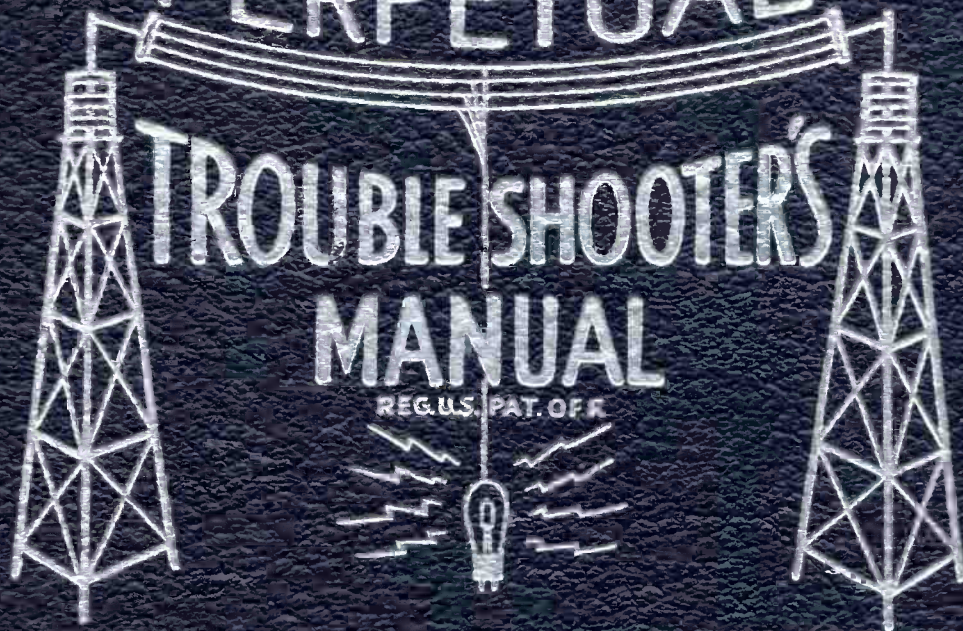


VOLUME XIX

PERPETUAL



JOHN F. RIDER

**PERPETUAL**  
**TROUBLE SHOOTER'S MANUAL**

Reg. U. S. Pat. Off.

**VOLUME XIX**



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ALIGNING PHILCO RECEIVERS, VOLUMES I AND II  
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THE THEORY AND PRACTICE OF 30-1000 MC RECEIVING ANTENNAS—by A. B. BAILEY

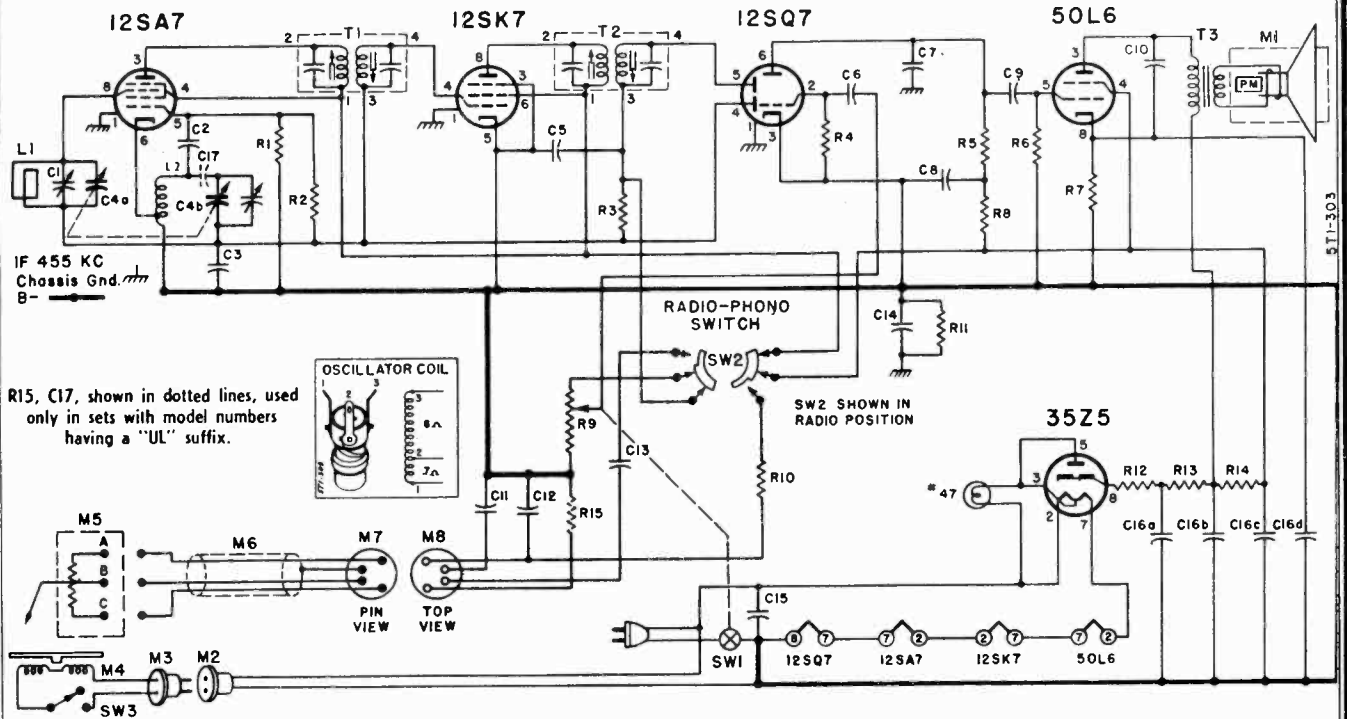
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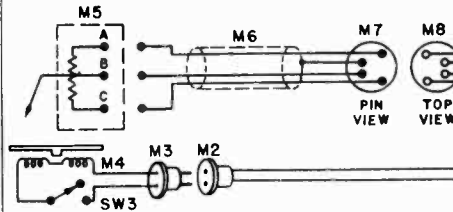
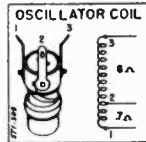
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ADMIRAL CORP.

MODEL 5T12,  
CHASSIS 5T1

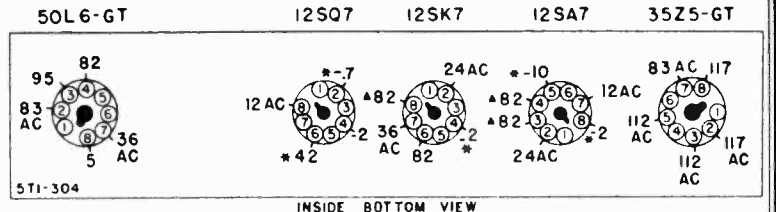


R15, C17, shown in dotted lines, used only in sets with model numbers having a "UL" suffix.



**VOLTAGE DATA**

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Switch in "Radio" position.
- Measured on 117 Volt AC line.
- Volume control minimum; dial turned to low frequency end.
- Voltages measured with Vacuum Tube Voltmeter. Readings taken with a 1000 ohm-per-volt meter will be approximately the same except for those marked with an asterisk \* in the voltage chart; these readings will either be lower or practically zero.



\* If taken with a 1000 ohm-per-volt meter, readings will be lower or practically zero.  
▲ On "Phono" these voltages will be zero. All other DC readings may be slightly higher.

RESISTORS		
Symbol	Description	Part No.
R1	22,000 Ohms, 1/2 Watt	60B 8-223
R2	10 Megohms, 1/2 Watt	60B 8-106
R3	1 Megohm, 1/2 Watt	60B 8-105
R4	4.7 Megohms, 1/2 Watt	60B 8-475
R5	470,000 Ohms, 1/2 Watt	60B 8-474
R6	470,000 Ohms, 1/2 Watt	60B 8-474
R7	150 Ohms, 1 Watt	60B 14-151
R8	47,000 Ohms, 1/2 Watt	60B 8-473
R9	1 Megohm Volume Control	75B 1-32
R10	22,000 Ohms, 1/2 Watt	60B 8-223
R11	150,000 Ohms, 1/2 Watt	60B 8-154
R12	33 Ohms, 1 Watt	60B 28-3
R13	220 Ohms, 1 Watt	60B 28-7
R14	1,000 Ohms, 1 Watt	60B 28-2
R15	33,000 Ohms, 1/2 Watt	60B 8-333
(R15 used only in sets with model numbers having a "UL" suffix)		

CONDENSERS		
Symbol	Description	Part No.
C1	Trimmer, 3 to 30 mmfd.	Part of L1
C2	50 mmfd., Ceramic	65B 6-4
C3	.1 mfd., 200 Volts, Paper	64B 1-30
C4a	0 to 420 mmfd.	Gang 68B 20-1
C4b	0 to 108 mmfd.	
Note—Gang spot welded to dial drum.		
C5	250 mmfd., Ceramic	65B 6-5
C6	.01 mfd., 400 Volts, Paper	64B 1-25
C7	500 mmfd., Ceramic	65B 6-6
C8	.1 mfd., 200 Volts, Paper	64B 1-30
C9	.01 mfd., 400 Volts, Paper	64B 1-25
C10	.03 mfd., 400 Volts, Paper	64B 1-23
C11	.05 mfd., 400 Volts, Paper	64B 1-22
C12	.18 mfd., 200 Volts, Paper	64A 2-2

Symbol	Description	Part No.
C13	.001 mfd., 600 Volts, Paper	64B 1-15
C14	.18 mfd., 200 Volts, Paper	64A 2-2
C15	.05 mfd., 400 Volts, Paper	64B 1-22
C16a	30 mfd., 150 Volts	Elect. 67A 14-1
C16b	30 mfd., 150 Volts	
C16c	20 mfd., 150 Volts	
C16d	20 mfd., 25 Volts	
C17	.02 mfd., 400 Volts, Paper	64B 1-24
(Used only in sets with model numbers having a "UL" suffix)		

COILS, TRANSFORMERS, ETC.		
Symbol	Description	Part No.
L1	Antenna and Trimmer, Loop	69B 13
L2	Coil, Oscillator	69A 52
T1	Transformer, 1st IF	72B 50
T2	Transformer, 2nd IF	72B 51
T3	Transformer, Output	79A 11-2
M1	Speaker (5") less output Trans.	78B 39-1
M2	Socket, Phono Motor	89A 6-3
M8	Socket, Phono input	88A 8-6
SW1	Switch, On-Off	Part of R9
SW2	Switch, Radio-Phono	77A 16-4

PHONOGRAPH PARTS		
Symbol	Description	Part No.
M3	Plug, AC Phono Motor	88A 8-1
M4	Motor, 60 Cycles, 115 Volts AC	407B 3-2
M5	Cartridge and Needle, Pickup	A1372-13
M6	Cable, Pickup (3 conductor)	89A 18-4
M7	Plug, Pickup Cable	88A 8-5

Symbol	Description	Part No.	
SW3	Switch, Motor On-Off	409A 1	
(See caution in changer manual)			
Centerpost (includes speed-nut)			G400B 137-1
Idler Wheel (407B 3-2 Motor)			G400A 23
Idler Wheel (407B 1-2 Motor)			G400A 57

CABINET PARTS			
Symbol	Description	Part No.	
Cabinet, Plastic			
Bottom Less Lid (Mahog.)			34D 11-12
Lid only (Mahogany)			34D 11-13
Dial Scale, Glass			21B 35-2
Escutcheon Overlay			23C 23-3
Grille Cloth and Baffle			A1859
Knobs, Radio			
"Volume" and "Tuning"			33A 21-5
"Radio-Phono"			33A 21-9
Hinge			37A 8-1
Stay Arm and Plate			37A 9-1
Rubber Strip, Dial Scale Mtg. (8 1/2")			12A 9-3

MISCELLANEOUS			
Symbol	Description	Part No.	
Background, Dial			22B 9-1
Bracket, Dial Light			15A 156
Carton and Fillers			44B 112
Dial Cord			50A 1-3
Pilot Light, Mazda No. 47			81A 1-8
Pilot Light Socket and Leads			82A 2-4
Pointer, Dial			25A 21
Spring, Dial Drum Tension			19B 1-3
Tuning Shaft			28A 26-3
Washer, "C" (Tuning Shaft)			4A 4-6
Washer, Felt			5A 4-11
Washer, Spring (Tuning Shaft)			4A 6-3-0

MODEL 5T12,  
CHASSIS 5T1

ADMIRAL CORP.

### ALIGNMENT PROCEDURE

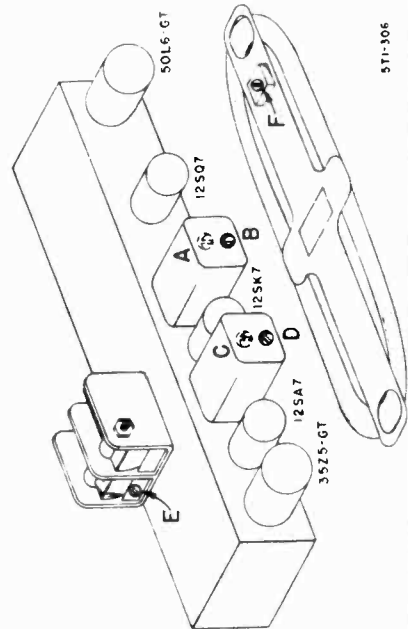
- Check pointer position. With tuning gang closed, the tip of the pointer clip should be over the 1/16" circular punch at the extreme left end of the dial background (see stringing diagram).
- Connect output meter across voice coil.
- Turn receiver volume control full on.
- Loop antenna must be connected and placed in the same relative position to the chassis as when in cabinet.
- Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and attach to B minus of chassis.
- Use an insulated alignment screwdriver for IF adjustments.
- Use lowest output setting of signal generator capable of producing adequate output meter indication and proceed in the following sequence.
- Repeat adjustments to insure good results.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Tuning condenser, antenna stator	455 KC	Gang fully open	2nd IF 1st IF	A, B C, D (see note below)	Maximum output
2	250 mmfd. condenser	Tuning condenser, antenna stator	1620 KC	Gang fully open	Oscillator	E	Maximum output
3	Loop of several turns of wire, or place generator lead close to receiver loop for adequate signal.	No physical connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	F (see note below)	Maximum output

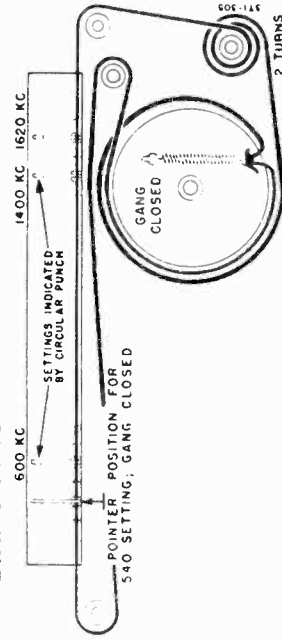
NOTE: Antenna Trimmer "F" must be aligned after chassis and loop are mounted in cabinet. Loop trimmer adjustment is located at the rear of the cabinet.

Trimmers "A" and "C" are adjusted from underside of chassis.

### TUBE AND TRIMMER LOCATION



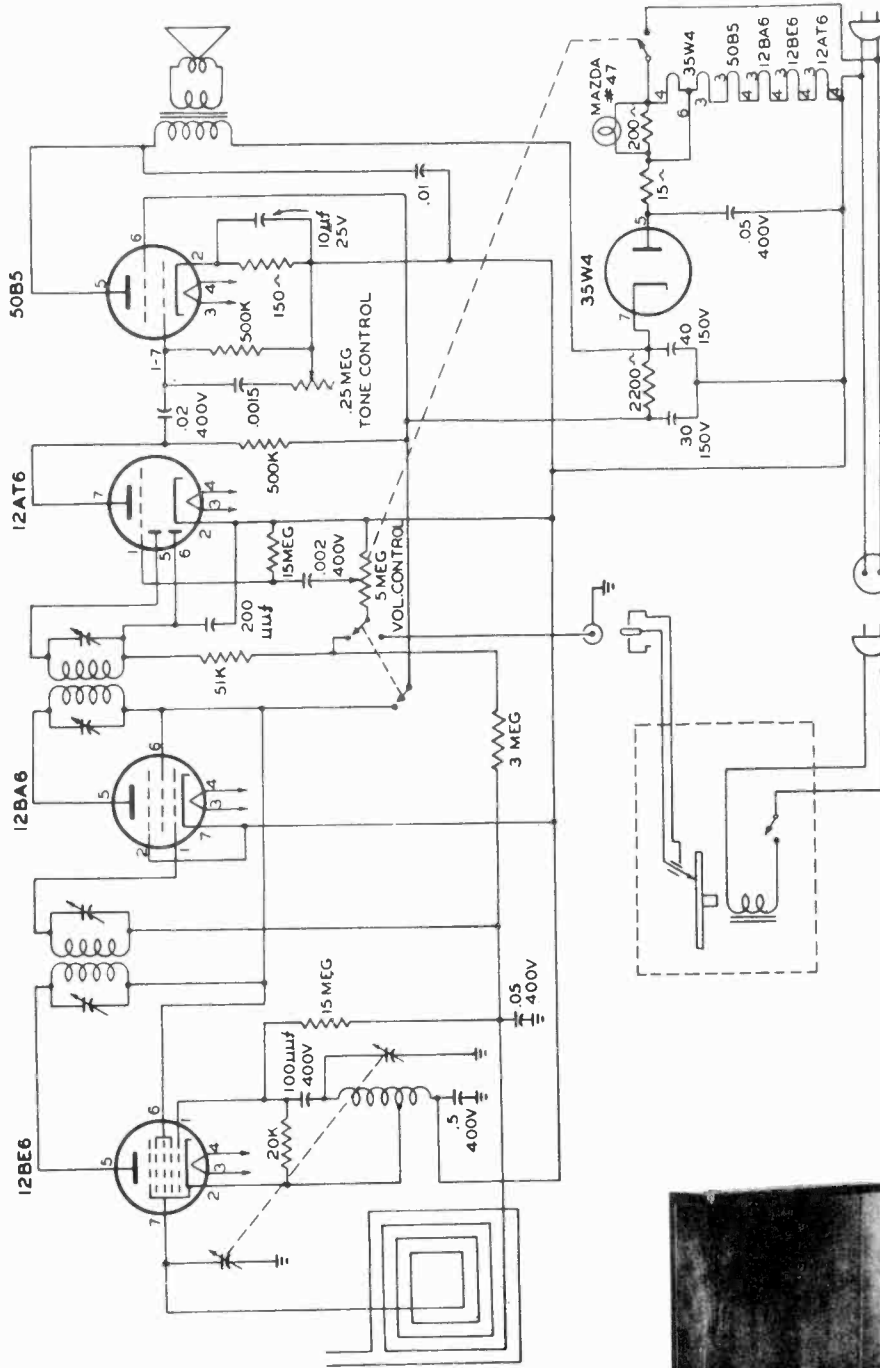
### DIAL STRINGING AND POINTER SETTING



With the gang fully closed, the tip of the pointer clip should be in line with the 1/16" circular punch at the extreme left end of the dial background.

5T1-306

**SCHEMATIC DIAGRAM**



**TYPE:** Five tube, single band, superheterodyne with Record Changer.

**FREQUENCY RANGE:** 540 to 1600 kc.

**INTERMEDIATE FREQUENCY:** 456 kc.

**POWER SUPPLY:** a.c.—60 cycle.

**VOLTAGE RATING:** 105-125 volts.

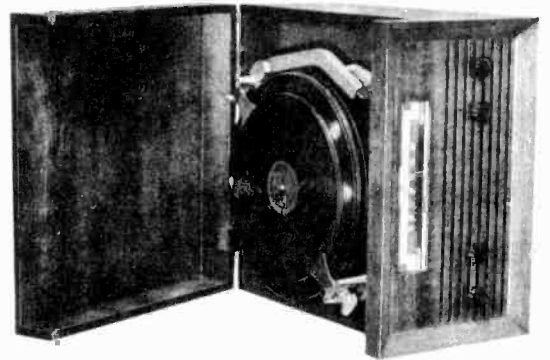
**POWER CONSUMPTION:** 35 watts.  
(Phonograph: 15 watts additional)

**POWER OUTPUT:** 1.5 watts.

**TUBE COMPLEMENT:**

Type	Function
12BE6	Oscillator, mixer
12BA6	I. F. Amplifier
12AT6	Detector, A. V. C. Audio Amplifier
50B5	Power output
35W4	Rectifier

**Pilot Lamp:** Mazda 47



PARTS LIST

PART No.	DESCRIPTION	PART No.	DESCRIPTION
LA-1014-32	Bulb, dial lamp, Mazda 47	AS-3362	Dial Glass (Calibrated)
AI-1018	Ant. loop	KN-1053	Knob
CI-1049	Oscillator coil	CD-1071-28	Condenser, 250 mmfd., mica
TR-1052	Transformer, 1st I.F.	CD-1071-22	Condenser, 100 mmfd., mica
TR-1051	Transformer, 2nd I.F.	CD-1227-3	Condenser, .002 mfd., 400 volt, tubular
CD-1217	Condenser, variable, two-section	CD-1227-10	Condenser, .02 mfd., 400 volt, tubular
BU-1120	Condenser drive bushing	CD-1227-13	Condenser, .05 mfd., 400 volt, tubular
CX-1025	Condenser drive bushing clip	CD-1227-19	Condenser, .5 mfd., 400 volt, tubular
SW-1060	Phono-radio switch	CD-1227-2	Condenser, .0015 mfd., 400 volt, tubular
RE-1165	Tone control potentiometer	CD-1227-8	Condenser, .01 mfd., 400 volt, tubular
RE-1164	Volume control and switch	CD-1224	Condenser, 10 mfd., .25 volt, electrolytic
SK-1011	Speaker with output transformer	RE-1169	Resistor, 15 ohm.
SO-1060	Socket (Tube)	RE-1168-225	Resistor, 2200 ohm, 1 watt
SO-1064	Socket (pilot lamp)	RE-1166-516	Resistor, 51 K ohm, 1/2 watt
SE-1033	Tube Shield	RE-1166-159	Resistor, 15 megohm, 1/2 watt
BE-1048	Tube Shield Base	RE-1166-308	Resistor, 3 megohm, 1/2 watt
SO-1061	Phono input jack	RE-1166-507	Resistor, .5 megohm, 1/2 watt
SO-1059	A.C. outlet (Phono)	RE-1166-206	Resistor, 20 K ohm, 1/2 watt
AS-3361	Dial drive cable assembly	RE-1003-154	Resistor, 150 ohm, 1/2 watt
IN-1024	Dial Pointer		

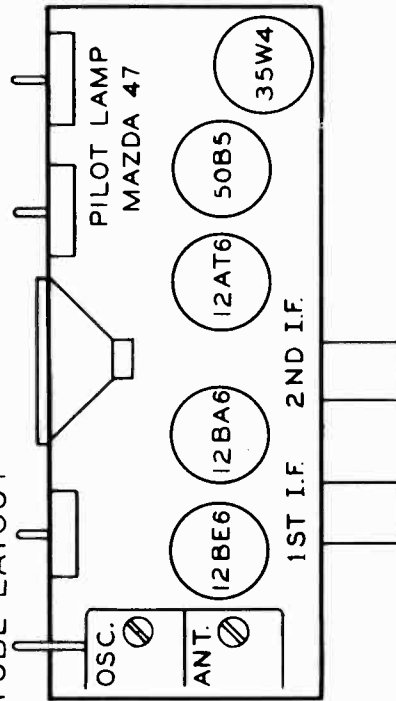
ALIGNMENT CHART

Alignment Sequence	Signal Generator	Position of Dial Pointer	Adjust for Maximum Output
1	456 kc.	Full mesh .55	2nd I.F. (2 trimmers)
2	456 kc.	Full mesh .55	1st I.F. (2 trimmers)
3	1400 kc.	1400	Oscillator Section of Gang Condenser
4	1400 kc.	1400	Antenna Section of Gang Condenser

ALIGNMENT PROCEDURE

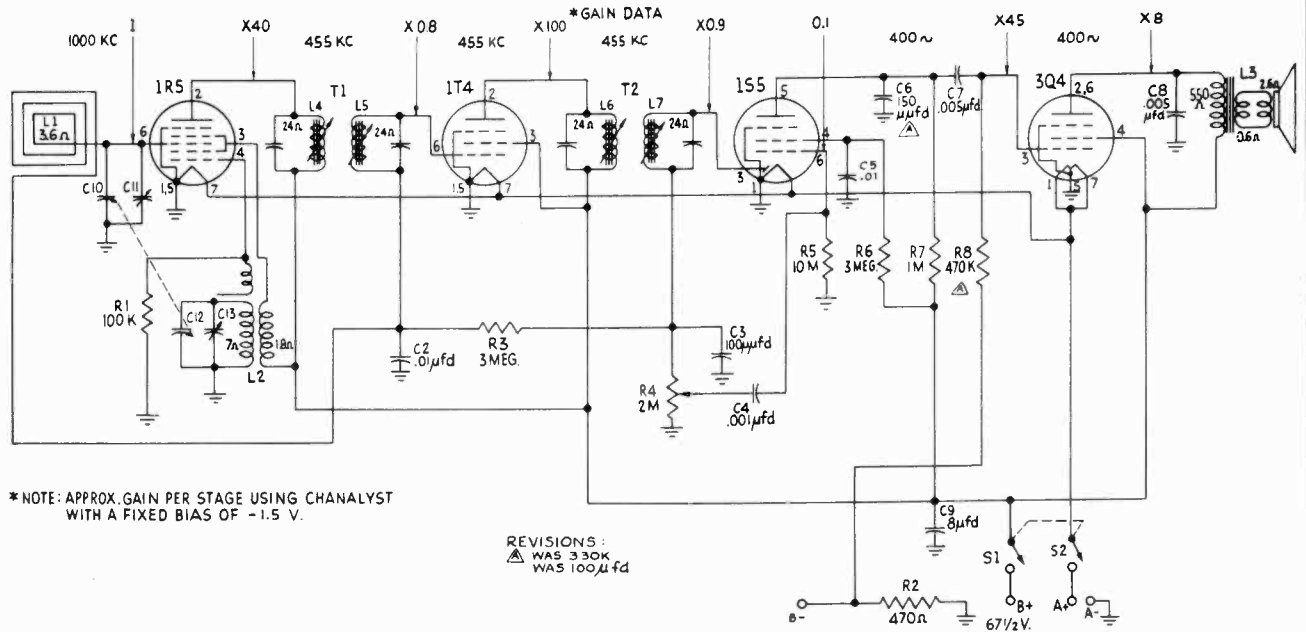
1. Turn gang condenser to full mesh position. Set dial pointer on the small dot to the left of the last calibration.
2. Connect the output meter across the voice coil.
3. Connect the output of the Signal Generator to a two-turn loop of wire and place about one foot away from loop on the set.
4. Turn volume full on. Keep output of Signal Generator as low as possible and still get deflection on output meter.

TUBE LAYOUT



AIR KING PRODUCTS CO., INC.

MODEL A410



\*NOTE: APPROX. GAIN PER STAGE USING CHANNELYST WITH A FIXED BIAS OF -1.5 V.

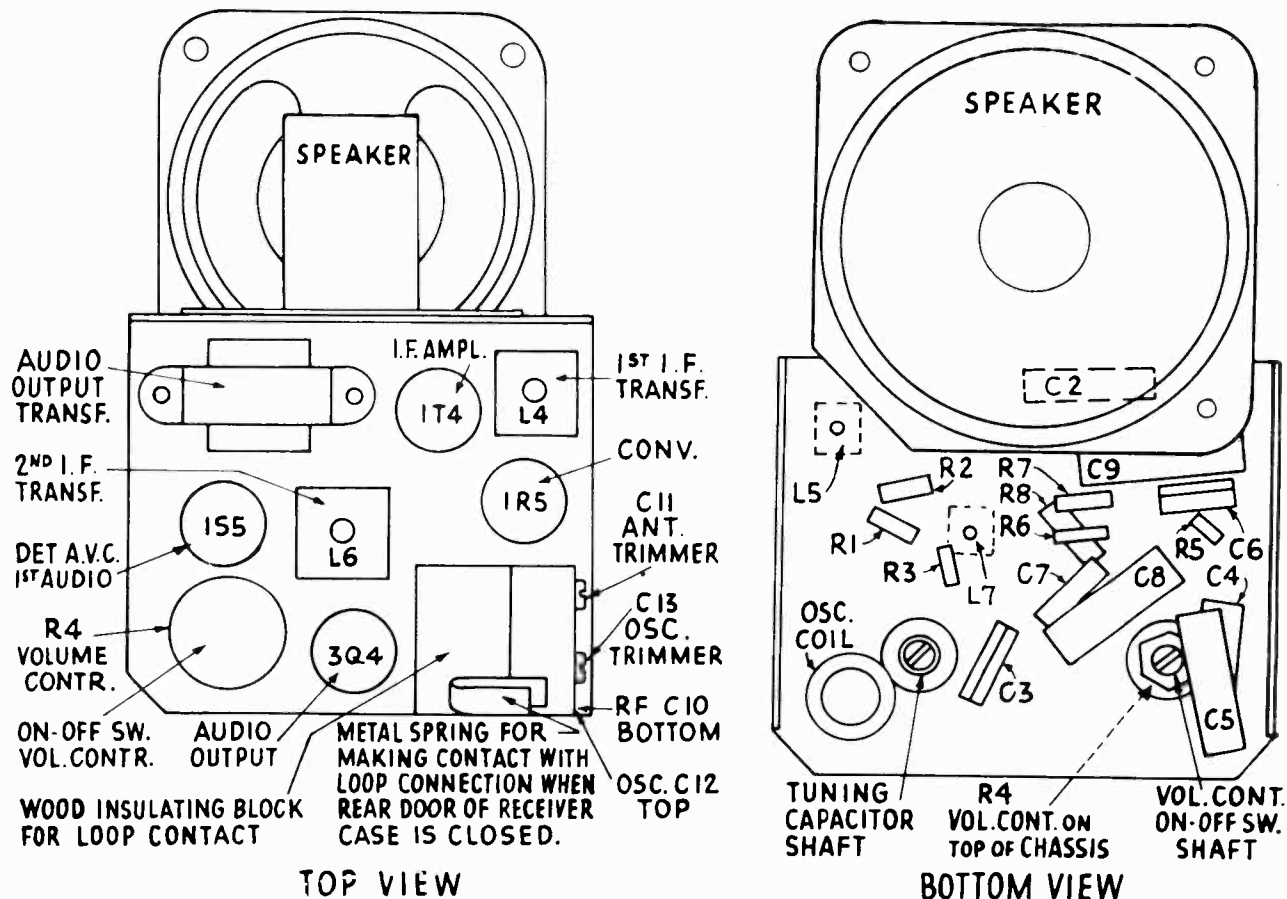
REVISIONS:  
 ▲ WAS 330K  
 WAS 100μfd

TUBE	PIN	VTVM	20,000 OHM/V	1,000 OHM/V	RESISTANCE	
1R5 CONVERTER	1	0	0	0	0	
	2	65	65	65	OVER 500K	
	3	65	65	65	OVER 500K	
	4					
		550 KC	-13	-7	-2.5	100K
		1600 KC	-17	-8	-3.5	100K
		5	0	0	0	0
1T4 IF AMPL.	6	0	0	0	5MEG	
	7	1.4	1.4	1.4	4.5 OHM	
	1	0	0	0	0	
	2	65	65	65	OVER 500K	
	3	65	65	65	OVER 500K	
	4	-5	-5	-5	480 OHM	
	5	0	0	0	0	
1S5 DET AVC 1st AUDIO	6	0	0	0	5 MEG	
	7	1.4	1.4	1.4	4.5 OHM	
	1	0	0	0	0	
	2	--	--	--	--	
	3	0	0	0	1.6 MEG	
	4	15	3.5	0.2	OVER 3 MEG	
	5	10	4.5	0.5	OVER 1 MEG	
3Q4 AUDIO OUTPUT	6	0	0	0	10 MEG	
	7	1.4	1.4	1.4	4.5 OHM	
	1	1.4	1.4	1.4	4.5 OHM	
	2	65	65	65	OVER 500K	
	3	5	5	5	1 MEG	
	4	65	65	65	OVER 500K	
	5	0	0	0	0	
6	65	65	65	OVER 500K		
7	1.4	1.4	1.4	4.5 OHM		

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND, AND WITH A SUPPLY VOLTAGE OF 67½ V.D.C.







## ALIGNMENT PROCEDURE

IF ALIGNMENT (REMOVE RECEIVER FROM CABINET)

CONNECT AN OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE LOOP MODEL 1150 AND COUPLE IT LOOSELY TO THE RECEIVER.

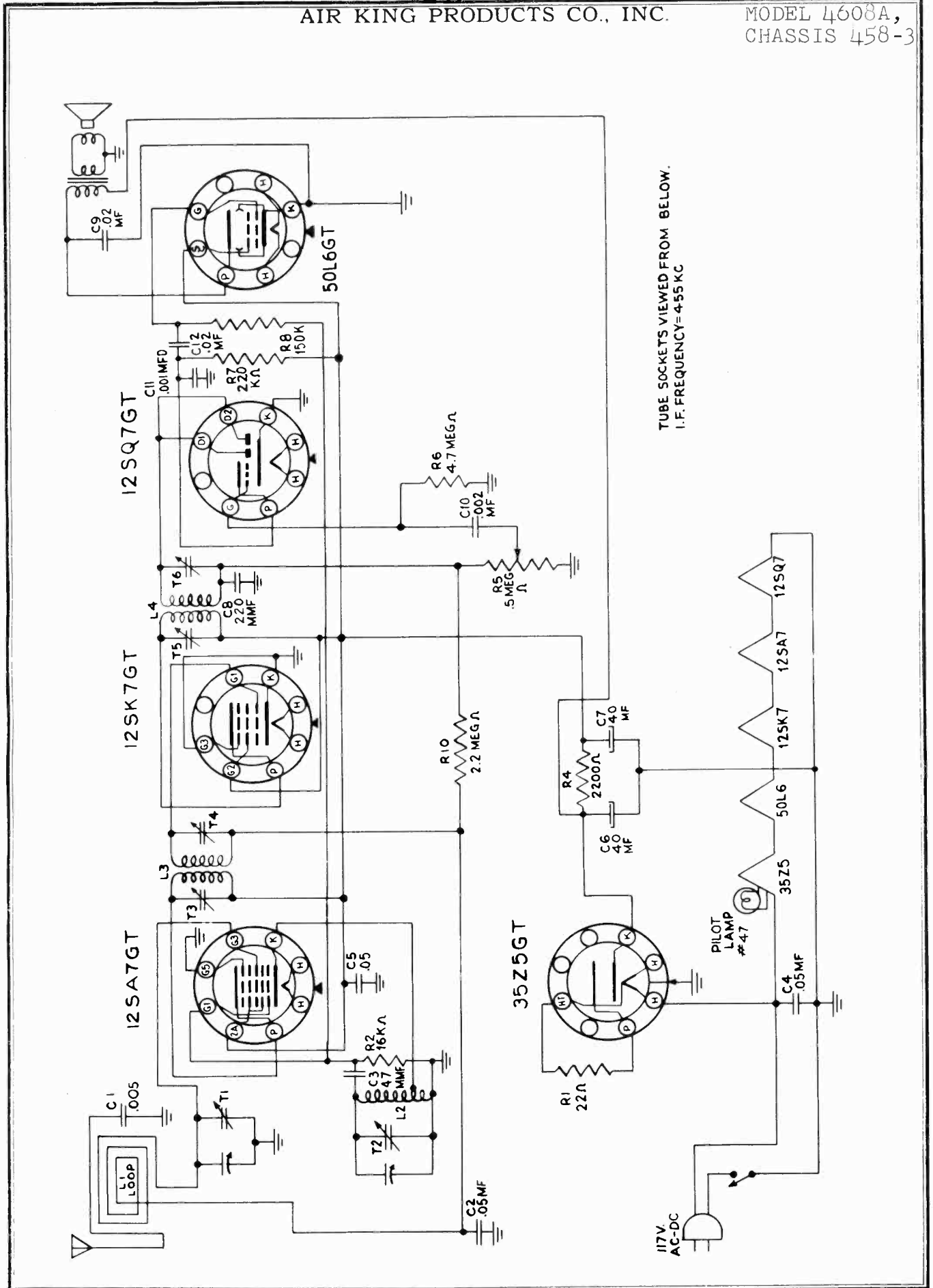
SET THE SIGNAL GENERATOR TO 455KC AND FULLY MESH THE RECEIVER TUNING CAPACITOR.

KEEP THE RECEIVER VOLUME CONTROL AT MAX. AND THE OUTPUT OF THE SIGNAL GENERATOR SUFFICIENT TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. ADJUST FOR MAX. IF TUNING SLUGS L7, L6, L5, L4.

## RF OSCILLATOR ADJUSTMENT

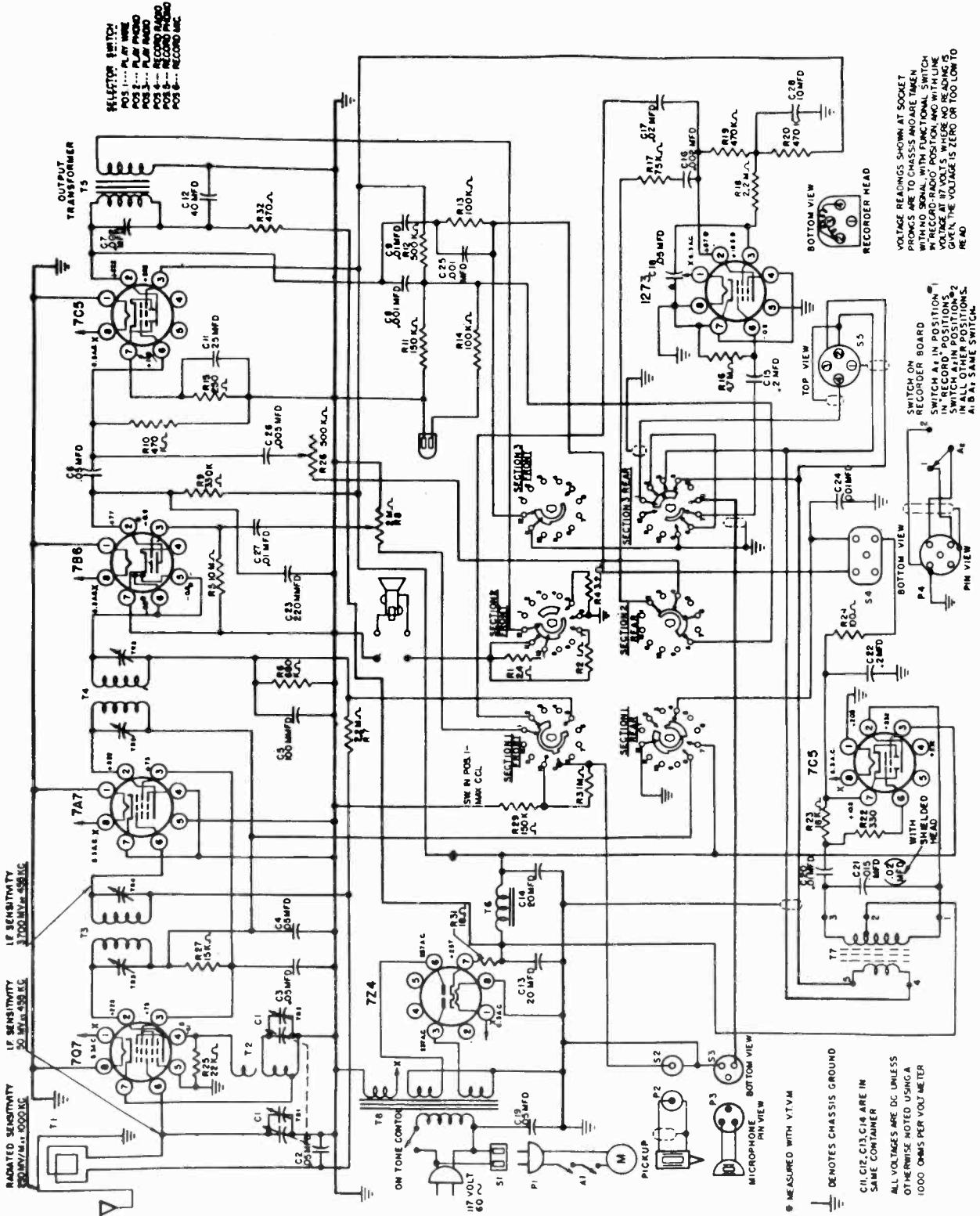
PLACE CHASSIS IN CABINET AND SET DIAL PCINTER TO 1500 KC. REMOVE KNOB AND REMOVE CHASSIS FROM CABINET. KEEPING THE SAME SETUP AS USED FOR IF ALIGNMENT, SET THE SIGNAL GENERATOR TO 1500 KC AND ADJUST OSCILLATOR TRIMMER C13 FOR MAX. OUTPUT.

SET THE SIGNAL GENERATOR AND RECEIVER TO 1300 KC AND ADJUST ANTENNA TRIMMER C11 FOR MAX. OUTPUT.



MODEL 4700,  
CHASSIS 476

AIR KING PRODUCTS CO., INC.



SELECTOR SWITCH:  
POS 1... PLAY WIRE  
POS 2... PLAY PHONO  
POS 3... RECORD PHONO  
POS 4... RECORD MIC

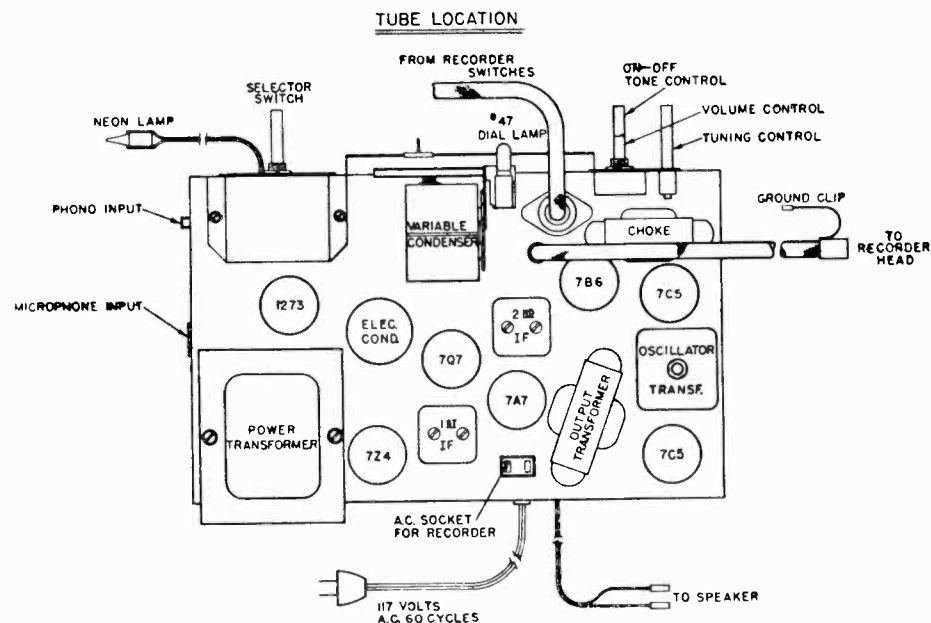
VOLTAGE READINGS SHOWN AT SOCKET PINS ARE TO CHASSIS AND ARE TAKEN WITH NO SIGNAL WITH FUNCTIONAL SWITCH IN "RECORD-RADIO" POSITION AND WITH LINE VOLTAGE AT 117 VOLTS WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ

SWITCH ON RECORDER BOARD SWITCH A1 IN POSITION "RECORD" POSITION. SWITCH A2 IN POSITION "2" IN ALL SAME POSITIONS IN ALL SAME SWITCHES.

⊕ MEASURED WITH VTVM  
⊕ DENOTES CHASSIS GROUND  
C1, C2, C13, C14 ARE IN SAME CONTAINER  
ALL VOLTAGES ARE DC UNLESS OTHERWISE NOTED USING A 1000 OHMS PER VOLT METER

## GENERAL DESCRIPTION

This model is a seven-tube superheterodyne receiver with wire recorder. It covers the broadcast frequency range of 540 to 1600 kc. The antenna input and oscillator circuits are tuned by a two gang variable capacitor. A loop antenna is built into the cabinet; provision is also made for the connection of an outside antenna. The wire recorder is designed to record sound magnetically on wire. The standard spool contains enough wire for an hour of continuous recording at two feet per second. The recordings may be played back immediately after the wire has been rewound. The receiver, in addition, can be used for playing phonograph records and listening to radio programs.



## TO REMOVE THE RECORDER ASSEMBLY FROM CABINET:

1. Remove the four Phillips Head screws (in each corner of the recorder board) taking care not to drop the flat washers and studs to the bottom of the unit.
2. Disconnect cable from recorder motor switches (see "Tube Location" Drawing for location of cable).
3. Disconnect A.C. Plug from recorder which plugs into chassis.
4. Tilt recorder assembly up from the front end, and disconnect recorder head cable, and ground connection.
5. The wire recorder assembly can now be removed.

## TO REMOVE CHASSIS FROM CABINET:

1. Remove Wire Recorder assembly as covered in above paragraph.
2. Remove four knobs.
3. Remove neon bulb from lens by pulling it out through bottom of motor board.
4. Remove three screws at rear of chassis.
5. Remove the two bolts at the sides of the chassis (one is near the 7C5 output tube, and other is near the 1273 preamplifier tube).
6. The chassis can now be removed from cabinet.

MODEL 4700,  
CHASSIS 476

AIR KING PRODUCTS CO., INC.

## ALIGNMENT PROCEDURE

Power Supply .....	117 V 60 Cycle A.C. 95 Watts
Frequency Range .....	540—1600 kc
Intermediate Frequency .....	455 kc
Power Output .....	2.25 Watts undistorted, 6 Watts maximum
Loudspeaker .....	10" P.M. 3.2 or 8 ohm V.C. Impedance
Output Meter Connection .....	Across loud speaker voice coil
Output Meter Reading .....	1/2 Watt
Connection of Generator output lead .....	See note below
Connection of Generator ground lead .....	B minus bus.
Generator Modulation .....	30% at 400 cycles
Position of Volume Control .....	Fully clockwise
Position of Tone Control .....	Counter clockwise
Position of Dial Pointer .....	Variable fully closed
Position of Functional Switch .....	Play radio

FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	POSITION VARIABLE	ADJUST TRIMMER TO MAXIMUM OUTPUT IN ORDER SHOWN
455 kc	0.1 mfd	grid 7Q7	Fully closed	Tr3, Tr4, Tr5, Tr6
1500 kc	* * *	* * *	1500 kc	Tr2
1500 kc	* * *	* * *	1500 kc	Tr1
600 kc	* * *	* * *	600 kc	Check Point

\* \* \* Run a wire from the output terminal of the signal generator near the receiver. No connection is made between the signal generator and the receiver.

The Alignment Procedure should be repeated stage by stage to insure greatest accuracy. Keep the output from signal generator at lowest value to make the A.V.C. action of the receiver ineffective.

## OPERATION

The proper operation of this unit is discussed in the customers' instruction book. The most important item is the proper loading of the recording wire. It must be done properly to eliminate "wow". Make sure that the reset button is making contact if the recorder fails to operate.

## ELECTRICAL ADJUSTMENTS

To check the erasing voltage of the recorder measure the voltage between pin 2 and 3 of the recorder head with a vacuum tube voltmeter. This measurement should be made with the recorder head attached to the plug of the recorder cable. The voltage at this point should be 4.0 volts minimum (as measured with a V.T.V.M.), with the shielded recorder head, and 2.7 volts minimum with the unshielded recorder head. If it is low, try replacing the 7C5 oscillator tube to increase the voltage.

If there is excessive hum when the unit is in the "Play Wire" position, the hum can be reduced by rotating the hum bucking coil (next to the power transformer) for minimum hum. If this does not entirely eliminate the hum, slide the power transformer shield slightly for minimum hum, and readjust the hum bucking coil. This should be done with the volume control on full.

## MECHANICAL ADJUSTMENTS

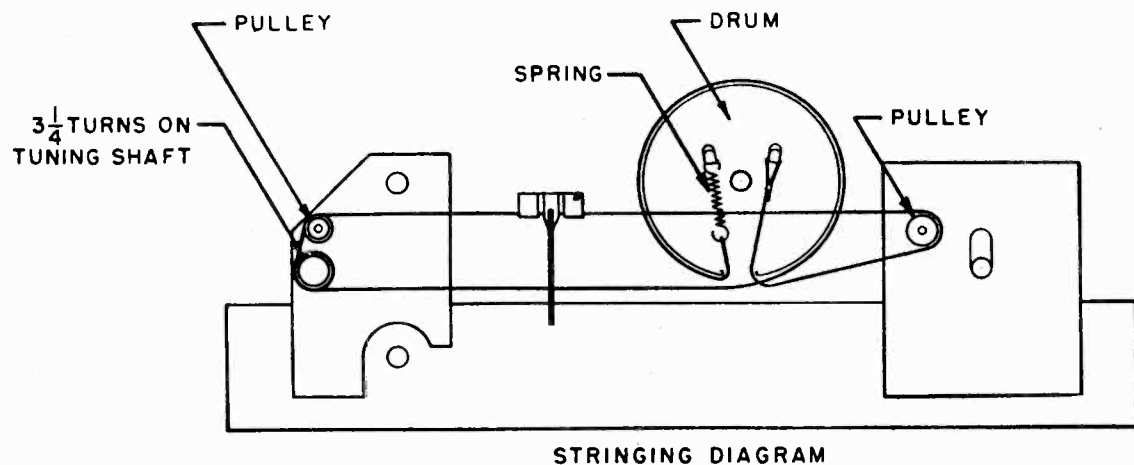
The Wire Recorder has been adjusted perfectly at the factory prior to shipment. There are very few things that can go wrong, and they are relatively simple to adjust.

The first thing to check if the recorder unit does not function properly is the centering of the motor. This is done by prying off the dust cap on the recorder board. The dust cap is the small cap which is directly to the rear of the "Reset" assembly, on the recorder board proper. Use a screwdriver, taking care not to mar the finish.

When this cap is removed, the motor spindle will be exposed. The spindle must be in the center of the opening. The centering should be checked using our centering gauge (Part #6815). If the spindle is not in the exact center, loosen the two screws holding the motor assembly, and adjust motor, with centering gauge in place, then tighten screws, and replace the dust cap.

Proper adjustment of the turntable torque is very important. To adjust the torque proceed as follows: With the power connect and wire being wound on the turntable, loosen the lock nut from the adjusting screw underneath the recorder chassis at the rear near the motor. Put your finger on the turntable to add a slight breaking action. Turn the adjusting screw clockwise until the turntable stops rotating, then turn the screw  $\frac{1}{2}$  turn counterclockwise. Let the wire continue to run and then switch the lever to "rewind". If the adjustment is correct the turntable should continue to rotate in a counterclockwise direction for about  $\frac{1}{2}$  turn before reversing. Tighten the lock nut taking care not to disturb the adjustment of the screw. Recheck the adjustment by going from maximum rewind to play.

If wire does not wind level, rotate the spindle until the cam under the level winding mechanism is at the position which allows the recording head to be at the bottom of its level. In this position the slot in which the wire rides should be approximately  $\frac{1}{64}$ th of an inch above the motor board. If the slot is closer than this, loosen the two screws, holding the recorder head to the slide mechanism (at the bottom of unit) and place additional shims between the slide and the recorder head until the slot is  $\frac{1}{64}$ th of an inch above the motor board. Place the wire on recorder and let it wind onto turntable if the wire rubs on the Reset Switch Trip Lever after about one minute of rewind. The Reset Switch Trip Lever should not depress the wire more than  $\frac{1}{64}$ th of an inch when the cam is in its top position. Let the wire run for awhile and check the way the wire lays into the channel underneath the turntable. With the proper adjustment, it should wind level across the channel. If it piles up on the top of the channel, remove the turntable by loosening the set screw on the turntable spindle, remove the felt washer, and spring. The turntable can now be removed. Remove the turntable and place additional shims underneath the spindle. Replace all parts and recheck to see if the wire is being wound level. If the wire piles up on the bottom of the channel remove some of the shims.

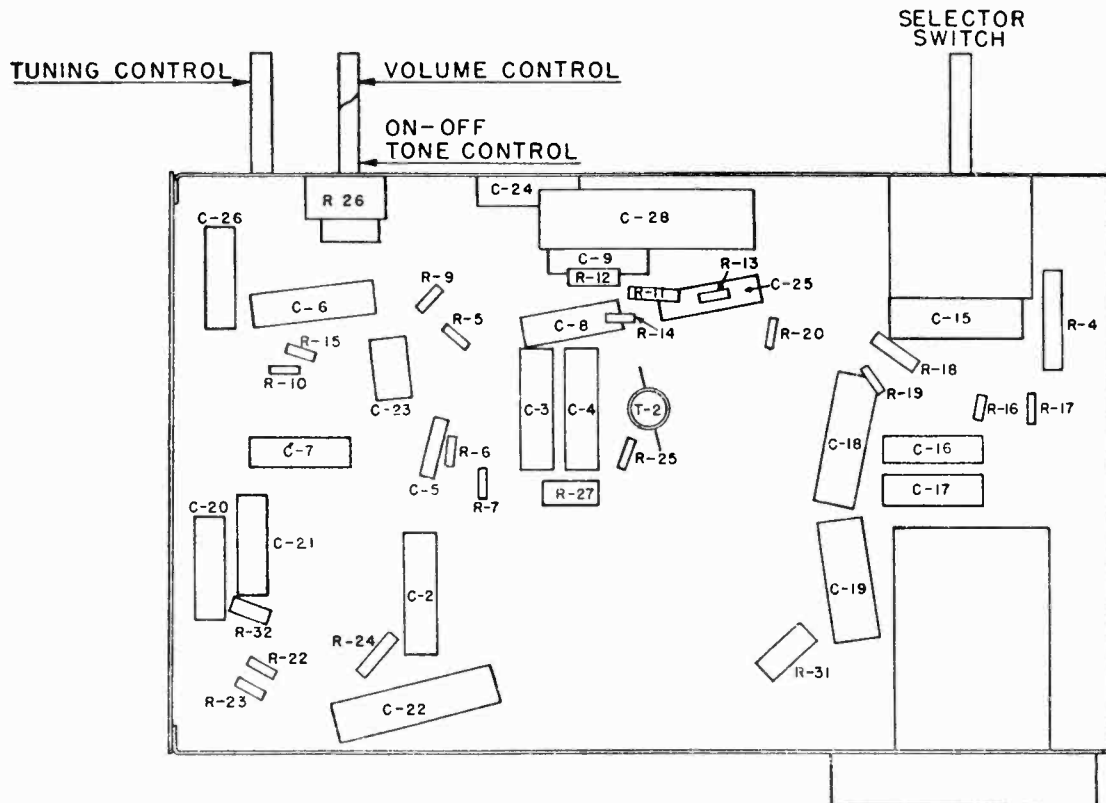


MODEL 4700,  
CHASSIS 476

AIR KING PRODUCTS CO., INC.

PARTS LIST

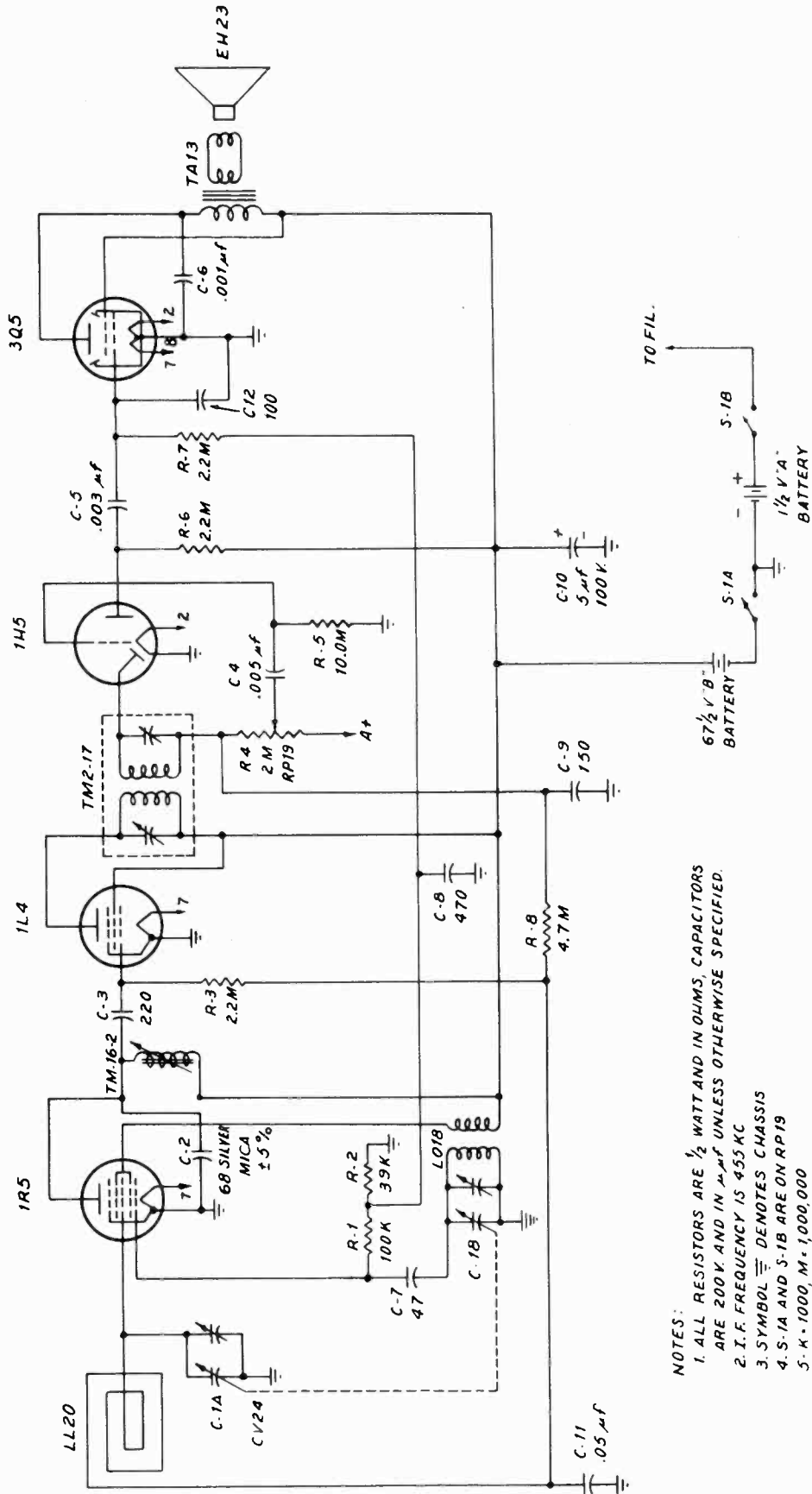
SCHEMATIC LOCATION	PART NO.	DESCRIPTION	SCHEMATIC LOCATION	PART NO.	DESCRIPTION
T6	5591	Cable, Recorder head	R5		Resistor—10 meg. ohms, 1/4 W
T2	3368	Choke	R6		Resistor—680,000 ohms, 1/4 W
C1	28184	Coil, B.C. Osc.	R7, R18		Resistor—2.2 meg. ohms, 1/4 W
C3, C4, C6, C18	1695	Condenser—Variable	R9		Resistor—330,000 ohms, 1/4 W
C5		Condenser—.05 mfd., paper, 200 V	R10, R14, R19		Resistor—470,000 ohms, 1/4 W
C7, C16		Condenser—.05 mfd., paper, 400 V	R11, R29		Resistor—150,000 ohms, 1/4 W
C8, C25, C24		Condenser—100 mmfd., Mica	R12		Resistor—470,000 ohms, 1/4 W
C9, C20, C27		Condenser—.002 mfd., paper, 400 V	R13		Resistor—100,000 ohms, 1/4 W
C11, C12, C13, C14		Condenser—.001 mfd., paper, 400 V	R15		Resistor—250 ohms, 1/2 W
		Condenser—.01 mfd., paper, 400 V	R16		Resistor—4.7 meg. ohms, 1/4 W
		Condenser—25 mfd.—20 V	R17		Resistor—33,000 ohms, 1/4 W
		40 mfd.—300 V	R20		Resistor—27,000 ohms, 1/4 W
		20 mfd.—300 V	R21		Resistor—5000 ohms, 1/4 W
		20 mfd.—300 V	R22		Resistor—330 ohms, 1/4 W
C15		Condenser—.2 mfd., paper, 200 V	R23, R25		Resistor—22,000 ohms, 1/4 W
C17		Condenser—.02 mfd., paper, 400 V	R24		Resistor—150 ohms, 1/4 W
C19		Condenser—.02 mfd., oil, 400 V	R27		Resistor—15,000 ohms, 2 W
C21		Condenser—.015 mfd., paper, 600 V (.02 mfd., if shielded recording head is used)	R28		Resistor—270,000 ohms, 1/4 W
		Condenser—.2 mfd., paper, 400 V	R31		Resistor—18 ohms, 2 W
		Condenser—220 mmfd., Mica	R32		Resistor—470 ohms, 1 W
		.005 mfd., paper, 400 V		54361	Shaft Dial Drive
	2078	Condenser—10 mfd., electrolytic 400 V		18144	Socket Dial Light
	2486	Control—Tone (with switch)		54374	Socket (for cable from recorder switch)
	2485	Control—Volume		18101	Socket (Microphone)
	54373	Cord Dial Drive		18104	Socket Phono
	5592	Cord, Line 8 Feet Long		58103	Speaker—10" P.M. 3.2 ohm voice coil
	40133	Dial, Station, Lucite		58108	Speaker—10" P.M. 8 ohm voice coil
		Knob, Pointer		18127	Speaker Socket, 2 Prong, used with Speaker 58108
	39177	Knob, Tone-off-on		18126	Speaker Plug, 2 Prong, used with Speaker 58108
	39177	Knob, Tuning		54335	Spring—Dial Cord
	39177	Knob, Volume control		3791	Switch—Master Selector
	4926	Lamp Ass'y Neon Glow	T3	3371	Transformer—1st I.F.
	54372	Lens Neon Light	T4	3535	Transformer—2nd I.F.
T1	28295	Loop Antenna	T6	28178	Transformer—40 KC Osc.
	6610	Microphone, Cord and Plug	T5	1339	Transformer—Output (used with Speaker 58103)
	4146	Painter, Dial		1341	Transformer—Output (used with Speaker 58108)
R1		Resistor—2.4 ohms, 1/2 W	T8	1091	Transformer—Power
R2		Resistor—1.0 ohms, 1/2 W			
R3		Resistor—1 meg. ohms, 1/4 W			
R4		Resistor—3.2 ohms, 1 W, Wirewound			



LOCATIONS OF PARTS UNDER CHASSIS

ALDEN INC.

MODELS 1800, 1801,  
1802, 1803

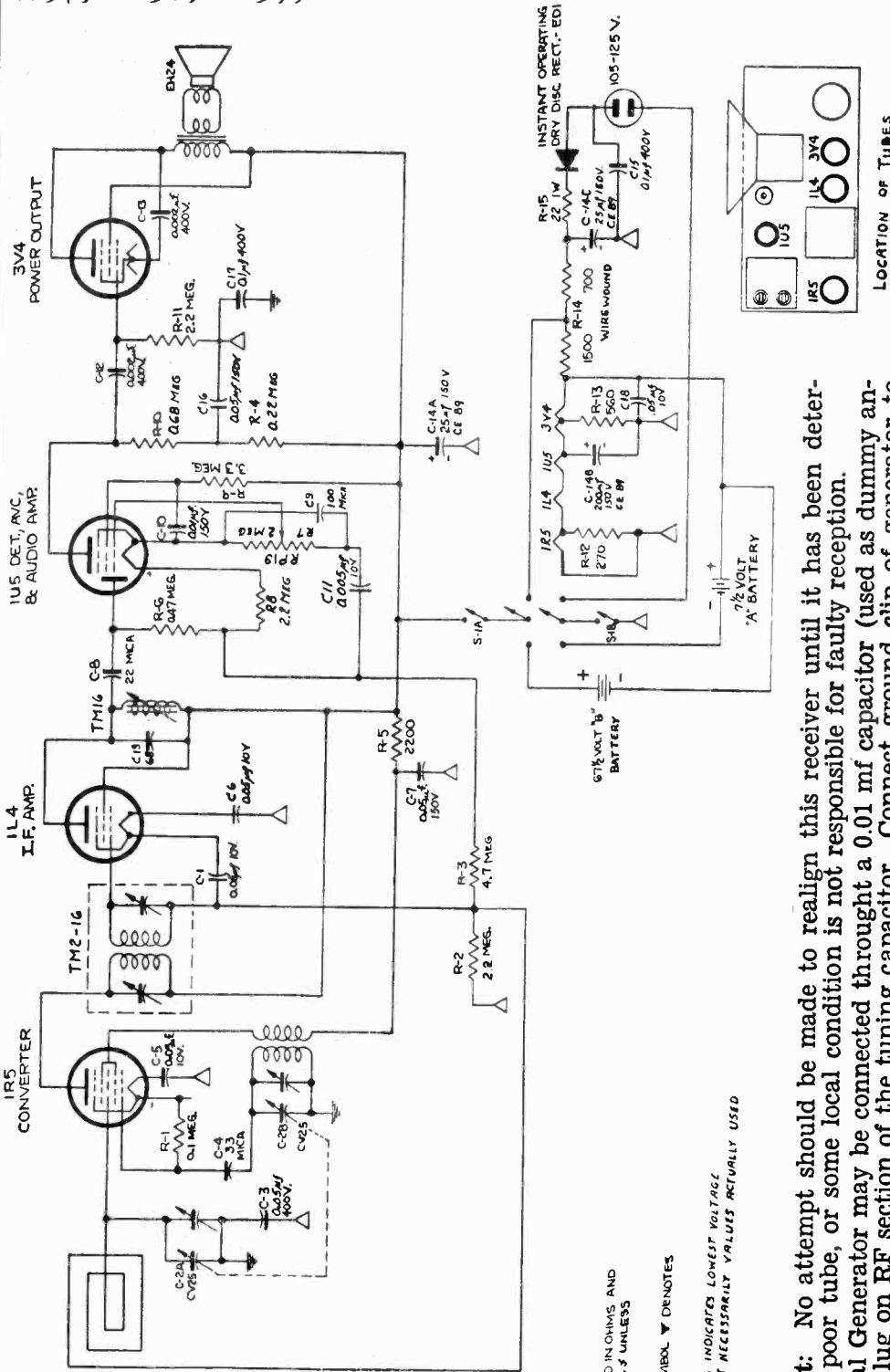


- NOTES:
1. ALL RESISTORS ARE 1/2 WATT AND IN OHMS, CAPACITORS ARE 200V. AND IN  $\mu$ mf UNLESS OTHERWISE SPECIFIED.
  2. I.F. FREQUENCY IS 455 KC
  3. SYMBOL  $\equiv$  DENOTES CHASSIS
  4. S-1A AND S-1B ARE ON RP19
  5. K = 1000, M = 1,000,000



MODELS 1855, 1856,  
1857, 1858, 1859, 1860

ALDEN, INC.

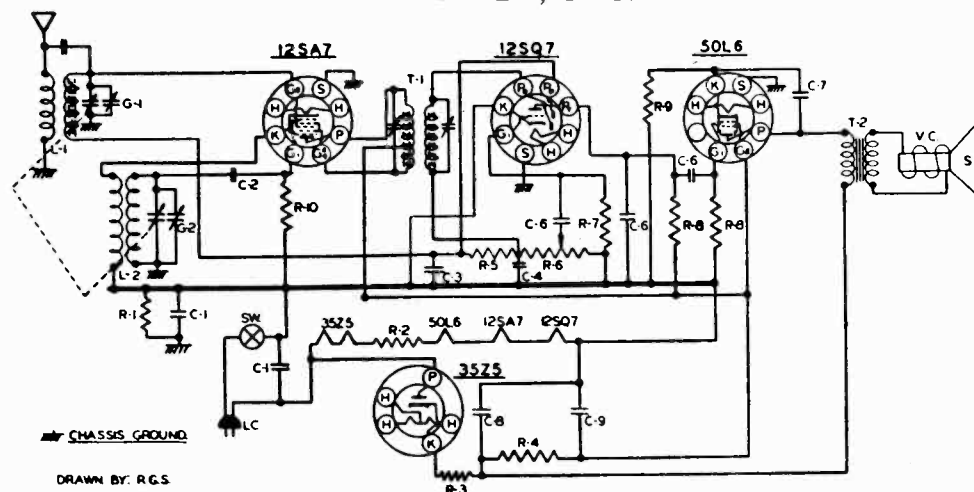


- NOTES:**
1. ALL RESISTORS ARE 1/2 WATT AND IN OHMS AND CAPACITORS ARE 500V. AND IN  $\mu$ F UNLESS OTHERWISE SPECIFIED.
  2. I.F. FREQUENCY IS 495 KC.
  3. SYMBOL  $\Delta$  DENOTES B- AND SYMBOL  $\nabla$  DENOTES C-MESH.
  4. S-1A AND S-1B ARE ON RP19.
  5. VOLTAGE RATING NEAR CAPACITORS INDICATES LOWEST VOLTAGE CAPACITORS THAT MAY BE USED, NOT NECESSARILY VALUES ACTUALLY USED

**Alignment:** No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section of the tuning capacitor. Connect ground clip of generator to the B— terminal. An output meter may be clipped directly across the voice coil lugs. Align the I.F. trimmers and iron core to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments broad. Provisions are made to align the R.F. trimmers with the receiver in the metal cabinet. Remove the two plug buttons on the right side of the cabinet and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and the pointer at the extreme right end of its travel, adjust the oscillator trimmer (on front section of tuning capacitor) to 1625 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (on rear section) for maximum response.

ALDEN, INC.

MODELS 1900, 1901



DRAWN BY: R.G.S.

## ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

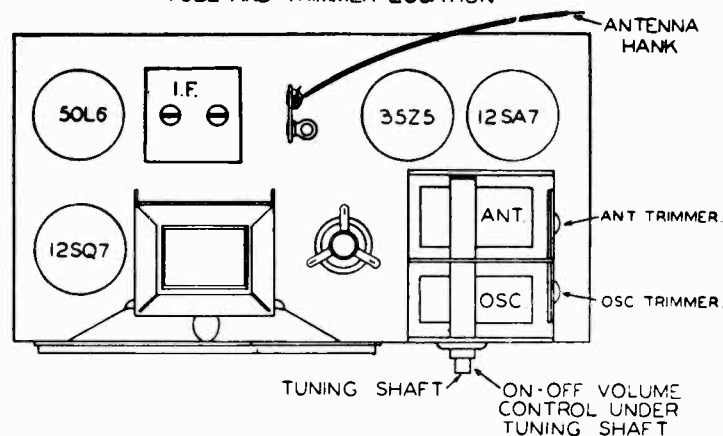
PART NO.	DESCRIPTION
1R-29	R-1 220M $\Omega$ RESISTOR 1/2W. 20
1R-41	R-2 47 $\Omega$ RESISTOR 1/2W. 10
1R-17	R-3 33 $\Omega$ RESISTOR 1/2W. 20
1R-25	R-4 2200 $\Omega$ RESISTOR 1/2W. 10
1R-23	R-5 3.3MEG. RESISTOR 1/2W. 20
VC-9	R-6 1MEG. VOLUME CONTROL
1R-3	R-7 10MEG. RESISTOR 1/2W. 20
1R-11	R-8 470M $\Omega$ RESISTOR 1/2W. 20
1R-14	R-9 150 $\Omega$ RESISTOR 1/2W. 20
1R-9	R-10 22M $\Omega$ RESISTOR 1/2W. 20
PC-5	C-1 .05MFD. CONDENSER 400V.
MC-4	C-2 50MMFD. MICA
PC-2	C-3 .05MFD. CONDENSER 200V
MC-2	C-4 100MMFD. MICA
MC-5	C-5 500MMFD. MICA
PC-6	C-6 .005MFD. CONDENSER 600V
PC-7	C-7 .01MFD. CONDENSER 400V.
EC-15	C-8 30MFD. ELECTROLYTIC COND.
	C-9 20MFD. ELECTROLYTIC COND.
LA-3	L-1 ANT. COIL
LO-14	L-2 OSC. COIL
LI-8	T-1 I.F. TRANSFORMER
	T-2 OUTPUT TRANSFORMER
SPK-10	S 4" PM. SPEAKER
	VC VOICE COIL
GC-7X	G-1 TUNING CONDENSER
	G-2 TUNING CONDENSER
CO-1	LC LINE CORD
TU-32	35Z5-50L6-12SA7-12SQ7

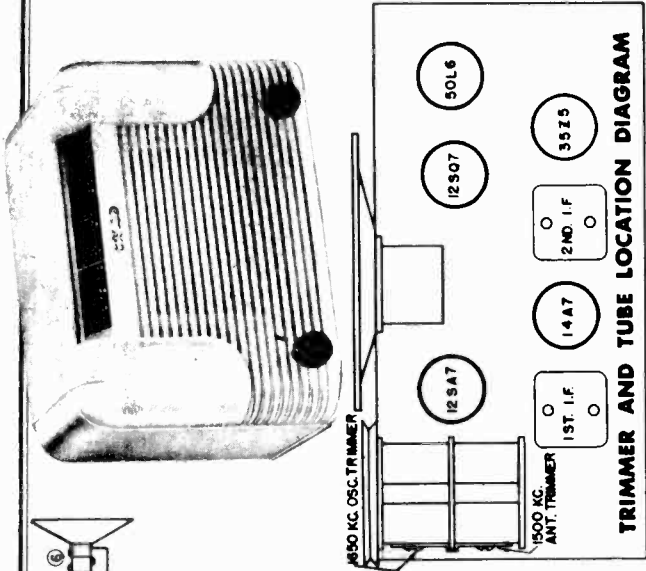
**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the trimmers of the I. F. transformer until a maximum reading is noted on the output meter.

**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

**THIRD STEP:** Remove the generator hot lead and connect it to the antenna hank terminal strip through a 200 MMFD. condenser. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer until a maximum signal is noted on the output meter. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

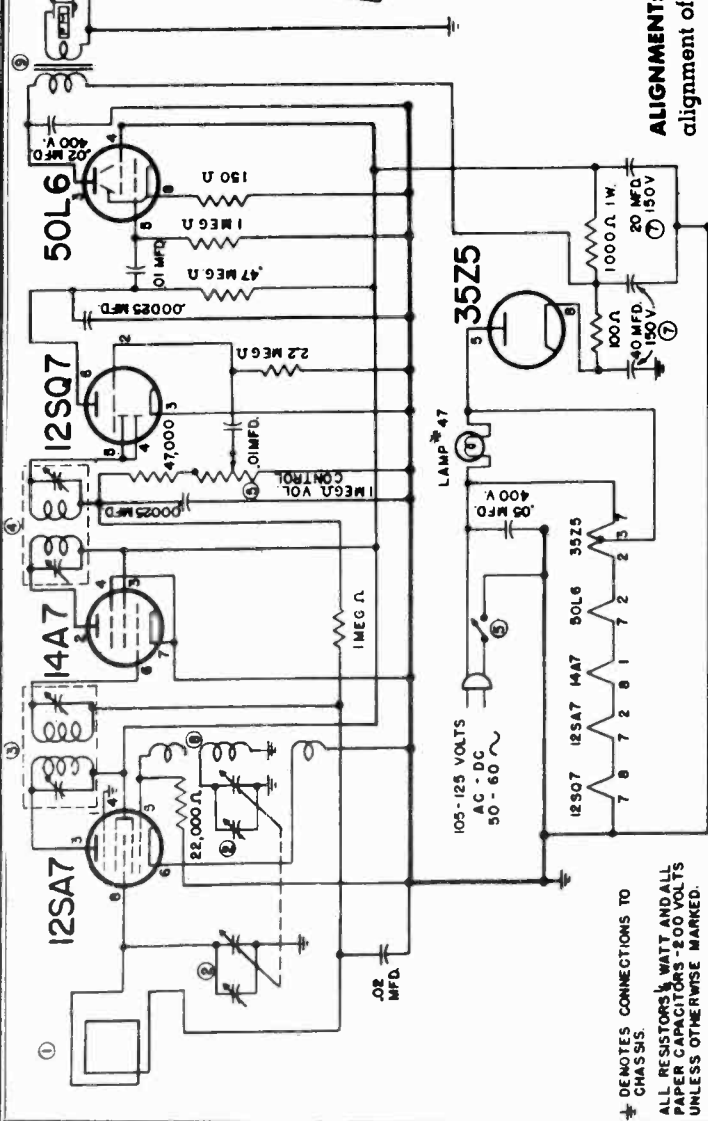
### TUBE AND TRIMMER LOCATION





**ALIGNMENT:** Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Set the Signal Generator to 455 KC and connect to the stator lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.
- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers or the iron cores located at the top and bottom of each I. F. for maximum output as indicated on the Output Meter.
- (3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.
- (4) With Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).
- (5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.



\* DENOTES CONNECTIONS TO CHASSIS.  
 ALL RESISTORS 1/2 WATT AND ALL PAPER CAPACITORS - 200 VOLTS UNLESS OTHERWISE MARKED.

- ① 1-469 LOOP ASSEMBLY
- ② 2-163 2GANG VARIABLE COND.
- ③ 1-259 1ST. I.F. TRANSFORMER
- ④ 1-409 2ND. I.F. TRANSFORMER
- ⑤ 8-20P-3 VOLUME CONTROL & SWITCH
- ⑥ 30-318 P.M. 5" SPEAKER
- ⑦ 5-400-8 ELECTROLYTIC CAP. 40-40-20 MFD
- ⑧ 1-402-1 OSCILLATOR COIL
- ⑨ 9-219 OUTPUT TRANSFORMER

**LINE VOLTAGE:** This receiver is designed for operation on 105-125 Volts, 50-60 Cycles, either Alternating or Direct Current (AC-DC).

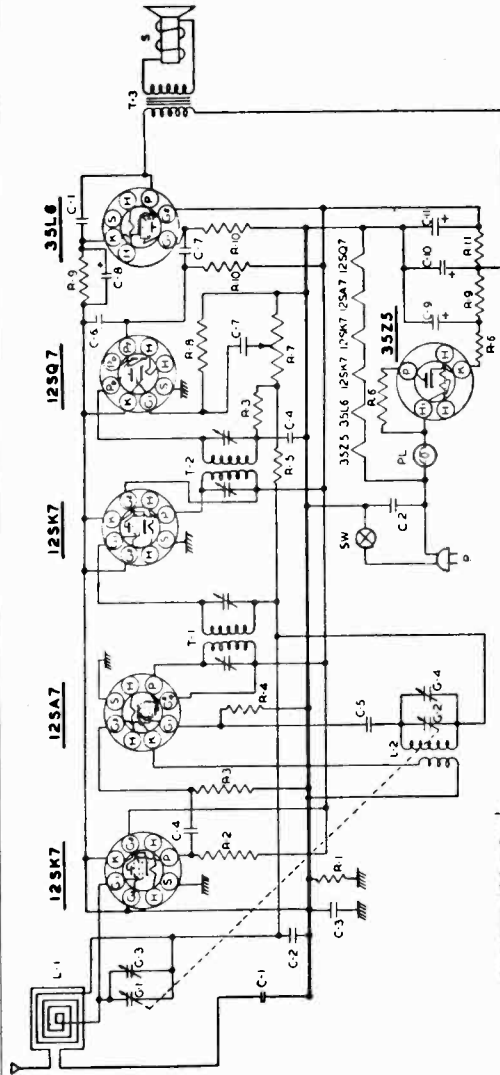
**POWER CONSUMPTION:** 30 Watts.

**TUNING RANGE:** Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

**DIAL:** The Dial Scale is calibrated in Kilocycles times 10 to correspond with newspaper or periodical listings.

**TUBES:** The tubes used, and their functions, are as follows:  
 12SA7 Converter  
 14A7 I.F. Amplifier  
 12SQ7 Detector, AVC and Audio Amp.  
 50L6 Beam Power Amplifier  
 35Z5 Rectifier

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
PC-7	1MFD CONDENSER 400 V	IR-9	22M $\Omega$ RESISTOR 1/2W 20%
PC-5	0.5MFD CONDENSER 400 V	IR-5	33MEG $\Omega$ RESISTOR 1/2W 20%
PC-8	1MFD CONDENSER 400 V	IR-6	33 $\Omega$ RESISTOR 1/2W 20%
MC-2	0001 MICA CONDENSER	VC-1	1MEG VOLUME CONTROL
MC-4	00005 MICA CONDENSER	IR-8	2MEG $\Omega$ RESISTOR 1/2W 20%
MC-5	0005 MICA CONDENSER	IR-9	220 $\Omega$ RESISTOR 1/2W 10%
PC-6	005MFD CONDENSER 600 V	IR-10	470M $\Omega$ RESISTOR 1/2W 20%
EC-2	40MFD 2.5W ELECTROLYTIC	IR-11	330 $\Omega$ RESISTOR 1/2W 1%
EC-14	40MFD ELECTROLYTIC 150 W.V	G-1	GANG CONDENSER
IR-20	220M $\Omega$ RESISTOR 1/2W 20%	G-2	ANT TRIMMER
IR-22	3900 $\Omega$ RESISTOR 1/2W 10%	C-3	OSC TRIMMER
IR-40	47M $\Omega$ RESISTOR 1/2W 20%	C-4	OSC TRIMMER
LI-6	INPUT I.F. TRANSFORMER	L-1	LOOP ANT
LI-7	OUTPUT I.F. TRANSFORMER	L-2	OSC COIL
SW	SWITCH ON VOLUME CONTROL		
T-3	OUTPUT TRANSFORMER		
SPK-12	5" P.M. SPEAKER		
PL	#47 PILOT BULB		
CO-1	LINE CORD		



### ALIGNMENT

Remove chassis from cabinet for alignment.

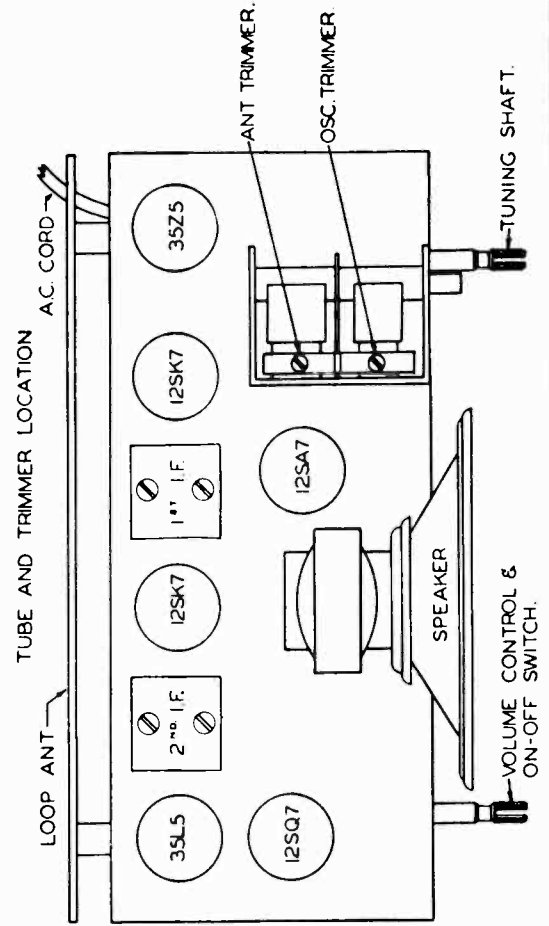
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

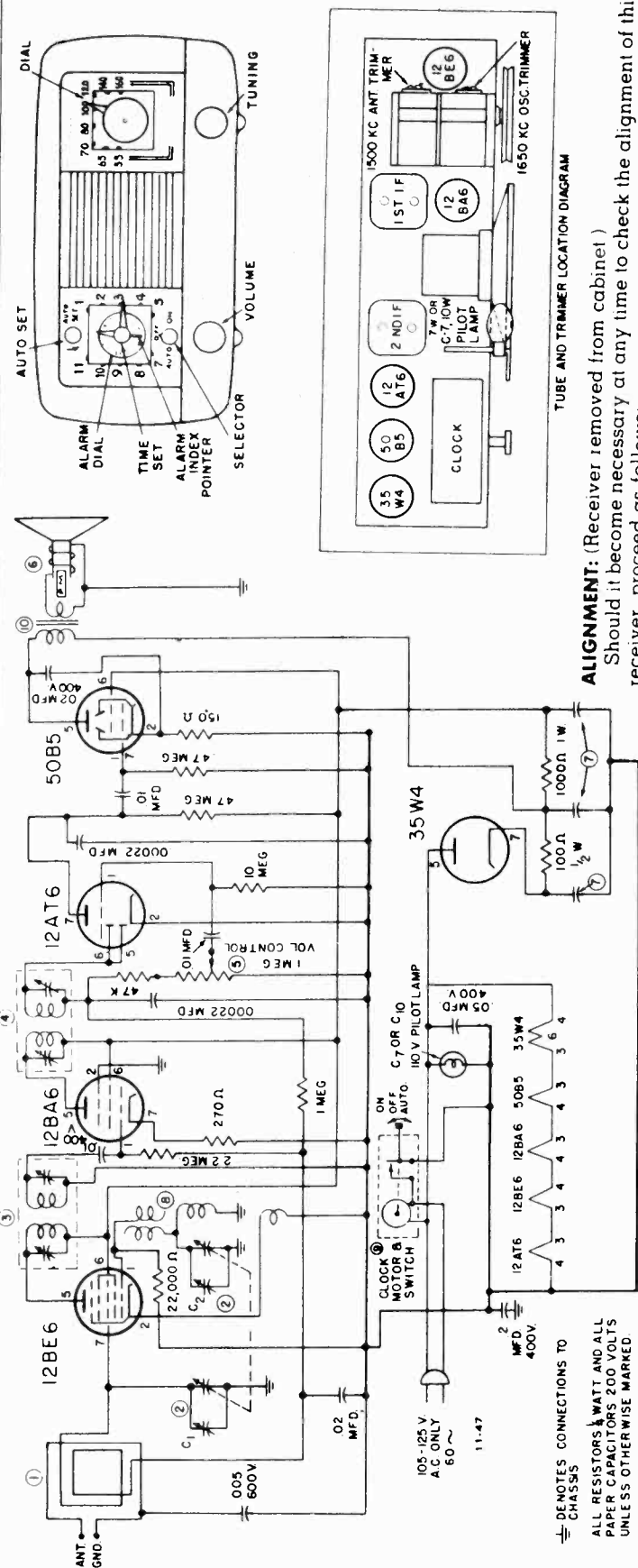
The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

**THIRD STEP:** Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.





**ALIGNMENT:** (Receiver removed from cabinet) Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Set the Signal Generator to 455 KC and connect to the stator lug on the rear section of the variable capacitor. Connect the signal generator ground lead to the chassis. Connect a suitable output meter across the speaker voice coil connections. Turn the volume control to the maximum position. Turn the variable capacitor to the extreme clockwise position.
- (2) Adjust the trimmers located at the top of the first and second I.F. Transformers for maximum output as indicated on the output meter.
- (3) Loosely couple the signal generator lead to the loop and set to 1650 KC.
- (4) With the variable capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the oscillator trimmer on the variable capacitor (front section).
- (5) Set the signal generator to 1500 KC and turn the tuning control so that this frequency is indicated on the dial. Adjust the antenna trimmer on the variable capacitor (rear section) for maximum output. No other adjustments are necessary.

**LINE VOLTAGE:** This clock radio receiver is designed for operation on 105-125 volts, 60 cycles alternating current only.

**POWER CONSUMPTION:** 40 Watts

**TUNING RANGE:** Broadcast 540 to 1650 Kilocycles (180 to 555 Meters).

**DIAL:** The dial scale is calibrated in kilocycles. Example: Read 60 as 600 KC.

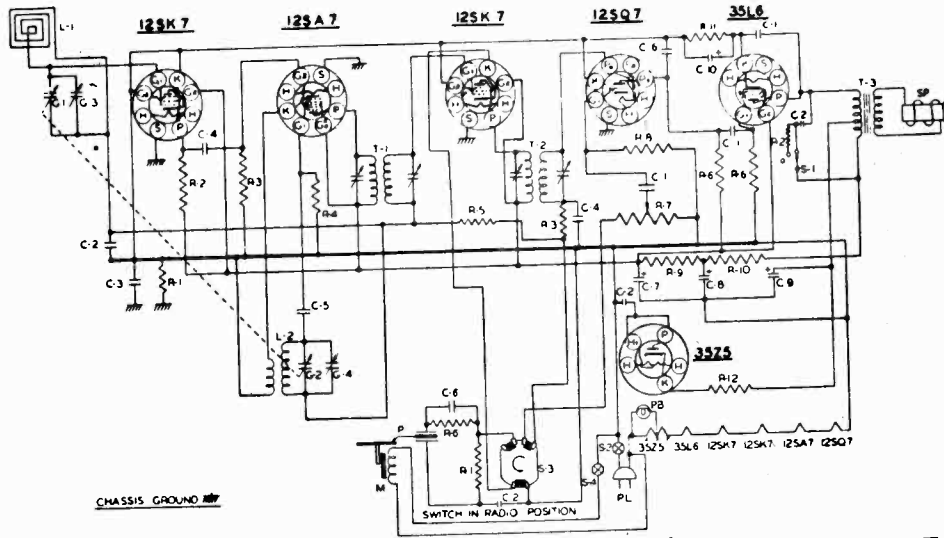
**TO OPERATE THE RADIO:** Turn the Selector knob located at the bottom of the clock face so that its index points to on. This turns on the power to the radio. Next, turn the Volume control knob at the bottom left of the cabinet about half way in the clockwise direction, or to the right. Wait a few seconds for the tubes to warm up. Turn the Tuning control knob so that the dial pointer indicates the frequency of the desired station. Turn carefully for best and clearest reception.

To turn the radio off, turn the Selector knob so that the index points to the upright or center position.

**TO OPERATE YOUR "MUSICAL ALARM" RADIO AS A MUSICAL ALARM:** You may set your clock radio to automatically turn on a program you wish to hear during the next eleven hours. Proceed by tuning in the station which will carry the program desired. Then set the Volume control knob at the level you want, as for the regular radio operation. Turn the Auto set knob at the top of the clock face, which relates the dial forming the alarm dial of the clock.

Stop rotation when the time you desire the radio to go on is directly under the short index pointer on the opposite end of the hour hand. Now turn the Selector knob so that the index points to Auto that is points to the left.

After setting the alarm, if you wish to return to normal radio operation, turn the Selector knob so that the index points to on. Then operate the radio as described in preceding paragraphs. Be sure to turn the Selector knob back to the Auto position if you want a program to be turned on automatically.



### ALIGNMENT DATA

Remove the chassis from the cabinet. A Signal Generator with the following frequencies is required: 455 KC, 1400 KC and 1720 KC.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the A.V.C. from working and giving false readings. Turn the tone control to complete left hand position. Keep the generator output as low as possible to prevent overloading.

Connect an output meter across the voice coil of the speaker.

Connect a 20,000 ohm resistor across the loop connector terminals to reflect proper loop impedance.

**FIRST STEP:** Connect the hot lead from the generator to the "ANT." section of the gang condenser through a .1 MFD. condenser. The ground lead must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455 KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

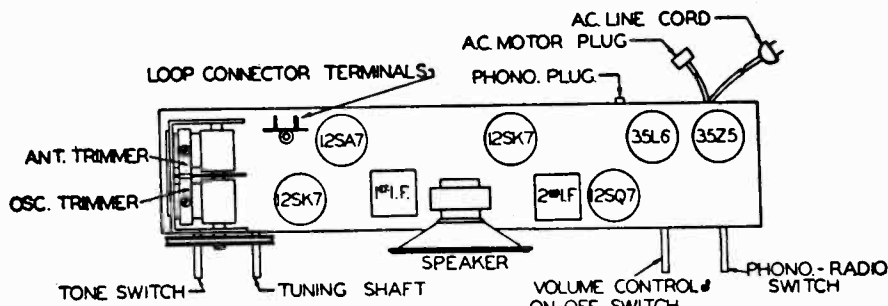
**SECOND STEP:** With the leads from the generator connected in the same manner as in I.F. alignment, adjust the signal generator to 1720 KC. The "O.S.C." trimmer is located on the front section of the gang condenser. Adjust this trimmer until the signal is tuned in. The gang condenser should be at complete minimum capacity for this setting.

**THIRD STEP:** Remove the generator leads from the chassis. Remove the 20,000 ohm resistor from the loop connector terminals. Reinstall the chassis in the cabinet, connect the loop leads, motor plug and phono pickup leads.

Connect the generator leads to a transmitting loop, made of a few turns of wire, and loosely couple to the receiver loop antenna which is located on the back end of the cabinet. Adjust the generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The "ANT." trimmer is located on the rear section of the gang condenser. Adjust this trimmer until a maximum signal is noted on the output meter.

No further adjustment should be necessary, unless the receiver has been damaged, as the coils and tuning condenser have been specially handled at the factory to insure proper alignment at the lower frequencies.

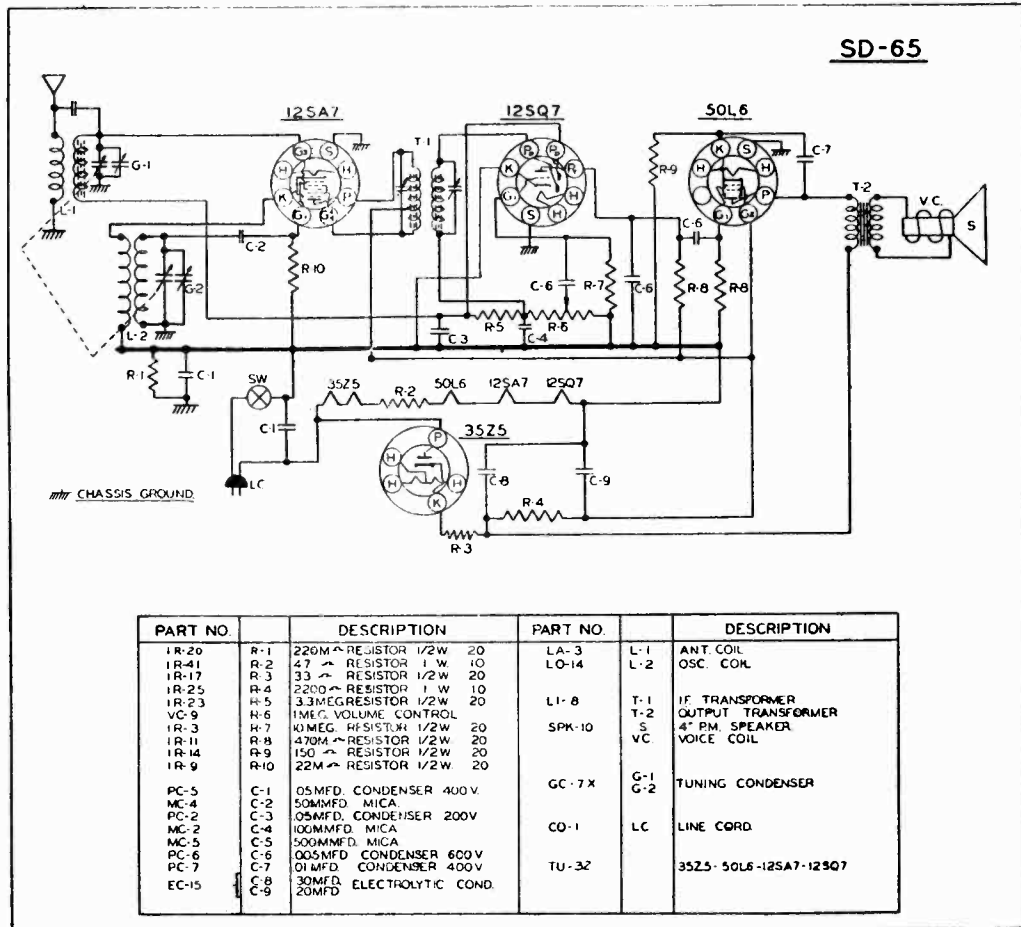
PART NO.	DESCRIPTION
PC-7	C-1 0.1 MFD. CONDENSER 400 V
PC-5	C-2 .05 MFD. CONDENSER 400 V
PC-8	C-3 .1 MFD. CONDENSER 400 V
MC-2	C-4 100MMFD MICA CONDENSER
MC-4	C-5 50MMFD MICA CONDENSER
MC-5	C-6 500MMFD MICA CONDENSER
EC-14	C-7 20 MFD
	C-8 40 MFD
EC-2	C-9 40 MFD
	C-10 .10 MFD 25 WV ELECTROLYTIC
IR-20	R-1 220M Ω RESISTOR 1/2W 20%
IR-15	R-2 2200 Ω RESISTOR 1/2W 20%
IR-10	R-3 47M Ω RESISTOR 1/2W 20%
IR-9	R-4 22M Ω RESISTOR 1/2W 20%
IR-23	R-5 33 MEG RESISTOR 1/2W 20%
IR-1	R-6 470M Ω RESISTOR 1/2W 20%
VC-4	R-7 1 MEG VOLUME CONTROL
IR-13	R-8 2.2 MEG RESISTOR 1/2W 20%
IR-1	R-9 470 Ω RESISTOR 1/2W 20%
IR-42	R-10 1000 Ω RESISTOR 1 W 10 %
IR-14	R-11 150 Ω RESISTOR 1/2W 20%
IR-17	R-12 33 Ω RESISTOR 1/2W 20%
GC-5	G-1 GANG CONDENSER
	G-2 ANT TRIMMER
	G-3 OSC TRIMMER
	G-4
L1-8	T-1 INPUT I.F. TRANSFORMER
L1-7	T-2 OUTPUT I.F. TRANSFORMER
	T-3 OUTPUT TRANSFORMER
LL-17	L-1 LOOP ANT
LO-15	L-2 OSC COIL
SPK-12	SP 5" PM SPEAKER
SW-2	S-1 TONE SWITCH
	S-2 SWITCH ON VOLUME CONTROL
SW-1	S-3 PHONO - RADIO SWITCH
	S-4 SWITCH ON RECORD CHANGER
AC-M-7	M RECORD CHANGER MOTOR
AC-PU-7	P CRYSTAL PICKUP ARM CARTRIDGE 5"
CO-2	PL #47 PILOT BULB
	PL LINE CORD





ALLIED RADIO CORP.

MODELS 4E-515,  
4E-516, 4F-515, 4F-516



PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
1R-20	R-1 220M RESISTOR 1/2W 20	LA-3	L-1 ANT. COIL
1R-41	R-2 47 RESISTOR 1 W 10	LO-14	L-2 OSC. COIL
1R-17	R-3 33 RESISTOR 1/2W 20		
1R-25	R-4 2200 RESISTOR 1 W 10	L1-8	T-1 IF TRANSFORMER
1R-23	R-5 3.3MEG RESISTOR 1/2W 20		
VC-9	R-6 1MEG. VOLUME CONTROL	SPK-10	T-2 OUTPUT TRANSFORMER
1R-3	R-7 10MEG. RESISTOR 1/2W 20	S	4" PM. SPEAKER
1R-11	R-8 470M RESISTOR 1/2W 20	VC	VOICE COIL
1R-14	R-9 150 RESISTOR 1/2W 20	GC-7X	G-1 TUNING CONDENSER
1R-9	R-10 22M RESISTOR 1/2W 20	CO-1	LC LINE CORD
PC-5	C-1 05MFD. CONDENSER 400V.	TU-3Z	35Z5-50L6-12SA7-12SQ7
MC-4	C-2 50MMFD. MICA		
PC-2	C-3 05MFD. CONDENSER 200V		
MC-2	C-4 100MMFD. MICA		
MC-5	C-5 500MMFD. MICA		
PC-6	C-6 005MFD CONDENSER 600V		
PC-7	C-7 01MFD. CONDENSER 400V		
EC-15	C-8 30MFD. ELECTROLYTIC COND.		
	C-9 20MFD		

## Operating Instructions

**POWER SOURCES:** This receiver may be operated on alternating current (AC) of 110 to 125 volts at 60 cycles or on direct current (DC) of 110 to 125 volts. When used on DC, if the tubes light up but set does not play, reverse the cord plug in the power outlet.

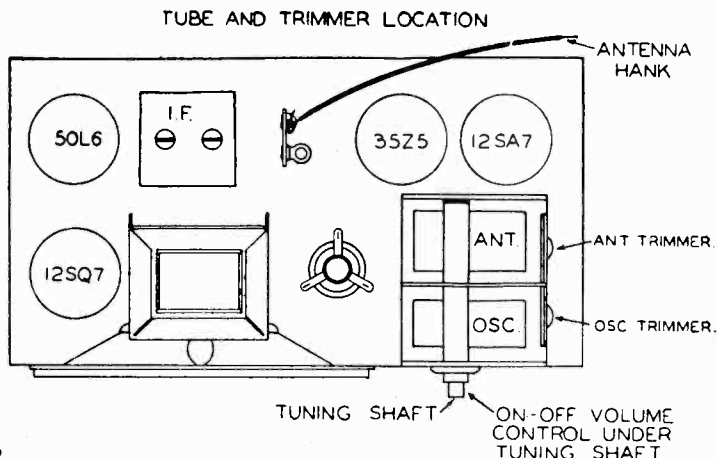
**CAUTION:** Always predetermine voltage of power sources. Never try to plug this receiver into a 220 volt line, as this will cause serious damage.

**INSTALLATION:** Unwind the power cord and plug into a convenient outlet. This receiver is equipped with an antenna hank, which should be uncoiled and stretched out to its full length for best reception. However, in steel constructed buildings or in distant isolated locations, better results may be obtained by connecting an outdoor antenna to the end of the antenna hank wire. The outdoor antenna should be about 50 feet long, including the lead-in wire.



MODELS 4E-515,  
4E-516, 4F-515, 4F-516

ALLIED RADIO CORP.



**CONTROLS:** Two knobs control the operation of this receiver. The lower knob is used to turn the set off and on. It is also used to control volume. Rotate this knob to the right in a clockwise direction and a click will be heard. This turns the receiver on. Allow about thirty seconds for tubes to heat up, then continue to rotate the knob to the right to increase volume. The upper knob is the station selector. Rotate this knob to the right or left to locate your station. By mentally adding a zero to the numbers on the dial, the result will be read directly in kilocycles. To turn off, turn the lower knob to the left in a counterclockwise direction as far as it will go and a click will be heard. The power switch will then be turned off.

## ALIGNMENT AND SERVICE DATA

(See Fig. No. 1 For Trimmer Location)

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the trimmers of the I. F. transformer until a maximum reading is noted on the output meter.

**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

**THIRD STEP:** Remove the generator hot lead and connect it to the antenna hank terminal strip through a 200 MMFD. condenser. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer until a maximum signal is noted on the output meter. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.



MODELS 5D-250,  
5D-251, 5E-250, 5E-251

ALLIED RADIO CORP.

## ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

**THIRD STEP:** Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the top of the ANT. section of the gang condenser. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

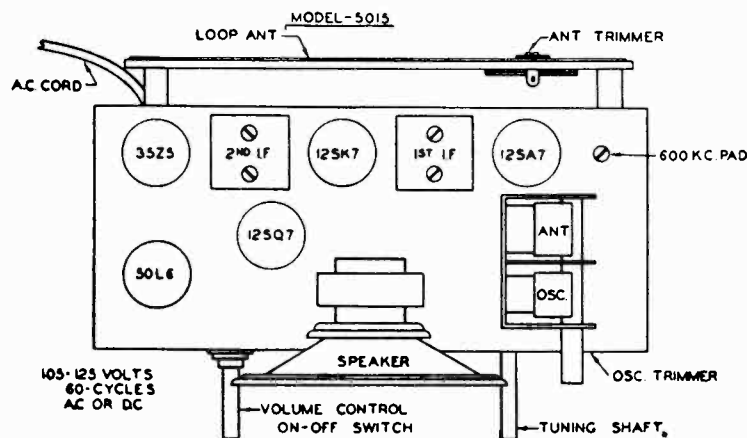


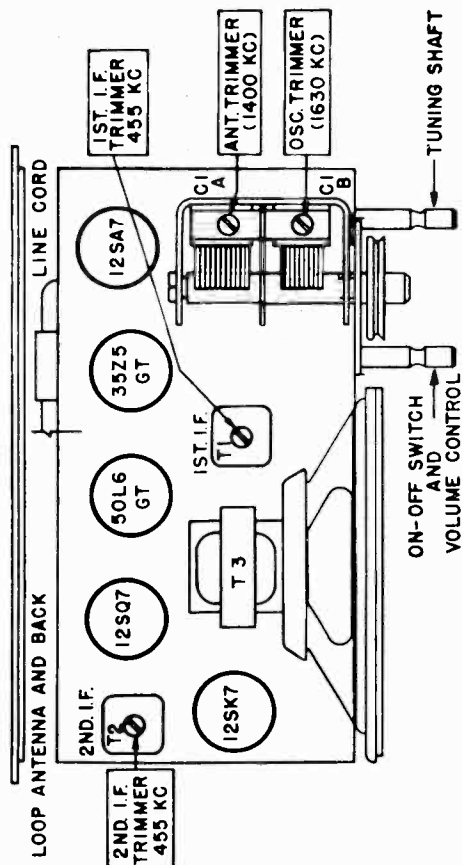
FIGURE-1

**CONTROLS:** Two knobs control the operation of this receiver. The left hand knob is used to turn set off and on. It is also used to control volume. Rotate knob to your right in a clockwise direction and a click will be heard. This turns receiver on. Allow about 30 seconds for tubes to heat up, then continue to rotate knob to your right to increase volume. The right hand knob is the station selector. Rotate this knob to the right or left to locate your station. By mentally adding a zero to the numbers on the dial, the result will be read directly in kilocycles. To turn set off, turn left hand knob to your left in a counter-clockwise direction as far as it will go and a click will be heard. The power switch will then be turned off.









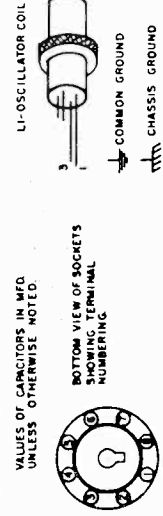
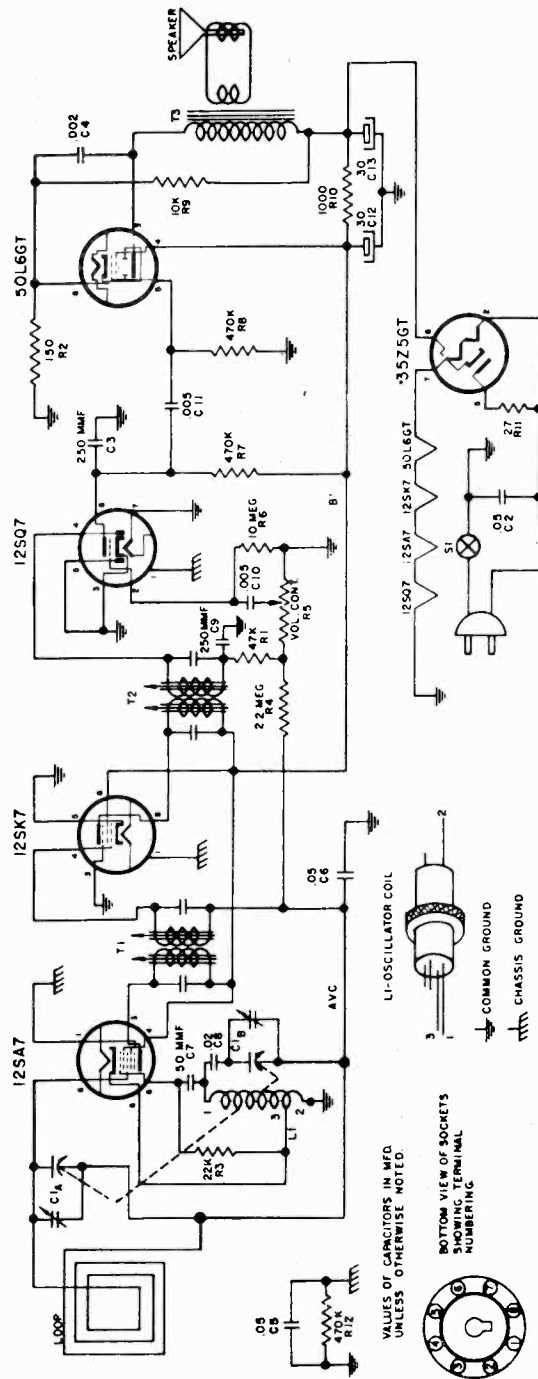
**ALIGNMENT PROCEDURE**

(Continued)

**CAUTION:** This is an A.C.-D.C. 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 place a .2 MFD. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mid.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	*12SA7 Grid (Stator of C1A)	T1	Input I.F.
Fully open	455 KC	.1	*12SA7 Grid (Stator of C1A)	T2	Output I.F.
Fully open	1630 KC	.1	*12SA7 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1400 KC		Loosely coupled to loop antenna	C1A	Antenna

\*Connect ground lead of signal generator to common negative.



ALLIED RADIO CORP.

MODELS 5F-525,  
5F-526

**INSTALLATION**

The loop antenna incorporated in the receiver is sufficient for all normal reception.

When using a DC power supply and after allowing sufficient time for the tubes to warm up the receiver does not operate, remove the line cord plug from the receptacle and reverse. Replace the plug in the reversed position and allow tubes to warm up at which time the receiver will operate.

If an excessive hum is noticed when operating from an AC power source, reverse the line cord plug to determine which position gives the best results.

NOTE: All loop antennas are somewhat directional in their characteristics.

Reception can sometimes be improved and/or local interference reduced by turning the set in a different direction.

**OPERATION**

To turn the receiver on, rotate the on-off switch and volume control knob (left hand control) clockwise about one-half its range. This supplies power to the receiver. Allow about thirty seconds for the tubes to warm up after which the desired station may be tuned by rotating the station selector (right hand control).

For best tone, tune the desired station with the volume control turned low. This enables you to get the exact point where the station comes in best. Then, adjust the volume to the desired level with volume control.

**DESCRIPTION**

This model is a 4 tube (plus rectifier) superheterodyne radio receiver designed for use on 117 volts 60 cycle AC or 117 volts DC power supply.

The tubes used are:—

- 1—12SA7 Oscillator Converter
- 1—12SK7 I.F. Amplifier
- 1—35Z5GT Power Rectifier
- 1—12SQ7 AVC Detector and 1st Audio
- 1—50L6GT Power Output

This receiver covers the frequency range from 540 kilocycles to 1600 kilocycles (KC).

**ALIGNMENT PROCEDURE**

The following alignment 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 A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milli-watts is .4 volts using a signal which is modulated 400 c.p.s.

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

**PARTS LIST**

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION
R7, R8, R12	A60-662	470K ohm 1/2 watt resistor	C1A, C1B	B19-194	Variable condenser
R9	A60-698	10K ohm 1 watt resistor	C2, C5	A16-158	.05 MFD 400 volt condenser
R10	A60-732	1000 ohm 1 watt resistor	C3, C9	A15-176	250 MMF mica condenser
R11	A60-690	27 ohm 1/2 watt resistor	C4	A16-155	.002 MFD 600 volt condenser
T1	A10-475	1st I.F. transformer	C6	A16-152	.05 MFD 200 volt condenser
T2	A10-479	2nd I.F. transformer	C7	A15-175	50 MMF mica condenser
L1	B10-502	Oscillator coil	C8	A16-150	.02 MFD 400 volt condenser
	A42-451	Cabinet, molded, brown	C10, C11	A16-153	.005 MFD 600 volt condenser
	D42-424	Cabinet, molded, ivory	C12, C13	B18-283	30-30 MFD 150 volt electrolytic condenser
	B67-510	Dial scale, paper	R1	A60-685	47K ohm 1/2 watt resistor
	A52-243	Knob, tenite, black	R2	A60-686	150 ohm 1/2 watt resistor
	A52-222	Knob, tenite, ivory	R3	A60-659	22K ohm 1/2 watt resistor
	S84-265	Loop and back	R4	A60-084	2.2 megohm 1/2 watt resistor
	A58-56	Pointer, "Knight"	R5	A24-174	Volume control and switch, 1 megohm
	B7-362	Socket, 5", P.M. (includes output transformer)	R6	A60-663	10 megohm 1/2 watt resistor



**POWER SOURCES:** This receiver is designed for operation on either an external power source or on the enclosed batteries.

**AC OR DC OPERATION:** This receiver may be operated on 50 to 60 cycle, 110 to 125 volt AC current or 110 to 125 DC current.

**CAUTION:** Never plug this receiver into a 220 volt line as this will seriously damage the component parts which have been designed for 110 to 125 volt operation only.

To operate on AC or DC open the small door at the right in the back of the cabinet. Pull out the power cord and plug into a convenient outlet of the proper voltage and current. Follow instructions under "Controls."

To operate on the enclosed batteries, follow instructions under "Controls."

**ANTENNA:** This receiver is equipped with a sensitive loop antenna and requires no external antenna wire. However, due to the directional qualities of the loop some stations may appear to be weak in reception. This condition may be remedied by rotating or changing the position of the receiver.

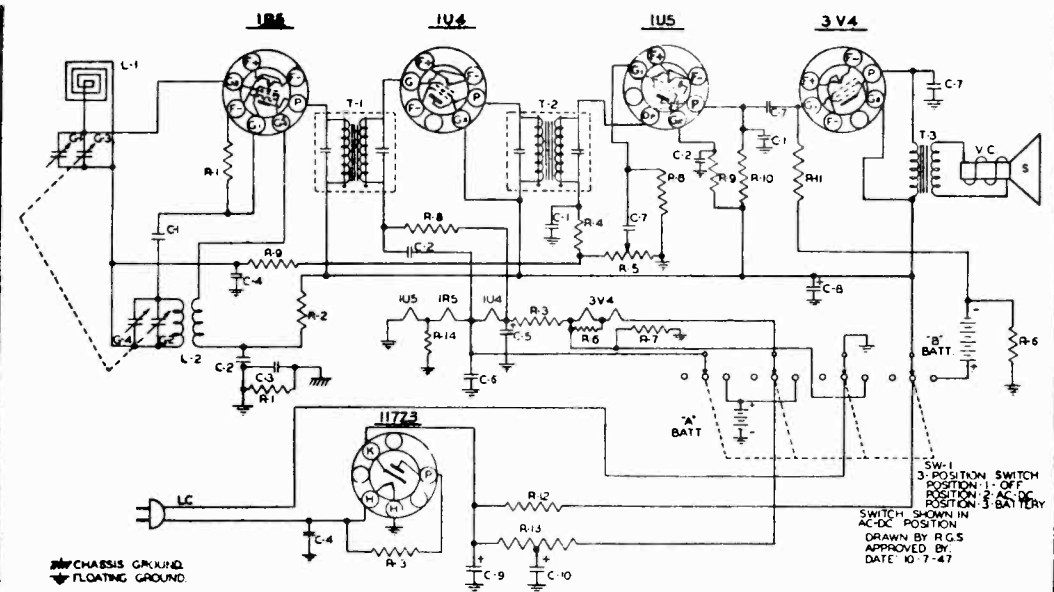
**CONTROLS:** This receiver has three control knobs which are located on the front panel of the cabinet.

**STATION SELECTOR KNOB:** The right hand knob is the station selector. Rotate this knob to the right or left to select your desired station. The dial scale is calibrated in kilocycles. By mentally adding a zero to the numbers on the scale, the result will be read directly in (KC) kilocycles. (i.e., 60 plus 0 equals 600 KC or 140 plus 0 equals 1400 KC).

**POWER SELECTOR SWITCH:** The left hand knob is the power selector. It has three positions which are indicated on the front panel. The extreme left hand position is the "OFF" position. The small dot on this knob must point to "OFF" when the receiver is not in use. The center position is "AC-DC" and is used when it is desired to operate the receiver from a power line source. The extreme right hand position is "BATT" and is used when it is desired to operate on the enclosed batteries.

**AC OPERATION:** When an AC power source is used, set the power selector knob to "AC-DC" after the power cord has been plugged into a convenient outlet. The receiver is now ready for operation.

**DC OPERATION:** If the receiver does not operate after a few seconds, reverse the power cord plug in the outlet and it will operate properly.



PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
IR-20	R-1 220M RESISTOR 1/2W 20%	KC-3	C-6 1MFD CONDENSER 200 WV	L1-5	T-1 INPUT IF TRANSFORMER
IR-37	R-2 50M RESISTOR 1/2W 20%	PC-6	C-7 005MFD CONDENSER 600 WV	L1-5	T-2 OUTPUT IE TRANSFORMER
IR-31	R-3 50M RESISTOR 1/2W 20%	C-3	C-8 40MFD	SPK-8	T-3 SPEAKER OUTPUT TRANSFORMER
VC-11	R-4 1MEG RESISTOR 1/2W 5%	C-9	C-9 40MFD -150WV ELECTROLYTIC	VC	VC VOICE COIL
IR-33	R-5 270M RESISTOR 1/2W 10%	C-10	C-10 20MFD	S	S 3 1/2" P.M. SPEAKER
IR-39	R-6 620M RESISTOR 1/2W 5%	C-1	C-1 100MFD MICA CONDENSER	TU-33	1723-IR5-IU4-IU5-3V4
IR-3	R-7 1MEG RESISTOR 1/2W 20%	C-2	C-2 GANG CONDENSER		
IR-2	R-8 10MEG RESISTOR 1/2W 20%	C-4	C-4 OSC TRIMMER		
IR-22	R-9 3MEG RESISTOR 1/2W 20%	C-5	C-5 1MEG RESISTOR 1/2W 20%		
IR-12	R-10 1MEG RESISTOR 1/2W 20%	C-10	C-10 1000 OHM RESISTOR 5W 5%		
IR-13	R-11 500M RESISTOR 1/2W 10%	C-9	C-9 470 OHM RESISTOR 1/2 20%		
IR-40	R-12 100M RESISTOR 1/2W 20%				
WR-7	R-13 1000 OHM RESISTOR 5W 5%				
R-1	R-14 470 OHM RESISTOR 1/2 20%				
KC-2	C-1 100MFD MICA CONDENSER	LL-14	L-1 LOOP ANTENNA	A BATT	2'D SIZE 1 1/2 VOLT FLASHLITE CELLS
PC-7	C-2 10MFD CONDENSER 400WV	LO-8	L-2 OSC COIL	B BATT	1-67 1/2 VOLT BATTERY
C-3	C-3 1MFD CONDENSER 400WV	CO-1	LC LIFE CORD		
C-4	C-4 40MFD CONDENSER 400WV	SW-8	SW-1 4 POLE-3 POSITION SWITCH		
EC-6	C-5 70MFD 100V ELECTROLYTIC				

**TUNING RANGE — 540 KC to 1650 KC**

**ALIGNMENT AND SERVICE DATA**

(See Fig. No. 2 For Trimmer Location)

Remove chassis from cabinet for alignment.

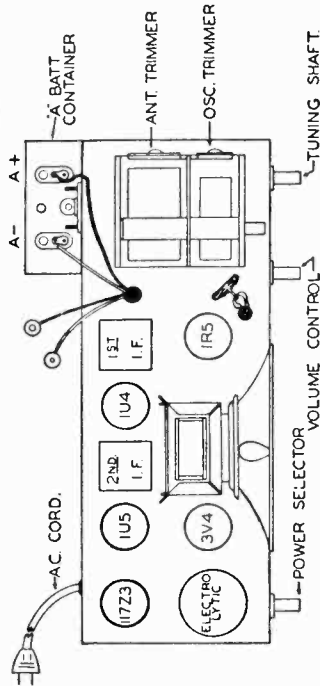
**A. Signal Generator** is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans. These IF adjustments are made in the top and in the bottom of the can under the chassis. Adjust the cores until a maximum reading is noted on the output meter.

**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

**THIRD STEP:** Remove the generator leads from the gang condenser and replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn of wire over the outside of the cabinet. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer through the hole which is provided in the end of the cabinet until a maximum signal is noted on the output meter. The ANT. trimmer hole in the side of the cabinet is covered by a small plug button. Replace this button after adjustment has been made. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.



TL-75  
TUBE AND TRIMMER LOCATION  
FIGURE-2

**BATTERY OPERATION:** The power cord is not used for battery operation and may be hanked and put back in the cabinet. Set the power control knob to "BATT" and the receiver is ready for operation on the enclosed batteries.

**CAUTION:** When the receiver is not in use, the power selector knob must be turned to "OFF." If the knob is allowed to remain in "BATT" position, the batteries will be in use constantly. The volume control does not control the batteries and they are still in operation even though the volume control is turned all the way off.

**VOLUME CONTROL:** The center knob is the volume control. After the power selector knob has been properly set and the receiver is in operation, rotate the volume control knob to the right to increase volume or to the left to decrease volume.

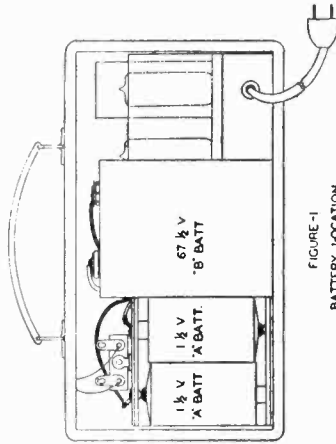
**BATTERY SUPPLIERS**

The batteries for this receiver may be purchased from any reliable dealer. For proper operation this receiver requires two "A" batteries and one "B" battery.

The "A" batteries are size "D" flashlight cells and are made by all battery manufacturers.

The "B" battery is a 67½ volt battery and is made by the following manufacturers:

- Eveready 67½ vlt. #467
- Burgess 67½ vlt. #XX45
- General 67½ vlt. #W45A
- Ray-O-Vac 67½ vlt. #4367



**BATTERY SUPPLIERS**  
(See Fig. No. 1)

To replace the batteries in this receiver:

Remove the back.

To the left, looking into the rear of the cabinet is the "A" or flashlight battery container. To the right is the "B" or 67½ volt battery.

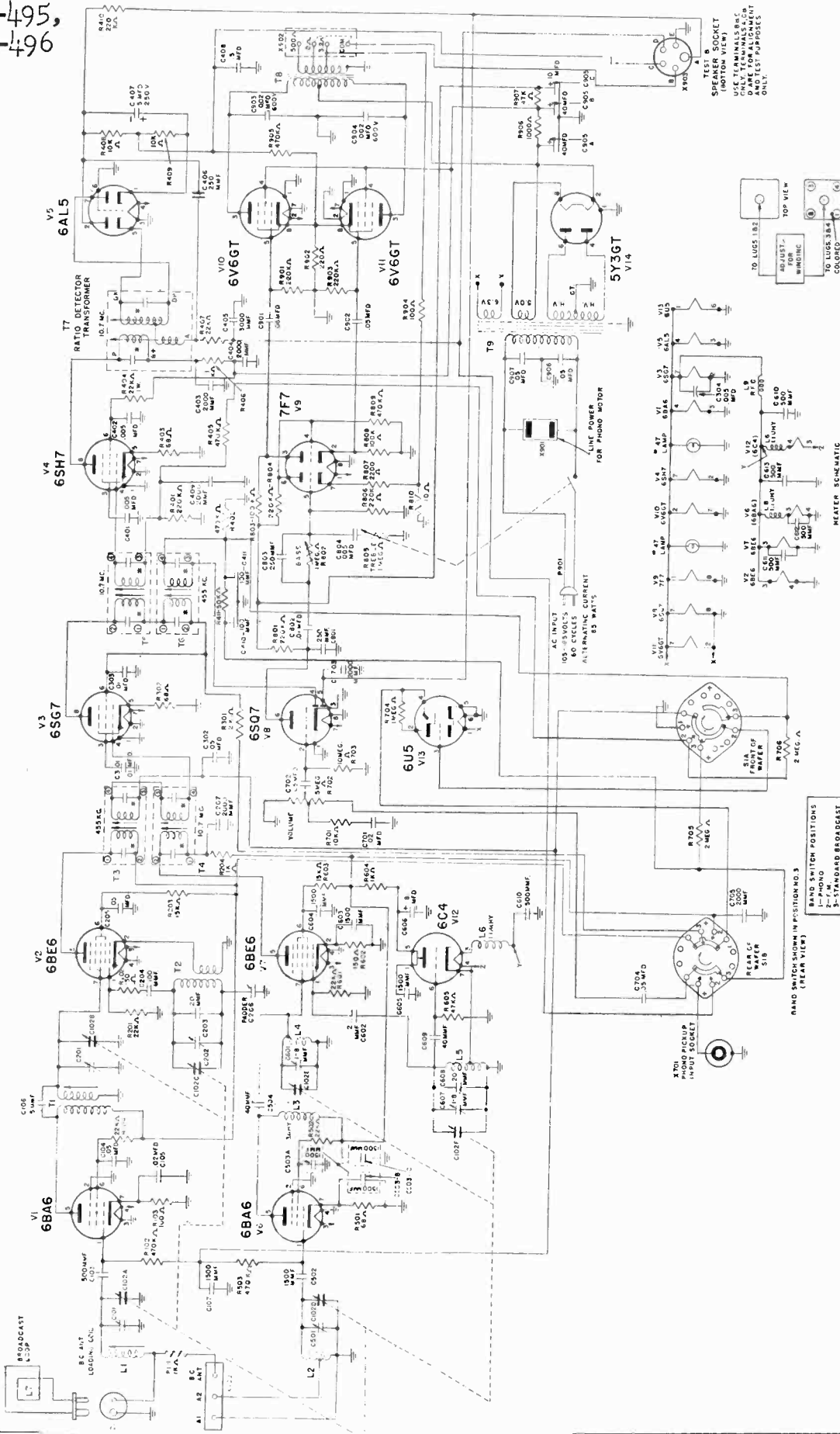
To replace the "A" batteries, pull the old batteries out of the container. Replace with fresh batteries, making sure the batteries are inserted according to the diagram on the inside of the container.

To replace the "B" battery, disconnect the snap fastener connectors. Replace with a fresh battery and snap the connectors into place. Replace the battery in the cabinet as shown in Fig. No. 1, making sure that the connector end faces the top of the cabinet.

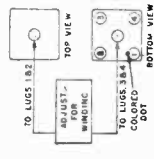
After the batteries have been installed, replace the back, making sure that the two washers in the bottom of the back fit into the slot near the bottom edge of the cabinet.

MODELS 14F-490,  
14F-495,  
14F-496

ALLIED RADIO CORP.



SPEAKER SOCKET  
(BOTTOM VIEW)  
USE TERMINALS B, C  
D ARE FOR ALIGNMENT  
AND TEST PURPOSES  
ONLY.



9 THESE CAPACITORS ARE ENCLOSED IN EACH CAN & ARE PART OF EACH COIL.

HEATER SCHEMATIC

BAND SWITCH SHOWN IN POSITION NO. 3  
BAND SWITCH POSITIONS  
1-PHONO  
2-STANDARD BROADCAST  
3-STANDARD BROADCAST

REAR OF WATER CUB

PHONO PICKUP INPUT SOCKET

AC INPUT 105-115 VOLTS 60 CYCLES ALTERNATING CURRENT 25 WATTS

LINE POWER FOR PHONO MOTOR

10 LUGS 18-2

ALLIED RADIO CORP.

MODELS 14F-490,  
14F-495, 14F-496

This AM-FM superheterodyne radio receiver is designed to operate on 105-125 volts, 60 cycles AC.

The Tuning Ranges are:

AM 525 kc to 1720 kc

FM 88 mc to 108 mc

Tube Complement:

- 1 Type 6BA6 FM R.F. Amplifier
- 1 Type 6BA6 AM R.F. Amplifier
- 1 Type 6BE6 FM Mixer
- 1 Type 6BE6 AM Oscillator, converter
- 1 Type 6C4 FM Oscillator
- 1 Type 6SG7 I.F. Amplifier
- 1 Type 6SH7 FM Detector Driver
- 1 Type 6AL5 FM Ratio Detector
- 1 Type 6SQ7 AM Detector, A.V.C., 1st Audio Amplifier
- 1 Type 7F7 2nd Audio Amplifier and Phase Inverter
- 1 Type 6U5 Electron Ray Tuning Indicator
- 2 Type 6V6/GT Push Pull Power Amplifiers
- 1 Type 5Y3/GT Full Wave Rectifier

#### SERVICE NOTES:

##### **Failure of Receiver to Operate May Be Due To:**

1. No current at power socket
2. All tubes not firmly in sockets
3. Band switch in wrong position
4. Output impedance jumper on rear of chassis not connected or missing
5. Low signal strength in the particular location. Change position (rotate) of loop, or "folded dipole" antenna, or use an outside antenna
6. Speaker or loop antenna not plugged into sockets

#### ALIGNMENT PROCEDURE

##### **Alignment Procedure for AM**

Equipment Required:  
Broadcast Band Signal Generator  
Audio Output Meter

A) 1. Set Band Switch to "AM". Advance Volume Control to maximum, set "BASS" Control at minimum, set Treble Control at maximum.

2. Connect output meter across speaker voice coil.

NOTE: During all of these tests it is necessary to reduce the signal generator output so that the receiver output level is maintained at .5 watt.

##### B) I. F. ALIGNMENT

1) Set signal generator to 455 kc. Connect a .05 mfd condenser in series with the "high" side of the generator output lead to pin #4 of the 6SG7 (V3) I.F. amplifier tube. Peak bottom and top cores of 2nd I.F. (T-6).

2) Connect signal generator ("high" side in series with a .05 mfd condenser) across C201 on variable condenser, peak bottom and top cores of 1st I.F. Transformer (T-3).

##### C) R. F. ALIGNMENT

1) Connect signal generator to the AM antenna terminal ("high" side in series with a 50 mmf condenser) and ground. Open variable condenser to minimum capacity, set signal generator to 1720 kc, adjust broadcast oscillator trimmer C202 to tune in signal.

2) Close variable condenser to maximum capacity, set signal generator to 535 kc and adjust broadcast band padder (C206) to tune in signal.

3) Repeat step (1).

4) With variable condenser fully meshed move dial pointer to small white line slightly to left of "55" on broadcast band dial scale.

5) Set signal generator to 1500 kc. Tune in signal with Tuning Control. Peak antenna trimmer (C101) and interstage trimmer (C201).

6) Set signal generator to 600 kc, tune in signal with receiver Tuning Control, peak antenna loading coil (L1). Peak interstage transformer (T1).

7) Repeat step (5).

MODELS 14F-490,  
14F-495, 14F-496

## ALLIED RADIO CORP.

**Alignment Procedure for FM**

NOTE: Contacts A, C, and D of the speaker socket at the rear of the chassis have been provided for connection to V.T.V.M. for the alignment of the FM circuits.

**Equipment Required:**

High Frequency Signal Generator 87.5 mc to 108.5 mc.  
Signal Generator capable of delivering .1 volt at 10.7 mc.  
Audio Output Meter.  
D.C. Vacuum Tube Voltmeter with zero center scale.  
Tuning Wand.

**A) RATIO DETECTOR ALIGNMENT**

- 1) Connect V.T.V.M. across speaker socket terminals "A" and "C", (A.V.C. Voltage).
- 2) Feed 10.7 mc unmodulated R.F. signal into 6SH7 (V4) grid, pin #4, through .01 mfd condenser. This signal should be .1 volt.
- 3) Adjust primary of ratio detector transformer (T-7) for maximum indication on V.T.V.M.
- 4) Connect zero centered V.T.V.M. across speaker socket terminals "D" and "C".
- 5) Adjust secondary of ratio detector transformer (T-7) for zero indication.
- 6) Tune 10.7 mc Signal Generator higher in frequency (about 200 kc) until maximum voltage reading is obtained on V.T.V.M.

Note this voltage, then tune signal generator lower in frequency until maximum voltage of the opposite polarity is obtained. Note this voltage, then if necessary re-adjust primary of the detector (T-7) until the maximum detector voltages are about equal on either the high or low side of 10.7 mc.

**B) FM 10.7 Mc I. F. ALIGNMENT**

- 1) Shunt a 100 ohm carbon resistor across the primary of the detector (T-7) lugs "B+" and "P".
- 2) Connect output meter across speaker.
- 3) Set volume controls at maximum, bass at minimum.
- 4) Connect 10.7 mc signal generator (modulated 30%) to the grid (pin #4) of the 6SG7 (V-3) through a .01 mfd condenser and ground.

**PARTS LIST**

Schematic No.	Description
C101	Trimmer Cond. (Part of C102)
C102	Variable Cond. Gang.* B6.070.
C103	500mmf $\pm 20\%$ .
C104	.05 mf 400V.
C105	.02 mf 150V.
C106	5mmf $\pm 10\%$ .
C107	1500 mmf $\pm 20\%$ .

- 5) Peak bottom and top cores of (T-5) 2nd I.F.
- 6) Connect 10.7 mc signal generator (modulated 30%) across the FM interstage trimmer (C601) and ground.
- 7) Peak bottom and top cores of 1st I.F. (T-4).
- 8) Remove 1000 ohm shunting resistor from (T17).

NOTE: during all of these tests it is necessary to reduce the signal generator output so that the receiver output level is maintained at .5 watts.

**C) FM OSCILLATOR ALIGNMENT**

- 1) Connect the high frequency signal generator across the FM antenna terminals. The ground side of the generator output cable is attached to terminal "A1", a 270 ohm carbon resistor is connected from the "high" side of the generator cable to terminal "A2".
- 2) Open variable condenser to minimum capacity; set signal generator to 108.5 mc, tune in signal with FM oscillator trimmer (C607).
- 3) Close variable condenser to maximum capacity; set signal generator to 87.5 mc. To adjust oscillator to signal it may be necessary to spread or squeeze the FM oscillator coil L5 slightly.
- 4) Repeat steps (2) and (3) if necessary.

**D) FM R. F. ALIGNMENT**

NOTE: When making the following tests keep the signal generator output at a level that will not cause A.V.C. voltage to rise above 1.5 volts DC.

- 1) Connect V.T.V.M. across test socket terminals "A" and "C" (A.V.C. Voltage).
- 2) FM antenna terminal connections as in "C-1".
- 3) Set signal generator to 108 mc. Tune in signal with the receiver Tuning Control. Peak FM antenna trimmer (C501), peak FM interstage trimmer (C601) for maximum voltage on V. T. V. M.
- 4) Set signal generator to 88 mc. Tune in signal with the receiver Tuning Control. Check FM antenna coil L2 and FM interstage coil L4 with a tuning wand; if any adjustment is necessary; spread or squeeze the coil turns slightly for maximum indication on V.T.V.M.
- 5) Repeat steps (3) and (4) if necessary.

C201	Trimmer Cond. (Part of C102).
C202	Trimmer Cond. (Part of C102)
C203	20 mmf $\pm 20\%$ .
C204	100 mmf $\pm 20\%$ .
C205	.05 mf 400V.
C206	Padder Cond. 500-1000 mmf * C13518.
C207	2000 mmf $\pm 20\%$ .
C301	.01 mf 400V.
C302	.05 mmf 200V.
C303	.01 mf 400V.
C304	.005 mf 400V.

ALLIED RADIO CORP.

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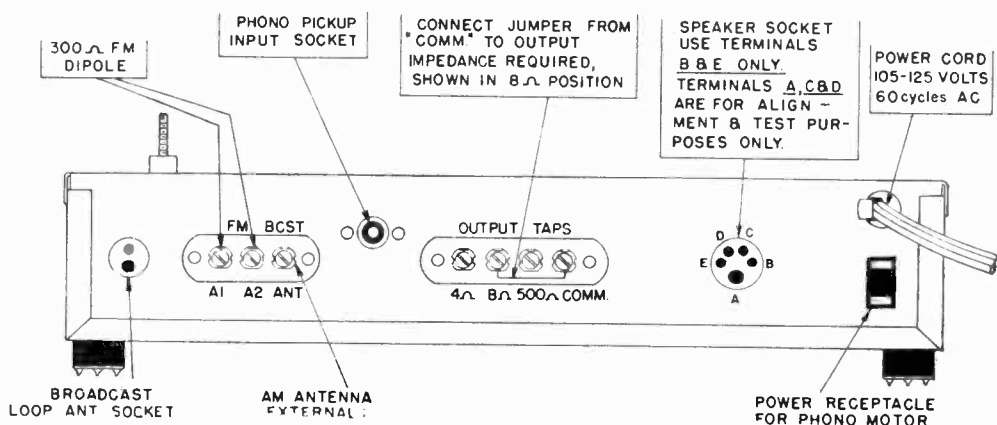
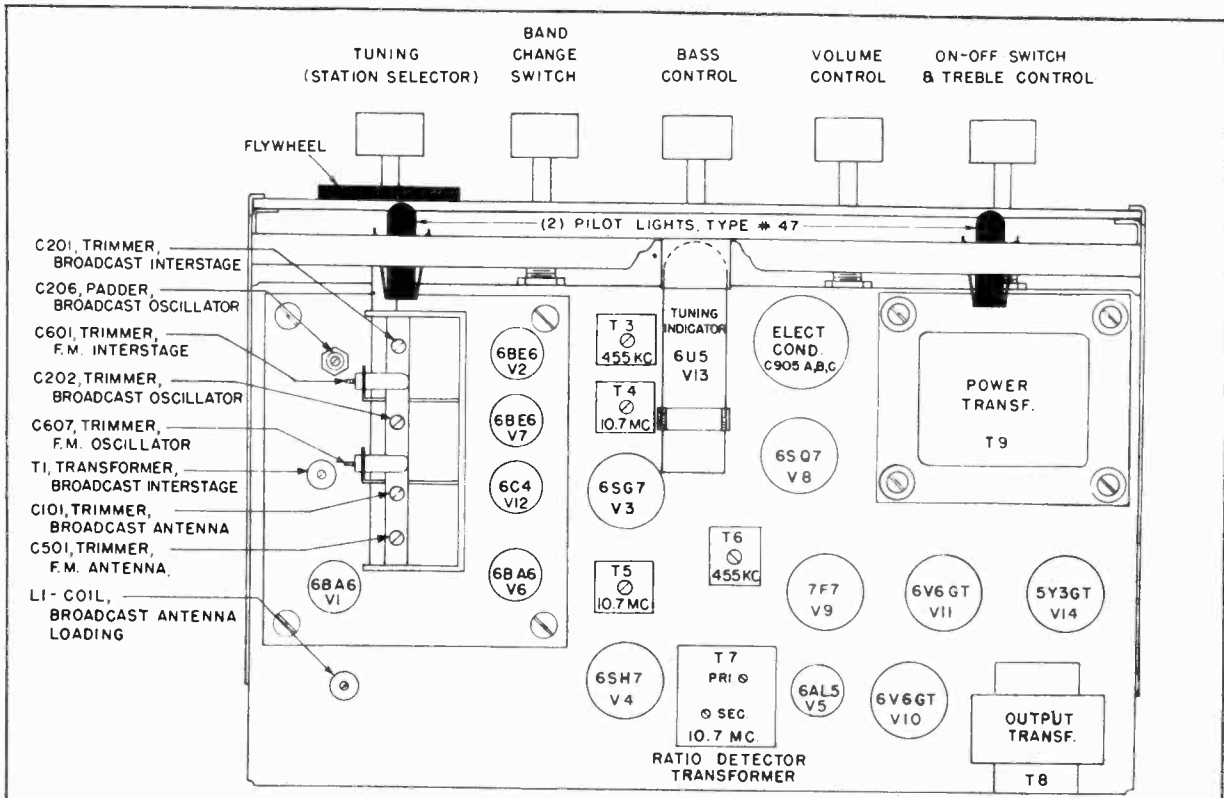
**PARTS LIST**

Schematic No.	Description		Description
C401	.005 mf 400V.	R 203	15 K ohm 2W. ±10%.
C402	.005 mf 400V.	R 204	1 K ohm ½W. ±10%.
C403	2000 mmf ±20%.	R 301	2 K ohm ½W. ±10%.
C404	2000 mmf ±20%.	R 302	68 ohm ½W. ±10%.
C405	3000 mmf ±20%.	R 401	220 K ohm ¼W. ±10%.
C406	250 mmf ±20%.	R 402	470 K ohm ¼W. ±10%.
C407	5. mf 250V.* Electrolytic Cond.*N25.206	R 403	68 ohm ½W. ±10%.
C408	.5 mf 200V	R 404	22 K ohm 1 W. ±10%.
C409	2000 mmf ±20%.	R 405	470 K ohm ¼W. ±10%.
C410	100 mmf ±20%.	R 406	1 K ohm ½W. ±20%.
C411	100 mmf ±20%.	R 407	22 K ohm ¼W. ±10%.
C501	Trimmer Cond. (Part of C102)	R 408	10 K ohm ¼W. ±5%.
C502	1500 mmf ±20%.	R 409	10 K ohm ¼W. ±5%.
C503	A, B, C, 1500 mmf each*N25.211.	R 410	220 K ohm ¼W. ±10%.
C504	40 mmf ±10% NPO	R 411	50 K ohm ¼W. ±20%.
C601	Trimmer Cond. 1-8 mmf*N20.022.	R 501	68 ohm ½W. ±10%.
C602	2 mmf ±10% NPO	R 502	22 K ohm 1 W. ±10%.
C603	1500 mmf ±20%.	R 503	470 K ohm ¼W. ±10%.
C604	1500 mmf ±20%.	R 601	22 K ohm ¼W. ±10%.
C605	1500 mmf ±20%.	R 602	150 ohm ½W. ±10%.
C606	8 mf 450V	R 603	15 K ohm 2W. ±10%.
C607	Trimmer Cond. 1-8 mmf*N20.022	R 604	1 K ohm ½W. ±10%.
C608	20 mmf ±10% N130* N25.220	R 605	47 Kohm ¼W. ±10%.
C609	40 mmf ±10% NPO.	R 701	10 K ohm ¼W. ±20%.
C610	500 mmf ±20%.	R 702	.5 Meg ohm volume control*A9.127.
C611	500 mmf ±20%.	R 703	10. Meg ohm ¼W. ±20%.
C612	500 mmf ±20%.	R 704	1. Meg ohm ¼W. ±20%.
C613	500 mmf ±20%.	R 705	2. Meg ohm ¼W. ±20%.
C701	.02 mf 150V.	R 706	2. Meg ohm ¼W. ±20%.
C702	.05 mf 200V.	R 801	220 K ohm ¼W. ±20%.
C703	2,000 mmf ±20%.	R 802	1. Meg ohm potentiometer*A9.129.
C704	.05 mf 200V.	R 803	100 K ohm ¼W. ±20%.
C705	2,000 mmf ±20%.	R 804	220 K ohm ¼W. ±220%.
C801	250 mmf ±20%.	R 805	1. Meg ohm potentiometer with S.P.S.T. Switch* A9.128
C802	.01 mf 400V.	R 806	220 K ohm ¼W. ±20%.
C803	250 mmf ±20%.	R 807	2,200 ohm ¼W. ±10%.
C804	.005 mf 400V.	R 808	100 K ohm ¼W. ±20%.
C901	.05 mf 400V.	R 809	470 K ohm ¼W. ±20%.
C902	.05 mf 400V.	R 810	10 ohm ¼W. ±10%.
C903	.002 mf 600V.	R 901	220 K ohm ¼W. ±20%.
C904	.002 mf 600V.	R 902	220 ohm 2 Watt ±10%.
C905	A, B, C, 40 mf x 40 mf x 10 mf Electrolytic Cond. 450V.*N25.205	R 903	220 K ohm ¼W. ±20%.
C906	.05 mf 400V. Bakelite	R 904	100 ohm ¼W. ±10%.
C907	.05 mf 400V. Bakelite.	R 905	470 K ohm ¼W. ±20%.
R101	1 K ohm ¼W. ±20%.	R 906	1000 ohm 15 W. ±10%* N14.087.
R102	470 K ohm ¼W. ±20%.	R 907	47 K ohm ¼W. ±20%.
R103	100 ohm ¼W. ±10%.	T 1	Interstage R.F. transf., AM*B2.409.
R104	22 K ohm 1 W. ±10%.	T 2	Oscillator Coil, AM* A2.410.
R201	22 K ohm ¼W. ±10%.	T 3	I.F. Transfer. 455KC* N2.414.
R202	150 ohm ¼W. ±10%.	T 4	I.F. Transf. 10.7MC* N2.415.
		T 5	I.F. Transf. 10.7MC* N2.415.
		T 6	I.F. Transf. 455 KO* N2.414.

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ALLIED RADIO CORP.

- |    |                                    |      |  |
|----|------------------------------------|------|--|
| T7 | Ratio Det. Transf. 10.7MC* C2.278. | L9   | R.F. Choke* N2.439.                        |
| T8 | Outut Transf.* A15.036.            | X101 | Socket, AM Loop* X13.852.                  |
| T9 | Power Transf.* B18.076.            | X102 | Ant. Terminal Strip* A32.329.              |
| S1 | Band Switch* A12.102.              | X701 | Socket, Phono input* N32.163.              |
| L1 | Ant. Loading Coil, AM* B2.423.     | X901 | Socket, Phono Motor* N32.072.              |
| L2 | Ant. Coil, FM* N2.411.             | X902 | Output taps terminals* A32.312.            |
| L3 | R.F. Choke 3uhy* A2.402.           | X903 | Speaker & test socket* N32.109.            |
| L4 | Interstage R.F. Coil, FM* N2.412.  | P1   | Power Cord and Plug set* N10.049.          |
| L5 | Oscillator Coil, FM* N2.413.       |      |  |
| L6 | R.F. Choke 1.1uhy* N2.416.         |      | Pilot Lamps, No. 47 6-8V. Bayonet* I12301. |
| L7 | Loop Ant. AM* C5.027.              |      | FM Folded dipole Ant.* A5.010.             |
| L8 | R.F. Choke 1.1uhy* N2.416.         |      |  |



TUBE LAYOUT & PARTS PLACEMENT

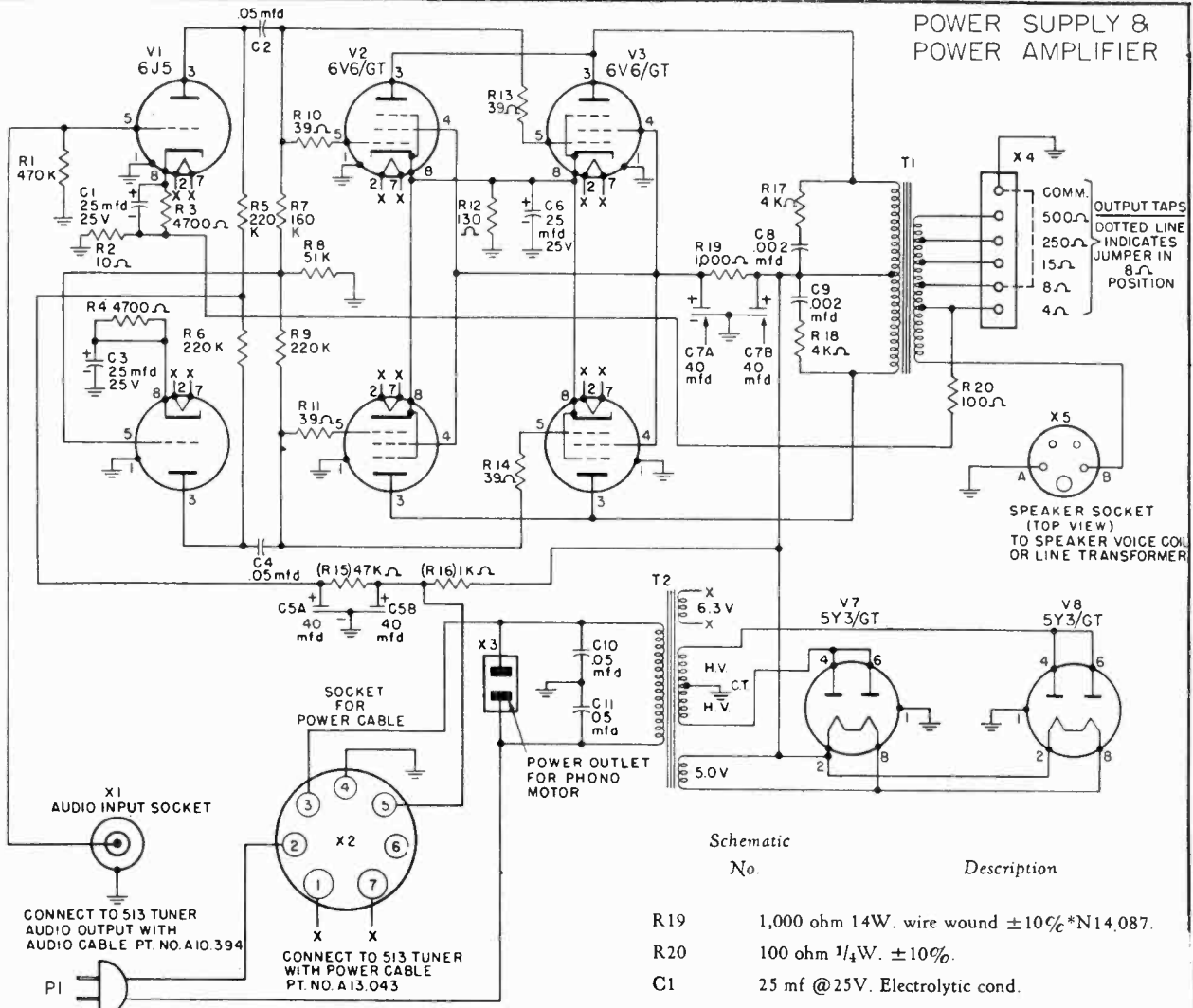




MODELS 19F-492,  
19F-497, 19F-498

ALLIED RADIO CORP.

POWER SUPPLY &  
POWER AMPLIFIER



**PARTS LIST**

Schematic No.	Description
R19	1,000 ohm 14W. wire wound $\pm 10\%$ *N14.087.
R20	100 ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C1	25 mf @25V. Electrolytic cond.
C2	.05 mf 400V. paper cond.
C3	25 mf @25V. Electrolytic cond.
C4	.05 mf 400V. paper cond.
C5	A & B 40 mf x 40 mf @450V. Electrolytic cond.*C13.806.
C6	25 mf @25V. Electrolytic cond.
C7	A & B 40 mf x 40 mf @450V. Electrolytic cond.*C13.806.
C8	.002 mf 600V. paper cond.
C9	.002 mf 600V. paper cond.
C10	.05 mf 400V. Bakelite paper cond.
C11	.05 mf 400V. Bakelite paper cond.
T1	Output transformer*B15.037.
T2	Power transformer*B18.077
X1	Coaxial socket audio connector* N32.163.
X2	7 pin power cable socket* N32.294.
X3	Phono motor power receptacle* N32.072.
X4	Output taps terminal board* A32.299.
X5	Speaker socket* N32.109.
P1	Line power cord & plug set* N10.049.
P2	7 wire power cable* A13.043.
P3	Audio connector cable* A10.394.
P4	Speaker plug* N32.230.

Schematic

No.	Description
R1	470K ohm $\frac{1}{4}$ W. $\pm 20\%$ .
R2	10 ohm $\frac{1}{4}$ W. $\pm 10\%$ .
R3	4,700 ohm $\frac{1}{4}$ W. $\pm 10\%$ .
R4	4,700 ohm $\frac{1}{4}$ W. $\pm 20\%$ .
R5	220K ohm $\frac{1}{4}$ W. $\pm 20\%$ .
R6	220K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
R7	160K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
R8	51K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
R9	220K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
R10	39 ohm $\frac{1}{4}$ W. $\pm 20\%$ .
R11	39 ohm $\frac{1}{4}$ W. $\pm 20\%$ .
R12	130 ohm 5W. $\pm 10\%$ wire wound*N14.089.
R13	39 ohm $\frac{1}{4}$ W. $\pm 20\%$ .
R14	39 ohm $\frac{1}{4}$ W. $\pm 20\%$ .
R15	47K ohm $\frac{1}{4}$ W. $\pm 20\%$ .
R16	1K ohm 14W. wire wound $\pm 10\%$ *N14.087.
R17	4K ohm 10W. wire wound $\pm 10\%$ .
R18	4K ohm 10W. wire wound $\pm 10\%$ .

## ALLIED RADIO CORP.

MODELS 19F-492,  
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this tuner may be used with any audio amplifier or P.A. system if it is powered by an auxiliary power supply capable of delivering 220 Volts @ 60 Ma., well filtered DC and 6.3V. @ 3.5 amps. 60 cycles AC or DC.

The Tuning Ranges are:

AM 535 kc to 1720 kc.

FM 88 mc to 108 mc.

**ALIGNMENT PROCEDURE****Alignment Procedure for AM**

Equipment Required:

Broadcast Band Signal Generator

Audio Output Meter

Power Supply and Amplifier

A) 1. Set Band Switch to "AM". Advance Volume Control to maximum, set "BASS" Control at minimum, set Treble Control at maximum.

2. Connect output meter across speaker voice coil.

NOTE: During all of these tests it is necessary to reduce the signal generator output so that the receiver output level is maintained at .5 watt.

**B) I.F. ALIGNMENT**

1) Set signal generator to 455 kc. Connect a .05 mfd condenser in series with the "high" side of the generator output lead to pin #4 of the 6SG7 (V3) I.F. amplifier tube. Peak bottom and top cores of 2nd I.F. (T-6).

2) Connect signal generator ("high" side in series with a .05 mfd condenser) across C201 on variable condenser, peak bottom and top cores of 1st I.F. Transformer (T-3).

**C) R. F. ALIGNMENT**

1) Connect signal generator to the AM antenna terminal ("high" side in series with a 50 mfd condenser) and ground. Open variable condenser to minimum capacity, set signal generator to 1720 kc, adjust broadcast oscillator trimmer C202 to tune in signal.

2) Close variable condenser to maximum capacity, set signal generator to 535 kc and adjust broadcast band padder (C206) to tune in signal.

3) Repeat step (1).

4) With variable condenser fully meshed move dial pointer to small white line slightly to left of "55" on broadcast band dial scale.

5) Set signal generator to 1500 kc. Tune in signal with Tuning Control. Peak antenna trimmer (C101) and interstage trimmer (201).

6) Set signal generator to 600 kc, tune in signal with receiver Tuning Control, peak antenna loading coil (L1). Peak interstage transformer (T1).

7) Repeat step (5).

**Tube Complement:**

- 1 Type 6BA6 FM R.F. Amplifier.
- 1 Type 6BA6 AM R.F. Amplifier.
- 1 Type 6BE6 FM Mixer.
- 1 Type 6BE6 AM Oscillator, converter.
- 1 Type 6C4 FM Oscillator.
- 1 Type 6SG7 I.F. Amplifier.
- 1 Type 6SH7 FM Detector Driver.
- 1 Type 6AL5 FM Ratio Detector.
- 1 Type 6SQ7 A.V.C., 1st Audio Amplifier.
- 1 Type 6U5 Electron Ray Tuning Indicator.
- 1 Type 6J5 AM Detector.

**SERVICE NOTES:****Failure of Tuner to Operate May Be Due to:**

- 1. Power Supply cable disconnected.
- 2. "Audio Connector" cable disconnected.
- 3. Band switch in wrong position.
- 4. Amplifier power off or gain set too low.
- 5. Low signal strength in the particular location. Change position (rotate) of loop, or "folded dipole" antenna, or use an outside antenna.
- 6. All tubes not firmly in sockets.

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ALLIED RADIO CORP.

**Alignment Procedure for FM**

NOTE: Contacts A, C, and D of the test socket at the rear of the chassis have been provided for connection to V.T.V.M. for the alignment of the FM circuits.

**Equipment Required:**

High Frequency Signal Generator 87.5 mc to 108.5 mc.  
Signal Generator capable of delivering .1 volt at 10.7 mc.  
Audio Output Meter.  
D.C. Vacuum Tube Voltmeter with zero center scale.  
Tuning Wand.

**A) RATIO DETECTOR ALIGNMENT**

- 1) Connect V.T.V.M. across test socket terminals "A" and "C", (A.V.C. Voltage).
- 2) Feed 10.7 mc unmodulated R.F. signal into 6SH7 (V4) grid, pin #4, through .01 mfd condenser. This signal should be .1 volt.
- 3) Adjust primary of ratio detector transformer (T-7) for maximum indication on V.T.V.M.
- 4) Connect zero centered V.T.V.M. across test socket terminals "D" and "C".
- 5) Adjust secondary of ratio detector transformer (T-7) for zero indication.
- 6) Tune 10.7 mc Signal Generator higher in frequency (about 200 kc) until maximum voltage reading is obtained on V.T.V.M.

Note this voltage, then tune signal generator lower in frequency until maximum voltage of the opposite polarity is obtained. Note this voltage, then if necessary re-adjust primary of the detector (T-7) until the maximum detector voltages are about equal on either the high or low side of 10.7 mc.

**B) FM 10.7 Mc I. F. ALIGNMENT**

- 1) Shunt a 1000 ohm carbon resistor across the primary of the detector (T-7) lugs "B+" and "P".
- 2) Connect output meter across speaker.
- 3) Set volume control at maximum, bass at minimum.
- 4) Connect 10.7 mc signal generator (modulated 30%) to the grid (pin #4) of the 6SG7 (V-3) through a .01 mfd condenser and ground.
- 5) Peak bottom and top cores of (T-5) 2nd I.F.
- 6) Connect 10.7 mc signal generator (modulated 30%) across the FM interstage trimmer (C601) and ground.
- 7) Peak bottom and top cores of 1st I.F. (T-4).
- 8) Remove 1000 ohm shunting resistor from (T-7).

NOTE: During all of these tests it is necessary to reduce the signal generator output so that the receiver output level is maintained at .5 watts.

**C) FM OSCILLATOR ALIGNMENT**

- 1) Connect the high frequency signal generator across the FM antenna terminals. The ground side of the generator output cable is attached to terminal "A1", a 270 ohm carbon resistor is connected from the "high" side of the generator cable to terminal "A2".
- 2) Open variable condenser to minimum capacity; set signal generator to 108.5 mc, tune in signal with FM oscillator trimmer (C607).
- 3) Close variable condenser to maximum capacity; set signal generator to 87.5 mc. To adjust oscillator to signal it may be necessary to spread or squeeze the FM oscillator coil L5 slightly.
- 4) Repeat steps (2) and (3) if necessary.

**D) FM R. F. ALIGNMENT**

NOTE: When making the following tests keep the signal generator output at a level that will not cause A.V.C. voltage to rise above 1.5 volts DC.

- 1) Connect V.T.V.M. across test socket terminals "A" and "C". (A.V.C. Voltage).
- 2) FM antenna terminal connections as in "C-1".
- 3) Set signal generator to 108 mc. Tune in signal with the receiver Tuning Control. Peak FM antenna trimmer (C501), peak FM interstage trimmer (C601) for maximum voltage on V. T. V. M.
- 4) Set signal generator to 88 mc. Tune in signal with the receiver Tuning Control. Check FM antenna coil L2 and FM interstage coil L4 with a tuning wand; if any adjustment is necessary; spread or squeeze the coil turns slightly for maximum indication on V.T.V.M.
- 5) Repeat steps (3) and (4) if necessary.

**V PARTS LIST**

Schematic No.	Description
C101	Trimmer Cond. (Part of C102)
C102	Variable Cond. Gang.*B6.070.
C103	500mmf $\pm 20\%$ .
C104	.05 mf 400V.
C105	.02 mf 150V.
C106	5mmf $\pm 10\%$ .
C107	1500 mmf $\pm 20\%$ .
C201	Trimmer Cond. (Part of C102).
C202	Trimmer Cond. (Part of C102).
C203	20 mmf $\pm 20\%$ .
C204	100 mmf $\pm 20\%$ .
C205	.05 mf 400V.
C206	Padder Cond. 500-1000 mmf*C13518.
C207	2000 mmf $\pm 20\%$ .
C301	.01 mf 400V.

## ALLIED RADIO CORP.

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## V PARTS LIST

Schematic No.	Description	Schematic No.	Description
C302	.05 mf 200V.	R301	2 K ohm $\frac{1}{2}$ W. $\pm 10\%$ .
C303	.01 mf 400V.	R302	68 ohm $\frac{1}{2}$ W. $\pm 10\%$ .
C304	.005 mf 400V.	R401	220 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C401	.005 mf 400V.	R402	470 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C402	.005 mf 400V.	R403	68 ohm $\frac{1}{2}$ W. $\pm 10\%$ .
C403	2000 mmf $\pm 20\%$ .	R404	22 K ohm 1 W. $\pm 10\%$ .
C404	2000 mmf $\pm 20\%$ .	R405	470 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C405	3000 mmf $\pm 20\%$ .	R406	1 K ohm $\frac{1}{2}$ W. $\pm 20\%$ .
C406	250 mmf $\pm 20\%$ .	R407	22 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C407	5. mf 250V. Electrolytic Cond. *N25.206.	R408	10 K ohm $\frac{1}{4}$ W. $\pm 5\%$ .
C408	.5 mf 200V.	R409	10 K ohm $\frac{1}{4}$ W. $\pm 5\%$ .
C409	2000 mmf $\pm 20\%$ .	R410	220 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C410	100 mmf $\pm 20\%$ .	R411	50 K ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C411	100 mmf $\pm 20\%$ .	R501	68 ohm $\frac{1}{2}$ W. $\pm 10\%$ .
C501	Trimmer Cond. (Part of C102).	R502	22 K ohm 1 W. $\pm 10\%$ .
C502	1500 mmf $\pm 20\%$ .	R503	470 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C503	A, B, C, 1500 mmf each*N25.211.	R601	22 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C504	40 mmf $\pm 10\%$ NPO.	R602	150 ohm $\frac{1}{2}$ W. $\pm 10\%$ .
C601	Trimmer Cond. 1.8 mmf*N20.022.	R603	15 K ohm 2W. $\pm 10\%$ .
C602	2 mmf $\pm 10\%$ NPO.	R604	1 K ohm $\frac{1}{2}$ W. $\pm 10\%$ .
C603	1500 mmf $\pm 20\%$ .	R605	47 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .
C604	1500 mmf $\pm 20\%$ .	R701	10 K ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C605	1500 mmf $\pm 20\%$ .	R702	.5 Meg ohm volume control*A9.127.
C607	Trimmer Cond. 1.8 mmf*N20.022.	R703	10. Meg ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C608	20 mmf $\pm 10\%$ N130*N25.220.	R704	1. Meg ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C609	40 mmf $\pm 10\%$ NPO.	R705	2. Meg ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C610	500 mmf $\pm 20\%$ .	R706	2. Meg ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C611	500 mmf $\pm 20\%$ .	R801	220 K ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C612	500 mmf $\pm 20\%$ .	R802	1. Meg ohm potentiometer*A9.129.
C613	500 mmf $\pm 20\%$ .	R803	47 K ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C614	100 mmf 400V. $\pm 20\%$ .	R804	260 K ohm 1 W. $\pm 20\%$ .
C701	.02 mf 150V.	R805	1. Meg ohm potentiometer with S.P.S.T. Switch* A9.128
C702	.05 mf 200V.	R806	10 K ohm 1W. $\pm 10\%$ .
C703	2,000 mmf $\pm 20\%$ .	R905	470 K ohm $\frac{1}{4}$ W. $\pm 20\%$ .
C704	.05 mf 200V.	T1	Interstage R.F. transf., AM*B2.409.
C705	2,000 mmf $\pm 20\%$ .	T2	Oscillator Coil, AM*A2.410.
C801	250 mmf $\pm 20\%$ .	T3	I.F. Transf. 455KC*N2.414.
C802	.01 mf 400V.	T4	I.F. Transf. 10.7MC*N2.415.
C803	250 mmf $\pm 20\%$ .	T5	I.F. Transf. 10.7MC*N2.415.
C804	.005 mf 400V.	T6	I.F. Transf. 455 KC*N2.414.
C901	.05 mf 400V.	T7	Ratio Det. Transf. 10.7MC*C2.278.
C902	.05 mf 400V.	S1	Band Switch*A12.102.
C905	A & B 20 mf x 20 mf Electrolytic Cond. 450V. *N25.225.	L1	Ant. Loading Coil, AM*B2.423.
R101	1 K ohm $\frac{1}{4}$ W. $\pm 20\%$ .	L2	Ant. Coil, FM*N2.411.
R102	470 K ohm $\frac{1}{4}$ W. $\pm 20\%$ .	L3	R.F. Choke 3uhy*A2.402.
R103	100 ohm $\frac{1}{4}$ W. $\pm 10\%$ .	L4	Interstage R.F. Coil, FM*N2.412.
R104	22 K ohm 1 W. $\pm 10\%$ .	L5	Oscillator Coil, FM*N2.413.
R201	22 K ohm $\frac{1}{4}$ W. $\pm 10\%$ .	L6	R.F. Choke 1.1uhy* N2.416.
R202	150 ohm $\frac{1}{4}$ W. $\pm 10\%$ .	L7	Loop Ant. AM* C5.027.
R203	15 K ohm 2W. $\pm 10\%$ .	L8	R.F. Choke 1.1uhy* N2.416.
R204	1 K ohm $\frac{1}{2}$ W. $\pm 10\%$ .		

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ALLIED RADIO CORP.

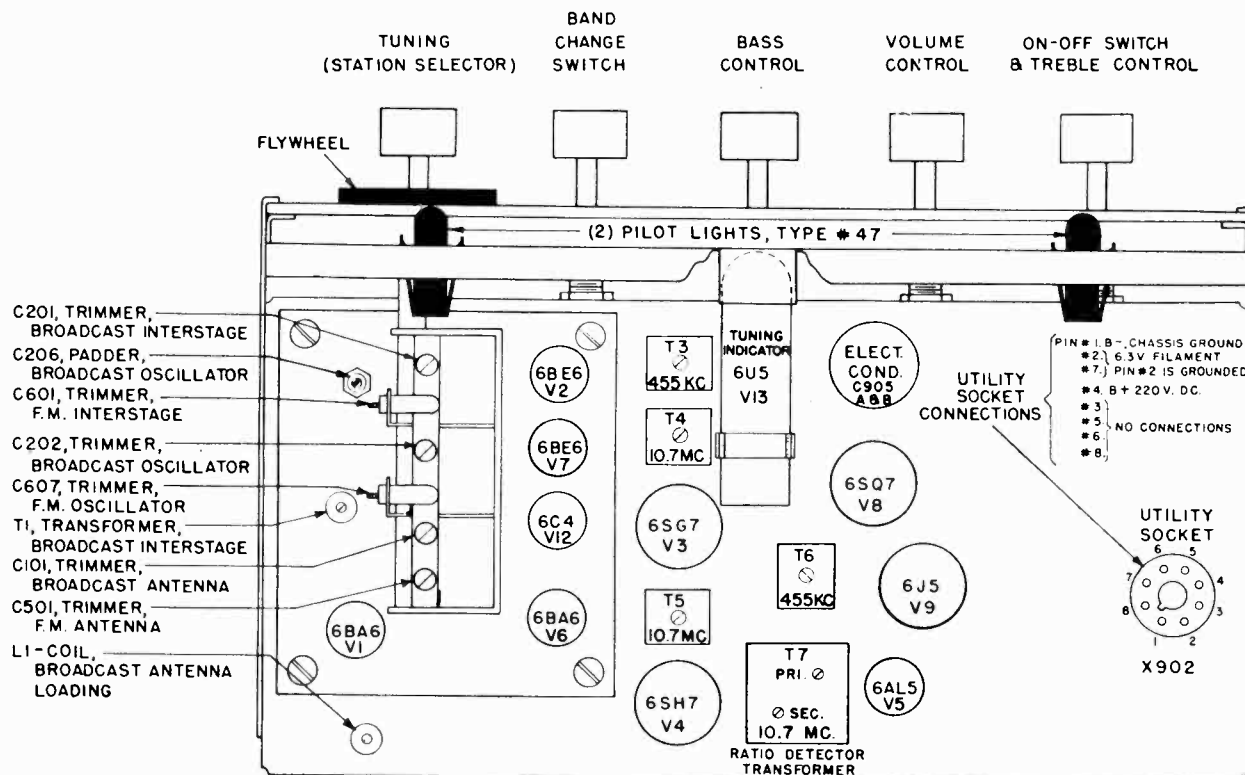
Schematic

No. Description

L9	R.F. Choke* N2.439.	X903	Test Socket* N32.109.
X101	Socket, AM Loop* X13.852.	*X904	Socket, Audio output* N32.163.
X102	Ant. Terminal Strip* A32.329.	P1	Plug, octal utility* N32.300.
X701	Socket, Phono input* N32.163.		
X901	Plug, recessed, 7 Pin* A32.297.		
X902	Socket, Octal* X13.821		

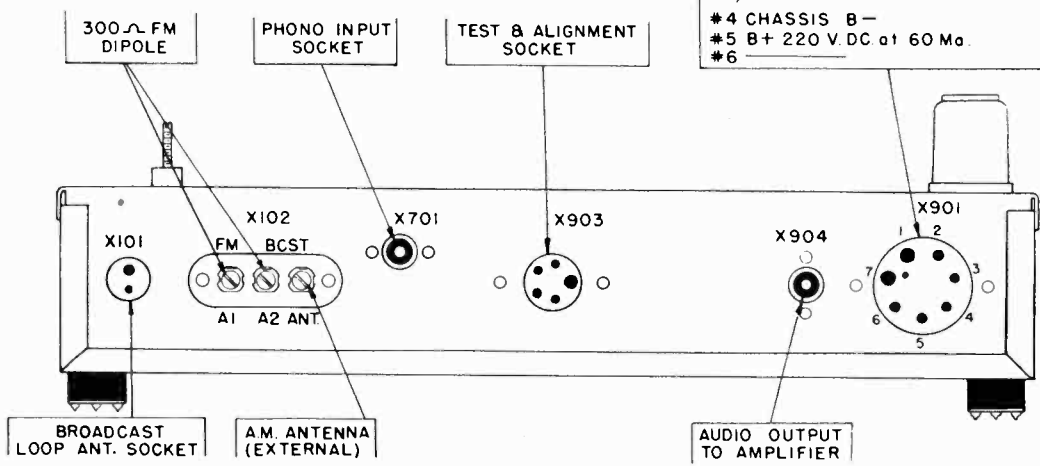
Pilot Lamps, No. 47 6-8V. Bayonet\* I12301.

FM Folded dipole Ant.\* A5.010.



**VOLTAGE REQUIREMENTS AT POWER CABLE RECEPTACLE (PIN CONNECTIONS)**

- #1 } 6.3 V. at 3.5 AMP. (PIN #1 GROUNDED)
- #7 }
- #2 } TO POWER SUPPLY ON-OFF SWITCH
- #3 }
- #4 CHASSIS B -
- #5 B+ 220 V. DC at 60 Ma.
- #6



TUBE & PARTS LAYOUT  
F.M. A.M. TUNER

ALLIED RADIO CORP.

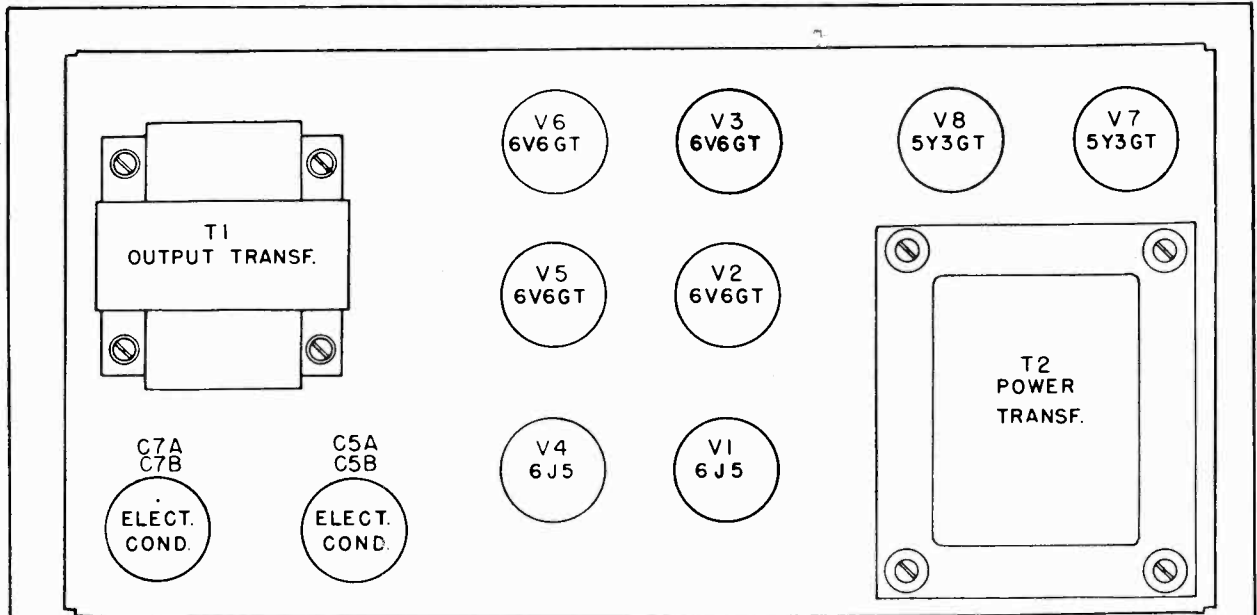
MODELS 19F-492,  
19F-497, 19F-498

**TUBE COMPLEMENT:**

- (4) 6V6/GT push-pull parallel power amplifier.
- (1) 6J5 Audio voltage amplifier.
- (1) 6J5 Audio voltage amplifier.
- (2) 5Y3/GT Rectifiers.

To be operated on 105-125 Volts 60 cycles AC

Power Consumption Approx. 150 Watts

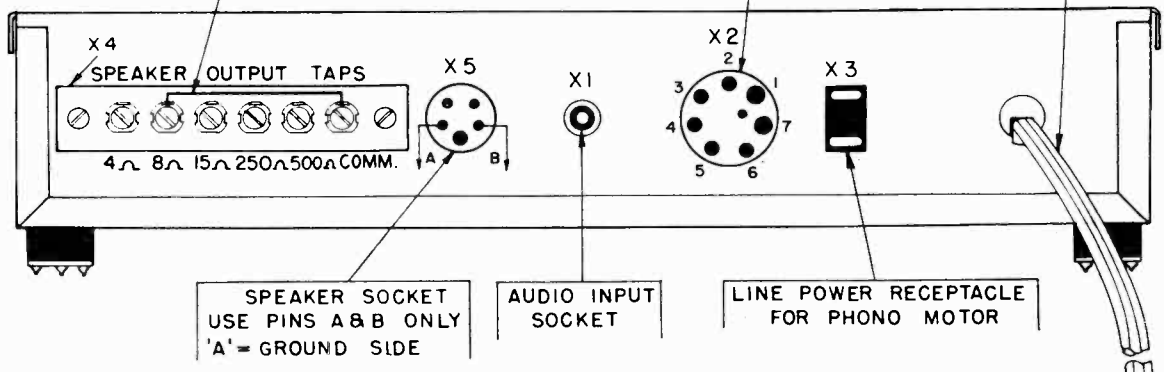


OUTPUT IMPEDANCE SELECTOR  
CONNECT JUMPER FROM "COMM." TERMINAL  
TO TERMINAL MARKED WITH DESIRED  
IMPEDANCE. (SHOWN IN 8Ω POSITION)

**PIN CONNECTIONS**

- #1 } 6.3 V. A.C. at 4.5 A
- #7 }
- #2 } TO TUNER ON-OFF SWITCH,
- #3 } OTHERWISE SHORT TERMINALS
- #3 } 2 & 3 TOGETHER TO OPERATE
- #4 } CHASSIS B-
- #5 } B+ 220V. D.C. at 75 MA.
- #6 }

POWER CORD  
105-125 VOLTS  
60cycles A.C.



SPEAKER SOCKET  
USE PINS A & B ONLY  
'A' = GROUND SIDE

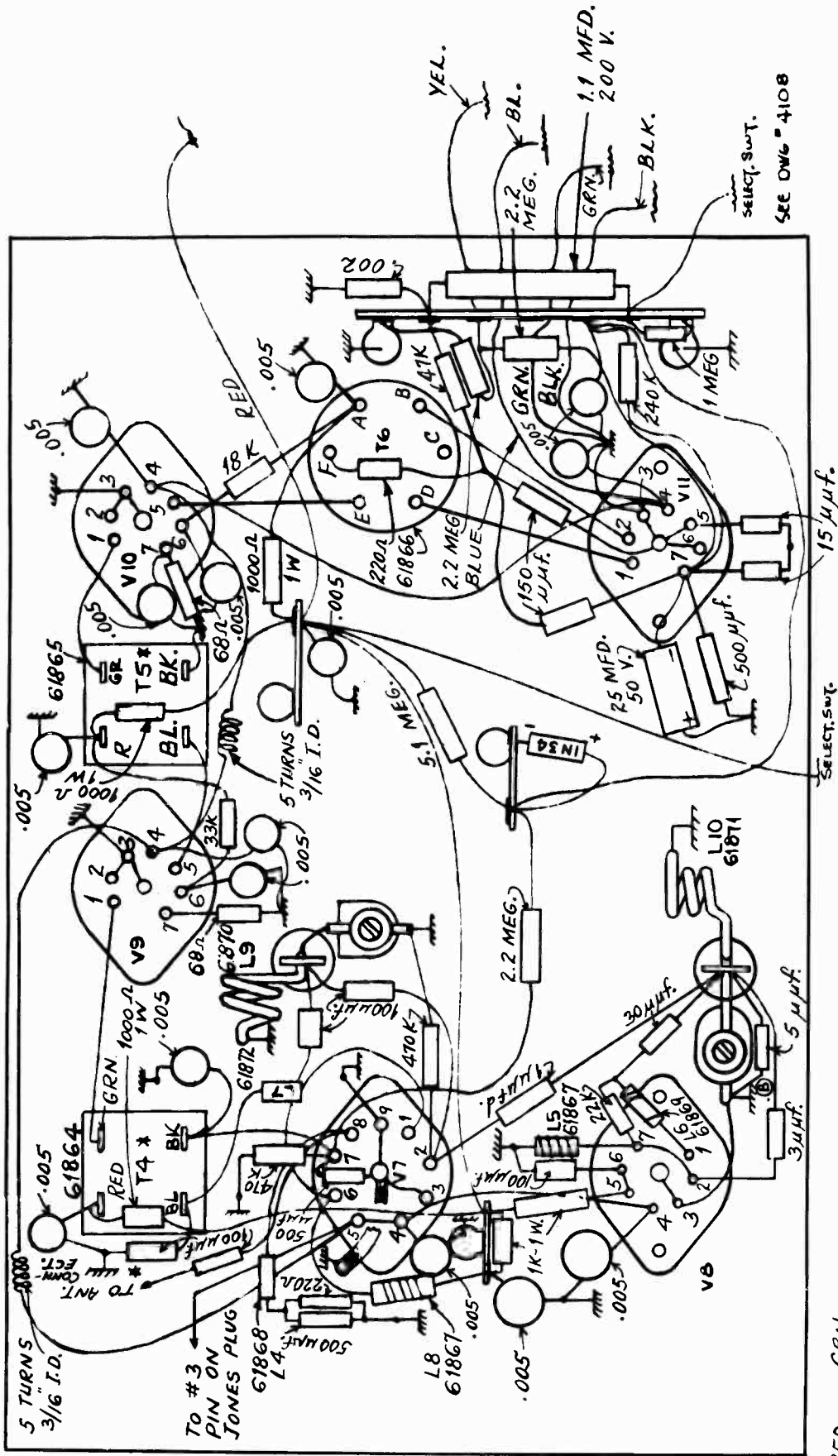
AUDIO INPUT  
SOCKET

LINE POWER RECEPTACLE  
FOR PHONO MOTOR

TUBE LAYOUT & CONNECTIONS  
POWER SUPPLY & AMPLIFIER

P1

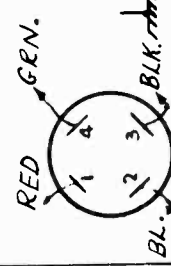




F. M. CHASSIS WIRING

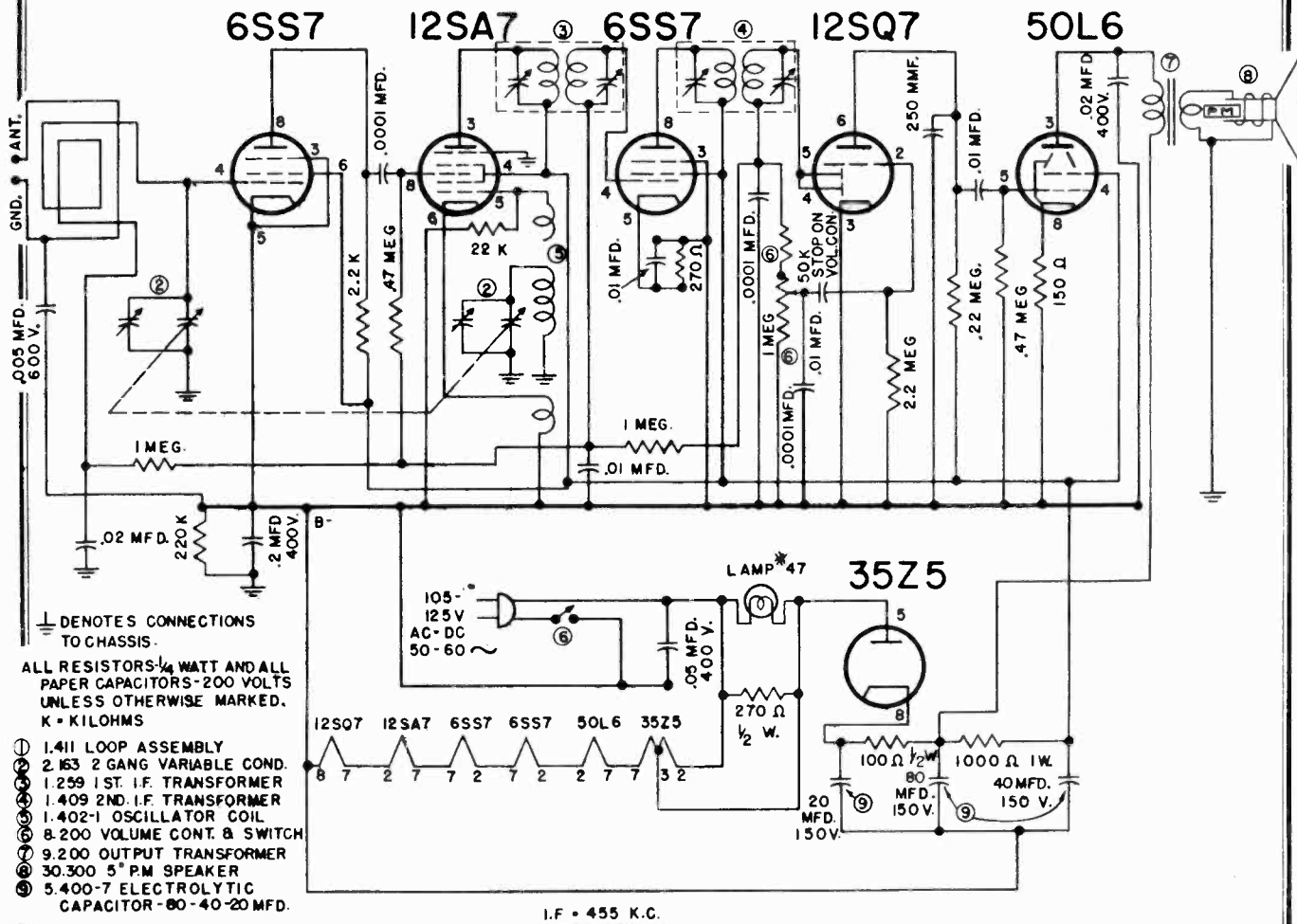
Ⓒ 5 MMF SOLAR MDS-5-55 (ZERO TEMP.)

Ⓐ T4 & T5 CONNECTIONS TO CHASSIS  
 TO BE USED ON RELAYS #152  
 ABOVE









**LINE VOLTAGE:** This receiver is designed for operation on 105-125 Volts, 50-60 Cycles, either Alternating or Direct Current (AC-DC)

**POWER CONSUMPTION:** 30 Watts.

**UNDERWRITER'S LABORATORIES LISTING:** This receiver is listed under the Re-examination Service of the Underwriter's Laboratories as indicated by the label attached to the cabinet.

**TUNING RANGE:** Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

**DIAL:** The Dial Scale is calibrated in Kilocycles.

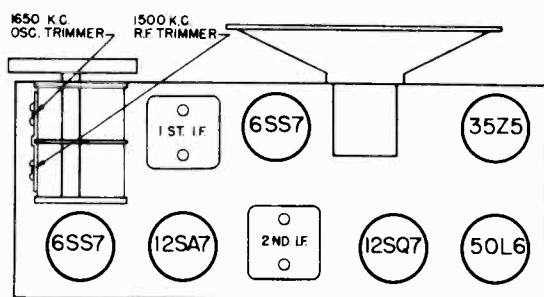
**TUBES:** The tubes used, and their functions, are as follows:

- |                      |                                    |
|----------------------|------------------------------------|
| 6SS7 R. F. Amplifier | 12SQ7 Detector, Avc and Audio Amp. |
| 12SA7 Converter      | 50L6GT Beam Power Amplifier        |
| 6SS7 I. F. Amplifier | 35Z5GT Rectifier                   |

**MINOR REASONS FOR FAILURE TO FUNCTION:** Defective tubes; defective Volume Control and On-Off Switch; line cord reversed on D. C.; defective line cord plug; or tubes in wrong socket.

**ALIGNMENT:** Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to a "-B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. First turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.
- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.
- (3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.
- (4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).
- (5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.



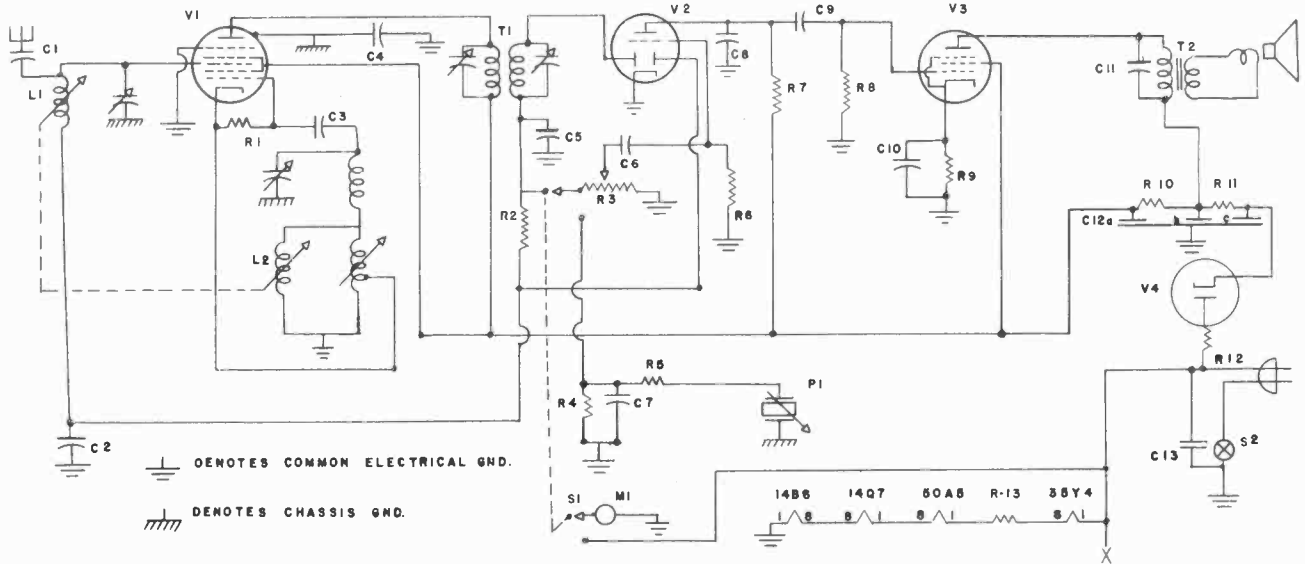
**TRIMMER AND TUBE LOCATION DIAGRAM**

**INSTALLATION:** The Model 126 is complete in every detail for efficient and immediate operation. A self-contained Loop Antenna is included, which will give excellent results in most locations. Due to the directional properties of the Loop, it may be advantageous to turn the receiver to the left or right in noisy locations for maximum signal and minimum noise. A best position for reception can always be found. In unfavorable locations where distant reception is required, a well-constructed outside antenna may be used, and connected to the green wire labeled "Ant." at the rear of the Loop. A water or gas pipe may be used as a ground and connected to the black wire labeled "Gnd." at the rear of the Loop.

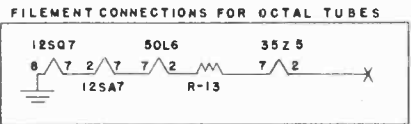
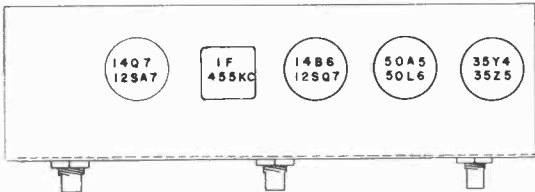
**CAUTION:** If this receiver is operated on D. C. (Direct Current), and you cannot obtain reception although the tubes are lighted, reverse the line cord plug to obtain the correct polarity. Objectionable hum or noise may also be eliminated on A. C. operation by reversing the line cord plug.

AUDAR INC.

MODEL PR-0



CIRCUIT DES.	PART NO.	DESCRIPTION	CIRCUIT DES.	PART NO.	DESCRIPTION
C1-C3	CM-85-11	COND. 50MMF 500V MICA	R9	RC-151-D	RES. CARBON, 150 OHM, 1 WATT
C2-C13	CP-15-9	.05MFD. 400V PAPER	R10	RC-102-C	" " 1000 " 1/2 WATT
C4	CP-01-9	.1 MFD "	R11	RC-221-D	" " 220 OHM 1 WATT
C5-C8	CM-325-11	250MMF 500V MICA	R12	RW-330-C	" " OR WIRE 33 OHM 1/2 WATT
C6-C9	CP-11-9	.01 MFD. 400V PAPER	R13	RW-50-H	RES. WIRE 50 OHM 5 WATT
C7	CP-21-9	.001 " "	S1		SWITCH, WAFER 2 POS.-2 POLE
C10	CE-E-1	10 MFD. 25V ELECTROLYTIC	S2		SWITCH ON VOLUME CONTROL, R3
C11	CP-12-9	.02 " 400V PAPER	T1	TIF-1	TRANSFORMER, IF, 455 KC
C12a-b-c	CE-LHM-4	a 20-b 20-c 50 150V ELECTROLYTIC	T2	TOS-20-3	TRANSFORMER, OUTPUT
L1-L2		TUNER, PERMEABILITY ASSEMBLY	V1		TUBE, 14Q7 OR 12SA7AT
M1	MP-200 MP-201	MOTOR, PHONO	V2		TUBE, 14B6 OR 12SQ76T
PI	PC-301M	PICKUP, CRYSTAL	V3		TUBE, 50A5 OR 50L6 GT
R1	RC-103-C	RES. CARBON-10K OHM 1/2 WATT	V4		TUBE, 35Y4 OR 35Z5
R2	RC-225-C	" " 2.2 MEGOHM 1/2 WATT			
R3	RVC-16-S	VOLUME CONTROL, 1 MEGOHM, WITH S2			
R4-R7	RC-224-C	RES. CARBON 220K OHM 1/2 WATT			
R5	RC-205-C	" " 2 MEGOHM " "			
R6	RC-475-C	" " 4.7 MEGOHM " "			
R8	RC-474-C	" " 470 K OHM " "			



## ALIGNMENT PROCEDURE

## I.F. ALIGNMENT:

1. The following adjustments have been made at the factory and should not be changed unless necessary, and then only by an authorized service man.
2. Set the signal generator to 455 kilocycles.
3. Connect an output meter so that the output can be determined.
4. Connect the high side of the signal generator output to the antenna lead of the tuner. The ground side of the signal generator output is connected to the common electrical ground through a 0.01 mfd. condenser.
5. Turn the volume control on full and turn the dial drive shaft so that the slugs of the tuner unit are all the way out (high frequency end).
6. Adjust the two I.F. trimmers, tuning each carefully to get the maximum deflection of the output meter.
7. Repeat both adjustments since the adjustment of each I.F. trimmer may effect the other to a certain extent.

## OSCILLATOR AND R.F. ALIGNMENT:

1. Connect the high side of the signal generator output to the insulation covering the antenna wire and not the wire itself.
2. Stretch antenna out to its full length.
3. Set the signal generator to 1650 kilocycles. Make sure that the slugs of the tuner are all the way out against the stop. Adjust the oscillator and antenna trimmers for maximum reading on the output meter.
4. Set the signal generator to 540 kilocycles. Turn the dial drive shaft until the slugs of the tuner are all the way in. Adjust the tracking core (screwdriver adjusted slug) to give maximum reading on the output meter.
5. Readjust as in steps 3 and 4.
6. Set signal generator to 1400 kilocycles. Turn the dial drive shaft until the 1400 kilocycle note is heard. Adjust the antenna core (core nearest the trimmers), by turning in or out with fingers, to give maximum reading on the output meter.

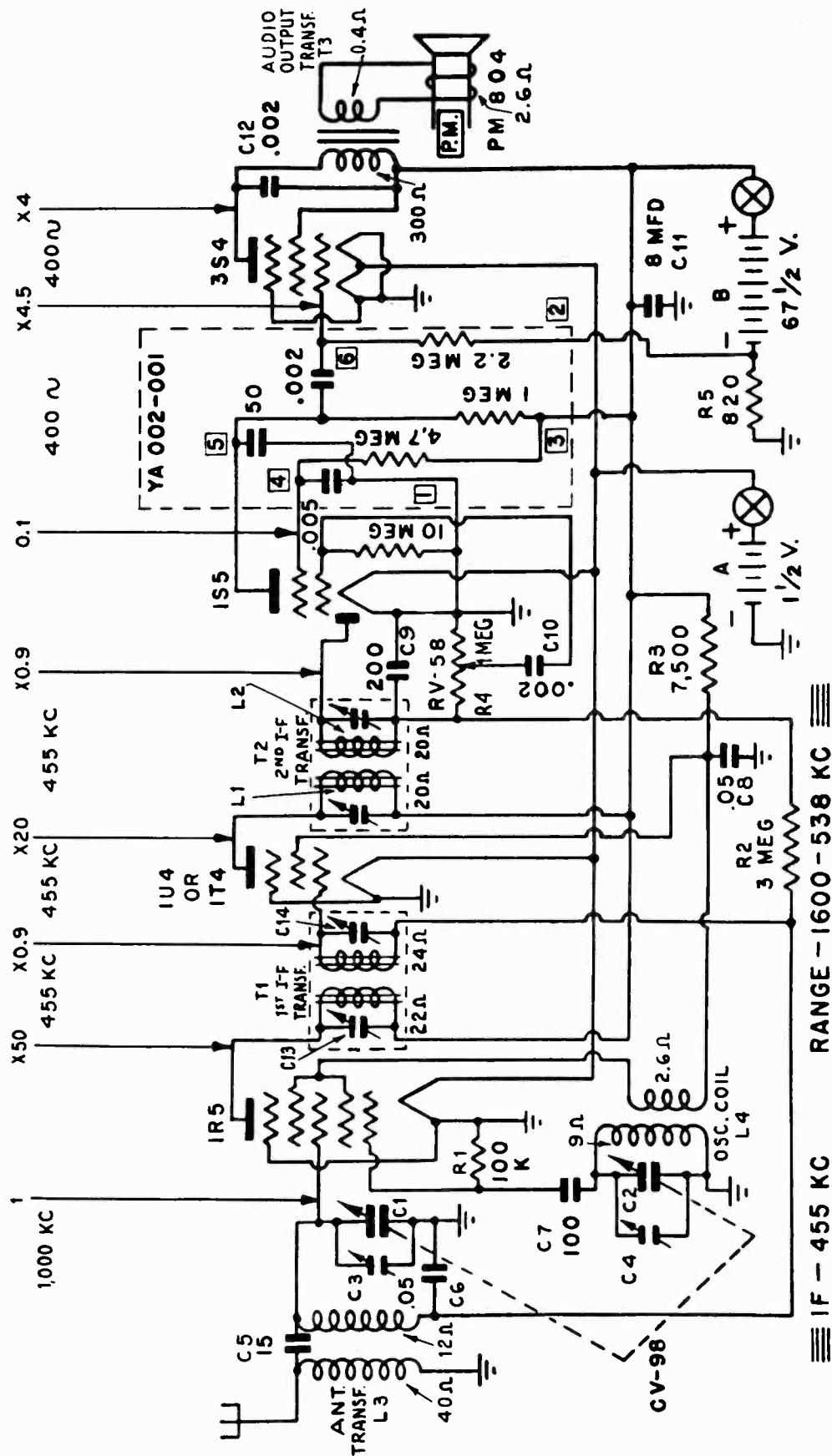
VOLTAGE TABLE

TYPE TUBE	1	2	3	4	5	6	7	8
1407	12.5 A.C.	92	92	-12	0	-1.05	0	25 A.C.
1486	0	65	-7	—	-9	-1.05	0	12.5 A.C.
30A5	74 A.C.	104	92	—	—	0	6.5	25 A.C.
35Y4	117 A.C.	112.5 A.C.	112	—	—	—	125	82 A.C.
12SA7	—	12.5 A.	92	92	-12	0	25 A.C.	-1.05
12SQ7	—	-7	0	-7	-1.05	65	12.5 A.C.	0
60L6	—	74 A.C.	104	92	0	—	25 A.C.	6.5
35Z5	—	117 A.C.	—	112	112.5 A.C.	—	82 A.C.	125

NOTE: USE HIGH RESISTANCE VOLTMETER 20,000 OHMS PER VOLT D.C. AND 1,000 OHMS PER VOLT A.C. READINGS MARKED WITH AN ASTERISK OBTAINED WITH A VACUUM TUBE VOLTMETER. ALL READINGS TAKEN UNDER NO SIGNAL CONDITION.

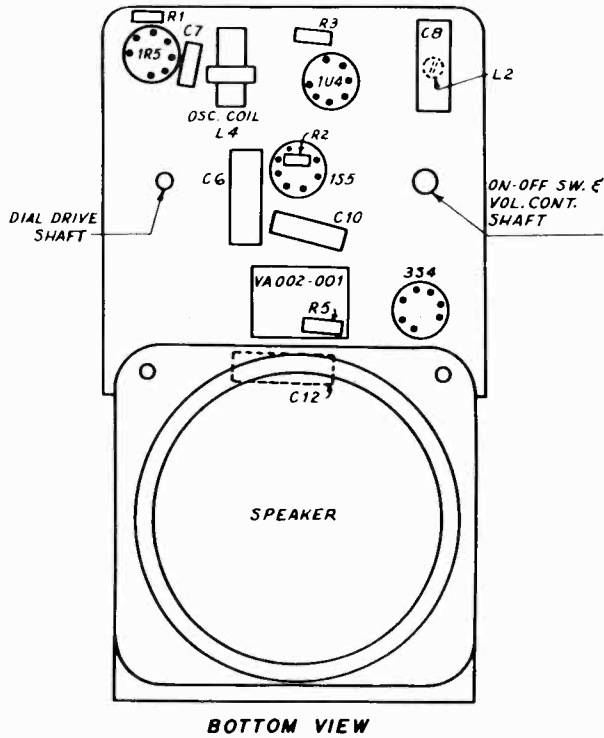
AUTOMATIC RADIO MFG. CO., INC.

MODEL B-44  
Bike Radio



MODEL B-44  
Bike Radio

AUTOMATIC RADIO MFG. CO., INC.



TUBE	PIN	V.T.V.M.	20,000 $\Omega$ /v.	RESISTANCE
1R5 CONV.	1	GND.	GND.	GND.
	2	+58	+58	OVER 1 MEG.
	3	+44	+44	OVER 1 MEG.
	4	-10	-6.5	175K
	5	0	0	LESS THAN 0.1 $\Omega$
	6	0	0	INFINITE
	7	+1.5	+1.5	5 $\Omega$
1U4 or 1T4 I.F. AMPL.	1	GND.	GND.	GND.
	2	+58	+58	OVER 1 MEG.
	3	+44	+44	OVER 1 MEG.
	4	N.C.	N.C.	N.C.
	5	GND.	GND.	GND.
	6	0	0	4 MEG.
	7	+1.5	+1.5	5 $\Omega$
1S5 DET. A.V.C. 1st AUDIO	1	GND.	GND.	GND.
	2	0	0	INFINITE
	3	0	0	28 $\Omega$ *
	4	+14	+10	OVER 5 MEG.
	5	+20	+16	OVER 1 MEG.
	6	0	0	10 MEG.
	7	+1.5	+1.5	5 $\Omega$
3S4 AUDIO OUTPUT	1	GND.	GND.	GND.
	2	+56	+56	OVER 1 MEG.
	3	-7	-1	2.2 MEG.
	4	+58	+58	OVER 1 MEG.
	5	+1.5	+1.5	5 $\Omega$
	6	+56	+56	OVER 1 MEG.
	7	GND.	GND.	GND.

Voltage and resistance measurements were made with respect to chassis ground, and with a B supply voltage of 65 V.D.C.

\*With Vol. Cont. full counter clockwise the resistance is 28  $\Omega$   
With Vol. Cont. full clockwise the resistance is 1 MEG.

ALIGNMENT PROCEDURE

Connect output meter across voice coil.

Connect the signal generator to the standard Hazeltine Loop Model 1150 and couple it loosely to the receiver loop. Set the volume control at maximum, and fully mesh the tuning capacitor.

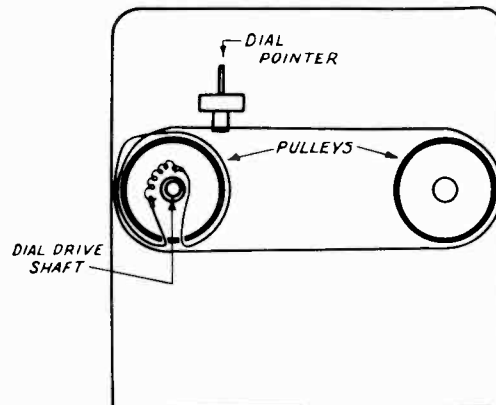
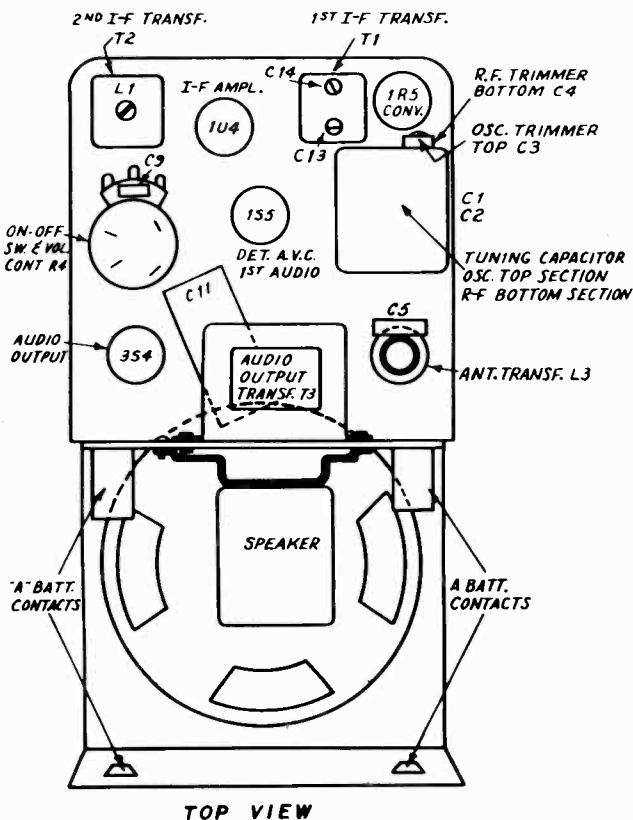
The output of the signal generator should be just sufficient to give a readable deflection on the output meter.

Set the signal generator to 455 kc and adjust i-f trimmers and slugs for maximum output in the following order: L2, L1, C14, C13. Repeat sequence if trimmers were badly maladjusted.

Set the signal generator and receiver to 1500 kc and adjust the oscillator trimmer C4 for maximum output.

Set the signal generator and receiver to 1400 kc and adjust the antenna trimmer C3 for maximum output.

Set the signal generator and receiver to 1500 kc and readjust oscillator trimmer C4 for maximum output



NOTE: TUNING CAPACITOR IN MAXIMUM CAPACITY POSITION

## BENDIX RADIO DIV.

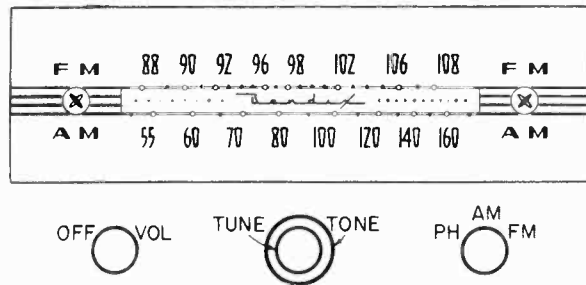
MODELS 69B8,  
69M8, 69M9

Fig. 2—Control Layout



Fig. 1—Models 69M8 &amp; 69M9—Mahogany; 69B8—Blonde

**GENERAL**

The Bendix Radio Models 69M8, 69B8, and 69M9 employ six tubes and a selenium rectifier to provide reception of the FM band and the AM standard broadcast band. The FM section of this receiver contains a tuned RF stage. The RF stage has its plate voltage removed when the range switch is in any but the FM position. The B+ is removed from the plates of the RF amplifier and mixer oscillator tubes when the band switch is in the PH position. Built in FM and AM antennas are mounted in the cabinet and a terminal board is provided on the rear of the cabinet for attaching external antennas. Each model contains a ten inch permanent magnet type speaker which is driven by a 50L6 audio output tube. Two multi-purpose tubes are used. One, the 19T8, combines the functions of an AM demodulator, FM detector, and first audio amplifier in one envelope. The other multi-purpose tube, the 12AT7, is a double triode and is used as a mixer-oscillator tube.

The power supply required for these models is 105-120 volts 60 cycle AC since a phono motor is included. The radio chassis itself is operative on AC or DC, but the phono motor would be damaged beyond repair if operated on DC.

**SPECIFICATIONS**

- Power Requirements
  - 105-120V 60 cycle AC
- Power Consumption
  - Radio 50W — Phono Turntable 25W
- Tuning Frequency Range
  - AM — 540-1620KC
  - FM — 88-108MC
- Intermediate Frequency
  - AM — 455KC — FM — 10.7MC
- Power Output
  - Maximum — 2.5W
- Tube Complement
  - 3—12BA6, 12AT7, 19T8, 50L6 — Total
  - 6 Tubes Plus Selenium Rectifier
- Loudspeaker — PM 10 Inch
- Record Changer
  - Models 69M8 and 69B8
    - Automatic for Twelve 10-inch or Ten 12-inch Standard Lateral Cut or Long Play Microgroove Records.
  - Model 69M9
    - Automatic for Twelve 10-inch or Ten 12-inch Standard Lateral Cut Records.
- Overall Dimensions — All Models
  - Height 33 5/16"; Width 33";
  - Depth 15 15/16"
- Shipping Weight — All Models — 75 lbs.



MODELS 69B8,  
69M8, 69M9

BENDIX RADIO DIV.

### PRELIMINARY ALIGNMENT PROCEDURE

The AM circuits should be aligned before the FM section because of possible interaction between the IF coils. Before attempting to align set allow receiver and test equipment to warm up for at least five minutes. Whenever possible, have a speaker connected to the output and use a 30% amplitude modulated signal in order to identify weak signals in a poorly tuned set. The antenna trimmer for AM which is attached to the loop antenna must be adjusted when the chassis is replaced in the cabinet, since the antenna loop is installed in the cabinet and cannot be removed with the chassis. It

may be necessary to adjust the FM antenna trimmer slightly when the chassis is replaced in the cabinet.

#### TEST EQUIPMENT REQUIRED

- Signal Generator
  - AM 455 KC to 106 MC
  - FM 10.7 MC & 88-108MC.
- Vacuum Tube Voltmeter  
(ground or minus must be isolated from power line)
- Capacitors, .01 mfd and 100 mmf
- Alignment Screwdrivers
- Standard Output Meter

### AM ALIGNMENT

**PRELIMINARY PROCEDURE:** With gang condenser closed, set dial pointer to coincide with reference mark etched into dial back plate. See Fig. 5. Place band switch in AM position and use a 30% modulated signal throughout. Connect an output meter across voice coil. Adjust Antenna Trimmer C87 after chassis is installed in the cabinet. Keep input as low as possible while obtaining a stable output meter reading.

GENERATOR FREQUENCY	GENERATOR COUPLING	DUMMY ANTENNA	SPECIAL CONDITIONS	DIAL SETTING	ADJUSTMENTS	REMARKS
1.) 455 KC AM	High Side—Term. #5 gang cond. Low side—common ground	.01 mfd capacitor	Short AM Osc. Term. #1 to common ground	Gang condenser fully open	Top slug of T1, T2, T4 and bottom slug of T4	Adjust for maximum output. Repeat several times to insure maximum output
2.) 1475 KC AM	High side—Term. #3 gang cond. Low side—common ground	100 mmf capacitor	Remove short from Osc. Term. #1	1475 KC Ref. mark	C79	Rock tuning control while adjusting for maximum output
3.) 965 KC AM	"	"		965 KC Ref. mark		* Check Calibration
4.) 580 KC	"	"		580 KC Ref. mark		* Check Calibration

\* If calibration does not check within tolerances denoted by etched lines on dial backplate, oscillator gang rotor plates must be bent to obtain proper calibration. This operation is very delicate and should be attempted only by properly trained personnel.

#### FM ANTENNA

The FM antenna used in Models 69M8, 69B8, and 69M9 will not be found in the Replacement Parts List since the service man, by following the specifications in the drawing, Fig. 3, can very easily and inexpensively make the antenna himself.

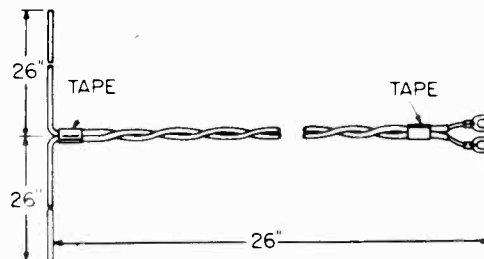


Fig. 3—FM Antenna

### FM ALIGNMENT CW METER METHOD

**PRELIMINARY ALIGNMENT PROCEDURE:** With gang condenser fully closed, adjust dial pointer to coincide with the reference mark etched into dial back plate. See Fig. 5. Place band switch in FM position. Use 30% amplitude modulated signals when possible.

GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR COUPLING	SPECIAL CONDITIONS	DIAL SETTING	VTVM CONNECTIONS	ADJUSTMENTS	REMARKS
1.) 10.7 MC AM or CW	.01 mfd capacitor	High side—term. #8 Gang Condenser. Low side—common ground	Short FM Osc. Term. #2 of Gang Condenser to common ground	Gang Condenser fully open	+Lead to B— —Lead to Pin #2 of tube 19T8	Bottom slug of T1, T2, Bottom slug of T3	Adjust for maximum AVC reading on VTVM. Repeat adjustment several times to insure maximum reading
2.) Remove Signal Generator		Remove Signal Generator	Short FM Osc. term. #2 of gang condenser to common ground. Two 100K matched resistors in series connected between Pin #2 of tube 19T8 & B—	"	Center Tap of 100K resistors and term. #6 of switch SIC	Adjust VTVM for Zero	While connected to chassis, the VTVM is adjusted to zero by its zero centering control
3.) 10.7 MC AM or CW	.01 mfd capacitor	High side—term. #3 of Gang condenser. Low Side—Common Ground	"	"	"	Top slug of T3	Adjust top slug to produce zero reading on VTVM
4.) Repeat in Step 3.	Steps 1, 2, and 3 until Step 1 produces no change in Step 3 adjustment and bottom of T3 produces no deflection						
5.) 106 MC	FM Dummy Antenna (See Fig. 4)	FM Dummy Antenna (See Fig. 4)	Remove short from Term. #2 of gang condenser. Remove 100K Resistors	106 MC Ref. mark	+Lead to B— —Lead to Pin #2 of tube 19T8	Osc. trimmer C9, then RF, C3c & Ant., C3b	Rock tuning control when adjusting C9 for maximum AVC reading, then adjust C3c and C3b respectively for max.†
6.) 97 MC AM or CW	"	"		97 MC Ref. mark	"		* Check Calibration
7.) 90 MC AM or CW	"	"		90 MC Ref. mark	"		* Check Calibration

† Oscillator operates on high frequency side of incoming signal but it is possible to adjust to the low side. Set Signal Generator to 84.6 MC and if signal is heard readjust oscillator trimmer at signal generator frequency of 106 MC and check again at 84.6 MC. Signal should not be heard.

\* If calibration is not within reasonable tolerance at these points, the inductance of the FM oscillator coil must be adjusted. If dial pointer reading is on low frequency side, inductance of oscillator coil is too low and turns of coil must be compressed slightly. If pointer reading is on high frequency side, the coil inductance is too high and coil turns must be spread slightly. Repeat steps 5, 6, and 7 until correct calibration is obtained.

To adjust RF coil, tune receiver to 90 MC and observe AVC reading. Insert into RF coil, the iron core of tuning wand (rod of insulating material one end of which contains an iron core slug and the other end contains a non-ferrous metallic slug). If reading increases, the inductance of coil is too low and, turns must be spread slightly. If reading decreases, insert opposite end (non-ferrous) of tuning wand into RF coil. Inductance of coil is too low if reading increases and, turns must be compressed slightly. Correct adjustment is obtained when insertion of either end of tuning wand causes the reading to decrease.

The antenna coil inductance is adjusted in the same manner as the RF coil.

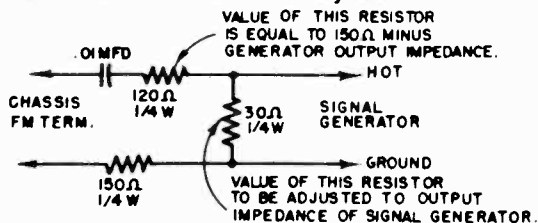


Fig. 4—FM Dummy Antenna

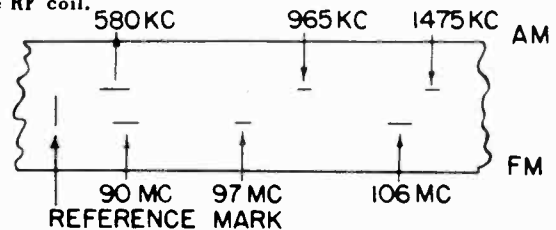


Fig. 5—Dial Reference Points

**VISUAL ALIGNMENT**

The ratio detector in the FM section of this radio receiver can be aligned by the so-called Visual Alignment method. This method can be used in conjunction with the CW method by following the procedure outlined below:

1. Perform Step 1 indicated in CW Meter Method Chart.
2. Set Signal Generator to 10.7 MC, FM, with sweep width at maximum possible (should be a minimum of 200 KC). Connect output of generator to terminal #4 of gang condenser and B-.
3. Connect vertical input of cathode ray oscilloscope to terminal #6 of switch S1C and B-, and place a 60 cycle sine wave signal to horizontal input if oscilloscope does not have an internal 60 cycle sweep.
4. Adjust signal generator frequency until "S" curve (Fig. 6) is centered on the

horizontal sweep. Curve may be reversed because of internal circuit of oscilloscope.

5. Adjust primary of T3 (top slug) and secondary (bottom slug) for maximum desired "S" curve. A VTVM can be very useful at this point if connected to pin #2 of tube 19T8 and B-. The oscilloscope will then indicate the most linear curve and the VTVM will indicate the maximum AVC voltage.
6. Adjust bottom of slugs of T1 and T2 and then repeat step 5 to insure correct alignment.
7. Continue at this point with the alignment procedure starting with step 5 as outlined in the FM-CW Meter Method.

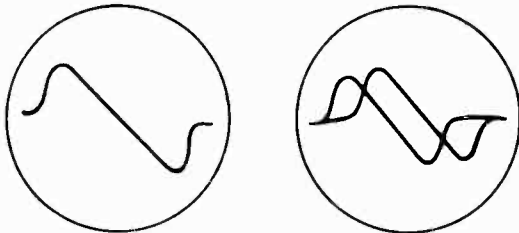


Fig. 6—S Curves

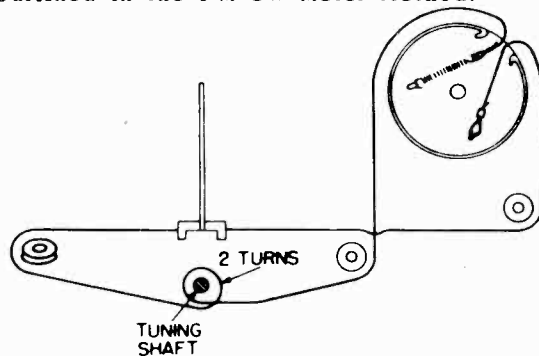


Fig. 7—Dial Stringing Diagram

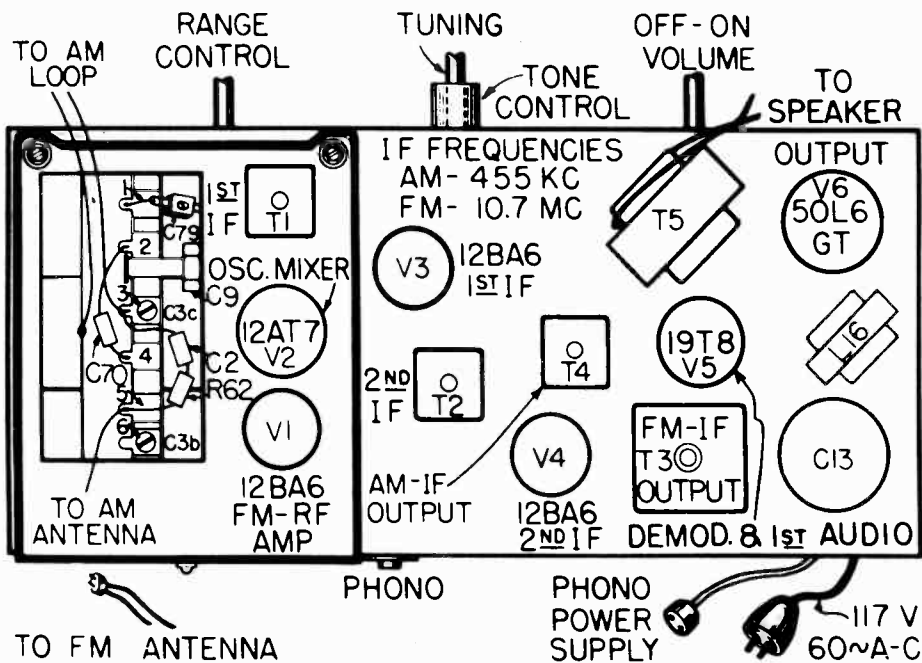
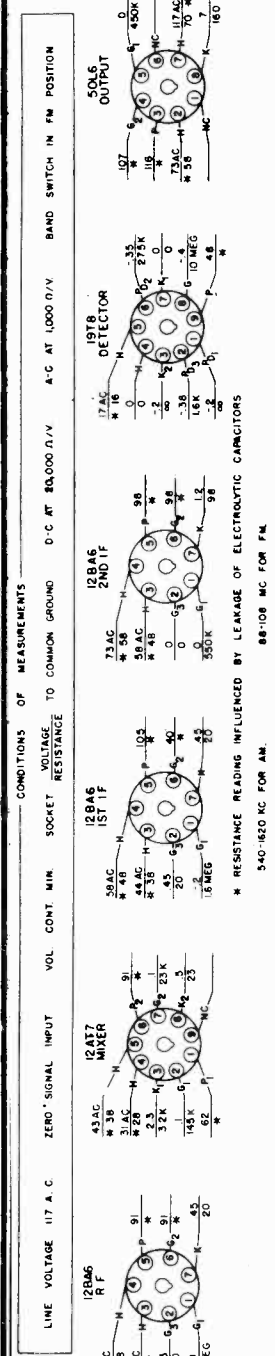
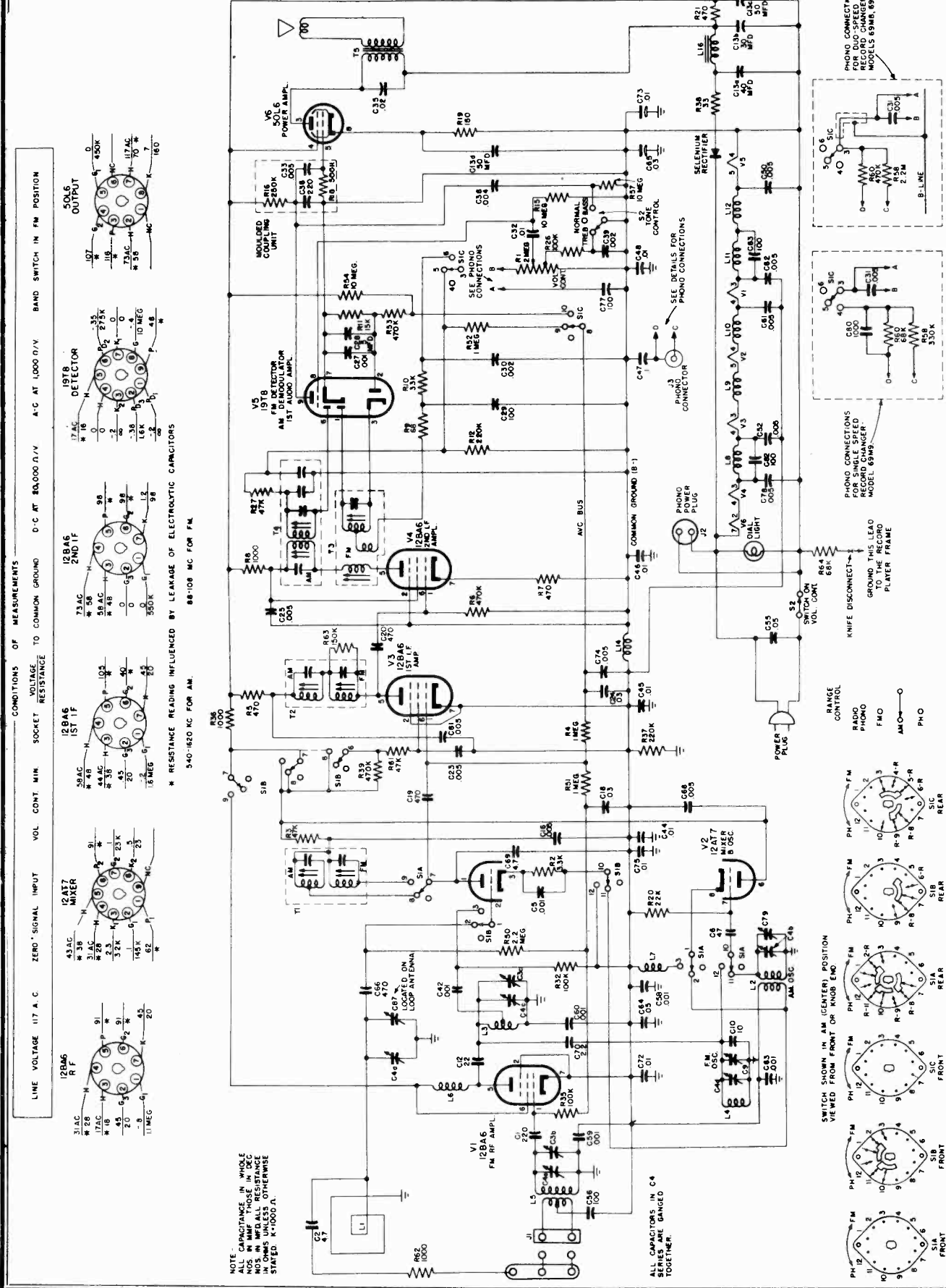


Fig. 8—Trimmer Location

BENDIX RADIO DIV.

MODELS 69B8, 69M8, 69M9



CONDITIONS OF MEASUREMENTS  
 LINE VOLTAGE 117 A. C.  
 ZERO SIGNAL INPUT  
 VOL. CONT. MIN.  
 SOCKET VOLTAGE TO COMMON GROUND  
 D. C. AT 50.000.0. V  
 A. C. AT 1000.0. V  
 BAND SWITCH IN FM POSITION

NOTE - ALL CAPACITANCE IN WHOLE NOS IN MF. ALL RESISTANCE IN OHMS UNLESS OTHERWISE STATED. K=1000. A.

\* RESISTANCE READING INFLUENCED BY LEAKAGE OF ELECTROLYTIC CAPACITORS  
 540-1620 KC FOR AM.  
 88-108 MC FOR FM.

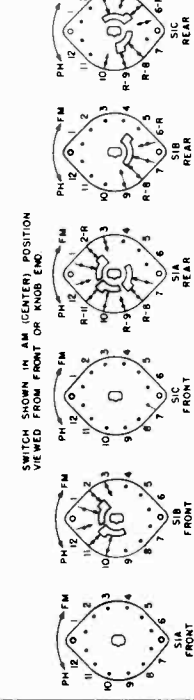
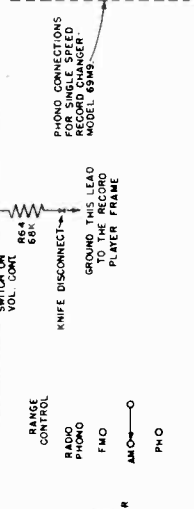
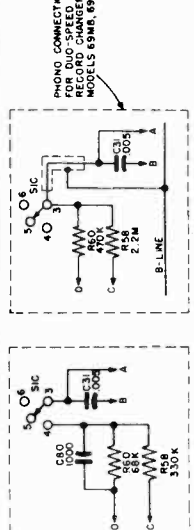


Fig. 9 - Schematic Diagram of Models 69M8, 69B8, and 69M9

## BENDIX RADIO DIV.

MODELS 69B8,  
69M8, 69M9**CHASSIS IDENTIFICATION**

The 69M8 and 69B8 chassis are identical and they differ from the 69M9 chassis only in the type of phono input circuit used. Models 69M8 and 69B8 include a dual speed record changer which requires a different phono input circuit than the single speed record changer that is installed in Model 69M9.

Models 69M8 and 69B8 chassis can be identified by the two resistors 470K and 2.2 meg, connected to terminal 4 of switch S1C. Model 69M9 chassis has two resistors, 68K and 330 K, connected to terminal 4 of switch S1C.

**CHASSIS CODES**

The chassis are coded by a large block letter within a square stamped in ink on the chassis rear apron visible from the back of the cabinet. Although code A chassis normally are not marked, check any unmarked chassis against following chart to insure proper code identification. In this chart the component revisions effected by various changes are listed in the left hand column. Under the right hand columns headed A, B, C, etc., are listed the revisions as applied to each chassis code.

DESCRIPTION OF CHASSIS DIFFERENCES	CHASSIS USED WITH DUAL SPEED RECORD CHANGER				CHASSIS USED WITH SINGLE SPEED RECORD CHANGER				
	A	B	C	D	A	B	C	D	E
Value of Resistor R61 in ohms.	1000	1000	47K	47K	1000	1000	1000	47K	47K
Chassis includes Resistor R63, 150K 1/4W, connected in parallel with AM coil of IF Transformer T2.	No	No	Yes	Yes	No	No	No	Yes	Yes
Chassis includes either Capacitor C84, .05 mfd 400V, or Resistor R64, 68K 1/2W, connected to common ground (B-) and grounded at Record Changer frame.	C84	C84	C84	R64	C84	C84	C84	C84	R64
Chassis includes antenna trimmer Capacitor C3a mounted on variable capacitor.	No	Yes	No	No	No	Yes	Yes	No	No
Chassis includes antenna trimmer Capacitor C87 mounted on loop antenna.	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes
Chassis includes Coil L15 wrapped on Capacitor C85, 100 mmf, connected between B+ and junction of Resistors R36 and R5.	No	Yes	No	No	No	Yes	Yes	No	No
Chassis includes Capacitor C11, .005 mfd, one lead of which is connected to common ground (B-) and the other lead of which is connected to junction of Coil L15, Capacitor C85, and B+.	No	Yes	No	No	No	Yes	Yes	No	No
Value of Resistor R8 in ohms, 1/2W.	1000	470	1000	1000	1000	470	470	1000	1000
Chassis includes Capacitor C26, .005 mfd, connected between pin #7 of tube V4 (12BA6) and common ground (B-).	No	Yes	No	No	No	Yes	Yes	No	No
Value of Resistor R9 in ohms, 1/4W.	68	33	68	68	68	33	33	68	68
Value of Capacitor C29 in mmf.	100	150	100	100	100	150	150	100	100
Chassis includes Capacitor C51, .005 mfd, connected between pin #3 of V3 (12BA6) and common ground (B-).	No	Yes	No	No	No	Yes	Yes	No	No
Chassis includes Capacitor C67, 4.7 mmf, connected between pins #1 and #7 of tube V5 (19T8).	No	Yes	No	No	No	Yes	Yes	No	No
Value of Resistor R11.	15K	22K	15K	15K	15K	22K	22K	15K	15K
Value of Capacitor C32 in mfd, 400V.	.01	.03	.01	.01	.01	.03	.03	.01	.01

BENDIX RADIO DIV.

MODELS 69B8,  
69M8, 69M9

REPLACEMENT PARTS LIST

Used On Chassis Codes		Stock No.	Symbol No.	Description	Used On Chassis Codes		Stock No.	Symbol No.	Description
69M8, 69B8	69M9				69M8, 69B8	69M9			
<b>ELECTRICAL COMPONENTS</b>					<b>ELECTRICAL COMPONENTS—(Continued)</b>				
ALL	ALL	AC0C01	C33,36; R16, 18	ASSY—Capacitor Resistor Coupling Plate	B ALL	B,C ALL	LF0C00 RV4S13	C85 & L15 R1; S2	ASSY—RF Choke ASSY—Potentiometer with Switch
ALL	ALL	CC9A38	C1	CAPACITOR—Ceramic 220 mmf	ALL	ALL	RC23A332M	R2	RESISTOR—Comp. 3.3K 1/2W
ALL	ALL	CC0A18	C2, 69	CAPACITOR—Ceramic 4.7 mmf	ALL	ALL	RC22A473M	R3,27	RESISTOR—Comp. 47K 1/4W
ALL	ALL	CV0D01	C3b,c; C4a,b,c, d,e	CAPACITOR—Variable	ALL	ALL	RC22A105M	R4,51,52	RESISTOR—Comp. 1 meg 1/4W
ALL	ALL	CM5A46	C5	CAPACITOR—Mica .001 mfd 300V	ALL	ALL	RC23A102M	R5,36,62	RESISTOR—Comp. 1000 ohms 1/2W
ALL	ALL	CC8B30	C6	CAPACITOR—Ceramic 47 mmf ±10% 500V	ALL	ALL	RC22A474M	R6,39,53, 60	RESISTOR—Comp. 470K 1/4W
ALL	ALL	CT1B05	C9	CAPACITOR—Corning Glass Trimmer 1-8 mmf	ALL	ALL	RC23A101M	R7	RESISTOR—Comp. 100 ohms 1/2W
ALL	ALL	CC8B22	C10	CAPACITOR—Ceramic 10 mmf ±10% 500V	A,C,D	A,D,E	RC23A102M	R8	RESISTOR—Comp. 1000 ohms 1/2W
B	B,C	CC0M00	C11,26,51	CAPACITOR—Ceramic .005 mfd Min Value 500V	B	B,C	RC23A471M	R8	RESISTOR—Comp. 470 ohms 1/2W
ALL	ALL	CC0A26	C12	CAPACITOR—Ceramic 22 mmf	A,C,D	A,D,E	RC22A680M	R9	RESISTOR—Comp. 68 ohms 1/4W
ALL	ALL	CE4A03	C13	CAPACITOR—Electrolytic 50-40-30 mfd 150V 50 mfd 25V	B	B,C	RC22A330M	R9	RESISTOR—Comp. 33 ohms 1/4W
ALL	ALL	CC0M00	C16,23,25, 31,50,52, 61,62,68, 74,78,81	CAPACITOR—Ceramic .005 mfd	ALL	ALL	RC22A333M	R10	RESISTOR—Comp. 33K 1/4W
ALL	ALL	CP4T36	C18,24,65	CAPACITOR—Paper .03 mfd 400V	A,C,D	A,D,E	RC22A153M	R11	RESISTOR—Comp. 15K 1/4W
ALL	ALL	CC9M42	C19,20,66	CAPACITOR—Ceramic 470 mmf Min Value	B	B,C	RC22A223M	R11	RESISTOR—Comp. 22K 1/4W
ALL	ALL	CC9M50	C27,42,58, 59,60,63	CAPACITOR—Ceramic .001 mfd Min Value	ALL	ALL	RC22A224M	R12, 37	RESISTOR—Comp. 220K 1/4W
ALL	ALL	CE1T06	C28	CAPACITOR—Electrolytic 5 mfd 50V	ALL	ALL	RC22A106M	R15,54,57	RESISTOR—Comp. 10 meg 1/4W
A,C,D	A,D,E	CC9A34	C29	CAPACITOR—Ceramic 100 mmf 500V	ALL	ALL	AC0C01	R16, 18; C33,36	ASSY—Capacitor Resistor Coupling Plate
B	B,C	CC9A36	C29	CAPACITOR—Ceramic 150 mmf 500V	ALL	ALL	RC23A151M	R19	RESISTOR—Comp. 150 ohms 1/2W
ALL	ALL	CP6T12	C30,39	CAPACITOR—Paper .002 mfd 600V	ALL	ALL	RC22A223M	R20	RESISTOR—Comp. 22K 1/4W
A,C,D	A,D,E	CC9R80	C32	CAPACITOR—Ceramic .01 mfd 450V	ALL	ALL	RC24A471M	R21	RESISTOR—Comp. 470 ohms 1W
B	B,C	CP4T36	C32	CAPACITOR—Paper .03 mfd 400V	ALL	ALL	RC22A104M	R26,32,35	RESISTOR—Comp. 100K 1/4W
ALL	ALL	AC0C01	C33,36; R16,18	ASSY—Capacitor Resistor Coupling Plate	ALL	ALL	RW1F06	R38	RESISTOR—Flexible Wirewound 1W
ALL	ALL	CP4T34	C35	CAPACITOR—Paper .02 mfd 400V	ALL	ALL	RW2F66	R50	RESISTOR—Metalized 2.2 meg 1/3W
ALL	ALL	CP6T16	C38	CAPACITOR—Paper .004 mfd 600V	ALL	ALL	RC22A225M	R58	RESISTOR—Comp. 2.2 meg 1/4W
ALL	ALL	CC9R80	C44,45,46, 48,72,73, 75	CAPACITOR—Ceramic .01 mfd 450V	A,B	A,B,C	RC23A102M	R61	RESISTOR—Comp. 1000 ohms 1/2W
ALL	ALL	CP4T51	C47	CAPACITOR—Paper .1 mfd 400V	C,D	D,E	RC22A473M	R61	RESISTOR—Comp. 47K 1/4W
ALL	ALL	CP4T40	C55,64	CAPACITOR—Paper .05 mfd 400V	C,D	D,E	RC22A154M	R63	RESISTOR—Comp. 150K 1/4W
ALL	ALL	CC9A34	C56,77	CAPACITOR—Ceramic 100 mmf 500V	D	E	RC23A683M	R64	RESISTOR—Comp. 68K 1/2W
B	B,C	CC0A18	C67	CAPACITOR—Ceramic 4.7 mmf 500V	ALL	ALL	AL0Z15	L1	ANTENNA—Loop AM
ALL	ALL	CC0A14	C70	CAPACITOR—Ceramic 2.2 mmf	ALL	ALL	LO7B01	L2	TRANSFORMER—BC Osc.
ALL	ALL	CT1A20	C79	CAPACITOR—Trimmer 4-40 mmf	ALL	ALL	L10F01	L3	COIL—RF Choke
ALL	ALL	LF0C00	C82 & L8; C83 & L11	ASSY—Capacitor Coil 10.7 MC	ALL	ALL	LO7F00	L4	COIL—FM Oscillator
A,B,C	A,B,C, D	CP4T40	C84	CAPACITOR—Paper .05 mfd 400V	ALL	ALL	LA0F01	L5	COIL—FM Antenna
					ALL	ALL	LF0A08	L6,7,9, 10,12	COIL—RF Filament Choke 2 mh
					ALL	ALL	LF0C00	L8 & C82; L11 & C83	ASSY—Capacitor Coil 10.7 MC
					ALL	ALL	LF0A07	L14	COIL—RF Choke 4.5 MC
					B	B,C	LF0C00	L15 & C85	ASSY—RF Choke
					ALL	ALL	LF01u2	L16	COIL—Filter Choke

MODELS 69B8,  
69M8, 69M9

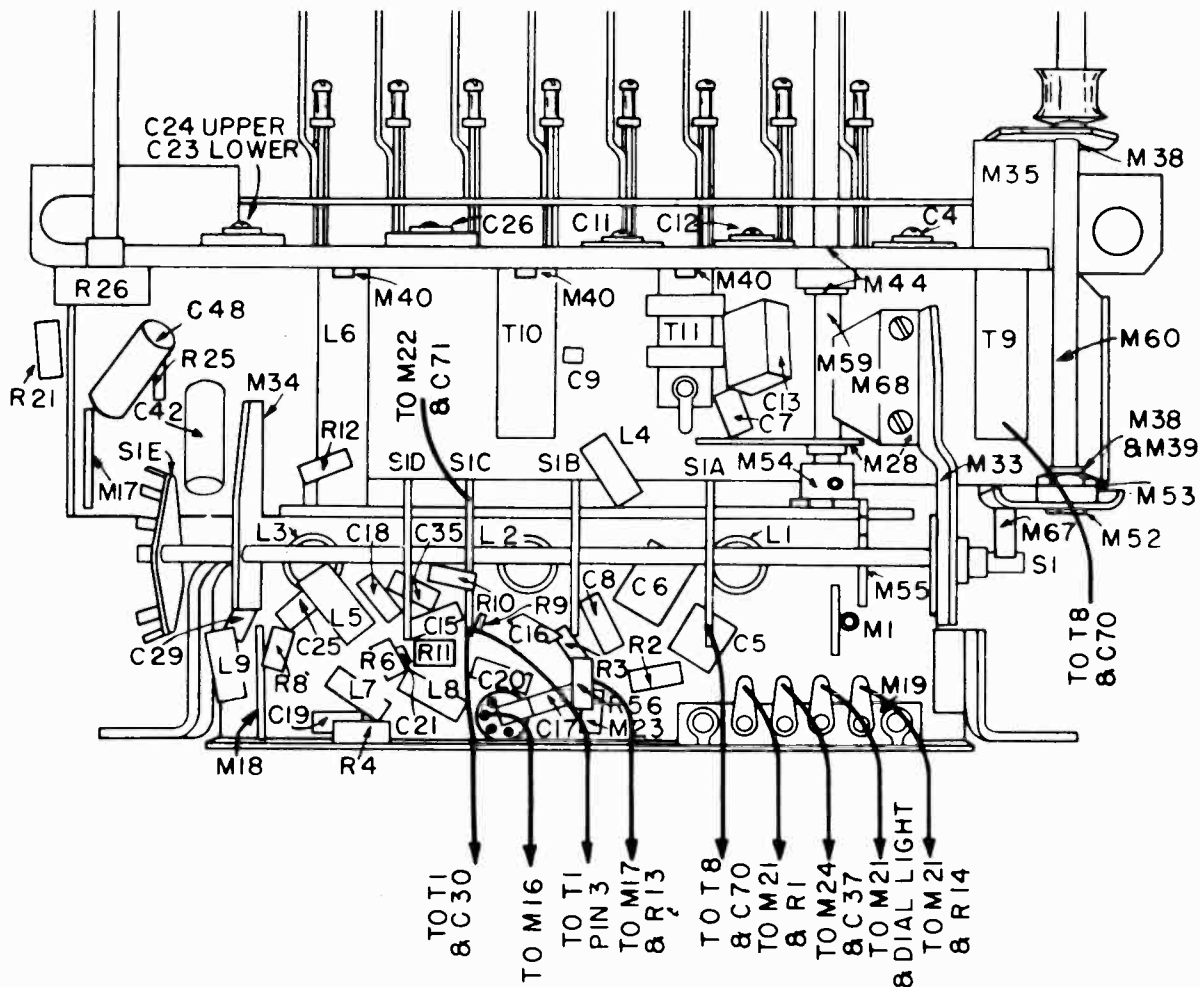
BENDIX RADIO DIV.

## REPLACEMENT PARTS LIST—Continued

Used On Chassis Codes		Stock No.	Symbol No.	Description	Used On Chassis Codes		Stock No.	Symbol No.	Description
69M8, 69B8	69M9				69M8, 69B8	69M9			
<b>ELECTRICAL COMPONENTS—(Continued)</b>					<b>MECHANICAL COMPONENTS—(Continued)</b>				
ALL	ALL	TI0C12	T1	TRANSFORMER—1st IF	ALL	ALL	PI0P01	PLATE—Line Cord Insulator	
ALL	ALL	TI0D20	T2	TRANSFORMER—2nd IF	ALL	ALL	SM0T10	SHIELD—Metal, Miniature Tube	
ALL	ALL	TR0R00	T3	TRANSFORMER—Ratio Detector	ALL	ALL	SO7M09	SOCKET—Main Chassis 7 Prong Min. Tube	
ALL	ALL	TI0D23	T4	TRANSFORMER—AM 3rd IF	ALL	ALL	SO7M10	SOCKET—Sub-Chassis 7 Prong Min. Tube	
ALL	ALL	TA0O20	T5	TRANSFORMER—Audio Output	ALL	ALL	SO9M00	SOCKET—Tube 9 Prong	
ALL	ALL	QR0S01		RECTIFIER—Selenium	ALL	ALL	SO0D12	SOCKET—Dial Light	
ALL	ALL	SR3F00	S1	SWITCH—Rotary 3 Section 3 Position	ALL	ALL	SO8S01	SOCKET—Octal Tube	
ALL	ALL	RV4S13	S2, R1	ASSY—Potentiometer With Switch	ALL	ALL	WF0I00	WASHER—Phono Input Insulating 23/64 x 15/16 x .015	
ALL	ALL	SS1C02	S3	SWITCH—Slide 2 Pole 3 Position	ALL	ALL	XS0C11	STRIP—Sub-Chassis Insulating Plate	
ALL	ALL	SP0R01		SPEAKER—PM 10"	ALL	ALL	XS0C13	STRIP—Sub-Chassis Ground Plate	
ALL	ALL	C7		LAMP—Dial 125V	ALL	ALL	XS0C15	STRIP—Right Angle Common Ground	
ALL	ALL	BT1S03		BOARD—Terminal 2 Lug 1 Mtg.	ALL	ALL	XS0C18	STRIP—Straight Common Ground	
ALL	ALL	BT3S06		BOARD—Terminal 3 Lug 1 Mtg.	ALL	ALL	ZB0M03	BUTTON—Chassis Plug	
ALL	ALL	BT4S06		BOARD—Terminal 4 Lug 1 Mtg.	<b>CABINET COMPONENTS</b>				
ALL	ALL	BT6S04		BOARD—Terminal 6 Lug 2 Mtg.	ALL	ALL	BT3S09	BOARD—Terminal 3 Lug 2 Mtg.	
ALL	ALL	BT8S00		BOARD—Terminal 8 Lug 2 Mtg.	ALL	ALL	BZ0B29	BACK—Cabinet Cover	
ALL	ALL	CD0N01		CABLE—Dial	ALL	ALL	BZ0D45	BAFFLE—Cardboard & Cloth (Models 69M8 & 69M9)	
ALL	ALL	CL2A08		CORD—AC Line	ALL	ALL	BZ0D46	BAFFLE—Cardboard & Cloth (Model 69B8)	
ALL	ALL	GR0S09		GROMMET—Sub-chassis Mtg. Rear	ALL	ALL	DS0C15	DIAL—Scale	
ALL	ALL	GR0S15		GROMMET—Sub-chassis Mtg. Top	ALL	ALL	ED0M06	ESCUTCHEON—Dial, Metal	
ALL	ALL	HB0M74		BRACKET—Indicator Slide Rail	ALL	ALL	HC0S10	CLIP—Control Knob Retainer Ring	
ALL	ALL	HB0M84		BRACKET—Dial Back Plate Mtg.	ALL	ALL	HC0S68	CLIP—Concentric Knob Retainer Ring	
ALL	ALL	HB0M86		BRACKET—Sub-chassis Mtg.	ALL	ALL	HC0S69	CLIP—Dial Retainer	
ALL	ALL	HB0M87		BRACKET—Dial Light Mtg.	ALL	ALL	HK0R17	KNOB—Door Pull	
ALL	ALL	HC0M08		CLAMP—Tube Shield Base	ALL	ALL	HK0T00	KNOB—Tray Pull	
ALL	ALL	HC0S00		CLIP—Tuning Shaft Spring	ALL	ALL	HZ0C12	CATCH—Bullet (Models 69M8 & 69M9)	
ALL	ALL	HC0S60		CLIP—IF Can Spring Retainer Mtg.	ALL	ALL	HZ0C13	CATCH—Bullet (Model 69B8)	
ALL	ALL	HC0S67		CLIP—Spring, Glass Trimmer	ALL	ALL	HZ0G01	GLIDE—Metal	
ALL	ALL	HS0C75		SPRING—Dial Cord Drum	ALL	ALL	HZ0H04	HINGE—Door (Models 69M8 & 69M9)	
ALL	ALL	HS0C88		SPRING—Coil Tension	ALL	ALL	HZ0H20	HINGE—Door (Model 69B8)	
ALL	ALL	HS0F19		SLEEVE—Spacer	ALL	ALL	JP2O07	JACK—Plug 2 Contact	
ALL	ALL	HS0S13		STUD—Chassis Shock-mount	ALL	ALL	KC0B16	KNOB—Control Brown (Models 69M8 & 69M9)	
ALL	ALL	ID0M21		INDICATOR—Metal	ALL	ALL	KC0L03	KNOB—Control Beige (Model 69B8)	
ALL	ALL	JR2O12	J1	RECEPTACLE—2 Contact	ALL	ALL	KY0B02	KNOB—Concentric Brown (Models 69M8 & 69M9)	
ALL	ALL	JR2O14	J2	RECEPTACLE—Phono 2 Contact	ALL	ALL	KY0L00	KNOB—Concentric Beige (Model 69B8)	
ALL	ALL	JR1S00	J3	RECEPTACLE—Phono 1 Contact	ALL	ALL	RD0F01	REFLECTOR—Dial Light	
ALL	ALL	MB0B00		BEARING—Brass, Tuning Shaft	ALL	ALL	WF0F17	WASHER—Felt (Conc. Knob)	
ALL	ALL	ML0C04		LEVER—Tone Control	ALL	ALL	XS0Z14	STRIP—Loop Support With Terminal Board	
ALL	ALL	MP0I00		PULLEY—Idler Fiber	ALL	ALL	ZW6G05	CABINET—Mahogany (Models 69M8 & 69M9)	
ALL	ALL	MS0T19		SHAFT—Tuning	ALL	ALL	ZW6G06	CABINET—Blonde Mahogany (Model 69B8)	
ALL	ALL	PB0D06		PLATE—Back					
ALL	ALL	PI0C01		PLATE—Electrolytic Capacitor Mtg.					







Component Diagram—Bottom View of Tuner Chassis

**CHASSIS CODE CHANGES**

**CODE "A" AND UNCODED CHASSIS**

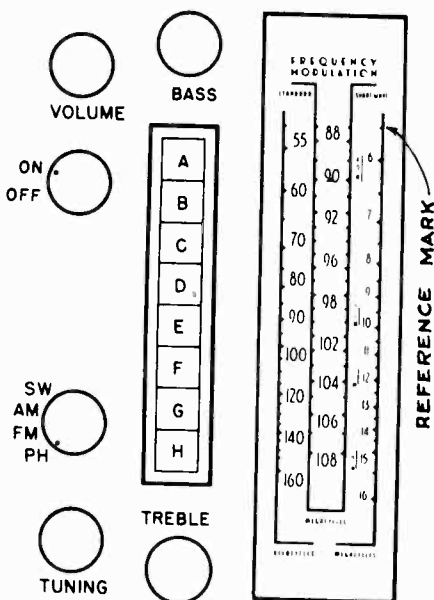
First audio amplifier was a 6J5.  
 FM antenna was connected to a tap on the antenna coil (L1) instead of by link.

**CODE "B" CHASSIS**

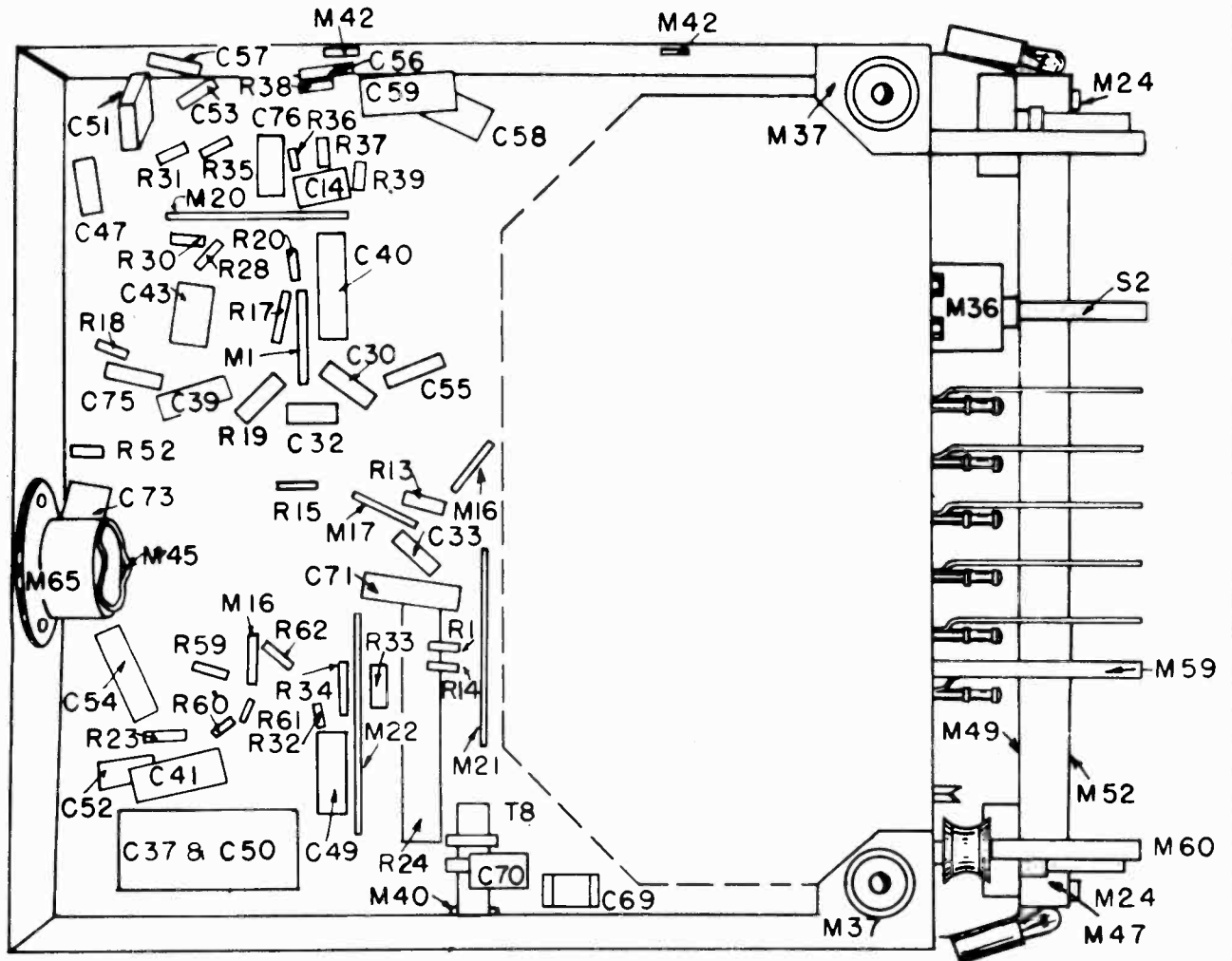
Some chassis used a 6J5 and some a 6SN7 as a first audio amplifier. Tone compensation network, R54 and C77, removed from phono input lead. RF choke, L9, added in plate circuit of 7F8. R38 in D.A.V.C. circuit of ratio detector changed from 8200 ohms to 10,000. FM antenna input same as in code "A" chassis. Cathode resistor, R12 and capacitor C72 in first 7AH7 removed and R15 connected directly to ground.

**CODE "C" CHASSIS**

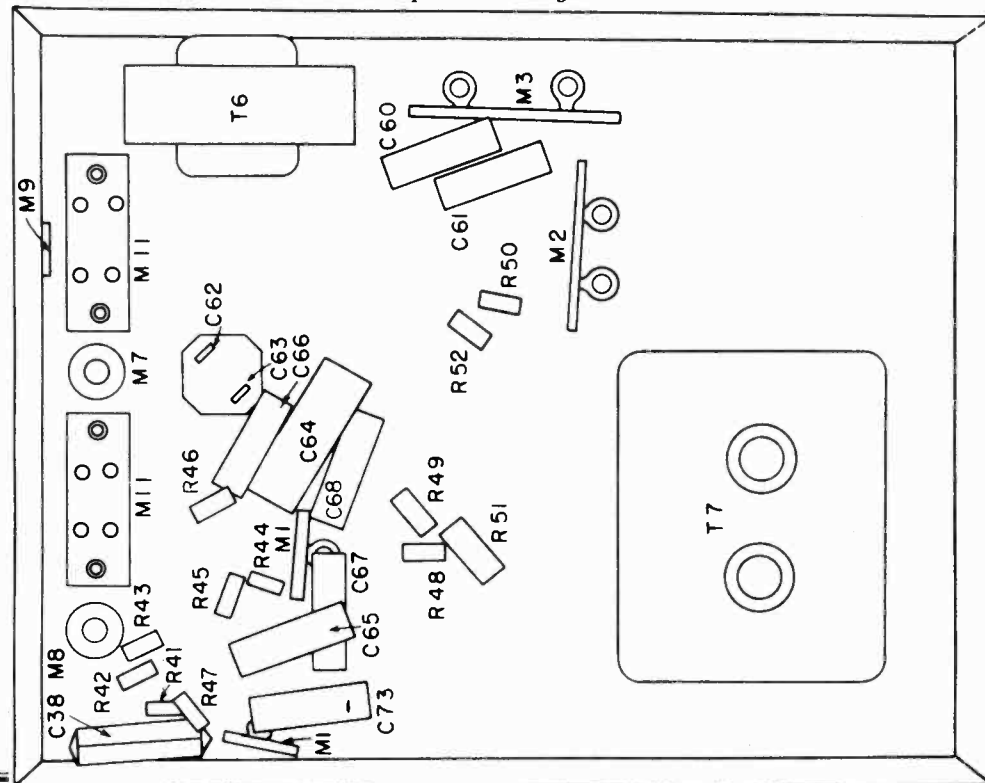
Included all previous changes.  
 FM antenna link coupled to antenna coil L1.



Control Layout



Component Diagram — Bottom View Radio Chassis



Component Diagram  
Bottom View of  
Amplifier Chassis

It is not necessary to remove the two chassis from the cabinet if the FM channel only is to be aligned. An FM test socket is provided on the chassis sideplate (facing outward in normal mounting position) at which the various voltages from the ratio detector are available for either meter or oscilloscope measurements.

If the BC and SW channels are to be aligned, it is advisable to remove the radio chassis from the cabinet in order to gain access to the BC and SW AVC voltage used for output indication. It is rather difficult to align the BC and SW RF and IF sections when the volume control is full "ON" because of background noise accompanying the high gain of the audio amplifier. A DC vacuum tube voltmeter connected to the junction of R20 and C40 (lug 3 of S1-E—See Figs. 9 & 10) will provide an accurate and stable indication of RF output, at the AM demodulator, for alignment of the BC and SW bands.

Unless the various circuits of each channel are very much out of alignment, adjustments made in the SW circuits will not affect the BC circuits and adjustments made in the FM circuits will not alter either the BC or SW circuit adjustments. However, if any of these channels are badly out of alignment necessitating considerable adjustment, it is best, after these adjustments have been made, to go back and check the adjustment previously made on the other channels.

An un-modulated (CW) signal of the proper radio frequency may be used for alignment of all three channels (BC, SW, and FM), but it is convenient to use a 400 cycle AM signal during alignment and occasionally advance the volume control to be sure the correct signal is tuned in.

Before making any adjustment, allow the receiver and signal generator to warm up for at least five minutes. **IMPORTANT:** All adjustments must be made in the order in which they are given; i.e., the BC band must be aligned first, followed by the SW, and last, the FM band.

#### **INSTRUCTIONS FOR REMOVING THE CHASSIS**

If, for any reason, it is necessary to remove the radio chassis from the cabinet, proceed as per following instructions:

Remove the power cord plug from the wall receptacle, and remove all control knobs and push-buttons by simply pulling them straight up from the panel. The cabinet back cover and AM loop assembly may be detached from the chassis by pulling the loop leads out of their receptacle on the chassis, after the small wood screws holding the assembly on the cabinet have been removed. The FM antenna is disconnected from the chassis by removing the three prong plug at the rear of the chassis. All power cables and leads may be disconnected at convenient plugs and jacks in the chassis. The speaker is connected to the amplifier chassis by a 5-prong plug on the speaker.

After all connecting leads and cables have been disconnected from the chassis, remove the four hexagon-head machine screws which hold the chassis mounting rails in the cabinet. The two upper machine screws are removed from inside the record changer compartment. The two lower bolts are located below the radio chassis and removed from the chassis side of the cabinet. Note: When replacing the chassis in the cabinet, be sure dial glass is up snug against the control panel when the four mounting screws are tightened and that they are tightened securely.

#### **PUSH-BUTTON ADJUSTMENT**

The mechanical type of push-button tuning used with this receiver makes possible the selection of any one of eight pre-selected stations. Any push-button may be adjusted to select any station in the three tuning bands. However, more accurate tuning of the SW and FM stations will be obtained if the lower four buttons E, F, G and H, Figures 2 and 3, are used for stations within these bands.

1. Remove all push-buttons by pulling straight up from the panel.
2. Manually tune in the desired station.
3. Release the screw adjacent to the push-button shank and push the shank in firmly as far as it will go while holding the tuning control knob.
4. Release the shank and tighten the locking screw.
5. Rotate the tuning control to a different position and check the push-button setting by again depressing the shank previously adjusted. The tuning dial should automatically return to the stations previously tuned in. However, in some cases it may not be exactly on the peak frequency of the stations. In such cases, continue as follows:
6. Re-tune the station manually to its peak frequency, and note whether it is necessary to increase or decrease the frequency setting for optimum tuning.
7. If it is necessary to increase the dial frequency setting, then the dial should be set at an additional increase beyond the optimum point (approximately the amount of the increase) and procedures 3, 4, 5 and 6 repeated. The push-button should then tune in the station exactly on its peak frequency.
8. If it is necessary to decrease the dial frequency setting, then the dial should be set at a lower frequency from its optimum point (approximately the amount of the decrease) and the procedure in 3, 4, 5 and 6 repeated.
9. Repeat the above procedures for the remaining seven push-buttons.

After the push-buttons have been set up as previously described, the proper tab with its transparent cover should be inserted together in each push-button knob. The push-buttons should now be placed on the proper shanks.

## ALIGNMENT PROCEDURE MODEL 1217B

### EQUIPMENT REQUIRED

Signal Generator

AM, 455 KC to 106 MC

Vacuum Tube Voltmeter

DC up to approximately 20 volts. Ground, or minus, must be isolated from the power line.

FM Test Circuit Plug

See Fig. 4 for details.

.01 mfd. and 50 mmf. (or less) capacitor

used for connecting signal generator to receiver.

Alignment Screwdriver

Must be 100% fiber and preferably over 8" in length.

Alignment Socket Wrenches

One  $\frac{1}{4}$ " hexagon - 100% fiber, 8" long.

One  $\frac{3}{8}$ " hexagon - 100% fiber, 6" long.

If the  $\frac{3}{8}$ " wrench has a hole through the handle of sufficient diameter to permit inserting the alignment screwdriver, the locking nuts on L1, L2 and L3 can be loosened or tightened at the same time these padders are adjusted with the screwdriver inside.

### AM ALIGNMENT

Turn receiver on and allow to warm up for at least 5 minutes. (Input voltage, 117 volts 60 cycle AC). Set volume control to minimum, bass and treble controls full counterclockwise, range control to BC (third from most counterclockwise position), tuning gang fully closed. Set dial pointer to Reference Mark at low Frequency end of dial as shown on Fig. 3. If built-in AM loop antenna is disconnected, the two contacts of the AM antenna input jack located on top the chassis must be shorted together. C69 and C4 should be adjusted with loop connected.

### IF CHANNEL

1. Short #5 terminal on gang (C2-F) to chassis. See Fig. 2.
2. Set signal generator to 455 KC, CW or AM, and connect to #3 gang terminal (C2-E) through a .01 mfd. capacitor. See Fig. 2.
3. Connect low range of V.T.V.M. to junction of R20 and C40 (lug 3 of switch S1-E is a convenient point—See Figs. 9 & 10), and chassis ground, and adjust signal generator attenuator to produce approximately 2 volts of AVC on the V.T.V.M.
4. Adjust C36B, C36A, C31B and C31A for maximum meter reading, keeping signal input to produce approximately 2 volts AVC. Repeat these adjustments until no further improvements can be made in any one of them. NOTE: All adjustments must be made with a completely non-metallic screwdriver.

### BC OSCILLATOR ALIGNMENT

1. Remove short from #5 gang terminal.
2. Move signal input from #3 gang terminal to external AM antenna terminal (J1) and set input frequency to 1475 KC CW or AM. (V.T.V.M. remains connected as for IF alignment.)

3. Set tuning control to 1475 KC.

4. Adjust C24, (BC oscillator trimmer) for maximum meter reading.

5. Set signal generator and receiver dial pointer to 580 KC.

6. Adjust BC oscillator padder C26 for maximum meter output. Repeat steps 2 to 6 until oscillator tracks correctly. Any change in C26 will necessitate a readjustment of oscillator trimmer C24.

### RF AND ANTENNA ALIGNMENT FOR BC BAND

1. Change coupling capacitor connecting signal generator to AM external antenna terminal from .01 mfd. to 50 mmf. or less. (Terminals of AM loop input jack must be shorted together if loop is disconnected.)
2. Adjust signal generator and receiver tuning control to 1475 KC.
3. Adjust BC oscillator trimmer, C24, BC RF trimmer, C12 and BC antenna trimmer, C69 for maximum output. (If AM loop is disconnected, C69 should be adjusted after chassis is installed in cabinet.)
4. Check overall tracking at 580 KC and 965 KC. Maximum output should occur within the  $\pm 10$  KC of the indicated dial pointer reading. If it falls outside these limits, the plates of the gang rotor should be bent to correct tracking, but this is a difficult operation and should be attempted only by experienced technicians.
5. Repeat steps 3 and 4 until no appreciable improvement can be obtained by additional adjustments.

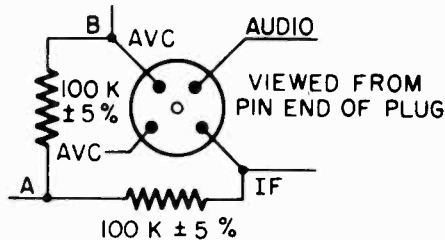
### SW ALIGNMENT

1. V.T.V.M. and signal generator connected as for preceding step 5 of BC RF and antenna alignments; range switch in SW (most clockwise position).
2. Set signal generator and tuning control to 15 MC CW.
3. Adjust SW oscillator trimmer (C23), SW RF trimmer (C11), and SW antenna trimmer (C4) for maximum output. NOTE: If circuits are badly out of alignment, it may be necessary to apply the signal first to terminal #3 on gang (C2-E) until oscillator is brought close to correct alignment. The local oscillator frequency in the receiver should be adjusted to the RF *plus* the IF (not below the RF). The correct position can be determined by turning C23 all the way in (clockwise) and then out (counterclockwise) until the second peak is reached.
4. Tune receiver and signal generator to 6 MC and check calibration and output. Maximum meter reading should be obtained with the dial pointer  $\pm 100$  KC of the 6 MC dial reference mark and an AVC output voltage not less than one-half of the AVC voltage obtained at 15 MC, providing the same voltage is applied to the antenna in both cases.

## FM ALIGNMENT

### FM IF CHANNEL

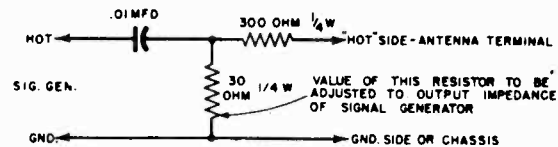
1. Set range control to FM (second from most counterclockwise position) and tuning gang to maximum capacity (closed).
2. Insert special FM test circuit plug, detailed below, in test circuit jack J2 located on left side of radio chassis. See Fig. 2.



Test Circuit Plug

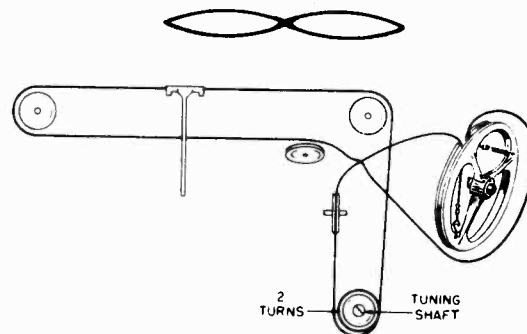
3. Connect V.T.V.M. ground or "minus" lead to point "B" and "plus" lead to IF pin on test circuit plug.
4. Connect signal generator to #4 (C2-B) gang terminal through a .01 mfd. capacitor and short #6 gang terminal (C2-C) to chassis. See Fig. 2.
5. Adjust output of signal generator to obtain 10.7 MC CW and approximately 4 volts on V.T.V.M.
6. Adjust C35B, C35A, C28B, C28A, and C46A for *maximum* meter reading, repeating all adjustments several times. NOTE: It may be necessary to apply the 10.7 MC signal to pin 6 of the 1st IF tube (7AH7) and adjust C35B, C35A, and C46A before applying the signal to #4 gang terminal and adjusting C28B and C28A.
7. Change V.T.V.M. "minus" to point "A" (center tap of two 100 K resistors) of test circuit jack and "plus" lead to audio (marked AF on chassis).
8. Turn signal generator OFF and set meter to zero when no signal is applied to IF.
9. Turn signal generator ON and adjust C46B for zero output on meter. It may be possible to obtain two or more points of adjustment at which a zero meter reading can be obtained. The correct one is the one at which the meter passes through zero most sharply with the minimum rotation of C46B.
10. Alternately adjust C46A (3rd FM IF primary) for maximum DC voltage across pins "B" and "IF" (meter connected as for previous IF alignment), and C46B (3rd FM IF secondary) for *minimum* DC voltage from point "A" to "audio." NOTE: In making this adjustment, the signal input level should be adjusted to provide approximately 6 volts DC across pins "B" and "IF" of test jack.

11. Remove short from #6 gang terminal and change signal generator input from gang to FM antenna jack on rear of radio chassis, applying signal through FM dummy antenna circuit shown in Fig. 5.



FM Dummy Antenna

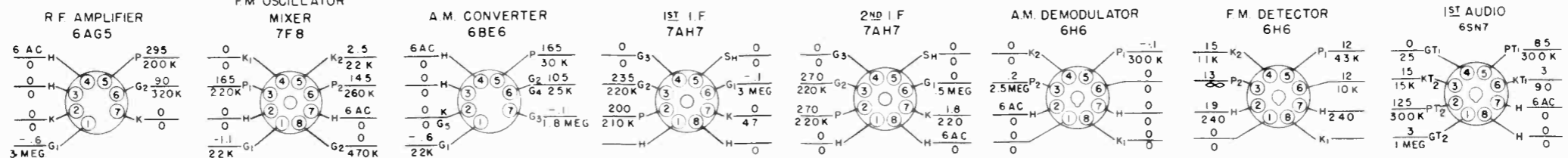
12. V.T.V.M. should be connected from point "B" to "IF" of test circuit plug.
13. Adjust signal generator and tuning control to 106 MC and output to produce approximately 8 volts on V.T.V.M.
14. Using a completely non-metallic  $\frac{1}{4}$ " hexagon socket wrench, adjust FM oscillator trimmer (C22), FM RF trimmer (C10) and FM antenna trimmer (C1) for maximum output voltage read on V.T.V.M., rocking the tuning gang slightly as these adjustments are made.
15. Set signal generator and tuning control to 90 MC.
16. Adjust FM oscillator padder (L3), FM RF padder (L2) and FM antenna padder (L1) for maximum output voltage. The  $\frac{3}{8}$ " locknut on these padders must be loosened before adjustments are made and tightened after adjustments are completed.
17. Repeat steps 14, 15 and 16 until maximum output voltage is obtained with the dial pointer at 90 MC and 106 MC when the signal generator is set at these respective frequencies. Any adjustments made under step 16 above must be followed by repeating the adjustments required under step 14.



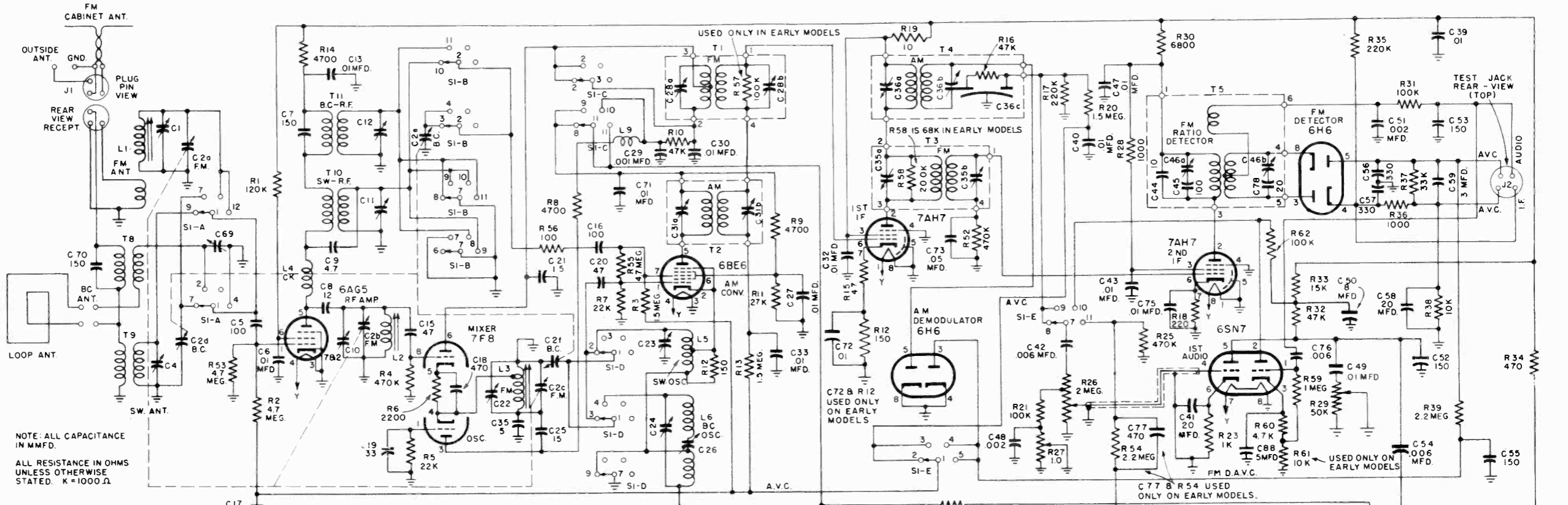
Dial Stringing Diagram

BENDIX RADIO DIV.

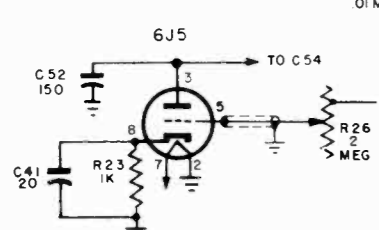
CONDITIONS OF MEASUREMENTS  
LINE VOLTAGE 117 A-C ZERO SIGNAL INPUT RANGE SWITCH IN FM POSITION VOL CONT MIN TONE CONTROL FULL COUNTERCLOCKWISE SOCKET VOLTAGE RESISTANCE TO COMMON GROUND D-C AT 20,000 Ω/V A-C AT 1,000 Ω/V



NOTE: VOLTAGE AND RESISTANCE MEASUREMENTS ON 6BE6 & 6H6 AM DEMODULATORS MADE WITH RANGE SWITCH IN AM POSITION

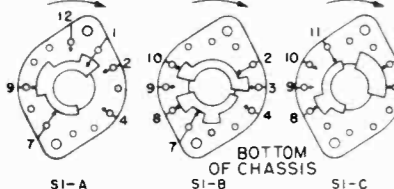


NOTE: ALL CAPACITANCE IN MMFD.  
ALL RESISTANCE IN OHMS UNLESS OTHERWISE STATED. K=1000 Ω

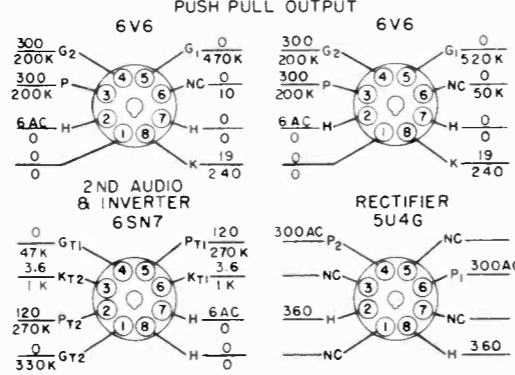


THE ABOVE CIRCUIT USED IN PLACE OF 6SN7 IN RADIO CHASSIS IN CODE "A" & "B" UNITS. LUG 10 OF SI-E CONNECTED DIRECTLY TO R31.

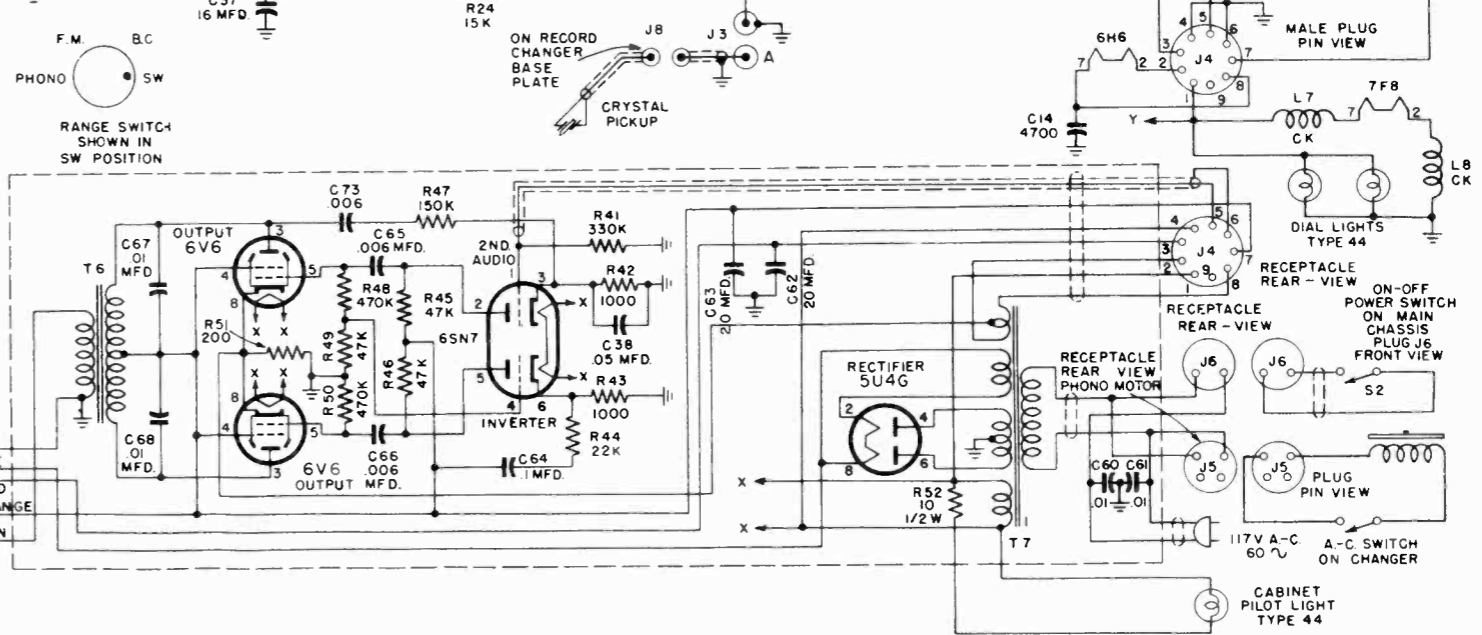
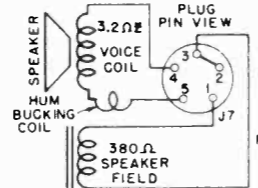
DUE TO SPROCKET DRIVE DIRECTION OF ROTATION OF SWITCH SHAFT IS OPPOSITE TO THAT OF CONTROL KNOB ROTATION. REAR OF WAFERS VIEWED THROUGH WAFER FROM THE FRONT.

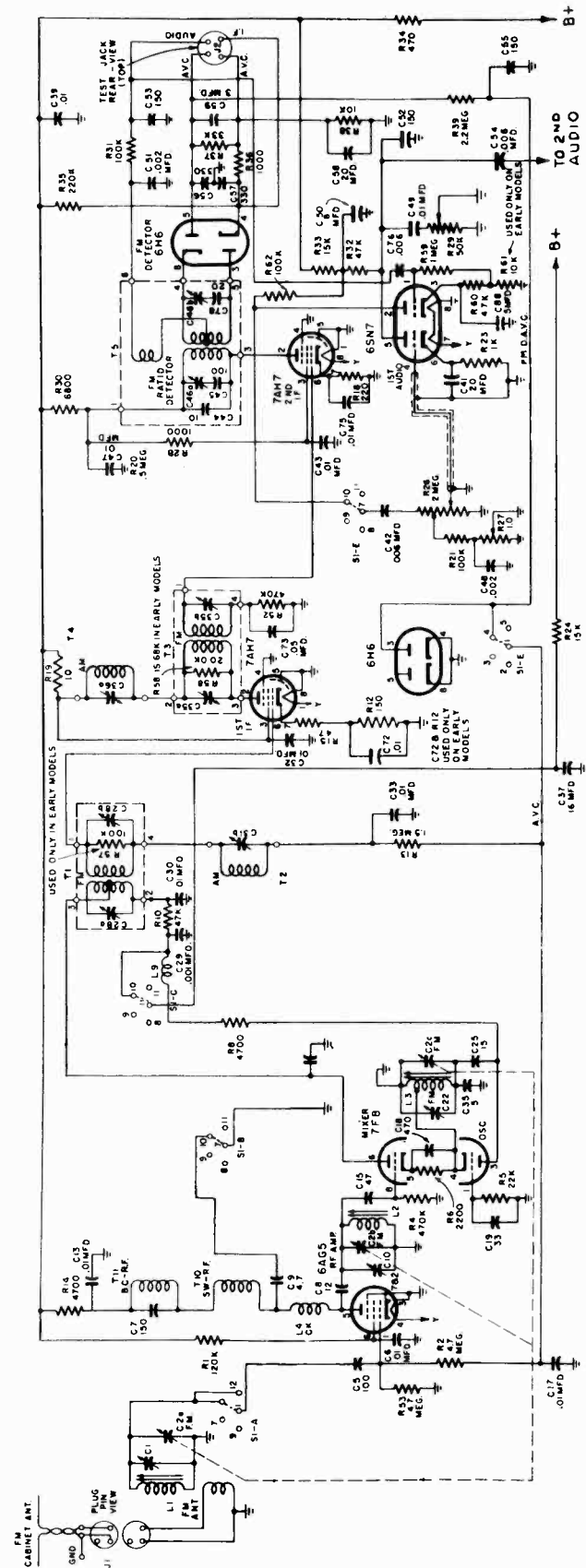


SWITCH SHAFT, SHOWN IN COUNTERCLOCKWISE POSITION - SHORT WAVE

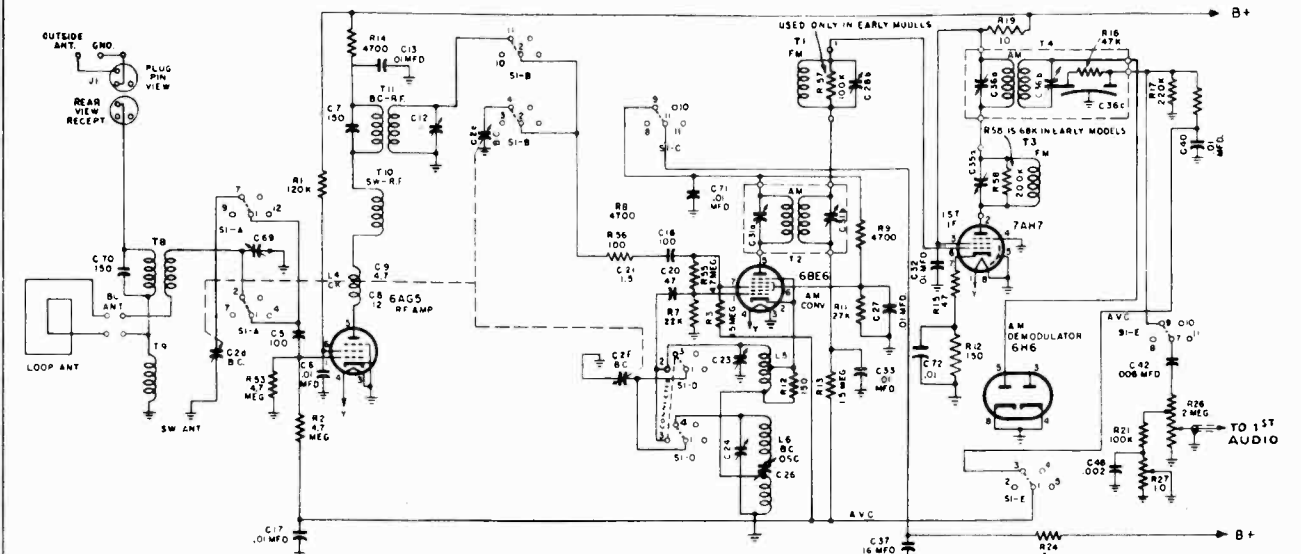


AMPLIFIER & POWER SUPPLY TUBES

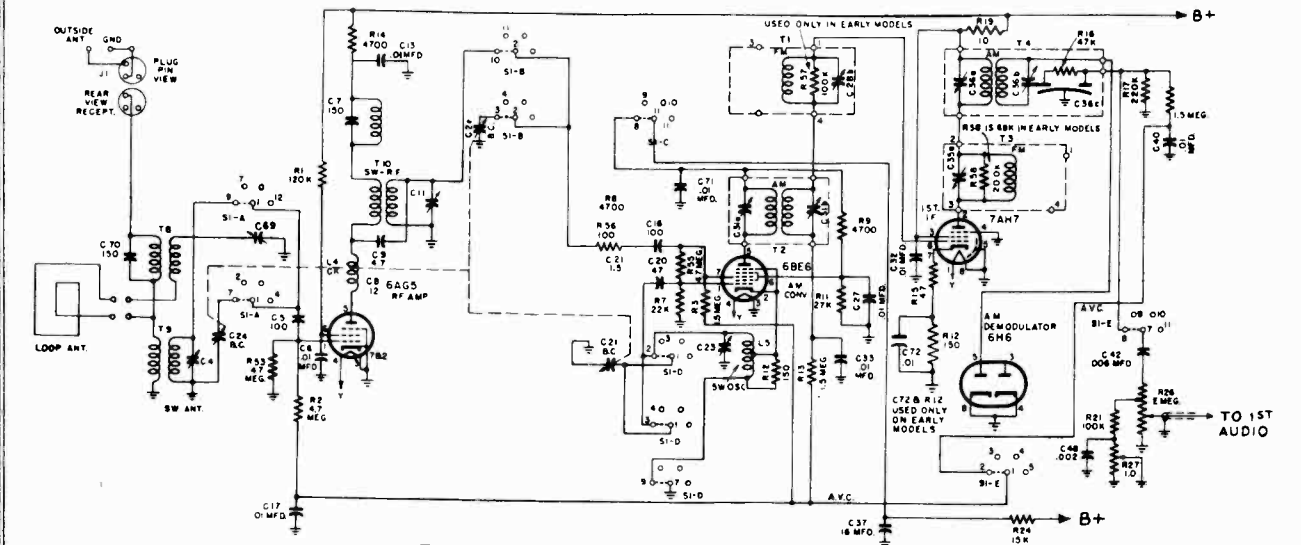




NOTE:  
1ST POSITION  
NOT SHOWN  
BAND-SWITCH SHOWN  
AT 2ND POSITION CLOCKWISE.  
FM BAND  
88-108 MC



BAND-SWITCH SHOWN  
AT 3RD POSITION CLOCKWISE.  
BROADCAST BAND  
540 - 1620 KC



BAND-SWITCH SHOWN  
AT 4TH POSITION CLOCKWISE.  
SHORT WAVE BAND  
5.75 - 15.5 MC

BENDIX RADIO DIV.

MODEL 1217B

AMPLIFIER ELECTRICAL COMPONENTS	
CE2A02	CAPACITOR—Electrolytic Fixed Dry, 20-20 mfd. 450V (C62 C63)
CP1M51	CAPACITOR—Paper .01 mfd. (C60 C61)
CP2T40†	CAPACITOR—Paper Tubular .05 mfd. 200V (C38)
CP4T20†	CAPACITOR—Paper Tubular .006 mfd. 400V (C65 C66 C79)
CP4T31†	CAPACITOR—Paper Tubular .01 mfd. 400V (C67 C68)
CP4T51†	CAPACITOR—Paper Tubular .1 mfd. 400V (C64)
RC4D16	RESISTOR—Comp. 220 ohms 2W = 20% (R51)
RC1G24†	RESISTOR—Comp. 1000 ohms 1/4W (R42 R13)
RC1G40†	RESISTOR—Comp. 22,000 ohms 1/4W (R44)
RC1G44†	RESISTOR—Comp. 47,000 ohms 1/4W (R49)
RC1G58	RESISTOR—Comp. 470,000 ohms 1/4W (R48 R50)
RC2G44	RESISTOR—Comp. 47,000 ohms 1/2W (R15 R16)
RC1H53	RESISTOR—Comp. 150,000 ohms 1/4W (R47)
RC1H56†	RESISTOR—Comp. 330,000 ohms 1/4W (R41)
RC21100	RESISTOR—Comp. 10 ohms (R52)
TA0Q00	TRANSFORMER—Output (T6)
TI9R00	TRANSFORMER—Power (T7)
AMPLIFIER MECHANICAL COMPONENTS	
BT1S03†	BOARD—Terminal 3 Soldering lugs, Single Mt. (M1)
BT1S05	BOARD—Terminal 3 Soldering lugs, Double Mt. (M2)
BT4S03	BOARD—Terminal 4 Soldering lugs, Double Mt. (M3)
CL2A08	CORD—A.C. Brown (M4)
CL2A10	CORD—Phono Power (J5 M5)
C8M02	COVER—Power Cable Assy. (M6)
GR0Z13†	GROMMET—Rubber (M7)
GR0S14†	GROMMET—Rubber Insulating (M8)
HC0C09†	CLIP—Tube (M9)
HC0T09†	CLAMP—Tube (M10)
JR2007	RECEPTACLE—2 Contact Female (J6)
JR5001	RECEPTACLE—5 Contact Female (J7)
PI0100†	PLATE—Line Cord Insulator (M11)
SE2R00†	SPEAKER—E.D. 12"
SO0100†	SOCKET—Pilot Light (M12)
SO8S01†	SOCKET—Octal Tube
RECEIVER ELECTRICAL COMPONENTS	
CC9A12	CAPACITOR—Ceramic Insulated 1.5 mmf. 500V (C21)
CC9A18	CAPACITOR—Ceramic Insulated 4.7 mmf. 500V (C9)
CC0B23	CAPACITOR—Ceramic Insulated 12 mmf. 500V (C8)
CC0B24	CAPACITOR—Ceramic Insulated 15 mmf. 500V (C25)
CC7B19	CAPACITOR—Ceramic Insulated 5 mmf. 500V (C35)
CC8B28†	CAPACITOR—Ceramic Insulated 33 mmf. 500V (C19)
CC8B30†	CAPACITOR—Ceramic Insulated 47 mmf. 500V (C15 C29)
CE1D00†	CAPACITOR—Electrolytic Single Section 1 mfd. 50V (C59)
CE2D00	CAPACITOR—Electrolytic Dry, 2 section 8 mfd. & 16 mfd. 450V (C37 C50)
CE1T02†	CAPACITOR—Electrolytic 20 mfd. 25V (C38 C11)
CM5A26†	CAPACITOR—Mica 150 mmf. 500V (C7 C35 C54 C52)
CM5A31†	CAPACITOR—Mica 370 mmf. (C56 C57)
CM5A38†	CAPACITOR—Mica 430 mmf. (C77)
CM5A39†	CAPACITOR—Mica .001 mfd. (C29)
CM5E78†	CAPACITOR—Mica 4700 mmf. 500V (C14)
CM5L02	CAPACITOR—Mica (Low Loss) .002 mfd. 500V (C51)
CM6L22	CAPACITOR—Mica (Low Loss) 100 mmf. 500V (C16 C5)
CM6L38	CAPACITOR—Mica (Low Loss) 170 mmf. 500V (C18)
CP0M31†	CAPACITOR—Paper .01 mfd. 120V (C39 C17 C72 C75)
CP1M31†	CAPACITOR—Paper .01 mfd. 400V (C6 C27 C29 C30 C31 C47 C43)
CP2T40†	CAPACITOR—Paper Tubular .05 mfd. 200V (C73)
CP4T20†	CAPACITOR—Paper Tubular .006 mfd. 400V (C54 C42 C76)
CP4T31†	CAPACITOR—Paper Tubular .01 mfd. 400V (C71 C40)
CP4T34†	CAPACITOR—Paper Tubular .02 mfd. 400V (C19)
CP6T12†	CAPACITOR—Paper .002 mfd. 600V (C48)
CT1A12†	CAPACITOR—Trimmer Mica (C26)
CT1A13†	CAPACITOR—Trimmer Mica 4-75 mmf. (C11 C1 C23 C24)
CT1A14†	CAPACITOR—Trimmer Mica 1.8-40 mmf. (C12)
CT1A15†	CAPACITOR—Trimmer 4.0-70 mmf. (C69)
CT1B00	CAPACITOR—Trimmer Air concentric 3-30 mmf. (C1 C10 C22)
CV0E00	CAPACITOR—Variable (C2)
LA0F00	COIL—FM Ant. (L1)
LF0A02	CHOKE—RF (L7 L8)
LF0A03	CHOKE—RF (L4)
LJ0F00	COIL—RF FM (L2)
LJ0I01	COIL—Osc. B.C. (L6)
LJ0I00	COIL—Osc. S.W. (L5)
LJ0I00	COIL—Osc. FM (L3)
LJ0A00	COIL—Broadcast Ant. (T8)
RC1G08	RESISTOR—Comp. 47 ohms 1/4W (R15)
RJ0T00	INSERT—Brass 10-32 Tuning Core (M8)
RC1G14†	RESISTOR—Comp. 150 ohms 1/4W (R12)
RC1G24†	RESISTOR—Comp. 1000 ohms 1/4W (R36)
RC1G35†	RESISTOR—Comp. 8200 ohms 1/4W (R38)
RC1G40†	RESISTOR—Comp. 22,000 ohms 1/4W (R57)
RC2G41†	RESISTOR—Comp. 27,000 ohms 1/2W (R11)
RC2G52†	RESISTOR—Comp. 120,000 ohms 1/2W (R1)
RC3G34†	RESISTOR—Comp. 68000 ohms 1W (R30)
RC1H12†	RESISTOR—Comp. 100 ohms 1/4W (R56)
RC1H16†	RESISTOR—Comp. 220 ohms 1/4W (R18)
RC1H24†	RESISTOR—Comp. 1000 ohms 1/4W (R23 R28)
RC1H28†	RESISTOR—Comp. 2200 ohms 1/4W (R6)
RC1H42†	RESISTOR—Comp. 33000 ohms 1/4 (R37)
RC1H44†	RESISTOR—Comp. 47000 ohms 1/4W (R10 R32)
RC1H51†	RESISTOR—Comp. 100,000 ohms 1/4W (R21 R31)
RC1H54†	RESISTOR—Comp. 220,000 ohms 1/4W (R17 R35)
RC1H58†	RESISTOR—Comp. 470,000 ohms (R25 R52 R4)
RC1H64†	RESISTOR—Comp. 1.5 meg. 1/4W (R3 R13 R20)
RC1H66†	RESISTOR—Comp. 2.2 meg. 1/4W (R39 R54)
RC2H32†	RESISTOR—Comp. 4700 ohms 1/2W (R8 R9 R14)
RC2H36	RESISTOR—Comp. 10,000 ohms 1/2W (R61)
RC2H38	RESISTOR—Comp. 15,000 ohms 1/2W (R33)
RC3H20	RESISTOR—Comp. 470 ohms 1W (R34)
RC3H36†	RESISTOR—Comp. 10,000 ohms 1W (R19)
RV0C09†	POTENTIOMETER—(Tone-Treble) (R29)
RV4C01†	POTENTIOMETER—Volume 2 meg. (R20)
RV1C02†	POTENTIOMETER—(Tone-Bass) 1 meg. (R27)
RW0D38	RESISTOR—Wirewound 15,000 ohms (R24)
TI0C07	TRANSFORMER—1st I.F. FM (T1)
TI0D09	TRANSFORMER—I.F. Output AM (T4)
TI0D10	TRANSFORMER—3rd I.F. FM (T5)
TI0C10	TRANSFORMER—1st I.F. Input AM (T2)
TI0I01	TRANSFORMER—2nd I.F. FM (T3)
TR1C00	TRANSFORMER—S.W.R.F. Assy. (T10)
TR1H00	TRANSFORMER—SW Ant. Assy. (T9)
TR1L00	TRANSFORMER—B.C. Interstage (T11)
*244†	LAMP—Bayonet Base Dial
*247†	LAMP—Bayonet Base Pilot
RECEIVER MECHANICAL COMPONENTS	
BT2R00	BOARD—Contact Loop (M15)
BT1S00†	BOARD—Terminal 1 soldering lug Single Mt. (M16)
BT2S00†	BOARD—Terminal 2 Soldering Lug Single Mt. (M17)
BT2S03†	BOARD—Terminal 2 Soldering Lug Single Mt. (M18)
BT2S06	BOARD—Terminal 2 Soldering Lug Single Mt. (M23)
BT3S03	BOARD—Terminal 3 Soldering Lug Single Mt. (M1)
BT1S02	BOARD—Terminal 4 Soldering Lug Double Mt. (M19)
BT5S01	BOARD—Terminal 5 Soldering Lug Double Mt. (M20)
BT6S01	BOARD—Terminal 6 Soldering Lug 2 mtg. lug (M21)
BT7S00	BOARD—Terminal 7 Soldering Lug 2 mtg. lug (M22)
CD0C20	CABLE—Dial
DS0E01	DIAL—12 Tube AM FM Glass
GR0D04	GROMMET— Cushion Dial Glass Rubber (M21)
GR0S12	GROMMET—Condenser Shockmount (30)
HB0M23	BRACKET—Assy. R.H. Back Plate Support (M26)
HB0M24	BRACKET—Assy. L.H. Back Plate Support (M27)
HB0M25	BRACKET—Bearing Assy. (M28)
HB0M31	BRACKET—Condenser R.H. (M29)
HB0M32	BRACKET—Condenser L.H. (31)
HB0M34	BRACKET—R.F. Assy. (M32)
HB0M36	BRACKET—Band Switch (M33)
HB0M37	BRACKET—Rotary Switch (M34)
HB0M38	BRACKET—Manual Tuning Control (M35)
HB0M41	BRACKET—Power Control Mt. (M36)
HB0M42	BRACKET—Chassis Shockmount (M37)
HB0M43	BRACKET—Terminal Board & Trimmer Plate Assy. (inside T5 Can)
HB0S03	BALL—Tuning Shaft Bearing 3/32 Dia. (M38)
HB0S04	BALL—Tuning Shaft End Bearing 5/32 Dia. (M39)
HC0C00†	CLIP—Coil Mtg. (M40)
HC0C03†	CLAMP—Dial Cable (M41)
HC0C08†	CLIP—Cable (M42)
HC0L00	COVER—S2 Switch (M43)
HC0S24	WASHER—"C" Blued Finish (M44)
HC0T02	CLAMP—Ring Retainer (M45)
HH0C00	HOOK—Dial Cord (M46)
HH0D00	HOLDER—Dial Glass (M47)
HP0R00	PLATE—Dial Back (M19)
HS0C57	SPRING—Dial Cord
HS0G74	SPRING—Push Button Shaft Coil
HS0H00	SLEEVE—28 Spacer Flatrod (M60)
HS0S06	STUD—Shoulder 10-32 Thread (M51)
HS0S07	SCREW—8-32 x 3/16 Shoulder (R.H. end of RF Tuner Assy.)
I00M11	INTERCATOR—Dial (M52)
PI0I00†	PIN—AM Loop Antenna Connector
JP1002†	PLUG—Single Contact Male Phono (J3)
JP2005	PLUG—2 Contact Male (J6)
JP3001	PLUG—3 Contact Male (J1)
JR3001	RECEPTACLE—3 Contact Ant. (J1)
JR4001	RECEPTACLE—4 Contact (J2)
JR1S00	RECEPTACLE—Single Contact (J3)
MB0B03	BEARING—Manual Tuning Control (M52)
MB0S00	BUSHING—Manual Tuning Control (M53)
MG0S00	GEAR—Segment & Hub Assy. (M54)
MG0S01	SPROCKET—Hub Assy. (M55)
MP0M01	PULLEY—Drive (M56)
MP0M02	PULLEY—Idle Dial Cord (M57)
MR0P00	RAIL—Pointer (M58)
MS0C01	SHAFT—Band Switch Control (M59)
MS0T09	TUNING—Shaft (M60)
SM0B00	SHIELD—Min. Tube Base (attached to chassis) (M61)
SM0R01	SHIELD—Metal Braid
SM0T03	SHIELD—Miniature Tube (M62)
SO0D07	SOCKET—Dial Light (Lead 12/14" Long) (M63)
SO0C08	SOCKET—Dial Light (Lead 8/3/4" Long) (M64)
SO0L02	SOCKET—Locktail Tube (Ringmount)
SO0L03	SOCKET—Locktail Tube
SO7M05	SOCKET—Min. Tube (Zip in type)
SO8M01	SOCKET—Power Cable (M65)
SR4G00	SWITCH—Rotary Range (S1)
SR2L00	SWITCH—Rotary Snap SPST (S2)
ST0M00	TUNING—Core 10-32 Threaded, Copper Rod
XS0C02	STRIP—Copper (M66)
XS0C03	STRIP—Contact (Rotary Switch Shaft) (M67)
XS0C04	STRIP—Contact (Band Switch Shaft) (M68)
XS0C05	STRIP—Copper 3" x 5/16" x .004 (M69)
WF0Z05†	WIRE—Stranded (used for AM loops antenna—10 ft. req.)
CABINET COMPONENTS	
BP0B01	BUTTON—Mottled Brown Push
BR0R00	BUMPER—Swing-A-Door Cam (Rubber)
BZ0B06	LOOP—Cabinet Back
BZ0D09	BAFFLE—Cardboard & Cloth
BZ0D10	BAFFLE—Cardboard & Cloth with cutout
DZ0F13	DECAL—Tuning
DZ0F14	DECAL—Volume
DZ0F15	DECAL—On - Off
DZ0F16	DECAL—AM - FM
DZ0F17	DECAL—Treble
DZ0F18	DECAL—Bass
DZ0N00	DECAL—"Swing-A-Door"
GR0S06†	GROMMET—3 x 7/8 x 1 1/2 thick Rubber Shockmount
GR0S11	GROMMET—3/16 x 1 1/4 x 9/32 thick Split-type Shockmount
GZ0M05	GRILLE—Metal
HB0M27	BRACKET—2 1/4 x 1 7/16 x 1" Record Player Mtg.
HB0M30	BRACKET—1 3/8 x 1 1/2 x 3/8" Record Changer Mtg.
HC0C07	CLIP—1 x 5/8" Cable
HC0R00	CLIP—V Shaped Runner Stop
HC0S29	CLIP—Spring Washer 5/16 x .039
HC0S30	CLIP—Pushbutton Retainer Spring
HK0R00†	RETAINER—Ring (For Control knobs)
HK0R04	KNOB—Door Pull
HN0R00†	BUSHING—10-32 Threaded
HR0P01†	RIVET—1/8 x 3/16" Oval Head N.P. Tubular
HR0P05†	RIVET—13/64 x .121" Oval Head N.P. Tubular
HR0S07	RIVET—5/16 Head x .185 Shoulder x .330" Length (Cam Bumper)
HS0C48†	SPRING—Helical Coil (Record Changer Shockmount)
HS0C56†	SPRING—Helical Coil (Record Changer Shockmount)
HS0P17†	SPACER—3/8 x 1 1/4 x 1/2 x 1/2"
HT0F00†	TRAY—FP51 Record Changer
HT0T00	TRACK—Record Changer
HZ0C00†	CATCH—Bullet Door Furniture
HZ0G01†	METAL—Glides
HZ0H00	HINGE—Lid
HZ0H04	HINGE—Door
HZ0S02	SUPPORT—Lid
J10A00	JEWEL—Pilot Light (Antenna)
KB0B01	KNOB—Index Control
KC0B06	KNOB—Control
MC0C00	CAM—Bumper Assy.
MC0C01	CAM—Swing-A-Door
MR0C04	ROLLER—Swing-A-Door (Shaft and Rollers)
MS0F00	RUNNER—15/8 x 1 3/8" Plain
MS0G00	RUNNER—13/8 x 1 3/8" Guide
NE0M00	NAMEPATE
NP0S00	NEEDLE—Sapphire Phono
PF0B00	FELT—Pads Brown
WF0Z05†	WASHER—Felt Brown 11/32 x 7/8 x 1/32"
XZ0R00	RAIL—Record Changer Stop
ZD1G00	DOOR—and front right section (Matched Mahogany)
ZL1G00	LID—and Top Permanent lid (Matched Mahogany)
*ZW1G00	CABINET—Assy. (BW71) Period Combination (Mahogany)
*FP51†	CHANGER—Record



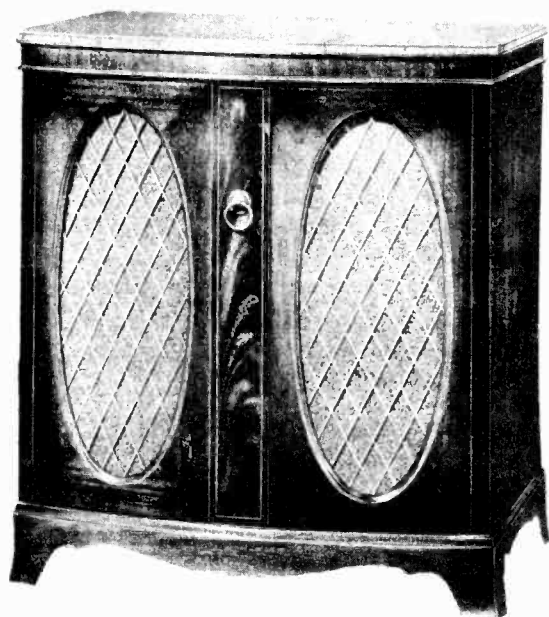


Fig. 1 Model 1217D

The Model 1217D radio provides radio reception of the Standard AM Broadcast Band, the Shortwave Band from 6 to 15.5 megacycles, and the FM Band from 88 to 108 megacycles. Phonograph reproduction is provided through the audio amplifier from a high impedance phono jack located on the radio chassis. A standard superheterodyne circuit is used, with one stage of tuned radio frequency on all three bands. A low impedance loop antenna installed on the back cover of the cabinet is used on both the Standard Broadcast and Shortwave Bands. A built-in dipole antenna is used on the FM Band. An outside antenna for the AM Bands may be connected to the binding screw marked ANTENNA on the rear of the cabinet. A 300 ohm outside FM dipole antenna may be connected to the terminals marked FM DIPOLE but the built-in dipole must be disconnected when an outside antenna is used.

#### CHASSIS CODE CHANGES

The schematic shown in Fig. 8 is for the code D radio chassis and the code C amplifier chassis. The data given below indicates the circuit changes incorporated in the different chassis as compared to this schematic.

#### RADIO CHASSIS

##### CODE C CHASSIS

First audio amplifier, 6SN7, and AM demodulator, 6H6, filaments were connected from pin #1 of J4 to ground, instead of being isolated from ground and in parallel with the FM detector 6H6 filament.

The audio output of the FM detector transformer (T5) was connected directly to pin #1 (grid) of the 6SN7 first audio amplifier. This deleted C85, 86, 87, R72, and 73. Cathode bypass capacitor, C88, was not used; cathode resistor R60 and grid resistor R59 were connected to ground through a common 10K resistor.

De-emphasis filter capacitors in the output circuit of T5, C51 and C53 were .002 mfd and 150 mmf respectively.

The Hush-O-Matic circuit shown in Fig. 9 was used in this chassis.

#### SPECIFICATIONS

**Power Requirements**  
105 - 125 volts, 60 cycles AC

**Power Consumption (including phonograph)**  
180 watts

**Tuning Frequency Range**  
AM 540 - 1620 KC  
SW AM 6 - 15.5 MC  
FM 88 - 108 MC

**Tube Complement**  
1-6AG5, 1-7F8, 1-6BE6, 2-7AH7, 2-6H6,  
2-6SN7, 2-6V6GT, 1-5U4G, 1-6AQ6, 1-6BA6,  
Total 14

**Pushbuttons**  
8 mechanical type for any AM, SW, or FM station.

**Loudspeaker**  
12-inch diameter electro-dynamic.

**Record Changer**  
Automatic - twelve 10-inch or ten 12-inch standard records.

**Maximum Power Output**  
12 watts.

**Overall Dimensions**  
Height 34", width 31", depth 18 $\frac{1}{4}$ ".

#### CIRCUIT ANALYSIS

The 7F8 dual triode is used as an oscillator-mixer in the FM circuit and is made inoperative by removing its plate voltages when the range switch (S1) is in any but the FM position. Likewise, the 6BE6 is used as a converter for the Standard Broadcast and Shortwave Bands only, and has no plate voltage applied to it when S1 is in the FM or PH (phono) positions. One half of the 6H6 (pins 3 and 4) AM demodulator tube is used in the delayed AVC circuit for FM. The first triode section (pins 1, 2 and 3) of the 6SN7 in the radio chassis is used only when the range switch, S1, is in the FM position, but does not have the B plus removed from its plate when S1 is in any of the other three positions. The 6AQ6 and 6BA6 are used as amplifier-rectifier and control tubes for the Hush-O-Matic circuit and are inoperative on radio reception.

#### AMPLIFIER CHASSIS

##### CODE B

The hum-balancing potentiometer R76 and the voltage divider network consisting of R74 and R75 were deleted. The transformer filament winding used only for the FM detector (6H6) was center tapped and this tap connected to the cathodes of the 6V6 output tubes.

Some chassis coded B were identical to code C chassis.

#### ADJUSTMENT OF HUM-BALANCING POTENTIOMETER

The hum-balancing potentiometer, R76, on code C amplifier chassis should be adjusted with the range control in the FM position and the volume control at minimum. Adjust R76 to obtain minimum hum from the loudspeaker.

## GENERAL

It is not necessary to remove the two chassis from the cabinet if the FM channel only is to be aligned. An FM test socket is provided on the chassis sideplate (facing outward in normal mounting position) at which the various voltages from the ratio detector are available for either meter or oscilloscope measurements.

If the BC and SW channels are to be aligned, it is advisable to remove the radio chassis from the cabinet in order to gain access to the BC and SW AVC voltage used for output indication. It is rather difficult to align the BC and SW RF and IF sections when the volume control is full "ON" because of background noise accompanying the high gain of the audio amplifier. A DC vacuum tube voltmeter connected to the junction of R20 and C40 (lug 3 of S1-E—See Figs. 7 & 13) will provide an accurate and stable indication of RF output, at the AM demodulator, for alignment of the BC and SW bands.

Unless the various circuits of each channel are very much out of alignment, adjustments made in the SW circuits will not affect the BC circuits and adjustments made in the FM circuits will not alter either the BC or SW circuit adjustments. However, if any of these channels are badly out of alignment necessitating considerable adjustment, it is best, after these adjustments have been made, to go back and check the adjustment previously made on the other channels.

An un-modulated (CW) signal of the proper radio frequency may be used for meter alignment of all three channels (BC, SW, and FM), but it is convenient to use a 400 cycle AM signal during alignment and occasionally advance the volume control to be sure the correct signal is tuned in.

Before making any adjustment, allow the receiver and signal generator to warm up for at least five minutes. **IMPORTANT:** All adjustments must be made in the order in which they are given; i.e., the BC band must be aligned first, followed by the SW, and last, the FM band.

### INSTRUCTIONS FOR REMOVING THE CHASSIS

If, for any reason, it is necessary to remove the radio chassis from the cabinet, proceed as per following instructions:

Remove the power cord plug from the wall receptacle, and remove all control knobs and push-buttons by simply pulling them straight up from the panel. The cabinet back cover and AM loop assembly may be detached from the chassis by pulling the loop leads out of their receptacle on the chassis, after the small wood screws holding the assembly on the cabinet have been removed. The FM antenna is disconnected from the chassis by removing the three prong plug at the rear of the chassis. All power cables and leads may be disconnected at convenient plugs and jacks in the chassis. The speaker is connected to the amplifier chassis by a 5-prong plug on the speaker.

After all connecting leads and cables have been disconnected from the chassis, remove the four hexagon-head machine screws which hold the chassis mounting rails in the cabinet. The two upper machine screws are removed from inside the record changer compartment. The two lower bolts are located below the radio chassis and removed from the chassis side of the cabinet. **Note:** When replacing the chassis in the cabinet, be sure dial glass is up snug against the control panel when the four mounting screws are tightened and that they are tightened securely.

### PUSH-BUTTON ADJUSTMENT

The mechanical type of push-button tuning used with this receiver makes possible the selection of any one of eight pre-selected stations. Any push-button may be adjusted to select any station in the three tuning bands. However, more accurate tuning of the SW and FM stations will be obtained if the lower four buttons E, F, G and H, Figures 2 & 3, are used for stations within these bands.

1. Remove all push-buttons by pulling straight up from the panel.
2. Manually tune in the desired station.
3. Release the screw adjacent to the push-button shank and push the shank in firmly as far as it will go while holding the tuning control knob.
4. Release the shank and tighten the locking screw.
5. Rotate the tuning control to a different position and check the push-button setting by again depressing the shank previously adjusted. The tuning dial should automatically return to the stations previously tuned in. However, in some cases it may not be exactly on the peak frequency of the stations. In such cases, continue as follows:
6. Re-tune the station manually to its peak frequency, and note whether it is necessary to increase or decrease the frequency setting for optimum tuning.
7. If it is necessary to increase the dial frequency setting, then the dial should be set at an additional increase beyond the optimum point (approximately the amount of the increase) and procedures 3, 4, 5 and 6 repeated. The push-button should then tune in the station exactly on its peak frequency.
8. If it is necessary to decrease the dial frequency setting, then the dial should be set at a lower frequency from its optimum point (approximately the amount of the decrease) and the procedure in 3, 4, 5 and 6 repeated.
9. Repeat the above procedures for the remaining seven push-buttons.

After the push-buttons have been set up as previously described, the proper tab with its transparent cover should be inserted together in each push-button knob. The push-buttons should now be placed on the proper shanks.

## ALIGNMENT PROCEDURE

### EQUIPMENT REQUIRED

Signal Generator

AM, 455 KC to 106 MC

FM, 10.7 MC and 88 to 108 MC.

Vacuum Tube Voltmeter

DC up to approximately 20 volts. Ground, or minus, must be isolated from the power line.

Oscilloscope

FM Test Circuit Plug

See Fig. 7 for details.

.01 mfd and 50 mmf (or less) capacitor

used for connecting signal generator to receiver.

Alignment Screwdriver

Must be 100% non-metallic and preferably over 8" in length.

Alignment Socket Wrenches—must be non-metallic.

One  $\frac{1}{4}$ " hexagon, 8" long.

One  $\frac{3}{8}$ " hexagon, 6" long.

If the  $\frac{3}{8}$ " wrench has a hole through the handle of sufficient diameter to permit inserting the alignment screwdriver, the locking nuts on L1, L2 and L3 can be loosened or tightened at the same time these padders are adjusted with the screwdriver inside.

### AM ALIGNMENT

Turn receiver and test instruments on and allow to warm up for at least 5 minutes. (Input voltage, 117 volts 60 cycles AC). Set volume control to minimum, bass and treble controls full counterclockwise, range control to BC (third from most counterclockwise position), tuning gang fully closed. Set dial pointer to Reference Mark at low frequency end of dial as shown on Fig. 6. If built-in AM loop antenna is disconnected, the two contacts of the AM antenna input jack located on top the chassis must be shorted together. C69 and C4 should be adjusted with loop connected.

### IF CHANNEL

1. Short #5 terminal on gang (C2-F) to chassis. See Fig. 2.
2. Set signal generator to 455 KC, CW or AM, and connect to #3 gang terminal (C2-E) through a .01 mfd capacitor. See Fig. 2.
3. Connect low range of V.T.V.M. to junction of R20 and C40 (lug 3 of switch S1-E is a convenient point—See Figs. 8 & 13), and chassis ground, and adjust signal generator attenuator to produce approximately 2 volts of AVC on the V.T.V.M.
4. Adjust C24 (BC oscillator trimmer) for maximum meter reading, keeping signal input to produce approximately 2 volts AVC. Repeat these adjustments until no further improvements can be made in any one of them. NOTE: All adjustments must be made with a completely non-metallic screwdriver.

### BC OSCILLATOR ALIGNMENT

1. Remove short from #5 gang terminal.
2. Move signal input from #3 gang terminal to external AM antenna terminal (J1) and set input frequency to 1475 KC CW or AM. (V.T.V.M. remains connected as for IF alignment.)

3. Set tuning control to 1475 KC.
4. Adjust C24 (BC oscillator trimmer) for maximum meter reading.
5. Set signal generator and receiver dial pointer to 580 KC.
6. Adjust BC oscillator padder C26 for maximum meter output. Repeat steps 2 to 5 until oscillator tracks correctly. Any change in C26 will necessitate a readjustment of oscillator trimmer C24.

### RF AND ANTENNA ALIGNMENT FOR BC BAND

1. Change coupling capacitor connecting signal generator to AM external antenna terminal from .01 mfd to 50 mfd or less. (Terminals of AM loop input jack must be shorted together if loop is disconnected.)
2. Adjust signal generator and receiver tuning control to 1475 KC.
3. Adjust BC oscillator trimmer, C24, BC RF trimmer, C12, and BC antenna trimmer, C69, for maximum output. (If AM loop is disconnected, C69 should be adjusted after chassis is installed in cabinet.) Rock tuning gang slightly for maximum output as adjustments are made.
4. Check overall tracking at 580 KC and 965 KC. Maximum output should occur within the  $\pm 10$  KC of the indicated dial pointer reading. If it falls outside these limits, the plates of the gang rotor should be bent to correct tracking, but this is a difficult operation and should be attempted only by experienced technicians. Bending the plates of the gang rotor will likely cause mistracking on the shortwave band.
5. Repeat steps 3 and 4 until no appreciable improvement can be obtained by additional adjustments.

### SW ALIGNMENT

1. V.T.V.M. and signal generator remain connected as for preceding step 5 of BC RF and antenna alignments; range switch in SW (most clockwise position).
2. Set signal generator and tuning control to 15 MC CW or AM.
3. Adjust SW oscillator trimmer (C23), SW RF trimmer (C11), and SW antenna trimmer (C4) for maximum output. NOTE: If circuits are badly out of alignment, it may be necessary to apply the signal first to terminal #3 on gang (C2-E) until oscillator is brought close to correct alignment. The local oscillator frequency in the receiver should be adjusted to the RF *plus* the IF (not below the RF). The correct position can be determined by turning C23 all the way in (clockwise) and then out (counter-clockwise) until the second peak is reached.
4. Tune receiver and signal generator to 6 MC and check calibration and output. Maximum meter reading should be obtained with the dial pointer  $\pm 100$  KC of the 6 MC dial reference mark and an AVC output voltage not less than one-half of the AVC voltage obtained at 15 MC, providing the same voltage is applied to the antenna in both cases.

## FM ALIGNMENT

### CW — METER METHOD

Turn receiver and test instruments "ON" and allow to warm up for at least five minutes. (Input voltage, 117 volts 60 cycles AC.) Set volume control to minimum, bass and treble controls full counterclockwise, range control to FM position (second from most counterclockwise position), and tuning gang fully closed. Dial pointer should be over Reference Mark as directed in first paragraph of AM Alignment. Connect FM dummy antenna to FM antenna binding screws on receiver.

1. Insert special FM test circuit plug, detailed below, in test circuit jack J2 located on left side of radio chassis. See Fig. 2 & 7.
2. Connect V.T.V.M. ground or "minus" lead to point "B" and "plus" lead to IF pin on test circuit plug.
3. Connect signal generator to #4 (C2-B) gang terminal through a .01 mfd capacitor and short #6 gang terminal (C2-C) to chassis. See Fig. 2.
4. Adjust output of signal generator to obtain 10.7 MC CW and approximately 4 volts on V.T.V.M.
5. Adjust C35B, C35A, C28B, C28A, and C46A for *maximum* meter reading, repeating all adjustments several times. NOTE: It may be necessary to apply the 10.7 MC signal to pin 6 of the 1st IF tube (7AH7) and adjust C35B, C35A, and C46A before applying the signal to #4 gang terminal and adjusting C28B and C28A.
6. Change V.T.V.M. "minus" to point "A" (center tap of two 100 K resistors) of test circuit jack and "plus" lead to audio (marked AF on chassis).
7. Turn signal generator "OFF" and set meter to zero when no signal is applied to IF.
8. Turn signal generator "ON" and adjust C46B for zero output on meter. It may be possible to obtain two or more points of adjustment at which a zero meter reading can be obtained. The correct one is the one at which the meter passes through zero most sharply with the minimum rotation of C46B.
9. Alternately adjust C46A (3rd FM IF primary) for maximum DC voltage across pins "B" and "IF" (meter connected as for previous IF alignment), and C46B (3rd FM IF secondary) for *minimum* DC voltage from point "A" to "audio." NOTE: In making this adjustment, the signal input level should be adjusted to provide approximately 6 volts DC across pins "B" and "IF" of test jack.
10. Remove short from #6 gang terminal and change signal generator input from gang to FM antenna jack on rear of radio chassis, applying signal through FM dummy antenna circuit shown in Fig. 3.
11. V.T.V.M. should be connected from point "B" to "IF" of test circuit plug.
12. Adjust signal generator and tuning control to 106 MC and output to produce approximately 10 volts on V.T.V.M.
13. Using a completely non-metallic 1/4" hexagon socket wrench, adjust FM oscillator trimmer (C22), FM RF trimmer (C10) and FM antenna trimmer (C1) for maximum output voltage read on V.T.V.M., rocking the tuning gang slightly as these adjustments are made. NOTE: Be very careful when adjusting these trimmers, not to spring them and thus cause them to become shorted.
14. Set signal generator and tuning control to 90 MC.
15. Adjust FM oscillator padder (L3), FM RF padder (L2) and FM antenna padder (L1) for maximum output voltage. The 3/8" locknut on these padders must be loosened before adjustments are made and tightened after adjustments are completed.
16. Repeat steps 13, 14 and 15 until maximum output voltage is obtained with the dial pointer at 90 MC and 106 MC when the signal generator is set at these respective frequencies. Any adjustments made under step 15 above must be followed by repeating the adjustments required under step 13.

### VISUAL METHOD

The antenna, RF, oscillator and first and second IF stages are aligned with a CW signal in the same manner described under the CW-meter method of alignment. The adjustment of the third IF, or ratio detector, determines to a considerable degree the fidelity and tuning characteristic of the receiver; therefore, the visual method, using an oscilloscope and FM signal, of aligning this stage may give better results than the CW - meter method. Numerous advantages can be given for either method. The best method to use depends not only on the type and quality of the test instruments available, but also on the ability and experience of the technician.

Turn receiver and test instruments "ON" and allow to warm up for at least five minutes. (Input voltage, 117 volts 60 cycles AC.) Set volume control to minimum, bass and treble controls full counterclockwise, range control to FM position (second from most counterclockwise position), and tuning gang fully closed. Dial pointer should be over Reference Mark as directed in first paragraph of AM Alignment. Connect FM dummy antenna to FM antenna binding screws on receiver.

1. Connect V.T.V.M. ground or "minus" lead to AVC pin of test circuit jack (J2) located on left side of radio chassis. (See Fig. 2).

**FM ALIGNMENT****VISUAL METHOD—Cont.**

- The test circuit plug used for the CW - meter method of FM alignment may be used throughout the following visual alignment procedure for providing convenient points of connections to the test circuit jack. The two 100 K resistors connected to the test circuit plug and used during the CW - meter method are not needed when the visual alignment procedure is followed, but do not affect the circuit any great amount and therefore may be disregarded.
2. Connect signal generator to #4 (C2-B) gang terminal through a .01 mfd capacitor and short #6 gang terminal (C2-C) to chassis. See Fig. 2 for gang terminal numbers.
  3. Adjust output of signal generator to obtain 10.7 MC CW and approximately 6 volts on the V.T.V.M.
  4. Adjust C35B, C35A, C28B, and C46A for maximum meter reading, repeating all adjustments several times.
  5. Connect test equipment as shown in Fig. 4. Some oscilloscopes have phasing controls and a 60 cycle sine wave horizontal sweep provided internally. If such an oscilloscope is available, the horizontal input connection and phasing capacitor shown in Fig. 4 are not required. The vertical input to the oscilloscope is connected to the AUDIO pin on the test circuit jack and the ground of the oscilloscope connected to the receiver chassis. Connect V.T.V.M. ground or "minus" lead to point B and "plus" lead to IF pin on test circuit plug.
  6. Connect signal generator to #4 (C2B) gang terminal (See Fig. 2) through a .01 mfd capacitor and short #6 gang terminal (C2C) to chassis.
  7. Adjust output of signal generator to obtain 10.7 MC FM and approximately 6 volts on the V.T.V.M. The sweep width of the FM signal must be at least 200 KC plus and minus the center frequency. An "S" curve similar to Fig. 5 should now appear on the oscilloscope, but it will likely be necessary to adjust the signal generator frequency slightly in order to properly center this "S" curve on the oscilloscope screen. If a double trace appears, as shown in Fig. 5b, adjust the phasing control (may be built in the oscilloscope or the phasing capacitor shown in Fig. 4) until a single trace is obtained.
  8. Adjust C46A (ratio detector primary) to obtain maximum V.T.V.M. reading and C46B (ratio detector secondary) for best symmetrical "S" curve on oscilloscope. Repeat these adjustments several times.
  9. Remove short from #6 gang terminal and change signal generator input from gang to FM antenna jack on rear of radio chassis, applying signal through FM dummy antenna circuit shown in Fig. 3.
  10. V.T.V.M. should be connected from point "B" to "IF" of test circuit plug.
  11. Adjust signal generator and tuning control to 106 MC CW and output to produce approximately 10 volts on V.T.V.M.
  12. Using a completely non-metallic 1/4" hexagon socket wrench, adjust FM oscillator trimmer (C22), FM RF trimmer (C10) and FM antenna trimmer (C1) for maximum output voltage read on V.T.V.M., rocking the tuning gang slightly as these adjustments are made. NOTE: Be very careful when adjusting these trimmers, not to spring them and thus cause them to become shorted.
  13. Set signal generator and tuning control to 90 MC.
  14. Adjust FM oscillator padder (L3), FM RF padder (L2) and FM antenna padder (L1) for maximum output voltage. The 3/8" locknut on these padders must be loosened before adjustments are made and tightened after adjustments are completed.
  15. Repeat steps 11, 12, 13 and 14 until maximum output voltage is obtained with the dial pointer at 90 MC and 106 MC when the signal generator is set at these respective frequencies. Any adjustments made under step 14 above must be followed by repeating the adjustments required under 12.
  16. It is possible to visually align the ratio detector transformer (C46A & C46B) after the oscillator, RF and antenna circuits, have been aligned. In some cases this may be desirable, especially if the output of the FM signal generator is rather low at 10.7 MC. If this method is followed, align the IF channel up through C46A (ratio detector primary) and the oscillator, RF and antenna circuits as directed above, using a CW or AM signal and the V.T.V.M. connected across the ratio detector load resistor. (Point B and IF of the test circuit jack as shown in Fig. 2). Then, with the oscilloscope and V.T.V.M. connected as directed in step 5 above and the signal generator still connected to the FM antenna input through the FM dummy antenna, apply an FM signal of any frequency between 90 and 106 MC and adjust the receiver tuning control to center the resulting "S" curve on the oscilloscope screen. The ratio detector transformer (C46A & C46B) may now be adjusted in exactly the same manner as directed in step 8, except that it may be advisable to adjust the output of the signal generator to produce approximately 10 volts on the V.T.V.M. instead of 8 volts.

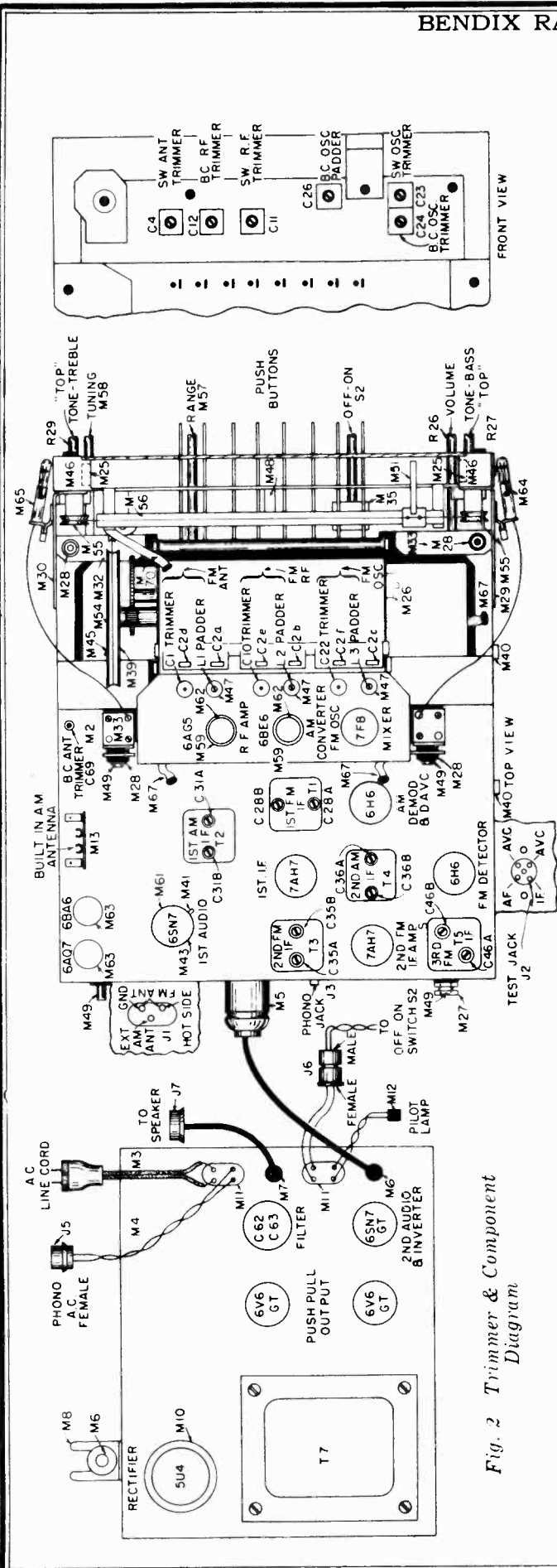


Fig. 2 Trimmer & Component Diagram

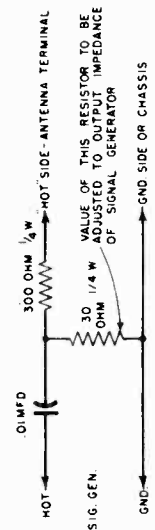


Fig. 3 FM Dummy Antenna

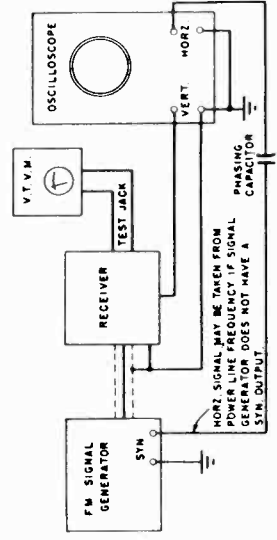


Fig. 4 Instrument Connection Diagram

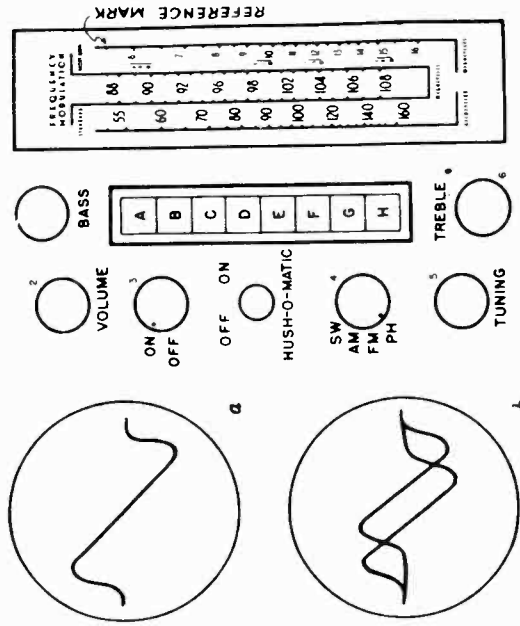


Fig. 5 Ratio Detector "S" Curves

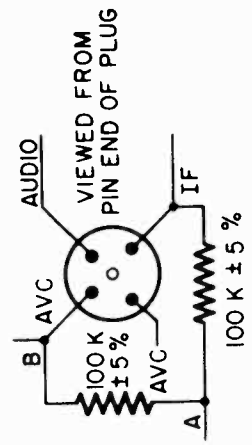
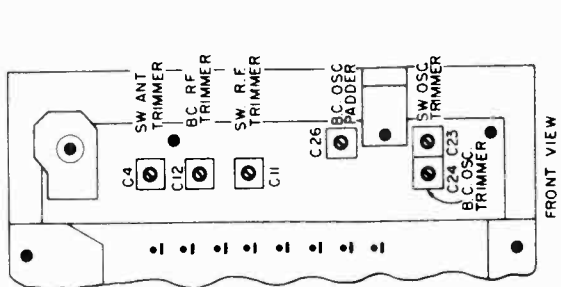


Fig. 7 Test Circuit Plug

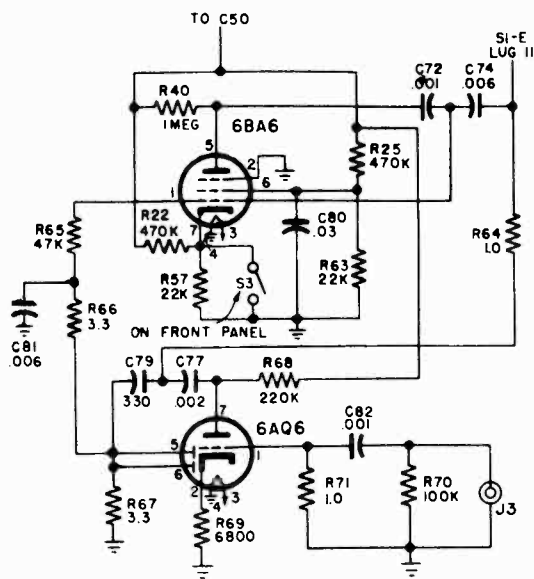


Fig. 9 Schematic Diagram—Model 1217D

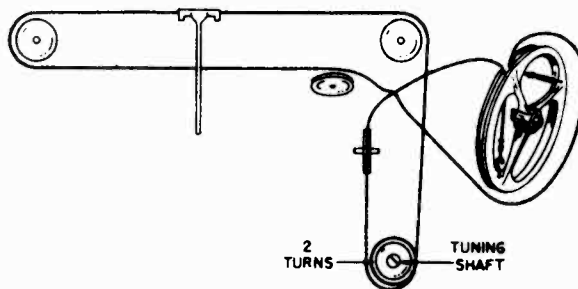


Fig. 11 Dial Stringing Diagram

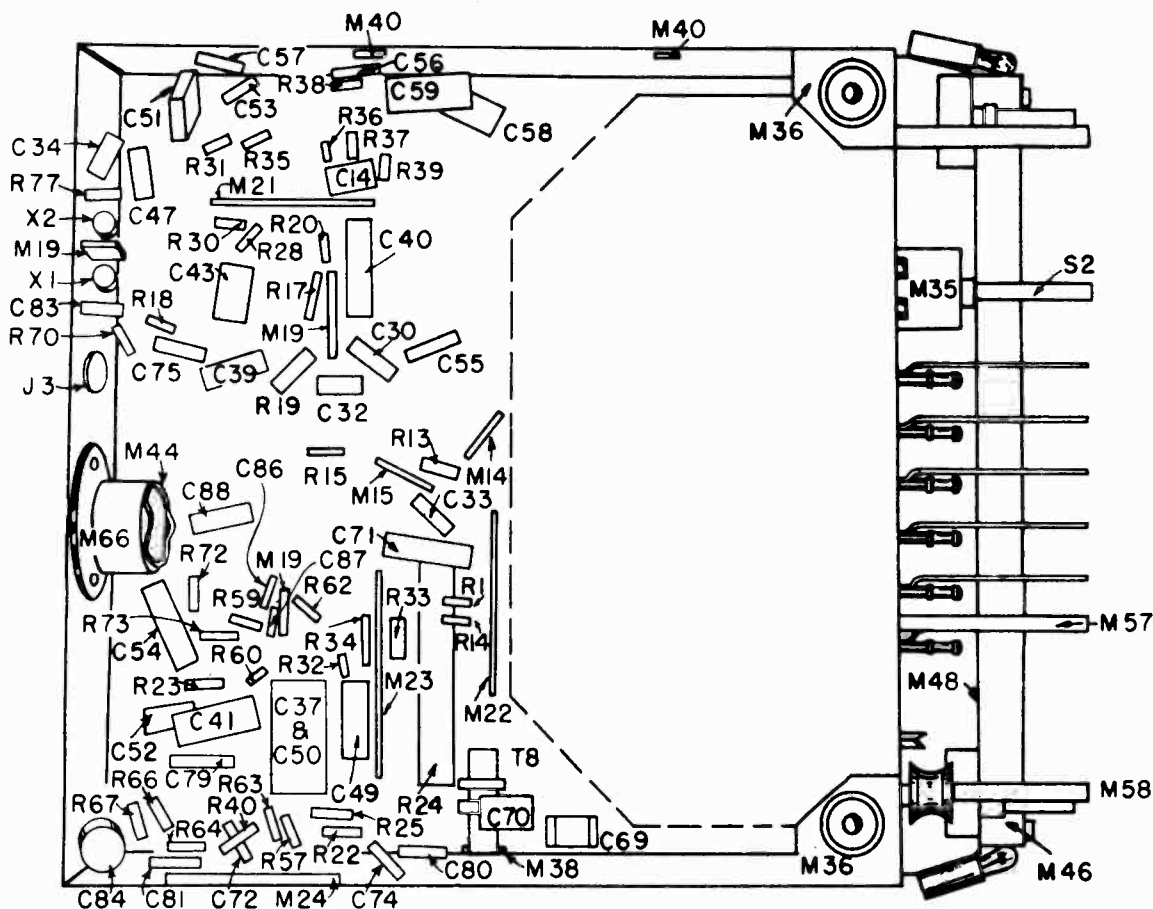
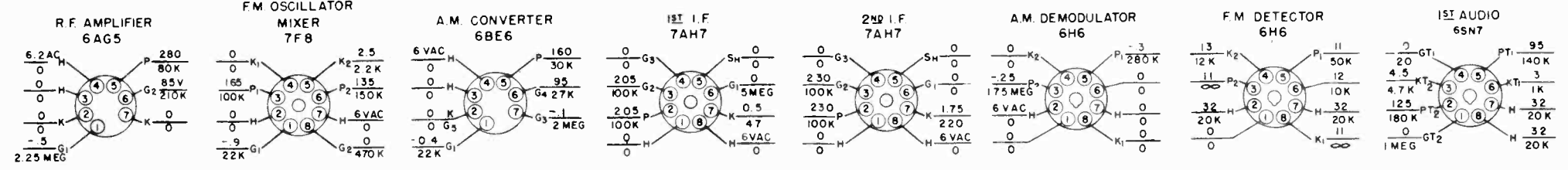


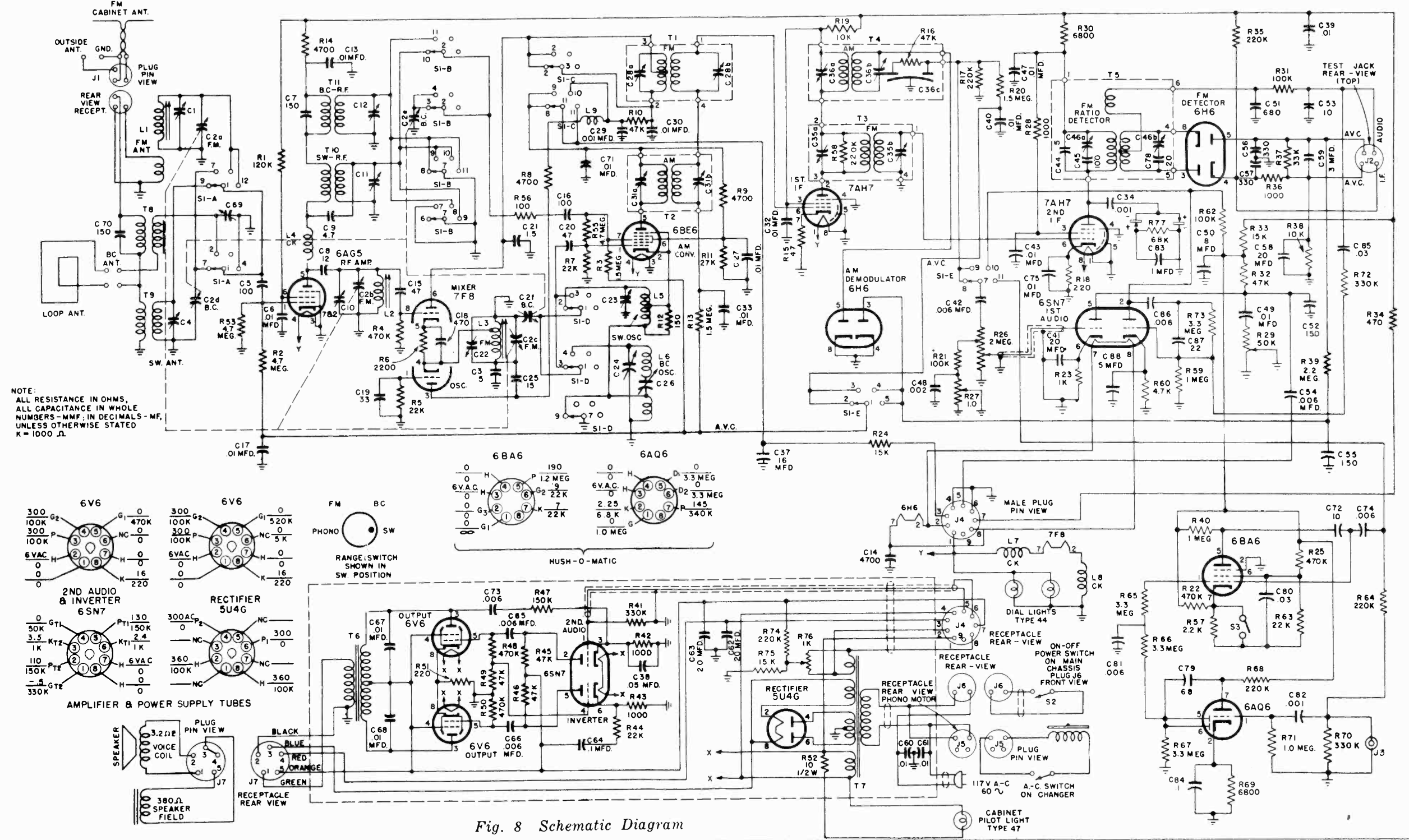
Fig. 12 Component Diagram—Bottom View Radio Chassis

BENDIX RADIO DIV.

CONDITIONS OF MEASUREMENTS  
 LINE VOLTAGE 117 A-C ZERO SIGNAL INPUT RANGE SWITCH IN FM POSITION VOL. CONT. MIN. TONE CONTROL FULL COUNTERCLOCKWISE SOCKET VOLTAGE RESISTANCE TO COMMON GROUND D-C AT 20,000 Ω/V A-C AT 1,000 Ω/V



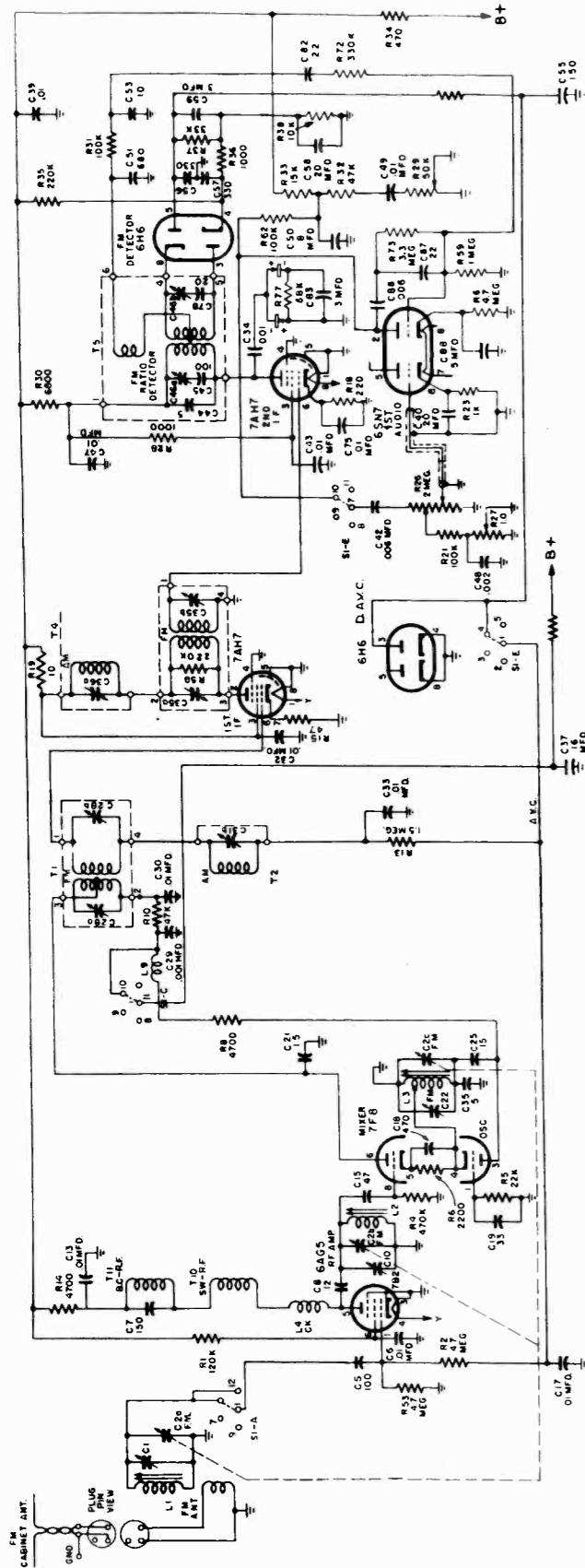
NOTE: VOLTAGE AND RESISTANCE MEASUREMENTS ON 6BE6 & 6H6 AM DEMODULATORS MADE WITH RANGE SWITCH IN AM POSITION



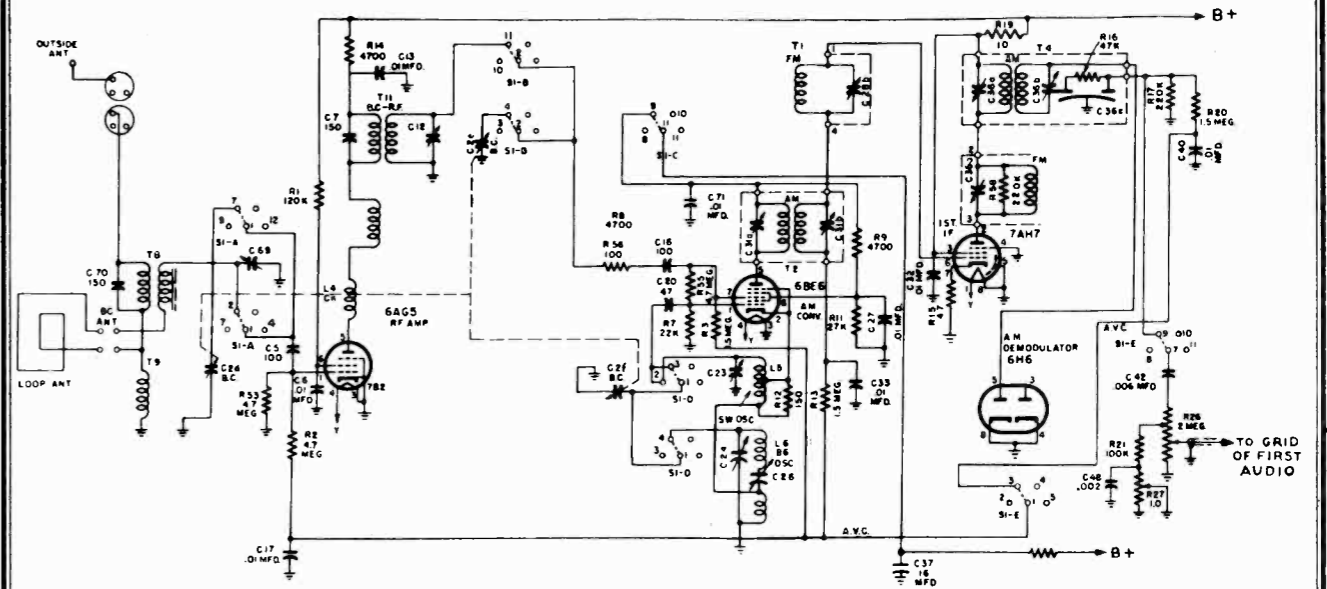
NOTE:  
 ALL RESISTANCE IN OHMS,  
 ALL CAPACITANCE IN WHOLE  
 NUMBERS-MMF. IN DECIMALS-MMF.  
 UNLESS OTHERWISE STATED  
 K=1000 Ω

Fig. 8 Schematic Diagram

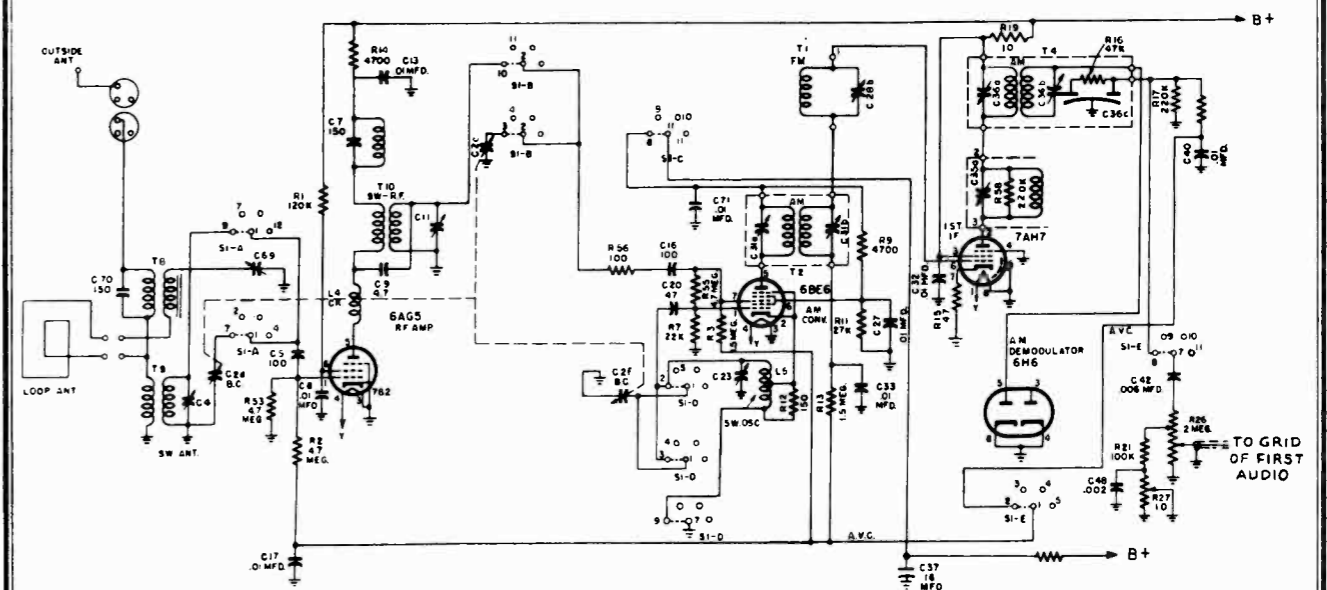




NOTE:  
1ST POSITION (PHONO)  
NOT SHOWN.  
BAND-SWITCH SHOWN  
AT 2ND POSITION CLOCKWISE.  
F.M. BAND  
88 - 108 MC



BAND-SWITCH SHOWN  
AT 3RD POSITION CLOCKWISE.  
BROADCAST BAND  
540-1600 KC



BAND-SWITCH SHOWN  
AT 4TH POSITION CLOCKWISE.  
SHORT WAVE BAND  
5.75 - 15.5 MC

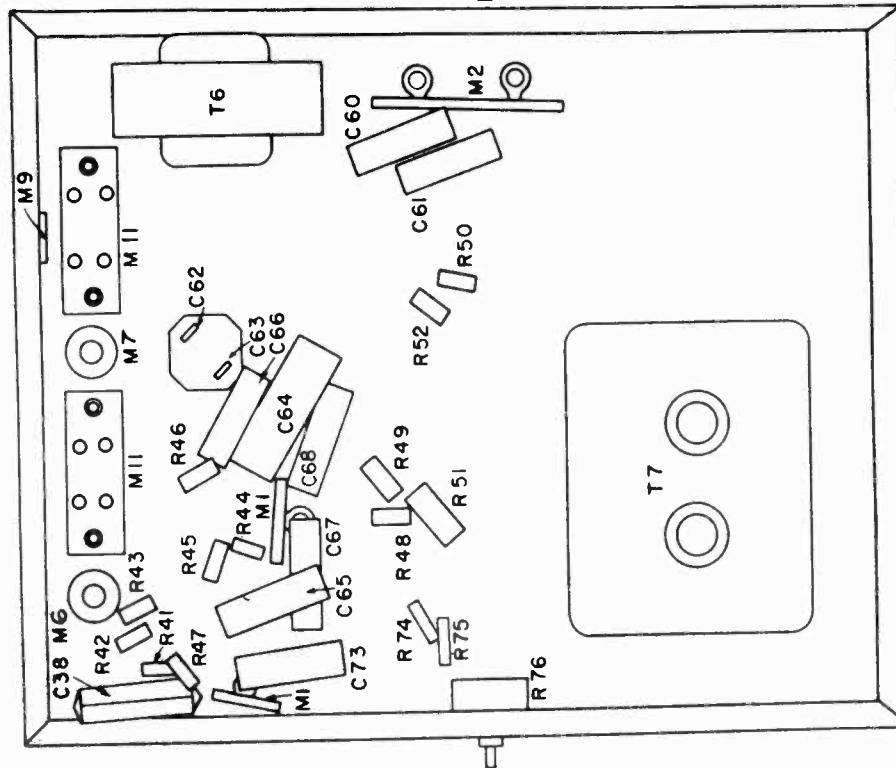


Fig. 10 Component Diagram—Bottom View of Amplifier Chassis

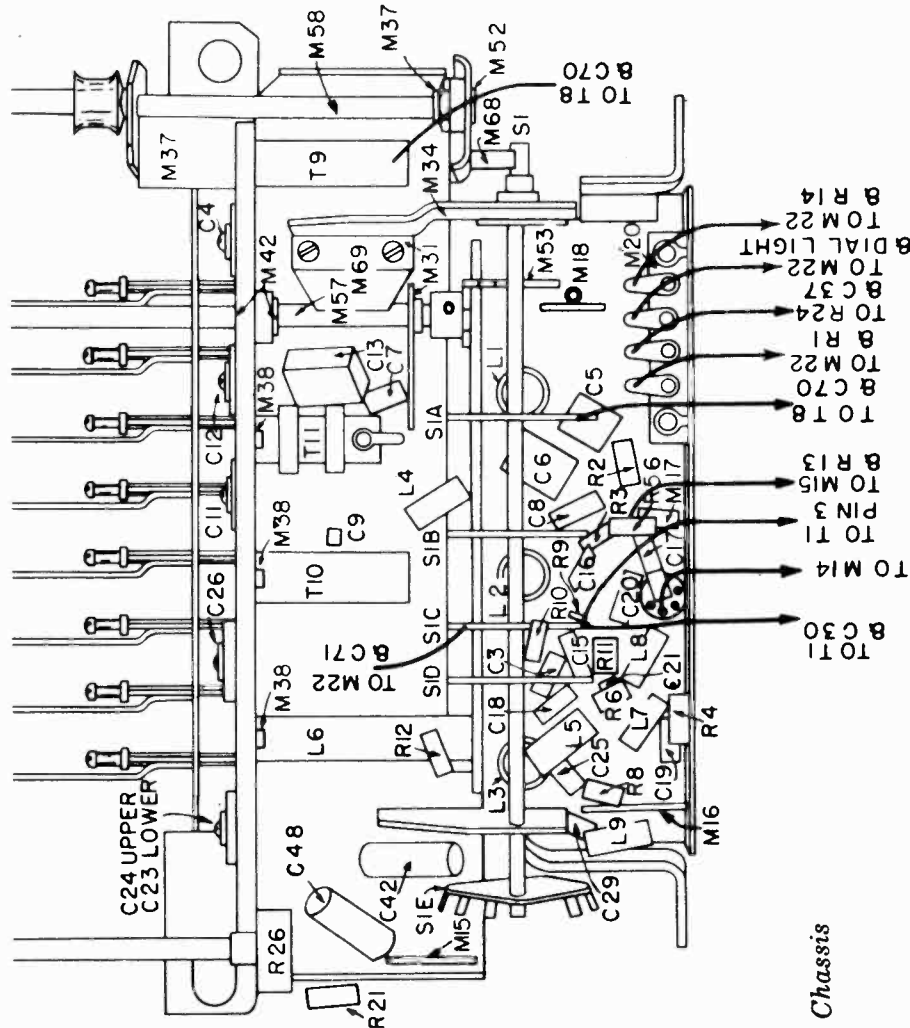


Fig. 13 Component Diagram—Bottom View of Tuner Chassis

**REPLACEMENT PARTS LIST**

Stock Number	Symbol Number	Description	Stock Number	Symbol Number	Description
<b>AMPLIFIER ELECTRICAL COMPONENTS</b>					
CP2T40	(C38)	CAPACITOR—Tubular Paper .05 mfd 200V	CT1B03	(C46b)	CAPACITOR—Trimmer 5-25 mmf
CP4M51	(C60,61)	CAPACITOR—Moulded Paper .01 mfd 400V	CP6T12	(C48,77)	CAPACITOR—Paper .002 mfd 600V
CE2A02	(C62,63)	CAPACITOR—Electrolytic 20-20 mfd 450V	CP4T34	(C49)	CAPACITOR—Tubular Paper .02 mfd 400V
CP5T51	(C64)	CAPACITOR—Paper .1 mfd 600V	CM4A42	(C51)	CAPACITOR—Mica 680 mmf 300V
CP4T20	(C65,66,73)	CAPACITOR—Tubular Paper .006 mfd 400V	CMSA00	(C53)	CAPACITOR—Mica 10 mmf 500V
CP4T31	(C67,68)	CAPACITOR—Tubular Paper .01 mfd 400V	CMSA34	(C56,57)	CAPACITOR—Mica 330 mmf 500V
RC22A334M	(R41)	RESISTOR—Comp. 330K ¼W	CE1D00	(C59)	CAPACITOR—Electrolytic 3 mfd 50V
RC22A102K	(R42,43)	RESISTOR—Comp. 1,000 ohms ±10% ¼W	CT1A15	(C69)	CAPACITOR—Trimmer 4-70 mmf
RC22A223K	(R44)	RESISTOR—Comp. 22K ±10% ¼W	CC5A22	(C72)	CAPACITOR—Ceramic 10 mmf 500V
RC23A473K	(R45,46)	RESISTOR—Comp. 47K ±10% ¼W	CC9K50	(C72,82)	CAPACITOR—Ceramic .001 mfd 300V
RC22A154M	(R47)	RESISTOR—Comp. 150K ¼W	CM7S17	(C78)	CAPACITOR—Silvered Mica 20 mmf 500V
RC22A474K	(R48,50)	RESISTOR—Comp. 470K ±10% ¼W	CC6A32	(C79)	CAPACITOR—Ceramic 68 mmf
RC22A473K	(R49)	RESISTOR—Comp. 47K ±10% ¼W	CC6A40	(C79)	CAPACITOR—Ceramic 330 mmf
RC25A221K	(R51)	RESISTOR—Comp. 220 ohms ±10% 2W	CP2T36	(C80)	CAPACITOR—Tubular Paper .03 mfd 200V
RC23A100M	(R52)	RESISTOR—Comp. 10 ohms ½W	CE1T05	(C83)	CAPACITOR—Electrolytic 1 mfd 100V
RC23A224M	(R74)	RESISTOR—Comp. 220K ½W	CP4T51	(C84)	CAPACITOR—Paper .1 mfd 400V
RC23A153M	(R75)	RESISTOR—Comp. 15K ½W	CP4T36	(C85)	CAPACITOR—Paper .03 mfd 400V
RYOC03	(R76)	RESISTOR—Pot. 1,000 ohms	CMSA05	(C87)	CAPACITOR—Mica 22 mmf 500V
TA0000	(T6)	TRANSFORMER—Output	CE1T03	(C88)	CAPACITOR—Electrolytic 5 mfd 25V
TP0R00	(T7)	TRANSFORMER—Power	RC23A124K	(R1)	RESISTOR—Comp. 120K ±10% ½W
<b>AMPLIFIER MECHANICAL COMPONENTS</b>					
BT3S05	(M1)	BOARD—Terminal	RC22A475M	(R2,53,55)	RESISTOR—Comp. 4.7 meg ¼W
BT4S03	(M2)	BOARD—Terminal	RC22A155M	(R3,13,20)	RESISTOR—Comp. 1.5 meg ¼W
CL2A08	(M3)	CORD—AC Brown	RC22A474M	(R4,22,25)	RESISTOR—Comp. 470K ¼W
CL2A10	(M4 & J5)	CORD—Phono Power	RC22A223K	(R5,7)	RESISTOR—Comp. 22K ±10% ¼W
CS0M02	(M5)	COVER—Power Cable	RC22A222M	(R6)	RESISTOR—Comp. 2.2K ¼W
GRO513	(M6)	GROMMET—Rubber Insulating	RC23A472M	(R8,9,14,60)	RESISTOR—Comp. 4.7 ¼W
GRO514	(M7)	GROMMET—Rubber Insulating	RC22A473M	(R10,16,32)	RESISTOR—Comp. 47K ¼W
HB0M19	(M8)	BRACKET—Shockmount Mounting	RC23A273K	(R11)	RESISTOR—Comp. 27K ±10% ½W
HC0C09	(M9)	CLIP—Cable	RC22A151K	(R12)	RESISTOR—Comp. 150 ohms ±10% ¼W
HC0T01	(M10)	CLAMP—Tube	RC22A470K	(R15)	RESISTOR—Comp. 47 ohms ±10% ¼W
JR2007	(J6)	RECEPTACLE—2 Contact	RC22A224M	(R17,64,68)	RESISTOR—Comp. 220K ¼W
JR5001	(J7)	RECEPTACLE—5 Contact	RC22A221M	(R18)	RESISTOR—Comp. 220 ohms ¼W
PI0P00	(M11)	PLATE—Line Cord Insulator	RC24A103M	(R19,38)	RESISTOR—Comp. 10K 1W
SO0D09	(M12)	SOCKET—Dial Light	RC22A104M	(R21,31,62,70)	RESISTOR—Comp. 100K ¼W
SO8S01		SOCKET—Octal 8 Prong Tube	RC22A102M	(R23,28)	RESISTOR—Comp. 1,000 ohms ¼W
SO8S02	(J4)	SOCKET—Octal 9 Prong Power Cable	RW0D38	(R24)	RESISTOR—Wirewound 15K ±10% 10W
<b>RECEIVER ELECTRICAL COMPONENTS</b>					
CT1B00	(C1,10,22)	CAPACITOR—Trimmer 3-30 mmf Variable Air	RC24A682K	(R30)	RESISTOR—Comp. 68K ±10% 1W
CY0E00	(C2)	CAPACITOR—Variable (3 section AM) (3 section FM)	RC23A153M	(R33)	RESISTOR—Comp. 15K ¼W
CC7B19	(C3)	CAPACITOR—Ceramic Insulated 5 mmf ±10% 500V	RC24A471M	(R34)	RESISTOR—Comp. 470 ohms 1K
CT1A13	(C4,11,23,24)	CAPACITOR—Trimmer Mica 4-75 mmf	RC22A224K	(R35,58)	RESISTOR—Comp. 220K ±10% ¼W
CM6L22	(C5,16)	CAPACITOR—Mica 100 mmf ±10% 500V (Low Loss)	RC22A102K	(R36)	RESISTOR—Comp. 1,000 ohms ±10% ¼W
CP4M31	(C6,13,27,30,32,39,43,47)	CAPACITOR—Paper .01 mfd 400V	RC22A333M	(R37)	RESISTOR—Comp. 33K ¼W
CMSA26	(C7,52,55,70)	CAPACITOR—Mica 150 mmf 500V	RC22A225M	(R39)	RESISTOR—Comp. 2.2 meg ¼W
CC0823	(C8)	CAPACITOR—Ceramic Insulated 12 mmf ±10% 500V	RC22A105M	(R40,59,67,71)	RESISTOR—Comp. 1 meg ¼W
CC9A18	(C9)	CAPACITOR—Ceramic Insulated 4.7 mmf 500V	RC22A101M	(R56)	RESISTOR—Comp. 100 ohms ¼W
CT1A14	(C12)	CAPACITOR—Trimmer Mica 1.8-40 mmf	RC22A223M	(R57,63)	RESISTOR—Comp. 22K ¼W
CM5E73	(C14)	CAPACITOR—Mica 4,700 mmf 500V	RC22A335M	(R65,66,67,73)	RESISTOR—Comp. 3.3 meg ¼W
CC8B30	(C15,20)	CAPACITOR—Ceramic Insulated 47 mmf ±10% 500V	RC22A473K	(R65)	RESISTOR—Comp. 47K ±10% ¼W
CP0M31	(C17,33,75)	CAPACITOR—Paper .01 mfd 120V	RC22A682M	(R69)	RESISTOR—Comp. 6.8K ¼W
CM6L38	(C18)	CAPACITOR—Mica 470 mmf ±10% 500V (Low Loss)	RC22A334M	(R70,72)	RESISTOR—Comp. 330K ¼W
CC8B28	(C19)	CAPACITOR—Ceramic Insulated 33 mmf ±10% 500V	RC22A683K	(R77)	RESISTOR—Comp. 68K ±10% ¼W
CC9A12	(C21)	CAPACITOR—Ceramic Insulated 1.5 mmf 500V	RC22A103K		RESISTOR—Comp. 10K ±10% ¼W (Used only on Code C Radio Chassis)
CC0824	(C25)	CAPACITOR—Ceramic Insulated 15 mmf ±10% 500V	LA0F00	(L1)	COIL—FM Ant.
CT1A12	(C26)	CAPACITOR—Trimmer Mica 150-600 mmf	LO0F00	(L2)	COIL—RF FM
CT2A09	(C28a,b,35a,b)	CAPACITOR—Trimmer 5-30 mmf, 5-30 mmf	LO1F00	(L3)	COIL—Osc. FM
CMSL01	(C29,34)	CAPACITOR—Mica .001 mfd 500 V (Low Loss)	LFOA03	(L4)	CHOKER—RF
CT2A15	(C31a,b)	CAPACITOR—Trimmer 75-145 mmf	LO1C00	(L5)	COIL—Osc. SW
CT2A13	(C36a,b)	CAPACITOR—Trimmer 75-145 mmf	LO1B01	(L6)	COIL—Osc. BC
CE2D00	(C37,50)	CAPACITOR—Electrolytic Dry 8-16 mfd 450V	LFOA02	(L7,8)	CHOKER—RF
CP4T31	(C40,71)	CAPACITOR—Tubular Paper .01 mfd 400V	LFOA01	(L9)	CHOKER—RF
CE1T02	(C41,58)	CAPACITOR—Electrolytic 20 mfd 25V	T10C07	(T1)	TRANSFORMER—1st IF FM
CP4T20	(C42,54,74,81,86)	CAPACITOR—Tubular Paper .006 mfd 400V	T10C10	(T2)	TRANSFORMER—1st IF BC
CM7S07	(C44)	CAPACITOR—Silvered Mica 5 mmf 500V	T10I01	(T3)	TRANSFORMER—2nd IF FM
CMSL25	(C45)	CAPACITOR—Mica 100 mmf 500V (Low Loss)	T10D09	(T4)	TRANSFORMER—1st IF Output
CT1B02	(C46a)	CAPACITOR—Trimmer 3-12 mmf	T10D15	(T5)	TRANSFORMER—3rd IF
			TR1B00	(T8)	TRANSFORMER—Ant.
			TR1H00	(T9)	TRANSFORMER—SW Ant.

BENDIX RADIO DIV.

MODEL 1217D

Stock Number	Symbol Number	Description	Stock Number	Symbol Number	Description
TR1C00	(T10)	TRANSFORMER—SW RF	SM0B03	(M60)	SHIELD—Miniature Tube Base
TR1L00	(T11)	TRANSFORMER—BC RF	SM0T01	(M61)	SHIELD—Metal Tube
SR4G00	(S1)	SWITCH—Rotary 5 Section-4 Position	SM0T03	(M62)	SHIELD—Miniature Tube
SR2L02	(S2)	SWITCH—Rotary Snap	SM0T04	(M63)	SHIELD—Miniature Tube
SR2A02	(S3)	SWITCH—Rotary Single Pole 2 Position	S00D07	(M64)	SOCKET—Dial Light (1 1/2" lead)
#1M34	(X1,2)	CRYSTAL—Detector	S00D08	(M65)	SOCKET—Dial Light (8/4" lead)
#44		LAMP—Dial	S0BL02		SOCKET—Loktal Tube Ringmount Type
			S0BL03		SOCKET—Loktal Tube Rivet Mtg.
			S0BL05		SOCKET—Miniature Tube (Zip In)
			S0BM01	(M66 & J4)	SOCKET—9 Contact
			S0BS01		SOCKET—Octal Tube
			ST0M00		SLUG—Tuning 10-32 Threaded Copper Rod
			XS0C02	(M67)	STRIP—Copper (.004 x 5/16 x 1 5/8)
			XS0C03	(M68)	STRIP—Contact (Rotary Switch Shaft)
			XS0C04	(M69)	STRIP—Copper (Band Switch Shaft)
			XS0C05	(M70)	STRIP—Copper (.004 x 5/16 x 3)
			XS0C10		SHIELD—Dial Cable
					CABINET COMPONENTS
BT2R00	(M13)	BOARD—Loop Terminal	BP0B01		PUSHBUTTON—Mottled Brown
BT1S00	(M14)	BOARD—Terminal 1 Lug 1 Mtg.	BZ0B11		BACK—Cabinet
BT2S00	(M15)	BOARD—Terminal 2 Lug 1 Mtg.	BZ0D12		BAFFLE—Cardboard and Cloth
BT2S03	(M16)	BOARD—Terminal 2 Lug 1 Mtg.	BZ0D13		BAFFLE—Cardboard and Cloth (With Cutout)
BT2S06	(M17)	BOARD—Terminal 2 Lug 1 Mtg.	BZ0D29		BAFFLE—Speaker (Wood)
BT3S03	(M18)	BOARD—Terminal 3 Lug 1 Mtg.	DZ0F13		DECAL—Tuning
BT3S06	(M19)	BOARD—Terminal 3 Lug 1 Mtg.	DZ0F14		DECAL—Volume
BT4S02	(M20)	BOARD—Terminal 4 Lug 2 Mtg.	DZ0F15		DECAL—On-Off
BT5S01	(M21)	BOARD—Terminal 5 Lug 2 Mtg.	DZ0F16		DECAL—SW-AM-FM-PH
B.4S01	(M22)	BOARD—Terminal 6 Lug 2 Mtg.	DZ0F17		DECAL—Trebble
BT7S00	(M23)	BOARD—Terminal 7 Lug 2 Mtg.	DZ0F18		DECAL—Bass
BT7S01	(M24)	BOARD—Terminal 7 Lug 2 Mtg.	EC0M00		ESCUTCHEON—Control, Hush-O-Matic
CD0C21		CABLE—Dial 53"	GRO511		GROMMET—Rubber, Phono Lead-In
DS0E01		DIAL—AM FM Glass	GZ0M06		GRILLE—Metal
GROD04	(M25)	GROMMET—Dial Glass	HC0C07		CLIP—Cable
GRO500	(M26)	GROMMET—Rubber Shockmount	HC0S29		CLIP—"C" Washer
GRO506	(M27)	GROMMET—Rubber Shockmount	HK0R00		CLIP—Knob Retainer Spring
GRO512	(M28)	GROMMET—Capacitor Shockmount	HK0R05		KNOB—Door Pull
HB0M23	(M29)	BRACKET—R.H. Back Plate With Pulleys	HM4S00		NUT—Speed
HB0M24	(M30)	BRACKET—L.H. Back Plate With Pulleys	HT0F02		TRAY—Record Changer
HB0M26	(M31)	BRACKET—Bearing Mtg.	HT0T00		TRACK—Swing-A-Door
HB0M31	(M32)	BRACKET—R.H. Capacitor Mtg.	HZ0C05		CATCH—Door Bullet
HB0M32	(M33)	BRACKET—L.H. Capacitor Mtg.	HZ0G01		GLIDE—Swing-A-Door
HB0M36	(M34)	BRACKET—Band Switch	HZ0H04		HINGE—Door (Semi Concealed)
HB0M41	(M35)	BRACKET—Switch (S2) Mtg.	HZ0H05		HINGE—Lid
HB0M72	(M36)	BRACKET—Chassis Shockmount	HZ0S02		SUPPORT—Lid (Bronze)
HB0M73	(M37)	BRACKET—Manual Tuning Control	J10A00		JEWEL—Amber Plastic
HB0S03		BALL—Bearing 3/32 Dia.	JP1000		PLUG—AM Ant.
HB0S04		BALL—Bearing 5/32 Dia.	JP3001		PLUG—3 Contact FM Ant. Connector
HC0C00	(M38)	CLIP—Coil Mtg.	JP1002		PLUG—Single Contact Phono
HC0C03	(M39)	CLAMP—Dial Cable	KB0B01		KNOB—Indexed Push-on
HC0C08	(M40)	CLIP—Cable	KC0B06		KNOB—Control (Brown)
HC0C11		CLAMP—Cable	KS0B02		KNOB—Hush-O-Matic Control
HC0C12		CLIP—1st IF	MC0C01		CAM—Swing-A-Door Bumper
HC0C13		CLIP—2nd IF	MRO0C4		ROLLER—Swing-A-Door
HC0M05	(M41)	CLAMP—Tube Shield	MRO0C5		ROLLER—Swing-A-Door Cam
HC0S28	(M42)	CLIP—"C" Washer	MS0F00		RUNNER—Plain, Swing-A-Door
HC0T00	(M43)	CLAMP—Tube Shield Ring	MS0G00		GUIDE—Runner, Swing-A-Door
HC0T02	(M44)	CLAMP—Ring Retainer	MS0S08		SHAFT—Roller, Swing-A-Door
HH0C00	(M45)	HOOK—Dial Cord	NE0M00		DECAL—Bendix Emblem
HH0D00	(M46)	RETAINER—Dial Glass	PFOB00		PADS—Felt Bumper, Lid
HI0T00	(M47)	INSERT—Tuning Core	SE2R00		SPEAKER—12" E.D.
HP0D00	(M48)	PLATE—Back	WP0B01		WINDOW—Call Letter
HR0S01		RIVET—Shoulder (1.171 x .083)	XS0Z11		STRIP—Fishpaper (.005 x 3/4 x 2 1/2)
HS0C57		SPRING—Dial Cord	XZ0M01		STRIP—Back Mtg.
HS0C74		SPRING—Push Button Coil	ZW1G01		CABINET
HS8F00	(M49)	SLEEVE—Flared, Tuning Cond.			
HS0S06	(M50)	STUD—Shoulder			
HS0S12		STUD—8-32 Shoulder (R.H. End RF Chassis)			
ID0M20	(M51)	INDICATOR—Dial			
JR3001	(J1)	RECEPTACLE—3 Contact			
JR4001	(J2)	RECEPTACLE—4 Contact			
JR1S00	(J3)	RECEPTACLE—Single Contact			
JP2002	(J6)	PLUG—2 Prong			
MB0B03	(M52)	BEARING—Tuning Control			
MG0S01	(M53)	SPROCKET—Hub			
MP0M01	(M54)	PULLEY—Drive			
MP0M02	(M55)	PULLEY—Dial Cord Idler			
MRO0P00	(M56)	RAIL—Pointer			
MS0C01	(M57)	SHAFT—Band Switch			
MS0T09	(M58)	SHAFT—Tuning Assy.			
SM0B00	(M59)	SHIELD—Miniature Tube Base			

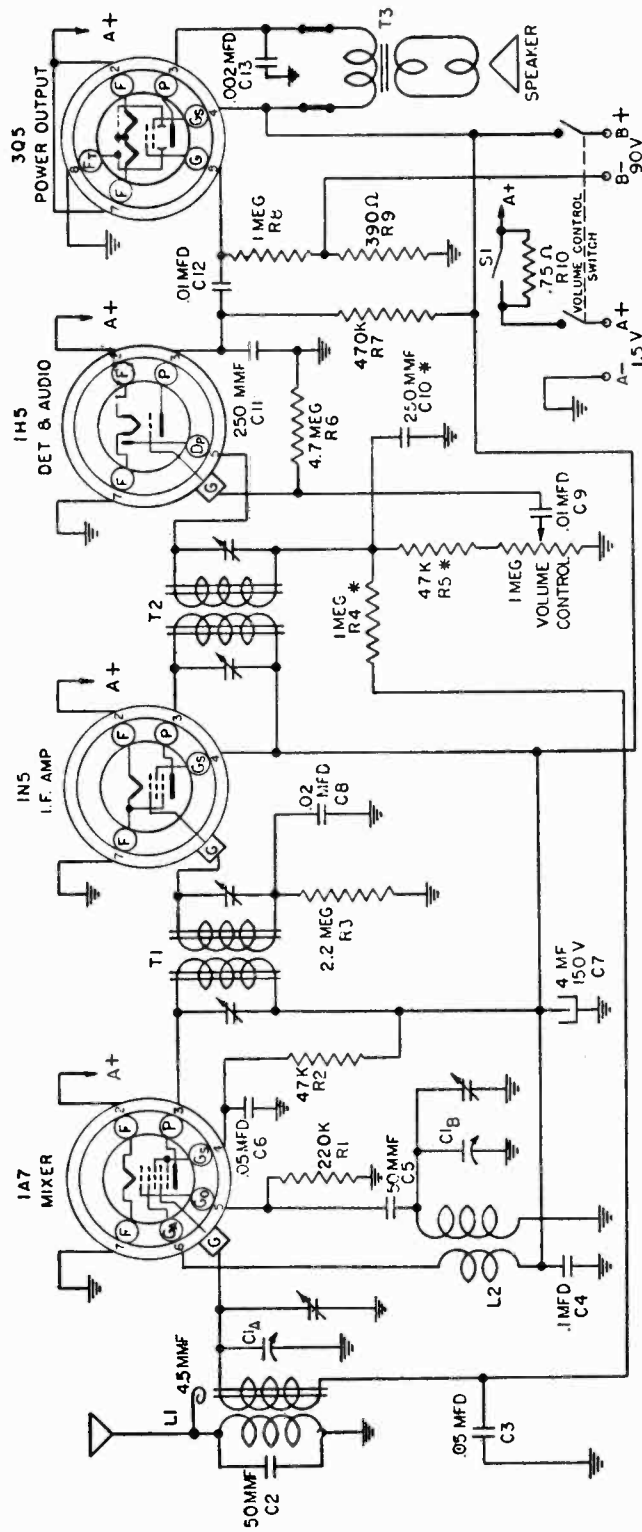
Circuit components, denoted by italicized symbol numbers, used only on Code C radio chassis.

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PARTS LIST

Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION
C1A-C1B	B19-185	Variable Condenser	R3	A60-684	2.2 Megohm 1/2 watt Carbon Resistor	T2	B10-417	2nd I.F. Transformer
C2	A16-152	50 MMFD Mica Condenser (Part of L-1)	R4	A60-688	1 Megohm 1/2 watt Carbon Resistor (Part of T-2)	T3	A80-226	Speaker Output Transformer
C3-C6	A16-157	.05 MFD 200 V Tubular Condenser	R5	A60-689	47 K Ohm 1/2 watt Carbon Resistor (Part of T-2)		B79-348	Speaker
C4	A15-175	1 MFD 200 V Tubular Condenser	R6	A60-689	47 K Ohm 1/2 watt Carbon Resistor		B79-345	Alternate Speaker
C5	A15-175	50 MMFD Mica Condenser	R7	A60-689	47 K Ohm 1/2 watt Carbon Resistor		B67-487	Dial Scale
C6	A16-150	.02 MFD 400 V Tubular Condenser	R8	A60-689	470 K Ohm 1/2 watt Carbon Resistor		A58-42	Dial Pointer
C7	A18-273	4 MFD 150 V Electrolytic Condenser	R9	A60-689	390 Ohm 1/2 watt Carbon Resistor		A52-182	Knob
C8-C12	A16-156	.01 MFD 400 V Tubular Condenser	R10	A60-691	75 Ohm 1 watt Resistor		A83-277	Dial Scale Retainer
C10	A15-176	250 MMFD Mica Condenser (Part of T-2)	L1	A10-414	390 Ohm 1/2 watt Carbon Resistor		D42-384	Wood Cabinet
C11	A16-155	.002 MFD 600 V Tubular Condenser	L2	A10-415	Antenna Coil		A84-35	Dial Drive Shaft Assembly
C13	A60-687	220 K Ohm 1/2 watt Carbon Resistor	T1	B10-416	Oscillator Coil		A89-164	Battery Thriftmaster Switch
R1	A60-687	220 K Ohm 1/2 watt Carbon Resistor			1st I.F. Transformer		A24-165	Volume Control and Switch
R2	A60-685	47 K Ohm 1/2 watt Carbon Resistor						

MODELS MA361,  
MEL

## COAST TO COAST STORES

## DESCRIPTION

This model is a 4-Tube Superhetrodyne radio receiver designed to cover a frequency range of from 535 Kilocycles to 1725 Kilocycles (K.C.). The tubes used are—

1A7 GT—Osc. Converter  
1N5 GT—I.F. Amplifier

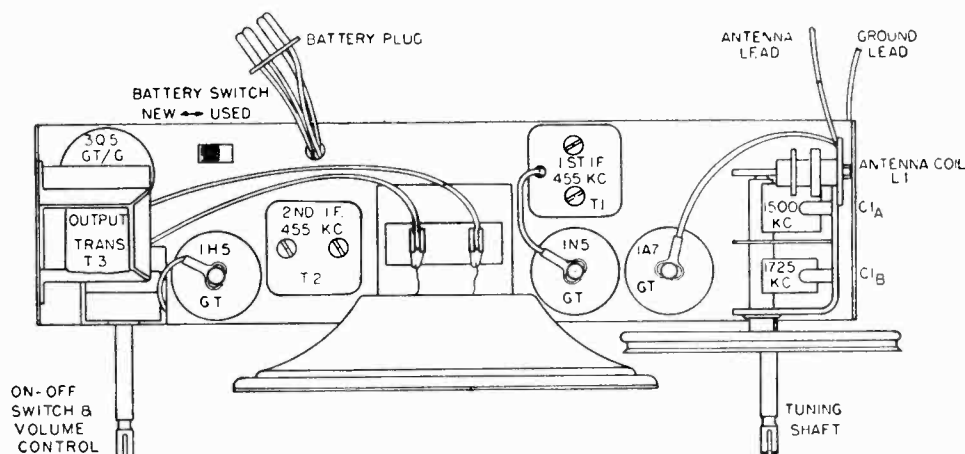
1H5 GT—AVC Det. Audio Amplifier  
3Q5 GT—Power Output

## INSTALLATION

This receiver has been designed to operate from a battery that has the "B" Supply (90V) and the "A" Supply (1-½ V) incorporated into a single unit.

Any one of the following batteries may be used in conjunction with this receiver and after inserting the plug from the radio into the battery it should be placed inside the cabinet in the space provided.

1. Ray-O-Vac . . . . . Their No. "AB" 82 Power Pack
2. Burgess . . . . . Their No. 17G-D60 Power Pack
3. General . . . . . Their No. 60DL 11 L Power Pack
4. Eveready . . . . . Their No. 748 Power Pack
5. Eveready . . . . . Their No. 758 Power Pack



## ALIGNMENT PROCEDURE

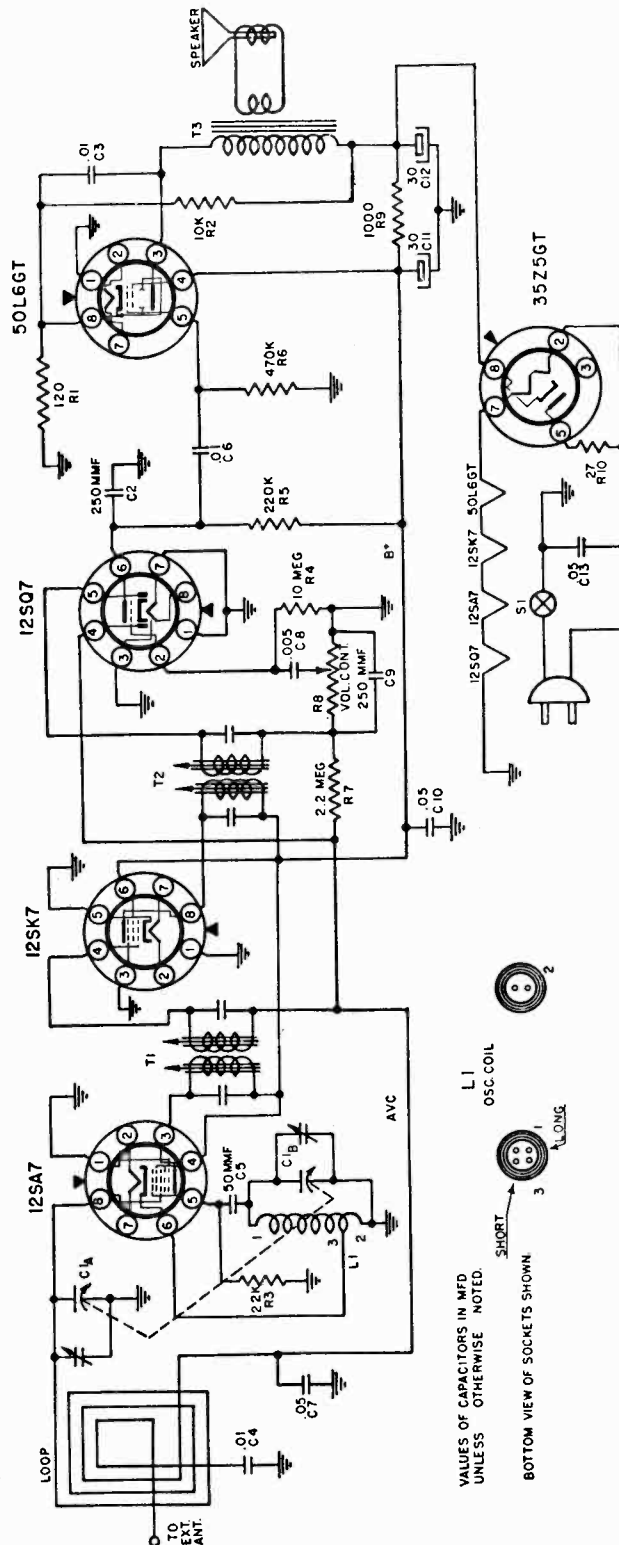
With an output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 30% at 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

Connect the signal generator to the grid cap of the 1A7 GT Tube through a .1 MFD. Condenser. Connect the ground lead of the generator to the chassis. Adjust the signal generator to 455 K.C. and set the variable condenser of the receiver to minimum capacity (fully opened). With the volume control full on and minimum output from the signal generator adjust the two trimmers on top of the first and second I.F. transformers for maximum output.

Now connect the signal generator to the antenna connection of the receiver through a .00025 condenser. Adjust the signal generator frequency to 1725 K. C. and set the variable condenser to minimum capacity (fully opened), and adjust the oscillator trimmer (C1B) for maximum output. Set signal generator to 1500 K. C. and tune receiver to signal. Adjust the antenna trimmer (C1A) on the variable condenser for maximum output.

COAST TO COAST STORES

MODELS MD26,  
MD27



VALUES OF CAPACITORS IN MFD UNLESS OTHERWISE NOTED.

BOTTOM VIEW OF SOCKETS SHOWN



PARTS LIST

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION
C1A, C1B	19-173	Variable Condenser	R9	A60-732	1000 Ohm 1 watt Resistor
C2, C9	A-15-176	250 M MFD. Mica Condenser	R10	A60-690	27 Ohm 1/2 watt Resistor
C3, C4, C6	A16-156	.01 MFD. 400 volt Condenser	T1	A10-478	1st I. F. Transformer
C5	A15-175	50 M MFD. Mica Condenser	T2	A10-479	2nd I. F. Transformer
C7, C10	A16-152	.05 MFD. 200 volt Condenser	T3	A80-233	Output Transformer
C8	A16-153	.005 MFD. 600 volt Condenser	L1	B10-480	Oscillator Coil
C11, C12	B18-283	30x50 MFD. 150 volt Dual Electrolytic Condenser		48-34	Dial Crystal
C13	A16-158	.05 MFD. 400 volt Resistor		58-37	4-inch P. M. Speaker
R1	A60-702	120 Ohm 1/2 watt Resistor		C83-439	Cabinet Back
R2	A60-698	10K Ohm 1/2 watt Resistor		882-46	Loop Antenna
R3	A60-659	22K Ohm 1/2 watt Resistor		85-256	Baffle
R4	A60-659	10 Megohm 1/2 watt Resistor		A42-421	Cabinet, Molded Ivory
R5	A60-667	220K Ohm 1/2 watt Resistor		B67-505	Dial Scale
R6	A60-662	470K Ohm 1/2 watt Resistor		36-116	Grille Cloth
R7	A60-684	2.2 Megohm 1/2 watt Resistor		A52-222	Knob, Ivory
R8	24-157	Volume Control, 1. Megohm			



MODELS MD26,  
MD27

COAST TO COAST STORES

DESCRIPTION

This radio is a 5 tube (including rectifier) superheterodyne radio receiver designed for use on 117 volts 60 cycle AC or 117 volts DC power supply.

The tubes used are:—

- |          |                      |          |                            |
|----------|----------------------|----------|----------------------------|
| 1—12SA7  | Oscillator Converter | 1—12SQ7  | AVC Detector and 1st Audio |
| 1—12SK7  | I.F. Amplifier       |          |                            |
| 1—35Z5GT | Power Rectifier      | 1—50L6GT | Power Output               |

This receiver covers the frequency range from 540 kilocycles to 1630 kilocycles (KC).

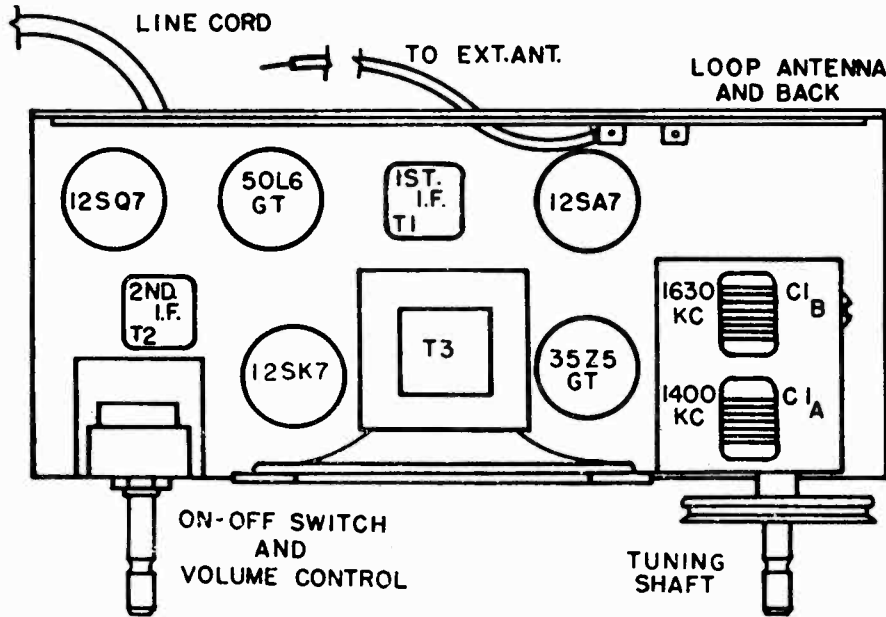
ALIGNMENT PROCEDURE

The following alignment 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 A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milli-watts is .4 volts using a signal which is modulated 400 c.p.s.

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



ALIGNMENT PROCEDURE

(Continued)

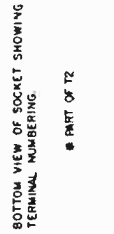
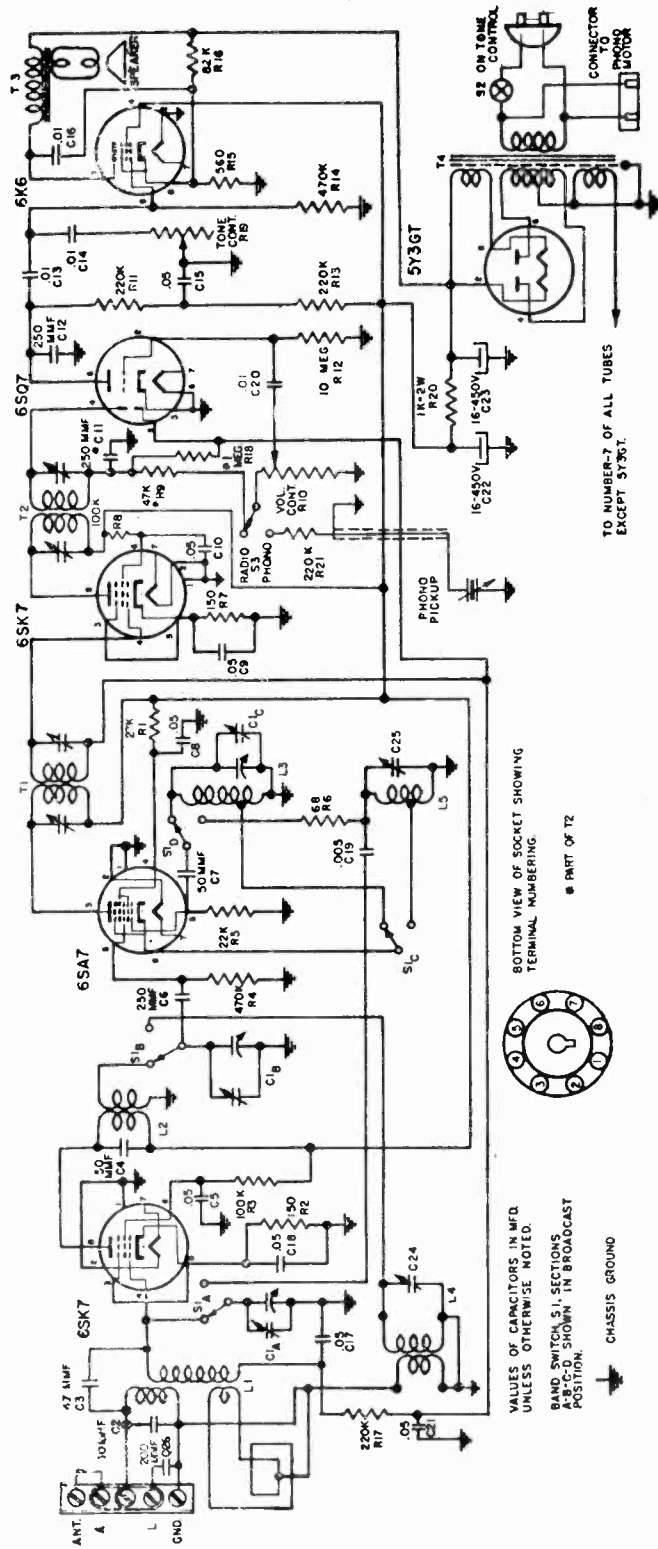
CAUTION: This is an A.C.-D.C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the Receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mid.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	*12SA7 Grid (Stator of C1A)	T1	Input I.F.
Fully open	455 KC	.1	*12SA7 Grid (Stator of C1A)	T2	Output I.F.
Fully open	1630 KC	.00025	*12SA7 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1400 KC	.00025	*Ant. lead from loop	C1A	Antenna

\*Connect ground lead of signal generator to chassis.

COAST TO COAST STORES

MODELS MD42,  
MD43, MD44



VALUES OF CAPACITORS IN MFD.  
UNLESS OTHERWISE NOTED.  
BAND SWITCH S1 SECTIONS  
A-B-C-D SHOWN IN BROADCAST  
POSITION.  
CHASSIS GROUND

DESCRIPTION

This Model is a 2 band six tube (including Rectifier) superhetrodyne radio receiver and phonograph combination for operation on 117 volt 60 cycle AC current.

This receiver covers the standard broadcast frequency range, 535 to 1725 Kilocycles (K.C.) and the short wave frequency range from 6 to 18.2 Megacycles (M.C.).

- The tubes used are:
- 6SK7—R. F. Amplifier
  - 6SA7—Mixer—Osc.
  - 6SK7—I. F. Amplifier
  - 6SQ7—Det. AVC—Audio
  - 6K6 GT—Power Output
  - 5Y3 GT—Rectifier

MODELS MD42,  
MD43, MD44

COAST TO COAST STORES

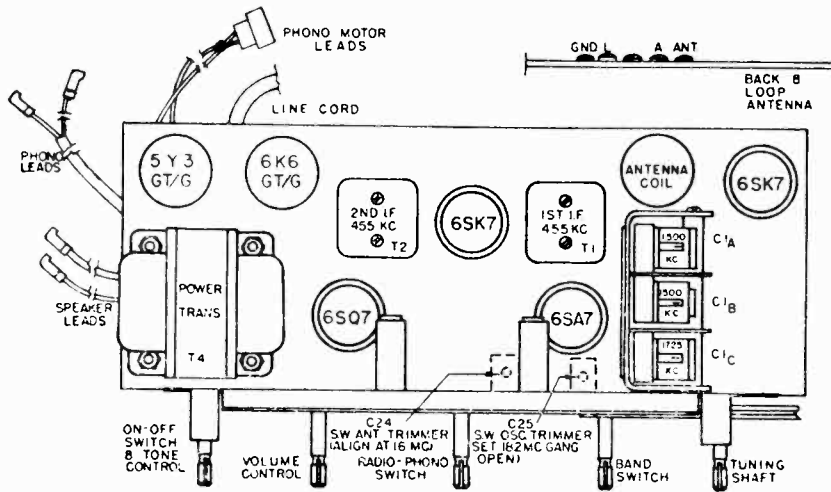


Fig. 2 Tube Positions and Alignment Points

**ALIGNMENT PROCEDURE**

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

With an output meter connected across the voice coil of the speaker, the output meter reading for 1/2 watt is 1.25 volts using a signal which is modulated 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, for accurate alignment.

Position of Variable	Band Switch Position	Generator Freq.	Dummy Ant.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully Open	BC	455 KC	.1 MFD	6SA7 Grid (Stator of C1B)	T1 T2	I. F.
Fully Open	BC	1725 KC	.00025 MFD	* Ant. Terminal on Loop	C1C	BC Osc.
Tune in signal from Generator	BC	1500 KC	.00025 MFD	* Ant. Terminal on Loop	C1B	R. F.
Tune in signal from Generator	BC	1500 KC	.00025 MFD	* Ant. Terminal on Loop	C1A	BC Ant.
Fully Open	SW	18.2 MC	400 ohms	* Ant. Terminal on Loop	C25	SW Osc.
Tune in signal from Generator	SW	16 MC	400 ohms	* Ant. Terminal on Loop	C24	SW Ant.

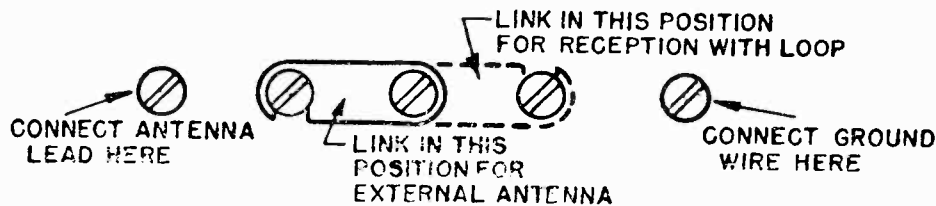
GROUND lead of generator should be attached to the chassis for all adjustments  
C24 and C25 are located under the chassis

For alignment points refer to Figure 2

\* Be sure coupling link is in correct position for external antenna operation. See illustration below.

Repeat above alignment procedure as a final check.

**ANTENNA and GROUND CONNECTIONS**



## COAST TO COAST STORES

MODELS MD42,  
MD43, MD44

## PARTS LIST

CODE	PART NO.	DESCRIPTION
C1A, C1B, C1C	B19-186	Variable Condenser
C2, C4, C7	A15-175	50 MMFD Mica condenser
C3	A83-355	4.7 MMFD condenser
C5, C8, C10, C15	A16-158	.05 MFD 400 volt condenser
C6, C12	A15-176	250 MMFD Mica condenser
C9, C17, C18, C21	A16-152	.05 MFD 200 Volt condenser
C13, C14, C20	A16-156	.01 MFD 400 Volt condenser
C16	A16-168	.01 MFD 1000 Volt condenser
C19	A16-181	.005 MFD Mica condenser
C22	A18-279	16 MFD 450 Volt electrolytic condenser
C23	A18-274	16 MFD 450 Volt electrolytic condenser
C24	A20-143	SW Antenna trimmer
C25	A20-143	SW Oscillator trimmer
C26	A15-189	200 MMFD Mica condenser
R1	A60-692	27K ohm 1 watt resistor
R2, R7	A60-686	150 ohm 1/2 watt resistor
R3, R8	A60-671	100K ohm 1/2 watt resistor
R4, R14	A60-662	470K ohm 1/2 watt resistor
R5	A60-659	22K ohm 1/2 watt resistor
R6	A60-733	68 ohm 1/2 watt resistor
R10	A24-169	Volume control, 500,000 ohm
R11, R13, R17, R23	A60-667	220K ohm 1/2 watt resistor
R12	A60-663	10 megohm 1/2 watt resistor
R15	A60-701	560 ohm 1 watt resistor
R16	A60-700	82K ohm 1 watt resistor
R19	A26-124	Tone control, 2 megohm, with switch
R20	A60-699	1K ohm 2 watt resistor
L1	C10-459	BC Antenna coil
L2	B10-452	RF Coil
L3	B10-446	BC Oscillator coil
L4	A10-482	SW Antenna coil
L5	A10-481	SW Oscillator coil
T1	B10-412	1st IF Transformer
T2	B10-444	2nd IF Transformer
T3	A80-222	Output Transformer
T4	C80-223	Power Transformer
	A84-41	Dial drive shaft assembly
S1	A69-176	Band Switch
S3	A69-180	Switch, Phono-Radio
	A52-200	Knob, Tuning
	A52-205	Knob, Volume
	A52-233	Knob, On-Off and Tone
	A52-234	Knob, SW-BC
	A52-235	Knob, Radio-Phono
	A58-67	Dial Pointer
	C67-513	Dial scale, glass
	C83-478	Dial scale retainer
	C79-357	Speaker, 8" P.M.
	S84-183	Back and Loop Assembly
	D42-426	Cabinet

( )

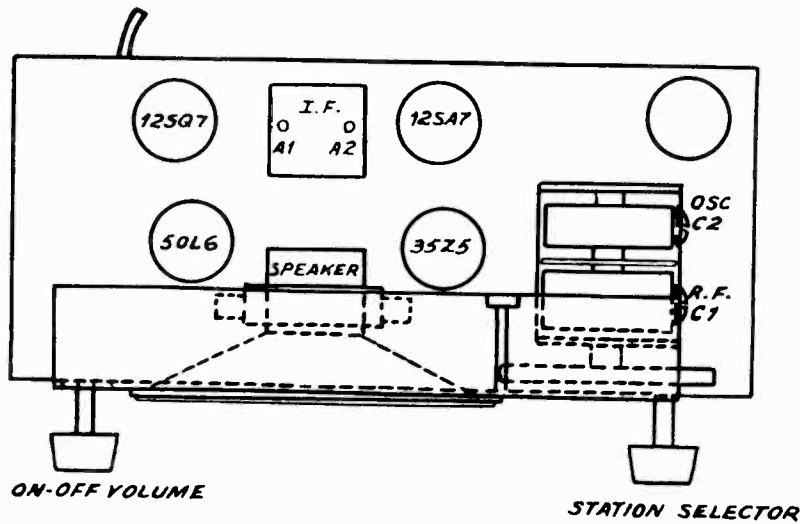
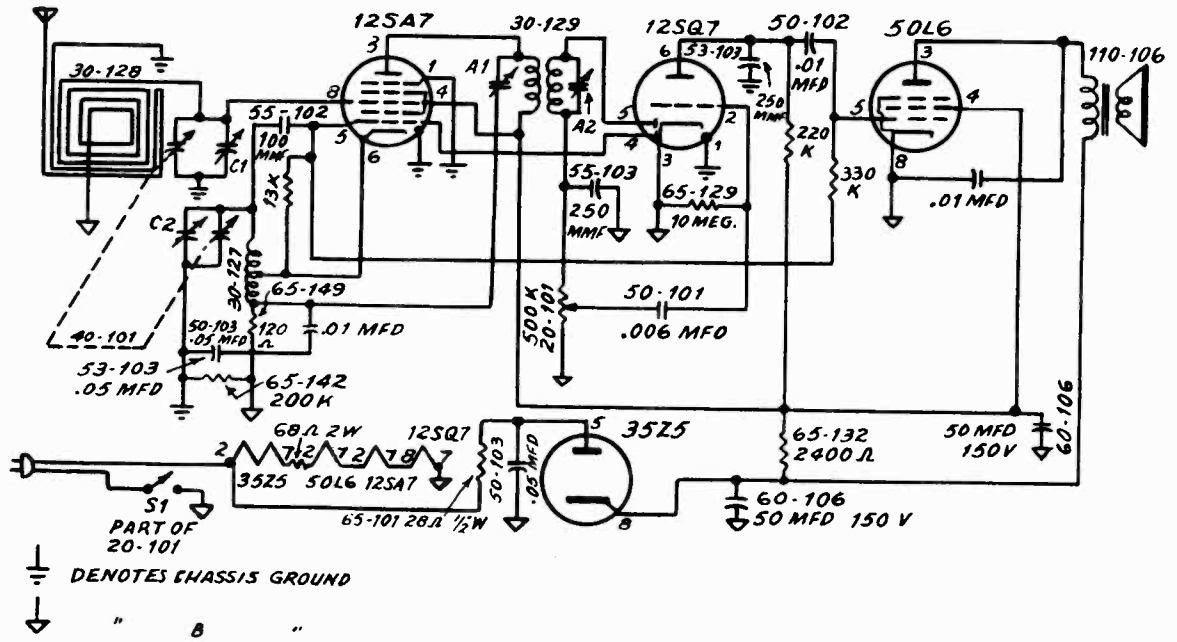
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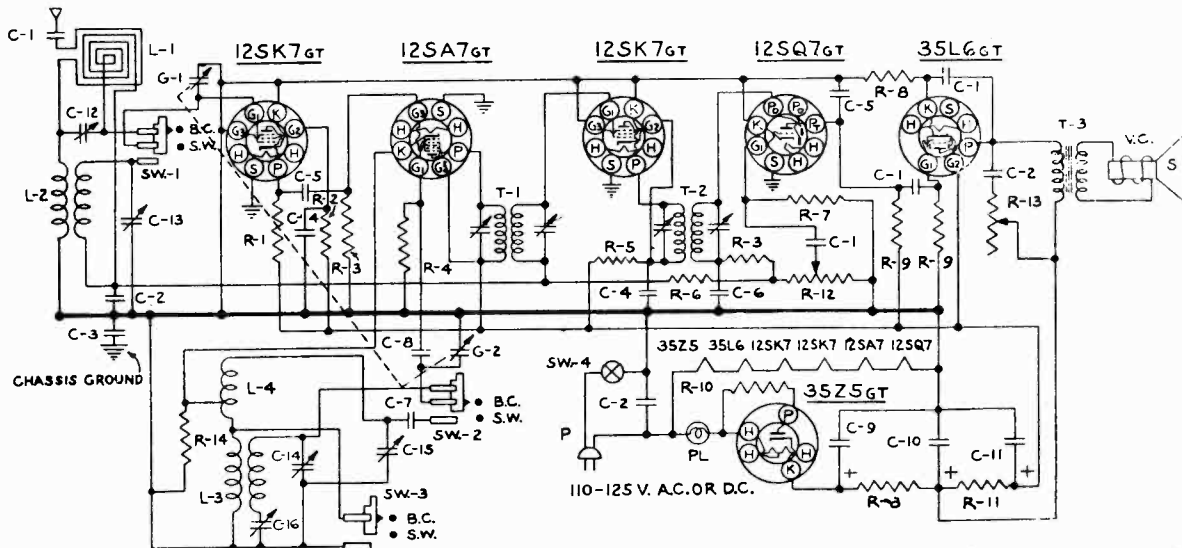
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CONCORD RADIO CORP.

MODEL 1-413





Remove the chassis from the cabinet for alignment.

A signal generator is required, having the following frequencies: 455 KC, 1400 KC, 1730 KC, 6 MC, 16 MC, and 18.3 MC. An output meter should be connected across the speaker.

**I. F. ALIGNMENT:** — Connect the generator lead through a .1 MFD Condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the gang frame. Set the generator at 455 KC. Adjust the trimmer screws in the 1st and 2nd I. F. cans (See Fig. 1) until a maximum reading is noted on the output meter.

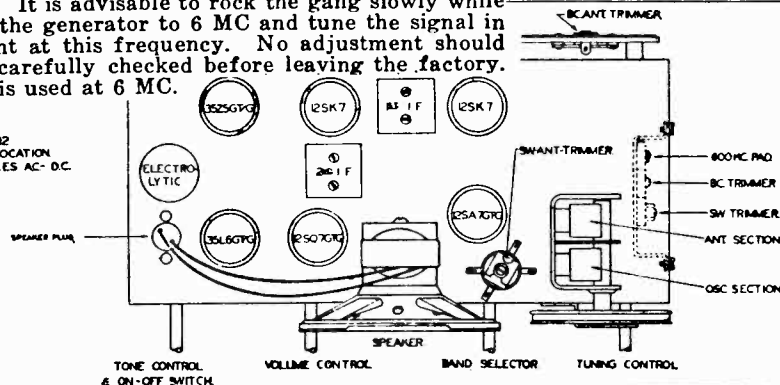
The receiver volume control should be turned to maximum during the I. F. and all subsequent alignments, to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

**BC. OR BROADCAST ALIGNMENT:** — With the generator leads still connected as in I. F. Alignment, rotate the tuning condenser to complete minimum capacity. Set the generator to 1730 KC. Adjust the BC. oscillator trimmer until the signal is tuned in. Next remove the hot lead of the generator from the "Ant" section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFDC condenser. Set the generator to 1400 KC and rotate the tuning condenser until the signal is tuned in. Adjust the BC. antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600 KC and turn the tuning control until the signal is tuned in. Rock the tuning control back and forth slowly and at the same time adjust the 600 KC pad, slowly to the right or left until a maximum reading is noted on the output meter. It is advisable to return to the 1730 KC adjustment and re-check that setting to make sure it has not changed while padding at 600 KC.

**S. W. OR SHORT WAVE ALIGNMENT:** — Set the generator at 18.3 MC. Turn the receiver band switch to short band position. Turn the tuning condenser to complete minimum capacity. The generator leads should be connected to the antenna lead wire that projects from the back of the loop antenna through a 400 Ohm resistor. Adjust the S. W. oscillator trimmer slowly until the 18.3 MC signal is tuned in. At this point, it will be well to make sure that the fundamental signal is tuned in. Turn up the generator output and tune the receiver to approximately 17.3 MC. At this point the 18.3 MC signal will be heard again but much weaker. This is the image frequency. If the image is not heard, then turn the tuning condenser back to complete minimum and readjust the S. W. oscillator trimmer. Remember, the image must always be heard (at 2 times the I. F. frequency in KC) lower the frequency than the fundamental signal. After the oscillator has been properly set, tune the signal generator to 16 MC and rotate the tuning control until the signal is tuned in. Adjust the S.W. antenna trimmer until a maximum reading is noted on the output meter. It is advisable to rock the gang slowly while adjusting the antenna trimmer. Set the generator to 6 MC and tune the signal in on the receiver. Check the alignment at this frequency. No adjustment should be necessary as the coils have been carefully checked before leaving the factory. A fixed oscillator padding condenser is used at 6 MC.

PART NO.	DESCRIPTION
IR-22	3900 $\Omega$ RESISTOR 1/2 W. 10%
IR-8	22,000 $\Omega$ RESISTOR 1/2 W. 10%
IR-10	47,000 $\Omega$ RESISTOR 1/2 W. 20%
IR-9	22,000 $\Omega$ RESISTOR 1/2 W. 20%
IR-24	1000 $\Omega$ RESISTOR 1/2 W. 20%
IR-23	3.9 MEG. RESISTOR 1/2 W. 20%
IR-13	2 MEG. RESISTOR 1/2 W. 20%
IR-5	220 $\Omega$ RESISTOR 1/2 W. 10%
IR-11	470,000 $\Omega$ RESISTOR 1/2 W. 20%
IR-17	39 $\Omega$ RESISTOR 1/2 W. 20%
IR-21	330 $\Omega$ RESISTOR 1/2 W. 10%
VC-3	1 MEG. VOLUME CONTROL
VC-1	25 M $\Omega$ TONE CONTROL & S.W.
IR-6	470 $\Omega$ RESISTOR 1/2 W. 10%
PC-7	.01 MFD. CONDENSER 400 V.
PC-5	.05 MFD. CONDENSER 400 V.
PC-9	.25 MFD. CONDENSER 400 V.
PC-8	.1 MFD. CONDENSER 400 V.
MC-3	.0022 MFD. MICA COND. 500 V.
MC-2	.0001 MFD. MICA COND. 500 V.
MC-1	.00475 MFD. MICA COND. 3%
C-7	.0005 MFD. MICA COND. 500 V.
C-9	40 MFD.
C-10	40 MFD. 150 V. ELECTROLYTIC
C-11	40 MFD.
C-12	LOOP ANTENNA TRIMMER
C-13	S.W. ANTENNA TRIMMER
C-14	B.C. OSC. TRIMMER
C-15	S.W. OSC. TRIMMER
C-16	B.C. OSC. PADDING COND.
G-1	GANG CONDENSER
G-2	GANG CONDENSER
SW-1	BAND SWITCH
SW-2	BAND SWITCH
SW-3	BAND SWITCH
SW-4	A.C. SW. ON TONE CONTROL INPUT I.F. TRANSFORMER
LI-1	T-1 OUTPUT I.F. TRANSFORMER
LI-2	T-2 OUTPUT I.F. TRANSFORMER
SPK-4	T-3 OUTPUT SPK. TRANSFORMER
V.C.	VOICE COIL
S	P.M. SPEAKER
PL	PILOT BULB #47
P	LINE CORD
L-1	LOOP ANTENNA
LA-2	S.W. ANTENNA COIL
LO-3	B.C. OSC. COIL
LO-4	S.W. OSC. COIL
TU-4	12 SK7GT 12 SA7GT 12 SK7GT 12 SQ7GT 35L6GT 35Z5GT

FIGURE-1  
MODEL-5010-5011-5012  
TUBE AND TRIMMER LOCATION  
110-125 VOLTS 60 CYCLES AC-DC.



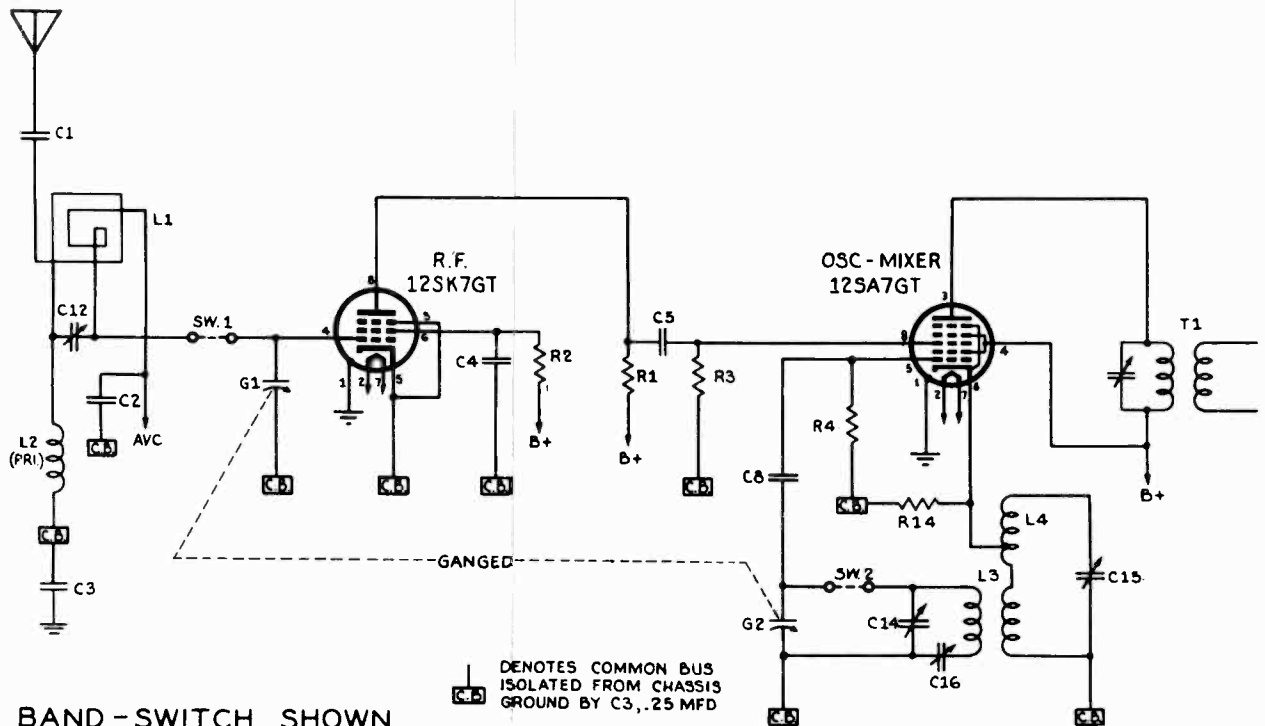
# CLARI-SKEMATIX

Registered Trademark

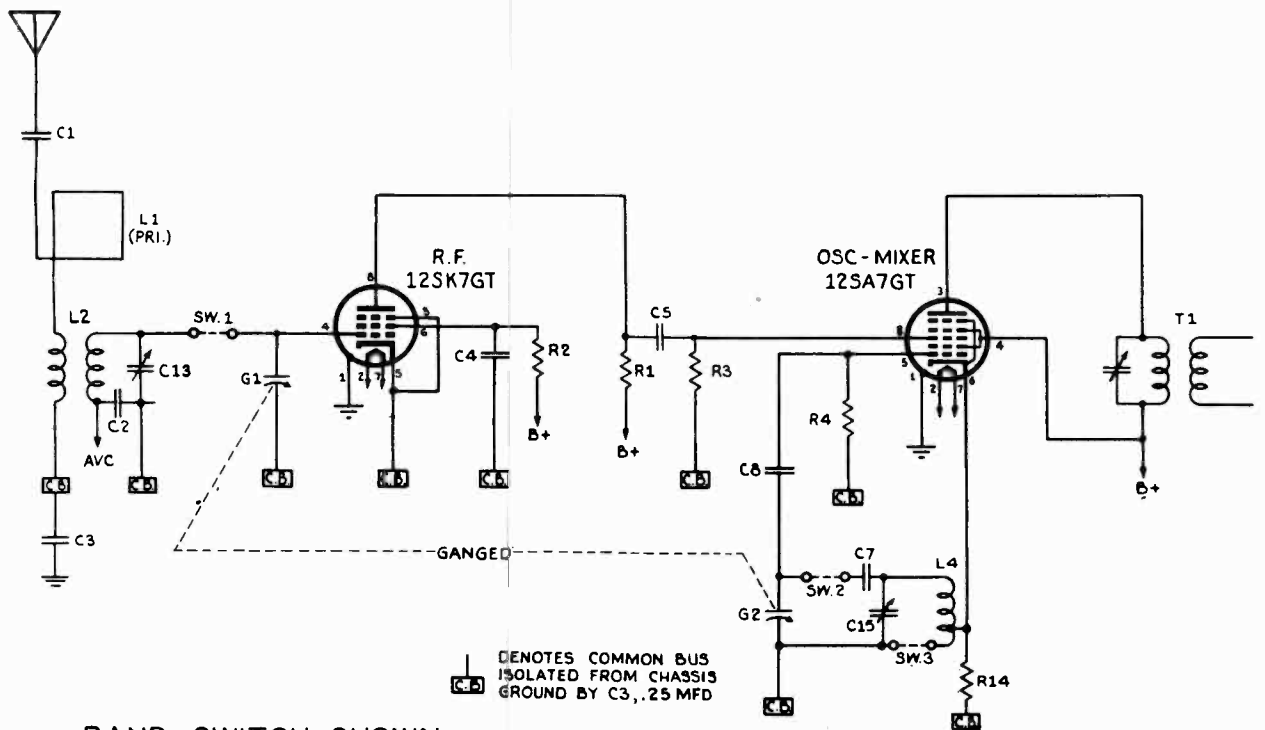
CONCORD PAGE 19-3

CONCORD RADIO CORP.

MODEL 1-608



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

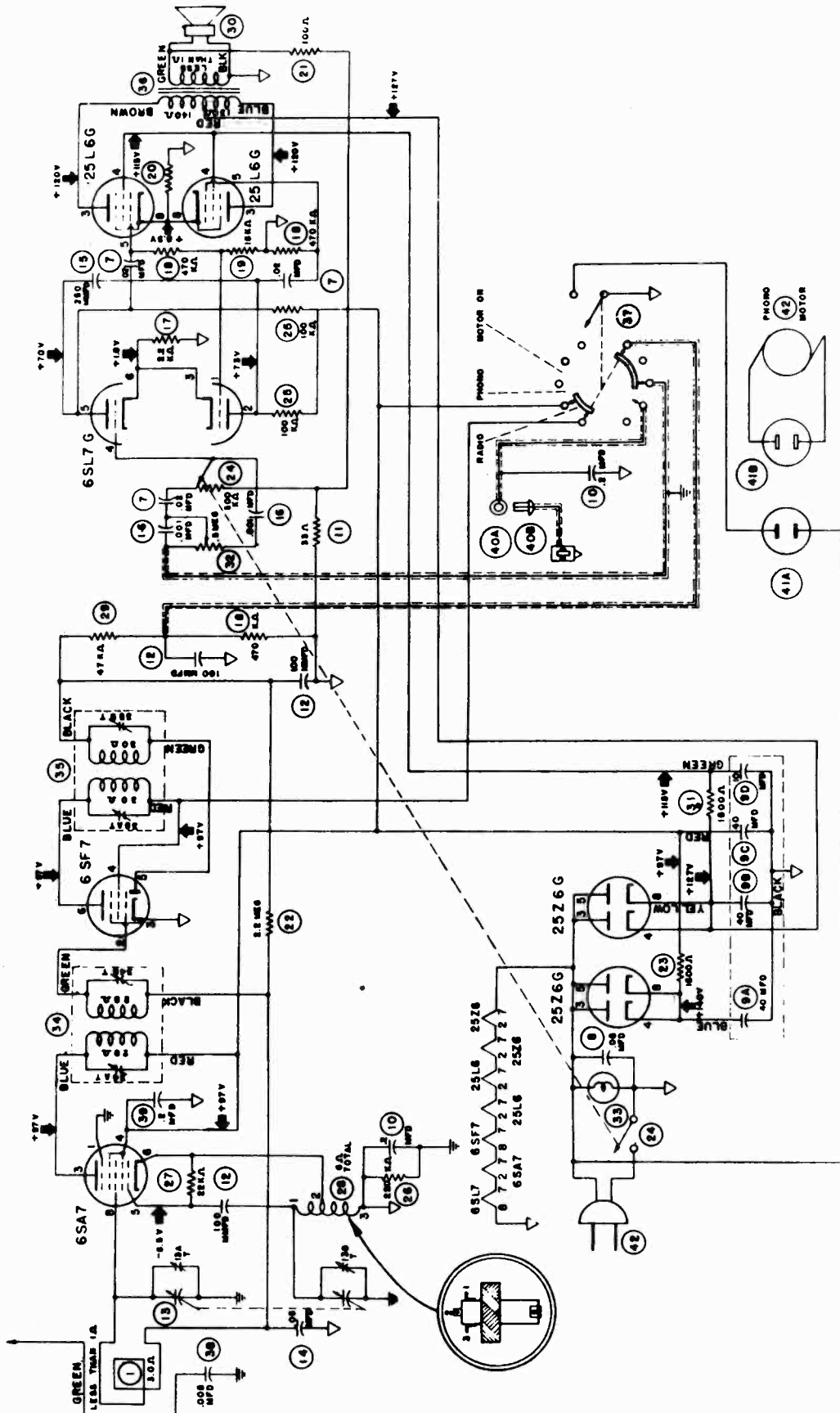


BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
SHORT WAVE BAND



MODELS 1-702,  
1-704

CONCORD RADIO CORP.



NOTE: ALL VOLTAGES MEASURED FROM B- WITH A 20,000 Ω/VOLT VOLTMETER -  
CONTROL AT MAXIMUM - NO SIGNAL RECEIVED  
LINE VOLTAGE 117 V. A.C. - VOLUME CONTROL DEMOTES CHASSIS GROUND  
I-F FREQUENCY 455 K.C. ▽ DEMOTES B - GROUND

CONCORD RADIO CORP.

MODELS 1-702,  
1-704

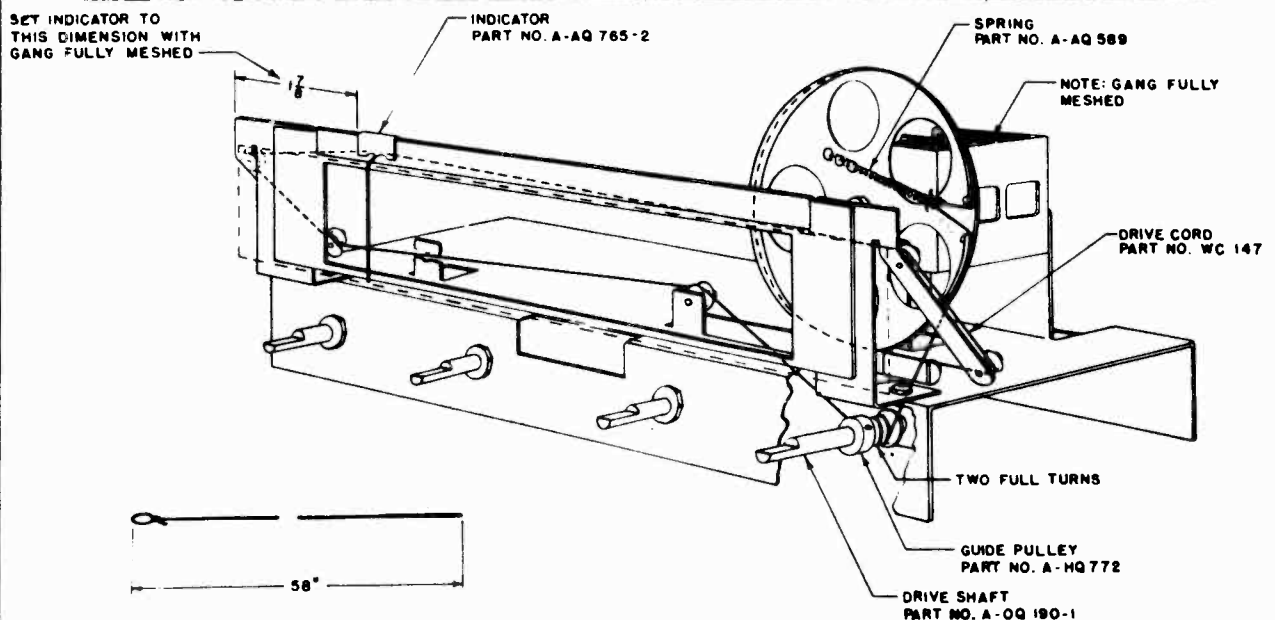
In order to make a proper alignment, the following equipment is required;

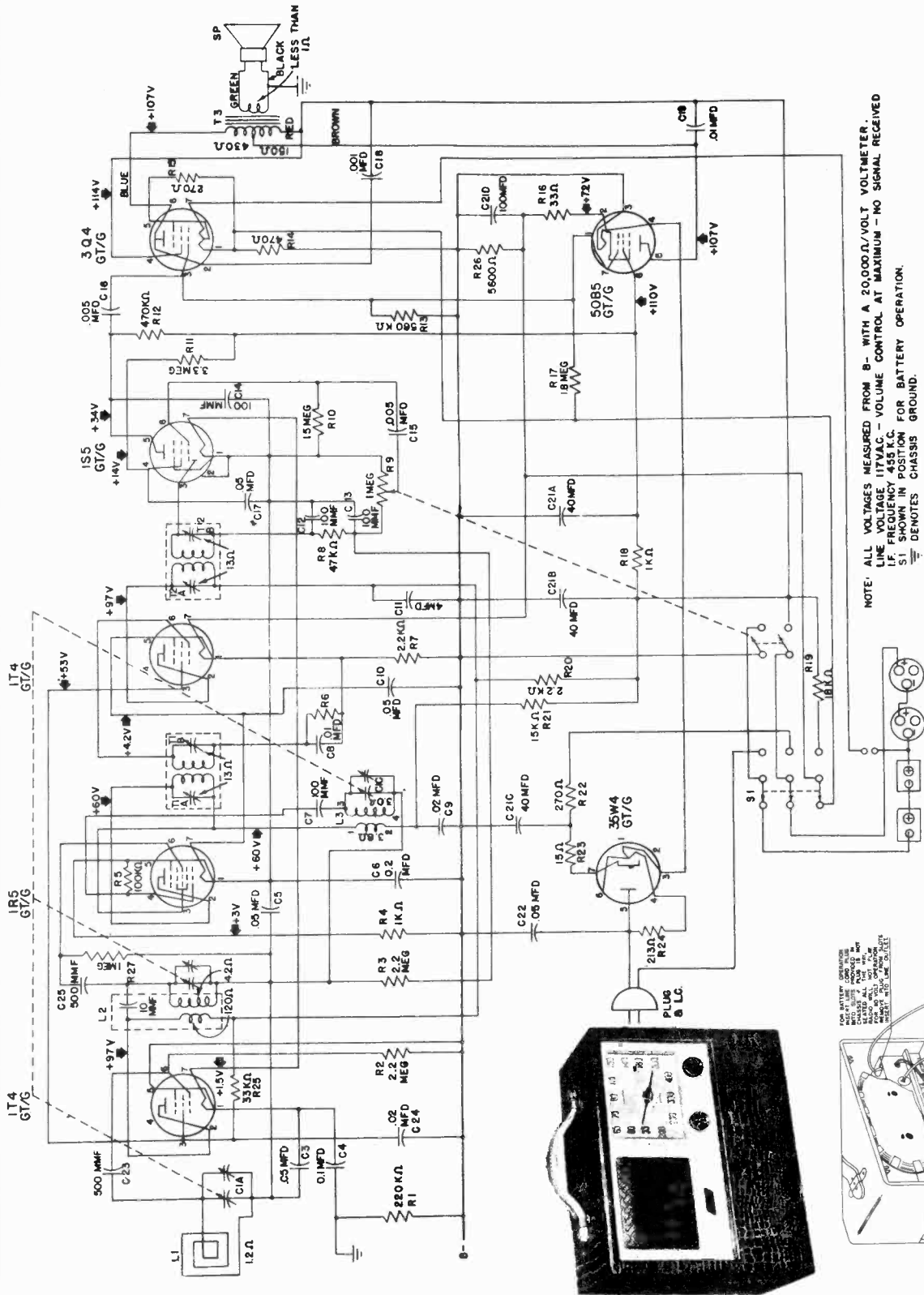
1. A signal generator capable of providing a modulated radio frequency output over the frequencies required.
2. A suitable output meter or sensitive AC voltmeter with a .1 mfd series blocking condenser.
3. A coupling loop, made of three turns of stiff hookup wire, 4 inches in diameter, mounted on a suitable block of wood or stand.
4. A non-metallic screwdriver.

With the receiver on and the volume control at maximum, connect the signal generator to the coupling loop and bring the loop close to the receiver chassis. Adjust the signal generator output to minimum necessary to give a suitable indication on the output meter, which should be connected from B minus to the plate of one output tube. CAUTION: Make sure the output meter is isolated from DC by a series blocking condenser.

I.F. FREQ. - 455 KC.

SET SIGNAL GENERATOR AT	SET GANG	LOOP DISTANCE	ADJUST TRIMMER	TUNE FOR	OPERATION
455 KC	Fully Meshed	Close	34a 34b 35a 35b	Max.	Align I.F.
1720 KC	Fully Open	Close	13b	Max.	Set Osc.
1400 KC	1400 KC	Close	13a	Max.	Align R.F.

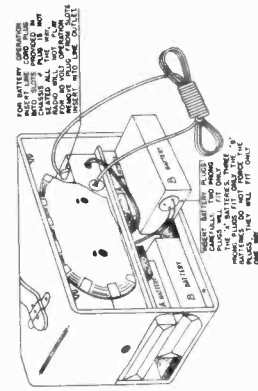
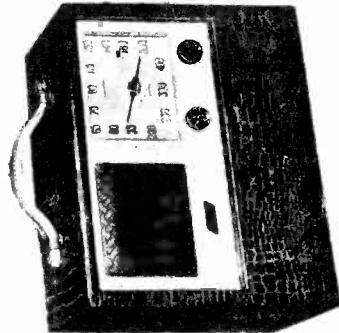




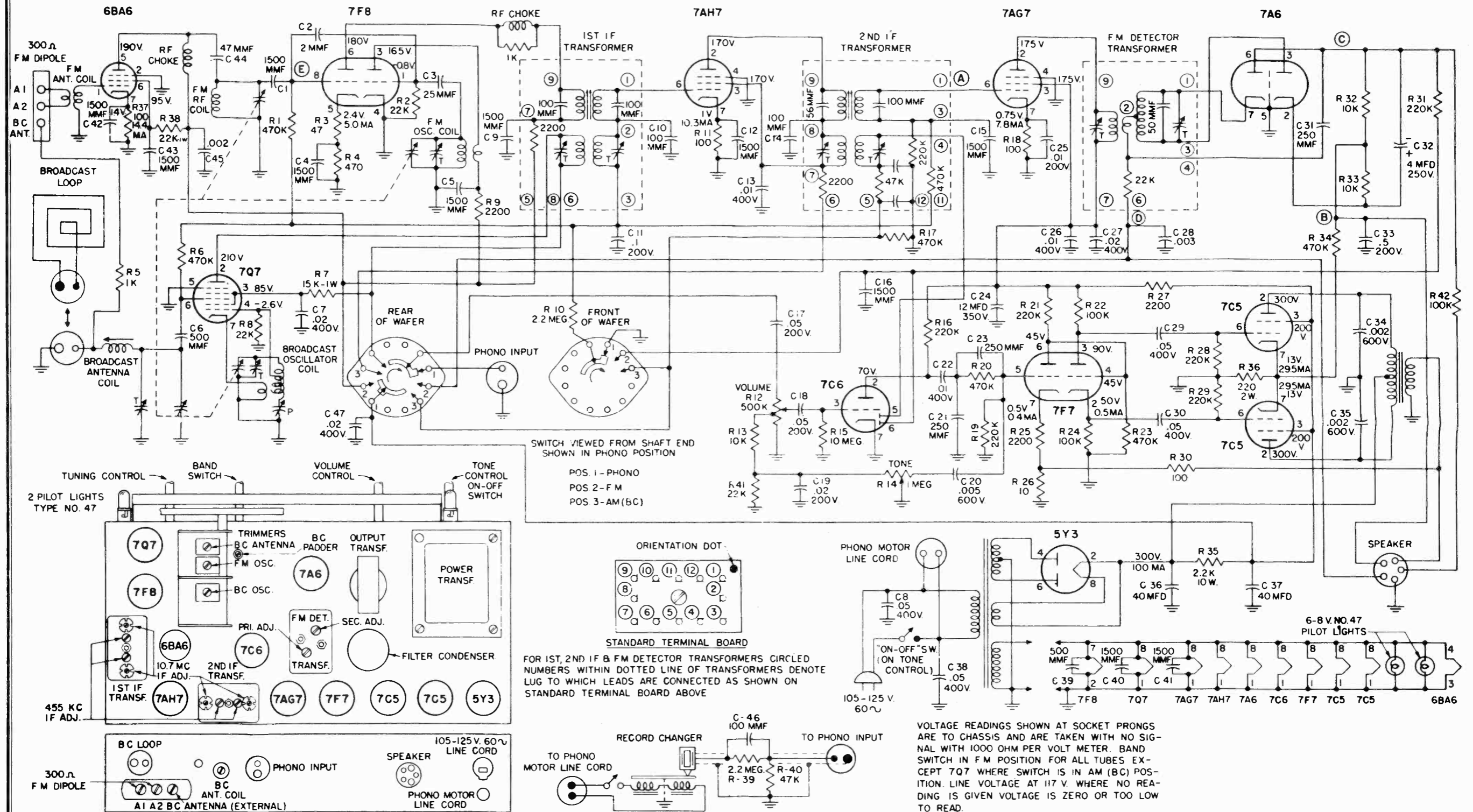
NOTE: ALL VOLTAGES MEASURED FROM B- WITH A 20,000 OHM/VOLT VOLTMETER. LINE VOLTAGE 117VAC - VOLUME CONTROL AT MAXIMUM - NO SIGNAL RECEIVED. IF FREQUENCY 485 K.C. SHOWN IN POSITION FOR BATTERY OPERATION. S1 DENOTES IN CHASSIS GROUND.

The following battery types may be used with this receiver

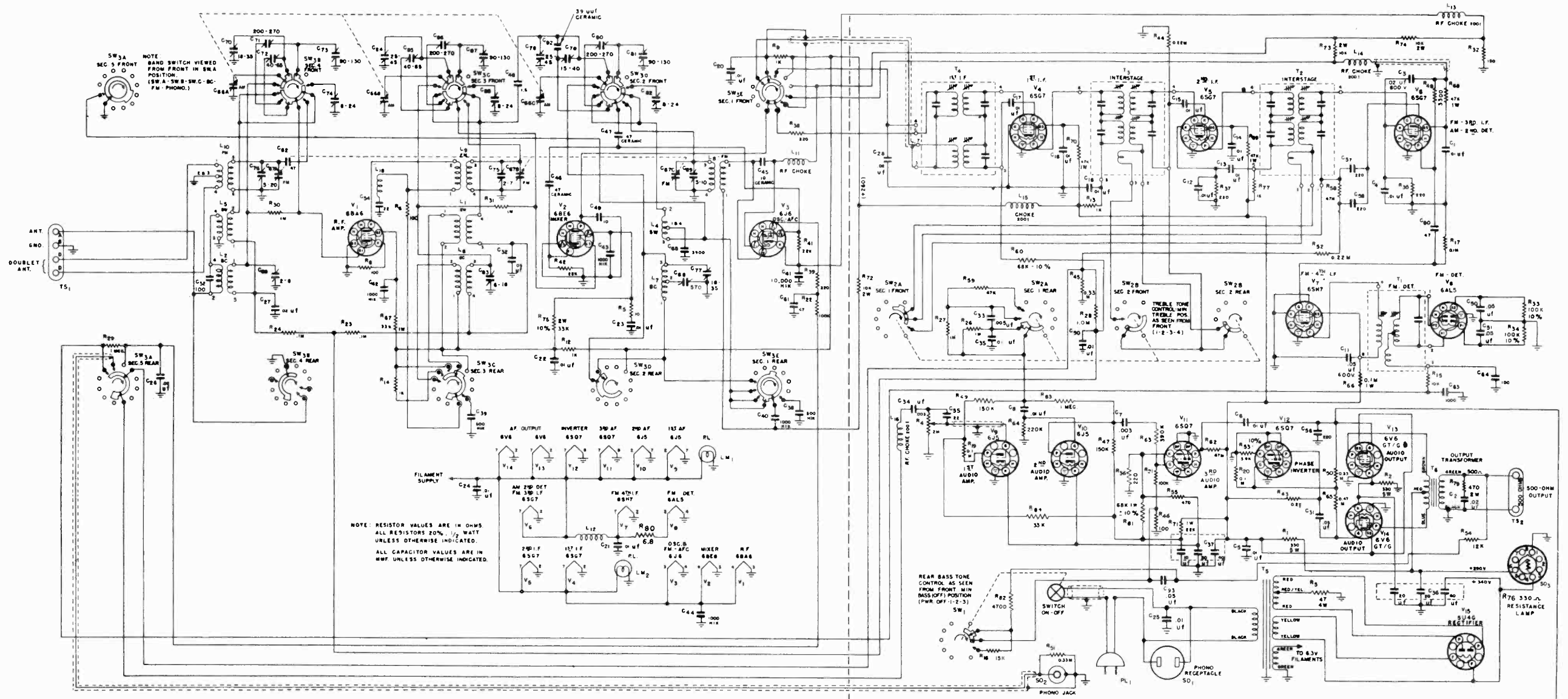
- |             |           |             |        |
|-------------|-----------|-------------|--------|
| "A" Battery | G3        | "B" Battery | M30    |
| Furgess     | Ray-O-Vac | P 83 A.     | P 7830 |
| Eveready    |           | 746         | 482    |



FOR BATTERY OPERATION  
 WITH THIS RECEIVER  
 THE BATTERY COMPARTMENT  
 SHOULD BE OPENED ALL THE TIME  
 THE BATTERY COMPARTMENT SHOULD  
 BE KEPT OPEN AT ALL TIMES  
 TO PREVENT ACCIDENTS  
 DUE TO SHORT CIRCUITS







- Tubes . . . . . Fourteen plus rectifier.
- Speaker output impedance . . . . . 500 ohms.
- Antenna . . . . . Provisions for external long wire antenna for AM bands and a folded dipole (300-ohm) for FM band.
- Tuning . . . . . Manual and mechanical push buttons. (Five channels for AM and five channels for FM.)
- Tuning Range . . . . . (BC) 540kc - 1700 kc.  
 (A) 15 mc - 18 mc.  
 (B) 9 mc - 12 mc.  
 (C) 5.8 mc - 18 mc.  
 (FM) 88 mc - 108 mc.
- I. F. (AM) . . . . . 455 kc.
- I. F. (FM) . . . . . 10.7 mc.
- Power Supply . . . . . 105-125 V. 60 cycles A. C.
- Power Consumption . . . . . 180 watts.

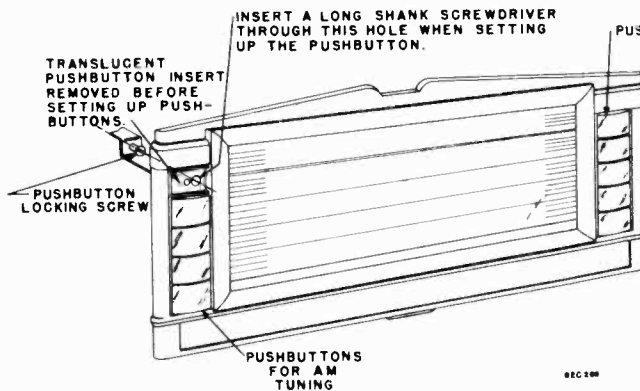


Fig. 1. View showing pushbutton setup.

**BUTTON SETTING:**

- Note - Insulate the muting switch springs before setting the AM buttons.
1. Select any one pushbutton.
  2. Pull translucent insert straight out.
  3. Insert screw driver blade through large hole of pushbutton into slot of locking screw. (See Fig. 1).
  4. Loosen locking screw about one-half turn. (Not more than one full turn.)
  5. With pushbutton depressed, carefully tune in desired station with the manual control and tighten the locking screw.

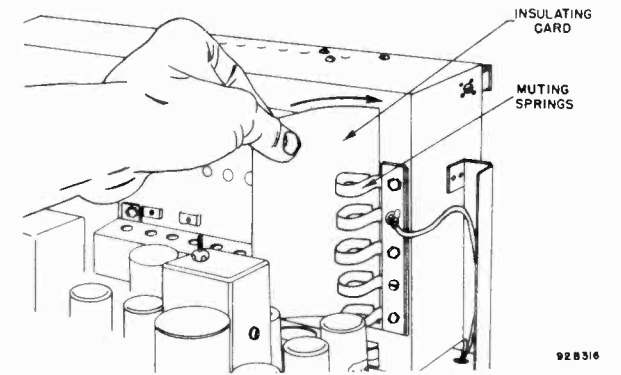
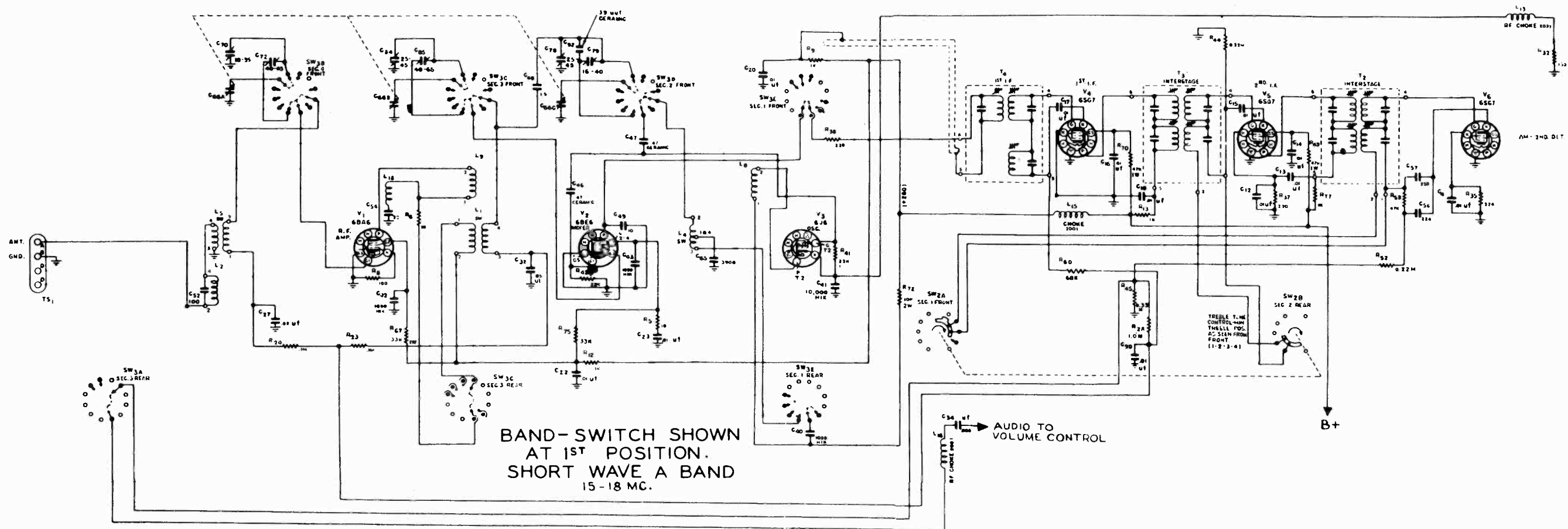
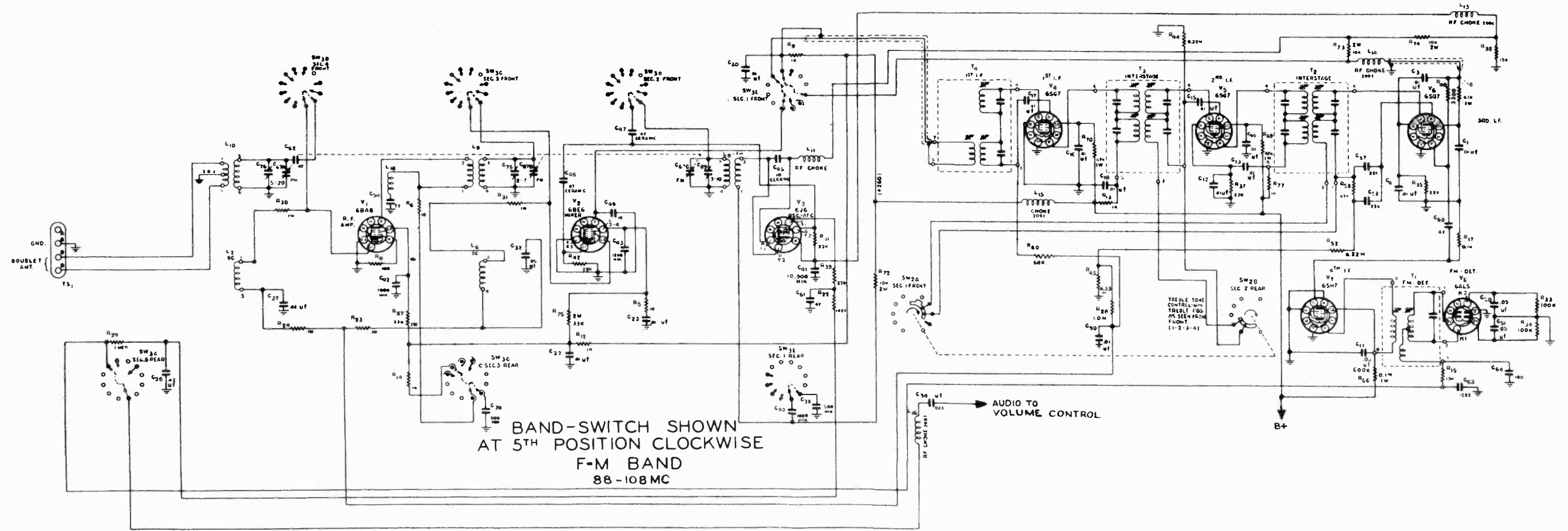


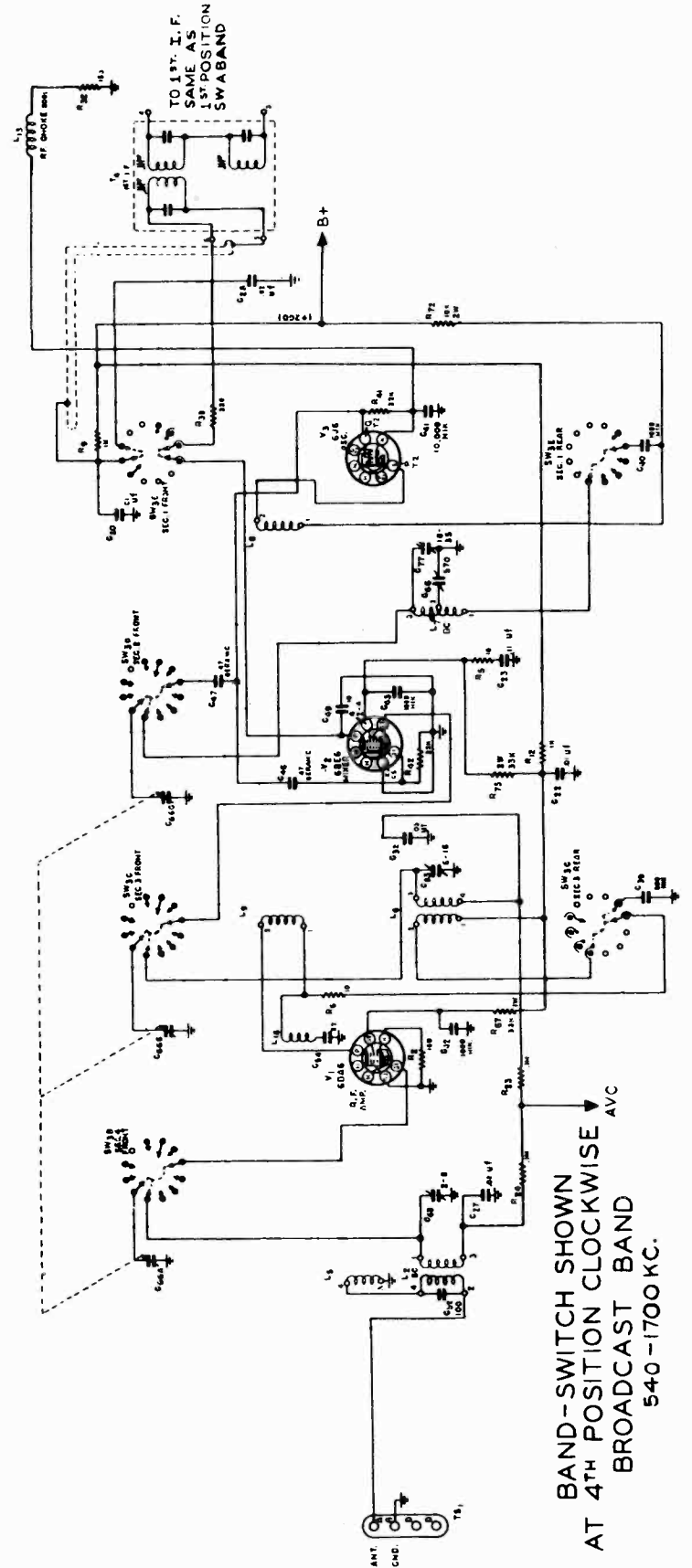
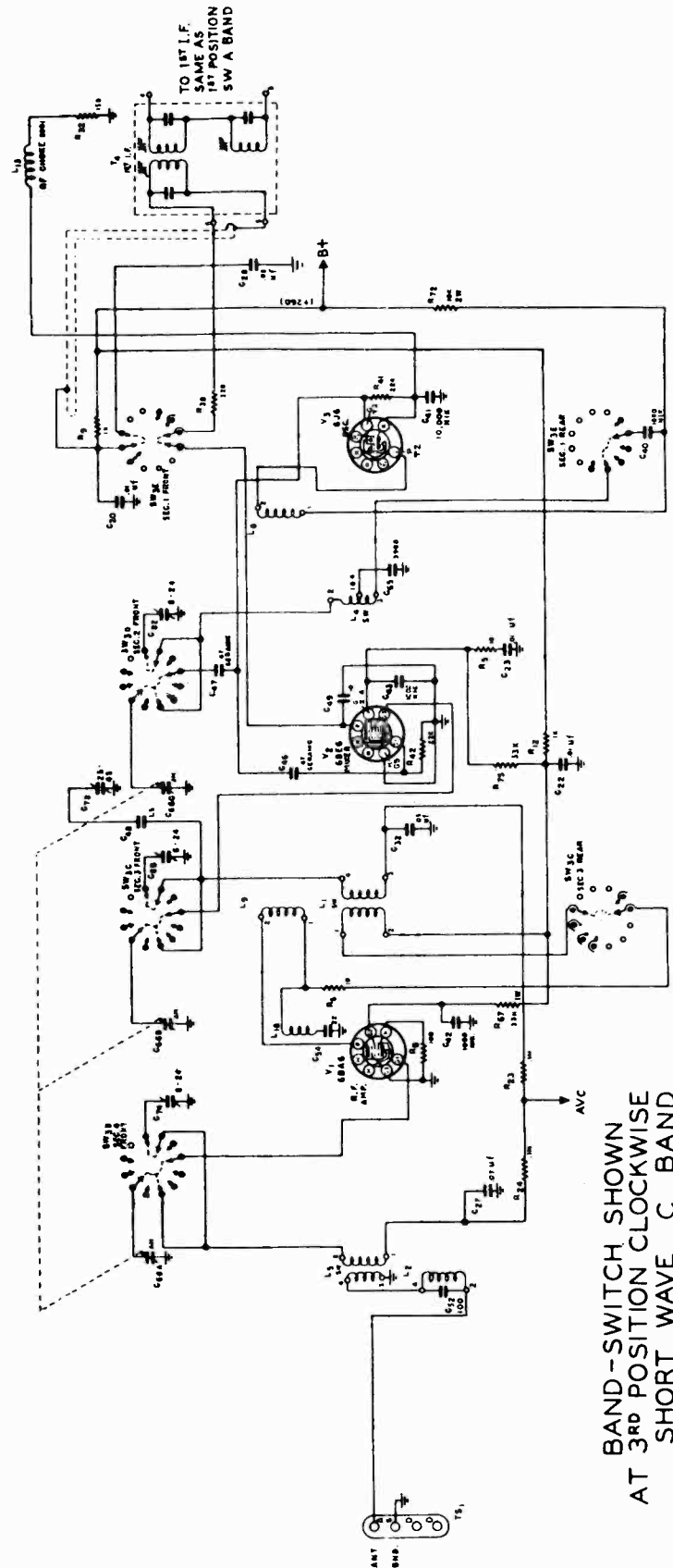
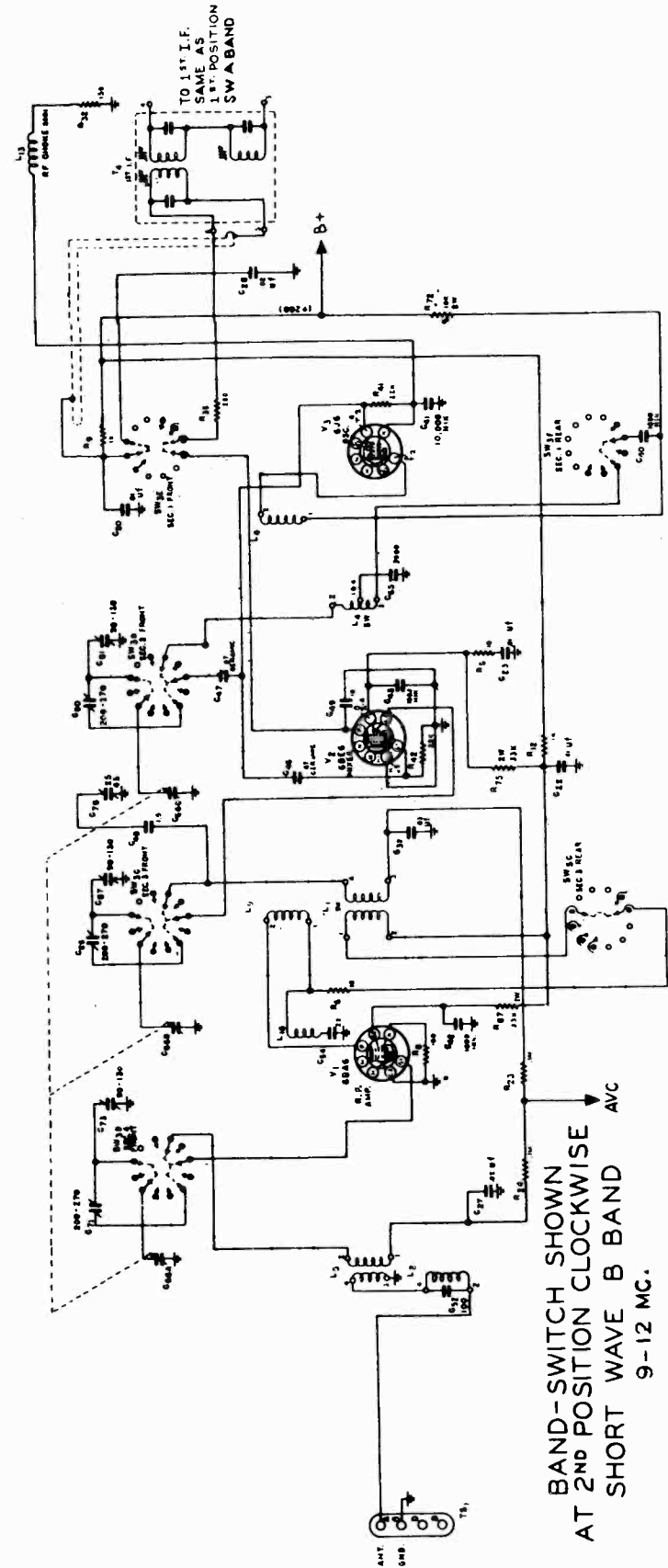
Fig. 3. Insulating the muting switch contacts



BAND-SWITCH SHOWN  
AT 1ST POSITION.  
SHORT WAVE A BAND  
15-18 MC.



BAND-SWITCH SHOWN  
AT 5TH POSITION CLOCKWISE  
F-M BAND  
88-108 MC





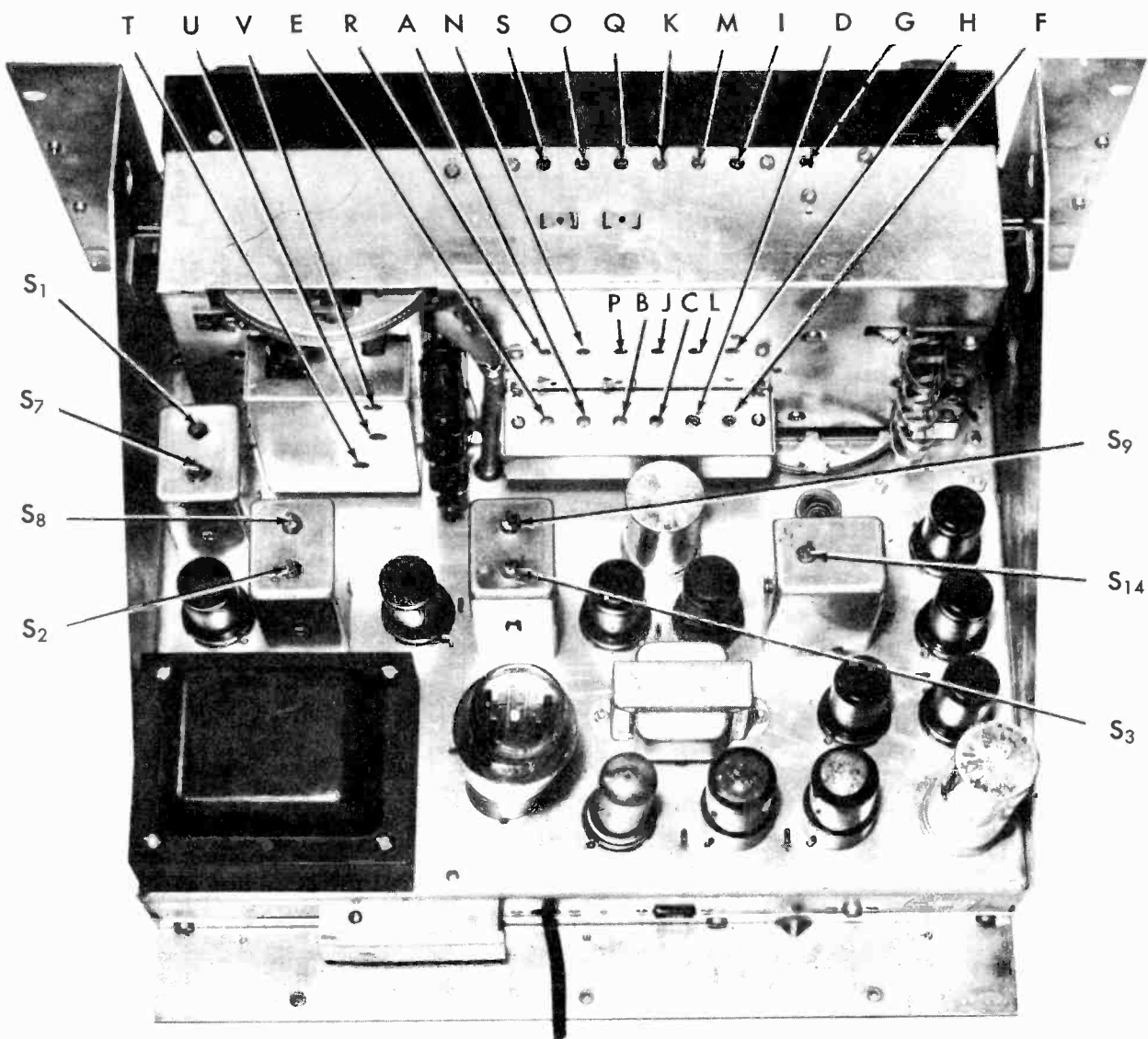


Fig. 4. Top view showing alignment points.

**INSERTING CALL LETTERS INTO TRANSLUCENT INSERT ASSEMBLY:**

1. Slide out metal insert from translucent insert assembly. (See Fig. 2).
2. Insert call letter tab.
3. Replace metal insert.
4. Replace translucent insert assembly into push-button.

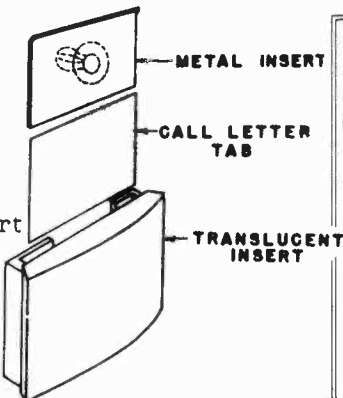


Fig. 2. View showing call letter installation.

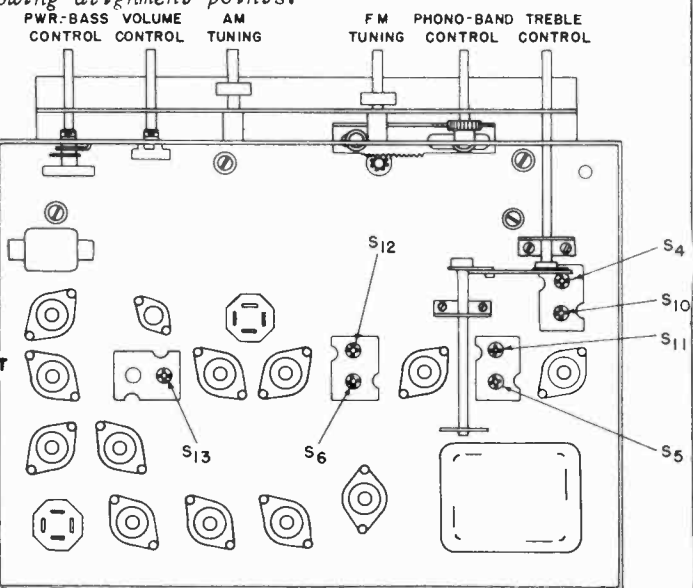


Fig. 5. Bottom view showing alignment points.

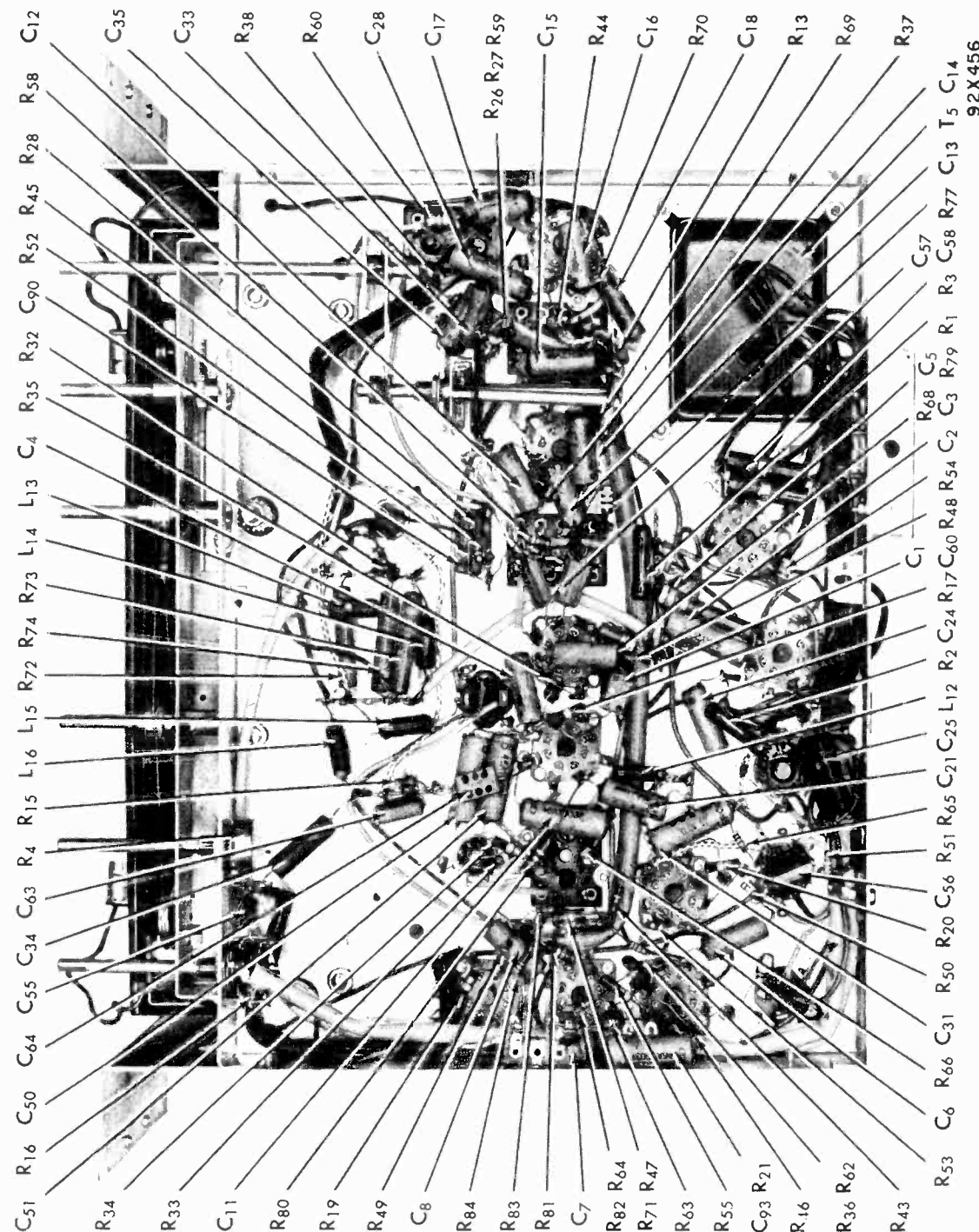


Fig. 6. Bottom view of receiver showing component location.

CONCORD RADIO CORP.

MODELS 1-1500,  
1-1501, 1-1502

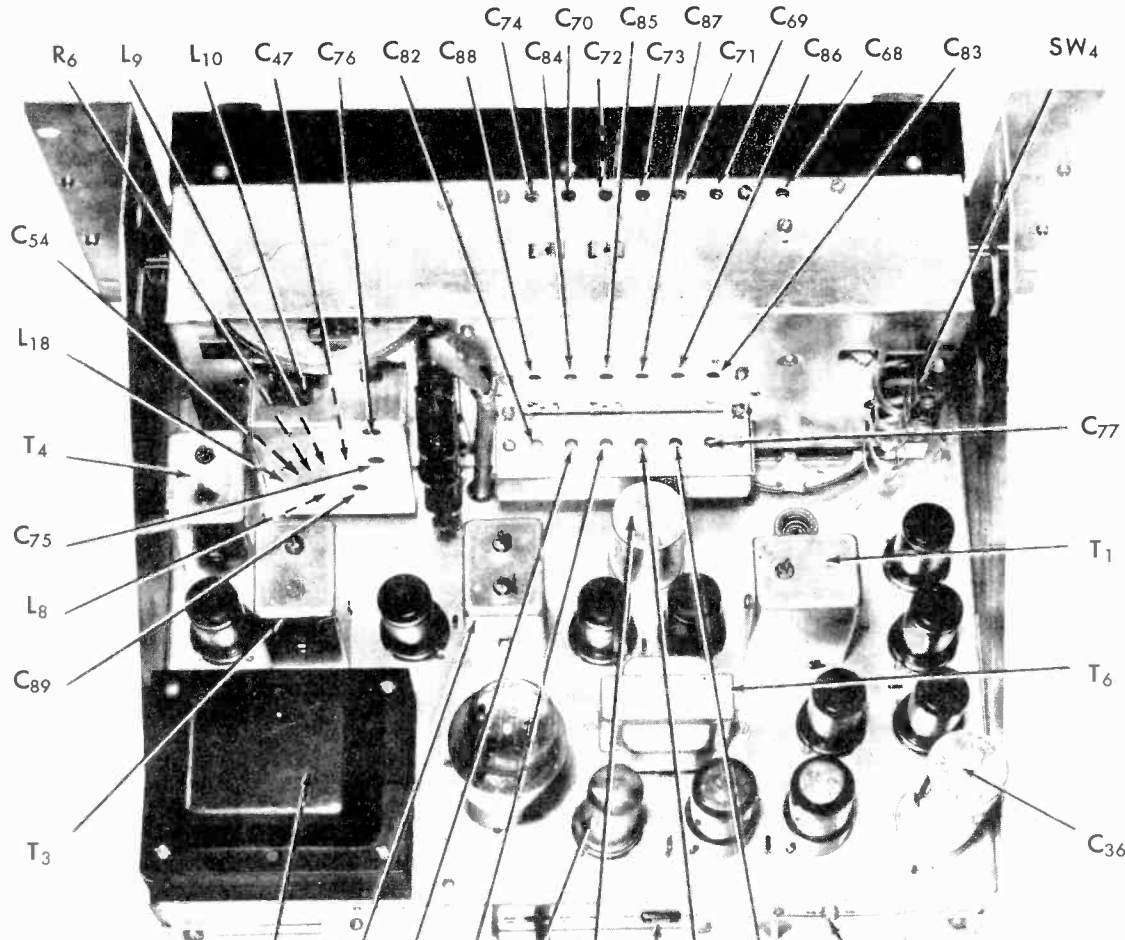


Fig. 7. Top view showing component location.

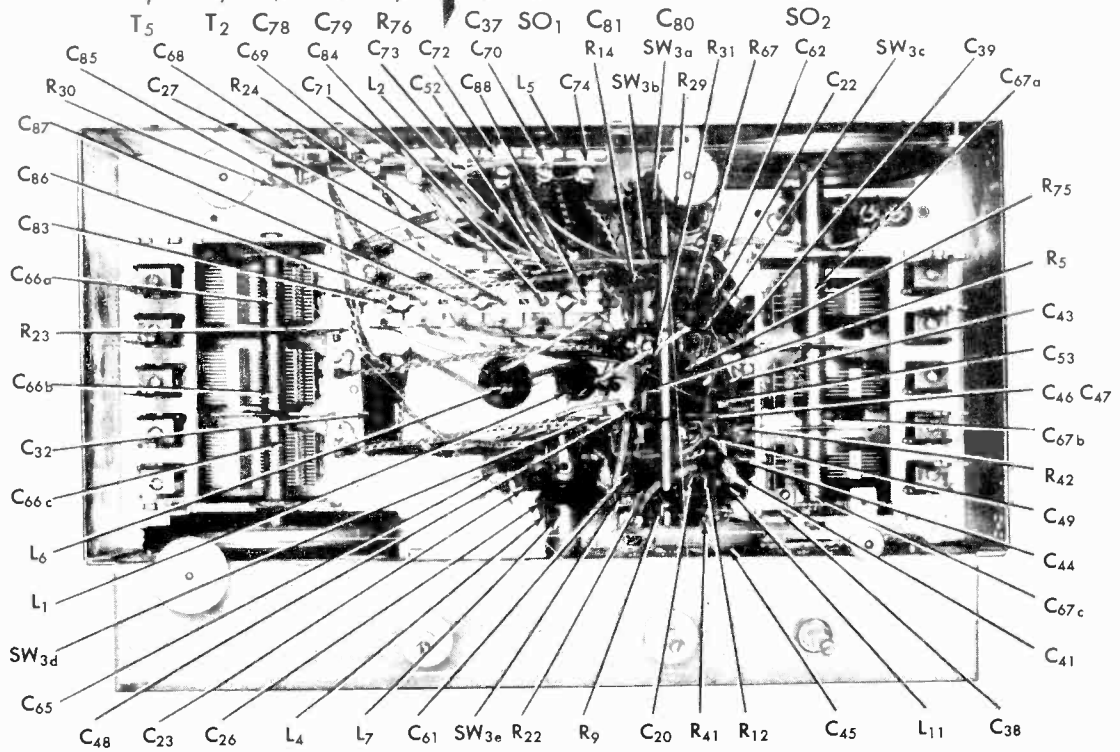


Fig. 8. Front view of R.F. chassis showing component location.

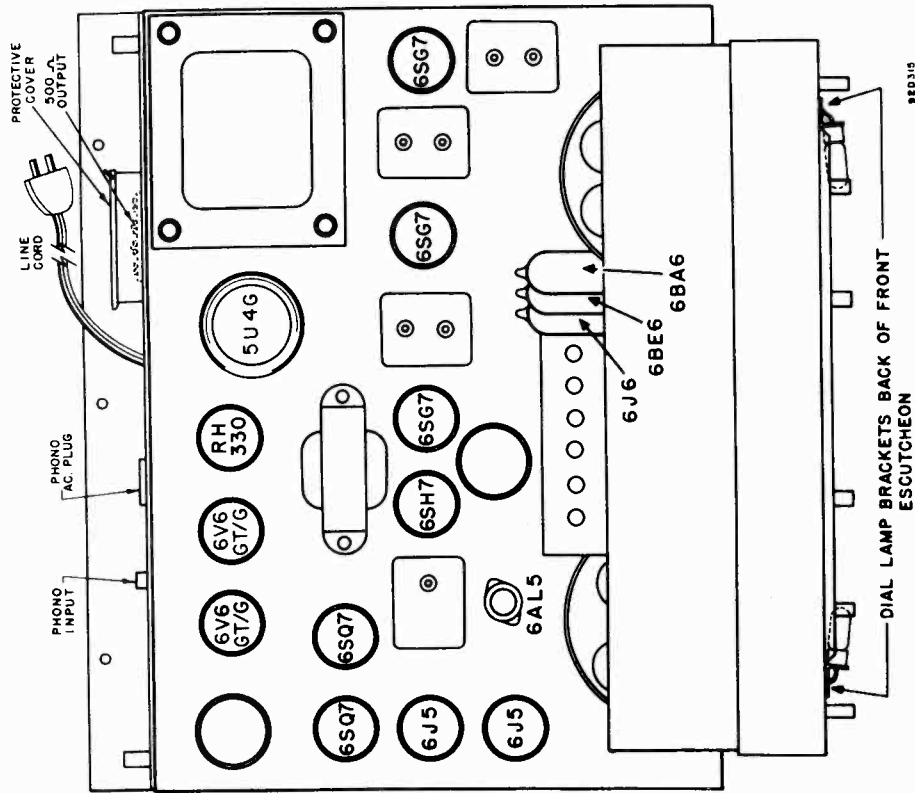


Fig. 10. Top view, Location of tubes and dial lamps.

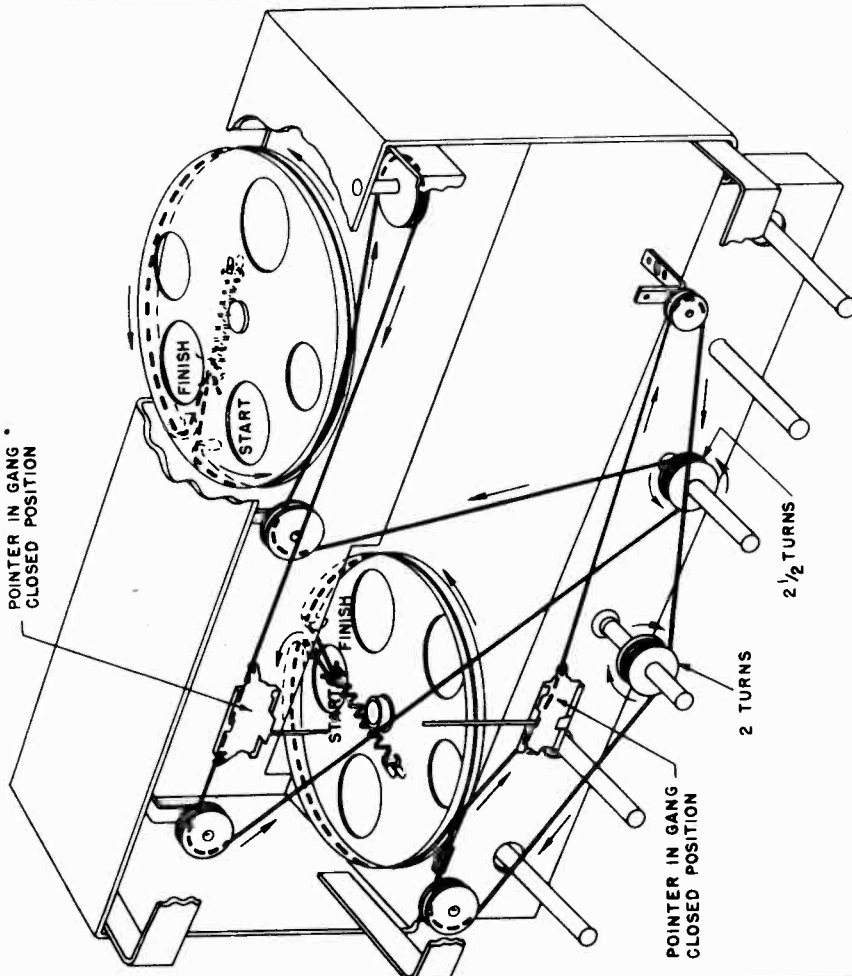


Fig. 9. Dial cable stringing procedure.



MODELS 1-1500,  
1-1501. 1-1502

## CONCORD RADIO CORP.

## SERVICE PARTS LIST

REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION
<b>CAPACITORS</b>			
C-1,4,5,6,8, 12,13,14,15,16, 17,18,20,21,22, 23,24,35,90	.01 mfd 600 V., tubular paper	R-80	<b>RESISTORS (Continued)</b>
C-2,3,26,27,28	.02 mfd 600 V., tubular paper	R-81	
C-7,34	.003 mfd 600 V., tubular paper	R-82	6.8 ohms 1 watt, carbon
C-11,31,32,50, 51,93	.05 mfd 600 V., tubular paper	R-84	68,000 ohms 1 watt, carbon
C-25	.01 mfd 600 V., molded paper		4700 ohms ½ watt, carbon
C-33	.005 mfd 600 V., tubular paper		33,000 ohms ½ watt, carbon
C-36	60-20 mfd 450 V., 20 mfd. 30 V., electrolytic	T-1	<b>TRANSFORMERS AND COILS</b>
C-37	40-10 mfd 450 V., 20 mfd. 30 V., electrolytic	T-2,3	
C-38,39	500 mmf 500 V., ceramic	T-4	
C-40,42,43,44	1000 mmf 500 V., ceramic	T-5	
C-41	10,000 mmf. 150 V., ceramic	T-6	
C-45	10 mmf 500 V., ceramic	L-1	
C-46,47	47 mmf 500 V., ceramic	L-2	
C-48	1.5 mmf., 500 V., bakelite	L-4	
C-49	10 mmf 500 V., mica	L-5	
C-52,64	100 mmf 500 V., mica	L-6	
C-54	22 mmf 500 V., mica.	L-7	
C-55	22 mmf 500 V., mica.	L-8	
C-56,57,58	220 mmf 500 V., mica.	L-9	
C-60,61,62	47 mmf 500 V., mica	L-10	
C-63	.001 mfd 500 V., mica.	L-11	
C-65	.0039 mfd 500 V., mica.	L-12	
C-66	Tuning condenser, "AM"	L-13,14,15,16	
C-67	Tuning condenser, "FM"	L-18	
C-68	570 mmf. trimmer.		
C-69,70,71, 72,73,74	Trimmer assembly, ant. stage.		
C-75	Trimmer, FM, mixer stage.		
C-76	Trimmer, FM, ant. stage.		
C-77,78,79,80,81, 82	Trimmer assembly, osc. stage.		
C-83,84,85,86,87, 88	Trimmer assembly, mixer stage.		
C-89	Trimmer, FM, osc. stage		
C-92	39 mmf. 500 V., ceramic		
<b>RESISTORS</b>			
R-1,2	330 ohms 5 watts, WW.		
R-3	47 ohms 4 watts, Carbon.		
R-4	2 meg-ohms, volume control		
R-5	10 ohms ½ watt, carbon		
R-6,8	100 ohms ½ watt, carbon		
R-9,10,12,13,14, 77	1000 ohms ½ watt, carbon		
R-15	10,000 ohms ½ watt, carbon		
R-16	15,000 ohms ½ watt, carbon		
R-17,19,20,21,22, 23,24	100,000 ohms ½ watt, carbon		
R-26,27,28,29, 30,31,83	1 meg-ohm ½ watt, carbon		
R-32	150 ohms ½ watt, carbon		
R-33,34	100,000 ohms ½ watt, carbon		
R-35,36,37,38,39	220 ohms ½ watt, carbon		
R-41,42	22,000 ohms ½ watt, carbon		
R-43,44,52,64	220,000 ohms ½ watt, carbon		
R-45,50,51	330,000 ohms ½ watt, carbon		
R-46	100 ohms ½ watt, carbon		
R-47,49	150,000 ohms ½ watt, carbon		
R-48	3300 ohms ½ watt, carbon		
R-53	3900 ohms ½ watt, carbon		
R-54	12,000 ohms ½ watt, carbon		
R-55	470 ohms ½ watt, carbon		
R-58,59	47,000 ohms ½ watt, carbon.		
R-60,61	68,000 ohms ½ watt, carbon.		
R-62,65	470,000 ohms ½ watt, carbon		
R-63	390,000 ohms ½ watt, carbon		
R-66	100,000 ohms 1 watt, carbon		
R-67	33,000 ohms 1 watt, carbon.		
R-68,69,70	47,000 ohms 1 watt, carbon.		
R-71	22,000 ohms 1 watt, carbon		
R-72,73,74	10,000 ohms 2 watt, carbon		
R-75	33,000 ohms 2 watts, carbon		
R-76	330 ohms, plug-in ballast		
R-79	470 ohms 2 watts, carbon		
		SW-1	Power & Bass tone switch ass'y
		SW-2	Treble switch ass'y.
		SW-3	Band switch
		SW-4	Muting switch
			<b>PLUGS AND SOCKETS</b>
		PL-1	Line cord and plug
		SO-1	Receptacle, phono motor
		SO-2	Jack, phono pick-up
		SO-3	Receptacle, ballast
			Socket, octal (tube)
			Socket, miniature (tube)
			Pilot light socket & bracket, L.H.
			Pilot light socket & bracket, R.H.
			<b>TUBES, RECTIFIERS AND LAMPS</b>
		V-1	Type 6BA6, Antenna
		V-2	Type 6BE6, Mixer
		V-3	Type 6J6, Oscillator and A.F.C.
		V-4,5,6	Type 6SG7, I.F. amplifier
		V-7	Type 6SH7, I.F. amplifier
		V-8	Type 6AL5, F.M. detector
		V-9,10	Type 6J5, A.F. amplifier
		V-11,12	Type 6SQ7, Phase inverter
		V-13,14	Type 6V6GT/G, A.F. power amplifier
		V-15	Type 5U4G, Rectifier
		LM-1.2	Lamp, 6-8 V., 150 MA. G.E. #47
			<b>MISCELLANEOUS COMPONENTS</b>
			Shield base, tube (miniature tube)
			Shield, tube (miniature tube)
			Spring, tube retainer
			Carriage, pointer
			Pointer, FM
			Pointer, AM
			Spring, pointer
			Push-button (black)
			Insert, push-button, lucite
			Insert, push-button, metal
			Call letters
			Spring, dial
			Cord, dial
			Escutcheon
			Dial glass, upper
			Dial glass, lower
			Knob
		TS-1	Terminal strip, antenna
		TS-2	Terminal strip, speaker
			Shield, speaker terminal

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MODEL 9-101  
Revised



**DESCRIPTION**

**TYPE:** Five-tube, single-band superheterodyne.

**FREQUENCY RANGE:** 540 to 1600 kc.

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** Crosley "A-B" Battery Pack, CR69.

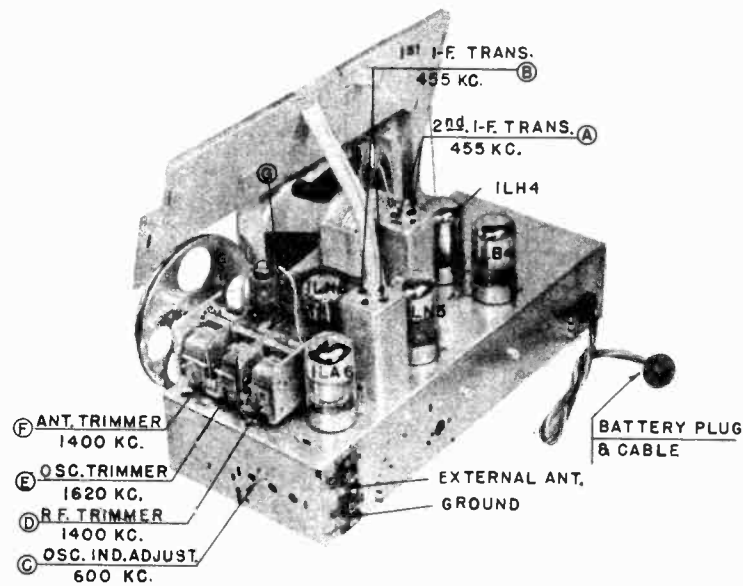
**VOLTAGE RATING:** 1½ v. "A"; 90 v. "B".

**POWER OUTPUT:** 175 mw. maximum.

**TUBE COMPLEMENT:**

Type	Function
1LA6	Mixer
1LN5	I. F. Amplifier,
1LN5	R. F. Amplifier
1LH4	Detector, AVC 1st A. F. Amplifier
1LB4	A. F. Power Output

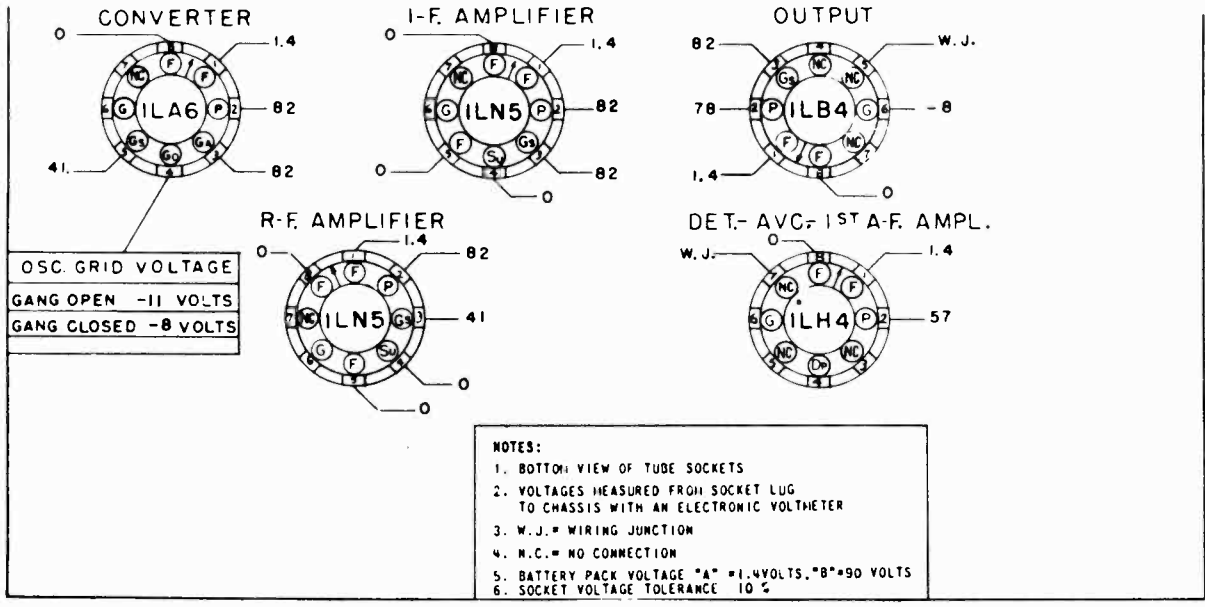
For satisfactory operation it is necessary that an antenna and ground be connected to this receiver.



**CHASSIS REAR VIEW**

MODEL 9-101  
Revised

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**ALIGNMENT PROCEDURE**

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be fed to the receiver as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the tone control to its treble position.
5. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

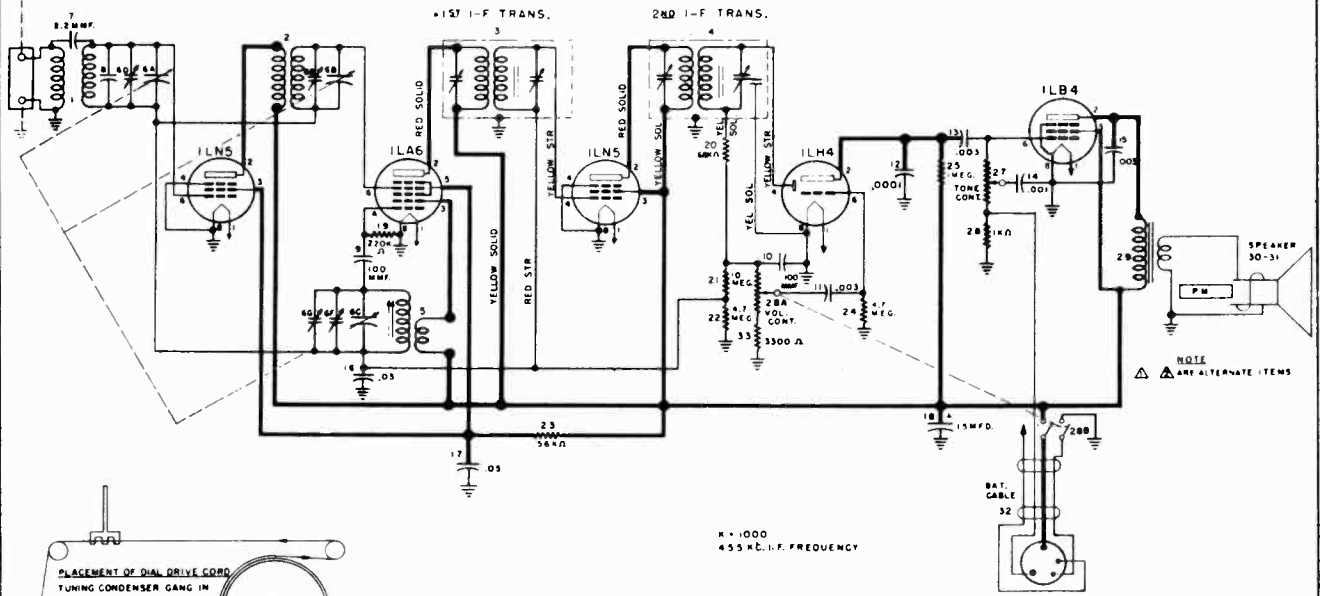
**ALIGNMENT CHART**

Alignment adjustment locations are shown on page 1, Chassis, Rear View.

Alignment Sequence	Signal Generator Output			Position of Dial Pointer or Var. Cond.	Adjust for Maximum Output	Remarks
	Frequency in kc.	In Series With	To			
1	455	.01 mfd.	R.F. Grid	Closed	A & B	
2	600	.01 mfd.	R.F. Grid	600 kc.	C	Preset "G" to 1/4 turn from the closed position and "E" to 1/2 turn from its closed position.
3	1620	.01 mfd.	Ant.	Open	E	
4	1400	200 mmf.	Ant.	Tune to Signal	D & F	
5	600	200 mmf.	Ant.	Tune to Signal	C	Rock Gang.
6	Repeat steps 3, 4, and 5 until circuits align and dial tracks.					
7	Conclude alignment by repeating step 4.					

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MODEL 9-101  
Revised



REPLACEMENT PARTS LIST—MODEL 9-101

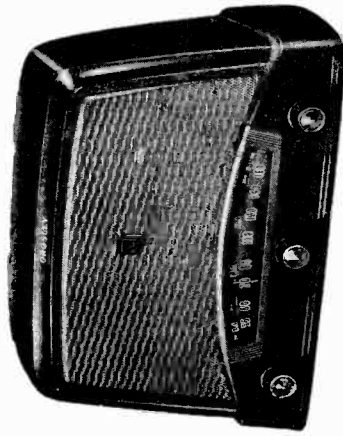
Figures in first column correspond to figures in Schematic Diagram.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AW-142997	Coil, Antenna	24	39373-102	Resistor, 4.7 megohm, 1/2 w.
2	AW-142993	Coil, R.F.	25	39373-92	Resistor, 1 megohm, 1/2 w.
3	AC-143013	Transformer, 1st I.F.	26	39373-33	Resistor, 1000 ohm, 1/2 w.
4	AC-143034	Transformer, 2nd I.F.	27	39368-11	Control, Tone (2 megohm)
5	AW-145105	Coil, Oscillator	28A	39368-14	Control, Volume (1 megohm)
6A	AC-137073-20	Condenser, Variable	28B	39369-2	Switch, Power
6B		Condenser, Variable	29	B-143018	Transformer, Output
6C		Condenser, Variable	31	143688	Speaker
6D	Part of Item 6A	Condenser, Trimmer	32	B-130493	Cable and Plug Assy., Battery
6E	Part of Item 6B	Condenser, Trimmer	33	39373-44	Resistor, 3300 ohm, 1/2 w.
6F	Part of Item 6C	Condenser, Trimmer		R-138573-5	Cabinet
6G	Part of Item 6C	Condenser, Trimmer		C-143245	Dial Glass
7	W-137398-4	Condenser, 2.2 mmf., 500 v.		W-134055	Grommet, Var. Cond. Mtg.
8	C-137727-47	Condenser, 10 mmf., 500 v., ceramic		W-143041	Grommet, Battery Cable
9	C-137727-1	Condenser, 100 mmf., 300 v., ceramic		C-39012-81	Iron Core, Osc. Coil
10	C-137727-1	Condenser, 100 mmf., 300 v., ceramic		B-138574-4	Knob
11	39001-76	Condenser, .003 mfd., 600 v., paper		W-46065	Mounting (Rubber), Speaker
12	39001-1	Condenser, .0001 mfd., 600 v., paper		W-132366-2	Nut, Locking (Osc. Iron Core)
13	39001-76	Condenser, .003 mfd., 600 v., paper		B-143115	Pointer, Dial
14	39001-7	Condenser, .001 mfd., 600 v., paper		W-137939-1	Pulley, Drive Cord Idler
15	39001-76	Condenser, .003 mfd., 600 v., paper		W-51071	Ring, Retaining (Drive Shaft)
16	39001-17	Condenser, .05 mfd., 600 v., paper		B-135075-5	Shaft, Dial Drive
17	39001-17	Condenser, .05 mfd., 600 v., paper		39441	Socket, Tube
18	39358-13	Condenser, 16 mfd., 150 v., Elect.		W-51752	Spring, Dial Drive Cord
19	39373-80	Resistor, 220,000 ohm, 1/2 w.		B-138649	Strip, Dial Glass
20	39373-71	Resistor, 68,000 ohm, 1/2 w.		W-138568	Strip, Dial Pointer
21	39373-107	Resistor, 10 megohm, 1/2 w.		AC-138443-3	Support and Pulley Assy., Dial
22	39373-102	Resistor, 4.7 megohm, 1/2 w.		W-134916	Washer, Spring (Drive Shaft)
23	39373-69	Resistor, 56,000 ohm, 1/2 w.			

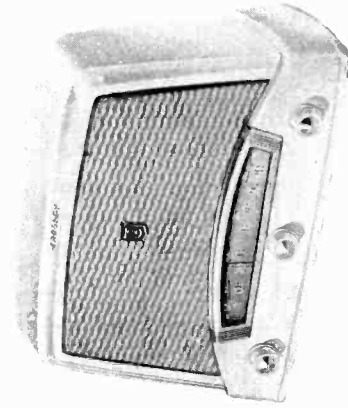


MODELS 9-105,  
9-106W

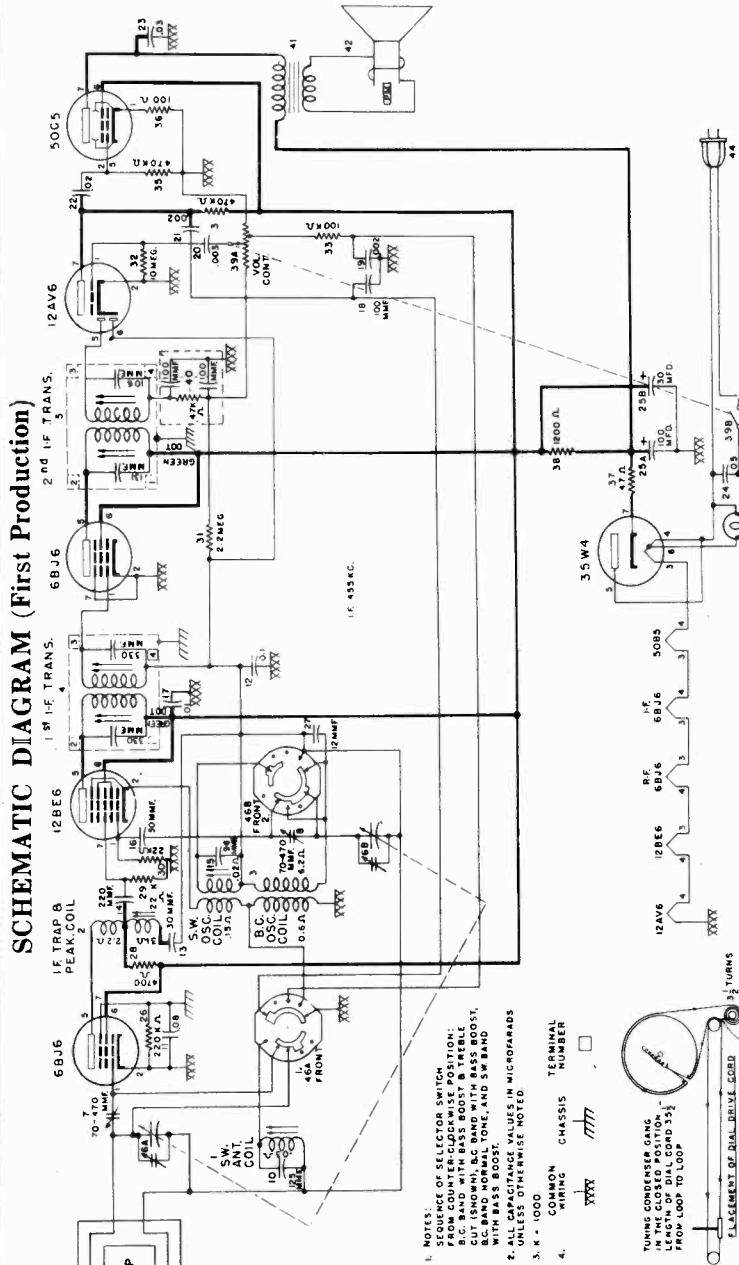
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9-105



9-106W



**DESCRIPTION**

**TUBE COMPLEMENT:**

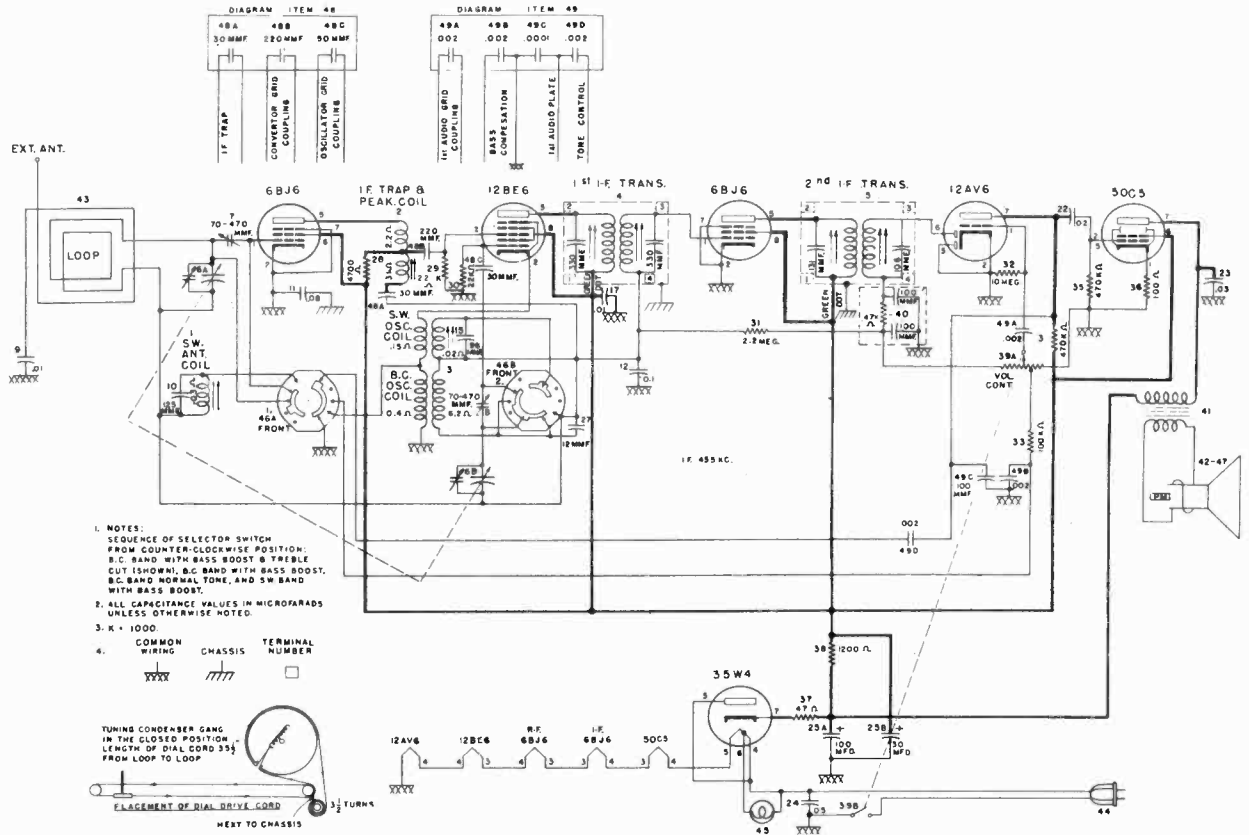
Type	Function
6BJ6	R.F. Amplifier
12BE6	Mixer
6BJ6	I.F. Amplifier
12AV6	Detector, AVC, 1st A.F. Amplifier
50C5	A.F. Power Output
35W4	Rectifier

- TYPE:** Six-tube, two-band, superheterodyne.
- FREQUENCY RANGE:** Standard Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)
- Short-wave Band: 9.4 to 11.9 mc. (Selector Switch, Clockwise or Right.)
- INTERMEDIATE FREQUENCY:** 455 kc.
- POWER SUPPLY:** a.c.—d.c.
- VOLTAGE RATING:** 105-125 volts.
- POWER CONSUMPTION:** 30 watts nominal.
- POWER OUTPUT:** 1.5 watt maximum.

**DIAL BULB:** Type 47, 6.3 volts, .15 amp.

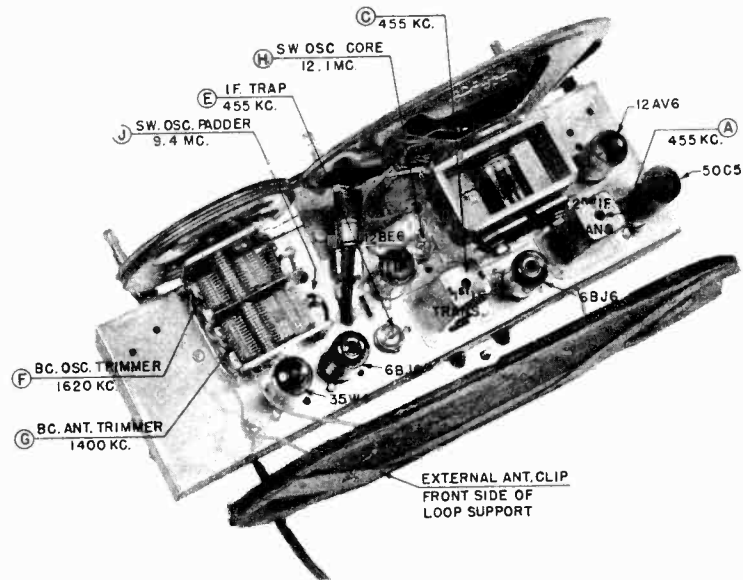
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MODELS 9-105,  
9-106W



SCHMATIC DIAGRAM (Second Production)

CHASSIS, TOP VIEW



MODELS 9-105,  
9-106WCROSLLEY DIV.  
AVCO MFG. CORP.

When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

Reversing the position of the power plug when alternating current is used may reduce power hum.

*Under no circumstances should a ground be connected to this receiver.*

### ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to B— (pin 2 on 6BJ6 tube socket, R.F. Amplifier).
4. Turn the volume control on full and turn the tone switch to maximum treble position; then adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

### ALIGNMENT CHART

Alignment Adjustment Locations are shown on page 1, Chassis, Top View and on page 3, Socket Voltage Chart.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency	In Series with	To	Band Switch	Tuning Dial or Tuning Cond.	
*1	455 kc	200 mmf.	Ant.	BC	Open	A & B
2	455 kc	200 mmf.	Ant.	BC	Open	C & D
†3	455 kc	200 mmf.	Ant.	BC	Open	E
4	1620 kc	200 mmf.	Ant.	BC	Open 1620	F
5	1400 kc	200 mmf.	Ant.	BC	Tune in Signal	G
6	12.1 mc	400 ohm	Ant.	SW	Open	H
7	9.4 mc	400 ohm	Ant.	SW	Closed	J
Repeat adjustments 6 and 7 until circuits align.						
△8	11.8 mc	400 ohm	Ant.	SW	Tune in Signal	K
9	9.6 mc	400 ohm	Ant.	SW	Tune in Signal	L

Repeat adjustments 6 and 7 until circuits align.

#### NOTES:

\*I-F Trap Core "E" must be turned counter-clockwise, to stop, before adjusting A, B, C, and D.

†Adjust for minimum signal.—Before making alignment adjustments E through K, the chassis bottom should be in place, and the antenna loop should be moved as far from the chassis as the loop bracket will permit.

△Adjustments K and L must be made while rocking the tuning condenser.

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MODELS 9-105,  
9-106W

SOCKET VOLTAGE CHART

**RECTIFIER**

**R-F AMPLIFIER**

**I-F AMPLIFIER**

**OUTPUT**

**CONVERTER**

OSCILLATOR GRID VOLTAGE		
POSITION OF BAND SWITCH	TUNING GANG	NEG VOLTS
BC	OPEN	-5.4
SW	OPEN	-5.2

**NOTES:**

1. BOTTOM VIEW OF TUBE SOCKETS
2. VOLTAGE MEASURED WITH AN ELECTRONIC VOLTMEETER FROM SOCKET LUG TO B-
3. LINE VOLTAGE 117 V. 60 CYCLE
4. NC = NO CONNECTION
5. W. J. = WIRING JUNCTION
6. \* AC VOLTAGE
7. SOCKET VOLTAGE TOLERANCE 10 %

**PARTS LIST—MODELS 9-105, 9-106W**

Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AW-144118	Coil (S. W. Antenna)	37	39373-119	Resistor, 47 ohm, 1 w.
2	AW-144145	Coil (I. F. Trap & Peaking)	38	39373-144	Resistor, 1,200 ohm, 1 w.
3	AW-144144	Coil (BC & SW Dual Osc.)	39A	39368-18	Volume control (1 megohm, tap 300,000 ohm)
4	AC-139919-4	Trans. Assy. (1st I. F.)	39B	39370-2	Shaft, Volume control
5	AC-139919-3	Trans. Assy. (2nd I. F.)	39B	39369-1	Switch, Power
6A	AC-137073-26	Capacitor, Variable & Pulley (Part of 6A)	40	B-142951-2	Capacitor-resistor
6B			41	138131-1	Transformer (Output)
7	C-136327-39	Capacitor, Trimmer 70-470 mmf.	42	AD-143694	Speaker (4" x 6" P. M.)
8	C-136327-39	Capacitor, Trimmer 70-470 mmf.	43	AC-143698	Loop, Back & Bracket Assy.
9	39001-13	Capacitor, .01 mfd., 600 v., paper	44	C-132300-1	Cable & Plug Assy., Power
10	C-137727-77	Capacitor, 125 mmf., 500 v., ceramic	45	W-48858	Bulb (Dial), type 47, 6.3 v., .15 amp.
11	39001-19	Capacitor, .1 mfd., 600 v., paper	46A	B-144128	Switch, Band Change & Tone Control (Part of 46A)
12	39001-19	Capacitor, .1 mfd., 600 v., paper	46B		
13	B-137498-12	Capacitor, 30 mmf., 500 v., mica	48A	B-144675-4	Capacitor, 30 mmf., 500 v. Three Section
14	B-137498-38	Capacitor, 220 mmf., 500 v., mica	48B		Capacitor, 220 mmf., 500 v. Section
15	C-137727-83	Capacitor, 96 mmf., 500 v., ceramic	48C		Capacitor, 50 mmf., 500 v. Section
16	C-137727-21	Capacitor, 50 mmf., 500 v., ceramic	49A	B-144675-5	Capacitor, .002 mfd., 500 v. Four Section
17	39001-13	Capacitor, .01 mfd., 600 v., paper	49B		Capacitor, .002 mfd., 500 v. Section
18	B-143686-3	Capacitor, 100 mmf., 500 v., ceramic	49C		Capacitor, 100 mmf., 500 v. Section
19	39001-74	Capacitor, .002 mfd., 600 v., paper	49D		Capacitor, .002 mfd., 500 v.
20	39001-76	Capacitor, .003 mfd., 600 v., paper		R-143113	Cabinet (9-105)
21	39001-74	Capacitor, .002 mfd., 600 v., paper		AW-143465	Cabinet (9-106W)
22	39001-80	Capacitor, .02 mfd., 600 v., paper		C-143753	Cloth, Grille
23	39001-17	Capacitor, .05 mfd., 600 v., paper		B-143844	Dial Background
24	39001-17	Capacitor, .05 mfd., 600 v., paper		B-142922	Emblem
25A	B-143680	Capacitor, 100 mmf., 150 v. Two Sect.		B-143907	Escutcheon
25B		Capacitor, 30 mfd., 150 v. Elect.		C-143176	Grille
27	C-137727-52	Capacitor, 12 mmf., 500 v., ceramic		B-138576-8	Knob (9-105)
28	39373-47	Resistor, 4700 ohm, 1/2 w.		B-138576-7	Knob (9-106W)
29	39373-60	Resistor, 22,000 ohm, 1/2 w.		B-143289	Pointer, Dial
30	39373-60	Resistor, 22,000 ohm, 1/2 w.		B-135075-2	Shaft, Drive
31	39373-97	Resistor, 2.2 megohm, 1/2 w.		W-46065	Shock Mount, Tuning Condenser
32	39373-107	Resistor, 10 megohm, 1/2 w.		D-136565	Socket, Dial Light
33	39373-74	Resistor, 100,000 ohm, 1/2 w.		39462-2	Socket, Miniature Tube
34	39373-87	Resistor, 470,000 ohm, 1/2 w.		W-93068	Speed Nut (for escutcheon)
35	39373-87	Resistor, 470,000 ohm, 1/2 w.		W-51752	Spring, Dial Drive Cord
36	39373-14	Resistor, 100 ohm, 1/2 w.		C-144179	Window, Dial

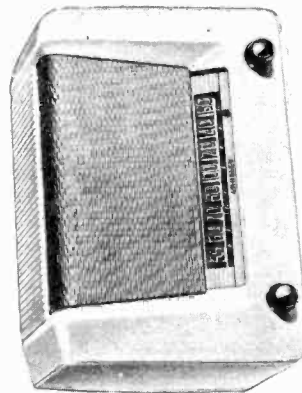
\*Used in place of items 13, 14, & 16 on 2nd production receivers.  
\*\*Used in place of items 18, 19, 20, & 21 on 2nd production receivers.

MODELS 9-113,  
9-114W

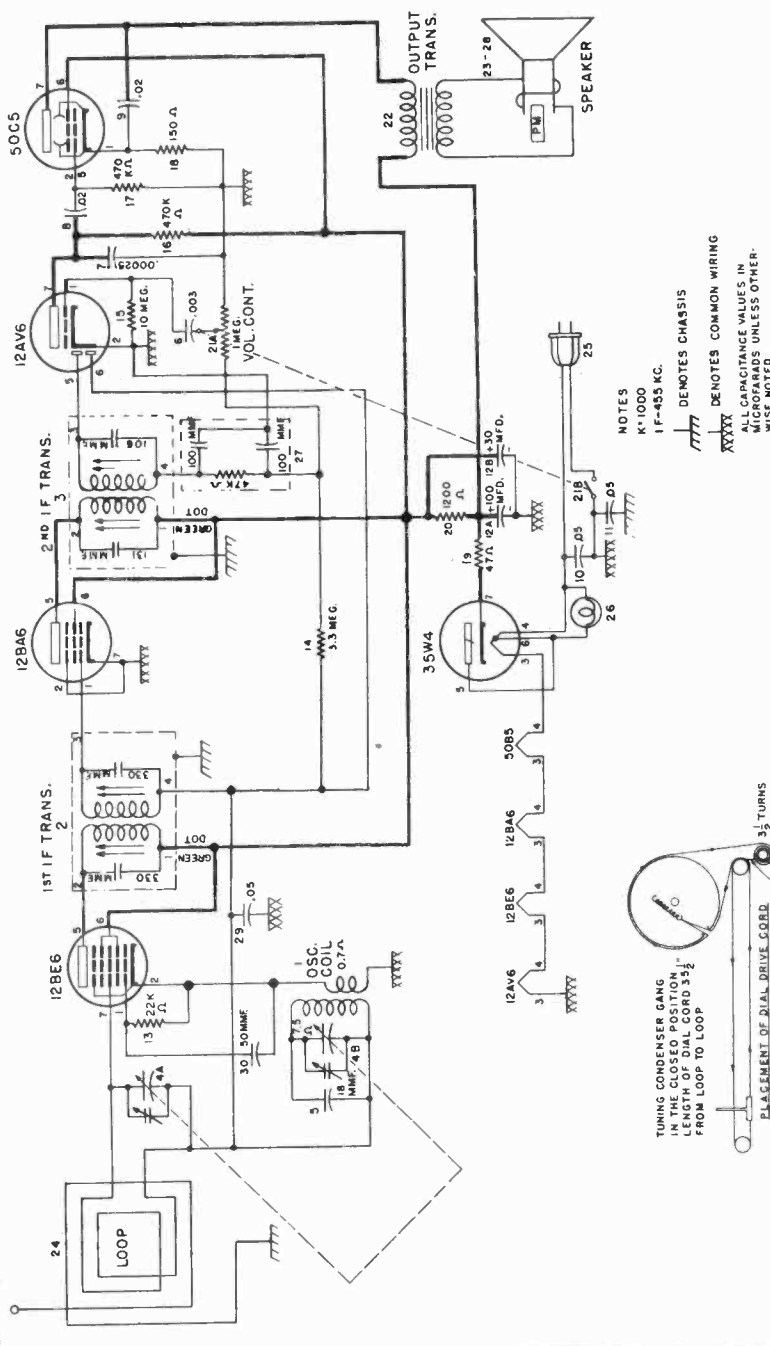
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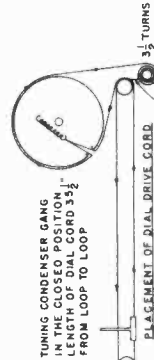
9-113



9-114W



NOTES  
K=1000  
M=1000000  
1F=455 KC.  
// DENOTES CHASSIS  
XXXXX DENOTES COMMON WIRING  
ALL CAPACITANCE VALUES IN  
MICROFARADS UNLESS OTHER-  
WISE NOTED



**SCHEMATIC DIAGRAM (First Production)**  
**DESCRIPTION**

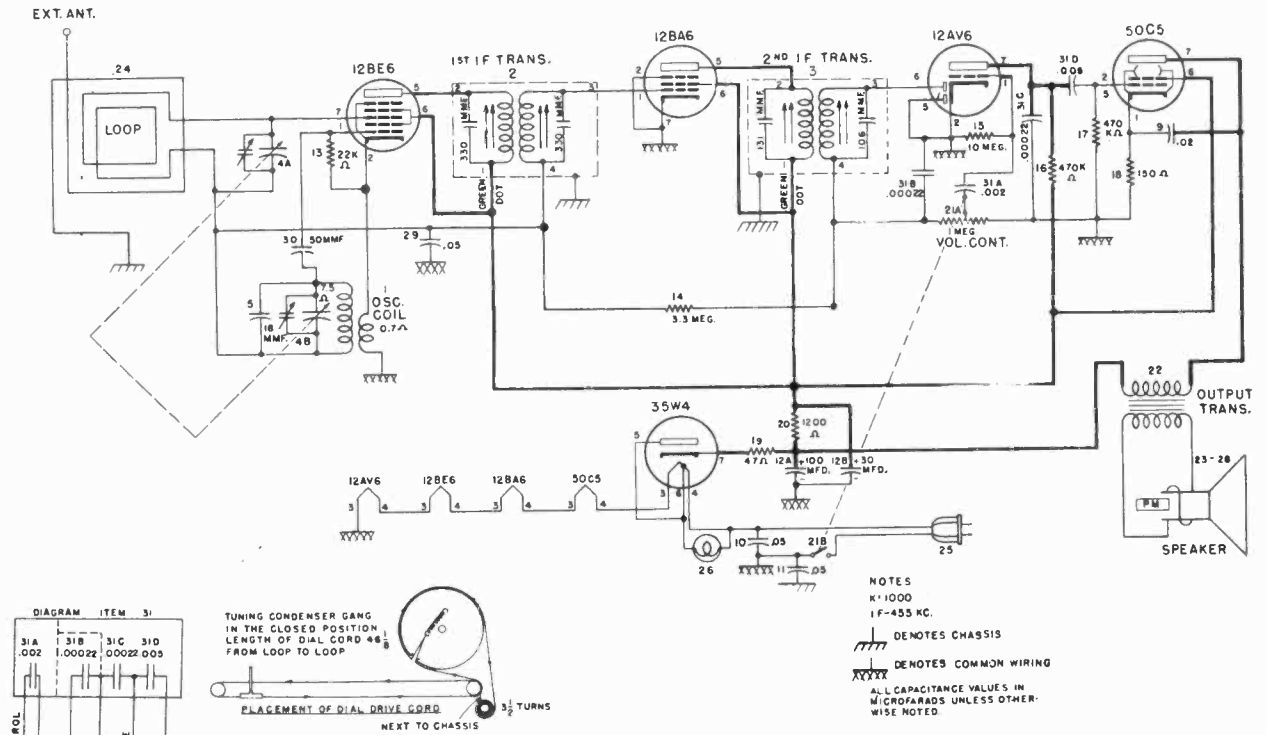
TUBE COMPLEMENT	
Type	Function
12BE6	Converter
12BA6	I. F. Amplifier
12AV6	Detector, AVC, 1st A. F. Amplifier
50C5	A. F. Power Output
35W4	Rectifier

**DIAL BULB: Type 47, 6.3 volts, .15 amp.**

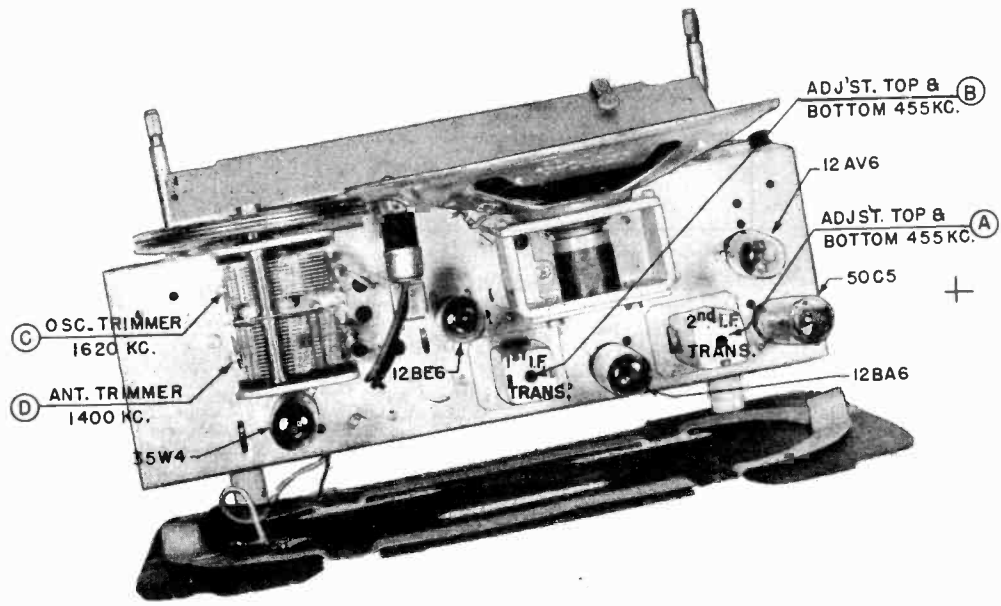
**TYPE:** Five-tube, single band, Superheterodyne.  
**FREQUENCY RANGE:** 540 to 1600 kc.  
**INTERMEDIATE FREQUENCY:** 455 kc.  
**POWER SUPPLY:** a.c.-d.c.  
**VOLTAGE RATING:** 105-125 volts.  
**POWER CONSUMPTION:** 35 watts maximum.  
**POWER OUTPUT:** 1.3 watts maximum.

CROSLY DIV.  
AVCO MFG. CORP.

MODELS 9-113,  
9-114W



SCHMATIC DIAGRAM (Second Production)



CHASSIS, TOP VIEW

When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

Reversing the position of the power plug when alternating current is used may reduce hum.

*Under no circumstances should a ground be connected to this receiver.*

MODELS 9-113,  
9-114W

CROSLLEY DIV.  
AVCO MFG. CORP.

**ALIGNMENT PROCEDURE**

1. Connect an output meter across the speaker voice coil.
2. The r.f. signal input from the signal generator should be connected to the high side of loop antenna. Connect the signal generator ground through a 0.1 mfd. condenser to B—(see Socket Voltage Chart).
3. Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

**ALIGNMENT CHART**

Alignment Sequence	Signal Generator Output			Position of Tuning Cond.	Adjust for Maximum Output
	Frequency in kc.	In Series with	To		
1	455	200 mmf.	High Side of Loop	Open	A & B
2	1620	*Radiated to Loop		Open	C
3	1400	*Radiated to Loop		Tune to Signal	D

\* Place signal generator output lead near the loop antenna.

**RECTIFIER**

**IF AMPLIFIER**

**OUTPUT**

**CONVERTER**

**DET. AVC. & 1st AUDIO AMPLIFIER**

**NOTES:**

1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGE MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B—.
3. LINE VOLTAGE 117 V. 60 CYCLE.
4. NC=NO CONNECTION.
5. W.J.= WIRING JUNCTION.
6. \* = AC VOLTAGE.
7. SOCKET VOLTAGE TOLERANCE 10%.

**SOCKET VOLTAGE CHART**

Item No.	Part Number	Description	Item No.	Part Number	Description
1	144325	Coil, Oscillator	24	144328	Antenna Loop and Back Assy.
2	139919-4	Transformer, 1st I. F.	25	132300-1	Cable and Plug Assy., Power
3	139919-3	Transformer, 2nd I. F.	26	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.
4A	137073-27	Condenser, Variable / Two	27	142951-2	Condenser - Resistor
4B		Condenser, Variable / Section	29	39001-17	Condenser, .05 mfd., 600 v., paper
5	137727-66	Condenser, 18 mmf., 500 v., ceramic	30	137727-21	Condenser, 50 mmf., 500 v., ceramic
6	39001-76	Condenser, .003 mfd., 600 v., paper	31A	144675-1	Condenser, .002 mfd., 500 v.
7	39001-73	Condenser, .00025 mfd., 600 v., paper	31B		Condenser, .00022 mfd., 500 v. Four
8	39001-80	Condenser, .02 mfd., 600 v., paper	* 31C		Condenser, .00022 mfd., 500 v. Sect.
9	39001-80	Condenser, .02 mfd., 600 v., paper	31D		Condenser, .005 mfd., 500 v.)
10	39001-17	Condenser, .05 mfd., 600 v., paper	144176		Background Assy., Dial
11	39001-17	Condenser, .05 mfd., 600 v., paper	144112		Bracket, Dial Light
12A	143680	Condenser, 100 mfd., 150 v. / Two Sect.	144034-1		Cabinet (9-113)
12B		Condenser, 30 mfd., 150 v. / Elec. Filter	144127		Cabinet (9-114W)
13	39373-60	Resistor, 22,000 ohm, 1/2 w.	144027		Dial, Glass
14	39373-100	Resistor, 3.3 megohm, 1/2 w.	144110		Grille and Baffle
15	39373-107	Resistor, 10 megohm, 1/2 w.	46065		Grommet, Var. Cond. Mtg.
16	39373-87	Resistor, 470,000 ohm, 1/2 w.	138576-10		Knob (9-113)
17	39373-87	Resistor, 470,000 ohm, 1/2 w.	138576-9		Knob (9-114W)
18	39373-16	Resistor, 150 ohm, 1/2 w.	144070		Pointer, Dial
19	39373-119	Resistor, 47 ohm, 1 w.	39220-36		Screw, Chassis Mtg.
20	39373-144	Resistor, 1200 ohm, 1 w.	135075-7		Shaft, Drive
21A	39368-14	Control, Volume, 1 megohm	131346		Socket (Miniature Tube)
21B	39369-1	Switch, Power	136565-17		Socket, Dial Light
22	138131-1	Transformer, Output	51752		Spring, Dial Drive Cord
23	143694	Speaker (Less Transformer)	132124SB		Trimount Stud

\*Used on 2nd production receivers in place of items 6, 7, 8, and 27.

CROSLY DIV.  
AVCO MFG. CORP.

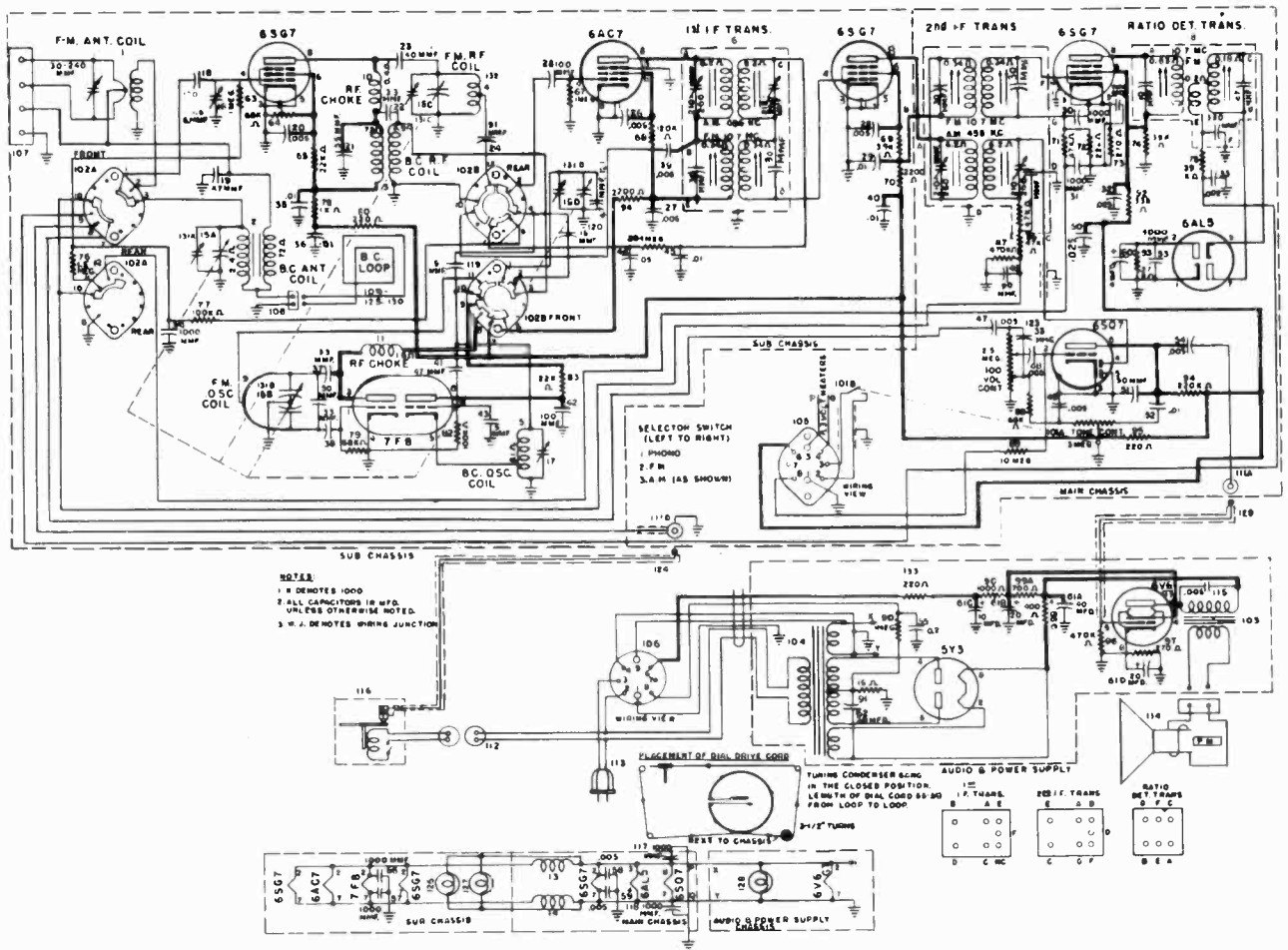
MODELS 9-204,  
9-205M



9-204






9-205M





MODELS 9-204,  
9-205M

**CROSLLEY DIV.  
AVCO MFG. CORP.  
ALIGNMENT CHART I (SCOPE METHOD)**

	Signal Generator Output		To	Range Switch	Tuning Dial or Tuning Cap	Adjust	Curve	Remarks
	Frequency	In Series With						
1	455 KC	.01 mfd.	1st IF. grid	AM	Gang open	A		Note 1
2	455 KC	.01 mfd.	Stator 21 plate sect. rear of gang	AM	Gang open	B		Note 1
3	10.7 MC	1000 mmf.	2nd IF grid	FM	Gang closed	C	Zero Volts	Note 2
4	10.7 MC	1000 mmf.	2nd IF grid	FM	Gang closed	D	Max. DC output	Note 3
5	RF sweep 10.7 marker	1000 mmf.	1st IF grid	FM	Gang closed	E & F		Align for max. output & symetry note 4
6	RF sweep 10.7 marker	1000 mmf.	Stator 3 plate sect. rear of gang	FM	Gang closed	G & H		Align for max. output & symetry note 5
7	FM-RF 98MC	FM dummy antenna	Dipole Ant. Term.	FM	98MC	I	Peak	Note 6
8	104MC	FM dummy antenna	Dipole Ant. Term.	FM	104MC	J	Peak	Note 7
9	92MC	FM dummy antenna	Dipole Ant. Term.	FM	92MC	Form RF Coil "K"	Peak	Note 8
10	Repeat steps 8 and 9 until no further improvement in sensitivity is noted.							
11	FM sweep Gen. 92-98-104 MC markers.	FM dummy antenna	Dipole Ant. Term.	FM	Gang closed	L & M		Note 9 or 9a
12	AM-RF Gen. 1400 KC	200 mmf.	BC Ant. Term. and ground	AM	1400 KC	N		Note 10
13	AM-RF Gen. 1400 KC	200 mmf.	BC Ant. Term. and ground	AM	1400 KC	P & Q		Note 1 & Note 10

**TUBE COMPLEMENT**

Type	Function
6SG7	R. F. Amplifier
6AC7	Mixer
7F8	Oscillator
6SG7	1st. I. F. Amplifier
6SG7	2nd. I. F. Amplifier
6AL5	Discriminator
6SQ7	A. M. Det.—AVC 1st. A. F. Amplifier
6V6 (GT/G)	Output
5Y3 GT/G	Rectifier

DIAL BULB: Type 47, 6.3 volts, .15 amp.

CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 9-204,  
9-205M

**ALIGNMENT CHART II**

(Using output meter and electronic voltmeter)

Alignment Sequence	Signal Gen. Output		To	Position of		Adjust	Remarks
	Frequency	In Series With		Range Switch	Tuning Dial or Tun. Cap.		
1	455 KC	.01 mfd.	1st IF grid	AM	Gang open	A	Align for peak on output meter.
2	455 KC	.01 mfd.	Stator 21 plate sect. rear of gang	AM	Gang open	B	Align for peak on output meter.
3	10.7 MC	1000 mmf	2nd IF grid	FM	Gang closed	C	Adjust for zero volts on electronic voltmeter Note 1 & 2.
4	10.7 MC	1000 mmf	2nd IF grid	FM	Gang closed	D	Adjust for max. DC. output on Elect. voltmeter Note 3.
5	10.7 MC	1000 mmf	1st IF grid	FM	Gang closed	E & F	Adjust for max. DC. output Note 4.
6	10.7 MC	1000 mmf	Stator 3 plate sect. rear of gang	FM	Gang closed	G & H	Adjust for max. DC. output Note 4.
Repeat steps 3 and 4, 5 and 6 if necessary.							
7	98 MC	FM dummy antenna	Dipole Ant. Terminals	FM	98 MC	I	Adjust for max. reading on output meter.
8	104 MC	FM dummy antenna	Dipole Ant. Terminals	FM	104 MC	J	Adjust for max. reading on output meter, rock gang if necessary while making adjustments.
9	92 MC	FM dummy antenna	Dipole Ant. Terminals	FM	92 MC	K	Adjust for max. sensitivity, the inductance of FM.RF. coil "K" by forming.
Repeat steps 8 and 9 until no further improvement in sensitivity is noted.							
10	98 MC	FM dummy antenna	Dipole Ant. Terminals	FM	98 MC	L & M	See Note 5.
11	AM-RF Gen. 1400 KC	200 mmf	BC Ant. Term.	AM	1400 KC	N	See Note 6.
12	AM-RF Gen. 1400 KC	200 mmf	BC Ant. Term. and ground	AM	1400 KC	P & Q	Note 6. Adj. for max. reading on output meter.

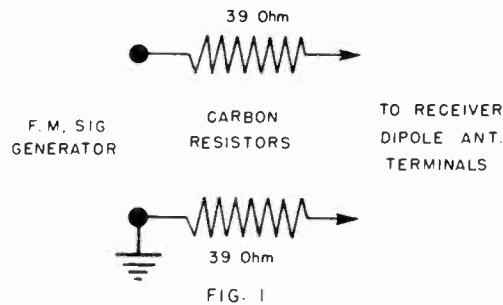
**DESCRIPTION**

**TYPE:** Nine tube, two-band superheterodyne.  
**FREQUENCY RANGE:** Standard Broadcast Band:  
 540 to 1600 kc. (Selector switch at AM position).  
**FREQUENCY MODULATION BAND:** 88 to 108 mc.  
 Channels 201 to 300.  
 (Selector switch at FM position).

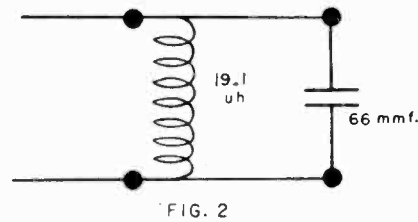
**INTERMEDIATE FREQUENCY:** AM Band:  
 455 kc. FM Band: 10.7 mc.  
**POWER SUPPLY:** 60 cycle a. c.  
**VOLTAGE RATING:** 105-125 volts.  
**POWER CONSUMPTION:** 90 watts.  
 20 watts additional for record changer.  
**POWER OUTPUT:** 7 watts maximum.

MODELS 9-204,  
9-205MCROSLY DIV.  
AVCO MFG. CORP.  
ALIGNMENT CHART I NOTES (SCOPE METHOD)

1. Align for peak on output meter.
2. Connect two 100,000 ohm resistors in series and connect these resistors from the No. 2 lug of the 6AL5 to the chassis. Connect an electronic voltmeter from the center of these resistors to the shielded lead junction of the 39,000 ohm resistor (75) and the .002 mfd. condenser, (33). Adjust the ratio detector transformer secondary (C) for zero volts on the electronic voltmeter. Remove the two 100,000 ohm resistors.



3. Connect the electronic voltmeter across the 27,000 ohm load resistor (93) and adjust primary of core (D) of the ratio detector transformer (8) for maximum DC output.
4. Connect output of marker generator across sweep generator output. Connect CRO across the 22,000 ohm resistor (72) in the grid circuit of the second I.F. amplifier.



5. CRO connections same as note 4.
6. For dummy antenna see figure 1.
7. Rock gang condenser if necessary while making adjustment.
8. Tune in signal and adjust for greatest sensitivity by forming FM.—R.F. coil.
9. Connect CRO in series with 100,000 ohm resistor to grid (pin 4) of R.F. amplifier and chassis. Remove 7F8 oscillator tube. Connect output of marker generator across output of sweep generator. Adjust (L-M) until pattern and markers approximate figure in alignment chart.
- 9a. Shunt primary of FM antenna transformer with a 10 ohm carbon resistor and adjust (M) for maximum output. Remove shunt and place it across FM antenna transformer secondary and adjust (L) for maximum output. Remove shunt.
10. Connect BC. dummy loop (Fig. 2) across loop terminals on rear of chassis.

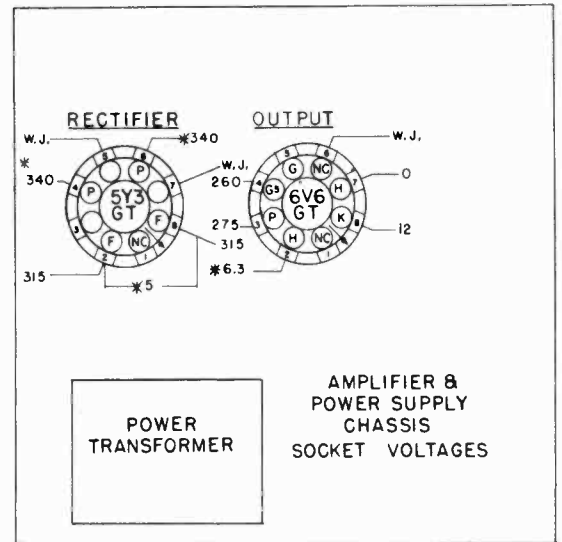
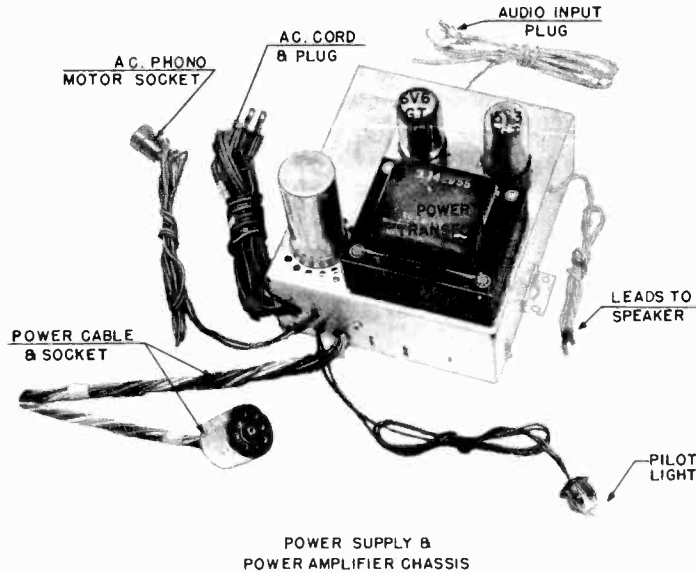
## ALIGNMENT CHART II NOTES

1. Use an unmodulated signal generator, with approximately 100,000 mv. output.
2. Connect two 100,000 ohm resistors in series and connect these resistors from the No. 2 lug of the 6AL5 to the chassis. Connect an electronic voltmeter from the center of these resistors to the shielded lead junction of the 39,000 ohm resistor (75) and the .002 mfd. condenser, (33). Adjust the ratio detector transformer secondary (C) for zero volts on the electronic voltmeter. Remove the two 100,000 ohm resistors.
3. Connect the electronic voltmeter across the 27,000 ohm load resistor (93) and adjust the primary of the core (D) of the ratio detector transformer (8) for maximum DC output.
4. Limit output of signal generator so that the reading on the electronic voltmeter will not exceed 4 volts.
5. Shunt the FM antenna transformer primary with a 10 ohm carbon resistor, and adjust the FM antenna secondary trimmer (M) for maximum output meter reading. Transfer the 10 ohm shunt to the secondary of FM antenna transformer. Adjust FM antenna primary trimmer (L) for maximum output meter reading. Remove the 10 ohm shunt resistor.
6. Connect the BC dummy loop antenna across the loop terminals on the rear of the chassis (see Figure 2,

CROSLY DIV.  
AVCO MFG. CORP.  
SOCKET VOLTAGE NOTES

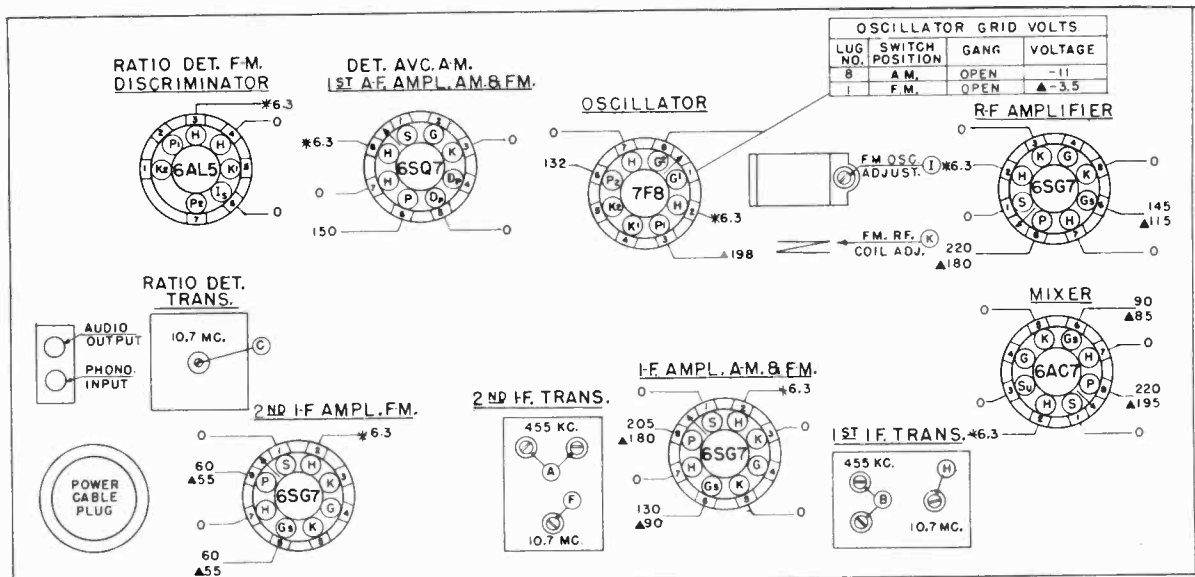
MODELS 9-204,  
9-205M

1. Bottom view of Sockets.
2. Voltage measured from Socket Lug to Chassis with an Electronic Voltmeter.
3. Voltage measured with Switch in BC position except where marked with delta(Δ)
4. Δ = Selector Switch in F.M. position.
5. W.J.=Wiring Junction.  
N.C.=No Connection.  
\*=A.C. Voltage.
6. All Voltages taken at Nominal Operating Voltage 117 V., 60 cycles.
7. Socket Voltage Tolerance ± 10%.



TOP VIEW—MODELS 9-204, 9-205M  
POWER SUPPLY AND AMPLIFIER CHASSIS,

RECEIVER SOCKET VOLTAGE CHART



MODELS 9-204,  
9-205M

CROSLEY DIV.  
AVCO MFG. CORP.  
ALIGNMENT PROCEDURE

1. This receiver has been aligned at the factory for best performance, and no attempt should be made to re-align it unless the proper test equipment is available.
2. Turn the tuning condenser to full mesh, against stop, and set the dial pointer at the edge of the clear section of the dial, left of "55."
3. Connect an output meter across the voice coil of the speaker (3.2 ohms).
4. Turn the volume control knob to maximum clockwise position and adjust the signal generator output to produce a noticeable output meter reading. Keep the signal generator output as low as possible to prevent excessive AVC action in the receiver.
5. Feed an R.F. amplitude modulated signal modulated 30% at 400 cycle to the receiver as indicated in the alignment procedure chart. Connect signal generator ground terminal to the chassis of the receiver. When F.M. generator is used, a 30% modulated signal is equal to a deviation of 22.5 kc.
6. Tone control is to be set for maximum treble response.
7. When aligning the broadcast band, the build-in loop antenna or a suitable dummy antenna, consisting of a coil with 19.1 u h. inductance shunted with a 66 mmf. capacitor must be used.
8. While aligning the set, the shorting link on the antenna terminal strip should be removed. After alignment replace the link, unless an external antenna is to be used.

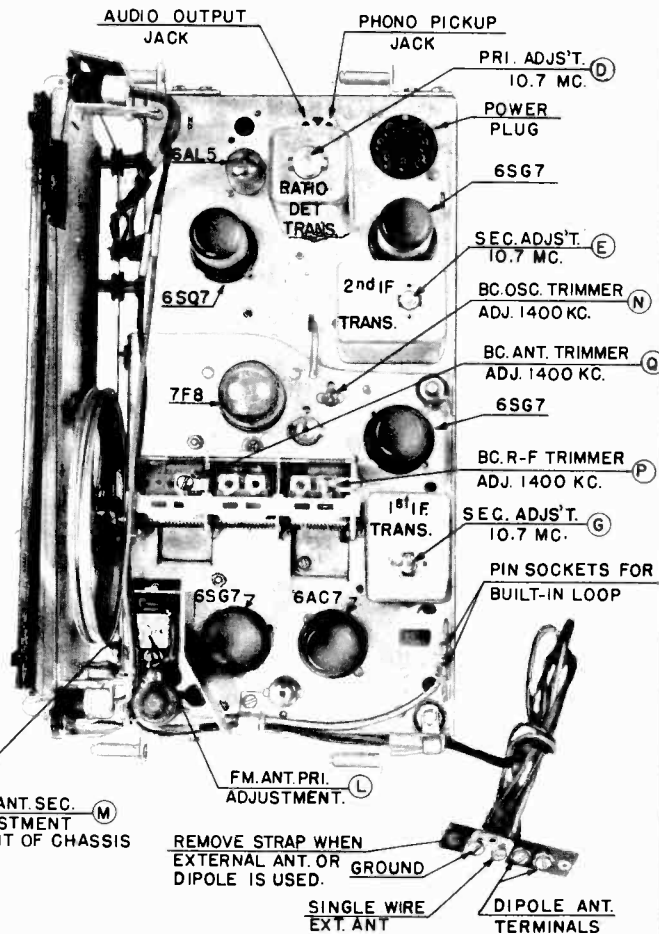
Cross index between frequency calibrations in megacycles  
on the dial and channel numbers follow:

MEGACYCLES TO CHANNEL NUMBERS

Frequency in Megacycles	Channel No.
87.9	200
88.9	205
89.9	210
90.9	215
91.9	220
92.9	225
93.9	230
94.9	235
95.9	240
96.9	245
97.9	250
98.9	255
99.9	260
100.9	265
101.9	270
102.9	275
103.9	280
104.9	285
105.9	290
106.9	295
107.9	300

To find the frequency in megacycles for CHANNEL NUMBERS between those given above, add .2 megacycle for every whole number added to the CHANNEL NUMBER; for example channel 204 would be 88.7 megacycles and 251 would be 98.1 megacycles.

CHASSIS TOP VIEW



CROSLEY DIV.  
AVCO MFG. CORP.MODELS 9-204,  
9-205M

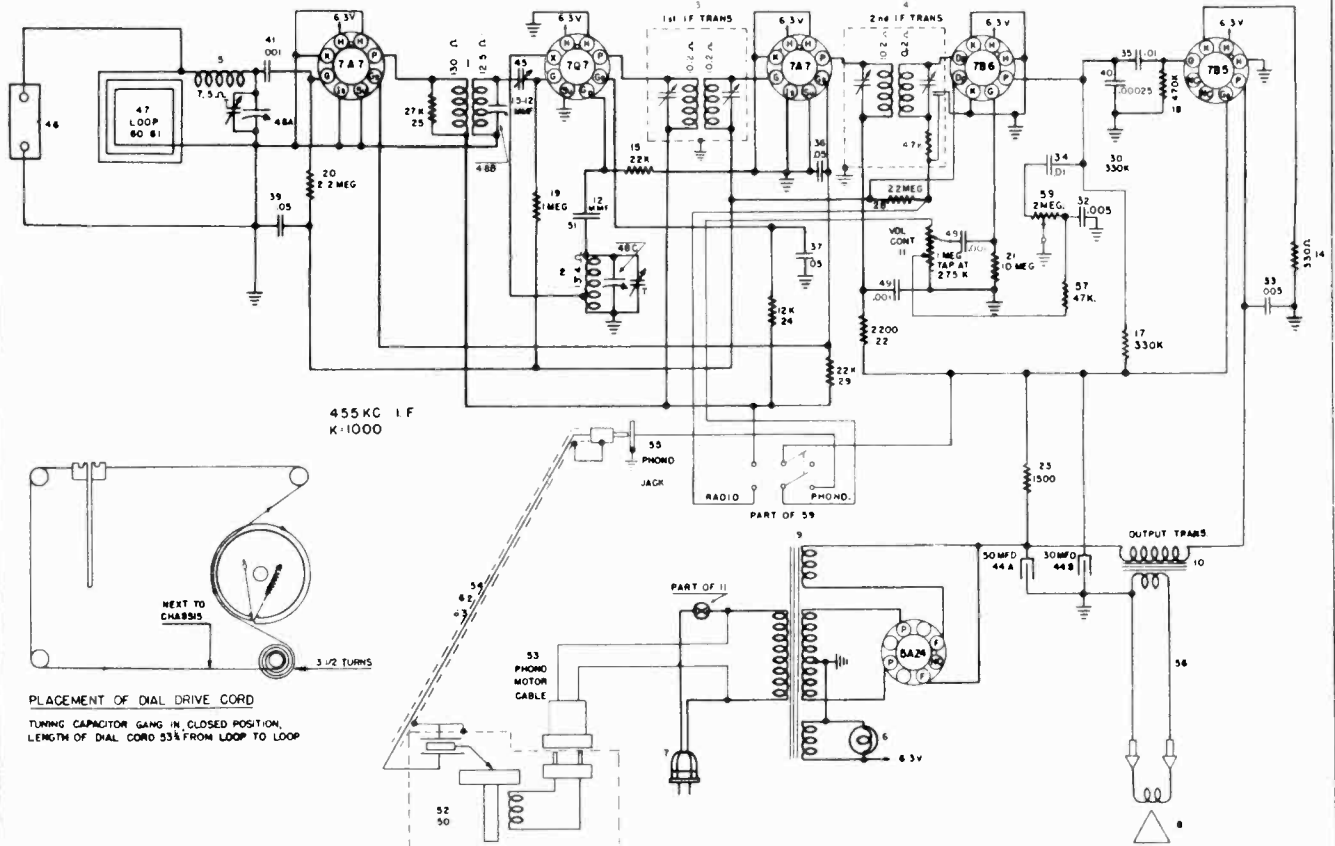
Item No.	Part Number	Description	Item No.	Part Number	Description
1	143784	Coil, Antenna (F.M.)	55	39001-87	Condenser, .25 mfd., 600 v., Paper
2	143267	Coil, Antenna Loading (B.C.)	56	137727-8	Condenser, 1000 mmf., 300 v., Ceramic
3	143402	Coil, R.F. (B.C.)	57	137727-8	Condenser, 1000 mmf., 300 v., Ceramic
4	143646	Coil, R.F. (F.M.);	58	137727-38	Condenser, .005 mfd., 500 v., Ceramic
5	143945	Coil, Osc. (B.C.)	59	137727-38	Condenser, .005 mfd., 500 v., Ceramic
6	143090	Transformer, 1st I. F.	60	142958	Condenser, 4 mfd., 50 v., Elect.
7	143105	Transformer, 2nd I.F.	61A	143089	Condenser, 40 mfd., 450 v. )
8	143378	Transformer, Ratio Det.	61B		Condenser, 20 mfd., 450 v. ) Four
9	143305	Coil Assy., Osc. (F.M.)	61C		Condenser, 10 mfd., 450 v. ) Section
10	143752	Coil, Choke	61D		Condenser, 20 mfd., 25 v. ) Elect.
11	143837	Coil, Choke	62	143062	Condenser, 30 mfd., 450 v., Elect.
13	143934	Coil, Coke R.F. (Heater)	63	39373-92	Resistor, 1.0 Megohm, ½ w.
14	143934	Coil, Coke R.F. (Heater)	64	39373-71	Resistor, 68,000 ohms, ½ w.
15A	142848	Condenser, Variable	65	39373-170	Resistor, 22,000 ohms, 1 w.
15B		Condenser, Variable	67	39373-92	Resistor, 1.0 Megohm, ½ w.
15C		Condenser, Variable	68	39373-75	Resistor, 120,000 ohms, ½ w.
15D		Condenser, Variable	69	39373-65	Resistor, 39,000 ohms, ½ w.
16	136327-43	Condenser, Trimmer	70	39373-40	Resistor, 2,200 ohms, ½ w.
17	143014	Condenser, Trimmer	71	39373-67	Resistor, 47,000 ohms, ½ w.
18	137727-12	Condenser, 120 mmf., 300 v., Ceramic	72	39373-60	Resistor, 22,000 ohms, ½ w.
19	137727-31	Condenser, 47 mmf., 300 v., Ceramic	73	39373-21	Resistor, 270 ohms, ½ w.
20	39001-11	Condenser, .005 mfd., 600 v., Paper	74	39373-65	Resistor, 39,000 ohms, ½ w.
21	137727-45	Condenser, 56 mmf., 500 v., Ceramic	75	39373-65	Resistor, 39,000 ohms, ½ w.
22	137398-5	Condenser, 3.3 mmf., 500 v., Ceramic	76	39373-94	Resistor, 1.5 Megohm, ½ w.
23	137727-73	Condenser, 40 mmf., 500 v., Ceramic	77	39373-74	Resistor, 100,000 ohms, ½ w.
24	137727-20	Condenser, 91 mmf., 300 v., Ceramic	78	39373-33	Resistor, 1,000 ohms, ½ w.
25	137727-25	Condenser, 100 mmf., 500 v., Ceramic	79	39373-71	Resistor, 68,000 ohms, ½ w.
26	39001-11	Condenser, .005 mfd., 600 v., Paper	80	39373-19	Resistor, 220 ohms, ½ w.
27	39001-11	Condenser, .005 mfd., 600 v., Paper	82	39373-74	Resistor, 100,000 ohms, ½ w.
28	39001-11	Condenser, .005 mfd., 600 v., Paper	83	39373-170	Resistor, 22,000 ohms, 1 w.
29	39001-13	Condenser, .01 mfd., 600 v., Paper	84	39373-40	Resistor, 2,200 ohms, ½ w.
30	137727-8	Condenser, 1000 mmf., 300 v., Paper	85	39373-92	Resistor, 1.0 Megohm, ½ w.
31	137727-8	Condenser, 1000 mmf., 300 v., Ceramic	86	39373-67	Resistor, 47,000 ohms, ½ w.
32	39001-80	Condenser, .02 mfd., 600 v., Paper	87	39373-87	Resistor, 470 000 ohms, ½ w.
33	39001-74	Condenser, .002 mfd., 600 v., Paper	88	39373-71	Resistor, 68,000 ohms, ½ w.
34	137727-8	Condenser, 1000 mmf., 3000 v., Paper	89	39373-107	Resistor, 10 0 Megohms, ½ w.
35	39001-13	Condenser, .01 mfd., 600 v., Paper	90	39373-92	Resistor, 1.0 Megohm, ½ w.
36	39001-13	Condenser, .01 mfd., 600 v., Paper	91	39373-3	Resistor, 15 ohms, ½ w.
37	137727-53	Condenser, 33 mmf., 500 v., Ceramic	92	39373-174	Resistor, 33,000 ohms, 1 w.
38	137727-53	Condenser, 33 mmf., 500 v., Ceramic	93	39373-62	Resistor, 27 000 ohms, ½ w.
39	39001-11	Condenser, .005 mfd., 600 v., Paper	94	39373-80	Resistor, 220,000 ohms, ½ w.
40	39001-13	Condenser, .01 mfd., 600 v., Paper	95	39373-19	Resistor, 220 ohms, ½ w.
41	137727-31	Condenser, 47 mfd., 300 v., Ceramic	96	39373-87	Resistor, 470,000 ohms, ½ w.
42	137727-8	Condenser, 1000 mmf., 300 v., Ceramic	97	39373-131	Resistor, 270 ohms, 1 w.
43	137727-79	Condenser, 5 mmf., 500 v., Ceramic	98	39373-253	Resistor, 1,000 ohms, 2 w.
44	39001-17	Condenser, .05 mfd., 600 v., Paper	99A	137021	Resistor, 700 ohms, (Wire Wound)
45	39001-13	Condenser, .01 mfd., 600 v., Paper	99B		Resistor, 700 ohms, (Wire Wound 4 w.)
46	143686-1	Condenser, 50 mmf., 500 v., Ceramic	100	39368-19	Cont., Vol., (2.5 Meg., Tap 750 k ohms)
47	39001-11	Condenser, .005 mfd., 600 v., Paper		39370-2	Shaft, volume control (knurled)
48	39001-11	Condenser, .005 mfd., 600 v., Paper			
49	39001-11	Condenser, .005 mfd., 600 v., Paper			
50	39001-80	Condenser, .02 mfd., 600 v., Paper			
51	143686-1	Condenser, 50 mmf., 500 v., Ceramic			
52	39001-13	Condenser, .01 mfd., 600 v., Paper			
53	137727-8	Condenser, 1000 mmf., 300 v., Ceramic			
54	39001-11	Condenser, .005 mfd., 600 v., Paper			

MODELS 9-204,  
9-205MCROSLLEY DIV.  
AVCO MFG. CORP.

Item No.	Part Number	Description	Item No.	Part Number	Description
101A	39368-22	Control, Tone (3 megohm)		136470	Socket, Tube, Octal
	39370-2	Shaft, Tone Control (knurled)		143146	Socket, Tube, Min.
101B	39369-1	Switch, Power		136565-25	Socket, Dial Light
102A	142969	Switch, Band Change / Two		137148	Spacer
102B		Switch, Band Change \ Section		51752	Spring, Dial Drive Cord
103	138131-2	Transformer, Output		46065	Shock Mount, Sub-Chassis Mtg.
104	135104	Transformer, Power		139040	Shock Mount, Sub-Chassis Mtg.
105	142918	Plug, Power		143552	Strip, Dial Pointer
106	143742	Plug and Cable Assy., Power		134916	Washer, Spring (Dial Drive Shaft)
107	143775	Cable Assy., Antenna		135038-37	Terminal Strip, One Lug
108	143404	Terminal Strip, Loop Antenna		135038-12	Terminal Strip, Two Lug
109	143807	Antenna Loop (9-205-M)		135038-13	Terminal Strip, Three Lug
111A	143126	Socket, Phono / Two		135038-17	Terminal Strip, Four Lug
111B		Socket, Audio Input \ Hole			
112	139727-4	Cable, Phono Motor			
113	132300-2	Cable and Plug Assy., Power			
114	138762-5	Speaker			
115	39001-11	Condenser, .005 mfd., 600 v., Paper	143653		<b>CABINET PARTS</b>
116	143513	Record Changer (W-148)	143654		<b>MODEL 9-204</b>
117	137727-8	Condenser, 1000 mmf., 300 v., Ceramic	143485		Bracket (R.H.), Radio Bin
118	137727-8	Condenser, 1000 mmf., 300 v., Ceramic	143486		Bracket (L.H.), Radio Bin
119	137727-79	Condenser, 5 mmf., 500 v., Ceramic	144048		Bumper (Rubber), Door
120	137727-43	Condenser, 15 mmf., 500 v., Ceramic	144053		Bumper (Rubber), Radio Bin
121	137398-6	Condenser, 4.7 mmf., 500 v. Ceramic	144052		Drawer Frame Assembly
122	39001-80	Condenser, .02 mfd., 600 v., Paper	144054		Door, Center
123	143686-2	Condenser, 33 mmf., 500 v., Ceramic	144055		Door, (Right), Record Compartment
124	143818	Shielded Lead Assy., Phono	144055		Grille, Metal
125	144527	Antenna Loop (9-204)	144055		Grille, Cloth
126	48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	144051		Hinge, Door
127	48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	144057		Leg and Base Assembly
128	48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	144049		Panels (Front), Drawer and Radio Bin
129	143768	Shielded Lead Assy., Audio Input	143856		Panel, Radio Dial
133	39373-19	Resistor, 220 ohms, 1/2 w.	144050		Pull (Handle), Drawer and Radio Bin
	143729	Background Assy., Dial	142912		Pull, Record Compartment Door
	142756	Blade Assy., F.M. Osc. Tuning	143478		Slides (1pair), Drawer
	139477-1	Button, Loop (With Shoulder)	144056		Speaker Baffle.
	139477-1	Button, Loop (without Shoulder)	139319		Strike and Catch Assy., Door
	144045	Cabinet (9-204)			
	143847	Cabinet (9-205 M)			
	134220	Cotter, External			
	136853	Cushion (Rubber), Dial Mtg.			
	136201	Clip, Dial Glass			
	144168	Dial, Calibrated			
	143464	Escutcheon, Dial			
	39012-85	Iron Core, Ratio Det. Transformer			
	39012-84	Iron Core, 1st I.F.			
	39012-84	Iron Core, 2nd I.F.			
	138576-6	Knob			
	143778	Knob (Band Switch)			
	45580	Mounting Rubber (Speaker)			
	136111	Mount, Rubber (Chassis)			
	143769	Pointer, Dial			
	143453	Pulley and Hub, Variable Condenser			
	136979	Pulley, Dial Drive Idler			
	51071	Ring, Retaining (Dial Drive Shaft)			
	39220-30CP	Screw, Chassis Mtg.			
	39220-38CP	Screw, Sub-Chassis Mtg.			
	143455	Shaft, Dial Drive			
	39232-2	Socket, Tube, Octal			
			143859		<b>CABINET PARTS</b>
			143653		<b>MODEL 9-205M</b>
			143654		Baffle, Speaker
			143654		Bracket, R.H., Radio Bin
			143846		Bracket, L.H., Radio Bin
			143485		Bumper, Rubber, Radio Bin
			142973		Bumper, Rubber, Door
			143857		Button, Indicator
			143487		Doors (matched pair), Record Compartment
			143855		Doors (matched pair), Radio
			143509		Frame Assy. only, Record Changer Drawer
			143912		Grille Cloth
			143860		Hinge, Record Compartment Door
			143858		Leg and Base Assy.
			143856		Panels (matched pair) Drawer and Radio Bin
			143334		Panel, Radio Dial
			143887		Pull, Radio Dial
			142912		Pull, Radio Bin
			143478		Pull, Record Storage Compartment
			143913		Slide (one set), Record Changer
			139319 S.B.		Spring, Radio Bin
					Strike and Catch Assy.

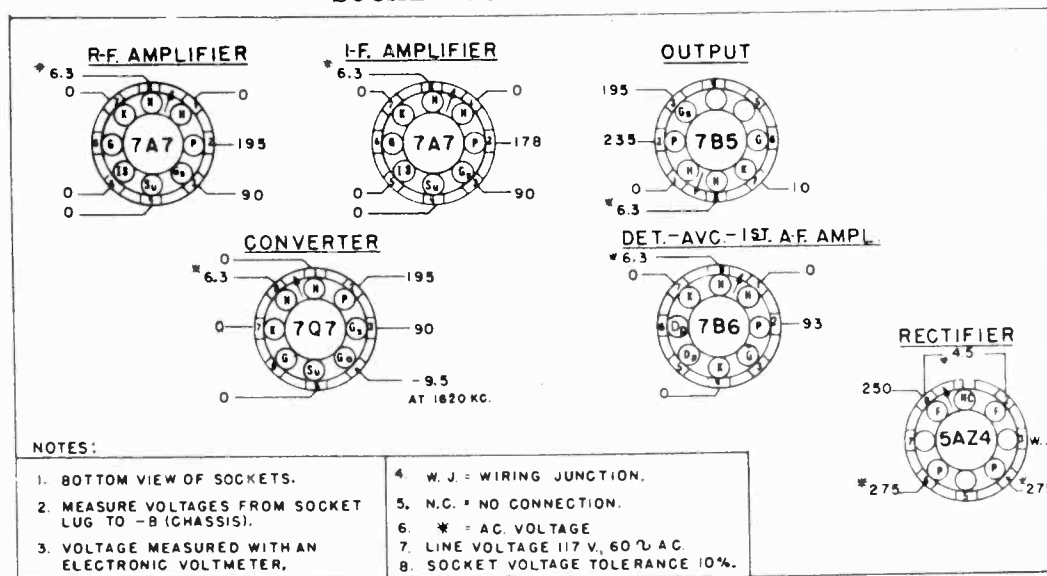
CROSLY DIV.  
AVCO MFG. CORP.

MODELS 9-209,  
9-212M



SCHMATIC DIAGRAM—MODELS 9-209, 9-212M

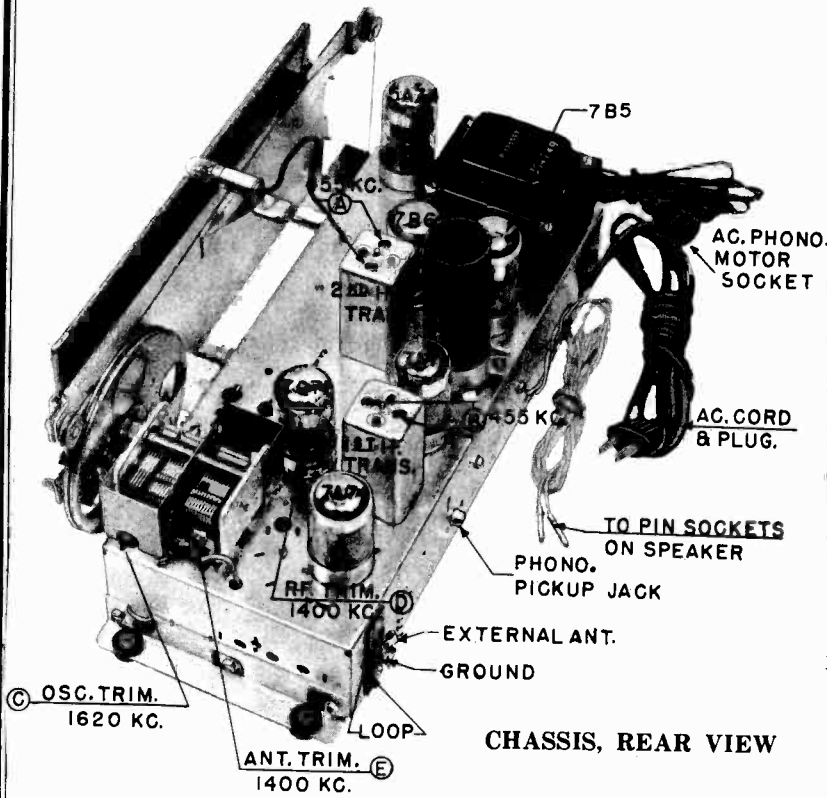
SOCKET VOLTAGE CHART





MODELS 9-209,  
9-212M

CROSLLEY DIV.  
AVCO MFG. CORP.



Model 9-209 (Walnut)—Model 9-212M (Mahogany)

CHASSIS, REAR VIEW

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the low frequency end of the dial scale.
2. Turn the selector switch to radio position (extreme left).
3. Connect the output meter across the speaker voice coil.
4. The r.f. signal input from the signal generator should be connected through a condenser as indicated in the alignment chart. Connect the signal generator ground to the receiver chassis.
5. Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
6. Loop antenna must remain connected at all times or replaced by dummy antenna consisting of a coil with 17.6 uh inductance shunted with a 53 mmf. condenser. See Fig. 1.

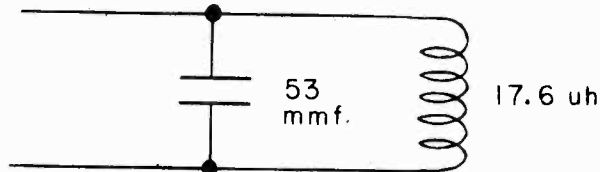


Fig. 1

Alignment Sequence	Signal Generator Output			Position of Tuning Dial or Var. Cond.	Adjust for Maximum Output
	Frequency in KC	In Series with	To		
1	455	.05 mfd.	Pin 6 7Q7	open	A & B
2	1620	15 mmf.	Top Ant. Clip	open 1620	C
3	1400	15 mmf.	Top Ant. Clip	1400	D
4	1400	15 mmf.	Top Ant. Clip	1400	E
5	1400	15 mmf.	Top Ant. Clip	1400	Rock var. cond. and repeat 3 & 4

**CROSLEY DIV. MODELS 9-209, 9-212M**  
**AVCO MFG. CORP.**  
**REPLACEMENT PARTS LIST—MODELS 9-209, 9-212M**

Figures in first column correspond to figures in Schematic Diagram

ITEM No.	Part Number	Description	No. ITEM	Part Number	Description
1	AW-13780C	Coil, R. F.	45	W-132267-1	Condenser, Trimmer
2	AW-137724	Coil, Oscillator	46	AB-138584	Terminal Board
3	AC-137933	Transformer, 1st. I. F.	47	AW-144064	Loop Antenna
4	AC-137934	Transformer, 2nd. I. F.	48A	B-137972	Condenser, Variable } Three
5	AW-139604	Coil, Antenna Loading	48B		Condenser, Variable } Section
6	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	48C		Condenser, Variable } Assy.
7	C-132300-1	Cable and Plug Assy., Power	49	39001-7	Condenser, .001 mfd., 600 v., paper
8	138762-5	Speaker	51	C-137727-52	Condenser, 12 mmf., 500 v., ceramic
9	135102	Transformer, Power	52	D-144489	Record Changer
10	138131-2	Transformer, Output	53	B-139727-6	Cable and Plus Assy., Phono Motor
11	39368-18	Control, Volume (1 meg., Tap at 300,000 ohm)	54	AW-143818	Cable & Plug Assy., (Shielded), Phono
	39369-1	Switch, power	55	W-136998	Jack, Phono
	39370-2	Shaft, Volume Control (plug-in)	56	AW-143361	Cable and Pins, Speaker
14	39373-23	Resistor, 330 ohm, ½ w.	57	39373-67	Resistor, 47,000 ohms, ½ w.
15	39373-60	Resistor, 22,000 ohm, ½ w.	59	B-144346	Control, Tone (2 Megohm) & Radio-Phono Switch
17	39373-84	Resistor, 330,000 ohm, ½ w.			
18	39373-87	Resistor, 470,000 ohm, ½ w.		AB-143417	Background Assy., Dial
19	39373-92	Resistor, 1 megohm, ½ w.		W-139477-1	Button, Loop Ant. Mtg. (4 required)
20	39373-97	Resistor, 2.2 megohm, ½ w.		W-139477-2	Button, Loop Ant. Mtg. (1 required)
21	39373-107	Resistor, 10 megohm, ½ w.		R-144134	Cabinet (9-209)
22	39373-40	Resistor, 2200 ohm, ½ w.		R-144182	Cabinet (9-212 M)
23	39372-7	Resistor, 1500 ohm, 10 w.		W-136201	Clip, Dial Glass
24	39373-165	Resistor, 12,000 ohm, 1 w.		C-143384	Dial Glass
25	39373-62	Resistor, 27,000 ohm, ½ w.		C-144785	Escutcheon
28	39373-97	Resistor, 2.2 megohm, ½ w.		W-134055	Grommet, Var. Cond. Mtg.
29	39373-60	Resistor, 22,000 ohm, ½ w.		B-144349	Knob
32	39001-11	Condenser, .005 mfd., 600 v., paper		B-143407	Pointer, Dial
33	39001-11	Condenser, .005 mfd., 600 v., paper		W-137939-1	Pulley, Dial Drive Idler
34	39001-13	Condenser, .01 mfd., 600 v., paper		W-51071	Ring, Drive Shaft retaining
35	39001-13	Condenser, .01 mfd., 600 v., paper		W-45580	Rubber Mtg., Speaker
36	39001-17	Condenser, .05 mfd., 600 v., paper		W-144498	Screw, Escutcheon Mtg.
37	39001-17	Condenser, .05 mfd., 600 v., paper		B-135075-5	Shaft, Dial Drive
39	39001-17	Condenser, .05 mfd., 600 v., paper		39441	Socket, Tube
40	39001-73	Condenser, .00025 mfd., 600 v., paper		D-136565-16	Socket, Dial Light
41	39001-7	Condenser, .001 mfd., 600 v., paper		W-51752	Spring, Dial Drive Cord
42	39001-13	Condenser, .01 mfd., 600 v., paper		W-138568	Strip, Dial Pointer
44A	B-136596	Cond'r., 50 mfd., 300 v. } Two section		W-134916	Washer, Spring (Drive Shaft)
44B		Cond'r., 30 mfd., 300 v. } Elect. Filter			

**REPLACEMENT CABINET PARTS—MODEL 9-209**

144152	Baffle, Speaker	137266	Hinge, Door
143485	Bumper (Rubber), Doors	144143	Panels (Front), Drawer and Radio Door
139319-SB	Catch & Strike Assy., Doors		Pull (Handle), Drawer and Radio Door
B-144173	Decal	144151	Slides, Drawer
144150	Drawer Frame Assy.,		
144169	Grille Cloth	143478	

**REPLACEMENT CABINET PARTS—MODEL 9-212M**

144183	Panels (Front), Drawer and Radio Door
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**DESCRIPTION**

**TYPE:** Six-tube, single band, superheterodyne.

**FREQUENCY RANGE:** 540 to 1600 kc.

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** 60 cycle a. c. only

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 50 watts nominal.

Phono 20 watts additional.

**POWER OUTPUT:** 2.5 watts maximum

**TUBE COMPLEMENT:**

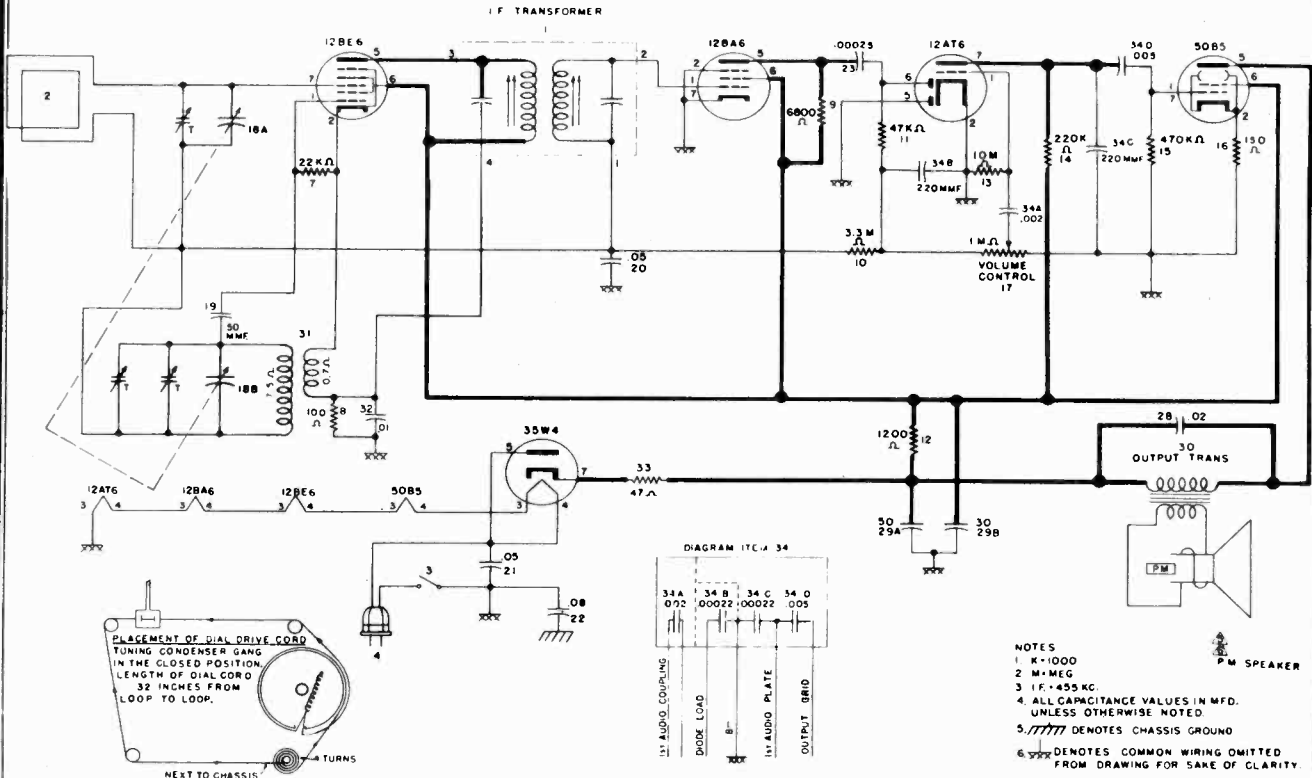
TYPE	FUNCTION
7A7	R. F. Amplifier
7Q7	Converter
7A7	I. F. Amplifier
7B6	Detector, AVC, 1st A. F. Amplifier
7B5	A. F. Power Output
5AZ4	Rectifier

**DIAL BULB:** Type 47, 6.3 volts, .15 amp.

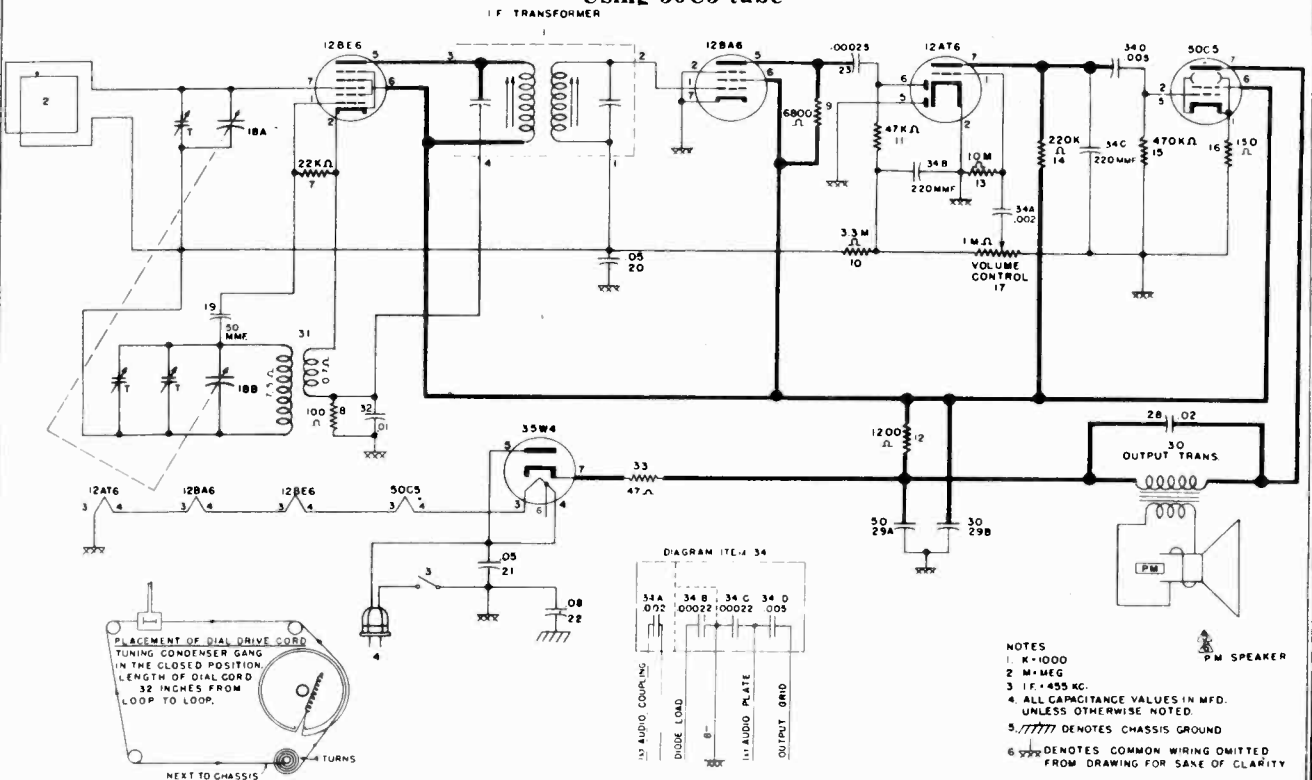
MODELS 9-121,  
9-122W

CROSLEY DIV.  
AVCO MFG. CORP.

**SCHEMATIC DIAGRAM**  
Using 50B5 tube



**SCHEMATIC DIAGRAM**  
Using 50C5 tube



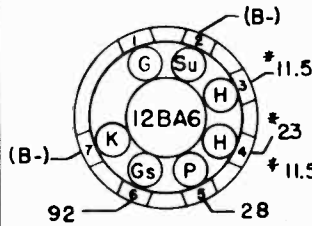
CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 9-121,  
9-122W

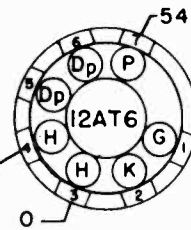
NOTES:

1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGE MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-. (PIN 7 ON 12BA6)
3. LINE VOLTAGE 117V. 60 CYCLE.
4. NC=NO CONNECTION.
5. W. J.= WIRING JUNCTION.
6. \* = AC VOLTAGE.
7. SOCKET VOLTAGE TOLERANCE. 10 %

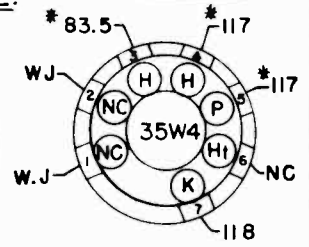
IF AMPLIFIER



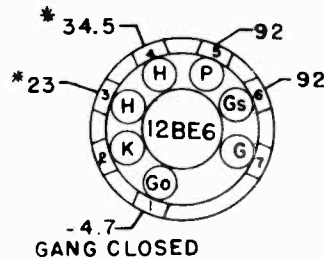
DET. AVC.  
1ST AUDIO AMPL.



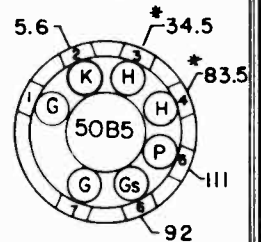
RECTIFIER



CONVERTER



OUTPUT



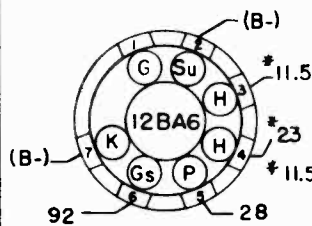
SOCKET VOLTAGE CHART

Using 50B5 tube

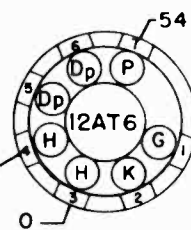
NOTES:

1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGE MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-. (PIN 7 ON 12BA6)
3. LINE VOLTAGE 117V. 60 CYCLE.
4. NC=NO CONNECTION.
5. W. J.= WIRING JUNCTION.
6. \* = AC VOLTAGE.
7. SOCKET VOLTAGE TOLERANCE. 10 %

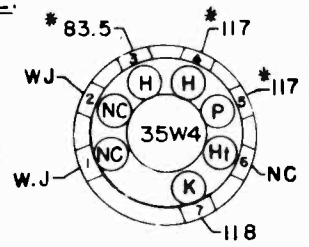
IF AMPLIFIER



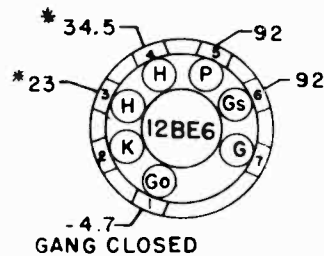
DET. AVC.  
1ST AUDIO AMPL.



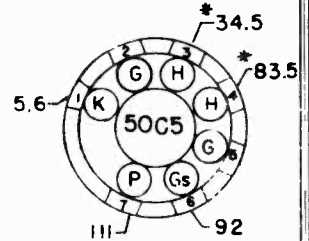
RECTIFIER



CONVERTER



OUTPUT



SOCKET VOLTAGE CHART

Using 50C5 tube

When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

Reversing the position of the power plug when alternating current is used may reduce power hum.

*Under no circumstances should a ground be connected to this receiver.*

MODELS 9-121,  
9-122W

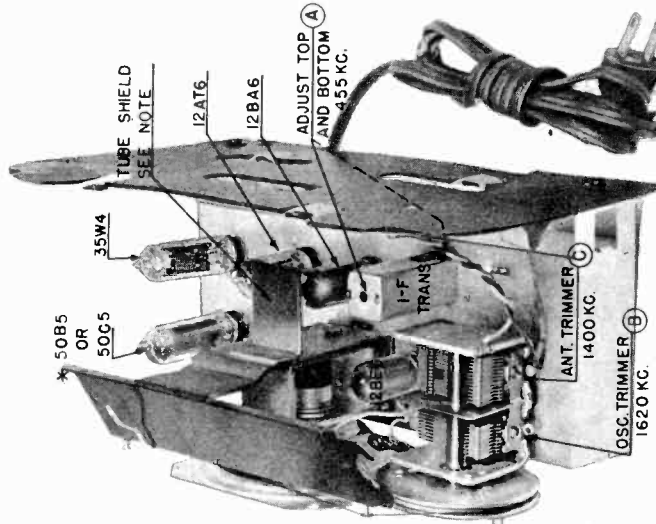
CROSLEY DIV.  
AVCO MFG. CORP.

**ALIGNMENT PROCEDURE**

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r. f. signal input from the signal generator should be connected to the external antenna clip. Connect the signal generator ground through a 0.1 mfd. condenser to B—(pin 7 on 12BA6 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

**ALIGNMENT CHART**

Alignment Sequence	Signal Generator Output		Position of Dial Pointer or Tuning Gang	Adjust for Maximum Output
	Frequency in kc.	In Series with		
1	455	.1 mfd. To Loop	Open	A
2	1620	.1 mfd. To Loop	1620	B
3	1400	.1 mfd. To Loop	1400	C



\* NOTE:  
RECEIVERS WITH TUBE SHIELD USE 50B5 TUBE  
RECEIVERS WITHOUT TUBE SHIELD USE 50C5 TUBE

**CHASSIS TOP VIEW**

**Note:**  
On some receivers, the tube shield that is attached to the speaker bracket is omitted.

CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 9-121,  
9-122W



9-121



9-122W

**DESCRIPTION**

**TYPE:** Five-tube, single band, Superheterodyne.

**FREQUENCY RANGE:** 540 to 1600 kc.

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** a.c.—d.c.

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 35 watts.

**POWER OUTPUT:** 1.5 watts maximum.

**TUBE COMPLEMENT:**

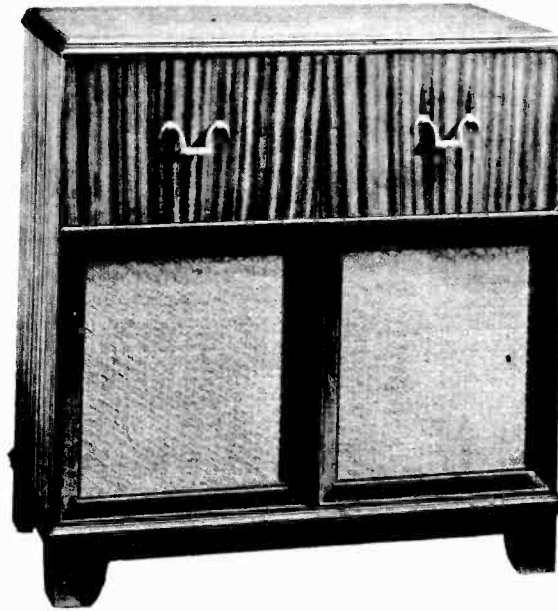
Type	Function
12BE6	Mixer
12BA6	I. F. Amplifier
12AT6	Detector, AVC, 1st A. F. Amplifier
50B5 or 50C5	A. F. Power Output
35W4	Rectifier

Item No.	Part No.	Description	Item No.	Part No.	Description
1	C-139919	Transformer, I.F.	30	138131-1	Transformer, Output
2	AC-144328	Loop Antenna & Back Assy.	31	AW-144325	Coil Assy., Oscillator
3	39369-1	Switch, Power	32	39001-13	Condenser, .01 mfd., 600 v., paper
4	C-142769-1	Cable & Plug Assy., Power	33	39373-119	Resistor, 47 ohm, 1 w.
5	139631	Speaker	34A	B-144675-1	Condenser, .002 mfd., 500 v.
7	39373-60	Resistor, 22,000 ohm, 1/2 w.	34B		Condenser, .00022 mfd., 500 v. } Four
8	39373-14	Resistor, 100 ohm, 1/2 w.	34C		Condenser, .00022 mfd., 500 v. } Sect.
9	39373-161	Resistor, 6,800 ohm, 1 w.	34D		Condenser, .005 mfd., 500 v.
10	39373-100	Resistor, 3.3 megohm, 1/2 w.		AB-143318	Background & Bracket Assy., Dial
11	39373-67	Resistor, 47,000 ohm, 1/2 w.		R-144015-2	Cabinet (9-121)
12	39373-144	Resistor, 1200 ohm, 1 w.		AW-143988	Cabinet (9-122W)
13	39373-107	Resistor, 10 megohm, 1/2 w.		W-139784	Clip, Spring (Cabinet Back)
14	39373-80	Resistor, 220,000 ohm, 1/2 w.		C-144175	Dial Glass
15	39373-87	Resistor, 470,000 ohm, 1/2 w.		B-138540-1	Knob (9-121)
16	39373-16	Resistor, 150 ohm, 1/2 w.		B-138540-2	Knob (9-122W)
17	39368-14	Control, Volume (1 meg.)		B-144162	Pointer, Dial
18A	AC-137073-15	Condenser, Variable } Two Section		W-51071	Ring, Retaining (Drive Shaft)
18B		Condenser, Variable } Two Section		39220-28CP	Screw, Chassis Mtg.
19	C-137727-21	Condenser, 50 mmf., 500 v. ceramic		B-135075-2	Shaft, Dial Drive
20	39001-17	Condenser, .05 mfd., 600 v., paper		W-46065	Shock Mount (Rubber), Var. Cond. Mtg.
21	39001-17	Condenser, .05 mfd., 600 v., paper		39462-1	Socket, Tube
22	39001-19	Condenser, .1 mfd., 600 v., paper		W-51752	Spring, Dial Drive Cord
23	39001-73	Condenser, .00025 mfd., 600 v., paper		B-144135	Spring, Retaining (Dial Glass)
28	39001-80	Condenser, .02 mfd., 600 v., paper		W-134916	Washer, Spring (Drive Shaft)
29A	B-136770	Condenser, 50 mfd., 150 v. } Two Section			
29B		Condenser, 30 mfd., 150 v. } Elect. Filter			

MODELS 9-209L,  
9-212ML, 9-213B

CROSLEY DIV.  
AVCO MFG. CORP.

REVISED MODELS  
9-209, 9-212M



Models 9-209, 9-209L (Walnut)

Models 9-212M, 9-212ML (Mahogany)

Model 9-213B (Blond)

**DESCRIPTION**

**TYPE:** Six-tube, single band, superheterodyne.

**FREQUENCY RANGE:** 540 to 1600 kc.

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** 60 cycle a. c. only

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 50 watts nominal.

Phono 20 watts additional.

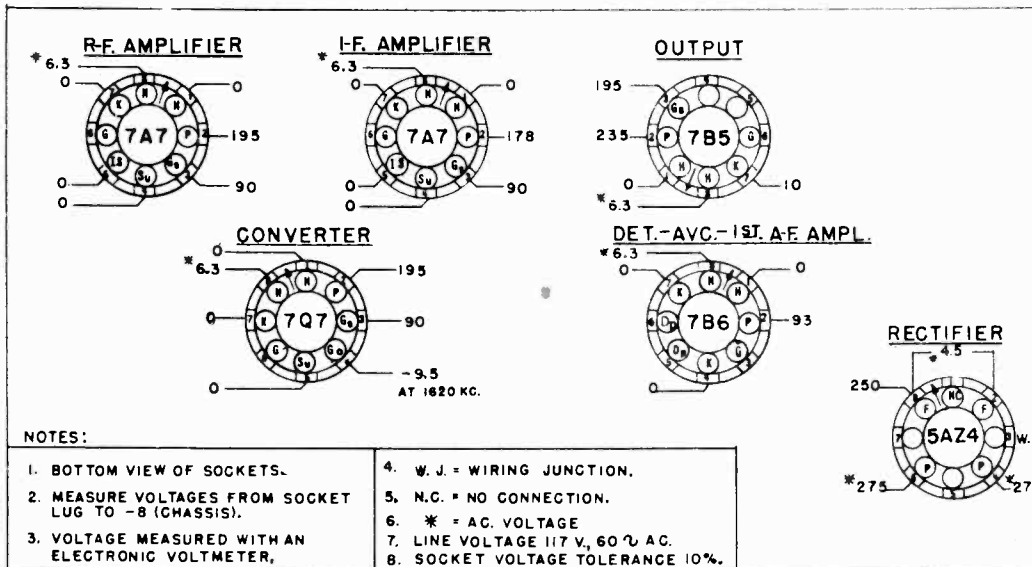
**POWER OUTPUT:** 2.5 watts maximum

**TUBE COMPLEMENT:**

TYPE	FUNCTION
7A7	R. F. Amplifier
7Q7	Converter
7A7	I. F. Amplifier
7B6	Detector, AVC, 1st A. F. Amplifier
7B5	A. F. Power Output
5AZ4	Rectifier

**DIAL BULB:** Type 47, 6.3 volts, .15 amp.

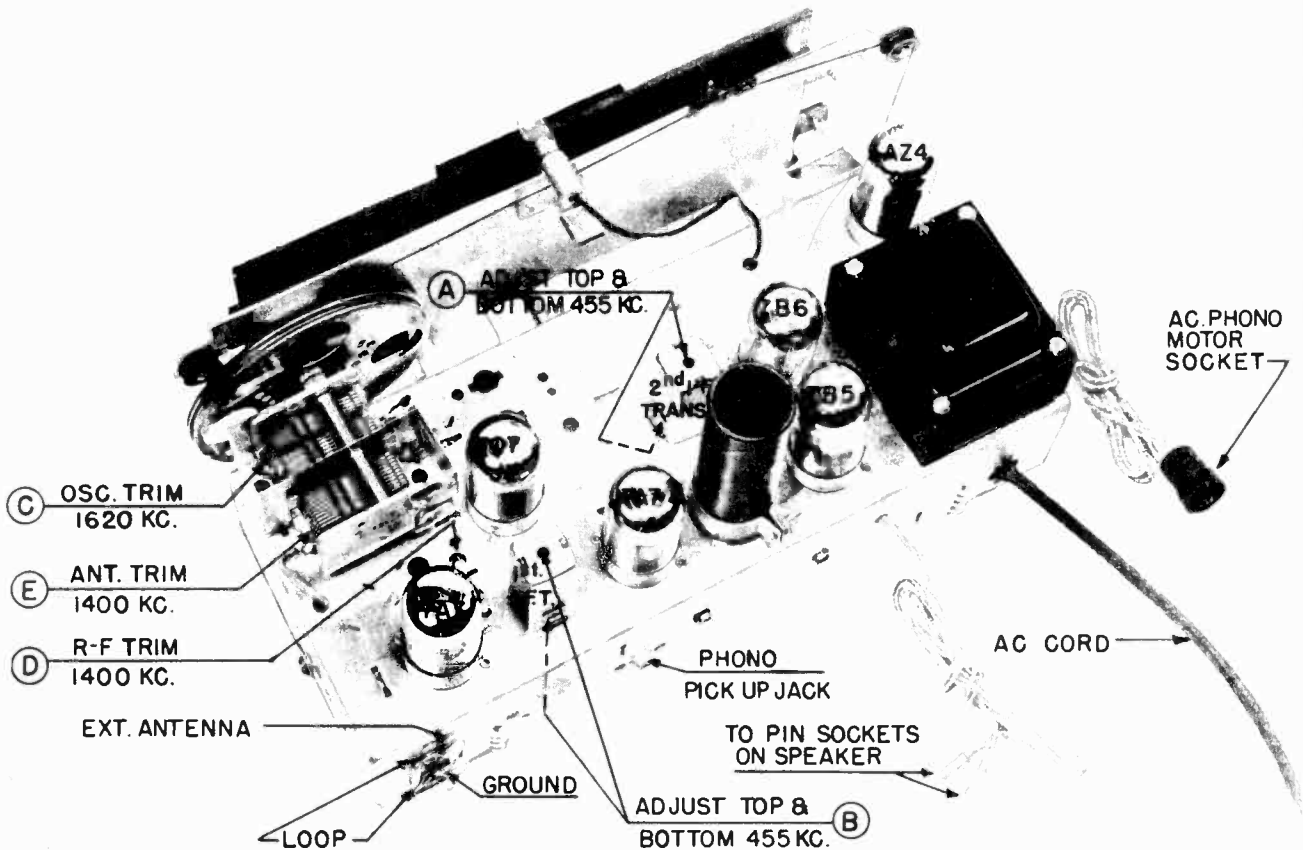
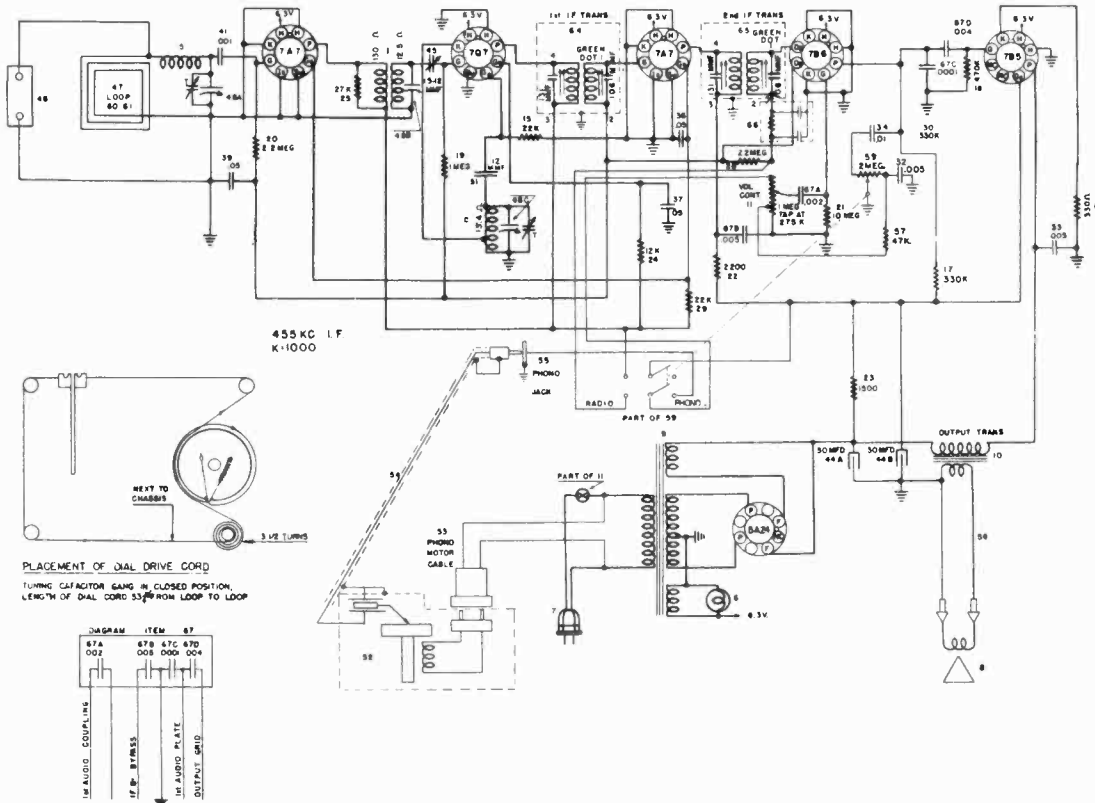
**SOCKET VOLTAGE CHART**



REVISED MODELS  
9-209, 9-212M

CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 9-209L,  
9-212NL, 9-213B





**ALIGNMENT PROCEDURE**

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the low frequency end of the dial scale.
2. Turn the selector switch to radio position (extreme left).
3. Connect the output meter across the speaker voice coil.
4. The r.f. signal input from the signal generator should be connected through a condenser as indicated in the alignment chart. Connect the signal generator ground to the receiver chassis.
5. Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
6. Loop antenna must remain connected at all times or replaced by dummy antenna consisting of a coil with 17.6 uH inductance shunted with a 53 mmf. condenser. See Fig. 1.

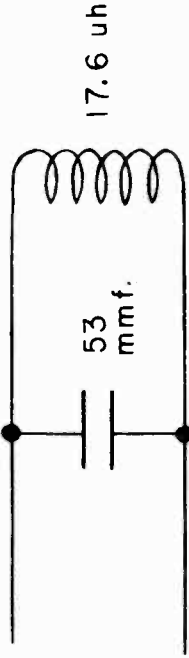


Fig. 1

**ALIGNMENT CHART**

Alignment adjustments are shown in "CHASSIS, REAR VIEW," page 2.

Alignment Sequence	Signal Generator Output			Position of Tuning Dial or Var. Cond.	Adjust for Maximum Output
	Frequency in KC	In Series with	To		
1	455	.05 mfd.	Pin 6 7Q7	open	A & B
2	1620	15 mmf.	Top Ant. Clip	open 1620	C
3	1400	15 mmf.	Top Ant. Clip	1400	D
4	1400	15 mmf.	Top Ant. Clip	1400	E
5	1400	15 mmf.	Top Ant. Clip	1400	Rock var. cond. and repeat 3 & 4

CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 9-209L,  
9-212ML, 9-213B  
REVISED MODELS  
9-209, 9-209M

REPLACEMENT PARTS LIST

Figures in first column correspond to figures in Schematic Diagram.

Item No.	Part Number	Description	Item No.	Part Number	Description
1	AW-137800	Coil, R. F.	51	C-137727-52	Capacitor, 12 mmf., 500 v., ceramic
2	AW-137724	Coil, Oscillator	52	D-144489	Record Changer (9-209, 9-212M, 9-213B)
5	AW-139604	Coil, Antenna Loading (7.5 ohm)	52	D-145113	Record Changer (9-209L, 9-212ML)
*5	AW-145468	Coil, Antenna Loading (8.6 ohm)	53	B-139727-6	Cable and Plug Assy., Phono Motor
6	138437-1	Bulb (Dial), Type 47, 6.3 v., .15 amp.	54	AW-143496	Cable & Plug Assy., (Shielded), Phono
7	C-132300-1	Cable and Plug Assy., Power	55	W-136998	Jack, Phono
8	138762-5	Speaker	56	AW-143361	Cable and Pins, Speaker
9	135102	Transformer, Power	57	39373-67	Resistor, 47,000 ohms, 1/2 w.
10	138131-2	Transformer, Output	59	B-144346	Control, Tone (2 Megohm) & Radio-Phono Switch
11	39368-18	Control, Volume (1 meg., Tap at 300,000 ohm)	64	AC-139919-3	Transformer, 1st. I. F.
	39369-1	Switch, power	65	AC-139919-3	Transformer, 2nd. I. F.
	39370-2	Shaft, Volume Control (plug-in)	66	B-142951-2	Capacitor-Resistor
14	39373-23	Resistor, 330 ohm, 1/2 w.	67A	B-144675-8	Capacitor, .002 mfd., 500 v. } Four
15	39373-60	Resistor, 22,000 ohm, 1/2 w.	67B		Capacitor, .005 mfd., 500 v. } Sect.
17	39373-84	Resistor, 330,000 ohm, 1/2 w.	67C		Capacitor, 100 mmf., 500 v. }
18	39373-87	Resistor, 470,000 ohm, 1/2 w.	67D		Capacitor, .004 mfd., 500 v. }
19	39373-92	Resistor, 1 megohm, 1/2 w.		AB-143417	Background Assy., Dial
20	39373-97	Resistor, 2.2 megohm, 1/2 w.		W-139477-1	Button, Loop Ant. Mtg. (4 required)
21	39373-107	Resistor, 10 megohm, 1/2 w.		W-139477-2	Button, Loop Ant. Mtg. (1 required)
22	39373-40	Resistor, 2200 ohm, 1/2 w.		R-144134	Cabinet (9-209, 9-209L)
23	39372-7	Resistor, 1500 ohm, 10 w.		R-144182	Cabinet (9-212M, 9-212ML)
24	39374-214	Resistor, 12,000 ohm, 1 w.		R-144806	Cabinet (9-213B)
25	39373-62	Resistor, 27,000 ohm, 1/2 w.		W-136201	Clip, Dial Glass
28	39373-97	Resistor, 2.2 megohm, 1/2 w.		C-143384	Dial Glass
29	39373-60	Resistor, 22,000 ohm, 1/2 w.		C-144785	Escutcheon
32	39001-11	Capacitor, .005 mfd., 600 v., paper		W-134055	Grommet, Var. Capacitor Mtg.
33	39001-11	Capacitor, .005 mfd., 600 v., paper		B-144349-1	Knob (9-209, 9-212M, 9-209L, 9-212ML)
34	39001-13	Capacitor, .01 mfd., 600 v., paper		B-144349-2	Knob (9-213B)
36	39001-17	Capacitor, .05 mfd., 600 v., paper		B-143407	Pointer, Dial
37	39001-17	Capacitor, .05 mfd., 600 v., paper		W-137939-1	Pulley, Dial Drive Idler
39	39001-17	Capacitor, .05 mfd., 600 v., paper		W-51071	Ring, Drive Shaft retaining
41	39001-7	Capacitor, .001 mfd., 600 v., paper		W-45580	Rubber Mtg., Speaker
44A	B-136596	Cap., 50 mfd., 300 v. {Two Section		W-144498	Screw, Escutcheon Mtg.
44B		Cap., 30 mfd., 300 v. {Elect. Filter		B-135075-5	Shaft, Dial Drive
45	W-132267-1	Capacitor, Trimmer		39441	Socket, Tube
46	AB-138584	Terminal Board		D-136565-16	Socket, Dial Light
47	AW-144042	Loop Antenna		W-51752	Spring, Dial Drive Cord
**47	39426-2	Loop Antenna (No. 22 wire, 144" long)		W-138568	Strip, Dial Pointer
48A	B-137972	Capacitor, Variable } Three		W-134916	Washer, Spring (Drive Shaft)
48B		Capacitor, Variable } Section			
48C		Capacitor, Variable }			

REPLACEMENT CABINET PARTS

144152	Baffle, Speaker	144149	Panels (Front), Drawer and Radio Door (9-209, 9-209L)
143485	Bumper (Rubber), Door	144183	Panels (Front), Drawer and Radio Door (9-212M, 9-212ML)
139319-SB	Catch & Strike Assy., Door	144812	Panels (Front), Drawer and Radio Door (9-213B)
B-144173	Decal	144151	Pull (Handle), Drawer and Radio Door (9-209, 9-212M, 9-209L, 9-212ML)
144150	Drawer Frame Assy. (9-209, 9-209L, 9-212M, 9-212ML)	144809	Pull (Handle), Drawer and Radio Door (9-213B)
144810	Drawer Frame Assy. (9-213B)	143478	Slides, Drawer
144169	Grille Cloth (9-209, 9-209L, 9-212M, 9-212ML)		
144811	Grille Cloth (9-213B)		
145173	Hinge, Door		

\*Used on sets equipped with single turn wire loop antenna (Item 47) mounted with staples.

\*\*Used on sets equipped with loading coil AW-145468 (Item 5).

MODELS 9-214M,  
9-214ML

CROSLLEY DIV.  
AVCO MFG. CORP.



#### DESCRIPTION

**TYPE:** Eleven tube, two-band superheterodyne.

**FREQUENCY RANGE:** Standard Broadcast

Band:  
540 to 1600 kc. (Selector switch at AM position).

**FREQUENCY MODULATION BAND:** 88 to  
108 mc.

Channels 201 to 300.

(Selector switch at FM position).

**INTERMEDIATE FREQUENCY:** AM Band:

455 kc. FM Band: 10.7 mc.

**POWER SUPPLY:** 60 cycle a. c.

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 90 watts.

20 watts additional for record changer.

**POWER OUTPUT:** 7 watts maximum.

#### TUBE COMPLEMENT

Type	Function
6SG7	R.F. Amplifier
7F8	Oscillator
6AC7	Mixer
6SG7	I.F. Amp., A.M. & F.M.
6SG7	2nd I.F. Amp. F.M.
6AL5	Ratio Det. F.M.
6SQ7	Det.—AVC. A.M. 1st A.F. Amp., A.M. & F.M.
6SQ7	Phase Inverter
6V6GT/G (2)	Push Pull Output
5Y3GT/G	Rectifier

**DIAL BULBS:** Type 47, 6.3 v., .15 amp.

#### NOTE:

Model 9-214M uses Model 700F automatic record changer (Part No. 144489).

See service sheet No. 364 for service information and parts list.

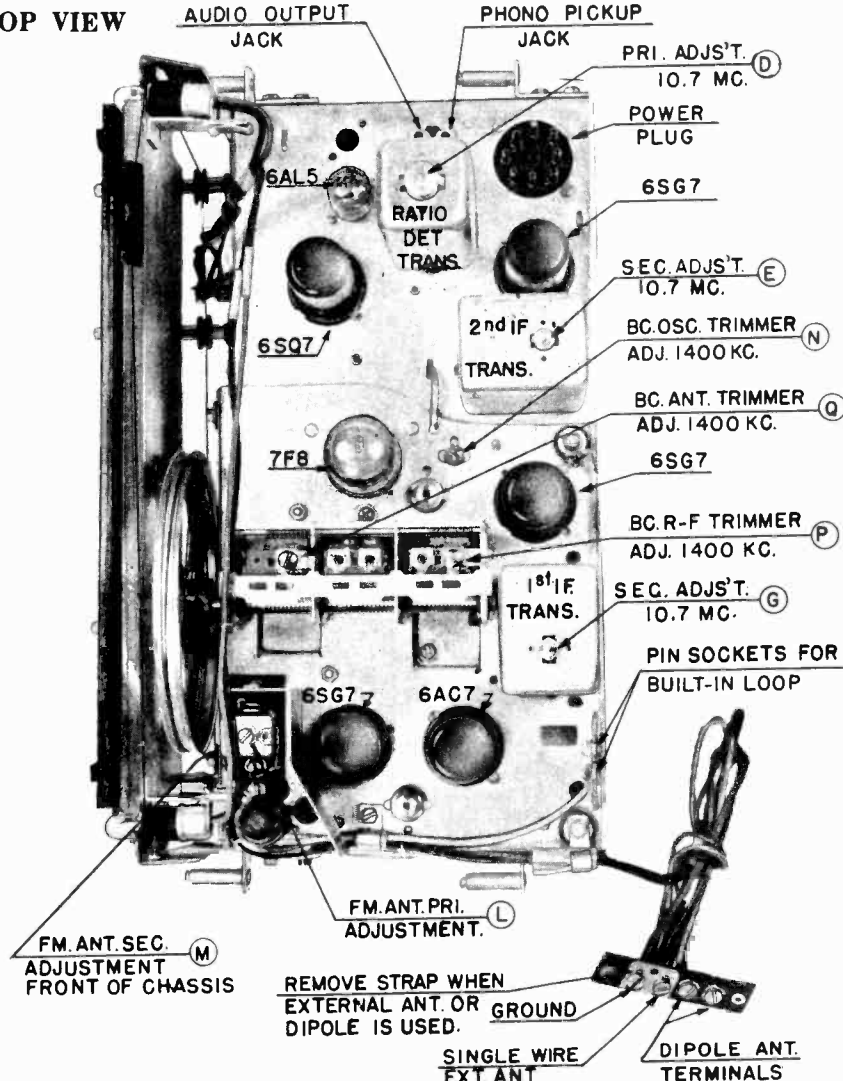
Model 9-214ML uses Model 700FLP automatic record changer (Part No. 145113).

See Service Bulletin No. 375 for service information and parts list.

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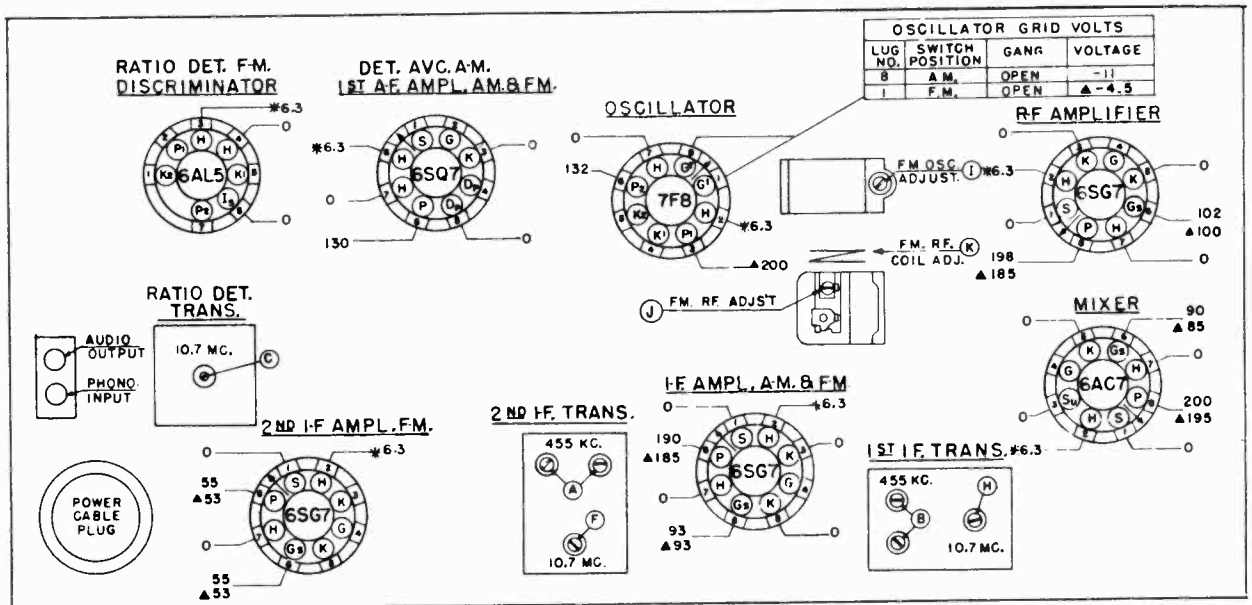
MODELS 9-214M,  
9-214ML

CHASSIS TOP VIEW



RECEIVER SOCKET VOLTAGE CHART

(See Socket Voltage Notes, Page 3)

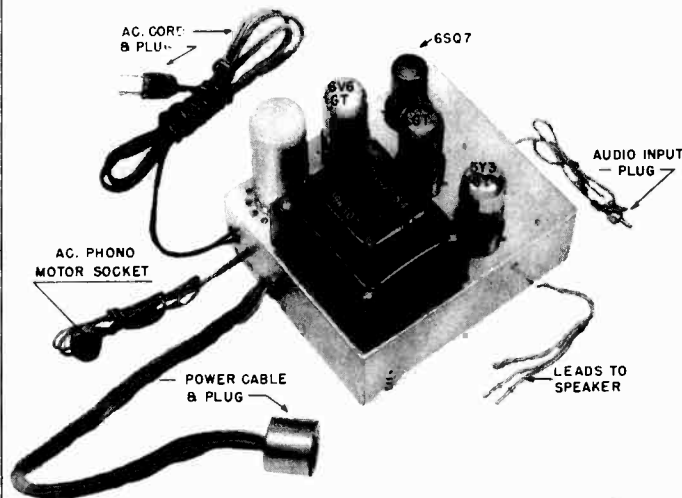


MODELS 9-214M.  
9-214ML

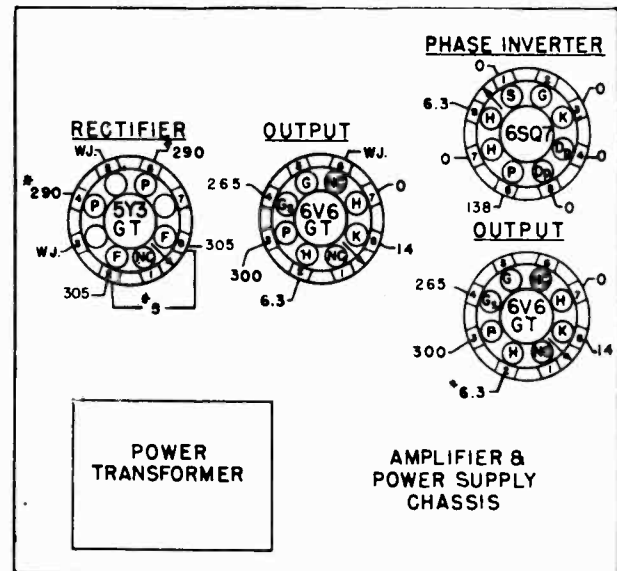
CROSLLEY DIV.  
AVCO MFG. CORP.

### SOCKET VOLTAGE NOTES

1. Bottom view of Sockets.
2. Voltage measured from Socket Lug to Chassis with an Electronic Voltmeter.
3. Voltage measured with Switch in BC position except where marked with delta(Δ)
4. Δ = Selector Switch in F.M. position.
5. W.J. = Wiring Junction.  
N.C. = No Connection.  
\* = A.C. Voltage.
6. All Voltages taken at Nominal Operating Voltage 117 V., 60 cycles.
7. Socket Voltage Tolerance  $\pm 10\%$ .



TOP VIEW—MODELS 9-214M, 9-214ML  
POWER SUPPLY AND AMPLIFIER CHASSIS,



### ALIGNMENT PROCEDURE




#### NOTE:

This receiver has been aligned at the factory for best performance, and no attempt should be made to re-align it unless the proper test equipment is available.

1. Turn the tuning condenser to full mesh, against stop, and set the dial pointer at the edge of the clear section of the dial, left of "55."
2. Connect an output meter across the voice coil of the speaker (3.2 ohms).
3. Feed an R.F. amplitude modulated signal modulated 30% at 400 cycles to the receiver as indicated in the alignment procedure chart. Connect signal generator ground terminal to the chassis of the receiver. When F.M. generator is used, a 30% modulated signal is equal to a deviation of 22.5 kc.
4. Turn the volume control knob to maximum clockwise position and adjust the signal generator output to produce a noticeable output meter reading. Keep the signal generator output as low as possible to prevent excessive AVC action in the receiver.
5. Set the tone control for maximum treble response.
6. When aligning the broadcast band, the built-in loop antenna or a suitable dummy antenna, consisting of a coil with 19.1 u. h. inductance shunted with a 66 mmf. capacitor must be used.
7. While aligning the set, the shorting link on the antenna terminal strip should be removed. After alignment replace the link, unless an external antenna is to be used.

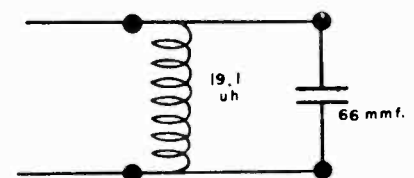
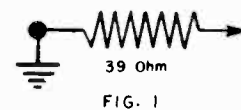
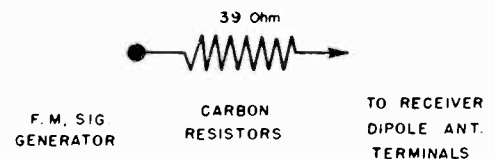
**CROSLEY DIV.**  
**AVCO MFG. CORP.**  
**ALIGNMENT CHART I (SCOPE METHOD)**

MODELS 9-214M,  
9-214ML

Alignment Sequence	Signal Gen. Output		To	Position of		Adjust	Curve	Remarks
	Frequency	In Series With		Range Switch	Tuning Dial or Tun. Cap.			
1	455 KC	.01 mfd.	1st I. F. grid	AM	Gang open	A		Note 1
2	455 KC	.01 mfd.	Stator 21 plate sect. rear of gang	AM	Gang open	B		Note 1
3	10.7 MC	1000 mmf.	2nd I. F. grid	FM	Gang closed	C	Zero Volts	Note 2
4	10.7 MC	1000 mmf.	2nd I. F. grid	FM	Gang closed	D	Max. D. C. output	Note 3
5	RF sweep 10.7 marker	1000 mmf.	1st I. F. grid	FM	Gang closed	E & F		Align for max. output & symmetry Note 4
6	RF sweep 10.7 marker	1000 mmf.	Stator 3 plate sect. rear of gang	FM	Gang closed	G & H		Align for max. output & symmetry Note 5
7	FM-RF 98MC	FM dummy antenna	Dipole Ant. Term.	FM	98MC	I	Peak	Note 6
8	104MC	FM dummy antenna	Dipole Ant. Term.	FM	104MC	J	Peak	Note 7
9	92MC	FM dummy antenna	Dipole Ant. Term.	FM	92MC	Form R. F. Coil "K"	Peak	Note 8
10	Repeat steps 8 and 9 until no further improvement in sensitivity is noted.							
11	FM sweep Gen. 92-98-104 MC markers	FM dummy antenna	Dipole Ant. Term.	FM	Gang closed	L & M		Note 9 or 9a
12	AM-RF Gen. 1400 KC	200 mmf.	BC Ant. Term. and ground	AM	1400 KC	N		Note 10
13	AM-RF Gen. 1400 KC	200 mmf.	BC Ant. Term. and ground	AM	1400 KC	P & Q		Note 1 & Note 10

**NOTES:**

1. Align for peak on output meter.
2. Connect two 100,000 ohm resistors in series and connect these resistors from the No. 2 lug of the 6AL5 tube socket to the chassis. Connect an electronic voltmeter from the center of these resistors to the shielded lead junction of the 39,000 ohm resistor (75) and the .002 mfd capacitor, (33). Adjust the ratio detector transformer secondary (C) for zero volts on the electronic voltmeter. Remove the two 100,000 ohm resistors.
3. Connect the electronic voltmeter across the 27,000 ohm load resistor (93) and adjust primary of core (D) of the ratio detector transformer (8) for maximum D. C. output.
4. Connect output of marker generator across sweep generator output. Connect CRO across the 22,000 ohm resistor (72) in the grid circuit of the second I. F. amplifier.
5. CRO connections same as note 4.
6. For dummy antenna see figure 1.
7. Rock gang capacitor if necessary while making adjustment.
8. Tune in signal and adjust for greatest sensitivity by forming FM.—R.F. coil.
9. Connect CRO in series with 100,000 ohm resistor to grid (pin 4) of R.F. amplifier and chassis. Remove 7F8 oscillator tube. Connect output of marker generator across output of sweep generator. Adjust (L-M) until pattern and markers approximate figure in alignment chart.
- 9a. Shunt primary of FM antenna transformer with a 10 ohm carbon resistor and adjust (M) for maximum output. Remove shunt and place it across FM antenna transformer secondary and adjust (L) for maximum output. Remove shunt.
10. Connect BC. dummy loop (Fig. 2) across loop terminals on rear of chassis.



MODELS 9-214M,  
9-214MLCROSLLEY DIV.  
AVCO MFG. CORP.

## ALIGNMENT CHART II

(Using output meter and electronic voltmeter)

Alignment Sequence	Signal Gen. Output		To	Position of		Adjust	Remarks
	Frequency	In Series With		Range Switch	Tuning Dial or Tun. Cap.		
1	455 KC	.01 mfd.	1st I. F. grid	AM	Gang open	A	Align for peak on output meter.
2	455 KC	.01 mfd.	Stator 21 plate sect. rear of gang	AM	Gang open	B	Align for peak on output meter.
3	10.7 MC	1000 mmf.	2nd I. F. grid	FM	Gang closed	C	Adjust for zero volts on electronic voltmeter Note 1 & 2.
4	10.7 MC	1000 mmf.	2nd I. F. grid	FM	Gang closed	D	Adjust for max. D.C. output on Elect. voltmeter Note 3.
5	10.7 MC	1000 mmf.	1st I. F. grid	FM	Gang closed	E & F	Adjust for max. D. C. output Note 4.
6	10.7 MC	1000 mmf.	Stator 3 plate sect. rear of gang	FM	Gang closed	G & H	Adjust for max. D. C. output Note 4.
Repeat steps 3 and 4, 5 and 6 if necessary.							
7	98 MC	FM dummy antenna	Dipole Ant. Terminals	FM	98 MC	I	Adjust for max. reading on output meter.
8	104 MC	FM dummy antenna	Dipole Ant. Terminals	FM	104 MC	J	Adjust for max. reading on output meter, rock gang if necessary while making adjustments.
9	92 MC	FM dummy antenna	Dipole Ant. Terminals	FM	92 MC	K	Adjust for max. sensitivity, the inductance of FM.RF. coil "K" by forming.
Repeat steps 8 and 9 until no further improvement in sensitivity is noted.							
10	98 MC	FM dummy antenna	Dipole Ant. Terminals	FM	98 MC	L & M	See Note 5.
11	AM-RF Gen. 1400 KC	200 mmf.	BC Ant. Term.	AM	1400 KC	N	See Note 6.
12	AM-RF Gen. 1400 KC	200 mmf.	BC Ant. Term. and ground	AM	1400 KC	P & Q	Note 6. Adj. for max. reading on output meter.

## NOTES:

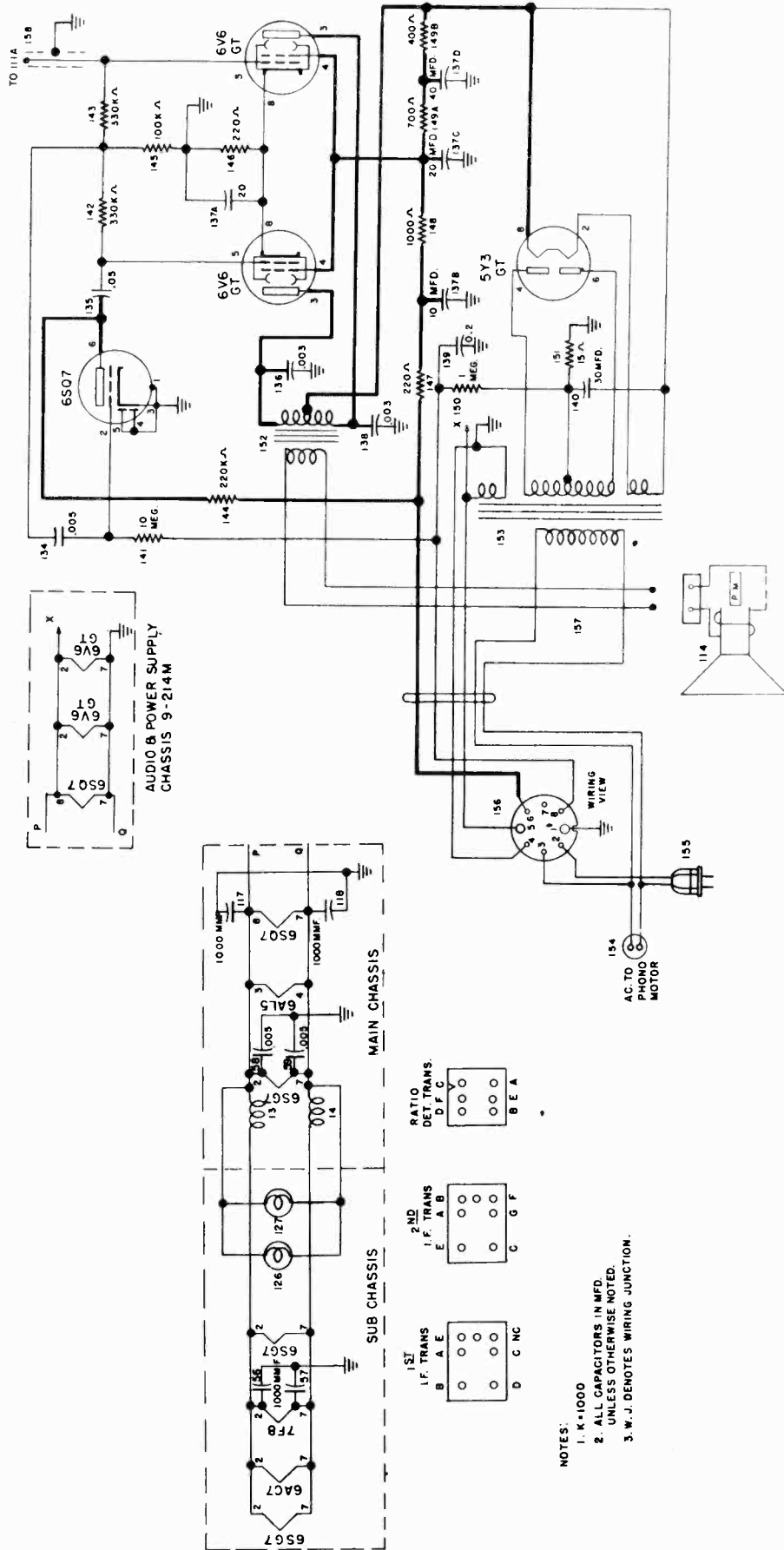
1. Use an unmodulated signal generator, with approximately 100,000 mv. output.
2. Connect two 100,000 ohm resistors in series and connect these resistors from the No. 2 lug of the 6AL5 to the chassis. Connect an electronic voltmeter from the center of these resistors to the shielded lead junction of the 39,000 ohm resistor (75) and the .002 mfd. capacitor, (33). Adjust the ratio detector transformer secondary (C) for zero volts on the electronic voltmeter. Remove the two 100,000 ohm resistors.
3. Connect the electronic voltmeter across the 27,000 ohm load resistor (93) and adjust the primary of the core (D) of the ratio detector transformer (8) for maximum D. C. output.
4. Limit output of signal generator so that the reading on the electronic voltmeter will not exceed 4 volts.
5. Shunt the FM antenna transformer primary with a 10 ohm carbon resistor, and adjust the FM antenna secondary trimmer (M) for maximum output meter reading. Transfer the 10 ohm shunt to the secondary of FM antenna transformer. Adjust FM antenna primary trimmer (L) for maximum output meter reading. Remove the 10 ohm shunt resistor.
6. Connect the BC dummy loop antenna across the loop terminals on the rear of the chassis (see Figure 2,





MODELS 9-214M,  
9-214ML

CROSLY DIV.  
AVCO MFG. CORP.



**CROSLEY DIV.**  
**AVCO MFG. CORP.**  
**REPLACEMENT PARTS LIST, MODELS—9-214M, 9-214ML**

MODELS 9-214M,  
9-214ML

Figures in first column correspond to figures in Schematic Diagram

Item No.	Part Number	Description	Item No.	Part Number	Description
1	AB-143784	Transformer, Antenna (F.M.)	83	39374-129	Resistor, 22,000 ohms, 1 w.
2	AW-143267	Coil, Antenna Loading	84	39373-40	Resistor, 2,200 ohms, 1/2 w.
3	AW-143402	Transformer, R.F. (B.C.)	85	39373-92	Resistor, 1 Megohm, 1/2 w.
4	AW-143646	Coil, R.F. (F.M.)	86	39373-67	Resistor, 47,000 ohms, 1/2 w.
5	AW-143945	Coil, Oscillator (B.C.)	87	39373-87	Resistor, 470,000 ohms, 1/2 w.
6	AC-143090	Transformer, 1st I.F.	88	39373-71	Resistor, 68,000 ohms, 1/2 w.
7	AC-143105	Transformer, 2nd I.F.	89	39373-107	Resistor, 10 Megohms, 1/2 w.
8	AC-143378	Transformer, Ratio Detector	92	39374-131	Resistor, 33,000 ohms, 1 w.
9	AC-143305	Coil, Oscillator (F.M.)	93	39374-42	Resistor, 27,000 ohms, 1/2 w.
10	AW-143752	Choke, R.F.	94	39373-80	Resistor, 220,000 ohms, 1/2 w.
11	AW-143837	Choke, R.F.	95	39373-19	Resistor, 220 ohms, 1/2 w.
13	AW-143934	Choke, R.F. Heater	100	39368-19	Control, Volume (2.5 Meg., Tap 750k ohms)
14	AW-143934	Choke, R.F. Heater		39370-2	Shaft, Volume Control (knurled)
15A	C-142848	Capacitor, Variable	101A	39368-22	Control, Tone (3 megohm)
15B		Capacitor, Variable		39370-2	Shaft, Tone Control (knurled)
15C		Capacitor, Variable	101B	39369-1	Switch, Power
15D		Capacitor, Variable	102A	B-142969	Switch, Band Change } Two
16	C-136327-43	Capacitor, Trimmer	102B		Switch, Band Change } Section
17	W-143014	Capacitor, Trimmer	105	W-142918	Plug, Power
18	C-137727-12	Capacitor, 120 mmf., 300 v., Ceramic	107	AB-143775	Cable Assy., Antenna
19	C-137727-31	Capacitor, 47 mmf., 300 v., Ceramic	108	W-143404	Contact, Loop Antenna
20	39001-11	Capacitor, .005 mfd., 600 v., Paper	111A	W-143126	Socket, Two Prong
21	C-137727-45	Capacitor, 56 mmf., 500 v., Ceramic	111B	Part of 111A	
22	W-137398-5	Capacitor, 3.3 mmf., 500 v.	114	138762-5	Speaker
23	C-137727-73	Capacitor, 40 mmf., 500 v., Ceramic	117	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic
24	C-137727-20	Capacitor, 91 mmf., 300 v., Ceramic	118	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic
25	C-137727-25	Capacitor, 100 mmf., 500 v., Ceramic	119	C-137727-79	Capacitor, 5 mmf., 500 v., Ceramic
26	39001-11	Capacitor, .005 mfd., 600 v., Paper	120	C-137727-43	Capacitor, 15 mmf., 500 v., Ceramic
27	39001-11	Capacitor, .005 mfd., 600 v., Paper	121	W-137398-6	Capacitor, 4.7 mmf., 500 v.
28	39001-11	Capacitor, .005 mfd., 600 v., Paper	122	39001-80	Capacitor, .02 mfd., 600 v., Paper
29	39001-13	Capacitor, .01 mfd., 600 v., Paper	123	B-143686-2	Capacitor, 33 mmf., 500 v.
30	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic	126	138437-1	Bulb (Dial), Type 47, 6.3 v., .15 amp.
31	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic	127	138437-1	Bulb (Dial), Type 47, 6.3 v., .15 amp.
32	39001-80	Capacitor, .02 mfd., 600 v., Paper	130	AW-144527	Loop Antenna
33	39001-74	Capacitor, .002 mfd., 600 v., Paper	134	39001-11	Capacitor, .005 mfd., 600 v., Paper
34	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic	135	39001-17	Capacitor, .05 mfd., 600 v., Paper
35	39001-13	Capacitor, .01 mfd., 600 v., Paper	136	39001-76	Capacitor, .003 mfd., 600 v., Paper
36	39001-13	Capacitor, .01 mfd., 600 v., Paper	137A	B-143089	Capacitor, 20 mfd., 25 v. } Four
37	C-137727-53	Capacitor, 33 mmf., 300 v., Ceramic	137B		Capacitor, 10 mfd., 450 v. } Section
38	C-137727-53	Capacitor, 33 mmf., 300 v., Ceramic	137C		Capacitor, 20 mfd., 450 v. } Electrolytic
39	39001-11	Capacitor, .005 mfd., 600 v., Paper	137D		Capacitor, 40 mfd., 450 v. }
40	39001-13	Capacitor, .01 mfd., 600 v., Paper	138	39001-76	Capacitor, .003 mfd., 600 v., Paper
41	C-137727-31	Capacitor, 47 mmf., 300 v., Ceramic	139	39001-87	Capacitor, .25 mfd., 600 v., Paper
42	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic	140	B-143062	Capacitor, 30 mfd., 450 v., Electrolytic
43	C-137727-79	Capacitor, 5 mmf., 500 v., Ceramic	141	39373-107	Resistor, 10 Megohms, 1/2 w.
44	39001-17	Capacitor, .05 mfd., 600 v., Paper	142	39374-55	Resistor, 330,000 ohms, 1/2 w.
45	39001-13	Capacitor, .01 mfd., 600 v., Paper	143	39374-55	Resistor, 330,000 ohms, 1/2 w.
46	B-143686-1	Capacitor, 50 mmf., 500 v., Ceramic	144	39374-53	Resistor, 220,000 ohms, 1/2 w.
47	39001-11	Capacitor, .005 mfd., 600 v., Paper	145	39374-49	Resistor, 100,000 ohms, 1/2 w.
48	39001-11	Capacitor, .005 mfd., 600 v., Paper	146	39374-193	Resistor, 220 ohms, 2 w.
49	39001-11	Capacitor, .005 mfd., 600 v., Paper	147	39373-19	Resistor, 220 ohms, 1/2 w.
50	39001-80	Capacitor, .02 mfd., 600 v., Paper	148	39374-201	Resistor, 1000 ohms, 2 w.
51	143686-1	Capacitor, 50 mmf., 500 v., Ceramic	149A	W-137021	Resistor, 700 ohms, 4 w. } Two
52	39001-13	Capacitor, .01 mfd., 600 v., Paper	149B		Resistor, 400 ohms, 4 w. } Section
53	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic	150	39373-92	Resistor, 1 Megohm, 1/2 w.
54	39001-11	Capacitor, .005 mfd., 600 v., Paper	151	39373-3	Resistor, 15 ohms, 1/2 w.
56	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic	152	B-137001	Transformer Output
57	C-137727-8	Capacitor, 1000 mmf., 300 v., Ceramic	153	135106	Transformer, Power
58	C-137727-38	Capacitor, .005 mfd., 500 v., Ceramic	154	B-139727-6	Cable, Phone Motor
59	C-137727-38	Capacitor, .005 mfd., 500 v., Ceramic	155	C-132300-2	Cable & Plug Assy., Power (AC)
60	B-142958	Capacitor, 4 mfd., 50 v., Electrolytic	156	AB-144819	Cable & Plug Assy., Power
63	39373-92	Resistor, 1 Megohm, 1/2 w.	157	AW-144823	Cable & Pins Assy., Speaker
64	39373-71	Resistor, 68,000 ohms, 1/2 w.	158	AW-144818	Shielded Lead Assy., (Audio)
65	39374-129	Resistor, 22,000 ohms, 1 w.	159	D-144489	Record Changer (700F), 9-214M
67	39373-92	Resistor, 1 Megohm, 1/2 w.	159	D-145113	Record Changer (700FLP), 9-214ML
68	39374-50	Resistor, 120,000 ohms, 1/2 w.		AB-143729	Background Assy., Dial
69	39374-44	Resistor, 39,000 ohms, 1/2 w.		W-139477-2	Button Loop Antenna (1 used)
70	39373-40	Resistor, 2,200 ohms, 1/2 w.		W-139477-1	Button, Loop Antenna (4 used)
71	39373-67	Resistor, 47,000 ohms, 1/2 w.		R-144841	Cabinet
72	39374-41	Resistor, 22,000 ohms, 1/2 w.		W-136201	Clip, Dial Glass
73	39374-18	Resistor, 270 ohms, 1/2 w.		W-134220	Cotter, External (Chassis Mtg.)
74	39374-44	Resistor, 39,000 ohms, 1/2 w.		W-136853	Cushion (Rubber), Dial Glass
75	39374-44	Resistor, 39,000 ohms, 1/2 w.		C-144768	Dial Glass
76	39373-94	Resistor, 1.5 Megohm, 1/2 w.		D-144931	Escutcheon
77	39373-74	Resistor, 100,000 ohms, 1/2 w.		39012-85	Iron Core, Ratio Det. Transformer
78	39373-33	Resistor, 1,000 ohms, 1/2 w.		39012-84	Iron Core, 1st I.F.
79	39374-47	Resistor, 68,000 ohms, 1/2 w.		39012-84	Iron Core, 2nd I.F.
80	39373-19	Resistor, 220 ohms, 1/2 w.		B-138576-6	Knob (3 used)
82	39373-74	Resistor, 100,000 ohms, 1/2 w.		B-143778	Knob (1 used)

MODELS 9-214M,  
9-214ML

CROSLEY DIV.  
AVCO MFG. CORP.

REPLACEMENT PARTS LIST, MODELS—9-214M, 9-214ML

Item No.	Part Number	Description	Item No.	Part Number	Description
	B-143769	Pointer, Dial		39232-2	Socket, Tube (6SG7, 2nd I.F. Amp., F.M.)
	AB-143453	Pulley & Hub Assy., Var. Capacitor		W-143146	Socket, Tube (6AL5, Ratio Det., F.M.)
	W-136979	Pulley, Idler (Dial Drive)		39232-10	Socket, Tube (6SQ7, Det., AVC, A.M.; 1st A.F. Amp., A.M. & F.M.)
	W-51071	Ring, Retaining (Dial Drive Shaft)		39232-6	Socket, Tube (6SQ7, Phase Inverter)
	W-211101	Ring, Tube Socket Retaining		39232-12	Socket, Tube (6V6GT, Output)
	W-136111	Rubber Mtg., Main Chassis		39232-12	Socket, Tube (6V6GT, Output)
	W-45580	Rubber Mtg., Speaker		39232-1	Socket, Tube (5Y3GT, Rectifier)
	W-143455	Shaft, Dial Drive		W-51752	Spring, Dial Drive Cord
	AW-143496	Shielded Wire Assy., Phono.		W-143913	Spring, Chassis Mtg.
	W-46055	Shock Mount, Sub Chassis Mtg.		W-144221	Spring (Hook) Chassis Mtg.
	W-139040	Shock Mount, Sub Chassis Mtg.		W-143552	Strip, Dial Pointer
	D-136565-25	Socket, Dial Light		C-135038-12	Terminal Strip (2 Lug)
	39232-10	Socket, Tube (6SG7, R.F. Amp.)		C-135038-13	Terminal Strip (3 Lug)
	39232-10	Socket, Tube (6AC7, Mixer)		C-135038-47	Terminal Strip (4 Lug)
	W-136470-2	Socket, Tube (7F8, Oscillator)		C-135038-37	Terminal Strip (1 Lug)
	39232-10	Socket, Tube (6SG7, I.F. Amp., A.M. & F.M.)		W-134916	Washer (Spring), Dial Drive Shaft

REPLACEMENT CABINET PARTS

Item No.	Part Number	Description	Item No.	Part Number	Description
	144885	Baffle, Speaker		143956	Grille Cloth
	143653	Bracket (R.H.) Radio Bin		144637	Hinge, Storage Door
	143654	Bracket (L.H.) Radio Bin		144887	Knob, Storage Door
	143846	Bumper (Rubber) Radio Bin		144883	Panels (Front), Drawer & Radio Bin
	143485	Bumper (Rubber), Door & Drawer		144886	Pull (Handle), Drawer & Radio Bin
	144900	Door, Storage Compartment		143478	Slides, Drawer (1 pair)
	144884	Drawer Frame Assy.		139819SB	Strike & Catch Assy., Door

MEGACYCLES TO CHANNEL NUMBERS

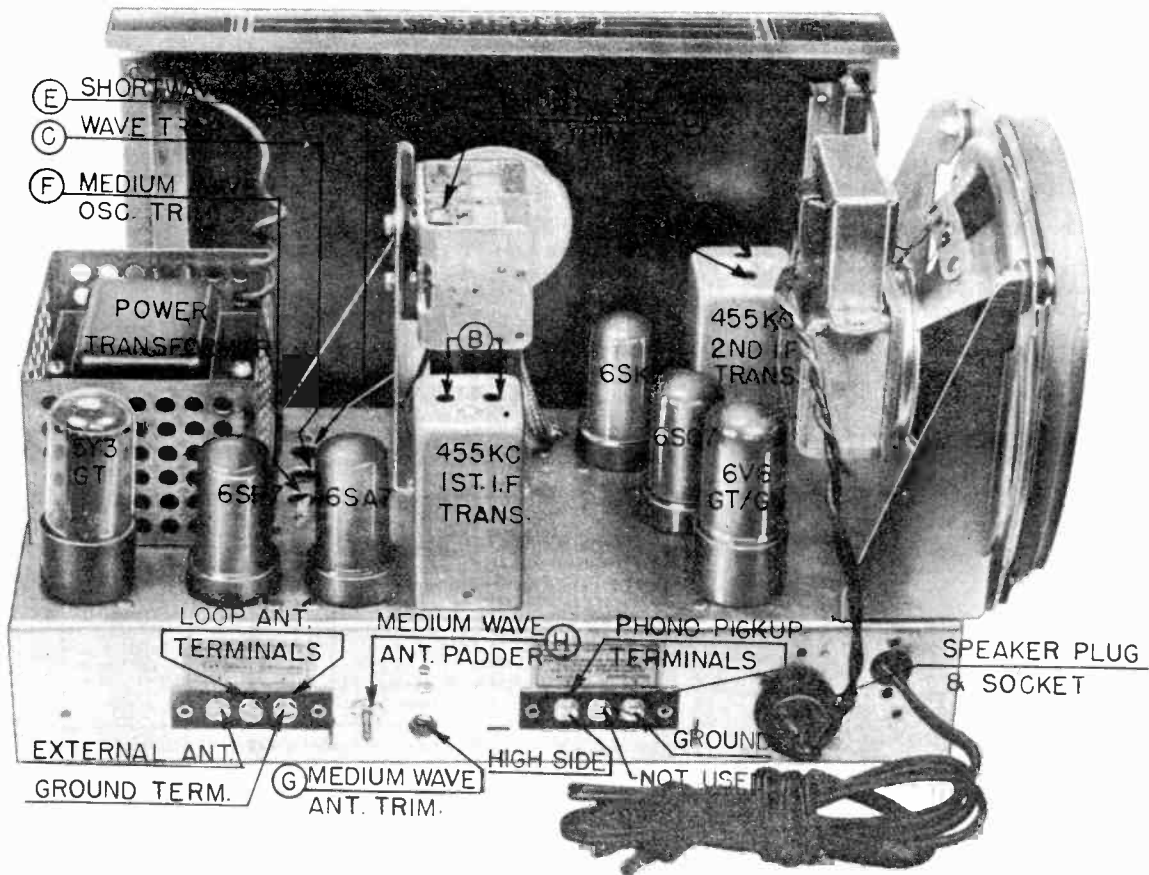
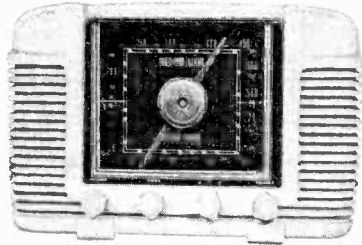
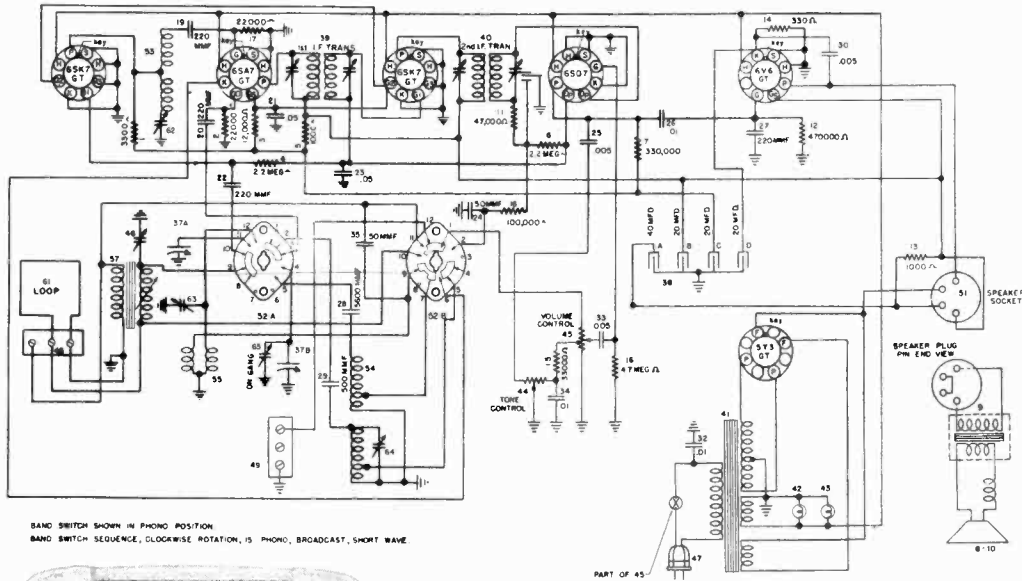
Cross index between frequency calibrations in megacycles on the dial and channel numbers follow:

Frequency in Megacycles	Channel No.	Frequency in Megacycles	Channel No.
87.9	200	98.9	255
88.9	205	99.9	260
89.9	210	100.9	265
90.9	215	101.9	270
91.9	220	102.9	275
92.9	225	103.9	280
93.9	230	104.9	285
94.9	235	105.9	290
95.9	240	106.9	295
96.9	245	107.9	300
97.9	250		

To find the frequency in megacycles for CHANNEL NUMBERS between those given above, add .2 megacycle for every whole number added to the CHANNEL NUMBER; for example channel 204 would be 88.7 megacycles and 251 would be 98.1 megacycles.

CROSLY DIV.  
AVCO MFG. CORP.

MODELS 66XTW,  
66XTW-10, 66XTW-20



CHASSIS, REAR VIEW

MODELS 66XTW,  
66XTW-10, 66XTW-20

CROSLLEY DIV.  
AVCO MFG. CORP.

ALIGNMENT PROCEDURE

1. Turn the tuning capacitor to the completely closed position against the stop, and set the dial pointer to the reference line at the end of the dial scale.
2. Turn the tone control to the high or treble position.
3. Connect the output meter across the speaker voice coil.
4. The r. f. signal input from the signal generator should be connected to the external antenna post. Connect the signal generator ground to the chassis.
5. Turn the volume control on full, and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
6. Loop antenna must be connected when making alignments.

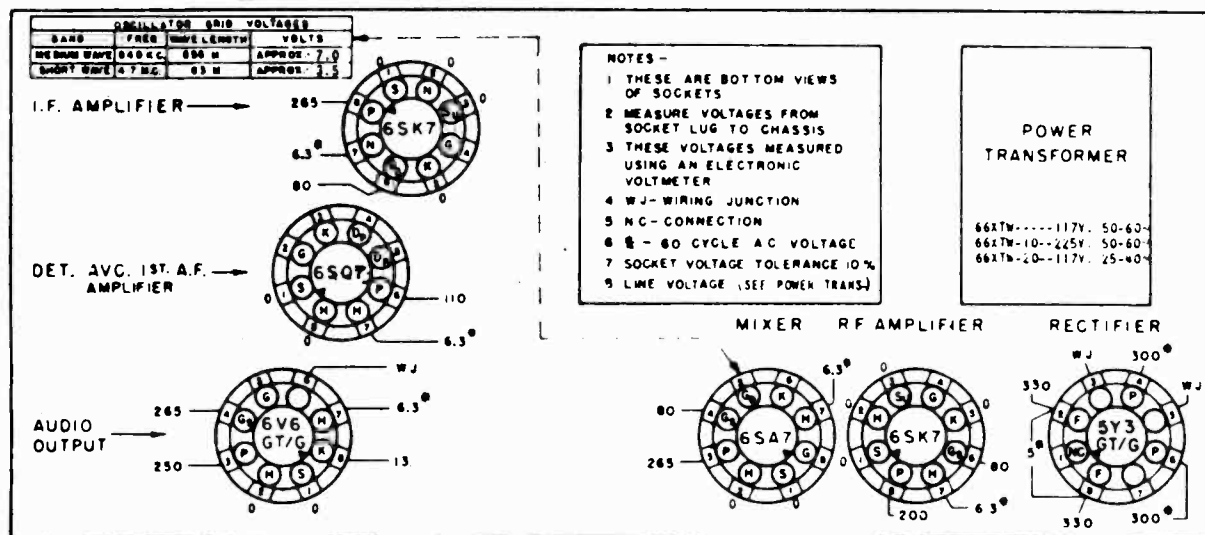
ALIGNMENT CHART

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	M	1650 KC	A & B
2	455	200 mmf.	Ant.	M	1650 KC	C*
3	15.500	400 ohms	Ant.	S	15.5 MC	D
4	15.000	400 ohms	Ant.	S	20 M	E
5	1650	200 mmf.	Ant.	M	1650 KC	F
6	1400	200 mmf.	Ant.	M	1400 KC	G
7	600	200 mmf.	Ant.	M	500 M	H
*8	1400	200 mmf.	Ant.	M	1400 KC	Recheck G

\*Adjust for minimum output (wavetrap). Reversing the position of the power plug may reduce power hum.

NOTE: When aligning the short-wave oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

SOCKET VOLTAGE CHART



CROSLLEY DIV.  
AVCO MFG. CORP.

MODELS 66XTW,  
66XTW-10, 66XTW-20

**TYPE:** Six-tube, two band superheterodyne with terminals provided for record player.

**FREQUENCY RANGE:** Medium wave band: 540 to 1650 kc. (555 to 182 meters). Band Switch at (M). Shortwave Band: 4.7 to 15.5 mc. (63 to 19.35 meters). Band Switch at (S).

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** Models 66XTW, 66XTW-10, 50-60 cycle a. c. only. Model 66XTW-20, 25-40 cycles a. c. only.

**VOLTAGE RATING:** Models 66XTW, 66XTW-20, 105-130 volts. Model 66XTW-10, 210-260 volts.

**POWER CONSUMPTION:** 65 watts maximum.

**POWER OUTPUT:** 4.5 watts maximum.

**TUBE COMPLEMENT**

Type	Function
6SK7	R. F. Amplifier
6SA7	Mixer
6SK7	I. F. Amplifier
6SQ7	Detector, AVC, 1st A. F. Amplifier
6V6 GT G	Power Amplifier
5Y3 GT G	Rectifier

**DIAL BULB:** Type 51, 7.5 volts, 0.2 amp.

**PARTS LIST—MODEL 66XTW, 66XTW-10, 66XTW-20**

Figures in first column correspond to figures in Schematic Diagram.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	39373-38	Resistor, 3300 ohm, 1/2 w.	41	B-136132	Transformer, Power (66XTW-10)
2	39373-60	Resistor, 22,000 ohm, 1/2 w.	41	B-136131	Transformer, Power (66XTW-20)
3	39373-275	Resistor, 12,000 ohm, 2 w.	42	W-43567	Bulb (dial), Type 51, 7.5 v., 0.2 amp.
4	39373-97	Resistor, 2.2 megohm, 1/2 w.	43	W-43567	Bulb (dial), Type 51, 7.5 v., 0.2 amp.
5	39373-143	Resistor, 1,000 ohm, 1 w.	44	B-135651	Control, Tone (3 megohm)
6	39373-97	Resistor, 2.2 megohm, 1/2 w.	*	39368-10	Control, Tone
7	39373-84	Resistor, 330,000 ohm, 1/2 w.	45	B-135859	Control, Volume (1 megohm) and Switch Assy.
9	B-138131-2	Transformer, output		39368-18	Control, Volume
10	C-135933	Speaker and Transformer Assy.	*	39370-1	Shaft, Volume (Plug in)
11	39373-67	Resistor, 47,000 ohm, 1/2 w.		39369-1	Switch, Power
12	39373-87	Resistor, 470,000 ohm, 1/2 w.	46	W-132267-1	Condenser, Trimmer
13	39371-5	Resistor, 1,000 ohm, 10 w.	47	C-132300-2	Cable and Plug, Power
14	39373-133	Resistor, 330 ohm, 1 w.	48	W-135479	Terminal Board Assy.
15	39373-64	Resistor, 33,000 ohm, 1/2 w.	49	W-135479	Terminal Board Assy.
16	39373-102	Resistor, 4.7 megohm, 1/2 w.	51	W-134968-2	Socket, Speaker
17	39373-60	Resistor, 22,000 ohm, 1/2 w.	52A	B-135936	Switch, Band Change
18	39373-74	Resistor, 100,000 ohm, 1/2 w.	52B		Switch, Band Change Section
19	39004-9	Condenser, 220 mmf., 500 v., mica	53	AW-135907	Coil Assy., R. F.
20	39004-9	Condenser, 220 mmf., 500 v., mica	54	AW-136360	Coil Assy., Osc.
21	39001-17	Condenser, .05 mfd., 600 v., paper	55	AW-136361	Coil Assy., Ant.
22	39004-9	Condenser, 220 mmf., 500 v., mica	57	AW-135954	Coil Assy., Ant. Loading
23	39001-17	Condenser, .05 mfd., 600 v., paper	61	AC-138210	Antenna Loop and Back Assy.
24	39004-5	Condenser, 50 mmf., 500 v., mica	62	B-132386-7	Condenser Trimmer Three
25	39001-11	Condenser, .005 mfd., 600 v., paper	63		Condenser Trimmer Section
26	39001-13	Condenser, .01 mfd., 600 v., paper	64		Condenser Trimmer Assy.
27	39004-9	Condenser, 220 mmf., 500 v., mica	65	Part of Item #37B	Condenser Trimmer
28	210685-188	Condenser, 5600 mmf., 500 v., mica		39388	Socket, Tube
29	210685-165	Condenser, 500 mmf., 500 v., mica		39017-3	Socket, Dial Light
30	39001-11	Condenser, .005 mfd., 600 v., paper		G-39012-8	Iron Core
32	W-30805	Condenser, .01 mfd., 400 v., paper		W-132366-2	Nut, Iron Core Locking
33	39001-11	Condenser, .005 mfd., 600 v., paper		AW-137205	Dial Face Assy.
34	39001-13	Condenser, .01 mfd., 600 v., paper		B-134571	Pointer, Dial
35	39004-5	Condenser, 50 mmf., 500 v., mica		W-134667	Clip, Dial Pointer
37A	B-136207	Condenser, Variable Two		W-51752	Spring, Dial Drive Cord
37B		Condenser, Variable Section		W-134917	Shaft, Drive
38A	B-135934	Condenser, 40 mfd., 360 w.v., Four Sec-		W-51071	Ring, Retaining
38B		Condenser, 20 mfd., 275 w.v., tion Elec.		W-134916	Washer, Spring
38C		Condenser, 20 mfd., 245 w.v., Filter used		W-135164	Bumper
38D		Condenser, 20 mfd., 22 w.v., on Models		W-134055	Grommet, Variable Cond. Mtg.
		66XTW,		AW-134737	Cabinet
		66XTW-10		C-132688	Lens, Dial
38A	B-137372	Condenser, 40 mfd., 360 w.v., Four Sec-		W-134635	Knob
38B		Condenser, 20 mfd., 275 w.v., tion Elec.		W-132766	Grille Cloth
38C		Condenser, 20 mfd., 245 w.v., Filter used		W-45580	Grommet
38D		Condenser, 20 mfd., 22 w.v., on Model		B-134660	Gasket, Speaker
		66XTW-20		W-132124	Stud, Trimount
39	AW-137495	Transformer, Assy., 1st I. F.		W-136584	Washer, Rubber
40	AW-134158	Transformer Assy., 2nd I. F.			
41	B-135937	Transformer, Power (66XTW)			

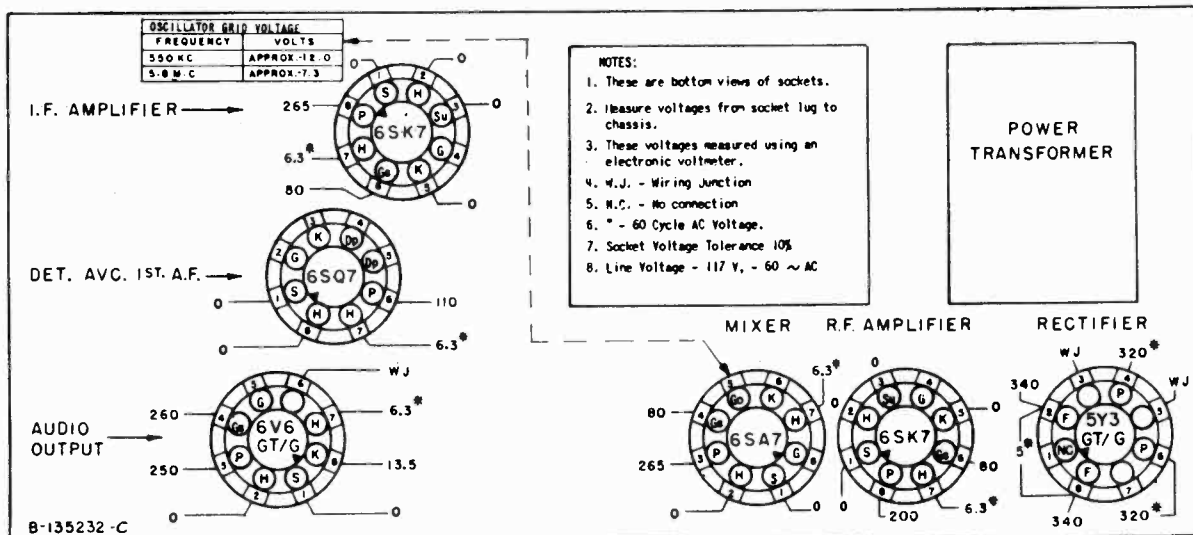
\*These parts will replace the original equipment parts.



CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 68CP,  
68CR

SOCKET VOLTAGE CHART



ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the notch at the right-hand end of the dial background.
2. Connect the output meter across the speaker voice coil and turn tone control to the treble position.
3. The r. f. signal input from the signal generator should be connected to the external antenna post as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain the signal generator output as low as possible to prevent AVC action in the receiver.

**NOTE:** The signal web antenna must remain connected at all times. If the receiver is removed from cabinet, use a suitable dummy antenna of 4 uh.

ALIGNMENT CHART

Alignment adjustment locations are shown on Chassis, Rear View

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency	In Series With	To	Band Switch	Variable Condenser	
1	455 kc.	200 mmf.	Ant.	BC	Open	A & B
2	455 kc.	200 mmf.	Ant.	BC	Open	C*
3	15.3 mc.	400 ohms	Ant.	SW	Open	D
4	15 mc.	400 ohms	Ant.	SW	To 15 mc. Signal	E
5	1620 kc.	200 mmf.	Ant.	BC	Open	F
6	1400 kc.	200 mmf.	Ant.	BC	To 1400 kc. Signal	G
7	600 kc.	200 mmf.	Ant.	BC	To 600 kc. Signal	H
8	1400 kc.	200 mmf.	Ant.	BC	To 1400 kc. Signal	Recheck G

\*Adjust for Minimum Output (Wave Trap).

**NOTE:** When aligning the short-wave oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak. The correct peak is the second peak of the trimmer from the closed position.

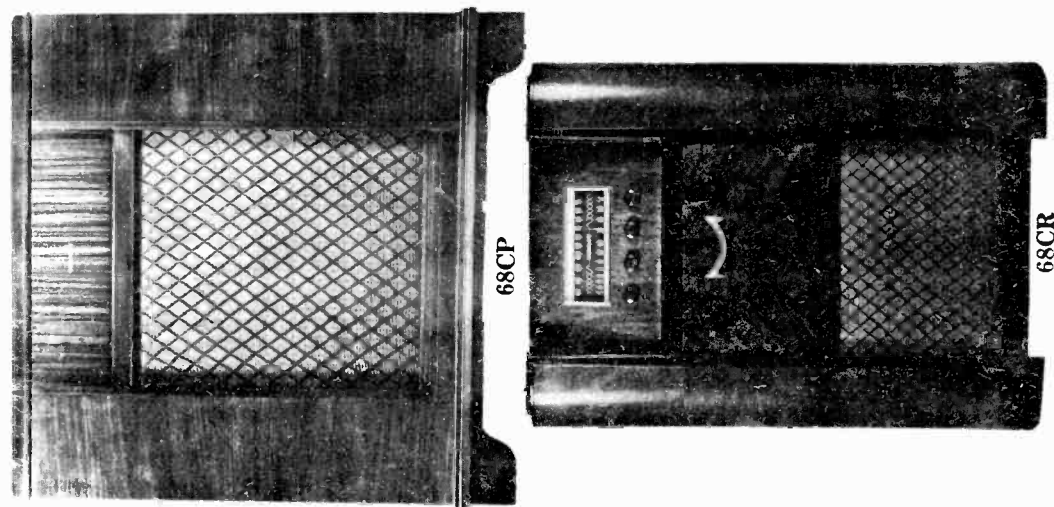


MODELS 68CP,  
68CR

CROSLEY DIV.  
AVCO MFG. CORP.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	39373-44	Resistor, 3300 ohm, 1/2 w.	46	W-132267-1	Condenser, Trimmer
2	39373-60	Resistor, 22,000 ohm, 1/2 w.	47	B-132300-1	Cable and Plug Assy., Power
3	39373-275	Resistor, 12,000 ohm, 2 w.	48	39019-3	Terminal Board Assy.
4	39373-97	Resistor, 2.2 megohm, 1/2 w.	49	39019-3	Terminal Board Assy.
5	39373-143	Resistor, 1,000 ohm, 1 w.	50	D-137057-1	Record Changer (68CP)
6	39373-97	Resistor, 2.2 megohm, 1/2 w.	52A	B-135312	Switch, Band Change } Two Section
7	39373-84	Resistor, 330,000 ohm, 1/2 w.	52B		
10	B-138131-2	Transformer, Output	53	AW-139073	Coil Assy., R.F.
11	39373-67	Resistor, 47,000 ohm, 1/2 w.	54	AW-139079	Coil Assy., Oscillator
12	39373-87	Resistor, 1,000 ohm, 5 w.	55	AW-139081	Coil Assy., Antenna (SW)
13	39371-5	Resistor, 470,000 ohm, 1/2 w.	56	C-138762-5	Speaker (Less Transformer)
14	39373-133	Resistor, 330 ohm, 1 w.	57	AW-139074	Coil Assy., Antenna Loading
15	39373-64	Resistor, 33,000 ohm, 1/2 w.	58	B-139727-2	Cable, Phono Motor (68CP)
16	39373-102	Resistor, 4.7 megohm, 1/2 w.	60	W-139692	Loop, Antenna (Transmission Line)
17	39373-60	Resistor, 22,000 ohm, 1/2 w.	61A	B-132386-7	Condenser, Trimmer
18	39373-74	Resistor, 100,000 ohm, 1/2 w.	61B		Section
19	39001-73	Condenser, .00025 mfd., 600 v., paper	61C		Three Section
20	39001-73	Condenser, .00025 mfd., 600 v., paper	64	Part of Item 37B	Condenser, Trimmer
21	39001-17	Condenser, .05 mfd., 600 v., paper	65	AB-139023	Cable and Plug Assy., Speaker (68CP)
22	39001-73	Condenser, .00025 mfd., 600 v., paper	69	AB-139035	Cable, Speaker (68CR)
23	39001-17	Condenser, .05 mfd., 600 v., paper	70	D-142552	Record Changer (68CR)
24	39004-5	Condenser, .47 mmf., 500 v., mica	71	B-139727-5	Cable, Phono Motor (68CR)
25	39001-11	Condenser, .005 mfd., 600 v., paper	72	AW-142644	Shielded Cable Assy. (68CR)
26	39001-13	Condenser, .01 mfd., 600 v., paper	73	R-139858	Cabinet (68CP)
27	39001-73	Condenser, .00025 mfd., 600 v., paper		R-142615	Cabinet (68CR)
30	39001-11	Condenser, .005 mfd., 600 v., paper		W-131154-1	Cotter, External
32	W-30805	Condenser, .01 mfd., 400 v., paper		D-139376	Dial Glass
33	39001-11	Condenser, .005 mfd., 600 v., paper		C-139888	Escutcheon, Dial
34	39001-13	Condenser, .01 mfd., 600 v., paper		W-45589	Grommet, Speaker and Chassis Mtg.
35	B-137727-21	Condenser, 50 mmf., 500 v., ceramic		W-134055	Grommet, Variable Cond. Mtg.
36	B-137498-14	Condenser, 580 mmf., 300 v., mica		G-39012-8	Iron Core
37A	B-137073-3	Condenser, Variable { Two Section		W-135309	Knob
37B		Assy.		AB-131935	Needle, Floating Jewel Assy.
38A	B-137076	Condenser, 20 mfd., 450 v. { Four Sec.		W-132266-2	Nut, Iron Core Locking
38B				C-135234	Plate, Dial Background
38C				W-135274	Pointer, Dial
38D				W-135074	Pulley, Drive Cord Idler
39	AW-137495	Transformer, 1st I.F.		W-51071	Ring, Retaining
40	AW-139080	Transformer, 2nd I.F.		B-135532	Shaft, Drive
41	B-134625	Transformer, Power		G-39204	Socket, Tube
42	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.		D-136565-3	Socket, Dial Light
43	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.		W-51752	Spring, Dial Drive Cord
44	B-135314	Control, Tone (3 megohm)		W-138136	Strip, Dial Pointer
*	{ 39368-22	Control, Volume		AC-137885	Support, Cabinet Lid (68CP)
	{ 39370-2	Control, Volume (1 megohm) and		C-135038-46	Terminal Strip
	{ B-135313	Switch Assy.		W-134916	Washer, Spring
45	{ 39368-18	Control, Volume			
	{ 39370-2	Switch, Power			
	{ 39369-1	Shaft, Plug-in			

TYPE: Six-tube, two-band, superheterodyne.  
 FREQUENCY RANGE: Broadcast Band, 540 to 1600 kc. (Selector Switch at BC.)  
 Short-wave Band, 5.8 to 15 mc. (Selector Switch at SW.)



68CP

68CR

TUBE COMPLEMENT:

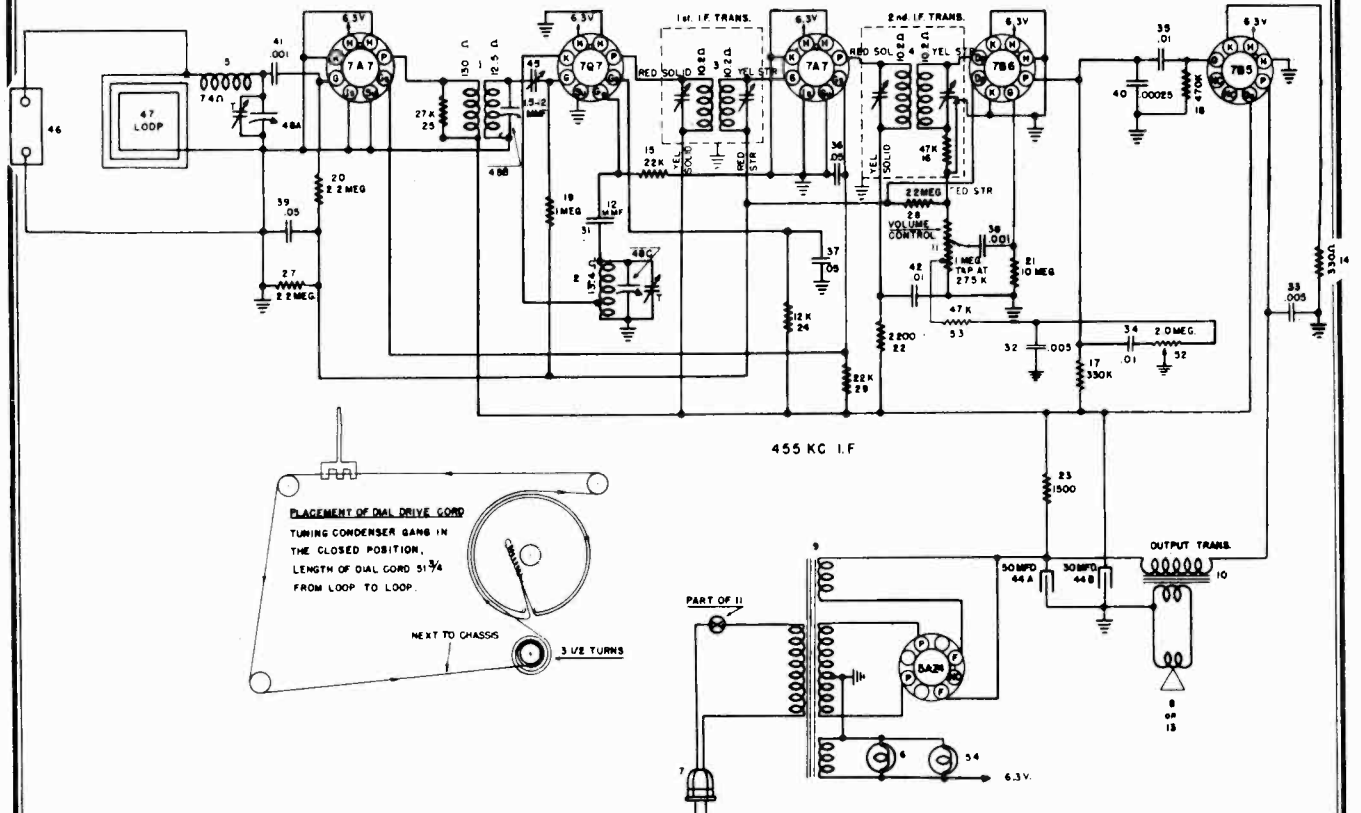
Type	Function
6SA7 (GT/G)	Mixer
6SK7 (GT/G)	R. F. Amplifier
6SK7 (GT/G)	I. F. Amplifier

\*These parts will replace the original equipment parts.  
 6SQ7 (GT/G) Detector, AVC, 1st A.F. Amplifier  
 6V6 (GT/G) A. F. Power Output  
 5Y3 GT/G Rectifier

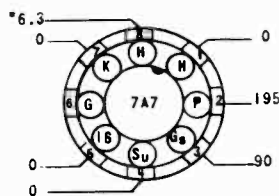
DIAL BULB: Type 47, 6.3 volts, .15 amp.

CROSLY DIV.  
AVCO MFG. CORP.

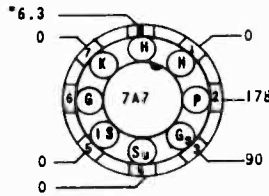
MODELS 68TA,  
68TW



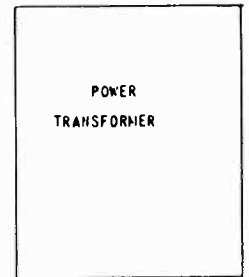
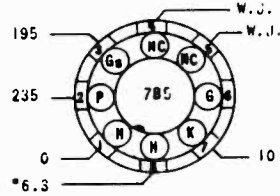
R. F. AMPLIFIER



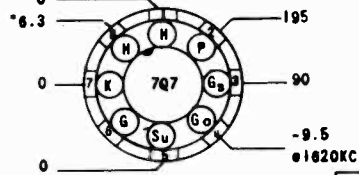
I. F. AMPLIFIER



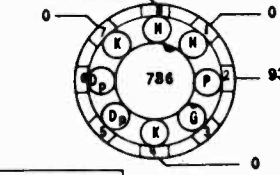
POWER OUTPUT



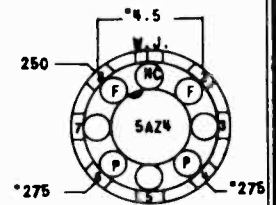
CONVERTER



DET.-AVC.-1st. A.F. AMPL.



RECTIFIER



- NOTES:  
 1. Bottom View of Sockets  
 2. Measure Voltage From Socket Lug To -B (Chassis)  
 3. Voltages Measured With An Electronic Voltmeter  
 4. W.J. = Wiring Junction.  
 5. N.C. = No Connection.  
 6. " = A.C. Voltage.  
 7. Voltage Tolerance, 10%  
 8. Line Voltage 117 V. 50 ~ A.C.

SOCKET VOLTAGE CHART

MODELS 68TA,  
68TW

CROSLLEY DIV.  
AVCO MFG. CORP.

**ALIGNMENT PROCEDURE**

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the low frequency end of the dial scale.
2. Turn the tone control to the treble (clockwise) position.
3. Connect the output meter across the speaker voice coil.
4. The r. f. signal input from the signal generator should be connected through a condenser as indicated in the alignment chart. Connect the signal generator ground to the receiver chassis.
5. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
6. Loop antenna must remain connected at all times.

**ALIGNMENT CHART**

Alignment adjustments are shown in "CHASSIS, SIDE VIEW,"

Alignment Sequence	Signal Generator Output			Position of Tuning Dial or Var. Cond.	Adjust for Maximum Output
	Frequency in KC	In Series with	To		
1	455	.05 mfd.	Pin 6 7Q7	open	A & B
2	1620	4 mmf.	Top Ant. Clip	open 1620	C
3	1400	4 mmf.	Top Ant. Clip	1400	D
4	1400	4 mmf.	Top Ant. Clip	1400	E
5	1400	4mmf.	Top Ant. Clip	1400	Rock var. cond. and repeat 3 & 4

**DESCRIPTION**

**TYPE:** Six-tube, single band, superheterodyne.

**FREQUENCY RANGE:** 540 to 1600 kc.

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** 60 cycle a. c. only

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 50 watts nominal.

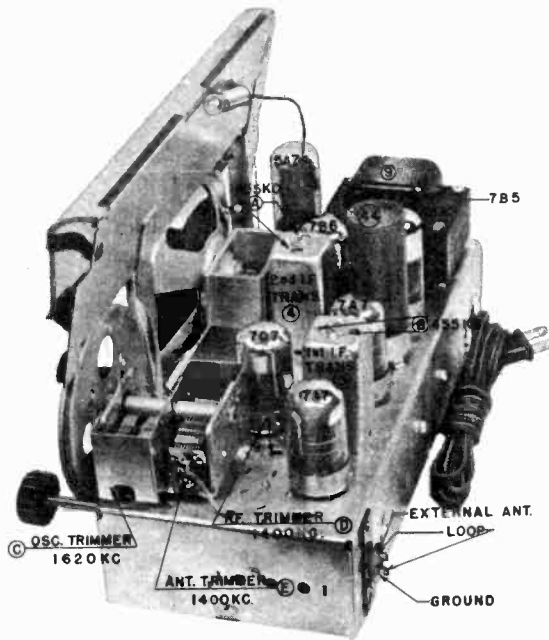
**POWER OUTPUT:** 2.5 watts maximum

**TUBE COMPLEMENT:**

TYPE	FUNCTION
7A7	R. F. Amplifier
7Q7	Converter
7A7	I. F. Amplifier
7B6	Detector, AVC, 1st A. F. Amplifier
7B5	A. F. Power Output
5AZ4	Rectifier

CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 68TA,  
68TW



CHASSIS, SIDE VIEW



68TA



68 TW

REPLACEMENT PARTS LIST

Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AW-137800	Coil, R. F.	40	39001-73	Condenser, .00025 mfd., 600 v., pap.
2	AW-137724	Coil, Oscillator	41	39001-7	Condenser, .001 mfd., 600 v., paper
3	AC-137933	Transformer, 1st I. F.	42	39001-13	Condenser, .01 mfd., 600 v., paper
4	AC-137934	Transformer, 2nd I. F.	44 A	B-136596	Cond., 50 mfd., 300 v. } Two Sec.
5	AW-138546	Coil, Antenna Loading	44 B		Cond., 30 mfd., 300 v. } Elec. Filt.
6	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	45	W-132267-1	Condenser, Trimmer
7	C-132300-1	Cable and Plug Assy., Power	46	AB-138584	Terminal Board
9	B-136597	Transformer, Power	47	AC-138464	Loop Antenna Assembly
10	B-136598	Transformer, Output	48 A	AC-138595-2	Condenser, Variable
11	B-136595	Control, Volume (1 meg., Tap 300K) and Switch Assy.	48 B		Condenser, Variable } Assembly
	39368-18	Control, Volume	48 C		Condenser, Variable
*	39370-2	Shaft, Plug in	51	C-137727-52	Condenser, 12 mmf., 500 v. ceramic
	39369-1	Switch, Power	52	B-142857	Control, Tone (2 megohm)
13	C-138246	Speaker	*	39368-11	Control, Tone
14	39373-23	Resistor, 330 ohm, 1/2 w.	53	39373-67	Resistor, 47,000 ohm, 1/2 w.
15	39373-60	Resistor, 22,000 ohm, 1/2 w.	54	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.
16	39373-67	Resistor, 47,000 ohm, 1/2 w.		R-138573-1	Cabinet, (66TA)
17	39373-84	Resistor, 330,000 ohm, 1/2 w.		AW-138663	Cabinet (66TW)
18	39373-87	Resistor, 470,000 ohm, 1/2 w.		C-137750	Cabinet Back
19	39373-92	Resistor, 1 megohm, 1/2 w.		W-138490	Clip, Spring
20	39373-97	Resistor, 2.2 megohm, 1/2 w.		AC-138443-1A	Dial Plate and Pulley Assy.
21	39373-107	Resistor, 10 megohm, 1/2 w.		C-143138	Dial Glass
22	39373-40	Resistor, 2200 ohm, 1/2 w.		W-134055	Grommet (Var. Cond. Mtg.)
23	39372-7	Resistor, 1500 ohm, 10 w.		B-138574-5	Knob (66TA)
24	39373-165	Resistor, 12,000 ohm, 1 w.		B-138574-2	Knob (66TW)
25	39373-62	Resistor, 27,000 ohm, 1/2 w.		143142	Pointer, Dial
27	39373-97	Resistor, 2.2 megohm, 1/2 w.		W-137939-1	Pulley, Idler (Drive Cord)
28	39373-97	Resistor, 2.2 megohm, 1/2 w.		W-51071	Ring, Retaining (Drive Shaft)
29	39373-60	Resistor, 22,000 ohm, 1/2 w.		W-46065	Rubber Mtg., Speaker
32	39001-11	Condenser, .005 mfd., 600 v., paper		W-136613-3CP	Screw, Dial Glass Strip
33	39001-11	Condenser, .005 mfd., 600 v., paper		39220-36CP	Screw, Chassis Mtg.
34	39001-13	Condenser, .01 mfd., 600 v., paper		B-135075-5	Shaft, Drive
35	39001-13	Condenser, .01 mfd., 600 v., paper		39441	Socket, Tube
36	39001-17	Condenser, .05 mfd., 600 v., paper		D-136565-16	Socket, Dial Light
37	39001-17	Condenser, .05 mfd., 600 v., paper		W-138568	Strip, Dial Pointer
38	39001-7	Condenser, .001 mfd., 600 v., paper		C-139844	Strip, Dial Trim
39	39001-17	Condenser, .05 mfd., 600 v., paper		B-138649	Strip, Dial Glass
				W-132124	Trimount Stud, Cabinet Back
				W-134916	Washer, Spring (Drive Shaft)

\*These parts will replace the original equipment parts.

MODELS 148CP,  
148CP(W), 148CQ,  
148CR

CROSLEY DIV.  
AVCO MFG. CORP.

ALIGNMENT PROCEDURE NOTES

1. Sweep alignment (use approximately 500 kc. to sweep).
2. Sweep Generator Output .1 to 1 Volt RMS.
3. Scope connected to center terminal on phono switch.
4. Align for maximum peak amplitude. Peak separation should be 150 to 200 kc.
5. Scope connected to center terminal of 3rd I.F. through 200,000 ohms.
6. Repeat operations 8 and 9 until no charge can be noted in sensitivity.
7. Rock gang.
8. When aligning the shortwave oscillator trimmer, make certain the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower in frequency as indicated on the receiver dial. To check, tune in signal generator frequency, then increase the generator output and tune in the image frequency which should be audible, but weaker than the fundamental frequency. If the image can not be tuned in, the oscillator trimmer is adjusted to the wrong peak. The correct peak is the second peak of the trimmer from the closed position.

CIRCUIT

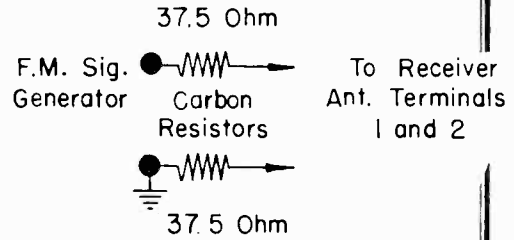


FIG. 1

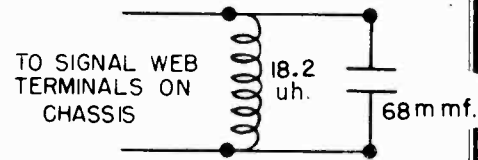


FIG. 2

MEGACYCLES TO CHANNEL NUMBERS

Cross index between frequency calibrations in megacycles on the dial and channel numbers follow:

Frequency in Megacycles	Channel No.	Frequency in Megacycles	Channel No.
87.9	200	98.9	255
88.9	205	99.9	260
89.9	210	100.9	265
90.9	215	101.9	270
91.9	220	102.9	275
92.9	225	103.9	280
93.9	230	104.9	285
94.9	235	105.9	290
95.9	240	106.9	295
96.9	245	107.9	300
97.9	250		

To find the frequency in megacycles for CHANNEL NUMBERS between those given above, add .2 megacycle for every whole number added to the CHANNEL NUMBER; for example Channel 204 would be 88.7 megacycles and 251 would be 98.1 megacycles.

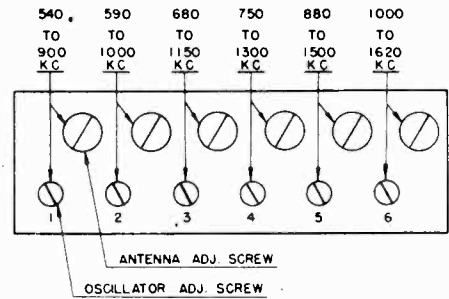
CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 148CP,  
148CP(W), 148CQ,  
148CR

**PUSH BUTTON ADJUSTMENT PROCEDURE**

Each of the six push buttons, for automatic tuning, has two adjusting screws by which it may be set to any nearby American broadcast station whose frequency in kilocycles is within the kilocycle range covered by that button. To gain access to these screws, carefully pull off the push button. To set No. 1 push button to a desired position, proceed as follows:

1. Turn the ANTENNA ADJ. SCREW clockwise until moderately tight, then turn the OSCILLATOR ADJ. SCREW counterclockwise until the threaded portion extends approximately 3/4 inch. Use a small screw-driver and do not exert pressure.
2. Turn the band selector switch to the "AM" position and manually tune in the station to which the push button is to be set. The frequency of the station selected must be between 540 and 900 kilocycles. Carefully adjust the tuning control to the point of clearest reception.
3. Turn the band selector switch to the "AUTO" position and slowly turn the OSCILLATOR ADJ. SCREW clockwise until the same station is heard. Adjust the screw for maximum volume.
4. Adjust the ANTENNA ADJ. SCREW for maximum volume.
5. Turn the band selector switch from "AUTO" to "AM" and back again to check if the adjustment has been correctly made. There should be no change in tone quality when switched from one to the other.
6. Place the tab with the call letters of the station, to which the push button has been set, in a celluloid "V" and slide it into the button from the side.
7. The remaining push buttons may be set in a similar manner. No adjustment of master tone control push buttons is required.



**ALIGNMENT PROCEDURE**

1. This receiver has been aligned at the factory for best performance, and no attempt should be made to re-align it unless the proper test equipment is available.
2. Turn the tuning condenser to full mesh, against stop, and set the dial pointer to the reference line at the end of the dial scale.
3. Release all tone control buttons to the out position.
4. Connect the output meter across the speaker voice coil (3.2 ohms).
5. Feed an R. F. amplitude modulated signal modulated 30% at 400 cycle to the receiver as indicated in the alignment procedure chart. Connect signal generator ground terminal to the chassis of the receiver. When F. M. generator is used, a 30% modulated signal is equal to a deviation of 22.5 kc.
6. Turn the volume control knob to maximum clockwise position and adjust the signal generator output to produce a noticeable output meter reading. Keep signal generator output as low as possible to prevent excessive AVC action in the receiver.
7. The low impedance "Signal Web" antenna should remain connected at all times. If the chassis is removed from cabinet, use a dummy antenna consisting of a 18.2 u.h. coil in parallel with a 68 mmf. capacitor
8. The link must be connected in external antenna position.

**TUBE COMPLEMENT**

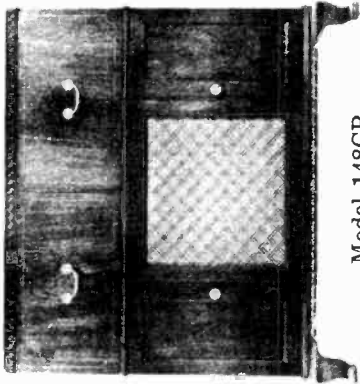
Type	Description
6SG7	R. F. Amplifier
6SA7	A. M. Converter
6AC7	F. M. Mixer
7F8	F. M. Oscillator
6SG7	1st I. F. Amplifier
6SG7	2nd I. F. Amplifier
6SH7	3rd I. F. Amplifier

6H6	Discriminator
6SQ7	A. M. Det.—AVC 1st A. F. Amplifier
6SQ7	Phase Inverter
6V6 GT/G	Output
6V6 GT/G	Output
5U4G	Rectifier
6E5	Tuning Indicator

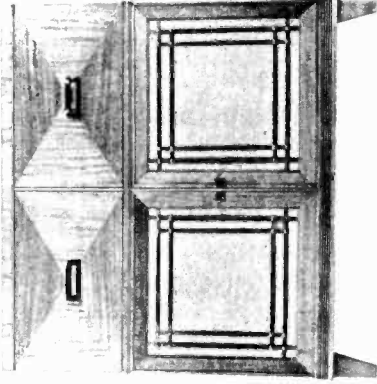
DIAL BULB: Type 51, 7.5 v., 0.2 amp.

MODELS 148CP,  
148CP(W), 148CQ,  
148CR

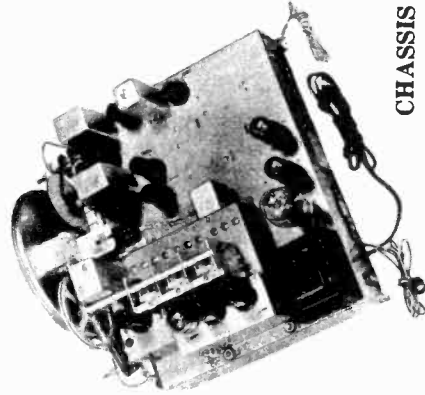
CROSLEY DIV.  
AVCO MFG. CORP.



Model 148CP



Model 148CQ



CHASSIS VIEW

ALIGNMENT PROCEDURE CHART

Align-ment Sequence	Signal Generator Output		Position of		Adjust for Maximum Output	Remarks
	Frequency	In Series with	Band Switch	Tuning Dial		
1	455 kc.	.1 mfd.	AM	Hi. Freq. stop	3rd I.F.	
2	455 kc.	.1 mfd.	AM	Hi. Freq. stop	2nd I.F.	
3	455 kc.	1 mfd.	AM	Hi. Freq. stop	1st I.F.	Retouch 3rd, 2nd, 1st I.F.
4	10.7 mc.	100 mmf.	FM	Hi. Freq. stop	Discriminator	Notes 1, 2, 3, 4
5	10.7 mc.	100 mmf.	FM	Hi. Freq. stop	3rd I.F.	Notes 1 and 5
6	10.7 mc.	100 mmf.	FM	Hi. Freq. stop	2nd I.F.	Retouch 3rd I.F.
7	10.7 mc.	100 mmf.	FM	Hi. Freq. stop	1st I.F.	Retouch 3rd, 2nd, 1st I.F.
8	1400 kc.	200 mmf.	AM	1400 kc.	BC-Osc.-R.F. & Ant. Trim	
9	600 kc.	200 mmf.	AM	600 kc.	Broadcast Osc. Padder	Notes 6 and 7
10	6.0 mc.	400 ohm	Police	6.0 mc.	Police Osc., R.F. & Ant. Trimmers	
11	18 mc.	400 ohm	SW	18 mc.	Sw. Osc., R.F., & Ant. Trimmers	Note 9
12	98 mc.	See Circuit Diag.	FM	98 mc.	FM-Osc. Core	
13	106 mc.	See Circuit Diag.	FM	106 mc.	FM-R.F. & Ant. Trimmer	Note 7





MODELS 148CP  
148CP(W), 148CQ,  
148CRCROSLEY DIV.  
AVCO MFG. CORP.

## REPLACEMENT PARTS LIST

Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
142	G-39012-7	Iron Core (P. B. #6)	216	39204	Socket, Tube (6V6)
143	G-39012-7	Iron Core (P. B. #5)	217	39232-1	Socket, Tube (5U4G)
144	G-39012-7	Iron Core (P. B. #4)	218	C-137727-64	Condenser, 300 mmf., 500 v., ceramic
145	G-39012-7	Iron Core (P. B. #3)	219	C-137727-68	Condenser, 11.5 mmf., 500 v., ceramic
146	G-39012-7	Iron Core (P. B. #2)		AC-136187	Background Assy., Dial
147	G-39012-7	Iron Core (P. B. #1)		AW-135502	Brackets & Bushing Assy., Pointer Pulley
148	Part of Item 180	Iron Core		W-41405-1	Bushing (Headed), Chassis Mtg., or Switch Mtg.
149	B-139727-4	Cable and Plug, Power (Phono)		W-41405-9	Bushing (Headed), R.F. Unit Mtg.
150	W-139692	Loop Assy., Transmission Line		B-135719-1	Button (On-Off)
151	W-135421	Switch, Power		B-135717-1	Button (Station)
152A	C-135976	Switch, Band Change		B-135688-1	Button (Tone), Treble 1
152B		Switch, Band Change		B-135714-1	Button (Tone), Treble 2
152C		Switch, Band Change		B-135715-1	Button (Tone), Treble 3
152D		Switch, Band Change		B-135694-1	Button (Tone), Bass 1
153	B-135828	Control, Volume (2.5 megohm, Tap 750,000 ohm)		B-135699-1	Button (Tone), Bass 2
	39368-19	Control, Volume		B-135716-1	Button (Tone), Bass 3
	39370-1	Shaft, Volume (Plug-in)		B-135719-2	Button (On-Off)
154	W-139882	Record Changer ("W56," Model 148CQ)		B-135717-2	Button (Station)
154	R-143055	RECORD CHANGER (W 156) 148 CP(W) CR		B-135688-2	Button (Tone), Treble 1
155	W-135741	Switch Assy., P. B. (Tone)		B-135714-2	Button (Tone), Treble 2
156	AC-136090	Transformer, Discriminator		B-135715-2	Button (Tone), Treble 3
157	AC-136073	Transformer, 1st I.F.		B-135694-2	Button (Tone), Bass 1
158	AC-136059	Transformer, 2nd I.F.		B-135699-2	Button (Tone), Bass 2
159	AC-136112	Transformer, 3rd I.F.		B-135716-2	Button (Tone), Bass 3
161	AW-134089	Coil, P.B. Oscillator, (No. 2)		W-136168	Call Letter Sheet
162	AW-134090	Coil, P.B. Oscillator, (No. 5)		W-136144	Call Letter Covers
163	AW-134091	Coil, P.B. Oscillator, (No. 6)		R-139505	Cabinet (148CP)
164	AW-134092	Coil, P.B. Oscillator, (No. 1)		R-139517	Cabinet (148CQ)
165	AW-134230	Coil, P.B. Oscillator, (No. 3)		W-135690	Clip, Escutcheon 148 CP, CQ
166	AW-134231	Coil, P.B. Oscillator, (No. 4)		W-230529	Clip, Tube
167	C-137058	Speaker (Less Transformer)		W-134595	Cord, Dial Drive
168	39001-17	Condenser, .05 mfd., 600 v., paper		D-136142	Dial Glass
169	39373-33	Resistor, 1,000 ohm, ½ w.		B-135970	Disc, Indicator
170	W-43567	Bulb (Dial), Type 51, 7.5 v., 0.2 amp.		D-135711-1	Escutcheon (148CP)
	138437-4	Bulb (Dial), Type 51, 7.5 v., 0.2 amp. (Carton of Ten Bulbs)		D-135711-2	Escutcheon (148CQ)
171	39001-76	Condenser, .003 mfd., 600 v., paper		AW-138590	Flywheel & Pinion Gear Assy.
172	39001-76	Condenser, .003 mfd., 600 v., paper		W-136656	Gasket, Dial Glass
173	39373-71	Resistor, 68,000 ohm, ½ w.		W-135581	Gasket, Dial Lens
174	39373-80	Resistor, 220,000 ohm, ½ w.		AW-136203	Gear & Hub Assy.
175	39373-80	Resistor, 220,000 ohm, ½ w.		W-45580	Grommet (Rubber)
176	W-135742	Switch, P.B. Tuning		AW-137266	Hinge Assy., Cabinet 148 CP, CQ
177	AB-137433	Coupling, F.M. Antenna		B-135981-1	Knob, Large (148CP) CP (W), CR
178	AW-136737	Coil, Antenna Secondary		W-135989-1	Knob, Small (148CP) CP (W), CR
179	AW-136411	Coil, Antenna		B-135981-2	Knob, Large (148CQ)
180	AW-136396	Coil, Antenna Loading		W-135989-2	Knob, Small (148CQ)
181	AW-136726	Choke, R.F.		C-134880	Lens, Dial
182	AW-136732	Choke, R.F. Primary		AB-136215	Link Assy., Toggle
183	AW-138245	Coil, R.F. Secondary		AB-134935	Needle, Floating Jewel Assy.
184	AW-136406	Coil, R.F. (S. W. & Police)		W-132366-2	Nut (Locking), Iron Core
185	AW-136362	Coil, R.F. (B. C.)		W-135580	Nut (Special), Escutcheon
186	AW-136392	Coil, Oscillator (S. W.)		B-135857	Pointer, Dial
187	AW-136393	Coil, Oscillator (Police)		W-139573	Pull (Handle), Cabinet—148CP
188	AW-136364	Coil, Oscillator (B. C.)		W-139574	Pull (Knob), Cabinet—148CP
189	AW-136682	Coil, and Mtg. (H. F.)		142,569	Pull (Handle), Cabinet—148CQ
190	39371-5	Resistor, 1,000 ohm, 10 w.		142568	Pull (Knob), Cabinet—148CQ
191	AW-136720	Choke, R.F. Heater		AW-136310	Pulley & Sleeve Assy.
192	Part of Item 189	Iron Core, F.M. Oscillator		W-51071	Ring (Retaining), Indicator Disc
193	39019-2	Terminal Board, Phono		W-135499	Ring (Snap), Pointer Bearing
194	W-136316	Tie Bar		W-211101	Ring (Retaining), Socket
195	39373-60	Resistor, 22,000 ohm, ½ w.		39311-60	Screw (#8-32x3/16 C. P. Headless Set)
196	39019-5	Terminal Board, Antenna		W-135752	Screw, Escutcheon
197	B-226638-31	Condenser, .001 mfd., 300 v., ceramic		W-136102	Screw, (#12-24 Hex. Hd. Ptd. Pilot Ma.)
198	B-226638-31	Condenser, .001 mfd., 300 v., ceramic		W-135350	Shaft, Drive
199	39373-33	Resistor, 1,000 ohm, ½ w.		D-136565-7	Socket, Dial Light
200	138927	Record Changer (400-12 Model 148CP)		W-132322	Spring, Chassis Mtg.
204	39232-5	Socket, Tube (6SG7)		W-136425	Spring (Comp.), Gear & Hub Assy.
205	39232-5	Socket, Tube (6AC7)		W-51752	Spring, Dial Drive Cord
206	39232-5	Socket, Tube (6SG7)		W-49829	Spring (Lock), Switch Shafts
207	39232-1	Socket, Tube (6SG7)		W-136113	Spring (Loop), Pointer
208	39232-5	Socket, Tube (6SH7)		W-136760	Spring, Grounding
209	39232-1	Socket, Tube (6H6)		W-137430	Spring, Static
210	39232-1	Socket, Tube (6SA7)		C-135693	Support, Dial Lens
211	W-136470	Socket, Tube (7F8)		AB-136283	Switch Assy. (Complete), Push Button
213	39232-1	Socket, Tube (6SQ7)		AB-136233	Toggle Assy., Double
214	39232-1	Socket, Tube (6SQ7)		W-134916	Washer (Spring), Indicator Disc
215	39204	Socket, Tube (6V6)			

\*These parts will replace the original equipment parts.

CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 148CP,  
148CP(W), 148CQ,  
148CR

REPLACEMENT PARTS LIST  
Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	39372-10	Resistor, 6,200 ohm, 10 w.	76	39001-13	Condenser, .01 mfd., 600 v., paper
2	39373-92	Resistor, 1.0 megohm, 1/2 w.	77	B-226638-53	Condenser, 50 mmf., 500 v., ceramic
3	39373-97	Resistor, 2.2 megohm, 1/2 w.	78	39004-7	Condenser, 100 mmf., 500 v., mica
4	39373-97	Resistor, 2.2 megohm, 1/2 w.	79	B-226638-31	Condenser, .001 mfd., 300 v., ceramic
5	39373-97	Resistor, 2.2 megohm, 1/2 w.	80	B-226638-31	Condenser, .001 mfd., 300 v., ceramic
6	39373-33	Resistor, 1,000 ohm, 1/2 w.	81	B-226638-31	Condenser, .001 mfd., 300 v., ceramic
7	39373-33	Resistor, 1,000 ohm, 1/2 w.	82	Part of Item 158	Condenser, 30 mmf., 500 v., ceramic
8	39373-33	Resistor, 1,000 ohm, 1/2 w.	83	Part of Item 159	Condenser, 30 mmf., 500 v., ceramic
9	39373-33	Resistor, 1,000 ohm, 1/2 w.	84	Part of Item 159	Condenser, 30 mmf., 500 v., ceramic
10	39373-33	Resistor, 1,000 ohm, 1/2 w.	85	Part of Item 158	Condenser, 30 mmf., 500 v., ceramic
11	39373-75	Resistor, 120,000 ohm, 1/2 w.	86	W-137398-2	Condenser, 1 mmf., 500 v., silver mica
12	39373-74	Resistor, 100,000 ohm, 1/2 w.	87	G-131502-20	Condenser, 680 mmf., 400 v., silver mica
13	39373-51	Resistor, 6,800 ohm, 1/2 w.	88	G-131502-5	Condenser, 500 mmf., 400 v., silver mica
14	39373-74	Resistor, 100,000 ohm, 1/2 w.	89	G-131502-5	Condenser, 500 mmf., 400 v., silver mica
15	39373-74	Resistor, 100,000 ohm, 1/2 w.	90	Part of Item 157	Condenser, 1,000 mmf., 500 v., mica
16	39373-74	Resistor, 100,000 ohm, 1/2 w.	91	Part of Item 157	Condenser, 1,000 mmf., 500 v., mica
17	39373-71	Resistor, 68,000 ohm, 1/2 w.	92	Part of Item 158	Condenser, 1,000 mmf., 500 v., mica
18	39373-60	Resistor, 22,000 ohm, 1/2 w.	93	Part of Item 158	Condenser, 1,000 mmf., 500 v., mica
19	39373-77	Resistor, 150,000 ohm, 1/2 w.	94	Part of Item 159	Condenser, 1,000 mmf., 500 v., mica
20	39373-67	Resistor, 47,000 ohm, 1/2 w.	95	Part of Item 159	Condenser, 1,000 mmf., 500 v., mica
21	39373-107	Resistor, 10 megohm, 1/2 w.	96	Part of Item 156	Condenser, 180 mmf., 500 v., mica
22	39373-107	Resistor, 10 megohm, 1/2 w.	97	Part of Item 156	Condenser, 180 mmf., 500 v., mica
23	39373-80	Resistor, 220,000 ohm, 1/2 w.	98	Part of Item 156	Condenser, 82 mmf., 500 v., silver mica
24	39373-80	Resistor, 220,000 ohm, 1/2 w.	99	GC-210685-179	Condenser, 1,460 mmf., 500 v., mica
25	39373-80	Resistor, 220,000 ohm, 1/2 w.	100	GC-210685-178	Condenser, 4,140 mmf., 500 v., mica
26	39373-80	Resistor, 220,000 ohm, 1/2 w.	101	GC-210685-168	Condenser, 3,300 mmf., 500 v., mica
27	39373-157	Resistor, 4,700 ohm, 1 w.	102	39004-7	Condenser, 100 mmf., 500 v., mica
28	39373-155	Resistor, 3,900 ohm, 1 w.	104	B-136327-12	Condenser, Trimmer
29	39373-239	Resistor, 220 ohm, 2 w.	105	B-136327-24	Condenser, Trimmer
30	39373-94	Resistor, 1.5 megohm, 1/2 w.	106	B-136327-24	Condenser, Trimmer
31	39373-94	Resistor, 1.5 megohm, 1/2 w.	107	B-136327-25	Condenser, Trimmer
32	39373-84	Resistor, 330,000 ohm, 1/2 w.	108	B-136327-26	Condenser, Trimmer
33	39373-84	Resistor, 330,000 ohm, 1/2 w.	109	B-136327-27	Condenser, Trimmer
34	Part of Item 157	Resistor, 39,000 ohm, 1/2 w.	110	Part of Item 157	Condenser, 16 mmf., 500 v., ceramic
35	Part of Item 158	Resistor, 39,000 ohm, 1/2 w.	111	Part of Item 157	Condenser, 27 mmf., 500 v., ceramic
36	Part of Item 159	Resistor, 39,000 ohm, 1/2 w.	113	B-136327-29	Condenser, Trimmer
37	39373-51	Resistor, 6,800 ohm, 1/2 w.	114	Part of Item 189	Condenser, 50 mmf., 500 v., ceramic
38	39373-19	Resistor, 220 ohm, 1/2 w.	115	B-136327-22	Condenser, Trimmer
39	39373-170	Resistor, 22,000 ohm, 1 w.	116	B-137001	Transformer, Output
40	39373-170	Resistor, 22,000 ohm, 1 w.	117A	W-135818-2	Condenser, Trimmer
41	39373-170	Resistor, 22,000 ohm, 1 w.	117B		Condenser, Trimmer
42	39373-278	Resistor, 18,000 ohm, 2 w.	117C		Condenser, Trimmer
43	39373-87	Resistor, 470,000 ohm, 1/2 w.	117D		Condenser, Trimmer
44	39001-13	Condenser, .01 mfd., 600 v., paper	118A	W-135821	Condenser, Trimmer
45	39001-13	Condenser, .01 mfd., 600 v., paper	118B		Condenser, Trimmer
46	39001-13	Condenser, .01 mfd., 600 v., paper	118C		Condenser, Trimmer
47	39001-13	Condenser, .01 mfd., 600 v., paper	119A	W-135821	Condenser, Trimmer
48	39001-13	Condenser, .01 mfd., 600 v., paper	119B		Condenser, Trimmer
49	39001-17	Condenser, .05 mfd., 600 v., paper	119C		Condenser, Trimmer
50	39001-17	Condenser, .05 mfd., 600 v., paper	120A	C-134895	Condenser, Variable
51	39001-17	Condenser, .05 mfd., 600 v., paper	120B		Condenser, Variable
52	39001-78	Condenser, .006 mfd., 600 v., paper	120C		Condenser, Variable
53	39001-78	Condenser, .006 mfd., 600 v., paper	121	W-43567	Bulb (Dial), Type 51, 7.5 v., 0.2 amp.
54	39001-1	Condenser, .0001 mfd., 600 v., paper	122A	B-137003	Condenser, 40 mfd., 400 w.v., } Two Sec.
55	B-226638-2	Condenser, 100 mmf., 300 v., ceramic	122B		Condenser, 20 mfd., 25 w.v., } Elec. Fil.
56	39001-1	Condenser, .0001 mfd., 600 v., paper	123A	B-137002	Condenser, 50 mfd., 400 w.v., } Two Sec.
57	39001-1	Condenser, .0001 mfd., 600 v., paper	123B		Condenser, 10 mfd., 300 w.v., } Elec. Fil.
58	39001-1	Condenser, .0001 mfd., 600 v., paper	124	W-135695	Socket, Tube (6E5)
59	39001-1	Condenser, .0001 mfd., 600 v., paper	125	B-135870	Switch, Phono
60	39004-9	Condenser, 220 mmf., 500 v., mica	126	C-132300-2	Cable and Plug, Power
61	39004-9	Condenser, 220 mmf., 500 v., mica	127	B-135600	Transformer, Power
62	B-226638-54	Condenser, 75 mmf., 500 v., ceramic	128	Part of Item 156	Iron Core
63	B-226638-54	Condenser, 75 mmf., 500 v., ceramic	129	Part of Item 156	Iron Core
64	B-226638-54	Condenser, 75 mmf., 500 v., ceramic	130	Part of Item 159	Iron Core
65	39001-17	Condenser, .05 mfd., 600 v., paper	131	Part of Item 159	Iron Core
66	39001-17	Condenser, .05 mfd., 600 v., paper	132	Part of Item 158	Iron Core
67	39001-17	Condenser, .05 mfd., 600 v., paper	133	Part of Item 158	Iron Core
68	39001-17	Condenser, .05 mfd., 600 v., paper	134	Part of Item 157	Iron Core
69	39001-17	Condenser, .05 mfd., 600 v., paper	135	Part of Item 157	Iron Core
70	39001-76	Condenser, .003 mfd., 600 v., paper	136	Part of Item 159	Iron Core
71	39001-76	Condenser, .003 mfd., 600 v., paper	137	Part of Item 159	Iron Core
72	39001-76	Condenser, .003 mfd., 600 v., paper	138	Part of Item 158	Iron Core
73	39001-11	Condenser, .005 mfd., 600 v., paper	139	Part of Item 158	Iron Core
74	39001-11	Condenser, .005 mfd., 600 v., paper	140	Part of Item 157	Iron Core
75	39001-17	Condenser, .05 mfd., 600 v., paper	141	Part of Item 157	Iron Core

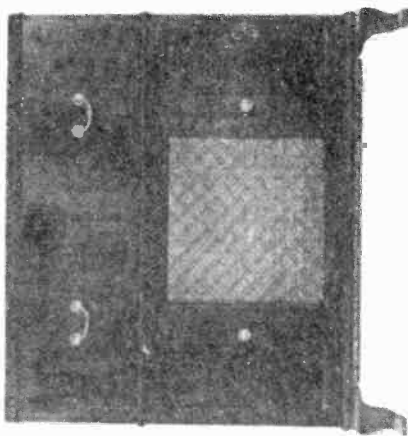
MODELS 148CP(W),  
148CR

CROSLEY DIV.  
AVCO MFG. CORP.

CABINET PARTS—MODEL 148CP(W)

Figures in first column correspond to figures in Schematic Diagram

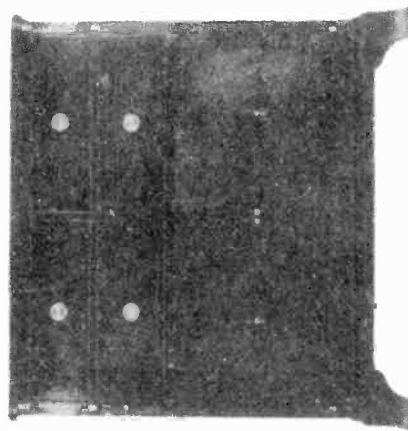
Part No.	Description	Item No.	Part No.	Description
R-143379	Cabinet, only	143608		Grille, Metal
139319	Catch & Strike Assy., Door & Drawer	143609		Grille, Cloth
W-135690	Clip, Escutcheon	137266		Hinge, Door
143221	Door, Left Record Comp. } Matched Set	143263		Leg, Cabinet
143220	Door, Right Record Comp. } Matched Set	C-134880		Lens, Dial
143610	Door, Radio Compartment } Matched Set	W-135580		Nut (Special), Escutcheon
	Panel (Front), Record } Matched Set	143631		Panel, Radio Dial
	Changer Drawer	W-139573		Pull (Handle), Drawer & Radio Door
	Drawer Frame Assy. only, Record Changer	W-139574		Pull (Knob), Record Comp. Door
D-135711-1	Escutcheon	W-135752		Screw, Escutcheon
W-135581	Gasket, Dial Lens	139006		Slide, Drawer
		C-135693		Support, Dial Lens



Model 148CP(W)

**CABINET PARTS—MODEL 148CR**

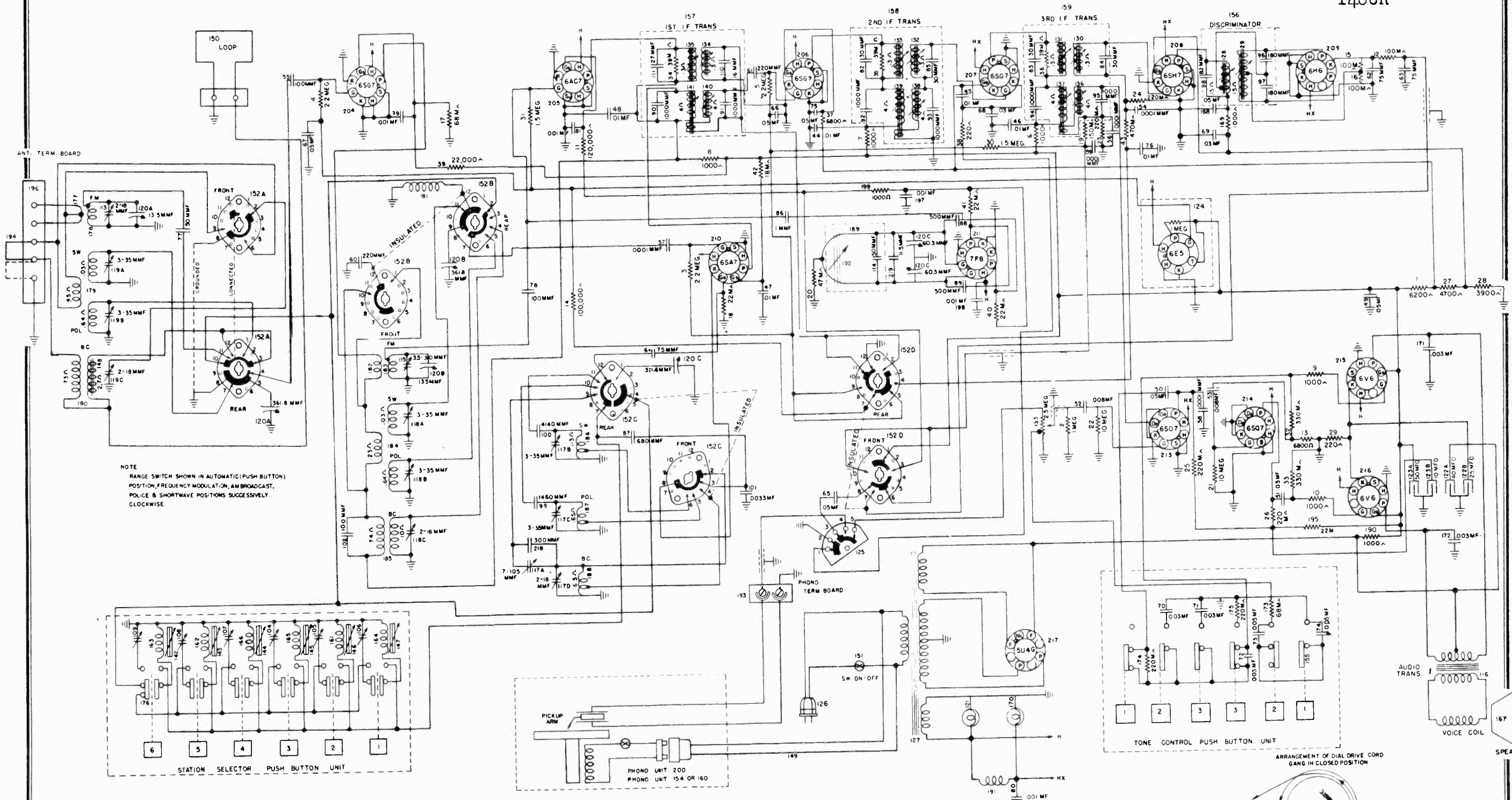
143485	Bumper (Rubber), Door	W-135581		Gasket, Dial Lens
R-143169-1	Cabinet, only	143509		Grille, Cloth
139319-SB	Catch & Strike Assy., Door & Drawer	143620-SB		Hinge, Radio Compartment Door
143623	Door, Left Record Comp. } Matched Set	143333		Hinge, Record Compartment Door
143625	Door, Right Record Comp. } Matched Set	143331		Knob, Drawer & Radio Comp. Door
	Door, Speaker (Left) } Matched Set	143334		Knob, Speaker Door
	Door, Speaker (Right) } Matched Set	143629		Leg & Base Assembly
	Door, Speaker (Left Center) } Matched Set	C-134880		Lens, Dial
	Door, Speaker (Right Center) } Matched Set	W-135580		Nut (Special), Escutcheon
143621	Door, Radio Compartment } Matched Set	143630		Panel, Radio Dial
	Panel (Front), Record } Matched Set	142912		Pull (Key Type) Record Comp. Door
	Changer Drawer	139006		Slide, Drawer
143865	Drawer Frame Assy. only, Record Changer	C-135693		Support, Dial Lens
D-135711-1	Escutcheon	W-135752		Screw, Escutcheon
143619-SB	Equalizer, Speaker Door	143332		Support, Radio Compartment Door



Model 148CR

CROSLY DIV.  
AVCO MFG. CORP.

MODELS 148CP,  
148CP(W), 148CQ,  
148CR



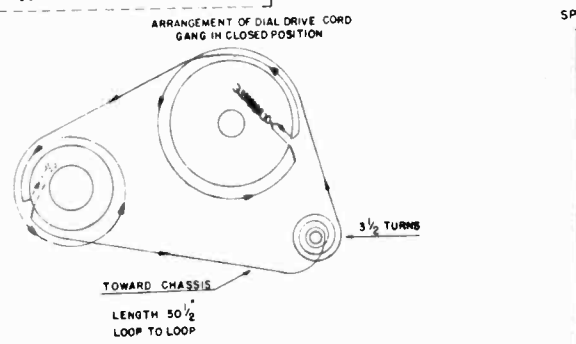
NOTE  
 RANGE SWITCH SHOWN IN AUTOMATIC (PUSH BUTTON)  
 POSITION, FREQUENCY MODULATION, AM BROADCAST,  
 POLICE & SHORTWAVE POSITIONS SUCCESSIVELY  
 CLOCKWISE.

**DESCRIPTION**

**TYPE:** Fourteen tube, four-band superheterodyne.  
**FREQUENCY RANGE:** American Broadcast Band: 535 to 1620 kc. (Selector switch at AM position).  
 Police Band: 2.25 to 6.7 mc. (Selector switch at POLICE position).  
 Short-wave Band: 6.7 to 18.5 mc. (Selector switch at SW position).

Frequency Modulation Band: 88.1 to 107.9 mc. (Selector switch at FM position).  
**INTERMEDIATE FREQUENCY:** AM, Police and SW Bands: 455 kc. FM Band: 10.7 mc.  
**POWER SUPPLY:** 60 cycle a.c. only  
**VOLTAGE RATING:** 105-125 volts.  
**POWER CONSUMPTION:** 120 watts.  
**POWER OUTPUT:** 18 watts maximum.

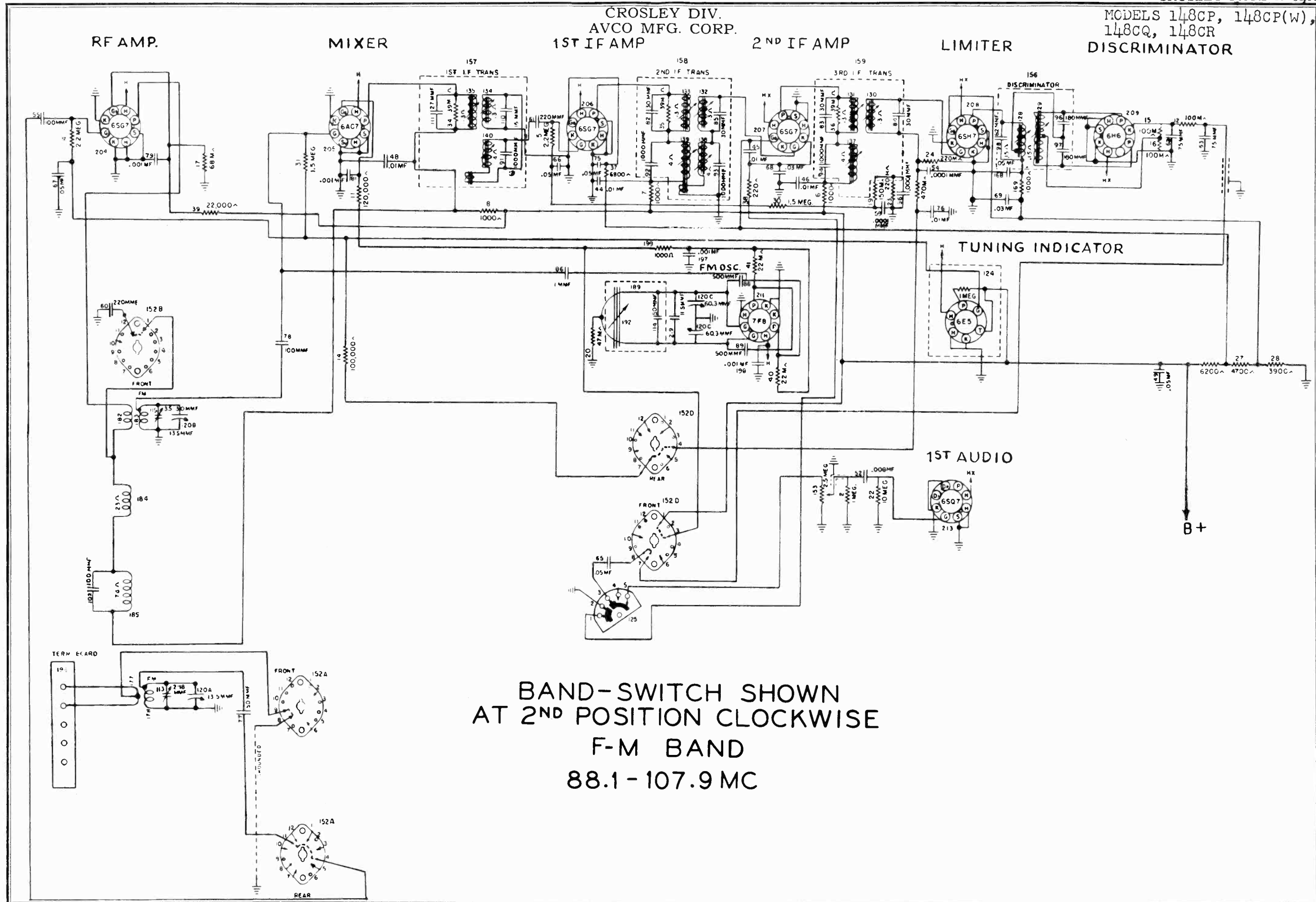
**RECORD CHANGERS:**  
 For 148CP, V-M Model 400, RCD.CH 15-1; for 148CP(W) and 148CR, Webster Model 156, RCD.CH. 19-1; for 148CQ, Webster 56, RCD.CH. 15-10.





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1ST IF AMP      2ND IF AMP

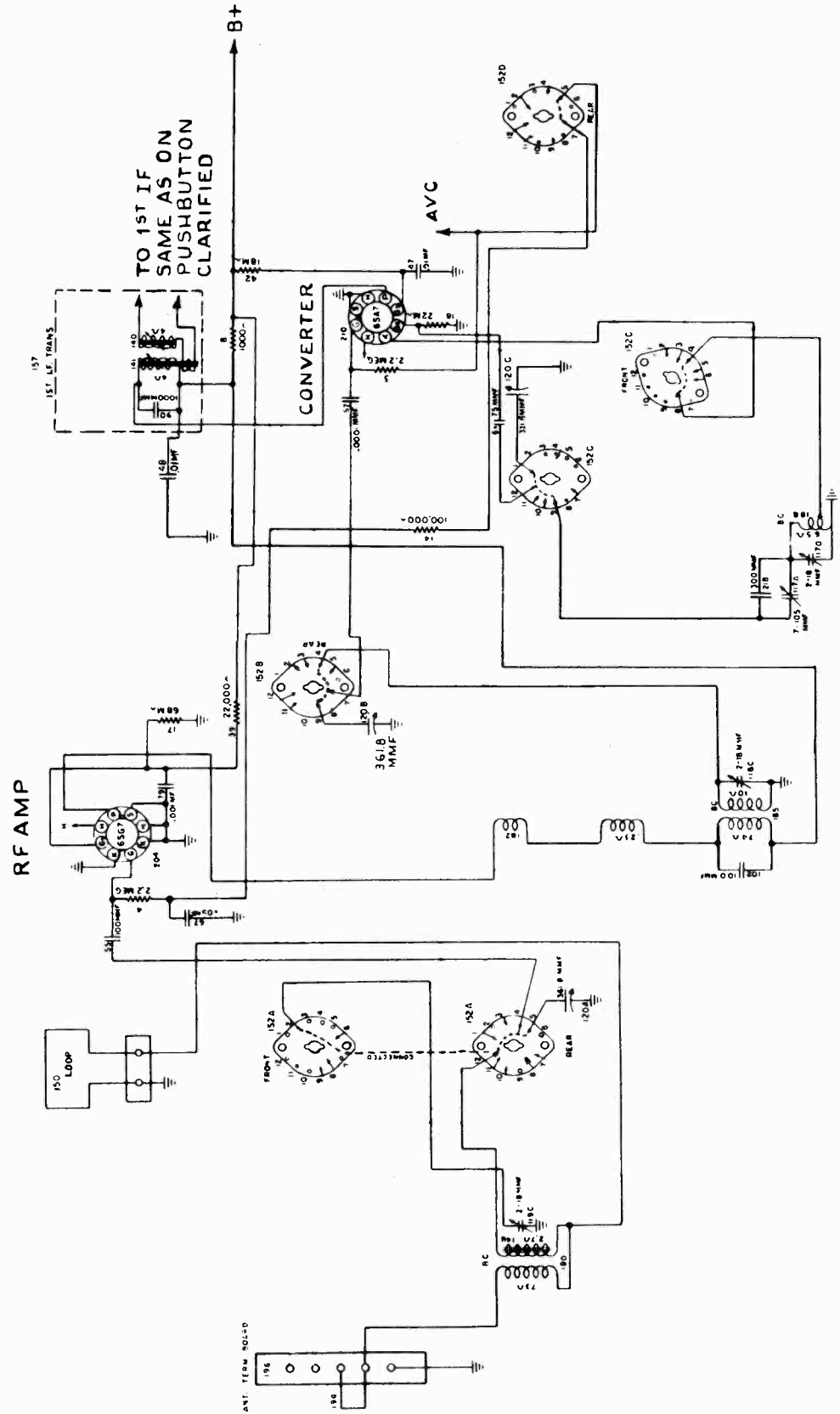
MODELS 148CP, 148CP(W),  
148CQ, 148CR  
LIMITER      DISCRIMINATOR



BAND-SWITCH SHOWN  
AT 2ND POSITION CLOCKWISE  
F-M BAND  
88.1 - 107.9 MC

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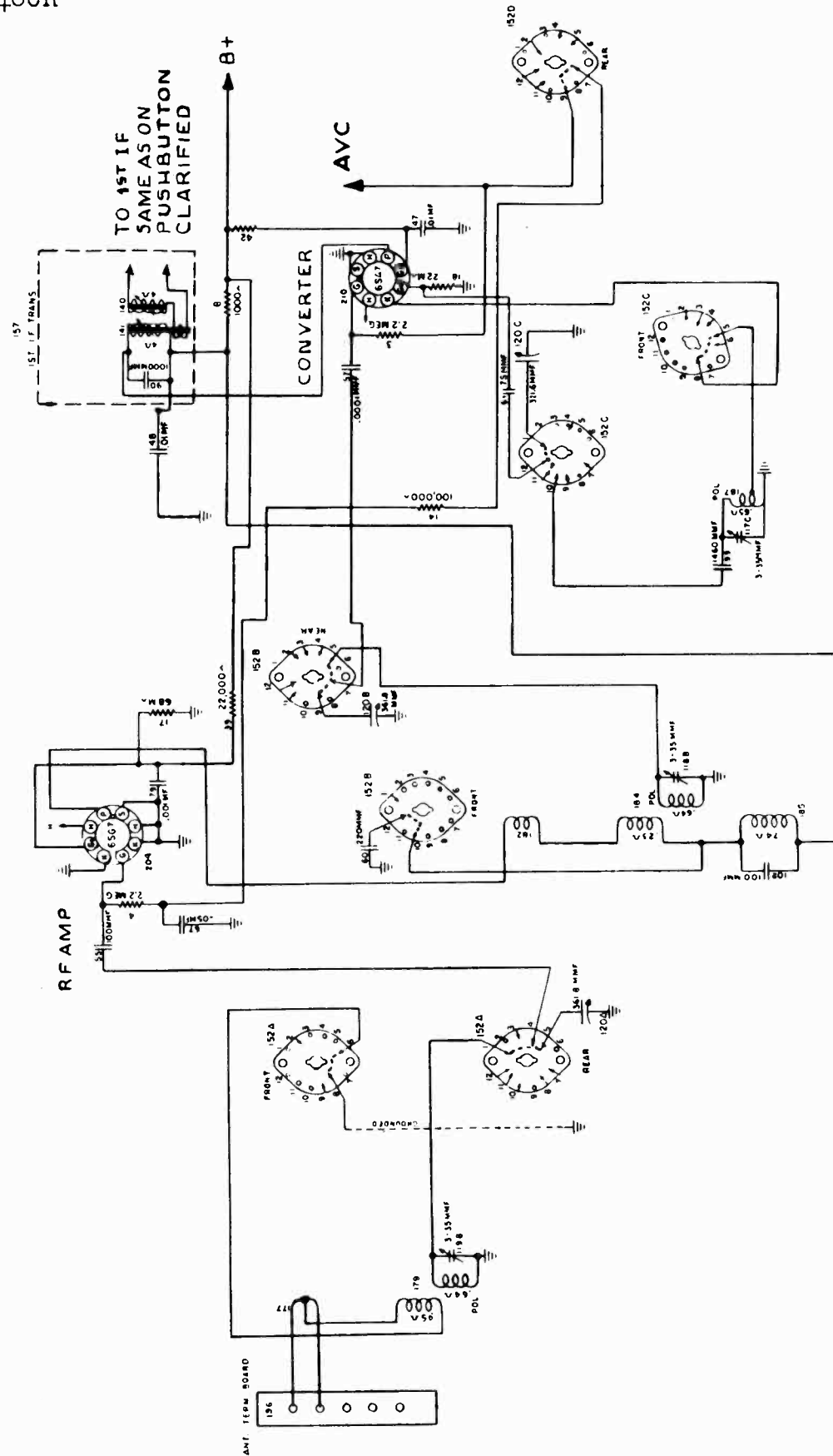
MODELS 148CP,  
148CP(W), 148CQ,  
148CR



BAND-SWITCH SHOWN  
AT 3RD POSITION CLOCKWISE.  
BROADCAST BAND (MANUAL TUNING)  
535 - 1620 KC

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MODELS 148CP,  
148CP(W), 148CQ,  
148CR



BAND-SWITCH SHOWN  
AT 4TH POSITION CLOCKWISE.  
POLICE BAND  
2.25 - 6.7 MC

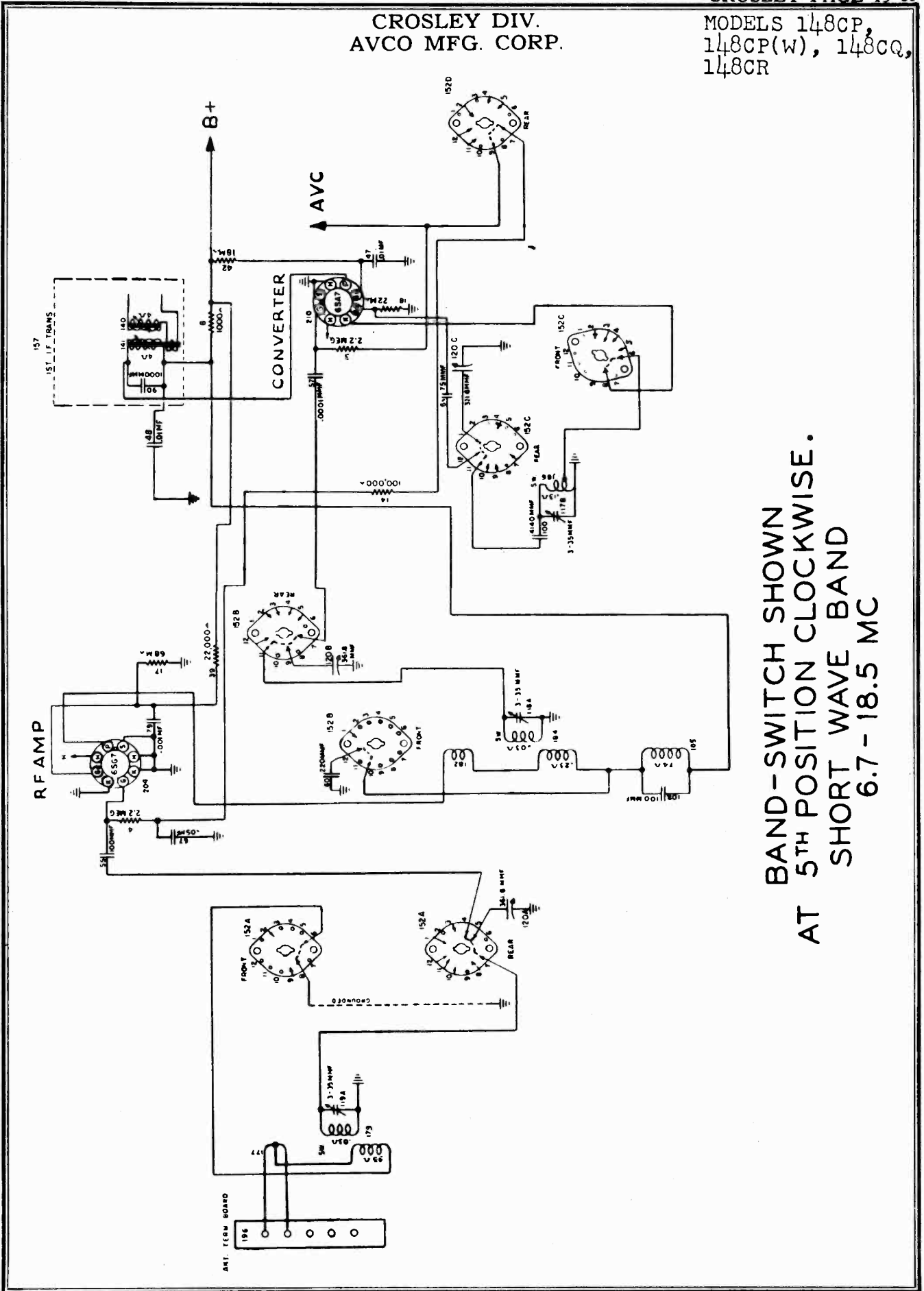
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CROSLEY PAGE 19-63

CROSLEY DIV.  
AVCO MFG. CORP.

MODELS 148CP,  
148CP(W), 148CQ,  
148CR



BAND-SWITCH SHOWN  
AT 5TH POSITION CLOCKWISE.  
SHORT WAVE BAND  
6.7 - 18.5 MC