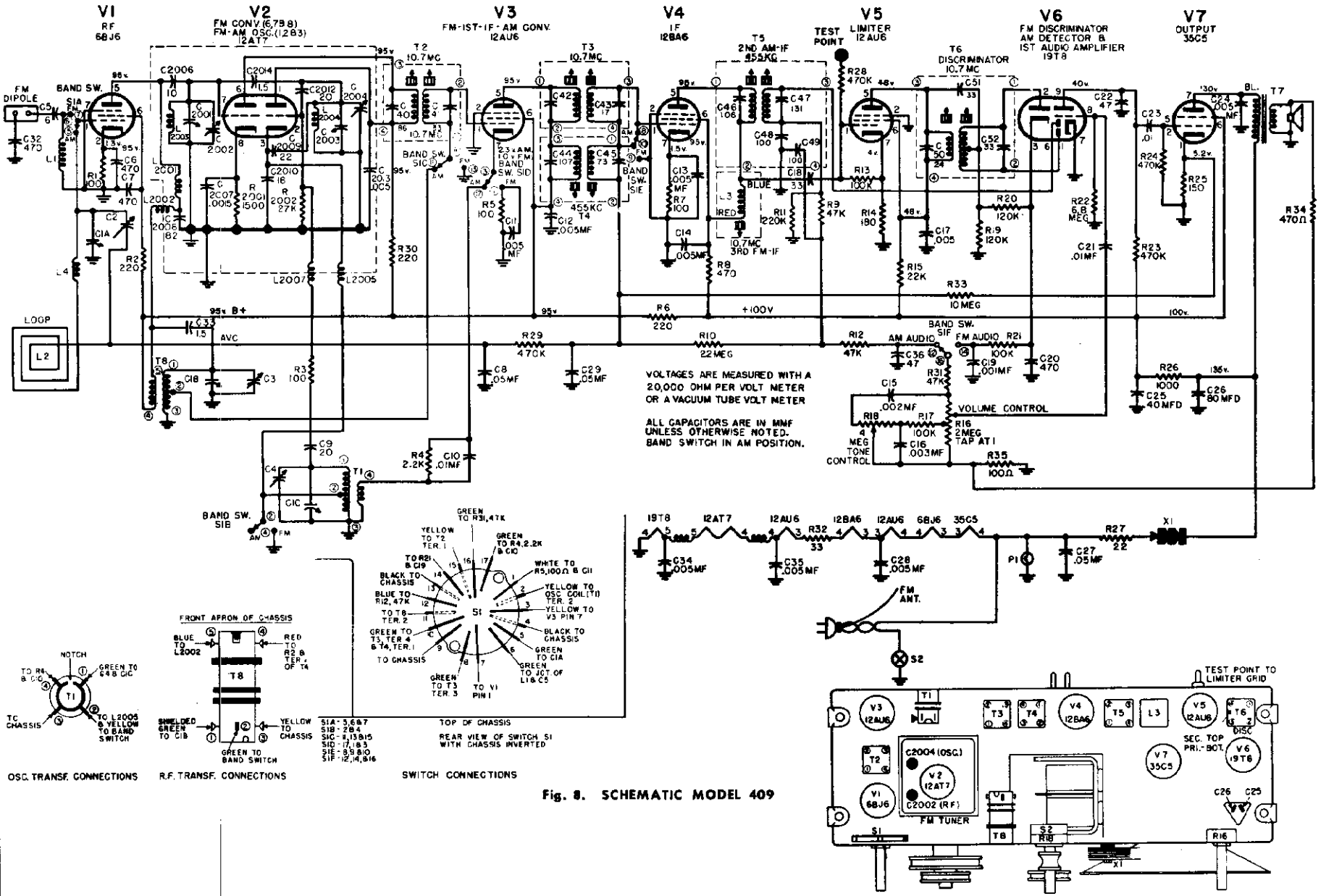


Fig. 8. SCHEMATIC MODEL 409

MODEL 409

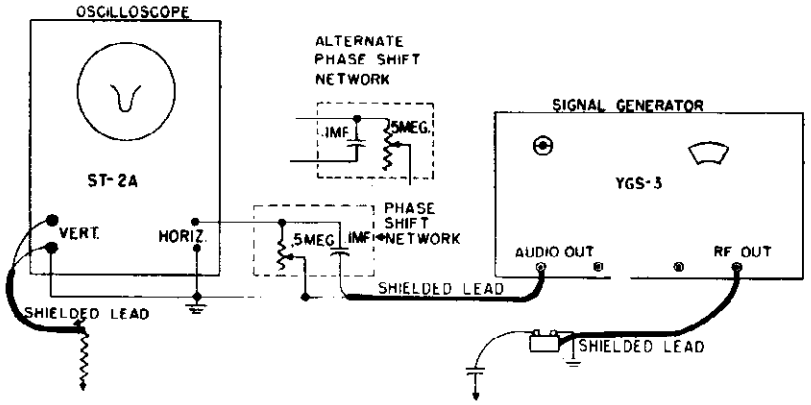


Fig. 7. VISUAL ALIGNMENT CONNECTIONS

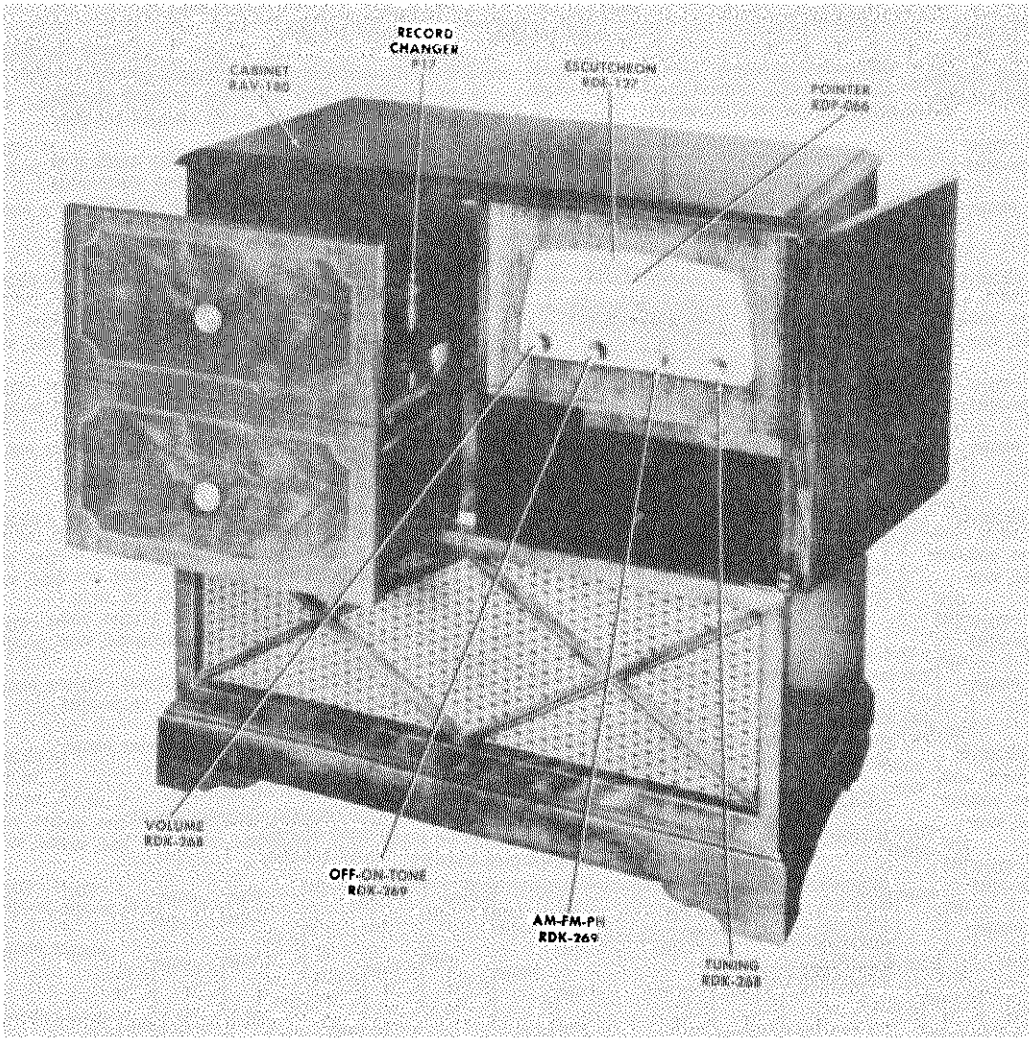
PARTS LIST

Cat. No.	Symbol	Description	Unit Price
		CAPACITORS	
*RCE-101	C25A, 25B	40-80 mfd., 150 v., electrolytic	$2.00
*RCN-040	C5	6 mmf., ceramic	.25
*RCN-046	C2010	18 mmf., silver mica	.25
*RCN-048	C2014, 33	1.5 mmf., ceramic	.20
RCT-055	C2001, 2002, 2003, 2004	F.M. tuning capacitor	3.50
RCT-056	C1A, 1B, 1C	A.M. tuning condenser	
*RCW-026	C2007	.0015 mf., ceramic	.25
*RCW-176	C6, 32	470 mmf., ceramic	.25
*RCW-3014	C11, 12, 13, 14, 17, 28, 34, 35, 2013	.005 mf., hi-k, ceramic	.25
*RCW-3016	C2012	20 mmf., ceramic	1.00
RCW-3065	C2009	22 mmf., ceramic	.60
RCY-016	C2	Trimmer, 2-20 mmf.	.35
*UCC-011	C8, C29	.05 mf., 200 v., paper	.30
*UCC-035	C19	.001 mf., 600 v., paper	.30
*UCC-036	C15	.002 mf., 600 v., paper	.25
*UCC-037	C16	.003 mf., 600 v., paper	.25
UCC-039	C24	.005 mf., 600 v., paper	.25
*UCC-040	C10, 21, 23	.01 mf., 600 v., paper	.25
*UCC-045	C27	.05 mf., 600 v., paper	.30
*UCG-004	C2006	10 mmf., silver mica	.25
*UCG-016	C18	33 mmf., silver mica	.25
*UCG-020	C22, 36	47 mmf., silver mica	.35
UCG-1011	C9	20 mmf., silver mica	
*UCG-1026	C2008	82 mmf., silver mica	.25
*UCU-044	C20	470 mmf., mica	.30
		RESISTORS	
RRC-177	R16	Volume control	$1.25
RRC-178	R18	Tone control	1.60
RRW-084	R26	1000 ohms, 2 w., w.w.	.35
RRW-085	R32	33 ohms, 2 w., w.w.	.35
*URD-009	R27	22 ohms, ½ w., carbon	.13
*URD-025	R1, 3, 5, 7	100 ohms, ½ w., carbon	.13
*URD-031	R14	180 ohms, ½ w., carbon	.13
*URD-033	R2, 6, 30	220 ohms, ½ w., carbon	.13
*URD-041	R8	470 ohms, ½ w., carbon	.13
*URD-053	R2001	1500 ohms, ½ w., carbon	.13
*URD-057	R4	2200 ohms, ½ w., carbon	.13
*URD-081	R15, R2002	22,000 ohms, ½ w., carbon	.13
*URD-089	R9, 12, 31	47,000 ohms, ½ w., carbon	.13
*URD-097	R13, 17, 21	100,000 ohms, ½ w., carbon	.13
*URD-099	R19, 20	120,000 ohms, ½ w., carbon	.13
*URD-105	R11	220,000 ohms, ½ w., carbon	.13
*URD-113	R23, 24, 28, 29	470,000 ohms, ½ w., carbon	.13
*URD-029	R25	150 ohms, ½ w., carbon	.13
*URD-129	R10	2.2 meg., ½ w., carbon	.13
*URD-141	R22	6.8 meg., ½ w., carbon	.13
*URD-145	R33	10 meg., ½ W., carbon	.13
		COILS AND TRANSFORMERS	
RLB-031	L2003	F.M.-R.F.—COIL	$0.15
RLB-032	T8	COIL—B.C.-R.F.	1.50
RLC-114	L2004	F.M. OSCILLATOR COIL	.15
RLC-115	T1	COIL—B.C. OSCILLATOR	.90
*RLI-122	L4, L2002, 2005, 2006, 2007	CHOKE—A.M. LOOP (2.2 uh)	.25
*RLI-124	L2001	R.F. PLATE—Choke	.80
*RLI-163	L1	CHOKE—F.M. ANTENNA	.15
*RTD-006	T6	F.M. DISCRIMINATOR TRANSFORMER	4.95

Cat. No.	Symbol	Description	Unit Price
		COILS AND TRANSFORMERS (Cont'd)	
*RTL-111	T5	I.F. TRANSFORMER—2nd B.C.	$2.10
*RTL-112	T2	I.F. TRANSFORMER—1st F.M.	1.80
RTL-128	T4	I.F. TRANSFORMER—1st B.C.	2.10
RTL-129	T3	I.F. TRANSFORMER—2nd F.M.	2.25
RTL-130	L3	I.F. COIL—3rd F.M.	2.10
RTO-112	T7	OUTPUT TRANSFORMER	2.75
		MISCELLANEOUS ELECTRICAL	
*RJC-004		TERMINAL—For loop connections	$0.02
*RJS-118		TUBE SOCKET—For V6	.35
*RJS-125	V1, 3, 4, 5, 7	TUBE SOCKET	.20
RJS-174		TUBE SOCKET—For V2	
*RJX-034		INTERLOCK Female terminal cap and insulator	.45
*RER-010		SELENIUM RECTIFIER	1.60
*RSI-003		INTERLOCK—Male	.15
RSW-090	S1A, 1B, 1C, 1D, 1F	BAND SWITCH	2.25
*RWL-022		POWER CORD SET	1.25
*RWX-031		PILOT LIGHT ASSEMBLY	.50
*IRS-527D		SPEAKER—5½ in.	4.60
		MISCELLANEOUS MECHANICAL	
RAC-099		COVER—For F.M. tuner	
*RDC-032		DIAL CORD—25 yds.	$2.50
*RDE-080		ESCUTCHEON—(Cabinet)	1.90
RDP-065		POINTER	.35
RDS-111		DIAL SCALE	2.35
*RHC-018		CLIP—For mounting loop and back	.05
*RHC-038		CLIP—For mounting B.C.-R.F. transformer T8	.02
*RHC-034		CLIP—Coil mounting for L3	.05
*RHC-049		CLIP — For mounting escutcheon around dial	.02
*RHF-006		CHASSIS FOOT	.15
*RHG-015		GROMMET—Tuning gang mounting	.05
RHH-004		SNAP FASTENER—For fastening back onto cabinet	.02
*RHM-025		"C" TYPE RETAINING RING on tone control shaft	.01
RHS-091		TUBE SHIELD—For V2	
RMC-002		CLIP—(Coil mounting)—for B.C. oscillator coil, T1	.05
*RMS-130		SPRING—(LG Drum of F.M. tuner)	.15
*RMS-243		SPRING—Tension, for pointer drive cord	.10
RMS-274		SPRING	.02
RMU-080		TUNING SHAFT	.60
RMX-198		LINK ROLLER ASSEMBLY—Includes shoulder rivets	.60
RMX-199		DRUM AND BUSHING ASSY.—On F.M. tuner	.85
		CABINETS AND CABINET PARTS	
RAB-173		LOOP AND BACK ASSEMBLY	$2.25
*RAD-049		BRACKET—Pilot light	.05
RAU-355		CABINET—409	8.50
*RDK-211		KNOB—Volume	.25
RDK-265		KNOB—Tuning	.25
RDK-266		KNOB—Tone	.20
RDK-267		KNOB—Band	.25

*PARTS USED ON PREVIOUS RECEIVERS

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



SPECIFICATIONS

CABINET:

	754	756
Material	Wood	Wood
Color	Mahogany	Blonde
Height	33⅓ in.	33⅓ in.
Width	33 in.	33 in.
Depth	17 in.	17 in.

ELECTRICAL RATING:

Voltage	105-125
Frequency	60 cycles
Wattage (Radio only)	85 watts
(With phono)	100 watts

OPERATING FREQUENCIES:

AM-RF	540-1600 kc
FM-RF	88-108 mc
AM-IF	455 kc
FM-IF	10.7 mc

AUDIO POWER OUTPUT (120 VOLTS LINE):

Undistorted	3 watts
Maximum	5 watts

LOUDSPEAKER:

Type	Alnico PM
Size	12 inc
Voice Coil Impedance at 400 cycles	3.2 oh

RECORD CHANGER:

Model P17	33⅓, 45 and 78 RI

PHONOGRAPH PICKUP:

Type	Dual stylus, variable reluctai
DC Resistance	340 oh

ANTENNA:

AM	External or built-in-l
FM	Powerline antenna or 300-ohm FM a

If it is necessary to install an external FM antenna, the built powerline antenna should be disconnected from the ante terminals.

TUBE COMPLEMENT:

(V1)	RF Amplifier 6I
(V2)	FM Oscillator Converter, AM Osc. 12A
(V3)	1st FM IF, AM Converter 6E
(V4)	AM FM I-F Amplifier, Phono Preamp 6A
(V5)	FM Limiter 6A
(V6)	FM Discriminator, AM Detector, 1st Audio Amplifier
(V7)	Rectifier
	Dial Lamp Mazda

MODELS 754, 756

STAGE GAINS

Stage gain measurements using a vacuum tube voltmeter or oscilloscope with a calibrated signal generator may be used to check circuit performance and isolate trouble. Use small signals to eliminate AVC action. Tolerance 20%. Signal applied through 470 ohm resistor and 1000 mmfd. capacitor in series.

STAGE	GAIN AM	GAIN FM
Ant. to V1 Grid	.....	1 (98 MC)
V1—V2 Grid	.....	6 (98 MC)
V1—V3 Grid	14 (1000 KC)	.....
V2—V3 Grid	.....	10 (10.7 MC)
V3—V4 Grid	70 (455 KC)	45 (10.7 MC)
V4—V5 Grid	(455 KC)	20 (10.7 MC)
V6—V4 Grid	80 (455 KC)	.....

OSCILLATOR GRID BIAS:

DC voltage developed across R2002. Use 100K resistor to isolate meter. Tolerance 20%.

	VTVM	20K ohms/voltmeter
1000 KC	7 volts	4 volts
98 MC	3 volts	2 volts

HUM MEASUREMENT

Hum measured across the voice coil of the speaker with the volume control set at minimum and band switch in the AM position should not exceed 7 millivolts.

On FM position ground the limiter grid through a .01 mfd. capacitor and measure the hum across the voice coil with volume control at maximum. Hum should not exceed 15 millivolts.

ANTENNA CONNECTIONS

This receiver is designed to operate on a built-in AM and a built-in FM antenna or from an external AM and an external 300 ohm FM antenna.

If no external AM antenna is used, the AM antenna terminal should be connected to the chassis ground by the shorting link.

If an external FM antenna is used the built-in FM antenna (third wire of the power cord) should be disconnected from the FM antenna terminal.

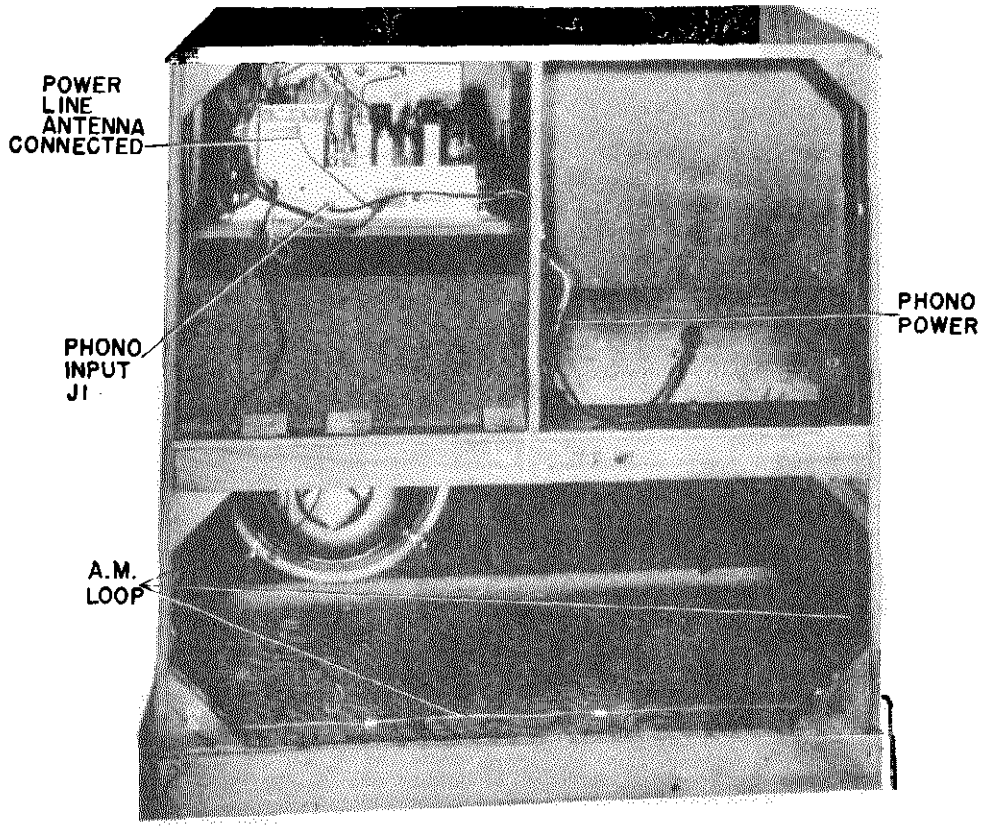
If the built-in FM antenna is to be used, it should be connected to the high side of the FM input terminals (second terminal from the right side of the terminal board).

METER ALIGNMENT NOTES

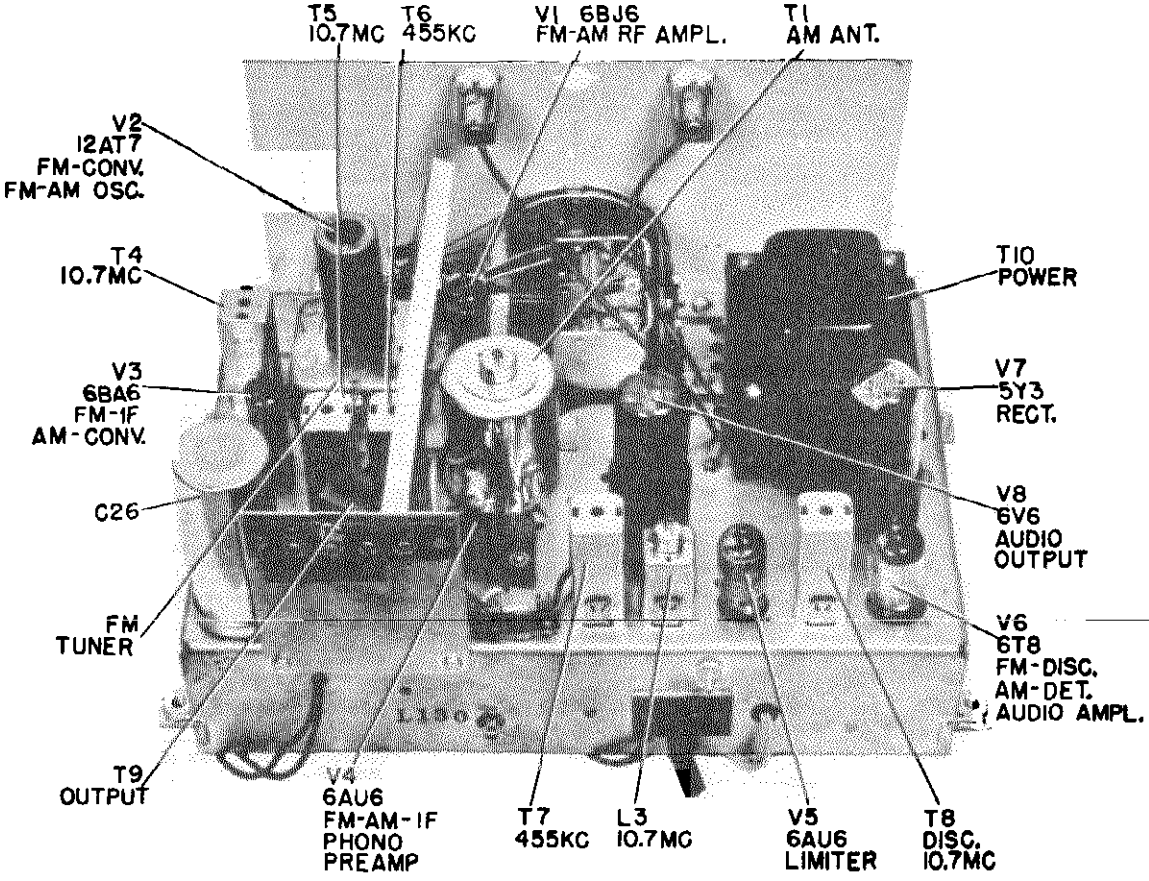
1. Connect an output meter across the speaker leads to indicate maximum output.
2. Turn volume control to maximum clockwise position and reduce signal input so that output meter does not indicate more than ½ watt output.
3. Band switch set in AM position.
4. Connect an 18 microhenry choke across the loop terminals to assimilate the loop during alignment.
5. Connect a vacuum tube voltmeter from the limiter grid test point to chassis to read the d-c voltage developed at the limiter grid during FM-IF and RF alignment. Dress the leads to the vacuum tube voltmeter leads away from the r-f end of the chassis to prevent regeneration. Reduce signal input so that V.T.V.M. reads approximately 1 volt d-c at limiter grid test point.
6. Connect a vacuum tube voltmeter across the volume control and align the secondary of T8 for zero output at 10.7 mc.
7. Detune the signal generator either side of 10.7 mc until maximum d-c volts across the volume control is read—then peak the primary core of T8.
8. For FM-RF alignment the output impedance of the signal generator cable should be 300 ohms to properly match the input impedance of this receiver.
9. The cover over the FM-RF tuner must be in place during FM-RF alignment.
10. Band switch in FM position.
11. Make the chassis connection as close to the signal input point as possible.

METER ALIGNMENT CHART

Step No.	Signal Generator Frequency	Signal Input Point Between	Tuning Gang Capacitor	Adjust	See Note No.
		AM-IF ALIGNMENT			
1	455 KC 30% mod. with 400 cycles	Pin 1 of V4 (6AU6) thru .02 mf. and chassis	Closed	Primary and secondary cores of T7 for max. output meter reading	1, 2, 3
2		Pin 1 of V3 (6BA6) thru .02 mf. and chassis		Primary and secondary cores of T6 for max. output meter reading. Recheck adjustment of T7 cores	
		AM-RF ALIGNMENT			
3	1620 KC 30% mod. with 400 cycles	Pin 1 of V1 (6BJ6) thru .02 mf. and chassis	AM gang cap. fully open. (Min. cap.)	Adjust oscillator trimmer (C36) for maximum output meter reading.	1, 2, 3
4	1500 KC 30% mod. with 400 cycles		Tuning gang for max. output meter reading.	Adjust r-f trimmer (C7) for maximum output meter reading while rocking gang condenser.	
5	580 KC 30% mod. with 400 cycles	AM antenna terminals thru I. R. E. dummy antenna		Core of T1 for maximum	1, 2, 3, 4
6	1500 KC 30% mod. with 400 cycles			Adjust antenna trimmer C5 for maximum	
		FM-IF ALIGNMENT CHART			
7	10.7 mc unmodulated	Pin 1 of V4 (6AU6) thru 100 mmf. and chassis	Closed	Core of L3 for max. d-c voltage at test point on rear of chassis	5, 10, 11
8		Pin 1 of V3 (6BA6) thru 100 mmf. and chassis		Cores of T5 for max. d-c volts at limiter test point	
9		Stator of C2001 thru 100 mmf. thru hole in bottom of tuner cover		Cores of T4 for max. d-c volts at limiter test point	
		FM DISCRIMINATOR ALIGNMENT			
10	10.7 mc unmodulated	Pin 1 of V4 thru 100 mmf. and chassis	Closed	T8 secondary core for zero output across the volume control R28 at 10.7 mc	6, 10, 11
11	Detune for max. d.c. at R28. See Note 7.			T8 primary core for max. d-c volts across the volume control R28	6, 7, 10, 11
		FM-RF ALIGNMENT			
12	108.5 mc	At FM antenna terminals	Tuning capacitor fully open	Oscillator trimmer C2004 for maximum d-c voltage at limiter grid test point.	5, 8, 9, 10, 11
13	108 mc		Tune for maximum	FM-RF trimmer C2002 for max. output at limiter grid test point while rocking signal generator	
14	Recheck oscillator alignment as in Step 12.				



REAR VIEW



TOP VIEW

EQUIPMENT REQUIRED FOR METER ALIGNMENT

1. Signal generator (G.E.-YGS-3 or equivalent)
2. Vacuum tube voltmeter
3. Output meter
4. One 18 microhenry choke to assimilate the loop
5. .02 mf capacitor
6. 100 mmf capacitor

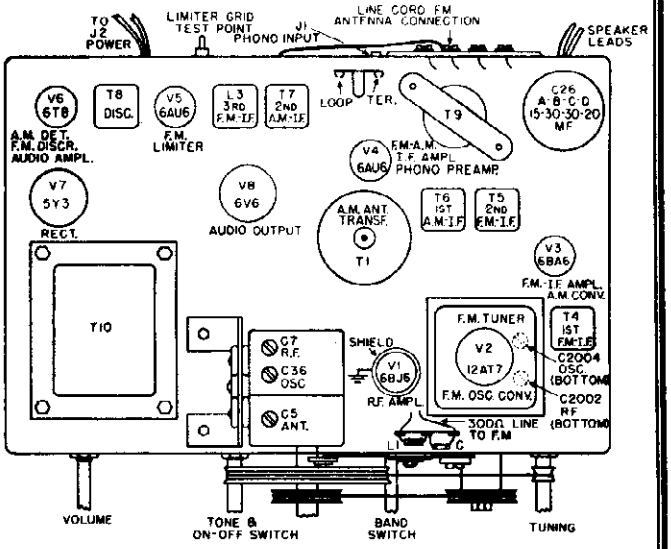


FIG. 1. TOP VIEW

VISUAL ALIGNMENT NOTES

1. Set the band switch to AM position.
2. Connect the vertical plates of the scope across the volume control for AM alignment.
3. Use a frequency modulated sweep with its center frequency, at the frequency specified. Connect the same frequency that modulates the signal to the horizontal plates of the scope.
4. Keep signal generator input low so that A.V.C. does not take place.
5. Visual oscillator alignment is done by using a signal amplitude modulated with 60 c.p.s. and sweeping the horizontal plates of the scope with the same frequency. As the receiver is tuned to the signal frequency the slope of the straight line trace will become steeper.
6. During AM-RF alignment connect an 18 microhenry choke across the loop terminals to assimilate the loop during alignment.
7. Shield of input cable should be connected to chassis as close to the point of input as possible.
8. Connect the vertical plates from the limiter grid test point on the rear of the chassis, to chassis for FM-IF and RF alignment. The cable should be dressed away from the r-f end of the chassis to prevent possible regeneration.
9. Connect the vertical plates of the scope from pin 3 of V6 (6T8) through 200,000 ohm resistor and to chassis to view the discriminator response.
10. The output impedance of the sweep generator should match the 300 ohm input impedance of this receiver during FM-RF alignment.
11. Set the band switch to FM position.

VISUAL ALIGNMENT CHART

Step No.	Signal Generator Frequency	Signal Input Point Between	Tuning Gang Capacitor	Adjust	See Note No.
		AM—IF ALIGNMENT			
1	455 KC with FM sweep ±20 KC at 60 cps	Pin 1 of V4 (6AU6) thru .02 mf. and chassis		Primary and secondary cores of T7 for max. amplitude and symmetry of curve of Fig. 3A.	1, 2, 3, 4, 7
2		Pin 1 of V3 (6BA6) thru .02 mf. and chassis		Primary and secondary cores of T6 for max. amplitude and symmetry of curve of Fig. 3A.	
		AM—RF ALIGNMENT			
3	1620 KC AM modulated at 60 cps	Pin 1 of V1 (6BJ6) thru .02 mf. and chassis	AM gang cap. fully open (min. cap.)	Adjust oscillator trimmer (C36) for steepest slope of trace on screen See Fig. 3C	1, 2, 4, 5, 7
4	1500 KC freq. mod. ±20 KC at 60 cps		Tuning gang for max. ampl. of response curve	C7 r-f trimmer for max. amplitude and symmetry of curve of Fig. 3A	1, 2, 3, 4, 7
5	580 KC freq. mod. ±20 KC at 60 cps	AM antenna terminal through I. R. E. dummy antenna and chassis		Core of T1 for maximum amplitude and symmetry of curve of Fig. 3A	1, 2, 3, 4, 6, 7
6	1500 KC freq. mod. ±20 KC at 60 cps			C5 antenna trimmer for max. amplitude and symmetry of curve of Fig. 3A.	
		FM—IF ALIGNMENT			
7	10.7 mc freq. mod. ±.3 mc at 60 cps	Pin 1 of V4 (6AU6) thru 100 mmf. and chassis	Closed	Core of L3 for max. amplitude and symmetry of curve of Fig. 3A.	4, 7, 8, 11
8		Pin 1 of V3 (6BA6) thru 100 mmf. and chassis		Cores of T5 for max, amplitude and symmetry of curve of Fig. 3A.	
9		Stator of C2001 thru 100 mmf. and chassis		Cores of T4 for max. amplitude and symmetry of curve of Fig. 3A.	
		FM DISCRIMINATOR ALIGNMENT			
10	10.7 mc freq. mod. ±.3 mc at 60 cps	Pin 1 of V4 thru 100 mmf. and chassis	Closed	T8 secondary core for curve of Fig. 3B.	4, 7, 9, 11
11				T8 primary core for max. ampl. and symmetry 3B.	
12				Retouch secondary core of T8 for symmetry	
		FM—RF ALIGNMENT			
13	108.5 mc ampl. mod. with 60 cps	At FM antenna terminals	Fully open (min. cap.)	Osc. trimmer C2004 for steepeat slope of trace Fig. 3C.	4, 5, 7, 8, 10, 11
14	108 mc freq. mod. ±.3 mc at 60 cps		Tune for maximum	FM—RF trimmer C2002 for max. ampl. and symmetry of curve of Fig. 3A.	4, 7, 8, 10, 11

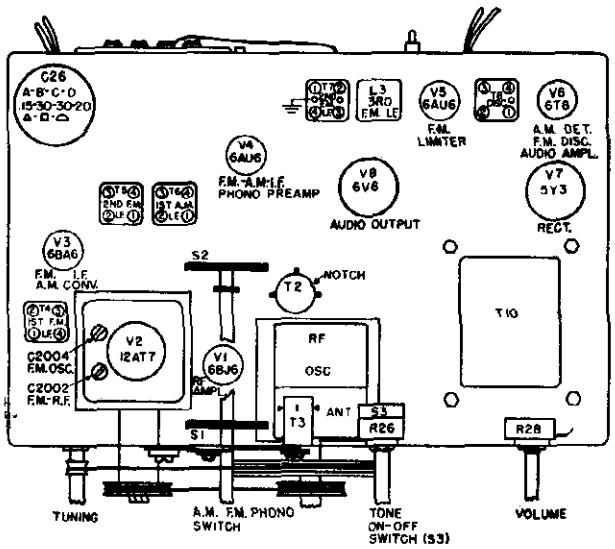


FIG. 2. BOTTOM VIEW

EQUIPMENT REQUIRED FOR VISUAL ALIGNMENT

1. Scope (G.E.ST2A or equivalent)
2. Sweep Generator (G.E. YG S-3 or equivalent)
3. Phase shift network as shown in Fig. 10
4. .02 mf capacitor
5. 100 mmf capacitor
6. 200,000 ohm resistor to isolate scope.
7. One 18 microhenry choke to assimilate the loop.

FIG. 3. ALIGNMENT CURVES

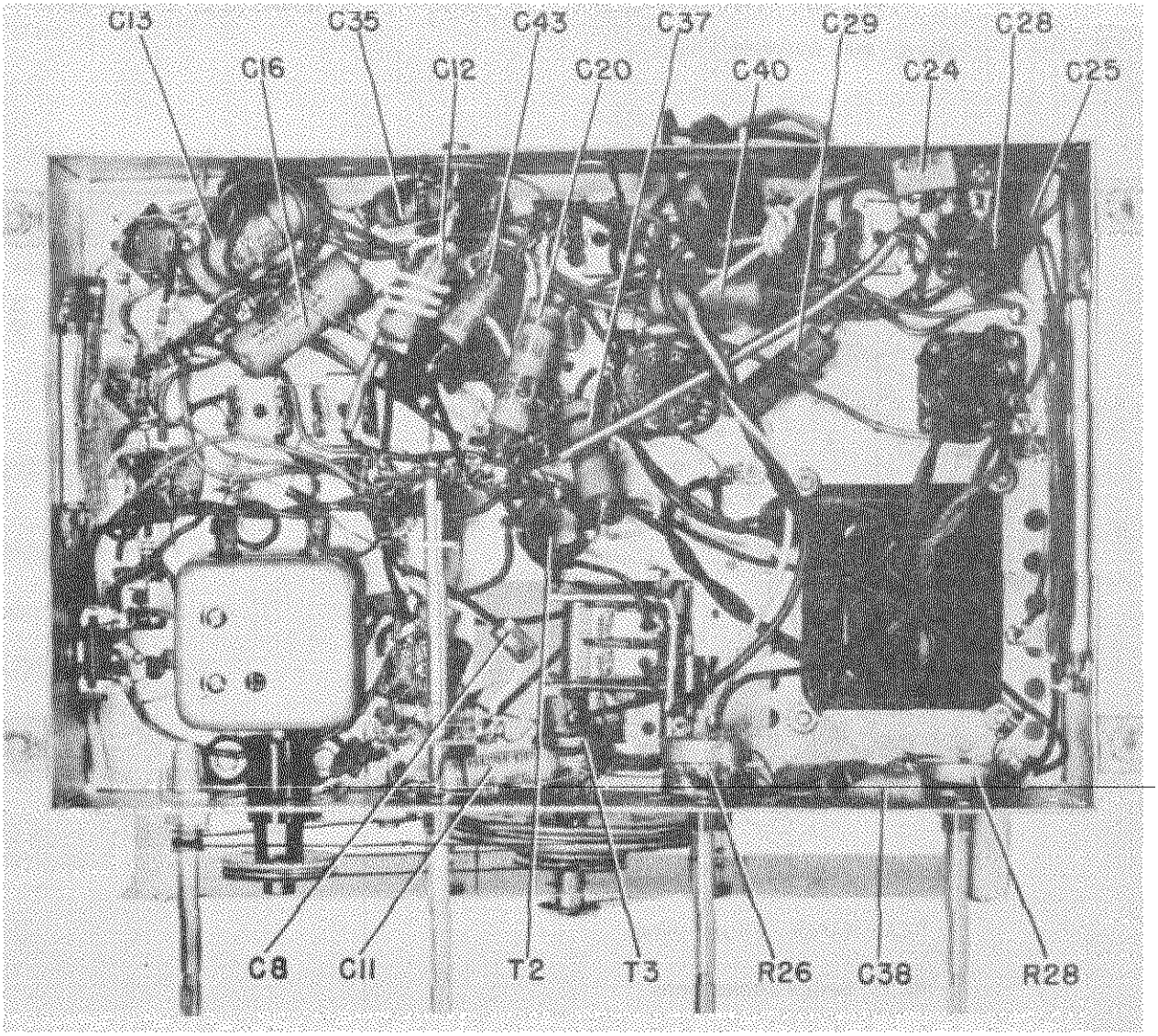


FIG. 4. BOTTOM VIEW OF CHASSIS

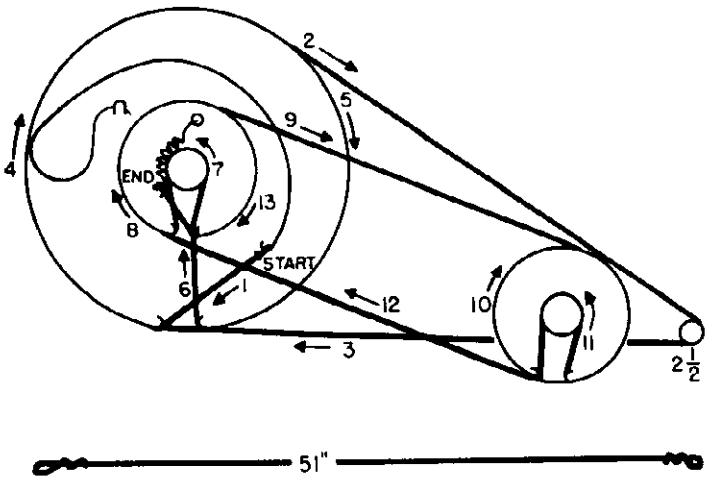


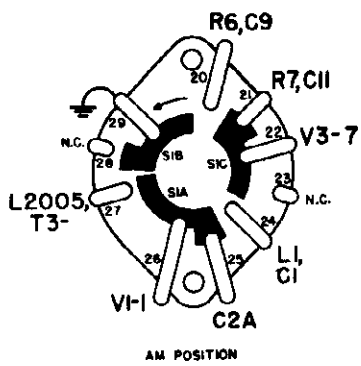
FIG. 5. DIAL STRINGING

DIAL STRINGING

When stringing the dial cord both the A.M. and the F.M. tuning capacitor drums should be turned fully clockwise (minimum capacity). When the dial stringing is completed both tuning capacitors should be fully open or fully closed at the same time.

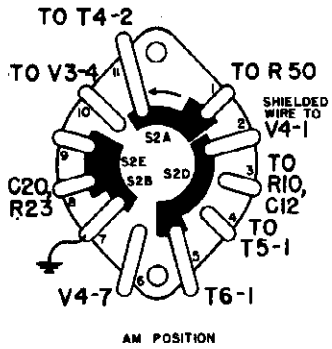
Steps 1, 2, 3, 4 and 5 are as shown in Fig. 5. At step 6 the cord is brought from the large drum onto the small drum as shown. Step 7 takes the cord around the axle and on to step 8 around the small drum of the A.M. tuning capacitor. Steps 9, 10, 11 and 12 are as shown in Fig. 5.

The pointer should be set opposite the last mark on the F.M. scale with the tuning capacitor in its fully clockwise position.



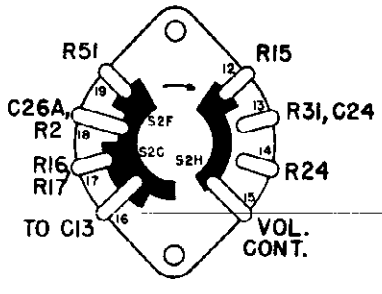
AM POSITION

FRONT WAFER REAR VIEW



AM POSITION

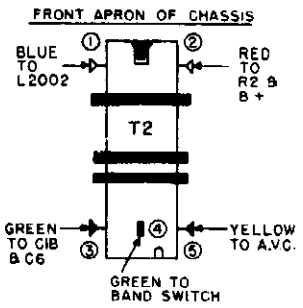
REAR WAFER REAR VIEW



AM POSITION

REAR WAFER FRONT VIEW

FIG. 7. SWITCH CONNECTIONS



R.F. TRANSF. CONNECTIONS

OSC. TRANSF. CONNECTIONS

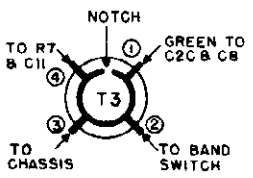
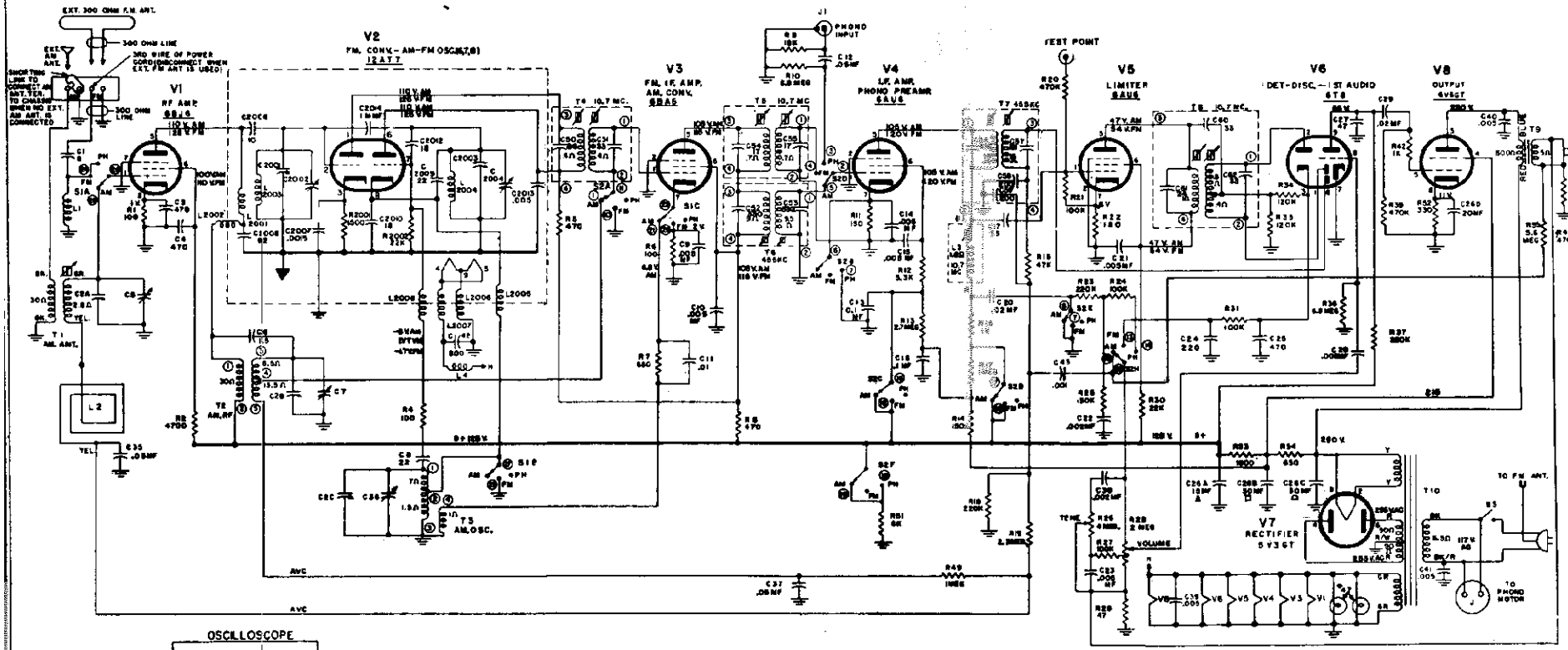
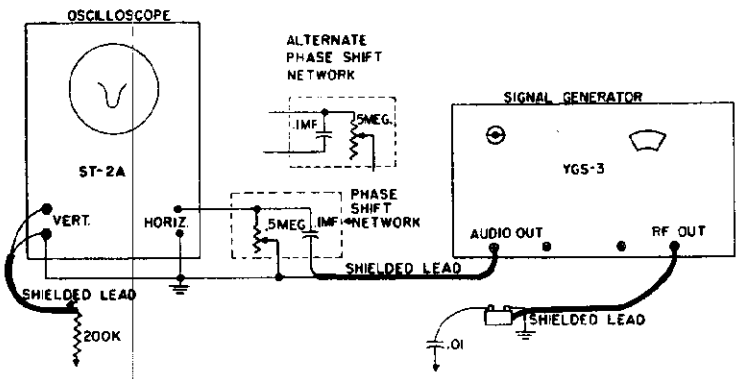


Fig. 8
COIL CONNECTIONS





NOTE: ALL RESISTANCES IN OHMS UNLESS OTHERWISE DESIGNATED
ALL CAPACITANCES GIVEN IN MICRO-MICROFARADS UNLESS OTHERWISE DESIGNATED
VOLTAGES ARE PLUS OR MINUS 20% TOLERANCE
VOLTAGES MEASURED WITH A V.T.V.M. OR 20,000 OHM PER VOLT METER

FIG. 6. SCHEMATIC 754 & 756

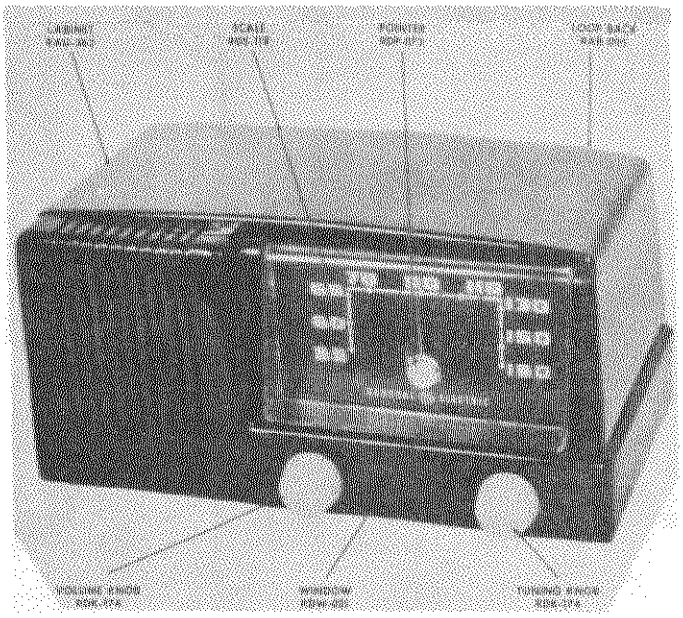
MODELS 754, 756

PARTS LIST

Cat. No.	Symbol	Description	Unit Price
		CAPACITORS	
RCE-039	C26A, B, C	15 mf., 300 v., 30-30 mf., 350 v., 20 mf., 25 v.	$3.50
RCN-001	C2014	1 mmf.	.20
RCN-040	C1	6 mmf., ceramic	.25
RCN-046	C2010	18 mmf., silver mica	.25
*RCN-048	C6	1.5 mmf.	.20
*RCT-055	C2001, C2002, 2003, 2004	F-M tuning capacitor	3.50
RCT-057	C2A, B, C.	A.M. tuning capacitor	
*RCW-026	C2007	1500 mmf., 300 v.	.25
*RCW-2031	C2012	18 mmf.	.60
*RCW-3014	C9, 10, 14, 15, 21, 39	.005 mf.	.25
RCW-3037	C42	800 mmf.	.25
*RCW-3065	C2009	22 mmf.	.60
RCW-3067	C3, 4	470 mmf.	
*UCC-011	C12, 35, 37	.05 mf., 200 v.	.30
*UCC-022	C23, 28	.005 mf., 400 v.	.25
*UCC-036	C22, 38	.002 mf., 600 v.	.25
*UCC-040	C11	.01 mf., 600 v.	.25
*UCC-041	C20, 29	.02 mf., 600 v.	.25
*UCC-048	C13, 16	.1 mf., 600 v.	.45
UCC-059	C40	.005 mf., 1000 v.	.30
*UCG-016	C17	33 mmf., silver mica	.25
*UCG-004	C2006	10 mmf.	.25
UCG-020	C27	47 mmf., silver mica	.35
*UCG-1012	C8	22 mmf., silver mica	.35
*UCG-1026	C2008	82 mmf., silver mica	.25
UCU-044	C25	470 mmf.	.30
UCU-536	C24	220 mmf.	.30
		RESISTORS	
RRC-179	R26, S3	Tone control 4 meg. and on-off switch	
RRC-180	R28	Volume control 2 megohms	
RRW-086	R51	600 ohms W. W.	
RRW-087	R53, 54	Dual 650 ohms & 1800 W. W. ohms	
*URD-019	R29	47 ohms	$0.13
*URD-025	R1, 4, 6	100 ohms, ½ w., carbon	.13
*URD-029	R11	150 ohms, ½ w., carbon	.13
*URD-031	R22	180 ohms, ½ w., carbon	.13
*URD-041	R5, 8, 48	470 ohms, ½ w., carbon	.13
*URD-045	R50, 7	680 ohms, ½ w., carbon	.13
*URD-049	R16, 42	1000 ohms, ½ w., carbon	.13
*URD-053	R2001	1500 ohms, ½ w., carbon	.13
*URD-061	R12	3,300 ohms, ½ w., carbon	.13
*URD-065	R2	4700 ohms, ½ w., carbon	.13
*URD-079	R9	18,000 ohms, ½ w., carbon	.13
*URD-081	R30, 2002	22,000 ohms, ½ w., carbon	.13
*URD-089	R15	47,000 ohms, ½ w., carbon	.13
*URD-097	R21, 24, 27, 31	100,000 ohms, ½ w., carbon	.13
*URD-099	R34, 35	120,000 ohms, ½ w., carbon	.13
*URD-101	R14, 24	150,000 ohms, ½ w., carbon	.13
*URD-105	R18, 23, 37	220,000 ohms, ½ w., carbon	.13
*URD-113	R20, 39, 45	470,000 ohms, ½ w., carbon	.13
*URD-121	R17, 49	1 megohm, ½ w., carbon	.13
*URD-129	R19	2.2 megohms, ½ w., carbon	.13
*URD-131	R13	2.7 megohms, ½ w., carbon'	.13
URD-139	R55	Resistor 5.6 meg ½ w.	.13
*URD-141	R10, 36	6.8 megohms, ½ w., carbon	.13
*URE-037	R52	330 ohms, 1 w., carbon	
		COILS AND TRANSFORMERS	
RLA-038	T1	TRANSF.—AM antenna	
*RLB-031	L2003	COIL—FM—RF coil	$0.15
RLB 033	T2	TRANSF.—AM—RF	
RLC-114	L2004	COIL—FM oscillator coil	.15
RLC-116	T3	TRANSF.—AM oscillator	
*RLI-102	L2005, 2006, 2007	COIL—Choke coil, 1 milhenry	.35
*RLI-122	L2002, 2008	COIL—2.2 milhenry choke coil	.25
RLI-124	L2001, L4	COIL—RF plate choke coil	.80
RLI-164	L1	COIL—FM antenna coil	.35
RLL-048	L2	LOOP—AM antenna loop	
RTD-010	T8	TRANSF. — Discriminator transformer, 10.7 mc	4.95
RTL-112	T4	TRANSF.—1st FM—IF	1.80
RTL-113	T5	TRANSF.—2nd FM—IF	2.25
RTL-131	T6	TRANSF.—1st AM—IF	
RTL-132	L3	COIL—3rd FM—IF coil, 10.7 mc	
RTL-134	T7	TRANSFORMER—2nd AM—IF	
RTO-113	T9	TRANSF.—Audio output	
RTP-311	T10	TRANSF.—Power, 60 cycle	
		MISCELLANEOUS ELECTRICAL	
RHC-040		TUBE SHIELD base for V1	$0.05
*RHS-091		SHIELD—For V2	
RHW-034		WASHER — Insulated shoulder washer for mounting RJC-023	
*RII-047		WASHER—Phono jack washer for J1	.05
*RJC 019		PIN—Speaker lead pins	.02
RJC-023		PIN—Contact pin for limiter grid test point	
*RJP-003		A.C. PLUG—Female for 110V. A.C. on record changer	.15
*RJP-004		PHONO PLUG—Male (audio) on record changer	.10
RJP-010		JACK—Phono jack (female)	.10
*RJS-003		SOCKET—Octal socket for V7 and V8	.20
*RJS-049	J2	SOCKET—Phono power socket (110 v.)	.25
*RJS-118		SOCKET—Tube socket for V6 (9 pin)	.35
*RJS-141		SOCKET—Tube socket for V4 (shock mounted)	.20
*RJS-145		SOCKET—7 pin tube socket for V1, V3, V5	.30
*RJS-174		SOCKET—Tube socket for V2	.40
RMM-166		TUBE SHIELD—For V1	.15
RPJ-014		STYLUS—Stylus and guide assembly, dual heavy bar type Hi Output 1 & 3 mil	5.95
*RPX-048		PICKUP CARTRIDGE — Phono pickup	13.95
RSW-091	S1, S2	SWITCH—AM—FM-phono switch	
RWX-044		SOCKET—Pilot light socket for dial scale	
*S1212D-7		SPEAKER—12 inch PM	12.95
		MISCELLANEOUS MECHANICAL	
*RDC-032		DIAL CORD—N.F. 28	$2.50
RDS-112		SCALE—Back plate and dial scale	
RDP-066		POINTER—Dial pointer	
*RHC-038		CLIP—Mounting clip for mounting AM—RF coil T2	.02
*RHG-010		GROMMET—Rubber for shock mounting V4	.05
RHI-022		STRAIN RELIEF—For power cord	
*RMC-002		CLIP—For mounting oscillator coil T3	.05
*RMS-111		SPRING—Dial cord tension spring in large drum	.15
*RMS-243		SPRING Coil spring in small drum for dial cord tension	.10
*RMS-274		SPRING—For mounting insulated shaft and drive drum on FM tuning capacitor	.02
RMX-201		SHAFT—Tuning drive shaft assembly	
RMX-202		ROLLER—Link and roller assembly between tuning capacitor shafts	.35
RMX-203		DRUM—For FM tuning capacitor insulated shaft	.15
RWL-028		CORD—Three wire power cord	
		CABINETS AND CABINET PARTS	
RAV-180		CABINET—Mahogany for 754	
RAV-181		CABINET—Blonde for 756	
RDE-127		ESCUTCHEON—For dial scale	
RDK-268		KNOB—Tuning and volume control knob	
RDK-269		KNOB—With dot for tone, ON-OFF and AM—FM—PH. switch controls	

PRICES ARE SUGGESTED LIST PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE

***PARTS USED ON PREVIOUS RECEIVERS**



SPECIFICATIONS

CABINET:

Color	Black
Height	6⅛ in.
Width	12½ in.
Depth	7¼ in.

ELECTRICAL RATING:

Voltage	105–125, 50–60 cycles or DC
Watts	26

OPERATING FREQUENCIES:

Standard Wave Band	540–1600 KC
I-F Amplifier	455 KC

POWER OUTPUT:

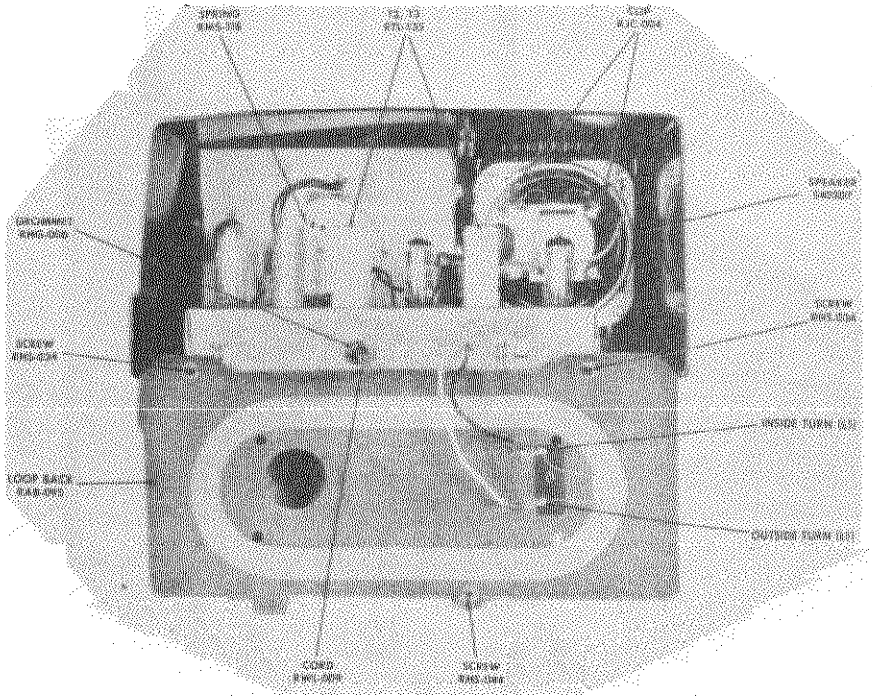
Undistorted	1 wa
Maximum	1.75 wa

LOUDSPEAKER:

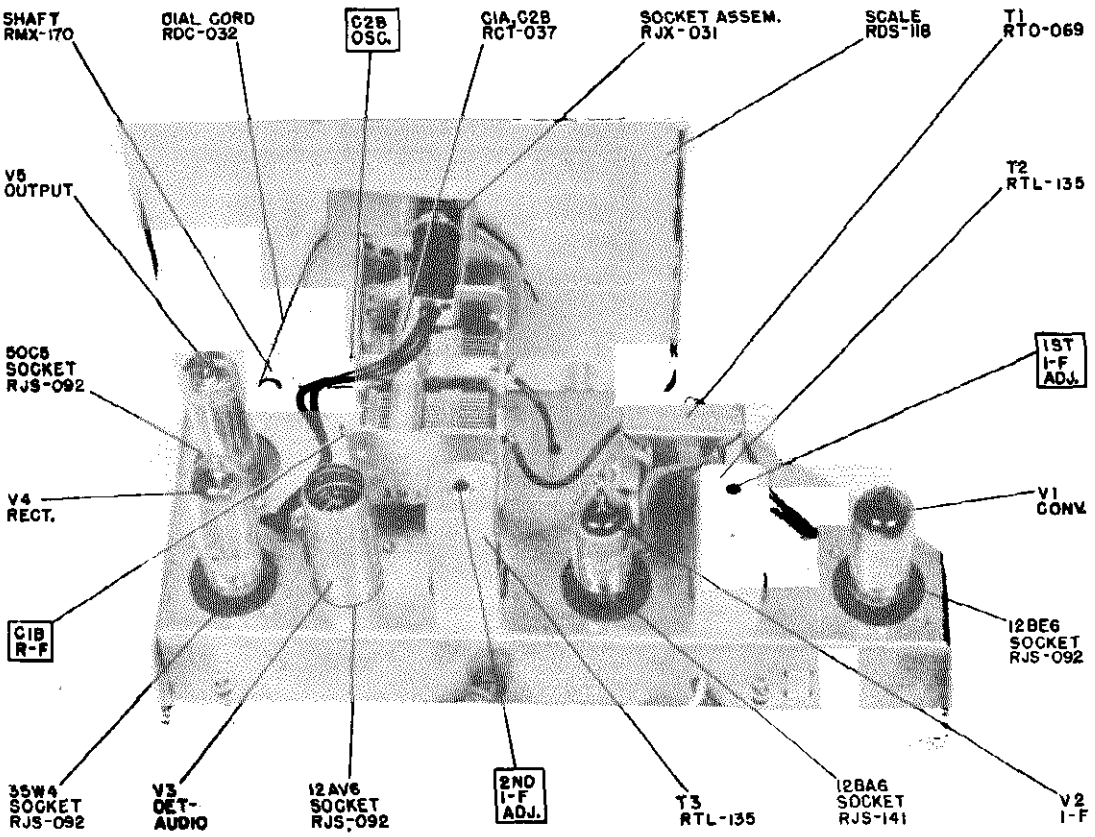
Type	Alnico P
Outside Cone Diameter	4 inch
Voice Coil Impedance @ 400 cycles	3.2 ohr

TUBE COMPLEMENT:

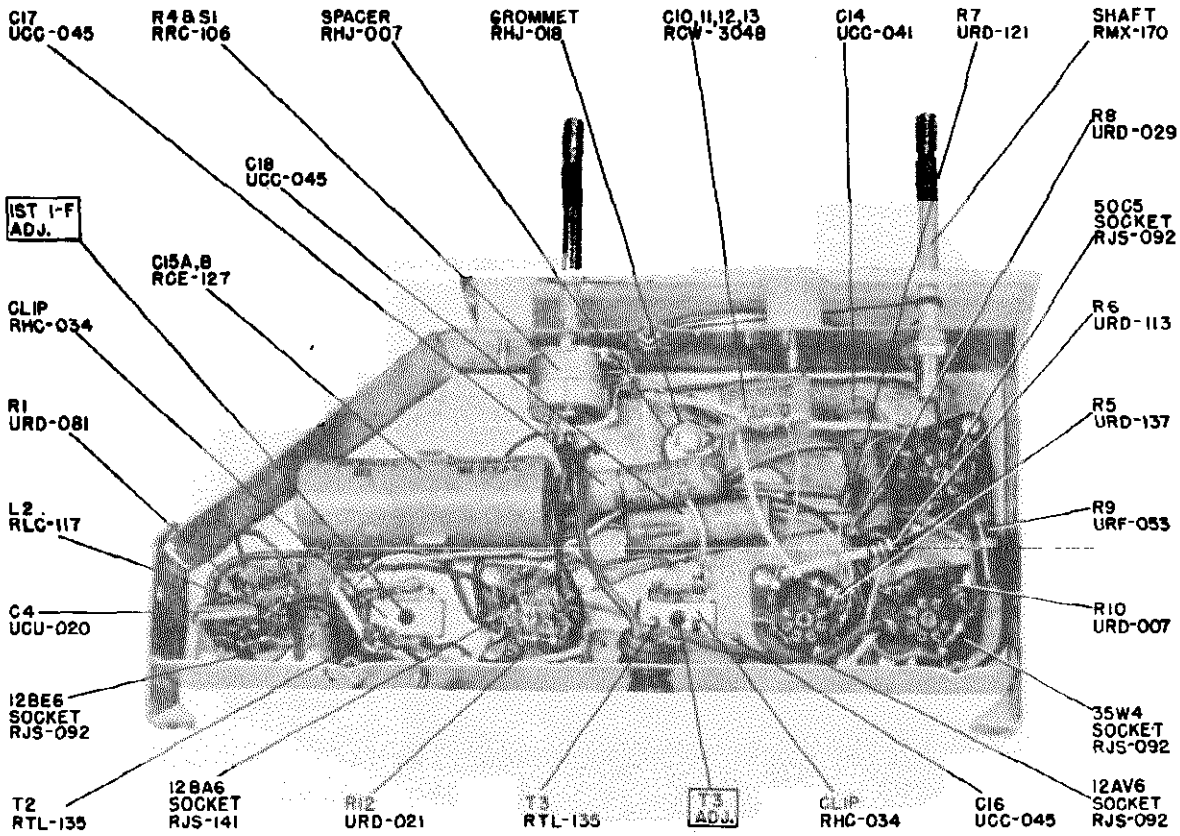
V1	Oscillator-Converter	12B
V2	I-F Amplifier	12B
V3	Detector-Audio	12A
V4	Rectifier	35V
V5	Audio Power Amplifier	50
I1	Dial Light	G. E. Mazda No.



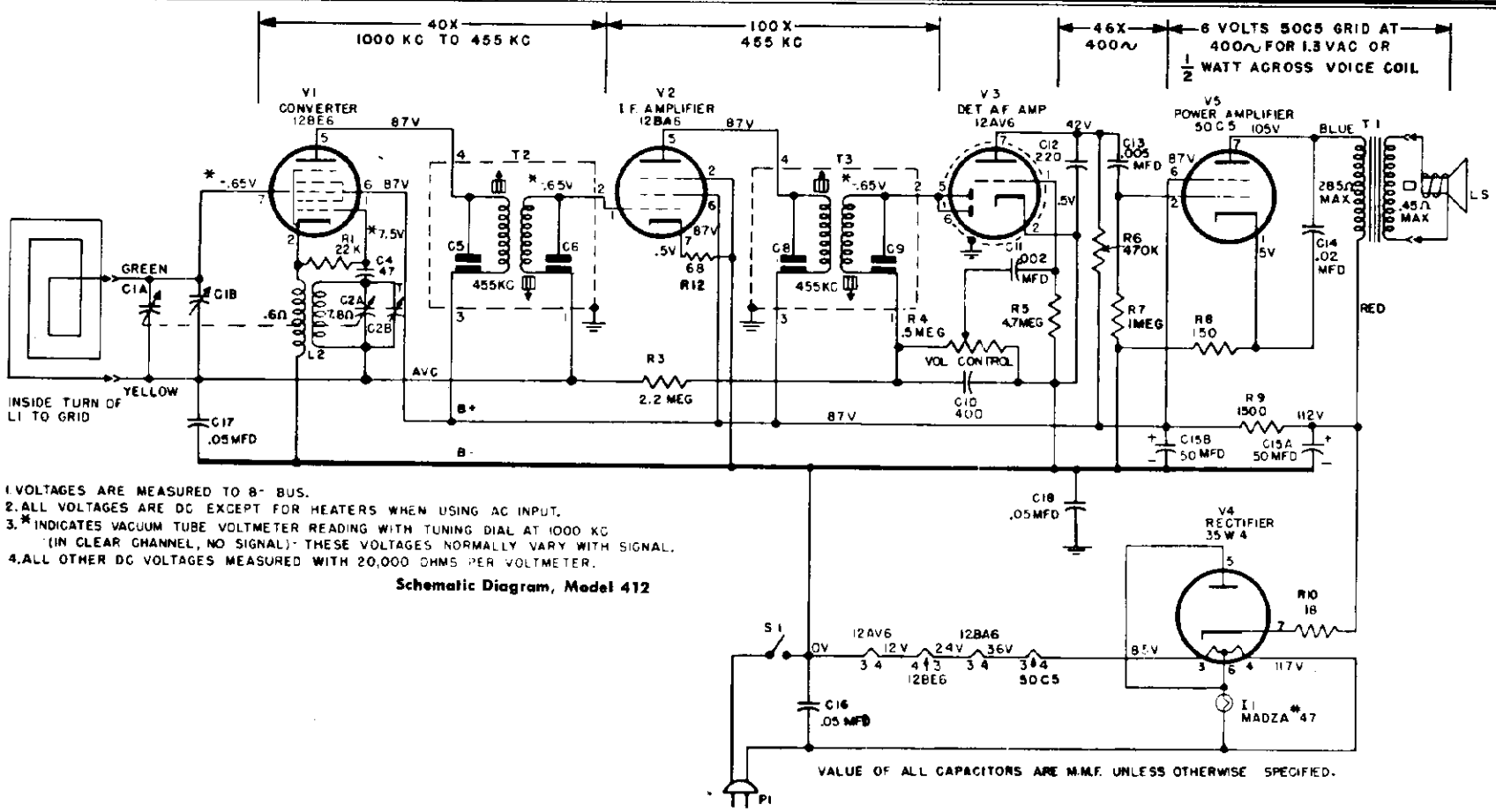
MODEL 412



Chassis, Top View



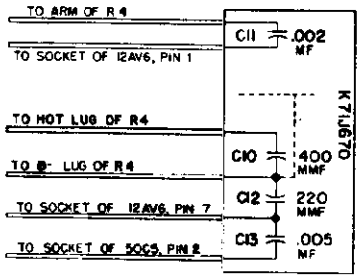
Chassis, Bottom View

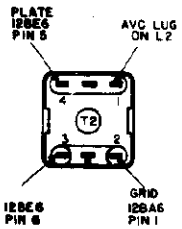


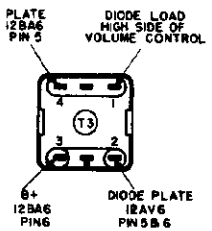
1. VOLTAGES ARE MEASURED TO B- BUS.
2. ALL VOLTAGES ARE DC EXCEPT FOR HEATERS WHEN USING AC INPUT.
3. * INDICATES VACUUM TUBE VOLTMETER READING WITH TUNING DIAL AT 1000 KC (IN CLEAR CHANNEL, NO SIGNAL). THESE VOLTAGES NORMALLY VARY WITH SIGNAL.
4. ALL OTHER DC VOLTAGES MEASURED WITH 20,000 OHMS PER VOLTMETER.

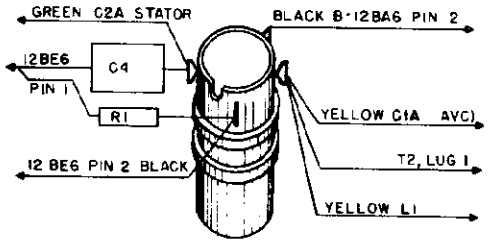
Schematic Diagram, Model 412

VALUE OF ALL CAPACITORS ARE M.M.F. UNLESS OTHERWISE SPECIFIED.

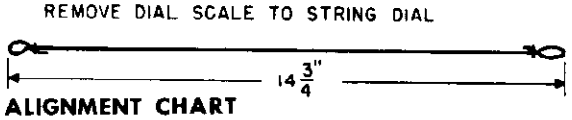


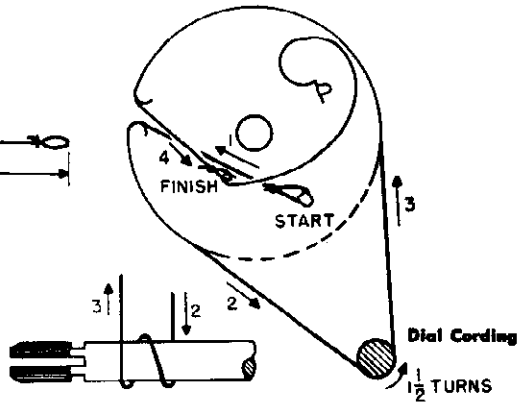






MODEL 412

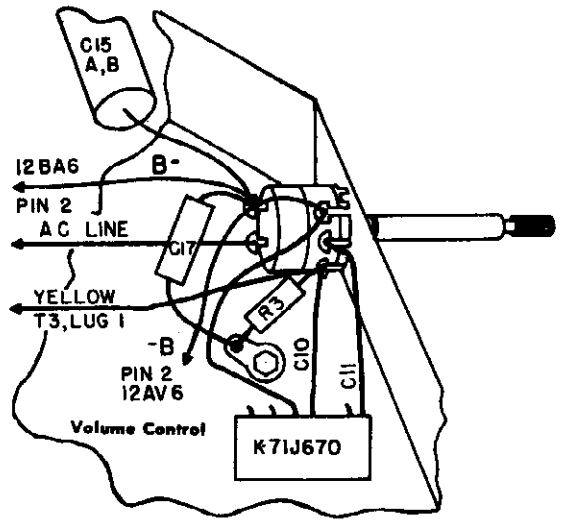




ALIGNMENT CHART

Always have volume control set for maximum and reduce signal input so AVC will not affect output.

Step	Connect Test Oscillator to	Test Osc. Setting	Radio Dial Setting	Adjust for Maximum
	I-F ALIGNMENT			
1	V2, 12BA6 grid (Pin 1) in series with .05 mfd.	455 kc		Cores of second I-F transformer, T3
2	V1, 12BE6 grid (Pin 7) in series with .05 mfd.			Cores of first I-F transformer, T2
3				Recheck adjustment of T2 and T3, for max.
	R-F ALIGNMENT			
4	Inductively coupled to radio loop	1620 kc	Minimum capacity C1A, C2A	C2B oscillator trimmer
5		1500 kc	For Maximum	C1B, R-F trimmer
6	Set pointer to 150.			



PARTS LIST FOR MODEL 412

Cat. No.	Symbol	Description	Unit Price
		CAPACITORS	
*RCE-127	C15A, B	50 mf., 150 v.; 50 mf., 150 v., electrolytic	$1.85
*RCT-037	C1A, B; C2A, B	Two gang, osc., 10.6-126 mmf., r-f 14.3-420 mmf., with drive drum and trimmers	3.60
*RCW-3048	C10, 11, 12, 13	400 mmf., .002 mf., 220 mmf., .005 mf., 450 v., ceramic	.90
*UCC-041	C14	.02 mf., 600 v. paper	.25
*UCC-045	C16, 17, 18	.05 mf., 600 v., paper	.30
*UCU-020	C4	47 mmf., 500 v., mica	.25
		RESISTORS (CARBON)	
*URD-007	R10	18 ohms ½ w.	$0.13
*URD-021	R12	68 ohms ½ w.	.13
*URD-029	R8	150 ohms ½ w.	.13
*URD-081	R1	22,000 ohms ½ w.	.13
*URD-113	R6, 11	470,000 ohms ½ w.	.13
*URD-121	R72	1 megohm ½ w.	.13
*URD-129	R3	2.2 megohms ½ w.	.13
*URD-137	R5	4.7 megohms, ½ w.	.13
*URF-053	R9	1500 ohms, 2 w.	.25
		POTENTIOMETER	
*RRC-106	R4, S1	500K ohms, composition, volume control and on-off switch.	$1.65
		COILS AND TRANSFORMERS	
*RLC-117	L2	COIL—For oscillator V1	$0.90
RTL-135	T2, C5, C6, T3, C8, C9	TRANSFORMER—1st or 2nd I-F, 455KC	1.90
*RTO-069	T1	TRANSFORMER—Audio output	1.75

Cat. No.	Symbol	Description	Unit Price
		MISCELLANEOUS ELECTRICAL	
*RJC-004		CONNECTOR—Speaker connector clip on audio output leads	$0.02
*RJS-092		SOCKET—Miniature wafer, seven pin wax impregnated, 1 5/16 in. mounting centers; for tubes 12BE6, 12AV6, 50C5, 35W4	.20
*RJS-141		SOCKET—Miniature wafer, seven pin, 1 5/16 in. mounting centers; for tube 12BA6	.20
*RJX-031		SOCKET—Bayonet type for Mazda #47 dial lamp; with clip-on bracket.	.40
*RWL-009		POWER CORD—AC cord and plug, brown	.70
*S403D7		LOUDSPEAKER—4 in. PM, 4 watt	4.30
		MISCELLANEOUS MECHANICAL	
*RDC-032		CORD—Dial cord, bulk quantity 25 yds	$2.50
*RDK-174		KNOB—Off-volume or tuning control knob, color buff	.15
RDP-073		DIAL POINTER—Dial pointer, metal, brass finish	.40
RDS-118		DIAL SCALE—Dial scale and back-plate, plastic, ivory, translucent numerals	1.05
*RHC-024		CLIP—⅜ in. clip mounts C15A, B	.10
*RHC-034		CLIP—For mounting I-F transformers	.05
*RHG-006		GROMMET—For 110 v. line cord	.05
*RHG-018		GROMMET—Rubber shock mount for tuning capacitor	.05
*RHJ-007		SPACER—In grommet, RHG-018, mounting tuning capacitor	.05
*RMC-002		CLIP—Osc., coil mtg. clip	.05
*RMS-118		SPRING—Dial cord tension spring	.10
*RMX-170		SHAFT—Tuning shaft and bushing assembly	.35
		CABINETS AND CABINET PARTS	
*RAB-095		BACK—Includes antenna loop, L1	$1.55
RAU-363		CABINET—Plastic, black	6.25
*RDW-021		DIAL WINDOW—Plastic, 6 17/32 x 3 13/32 inches	.60

*Parts used on previous receivers.

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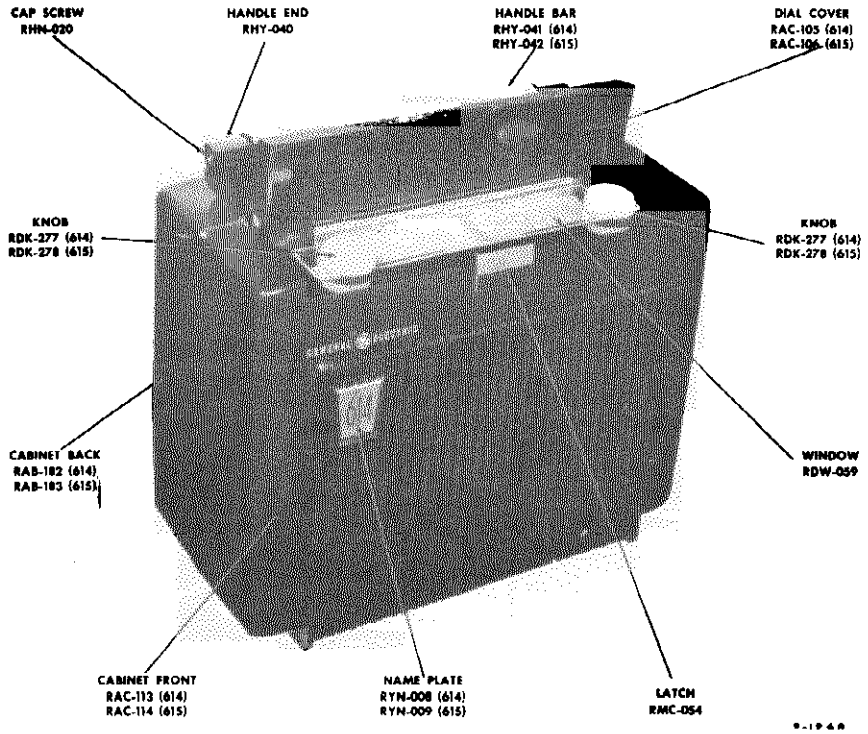


SPECIFICATIONS

CABINET:

Model 614 . . . . . Maroon, plastic
Model 615 . . . . . Green, plastic
Height . . . . . 10¾ inches
Length . . . . . 11⅜ inches
Width . . . . . 5¾ inches

POWER SUPPLY:

Power line . . . . . 105-120 volts, D-c or 60 cps A-c
Battery . . . . . AB combination 9 and 90 volts
Eveready 753
Bright Star 66–50
Burgess F6A60
Rayovac AB994
Power Consumption (connected to power line) . . . . . 25 watts

OPERATING FREQUENCIES:

Broadcast . . . . . 540–1600 kc
I-F Amplifier . . . . . 455 kc

POWER OUTPUT:

Undistorted . . . . . 180 milliwatts
Maximum . . . . . 250 milliwatts

LOUDSPEAKER:

Type . . . . . Alnico PM
Cone Size . . . . . Oval, 4 inches x 6 inches
Voice coil impedance @ 400 cycles . . . . . 3.2 ohms

TUBE COMPLEMENT:

V1	R-F amplifier	1
V2	Oscillator-Converter	1
V3	I-F amplifier	1
V4	Detector and 1st audio	1
V5	Power amplifier	3

BOTTOM SHIELD REMOVAL:

For most services to the chassis such as i-f alignment, volta measurement and component replacement it is not necessary completely remove the radio from the cabinet. To gain access the inside of the chassis to perform these services it is or necessary to remove the chassis bottom shield as follows:

1. Remove the hex head screw in cabinet bosses at each side chassis.

2. Remove the three snap fasteners holding shield to ba edge of chassis.

3. Remove the hex head screw holding bottom shield to ea end of chassis.

4. Withdraw shield to position exposing chassis component

CHASSIS REMOVAL:

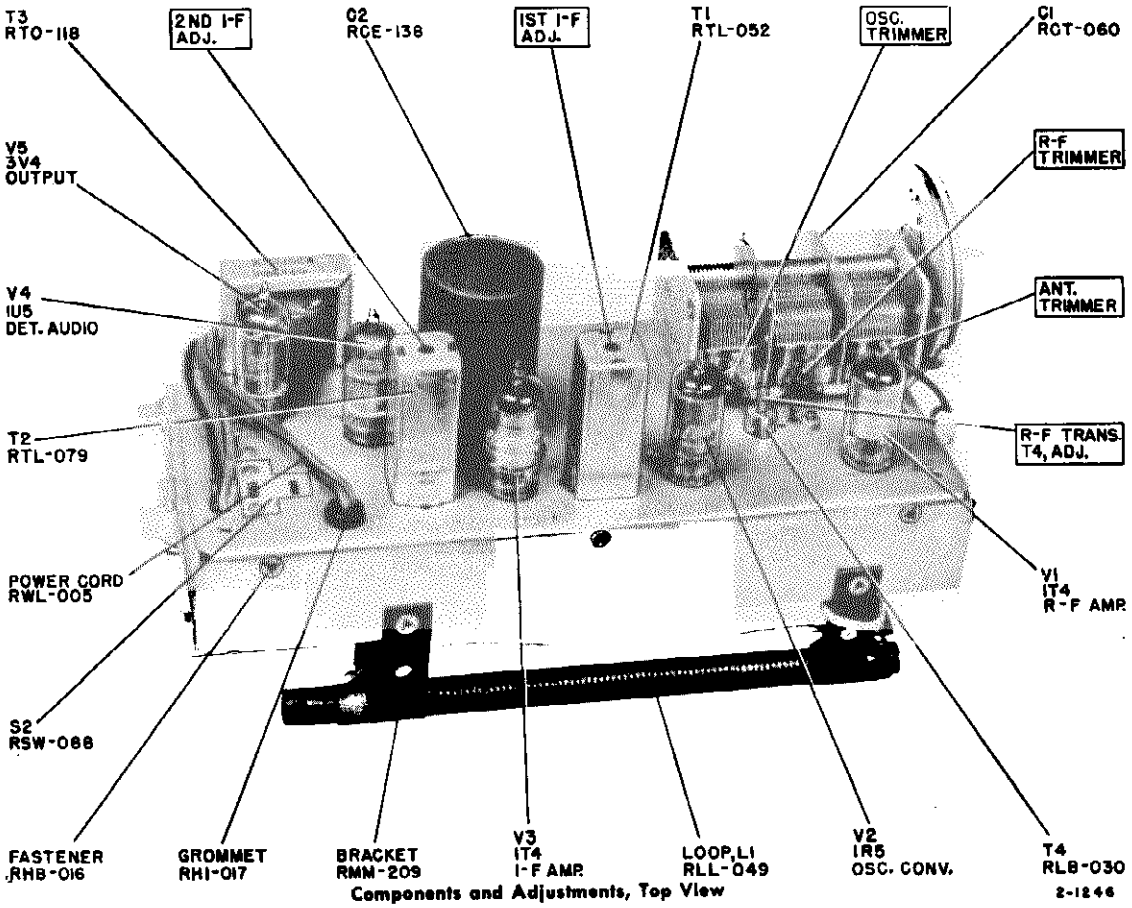
1. Remove the two control knobs.

2. Remove the hex head screw in cabinet bosses at each side chassis.

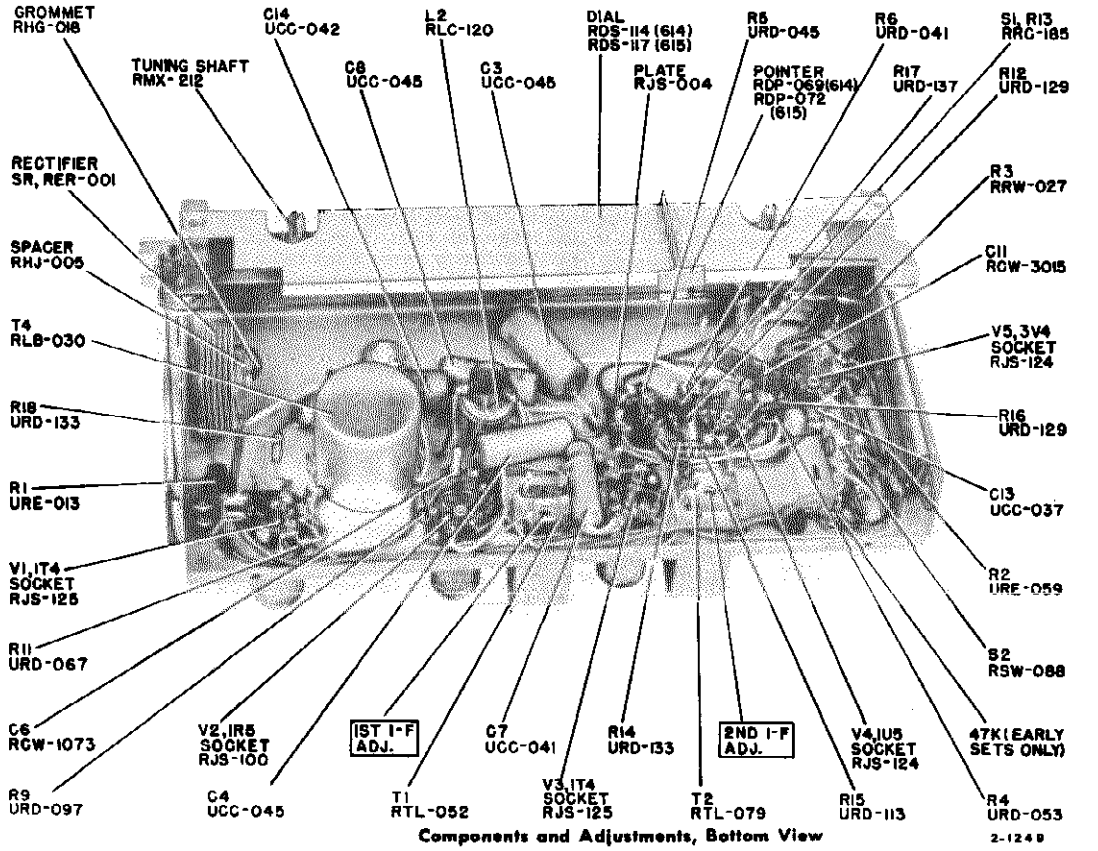
3. Remove two hex head screws holding chassis supp brackets to bosses in bottom of cabinet.

4. Disconnect audio output leads from loudspeaker and move complete chassis with brackets.

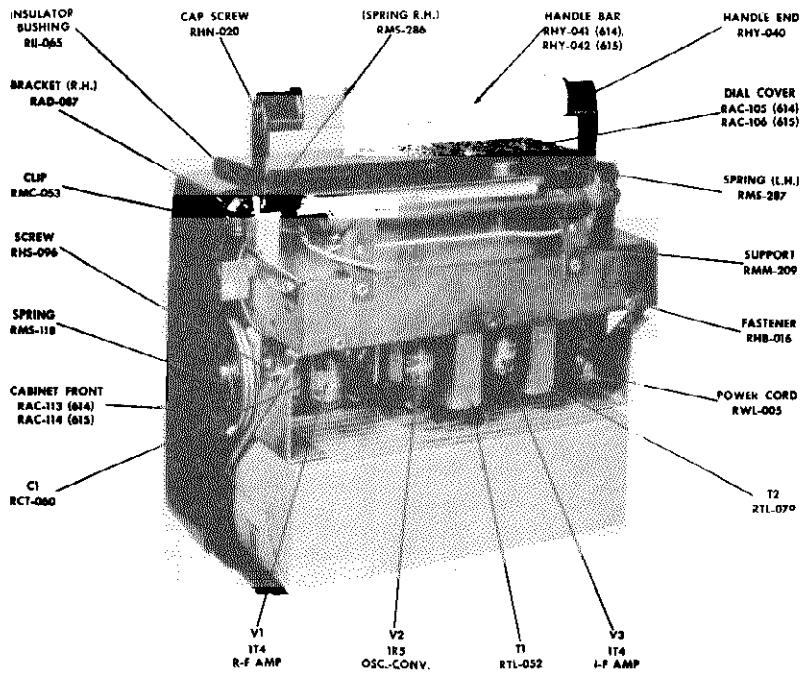
MODELS 614, 615



Components and Adjustments, Top View 2-1246



Components and Adjustments, Bottom View 2-1249



ALIGNMENT CHART

Always have volume control full on and reduce signal input so A-V-C will not affect output.

Step	Test-oscillator Connected to	Test Osc. Setting	Pointer Setting	Adjust for Maximum Output
1	1T4 (V3) I-F grid (pin 6) in series with .05 mfd. and B− bus.	455 KC	550 KC	Iron cores of 2nd I-F Transformer, T
2	1R5 (V2) converter grid (pin 6) in series with .05 mfd. and B− bus.	455 KC	550 KC	Iron cores of 1st I-F Transformer, T
3	1T4 (V1) R-F amplifier grid (pin 6) in series with .05 mfd. and B− bus.	1670 KC	Gang condenser (C1A, B, C) fully open	C1B oscillator trimmer.
4		1500 KC	For max. output	C1C R-F trimmer.
5		580 KC	For max. output	Core of T4.
6	Repeat steps 4 and 5 to give maximum output.			
7	Inductively coupled to loop, L1	1500 KC	For max. output	C1A antenna trimmer.

Cat. No.	Symbol	Description	Unit Price
CAPACITORS			
RCE-138	C2A, B, C, D	40 mfd.-40 mfd., 150v.; 200 mfd.-100 mfd., 25 v.	$4.50
RCT-060	C1A, B, C	Tuning capacitor, 3 gang	5.75
*RCW-1073	C6	47 mmf., 10% temp. coeff., ceramic	.60
*RCW-3015	C11A, B, C, D, E	.002 mf., 220 mmf., 220 mmf., .005 mf., .005 mf., ceramic couplate (late receivers use C12, UCU-036, in lieu of section C11E)	1.10
*UCC-037	C13	.003 mf., 600 v., paper	.25
*UCC-041	C7	.02 mf., 600 v., paper	.25
*UCC-042	C14	.03 mf., 600 v., paper	.30
*UCC-045	C3, 4, 8	.05 mf., 600 v., paper	.30
*UCU-036	C12	220 mmf., 500 v., mica used in late prod. in lieu of RCW-3015, C11, section E	.30

		RESISTORS (Carbon)	
*URD-041	R6	470 ohms, ½ w.	.1
*URD-045	R5	680 ohms, ½ w.	.1
*URD-053	R4	1500 ohms, ½ w.	.1
*URD-067	R11	5600 ohms, ½ w.	.1
*URD-097	R9	100 K ohms, ½ w.	.1
*URD-113	R15	470 K ohms, ½ w.	.1
*URD-129	R12, 16	2.2 megohms, ½ w.	.1
*URD-133	R14, 18	3.3 megohms, ½ w.	.1
*URD-137	R17	4.7 megohms, ½ w.	.1
*URE-013	R1	33 ohms, 1 w.	.1
*URE-059	R2	2700 ohms, 1 w.	.1

MODELS 614, 615

PARTS LIST

(Potentiometers and Wirewound)

RCC-185	R13, S1	Volume control, 500K ohms, with DPST switch	1.70
*RRW-027	R3	2300 ohms, 10 w., w.w.	1.00

COILS AND TRANSFORMERS

*RLB-030	T4	TRANSFORMER—R-F	1.95
RLC-120	L2	COIL—Oscillator coil	.90
RLL-049	L1	COIL—Antenna pickup coil wound on ferrite core	1.50
*RTL-052	T1	TRANSFORMER—1st I-F	2.75
*RTL-079	T2	TRANSFORMER—2nd I-F	2.75
RTO-118	T3	TRANSFORMER—Audio output	2.85

MISCELLANEOUS ELECTRICAL

*RER-001	SR	SELENIUM RECTIFIER—75 ma., 6 plates, 1 in. x 1 in.	.66
RII-070	S2	PLATE—Textolite mtg. plate for line battery changeover switch, S2	.05
*RJP-025	PL1	PLUG—Four prong battery plug with locating pin	.15
*RJS-100		SOCKET—Miniature wafer, seven pin, wax impregnated, one inch mtg. centers for tube 1R5 (V2)	.20
*RJS-124		SOCKET—Miniature wafer, seven pin, one inch mtg. centers; for tubes 1U5, 3V4 (V4 or V5)	.20
*RJS-125		SOCKET—Miniature wafer, seven pin, with pin shield post, one inch mtg. centers for tubes 1T4 (V1 or V3)	.20
ROP-024	LS1	LOUDSPEAKER—Oval, 4 x 6 inch, PM, 2 watt, 3.2 ohms at 400 cycles	7.95
*RSW-088	S2	SWITCH—Line-battery changeover switch, power plug operated, wafer type	1.75
*RWL-005		CORD—Power cord and plug, 6 feet long	1.25

MISCELLANEOUS MECHANICAL

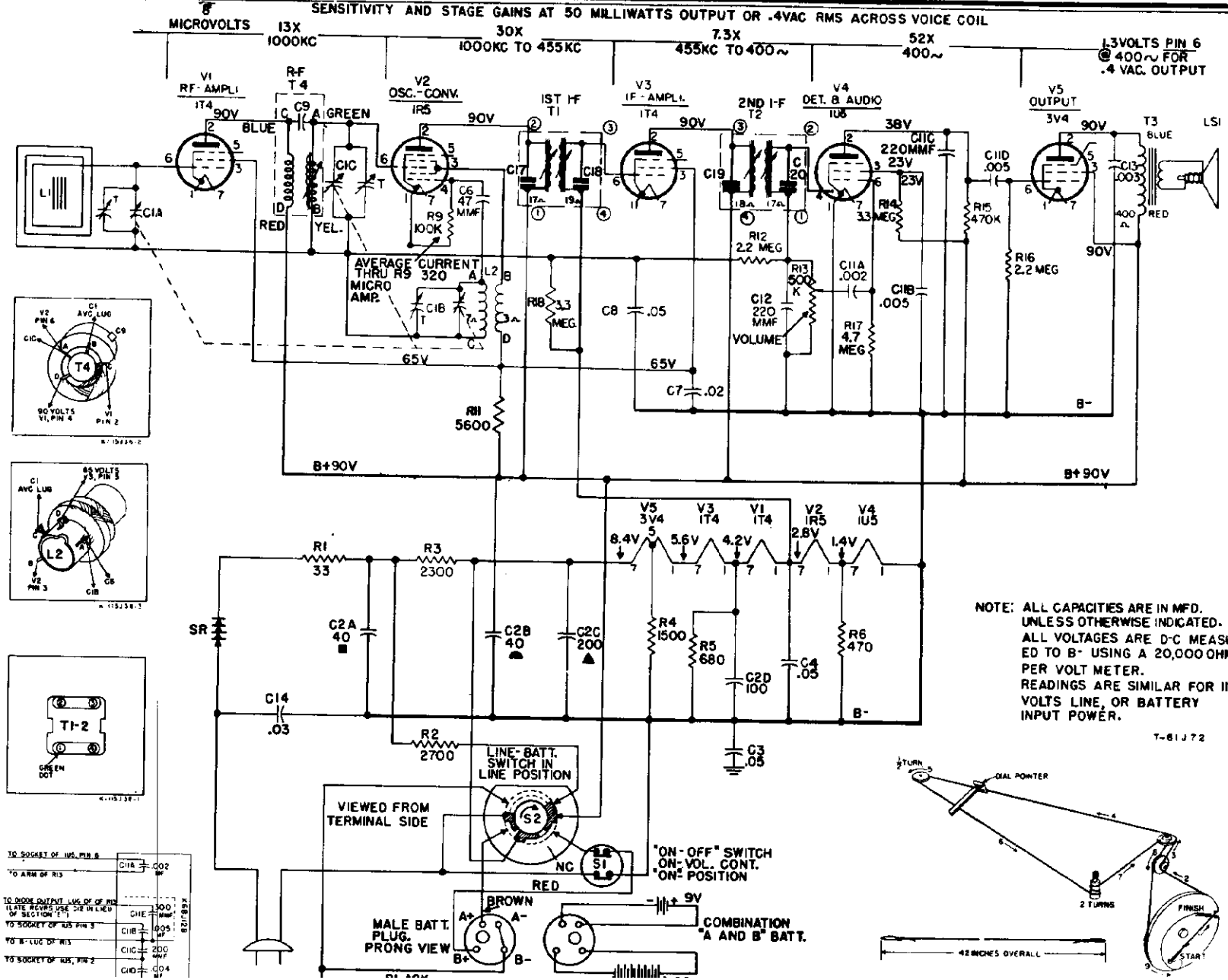
*RDC-032		CORD—Dial cord, bulk quantity, 25 yards	$2.50
RDP-069		DIAL POINTER—Metal slider and red plastic flag; for Model 614	.25
RDP-072		DIAL POINTER—Metal slider and gold finished plastic flag; for Model 615	.25
RDS-114		DIAL SCALE—Scale and backplate, green background; for Model 614	.95
RDS-117		DIAL SCALE—Scale and backplate, gold finish background; for Model 615	.95
*RHB-016		FASTENER—Snap fastener, Trimount type; for chassis cover	.05
*RHG-018		GROMMET—Rubber grommet for tuning capacitor shock mounting	.05
*RHI-017		GROMMET—Two piece strain relief insulator for power cord	.15
*RHJ-005		SPACER—Metal spacer bushing for mounting tuning capacitor	.02
*RHN-020		CAP SCREW—No. 6-32 tap, Phillips head, for handle ends	.10
RHS-094		SCREW—No. 6-32 threaded rod 8 1/8 inches long; through handle bar to handle ends	.40
RHS-096		SCREW—Thumbscrew on battery hold-down bracket	.10
RHY-040		HANDLE END—Metal casting, chrome finish	1.40
RHY-041		HANDLE BAR—Hand grip, plastic, ivory; for Model 614	.75
RHY-042		HANDLE BAR—Hand grip, plastic, green; for Model 615	.75

Cat. No.	Symbol	Description	Unit Price
*RII-065		INSULATOR BUSHING — For handle bracket on chassis	.10
*RJS-004		MOUNTING PLATE—For electrolytic capacitor, C2	.10
*RMC-002		CLIP—Coil clip for 1/2 inch diameter oscillator coil, L2	.05
RMM-206		CORK—On battery hold-down bracket	.05
RMM-209		SUPPORT—Formed paper antenna loop support	.03
*RMS-118		SPRING—Dial cord tension spring	.10
RMX-212		SHAFT—Tuning control shaft and bushing assembly	.90

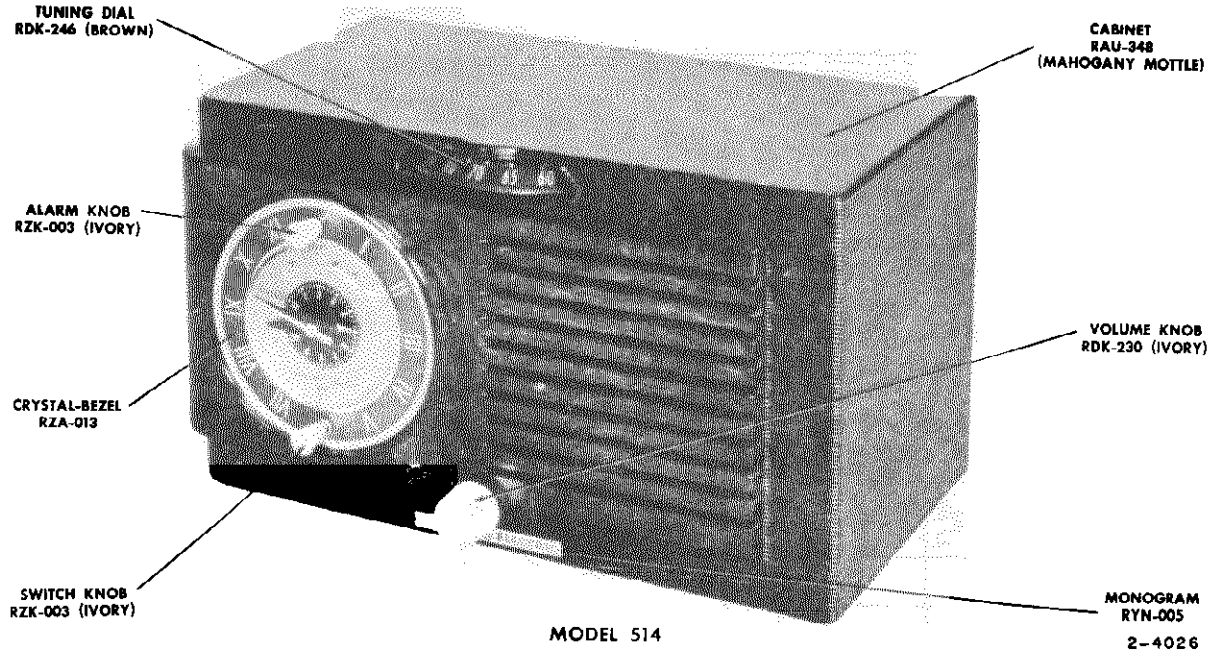
CABINET AND CABINET PARTS

RAB-182		CABINET BACK—Back half of cabinet, maroon, plastic; for Model 614; includes 1/2 slip hinge	3.90
RAB-183		CABINET BACK—Back half of cabinet, green plastic; for Model 615; includes 1/2 slip hinge	3.90
RAC-105		COVER—Dial cover, maroon, plastic; for Model 614	1.45
RAC-106		COVER—Dial cover, green, plastic; for Model 615	1.40
RAC-113		CABINET FRONT—Front half of cabinet, maroon, plastic; includes 1/2 slip hinge and Model 614 nameplate	7.95
RAC-114		CABINET FRONT—Front half of cabinet, green, plastic; includes 1/2 slip hinge and Model 615 nameplate	7.95
RAD-087		BRACKET—Dial cover hinge bracket, right-hand	.20
RAD-088		BRACKET—Dial cover hinge brocket, left-hand	.20
RAG-046		GRILLE CLOTH—Maroon, pasteboard mounted assembly, for Model 614	.45
RAG-047		GRILLE CLOTH — Green, pasteboard mounted assembly, for Model 615	.45
RAX-029		LATCH BRACKET—For dial cover, includes latch spring	.15
RDK-277		KNOB—Volume or tuning control, ivory; for Model 614	.15
RDK-278		KNOB—Volume or tuning control, green; for Model 615	$0.15
RDW-059		WINDOW—Dial scale window, plastic	.60
*RHE-010		EYELET—Cabinet catch, held by screw RHS-097 to cab. back cover	.05
RHI-023		HINGE—Cabinet slip hinge in two parts	.30
RHS-097		SCREW—Screw No. 6 x 1/2 inch, Phillips round head; holds eyelet used as cabinet catch	.02
*RMC-053		CLIP—Latch clip on front half of cabinet engages eyelet, RHE-010, to close cabinet	$0.05
RMC-054		LATCH—Chrome finish metal, for dial cover	.90
RMP-033		ROD—Pivot rod for dial cover latch, RMC-054	.10
RMS-286		SPRING—Coil spring for dial cover hinge (right-hand)	.05
RMS-287		SPRING—Coil spring for dial cover hinge (left-hand)	.05
RYN-008		NAMEPLATE—Model 614 nameplate	.40
RYN-009		NAMEPLATE—Model 615 nameplate	.40

PRICES ARE SUGGESTED LIST PRICES AND SUBJECT TO CHANGE WITHOUT NOTICE.
*Parts used on previous receivers.

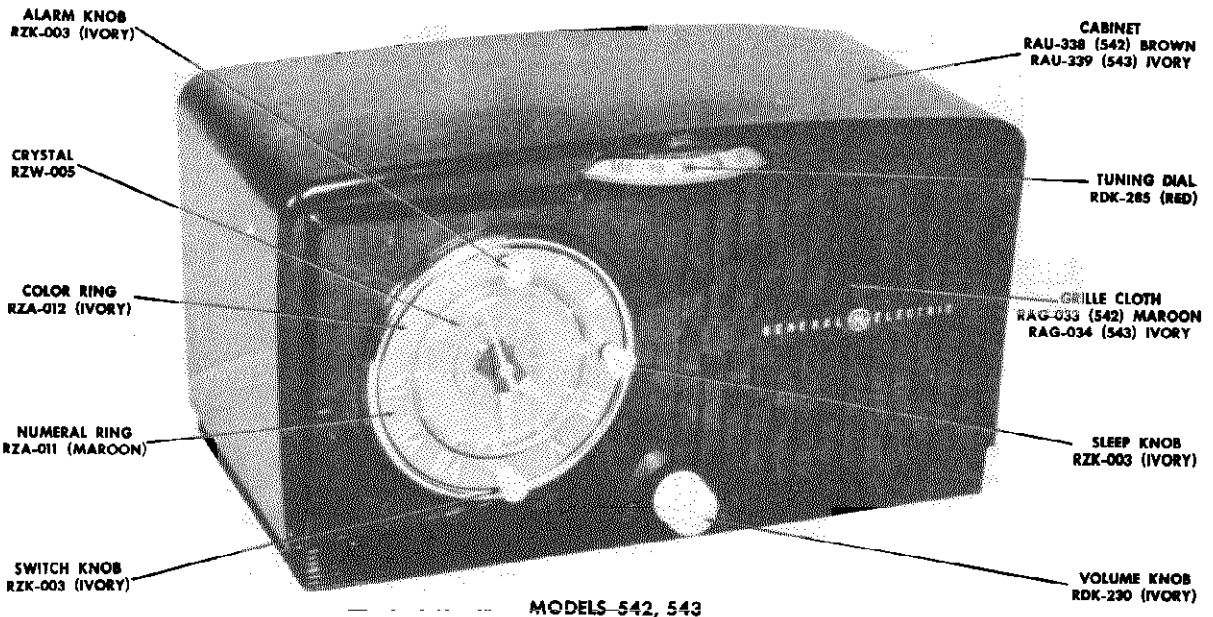

SENSITIVITY AND STAGE GAINS AT 50 MILLIWATTS OUTPUT OR .4VAC RMS ACROSS VOICE COIL
MICROVOLTS
13X
1000KC
30X
1000KC TO 455KC
7.3X
455KC TO 400~
52X
400~
1.3VOLTS PIN 6 @ 400~ FOR .4 VAC. OUTPUT
V1 RF-AMPL 1T4
R-F T4
V2 OSC.-CONV. 1R5
IST I-F T1
V3 I-F AMPL. 1T4
2ND I-F T2
V4 DET. & AUDIO 1U5
V5 OUTPUT 3V4
T3
LSI
90V
38V
BLUE
GREEN
YEL.
RED
C1A
C1B
C1C
C6 47 MMF
R9 100K
C17
C18
C19
C20
R12 2.2 MEG
R13 500 K
C12 220 MMF VOLUME
C11A .002
C11B .005
C11C 220MMF 23V
C11D .005
R14 3.3 MEG
R15 470K
R16 2.2 MEG
C13 .003
400 P
AVERAGE CURRENT THRU R9 320 A
MICRO AMP.
R8 3.3 MEG.
C8 .05
C7 .02
65V
R11 5600
B+90V
B-
R1 33
R3 2300
R2 2700
C14 .03
C2A 40
C2B 40
C2C 200
C2D 100
C4 .05
C3 .05
R4 1500
R5 680
R6 470
SR
8.4V
5.6V
4.2V
2.8V
1.4V
V5 3V4
V3 1T4
V1 1T4
V2 1R5
V4 1U5
LINE-BATT. SWITCH IN LINE POSITION
VIEWED FROM TERMINAL SIDE
S2
S1
NC
"ON-OFF" SWITCH ON-VOL. CONT. "ON" POSITION
RED
BROWN
9V
MALE BATT. PLUG. PRONG VIEW
A+
A-
B+
B-
COMBINATION "A AND B" BATT.
NOTE: ALL CAPACITIES ARE IN MFD. UNLESS OTHERWISE INDICATED. ALL VOLTAGES ARE D-C MEASURED TO B- USING A 20,000 OHMS PER VOLT METER. READINGS ARE SIMILAR FOR 117 VOLTS LINE, OR BATTERY INPUT POWER.
T-61J72
DIAL POINTER
2 TURNS
42 INCHES OVERALL
FINISH
START
T1-2
GREEN DOT
T4
L2
TO SOCKET OF 1U5, PIN 6
TO ARM OF R13
TO DIODE OUTPUT LUG OF R13 (LATE REVERS USE C1B IN LIEU OF SECTION T1)
TO SOCKET OF 1U5 PIN 5
TO B- LUG OF R13
TO SOCKET OF 1U5, PIN 2

MODELS 514, 542, 543



MODEL 514

2-4026



MODELS 542, 543

2-4024

ER-S-514

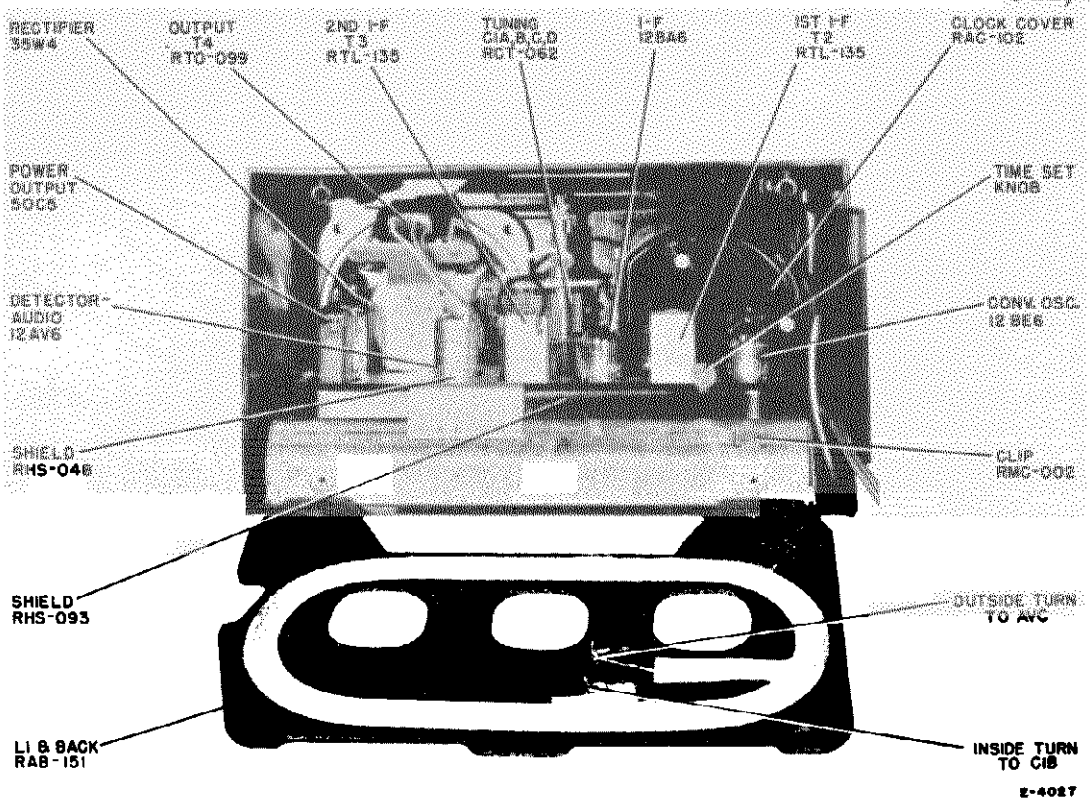


Fig. 1. Identification of Components, Model 514, Rear view

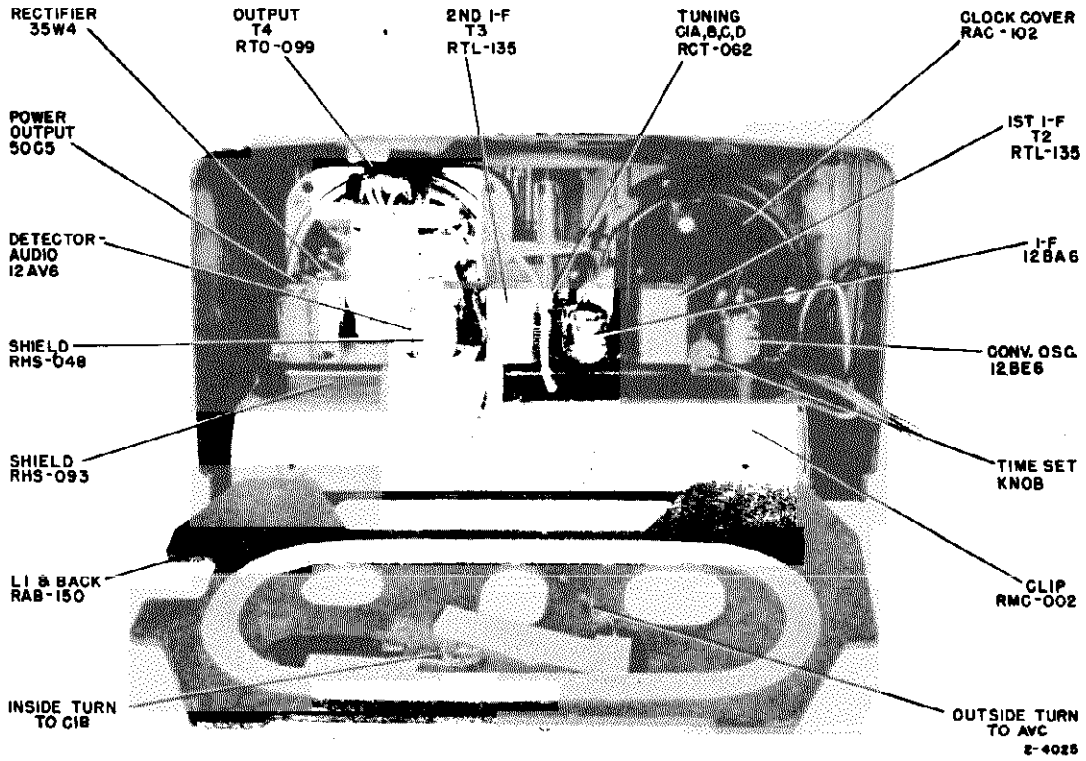


Fig. 2. Identification of Components, Models 542 and 543, Rear view

MODELS 514,
542, 543

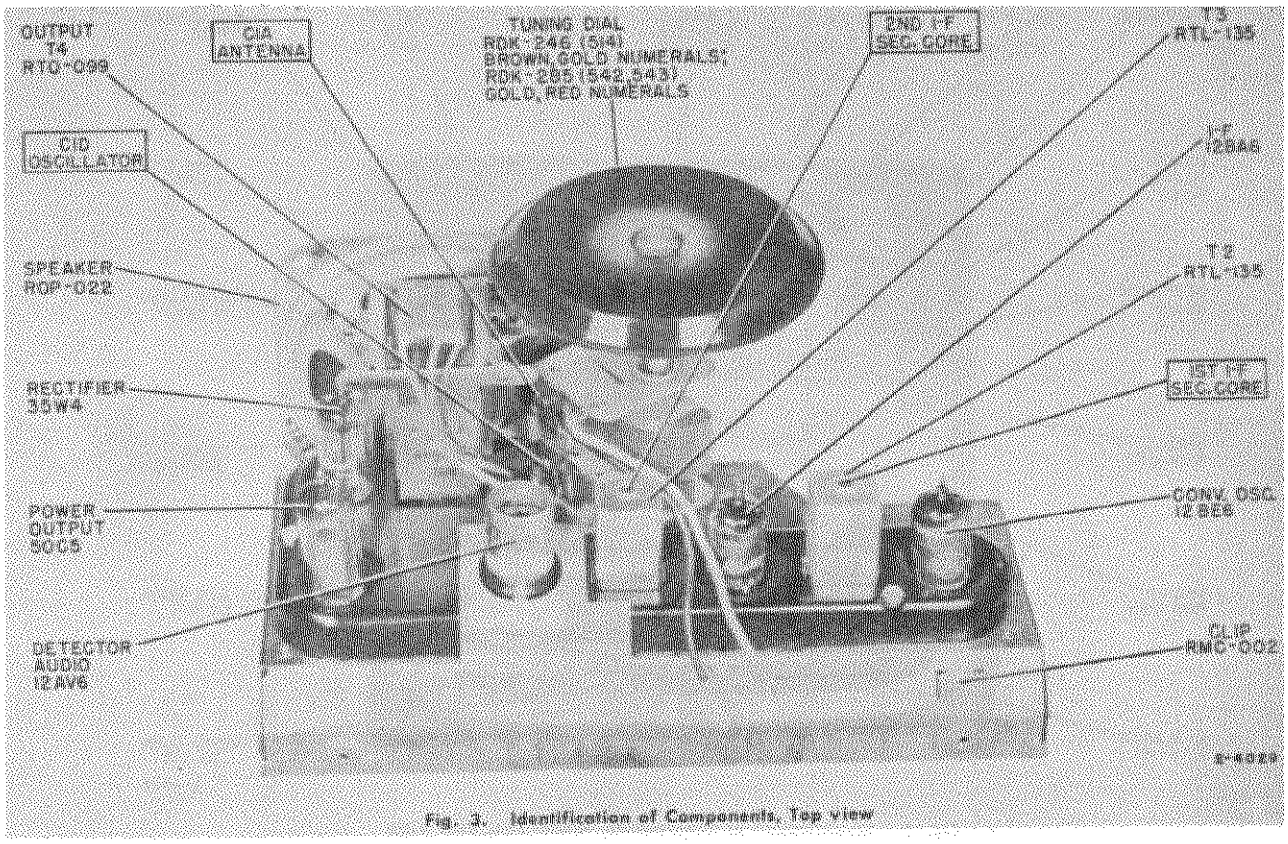


Fig. 3. Identification of Components, Top view

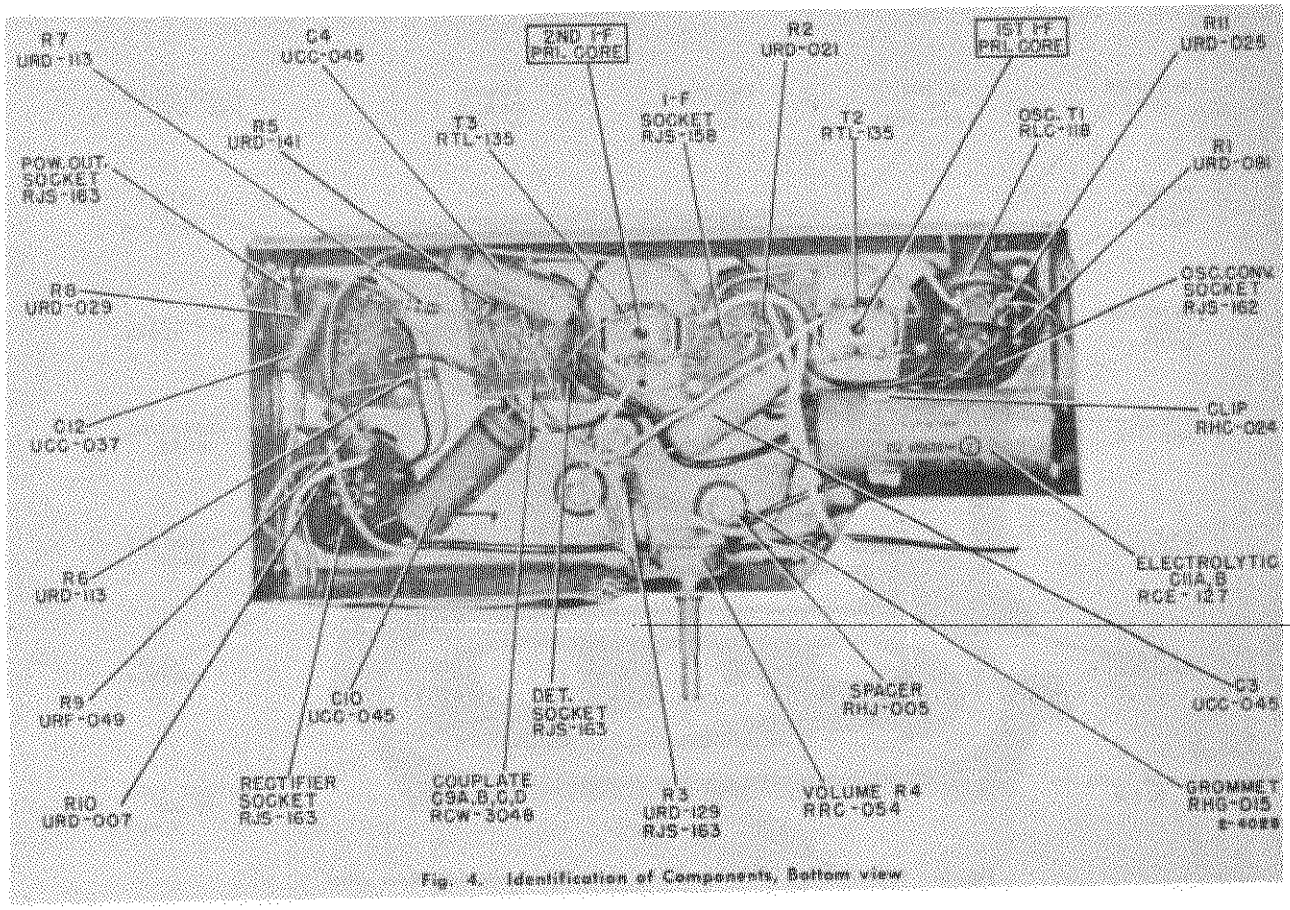
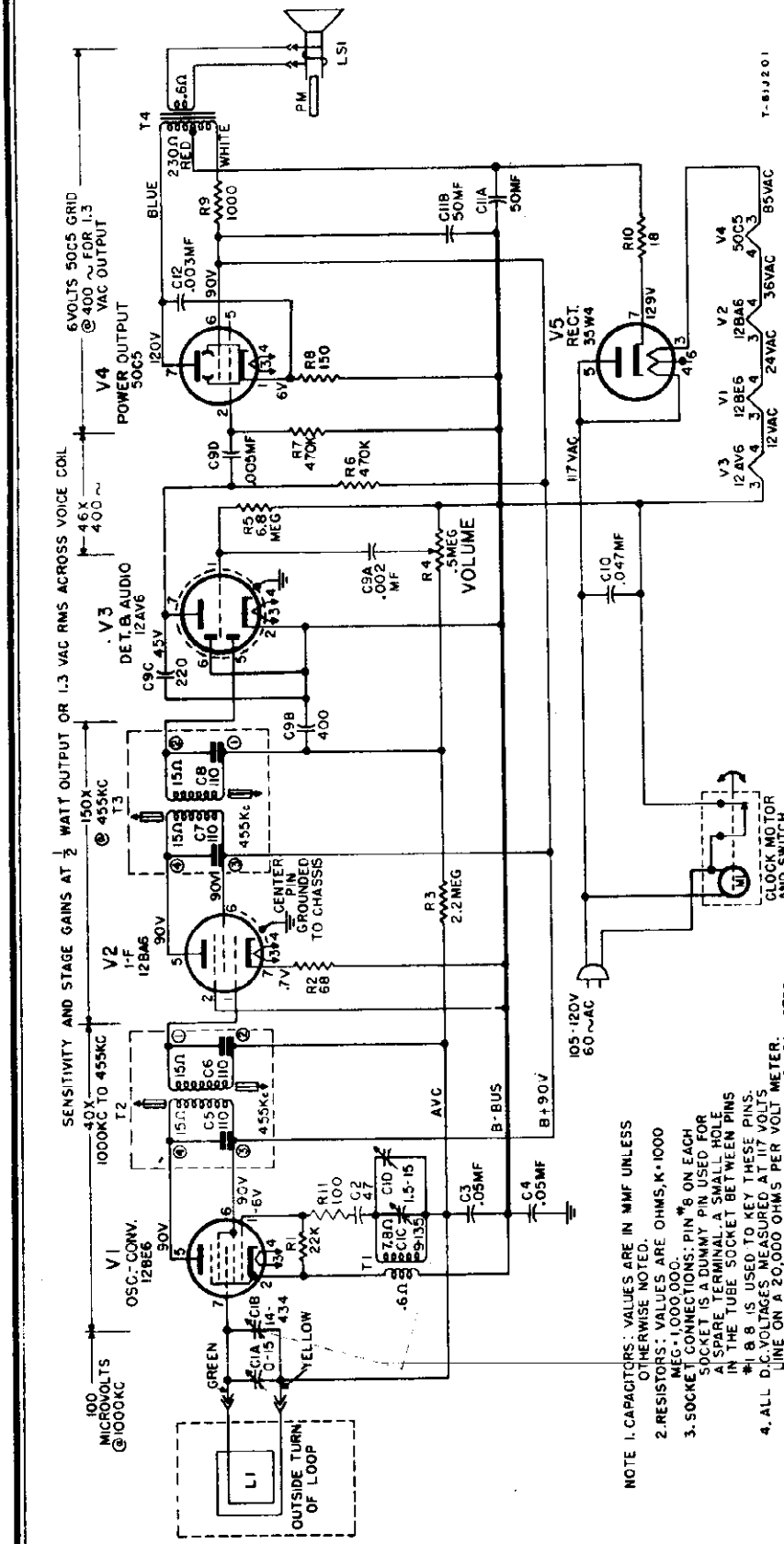


Fig. 4. Identification of Components, Bottom view



NOTE 1. CAPACITORS: VALUES ARE IN MMF UNLESS OTHERWISE NOTED.
2. RESISTORS: VALUES ARE OHMS, K=1000 MEG=1,000,000.
3. SOCKET CONNECTIONS: PIN *8 ON EACH SOCKET IS A DUMMY PIN USED FOR A SPARE TERMINAL. A SMALL HOLE IN THE TUBE SOCKET BETWEEN PINS *1 & 8 IS USED TO KEY THESE PINS.
4. ALL D.C. VOLTAGES MEASURED AT 117 VOLTS LINE ON A 20,000 OHMS PER VOLT METER. ALL VOLTAGES ARE D-C UNLESS OTHERWISE NOTED. READINGS TAKEN BETWEEN TUBE PIN TERMINALS & B-.

Fig. 5. Schematic Diagram, Models 514, 542 and 543

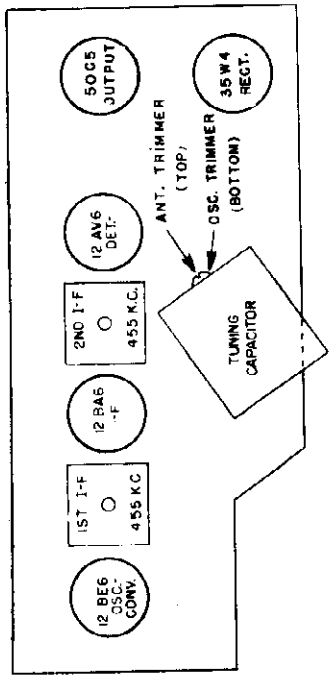


Fig. 6. Location of Tubes and Adjustments

MODELS 514, 542, 543

SPECIFICATIONS

OVER-ALL CABINET DIMENSIONS	MODEL	514	542	543
	Color	Mahogany Mottle	Brown Mottle	Ivory
	Height	6¼ in.	6⅜ in.	6⅜ in.
	Width	10⅝ in.	11⅜ in.	11⅜ in.
	* Depth	6¼ in.	6¼ in.	6¼ in.

* Including knobs

ELECTRICAL RATING	Voltage . . . . . 105–120 Frequency . . . . . 60 cycles only Watts 30
OPERATING FREQUENCIES	Standard Broadcast . . . . . 540–1600 kc I-F Amplifier . . . . . 455 kc
POWER OUTPUT	Undistorted . . . . . 1 watt Maximum . . . . . 1.75 watts
LOUDSPEAKER	Type . . . . . Alnico PM Outside Cone Diameter . . . . . 4 inches Voice Coil Impedance @ 400 cycles . 3.5 ohms

TUBE COMPLEMENT	Purpose	Type
	V1 Oscillator-Converter	12BE6
	V2 I-F Amplifier	12BA6
	V3 Detector—1st Audio	12AV6
	V4 Audio Output	50C5
	V5 Rectifier	35W4

GENERAL INFORMATION

The Model 514, 542 and 543 clock-radio receivers employ four tubes, plus rectifier tube, in a superheterodyne circuit. A loop antenna, part of the cabinet back, provides excellent signal pick-up, without the need of an external antenna. Each model has an electric alarm clock which is also connected to automatically turn on the radio as a Musical Alarm. The clocks of receiver Models 542 and 543 have the additional Sleep Control feature to permit one hour of radio operation, or a portion thereof, where upon the control mechanism will automatically shut off the radio.

PRODUCTION CHANGES—Two versions of the Models 514, 542 and 543 are noted in the tube socket construction, involving production methods.

MECHANIZED CHASSIS—Mechanized production uses sockets of the dip solder construction. In this operation components and wires are placed into tube pin connections of each socket. The chassis is inverted and dipped into molten metal, to solder the pins from the top. A plastic cover over the top of the sockets insulates these connections against shock hazard.

NONMECHANIZED CHASSIS—A part of production employed the standard method of the past, in socket wiring. In these chassis, components are wired, crimped and individually soldered to standard socket pin connections. Nonmechanized chassis have the letter "C" rubber stamped on the rear chassis apron for identification.

COMPONENT REPLACEMENT—When servicing mechanized chassis, the time and effort otherwise spent to remove the shield, heat tube pin connections and free the components may be spared. A neater job can be done without the risk of damage to the tube sockets by using the following method in wiring a replacement part.

Clip the defective unit out, leaving enough of its leads attached to the tube socket so an eye loop may be formed in the leads. Each lead of the new component may then be passed through the proper loop, pruned to length, crimped and soldered.

CAUTION: One side of the power line is connected to B−. Avoid any ground connections direct to B−. Use an isolating transformer when making service adjustments with the chassis removed from the cabinet.

CIRCUIT ALIGNMENT

Always have volume control at maximum and use the minimum amount of signal input necessary to produce a suitable output response.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Osc. Setting	Dial Drum Setting	Adjust for Maximum Output
1	12BA6 grid (1) in series with 0.05 mf. cap.	455 kc	Minimum capacity	Cores of 2nd I-f transformer T3
2	12BE6 grid (7) in series with 0.05 mf. cap			Cores of 1st I-F transformer, T2
3	Inductively coupled to Radio loop	1620 kc		C1D (oscillator)
4		1500 kc	Tune for max.	C1A (antenna)

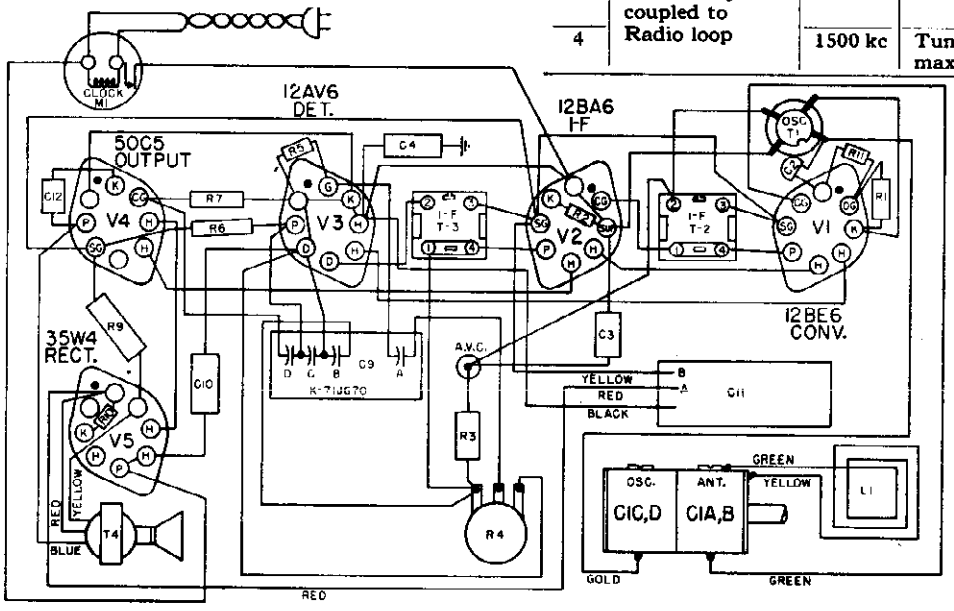


Fig. 7. Wiring Diagram

CLOCK SERVICE

Figures 8, 9 and 10 show clock parts referred to in the following paragraphs and the parts list.

CLOCK MOVEMENT DISASSEMBLY

1. Remove clock movement from case, and pull off knobs.
2. Remove Crystal, Hands and Dial Face.
3. Remove the motor assembly by removing two screws (13) and break two soldered joints on Field. The Field and Rotor Assembly (22 and 23) can now be removed. The Rotor is held by friction only, to the Field.
4. Remove Switch Assembly (4) by removing two screws from base plate.
5. Remove Switch Shaft Assembly (8) and spacer.
6. Remove Alarm-Set Shaft Assembly (31) and spacer.
7. Remove the three front plate assembly screws that are located under the Dial Face and then remove Front Plate.
8. Remove Alarm Gear Sleeve Assembly (17), Hour Gear Sleeve Assembly (18), Minute Gear Sleeve Assembly (19), and Sweep Second Gear Shaft Assembly (20).
9. Remove Alarm Cam Gear Assembly (26) and Spring Washer (25).
10. Remove Intermediate Gear (27).
11. Remove Time-Set Gear and Shaft Assembly (11).
12. Remove Switch Cam Lever (12).

CLOCK MOVEMENT REASSEMBLY

Reassemble in the reverse order of disassembly, observing the following precautions:

1. The spring washer (25) should curve away from the gear when placed on the Alarm Cam Gear Assembly (26).
2. The Switch Cam Lever (12) fork must straddle the base plate post as shown in the illustration.
3. After reassembly of front plate, check, the Sweep Second Gear (20) through the hole in the base plate to make sure it is free to turn.
4. Proceed with Alarm and Switch Adjustments as descril below before installing hands.

ALARM AND SWITCH ADJUSTMENTS

1. Turn Switch Knob to Wake-up position.
2. Slowly rotate Time-Set Shaft clockwise until the conta of the Switch Assembly (4) close.
3. Replace Dial Face, Alarm Dial, the Minute, Hour a Second Hands. Set all Hands and Dial so that they indic 12 o'clock. Make sure all Hands and Alarm Dial are tight their respective shafts.
4. With Alarm-Set knob pulled out, continue to rotate Tir Set Shaft clockwise and note that the vibrator arm drops agai field core approximately 7–10 minutes later.
5. Set alarm at some other selected position and make s mechanism actuates within limits (±1 minute).
6. Check alarm tone of vibrator. This can be adjusted either bending vibrator arm nearer or farther away from fi core. Bend arm near anchor point.

CLEANING AND LUBRICATION

To clean, completely disassemble and clean all moving parts carbon tetrachloride or some similar cleaner.

The inside of the sleeves and shaft surfaces may be clear of oxidized oil by rubbing with a fine grade of steel wool damper in carbon tetrachloride.

Do not use too much oil and apply by means of a small w (drop oiler). Too much oil collects dust and later oxidizes. U only recommended clock oil, such as Nye's Celebrated Oil, wh may be purchased from Wm. F. Nye Co., Inc., New Bedford, an equivalent.

CLOCK TROUBLES

1. Clock will not operate—Defective field coil, defective rot binding of parts.
2. Clock loses time—Binding parts, too little friction minute hand sleeve assembly, defective rotor. Clock time- shaft bent and rubs against hole in clock bracket.
3. Noisy Clock—Rotor defective, alarm armature improper adjusted, loose parts, or binding of moving parts.

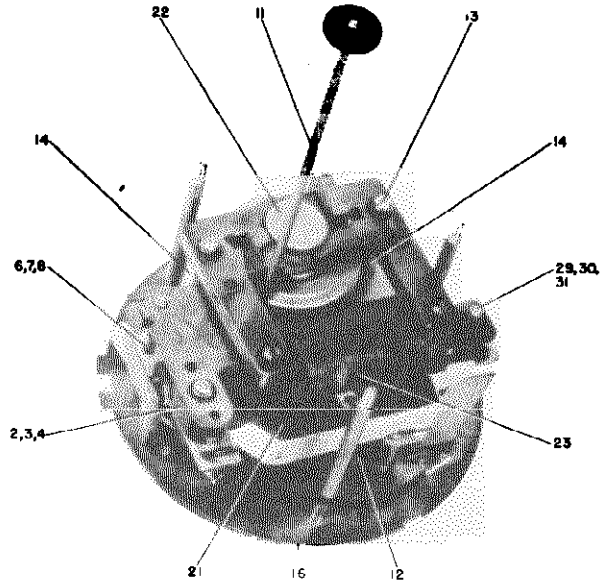


Fig. 8. Back View of C51 Clocks

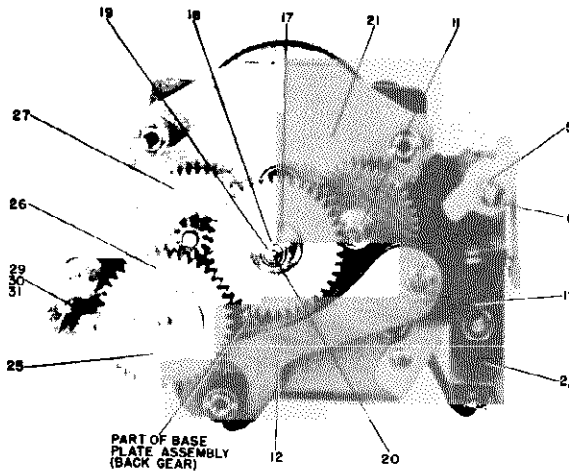


Fig. 9. Front View of C51 Clocks—Front Plate Removed

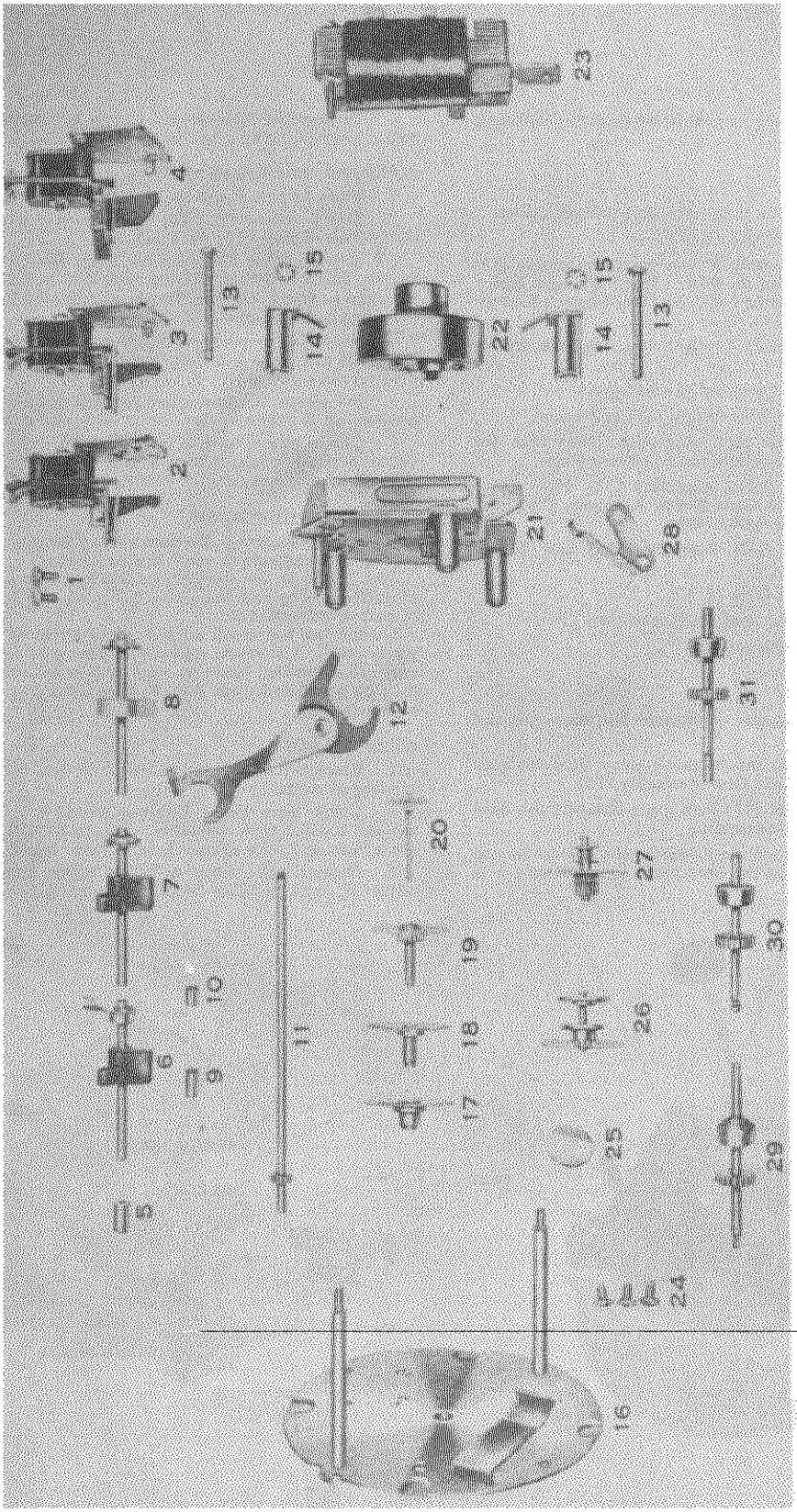


Fig. 10. Exploded View of C51 Clock Movement

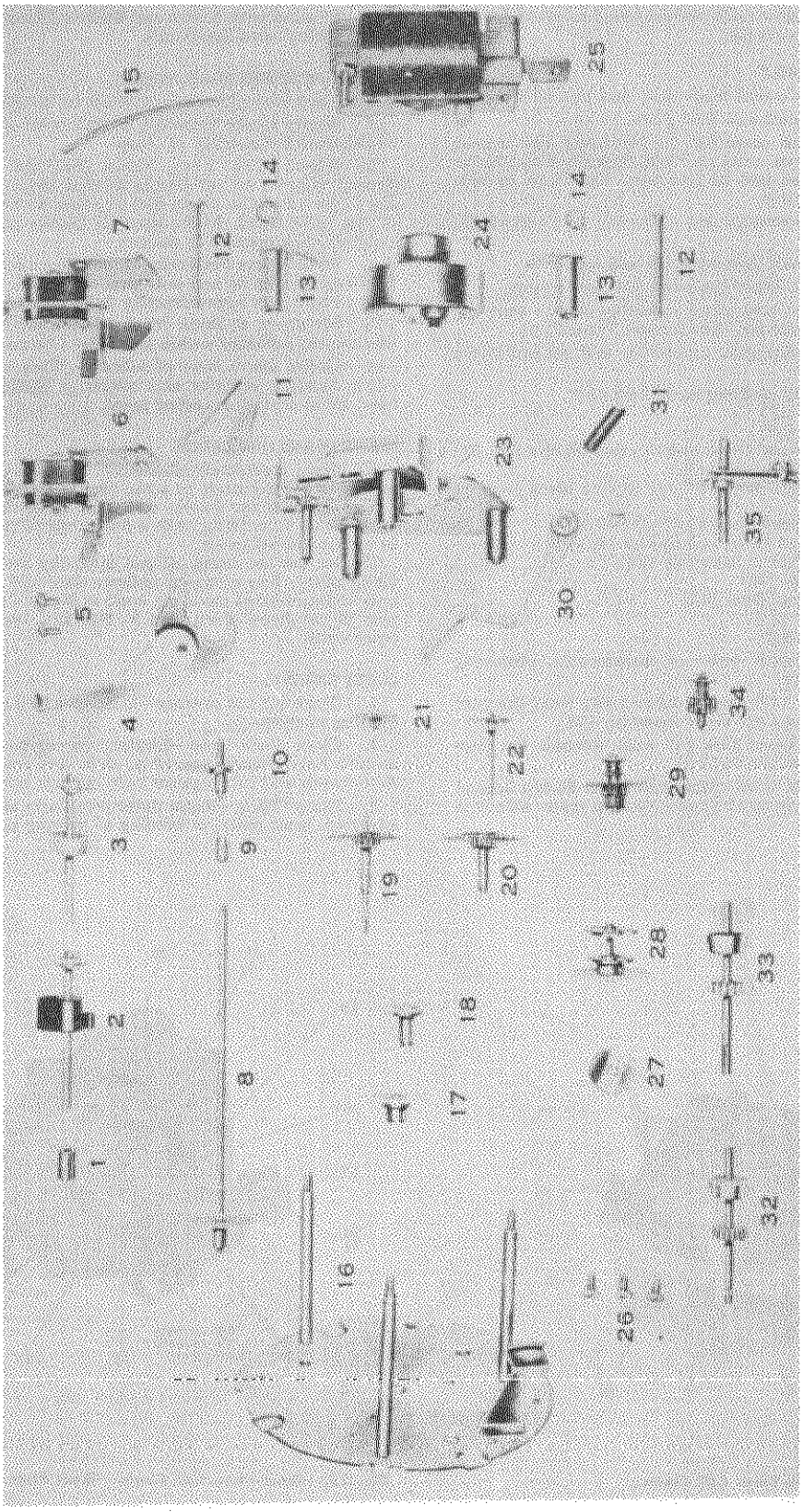


Fig. 13. Exploded View of C37 Series Clock Movement

MODELS 514, 542, 543

CLOCK SERVICE

Figures 11, 12 and 13 show clock parts referred to in the following paragraphs and the parts list.

CLOCK MOVEMENT DISASSEMBLY

1. Remove clock movement from case, and pull off knobs.
2. Remove Bezel, Hands and Dial Face.
3. Remove the motor assembly by removing two screws (12) and break two soldered joints on Field. The Field and Rotor Assembly (25 and 24) can now be removed. The Rotor is held by friction only, to the Field.
4. Remove Switch Assembly by removing two screws (5) from base plate.
5. Remove Switch Shaft Assembly (3) and spacer.
6. Remove Alarm-Set Shaft Assembly (33) and spacer.
7. Remove the three front plate assembly screws that are located under the Dial Face and then remove Front Plate.
8. Remove the following gear assemblies and control levers in the order listed below:
   (a) Sleep Control Shaft and Segment Gear (35)
   (b) Alarm Dial Gear (17)
   (c) Hour Hand Gear (18)
   (d) Alarm Signal Cam and Gear, and Friction Washer (28, 27)
   (e) Sleep Control Switch Lever (30)
   (f) Pinion Drive Gear Assembly (34) (drives Sleep Control Segment Gear)
   (g) Alarm Control Switch Cam Lever (4)
   (h) Time Set Shaft and Gear, and Spacer (8, 9)
   (i) Drive Gear and Pinion Assembly (29)
   (j) Minute Hand Gear (20)
   (k) Sweep Second Hand Gear (22)

CLOCK MOVEMENT REASSEMBLY

Reassemble in the reverse order of disassembly, observing the following precautions:

1. The spring washer (27) should curve away from the gear when placed on the Alarm Cam Gear Assembly (28).
2. The Switch Cam Lever fork (4) must straddle the base plate post as shown in the illustration.
3. After reassembly of front plate, check the Sweep Second Gear (22) through the hole in the base plate to make sure it is free to turn.
4. Proceed with Alarm and Switch Adjustments as described below before installing hands.

ALARM AND SWITCH ADJUSTMENTS

1. Turn Wake-Up Manual shaft to WAKE UP position.
2. Slowly rotate Time Set Shaft clockwise until the contacts of the Switch Assembly (7) close.
3. Replace Dial Face, Alarm Dial, the Minute, Hour and Second Hands. Set all Hands so that they indicate 12 o'clock. Set figure 12 of the alarm dial to index with the smaller pointer of the hour hand. Make sure all Hands and Alarm Dial are tight on their respective shafts.
4. With Alarm Set knob pulled out, continue to rotate Time Set Shaft clockwise and note that the Alarm vibrator arm drops against field core approximately 7–10 minutes later.
5. Set alarm at some other selected position and make sure mechanism actuates within limits (±1 minute).
6. Check alarm tone of vibrator. This can be adjusted by either bending vibrator arm nearer or farther away from field core. Bend arm near anchor point.

CLEANING AND LUBRICATION

To clean, completely disassemble and clean all moving parts in carbon tetrachloride or some similar cleaner.

The inside of the sleeves and shaft surfaces may be cleaned of oxidized oil by rubbing with a fine grade of steel wool dampened in carbon tetrachloride.

Do not use too much oil and apply by means of a small wire (drop oiler). Too much oil collects dust and later oxidizes. Use only recommended clock oil, such as Nye's Celebrated Oil which may be purchased from Wm. F. Nye Co., Inc., New Bedford, or equivalent.

CLOCK TROUBLES

1. Clock will not operate—Defective field coil, defective rotor, binding of parts.
2. Clock loses time—Binding parts, too little friction on minute hand sleeve assembly, defective rotor. Clock time-set shaft bends and rubs against hole in clock bracket.
3. Noisy Clock—Rotor defective, alarm armature improperly adjusted, loose parts, or binding of moving parts.

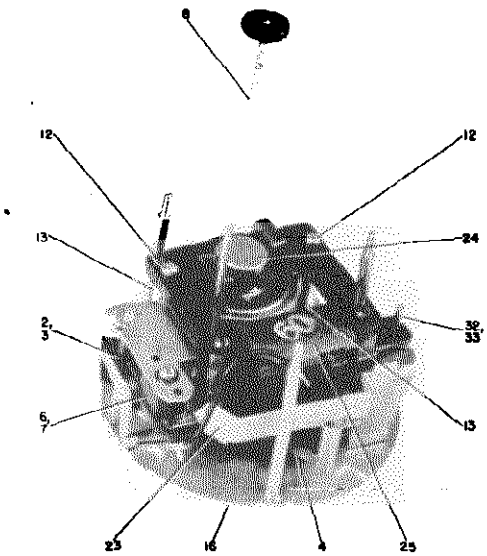


Fig. 11. Back View, C57 Clocks

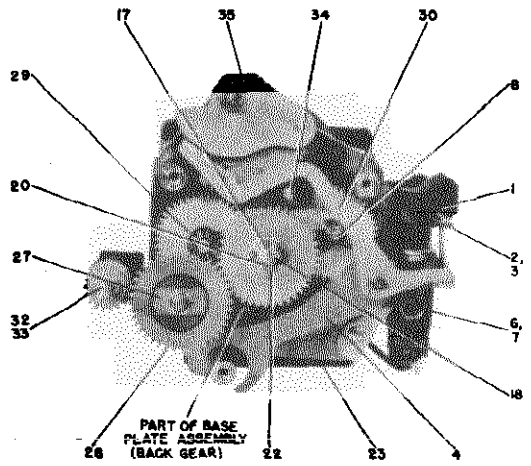


Fig. 12. Front View, C57 Clocks—Front Plate Removed

PARTS LIST FOR MODELS 514, 542 AND 543

Cat. No.	Symbol	Description	Unit Price
		CAPACITORS (Paper)	
*RCE-127	C11A, B	50-50 mf., 150 v., electrolytic	$1.85
RCE-062	C1A, B, C, D	Tuning, two section, 9 mmf.–135 mmf., osc., 14 mmf.–434 mmf., ant.	3.50
*RCW-3048	C9A, B, C, D	Four ceramic capacitors in two sections—one—.002 mf., section two—400 mmf., 220 mmf., .005 mf.	.90
RCW-3075	C2	47 mmf., ceramic	.25
*UCC-037	C12	.003 mf., 600 v., paper	.25
*UCC-045	C3, 4, 10	.05 mf., 600 v., paper	.30
		RESISTORS (Carbon, ½ Watt)	
*URD-007	R10	18 ohms	.13
*URD-021	R2	68 ohms	.13
*URD-029	R8	150 ohms	.13
*URD-081	R1	22,000 ohms	.13
*URD-113	R6, 7	470,000 ohms	.13
*URD-129	R3	2.2 meg.	.13
*URD-141	R5	6.8 megohms	.13
		(Carbon, 2 Watt)	
*URF-049	R9	1000 ohms	.25
		(Potentiometers)	
*RRC-054	R4	Volume control 500,000, composition	1.25
		COILS AND TRANSFORMERS	
*RLC-118	T1	COIL—Oscillator coil	.90
*RTL-135	T2, 3	TRANSFORMER—1st or 2nd I-F, with tuning cores	1.90
*RTO-099	T4	TRANSFORMER—Audio output	1.90
		MISCELLANEOUS ELECTRICAL	
*RJS-158		SOCKET—Tube socket for V2, 12BA6 mechanized, see RJS-188	.35
*RJS-162		SOCKET—Tube socket for V1, 12BE6 mechanized, see RJS-189	.30
*RJS-163		SOCKET—Tube socket for V3, V4, V5, 12AV6, 50C5, 35W4 mechanized, see RJS-190	.30
RJS-188		SOCKET—Tube socket for V2, 12BA6 nonmechanized, see RJS-158	
RJS-189		SOCKET—Tube socket for V1, 12BE6 nonmechanized, see RJS-162	
RJS-190		SOCKET—Tube socket for V3, V4, V5; 12AV6, 50C5, 35W4 nonmechanized, see RJS-163	
*ROP-022		LOUDSPEAKER—4-inch PM	4.90
*RWL-009		CORD—A-c power cord and plug, brown, for Models 514 or 542	.70
*RWL-116		CORD—A-c power cord and plug, ivory, for Model 543	$0.75
RZC-021		CLOCK ASSEMBLY—60 cycles, 105–125 v, for Models 542, 543	17.25
*RZC-022		CLOCK ASSEMBLY—60 cycles, 105–125 v, for Model 514	13.00
		MISCELLANEOUS MECHANICAL	
RAC-102		BRACKET—Clock mounting bracket, plastic	.75
*RDK-230		KNOB—For volume control (ivory)	.15
*RDK-246		DIAL—Tuning, brown, gold numerals; for Model 514	.60
*RDK-285		DIAL—Tuning, red, for Models 542, 543	.60
*RHC-024		CLIP—For mounting electrolytic capacitor C11	.10
*RHC-034		CLIP—Fastener to hold 1st and 2nd I-F transformer can to chassis	.05
*RHG-015		GROMMET—Rubber grommet used to insulate and shock mount tuning cap	.05
*RHH-004		FASTENER—Snap on type for holding back to cabinet on Model 514	.02
*RHJ-005		SPACER—Metal spacer bushing in grommet mounting tuning capacitor	.02
*RHS-075		SCREW—No. 6 self tapping ⅜ in. long, used to hold chassis to cabinet	.02
*RHS-085		SHIELD—Metal tube shield for V3, 12AV6 mechanized production, see RHS-110	.15
*RHS-093		SHIELD—Plastic cover over tube socket pins and terminal board (mechanized production only)	.75
RHS-110		SHIELD—Metal tube shield for V3, 12AV6 nonmechanized production, see RHS-085	
RMC-002		CLIP—Oscillator coil mounting	.02
*RMS-214		SPRING—Retaining ring for hub of tuning dial	.05
		CABINETS AND CABINET PARTS	
*RAB-150		CABINET BACK—Includes loop antenna, L1, for Models 542, 543	1.25
*RAB-151		CABINET BACK—Includes loop antenna, L1, for Model 514	1.25
*RAG-033		CLOTH—Cabinet grille cloth, dark maroon; for Model 542	.30
*RAG-034		CLOTH—Cabinet grille cloth, ivory; for Model 543	.30
*RAU-338		CABINET—Brown mottle, plastic; for Model 542	4.95
*RAU-339		CABINET—Ivory, plastic; for Model 543	4.95
*RAU-348		CABINET—Mahogany mottle, plastic; for Model 514	5.45
*RYN-005		NAMEPLATE—G-E monogram for Model 514 cabinet	.20

* Used on previous receivers.

MODELS 514, 542, 543

CLOCK PARTS LIST—FOR RADIO MODELS 514, 542 AND 543

Any item bearing a Telechron catalogue number may be procured through a Telechron Service Station. Inasmuch as radio parts and clock parts procurement procedures may differ, it is suggested you contact your General Electric Radio Distributor for assistance. All or at least those items bearing General Electric catalogue numbers may also be procured directly through the General Electric Radio Distributor.

MODEL 514 CLOCK ASSEMBLY

G.E. CAT. NO. RZC-022, TELECHRON NO. C51G22

APPEARANCE ITEMS

Description	G.E. Cat. No.	Telechron Cat. No.
Alarm Disc (Black, white figures)		55X48
*Crystal-Bezel (Plastic)	RZA-013	58X129
Dial Face (Gold and black, gold figures)		61X1056
*Dial and Crystal Spacer (paper)	RZJ-002	59X772
Hands, Hour and Minute (Black)		32X308
*Hand, Sweep Second (Red)		31X81
*Knob, Alarm or Switch Set (Ivory)	RZK-003	59X716
*Knob, Time Set (Bronze)		3X36

MOVEMENT ITEMS

Description	Symbol	Telechron Cat. No.
*Alarm Set Sleeve	17	15X3
*Alarm Set Shaft (Slotted)	31	11X43

MOVEMENT ITEMS (Cont'd)

Description	Symbol	Telechron Cat. No.
*Base Plate Assembly	21	35X101
*Cam Shaft Assembly	26	17X10
*Cam Shaft Washer	25	40X252
*Field and Coil	23	45X209
Field Screw (2)	13	1X1
Front Plate Assembly	16	34X287
*Hour Hand Sleeve	18	13X11
*Intermediate Gear Assembly	27	40X87
*Minute Hand Sleeve	19	14X32
*Rotor Unit—60 cycle	22	44X38
*Spreader Post (2)	14	40X201
*Sweep Second Hand Shaft	20	16X14
*Switch Contact Assembly	4	40X322
*Switch Index Spring	28	40X185
*Switch Lever Assembly	12	40X88
*Switch Shaft Assembly	8	59X782
*Switch Shaft Spacer	5	40X275
Time Set Shaft	11	10X151
*Time Set Shaft Spacer	9	40X276

MODEL 542 AND 543 CLOCK ASSEMBLY

G.E. CAT. NO. RZC-021, TELECHRON NO. C57G76

APPEARANCE ITEMS

Description	G.E. Cat. No.	Telechron Cat. No.
Alarm Disc (Red, white figures)		55X48
Bezel, Outer Ring (Metal, gold color finish)		54X31
Bezel, Numeral Ring (Metal, maroon, perforated numerals)	RZA-011	53X163
Bezel, Numeral Color Ring (paper, ivory)	RAZ-012	59X816
Crystal (glass, round)	RZW-005	58X146
Dial Face (Gold color, red figures)		61X1058
Hands, Hour and Minute (Black, radium treated tips)		32X306
Hand, Sweep Second (white)		31X103
*Knob; Alarm, Sleep or Switch Set (Ivory)	RZK-003	59X716
*Knob, Time Set (Bronze)		3X36

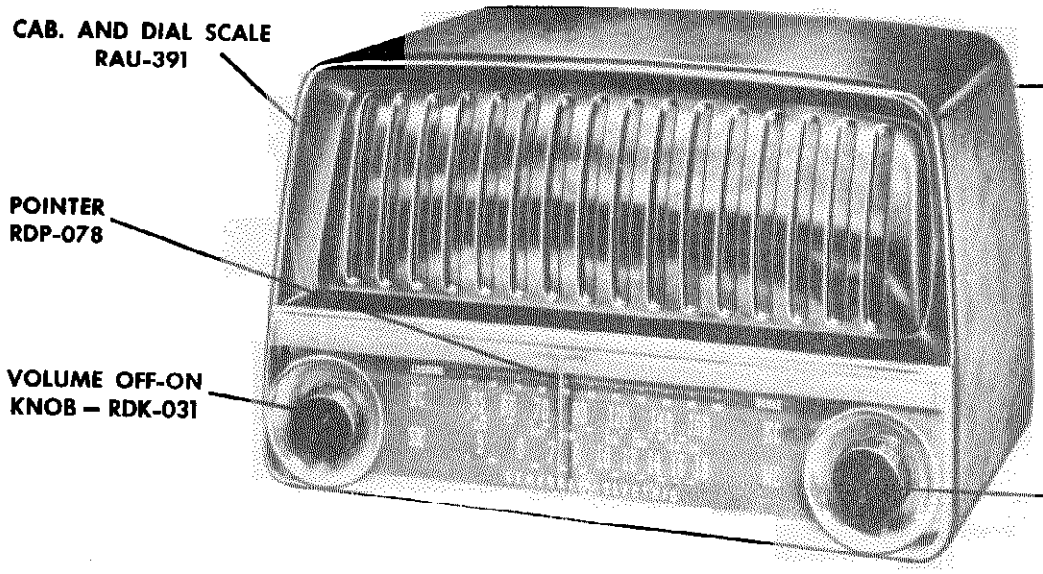
MOVEMENT ITEMS

Description	Symbol	Telechron Cat. No.
*Alarm Set Sleeve	17	15X3
*Alarm Set Shaft (Slotted)	33	11X41

MOVEMENT ITEMS (Con't)

Description	Symbol	Telechron Cat. No.
*Base Plate Assembly	23	35X93
*Cam Shaft Assembly	28	17X10
*Cam Shaft Washer	27	40X252
*Field and Coil (60 cycles)	25	45X209
Front Plate Assembly	16	34X285
*Hour Hand Sleeve	18	13X11
*Intermediate Gear Assembly	29	40X87
*Minute Hand Sleeve	20	14X32
*Rotor Unit—60 cycle	24	44X38
*Sleep Switch Shaft	35	40X308
*Sleep Switch Lever Assembly	30	40X194
*Sleep Switch Friction Assy.	34	40X196
*Spreader Post (2)	13	40X201
*Sweep Second Hand Shaft	22	16X14
*Switch Contact Assembly	7	40X322
*Switch Index Spring	11	40X185
*Switch Yoke Lever	4	40X197
Switch Shaft Assembly	3	59X780
*Switch Shaft, Spacer	1	40X275
*Time Set Shaft	8	10X141
*Time Set Shaft Spacer	9	40X276

*Used on previous General Electric radio clocks



SPECIFICATIONS

CABINET	Mahogany mottle, plastic, 12¼ x 7 x 8¾ in.
INPUT	105–125 volts (using 50L6GT) or 90–110 volts (using 35L6GT) AC or DC, 50–60 cycles, 30 watts
OUTPUT	Undistorted: 1 watt; Maximum: 2 watts
LOUDSPEAKER	4-inch Alnico PM; 3.2 ohms @ 400 cps
TUBE COMPLEMENT	V1 Oscillator-Converter . . . . . 12SA7 V2 I-F Amplifier . . . . . 12BA6 V3 Detector-Audio Amplifier . . . . . 12SQ7 V4 Audio Output For input voltages 105–125 volts . 50L6GT For input voltages 90–110 volts . 35L6GT V5 Rectifier 35Z5GT

GENERAL INFORMATION

The normal input rating of this receiver is in the range of 105 to 125 volts. In the event of low power line voltage conditions, the receiver may be operated efficiently at 90 to 110 volts by substituting a 35L6GT audio output tube in place of the 50L6GT tube.

Note: When servicing or aligning this receiver always use an isolation transformer to protect test equipment.

ALIGNMENT

For r-f alignment, the low frequency limit of dial pointer travel should be checked with tuning gang fully closed and reset, if necessary, to a measured distance of $2\frac{3}{16}$ inches from center of front plate to pointer. To facilitate alignment, this reference point, as well as 4 inches (18 mc) and $3\frac{21}{32}$ inches (1500 kc) measured along the front plate from low frequency end of dial scale, may be marked with pencil on the back of front plate at the edge of pointer slider.

The volume control should be kept at maximum and the signal generator output attenuated so that the output meter reading does not exceed 1¼ volts.

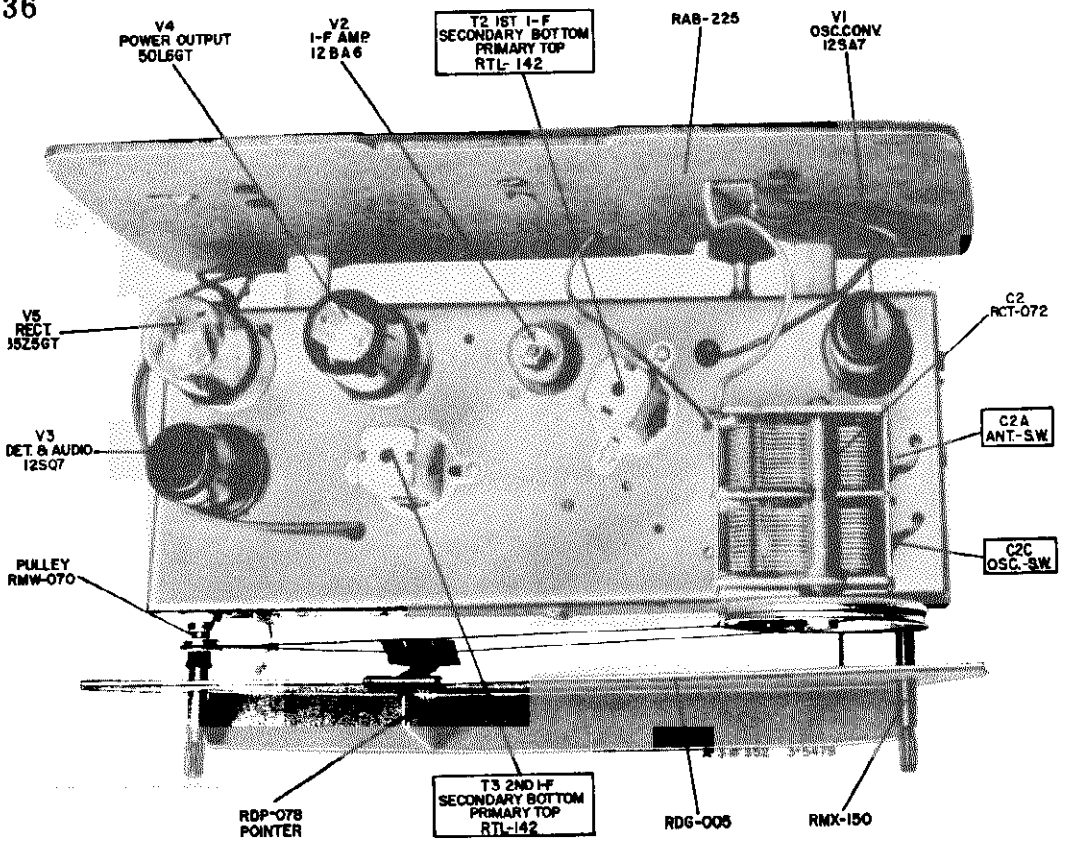
After the chassis has been aligned and replaced into the cabinet, the pointer, at the low frequency end of its travel, should rest on the zero point of the logging scale. A slight inaccuracy in calibration may be corrected by moving the chassis slightly sideways.

ALIGNMENT CHART

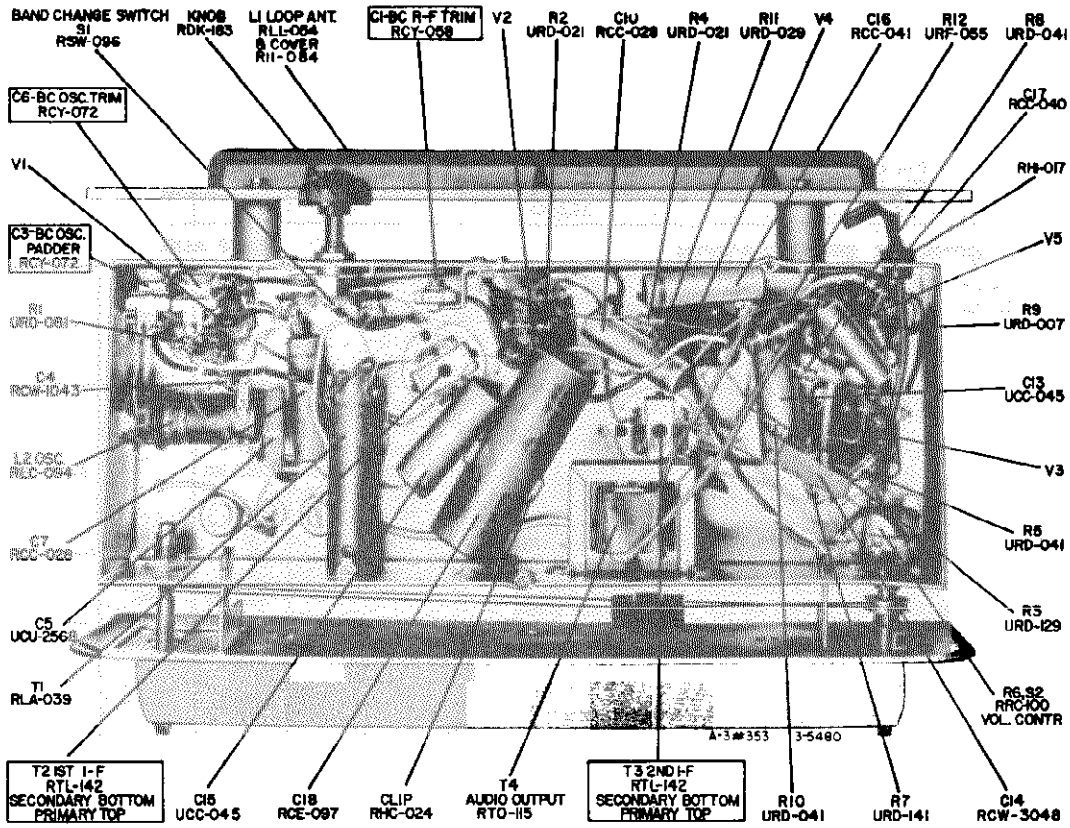
Step	Signal Generator Output	Signal Gen. Setting	Band Switch Setting	Dial Pointer Setting	Adjust for Maximum Output
		I-F ALIGNMENT			
1	Pin 8, 12SA7 grid, in series with .05 mfd	455 kc	BC	Tuning capacitor closed	Cores of 2n i-f transformer, T3
2					Cores of 1st i-f transformer, T2
3					Recheck adjustment of T3 and T2
		R-F ALIGNMENT			
4	In series with 200 mmf to antenna input (green wire lead)	18 mc	SW	18 mc	Oscillator SW trimmer, C2
5					Antenna SW trimmer, C2
6		1500 kc	BC	1500 kc	Oscillator BC trimmer, C6
7					Antenna BC trimmer, C1
8		580 kc		For max.	Oscillator BC padder, C3*
9		1500 kc		1500 kc	Recheck adjustment of trimmers C6 and C1, steps 6 and 7

* ALIGNMENT NOTE:
This adjustment is "rocked in" for maximum output.

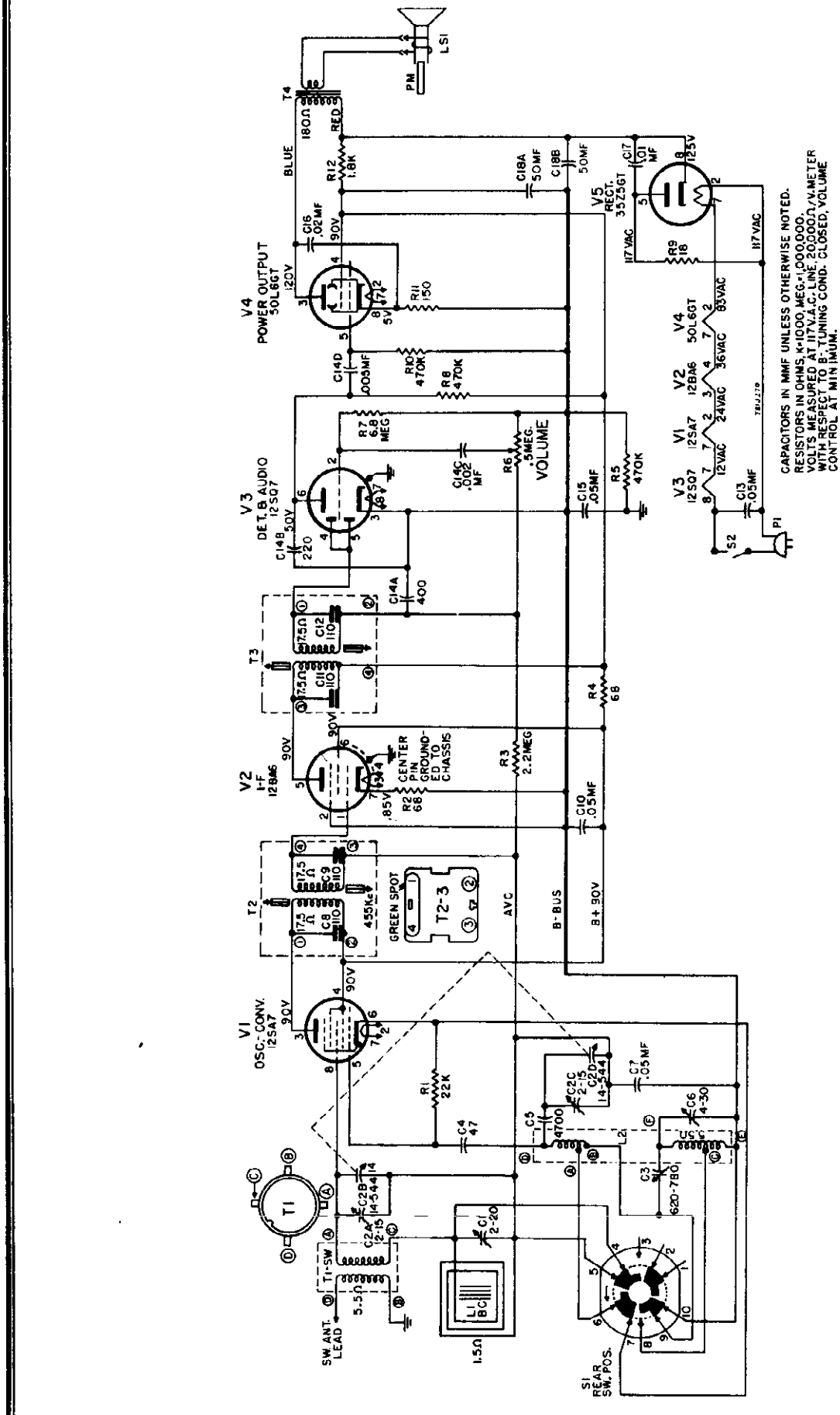
MODEL 436

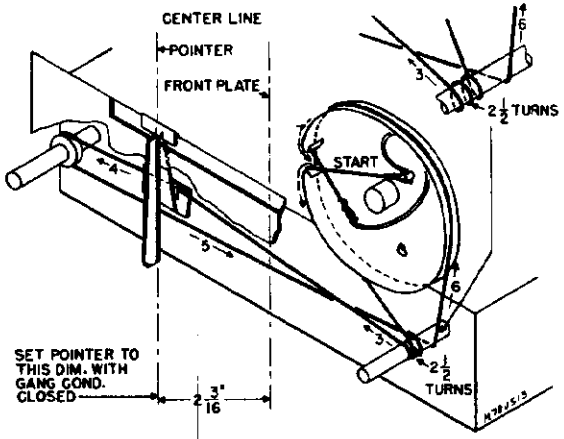


CHASSIS TOP VIEW

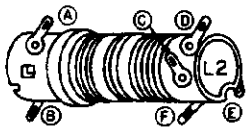


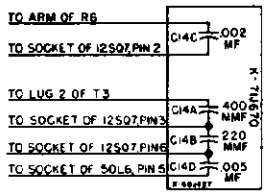
CHASSIS BOTTOM VIEW


V1 OSC.-CONV. 12SA7
V2 I-F 12BA6
V3 DET. & AUDIO 12SQ7
V4 POWER OUTPUT 50L6GT
V5 RECT. 35Z5GT
V1 12SA7
V2 12BA6
V3 12SQ7
V4 50L6GT
T1
T2
T2-3
T3
T4
PM
LSI
P1
S1 REAR SW. POS.
S2
SW. ANT. LEAD
VOLUME
GREEN SPOT
CENTER PIN GROUNDED TO CHASSIS
AVC
B- BUS
B+ 90V
455Kc
1.5Ω
CAPACITORS IN MMF UNLESS OTHERWISE NOTED.
RESISTORS IN OHMS, K=1000, MEG=1,000,000.
VOLTS MEASURED AT 117V.A.C. LINE, 20,000Ω/V METER WITH RESPECT TO B- TUNING COND. CLOSED, VOLUME CONTROL AT MIN IMUM.



DIAL STRINGING DIAGRAM





BULLPLATE

PARTS LIST

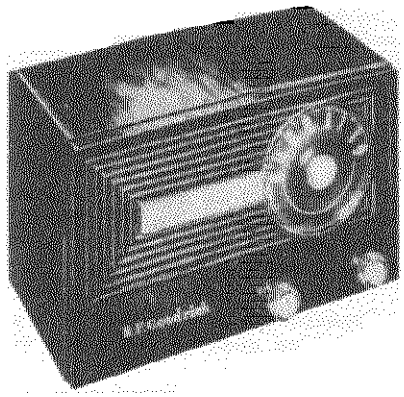
Cat. No.	Symbol	Description	Unit Price
		CAPACITORS	
*RCC-028	C10	.05 mf, +40 −10%, 400 v., paper	$0.25
*RCC-040	C17	.01 mf, +40 −10%, 600 v., paper	.30
*RCC-041	C16	.02 mf, +40 −10%, 600 v., paper	.30
*RCE-097	C18B, C	50-50 mf, 150 v., electrolytic	1.70
RCT-072	C2A, B, C, D	TUNING—Two-gang with drive drum	9.00
*RCW-1043	C4	47 mm, ±2%, 0 temp. coeff., ceramic	.60
*RCW-3048	C14A, B, C, D	BULLPLATE—Consists of four capacitors in two sections: 1-.002 mmf, +100 −0%, 2-440 mmf, 220 mmf, +70 −30%, .005 mmf, +100 −0%	.90
*RCY-058	C1	TRIMMER—2-20 mf	.40
RCY-072	C3, 6	TRIMMER	1.65
*UCC-045	C7, 13, 15	.05 mf, +40 −10%, 600 v., paper	.30
*UCU-2568	C5	4700 mmf, ±5%, 500 v., mica	.85
		RESISTORS	
RRC-100	R6, S2	VOLUME CONTROL & SWITCH —500,000 ohms	1.65
*URD-007	R9	18 ohms, ±10%, ½ w.	.13
*URD-021	R2, 4	68 ohms, ±10%, ½ w.	.13
*URD-029	R11	150 ohms, ±10%, ½ w.	.13
*URD-081	R1	22,000 ohms, ±10%, ½ w.	.13
*URD-113	R5, 8, 10	470K ohms, ±10%, ½ w.	.13
*URD-129	R3	2.2 meg., ±10%, ½ w.	.13
*URD-141	R7	6.8 meg., ±10%, ½ w.	.13
*URF-055	R12	1800 ohms, ±10%, 2 w.	.25
		COILS AND TRANSFORMERS	
*RLA-039	T1	COIL—Antenna coil, short wave	1.75
*RLC-094	L2	COIL—Oscillator coil	3.50
RLL-054	L1	LOOP ANTENNA—Ferrite core	1.50
*RTL-142	T2, 3	TRANSFORMER—1st and 2nd I-F	1.85
*RTO-115	T4	TRANSFORMER—Audio output	1.90

Cat. No.	Symbol	Description	Unit Price
		MISCELLANEOUS ELECTRICAL	
*RJS-003		SOCKET—For tubes 50L6, 35Z5, 12SQ7, 12SA7	$0.20
*RJS-141		SOCKET—For 12BA6	.20
*RSW-096	S1	SWITCH—Band change switch	1.75
*RWL-009		CORD—Power cord & plug, brown, ivory plug, 6 ft. long	.70
*S403-D7	LS1	LOUDSPEAKER—4-inch PM	4.30
		MISCELLANEOUS MECHANICAL	
*RAP-036		PLATE—I-F adapter plate	.10
*RDC-032		CORD—Drive cord, 25 yds. bulk	2.50
RDG-005		BACKPLATE—Dial scale backplate (grey)	.30
*RHC-024		CLIP—Electrolytic mounting clip	.10
*RHC-038		CLIP—Antenna mounting	.02
*RHC-053		CLIP—I-F can mounting	.02
*RHG-006		SLEEVE—Volume control shaft, fiber	.05
*RHG-012		GROMMET—For front chassis mounting	.05
*RHG-040		GROMMET—For rear chassis mounting	.05
*RHI-017		STRAIN RELIEF—Two-piece insulator for power cord	.15
*RII-084		LOOP SHIELD—Antenna cover, polystyrene	.60
*RMM-206		CORK—For front chassis mounting	.05
*RMS-118		SPRING—Dial cord tension spring	.10
*RMW-070		PULLEY—Idler pulley	.05
*RMX-150		SHAFT—Tuning control shaft mounting bushing, less nut	.50
		CABINET AND APPEARANCE ITEMS	
RAB-225		BACK—Cabinet back less antenna	.40
RAU-391		CABINET AND DIAL SCALE—Plastic, mahogany	11.50
*RDK-031		KNOB—Mahogany, f. tuning and volume control	.10
*RDK-183		KNOB—Band change switch, mahogany	.15
RDP-078		POINTER—Dial pointer, red plastic flag	.45

*Parts used on previous receivers.

PRICES ARE SUGGESTED LIST PRICES AND SUBJECT TO CHANGE WITHOUT NOTICE

GENERAL INFORMATION



TYPE - AC-DC table model superheterodyne with loop antenna.

TUNING RANGE - 535 to 1620 Kc

IF FREQUENCY - 455 Kc

TUBE COMPLEMENT - 12BE6 - Converter
12BA6 - IF Amplifier
12AT6 - Detector, AVC & 1st AF Amp
50C5 - Power Amplifier
35W4 - Rectifier

POWER SUPPLY - 117V AC (50 to 60 cycles) or DC, 30 watts

INSTALLATION & OPERATING INSTRUCTIONS

POWER SWITCH AND VOLUME CONTROL. The power switch and volume control are combined and operated with the left-hand knob. Turn radio ON by rotating volume knob to the right until a click is heard. Continued rotation of this control to the right will increase volume. Turn receiver OFF by rotating volume knob to the left until a click is heard.

NOTE: When operating from AC line, reverse power line plug for minimum hum. If the receiver does not operate from a DC power line after being turned ON for a few minutes, reverse the power line plug.

TUNING. Stations are tuned in with the right-hand knob. Tune carefully until you are exactly on the station; tuning to either side of it will result in noisy reception and poor tone quality. Do not regulate volume by detuning the station; always tu exactly on the station, then adjust volume contr to desired loudness.

ANTENNA. A loop antenna is built into this rece ver, eliminating the need for an external antenn Reception from some stations may be improved by r tating the whole receiver; this is due to the slig directional characteristic of the loop antenna. extremely noisy locations, rotate the entire rece ver till minimum noise and maximum signal pick- are obtained. For additional pick-up, an extern antenna may be connected as shown on back of rece ver.

CAUTION: Never connect antenna or chassis water pipe, radiator or other ground.

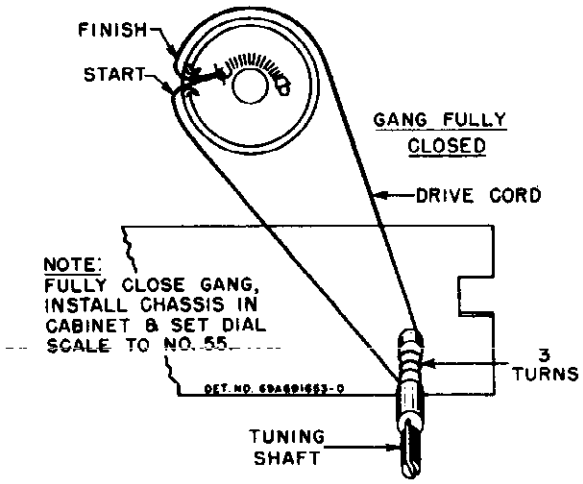


FIGURE 1. STRING DRIVE DETAIL

MODELS 92-523,
-524, -525, -526

TO REMOVE CHASSIS FROM CABINET

1. Remove dial scale; it pulls off.
2. Remove the knobs; they pull off.
3. Remove the two split plugs that hold top of loop panel to cabinet.
4. Remove the two screws that hold the chassis to the cabinet. These screws are accessible through slots in the loop panel.
5. Slide chassis out of cabinet.

ALIGNMENT

If AC power is used, use an isolation transformer between power line and receiver. If isolation transformer is not available, connect low side of signal generator to B- through .1 mf capacitor.

Connect a low range output meter across the speaker voice coil and set the volume control at maximum. For greatest accuracy, keep output of receiver at approximately .05 watt (.05 watt = .40 volt on output meter) throughout alignment by reducing signal generator output as stages are brought into alignment. Use a small fibre screwdriver for aligning IF & diode transformers.

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SET TO	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Rear stator of tuning cap	455 Kc	Gang opened	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT						
2.	.1 mf	Rear stator of tuning cap	1620 Kc	Gang opened	5	Adjust for maximum.
3.	None	Radiation loop*	1400 Kc	Tune for maximum	6	Adjust for maximum.

*Connect generator output to 5" diameter, 3 turn loop & couple to receiver loop. Keep loops at least 12" apart.

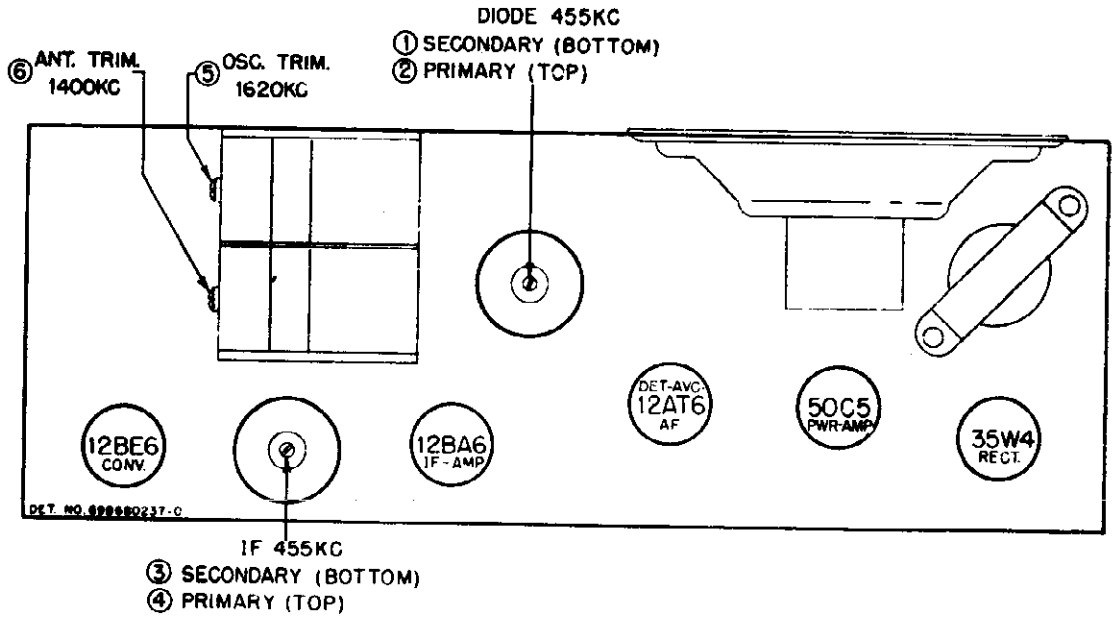


FIGURE 2. TUBE & TRIMMER LOCATION

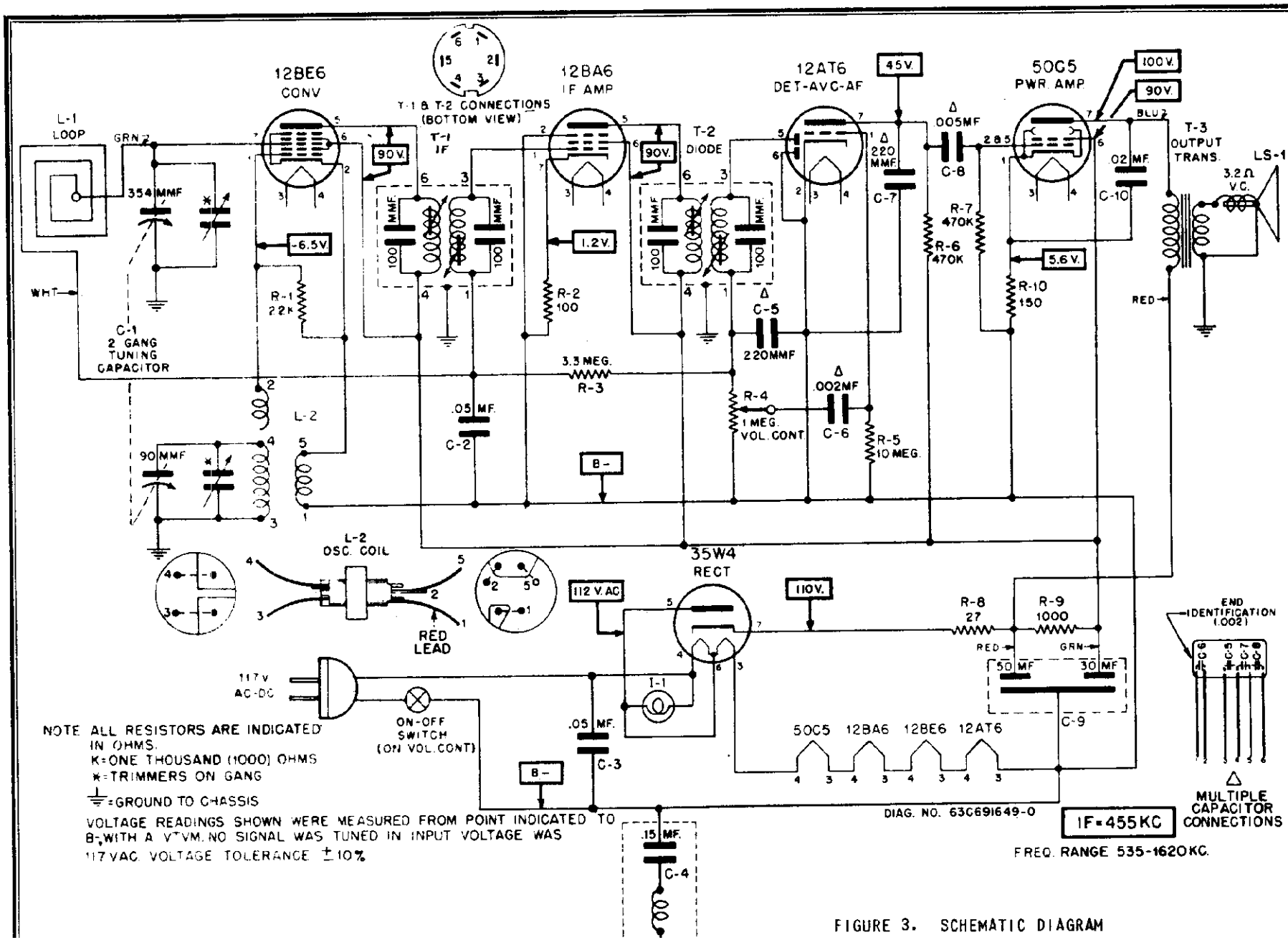
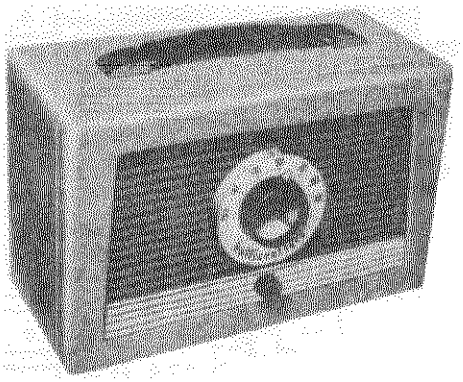


FIGURE 3. SCHEMATIC DIAGRAM

MODELS 92-523, -524, -525, -526

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
CHASSIS PARTS - ELECTRICAL			
CAPACITORS			
C-1	1X485960	Variable, 2-gang: includes pulley	2.65
C-2	8K691444	Paper: .05 mf 200V	.20
C-3	8K691443	Paper: .05 mf 400V	.20
C-4	8A691842	Paper: .15 mf (resonant at 455 Kc)	.60
C-5,6, 7,8	21B482847	Ceramic, multiple: 220 mmf; .002 mf; 220 mmf; .005 mf (all 400 wv)	.65
C-9	23A691441	Electrolytic: 50 mf-30 mf/ 150V	1.10
C-10	8A691442	Paper: .02 mf 400V	.20
DIAL LIGHT			
I-1	65X11854	Bulb: 6.3V-.15A; tubular; clear; #47	.15
COILS			
L-1	24K691446	Loop Antenna: includes back panel	1.05
L-2	24K690762	BC Oscillator Coil	.65
SPEAKER			
LS-1	50K691765 or 50C478138	Speaker, PM: 4"; 3.2 ohm VC	2.60 exch 1.95
RESISTORS		Note: All resistors are insulated carbon type unless otherwise specified.	
R-1	6R6028	22,000 20% 1/2W .....doz	1.00
R-2	6R6018	100 20% 1/2W .....doz	1.00
R-3	6R2118	3.3 meg 20% 1/2W .....doz	1.00
R-4	18A691440	Volume control: 1 meg; includes ON-OFF switch	1.00
R-5	6R2109	10 meg 20% 1/2W .....doz	1.00
R-6	6R6032	470,000 20% 1/2W .....doz	1.00
R-7	6R6032	470,000 20% 1/2W .....doz	1.00
R-8	6R5683	27 10% 1/2W .....doz	1.00
R-9	6R3953	1000 20% 1W .....each doz	.15 1.45
R-10	6R3992	150 20% 1/2W .....doz	1.00
SWITCH			
S-1	-	SPST Switch: part of volume control R-4	-
TRANSFORMERS			
T-1	24B482863	IF, 455 Kc: complete	1.70
T-2	24B482865	Diode, 455 Kc: complete	1.70
T-3	25K485973	Output Transformer	.65
CHASSIS PARTS - MECHANICAL			
	7K690449	Bracket, loop mtg	.10
	7A690445	Bracket, pilot light mtg.	.10
	7A77337	Bracket, tuning shaft mtg.	.05
	11M8944	Cord, dial: 18 lb; blk .....yd	.10
	30A470651	Cord, line & plug: 6 ft long	.75
	46K680318	Core, iron: threaded (for T-1 & T-2)	.10
	5A19658	Eyelet, spacer (gang mtg) ...doz	.20
	5A70404	Grommet, rubber (gang mtg) ..doz	.60
	14A482844	Insulator, cord outlet .....doz	.25
	29R3010	Lug, soldering: #6; hot tinned (gang) .....doz	.30
	2S7051	Palnut, hex: 3/8-32 x 9/16; cad pl (volume control mtg) ....doz	.15
	5S7771	Rivet: .088 x 3/16; stl; pol nkl (tube socket mtg) .....per/c	.50
	5S7707	Rivet: .122 x 5/32 stl; nkl pl (spring tube shield mtg & output transformer mtg)...per/c	.50
	5S7701	Rivet: .122 x 3/16; stl; nkl pl (tuning shaft bracket mtg) .....per/c	.50
	3S2294	Screw, machine: 6-32 x 1/2 plain hex head; locking type; cad pl (gang mtg) .....doz	.15
	3S7205	Screw, machine: 8-32 x 1/4 slotted hex head; locking type; cad pl (pilot light brkt mtg) .....doz	.15
	3S3398	Screw, sheet metal: #6 x 3/8 PKZ plain hex head; cad pl (bracket, loop mtg) .....per/c	.50
	3S7454	Screw, sheet metal: #8 x 1/4 PKZ plain hex head; cad pl (speaker mtg) .....per/c	.50
	3S7455	Screw, sheet metal: #8 x 3/8 PKA slotted acorn head; antique copper finish (loop mtg) .....doz	.15
	47A482845	Shaft, tuning	.15
	26K485936	Shield, coil (T-1 & T-2)	.20
	26A481521	Shield, spring (tube shield).doz	.50
	9A485979	Socket, pilot light & bracket...	.30
	9A472534	Socket, tube: miniature	.15
	41A691088	Spring, tension coil (elect. cap retaining)	.10
	41A14111	Spring, tension coil (dial cord) .....doz	.40
	4A70015	Washer, 'C' (tuning shaft retainer) .....per/c	.50
	4S7633	Washer, flat: 9/16 x 11/64 x .033 stl; cad pl (loop mtg).doz	.15
	4K482859	Washer, insulated shoulder (loop mtg brkt) .....doz	.15
CABINET PARTS			
	16E690434	Cabinet, table model: plastic; walnut	3.95
	16K690438	Cabinet, table model: plastic; ivory	5.40
	16K690436	Cabinet, table model: plastic; green	5.40
	16K691447	Cabinet, table model: plastic; maroon	5.40
	42A485984	Clip, dial scale retainer ...doz	.20
	36B690442	Knob, control: plastic; walnut	.25
	36K690444	Knob, control: plastic; ivory	.25
	36K691460	Knob, control: plastic; green	.25
	36K691459	Knob, control: plastic; maroon	.25
	38A25507	Plug, split (loop & back to cabinet mtg) .....doz	.15
	34C690441	Scale, dial	.55
	3S7374	Screw, machine: 8-32 x 5/16 plain hex head; cad pl (chassis mtg) .....per/c	.50



92X1525

Fig. 1. Radio Receiver Model 5R24

SPECIFICATIONS

Tubes and Rectifiers . . . . . 4 tubes and 1 selenium rectifier
Power Supply . . . . 105-125 volts DC/50-60 cycle AC or 90 and 7½ volt batteries
Frequency Coverage . . . . . 540 KC to 1650 KC
Intermediate Frequency . . . . . 455 KC
Speaker . . . . . 4 inch PM
Voice Coil Impedance . . . . . 3.2 ohms
Antenna . . . . . Built-in loop

REPLACEMENT BATTERIES

7½V "A" - Eveready 717, Burgess C5, RCA VS 065
90V "B" - Eveready 490, Burgess N60, RCA VS 090

ALIGNMENT PROCEDURE

- Connect output meter across voice coil.
- Turn volume control at maximum.
- Use a non-metallic alignment tool.
- Loop antenna must be connected.
- Refer to Fig. 2 for location of alignment adjustments.
- Generator must have a modulated output.
- Align for maximum output. To prevent AVC acti from interfering with alignment, use lowest outp setting of generator that gives satisfactory reading output meter (approximately 50 milliwatts).

STEP	SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	ADJUST FOR MAXIMUM OUTPU
1	High side to pin 6 of the 1R5 through a .1 mfd. capacitor. Ground side to B-.	455 KC	Tuning gang fully open.	A,B,C,D
2	Same as STEP 1.	1650 KC	Tuning gang fully open.	E
3	Place generator lead close to loop antenna. No actual connection.	1500 KC	1500 KC	F

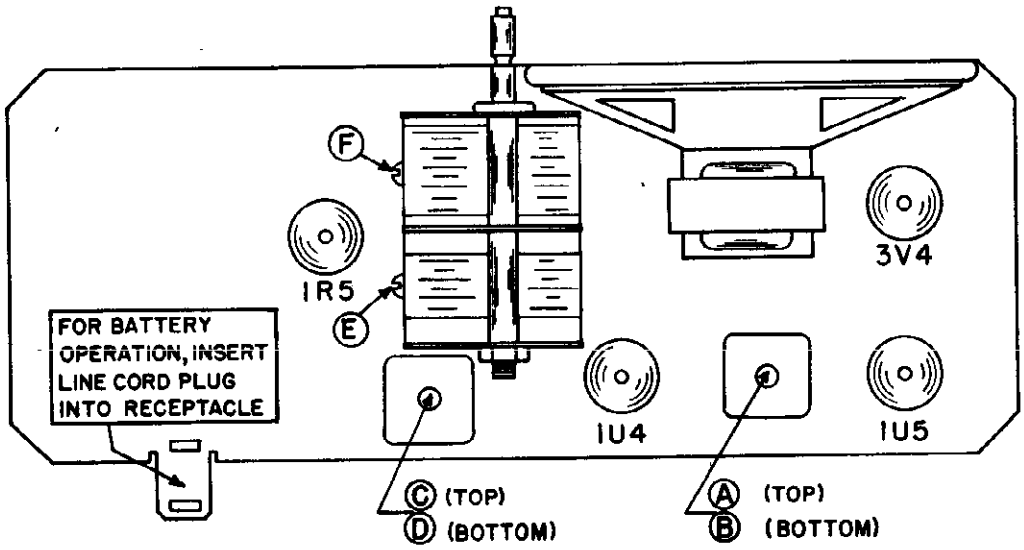


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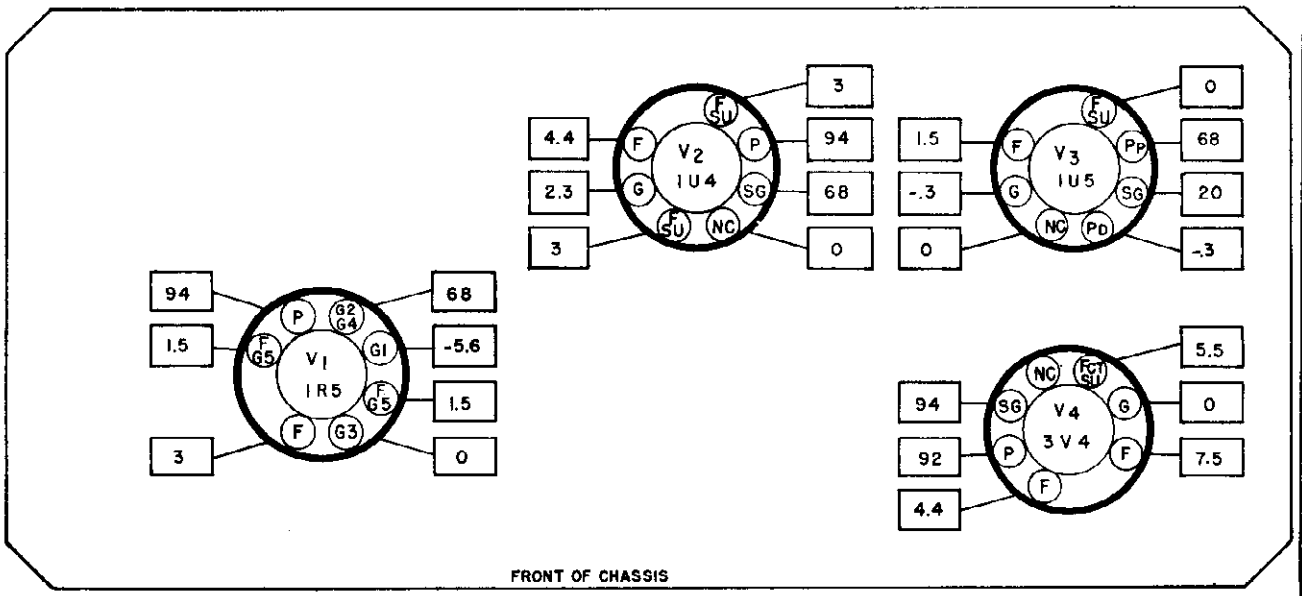
Fig. 2. Top View of Chassis Showing Location of Alignment Adjustments and Tubes

MODEL 5R24

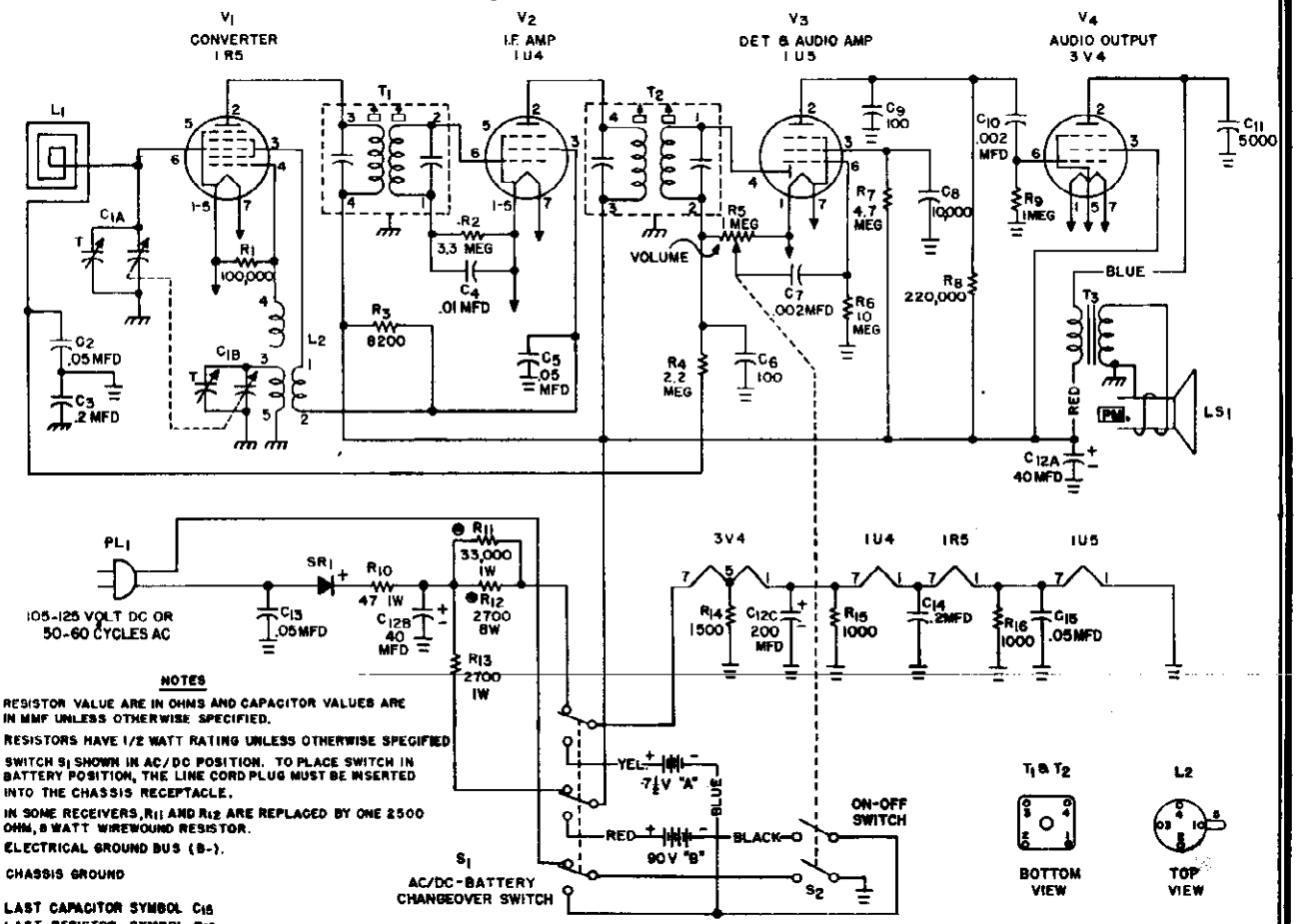


NOTES

1. SOCKET VIEWS ARE BOTTOM VIEWS.
2. ALL VOLTAGES MEASURED BETWEEN TUBE SOCKET TERMINALS AND B-(NOT CHASSIS) WITH ZERO SIGNAL INPUT.
3. LINE VOLTAGE - 117 VOLTS AC.
4. LOOP ANTENNA CONNECTED AND TUNING GANG FULLY MESHED.
5. ALL VOLTAGES ARE DC AND POSITIVE UNLESS OTHERWISE SPECIFIED.
6. ALL VOLTAGES MEASURED WITH A VACUUM TUBE VOLTMETER.
7. NC-NO CONNECTION. VOLTAGE SHOWN FOR THIS TERMINAL ONLY WHEN USED AS A TIE LUG.

Fig. 3. Tube Socket Voltage Chart

92C1524



NOTES

1. RESISTOR VALUE ARE IN OHMS AND CAPACITOR VALUES ARE IN MMF UNLESS OTHERWISE SPECIFIED.
2. RESISTORS HAVE 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED
3. SWITCH S_1 SHOWN IN AC/DC POSITION. TO PLACE SWITCH IN BATTERY POSITION, THE LINE CORD PLUG MUST BE INSERTED INTO THE CHASSIS RECEPTACLE.

● IN SOME RECEIVERS, R_{11} AND R_{12} ARE REPLACED BY ONE 2500 OHM, 8 WATT WIREWOUND RESISTOR.

⏚ ELECTRICAL GROUND BUS (B-).

⏥ CHASSIS GROUND

LAST CAPACITOR SYMBOL C_{15}
LAST RESISTOR SYMBOL R_{16}

Fig. 4. Schematic Diagram

89C397

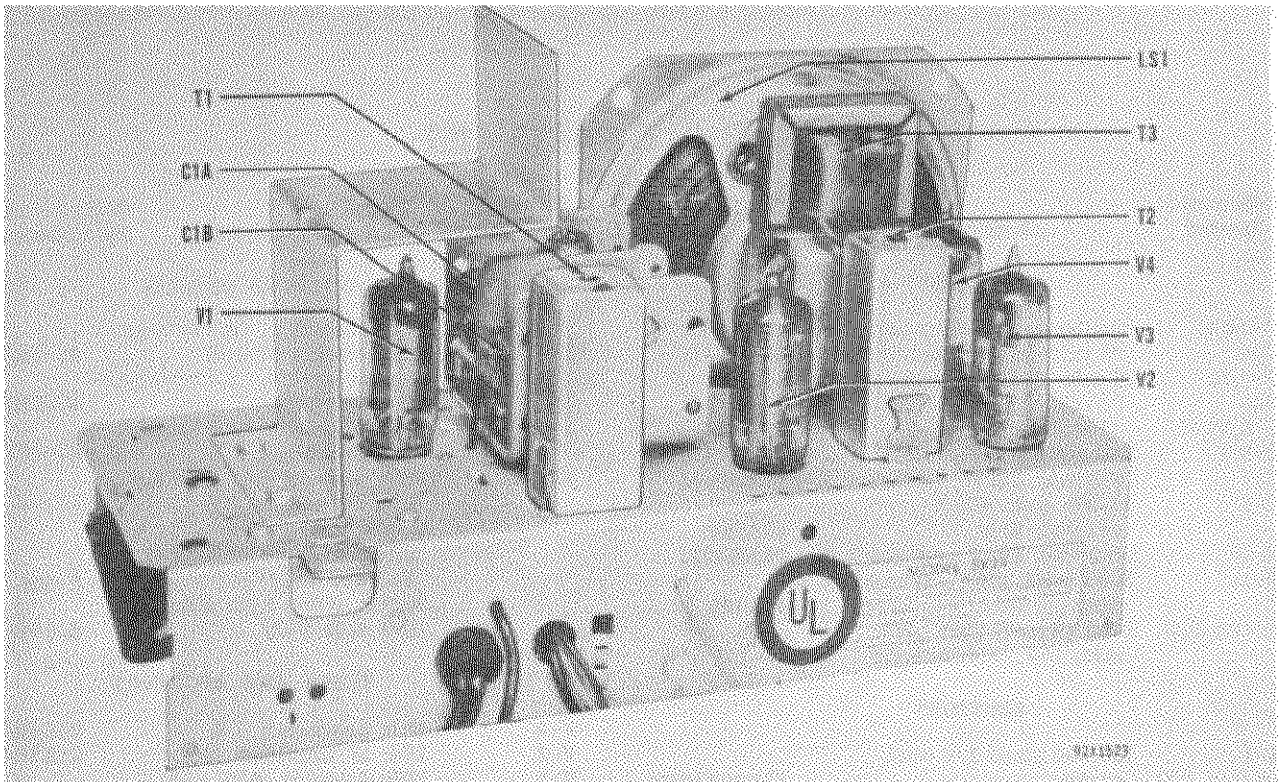


Fig. 5. Top View of Chassis Showing Component Location

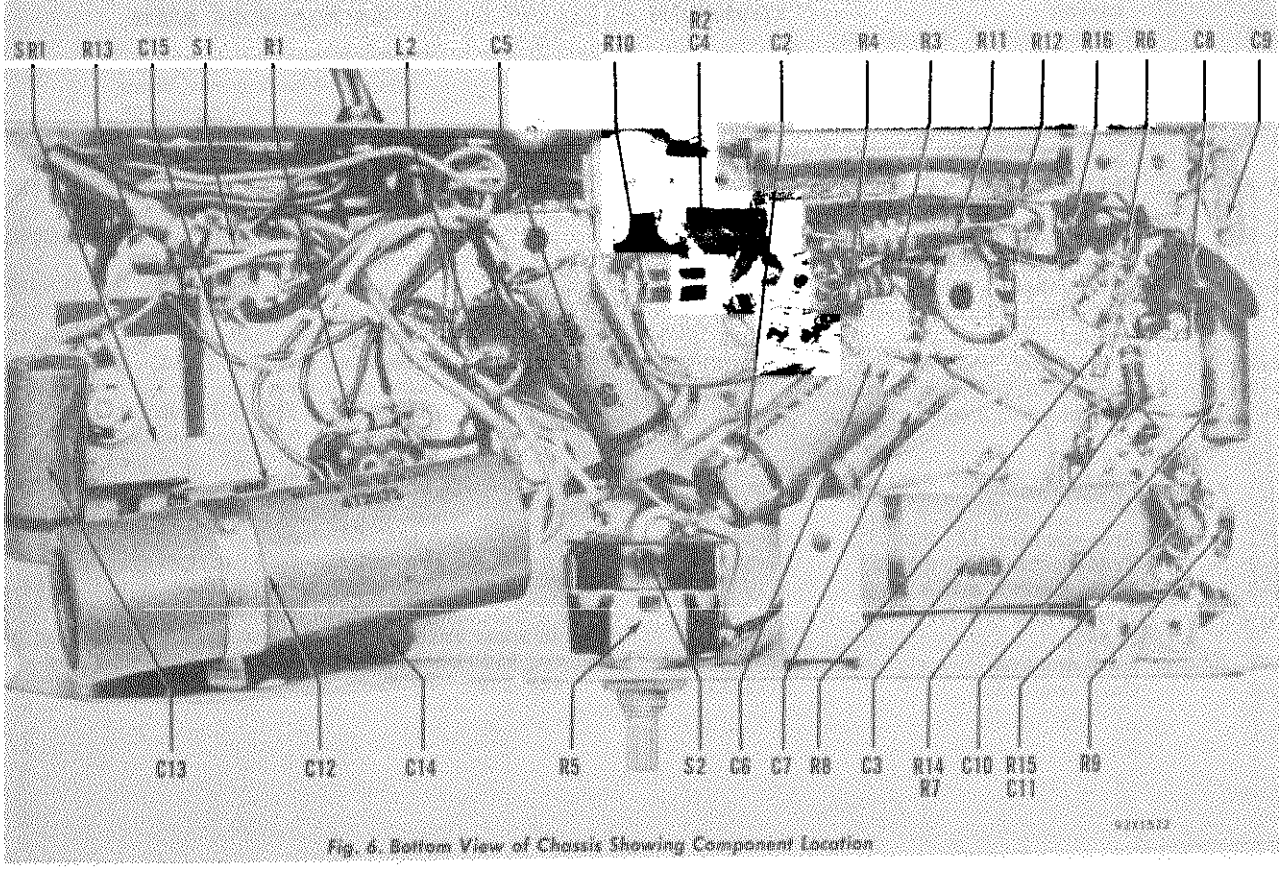


Fig. 6. Bottom View of Chassis Showing Component Location

MODEL 5R24

SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number
	CAPACITORS	
C-1A,B	Tuning capacitor, 2 section	48-280
C-2	.05 mfd. 200V., tubular	46AU503J
C-3,14	.2 mfd. 400V., tubular	46AW204J
C-4	.01 mfd. 200V., tubular	46AU103J
C-5,13,15	.05 mfd. 400V., tubular	46AW503J
C-6,9	100 mmf. 500V., mica	47X20B101M
C-7	.002 mfd. 200V., tubular	46AU202J
C-8	10,000 mmf. 450 V., ceramic disc	47A224
C-10	.002 mfd. 400V., tubular	46AW202J
C-11	5000 mmf. 450V., ceramic disc	47A168
C-12A,B,C	Dual 40 mfd. 150V.,200 mfd. 15V., electrolytic	45-193
	RESISTORS	
R-1	100,000 ohms 1/2 watt, carbon	23X20X104M
R-2	3.3 megohms 1/2 watt, carbon	23X20X335M
R-3	8200 ohms 1/2 watt, carbon	23X20X822M
R-4	2.2 megohms 1/2 watt, carbon	23X20X225M
R-5	Volume control, 1 megohm; includes ON-OFF switch S-2	25-963
R-6	10 megohms 1/2 watt, carbon	23X20X106M
R-7	4.7 megohms 1/2 watt, carbon	23X20X475M
R-8	220,000 ohms 1/2 watt, carbon	23X20X224M
R-9	1 megohm 1/2 watt, carbon	23X20X105M
R-10	47 ohms 1 watt, carbon	23X30X470K
R-11*	33,000 ohms 1 watt, carbon	23X30X333M
R-12*	2700 ohms 8 watts, wire-wound	24-937
R-13	2700 ohms 1 watt, carbon	23X30X272K
R-14	1500 ohms 1/2 watt, carbon	23X20X152K
R-15,16	1000 ohms 1/2 watt, carbon	23X20X102K
	TRANSFORMERS AND COILS	
T-1	Transformer, IF; input	50-521
T-2	Transformer, IF; output	50-521
T-3	Transformer, audio output (part of speaker LS-1)	--------
L-1	Loop antenna	57-154
L-2	Coil, oscillator	51-1483

Schematic Symbol	Description	Hallicrafters Part Number
	PLUGS AND SOCKETS	
	Plug assembly, "B" battery; male (includes lead)	87-1972
	Plug assembly, "B" battery; female (includes lead)	87-3508
	Plug assembly, "A" battery; includes leads	87-1971
PL-1	Plug, line cord (part of line cord 87-1973)	-------
	Socket, tube; 7 pin miniature (for tubes V-1, V-3 and V-4)	6-404
	Socket, tube; 7 pin miniature (for tube V-2)	6-403
	TUBES AND RECTIFIERS	
V-1	1R5: converter	90X1R5
V-2	1U4: IF amplifier	90X1U4
V-3	1U5: detector, AVC and audio amplifier	90X1U5
V-4	3V4: audio output	90X3V4
SR-1	Selenium rectifier, 65 ma	27-162
	MISCELLANEOUS PARTS	
	Cabinet; includes carrying strap and back cover, does not include loop antenna or front panel	78F684
	Clip, mtg. (for T-1 and T-2)	76A385
	Dial scale	83D398
	Front panel, cardboard; includes grille cloth	32C502
	Grommet, rubber; for mounting tuning capacitor	16A015
	Knob, station selector	15C414
	Knob, volume control	15B413
	Line cord and plug PL-1	87-1973
	Line cord lock	76-857
LS-1	Speaker, 4" PM; 3.2 ohm voice coil (includes output transformer T-3)	85-121
	Strip, front panel decorative	7C302
S-1	Switch, spring slide; 3pdt (AC/DC-Battery)	60-466
S-2	Switch, ON-OFF; part of volume control R-5	-------

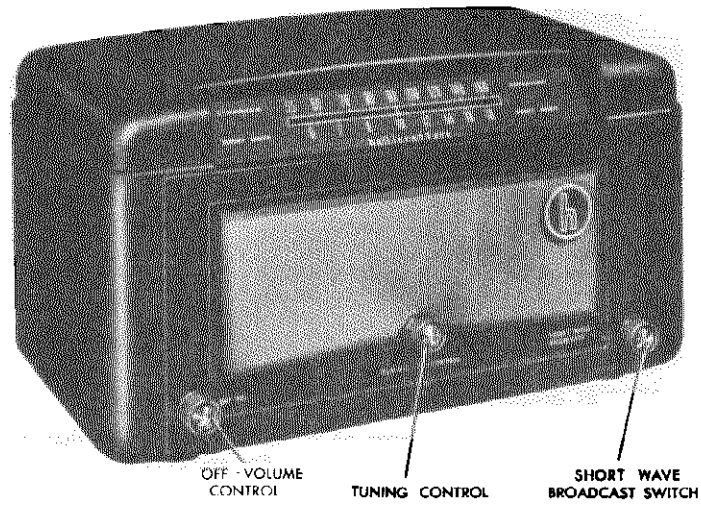
* In some receivers, R-11 and R-12 are replaced by one 2500 ohm 8 watt, wirewound resistor (part #24-938).

DESCRIPTION

Your Hallicrafters Model S-80, the "Defender", is a super-sensitive, four tube battery operated radio specially designed for use in rural and remote areas where commercial power is not available. It covers both the standard broadcast band and the 6 to 18 megacycle shortwave range thus assuring 24 hour reception even in weak signal areas where the broadcast band "blacks-out" in daytime.

The receiver is designed to operate from any standard 1½ volt "A" - 90 volt "B" heavy duty battery pack such as listed below under BATTERY INSTALLATION. These batteries will provide over 1,000 hours or approximately one year of service and will fit inside the rear of the cabinet. A special feature is the battery saver switch, a slide switch located on the chassis which will provide approximately 50 hours of additional battery operation at the normal end life of the battery.

Operation of the receiver in metropolitan areas from commercial power is easily possible by the use of a moderate cost power converter such as Perma Power Model A or Sears "Power Shifter". Such a unit equips the receiver for 110-120 volt, 50 or 60 cycle AC operation.



Model S-80 Defender

The tuning dial is of the slide rule type with separate dial scales for both the standard broadcast and shortwave bands. Major foreign cities are clearly indicated on the shortwave portion of the dial to facilitate tuning. Shortwave services covered by this receiver include the following international shortwave bands: 5.9 to 6.2 MC, 9.5 to 9.7 MC, 11.7 to 11.9 MC, 15.1 to 15.45 MC and 17.7 to 17.9 MC.

To get the utmost enjoyment from your Hallicrafters receiver, carefully follow the instructions contained in this book.

OPERATING INSTRUCTIONS

BATTERY INSTALLATION

1. The receiver is designed to operate from any one of the following combination 90 and 1½ volt farm battery packs: Sears 06308, Wards 51, Burgess 17GD60, RCA VSO 99, General 60DL-11L, Eveready 748, Ray-O-Vac AB-82, Bond 0528 or Ensign AB48.

2. Place the battery pack into the compartment provided in the rear of the cabinet and insert the BATTERY CABLE PLUG (see Fig. 3) into the receptacle located on the battery.

3. Set the BATTERY SAVER SWITCH on the top right of the chassis to the NEW POSITION. (See Fig. 3.) This switch should be set at NEW whenever a new battery pack is installed.

   NOTE: Maximum battery life will be obtained if the receiver is operated intermittently, i.e., for short periods of time, instead of continuously for prolonged periods.

4. When the volume of stations decreases noticeably due to the battery approaching the end of its normal operating life, set the BATTERY SAVER SWITCH at USED.

5. When reception becomes weak even with the BATTERY SAVER SWITCH at USED, replace the battery pack.

MODEL S-80,
Defender

ANTENNA INSTALLATION

Two leads have been provided at the top left of the chassis for antenna and ground connections. A satisfactory antenna in most cases is 30 to 60 feet of wire connected to the green lead and run about the room in any convenient manner. A good ground connection is required when this type of antenna is employed. For best results, an outside antenna should be used.

SINGLE WIRE ANTENNA

1. Construct the antenna as shown in Fig. 1 and connect it to the green lead located on the top left of the chassis. (See Fig. 3.)
2. Erect the antenna as high as possible and free from surrounding objects.
3. Use an Underwriters approved lightning arrester designed for single lead-in at the point where the lead-in enters the house.
4. Connect the black lead located at the top left of the chassis to a cold water pipe or other good ground such as a six foot ground rod driven into moist soil.

For shortwave reception, a doublet antenna with a 300 ohm ribbon type transmission line is recommended. The doublet antenna, when properly constructed and installed, will provide excellent world-wide shortwave reception as well as standard broadcast reception.

DOUBLET ANTENNA

1. Construct the antenna as shown in Fig. 2. Note that the antenna is $19\frac{1}{2}$ feet long each side of center, the two sections being insulated from one another.
2. Use a length of 300 ohm ribbon type transmission line, commonly called twin-lead, as the lead-in from the antenna to the receiver. Connect one end of the transmission line to the two $19\frac{1}{2}$ foot antenna sections and the other end to the black and green leads located at the top left of the chassis.
3. Use an Underwriters approved lightning arrester designed for twin-lead at the point where the lead-in enters the house.
4. No ground connection is required with the doublet antenna.

TUNING DIAL

1. The standard broadcast band is calibrated in kilocycles with a zero deleted for convenience. To convert the dial reading to the station frequency in kilocycles, add one zero.
2. The shortwave band is calibrated directly in megacycles.

STANDARD BROADCAST AND SHORT WAVE RECEPTION

1. Set the SHORTWAVE-BROADCAST control knob to BROADCAST for standard broadcast reception or to SHORTWAVE for shortwave reception.
2. Turn the receiver ON by rotating the VOLUME control knob clockwise. Turn this control to a well advanced position and reset it for the desired volume after a station has been tuned in.
3. Tune in the desired station by turning the TUNING CONTROL knob slowly until the dial pointer indicates the station frequency.
4. Readjust the VOLUME control for the desired volume.
5. To turn the receiver OFF, turn the VOLUME control knob counterclockwise until a click is heard.

BEST SHORTWAVE RECEPTION TABLE

BAND	MOST FAVORABLE TIME	MOST FAVORABLE DISTANCE
6-7 MC	Night - Winter	Day - 400 Miles Night - Over 1500 Miles
9-10 MC	Day - Late Afternoon and Night - Winter	Over 500 Miles
11-12 MC	Evenings or Late Summer Afternoons	Day - Under 1500 Miles Night - Over 1500 Miles
15-18 MC	Early Mornings and Summer Evenings	Over 1500 Miles

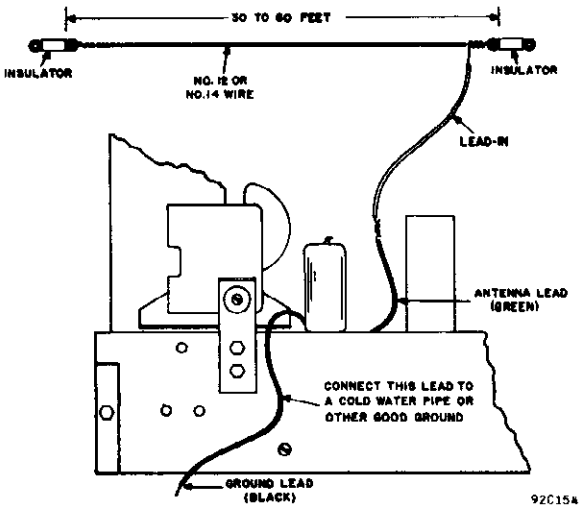


Fig. 1. Single Wire Antenna Installation

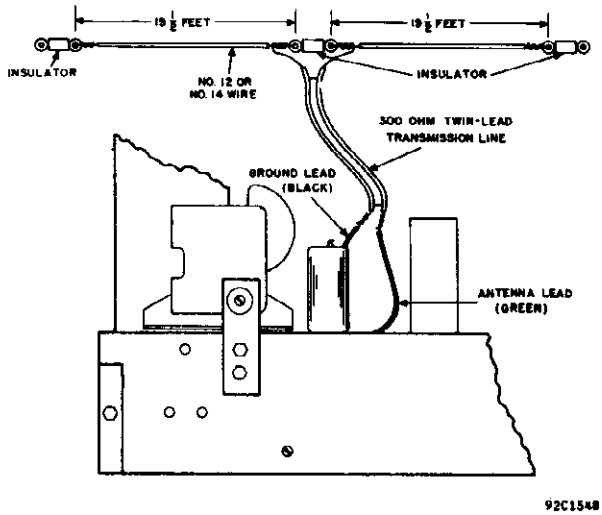


Fig. 2. Doublet Antenna Installation

SERVICE INSTRUCTIONS

SPECIFICATIONS

Tubes . . . . . Four
Speaker . . . . . 5 inch PM
Speaker Voice Coil Impedance . . . . . 3.2 ohms
Intermediate Frequency . . . . . 455 KC
Antenna . . . . . Provision for external single wire or doublet antenna.
Power Supply. . . .90 volt "B" - 1½ volt "A" battery pack
Frequency Coverage. . . . .540 - 1620 KC and 6 - 18 MC

TUBE REPLACEMENT - The tube types and their relative location in the receiver are shown in Fig. 3. To gain access to all tubes, slide the battery pack out of the cabinet. When installing a replacement tube, line up the seven pins on the tube with the socket holes and push down on the tube until the base of the tube rests firmly on the socket. Handle all tubes with care as they are fragile and will not withstand mechanical abuse.

REPLACEMENT BATTERY PACKS - Sears 06308, Wards 51, Burgess 17GD60, RCA VSO 99, General 60DL-11L, Eveready 748, Ray-O-Vac AB-82, Bond 0528 and Ensign AB48.

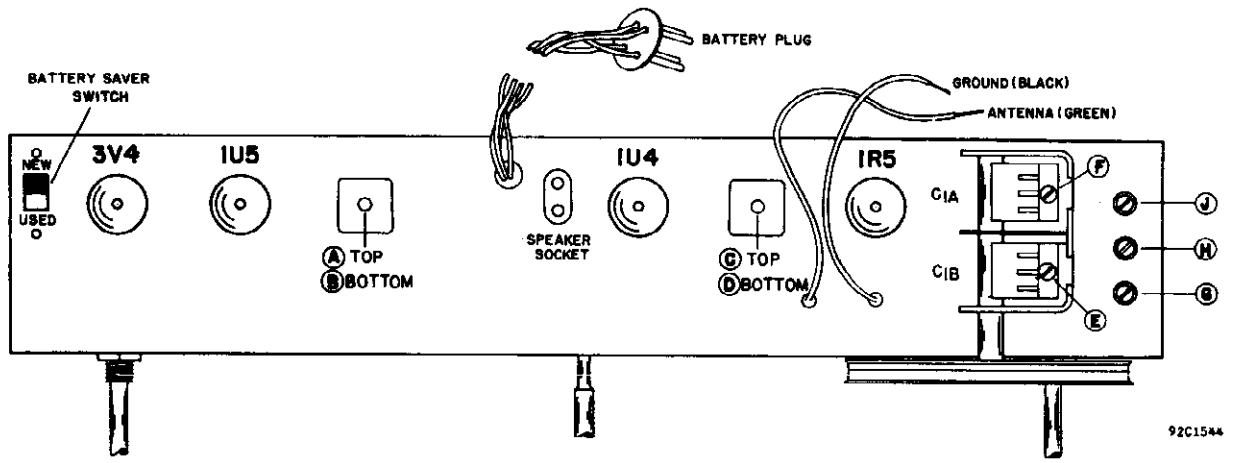


Fig. 3. Top View of Chassis Showing Location of Alignment Adjustments and Tubes

MODEL S-80,
Defender

ALIGNMENT PROCEDURE

- Connect output meter across speaker voice coil.
- Set volume control at maximum.
- Use a non-metallic alignment tool.
- Signal generator must have a modulated output and cover 455 KC, 600 KC, 1300 KC and 14 MC.
- Keep the generator output as low as possible to avoid AVC action.
- Refer to Fig. 3 for location of alignment adjustments.

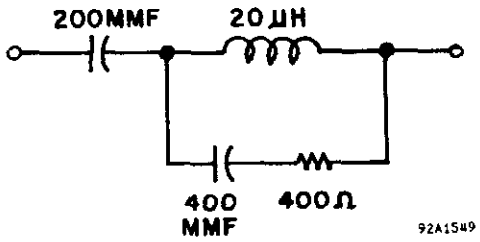


Fig. 4. RTMA Dummy Antenna

STEP	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR FREQUENCY	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT
1	High side to stator plates of rear section of tuning capacitor through a .01 mfd. capacitor. Low side to chassis.	455 KC	BROADCAST	1000 KC	A, B, C, D
2	High side to green antenna lead (Fig. 3) through a standard RTMA dummy antenna (Fig. 4). Low side to chassis.	14 MC	SHORTWAVE	14 MC	E, F
3	Same as STEP 2.	1300 KC	BROADCAST	1300 KC	G, H.
4	Same as STEP 2.	600 KC	BROADCAST	600 KC	J

DIAL CORD RESTRINGING

1. Set the tuning capacitor in a fully meshed position.
2. Tie one end of a 60 inch length of 30 lb. test dial cord to the tension spring at position 1. See Fig. 5.
3. Follow the stringing procedure 1 through 10. At position 10, stretch the spring and tie the cord securely to the spring.
4. With the tuning capacitor fully meshed, attach the dial pointer to the cord and align it with the left hand index marks on the dial. Cement the pointer to the cord with a drop of quick drying cement.

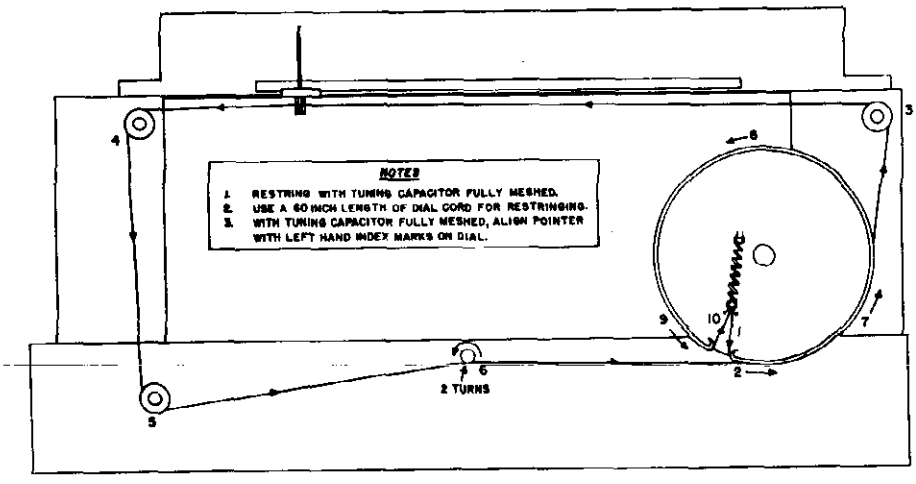


Fig. 5. Dial Cord Stringing Procedure

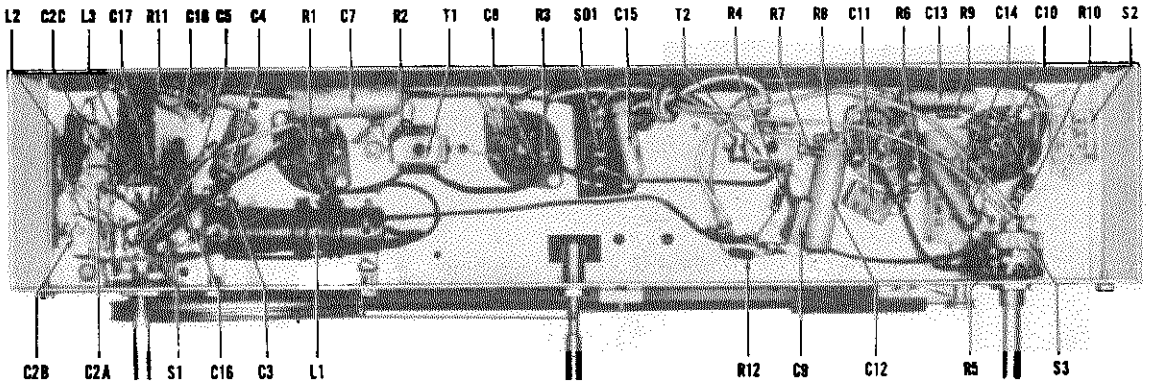


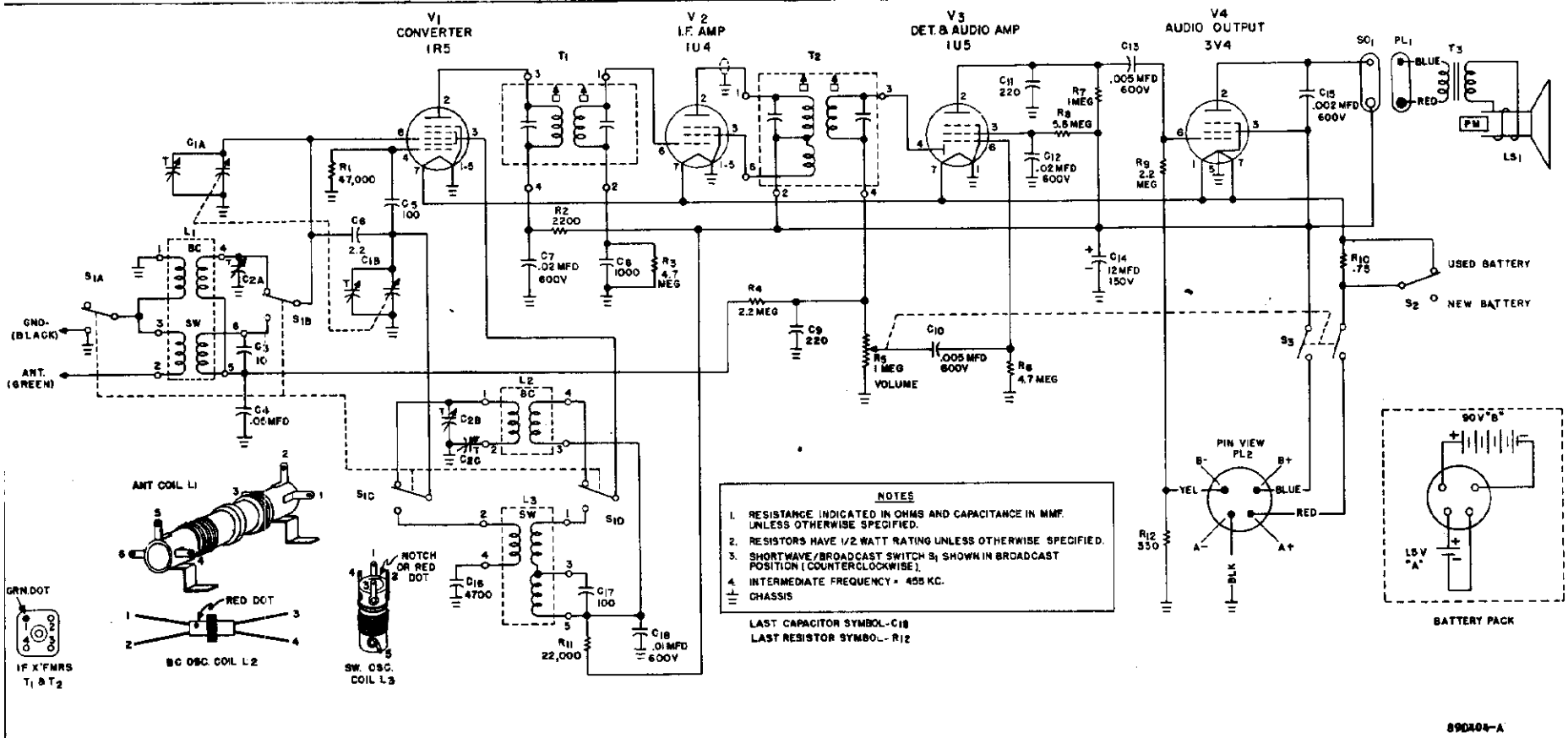
Fig. 6. Bottom View of Chassis Showing Component Location

92X1541

SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number
	CAPACITORS	
C-1A,B	Tuning capacitor, 2 section	48C274
C-2A,B,C	Trimmer assembly; includes mtg. bracket and 3 trimmers	44C406
C-3	10 mmf. 500 V., ceramic	47B20A100K5
C-4	.05 mfd. 200 V., tubular	46A091
C-5,17	100 mmf. 500 V., ceramic	47B20A101K5
C-6	2.2 mmf. 500 V., ceramic	47A160-4
C-7,12	.02 mfd. 600 V., tubular	46AY203J
C-8	1000 mmf. 500 V., ceramic	47B20A102K5
C-9,11	220 mmf. 500 V., mica	47X20B221M
C-10,13	.005 mfd. 600 V., tubular	46AZ502J
C-14	12 mfd. 150 V., electrolytic	45B194
C-15	.002 mfd. 600 V., tubular	46AZ202J
C-16	4700 mmf. 500 V., mica	47X35B472K
C-18	.01 mfd. 600 V., tubular	46AY103J
	RESISTORS	
R-1	47,000 ohms 10%, ½ watt; carbon	23X20X473K
R-2	2200 ohms 10%, ½watt; carbon carbon	23X20X222K
R-3,6	4.7 megohms 10%, ½ watt; carbon	23X20X475K
R-4,9	2.2 megohms 10%, ½ watt, carbon	23X20X225K
R-5	VOLUME control, 1 megohm, includes ON-OFF switch S-3	25B959
R-7	1 megohm 10%, ½ watt, carbon	23X20X105K
R-8	5.6 megohms 20%, ½ watt, carbon	23X20X565M
R-10	.75 ohms 10%, ½ watt; carbon	23A062
R-11	22,000 ohms 10%, ½ watt; carbon	23X20X223K
R-12	330 ohms 10%, ½ watt; carbon	23X20X331K
	COILS AND TRANSFORMERS	
L-1	Coil, antenna; BC and SW	51B1459
L-2	Coil, oscillator; BC	51B1460
L-3	Coil, oscillator; SW	51B1461
T-1	Transformer, IF; input	50C233

Schematic Symbol	Description	Hallicrafters Part Number
	COILS AND TRANSFORMERS (Cont.)	
T-2	Transformer, IF; output	50C516
T-3	Transformer, audio output; part of speaker LS-1	--------
	PLUGS AND SOCKETS	
PL-1	Plug, speaker; part of speaker LS-1	--------
PL-2	Plug, battery cable; includes leads	87B1555-1
SO-1	Socket, speaker	6A275
	Socket, tube; miniature 7 pin	6A314
	SWITCHES	
S-1A,B,C,D	Switch, rotary wafer; SHORT WAVE-BROADCAST	60B461
S-2	Switch, slide (spst); NEW-USED BATTERY	60A244
S-3	Switch, ON-OFF; part of VOLUME control R-5	--------
	MISCELLANEOUS PARTS	
	Cabinet	66A754
	Clip, mtg.; for dial glass	76A412
	Clip, mtg.; for coil L-3	76A326
	Clip, mtg.; for transformers T-1 and T-2	76A385
	Clip, speed; for mounting front panel	76A413
	Dial cord, 57 inches	38A001
	Dial scale, glass	22C342
	Grille assembly	7C318
	Grommet, rubber	16A125
	Knob, VOLUME and SHORT WAVE - BROADCAST	15B322
	Knob, TUNING CONTROL	15B323
	Pointer, dial	82A205
	Retaining ring; for tuning shaft	76A649
	Shaft, tuning	74A500
LS-1	Speaker, 5" PM; includes output transformer T-3 and plug PL-1	85C085
	Spring, dial cord	75A012



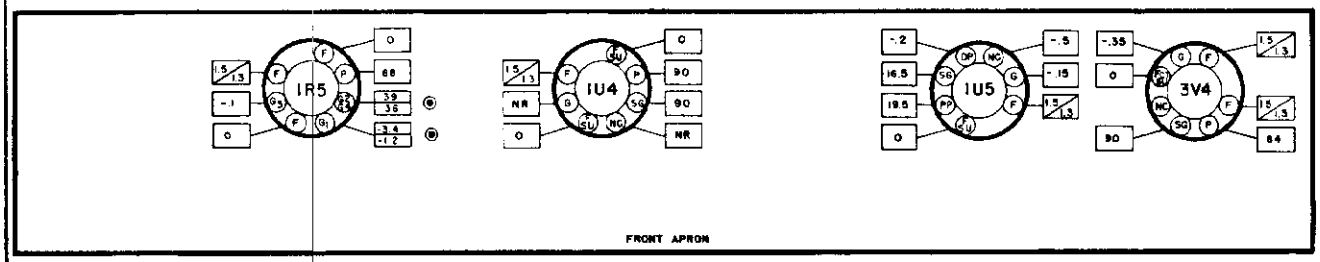
NOTES

1. RESISTANCE INDICATED IN OHMS AND CAPACITANCE IN MMF. UNLESS OTHERWISE SPECIFIED.
2. RESISTORS HAVE 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED.
3. SHORTWAVE/BROADCAST SWITCH S_1 SHOWN IN BROADCAST POSITION (COUNTERCLOCKWISE).
4. INTERMEDIATE FREQUENCY = 455 KC.
5. ⏚ CHASSIS

LAST CAPACITOR SYMBOL - C18
LAST RESISTOR SYMBOL - R12

890X84-A

Fig. 7. Schematic Diagram



NOTES

1. SOCKET VIEWS ARE BOTTOM VIEWS.
2. ALL VOLTAGES ARE MEASURED BETWEEN TUBE SOCKET TERMINALS & CHASSIS WITH ZERO SIGNAL INPUT USING A VACUUM TUBE VOLTMETER.
3. VOLTAGE MEASURED WITH NEW BATTERY, VOLUME AT MAXIMUM, TUNING GANG FULLY MESHED AND SPEAKER CONNECTED.
4. ALL VOLTAGES SHOWN ARE DC AND POSITIVE UNLESS OTHERWISE SPECIFIED.
5. FILAMENT VOLTAGES SHOWN WITH THE BATTERY SAVER AT USED / NEW.
6. NC - NO CONNECTION. VOLTAGE SHOW ONLY WHEN TERMINAL IS USED AS A TIE LUG.
7. NR - NOT READABLE.

◉ BROADCAST / SHORT WAVE — VOLTAGE SHOWN WITH BAND SWITCH IN BOTH BROADCAST AND SHORT WAVE POSITION.

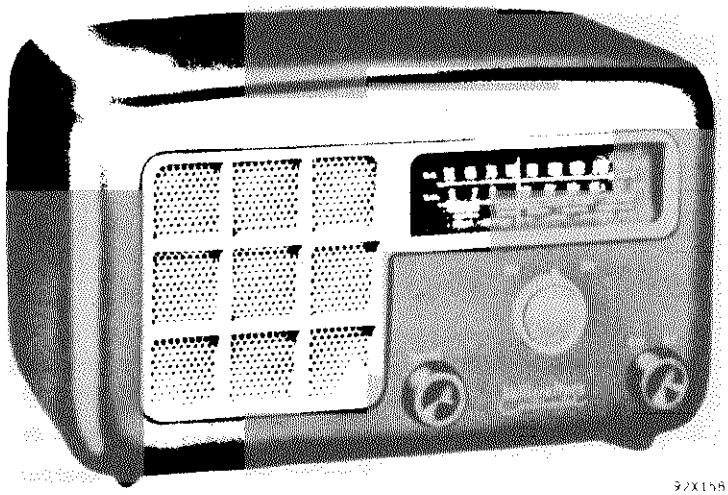
92D1586

Fig. 8. Tube Socket Voltage Chart

GENERAL DESCRIPTION

Your Hallicrafters Continental provides reception of both the standard broadcast band and the 6 to 18 megacycle shortwave range. It is a 5 tube superheterodyne radio and is designed to operate from 105 to 125 volt direct current (DC) or 50/60 cycle alternating current (AC).

Fine performance of both standard and shortwave broadcasts can be obtained with the 15 foot antenna wire included with your receiver. It is merely necessary to uncoil this wire, connect one end of it to terminal A1 on the back of the set and then run it about the room in any convenient manner. To complete the antenna installation, the jumper should be connected between terminals A2 and G on the back of the set.



HALLICRAFTERS CONTINENTAL
Models 5R30, 5R31, 5R32, 5R33 and 5R34

For your convenience, the principal shortwave stations of the world have been clearly marked on the dail. Since shortwave reception conditions vary with the season of the year and even with the time of day, shortwave programs may not be heard with the same regularity as standard broadcasts. It is important, therefore, that you refer to the table below as it provides an easy means of selecting the shortwave band most suitable to the time of day.

To get the maximum enjoyment from your Hallicrafters radio, carefully follow the instructions contained in this book.

BEST SHORTWAVE RECEPTION TABLE

BAND	MOST FAVORABLE TIME	MOST FAVORABLE DISTANCE
6-7 MC	Night - Winter	Day-400 Miles Night - Over 1500 Miles
9-10 MC	Day - Late Afternoon and Night - Winter	Over 500 Miles
11-12 MC	Evenings or Late Summer Afternoons	Day - Under 1500 Miles Night - Over 1500 Miles
15-18 MC	Early Mornings and Summer Evenings	Over 1500 Miles

INSTALLATION INSTRUCTIONS

UNPACKING - Check all shipping labels and tags for instructions before removing or destroying them.

LOCATION - Do not locate the receiver close to sources of heat such as radiators and heating vents. Allow for proper ventilation of the receiver by placing it at least two or three inches away from the wall.

ANTENNA - The terminals marked A1, A2 and G on the back of the receiver are for antenna and ground connections. Satisfactory results can be obtained in most localities with the 15 foot antenna wire included with your receiver. This wire should be uncoiled for maximum signal pickup. An outside antenna 30 to 60 feet long may be necessary if the receiver is to be operated in a steel constructed building or in an area surrounded by numerous steel structures. The antenna used should be connected to terminal A1 on the antenna terminal strip. The jumper provided on this strip should be connected between terminals A2 and G. In some locations, reception may be improved by connecting a lead from terminal G to a cold water pipe or other good ground.

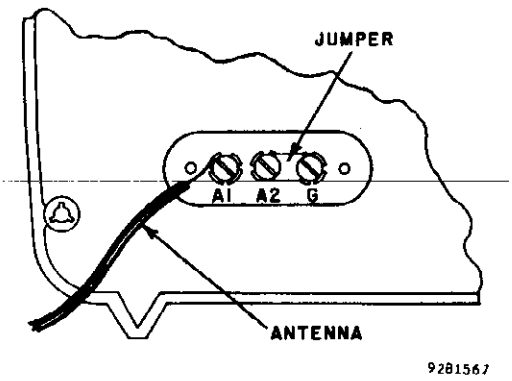


Fig. 1. Rear View of Receiver Showing Antenna and Ground Connections

MODELS 5R30, 5R31,
5R32, 5R33, 5R34,
Continental

OPERATING INSTRUCTIONS

TUNING DIAL

1. The standard broadcast band is calibrated in kilocycles with a zero deleted for convenience. To convert the dial reading to the station frequency in kilocycles, add one zero.
2. The shortwave band is calibrated directly in megacycles.

STANDARD BROADCAST AND SHORTWAVE RECEPTION

1. Plug the power cord into a convenient electrical outlet which provides 105 to 125 volts DC or 50/60 cycles AC. If in doubt about your power supply, call your power company before plugging in the receiver. The wrong power source may cause damage to the receiver.
2. Set the SW/BC control to BC for standard broadcast reception or to SW for shortwave reception.
3. Turn the receiver on by turning the VOLUME control clockwise to the ON position. Allow about a minute for the receiver to warm up.

   NOTE: If the receiver does not operate after the one minute warm up when connected to a DC source, the power plug should be reversed in the wall outlet to obtain proper polarity.

4. Rotate the VOLUME control clockwise about 1/2 turn as a preliminary setting. Turning this control clockwise increases volume.
5. Tune in the desired station by rotating the TUNING control slowly until the dial pointer indicates the station frequency.
6. After the station has been accurately tuned in, adjust the VOLUME control for the desired volume.
7. To turn the receiver off, turn the VOLUME control counterclockwise to the OFF position.

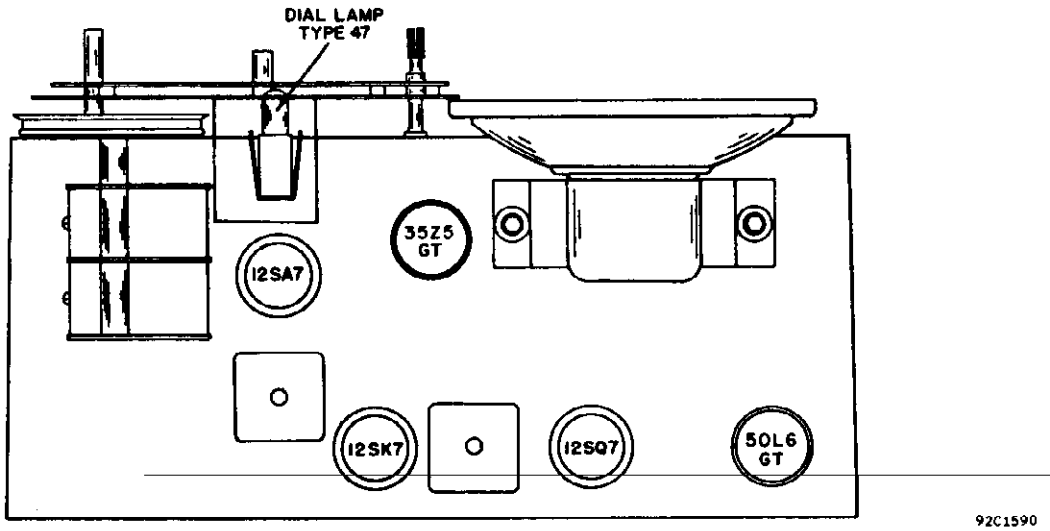


Fig. 2. Top View of Chassis Showing Location of Tubes and Dial Lamp

SERVICE INSTRUCTIONS

SPECIFICATIONS

Tubes . . . . . 5 including 1 rectifier
Speaker . . . . . 5 inch PM
Voice Coil Impedance . . . . . 3.2 ohms
Intermediate Frequency . . . . . 455 KC
Antenna . . . . . .Single wire or doublet
Power Supply . . . .105-125 volts DC or 50/60 cycles AC
Frequency Coverage. . . . .540-1620 KC and 6-18 MC

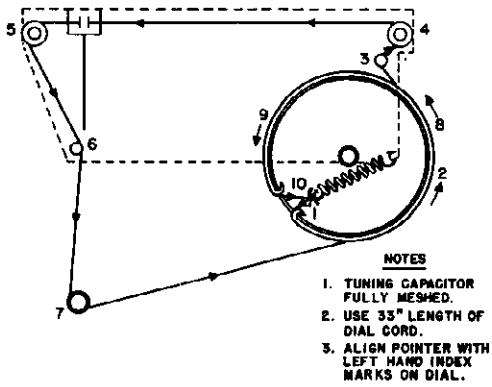


Fig. 3. Dial Cord Stringing Diagram

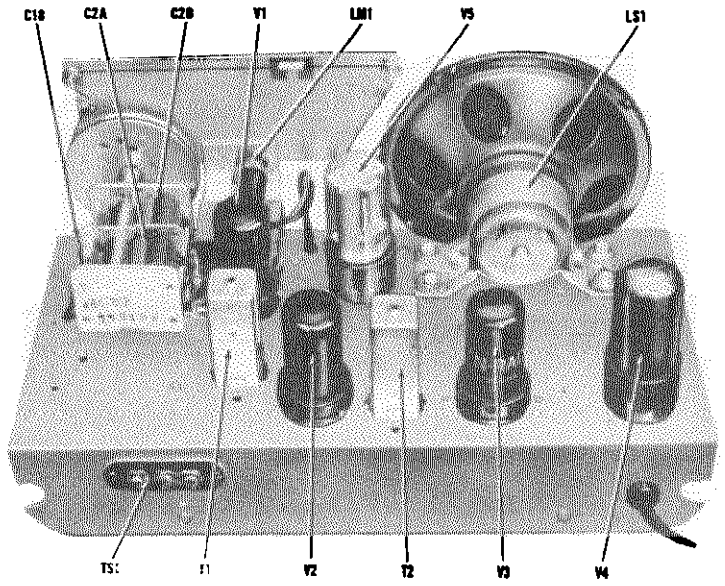


Fig. 4. Top View of Chassis Showing Component Location

TUBE AND DIAL LAMP REPLACEMENT - Refer to Fig. 2. for the location of the tubes and dial lamp used in the receiver. It will be necessary to remove the back cover from the cabinet to gain access to the tubes and dial lamp. To prevent damage to the tuning capacitor, set the TUNING control fully counterclockwise before making any replacement. When replacing tubes, check the tube type carefully and replace it with the correct type. The dial lamp and socket can be removed by compressing the side springs on the socket. Replacement of the dial lamp should be made with a 6-8 volt, Mazda #47 (brown bead) pilot lamp or equivalent.

ALIGNMENT PROCEDURE

- Connect output meter across speaker voice coil.
- Set volume control at maximum.
- Use a non-metallic alignment tool.
- Signal generator must have a modulated output and cover 455 KC, 600 KC, 1300 KC and 14 MC.
- Keep the generator output as low as possible to avoid AVC action.
- Refer to Figs. 6 and 7 for location of alignment adjustments.

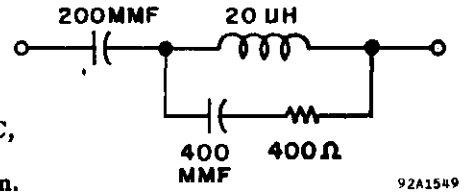


Fig. 5. RTMA Dummy Antenna

STEP	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR FREQUENCY	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT
1	High side to stator plates of rear section of tuning capacitor through a .01 mfd. capacitor. Low side to chassis.	455 KC	BROADCAST	1000 KC	A,B, C,D
2	High side to A1 on antenna terminal strip on rear of chassis through a standard RTMA dummy antenna (Fig.5). Low side to chassis. Connect the jumper between A2 and G.	14 MC	SHORTWAVE	14 MC	E,F
3	Same as STEP 2.	1300 KC	BROADCAST	1300 KC	G,H
4	Same as STEP 2.	600 KC	BROADCAST	600 KC	J

MODELS 5R30, 5R31,
5R32, 5R33, 5R34,
Continental

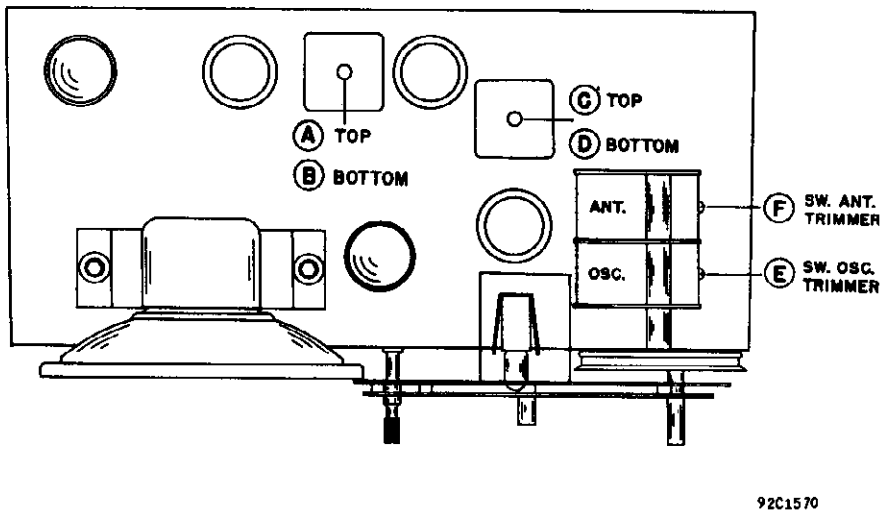


Fig. 6. Top View of Chassis Showing Location of Alignment Adjustments

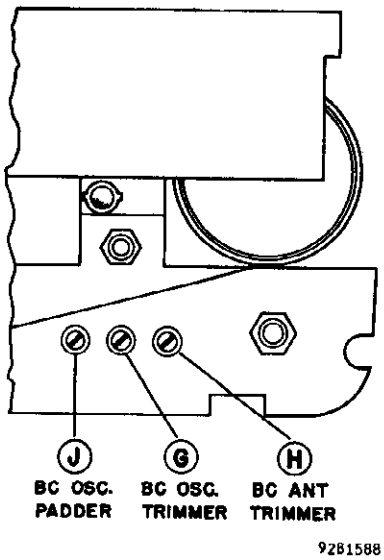


Fig. 7. Front Right View of Chassis Showing Location of Alignment Adjustments

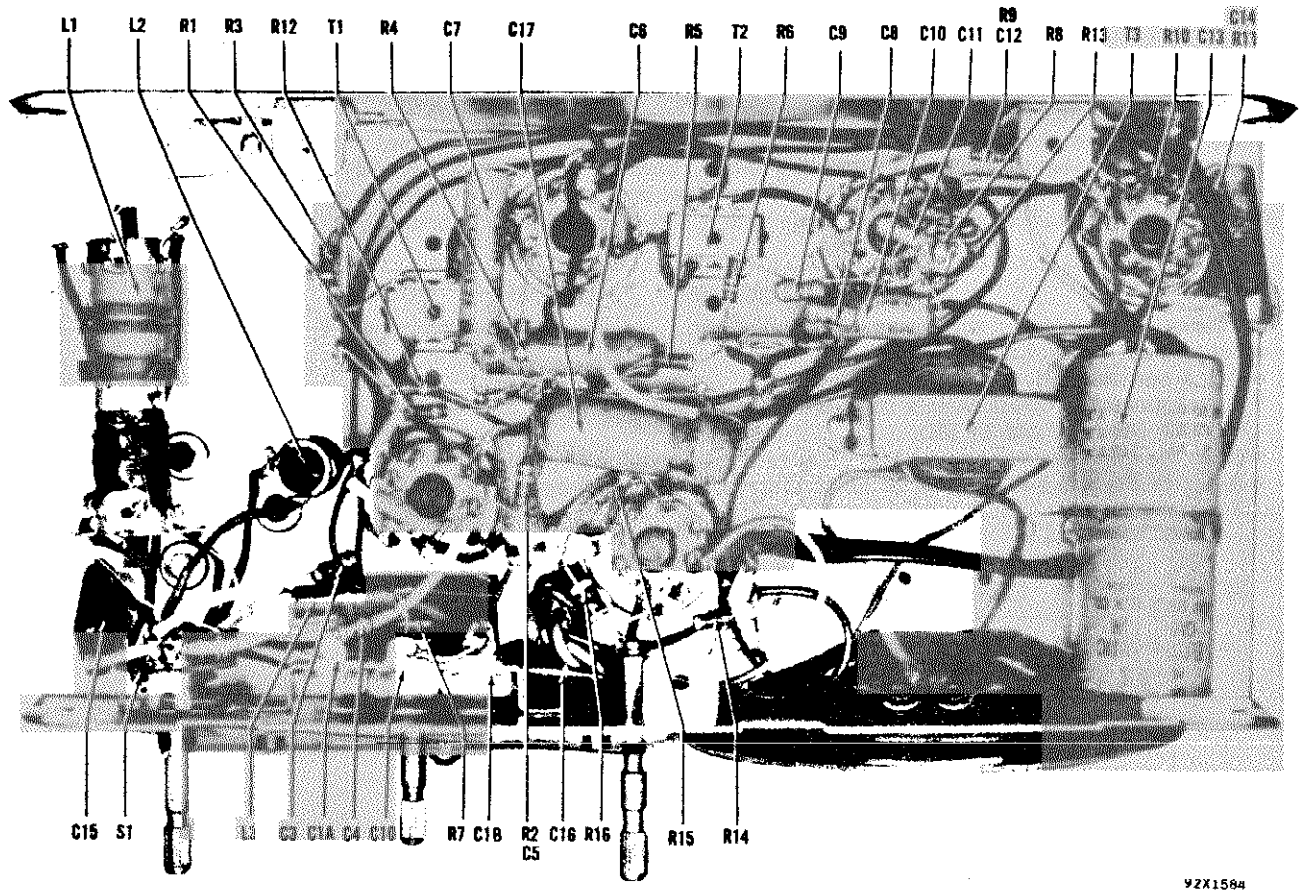
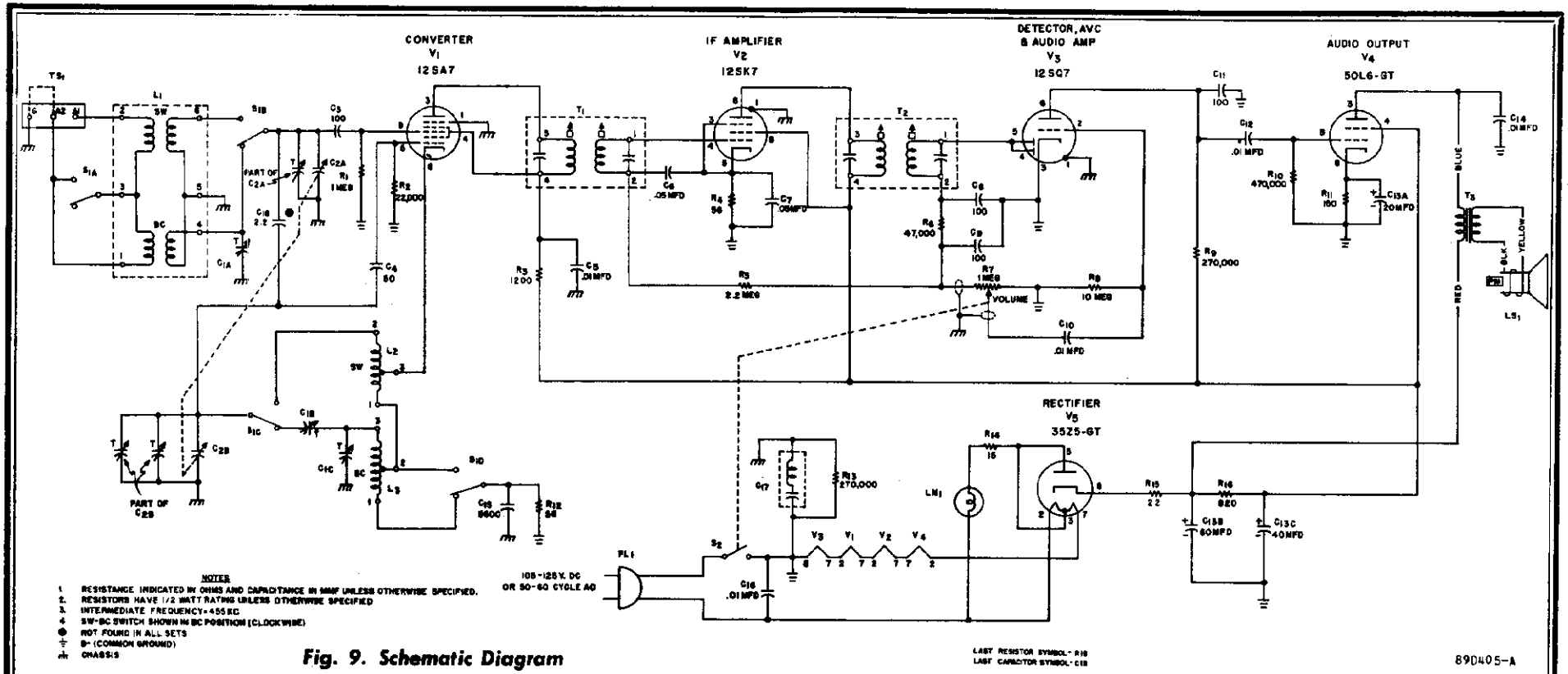


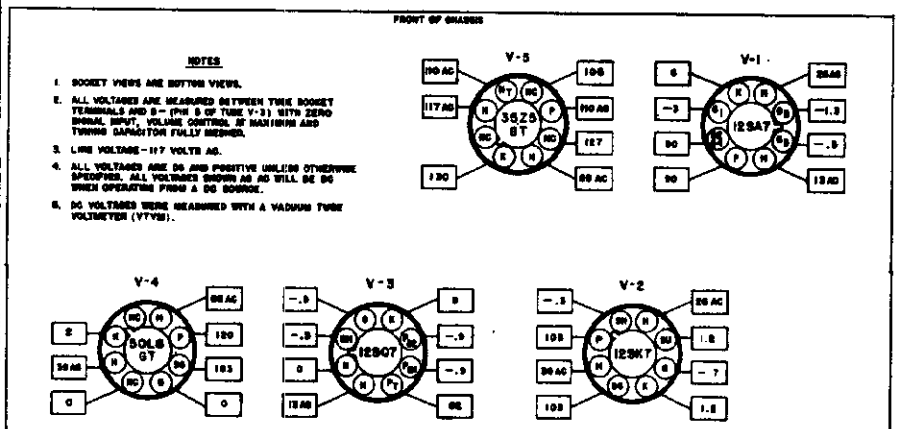
Fig. 8. Bottom View of Chassis Showing Component Location

MODELS 5R30, 5R31, 5R32, 5R33, 5R34, Continental



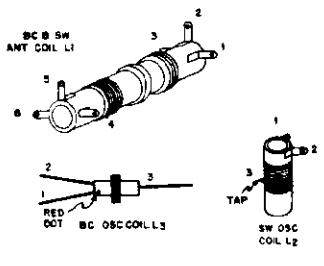
89D405-A

Fig. 9. Schematic Diagram



VALUES AND TOLERANCES SHOWN ARE NOMINAL AND VARIATIONS MAY BE FOUND. IT IS RECOMMENDED THAT THE VALUE OF ANY REPLACEMENT CORRESPOND TO THE NOMINAL VALUE OF THE PART BEING REPLACED.

Fig. 10. Tube Socket Voltage Chart



92C1566

MODELS 5R30, 5R31,
5R32, 5R33, 5R34,
Continental

SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number
	CAPACITORS	
C-1A,B & C	Trimmer assembly, 3 section	44C408
C-2	Tuning capacitor, 2 section	48C282
C-3,8,9,11	100 mmf. 500 V., ceramic	47X20UJ101K
C-4	50 mmf. 500 V., ceramic	47X20UJ500K
C-5,10,12, 14	.01 mfd. 600 V., tubular paper	46AY103J
C-6,7	.05 mfd. 200 V., tubular paper	46AU503J
C-13A,B & C	20 mfd. 25 V., 60-40 mfd. 150 V.; electrolytic	45B197
C-15	5600 mmf. 500 V., mica	47X30A562
C-16	.01 mfd. 600 V., molded tubular paper	46BR103L6 or 46BR103J6
C-17	Resonant capacitor	46A150
C-18	2.2 mmf. 500 V., bakelite	47A160-4
	RESISTORS	
R-1	1 megohm ½ watt, carbon	23X20X105M
R-2	22,000 ohms ½ watt, carbon	23X20X223M
R-3	1200 ohms ½ watt, carbon	23X20X122M
R-4,12	56 ohms ½ watt, carbon	23X20X560K
R-5	2.2 megohms ½ watt, carbon	23X20X225M
R-6	47,000 ohms ½ watt, carbon	23X20X473M
R-7	VOLUME control, 1 megohm; includes OFF-ON switch S-2	25B965
R-8	10 megohms ½ watt, carbon	23X20X106M
R-9,13	270,000 ohms ½ watt, carbon	23X20X274M
R-10	470,000 ohms ½ watt, carbon	23X20X474M
R-11	150 ohms ½ watt, carbon	23X20X151K
R-14	15 ohms ½ watt, carbon	23X20X150M
R-15	22 ohms ½ watt, carbon	23X20X220M
R-16	820 ohms 1 watt, carbon	23X30X821M
	COILS AND TRANSFORMERS	
L-1	Coil, antenna; BC and SW	51B1494
L-2	Coil, oscillator; SW	51B1493
L-3	Coil, oscillator; BC	51B1495
T-1	Transformer, IF; input	50B524
T-2	Transformer, IF; output	50B525
T-3	Transformer, audio output	55C181
	SWITCHES	
S-1A,B,C & D	Switch, rotary; SW-BC	60B472
S-2	Switch, OFF-ON; part of VOLUME control R-7	---

Schematic Symbol	Description	Hallicrafters Part Number
	TUBES AND RECTIFIERS	
V-1	12SA7: converter	90X12SA7
V-2	12SK7: IF amplifier	90X12SK7
V-3	12SQ7: detector and audio amplifier	90X12SQ7
V-4	50L6: audio output	90X50L6
V-5	35Z5: rectifier	90X35Z5
	MISCELLANEOUS	
	Cabinet: Model 5R30	116E003
	Model 5R31	116E004
	Model 5R32	116E005
	Model 5R33	116E006
	Model 5R34	116E007
	Cabinet back	8C1657
	Clip, mtg.; for antenna coil L-1	76A879
	Clip, mtg.; for IF transformers T-1 and T-2	76A385
	Clip, mtg.; for oscillator coil L-2	76A868
	Dial cord, 30 inches	38A001
	Dial glass	22C349
	Dial light assembly; does not include dial lamp	86A011
	Escutcheon: Model 5R30	7D349
	Models 5R31, 5R32, 5R33 and 5R34	7A352
	Grommet, rubber; for mounting speaker	16A125
	Grommet, rubber; for mounting tuning capacitor	16A269
	Knob, VOLUME: Model 5R30	15B477
	Models 5R31, 5R32, 5R33, and 5R34	15A480
	Knob, TUNING and SW-BC:	
	Model 5R30	15B478
	Model 5R31	15B481
	Model 5R32	15B482
	Model 5R33	15B483
	Model 5R34	15B484
PL-1	Line cord and plug	87A078
LM-1	Lamp, dial; Mazda #47	39A004
	Lock, line cord; male	76A397-1
	Lock, line cord; female	76A397-2
	Pointer, dial	82A211
	Shaft, tuning	74B511
	Socket, tube; octal	6A250
	Spring, dial cord	75A012
LS-1	Speaker, 5 inch PM	85C110
TS-1	Terminal strip, antenna	88A032

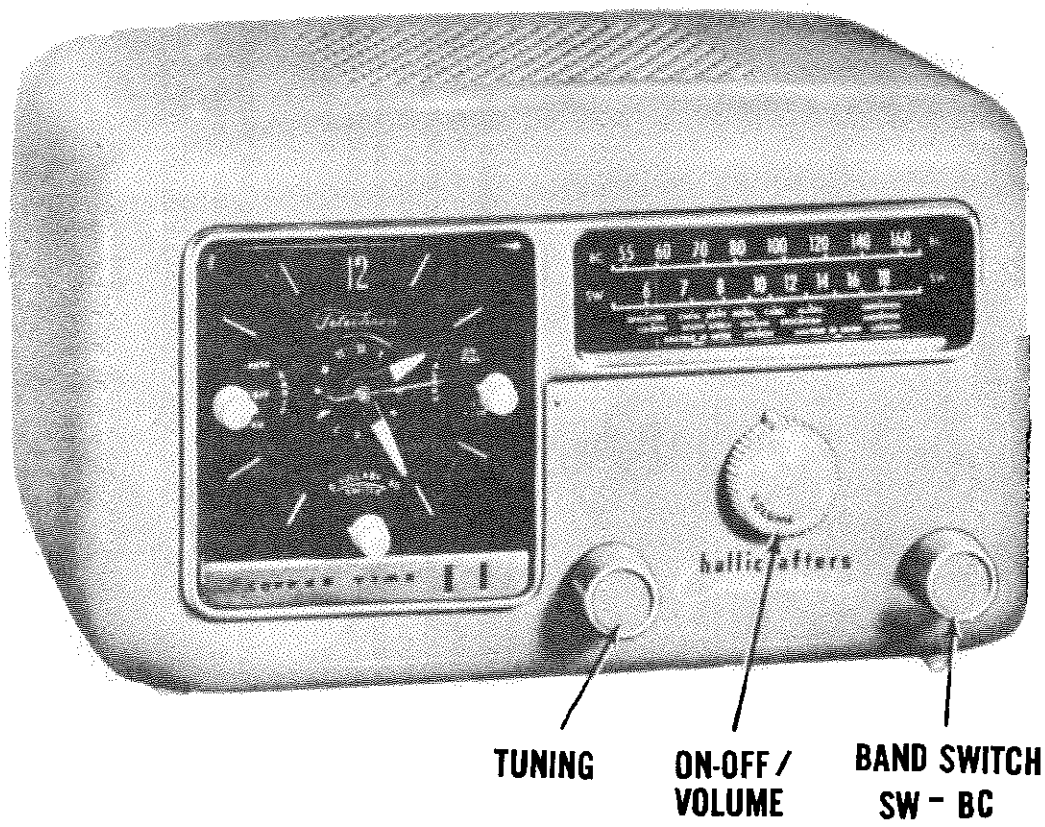


Fig. 1. Hallicrafters Clock Radio Models 5R50—Aqua Blue, 5R51—Minosa Yellow, 5R52—Shell Pink

For operating convenience the principal short wave stations of the world have been clearly marked on the dial. Since short wave receiving conditions vary with the time of day and the season of the year short wave programs may not be heard with the same regularity as standard broadcasts. It is important, therefore, that you refer to the table on page 3 as it provides a simple method of selecting the short wave band most suitable for any given time and season.

BEST SHORTWAVE RECEPTION TABLE

Band	Most Favorable Time	Most Favorable Distance
6-7 MC	Night - Winter	Day-400 Miles Night - Over 1500 Miles
9-10 MC	Day-Late Afternoon and Night-Winter	Over 500 Miles
11-12 MC	Evenings or Late Summer Afternoons	Day - Under 1500 Miles Night - Over 1500 Miles

MODELS 5R50, 5R51,
5R52, Runs 1, 2

INSTALLATION INSTRUCTIONS

UNPACKING - Observe all shipping labels and tags for instructions before removing or destroying them.

LOCATION - Your Hallicrafters Clock Radio should be placed in a convenient location away from radiators or other hot air sources. It should be positioned at least 2 inches from the wall to permit proper air circulation.

POWER SOURCE - The power plug should be inserted into a power outlet that will supply 105 to 125 volts 60 cycle AC ONLY. If in doubt about your power supply, call your power company before connecting the receiver. The wrong source of power may cause serious damage to both the radio receiver and the clock motor.

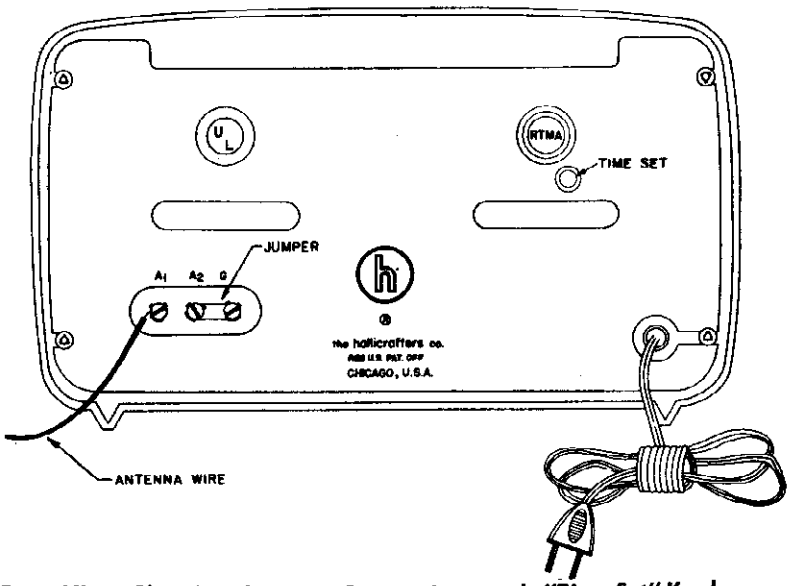


Fig. 2. Rear View Showing Antenna Connections and "Time Set" Knob

ANTENNA - The terminals marked A1, A2 and G on the back of the receiver are for antenna and ground connections. Satisfactory results can be obtained in most localities with the 15 foot antenna wire included with your receiver. This wire should be uncoiled for maximum signal pickup. An outside antenna 30 to 60 feet long may be necessary if the receiver is to be operated in a steel constructed building or in an area surrounded by numerous steel structures. The antenna used should be connected to terminal A1 on the antenna terminal strip. The jumper provided on this strip should be connected between terminals A2 and G. In some locations, reception may be improved by connecting a lead from terminal G to a cold water pipe or other good ground.

CLEANING— The cabinet, dial glass, and clock face should be cleaned with mild soap and water taking care to prevent excess moisture from entering the cabinet. Chemical cleaning solutions should not be used on your Hallicrafters Clock Radio.

OPERATING INSTRUCTIONS

CLOCK— Your clock will start automatically as soon as the power cord is plugged into the proper outlet. The correct time may be set by rotating the TIME SET knob that protrudes from the rear of the cabinet. The self starting feature will re-start the clock if there is a temporary interruption of the electric power.

ELECTRIC ALARM— - The control regulating the electric alarm is located at the "three o'clock" position on the clock face. To set the alarm pull the knob to the "OUT" position and rotate the knob in the counterclockwise direction until the desired alarm time appears under the pointer near the center of the clock face. Leave the knob in the "OUT" position. When the alarm rings it may be turned off simply by pushing the control knob. If the alarm is not turned off after sounding for about forty five minutes it will turn off automatically.

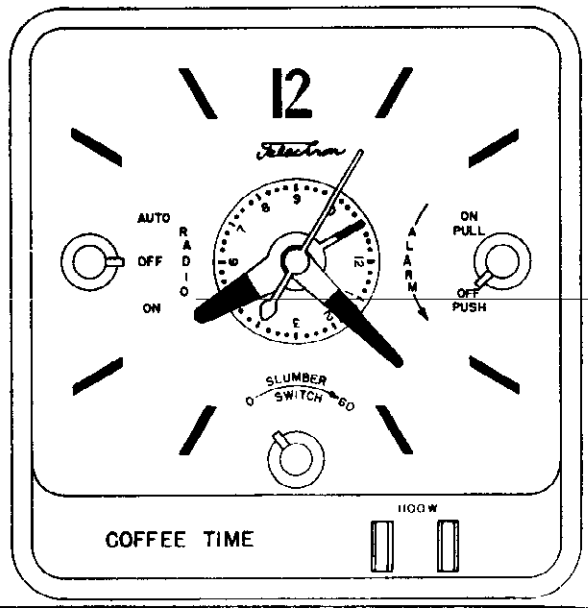


Fig. 3. Clock Face Showing Controls and "Coffee Time" Outlet

IMPORTANT

The alarm will begin to sound approximately ten minutes later than the time indicated on the alarm set dial. This period is to allow for a time difference between the turning on of the radio and "coffee time" appliance outlet and the sounding of the alarm. Refer to the instructions below.

RADIO AND "COFFEE TIME" APPLIANCE OUTLET— The RADIO switch, located at the "nine o'clock" position on the clock face, controls the mode of operation of the radio and the "coffee time" appliance outlet. When this switch is set to the "OFF" position neither radio nor outlet will operate. When set to the "ON" position the outlet will supply power and the radio may be operated by advancing the **OFF-VOLUME** control. When set to the "AUTOMATIC" position both radio and outlet will turn on automatically at the time to which the alarm has been set. If the alarm control has been left in the "OUT" position the alarm will begin to sound ten minutes later.

SLUMBER SWITCH— The SLUMBER switch, located at the "six o'clock" position on the clock face, may be used to turn the radio and/or the "coffee time" appliance outlet off automatically after operation for any desired period of time up to one hour. The SLUMBER switch will operate only when the RADIO switch is set to either the "OFF" or to the "AUTOMATIC" position. Operation of the SLUMBER switch is accomplished simply by advancing the knob until the pointer is at a position corresponding to the number of minutes that operation of the radio or outlet is desired. For example if you desire the radio to operate for one hour and then shut off advance the SLUMBER switch all of the way to the "60" position. If only 30 minutes operation is desired advance the SLUMBER switch only to the half way position, etc.

For your convenience in becoming acquainted with the use of the various controls the following table has been provided showing the proper control position for various types of operation.

TABLE 1, SHOWING OPERATING POSITIONS

MODE OF OPERATION	SET EACH CONTROL TO THE POSITION INDICATED AND FOLLOW THE SIMPLE INSTRUCTIONS				
	RADIO CONTROL	ALARM CONTROL	SLUMBER SWITCH	RADIO OFF-VOLUME CONTROL	"COFFEE TIME" OUTLET WILL BE:
To operate the radio manually	On	In	Off	On	On
To turn the radio on automatically at a desired time	Automatic	Set for desired time and push in	Off	On	Off, but will turn on with the radio
To sound the alarm only at a desired time	Off	Set for ten minutes earlier than the desired time and leave out	Off	Off	Off
To automatically turn on the radio at a desired time and sound the alarm ten minutes later	Automatic	Set for desired time and leave out	Off	On	Off, but will turn on with the radio
To automatically turn on the "Coffee Time" outlet only at a desired time and sound the alarm ten minutes later	Automatic	Set for desired time and leave out	Off	Off	Off, but will turn on at the desired time
To automatically turn off the radio and "Coffee Time" outlet after operating for any desired length of time up to one hour	Off	In	Set for desired length of operating time	On	On, but will turn off with the radio
To automatically turn off the radio and "Coffee Time" outlet after operation for any desired period of time (up to one hour) and to turn them on again automatically at a later time (up to twelve hours) and to sound the alarm ten minutes later	Automatic	Set for the desired "TURN ON" time and leave out	Set for desired length of operating time before turning off	On	On, then off, then on automatically

MODELS 5R50, 5R51,
5R52, Runs 1, 2

RADIO OPERATION

IMPORTANT

Before operating the radio be sure that the clock controls are set to an appropriate position. Refer to the above table. The radio will not operate if the RADIO switch on the clock face is set to the "OFF" position and may not operate if this switch is set to the "AUTOMATIC" position.

TUNING DIAL - The standard broadcast band is calibrated in kilocycles with the last zero deleted for convenience in reading the dial. To convert the dial reading to the station frequency in kilocycles simply add one zero.

The short wave band is callibrated directly in megacycles.

STANDARD BROADCAST AND SHORTWAVE RECEPTION - Turn the BAND SWITCH (right hand knob) clockwise for standard broadcast reception and counterclockwise for short wave reception.

The OFF-VOLUME control (large center knob) turns the receiver on and off and also controls the volume. Turn this knob in the clockwise direction to turn the receiver on and to increase volume. Allow about sixty seconds for the set to warm up.

Tune in the desired station with the TUNING control (left hand knob).

After the desired station has been tuned readjust the VOLUME control as desired.

The receiver may be turned off either by turning the OFF-VOLUME control to the extreme counterclockwise position (until a click is heard) or by setting the RADIO switch, located at the "nine o'clock" position on the clock face, to the "OFF" position.

SERVICE INSTRUCTIONS

SPECIFICATIONS

Tubes	5 including 1 rectifier
Speaker	5 inch PM
Voice Coil Impedance	3.2 ohms
Intermediate Frequency	455 KC
Antenna	Single wire or doublet
Power Supply	105-125 volts 60 cycles AC only
Frequency Coverage	540-1620 KC and 6-18 MC

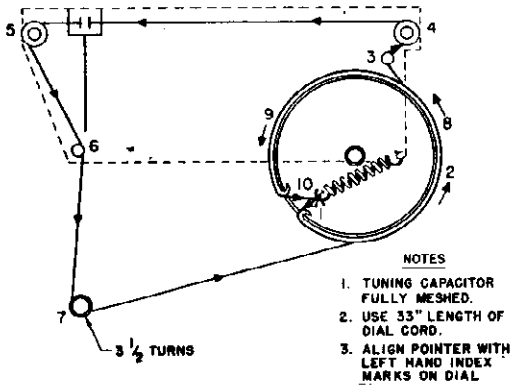


Fig. 4. Dial Cord Stringing Diagram 92C1569-A

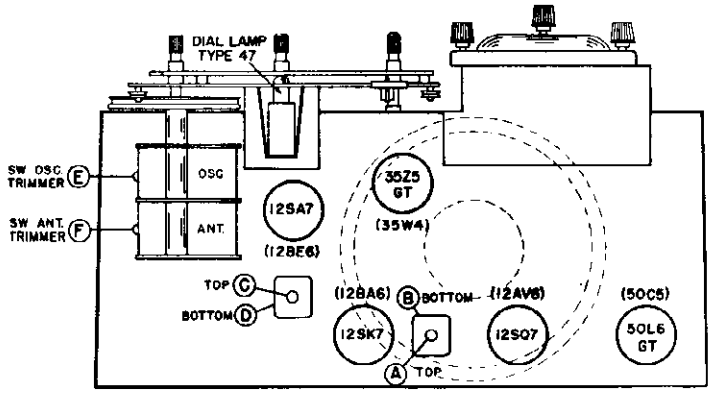


Fig. 5. Top View of Chassis Showing Location of Tubes and Alignment Adjustments

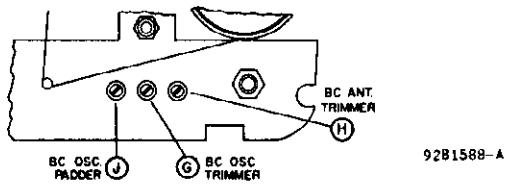


Fig. 6. Front View of Chassis Showing Location of Alignment Adjustments

TUBE AND DIAL LAMP REPLACEMENT - Refer to Fig. 5. for the location of the tubes and dial lamp used in the receiver. It will be necessary to remove the back cover from the cabinet to gain access to the tubes and dial lamp. To prevent damage to the tuning capacitor, set the TUNING control fully counterclockwise before making any replacement. When replacing tubes, check the tube type carefully and replace it with the correct type. The dial lamp and socket can be removed by compressing the side springs on the socket. Replacement of the dial lamp should be made with a 6-8 volt, Mazda #47 (brown bead) pilot lamp or equivalent.

MODELS 5R50, 5R
5R52, Runs 1, 2

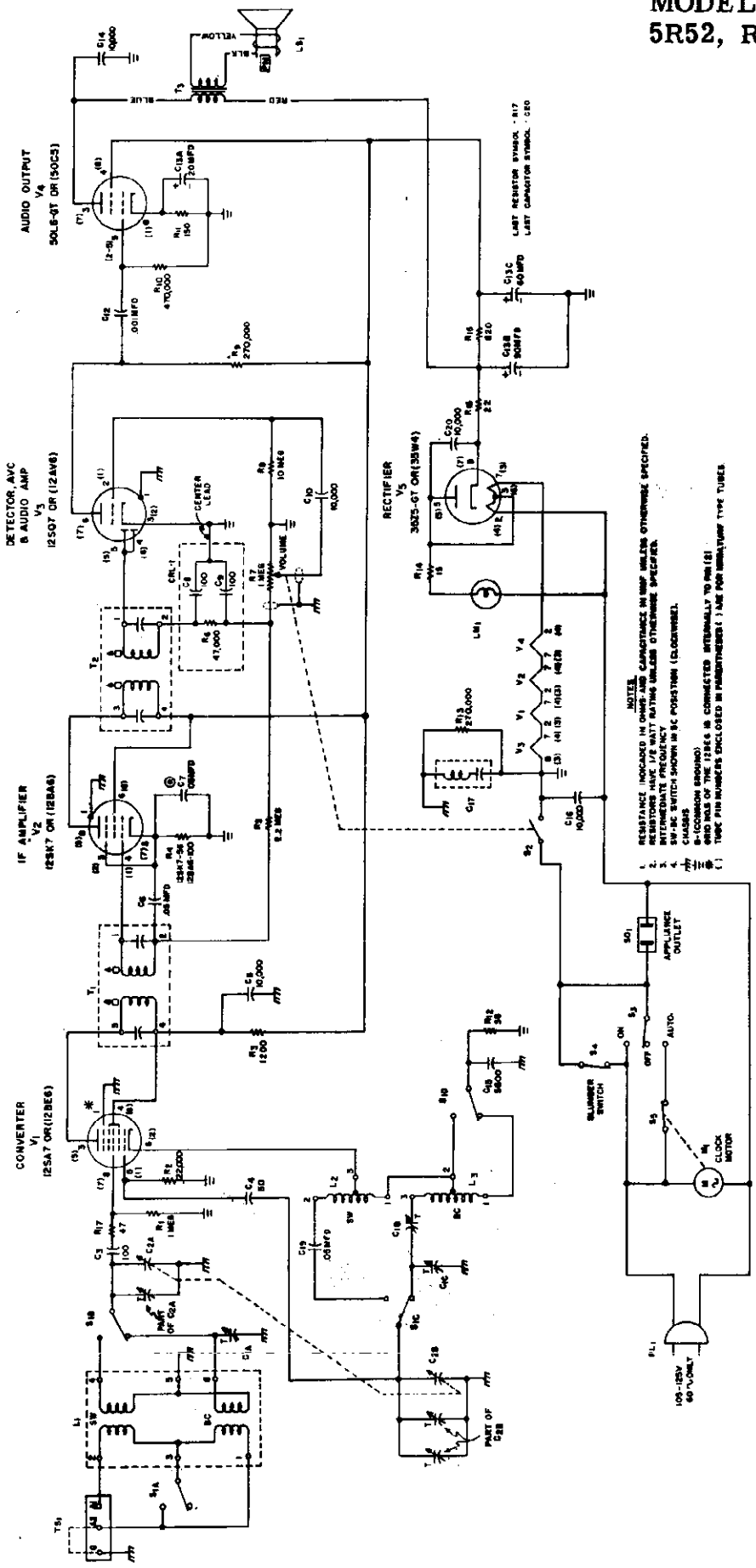
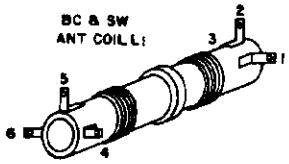
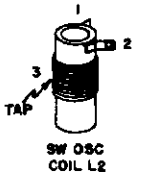
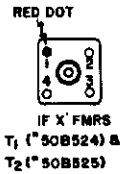


Fig. 8. Schematic Diagram







ALIGNMENT PROCEDURE

- Connect output meter across speaker voice coil.
- Set volume control at maximum.
- Use a non-metallic alignment tool.
- Signal generator must have a modulated output and cover 455 KC, 600 KC, 1300 KC and 14 MC.
- Keep the generator output as low as possible to avoid AVC action.
- Refer to Figs. 5 and 6 for location of alignment adjustments.

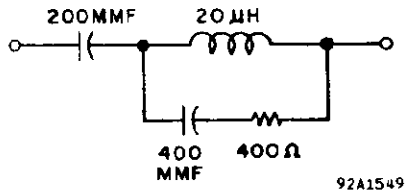


Fig. 7. RTMA Dummy Antenna

STEP	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR FREQUENCY	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT
1	High side to stator plates of rear section of tuning capacitor through a .01 mfd. capacitor. Low side to chassis.	455 KC	BROADCAST	1000 KC	A,B, C,D
2	High side to A1 on antenna terminal strip on rear of chassis through a standard RTMA dummy antenna (Fig.7). Low side to chassis. Connect the jumper between A2 and G.	14 MC	SHORTWAVE	14 MC	E,F
3	Same as STEP 2.	1300 KC	BROADCAST	1300 KC	G,H
4	Same as STEP 2.	600 KC	BROADCAST	600 KC	J

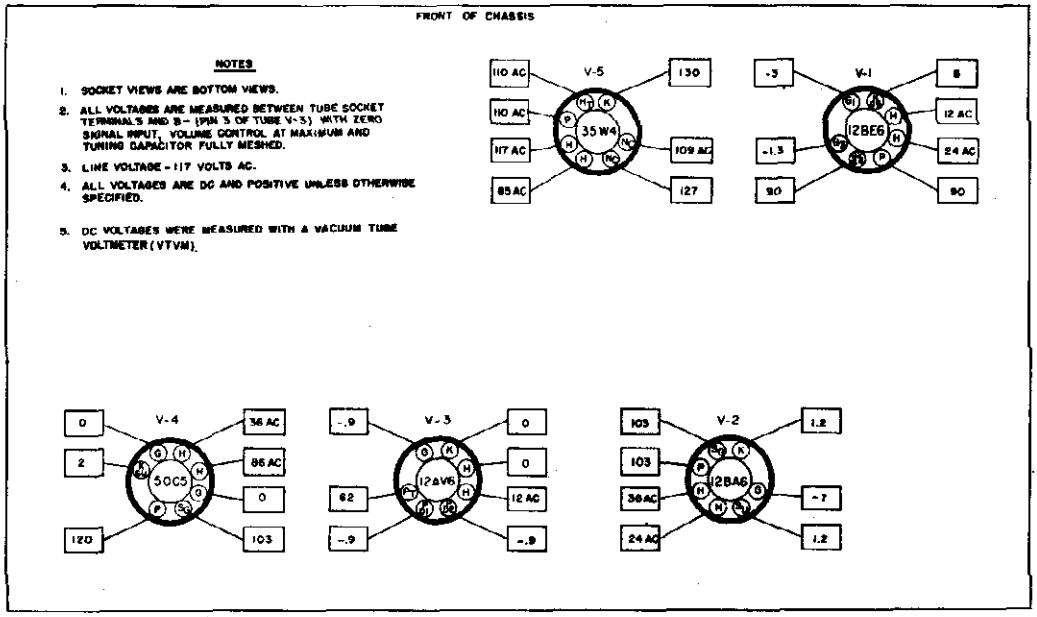


Fig. 9. Tube Socket Voltage Chart for Chassis Using Miniature Tubes

92C1709

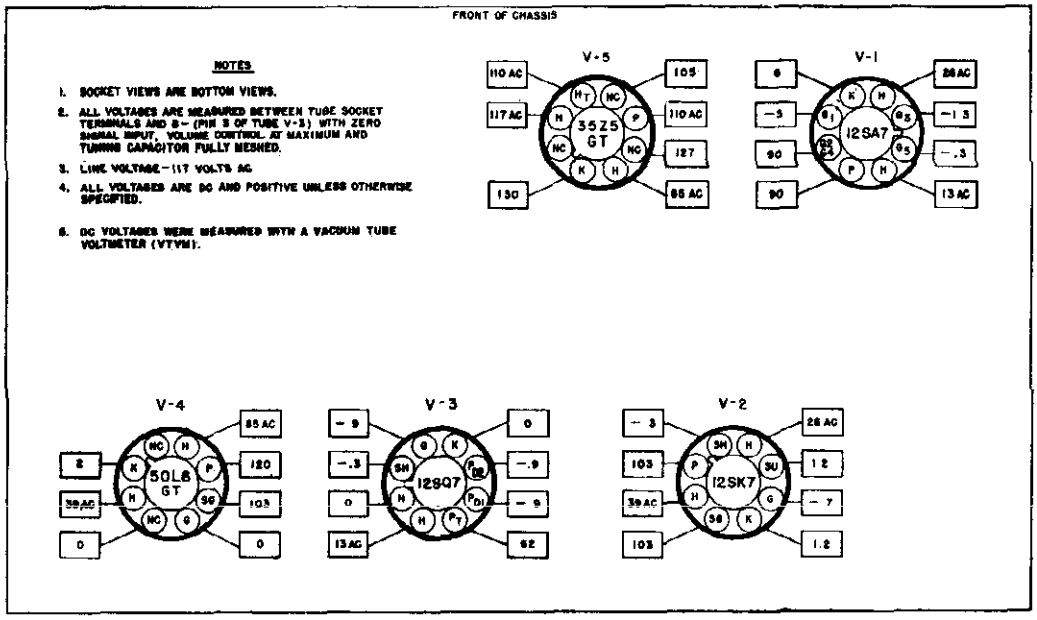


Fig. 10. Tube Socket Voltage Chart for Chassis Using Octal Tubes

92C1566

MODELS 5R50, 5R51,
5R52, Runs 1, 2

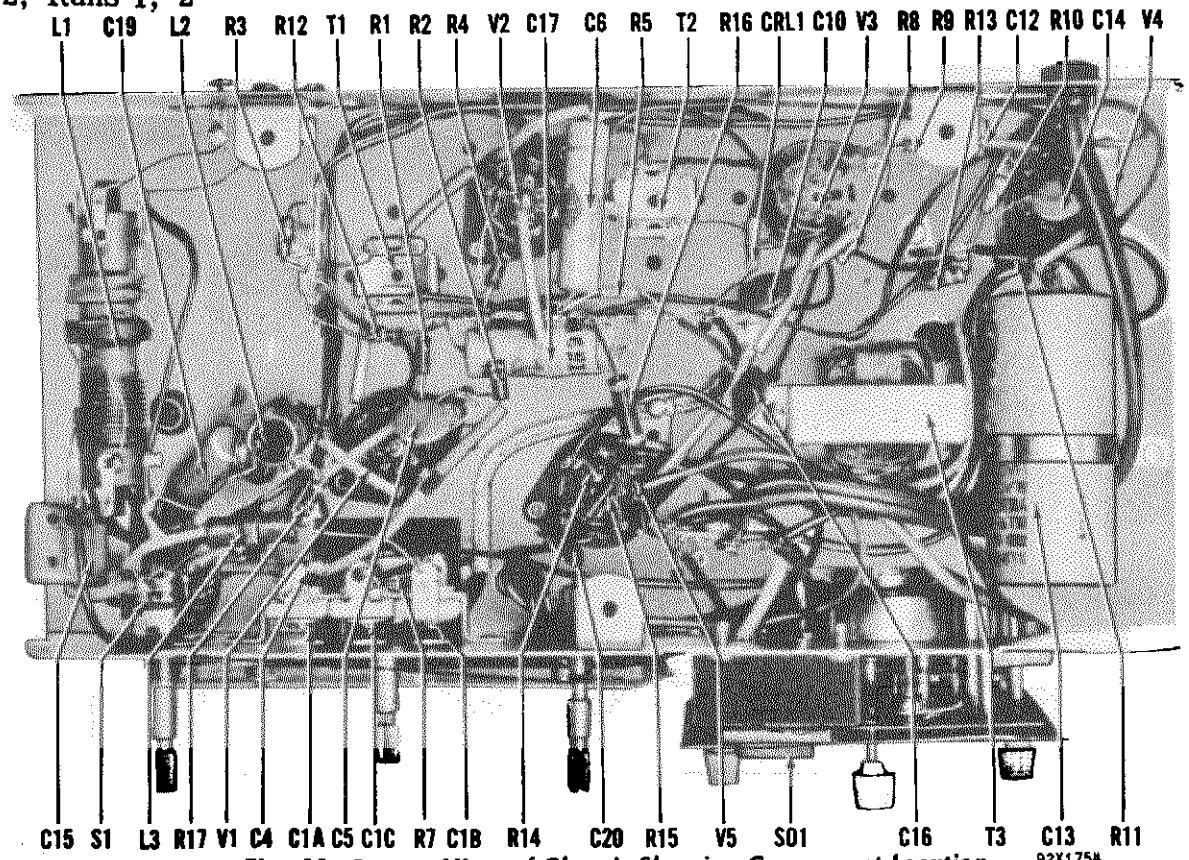


Fig. 11. Bottom View of Chassis Showing Component Location (Chassis Using Miniature Tubes)

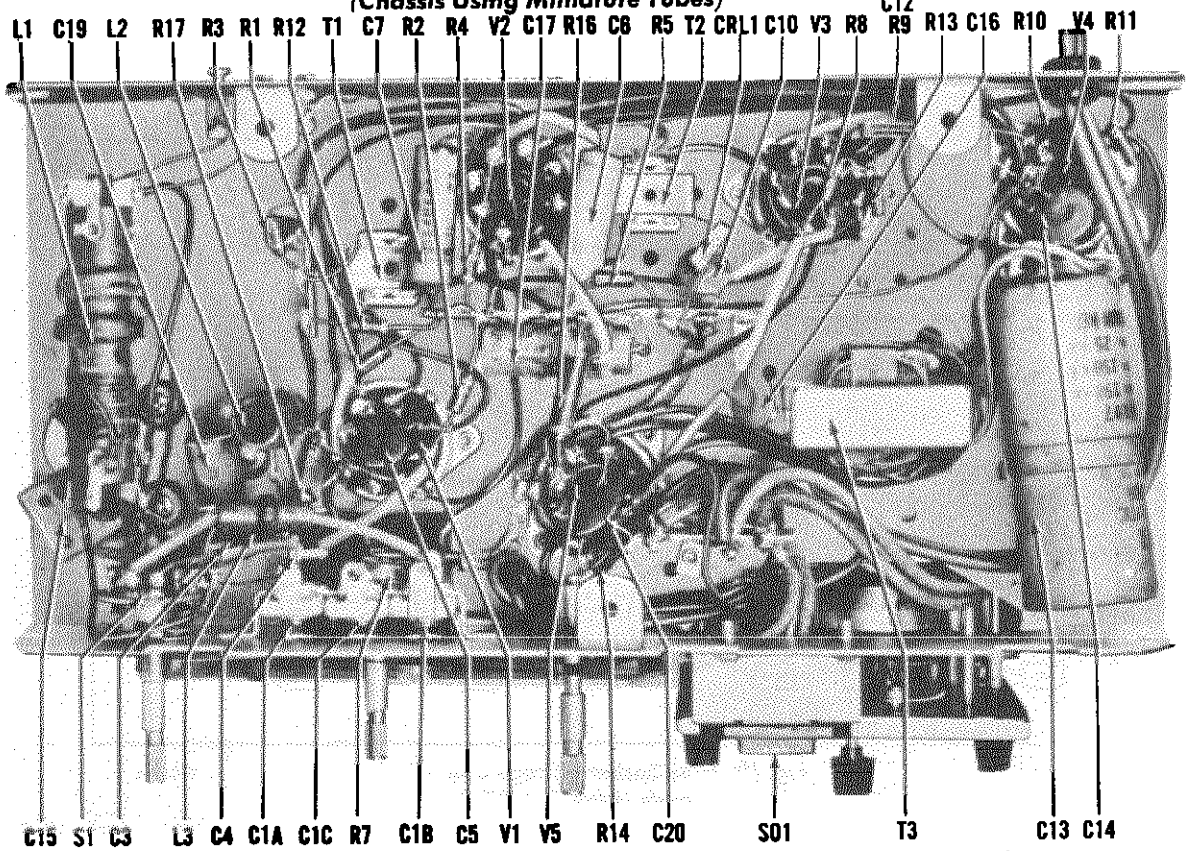


Fig. 12. Bottom View of Chassis Showing Component Location (Chassis Using Octal Tubes)

Schematic Symbol	Description	Hallicrafters Part Number
	CAPACITORS	
C-1A,B & C	Trimmer assembly, 3 section	44C408
C-2A & B	Tuning capacitor, 2 section	48C282
C-3	100 mmf. 500 V., ceramic	47X20UJ101K
C-4	50 mmf. 500 V., ceramic	47X20UJ500K
C-5,10,14 16,20	10,000 mmf. 450 V., ceramic disc	47A217
C-6,7,19	.05 mfd. 200 V., tubular paper	46AU503J
C-8,9	100 mmf. (part of diode filter network CRL-1)	---------
C-12	.001 mfd. 600 V., tubular paper	46AZ102J
C-13A,B & C	20 mfd. 25 V., 90-60 mfd. 150 V.; electrolytic	45B197
C-15	5600 mmf. 500 V., mica	47X30A562K
C-17	Resonant capacitor	46A150
	RESISTORS	
R-1	1 megohm 1/2 watt, carbon	23X20X105M
R-2	22,000 ohms 1/2 watt, carbon	23X20X223M
R-3	1200 ohms 1/2 watt, carbon	23X20X122M
R-4	56 ohms 1/2 watt, carbon (used with 12SK7)	23X20X560K
R-4	100 ohms 1/2 watt, carbon (used with 12BA6)	23X20X101K
R-5	2.2 megohms 1/2 watt, carbon	23X20X225M
R-6	47,000 ohms (part of diode filter network CRL-1)	----------
R-7	VOLUME control, 1 megohm; includes OFF-ON switch S-2	25B965
R-8	10 megohms 1/2 watt, carbon	23X20X106M
R-9,13	270,000 ohms 1/2 watt, carbon	23X20X274M
R-10	470,000 ohms 1/2 watt, carbon	23X20X474M
R-11	150 ohms 1/2 watt, carbon	23X20X151K
R-12	56 ohms 1/2 watt, carbon	23X20X560K
R-14	15 ohms 1/2 watt, carbon	23X20X150M
R-15	22 ohms 1/2 watt, carbon	23X20X220M
R-16	820 ohms 1 watt, carbon	23X30X821M
R-17	47 ohms 1/2 watt, carbon	23X20X470K
	COILS AND TRANSFORMERS	
L-1	Coil, antenna; BC and SW	51B1494
L-2	Coil, oscillator; SW	51B1493
L-3	Coil, oscillator; BC	51B1495
T-1	Transformer, IF; input	50B524
T-2	Transformer, IF; output	50B525
T-3	Transformer, audio output	55C187
	SWITCHES	
S-1A,B,C & D	Switch, rotary; SW-BC	60B472
S-2	Switch, OFF-ON; part of VOLUME control R-7	--------
	TUBE COMPLEMENT (OCTAL)	
V-1	12SA7: converter	90X12SA7
V-2	12SK7: IF amplifier	90X12SK7
V-3	12SQ7: detector and audio amplifier	90X12SQ7
V-4	50L6GT: audio output	90X50L6GT
V-5	35Z5GT: rectifier	90X35Z5GT
	TUBE COMPLEMENT (MINIATURE)	
V-1	12BE6: converter	90X12BE6
V-2	12BA6: IF amplifier	90X12BA6
V-3	12AV6: detector and audio amplifier	90X12AV6
V-4	50C5: audio output	90X50C5
V-5	35W4: rectifier	90X35W4
	MISCELLANEOUS	
SO-1	AC Receptacle	10A496
	Cabinet:	
	Model 5R50 (Aqua Blue)	116E009
	Model 5R51 (Minosa Yellow)	116E010
	Model 5R52 (Shell Pink)	116E011
	Cabinet back	8C1657
	Clip, mtg.; for antenna coil L-1	76A879
	Clip, mtg.; for IF transformers T-1 and T-2	76A385
	Clip, mtg.; for oscillator coil L-2	76A868
	Clock Unit	80D117
	Dial cord (specify length)	38A026
	Dial glass	22C349
	Dial light assembly; does not include dial lamp	86A011
CRL-1	Diode filter network (includes R-6, C-8 and C-9)	49A016
	Escutcheon	7D369
	Grill cloth	14B326
	Grommet, rubber	16A125
	Knob, VOLUME	15B477
	Knob, clock	15B504
	Knob, TUNING and SW-BC:	
	Model 5R50 (Blue)	15B505
	Model 5R51 (Yellow)	15B506
	Model 5R52 (Pink Beige)	15B507
PL-1	Line cord and plug	87B3577
LM-1	Lamp, dial; Mazda #47	39A004
	Lock, line cord	76A953
	Pointer, dial	82A211
	Shaft, tuning	74B511
	Socket, tube; miniature (with center shield)	6B402
	Socket, tube; miniature (without center shield)	6B314
	Socket, tube; octal	6A250
	Spring, dial cord	75A012
LS-1	Speaker, 5 inch PM (Run 1)	85C110
	Bracket, speaker mtg. (Run 1)	67A570
	Bracket, speaker mtg. (Run 1) 1 13/16" dia. x 2 7/8" high	67B1921
LS-1	Speaker, 5 inch PM (Run 2)	85C140
	Plate, speaker mtg. (Run 2)	63B849
	Bracket, speaker mtg. (Run 2)	67B2026
TS-1	Terminal strip, antenna	88A032

GENERAL DESCRIPTION

World-wide radio reception is yours with the Hallicrafters Model S-38C. This 5 tube communications receiver tunes from 540 kilocycles to 32 megacycles to bring you standard broadcast programs, foreign and domestic shortwave broadcasts, amateurs, police, ships, aircraft and countless other exciting distant stations. It receives both voice and code broadcasts and is designed to operate from 105 to 125 volt direct current (DC) or 60 cycles alternating current (AC). A 5-inch Alnico V permanent magnet speaker is built into the top of the cabinet and tip jacks have been provided on the back of the set for plugging in a pair of headphones. The RECEIVE-STANDBY switch on the front panel is a special feature which permits you to silence the receiver without turning the set off.

Hallicrafters Model S-38C

Good reception of both standard and shortwave broadcasts can be obtained in most localities with the 15 foot antenna wire included with your receiver. It is merely necessary to uncoil this wire, connect one end of it to terminal A1 on the back of the set and then run it about the room in any convenient manner. To complete the antenna installation, connect the jumper between terminals A2 and G.

Your set is provided with two tuning knobs for greater ease of tuning. Wide tuning is done with the knob marked TUNING and fine tuning with the knob marked BAND SPREAD. The BAND SPREAD knob permits you to accurately tune in stations on crowded bands by spreading them out so that they may be more easily separated. In this way you are able to hear many more stations than you would on an ordinary radio with just one tuning knob.

The amateur bands and principal shortwave channels of the world are clearly marked on the dial for your convenience. Since shortwave conditions vary with the season of the year and even with the time of day, shortwave programs may not be heard with the same regularity as standard broadcasts. A special table has been provided on page 3 to aid you in determining the most favorable times for shortwave listening.

INSTALLATION INSTRUCTIONS

ANTENNA - The terminals marked A1, A2 and G on the back of the set are for antenna and ground connections. Good results can be obtained in most localities with the 15 foot antenna wire included with your receiver. This wire should be uncoiled to provide maximum signal pickup. An outside antenna 50 to 100 feet long (ordinary copper wire) may be necessary if the receiver is operated in a difficult reception area or steel constructed building. Connect the antenna wire to terminal A1 on the back of the set and then connect the jumper between terminals A2 and G. In some locations, reception may be improved by connecting a lead from terminal G to a cold water pipe or outside ground rod.

For really top performance, there is no substitute for an outside antenna such as used by the commercial radio stations. Provision has been made on your receiver for the connection of this type of antenna, commonly called a doublet. When a doublet antenna is used, the jumper is removed and the antenna is connected to terminals A1 and A2. Consult your radio dealer for further information.

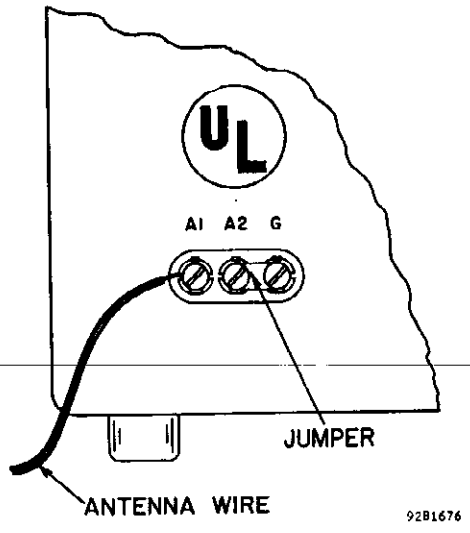


Fig. 1. Rear View of Receiver Showing Antenna and Ground Terminals

OPERATING INSTRUCTIONS

TUNING DIAL - All dial readings are in megacycles. To convert the readings on the standard broadcast band (band 1) to kilocycles, simply remove the dot and add two zeros; thus, .7 on the dial corresponds to 700 kilocycles.

AM-CW SWITCH - Set this switch at AM to listen to voice and musical broadcasts. Set it at CW only if you wish to hear code signals.

SPEAKER-PHONES SWITCH - For operation of the built-in speaker, set the switch at SPEAKER. Tip jacks are provided on the back of the set for plugging in a pair of headphones. Use any 500 to 5000 ohm headphones. For headphone operation set the switch at PHONES.

BAND SELECTOR CONTROL- Set this control for the band you wish to tune.

VOLUME CONTROL - Turn this control clockwise to turn the set on. Allow about 30 seconds for the tubes to reach operating temperature and then advance the control to increase volume. To turn the set off, turn this control counter-clockwise until a click is heard.

NOTE - If the receiver does not operate after the 30 second warm up when connected to a DC source, the power plug should be reversed in the wall outlet to obtain proper polarity.

RECEIVE - STANDBY SWITCH - Set this switch at RECEIVE for radio reception. If you wish to silence the receiver without turning the set off, set the switch at STANDBY. To resume radio reception, simply return the switch to the RECEIVE position.

TUNING KNOB - Your receiver has been provided with two tuning knobs - The TUNING knob which operates the pointer on the left hand dial and a separate BAND SPREAD knob which operates the pointer on the right hand dial. The TUNING knob is for wide tuning and the BAND SPREAD knob for fine tuning. Use the TUNING knob to tune in the desired station. Tune for the clearest and strongest signal. If the signal is too strong, reduce it by means of the VOLUME control, not by using the TUNING knob. For code reception, adjust the TUNING knob for the desired pitch of the CW code signal when tuning in the station.

IMPORTANT - The dial readings will correspond to the exact station frequencies only if the BAND SPREAD dial pointer is set at 0.

BAND SPREAD KNOB - The BAND SPREAD knob permits you to accurately tune in stations on crowded bands by spreading them out so that they can be more easily separated. The BAND SPREAD knob can be used in two different ways. First, it may be left with the pointer at 5 while you partially tune in the desired station with the TUNING knob. Then, by "rocking" the BAND SPREAD knob back and forth (turn it a few degrees to the left and right through the desired station), you will be able to tune in the desired station with precision accuracy.

The second way to operate the BAND SPREAD knob is to use it to cover a group of stations. Set the BAND SPREAD knob so that the pointer reads 0 and then turn the TUNING knob to tune in the highest frequency station in the group. The other stations can be heard by slowly turning the BAND SPREAD knob from 0 to 100.

BEST SHORTWAVE RECEPTION TABLE

Band	Most Favorable Time	Most Favorable Distance
6-7 MC	Night - Winter	Day - 400 Miles - Night - Over 1500 Miles
9-10 MC	Day - Late Afternoon and Night - Winter	Over 500 Miles
11-12 MC	Evenings or Late Summer Afternoons	Day - Under 1500 Miles Night - Over 1500 Miles
15-18 MC	Early Mornings and Summer Evenings	Over 1500 Miles

SERVICE INSTRUCTIONS

GENERAL SPECIFICATIONS

Tubes . . . . . 5 including 1 rectifier
Speaker . . . . . 5 inch PM
Voice Coil Impedance . . . . . 3.2 ohms
Headphone Output Impedance . . . 15 ohms
Antenna . . . Terminals for single wire or doublet antenna. (See Page 2.)
Intermediate Frequency . . . . . 455 KC
Frequency Coverage . . . 540 KC - 32 MC
Power Supply . . . . . 105-125 volts DC or 60 cycles AC
Power Consumption . . . . . 30 watts

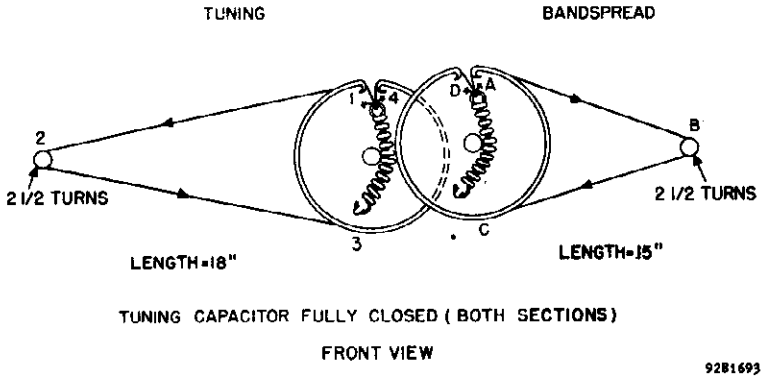


Fig. 2. Dial Cord Stringing Diagram

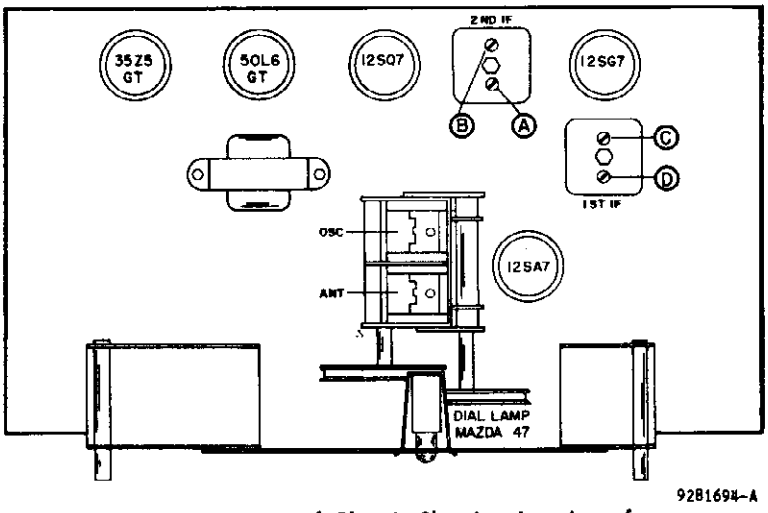


Fig. 3. Top View of Chassis Showing Location of Alignment Adjustments, Tubes and Dial Lamp

DIAL CORD STRINGING - Refer to Fig. 2 for the stringing diagram. Both sections of the tuning gang should be fully meshed. To restring the TUNING dial cord, tie one end of an 18 inch length of 30 lb. dial cord to the dial spring at 1 on the drive pulley. Follow the stringing sequence 1 through 4. At 4, stretch the spring and tie the cord securely to the spring. Cut off the excess cord and apply a drop of quick drying cement to the knot.

To restring the BAND SPREAD dial cord, cut a 15 inch length of dial cord and follow the procedure as explained above, starting at A and proceeding through D.

TUBE AND DIAL LAMP REPLACEMENT - Refer to Fig. 3 for the location of the tubes and dial lamp used in the receiver. To gain access to the tubes and lamp, remove the back cover from the cabinet. Before attempting to make any replacement, set the BAND SPREAD control fully clockwise and the TUNING control fully counterclockwise to prevent damage to the tuning gang. To replace a tube, insert the center guide pin into the center hole of the tube socket, rotate the tube until the key drops into position and then push down until the tube is held firmly in the socket. To make a dial lamp replacement, remove the dial lamp socket by compressing the side springs. Make replacement only with a type 47 pilot lamp.

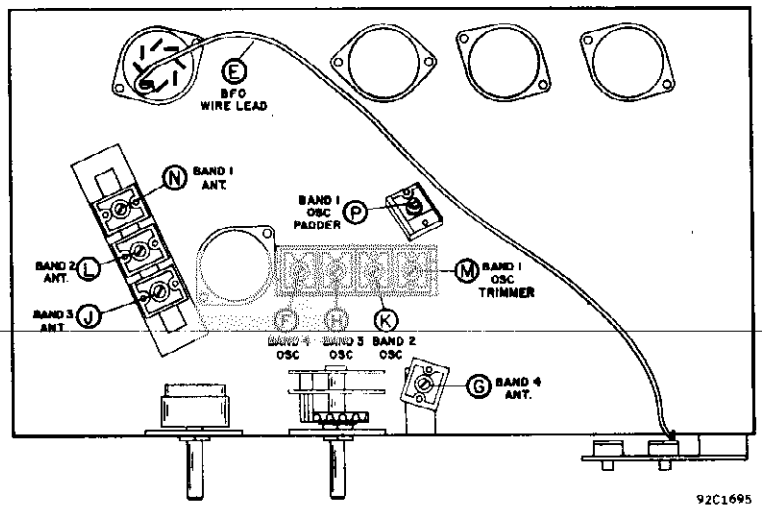


Fig. 4. Bottom View of Chassis Showing Location of Alignment Adjustments

ALIGNMENT INSTRUCTIONS

- Use an amplitude modulated generator covering 455 KC to 30 MC. Use a modulated output for every step except Step 2.
- Connect output meter across speaker voice coil.
- Use a non-metallic alignment tool.
- Set the AM/CW switch at AM, (except for BFO adjustment), SPEAKER/PHONES switch at SPEAKER, VOLUME control at maximum, RECEIVE/STANDBY switch at RECEIVE and the BAND SPREAD control at 0.
- See Figs. 3 and 4 for location of alignment adjustments.

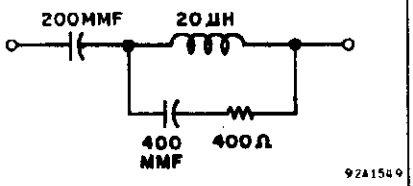


Fig. 5. RMA Dummy Antenna

Step	Signal Generator Connections	Generator Frequency	Band Selector Setting	Receiver Dial Setting	Adjust
		IF ALIGNMENT			
1	High side thru a .01 mfd. capacitor to stator plates of front section of TUNING gang. Low side to chassis.	455 KC	1	1.0 MC	A, B, C and D for maximum output. Keep reducing gen. output so that the reading on the output meter does not exceed 50 milliwatts
		BFO ADJUSTMENT			
*2	Same as Step 1.	455 KC (No Mod.)	1	1.0 MC	Set the AM/CW switch at CW. (Reset the switch at AM when Step 2 is completed.) For correct BFO operation, vary the coupling between lead E and pins 4 and 8 of the 12SG7 tube for a maximum beat note. Pushing lead E toward pin 4 increases the strength of the beat.
		RF ALIGNMENT			
3	High side thru RMA dummy antenna (Fig. 5) to terminal A1 on back of chassis. Low side to chassis. Connect jumper between A2 and G.	30 MC	4	30 MC	F and G for maximum output as in Step 1.
4	Same as Step 3.	14 MC	3	14 MC	H and J for maximum output as in Step 1.
5	Same as Step 3.	5 MC	2	5 MC	K and L for maximum output as in Step 1.
6	Same as Step 3.	1500 KC	1	1.5 MC	M and N for maximum output as in Step 1.
		500 KC	1	.6 MC	P for maximum output as in Step 1.

* Step 2 is usually unnecessary. Adjustment should be made ONLY if a weak beat note is obtained on strong CW signals indicating lack of coupling between wire lead E and pins 4 and 8 of the 12SG7.

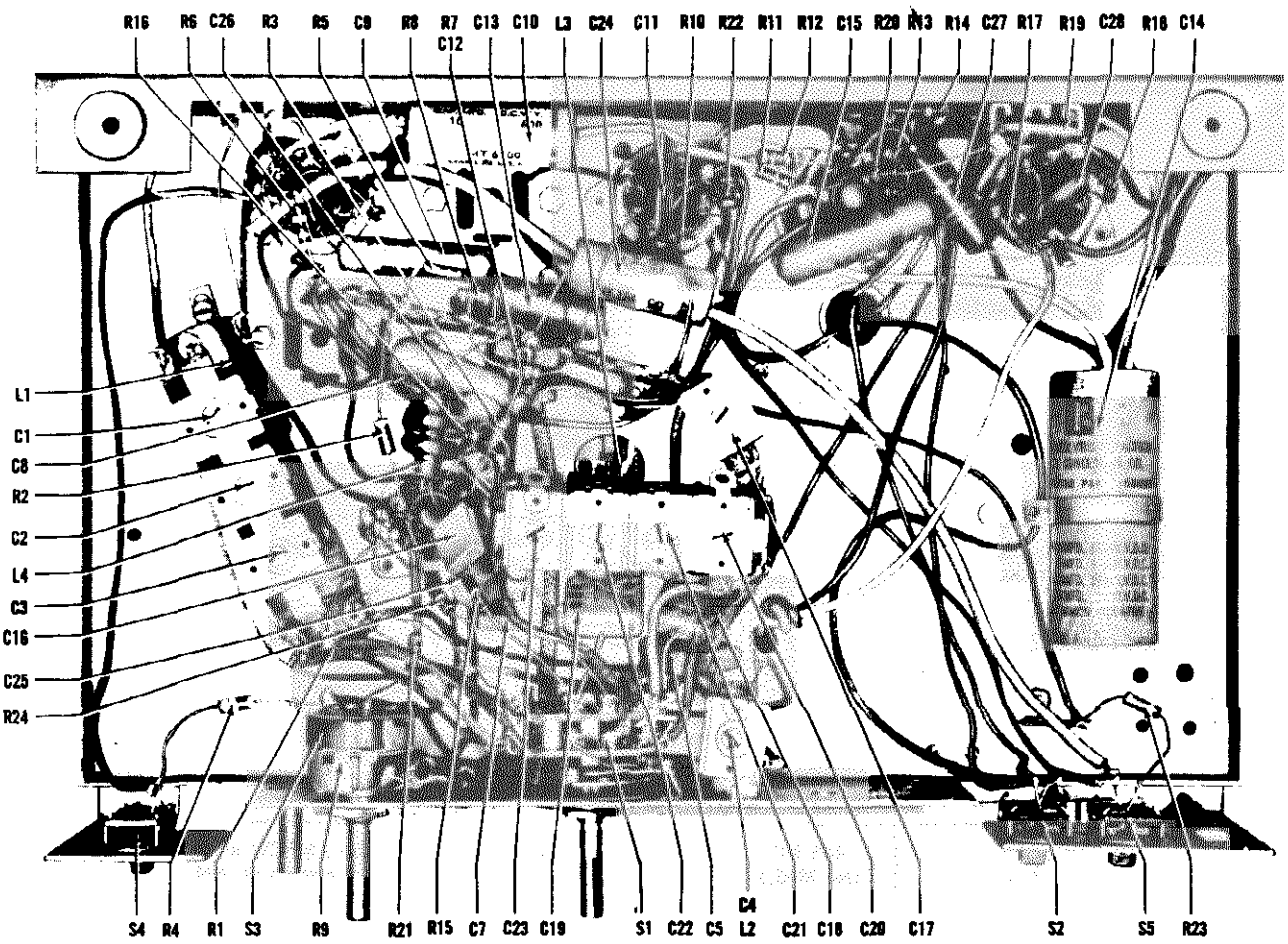


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Fig. 6. Bottom View of Chassis Showing Component Location

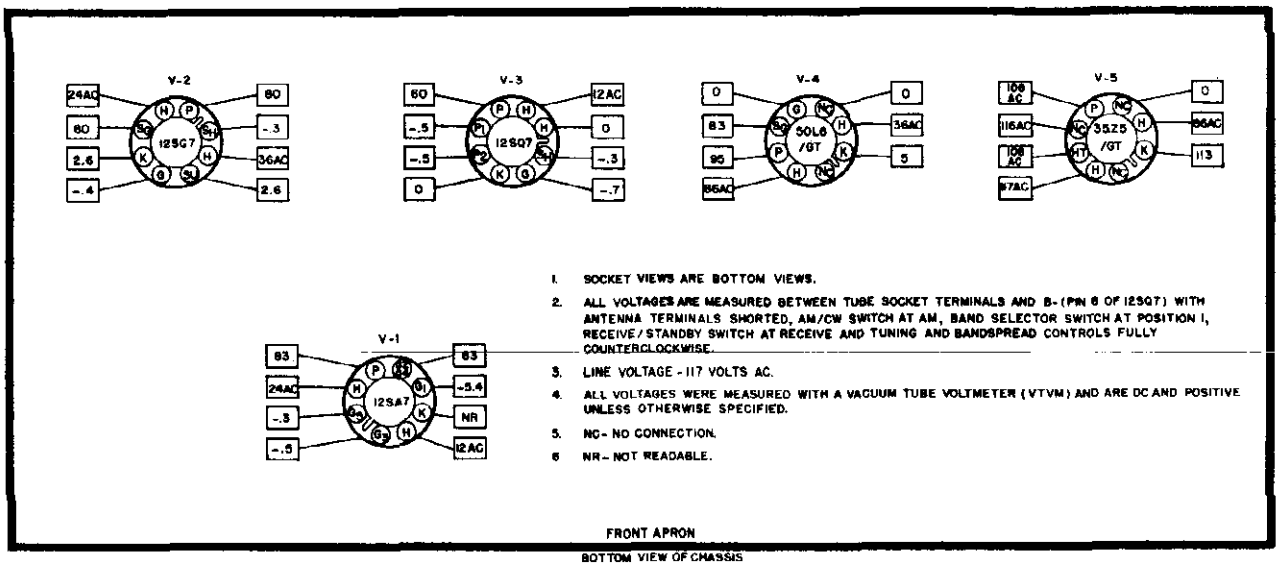

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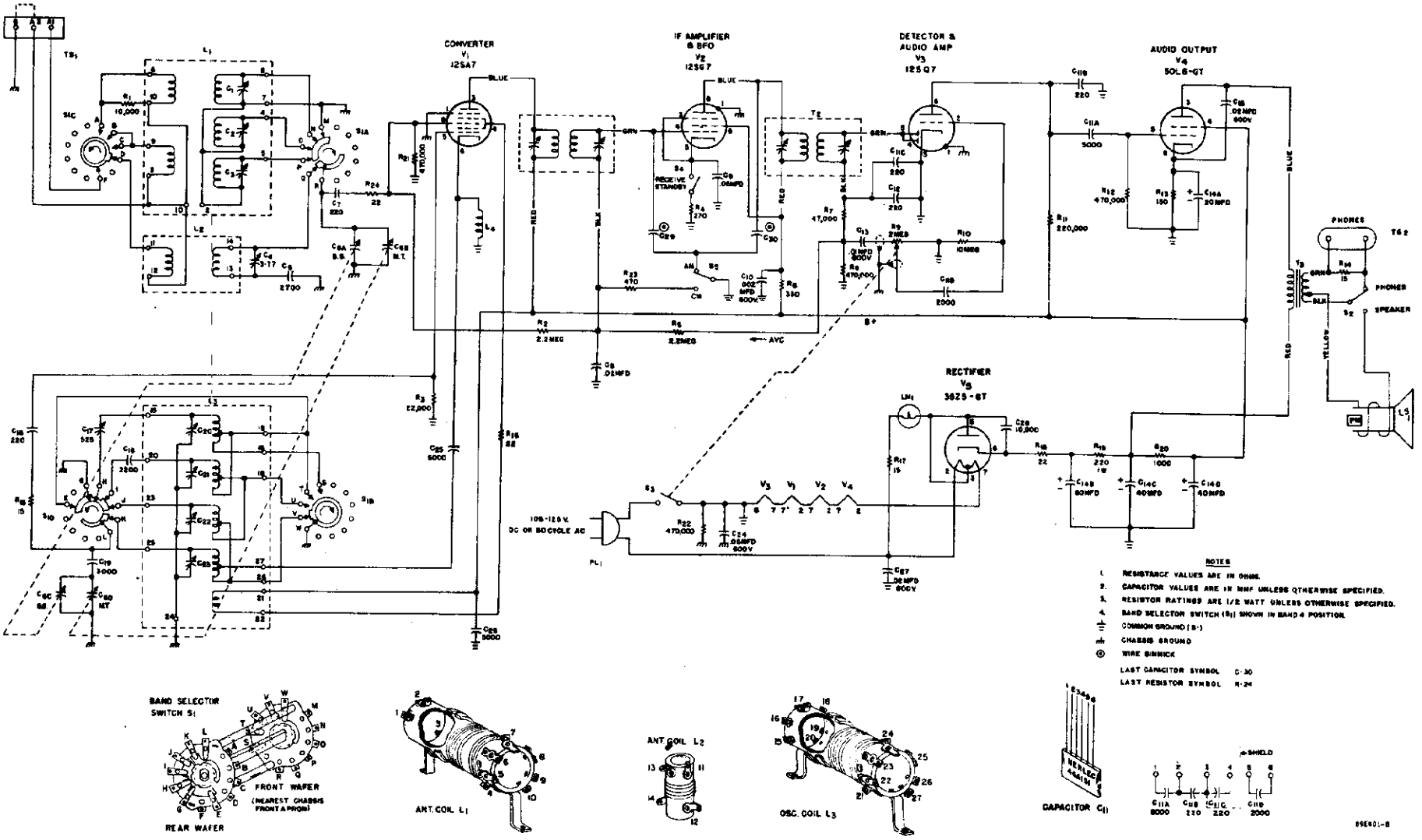
Fig. 7. Tube Socket Voltage Chart



MODEL S-38C
RUN 2

NOTE: VALUES & TOLERANCES SHOWN ARE NOMINAL AND VARIATIONS MAY BE FOUND. IT IS RECOMMENDED THAT THE VALUES OF ANY REPLACEMENT CORRESPOND TO THE NOMINAL VALUE OF THE PART BEING REPLACED.

Fig. 8. Schematic Diagram

MODEL S-38C, Run 2

SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number
	CAPACITORS	
C-1,2,3	Trimmer; part of antenna coil L-1	----------
C-4	Trimmer, 3-77 mmf.	44A039
C-5	2700 mmf. 5%, 500V.; mica	47X30B272J
C-6A,B,C&D	Tuning capacitor, 2 section	48C162-1
C-7,12,16	220 mmf. 10%, 500V.; mica	47X20B221K
C-8,15	.02 mfd. 600V., tubular	46AY203J
C-9	.05 mfd. 200V., tubular	46AU503J
C-10	.002 mfd. 600V., tubular	46AZ202F
C-11A,B,C &D	Capacitor, composite: 5000, 220, 220 and 2000 mmf., 500V.; ceramic	46A151
C-13	.01 mfd. 600V., tubular	46AZ103J
C-14A,B,C &D	60-40-40 mfd. 150V., 20 mfd. 25V.; electrolytic	45B091
C-17	Padder, 525 mmf.	44A349
C-18	2200 mmf. 5%, 500V.; mica	47X30B222J
C-19	3000 mmf. 5%, 500V.; mica	47X30B302J
C-20,21,22, 23	Trimmer; part of oscillator coil L-3	----------
C-24	.05 mfd. 600V., tubular	46AY503J
C-25,26	5000 mmf. 450V., ceramic disc	47A168
C-27	.02 mfd. 600V., molded tubular	46BR203L6
C-28	10,000 mmf. 450V., ceramic disc	47A217
	RESISTORS	
R-1	10,000 ohms 1/2 watt, carbon	23X20X103M
R-2,5	2.2 megohms 1/2 watt, carbon	23X20X225M
R-3	22,000 ohms 1/2 watt, carbon	23X20X223M
R-4	270 ohms 1/2 watt, carbon	23X20X271K
R-6	330 ohms 1/2 watt, carbon	23X20X331M
R-7	47,000 ohms 1/2 watt, carbon	23X20X473M
R-8,12,21,22	470,000 ohms 1/2 watt, carbon	23X20X474M
R-9	2 megohms; VOLUME control	25B896
R-10	10 megohms 1/2 watt, carbon	23X20X106M
R-11	220,000 ohms 1/2 watt, carbon	23X20X224M
R-13	150 ohms 1/2 watt, carbon	23X20X151K
R-14,15,17	15 ohms 1/2 watt, carbon	23X20X150M
R-16,18,24	22 ohms 1/2 watt, carbon	23X20X220M
R-19	220 ohms 1 watt, carbon	23X30X221M
R-20	1000 ohms 1/2 watt, carbon	23X20X102M
R-23	470 ohms 1/2 watt, carbon	23X20X471K
	COILS AND TRANSFORMERS	
L-1	Coil, antenna; bands 1, 2 and 3	51C821
L-2	Coil, antenna; band 4	51B1015
L-3	Coil, oscillator; all bands	51C822
L-4	Choke, RF; 540 microhenries	53A107
T-1	Transformer, 1st IF	50C531
T-2	Transformer, 2nd IF	50C532
T-3	Transformer, audio output	55A127

Schematic Symbol	Description	Hallicrafters Part Number
	SWITCHES	
S-1A,B,C&D	Bandswitch assembly (BAND SELECTOR)	60C393
S-2,5	Switch, slide; spdt (SPEAKER/ PHONES and AM/CW)	60A477
S-3	Switch, ON-OFF; part of VOLUME control R-9	---------
S-4	Switch, slide; spst (RECEIVE/ STANDBY)	60A476
	SOCKETS AND CONNECTORS	
	Socket, dial lamp; includes leads	86A011
	Socket, tube; octal	6A250
TS-1	Terminal strip, antenna	88A671
TS-2	Tip jacks, PHONE	88A071
	TUBES AND DIAL LAMP	
V-1	12SA7: convertor	90X12SA7
V-2	12SG7: IF amplifier and BFO	90X12SG7
V-3	12SQ7 or 12SQ7GT/G: detector and audio amplifier	90X12SQ7 or 90X12SQ7GT/G
V-4	50L6GT: audio output	90X50L6GT
V-5	35Z5GT: rectifier	90X35Z5GT
LM-1	Lamp, dial; type 47	39A004
	MISCELLANEOUS PARTS	
	Cabinet	66C772
	Cabinet back	32C513
	Cabinet bottom cover	32C501
	Clip, mtg; for antenna coil L-2	76A326
	Dial cord (specify length)	38A026
	Dial scale	83C406
	Dial window	22B311
	Knob, BAND SELECTOR and VOLUME	15A049
	Knob, BAND SPREAD and TUNING	15A048
PL-1	Line cord and plug	87A078
	Line cord lock; male section	76A397-1
	Line cord lock; female section	76A397-2
	Mounting foot, cabinet	16A244
	Pointer, dial; BAND SPREAD	82A216
	Pointer, dial; TUNING	82A217
LS-1	Speaker, 5-inch PM	85C030
	Spring, dial cord	75A012