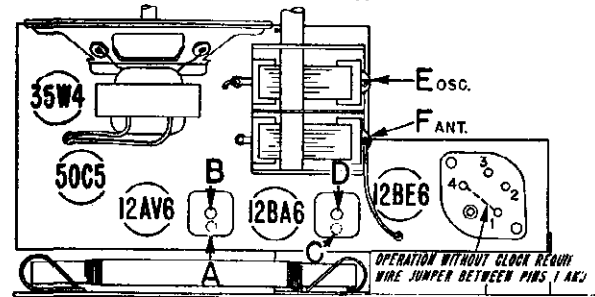


TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis.

TO REMOVE CLOCK FROM CABINET

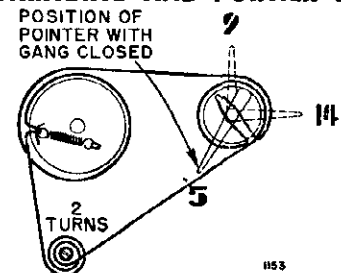
(Radio chassis need not be removed when removing clock)

1. Remove the back from radio cabinet.
2. Remove the clock plug from the socket on top of the radio chassis, by removing screw from top of plug and gently prying plug out from socket.
3. Remove the 2 nuts which hold the clock back cover to the clock.
4. Pull the clock out through the front of the cabinet.

OPERATING RADIO WHEN CLOCK IS REMOVED FROM CABINET

If the radio must be operated without the clock, a wire jumper must be connected between contacts 1 and 4 on socket M2 to complete the circuit.

DIAL STRINGING AND POINTER SETTING



Dial stringing and pointer with solid lines shown when gang closed. Dashed line pointer positions (1400 KC and 900 KC) shown when tuning condenser is tuned to generator signal.

ALIGNMENT PROCEDURE

- Connect a wire jumper between contacts 1 and 4 on clock socket (M2) as shown in illustration.
- Turn receiver volume control full on (fully clockwise).
- Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and connect to chassis. Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- 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.

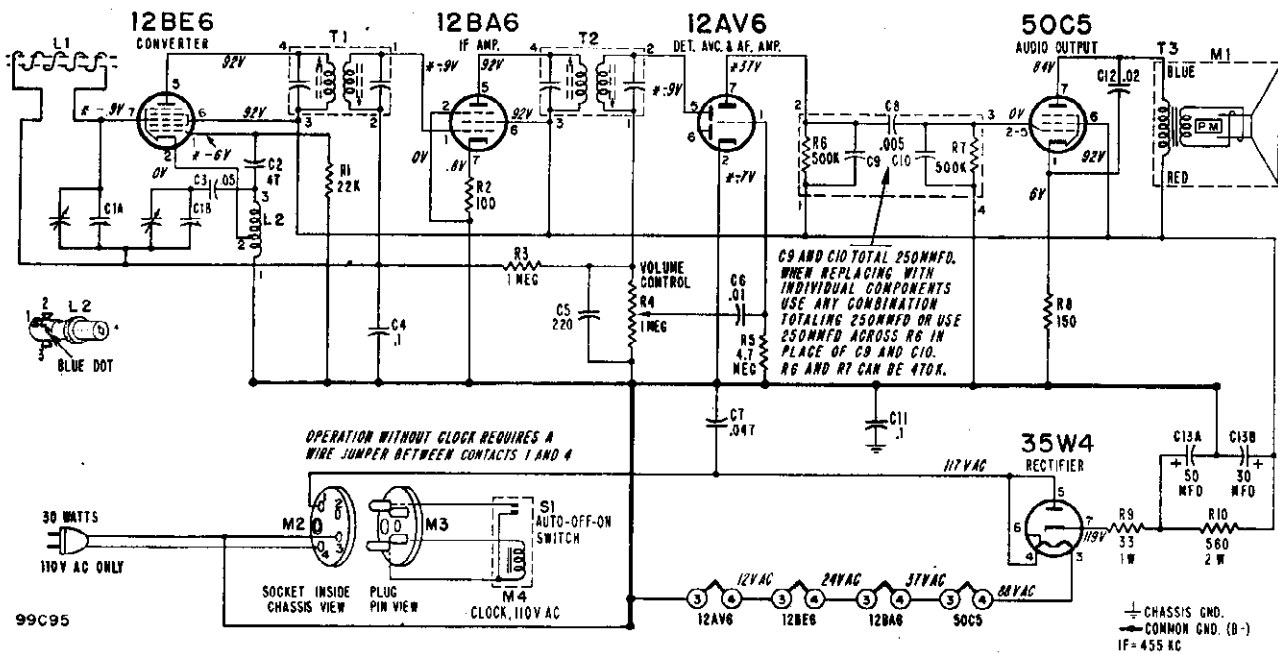
Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Antenna stator of tuning condenser	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	250 mmfd. condenser	Antenna stator of tuning condenser	1620 KC	Gang fully open	Oscillator	E	Maximum output

Mount and set dial pointer to horizontal position with tuning condenser tuned to 1400 KC generator signal; see illustration below.

3	Loop of several turns of wire, or place generator lead close to receiver loop for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	F	Maximum output
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*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may all be made from the top of the chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug.

MODELS 5L21, 5L22,
5L23, Ch. 5L2



*These readings will be either lower or practically zero if taken with a 1000 ohm-per-volt meter.

VOLTAGE DATA

Voltages shown on schematic diagram

- All readings made between tube socket terminals and B minus (negative lead of electrolytic condenser C13).
- Measured on 117 Volt 60 Cycle AC line.
- Volume control minimum; dial turned to low frequency end.
- Voltages measured with Vacuum Tube Voltmeter.

RESISTORS		
Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	100 ohms, 1/2 watt	60B 8-101
R3	1 megohm, 1/2 watt	60B 8-105
R4	1 megohm, Volume Control	75B 1-46
R5	4.7 megohms, 1/2 watt	60B 8-475
R6	500,000 ohms, 1/4 watt	60B 8-475
R7	500,000 ohms, 1/4 watt	60B 8-475
R8	150 ohms, 1/2 watt	60B 8-151
R9	33 ohms, 1 watt	60B 28-3
R10	580 ohms, 2 watt	60B 20-561

CONDENSERS		
Symbol	Description	Part No.
C1A	290 mmd. max., Ant.	69B 39
C1B	104 mmd. max., Osc. (Gang)	
C2	(Dial drum spotwelded to gang)	
C3	47 mmd. ceramic	65C 6-79
C4	.05 mfd. 400 volts, paper	64B 1-22
C5	.1 mfd. 200 volts, paper	64B 1-30
C6	.220 mfd. ceramic	65C 6-90
C7	.01 mfd. 400 volts, paper	64B 1-25
C8	.047 mfd. 400 volts, paper	65A 13-5
C9	.005 mfd. 450 volts	
C10	See Schematic	
C11	.1 mfd. 200 volts, paper	64B 1-30
C12	.02 mfd. 400 volts, paper	64B 1-24
C13A	50 mfd. 150 volts	
C13B	30 mfd. 150 volts | Elect.	67A 22-1

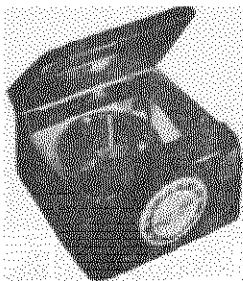
Part of couplate (part #63A5-4). Replace with exact duplicate or individual components. Note that numbers 1, 2, 3, 4, on schematic correspond to lead numbers printed on face of couplate.

COIL, TRANSFORMERS, ETC.		
Symbol	Description	Part No.
L1	Rod Antenna & Cabinet	
L2	Coil, Oscillator	69C 143-1
T1	Transformer, 1st IF	69A 52-4
T2	Transformer, 2nd IF	72B 28-7
T3	Transformer, Output	72B 28-7
M1	Speaker (4" PM) and Output Trans.	93A 21
S1	Switch, Auto-Off-On (part of M4)	78B 65-2

MISCELLANEOUS PARTS		
Description	Part No.	
Bracket, Tuning Shaft	15A	69B
Carton and Fillers	44B	214
Clamp, for Line Cord	11A	9-4
Clip, IF Transformer mtg.	72B	28-10
Compression Ring (for pointer)	19A	31-2
Dial Cord (30" length needed)	50A	1-3
Drum, Dial Pointer	17A	27
Grommet, Rubber (Gang mtg.)	18A	1-19
Line Cord and Plug	89A	1-4
Manual		
Customer Instructions	41A	18-45
Socket, Tube		
plain type	87A	24-2
with grounding strap	87A	24-3
Plate, Pointer Support	15A	49B
Pointer, Dial	25A	46-2
Sleeve, for pointer shaft	27A	124
Sleeve, Tuning (Brass)	27A	157
Speed Nut (for mtg. pointer shaft sleeve)	2B	10-28-59
Spring, Dial Cord Tension	19B	1-5
Washer, "C" (for pointer drum)	4A	4-6

CABINET PARTS		
Description	Part No.	
Bezel, Tuning Dial (Frame)		
Copper Bronze finish	23A	107-1
Cabinet, Plastic		
Ebony (5L21)	34D	43-1
Mahogany (5L22)	34D	43-2
Ivory (5L23)	34D	43-3
Grille, Speaker (plastic)	36A	22
Knob		
Volume, Ebony	33D	55-28
Volume, Maroon	33D	55-32
Volume, Ivory	33D	55-29
Tuning, Ebony	33D	55-24
Tuning, Maroon	33D	55-23
Tuning, Ivory	33D	55-26
Washer, Felt (for tuning knobs)	5A	4-18

CLOCK PARTS		
Description	Part No.	
M2	Socket, Clock, 4 contact	87A 6-3
M3	Plug, Clock, 4 pin	88B 22-5
	Shell and Insulator for plug M3	88B 22-3
M4	Clock, Complete	
	60 cycle, for 5L21,	
	5L22, 5L23	91C 6-1
Bezel, Clock (Frame)		
Copper Bronze finish	91C	6-10
Motor Assembly		
for 110 V. 60 cycles	91C	6-14
Glass, Window	91C	6-13
Knob, Clock		
Off-Auto-On	91C	6-12
Time set, Alarm set	91C	6-11

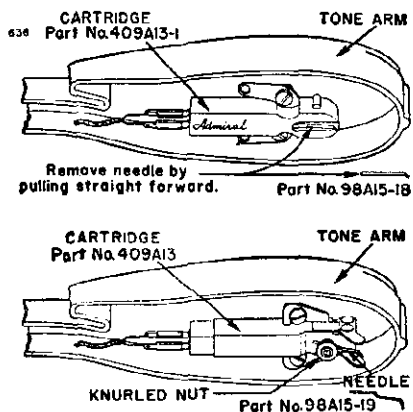


RECORD CHANGER SERVICE DATA

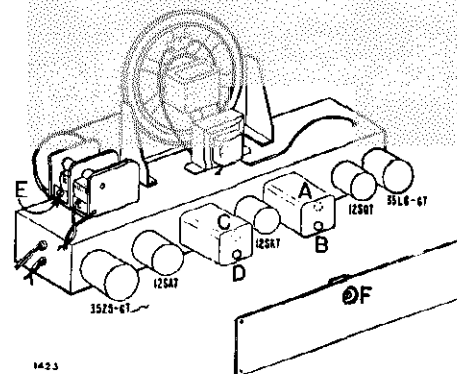
The changer model number will be found stamped at the top rear of the changer base and also on the changer model label.

Cartridge and Needle

As shown in the illustrations, alternate cartridges may be used. Cartridges are interchangeable when complete with needle.



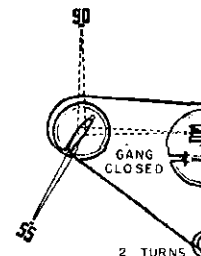
TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis

DIAL STRINGING AND POINTER SETTING

Dial stringing and pointer with solid lines shown with gang closed. Dashed line pointer positions (1400 KC and 900 KC) shown when tuning condenser is tuned to generator signal.



ALIGNMENT PROCEDURE

- Turn receiver volume control full on.
- 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 connect to chassis. Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output setting of signal generator capable producing adequate output meter indication and proceed 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 Adjustm
1	250 mmfd. condenser	Tuning condenser, antenna stator	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maxim output
2	250 mmfd. condenser	Tuning condenser, antenna stator	1620 KC	Gang fully open	Oscillator	E	Maxim output

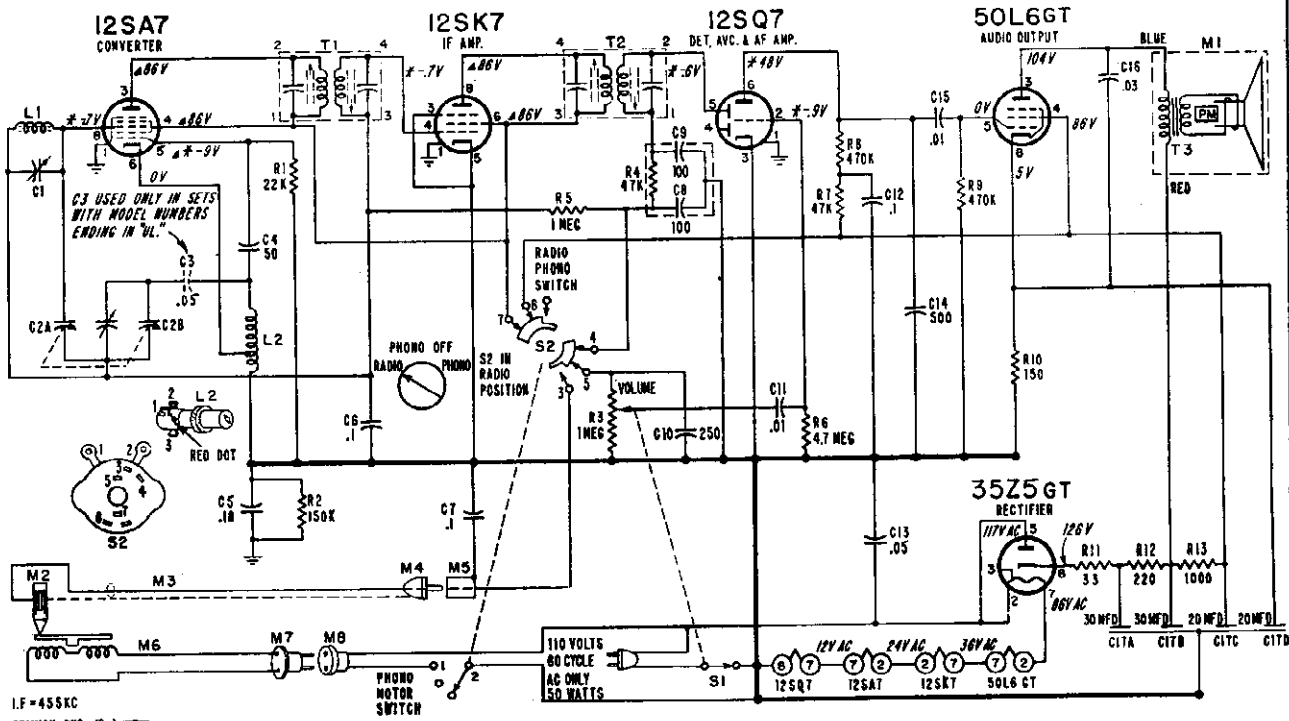
Mount dial pointer. Set pointer to horizontal position with tuning condenser tuned to 1400 KC generator signal (see illustration below). Rotate the tuning condenser until the pointer is in a vertical position (900 KC), then slip chassis in cabinet, carefully guiding the pointer so that it locates between the dial escutcheon and the cabinet. Install antenna and chassis mounting box. The pointer and escutcheon may be mounted after installing the chassis in cabinet as follows: Set pointer to horizontal position with gang tuned to 1400 KC signal. Place escutcheon on cabinet. With long nose pliers slip the hairpin ends of the escutcheon mounting springs in holes of escutcheon tabs.

3	Loop of several turns of wire, or place generator lead close to receiver antenna for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	†F	Maxim output
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*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments will all be made from the top of chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug.

† Antenna Trimmer "F" should be aligned after chassis and antenna are mounted in cabinet.

MODELS 5M21, 5M22, Ch. 5M2



I.F. = 455 KC

COMMON GND. (B-) —

CHASSIS GND. —

*These readings will be either lower or practically zero if taken with a 1000 ohm-per-volt meter.
 ▲ These readings will be zero on "Phono"; all other DC readings may be slightly higher.

99C97

VOLTAGE DATA

Volts given on schematic diagram.

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Switch S2 in "Radio" position.
- Measured on 117 Volt 60 Cycle AC line.
- Volume control minimum; dial turned to low end.
- Voltages measured with Vacuum Tube Voltmeter.

RESISTORS

Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	150,000 ohms, 1/2 watt	60B 8-154
R3	1 megohm, volume and On-Off Switch S1	75B 1-41
†R4	47,000 ohms, 1/4 watt	60B 8-105
R5	1 megohm, 1/2 watt	60B 8-105
R6	4.7 megohms, 1/2 watt	50B 8-475
R7	47,000 ohms, 1/2 watt	60B 8-473
R8	470,000 ohms, 1/2 watt	60B 8-474
R9	470,000 ohms, 1/2 watt	60B 8-474
R10	150 ohms, 1 watt	60B 14-151
R11	33 ohms, 1 watt	60B 28-3
R12	220 ohms, 1 watt	60B 28-7
R13	1,000 ohms, 1 watt	50B 28-2

CONDENSERS

Symbol	Description	Part No.
C1	Trimmer, 3 to 30 mmfd.	Part of L1
C2A	Ant. 324 mmfd. max.	Gang 58B 30-1
C2B	Osc. 108 mmfd. max.	Gang 58B 30-1
C3	Dial drum spotwelded to gang	
C4	.05 mfd., 400 volts, paper	64B 1-22
C5	50 mmfd., Ceramic	65B 6-4
C6	.18 mfd., 200 volts, paper	64A 2-2
C7	.1 mfd., 200 volts, paper	64B 1-30
C8	.1 mfd., 200 volts, paper	64B 1-30
†C9	100 mmfd., Ceramic	65B 6-5
C10	250 mmfd., ceramic	65B 6-5
C11	.01 mfd., 400 volts, paper	64B 1-25
C12	.1 mfd., 200 volts, paper	64B 1-30
C13	.05 mfd., 400 volts, paper	64B 1-22
C14	500 mmfd., Ceramic	65B 6-5
C15	.01 mfd., 400 volts, paper	64B 1-25
C16	.03 mfd., 400 volts, paper	64B 1-23
C17A	30 mfd., 150 volts	Elect. 67A 14-1
C17B	30 mfd., 150 volts	
C17C	20 mfd., 150 volts	
C17D	20 mfd., 25 volts	

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Rod Antenna (Includes board and C1)	69B 144

Symbol	Description	Part No.
L2	Coil, Oscillator	69A 52
T1	Transformer, 1st IF	72B 50
T2	Transformer, 2nd IF	72B 51
T3	Transformer, Output	75A 11-3
M1	Speaker, (5" pm)	78B 39-3
M5	Socket, Phono input	88A 1
M8	Socket & Leads, Motor	89A 6-3
S1	Switch, On-Off	Part of R3
S2	Switch, Radio-Phono	77A 28-1
†	Switch, Phono Motor	Part of S2
†	Diode Filter	63A 3-1

MISCELLANEOUS

Description	Part No.
Carton and Fillers	44B 145
Clip, Electrolytic Mounting	18A 10-6
Speed Nut (exc. mtg.)	2B 10-35-68
Dial Cord	50A 1-3
Drum, Pointer	17A 27
Gasket, Sponge Rubber (mounts on Speaker)	12B 43
Grommet, Rubber (gang mtg.)	12A 1-2
Insulator, Phono Receptacle	32A 46
Manual	
Customer Instruction	41A 18-46
Service, for RC550 Changer	S327
Plate, Pointer Support	15A 498
Pointer, Dial	25A 35-1
Shaft, Pointer	28A 42
Sleeve, Pointer Shaft	27A 124
Sleeve, Tuning (Brass)	27A 123
Spacer, "T" (gang condenser mtg.)	29A 2-1-71
Spring, Dial Cord Tension	19B 1-5
Washer, "C" (for pointer drum)	4A 4-6
Washer, Spring	4A 8-10-0

CABINET PARTS

Description	Part No.
Cabinet, Plastic	
Bottom, less lid (Ebony 5M21)	34D 28-3
Bottom, less lid (Mahogany 5M22)	34D 28-5
Lid only (Ebony 5M21)	34D 28-11
Lid only (Mahogany 5M22)	34D 28-12

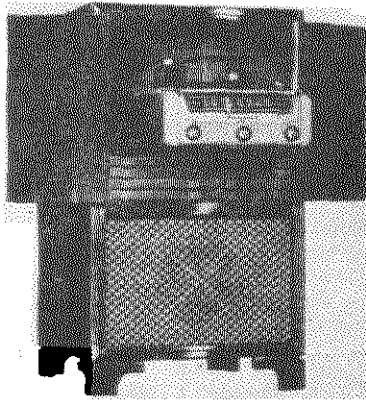
Description	Part No.
Clamp, Cable	11A 2-2
Escutcheon, Dial	
Copper Painted, for 5M22	29C 51-1
Ebony Painted, for 5M21	29C 51-3
Escutcheon Ring (Gold trim)	23A 53
Hinge	37A 8-1
Hinge Stud	365-250-C2-58
Hinge Screw (6/32x1/4 BH MS)	27A 17-1
Knobs, Radio, for Ebony 5M21	
"Tuning" (outer knob)	33C 55-11
"Radio-Phono" (inner knob)	33C 55-12
"Off-On Volume"	33C 55-30
Knobs, Radio, for Mahogany 5M22	
"Tuning" (outer knob)	33C 55-7
"Radio-Phono" (inner knob)	33C 55-8
"Off-On Volume"	33C 55-31
Rubber Bumper	
for cabinet bottom	12A 3-4
for cabinet top	12A 9-8
Spring, Escutcheon Retaining	19A 60
Stay Arm and Plate	37A 8-1
Washer, Felt (for tuning knobs)	5A 4-11

PHONOGRAPH PARTS

Symbol	Description	Part No.
M2	Cartridge Pickup (includes needle)	409A 13
M3	Cable, Shielded Pickup (includes plug)	413A 11-1
M4	Plug, Pickup Cable	88A 2-3
M6	Motor, Phono (3 speed)	407B 19
M7	Plug, Motor (Male)	88A 8-1
	Adapter, 45 RPM (envelope of 12)	48A 8-1
	Button, Snap-in Plug	13A 2-6-57
	Centerpost, Record	G400B 505-1
	Idler Wheel (includes tire)	G400A 279
	Needle, Pickup	
	for 409A13 cartridge	98A 15-19
	for 409A13-1 cartridge	98A 15-18
	Needle Retaining Nut (for 409A13 cartridge)	98A 54-2
	Service Manual, RC550 Changer	S327
	Screw and Washer, Changer Mounting (A0-32x1/4 RH MS)	AA210
	Spring, Changer Float	19A 10-3

† Part of Diode Filter 63A3-1. This unit consisting of C8, C9 and R4 may be replaced with individual components.

SPECIFICATIONS



Models 6N25, 6N26, 6N27.

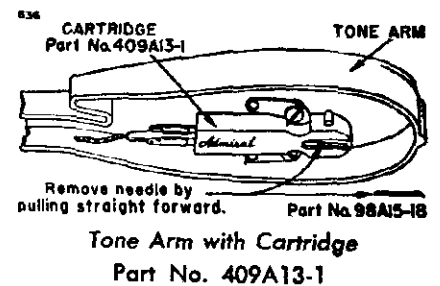
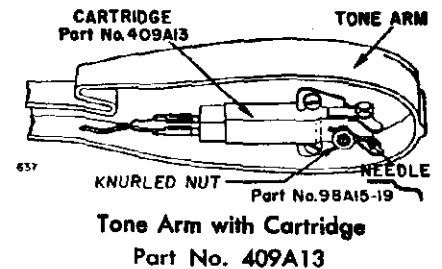
Models 6N25, 6N26 and 6N27 are combination sets consisting of a 5R2 radio chassis, a IPA4 power supply and a RC550 record changer. The 5R2 radio chassis is a 5 tube (AM only) superheterodyne receiver used with a IPA4 (one tube) power supply. Operate the radio and record changer only from a 60 cycle AC (alternating current) power line of from 110 to 120 volts. Power, 80 watts.

RECORD CHANGER SERVICE DATA

The changer model number will be found stamped at the top rear of the changer base and also on the changer model label.

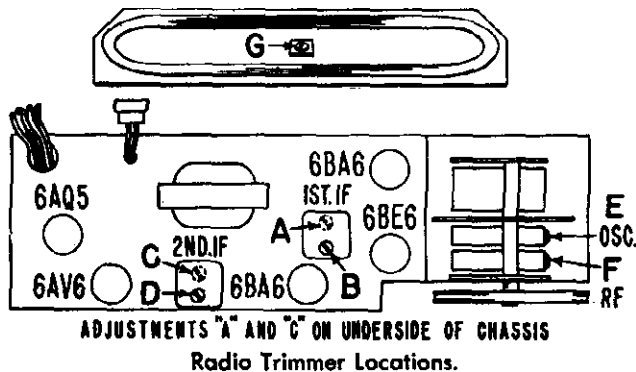
Cartridge and Needle

As shown in the illustrations at right, alternate cartridges may be used. Cartridges are interchangeable when complete with needle.



3006

TUBE AND TRIMMER LOCATION



MODELS 6N25, 6N26,
6N27, Ch. 5R2

ALIGNMENT PROCEDURE

IMPORTANT: For IF alignment, it will be necessary to disassemble the radio chassis from the escutcheon and housing and also remove the chassis cover and dial scale assembly. The antenna, RF and oscillator trimmers are accessible from top of chassis; disassembly of chassis cover and dial scale will generally not be required.

- Connect output meter across speaker voice coil.
- Turn receiver Volume control fully on; Tone control fully clockwise.
- Radio-Phono switch in "Radio" position.
- Antenna must be connected and placed in the same relative position to the chassis as when in the cabinet.
- Use lowest output setting of signal generator that gives a satisfactory reading on meter.
- Use a non-metallic alignment tool for IF adjustments.
- Repeat adjustments to insure good results.

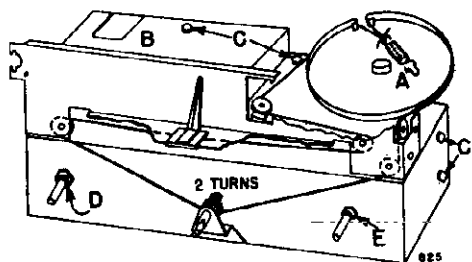
Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	.1 mfd. condenser	Pin 7 of 6BE6 tube	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum Output
2	.1 mfd. condenser	Tuning condenser, antenna stator	1620 KC	"	Oscillator	E	"
3	Loop of several turns of wire, or place generator lead close to receiver loop for adequate signal.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	RF	F	"
4	"	"	"	"	Antenna	G	"

*Adjustments "A" and "C" are made from underside of chassis.

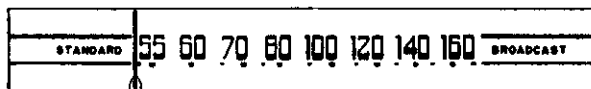
REMOVING RADIO CHASSIS FROM HOUSING

To remove the radio chassis from the front housing proceed as follows:

1. Position the gang condenser drum as shown below.
2. Unhook spring at "A".
3. Keeping tension on dial cord, hook spring to edge of cut out at "B".
4. Remove six screws "C" and hex nuts "D" and "E".
5. Remove front housing from chassis.
6. Reassemble in reverse order. See illustration below for pointer setting.

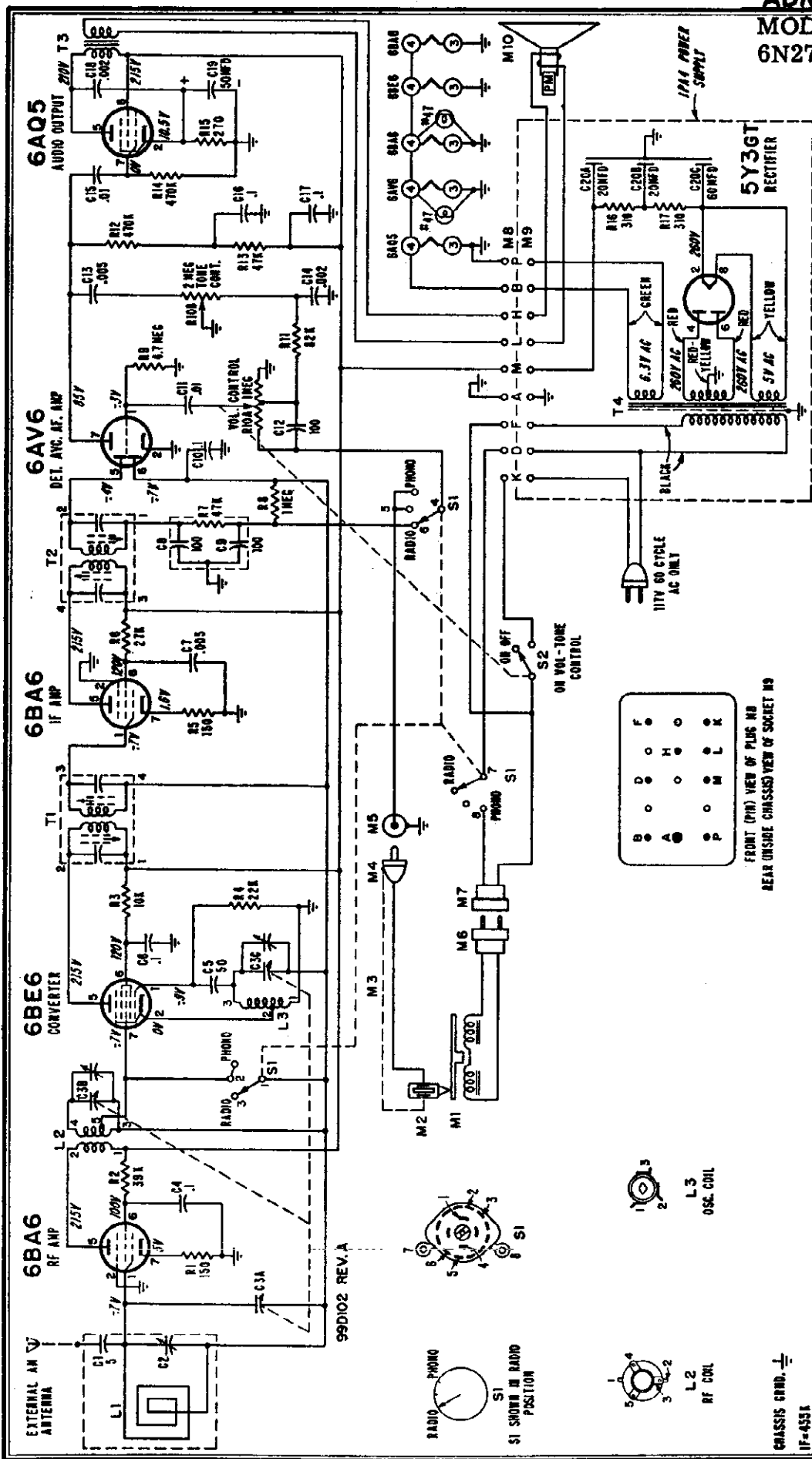


Radio Chassis With Front Housing Removed.
Dial Stringing Also Shown.



WITH GANG FULLY CLOSED, SET POINTER
AT DIAL SETTING SHOWN HERE.

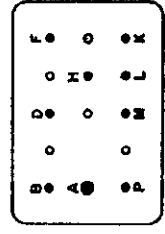
Dial Scale and Pointer Setting.



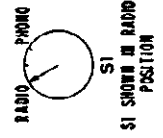
VOLTAGE DATA

Voltages given on schematic diagram.

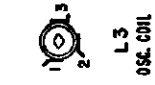
- All readings made between tube socket terminals and chassis.
- Radio-Phono switch in "Radio" position.
- Volume control minimum; dial turned to low end.
- Measured on 117 Volt, 60 Cycle AC line.
- Voltages measured with Vacuum Tube Voltmeter.



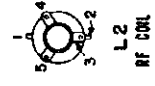
FRONT (PIN) VIEW OF PLUG NO
 REAR (INSIDE CHASSIS) VIEW OF SOCKET NO



S1 SHOWN IN RADIO POSITION



L3
 OSC. COIL



L2
 RF COIL

CHASSIS GND. \perp
 IF-455K

MODELS 6N25, 6N26,
6N27, Ch. 5R2

RESISTORS

Symbol	Description	Part No.
R1	150 ohms, 1/2 watt	60B 8-151
R2	39,000 ohms, 1 watt	60B 14-393
R3	10,000 ohms, 1 watt	60B 14-103
R4	22,000 ohms, 1/2 watt	60B 8-223
R5	150 ohms, 1/2 watt	60B 8-151
R6	27,000 ohms, 1 watt	60B 14-273
†R7	47,000 ohms, 1/2 watt	
R8	1 megohm, 1/2 watt	60B 8-105
R9	4.7 megohms, 1/2 watt	60B 8-475
R10A	1 megohm, Volume pot.	75B 11-11
R10B	2 megohms, Tone	
(R10 includes switch S2)		
R11	82,000 ohms, 1/2 watt	60B 8-823
R12	470,000 ohms, 1/2 watt	60B 8-474
R13	47,000 ohms, 1/2 watt	60B 8-473
R14	470,000 ohms, 1/2 watt	60B 8-474
R15	270 ohms, 2 watts	60B 20-271
R16	310 ohms, 5 watts	61A 5-10
R17	310 ohms, 5 watts	

CONDENSERS

Symbol	Description	Part No.
C1	5 mmfd, mica	65B 1-62
C2	2 to 20 mmfd, trimmer	66B 8-5
C3A	420 mmfd, max.	Gang 68B 48-2
C3B	193.8 mmfd, max.	
C3C	90 mmfd, max.	
(Note: Dial drum spot-welded to gang)		
C4	.1 mfd, 400 volts, paper	64B 5-20
C5	50 mmfd, ceramic	65B 6-4
C6	.1 mfd, 400 volts, paper	64B 5-20
C7	.005 mfd, min, ceramic	65A 10-1
†C8	100 mmfd, ceramic	
†C9	100 mmfd, ceramic	
C10	.1 mfd, 200 volts, paper	64B 5-30
C11	.01 mfd, min, ceramic	65A 10-3
C12	100 mmfd, min, ceramic	65B 6-3
C13	.005 mfd, min, ceramic	65A 10-1
C14	.002 mfd, min, ceramic	65A 10-7
C15	.01 mfd, min, ceramic	65A 10-3
C16	.1 mfd, 400 volts, paper	64B 5-20
C17	.1 mfd, 400 volts, paper	64B 5-20
C18	.002 mfd, 600 volts, paper	64B 5-14
C19	50 mfd, 25 volts, elect.	67A 4-10
C20A	20 mfd, 350 volts	Elect 67C 15-17
C20B	20 mfd, 350 volts	
C20C	60 mfd, 400 volts	

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Antenna Loop	69C116-2
L2	Coil, RF	69A 115-2
L3	Coil, Oscillator	69A 52-5
T1	Transformer, 1st IF	72B 28-7a
T2	Transformer, 2nd IF	72B 28-7
T3	Transformer, Output	79A 22
T4	Transformer, Power	80B 22
M10	Speaker (8" PM)	78B 49-3
S1	Switch, Radio-Phono	77A 28-2
S2	Switch, On-Off	Part of R10
	Diode Filter	63A3-1

MISCELLANEOUS PARTS

Symbol	Description	Part No.
M5	Socket, Phono Input	88A1
M7	Socket, Phono Motor	89A 6-11
†Part of diode filter (part #63A3-1). Replace with exact duplicate or individual components.		

M8	Plug, Cable Connector	88A 20-1
	Cover and Insulator (for plug 88A20-1)	88A 20-12
	Cable (9 wire), including Plug and cover	AB225
M9	Socket, Cable	88A 20-2
	Clip, IF Transformer Mtg	72B 28-10
	Cover Assembly, Chassis	A1880
	Dial Back and Bracket Assembly	A1881
	Dial Cord (50" length needed)	50A 1-3
	Dial Scale	22B 23-1
	Escutcheon, Radio	23D 63-3
	Grommet, Gang Mounting	12A 1-2
	Pilot Light, #47	81A 1-8
	Pointer, Metal Dial	25A 37
	Shaft, Tuning	28A 48-1
	Snap Button (for mtg. dial scale)	13A 1-1-71
	Socket, Pilot Light	82A 6-3
	Socket, Tube (7 pin miniature)	87A 3-7
	Spacer Sleeve (for mounting gang)	29A 2-1-71
	Speed Nut (for mounting radio escutcheon)	2B 12-4-68
	Spring, Dial Cord Tension	19B 1-3
	Spring, Hairpin (for tuning shaft)	19A 2-5

CABINET PARTS

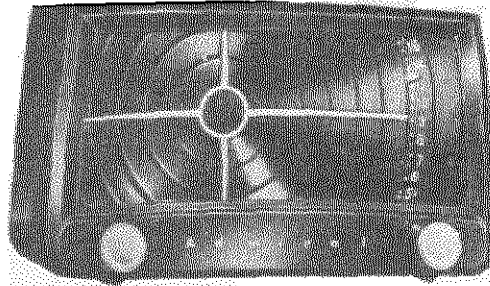
Description	Part No.
Back, Cabinet	43C 169-2
*Cabinet, Wood	
Walnut (6N25)	35E 189-1
Mahogany (6N26)	35E 189-2
Blond (6N27)	35E 189-3
Cartons and Fillers	44B 202
‡Door Catch and Strike Plate. See ‡ note below	
Door Handle	37A 64-1
Doors, Matched Pair	
for Walnut (6N25)	35E 189-50
for Mahogany (6N26)	35E 189-51
for Blond (6N27)	35E 189-52
Grille Cloth	
for Walnut (6N25) and Mah. (6N26)	36C 3-60
for Blond (6N27)	36C 3-61
‡Hinge, Knife Door. See ‡ note below	
Knob, 'Radio-Phono', Tuning	33D 55-1
Knob, 'Tone'	33D 55-4
Knob, 'Volume'	33D 55-5
Bracket, Slide-out Drawer Stop	15A 782
Pull, Slide-out Drawer	37A 66-1
Slide, Drawer	37A 32-9

PHONOGRAPH PARTS

Symbol	Description	Part No.
M1	Motor, Phono. (3 speed)	407B 19
M2	Cartridge Pickup (includes needle)	409A 13 or 409A 13-1
M3	Cable, Shielded Pickup (includes plug)	413A 11-2
M4	Plug, Pickup Cable	88A 2-3
M6	Plug, Motor (Male)	88A 8-1
	Adapter, 45 RPM (envelope of 12)	49A 8-1
	Button, Snap-in Plug	13A 2-8-57
	Belt, Rubber Drive	406A 20
	Centerpost, Record	G400B 505-1
	Idler Wheel (includes tire)	G400A 59
	Needle, Pickup	
	for 409A13 cartridge	88A 15-19
	for 409A13-1 cartridge	88A 15-18
	Needle Retaining Nut (for 409A13 cartridge)	98A 54-2
	Screw and Washer, Changer Mounting (10-32x1 1/4 RH MS)	AA210
	Spring, Changer Float	405A 139

*To insure proper matching and fit, also specify cabinet manufacturer's code letters (usually burned or stamped on back rail of cabinet). Wood parts are supplied only if old part cannot be repaired; when ordering, describe condition of old part in detail.

‡Order these parts using the part number given in Cabinet Hinge Ordering Data, Form No. S379. Otherwise, return old part, or send an outline tracing (exact size) of part and specify finish (brass, bronze, etc.).



Model 5S21 Ebony, 5S22 Mahogany, 5S23 Ivory.
 Operating Voltage: 117 volts, 60
 cycle AC or DC. Power: 30 watts.

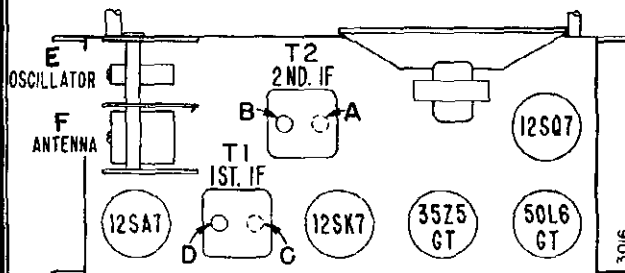
ALIGNMENT PROCEDURE

- Connect output meter across speaker voice coil.
 - Turn receiver volume control full on.
 - Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and connect to chassis.
 - Use lowest output setting of signal generator capable of producing adequate output meter indication and then proceed as outlined in chart below.
 - Repeat adjustments to insure good results.
- Caution: Do not connect a ground wire directly to chassis.

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	Antenna stator of tuning condenser	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum Output
2	250 mmfd. condenser	Antenna stator of tuning condenser	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum Output
3	Loop of several turns of wire or place generator lead close to receiver loop for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Maximum Output
4	Set dial pointer slide as shown in Dial Cord Stringing Diagram. Also see instructions below on "Setting Pointer Slide" and on "Removing Or Installing Chassis In Cabinet."						

*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may be made from the top of chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF adjustment may be reached through the hollow core in the upper slug.

TUBE AND TRIMMER LOCATION

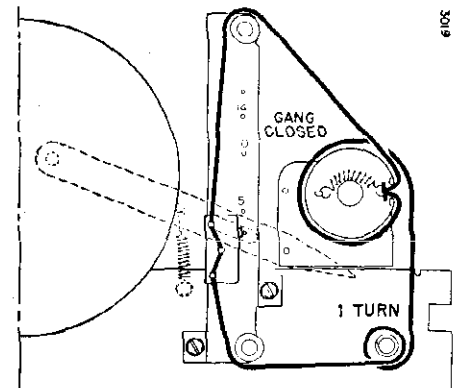


Adjustments A and C are made from underside of chassis.

REMOVING OR INSTALLING CHASSIS IN CABINET

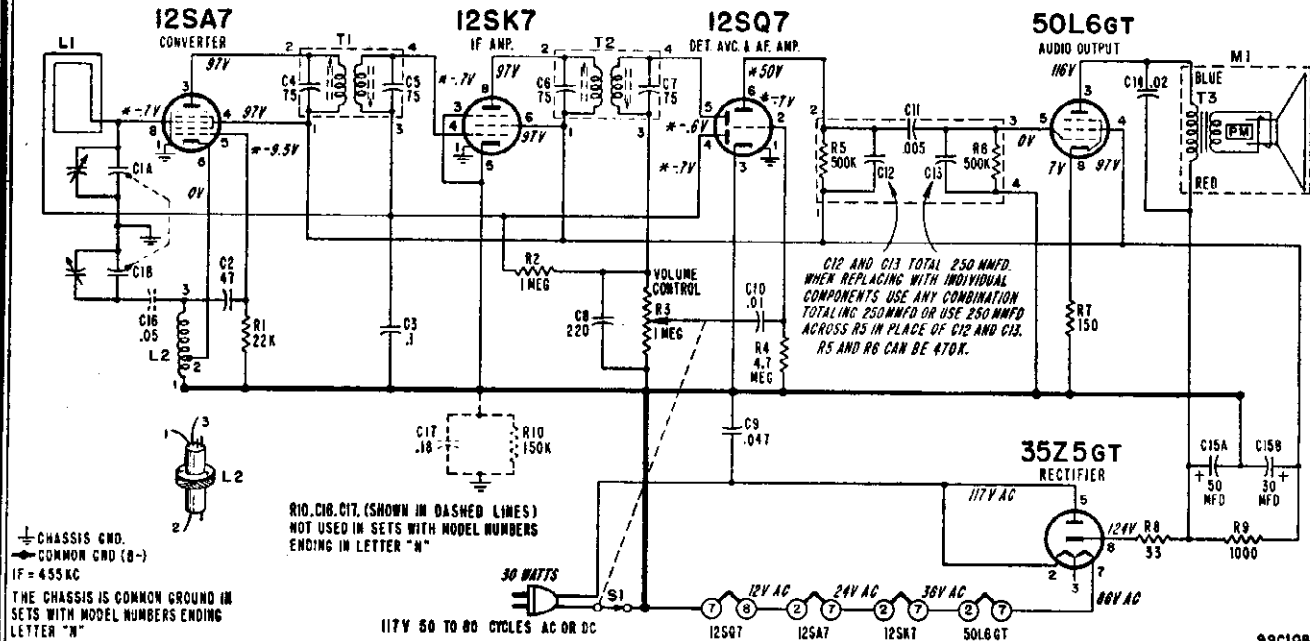
Fully close the gang condenser before removing or installing the chassis in the cabinet. When installing, carefully slide the chassis in the cabinet, so that the tab on the pointer slide fits into the elongated hole at the center of the dial pointer. See the "Pointer Setting and Dial Stringing" diagram at the right. Parts which are shown in dotted lines are not assembled to the chassis. These parts are mounted on the inside of the cabinet.

POINTER SETTING AND DIAL CORD STRINGING



SETTING POINTER SLIDE

With the gang condenser fully closed, line up the center of the pointer slide with the bottom hole in the pointer slide bracket as shown in the figure above.



*These voltage readings will be either lower or practically zero if taken with a 1000 ohm-per-volt meter.

VOLTAGE DATA

Voltagcs shown on schematic diagram.

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Dial turned to low frequency end; volume control at minimum.
- Measured on 117 Volts AC line.
- Voltages measured with Vacuum Tube Voltmeter.

RESISTORS

Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	1 megohm, 1/2 watt	60B 8-105
R3	1 megohm, Volume Control and On-Off switch S1	75B 1-25
R4	4.7 megohms, 1/2 watt	60B 8-475
†R5	500,000 ohms, 1/2 watt	60B 8-151
†R6	500,000 ohms, 1/2 watt	60B 8-151
R7	150 ohms, 1/2 watt	60B 8-151
R8	33 ohms, 1 watt	60B 28-3
R9	1,000 ohms, 1 watt	60B 28-2
R10	150,000 ohms, 1/2 watt	60B 8-154

R10 not used in sets with model numbers ending in "N".

CONDENSERS

C1a	Ant., 420 mmfd., max.	Gang 68B 48 (Dial drum spot welded to gang)
C1b	Osc., 108 mmfd., max.	
C2	47 mmfd., ceramic	65C 6-79
C3	.1 mfd., 200 volts, paper	64B 1-30
C4	75 mmfd., 3%	Part of T1
C5	75 mmfd., 3%	Part of T1
C6	75 mmfd., 3%	Part of T2
C7	75 mmfd., 3%	Part of T2

†Part of couplate (part 63A 5-4). Replace with exact duplicate or individual components. Note that numbers 1, 2, 3, 4, on schematic correspond to couplate lead numbers printed on face of couplate 63A 5-4.

Symbol Description Part No.

C8	220 mmfd., ceramic	65C 6-80
C9	.047 mfd., 400 volts, paper	65A13-5
C10	.01 mfd., 400 volts, paper	64B 1-25
†C11	.005 mfd., 400 volts	
†C12	{ See note on schematic.	
†C13		
C14	.02 mfd., 400 volts, paper	64B 1-24
C15a	50 mfd., 150 volts} elect	67A 10
C15b	30 mfd., 150 volts}	
C16	.05 mfd., 400 volts, paper	64B 1-22
C17	.18 mfd., 200 volts, paper	64A 2-2

(C16 and C17 not used in sets with model numbers ending in "N".)

COILS, TRANSFORMERS, ETC.

L1	Antenna Loop (mounted on cardboard back)	69C 154
L2	Coil, Oscillator	69A 20-2
T1	Transformer, 1st I.F.	72B 50
T2	Transformer, 2nd I.F.	72B 51
T3	Transformer, Output	98A 4
	Speaker (5" PM) and Output Transformer	78B 26-1
S1	Switch, On-Off	Part of R3
	Couplate	63A 5-4

(Includes R5, R6, C11, C12, C13)

MISCELLANEOUS

Description	Part No.
Bracket, Pointer Slide	15A 801
Cabinet	
Ebony (5S21)	34D 26-12
Mahogany (5S22)	34D 26-13
Ivory (5S23)	34D 26-14
Carton and Fillers	44B 236
Clip, Electrolytic Mounting	18A 10-6
Dial Cord (27" length needed)	50A 1-3
Dial Background	22A 30
Knob, Tuning	
Ebony (5S21)	33A 81-1
Ivory (5S23)	33A 81-2
Mahogany (5S22)	33A 81-3
Pointer, Dial	25A 52
Shaft, Tuning	28A 26-6
Slide, Pointer	15A 800
Snap Button (mtg pointer to cabinet)	13A 1-2-59
Snap Button (mtg. dial background)	13A 1-3-59
Socket, Tube	87A 10-2
Spacer, Tuning Shaft	29A 2-1-71
Speed Nut (for tuning shaft spacer)	2B 10-19-2
Spring, Dial Cord Tension	19C 1-2
Spring, Pointer Tension	19C 1-20
Washer, "C" (tuning shaft)	4A 4-6-0
Washer, Spring (tuning shaft)	4A 6-3-0

SPECIFICATIONS

Circuit: Superheterodyne using 4 miniature tubes and a selenium rectifier.

Frequency Range: Standard broadcast band, 535 to 1620 KC.

Intermediate Frequency: 455 KC.

Power Supply: Power line of 117 volts, 50 to 60 cycles AC or DC. Batteries using one 67½ volt "B" battery and one 7½ volt "A" battery.

Power Consumption: 20 watt on operation from power line.

Antenna: Built-in Ferro-Scope (iron core) antenna.

Speaker: 3½" PM, with a 1 oz. Alnico V magnet. Voice coil impedance, 3.2 ohms.

REPLACING BATTERIES

Replacement batteries of the following types may be used in this set:

"A" Battery (7½ Volts): General 31, Eveready 717, Burgess C5, Ray-O-Vac 751C or equivalent.

"B" Battery (67½ Volts): General 108, Eveready 467, Burgess XX45, Ray-O-Vac 4367 or equivalent.

The "A" and "B" batteries have been designed for equal life. Under normal operating conditions, battery life should be approximately 40 operating hours. The "A" battery may give satisfactory performance with voltage as low as 5.5 volts. The "B" battery may give satisfactory performance with voltage as low as 49.5 volts. Replace the batteries when the reception is weak and the battery voltage has dropped below values given above.

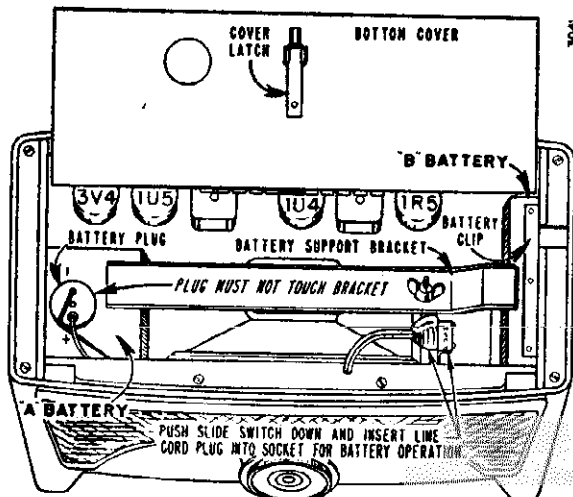
To install replacement batteries, slide the cover latch and open the hinged bottom cover. Then remove the wing nut which holds the battery support bracket in place.

Disconnect the battery connectors from the old worn out batteries. Batteries can easily be removed from the set by grasping them with long nose pliers or if necessary, removing the cabinet bottom. Install the new batteries so that the battery connectors are farthest away from the ends of the battery bracket. Batteries may become shorted if the bracket touches the connectors.

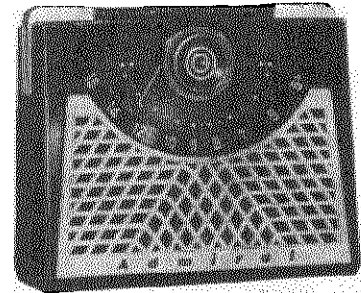
Note: It is important that the run-down batteries be removed from the set IMMEDIATELY because the chemical action inside of the cells will cause some batteries to leak when they are worn out. The acid which leaks from a run-down battery may damage parts of the set or the cabinet because of its corrosive action.

REPLACING TUBES

Tubes can most conveniently be removed or replaced by first removing the batteries and cabinet bottom. A miniature tube puller or extractor will be of help in facilitating tube replacement.



Tube and Battery Location



Models 4V12 Mahogany, 4V18 Green and 4V19 Ebony.

REMOVING AND INSTALLING CHASSIS IN CABINET

Removal of the chassis from the cabinet is not required when replacing tubes or batteries. It will, however, be necessary to remove the chassis for making alignment or for taking voltage readings. For taking voltage readings, it will also be necessary to remove the metal cover enclosing the underside of the chassis.

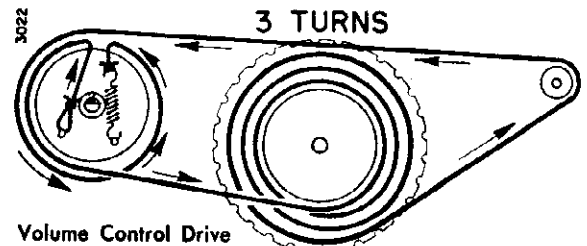
To remove the chassis from the cabinet, proceed as follows:

- (a) Remove the tuning knob, pointer hub and cabinet bottom (base). The speaker grille may be removed by pulling it down and away from the cabinet.
- (b) Remove the 2 chassis mounting screws located at the top inside of the cabinet, just below the handle brackets.
- (c) Carefully slide the chassis out of the cabinet, being careful not to damage the built-in iron core antenna or the speaker.

Install the chassis in the cabinet in the reverse order. A screwdriver with a magnetic blade or a screw holding type screwdriver will be of help in inserting the chassis mounting screws when installing the chassis in the cabinet.

STRINGING THE VOLUME CONTROL DRIVE CORD

The illustration below shows the volume control drive cord

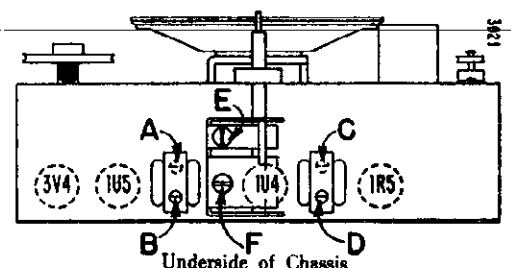


Volume Control Drive Cord Stringing VOLUME OFF

stringing used in 4V1 radio chassis. The arrows along the drive cord show the direction in which the volume control drive cord is strung.

Before stringing the drive cord, rotate the volume control fully counterclockwise until the on-off switch snaps in the off position. Place the volume knob over the gang condenser tuning shaft. To prevent the volume knob from slipping off during drive cord stringing, mount the dial pointer hub to the gang condenser tuning shaft. To prevent slipping of the volume control drive, it is important to maintain tension on the drive cord tension spring.

TRIMMER LOCATION



Adjustments A and C are made from other side of chassis.

MODELS 4V12, 4V18, 4V19, Ch. 4V1

ALIGNMENT PROCEDURE

- Use battery power for alignment if fresh batteries are available. If using AC power, an isolation transformer should be used if available. If an isolation transformer is not used, connect a .1 mfd. condenser in series with the signal generator low side to B minus (pin 7 of 1U5 tube.)
- Batteries should be held in place on the chassis during alignment.
- The metal chassis cover need not be removed during alignment.
- Set volume control full on.
- Connect output meter across speaker voice coil.
- Use lowest setting of signal generator capable of producing adequate output meter indication.
- Use a non-metallic alignment tool for IF transformers.
- 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	.001 mfd. when using AC. .1 mfd. when using Battery	Antenna stator of tuning condenser	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	.001 mfd. when using AC. .1 mfd. when using Battery	Antenna stator of tuning condenser	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum output
Install the metal chassis cover if removed during IF Alignment.							
3	Loop of several turns of wire, or place generator lead close to receiver for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Maximum output

*Adjustments A and C are made from other side of chassis.

RESISTORS

Symbol	Description	Part No.
R1	2.2 megohms, 1/2 watt	60B 8-225
R2	270 ohms, 1/2 watt	60B 8-271
R3	100,000 ohms, 1/2 watt	60B 8-104
R4	18,000 ohms, 1/2 watt	60B 8-183
R5	3.3 megohms, 1/2 watt	60B 8-335
R6	10 megohms, 1/2 watt	60B 8-106
R7	390 ohms, 1/2 watt	60B 8-391
R8	1 megohm, Vol. Control (R8 includes Switch S1)	75B 1-43
R9	120 ohms, 1/2 watt	60B 8-121
*R10	10 megohms, 1/2 watt	
*R11	4.7 megohms, 1/2 watt	
*R12	1 megohm, 1/2 watt	
*R13	3.3 megohms, 1/2 watt	
R14	2,200 ohms, 1/2 watt	60B 8-222
R15	47 ohms, 1 watt	60B 14-470
R16	2,700 ohms, 1 watt	60B 14-272
R17A	1380 ohms | 5 watt, topped	
R17B	1380 ohms | Candohm	61A 5-7

CONDENSERS

Symbol	Description	Part No.
C1A	272 mmfd, max. Ant. } gang	68B 41
C1B	107 mmfd, max. Osc. }	
C2	250 mmfd, ceramic	65C 6-5
C3	.25 mfd, 200 volts, paper	64B 1-28
C4	100 mmfd, ceramic	65C 6-3
C5	.005 mfd, ceramic	65C 10-5
C6	.01 mfd., 400 volts, paper	64B 1-25
C7	.001 mfd, min, ceramic	65C 6-41
C8	100 mid, 25 volts, elect.	67A 4-6
*C9	100 mmfd, ceramic	
*C10	.001 mfd, min, ceramic	
*C11	.01 mfd, min, ceramic	
*C12	100 mmfd, ceramic	
*C13	.005 mfd, ceramic	
C14	.001 mfd, min, ceramic	65C 6-41
C15	.1 mfd, 200 volts, paper	64B 1-30
C16	.047 mfd, 400 volts, paper	65A 13-5
C17A	20 mfd, 150 volts } elect.	67C 7-41
C17B	30 mfd, 150 volts }	
C17C	20 mfd, 150 volts }	

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Antenna, Rod	69C 120-1
L2	Coil, Oscillator	69A 39-6
T1	Transformer, 1st IF	72B 28-1
T2	Transformer, 2nd IF	72B 28-62
T3	Transformer, Output	98A 21
M1	Speaker (3 1/2" PM) and Output Trans.	78B 58-1
M2	Rectifier, Selenium	93A 1-6
S1	Switch, On-Off	Part of R8
S2	Switch, Power Change	77A 19-1
	Couplate (includes R10, R11, R12, R13, C9, C10, C11, C12, C13)	63B 6-6

MISCELLANEOUS PARTS

Description	Part No.
Baffle, Speaker	43A 174
Bracket	
battery support	15A 603
volume pulley and bracket ass'y	A3316
shield for gang	15A 618
cover for AC switch	15A 595
Carton and Fillers	44B 165
Clip, IF Transformer Mounting	72B 28-10
Clip "B" Battery Connector	90A 5-3
Cover, Metal for chassis	14C 70
Drum, Vol. Control	17A 30
Insulator, Fibre (for mtg. rectifier)	32A 137
Customer Instructions	41B 20-3
Dial Cord (30" length needed)	50A 1-3
Nut, Wing (=6/32 for battery support bracket)	2A 5-4-71
Plate, Electrolytic Mounting	67A 2-1
Plug, "A" Battery Connector	88A 4-6
Hub, Brass	
mounts on volume control shaft	27A 153
Screw, Set	
for volume control drum (=6-32x3/16)	1A 43-8
Socket, Tube	87A 3-4
Washer, Spring (5/16" ODX3/16" ID)	4A 6-13

CABINET PARTS

Symbol	Description	Part No.
	Bottom, Cabinet (Base)	
	Mahogany for 4V12 complete with metal door	A3721
	plastic frame only	34D 35-4

Description Part No.

Bottom, Cabinet (Base) contid.	
Green for 4V18 complete with metal door	A3493
plastic frame only	34D 35-6
Ebony for 4V19 complete with metal door	A3270
plastic frame only	34D 35-2
Bracket, Handle Support (metal ends)	20B 14
Cabinet (less bottom)	
Mahogany for 4V12	34D 49-2
Green for 4V18	34D 49-3
Ebony for 4V19	34D 49-1
Dial Pointer and Hub Assembly (includes compression ring)	
Mahogany for 4V12	A3711
Green for 4V18	A3712
Red for 4V19	A3713
Escutcheon Overlay, Plastic	23C 112-1
Grille Cloth and Support Assembly	
Mahogany for 4V12 and 4V19	AA227-2
Green for 4V18	AA227-3
Handle, Carrying (plastic covering only)	
Mahogany for 4V12	33A 58-2
Green for 4V18	33A 58-3
Red for 4V19	33A 58-6
Hinge, Bottom Cover	37A 33
Knob, Volume	
Mahogany for 4V12	33C 67-3
Green for 4V18	33C 67-5
Red for 4V19	33C 67-6
Knob, Tuning (includes compression ring)	
Mahogany for 4V12	A3707
Green for 4V18	A3708
Red for 4V19	A3709
Ring, Compression (for tuning knob)	19A 31-7
Ring, Compression (for pointer hub)	19A 31-2
Rivet, Shoulder	
with 7/64 shoulder	6A 4-12-71
with 3/32 shoulder	6A 4-7-71
Rubber Strap, for carrying handle	
upper, with 13/32" holes	12A 38
lower, with 1/4" holes	12A 38-1
Screw	
=4x5/8 self tapping; for mtg. plastic base to cabinet	1A 69-6-71
=8-32x7/16; for mtg. handle and chassis	280-437-C2-71
Slide Arm (for bottom door)	15A 291
Spring, Support (for carrying handle)	18A 42
Washer, Felt (for volume knob)	5A 4-8

(Part of couplate (part #63B 6-6). Replace with extra duplicate or individual components. Note that numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 on schematic correspond to lead numbers printed on face of couplate.

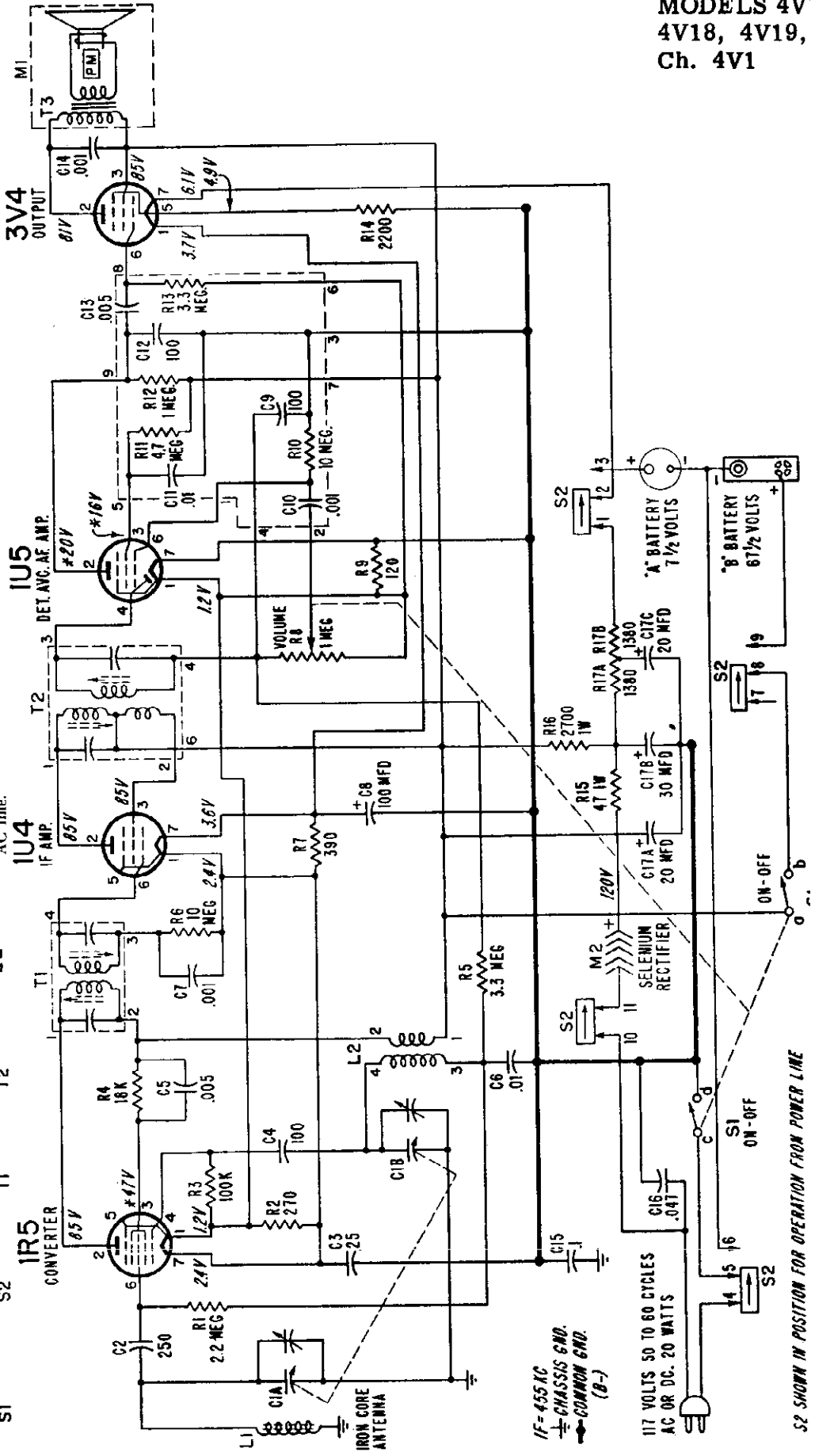
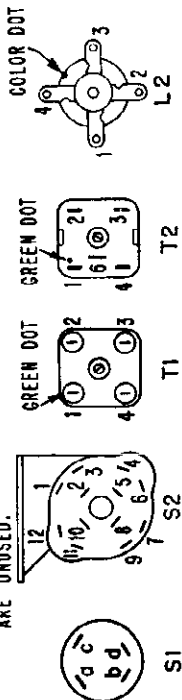
MODELS 4V
4V18, 4V19,
Ch. 4V1

VOLTAGE DATA

Voltages shown on schematic diagram.

- All voltages taken between tube socket terminals and B minus (pin 7 of 1U5 tube).
- Dial turned to low frequency end; volume control at minimum.
- Voltages measured with Vacuum Tube Voltmeter from 117 Volts AC line.

TERMINALS T AND 12 OF SWITCH S2 ARE UNUSED.



IF = 455 KC
⊕ CHASSIS GND.
⊖ COMMON GND. (B-)

117 VOLTS 50 TO 60 CYCLES AC OR DC. 20 WATTS

S2 SHOWN IN POSITION FOR OPERATION FROM POWER LINE

MODELS 5Y22, 5Y22A, Ch. 5Y2

ALIGNMENT PROCEDURE

- Turn receiver volume control full on.
- 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 connect to chassis. Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- 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	Maximum output
2	250 mmfd. condenser	Tuning condenser, antenna stator	1620 KC	Gang fully open	Oscillator	E	Maximum output

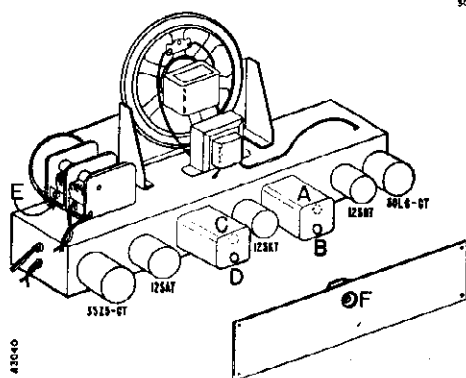
Mount dial pointer. Set pointer to horizontal position with tuning condenser tuned to 1400 KC generator signal (see Dial Stringing and Pointer Setting diagram below). Rotate the tuning condenser until the pointer is in a vertical position (900 KC), then slip chassis in cabinet, carefully guiding the pointer so that it locates between the dial escutcheon and the cabinet. Install antenna and chassis mounting bolts.

3	Loop of several turns of wire, or place generator leads close to receiver antenna for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	†F	Maximum output
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*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may all be made from the top of chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug.

†Antenna Trimmer "F" should be aligned after chassis and antenna are mounted in cabinet.

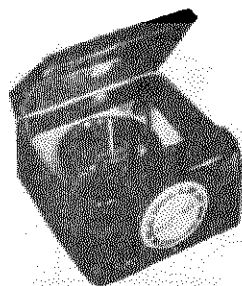
TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis.

RECORD CHANGER SERVICE DATA

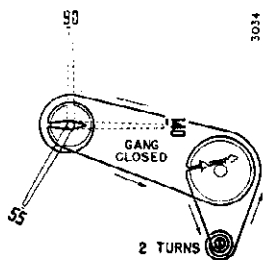
The changer model number will be found stamped at the top rear of the changer base and also on the changer model label.



Models 5Y22 and 5Y22A

DIAL STRINGING AND POINTER SETTING

Solid lines show dial stringing and pointer position with gang closed. Dashed lines show pointer positions (1400 KC and 900 KC) when gang condenser is tuned to a generator signal.

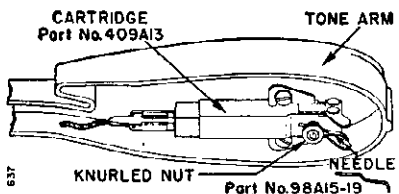
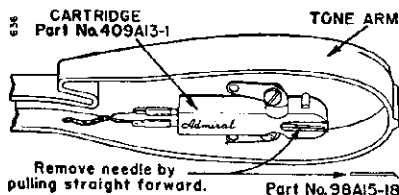


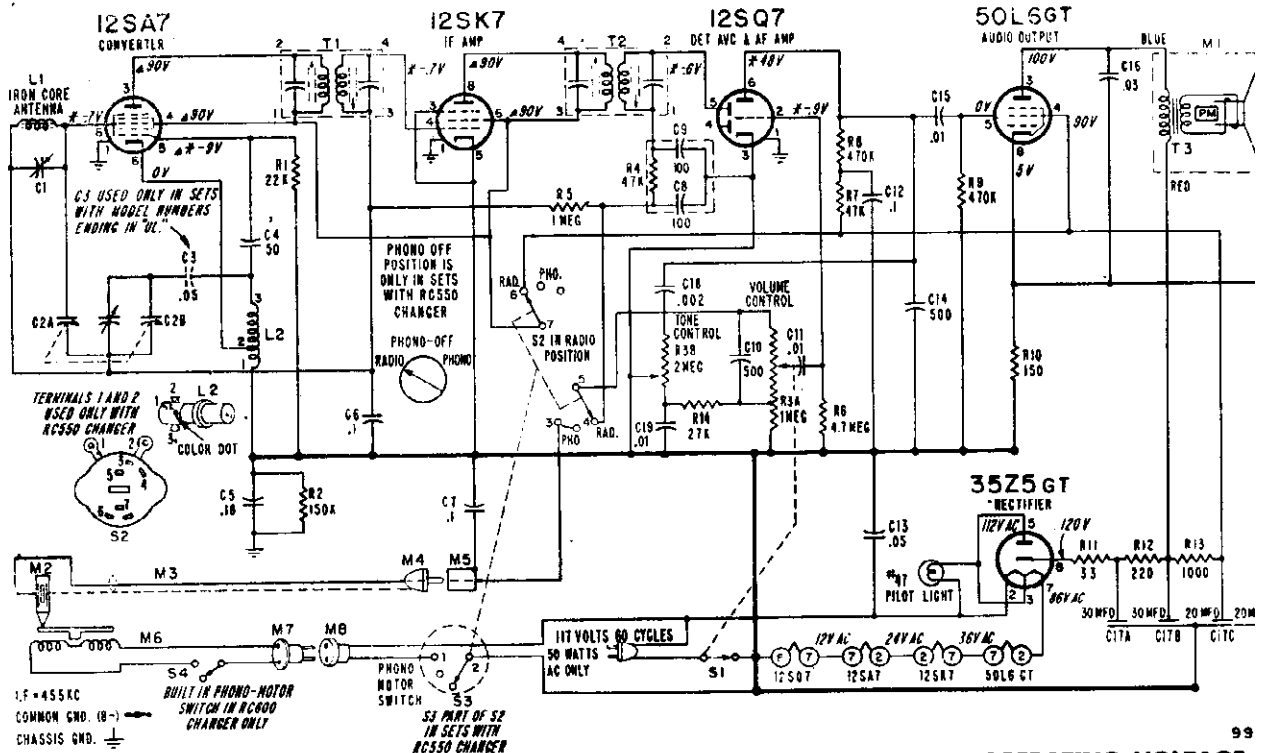
DIFFERENCES IN MODELS

Models 5Y22 and 5Y22A are the same with exception of the Radio-Phono switch and the record changer. Model 5Y22 has a 3 position Radio-Phono switch and uses the RC550 record changer. Model 5Y22A has a 2 position Radio-Phono switch and uses the RC600 record changer. See circuit notes on schematic.

Cartridge and Needle

As shown in the illustrations, alternate cartridges may be used. Cartridges are interchangeable when complete with needle.





* These readings will be lower if taken with a 1000 ohm-per-volt meter.
 ▲ These readings will be zero on "Phono"; all other DC readings may be slightly higher.

OPERATING VOLTAGE
 117 volts, 60 cycles AC only; 50 w

VOLTAGE DATA

Voltages given on schematic diagram.

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Radio-Phono switch S2 in "Radio" position.
- Measured on 117 Volt, 60 Cycle AC line.
- Volume control minimum; dial turned to low end.
- Voltages measured with Vacuum Tube Voltmeter.

RESISTORS		
Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	150,000 ohms, 1/2 watt	60B 8-154
R3A	1 megohm, Volume	75B 11-8
R3B	2 megohms, Tone	
R4	47,000 ohms, 1/2 watt	60B 8-474
R5	1 megohm, 1/2 watt	60B 8-105
R6	4.7 megohms, 1/2 watt	60B 8-475
R7	47,000 ohms, 1/2 watt	60B 8-473
R8	470,000 ohms, 1/2 watt	60B 8-474
R9	470,000 ohms, 1/2 watt	60B 8-474
R10	150 ohms, 1 watt	60B 14-151
R11	33 ohms, 1 watt	60B 28-3
R12	220 ohms, 1 watt	60B 28-7
R13	1,000 ohms, 1 watt	60B 28-2
R14	27,000 ohms, 1/2 watt	60B 8-273

CONDENSERS		
Symbol	Description	Part No.
C1	Trimmer, 3 to 30 mmfd.	66A 33
C2A	Ant. 324 mmfd, max.	60B 30-1
C2B	Osc., 108 mmfd, max. } gang	
C3	.05 mfd, 400 volts, paper	64B 1-7
C4	50 mmfd, ceramic	65C 6-4
C5	.18 mfd, 200 volts, paper	64A 2-2
C6	.1 mfd, 200 volts, paper	64B 1-5
C7	.1 mfd, 200 volts, paper	64B 1-5
C8	100 mmfd, ceramic	65C 6-6
C9	100 mmfd, ceramic	
C10	500 mmfd, ceramic	65C 6-6
C11	.01 mfd, 400 volts, paper	64B 1-10
C12	.1 mfd, 200 volts, paper	64B 1-5
C13	.05 mfd, 400 volts, paper	64B 1-7
C14	500 mmfd, ceramic	65C 6-6
C15	.01 mfd, 400 volts, paper	64B 1-10
C16	.03 mfd, 400 volts, paper	64B 1-8
C17A	30 mid, 150 volts	elect. 67A 14-1
C17B	30 mid, 150 volts	
C17C	20 mid, 150 volts	
C17D	20 mid, 25 volts	
C18	.002 mfd, 600 volts, paper	64B 1-14
C19	.01 mfd, 400 volts, paper	64B 1-10

COILS, TRANSFORMERS, ETC.		
Symbol	Description	Part No.
L1	Rod Antenna (includes board and C1)	69B 144
L2	Coil, Oscillator	69A 52
T1	Transformer, 1st IF	79B 50

Symbol	Description	Part No.
T2	Transformer, 2nd IF	72B 51
T3	Transformer, Output	79A 11-3
M1	Speaker, (5" PM)	78B 39-3
M5	Socket, Phono Input	88A 1
M8	Socket & Leads, Motor	88A 6-3
S1	Switch, On-Off	Part of R3
S2	Switch, Radio-Phono	Part of S2
S3	Switch, Phono-Motor	
	Diode Filter	63A 3-1

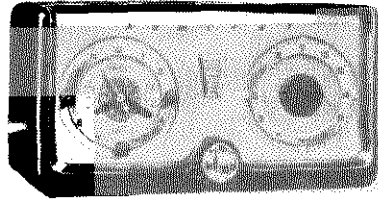
MISCELLANEOUS		
Symbol	Description	Part No.
	Carton and Fillers	44B 213
	Clip, Electrolytic Mounting	18A 10-6
	Speed Nut (sec. mtg.)	2B 10-28-50
	Dial Cord (40" length needed)	50A 1-3
	Drum, Pointer	17A 27
	Gasket, Sponge Rubber (mounts on speaker)	12B 43
	Grommet, Rubber (gang mtg.)	12A 1-2
	Insulator, Phono Receptacle	32A 46
	Manual, Customer Instruction for RC550 record changer	41B 20-19
	Manual, Service for RC600 record changer	41B 20-25
	Manual, Service for RC550 record changer	S327
	Manual, Service for RC600 record changer	S454
	Pilot Light, #47	81A 1-8
	Pointer, Dial	25A 35-3
	Shaft, Pointer	28A 42
	Shield, Pilot Light	82A 15-1
	Sleeve, Pointer Shaft	27A 162-1
	Sleeve, Tuning (brass)	27A 123
	Socket, Pilot Light	82A 2-2
	Spacer, "T" (gang condenser mtg.)	28A 2-1-71
	Spring, Dial Cord Tension	19B 1-5
	Washer, "C" (for pointer drum)	4A 4-8
	Washer, Spring	4A 6-10-0

CABINET PARTS		
Symbol	Description	Part No.
	Cabinet, Plastic	
	Bottom, less lid	34D 28-5
	Lid only	34D 28-6

PHONOGRAPH PARTS		
Symbol	Description	Part No.
M2	Cartridge Pickup (includes needle)	409A 1:1
M3	Cable, Shielded Pickup (includes plug)	413A 1:1
M4	Plug, Pickup Cable	88A 2-1
M6	Motor, Phono (3 speed)	88A 8-1
	for RC550 record changer	407B 1
	for RC600 record changer	407C 2
M7	Plug, Motor (Male)	88A 8-1
	Adapter, 45 RPM (envelope of 12)	
	for RC550 record changer	48A 8-1
	for RC600 record changer	48A 8-1
	Button, Snap-in Plug	13A 2-1
	Centerpost Assembly	
	for RC550 record changer	G400B 1
	for RC600 record changer	G400B 2
	Idle Wheel (includes tire)	G400A 1
	for RC550 record changer	G400A 2
	for RC600 record changer	G400A 3
	Manual, Service for RC550 record changer	S327
	Manual, Service for RC600 record changer	S454
	Needle, Pickup	
	for 409A13 cartridge	98A 15
	for 409A13-1 cartridge	98A 15
	Needle Retaining Nut (for 409A13 cartridge)	98A 15
	Screw and Washer, Changer Mounting (10-32x1 1/4 RH MS)	AA210
	Spring, Changer Float	19A 1C

Part of Diode Filter 33A 3-1. This unit consisting of C8, C9 and R4 may be replaced with individual components.

MODELS 5A32/12, /15, /16, 5A33/12, /15, /16, Ch. 5A3



Model 5A32 Mahogany, 5A33 Ivory
 Operating Voltage: 117 volt AC only.
 Power: 30 watts.

ALIGNMENT PROCEDURE

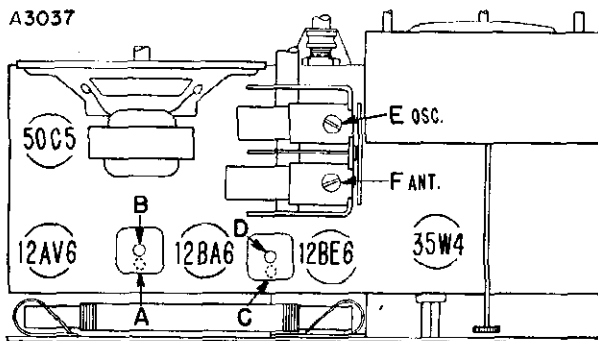
- Turn receiver volume control full on (fully clockwise).
- Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and connect to chassis.
 Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- 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	Antenna stator of tuning condenser	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	250 mmfd. condenser	Antenna stator of tuning condenser	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 pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	F	Maximum output

Mount and set dial pointer to horizontal position with tuning condenser tuned to 1400 KC generator signal; see illustration below.

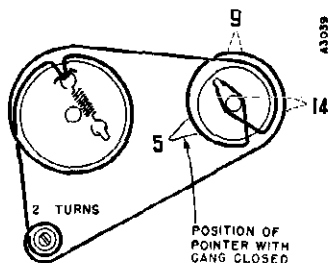
*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may all be made from the top of the chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug.

TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis.

DIAL STRINGING AND POINTER SETTING



Dial stringing and pointer with solid lines shown with gang closed. Dashed line pointer positions (1400 KC and 900 KC) shown when tuning condenser is tuned to generator signal.

OPERATING RADIO MANUALLY

To operate the radio manually, the "Auto-Off-On" switch must be in the "On" position or the radio will not operate.

The radio on-off switch will turn the radio on or off, but will have no control over the appliance or the clock.

TO REMOVE CLOCK FROM CABINET

To remove the clock, proceed as follows:

1. Remove the radio chassis from the cabinet.
2. Remove the three hexagonal nuts and lock washers which mount the clock movement to the metal cover.
3. Carefully remove the clock movement from the cover. Do not unsolder leads unless complete removal of the clock is required. The metal cover mounting the clock to the chassis may be removed if more space is required for servicing the clock.

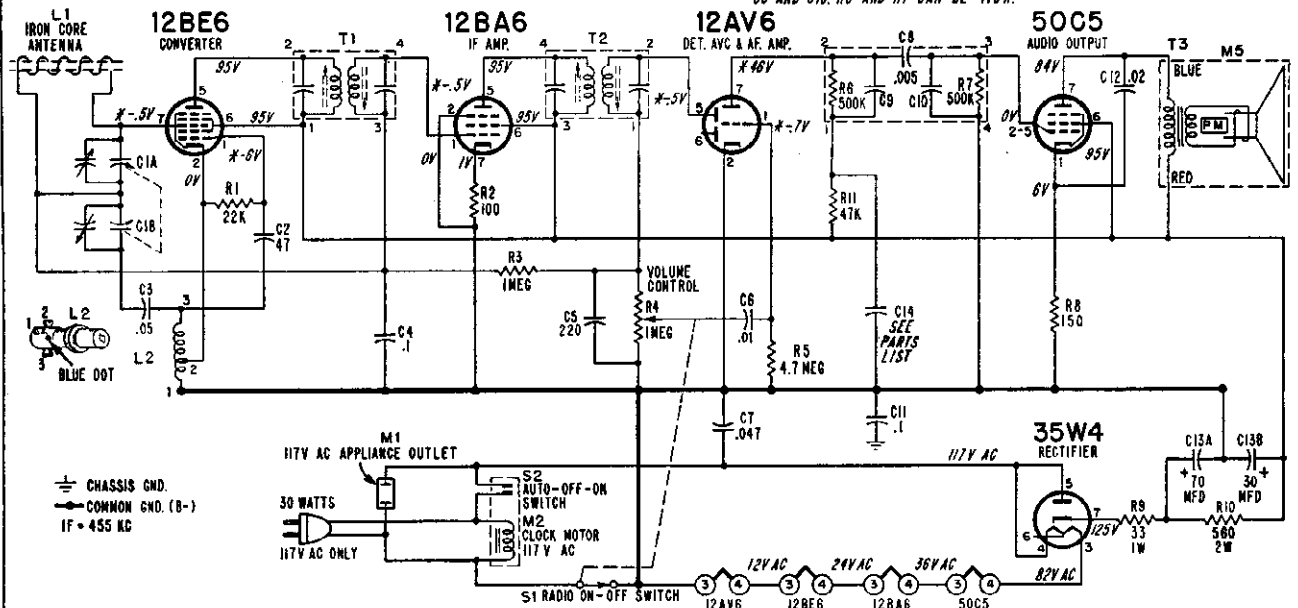
TO REMOVE FIELD AND COIL ASSEMBLY OR TO REMOVE ROTOR

The field and coil assembly and the rotor can be easily removed after the two screws which mount the nameplate are removed.

Note that when the rotor is replaced, the gear on the rotor must drop into the hole in the center of the gear plate and mesh with the clock gear.

MODELS 5A32/12, /15, /16, 5A33/12, /15, /16, Ch. 5A3

C9 AND C10 TOTAL 250 MMFD WHEN REPLACING WITH INDIVIDUAL COMPONENTS; USE ANY COMBINATION TOTALING 250 MMFD OR USE 250 MMFD ACROSS R6 IN PLACE OF C9 AND C10. R6 AND R7 CAN BE 470K.



*These voltage readings will be either lower or practically zero if taken with a 1000 ohm-per-volt meter.

VOLTAGE DATA

Voltages shown on schematic diagram.

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Measured on 117 Volt AC line.
- Volume control minimum; dial turned to low frequency end.
- Voltages measured with Vacuum Tube Voltmeter.

RESISTORS

Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	100 ohms, 1/2 watt	60B 8-101
R3	1 megohm, 1/2 watt	60B 8-105
R4	1 megohm, Volume control (S1)	75B 1-41
R5	4.7 megohms, 1/2 watt	60B 8-475
R6	500,000 ohms, 1/2 watt	60B 8-151
R7	500,000 ohms, 1/2 watt	60B 28-3
R8	150 ohms, 1/2 watt	60B 20-561
R9	33 ohms, 1 watt	60B 8-473
R10	560 ohms, 2 watts	
R11	47,000 ohms, 1/2 watt	

CONDENSERS

Symbol	Description	Part No.
C1A	290 mmfd, max., Ant. (Dial drum spotwelded to gang)	68B 39
C1B	104 mmfd, max., Osc. (gang)	68B 39
C2	47 mmfd, ceramic	65C 6-79
C3	.05 mfd, 400 volts, paper	64B 1-22
C4	.1 mfd, 200 volts, paper	64B 1-30
C5	220 mmfd, ceramic	65C 6-80
C6	.01 mfd, 400 volts, paper	64B 1-25
C7	.047 mfd, 400 volts, paper	65A 13-5
C8	.005 mfd, 400 volts	
C9	{ See note	
C10	{ on schematic	
C11	.1 mfd, 200 volts, paper	64B 1-30
C12	.02 mfd, 400 volts, paper	64B 1-24
C13A	70 mfd, 150 volts	
C13B	30 mfd, 150 volts { elect.	67A 17
	{ .25 mfd, 200 volts, paper	
	{ in later sets	64B 1-28
C14	{ 4 mfd, 150 volts, elect.	
	{ in early sets	67A 4-2

§Part of couplate (part No. 63A 5-4). Replace with exact duplicate or individual components. Note that numbers 1, 2, 3, 4, on schematic correspond to lead numbers printed on face of couplate.

COIL, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Rod Antenna and Cabinet Back	69C 156
L2	Coil, Oscillator	69A 52-4
T1	Transformer, 1st IF	72B 28-7
T2	Transformer, 2nd IF	72B 28-7
T3	Transformer, Output	98A 21
M1	Outlet, Appliance	87A 21-1
M5	Speaker (4" PM) and Output Transformer	78B 72-1
S1	Switch, Radio On-Off	Part of R4
S2	Switch Auto-On-Off (part of M4)	91C 4-14
	Couplate (includes R6, R7, C8, C9, C10)	63A 5-4

MISCELLANEOUS PARTS

Baffle Ring, Speaker	12B 49
Bracket, Dial Pointer Support	15A 498
Bracket, Tuning Shaft	15A 698
Carton and Fillers	44B 228
Clip, IF Transformer Mounting	72B 28-10
Compression Ring (for pointer)	19A 31-10
Dial Cord (20" length needed)	50A 1-3
Drum, Dial Pointer	17A 27
Grommet, Rubber (gang mtg.)	12B 1-19
Line Cord and Plug	89A 34-1
Manual, Customer Instruction	41B 20-11
Shaft, Dial Pointer	28A 42-2
Sleeve (for pointer shaft)	27A 124
Sleeve, Tuning (brass)	27A 157
Socket, Tube plain	87A 24-2
with grounding strap	87A 24-3
Speaker Gasket	12B 49
Spacer, Metal "T" (for mtg. gang)	29A 2-1-71
Speed Nut (mtg. pointer shaft sleeve)	2B 10-28-59
Spring, Dial Cord Tension	19C 1-5
Washer, "C" (for pointer drum)	4A 4-6
Washer, Spring (for tuning shaft)	4A 6-10-0

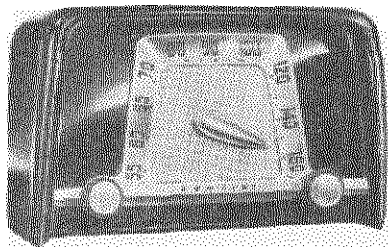
CABINET PARTS

Description	Part No.
Cabinet, Plastic Mahogany	34D 56-2
Ivory	34D 56-3
Escutcheon and Speaker Grille Assembly	AA230
Knob Off-Volume, Mahogany	33D 55-3
Off-Volume, Ivory	33D 55-27
Tuning, Mahogany	33D 55-23
Tuning, Ivory	33D 55-28
Pointer and Hub Assembly (includes compression ring)	
Mahogany	A3732
Ivory	A3733
Washer, Felt (for dial pointer)	5A 4-3
Washer, Felt (for tuning knobs)	5A 4-18

CLOCK PARTS

M2 Clock, Complete for 117 volts, 60 cycles	91C 7-1
for 117 volts, 50 cycles	91C 7-2
for 117 volts, 25 cycles	91C 7-3
Back Cover (fibre)	32A 151
Bumper, Sleep Switch (rubber)	12B 3-6
Cover (metal)	15B 838
Field and Coil Assembly for 117 volts, 60 cycles	91C 4-15
for 117 volts, 50 cycles	91C 4-17
for 117 volts, 25 cycles	91C 4-19
Knob, Clock Mahogany	91C 7-11
Ivory	91C 7-12
Rotor for 117 volts, 60 cycles	91C 4-16
for 117 volts, 50 cycles	91C 4-18
for 117 volts, 25 cycles	91C 4-20
Window (plastic)	24B 11

MODELS 5Z22,
5Z23, Ch. 5Z2



Model 5Z22 Mahogany and 5Z23 Ivory
Operating Voltage: 117 volts, 50 to 60
cycles AC or DC.
Power: 30 watts.

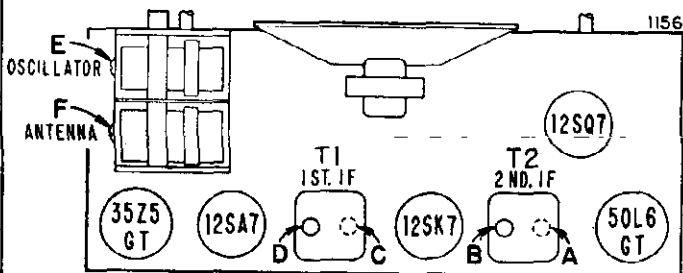
ALIGNMENT PROCEDURE

- Connect output meter across speaker voice coil.
 - Turn receiver volume control full on.
 - Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and connect to chassis.
 - Use lowest output setting of signal generator capable of producing adequate output meter indication and then proceed as outlined in chart below.
 - Repeat adjustments to insure good results.
- Caution: Do not connect a ground wire directly to chassis.

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	Antenna stator of tuning condenser	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum Output
2	250 mmfd. condenser	Antenna stator of tuning condenser	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum Output
3	Loop of several turns of wire or place generator lead close to receiver loop for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Maximum Output
4	Mount and set dial pointer as shown in "Pointer Setting and Dial Cord Stringing" diagram.						

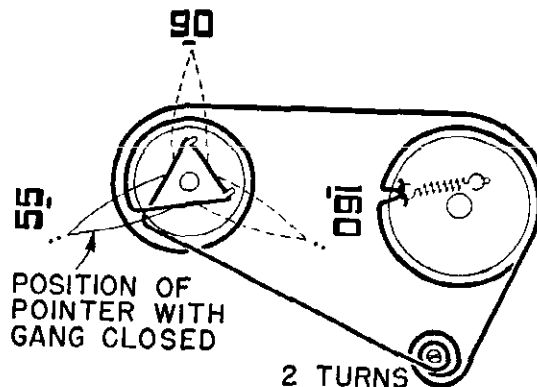
*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may all be made from the top of chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug.

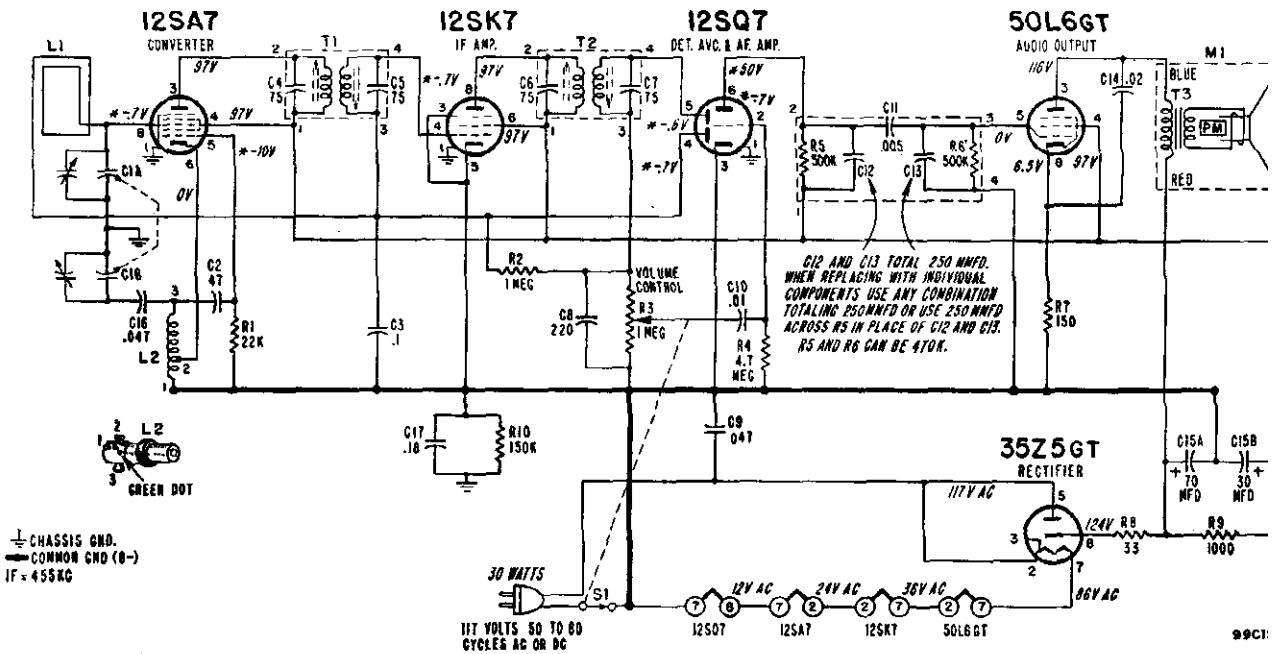
TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis.

POINTER SETTING AND DIAL CORD STRINGING





*These voltage readings will be either lower or practically zero if taken with a 1000 ohm-per-volt meter.

VOLTAGE DATA

Voltages shown on schematic diagram.

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Dial turned to low frequency end; volume control at minimum.
- Measured on 117 Volts AC line.
- Voltages measured with Vacuum Tube Voltmeter.

RESISTORS

Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	1 megohm, 1/2 watt	60B 8-105
R3	1 megohm, Volume control (R3 includes switch S1)	75B 1-40
R4	4.7 megohms, 1/2 watt	60B 8-475
R5	500,000 ohms, 1/2 watt	60B 8-151
R6	500,000 ohms, 1/2 watt	60B 28-3
R7	150 ohms, 1/2 watt	60B 28-2
R8	33 ohms, 1 watt	60B 8-154
R9	1,000 ohms, 1 watt	60B 8-154
R10	150,000 ohms, 1/2 watt	60B 8-154

CONDENSERS

Symbol	Description	Part No.
C1a	Ant., 420 mmfd, max	gang - 60B 38
C1b	Osc. 108 mmfd, max (Dial drum spot welded to gang)	
C2	47 mmfd, ceramic	65C 8-78
C3	1 mfd, 200 volts, paper	64B 1-30
C4	75 mmfd, 3%	Part of T1
C5	75 mmfd, 3%	Part of T1
C6	75 mmfd, 3%	Part of T2
C7	75 mmfd, 3%	Part of T2

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
C8	220 mmfd, ceramic	65C 8-80
C9	.05 mfd, 400 volts, paper	64B 1-22
C10	.01 mfd, 400 volts, paper	64B 1-25
C11	.005 mfd, 400 volts	64B 1-25
C12	See note	
C13	See note	
C14	.02 mfd, 400 volts, paper	64B 1-24
C15a	70 mfd, 150 volts	elect - 67A 17
C15b	30 mfd, 150 volts	
C16	.047 mfd, 400 volts, paper	64B 8-28
C17	.18 mfd, 200 volts, paper	64A 2-2
L1	Antenna, Loop (mounted on cardboard back)	69C 142-2
L2	Coil, Oscillator	65A 52-3
T1	Transformer, 1st I.F.	72B 50
T2	Transformer, 2nd I.F.	72B 51
T3	Transformer, Output Speaker (5" PM) and Output Transformer	98A 4
S1	Switch, On-Off Couplate (Includes R5, R6, C11, C12, C13)	78B 62-1 Part of R3 63A 5-4

MISCELLANEOUS

Description	Part No.
Cabinet	
Ebony (5Z21)	34D 54-1
Mahogany (5Z22)	34D 54-2
Ivory (5Z23)	34D 54-3
Carton and Fillers	44B 191
Clip, Elect., Mtg.	19A 10-6
Dial Cord (32" length required)	50A 1-3
Drum, Dial Pointer	17A 35-1
Escutcheon, Dial Scale	23C 126-1
Grille, Speaker (metal)	16A 34-1
Knob, Tuning	
Ebony (for 5Z21)	33A 64-4
Ivory (for 5Z23)	33A 64-3
Mahogany (for 5Z22)	33A 64-2
Pointer, Dial	25A 45-1
Ring, Dial Pointer Compression	19A 31-2
Shaft, Dial Pointer	28A 42-1
Shaft, Tuning	28A 26-4
Sleeve, Dial Pointer Shaft	27A 162
Snap Button (for mtg. cabinet back)	13A 1-5
Snap Button, (for mtg. speaker grille)	13A 1-2-71
Socket, Tube	87A 10-2
Speed Nut, Escutcheon Retaining	2B 10-35-66
Speed Nut (for tuning shaft spacer)	
Spring, Dial Cord Tension	2B10-21-59
Washer, "C" (tuning shaft)	19B 1-5
Washer, Felt (knob)	4A 4-6-0
Washer, "C" (for pointer shaft)	5A 4-4
Washer, "C" (for pointer shaft)	4A 4-6-0

†Part of couplate (part 63A 5-4). Replace with exact duplicate or individual components. Note that numbers 1, 2, 3, 4, on schematic correspond to couplate lead numbers printed on face of couplate 63A 5-4.

ALIGNMENT PROCEDURE

- Turn receiver volume control full on.
- 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 connect to chassis. Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- 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.

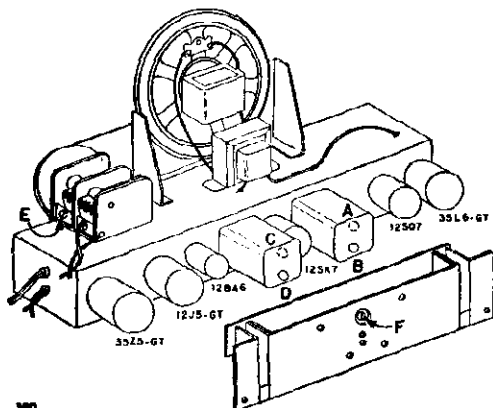
Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Tuning condenser, antenna stator	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	250 mmfd. condenser	Tuning condenser, antenna stator	1620 KC	Gang fully open	Oscillator	E	Maximum output

Mount dial pointer. Set pointer to horizontal position with tuning condenser tuned to 1400 KC generator signal (see illustration below). Rotate the tuning condenser until the pointer is in a vertical position (900 KC), then slip chassis in cabinet, carefully guiding the pointer so that it locates between the dial escutcheon and the cabinet. Install antenna and chassis mounting bolts. The pointer and escutcheon may be mounted after installing the chassis in cabinet as follows: Set pointer to horizontal position with gang tuned to 1400 KC signal. Place escutcheon on cabinet. With long nose pliers slip the hairpin ends of the escutcheon mounting springs in holes of escutcheon tabs.

3	Loop of several turns of wire, or place generator lead close to receiver antenna for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	†F	Maximum output
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*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may all be made from the top of chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug.
 †Antenna Trimmer "F" should be aligned after chassis and antenna are mounted in cabinet.

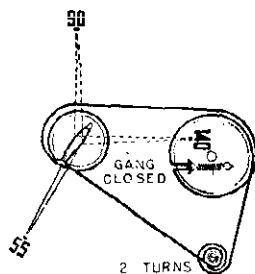
TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis.

DIAL STRINGING AND POINTER SETTING

Dial stringing and pointer with solid lines shown with gang closed. Dashed line pointer positions (1400 KC and 900 KC) shown when tuning condenser is tuned to generator signal.

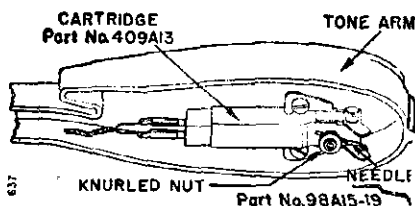
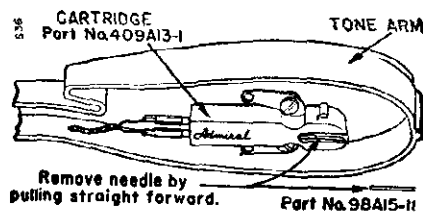


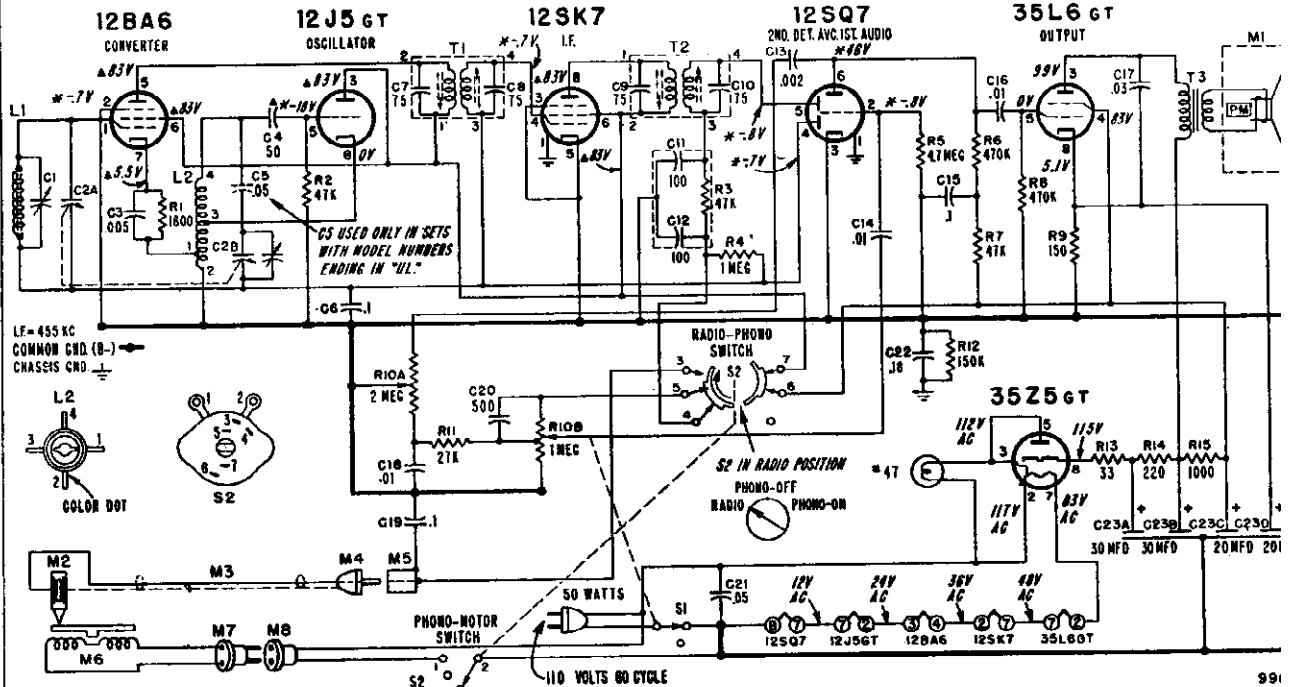
RECORD CHANGER SERVICE DATA

The changer model number will be found stamped at the top rear of the changer base and also on the changer model label.

Cartridge and Needle

As shown in the illustrations, alternate cartridges may be used. Cartridges are interchangeable when complete with needle.





*These readings will be either lower or practically zero if taken with a 1000 ohm-per-volt meter.
▲ These readings will be zero on "Phono"; all other DC readings may be slightly higher.

VOLTAGE DATA

Voltages given on schematic diagram.

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Measured on 117 Volt 60 Cycle AC line.
- Volume control minimum; dial turned to low end.
- Switch S2 in "Radio" position.
- Voltages measured with Vacuum Tube Voltmeter.

RESISTORS		
Symbol	Description	Part No.
R1	1,600 ohms, 1/2 watt, 5%	60B 7-162
R2	47,000 ohms, 1/2 watt	60B 8-473
R3	47,000 ohms, 1/2 watt	60B 8-105
R4	1 megohm, 1/2 watt	60B 8-105
R5	4.7 megohms, 1/2 watt	60B 8-475
R6	470,000 ohms, 1/2 watt	60B 8-474
R7	47,000 ohms, 1/2 watt	60B 8-473
R8	470,000 ohms, 1/2 watt	60B 8-474
R9	150 ohms, 1 watt	60B 14-151
R10A	2 megohms, tone	75B 11-8
R10B	1 megohm, volume	60B 8-273
R11	27,000 ohms, 1/2 watt	60B 8-273
R12	150,000 ohms, 1/2 watt	60B 8-154
R13	33 ohms, 1 watt	60B 28-3
R14	220 ohms, 1 watt	60B 28-7
R15	1,000 ohms, 1 watt	60B 28-2

CONDENSERS		
Symbol	Description	Part No.
C1	Trimmer, 3 to 30 mmfd.	Part of L1
C2	Antenna and Oscillator gang	65A 10-1
C3	.005 mfd., min., Ceramic	65B 6-4
C4	50 mmfd., Ceramic	64B 1-22
C5	.05 mfd., 400 volts, paper	64B 1-22
C6	.1 mfd., 200 volts, paper	64B 1-30
C7	75 mmfd., 3%, Ceramic	Part of T1
C8	75 mmfd., 3%, Ceramic	Part of T1
C9	75 mmfd., 3%, Ceramic	Part of T2
C10	75 mmfd., 3%, Ceramic	Part of T2
C11	100 mmfd., Ceramic	65B 6-6
C12	100 mmfd., Ceramic	65B 6-6
C13	.002 mfd., 600 volts, paper	64B 1-14
C14	.01 mfd., 400 volts, paper	64B 1-25
C15	.1 mfd., 200 volts, paper	64B 1-30
C16	.01 mfd., 400 volts, paper	64B 1-25
C17	.03 mfd., 400 volts, paper	64B 1-23
C18	.01 mfd., 400 volts, paper	64B 1-25
C19	.1 mfd., 200 volts, paper	64B 1-30
C20	500 mmfd., Ceramic	65B 6-6
C21	.05 mfd., 400 volts, paper	64B 1-22
C22	.18 mfd., 200 volts, paper	64A 2-2
C23a	30 mfd., 150 volts	Elect. 67A 14-1
C23b	30 mfd., 150 volts	Elect. 67A 14-1
C23c	30 mfd., 150 volts	Elect. 67A 14-1
C23d	20 mfd., 25 volts	Elect. 67A 14-1

COILS, TRANSFORMERS, ETC.		
Symbol	Description	Part No.
L1	Rod Antenna (includes board and CI)	68A 113-1
L2	Coil, Oscillator	68A 113-1
T1	Transformer, 1st IF	72B 50
T2	Transformer, 2nd IF	72B 51
T3	Transformer, Output	79A 11-3
M1	Speaker, (5" pm)	78B 39-3
M5	Socket, Phono input	88A 1
M8	Socket & Leads, Motor	89A 6-3
S1	Switch, On-Off	Part of R10B
S2	Switch, Radio-Phono	77A 28-1
S2	Switch, Phono Motor	Part of S2
†	Diode Filter	63A 3-1

MISCELLANEOUS		
Description	Part No.	
Carton and Fillers	44B 145	
Clip, Electrolytic Mounting	18A 10-6	
Speed Nut (sec. mtg.)	2B 10-35-68	
Dial Cord	50A 1-3	
Drum, Pointer	17A 27	
Gasket, Sponge Rubber (mounts on Speaker)	12B 43	
Grommet, Rubber (gang mtg.)	12A 1-2	
Insulator, Phono Receptacle	32A 46	
Manual		
Customer Instruction for 6J21, 6J22	41A 18-33	
for 6M22	41A 19-47	
Service, for RC550 Changer	5327	
Pilot Light, #47	81A 1-8	
Pilot Light Socket and Leads	82A 2-2	
Plate, Pointer Support	15A 498	
Pointer, Dial	25A 35-1	
Shaft, Pointer	28A 42	
Shield, Pilot Light (6J21 only)	82A 15-1	
Sleeve, Pointer Shaft	27A 162-1	
Sleeve, Tuning (Brass)	27A 123	
Spacer, "T" (gang condenser mtg.)	28A 2-1-71	
Spring, Dial-Cord-Tension	19B 1-5	
Socket, Tube (12BA6)	87A 33-2	
Washer, "C" (for pointer drum)	4A 4-6	
Washer, Spring	4A 6-10-0	

CABINET PARTS		
Description	Part No.	
Cabinet, Plastic		
Bottom, less lid (Ebony 6J21)	34D 28-3	
Bottom, less lid (Mahogany 6J22, 6M22)	34D 28-5	
Lid only (Ebony 6J21)	34D 28-4	
Lid only (Mahogany 6J22, 6M22)	34D 28-6	

Description			Part No.
Clamp, Cable		11A 2-2	
Escutcheon, Dial for 6J21, 6J22		23C 81-1	
for 6M22		23C 51-1	
Escutcheon Ring (Gold trim)		23A 53	
Hinge		37A 8-1	
Hinge Screw (6/32x1/4 BH MS)		365-250-C2-	
Hinge Stud		27A 17-1	
Jewel, Pilot Light		82A 14-2	
Knob, Radio, for Ebony 6J21			
"On-Off Volume" (inner knob)	33C 55-22		
"Tone" (outer knob)	33C 55-21		
"Radio-Phono" (inner knob)	33C 55-20		
"Tuning" (outer knob)	33C 55-19		
Knob, Radio, for Mahogany 6J22			
"On-Off Volume" (inner knob)	33C 55-18		
"Tone" (outer knob)	33C 55-17		
"Radio-Phono" (inner knob)	33C 55-16		
"Tuning" (outer knob)	33C 55-15		
Knob, Radio, for Mahogany 6M22			
"On-Off Volume" (inner knob)	33C 55-14		
"Tone" (outer knob)	33C 55-9		
"Radio-Phono" (inner knob)	33C 55-8		
"Tuning" (outer knob)	33C 55-7		
Rubber Bumper for cabinet bottom	12A 3-4		
for cabinet top	12A 9-8		
Stay Arm and Plate	37A 9-1		
Washer, Felt (for tuning knobs)	5A 4-9		

PHONOGRAPH PARTS		
Symbol	Description	Part No.
M2	Cartridge Pickup (includes needle)	409A 13
M3	Cable, Shielded Pickup (includes plug)	413A 11
M4	Plug, Pickup Cable	88A 2-3
M5	Motor, Phono (3 speed)	407B 19
M7	Plug, Motor (Male)	88A 8-1
M7	Adapter, 45 RPM (envelope of 12)	48A 8-1
Button, Snap-in Plug	13A 2-8	
Centerpost Record	G400B 50	
Idler Wheel (includes tire)	G400A 27	
Needle, Pickup for 409A13 cartridge	88A 15-1	
for 409A13-1 cartridge	88A 15-1	
Needle Retaining Nut (for 409A13 cartridge)	88A 54-	
Service Manual, RC550 Changer	S327	
Screw and Washer, Changer		
Mounting (10-32x1/4 RH MS)	AA210	
Spring, Changer Float	19A 10-	

† Part of Diode Filter 63A3-1. This unit consisting of C11, C12 and R3 may be replaced with individual components.
§ 6M22 chassis use part number 68B30-1 gang (antenna 324 mmfd. max., oscillator 108 mmfd. max.) with part number 69B144

MODELS 5A22, 5A23, Ch. 5A2

SPECIFICATIONS

CIRCUIT

5 tube AC-DC Superheterodyne covering two bands, 540 KC to 1730 KC and 5.8 MC to 18 MC (16 to 52 meters).

OPERATING VOLTAGE

110-120 Volts AC or 110-120 Volts DC. It can be operated on 220 Volts AC or DC only if a special line resistance cord is used. (See Parts List.)

ALIGNMENT PROCEDURE

- Connect output meter across voice coil.
- Turn receiver volume control full on.
- 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 lowest output setting of signal generator capable of producing adequate output meter indication and then proceed as outlined in chart below.
- Repeat adjustments to insure good results.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Band Switch Position	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Grid Cap 12A8 Tube	BC	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum Output
2	250 mmfd. condenser	End of Ant. Wire	BC	1730 KC	Gang fully open	BC Oscillator (on gang)	E	Maximum Output
3	250 mmfd. condenser	End of Ant. Wire	BC	1400 KC	Tune in generator signal	BC Antenna (on gang)	F	Maximum Output
4	250 mmfd. condenser	End of Ant. Wire	BC	600 KC	Tune in generator signal	BC pad	G	Maximum Output. Rock gang while adjusting

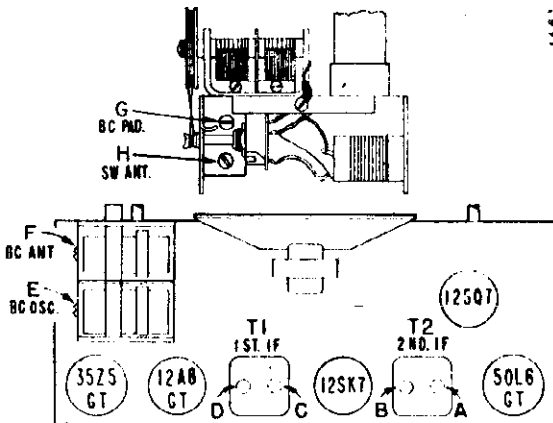
Recheck alignment at 1400 KC (in step 3 above)

5	400 ohm carbon resistor	End of Ant. Wire	SW	15 MC	Tune in generator signal	SW Antenna	†H	Maximum Output. Rock gang while adjusting
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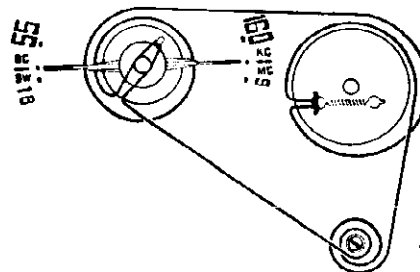
* Adjustments A and C are made from underside of chassis.

† Be sure that trimmer is aligned at correct frequency and not on image which should be approximately 910 KC lower than correct frequency, as indicated on the dial. Check to see that image appears 910 KC lower than alignment frequency.

TUBE AND TRIMMER LOCATION



POINTER SETTING AND DIAL CORD STRINGING



RESISTORS		
Symbol	Description	Part No.
R1	47,000 ohms, 1/2 watt.....	60B 8-473
R2	330 ohms, 1/2 watt.....	60B 8-331
R3	39,000 ohms, 1/2 watt.....	60B 8-393
R4	3,300 ohms, 1/2 watt.....	60B 8-332
R5	150,000 ohms, 1/2 watt.....	60B 8-154
R6	2.2 megohms, 1/2 watt.....	60B 8-225
R7	1 megohm, Volume Control.....	75B 1-40
R8	4.7 megohms, 1/2 watt.....	60B 8-475
*R9	500,000 ohms, 1/2 watt	
*R10	500,000 ohms, 1/2 watt	
R11	150 ohms, 1/2 watt.....	60B 8-151
R12	33 ohms, 1 watt.....	60B 28-3
R13	150 ohms, 1 watt.....	60B 28-1
R14	1,000 ohms, 1 watt.....	60B 28-2

CONDENSERS		
C	Description	Part No.
C1	.001 mfd, min, ceramic disc.....	65C 10-6
C2	50 mfd, mica.....	65B 5-11
C3A	3 to 30 mmfd. } Dual	
C3B	450 to 510 mmfd. } Trimmer	66A 23-4
C4A	420 mmfd, max, Ant. } Gang	68B 45-1
C4B	420 mmfd, max, Osc. } (Dial drum spotwelded to gang)	
C5	.003 mfd, 3%, silver mica.....	65B 1-6
C6	10 mfd, Zero temp. coeff, ceramic.....	65C 6-44
C7	100 mfd, -.00075 temp coeff, ceramic.....	65C 6-19
C8	.005 mfd, min, ceramic disc.....	65C 10-1
C9	.047 mfd, 400 volts, paper.....	64B 5-22
C10	.047 mfd, 400 volts, paper.....	64B 5-22
C11	.047 mfd, 400 volts, paper.....	64B 5-22
C12	.2 mfd, 400 volts, paper.....	64B 5-19
C13	250 mmfd, ceramic.....	65C 6-5
C14	.01 mfd, min, ceramic disc.....	65C 10-3
C15	.047 mfd, 400 volts, paper.....	64B 5-22
*C16	250 mmfd, 500 volts	
*C17	.01 mfd, 400 volts	
C18	.01 mfd, min, ceramic disc.....	65C 10-3
C19	.047 mfd, 400 volts, paper.....	64B 5-22
C20A	30 mfd, 150 volts } Elect.....	67B 23-1
C20B	30 mfd, 150 volts }	
C20C	20 mfd, 150 volts }	

COILS, TRANSFORMERS, ETC.		
Symbol	Description	Part No.
L1	Coil, Antenna BC.....	69A 74
L2	Coil, Antenna SW.....	69B 75-1
L3	Coil, Oscillator BC and SW.....	69B 76-1
T1	Transformer, 1st IF.....	72B 50

Symbol	Description	Part No.
T2	Transformer, 2nd IF.....	72B 51
T3	Transformer, Output.....	98A 4
S1	Switch, Band.....	77A 32-3
S2	Switch, On-Off.....	Part of R7
M1	Speaker (5" PM) and Output Transformer.....	78B 62-1
	Couplate.....	63A 5-1

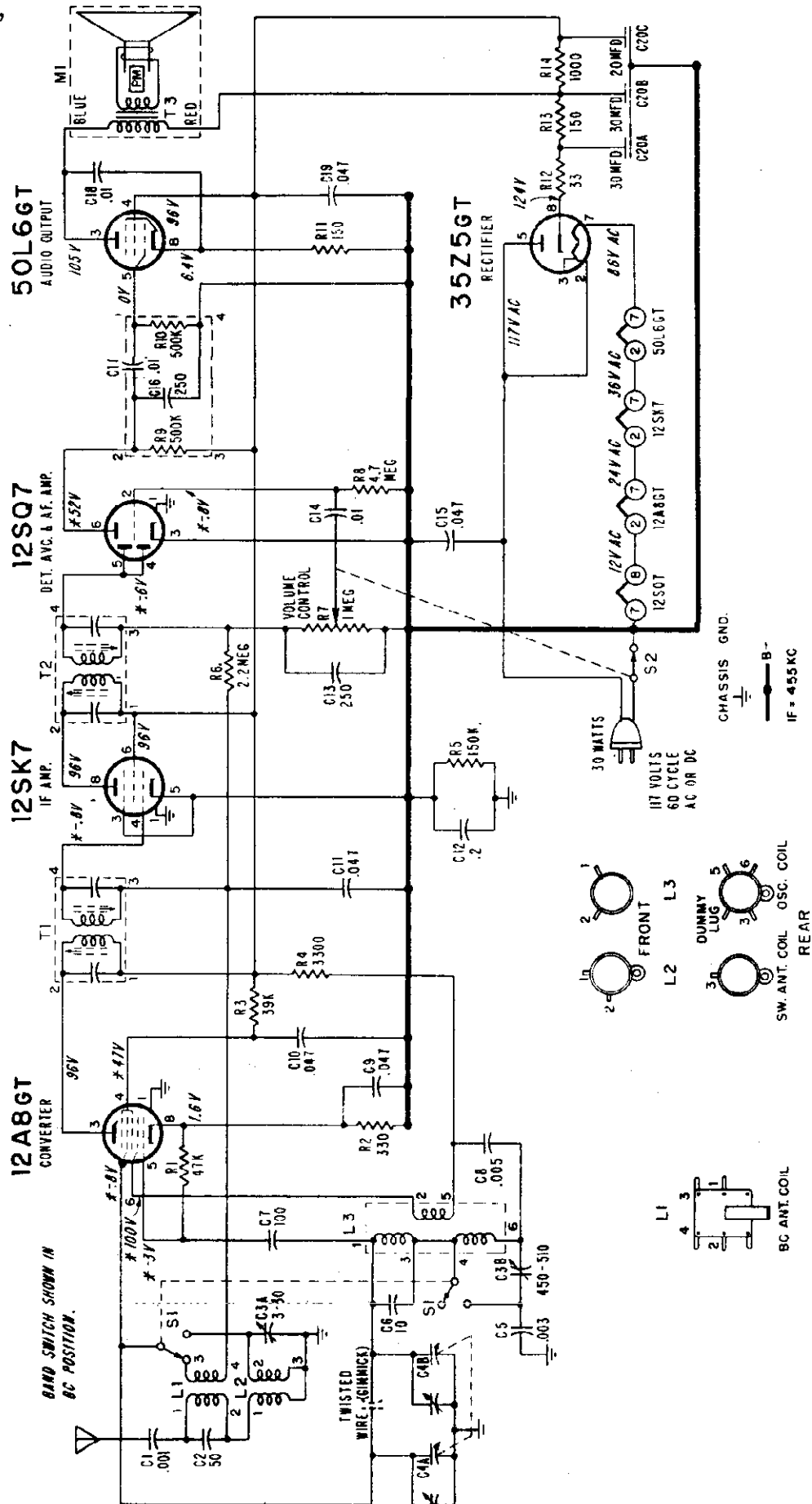
MISCELLANEOUS		
Description	Part No.	
Antenna Hank (20' length).....	89A 4-2	
Back, Cabinet.....	43B 170	
Baffle Ring, Speaker.....	43A 154	
Bracket, Band Switch Mounting.....	15A 393	
Cabinet		
Mahogany (5A22).....	34D 39-5	
Ivory (5A23).....	34D 39-6	
Carton and Fillers.....	44B 191	
Dial Cord (32" length needed).....	50A 1-3	
Drum, Dial Pointer.....	17A 32	
Escutcheon, Dial Scale.....	23C 77-2	
Felt Washer (Knob).....	5A 4-11	
Grille, Speaker (Metal).....	16A 30-2	
Grommet, Rubber (for mtg. gang).....	12A 1-2	
Knob, Band Switch (Inner Knob)		
Maroon (for 5A22).....	33B 39-27	
Ivory (for 5A23).....	33B 39-30	
Knob, Off-On Volume		
Maroon (for 5A22).....	33B 39-29	
Ivory (for 5A23).....	33B 39-32	
Knob, Tuning (Outer Knob)		
Maroon (for 5A22).....	33B 39-28	
Ivory (for 5A23).....	33B 39-31	
Pointer, Dial.....	25A 51-1	
Resistance Cord, for 220 V. operation		
with American Male Plug.....	89A 14	
with Continental Male Plug.....	89A 14-1	
Shaft, Pointer.....	28A 42-1	
Sleeve, Metal		
for mtg. dial pointer.....	27A 162-1	
for mtg. gang condenser.....	29A 2-1-71	
Sleeve, Tuning Shaft.....	27A 156	
Socket, Tube.....	87A 5-1	
Spacer, Tuning Shaft.....	29A 2-1-71	
Speed Nut (for mtg. escutcheon).....	2B 10-35-68	
Spring, Dial Cord Tension.....	19B 1-2	
Washer, "C" (Tuning Shaft).....	4A 4-6	

* Part of couplate (part number 63A5-1). Replace with exact duplicate or individual components. Note that numbers 1, 2, 3, 4, on schematic correspond to lead numbers printed on face of couplate.

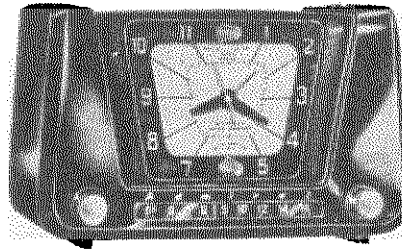
VOLTAGE DATA

- Voltages shown on schematic diagram.
- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Dial turned to low frequency end; volume control at minimum.
- Band switch set in "BC" position.
- Measured on 117 volts AC line.
- Voltages measured with Vacuum Tube Voltmeter.

MODELS 5A22,
5A23, Ch. 5A2



MODELS 5X21, 5X2
5X23, Ch. 5X2



Model 5X21 Ebony, 5X22 Mahogany, 5X23 Ivo
Operating Voltage: 117 volts AC only.
Power: 30 watts.

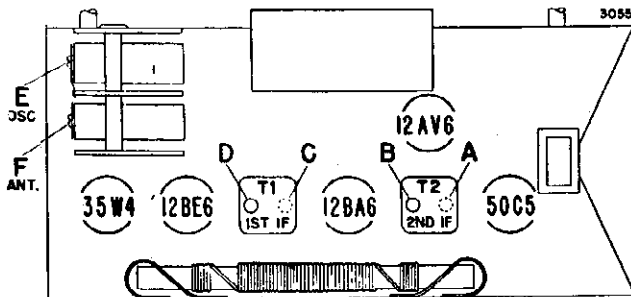
ALIGNMENT PROCEDURE

- Turn receiver volume control full on (fully clockwise).
- Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and connect to chassis.
- Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output setting of signal generator capable of producing adequate output meter indication and proceed in the following sequence.
- Use a NON-METALLIC alignment tool for IF transformers. See asterisk * note below.
- 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	Antenna stator of tuning condenser	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	250 mmfd. condenser	Antenna stator of tuning condenser	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum output
3	Loop of several turns of wire, or place generator lead close to receiver antenna for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Maximum output

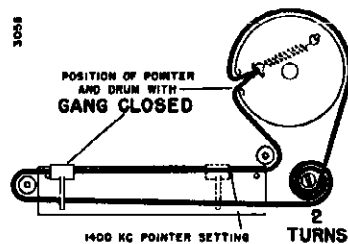
*Adjustments A and C made from the underside of the chassis. To avoid splitting the slotted head of the powdered iron core tuning slugs in IF transformers, use an alignment tool having a blade $\frac{1}{8}$ " wide.

TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis.

DIAL STRINGING AND POINTER SETTING



Dial stringing and pointer setting is shown with the gang condenser closed. The 1400 KC pointer setting is shown in dashed lines.

OPERATING THE RADIO

The radio is turned on manually when the "Off-Auto-On" switch is set to the "ON" position. The radio is turned on and off automatically when the switch is set to the "AUTO" position.

REMOVING THE CLOCK FROM CABINET

To remove the clock, proceed as follows:

1. Remove the radio chassis from the cabinet.
2. Remove the two hexagonal nuts and lock washers which mount the clock movement to the metal cover.
3. Carefully remove the clock movement from the cover. Do not unsolder leads unless complete removal of the clock is required. The metal cover mounting the clock to the chassis may be removed if more space is required for servicing the clock.

REPLACING THE CLOCK MOTOR

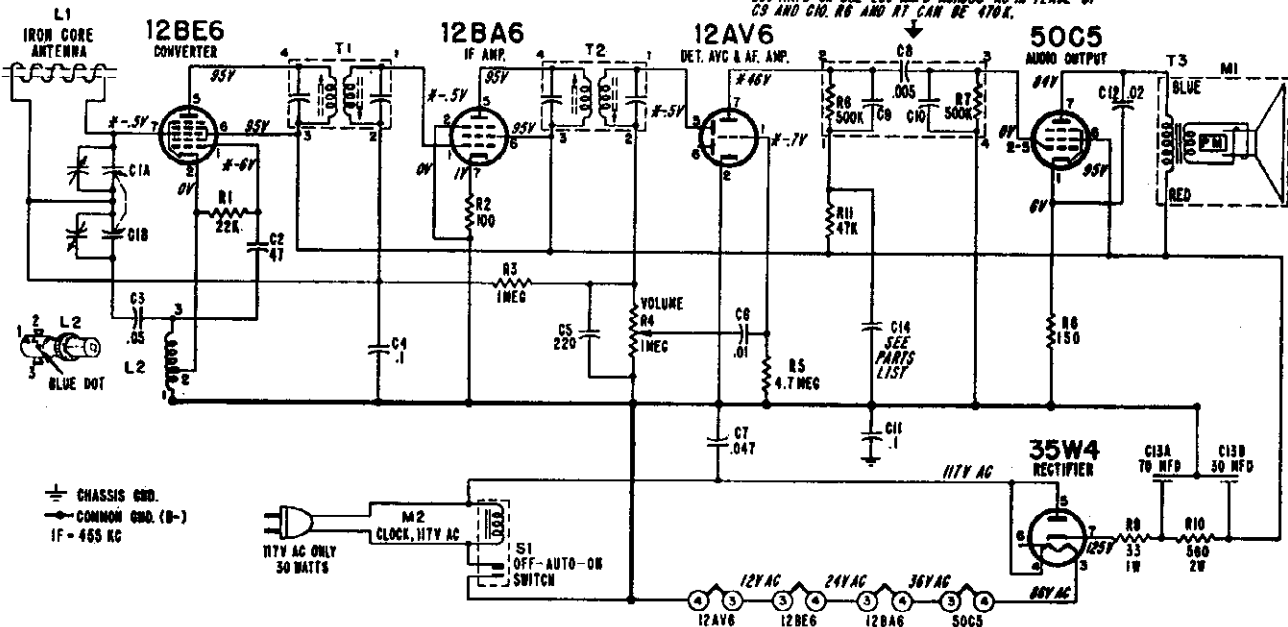
To remove the clock motor, press the motor inwardly and rotate it to the left (counterclockwise).

Mount the clock motor by pressing the motor inwardly and rotating it to the right (clockwise).

Caution: The gear on the motor must mesh with the fiber gear on the clock mechanism. If the gears are not properly meshed, damage may result.

MODELS 5X21, 5X22, 5X23, Ch. 5X2

C8 AND C10 TOTAL 250 MMFD. WHEN REPLACING WITH INDIVIDUAL COMPONENTS, USE ANY COMBINATION TOTALING 250 MMFD OR USE 250 MMFD ACROSS R6 IN PLACE OF C8 AND C10. R6 AND R7 CAN BE 470K.



*These voltage readings will be either lower or practically zero if taken with a 1000 ohm-per-volt meter.

VOLTAGE DATA

Voltages shown on schematic diagram.

- All readings made between tube socket terminals and B minus (negative of electrolytic condenser C13).
- Measured on 117 Volt AC line.
- Volume control minimum; dial turned to low frequency end.
- Voltages measured with Vacuum Tube Voltmeter.

RESISTORS

Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	100 ohms, 1/2 watt	60B 8-101
R3	1 megohm, 1/2 watt	60B 8-105
R4	1 megohm, Volume control	75B 1-51
R5	4.7 megohms, 1/2 watt	60B 8-475
R6	500,000 ohms, 1/2 watt	
R7	500,000 ohms, 1/2 watt	
R8	150 ohms, 1/2 watt	60B 8-151
R9	33 ohms, 1 watt	60B 28-3
R10	560 ohms, 2 watts	60B 20-561
R11	47,000 ohms, 1/2 watt	60B 8-473

CONDENSERS

C1A	290 mmfd, max. Ant.	} gang. 68B 51 (Dial drum spot welded to gang)
C1B	104 mmfd, max. Osc.	
C2	47 mmfd, ceramic	85C 6-79
C3	.05 mid, 400 volts, paper	64B 1-7
C4	.1 mfd, 200 volts, paper	64B 1-5
C5	220 mmfd, ceramic	85C 6-80
C6	.01 mid, 400 volts, paper	64B 1-10
C7	.047 mid, 400 volts, paper	65A 13-5
C8	.005 mfd, 450 volts	
C9	{ See note on schematic.	
C10	{ See note on schematic.	
C11	.1 mfd, 200 volts, paper	64B 1-5
C12	.02 mid, 400 volts, paper	64B 1-9
C13A	70 mfd, 150 volts	} elect. 67A 17-1.
C13B	30 mfd, 150 volts	

Part of couplet (part number 63A5-4). Replace with exact duplicate or individual components. Note that numbers 1, 2, 3, 4 on schematic correspond to lead numbers printed on face of couplet.

COIL, TRANSFORMERS, ETC.

Symbol	Description	Part No.
C14	{ 4 mid, 150 volts, elect. (in early sets) 67A 4-2 { 25 mid, 200 volts, paper (in later sets) 64B 1-3	
L1	Rod Antenna and Cabinet Back	69C 157
L2	Coil, Oscillator	69A 52-4
T1	Transformer, 1st IF	72B 28-7
T2	Transformer, 2nd IF	72B 28-7
T3	Transformer, Output	98A 4
M1	Speaker (4" PM) and Output Transformer	78B 65-3
S1	Switch, Off-Auto-On (part of clock)	91C 6-16
	Couplets (includes R6, R7, C8, C9, C10)	63A 5-4

MISCELLANEOUS PARTS

Description	Part No.
Carton and Fillers	44B 259
Clip, IF Transformer Mounting	72B 28-10
Dial Background	15B 840
Dial Cord (27" length needed)	50A 1-3
Grommet, Rubber (for mounting gang)	12B 1-19
Manual, Operating Instructions	41B 20-12
Pointer, Dial	25A 49-2
Shaft, Tuning	25A 26-7
Sleeve, Tuning Shaft	27A 124-1
Snap Button (for mtg. cabinet back)	13A 1-5-71
Socket, Tube plain	87A 24-2
with grounding strap	87A 24-3
Spacer, Metal (for mounting gang)	29A 2-3-24

Description	Part No.
Speed Nut (for mounting tuning shaft sleeve)	2B 10-21-59
Spring, Dial Cord Tension	19C 1-5
Washer, "C" (for tuning shaft)	4A 4-6

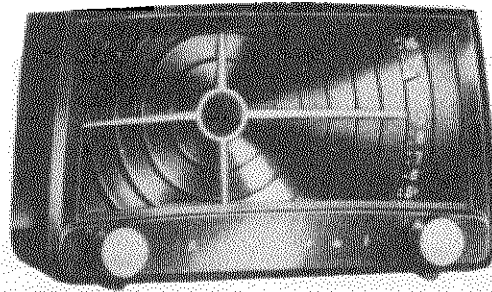
CABINET PARTS

Cabinet, Plastic	
Ebony	34D 55-1
Mahogany	34D 55-2
Ivory	34D 55-3
Escutcheon, Dial Scale	21B 63
Grille Cloth and Baffle Board	
Ebony	AA227-5
Mahogany	AA227-6
Knob, Radio	
Ebony	33A 81-1
Mahogany	33A 81-3
Ivory	33A 81-2
Washer, Felt (for radio knobs)	5A 4-19

CLOCK PARTS

Symbol	Description	Part No.
M2	Clock, Complete for 117 volts, 60 cycles	91C 8-1
	for 117 volts, 50 cycles	91C 8-2
	Knob, Clock	
	Ebony	91C 8-11
	Mahogany	91C 8-12
	Ivory	91C 8-13
	Motor, Clock for 117 volts, 60 cycles	91C 6-14
	for 117 volts, 50 cycles	91C 6-15
	Snap Button (for mtg. clock window)	13A 1-4
	Window (plastic)	24B 12

MODELS 5S21A
5S22AN, 5S23AN
Ch. 5C3



Models 5S21AN Ebony, 5S22AN Mahogany
and 5S23AN Ivory

GENERAL

This receiver employs the very latest in radio circuitry and printed circuit wiring technique. The printed circuit wiring used in this receiver replaces the hookup wire type of circuit wiring used in earlier receivers. See figures 1 and 2. The printed circuit wiring is permanently adhered to the underside of the plastic chassis base by a photo engraving process. This new method of wiring has produced greater uniformity of chassis wiring, fewer wiring troubles and simplifies circuit tracing and trouble shooting. All circuit components are of standard size and design. For servicing convenience, all parts are mounted on the top side of the chassis; see figure 3. Audio circuit components are contained in a printed circuit couplate.

Trouble shooting and parts replacement will in general be the same as for receivers wired with hookup wire. However, when servicing, it is important to read the service information given in this manual with respect to servicing technique printed circuit receivers. A top view of the chassis is shown in figure 3. A bottom view of early and later production chassis is shown in figures 1 and 2. The early and later production chassis have some minor differences in the routing of the printed circuit wiring but however, are the same electrically.

REPLACEMENT OF COMPONENTS

All components used in this receiver are of standard size and design. For servicing convenience, all components are mounted on the top side of the chassis, see figure 3.

To avoid damage to printed circuits by application of excessive heat when replacing components, use a soldering iron (60 watts or less) with a small tip. Do not use a soldering gun.

To remove a defective component, apply the tip of the soldering iron to the connection point at the underside of the chassis. Keep soldering iron on connection just long enough to melt the solder, then quickly tap the chassis against the service bench to shake the solder away from the connection. After the solder is removed, untwist or separate connections. A pick will be helpful for untwisting or separating connections. After disconnecting connecting wires or lugs, carefully remove components from the top side of the chassis.

Before installing replacement components, clean the solder from the connection point, so that the leads or lugs can be pushed through the holes in the chassis panel. To avoid running solder into adjacent leads of the printed circuit, use as little solder as possible.

For quick replacement, resistors and condensers may be replaced by clipping out the defective part and soldering the new part to the connecting leads remaining from the original part.

An open or damaged section of printed circuit wiring can be replaced by soldering a jumper of ordinary hookup wire across the connection points. To avoid need for complete tube socket replacement, defective tube socket pin clips may be replaced individually. Tube socket pin clips are available under part number 87A35-2.

Note: The tubular shield (center connection) at the bottom of each tube socket must be securely soldered to the printed circuit wiring, otherwise hum or oscillation will result.

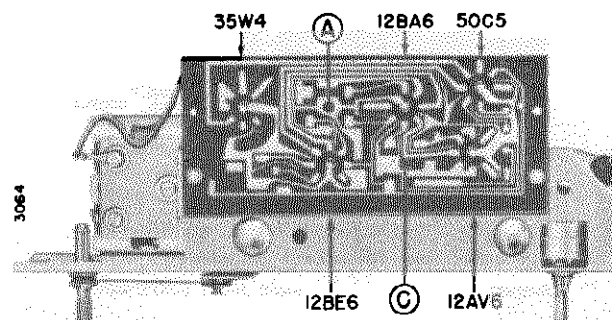


Figure 1. Bottom View of (Early Production) Chassis.

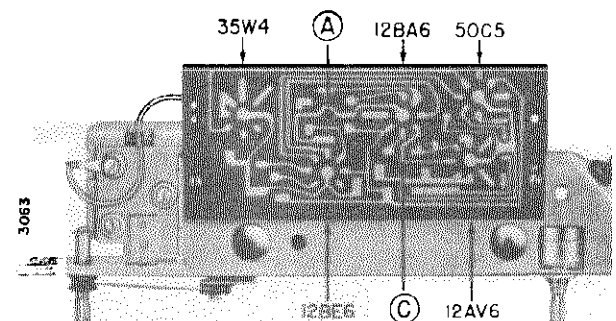


Figure 2. Bottom View of (Later Production) Chassis.

MODELS 5S21AN, 5S22AN, 5S23AN, Ch. 5C3

ALIGNMENT PROCEDURE

- Connect output meter across speaker voice coil.
 - Turn receiver volume control full on.
 - Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and connect to chassis.
 - Use lowest output setting of signal generator capable of producing adequate output meter indication and then proceed as outlined in chart below.
 - Use a NON-METALLIC alignment tool for IF transformers.
 - Repeat adjustments to insure good results.
- Caution: Do not connect a ground wire directly to chassis.

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	Antenna stator of tuning condenser	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum Output
2	250 mmfd. condenser	Antenna stator of tuning condenser	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum Output
3	Loop of several turns of wire or place generator lead close to receiver loop for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Maximum Output
4	Set dial pointer slide as shown in Pointer Setting and Dial Cord Stringing Diagram below. Also see instructions below on "Removing Or Installing Chassis In Cabinet" and on "Setting Pointer Slide."						

*Adjustments A and C made from the underside of the chassis. To avoid splitting the slotted head of powdered iron core tuning slugs in IF transformers, use an alignment tool with a blade 1/8" wide.

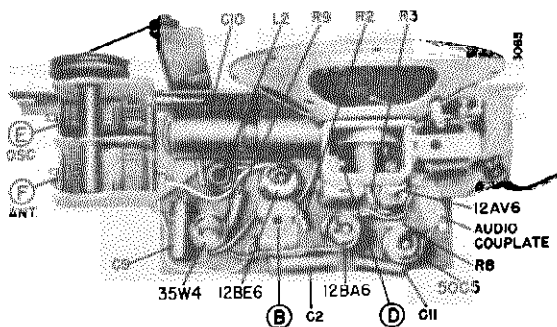
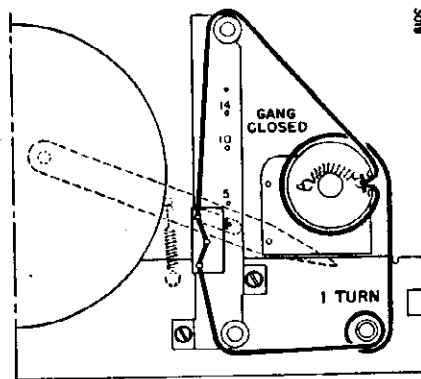


Figure 3. Top View of Chassis. Location of Components and Alignment Adjustments Shown. Adjustments A and C made from underside. See figures 1 and 2.

REMOVING OR INSTALLING CHASSIS IN CABINET

Fully close the gang condenser before removing or installing the chassis in the cabinet. When installing, carefully slide the chassis in the cabinet, so that the tab on the pointer slide fits into the elongated hole at the center of the dial pointer. See the "Pointer Setting and Dial Stringing" diagram at the right. Parts which are shown in dotted lines are not assembled to the chassis. These parts are mounted on the inside of the cabinet.

POINTER SETTING AND DIAL CORD STRINGING



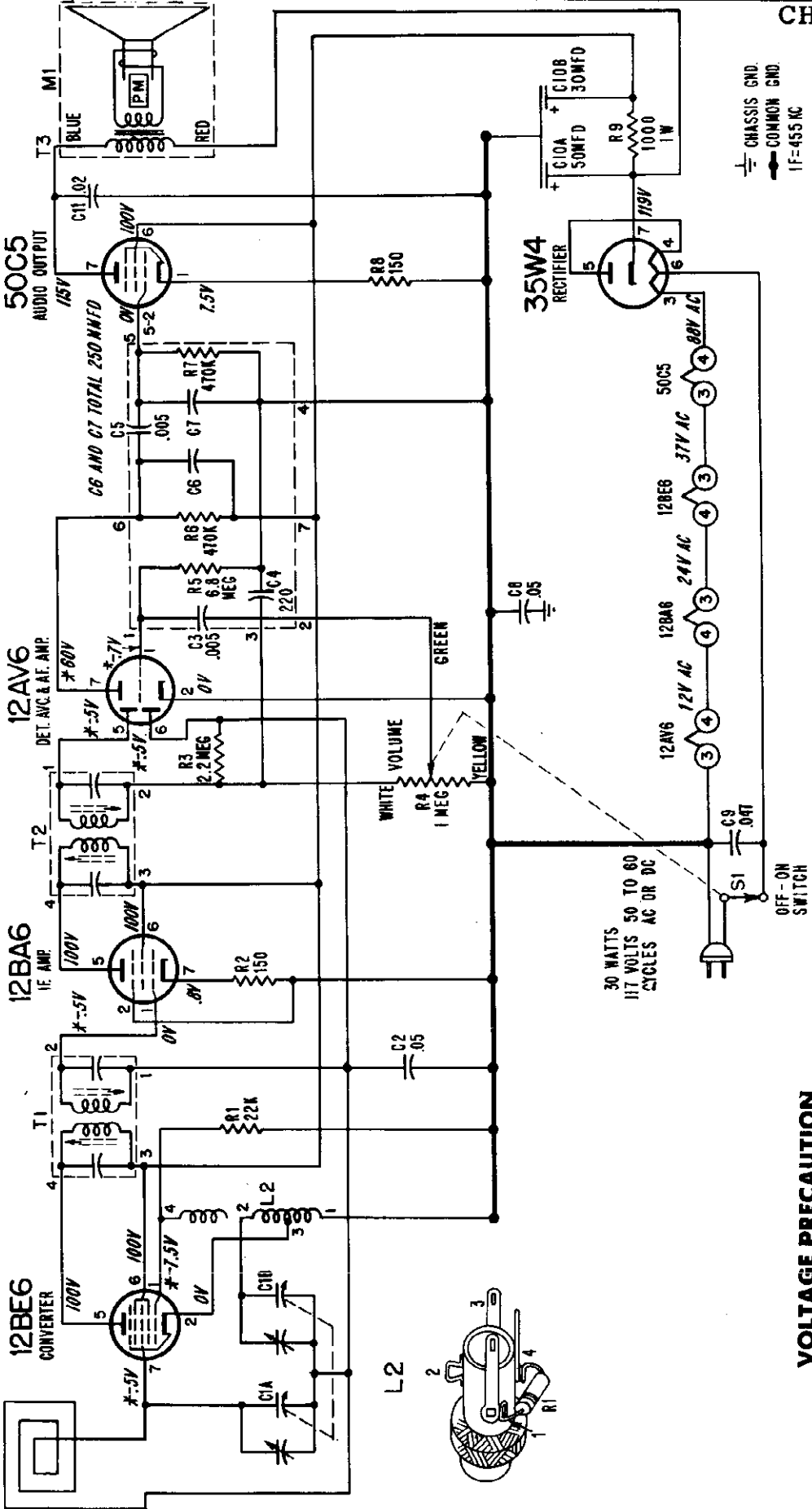
SETTING POINTER SLIDE

With the gang condenser fully closed, line up the center of the pointer slide with the bottom hole in the pointer slide bracket as shown in the figure above.

VOLTAGE DATA

Voltages shown on schematic diagram.

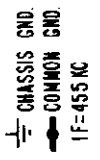
- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Dial turned to low frequency end; volume control at minimum.
- Measured on 117 Volts AC line.
- Voltages measured with Vacuum Tube Voltmeter.



VOLTAGE PRECAUTION

The chassis of this receiver is connected directly to one side of the power line. To avoid possibility of damage to test equipment or to printed circuit wiring, do not place the chassis directly on a metal service bench, tools or other metal objects.

When taking voltage readings or making resistance measurements, use test leads with needle point prods to avoid possibility of short circuit between sections of the printed circuit wiring.



SPECIFICATIONS

Circuit: Superheterodyne using 5 miniature tubes. See additional circuit information on front page.

Frequency Range: Standard broadcast band, 535 to 1620 KC.

Intermediate Frequency: 455 KC.

Power Supply: Power line of 117 volts, 50 to 60 cycles AC or DC.

Power Consumption: 30 watts.

Antenna: Built-in loop antenna.

Speaker: 5" PM, with Alnico V magnet. Voice coil impedance, 3.2 ohms.

COILS, TRANSFORMERS, ETC.

L1	Antenna, Loop.....	69C	159
	(mounted on cardboard back)		
L2	Coil, Oscillator.....	69A	158-1
	(includes R1)		
T1	Transformer, 1st IF.....	72B	28-63
T2	Transformer, 2nd IF.....	72B	28-63
T3	Transformer, Output.....	98A	4
M1	Speaker (5" PM) and Output Transformer.....	78B	26-3
S1	Switch, On-Off.....	Part of R4	
	Couplate.....	63B	6-7
	(Includes R5, R6, R7, C3, C4, C5, C6, C7)		

RESISTORS

Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt.....	60B 8-223
R2	150 ohms, 1/2 watt.....	60B 8-151
R3	2.2 megohms, 1/2 watt.....	60B 8-225
R4	1 megohm, Volume control.....	75B 1-52
	(includes switch S1)	
§R5	6.8 megohms, 1/2 watt	
§R6	470,000 ohms, 1/2 watt	
§R7	470,000 ohms, 1/2 watt	
R8	150 ohms, 1/2 watt.....	60B 8-151
R9	1,000 ohms, 1 watt.....	60B 28-2

CONDENSERS

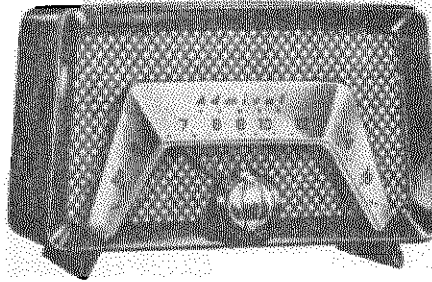
C1A	420 mmfd, max, Ant. } gang.....	68B 48
C1B	108 mmfd, max, Osc. }	
	(Dial drum spot welded to gang.)	
C2	.05 mfd, 400 volts, paper.....	64B 1-7
§C3	.005 mfd, 450 volts	
§C4	220 mmfd, 450 volts	
§C5	.005 mfd, 450 volts	
§C6	{ See note on	
§C7	{ schematic.	
C8	.05 mfd, 400 volts, paper.....	64B 1-7
C9	.047 mfd, 400 volts, paper.....	65A 13-5
C10A	50 mfd, 150 volts } elect.	67A 10
C10B	30 mfd, 150 volts }	
C11	.02 mfd, 400 volts, paper.....	64B 8-11

MISCELLANEOUS PARTS

Bracket, Pointer Slide (incl. pulleys).....	A3730
Cabinet, Plastic	
Ebony.....	34D 26-12
Mahogany.....	34D 26-13
Ivory.....	34D 26-14
Carton and Fillers.....	44B 236
Dial Background.....	22A 30
Dial Cord (27" length needed).....	50A 1-3
Grommet (for mtg. gang).....	12A 1-19
Grommet (for mtg. tuning shaft).....	12A 1-21
Knob, Tuning	
Ebony.....	33A 81-1
Mahogany.....	33A 81-3
Ivory.....	33A 81-2
Pointer, Dial.....	25A 52
Shaft, Tuning.....	28A 26-6
Slide, Pointer.....	15A 800
Snap Button	
for mtg. pointer to cabinet.....	13A 1-2-59
for mtg. dial background.....	13A 1-3-59
Socket, Tube.....	87A 35-1
Spacer, Metal "T" (for mtg. gang).....	29A 2-1-24
Spacer, Tuning Shaft.....	29A 2-7-24
Speed Nut (for tuning shaft spacer).....	2B 10-19-27
Spring, Dial Cord Tension.....	19C 1-2
Spring, Pointer Tension.....	19C 1-20
Washer, "C" (for tuning shaft).....	4A 4-6-0
Washer, Spring (for tuning shaft).....	4A 6-3-0
Washer, Spring (for pointer).....	4A 6-5

§Part of couplate, part number 63B6-7. Numbers 1, 2, 3, 4 on schematic correspond to lead numbers printed on face of couplate 63B6-7.

MODELS 6C22, 6C22A
6C23, 6C23A, Ch. 6C2
6C2A



6C22, 6C22A Mahogany, 6C23, 6C23A Ivory
Operating Voltage: 117 volts, 50 to 60
cycles, AC or DC. Power: 30 watts.

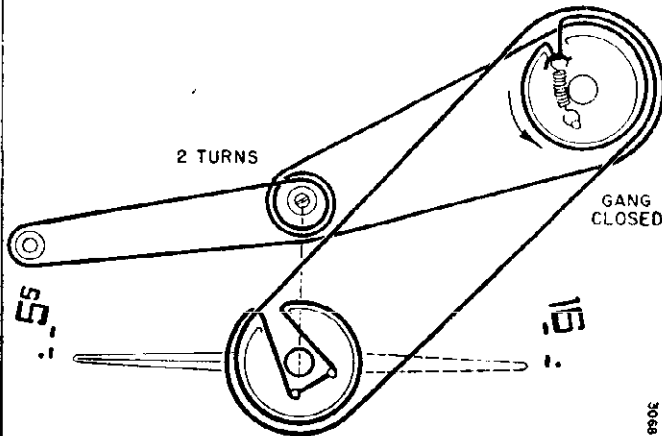
ALIGNMENT PROCEDURE

- Turn receiver volume control full on.
 - Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and connect to B minus (terminal of On-Off switch).
 - Connect output meter across speaker voice coil.
 - Use lowest output setting of signal generator capable of producing adequate output meter indication and then proceed as outlined in chart below.
 - Repeat adjustments to insure good results.
 - Use a non-metallic alignment tool for IF transformers.
- Caution: Do not connect a ground wire directly to chassis.

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	Pin 8 of 12SA7 tube	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum Output
2	250 mmfd. condenser	Tuning condenser Antenna stator	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum Output
3	Loop of several turns of wire, or place generator lead close to receiver antenna for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	RF (on gang)	F	Maximum Output
4	"	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	G	Maximum Output

*Adjustments A and C are made from underside of chassis.

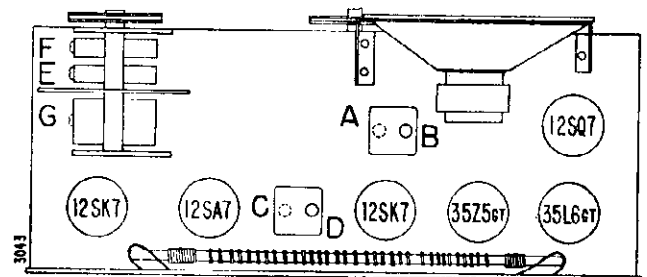
POINTER SETTING AND DIAL CORD STRINGING



POINTER SETTING

Before installing the chassis in the cabinet, fully close the gang condenser. Slide the chassis in the cabinet and mount the dial pointer in a horizontal position (pointed at the dot and dash below 55 on the radio dial scale).

TUBE AND TRIMMER LOCATION

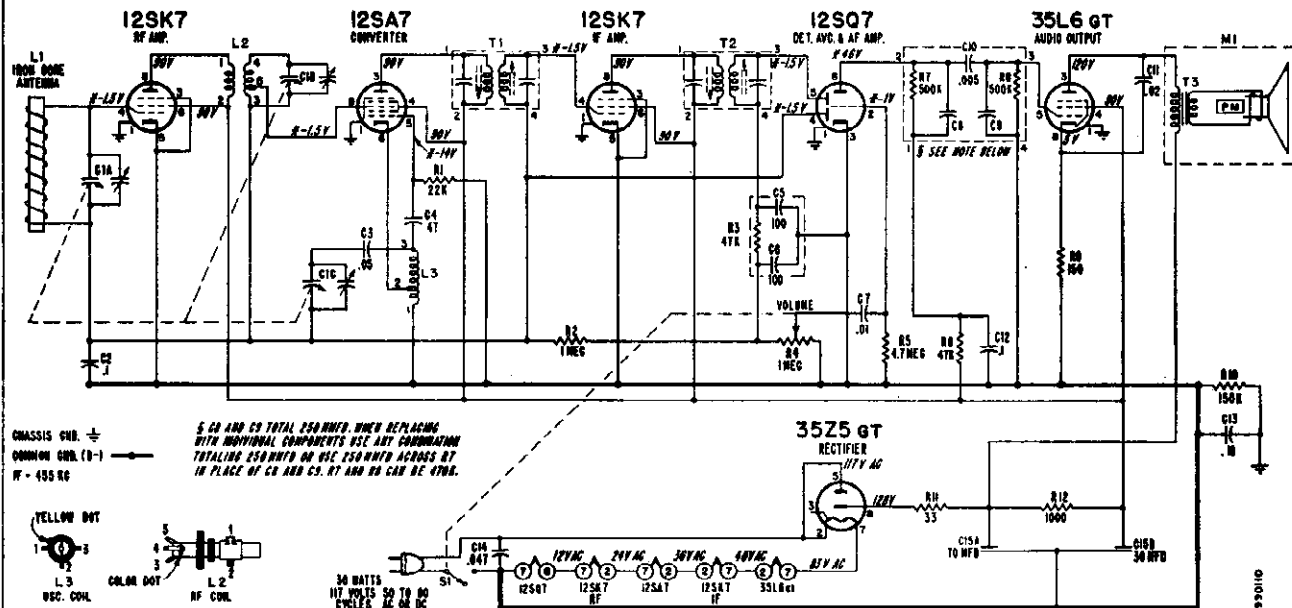


Adjustments A and C are made from underside of chassis.

DIAL STRINGING

When stringing the dial cord, the gang condenser and pointer setting diagram at right. Starting at the tension spring on the gang condenser drum, string the dial cord in the direction shown by the arrows. Maintain sufficient tension on the dial cord tension spring to prevent slipping of the dial cord.

MODELS 6C22, 6C22A, 6C23, 6C23A, Ch. 6C2, 6C2A



*These voltage readings will be either lower or practically zero if taken with a 1000 ohms-per-volt meter.

VOLTAGE DATA

Voltages shown on schematic diagram

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Measured on 117 Volt 60 Cycle AC line.
- Volume control minimum; dial turned to low frequency end.
- Voltages measured with Vacuum-tube Voltmeter.

RESISTORS

Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	1 megohm, 1/2 watt	60B 8-105
††R3	47,000 ohms, 1/2 watt	
R4	1 megohm, Volume control and On-Off switch S1	
	for 6C2 chassis	75B 1-48
	for 6C2A chassis	75B 1-56
R5	4.7 megohms, 1/2 watt	60B 8-475
R6	47,000 ohms, 1/2 watt	60B 8-473
†R7	470,000 ohms, 1/2 watt	
†R8	470,000 ohms, 1/2 watt	
R9	150 ohms, 1/2 watt	60B 8-151
R10	150,000 ohms, 1/2 watt	60B 8-154
R11	33 ohms, 1 watt	60B 28-3
R12	1,000 ohms, 1 watt	60B 28-2

CONDENSERS

Symbol	Description	Part No.
C1A	323 mmfd, max Ant.	
C1B	193.8 mmfd, max RF	} gang. 68B 50-1
C1C	90 mmfd, max Osc.	
C2	(Dial drum spot welded to gang)	
C3	.1 mfd, 200 volts, paper	64B 1-30
C4	.05 mfd, 400 volts, paper	64B 1-22
C5	47 mmfd, mica	65C6-79
††C5	100 mmfd, ceramic	
††C6	100 mmfd, ceramic	
C7	.01 mfd, 400 volts, paper	64B 1-25
†C8	} See Schematic	
†C9		

†Part of couplate (part number 63A 5-4). Replace with exact duplicate or individual components.
 Note that numbers 1, 2, 3, 4, on schematic correspond to couplate lead numbers printed on face of couplate 63A 5-4.
 ††Part of diode filter (part number 63A 3-1). Replace with exact duplicate or individual components.

Symbol	Description	Part No.
†C10	.005 mfd, ceramic	
C11	.02 mfd, 500 volts, paper	64B 1-24
C12	.1 mfd, 200 volts, paper	64B 1-30
C13	.18 mfd, 200 volts, paper	64A 2-2
C14	.047 mfd, 400 volts, paper	65A 13-5
C15A	70 mfd, 150 volts	} elect. 67A 17
C15B	30 mfd, 150 volts	

COILS, TRANSFORMERS, Etc.

Symbol	Description	Part No.
L1	Antenna, Iron Core	69C 148-1
	(mounted on cardboard back)	
L2	Coil, RF	69A 115-1
L3	Coil, Oscillator	69A 52-2
T1	Transformer, 1st I.F.	72B 28-7
T2	Transformer, 2nd I.F.	72B 28-7
T3	Transformer, Output	98A 4
M1	Speaker (5" PM) and Output Transformer	78B 70-1
S1	Switch, On-Off	Part of R4
	Couplate	63A 5-4
	(includes R7, R8, C8, C9, C10)	
	Diode Filter	63A 3-1
	(includes R3, C5, C6)	

MISCELLANEOUS

Description	Part No.
Carton and Fillers	44B 255
Clamp, Line Cord	11A 9-2

Description	Part No.
Clip, IF Transformer Mounting	72B 28-10
Dial Cord (62" length needed)	50A 1-3
Drum, Pointer	A3731
Grommet, Rubber (for mtg. gang)	
Ring, Pointer Compression	12A 1-2
Sleeve, Tuning	19A 31-8
for 6C2 chassis	27A 164
for 6C2A chassis	27A 172-1
Socket, Tube	67A 10-2
Spacer, Metal "T" (for mtg. gang)	29A 2-1-71
Spring, Dial Cord Tension	19C 1-5
Spring, Shaft Retaining	19A 77-1
(for 6C2A chassis)	

CABINET PARTS

Description	Part No.
Back Assembly (includes built-in antenna L1)	69C 148-1
Cabinet, Plastic	
Mahogany	34D 50-2
Ivory	34D 50-3
Escutcheon Overlay (dial scale)	23C 119-1
Grille Cloth and Baffle Board	AA226
Knob, On-Off Volume	33A 80-2
Knob, Tuning	
Mahogany	33A 79-2
Ivory	33A 79-3
Pointer, Dial	
for 6C22, 6C23	
Mahogany	25A 53-2
Ivory	25A 53-3
for 622A, 623A	
Mahogany	A3919
Ivory	A3920
Speed Nut (for mtg. baffle to cabinet)	2B 10-12-69
Stud, Trimount (for mtg. cabinet back)	13A 1-5-68
Washer, Felt (for tuning knobs)	5A 4-4

ALIGNMENT PROCEDURE

- Turn receiver volume control full on.
- Antenna must be connected and placed in the same relative position to the chassis as when in cabinet.
- Use an isolation transformer; otherwise, connect a .1 mfd. capacitor in series with low side of signal generator and connect to chassis. Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output of signal generator necessary to produce midscale 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	.001 mfd. capacitor	Tuning capacitor, antenna stator	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	.001 mfd. capacitor	Tuning capacitor, antenna stator	1620 KC	Gang fully open	Oscillator	E	Maximum output
3	Loop of several turns of wire, or place generator leads close to receiver antenna for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	†F	Maximum output

* Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may all be made from the top of chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug. If IF transformers have slotted tuning slugs, use an alignment tool with a blade 3/32" wide.

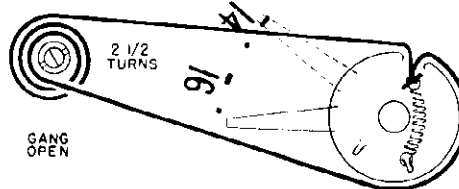
† Antenna Trimmer "F" should be aligned after chassis and antenna are mounted in cabinet.

RECORD CHANGER SERVICE DATA

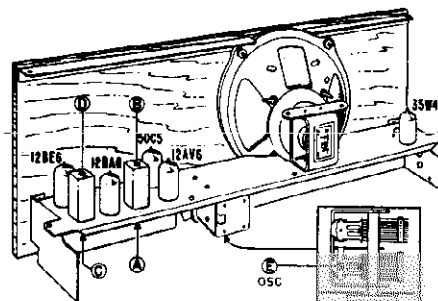
The record changer model number is found stamped at the top rear of the changer pan and on the changer model label.



Models 5D31 Ebony, 5D32 Maroon, 5D33 Ivory



Solid lines show dial stringing and pointer position with tuning gang open. Dashed lines show pointer position (1400KC) when tuning gang is tuned to a generator signal.

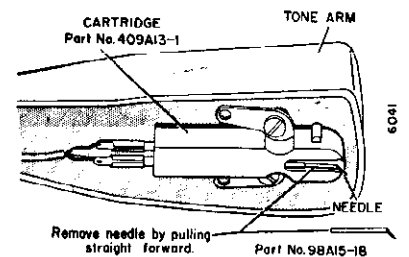
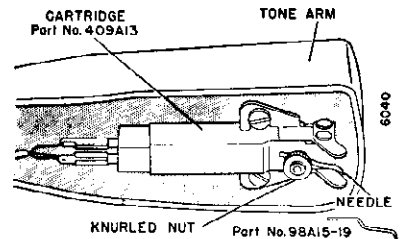
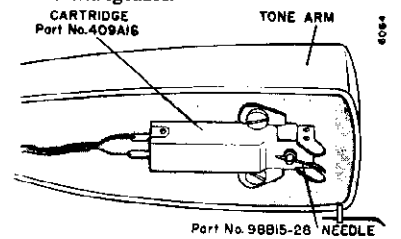


TUBE AND TRIMMER LOCATION

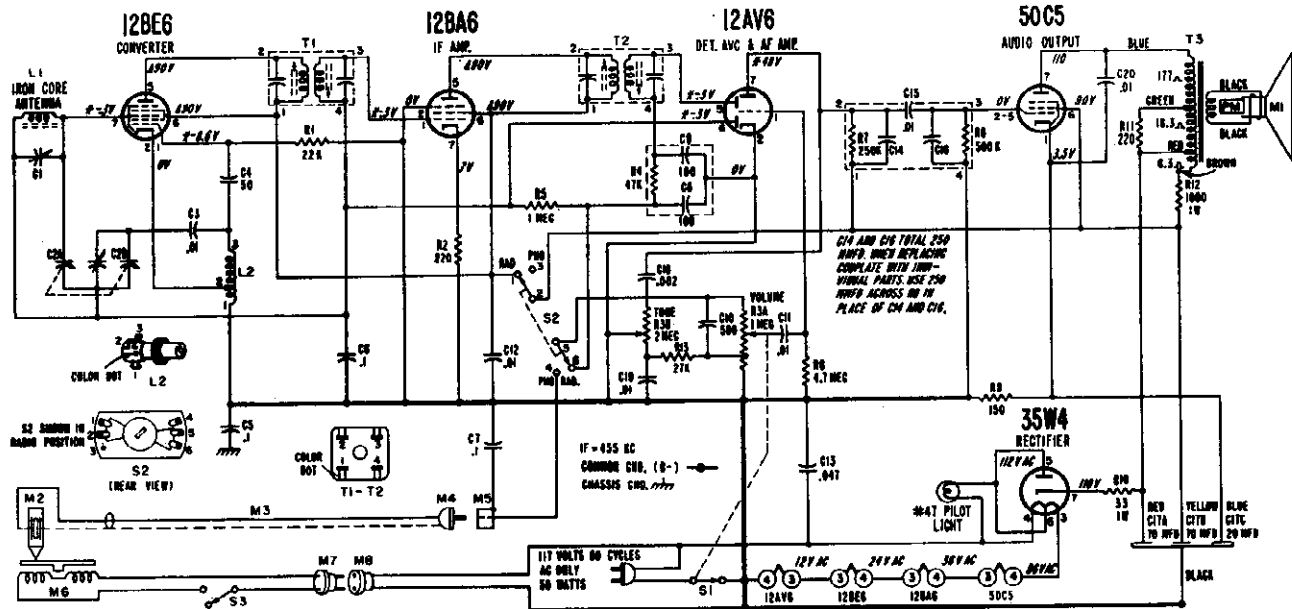
Adjustments A and C made from underside of chassis.
Adjustment F on antenna.

CARTRIDGE AND NEEDLE

Cartridges complete with needle are interchangeable.



MODELS 5D31, 5D32, 5D33, Ch. 5D3



*These readings will be lower if taken with a 1000 ohms-per-volt meter.
 ▲These readings will be zero on "Phono"; other DC readings may be slightly higher.

OPERATING VOLTAGE

117 volts, 60 cycles AC only; 50 watts

VOLTAGE DATA

- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Radio-Phono switch S2 in "Radio" position.

- Measured on 117 Volt, 60 Cycle AC line.
- Volume control minimum; dial turned to low end.
- Voltages measured with vacuum-tube voltmeter.

RESISTORS

Symbol	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223
R2	220 ohms, 1/2 watt	60B 8-221
R3A	1 megohm, Volume	75B 11-8
R3B	2 megohms, Tone	
(Includes switch S1)		
§R4	47,000 ohms, 1/2 watt	60B 8-105
R5	1 megohm, 1/2 watt	60B 8-105
R6	4.7 megohms, 1/2 watt	60B 8-475
†R7	250,000 ohms, 1/2 watt	60B 8-221
†R8	500,000 ohms, 1/2 watt	60B 8-151
R9	150 ohms, 1/2 watt	60B 28-3
R10	33 ohms, 1 watt	60B 28-3
R11	220 ohms, 1/2 watt	60B 8-221
R12	1,000 ohms, 1 watt	60B 28-2
R13	27,000 ohms, 1/2 watt	60B 8-273

CAPACITORS

C1	Trimmer, 3 to 30 mmfd.	66A 33
C2A	Ant. 323 mmfd, max.	gang. 68B 55-1
C2B	Osc. 105 mmfd, max.	gang. 68B 55-1
(Drum spotwelded to gang)		
C3	.01 mfd, 450 volts, ceramic	65C 10-3
C4	50 mmfd, 500 volts, ceramic	65C 6-4
C5	.1 mfd, 200 volts, paper	64B 1-30
C6	.1 mfd, 200 volts, paper	64B 1-30
C7	.1 mfd, 200 volts, paper	64B 1-30
§C8	100 mmfd, ceramic	
§C9	100 mmfd, ceramic	
C10	500 mmfd, ceramic	65C 6-6
C11	.01 mfd, 450 volts, ceramic	65C 10-3
C12	.01 mfd, 450 volts, ceramic	65C 10-3
C13	.047 mfd, 400 volts, paper	65A 13-5
†C14	See schematic	
†C15	.01 mfd, 500 volts, ceramic	
†C16	See schematic	
C17A	70 mfd, 150 volts	
C17B	70 mfd, 150 volts	elect. 67B 7-18
C17C	20 mfd, 25 volts	
C18	.002 mfd, 600 volts, paper	64B 1-14
C19	.01 mfd, 450 volts, ceramic	65C 10-3
C20	.01 mfd, 450 volts, ceramic	65C 10-3

COILS, TRANSFORMERS, ETC.

L1	Antenna, Iron Core (includes C1)	69B 164
L2	Coil, Oscillator	69A 52-6
*T1	Transformer, 1st IF with hollow core slugs. 72C 128-7 with slotted core slugs. 72C 28-7	
*T2	Transformer, 2nd IF with hollow core slugs. 72C 128-7 with slotted core slugs. 72C 28-7	

Symbol	Description	Part No.
T3	Transformer, Output	79C 46-1
M1	Speaker, (6", PM)	78B 81-1
M5	Socket, Phono Input	88A 1
M8	Socket & Leads, Phono Motor	89A 6-3
S1	Switch, On-Off	Part of R3
S2	Switch, Radio-Phono	76B 28-1
	Couplate (Includes R7, R8, C14, C15, C16)	63A 5-6
	Diode Filter (Includes R4, C8, C9)	63A 3-1

MISCELLANEOUS PARTS

Dial Cord (22" length needed)	50A 1-3
Grommet, Rubber (gang mtg.)	12B 1-18
Manual, Customer Instruction	41B 20-31
Manual, Service for RC600	
Record Changer	S454
Pilot Light, #47	81A 1-8
Pointer, Dial (includes compression ring)	A4103
Shaft, Pointer	28A 42
Shield, Pilot Light	82A 4
Sleeve, Tuning (brass)	27A 180
Socket, Pilot Light	82A 20-1
Tube, 7-pin (gang condenser mtg.)	37A 3-4
Spacer, (gang condenser mtg.)	29A 2-1-24
Spring, Dial Cord Tension	19B 1-5
Spring, Hairpin (for tuning sleeve)	19A 2-5

CABINET PARTS

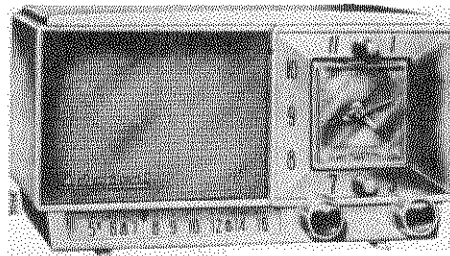
Base, Metal (cabinet legs)	35E 289
Bottom Board	43B 205
Cabinet Bottom, Plastic	
ebony	34E 63-3
maroon	34E 63-5
ivory	34E 63-8
Cabinet Cover, Plastic	
ebony	34F 63-4
maroon	34E 63-6
ivory	34E 63-9
Escutcheon, Dial	23D 140
Escutcheon Ring (gold trim)	23A 53-1
Grille Cloth and Baffle Board	
ebony	A3980
maroon	A3981
ivory	A3982
Hinge	37A 8-1
Hinge Screw (6-32x4 BH MS)	365-250-C2-58
Hinge Stud	27A 17-1
Jewel, Pilot Light	82A 21-4

Description	Part No.
Knob, Radio, "Off-Volume" (inner knob)	
ebony	33C 111-7
maroon	33C 111-3
ivory	33C 111-11
"Rad-Pho" (inner knob)	
ebony	33C 111-8
maroon	33C 111-4
ivory	33C 111-12
"Tone" (outer knob)	
ebony	33C 111-5
maroon	33C 111-1
ivory	33C 111-9
"Tuning" (outer knob)	
ebony	33C 111-6
maroon	33C 111-2
ivory	33C 111-10
Nameplate, "Admiral," Plastic	26B 45
Ring, Compression for dial pointer	19A 31-14
for "Off-Volume" knob	19A 31-11
for pilot light jewel	19A 31-15
for "Rad-Pho" knob	19A 31-5
Rubber Channel for cabinet top	12A 9-8
Rubber Foot for cabinet bottom	8A 10
Speed Nut, for mtg. nameplate	2B 12-3-69
Stay Arm and Plate	37A 9-1
Washer, Felt (for tuning knobs)	5A 4-21

PHONOGRAPH PARTS

M2 Cartridge, Pickup (Part nos. 409A 13, 409A 13-1 and 409A 16 used; see illustrations on back page.)	
M3 Cable, Shielded Pickup (includes plug)	413A 11-1
M4 Plug, Pickup Cable	88A 2-3
M6 Motor, Phono (3 speed)	407C 20
M7 Plug, Motor (Male)	88A 8-1
S3 Switch and Mtg. Plate	G400A 606
Adapter, 45 RPM (envelope of 12)	46A 8-2
Button, Snap-in Plug	13A 2-8-57
Centerpost Assembly	G400B 601
Idler Wheel (includes tire)	G400A 279
Kit, 50 Cycle Conversion	98B 15-23
Manual, Service	S454
Needle, Pickup for 409A13 cartridge	98A 15-19
for 409A13-1 cartridge	98A 15-18
for 409A 16 cartridge	98B 15-28
Needle Retaining Nut (for 409A13 cartridge)	98A 54-2
Screw and Washer, Changer Mounting (10-32x1/4 RH MS)	AA210
Spring, Changer Float	19A 10-3

*Transformers differ slightly. For best results, order exact part.
 †Part of Diode Filter, part number 63A 3-1. This unit consisting of C8, C9 and R4 may be replaced with individual components.
 ‡Part of couplate, part number 63A 5-6. See schematic.



Model 5E31 Ebony, 5E32 Maroon, 5E33 Ivory, 5E38 Green, 5E39 Gray.

ALIGNMENT PROCEDURE

- Turn receiver volume control full on (fully clockwise).
- Use an isolation transformer if available; otherwise, connect a .1 mfd. capacitor in series with low side of signal generator and connect to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output of signal generator required for midscale meter indication and proceed in the following sequence.
- Repeat adjustments to insure good results.

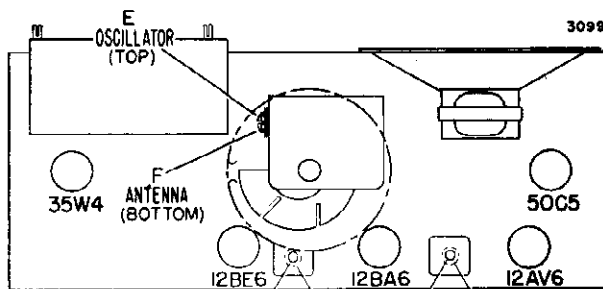
Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Antenna stator of tuning capacitor	455 KC	Gang fully open	2nd IF 1st IF	*A, B, *C, D	Maximum output
2	250 mmfd. condenser	Antenna stator of tuning capacitor	1620 KC	Gang fully open	Oscillator	E	Maximum output

Set tuning pointer with tuning gang tuned to 1400 KC generator signal; see illustration below.

3	Loop of several turns of wire, or place generator lead close to receiver loop for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	F	Maximum output
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*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may be made from the top of the chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug. If IF transformers have slotted head tuning slugs, use an alignment tool with a blade 3/32" wide.

TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis.

OPERATING RADIO MANUALLY

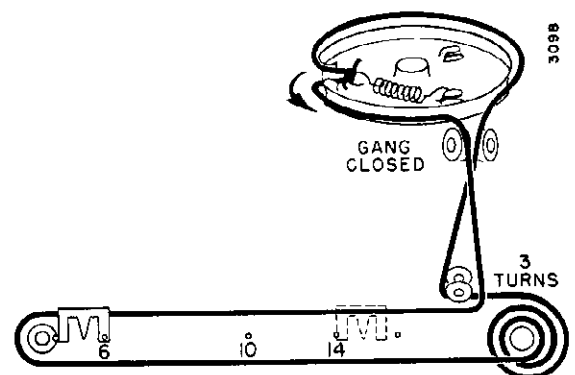
When the "Auto-Off-On" switch is set to the "On" position, the radio may be operated manually with the "Off-Volume" knob. The On-Off switch in the radio will not control the clock or the appliance outlet.

TO REMOVE CLOCK FROM CABINET

To remove the clock, proceed as follows:

1. Remove the radio chassis from the cabinet.
2. Remove four Phillips screws which mount the clock to the cabinet.
3. Carefully remove the clock. Do not unsolder electrical connections unless complete removal of the clock is required.

DIAL STRINGING AND POINTER SETTING

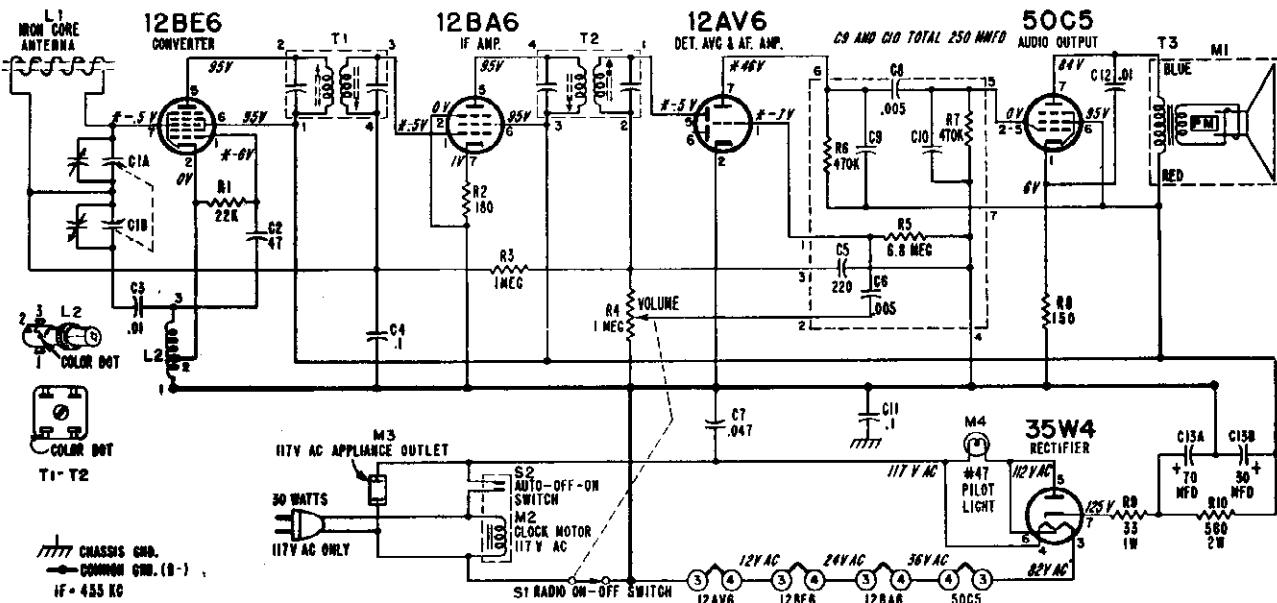


Dial stringing and pointer with solid lines shown with gang closed. Dashed line pointer position (1400 KC) shown when tuning gang is tuned to generator signal.

PARTS AND SERVICE FOR CLOCK

Consult your Admiral distributor for the address of the nearest parts and service station for clocks used in Admiral radios.

MODELS 5E31, 5E32, 5E33, Ch. 5E3



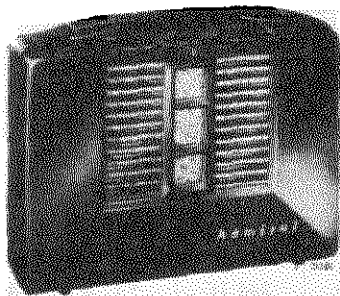
*These voltage readings will be either lower or practically zero if taken with a 1000 ohms-per-volt meter.

VOLTAGE DATA

- Voltages shown on schematic diagram.
- All readings made between tube socket terminals and B minus (terminal of On-Off switch).
- Measured on 117 Volt AC line.
- Volume control minimum; dial set at low frequency end.
- Voltages measured with vacuum-tube voltmeter.

RESISTORS			MISCELLANEOUS PARTS			CABINET PARTS	
Symbol	Description	Part No.	Symbol	Description	Part No.	Description	Part No.
R1	22,000 ohms, 1/2 watt	60B 8-223	L2	Coil, Oscillator	69A 52-7	Cabinet, Plastic	
R2	180 ohms, 1/2 watt	60B 8-181	*T1	Transformer, 1st IF with hollow core slugs	.72C 128-7	ebony	34D 67-1
R3	1 megohm, 1/2 watt	60B 8-105		with slotted core slugs	.72C 28-7	maroon	34D 67-2
R4	1 megohm, Volume control (R4 includes switch S1)	75B 1-58	*T2	Transformer, 2nd IF with hollow core slugs	.72C 128-7	ivory	34D 67-3
R5	6.8 megohms, 1/4 watt			with slotted core slugs	.72C 28-7	green	34D 67-4
R6	470,000 ohms, 1/4 watt		T3	Transformer, Output	98A 21	gray	34D 67-5
R7	470,000 ohms, 1/4 watt		M1	Speaker (4" PM) and Output Transformer	78B 85	Grille, Metal	36B 46
R8	150 ohms, 1/2 watt	60B 8-151	M3	Outlet, Appliance	87A 21-1	Knobs, Tuning and Volume	
R9	33 ohms, 1 watt	60B 28-3	M4	Socket, Pilot Light	82A 17-4	ebony	33A 81-1
R10	560 ohms, 2 watts	60B 20-561	S1	Switch, Radio On-Off (Part of R4)		maroon	33A 81-2
C1A	290 mfd, max. Ant.	} gang, 68B 51-1 (Dial drum spotwelded to gang)	S2	Switch Auto-On-Off (Part of M2 Couplate)	63B 6-7	ivory	33A 81-3
C1B	104 mfd, max. Osc.			(Includes R5, R6, R7, C5, C6, C8, C9, C10)		green	33A 81-4
C2	47 mfd, ceramic	65C 6-79	MISCELLANEOUS PARTS			gray	33A 81-5
C3	.01 mfd, ceramic	65C 10-3	Bracket, Pointer Support	15A 936	Nameplate, "Admiral"	26A 44	
C4	.1 mfd, 200 volts, paper	64B 1-30	Clip, IF Transformer Mounting	.72B 28-10	Pointer, Tuning	25A 57	
C5	220 mfd, ceramic		Drum, Dial Pointer	17A 5-2	Trimount Fastener (for cabinet back)	13A 1-5	
C6	.005 mfd, ceramic		Grommet, Rubber (gang mtg.)	12B 1-18	Washer, Felt (for tuning knobs)	5A 4-19	
C7	.047 mfd, 400 volts, paper	65A 13-5	Line Cord and Plug	89A 34-1			
C8	.005 mfd, ceramic		Manual, Customer Instructions	.41B 20-32			
C9	{ see note		Pilot Light, #47	81A 1-8			
C10	{ on schematic		Pointer, Dial	25A 57			
C11	.1 mfd, 200 volts, paper	64B 1-30	Shaft, Tuning	28A 70-1			
C12	.01 mfd, ceramic	65C 10-3	Pointer, Tube	87A 3-4			
C13A	70 mfd, 150 volts	} elect, 67A 17-1	Spacer, Metal "T" (for mtg. gang)	29A 2-3-24			
C13B	30 mfd, 150 volts			Speed Nut (mtg. pointer shaft sleeve)	2B 10-28-59		
COILS, TRANSFORMERS, ETC.			Spring, Dial Cord Tension	19C 1-5			
L1	Iron Core Antenna and Cabinet Back	69B 171	Washer, "E" (for tuning shaft)	4B 12-4			

§Part of couplate (part No. 63B 6-7). Numbers on schematic correspond to lead numbers on couplate.
 *Transformers differ slightly. For best results, order exact part.



Models 4X11 Ebony, 4X12 Maroon,
4X18 Green and 4X14 Gray

GENERAL

This receiver incorporates the latest radio circuitry with printed circuit technique. The printed circuit used in this receiver replaces the hookup wire used in earlier receivers. See figures 1 and 2. The printed circuit is permanently fixed to the plastic chassis base by a photoengraving process. This new method of circuitry offers uniform chassis wiring, fewer wiring troubles and simplifies circuit tracing and trouble shooting. All circuit components are standard size and design. For servicing convenience, all parts are mounted on the top of the chassis; see figure 2. Audio circuit parts are contained in a printed circuit couplate, part number 63B6-6.

In general, trouble shooting and parts replacement will be the same as for receivers wired with hookup wire. However, when servicing, it is important to read the service information given in this manual concerning servicing technique for printed circuit receivers. A top view of the chassis is shown in figure 2. A bottom view of the chassis is shown in figure 1.

REPLACING PARTS

To avoid damaging printed circuits with excessive heat, use a soldering iron (60 watts maximum) with a small tip when replacing parts.

To remove defective parts, apply the tip of the soldering iron to the connection at the underside of the chassis. Keep soldering iron on connection just long enough to melt the solder, then quickly tap the chassis against the service bench to shake the solder away from the connection. After the solder is removed, untwist or separate connections. A pick will be helpful for untwisting or separating connections. After disconnecting wires or lugs, carefully remove parts from the top of the chassis.

SPECIFICATIONS

- Circuit:** Superheterodyne using 4 miniature tubes. additional circuit information
- Frequency Range:** Standard broadcast band, 535-1620 KC.
- Intermediate Frequency:** 455 KC.
- Power Supply:** Two 1½ volt "A" batteries and 67½ volt battery.
- Antenna:** Built-in Ferro-Scope (iron-core) antenna
- Speaker:** 3½" PM, with Alnico V magnet. Voice impedance, 3.2 ohms.

Before installing replacement parts, clean solder from the connection, so the wires or lugs pass through the holes in the chassis panel. To avoid running solder into adjoining circuits, use as little solder as necessary.

For quick replacement, resistors and capacitors may be replaced by clipping out the defective part and soldering the new part to the connecting wires remaining from the original part.

An open or damaged section of the printed circuit can be repaired by soldering a jumper of ordinary hookup wire across the connection points. To avoid need for complete tube socket replacement, defective tube socket terminals may be replaced individually. Tube socket terminals are available under part number 87A35-2.

Note: The tubular shield (center connection) at the bottom of each tube socket must be securely soldered to the printed circuit, otherwise hum oscillation will result.

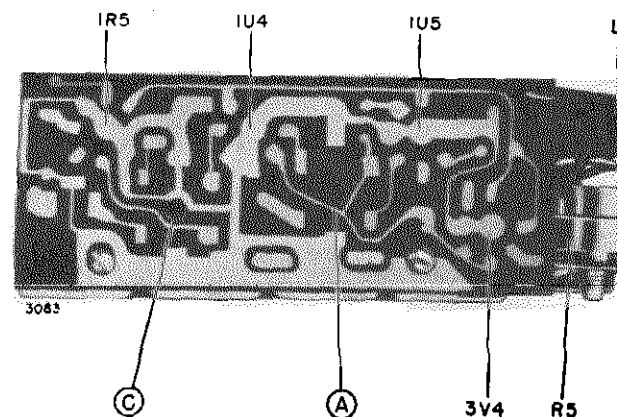


Figure 1. Bottom View of Chassis.

MODELS 4X11, 4X12, 4X18, 4X19, Ch. 4X1

ALIGNMENT PROCEDURE

- Use FRESH batteries when alignment adjustments are made.
- Connect output meter across speaker voice coil.
- Turn receiver volume control full on.
- Use lowest output of signal generator necessary for producing adequate output meter indication and then proceed as outlined in chart below.
- Use a NON-METALLIC alignment tool for IF transformers.
- Repeat adjustments to insure good alignment.

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	.1 mfd. capacitor	Stator of antenna tuning capacitor	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum Output
2	.1 mfd. capacitor	Stator of antenna tuning capacitor	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum Output
3	Loop of several turns of wire or place generator lead close to receiver loop for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Maximum Output

*Adjustments A and C made from the underside of the chassis. To avoid splitting the slotted head of powdered iron core tuning slugs in IF transformers, use an alignment tool with a blade 3/32" wide.

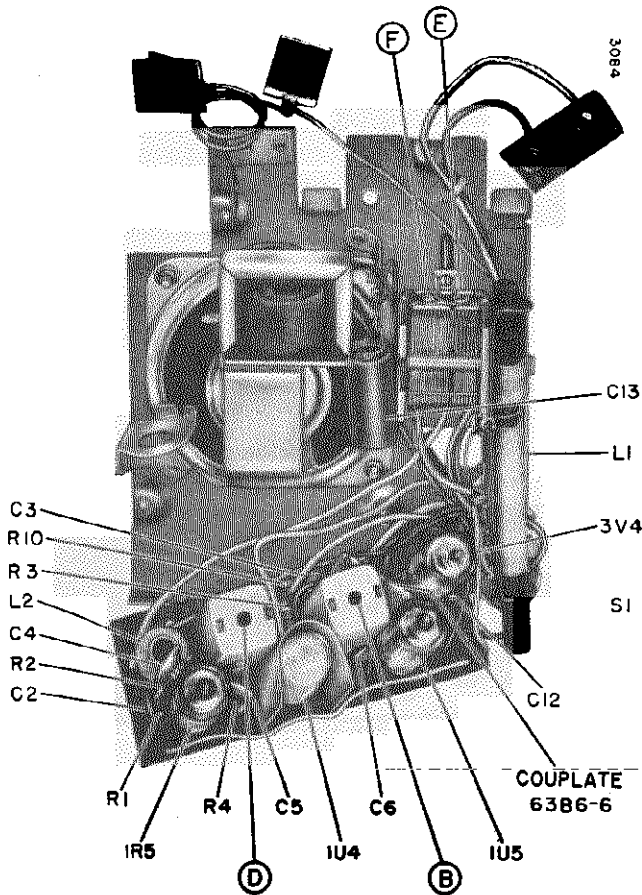
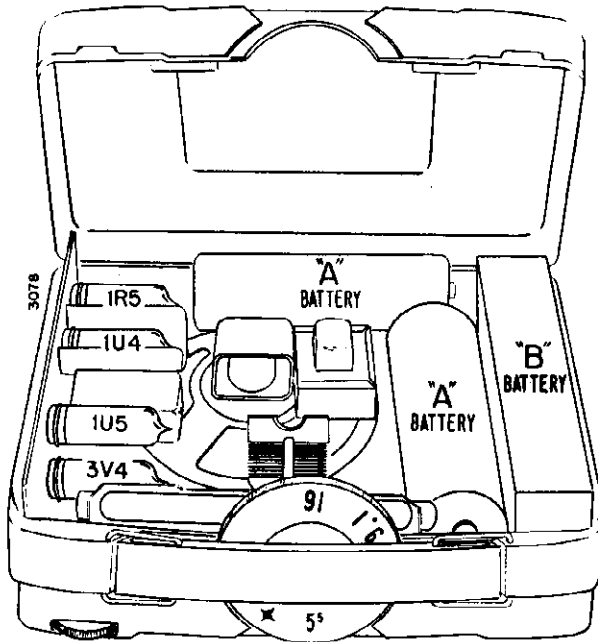


Figure 2. Top View of Chassis. Location of Components and Alignment Adjustments Shown. Adjustments A and C made from underside. See figure 1.



REPLACING BATTERIES

In normal use, batteries for this set should furnish about 80 operating hours. Batteries of the type given below, or an equivalent substitute may be used in this set.

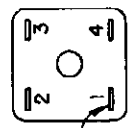
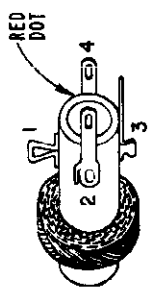
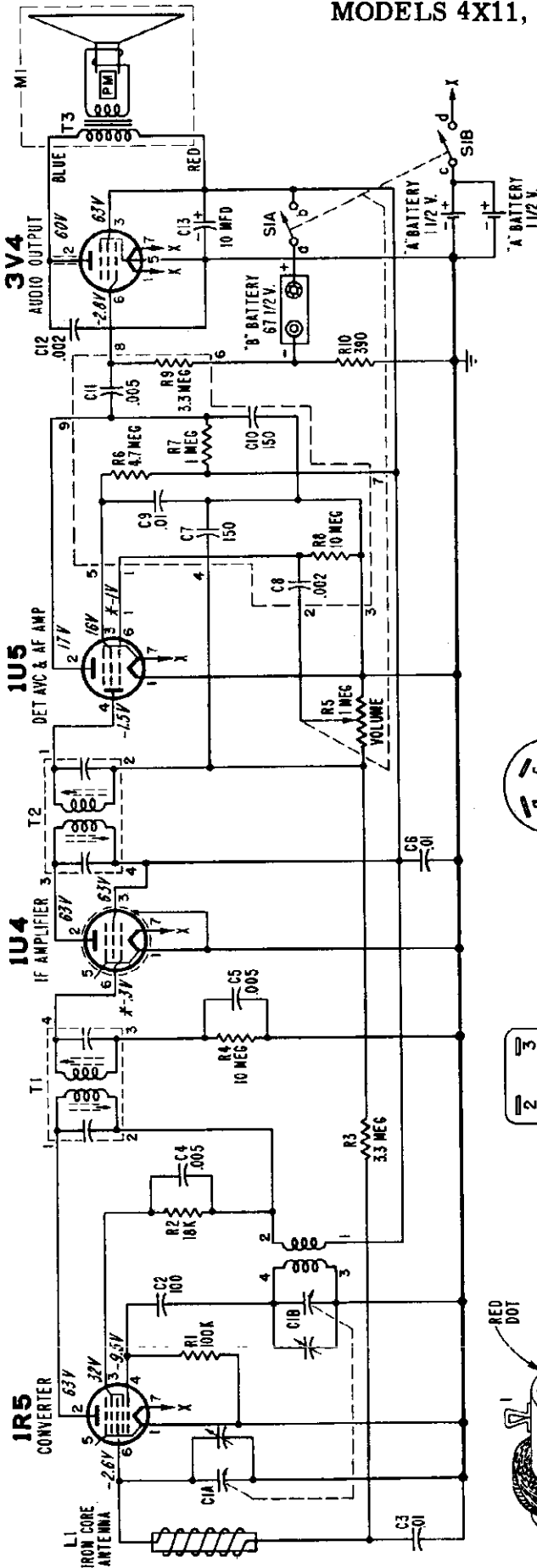
"A" Battery (1½ volts): R.C.A. VS236, Burgess 21R, Eveready 964.

"B" Battery (67½ volts): R.C.A. VS216, Burgess P45, Eveready 477.

CAUTION

To avoid damage to test equipment or to the printed circuit, do not place the chassis directly on a metal service bench, tools or other metal objects.

When making voltage or resistance measurements, use test leads with needle point prods to avoid short circuits between sections of the printed circuit wiring.



*These voltage readings will be either lower or practically zero if taken with a 1000 ohms-per-volt meter.

VOLTAGE DATA

Voltages shown on schematic diagram.

- All readings made between tube socket terminals and chassis
- Dial turned to low frequency end; volume control at minimum.
- Voltages measured with fresh batteries.
- Voltages measured with Vacuum-tube Voltmeter.

MODELS 4X11, 4X12, 4X18, 4X19, Ch. 4X1

RESISTORS

Symbol	Description	Part No.
R1	100,000 ohms, 1/2 watt.....	60B 8-104
R2	18,000 ohms, 1/2 watt.....	60B 8-183
R3	3.3 megohms, 1/2 watt.....	60B 8-335
R4	10 megohms, 1/2 watt.....	60B 8-106
R5	1 megohm, Volume control.....	75B 19-1 (includes switch S1)
†R6	4.7 megohms	
†R7	1 megohm	
†R8	10 megohms	
†R9	3.3 megohms	
R10	390 ohms, 1/2 watt.....	60B 8-391

CAPACITORS

Symbol	Description	Part No.
C1A	197 mmfd, max, ant. } gang.....	68B 56
C1B	97.8 mmfd, max, osc. }	
C2	100 mmfd, ceramic.....	65C 6-3
C3	.01 mfd, ceramic.....	65A 10-3
C4	.005 mfd, ceramic.....	65A 10-5
C5	.005 mfd, ceramic.....	65A 10-5
C6	.01 mfd, ceramic.....	65A 10-3
†C7	150 mmfd	
†C8	.002 mfd	
†C9	.01 mfd	
†C10	150 mmfd	
†C11	.005 mfd	
C12	.002 mfd, ceramic.....	65B 9-37
C13	10 mfd, 75 volts, electrolytic.....	67A 4-11

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Antenna, Iron Core.....	69B 166-1
L2	Coil, Oscillator.....	69A 165-1
T1	Transformer, 1st IF.....	72B 28-64
T2	Transformer, 2nd IF.....	72B 28-64
T3	Transformer, Output.....	98A 21
M1	Speaker (3 1/2" PM) and Output Transformer.....	78B 83-1
S1	Switch, On-Off.....	Part of R5
	Couplate.....	63B 6-6 (includes R6, R7, R8, R9 C7, C8, C9, C10, C11)

MISCELLANEOUS PARTS

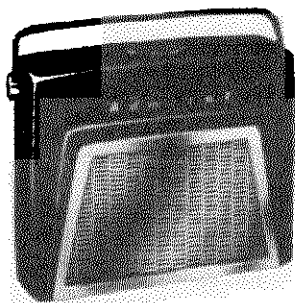
Description	Part No.
Bracket	
"A" Battery Ground.....	18A 70
"A" Battery Ground.....	18A 74
Carton and Fillers.....	44C 288
Clip, Fuse (for cabinet catch).....	84A 10-16
Connector	
"A" Battery.....	18A 72
"B" Battery.....	90A 6-1
Nut (for mtg. speaker).....	2A 1-14-24
Lockwasher (for mtg. speaker).....	3B 1-26-24

Description	Part No.
Screw	
for mtg. antenna, #6-32 x 1/8	
BH MS.....	265-125-C2-24
for mtg. fuse clip, #4-40 x 3/16	
RH MS.....	40-187-C2-24
for mtg. gang, #6-32 x 3/16	
BH MS.....	265-187-C2-24
for mtg. chassis base, #6-32 x 1/4	
RH MS.....	260-250-C2-24
for mtg. speaker, #8-32 x 5/16	
BH MS.....	85-312-C2-70
Socket, Tube.....	87A 35-1
Terminal, Tube Socket.....	87A 35-2
Terminal Lug.....	9B 1-3

CABINET PARTS

Description	Part No.
Bracket, Handle Support.....	19A 76
Cabinet, Front (includes grille)	
ebony.....	34D 64-1
maroon.....	34D 64-3
green.....	34C 64-5
gray.....	34D 64-7
Cabinet, Rear	
ebony.....	34D 64-2
maroon.....	34D 64-4
green.....	34D 64-6
gray.....	34D 64-8
Compression Ring (for tuning knob).....	19A 31-10
Eyelet (for cabinet catch).....	6B 3-31
Grille Cloth and Baffle.....	AA 227-7
Handle, Plastic	
ebony.....	37B 87-1
maroon.....	37B 87-2
green.....	37B 87-3
gray.....	37B 87-4
Hinge, Spring.....	19A 72-1
Knob, Tuning	
ebony.....	33B 104-1
maroon.....	33B 104-3
green.....	33B 104-5
gray.....	33B 104-7
Knob, Volume	
ebony.....	33B 104-2
maroon.....	33B 104-4
green.....	33B 104-6
gray.....	33B 104-8
Screw	
for mtg. chassis, #4-40 x 3/16	
BH MS.....	245-187-C2-24
for mtg. eyelet, #6-32 x 3/8	
BH MS.....	60-375-C2-24
for mtg. Volume knob, #4-40 x 5/16	
BH MS.....	245-312-C2-24

†Part of couplate, part number 63B 6-6. Numbers on schematic correspond to lead numbers on couplate.



Models 4Y11 Ebony, 4Y12 Maroon,
4Y18 Green and 4Y19 Gray

SPECIFICATIONS

Circuit: Superheterodyne receiver with 4 miniature tubes and a selenium rectifier.

Frequency Range: Standard broadcast band, 535 to 1620 KC.

Intermediate Frequency: 455 KC.

Power Supply: This receiver will operate on 117 volt AC or DC or on one 67½ volt "B" battery and one 7½ volt "A" battery.

Power Consumption: 20 watts on 117 volt AC or DC line.

Antenna: Built-in Ferro-Scope (iron core) antenna.

Speaker: 3½" PM, with Alnico V magnet. Voice coil impedance, 3.2 ohms.

REPLACING BATTERIES

Note: Run-down batteries should be removed from the set. Corrosive material may leak from a run-down battery and parts of the chassis or the cabinet are likely to be damaged.

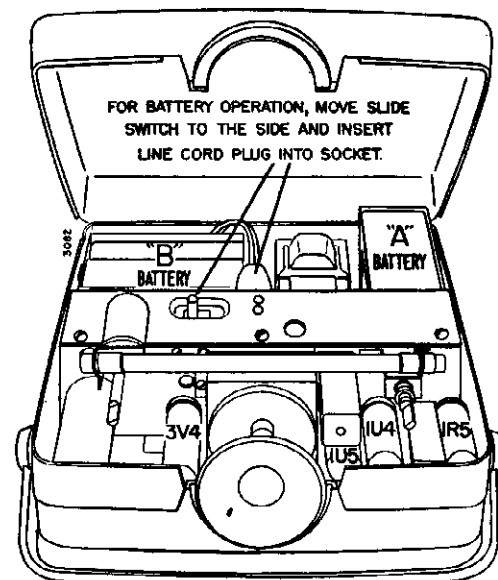
In normal use, batteries for this set should furnish about 40 operating hours. Batteries listed below, or an equivalent substitute may be used in this set.

"A" Battery (7½ volts): Burgess C5, Eveready 717 or equivalent.

"B" Battery (67½ volts): Burgess XX45, Eveready 467 or equivalent.

REPLACING TUBES

Any tube may be removed or replaced after the knurl knobs are pulled off the tuning and volume control shaft. Some type of tube extracting device may be useful, or tube may be removed by carefully working a slant screwdriver between the base of the tube and its sock.



Tube and Battery Location

REMOVING THE CHASSIS

The chassis need only be removed from the cabin when servicing the underside of the chassis.

To remove the chassis, proceed as follows:

- Remove one screw from the chassis to disconnect the bead chain fastened to the cabinet.
- Remove and disconnect the "A" and "B" batteries. Remove the knurled tuning knob and the 1U4 tube.
- Remove the chassis mounting screw located in the battery case and behind the tubes. The entire chassis may be lifted out of the cabinet.

The chassis cover must be removed to align the

ALIGNMENT PROCEDURE

- Battery power is preferable for alignment; use FRESH batteries. If this set is to be aligned while operating on an AC power line, an isolation transformer should be used. If an isolation transformer is not available, connect a .1 mfd. capacitor in series with the signal generator low side to B minus (pin 7 of 1U5 tube.)
- The chassis cover must be removed to align trimmers A and C.
- Set volume control full on.
- Connect output meter across speaker voice coil.
- Use lowest setting of signal generator capable of producing adequate output meter indication.
- Use a non-metallic alignment tool for IF transformers.
- 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	.001 mfd. when using AC. .1 mfd. when using Battery.	Stator of antenna tuning capacitor	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	.001 mfd. when using AC. .1 mfd. when using Battery.	Stator of antenna tuning capacitor	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum output

Install the metal chassis cover removed during IF Alignment.

3	Loop of several turns of wire, or place generator lead close to receiver for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal.	Antenna (on gang)	F	Maximum output
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*Adjustments A and C are made from underside of chassis. To avoid splitting the slotted head of powdered iron tuning slug in IF transformers, use an alignment tool with a blade 3/32" wide.

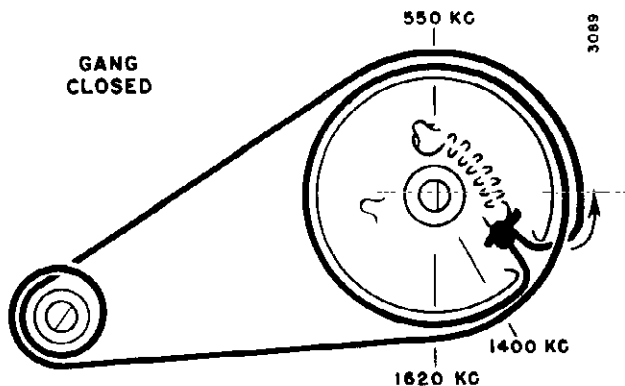
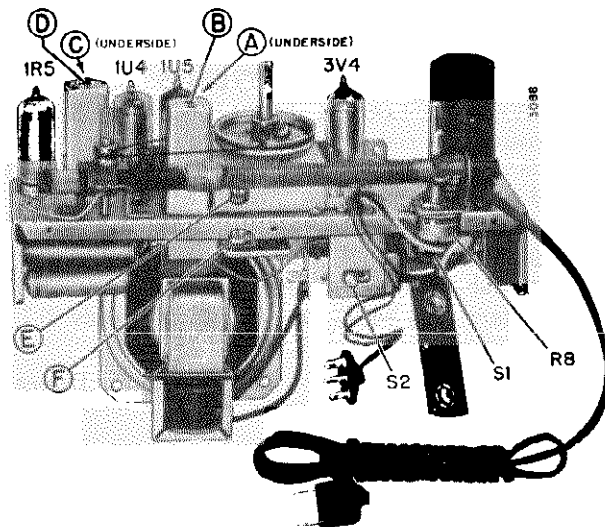
ceiver or check voltages, etc. Remove the remaining two screws which hold the cover on the chassis. Press the switch button to disengage the chassis cover.

When replacing the chassis cover, press the switch button to permit the cover to fit on the chassis at all points. Three tabs on the chassis cover must fit in slots along the edge of the chassis at either side of the speaker. Caution: Be sure the lead wires from the output transformer (on the speaker) are not caught between the chassis and the cover.

DIAL CORD STRINGING

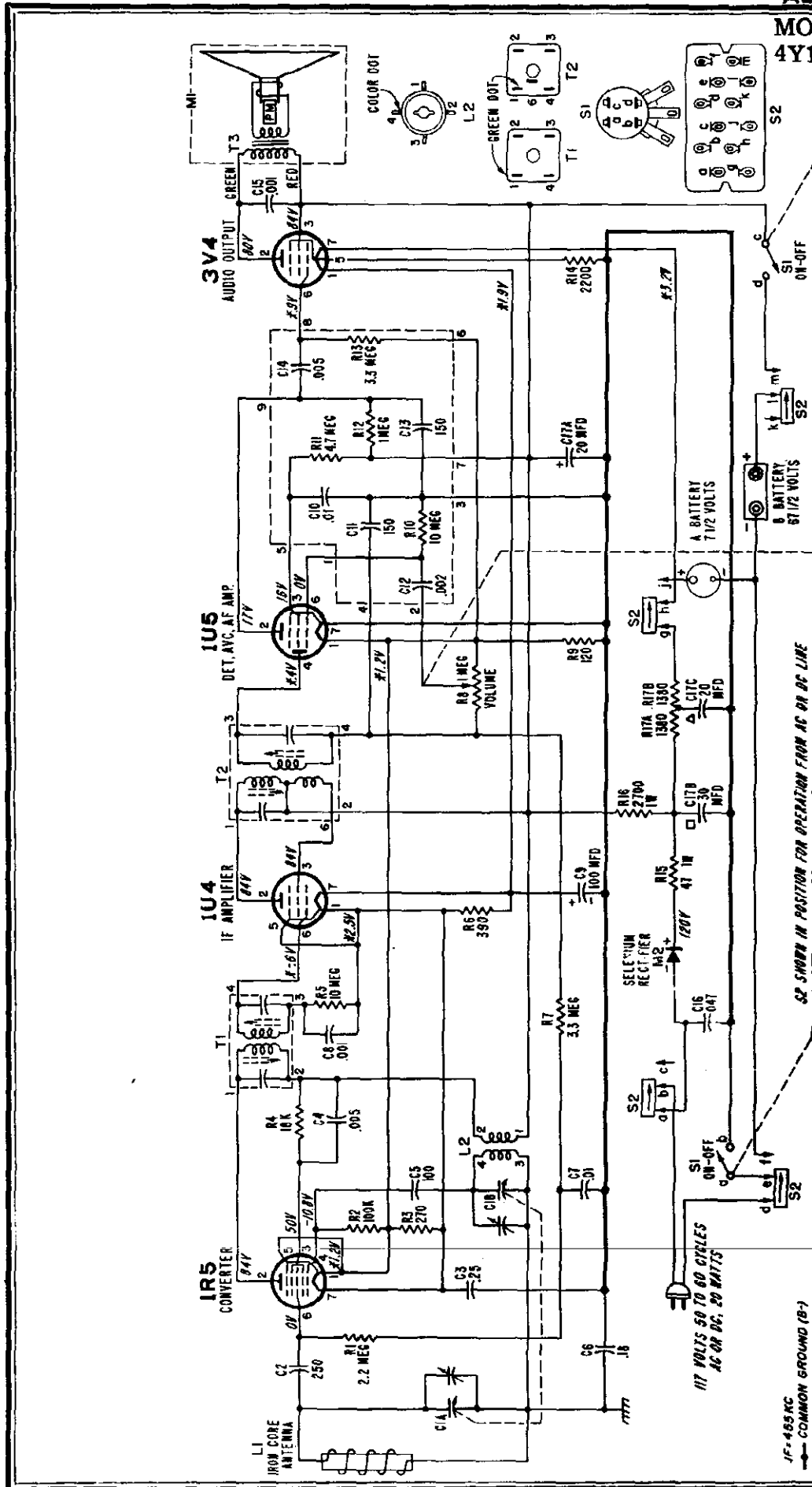
To string the dial cord, close the tuning gang. Start stringing at the tension spring and run the dial cord in the direction indicated by the arrow. See illustration below. Draw the dial cord tight to apply tension on the spring and prevent slipping at the tuning shaft.

TUBE AND TRIMMER LOCATION



Dial Cord Stringing

Adjustments A and C are made from underside of chassis.



*These voltage readings will be either lower or practically zero if taken with a 1000 ohms-per-volt meter.

VOLTAGE DATA

Voltages shown on schematic diagram.

- All voltages taken between tube socket terminals and B minus (pin 7 of 1U5 tube).
- Dial set at low frequency end; volume control at minimum.
- Voltages measured on 117 volts AC with voltmeter.

MODELS 4Y11, 4Y12, 4Y18, 4Y19, Ch. 4Y1

RESISTORS

Symbol	Description	Part No.
R1	2.2 megohms, 1/2 watt	60B 8-225
R2	100,000 ohms, 1/2 watt	60B 8-104
R3	270 ohms, 1/2 watt	60B 8-271
R4	18,000 ohms, 1/2 watt	60B 8-183
R5	10 megohms, 1/2 watt	60B 8-106
R6	390 ohms, 1/2 watt	60B 8-391
R7	3.3 megohms, 1/2 watt	60B 8-335
R8	1 megohm, Volume control. 75C 1-57 (Includes On-Off switch S1)	
R9	120 ohms, 1/2 watt	60B 8-121
†R10	10 megohms, 1/2 watt	
†R11	4.7 megohms, 1/2 watt	
†R12	1 megohm, 1/2 watt	
†R13	3.3 megohms, 1/2 watt	
R14	2,200 ohms, 1/2 watt	60B 8-222
R15	47 ohms, 1 watt	60B 14-470
R16	2,700 ohms, 1 watt	60B 14-272
R17A	1380 ohms } 5 watt tapped	
R17B	1380 ohms } Candohm	61A 5-7

CAPACITORS

Symbol	Description	Part No.
C1A	272 mmfd, max. Ant. } gang	88B 57
C1B	107 mmfd, max. Osc. }	
C2	250 mmfd, ceramic	65C 6-5
C3	.25 mfd, 200 volts, paper	64B 1-28
C4	.005 mfd, ceramic	65C 10-5
C5	100 mmfd, ceramic	65C 6-3
C6	.18 mfd, 200 volts, paper	64A 2-2
C7	.01 mfd, 400 volts, paper	64B 1-25
C8	.001 mfd, ceramic	65C 6-41
C9	100 mfd, 25 volts, electrolytic	67A 4-6
†C10	.01 mfd, ceramic	
†C11	150 mmfd, ceramic	
†C12	.002 mfd, ceramic	
†C13	150 mmfd, ceramic	
†C14	.005 mfd, ceramic	
C15	.001 mfd, ceramic	65C 6-41
C16	.047 mfd, 400 volts, paper	65A 13-5
C17A	20 mfd, 150 volts	elect. 67C 7-41
C17B	30 mfd, 150 volts	
C17C	20 mfd, 150 volts	

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Antenna, Iron Core	69B 167-1
L2	Coil, Oscillator	69A 39-7
T1	Transformer, 1st IF	72B 28-1
T2	Transformer, 2nd IF	72B 28-62
T3	Transformer, Output	98A 21
M1	Speaker (3 1/2" PM) and Output Trans.	78B 58-2
M2	Rectifier, Selenium	93A 1-4
S1	Switch, On-Off	Part of R8
S2	Switch, Power Change	77A 46
	Couplate (includes R10, R11, R12, R13, C10, C11, C12, C13, C14)	63B 6-6

MISCELLANEOUS PARTS

Description	Part No.
Bracket, Antenna Support (Includes fiber insulator support)	A3911
Chassis Cover (Includes "A" and "B" battery cases)	A3904
Clip, IF Transformer Mounting	72B 28-10
Connector	
"A" Battery	90A 7-1
"B" Battery	90A 5-3
Dial Cord (13" length needed)	50A 1-3
Drum, Tuning, and Hub	A3906
Insulator, Fiber (for mtg. rectifier)	32A 137
Insulator Support, Fiber (for mtg. ant.)	32A 195

Description	Part No.
Line Cord Clamp	11A 9-2
Plate, Fiber (for mtg. Electrolytic)	67A 2-1
Retainer, Fiber (for "B" Battery)	32A 191
Screw	
for mtg. chassis cover (#6-32 x 1/4 S.T.)	1A 52-10-24
for mtg. speaker (#6-32 x 1/4 B.H.M.S.)	265-250-C2-24
for mtg. tuning drum (#6-32 x 1/8 Allen Set)	1A 43-7
Shaft, Tuning	28A 69
Socket, Tube	87A 3-7
Spring, Dial Cord	19C 1-5
Washer	
"C", for mtg. tuning shaft	4A 4-5
for mtg. tuning shaft	4A 6-13

CABINET PARTS

Description	Part No.
Button, Handle Ornament	20A 18
Cabinet, Front	
ebony	34E 65-1
maroon	34E 65-3
green	34E 65-5
gray	34E 65-7
Cabinet, Rear	
ebony	34E 65-2
maroon	34E 65-4
green	34E 65-6
gray	34E 65-8
Carton and Fillers	44C 287
Chain, Bead	31A 1-2
Clip,	
for mtg. baffle	15A 922
Fuse, for cabinet catch	84A 10-16
Latch, for cabinet catch	18A 80
Eyelet, for mtg. fuse clip	6B 3-43
Grille Cloth and Baffle	AA227-8
Grille, Metal	36B 44
Grille Trim, Metal for front and rear of cabinet	23C 147
Handle, Plastic Covered	
ebony	A4127
maroon	A4128
green	A4129
gray	A4130
Hinge, Spring	19A 72-1
Knob, Dial	
ebony	33C 105-1
maroon	33C 105-4
green	33C 105-7
gray	33C 105-10
Knob, Tuning	
ebony	33C 105-2
maroon	33C 105-5
green	33C 105-8
gray	33C 105-11
Knob, Volume	
ebony	33C 105-3
maroon	33C 105-6
green	33C 105-9
gray	33C 105-12
Ring, Compression, for knobs	19A 31-10
Screw,	
for mtg. chassis (#6-32 x 5/16 R.H.M.S.)	260-312-C2-24
for mtg. baffle (#4-24 x 1/4 B.H.S.T.)	1A 27-1-24
Tubing, Plastic, for bead chain (5/16" dia. x 4 1/2 long)	96B 19-2
Washer,	
"E", for mtg. handle (3/16" size)	4B 12-23
Flat, for mtg. handle (.196 x 1/4 x 1/32)	4B 1-68-24
Flat, for mtg. handle (.196 x 1/4 x 1/32)	4B 2-74
Spring, for mtg. handle (3/16 x 1/4 x 5/64)	4A 5-19

†Part of couplate, part of number 63B 6-6. Numbers on schematic correspond to lead numbers on couplate.

<u>MANUFACTURER</u>	<u>MANUFACTURER'S TYPE NUMBER</u>
<u>"A" Battery</u>	<u>"B" Battery</u>
National Carbon (Eveready)	746 490
General Dry Battery	3H3 132
Ray-O-Vac	P83A 4390
Burgess Battery	G3 N-60

BATTERY OPERATION

BATTERY OPERATION: To operate this receiver on battery, insert the power cord prongs into the power switch through the two slots provided in the bottom of chassis. These slots are at the right hand edge of chassis as viewed from rear.

TUBE REPLACEMENT

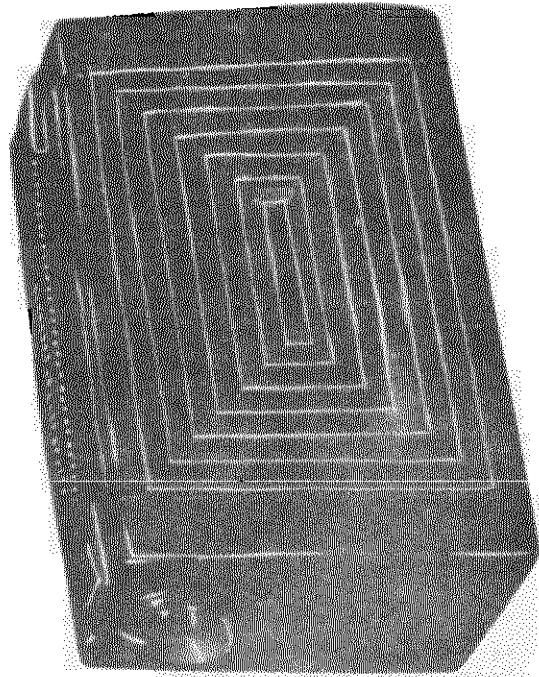
Do not replace tubes or batteries unless switch on the volume control is turned completely off. In case of tube failure be sure to turn the receiver off immediately.

Four tubes (Plus selenium rectifier) are used. Type numbers and locations are shown in the tube diagram label located inside the cabinet. If tubes are removed from their sockets for test or replacement purposes, make certain that the receiver is turned off when replacing the tubes in their proper sockets. Failure to replace tubes in their proper sockets may result in damage to the tube, or to the receiver, or both.

SERVICE DATA

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

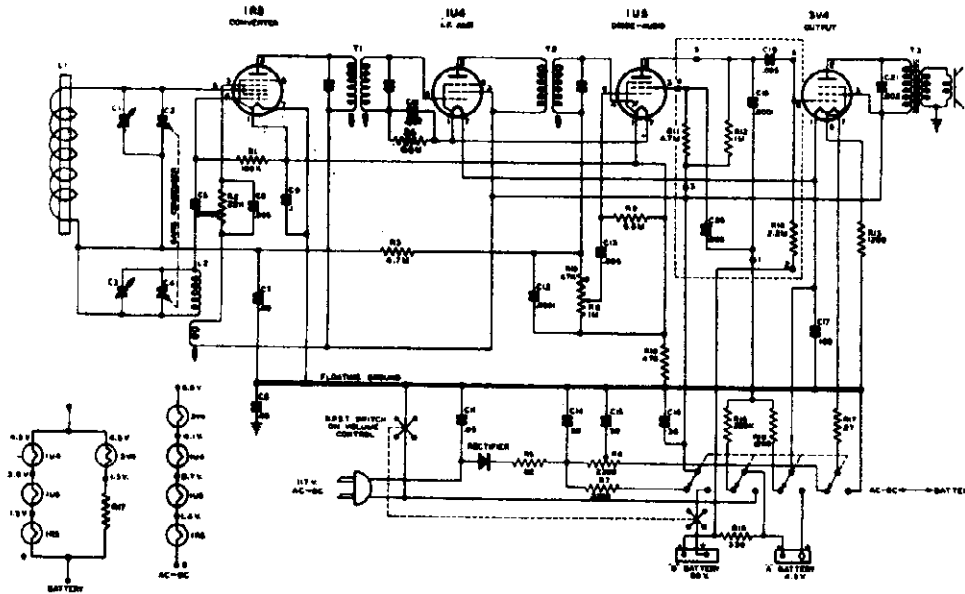


BATTERY INSTALLATION

BATTERY INSTALLATION: Before installing new batteries or replacing old ones, turn the volume control to the extreme left or "OFF" position.

Attach the connector with the snap-on fasteners to the "B" battery (90 Volt) and insert battery into the left hand side of the battery retaining area of the cabinet back so that the connector faces in the direction of the top of the receiver. Insert the prongs of the other battery connector into the socket of the "A" battery (4-1/2 Volt) and place battery in cabinet back so that the connector faces the outside wall of cabinet.

This receiver will accommodate any of the batteries listed below: (No preference is intended by the order of listing.)



ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455,600,1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
C18	)	(.0001 MFD.)
C19, C20	)	(.005 MFD.)
R11	M-8330	Couplate (4.7 Megohms)
R12	)	(1.0 Megohms)
R14	)	(2.2 Megohms)
C6	M-6375	Condenser, Ceramic 50 MMFS. 800 V.
C6, C13	M-4004	Condenser, Paper .005 MFD. 800 V.
C7, C8	M-1245	Condenser, Paper .05 MFD. 200 V.
C9	M-1351	Condenser, Paper .1 MFD. 200 V.
C10, C21	M-6377	Condenser, Paper .002 MFD. 800 V.
C11	M-1246	Condenser, Paper .05 MFD. 100 V.
C12	M-6015	Condenser, Paper 100 MMFD. 500 V.
C14	)	(50 MFD. 150 V.)
C15	M-6841	Condenser, Electrolytic (30 MFD. 150 V.)
C16	)	(30 MFD. 150 V.)
C17	)	(100 MFD. 25 V.)
L1	M-6681	Speaker, 4" P.M.
	M-8328	Coil, Loop - Iron Rod Type
T1	M-7981	Coil, 1st. I.F.
T2	M-8325	Coil, 2nd. I.F.
L2	M-6327	Coil, Oscillator
T3	M-8329	Transformer, Output
	M-6331	Rectifier, Selenium
	M-3951	Switch, Power Changeover

ALIGNMENT PROCEDURE CHART

STEP NO.	POSITION OF GANG	SIGNAL GENERATOR FREQUENCY	GENERATOR CONNECTION	DUMMY ANTENNA	ADJUSTMENT	TYPE OF ADJUSTMENT
1	Any point where no interfering signal is received	Exactly 955 KC	High side to grid of 1A5 tube. Low side to common negative	.05 MFD Condenser	Slug at top of 2nd. I.F. (T2) and then each of the slugs of the 1st. I.F.	For Maximum Output.
2	Exactly 1620 KC	Exactly 1620 KC.	DUMMY	2 Turns of hookup wire 6" in diameter. (Place approximately a foot from end of, and in same axis as loop.)	Front Gang	For Maximum Output.
3	Approx. 1400 KC.	Approx. 1400 KC.			Rear Gang	For Maximum Output.
4	Exactly 600 KC	Exactly 600 KC			ANTENNA	Slug in Oscillator Coil. (L2)	For Maximum Output.
5					Repeat Steps 2 and 3.	

PARTS LIST

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
R1	M-1973	Resistor 100,000 Ohm 1/2W. 10%
R2	M-8012	Resistor 22,000 Ohm 1/2W. 10%
R3	M-4061	Resistor 4.7 Megohm 1/2W. 20%
R4, R5	M-4028	Resistor 6.8 Megohm 1/2W. 20%
R5	M-4023	Resistor 82 Ohm 2.0W. 10%
R6	M-6333	Resistor 2,300 Ohm 5.6W. 5% (Center Tapped)

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
R7	M-4896	Resistor 2,200 Ohm 1/2W. 10%
R8	M-8332	Volume Control with Switch 1.0 Megohm
R10	M-4066	Resistor 470 Ohm 1/2W. 10%
R13, R16	M-6795	Resistor 1,200 Ohm 1/2W. 10%
R15	M-4026	Resistor 220,000 Ohm 1/2W. 20%
R17	M-6792	Resistor 27 Ohm 1/2W. 10%
R18	M-4420	Resistor 330 Ohm 1/2W. 10%

M-8381

This receiver may be operated on either AC or DC, 105-125 volts, 50-60 cycles.

FM 88 to 108 MC.
AM 540 to 1700 KC.

Antenna Connections:

It is equipped with built-in AM and FM antennae so that in primary listening areas an outside antenna is not necessary. WHEN LISTENING TO FM BY USING THE BUILT-IN ANTENNA, KEEP THE ELECTRIC LINE CORD EXTENDED TO ITS FULL LENGTH.

For weak or distant stations there are provisions made in the rear for antenna connections. A terminal strip with two screw connections for the lead-in wires from the FM antenna, also a wire coming out the back of the receiver for an external AM antenna.

When using the built-in antenna on FM, the lug coming out between the two screw connections on the terminal strip in the rear, must be connected to the screw connection marked "ANT." When using an external FM antenna disconnect this wire and connect external antenna lead-in wires to the two screw connections.

Station Selector:

The knob on the extreme right hand side of the cabinet operates the tuning condenser on both AM and FM and simultaneously moves the indicating pointer. Ease and accuracy in tuning is made possible due to a reduction drive.

Band Switch:

The second knob from the right is the AM-FM band switch. This is a two position switch. When the switch is in the counterclockwise position, AM (Standard Broadcast) stations may be tuned in. When the switch is in the clockwise position, FM (Frequency Modulation) stations may be tuned in.

Volume Control and Power Switch:

The third knob from the right is the volume control and power switch. When the control is in the extreme counterclockwise position the power is "OFF." From this position, a slight clockwise rotation will turn the power "ON." By further rotation in this direction volume may be increased to any degree until the full output of the receiver is obtained.

Tone Switch:

The fourth knob from the right is the tone switch. For normal operation the switch should be clockwise. For increased bass response turn switch fully counterclockwise.

Notes:

Since this receiver has a loop-tenna on AM which has a directional effect, it may be necessary at times to turn the receiver for best reception. This set will operate properly only after the tubes are sufficiently heated. This may take two minutes after the power switch is turned "ON." If the receiver is being operated on DC (Direct Current) and no signals are heard after two minutes, reverse the line cord plug in the power

outlet. Should noticeable hum be detected when operating on AC (Alternating Current), reverse the line cord plug in the power outlet.

Servicing

(For Use of Radio Technician):

Alignment of the receiver will, in most cases, be unnecessary unless an RF or IF transformer is replaced or the adjustment has been tampered with. The IF slugs are slotted for a small size fiber screwdriver. Do not put excessive pressure on the aligning tool or the threads in the coil-form will be stripped and adjustments will be impossible.

IF Alignment:

Set bandswitch to AM position. Connect the signal generator, modulated at 400 cycles, through a 0.01 Mfd condenser to the grid of the 12AT7 converter tube. Connect the low side of the generator through a 0.1 Mfd condenser to the receiver chassis. Adjust the signal generator to 455 KC. Tune primary and secondary slugs of T3 & T5, AM-IF Transformers, for maximum output.

For FM alignment set bandswitch to FM position and leave generator connected to the grid of the 12AT7 converter tube. Adjust generator to 10.7 MC. Connect 20,000 ohm per volt or VTVM meter as in note "1" of schematic diagram. Tune primary of T1, bottom slug, and both primary and secondary of T2 & T4 for maximum indication on meter. To align secondary of Ratio Detector Transformer connect meter as in note "2" of schematic diagram. Tune top slug through positive and negative indication and then slowly return until meter reads zero. This is in the center of the "S" curve.

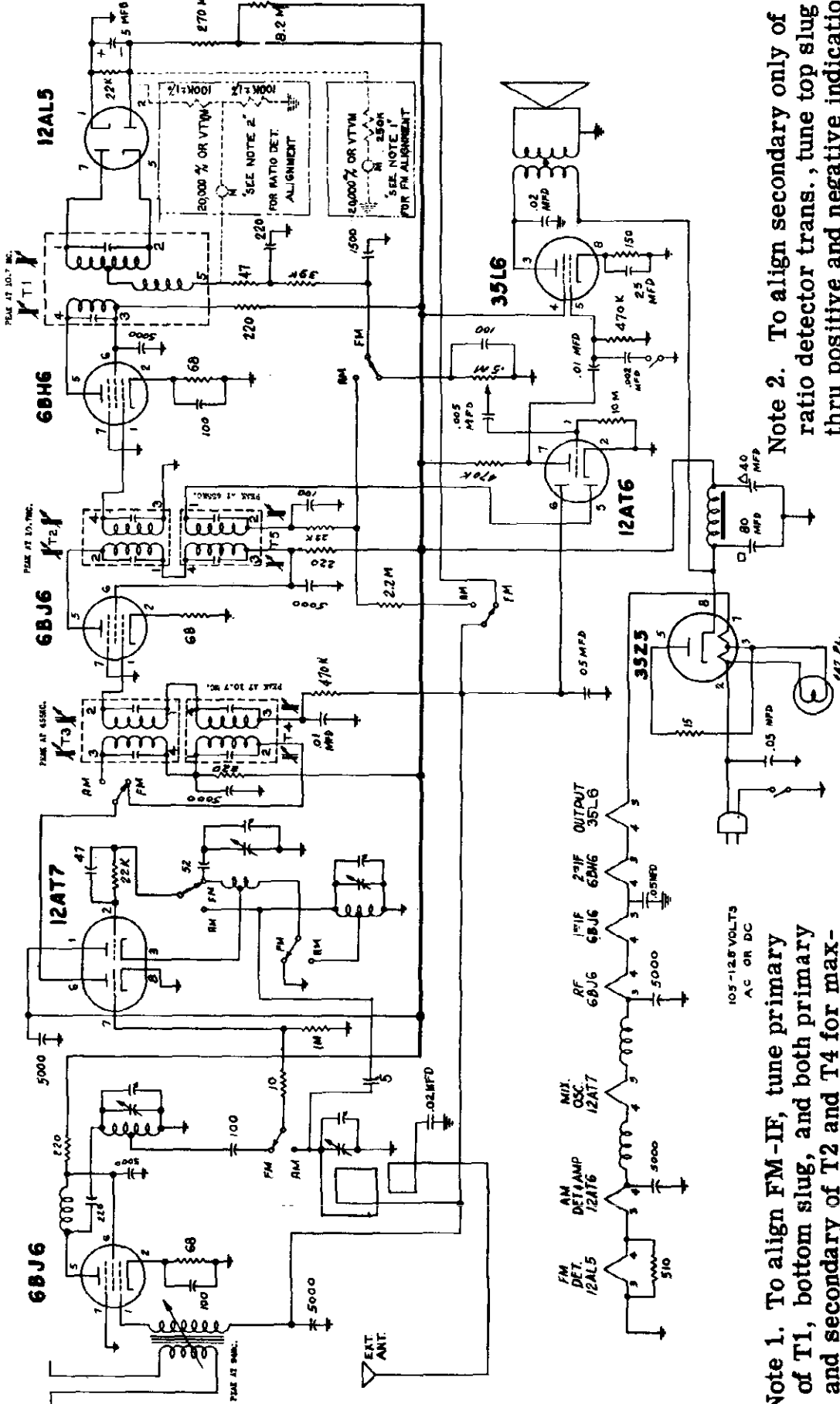
RF Alignment:

Set bandswitch to AM position. Connect signal generator, modulated at 400 cycles, to external antenna lead and to ground through a 0.1 Mfd condenser and adjust to 1700 KC. Set dial pointer to 1700 KC and tune signal for maximum output with oscillator trimmer. Next set generator to 1500 KC and tune in this signal on the receiver. Then adjust RF trimmer for maximum output.

Set bandswitch to FM position. Connect in series with each generator lead a carbon 150 ohm resistor and connect to rear antenna terminal board. Adjust generator and dial pointer to 108 MC. Peak oscillator trimmer for maximum signal output. Next set generator to 105 MC and tune in this signal on receiver. Then peak RF trimmer for maximum output. No adjustment is necessary at the low end because a special compensated fixed padder is used. Set the generator to 94 MC and tune the FM antenna coil for maximum.

In all the IF and RF adjustments it is important to keep the signal generator output as low as possible. It is extremely necessary in making the RF adjustments, that the fundamental oscillator signal be tuned in and not the image frequency. This can be checked by the use of a calibrated wavemeter.

MODEL 8J702



Note 1. To align FM-IF, tune primary of T1, bottom slug, and both primary and secondary of T2 and T4 for maximum indication of meter.

Note 2. To align secondary only of ratio detector trans., tune top slug thru positive and negative indication of meter and then slowly return until meter reads zero.

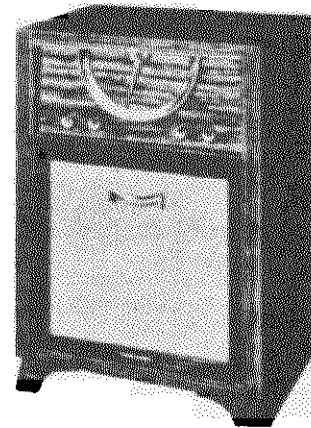
GENERAL INFORMATION

TYPE - FM-AM Radio Phonograph Combination

TUNING RANGE - AM 535 to 1620 Kc AM IF - 455 Kc
 FM 88 to 108 Mc FM IF - 10.7 Mc

TUBE COMPLEMENT - 6BA6 - FM-AM RF Amplifier
 6BA7 - FM-AM Converter
 6BA6 - FM-AM IF Amplifier
 6BA6 - FM IF Amplifier
 6AL5 - FM Ratio Detector
 6AV6 - AM Det & 1st Audio Amp
 6K6GT - Power Amplifier
 5Y3GT - Rectifier

POWER SUPPLY - 117 volts, 60 cycles AC only; 85 watts, including phono motor



INSTALLATION & OPERATING INSTRUCTIONS

ANTENNAS

No outside antenna or ground is normally required for standard broadcast (AM) reception, as a loop antenna is located inside the cabinet. Antenna connections are shown in Figure 1. In locations where additional pick-up is desired, an external antenna may be connected to the clip marked "EXT BC ANT" on the loop antenna.

An FM antenna, built into the power cord, eliminates the need for an external FM antenna when the receiver is used in normal FM service areas, such as are found in and for a few miles around metropolitan areas. In "fringe" or weak signal areas, improved FM reception can be obtained by using an outside FM antenna. The external antenna should be connected through a 300 ohm twin transmission line to the 1st and 2nd screws on the terminal strip on the chassis, as in Figure 1. The link between the 2nd and 3rd screws should be opened. Orient the antenna to obtain maximum volume of the FM stations.

For best FM reception from the built-in power line cord antenna, it is important to stretch the cord to its full length. Changing the direction or position of the line cord, or reversing the plug in the wall outlet, will often improve reception from weak stations. Connect the link between the 2nd and 3rd screws on the terminal strip on the chassis when the built-in antenna is used.

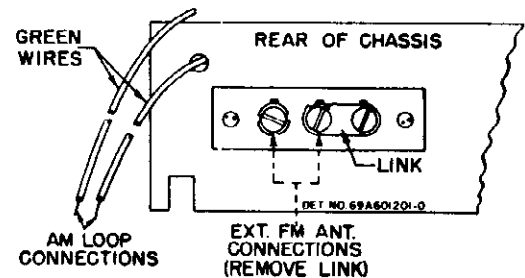


FIGURE 1. ANTENNA CONNECTIONS

CONTROLS

Refer to Figure 2 for the locations of the radio operating controls.

Power for both the radio and the record changer is controlled by the VOL-ON-OFF knob.

The phonograph motor will not operate, however, until the PHONO-TONE-RADIO knob is rotated also to "PHONO".

Tuning of FM stations should be done very carefully for best sound reproduction, not necessarily for the strongest volume received.



FIGURE 2. OPERATING CONTROLS

MODEL 8J703

ALIGNMENT

GENERAL INFORMATION

- 1. Maximum performance can be obtained only if extreme care is exercised during alignment.
- 2. Use a small fibre screwdriver for aligning the IF transformers.
- 3. Refer to Figure 4 for the location of all alignment trimmers and cores.
- 4. As the stages are brought into alignment, reduce the signal generator output to a low value to avoid overloading the receiver.

ORDER OF ALIGNMENT AND EQUIPMENT REQUIRED

- 1. AM Broadcast Band IF & RF Alignment
 - a. 455 to 1620 Kc AM signal generator
 - b. Low range output meter.
- 2(A) FM Band IF & RF Alignment (preferred method)
 - a. 10.7 to 108 Mc FM signal generator
- b. Oscilloscope
- (B) FM Band IF & RF Alignment (alternate method)
 - a. 10.7 to 108 Mc signal generator (unmodulated)
 - b. Low range DC electronic voltmeter

AM BROADCAST BAND - IF & RF ALIGNMENT

- 1. Connect the AM signal generator as in chart below, with 400 cycle, 30% modulation.
- 2. Connect the output meter across the speaker voice coil. Throughout alignment, reduce the generator output to a level which produces less than 1.27 volts (.5 watt) across the voice coil to avoid overloading the receiver.
- 3. Set the bandswitch to the AM position.
- 4. Turn the receiver volume control to maximum.
- 5. Proceed as shown in the following chart.

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Grid of conv. V-2 (pin 7, 6BA7)	455 Kc	Fully opened	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	.1 mf	Grid of conv. V-2 (pin 7, 6BA7)	1620 Kc	Fully opened	5 (AM Osc)	Adjust for maximum. *
3.	-	-	-	-	-	Connect AM loop to chassis.
4.	-	Across radiation loop**	1400 Kc	Tune in signal	8 (AM Ant)	Adjust for maximum.

5. If, after the receiver has been aligned as above, it is found to be badly off calibration, it will be necessary to adjust oscillator core (7) as follows: connect the generator to the grid of the converter tube and, with the gang fully closed, adjust core (7) at 535 kc. It is advisable to repeat the oscillator adjustments at 1620 kc and 535 kc several times until the tuning range is correct. Core (7) has been pre-set at the factory and normally should require no retuning.

* If difficulty is encountered in tuning trimmer (5), adjust trimmer (6) to 1/2 turn from tight.

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

FM BAND - IF & RF ALIGNMENT (PREFERRED METHOD)

- 1. The following FM alignment procedure, using an FM signal generator and an oscilloscope, is to be preferred because the actual response pattern may be observed on the scope and adjusted for best symmetry and maximum amplitude.
- 2. Connect the vertical input terminals of the oscilloscope between the chassis and the junction of resistor R-18 (47K) and capacitor C-23 (1000 mmf).
- 3. Connect the FM signal generator sync voltage output terminals, through a phase shifting network, to the horizontal input terminals of the scope, as in Figure 5. (Other values of resistance and capacitance may be required, depending upon the scope). The phasing control should be adjusted to give only one trace on the scope. NOTE: If the FM generator has a built-in phase control, the phase shifting network is not necessary.
- 4. Set the bandswitch to the FM position.
- 5. Throughout alignment, reduce the generator output to keep the signal just above the noise level, to avoid

SERVICE NOTES

TO REMOVE CHASSIS FROM CABINET:

1. Remove the screws from the cabinet back.
2. Disconnect the phono power lead, the phono pick-up lead, the speaker leads, the line cord, and the antenna loop leads.
3. Remove the pointer escutcheon by pulling it downward.
4. Turn the tuning knob counterclockwise until the pointer reaches the extreme low frequency end of the dial scale.
5. From the back of the cabinet, loosen the pointer adjustment setscrew (see Figure 3) and pull the pointer and shaft assembly from the chassis. CAUTION: Do not remove the nut from the front of the pointer, as the detent ball and spring will fall out, and may become lost.
6. Pull off the control knobs.
7. Remove the three chassis mounting screws, from

beneath the chassis.

8. Slide the chassis from the cabinet.

TO CALIBRATE DIAL:

1. Turn the tuning knob counterclockwise until the end of its travel is reached.
2. From the back of the cabinet, loosen the pointer adjustment setscrew (see Figure 3). CAUTION: Do not remove the nut from the front of the pointer.
3. Move the pointer until it is in a horizontal position (at the low frequency end of the dial scale).
4. Tighten the adjustment setscrew.

NOTE: If the pointer is moved by hand accidentally, it will be released from a detent in the pointer collar, and no damage to the tuning mechanism will result. To reset the pointer, move it back and forth until it again engages in the detent.

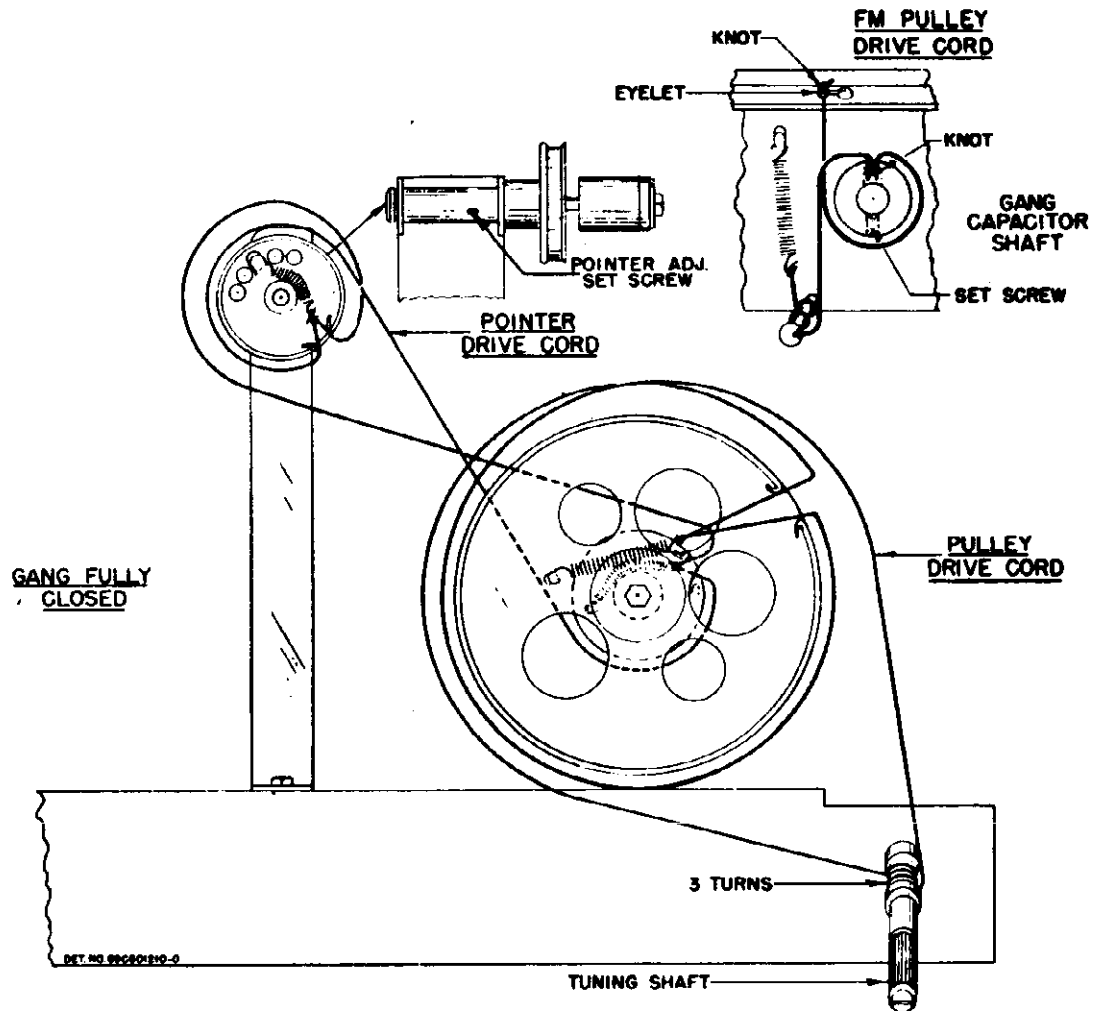


FIGURE 3. POINTER AND DRIVE CORD RESTRINGING DETAIL

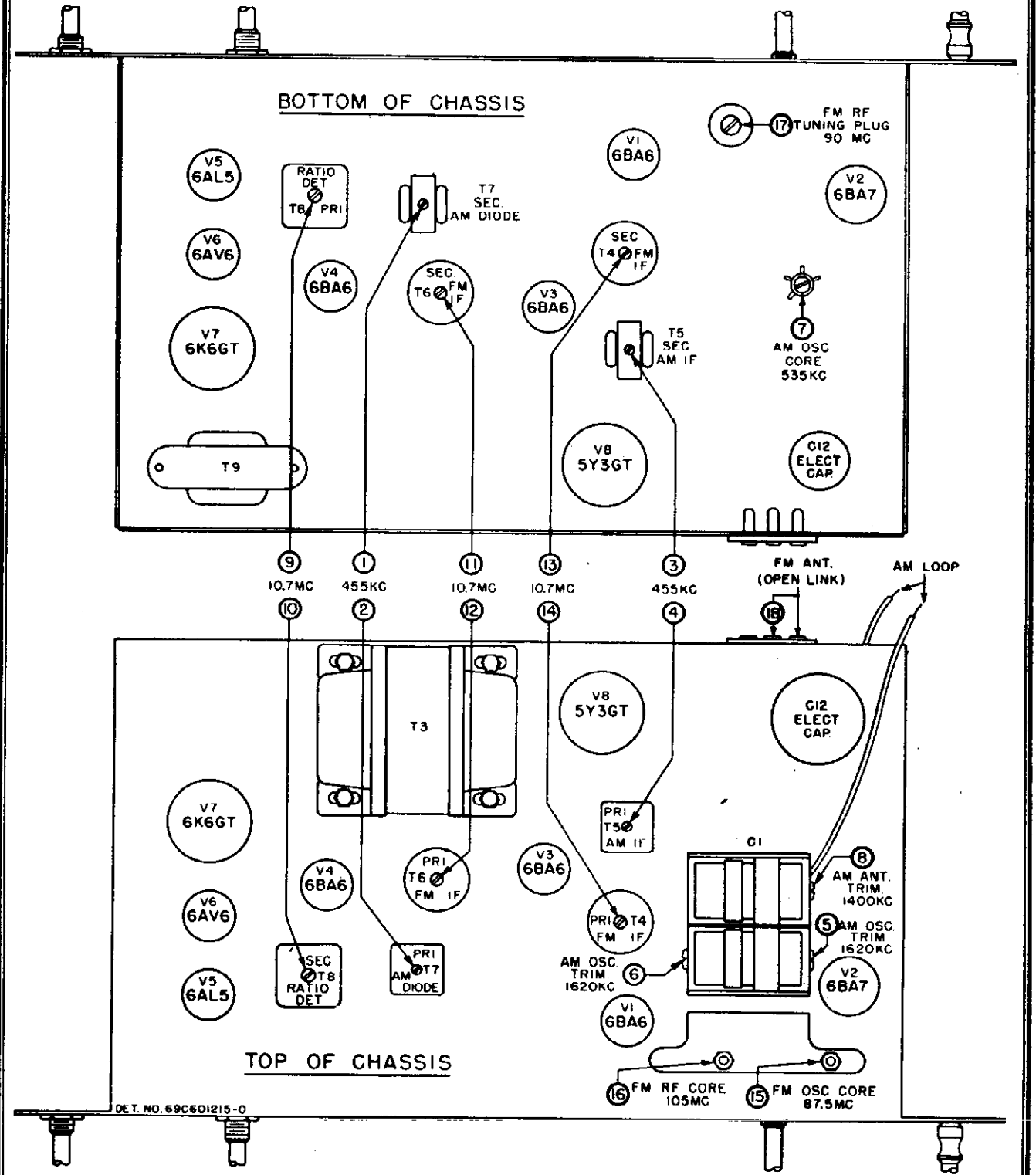


FIGURE 4. TUBE AND TRIMMER LOCATIONS

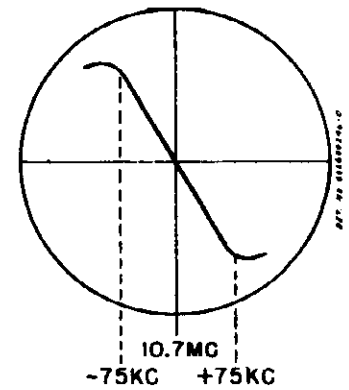
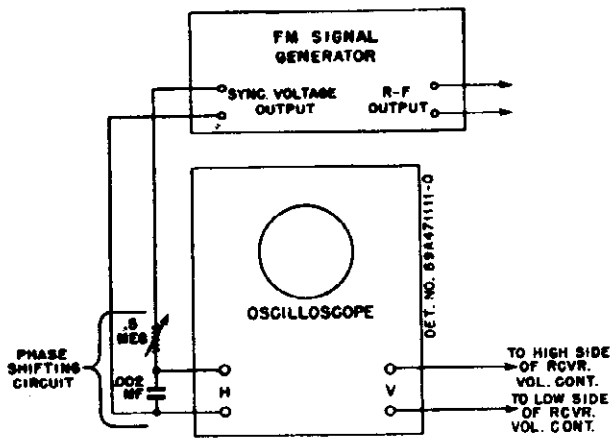


FIGURE 6. RATIO DETECTOR WAVEFORM

FIGURE 5.
FM SIGNAL GENERATOR & OSCILLOSCOPE HOOK-UP

overloading the receiver.
6. Proceed as shown in the following chart.

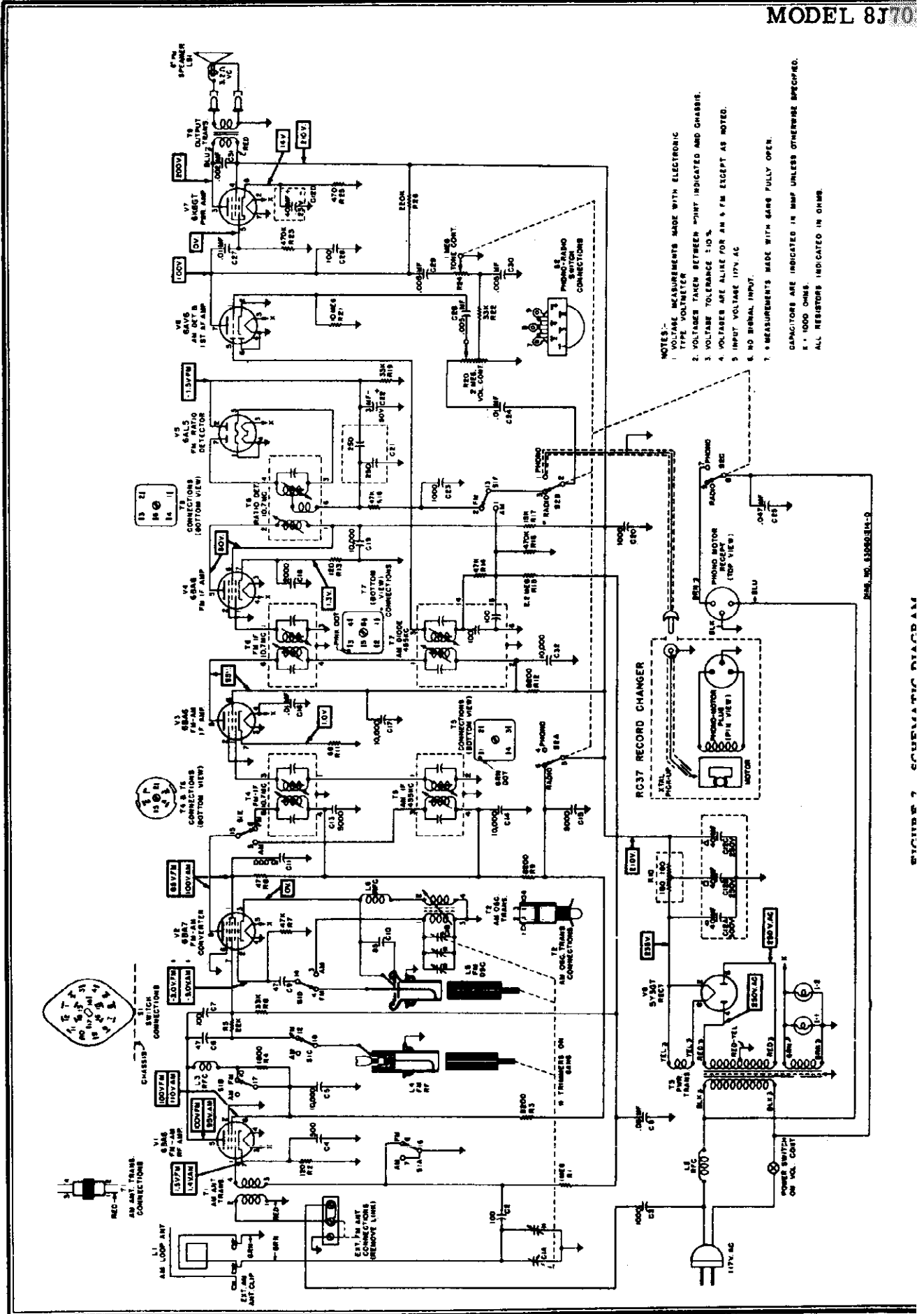
STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	TUNER SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	1000 mmf	Grid of 2nd IF Amp V-4 (pin 1, 6BA6)	10.7 mc ±100 kc dev	Fully opened	9 (ratio det pri)	Adjust for maximum amplitude of pattern. *
2.	1000 mmf	Grid of 2nd IF Amp V-4 (pin 1, 6BA6)	10.7 mc ±100 kc dev	Fully opened	10 (ratio det sec)	Adjust for symmetrical curve, as shown in Figure 6.
3.	-	-	-	-	-	Repeat steps 1 & 2 for maximum amplitude and best symmetry.
4.	1000 mmf	Grid of 1st IF Amp V-3 (pin 1, 6BA6)	10.7 mc ±100 kc dev	Fully opened	11 & 12 (2nd IF sec & pri)	Adjust for maximum amplitude of pattern. *
5.	1000 mmf	Grid of conv. V-2 (pin 7, 6BA7)	10.7 mc ±100 kc dev	Fully opened	13 & 14 (1st IF sec & pri)	Adjust for maximum amplitude of pattern. *
6.	1000 mmf	Grid of conv. V-2 (pin 7, 6BA7)	10.7 mc ±100 kc dev	Fully opened	11, 12, 13 & 14	Readjust for maximum amplitude and best symmetry.
RF ALIGNMENT						
7.	270 ohms	FM terminal 18 on rear of chassis (open link)	87.5 mc ±22-1/2 kc dev	Fully closed	15 (osc core)	Adjust for maximum amplitude of pattern. *
8.	-	-	-	Fully closed	16 (RF core)	Turn counterclockwise until core is at bottom of pipe, then turn four turns clockwise.
9.	270 ohms	FM terminal 18 on rear of chassis	90 mc ±22-1/2 kc dev	Tune in signal	17 (RF tuning plug)	Adjust for maximum amplitude of pattern. *
10.	270 ohms	FM terminal 18 on rear of chassis	105 mc ±22-1/2 kc dev	Tune in signal	16 (RF core)	Adjust for maximum amplitude of pattern. *
11.	-	-	-	-	-	Repeat steps 9 & 10, until no further adjustment is necessary

* An output meter across the speaker voice coil will also indicate maximum amplitude. It should not be used in place of the scope, however, since it will not show symmetry of the curve.

FM BAND - IF & RF ALIGNMENT (ALTERNATE METHOD)

1. The following procedure for FM alignment, with an unmodulated carrier generator and a DC electronic voltmeter, is not as desirable as the preceding method; but it may be used if no FM generator is available.
2. Connect the signal generator as in chart below, with no modulation.
3. Set the bandswitch to the FM position.
4. Except in step 2 below, connect the electronic voltmeter across resistor R-19 (33K) in the ratio detector stage.
5. Throughout alignment reduce the signal generator output to a value which produces no more than a 5 volt rise above no signal voltage, to avoid overloading the receiver.
6. In step 2 below, connect two 100K ohm resistors in series across R-19. Connect the electronic voltmeter between the volume control side of resistor R-18 (47K) and the junction of the two 100K resistors, with the low side of the meter at the 100K resistors.
7. Proceed as shown in the following chart.

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	TUNER SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	1000 mmf	Grid of conv. V-2 (pin 7, 6BA7)	10.7 mc	Fully opened	9, 11, 12, 13 & 14 (IF cores)	Adjust for maximum.
2.	1000 mmf	Grid of conv. V-2 (pin 7, 6BA7)	10.7 mc	Fully opened	10 (ratio det sec)	Adjust for zero (connect meter as in step 6 above.)
RF ALIGNMENT						
3.	270 ohms	FM terminal 18 on rear of chassis (open link)	87.5 mc	Fully closed	15 (osc core)	Adjust for maximum.
4.	-	-	-	Fully closed	16 (RF core)	Turn counterclockwise until core is at bottom of pipe, then turn four turns clockwise.
5.	270 ohms	FM terminal 18 on rear of chassis	90 mc	Tune in signal	17 (RF tuning plug)	Adjust for maximum.
6.	270 ohms	FM terminal 18 on rear of chassis	105 mc	Tune in signal	16 (RF core)	Adjust for maximum.
7.	-	-	-	-	-	Repeat steps 5 & 6 until no further adjustment is necessary.



- NOTES -
1. VOLTAGE MEASUREMENTS MADE WITH ELECTRONIC TYPE VOLTMETER
 2. VOLTAGES TAKEN BETWEEN POINTS INDICATED AND CHASSIS.
 3. VOLTAGE TOLERANCE $\pm 10\%$.
 4. VOLTAGES ARE ALIKE FOR AM & FM EXCEPT AS NOTED.
 5. INPUT VOLTAGE 117V AC
 6. NO SIGNAL INPUT.
 7. MEASUREMENTS MADE WITH GAINS FULLY OPEN.
- DENOTATIONS ARE INDICATED IN BUMP UNLESS OTHERWISE SPECIFIED.
E = 1000 OHMS.
ALL RESISTORS INDICATED IN OHMS.

FIGURE 7 SCHEMATIC DIAGRAM

MODEL 8J703

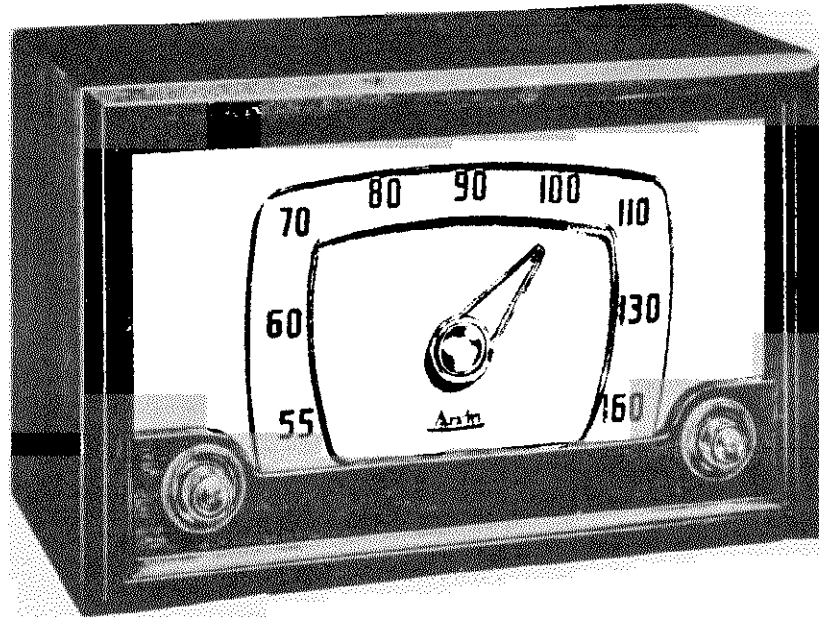
REPLACEMENT PARTS LIST

NOTE: When ordering parts, specify model number of set in addition to part number and description of part.

Ref. No.	Part No.	Description
CHASSIS PARTS - ELECTRICAL		
<u>Capacitors</u>		
C-1	19B691877	Variable, 2-gang
C-2	21B77286	Ceramic: 100 muf 500V
C-3	21K478410	Ceramic: 1000 muf 500V
C-4	21K481377	Ceramic: 500 muf 500V
C-5	21K482726	Ceramic, disc type: 10,000 muf 450V
C-6	21K77373	Ceramic: 47 muf 500V
C-7	21B77286	Ceramic: 100 muf 500V
C-8	8R9816	Paper: .05 mf 400V
C-9	21K77373	Ceramic: 47 muf 500V
C-10	21A690688	Ceramic: 85 muf 500V
C-11	21K482726	Ceramic, disc type: 10,000 muf 450V
C-12	23B690975	Electrolytic: 40 mf/300V, 40-40 mf/250V, 40 mf/25V
C-13	21A470789	Ceramic, disc type: 5000 muf 450V
C-14	21K482726	Ceramic, disc type: 10,000 muf 450V
C-15	21A470789	Ceramic, disc type: 5000 muf 450V
C-16	8R9809	Paper: .01 mf 400V
C-17	21K482726	Ceramic, disc type: 10,000 muf 450V
C-18	21K790912	Ceramic: 2000 muf 500V
C-19	21K482726	Ceramic, disc type: 10,000 muf 450V
C-20	21K478410	Ceramic: 1000 muf 500V
C-21	21B484337	Ceramic: dual; 250-250 muf/450V
C-22	23K690543	Electrolytic: 3 mf 50V
C-23	21K478410	Ceramic: 1000 muf 500V
C-24	8R9809	Paper: .01 mf 400V
C-25	8R490232	Tubular, molded: .047 mf 400V
C-26	8R9813	Paper: .005 mf 600V
C-27	8R9809	Paper: .01 mf 400V
C-28	21B77286	Ceramic: 100 muf 500V
C-29	8R9813	Paper: .005 mf 600V
C-30	8R9813	Paper: .005 mf 600V
C-31	8R9847	Paper: .002 muf 600V
C-32	21K482726	Ceramic, disc type: 10,000 muf 450V
<u>Pilot Light</u>		
I-1,2	65X10867	Bulb, pilot light: #44; 6-8W; .25 amp; clear; bayonet base
<u>Coils</u>		
L-1	24C690896	AM Loop Antenna
L-2	24A692148	RF Choke
L-3	24A90064	RF Choke
L-4	24C690584	Inductor and Capacitor Assembly: FM RF; less tuning core
L-5	24K600519	Inductor and Capacitor Assembly: FM osc; less tuning core
L-6	24A791081	RF Choke
<u>Speaker</u>		
LS-1	50C601098	Speaker: 8" FM; 3.2 ohm VC each
<u>Resistors</u>		
Note: All resistors are insulated carbon type unless otherwise specified.		
R-1	6R6004	1 meg 20% 1/2W
R-2	6R5551	120 10% 1/2W
R-3	6R5725	8200 10% 2W
R-4	6R2039	1800 10% 1/2W
R-5	6R6028	22,000 20% 1/2W
R-6	6R6410	33,000 10% 1/2W
R-7	6R6056	47,000 20% 1/2W

Ref. No.	Part No.	Description
R-8	6R2108	47 20% 1/2W
R-9	6R5725	8200 10% 2W
R-10	17A690973	Wire wound: 360 10% 3W; center-tapped
R-11	6R2039	68 10% 1/2W
R-12	6R5725	8200 10% 2W
R-13	6R5551	120 10% 1/2W
R-14	6R6056	47,000 20% 1/2W
R-15	6R3927	2.2 meg 20% 1/2W
R-16	6R6377	470,000 10% 1/2W
R-17	6R5732	15,000 10% 2W
R-18	6R6056	47,000 20% 1/2W
R-19	6R6410	33,000 10% 1/2W
R-20	18A600974	Volume control: 2 meg; tapped at 600,000 ohms; includes on-off sw 10 meg 20% 1/2W
R-21	6R2109	10 meg 20% 1/2W
R-22	6R6410	33,000 10% 1/2W
R-23	6R6032	470,000 20% 1/2W
R-24	18B600683	Tone control: 1 meg; with phono-radio switch
R-25	6R5593	470 10% 1W
R-26	6R6015	220,000 20% 1/2W
<u>Switches</u>		
S-1	40B690538	Bandswitch, AM-FM
S-2	-	Phono-radio switch (on tone control)
<u>Transformers</u>		
T-1	24A690544	FM Antenna Input Transformer
T-2	24K691878	AM Oscillator Transformer: white & red dot
T-3	25B600684	Power Transformer
T-4	24B690540	1st FM IF Transformer (orange dot): 10.7 mc; complete with capacitors and cores; less shield
T-5	24K485553	AM IF Transformer (green dot): 455 kc; complete with capacitors, cores, and shield
T-6	24B690541	2nd FM IF Transformer (yellow dot): 10.7 mc; complete with capacitors and cores; less shield
T-7	24K485555	AM Diode Transformer (pink dot): 455 kc; complete with capacitors, cores, and shield
T-8	24K600893	Ratio Detector Transformer: 10.7 mc; complete with capacitors, cores and shield
T-9	25B600969	Audio Output Transformer
<u>Part Number Description</u>		
CHASSIS PARTS - MECHANICAL		
1K690717	Bracket Assembly, tuning core mtg: includes shoulder rivet and anti-backlash clip...	
7A600965	Bracket, pilot light mtg	
7B600801	Bracket, pointer mtg	
7C690567	Bracket, tuner mtg (gang mtg)	
7A77337	Bracket, tuning shaft	
43A890397	Bushing, line cord strain relief (use with 43K890398)	
43K890398	Bushing, line cord retainer (use with 43A890397)	
42K690561	Clip, anti-backlash: single (on core mtg bracket)	
42A690560	Clip, anti-backlash: double (on tuner mtg brkt)	

Part Number	Description	Part Number	Description
42A485548	Clip, coil can mtg (AM IF transformer)	585405	Terminal, pin (on speaker leads)...
42B482867	Clip, spring: blued finish (holds FM IF transformer)	4A70015	Washer, "C" (tuning shaft mtg).....
11K8944	Cord, dial (pointer drive)	4A21941	Washer, "C" (holds pointer mtg shaft & pulley)
11M488137	Cord, dial (core drive)	4A600676	Washer, dog (AM-FM switch mtg).....
30K21859	Cord, line: with plug; 9 ft long	4S7582	Washer, flat: 1/2 x .195 x .033 stl; cad pl (pointer drive pulley mtg).....
46B692164	Core, iron and screw: green dot (FM osc tuning core)		
46K692165	Core, iron and screw (FM RF tuning core)	MODEL 8PM21 CABINET PARTS	
15A600877	Cover, volume control: with insulator...	43A4326	Ball, steel: 1/8" diameter (pointer detent)
5S7866	Eyelet: .125 x .091 brass; nkl pl (core drive cord retainer)	38K691915	Button, plug (on record changer).....
1X600495	Lead and Plug Assembly, phono pick-up...	16P600649	Cabinet, console: red-brown mahogany; complete less pointer escutcheon and dial scale
4S9751	Lockwasher, int-ext: #8; cad pl (pointer drive pulley mtg)	13K600651	Cloth, grille: 17-1/2" x 18-1/4"; mahogany
2S7019	Nut, hex: 4-40 x 1/4; cad pl (FM tuning core mtg)	15C600874	Cover, cabinet back
2S7051	Nut, hex palnut: 3/8-32 x 9/16; cad pl (control mtg)	34D600819	Dial scale
35K691846	Pad, rubber: 1-hole (gang mtg).....	34K600817	Escutcheon, pointer
35A691845	Pad, rubber: 2-hole (gang mtg)	5S7870	Eyelet: brass (on RC drawer panel-holds extra spindle)
28K71775	Plug, phono pick-up	5A71081	Eyelet, chassis mtg: plain; 9/32" long.
1X600828	Pulley Assembly, pointer & gang drive (includes 3-1/2" & 1-1/4" pulleys)...	5A600963	Eyelet, chassis mtg: pierced; 1/8" long
49A690562	Pulley, core drive: brass	5A71092	Grommet, chassis mtg: rubber
9A600040	Receptacle, phono motor: 3-prong; includes shell	36K601052	Knob, control (Vol-On-Off): walnut-mahog.
5S8497	Rivet: .088 x 1/8 stl; nkl pl (anti-backlash clip mtg)	36K601056	Knob, control (Phono-Tone-Radio): walnut-mahogany
5S7771	Rivet: .088 x 3/16 stl; nkl pl (min socket mtg)	36K601057	Knob, control (AM-FM): walnut-mahogany...
5S7774	Rivet: .088 x 1/4 stl; nkl pl (noval socket mtg)	36K601055	Knob, control (Tuning): walnut-mahogany..
5S7707	Rivet: .122 x 5/32 stl; nkl pl (term strip mtg)	4S7657	Lockwasher, ext: #8; cad pl (spkr mtg)
5S7701	Rivet: .122 x 3/16 stl; nkl pl (ant term strip mtg)	2S7005	Nut, hex: 6-32 x 1/4 stl; cad pl (pointer mtg)
5S7700	Rivet: .122 x 1/4 stl; nkl pl (octal socket mtg)	2S7003	Nut, hex: 8-32 x 5/16; cad pl (spkr mtg)
5K13896	Rivet, shoulder (on core mtg brkt)....	62K70581	Overlay, logotype: "Motorola"; gold lacquer finish
3S7163	Screw, machine: 8-32 x 1/4 plain hex head; cad pl (pointer drive pulley mtg).	1X600851	Pointer and Collar Assembly (less shaft and sleeve)
3S7205	Screw, machine: 8-32 x 1/4 slotted locking hex head; cad pl (gang mtg)	55K600653	Pull, record changer drawer: satin brass.
3S2695	Screw, sheet metal: #6 x 3/16 PKZ plain hex head; cad pl (tuner brkt mtg)....	3K600655	Screw, machine: 8-32 x 1/2 cross slot head; statuary bronze finish (RC drawer pull mtg)
3S7454	Screw, sheet metal: #8 x 1/4 PKZ plain hex head; cad pl (pwr trans & pointer brkt mtg)	3S7536	Screw, sheet metal: #6 x 3/8 PKA slotted acorn head; antique copper finish (back cover mtg)
3S7103	Setscrew: 8-32 x 1/8 Allen head; cad pl (core drive pulley & pointer mtg).....	3K653	Screw, speaker mtg: 8-32 x 1-1/4"; copper oxide finish
1K601085	Shaft and Pulley Assembly, pointer mtg...	1A690738	Shaft and Sleeve Assembly, pointer: less detent spring and ball, and pointer....
1X600489	Shaft, tuning: complete with pulley.....	55K600654	Slide, record changer (on sides of RC drawer)
15A690616	Shell, receptacle (on phono motor receptacle)	2B400199	Speednut: for .050 stud (dial scale mtg)
26K485936	Shield, coil (for FM IF transformers)....	41A690732	Spring, compression (pointer detent)..
9K600968	Socket, pilot light	4S1765	Washer, flat: 1/2 x .147 x .015 stl; cad pl (pointer mtg)
9K484167	Socket, tube: miniature; 7-prong.....	4S7629	Washer, flat: 1/2 x 3/16 x .048 stl; cad pl (spkr mtg)
9A485495	Socket, tube: noval; 9-prong	4A690729	Washer, spring (pointer mtg)
9A76209	Socket, tube: octal		
41A690598	Spring, coil: 7 turns; cosmoline dipped (FM RF core mtg)	MODEL 8PM21B CABINET PARTS -Same as 8PM21 except:	
41K691840	Spring, coil: 8 turns; cop pl (FM osc core mtg)	16K600650	Cabinet, console: blonde; complete, less pointer escutcheon and dial scale.....
41A14244	Spring, tension (core & pointer drive cord)	13K600652	Cloth, grille: 17-1/2" x 18-1/4"; eggshell
31K37504	Strip, terminal: 1 insulated lug; #1 mtg. 3/8" spacing	36K601058	Knob, control (Vol-On-Off): tan
31K76184	Strip, terminal: 2 insulated lugs; #1 gnd; 3/8" spacing	36K601063	Knob, control (Phono-Tone-Radio): tan....
31K26235	Strip, terminal: 3 insulated lugs; #1 gnd; 3/8" spacing	36K601064	Knob, control (AM-FM): tan
31K26658	Strip, terminal: 5 insulated lugs; #3 gnd; 3/8" spacing	36K601062	Knob, control (Tuning): tan
31A470403	Strip, terminal: 3-screw (antenna input).	3K600656	Screw, machine: 8-32 x 1/2 cross slot head; brass (RC drawer pull mtg).....



ELECTRICAL AND MECHANICAL SPECIFICATIONS

FREQUENCY RANGE

Broadcast 540-1600 kc
 IF 455 kc

TUBES AND FUNCTIONS

6BE6 Mixer-oscillator
 6BA6 I.F. AMP
 6AV6 Detector — AVC-AF.
 6V6 Output
 5Y3 Rectifier

POWER OUTPUT

Type: Beam tube
 Undistorted 3.9 Watts
 Maximum 4.5 Watts
 Plate Load 5000 Ohms

LOUD SPEAKER

Type: Permanent magnet, 2.15 oz., Alnico 5
 Size: 8 inch
 Voice coil impedance 3.2 Ohms

CHASSIS FEATURES

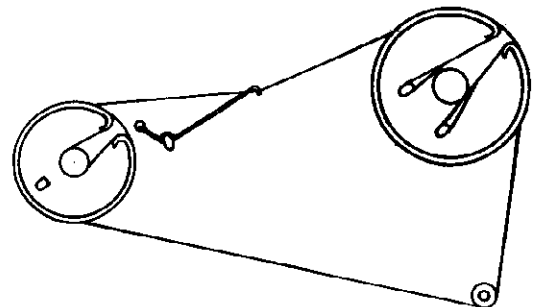
Automatic Volume Control
 Built-in Loop
 Underwriter's Listed

OPERATING CONTROLS

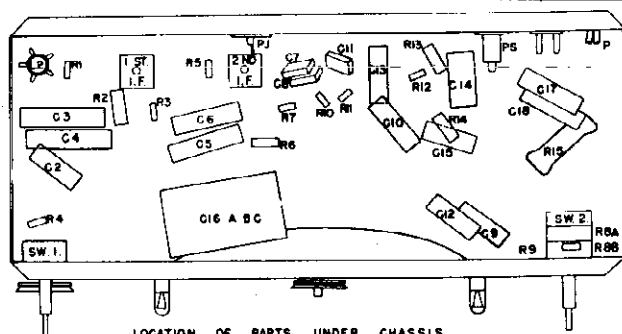
1. Right knob Tuning and Phono-Radio
2. Left knob ON-OFF, Volume and Tone

PHYSICAL DIMENSIONS

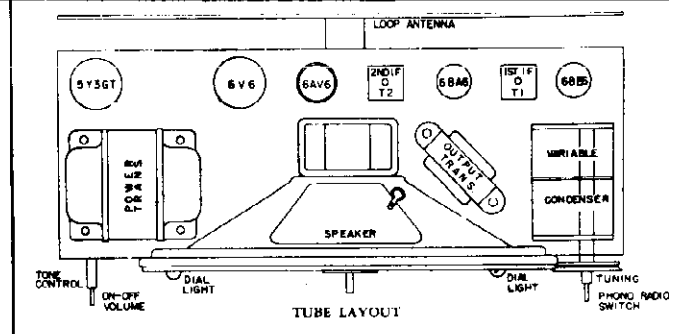
Length 15-1/8 inches
 Width 8 inches
 Height 9-5/8 inches



2 1/4 TURNS

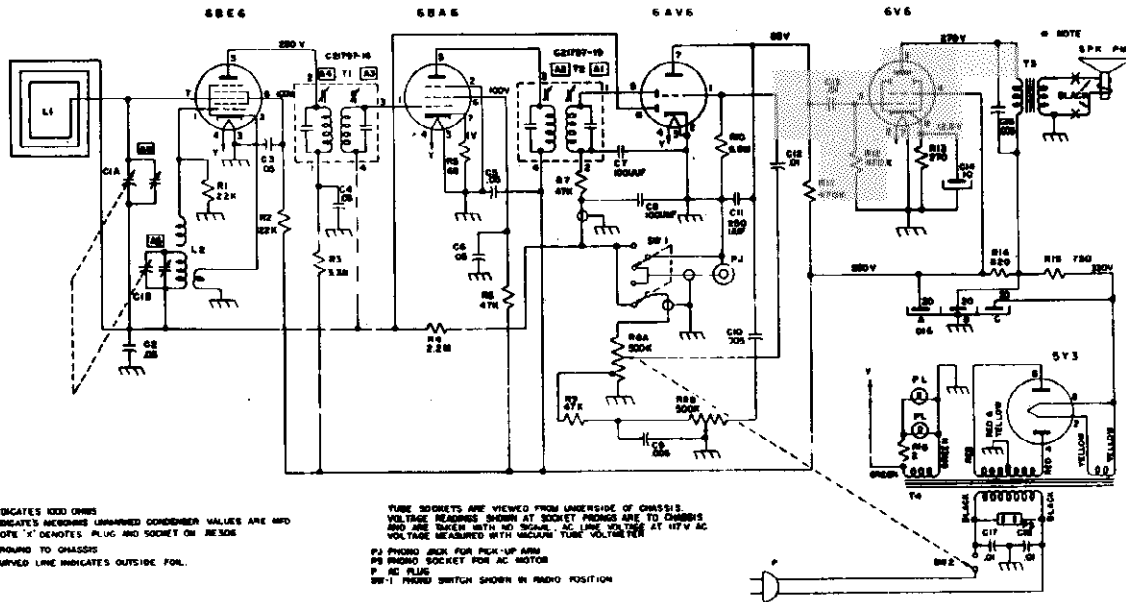


LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT

MODEL 551T, Ch. RE-297



PRELIMINARY:

ALIGNMENT PROCEDURE

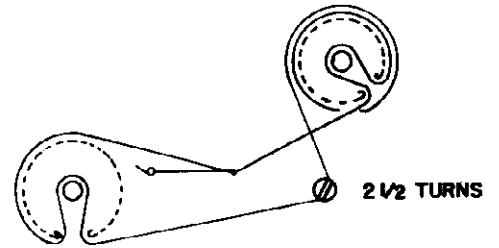
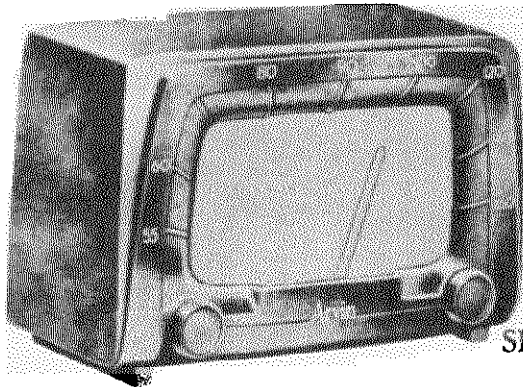
Output meter connection.....	Across loudspeaker voice coil
Output meter reading to indicate .5 W (standard output).....	1.26 volts
Connection of generator ground lead.....	Chassis
Generator Modulation.....	30% 400 cycles
Position of volume & tone control.....	Fully clockwise
Position of dial pointer with variable fully closed.....	to left

1. Connect signal generator lead through a .05 uf condenser to converter grid. Open tuning condenser. Set signal generator to 455 Kc. Tune I.F. Trimmers A1, A2, A3 and A4 for maximum output.
2. Close tuning condenser and set pointer to left. Open tuning condenser. Connect signal generator to test loop or to blue lead on set loop. Set signal generator to 1650 Kc. Tune A5 trimmer on oscillator section of tuning condenser for maximum output.
3. Set signal generator to 1400 Kc. Adjust tuning shaft until maximum output is obtained. Tune antenna trimmer A6 on tuning condenser for greatest output. Reset tuning shaft until output is again maximum. Retune antenna trimmer. Repeat this cycle of operations at 1400 Kc. until no further increase of output can be obtained. Keep generator output at a low value to prevent detuning by A.V.C. action.
4. Set signal generator to 600 Kc. Adjust tuning shaft for maximum output. Adjust tuning condenser plate for maximum output if necessary.

Approximate sensitivities with 117 V. AC line voltage and .5 W. output across voice coil should be: Antenna, lead 600 Kc. — 600 uv/m., 1000 Kc.— 400 uv/m., 1400 Kc.— 300 uv/m.

PARTS

Schematic Loc.	Part Number	Description	Quantity	Schematic Loc.	Part Number	Description	Quantity
L1	D24777	Antenna Loop Assembly	1.50		A2443-1	Knob, Tone, Tuning	.09
	R24876	Cabinet, Wood	11.20		A19351	Lamp, Dial, Mazda No. 47	.20
C1A, B	C24305	Capacitor, Variable, 2 gang with Trimmers	2.10		B20138-15	Line Cord	.75
C2	C20067-503	Capacitor, .05 mfd, 200 V, P.T.	.09		A19552	Phono Jack	.10
C3, C4, C5, C6	C20068-503	Capacitor, .05 mfd, 400 V, P.T.	.09		AC24475-1	Pointer, Shaft & Bracket Assembly	.35
C7, C8	C20065-101	Capacitor, 100 mmfd, 500 V, Mica	.30	R1	C20060-223	Resistor, 22K ohm, 20%, 1/4 W	.10
C9	C20067-502	Capacitor, .005 mfd, 200 V, P.T.	.20	R2	C20302-223	Resistor, 22K ohm, 10%, 2 W	.10
C10	C20068-302	Capacitor, .003 mfd, 400 V, P.T.	.20	R3	C20060-332	Resistor, 3.3K ohm, 20%, 1/4 W	.10
C11	C20065-251	Capacitor, 250 mmfd, 500 V, Mica	.20	R4	C20060-225	Resistor, 2.2 megohm, 20%, 1/4 W	.10
C12, C13	C20068-103	Capacitor, .01 mfd, 400 V, P.T.	.20	R5	C20060-680	Resistor, 68 ohm, 20%, 1/4 W	.10
C14	A22602	Capacitor, 10 mfd, 25 V, Electrolytic	.65	R6	C20070-473	Resistor, 47K ohm, 10%, 1 W	.10
C15	C20069-302	Capacitor, .003 mfd, 600 V, P.T.	.20	R7, R9	C20060-473	Resistor, 47K ohm, 20%, 1/4 W	.10
C16A, B, C	C24415	Capacitor, 20-20-20 mfd, 450 V, Electrolytic	1.75	R10	C20060-685	Resistor, 6.8 megohm, 20%, 1/4 W	.10
C17, C18	D20358-103	Capacitor, .01 mfd, 600 V, Molded	.50	R11, R12	C20060-474	Resistor, 470K ohm, 20%, 1/4 W	.10
	E24490	Carton, with Fillers	1.10	R13	C20070-271	Resistor, 270 ohm, 10%, 1 W	.15
L2	AC24482-1	Coil, Oscillator Assembly	.10		or		
R8A, B	C24535	Control, Volume and Tone, Dual 500K-500K ohms	.75	R14	A24891	Resistor, 270 ohm, 10%, 1 W Wire	.15
	A19132	Cord, Dial Drive	10 for .25	R15	C20070-821	Resistor, 820 ohm, 10%, 1 W	.15
	D24439	Cover, Cabinet Rear	.35	R16	C23970-14	Resistor, 750 ohm, 10%, 5 W Wire	.40
	C24449	Dial, Pointer	.30		A24761	Resistor, 2 ohm, 10%, 1/2 W Wire	.10
	E24447	Dial, Crystal	2.75		A24435-1	Socket, Dial Lamp	.06
	AD24448-1	Grille, Assembly	1.00		A19551	Socket, AC Phono Motor	.25
	A24442-1	Knob, Volume, Radio-Phono	.09	SPK	D24402	Speaker, 6" x 9" P.M.	6.10
					A24653	Spring, Dial Drive Cord	.30
				SW-1	C24438	Switch, Phono-Radio	.75
				T1	C21797-16	Transformer, 1st I.F.	1.20
				T2	C21797-19	Transformer, 2nd I.F.	1.25
				T3	C24776-2	Transformer, Output	.61
				T4	D24440	Transformer, Power	3.75



SPECIFICATIONS

FREQUENCY RANGE

Broadcast 540-1600 kc
IF 455 kc

TUBES AND FUNCTIONS

12BE6 Mixer-oscillator
12BA6 IF Amp.
12AV6 DET-AVC AF Amp.
50C5 Output
35W4 Rectifier

POWER SUPPLY

105-125 Volts, AC-DC, 35 Watts

POWER OUTPUT

Undistorted 1 Watt
Maximum 1.5 Watts
Plate load 2000 Ohms

THE ANTENNA

This receiver has a built-in loop which gives satisfactory reception in most locations.

This receiver is designed to operate without a ground connection and no attempt should be made to use one.

LOUD SPEAKER

Type: Permanent magnet
Size: 4 inch
Voice coil impedance 3.2 Ohms

CHASSIS FEATURES

Automatic Volume Control
Built-in Loop
Underwriters' Listed

OPERATING CONTROLS

1. Left knob ON-OFF Sw and Volume
2. Right knob Tuning

PHYSICAL DIMENSIONS

Length 11-5/16 inches
Height 7-9/16 inches
Depth 4 1/4 inches

ALIGNMENT PROCEDURE

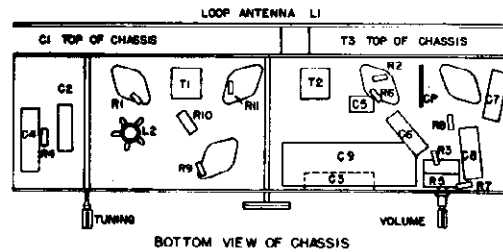
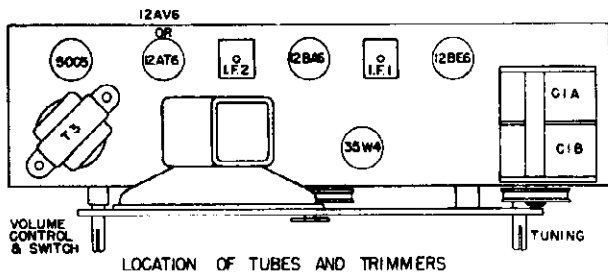
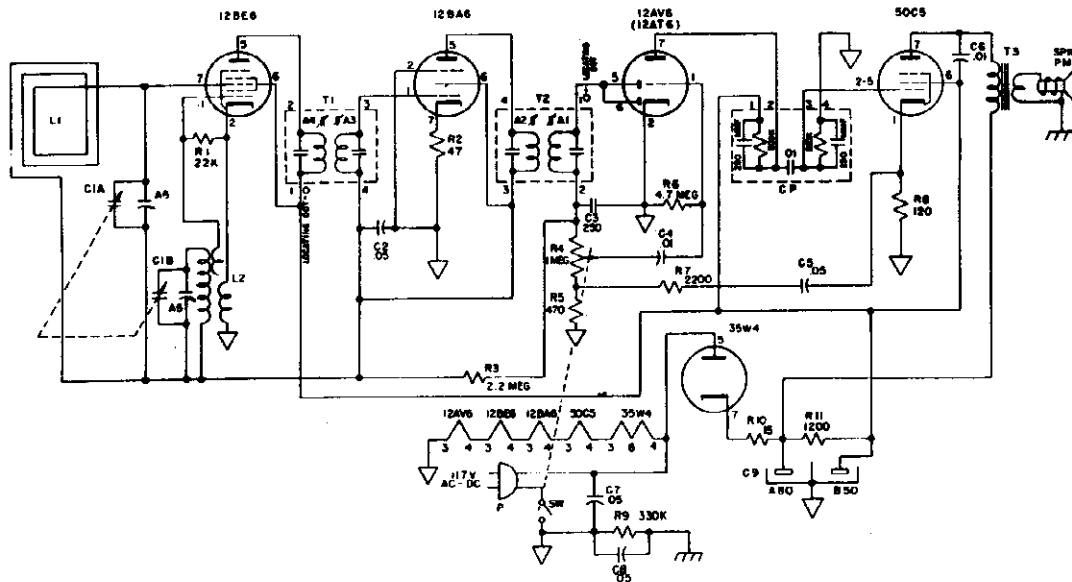
PRELIMINARY:

Output meter connection.....Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts (standard output).....8 volt
Dummy antenna value to be used in series with generator output.....See chart below
Connection of generator output lead.....See chart below
Connection of generator ground lead.....Floating ground
Generator modulation.....30% 400 cycle
Position of volume controlFully clockwise
Position of dial pointer with variable fully closed.....Last mark at left end of dial

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Function of Trimmer
Open	455	.05 mfd.	12BE6 Grid (Stator of CIA)	A1, A2, A3, A4,	IF
1400	1400		*Test Loop	A5, A6 on Variable Condenser	Osc. Ant.
600	600		*Test Loop	Check Point	

*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter, placed about one foot from the speaker loop.

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

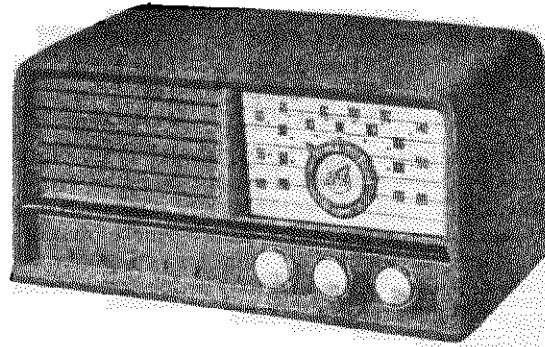


HOW TO ORDER PARTS

Replacement parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order direct from the factory. All prices subject to changes in accordance with O.P.S. regulations. Parts shipments are F.O.B. Columbus, Indiana.

PARTS LIST—553T

Schematic Location	Part Number	Description	List Price	Schematic Location	Part Number	Description	List Price
L1	D24514	Antenna Loop & Rear Cover	1.80		C20138-18	Line Cord	.60
	B23456	Antenna Loop Mounting Bracket	.10		A24493	Pointer	.40
	R24491-1	Cabinet, Plastic, Walnut	3.25	R1	C20060-223	Resistor, 22K ohm, 20%, 1/4 W.	.10
C1A, B	C24516	Capacitor, Variable	2.25	R2	C20060-225	Resistor, 2.2 megohm, 20%, 1/4 W.	.10
C2, C8	C20067-503	Capacitor, .05 mf, 200 V., P.T.	.20	R3	C20060-471	Resistor, 470 ohm, 20%, 1/4 W.	.10
C3, C4	C20068-503	Capacitor, .05 mf, 400 V, P.T.	.20	R4	C20060-334	Resistor, 330K ohm, 20%, 1/4 W.	.10
C5	C20065-251	Capacitor, 250 mmf, 500 V. Mica	.20	R6	C20060-475	Resistor, 4.7 megohm, 20%, 1/4 W.	.10
C6, C7	C20068-103	Capacitor, .01 mf, 400 V, P.T.	.20	R7	C20060-222	Resistor, 2200 ohm, 20%, 1/4 W.	.10
C9	A24537	Capacitor, 50-80 mf, 150 V, Electrolytic	1.85	R8	C20120-121	Resistor, 120 ohm, 10%, 1/4 W.	.10
	E24497	Carton, Complete with Fillers	.35	R9	C20060-150	Resistor, 15 ohm, 20%, 1/4 W.	.10
L2	AC24210-1	Coil, Oscillator	.60	R10	C20070-122	Resistor, 1200 ohm, 10%, 1 W.	.15
R5	C24515	Control, Volume	.85	R11	C20060-470	Resistor, 47 ohm, 20%, 1/4 W.	.10
CP	A24084	Couplate	.45	SPR	C24513	Speaker, 4" P.M.	3.35
	AD24530-1				AA24607-1	Pointer Shaft & Pulley Assembly	.20
	OR			T1, T2	C21797-16	Transformer, I.F.	1.20
	AC24496-1	Grille, Assembly	.30	T3	AC24542	Transformer, Output	1.25
	A24492-4	Knob, Control	.20		A24533	Tuning Shaft	.20
					A19361	Tuning Shaft Hair Pin Clip	.11



SPECIFICATIONS

FREQUENCY RANGE

Broadcast (AM)	540-1600 kc
IF	455 kc
FM	88-108 mc
IF	10.7 mc

TUBES AND FUNCTIONS

6BA6	FM R. F. Amp.
12AT7	FM Converter
6BE6	AM Converter
6BA6	AM-FM-IF Amp.
6BA6	FM, IF Amp.
6T8	FM-AM DET, IST Audio AVC
6V6GT	Output
6X4	Rectifier

POWER OUTPUT

Undistorted	1.5 Watts
Maximum	2.5 Watts
Plate load	5500 Ohms

LOUD SPEAKER

Type: Permanent magnet, .68 oz. Alnico 5	
Size: 5 Inch	
Voice coil impedance	3.2 Ohms

CHASSIS FEATURES

Automatic Volume Control
 Built-in Loop—AM
 Underwriters' Listed
 Built-in Line Cord Antenna—FM

OPERATING CONTROLS

1. Left knob ON-OFF Sw and Volume
2. Right knob Tuning
3. Center knob Band Sw

PHYSICAL DIMENSIONS

Length	13 ⁷ / ₈ inches
Height	6 ³ / ₈ inches
Depth	7 ⁵ / ₈ inches

Colors are as follows:

Ivory, Willow Green, Sandalwood and Rosewood.

THE ANTENNA

AM - This receiver has a built-in loop which gives satisfactory reception in most locations. If the receiver is located some distance from a broadcasting station, or where the electrical interference is high, an outside antenna connected to the terminal marked AM on the antenna terminal strip will improve reception.

FM - A Built-in Line Cord Antenna is connected to the FM antenna. Terminals are provided on the antenna terminal strip to connect an outside FM antenna, they are labeled FM & G.

TECHNICAL INFORMATION

- AM** Tuning range — 540 Kc. to 1600 Kc. Intermediate Frequency 455 Kc. I. F. and R. F. measurements made at 500 milliwatts output — approximately 1.27 volts on a receiver type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I. F. 300 uv; R. F. with standard loop: at 600 Kc. 1200 uv/m; at 1000 Kc. 900 uv/m; at 1400 Kc. 800 uv/m.
- FM** Tuning range — 88 megacycles to 108 megacycles. Intermediate frequency 10.7 megacycles. I.F. and R.F. measurements made at 500 milliwatts output — approximately 1.27 volts on a rectifier type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I. F. 300 uv; R. F. "Absolute Measurements": 9 megacycles 100 uv; 105 megacycles, 100 uv.

MODEL 580TFM, Ch. RE-313

ALIGNMENT PROCEDURE

Output meter connection Across speaker voice coil
 Output meter reading to indicate 500 MW 1.27 volts
 Generator Modulation 30%, 400 cycles
 Position of volume control Fully clockwise

Set dial pointer Horizontal, variable condenser closed
 Set band switch
To left for AM alignment, right for FM alignment

AM ALIGNMENT

Position of Variable	Generator Frequency	Dummy Ant.	Generator Connection (high)	Generator Connection Ground Lead	Adjust Trimmers In Order Shown For Max. Output	Trimmer Function
Open	455 Kc	.05 mfd.	Mixer Grid	Chassis	A1, A2, A3, A4,	I. F.
Open	1650 Kc		*Test Loop	Test Loop	A5	Oscillator
1400 Kc	1400 Kc		*Test Loop	Test Loop	A6	Antenna
**600 Kc	600 Kc		*Test Loop	Test Loop	Check Point	Antenna

* Connect generator lead to Standard Hazeltine Test Loop, Model 1150, placed two feet from the set loop, or three turns of wire about six inches in diameter, placed about one foot from the set loop. Or the generator can be connected with the high side lead to the AM antenna screw terminal and the ground lead to the chassis.
 **With a generator signal of 600 Kc, tune the set to the point where maximum output is obtained, which should be approximately 600 Kc on the dial. Adjust antenna section plates of variable for maximum output. The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A. V. C. action of the receiver ineffective.

FM ALIGNMENT

1. Turn band switch to FM, (right).
2. Connect (FM) I. F. generator to the second 6BA6 I. F. amp. grid, (lug No. 1) through a .01 uf mica dummy. Connect oscilloscope across volume control. With the I. F. generator tuned to 10.7 mc with 150 Kc deviation, and the same audio voltage used as horizontal sweep on the scope that is used to modulate the generator, adjust the ratio detector transformer slugs A7-A8 for the characteristic "S" curve (See Fig. 1), with maximum vertical height on the scope. After this adjustment the top slug of the ratio detector should not be moved during the rest of the alignment.
3. Connect I. F. generator to mixer grid through .01 mica dummy. Using 23 Kc deviation at 10.7 Mc, adjust for maximum output. Maximum output may be indicated by maximum vertical height on the scope or maximum voltage on a standard output meter across the voice coil of the receiver. After the two I. F. transformers have been aligned the bottom slug A8 of the ratio detector should also be peaked.

The characteristic "S" curve of the complete I. F. channel should be checked by applying a 10.7 Mc signal with 150 Kc deviation to the mixer grid and observing the "S" curve on the scope. It should not be very much different from that observed in step 2.

Connect R. F. (FM) generator (88 to 108Mc) to the antenna terminals through the standard 300 ohm dummy (150 ohm in each side of generator leads).

Use R. F. generator with 23 Kc deviation. With the variable condenser completely open and Signal Generator tuned to 108.5 Mc adjust oscillator trimmer A12 (small ceramic trimmer) for maximum reading on output meter.

Then tune receiver to low end of band (variable completely closed) and Signal Generator to 87.5 Mc. If the receiver does not tune to this frequency the FM oscillator coil L4 will either have to be squeezed together or lengthened to cover the band, (squeezing lowers and lengthening raises the frequency). Any change in the coil will have to be completed by the trimmer at the high end of the band.

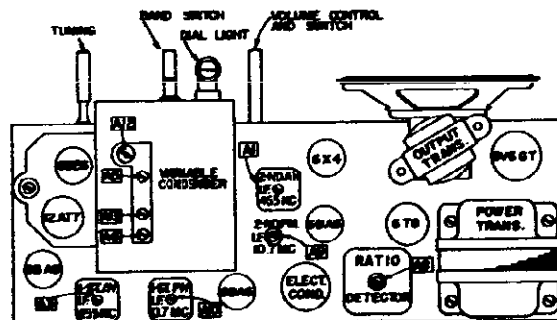
5. With the same Signal Generator connections as per paragraph 4 tune Signal Generator and set to 105 Mc. Tune R. F. trimmer A13 for maximum output at the same time rock variable back and forth through the frequency. (Rocking is necessary because slight oscillator pulling causes erroneous maximum readings).

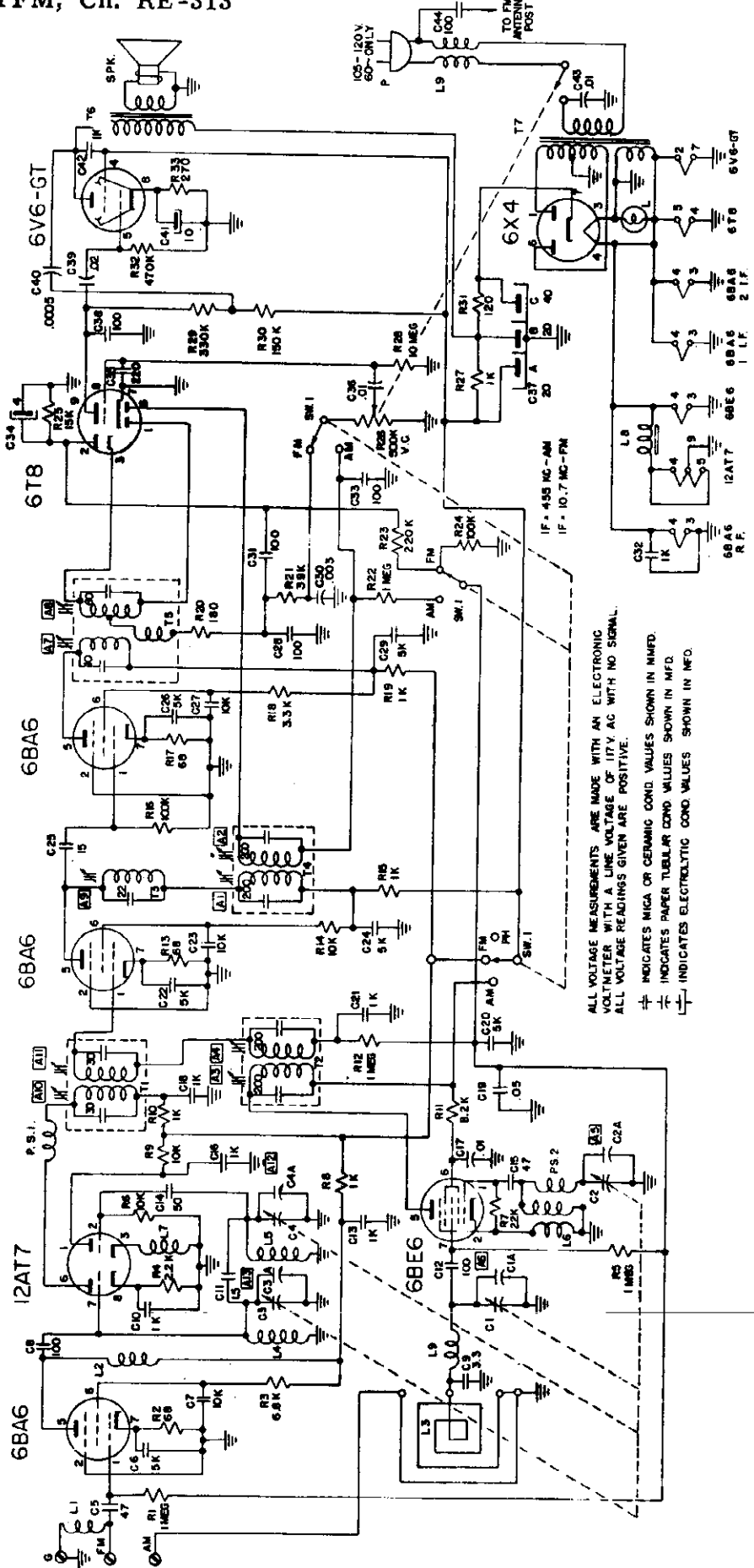
Tune Signal Generator and set to 90 Mc. Adjust R. F. coil L3 length for maximum output by squeezing or lengthening. Any change in the coil will have to be compensated at 105 Mc by the R. F. trimmer A13.

6. After Steps 4 and 5 are finished check calibration and band coverage. Steps 4 and 5 may have to be repeated if set is off calibration. Band coverage should be 87.5 Mc to 108.5 Mc. Sensitivity should be approximately 100 uv at 105 Mc, 98 Mc and 90 Mc.



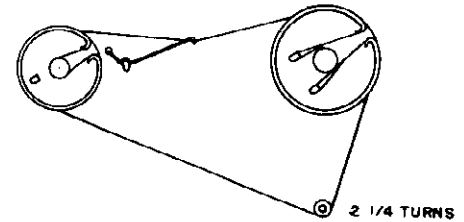
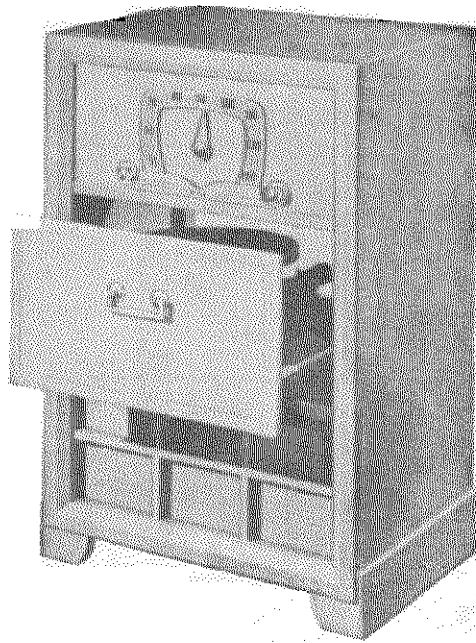
FIG. 1.





ALL VOLTAGE MEASUREMENTS ARE MADE WITH AN ELECTRONIC VOLTMETER WITH A LINE VOLTAGE OF 117V. AC WITH NO SIGNAL. ALL VOLTAGE READINGS GIVEN ARE POSITIVE.

⊕ INDICATES MICA OR CERAMIC COND. VALUES SHOWN IN MFD.
 ⊕ INDICATES PAPER TUBULAR COND. VALUES SHOWN IN MFD.
 ⊕ INDICATES ELECTROLYTIC COND. VALUES SHOWN IN MFD.



SPECIFICATIONS

FREQUENCY RANGE

Broadcast 540-1600 kc
 IF 455 kc

TUBES AND FUNCTIONS

6BE6 Mixer-oscillator
 6BA6 IF Amp.
 6AV6 DET-AVC AF Amp.
 6V6 Output
 5Y3 Rectifier

Models 554CCM and 554 CCB have the same radio chassis and changer. They differ only in cabinet trim, and knobs 554CCM with Mahogany Cabinet and 554CCB with Blonde Cabinet.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection.....Across loudspeaker voice coil
 Output meter reading to indicate .5 W (standard output).....1.26 volts
 Connection of generator ground lead.....Chassis
 Generator modulation.....30% 400 cycles
 Position of volume and tone control.....Fully clockwise
 Position of dial pointer with variable fully closed.....To left

1. Connect signal generator lead through a .05 uf. condenser to converter grid. Open tuning condenser. Set signal generator to 455 Kc. Tune I. F. Trimmers A1, A2, A3, and A4 for maximum output.
2. Close tuning condenser and set pointer to left. Open tuning condenser. Connect signal generator to test loop or to blue lead on set loop. Set signal generator to 1650 Kc. Tune A5 trimmer on oscillator section of tuning condenser for maximum output
3. Set signal generator to 1400 Kc. Adjust tuning shaft until maximum output is obtained. Tune antenna trimmer A6 on tuning condenser for greatest output. Reset tuning shaft until output is again maximum. Retune antenna trimmer. Repeat this cycle of operations at 1400 Kc. until no further increase of output can be obtained. Keep generator output at a low value to prevent detuning by A. V. C. action.
4. Set signal generator to 600 Kc. Adjust tuning shaft for maximum output. Adjust tuning condenser plates for maximum output if necessary.

Approximate sensitivities with 117 V. AC line voltage and .5 W. output across voice coil, should be: Antenna lead 600 Kc.—600 uv/m., 1000 Kc.—400 uv/m., 1400 Kc.—300 uv/m.

POWER OUTPUT

Undistorted 3.5 Wa
 Maximum 4.5 Wa
 Plate load 5000 Ohm

LOUD SPEAKER

Type: Permanent magnet, 2.15 oz. Alnico 5
 Size: 8 Inch
 Voice coil impedance 3.2 Ohm

CHASSIS FEATURES

Automatic Volume Control
 Built-in Loop
 Underwriters' Listed

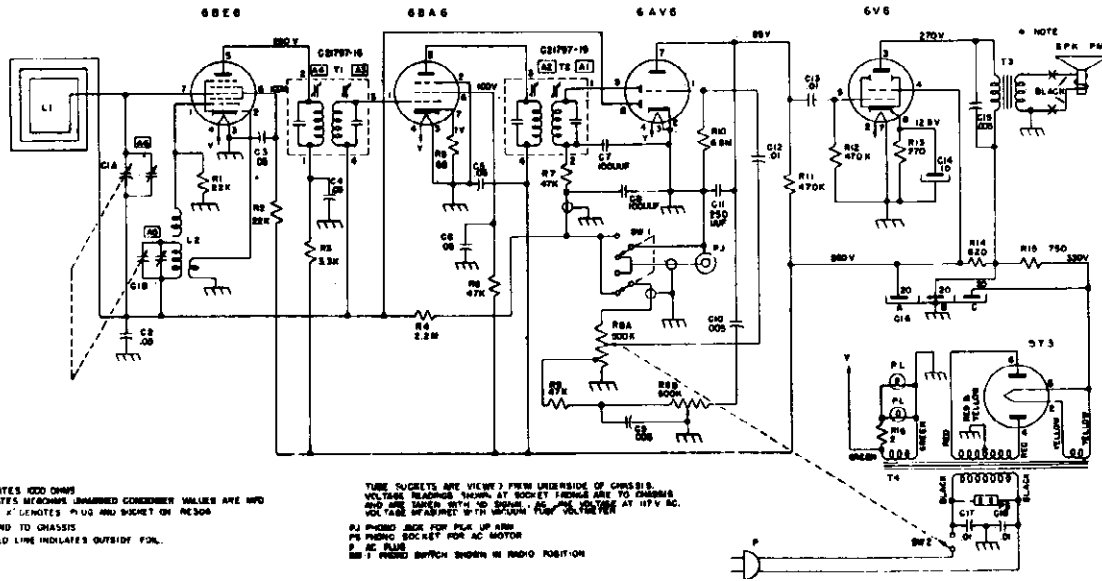
OPERATING CONTROLS

1. Left knob..... ON-OFF, Volume and Tone
2. Right knob Tuning and Phono-Rac

PHYSICAL DIMENSIONS

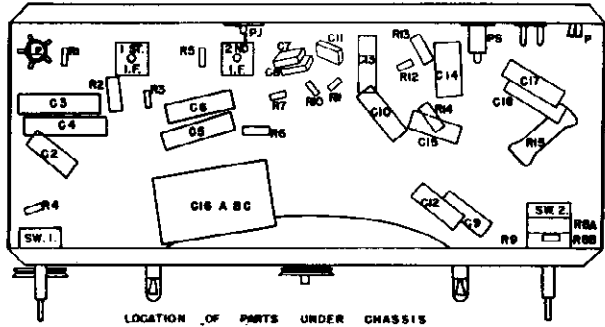
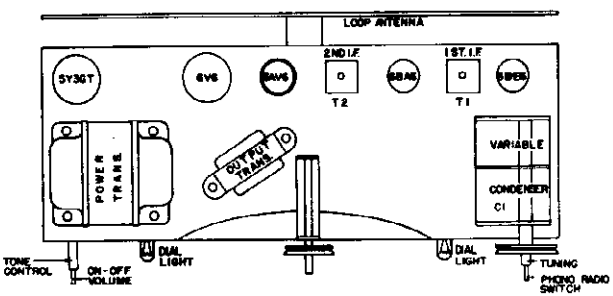
Length 22 inch
 Height 34 inch
 Depth 16 inch

MODELS 554CCB, 554CCM, Ch. RE-306



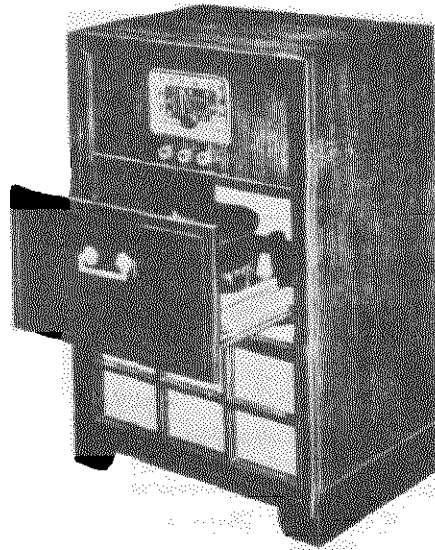
K INDICATES 100 OHMS
 M INDICATES MEGOHMS UNLESS OTHERWISE SPECIFIED
 * NOTE * DENOTES PHONO MOTOR SOCKET ON REAR
 † GROUND TO CHASSIS
 ‡ CURVED LINE INDICATES OUTSIDE POL.
 TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
 VOLTAGE READINGS SHOWN AT SOCKET TERMINALS ARE TO CHASSIS
 AND ARE TAKEN WITH 10 OHMS, 100 OHMS AND 1K OHMS
 RESISTORS IN SERIES WITH THE SOCKET. ALL VOLTAGE
 MEASUREMENTS SHOULD BE MADE WITH RADIO SET AT 1000 KC.
 PHONO SOCKET FOR PICK UP ARM
 PHONO SOCKET FOR AC MOTOR
 P. AC PLUG
 SW 1 PHONO SWITCH SHOWN IN RADIO POSITION

TUBE LAYOUT



PARTS PRICE LIST FOR NO. 554CCM AND 554CCB

Schematic Loc.	Number Part	Description	Price	Schematic Loc.	Number Part	Description	Price
L1	D24777	Antenna Loop Assembly	1.50	E24702-1	Escutcheon, Decorative (Mahogany)	2.00	
	R24720-3	Cabinet, Mahogany	72.00	E24702-2	Escutcheon, Decorative (Blonde)	2.00	
	R24720-4	Cabinet, Blonde	80.00	A24442-1	Knob, Volume, Radio-Phono	.20	
C1A, B	C24305	Capacitor, Variable, 2 gang with Trimmers	2.10	A24443-1	Knob, Tone, Tuning	.20	
C2	C20067-503	Capacitor, .05 mf, 200 V, P.T.	.20	A19351	Lamp, Dial, Mazda No. 47	.20	
C3, C4, C5, C6	C20068-503	Capacitor, .05 mf, 400 V, P.T.	.20	B20138-15	Line Cord	.75	
C7, C8	C20065-101	Capacitor, 100 mmf, 500 V, Mica	.30	AA24766-1	Pointer, Shaft & Bracket Assy.	.30	
C9	C20067-502	Capacitor, .005 mf, 500 V, P.T.	.20	R1	C20060-223 Resistor, 22K ohm, 20%, 1/4 W.	.10	
C10	C20068-302	Capacitor, .003 mf, 400 V, P.T.	.20	R2	C20302-223 Resistor, 22K ohm, 10%, 2 W.	.15	
C11	C20065-251	Capacitor, 250 mmf, 500 V, Mica	.20	R3	C20060-332 Resistor, 3.3K ohm, 20%, 1/4 W.	.10	
C12, C13	C20068-103	Capacitor, .01 mfd, 400 V, P.T.	.20	R4	C20060-225 Resistor, 2.2 megohm, 20%, 1/4 W.	.10	
C14	A22602	Capacitor, 10 mfd, 25 V. Electrolytic	.65	R5	C20060-680 Resistor, 68 ohm, 20%, 1/4 W.	.10	
C15	C20069-302	Capacitor, .003 mfd, 600 V, P.T.	.20	R6	C20070-473 Resistor, 47K ohm, 10%, 1 W.	.15	
C16A, B, C	C24415	Capacitor, 20-20-20 mfd, 450 V. Electrolytic	1.75	R7, R9	C20060-473 Resistor, 47K ohm, 20%, 1/4 W.	.10	
C17, C18	D20358-103	Capacitor, .01 mfd, 600 V. Molded	.50	R10	C20060-685 Resistor, 6.8 megohm, 20%, 1/4 W.	.10	
	E23593	Changer, 3-speed Record Assembly (See VM—Model 950)		R11, R12	C20060-474 Resistor, 470K ohm, 20%, 1/4 W.	.10	
L2	AC24482-1	Coil, Oscillator	.60	R13	C20070-271 Resistor, 270 ohm, 10%, 1 W.	.15	
R8A, B	C24535	Control, Volume & Tone, Dual 500K-500K ohms	1.00		OR		
	C24726	Cover, Cabinet, Rear	.75	R14	A24891 Resistor, 270 ohm, 10% 1 W. Wire	.15	
	C23578	Cover, Record Changer Bottom	.10	R15	C20070-821 Resistor, 820 ohm, 10%, 1 W.	.15	
	C24449	Dial, Pointer	.30	R16	C23970-14 Resistor, 750 ohm, 10%, 5 W. Wire	.40	
	E24447	Dial, Crystal	2.75		A24761 Resistor, 2 ohm, 10%, 1/2 W. Wire	.10	
	D24803-1	Dial, Crystal Background (Mahogany)	.25	SPK	A24762-2 Socket, Dial Lamp	.10	
	D24803-2	Dial, Crystal Background (Blonde)	.25		A19579 Socket, Speaker	.10	
					A19551 Socket, AC Phono Motor	.25	
					AD24763-1 Speaker, Assembly 8" P.M.	7.85	
					C24438 Switch, Phono-Radio	.75	
				T1	C21797-16 Transformer, 1st I.F.	1.20	
				T2	C21797-19 Transformer, 2nd I.F.	1.25	
				T3	C24776-1 Transformer, Output	2.25	



SPECIFICATIONS

FREQUENCY RANGE

Broadcast (AM)	540-1600 kc
IF	455 kc
FM	88-108 mc
IF	10.7 mc

TUBES AND FUNCTIONS

6BA6	FM R. F. Amp.
12AY7	FM Converter
6BE6	AM Converter
6BA6	AM-FM-IF Amp.
6BA6	FM, IF Amp.
6T8	FM-AM DET, 1ST Audio AVC
6V6GT	Output
6X4	Rectifier

POWER OUTPUT

Undistorted	1.5 Watts
Maximum	2.5 Watts
Plate load	2000 Ohms

LOUD SPEAKER

Type: Permanent magnet, 1.47 oz. Alnico 5	
Size: 8 Inch	
Voice coil impedance	3.2 Oh

CHASSIS FEATURES

Automatic Volume Control
Built-in Loop
Underwriters' Listed

OPERATING CONTROLS

1. Left knob	ON-OFF Sw and Volume
2. Right knob	Tuning
3. Center knob	Program

PHYSICAL DIMENSIONS

Width	22 incl
Height	34 incl
Depth	16 incl

Models 582CFM, and 582CFB have the same Chassis, they differ only in Cabinet, trim and knobs.

THE ANTENNA

AM - This receiver has a built-in loop which gives satisfactory reception in most locations. If the receiver is located some distance from a broadcasting station, or where the electrical interference is high, an outside antenna connected to the terminal marked AM on the antenna terminal strip will improve reception.

FM - An 8' length of wire is connected to the FM antenna terminal for an indoor FM antenna. Terminals are provided on the antenna terminal strip to connect an outside FM antenna, they are labeled FM & G.

TECHNICAL INFORMATION

AM	Tuning range — 540 Kc. to 1600 Kc. Intermediate Frequency - 455 Kc. I. F. and R. F. measurements made at 5 milliwatts output — approximately 1.27 volts on a receiver type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I. F. 300 uv; R. F. with standard loop: at 600 Kc. 1200 uv/m; 1000 Kc. 900 uv/m; at 1400 Kc. 800 uv/m.
FM	Tuning range — 88 megacycles to 108 megacycles. Intermediate frequency 10.7 megacycles I.F. and R.F. measurements made at 500 milliwatts output — approximately 1.27 volts on a rectifier type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I. F. 300 uv; R. F. "Absolute Measurements": megacycles 100 uv; 105 megacycles, 100 uv.

ALIGNMENT PROCEDURE

Output meter connection	..... Across speaker voice coil	Set dial pointer	..... Horizontal, variable condenser closed
Output meter reading to indicate 500 MW	..... 1.27 volts	Set band switch	..... To left for AM alignment, right for FM alignment
Generator Modulation	..... 30%, 400 cycles		
Position of volume control	..... Fully clockwise		

AM ALIGNMENT

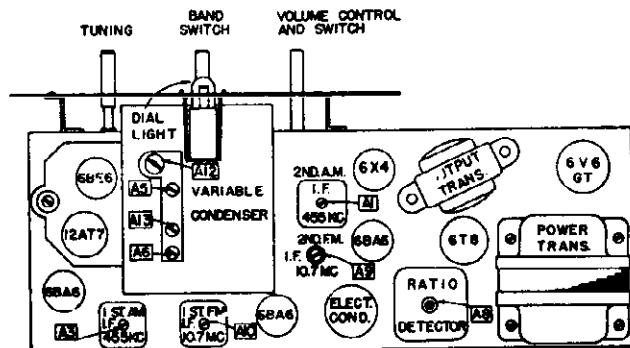
Position of Variable	Generator Frequency	Dummy Am.	Generator Connection (high)	Generator Connection Ground Lead	Adjust Trimmers In Order Shown For Max. Output	Trimmer Function
Open	455 Kc	.05 mfd.	Mixer Grid	Chassis	A1, A2, A3, A4,	I. F.
Open	1650 Kc		*Test Loop	Test Loop	A5	Oscillator
1400 Kc	1400 Kc		*Test Loop	Test Loop	A6	Antenna
**600 Kc	600 Kc		*Test Loop	Test Loop	Check Point	Antenna

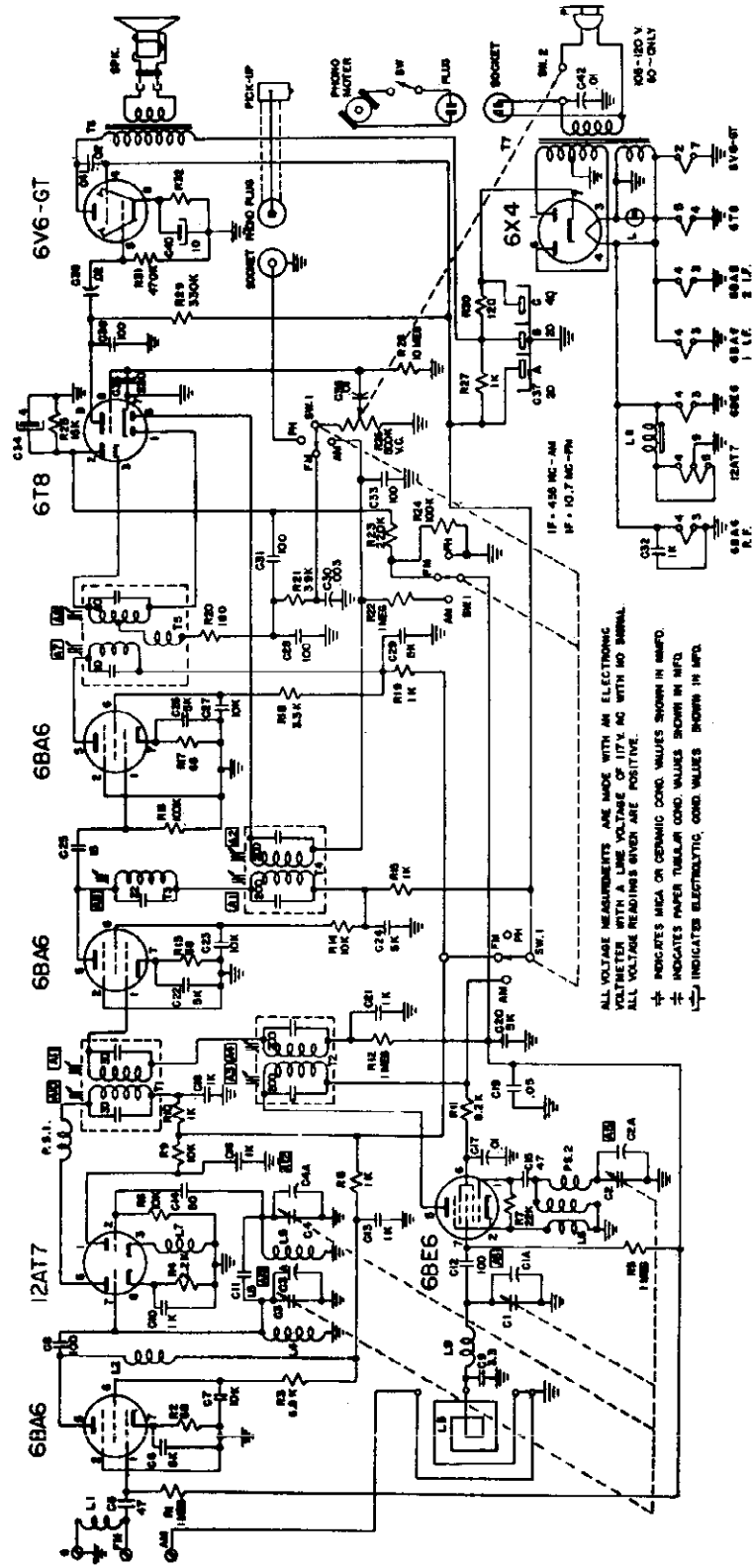
* Connect generator lead to Standard Hazeltine Test Loop, Model 1150, placed two feet from the set loop, or three turns of wire about six inches in diameter, placed about one foot from the set loop. Or the generator can be connected with the high side lead to the AM antenna screw terminal and the ground lead to the chassis.

**With a generator signal of 600 Kc, tune the set to the point where maximum output is obtained, which should be approximately 600 Kc on the dial. Adjust antenna section plates of variable for maximum output. The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A. V. C. action of the receiver ineffective.

FM ALIGNMENT

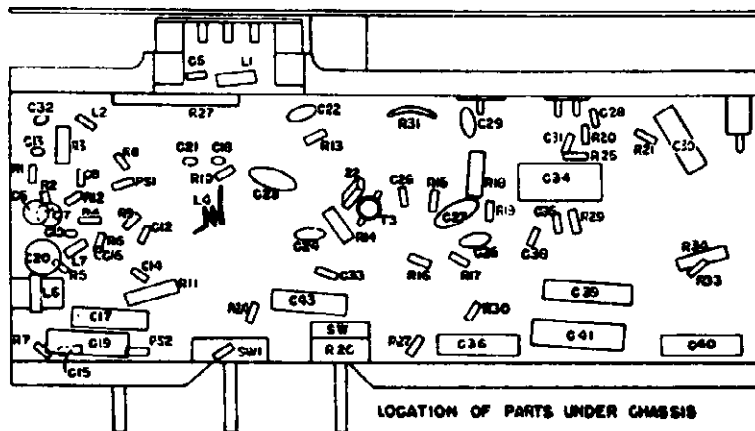
1. Turn band switch to FM, (right).
2. Connect (FM) I. F. generator to the second 6BA6 I. F. amp. grid, (lug No. 1) through a .01 uf mica dummy. Connect oscilloscope across volume control. With the I. F. generator tuned to 10.7 mc with 150 Kc deviation, and the same audio voltage used as horizontal sweep on the scope that is used to modulate the generator, adjust the ratio detector transformer slugs A7-A8 for the characteristic "S" curve (See Fig. 1), with maximum vertical height on the scope. After this adjustment the top slug of the ratio detector should not be moved during the rest of the alignment.
3. Connect I. F. generator to mixer grid through .01 mica dummy. Using 23 Kc deviation at 10.7 Mc, adjust for maximum output. Maximum output may be indicated by maximum vertical height on the scope or maximum voltage on a standard output meter across the voice coil of the receiver. After the two I. F. transformers have been aligned the bottom slug A8 of the ratio detector should also be peaked.
The characteristic "S" curve of the complete I. F. channel should be checked by applying a 10.7 Mc signal with 150 Kc deviation to the mixer grid and observing the "S" curve on the scope. It should not be very much different from that observed in step 2.
4. Connect R. F. (FM) generator (88 to 108Mc) to the antenna terminals through the standard 300 ohm dummy (150 ohm in each side of generator leads).
5. With the same Signal Generator connections as per paragraph 4 tune Signal Generator and set to 105 Mc. Tune R. F. trimmer A13 for maximum output at the same time rock variable back and forth through the frequency. (Rocking is necessary because slight oscillator pulling causes erroneous maximum readings).
Tune Signal Generator and set to 90 Mc. Adjust R. F. coil L3 length for maximum output by squeezing or lengthening. Any change in the coil will have to be compensated at 105 Mc by the R. F. trimmer A13.
6. After Steps 4 and 5 are finished check calibration and band coverage. Steps 4 and 5 may have to be repeated if set is off calibration. Band coverage should be 87.5 Mc to 108.5 Mc. Sensitivity should be approximately 100 uv at 105 Mc, 98 Mc and 90 Mc.





ALL VOLTAGE MEASUREMENTS ARE MADE WITH AN ELECTRONIC VOLTMETER WITH A LINE VOLTAGE OF 117 V AC WITH NO SIGNAL.
 ALL VOLTAGE READINGS GIVEN ARE POSITIVE.
 † INDICATES MICA OR CERAMIC COND. VALUES SHOWN IN INFO.
 ‡ INDICATES PAPER TUBULAR COND. VALUES SHOWN IN INFO.
 †† INDICATES ELECTROLYTIC COND. VALUES SHOWN IN INFO.

MODELS 582CFB, 582CFM, Ch. RE-310



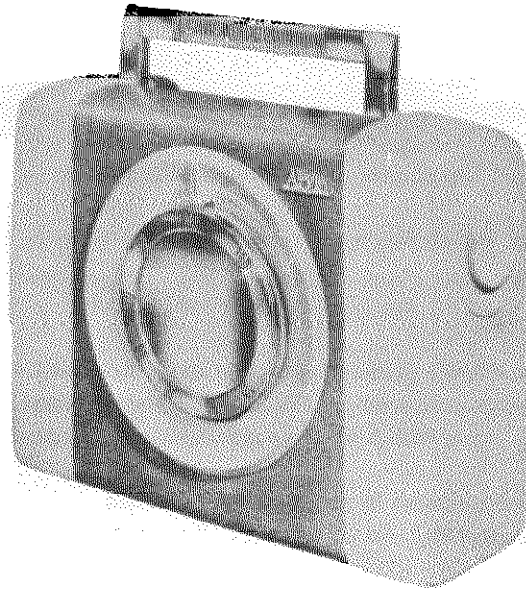
HOW TO ORDER PARTS

Replacement parts should be ordered by Arvin part number, description and model number of instrument from your Arvin Distributor.

Replacement parts for the V-M Changer must be obtained direct from the V-M Corporation, Benton Harbor, Michigan.

PARTS PRICE LIST FOR 582-CFM & 582-CFB, RE-310

Schematic Location	Part Number	Description	List Price	Schematic Location	Part Number	Description	List Price
	D24770	Antenna Loop Assembly	1.00		A24464	Knobs, Ph-AM-FM [Mahogany]	.20
	B22953	Bracket, Antenna Loop Mounting	.10		A24464-4	Knob, Tuning, On-Off, PH-AM-FM [Blonde]	.20
	C24724	Bracket, Dial [2 used]	.10		A24464-3	Knob, Tuning, On-Off, PH-AM-FM [Mahogany]	.20
	R24692-1	Cabinet, Mahogany [with Carton]	72.00		A19351	Lamp, Dial, Mazda No. 47	.20
	R24692-2	Cabinet, Blonde [with Carton]	80.00		C20138-17	Line Cord & Plug	.45
C1, C2, C3, C4	D24773	Capacitor, Variable, 4-gang	4.15	PS-1	AA22345-1	Parasitic Suppressor FM	.20
C4A	A22724	Capacitor, FM Oscillator Trimmer, 5-25uuf	.80	PSO2	AA22334-1	Parasitic Suppressor AM	.20
C11	A20238-3	Capacitor, 1.5uuf, 350V, Gimmick	.10	R3,	C20070-682	Resistor, 6.8K ohms, 10%, 1 W.	.15
C25	C20203-150	Capacitor, 15uuf, 350V, Ceramic	.20	R2, R13, R17	C20060-680	Resistor, 68 ohms, 20%, 1/2 W.	.10
C5, C15	C20203-470	Capacitor, 47uuf, 350V, Ceramic	.20	R31	A23933	Resistor, 120 ohms, 10%, 1 W.	.15
C14	C20205-5	Capacitor, 50uuf, 500V., Ceramic	.20	R20	C20060-181	Resistor, 180 ohms, 10%, 1/2 W.	.10
C8, C12, C28, C33, C31, C38	C20203-101	Capacitor, 100uuf, 350V., Ceramic	.20	R34	C20070-271	Resistor, 270 ohms, 10%, 1 W.	.15
C35	C20203-221	Capacitor, 220uuf, 350V., Ceramic	.20	R8, R10, R15, R19	C20060-102	Resistor, 1K ohms, 20%, 1/2 W.	.10
C10, C13, C16, C18, C21, C32	C23078	Capacitor, 1000uuf, 350V., Ceramic	.20	R4	C20060-222	Resistor, 2.2K ohms, 20%, 1/2 W.	.10
C30	C20069-302	Capacitor, .003 mfd., 600V., Paper	.20	R18	C20070-332	Resistor, 3.3K ohms, 10%, 1 W.	.15
C6, C20, C22, C24, C26, C29	A21674	Capacitor, 5000uuf, 350V., Disc Ceramic	.25	R11	C20070-822	Resistor, 8.2K ohms, 10%, 1 W.	.15
C7, C23, C27	A22295	Capacitor, 10,000uuf, 350V., Disc Ceramic	.25	R14	C20070-103	Resistor, 10K ohms, 10%, 1 W.	.15
C17, C36, C40	C20068-103	Capacitor, .01 mfd., 400V., Paper	.20	R25	C22381-153	Resistor, 15K ohms, 10%, 1/2 W.	.10
C42	C20249-103	Capacitor, .01 mfd., 400V., Phenolic	.20	R7	C20060-223	Resistor, 22K ohms, 20%, 1/2 W.	.10
C9	C20205-20	Capacitor, Ceramic, 3.3uuf, +.05 mmf, 500V.	.30	R6, R9	C20060-103	Resistor, 10K ohms, 20%, 1/2 W.	.10
C39	C20068-203	Capacitor, .02 mfd., 400V., Paper	.20	R21	C20120-393	Resistor, 39K ohms, 20%, 1/2 W.	.10
C19, C41	C20067-503	Capacitor, .05 mfd., 200V., Paper	.20	R28	A24774	Resistor, 1000 ohms, 10 W. Wire	.55
C34	A22659	Capacitor, 4 mfd., 25V., Electrolytic	.65	R16, R24	C20060-104	Resistor, 100K ohms, 20%, 1/2 W.	.10
C37A, B, C	A22806	Capacitor, 20-20-40 mfd., 250V., Electrolytic	1.65	R23	C20060-224	Resistor, 220K ohms, 20%, 1/2 W.	.10
L1	E23593-1	Changer, 3-speed Record [See VN Bulletin]		R30	C20060-334	Resistor, 330K ohms, 20%, 1/2 W.	.10
L7	AA22648-1	Choke, 1.5 uh	.30	R32	C20060-474	Resistor, 470K ohms, 20%, 1/2 W.	.10
L2	AA22597-1	Choke, 3 uh	.30	R1, R5, R12, R22	C20060-105	Resistor, 1 megohm, 20%, 1/2 W.	.10
L8	AA21445-1	Choke, 7.5 uh	.50	R29	C20060-106	Resistor, 10 megohms, 20%, 1/2 W.	.10
L6	A2 1673	Choke, 14 uh, Iron Core	.40	R27	C20060-681	Resistor, 680 ohms, 20%, 1/4 W.	.10
L5	AC22587-1	Coil, Oscillator, AM	.50	A19551	Socket, AC, Phono Motor	.25	
L4	A22594	Coil, Oscillator, FM	.10	A24345-1	Socket, Dial Lamp	.25	
R26	A22593	Coil, RF, FM	.10	A19552	Socket, Phono Pickup	.10	
	C22963	Control, Volume & Switch, 500K ohms	.80	A19579	Socket, Speaker	.10	
	C24726	Cover, Cabinet Rear	.06	AD23693-1	Speaker Assy. 8" PM with Cable & Plug	4.00	
	C23578	Cover, Record Changer Bottom	.15	A19133	Spring, Dial Cord	10 for .25	
	A24449	Dial Pointer [Mahogany]	.30	C23485	Switch, Band	.80	
	A24449	Dial Pointer [Blonde]	.30	A22960	Terminal Strip, Antenna	.10	
	C24709	Dial Scale [Mahogany]	.85	T1	C22590	Transformer, I.F., 1st F.M. [10.7 Mc]	1.35
	C24709	Dial Scale [Blonde]	.85	T4	C22352	Transformer, I.F., AM [455Kc]	1.35
	C24723	Escutcheon & Crystal	2.10	T3	AC22967-1	Transformer, I.F., 2nd FM [10.7 Mc]	.75
				T6	AC23669-1	Transformer, Output	1.75
				T7	D22959	Transformer, Power	4.20
				T5	AD22592-1	Transformer, Ratio Detector	1.80
					A22957	Tuning Shaft	.15



SPECIFICATIONS

FREQUENCY RANGE

Broadcast540-1600 Kc
 IF455 Kc

POWER OUTPUT

Maximum2 wat
 Undistorted16 wat
 Speaker Size 4 inc
 Voice Coil Impedance..... 8.2 ohm

TUBES AND FUNCTIONS

1T4 RF Amp.
 1R5 Converter
 1T4 IF Amp.
 1U5 Audio Amp. Detector
 3V4 Audio Output

CHASSIS FEATURES

Automatic Volume Control
 Iron Core Rod Antenna

CONTROLS

Left knob On-Off Sw. and Volun
 Right Knob Tunir

POWER SUPPLY

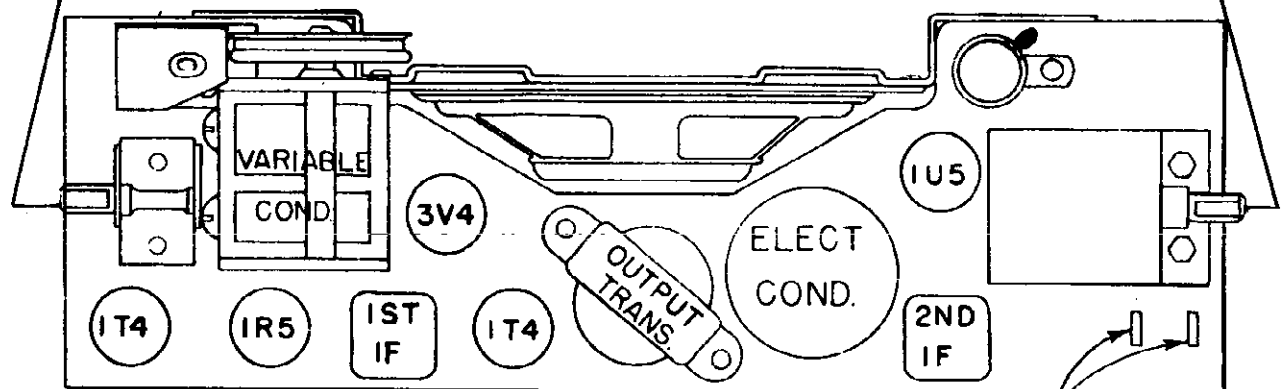
"B" 90 Volts2 No. 455 Ever Ready or Equal
 "A" 9 Volts Six 1½ volt size "C" Flashlight Cells
 Or 115 Volts A.C. or D.C.

PHYSICAL DIMENSIONS

Width11 inch
 Height9 inch
 Depth4 inch

TUNING

VOLUME-CONTROL



TUBE LAYOUT

PLUG LINE CORD IN
 HERE FOR BATTERY
 OPERATION

ALIGNMENT

A. Connect to 117 V. A.C. line and turn set on with volume control at full volume.

B. With variable condenser closed set pointer to end mark on dial back.

C. Connect signal generator high side through .05 uf or larger condenser to Pin 6 on 1R5 tube.

D. Open variable condenser.

E. With signal generator set at 455KC, increase output of generator until output is heard in speaker. Adjust all I.F. trimmers until maximum output meter reading is obtained, reducing signal generator output as adjustment progresses so that final adjustment is made with lowest input consistent with good signal to noise ratio.

NOTE: After I.F. alignment, the set must be provided with a bottom cover, or test jig which is the equivalent of the bottom cover, and the rest of the R.F. alignment carried out with this in place.

F. With signal generator at 455 KC and connected to a radiating loop, adjust R.F. transformer coupling condenser until output meter reading is a minimum. Final adjustment is to be made with high signal input so that an accurate adjustment can be made.

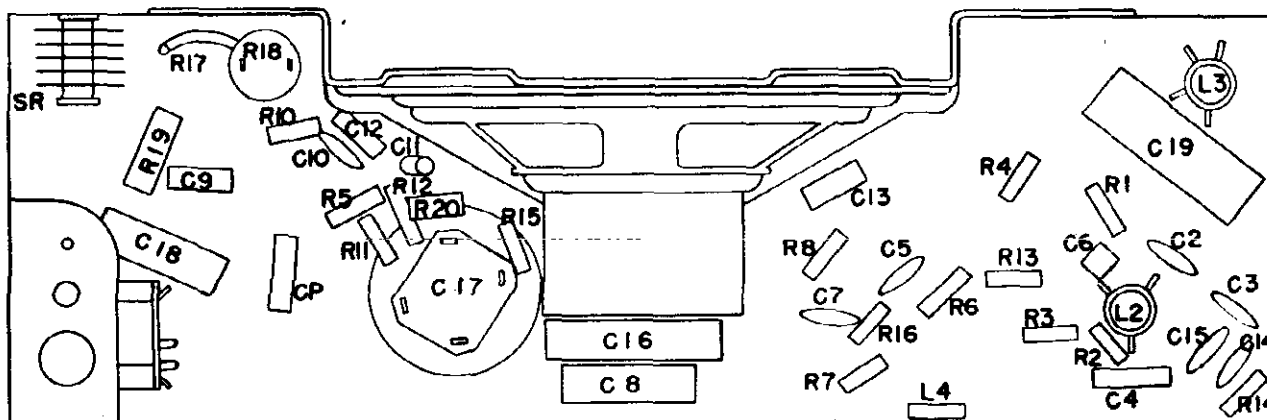
G. With signal generator connected to radiating loop and set to 1650 KC adjust oscillator trimmer on variable condenser until output is maximum. Variable condenser is to be fully opened during adjustment.

H. Set signal generator to 1400 KC and rotate variable condenser until output is maximum. Adjust R.F. trimmer on variable condenser until output increases to a new maximum. Rotate variable condenser slightly to obtain another maximum output. Re-adjust trimmer until output is again a maximum. Repeat this cycle until no further increase in output can be obtained. Final adjustment to be made with signal generator output at sensitivity limit given below or lower.

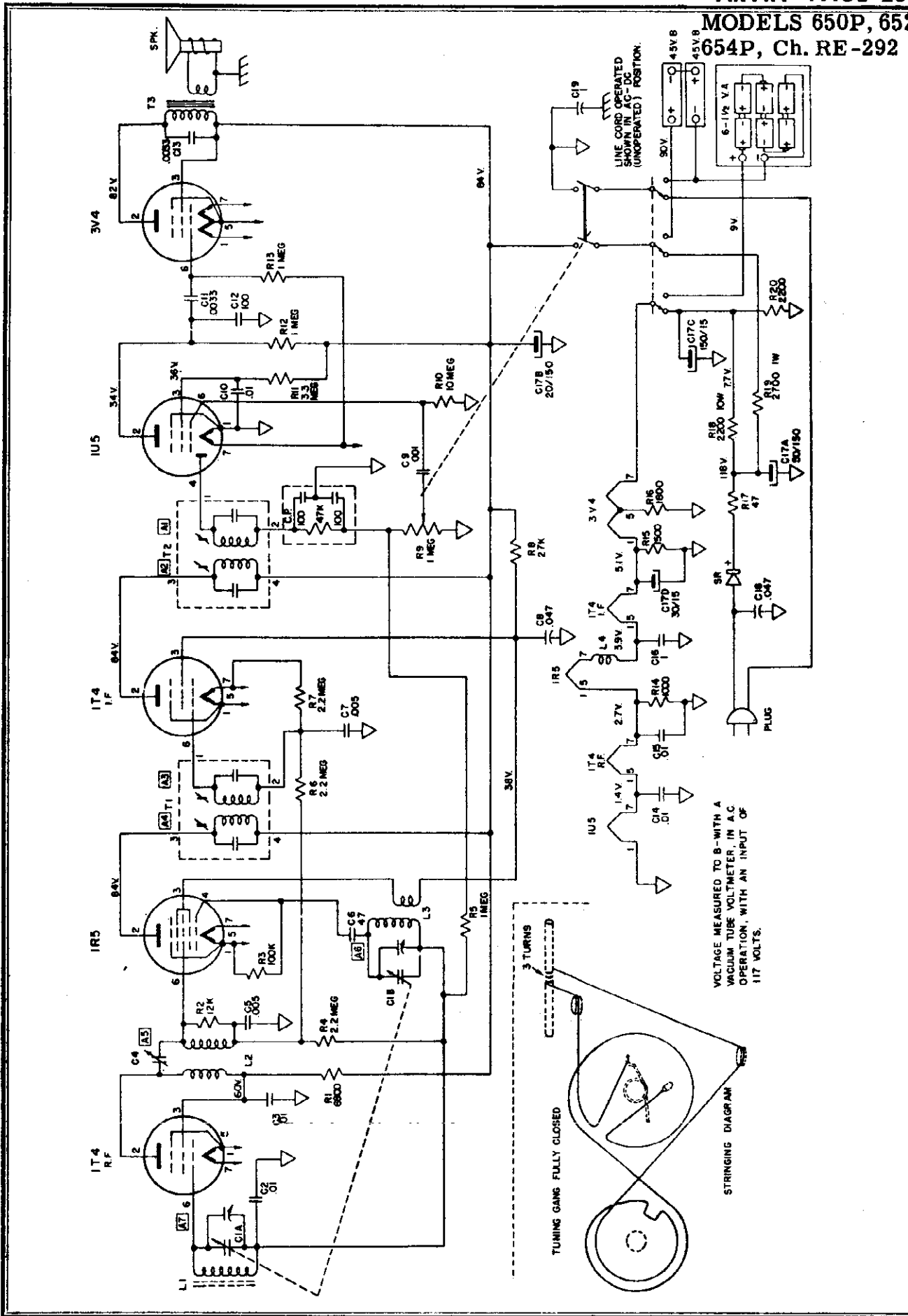
I. Set signal generator to 1000 KC and tune radio to maximum output. Read sensitivity. Adjust R.F. section of variable blades for maximum output.

J. Set signal generator to 600 KC and proceed as in I. above.

K. Set signal generator to 540 KC and make sure that radio will tune to maximum output slightly before variable condenser is fully closed.



LOCATION OF PARTS UNDER CHASSIS



MODELS 650P, 652P, 654P, Ch. RE-292

HOW TO ORDER PARTS

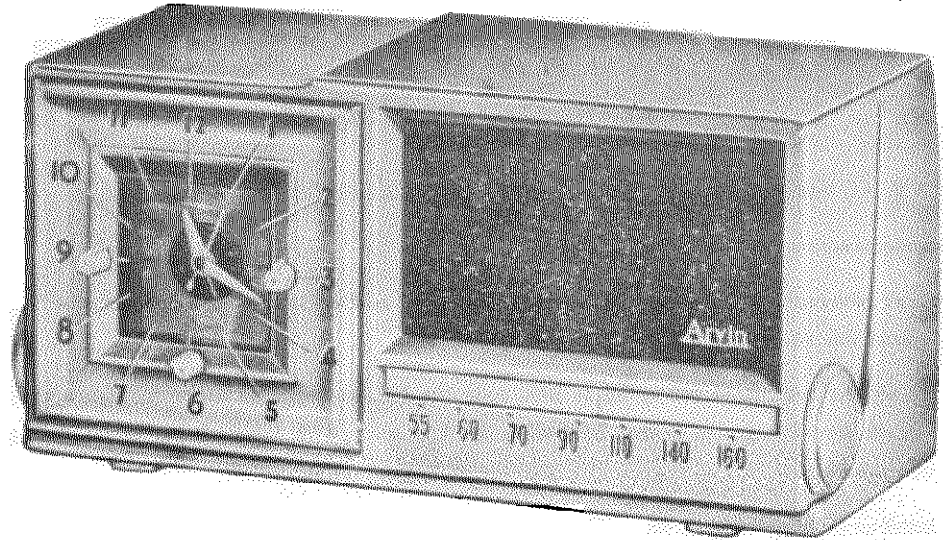
Replacement parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order direct from the

factory. All prices subject to changes in accordance with O. P. S. regulations. Parts shipments are F. O. B. Columbus, Indiana

SCHEMATIC LOCATION	PART NO.	DESCRIPTION	LIST	SCHEMATIC LOCATION	PART NO.	DESCRIPTION	LIST
L1	24372-2	Arvin Name Plate	.20		25396-3	Handle (650P-654P)	1.00
CP	25385-1	Antenna Assembly	1.40		25396-3	Handle (652P Red)	.75
	25430	Audio Coupling Unit	.30		25396-5	Handle (652P Jade)	.75
	25379-1	Battery Clip Assembly	.55		25349-1	Knob, Tuning (Tan 650P-654P)	.25
	25419	"B" Battery Cable Assembly	.45		-2	Knob, Tuning (Red 650P-652P)	.25
	25403	Cabinet, Handle Bracket Right	.10		-3	Knob, Tuning (Black 650P-654P)	.25
	25404	Cabinet, Handle Bracket Left	.10		-4	Knob, Tuning (Jade 652P-654P)	.25
	25323*	Cabinet Back (see note)*	3.50		25350-1	Knob, Volume (Tan 650P-654P)	.25
	25324*	Cabinet Front (see note)*	3.50		-2	Knob, Volume (Burgundy 650P-652P)	.25
	25315*	Cabinet Speaker Ring (see note)*	.75		-3	Knob, Volume (Black 650P-652P)	.25
C1	25393	Capacitor, Variable	2.15		-4	Knob, Volume (Jade 652P-654P)	.25
C4	25418	Capacitor, Timmer with Bracket	.35	R17	19177	Resistor 47 10% 1w	.20
C6	21643	Capacitor 50 ufd	.20	R14	20061-102	Resistor 1000 20% 1/2w	.10
C12	20300-101	Capacitor 100 ufd	.20	R15	20061-152	Resistor 1500 20% 1/2w	.10
C9	20424-102	Tabular Ceramic	.20	R16	22361-182	Resistor 1800 10% 1/2w	.10
C11-C13	20423-332	Capacitor .001 ufd Ceramic	.20	R20	20061-222	Resistor 2200 20% 1/2w	.10
C5-C7	21674	Capacitor .005 Disc	.20	R18	25392	Resistor 2200 10w	.55
C2, C3, C10	22295	Capacitor .01 Disc	.25	R1	20061-682	Resistor 6800 20% 1/2w	.10
C14, C15	20068-473	Capacitor .047 Paper 400 V	.20	R9	20070-272	Resistor 2700 10% 1w	.15
C18	20067-473	Capacitor .047 Paper 200 V	.20	R2	22381-123	Resistor 12K 10% 1/2w	.10
C8	20067-104	Capacitor .1 Paper 200 V	.25	R8	22381-273	Resistor 27K 10% 1/2w	.10
C16	20068-104	Capacitor .1 Paper 400 V	.30	R3	20061-104	Resistor 100K 20% 1/2w	.10
C19	25394	Capacitor Electrolytic 5/150-20/150-150/15-30/15	2.50	R5, R12, R13, R4, R6, R7	20061-105	Resistor 1 meg. 20% 1/2w	.10
C17	25434	Coil, RF Choke	.40	R11	20061-335	Resistor 3.3 meg. 20% 1/2w	.10
L4	25382-1	Coil, Oscillator	.45	R10	20061-106	Resistor 10 meg. 20% 1/2w	.10
L2	25383-1	Coil, Volume and Switch	1.00	SPK	20207-5	Rectifier 75 MA Selenium	1.75
R9	25391	Clip (rear cover)	.05		25387	Speaker 4"	3.25
	25917	Clip, hairpin (tuning shaft)	.15		25386	Switch, AC-Batt.	.50
	19361	Dial Assembly (650P-654P)	1.25	T1	21802	Spring Ring	.05
	25348-1	Dial Assembly (652P)	1.25	T2	21797-5	Transformer IF	1.25
	25348-2	Dial Assembly (654P)	1.25	T3	21797-11	Transformer IF	1.25
					25384-1	Transformer Audio Output	1.25
					25376	Tuning Shaft	.25

NOTE* Use the following suffixes with cabinet part numbers.

- 650P Sustain -1
- 650P Burgundy-2
- 650P Black -3
- 654P Jade -4
- 654P Ebony -5
- 654P Sustain-6
- 652P Red -7
- 652P Jade -8



SPECIFICATIONS

FREQUENCY RANGE

Broadcast 540-1600 Kc
 IF 455 Kc

TUBES

12BE6 Converter
 12BA6 IF Amp
 12AV6 Det, Audio, Avc
 50C5 Audio Output
 35W4 Rectifier

PHYSICAL DIMENSIONS

Length 13"
 Height 6-3/4"
 Depth 6"

COLORS

Ivory Willow Green Clock Face
 Willow Green Ivory Clock Face

POWER OUTPUT

Undistorted 1.1 w.
 Maximum 2.3 w.

SPEAKER

Type Permanent Mag
 Size
 Voice Coil Impedance 3.2 Ω

RADIO CONTROLS

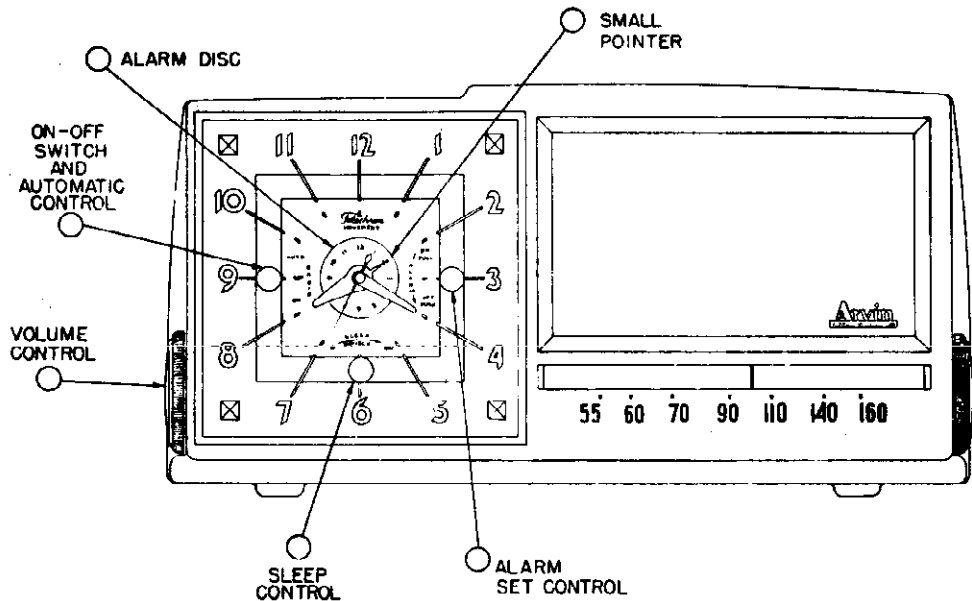
Left Knob Volume Cont
 Right Knob Station Select

CLOCK FACE CONTROLS

Right On-Off-Autom
 Left Al
 Bottom Sleep Cont
 Cabinet Rear Time

CHASSIS FEATURES

Clock Controlled Power
 Appliance Socket
 Alarm
 Built-In Rod Antenna
 Automatic Volume Control
 Slide Rule Dial

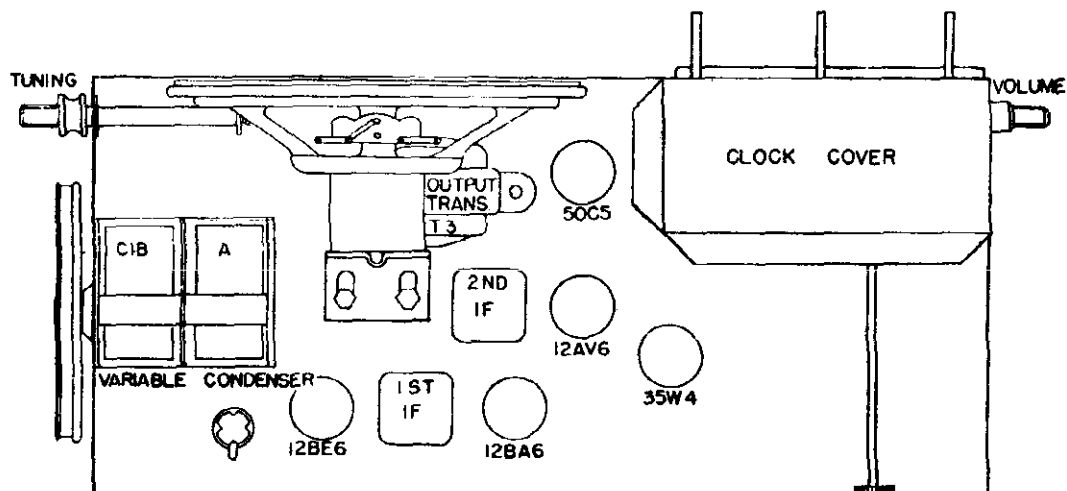


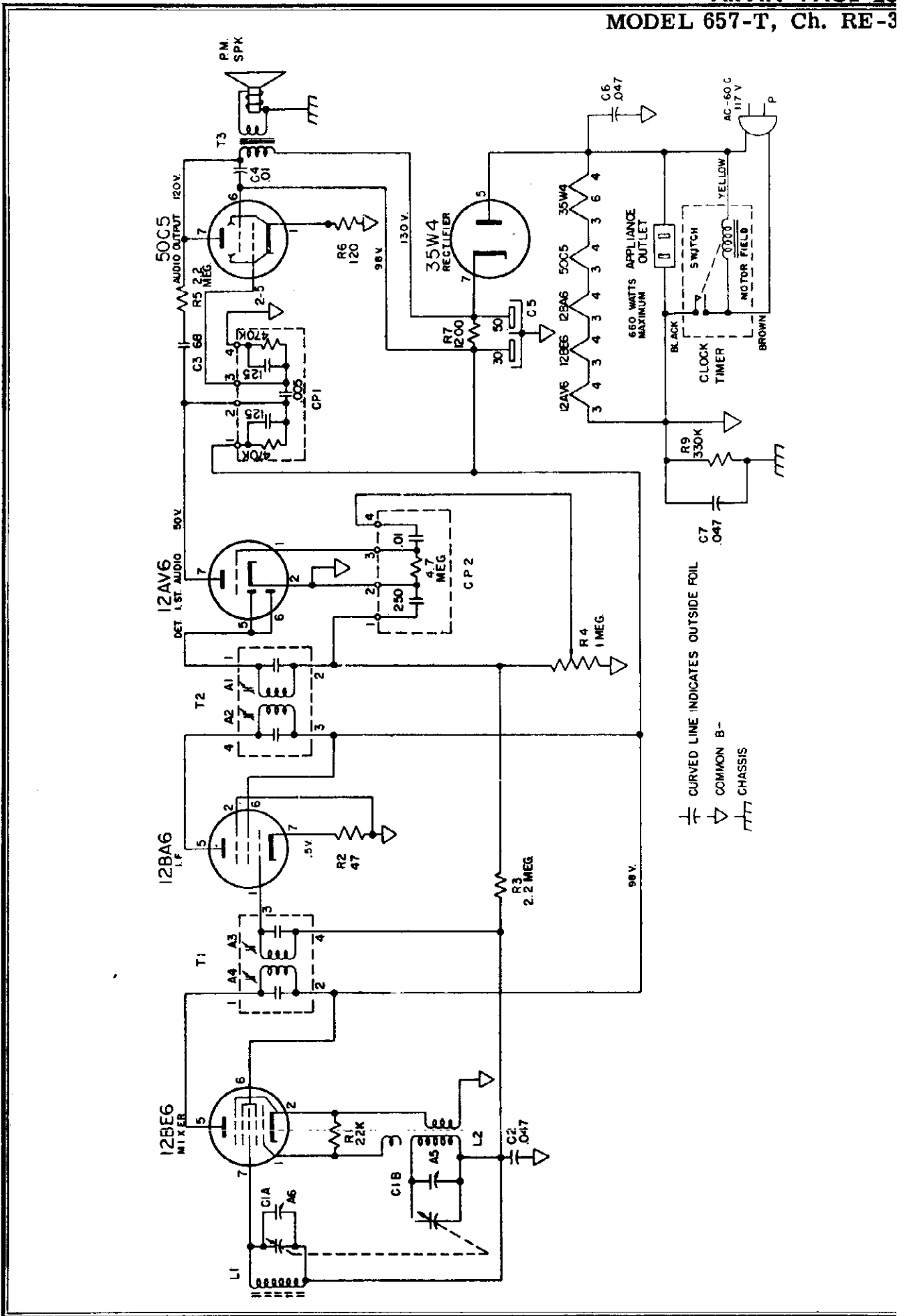
ALIGNMENT PROCEDURE

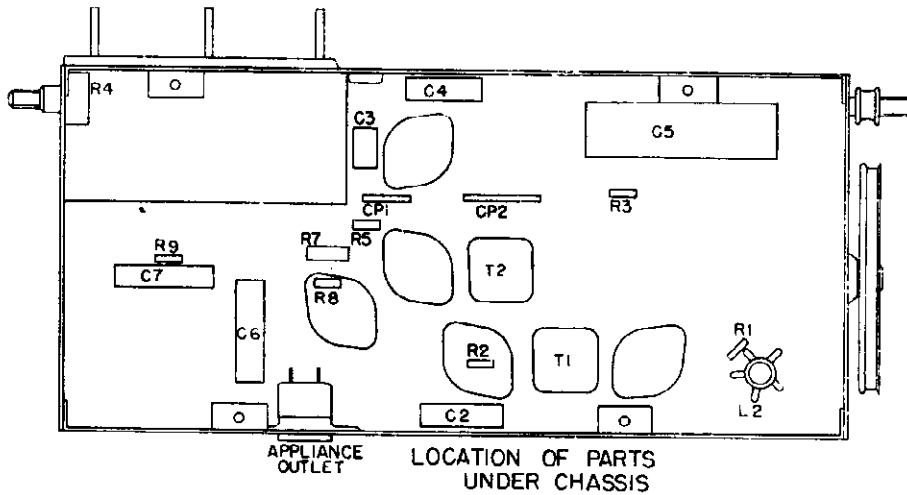
1. Connect to 117 V. AC line and turn set on with volume control at full volume.
2. Connect output meter across the speaker voice coil.
3. Connect the signal generator to the mixer grid, pin 7, using a .05 mfd condenser in series with the "hot" generator lead. Connect the ground side of the generator to floating ground.
4. Set generator to 455 Kc modulated 400 cycles at 30%, tune the I.F. transformers for maximum output. Reduce the generator output as the signal increases so that final adjustment is made with lowest input possible to give a good signal to noise ratio at the output.
5. Connect generator to a radiating loop, set to 1400 Kc. Close the variable condenser and set the pointer to 540 Kc. This is indicated by a notch in the top of the dial plate. First notch to the left is 540, second 600 Kc, 1000 Kc, and 1400 Kc. After setting the pointer tune to 1400 Kc trim the oscillator and antenna stages for maximum output. Repeat trimmer adjustments until no further increase is obtained.
6. Set generator at 600 Kc. Tune receiver to 600 Kc. Adjust antenna section condenser plates for maximum output.
7. Check calibration and coverage after alignment coverage must be 535 Kc to 1650 Kc.

ELECTRICAL TEST FOR CLOCK

- A. By turning right hand knob set alarm disc to an even hour number.
- B. Turn left hand clock knob to the "AUTO" position.
- C. Turn rear knob or time set knob until radio goes on.
- D. There should not be more than seven minutes difference between alarm disc and time shown by the hands on clock face.
- E. Check sleep switch by setting to the 60 minute position. Rotate time set knob until radio shuts off. Time shown by the hands on the clock face should be one hour plus or minus seven minutes.
- F. Clock switch must have a definite snap action on the ON-OFF-AUTO switch.







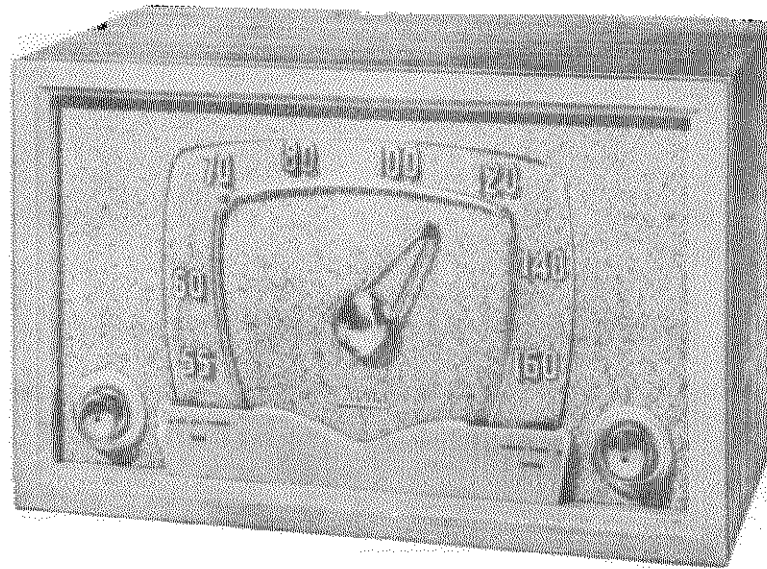
HOW TO ORDER PARTS

Replacement parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order direct from the factory, except in the case of tubes, which should be obtained through regular tube distribution channels.

Part No.	Description	Part No.	Description
AD25191-1	Antenna Rod and Rear Cover	A25233-1	Knob, Clock
R25169-1	Cabinet, Willow Green	A25170-1	Knob, Radio
R25169-2	Cabinet, Ivory	C20138	Line Cord
C20065-680	Capacitor, 68uuf 500V Mica, C3	IF25259	Pointer (Radio)
C20292-103	Capacitor, .01 400V, C4	C20061-470	Resistor 47 ohm 1/2w 20%, R2
C20292-473	Capacitor, .047 400V, C7 C6	C22381-121	Resistor 120 ohm 1/2w 10%, R6
C20291-473	Capacitor, .047 200V, C2	C20061-334	Resistor 330 ohm 1/2w 20%, R9
A25196	Capacitor, Electrolytic 50-30/150, C5	C20070-122	Resistor 1200 ohm 1w 10%, R7
C25195	Capacitor, Variable, C1	C20061-223	Resistor 22K ohm 1/2w 20%, R1
D25171	Clock Crystal	C20061-225	Resistor 2.2 meg 1/2w 20%, R3 R5
C25229	Clock Face Mat	A19551	Socket, Power
D25189-1	Clock Timer	C25194	Speaker 5" PM
AC25192-1	Coil, Oscillator, L2	A25186	Speaker Mtg. Bracket
A20222-1D	Clip, Push on (Mtg. Clock Crystal)	AC25174-1	Speaker Baffle Assy.
A19361	Clip, Hairpin (Tuning Shaft)	A25263	Shielded Lead
A21792	Clip, Spring (IF Mtg.)	A19133	Spring (Dial Cord Tension)
C25197	Control, Volume, R4	A19124	Snap Buttons, Speaker Baffle Mtg.
A25257	Couplate, CP2	A25633	Tuning Shaft
A25264	Couplate, CP1	C21797-6	Transformer, IF, T1, T2
C25185-2	Dial Plate (All Willow Green)	A25263	Transformer, Audio Output, T3
A22941	Flapper Stud, Read Cover Mtg.		

CLOCK REPAIR AND PARTS

For the address of the Telecron service station nearest you, contact your Arvin Distributor or write to the Arvin Factory.



ELECTRICAL AND MECHANICAL SPECIFICATIONS

FREQUENCY RANGE

Broadcast 540-1600 kc
IF 455 kc

TUBES AND FUNCTIONS

6BE6 Mixer-oscillator
6BA6 I.F. AMP
6AV6 Detector — AVC-AF.
6V6 Output
5Y3 Rectifier

POWER OUTPUT

Type: Beam tube
Undistorted 3.5 Watts
Maximum 4.5 Watts

LOUD SPEAKER

Type: Permanent magnet, 2.15 oz., Alnico 5
Size: 9 x 6 inch
Voice coil impedance 3.2 Ohms

CHASSIS FEATURES

Automatic Volume Control
Built-in-Loop
Underwriter's Listed

OPERATING CONTROLS

1. Right knob Tuning and Phono-Radic
2. Left knob ON-OFF, Volume and Tone

PHYSICAL DIMENSIONS

Length 15 inches
Width 7 $\frac{5}{8}$ inches
Height 9 inches

ALIGNMENT PROCEDURE

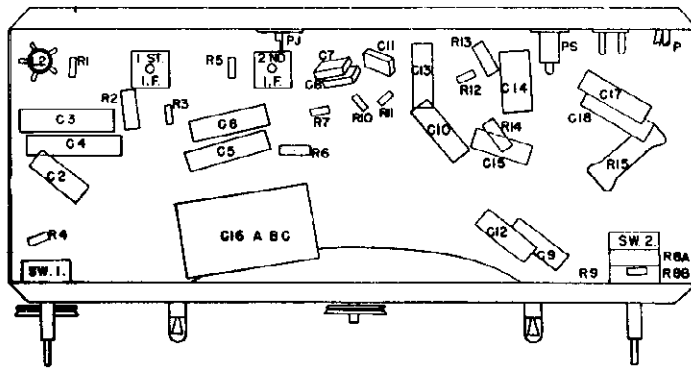
PRELIMINARY:

Output meter connection Across loudspeaker voice coil
Output meter reading to indicate .5W (standard output) 1.26 volts
Connection of generator ground lead Chassis
Generator Modulation 30% 400 cycles
Position of volume & tone control Fully clockwise
Position of dial pointer with variable fully closed To left

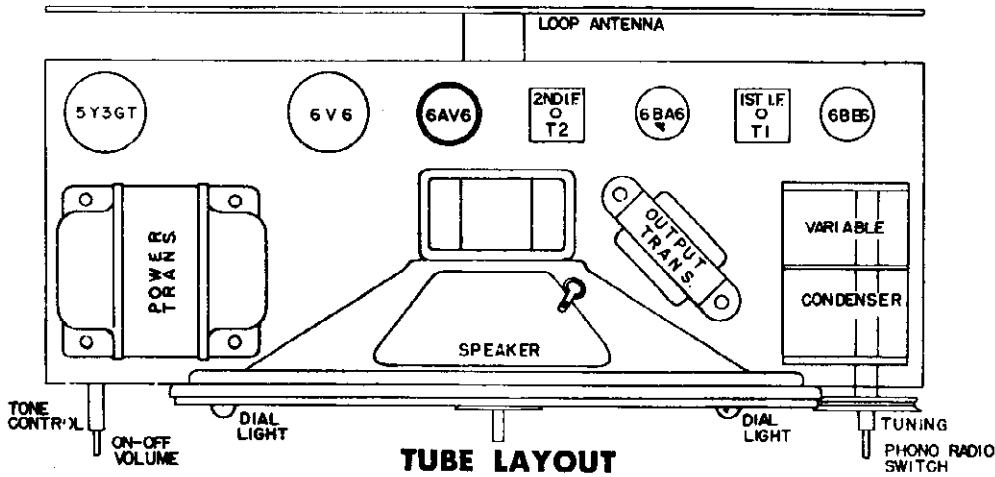
1. Connect signal generator lead through a .05 uf condenser to converter grid. Open tuning condenser. Set signal generator to 455 Kc. Tune I.F. Trimmers A1, A2, A3 and A4 for maximum output.
2. Close tuning condenser and set pointer to left. Open tuning condenser. Connect signal generator to test loop or to blue lead on set loop. Set signal generator to 1650 Kc. Tune A5 trimmer on oscillator section of tuning condenser for maximum output.
3. Set signal generator to 1400 Kc. Adjust tuning shaft until maximum output is obtained. Tune antenna trimmer A6 or tuning condenser for greatest output. Reset tuning shaft until output is again maximum. Retune antenna trimmer. Repeat this cycle of operations at 1400 Kc. until no further increase of output can be obtained. Keep generator output at a low value to prevent detuning by A.V.C. action.
4. Set signal generator to 600 Kc. Adjust tuning shaft for maximum output. Adjust tuning condenser plate for maximum output if necessary.

Approximate sensitivities with 117 V. AC line voltage and .5 W. output across voice coil should be: Antenna lead 600 Kc.—600 uv/m., 1000 Kc.—400 uv/m., 1400 Kc.—300 uv/m.

MODELS 751TB,
751TM, Ch. RE-
343



LOCATION OF PARTS UNDER CHASSIS



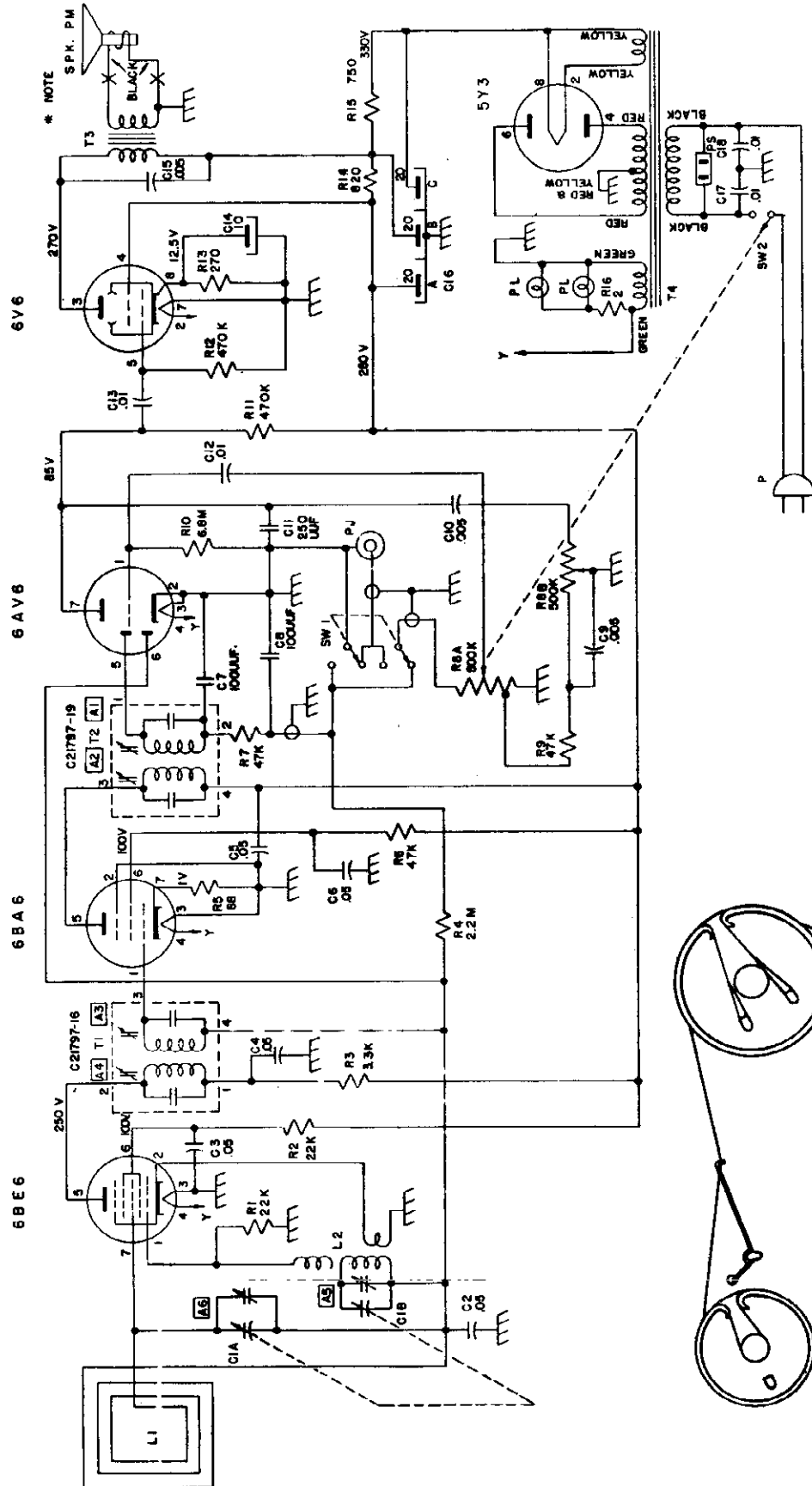
TUBE LAYOUT

HOW TO ORDER PARTS

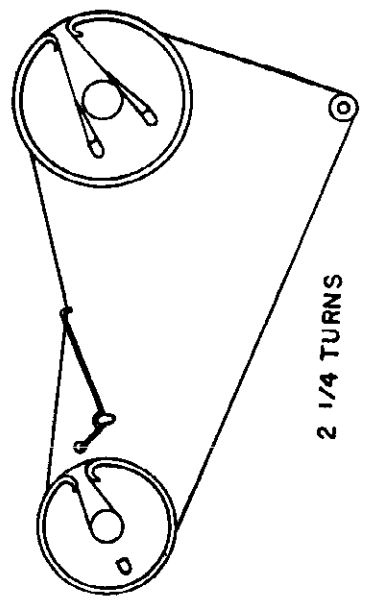
parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order direct from the factory. All prices subject to changes in accordance with O.P.S. regulations. Parts shipments are F.O.B. Columbus, Indiana.

Schematic Location	Part Number	Description	List
L1	D24777	Antenna Loop Assembly	1.50
C1A, B	C24305	Capacitor, Variable, 2 Gang with Trimmers	2.10
C2	C20067-503	Capacitor, .05 mfd. 200 V P.T.	.20
C3, C4, C5, C6	C20069-503	Capacitor, .05 mfd 600 V P.T.	.20
C7, C8	C20065-101	Capacitor, 100 mmfd, 500 V, Mica	.30
C9	C20067-502	Capacitor, .005 mfd, 200 V, P.T.	.20
C10	C20068-502	Capacitor, .005 mfd, 400 V, P.T.	.10
C11	C20065-251	Capacitor, 250 mmfd, 500 V, Mica	.20
C12, C13	C20068-103	Capacitor, .01 mfd, 400 V, P.T.	.20
C14	A22602	Capacitor, 10 mfd, 25 V, Electrolytic	.65
C15	C20069-502	Capacitor, .005 mfd, 600 V, P.T.	.10
C16A, B, C	C24415	Capacitor, 20-20-20 mfd, 450 V, Electrolytic	1.75
C17, C18	D20358-103	Capacitor, .01 mfd, 600 V, Molded	.50
L2	AC24482-1	Coil, Oscillator Assembly	.50
R8A, B	C40389	Control, Volume and Tone, Dual 500K-500K ohms	1.80
	A19132	Cord, Dial Drive	10 for .25
	D40404	Cover, Cabinet Rear, Blonde	.35
	D40404-1	Cover, Cabinet Rear, Mahogany	.35
	C24449	Dial, Pointer	.30
	E24447	Dial, Crystal	2.75
	AD40399-1	Grille, Assembly, Blonde	1.00
	AD40399-2	Grille, Assembly, Mahogany	1.00
	A24442-2	Knob, Volume, Radio-Phono	.30

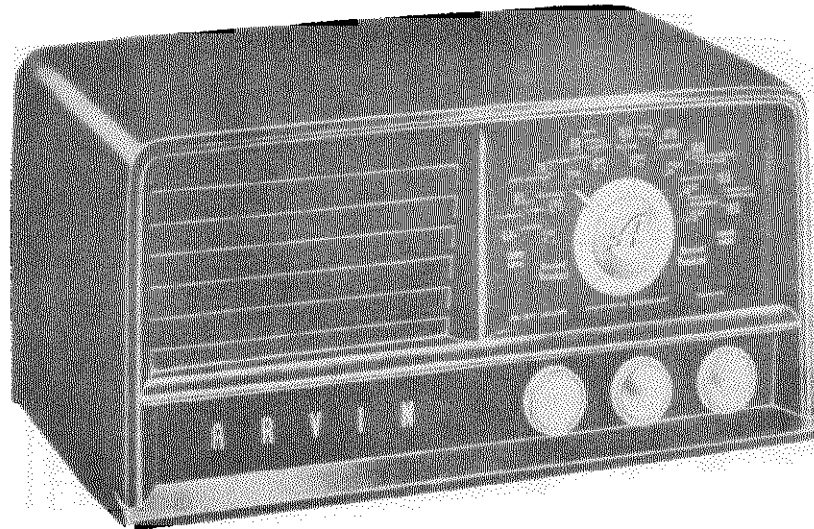
Schematic Location	Part Number	Description	List
	A24443-2	Knob, Tone, Tuning	.20
	A19351	Lamp, Dial Mazda No. 47	.20
	B20138-15	Line Cord	.75
	A19552	Phono Jack	.10
	AC24475-1	Pointer, Shaft & Bracket Ass'y.	.35
R1	C20061-223	Resistor, 22K ohm, 20% 1/2w	.10
R2	C20302-223	Resistor, 22K ohm, 10% 2w	.10
R3	C20061-332	Resistor, 3.3K ohm, 20% 1/2w	.10
R4	C20061-225	Resistor, 2.2 megohm, 20% 1/2w	.10
R5	C20061-680	Resistor, 68 ohm, 20% 1/2w	.10
R6	C20070-473	Resistor, 47K ohm, 10% 1w	.10
R7, R9	C20061-473	Resistor, 47K ohm, 20% 1/2w	.10
R10	C20061-685	Resistor, 6.8 megohm, 20% 1/2w	.10
R11, R12	C20061-474	Resistor, 470K ohm, 20% 1/2w	.10
R13	C20070-271	Resistor, 270 ohm 10% 1w	.15
	or		
	A24891	Resistor, 270 ohm 10% 1w Wire	.15
R14	C20070-821	Resistor, 820 ohm, 10% 1w	.15
R15	C23970-14	Resistor, 750 ohm 10% 5w Wire	.40
R16	A24761	Resistor, 2 ohm 10% 1/2w Wire	.10
	A24435-1	Socket, Dial Lamp, Left	.15
	A24435-2	Socket, Dial Lamp, Right	.15
	A19551	Socket, AC Phono Motor	.25
SPK	D24402	Speaker, 6" x 9" P.M.	6.10
	A24653	Spring, Dial Drive Cord	.15
SW-1	C40388	Switch, Phono-Radio	1.60
T1	C21797-16	Transformer, 1st I.F.	1.20
T2	C21797	Transformer, 2nd I.F.	1.25
T3	C24776-2	Transformer, Output	1.35
T4	D24440	Transformer, Power	3.75



K INDICATES 1000 OHMS.
 # INDICATES MEGOHMS UNMARKED CONDENSER VALUES ARE MFD.
 * NOTE * DENOTES PLUG AND SOCKET ON RES.06.
 † GROUND TO CHASSIS
 ‡ CURVED LINE INDICATES OUTSIDE FOIL.
 TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
 VOLTAGE READINGS SHOWN AT SOCKET PRINGS ARE TO CHASSIS
 AND ARE TAKEN WITH NO SIGNAL AC LINE VOLTAGE AT 117 V. AC.
 VOLTAGE MEASURED WITH VACUUM TUBE VOLTMETER.
 PJ PHONO JACK FOR PICK-UP ARM.
 P5 PHONO SOCKET FOR AC MOTOR.
 SW-1 PHONO SWITCH SHOWN IN RADIO POSITION



STRINGING DIAGRAM



SPECIFICATIONS

FREQUENCY
 Broadcast (AM) 540-1600 KC
 Shortwave (SW) 6.0-18.0 MC

POWER OUTPUT
 Undistorted 1.0 Watts
 Maximum 1.5 Watts

Speaker Voice Impedance 3.2 ohms

TUBES AND FUNCTION

12BE6 Converter
 12BA6 I.F. Amplifier
 12AV6 Det. 1st Audio
 50C5 Output
 35W4 Rectifier

OPERATING CONTROLS

1. Left Knob On-Off Switch & Volume
 2. Center Knob Shortwave-Broadcast
 3. Right Knob Tuning

PHYSICAL DIMENSIONS

Length 13³/₈ inches
 Height 6⁵/₈ inches
 Depth 7³/₈ inches

TECHNICAL INFORMATION FOR SERVICE MEN

AM Tuning range—540 Kc to 1600 Kc. Intermediate Frequency—455 Kc. I.F. and R.F. measurements made at 500 milliwatts output—approximately 1.27 volts on a rectifier type voltmeter connected across speaker voice coil. Approximately input for 500 MW output: R.F. with standard loop: at 600 Kc, 480 uv/m, at 1000 Kc, 360 uv/m; at 1400 Kc, 240 uv/m.

PRELIMINARY:

Output meter connection Across speaker voice coil
 Output meter reading to indicate 500 MW 1.27 volts
 Generator Modulation 30%, 400 cycles
 Position of volume control Fully clockwise
 Set band switch To left for AM alignment, to right for SW alignment

AM Alignment

Position of Variable	Generator Frequency	Dummy Ant.	(high) Generator Connection	Generator Connection Ground Lead	Adjust Trimmer In Order Shown For Max. Output	Trimmer Function
Open	455 Kc	.05 mfd.	Mixer Grid	Floating Grnd.	A1, A2, A3, A4,	I.F.
Open	1670 Kc		Test Loop	Test Loop	A5	Oscillator
Closed	535 Kc		Test Loop	Test Loop	A5	Osc. Pad.
1400 Kc	1400 Kc		Test Loop	Test Loop	A7	Antenna
600 Kc	600 Kc		Test Loop	Test Loop	A5	Osc. Pad.

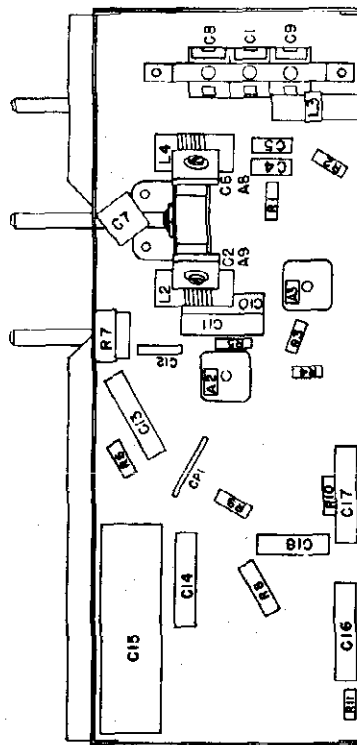
Connect generator lead to a Standard Hazeltine Test Loop, Model 1150, place two feet from the set loop, or three turns of wire about six inches in diameter, placed about one foot from the set loop.

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A.V.C. action of the receiver ineffective.

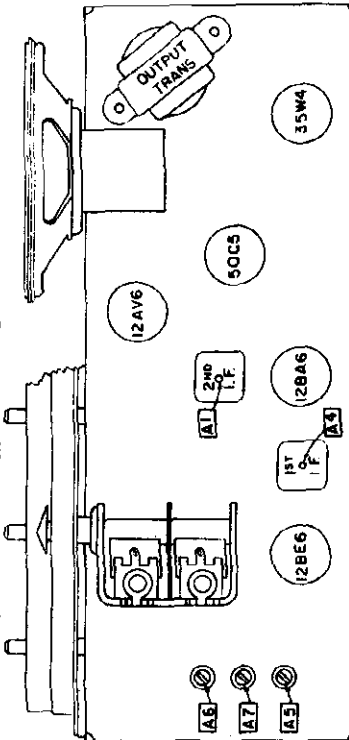
SHORT WAVE R.F. ALIGNMENT

A. Before attempting short wave alignment, the Broadcast IF Alignment procedure must be completed.

1. Turn band switch clockwise to Short Wave position.
2. Connect the Signal Generator to the antenna terminals (bank disconnected). A 50 MMF "Dummy" must be used in the "high-side" of the generator-lead and the generator "groundlead" connects directly to the ground-terminal.
3. In aligning the short wave band some trouble may be experienced with image frequencies. The image frequency is separated from the desired frequency by a 910 Kc difference. In order to identify which signal is being picked up, use the following procedure to assure the receiver oscillator is above the incoming signal:
 - a. With variable condenser completely open and the trimmer, A8, loose set the signal generator to 18 Mc. Then gradually tighten the trimmer until a signal is heard. This is the correct frequency. Now if the variable condenser is closed slightly, another signal will be picked up. This is the image frequency and must not be confused with the above desired frequency. This relationship must be maintained throughout the following balancing procedure.
 - The image frequency must always be found by closing the variable a slight amount.
4. Set generator to 6 Mc. The set must tune to maximum output slightly before variable is completely closed.
5. Set generator to 16 Mc. Rotate variable until the 16 Mc signal is heard at two points near the open position of the variable. Again the desired signal is the one with the variable open the farthest. Adjust the trimmer, A9, as for maximum output. Rotate variable very slightly for a new maximum and repeat trimmer A9. Repeat this operation until no further increase can be obtained.



LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT

HOW TO ORDER PARTS

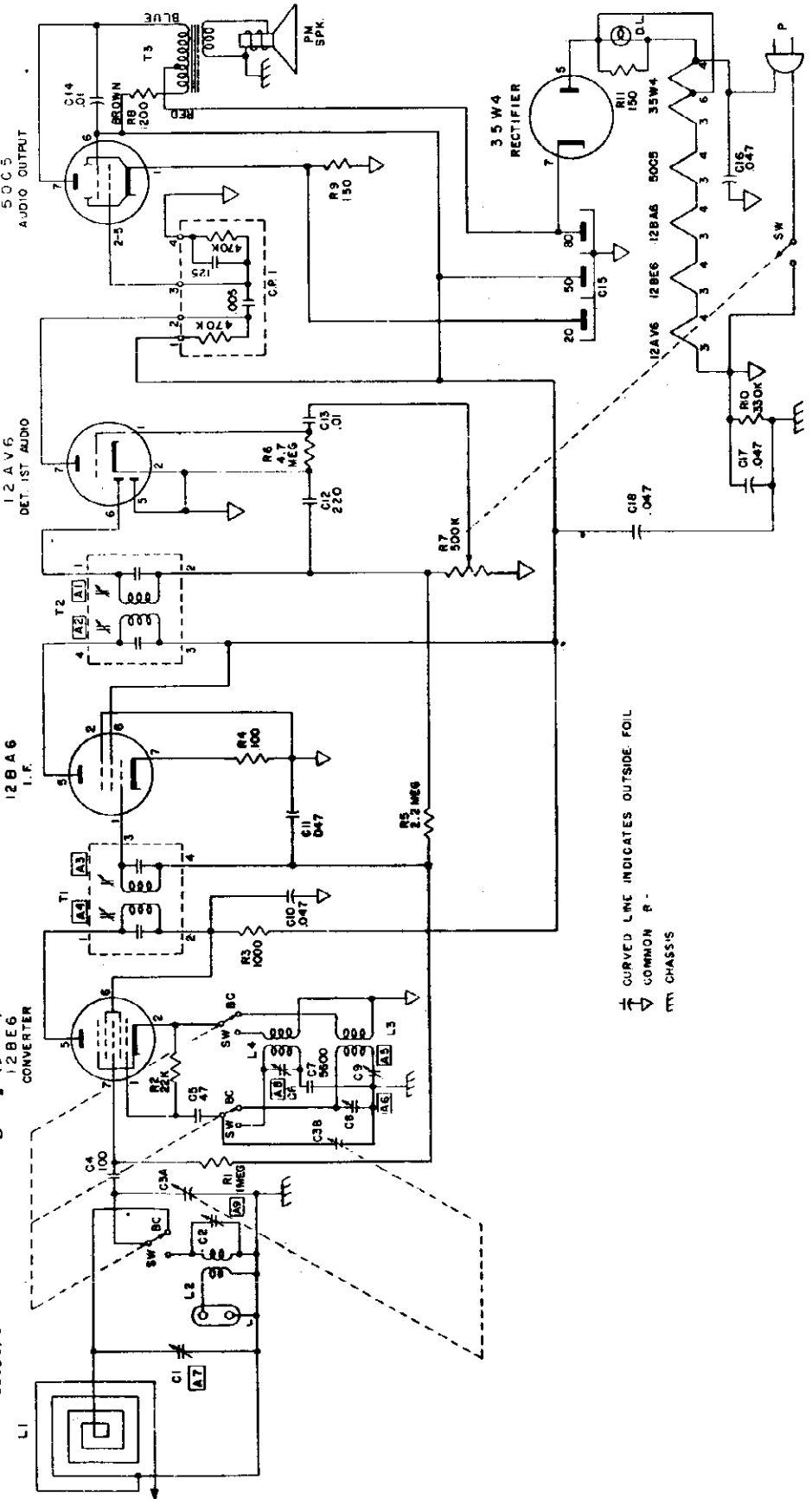
parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order direct from the factory.

Prices are subject to change without notice.

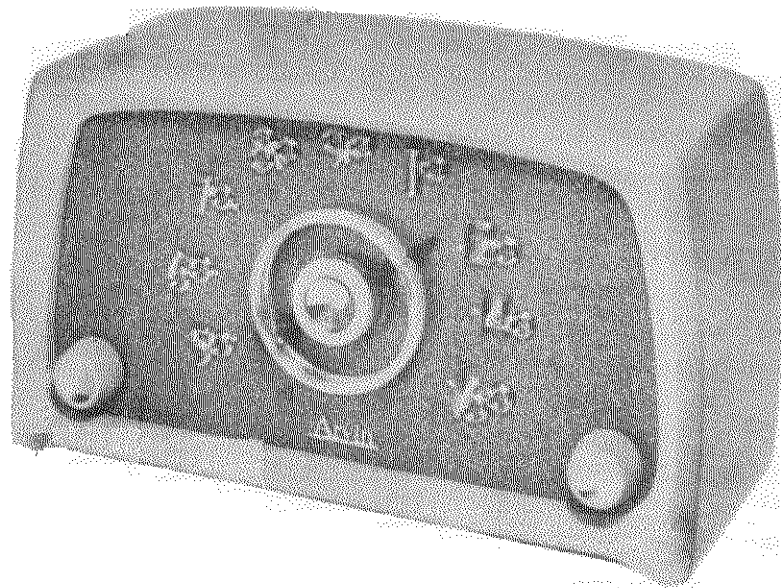
Part Number	Schematic Location	Description	List
C15	A25830	Capacitor, electrolytic	.10
C10, 11	C3A, B	Capacitor, variable	.10
C14	C1, 8, 9	Capacitor, Trimmer	.10
C16, 17, 18	Resistors		
C13	C20061-151 R9	Resistor, 150 ohm	.10
C5	C20061-101 R4	Resistor, 100 ohm	.10
C4	C20061-102 R3	Resistor, 1000 ohm	.10
C12	C20223-122 R8	Resistor, 1200 ohm 2w 10%	.20
C21, 22, 23	C20061-223 R2	Resistor, 22K ohm	.10
C24, 25, 26, 27	C20061-334 R10	Resistor, 330K ohm	.10
C28	C20061-105 R1	Resistor, 1 megohm	.10
C29	C20061-225 R5	Resistor, 2.2 megohm	.10
C30	C20061-475 R6	Resistor, 4.7 megohm	.10
C31	Cabinet		
C32	R23228-5	Cabinet, Sea-Mist	4.25
C33	C23299	Cabinet, rear cover	.25
C34	A24464-5	Knob, Sea-Mist	.25
C35	Miscellaneous		
C36	AC25843-1 L2	Antenna coil S.W.	.60

MODEL 655SWT, Ch. RE-327

Part Number	Schematic Location	Description	List
D25844	L1	Antenna loop	1.25
B22953		Antenna loop mtg. brkt.	.10
A25858		Antenna terminal board	.20
A23237		Carton	.90
C22963	R7	Control, volume & switch	.60
A25873	CP1	Couplate	.25
A19132		Dial Cord (10 for)	.25
19133		Dial Cord Spring (10 for)	2.00
A40080		Dial crystal	.20
A19351		Dial light bulb	.35
A19628-2		Dial light socket	.15
AC23302-5		Dial Plate Assembly	.10
A19361		Hairpin clip (10 for)	
A40474		I.F. Mtg. clip (5 for)	
C20138-15		Line cord & plug	.60
AC23871-1	L3	Oscillator coil B.C.	.60
AC23843-1	L4	Oscillator coil S.W.	.25
C23461-1		Pointer	.10
A19124		Snap fasteners (10 for)	.30
A20243-3		Socket, tube	.25
A20243-1		Socket, tube plain	3.40
C25756	SPK	Speaker	.10
A22941		Stud, flapper (10 for)	1.15
C25831		Switch, band	.10
C25859		Switch band mtg. brkt.	2.35
C21797-6	T1, T2	Transformer I.F.	1.25
AC23868-1	T3	Transformer, output	.90
A25832		Trimmer assembly	.15
A22957-1		Tuning shaft	.10
A25156		Tuning shaft brkt.	



CURVED LINE INDICATES OUTSIDE FOIL
 COMMON R - CHASSIS



SPECIFICATIONS

FREQUENCY RANGE

Broadcast 540-1600 kc
 IF 455 kc

TUBES AND FUNCTIONS

12BE6 Mixer-oscillator
 12BA6 IF Amp.
 12AT6 DET-AVC AF Amp.
 50C5 Output
 35W4 Rectifier

POWER SUPPLY

105-125 Volts, AC-DC, 35 Watts

POWER OUTPUT

Undistorted 1 Watt
 Maximum 1.5 Watts

LOUD SPEAKER

Type: Permanent magnet
 Size: 5 Inch
 Voice coil impedance 3.2 Ohms

CHASSIS FEATURES

Automatic Volume Control
 Built-in Loop
 Underwriters' Listed

OPERATING CONTROLS

1. Left knob ON-OFF Sw and Volume
 2. Right knob Tuning

PHYSICAL DIMENSIONS

Length 11 3/4 inches
 Height 7 inches
 Depth 6 inches

THE ANTENNA

This receiver has a built-in loop which gives satisfactory reception in most locations. If the receiver is located some distance from a broadcasting station or where the electrical interference is high, an outside antenna connected to the pickup lead on the loop will improve reception.

This receiver is designed to operate without a ground connection and no attempt should be made to use one.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection..... Across speaker voice coil
 Output meter reading to indicate 500 milliwatts (standard output) 1.27 volts
 Dummy antenna value to be used in series with generator output..... See chart below
 Connection of generator output lead See chart below
 Connection of generator ground lead..... Floating ground
 Generator modulation..... 30% 400 cycles
 Position of volume control..... Fully clockwise
 Position of dial pointer with variable fully closed..... Last mark at left end of dial

ALIGNMENT PROCEDURE

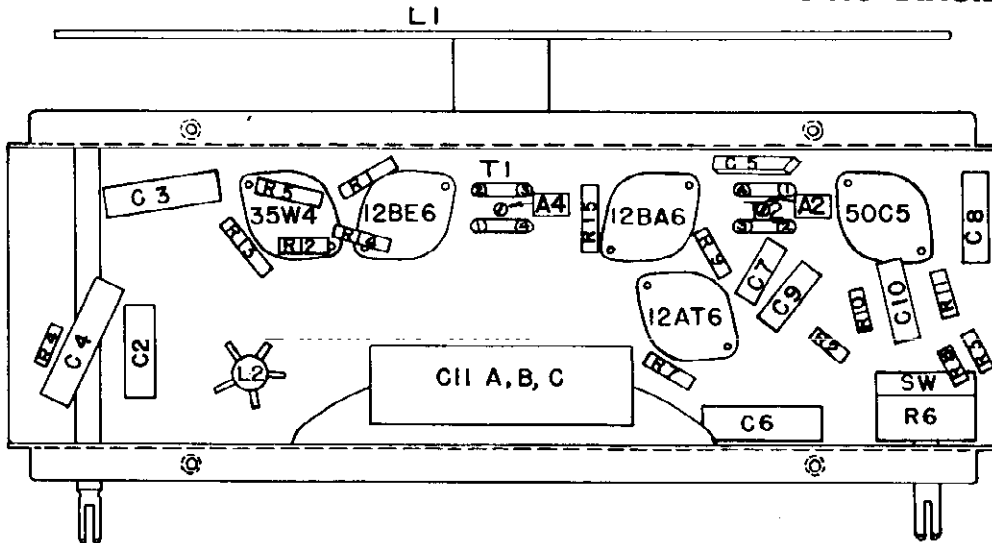
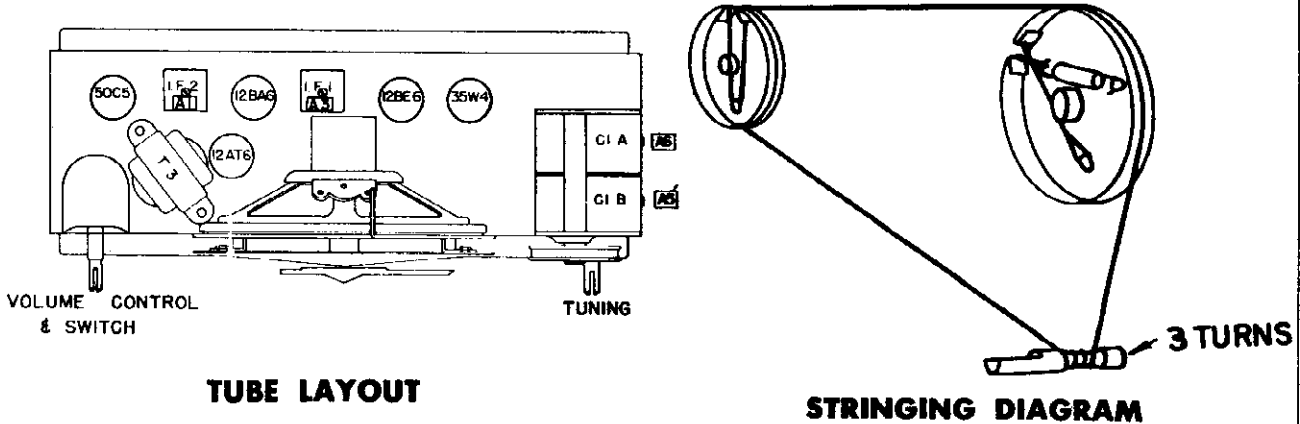
PRELIMINARY:

Output meter connection.....	Across speaker voice coil
Output meter reading to indicate 500 milliwatts (standard output).....	1.27 volts
Dummy antenna value to be used in series with generator output.....	See chart below
Connection of generator output lead.....	See chart below
Connection of generator ground lead.....	Floating ground
Generator modulation.....	30% 400 cycles
Position of volume control.....	Fully clockwise
Position of dial pointer with variable fully closed.....	Last mark at left end of dial

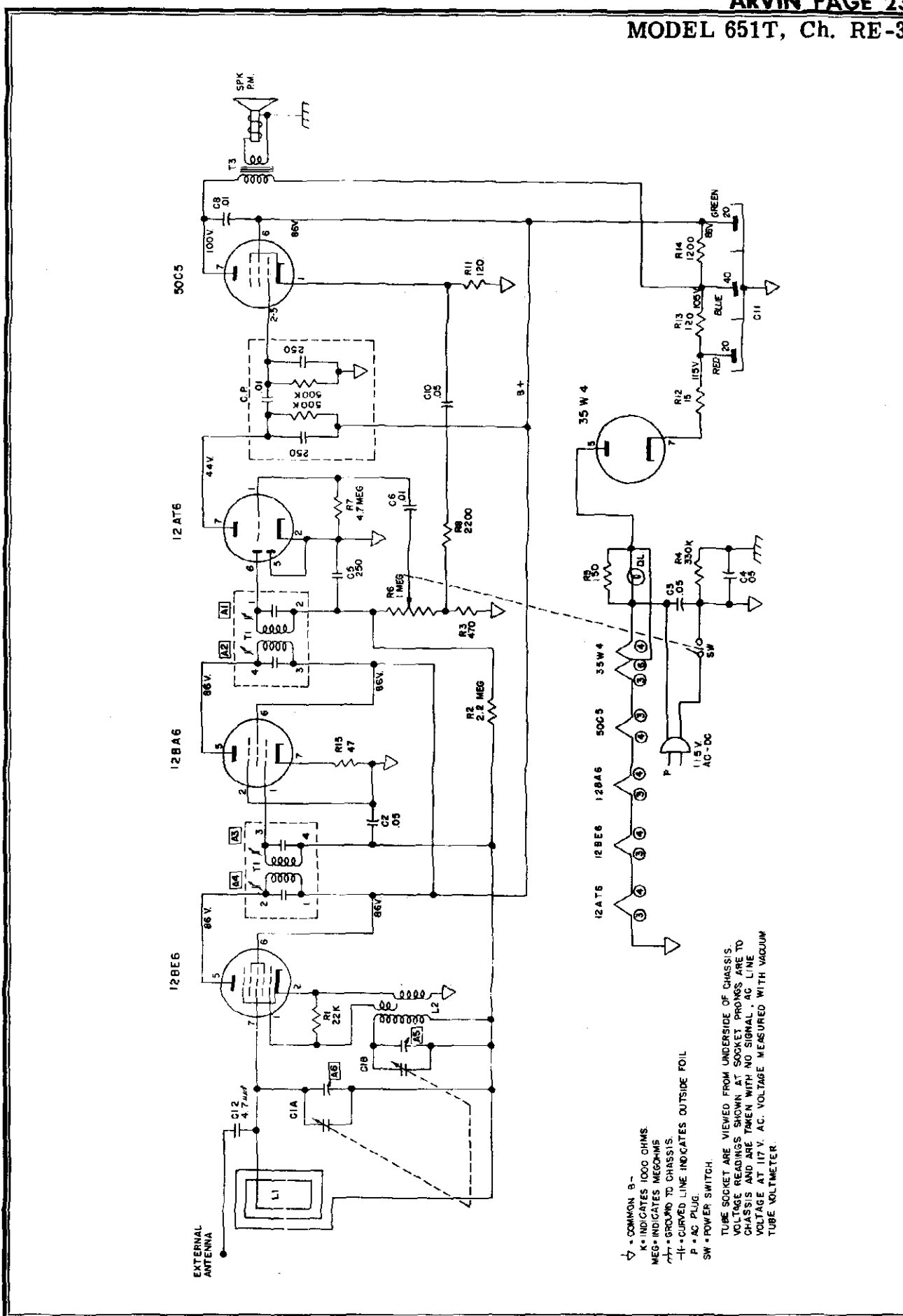
Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Function of Trimmer
Open	455	.05 mfd.	12BE6 Grid (Stator of C1A)	A1, A2, A3, A4	IF
1400	1400		*Test Loop	A5, A6 on Variable Condenser	Osc. Ant.
600	600		*Test Loop	Check Point	

*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATION OF PARTS UNDER CHASSIS



* - COMMON B+
 K - INDICATES 1000 OHMS
 MEG - INDICATES MEGOHMS
 GND - GROUND TO CHASSIS
 -|- - CURVED LINE INDICATES OUTSIDE FOIL
 P - AC PLUG
 SW - POWER SWITCH
 TUBE SOCKET ARE VIEWED FROM UNDERSIDE OF CHASSIS.
 VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS AND ARE TAKEN WITH NO SIGNAL, AC LINE VOLTAGE AT 117 V. A.C. VOLTAGE MEASURED WITH VACUUM TUBE VOLTMETER.

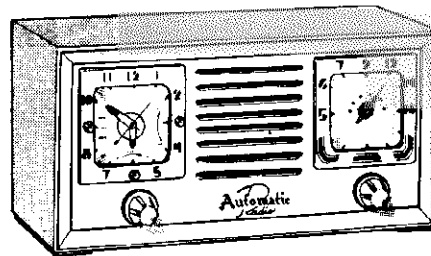
HOW TO ORDER PARTS

parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order from the factory.

Parts shipments are F.O.B. Columbus, Indiana. Prices are subject to change without notice.

REPLACEMENT PARTS LIST FOR 651T

Part Number	Schematic Location	Description	List	Part Number	Schematic Location	Description	List
Capacitors				AD25559-1			
C25569	C1, A, B	Capacitor, variable	2.25			Baffle ass'y. with cloth & numerals	3.10
C23470	C11	Capacitor, Elect. 20-40-20 150V	1.45			Ebony (Ch-gold cloth)	
C20065-251	C5	Capacitor, Mica 250 mmf. 500V	.15	AD25559-3		Baffle ass'y. with cloth & numerals	3.10
C20067-503	C2, C10	Capacitor, paper tubular, .05 mf. 200 V	.20			California Tan (Mahogany—gold cloth)	
C20068-503	C3, C4	Capacitor, paper tubular, .05 mf. 400V	.20	A25558-1		Knobs, ivory	.30
C20068-103	C6, C8	Capacitor, paper tubular, .01 mf. 400V	.20	A25558-2		Knobs, willow green	.30
A20238-6	C12	Capacitor, 4.7 mmf.	.10	A25558-3		Knobs, California Tan	.30
A24084	C.P.	Couplate	.50	A25558-4		Knobs, Ebony	.50
Resistors				D25579		Numerals Dial (Specify Number)	.25
C20061-223	R1	Resistor, 22 K ½W. 20%	.10	D25556-1		Pointer, Ivory	1.50
C20061-225	R2	Resistor, 2.2 meg. ½W. 20%	.10	D25556-2		Pointer, Willow Green	1.50
C20061-471	R3	Resistor, 470 ½W. 20%	.10	D25556-3		Pointer, California Tan	1.50
C20061-334	R4	Resistor, 330K ½W. 20%	.10	D25556-4		Pointer, Ebony	1.50
C20061-151	R5	Resistor, 150 ½ W. 20%	.10	Misc.			
C20120-121	R11	Resistor, 120 ½W. 10%	.10	D25572	L1	Antenna loop & rear cover	1.50
C20061-150	R12	Resistor, 15 ½W. 10%	.10	B23456		Antenna loop mtg. brkt.	.10
C20070-121	R13	Resistor, 120 1W. 10%	.10	E25565		Carton & filler	.75
C20070-122	R14	Resistor, 1200 1W. 10%	.10	AC24210-1	L2	Coil, Oscillator	.60
C20061-470	R15	Resistor, 47 ½W. 20%	.10	C20138-16		Cord, line	.45
C20061-475	R7	Resistor, 4.7 meg. ½W. 20%	.10	A19351		Dial light bulb No. 47	.20
C20061-222	R8	Resistor, 2200 ½W. 20%	.10	A25481-2		Dial light socket	.35
Cabinet parts				A20243-3		Socket, wafer, center pin shielded	.15
A25579-1		Arvin Name	.20	A20243-1		Socket, wafer, plain	.15
R25546-1		Cabinet, Ivory	4.20	C23467		Speaker 5"	3.00
R25546-2		Cabinet, Willow Green	4.20	AD25574-1		Speaker brkt. & pointer shaft ass'y.	1.15
R25546-3		Cabinet, California Tan	4.20	A40474		Spring clip mtg. I.F. transf. (5 for)	.10
R25546-4		Cabinet, Ebony	4.20	C21797-16	T1, T2	Transformer I.F.	1.20
AD25559-1		Baffle ass'y. with cloth & numerals	3.10	A19361		Tuning shaft hair pin clip (10 for)	.15
		Ivory (Ch—gold cloth)		AC23464-1	T3	Transformer output	1.25
AD25559-2		Baffle ass'y. with cloth & numerals	3.10	C25576	R6	Volume control 1 meg. ¼W. 20%	1.00
		Willow Green (green—gold cloth)		A25575		Tuning shaft	.30



ELECTRICAL SPECIFICATIONS

Power Supply	115 to 125 volts 60 cycles AC only	This receiver contains the following tubes:
Frequency Range	538 to 1650 KC	1-12BE6 .....Mixer
Speaker .....	.5 inch PM	1-12BA6 .....I.F. Amplifier
Power Output	1.5 watts maximum	1-12AT6 .....Detector-AVC-1st Audio
		1-50C5 .....Power Output
		1-35W4 .....Rectifier

SERVICE NOTES

Voltages taken from different parts of the circuit to the common ground above chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a voltmeter having a resistance of 20,000 ohms per volt. These voltages are shown on the voltage chart on the back of this sheet. All voltages should be measured with an input voltage of 118 volts AC only. To check for open bypass condensers, shunt each condenser with a known good condenser of the same capacity and voltage rating.

ALIGNING INSTRUCTIONS

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other components, such as tubes, resistors, condensers, etc., are normal before proceeding with re-alignment. If re-alignment is necessary follow the instructions given below under the heading "Alignment Procedure." After the re-alignment has been completed, repeat the procedure as a final check.

To remove the chassis for servicing, remove the three chassis screws from the bottom of the cabinet and remove the cabinet back, volume control knob and tuning knob. Remove the bracket securing the clock to the cabinet and slide out the chassis and clock.

ALIGNMENT PROCEDURE

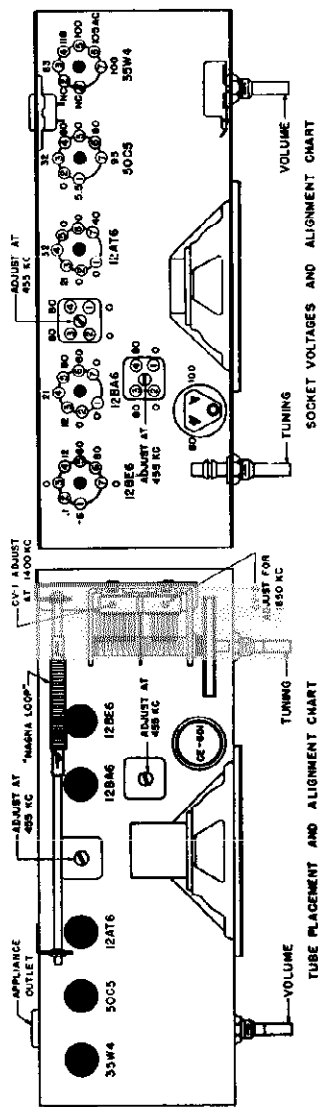
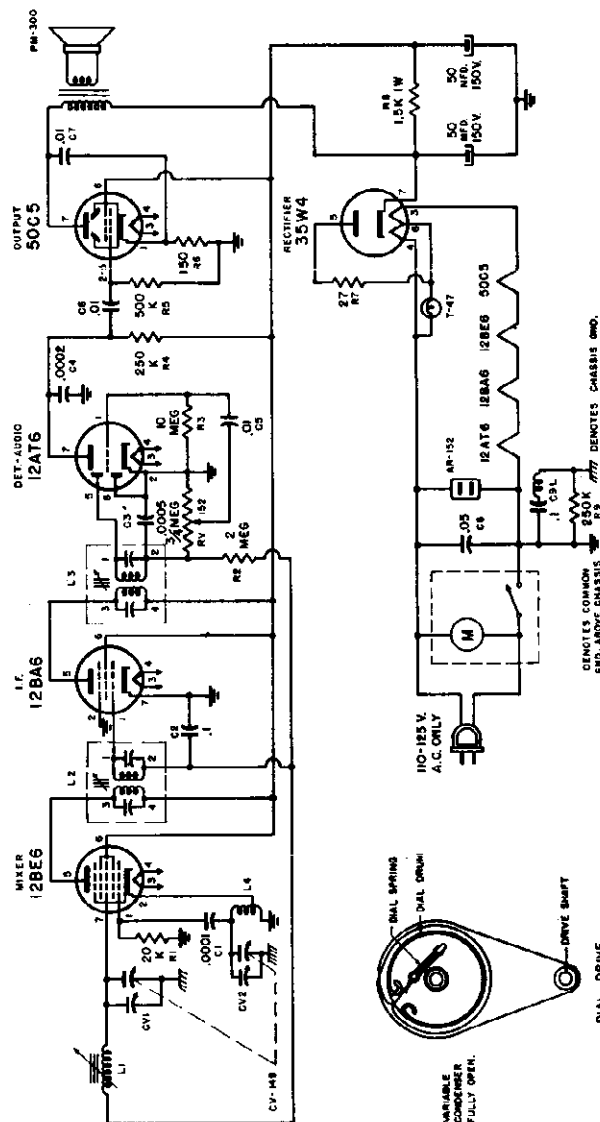
Volume Control — Maximum, all adjustments.
 No signal applied to antenna.
 Power Input — 115 to 125 volts, 60 cycle AC.
 Connect dummy antenna in series with output lead of signal generator.
 Connect ground lead of signal generator to common ground above chassis.
 Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
 Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
 Non-metallic screwdriver.
 Output meter.
 Dummy antenna — .1 MFD condenser.
 For alignment points refer to Schematic Diagram

Dial Setting	Generator Frequency	Dummy Antenna	Generator Connection	Trimmer Reference	Trimmer Adjustment	Trimmer Function
1. Fully open	455 KC	.1 MFD	12BE6 Grid	L3 Top & Bot.	Maximum	Output I.F.
2. Fully open	455 KC	.1 MFD	12BE6 Grid	L2 Top & Bot.	Maximum	Input I.F.
3. Fully open	1650 KC	.1 MFD	12BE6 Grid	CV2	Maximum	Oscillator
4. Tune in signal from generator	1400 KC		Loosely couple signal generator to "Magna Loop"	CV1	Maximum	Antenna R.F. Trimmer

PARTS LIST

Schematic Diagram Reference	Part No.	Description	List Price
CONDENSERS			
C1	CC200	100 MMFD Ceramic	.25
C2	1 MFD	400 volt	.35
C3	CC500	500 MMFD Ceramic	.25
C4	CC201	200 MMFD Ceramic	.25
C5	C6, C7	.01 600 volt	.30
C8	C206	.05 400 volt	.35
C9L	C14L	1 MFD 400 volt con-denser-choke assbly. electrolytic	.50
CE-601	OE-601-U	Dual 50 MFD 150 volt	2.50
CV1, CV2	CV-149	2 section variable	2.75
RESISTORS			
R1	R306	20 K ohm ½ watt 20%	.10
R2	R310	2 megohm ½ watt 20%	.10
R3	R311	10 megohm ½ watt 20%	.10
R4, R9	R307	250 K ohm ½ watt 20%	.10
R5	R308	500 K ohm ½ watt 20%	.10
R6	R320	150 ohm ½ watt 20%	.10
R7	R321	27 ohm ½ watt 20%	.10
R8	R314	1.5 K ohm 1 watt 20%	.20
RV-152	RV-152	¼ megohm volume control	1.00
COILS AND TRANSFORMERS			
L1	L-A51	Magna-Loop Antenna Coil	1.50
L2	1655-16	1st I.F. Transformer	2.00
L3	1655-16	2nd I.F. Transformer	2.00
L4	L201	R.F. Oscillator Coil	1.00
MISCELLANEOUS			
T-47	T-47	Pilot Light	.15
FM-300	FM-300	Speaker, 5" PM, includes Output Transformer	6.40
H-152B	H-152B	Blond Cabinet	10.50
H-152M	H-152M	Manogany Cabinet	9.50
H-164B	H-164B	De Luxe Blond Cabinet	12.00
H-101	H-101	Knob	.20
M	C57G27	Electric Clock	9.00
M	C57G84	Electric Clock	10.00
AR-152	AR-152	Appliance Socket	.40
DIAL PARTS			
H-102	H-102	Dial Pointer	.35
H-103	H-103	Dial Pulley	.05
H-152	H-152	Dial Window String, Dial Drive Spring, Dial Drive	.80
H-104	H-104	String, Dial Drive	.05
H-105	H-105	String Tension	.10



SOCKET VOLTAGES AND ALIGNMENT CHART

TUBE PLACEMENT AND ALIGNMENT CHART

Model 753F—"The Cascade"—Cherry Cabinet
 Model 753M—"The Marion"—Mahogany Cabinet
 Model 753W—"The Bedford"—Blond Oak Cabinet

SPECIFICATIONS

POWER REQUIREMENTS:

105-120 volts, 60 cycles A.C. only

POWER CONSUMPTION:

Radio and Clock—35 Watts
 Appliance outlet may be used for any electrical appliance rated at 1100 Watts or less.

RADIO I.F. FREQUENCY:

455 KC

RADIO TUNING RANGE:

540-1620 KC

MAXIMUM POWER OUTPUT:

1 Watt undistorted

LOUDSPEAKER:

4" PM

TUBE COMPLEMENT:

V1 12BE6 Converter

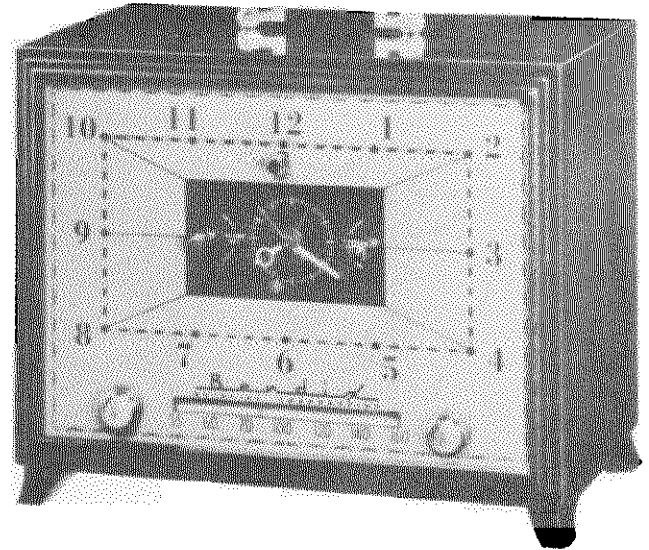
V2 12BA6 I.F. Amplifier

V3 12AT6 Demodulator, AVC, and
 1st Audio Amplifier

V4 50C5 Audio Output

V5 35W4 Rectifier

Special Switch Permits Use of Automatically Controlled Appliance Outlet without Turning on Radio.



Realizing the importance of prompt dissemination of service information to the field, this first in a series of newsletters is released. We suggest that the information furnished in this and subsequent releases be passed on to your dealers and service organizations to assist them in their service problems on our products. These releases will, if properly filed, serve a ready reference for your future use.

Model 753 Clock Radio

If set remains on regardless of position of Off-Auto-On switch, check to see that production jumper is still connected across the lines to this switch. The jumper must be removed for proper switch operation.

Failure of oscillator, when receiver is tuned to the low end of the band, may be corrected by substituting a lead 6 3/4" in length for the original one connecting pin #7 of the 12BE6 to the antenna section of the gang condenser. Sets involved will only be those with serial numbers from 10,001 to 11,550.

Switch Adjustment for the Clock Radio

When this switch fails to operate in the "Auto" or "On" position it can be adjusted in the following manner.

1. Locate the slotted adjusting screw which is on the back of the clock just to the left of the lower mounting bolt for the switch assembly.
2. With a small screw driver turn this screw in the clockwise direction approximately 3/4 of a turn. (Take precautions not to over adjust this screw, to do so will not permit the switch to operate in the "Off" position)

CAUTION: For any further adjustments or repairs to the clock mechanism it will be necessary to disassemble the clock from the radio completely and send it to the nearest Sessions clock repair station. Information concerning the repair stations locations may be obtained from the Bendix distributor.

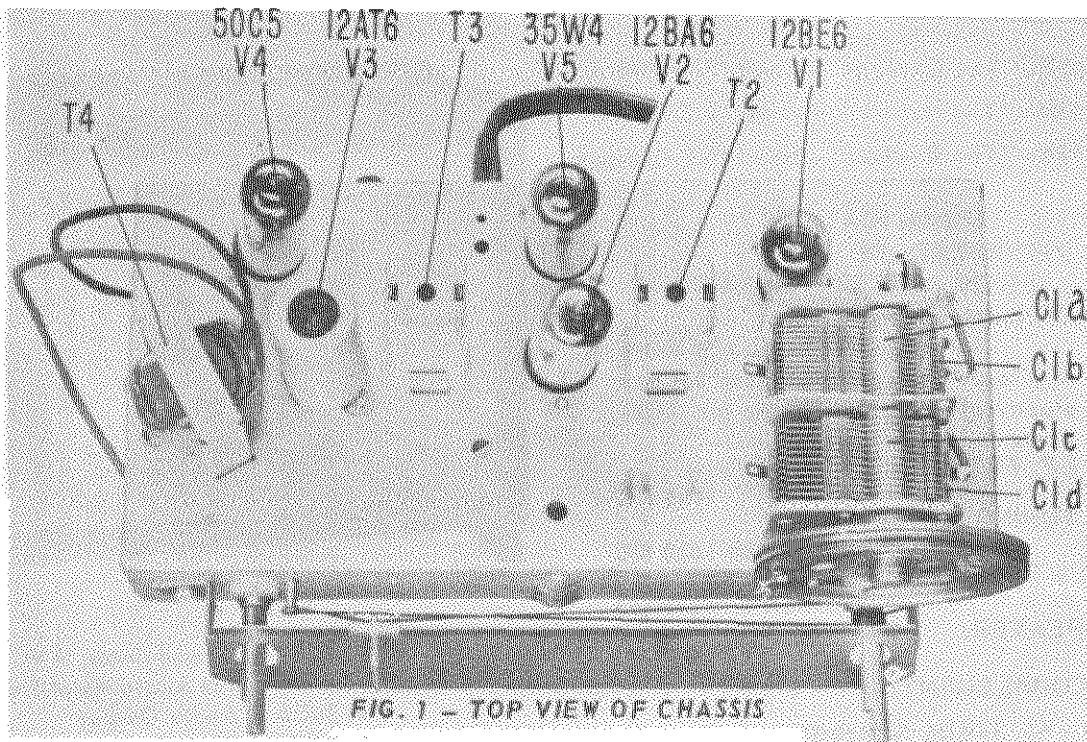


FIG. 1 - TOP VIEW OF CHASSIS

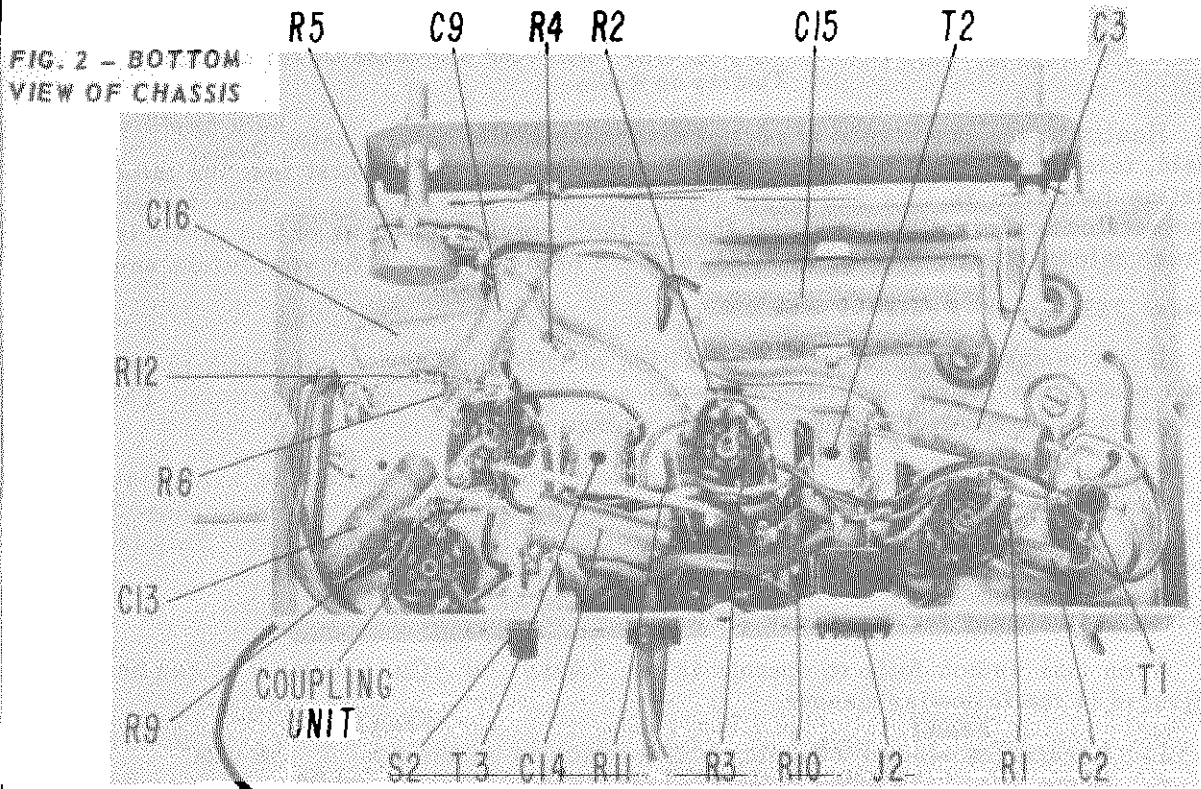


FIG. 2 - BOTTOM VIEW OF CHASSIS

Removal of the Clock and Switch Assembly

1. Remove the two top screws from the cabinet back.
2. Unscrew the four chassis bolts and take the radio from the cabinet.
3. Remove the clock mounting board by turning the four clip springs around the outer edge in either direction with a screw driver until they are free from the grooves in the top and sides of the cabinet. (Since this mounting board also holds the dial glass in place precautions must be taken to prevent it from falling and breaking.)

4. The clock is dismantled from the mounting board by turning the four clip springs located around the inside opening with a screw driver until they are free from the clock face.
5. Unsolder the three leads (Brown, Black and Blue) from the radio.
6. Securely pack the assembly for shipment to the nearest Sessions clock repair station.
7. In order to reassemble the clock in the radio cabinet, just reverse the procedure outlined above making sure that the three leads are fed through the mounting board before they are connected to their respective points within the radio chassis.

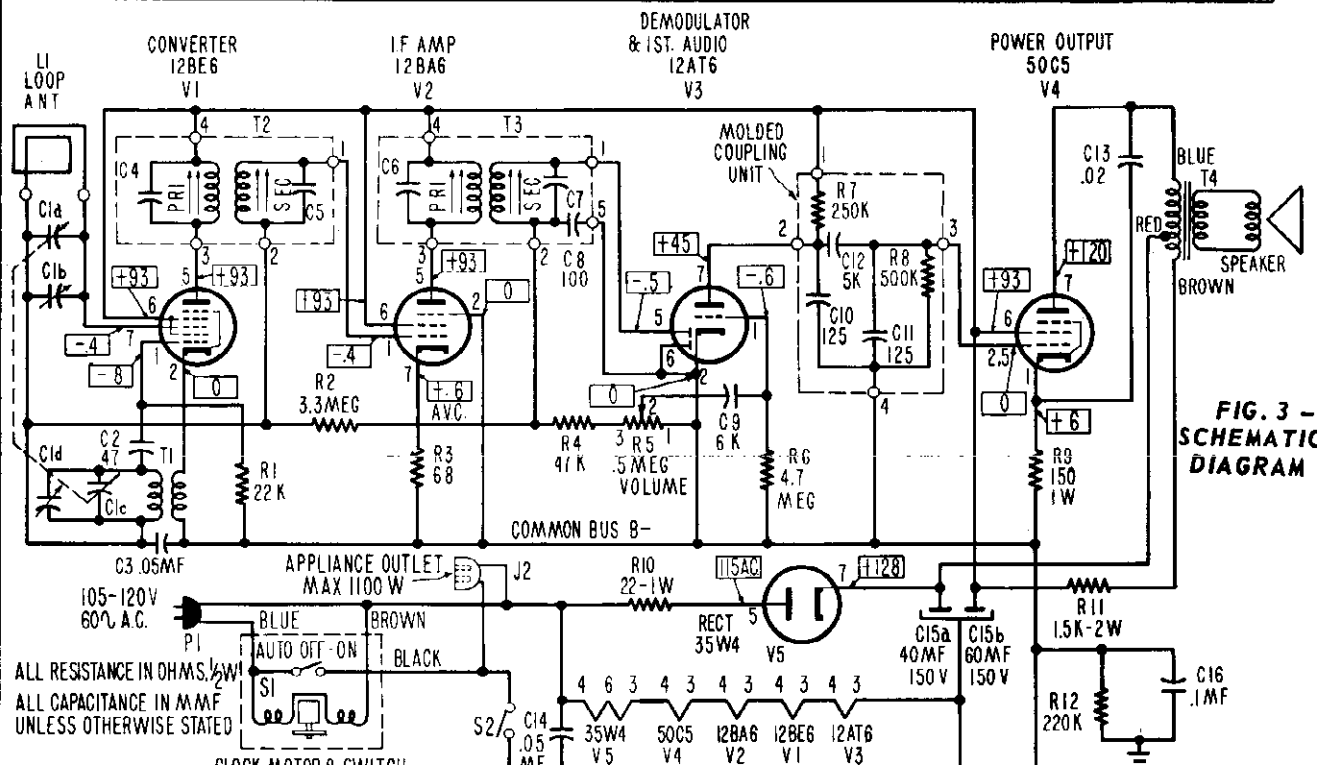
ALIGNMENT PROCEDURE

An isolation transformer should be used between the AC power line and the receiver for protection of any test equipment that must be operated from the same power line.

Volume control should be set at maximum position. Keep output of signal generator as low as practical at all times and make adjustments with an insulated alignment screw driver.

Tune tuning gang fully closed and set pointer

Signal Generator Coupling	Signal Generator Frequency	Dial Setting	Connect	Adjust	Remarks
High side through .01 to pin 7 (Grid) of 12BE6 Low side to B-	455KC	Max. to right	Output Meter across voice coil	T3, T2	Adjust in order given for max. meter reading
A loop fashioned of several turns of wire radiating the signal into the receivers antenna	1640	To the correct dial marking See Fig. 4	Same	C1d	Adjust for max. meter reading
Same	1475	To correct dial marking See Fig. 4	Same	C1b	Adjust for max. meter reading



MODELS 753F, 753M, 753W



FIG. 4 - DIAL BACK PLATE REFERENCE MARKS

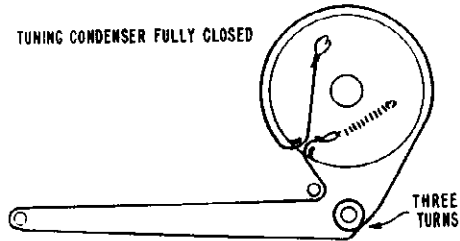


FIG. 5 - DIAL CORD DIAGRAM

PARTS LIST

ELECTRICAL COMPONENTS

PART NUMBER	SYMBOL NUMBER	DESCRIPTION	LIST PRICE
RC23A223M	R1	RESISTOR-Comp. 22K 1/2W ±20%	.10
RC23A335M	R2	RESISTOR-Comp. 3.3 Meg 1/2W ±20%	.10
RC23A680M	R3	RESISTOR-Comp. 68 ohms 1/2W ±20%	.10
RC23A473M	R4	RESISTOR-Comp. 47K 1/2W ±20%	.10
CH262022-5	R5	POTENTIOMETER-.5 Meg 1/4W ±30%, Volume	.80
RC23A475M	R6	RESISTOR-Comp. 4.7 Meg 1/2W ±20%	.15
RC24A151K	R9	RESISTOR-Comp. 150 ohms 1W ±10%	.15
RC24A220M	R10	RESISTOR-Comp. 22 ohms 1W ±20%	.15
RC25A152M	R11	RESISTOR-Comp. 1.5K 2W ±20%	.20
CH274249-1	R7	250K 1/5W	.54
	R8	MOLDED COUPLING UNIT-500K 1/5W	
	C10, C11, C12	-125 mmf 5K	
LH260016	C1a, b, c, d	CAPACITOR-Variable	2.70
CM22A470M	C2	CAPACITOR-Mica 47 mmf ±20% 500V	.25
CH267001-503	C3, 14	CAPACITOR-Tub. Paper .05 mfd ±20% 400V	.29
CH267003-602	C9	CAPACITOR-Tub. Paper .006 mfd +40% -20% 600V	.24
CH267001-203	C13	CAPACITOR-Tub. Paper .02 mfd ±20% 400V	.26
CH267013-2	C15a, b	CAPACITOR-Electrolytic (40-60, 150V)	1.20
CH267001-104	C16	CAPACITOR-Tub. Paper .1 mfd ±20% 400V	.38
LH259151-1	T1	TRANS. ASSY.-Oscillator	.83
CH259038-1	T2, C4, 5	TRANS.-I.F. Input	1.42
LH259152-1	T3, C6, 7, 8	TRANS.-I.F. Output	1.56
LH265062-1	T4	TRANS.-Audio Output	1.89
NH274248		TIMER ASSY.-Sessions Clock Co.	7.50
CH268910-6	P1	CORD-Power (#16 wire)	.70
LH251234-1		BACK & LOOP ASSEMBLY	1.20
LH256017-3		SPEAKER-4" PM	4.00
CH270629-1		POINTER	.15
AH266055	J2	RECEPTACLE-2 contacts "Appliance Outlet"	.29
AH258033	S2	SWITCH-Slide - S.P.S.T. "Radio Off-On"	.21

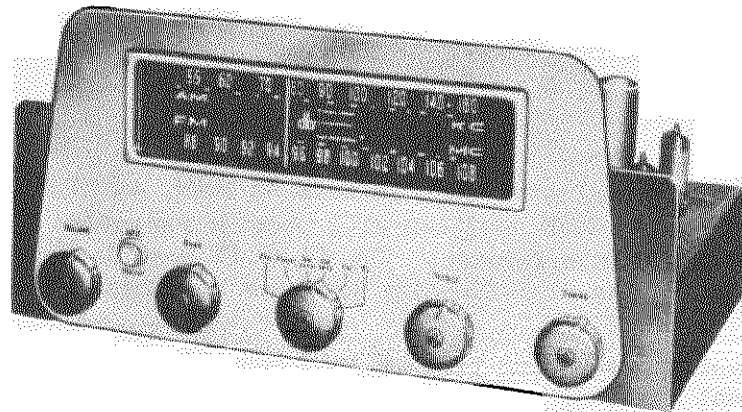
CABINET COMPONENTS

PART NUMBER	753M	753W	753F	DESCRIPTION	LIST PRICE
LH257636-1	X	X	X	DIAL-Glass	2.50
CH269081-1	X	X	X	KNOB-Clock Controls	.29
LH269082-1	X	X	X	KNOB-Radio Controls	.28
RH255122-1	X			CABINET-Mahogany	8.10
RH255122-3		X		CABINET-Blond	8.55
RH255122-4			X	CABINET-Cherry Wood	8.55

TUBES

	LIST PRICE		LIST PRICE
V1 12BE6	1.90	V4 50C5	2.00
V2 12BA6	1.90	V5 35W4	1.30
V3 12AT6	1.55		

ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

MODEL R70:
AM-FM Tuner

R701 SPECIFICATIONS

POWER CONSUMPTION: 60 watts, 117 volts, 60 cps.	PHONO PREAMPLIFIER: 35 db gain and 21 db equalization at 30 cycle
TUBES: 1-6BK7-A, 1-6AS4, 4-12AT7, 2-6BA6, 1-6BE6, 3-6AU6, 1-6AL5, 1-6X4 (14 tubes including rectifier).	AM SELECTIVITY: Normal: at 8 KC: 6 db. Hi-Fi: at 15 KC: 6 db.
SENSITIVITY: FM: Input required for 30 db quieting: 3 microvolts. AM: 5 microvolts.	FM SELECTIVITY: 180 KC: 6 db. Discrimination peak to peak separation: 375 KC.
FREQUENCY RANGE: FM: 88-108 MC. AM: 530-1650 KC.	ANTENNA INPUT: AM: Low impedance loop or high impedance external antenna. FM: 300 ohms.
HUM & NOISE: FM, AM: -65 db below 100% modulation. TV, PHONO: -65 db below 2 volts.	CONTROLS: 1. Volume, 2. Bass, 3. Function Switch (Off, phono, AM normal, AM Hi-Fi, FM, TV), 4. Treble, 5. Tuning.
AUDIO OUTPUT: 3 volts at 6000 ohms.	FM DRIFT: ± 20 KC with AFC defeated. ± 3 KC with AFC in.
DISTORTION: 3 volts at .2%.	SIZE: 15" x 8 1/2" x 9".
TONE CONTROL: At 60 cycles: 17 db boost, 19 db cut. At 10,000 cycles: 15 db boost, 18 db cut. At 15,000 cycles: 17 db boost, 21 db cut.	SHIPPING WEIGHT: 17 lbs.
FREQUENCY RESPONSE: FM: 20-20,000 cps $\pm .5$ db. AM: 20-4,000 cps $\pm .5$ db normal position. 20-7,500 cps $\pm .5$ db Hi-Fi position.	

CONNECTIONS: All connections are made at the rear of the chassis.

Power input: AC power is supplied to the tuner through the attached line cord. Plug this cord into an AC receptacle.

AC power output: The two AC receptacles are supplied with AC power when the tuner is turned on. By plugging other units of the reproducing system into these receptacles, power control can be centralized.

Antenna: All antenna connections are made to the numbered terminal strip. In areas of normal signal strength a loop antenna, made from the cable supplied with the tuner, will provide good reception with low noise on both the AM and FM bands. Tack the cable around the rear of the cabinet to form a single or double turn loop of the largest possible cross-sectional area. Connect the two lead lugs to terminals 1 and 4, and the shorting jumper between terminals 2 and 3.

In areas where FM signals are weak, an outdoor FM antenna may be used in conjunction with the indoor loop for AM. Connect an FM antenna to terminals 1 and 2, the shorting jumper between terminals 2 and 3, and the loop to terminals 3 and 4.

In AM fringe areas an external antenna may be used to increase AM sensitivity. Connect the AM antenna to terminal 4, disconnect the jumper from terminals 2 and 3, and connect the FM antenna to terminals 1 and 2.

Audio input: The signals from a TV set and a record player can be connected to the tuner at the jacks marked TV and PHONO. When the connections are made, the signal to be delivered to the amplifier is selected by the control knob on the front of the chassis.

Audio output: The amplifier used with the tuner is to be connected to the jack marked OUTPUT. The output of the tuner may be simultaneously recorded without affecting the operation of the amplifier by connecting a recorder to the DETECTOR jack. In order to reduce the possibility of hum pickup, the connections to the tuner should be made with single conductor shielded wire, not exceeding 7 feet in length.

CONTROLS: **Selector:** Turning the selector knob from OFF to PHONO:

- 1) Supplies power to the A.C. receptacles on the rear of the chassis.
- 2) Supplies power to warm up the tuner tubes.
- 3) Supplies signal from the record player to the OUTPUT and DETECTOR jacks.

**MODEL R701,
AM-FM Tuner**

Further movement of the selector knob selects AM NORM, AM HI-FI, FM, and TV. For most programs the AM NORM position will provide reception with a minimum of background noise and interference. The AM HI-FI position enables the listener to take full advantage of the high-fidelity programs broadcast by some AM stations.

AFC DEFEAT: If, while attempting to tune in a weak FM station, the tuner "jumps" to a stronger adjacent station, hold down the pushbutton marked AFC DEFEAT, located on the front of the chassis. This will disconnect the Automatic Frequency Control and permit tuning of the weak station. Release the button when the station is tuned in. The AFC will then center the station and hold it in tune.

If recordings are being made, it is recommended that the tuner be adjusted to the exact frequency of the station being recorded. This may be accomplished by defeating the AFC as described above, tuning the station to its exact frequency, and releasing the AFC DEFEAT pushbutton.

PREAMPLIFIER: A preamplifier is included in the Model R701 to supply the additional amplification and equalization needed when a magnetic type phono pickup, such as the G.E. cartridge is used. Since the preamplifier is not required when the phono pickup is a crystal type, it can be disconnected by the switch at the rear of the chassis. Place this switch in the MAG position when using a magnetic pickup, and in the CRYST position when using a crystal pickup.

SERVICE: The tuner should not require any service other than a periodic check of vacuum tubes. The critical adjustments all have a high degree of stability over long periods of time and should not be tampered with. The adjustment of a modern high fidelity receiver such as the R701 should be made by competent, experienced personnel with proper visual alignment equipment. Ordinary meters or aural methods are in general unsatisfactory for alignment.

VOLTAGE CHART

TUBE	FUNCTION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
6BK7A	FM RF	95	0	.7	0	6.3 AC	95	0	0	0
6AB6	FM MIXER	95	0	6.3 AC	0	0	.8 *	0	-	-
12AT7	FM OSC & AFC	92	-1 *	0	6.3 AC	6.3 AC	96	0	1	-
6BA6	AM RF	-.7	0	6.3 AC	0	75	75	0	-	-
6BE6	AM MIXER	-.9	0	6.3 AC	0	75	75	.7	-	-
6BA6	1st IF	-.7	0	6.3 AC	0	68	68	0	-	-
6AU6	2nd IF	0	0	6.3 AC	0	86	86	5.5	-	-
6AU6	1st LIM	-.5	0	6.3 AC	0	30	30	0	-	-
6AU6	2nd LIM	-1.5	0	6.3 AC	0	25	25	0	-	-
6AT5	DISCRIMINATOR	-.5	-3	6.3 AC	0	0	0	-.4	-	-
12AT7	AM DETECTOR	-.6	-.6	0	6.3 AC	6.3 AC	150	12	16	0
12AT7	AUDIO AMP	83	20	30	6.3 AC	6.3 AC	150	30	55	0
12AT7	PHONO PREAMP	52	0	.9	6.3 AC	6.3 AC	13	-.5	0	0
6X4	RECT	220 AC	-	6.3 AC	0	3.5 AC	220 AC	220	-	-

Switch in AM position

Switch in AM position

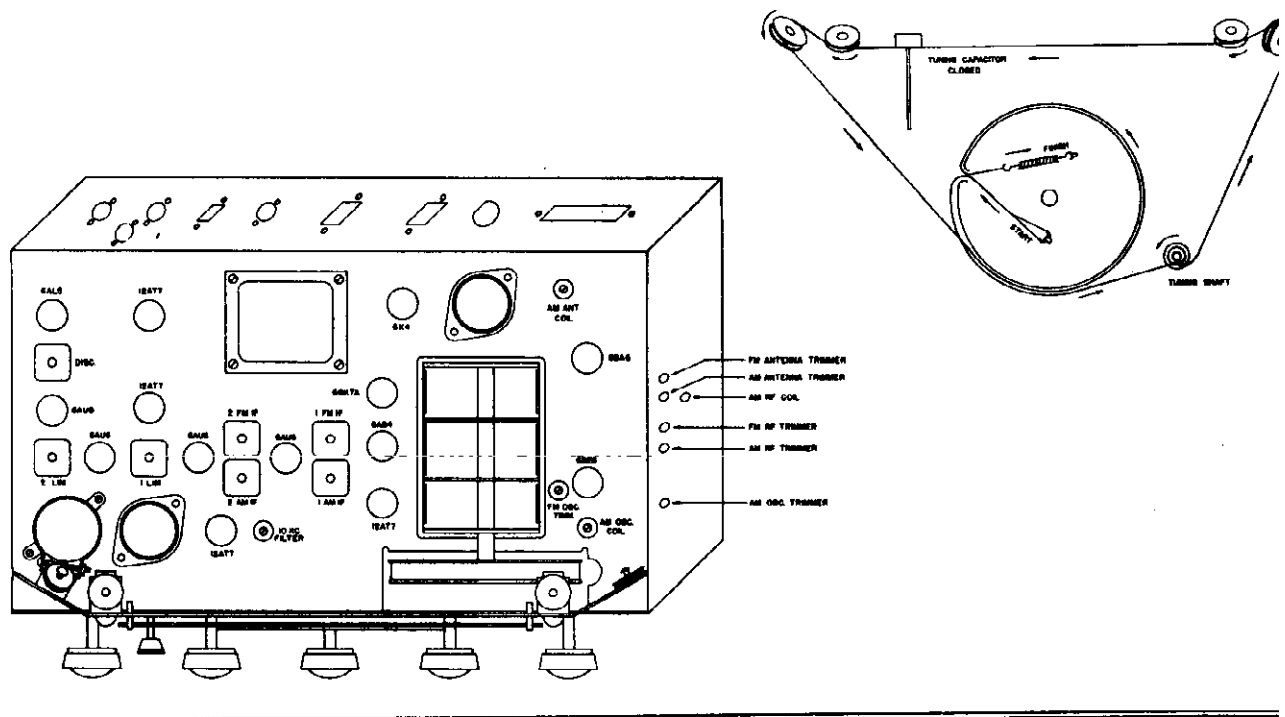
- Note:
1. All measurements taken with VTVM
 2. Bandswitch to be in FM position unless otherwise noted
 3. Input voltage to be 117 v 60 cycles AC
 4. Readings to be within 15% of chart except readings marked with asterisk to be within 50%
 5. Set must be tuned off station for voltage readings

MODEL R70
AM-FM Tuner

ALIGNMENT PROCEDURE

Note: Use insulated screwdriver for adjustment

Step No.	Bandswitch Setting	Generator Frequency	Generator Modulation	Signal Input Point	Indicator	Indicator Connection Point	Dial Setting	Adjust	Remarks
AM ALIGNMENT									
1	AM NORM	455 Kc	30% AM	6BE6 Pin #7	AC VTVM or PA + output meter	Audio output	-	2- AM IF transformers	For maximum output
2	same	600 Kc	same	AM Antenna terminal thru 200 muf condenser	same	same	600 Kc	BC osc coil BC RF coil BC antenna coil	same
3	same	1500 Kc	same	same	same	same	1500 Kc	BC osc. trimmer BC IF trimmer BC antenna trimmer	same. Repeat steps 2 and 3
FM ALIGNMENT									
4	FM	10.7 Mc	300 Kc deviation FM at 60 cycles	6BA6 IF AMP Pin #1	DC VTVM + Oscilloscope	"A" on schematic through 100 K	-	All FM IF transformers	For maximum gain and symmetry
5	same	same	same	same	same	"B"	-	Discr. transformer + 2nd LIM coil	For balanced discriminator S pattern of max. amplitude
6	same	106 Mc	same	FM antenna terminal through 300 ohms	same	"A" on schematic through 100 K	106 Mc	FM osc + RF + Antenna trimmer	For maximum output
7	same	90 Mc	same	same	same	same	90 Mc	-	Check for tracking
8	AM NORM	10 Kc	none	"CN" on schematic	AC VTVM	Audio output	-	10 Kc whistle filter	For maximum dip



MODEL R701,
AM-FM Tuner

INSTALLATION INSTRUCTIONS: Installation of the R701 tuner should be carefully planned, specifically with the following in mind:

- 1) Ventilation: Adequate air circulation will prolong the life of the tuner. This can best be accomplished by providing air vents near the top and bottom of the cabinet enclosure.
- 2) Ease of manipulation: Tuner should be mounted so that the dial can be read easily; control knobs should be kept clear of any cabinet projections.
- 3) Ease of accessibility: Tuner should be mounted in such a way that it may be easily removed for servicing. Tubes, pilot lights and connections at the rear of the chassis should be readily accessible.
- 4) Loop antenna: If a loop antenna is used, it should be kept as far as possible from any metal parts to insure good signal pick up.
- 5) Tuner position: Tuner may be mounted either horizontally or vertical

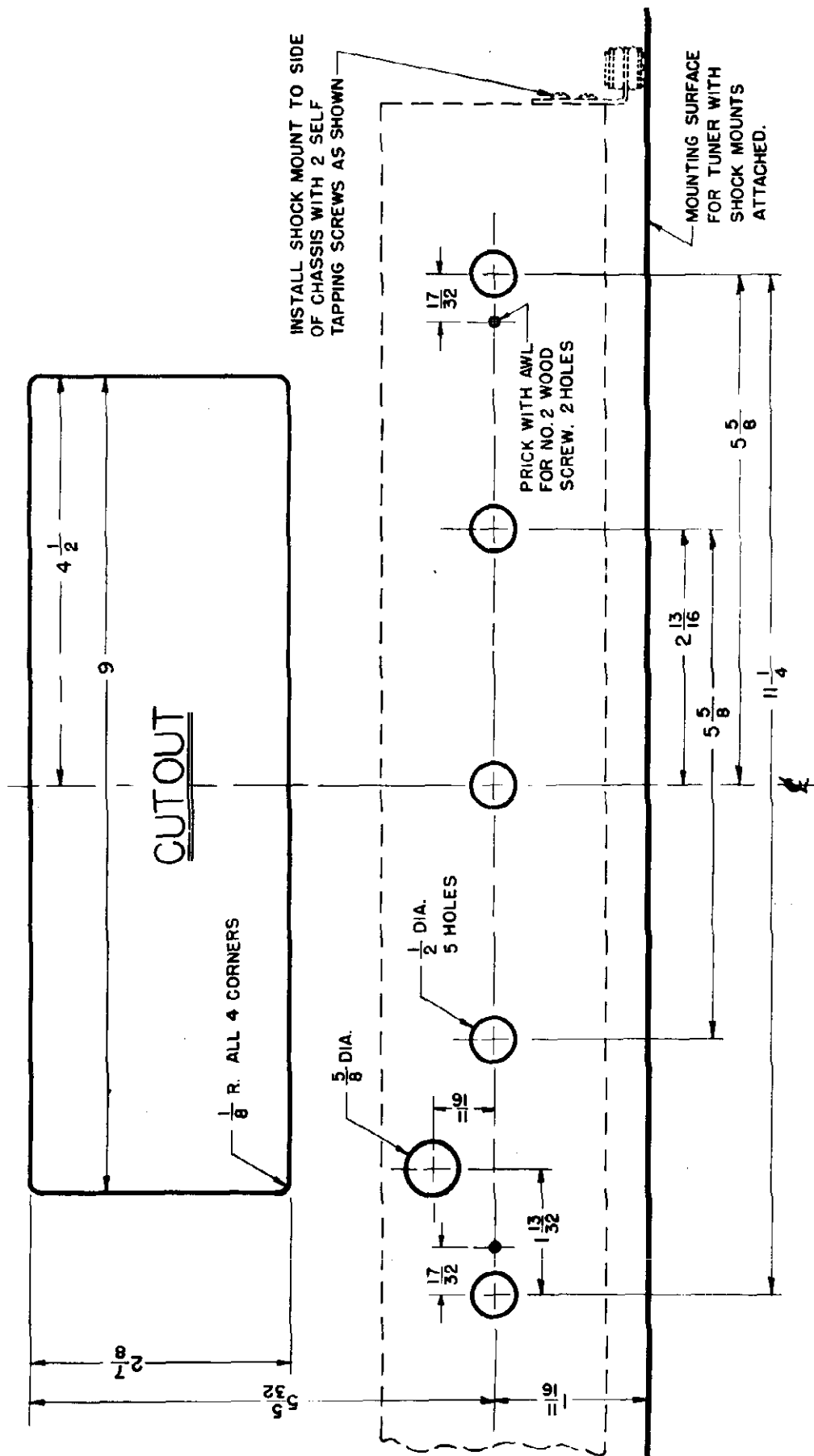
ASSEMBLY INSTRUCTIONS:

- 1) Cut out front panel in accordance with attached front panel template.
- 2) Mount 4 shockmounts on side of chassis as indicated by dotted sketch on front panel template.
- 3) Mount the escutcheon in the opening of the escutcheon plate. Fasten securely by bending the tabs at the top and bottom edges of the escutcheon firmly over the escutcheon plate.
- 4) Place the escutcheon assembly on the mounting surface, carefully aligning all cutouts. Fasten to the mounting surface with two #2 woodscrews as indicated on the template. Bend the tabs extending from the protruding angle bracket of the escutcheon plate firmly over the mounting surface.
- 5) Move the tuner forward on the mounting surface until the glass dial is 1/16" behind the protruding bracket. Check centering of shafts and dial in the cutouts. Mark with an awl the position of 4 holes on the chassis mounting board through the center of the shock mounts.
- 6) Cut out the 4 marked holes with a 1/4" drill, and fasten the tuner chassis by inserting the #10 machine screws from the bottom of the mounting board.
- 7) Mount knobs on shafts and make all rear connections.

MATERIAL SUPPLIED WITH TUNER:

- 5 knobs
- 1 escutcheon
- 1 escutcheon plate with two #2 woodscrews
- 4 phono plugs
- 4 shockmounts with 8 self-tapping screws
- 4 #10 machine screws
- 1 loop antenna cable

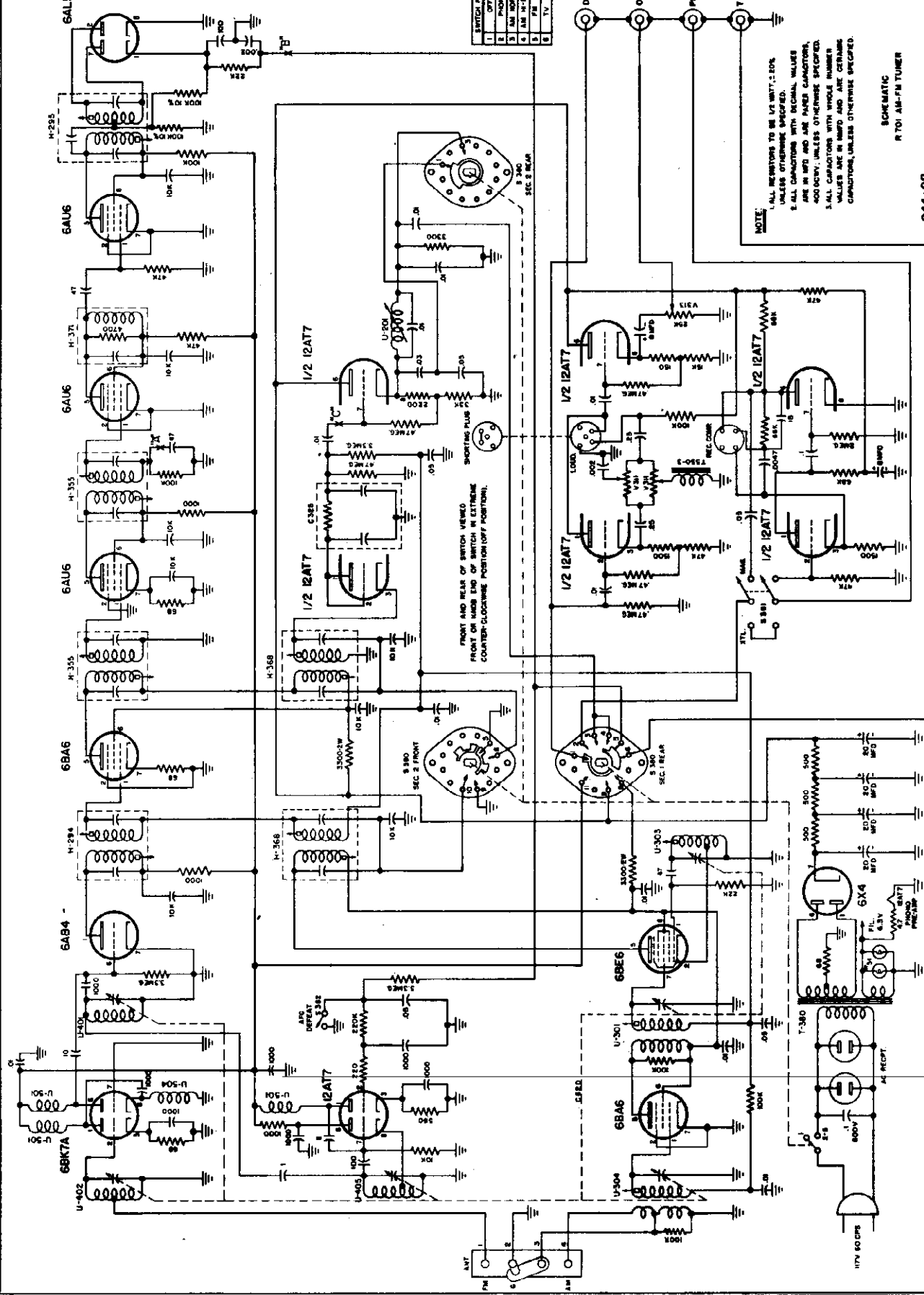
MODEL R701
AM-FM Tune



R 701 TUNER FRONT PANEL TEMPLATE

MODEL R701,
AM-FM Tuner

SWITCH POSITIONS	
1	ON
2	OFF
3	AM
4	FM
5	1M
6	2M
7	TV



NOTE:
1. ALL RESISTORS TO BE 1/2 WATT, ± 5% UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS WITH DECIMAL VALUES ARE IN MFD AND ARE PAPER CAPACITORS, 500 VOLT, UNLESS OTHERWISE SPECIFIED.
3. ALL CAPACITORS WITH WHOLE NUMBER VALUES ARE IN MFD AND ARE CERAMIC CAPACITORS, UNLESS OTHERWISE SPECIFIED.

SCHEMATIC
R701 AM-FM TUNER

844-02

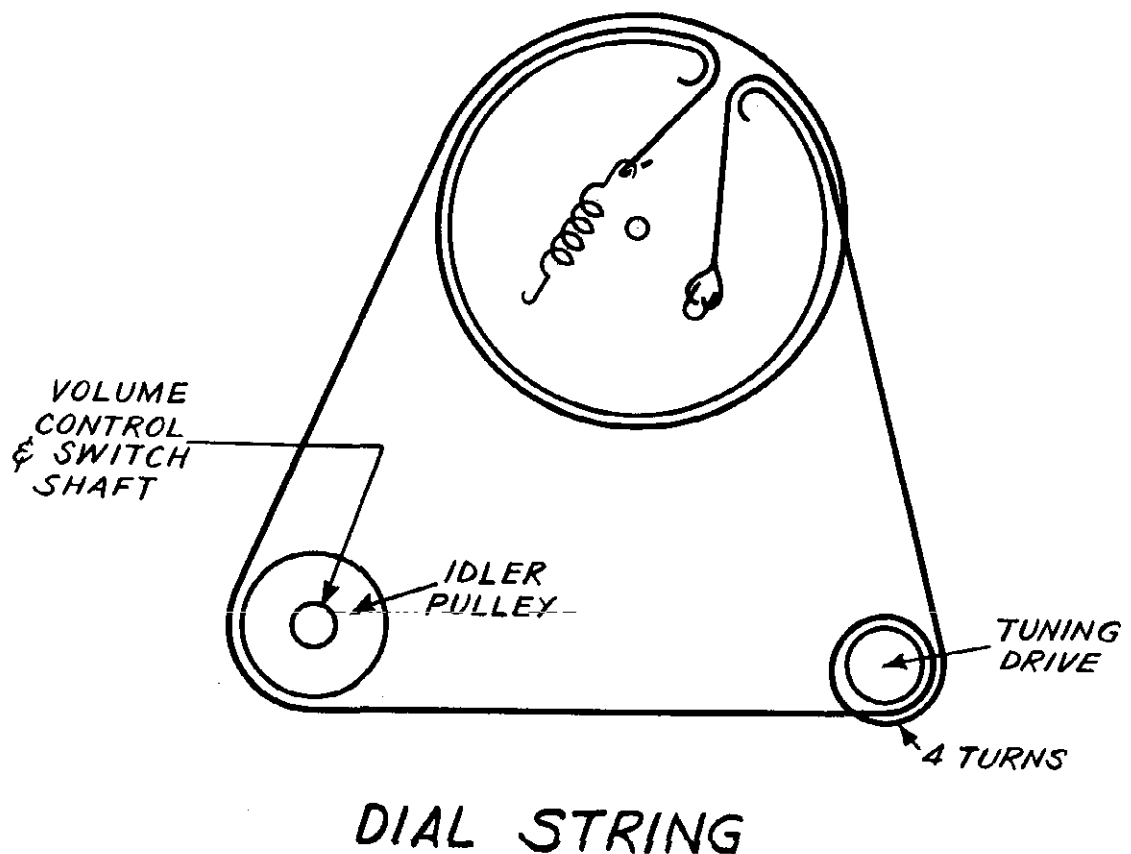
ALIGNMENT DATA

I. F. Alignment:

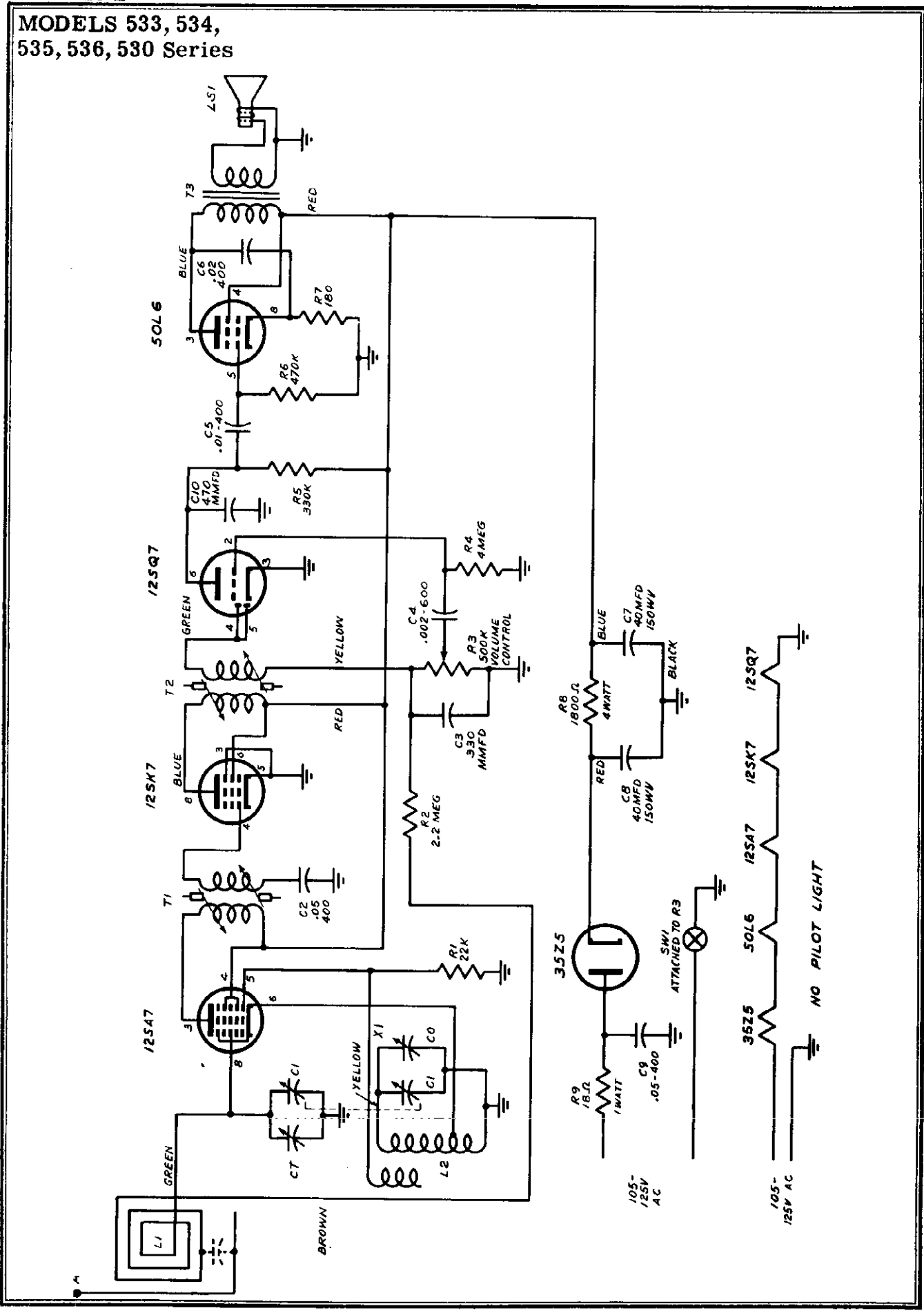
T1 and T2 at 455 Kc - tuning condenser plates completely closed. Connect generator with modulated RF signal to pin 8 - mixer grid 12SA7. Keep output of signal generator as low as possible so as not to overload IF amplifier or audio amplifier stages, volume control at maximum. Peak by audio signal from speaker, or an A. C. voltmeter connected across speaker.

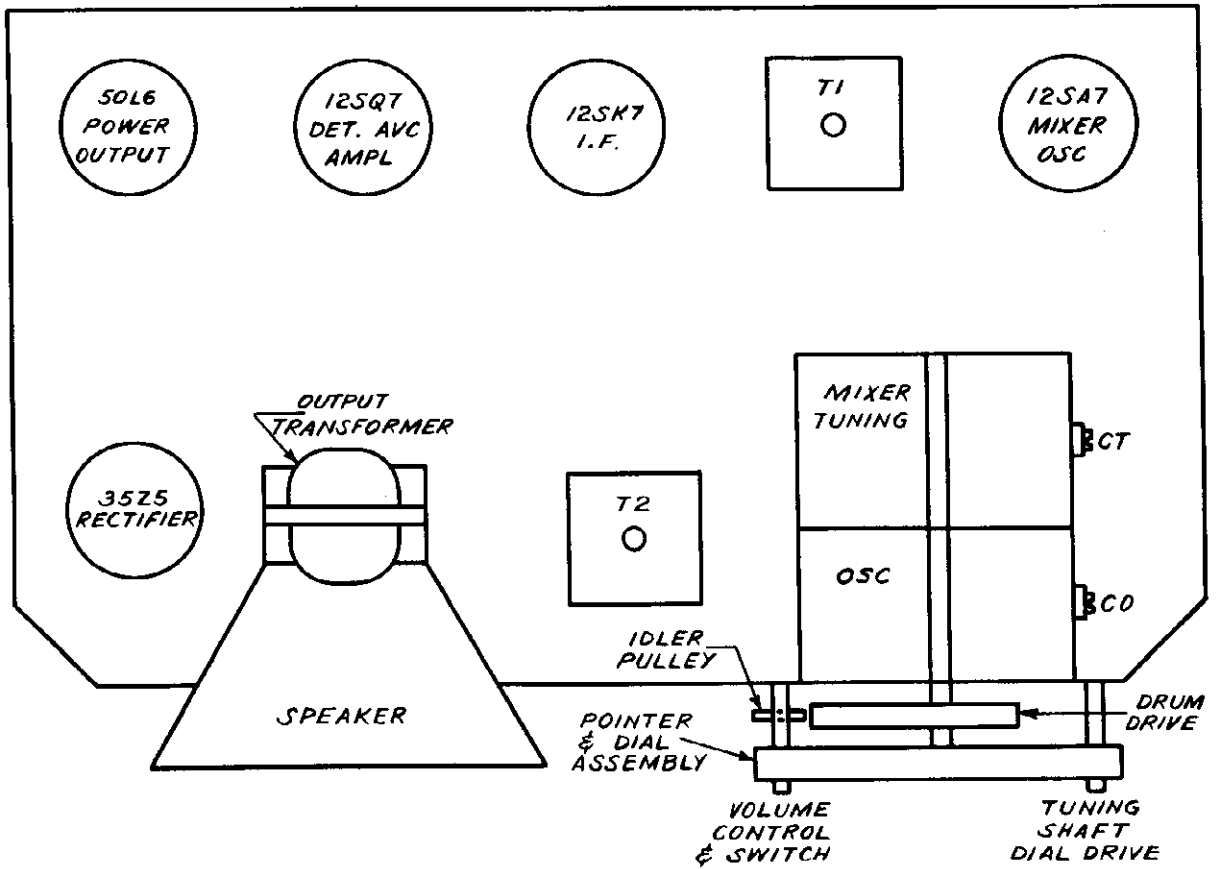
R. F. Alignment:

1. Set pointer with condenser plates completely closed so that it is horizontal.
2. Turn tuning drive so that pointer reads 1400 KC.
3. Adjust tuning condenser trimmer C_O for maximum response. Volume control at maximum, modulated signal from generator as small as possible.
4. Adjust C_T for maximum response as in step 3.
5. Repeat if necessary steps 1-5.

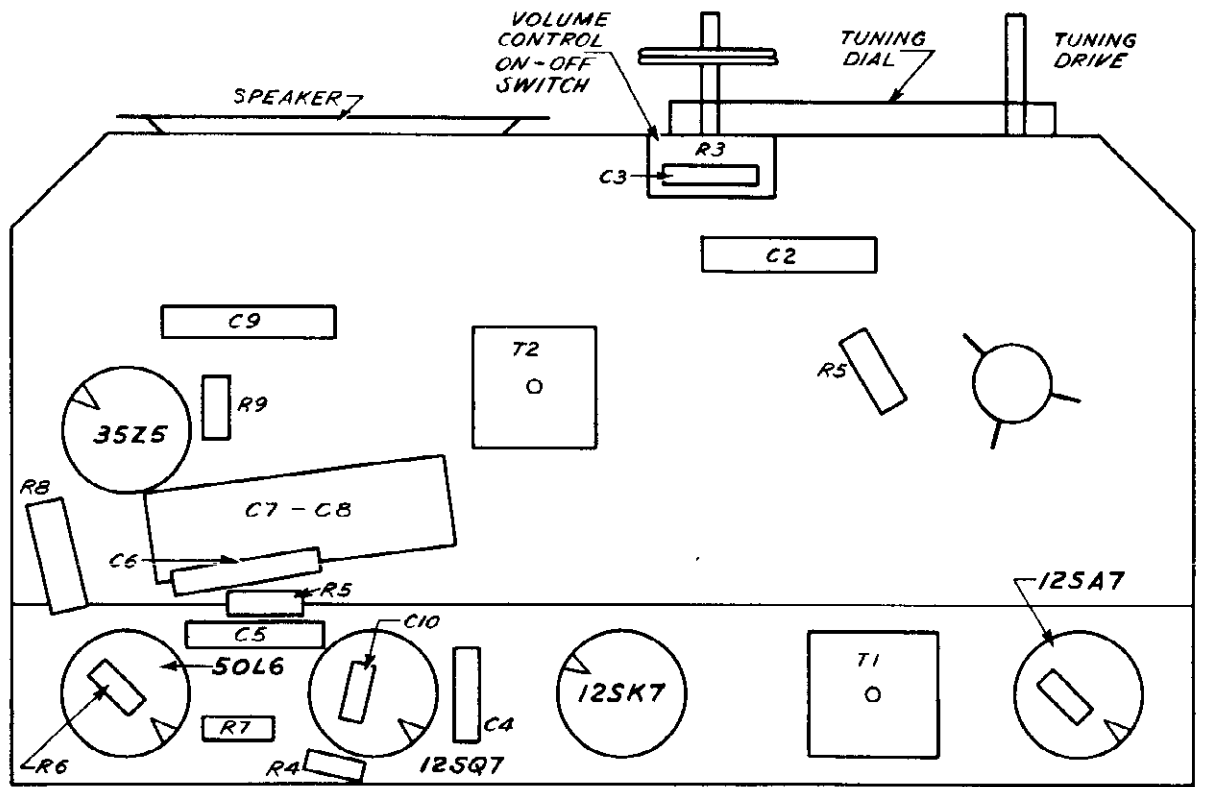


MODELS 533, 534,
535, 536, 530 Series





TOP VIEW



BOTTOM VIEW

MODELS 533, 534,
535, 536, 530 Series

<u>SCHEMATIC LOCATION</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
	1686	Cabinet (Walnut or Ivory)
C1	PE 196-98	Capacitor, Paper, .002 MFD 400V
C2	1666	Capacitor, Variable
C5	PE 191-15	Capacitor, Mica 47 MMF
C6	PE 191-31	Capacitor, Mica 220 MMF
C7	PE 196-112	Capacitor, Paper .05 MFD 400V
C8	PE 191-35	Capacitor, Mica 330 MMF
C9	PE 196-97	Capacitor, Paper .001
C10	PE 191-40	Capacitor, Mica 510 MMF
C11	PE 196-107	Capacitor, Paper .01
C12	PE 196-108	Capacitor, Paper .02 MFD 400V
C13	PA 20136	Capacitor, Electrolytic 40-40 @150
C14	PP 19105	Capacitor, Paper .05 MFD 600V
L2	28210	Coll, Oscillator
R5	2471	Control, Volume w/switch
	4275	Dial Crystal
	54172	Drive Shaft Assembly
	39137	Knob (Walnut or Ivory)
L1	28159	Loop Antenna
	4145	Pointer
R1	PE 230-2281	Resistor, 22000 ohm $\frac{1}{2}$ w
R2	PE 230-2325	Resistor, 1,500,000 ohm $\frac{1}{2}$ w
R3	PE 230-2309	Resistor, 330,000 ohm $\frac{1}{2}$ w
R4	PE 230-2333	Resistor, 3.3 megohm $\frac{1}{2}$ w
R6	PE 230-2305	Resistor, 220,000 ohm $\frac{1}{2}$ w
R7	PE 233-2257	Resistor, 2200 ohm 2w
R8	PE 230-2337	Resistor, 4.7 megohm $\frac{1}{2}$ w
R9	PE 232-1107	Resistor, 18 ohm 1w
	18110	Socket, Octal wafer
T3	5868	Speaker w/output transformer
T1	1770	Transformer, 1st. I.F.
T2	3535	Transformer, 2nd. I.F.

CHASSIS DESCRIPTION

The C-282 and C-318 are both 11 tube AM-FM Radio Chassis. The C-305 is a 10 tube AM-FM Radio Chassis and the C-284 is an 11 tube chassis designed for reception of AM signals only.

All of these chassis contain push-pull audio output amplifiers which are used for radio and phonograph reproduction and also television sound when the chassis are used in "3-way" combination instruments. The C-282 and C-305 chassis are wired for use of the C-295 Phono Pre-Amplifier Chassis which is used in conjunction with the Model 333A-VR Record Changer employing the Variable Reluctance type pickup. The C-284 and C-318 chassis are wired for use with the Model 333A Record Changer which employs a crystal pickup. In all of the above models, the on-off switch on the radio chassis controls the power source for all functions of the receiver. Volume and Tone controls on the radio chassis also function for phonograph and television as well as radio operation.

NOTE: With the Operation Selector (Band Switch) in the phonograph position, the record changer will automatically shut off the power source to the entire instrument when it has played the last record. When the Operation Selector is then switched to either TV or Radio, the power source will again, automatically, be turned on.

SPECIFICATIONS.

Radio Tuning Range:

AM Band 540 KC to 1620 KC

FM Band 88 MC to 108 MC

C-282 & C-318 Radio Chassis Tube Complement:

Type	Description
6BA6.....	AM FM RF Amplif.
6RE6.....	AM Converter-Oscilla
12AT7.....	FM Mixer-Oscilla
6BA6.....	1st AM FM IF Amplif.
6BA6.....	2nd AM FM IF Amplif.
6AL5.....	FM Ratio Detect
6SQ7.....	1st Audio AM Detector & Gas G
6SQ7.....	Phase Invert
6V6GT (2).....	Power Amplifiers (Push-Pul
5Y3GT.....	Full Wave Rectif:
Total: 11 tubes, including one Rectifier.	

C-305 Radio Chassis Tube Complement:

Type	Description
6BA6.....	AM-FM RF Amplifi
6J6.....	AM-FM Oscillator-Mix
6BA6.....	1st AM-FM IF Amplifi
6BA6.....	2nd AM-FM IF Amplifi
6AL5.....	FM Ratio Detect
6SQ7.....	1st Audio, AM Det. & Gas G
6SQ7.....	Phase Invert
6V6-GT (2).....	Power Amplifiers (Push-Pt
5Y3-GT.....	Full Wave Rectifi
Total: 10 tubes, including one Rectifier	

C-284 Radio Chassis Tube Complement:

Type	Description
6SK7.....	RF Amplifi
6J5.....	Oscilla
6SA7.....	Mix
6SK7.....	1st IF Amplifi
6SK7.....	2nd IF Amplifi
6SR7.....	Detect
6SQ7.....	1st Audio Amplifi
6SQ7.....	Phase Invert
6V6 (2).....	Power Amplifiers (Push-Pul
5Y3GT.....	Full Wave Rectifi
Total: 11 tubes, including one Rectifier.	

CHASSIS C-282, C-284, C-305, C-318

C-295 Pre-Amplifier Chassis Tube Complement:

Type	Description
6SC7.....	1st & 2nd Pre- Amplifiers
Speaker (Used for all types of operation).....	12 inch FM
Audio Output.....	12 watts
Power Source.....	105 to 125 volts, 60 cycle AC only

ALIGNMENT INSTRUCTIONS

Equipment Required

AM (broadcast band) IF and RF Alignment

1. Calibrated RF Signal Generator (range, 455KC to 1620KC)
2. Low Range Output Meter

FM (Frequency Modulation) IF & RF Alignment

1. FM Sweep Generator (range 10.7 mc to 108.5 mc)
2. Oscilloscope
3. RF Signal Generator (range 10.7 mc to 108.5 mc)
4. Vacuum tube Voltmeter

AM Alignment (IF & RF)

C-305

- a. Set Operation Selector to AM position
- b. See that the dial pointer coincides with the calibration marks at the extremes of the dial scale.
- c. Connect the Output Meter cable to Speaker socket on receiver.
- d. Turn set on and adjust Volume to maximum.

STEP	CONNECT GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	TO OBTAIN
1	Green lead on mixer coil	455KC	fully open	T104, T105 & T108 Top & Bottom slugs	M A X I M U M O U T P U T
2	Loose Couple to loop Ant.	1620 KC	1620KC	C102F, AM Osc. coil Trimmer	
3	Same	1500KC	1500KC	C102B, Ant. Trimmer, C102D, AM Mixer coil Trimmer	
4	Same	600KC	600KC	T102, AM Mixer coil Slug	
5	Same	537KC	fully closed	T101 AM Osc. coil Slug	

C-282 and C-318

STEP	CONNECT GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	TO OBTAIN
1.	Grid of AM Conv., 6BE6 (pin 7 of V103) Through .1 mfd.	455KC	Fully Open	T102, T104 & T106 (IF Slugs)	M O U T P U T M
2.	Ant. Section of Gang (through .1 mfd.)	1620KC	1620KC	C156, AM Osc. Trim. & C154, AM Conv. Trim.	
3.	- Same -	1500KC	1500KC	C152, AM Ant. Trim.	
4.	- Same -	600KC	600KC	L103, Loop Loading Coil & L111* AM Osc. Coil	
5.	"Ant" Terminal (on rear of chassis) with Loop connected.	455KC	Quiet Point	L102, Wave Trap (on Loop Ant.)	Minimum Output

* Adjust while rocking gang condenser.

C-284

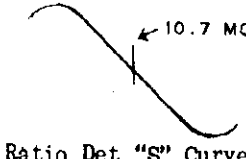
STEP	CONNECT GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	TO OBTAIN
1.	Grid of Mixer, 6SA7 (pin 5 of V102) through .1 mfd.	455KC	Fully Open	IF Slugs T102, T103 & T104	MAXIMUM OUTPUT
2.	RF Section of Gang through 1. mfd.	1620KC	1620KC	C102C Osc. Trim. (on gang)	MAXIMUM OUTPUT
3.		1500KC	1500KC	C102A, Ant. Trim. C102B, RF Trim. (on gang)	MAXIMUM OUTPUT
4.		600KC	600KC	L103, Loop Loading Coil and L104* Osc. Coil	MAXIMUM OUTPUT
5.	Terminal "A" Ant. Term. Strip (with Loop connected)	455KC	Quiet Point	L102, Wave Trap on Loop	MINIMUM OUTPUT

FM Alignment

- Connect the oscilloscope and FM or RF Generator as shown in the chart.
- Set the Operation Selector in the FM position.
- Turn the Receiver on.
- During alignment, reduce the generator output to keep the signal just above noise level to avoid overloading.
- For maximum signal transfer, Signal Generator should be balanced to 300 ohm I Antenna terminal input.

C-282 and C-318

IF SECTION

STEP	CONNECT FM (SWEEP) GENERATOR	SET GENERATOR AT	SET GANG AT	CONNECT OSCILLOSCOPE	ADJUST	REMARKS
1	Grid 6BA6 2nd I-F Amp. pin #1, V105	10.7 MC \pm 100KC dev.	fully open	Across C138 (Grd. lead to chassis)	Top & bottom slugs of T105	Adjust for "S" curve and centered so that the two curved portions are symmetrically spaced from the center.
2	Grid of 6BA6 (1st IF amp) pin #1, V104	10.7 MC \pm 100KC dev.	open	Same	Top & bottom slugs of T103	Adjust for Max. Amplitude of "S" curve 
3	Grid of 12AT7 (FM Mixer) pin #2, V102, through 1000 uuf.	10.7 MC \pm 100KC dev.	open	Same	Top & bottom slugs of T101	

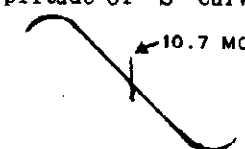
C-282 and C-318

RF SECTION

STEP	CONNECT SIGNAL GENERATOR	SET GENERATOR AT	SET GANG AT	CONNECT VTVM	ADJUST	REMARKS
1.	High Side of FM dipole thru 330 ohms	106MC	106 MC	Across R132	C155, FM Osc. Trim.	Adjust for Maximum
2.	-Same-	105MC	105MC	- Same -	C153, FM Mixer Trim. & C151, FM Ant. Trim.	Adjust for Maximum while rocking gang condenser

CHASSIS C-282, C-284, C-305, C-318

C-305 IF SECTION

STEP	CONNECT FM (SWEEP) GENERATOR	SET GENERATOR AT	SET GANG AT	CONNECT OSCILLOSCOPE	ADJUST	REMARKS
1	Grid 6BA6 (2nd I-F Amp) pin #1, V104	10.7 MC ± 100KC dev.	fully open	Across C130 (Grd lead to chassis)	Top & bottom slugs of T107	 <p>Ratio Det. "S" Curve</p>
2	Grid of 6BA6 (IF amp) pin #1, V103	10.7 MC ± 100KC dev.	open	Same	Top & bottom slugs of T105	
3	Contact D10 of section 2 rear of the Band Switch	10.7 MC ± 100KC dev.	open	Same	Top & bottom slugs of T103	

C-305

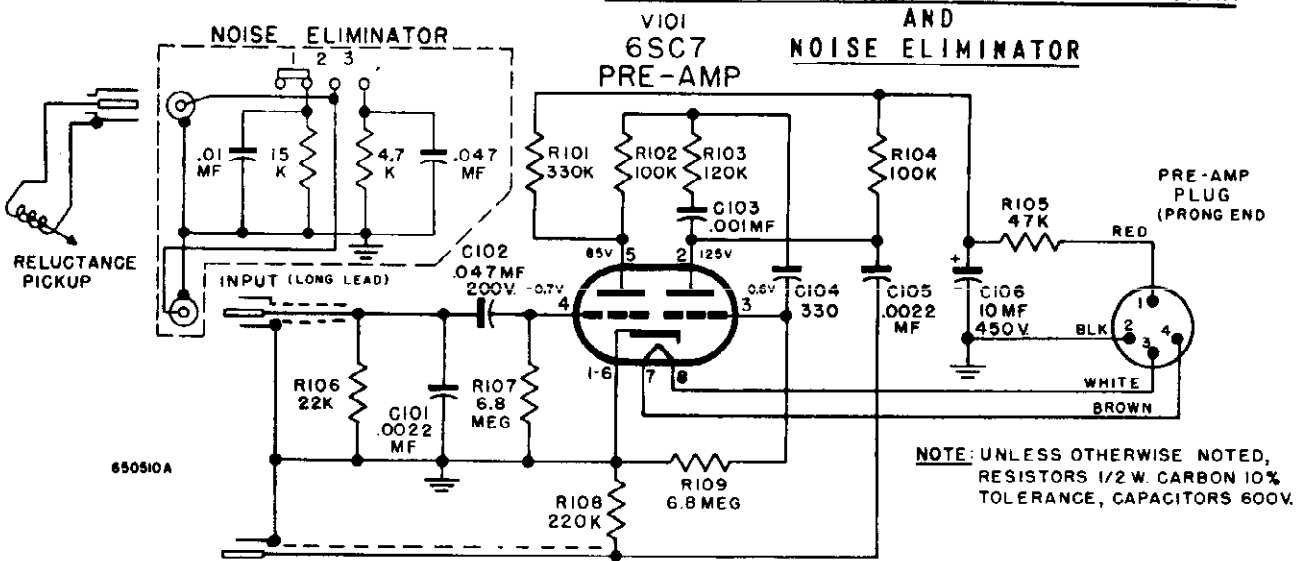
RF SECTION

STEP	CONNECT RF GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	REMARKS
1.	To FM Ant. Terminals	Modulated 106MC	106MC	*L103 osc. coil by adj. spacing of turns	For Max. Sound Output
2.	Same	Modulated 90 MC	90 MC	Plates of FM Osc. tuning capacitor	If necessary adjust the end plates of the FM Osc. Section of the gang for Max. Output.
3.	Repeat adjustment of L103 (Step 1) to calibrate dial pointer at 90 MC and 106 MC respectively, with the R-F Unit Shield in place.				
4.	To FM Ant. terminals	Modulated 106 MC	106 MC	C102D FM trimmer on Mix. Sec.	Max. output while rocking gang
5.	Same	Same	Same	C102A FM trimmer on Ant. section	Maximum Output
6.	Same	Modulated 90 MC	90MC	* L103 (mixer)	Check coils with a tuning wand. If necessary expand or compress coil turns for max. output
7.	Same	Same	Same	L102 FM Ant. Coil	

* Cement both coils on L103 after adjusting.

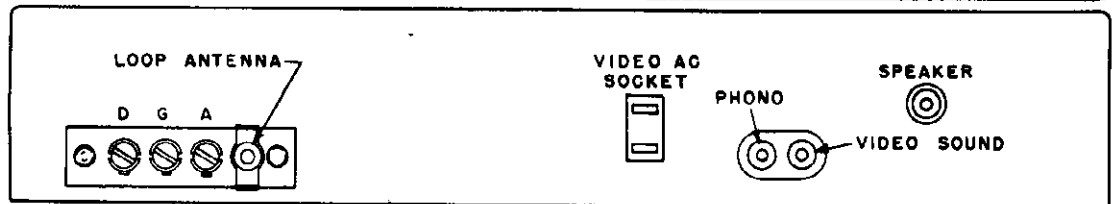
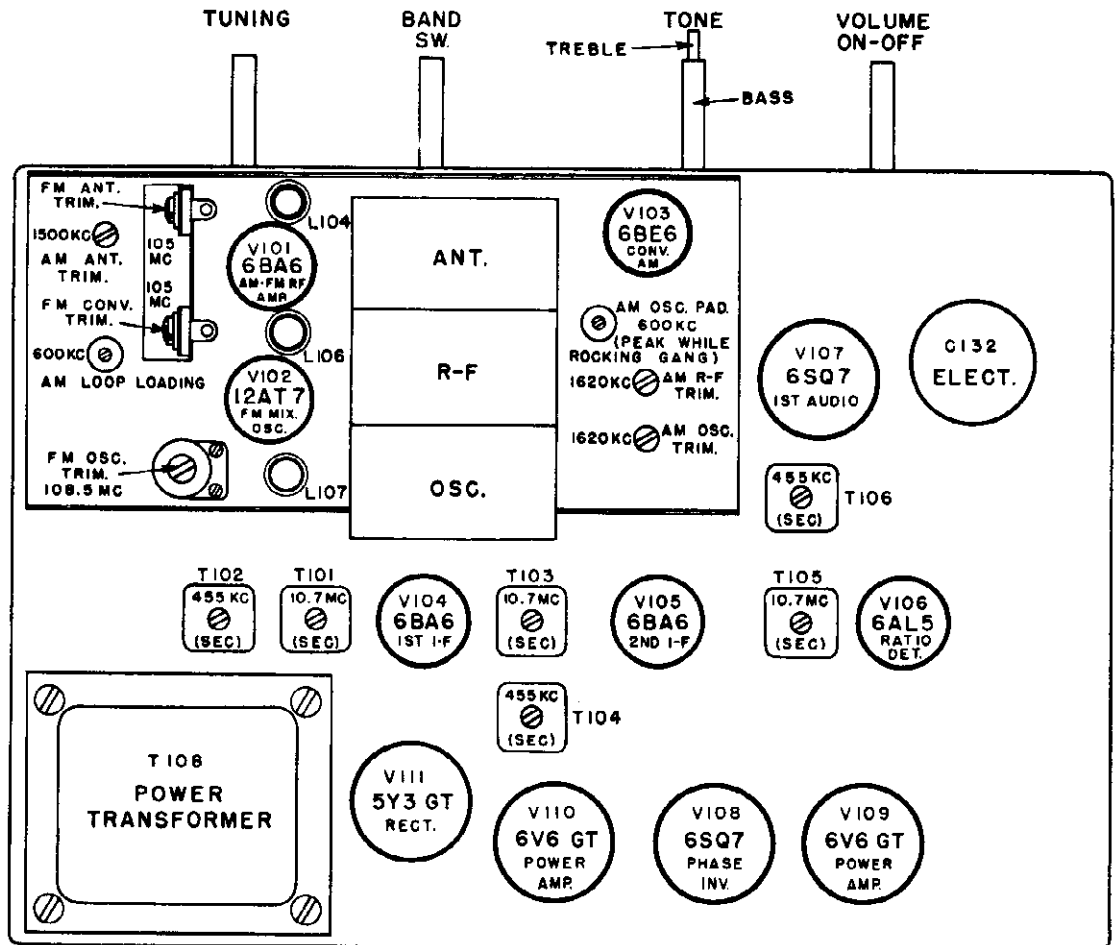
Check calibration of dial against known AM and FM stations.

C-295 PREAMPLIFIER CIRCUIT DIAGRAM

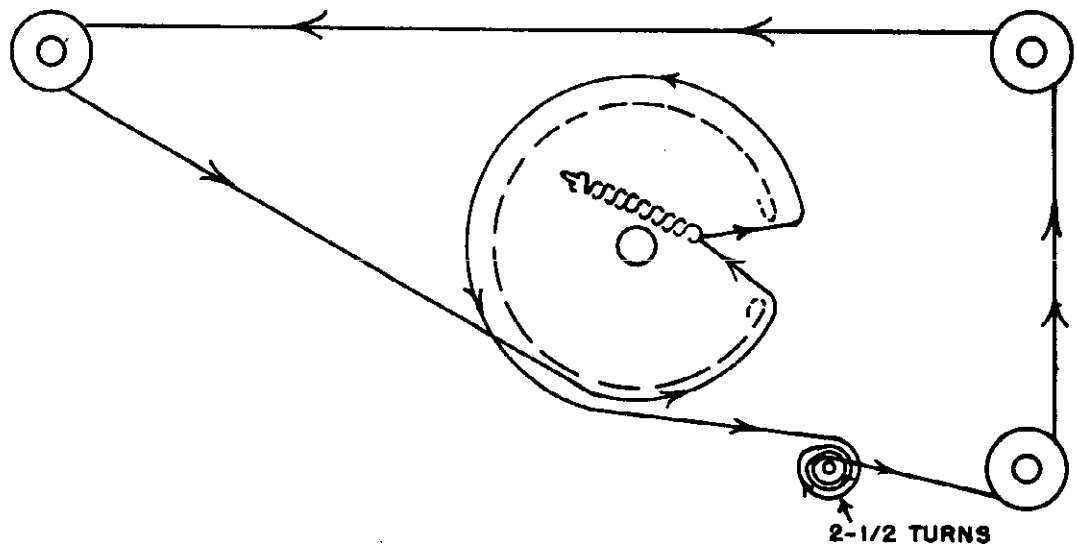


RADIO CHASSIS C-282 & C-318

MODELS 110AM, C
C-318; 1008M, 1009
1010B, Ch. C-282



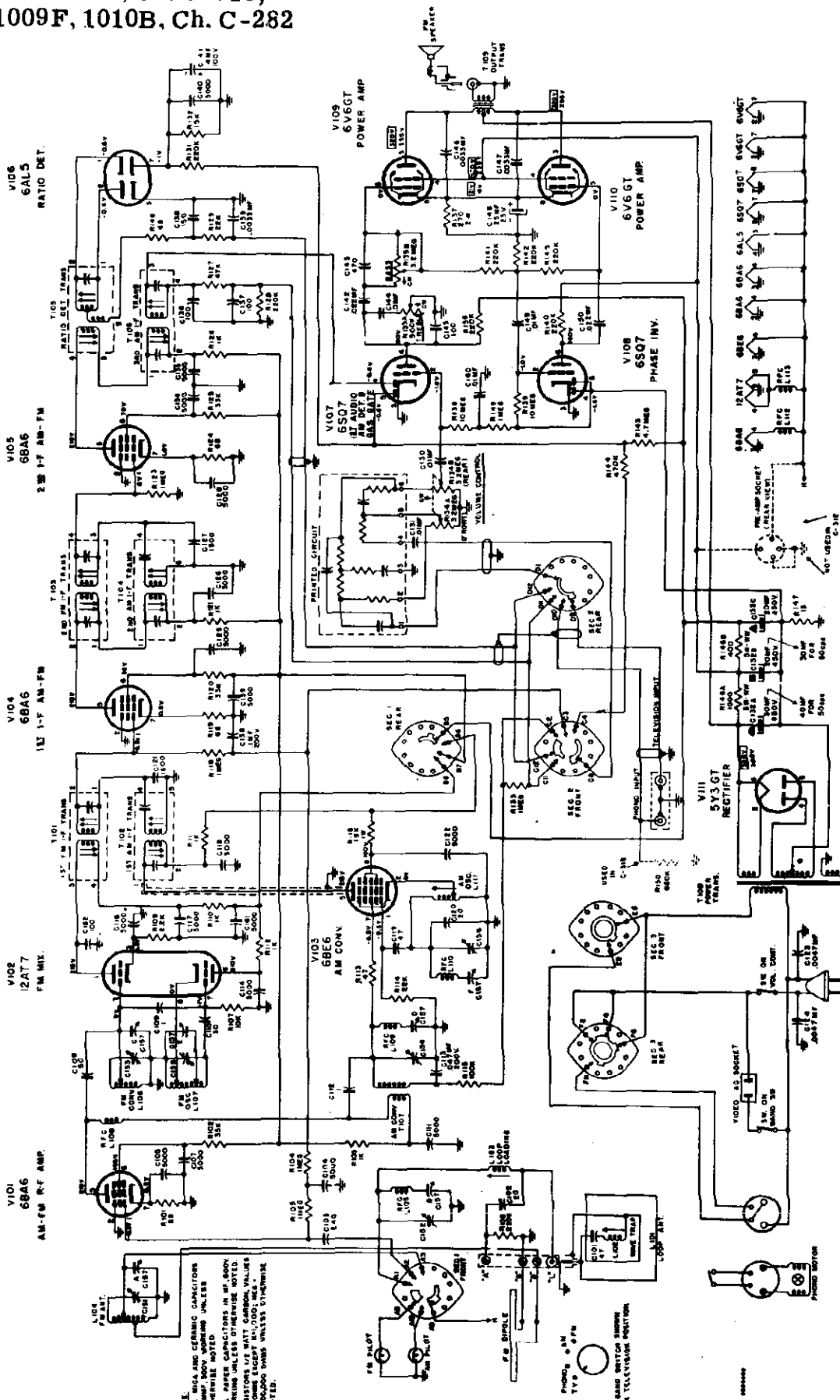
DIAL STRINGING C-282 & C-318



MODELS 1007AM, Ch. C-318;
1008M, 1009F, 1010B, Ch. C-282

SCHEMATIC DIAGRAM RADIO CHASSIS C-282 & C-318

ALL VOLTAGES ARE MEASURED WITH BAND SWITCH IN AM POSITION EXCEPT FOR V102 & V106 WITH BAND SWITCH IN FM POSITION. IN THE PHONO AND TV POSITIONS VOLTAGES ARE APPLIED ONLY TO V109, V110 & V111. THESE VOLTAGES ARE ENCLOSED IN A BOX MEASUREMENTS MAY VARY WITHIN 20%. MEASUREMENTS MADE WITH VOLTOHMIST OR EQUIVALENT. VOLTAGES MEASURED FROM CHASSIS GROUND.



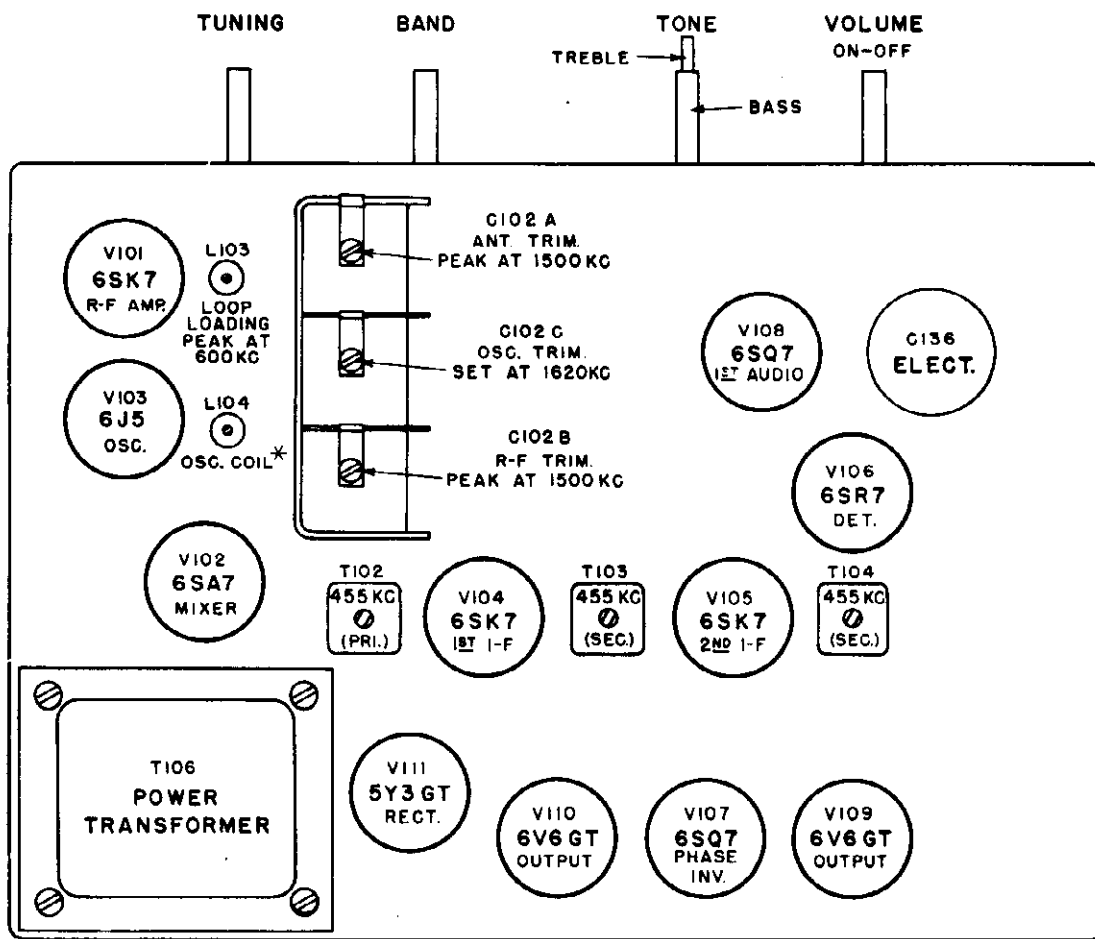
NOTE: ALL mica and ceramic capacitors in amp. 500V working unless otherwise noted. ALL paper capacitors in amp. 500V working unless otherwise noted. IN OTHER EXCEPT MIL-0001 MIL-0002 MIL-0003 UNLESS OTHERWISE NOTED.

PHONO & TV POS. ON BAND SWITCH SHOWS TELEVISION POSITION.

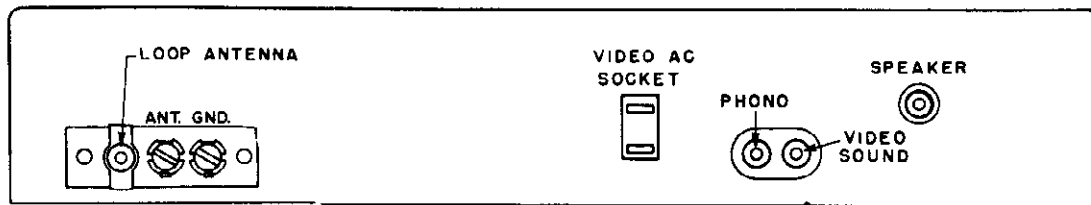


RADIO CHASSIS C-284

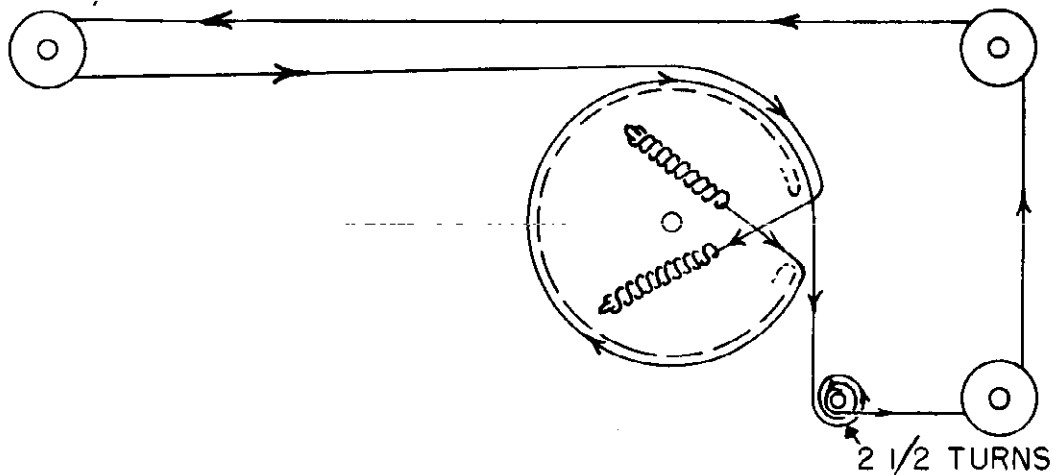
CHASSIS C-28



* PEAK AT 600KC WHILE ROCKING GANG CONDENSER



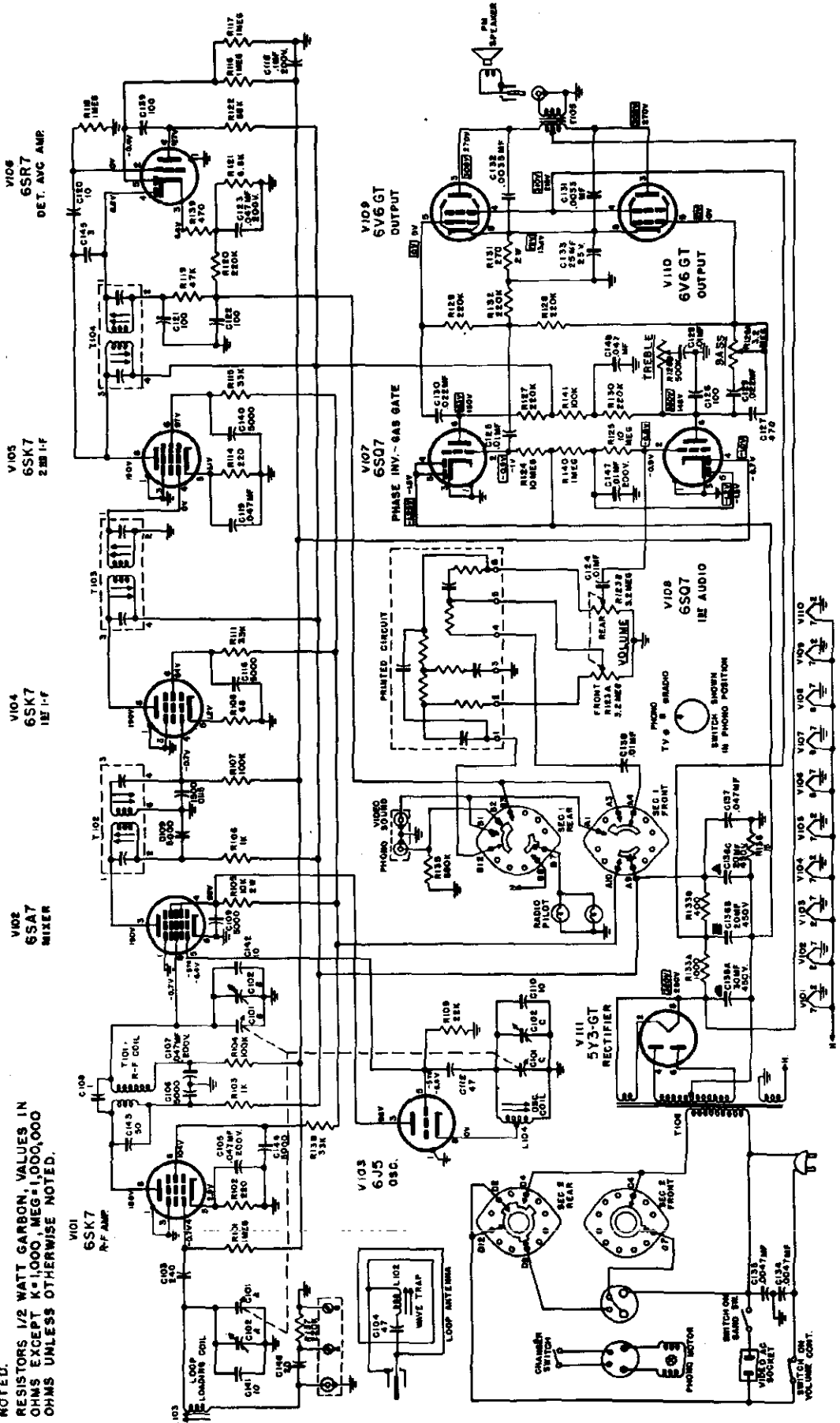
DIAL STRINGING C-284



CHASSIS C - 284

SCHMATIC DIAGRAM RADIO CHASSIS C-284

NOTE:
 ALL MICA AND CERAMIC CAPACITORS
 IN MMF 500V WORKING UNLESS
 OTHERWISE NOTED.
 ALL PAPER AND ELECTROLYTIC CAPACITORS
 IN MF, 500V WORKING UNLESS OTHERWISE
 NOTED.
 RESISTORS 1/2 WATT CARBON, VALUES IN
 OHMS EXCEPT K=1,000, MEG=1,000,000
 OHMS UNLESS OTHERWISE NOTED.

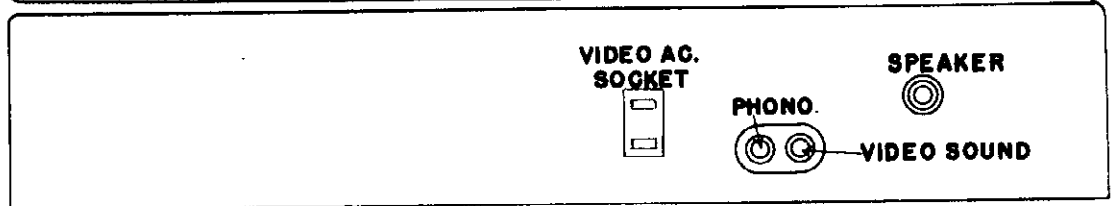
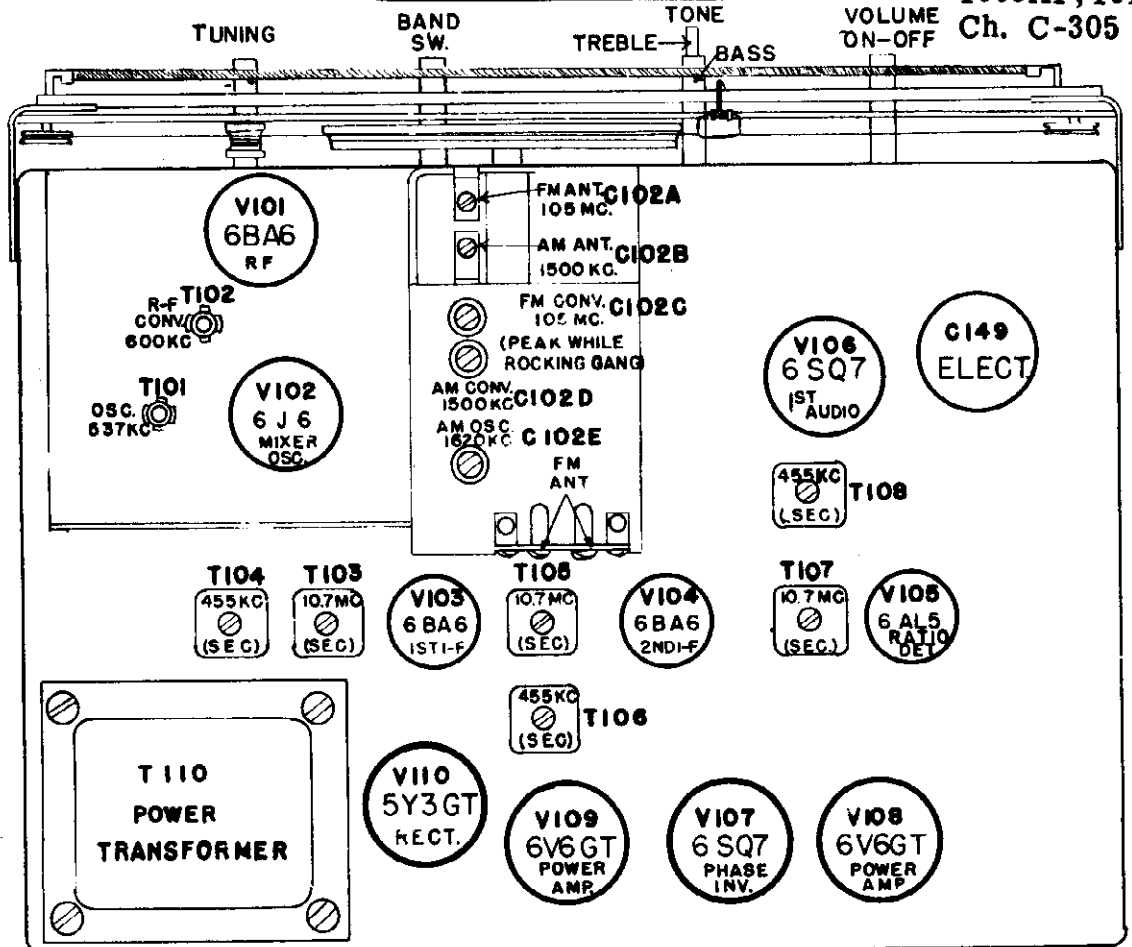


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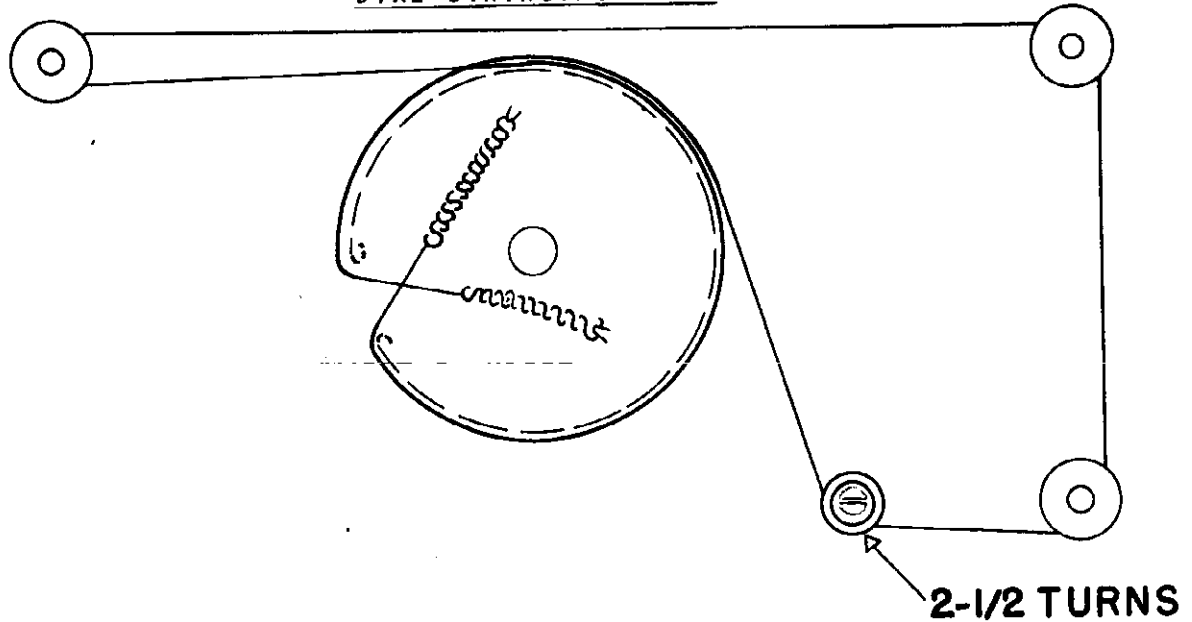
ALL VOLTAGES MEASURED WITH BAND SWITCH IN RADIO POSITION.
 IN THE PHONO & TV POSITIONS ONLY V107, V108, V109, V110 & V111 ARE IN OPERATION.
 THESE VOLTAGES ARE ENCLOSED IN A BOX [X]. VOLTAGE READINGS MAY VARY WITHIN 20%.
 MEASUREMENTS MADE WITH VOLTOHMYST OR EQUIV. VOLTAGES MEASURED FROM CHASSIS GROUND.

MODELS 1008AM,
1009AF, 1010AB,
Ch. C-305

RADIO CHASSIS C-305



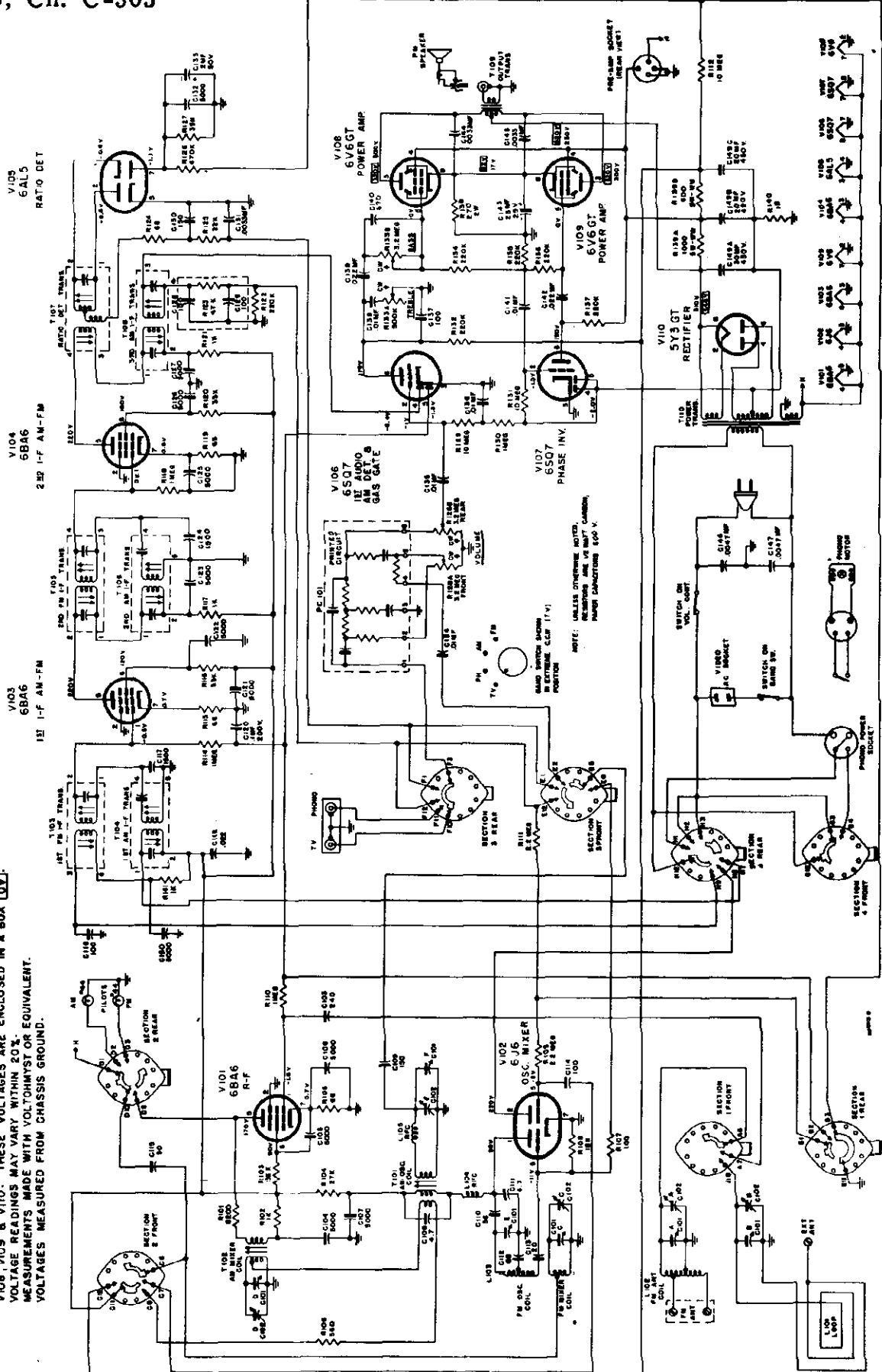
DIAL STRINGING C-305



MODELS 1008AM, 1009AF,
1010AB, Ch. C-305

SCHEMATIC DIAGRAM RADIO CHASSIS C-305

ALL VOLTAGES ARE MEASURED WITH BAND SWITCH IN AM POSITION.
IN THE PHONO & TV POSITIONS VOLTAGES ARE ONLY APPLIED TO
V108, V109 & V110. THESE VOLTAGES ARE ENCLOSED IN A BOX []
VOLTAGE READINGS MAY VARY WITHIN 20%.
MEASUREMENTS MADE WITH VOLTOHMIST OR EQUIVALENT.
VOLTAGES MEASURED FROM CHASSIS GROUND.



PARTS LIST RADIO CHASSIS C-282 & C-318

- CAPACITORS -

Ref. no.	Description	Part no.	List
C101, C119	Mica, 47 uuf, 10%, 500V.....	25193	\$.30
C136, C 137, C 145	Mica, 100 uuf, 10%, 500V.....	25188	.20
C138	Mica, 150 uuf, 10%, 500V.....	650162A-8	.20
C143	Mica, 470 uuf, 10%, 500V.....	25189	.25
C121, C127	Silver Mica, 1500 uuf, 5%, 500V.....	25299	.90
C102, C120	Ceramic, 20 uuf, 10%, 500V.....	25492	.20
C103	Ceramic, 240 uuf, 10%, 500V.....	25427	.20
C104, C105, C111)			
C114, C116, C107)			
C117, C118, C122)			
C125, C126, C128)			
C134, C135, C140)			
C159, C161)	----Ceramic, 5000 uuf, 10%, 500V.....	450469A-1	.25
C108	Ceramic, 50 uuf, 10%, 500V.....	25493	.20
C109, C112	Ceramic, 1 uuf, 20%, 500V.....	25497	.25
C110	Ceramic, 30 uuf, 10%, 500V.....	650030A-8	.30
C162	Ceramic, 100 uuf, 10%, 500V.....	2241A-367	.40
C113	OPT, .047 ufd, 20%, 200V.....	2246A-4530	.20
C123, C124	OPT, .0047 ufd, 20%, 600V.....	2244A-4720	.25
C130, C131, C144)			
C149, C160)	----OPT, .01 ufd, 20%, 500V.....	2248A-1030	.20
C136, C137, C147	OPT, .0033 ufd, 20%, 600V.....	2248A-3320	.20
C142, C150	OPT, .022 ufd, 20%, 600V.....	2248A-2230	.25
C158	OPT, .1 ufd, 20%, 600V.....	2246A-1040	.25
C132A	Elect, 30 ufd, 450V)		
C132B, C132C	Elect, 20 ufd, 450V)-----	25424	3.45
C141	Elect, 4 ufd, 100V.....	25270	1.05
C148	Elect, 25 ufd, 25V.....	25158	.80
C151, C153	Trimmer Strip (FM Ant. & Mixer).....	26280	.55
C152	Trimmer (AM Ant.).....	26279	.30
C154, C156	Trimmer Strip (AM Conv. & Osc.).....	450468A-2	.70
C155	Trimmer (FM Osc.).....	452094A-1	1.40
C157	Variable Gang Capacitor Ass'y.....	452051A-G1	6.75

- RESISTORS -

R101, R119, R124)			
R148)	----Carbon, 68 ohms, 1/2w, 10%.....	3229A-680	.10
R102, R 120, R125	Carbon 33K, 1/2w, 10%.....	3229A-333	.10
R103, R104, R118)			
R123, R133, R149)	----Carbon, 1 megohm, 1/2w, 10%.....	3229A-105	.10
R105, R110, R112)			
R111, R121, R126)	----Carbon, 1K, 1/2w, 10%.....	3229A-102	.10
R106, R128, R131)			
R136, R140, R141)			
R142, R145)	----Carbon, 220K, 1/2w, 10%.....	3229A-224	.10
R107	Carbon, 10K, 1/2w, 10%.....	3229A-103	.10
R109	Carbon, 2.2K, 1/2w, 10%.....	3229A-222	.10
R113	Carbon, 47 ohms, 1/2w, 10%.....	3229A-470	.10
R114 R129	Carbon, 22K, 1/2w, 10%.....	3229A-223	.10
R115	Carbon, 100K, pw, 10%.....	3229A-104	.10
R116	Carbon, 15K, 1w, 10%.....	3229A-153	.10
R127	Carbon, 47K, 1/2w, 10%.....	3229A-473	.10
R132	Carbon, 15K, 1/2w, 10%.....	3229A-153	.10
R137	Carbon, 270, 2w, 10%.....	3225A-271	.40
R138, R139	Carbon, 10 megohm, 1/2w, 10%.....	3229A-106	.10
R143	Carbon, 4.7 megohm, 1/2w, 10%.....	3229A-475	.10
R144	Carbon, 470K, 1/2w, 10%.....	3229A-474	.10
R147	Carbon, 15 ohms, 1/2w, 10%.....	3229A-150	.10
R146A	Molded Resistor, 1000 ohms, 5w)		
R146B	Molded Resistor, 400 ohms, 5w)-----	77463	.80
R134	Volume Control (dual 3.2 megohms).....	650285A-1	2.15
R135A	Treble Tone Control, 500K)		
R135B	Bass Tone Control, 3.2 megohms)-----	78159	1.80
R150	Carbon, 680K, 1/2w, 10% (C-318 only).....	3229-684	.10

CHASSIS C-282, C-318

Parts List Radio Chassis C-282 & C-318 Cont'd.

Ref. no.	Description	Part no.	List
- INDUCTANCES -			
T101	Transformer, 1st FM IF.....	650251A-1	1.40
T102, T104	Transformer, 1st & 2nd AM IF.....	452019A-1	1.60
T103	Transformer, 2nd FM IF.....	452027A-1	1.45
T105	Transformer, Ratio Detector.....	452028A-1	2.00
T106	Transformer, 3rd AM IF.....	450336A-1	1.50
T107	Transformer, AM Converter.....	38961	1.20
T108	Transformer, Power.....	750182A-1	11.10
T109	Transformer, Output.....	650245A-1	3.50
L101	Loop Antenna Assembly (AM).....	750165A-1	5.35
L102	Wave Trap Coil (Part of Ass'y, 750165A-1)		
L103	Coil Assembly, Loop Loading.....	38963	.60
L104	Coil Assembly, FM Antenna.....	38958	.55
L106	Coil Assembly, FM Mixer.....	38959	.50
L107	Coil Assembly, FM Oscillator.....	38960	.55
L111	Coil Assembly, AM Oscillator.....	452030A-1	.80
L105, L108, L109)			
L110, L112, L113)---	RF Choke Coil.....	38884	.20

- MISCELLANEOUS -

Description	Part no.	List
Printed Circuit.....	77462	1.60
Band Switch.....	750158B1	4.15
Cable--Pre Amp (C-282 only).....	650259A-1	1.10
Cord--Phono AC.....	22193	1.25
Line Cord.....	650171A2	.60
Pointer.....	650252A1	.20
Pointer Sleeve.....	452043A2	.10
Pointer Rod.....	55383	.15
Drive Cord Assembly.....	452041AG1	.65
Dial Glass (AM) (C-282 only).....	750161B1	.35
Dial Glass (FM) (C-282 only).....	750161B2	.35
Channel (Dial Glass).....	452042A2	.15
Hum Shield.....	05147	.10
Speaker Socket.....	80030	.10
Connector (Phono-Tel.).....	450972A1	.20
Dial Glass (AM) (C-318 only).....	750284A-1	.36
Dial Glass (FM) (C-318 only).....	750284A-2	.36

PARTS LIST PRE-AMPLIFIER CHASSIS C-295

- RESISTORS -

Ref. no.	Description	Part no.	List
R106	Carbon, 22K, 1/2w, 10%.....	3229A-223	.10
R105	Carbon, 47K, 1/2w, 10%.....	3229A-473	.10
R102, R104	Carbon, 100K, 1/2w, 10%.....	3229A-104	.10
R103	Carbon, 120K, 1/2w, 10%.....	3229A-124	.10
R108	Carbon, 220K, 1/2w, 10%.....	3229A-224	.10
R101	Carbon, 33K, 1/2w, 10%.....	3229A-334	.10
R107, R109	Carbon, 6, 8 megohm, 1/2w, 10%.....	3229A-685	.10

- CAPACITORS -

Ref. no.	Description	Part no.	Li
C102	OPT, .047 ufd, 200V.....	2246A-4730	.
C103	OPT, .001 ufd, 600V.....	2248A-1020	.
C101, C105	OPT, .0022 ufd, 600V.....	2248A-2220	.
C104	Mica, 330 uuf, 500V.....	650162A-9	.
C106	Elect, 10 ufd, 450V.....	452203A-1	1.

- MISCELLANEOUS -

Description	Part no.	Li
Pickup Cable.....	22169	1.
Output Cable.....	22170	.
Power Cable....	650258A-1	.

PARTS LIST RADIO CHASSIS C-305

- RESISTORS -

Ref. no.	Description	Part no.	Li
R101	8.2K 1/2w, 10%.....	3229A-822	.
R102, 113, 117, 121, 141	1K 1/2w, 10%.....	3229A-102	.
R103, 116, 120	3.3K 1/2w, 10%.....	3229A-333	.
R104	27K 1/2w, 10%.....	3229A-273	.
R105, 115, 119, 124	68 ohms, 1/2w, 10%.....	3229A-680	.
R106	560 ohms, 1/2w, 10%.....	3229A-561	.
R107	100 ohms, 1/2w, 10%.....	3229A-101	.
R108	18K 1/2w, 10%.....	3229A-183	.
R109, R111	2.2 meg, 1/2w, 10%.....	3229A-225	.
R110, 114, 118, 130	1 meg 1/2w, 10%.....	3229A-105	.
R112, 129, 131	10 meg 1/2w, 10%.....	3229A-106	.
R122, 132, 134, 135) 136, 137)	220K 1/2w, 10%.....	3229A-224	.
R123	47K 1/2w, 10% (Part of Diode Filter, 452171A-1)		.
R125	22K 1/2w, 10%.....	3229A-223	.
R126	470K 1/2w, 10%.....	3229A-474	.
R127	39K 1/2w, 10%.....	3229A-393	.
R128 A&B	Control (Vol. & Switch).....	650285A-1	2.
R133 A&B	Control (Tone).....	750303A-5	1.
R138	270 ohms 2w, 10%.....	3235A-271	.
R139 A&B	Molded Resistor.....	750288A-3	.
R140	15 ohms 1/2w, 10%.....	3229A-150	.
PC101	Printed Circuit.....	452927A-1	1.

- CONDENSERS -

Ref. no.	Description	Part no.	Li
C101 A B D C E F	Tuning Gang & Trimmers.....	650278A-1	7.
C102 A G C D E F	240 mmf Ceramic.....	650501A-3	.
C103			.
C104, 105, 106, 107 118, 119, 121, 122, 123, 125, 126, 127, 132, 150	5000 mmf, Ceramic Disc.....	450469A-1	.
C108	4.7 mmf Ceramic.....	650030A-10	1
C109, 130	150 mmf, Mica.....	650162A-8	.
C112	68 mmf, Cer. N-330.....	2241A-558	.
C111	4.7 mmf Cer. N-750.....	650030A-12	.
C110	56 mmf, Cer. N-330.....	2241A-554	.

CHASSIS C-282, C-305

Parts List Radio Chassis C-305 Cont'd.

Ref. no.	Description	Part no.	List
C113	20 mmf, Cer. N-750	2241A-722	.25
C114	100 mmf, Cer. N-750	2241A-766	.25
C115	50 mmf, Ceramic	650501A-24	.20
C116	100 mmf, Cer. N-150	2241A-367	.40
C117, 124	1500 mmf, Silver Mica	650514A-13	.90
C120	.1 mfd 200V OPT.....	2246A-1040	.25
C137	100 mmf, Mica	750 27 2A-11	.20
C131, 144, 145	.0033 mmf 600V OPT	2248A-3320	.20
C133	2 mfd, 50V Elec.....	452132A-1	5.40
C134, 135, 136, 138, 141)	.01 600V OPT.....	2248A-1030	.20
C139, 142	.022 600V OPT.....	2248A-2230	.25
C140	470 mmf 10% Mica.....	750 27 2A-12	.25
C143	25 mfd 25V Elec.....	650228A-7	.80
C146, 147	.0047 600V (Line Buffer).....	2244A-4720	.25
C148 ABC	30 20 20 mfd 450V. Elec.....	750090B-30	3.45
C128, 129, R123	Diode Filter.....	452171A-1	

- TRANSFORMERS -

T101	Coil AM Oscillator.....	452174A-1	.90
T102	Coil AM Mixer.....	452466A-1	1.53
T103	1st FM IF.....	650251A-1	1.40
T104, 106	1st & 2nd AM IF.....	452091A-1	.40
T105	2nd FM IF.....	452027A-1	1.45
T107	Ratio Detector.....	452028A-1	2.00
T108	3rd AM IF.....	450336A-1	1.50
T109	Output.....	650245A-1	3.50
T110	Power.....	750182A-1	11.10
L101	Loop Antenna.....	750194A-G1	1.20
L102	Antenna Coil (FM).....	452459A-1	.10
L103	Coil Assembly (FM Mixer & Osc).....	452454A-1	.25
L104, 105	Choke (RF Heater).....	38884	.20

- MISCELLANEOUS -

	Band Switch.....	750238A-1	
	Speaker Socket.....	80030	.10
	Connector (Phono-TV).....	450972A-1	.20
	Dial Glass AM.....	750161B-1	.35
	Dial Glass FM.....	750161B-2	.35
	Channel (Dial Glass).....	452042A-2	.15
	Pointer.....	650252A-1	.20
	Line Cord.....	650171A-2	.60
	Cord (Phono AC).....	650502A-1	1.25
	Cable (Pre Amp).....	650259 A-1	1.10
	Speaker.....	850105A-1	14.35
	Receptacle (2 prong).....	450427A-1	.30
	Mounting Clips.....	58514	.10

PARTS LIST RADIO CHASSIS C-284

- CAPACITORS -

Ref. no.	Description	Part no.	List
C101	Variable (3 gang) tuning Capacitor.....	452040A-G1	5.25
C102A)	Antenna Trimmer)		
C102B)-----	RF Trimmer)-----Part of Assembly.#452040A-G1		
C102C)	Osc. Trimmer)		

Parts List Radio Chassis C-284 Cont'd.

Ref. no.	Description	Part no.	Li
C144	Ceramic, 3.3 uuf., 20%, 500V.....	650030-5	.
C103	Ceramic, 240 uuf., 20%, 500V.....	25427	.
C143	Ceramic, 50 uuf., 10%, 500V.....	25493	.
C108	Ceramic, 1uuf., 20%, 500V.....	25497	.
C110)			
C141)	-----Ceramic, 10 uuf., 10%, 500V.....	25479	.
C142)			
C146	Ceramic, 20 uuf., 10%, 500V.....	25492	.
C106, C109)			
C113, C116)	-----Ceramic Disk, 5000 uuf., 450 V.....	450469A-1	.
C140, C144)			
C104	Mica, 47 uuf., 10%, 500V (part of Assy, #750165A-1)		.
C112	Mica, 47 uuf., 10%, 500V.....	25193	.
C115	Silver mica, 1500 uuf., 5%, 500V.....	25299	.
C120	Mica, 10 uuf., 10%, 500V.....	25049	.
C121, C122)			
C126, C139)	-----Mica, 100 uuf., 10%, 500V.....	25188	.
C127	Mica, 470 uuf., 20%, 500V.....	25285	.
C105, C107)			
C119, C123)	-----OPT., .047 ufd., 20%, 600V.....	2248A-4730	.
C137, C148)			
C125, C124)			
C128, C138)	OPT., .01 ufd., 20%, 600V.....	2248A-1030	.
C147)			
C118	OPT., .1 ufd., 20%, 200V.....	2246A-1040	.
C129, C130)	-----OPT., .022 ufd., 20%, 600V.....	2248A-2230	.
C131, C132)	-----OPT., .0033 ufd., 20%, 600V.....	2248A-3320	.
C134, C135)	-----MPT., .0047 ufd., 20%, 600V.....	2244A-4720	.
C133	Elec., 25 ufd., 25V.....	25158	.
C136A	Elec., 30 ufd., 350V)		.
C136B, C136C)	-----Elec., 20 ufd., 350V)-----	25424	3

- RESISTORS -

R101, R116)			
R117, R118)	-----Carbon, 1 meg. 1/2w., 10%.....	3229A-105	.
R140)			
R102, R14	Carbon, 220 ohms, 1/2w., 10%.....	3229A-221	.
R103, R106	Carbon, 1K, 1/2w., 10%.....	3229A-102	.
R104, R107)			
R141)	-----Carbon, 100K, 1/2w., 10%.....	3229A-104	.
R105	Carbon 10K, 2w., 10%.....	3235A-103	.
R108	Carbon, 68 ohms, 1/2w., 10%.....	3229A-680	.
R109	Carbon, 22K, 1/2w., 10%.....	3229A-223	.
R111, R115)			
R138)	-----Carbon, 33K. 1/2., 10%.....	3229A-333	.
R119	Carbon, 47K, 1/2w., 10%.....	3229A-473	.
R120, R127)			
R128, R129)			
R130, R132)			
R137)	-----Carbon, 220 K. 1/2w., 10%.....	3229A-224	.
R121	Carbon, 6.8K. 1/2w., 10%.....	3229A-682	.
R122	Carbon, 68K, 1/2w., 10%.....	3229A-683	.
R124, R125)	-----Carbon, 10 meg., 1/2w., 10%.....	3229A-106	.
R131	Carbon, 270 ohms. 2w., 10%.....	3235A-271	.
R135	Carbon, 680K. 1/2w., 10%.....	3229A-684	.
R136	Carbon, 15 ohms, 1/2w., 10%.....	3229A-150	.
R139	Carbon. 470 ohms, 1/2w., 10%.....	3229A-471	.
R123A	Front Section, 3.2 meg. (1/2w.) Dual Volume)		.
R123B	Rear Section, 3.2 meg., (1/2w.) Control & Switch)-----	650285A-1	2
R126A	Bas Section, 3.2 meg. (1/2w.)		.

CHASSIS C-282, C-284,
C-305, C-318

Parts List Radio Chassis C-284 Cont'd.

Ref. no.	Description	Part no.	List
R126B	Treble Section, 3.2 meg. $\frac{1}{2}$ w.) Dual Tone Controls-----	78 159	1.80
R133A	1000 Ohm Section)		
R133B	400 Ohm Section)--Molded Resistor.....	77463	.80

- COILS & TRANSFORMERS -

T101	RF Coil.....	650 248A-1	1.15
T102	1st IF Transformer.....	4520 19A-1	1.60
T103, T104	2nd & 3rd IF Transformer.....	450336A-1	1.50
T105	Audio Output Transformer.....	650 245A-1	3.50
T106	Power Transformer.....	750 182A-1	11.10
L101	Loop Antenna Assembly.....	750 165A-1	5.35
L102	Wave Trap Coil (Part of 750165A-1)		
L103	Loop Loading Coil.....	45 20 20A-1	.70
L104	Oscillator Coil.....	4520 21A-1	.80

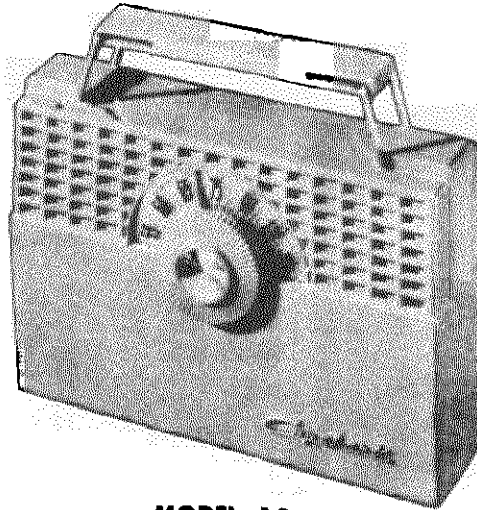
- MISCELLANEOUS -

Description	Part no.	List
Operation Selector (Band) Switch.....	750 156A-1	3.10
AC Line Cord.....	650 17 1A-1	1.30
Phono AC Cable.....	22193	1.25
Dial Cord Assembly.....	45204 1A-G1	.65
Dial Pointer.....	650252A-1	.20
Dial Pointer Sleeve.....	452043A-2	.10
Dial Glass.....	650250B-1	.45
Speaker Socket.....	80030	.10
Connector (Phono-TV Sound).....	450972A-1	.20
Connector (Video AC).....	450973A-1	.10

CABINET ASSEMBLY PARTS LIST FOR
RADIO PHONO MODELS 1007AM, 1008M & AM, 1009F & AF, & 1010B & AB

Description	Part no.	Price
Glass Escutcheon (Radio) (for 1009F, AF & 1010B).....	750 186B-1	1.60
Glass Escutcheon (Radio) (for 1008M & AM).....	750 186B-3	1.60
Glass Escutcheon (Radio) (for 1007AM).....	650 305A-1	.75
Speaker (12" PM).....	850 105A-2	14.35
Loop Antenna Ass'y. (for 1007AM, 1008M, 1009F, 1010B).....	750 165A-G3	5.90
Loop Antenna Ass'y. (for 1008AM, 1009AF & 1010AB).....	750 194A-G1	1.20
Tuning Knob (for 1010B & AB).....	650 207A-2	.10
Tuning Knob (for 1009AF).....	45 268 1A-1	.26
Tuning Knob (for 1007AM, 1008M, & AM, 1009F).....	650 207A-1	.10
Volume Knob (for 1010B & AB).....	650 207A-2	.10
Volume Knob (for 1007AM, 1008M & AM, 1009F).....	650 207A-1	.10
Volume Knob (for 1009AF).....	45268 1A-1	.26
Bandswitch Knob (for 1010B & AB).....	650 206A-2	.40
Bandswitch Knob (for 1007AM, 1008M & AM, 1009F).....	650 206A-1	.40
Bandswitch Knob (for 1009AF).....	45 2684A-1	.44
Bass Tone Knob (for 1010B & AB).....	59538-2	.15
Bass Tone Knob (for 1007AM, 1008M & AM, 1009F).....	59538-1	.20
Bass Tone Knob (for 1009AF).....	452682A-1	.26
Treble Tone Knob (for 1010B & AB).....	59539-2	.15
Treble Tone Knob (for 1007AM, 1008M & AM, 1009F).....	59539-1	.20
Treble Tone Knob (for 1009AF).....	45 2683A-1	.23
Audio Cable.....	22150	1.15
Jewel (ON-OFF Indicator) (not used in 1007AM).....	452429A-1	.25
Bracket (ON-OFF Indicator) (not used in 1007AM).....	452428A-1	.35
Socket Assembly (Indicator Light) (not used in 1007AM).....	452427A-1	.50
Noise Eliminator Assembly (not used in 1007AM).....	45 210 1A-GL	1.40
3 position switch.....	90265	.30
Capacitor (.01, 200V, OPT).....	2246A-1030	.20
Capacitor (.047, 200V, OPT).....	2246A-4730	.20
Resistor (4.7K, $\frac{1}{2}$ w, 10%).....	3229A-159	.10
Resistor (15K, $\frac{1}{2}$ w, 10%).....	3229A-472	.10
Noise Eliminator Escutcheon (for 1010B & AB).....	452297A-4	.35
Noise Eliminator Escutcheon (for 1008M & AM, & 1009F & AF).....	452297A-2	.30
Capehart Emblem.....	45 2188B-1	.25

MODEL 1
Ch. C-31



MODEL 10

SPECIFICATIONS

Tube Complement:

Type	Purpose
IR5	Oscillator-Converter
1U4	I-F Amplifier
1U5	Detector, AVC & 1st Audio Amplifier
3V4	Power Output

Frequency Range:

AM Broadcast Band532 KC to 1620 KC

Power Source:

Rating	
0.25 Amp. at 1½ VDC & 9.8 Milliamps at 67½ VDC	
"A" Battery	1.5 volts (Flashlight type D)
"B" Battery	67.5 volts

Loudspeaker:

Size and typeElliptical 2 x 3 inch
Voice coil impedance3.2 ohms

Antenna:

Built-in "ferrite rod" antenna in rear of cabinet.

Cabinet Dimensions:

Height: 5½ inches Width: 7½ inches
Depth: 2¼ inches

Weight:

Including batteries: 3¼ pounds

STAGE GAIN MEASUREMENTS

To facilitate troubleshooting and to determine proper operation of circuits, the following data is presented. To make these measurements, a signal generator (covering the specified frequencies) and a VTVM are required. The signal generator output should be maintained low to avoid AVC action. The listed values of gain may have tolerances of 20%.

Gain Measurements:

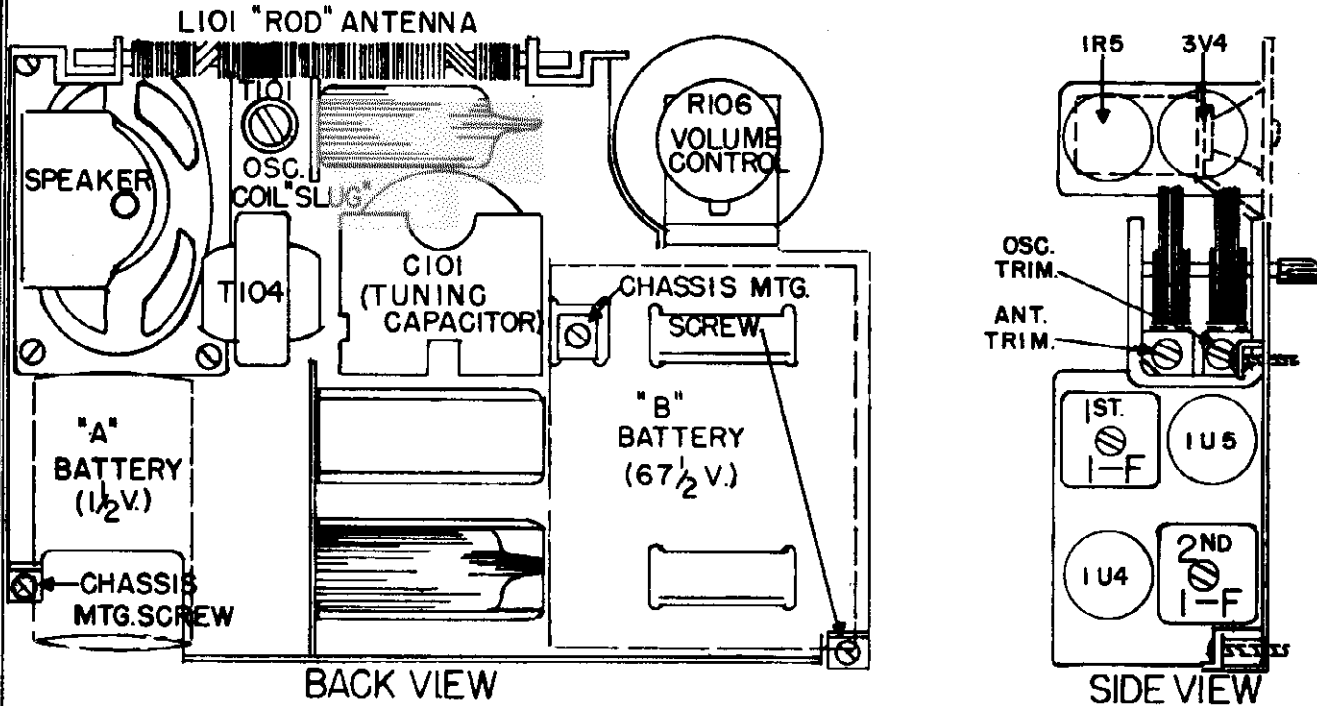
IR5 Conv. Grid (pin 6) to 1U4 Grid (pin 6) .....	.....25 @ 1000
1U4 Grid (pin 6) to 1U5 Diode plate (pin 4) .....	.....74 @ 455
1U5 Diode Plate (pin 4) to 3V4 Grid (pin 6) .....	.....37 @ 455
3V4 Grid (pin 6) to Speaker Voice Coil .....	.....19 @ 400 C.

MODEL 10,
Ch. C-312

TO REMOVE CHASSIS FROM CABINET

1. Remove the cabinet back cover and pull off the tuning knob.
2. Remove both the "A" and "B" batteries.
3. Remove the 3 chassis mounting screws (refer to the chassis layout drawing below).
4. Lift the chassis out of the cabinet from the bottom first

and pull down to clear the volume knob at the top. To operate the chassis outside the cabinet, solder two short clip leads to a flashlight cell and connect them to the "A" battery leads on the chassis (observe polarity). The "B" battery can be connected normally. Note: To prevent damage to the gang condenser, do not place the chassis face down on the service bench.



ALIGNMENT INSTRUCTIONS

Equipment required:

1. Calibrated R.F. Signal Generator (Signal from 455KC to 1620KC).
2. Low Range Output Meter.

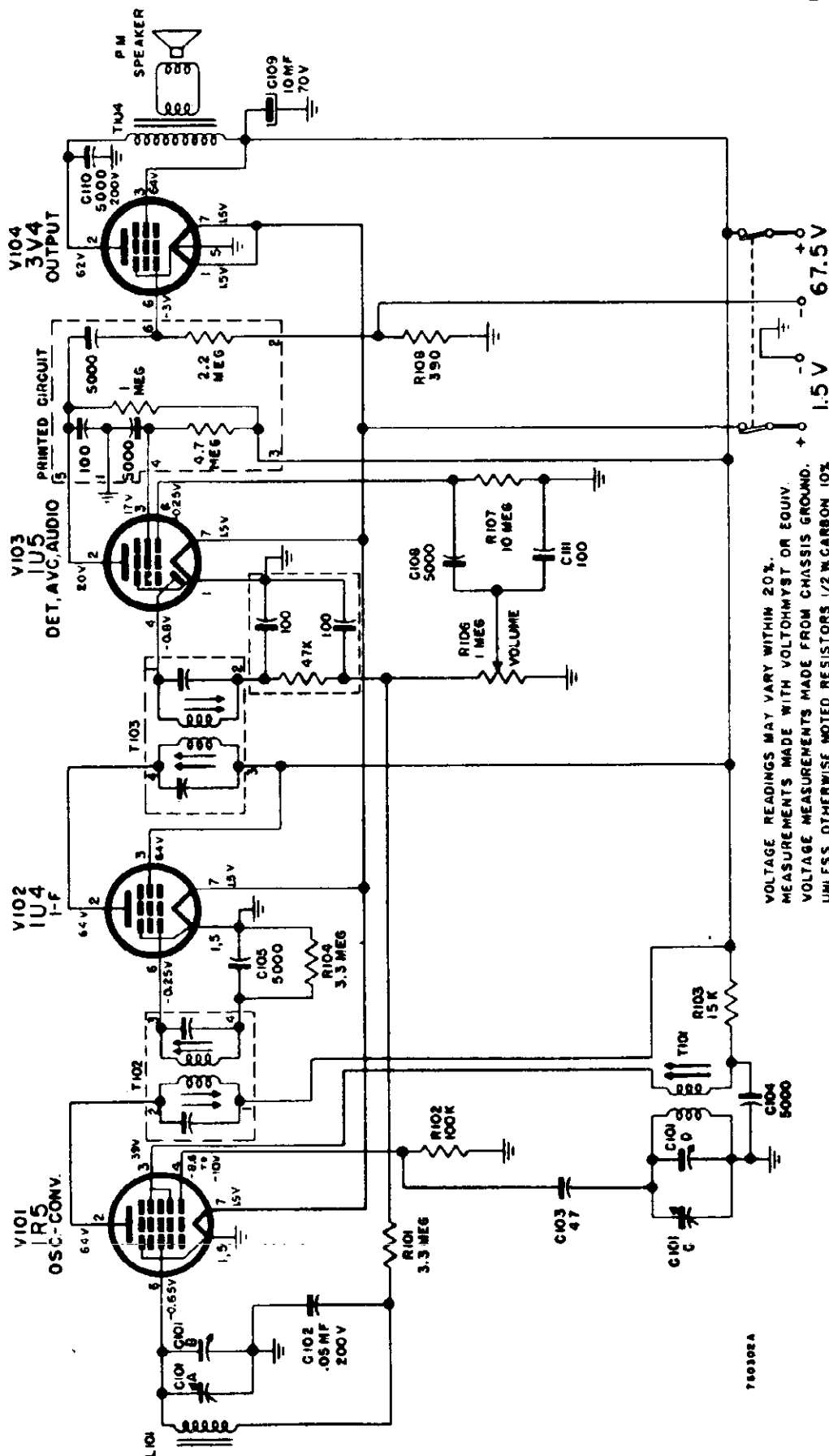
Alignment:

- a. Turn set on, adjust volume to maximum.
- b. See that dial pointed coincides with calibration marks at extremes of dial scale.
- c. Connect output meter across the speaker voice coil.

Step No.	Set RF Generator At	Connect RF Generator To	Set Gang Condenser To	Adjust	To Obtain
1	455KC (400 ~ Mod.)	To Grid of 1U4 (pin 6 of V102)	Fully Closed	IF Slugs T103	Max. Output
2	455KC (400 ~ Mod.)	To Grid of 1R5 (pin 6 of V101)	Fully Closed	IF Slugs T102	Max. Output
3	1620KC	To Grid of 1R5 (pin 6 of V101)	1620KC (Gang fully open)	Osc. Trimmer C101C	Max. Output
4	532KC	To Grid of 1R5 (pin 6 of V101)	532KC (Gang fully closed)	Osc. Slug T101	Max. Output
5	1500KC	See Note 1	1500KC	RF Trimmer C101A	Max. Output
6	600KC	See Note 1	600KC	Compress or spread turns on Rod Antenna (at end next to Vol. Control)	Max. Output
7	Repeat Step 5				

Note 1: Make a loop of the R-F Generator leads (Connect the leads together through a .01 mfd capacitor) and loosely couple to the Rod Antenna.

SCHEMATIC DIAGRAM CAPEHART PERSONAL PORTABLE

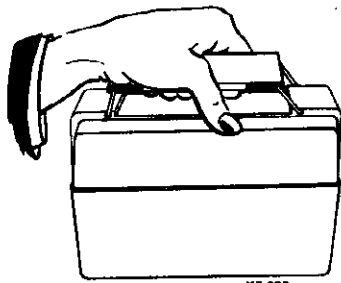


VOLTAGE READINGS MAY VARY WITHIN 20%.
MEASUREMENTS MADE WITH VOLTOHMYST OR EQUIV.
VOLTAGE MEASUREMENTS MADE FROM CHASSIS GROUND.
UNLESS OTHERWISE NOTED RESISTORS 1/2 W. CARBON 10%.

T10302A

MODEL 10,
Ch. C-312

BATTERY REPLACEMENT



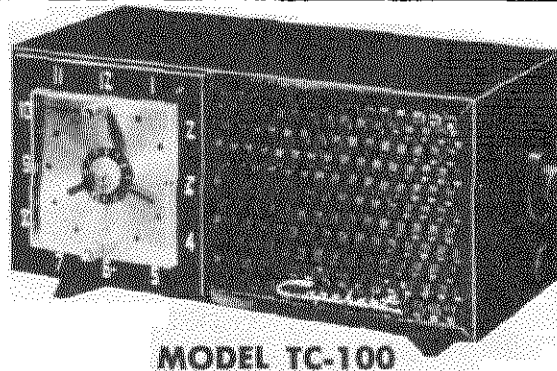
Both the "A" and "B" batteries are easily removable from the rear of the cabinet. To remove the cabinet back grasp the handle with the fingers, placing the thumb on the top of back cover (see illustration) exert thumb pressure down and away from the case. To replace the case, insert the bottom first. Exert downward pressure on back and close at top. A drawing showing proper location of the batteries is included on the inside of the back cover. When replacing batteries always try the "A" battery first. Under intermittent operating conditions, battery life is estimated at approximately 40 hours for the "B" battery and approximately 10 hours for the "A" battery. The batteries can be replaced with the following types or their equivalent: "A" battery—Everyready type 950. "B" battery—Everyready type 467. Do not allow run down batteries to remain in the cabinet. If the receiver is not to be used for a long period of time, the batteries should be removed.

— PARTS PRICE LIST —

REF. NO.	DESCRIPTIONS	PART NO.	LIST PRICE
CAPACITORS			
C1, A, B, D, & C	Tuning Capacitor	650448A-1	\$3.30
C2	.047 ufd, 200V	650450A-473	.30
C3	47 uuf, 400V Ceramic 10%	2240-006	.20
C4, 5, 8	5000 uuf, 400V Ceramic Disc	450469A-1	.25
C6, 7	Part of Diode Filter part no. 452171A-1		
C9	10 ufd, 70V Electrolytic	452132A-2	.90
C10	.0047 ufd, 200V	650450A-472	.20
C11	100 uuf, Ceramic 20%	2240-014	.20
RESISTORS			
R1, 4	3.3 meg, ½w, 10%	3229-335	.10
R2	100K, ½w, 10%	3229-104	.10
R3	15K, ½w, 10%	3229-153	.10
R5	Part of Diode Filter part no. 452171A-1		
R6	Volume Control & On-Off Switch	750276A-1	1.20
R7	10 meg, ½w, 10%	3229-106	.10
R8	390 ohm, ½w, 10%	3229-391	.10
INDUCTANCES			
T1	Oscillator Coil	452610A-1	.80
T2, 3	I-F Transformer	750273A-1	1.55
T4	Output Transformer	452612A-1	1.90
L101	Rod Antenna	452614A-1	1.10
MISCELLANEOUS			
	*Cabinet Assembly (Green)	452815A-G4	3.70
	*Cabinet Assembly (Taupe)	452815A-G1	3.70
	*Cabinet Assembly (Burgundy)	452815A-G3	3.70
	Tuning Knob (for Taupe Cabinet)	452750A-1	.40
	Tuning Knob (for Burgundy Cabinet)	452750A-3	.40
	Tuning Knob (for Green Cabinet)	452750A-4	.40
	Volume Knob (for Green Cabinet)	452749B-2	.30
	Volume Knob (for Taupe & Burgundy Cabinets)	452749B-1	.30
	Set Screw for Volume Control	2041-122	.10
	Dial Background	452781A-1	.10
	Dial Pointer	452748A-1	.20
	Speaker	650451A-1	5.55
	Mtg. Clips for I-F Transformer	452647A-1	.10
	Diode Filter (R5, C6, C7)	452171A-1	.55
	Printed Circuit	452615A-2	.85
	"A" Battery Clip	452814A-1	.10
	Cabinet Back Cover (Taupe)	750278A-1	.95
	Cabinet Back Cover (Burgundy)	750278A-3	.95
	Cabinet Back Cover (Green)	750278A-4	.95
	Cabinet Handle (Taupe)	650491A-1	.30
	Cabinet Handle (Burgundy)	650491A-3	.30
	Cabinet Handle (Green)	650491A-4	.30
	Handle Link	452818A-1	.10

* Consists of entire front portion of cabinet complete.

MODELS TC-101
Ch. CR-36; TC-101, Ch. C-297



MODEL TC-100

CHASSIS DESCRIPTION

The C-297 & CR-36 are 5 tube radio chassis, designed for reception of AM (Broadcast Band) signals only. Since the chassis are operated in conjunction with an electric clock mechanism, they are to be operated only from an alternating current (AC) source. The two chassis are identical with exception that the CR-36 includes an appliance outlet.

The power source for the chassis is turned "on" and "off" by the Control Knob on the clock. When the Control Knob is in the "On" position, the radio

chassis power source is on and it is not controlled by the clock. When the Control Knob is in the "Off" position, the power source to the chassis is off and it cannot be turned on by the clock. When the Control Knob is in the "Auto" position, the power source is off, however, it will be turned on automatically by the clock mechanism at the time to which the clock alarm is set.

NOTE: The clock motor will be energized at a certain time each day when the line cord is connected to the power source.

SPECIFICATIONS

Tube Complement:

Type	Purpose
12BE6	Oscillator-Converter
12BA6	I-F Amplifier
12AV6	Detector, AVC & 1st Audio Amplifier
50C5	Power Output
35W4	Rectifier

Frequency Range:

AM Broadcast Band540KC to 1620 KC

Power Source:

Rating105-125 volts, 60 cycle AC only
Power Consumption35 watts

Appliance Outlet: (Model TC-101 only)

Maximum Rating1100 watt

Loudspeaker:

Size and type4 inch P
Voice Coil Impedance3.2 ohm

Power Output:

.....1.5 watt

Antenna:

Built-in loop in rear of cabinet.

Cabinet Dimensions:

Height 5³/₈ inches, Width 11⁷/₈ inches,
Depth 5⁷/₈ inches.

OPERATING INSTRUCTIONS

TO SET ALARM FOR EITHER AUTOMATIC RADIO OPERATION OR "BUZZER" OR COMBINATION OF BOTH

Pull out Alarm Knob and Turn to the left; this motion will rotate the small disk in the center of the clock face. Turn the knob until the small red pointer indicates the desired time on the disk. When the Control Knob is on "AUTO", the radio will turn on automatically. Of course, the radio should be pre-tuned to a station and the Volume Control should be pre-set to the desired level to obtain proper automatic radio operation. If the

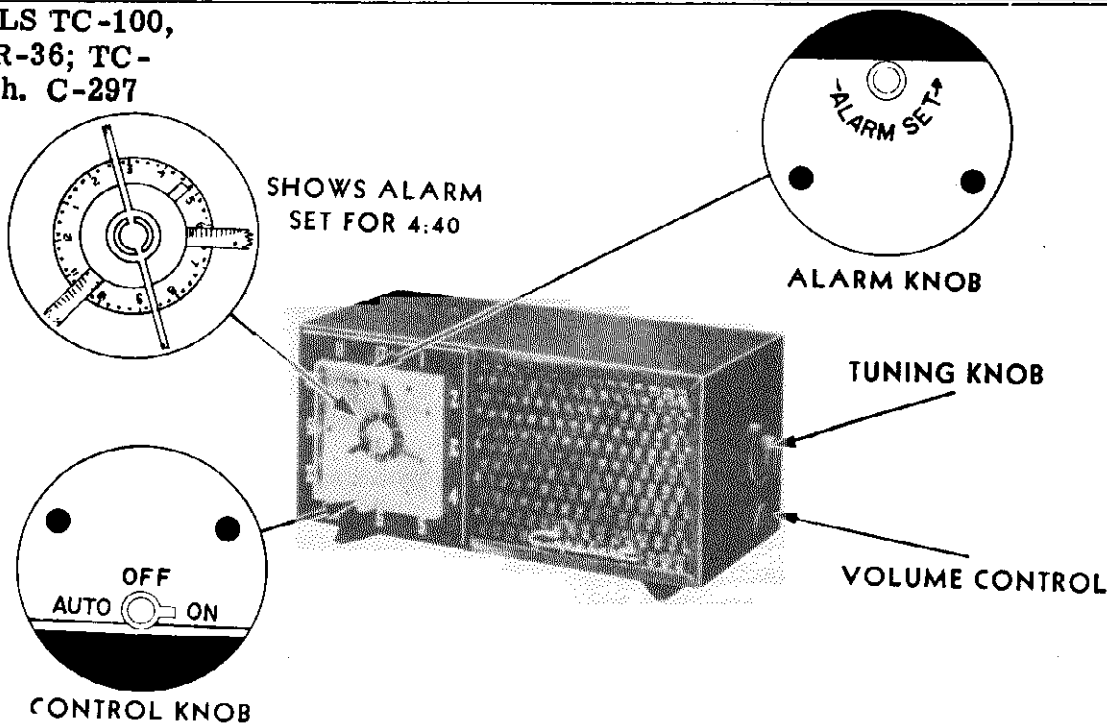
Alarm Knob is in the out position, the "buzzer" will be sounded shortly after the radio turns on.

If it is desired to have the alarm only, independent of the radio, pull the Alarm Knob out and set the Control Knob to "Off".

TO SET CLOCK

Rotate the knob on the rear of the cabinet in the clockwise direction. This will cause the clock hands to move in the normal direction. Do not cause the clock hands to move backward.

MODELS TC-100,
Ch. CR-36; TC-
101, Ch. C-297



TO PLAY RADIO MANUALLY

1. Set the Control Knob to the "ON" position.
2. Adjust the Tuning Knob for the desired station.
3. Set the Volume Control so that some sound is heard from the speaker. Then re-adjust the Tuning Knob for the desired station, in the conventional manner, by setting the calibrations on the outer ring of the Tuning Knob against the small indicator located directly above it. Slight mis-adjustment of tuning will cause distortion, therefore, the

Tuning Knob should be used to adjust for the clearest sound and the Volume Control for the proper sound volume.

TO TURN ON APPLIANCE AUTOMATICALLY (TC-101 ONLY)

Plug electrical appliance into outlet on rear of radio, set Control Knob at "Auto" position and the appliance will be turned on at the time determined by the setting of the Alarm Knob. The radio will operate at the same time, but if radio music is not desired the Volume Knob should be turned fully to the left.

ALIGNMENT INSTRUCTIONS

Equipment required:

1. Calibrated R.F. Signal Generator (Signal from 455KC to 1620KC).
2. Low Range Output Meter.

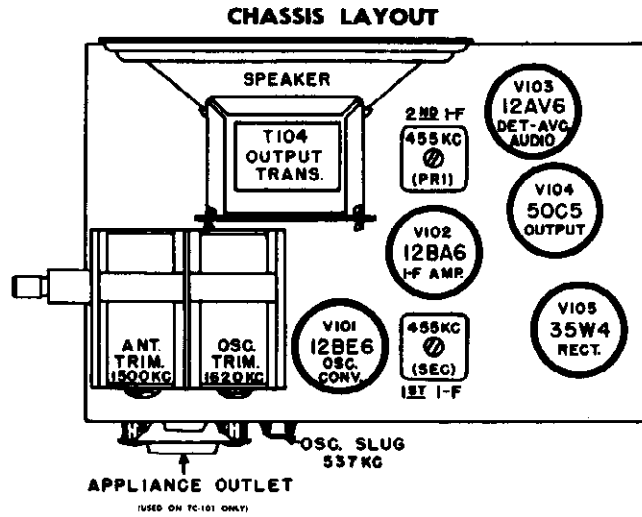
Alignment:

- a. Turn set on, adjust volume to maximum.
- b. Connect output meter across the speaker voice coil.
- c. Make a loop of the R-F Generator leads (connect the leads together through a .01mfd capacitor) and loosely couple to the Loop Antenna.

Step	Set RF Generator At	Set Condenser Gang At	Adjust	To Obtain
1	455KC	Tune To Quiet Point	IF Slugs T103 T102	Max. Output
2	1620KC	Fully Open	Osc. Trimmer C103D	Same
3	1500	1500	RF Trimmer C103B	Same
4	600KC	600KC	*T101 Osc. Slug	Same

* Adjust as Tuning Gang is Rocked

MODELS TC-100, Ch. CR-36; TC-101, Ch. C-297



REMOVAL AND SERVICE OF CLOCK MECHANISM

SERVICE

When it is determined that the clock requires adjustment or repair, remove the clock mechanism from the cabinet (as per the following instructions) and return the clock mechanism to your Capehart distributor or an agency specified by him. If the clock mechanism is to be shipped by mail or express, be certain that it is adequately protected and properly packed.

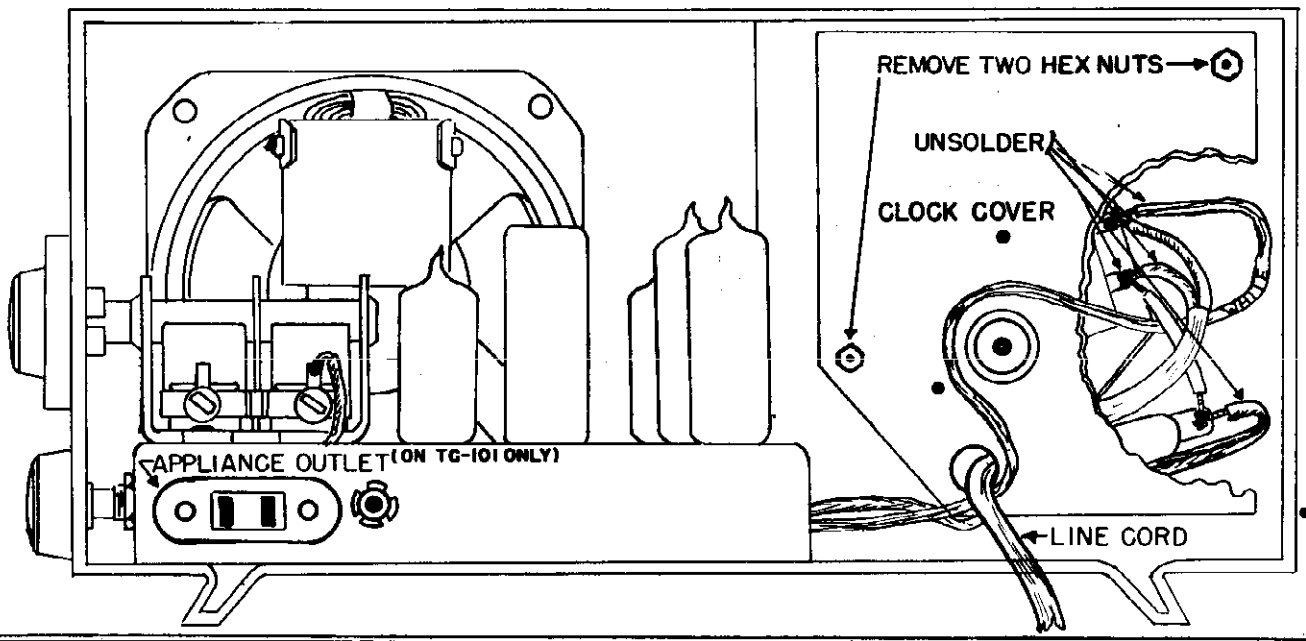
TO REMOVE CLOCK

1. Remove the back of the cabinet by pulling off.

Note the loop antenna is fastened to the cabinet back and care should be exercised not to break off the leads.

2. Remove the two hex nuts which fasten the clock to the metal cover. Keep the metal cover and hardware (2 hex nuts, and 2 fibre washers) with the cabinet, do not return this material with the clock.
3. Pull clock out from the front of the cabinet.
4. Unsolder four (4) electrical leads from the clock. (See sketch below).
5. Remove clock.

NOTE: To re-install the clock follow the above procedure in reverse.



MODELS TC-100, Ch. CR-36;
TC-101,
Ch. C-297

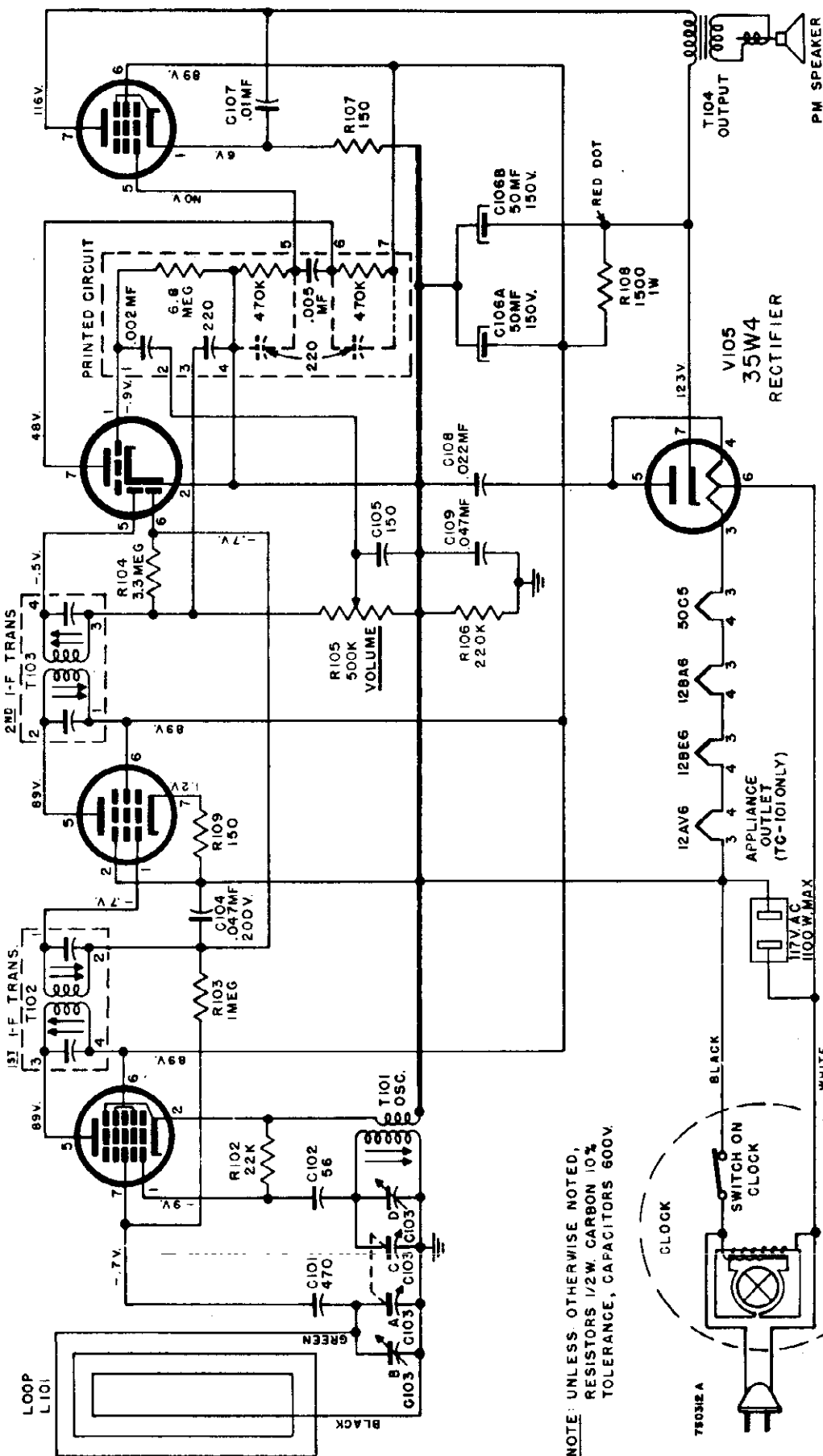
SCHEMATIC DIAGRAM

V104
50C5
OUTPUT

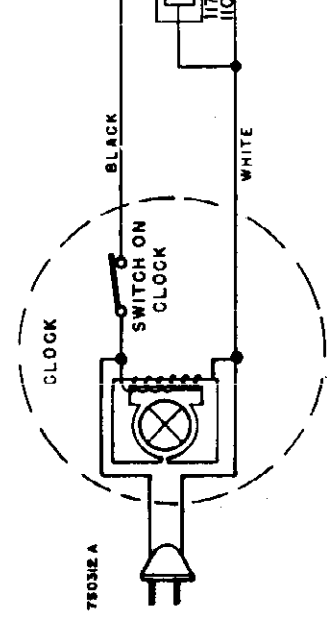
V103
12AV6
DET. AVC - 1ST AUDIO

V102
12BA6
I-F AMP.

V101
12BE6
OSC.-CONV.



NOTE: UNLESS OTHERWISE NOTED,
RESISTORS 1/2W. CARBON 10%
TOLERANCE, CAPACITORS 600V.

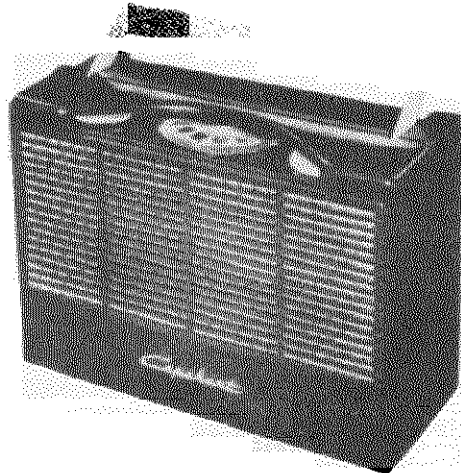


VOLTAGE READINGS VARY WITHIN 20%
MEASUREMENTS MADE WITH VOLTOHMYST OR EQUIV.
VOLTAGES MEASURED FROM B-

MODELS TC-10
Ch. CR-36; TC-
101, Ch. C-297

Ref. No.	DESCRIPTION	Part No.	List
INDUCTANCES			
L101	Loop Antenna	750207A-1	\$1.00
T101	Oscillator Coil	452242A-1	.75
T102	1st IF Transformer	452243A-1	1.40
T103	2nd IF Transformer	452243A-1	1.40
T104	Output Transformer (Part of Assy. No. 750204A-1)		
RESISTORS			
R102	22K, 1/2W, 10%	3229-223	.10
R103	1 Meg., 1/2W, 10%	3229-105	.10
R104	3.3 Meg., 1/2W, 10%	3229-335	.05
R105	500K Volume Control	452241A-1	.80
R106	220K, 1/2W, 10%	3229-224	.10
R107 & R109	150 Ohm, 1/2W, 10%	3229-151	.10
R108	1500 Ohm, 1W, 10%	3232-152	.10
	Printed Circuit	452244A-1	.90
CAPACITORS			
C103A,B,C,D	Variable Tuning Capacitor	650327A-1	2.85
C101	470 mmf. 20% Ceramic	2239-013	.20
C102	56 mmf. 10% Ceramic	2241-554	.25
C104	.047 mf. 200V (MOPT)	2246A-4730	.20
C105	150 mmf. 20% Ceramic	2240-021	.20
C106	(a. 50 mf. 150V Electrolytic) (b. 50 mf. 150V Electrolytic)	650326A-1	2.10
C107	.01 mf. 600V Paper	2248-1030	.20
C108	.022 mf. 600V (MOPT)	2244-2230	.30
C109	.047 mf. 600V (MOPT)	2244-4730	.35
MISCELLANEOUS			
	PM Speaker and Output Trans. Assy.	750204B-1	5.90
	Clock Mechanism	750311A-1	1.65
	Line Cord (TC-100)	650171A-4	.60
	Line Cord (TC-101)	650171A-3	.60
	Capehart Insignia	452188B-1	.25
	Clock Knob	452233A-2	.10
	TC-100 Cabinet Assy. (Brown)	850206A-1	4.85
	TC-100 Cabinet Assy. (Ivory)	850206A-4	4.85
	TC-101 Cabinet Assy. (Grey Blue)	850206A-6	4.85
	TC-100 Dial Knob (Brown)	650325A-8	.35
	TC-100 Dial Knob (Ivory)	650325A-10	.35
	TC-101 Dial Knob (Grey Blue)	650325A-1	.30
	TC-100 Radio Knob (Brown)	452240A-8	.15
	TC-100 Radio Knob (Ivory)	452240A-10	.15
	TC-101 Radio Knob (Grey Blue)	452240A-1	.10
	Loop Antenna (TC-100)	750310A-1	1.10
	Loop Antenna (TC-101)	750310A-2	1.10
	Appliance Outlet 117V AC 1100 Watts Max. (TC-101)	450427A-1	.30

**MODEL 15,
Ch. CR-48**



GENERAL DESCRIPTION

The Capehart Portable Radio, Model 15, consists of a five tube superheterodyne chassis housed in a molded polystyrene case. The radio can be operated from self-contained batteries or from 117 volts A.C. or D.C. Reception is obtained on the standard broadcast band of 537 Kc. to 1620 Kc. Three normal operating controls are available for use: On-Off Volume Control, Tone Control and Station Tuning. A three gang vari-

able tuning capacitor is used in conjunction with seven tuned circuits to provide the high selectivity and image rejection needed in a portable type radio. To aid in providing this selectivity a "ferrite rod" type built-in antenna is used. In addition to being small in size and providing excellent signal pickup, this antenna eliminates the pickup of electrostatic type interference.

Warning! Do Not Remove Any Circuit Tubes While Instrument Is Turned On

**MODEL 15
SPECIFICATIONS**

Tube Complement:

Type	
1T4	R.F. Amplifier
1R5	Osc.-Convertor
1U4	L.F. Amplifier
1U5	Det AVC Audio
3V4	Power Output

Loudspeaker:

Size & Type	4 inch PM
V. C. Impedance	3.2 ohms

Antenna:

Built-in "Ferrite Rod"

Cabinet Specifications:

Height 7½ in.	Width 10½ in.
Depth 4½ in.	Weight (tot) 7½ lbs.

Frequency Range:

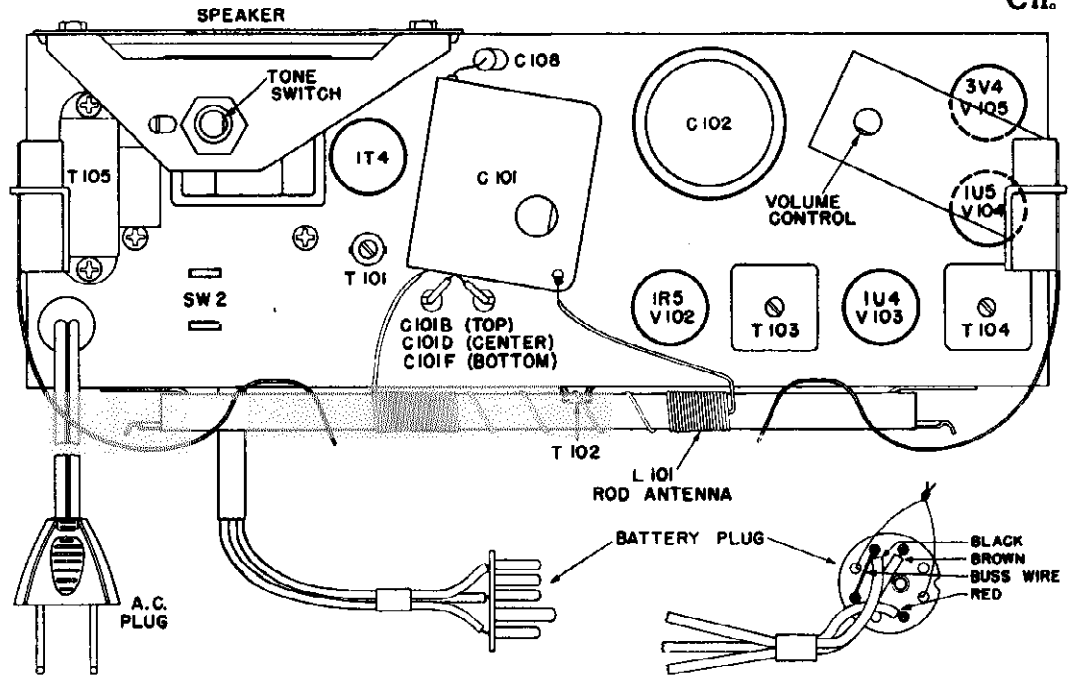
AM Bdcst. Band 537 Kc-1620 Kc

Power Source:

AC/DC Operation	12 watts at 105-125V DC or 60 cycle A.C.
Battery Operation	50 MA at 9 V DC & 11 MA at 90 V
Battery Type	Eveready No. 756 or equivalent

TO REMOVE CHASSIS FROM CABINET

1. Remove cabinet back cover by lifting the handle up and pulling outward at the top rear of the cabinet. After the top is disengaged the back is completely removed by disengaging the hinges at the bottom.
2. Remove two screws that hold chassis to cabinet (see chassis layout drawing).
3. With the cabinet front setting upright, the chassis can be removed by grasping the handle and sliding the chassis out the back.
4. The battery can be removed or left on the chassis as desired. Care must be exercised that the battery does not slide from the battery carrier when the chassis is being removed. Damage to the battery cable can result.



ALIGNMENT INSTRUCTIONS

Equipment Required:

1. Calibrated R.F. Signal Generator.
(455 KC to 1620 KC)
2. Low Range Output Meter

Alignment:

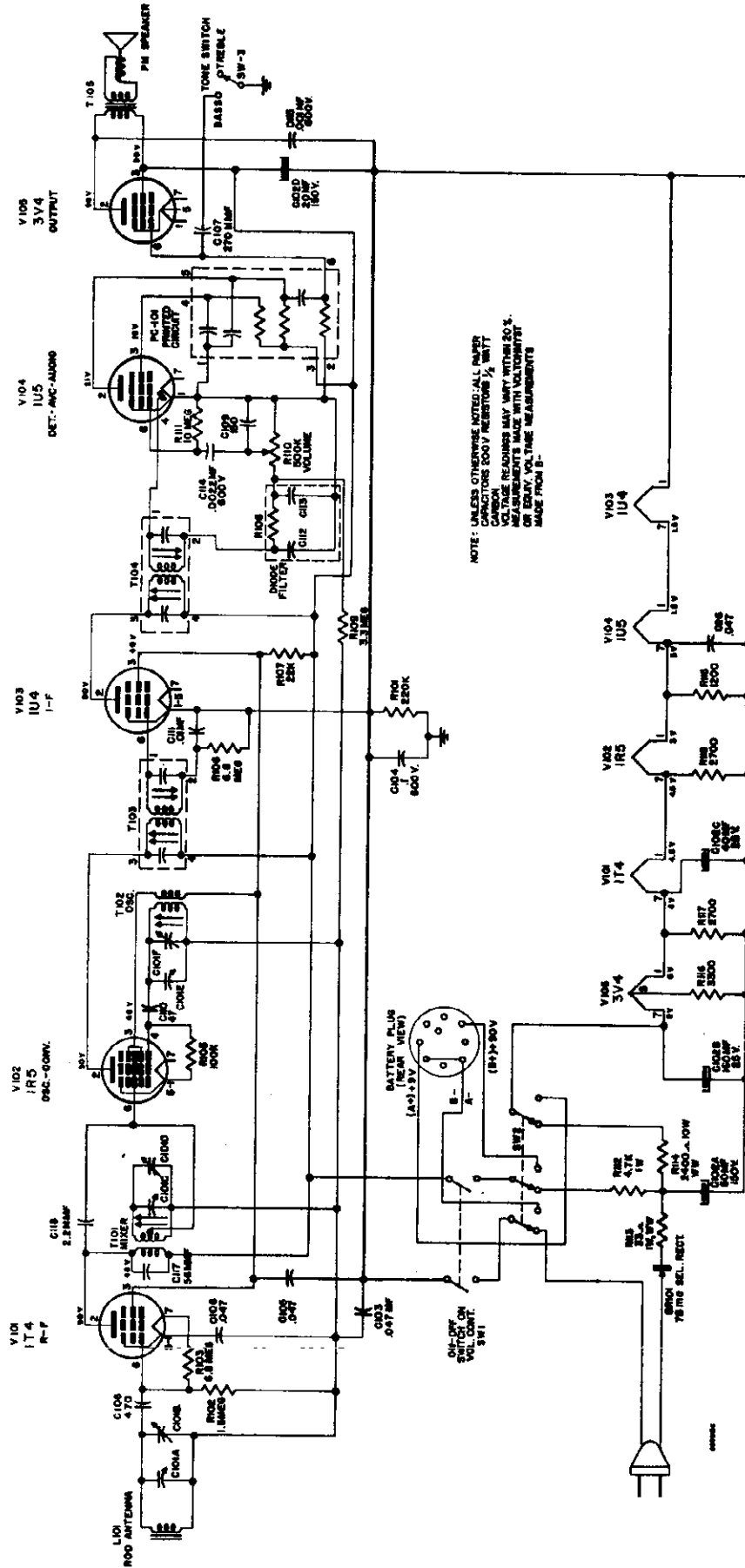
1. Turn set on and adjust to maximum volume.
2. Connect output meter across speaker voice coil
3. If alignment is done with A.C. power an isolation transformer should be used.

Step No.	Set R.F. Generator At	Connect R.F. Generator To	Set Gang Condenser To	Adjust	To Obtain
1.	455 Kc. (400 Cy Mod)	Pin 6 V103 thru .1 mfd capacitor. Ground lead to B-.	Fully Closed	T104 I.F. Transformer	Maximur
2.	"	Pin 6 V102 thru .1 mfd capacitor. Ground lead to B-.	"	T103 I.F. Transformer	"
3.	537 Kc. (400 Cy Mod)	"	"	T102 Osc. Slug	"
4.	1620 Kc. (400 Cy Mod)	"	Fully Open	C101F Osc. Trimmer	"
5.	1500 Kc. (400 Cy Mod)	Pin 6 V101 thru .1 mfd capacitor. Ground lead to B-.	1500 Kc. Rock Gang	C101D Mixer Trimmer	"
6.	600 Kc. (400 Cy Mod)	"	600 Kc. Rock Gang	T101 Mixer Slug	"
7.	1500 Kc. (400 Cy Mod)	Form a loop and loosely couple to antenna.	1500 Kc.	C101B Antenna Trimmer	"
8.	600 Kc. (400 Cy Mod)	"	600 Kc.	L101 * Adjust turns on loop Ant.	"

* Adjust coil winding on right end of rod antenna (see sketch above). Twist the winding about the rod to loosen and then slide either to left or right.

MODEL 15,
Ch. CR-48

SCHMATIC DIAGRAM



PARTS - PRICE LIST

CAPACITORS

<u>Ref. No.</u>	<u>Description</u>	<u>Part No.</u>	<u>List Price</u>
C101A-B-C-D-E-F	Tuning Capacitor	650549A-1	\$ 3.20
C102A-B-C-D	Filter Capacitor	750090B-31	3.40
C103 C105			
C106 C116	.047mfd. 200V.	2246A-4730	.20
C104	.1mfd. 600V.	2244A-1040	.55
C107	270mmf. Ceramic	650501A-18	.20
C108	470mmf. Ceramic	2239A-013	.20
C109	150mmf. Ceramic	2240A-021	.20
C110	47mmf. Ceramic	2240A-006	.20
C111	.01mfd. 200V.	2246A-1030	.20
C114	.0022mfd. 600V.	2248A-2220	.20
C115	.001mfd. 600V.	2248A-1020	.20
C117	56mmf. Ceramic	2241A-754	.25
C118	2.2mmf. Ceramic	650030A-3	.10

RESISTORS

R101	220K 1/2W 20%	3230A-224	.10
R102	1.5 Meg. 1/2W 10%	3229A-155	.10
R103 106	6.8 Meg. 1/2W 10%	3229A-685	.10
R105	100K 1/2W 20%	3230A-104	.10
R107	22K 1/2W 10%	3229A-223	.10
R109	3.3 Meg. 1/2W 20%	3230A-335	.10
R110	Volume Control & Sw.	750276A-2	1.30
R111	10 Meg. 1/2W 20%	3230A-106	.10
R112	4.7K 1W 10%	3232A-472	.15
R113	33 1W 10% WW	650101A-19	.20
R114	2.4K 10W WW	750288A-4	.85
R115	1.2K 1/2W 10%	3229A-122	.10
R116	3.3K 1/2W 10%	3229A-332	.10
R117 118	2.7K 1/2W 10%	3229A-272	.10

INDUCTANCES

L101	Loop Antenna	650547A-1	1.45
T101	Mixer Coil	453074B-1	1.25
T102	Osc. Coil	452629B-1	.85
T103 104	I. F. Transformer	750273A-1	1.55
T105	Output Transformer	453028A-1	1.95

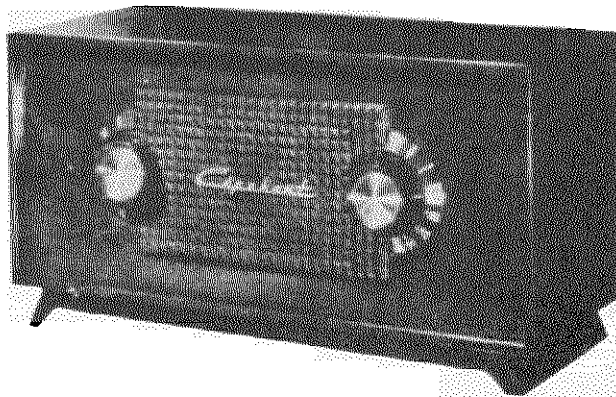
MISCELLANEOUS

SW2	Switch (AC-DC Bat.)	452625A-1	.90
SW3	Switch (Tone Control)	453029A-1	.80
SR101	Rectifier (Selenium)	650150D-5	1.60
	Speaker	650546A-1	4.20
PC101	Printed Circuit	452615A-1	.85
	Diode Filter	452171A-1	.55
	Battery Cable	650548A-1	.65

CABINET

	Cabinet, front (Taupe)	453037A-G1	2.90
	Cabinet, front (Burgundy)	453037A-G2	2.90
	Cabinet, back (Taupe)	453038A-G1	2.40
	Cabinet, back (Burgundy)	453038A-G2	2.40
	Grille Clothe & Baffle	650541A-1	1.60
	Carrying Handle	650599A-1	.60
	Knob (tuning)	750326A-1	.90
	Knob (volume)	452749C-3	.30
	Knob (tone)	452749C-4	.30

MODEL T-30,
Ch. C-300



CHASSIS DESCRIPTION

The C-300 chassis used in the Model T-30 is a five tube radio chassis designed for reception of AM (Broadcast band) signals. The chassis contains a single ended 50L6 Power Output amplifier in conjunction with a 5" speaker for sound reproduction. It can be operated on either AC or DC.

SPECIFICATIONS

TUBE COMPLIMENT:

Type:
 12BE6Oscillator - Converter
 12BA6IF Amplifier
 12SQ7Detector, AVC & 1st Aud. Amp.
 50L6Power Output
 35Z5Rectifier

FREQUENCY RANGE:

AM Broadcast Band540KC to 1620KC

POWER SOURCE

Rating105-125 volts, AC-DC
 Power Consumption35 watts

LOUDSPEAKER:

Size & Type5 inch PM
 Voice Coil Impedance3.2 ohms

POWER OUTPUT:.....1.75 watts

ANTENNA:

Built-in Loop in rear of cabinet (Terminal on rear of cabinet for connection of outdoor aerial.)

CABINET DIMENSIONS:

Height 6⁵/₈", Width 12¹/₂", Depth 5⁷/₁₆"

ALIGNMENT INSTRUCTIONS

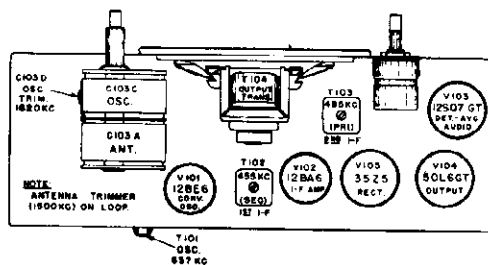
EQUIPMENT REQUIRED:

1. Calibrated RF Signal Generator (Signal from 455KC to 1620 KC).
2. Low Range Output Meter.

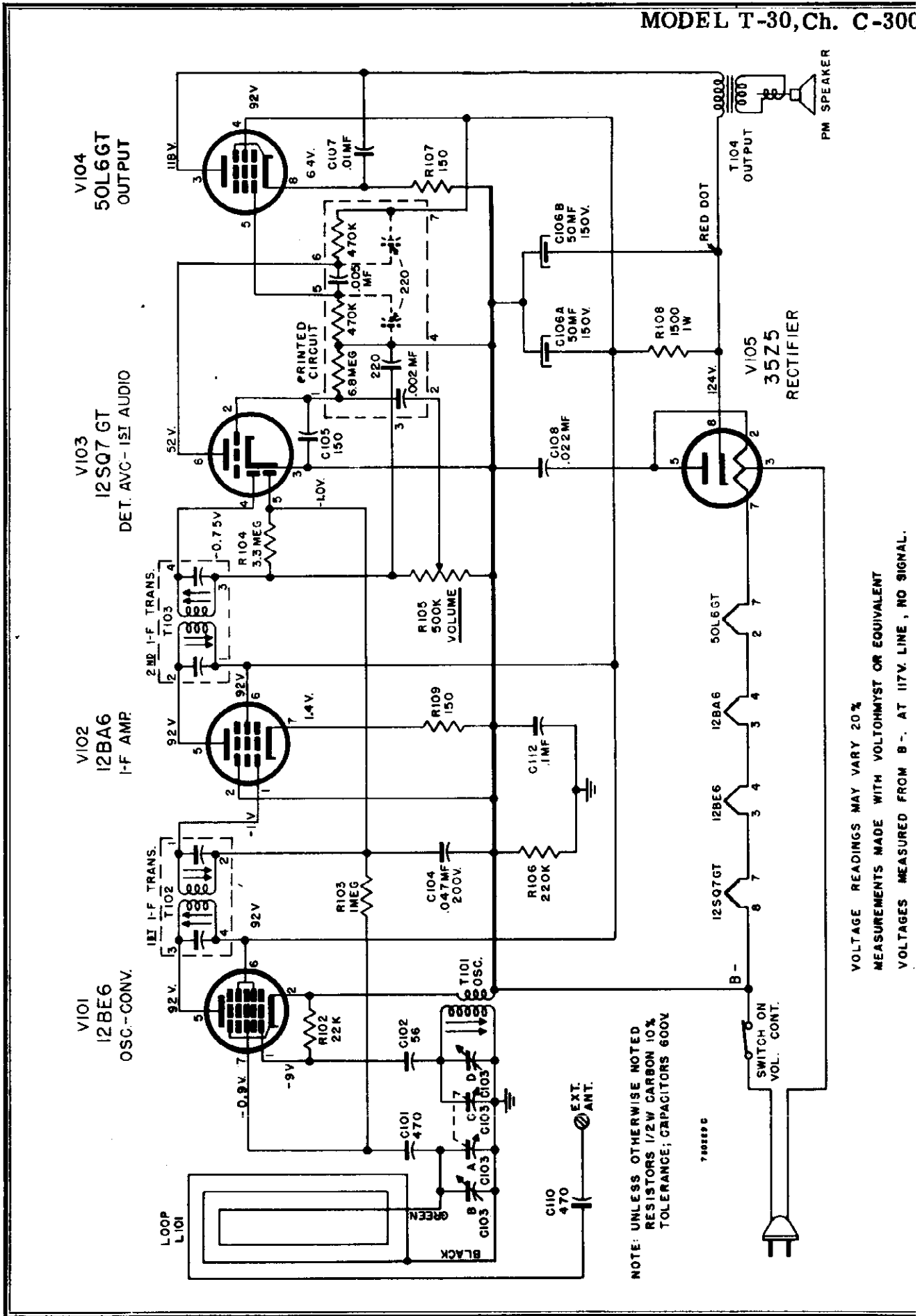
ALIGNMENT:

- a. Turn set on, adjust volume to maximum.
- b. See that dial pointer coincides with calibration marks at extremes of dial scale.
- c. Connect output meter across the speaker voice coil.
- d. Make a loop of the RF Generator leads (connect the leads together through a .01 mfd capacitor) and loosely couple to the Loop Antenna.

CHASSIS LAYOUT



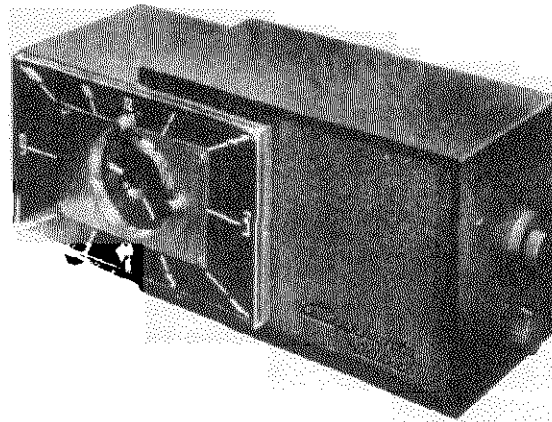
STEP	SET RF GENERATOR AT	SET CONDENSER GANG AT	ADJUST	TO OBTAIN
1	455KC	Fully Open at some quiet point	IF Slugs T103 T102	Maximum Output
2	1620KC	1620KC	Osc. Trimmer C103D	Same
3	1500	1500	Ant. Trimmer C103B (on loop)	Same
4	537KC	537KC	T101 Osc. Slug	Same



MODEL T-30,
Ch. C-300**PARTS LIST C-300 (T-30)**

REF. NO.	PART DESCRIPTION	PART NO.	LIST
TRANSFORMERS			
L101	Loop Antenna	750219A-1	\$1.60
T101	Oscillator Coil	452242A-1	.75
T102	IF Transformer	452243A-1	1.40
T103	IF Transformer	452243A-1	1.40
T104	Output Transformer—(Part of 750220A-1)		
RESISTORS			
R102	22K, 1/2w, 10%	3229A-223	.10
R103	1 meg, 1/2w, 10%	3229A-105	.10
R104	3.3 meg, 1/2w, 10%	3229A-335	.05
R105	Control (Volume & Switch)	452312A-1	.80
R106	220K, 1/2w, 10%	3229A-224	.10
R107, R109	150 ohms, 1/2w, 10%	3229A-151	.10
R108	1500 ohms, 1w, 10%	3232A-152	.10
	Printed Circuit	452244A-1	.90
CONDENSERS			
C101, C110	470 mmf., 20%, Ceramic	2239A-013	.20
C102	56 mmf., 10%, Ceramic	2241A-554	.25
C103, A B C D	Tuning Gang	650349A-1	3.10
C104	.047 mfd., 200V, MOPT	2246A-4730	.35
C105	150 mmf., 20%, Ceramic	2240A-021	.20
C106, A B	Electrolytic (a) 50 mfd 150V (b) 50 mfd 150V	650326A-1	1.90
C107	.01 mfd., 600V, MOPT	2248A-1030	.20
C108	.022 mfd., 600V, MOPT	2244A-2230	.30
C112	.1 mfd., 600V, MOPT	2244A-1040	.55
MISCELLANEOUS			
	Cabinet Ass'y (Green)	452554A-G1	5.75
	Knobs (2) (Green)	452321A-G1	.35
	Cabinet Ass'y (Burgundy)	452554A-G2	5.75
	Knobs (2) (Burgundy)	452321A-G2	.35
	Cabinet Ass'y (Ivory)	452554A-G3	5.75
	Knobs (2) (Ivory)	452321A-G3	.35
	Cabinet Ass'y (Black)	452554A-G4	5.75
	Knobs (2) (Black)	452321A-G4	.35
	Back Cover	850135A-1	.35
	Speaker, PM 5" & Output Transformer	750220A-1	8.00
	Line Cord	650171A-4	.60
	Mounting Clips for IF Transformers	58514	.10

MODEL TC-6
Ch. CR-71



CHASSIS DESCRIPTION

The CR-71 is a 6 tube radio chassis, designed for reception of AM (Broadcast Band) signals only. Since the chassis is operated in conjunction with an electric clock mechanism, it is to be operated only from an alternating current (AC) source.

The power source for the chassis is turned "on" and "off" by the Control Knob on the clock. When the Control Knob is in the Manual position, the radio chassis power source is on and it cannot be turned on or off automatically by the clock. When the Control Knob is in the Off position, the power source to the chassis is off and it cannot be turned on by the clock. However, with the Control in the Off position the power source can be turned on by

adjusting the Sleep Knob for a time period up to 60 minutes and at the expiration of this time period, the power source will be turned off. (The Sleep control is a mechanical timing device which mechanically actuates the "on-off" switch which is also manually actuated by the Control Knob. When the Control Knob is in the Wake-Up position, the power source is off, however, it will be turned on automatically by the clock mechanism at the time to which the clock alarm is set. The function of the Sleep Knob is the same in the Control Knob position as it is in the Off position.

NOTE: The clock motor will be energized at 15 times when the line cord is connected to the power source.

SPECIFICATIONS

Tube Complement:

Type	Purpose
12BA6	R-F Amplifier
12BE6	Oscillator-Converter
12BA6	I-F Amplifier
12AV6	Detector, AVC & 1st Audio Amplifier
35C5	Power Output
35W4	Rectifier

Frequency Range:

AM Broadcast Band540KC to 1620 KC

Power Source:

Rating105-125 volts, 60 cycle AC only
Power Consumption35 watts

Appliance Outlet:

Maximum Rating1100 watt

Loudspeaker:

Size and type4 inch F
Voice Coil Impedance3.2 ohm

Power Output:

.....1.5 watt

Antenna:

Built-in loop in rear of cabinet
(terminal on rear of cabinet for connection of outdoor aerial.)

Cabinet Dimensions:

Height 5¹/₈ inches, Width 12³/₈ inches,
Depth 5¹/₂ inches.

MODEL TC-62,
Ch. CR-71

OPERATING INSTRUCTIONS

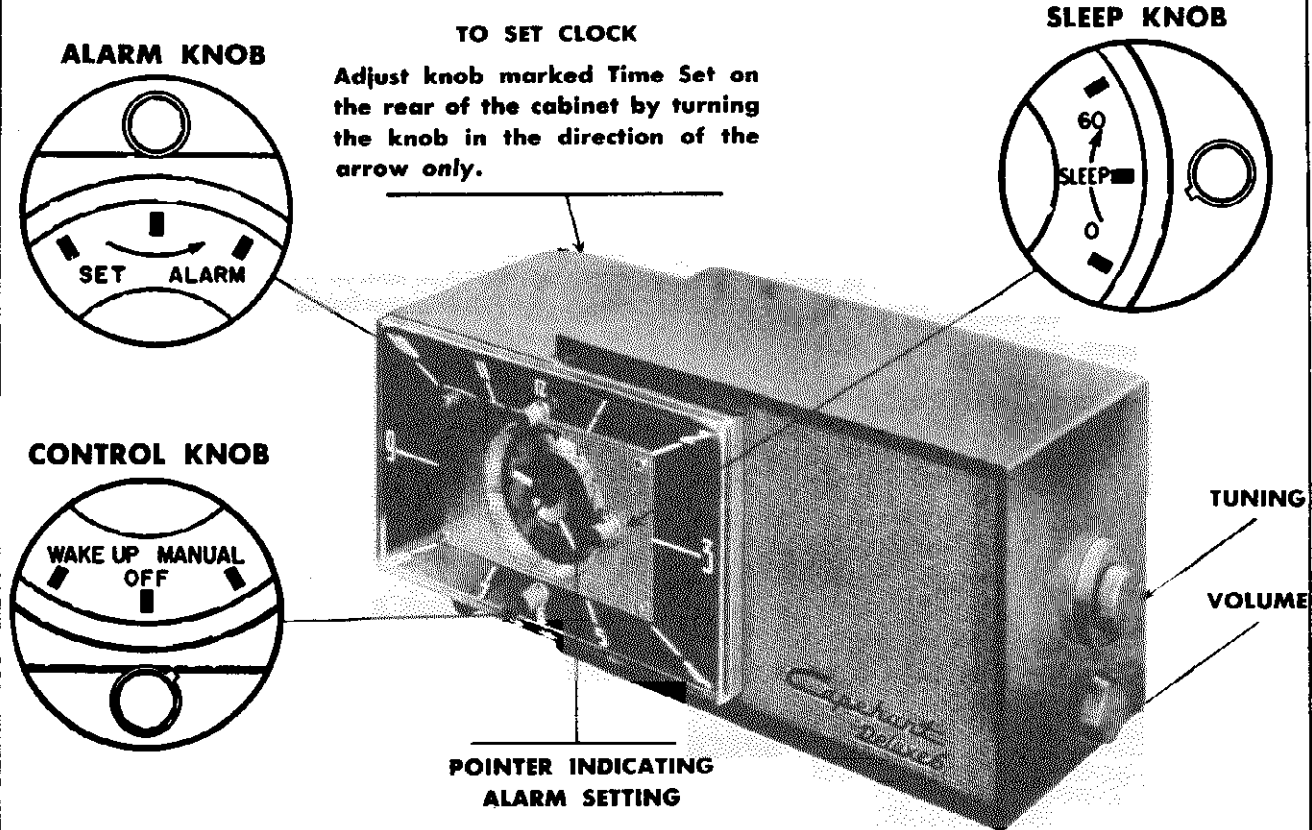
TO SET ALARM FOR EITHER AUTOMATIC RADIO OPERATION OR "BUZZER" OR COMBINATION OF BOTH

Pull out Alarm Knob and turn to the left, this motion will rotate the small disk in the center of the clock face. Set the pointer attached to the hour hand to the desired time indicated on the disk. When the Control Knob is on **Wake-Up** the radio will turn on automatically. Of course, the radio should be pre-tuned to a station and the Volume Control should be pre-set to the proper level to obtain proper automatic radio operation.

If the Alarm Knob is in the out position the "buzzer" will be sounded shortly after the radio goes on.

If it is desired to have the alarm only, independent of the radio pull the Alarm Knob out and set the Control Knob to Off.

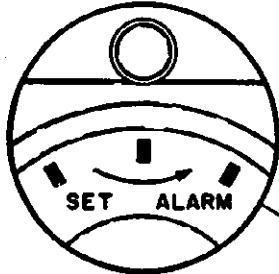
Another combination of operations is provided with the Sleep Knob, which will turn off the radio automatically at night (see "TO TURN RADIO AND APPLIANCE OFF AUTOMATICALLY") and, provided the Control Knob is in Wake-Up position, the radio will turn on automatically in the morning.



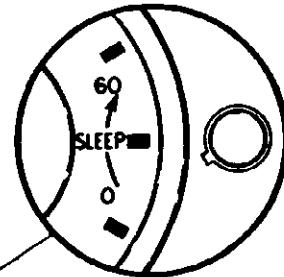
TO SET CLOCK

Adjust knob marked Time Set on the rear of the cabinet by turning the knob in the direction of the arrow only.

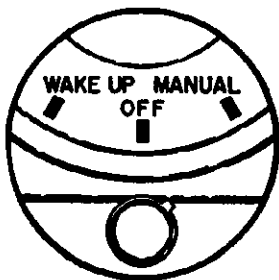
ALARM KNOB



SLEEP KNOB



CONTROL KNOB



TUNING

VOLUME

POINTER INDICATING
ALARM SETTING

TO TURN RADIO AND APPLIANCE OFF AUTOMATICALLY

Turn the Sleep Knob to the right and if the small projection on the Sleep Knob is used as a rough indicator a reasonable degree of accuracy can be obtained in adjusting for any period of operation up to 60 minutes. For instance, if 15 minutes of operation is desired the Sleep Knob should be adjusted approximately one-quarter of its full rotation. If it is not desired to have the radio turned on automatically in the morning, then set the Control Knob to Off before you set the Sleep Knob for automatic turnoff.

TO TURN ON APPLIANCE AUTOMATICALLY

Plug electrical appliance into outlet on rear of radio, set Control Knob at Wake-Up position and the appliance will be turned on at the time determined by the setting of the Alarm Knob. The radio will operate at the same time, but if radio music is not desired the Volume Knob should be turned fully to the left.

TO PLAY RADIO MANUALLY

1. Set the Control Knob to the manual position.
2. Adjust Tuning Knob for desired station.
3. Set the Volume Control for desired sound volume.

REMOVAL AND SERVICE OF CLOCK MECHANISM

SERVICE

The clock mechanism used in this unit is not to be serviced by anyone other than an authorized Telechron Service Agency (see pages 7 and 8 of this manual for a listing of these agencies). When it is determined that the clock requires adjustment or repair, remove the clock mechanism from the cabinet (as per the following instructions) and return the clock mechanism to your Capehart distributor or an agency specified by him. If the clock mechanism is to be shipped by mail or express, be certain that it is adequately protected and properly packed.

TO REMOVE CLOCK

1. Remove (pull off) the three knobs from the front of the clock.
2. Remove the six (6) Phillips-head screws which fasten the back of the cabinet.

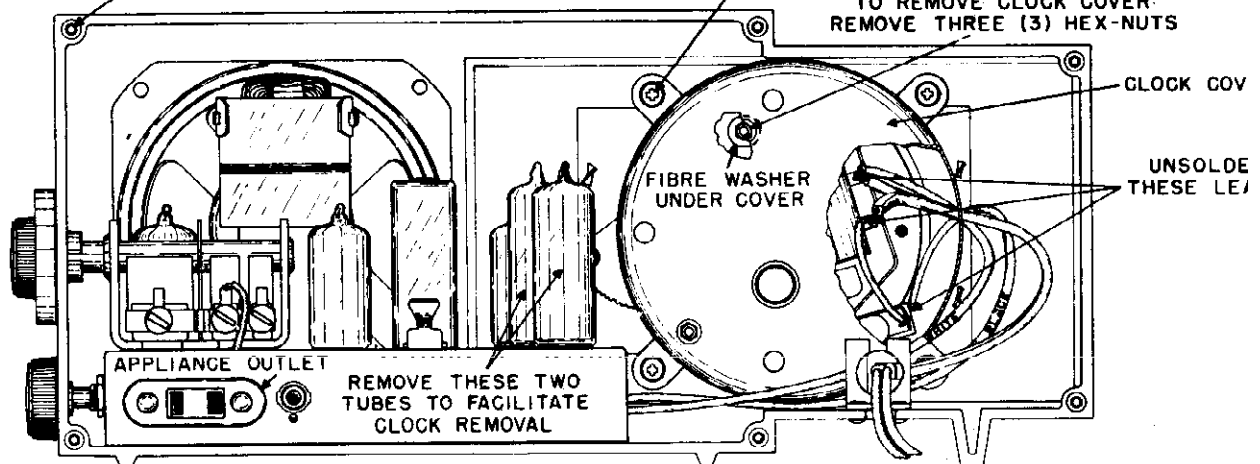
3. Remove the four (4) Phillips-head screw which secure the clock to the inside of the cabinet.
4. Remove the 35W4 and 35C5 tubes to facilitate removal of the clock.
5. Pull clock out of the cabinet by sliding it to the left and back.
6. Remove the three hex nuts which fasten the metal cover to the clock. Keep the metal cover and hardware (4 Phillips screws, 3 hex nut and 3 fibre washers) with the cabinet, do not return this material with the clock.
7. Unsolder four (4) electrical leads from the clock.

NOTE: To re-install the clock follow the above procedure in reverse.

TO REMOVE CABINET BACK:
REMOVE SIX (6) PHILLIPS SCREWS

TO REMOVE CLOCK FROM CABINET:
REMOVE FOUR (4) PHILLIPS SCREWS

TO REMOVE CLOCK COVER:
REMOVE THREE (3) HEX-NUTS



MODEL TC-62,
Ch. CR-71

TC-62 ALIGNMENT INSTRUCTIONS

Equipment required:

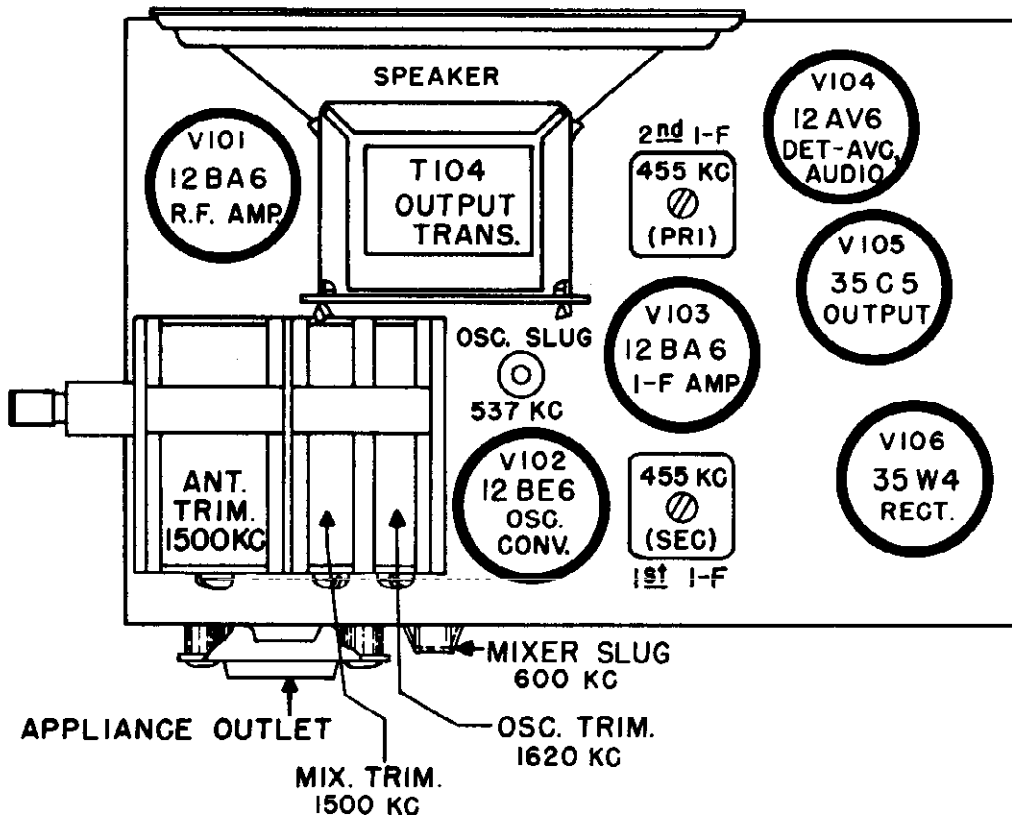
1. Calibrated R.F. Signal Generator (Signal from 455KC to 1620KC).
2. Low Range Output Meter.

Alignment:

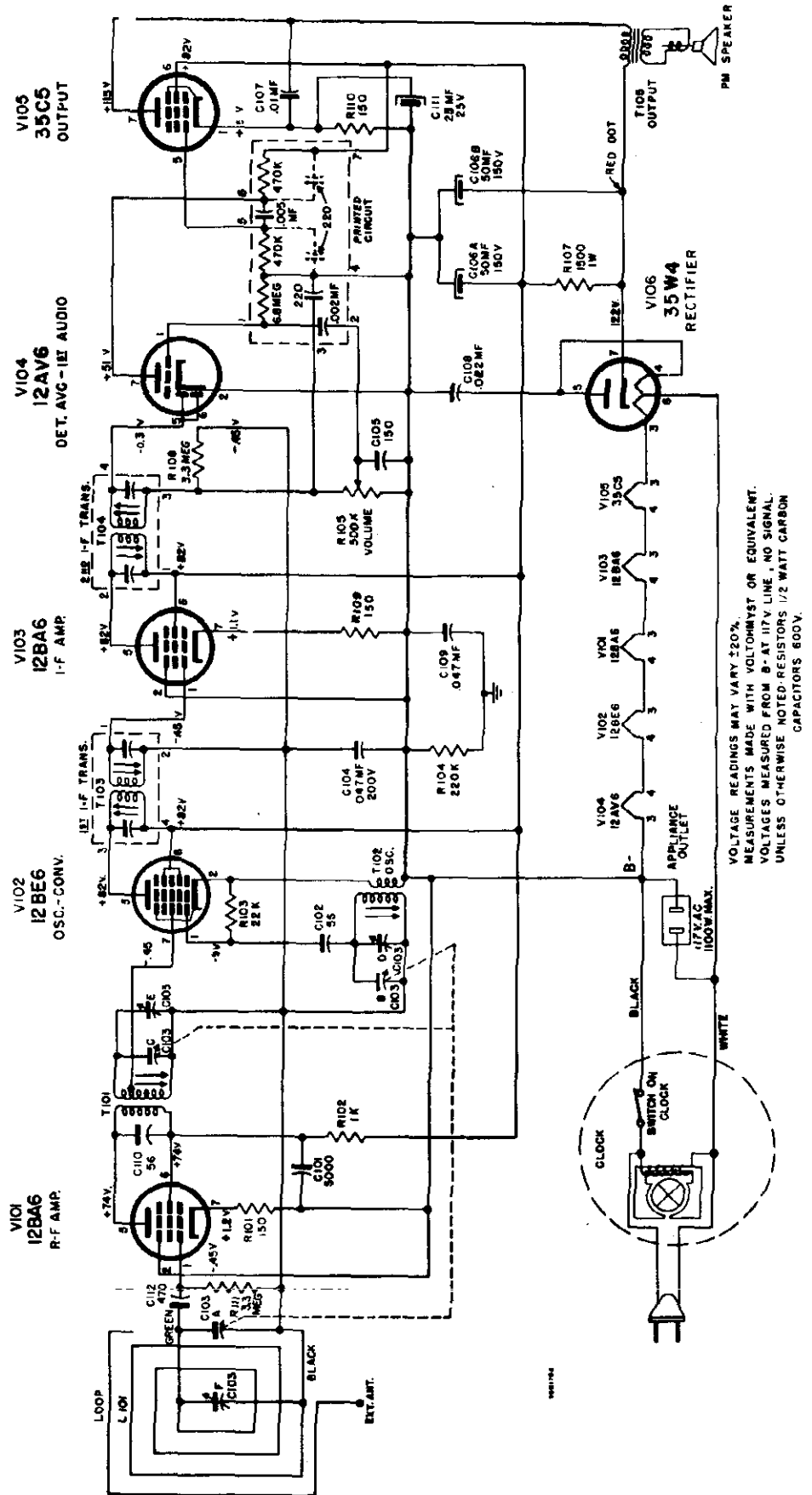
- a. Turn set on, adjust volume to maximum.
- b. See that dial pointer coincides with calibration marks at extremes of dial scale.
- c. Connect output meter across speaker voice coil.

Step No.	Set R.F. Generator At	Connect Generator To	Set Gang Condenser To	Adjust	To Obtain
1	455 Kc.	Antenna section of Gang Condenser	Fully open. Disable osc. section of tuning gang.	I.F. slugs T103 T104	Max.
2	1620 Kc.	Antenna section of Gang Condenser	Fully open.	Osc. Trimmer C103D	Max.
3	537 Kc.	Antenna section of Gang Condenser	Fully closed.	Osc. Coil T102	Max.
4	1500 Kc.	Antenna section of Gang Condenser	1500 Kc.	Mixer Trimmer C103E	Max.
5	600 Kc.	Antenna section of Gang Condenser	600 Kc.	Mixer Coil T101	Max.
6	1500 Kc.	Loosely couple to Loop antenna	1500 Kc.	Antenna Trimmer C103F	Max.

CHASSIS LAYOUT



SCHEMATIC DIAGRAM



VOLTAGE READINGS MAY VARY ±20%.
MEASUREMENTS MADE WITH VOLTOHMIST OR EQUIVALENT.
VOLTAGES MEASURED FROM B- AT 117V LINE, NO SIGNAL.
UNLESS OTHERWISE NOTED: RESISTORS 1/2 WATT CARBON
CAPACITORS 600V.

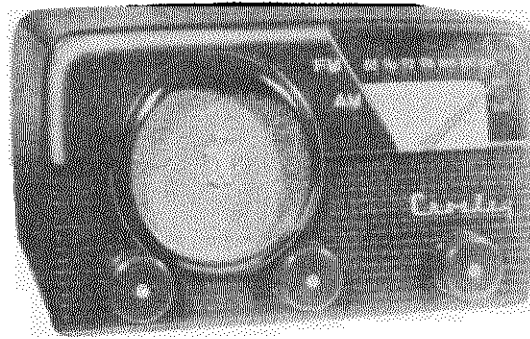
MODEL TC-62,
Ch. CR-71

Ref. No.	Description	Part No.	List
PARTS PRICE LIST			
INDUCTANCES			
L101	Loop Antenna	750207A-2	
T101	Mixer Coil	453247B-1	\$ 1.30
T102	Oscillator Coil	453248A-1	1.30
T103	1st I. F. Transformer	452243A-1	.90
T104	2nd I. F. Transformer	452243A-1	1.40
T105	Output Transformer (Part of Assembly No. 750373A-1)	452243A-1	1.40
RESISTORS			
R101, 109, 110	150 ohm ½ w. 10%	3229-151	.10
R102	1K ½ w. 10%	3229-102	.10
R103	22K ½ w. 10%	3229-223	.10
R104	220K ½ w. 10%	3229-224	.10
R105	500K Volume Control	452241A-1	.80
R107	1500 ohm 1 w. 10%	3232-152	.10
R108	3.3 meg. ½ w. 20%	3230-335	.10
CAPACITORS			
C101	5000 mmf. Ceramic Disc	450469A-1	.25
C102, 110	56 mmf. Ceramic	2241-554	.25
C103 A,B,C,D,E,F	Variable Tuning Capacitor	650227A-1	3.50
C104	.047 mfd. 200 V.	2246-4730	.20
C105	150 mmf. Ceramic	2240-021	.20
C106	50 mfd. 50 mfd. 150 V. Electrolytic	650326A-1	2.10
C107	.01 mfd. 600 V.	2248-1030	.20
C108	.022 mfd. 600 V.	2248-2230	.25
C109	.047 mfd. 600 V.	2248-4730	.30
C111	25 mfd. 25 V. Electrolytic	452132A-3	1.00
MISCELLANEOUS			
	Speaker and Output Transformer Assembly	750373A-1	6.00
	Clock	750377A-1	17.15
	Appliance A. C. Outlet	450427A-1	.30
	Line Cord	650171A-3	.60
	Speaker Grille	650634A-1	1.20
	Clock Grille	650323A-1	.85
	Clock Grille (Sage Green)	650323A-2	1.25
	Capehart Insignia	452188B-2	.25
	Decorative Stud	452235A-1	.10
	Speednut	452696A-14	.10
	Clock Escutcheon	750198A-1	2.05
	Clock Escutcheon (Ivory)	750198A-2	2.05
	Insignia "Deluxe 6"	453314A-2	.15
CABINET PARTS			
Cabinet Assembly	(Grey-Blue)	453246A-G1	7.20
	(Ivory)	453246A-G4	7.20
	(Ebony)	453246A-G5	7.20
	(Sage Green)	453246A-G7	7.20
Cabinet Back	(Grey-Blue)	850130A-1	2.75
	(Ivory)	850130A-4	2.75
	(Ebony)	850130A-5	2.75
	(Sage Green)	850130A-7	2.75
Knob, Tuning Dial	(Grey-Blue)	650325A-1	.35
	(Ivory)	650325A-4	.35
	(Ebony)	650325A-5	.35
	(Sage Green)	650325A-12	.35
Knob, Radio	(Grey-Blue)	452240A-1	.15
	(Ivory)	452240A-4	.15
	(Ebony)	452240A-5	.15
	(Sage Green)	452240A-11	.15
Knob Clock	(Grey-Blue)	453134A-1	.10
	(Ivory)	453134A-4	.10
	(Ebony)	453134A-5	.10
	(Sage Green)	453134A-7	.10

Use only genuine Capehart replacement parts.

All prices subject to change without notice.

MODELS E30BE, E30GN
E30MN, E30TN, Ch. 30E
30E-1



Model No.	Cabinet Color
E30BE	Blue
E30GN	Green
E30MN	Maroon
E30TN	Tan

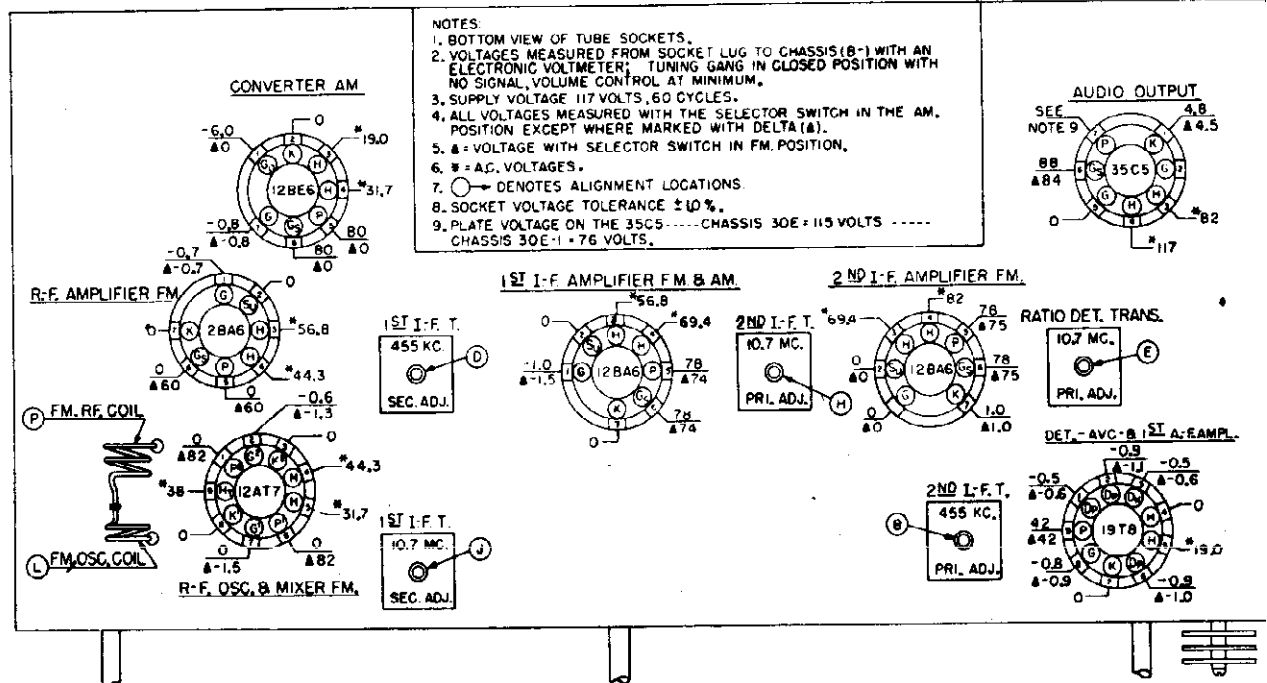
DESCRIPTION

TYPE: Seven-tube, two-band, superheterodyne.
FREQUENCY RANGE: Standard Broadcast Band (AM); 540 to 1620 kc.
 Frequency Modulation Band (FM); 88 to 108 megacycles.
INTERMEDIATE FREQUENCY: Standard Broadcast Band; 455 kc.
 Frequency Modulation Band; 10.7 mc.
FM ANTENNA INPUT IMPEDANCE: 75 ohms balanced.
POWER SUPPLY: a.c.—d.c.
VOLTAGE RATING: 105-125 volts.
POWER CONSUMPTION: 40 watts at normal power supply voltage (117 volts).
POWER OUTPUT: 1 watt maximum.

TUBE COMPLEMENT:

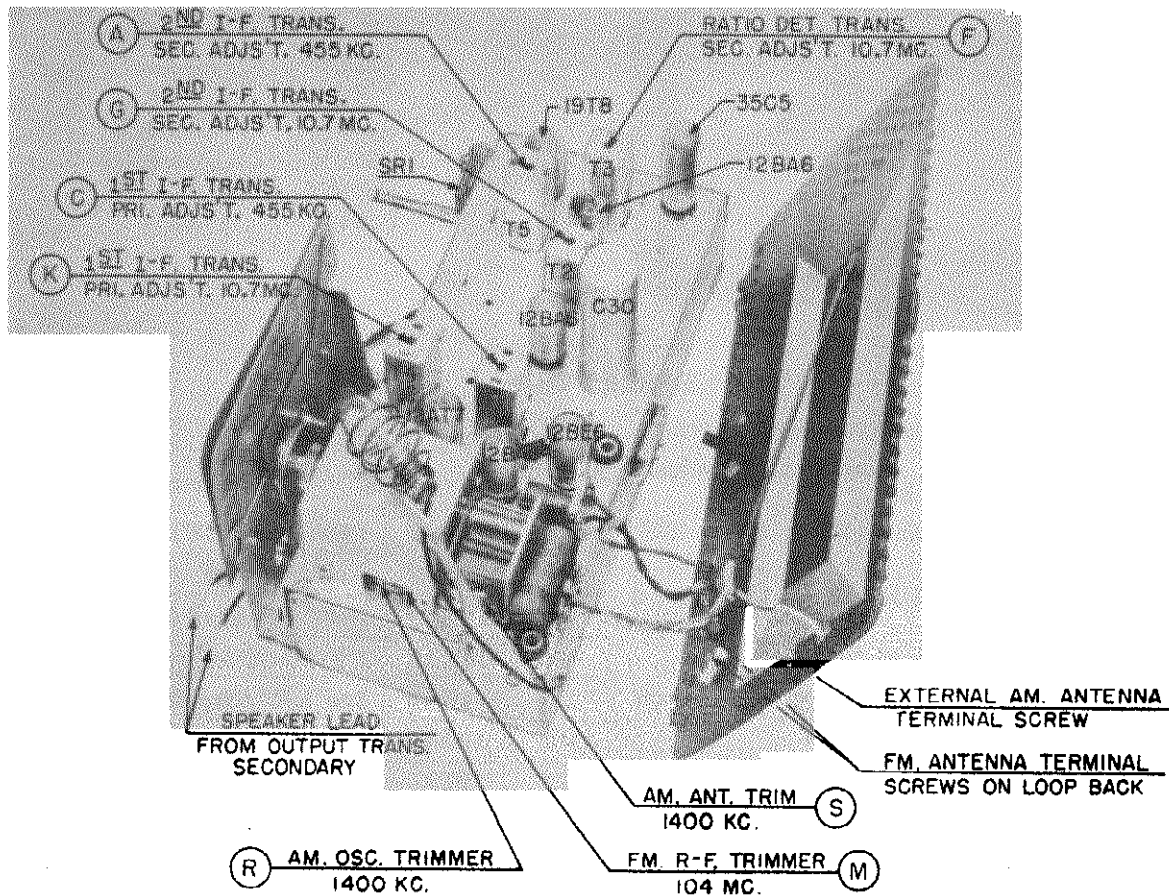
Symbol No.	Type	Function
V1	12BE6	Converter (AM)
V2	35C5	Audio Output
V3	12BA6	R. F. Amplifier (FM)
V4	12BA6	I. F. Amplifier (AM & FM)
V5	12BA6	2nd I. F. Amplifier & AVC (FM)
V6	12AT7	Oscillator & Mixer (FM)
V7	19T8	Detector & 1st A.F. Ampl. (AM & FM); AVC (AM)
SRI	Selenium Rectifier	

DIAL BULB: 7 w., 120 v., Candelabra Base



SOCKET VOLTAGE CHART

**MODELS E30BE, E30GN, E30MN,
E30TN, Ch. 30E, 30E-1**



CHASSIS TOP VIEW SHOWING ALIGNMENT ADJUSTMENTS

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.

Never place the receiver chassis on a metal bench or grounded object when the power plug is connected to the electric outlet. To avoid shock when making repairs or adjustments, do not permit any part of the body to contact grounded metal objects.

ALIGNMENT PROCEDURE

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

1. Turn the tuning condenser to full mesh, against stop, and set the dial pointer to the reference point at the "88" end of the dial.
2. Set the tone control knob to the full treble position (extreme right).
3. For Amplitude Modulated signal readings, connect output meter across voice coil (3.2 ohms).

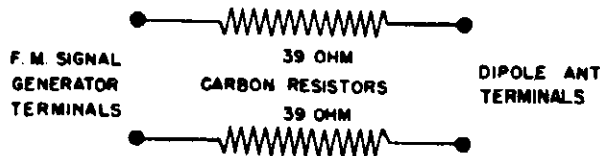
**MODELS E30BE, E30GN, E30MN
E30TN, Ch. 30E, 30E-1**

4. All Amplitude Modulated input signals are modulated 30% at 400 cycles with the High side of the signal generator connected to receiver as indicated in the alignment chart. Connect the low side of signal generator through a 0.1 mfd. condenser to the receiver chassis. If hum is encountered, use a 1 to 1 isolating transformer between the power line outlet and the receiver power line cord. Then connect the low side of the signal generator directly to the receiver chassis.
5. All Frequency Modulated signals are modulated 30% at 400 cycles. 30% modulation is equal to a deviation of 22.5 kilocycles.
6. Turn the volume control to maximum clockwise position and adjust signal generator output to produce a noticeable output meter reading. Keep signal generator output as low as possible to prevent AVC action in the receiver.
7. Disconnect short wire, with spade lug, from F.M. Antenna Terminal.

ALIGNMENT CHART

Align- ment Se- quence	Signal Generator Output			Position of		Adjust	Type of Selectivity Curve	Remarks
	Frequency	In Series With	To	Range Switch	Tuning Dial or Tun. Cap.			
1	455 kc.	.05 mfd.	V4 grid pin 1	AM	Open	A & B	Single peak	
2	455 kc.	.05 mfd.	V1 grid pin 7	AM	Open	C & D	Single peak	Retouch A & B
3	10.7 mc.	.05 mfd.	V5 grid pin 1	FM	Closed	E	Single peak	See note 1 & 2
4	10.7 mc.	.05 mfd.	V5 grid pin 1	FM	Closed	F	—	Balance to zero volts. Note 3
5	10.7 mc.	.05 mfd.	V4 plate pin 5	FM	Closed	E & G	Single peak	See note 4 repeat adj. of E & G for max. alignment
6	10.7 mc.	.05 mfd.	V4 grid pin 1	FM	Closed	H	Single peak	Note 4
7	10.7 mc.	.05 mfd.	Stator center gang section	FM	Closed	J, K & H	Single peak	Note 4 & 5
8	98 mc.	FM Dummy *Antenna	FM Ant. Term.	FM	98 mc.	L	—	Note 6
19	104 mc.	FM Dummy *Antenna	FM Ant. Term.	FM	104 mc.	M	—	Note 7
10	92 mc.	FM Dummy *Antenna	FM Ant. Term.	FM	92 mc.	P	—	Note 8
11	Repeat steps 9 and 10 until no further improvement is noted.							
12	1400 kc.	200 mmf.	Ext. Ant. Term.	AM	1400 kc.	R & S	—	Adjust S for max. output

MODELS E30BE,
E30GN, E30MN,
E30TN, Ch. 30E,
30E-1



* DUMMY ANTENNA

ALIGNMENT NOTES

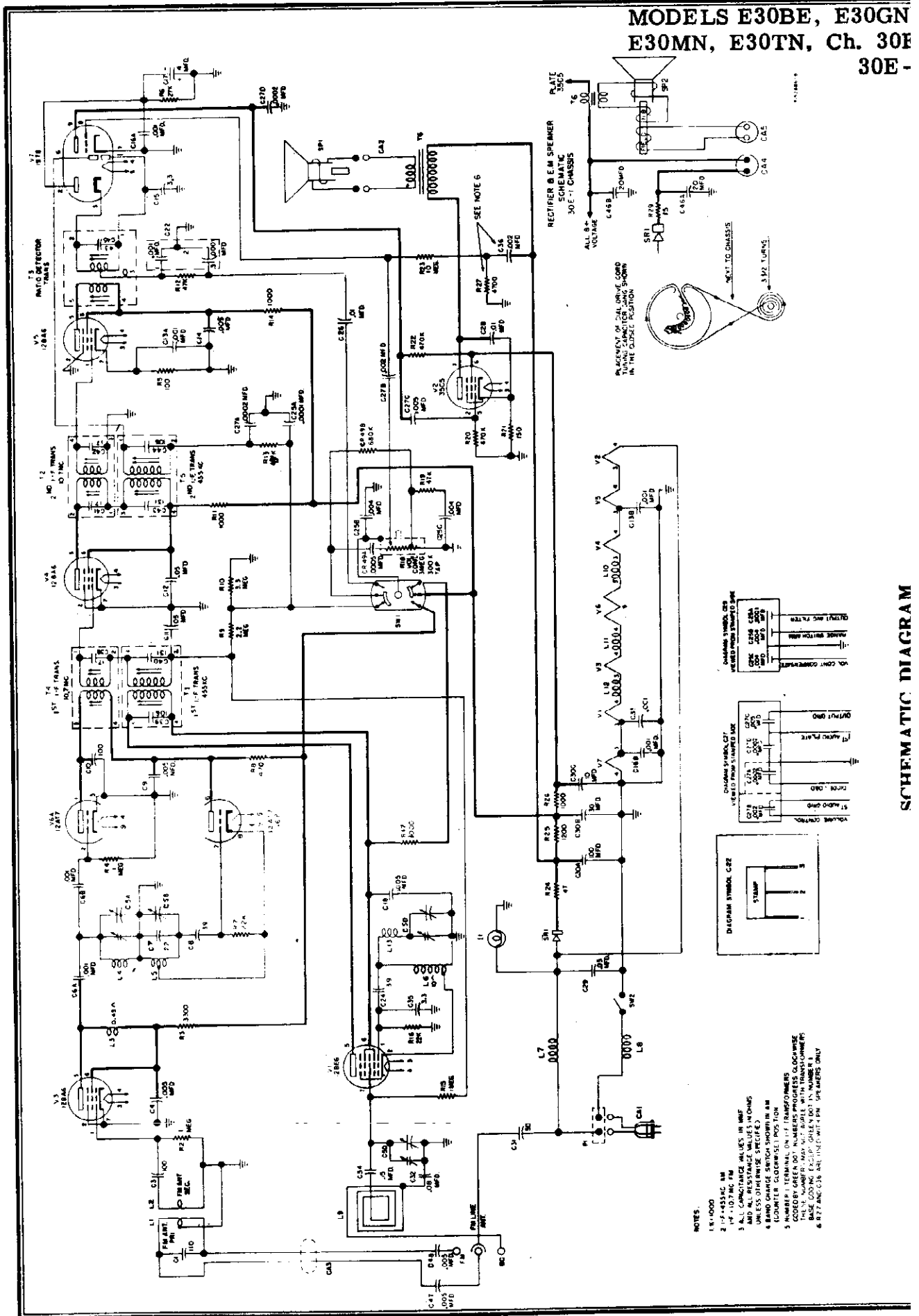
1. Use an unmodulated signal generator with approximately 100,000 mv. output.
2. Connect the electronic voltmeter across the 27,000 ohm diode load resistor (R6).
3. Connect two 100,000 ohm 5% carbon resistors in series, connect these resistors across the 4 mfd. stabilizing capacitor (C17) in the diode circuit, connect the electronic voltmeter between the output of the RF filter network (C22) and the midpoint of the two 100,000 ohm resistors. Align secondary core (F) of T3 for zero volts, first using a high scale on the electronic voltmeter and then switching to the lowest scale for close balance.
4. Use an unmodulated signal. Electronic voltmeter connected across 27,000 ohm load resistor (R6). Limit output of signal generator so that the reading on the electronic voltmeter will not exceed 5 volts.
5. Remove the two 100,000 ohm resistors and electronic voltmeter after alignment.
6. Adjust turns on FM oscillator coil by spreading or squeezing together, so that 98 megacycle signal falls on 98 megacycles on the dial.
7. Rock gang while adjusting FM. RF trimmer until maximum output meter reading is obtained, or align for maximum noise level at zero signal.
8. Adjust turns on FM. RF coil until maximum output meter reading is obtained.

MEGACYCLES TO CHANNEL NUMBERS "FM" BAND

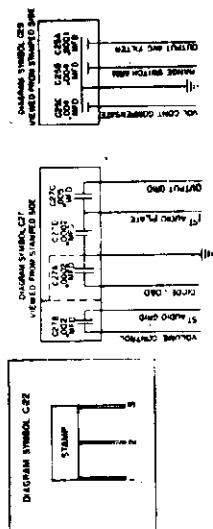
Frequency in Megacycles	Channel No.	Frequency in Megacycles	Channel No.
87.9	200	98.9	255
88.9	205	99.9	260
89.9	210	100.9	265
90.9	215	101.9	270
91.9	220	102.9	275
92.9	225	103.9	280
93.9	230	104.9	285
94.9	235	105.9	290
95.9	240	106.9	295
96.9	245	107.9	300
97.9	250		

To find the frequency in megacycles for CHANNEL NUMBERS between those given above, add .2 megacycles 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.

MODELS E30BE, E30GN
E30MN, E30TN, Ch. 30E -
30E -



- NOTES:
1. 1K = 1000
 - 100 = 100,000
 - 10 = 10,000
 - 1 = 1,000
 - ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED
 - BRAND CHANGE SWITCH SHOWN IN RM
 - NUMBER 1 TERMINAL ON ALL TRANSFORMERS CODED BY GREEN DOT NUMBERS PROGRESS CLOCKWISE
 - THE 50 NUMBER 100V 50T TUBE WITH TRANSFORMERS 6-872 AND 6-876 ARE INTERCHANGIBLE WITH 100V 50T TUBES ONLY



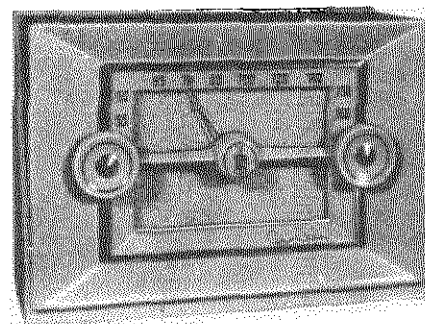
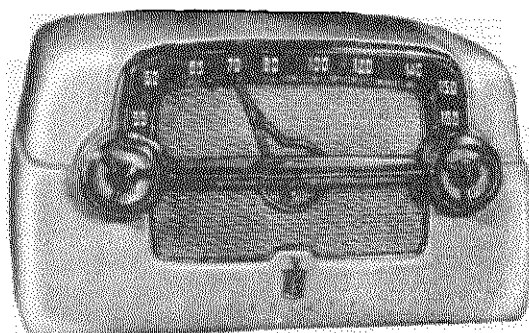
SCHEMATIC DIAGRAM

**MODELS E30BE,
E30GN, E30MN,
E30TN, Ch. 30E,
30E-1**

PARTS LIST

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
C1	W-145913-2	Capacitor, 110 mmf., 5%, 500 v., ceramic	R19	39373-67	Resistor, 47,000 ohm, 1/2 w.
C3	C-137727-1	Capacitor, 100 mmf., 500 v., ceramic	R20	39373-87	Resistor, 470,000 ohm, 1/2 w.
C4	C-144675-2	Capacitor, .005 mfd., 500 v., disc ceramic	R21	39374-15	Resistor, 150 ohm, 10%, 1/2 w.
C5A	C-152824	Capacitor, Variable	R22	39373-87	Resistor, 470,000 ohm, 1/2 w.
C5B		Capacitor, Variable	R23	39373-107	Resistor, 10 megohm, 1/2 w.
C5C		Capacitor, Variable	R24	39374-185	Resistor, 47 ohm, 10%, 2 w.
C5D		Capacitor, Variable	R25	39374-202	Resistor, 1200 ohm, 10%, 2 w.
C6A	C-144675-7	Capacitor, .001 mfd., 500 v. } Two section	R26	39374-25	Resistor, 1000 ohm, 10%, 1/2 w.
C6B		Capacitor, .001 mfd., 500 v. } disc ceramic	R27	39374-33	Resistor, 4700 ohm, 10%, 1/2 w.
C7	C-137727-98	Capacitor, 22 mmf., 2%, 500 v., ceramic	R29	39373-3	Resistor, 15 ohm, 1/2 w (chassis 30E-1 only)
C8	C-137727-109	Capacitor, 39 mmf., 10%, 200 v., ceramic	CA1	C-132300-6	Cable & Plug Assy., Power
C9	C-137727-121	Capacitor, 5000 mmf., 500 v., ceramic	CA4	B-139727-9	Cable & Plug Assy. (chassis 30E-1 only)
C10	C-137727-90	Capacitor, 100 mmf., 5%, 500 v., ceramic	I1	W-145851	Bulb (Dial), 7 w., 120 v., Candelabra Base
C11	39001-17	Capacitor, .05 mfd., 600 v., paper	SP1	C-145768	Speaker
C12	39001-17	Capacitor, .05 mfd., 600 v., paper	SP2	AD-151190-1	Speaker 5 1/4"E.M
C13A	C-144675-7	Capacitor, .001 mfd., 500 v. } Two section	SR1	B-145370	Rectifier, Selenium
C13B		Capacitor, .001 mfd., 500 v. } disc ceramic	SW1	W-145300-2	Switch, Band Change
C14	C-137727-121	Capacitor, 5000 mmf., 500 v., ceramic	SW2	Part of R18	Switch, Power
C15	C-137398-5	Capacitor, 3.3 mmf., 500 v.	T1	AC-139919-3	Transformer, 1st I.F. (455 kc.)
C16A	C-144675-7	Capacitor, .001 mfd., 500 v. } Two section	T2	D-145025-1	Transformer, 2nd IF. (10.7 mc.)
C16B		Capacitor, .001 mfd., 500 v. } disc ceramic	T3	C-145193-1	Transformer, Ratio Detector
C17	B-142958	Capacitor, 4 mfd., 50 v., Electrolytic	T4	D-145025-3	Transformer, 1st I.F. (10.7 mc.)
C18	C-137727-121	Capacitor, 5000 mmf., 500 v., ceramic	T5	AC-139919-3	Transformer, 2nd I.F. (455 kc.)
C22	C-144675-12	Capacitor, .001 mfd., 500 v. } Two section	T6	138131-1	Transformer, Output
C22		Capacitor, .0001 mfd., 500 v. } disc ceramic	L1	B-143322	Coil, F.M. Antenna Primary
C24	C-137727-109	Capacitor, 39 mmf. 10%, 200 v., ceramic	L2	AW-145724	Coil Assy., F.M. Antenna Secondary
C25A	C-144675-18	Capacitor, .0001 mfd., 500 v. } Three sec-	L3	AW-143837	Choke Assy., R.F. (F.M.)
C25B		Capacitor, .004 mfd., 500 v. } tion disc	L4	AA-151747	Coil Assy., R.F. (F.M.)
C25C		Capacitor, .004 mfd., 500 v. } ceramic	L5	AA-151746	Coil Assy., Oscillator (F.M.)
C26	39001-13	Capacitor, .01 mfd., 600 v., paper	L6	AC-152448	Coil Assy., Oscillator (A.M.)
C27A	C-144675-1	Capacitor, .0002 mfd., 500 v. } Four sec-	L7	AW-143934	Choke Assy., R.F.
C27B		Capacitor, .002 mfd., 500 v. } tion disc	L8	AW-143934	Choke Assy., R.F.
C27C		Capacitor, .005 mfd., 500 v. } ceramic	L9	AC-152873	Loop Antenna, Back & Power Cable Assy.
C27D		Capacitor, .0002 mfd., 500 v. } ceramic	L10	AW-149187	Choke Assy.
C28	39001-13	Capacitor, .01 mfd., 600 v., paper	L11	AW-149187	Choke Assy.
C29	39001-17	Capacitor, .05 mfd., 600 v., paper	L12	AC-149187	Choke Assy.
C30A	B-149183	Capacitor, 100 mfd., 150 v. } Three sec-	L13	AC-143837	Choke Assy.
C30B		Capacitor, 30 mfd., 150 v. } tion elec-	P1	W-139900	Plug, Interlock
C30C		Capacitor, 10 mfd., 150 v. } trolytic		C-152811	Background, Dial
C31	B-143686-1	Capacitor, 50 mmf., 500 v., molded disc ceramic		AB-149145-2	Baffle Assembly, Speaker
C32	39001-85	Capacitor, .08 mfd., 600 v., paper		AW-149073	Bracket Assembly, Dial Pointer
C33	C-144675-14	Capacitor, 1000 mmf., 500 v., disc ceramic		AW-145697	Bushing & Insulator, Drive Shaft
C34	39001-20	Capacitor, .15 mfd., 600 v., paper		AC-152861-4	Cabinet (E 30 BE)
C35	W-137398-5	Capacitor, 3.3 mmf., 500 v.		AC-152861-3	Cabinet (E 30 GN)
C36	39001-74	Capacitor, .002 mfd., 600 v., paper		AC-152861-2	Cabinet (E 30 MN)
C38	Part of T4	Capacitor, 17 mmf., 3%		AC-152861-1	Cabinet (E 30 TN)
C39	Part of T1	Capacitor, 106 mmf., 5%		W-131154-1	Cotter (External), Drive Shaft
C40	Part of T1	Capacitor, 131 mmf. 5%		C-152832-4	Dial (E 30 BE)
C41	Part of T2	Capacitor, 17 mmf., 3%		C-152832-3	Dial (E 30 GN)
C42	Part of T2	Capacitor, 17 mmf., 3%		C-152832-2	Dial (E 30 MN)
C43	Part of T5	Capacitor, 131 mmf., 5%		C-152832-1	Dial (E 30 TN)
C44	Part of T5	Capacitor, 106 mmf., 5%		W-138853	Insulator, Volume Control
C45	Part of T3	Capacitor, 43 mmf., 5%		B-149065-1	Knob (E 30 TN)
46A	B-151670	Capacitor, 20 mfd., 150 v. } Two section		B-149065-2	Knob (E 30 GN)
46B		Capacitor, 20 mfd., 150 v. } Electrolytic		B-149065-6	Knob (E 30 MN)
C47	C-137727-121	Capacitor, 5000 mmf., 500 v., ceramic		B-149065-7	Knob (E 30 BE)
C48	C-137727-121	Capacitor, 5000 mmf., 500 v., ceramic		C-151852	Lens, Dial
CR49A	C-142951-12	Capacitor, 500 mmf., 500 v. } Capacitor-		B-148080-4	Medallion
CR49B		Resistor, 680,000 ohm, 1/5 w } Resistor unit.		A-152814	Pointer, Dial
R2	39373-92	Resistor, 1 megohm, 1/2 w.		W-143206-4	Shaft, Dial Drive
R3	39373-44	Resistor, 3300 ohm, 1/2 w.		AB-152842	Shaft & Gear Assy., Dial Pointer
R4	39373-92	Resistor, 1 megohm, 1/2 w.		W-139040	Shock Mount, Sub-Chassis
R5	39373-14	Resistor, 100 ohm, 1/2 w.		AB-152902	Socket & Bracket Assy., Dial Light
R6	39374-42	Resistor, 27,000 ohm, 10% 1/2 w.		W-144732	Socket, Tube (V6)
R7	39374-41	Resistor, 22,000 ohm, 10%, 1/2 w.		W-145607	Socket, Tube (V7)
R8	39373-26	Resistor, 470 ohm, 1/2 w.		W-142761	Socket, Tube (V1, V3)
R9	39373-97	Resistor, 2.2 megohm, 1/2 w.		39462-1	Socket, Tube (V2)
R10	39373-100	Resistor, 3.3 megohm, 1/2 w.		39462-2	Socket, Tube (V4, V5)
R11	39373-33	Resistor, 1000 ohm, 1/2 w.		W-149096	Spring, Gear
R12	39373-67	Resistor, 47,000 ohm, 1/2 w.		W-51752	Spring, Drive Cord
R13	39373-67	Resistor, 47,000 ohm, 1/2 w.		W-139121	Stud (Insulated), Chassis Mtg.
R14	39373-33	Resistor, 1000 ohm, 1/2 w.		W-139976	Washer (Shouldered), Volume Control
R15	39373-92	Resistor, 1 megohm, 1/2 w.		W-134916	Washer (Spring), Drive Shaft
R16	39373-60	Resistor, 22,000 ohm, 1/2 w.			
R17	39373-33	Resistor, 1000 ohm, 1/2 w.			
R18	B149184	Control, Volume (3 megohm-Tap 300,000 ohm)			

**MODELS E15BE, CE, SL, TN, V
E20GN, GY, MN, TN, Ch. 15-20**



Model	Color
E 15 WE	White
E 15 BE	Blue
E 15 TN	Tan
E 15 SL	Steel Blue
E 15 CE	Chartreuse

Model	Color
E 20 MN	Maroon
E 20 GN	Green
E 20 GY	Grey
E 20 TN	Tan

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: 30 watts maximum.
POWER OUTPUT: 1 watt maximum.

TUBE COMPLEMENT:

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

When using direct current it may be necessary to reverse the position of the power plug in the elec 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.

PHONOGRAPH CONNECTION — To use a record player with this receiver insert the pickup plug the record player into the Phono jack on back of receiver. Then slide the Radio-Phono Switch on back of the receiver to the "Phono" position. Connect the power cord of the record player to a conv ent electric outlet of the correct voltage and frequency. Operate the record player in the nor manner.

ALIGNMENT PROCEDURE

Note: Before removing the chassis from the cabinet, turn the tuning control completely count clockwise and push the dial pointer down so as to clear opening in grille.

1. Connect an output meter across the speaker voice coil.
2. The r.f. signal input from the signal generator should be connected as indicated in the alignn chart. Connect the signal generator ground to lug as shown in Chassis Top View.
3. Turn the volume control on full and adjust the signal generator output to produce approximat midscale deflection of the output meter, but maintain signal generator output as low as possi to prevent AVC action in the receiver.

MODELS E15BE, CE, SL, TN, WE,
E20GN, GY, MN, TN, Ch. 15-20E

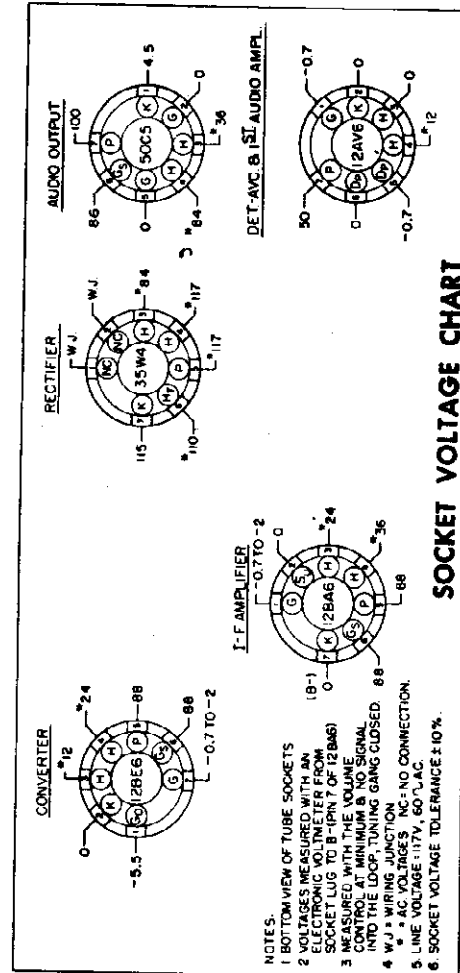
ALIGNMENT CHART

Alignment adjustment locations are shown on page 9 "CHASSIS, TOP VIEW."

Alignment Sequence	Signal Generator Output		Position of Dial pointer	Adjust for Maximum Output
	Frequency in KC	In Series with To		
1	455	200 mmf. External Ant. Screw	1620	A, B, C & D (See Note 1.)
2	1620	200 mmf. External Ant. Screw	1620	E (See Note 2.)
3	1400	200 mmf. External Ant. Screw	Tune to Signal	F (See Note 2.)

ALIGNMENT NOTES

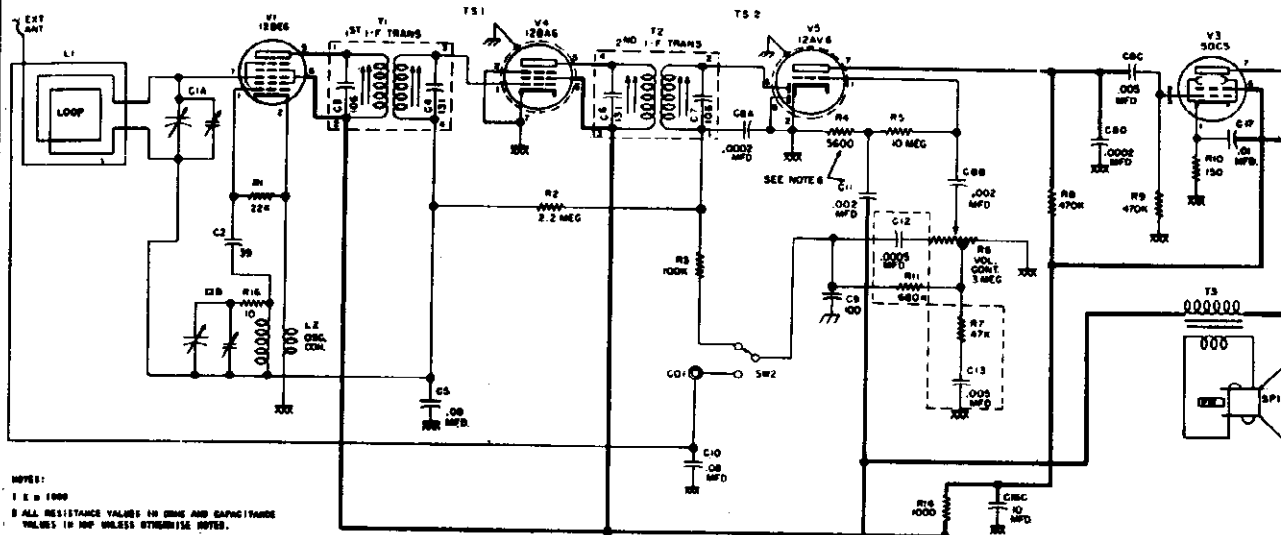
1. Repeat adjustments (A, B, C & D) in sequence, until maximum output is obtained.
2. The loop antenna must be positioned with respect to the chassis to simulate its position when chassis and loop are fastened in cabinet.
3. After the chassis is installed in the cabinet, set the pointer for proper dial calibration.



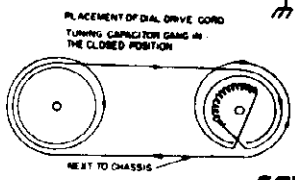
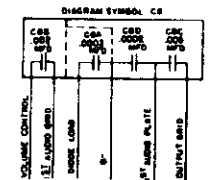
NOTES:
 1. BOTTOM VIEW OF TUBE SOCKETS
 2. VOLTAGES MEASURED WITH AN ALIGNING VOLTMETER FROM SOCKET WIRING (TO COMMON OR BASE)
 3. MEASURED WITH THE SIGNAL CONTROL AT MINIMUM & NO SIGNAL INTO THE LOOP, TUNING GANG CLOSED.
 4. WJ = WIRING JUNCTION
 5. * AC VOLTAGES; ** NO CONNECTION.
 6. SOCKET VOLTAGE TOLERANCE ±10%.

SOCKET VOLTAGE CHART

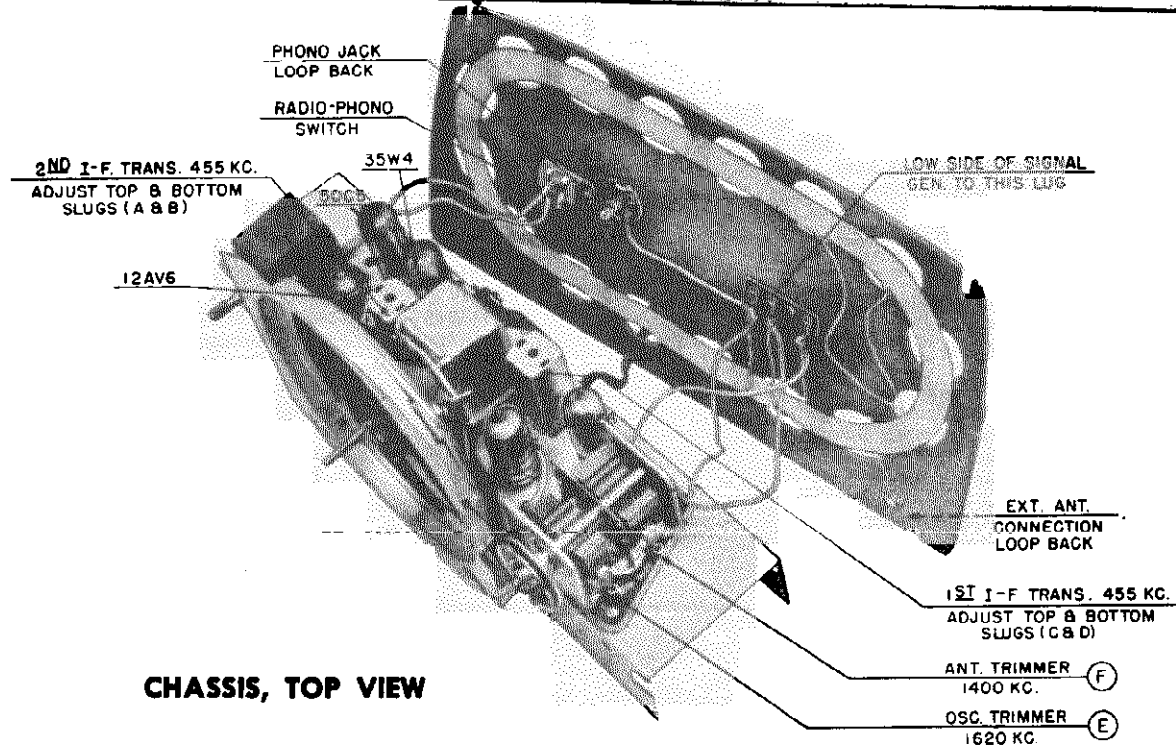
MODELS E15BE, CE, SL, TN, W.
E20GN, GY, MN, TN, Ch. 15-20E



- NOTES:
- 1 K = 1000
 - 2 ALL RESISTANCE VALUES IN OHMS AND CAPACITANCE VALUES IN MFD UNLESS OTHERWISE NOTED.
 - 3 NUMBER ONE TERMINAL ON I.F. TRANSFORMERS CONNECT WITH GREEN DOT, NUMBER TWO TERMINAL WITH RED DOT.
 - 4 I.F. = 455 KC.
 - 5 CHASSIS
 - 6 B4 AND C11 USED WITH PH. SPEAKERS ONLY.



SCHEMATIC DIAGRAM



CHASSIS, TOP VIEW

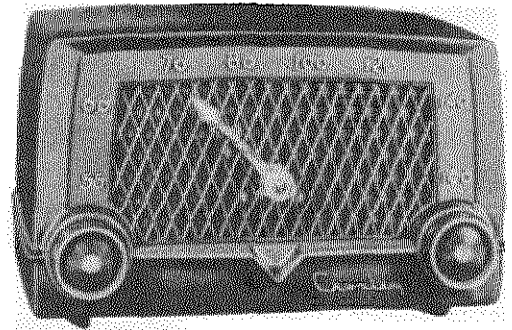
MODELS E15BE, CE, SL, TN, WE,
E20GN, GY, MN, TN, Ch. 15-20E

PARTS LIST

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
C1A	151844	Capacitor, Variable		151773-4	Bridge (E20GY)
C1B		Capacitor, Variable } Two Section		151773-2	Bridge (E20TN)
C2	137727-109	Capacitor, 39 mmf., 10%, 200 v., ceramic		153567-1	Cabinet (E15WE)
C3	Part of T1	Capacitor, 106 mmf.		153567-2	Cabinet (E15BE)
C4	Part of T1	Capacitor, 131 mmf.		153567-3	Cabinet (E15TN)
C5	39001-85	Capacitor, .08 mfd., 600 v., paper		153567-4	Cabinet (E15SL)
C6	Part of T2	Capacitor, 131 mmf.		153567-5	Cabinet (E15CE)
C7	Part of T2	Capacitor, 106 mmf.		153007	Cabinet (E20MN)
C8A	144675-1	Capacitor, .0002 mfd., 500 v.		153008-3	Cabinet (E20GN)
C8B		Capacitor, .002 mfd., 500 v.		153008-4	Cabinet (E20GY)
C8C		Capacitor, .005 mfd., 500 v.		153008-2	Cabinet (E20TN)
C8D		Capacitor, .0002 mfd., 500 v.		139921	Clip, I.F. Transformer Mtg.
C9	143686-3	Capacitor, 100 mmf., 500 v., Molded disc ceramic		131154-1	Cotter (External), Pointer Pulley
C10	39001-85	Capacitor, .08 mfd., 600 v., paper		153291-1	Escutcheon, Dial (E15WE)
C11	39001-74	Capacitor, .002 mfd., 600 v., paper		153291-2	Escutcheon, Dial (E15BE, E15TN, E15SL, E15CE)
C12	142951-12	Capacitor-Resistor		151674-1	Escutcheon (E20MN)
C13	142951-11	Capacitor-Resistor		151674-3	Escutcheon (E20GN)
C14	39001-85	Capacitor, .08 mfd., 600 v., paper		151674-4	Escutcheon (E20GY)
C15	39001-17	Capacitor, .05 mfd., 600 v., paper		151674-2	Escutcheon (E20TN)
C16A	147174	Capacitor, 100 mfd., 150 v.		150423	Foot (Felt in metal cup)
C16B		Capacitor, 30 mfd., 150 v.		153862	Grille Assembly
C16C		Capacitor, 10 mfd., 150 v.		151627	Grille Cloth & Baffle Assy.
C17	39001-13	Capacitor, .01 mfd., 600 v., paper		153552-1	Knob (E15WE)
R1	39374-41	Resistor, 22,000 ohm, 10%, 1/2 w.		153552-2	Knob (E15BE)
R2	39374-69	Resistor, 2.2 megohm, 10%, 1/2 w.		153552-3	Knob (E15TN)
R3	39374-49	Resistor, 100,000 ohm, 10%, 1/2 w.		153552-4	Knob (E15SL)
R4	39374-34	Resistor, 5600 ohm, 10%, 1/2 w.		153552-5	Knob (E15CE)
R5	39374-85	Resistor, 10 megohm, 10%, 1/2 w.		152996-1	Knob (E20MN)
R6	151845	Control, Volume(3 megohm, Tap 300,000 ohm)		152996-3	Knob (E20GN)
R7	Part of C13	Resistor, 47,000 ohm, 1/2 w.		152996-4	Knob (E20GY)
R8	39374-57	Resistor, 470,000 ohm, 10%, 1/2 w.		152996-2	Knob (E20TN)
R9	39374-57	Resistor, 470,000 ohm, 10%, 1/2 w.		153540-2	Medallion (E15WE)
R10	39374-15	Resistor, 150 ohm, 10%, 1/2 w.		153540-3	Medallion (E15BE, E15TN, E15SL, E15CE)
R11	Part of C12	Resistor, 680,000 ohm, 1/2 w.		153289-1	Moulding, Trim (E15WE)
R12	39374-189	Resistor, 100 ohm, 10%, 2 w.		153289-2	Moulding, Trim (E15BE, E15TN, E15SL, E15CE)
R13	39374-114	Resistor, 1200 ohm, 10%, 1 w.		147275	Mounting, Rubber (2 used)
R14	39374-25	Resistor, 1000 ohm, 10%, 1/2 w.		45580-2	Mounting, Rubber (1 used)
R16	39374-1	Resistor, 10 ohm, 10%, 1/2 w.		94704-19	Nut (Push-On), Escutcheon
CA1	132300-1	Cable & Plug Assy., Power		153380-2	Pointer, Dial (E15BE, E15TN, E15SL, E15CE)
CO1	136998	Connector, Phono		153380-1	Pointer, Dial (E15WE)
L1	153571	Loop & Back Assy. (E15WE, E15BE, E15TN, E15SL, E15CE)		151854	Pointer, Dial (E20MN, E20GN, E20GY, E20TN)
L1	152994	Loop & Back Assy., (E20MN, E20GN, E20GY, E20TN)		151946	Pulley, & Shaft Assy., Dial Pointer
L2	153405	Coil, Oscillator		39482-18CL	Screw, Bridge Mtg. (E15WE)
SP1	145956-2	Speaker (5-1/4" P.M.)		39178-29CL	Screw, Bridge Mtg. (E20MN, E20GN, E20GY, E20TN)
SW1	Part of R6	Switch, Power		39482-2	Socket, Tube
SW2	148260	Switch, Phono		51752	Spring, Drive Cord
T1	139919-3	Transformer, 1st I.F.		136630	Stud, Trimount (E20MN, E20GN, E20GY, E20TN)
T2	139919-3	Transformer, 2nd I.F.		153582	Stud, Trimount (E15WE, E15BE, E15TN, E15SL, E15CE)
T3	147171	Transformer, Output		147216	Suction Cup
TS1	147784	Shield, Tube (V2)		148775-2	Support & Bushing Assy., Pointer Pulley
TS2	147784	Shield, Tube (V3)			
	147934	Bottom, Chassis			
	153290-1	Bridge (E15WE)			
	153290-2	Bridge (E15BE, E15TN, E15SL, E15CE)			
	151773-1	Bridge (E20MN)			
	151773-3	Bridge (E20GN)			

MODELS E10BE, CE, RD
WE, Ch. 10E, 10E-1

Model No.	Color
E10BE	Blue
E10CE	Chartreuse
E10RD	Red
E10WE	White

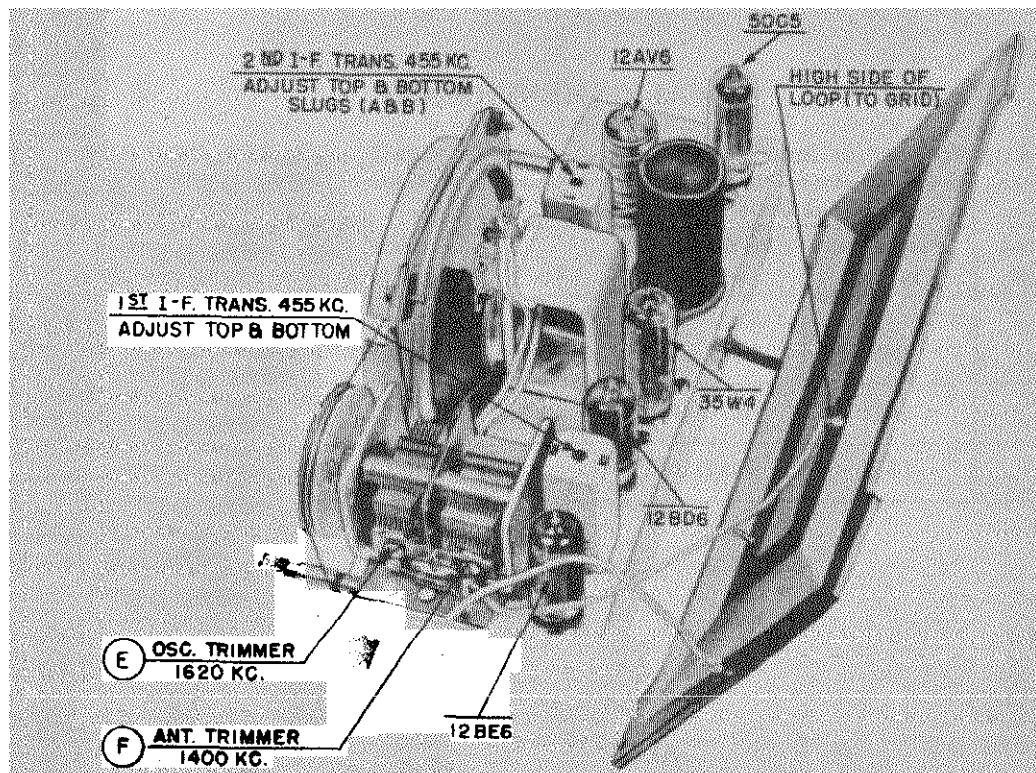


DESCRIPTION

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: 30 watts maximum.
POWER OUTPUT: 1 watt maximum.

TUBE COMPLEMENT:

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



CHASSIS, TOP VIEW

**MODELS E10BE, CE, RD,
WE, Ch. 10E, 10E-1**

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.

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 as indicated in the alignment chart. Connect the signal generator ground through a 0.1 mfd. condenser to B - (pin 2 on 12BA6 tube socket).
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

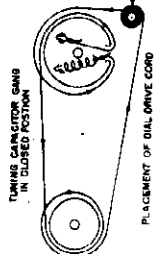
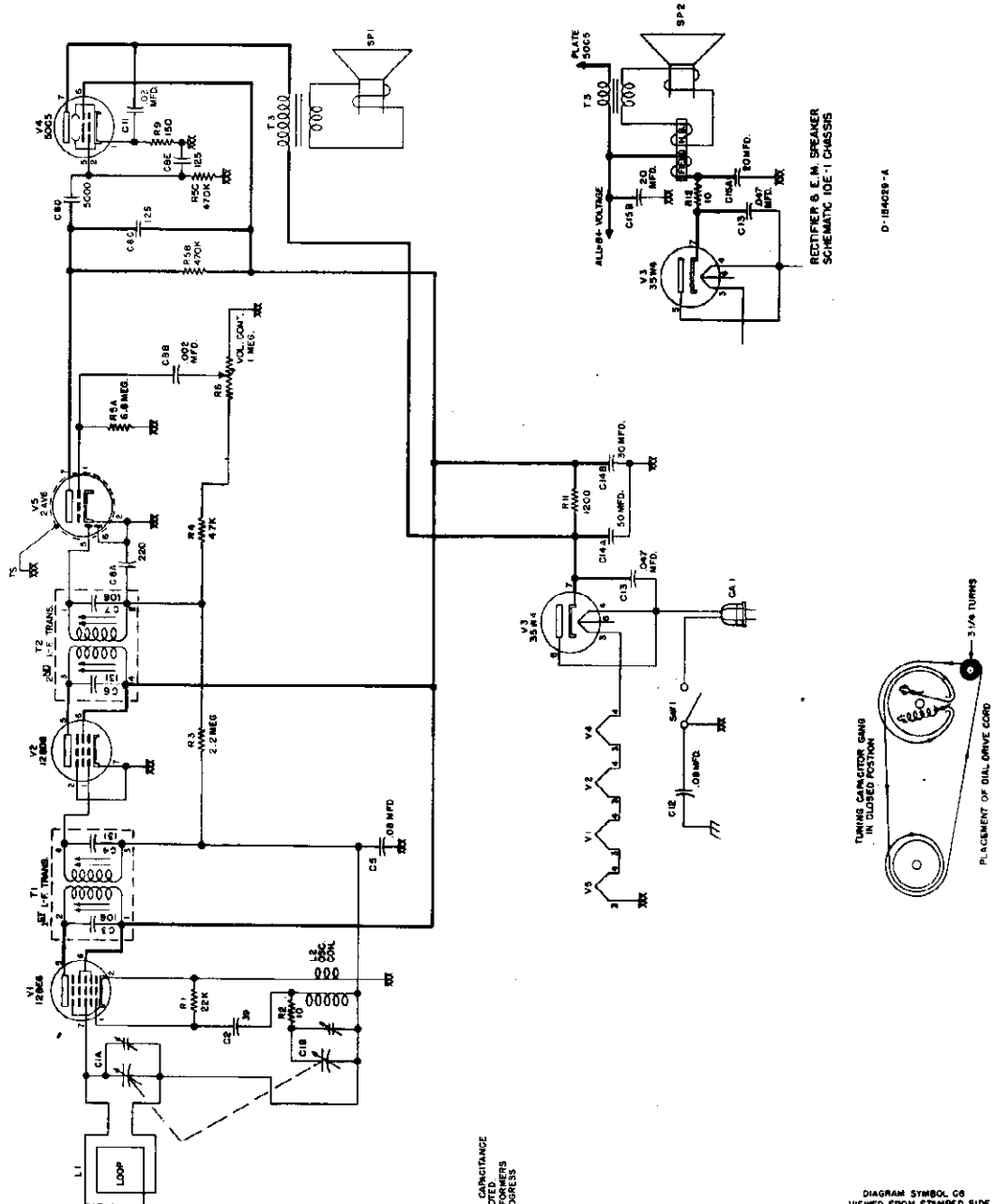
Alignment adjustment locations are shown on page 11, "CHASSIS, TOP VIEW."

Alignment Sequence	Signal Generator Output			Position of Dial pointer	Adjust for Maximum Output
	Frequency in KC	In Series with	To		
1	455	200 mmf.	High Side of Loop	1620	A, B, C & D (See Note 1.)
2	1620	Radiated to Loop		1620	E (See Note 2.)
3	1400	Radiated to Loop		Tune to Signal	F (See Note 2.)

ALIGNMENT NOTES

1. Repeat adjustments (A, B, C & D) in sequence, until maximum output is obtained.
2. Place signal generator output lead near the loop antenna. The loop antenna must be positioned with respect to the chassis to simulate its position when chassis and loop are fastened in cabinet.

SCHEMATIC DIAGRAM



NOTES:
 1. K=1000
 2. RESISTANCE VALUES IN OHMS AND CAPACITANCE VALUES IN MICROFARADS
 3. NUMBER ONE TERMINAL ON I.F. TRANSFORMERS SHOULD BE GREEN DOT, NUMBERS PROGRESS CLOCKWISE
 4. I.F. = 455 KC.
 5. // = CHASSIS
 ☎ = COMMON WIRING

DIAGRAM SYMBOL CO
 VIEWED FROM STAMPED SIDE

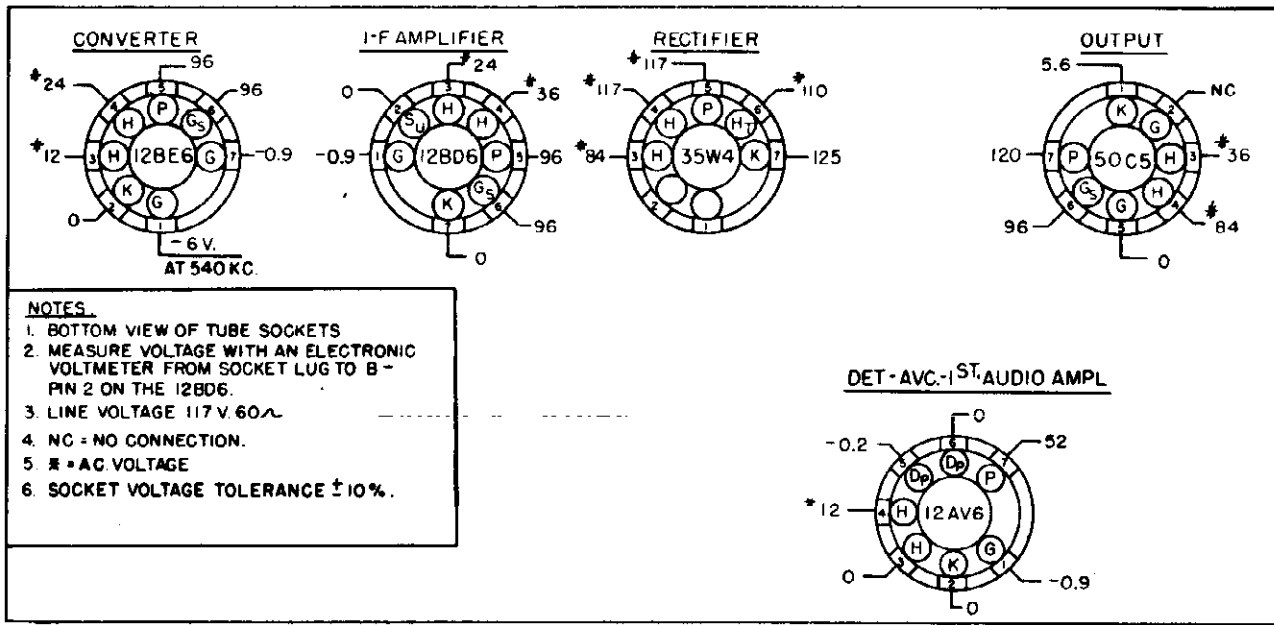
R5A	250K	R5B	250K	R5C	250K	R5D	250K
CBE	6.8 MEG	CBE	4.70K	CBE	4.70K	CBE	4.70K
DOZ	250M	DOZ	250M	DOZ	250M	DOZ	250M
C18	100P	C13	20MFD	C13	20MFD	C13	20MFD
C18	100P	C13	20MFD	C13	20MFD	C13	20MFD
C18	100P	C13	20MFD	C13	20MFD	C13	20MFD
C18	100P	C13	20MFD	C13	20MFD	C13	20MFD
C18	100P	C13	20MFD	C13	20MFD	C13	20MFD
C18	100P	C13	20MFD	C13	20MFD	C13	20MFD

D-184628-4

MODELS E10BE, CE, RD,
WE, Ch. 10E, 10E-1

PARTS LIST

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
C1A	153497	Capacitor, Tuning & Pulley } Assembly	R12	39374-1	Resistor, 10 ohm, 1/2 w. (10E-1 chassis)
C1B		Capacitor, Tuning & Pulley } Assembly	CA1	142769-4	Cable & Plug Assembly, Power
C2	137727-109	Capacitor, 39 mmf., 10%, 200v., Ceramic	L1	153872	Loop & Back Assembly
C3	Part of T1	Capacitor, 106 mmf.	L2	153405	Coil, Oscillator
C4	Part of T1	Capacitor, 131 mmf.	SP1	148400-1	Speaker (4" PM), 10E chassis
C5	39001-85	Capacitor, .08 mfd., 600v., paper	SP2	135632	Speaker (4" EM), 10E-1 chassis
C6	Part of T2	Capacitor, 131 mmf.	TS1	147784-1	Shield, Tube (V5)
C7	Part of T2	Capacitor, 106 mmf.	SW1	39379-1	Switch, ON-OFF
C8A	151550-1	Capacitor, 220 mmf.	T1	139919-3	Transformer, 1st I.F.
C8B		Capacitor, .002 mmf.	T2	139919-3	Transformer, 2nd I.F.
C8C		Capacitor, 125 mmf. } Assembly	T3	138131-1	Transformer, Audio, Output
C8D		Capacitor, 5000 mmf. }	153886	Baffle & Grille Cloth Assembly	
C8E		Capacitor, 125 mmf. }	153851	Bracket & Baffle Assembly, Pointer Shaft Bushing	
C11	39001-80	Capacitor, .02 mfd., 600v., paper	153887-1	Cabinet, Model E-10WE	
C12	39001-85	Capacitor, .08 mfd., 600v., paper	153887-2	Cabinet, Model E-10CE	
C13	39477-45	Capacitor, .047 mfd. 600v., molded paper	153887-3	Cabinet, Model E-10RD	
C14A	154280	Capacitor, 50 mfd., 150v., } Electrolytic	153887-4	Cabinet, Model E-10BE	
C14B		Capacitor, 30 mfd., 150v., } (10E chassis)	131154-1	Cotter (External), Drive Shaft	
C15A	151617	Capacitor, 20 mfd., 150v., } Electrolytic	153855-1	Knob (2 used), Model E-10WE	
C15B		Capacitor, 20 mfd., 150v. } (10E-1 chassis)	153855-2	Knob (2 used), Model E-10CE	
R1	39374-41	Resistor, 22,000 ohm, 10%, 1/2 w.	153855-3	Knob (2 used), Model E-10RD	
R2	39374-1	Resistor, 10 ohm, 10%, 1/2 w.	153855-4	Knob (2 used), Model E-10BE	
R3	39374-69	Resistor, 2.2 megohm, 10%, 1/2 w.	94704-7	Nut (Push on type), 4 used	
R4	39374-45	Resistor, 47,000 ohm, 10%, 1/2 w.	153846	Pointer, Dial	
R5A	Part of C8	Resistor, 6.8 megohm } Assembly	153848	Pulley & Shaft Assembly, Dial Pointer	
R5B	Part of C8	Resistor, 470,000 ohm }	153588-1	Shaft, Dial Cord Drive	
R5C	Part of C8	Resistor, 470,000 ohm }	39462-2	Socket, Tube	
R8	39378-13	Control, Volume (1 megohm, tapped 300,000 ohm)	51752	Spring, Drive Cord	
R9	39374-15	Resistor, 150 ohm, 10%, 1/2 w.	132124	Stud (Trimount, 4 used), Back & Loop Assembly	
R11	39374-26	Resistor, 1200 ohm, 10%, 1/2 w. (10E chassis)			

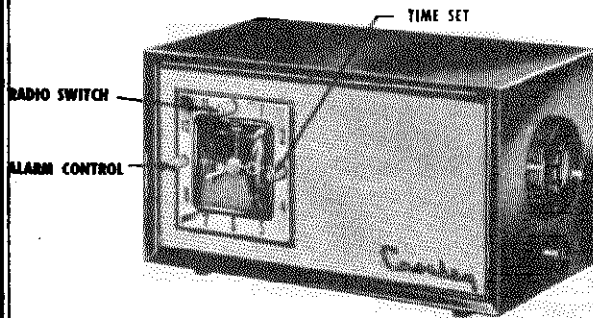


- NOTES.**
1. BOTTOM VIEW OF TUBE SOCKETS
 2. MEASURE VOLTAGE WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-PIN 2 ON THE 12BD6.
 3. LINE VOLTAGE 117 V. 60~
 4. NC = NO CONNECTION.
 5. * = AC VOLTAGE
 6. SOCKET VOLTAGE TOLERANCE ±10%.

MODELS E-75CE, RD, GN, TN
Ch. 75E; E-85CE, GN, RD, TN,
Ch. 85E

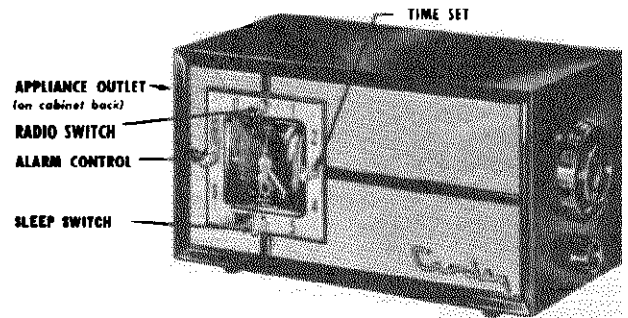
Chassis 75E

Models: E-75 CE, E-75 RD, E-75 GN, E-75-TN



Chassis 85E

Models: E-85 CE, E-85 RD, E-85 GN, E-85 TN



DESCRIPTION

TYPE: Five-tube, single band, Superheterodyne.

FREQUENT RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

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

VOLTAGE RATING: 105-125 volts.

POWER OUTPUT: 1 watt maximum.

POWER CONSUMPTION. 35 watts.

SLEEP SWITCH. Set it for up to 90 minutes operation of radio or appliance — turns them off automatically. (85E only.)

ELECTRIC CLOCK of highest accuracy. The jewel-like clock has a black face set off by hour and minute hands in blue, sweep-second hand in gold, and alarm set hand in red. Clock controls in sparkling clear plastic.

ALARM CONTROL. Set it for time radio (or appliance 85E only) is to turn on automatically.

RADIO SWITCH has three positions: "Off" to turn off radio; "Auto" to turn radio (or appliance 85E only) on automatically at pre-set time; "On" for manual radio operation.

APPLIANCE OUTLET is provided at rear of set for connecting any appliance (not exceeding 1100 watts) to be controlled by timing device. (85E only.)

TUBE COMPLEMENT:

Type	Function
12BE6	Converter
12BD6	I. F. Amplifier
12AT6	Detector, AVC, Ist. A. F. Amplifier
50C5	A. F. Power Output
35W4	Rectifier

TIME SET, for setting clock to time of day.

DRIFT-FREE TUNING, accomplished by Crosley' frequency stabilized oscillator, keeps receive aligned precisely with station to which you have tuned.

ECEPTIONALLY FINE TONE — the result of advanced engineering of the Crosley circuit and components.

INCREASED SENSITIVITY AND STABILITY Permeability tuned (iron core) I.F. transformer give greater stability and sensitivity so that distant station can be received with minimum interference.

AUTOMATIC VOLUME CONTROL holds the volume as you set it.

BUILT-IN ANTENNA consists of a sturdy high efficiency loop which receives stations sharply and clearly.

CHASSIS 75E, 85E

ALIGNMENT PROCEDURE

1. Connect an output meter across the speaker voice coil (3.2 ohms).
2. Feed an R.F. signal modulated 30% at 400 cycles to the high side of loop (inside winding of loop) as indicated in the alignment chart. Connect signal generator ground through a 0.1 mfd capacitor to B-.
3. Turn the Radio Switch (top knob on clock dial) to the "ON" position.
4. Turn the volume control to maximum clockwise position 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.

ALIGNMENT CHART

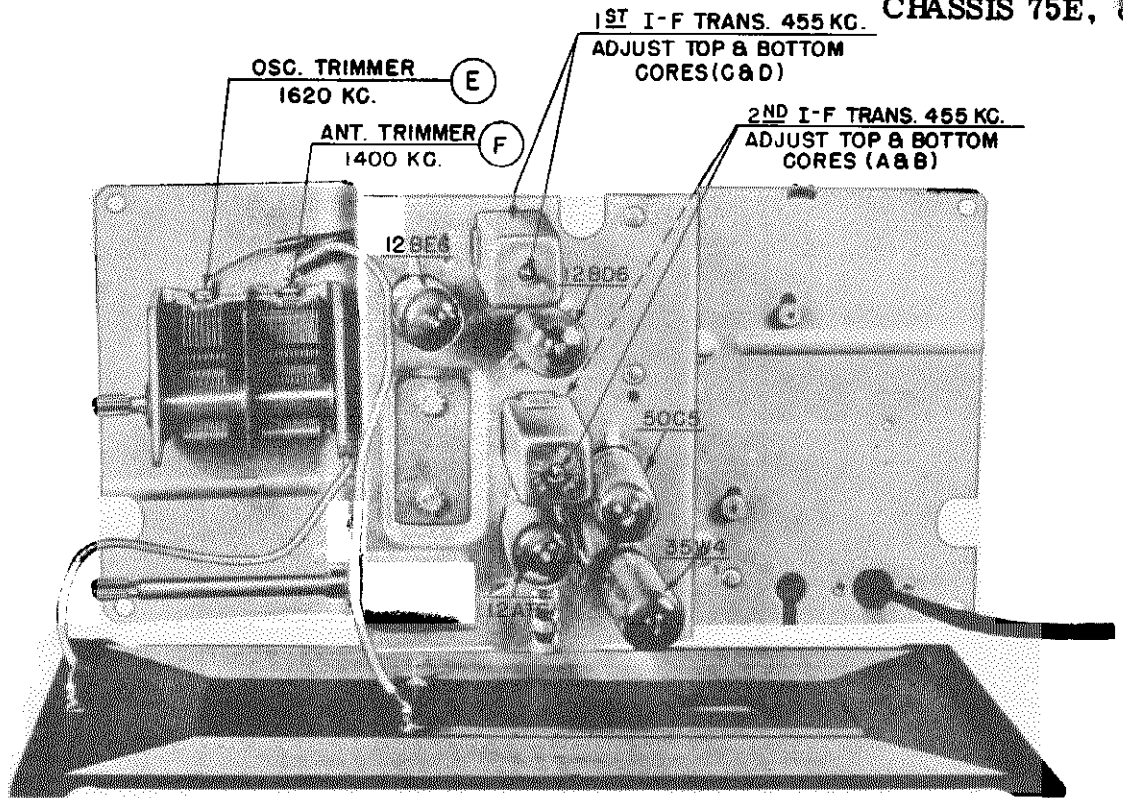
Alignment locations are shown on page 17.

Alignment Sequence	Signal Generator Output			Position of Tuning Gang	Adjust for Max. Output	Remarks
	Freq. in KC.	In Series With	To			
1	455	200 mmf.	Hi side of loop	Open	A&B	See note 1
2	455	200 mmf.	Hi side of loop	Open	C&D	See note 1
3 Repeat adjustments 1 and 2 until maximum output is obtained.						
4	1620	Radiated Signal	Loop	Open	E	See note 2
5	1400	Radiated Signal	Loop	Tune in Sig.	F	See note 2

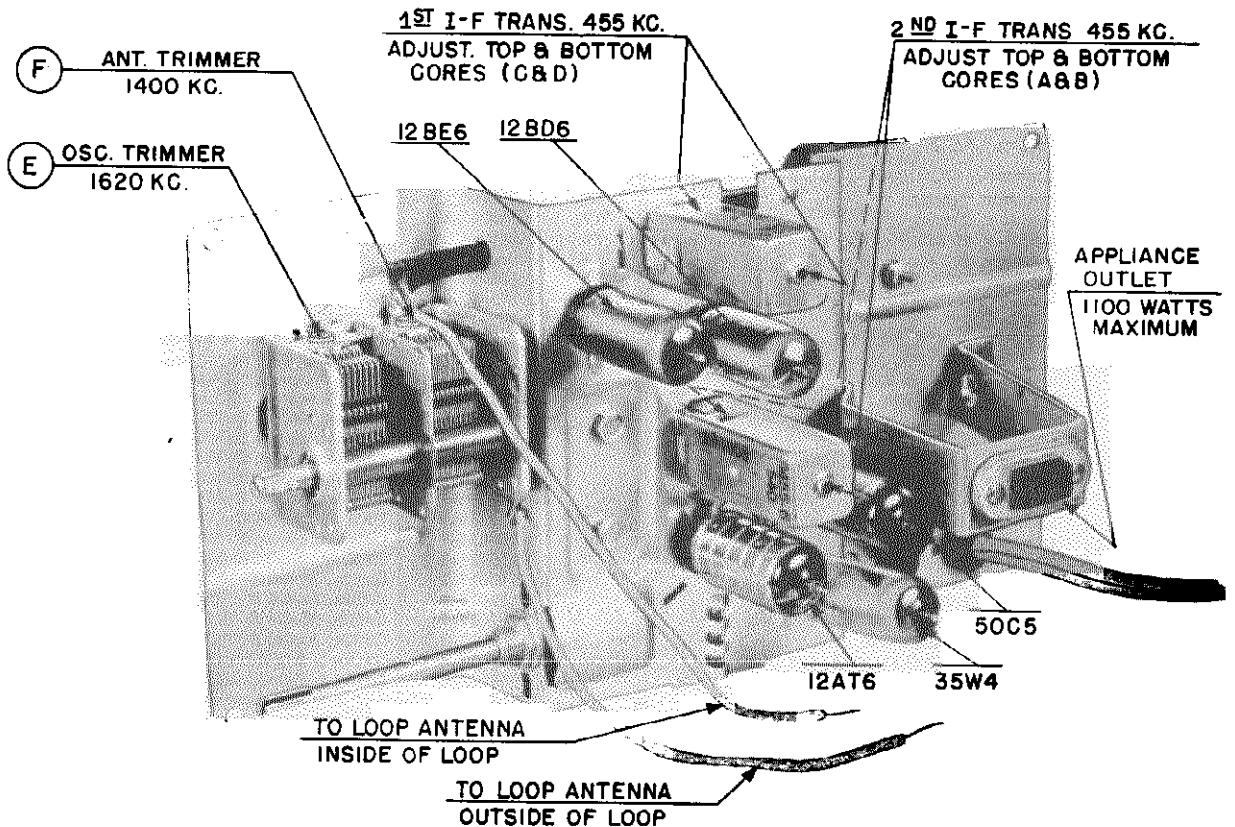
Notes:

1. The speaker must be removed from the chassis in order to adjust the bottom slugs on the I.F. Transformers. **DO NOT REMOVE THE WIRES FROM THE SPEAKER.**
2. The signal can be radiated to the loop antenna by placing the output lead of the signal generator close to the loop.

For oscillator and antenna trimmer alignment, the loop antenna must be positioned with respect to the chassis to simulate position when chassis and loop are fastened in the cabinet so that no further adjustment of the antenna trimmer (F) will be necessary when the chassis and loop are mounted in the cabinet.



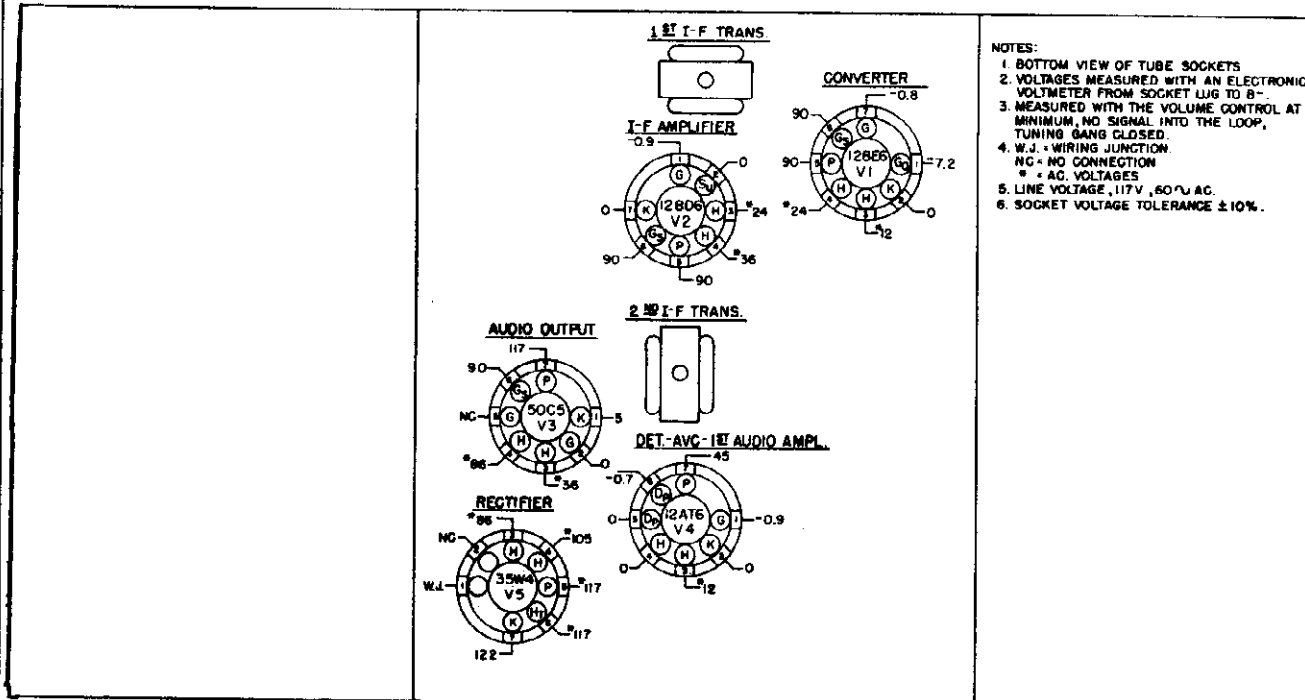
TOP VIEW - CHASSIS 75E



TOP VIEW - CHASSIS 85E

MODELS E-75CE, GN, RD, TN,
Ch. 75E; E-85CE, GN, RD, TN,
Ch. 85E

SOCKET VOLTAGE CHART



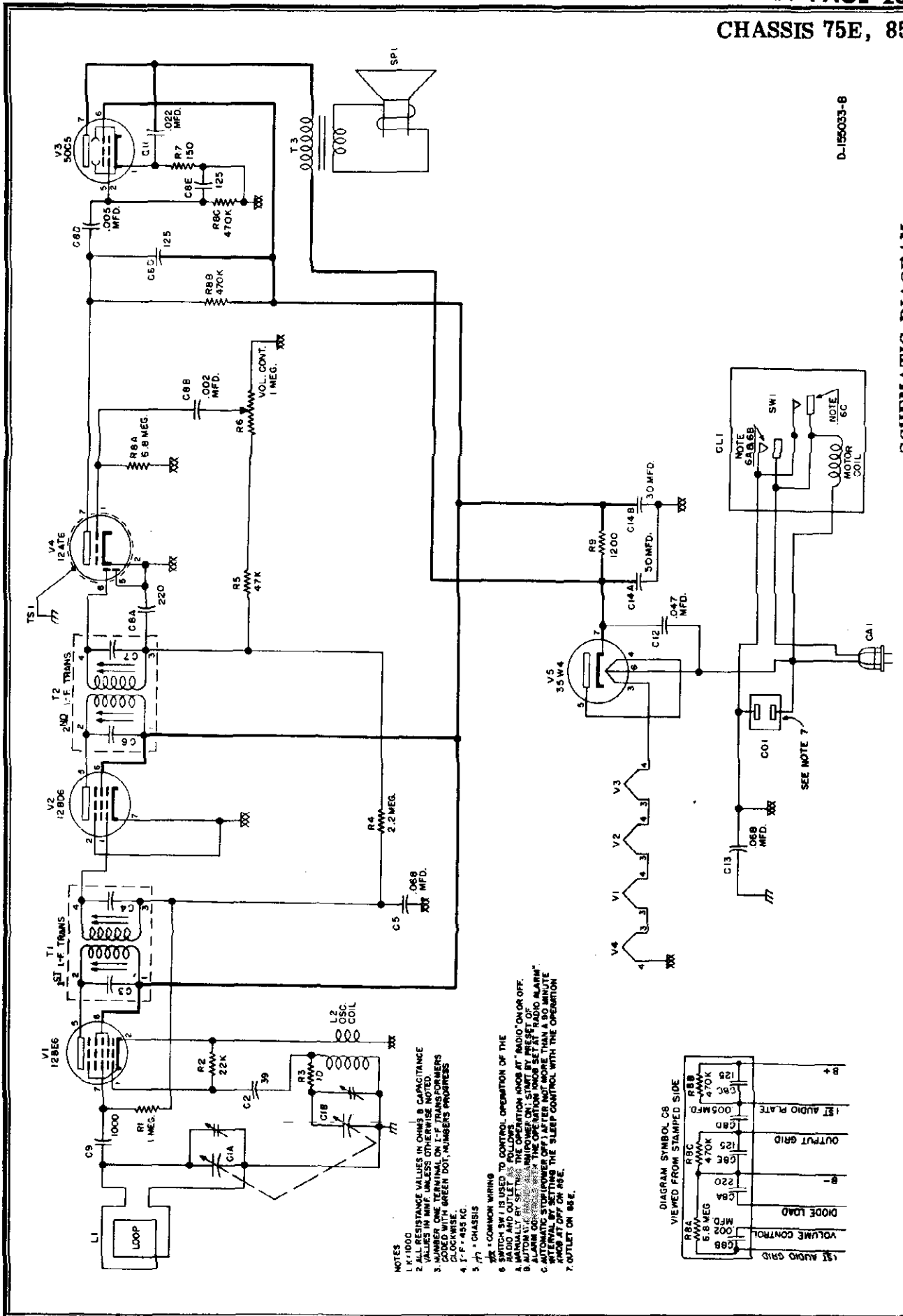
- NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS
 2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO 8-
 3. MEASURED WITH THE VOLUME CONTROL AT MINIMUM, NO SIGNAL INTO THE LOOP, TUNING GANG CLOSED.
 4. W.J. = WIRING JUNCTION
NG = NO CONNECTION
* = AC VOLTAGES
 5. LINE VOLTAGE, 117V., 60 \pm AC.
 6. SOCKET VOLTAGE TOLERANCE \pm 10%.

PARTS LIST

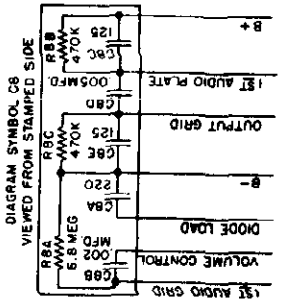
Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
C1A	154982	Capacitor, Tuning } Assembly	L2	158405	Coil, Oscillator
C1B		Capacitor, Tuning } Assembly	SP1	138762-8	Speaker P.M. (4")
C2	137727-109	Capacitor, 39 MMF., 10%, 200 v., Ceramic	T81	147784	Shield, Tube
C3	Part of T1	Capacitor	SW1	Part of CL1	Switch, ON-OFF, Power
C4	Part of T1	Capacitor	T1	155007-1	Transformer, 1st I.F.
C5	39477-46	Capacitor, .068 MFD., 600 v., Molded Paper	T2	155007-1	Transformer, 2nd I.F.
C6	Part of T2	Capacitor	T3	155015	Transformer, Audio Output
C7	Part of T2	Capacitor	CO1	155016	Appliance Outlet & Bracket Assembly (Chassis 85E only)
C8A	151550-1	Capacitor, 220 MMF. } Assembly	CL1	154971	Clock Assembly (Chassis 75E)
C8B		Capacitor, .002 MFD. } Assembly	CL1	155107	Clock Assembly (Chassis 85E)
C8C		Capacitor, 125 MMF. } Assembly	155214-1		Cabinet, Model E-75CE
C8D		Capacitor, .005 MFD. } Assembly	155214-2		Cabinet, Model E-75RD
C8E		Capacitor, 125 MMF. } Assembly	155214-3		Cabinet, Model E-75TN
C9	137727-8	Capacitor, 1000 MMF., 10%, 300v., Ceramic	155214-4		Cabinet, Model E-75GN
C11	39477-43	Capacitor, .002 MFD., 600v., Molded Paper	155214-5		Cabinet, Model E-85CE
C12	39477-45	Capacitor, .047 MFD., 600v., Molded Paper	155214-6		Cabinet, Model E-85RD
C13	39477-46	Capacitor, .068 MFD., 600v., Molded Paper	155214-7		Cabinet, Model E-85TN
C14A	155006	Capacitor, 50 MFD., 150v. } Electrolytic	155214-8		Cabinet, Model E-85GN
C14B		Capacitor, 30 MFD., 150v. } Electrolytic	155017-1		Grille, Model E-75CE
R1	39374-61	Resistor, 1 meg OHM, 10%, 1/2 w.	155017-2		Grille, Model E-75RD
R2	39374-41	Resistor, 22,000 OHM, 10%, 1/2 w.	155017-3		Grille, Model E-75TN
R3	39374-1	Resistor, 10 OHM, 10%, 1/2 w.	155017-4		Grille, Model E-75GN
R4	39374-69	Resistor, 2.2 Meg OHM, 10%, 1/2 w.	155021-1		Grille & Bar Assembly, Model E-85CE
R5	39374-45	Resistor, 47,000 OHM, 10%, 1/2 w.	155021-2		Grille & Bar Assembly, Model E-85RD
R6	154961	Control, Volume, 1 Meg OHM	155021-3		Grille & Bar Assembly, Model E-85TN
R7	39374-15	Resistor, 150 OHM, 10%, 1/2 w.	155021-4		Grille & Bar Assembly, Model E-85GN
R8A	Part of C8	Resistor, 6.8 Meg OHM } Assembly	155061-1		Knob, Volume Control
R8B		Resistor, 470,000 OHM } Assembly	154062-1		Knob, Tuning
R8C		Resistor, 470,000 OHM } Assembly	155003		Name Plate, Crosley (Used on 75 models only)
R9	39374-114	Resistor, 1200 OHM, 10%, 1 w.	154347-3		Name Plate, Crosley (Used on 85 models only)
CA1	149780-3	Cable & Plug, Power (85E only)	39462-2		Socket, Tube (V1, V2, V3, V4, V5)
CA1	142769-5	Cable & Plug, Power (75E only)	132124		Stud (Trimount 3 used) Loop & Back Assembly
L1	154987	Loop Antenna & Back Assembly (75E only)	154963		Washer, Extruded (4 used), Clock Mounting
L1	155042	Loop Antenna & Back Assembly (85E only)			

D-156033-8

SCHEMATIC DIAGRAM



- NOTES
1. K=1000
 2. ALL RESISTANCE VALUES IN OHMS & CAPACITANCE VALUES IN P.F. UNLESS OTHERWISE NOTED.
 3. NUMBER ONE TRANSFORMERS CLOTTED WITH GREEN DOT, NUMBERS PROGRESS CLOCKWISE.
 4. 1" P=455 KC.
 5. CHASSIS
 6. COMMON WIRING
 7. SWITCH SW1 IS USED TO CONTROL OPERATION OF THE RADIO AND OUTLET AS FOLLOWS:
 - POSITION 1: SETTING THE OPERATOR MODES AT RADIO ON OR OFF.
 - POSITION 2: SETTING THE OPERATOR MODES AT RADIO OFF.
 - POSITION 3: SETTING THE OPERATOR MODES AT RADIO ALARM.
 - POSITION 4: SETTING THE OPERATOR MODES AT RADIO ALARM.
 - POSITION 5: SETTING THE SLEEP CONTROL WITH THE OPERATOR MODES AT RADIO OFF.
 - POSITION 6: SETTING THE SLEEP CONTROL WITH THE OPERATOR MODES AT RADIO OFF.
 8. OUTLET ON 85E.



SEE NOTE 7

CHASSIS 75E, 85E

SUBJECT: TO ADD CLOCK REPLACEMENT PARTS TO CHASSIS 75E AND CHASSIS 85E PARTS LIST.

The following parts are now available for replacement on Clock Assemblies, part numbers 154971 and 155107.

PARTS LIST

Part No.	Description	Part No.	Description
156208-1	Dial Crystal (Plastic)	156208-8	Sleeve, Hand (Second)
156208-2	Bezel (Model E-75)	156208-9	Minute, Hand
156208-3	Knob (3 used on model E-75) (4 used on model E-85)	156208-10	Hour, Hand
156208-4	Timer Switch	156208-11	Indicator, Hand (Alarm)
156208-6	Adjusting Screw For Timer Switch	156208-13	Filler
156208-7	Bezel (Model E-85)	156208-14	Filler (Black)

A glass crystal is found on some of the above clock assemblies which were used in early production. Since the glass is not available, the following parts must be used for replacement.

Part No.	Description
156208-1	Dial Crystal, Plastic (1 used)
156208-13	Filler (3 used)
156208-14	Filler, Black (1 used)

The filler, 156208-14, with the black surface, should be placed next to the bezel, with the black surface facing the bezel. Figure 1 shows the assembly of these parts.

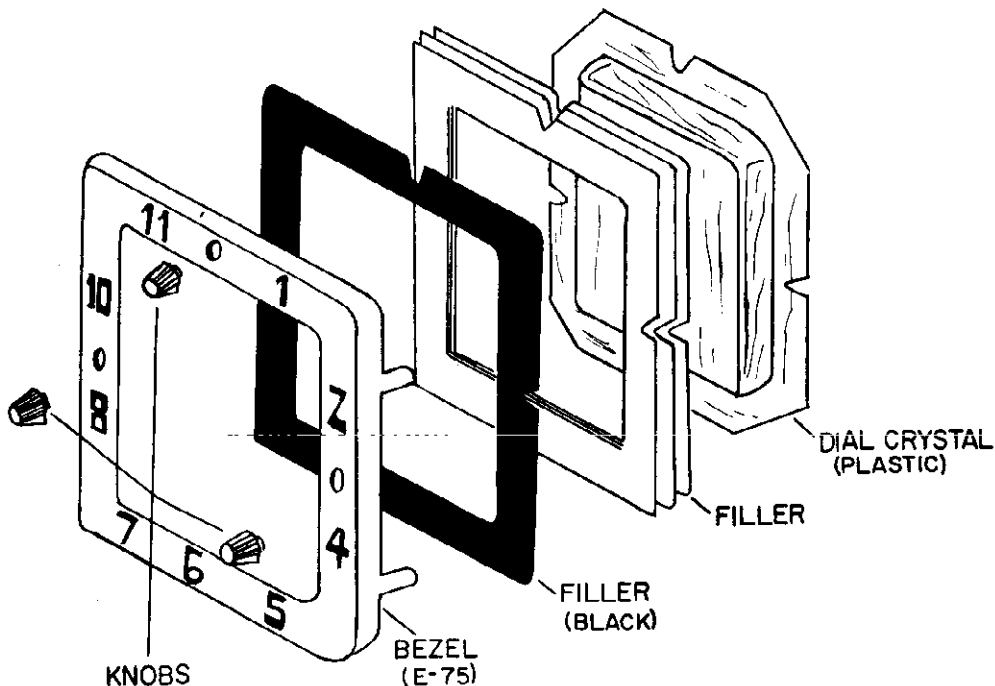
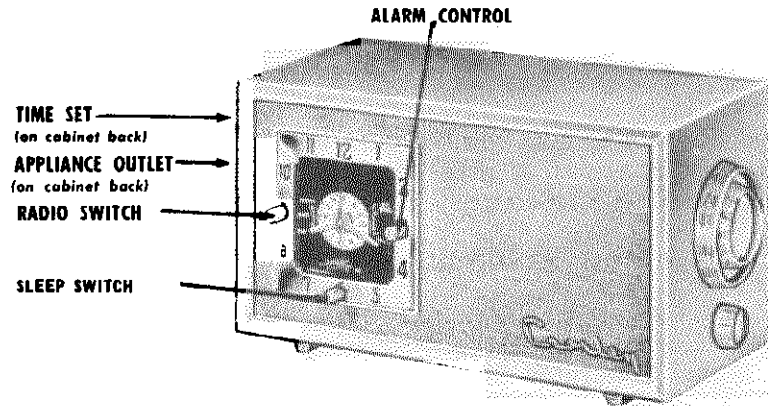


Figure 1

MODELS E-90BK, CE,
GY, RD, WE, Ch. 90E

CHASSIS 90E

Models: E-90WE, E-90CE, E-90GY, E-90RD, E-90BK



DESCRIPTION

TYPE: Five-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 OUTPUT: 1 watt maximum.

POWER CONSUMPTION:

Radio and Clock 35 watts
Clock 2 watts

TUBE COMPLEMENT:

Type	Function
12BE6	Converter
12BD6	I. F. Amplifier
12AT6	Detector, AVC, 1st. A. F. Amplifier
50C5	A. F. Power Output
35W4	Rectifier

SLEEP SWITCH — Set it up to 60 minutes operation of radio or appliance — turns them off automatically.

ELECTRIC CLOCK of highest accuracy. Framed in gold-color, the jewel-like clock has a black face set off by hour and minute hands in blue and sweep second hand in gold. Clock controls in clear plastic.

RADIO SWITCH has three positions: "Off" to turn off radio; "Auto" to turn radio or appliance on automatically; "On" for manual radio operation.

APPLIANCE OUTLET is provided at rear of set for connecting any appliance (not exceeding 1100 watts) to be controlled by timing device.

TIME SET, for setting clock to time of day.

ALARM CONTROL — Set it for time radio or appliance is to turn on automatically. Pull out

to have buzzer sound a few minutes after radio turns on.

DRIFT-FREE TUNING, accomplished by Crosley frequency stabilized oscillator, keeps receiver aligned precisely with station to which you have tuned.

EXCEPTIONALLY FINE TONE — The result of advanced engineering of the Crosley circuit and components.

INCREASED SENSITIVITY AND STABILITY Permeability tuned (iron core) IF transformer give greater stability and sensitivity so that distant stations can be received with minimum interference.

AUTOMATIC VOLUME CONTROL holds the volume as you set it.

BUILT-IN ANTENNA consists of a sturdy high efficiency loop which receives stations sharply and clearly.

MODELS E-90BK, CE, GY, RD, WE, Ch. 90E

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

ALIGNMENT PROCEDURE

1. Connect an output meter across the speaker voice coil (3.2 ohms).
2. Feed an R-F signal modulated 30% at 400 cycles to the high side of loop (inside winding of loop) as indicated in the alignment chart. Connect signal generator ground through a 0.1 mfd capacitor to B-.
3. Turn the Radio Switch to the "ON" position.
4. Turn the Volume Control to maximum clockwise position 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.

ALIGNMENT CHART

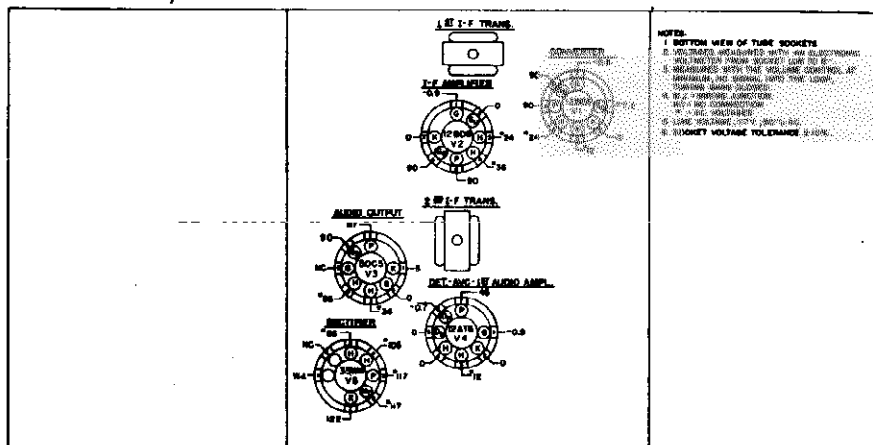
Alignment locations shown on page 23,

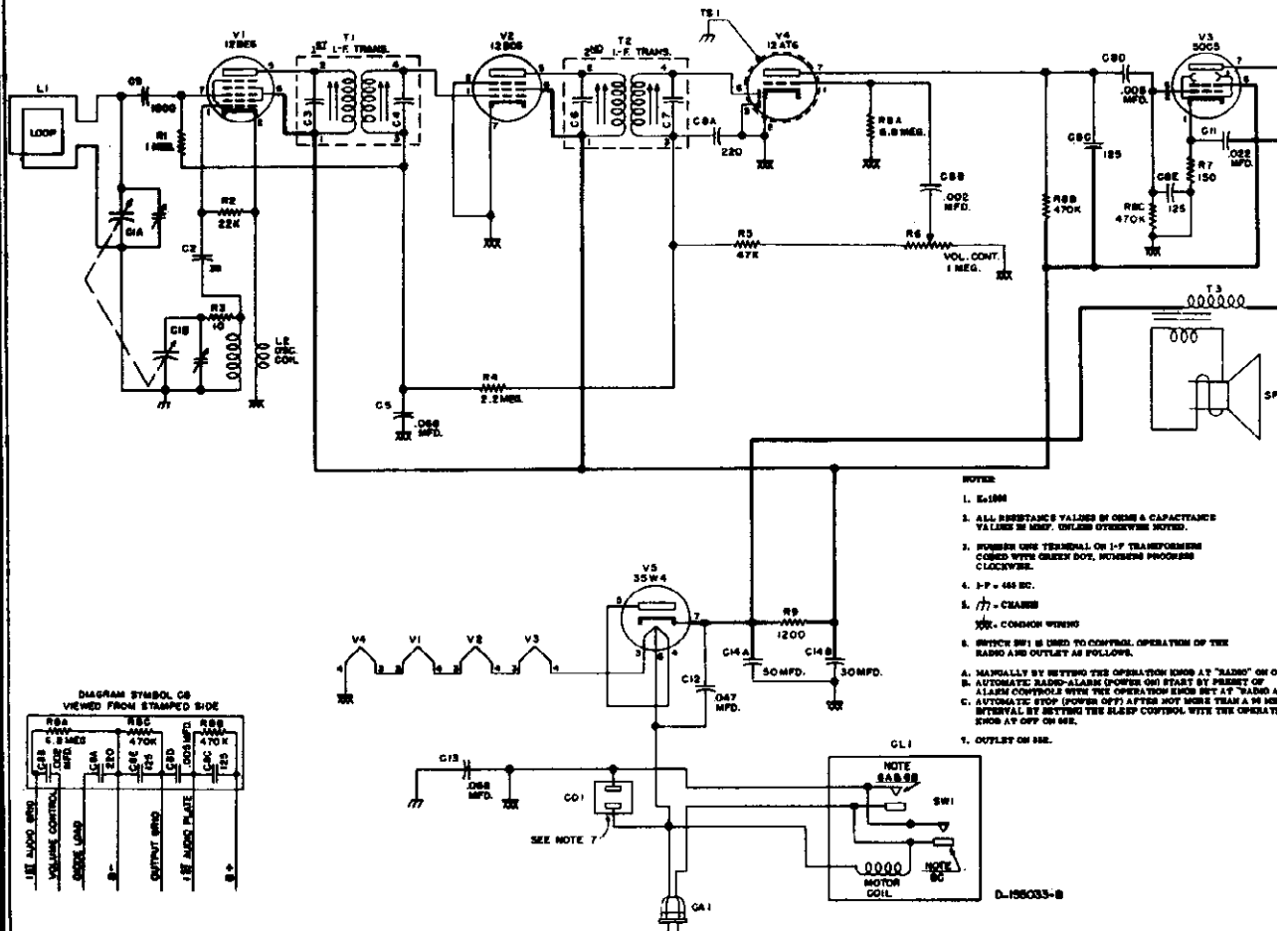
Alignment Sequence	Signal Generator Output			Position of Tuning Gang	Adjust for Max. Output	Remarks
	Freq. in KC.	In Series With	To			
1	455	200 mmf.	Hi side of loop	Open	A & B	See note 1
2	455	200 mmf.	Hi side of loop	Open	C & D	See note 1
3 Repeat steps 1 and 2 until maximum output is obtained						
4	1620	Radiated Sig.	Loop	Open	E	See note 2
5	1400	Radiated Sig.	Loop	Tune in Signal	F	See note 2

Notes:

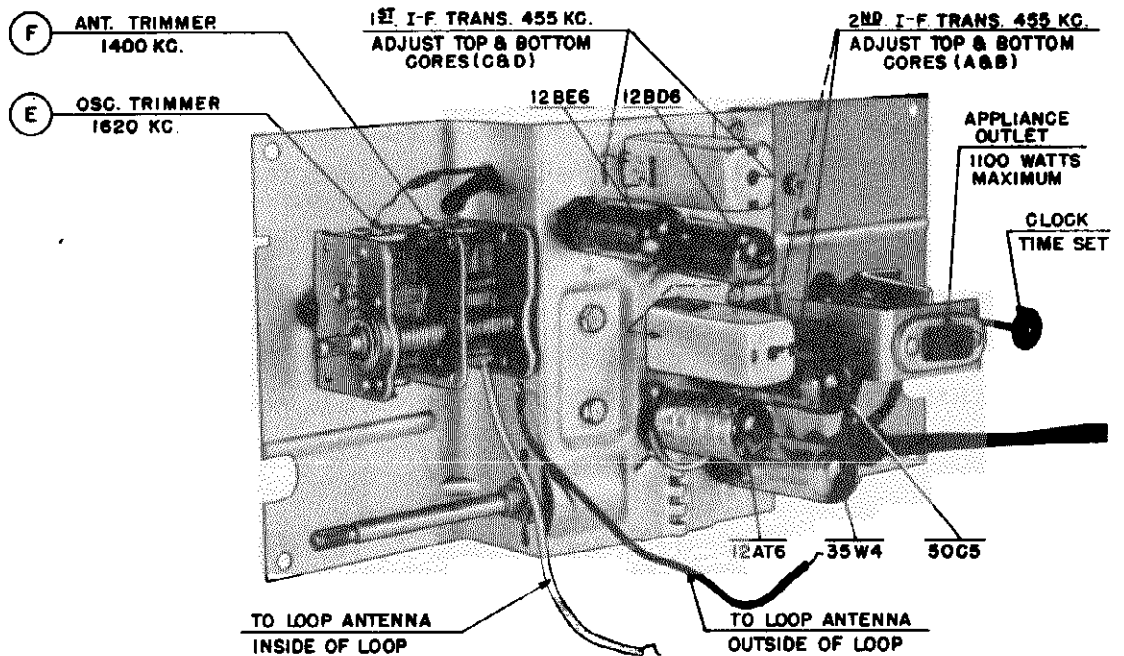
1. The speaker must be removed from the chassis in order to adjust the bottom slugs on the I-F Transformers. **DO NOT REMOVE THE WIRES FROM THE SPEAKER.**
2. The signal can be radiated to the loop antenna by placing the output lead of the signal generator close to the loop. For oscillator and antenna trimmer alignment, the loop antenna must be positioned with respect to the chassis to simulate position when chassis and loop are fastened in the cabinet so that no further adjustment of the antenna trimmer (F) will be necessary when the chassis and loop are mounted in the cabinet.

SOCKET VOLTAGE CHART





SCHEMATIC DIAGRAM



CHASSIS - TOP VIEW

MODELS E-90BK, CE,
GY, RD, WE, Ch. 90E

CLOCK ADJUSTMENTS

Procedure for checking timer switch and vibrator:

1. With the time set knob, turn the clock hands so as to advance the time at least one (1) hour. (For ease in checking, it is recommended that the time be set to the hour.)
2. Attach test light to switch leads.
3. Turn switch knob to "ON" position - light must go on.
4. Turn switch knob to "OFF" position - light must go out.
5. Set alarm disc so that small pointer on hour hand reads two (2) hours in advance of the time of the clock. **EXAMPLE:** If the clock hands are set to read 7 o'clock, set the alarm disc to read 9 o'clock.
6. Turn sleep switch to "60" - test light must go on.
7. Turn time set knob advancing clock hands to next hour - light must go out and **SLEEP SWITCH SECTOR GEAR** must be completely disengaged within one (1) hour plus or minus eight (8) minutes.
8. Manually push **SLEEP SWITCH SECTOR GEAR** in until it touches its mating pinion **WITH-OUT** meshing - light must go on.
9. Turn switch knob to "AUTO" position.
10. Turn time set knob to advance clock hands so they read 15 minutes until the next hour. Then slowly advance the hands until the test light lights, which indicates the contacts are closed. The contacts must close somewhere between 14 minutes to the hour and 4 minutes past the hour.
11. Remove test light and connect 110 volt supply to the motor terminals.
12. Turn time set knob to advance the clock hands 4 minutes - vibrator must **NOT** buzz. Then advance the hands 14 minutes - vibrator **MUST** buzz within this 14 minute period.

Adjusting Contacts

1. Set the switch to "AUTO" position so that the **SWITCH CAM FOLLOWER** rests on the **TIMING CAM**. Contacts shall be adjusted at .020" minimum gap.
2. With switch in "OFF" position contacts shall remain open as in step one and there shall be clearance between **SWITCH CAM FOLLOWER** and **TIMING CAM**.
3. With switch in "ON" position, contacts shall be closed. Check for proper contact pressure by depressing **LOWER CONTACT** strip, using a small pointed tool. If **UPPER CONTACT** strip follows the **LOWER CONTACT** strip, a noticeable amount before the contacts separate, the pressure is sufficient.
4. Set the switch to "AUTO" position; pull out and turn alarm set knob counter-clockwise until the **SWITCH CAM FOLLOWER** drops into the slot of **TIMING CAM**. The contacts shall be closed. Check contact pressure as previously described in step three.
5. **SWITCH ARM** should clear **CAM** by .008" minimum when in the "AUTO" position.

Timing

1. Adjust timer for contact closure at 6:55 o'clock. On repeat tests, contacts shall close at 6:55 plus or minus 3 minutes. At all other settings the contacts shall close between 12 minutes before and 2 minutes after the setting time.
2. Check time keeping for a minimum of twelve hours with power applied to the motor. Clock must be run with vibrator (buzzer) shut off.

Vibrator Adjustment:

1. Vibrator shall start buzzing 10 minutes plus or minus 5 minutes after contact closure occurs.
2. When the alarm set knob is pushed in ("shut-off" position of vibrator) the shut-off spring shall lift the vibrator sufficiently above the cam, so that the cam will not contact the vibrator in any position.
3. Adjust vibrator for good sounding position.
4. Vibrator shall be manually shut off before completion of buzzing period.

CLOCK LUBRICATION

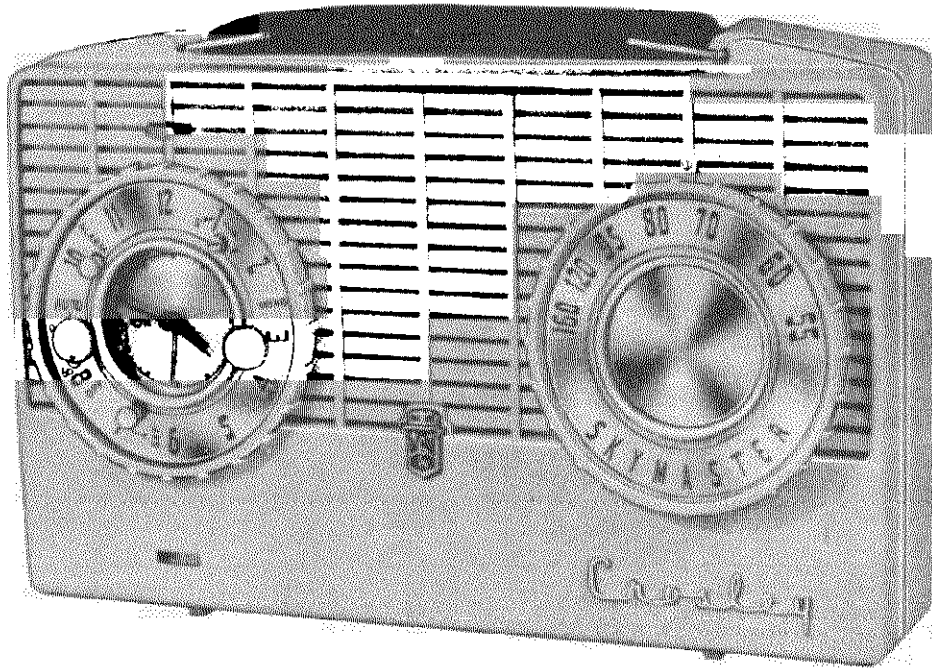
1. Center stack bearing in base plate and hole in back gear pinion should be lubricated with Nye watch oil or equivalent.
2. Path of switch locating spring on bracket should be lubricated with Dixon graphite grease

Symbol No	Part No.	Description	Symbol No.	Part No.	Description
C1A	154962	Capacitor, Tuning } Assembly	L1	155042	Loop Antenna & Back Assembly
C1B		Capacitor, Tuning }	L2	153405	Oscillator Coil
C2	137727-109	Capacitor, 39 mmf., 10%, 200 V., Ceramic	SP1	138762-8	Speaker 4 inch (P.M.)
C3	Part of T1	Capacitor	TS1	147784	Shield Tube
C4	Part of T1	Capacitor	SW1	Part of CL1	Switch, ON - OFF, Power
C5	39477-46	Capacitor, .68 mfd., 600 V., Molded Paper	T1	155007-1	Transformer, 1st IF
C6	Part of T2	Capacitor	T2	155007-1	Transformer, 2nd IF
C7	Part of T2	Capacitor	T3	155015	Transformer, Audio Output
C8A	151550-1	Capacitor, 220 mmf. }	CO1	155016-2	Bracket & Appliance Outlet, Assem
C8B		Capacitor, .002 mfd. }	CL1	155631	Clock Assembly
C8C		Capacitor, 125 mmf. }		155214-9	Cabinet, Model E-90 CE
C8D		Capacitor, .005 mfd. }		155214-10	Cabinet, Model E-90 RD
C8E		Capacitor, 125 mmf. }		155214-11	Cabinet, Model E-90 GY
C9	137727-8	Capacitor, 1000 mmf., 10%, 300 V., Ceramic		155214-12	Cabinet, Model E-90 WE
C11	39477-43	Capacitor, .022 mfd., 600 V., Molded Paper		155214-13	Cabinet, Model E-90 BK
C12	39477-45	Capacitor, .047 mfd., 600 V., Molded Paper		155022	Gasket, Grille
C13	39477-46	Capacitor, .068 mfd., 600 V., Molded Paper		155074	Grille, Metal
C14A	155006	Capacitor, 50 mfd., 150 V. }		155061-1	Knob, Volume Control, Model E-90
C14B		Capacitor, 30 mfd., 150 V. }		155061-2	Knob, Volume Control, Model E-90
C15	143686-1	Capacitor, 50 mmf., 500 V., Ceramic		155061-3	Knob, Volume Control, Model E-90
R1	39374-61	Resistor, 1 Megohm, 10%, 1/2 W.		155061-4	Knob, Volume Control, Model E-90
R2	39374-41	Resistor, 22,000 ohm, 10%, 1/2 W.		155061-5	Knob, Volume Control, Model E-90
R3	39374-1	Resistor, 10 ohm, 10%, 1/2 W.		154062-1	Knob, Tuning, Model E-90 BK
R4	39374-69	Resistor, 2.2 Megohm, 10%, 1/2 W.		154062-2	Knob, Tuning, Model E-90 GY
R5	39374-45	Resistor, 47,000 ohm, 10%, 1/2 W.		154062-3	Knob, Tuning, Model E-90 WE
R6	154961	Control, Volume, 1 megohm		154062-4	Knob, Tuning, Model E-90 RD
R7	39374-15	Resistor, 150 ohm, 10%, 1/2 W.		154062-5	Knob, Tuning, Model E-90 CE
R8A	Part of C8	Resistor, 6.8 megohm }		155003	Name Plate (Crosley), Model E-90
R8B		Resistor, 470,000 ohm }		155347-3	Name Plate (Crosley), Models E-90
R8C		Resistor, 470,000 ohm }		39462-2	E-90 WE, E-90 RD, & E-90 CE
R9	39374-114	Resistor, 1200 ohm, 10%, 1 W.		132124	Socket, Tube (V1, V2, V3, V4, V5)
R10	39374-9	Resistor, 47 ohm, 10%, 1/2 W.		164963	Stud (Trimount 3 Used), Loop & Back Assen
CA1	149780-3	Cable & Plug, Power			Washer, Extruded (4 Used), Clock Mounting

CLOCK REPLACEMENT PARTS

Part No.	Description	Part No.	Description
151389-15	Alarm Dial	151389-19	Knob, Radio Switch
151389-11	Bezel	151389-18	Knob, Sleep Switch
151389-12	Bezel Color Ring	151389-8	Knob, Time Set
151389-13	Crystal	151389-10	Rotor Unit (60 cycle)
151389-14	Dial, Black		
151389-9	Field & Coil (60 cycle)		
151389-16	Hands, Hour & Minute		
151389-17	Hand, Sweep Second		
151389-18	Knob, Alarm Set		

MODELS F-100BE, BK,
CE, GN, RD, Ch. 100F



DESCRIPTION

The above models are four-tube superheterodyne, battery portable radio receivers combined with a spring wound clock timer that can be set to automatically turn the radio on or off. The receiver is designed for reception of Standard Broadcast (AM) stations with frequencies between 540 and 1600 kilocycles.

The receiver uses long-life "A" batteries, with provision made to use standard flash-light batteries ("D" cells) in localities where the long-life batteries are not available, with a resultant decrease in "A" battery life.

TYPE: Four-tube, single band Superheterodyne.

FREQUENCY RANGE: 540 to 1600Kc.

INTERMEDIATE FREQUENCY: 455 Kc.

MAXIMUM POWER OUTPUT: 170 Milliwatts.

"A" BATTERY: Two 1½ Volt Eveready #964.

"B" BATTERY: One 75 Volt Eveready #437.

NOTE: Complete Battery Kit No. EV-1
(Crosley Part No. 156292)

Consists of {Two 1½ volt "A" Batteries # 964.
 {One 75 volt "B" Battery #437.

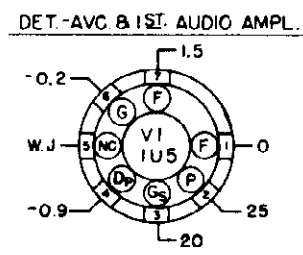
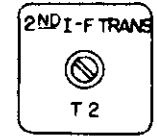
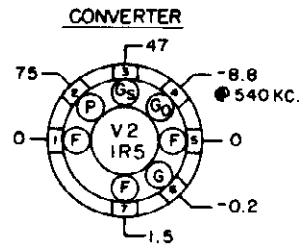
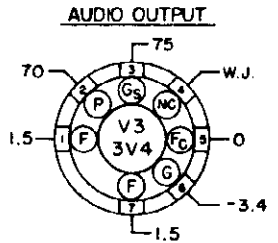
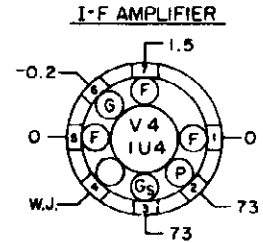
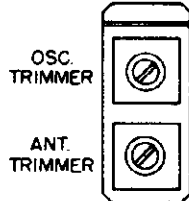
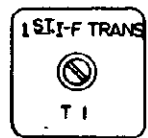
Available at your Crosley Distributor.

TUBE COMPLEMENT:

Type	Function
1U5	Detector — AVC — 1st Audio Amplifier
1R5	Converter
3V4	Audio Output
1U4	IF Amplifier

SOCKET VOLTAGE CHART

- NOTES:
 1. BOTTOM VIEW OF TUBE SOCKETS.
 2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO CHASSIS.
 3. BATTERY SUPPLY VOLTAGES "A" BATTERY 1.5V. "B" BATTERY 75V.
 4. BATTERY SWITCH IN "MAX. POWER OUTPUT" POSITION. "OUTDOOR INDOOR" SWITCH IN "OUTDOOR" POSITION.
 5. N.C. = NO CONNECTION, W.J. = WIRE JUNCTION.
 6. SOCKET VOLTAGE TOLERANCE $\pm 10\%$.



REMOVING THE CHASSIS

- Slip the tuning knob from the shaft of the tuning gang, and pull the knobs from the clock.
- Open the cabinet back by lifting up on the handle and pushing down and out with the thumb on the top edge of the cabinet back; then remove the back.
- Remove the "A" and "B" batteries.
- Remove the chassis (Chassis is fastened to the front of the cabinet by five cross recess screws)

ALIGNMENT PROCEDURE

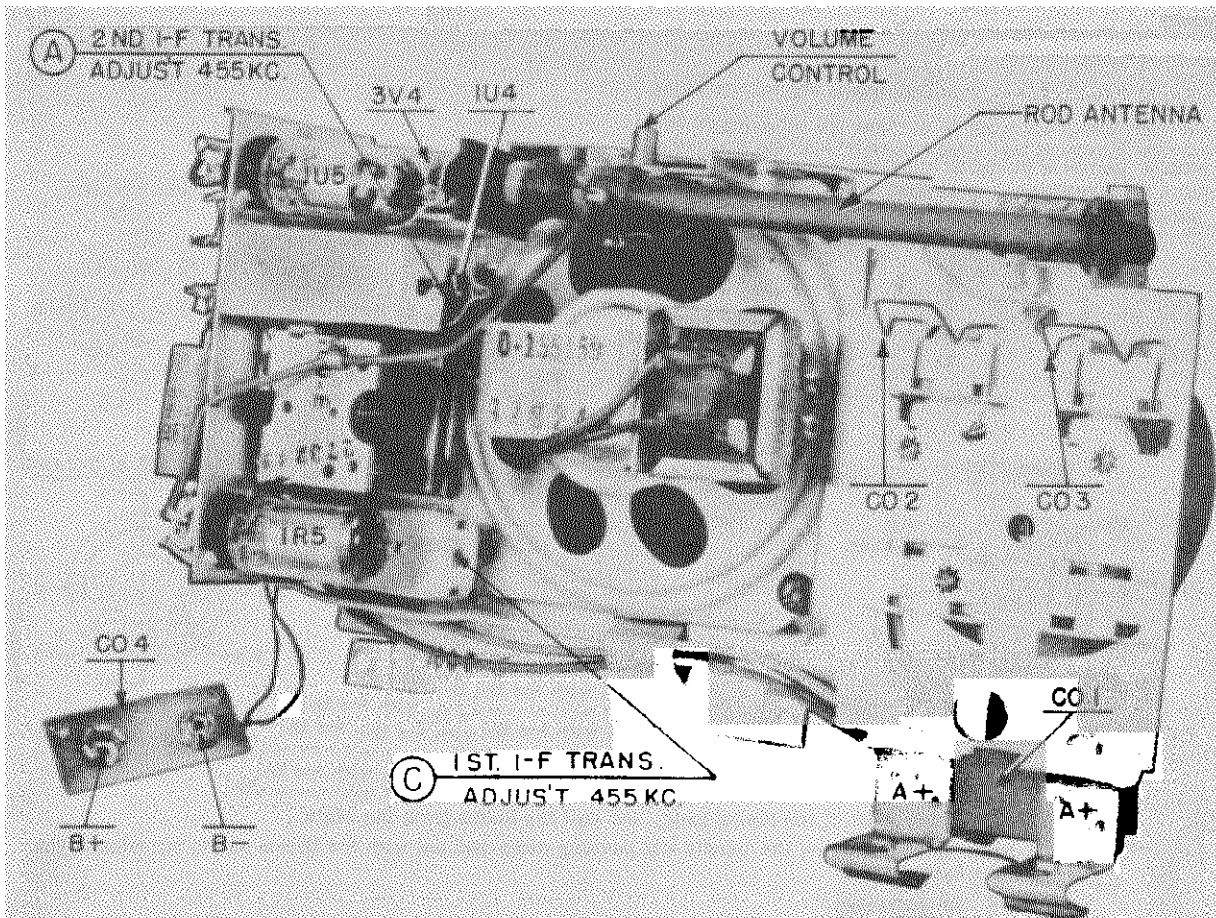
- Connect an output meter across the speaker voice coil (3.2 ohms).
- Connect "A" and "B" batteries to the receiver.
- Turn the "TIMER SWITCH" to the on position.
- Apply an R-F signal, modulated 30% at 400 cycles to the receiver as indicated in the alignment chart. Connect signal generator ground lead to chassis.
- Turn the volume control to maximum, set the POWER SAVER SWITCH for maximum power output and the INDOOR OUTDOOR SWITCH to the Outdoor position.
- Adjust the signal generator to produce mid-scale deflection on the output meter, but maintain output as low as possible to prevent AVC action.

ALIGNMENT CHART

ALIGNMENT SEQUENCE	SIGNAL GENERATOR			POSITION OF TUNING GANG	ADJUST FOR MAX. OUTPUT	REMARKS
	FREQ. IN KC.	SIGNAL	TO			
1.	455	in series with .05MFD	Mixer Grid	OPEN	A & B	
2.	455	in series with .05MFD	Mixer Grid	OPEN	C & D	
3. Repeat steps 1 and 2 until maximum output is obtained.						
4.	1620	Radiated	Built-in Antenna	OPEN	E	See Note 1
5.	1400	Radiated	Built-in Antenna	Tune-in sig.	F	See Note 1 & 2

- NOTES:
 1. The signal can be radiated to the built-in antenna by placing the output lead of the signal generator close to the antenna.
 2. Replace the chassis in the cabinet by reversing the order of the removal procedure listed above.

MODELS F-100BE, BK,
CE, GN, RD, Ch. 100F



(A) 2ND I-F TRANS.
ADJUST 455KC.

VOLUME
CONTROL

ROD ANTENNA

3V4 1U4

CO 4

B+

B-

(C) 1ST I-F TRANS.
ADJUST 455 KC.

CO 2

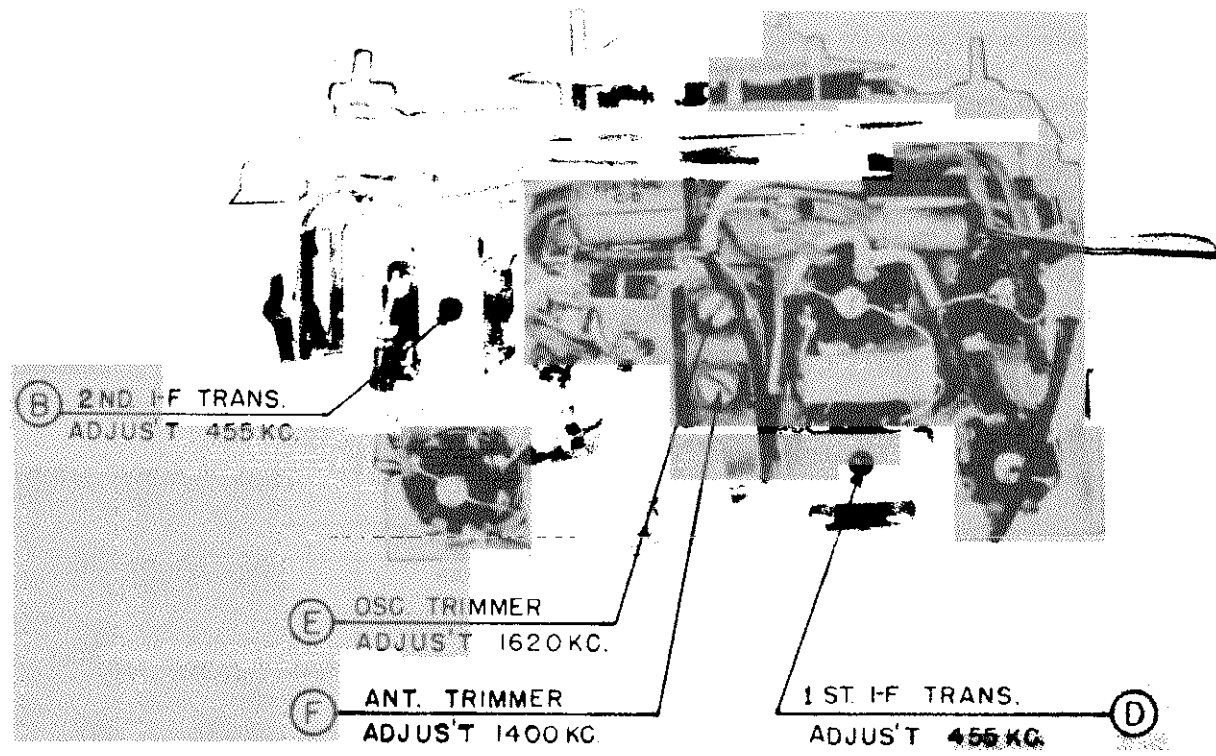
CO 3

CO

A+

A+

CHASSIS, REAR VIEW



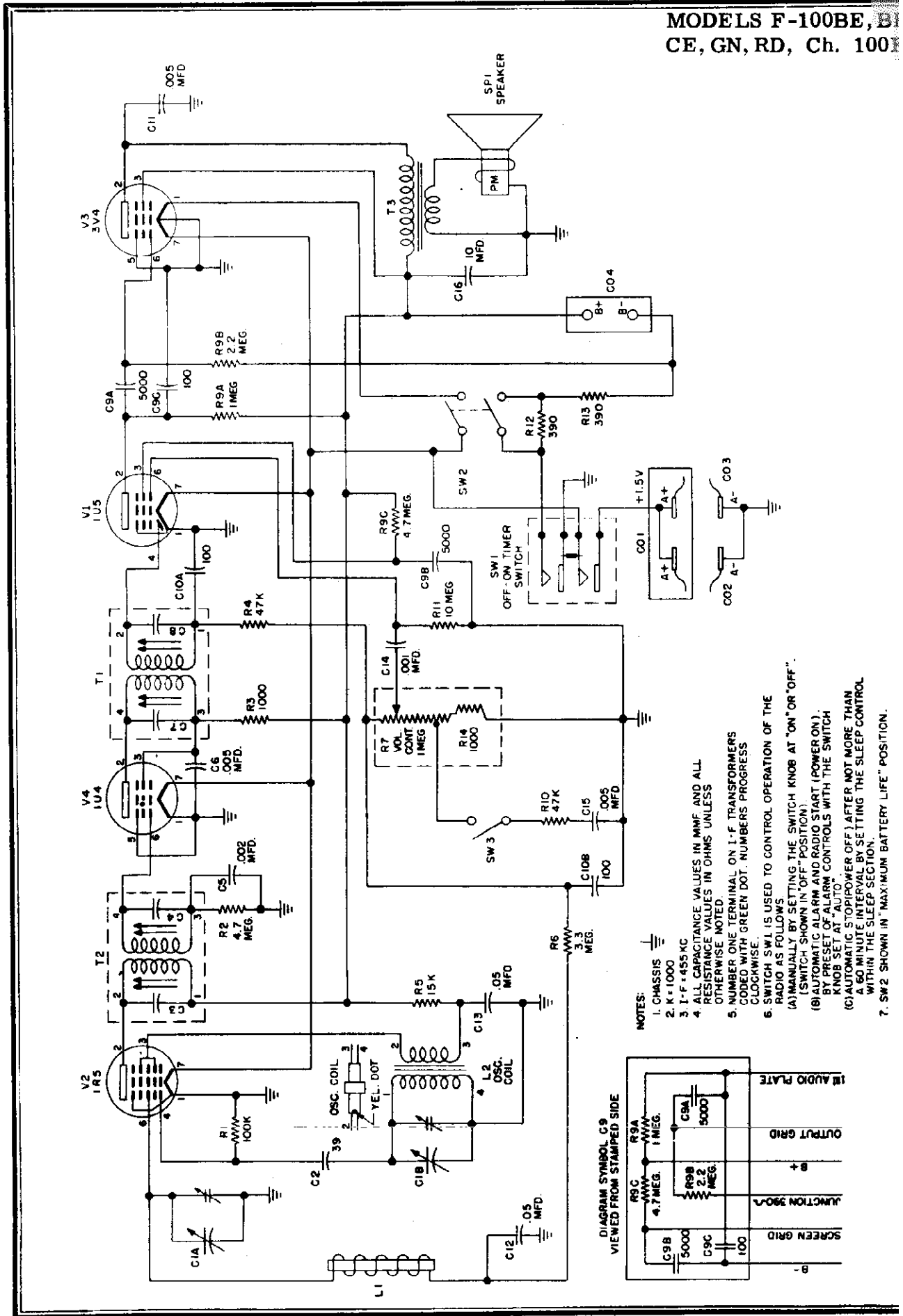
(B) 2ND I-F TRANS.
ADJUST 455 KC.

(E) OSC. TRIMMER
ADJUST 1620 KC.

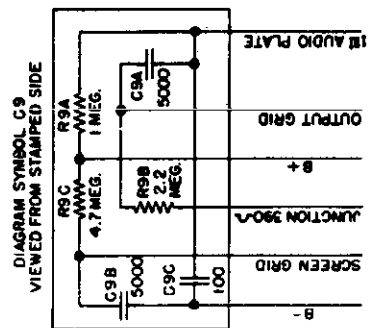
(F) ANT. TRIMMER
ADJUST 1400 KC.

1ST I-F TRANS.
ADJUST 455 KC. (D)

CHASSIS, BOTTOM VIEW



- NOTES:
1. CHASSIS
 2. K = 1000
 3. I - F = 455 KC
 4. ALL CAPACITANCE VALUES IN MMF AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE NOTED
 5. NUMBER ONE TERMINAL ON I-F TRANSFORMERS CODED WITH GREEN DOT. NUMBERS PROGRESS CLOCKWISE.
 6. SWITCH SW1 IS USED TO CONTROL OPERATION OF THE RADIO AS FOLLOWS:
(A) MANUALLY BY SETTING THE SWITCH KNOB AT "ON" OR "OFF".
(B) AUTOMATIC ALARM AND RADIO START (POWER ON) BY PRESET OF ALARM CONTROLS WITH THE SWITCH KNOB SET AT "AUTO".
(C) AUTOMATIC STOPOW (POWER OFF) AFTER NOT MORE THAN A 60 MINUTE INTERVAL BY SETTING THE SLEEP CONTROL WITHIN THE SLEEP SECTION.
 7. SW 2 SHOWN IN "MAXIMUM BATTERY LIFE" POSITION.



CHASSIS 100F

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
C1A	155290	Capacitor, Tuning { Assembly		155254-4	Button, "Indoor - Outdoor Switch", Model F-100BK
C1B		Capacitor, Tuning		155254-5	Button, "Max. Battery Life Switch", Model F-100GN
C2	137727-109	Capacitor, 39 mmf., 10%, 200V., ceramic		155254-6	Button, "Indoor - Outdoor Switch", Model F-100GN
C3	Part of T 1	Capacitor		155254-7	Button, "Max. Battery Life Switch", Model F-100RD
C4	Part of T 1	Capacitor		155254-8	Button, "Indoor - Outdoor Switch", Model F-100RD
C5	39433-10	Capacitor, .002 mfd., 150., paper		155254-9	Button, "Max. Battery Life Switch", Model F-100CE
C6	144675-2	Capacitor, .005 mfd., 500V., disc ceramic		155254-10	Button, "Indoor - Outdoor Switch", Model F-100CE
C7	Part of T 2	Capacitor		155248-1	Cabinet Assembly, Model F-100BE
C8	Part of T 2	Capacitor		155248-2	Cabinet Assembly, Model F-100BK
C9A	151550-3	Capacitor, 5000 mmf., 450V.		155248-3	Cabinet Assembly, Model F-100GN
C9B		Capacitor, 5000 mmf., 450V. } Assem-		155248-4	Cabinet Assembly, Model F-100RD
C9C		Capacitor, 100 mmf., 450V. } bly		155248-5	Cabinet Assembly, Model F-100CE
C10A	142951-2	Capacitor, 100 mmf., 500V. } Assem-		155239-1	Cabinet, Back, Model F-100BE
C10B		Capacitor, 100 mmf., 500V. } bly		155239-2	Cabinet, Back, Model F-100BK
C11	39433-11	Capacitor, .005 mfd., 150V., paper		155239-3	Cabinet, Back, Model F-100GN
C12	39433-14	Capacitor, .05 mfd., 150V., paper		155239-4	Cabinet, Back, Model F-100RD
C13	39433-14	Capacitor, .05 mfd., 150V., paper		155239-5	Cabinet, Back, Model F-100CE
C14	144675-28	Capacitor, .001 mfd., 500V., disc ceramic		155238-1	Cabinet, Front, Model F-100BE
C15	137727-121	Capacitor, .005 mfd., 10%, 500V. ceramic		155238-2	Cabinet, Front, Model F-100BK
C18	155355	Capacitor, 10 mfd., 80V., Electrolytic		155238-3	Cabinet, Front, Model F-100GN
R1	39374-49	Resistor, 100,000 ohm, 10%, 1/2W.		155238-4	Cabinet, Front, Model F-100RD
R2	39374-77	Resistor, 4.7 megohm, 10%, 1/2W.		155238-5	Cabinet, Front, Model F-100CE
R3	39374-25	Resistor, 1000 ohm, 10%, 1/2W.		155200	Clock Assembly
R4	Part of C10	Resistor, 47,000 ohm		155286-1	Handle
R5	39374-39	Resistor, 15,000 ohm, 10%, 1/2W.		155272-1	Knob, Tuner, Model F-100BE
R6	39374-73	Resistor, 3.3 megohm, 10%, 1/2W.		155272-2	Knob, Tuner, Model F-100BK
R7	155206	Control, Volume, 1 megohm (Tapped at 100,000 ohm)		155272-3	Knob, Tuner, Model F-100GN
R9A	Part of C9	Resistor, 1 megohm		155272-4	Knob, Tuner, Model F-100RD
R9B		Resistor, 2.2 megohm } Assembly		155272-5	Knob, Tuner, Model F-100CE
R9C		Resistor, 4.7 megohm		155262-1	Knob, Volume, Control
R10	39374-45	Resistor, 47,000 ohm, 10%, 1/2W.		155269-1	Knob, Timer Switch, Model F-100BE
R11	39374-85	Resistor, 10 megohm, 10%, 1/2W.		155269-3	Knob, Timer Switch, Model F-100BK
R12	39374-20	Resistor, 390 ohm, 10%, 1/2W.		155269-5	Knob, Timer Switch, Model F-100GN
R13	39374-20	Resistor, 390 ohm, 10%, 1/2W.		155269-7	Knob, Timer Switch, Model F-100RD
R14	39374-25	Resistor, 1000 ohm, 10%, 1/2W.		155269-9	Knob, Timer Switch, Model F-100CE
L1	155415	Antenna & Rod, Assembly		155269-2	Knob, Clock Wind, Model F-100BE
L2	155329	Oscillator Coil, Assembly		155269-4	Knob, Clock Wind, Model F-100BK
SP1	155159	Speaker, 4 inch (P. M.)		155269-6	Knob, Clock Wind, Model F-100GN
SW1	Part of Clock	Switch, ON-OFF, Power		155269-8	Knob, Clock Wind, Model F-100RD
SW2	155315	Switch & Bracket Assembly, "Max Battery Life"		155269-10	Knob, Clock Wind, Model F-100CE
SW3	155240	Switch, Indoor - Outdoor		155261-1	Knob (2 used), Alarm Button & Time Set Alarm, Model F-100BE
T1	145025-7	Transformer, 2nd. I. F.		155261-2	Knob (2 used), Alarm Button & Time Set Alarm, Model F-100BK
T2	145025-8	Transformer, 1st. I. F.		155261-3	Knob (2 used), Alarm Button & Time Set Alarm, Model F-100GN
T3	Part of SP1	Transformer, Audio Output		155261-4	Knob (2 used), Alarm Button & Time Alarm Set, Model F-100RD
CO1	155314	Connector Assembly, "A" Battery		155261-5	Knob (2 used), Alarm Button & Time Alarm Set, Model F-100CE
CO2	155210	Spring Grounding, "A" Battery		155280	Link (2 used), Handle Mtg.
CO3	155210	Spring Grounding, "A" Battery		153540-3	Medallion
CO4	155205	Connector, "B" Battery		94704-35	Nut, Push on Type
	155254-1	Button, "Max Battery Life Switch", Model F-100BE		155340-1	Pin, Indicator
	155254-2	Button, "Indoor - Outdoor Switch", Model F-100BE		155308	Washer, Felt
	155254-3	Button, "Max. Battery Life Switch", Model F-100BK			

MODEL	PART NO.	DESCRIPTION
F-100 Series	156178	Insert, Tuning Knob
	156180	Insert, Clock

To install a new insert, first remove the old insert; then remove the paper backing from the adhesive on the new insert and press the insert firmly in place. NOTE: When replacing a tuning knob insert, it is possible to install the new insert up-side-down. To eliminate this possibility, do not remove the tuning knob from its shaft while changing the insert.

MODEL	ORIGINAL PART NO.	CORRECT PART NO.	DESCRIPTION
F-100BE	155238-1	156779-1	Cabinet front
F-100BK	155238-2	156779-2	Cabinet front
F-100GN	155238-3	156779-3	Cabinet front
F-100RD	155238-4	156779-4	Cabinet front
F-100CE	155238-5	156779-5	Cabinet front
F-100BE	155272-1	156545-1	Knob, tuning
F-100BK	155272-2	156545-2	Knob, tuning
F-100GN	155272-3	156545-3	Knob, tuning
F-100RD	155272-4	156545-4	Knob, tuning
F-100CE	155272-5	156545-5	Knob, tuning
F-100BE	155286-1	156289-1	Handle
F-100BK	155286-1	156289-2	Handle
F-100GN	155286-1	156289-3	Handle
F-100RD	155286-1	156289-4	Handle
F-100CE	155286-1	156289-5	Handle

SUBJECT: WARNING AGAINST PARTIAL WINDING OF THE CLOCK USED ON THE F-100 SERIES CLOCK RADIOS.

Several cases have been noted where the user of a F-100 Series Clock Radio failed to wind the clock completely and then reported that the clock was defective and would not continue running more than a few hours. To meet such complaints and to prevent future complaints of the same sort, the following information is directed to all Sales and Service personnel.

On the F-100 Series Clock Radio, both the clock and the alarm are operated by the same spring. Generally, the first few turns of the wind shaft (until a click is heard after each revolution) store the energy needed for alarm operation, while any further turns store energy for the clock.

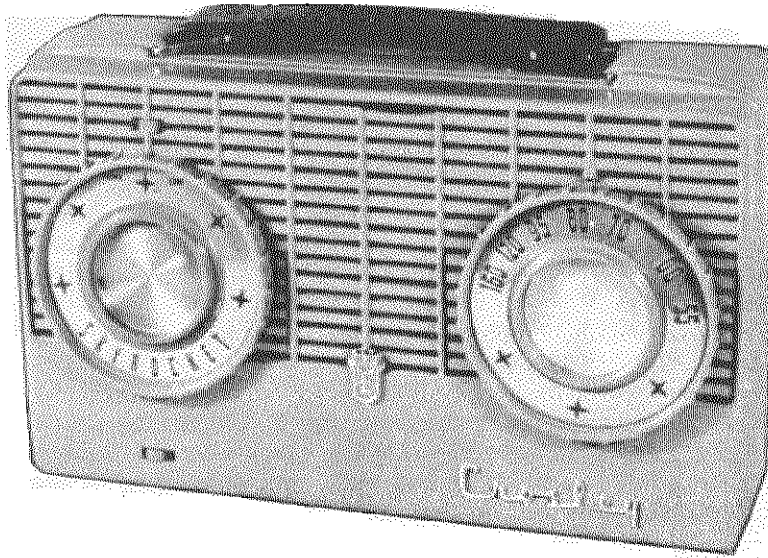
Here is why the user may fail to wind the clock completely.

Example A: Let us assume the clock is run-down, including the alarm, and that we begin winding it. For the first few turns, a certain amount of resistance in the wind shaft is felt. Then a point is reached where *more* resistance is noted and where a click is heard each time the wind shaft makes one revolution. A careful user would, most likely, stop winding for fear of causing damage. In actuality the clock has, at this point, been wound only enough for the alarm and a small portion of the clock's running time. If we want to get the full running time of 30 hours, we must continue winding comparatively for a much longer time — until the spring is fully wound (wind shaft will no longer turn without literally forcing it). Only then can the clock be considered fully wound.

Example B: For a slightly different situation let us assume that, six hours after the clock has been fully wound, the alarm goes off and runs down completely. Most of the potential energy for the clock's operation is still stored in the spring. If we wish to re-set the alarm and fully rewind the clock, we experience the same resistance as before, i. e., when starting with the clock run down. Now, when that point is reached where maximum alarm potential energy is again stored in the spring, the resistance increases more sharply than it would if the whole spring were run down. At this point, the same clicking as described in Example A is heard.

Mechanically the alarm and the clock are both operated by only one spring; three turns of the wind shaft are required to complete one revolution of the spring shaft. Fifteen to twenty complete revolutions of the spring shaft are required to wind the clock to its maximum running time of 30 hours. But, when the alarm goes off, it uses only one complete revolution of the spring shaft for its operation. When the spring shaft has been wound the first complete turn, maximum potential energy is stored in the spring for the operation of the alarm, but less than 10% is stored for clock operation. It is here that there is the tendency to stop winding.

MODELS F-110BE, BK,
CE, GN, RD, Ch. 110F



DESCRIPTION

The above Models are four tube superheterodyne, battery operated portable radio receivers. The receiver is designed for reception of Standard Broadcast (AM) stations with frequencies between 540 and 1600 kilocycles.

The receiver uses long-life "A" batteries, with provision made to use standard flash-light batteries ("D" cells) in localities where the long-life batteries are not available, with a resultant decrease in "A" battery life.

TYPE: Four-tube, single band, Superheterodyne

FREQUENCY RANGE: 540 to 1600 Kc

INTERMEDIATE FREQUENCY: 455 Kc

POWER OUTPUT: 200 Milliwatts

"A" BATTERY: Two 1½ volt Eveready #964.

"B" BATTERY: One 75 volt Eveready #437.

NOTE: Complete Battery Kit No. EV-1
(Crosley Part No. 156292)

Consists of { Two 1½ volt "A" Batteries # 964.
 { One 75 volt "B" Battery #437.

Available at your Crosley Distributor.

TUBE COMPLEMENT

Type	Function
1U5	Detector, AVC, 1st Audio Ampl.
1R5	Converter
3V4	Audio Output
1U4	IF Amplifier

REMOVING THE CHASSIS

1. Slip the tuning knob from the shaft of the tuning gang.
2. Open the cabinet back by lifting up on the handle and pushing down and out with the thumb on the top edge the cabinet back; then remove the back.
3. Remove the "A" and "B" batteries.
4. Remove the chassis (Chassis is fastened to the front of the cabinet by five cross-recess screws).

ALIGNMENT PROCEDURE

1. Connect an output meter across the speaker voice coil (3.2 ohms).
2. Connect "A" and "B" batteries to the receiver.
3. Slide the "ON-OFF SWITCH" to the "ON" position.
4. Apply an R-F signal, modulated 30% at 400 cycles to the receiver as indicated in the alignment chart. Connect the signal generator ground lead to chassis.
5. Turn the volume control to maximum, set the POWER SAVER SWITCH for maximum power output.
6. Adjust the signal generator to produce mid-scale deflection on the output meter, but maintain output as low as possible to prevent AVC action.

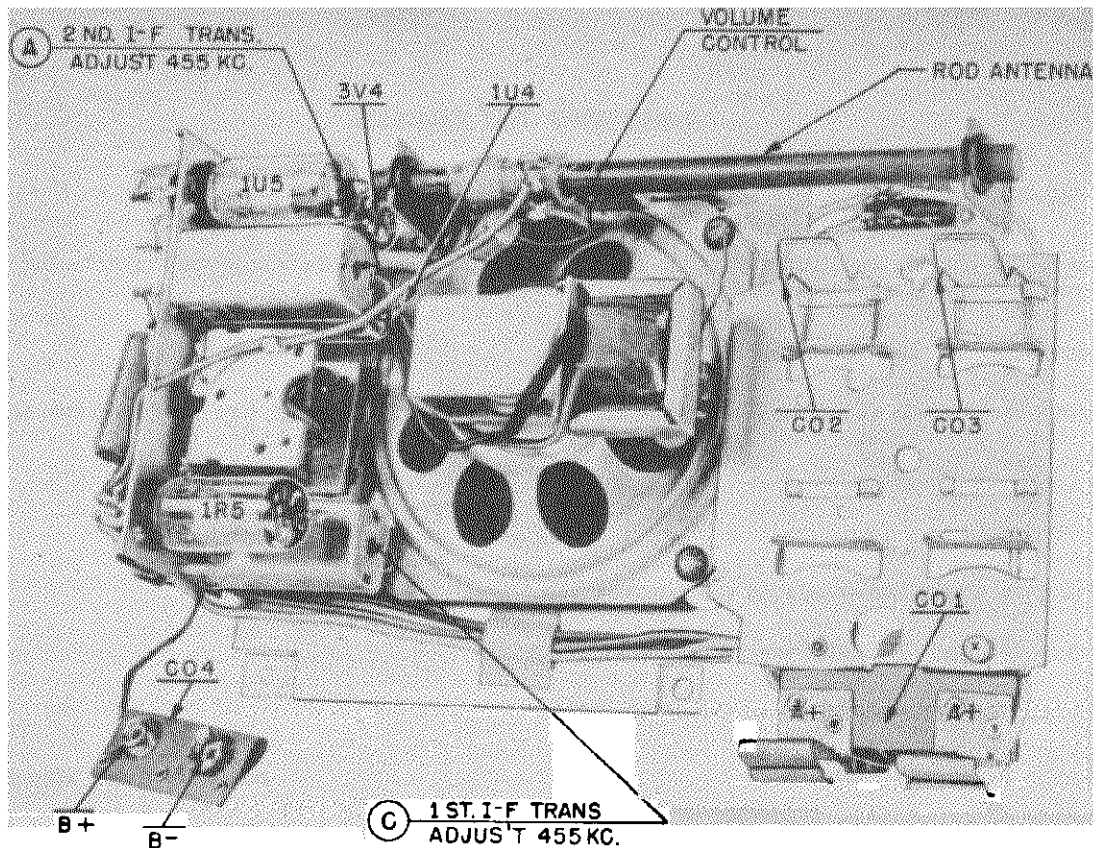
ALIGNMENT CHART

ALIGNMENT SEQUENCE	SIGNAL GENERATOR			POSITION OF TUNING GANG	ADJUST FOR MAX. OUTPUT	REMARKS
	FREQ. IN KC.	IN SERIES WITH	TO			
1	455	.05 mfd.	Mixer grid	Open	A & B	
2	455	.05 mfd.	Mixer grid	Open	C & D	
3	Repeat steps 1 and 2 until maximum output is obtained.					
4	1620	Radiated	Built-in Ant.	Open	E	Note 1
5	1400	Radiated	Built-in Ant.	Tune-in Sig.	F	Note 1 & 2

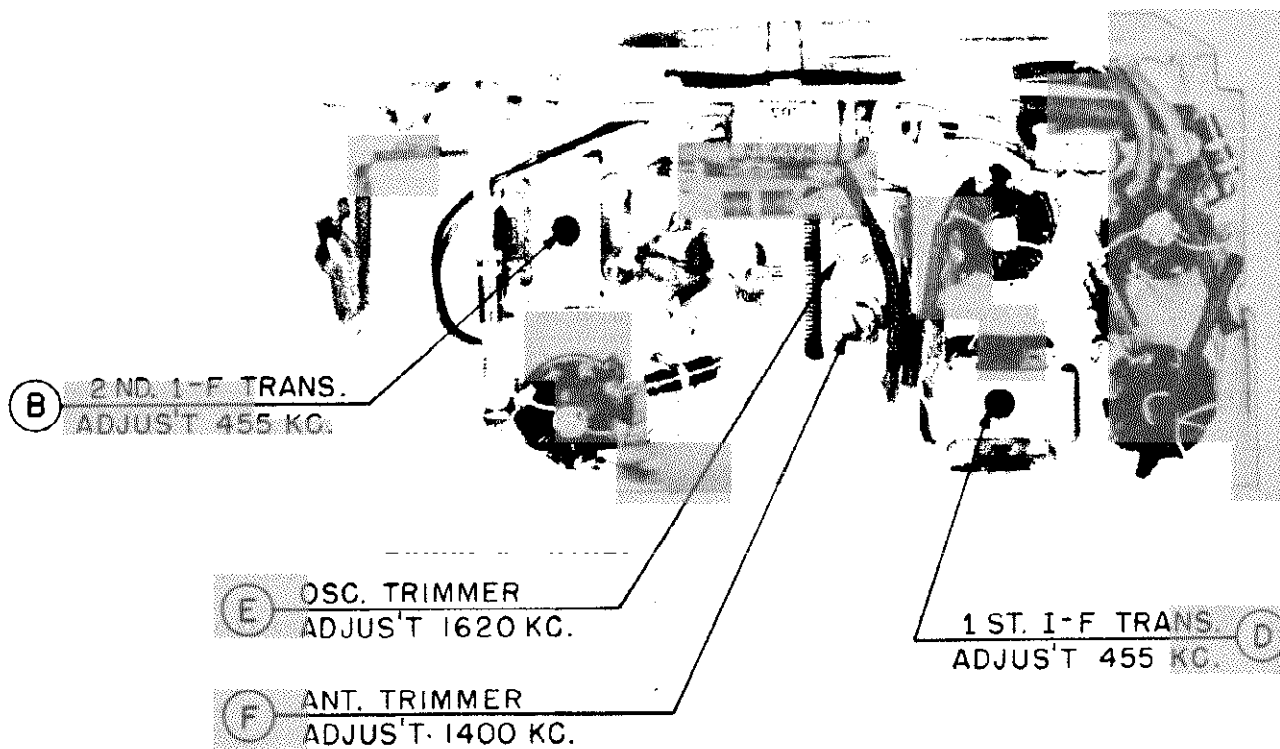
NOTES:

1. The signal can be radiated to the built-in antenna by placing the output lead of the signal generator close to the antenna.
2. Replace the chassis in the cabinet by reversing the order of the removal procedure listed above.

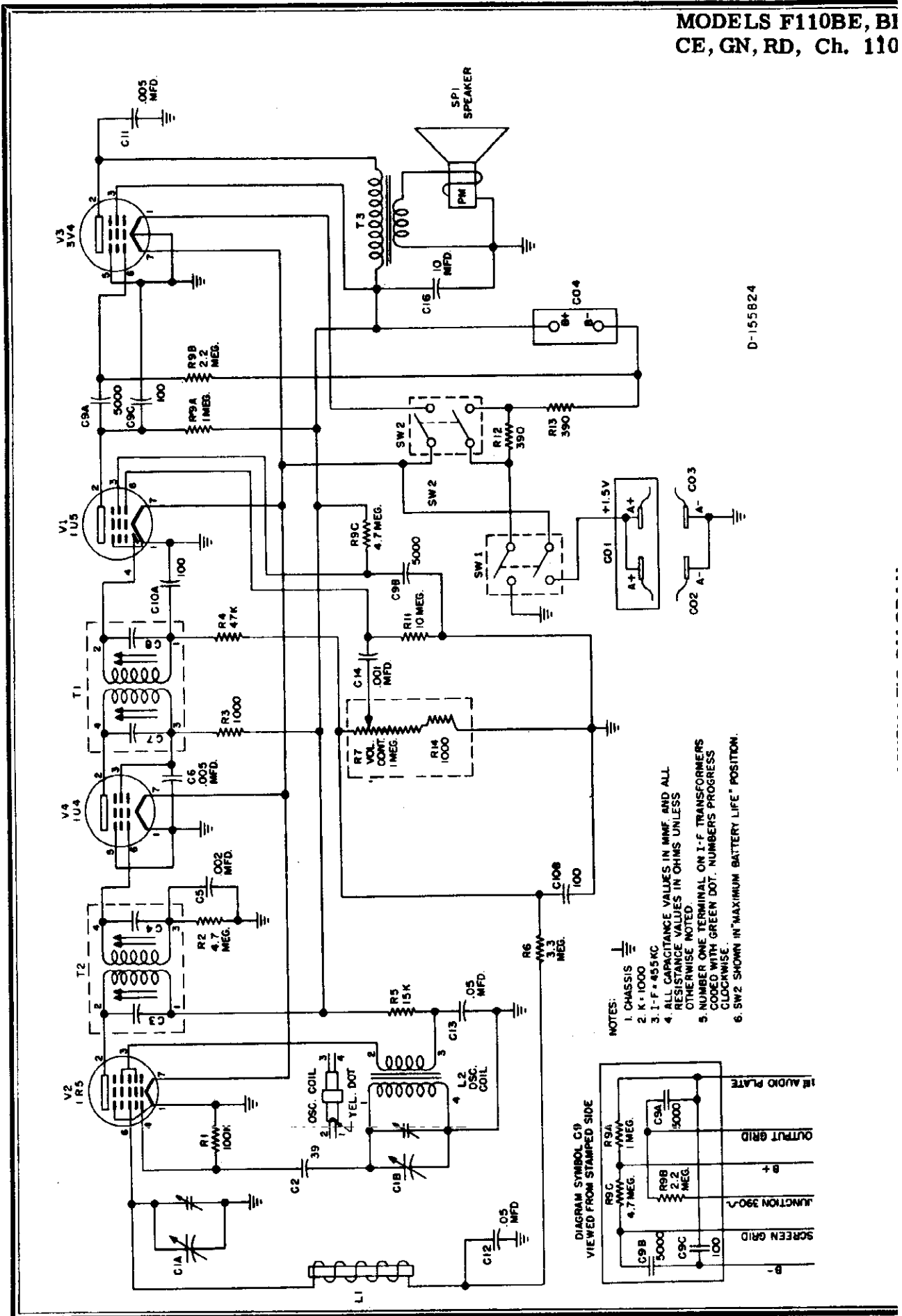
MODELS F-110BE, BK,
CE, GN, RD, Ch. 110F



CHASSIS, REAR VIEW



CHASSIS, BOTTOM VIEW



D-155824

SUBJECT— CORRECT PART NUMBERS FOR CABINET FRONTS, TUNING KNOBS FOR F-110 SERIES

MODEL	ORIGINAL PART NO.	CORRECT PART NO.	DESCRIPTION
F-110BE	155813-1	156779-1	Cabinet front
F-110BK	155813-2	156779-2	Cabinet front
F-110GN	155813-3	156779-3	Cabinet front
F-110RD	155813-4	156779-4	Cabinet front
F-110CE	155813-5	156779-5	Cabinet front
F-110BE	156086-1	156547-1	Knob, tuning
F-110BK	156086-2	156547-2	Knob, tuning
F-110GN	156086-3	156547-3	Knob, tuning
F-110RD	156086-4	156547-4	Knob, tuning
F-110CE	156086-5	156547-5	Knob, tuning
F-110BE	155286-1	156289-1	Handle
F-110BK	155286-1	156289-2	Handle
F-110GN	155286-1	156289-3	Handle
F-110RD	155286-1	156289-4	Handle
F-110CE	155286-1	156289-5	Handle

**SUBJECT— ADDITIONAL PART NUMBERS
PORTABLE RADIOS**

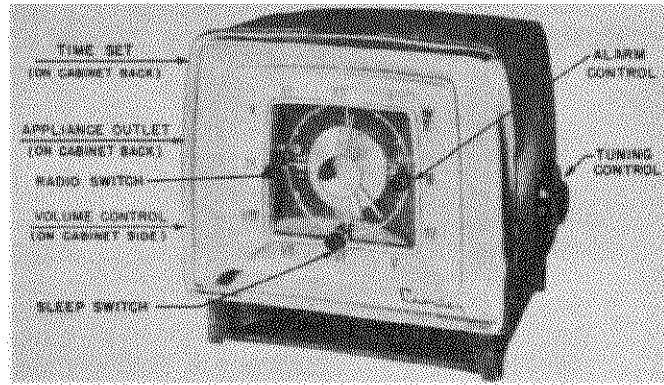
The part numbers in the table below should be added to the parts list

MODEL	PART NO.	DESCRIPTION
F-110 Series	156179	Insert, Tuning Knob
	156173	Insert, Escutcheon

To install a new insert, first remove the old insert; then remove the paper backing from the adhesive on the new insert and press the insert firmly in place.

NOTE: When replacing a tuning knob insert, it is possible to install the new insert up-side-down. To eliminate this possibility, do not remove the tuning knob from its shaft while changing the insert.

**MODELS F-25BE, BK,
GN, MN, Ch. 25F**



DESCRIPTION

TYPE: Five-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 OUTPUT: 1 watt maximum.

POWER CONSUMPTION:

Radio and Clock.....	35 watts
Clock	2 watts

SLEEP SWITCH — Set it up to 60 minutes operation of radio or appliance — turns them off automatically.

ELECTRIC CLOCK of highest accuracy. The face is provided with luminous hour and minute hands for easy reading in the dark. Sweep second hand of red; clock controls of same color as cabinet.

RADIO SWITCH has three positions: "Off" to turn off radio; "Auto" to turn radio or appliance on automatically; "On" for manual radio operation.

APPLIANCE OUTLET is provided at rear of set for connecting any appliance (not exceeding 1100 watts) to be controlled by timing device.

TIME SET, for setting clock to time of day.

ALARM CONTROL — Set it for time radio or appliance is to turn on automatically. Pull out

TUBE COMPLEMENT:

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

to have buzzer sound a few minutes after radio turns on.

DRIFT-FREE TUNING, accomplished by Crosley frequency stabilized oscillator, keeps receiver aligned precisely with station to which you have tuned.

EXCEPTIONALLY FINE TONE — The result of advanced engineering of the Crosley circuit and components.

INCREASED SENSITIVITY AND STABILITY. Permeability tuned (iron core) IF transformers give greater stability and sensitivity so that distant stations can be received with minimum interference.

AUTOMATIC VOLUME CONTROL holds the volume as you set it.

BUILT-IN ANTENNA to provide satisfactory reception from AM broadcast stations within range of the receiver.

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

ALIGNMENT PROCEDURE

1. Connect an output meter across the speaker voice coil (3.2 ohms).
2. Feed an R-F signal modulated 30% at 400 cycles to the receiver, as indicated in the alignment chart. Connect signal generator ground through a 0.1 mfd capacitor to B-.
3. Turn the Radio Switch to the "ON" position.
4. Turn the Volume Control to maximum clockwise position and adjust the signal generator output produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action.

ALIGNMENT CHART

Alignment locations shown on page 41.

Alignment Sequence	Signal Generator Output			Position of Tuning Gang	Adjust for Max. Output	Remarks
	Freq. in KC.	In Series With	To			
1	455	200 mmf.	Mixer grid, pin 7 of V5	Open	A & B	See note 1
2	455	200 mmf.	Mixer grid, pin 7 of V5	Open	C & D	See note 1
3 Repeat steps 1 and 2 until maximum output is obtained.						
4	1620	Radiated Sig.	Antenna	Open	E	See note 2
5	1400	Radiated Sig.	Antenna	Tune in Signal	F	See note 2

Notes:

1. The bottom slugs of the I. F. Transformers can be adjusted through the holes in the front plate opposite the transformers.
2. The signal can be radiated to the antenna by placing the output lead of the signal generator close to the antenna rod.

CLOCK ADJUSTMENTS

Procedure for checking timer switch and vibrator:

1. With the time set knob, turn the clock hands so as to advance the time at least one (1) hour. (For ease in checking, it is recommended that the time be set to the hour.)
2. Attach test light to switch leads.
3. Turn switch knob to "ON" position - light must go on.
4. Turn switch knob to "OFF" position - light must go out.
5. Set alarm disc so that small pointer on hour hand reads two (2) hours in advance of the time of the clock. **EXAMPLE:** If the clock hands are set to read 7 o'clock, set the alarm disc to read 9 o'clock.
6. Turn sleep switch to "60" - test light must go on.
7. Turn time set knob advancing clock hands to next hour—light must go out and SLEEP SWITCH SECTOR GEAR must be completely disengaged within one (1) hour plus or minus eight (8) minutes.

**MODELS F-25BE, BK,
GN, MN, Ch. 25F**

8. Manually push SLEEP SWITCH SECTOR GEAR in until it touches its mating pinion WITHOUT meshing - light must go on.
9. Turn switch knob to "AUTO" position.
10. Turn time set knob to advance clock hands so they read 15 minutes until the next hour. Then slowly advance the hands until the test light lights, which indicates the contacts are closed. The contacts must close somewhere between 14 minutes to the hour and 4 minutes past the hour.
11. Remove test light and connect 110 volt supply to the motor terminals.
12. Turn time set knob to advance the clock hands 4 minutes - vibrator must NOT buzz. Then advance the hands 14 minutes - vibrator MUST buzz within this 14 minute period.

Adjusting Contacts

1. Set the switch to "AUTO" position so that the SWITCH CAM FOLLOWER rests on the TIMING CAM. Contacts shall be adjusted at .020" minimum gap.
2. With switch in "OFF" position contacts shall remain open as in step one and there shall be clearance between SWITCH CAM FOLLOWER and TIMING CAM.
3. With switch in "ON" position, contacts shall be closed. Check for proper contact pressure by depressing LOWER CONTACT strip, using a small pointed tool. If UPPER CONTACT strip follows the LOWER CONTACT strip a noticeable amount before the contacts separate, the pressure is sufficient.
4. Set the switch to "AUTO" position; pull out and turn alarm set knob counter-clockwise until the SWITCH CAM FOLLOWER drops into the slot of TIMING CAM. The contacts shall be closed. Check contact pressure as previously described in step three.
5. SWITCH ARM should clear CAM by .008" minimum when in the "AUTO" position.

Timing

1. Adjust timer for contact closure at 6:55 o'clock. On repeat tests, contacts shall close at 6:55 plus or minus 3 minutes. At all other settings the contacts shall close between 12 minutes before and 2 minutes after the setting time.
2. Check time keeping for a minimum of twelve hours with power applied to the motor. Clock must be run with vibrator (buzzer) shut off.

Vibrator Adjustment

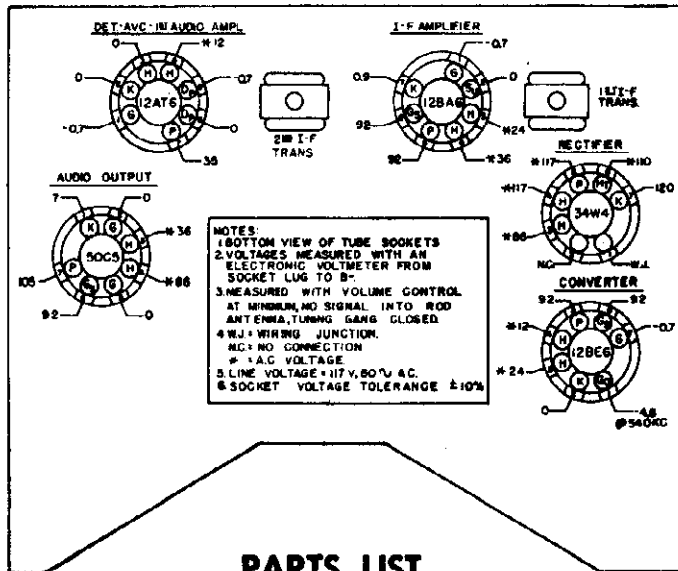
1. Vibrator shall start buzzing 10 minutes plus or minus 5 minutes after contact closure occurs.
2. When the alarm set knob is pushed in ("shut-off" position of vibrator) the shut-off spring shall lift the vibrator sufficiently above the cam, so that the cam will not contact the vibrator in any position.
3. Adjust vibrator for good sounding position.
4. Vibrator shall be manually shut off before completion of buzzing period.

CLOCK LUBRICATION

1. Center stack bearing in base plate and hole in back gear pinion should be lubricated with Nye watch oil or equivalent.
2. Path of switch locating spring on bracket should be lubricated with Dixon graphite grease.

MODELS F-25BE, BK,
GN, MN, Ch. 25F

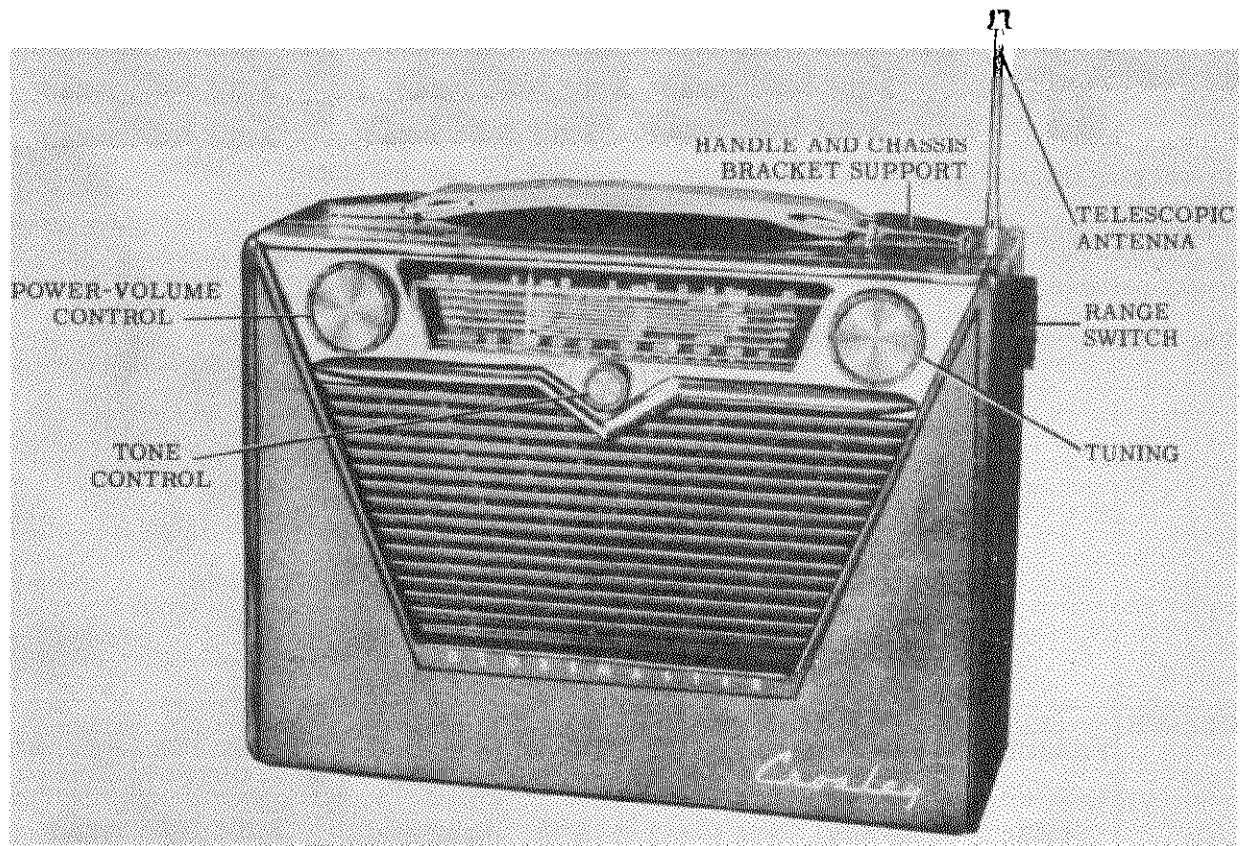
SOCKET VOLTAGE CHART



PARTS LIST


Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
C1A } C1B }	154559	Capacitor, 2 Section, Tuning	SW1	Part of CL1	Switch, on-off
C2	137727-109	Capacitor, Ceramic 39 mmf., 10%, 200 v.	T1	139919-3	Transformer, 1st. I. F.
C3	Part of T1	Capacitor, 108 mmf.	T2	139919-3	Transformer, 2nd. I. F.
C4	Part of T1	Capacitor, 131 mmf.	T3	147171	Transformer, Audio Output
C5	39477-47	Capacitor, 0.1 mfd., 600 v., Molded Paper	CL1	154916-1	Clock Assembly, Model F-25BK
C6	Part of T2	Capacitor, 131 mmf.	CL1	154916-2	Clock Assembly, Model F-25MN
C7	Part of T2	Capacitor, 108 mmf.	CL1	154916-3	Clock Assembly, Model F-25BE
C8A } C8B } C8C } C8D } C8E }	151550-1	Capacitor, 220 mmf. Capacitor, .002 mfd. Capacitor, 125 mmf. Capacitor, .005 mfd. Capacitor, 125 mmf.	CL1	154916-4	Clock Assembly, Model F-25GN
C9	142951-12	Capacitor Resistor Unit; 500 mmf., 500 v., 680,000 ohm, 1/5 w. Min.	CO1	154639	Appliance Outlet & Bracket Assembly
C10	142951-11	Capacitor Resistor Unit; .005 mfd., 500 v., 47,000 ohm, 1/5 w. Min.	154809	Bracket, Speaker Mounting	
C11	39477-41	Capacitor, .01 mfd., 600 v., Molded Paper	155180	Cabinet (Model F-25BK)	
C12	39477-45	Capacitor, .047 mfd., 600 v., Molded Paper	155285-1	Cabinet (Model F-25MN)	
C13	39477-46	Capacitor, .068 mfd., 600 v., Molded Paper	155285-2	Cabinet (Model F-25GN)	
C14A } C14B }	154561	Capacitor, 100 mfd., 150 v., } Assem- Capacitor, 30 mfd., 100 v., } bly	155285-3	Cabinet (Model F-25BE)	
R1	39374-41	Resistor, 22,000 ohm, 1/2 w.	157013	Clamp, Power Cable	
R2	39374-1	Resistor, 10 ohm, 1/2 w.	154320	Face, Clock Dial	
R3	39374-69	Resistor, 2.2 megohm, 1/2 w.	149339-2	Knob, Alarm Set (Model F-25BK)	
R4	39374-69	Resistor, 2.2 megohm, 1/2 w.	149339-11	Knob, Alarm Set (Model F-25BE)	
R5	39375-45	Resistor, 47,000 ohm, 1/2 w.	149339-12	Knob, Alarm Set (Model F-25GN)	
R6	154560	Control, Volume, 3 megohm	149339-13	Knob, Alarm Set (Model F-25MN)	
R7	39374-16	Resistor, 180 ohm, 1/2 w.	154993-2	Knob, Small, Tuning (Model F-25MN)	
R8A } R8B } R8C }	Part of C8	Resistor, 6.8 megohm Resistor, 470,000 ohm Resistor, 470,000 ohm	154993-3	Knob, Small, Tuning (Model F-25BK)	
R10	39374-97	Resistor, 47 ohm, 1 w.	154993-4	Knob, Small, Tuning (Model F-25BE)	
R11	39374-114	Resistor, 1200 ohm, 1 w.	154993-5	Knob, Small, Tuning (Model F-25GN)	
CA1	149780-2	Cable & Plug, Power	149311-2	Knob (2 used), Radio Switch & Sleep Switch (Model F-25BK)	
L1	155014	Antenna Coil & Support Assembly	149311-11	Knob (2 used), Radio Switch & Sleep Switch (Model F-25BE)	
L2	153405	Oscillator Coil Assembly	149311-12	Knob (2 used), Radio Switch & Sleep Switch (Model F-25GN)	
SP1	154812-1	Speaker, 5 1/2" P.M.	149311-13	Knob (2 used), Radio Switch & Sleep Switch (Model F-25MN)	
TS1	147784-1	Shield, Tube	154998-1	Knob, Tuning Dial (Model F-25MN)	
			154998-2	Knob, Tuning Dial (Model F-25BK)	
			154998-3	Knob, Tuning Dial (Model F-25BE)	
			154998-4	Knob, Tuning Dial (Model F-25GN)	
			154993-1	Knob, Volume Control (Model F-25MN)	
			154993-6	Knob, Volume Control (Model F-25BK)	
			154993-7	Knob, Volume Control (Model F-25BE)	
			154993-8	Knob, Volume Control (Model F-25GN)	
			154521-2	Molding, Trim	
			154313	Nail, Channel Indicator	
			155968	Rod, Support	
			39452-2	Socket, Tube (5 used)	
			45580-2	Washer, Rubber, Speaker Mtg. (2 used)	

MODELS F-115GN
MN, TN, Ch. 1151



DESCRIPTION

These Crosley Models are five-tube, two band portable radio receivers employing a superheterodyne circuit and are designed to operate on an "A-B" battery pack or to operate directly from 105 to 125 volts, alternating current (50 to 60 cycles) or direct current power lines. A selenium rectifier supplies the "A" and "B" voltage when the receiver is being operated on the power lines. The tuning range covers the AM Broadcast Band, 540 to 1600 kilocycles, and the Shortwave Band, 8.4 to 15.4 megacycles.

Civilian Defense Emergency frequencies fall within the AM Broadcast Band, and the markers "  " on the dial at 1240 Kc. and 640 Kc. designate the spot on the dial where stations may be received when they are operating on the emergency frequencies. Reception points for Standard Time Signal transmitted by U. S. Bureau of Standards' Station WWV are marked in red at 10 and 15 megacycles on the shortwave portion of the dial.

FREQUENCY RANGE: 540 to 1600 Kc.
8.4 to 15.4 Mc.

INTERMEDIATE FREQUENCY: 455 Kc.

POWER OUTPUT: 300 milliwatts

POWER CONSUMPTION: 13 watts at 117 volts A.C. or D.C.

POWER REQUIREMENTS: 105-125 volts, 50 to 60 cycles A.C.
105-125 volts D.C.
Battery Pack (Crosley part number 156745) with 9 volts "A" and 90 volts "B".

TUBE COMPLEMENT:

TUBE TYPE	FUNCTION
1U4	R. F. Amplifier
1L6	Oscillator & Mixer
1U4	I. F. Amplifier
1U5	Diode Detector - AVC - 1st Audio Amplifier
3V4	Audio Output

MODELS F-115GN,
MN, TN, Ch. 115F

SERVICE ALIGNMENT PROCEDURE

1. Connect output meter across speaker voice coil (3.2 ohms).
2. Feed an R-F signal modulated 30% at 400 cycles to the receiver as indicated below in the alignment chart.
3. Preset gang trimmers, oscillator section open, mixer and R-F section closed.
4. Turn the volume control to full on and the tone control to high frequency position. Adjust the generator to produce approximately mid-scale deflection of the output meter, but maintain generator output as low as possible to prevent a-v-c action.
5. The "Dummy" shown in Fig. 1 is to be used in steps 2 & 3 in the alignment procedure.

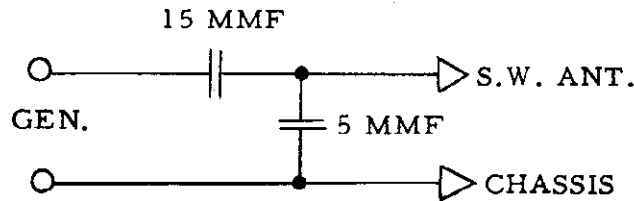


Fig. 1. Shortwave Dummy

ALIGNMENT CHART

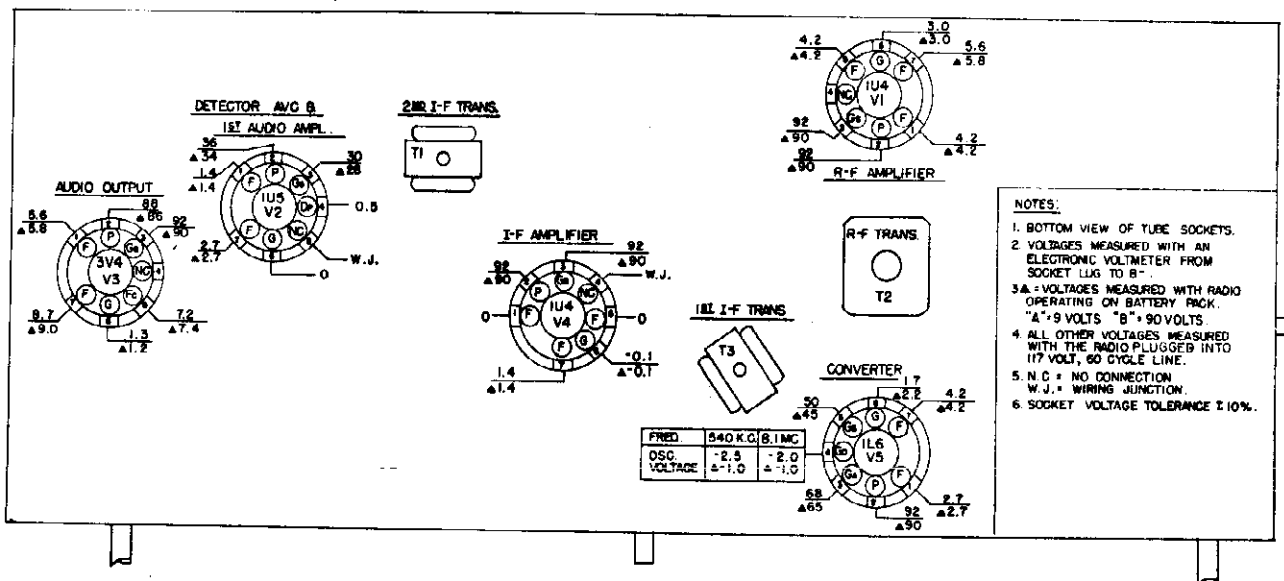
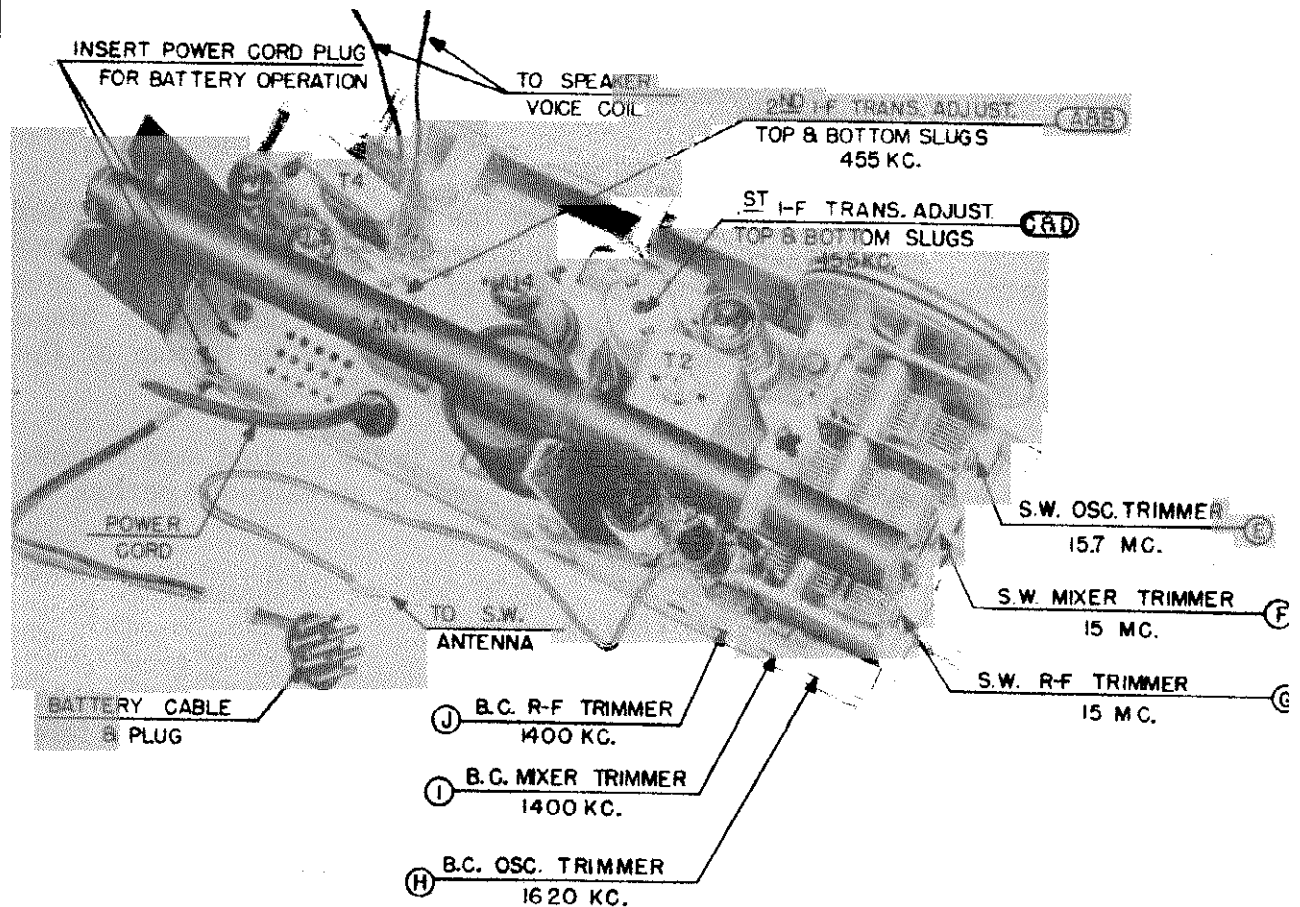
SEQUENCE	SIGNAL GENERATOR OUTPUT			POSITION OF		ADJUST FOR MAX. OUTPUT	REMARKS
	FREQUENCY	IN SERIES WITH	TO	RANGE SWITCH	TUNING DIAL		
1	455Kc	.05 mfd	Note 1	S.W.	Gang open	A,B,C,D	Note 1
	Repeat adjustments to obtain maximum output						Note 2
2	15.7Mc	Dummy	S.W. Antenna	S.W.	Gang open	E	Note 3 & 6
3	15Mc	Dummy	S.W. Antenna	S.W.	Tune in Sig.	F,G	Note 3 & 4
4	1620Kc	Radiated	B.C. Antenna	B.C.	Gang open	H	Note 5
5	1400Kc	Radiated	B.C. Antenna	B.C.	Tune in Sig.	I,J	Note 5

NOTES:

1. Low side of generator returned to B- on electrolytic capacitor, high side of generator connected to stator of gang capacitor, center section.
2. After aligning I-F Transformers, replace bottom cover of chassis.
3. Low side of generator returned to chassis, high side of generator connected to shortwave antenna through dummy.
4. Peak center trimmer (mixer section) and rear trimmer (antenna section by rocking gang to secure maximum output.)
5. Radiate signal from generator to rod antenna by placing wire attached to high side of generator close to the rod antenna opposite to the end that is wired to the gang stator.
6. Do not align the shortwave oscillator to image at 14 megacycles.

CHASSIS, REAR VIEW

MODELS F-115GM
MN, TN, Ch. 115I



SOCKET VOLTAGE CHART

MODELS F-115GN,
MN, TN, Ch. 115F

BATTERY INSTALLATION

To open the cabinet, lift up on the handle and use the thumb to push down and out on the top edge of the cabinet back. The back is hinged at the bottom. Place the battery pack under the flexible webbing strap, and insert the battery cable plug into the battery socket. To replace the back, place the curved portion of the hinge plates on the bottom of the cabinet back over the hinge pins on the bottom of the cabinet. Push the back forward until it locks into the top of the cabinet.

CAUTION: Never allow run-down batteries to remain in the cabinet, and remove the battery pack when the receiver is stored for an extended period.

ANTENNAS

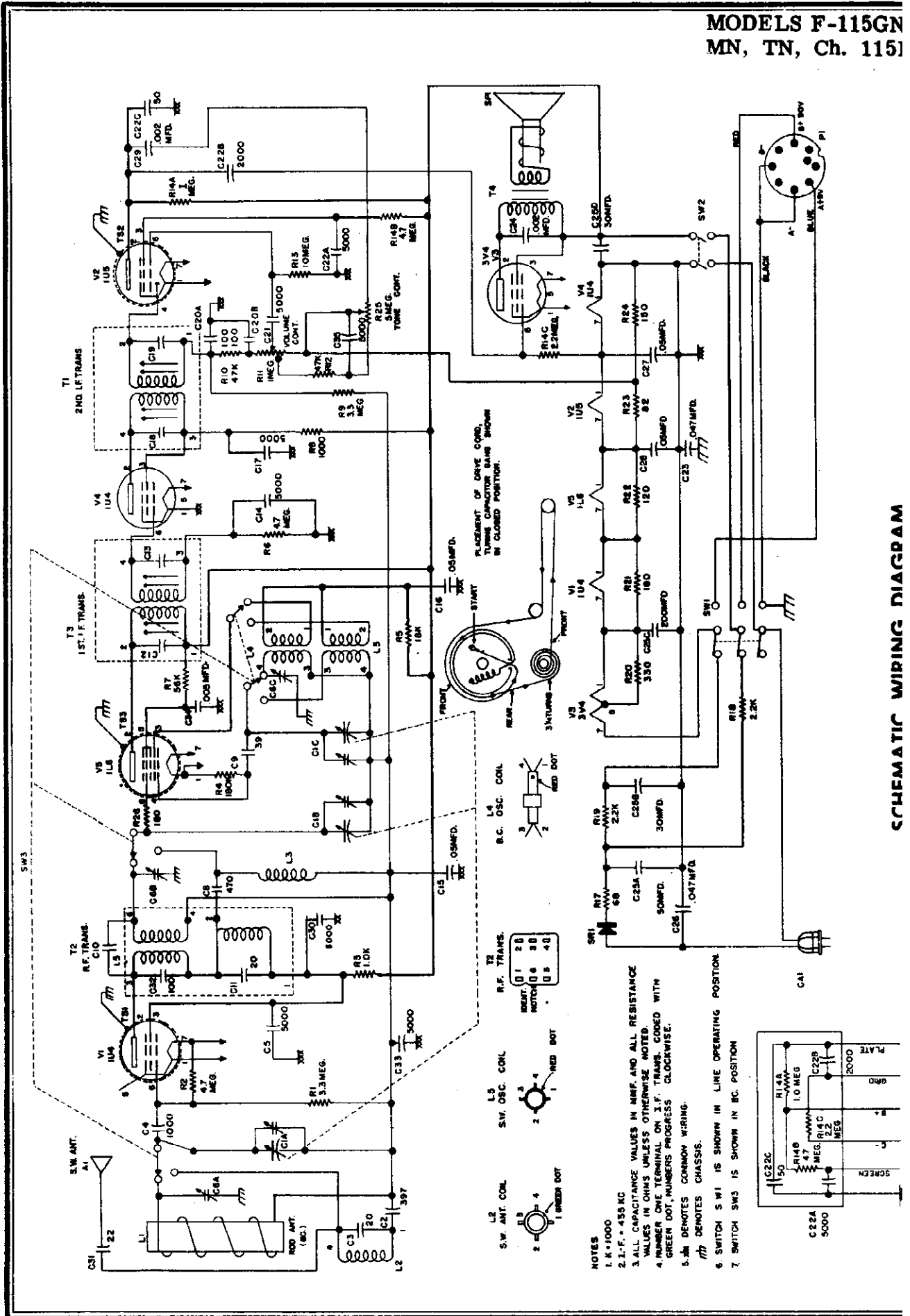
Two built-in antennas are provided: an iron core, high efficiency rod antenna for standard broadcast reception, and for shortwave reception, a vertical telescoping antenna that can be pushed down in the cabinet when not in use.

When removing or opening the back of the cabinet, be sure that the clip on the wire from the coil next to the tuning gang, is on the pin of the bracket that supports the telescoping antenna.

OPERATION

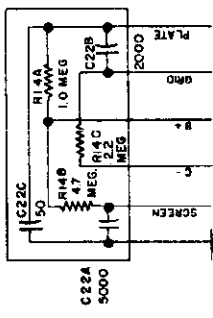
Battery Operation: - Open the back of the cabinet. It will be noted that a flat spring is located on the back of the chassis on the battery cable side, and also a slot in the chassis on the underside. For battery operation, one of the prongs of the power cord plug must be inserted in this slot and the other prong over the spring. This operates the line-battery switch (SW1). After inserting the plug, close the cabinet back.

AC or DC Operation: - For 105 to 125 volt, 50 to 60 cycle alternating current or direct current power line operation, remove the power cord plug from the receptacle on the chassis and connect to the electrical outlet. The power cord may be brought out of the cabinet through the slot provided at the lower right hand corner of the cabinet.



SCHEMATIC WIRING DIAGRAM

- NOTES
1. K = 1000
 2. I.F. = 455 KC
 3. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE NOTED
 4. NUMBER ONE TERMINAL ON I.F. TRANS. COILS WITH GREEN DOT, NUMBERS PROGRESS CLOCKWISE.
 5. ω DENOTES COMMON WIRING.
 6. SW1 IS SHOWN IN LINE OPERATING POSITION
 7. SWITCH SW3 IS SHOWN IN B.C. POSITION



MODELS F-115GN,
MN, TN, Ch. 115F

PARTS LIST

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
C1A	156174-1	Capacitor, Tuning (3-gang) } Assembly	R23	39374-12	Resistor, 82 ohm, 10%, 1/2 w.
C1B		and Short wave Trimmers }	R24	39374-15	Resistor, 150 ohm, 10%, 1/2 w.
C1C			R25	156307-1	Tone Control (5 megohm)
C2	137499-43	Capacitor, 397 mmf., 2%, 500v., Mica	R26	39374-16	Resistor, 180 ohm, 10%, 1/2 w.
C3	137727-99	Capacitor, 20 mmf., N080, 500v., Ceramic	L1	156533	Rod Antenna (Broadcast)
C4	137727-142	Capacitor, 1000 mmf., 300v., Ceramic	L2	156653-1	Antenna Coil (Short-wave)
C5	137727-121	Capacitor, 5000 mmf., 500v., Ceramic	L3	156714	R. F. Choke
C6A	156491-1	Trimmer (Broadcast), 2-18 mmf.	L4	156691-1	Oscillator Coil (Broadcast)
C6B		Trimmer (Broadcast), 1-8 mmf.	L5	156655-1	Oscillator Coil (Short-wave)
C6C		Trimmer (Broadcast), 2-18 mmf.	A1	156390-1	Telescopic Antenna
C8	137499-46	Capacitor, 470 mmf., 2%, 500v., Mica	P1	156689	Plug (Battery) and Cable
C9	152999-2	Capacitor, 39 mmf., N5600, 300v.	T1	145025-7	Transformer, 2nd I.F.
C10	137398-3	Capacitor, 1.5 mmf., 500v., Disc Ceramic	T2	156756-1	Transformer, R.F.
C11	137727-99	Capacitor, 20 mmf., N080, 500v., Ceramic	T3	145025-8	Transformer, 1st I.F.
C12	Part of T3	Capacitor, 47 mmf.	T4	156321-1	Transformer, Audio Output
C13	Part of T3	Capacitor, 62 mmf.	SR1	156396-1	Selenium Rectifier, 75 ma.
C14	137727-121	Capacitor, 5000 mmf., 500v., Ceramic	SP1	156420	Speaker 5" PM
C15	39001-17	Capacitor, .05 mfd., 150v., Paper	CA1	142769-6	Power Cable and Plug
C16	39433-14	Capacitor, .05 mfd., 150v., Paper	SW1	153347-1	Switch, Line-Battery
C17	137727-121	Capacitor, 5000 mmf., 500v., Ceramic	SW2	Part of 156260	Switch, On-Off
C18	Part of T1	Capacitor, 62 mmf.	SW3	156523-1	Switch, Range
C19	Part of T1	Capacitor, 47 mmf.		156745	Battery Pack
C20A	142951-13	Capacitor, 100 mmf., 500v., } Resistor (R10)-		156285-1	Bracket, Chassis Mounting (R.H.)
C20B		Capacitor, 100 mmf., 500v., } Capacitor Unit		156285-2	Bracket, Chassis Mounting (L.H.)
C21	137727-121	Capacitor, 5000 mmf., 500v., Ceramic		156397	Bracket, Telescopic Antenna
C22A	151550-4	Capacitor, 5000 mmf., } Couplate		156368-1	Cabinet, Back (Model F-115MN)
C22B		Capacitor, 2000 mmf., }		156368-2	Cabinet, Back (Model F-115GN)
C22C		Capacitor, 50 mmf., }		156368-3	Cabinet, Back (Model F-115TN)
C23	39477-45	Capacitor, .047 mfd., 600v., Molded Paper		156367-1	Cabinet, Front (Model F-115MN)
C24	39433-25	Capacitor, .002 mfd., 400v., Paper		156367-2	Cabinet, Front (Model F-115GN)
C25A	150975-1	Capacitor, 50 mfd., 150v. } Electrolytic		156367-3	Cabinet, Front (Model F-115TN)
C25B		Capacitor, 30 mfd., 25v. }		145420	Clip (Fuse Type), Cabinet (2 used)
C25C		Capacitor, 200 mfd., 10v. }		157055	Dial
C25D		Capacitor, 30 mfd., 100v. }		156487	Dial Background
C26	39477-45	Capacitor, .047 mfd., 600v., Molded Paper		156363	Escutcheon
C27	39433-14	Capacitor, .05 mfd., 150v., Paper		131154-1	External Cotter (Dial Drive Shaft)
C28	39433-14	Capacitor, .05 mfd., 150v., Paper		155286-3	Handle
C29	39433-25	Capacitor, .002 mfd., 400v., Paper		156378	Hinge Clip, Cabinet Back (2 used)
C30	137727-121	Capacitor, 5000 mmf., 500v., Ceramic		156379	Hinge Clip, Cabinet Front (2 used)
C31	137727-128	Capacitor, 22 mmf., N080, 500v., Ceramic		156302-1	Knob, Range Switch (Model F-115MN)
C32	137727-139	Capacitor, 100 mmf., 500v., Ceramic		156302-3	Knob, Range Switch (Model F-115GN)
C33	137727-121	Capacitor, .005 mfd., 500v., Ceramic		156302-5	Knob, Range Switch (Model F-115TN)
C34	137727-141	Capacitor, 5000 mmf., 500v., Ceramic		156315-1	Knob, Tone Control (Model F-115MN)
C35	137727-121	Capacitor, 5000 mmf., 500v., Ceramic		156315-2	Knob, Tone Control (Model F-115GN)
R1	39374-73	Resistor, 3.3 megohm, 10%, 1/2 w.		156315-3	Knob, Tone Control (Model F-115TN)
R2	39374-77	Resistor, 4.7 megohm, 10%, 1/2 w.		156302-2	Knob, Volume and Tuning Controls (Model F-115MN)
R3	39374-25	Resistor, 1000 ohm, 10%, 1/2 w.		156302-4	Knob, Volume and Tuning Controls (Model F-115GN)
R4	39374-52	Resistor, 180,000 ohm, 10%, 1/2 w.		156302-6	Knob, Volume and Tuning Controls (Model F-115TN)
R5	39374-40	Resistor, 18,000 ohm, 10%, 1/2 w.		155280	Link, Handle (2 used)
R6	39374-77	Resistor, 4.7 megohm, 10%, 1/2 w.		94704-39	Nut (Push-on), Escutcheon Mounting (4 used)
R7	39374-46	Resistor, 56,000 ohm, 10%, 1/2 w.		94704-45	Nut (Push-on), Speaker Mounting (4 used)
R8	39374-25	Resistor, 1000 ohm, 10%, 1/2 w.		156669	Pin, Telescopic Antenna Bracket
R9	39374-73	Resistor, 3.3 megohm, 10%, 1/2 w.		156724	Plate (Metal) Battery Strap
R10	Part of C20	Resistor, 47,000 ohm		156461	Pointer, Dial
R11	156260	Volume Control (1 megohm, Tapped at 300,000 ohm)		137939-2	Pulley, Idler (2 used)
R12	39374-45	Resistor, 47,000 ohm, 10%, 1/2 w.		137940-1	Rivet, Idler Pulley (2 used)
R13	39374-85	Resistor, 10 megohm, 10%, 1/2 w.		156481	Shaft, Dial Drive
R14A	Part of C22	Resistor, 1 megohm, 1/2 w.		147784	Shield, Tube (V1, V2, V5)
R14B		Resistor, 4.7 megohm, 1/2 w.		148346	Socket, Tube (5 used)
R14C		Resistor, 2.2 megohm, 1/2 w.		156612	Spring, Contact (Receptacle on chassis for line-cord)
R17	39374-187	Resistor, 68 ohm, 10%, 2 w.		145757	Spring, Dial Drive Cord
R18	39374-117	Resistor, 2200 ohm, 10%, 1 w.		157611-1	Spring, Fuse Clip
R19	156643-1	Resistor, 2200 ohm, 3%, 7 w., Wire Wound		156662	Strap, Battery
R20	39374-19	Resistor, 330 ohm, 10%, 1/2 w.		156595	Strip (Fish Paper), Dial Pointer
R21	39374-16	Resistor, 180 ohm, 10%, 1/2 w.		156692	Support and Bracket Assembly (Rod Antenna)
R22	39374-14	Resistor, 120 ohm, 10%, 1/2 w.		156278-1	Support, Handle & Chassis Bracket (R.H.)
				156278-2	Support, Handle & Chassis Bracket (L.H.)
				156684	Support and Terminal Assembly (Rod Antenna)
				156398-2	Washer, Felt (3 used)
				134916	Washer (Spring), Dial Drive Shaft