

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

Reg. U.S. Pat. Off.

**VOLUME XVI**



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AUTOMATIC RECORD CHANGERS AND RECORDERS

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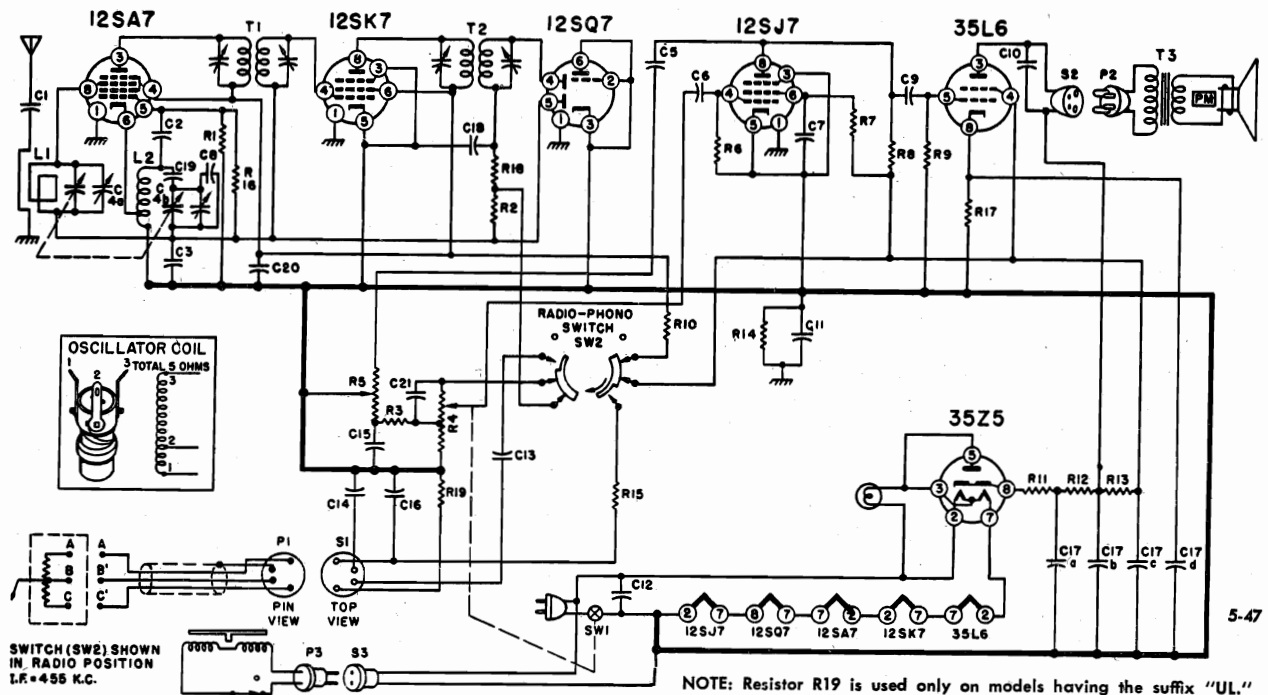
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## ADMIRAL CORPORATION

MODEL 7C62, Chassis 6M1  
MODELS 7RT41, 7RT42, 7RT43

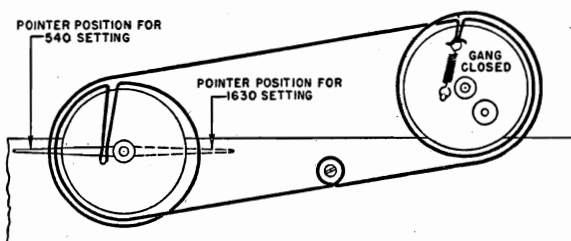
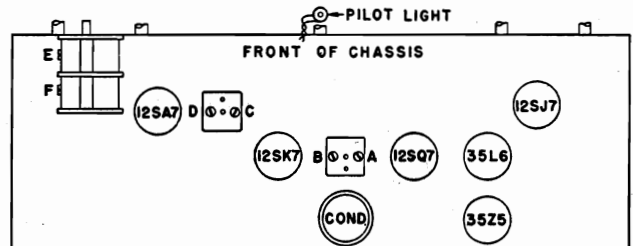
MODELS 7RT41, 7RT42, 7RT43

MODEL 7C62

**ALIGNMENT PROCEDURE**

1. Connect Output Meter across Voice Coil.
2. Turn Receiver Volume Control—full on.
3. Use lowest Output setting of Signal Generator
4. Repeat adjustments to insure good results.

Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Frequency to—	Set Receiver Dial Frequency to—	Adjust Following Trimmers	Type of Adjustment
Tuning Condenser Antenna Stator	250 mmfd. Condenser	455 K.C.	High frequency end of Dial	A-B—2nd I. F. C-D—1st I. F.	Adjust to maximum Output
Tuning Condenser Antenna Stator	250 mmfd. Condenser	1630 K.C.	High frequency end of Dial	E—Osc.	Adjust to maximum Output
Loop radiator (or place lead from generator close to loop of set to obtain adequate signal)	No actual connection between set and generator.	1400 K.C.	Tune in generator signal	F—Ant.	Adjust to maximum Output

**DIAL CORD STRINGING & POINTER SETTING****TOP VIEW**

## MODEL 7C62

MODELS 7RT41, 7RT42,  
7RT43

## ADMIRAL CORPORATION

MODEL 7RT41, 7RT42, 7RT43

## REPLACEMENT PARTS

## RESISTORS

Symbol	Description	Part No.
R1.....	22,000 Ohms, 1/2 Watt.....	608 8-223
R2.....	1 Megohm, 1/2 Watt.....	608 8-105
R3.....	27,000 Ohms, 1/2 Watt.....	608 8-273
R4.....	1 Megohm Volume Control (Tapped at 500,000 ohms).....	75B 2-6
R5.....	2 Megohm Tone Control and Switch SW1.....	75B 1-12
R6.....	4.7 Megohms, 1/2 Watt.....	608 8-475
R7.....	1.8 Megohms, 1/2 Watt.....	608 8-185
R8.....	100,000 Ohms, 1/2 Watt.....	608 8-104
R9.....	470,000 Ohms, 1/2 Watt.....	608 8-474
R10.....	100 Ohms, 1/2 Watt.....	608 8-101
R11.....	33 Ohms, 1 Watt.....	608 28-3
R12.....	220 Ohms, 1 Watt.....	608 28-7
R13.....	1,000 Ohms, 1 Watt.....	608 28-2
R14.....	150,000 Ohms, 1/2 Watt.....	608 8-154
R15.....	22,000 Ohms, 1/2 Watt.....	608 8-223
R16.....	10 Megohms, 1/2 Watt.....	608 8-106
R17.....	150 Ohms, 1 Watt.....	608 14-151
R18.....	100,000 Ohms, 1/2 Watt.....	608 8-104
R19.....	33,000 Ohms, 1/2 Watt.....	608 8-333

## CONDENSERS

C1.....	.005 mfd., 600 Volts, Paper.....	64B 1-12
C2.....	50 mmfd. $\pm 20\%$ , Ceramic.....	65B 6-4
C3.....	.1 mfd., 200 Volts, Paper.....	64B 1-30
C4a.....	Gang, 0 to 420 mmfd. ....	68B 5
C4b.....	Gang, 0 to 162 mmfd. ....	68B 5
C5.....	.002 mfd., 600 Volts, Paper.....	64B 1-14
C6.....	.01 mfd., 400 Volts, Paper.....	64B 1-25
C7.....	.05 mfd., 400 Volts, Paper.....	64B 1-22
C8.....	15 mmfd. $\pm 20\%$ , Ceramic.....	65B 6-18
C9.....	.01 mfd., 400 Volts, Paper.....	64B 1-25
C10.....	.03 mfd., 400 Volts, Paper.....	64B 1-23

## CONDENSERS

Symbol	Description	Part No.
C11.....	.18 mfd., 200 Volts, Paper.....	64A 2-2
C12.....	.05 mfd., 400 Volts, Paper.....	64B 1-22
C13.....	.001 mfd., 600 Volts, Paper.....	64B 1-15
C14.....	.05 mfd., 400 Volts, Paper.....	64B 1-25
C15.....	.01 mfd., 400 Volts, Paper.....	64B 1-24
C16.....	.1 mfd., 200 Volts, Paper.....	64B 1-30
C17a.....	30 mfd., 150 Volts	Elect.....67A 14-1
C17b.....	30 mfd., 150 Volts	
C17c.....	20 mfd., 150 Volts	
C17d.....	20 mfd., 25 Volts	
C18.....	250 mmfd. $\pm 20\%$ , Ceramic.....	65B 6-5
C19.....	.02 mfd., 200 Volts, Paper.....	64B 1-24
C20.....	.05 mfd., 400 Volts, Paper.....	64B 1-22
C21.....	500 mmfd. $\pm 20\%$ , Ceramic.....	65B 6-6

## COILS, TRANSFORMERS, ETC.

L1.....	Antenna, Loop.....	69B 13
L2.....	Coil, Oscillator.....	69A 14
T1.....	Transformer, 1st I.F.....	72B 3
T2.....	Transformer, 2nd I.F.....	72B 4
T3.....	Transformer, Output.....	98A 17
	Speaker (5") & Output Trans- former .....	78B 19-1

## SWITCHES, PLUGS &amp; SOCKETS

P1.....	Plug, Pickup.....	88A 8-5
P3.....	Plug, Motor.....	88A 8-1
S1.....	Socket, Phono.....	88A 8-6
S3.....	Phono-Motor Socket & Leads (Female connector).....	89A 6-3
SW1.....	Part of Tone Control R5	
SW2.....	Switch, Radio-Phono.....	77A 16-2

## CABINET PARTS

Description	Part No.
Cabinet Body Less Lid (7RT41).....	34D 11-11
Cabinet Lid (7RT41).....	34D 11-10
*Cabinet, Wood (7RT42).....	35D 47
*Cabinet, Wood, Walnut (7RT43).....	35D 48-1
*Cabinet, Wood, Mahogany (7RT43).....	35D 48-2
Clip, Dial Glass Mounting (7RT43).....	18A 12
Dial Scale, Glass (7RT41-7RT42).....	21B 35-1
Dial Scale, Glass (7RT43).....	21B 33-1
Escutcheon, Overlay (7RT41-7RT42).....	23C 23-1
Grille, Inside.....	16C 1

## PHONOGRAPH PARTS

Note: See record changer manual for complete parts list.

Cartridge and Needle, Pickup.....	A 1372
Centerpost .....	G400B137-1
Drive Disc Assembly.....	G 400A 179
Idler Wheel (407B3 Motor).....	G 400A 23
Idler Wheel (407B1 Motor).....	G 400A 57
Motor, 60 Cycle 115 Volt A.C. ....	407B 3-2
Pickup Cable and Plug.....	A 1322

## MISCELLANEOUS

Background, Dial.....	22B 9-1
Bracket, Tuning Shaft.....	15A 152
Bracket, Dial.....	15B 151
Cord, Dial (48").....	50A 1-3
Drum, Dial.....	17A 14
Grommet, Rubber.....	12A 1-2
Knob.....	33A 19-1
Pilot Light #47.....	81A 1-8
Pilot Light Socket and Leads.....	82A 2-3
Pointer.....	25A 21
Pulley, Fibre Dial 1/8"x1/2" O.D.....	17A 1-3
Shaft, Tuning.....	28A 11-4
Spring, Dial Drum Cord Tension.....	19B 1-7

\* Supplied only if old cabinet cannot be repaired.  
When ordering, describe condition of old cabinet in detail.

## MODEL 7C62

## REPLACEMENT PARTS

## RESISTORS

Symbol	Description	Part No.
R1.....	22,000 Ohms, 1/2 Watt.....	608 8-223
R2.....	1 Megohm, 1/2 Watt.....	608 8-105
R3.....	27,000 Ohm, 1/2 Watt.....	608 8-273
R4.....	1 Megohm Volume Control and Switch SW1 (Tapped at 500,000 ohms).....	75B 2-2
R5.....	2 Megohms, Tone Control.....	75B 1-8
R6.....	4.7 Megohms, 1/2 Watt.....	608 8-475
R7.....	1.8 Megohms, 1/2 Watt.....	608 8-185
R8.....	100,000 Ohms, 1/2 Watt.....	608 8-104
R9.....	470,000 Ohms, 1/2 Watt.....	608 8-474
R10.....	100 Ohms, 1/2 Watt.....	608 8-101
R11.....	33 Ohms, 1 Watt.....	608 28-3
R12.....	220 Ohms, 1 Watt.....	608 28-7
R13.....	1,000 Ohms, 1 Watt.....	608 28-2
R14.....	150,000 Ohms, 1/2 Watt.....	608 8-154
R15.....	22,000 Ohms, 1/2 Watt.....	608 8-223
R16.....	10 Megohms, 1/2 Watt.....	608 8-106
R17.....	150 Ohms, 1 Watt.....	608 14-151
R18.....	100,000 Ohms, 1/2 Watt.....	608 8-104
R19.....	33,000 Ohms, 1/2 Watt.....	608 8-333

## CONDENSERS

C1.....	.005 mfd., 600 Volts, Paper.....	64B 1-12
C2.....	50 mmfd. $\pm 20\%$ , Ceramic.....	65B 6-4
C3.....	.1 mfd., 200 Volts, Paper.....	64B 1-30
C4a.....	Gang, 0 to 420 mmfd. ....	68B 5
C4b.....	Gang, 0 to 162 mmfd. ....	68B 5
C5.....	.002 mfd., 600 Volts, Paper.....	64B 1-14
C6.....	.002 mfd., 600 Volts, Paper.....	64B 1-14
C7.....	.05 mfd., 400 Volts, Paper.....	64B 1-22
C8.....	15 mmfd. $\pm 20\%$ , Ceramic (Used on Model 7C62-N).....	65B 6-18
C8.....	20 mmfd., Mica (Used on Model 7C62-UL).....	65B 7-5

## CONDENSERS

Symbol	Description	Part No.
C9.....	.01 mfd., 400 Volts, Paper.....	64B 1-25
C10.....	.03 mfd., 400 Volts, Paper.....	64B 1-23
C11.....	.1 mfd., 400 Volts, Paper.....	64B 1-20
C12.....	.05 mfd., 400 Volts, Paper.....	64B 1-22
C13.....	.001 mfd., 600 Volts, Paper.....	64B 1-15
C14.....	.05 mfd., 400 Volts, Paper.....	64B 1-22
C15.....	.02 mfd., 400 Volts, Paper.....	64B 1-24
C16.....	.1 mfd., 200 Volts, Paper.....	64B 1-30
C17a.....	30 mfd., 150 Volts	Elect.....67C 7-46
C17b.....	30 mfd., 150 Volts	
C17c.....	20 mfd., 150 Volts	
C17d.....	20 mfd., 25 Volts	
C18.....	250 mmfd. $\pm 20\%$ , Ceramic.....	65B 6-5
C19.....	.02 mfd., 200 Volts, Paper.....	64B 1-24
C20.....	.05 mfd., 400 Volts, Paper.....	64B 1-22
C21.....	500 mmfd. $\pm 20\%$ , Ceramic.....	65B 6-6

## COILS, TRANSFORMERS, ETC.

L1.....	Antenna, Loop.....	69B 18
L2.....	Coil, Oscillator.....	69A 14
T1.....	Transformer, 1st I.F.....	72B 3
T2.....	Transformer, 2nd I.F.....	72B 4
T3.....	Transformer, Output.....	98A 18
	Speaker (8" PM) & Output Transformer .....	78C 20-1

## SWITCHES, PLUGS &amp; SOCKETS

P1.....	Plug, Pickup.....	88A 8-5
P2.....	Plug, Speaker.....	88A 4
P3.....	Plug, Motor.....	88A 8-1
S1.....	Socket, Phono.....	88A 8-6
S2.....	Socket, Speaker.....	87A 6-1
S3.....	Phono-Motor Socket & Leads (Female connector).....	89A 6-6
SW1.....	Part of Volume Control R4	
SW2.....	Switch, Radio-Phono.....	77A 16-2

## CABINET PARTS

Description	Part No.
Screw, Chassis Mounting.....	1A 67-17-2
Tie Bar, Tilt Out.....	15B 126
Springs, Tilt Out.....	19A 15-1
Escutcheon, Plastic.....	23C 22-2
Dial Window, Plastic.....	24B 1
*Cabinet, Wood (7C62).....	35E 52
Hinge Assembly, Record Support Side.....	AC 118-1
Hinge Assembly, Pickup Arm Side.....	AC 118-2

## PHONOGRAPH PARTS

Note: See record changer manual for complete parts list.

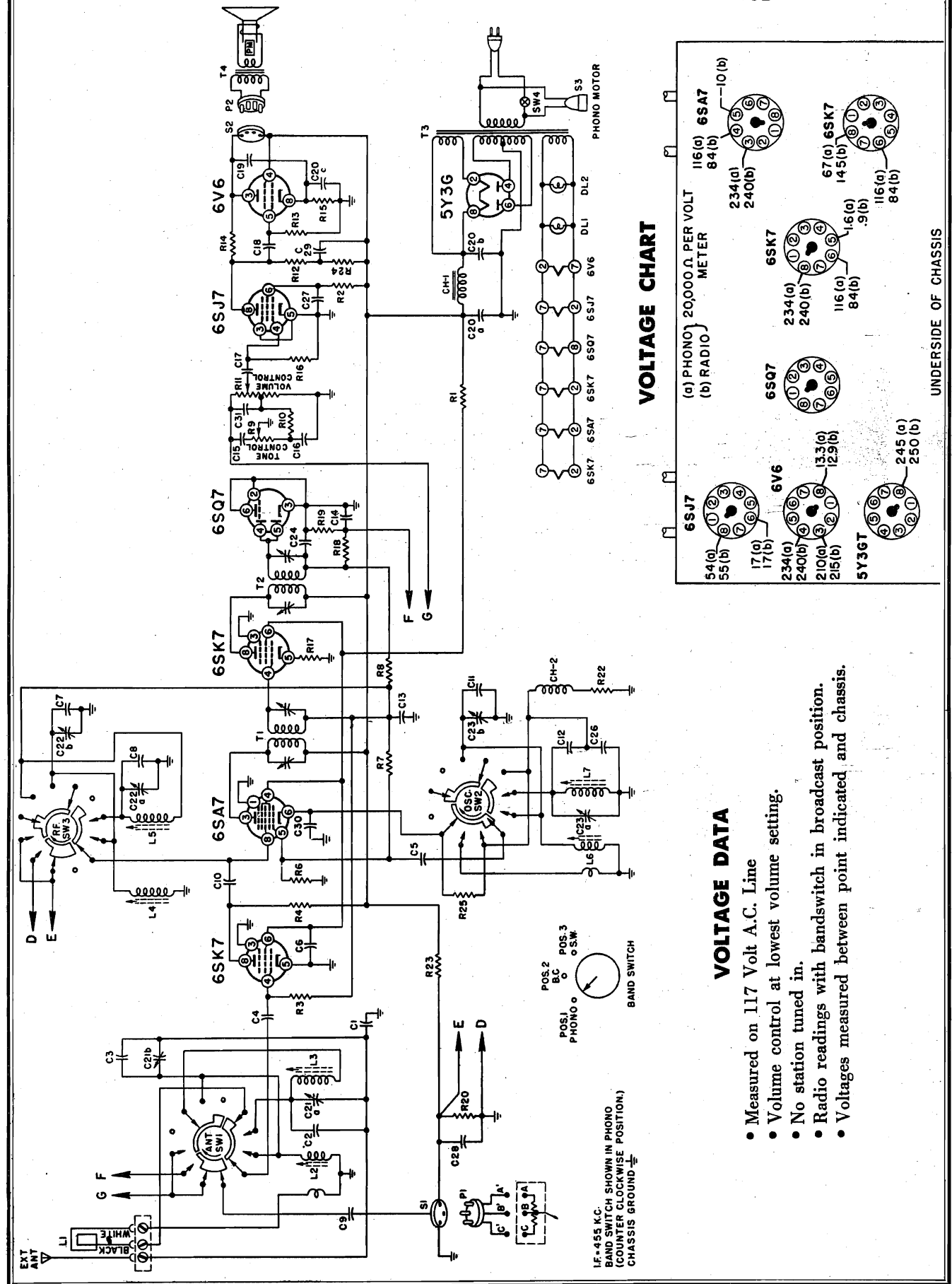
Cartridge and Needle, Pickup.....	A 1372
Centerpost .....	G400B137-1
Drive Disc Assembly.....	G 400A 179
Idler Wheel (407B3 Motor).....	G 400A 23
Idler Wheel (407B1 Motor).....	G 400A 57
Motor, 60 Cycle 115 Volt, A. C. ....	407B 3-2
Pickup Cable and Plug.....	A 1304

## MISCELLANEOUS

Compression Ring (For pointer).....	18A 5-2
Cord, Dial.....	50A 1-3
Grommet, Rubber (For gang cond.).....	12A 1-2
Knob.....	33A 19-2
Pilot Light #47.....	81A 1-8
Pilot Light Socket & Leads.....	82A 3-3
Pointer.....	25B 22
Scale, Dial.....	21B 30-2
Shaft, Pointer.....	28A 16
Shaft, Tuning.....	28A 10-1
Spring, Dial Drum Cord Tension.....	19B 1-5
Spring, Tuning Shaft Tension.....	19A 18

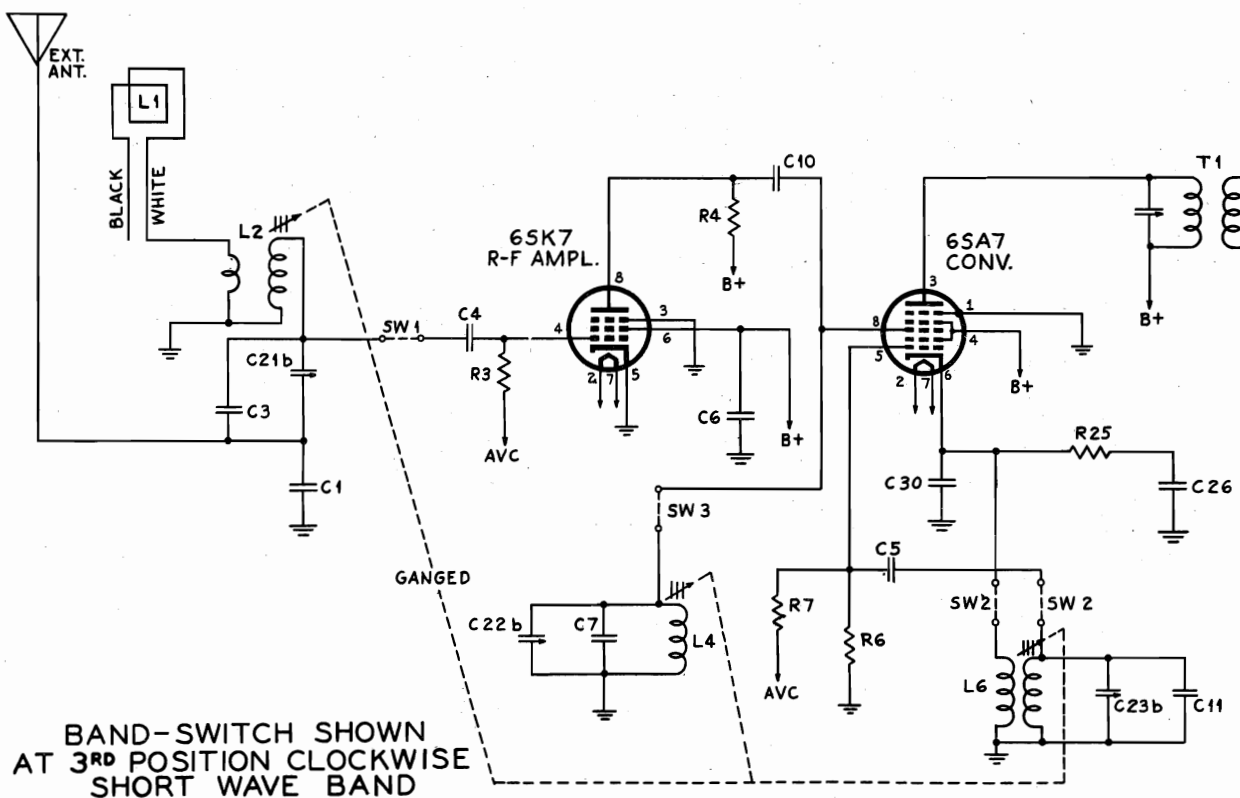
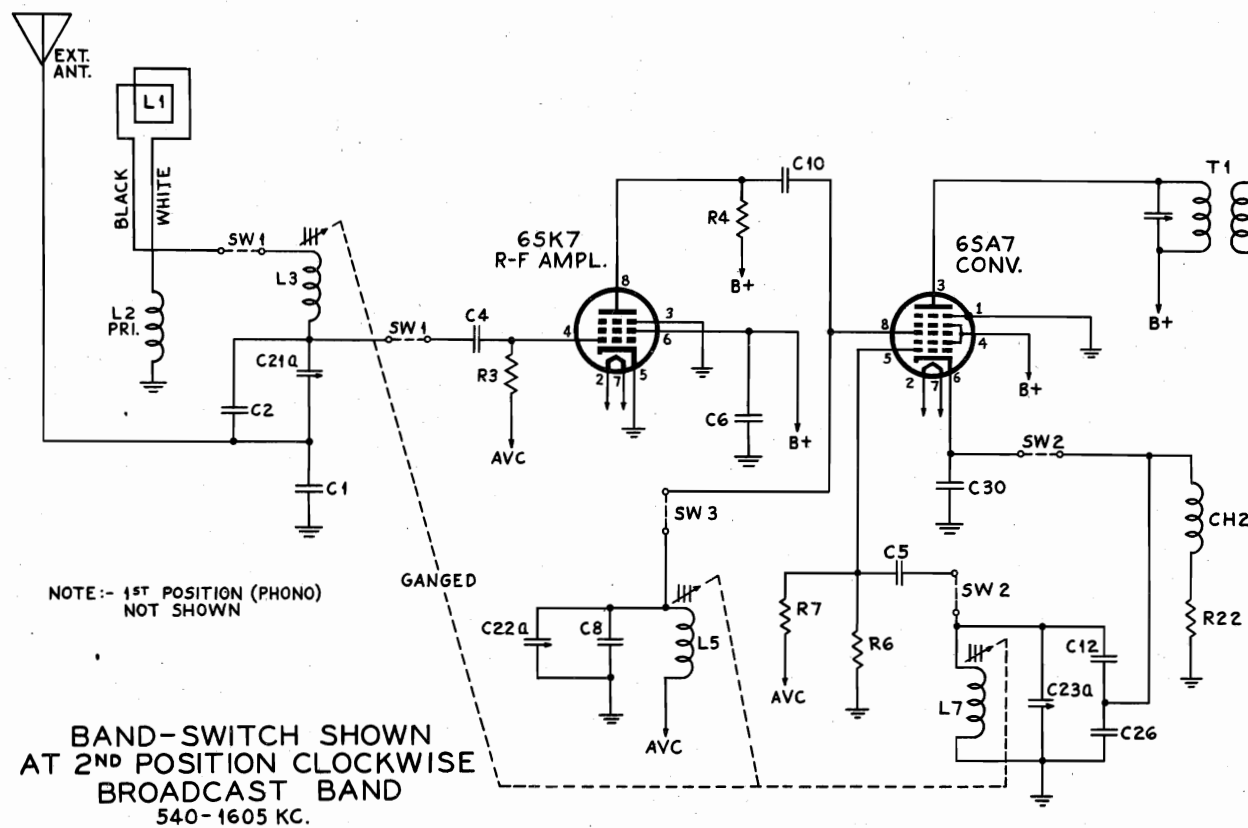
\* Supplied only if old cabinet cannot be repaired.  
When ordering, describe condition of old cabinet in detail.

## ADMIRAL CORPORATION

MODEL 7C63, Chassis  
7C1

MODEL 7C63,

ADMIRAL CORPORATION



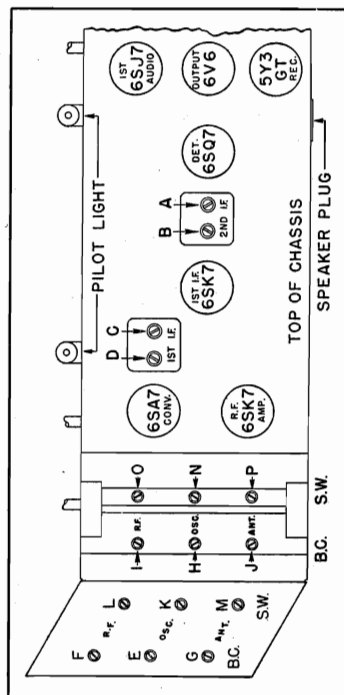
## ADMIRAL CORPORATION

## ALIGNMENT PROCEDURE

1. Loop must be connected during alignment. Check the set screws that hold the tuning drum to the shaft to see that they are tight and that the drum has not slipped. The correct position of the drum can be seen on the straining diagram.
2. In the closed position the stop on the rear of the dial drum must be against the stop position.
3. With the gang wide open, all slugs should be 1 1/4 inches out of their coil forms. If there is any serious deviation or if there has been any tampering, turn the adjusting screws until this distance is correct.
4. Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.
5. Turn receiver Volume Control full on.
6. Use lowest output setting of signal generator that gives a satisfactory reading on meter.
7. Proceed in sequence as outlined below.

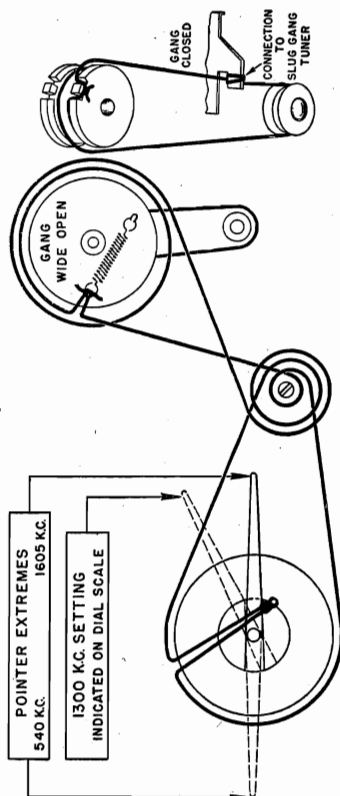
Step	Connect Signal Generator To	Dummy Antenna Between Radio and Signal Generator	Signal Generator Frequency	Tuning Gang Setting	Adj. Trimmers in Following Order to Max.
1	Set Band Change Switch to Broadcast Position.	6SA7 Grid (Pin No. 8)	455 K.C.	Set Pointer to Upper Limit	A, B, C, D
2	Before proceeding to step 3 check pointer travel and slug position as described below.				
3	Black Loop Lead	10 MMFD. If not available wrap several turns of the generator lead around the black loop lead.	1605 K.C.	Set Pointer to Upper Limit	E, F, G
4	Black Loop Lead		1300 K.C.	Set Pointer to 1300 K.C. on Dial Scale	H, I, J
5	Set Band Change Switch to Short Wave Position.				
6	White Loop Lead	400 Ohms	12.5 M.C.	Set Pointer to Upper Limit	K, L, M
7	White Loop Lead	400 Ohms	12.0 M.C.	Set Pointer to 12.0 M.C. on Dial Scale	N, O, P

## TUBE AND TRIMMER LAYOUTS



## ANTENNA CONNECTIONS

In replacing connections to antennas, it is necessary to see that the flat twin parallel conductor is not twisted. The rear parallel conductor should be connected to the rear terminal screw on each loop antenna. The front parallel conductor should be connected to the front terminal screw on each loop antenna.



## RECORD CHANGER SERVICE DATA

The element in the new Admiral pickup cartridge is made of a special rubber which acts as a high resistance electrical conductor. The resistance varies as the length of the rubber is changed. A needle is clamped to the center of the resistive rubber as shown at "P" (see schematic). A DC voltage is applied at AA'. The voltage drop from "B" to "C" varies as the resistance changes due to the "back and forth" movement of the needle. This varying voltage drop, which is in reality an alternating voltage of audio frequency, is applied through the coupling condenser to the grid of the audio amplifier tube. In case of distortion or low volume on phono operation only, check as follows:

1. Replace cartridge and check operation. If not satisfactory, proceed with tests.
2. With the volume control at maximum, touch the needle with the finger. If a loud hum is heard, then on the cartridge assembly as this will void the warranty.

## POINTING ADJUSTMENT

Turn the tuning control knob clockwise until tuning gang is wide open. The pointer should now be at 1605 Kc. (last dial dot). If it is not, grasp the pointer with your hand and move it to 1605 Kc. Then proceed with alignment.

## REPLACING TUNING SLUG

Set the gang to its wide open position, unsolder and remove the old slug. Set the slug adjusting screw about half way down. Place the new slug in such a position that 1 3/8 inches of its length is above the coil form. Solder it in this position making sure that the slug wire is straight. Re-align the set as shown in the chart.

MODEL 7C63  
MODEL 7C73

## ADMIRAL CORPORATION

## PARTS LIST - 7C63

## RESISTORS

SYMBOL	DESCRIPTION	PART NO.
R1.....	12,000 Ohms, 5 Watt.....	61A 1-1
R2.....	2.2 Megohms, Carbon, 1/2 Watt.....	60B 8-225
R3.....	470,000 Ohms, 1/2 Watt.....	60B 8-474
R4.....	10,000 Ohms, 2 Watt.....	60B 20-103
R6.....	22,000 Ohms, 1/2 Watt.....	60B 8-223
R7.....	10 Megohms, 1/2 Watt.....	60B 8-106
R8.....	1 Megohm, 1/2 Watt.....	60B 8-105
R9.....	2 Megohms Tone Control.....	75B 1-8
R10.....	22,000 Ohms, 1/2 Watt.....	60B 8-273
R11.....	1 Megohm Volume Control and Switch SW4	75B 2-2
R12.....	470,000 Ohms, 1/2 Watt.....	60B 8-474
R13.....	470,000 Ohms, 1/2 Watt.....	60B 8-474
R14.....	3.3 Megohms, 1/2 Watt.....	60B 8-335
R15.....	390 Ohms, 1 Watt.....	60B 14-396
R16.....	10 Megohms, 1/2 Watt.....	60B 8-106
R17.....	100 Ohms, 1/2 Watt.....	60B 8-101
R18.....	220,000 Ohms, 1/2 Watt.....	60B 8-224
R19.....	100,000 Ohms, 1/2 Watt.....	60B 8-104
R20.....	100,000 Ohms, 1/2 Watt.....	60B 8-104
R22.....	100 Ohms, 1/2 Watt.....	60B 8-101
R23.....	100,000 Ohms, 1 Watt.....	60B 14-104
R24.....	47,000 Ohms, 1/2 Watt.....	60B 8-473
R25.....	470 Ohms, 1/2 Watt.....	60B 8-471

## CONDENSERS

C1.....	1000 mmfd., Mica.....	65B 7-33
C2.....	35 mmfd., Silver Mica 3%.....	65B 1-31
C3.....	25 mmfd., Silver Mica 3%.....	65B 1-28
C4.....	100 mmfd., Mica.....	65B 7-17
C5.....	50 mmfd., Ceramic.....	65B 6-4
C6.....	.05 mfd., 400 V.D.C., Paper.....	64B 1-22
C7.....	65 mmfd., Silver Mica 3%.....	65B 1-27
C8.....	420 mmfd., Silver Mica.....	65B 1-13
C9.....	1000 mmfd., Mica.....	65B 7-33
C10.....	200 mmfd., Mica 2%.....	65B 7-5
C11.....	65 mmfd., Silver Mica 3%.....	65B 1-27
C12.....	200 mmfd., Silver Mica, 2%.....	65B 1-14
C13.....	.1 mfd., 400 V.D.C., Paper.....	64B 1-20
C14.....	250 mmfd., Mica.....	65B 7-22
C15.....	1000 mmfd., Mica.....	65B 7-33
C16.....	.02 mfd., 400 V.D.C., Paper.....	64B 1-24

SYMBOL	DESCRIPTION	PART NO.
C17.....	.01 mfd., 400 V.D.C., Paper.....	64B 1-25
C18.....	.005 mfd., 600 V.D.C., Paper.....	64B 1-12
C19.....	.01 mfd., 600 V.D.C., Paper.....	64B 1-10
C20a.....	30 mfd., 350 V.D.C., Elec.....	67C 6-25
C20b.....	30 mfd., 350 V.D.C., Elec.....	
C20c.....	20 mfd., 25 V.D.C., Elec.....	66A 1-5
C21a.....	3-40 mmfd., Dual Trimmer.....	
C21b.....	3-40 mmfd., Dual Trimmer.....	66B 8-1
C22a.....	3-40 mmfd., Trimmer.....	
C22b.....	3-40 mmfd., Trimmer.....	66B 8-1
C23a.....	3-40 mmfd., Trimmer.....	66B 8-1
C23b.....	3-40 mmfd., Trimmer.....	66B 8-1
C24.....	100 mmfd., Mica.....	65B 7-17
C26.....	1,200 mmfd., Mica.....	65B 5-34
C27.....	.05 mfd., 200 V.D.C., Paper.....	64B 1-32
C28.....	.25 mfd., 200 V.D.C., Paper.....	64B 1-28
C29.....	.1 mfd., 400 V.D.C., Paper.....	64B 1-20
C30.....	.20 mmfd., Mica.....	65B 7-5
C31.....	500 mmfd. ± 20%, Ceramic.....	65B 6-6

## CHOKES, COILS, TRANSFORMERS, Etc.

LI.....	Loop Antenna, (Record Support Side).....	AD120
LI.....	Loop Antenna, (Pickup Arm Side).....	AD117
L2.....	Coil, S.W. Antenna.....	AD116-1
L3.....	Coil, B. C. Antenna.....	AC105-2
L4.....	Coil, S.W. R.F.....	AD116-2
L5.....	Coil, B. C. R.F.....	AB100-1
L6.....	Coil, S.W. Oscillator.....	AD116-3
L7.....	Coil, B.C. Oscillator.....	AC101-1
CH1.....	Choke, Filter.....	74A 3
CH2.....	Coil, Oscillator Choke.....	AB103-1
T1.....	Transformer, 1st I.F.....	72B 7
T2.....	Transformer, 2nd I.F.....	72B 8
T3.....	Transformer, Power.....	80B 1
T4.....	Transformer, Output.....	98A 20
	Speaker 10" and Transformer.....	78B 6

## When Ordering Slugs Specify Color Code

Slug, Tuning (B.C.—Osc. & R.F.).....	71B 1-3
Slug, Tuning (S.W.—Ant. R.F. & Osc.).....	71B 1-9
Slug, Tuning (B.C. Ant.).....	71B 1-13

## SWITCHES, PLUGS AND SOCKETS

SYMBOL	DESCRIPTION	PART NO.
P1.....	Plug, Pickup.....	88A 5-7
P2.....	Plug, Speaker.....	88A 4
S1.....	Phono Socket, Shielded.....	88A 5-9
S2.....	Socket, Speaker.....	87A 6-1
S3.....	Phono-Motor Socket & Leads.....	89A 6-8
SW1.....	Switch, Antenna.....	76B 1-3
SW2.....	Switch, Oscillator.....	76B 1-2
SW3.....	Switch, R.F.....	76B 1-1
SW4.....	Part of Volume Control R11	

## PHONOGRAPH PARTS

Note: See record changer manual for complete parts list.

DESCRIPTION	PART NO.
Cartridge and Needle, Pickup.....	A1372
Centerpost.....	G400B 137-1
Drive Disc Assembly.....	G400A 179
Idler Wheel (407B 3 Motor).....	G400A 23
Idler Wheel (407B 1 Motor).....	G400A 57
Motor.....	407B 3-2
Pickup Cable and Plug.....	A1305
Tilt Out Hinge Assembly (Record Support Side).....	AC118-1
Tilt Out Hinge Assembly (Pickup Arm Side).....	AC118-2
Tilt Out Spring.....	190A 15-1
Tilt Out Tie Bar.....	15B 126

## MISCELLANEOUS

*Cabinet (7C63), Wood.....	35D 51
Compression Ring-Pointer.....	18A 5-2
Cord, Dial.....	50A 1-3
Dial Background Assembly.....	A1357
Dial Window—Plastic.....	24B 1
Drum and Hub Assembly, Pointer.....	A1355
Drum and Hub Assembly, Tuner.....	A1356
Escutcheon—Plastic Dial.....	23C 22-1
Handle, Door.....	37B 10-1
Knob.....	33A 19-2
Pilot Light No. 47.....	31A 1-8
Pilot Light Socket.....	82A 3-8
Pointer, Dial.....	25B 22
Screw, Escutcheon Mounting.....	1A 15-6-58
Spring, Dial Cord Tension.....	19B 1-10
Spring, Tension.....	19B 1-11
Transmission Line (43").....	95A 16-1
Transmission Line (54").....	95A 16-2

\*Supplied only if old cabinet cannot be repaired. When ordering, describe condition of old cabinet in detail.

## PARTS LIST (CONTD.) - 7C73-9A1

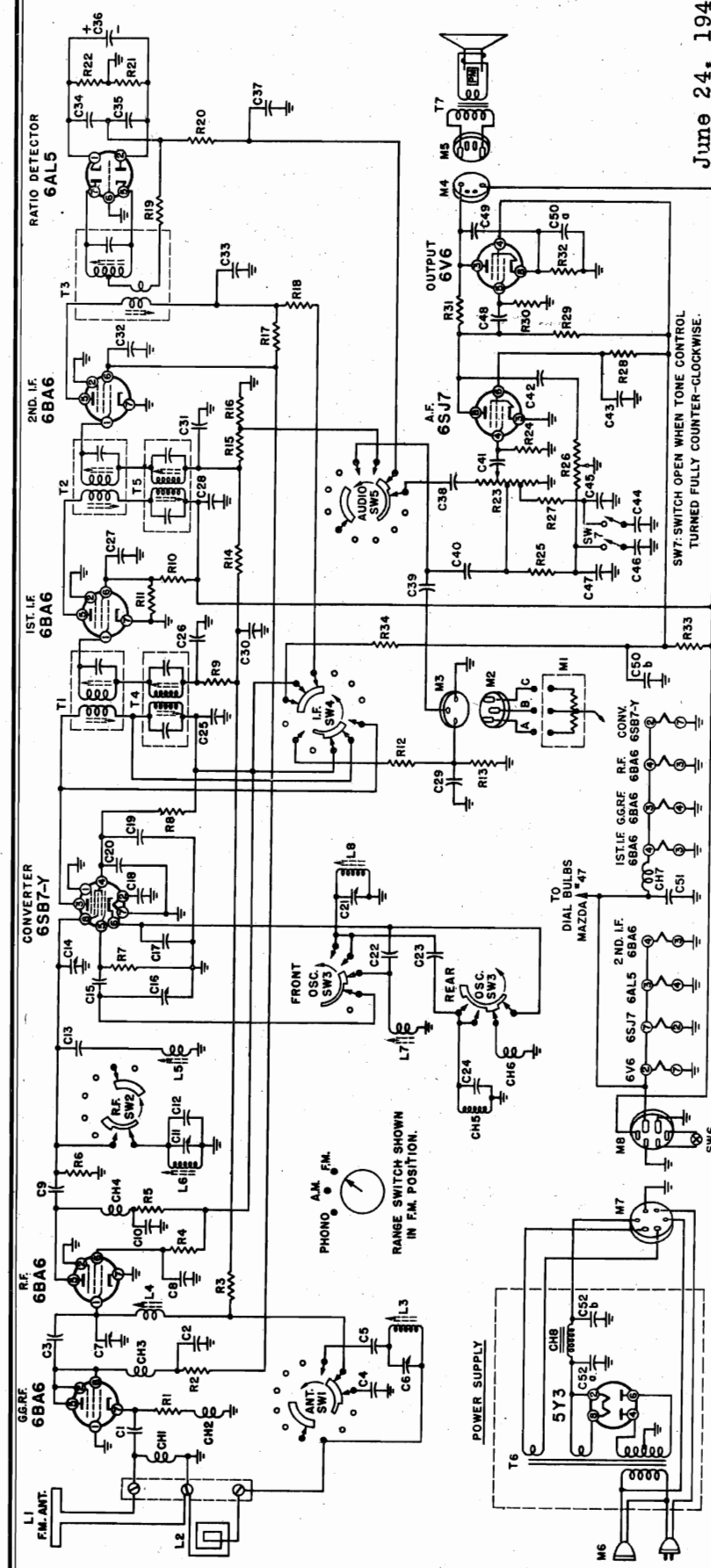
Symbol	COILS, TRANSFORMERS, ETC.	Part No.	Description	TUNER PARTS	Part No.	Description	PHONOGRAPH PARTS	Part No.
CH1.....	Choke, F.M. Antenna.....	AB 103-33	Tuning Shaft.....	26A 17		Tilt Out Spring (2-1/4" long).....	19A 15-1	
CH2.....	Choke, Grounded Grid Cathode.....	AB 103-35	Slug Travel Bracket, Bushing and Roller Assy. (front).....	A1396		Shoulder Eye Bolt (for Tilt Out Spring).....	1A87-1	
CH3.....	Choke, Grounded Grid Plate.....	AB 103-36	Slug Travel Bracket, Bushing and Roller Assy. (rear).....	A1398		Tilt Out Tie Bar.....	15B 126	
CH4.....	Choke, R.F. Plate.....	AB 103-36	Brass Guide Rod (Tuner).....	28A 7-2				
CH5.....	Choke, A.M. Oscillator Cathode.....	AB 103-1	Cam and Hub for Tuner (front).....	A1400				
CH6.....	Choke, F.M. Oscillator Cathode.....	AB 103-34	Cam and Hub for Tuner (rear).....	A1467				
CH7.....	Choke, R.F. Filament.....		Spring, Bearing Takeup.....	19A 16				
	of approximately 8 turns of #20 solid hookup wire wound around condenser C51		Cable, Drive (for Cam and Hub).....	95A 16				
CH8.....	Choke, Filter.....	74A 9	Spring, Coil (for Cam and Hub).....	19B 1-14				
L1.....	Antenna, F.M. Folded Dipole.....	AB 128	Bakelite Plate for slug mounting (1-15/16" x 2-5/8").....	32A 36				
L2.....	Antenna, A.M. (13').....	96A 18	Drum and Hub on Tuner Shaft (includes 1" drum and 3-11/32" drum).....	A1401				
L3.....	Coil, A.M. Antenna (less slug).....	AA 108-2						
L4.....	Coil, F.M.-R.F. (less slug).....	AA 122	Description	DIAL PARTS	Part No.			
L5.....	Coil, F.M. Converter (less slug).....	AA 122	Pointer Shaft.....	26A 19				
L6.....	Coil, A.M. Converter (less slug).....	AB 100-1	Drum and Hub Assembly (Pointer Shaft).....	A1398				
L7.....	Coil, F.M. Oscillator (less slug).....	AA 125	Dial Cord (100 inches).....	50A 1-3				
L8.....	Coil, A.M. Oscillator (less slug).....	AC 101-2	Spring, Dial Cord (2 used).....	19B 1-5				
SW1.....	Switch, Antenna (Second from chassis front).....	76C 11-5	Dial Scale & Indicator Assembly.....	A1404				
SW2.....	Switch, R.F. (Fourth from chassis front).....	76C 11-5	Indicator Link.....	15A 176				
SW3.....	Switch, Oscillator (Third from chassis front).....	76C 11-4	Indicator Arm & Hub (on Band Switch Shaft).....	A1406				
SW4.....	Switch, I.F. (Farthest from chassis front).....	76C 11-6	Dial Bulb #47.....	81A 1-8				
SW5.....	Switch, Audio (Closest to chassis front).....	76C 11-2	Socket, Dial Bulb.....	82A 3-9				
SW6.....	Switch (ON-OFF).....	Part of R-23	Dial Pointer.....	A1477				
SW7.....	Switch (Tone Control).....	Part of R-26	Dial Escutcheon (less rectangular insert).....	23E 20				
	Band-Switch Shaft Assembly.....	76C 11-1	Dial Escutcheon insert (Approx. 2-1/2" x 3-5/8").....	23C 25				
	Set Screw, #6-32 x 1/4.....	1A 5-64	Description	PHONOGRAPH PARTS	Part No.			
	Spacers for Shaft Assembly.....	28A 4-4	M1.....	Cartridge and Needle, Pickup.....	A1372			
T1.....	Transformer, 1st I.F. (F.M.).....	72B 24	M2.....	Pickup Cable & Plug Assembly.....	A1415			
T2.....	Transformer, 2nd I.F. (F.M.).....	72B 25	Centerpost.....	G400B 137-1				
T3.....	Transformer, Ratio Detector.....	72B 27	Drive Disc Assembly (under turntable).....	G400A 179				
T4.....	Transformer, 1st I.F. (A.M.).....	72B 25	Idler Wheel (407B 3 Motor).....	G400A 23				
T5.....	Transformer, 2nd I.F. (A.M.).....	72B 25	Idler Wheel (407B 1 Motor).....	G400A 57				
T6.....	Transformer, Power.....	80B 2	Motor.....	407B 3-2				
T7.....	Transformer, Output.....	98A 22	Pickup Cable and Plug.....	A1305				
	Speaker (12" F.M.) and Output Transformer.....	78B 21	Tilt Out Hinge Assembly (Record Support Side).....	AC118-1				
	When Ordering Slugs Specify Color Code		Tilt Out Hinge Assembly (Pickup Arm Side).....	AC118-2				
	Slug, Iron Core (F.M.—Osc., Conv., & R.F.).....	71B 1-19						
	Slug, Iron Core (A.M.—Osc., Conv.).....	71B 1-20						
	Slug, Iron Core (A.M.—Antenna).....	71B 1-21						



## ADMIRAL CORPORATION

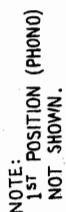
MODEL 7C73, Chassis  
9A1, Preliminary

June 24, 1947



RESISTORS		RESISTORS		CONDENSERS		CONDENSERS	
Symbol	Part No.	Symbol	Part No.	Symbol	Part No.	Symbol	Part No.
R1.....	100 Ohms, 1/2 Watt.....	R24....	4.7 Megohms, 1/2 Watt.....	C8....	200 mfd., Mica.....	C30....	.05 mfd., 400 Volts, Paper.....
R2.....	330 Ohms, 1/2 Watt.....	R25....	47,000 Ohms, 1/2 Watt.....	C9....	35 mfd., Ceramio.....	C31....	200 mfd., Mica.....
R3.....	39,000 Ohms, 1/2 Watt.....	R26....	2 Megohms Tone control & D.P.S.T. switch SW7.....	C10....	40 mfd., Ceramio.....	C32....	.05 mfd., 200 Volts, Paper.....
R4.....	47,000 Ohms, 1 Watt.....	R27....	10,000 Ohms, 1/2 Watt.....	C11....	12-170 mfd., Trimmer.....	C33....	.05 mfd., 200 Volts, Paper.....
R5.....	4,700 Ohms, 1 Watt.....	R28....	10,000 Ohms, 1/2 Watt.....	C12....	300 mfd., Silver Mica.....	C34....	100 mfd., Ceramio.....
R6.....	33,000 Ohms, 1/2 Watt.....	R29....	470,000 Ohms, 1/2 Watt.....	C13....	25mfd., Ceramio.....	C35....	100 mfd., Ceramio.....
R7.....	47,000 Ohms, 1/2 Watt.....	R30....	100,000 Ohms, 1/2 Watt.....	C14....	3-12 mfd., Trimmer.....	C36....	4 mfd., 150 Volts, Electrolytic.....
R8.....	18,000 Ohms, 1/2 Watt.....	R31....	470,000 Ohms, 1/2 Watt.....	C15....	50 mfd., Ceramio.....	C37....	.002 mfd., 600 Volts, Paper.....
R9.....	120,000 Ohms, 1/2 Watt.....	R32....	2.2 Megohms, 1/2 Watt.....	C16....	3-12 mfd., Trimmer.....	C38....	.002 mfd., 600 Volts, Paper.....
R10....	19,000 Ohms, 1 Watt.....	R33....	390 Ohms, 1 Watt.....	C17....	200 mfd., 5% Ceramio.....	C39....	1000 mfd., Mica.....
R11....	22,000 Ohms, 1 Watt.....	R34....	100 Ohms, 1/2 Watt.....	C18....	.005 mfd., 600 Volts, Paper.....	C40....	500 mfd., Mica.....
R12....	120,000 Ohms, 1/2 Watt.....			C19....	100 mfd., Ceramio.....	C41....	.005 mfd., 600 Volts, Paper.....
R13....	100,000 Ohms, 1/2 Watt.....			C20....	5000 mfd., Ceramio.....	C42....	.005 mfd., 600 Volts, Paper.....
R14....	470,000 Ohms, 1/2 Watt.....			C21....	3-40 mfd., Trimmer.....	C43....	.05 mfd., 200 Volts, Paper.....
R15....	220,000 Ohms, 1/2 Watt.....			C22....	27 mfd., Trimmer.....	C44....	.05 mfd., 400 Volts, Paper.....
R16....	82,000 Ohms, 1/2 Watt.....			C23....	180 mfd., 5% Ceramio.....	C45....	.01 mfd., 400 Volts, Paper.....
R17....	8,200 Ohms, 1 Watt.....			C24....	2000 mfd., Mica.....	C46....	.005 mfd., 600 Volts, Paper.....
R18....	2,200 Ohms, 1 Watt.....			C25....	.01 mfd., 400 Volts, Paper.....	C47....	.005 mfd., 600 Volts, Paper.....
R19....	390 Ohms, 1/2 Watt.....			C26....	.01 mfd., 400 Volts, Paper.....	C48....	.01 mfd., 400 Volts, Paper.....
R20....	27,000 Ohms, 1/2 Watt.....			C27....	.01 mfd., 400 Volts, Paper.....	C49....	.002 mfd., 600 Volts, Paper.....
R21....	6,800 Ohms, 1/2 Watt.....			C28....	.10 mfd., 400 Volts, Paper.....	C50....	2mfd., 250 Volts, Electrolytic.....
R22....	6,800 Ohms, 1/2 Watt.....			C29....	.2 mfd., 400 Volts, Paper.....	C51....	.01 mfd., 400 Volts, Paper.....
R23....	1 Megohm Volume Control & on-off switch SW6 Tapped at 300,000 and 600,000 Ohms.....			C30....	30 mfd., 350 Volts, Electrolytic.....	C52a...	.30 mfd., 350 Volts, Electrolytic.....
						C52b...	.30 mfd., 350 Volts, Electrolytic.....

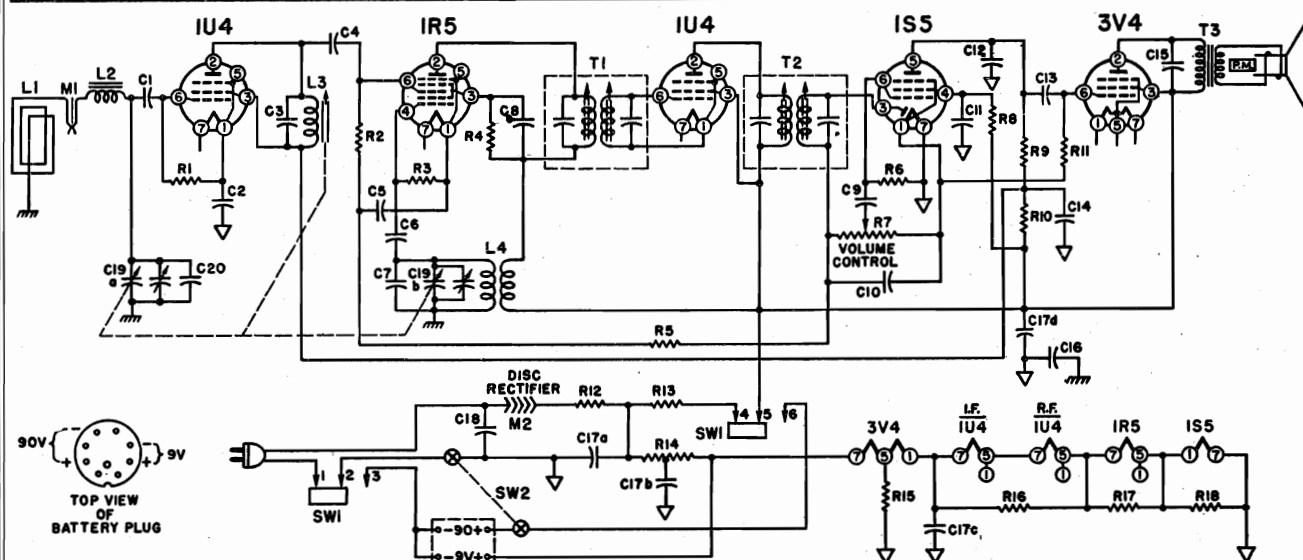
# ADMIRAL CORPORATION



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



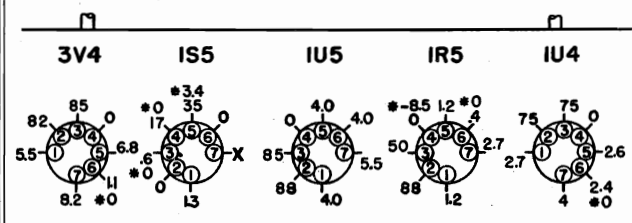
## ADMIRAL CORPORATION

MODELS 7P32, 7P33, 7P34,  
Chassis 5H1

NOTES:  
I.F. = 455 K.C.  
COMMON (LINE GROUND)  $\nabla$   
CHASSIS GROUND  $\text{---}$

5-47

## VOLTAGE CHART



\*Indicates reading taken with 1000 ohm-per-volt meter.

## VOLTAGE DATA

- All readings made between Tube Socket Terminals and Terminal No. 7 on the IS5 (Point "X" on Voltage Chart).
- A.C. Voltages measured on a 117 Volt A.C. line.
- Dial turned to low frequency end, no signal.
- All Voltages measured with a VoltOhmyst.
- A second voltage reading (marked with an asterisk \*) indicates readings made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

## REPLACEMENT PARTS

RESISTORS			CONDENSERS			MISCELLANEOUS	
Symbol	Description	Part No.	Symbol	Description	Part No.	Description	Part No.
R1.....	2.2 Megohms, 1/4 Watt.....	60B 3-225	C12.....	100 Mmfd., Mica.....	65B 7-17	M1.....	Jack for External Loop Antenna
R2.....	1 Megohm, 1/4 Watt.....	60B 3-105	C13.....	.01 Mfd., 400 Volts, Paper.....	64B 1-25	M2.....	Rectifier, Selenium.....
R3.....	100,000 Ohms, 1/4 Watt.....	60B 3-104	C14.....	4 Mfd., 150 Volts, Electrolytic.....	67A 4-2	Buttons, Snap (for dial scale).....	13A 1-1-2
R4.....	18,000 Ohms, 1/3 Watt.....	60B 2-183	C15.....	.002 Mfd., 600 Volts, Paper.....	64A 2-2	Cabinet (Black 7P32).....	35D 58-1
R5.....	3.3 Megohms, 1/4 Watt.....	60B 2-335	C16.....	.18 Mfd., 200 Volts, Paper.....	64A 2-2	Cabinet (Black 7P33).....	35D 50-1
R6.....	10 Megohms, 1/4 Watt.....	60B 3-106	C17a.....	50 Mfd., 150 Volts, Elect.....		Cabinet (Brown 7P34).....	35D 50-2
R7.....	1 Megohm Volume Control and Switch SW2 (DPST).....	75B 1-18	C17b.....	20 Mfd., 150 Volts, Elect.....	67C 7-5	Cord, Dial.....	50A 1-3
R8.....	4.7 Megohms, 1/4 Watt.....	60B 2-475	C17c.....	200 Mfd., 25 Volts, Elect.....		Dial Window, Plastic (7P33, 7P34).....	24B 2
R9.....	470,000 Ohms, 1/4 Watt.....	60B 3-474	C17d.....	20 Mfd., 150 Volts, Elect.....		Dial Window and Speaker Grill (7P32).....	23C 26
R10.....	10,000 Ohms, 1/4 Watt.....	60B 3-103	C18.....	.05 Mfd., 400 Volts, Paper.....	64B 1-22	Drum & Cam Assembly.....	A 1313
R11.....	2.2 Megohms, 1/4 Watt.....	60B 3-225	C19a.....	0 to 420 Mmfd., Gang.....	68B 6	Escutcheon, Plastic (7P33, 7P34).....	23D 24
R12.....	47 Ohms, 1 Watt.....	60B 14-470	C19b.....	0 to 162 Mmfd., Gang.....	68B 6	Grommet (for mounting R.F. coil).....	12A 1-12
R13.....	2700 Ohms, 1 Watt.....	60B 14-272	C20.....	10 Mmfd., Ceramic.....	65B 6-24	Handle, Plastic (7P32, 7P33).....	37C 11-1
R14.....	2600 Ohms, 5 Watt.....	61A 6-1				Knob (7P32).....	33A 18-3
R15.....	1500 Ohms, 1/4 Watt.....	60B 2-152				Knob (7P33, 7P34).....	33A 18-1
R16.....	820 Ohms, 1/4 Watt.....	60B 2-821				Latch, Cover (7P33, 7P34).....	37B 2-1
R17.....	220 Ohms, 1/4 Watt.....	60B 2-221				Mounting Clip (for I.F. transformer).....	72B 28-10
R18.....	150 Ohms, 1/4 Watt.....	60B 2-151				Mounting Plate (for R.F. coil).....	32A 40
CONDENSERS			COILS, TRANSFORMERS, SWITCHES, ETC.			Pointer, Dial.....	25A 24
C1.....	250 Mmfd., Mica.....	65B 7-22	L1.....	Antenna, Loop (Part of cabinet —not supplied separately)		Scale, Dial (metal).....	21B 44
C2.....	.25 Mfd., 200 Volts, Paper.....	64B 1-28	L2.....	Coil, Loading.....	AA 121	Spring.....	19B 1-13
C3.....	420 Mmfd., Mica.....	65B 1-13	L3.....	Coil, R. F.....	AB 100-7	Spring, Tension (Dial Cord).....	19B 1-5
C4.....	250 Mmfd., Mica.....	65B 7-22	L4.....	Coil, Oscillator.....	69A 15	Tube Shield.....	87A 7-7
C5.....	.01 Mfd., 400 Volts, Paper.....	64B 1-25	P1.....	Plug, Battery (9 prong).....	88A 3-3	Tube Socket.....	87A 3-2
C6.....	100 Mmfd., Mica.....	65B 7-17	SW1.....	Switch, Power Change.....	77A 2-4	Tuner Arm (for R.F. slug tuner).....	A1314
C7.....	.15 Mmfd., Ceramic.....	65B 6-18	SW2.....	Switch, On-Off (Part of volume control R7).....		Washer, Felt (3/4") (for knobs).....	5A 4-3
C8.....	.01 Mfd., 400 Volts, Paper.....	64B 1-25	T1.....	Transformer, 1st I. F.....	72B 28-1	Washer, Spring (for tuner arm).....	4A 6-3-0
C9.....	.01 Mfd., 400 Volts, Paper.....	64B 1-25	T2.....	Transformer, 2nd I.F.....	72B 28-1		
C10.....	250 Mmfd., Mica.....	65B 7-22	T3.....	Transformer, Output.....	98A 21		
C11.....	.01 Mfd., 400 Volts, Paper.....	64B 1-25		Slug, Tuning (R.F.).....	71B 1-3		
				Adjustment Screw for Slug.....	27A 4		
				Speaker 6" P.M. & Output Transformer.....	78B 17-3		

**MODELS 7P32, 7P33, 7P34**  
**MODELS 7T06, 7T12**
**ADMIRAL CORPORATION**

 MODELS 7P32, 7P33, 7P34  
 CHASSIS 5H1

**ALIGNMENT PROCEDURE**

1. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
2. Make alignment using a battery whenever possible.
3. Connect a fresh battery to the set.

**IMPORTANT:** Check dial drum position on shaft. Tuner arm should just complete downward travel when gang is fully meshed. At this point, tuner arm should be on short flat part of cam. Check pointer. It should be at last dial scale mark just below 550 K.C. when gang is fully meshed. If not, move pointer on dial cord

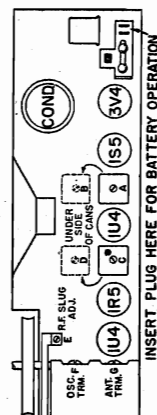
Step	Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Receiver Gang Setting	Trimmer Designation and Description	Type of Adjustment
(1)	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid of 1R5 (Pin 6)	455 K.C.	Any point where it does not affect signal	2nd I.F. (A), (B), 1st I.F. (C), (D).	Maximum Deflection Then repeat
(2)	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Stator lug of rear variable -condenser section	1620 K.C.	Tuning Gang Wide Open	Oscillator Trimmer (F)	Maximum Deflection
(3)	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Stator lug of condenser section	1400 K.C.	Tune in Generator Signal	R.F. Slug (E)	Maximum Deflection

Replace Set in Cabinet

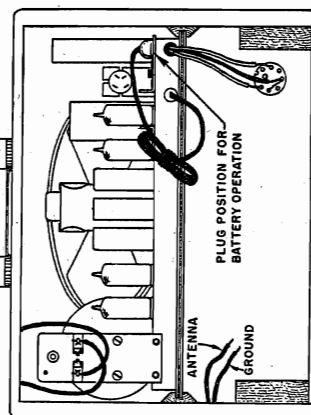
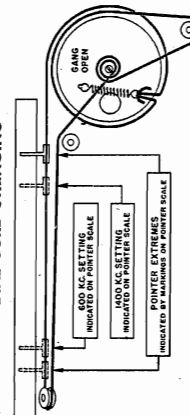
Step	Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Receiver Gang Setting	Trimmer Designation and Description	Type of Adjustment
(4)	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Stator lug of condenser section	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (G)	Maximum Deflection

**REPLACING R.F. TUNING SLUG**

If the R.F. Tuning Slug has to be changed use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to realign the set as shown in the chart.

**TUBE AND TRIMMER LAYOUT**


**INTERNAL ANTENNA CONNECTIONS**  
 Note: Antenna connections cross over as shown above for 7P32. For 7P33, 7P34 antenna connections are made to the clip nearest the wire.

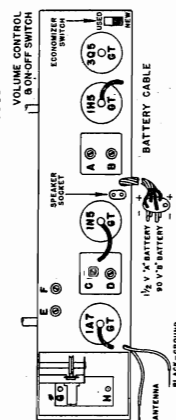

**DIAL CORD STRINGING**

 MODELS 7T06, 7T12  
 CHASSIS 4B1

**ALIGNMENT PROCEDURE**

1. **IMPORTANT** — Check to see that dial pointer reaches each end of dial scale when Station Selector Control is turned from one end to the other.
2. Volume control—Maximum for all adjustments.
3. Connect radio chassis to ground post of signal generator with a short heavy lead.
4. Connect output meter across voice coil of speaker.
5. Connect dummy Antenna value in series with generator output lead, when needed (see below).
6. Allow chassis and signal generator to "heat up" for several minutes.
7. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.

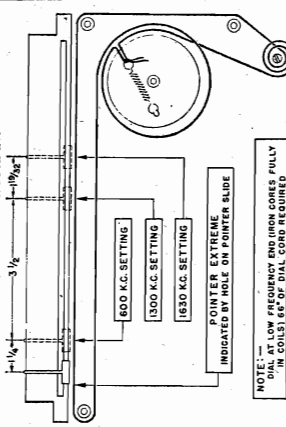
Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Receiver Dial Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Type of Adjustment
I.F.	455 K.C.	.1 mfd.	Grid of 1A7 (Cap)	High Frequency end of dial	A-B—2nd I.F.	Output I.F.	Adjust to maximum output
I.F.	455 K.C.	.1 mfd.	Grid of 1A7 (Cap)	High Frequency end of dial	C-D—1st I.F.	Input I.F.	Adjust to maximum output
Broad- cast	1630 K.C.	.00020 mfd. Mica	Antenna Lead	High Frequency end of dial	E—(See note below) F—(See note below)	Oscillator Antenna	Adjust to maximum output
Broad- cast	1300 K.C.	.00020 mfd. Mica	Antenna Lead	1300 K.C.	G H	Oscillator Antenna	Adjust to maximum output

NOTE: Before adjusting trimmers "E" and "F," make sure that each iron core is  $1\frac{1}{4}$ " or more outside of its coil form. If necessary, turn adjustments "G" and "H" to accomplish this.

**TUBE AND TRIMMER LOCATION**

**ECONOMIZER SWITCH**

The battery economizer switch is located on the top of the chassis, right side.

Always have this Economizer Switch in the "NEW" battery position when first placing radio in operation or when installing a new battery.

**STRINGING DIAGRAM**


NOTE: —  
 DIAL AT LOW FREQUENCY END (IRON CORES FULLY  
 IN COILS) 60 OF DIAL CORRESPOND

**CIRCUIT**

Battery-operated 4 Tube Superhetrodyne with Single Tuning Range: 535 KC. to 1630 KC. Covers standard broadcast band, using antenna and ground. Permeability tuning on Antenna and Oscillator circuits. Intermediate Frequency is 455 KC.

**POWER SUPPLY**

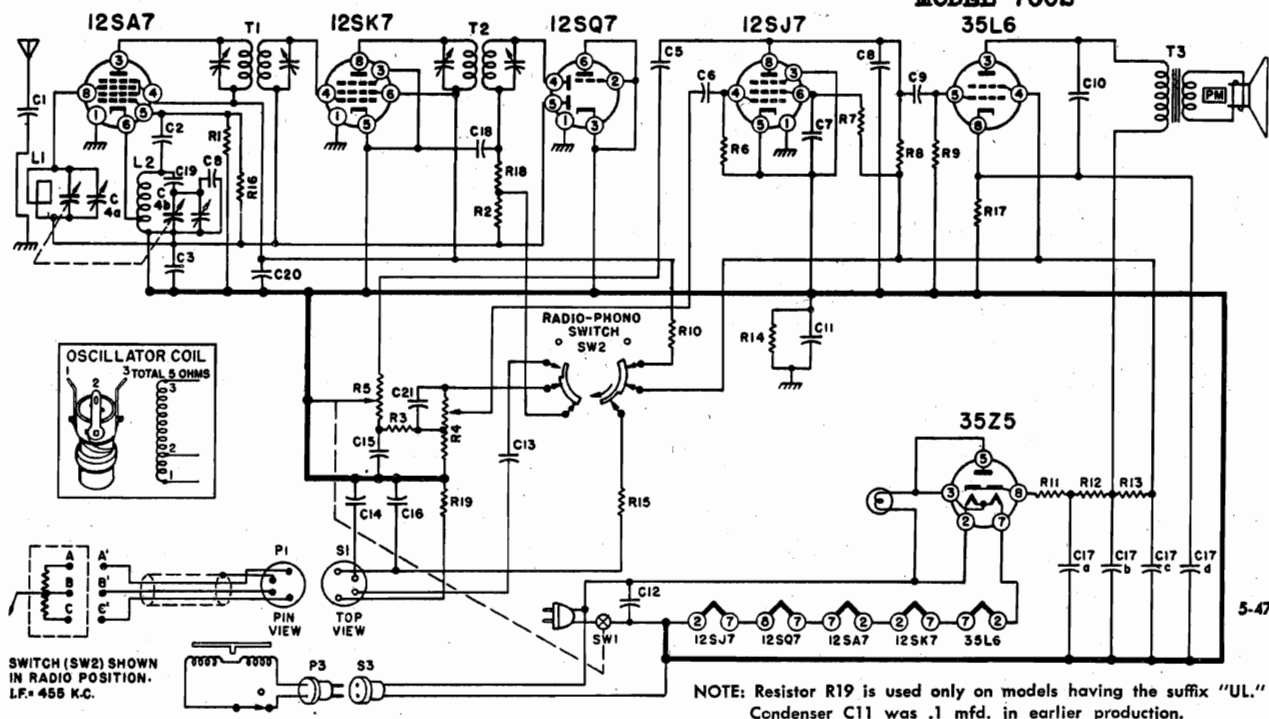
Single unit "AB" battery pack: 90 volt "B",  $1\frac{1}{2}$  volt "A" Plug-in connection. Use Ensign AB48, Burgess 17G-D60, Eveready 748, General 60DL-11L, Ray-O-Vac AB-82, Bond 0528 Battery or equivalent.

## ADMIRAL CORPORATION

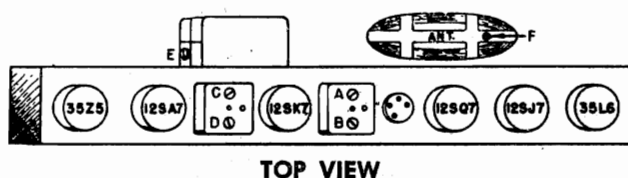
MODELS 7RT41, 7RT42, 7RT43

Chassis 6L1

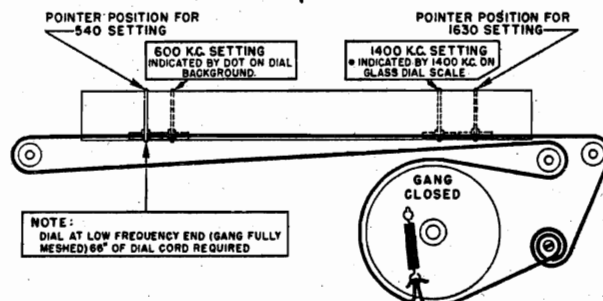
MODEL 7C62



## TUBE &amp; TRIMMER LOCATION



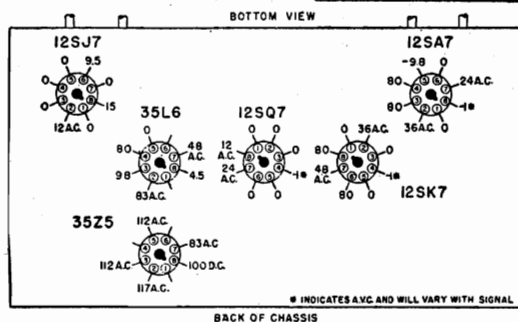
## DIAL CORD STRINGING &amp; POINTER SETTING



## VOLTAGE DATA

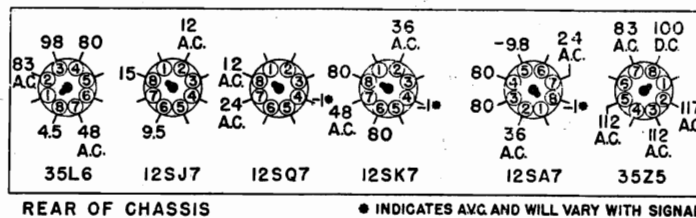
- All readings made between Tube Socket Terminals and B minus.
- Measured on a 117 Volt A.C. line.
- Volume control full on.
- Dial tuned to low frequency end, no signal.
- Voltage obtained on Vacuum Tube Volt-meter.

## MODEL 7C62



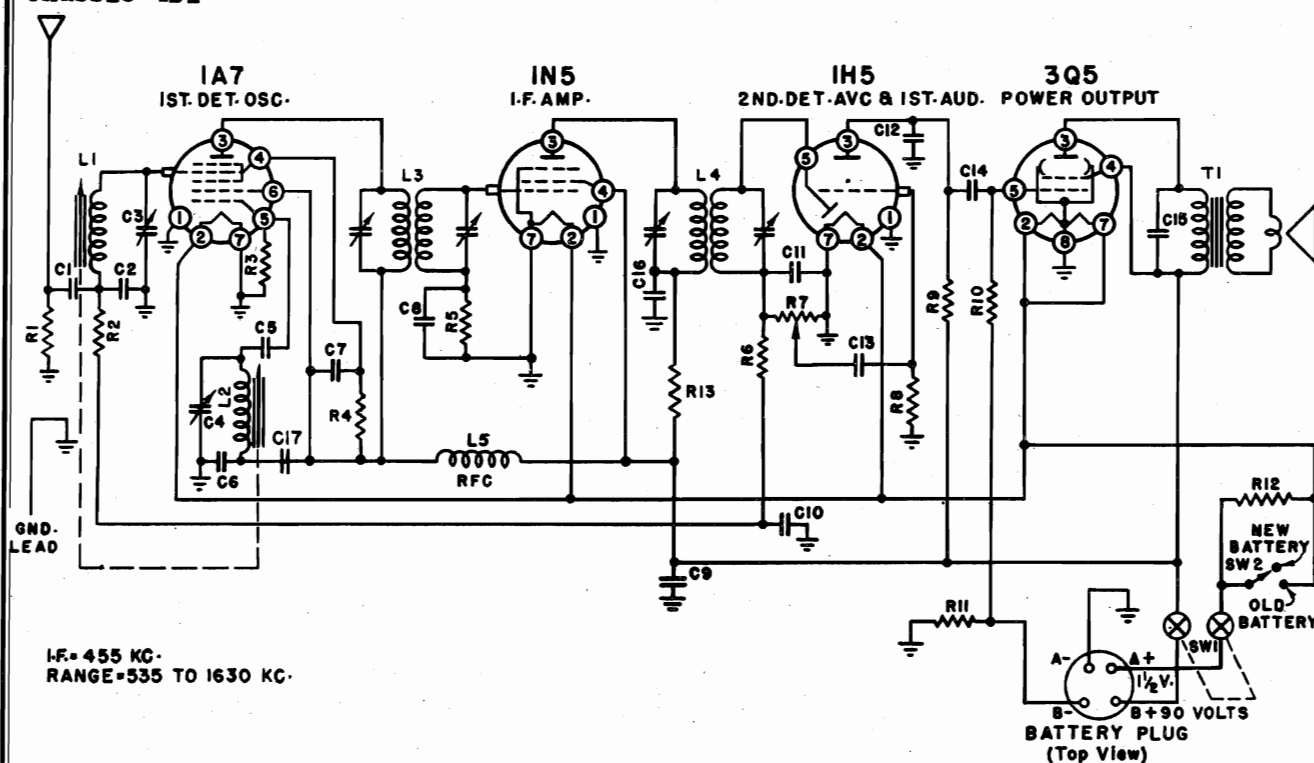
## MODEL 7RT41, 7RT42, 7RT43

## VOLTAGE CHART



MODELS 7T06, 7T12,  
Chassis 4B1

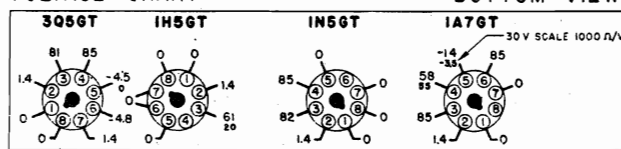
## ADMIRAL CORPORATION



## VOLTAGE DATA

All readings made between tube socket terminals and chassis. Voltages indicated have been obtained using a Vacuum Tube Voltmeter. A second voltage reading is shown made with a 1000 ohm-per-volt meter, when use of this instrument would result in appreciably lower readings. Measured with a fresh battery, volume control full on, dial at the high frequency end, no signal.

## VOLTAGE CHART



BACK OF CHASSIS

## OSCILLATION IN 4B1 RADIO CHASSIS

Occasionally audio oscillation may occur in the 4B1 chassis with the volume control in an intermediate position. Should you encounter this trouble, reverse the leads of the primary of the output transformer or ground the speaker frame to the chassis. The speaker leads and the grid lead of the 1H5 should be kept as far as possible from the 3Q5 output tube.

## REPLACEMENT PARTS

ISSUE A 1947

## CONDENSERS

Symbol	Description	Part No.
C1	.01 mfd., 400 Volts.	.648 1-25
C2	.0008 mfd., Mica	.658 5-31
C3	Trimmer, Antenna	.66A 9-1
C4	Trimmer, Oscillator	.66A 9-1
C5	.0001 mfd., Mica	.658 7-17
C6	.0008 mfd., Mica	.658 5-31
C7	.01 mfd., 400 Volts.	.648 1-25
C8	.002 mfd., 600 Volts.	.648 1-14
C9	4. mfd., 150 Volts (Elect.)	.67A 4-2
C10	.05 mfd., 200 Volts.	.648 1-32
C11	.00025 mfd., Mica	.658 7-22
C12	.00025 mfd., Mica	.658 7-22
C13	.01 mfd., 400 Volts.	.648 1-25
C14	.01 mfd., 400 Volts.	.648 1-25
C15	.005 mfd., 600 Volts.	.648 1-12
C16	.01 mfd., 400 Volts.	.648 1-25
C17	.01 mfd., 400 Volts.	.648 1-25

(C17 omitted in early models)

## RESISTORS

Symbol	Description	Part No.
R1	15,000 ohm 1/2 Watt	.608 8-153
R2	470,000 ohm 1/4 Watt	.608 2-474
R3	220,000 ohm 1/2 Watt	.608 8-224
R4	33,000 ohm 1/2 Watt	.608 8-333
R5, R8	4,700,000 ohm 1/4 Watt	.608 2-475
R6	2,200,000 ohm 1/4 Watt	.608 2-225
R7	1 meg. Vol. Control	.758 1-1
R9, R10	1,000,000 ohm 1/4 Watt	.608 2-105
R11	390 ohm 1/4 Watt	.608 2-391
R12	.75 ohm 1/2 Watt (wire)	.61A 2-1
R13	2200 ohm 1/4 Watt	.608 2-222

## TRANSFORMERS and COILS

Symbol	Description	Part No.
L1	Antenna Coil	.AC105-1
L2	Oscillator Coil	.A1020
L3	1st I.F. Transformer	.72B 5
L4	2nd I.F. Transformer	.72B 6
L5	Choke Coil (RF)	.AB103-1
T1	Output Transformer	.98A 5

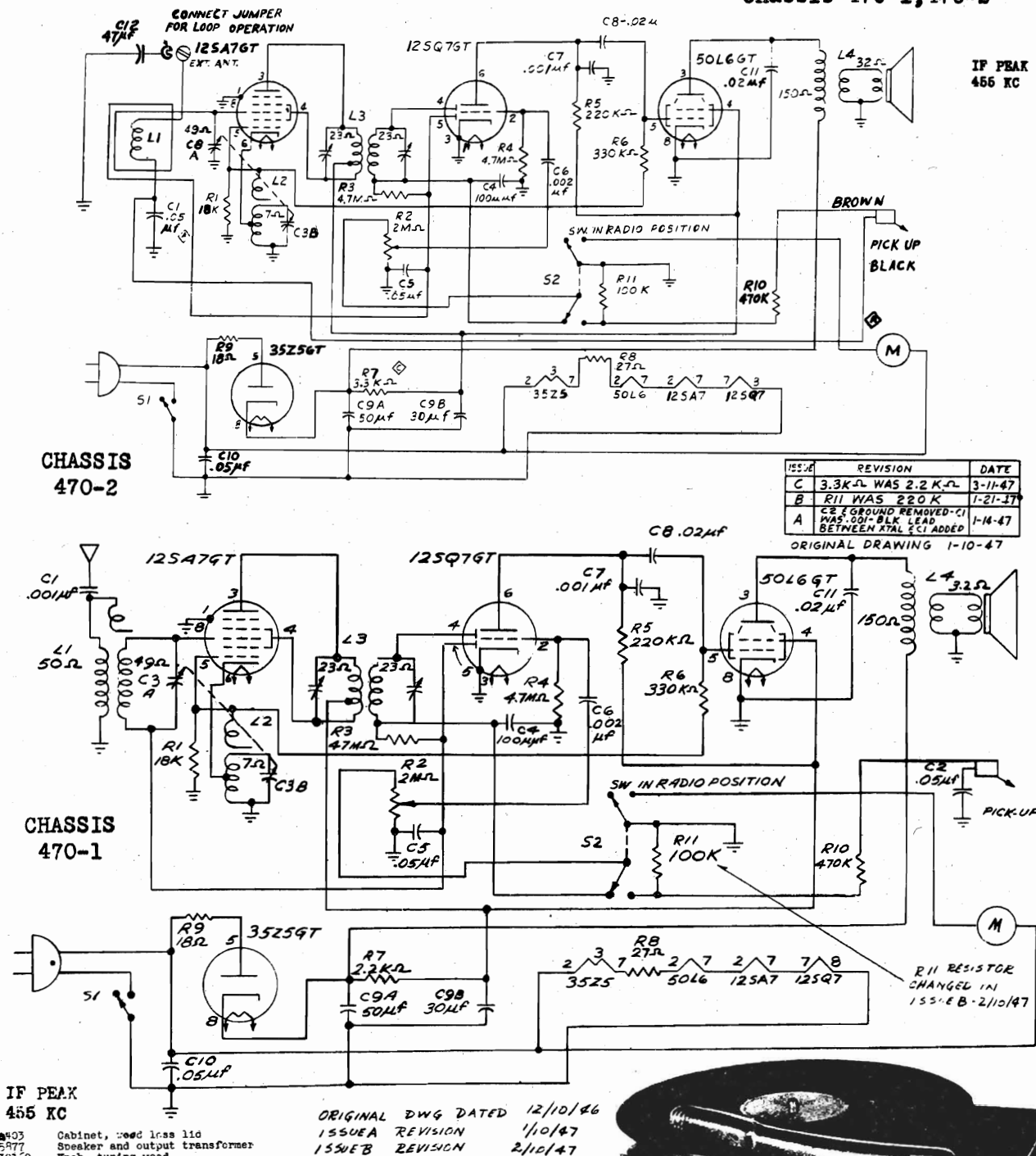
## MISCELLANEOUS

Description	Part No.
Background, Dial	.X22C 5-1
Cabinet, Plastic (7T12)	.34D 10
Cabinet, Wood (7T06)	.35D 49
Cable, Battery (complete with plug)	.A1026
Cord, Dial (5' on tuner and 66' on dial drive)	.50A 1-3
Drum and Hub, Tuning	.A1035
Iron Slug, with wire (Osc.)	.71B 1-3
Iron Slug, with wire (Ant.)	.71B 1-4
Knob	.33A 21-3

## MISCELLANEOUS

Description	Part No.
Plug, Battery 5 Prong	.88A 4-4
Pointer, Dial	.25A 9-1
Pulley, Fibre Dial	.17A 1-3
Scale, Glass Dial (7T06)	.21B 31-1
Scale, Glass Dial (7T12)	.21B 32-1
Screw studs (for iron cores)	.27A 4
Shaft, Tuning	.28A 1-1
Shield, Tube	.87A 8
Socket, Octal Tube	.87A 5-1
Speaker and Output Transformer	.78B 3
Spring, Dial Drum Cord Tension	.19B 1-7
Spring, Hairpin (To hold Ant. or Osc. coils)	.19A 3-1
Spring, Tuner, back bearing takeup	.19A 6
Spring, Tuner, front bearing takeup	.19A 5
Spring, Tuner Slide Cord Tension	.19B 1-8
Spring, Tuner Slide Pressure	.18A 9
Switch, SPST (Economizer) SW2	.77B 1-6
Washer, C	.4A 4-1
Washer, spring (coils)	.4A 6-12-0
Washer, spring (shaft)	.4A 6-3-0

# AIR KING PRODUCTS CO., INC. MODEL A-403 COURT JESTER Chassis 470-1, 470-2



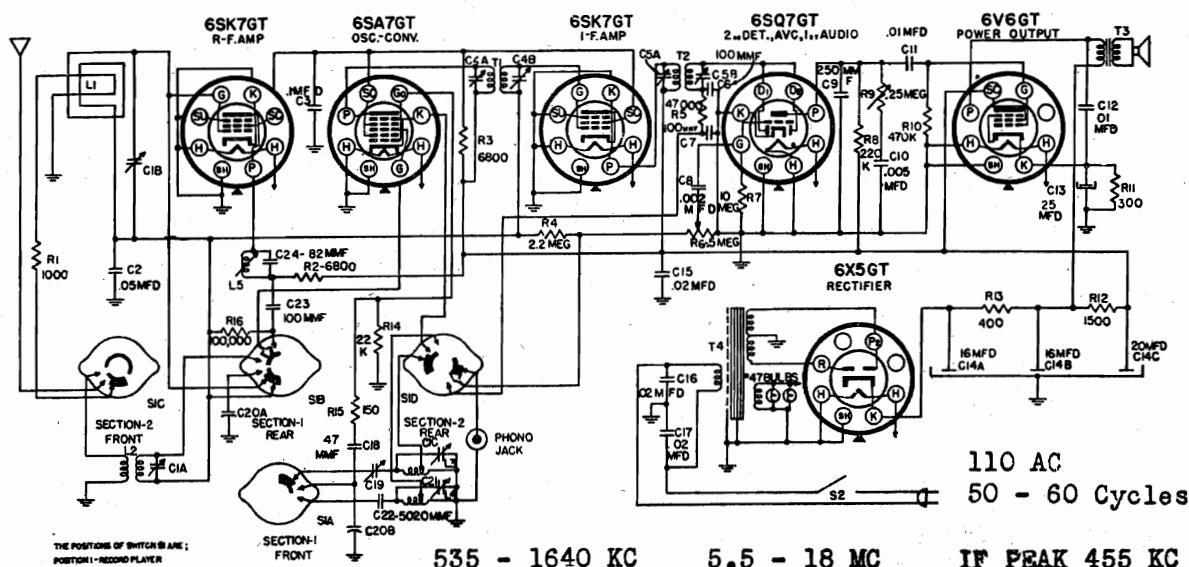
PARTS LIST AND CABINET ARE THE SAME FOR BOTH CHASSIS 470-1 and 470-2	
A403	Cabinet, wood less lid
5977	Speaker and output transformer
39130	Knob, tuning wood
39161	Knob, (volume, phono-radio)
69507	Instruction book
1-75	Variable condenser
2-75	Electrolytic condenser unit 50-30 mf/150 v
29104	Volume control 2 meg with switch
28185	Oscillator coil
3376	Antenna coil (chassis 470-1)
28186	I.F. transformer
28189	Loop and loading coil (chassis 470-2)
5555	Line cord
3828	Switch radio/phonograph
6343	Pick-up arm and rest
6418	Motor and turntable 8"
	Lifetime needle
	Paper condenser
	.05 mf 400 v.
	.002 200 v.
	.02 "
	.05 "
	.001 "
	Ceramic 100 mmf 500 volts
	16K ohms 1/2 w.
	4.7 meg ohms 1/2 w.
	220K "
	2200 "
	18 " 2 w.
	47 " 1 w.
	330K " 1/2 w.
	470K " 1/2 w.





MODELS 4604D, 4604F  
Chassis 458-2

## AIR KING PRODUCTS CO., INC.



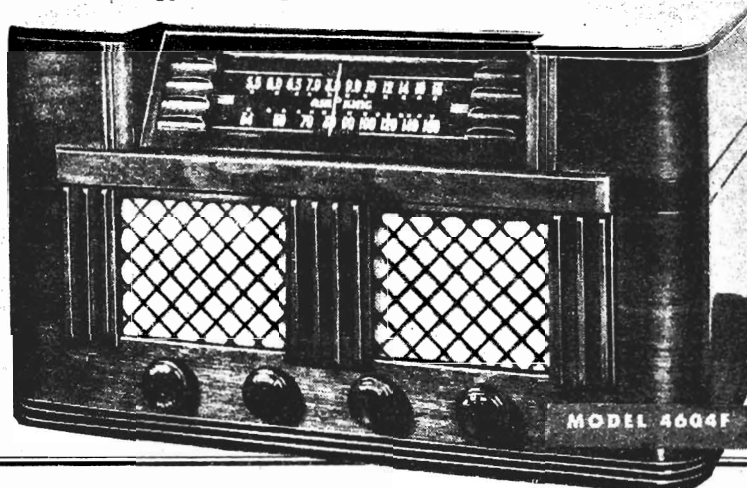
THE POSITIONS OF SWITCH S2 ARE:  
POSITION 1 - RECORD PLAYER  
POSITION 2 - BROADCAST  
POSITION 3 - SHORT WAVE  
THE SWITCH IS DRAWN IN POSITION 1  
(MAXIMUM COUNTERCLOCKWISE)

If this receiver is to be operated in conjunction with an external phonograph record player, the pin plug from the phonograph pick-up arm should be inserted in the Phono Input Socket at the back of the receiver chassis. The switch should be placed in the RP position (fully counter-clockwise). Both the volume control and tone control of the receiver function for the record player. These should be set to give the loudness and tone quality desired.

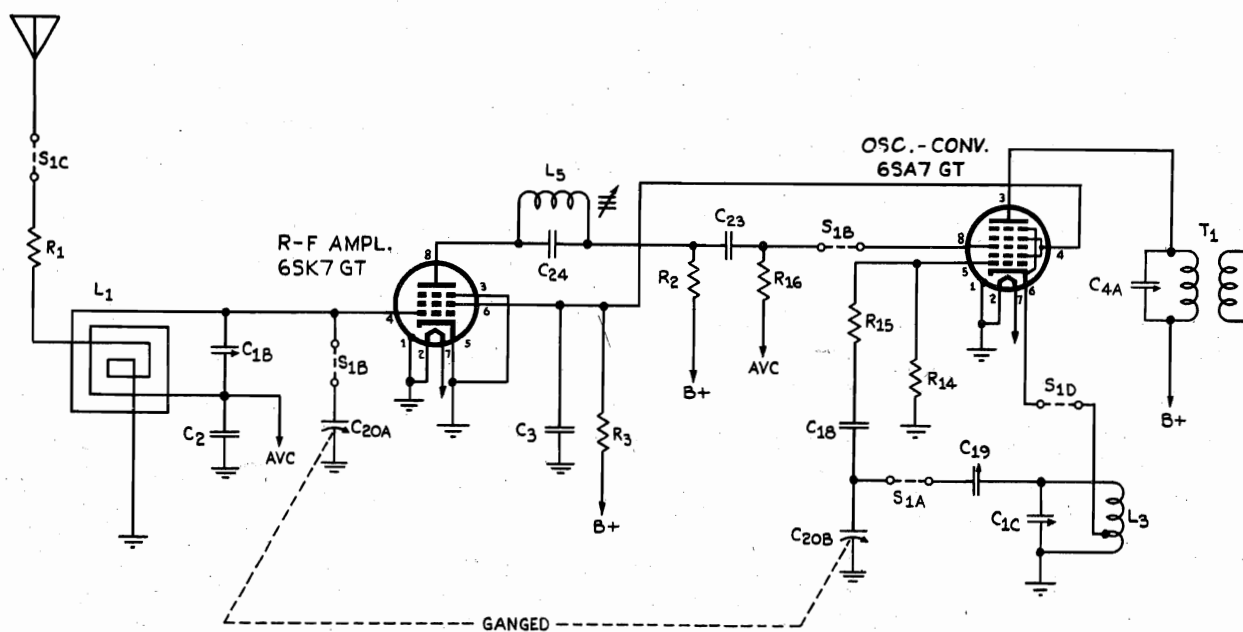
Location Schematic	Part No.	Description
	62189	Cabinet Back
C-20	1668	Condenser, Variable
C14	A20102	Condenser, Electrolytic 20-16-16 mfd. x 350 V.
C13	20105	Condenser, Electrolytic 25 mfd. x 25 VDC.
C1	A1725	Condenser, Trimmer, 3 Section, 3-30mmfd.
C18		Condenser, Mica 47 mmfd.
C6, C7, C23		Condenser, Mica 100 mmfd.
C9		Condenser, Mica 250 mmfd.
C22		Condenser, Mica 5020 mmfd.
C24		Condenser, Mica 82 mmfd.
C2		Condenser, Paper .05 mfd. 600 V.
C3		Condenser, Paper .1 mfd. 400 V.
C8		Condenser, Paper .002 mfd. 400 V.
C10		Condenser, Paper .005 mfd. 400 V.
C11		Condenser, Paper .01 mfd. 600 V.
C12		Condenser, Paper .01 mfd. 800 V.
C15		Condenser, Paper .02 mfd. 400 V.
C16, C17	1975	Condenser, Oil filled metal case .02 mfd. 600V.
R6	2470-A	Control, Volume .5 Meg
R9	2521	Control, Tone .25 Meg with switch
L1	28170	Coil, Loop
L2	28167	Coil, S.W. Antenna

Location Schematic	Part No.	Description
L3	28169	Coil, B.C. Oscillator
L4	28168	Coil, S.W. Oscillator
L5	28175	Coil, Wave Trap
		Knob, Tone-off-on
		Knob, Volume
		Knob, Tuning
		Knob, (RP, BC, SW)
		Pilot Lamp #47
R1		Resistor, 1,000 ohms 1/2 W.
R2, R3		Resistor, 6,800 ohms 2 W.
R14		Resistor, 22,000 ohms 1/2 W.
R4		Resistor, 2.2 Megohms 1/2 W.
R5		Resistor, 47,000 ohms 1/2 W.
R7		Resistor, 10 Meg ohms 1/2 W.
R8		Resistor, 220,000 ohms 1/2 W.
R10		Resistor, 470,000 ohms 1/2 W.
R11		Resistor, 300 ohms 2 W. Wirewound
R12		Resistor, 1500 ohms 2 W. Wirewound
R13		Resistor, 400 ohms 2 W. Wirewound
R15		Resistor, 150 ohms 1/2 W. Wirewound
R16		Resistor, 100,000 ohms 1/2 W.
	5866	Speaker, P. M.
T1	3360	Transformer, I.F. Input
T2	3530	Transformer, I.F. Output
T3	1333	Transformer, Output
T4	1020	Transformer, Power

- CD-4604 Cabinet 4604D
- CF-4604 Cabinet 4604F
- 3785A Rotary Bandswitch
- 4675B Drive Shaft Assembly
- 54161 Grommets for mounting Variable Condenser
- 40114 Dial scale
- 4140 Pointer
- 4633 Cord Spring
- Knob Felts
- Back Fastener Clips
- 54170 Antenna-Ground Post
- 24A5 Phono Jack
- Ins 4604 Instruction Book

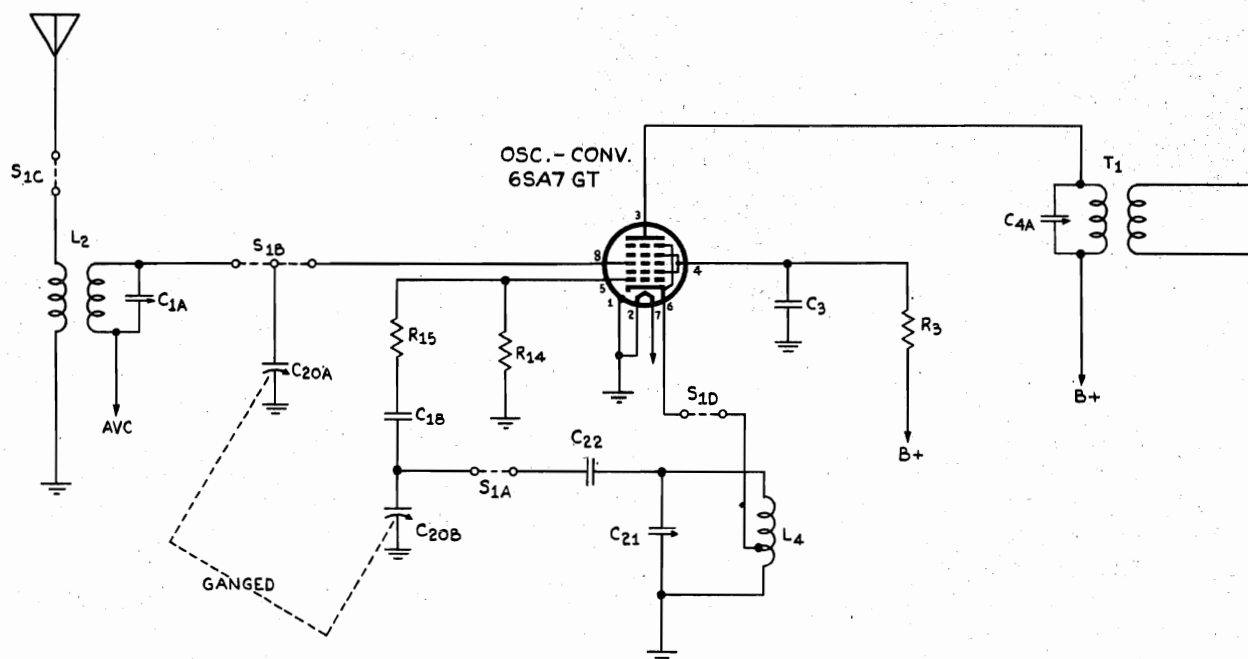




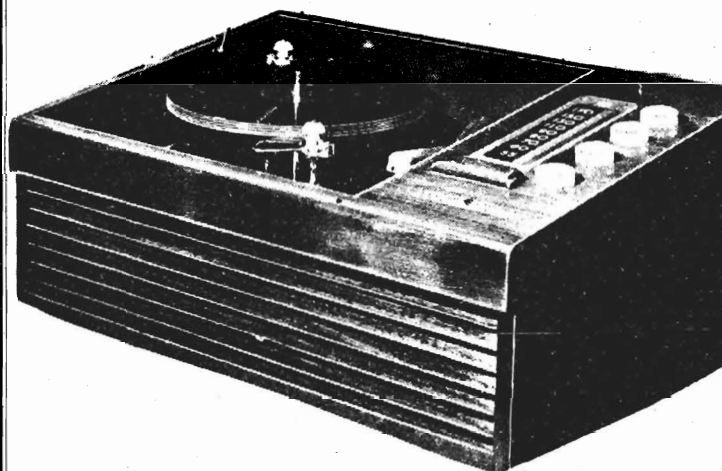
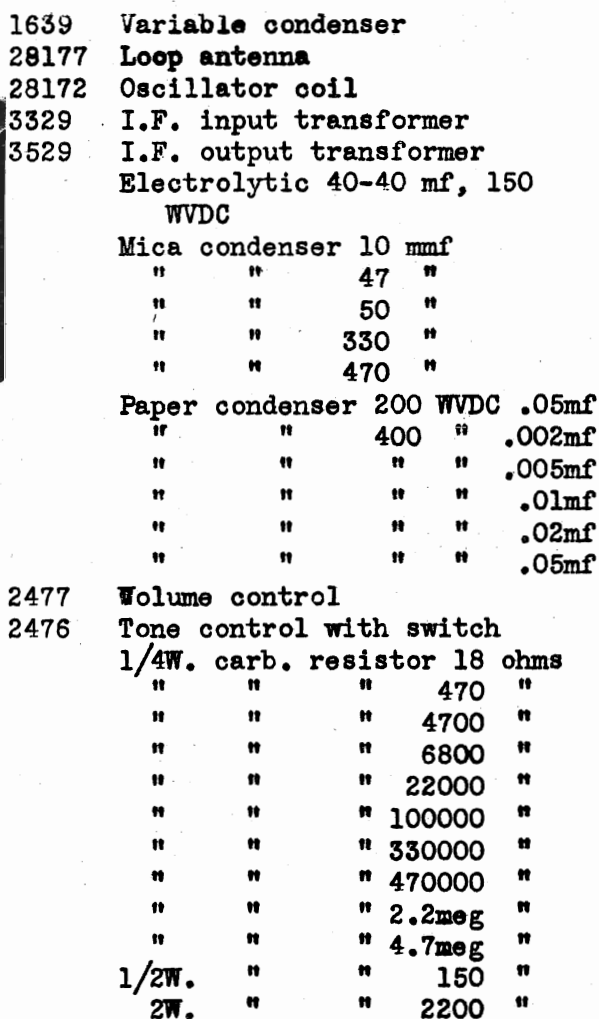


BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
BROADCAST BAND  
535 - 1640 KC.

NOTE:  
1ST POSITION (PHONO)  
NOT SHOWN.

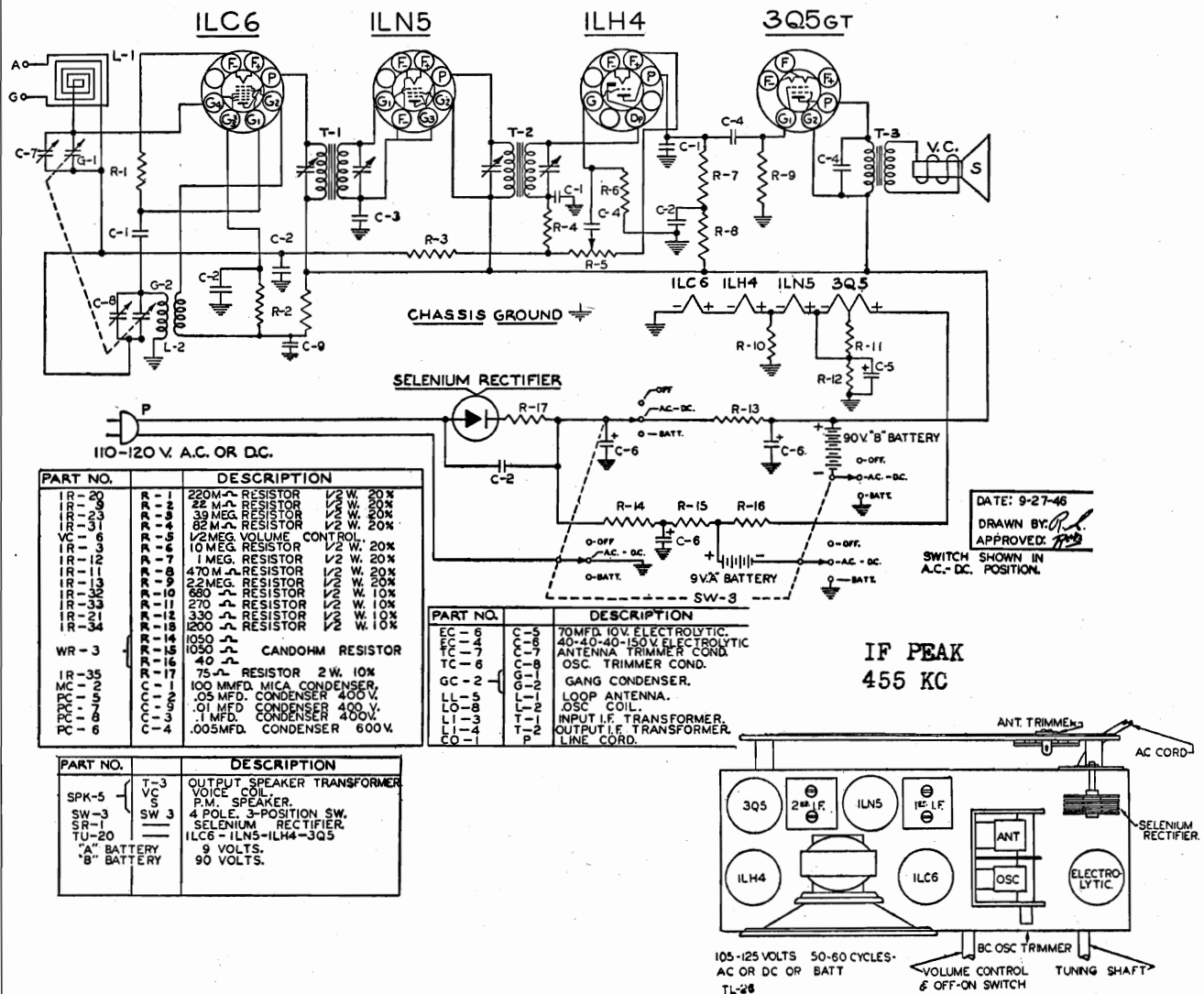


BAND-SWITCH SHOWN  
AT 3<sup>RD</sup> POSITION CLOCKWISE.  
SHORT WAVE BAND  
5.5 - 18 MC.



- |       |                         |
|-------|-------------------------|
| 4678  | Drive shaft             |
|       | Pointer                 |
| 1851  | Pilot light socket      |
| 4633  | Cord spring             |
|       | Grommet (for variable)  |
| 40177 | Lucite dial face        |
| 62191 | Cabinet back            |
| 39150 | Knob,phono-radio        |
| 39151 | Knob, tone              |
| 39152 | Knob, volume            |
| 39153 | Knob, tuning            |
|       | Back fastener clips     |
| 3827A | Phono switch            |
|       | Lifetime needle         |
| C4704 | Cabinet                 |
| 5870  | Speaker w/transformer   |
| C4704 | Record changer assembly |

## ALLIED RADIO CORP.



Remove chassis from cabinet for alignment.

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

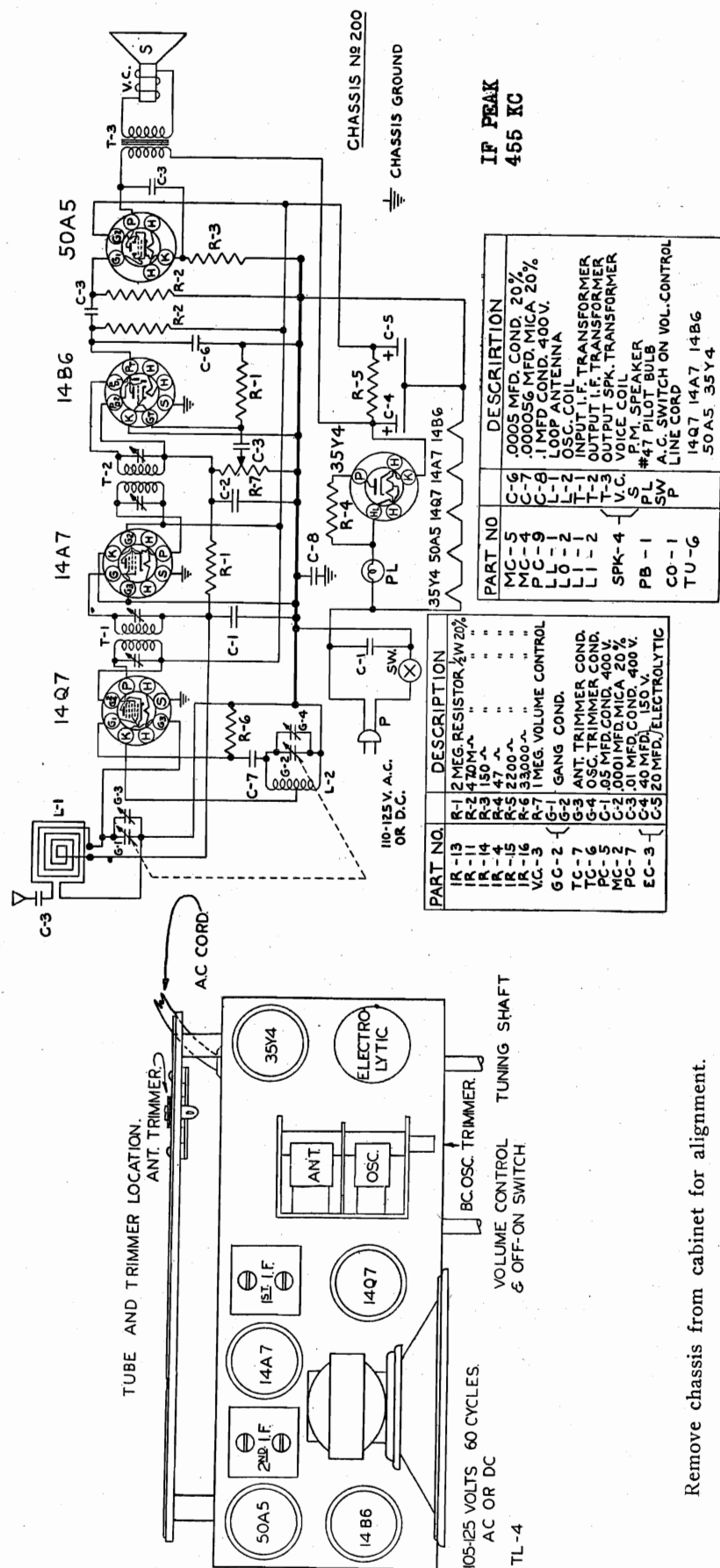
**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC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

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

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

MODELS 5B-175, 5B-176  
Chassis 200

## ALLIED RADIO CORP.



Remove chassis from cabinet for alignment.

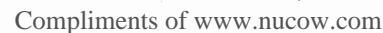
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

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

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

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

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ALLIED RADIO CORP.

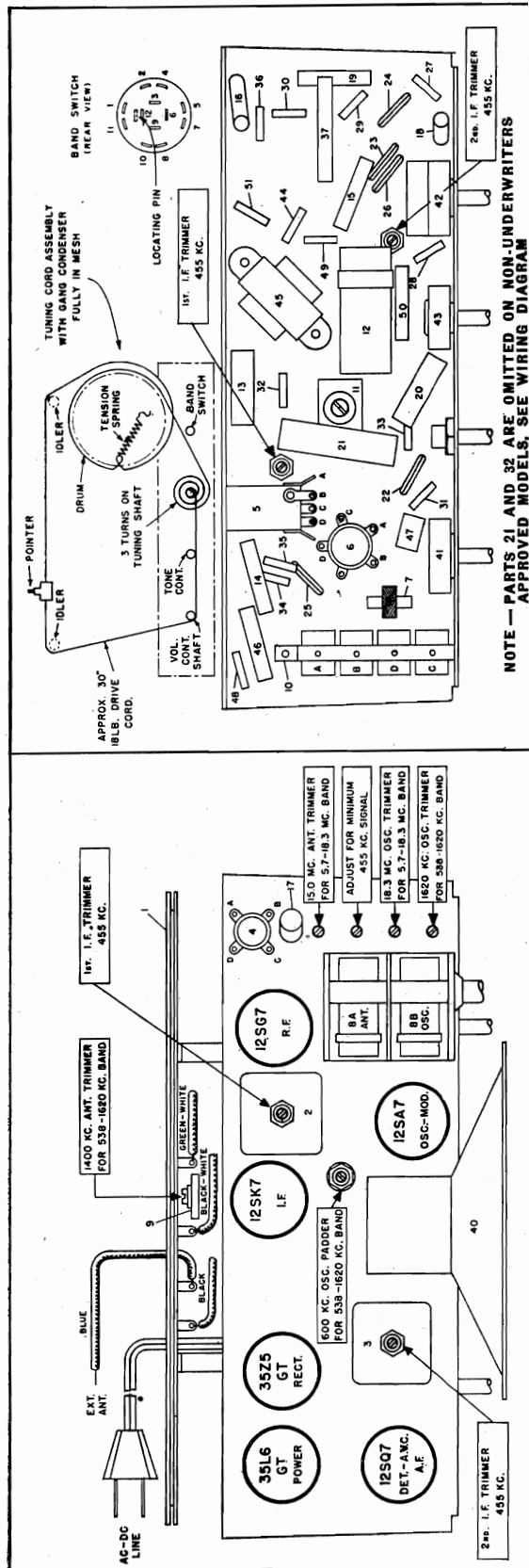
## ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third etc.

**Before starting alignment:**

- (a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.
- (b) Use an accurately calibrated test oscillator with some type of output measuring device.
- (c) Place loop antenna in the same position it will be in when set is in the cabinet.

Steps	Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
			Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of	Attach output of test oscillator to:	
1	I.F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through .01 Mfd. condenser	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
2	1620 to 538 K.C. Band	Rotate gang condenser to Maximum Capacity	Exactly 455 K.C.	.00025 Condenser	High side to BLUE Antenna Lead. Low side to chassis through a .01 mfd. condenser.	Adjust R.F. coil trimmer for <u>minimum</u> 455 K.C. signal.
		Exactly 1620 K.C.	Exactly 1620 K.C.			Adjust 1620 K.C. oscillator trimmer for maximum output.
		Approx. 1400 K.C.	Approx. 1400 K.C.			While rocking gang condenser adjust 1400 K.C. loop trimmer for maximum output.
		Approx. 600 K.C.	Approx. 600 K.C.			While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
3	5.7 to 18.3 Mc. Band	Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor		Adjust 18.3 M.C. oscillator trimmer for maximum output.
		Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm carbon resistor		While rocking gang condenser adjust *15 M.C. antenna trimmer for maximum output.



**NOTE — PARTS 21 AND 32 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS. SEE WIRING DIAGRAM**

## ALLIED RADIO CORP.

## PARTS LIST

Illus. No.	Part Name	Description	Part No.	Part Name	Description
1	20E105 Coil	Antenna Loop	27	27E335 Resistor	Carbon, 3.3 Megohm, 1/3 Watt
2	20E21 Coil	1st I. F. Transformer	28	27E335 Resistor	Carbon, 3.3 Megohm, 1/3 Watt
3	20E22 Coil	2nd I. F. Transformer	29	27E474 Resistor	Carbon, 470,000 Ohm, 1/3 Watt
4	20E72 Coil	Antenna	30	27E474 Resistor	Carbon, 470,000 Ohm, 1/3 Watt
5	20E102 Coil	Oscillator, Broadcast Band	31	27E224 Resistor	Carbon, 220,000 Ohm, 1/3 Watt
6	20E103 Coil	Oscillator, Short Wave Band	32	27E224 Resistor	Carbon, 220,000 Ohm, 1/3 Watt (Und. App'd Only)
7	2E19 Coil	R. F. Choke	33	27E223 Resistor	Carbon, 22,000 Ohm, 1/3 Watt
8	24E9 Condenser	Tuning, 2 gang with pulley	34	27E103 Resistor	Carbon, 10,000 Ohm, 1/3 Watt
9	24E3 Capacitor	Trimmer, 2-40 MMF (On Loop)	35	27E822 Resistor	Carbon, 8,200 Ohm, 1/3 Watt
10	24E15 Capacitor	Trimmer, 4 Gang Strip	36	27E151 Resistor	Carbon, 150 Ohm, 1/3 Watt
11	24E16 Capacitor	Padder, 200-600 MMF	37	27E102-3 Resistor	Carbon, 1,000 Ohm, 1 Watt
12	23E6 Capacitor	50-50 Mfd. 150 Volt Dry Electrolytic	38	Resistor	230 Volt Extension Line Cord Used Only in Models Not Having Common Ground
13	23E216 Capacitor	Tubular, .05 Mfd.—200 Volt			125 Volt Extension Line Cord Used Only in Models Not Having Common Ground
14	23E211 Capacitor	Tubular, .01 Mfd.—200 Volt			Elliptical Shape 4" x 6"
15	23E416 Capacitor	Tubular, .05 Mfd.—400 Volt	40	1E1 Speaker	Band
16	23E411 Capacitor	Tubular, .01 Mfd.—400 Volt	41	29E8 Switch	Volume Control with S.P.S.T. Switch
17	23E408 Capacitor	Tubular, .005 Mfd.—400 Volt	42	28E7 Resistor	Tone Control
18	23E208 Capacitor	Tubular, .005 Mfd.—200 Volt	43	28E8 Resistor	Carbon, 100 Ohm, 1/2 Watt
19	23E411 Capacitor	Tubular, .01 Mfd.—400 Volt	44	27E101-2 Resistor	Output, Speaker
20	23E205 Capacitor	Tubular, .002 Mfd.—200 Volt	45	22E8 Transformer	Tubular, .01 Mfd., 200 Volt
21	23E421 Capacitor	Tubular, .2 Mfd. 400 Volt (Und. App'd Only)	46	23E211 Capacitor	Mica, .0021 Mfd.
22	23E37 Capacitor	Mica, .00005 Mfd.	47	23E2000 Capacitor	Carbon, 56 Ohm, 1/3 Watt
23	23E39 Capacitor	Mica, .0001 Mfd.	48	27E560 Resistor	Carbon, 470 Ohm 1/3 Watt
24	23E39 Capacitor	Mica, .0001 Mfd.	49	27E471 Resistor	Tubular, .01 Mfd. 200 Volt
25	23E42 Capacitor	Mica, .00025 Mfd.	50	23E211 Capacitor	Carbon 47 Ohm, 1/2 Watt
26	23E42 Capacitor	Mica, .00025 Mfd.	51	27E470-2 Resistor	

## MISCELLANEOUS PARTS

Part No.	Part Name	Description
40E1 Bulb	6-8 Volt .150 Amp. Dial light, No. 47	
7E100 Cabinet	Wood Table Model	
7E61 Cabinet Back	For Wood Table Model	
65E2 Dial Cord Spring	Tension Spring	
4E1 Dial Cord	36" of 18 lb. Drive Cord	
68E1 Dial Shaft	Drive Shaft	
19E3 Dial Shaft Bearing	Bearing for Drive Shaft	
12E103-F10 Dial Shaft Washer	"C" Retainer Washer for Drive Shaft	
20E65 Dial Back Plate	Back Plate Assem. less Calibrated Scale	

## OUTSIDE AERIAL

A 50 TO 75 FOOT AERIAL must be connected to the receiver WHEN TUNING FOR SHORT WAVE STATIONS or when the volume of 538-1620 KC band stations is not satisfactory. Attach this external aerial to the blue lead coming out of the rear of the chassis. WARNING—DO NOT ATTACH A GROUND TO THE RADIO—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS WILL CAUSE A SHORT AND POSSIBLE DAMAGE.

5.7 - 18.3 M.C. BAND  
OPERATING INSTRUCTIONS

BE SURE TO ATTACH A REGULAR AERIAL TO BLUE ANTENNA LEAD COMING OUT OF REAR OF CHASSIS WHEN TUNING FOR SHORT WAVE STATIONS.

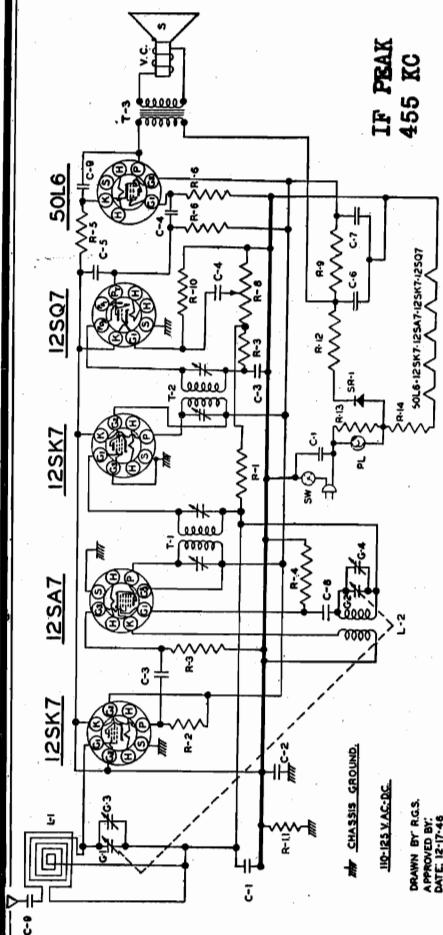
TURN WAVE BAND SWITCH KNOB to the left hand position. Use section of dial that is calibrated from 5.7 - 18.3 M.C.

Part No.	Part Name	Description
36E28-1 Dial Scale	Calibrated Glass Scale	
32E4 Dial Scale Clip	For Mounting Dial Scale	
35E13 Dial Pointer	Dial Indicator	
9E5 Dial Crystal	Marked "OFF-ON-VOLUME" for Wood Table Cabt.	
37E21-10 Knob	Marked "TONE" for Wood Table Cabt.	
37E21-11 Knob	Marked "TUNING" for Wood Table Cabt.	
37E21-12 Knob	Marked "SW-BC" for Wood Table Cabt.	
37E21-13 Knob		



MODELS 6B-155, 6B-156  
MODEL 5B-171

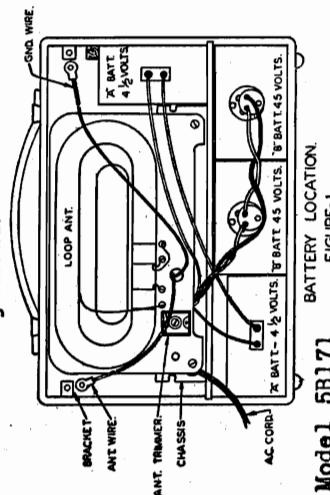
ALLIED RADIO CORP.



PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
IR-23	1R-23 33MEG. RESISTOR 1/2 W 10	GC-2	GANG CONDENSER
IR-10	R-2 3900 A. RESISTOR 1/2 W 10	TC-7	ANT. TRIMMER CONDENSER
IR-9	R-3 22M A. RESISTOR 1/2 W 20	TC-8	OSC. TRIMMER CONDENSER
IR-11	R-4 22M A. RESISTOR 1/2 W 20	SW	SWITCH ON VOLUME CONTROL
IR-12	R-5 170M A. RESISTOR 1/2 W 20	TU-23	TUNING INDICATOR
VC-4	R-6 1MEG. VOLUME CONTROL	WR-4	35C-1 SW. 5%
IR-25	R-7 2000 A. RESISTOR 1 W 10	SR-1	SELENIUM RECTIFIER
IR-20	R-8 2000 A. RESISTOR 1/2 W 10		
IR-35	R-9 100K A. RESISTOR 1/2 W 10		
PC-8	R-10 100K A. RESISTOR 1/2 W 10		
PC-9	R-11 100K A. RESISTOR 1/2 W 10		
PC-10	R-12 100K A. RESISTOR 1/2 W 10		
	R-13 100K A. RESISTOR 1/2 W 10		
	R-14 100K A. RESISTOR 1/2 W 10		
	C-1 100MFD. CONDENSER 50V		
	C-2 100MFD. CONDENSER 50V		
	C-3 100MFD. CONDENSER 50V		
	C-4 100MFD. CONDENSER 50V		
	C-5 100MFD. CONDENSER 50V		
	C-6 100MFD. CONDENSER 50V		
	C-7 100MFD. CONDENSER 50V		
	C-8 100MFD. CONDENSER 50V		
	C-9 100MFD. CONDENSER 50V		
	C-10 100MFD. CONDENSER 50V		

To replace batteries, loosen and remove the two screws at the upper left and right hand corners of the cabinet back. Remove the back and pull out the plug from each battery. Never pull on the wires connected to the plugs as they may break. Always grasp the plug form between the fingers, or use a flat blade to pry out the plug. Observe with care the position of the batteries and plugs when replacing. Be sure that batteries and plugs are replaced as shown in the "Battery Location" diagram. (Figure No. 1)

After the batteries have been installed, replace the back, making sure that the two washers riveted to the bottom of the back, fit into the slots near the bottom edge of the cabinet. Also make sure that the two wires from the loop antenna are held in place between the top brackets of the cabinet and the back by the two fastening screws.



Mfr.	Volts	Type No.
Burgess	45 "B"	M30
General	45 "B"	W30B
Bright Star	45 "B"	3033
Usalite	45 "B"	640
Rayovac	45 "B"	P7830
Eveready	45 "B"	482
Burgess	4 1/2 "A"	G3
General	4 1/2 "A"	3H3
Bright Star	4 1/2 "A"	361
Usalite	4 1/2 "A"	683
Rayovac	4 1/2 "A"	P83A
Eveready	4 1/2 "A"	746

FIGURE-1  
BATTERY LOCATION  
Model 5B171

Remove chassis from cabinet for alignment.

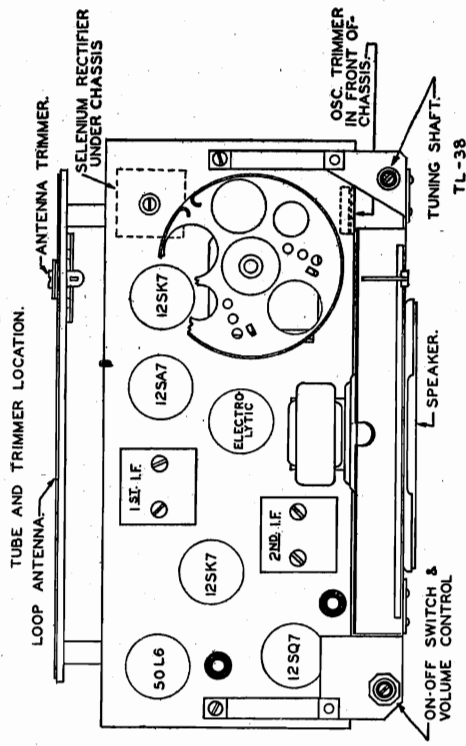
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

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

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

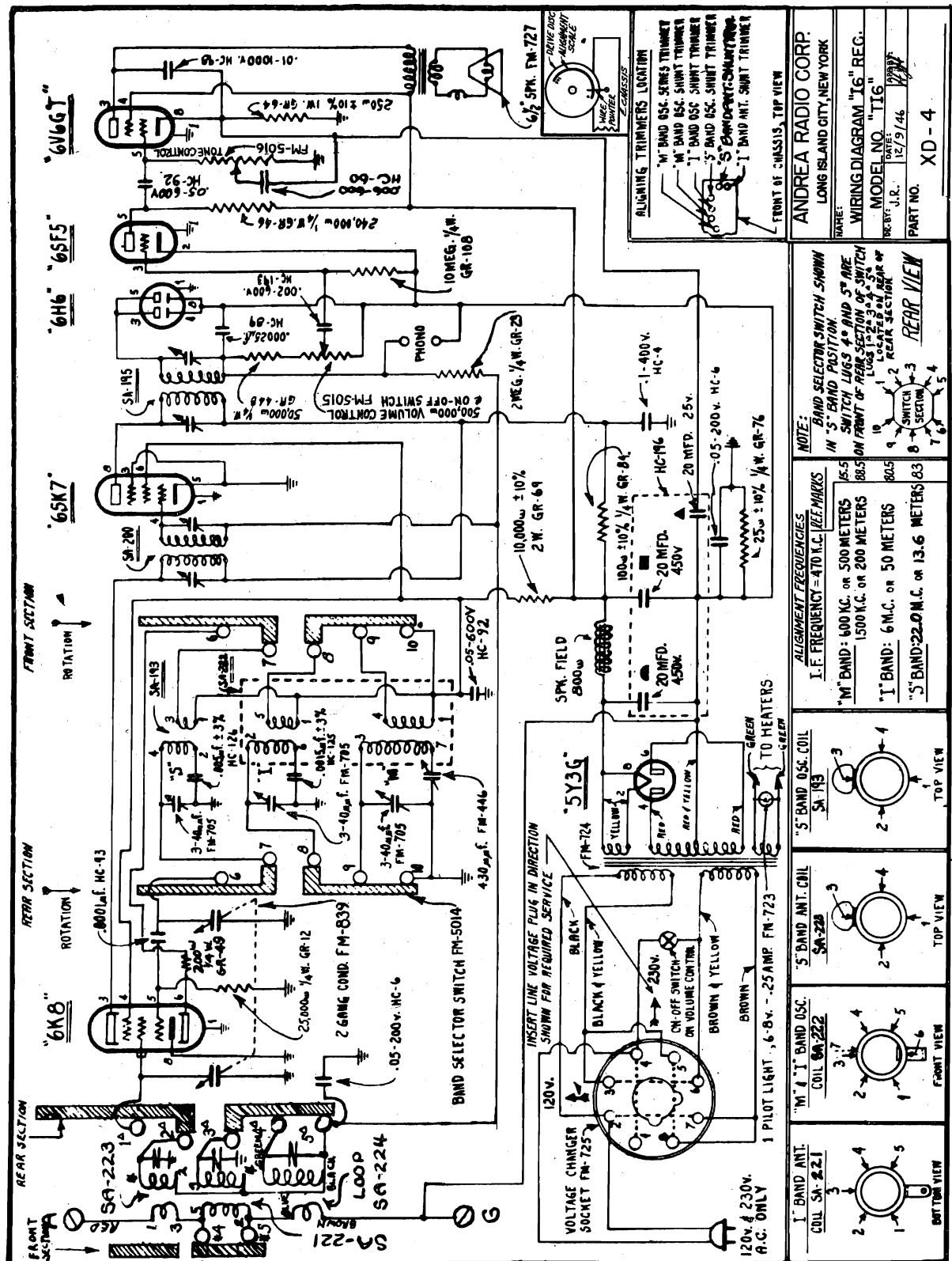
**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

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



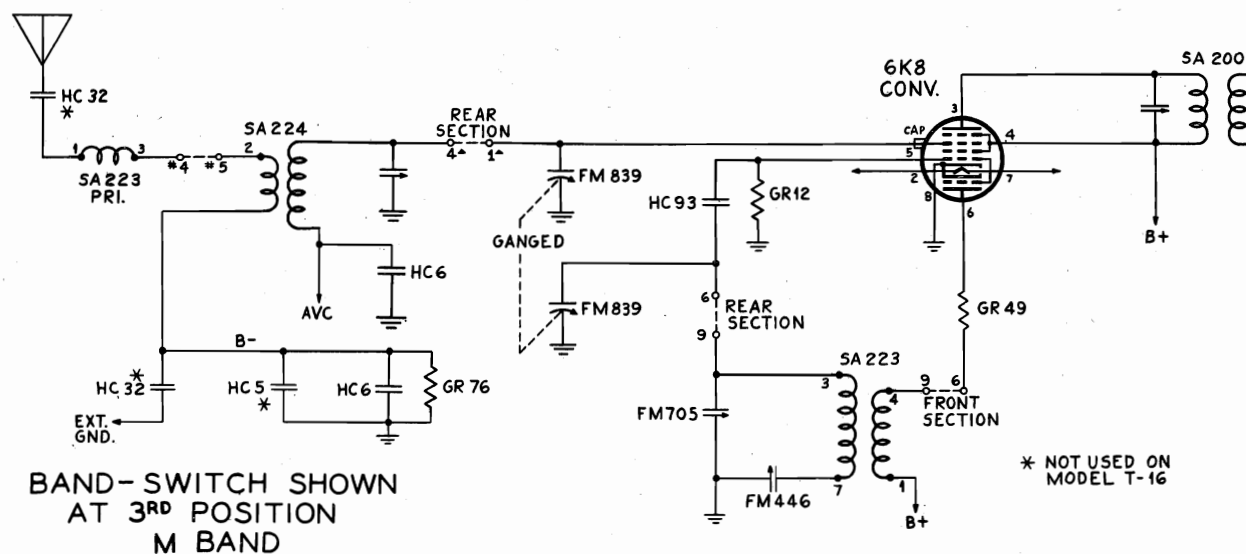
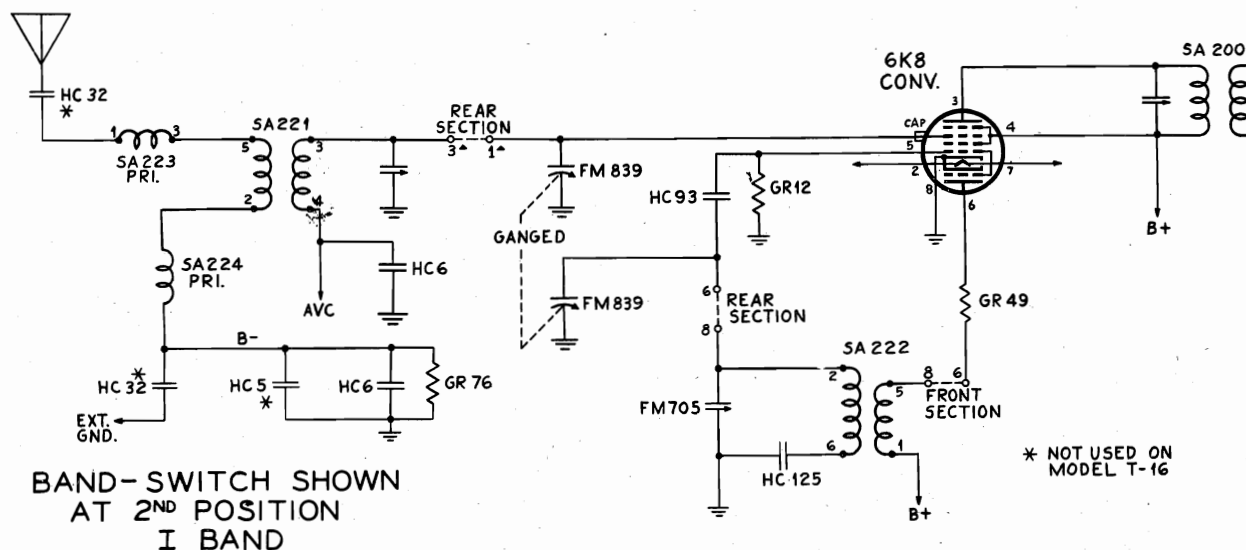
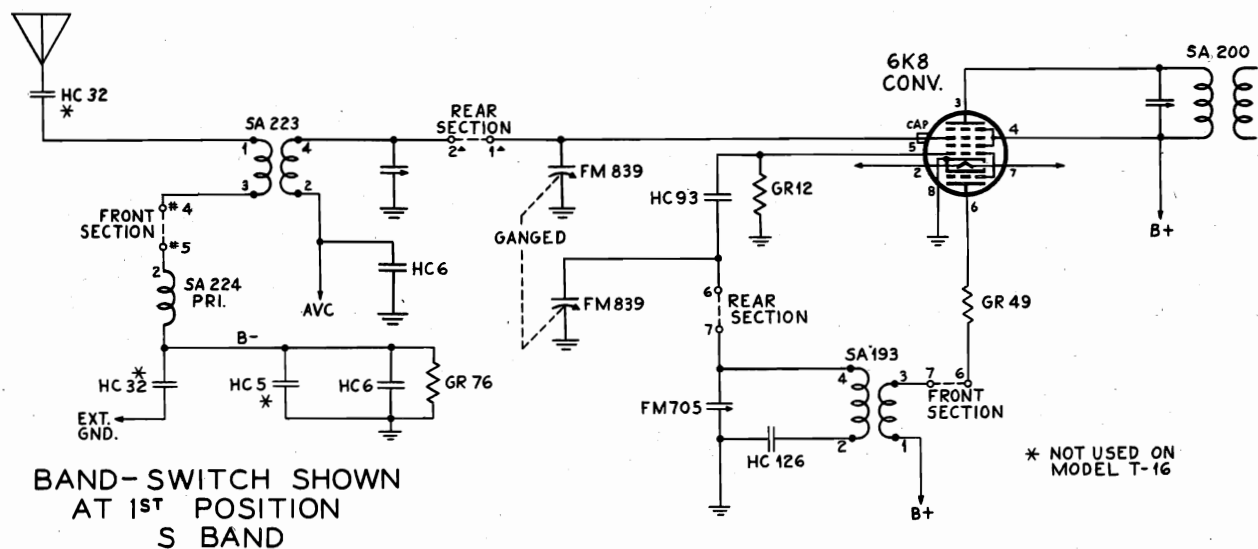


## ANDREA RADIO CORP.



MODEL T-16

ANDREA RADIO CORP.



## ANDREA RADIO CORP.

adjust the generator to 22,000 kc., and the receiver reference scale to 22.0 mc. Vary the S band oscillator shunt trimmer slowly from maximum to minimum. You will hear the signal at two settings of the trimmer, one nearer the minimum capacity (plates open) and one near the maximum capacity (plates closed). The setting near minimum capacity is correct, because the setting near maximum capacity is at the image frequency.

Now adjust the antenna shunt trimmer. During this adjustment, be sure to rock the gang condenser back and forth SLOWLY each time you make an adjustment of the trimmer. As you continue to do this, you will reach a point where further turning of the trimmer screw, while rocking the gang condenser, will not increase the signal response. This is the correct adjustment.

A simple method of determining if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator at 22,000 kc. and tune the receiver slowly from 21,000 to 23,000 kc. Two signals should be heard, 940 kc. apart. One will be lower in frequency than 22,000 kc. and the other will be higher. The higher frequency, as indicated on the dial, is the correct aligning frequency, and the lower one is the image.

As a further check, leave the receiver tuned to the higher frequency. Vary slowly, increase the generator frequency from 22,000 kc. to about 23,000 kc. A signal will be heard near 23,000 kc. If all the settings are correct for alignment. If there is no signal, the original settings were on the image frequency. In that case, you must start again from the beginning, in order to be sure of accurate results.

After you have found the correct settings, the image, or lower, frequency response on the receiver will always sound weaker than the true signal.

**"I" BAND ALIGNMENT:** With the signal generator connected in accordance with the preceding instructions, set the generator at 6,000 kc., turn the wave band switch to the I position, and adjust the gang reference scale to 6 mc., as set forth in the chart. Following the procedure just described, adjust the I band oscillator shunt trimmer for maximum signal response. Next, adjust the I band antenna shunt trimmer. Rock the gang condenser back and forth slowly as you adjust the trimmer, in accordance with the instructions for the S band adjustment. This completes the adjustment for the I band.

**"M" BAND ALIGNMENT:** Replace the 400-ohm resistor in the generator lead by a .00025 mfd. condenser. Set the generator at 1,500 kc., turn the wave band switch to the M position, and set the gang reference scale of the receiver at 1,500 kc., as set forth in the chart. Adjust the M band oscillator shunt trimmer for maximum signal response. Next, adjust the antenna shunt trimmer for maximum response.

This band must be aligned at 600 kc. also. Set the generator accordingly, and tune the receiver to 600 kc., as set forth in the chart. Adjust the M band oscillator series trimmer for maximum response. During this adjustment, be sure to rock the gang condenser for each small change of capacity of the series trimmer. When this adjustment has been completed, recheck the antenna adjustment at 1,500 kc. This completes the adjustment of the M band.

After installing the chassis in the cabinet, turn the tuning knob until the gang condenser plates are completely meshed. Then slide pointer along cord (without opening gang) until the center of the pointer is over the last diamond marking on the left side of the 2-8-7 mc. scale. When the above is followed correctly along with method of alignment, the pointer will match the correct scale calibration throughout.

TUNES: 6X8 Oscillator & Modulator 6S7S 1st Audio  
6V6GT Beam Power Output 6Y30 Rectifier  
6S6 2nd Detector & AVC 6SK7 I.F. Amplifier

**IMPORTANT:** If you find it necessary to replace any part in this receiver, bear this in mind: In order to maintain the high performance standards of Andrea Radio receivers, the component parts on all Andrea models are held to exceedingly close tolerance limits. Furthermore, Andrea components are given the exclusive "Climate Sealed" treatment which protects them from all weather and temperature conditions. Consequently, standard Andrea Radio replacement parts must be used for all service work, for the substitution of ordinary stock items will result in inferior performance.

#### FOR OPERATION ON 40 - LINE VOLTAGES OF 106-125, 210-240, 50/60 CYCLES

**WARNING!** Always remove the line plug from the electric outlet before removing the chassis from the cabinet. Also - connect the speaker plug to the receiver before switching on the power. Otherwise, damage will result.

**I. F. REALIGNMENT GENERALLY SUFFICIENT:** As a rule, it is not necessary to readjust the short wave oscillator and antenna shunt and series trimmers unless they have been tampered with, or require replacing. Consequently, careful realignment of the I. F. system is all that requires attention, ordinarily. Before making any adjustments, tune in one particular station and note the quality of reception so that you can check the improvement after the I. F. system has been realigned.

**USE SIGNAL GENERATOR AND OUTPUT VOLTMETER:** For realigning, use a signal generator to supply a modulated carrier of 470, 600, 1,500, 6,000, and 22,000 kc., plus an output voltmeter. Alignment by any other means is not recommended. Your service test generator should be checked frequently for change in calibration by getting a zero beat between the generator and broadcast stations of known frequency.

**SPECIAL NOTES:** Before proceeding to align the antenna and oscillator circuits bear in mind that these circuits control the accuracy of the main tuning dial calibration particularly the oscillator trimmers. As the main dial is a part of the cabinet, servicing of the chassis can be made without the use of this dial by using the reference alignment scale 0 to 100 divisions attached permanently to the gang condenser drive drum.

The table below indicates the reference dial settings for the required alignment frequencies. You will note that the chassis contains a self-tapping screw located just below the gang condenser drum, the purpose of which, is to enable you to wrap a piece of bare wire and thereby form a pointer to the reference scale. Set the pointer at the zero marking on the reference scale with the gang condenser plates fully meshed (all capacity in) after which rotate the drum to the correct reference setting for proper circuit alignment and procedure in accordance with the Band alignment instruction. Remove reference pointer before installing in cabinet.

REFERENCE FREQ. KC.	BAND	SETTING
1,500	"M"	88.5
600	"M"	15.5
6,000	"I"	80.5
22,000	"S"	85

**NOTES ON REALIGNING THE BANDS:** During the aligning measurements, the output of the signal generator must be kept low so that it will not cause the AVC circuit in the set to function. In other words, when the volume control on the set is turned to maximum, the output should not show more than .5 volt across the voice coil, or 50 milliwatts in the plate circuit of the output tube.

Generally, at frequencies above 7,000 kc., the signal generator frequency will change with each adjustment of the generator output attenuator control. Hence, the receiver must be retuned each time the attenuator is adjusted.

Some generators cause trouble by direct radiation to the set at frequencies above 8 mc. Experience indicates that more accurate alignment is possible when the generator is separated by several feet from the receiver under test, in order to eliminate this direct pickup.

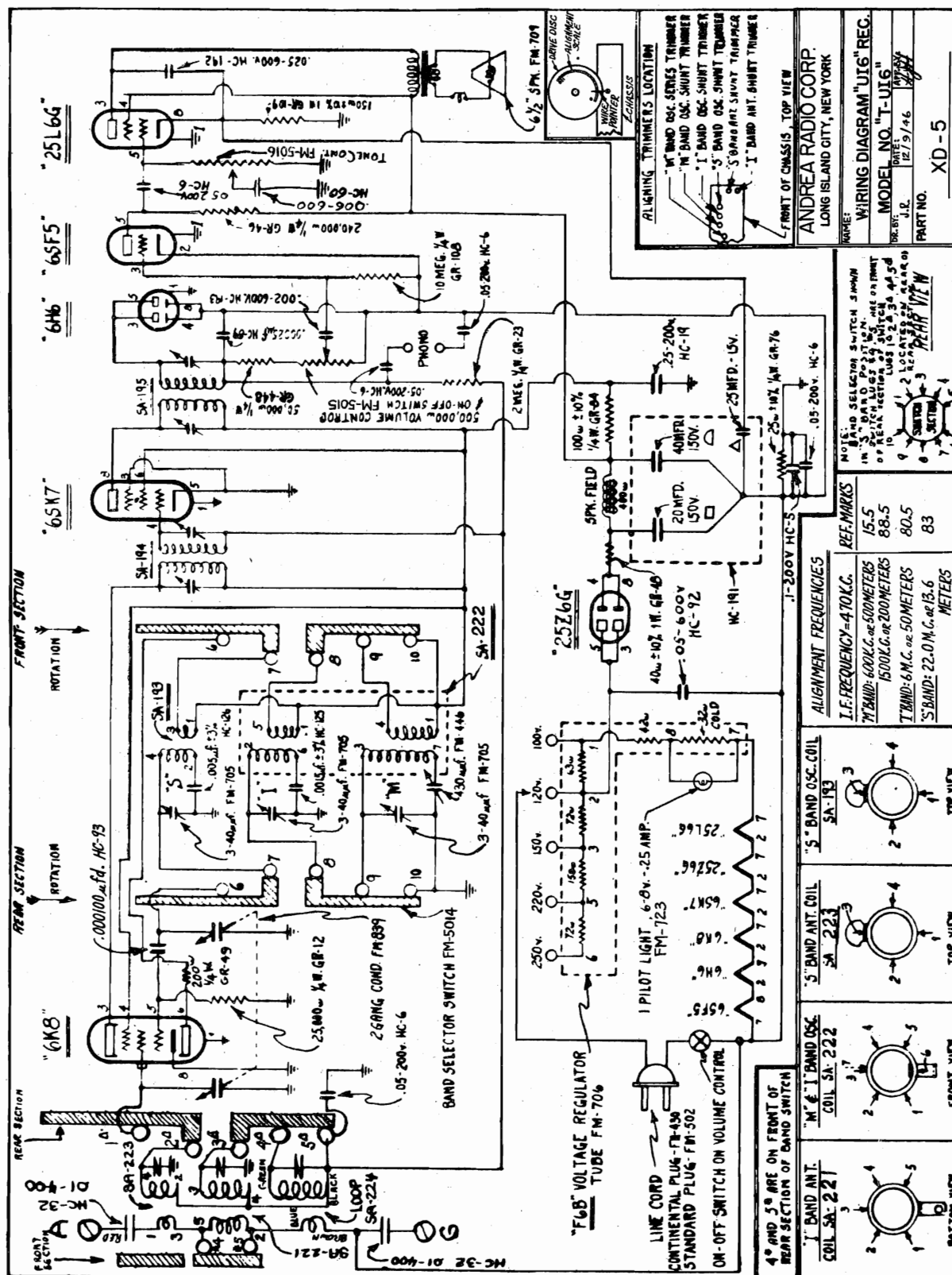
**470-KC. I. F. ALIGNMENT:** Connect the high-potential lead of the signal generator in series with a .1 mfd. condenser to the grid of the 6X8 tube. Set the generator at 470 kc., and adjust the output until a small deflection is obtained in the output meter. Adjust the trimmers condensers on the top of the 1st and 2nd I.F. transformers (see circuit diagram) for maximum deflection on the output meter. After this adjustment has been made, disconnect the generator from the grid of the 6X8 tube. This completes the alignment of the I. F. system.

#### "S" BAND ALIGNMENT:

Connect the high-potential lead from the generator in series with a 400 ohm resistor to the antenna terminal (marked A) on rear of loop, and the low side of the generator to the ground terminal (marked G) on rear of loop. Put the wave band switch at the S position.

MODEL T-U16

ANDREA RADIO CORP.



ALIGNING TRIMMERS LOCATION

W-BAND OSC. SERIES TRIMMER  
 W-BAND OSC. SHUNT TRIMMER  
 I-BAND OSC. SERIES TRIMMER  
 I-BAND OSC. SHUNT TRIMMER  
 S-BAND ANT. SHUNT TRIMMER  
 I-BAND ANT. SHUNT TRIMMER

FRONT OF CHASSIS, TOP VIEW

ANDREA RADIO CORP.  
 LONG ISLAND CITY, NEW YORK

WIRING DIAGRAM "UT6" REG.  
 MODEL NO. "T-U16"  
 DATE: 12/9/46  
 J.E.  
 PART NO. XD-5

NOTE: NO SELECTOR SWITCH 3-4-5 IN "A" POSITION. IF ON FRONT OF REAR SECTION, SWITCH 2-3-4-5 IN "A" POSITION.

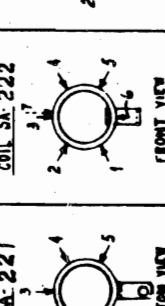
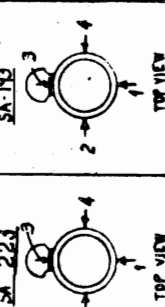
REF. MARKS

15.5  
 88.5  
 80.5  
 83

ALIGNMENT FREQUENCIES

I.F. FREQUENCY = 470 K.C.

W-BAND: 600 K.C. or 500 METERS  
 I-BAND: 1500 K.C. or 200 METERS  
 T-BAND: 6 M.C. or 50 METERS  
 S-BAND: 22.0 M.C. or 13.6 METERS



## ANDREA RADIO CORP.

**"S" BAND ALIGNMENT:**

Connect the high-potential lead from the generator in series with a 400 ohm resistor to the antenna terminal (marked A) on rear of loop, and the low side of the generator to the ground terminal (marked G) on rear of loop. Put the wave band switch at the S position, adjust the generator to 22,000 kc., and the receiver to 22.0 mc. Vary the S band oscillator shunt trimmer slowly from maximum to minimum. You will hear the signal at two settings of the trimmer, one nearer the minimum capacity (plates open) and one near the maximum capacity (plates closed). The setting near minimum capacity is correct, because the setting near maximum capacity is at the image frequency.

Now adjust the antenna shunt trimmer. During this adjustment, be sure to rock the gang condenser back and forth slowly each time you make an adjustment of the trimmer. As you continue to do this, you will reach a point where further turning of the trimmer screw, while rocking the gang condenser, will not increase the signal response. This is the correct adjustment.

A simple method of determining if the receiver and generator are tuned for correct alignment is as follows:  
Set the signal generator at 22,000 kc., and tune the receiver slowly from 21,000 to 23,000 kc. Two signals should be heard, 940 kc. apart. One will be lower in frequency than 22,000 kc. and the other will be higher. The higher frequency, as indicated on the dial, is the correct aligning frequency, and the lower one is the image.

As a further check, leave the receiver tuned to the higher frequency. Vary slowly, increase the generator frequency from 22,000 kc. to about 23,000 kc.

A signal will be heard near 23,000 kc. if all the settings are correct for alignment. If there is no signal, the original settings were on the image frequency. In that case, you must start again from the beginning, in order to be sure of accurate results.

After you have found the correct settings, the image, or lower, frequency response on the receiver will always sound weaker than the true signal.

**"I" BAND ALIGNMENT:** With the signal generator connected in accordance with the preceding instructions, set the generator at 6,000 kc., turn the wave band switch to the I position, and adjust the dial to 6 mc. Following the procedure just described, adjust the I band oscillator shunt trimmer for maximum signal response. Next, adjust the I band antenna shunt trimmer. Rock the gang condenser back and forth slowly as you adjust the trimmer, in accordance with the instructions for the S band adjustment. This completes the adjustment for the I band.

**"M" BAND ALIGNMENT:** Replace the 400-ohm resistor in the generator lead by a .00025 mfd. condenser. Set the generator at 1,500 kc., turn the wave band switch to the M position, and set the dial of the receiver at 1,500 kc. Adjust the M band oscillator shunt trimmer for maximum signal response. Next adjust the antenna shunt trimmer for maximum response. This band must be aligned at 600 kc. also. Set the generator accordingly, and tune the receiver to 600 kc. Adjust the M band oscillator series trimmer for maximum response. During this adjustment, be sure to rock the gang condenser for each small change of capacity of the series trimmer. When this adjustment has been completed, recheck the antenna adjustment at 1,500 kc. This completes the adjustment of the M band.

**TUBES:** The following tubes are required for this receiver:

618 Oscillator and Modulator	25L40 Beam Power Output
6327 I. F. Amplifier	25Z6G Rectifier
636 2nd Detector and AVC	763 Ballast Tube
637's 1st Audio	

**IMPORTANT!** If you find it necessary to replace any part in this receiver, bear this in mind: In order to maintain the high performance standards of Andrea Radio receivers, the components parts on all Andrea models are held to exceedingly close tolerance limits. Furthermore, Andrea components are given the exclusive "Climate Sealed" treatment which protects them from all weather and temperature conditions. Consequently, standard Andrea Radio replacement parts must be used for all service work, for the substitution of ordinary, stock items will result in inferior performance.

# 100-120-150-220-250 40/60 CYCLES OR DC FOR OPERATION ON AC OR DC, LINE VOLTAGES OF 100 TO 250

**WARNING!** Always remove the line plug from the electric outlet before removing the chassis from the cabinet. Also - connect the speaker plug to the receiver before switching on the power. Otherwise, damage will result.

**I. F. REALIGNMENT GENERALLY SUFFICIENT:** As a rule, it is not necessary to readjust the short wave oscillator and antenna shunt and series trimmers unless they have been tampered with, or require replacing. Consequently, careful realignment of the I. F. system is all that requires attention, ordinarily. Before making any adjustments, tune in one particular station and note the quality of reception so that you can check the improvement after the I. F. system has been realigned.

**USE SIGNAL GENERATOR AND OUTPUT VOLTMEETER:** For realigning, use a signal generator to supply a modulated carrier of 470, 600, 1,500, 6,000, and 22,000 kc., plus an output voltmeter. Alignment by any other means is not recommended. Your service test generator should be checked frequently for change in calibration by getting a zero beat between the generator and broadcast stations of known frequency.

**SPECIAL NOTES:** Before proceeding to align the antenna and oscillator circuits bear in mind that these circuits control the accuracy of the main tuning dial calibration particularly the oscillator trimmer. As the main dial is a part of the cabinet, servicing of the chassis can be made without the use of this dial by using the reference alignment scale 0 to 100 divisions attached permanently to the gang condenser drive drum.

The table below indicates the reference dial settings for the required alignment frequencies. You will note that the chassis contains a self-tapping screw located just below the gang condenser drum, the purpose of which, is to enable you to wrap a piece of bare wire and thereby form a pointer to the reference scale. Set the pointer at the zero marking on the reference scale with the gang condenser plates fully meshed (all capacity in) after which rotate the drum to the correct reference setting for proper circuit alignment and procedure in accordance with the Band alignment instruction. Remove reference pointer before installing in cabinet.

ALIGNMENT FREQ. KC.	REFERENCE DIAL SETTING	BAND
1,500	88.5	"M"
600	18.5	"M"
6,000	80.5	"I"
22,000	85	"S"

**NOTES ON REALIGNING THE BANDS:** During the aligning measurements, the output of the signal generator must be kept low so that it will not cause the AVC circuit in the set to function. In other words, when the volume control on the set is turned to maximum, the output should not show more than .5 volt across the voice coil, or 50 milliwatts in the plate circuit of the output tube.

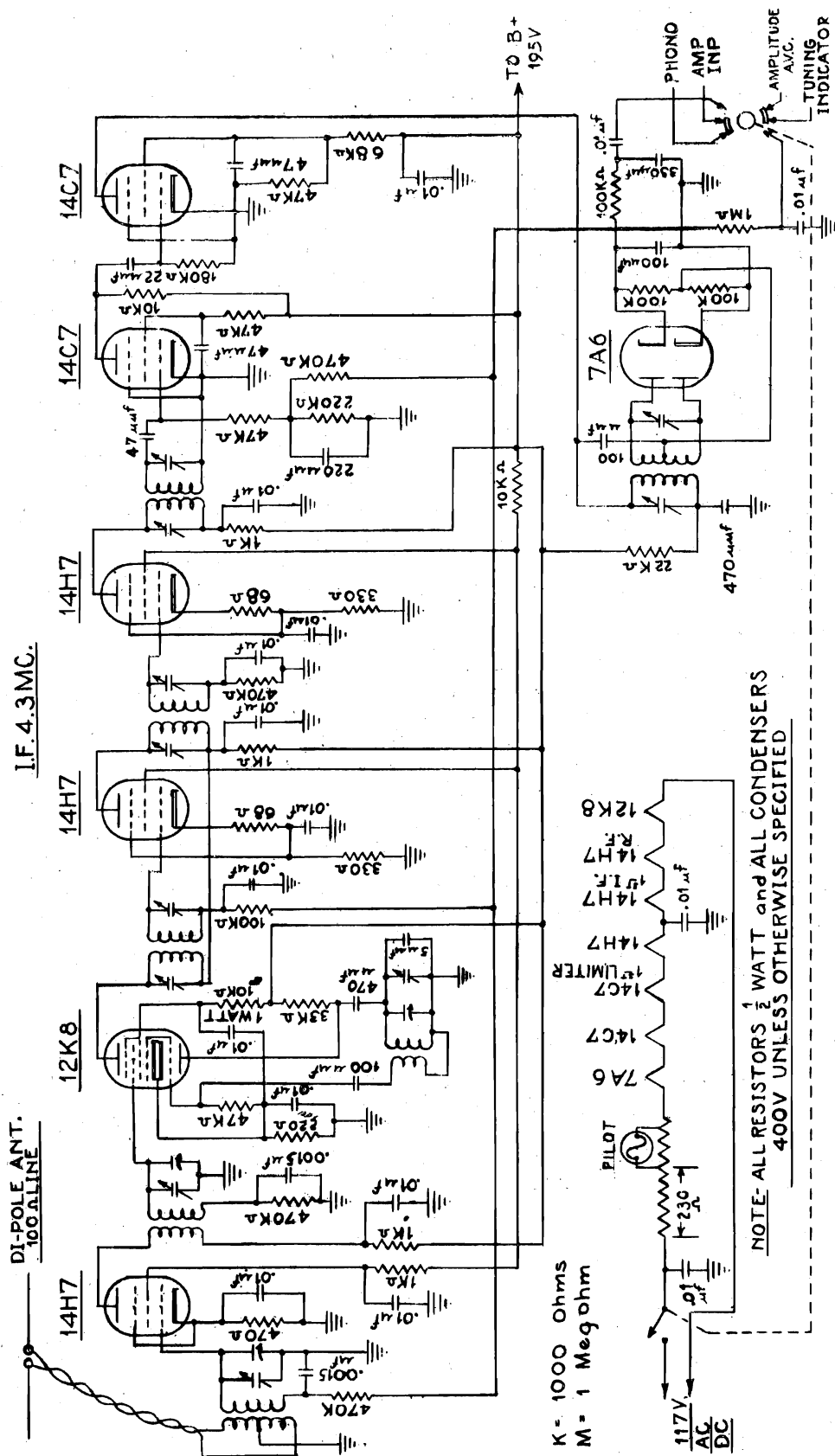
Generally, at frequencies above 7,000 kc., the signal generator frequency will change with each adjustment of the generator output attenuator control. Hence the receiver must be retuned each time the attenuator is adjusted.

Some generators cause trouble by direct radiation to the set at frequencies above 8 mc. Experience indicates that more accurate alignment is possible when the generator is separated by several feet from the receiver under test, in order to eliminate this direct pickup.

**470 KC. I. F. ALIGNMENT:** Connect the high-potential lead of the signal generator in series with a .1 mfd. condenser to the grid of the 618 tube. Set the generator at 470 kc., and adjust the output until a small deflection is obtained in the output meter. Adjust the trimmer condensers on the top of the 1st and 2nd I. F. transformers (see circuit diagram) for maximum deflection on the output meter. After this adjustment has been made, disconnect the generator from the grid of the 618 tube. This completes the alignment of the I. F. system.

1

[illegible]



TUBE and TRIMMER LOCATIONS		VARIABLE CONDENSER	
7A6	14C7	ANT.	R.F.
14C7	14H7	42 Mc	50 Mc
14C7	14H7	I.F.	4.3 Mc.
14C7	14H7	OSC.	



MODEL FM-4, FM Tuner

## ANSLEY RADIO CORP.

Replacement Parts  
The F.M. Tuner - Model F.M. 4

Req.	Description	Part No.	List Price
3	I.F. Transformer 4.3 M.C.	8.21A	1.50
1	Discriminator Transformer 4.3 M.C.	8.22A	5.00
1	Antenna Coil	28.39A	1.00
1	Oscillator Coil	28.41A	1.00
1	R.F. Coil	28.40	1.00
1	Pilot Bulb 12-100 M.A.	18.06	.65
	( Dial Assembly	25.63 )	
	( Flexible Connecting Shaft		
	( Flexible Casing		7.50
	( Hardware Shaft and Casing		
1	On-Off Switch	16.12	1.60

Condensers

1	3 Section Variable	6.87A	6.00
17	.01 MFD 400 volt P.T.C.	7.76	.15
2	.0015 MFD Mica MW	6.88	.15
2	.0005 MFD Mica MW	6.10	.15
1	.00025 MFD Mica MO	6.47	.15
2	.0001 MFD Mica MO	6.08	.15
1	.00033 MFD Mica MO	6.89	.15
1	.000022 MFD Mica MO	6.90	.15
3	.00005 MFD Mica MO	6.70	.15
1	.0001 MFD Silver Mica MO	6.91	.35
1	5 MMF Sprague Type 3 Liquid Dielectric Cond.	6.92	.50

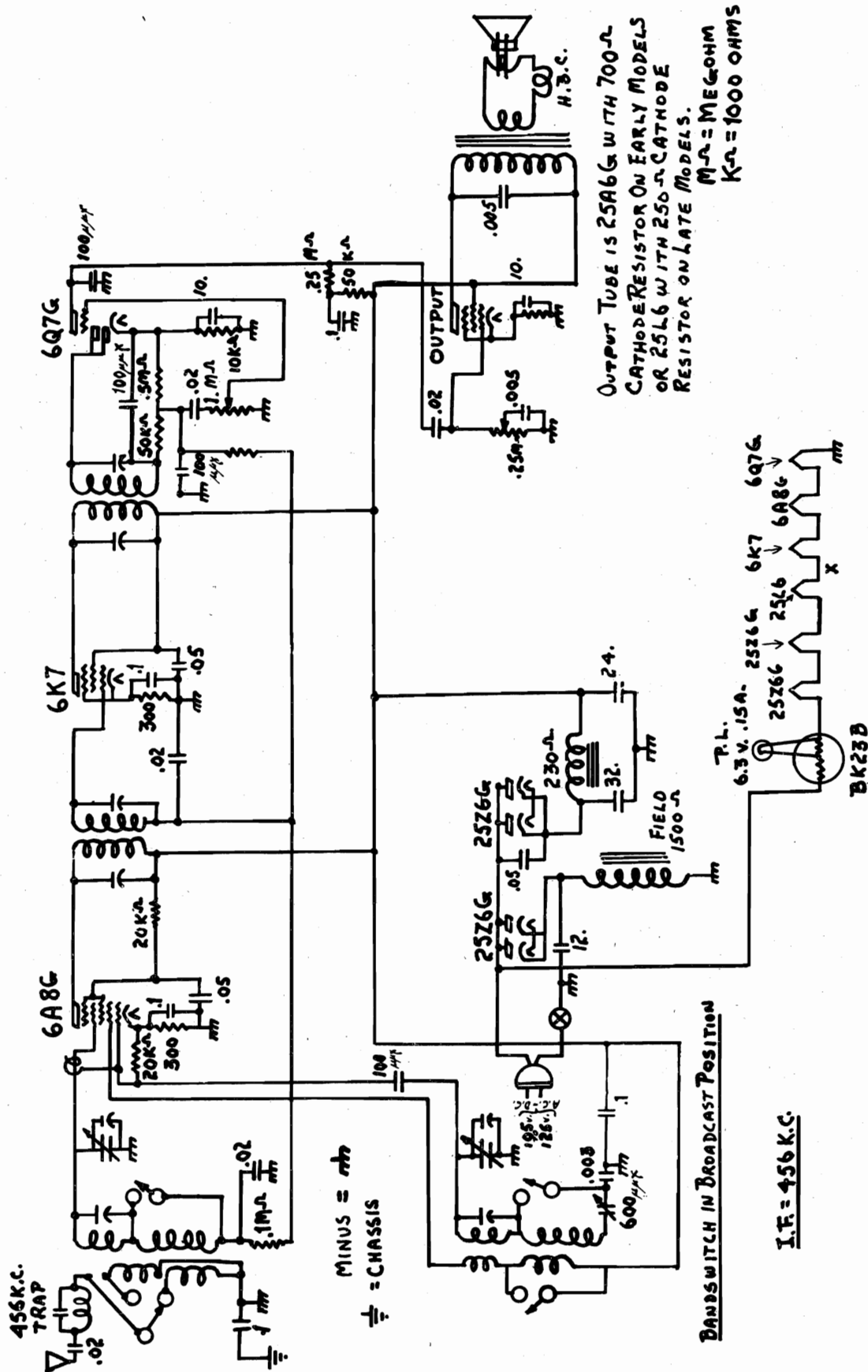
Resistors

2	68 Ohms $\frac{1}{2}$ Watt	7.89	.15
2	220 Ohms $\frac{1}{2}$ Watt	7.67	.15
2	330 Ohms $\frac{1}{2}$ Watt	7.73	.15
1	470 Ohms $\frac{1}{2}$ Watt	7.90	.15
4	1000 Ohms $\frac{1}{2}$ Watt	7.47	.15
2	10 K Ohms $\frac{1}{2}$ Watt	7.91	.15
1	22 K Ohms $\frac{1}{2}$ Watt	7.92	.15
1	33 K Ohms $\frac{1}{2}$ Watt	7.93	.15
4	47 K Ohms $\frac{1}{2}$ Watt	7.94	.15
1	68 K Ohms $\frac{1}{2}$ Watt	7.95	.15
4	100 K Ohms $\frac{1}{2}$ Watt	7.14	.15
1	180 K Ohms $\frac{1}{2}$ Watt	7.96	.15
1	220 K Ohms $\frac{1}{2}$ Watt	7.97	.15
4	470 K Ohms $\frac{1}{2}$ Watt	7.98	.15
1	1 Megohm $\frac{1}{2}$ Watt	7.34	.15
1	10 K Ohms 1 Watt	7.59	.15
1	230 Ohm 5 Watt Metal Clad	7.99	1.25

Tubes

1	12K8	34.38
3	14H7	34.39
2	14C7	34.40
1	7A6	34.41

OUTPUT TUBE IS 25A6G WITH 700- $\Omega$  CATHODE RESISTOR ON EARLY MODELS OR 25L6 WITH 250- $\Omega$  CATHODE RESISTOR ON LATE MODELS.  
M $\mu$  = MEGOHM  
K $\Omega$  = 1000 OHMS

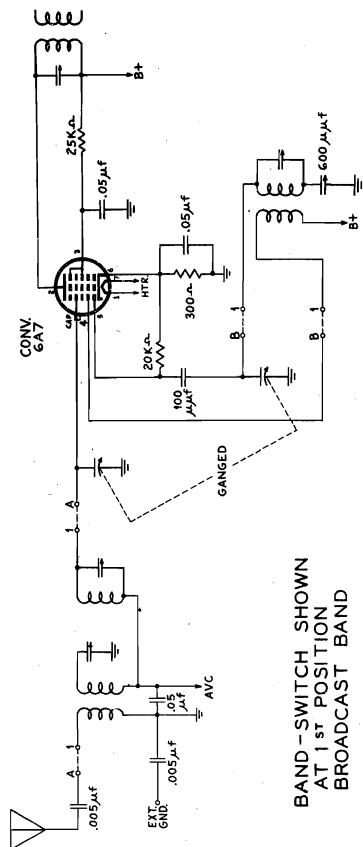


NOTE: ON LATE PRODUCTION THE RESISTOR TUBE IS MOVED TO POINT "X" IN FILAMENT SERIES.

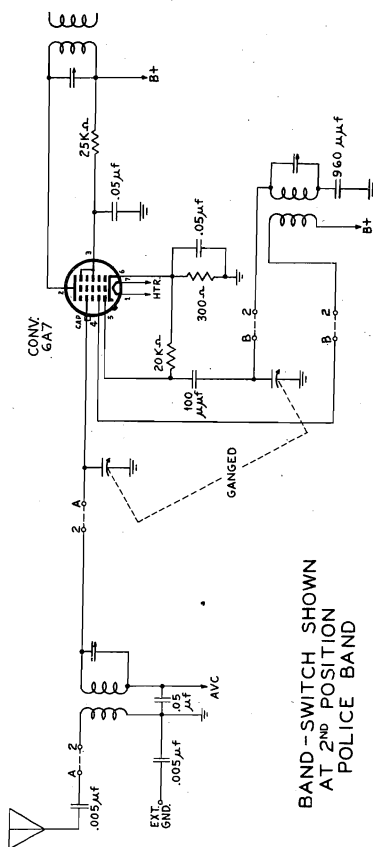
ANSLEY RADIO CORP.

MODELS 677, 678  
MODEL 5111

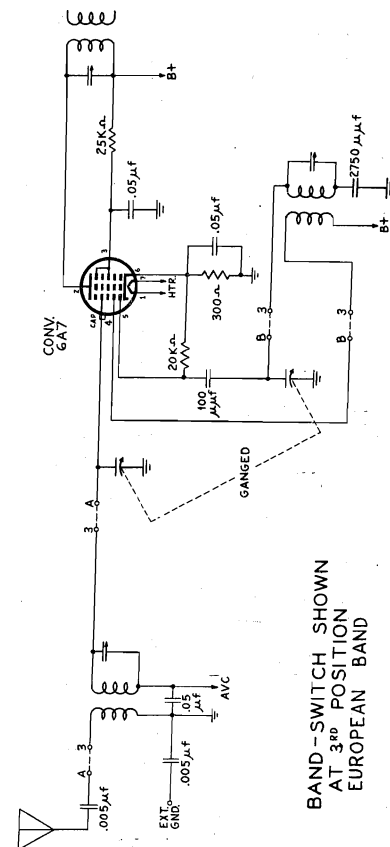
MODEL 5111



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

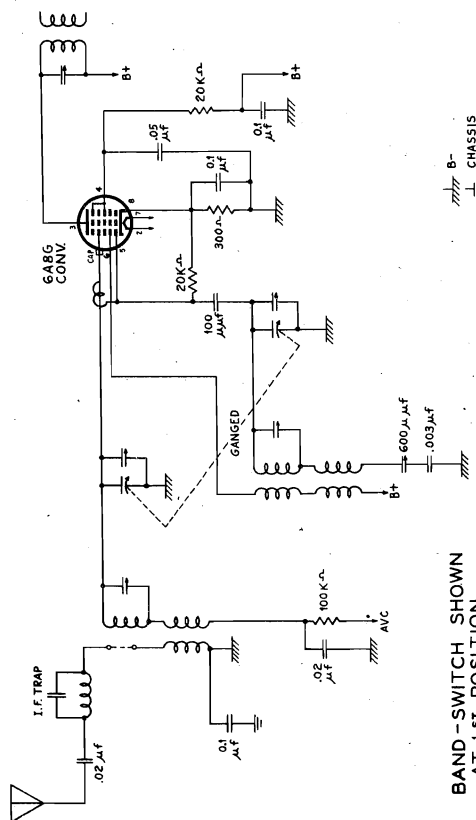


BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION  
POLICE BAND

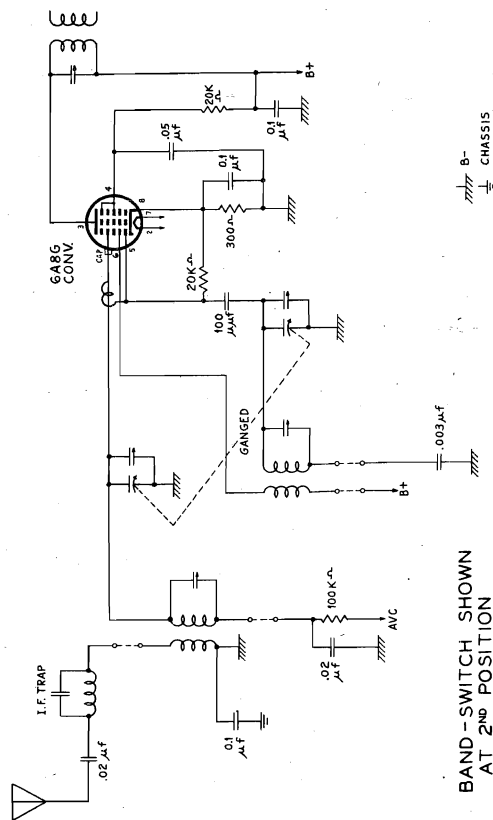


BAND-SWITCH SHOWN  
AT 3<sup>RD</sup> POSITION  
EUROPEAN BAND

MODELS 677, 678



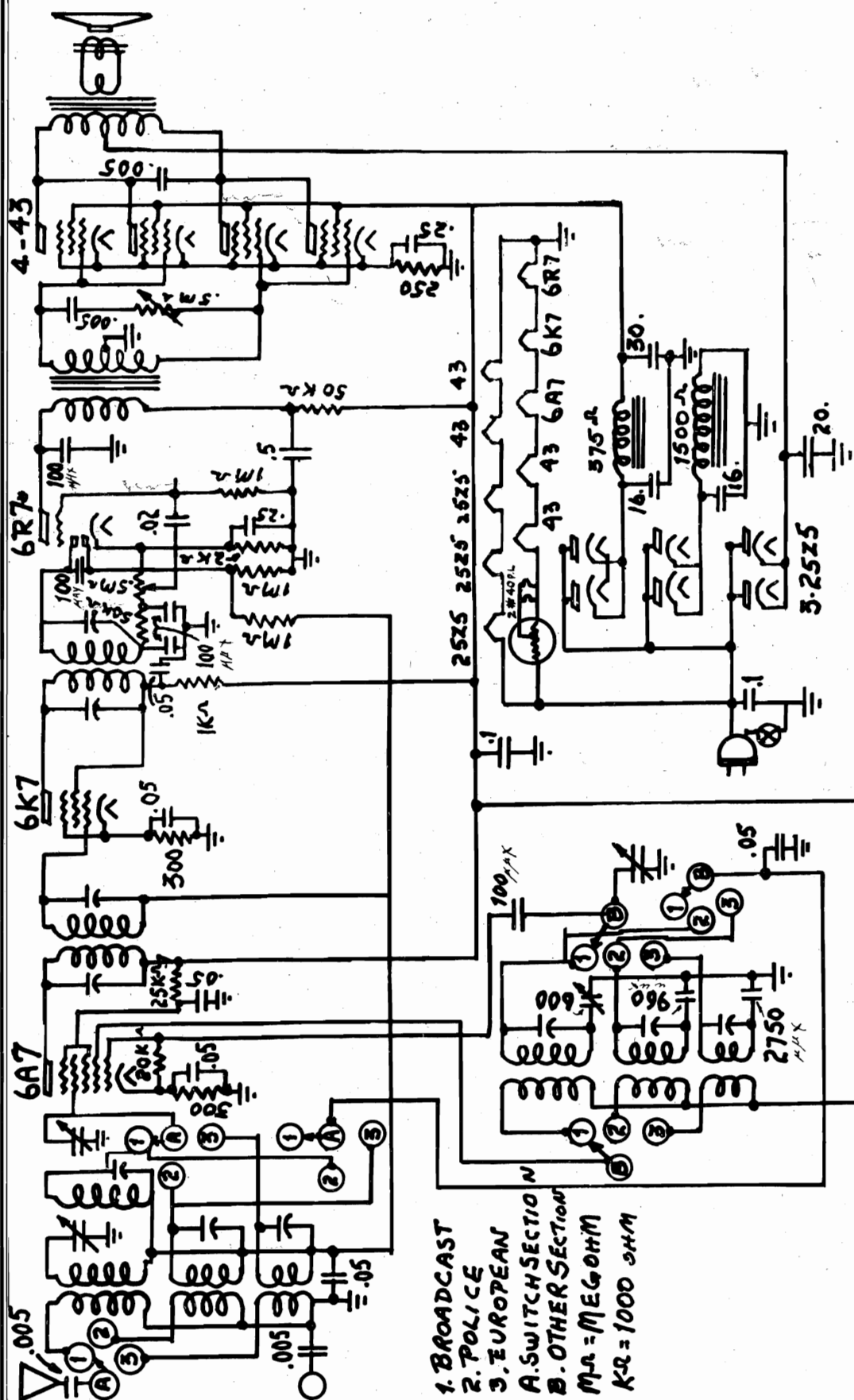
BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION  
BROADCAST BAND



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

MODEL 5111

ANSLEY RADIO CORP.



### ALIGNMENT FREQUENCIES:

**I.F. = 456 K.C.**

**VOLTS  
PRESELECTOR**

**BAND I → 1400 K.C.**

" 2 - NONE

3 ↑  
NONE

# OSCILLATOR

1400 K.C.

4 mc.

15 mc.

PADDER

00000

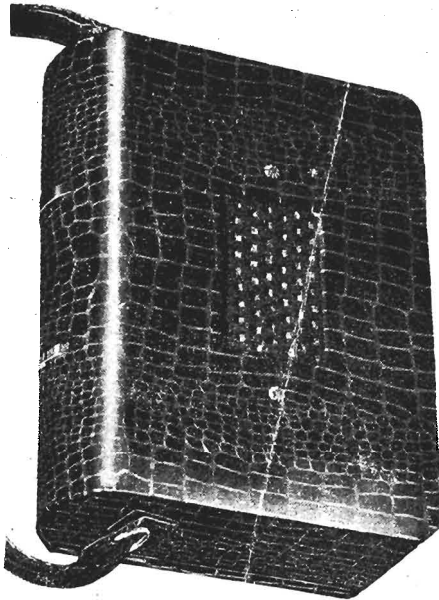
**FILED**

Fixed

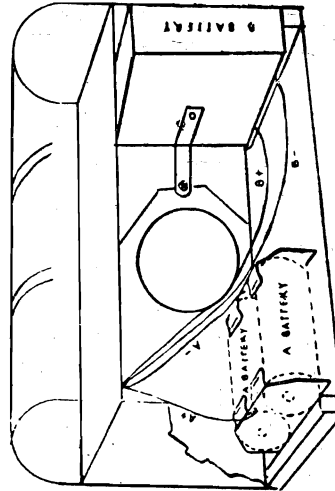
6-1-36

## MODEL 601

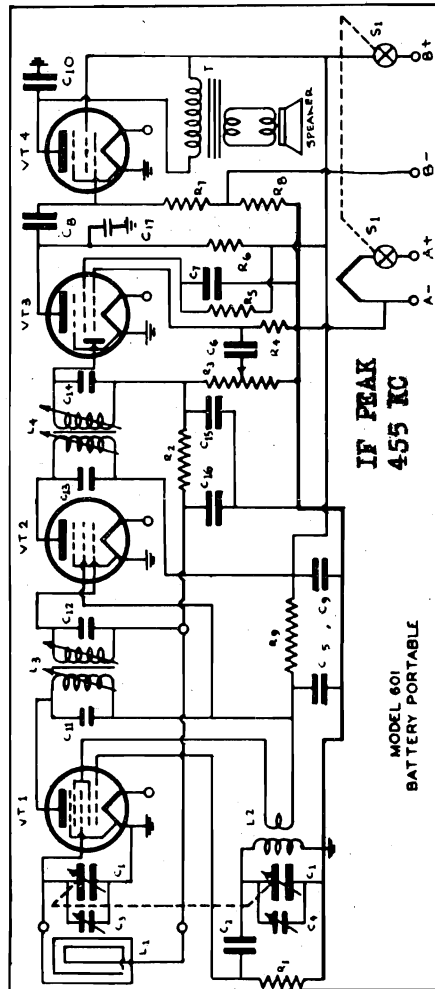
## ARC RADIO CORP.



Cut-Away View  
Showing Batteries  
Placed in Cabinet



NOTE: Nipple end of "A" batteries go to A+.  
Snap back cover in proper place. Set will not operate with cover open.



Quantity	Item**	Part No.	Description	Price
1.	c1	601-5	Two Gang Variable Condenser	\$2.35
2.	c2, c17	601-43	50 MMF Condenser	.20 each
2.	*c3, c4	601-5	Trimmers, Part of Variable Condenser	0
1.	c15	601-42	.00025 Tubular Condenser	.20
3.	c6, c8, c10	601-41	.002MFD, 200 Volt Tubular Condenser	.20 each
3.	c7, c5, c16	601-44	.05MFD, 200 Volt Tubular Condenser	.20 each
1.	c9	601-10	8MFD, 150 Volt Dry Electrolytic Condenser	.50
4.	*c11, c12, c13, c14	601-3, 3A	Part of I.F. Transformers	0
1.	L1.	601-8	Loop Antenna Assembly	.85
1.	L2.	601-9	Oscillator Coil	.50
1.	L3.	601-3	Double tuned iron core First I.F. Transformer	.95
1.	L4.	601-3A	Double Tuned Iron Core Second I.F. Transformer	.95
1.	T.	601-2	Output Transformer	.95
1.	R1.	601-16	100,000 ohm 1/4 Watt Carbon Resistor	.15
1.	R2.	601-17	2.2 Megohm 1/4 Watt Carbon Resistor	.15
1.	R3.	601-6	1 Megohm Volume Control with S1	1.05
1.	R4.	601-18	10 Megohm 1/4 Watt Carbon Resistor	.15
1.	R5.	601-19	4.7 Megohm 1/4 Watt Carbon Resistor	.15
1.	R6.	601-20	1 Megohm 1/4 Watt Carbon Resistor	.15
1.	R7.	601-21	3 Megohm 1/4 Watt Carbon Resistor	.15
1.	R8.	601-22	820 Ohm 1/2 Watt Carbon Resistor	.15
1.	R9.	601-23	5000 Ohm 1/4 Watt Carbon Resistor	.15
1.	*S1.	601-6	Double Pole Single Throw Switch	0
1.	VT.1	601-55	1R5 Tube	2.20
1.	VT.2	601-54	1T4 Tube	2.20
1.	VT.3	601-56	1S5 Tube	2.20
1.	VT.4	601-4	3S4 Tube	2.20
1.	Speaker	601-2	4" Permanent Magnet Dynamic Speaker 1 oz. Alnico No.5	3.00

\*NOT SUPPLIED SEPARATELY.

## MODEL 601

ARC RADIO CORP.

## LOCATION OF COILS AND ADJUSTMENTS

The oscillator coil is located beneath the chassis. The loop is mounted inside the cover with the connection of the loop soldered to snaps on the cover. The trimmers for oscillator coil and loop are mounted on the variable condenser. The IF is permeability tuned, and the slugs are reached from top and bottom of the IF transformer.

The IF transformers are located in cans mounted on top of the chassis. The first IF transformer No. 1455-1R is at the rear right of the chassis. The second IF transformer No. 1455-6 is to the front left of the variable condenser.

**NOTE:** The top iron core slug is the secondary of each transformer.

A signal generator with frequencies of 455 & 1400 KC is required. An output meter should be used across the voice coil or output transformer for observing maximum response. Always use as weak a test signal as possible when aligning the receiver.

## I.F. ALIGNMENT

Connect two jumpers, one to each snap button on cover to other part of snap button on posts of cabinet. This connects the loop.

Swing variable condenser to minimum capacity position. Feed 455KC to the grid of the 1R5 tube through a .01 condenser. Tune secondary of second IF for maximum indication of output meter, then tune primary in similar manner. Tune first IF secondary and then primary.

## R.F. ALIGNMENT

Set the dial pointer at 1400KC. Feed 1400 KC from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop approximately one foot away from and parallel to the receiver loop antenna and advance the output of the signal generator until a suitable deflection is obtained on the output meter. First adjust the oscillator and then the antenna trimmer for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 1400KC. Set the dial at 600KC and feed 600KC to the antenna lead. A portion of the outside turn of loop may be swung to either side of the center to give maximum response. Realign at 1400 KC.

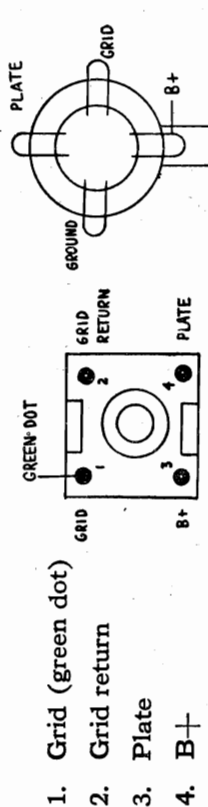
Current drain ..... A Battery-0.220 Amps.  
B Battery-0.008 Amps.  
Frequency Range.....1600 KC to 550 KC

## GENERAL NOTES

1. Batteries: The model No. 601 is designed to house the complete set of batteries within the cabinet. The battery complement should be as follows:

Type Battery	No. Req.	Eveready Part No.	Burgess Part No.	Ray-O-Vac Part No.
1 1/2 Volt "A"	2	No. 950	No. 2R	No. 2LP
6 7/2 Volt "B"	1	No. 467	No. XX 45	No. 4367

2. The lug connections for the I.F. transformers and oscillator coil are as follows:



1. Grid (green dot)
2. Grid return
3. Plate
4. B+

3. If replacements are made in the R.F. section of the circuit, the receiver should be carefully re-aligned.

4. The self-contained loop antenna has directional characteristics. It is important therefore, once the station is tuned in, that the cabinet be rotated on its base, back and forth, through a quarter of a circle (90°) and left at the position where the station is received with maximum volume.

## TUBE DATA

The tube complement is as follows:

- |   |                                       |
|---|---------------------------------------|
| 1 | 1R5 oscillator modulator              |
| 1 | 1T4 I.F. amplifier                    |
| 1 | 1S5 2nd detector, AVC, A.F. amplifier |
| 1 | 3S4 beam power output                 |

## VOLTAGE ANALYSIS

Reading should be taken with a 20,000 OHMS-PER-VOLT meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings are as follows:

"A" Battery 1.4 Volts.  
"B" Battery 60 Volts.

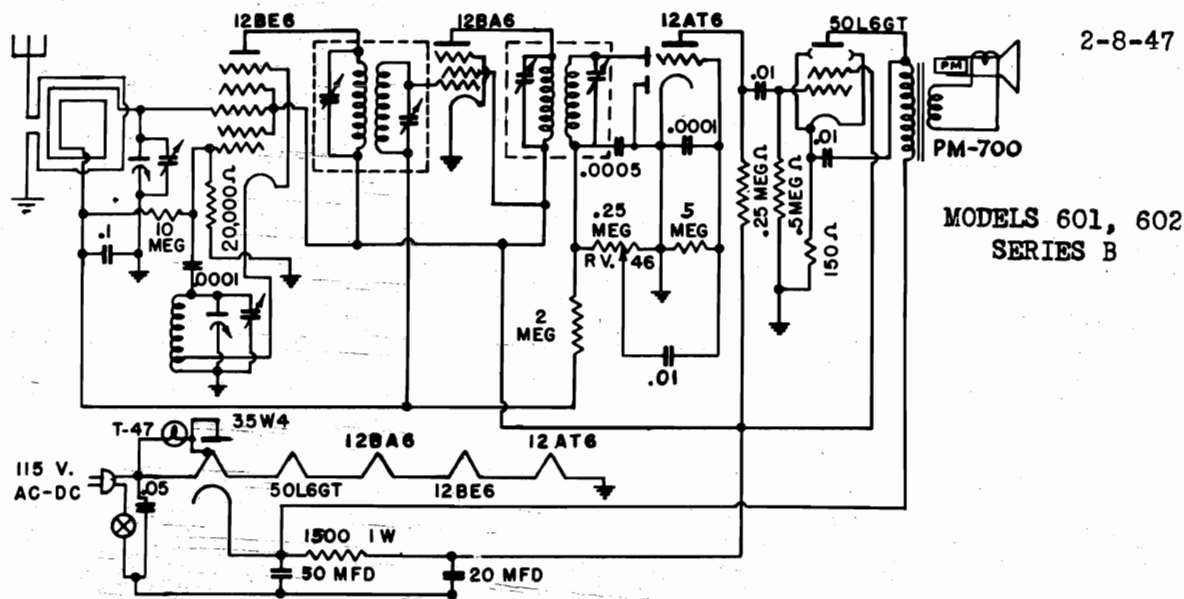
TUBE	PLATE	SCREEN	OSC. PLATE	FIL.
1R5	43 Volts	43 Volts	43 Volts	1.4 Volts
1T4	60 Volts	43 Volts		1.4 Volts
1S5	14 Volts	10 Volts		1.4 Volts
3S4	60 Volts	60 Volts		1.4 Volts

Bias for the 3S4 is obtained across the R8. The voltage drop across this resistor should be 6.9 volts.



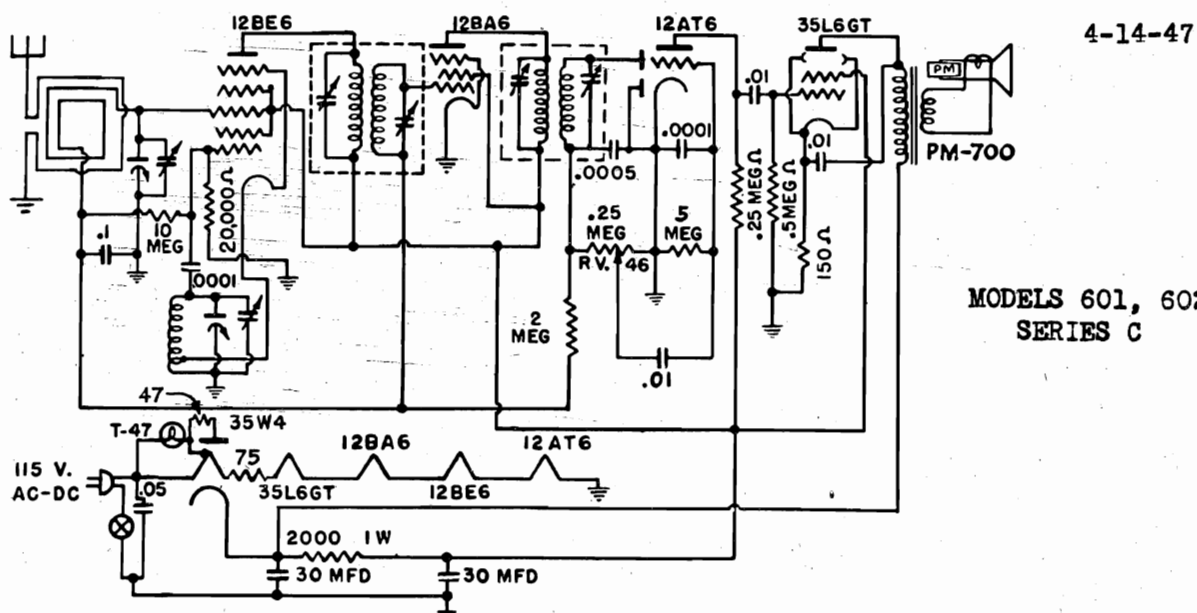
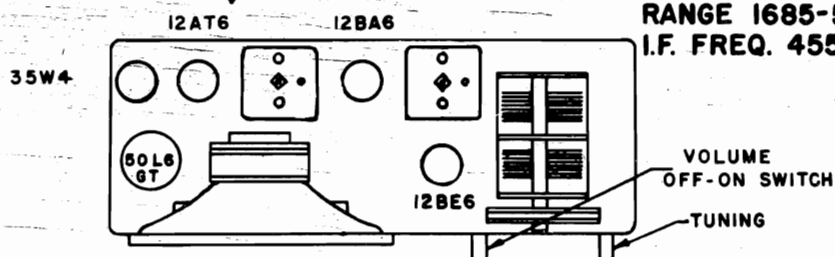
MODELS 601,602, Series B  
MODELS 601,602, Series C

AUTOMATIC RADIO MFG. CO., INC.



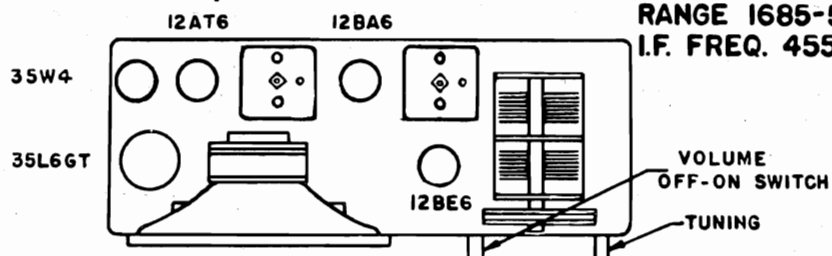
MODELS 601, 602  
SERIES B

**RANGE 1685-538 KC**  
**I.F. FREQ. 455 KC**



MODELS 601, 602  
SERIES C

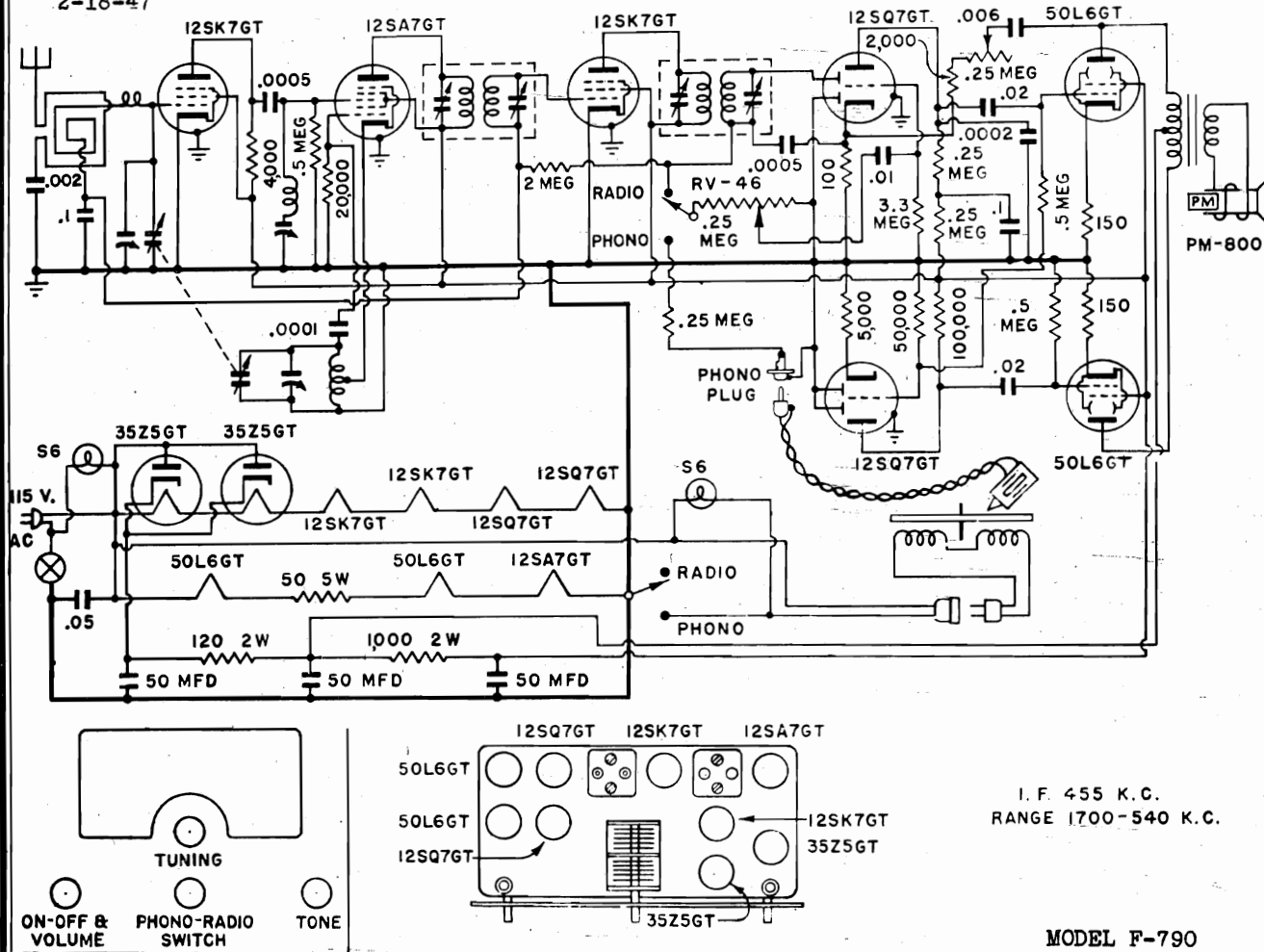
**RANGE 1685-538 KC**  
**I.F. FREQ. 455 KC**





[illegible]

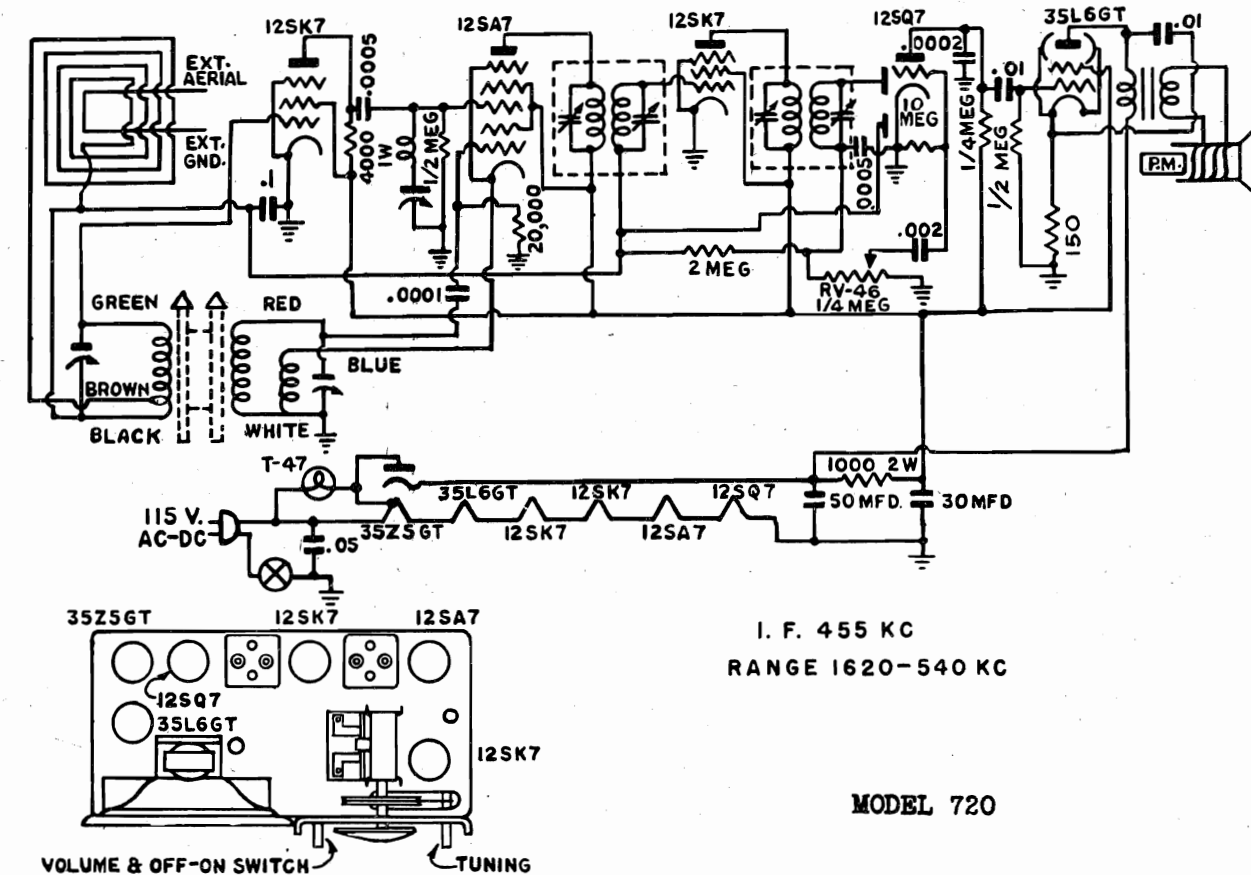
2-18-47



I. F. 455 K.C.  
RANGE 1700-540 K.C.

MODEL F-790

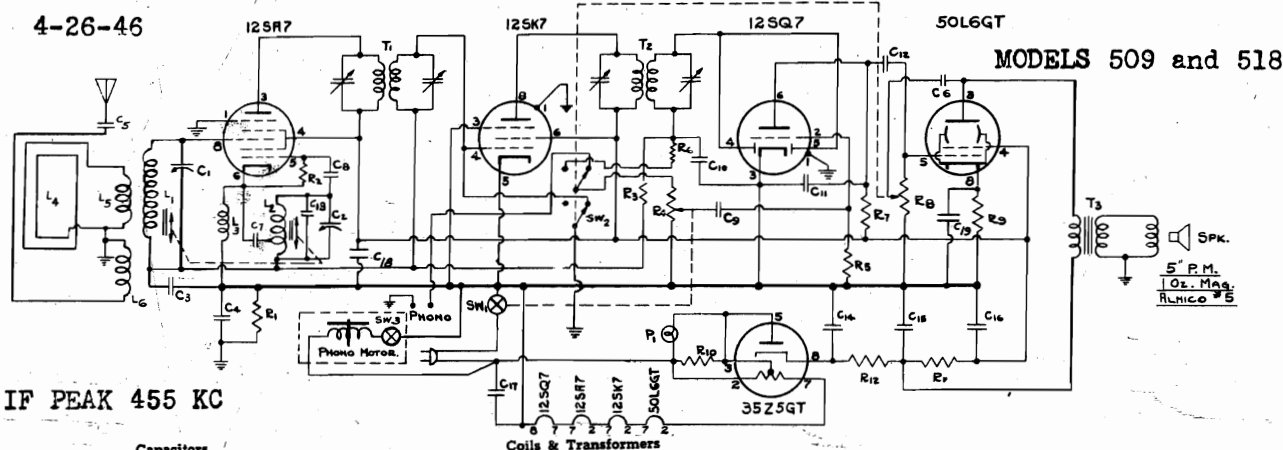
7-26-46





## MODELS 501,512 MODELS 509,518 AVIOLA RADIO CORP.

4-26-46



IF PEAK 455 KC

## Capacitors

Part No.	Part No.
C1 Ant. Trimmer 160 mmf	R-1027-1
C2 Osc. Trimmer 160 mmf	12000-05
C3 .05 mf 200 V	12000-1
C4 1 mf 200 V	12010-100
C5 100 mmf Mica	12012-1000
C6 1000 mmf Mica	12012-2000
C7 2000 mmf Mica	12010-50
C8 50 mmf Mica	12002-01
C9 .01 mf 400 V	12010-100
C10 100 mmf Mica	12010-250
C11 250 mmf Mica	12002-01
C12 .01 mf 400 V	12010-250
C13 250 mmf Mica	12010-250
C14 20 mf 150 V	12104-20-20-20
C15 20 mf 150 V	
C16 20 mf 150 V	
C17 .05 mf 400 V	12002-05
C18 .05 mf 200 V	12000-05
C19 10 mf 25 V	12105-10

## Resistors

Part No.	Part No.
R1 220,000 $\frac{1}{2}$ W	11005-224
R2 33,000 $\frac{1}{2}$ W	11005-333
R3 2.2 Meg. $\frac{1}{2}$ W	11005-225
R4 500,000 V. C. & SW	R-1043-2
R5 6.8 Meg. $\frac{1}{2}$ W	11005-685
R6 47,000 $\frac{1}{2}$ W	11005-473
R7 220,000 $\frac{1}{2}$ W	11005-224
R8 500,000 T. C.	R-1247
R9 150 $\frac{1}{2}$ W	11005-151
R10 150 $\frac{1}{2}$ W	11005-151
R11 1200 1W	11008-122
R12 330 1W	11008-331

## Cabinet &amp; Accessories

Part No.	Part No.
Cabinet	R-5002
Knobs	R-1051
Lid Bracket	R-5056

## Coils &amp; Transformers

Part No.	Part No.
L1 R. F. Coil	R-1162
L2 Osc. Coil	R-1163
L3 Tracking Coil	R-1165
L4 Loop	R-1076
L5 Primary Coil	R-1166
T1 1st IF	R-1025-1
T2 2nd IF	R-1025-2
T3 Output Trans.	R-1040-1
L6 Antenna Coil	R-1093

## Phonograph Unit

Part No.	Part No.
Phono Motor & Turntable Assem.	RC-206 or RC-207
Pickup Arm Assem.	RC-251
Motor Switch	RC-148

## Miscellaneous

Part No.	Part No.
Spk Speaker	R-1046
P1 Mazda No. 47	R-6005
Pilot Light Socket	R-1098
Dial—Glass	R-1052
Dial—String	10132
Dial—Pointer	R-1255-1
Dial—Spring	10083
Diffusion Screen	R-1194
Pulley	R-1013
Line Cord	10111-1
Chassis—Mtg. screw	10019-8-14
Tuning Shaft	R-1159
Dial Glass Clip	R-1019
Phono-Radio Switch	R-1248

Specifications: These combinations are available for both 110V-60 Cycle and 50 Cycle AC.

**WARNING: DO NOT USE ON DC**  
Each instrument is shipped operating on 110V-60 Cycle. Additional motor bushings will be supplied to each dealer desiring 50 Cycle operation.

**Power Supply**  
105 to 125 Volts 50 or 60 Cycle AC

**Power Consumption**  
50 Watts AC

**Tuning Range**  
540 KC to 1625 KC

**Circuit**  
5 tube superheterodyne. Built in Antenna with provision for connecting external antenna. Do not connect ground to receiver.

## 501,512 ALIGNMENT PROCEDURE 509,518

Allow receiver to warm up thoroughly before alignment. Turn volume control to maximum. Connect output meter to voice coil terminals.

## 455 IF ALIGNMENT

Tune receiver to high end of dial. Connect signal generator to antenna through .0005 mf condenser. Set generator to 455 KC, tune trimmers E-F-G-D- to maximum output. Always use lowest input from signal generator that provides good output indication.

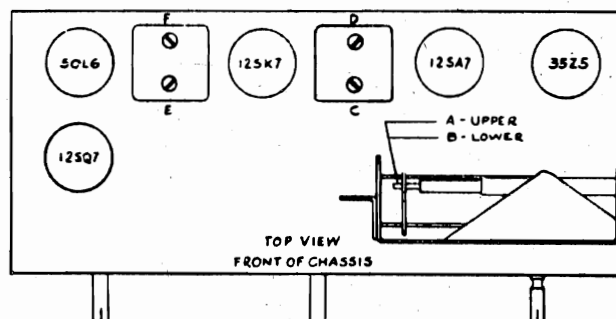
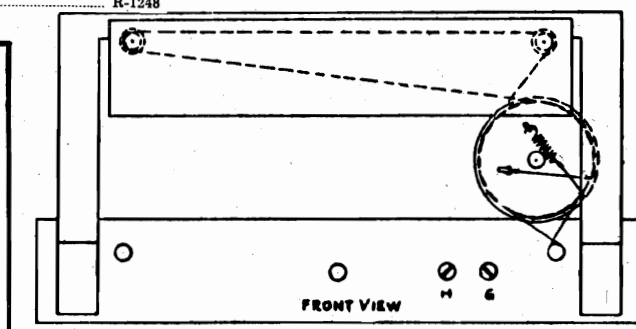
## 540 KC to 1640 KC ALIGNMENT

Loosely couple the signal generator to receiver by placing S.G. output lead near the pick-up antenna. (Not connected to it.) Set generator and receiver to 1400 KC.

Adjust trimmer H to signal.

Adjust trimmer G to maximum output.

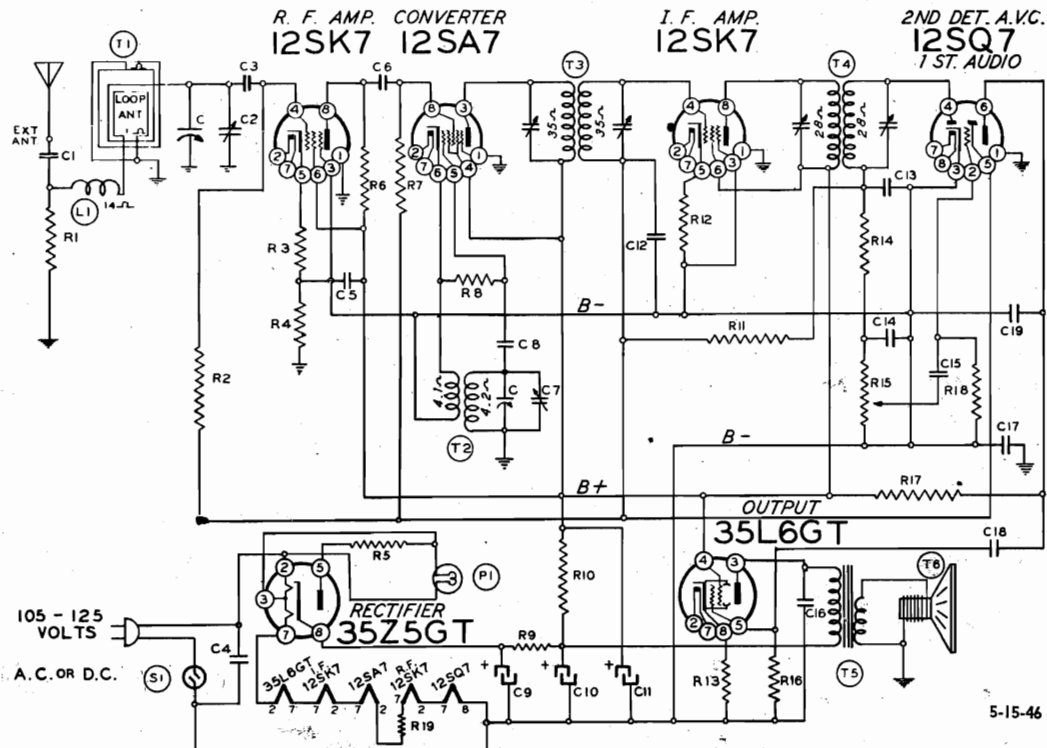
Set generator to 600 KC. Tune receiver to 600 KC. Adjust tuning slug A to signal meter.



Adjust tuning slug B to maximum output. Decrease signal generator output as receiver alignment provides more output to

## BELMONT RADIO CORP.

## MODEL 6D111, Series B



5-15-46

Tuning range ..... 530 to 1650 Kc.  
 Intermediate frequency ..... 455 Kc.  
 Power consumption ..... 35 Watts  
 Sensitivity (for 0.05 watt output) ..... 10 microvolts average

Selectivity ..... 55 Kc. broad at 1000 x signal at 1000 Kc.  
 Power output (in voice coil)  
     Undistorted ..... 0.8 watt  
     Maximum ..... 1.0 watt  
 Voice coil impedance ..... 3.2 ohms

## DIAL PARTS

115448	End plate (right hand bracket)
115448C	End plate (left hand bracket)
115146	Cams
115143	Key washer (13 used on cam shaft)
117528	Brass spacer (one used on cam shaft)
117602	Brass spacer (four used on cam shaft)
131181	Spring washers, for locking collar
117604	Locking collar
117600	Lever shaft
115361	Lever with roller
120283	Return spring for levers
115449B	Dial bracket assembly
112785	Pointer
A-53A-10989	Drive cord, 6 inches used
A-49A-11087	Spring on tuning shaft, for cord
A-3N-11086	Spacer under above spring
120143	Take-up spring for drive cord
B-6D-10241	Dial scale
112659	Crystal, clear, for dial scale
A-2M-7758	Cinch buttons for fastening scale to bracket
117833	Brass spacer (for spacing pointer from dial)

## MISCELLANEOUS

10798	Line cord and plug
101218	R15 Volume control and switch, 1 megohm
B-8A-10211	C 2-gang variable condenser
107249	P1 Pilot light bulb, type T-47
134123	Rubber bumper (bottom of cabinet)
128495B	Cardboard back
131193	Cinch buttons, for fastening back to cabinet
13141	Cinch buttons, to cover trimmer holes in cabinet
128292B-8	Pushbuttons
112784	Station call letters, set
112606	Acetate tabs for call letters
128473-9	Cabinet, bakelite
128496-8	Knob, volume
A-5B-10994-9	Knob, tuning
A-3F-10995	Locking screw for tuning knob
120388	Locking spring for tuning knob
A-2H-10715	Tube shield (for metal-base 12SA7GT)
A-2H-11271	Tube shield (for bakelite-base 12SA7GT)

C-8D-10778  
 1292  
 1001  
 1006  
 1295  
 11994

A-8C-10946  
 1009  
 129161  
 10026  
 100110  
 100106

C-9B1-70  
 C-9B1-31  
 C-9B1-50  
 C-9B1-26  
 C-9B1-42  
 C-9B1-17  
 C-9B1-25  
 C-9B1-23  
 C-9B2-53  
 C-9B2-63  
 C-9B1-34  
 C-9B1-52  
 C-9B1-29  
 C-9B1-27  
 C-9B1-35  
 C-9B2-44

12310  
 B-13E-10242  
 A-13D-10215  
 108140H  
 108145

121210  
 121171  
 121216  
 107271

114197  
 105104

C1, C15  
 C3  
 C4  
 C5  
 C6, C8, C19  
 C9, C10, C11  
 C12  
 C13, C14  
 C16  
 C17  
 C18

R1  
 R2  
 R3  
 R4  
 R5  
 R6  
 R7  
 R8, R14  
 R9  
 R10  
 R11  
 R12, R13  
 R16  
 R17  
 R18  
 R19

L1  
 T1  
 T2  
 T3  
 T4

T6  
 T5

## CONDENSERS

.002 x 600 volts, +40%, -15%  
 .0005, mica, ±20%  
 .1 x 400 volts, +50%, -10%  
 .25 x 200 volts, ±20%  
 .0001, mica, ±20%  
 Electrolytic (for 60-cycle sets), 40 mfd. x 150 volts, 20 mfd. x 150 volts, 20 mfd. x 150 volts.  
 Electrolytic (for 25-cycle sets), 60 mfd. x 150 volts, 40 mfd. x 150 volts, 40 mfd. x 150 volts.  
 .05 x 200 volts, ±25%  
 Dual .0001, mica, +25%, -10%  
 .02 x 400 volts, ±25%  
 .2 x 400 volts, +5%, -20%  
 .004 x 600 volts, ±10%

## RESISTORS

4700 ohms, ½ watt, ±10%  
 1 megohm, ½ watt, ±20%  
 100 ohms, ½ watt, ±10%  
 150,000 ohms, ½ watt, ±20%  
 22 ohms, ½ watt, ±10%  
 4700 ohms, ½ watt, ±20%  
 100,000 ohms, ½ watt, ±20%  
 47,000 ohms, ½ watt, ±20%  
 180 ohms, 1 watt, ±10%  
 1200 ohms, 1 watt, ±10%  
 3.3 megohms, ½ watt, ±20%  
 150 ohms, ½ watt, ±10%  
 470,000 ohms, ½ watt, ±20%  
 220,000 ohms, ½ watt, ±20%  
 4.7 megohms, ½ watt, ±20%  
 33 ohms, 1 watt, ±10%

## COILS

Load coil  
 Loop antenna assembly, complete on back  
 Oscillator coil  
 Input I.F. coil in can, 455 Kc.  
 Output I.F. coil in can, 455 Kc.

## SOCKETS

8-prong octal tube sockets, molded  
 8-prong socket for 12SK7, laminated  
 Socket base, bakelite  
 Pilot light socket assembly

## SPEAKER

5-inch P.M. speaker  
 Output transformer for speaker

## MODEL 6D111, Series B

## BELMONT RADIO CORP.

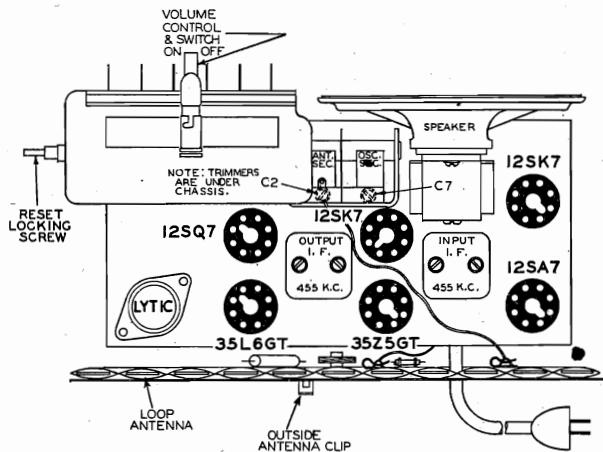
## ALIGNMENT PROCEDURE

- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The two adjustment screws can be reached with a long insulated screwdriver.
- It is important that during alignment the loop antenna

- be maintained at the same distance from the chassis as when the chassis is installed in the cabinet.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B- of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for Maximum Output (see chassis view)
I.F.	455 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	4 trimmers on input and output I.F. transformers
Broadcast	1650 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	Oscillator trimmer C7 on bottom of radio
	1400 Kc.	None	See note A	Set dial at 1400 Kc.	Antenna trimmer C2 on bottom of radio

Note A: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up energy.



CHASSIS VIEW, SHOWING TUBE LOCATIONS

## SETTING THE PUSHBUTTONS

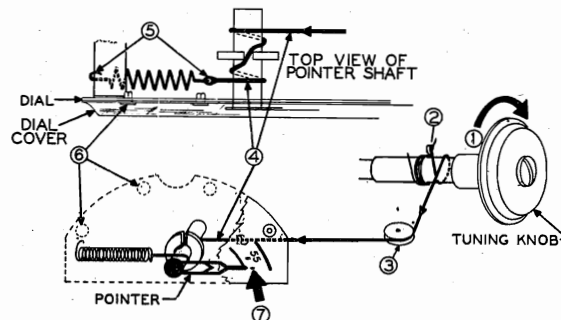
The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.
2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual.
3. Insert one call-letter tab in the rectangular opening in each of the pushbuttons, in any sequence. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.
4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see illustration) is loose. If it is not, turn it several turns to the left (counterclockwise).
5. Press the first pushbutton down all the way. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.
6. Follow this procedure for each of the five other buttons, adjusting each one for a different station.
7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. **IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.**
8. The pushbuttons are now properly set for automatic tuning. Any of the six stations may now be tuned in simply by pressing the proper button down as far as it will go. If it is desired to reset any of the buttons for a new station, loosen the locking screw in the center of the tuning knob, set the pushbutton as described above, and re-tighten the locking screw.

## REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required in the set. Use a piece slightly longer so that knots may be tied at each end. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position. This closes tuning condenser. Knob should remain in this position until installation is completed.
2. Tie cord to loop in spring as shown. Wind cord one turn around shaft in direction shown.
3. Pass cord over idler pulley.
4. Pass cord over pointer shaft; wind it one turn around shaft; pass it through key washer; wind it one more turn around shaft.
5. Hook spring over end of dial support. Tie cord to spring. **IMPORTANT:** Before tying knot stretch spring enough so that full contraction of spring will rotate pointer shaft at least one-half turn.
6. Remove dial crystal by removing Cinch buttons.
7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in horizontal position, as shown.



A--CANNOT BE MEASURED WITH VOLTMETER.

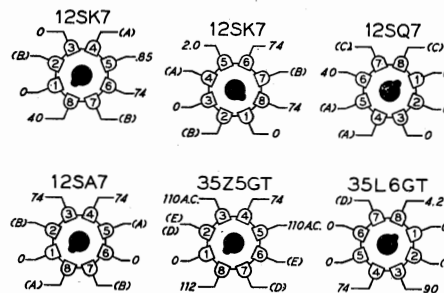
B--12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.

C--12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.

D--30 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.

E--117 VOLTS A.C. MEASURED ACROSS PINS 2 & 6.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B--LINE VOLTAGE 117 VOLTS AC. VOLUME CONTROL AT MINIMUM.

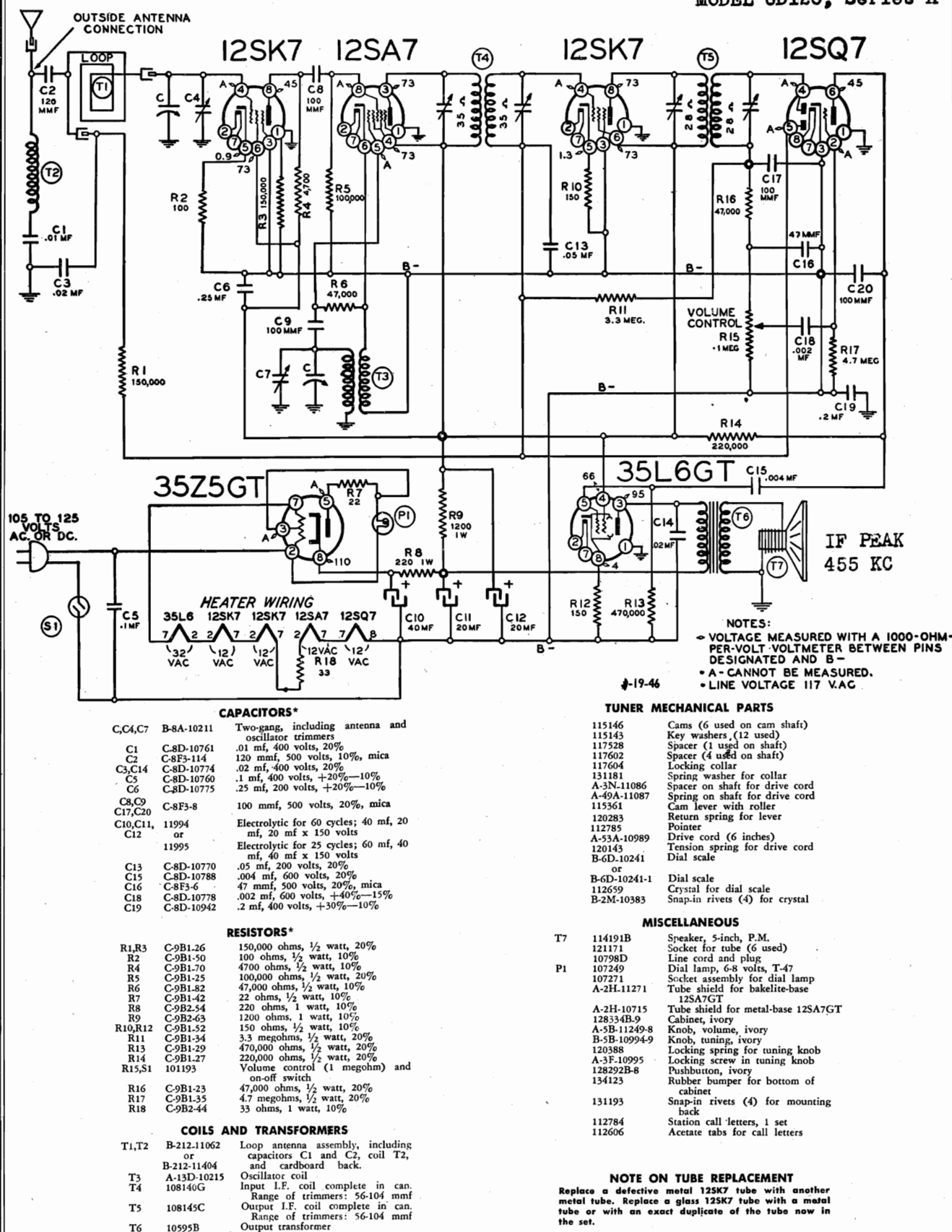


BOTTOM VIEW OF CHASSIS

VOLTAGES AT TUBE SOCKET TERMINALS

## BELMONT RADIO CORP.

MODEL 6D120, Series A



\*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt  
 RMA value—220,000 ohms, 20%, 1/2 watt  
 Pre-standardized value—50 mmf, 500 volts, 20%  
 RMA value—47 mmf, 500 volts, 20%



## MODEL 6D120, Series A

## BELMONT RADIO CORP.

## ALIGNMENT PROCEDURE

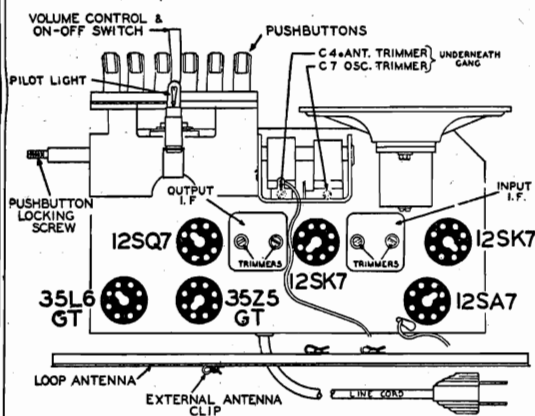
(Refer to Chassis View for location of trimmers)

- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to B— of radio.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The screws can be reached with a long screwdriver.

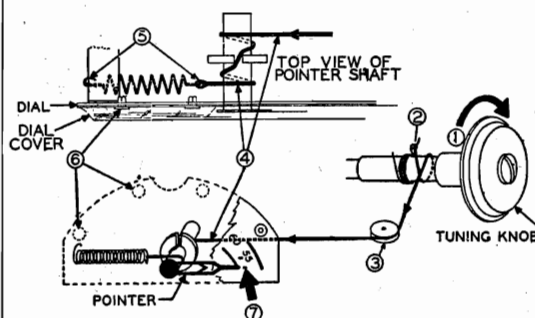
## SIGNAL GENERATOR

Frequency	Dummy Antenna	Connection to Radio	TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
455 kc	.1 mf	Grid (pin 8) of 12SA7	Plates out of mesh	Trimmers on output and input I.F. cans
1650 kc	.1 mf	Grid (pin 8) of 12SA7	Plates out of mesh	Oscillator trimmer C7 on bottom of gang
1400 kc	200 mmf	See note below	Set dial at 1400 kc	Antenna trimmer C4 on bottom of gang

Note: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop will pick up energy.



Chassis View



## REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position.
2. Tie cord to loop in spring as shown.
3. Pass cord over idler pulley.
4. Pass cord OVER pointer shaft; wind it one turn around shaft; pass it through key washer, then once more around shaft.
5. Hook spring over end of dial support. Tie cord to spring. IMPORTANT: Full contraction of spring must rotate pointer shaft at least one half turn.
6. Remove dial crystal by removing snap-in rivets.
7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in a horizontal position, as shown.

**SETTING THE PUSHBUTTONS**—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations on the standard broadcast band. They can be set up in any order.

1. Turn on the radio.
2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual.
3. Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.
4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).
5. Press the first pushbutton down *all the way*. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

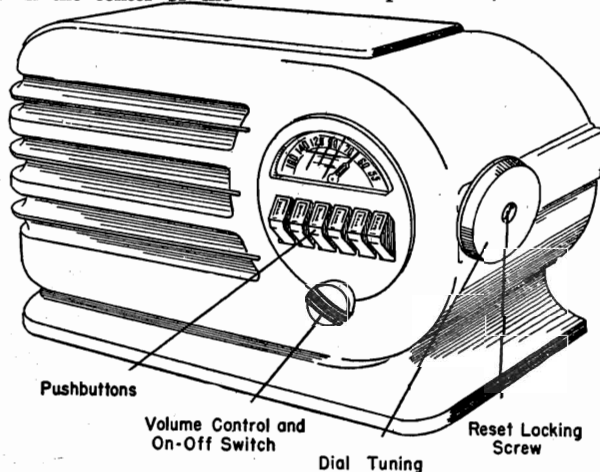
6. Follow this procedure for each of the five other buttons, setting each one for a different station.

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the

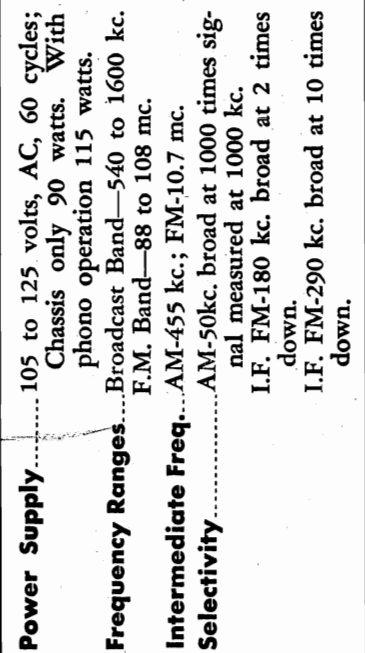
knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

8. The pushbuttons are now properly set for automatic tuning. Any of the six stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

**DIAL LIGHT**—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp, first remove the four buttons which hold the back to the cabinet. On the inside of the back unclip the green, black, and white wires clipped to the back. The Chassis View illustration shows the location of the dial lamp. Pull the lamp bracket toward the rear of the radio. The lamp can now be removed and replaced. Use a 6- to 8-volt lamp, type T-47. When replacing the back on the cabinet, connect the green wire to the green-painted clip, the black wire to the black-painted clip, and the white wire to the unpainted clip.







BELMONT RADIO CORP.



## BELMONT RADIO CORP.

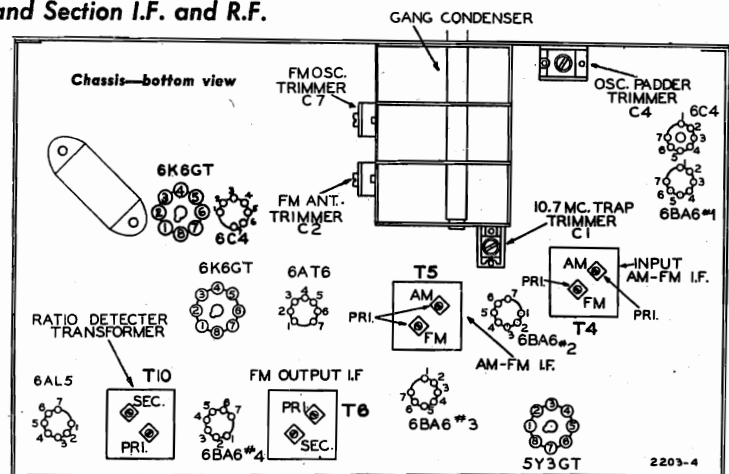
MODEL 11AF21, Series A

## ALIGNMENT PROCEDURE

Broadcast Band Section I.F. and R.F.

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of  $\frac{1}{2}$  watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a  $\frac{1}{2}$ -watt output with the speaker connected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.



## AM - I. F. ALIGNMENT

Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.

Signal Generator Frequency	Connection to Radio	Adjustment to Be Made	Adjust for
455 Kc. Use 2100 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Primary and Secondary of T5 AM windings. See top and bottom views	Maximum output. Should be $\frac{1}{2}$ watt
455 Kc. Use 64 microvolts	Pin No. 1 of 6BA6 No. 1 and ground	Primary and Secondary of T4 AM windings. See top and bottom views	Maximum output. Should be $\frac{1}{2}$ watt
400 cycles. Use 63 millivolts	Pin No. 1 of 6AT6 and ground	None	Maximum output. Should be $\frac{1}{2}$ watt

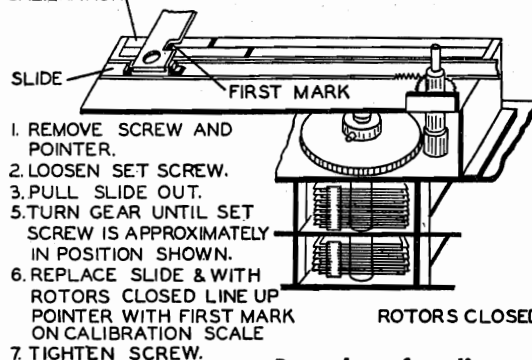
## BROADCAST BAND - R. F. ALIGNMENT

Check Pointer so that the inside of the notch is exactly over the first mark to the extreme left when Gang is fully closed. For adjustment loosen set screw on large gear. (see dial mechanism illustration).

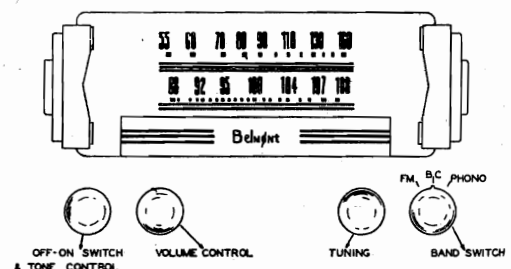
Signal Generator Frequency	Connection to Radio	Dummy Antenna	Adjust
1400 Kc. Use 15 microvolts	Antenna and Ground	200 mmf.	C6A for maximum. $\frac{1}{2}$ watt
600 Kc. Use 25 microvolts	Antenna and Ground	200 mmf.	C4 for maximum. $\frac{1}{2}$ watt
1400 Kc.	Antenna and Ground	200 mmf.	C6 See Note

NOTE: Recheck first two adjustments after this adjustment because of inter-locking effects.

## CALIBRATION



ROTORS CLOSED



Procedure for disassembly and assembly of dial mechanism

MODEL 11AF21, Series A

BELMONT RADIO CORP.

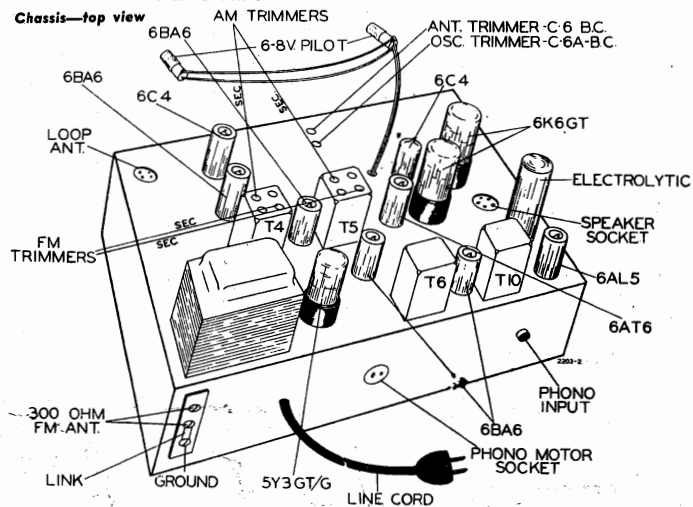
**ALIGNMENT PROCEDURE****FM Band Section. I.F. and R.F.****IMPORTANT**

No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment. All components used in this radio are extremely stable and the tuned circuits should require no adjustment over long periods of time.

**NOTE**

The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground." In other words, the meter, when used as a vacuum tube voltmeter, can have both the positive and negative sides connected to points above ground and still give true readings.

A standard AM signal generator is required.

**FM - I. F. ALIGNMENT**

Band Switch in FM Position. Dummy Antenna .1 Mfd.

Signal Generator Frequency	Connection to Radio	Vacuum Tube Volt Meter Connection to Radio	Adjustment to Be Made	Adjust for
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 4 and ground	Pin No. 7 of 6AL5 and ground	Primary of T10	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 4 and ground	See note "A"	Secondary of T10	Zero. Use zero center scale. See note "B"
10.7 Mc. Use about 4000 microvolts	Pin No. 1 of 6BA6 No. 3 and ground	Pin No. 7 of 6AL5 and ground	Primary and Secondary of T6	Resonance should be about 3 volts
10.7 Mc. Use about 150 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Pin No. 7 of 6AL5 and ground	Primary and Secondary of 10.7 mc. windings of T5. See top and bottom views.	Resonance should be about 3 volts
10.7 Mc. Use 3000 microvolts	FM Antenna input and ground	Pin No. 7 of 6AL5 and ground	Primary and Secondary of 10.7 mc. windings of T4. See top and bottom views.	Resonance should be about 3 volts See Note "C"
10.7 Mc.	FM Antenna input and ground	Pin No. 7 of 6AL5 and ground	C1	Minimum response. This is a trap circuit

**NOTES ON FM-I.F. ALIGNMENT**

NOTE "A"—Connect two resistors, 100K OHMS each, from Pin No. 7 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid point of the resistors and point zz.

NOTE "B"—If T10 has been tampered with, it is possible that no cross-

over point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL—Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

NOTE "C"—The input microvolts specified is based on the trap circuits being adjusted.

**FM - R. F. ALIGNMENT**

Check Pointer so that the inside of the notch is exactly over the first mark to the extreme left when Gang is fully closed. For adjustment loosen set screw on large gear. (see dial mechanism illustration).

Signal Generator Frequency	Connection to Radio	Dummy Antenna	Adjust	Vacuum Tube Volt Meter Connection to Radio	Adjust to
100 Mc. Use about 15 microvolts	FM Antenna lead	300 ohms	C7 Osc. C2 Ant.	Pin No. 7 of 6AL5 and Ground	Resonance about 3 volts

NOTE—If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local

station carrier of known frequency to align the F.M. Band and to use the vacuum tube volt meter as above for resonance indication. A weak carrier, however, will not produce 3 volts.

## BELMONT RADIO CORP.

MODEL 11AF21, Series A

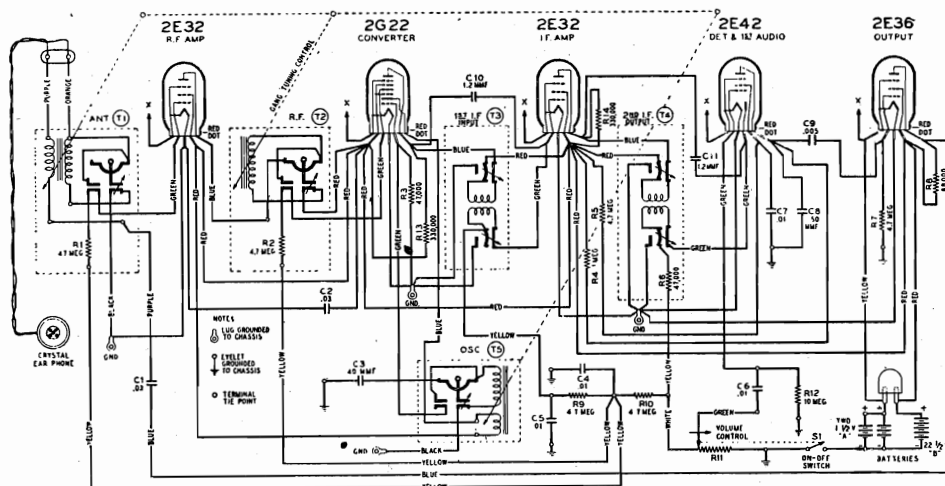
## REPLACEMENT PARTS LIST

When ordering specify part number, model number, and series

Ref. No.	Part No.	Description	Qty. Used in Set
<b>R.F. TUNER PARTS</b>			
<b>CONDENSERS</b>			
C3A-B, C-D	B-8A-11275	Two gang split stator variable	1
C2	A-8E-12079	Trimmer cond. F.M. antenna	1
C1	A-8E-11506	Trimmer cond. I.F. trap	1
C7	A-8E-11279	Trimmer cond. F.M. osc. trimmer	1
C6, C6A	A-8E-12557	Trimmer cond. B.C. antenna and oscillator	1
C4	A-8E-12177	Padder cond.—B.C. Band	1
C8	C-8G-11484	50 mmf, $\pm 10\%$ , ceramic	1
C55	C-18G-12408	1.0 mmf, $\pm 2$ mmf, ceramic	1
C-9-10-11-12	C-8G-11486	3000 mmf, $\pm 20\%$ , ceramic	4
C5-13	C-8F3-12	470 mmf, 500 volts, $\pm 20\%$ mica	2
<b>RESISTORS</b>			
R3	C-9B1-61	820 ohms, $\frac{1}{2}$ watt, 10%	1
R12	A-10B-11263	Volume control (1 megohm)	1
R20, S8	A-11A-11262	Tone control (500M ohms) and switch	1
R5, R6	C-9B1-15	2200 ohms, $\frac{1}{2}$ watt, 20%	2
R1	C-9B1-32	1.5 megohm, $\frac{1}{2}$ watt, 20%	1
R2	C-9B1-78	22K megohms, $\frac{1}{2}$ watt, 10%	1
<b>MISCELLANEOUS</b>			
	A-15C-11491	7-prong miniature tube socket	1
	A-15A-11276	Miniature tube socket, ceramic with base	1
	A-2H-12337	Socket shield base	1
	A-2H-11494	Tube shield	2
	200-12862	Spur gear assembly—consists of two gears, two springs and bushing	1
	A-49A-11673	Spring for above assembly	2
S1-2-3-4-5-6-7	B-20A-11261	Band switch and phono-radio switch	1
	B-2C-11188-1	Dial plate assembly with tape guide, bushing, shaft and pinion gears	1
	A-3J-11182	Pinion gear—inner side of plate	1
	A-3J-11183	Pinion gear—outer side of plate	1
	A-3A-11181	Shaft—for pinion gears	1
	B-2J-11190	Rack tape—with teeth and bracket	1
	B-2G-10588-2	Pointer	1
	A-2D-11513	Pointer bracket	1
	A-2J-11041	Pointer tension spring	1
	32F4-10830	B.H.M.S. 4-40 x $\frac{1}{8}$ screw, to fasten pointer and bracket to tape bracket	1
<b>COILS</b>			
T2	A-13D-11282	88-108 mc oscillator coil	1
T1	A-13E-11283	88-108 mc antenna coil secondary	1
T12A, T12B	A-13E-11284	88-108 mc antenna coil primary with trap	1
<b>MAIN CHASSIS PARTS</b>			
C52	A-8C-11495	Electrolytic condenser 10 mfd x 150 volts	1
C19A, B, C	A-8C-10272	Electrolytic condenser 10 mfd x 10 mfd x 20 mfd	1
C24, C36, C37	C-8D-10774	.02 mfd x 400 v., 20%, tubular	3
C20	C-8D-10770	.05 mfd x 200 v., 20%, tubular	1
C22	C-8D-11738	.01 mfd x 200 v., 20%, tubular	1
C23, 35	C-8D-10761	.01 mfd x 400 v., 20%, tubular	2
C50, 53, 56	C-8D-10788	.004 mfd x 600 v., 20%, tubular	3
C49	C-8F3-116	180 mmfd x 500 v., 10%, mica	1
C23, 38, 45	C-8F9-20	10K mmfd x 300 v., 20%, mica	3
C21, 18	C-8F3-12	470 mmfd x 500 v., 20%, mica	2
C30, 33, 34	C-8F3-10	220 mmfd x 500 v., 20%, mica	3
C44	C-8J-11388	.05 mfd x 600 v., 20%, molded case paper	1
C26-27-39-40-46-47	C-8G-12449	3000 mmfd, 20%, ceramic-insulated	6
C14, 16, 28, 31, 42, 43	C-8G-12159	30 mmfd, 500 volts, 5%, ceramic	6
C48	C-8G-11789	10 mmfd, 10%, ceramic	1
<b>RESISTORS</b>			
C51	C-8G-11891	51 mmfd, 5%, ceramic	1
C15-17	C-8G-12160	91 mmfd, 5%, ceramic	2
C-29-32	C-8F5-224	91 mmfd, 5%, silver mica	2
C41	C-8D-10789	.002 mfd x 600 v., 20%	1
C57	C-8F3-8	100 mmfd x 500 v., 20%, mica	1
<b>RESISTORS</b>			
R4	C-9B1-87	120K ohms, $\frac{1}{2}$ watt, 10%	1
R15	C-9B1-73	8200 ohms, $\frac{1}{2}$ watt, 10%	1
R26	C-9B1-77	18K ohms, $\frac{1}{2}$ watt, 10%	1
R18	C-9B1-96	680K ohms, $\frac{1}{2}$ watt, 10%	1
R21, 35	C-9B1-82	47K ohms, $\frac{1}{2}$ watt, 10%	2
R28	C-9B2-81	39K ohms, $\frac{1}{2}$ watt, 10%	1
R7	B-9C-11489	10K ohms, $\frac{1}{2}$ watt, 10%, wire-wound	1
R30	C-9B1-78	22K ohms, $\frac{1}{2}$ watt, 10%	1
R16, 25, 29	C-9B1-15	2200 ohms, $\frac{1}{2}$ watt, 20%	3
R8	C-9B1-107	5.6 megohms, $\frac{1}{2}$ watt, 10%	1
R9, 10	C-9B1-31	1 megohm, $\frac{1}{2}$ watt, 20%	2
R13	C-9B1-50	100 ohms, $\frac{1}{2}$ watt, 10%	1
R11, R17	C-9B1-23	47K ohms, $\frac{1}{2}$ watt, 20%	2
R19	C-9B1-27	220K ohms, $\frac{1}{2}$ watt, 20%	1
R14	C-9B1-37	10 megohms, $\frac{1}{2}$ watt, 20%	1
R27	C-9B1-54	220 ohms, $\frac{1}{2}$ watt, 10%	1
R32, 22, 33	C-9B1-94	470K ohms, $\frac{1}{2}$ watt, 10%	3
R31	C-9B1-78	22K ohms, $\frac{1}{2}$ watt, 10%	1
R23	C-9B1-58	470 ohms, $\frac{1}{2}$ watt, 10%	1
R34	C-9B1-62	1000 ohms, $\frac{1}{2}$ watt, $\pm 10\%$	1
R36	C-9B2-55	270 ohms, 1 watt, $\pm 10\%$	1
<b>COILS</b>			
T3	A-13D-11285	B.C. oscillator coil	1
T4	C-203-11743	Input I.F. coil combination assembly, 455 kc and 10.7 mc	1
T5	C-203-11746	2nd I.F. coil combination assembly, 455 kc and 10.7 mc	1
T6	C-203-11744	3rd I.F. coil assembly, 10.7 mc	1
T10	C-203-11745	Ratio detector I.F. coil assembly, 10.7 mc	1
T11, C55	C-13E-12340	Loop antenna assembly with 1.0 mmfd cond. C-8G-12408	1
<b>TRANSFORMERS</b>			
T7	B-12C-10234-2	Output transformer for speaker	1
T9	B-12A-12254	Power transformer—105-125 volts AC, 60 cycles primary	1
<b>SPEAKER</b>			
T8	B-18B-10617	Electrodynamic speaker, 10-inch, less output transformer	1
<b>MISCELLANEOUS</b>			
	C-6D-12459	Dial scale	1
	B-5C-12457-14	Escutcheon—walnut	2
	B-5C-12457-41	Escutcheon—mahogany	2
	B-5B-10376-14	Knob, "Volume"—walnut	1
	B-5B-11672-14	Knob, "Bandswitch"—walnut	1
	B-5B-10377-14	Knob, "Tuning"—walnut	1
	B-5B-10378-14	Knob, "Tone"—walnut	1
	B-5B-10376-41	Knob, "Volume"—mahogany	1
	B-5B-11672-41	Knob, "Bandswitch"—mahogany	1
	B-5B-10377-41	Knob, "Tuning"—mahogany	1
	B-5B-10378-41	Knob, "Tone"—mahogany	1
	B-47A-12458	Pilot lite assembly	1
P1, P2	A-46A-11739	Pilot lite bulb, 6-8 volt, T-44	2
	A-19B-11009	Socket for phono motor	1
	A-15B-11538	Speaker socket	1
	A-19B-12170	Socket for tone arm lead	1
	A-19B-11272	Antenna socket	1
	A-15B-10440	8-prong, octal, tube socket	3
	A-15C-10717	7-prong, miniature tube socket	6
	A-2H-10718	Shield base	6
	A-2H-10974	Shield can	6
	B-14M-11479	A.C. line cord	1
	A-23A-10344	Line cord lock	1
<b>RECORD CHANGER</b>			
B-201-12262		Record changer assembly, 115 volts, 60 cycles	1
Note: For list of record changer parts, see Record Changer Manual.			

MODELS 5P113, 5P116, 5P117,  
Boulevard

BELMONT RADIO CORP.



#### CAPACITORS

C1, C2	A-8J-10295	.03 mf, 150 volts, 20%
C3	A-8G-11083	40 mmf, $\pm 2.5$ mmf
C6, C7	A-8J-10297	.01 mf, 150 volts, 20%
C8	A-8J-10298	50 mmf, 150 volts, 20%
C9	A-8J-10296	.005 mf, 150 volts, 20%
C10, C11	A-13G-11303	1.2 mmf, $\pm 0.2$ mmf (two wires)

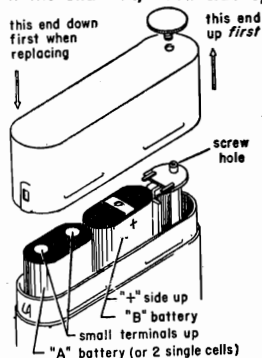
#### RESISTORS

R3	C-9B9-82	47,000 ohms, 1/5 watt, 10%
R4	C-9B3-98	1 megohm, 1/3 watt, 10%
R5, R7	C-9B3-106	4.7 megohms, 1/3 watt, 10%
R8	C-9B9-84	68,000 ohms, 1/5 watt, 10%
R12	C-9B3-37	10 megohms, 1/3 watt, 20%
R13, R14	C-9B9-92	330,000 ohms, 1/5 watt, 10%

#### MISCELLANEOUS

A-48A-10346	Crystal phone
A-19B-10354	Phone connector and cord
A-5M-10455	Earpiece (medium)
A-5M-10455-1	Earpiece (small)
A-5M-10455-2	Earpiece (large)
B-2E-10308	End bell, top (Model 5P116)
B-2E-10308-1	End bell, top (Models 5P113, 5P117)
B-202-10419	End bell, bottom (Model 5P116)
B-202-10419-1	End bell, bottom (Models 5P113, 5P117)
A-5B-10466-2	Knob, tuning (Models 5P113, 5P117)
A-5B-10466-51	Knob, tuning (Model 5P116)
A-5B-10806-2	Knob, volume (Models 5P113, 5P117)
A-5B-10806-51	Knob, volume (Model 5P116)

**How to Install Them**—Three "A" batteries and one "B" battery are supplied with the Boulevard. The extra "A" batteries are for replacement purposes. Remove the screw on the bottom of the radio and lift off the end bell, screw side up first, as shown in the illustration. (To avoid distorting the end bell, grasp it at the ends, not on the sides. Insert the "A" and "B" batteries in the case exactly as shown, with the "B" battery on the side with the screw hole. (If desired, the wide rubber band supplied with the set may be placed around the batteries to prevent any movement.) Then replace the end bell and the screw.



#### ALIGNMENT PROCEDURE

Output meter must give 1.5-volt deflection without loading output tube.

Use any 1½-volt "A" battery and 22½-volt "B" battery which can be connected to set. Keep battery leads short.

Unsolder lead between .03 mf output capacitor and purple lead (see illustration). Connect one side of meter to this capacitor terminal, other side to receiver chassis. Be sure to reconnect leads after alignment is completed.

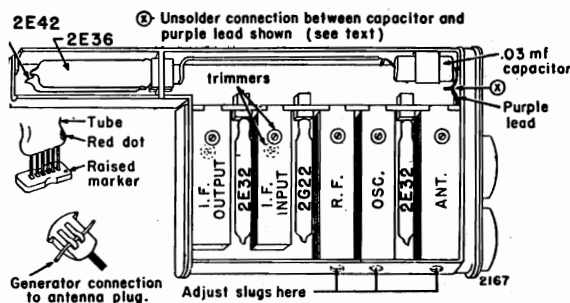
Volume control at maximum.

Connect ground lead of generator to chassis.

Align for maximum output. Reduce input as needed to keep output near 1.5 volts.

Generator Frequency	Coupling Capacitor	Connection to Set	Adjust for Max. Output
455 kc	.1 mf	Converter 2G22 grid	Trimmers on both I.F. transformers
1625 kc	.1 mf	Converter 2G22 grid	Oscillator trimmer
1400 kc	.1 mf	Converter 2G22 grid	Oscillator tuning slug*
1625 kc	10 mmf	Antenna lead (see illust.)	Osc, ant, rf trimmers
1400 kc	10 mmf	Antenna lead	Antenna, rf tuning slugs*

Repeat this and previous step alternately for best tracking.

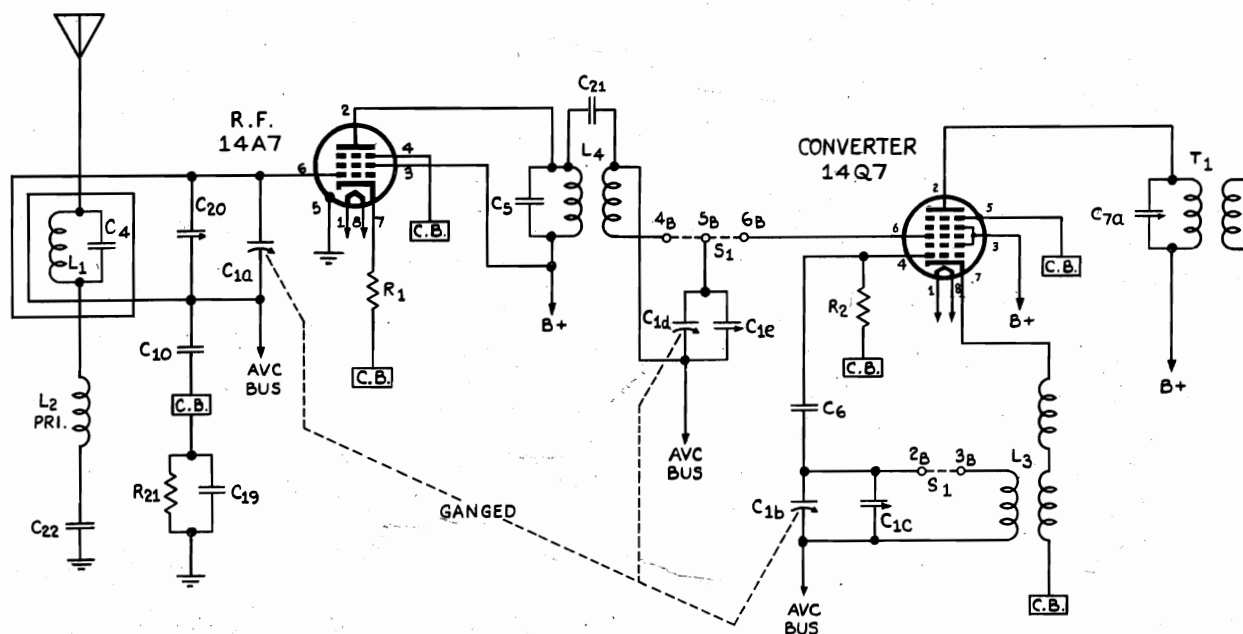




# "clarified schematics"

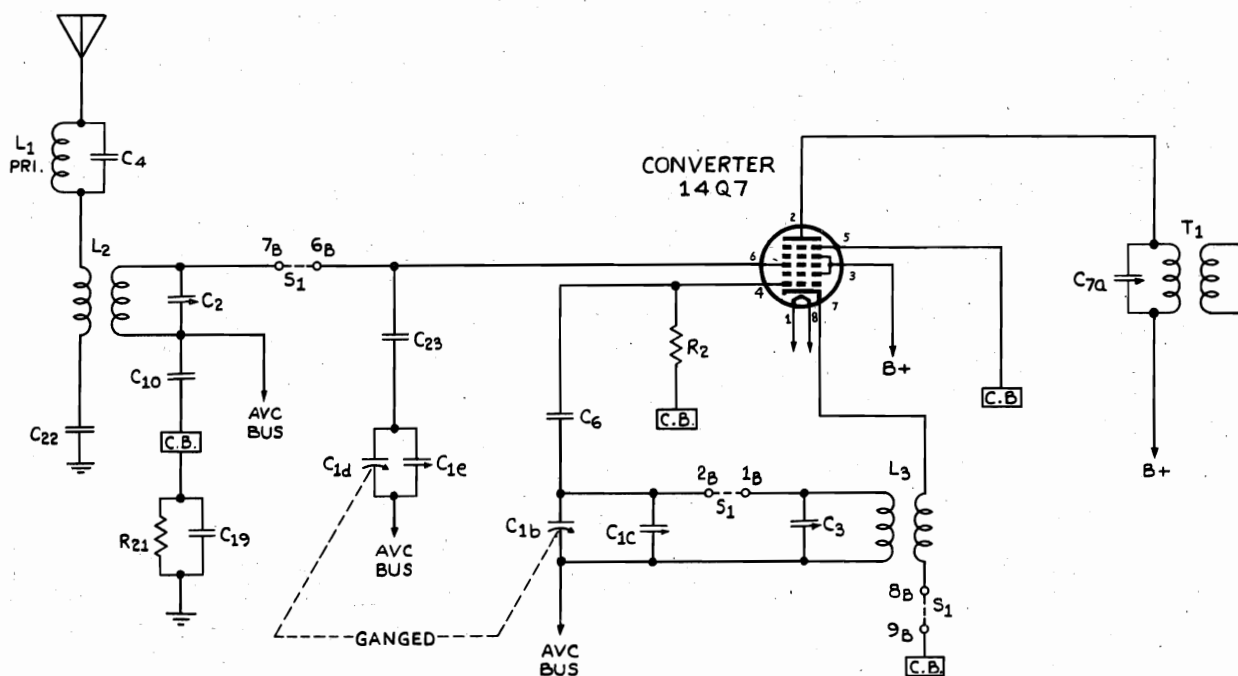
MODEL 626-A

BENDIX RADIO DIV.



BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION.  
BROADCAST BAND  
535 - 1725 KC.

**C.B.** DENOTES COMMON BUS  
ABOVE GROUND BY  
R<sub>21</sub> (220k) & C<sub>19</sub> (.1μf)



BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION.  
SHORT WAVE BAND  
5.8 - 12 MC.

**C.B.** DENOTES COMMON BUS  
ABOVE GROUND BY  
R<sub>21</sub> (220k) & C<sub>19</sub> (.1μf)



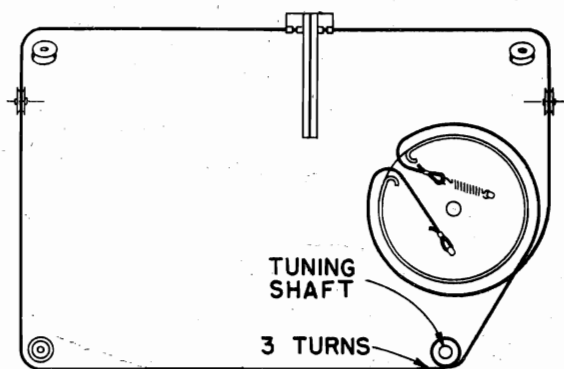
## BENDIX RADIO DIV.

MODEL 626-A

Stock No.	Description	List Price
<b>ELECTRICAL COMPONENTS</b>		
AL0C01*	ANTENNA—Loop (L1) .....	2.60
CC9A16†	CAPACITOR—Ceramic 3.3 mmf. (C21) .....	.05
CE3A00	CAPACITOR—Electrolytic 40, 20, 60	
CE3A00†	CAPACITOR—Electrolytic 40, 20, 60 mfd. (C18a, C18b, C18c) .....	1.86
CL2A01†	CORD—AC Power .....	.42
CM5A14†	CAPACITOR—Mica 47 mmf. (C5, C6) .....	.18
CM5A30†	CAPACITOR—Mica 220 mmf. (C4, C12) .....	.22
CM5A38†	CAPACITOR—Mica 470 mmf. (C22) .....	.21
CM8S50†	CAPACITOR—Mica 470 mmf. 3% (C23) .....	.47
CP4T20	CAPACITOR—Paper 400 V .006 mfd. (C11, C24) .....	.14
CP4T34†	CAPACITOR—Paper 400V .02 mfd. (C14) .....	.14
CP4T40†	CAPACITOR—Paper 400V .05 mfd. (C9, C10, C13, C15, C17) .....	.16
CP4T51†	CAPACITOR—Paper 400V .1 mfd. (C16, C19, C25) .....	.18
CT2A00	CAPACITOR—Trimmer (C2 4-70 mmf., C3 2-20 mmf.) .....	.46
CV0C00	CAPACITOR—Variable, 3 gang (C1a, C1b, C1c, C1d, C1e) .....	7.91
LO6H00	COIL—Oscillator (L3) .....	1.61
RC1H16†	RESISTOR—220 ohms 1/4 W Comp. (R1) .....	.04
RC1H20†	RESISTOR—470 ohms 1/4 W Comp. (R3) .....	.04
RC1H32†	RESISTOR—4700 ohms 1/4 W Comp. (R19) .....	.04
RC1H34†	RESISTOR—6800 ohms 1/4 W Comp. (R14) .....	.04
RC1H38†	RESISTOR—15000 ohms 1/4 W Comp. (R12) .....	.06
RC1H40†	RESISTOR—22000 ohms 1/4 W Comp. (R2, R10) .....	.04
RC1H44†	RESISTOR—47000 ohms 1/4 W Comp. (R5) .....	.04
RC1H51†	RESISTOR—100000 ohms 1/4 W Comp. (R11) .....	.04
RC1H54†	RESISTOR—220,000 ohms 1/4 W Comp. (R7, R21) .....	.04
RC1H58†	RESISTOR—470,000 ohms 1/4 W Comp. (R13, R20) .....	.04
RC1H68†	RESISTOR—3.3 meg. 1/4 W Comp. (R4) .....	.04
RC1H70†	RESISTOR—4.7 meg. 1/4 W Comp. (R8) .....	.04
RC4G28†	RESISTOR—2200 ohms 2W Comp. (R18) .....	.14
RV4S00†	POTENTIOMETER—1 meg. with Switch (R9, S3) .....	.92
RW1A06†	RESISTOR—33 ohms WW 1W (R17) .....	.14
RW1B28†	RESISTOR—150 ohms WW 1W (R15) .....	.08
SO0D01	SOCKET—Dial Lamp .....	.23
SO9S00†	SOCKET—Loctal Tube .....	.19
SR2C01	SWITCH—Rotary 2 Pos. 3 Pole (S1) .....	.70
SR4C00†	SWITCH—Rotary 4 Pos. 3 Pole (S2) .....	.84
T10C01†	TRANSFORMER IF—1st (T1) .....	3.75
T10D01†	TRANSFORMER IF—2nd (T2) .....	2.65
TR6D00	TRANSFORMER RF—Shortwave (L2) .....	1.26
TR6L00†	TRANSFORMER BC—RF Interstage (L4) .....	3.75
#47†	LAMP—Pilot .....	.09

Stock No.	Description	List Price
<b>ELECTRICAL COMPONENTS (continued)</b>		
JR1S00†	JACK—Receptacle, 1 Contact, Phono Jack (J1) .....	.06
<b>SPEAKER AND COMPONENTS</b>		
SP400†	SPEAKER—Oval PM (4 x 6) .....	5.70
CS4000†	CONE & VOICE COIL ASS'Y.—Code 252	
CS4001†	CONE & VOICE COIL ASS'Y.—Code 328	
CS4002†	CONE & VOICE COIL ASS'Y.—Code 270	
CS4006†	CONE & VOICE COIL ASS'Y.—Code 191	
CS4007†	CONE & VOICE COIL ASS'Y.—Code 371	
TA0001†	TRANSFORMER—Output (T3) .....	.96
<b>MECHANICAL COMPONENTS</b>		
AD0C00	ASSEMBLY—Dial Back Plate .....	1.04
BT1S00†	BOARD—Terminal Strip 1 Lug 1 Mt .....	.03
BT2S00	BOARD—Terminal Strip 2 Lugs 1 Mt. ....	.02
BT4S01†	BOARD—Terminal Strip 4 Lugs 1 Mt. ....	.05
CD0C02	CABLE—Dial .....	.17
GR0S00†	GROMMET—Shockmount Rubber .....	.04
HC0C00†	CLIP—Coil Mtg .....	.65/c
HC0C02†	CLIP—Coil Mtg .....	.90/c
HC0C03†	CLAMP—Cable (Dial) .....	.43/c
HC0S00†	CLIP—Tuning Shaft Spring .....	.01
HC0T00†	CLAMP—Tube Shield .....	.01
HN9P45†	PALNUT—3/8 x 32 .....	.60/c
HR0P00†	RIVET—Plain 13/64 x .121 .....	.40/c
HR0P01†	RIVET—Plain .088 x 1/8 .....	.40/c
HR0S01†	RIVET—Shoulder .171 x .118 .083 x .088 .....	.02
HS0C00†	SPRING—Dial Cable .....	.04
HS0P01†	SPACER—Antenna, Wood .....	.01
HS6F00†	SLEEVE & SPACER—Tuning Capacitor .....	.02
ID0M06†	INDICATOR—Metal, Dial .....	.28
IT0C01	INSULATOR—Elec. Cap., Tube .....	.04
IW0F00†	INSULATOR—Felt Washer .....	.20/c
MB0B00†	BEARING—Bushing (Tuning Shaft) .....	.18
MP0F00†	PULLEY—Fiber (Idler) .....	.02
MS0T02†	SHAFT—Tuning .....	.15
PI0P01†	PLATE—Insulating, Power Cord .....	.01
SM0T00†	SHIELD—Metal, Tube .....	.05
<b>CABINET COMPONENTS</b>		
DS0C01	DIAL—Scale .....	.77
GC0D02	GASKET—Dial, Cork Strip .....	.09
HC0D00	CLIP—Dial (Metal) Retainer R.H. ....	.04
HC0D01†	CLIP—Dial Retainer (Metal) L.H. ....	.03
HC0S09	CLIP—Spring, Knob, Band Switch .....	.01
HK0R00†	CLIP—Spring, Knob .....	.01
IT0F00	INSULATOR—Flexible Tubing .....	.08/ft.
KB0B03	KNOB—Indexed, Tan .....	
KC0B08	KNOB—Plain, Tan .....	
KY0B00	KNOB—Brown, Band Switch .....	.31
ZP0I00	CABINET—Ivory, Plastic .....	

\*Subject to excise tax /c—Price per hundred Prices subject to change without notice †Used on previous models PRINTED IN U.S.A.



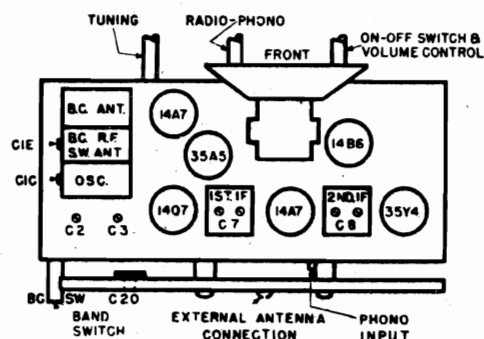
Adjust pointer 2 in. from left end with tuning gang fully meshed

Make adjustments in table for maximum output with output meter connected across voice coil. Always keep input as low as possible for perceptible output.

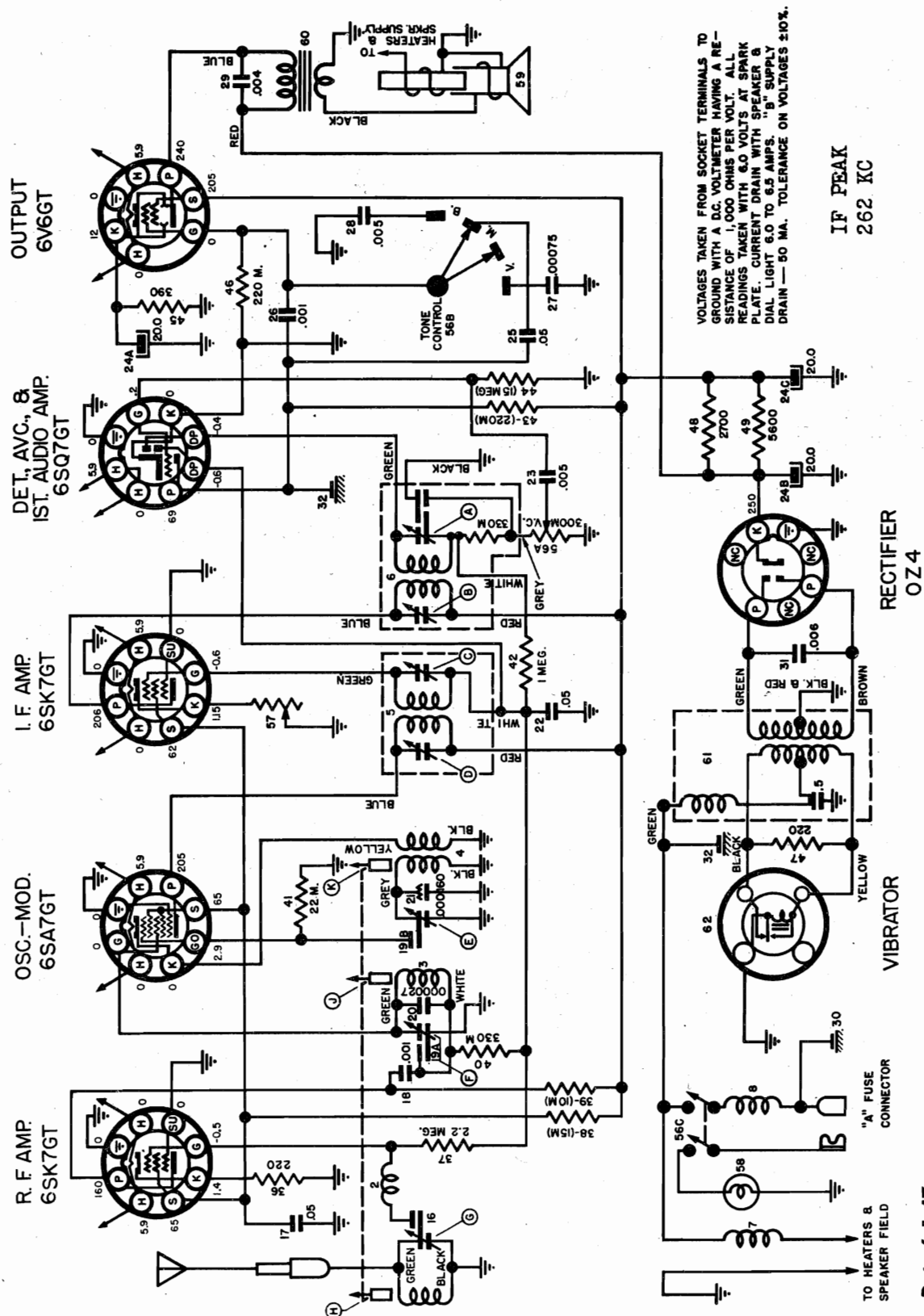
## PRECAUTIONS

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.

CIRCUIT	CONTROL POSITIONS	APPLY	THRU	TO	ADJ
I.F.	Volume—Maximum			Grid 14A7	C8b
	Tone—Treble				C8a
	Band Switch—Broadcast	455 KC	.01mfd.	I.F. Amp, Grid 14Q7	C7b
	Tuning Condenser—Fully Open			I.F. Amp.	C7a
Broadcast	Pointer 4 3/8 in. from left end.	1475 KC	50 mmf.	External Antenna Connection	C1c C1e C20
Short Wave	Pointer 4 1/2 in. from left end.	11 MC	400 ohms in series with .01 mfd.	External Antenna Connection	C3 C2

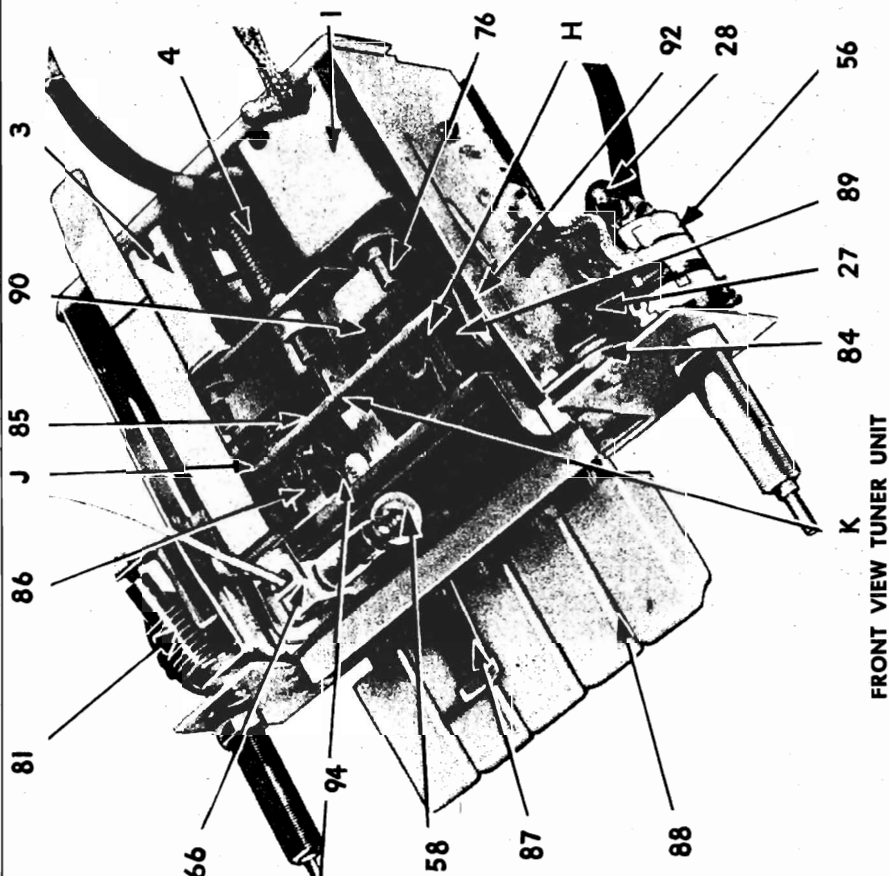
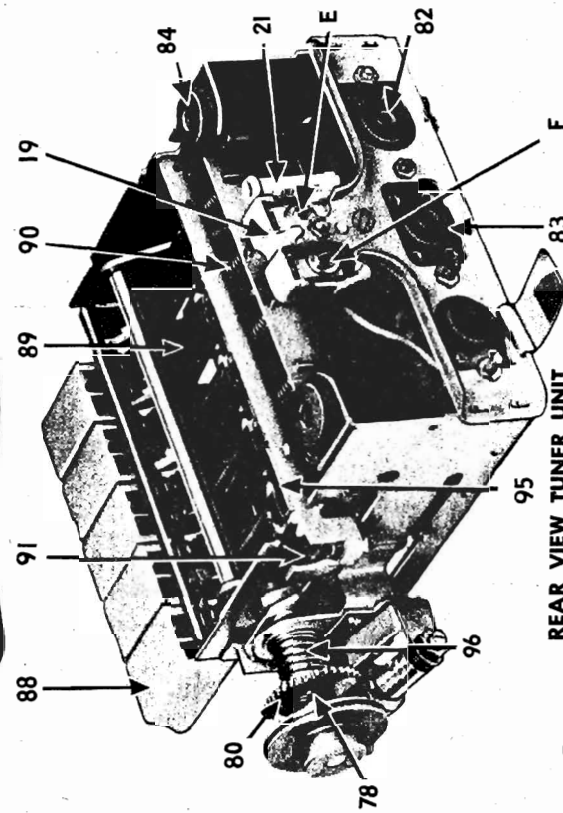
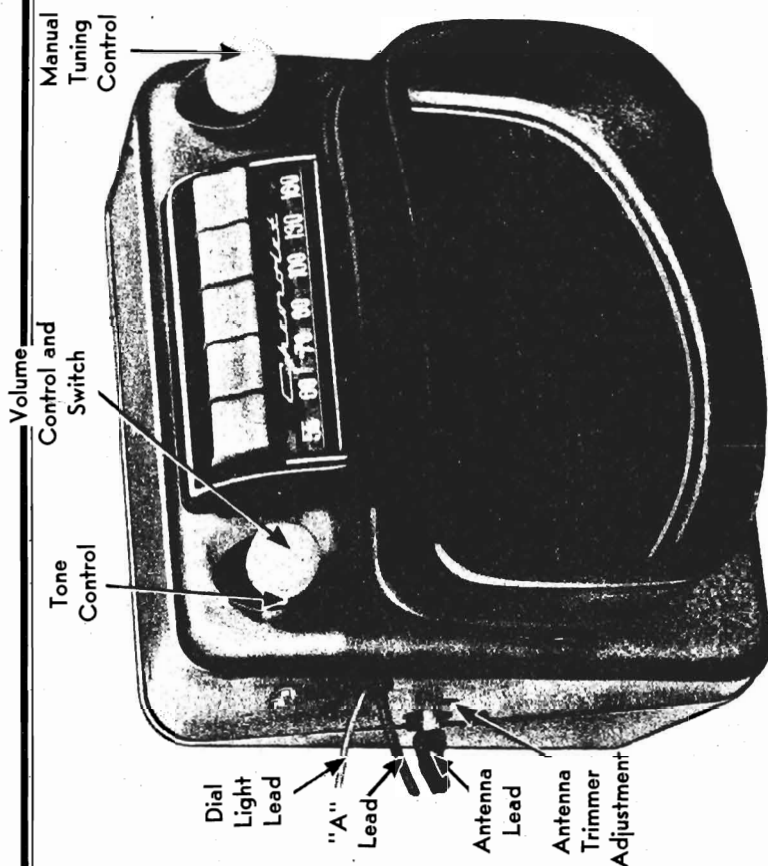






**Antenna Circuit:** The antenna circuit is directly coupled to the antenna. The antenna oscillator and R.F. circuits are tuned by means of iron cores. The antenna circuit is adjusted for slight variations in antenna capacity by means of an antenna trimmer located on the side of the receiver case.

Date 6-1-47



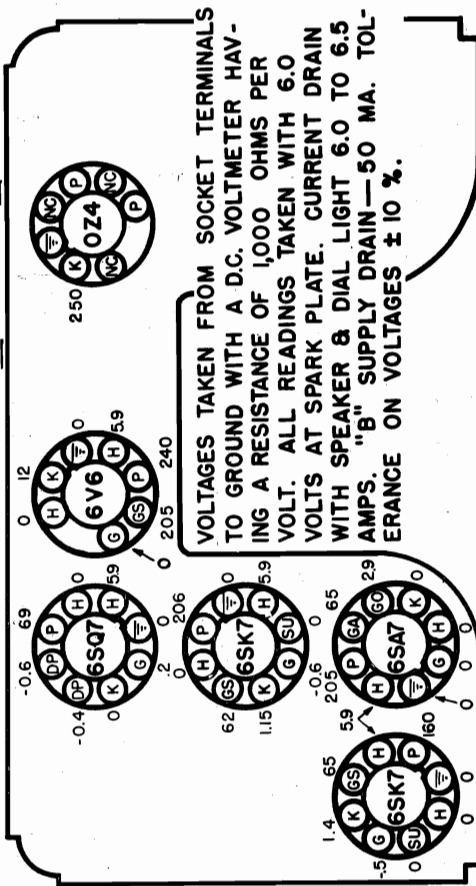
### Procedure for Setting Pushbuttons

Turn on the receiver for ten minutes or longer to allow circuits to stabilize.

1. Select your five favorite stations in order of frequency.
2. Pull the button slightly to the left and out approximately one-half inch.
3. Turn the manual control knob until the desired station is tuned in. To secure an accurate set-up, turn the manual tuning knob back and forth until the station is tuned in clearly.
4. Push button in firmly to the end of its travel.
5. Repeat the same procedure to set up the remaining four buttons.

## CHEVROLET DIV.-GENERAL MOTORS

MODEL 986067



## Circuit Alignment

The trimmer condensers in this receiver have been carefully adjusted at the factory and should require no further adjustment (except the antenna trimmer) unless tampered with or a coil replaced. It is advisable not to attempt any adjustment unless it is definitely known that alignment is necessary. Since the iron cores of the tuning unit are sealed in place at the factory, only the trimmer adjustment as outlined under "Capacity Alignment" should be made, unless the coils or cores of the iron core tuning unit are changed. A signal generator and an output meter must be used to align the receiver circuits correctly. To make all alignment adjustments the back cover must be removed.

## Capacity Alignment

## 1. I.F. Alignment at 262 Kilocycles

- Connect a 0.1 mfd. condenser between the plate prong of the 6V6GT output tube and one terminal of the output meter, to protect the meter from DC voltages. Connect the other terminal of the output meter to ground.
- Connect the ground lead of the signal generator to the chassis frame.
- Connect the signal lead of the signal generator to the grid (G) prong of the 6SA7 tube socket through a 0.1 mfd. condenser.
- Turn the set volume control on full and rotate the tone control knob to the center of its range. Adjust the signal generator to 262 kilocycles, and tune the receiver to a frequency where no squeals or beat notes may be heard and so that when the tuning control is moved through narrow limits no appreciable change in output is noticeable.
- Adjust the I.F. trimmers A, B, C, and D for maximum output.

## 2. Aligning at 1615 Kilocycles

- Connect the signal lead of the signal generator to the receiver antenna connection through a .000070 mfd. condenser.
- Turn the manual control of the receiver to the stop at the high frequency end of the dial.
- Set the signal generator to 1615 kilocycles.
- Adjust the oscillator trimmer "E" for maximum output.
- Adjust the R.F. trimmer "F" for maximum output.
- Adjust the antenna trimmer "G" for maximum output.

## 3. Aligning at 1400 Kilocycles

- Set the signal generator frequency to 1400 kilocycles or the nearest frequency at which there is no interference from radio stations.
- Tune the receiver to this signal and readjust the R.F. trimmer "F" and antenna trimmer "G" for maximum output. The signal generator output should be as low as possible and still give a satisfactory output meter reading.

NOTE: This type tuning circuit does not require alignment at 600 kilocycles.

## 4. Alignment with Car Antenna

Antenna trimmer "G" must be adjusted to match the car antenna when receiver is installed. With the antenna fully extended, tune in a weak station, adjust trimmer for maximum volume.

## Capacity and Inductance Alignment

This alignment should be used only when there is definite evidence that the iron cores are out of adjustment.

## 1. I.F. Alignment at 262 Kilocycles

The same procedure as previously outlined should be followed.

## 2. Aligning at 1615 Kilocycles

- Connect the signal lead of the signal generator to the set through a .000070 mfd. condenser.
- Set the signal generator to 1615 kilocycles.
- Rotate the manual tuning knob until the pointer is against the high frequency stop. Mechanically align the iron cores H, J, and K by setting the oscillator core "K" so that its rear edge is  $1\frac{1}{2}$ " from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) The antenna core "H" and the R.F. core "J" are aligned in the same way as the oscillator core "H".
- Adjust the oscillator trimmer "E," the R.F. trimmer "F," and the antenna trimmer "G" for maximum output.

## 3. Aligning at 1400 Kilocycles

- Adjust the signal generator to 1400 kilocycles or the nearest frequency at which there is no radio station interference.
- Adjust the R.F. core "J" for maximum output.
- Adjust the antenna core "H" for maximum output.

NOTE: The rear end of iron cores are slotted so the maximum output adjustment can be made with a non-metallic screw driver that fits loosely in the coil form. (No inward force should be used.)

## 4. Realignment at 1615 and 1400 Kilocycles

- Repeat alignment of trimmers "F" and "G" at 1615 kilocycles.
- Repeat alignment of cores "H" and "J" at 1400 kilocycles. Do not change adjustment of oscillator core "K."
- Reseat core studs in guide bar with gypal or household cement.

## 5. Alignment with Car Antenna

The same procedure as outlined previously should be followed.

MODEL 986067

## CHEVROLET DIV.-GENERAL MOTORS

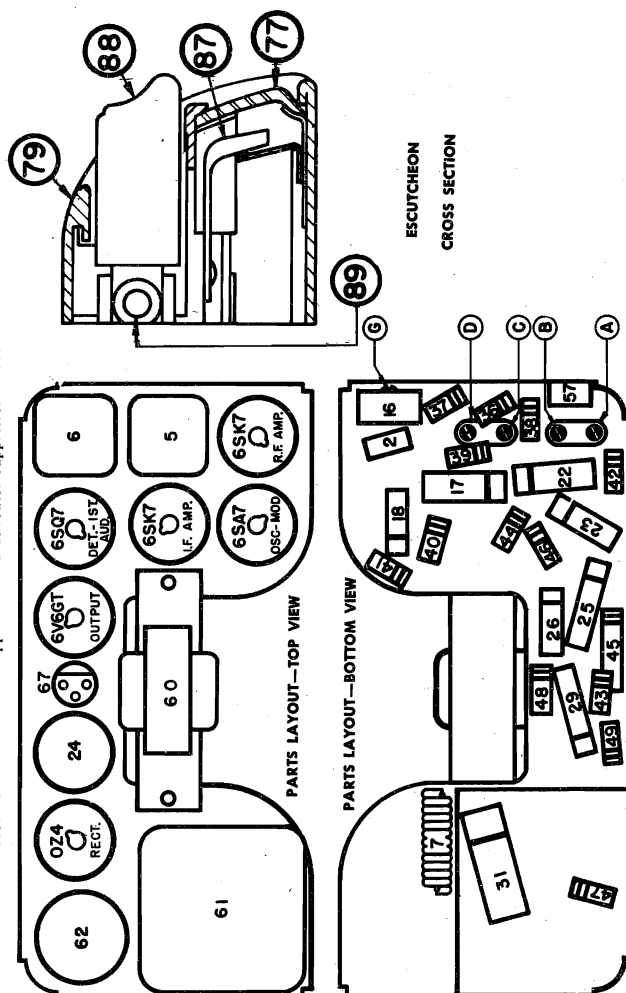
7255985	Push Button (Included in Slide and Push Button Package)	88
1217837	Slide and Push Button Package	89
7255984	Slide Return Spring	90
7255980	Cam Return Spring	91
7255990	Treadle Bar Connecting Link Spring	92
7256269	(Included in Pointer Assembly Connecting Link)	94
7255992	Pointer Connecting Link Spring	95
7255987	Declutch Lever Spring	96
7255991	Clutch Spring	

## Tube Complement

1211924	024 Rectifier (1 required)
1213637	6V8GT Output (1 required)
7237886	6SA7GT Oscillator Modulator (1 required)
7237887	6SK7GT R.F. and I.F. Amplifier (2 required)
7237888	6SQ7GT Detector AVC and 1st Audio (1 required)

## Installation Parts

494786	Static Collector (Front Wheel)
1849161	Ammeter Condenser
1908848	Generator Condenser
1910147	Ignition Coil Condenser
1476885	Fuse—Radio, 14 Amp.
7256297	Fuse Holder
7255986	Wing Knob Tone Control
7255935	Knob
7256148	Knob
1217909	Control Knob
188204	"A" Lead (Includes Fuse Holder)
986121	Rubber Nipple (Distributor Suppressor)
1887829	Static Powder (Tire)
	Distributor Suppressor

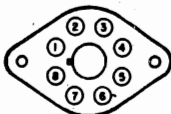


The tuning circuits are tuned by varying the inductance of the antenna, R.F. and oscillator coils by means of iron cores which slide in and out of the coils like pistons. The alignment of the cores has been sealed at the factory and further adjustment should not be required unless the coils have been changed or an iron core has been replaced.

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
7230592		Antenna—Coil	Antenna—Coil	1
7240251		Choke	Choke	2
7240251		Coil	R.F. Coil	3
7240251		Coil	Oscillator—Coil	4
7240251		Coil	1st I.F. Transformer Assembly	5
7240251		Coil	2nd I.F. Transformer Assembly	6
7240251		Coil	Hash Choke	7
7241708		Choke	"A" Choke (inside front cover)	8
1217846		Trimmer	Antenna Trimmer	16
7230592		Condenser	Tubular—.05 Mfd. 600 Volt, Screen By Pass	17
7242942		Condenser	Tubular—.001 Mfd. 600 Volt, R.F. Coupling	18
7242942		Trimmer	Dual Trimmer—R.F. and Oscillator Sections	19
7256259		Condenser	Molded .000027 Mfd.	20
7230592		Condenser	Temperature Compensating .000160 Mfd.	21
7230592		Condenser	Tubular—.05 Mfd. 600 Volt, AVC By Pass	22
7230592		Condenser	Tubular—.005 Mfd. 600 Volt, Audio Coupling	23
7240724		Condenser	3 Section Electrolytic	24
		Section A	20 Mfd. 25 Volt, Output By Pass	24A
		Section B	520 Mfd. 400 Volt, "B" Input Filter	24B
		Section C	20 Mfd. 400 Volt, "B" Output Filter	24C
7230592		Condenser	Tubular—.05 Mfd. 600 Volt, Tone Control (Voice)	25
1217790		Condenser	Tubular—.001 Mfd. 600 Volt, Audio Coupling	26
7230592		Condenser	Tubular—.00075 Mfd. 400 Volt, Tone Control (Music)	27
7230767		Condenser	Tubular—.005 Mfd. 600 Volt, Tone Control (Bass)	28
7240906		Spark Plate	Tubular—.004 Mfd. 600 Volt, 6V6 Output	29
1217848		Condenser	Spark Plate (inside front cover)	30
1211747		Resistor	Tubular .006 Mfd. 1600 Volt, Buffer	31
121147		Resistor	Insulated, 220 ohms 1/2 watt, R.F. Amp. Bias	32
7233653		Resistor	Insulated, 2.2 Megohm 1/2 watt, AVC Isolating	33
121085		Resistor	Insulated, 15,000 ohm 2 watt, Screen Dropping	38
7240732		Resistor	Insulated, 10,000 ohm 1 watt, Plate Dropping	39
1214550		Resistor	Insulated, 330,000 ohm 1/2 watt, AVC Isolating	40
7238873		Resistor	Insulated, 22,000 ohm 1/2 watt, Oscillator Grid	41
1213479		Resistor	Insulated, 1 Megohm 1/2 watt, AVC Isolating	42
7235837		Resistor	Insulated, 220,000 1/2 watt, Plate Dropping	43
7240977		Resistor	Insulated, 15 Megohm 1/2 watt, GSQ7 Grid	44
1213479		Resistor	Insulated, 390 ohm 1 watt, Output Tube Bias	45
7237994		Resistor	Insulated, 220,000 ohm 1/2 watt, 6V6 Grid	46
7240917		Resistor	Insulated, 220 ohm 1 watt, Power Transformer, Primary	47
7240918		Resistor	Insulated, 2700 ohm 2 watt, "B" Filter	48
7256188		Control	Insulated, 5,600 ohm 1 watt "B" Filter	49
		Control	Volume, Tone and Switch	56
		Control	Volume Control, 300,000 ohm	56A
		Control	Tone Control	56B
		Control	Switch	57
7242204		Control	Sensitivity Control	58
125588		Bulb	Dial Lamp	59
7255903		Speaker	Electro Dynamic 6 3/4" x 9 1/4" Elliptical Less Cable	60
7256009		Transformer	Output Transformer	61
7255881		Transformer	Power Transformer	62
7259142		Vibrator	Non-Synchronous 4 Prong	
725920		Cable	Speaker Cable and Plug	
7259475		Socket	Antenna Socket	66
1217838		Socket	Dial Light Assembly (Less Lamp)	
7236279		Socket	Tube—Octal	
1210862		Socket	Speaker Socket	67
7239125		Socket	Vibrator Socket	
<b>Tuner Unit Part</b>				
7256112		Core	Iron Tuning Core	76
7255988		Disc	Dial (Included in Escutcheon Assembly)	77
7256105		Escutcheon	Clutch Driver Disc	78
7256177		Gear	Escutcheon Assembly	79
7256102		Gear	Gear and Bushing (Tuning)	80
7256100		Grommet	Gear and Bracket Worm (Tuning)	81
7244021		Grommet	Antenna & R.F. Coil Grommet	82
7241772		Grommet	Oscillator Coil Grommet	83
7246179		Link	Mounting Bracket Grommet	84
7246971		Pointer	Guide Bar—Parallel	85
7256125		Pointer	Pointer Assembly Connecting Link	86
		Pointer	Pointer Assembly	87

## SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Osc. and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112

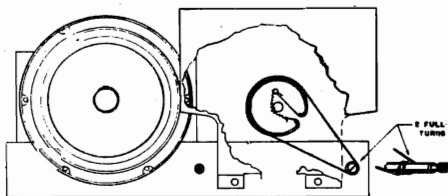
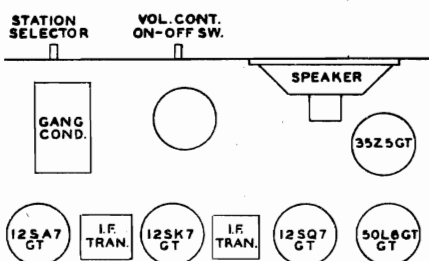


**NOTE:** All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.  
All voltages are positive DC unless otherwise marked.  
Volume control full on.  
Line voltage 117 volts AC.

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — 10 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
1F 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
535 kc.	12SA7GT Grid	10 mmf.	LF end	Osc. trimmer B	Set limit of band
1400 kc.	12SA7GT Grid	10 mmf.	1400 kc.	Ant. trimmer A Frequency Range 5	Tune to max.



### Dial Mechanism

Frequency Range.....540-1700 kc.  
Intermediate Frequency.....455 kc.  
Power Supply 105-125 volts AC-DC  
Loudspeaker .....5-inch Dynamic  
V.C. Impedance.....3.5 ohms at 400 cycles  
Power Output (Undistorted) .75 watts  
Power Output (Maximum) 1.5 watts  
Tuning Drive Ratio.....3 to 1  
Rated Power Input .....32 watts

MODEL 7G26C

CONCORD RADIO CORP.

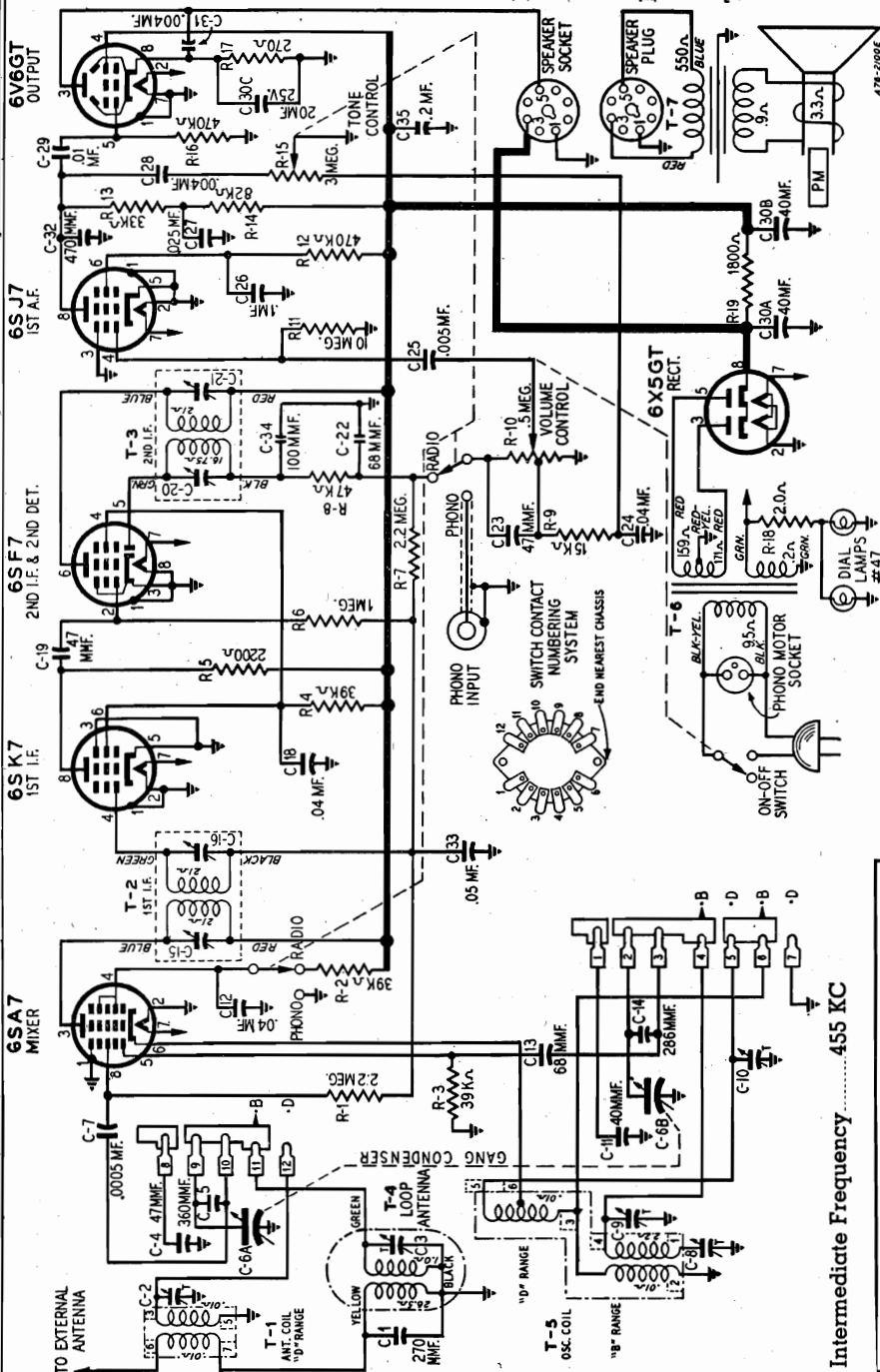
# REMOVAL OF CHASSIS FROM CABINET

Before the chassis may be taken from the cabinet, it is necessary to pull off the 4 control knobs, remove the 4 chassis mounting bolts, disconnect the leads running to the loop antenna, record changer and speaker and loosen the screw and remove the black lead fastened to the lower left corner of the chassis.

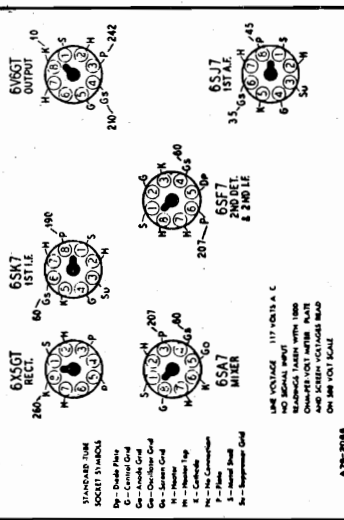
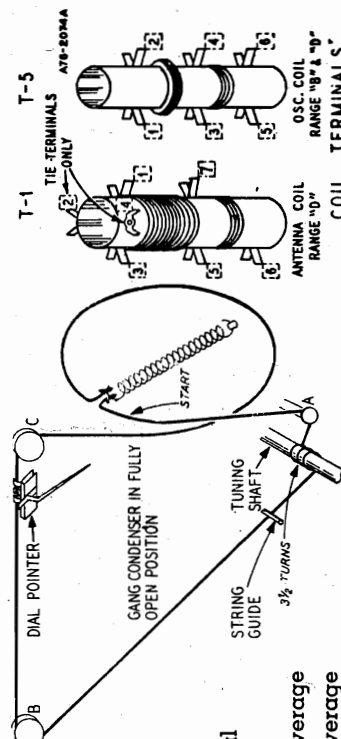
**Power Consumption**  
(at 117 Volts AC) 40 Watts (normal)  
58 Watts (phono operating)

**Power Output**... 4 Watts, Maximum  
2.3 Watts, 10% Distortion

**Tuning Frequency Range**  
B Range... 540-1600 Kilocycles  
D Range... 9.25-15 Megacycles



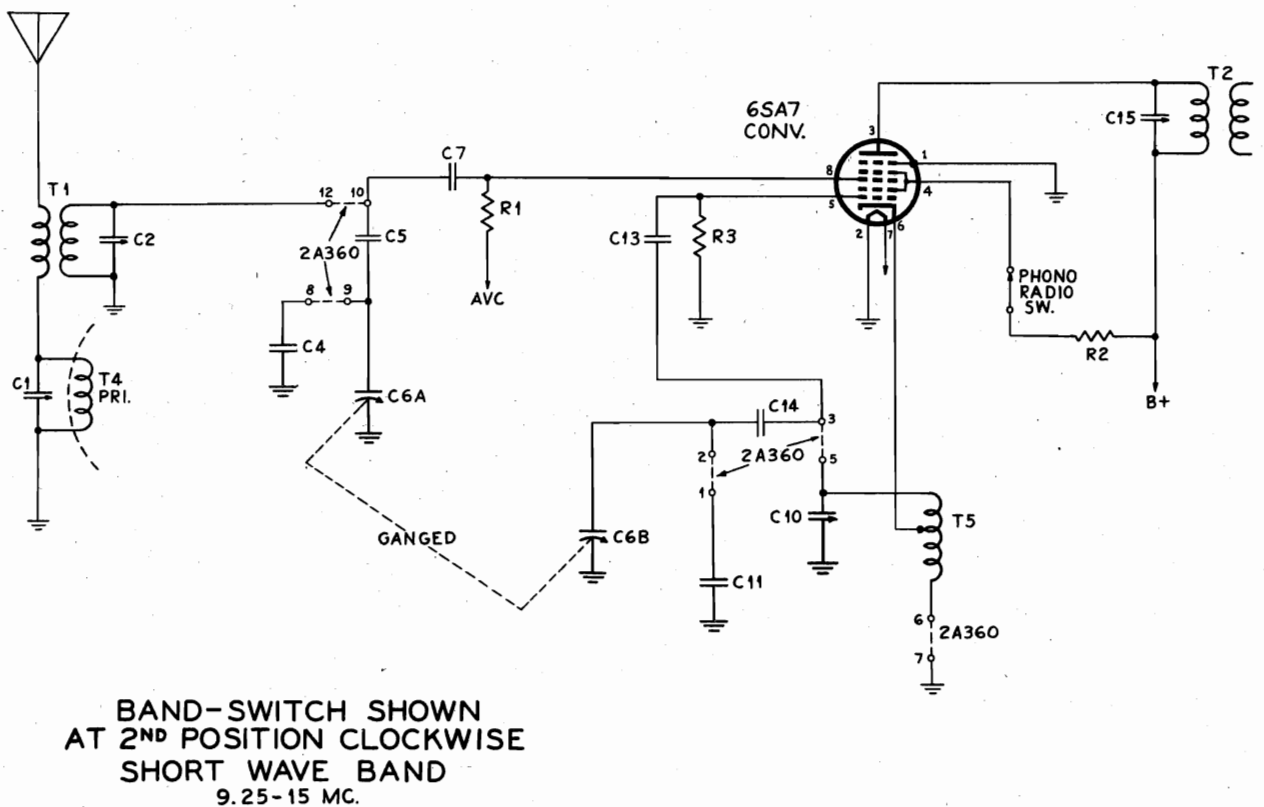
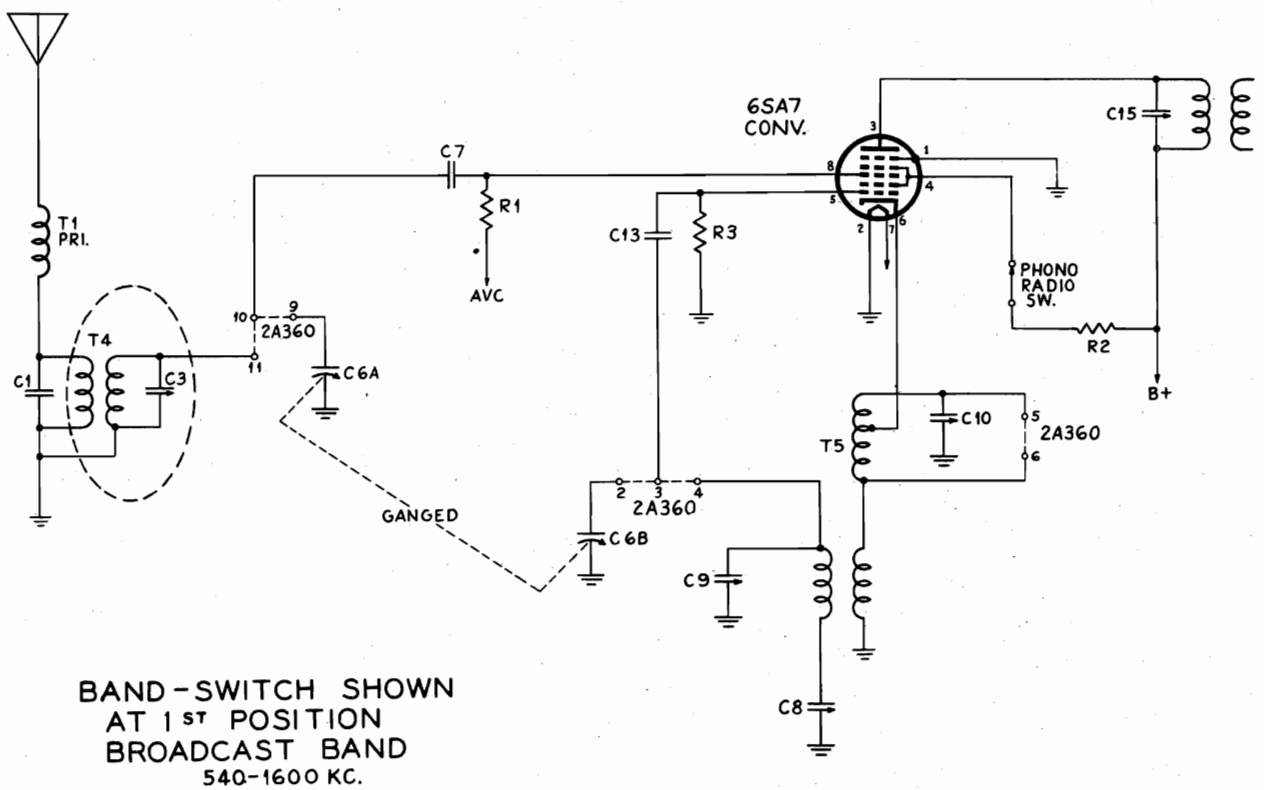
## DRIVE CORD REPLACEMENT



**Sensitivity** (For 0.5 Watt Output, with External Antenna)  
B Range... 9 Microvolts Average  
D Range... 20 Microvolts Average

**Selectivity**  
40 KC Broad at 1000 Times Signal  
455 KC





MODEL 7G26C

CONCORD RADIO CORP.

**ALIGNMENT PROCEDURE**

Volume Control—Maximum All Adjustments.

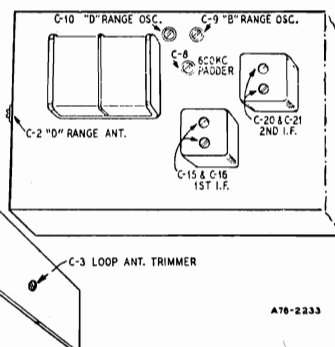
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:  
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.Output Indicating Meter—Non-Metallic Screwdriver.  
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR	FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	455 KC	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C20) & (C21)
RANGE B	1620 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output See Note A	Ant. Range B (C3)
	600 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output See Note B	Oscillator (C8)
Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.						
RANGE D	15.6 MC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	14 MC	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Ant. Range D (C2)
LOOP RANGE B	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Ant. Range B (C3)

Reassemble chassis in cabinet.



A78-2233

NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn rotor back and forth and adjust the trimmer until peak of greatest intensity is obtained.

**REPLACEMENT PARTS LIST**

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

**MISCELLANEOUS**

PART NO.	DESCRIPTION
12A442	6" P.M. Speaker complete with Output Transformer.....
12A436	8" P.M. Speaker complete with Output Transformer..... Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker).....
	Output Transformer (Specify part number and letters stamped on speaker).....
3A303	Tube Socket—Octal (8 prong) Molded.....
3A304	Phono Motor Socket.....
3A305	Phono Socket—Single Pin Tip.....
2A360	Band Change Switch.....
13X328	Line Cord and Plug Assembly.....
10A614	Knob (Tuning).....
10A615	Knob (Volume).....
10A616	Knob (Tone—R.P.).....
10A617	Knob (SW-BC).....

**TRANSFORMERS AND COILS**

T-1	9A1812	"D" Range Antenna Coil Assembly.....
T-2	9A1814	1st I-F Coil Assembly.....
T-3	9A1815	2nd I-F Coil Assembly.....
T-4	26A449	"B" Range Loop Antenna Assembly.....
T-5	9A1813	"B" and "D" Range Oscillator Coil Assembly.....
T-6	53X282	117 Volt, 60 Cycle, Standard Power Transformer.....
T-7		Output Transformer (See Miscellaneous).....

**CAPACITORS**

C-1	47X445	270 mmf	Molded
C-2	17A164	5-50 mmf	Trimmer
C-3	17A235	2-12 mmf	Trimmer
C-4	47X473	47 mmf	Silvered Mica
C-5	47X474	360 mmf	Silvered Mica
C-6A, C-6B	14A184	Gang Condenser	
C-7	B66501	.0005 mf	200 V Tubular
C-8	17A155	350-430 mmf	Trimmer
C-9, C-10	17A109	2.5-35 mmf	Dual Trimmer
C-11	47X472	40 mmf	Silvered Mica
C-12, C-18	D56403	.04 mf	400 V Tubular
C-13	47X466	68 mmf	Molded
C-14	47X481	286 mmf	Silvered Mica
C-15, C-16	Part of T-2	1st I-F Coil Assem.)	
C-19, C-23	47X463	47 mmf	Molded
C-20, C-21	Part of T-3	2nd I-F Coil Assem.)	
C-22	47X471	68 mmf	Molded
C-24	D64403	.04 mf	400 V Tubular
C-25	D66502	.005 mf	400 V Tubular
C-26	D67104	.10 mf	400 V Tubular
C-27	D64253	.025 mf	400 V Tubular
C-28	D66402	.004 mf	400 V Tubular
C-29	D66103	.01 mf	400 V Tubular
C-30A		40 mf	450 V
C-30B		40 mf	450 V
C-30C	45X346	20 mf	25 V Three Section Electrolytic..
C-31	F66402	.004 mf	600 V Tubular
C-32	47X505	470 mmf	Molded
C-33	B66503	.05 mf	200 V Tubular
C-34	47X476	100 mmf	Molded
C-35	D67204	.2 mf	400 V Tubular

**RESISTORS**

	OHMS	WATTS	
R-1, R-7	B85225	2.2 meg.	0.5 Carbon.....
R-2, R-4	C84393	39 K	1.0 Carbon.....
R-3	B94393	39 K	0.5 Carbon.....
R-5	B84222	2200	0.5 Carbon.....
R-6	B85105	1 meg.	0.5 Carbon.....
R-8	B85473	47 K	0.5 Carbon.....
R-9	B84153	15 K	0.5 Carbon.....
R-10	36X357	.5 meg.	Volume Control & Switch
R-11	B85106	10 meg.	0.5 Carbon.....
R-12, R-16	B85474	470 K	0.5 Carbon.....
R-13	B84333	33 K	0.5 Carbon.....
R-14	B84823	82 K	0.5 Carbon.....
*R-15	40X277	3 meg.	Tone Control & Radio Phono Switch
R-17	C84271	270	1.0 Carbon.....
R-18	43X213	2.0	0.5 Wire-wound.....
R-19	D84182	1800	2.0 Carbon.....

**DIAL AND DRIVE ASSEMBLY**

6X21	Rubber Grommet	
20X329	Cond. Cushion Stud	Mtg. Gang Condenser
26A443	Dial Bracket Assembly complete with Snacers, Pulleys, Diffusers and Dial Background less Dial Glass.....	
58X676	Dial Glass	
26A444	Idle Bracket Assembly.....	
26X486	Drive Shaft	
19X192	"C" Washer (for drive shaft).....	
15X163	Pointer	
10X38	Drive Cord Assembly or 50" Cord.....	
28X113	Drive Cord Tension Spring	
7X199	Pilot Light Socket Assembly.....	
4X353	No. 47 Pilot Light	
	Escutcheon	

**TYPE F-28A131 RECORD CHANGER PARTS**

F-44038	Motor, 60 Cycle, 115 volts.....
F-59175	Tone Arm (Less Crystal Cartridge).....
F-71214	Crystal Cartridge.....
F-64343	Tone Arm Spring.....
F-13510	Control Knob Assembly.....
F-13412	Automatic Stop Switch & Bracket Assembly.....
F-13435	Turntable.....
F-13544	Shelf Cover Arm & Record Hold Down Assembly.....
F-59176	Shelf Cover.....
F-561333	Shelf Cover Spring.....
	Needle, Permo No. 100.....

**SUBSTITUTE PARTS**

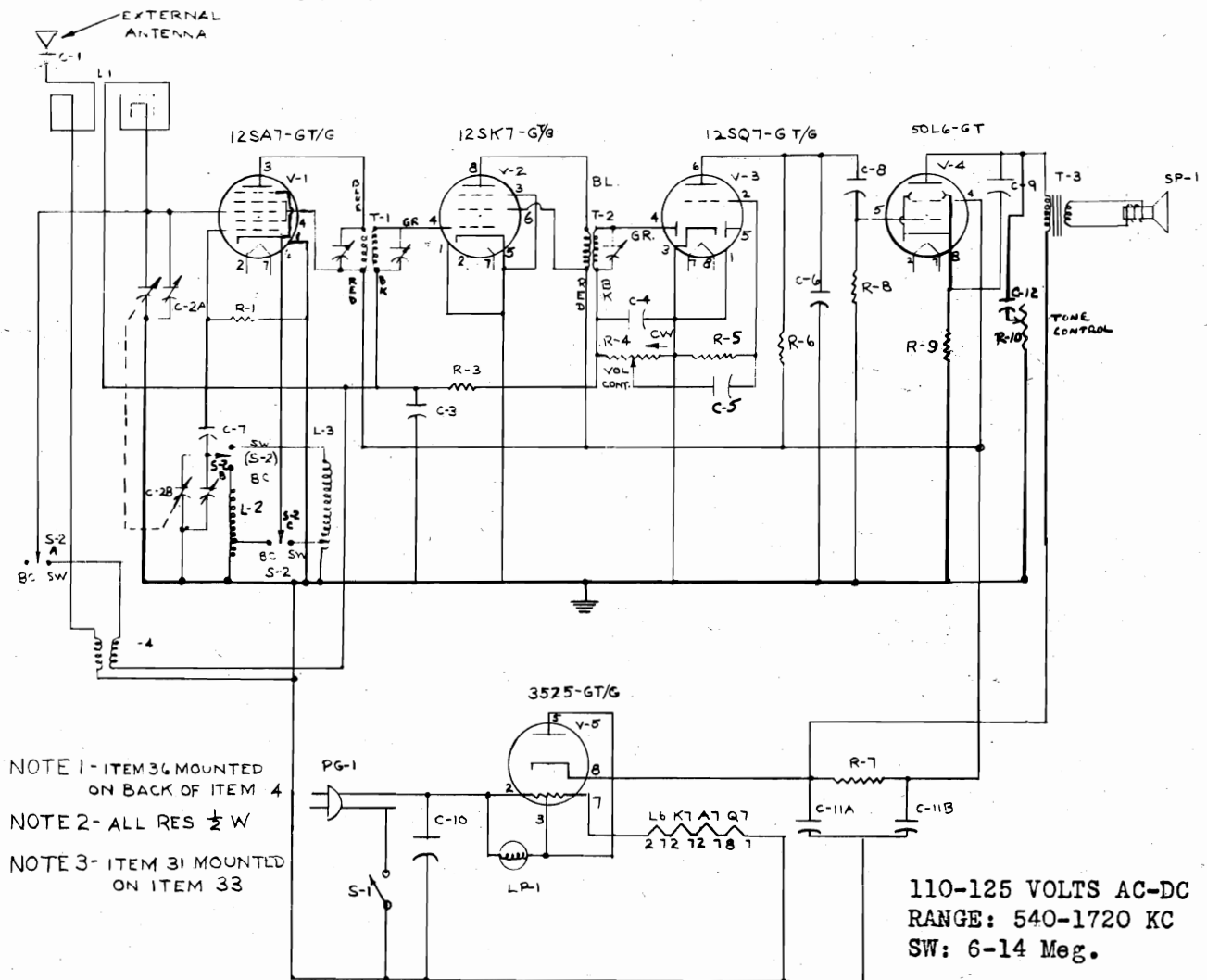
The following parts are used in some receivers only. Check part numbers on old part before ordering and order part originally used in receiver.

*40X282	Tone Control (Substitute for 40X277).....
*25X1539	Radio Phono Switch Lever (Use with 40X282).....
*2A161	D.P.D.T. Switch (Use with 40X282).....

Use only GENUINE factory tested parts to insure service jobs you can depend on and to obtain original set performance.

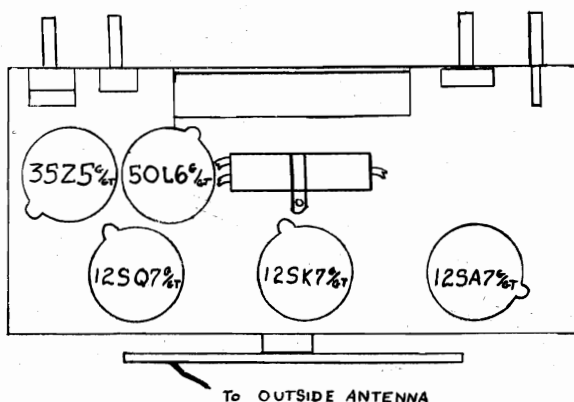
## CORONET RADIO &amp; TELEV. CO.

MODEL 1583



VOL. CON. TONE

BAND SW. STATIONS



CODE	PART	DESCRIPTION	ITEM
R-1	A-95	Resistor, 22,000 ohms	1
R-3	A-17	" 2.2 meg	2
R-4	A-96	Potentiom'r, 0.5 meg.	3
R-5	A-18	Resistor, 10 meg	4
R-6	A-14	" 0.25 meg	5
R-7	A-98	" 1200 ohm	6
R-8	A-15	" 0.5 meg	7
R-9	A-16	" 140 ohm	8
R-10	A-18	Potentiom'r .1 meg	9
			10
			11

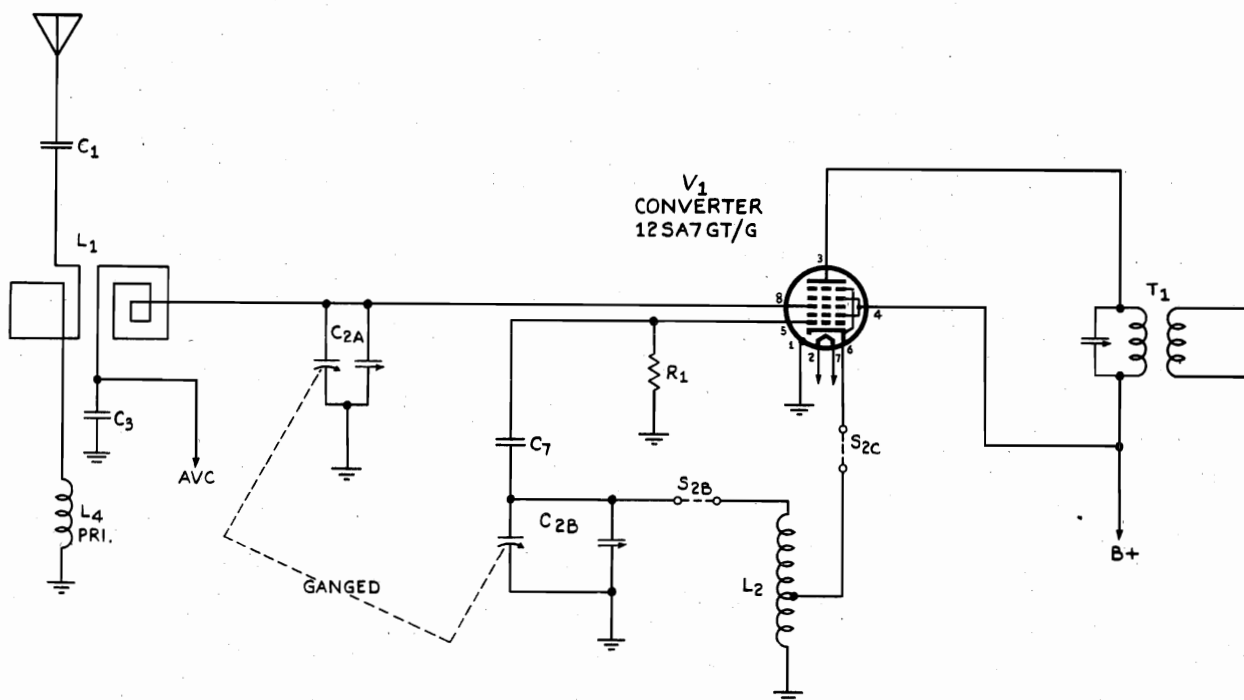
C-1	A-5	Condens'r;	02 meg	200v	12
C-2	A-19	"	Tuning		13
C-3	A-7	"	.05 mf	200v	14
C-4	A-9	"	250 mmf	"	15
C-5	A-6	"	.002 mf	"	16
C-6	A-9	"	250 mmf	"	17
C-7	A-8	"	100 mmf	"	18
C-8	A-5	"	.02 mf	"	19
C-9	A-5	"	.02 "	400v	20
C-10	A-4	"	0.1 "	200v	21
C-11	A-3	"	50-20mf	150v	22
S-2	A-97	4 pole 2 pos'ion			23
C-12	A-99	Cond. .05 mf		200v	24
L-1	A-1	Internal loop ant.			25
L-2	A-28	B.C. osc. coil			26
L-3	A-98	SW osc. coil			27
L-4	A-98	SW ant. coil			28
T-1	A-10	456 kc. IF xformer			29
T-2	A-11	" "			30
T-3	A-2	Output			31
LP-1	A-30	Lamp, 6v, 0.15A.			32
SP-1	A-2	P.M. speaker			33
PG-1	A-55	Power plug			34
					35
S-1	A-96	Power switch			36
V-1	A-22	Vac. tube, 12SA7-GT/G			37
V-2	A-23	" " 12SK7-			38
V-3	A-24	" " 12SQ7			39
V-4	A-25	" " 50L6-GT			40
V-5	A-26	" " 35Z5-GT/G			41

# "clarified schematics"

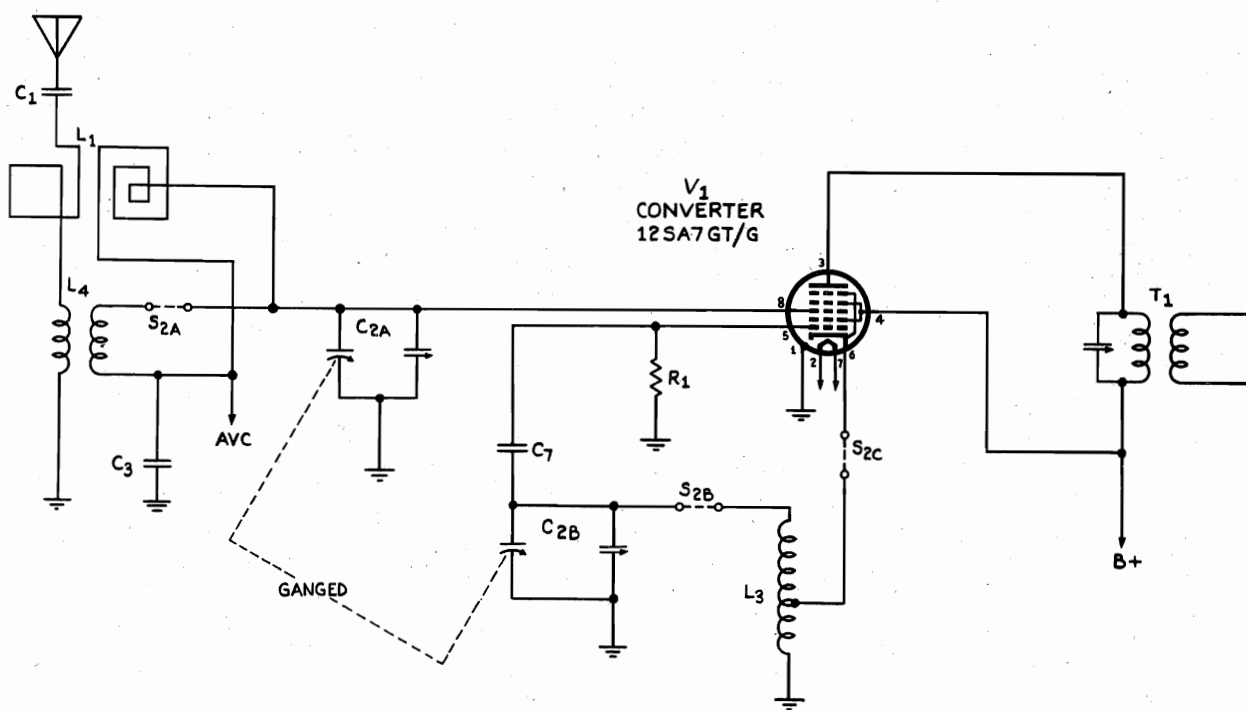
PAGE 16-2 CORONET

MODEL 1583

CORONET RADIO & TELEV. CO.



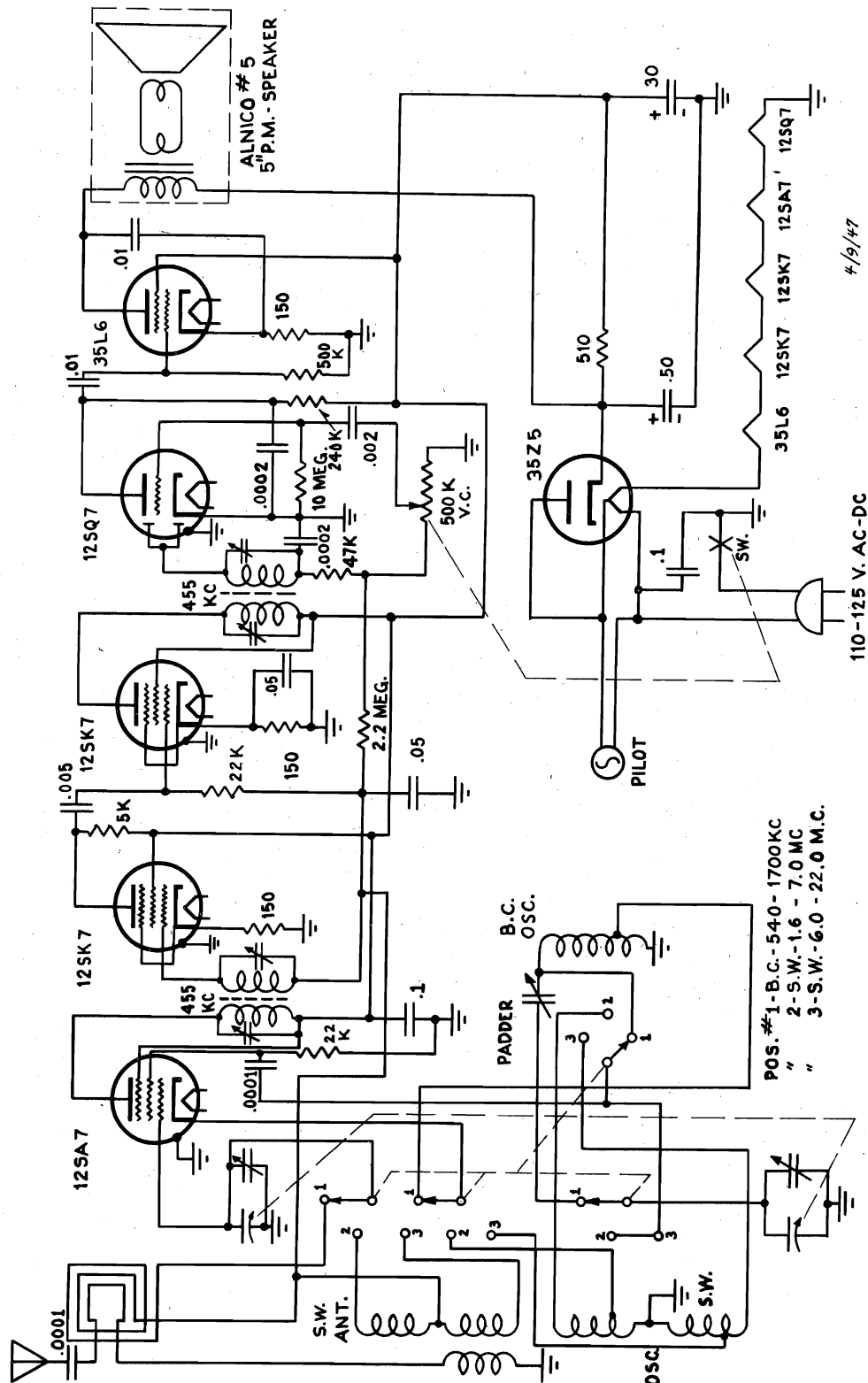
BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION.  
BROADCAST BAND  
540-1720 KC.



BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION.  
SHORT WAVE BAND  
6 - 14 MC.

## CORONET RADIO &amp; TELEV CO.

MODEL 1701

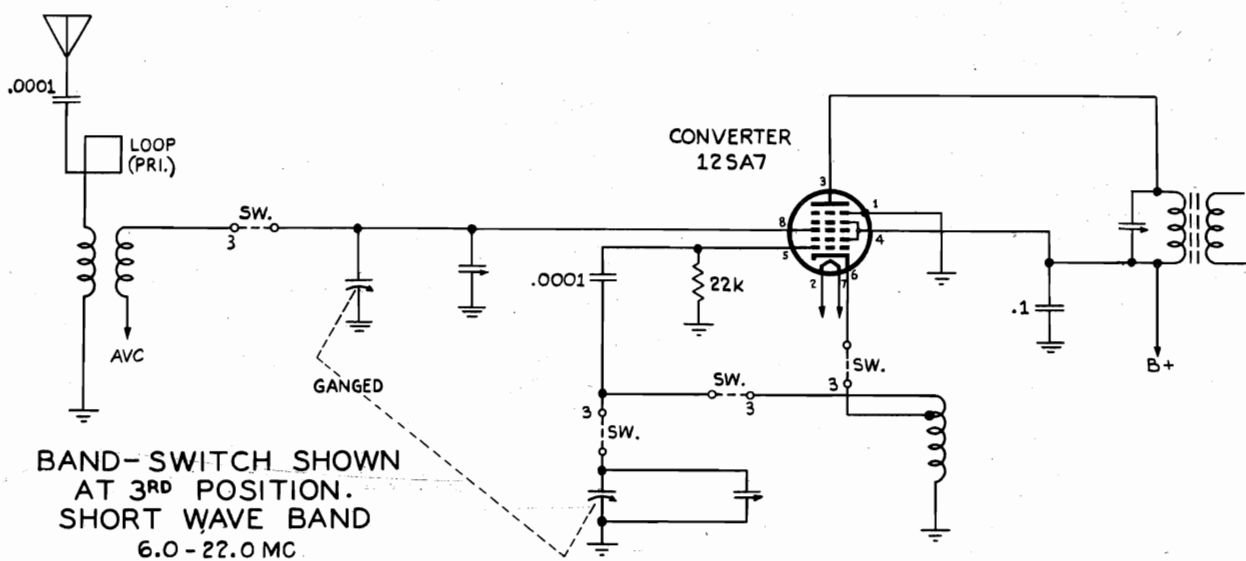
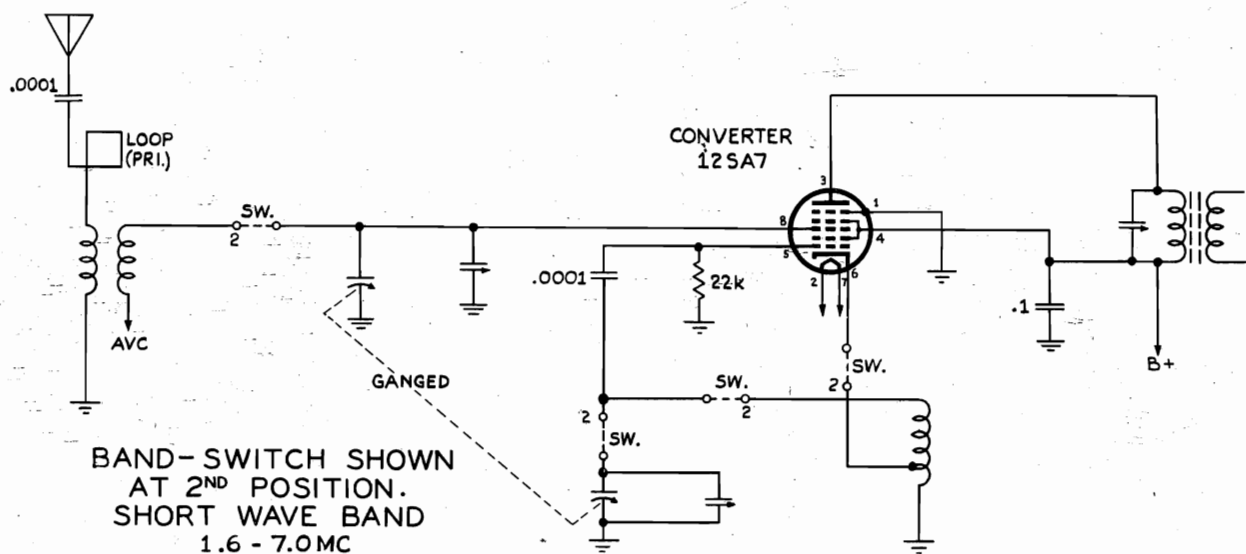
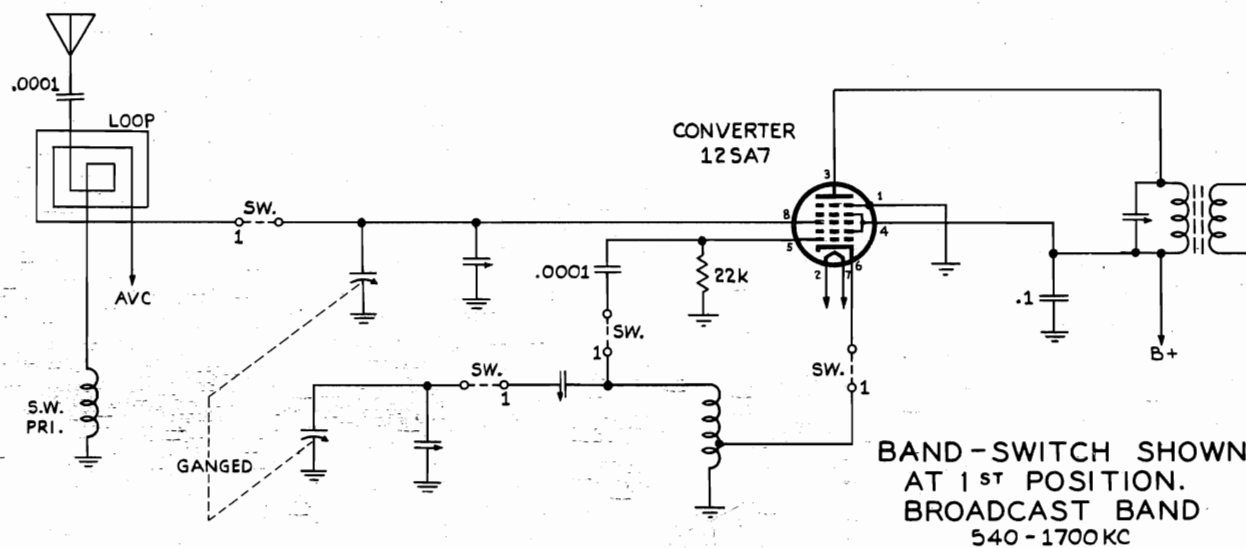


# "clarified schematics"

PAGE 16-4 CORONET

MODEL 1701

CORONET RADIO & TELEV. CO.

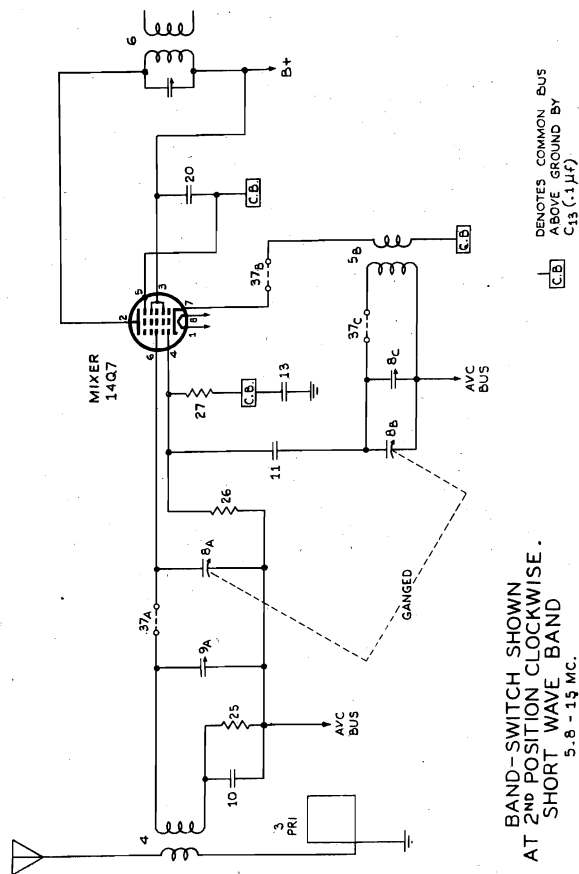
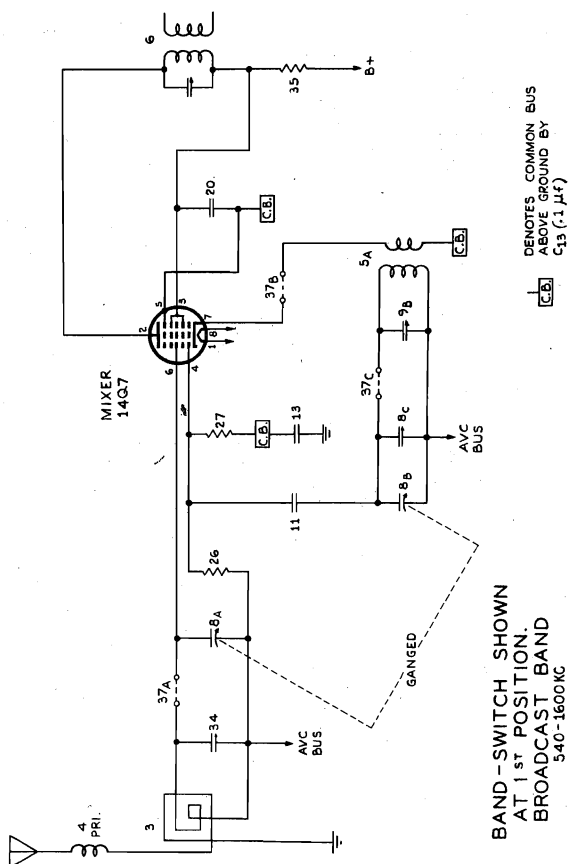
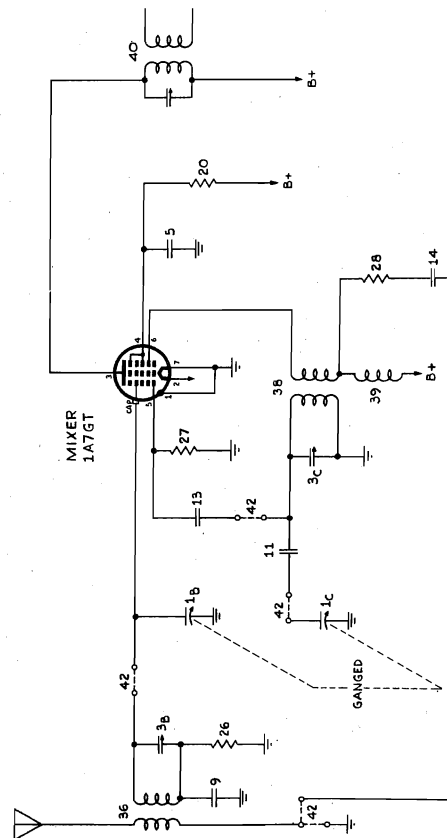
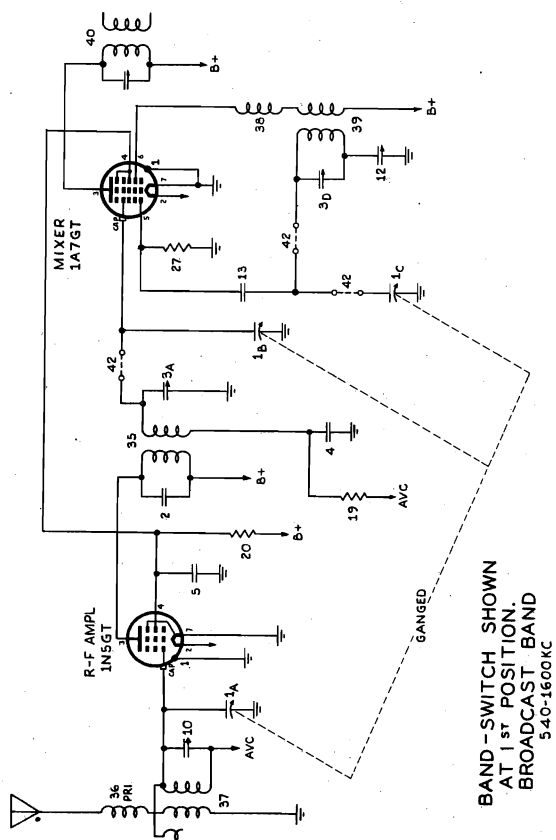




# "clarified schematics"

MODEL 56FC  
MODEL 56TX-L

CROSLLEY DIV.  
AVCOMFG. CORP.





# CROSLEY DIV. AV COMFG. CORP.

MODEL 56FC

## ALIGNMENT PROCEDURE

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

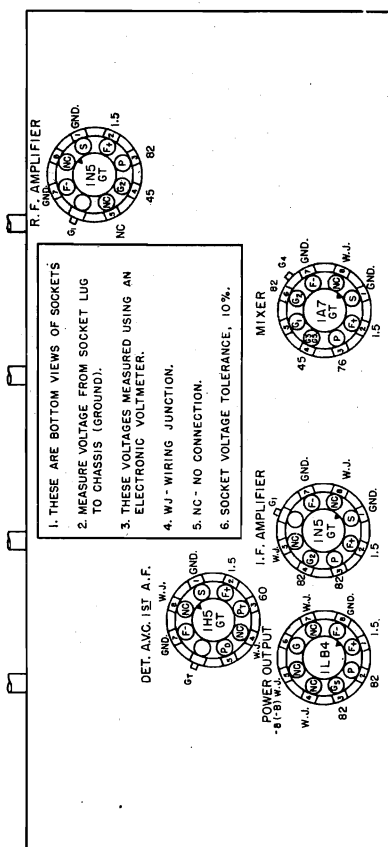
## ALIGNMENT CHART

Alignment Sequence	Signal Generator Output			Position of	
	Frequency in kc.	In Series with	To	Band Switch	Adjust for Maximum Output
1	455	200 mmf.	Ant.	A	A & B
2	1,620	200 mmf.	Ant.	A	C
3	600	200 mmf.	Ant.	A	D
4	1,620	200 mmf.	Ant.	A	C
5	1,400	200 mmf.	Ant.	A	E & F
6	600	200 mmf.	Ant.	A	D
7	15,300	400 ohms	Ant.	O	G*
8	15,000	400 ohms	Ant.	O	H

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

TYPE: Five-tube, two-band superheterodyne.  
 FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)  
 Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)  
 INTERMEDIATE FREQUENCY: 455 kc.  
 POWER SUPPLY: Crosley "A-B" Battery Pack, CR69.  
 VOLTAGE RATING: 1½ v. "A"; 90 v. "B"  
 POWER OUTPUT: 170 mw. minimum.

## SOCKET VOLTAGE CHART

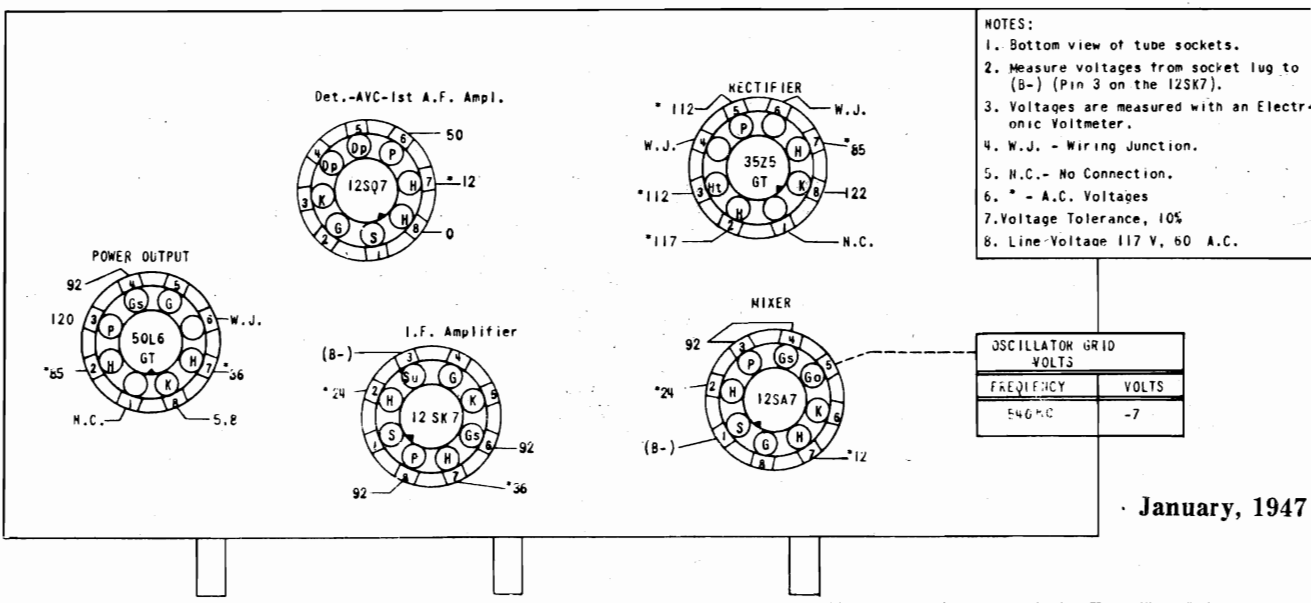


## PARTS LIST—MODEL 56FC

Item No.	Part No.	Description	Item No.	Part No.	Description
1A	AC-134898	Condenser (Variable)	31	39365-8	Control (Volume)
1B		Condenser (Variable)	32	39365-2	Switch (Plate Supply)
1C		Condenser (Variable)	33	39294-16	Resistor, 3300 ohm, ½ w.
2A	39004-1	Condenser, 100 mfd., 500v., Paper	34	39294-35	Resistor, 4.7 megohm, ½ w.
2B	B-132386-12	Condenser, 100 mfd., 500v., Paper	35	39365-108	Control (Tune)
3A		Condenser, 100 mfd., 500v., Paper	36	AW-135133	Coil Assembly (R. F.)
3B		Condenser, 100 mfd., 500v., Paper	37	AW-135147	Coil Assembly (H. F. Ant.)
3C		Condenser, 100 mfd., 500v., Paper	38	AW-135154	Coil Assembly (H. C. Ant.)
3D		Condenser, 100 mfd., 500v., Paper	39	AW-135141	Coil Assembly (H. C. Osc.)
4	39001-30	Condenser, 0.02 mfd., 600v., Paper	40	AW-132803	Transformer (1st I. F.)
5	39001-30	Condenser, 0.02 mfd., 600v., Paper	41	AW-132804	Transformer (2nd I. F.)
6	39001-30	Condenser, 0.02 mfd., 600v., Paper	42	B-135079	Switch (Band Change)
7	39001-77	Condenser, 0.02 mfd., 600v., Paper	43	C-135199	Speaker and Transformer Assembly
8	39001-1	Condenser, 100 mfd., 500v., Paper	44	W-132922	Cable and Plug (Battery)
9	GC-210685-99	Condenser, 600 mfd., 300v., Mica	45	W-132922	Socket (1 LB4 Tube)
10	W-48652-15	Condenser, 480 mfd., 500v., Mica		W-135371	Socket (1 LB4 Tube)
11	GC-210685-138	Condenser, 600 mfd., 300v., Mica		W-39204	Shield (Tube)
12	B-135138	Condenser, 100 mfd., 500v., Paper		W-46447-1	CR69 "A-B" Battery Pack
13	B-135138	Condenser, 100 mfd., 500v., Paper		B-134571	Dial Face Assembly
14	39001-76	Condenser, 0.03 mfd., 600v., Paper		W-134667	Clip (Dial Pointer)
15A	W-48664	Condenser, 15 mfd., 140 v. w. v. Section		W-134917	Ring (Retaining)
15B		Condenser, 15 mfd., 140 v. w. v. Section		W-51071	Washer (Spring)
16	39001-76	Condenser, 0.03 mfd., 600v., Paper		D-132923	Spring (Dial Cord)
17	39001-78	Condenser, 0.03 mfd., 600v., Paper		C-132668	Lens (Dial)
18	39001-74	Condenser, 0.02 mfd., 600v., Paper		W-130197	Rubber Mtg.
19	39294-25	Resistor, 100,000 ohm, ½ w.		39220-38	Screw (Chassis Mtg.)
20	39294-23	Resistor, 47,000 ohm, ½ w.			
21	39294-35	Resistor, 4.7 megohm, ½ w.			
22	39294-35	Resistor, 4.7 megohm, ½ w.			
23	39294-35	Resistor, 4.7 megohm, ½ w.			
24	39294-31	Resistor, 1 megohm, ½ w.			
25	39294-33	Resistor, 2.2 megohm, ½ w.			
26	39294-34	Resistor, 3.3 megohm, ½ w.			
27	39294-27	Resistor, 220,000 ohm, ½ w.			
28	39294-17	Resistor, 65 ohm, ½ w.			
29	39294-17	Resistor, 65 ohm, ½ w.			
30A	B-130520-3	Control, Volume (1 megohm)			
30B		Switch (Plate Supply)			
30C		Switch (Filament Supply)			

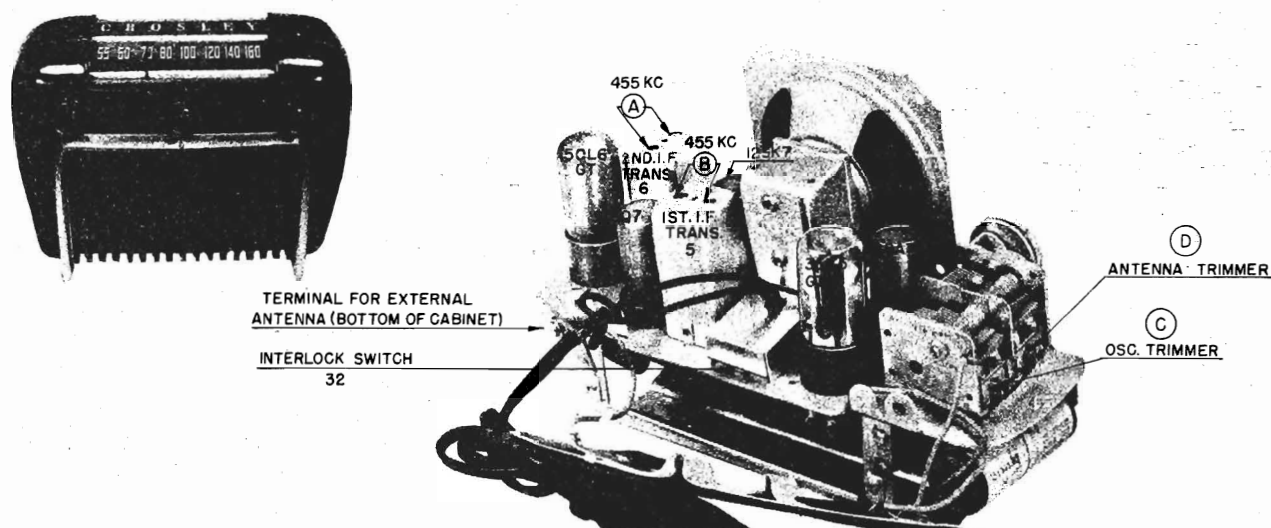
\*These parts will replace the original equipment parts.

**SOCKET VOLTAGE CHART** POWER OUTPUT: 2 watts maximum.



January, 1947

CROSLEY DIV.  
AVCOMFG. CORP.



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

Reversing the position of the power plug when alternating current is used may reduce power hum.  
*Under no circumstances should a ground be connected to this receiver.*

When checking or replacing tubes or aligning this receiver, the back of the cabinet must be removed. This is accomplished by removing the two screws located near the top of the cabinet back in the louvre recess. Remove the back carefully and do not exert too much pressure. When the back is removed it disengages the interlock safety switch (item 32 on schematic) and cuts off the power to the receiver. To turn on the radio when the back of the cabinet is removed, it is necessary to hold in the lever on the interlock switch and caution should be exercised not to come in contact with exposed wires on the chassis.

#### ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r. f. signal input from the signal generator should be connected to the external antenna terminal screw, as indicated in the alignment chart. Connect the signal generator ground through a 0.1 mfd. condenser to—B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of Tuning Dial KC	Adjust for Maximum Outout
	Frequency in KC	In Series with	To		
1	455	200 mmf.	Ant.	1620	A & B
2	1620	200 mmf.	Ant.	1620	C
3	1400	200 mmf.	Ant.	1400	D

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48588	Bulb (Dial), Type 47, 6.3v., 15 amp.	26	39294-38	Resistor, 15 megohm, $\frac{1}{2}$ w.
2	C-132300-1	Cable and Plug (power)	27	39294-41	Resistor, 22,000 ohm, $\frac{1}{2}$ w.
3	A-134018	Antenna Loop Assembly	28	39294-42	Resistor, 22,000 ohm, $\frac{1}{2}$ w.
4	W-134018	Antenna Loop Assembly	29	39294-43	Resistor, 47,000 ohm, $\frac{1}{2}$ w.
5A	AW-134993	Coil (B. C. Oscillator) Two	30	39294-44	Resistor, 47,000 ohm, $\frac{1}{2}$ w.
5B	AW-134993	Coil (B. F. Oscillator) Section	31	39294-35	Resistor, 47 megohm, $\frac{1}{2}$ w.
6	AW-134065	Transformer (1st I. F.)	32	W-137367	Part of Item #3
6B	AW-134158	Transformer (2nd I. F.)	34	39294-36	Condenser (Antenna Trimmer)
7	AW-134158	Condenser (Variable) Two	35	39294-37	Resistor, 10 ohm, $\frac{1}{2}$ w.
8	B-134956	Condenser (Variable) Section	36	39294-36	Resistor, 1200 ohm, $\frac{1}{2}$ w.
8B	AW-134956	Condenser (Trimmer)	37A	39011-26	Switch (Band Change) Three
8C	AW-134956	Condenser (Trimmer) Two	37B	39011-26	Switch (Band Change) Section
9A	AB-135088	Condenser (Trimmer) 300v., Paper	37C	AB-137006	Switch (Band Change) Section
9B	AB-135088	Condenser (Trimmer) 500v., Paper	38A	C-4604-6	Speaker W. and Transformer Assembly
10	GC-210885-143	Condenser, 50 mfd., 600v., Mica	38B	39011-26	Switch (Power)
11	39004-5	Condenser, 50 mfd., 600v., Paper	39868-8	Control, Volume	
11B	39001-17	Condenser, .05 mfd., 600v., Paper	39869-1	Switch, Power	
12	39001-19	Condenser, .05 mfd., 600v., Paper	39011-371	Socket, Tube	
13	39001-17	Condenser, .05 mfd., 600v., Paper	39011-371	Socket, Tube	
14	39001-17	Condenser, .05 mfd., 600v., Paper	C-135175	Part of Item #3	
15	39001-76	Condenser, .03 mfd., 600v., Paper	B-134952	Pointer (Dial)	
16	39001-76	Condenser, .03 mfd., 600v., Paper	B-134952	Pointer (Dial)	
17	W-134988	Condenser, 60 mfd., 150v., Section	W-134667	Clip (Dial Pointer)	
17B	W-134988	Condenser, 20 mfd., 100v., Elect.	W-134917	Shut (Drive)	
18	W-134988	Condenser, 20 mfd., 100v., Elect.	W-134917	Shut (Drive)	
19	39001-80	Condenser, .02 mfd., 600v., Paper	W-134916	Washer (Spring)	
19B	39001-80	Condenser, .02 mfd., 600v., Paper	W-134916	Washer (Spring)	
20	39001-80	Condenser, .02 mfd., 600v., Paper	61762	Spring (Dial Cord)	
21	39294-29	Resistor, 470,000 ohm, $\frac{1}{2}$ w.	W-134055	Grommet	
22	39294-29	Resistor, 470,000 ohm, $\frac{1}{2}$ w.	AW-134738	Cabinet	
23	39294-29	Resistor, 470,000 ohm, $\frac{1}{2}$ w.	W-134863	Knob (Dial)	
24	39294-29	Resistor, 100 ohm, $\frac{1}{2}$ w.	W-136680	Stud, Trimmer	
25	39294-28	Resistor, 330,000 ohm, $\frac{1}{2}$ w.	W-136214	Stud, Trimmer	

**These parts will replace the original equipment parts.**

## PARTS LIST—MODELS 56TZ, 57TQ

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-4858	Bulb (Dia), Type 47, 6.3 v., .15 amp.	29	39373-37	Resistor, 470,000 ohm, $\frac{1}{2}$ w.
2	C-12300-2	Cable and Plug, Power	30	39373-36	Resistor, 150 ohm, $\frac{1}{2}$ w.
3	AC-18383-3	Loop Assembly, Antenna	31A	B-185692	Control, Volume (1 megohm)
4	AW-135730	Coil Assembly, Oscillator	31B		Switch, Volume
5	AW-135729	Transformer, 1st I.F.		39388-14	Control, Volume
6	AW-135723	Transformer, 2nd I.F.		B-185691	Control, Volume (Radio)
7A	B-135570	Condenser, Variable	32A		Switch, (Radio, Phone, Tone)
7B		Condenser, Variable Section	32B		Switch, (Radio, Phone)
8	Part of Item 7B		AD-1356420		Speaker (Lens Transformer)
9	39001-16	Condenser, .001 mfd., 600 v., Paper	33		Transformer (Output 400)
10	39001-17	Condenser, .01 mfd., 600 v., Paper	34	B-135523	Resistor, 470 ohm, $\frac{1}{2}$ w.
11	39001-17	Condenser, .05 mfd., 600 v., Paper	38	W-137367	Resistor, 47 ohm, $\frac{1}{2}$ w.
12	39001-19	Condenser, .1 mfd., 600 v., Paper	41	39001-40	Condenser, .02 mfd., 600 v., Paper
13	39001-17	Condenser, .03 mfd., 600 v., Paper	44		Condenser, .02 mfd., 600 v., Paper
14	39001-17	Condenser, .03 mfd., 600 v., Paper			Condenser, .02 mfd., 600 v., Paper
15	39001-17	Condenser, .03 mfd., 600 v., Paper			Condenser, .02 mfd., 600 v., Paper
16	39001-50	Condenser, .02 mfd., 600 v., Paper			Condenser, .02 mfd., 600 v., Paper
17	39001-50	Condenser, .02 mfd., 600 v., Paper			Condenser, .02 mfd., 600 v., Paper
18	B-136770	Condenser, 60 mfd., 150 v. v. Two Section			Condenser, .02 mfd., 600 v., Paper
19A		Condenser, 60 mfd., 150 v. v. Two Section			Condenser, .02 mfd., 600 v., Paper
19B		Condenser, 60 mfd., 150 v. v. Three			Condenser, .02 mfd., 600 v., Paper
19C	B-135732	Condenser, 20 mfd., 150 v. v. Section			Condenser, .02 mfd., 600 v., Paper
18C		Condenser, 20 mfd., 150 v. v. Elect. Filter			Condenser, .02 mfd., 600 v., Paper
19	39373-16	Resistor, 22,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
20	39373-60	Resistor, 22,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
21	39373-109	Resistor, 15 megohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
22	39373-60	Resistor, 22,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
23	39373-80	Resistor, 220,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
24	39373-80	Resistor, 220,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
25	39373-144	Resistor, 120,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
26	Part of Item #6				Condenser, .02 mfd., 600 v., Paper
27	39373-35	Resistor, 470,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
28	39373-35	Resistor, 470,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper
29	39373-37	Resistor, 470,000 ohm, $\frac{1}{2}$ w.			Condenser, .02 mfd., 600 v., Paper

<sup>a</sup>These parts are used on 2nd production models only

These parts will replace the original equipment parts.

## PARTS LIST—MODEL 56TD

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48588	Bulb (Dual), Type 47, 6.3 v., 15 amp.	38968-18		Control (Volume)
2	C-132900-1	Cable and Plug (Power)	38970-2		Shift (Plug-in)
3	AW-136068	Coil Assy. (Oscillator)	38970-3		Control (Tone)
4	AW-137656	Transformer (2 st. F.)	38986-11		Transformer (Output)
5	AW-137657	Transformer (2 st. F.)	28	B-135388	Resistor, .01 mfd., 600 v., paper
6	B-136810	Condenser, Variable (Two Section)	29	39001-33	Condenser, .03 mfd., 600 v., paper
7		Condenser, Trimmer	31	39001-76	Condenser, .03 mfd., 600 v., paper
7C	Part of Item 7A	Condenser, Trimmer	32	W-135355	Switch (Interlock)
7D	Part of Item 7B	Condenser, Trimmer	34	39294-8	Resistor, 150 ohm, 1/2 w.
7E		Condenser, .02 mfd., 600 v., paper	35	39015-26	Resistor, 1200 ohm, 1 w.
8	39001-90	Condenser, .02 mfd., 600 v., paper	36	39029-4	Socket, Tube
9	39001-75	Condenser, .03 mfd., 600 v., paper		G-3901-4	Socket, Light
10	39001-76	Condenser, .03 mfd., 600 v., paper		AW-136809	Pulley and Pinion
11	39001-78	Condenser, .02 mfd., 600 v., paper			Cond.
12	39001-80	Condenser, .02 mfd., 600 v., paper		C-136897	Backgrip, Dial
13	39001-80	Condenser, .02 mfd., 600 v., paper		D-136823	Packet, Dial
14	39001-80	Condenser, .02 mfd., 600 v., paper		W-134683	Roller, Drive Cord
15	39001-80	Condenser, .02 mfd., 600 v., paper		W-57752	Spring, Drive Cord
16	39001-80	Condenser, .02 mfd., 600 v., paper		C-134657	Pointer, Dial
17	39001-80	Condenser, .02 mfd., 600 v., paper		W-134916	Wash, Drive Shaft
18	39001-80	Condenser, .02 mfd., 600 v., paper		W-134916	Wash, Drive Shaft
19	39001-80	Condenser, .02 mfd., 600 v., paper		W-50771	Ring, Spring (Drive Shaft)
20	39001-80	Condenser, .02 mfd., 600 v., paper		W-134655	Grommet
21	39001-80	Condenser, .02 mfd., 600 v., paper		AC-138168-1	Cabinet Assy.
22	39001-80	Condenser, .02 mfd., 600 v., paper		W-135357	Knob, Dial
23	39001-80	Condenser, .02 mfd., 600 v., paper		B-136630	Stud, Trimmer
24	39001-80	Condenser, .02 mfd., 600 v., paper		W-136630	Stud, Trimmer
25	39001-80	Condenser, .02 mfd., 600 v., paper		39001-80	Condenser, .02 mfd., 600 v., paper
26	39001-80	Condenser, .02 mfd., 600 v., paper		39294-21	Resistor, 22,000 ohm, 1/2 w.
27	39001-80	Condenser, .02 mfd., 600 v., paper			
28	39001-80	Condenser, .02 mfd., 600 v., paper			
29	39001-80	Condenser, .02 mfd., 600 v., paper			
30	39001-80	Condenser, .02 mfd., 600 v., paper			
31	39001-80	Condenser, .02 mfd., 600 v., paper			
32	39001-80	Condenser, .02 mfd., 600 v., paper			
33	39001-80	Condenser, .02 mfd., 600 v., paper			
34	39001-80	Condenser, .02 mfd., 600 v., paper			
35	39001-80	Condenser, .02 mfd., 600 v., paper			
36	39001-80	Condenser, .02 mfd., 600 v., paper			
37	39001-80	Condenser, .02 mfd., 600 v., paper			
38	39001-80	Condenser, .02 mfd., 600 v., paper			
39	39001-80	Condenser, .02 mfd., 600 v., paper			
40	39001-80	Condenser, .02 mfd., 600 v., paper			
41	39001-80	Condenser, .02 mfd., 600 v., paper			
42	39001-80	Condenser, .02 mfd., 600 v., paper			
43	39001-80	Condenser, .02 mfd., 600 v., paper			
44	39001-80	Condenser, .02 mfd., 600 v., paper			
45	39001-80	Condenser, .02 mfd., 600 v., paper			
46	39001-80	Condenser, .02 mfd., 600 v., paper			
47	39001-80	Condenser, .02 mfd., 600 v., paper			
48	39001-80	Condenser, .02 mfd., 600 v., paper			
49	39001-80	Condenser, .02 mfd., 600 v., paper			
50	39001-80	Condenser, .02 mfd., 600 v., paper			
51	39001-80	Condenser, .02 mfd., 600 v., paper			
52	39001-80	Condenser, .02 mfd., 600 v., paper			
53	39001-80	Condenser, .02 mfd., 600 v., paper			
54	39001-80	Condenser, .02 mfd., 600 v., paper			
55	39001-80	Condenser, .02 mfd., 600 v., paper			
56	39001-80	Condenser, .02 mfd., 600 v., paper			
57	39001-80	Condenser, .02 mfd., 600 v., paper			
58	39001-80	Condenser, .02 mfd., 600 v., paper			
59	39001-80	Condenser, .02 mfd., 600 v., paper			

\*These parts will replace the original equipment parts.

## PARTS LIST—MODEL 56TN-L

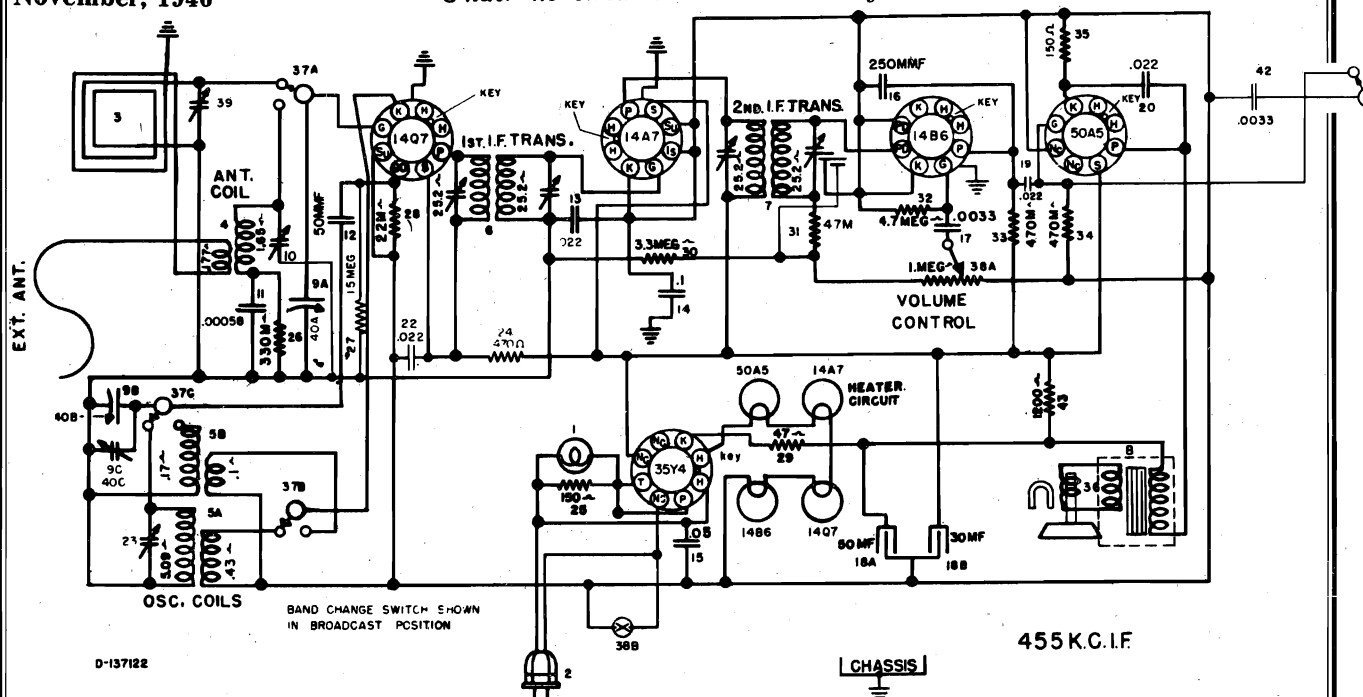
Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48868	Bulb (Dial Light), Type 47, 6.3v.,	29	W-137907	Resistor, 47 Ohm, 1 W.
2	C-132000-1	Cable and Plug (power)	30	W-134937	Resistor, 1 Megohm, $\frac{1}{2}$ w.
3	AC-134238	Antenna Loop and Back Assembly	31	39231-25	Resistor, 47 Ohm, $\frac{1}{2}$ w.
4	AW-154994	Coil (H.F. Antenna)	32	39231-35	Resistor, 47 megohm, $\frac{1}{2}$ w.
5A	AW-134959	Coil (H.C. Oscillator)	33	39231-29	Resistor, 470,000 Ohm, $\frac{1}{2}$ w.
5B	AW-134959	Coil (H.C. Oscillator) Two	34	39231-29	Resistor, 470,000 Ohm, $\frac{1}{2}$ w.
6	AW-134959	Transformer (1st L.F.) Section	35	39231-29	Resistor, 470,000 Ohm, $\frac{1}{2}$ w.
7	AW-134965	Transformer (2nd L.F.)	36	AB-138073	Speaker, 130 Ohm, $\frac{1}{2}$ w.
8	AW-134158	Condenser (Variable) Two	37A	B-137026	Switch (Band Change)
9A	B-134955	Condenser (Variable) Section	37B		Switch (Band Change) Section
9B	B-134955	Condenser (Variable) Section	37C		Switch (Band Change) Section
10	B-134955	Condenser (Variable) Section	37D		Switch (Band Change) Section
11	B-134955	Condenser (Variable) Section	37E		Switch (Band Change) Section
12	B-134955	Condenser (Variable) Section	37F		Switch (Band Change) Section
13	B-134955	Condenser (Variable) Section	37G		Switch (Band Change) Section
14	B-134955	Condenser (Variable) Section	37H		Switch (Band Change) Section
15	B-134955	Condenser (Variable) Section	37I		Switch (Band Change) Section
16	B-134955	Condenser (Variable) Section	37J		Switch (Band Change) Section
17	B-134955	Condenser (Variable) Section	37K		Switch (Band Change) Section
18	B-134955	Condenser (Variable) Section	37L		Switch (Band Change) Section
19	B-134955	Condenser (Variable) Section	37M		Switch (Band Change) Section
20	B-134955	Condenser (Variable) Section	37N		Switch (Band Change) Section
21	B-134955	Condenser (Variable) Section	37O		Switch (Band Change) Section
22	B-134955	Condenser (Variable) Section	37P		Switch (Band Change) Section
23	B-134955	Condenser (Variable) Section	37Q		Switch (Band Change) Section
24	B-134955	Condenser (Variable) Section	37R		Switch (Band Change) Section
25	B-134955	Condenser (Variable) Section	37S		Switch (Band Change) Section
26	B-134955	Condenser (Variable) Section	37T		Switch (Band Change) Section
27	B-134955	Condenser (Variable) Section	37U		Switch (Band Change) Section
28	B-134955	Condenser (Variable) Section	37V		Switch (Band Change) Section
29	B-134955	Condenser (Variable) Section	37W		Switch (Band Change) Section
30	B-134955	Condenser (Variable) Section	37X		Switch (Band Change) Section
31	B-134955	Condenser (Variable) Section	37Y		Switch (Band Change) Section
32	B-134955	Condenser (Variable) Section	37Z		Switch (Band Change) Section
33	B-134955	Condenser (Variable) Section	37A		Switch (Band Change) Section
34	B-134955	Condenser (Variable) Section	37B		Switch (Band Change) Section
35	B-134955	Condenser (Variable) Section	37C		Switch (Band Change) Section
36	B-134955	Condenser (Variable) Section	37D		Switch (Band Change) Section
37	B-134955	Condenser (Variable) Section	37E		Switch (Band Change) Section
38	B-134955	Condenser (Variable) Section	37F		Switch (Band Change) Section
39	B-134955	Condenser (Variable) Section	37G		Switch (Band Change) Section
40	B-134955	Condenser (Variable) Section	37H		Switch (Band Change) Section
41	B-134955	Condenser (Variable) Section	37I		Switch (Band Change) Section
42	B-134955	Condenser (Variable) Section	37J		Switch (Band Change) Section
43	B-134955	Condenser (Variable) Section	37K		Switch (Band Change) Section
44	B-134955	Condenser (Variable) Section	37L		Switch (Band Change) Section
45	B-134955	Condenser (Variable) Section	37M		Switch (Band Change) Section
46	B-134955	Condenser (Variable) Section	37N		Switch (Band Change) Section
47	B-134955	Condenser (Variable) Section	37O		Switch (Band Change) Section
48	B-134955	Condenser (Variable) Section	37P		Switch (Band Change) Section
49	B-134955	Condenser (Variable) Section	37Q		Switch (Band Change) Section
50	B-134955	Condenser (Variable) Section	37R		Switch (Band Change) Section
51	B-134955	Condenser (Variable) Section	37S		Switch (Band Change) Section
52	B-134955	Condenser (Variable) Section	37T		Switch (Band Change) Section
53	B-134955	Condenser (Variable) Section	37U		Switch (Band Change) Section
54	B-134955	Condenser (Variable) Section	37V		Switch (Band Change) Section
55	B-134955	Condenser (Variable) Section	37W		Switch (Band Change) Section
56	B-134955	Condenser (Variable) Section	37X		Switch (Band Change) Section
57	B-134955	Condenser (Variable) Section	37Y		Switch (Band Change) Section
58	B-134955	Condenser (Variable) Section	37Z		Switch (Band Change) Section
59	B-134955	Condenser (Variable) Section	37A		Switch (Band Change) Section
60	B-134955	Condenser (Variable) Section	37B		Switch (Band Change) Section
61	B-134955	Condenser (Variable) Section	37C		Switch (Band Change) Section
62	B-134955	Condenser (Variable) Section	37D		Switch (Band Change) Section
63	B-134955	Condenser (Variable) Section	37E</		

W-134742	Knob, Tone (Large)

CROSLEY DIV.  
AVCO MFG. CORP.

November, 1946

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

**TYPE:** Five-tube, two-band, superheterodyne.**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)

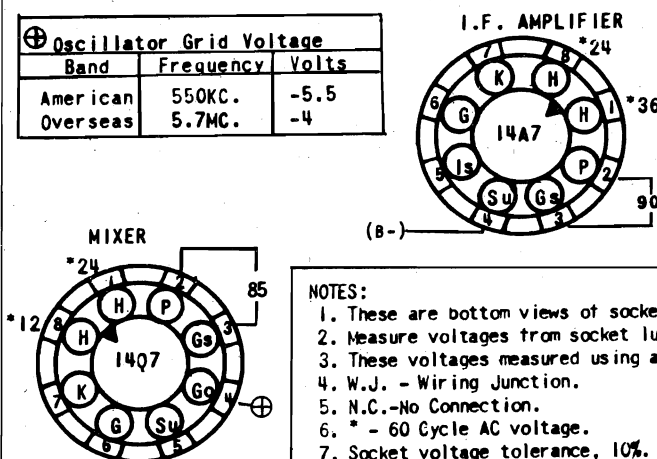
Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch, Clockwise or Right.)

**INTERMEDIATE FREQUENCY:** 455 kc.**POWER SUPPLY:** a.c.—d.c.**VOLTAGE RATING:** 105-125 volts.**POWER CONSUMPTION:** 35 watts nominal.**POWER OUTPUT:** 1 watt minimum.**VOLTAGE DROP ACROSS SPEAKER FIELD:** 27 volts. **WITH E.M. SPEAKER****RESISTANCE OF SPEAKER FIELD:** 450 ohms**SPEAKER FIELD CURRENT:** 60 ma.**TUBE COMPLEMENT:**

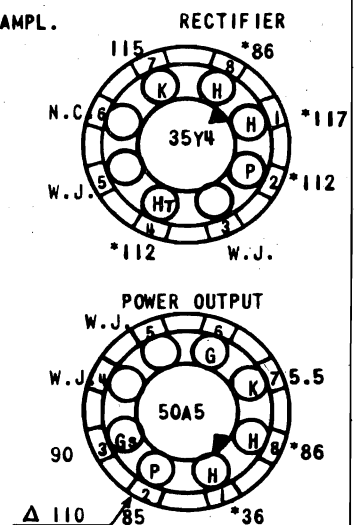
Type	Function
14Q7	Mixer
14A7	I. F. Amplifier
14B6	Detector, AVC, 1st A.F. Amplifier
50A5	A.F. Power Output
35Y4	Rectifier

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

⊕ Oscillator Grid Voltage		
Band	Frequency	Volts
American	550KC.	-5.5
Overseas	5.7MC.	-4

**NOTES:**

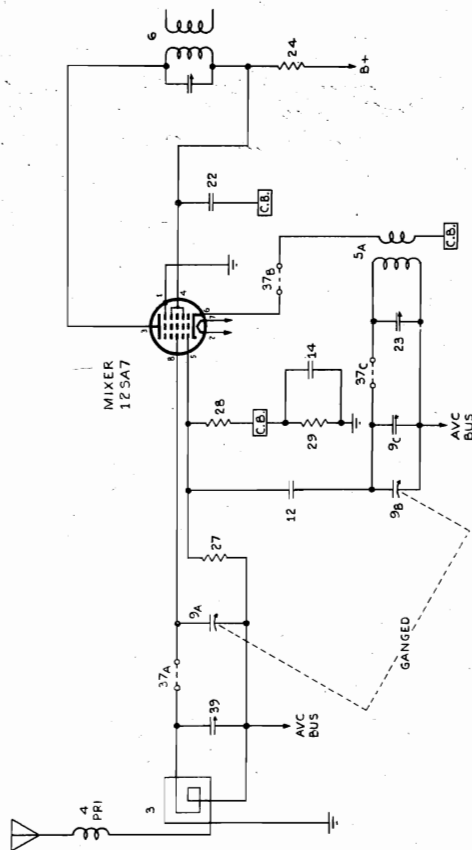
- These are bottom views of sockets.
- Measure voltages from socket lugs to -B (Pin 4 on the 14A7)
- These voltages measured using an electronic voltmeter.
- W.J. - Wiring Junction.
- N.C. - No Connection.
- \* - 60 Cycle AC voltage.
- Socket voltage tolerance, 10%.
- All voltages are the same for receivers using E.H. or P.H. speakers except where marked with Δ; This voltages is for P.M. speakers only.



# "clarified schematics"

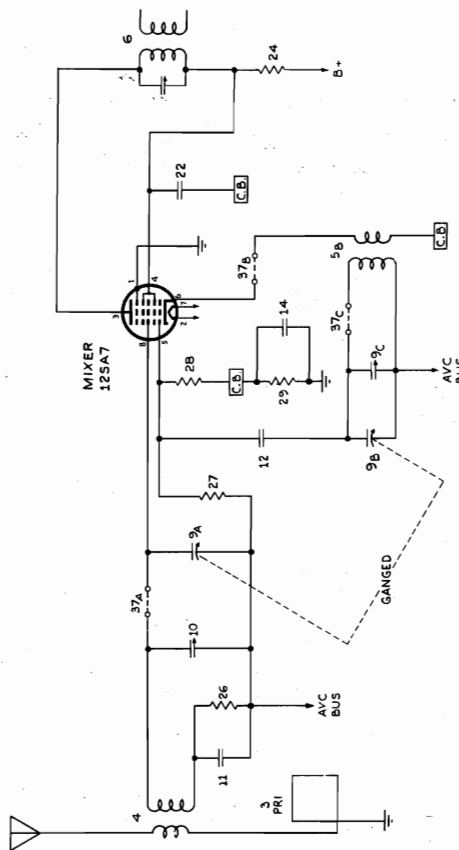
MODELS 56XTA, 56XTW  
MODEL 56TN-L

CROSLEY DIV.  
AV CO MFG. CORP.



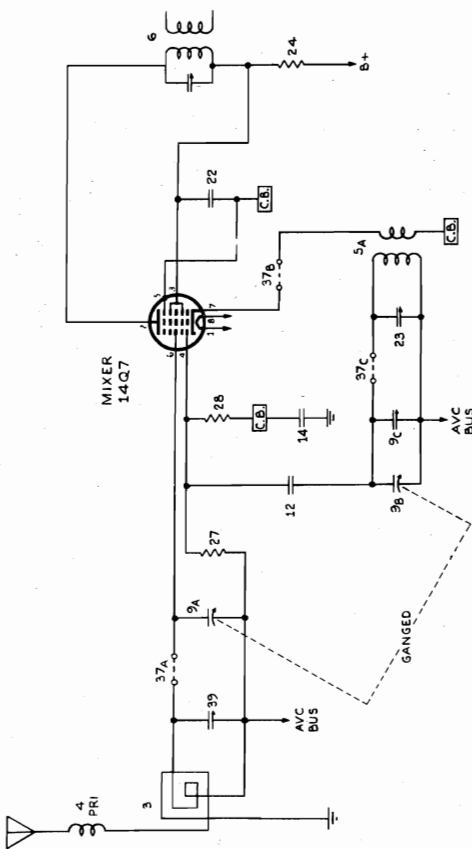
BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION.  
BROADCAST BAND  
540-1600 KC

Ⓢ DENOTES COMMON BUS  
ABOVE GROUND BY  
C<sub>14</sub> (1.1μf) & R<sub>29</sub> (220k)



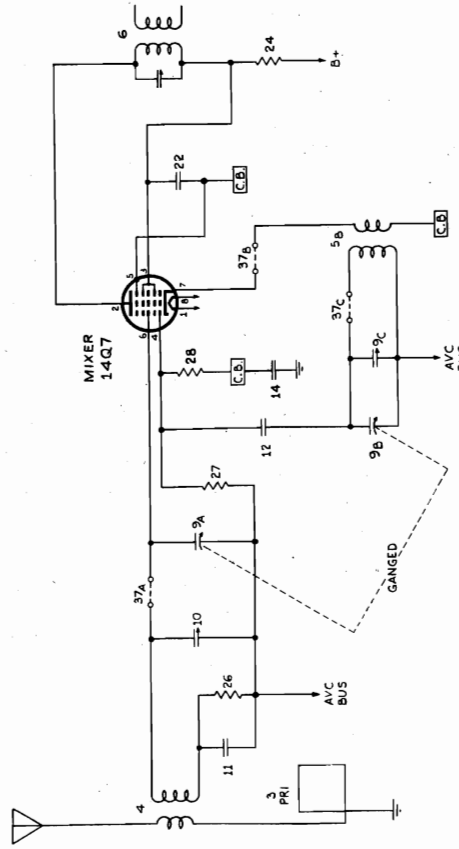
BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
SHORT WAVE BAND  
5.8-15 MC

Ⓢ DENOTES COMMON BUS  
ABOVE GROUND BY  
C<sub>14</sub> (1.1μf) & R<sub>29</sub> (220k)



BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION.  
BROADCAST BAND  
540-1600 KC

Ⓢ DENOTES COMMON BUS  
ABOVE GROUND BY  
CAP. 14 (1.1μf)

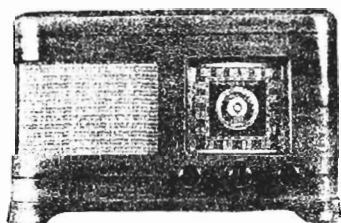


BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
SHORT WAVE BAND  
5.8-15 MC

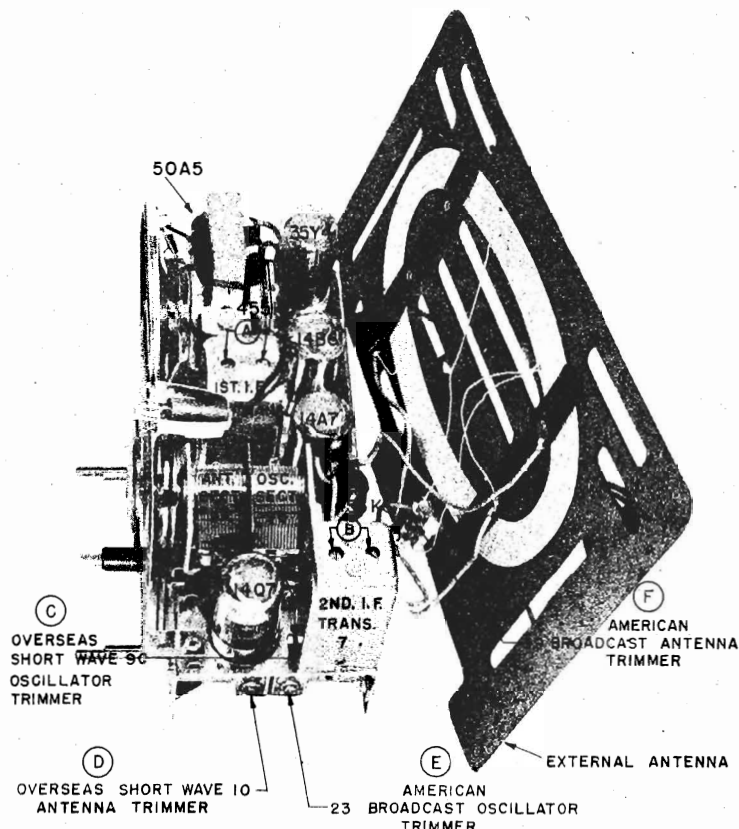
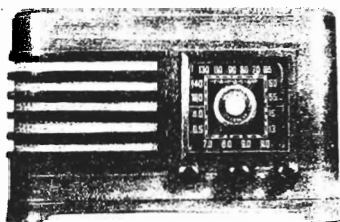
Ⓢ DENOTES COMMON BUS  
ABOVE GROUND BY  
CAP. 14 (1.1μf)

CROSLEY DIV.  
AVCOMFG. CORP.

MODEL 56TN-L



Alternate Cabinet Design



1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1,620	A & B
2	15,300	400 ohms	Ant.	O	15,300	C
3	15,000	400 ohms	Ant.	O	15,000	D
4	1,400	200 mmf.	Ant.	A	1,400	E & F

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

MODELS 57TQ, 56TZ  
1st and 2nd Production

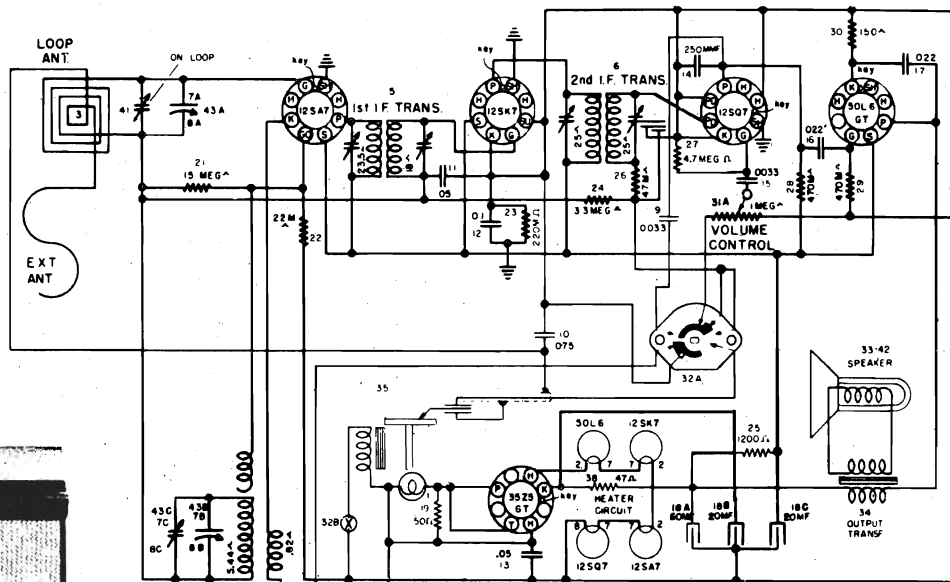
CROSLEY DIV.  
AV CO MFG. CORP.

January, 1947

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

BAND CHANGE SWITCH SHOWN IN EXTREME  
COUNTER-CLOCKWISE POSITION SWITCH  
SEQUENCE: RADIO NORMAL TONE, RADIO  
LOW TONE, PHONO LOW TONE, PHONO  
NORMAL TONE.

56TZ



455 KC. I.F.

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

**FREQUENCY RANGE:** 540 to 1600 kc. (Selector switch at R.)

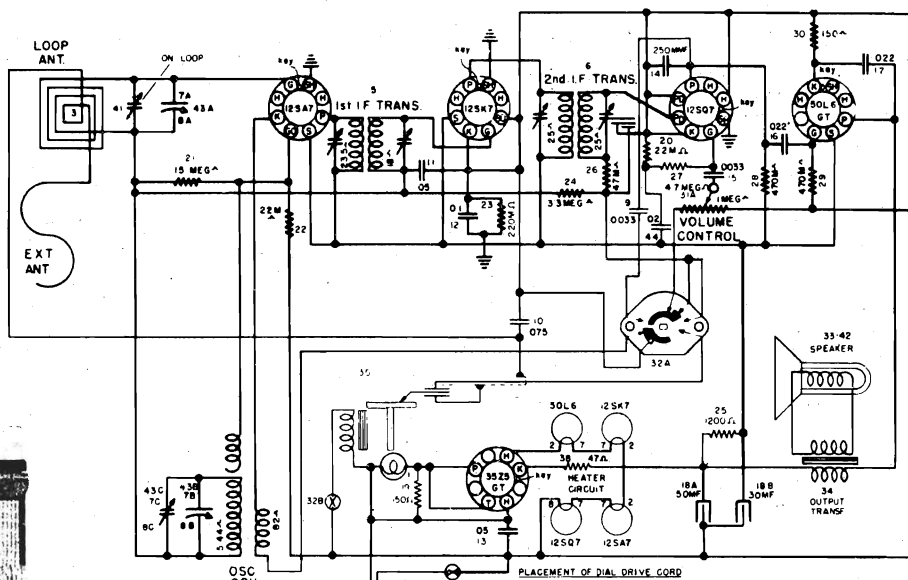
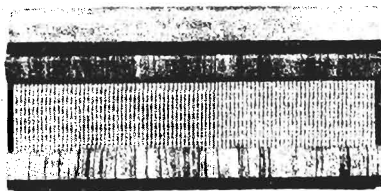
**INTERMEDIATE FREQUENCY:** 455 kc.

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

**SCHEMATIC DIAGRAM—MODELS 56TZ, 57TQ, 1st PRODUCTION**

BAND CHANGE SWITCH SHOWN IN EXTREME  
COUNTER-CLOCKWISE POSITION SWITCH  
SEQUENCE: RADIO NORMAL TONE, RADIO  
LOW TONE, PHONO LOW TONE, PHONO  
NORMAL TONE.

57TQ



455 KC. I.F.

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

**POWER CONSUMPTION:**

Radio position—30 watts.

Phono position—45 watts.

**POWER OUTPUT:** 1.5 watts maximum.

**SCHEMATIC DIAGRAM—MODELS 56TZ, 56TQ, 2nd PRODUCTION**

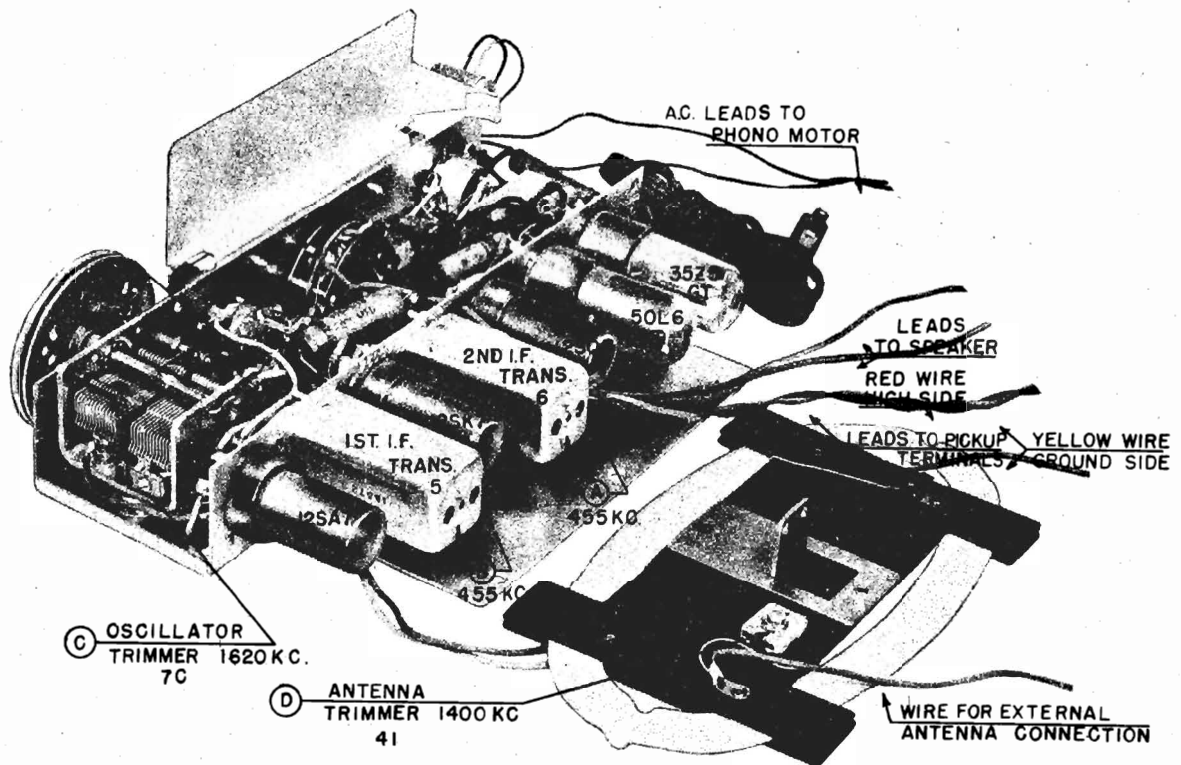
For Parts List, see P. 16-6

RECORD CHANGER: V-M 400, RCD. CH. P.15-1



CROSLEY DIV.  
AVCOMFG. CORP.

MODELS 57TQ, 56TZ



## ALIGNMENT PROCEDURE

Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.

Turn the tone control to the normal tone position.

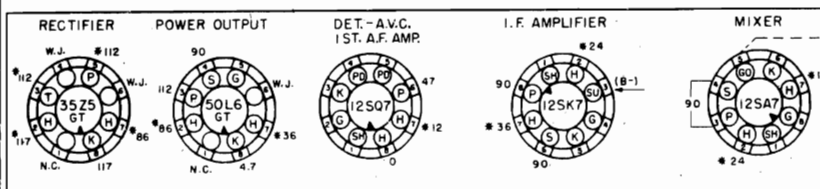
Connect the output meter across the speaker voice coil.

The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to—B (Pin 3 on 12SK7 tube socket).

Turn volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Selector Switch	Tuning Dial	
1	455	200 mmf.	Ant.	R	1620	A & B
2	1620	200 mmf.	Ant.	R	1620	C
3	1400	200 mmf.	Ant.	R	1400	D

OSCILLATOR GRID VOLTAGE		
BAND	FREQUENCY	VOLTS
AMERICAN	540 KC	-5.5

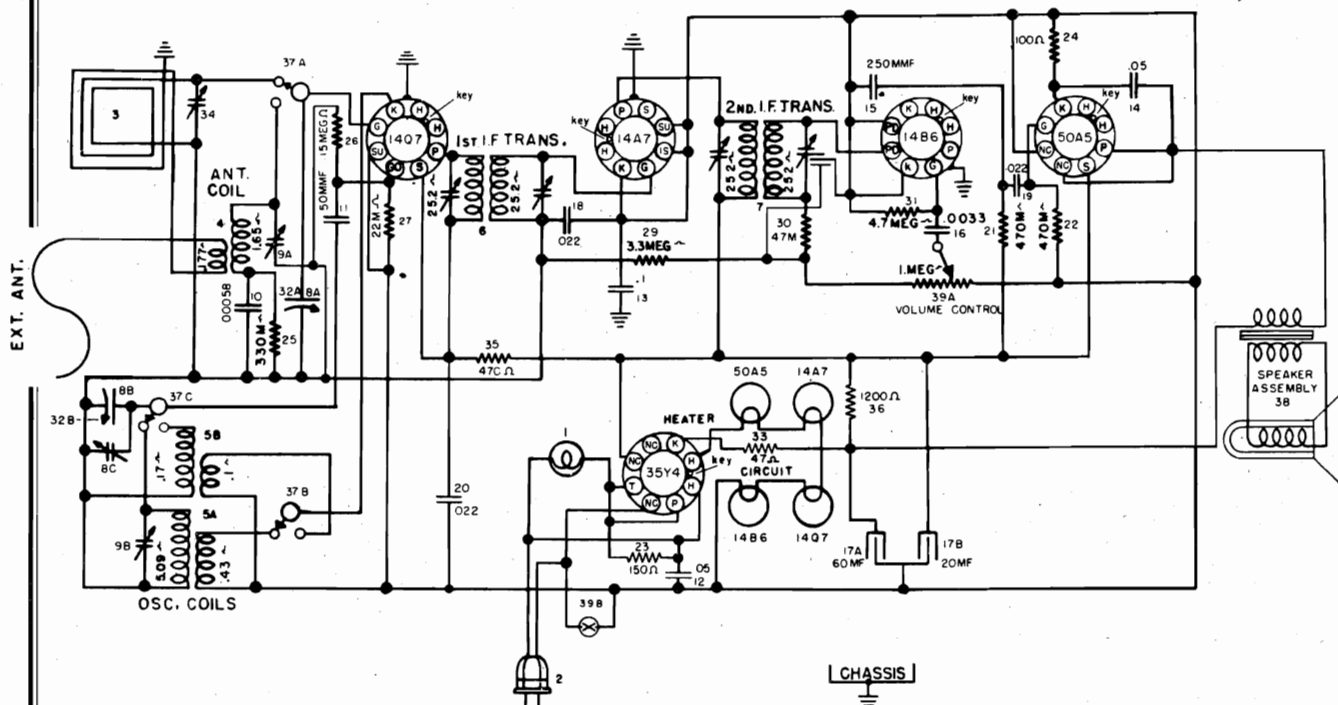


- NOTES:
1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
  2. MEASURE VOLTAGES FROM SOCKET LUGS TO B—(PIN 3 ON THE 12SK7).
  3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLT-METER.
  4. W.J. — WIRING JUNCTION.
  5. N.C. — NO CONNECTION.
  6. \* — 60 CYCLE A.C. VOLTAGES.
  7. SOCKET VOLTAGE TOLERANCE, 10%.
  8. LINE VOLTAGE 117 V, 60 ~ A.C.

MODEL 56TX-L

CROSLEY DIV.  
AV CO MFG. CORP.*Under no circumstances should a ground be connected to this receiver.*

October, 1946

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

455 KC. I.F.

**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch, Clockwise or Right.)

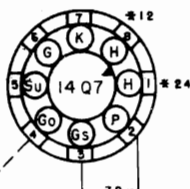
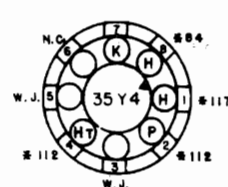
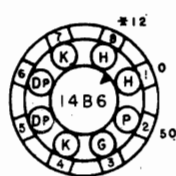
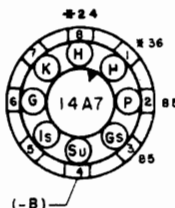
**INTERMEDIATE FREQUENCY:** 455 kc.**POWER SUPPLY:** a.c.—d.c.**VOLTAGE RATING:** 105-125 volts.**POWER CONSUMPTION:** 35 watts nominal.**POWER OUTPUT:** 1.5 watts minimum.

OSCILLATOR GRID VOLTAGES		
BAND	FREQUENCY	VOLTS
AMERICAN	540 KC.	- 4.9
OVERSEAS	5.7 MC	- 3.8

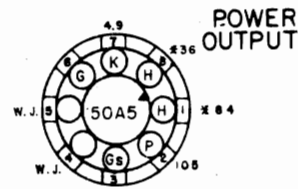
I.F. AMPLIFIER DET.-A.V.C.-1st. A.F.

RECTIFIER

MIXER

**NOTES:**

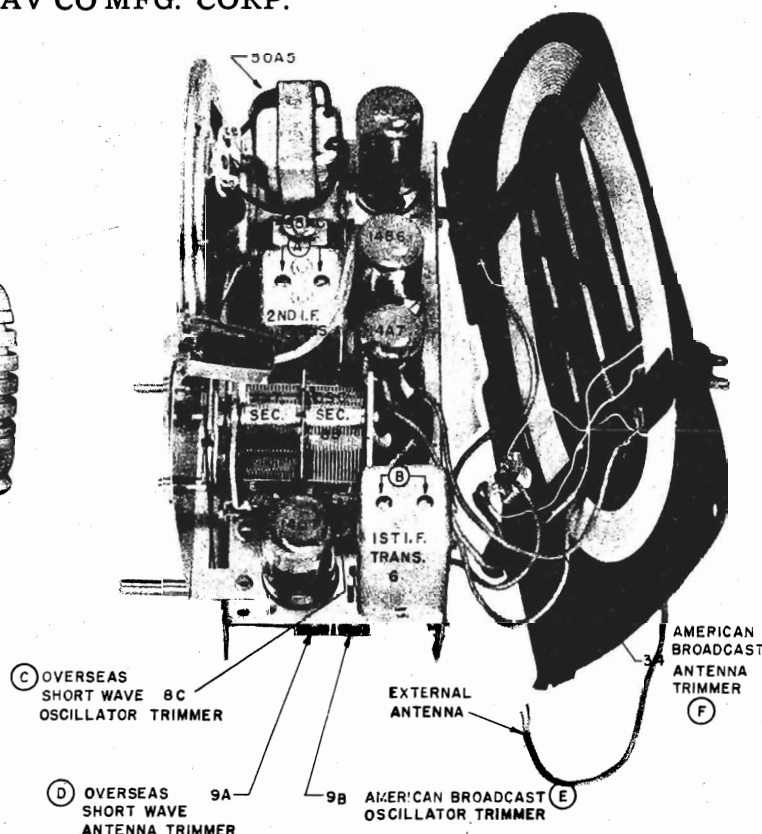
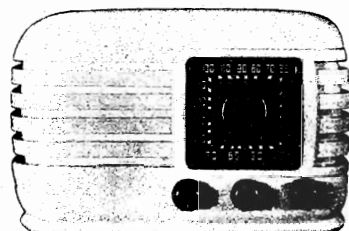
1. TUBE SOCKETS ARE BOTTOM VIEWS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO -B (PIN 4 ON THE 14A7)
3. VOLTAGES AS MEASURED WITH AN ELECTRONIC VOLT-METER.
4. WJ - WIRING JUNCTION
5. NC - NO CONNECTION
6. \* - AC VOLTAGES
7. VOLTAGE TOLERANCE, 10 %
8. LINE VOLTAGE 117V, 60 ~ AC.



POWER OUTPUT

CROSLEY DIV.  
AV CO MFG. CORP.

MODEL 56TX-L



1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	Left	1,620	A & B
2	15,300	400 ohms	Ant.	Right	15,300	C
3	15,000	400 ohms	Ant.	Right	15,000	D
4	1,400	200 mmf.	Ant.	Left	1,400	E & F

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

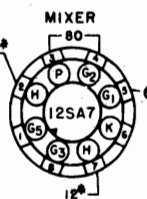
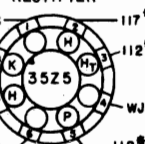
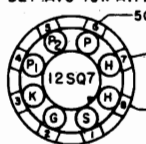
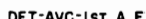
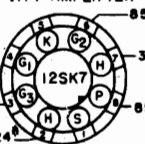
**CROSLEY DIV.  
AVCOMFG. CORP.**

**November, 1946**



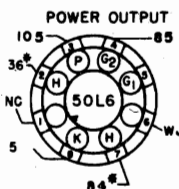
## SOCKET VOLTAGE CHART

### 1 F AMPLIFIER



**NOTES:**

1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO -B (PIN 3 ON THE 12SK7)
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. 60 - 60 CYCLE AC VOLTAGE.
7. SOCKET VOLTAGE TOLERANCE, 10%
8. ALL VOLTAGE MEASURED AT 117 VOLTS 60 CYCLE LINE VOLTAGE.



For English translation  
of Spanish, see Crosley  
Model 56TX-L

**WJ =borne de conexiones**

NC=Sim conectar

\* = Voltaje C. A.

**Tolerancia—10%**

**Voltaje de linea: 117 voltios, 60 ciclos.**

Voltaje de rejilla osciladora: onda media, 540 KC:—4.9  
onda corta, 5.7 mc: 3.8

**TIPO:** Superheterodino, cinco tubos, dos bandas.

**FRECUENCIAS:** Banda de onda media 540 a 1600 KC (Interruptor de bandas hacia la izquierda)

**Banda de onda corta: 5.8 a 15 mc (Interruptor de bandas hacia la derecha)**

**FRECUENCIA INTERMEDIA: 455 KC.**

**FUENTE DE ALIMENTACION:** Corriente alterna y directa.

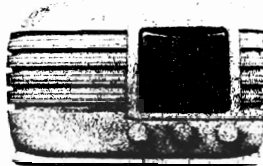
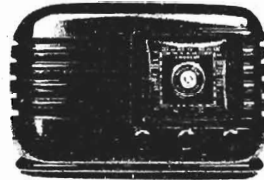
**VOLTAJE:** 105-125 voltios

**CONSUMO:** 35 watts.

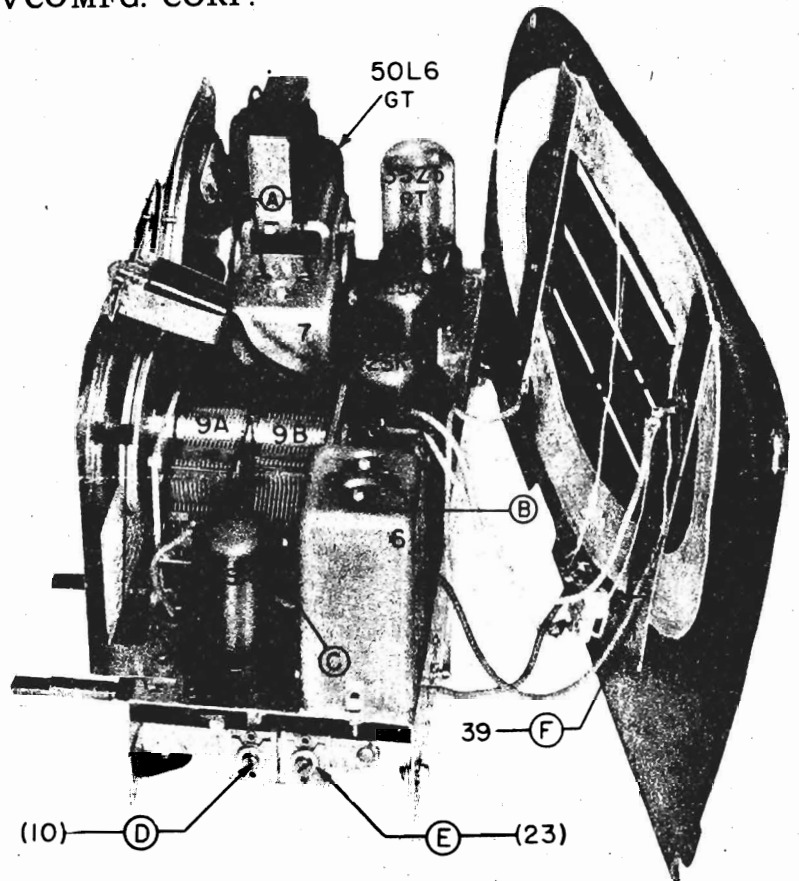
**POTENCIA DE SALIDA:** 1.5 watts mínima.

CROSLEY DIV.  
AVCOMFG. CORP.

56XTA



56XTW



1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

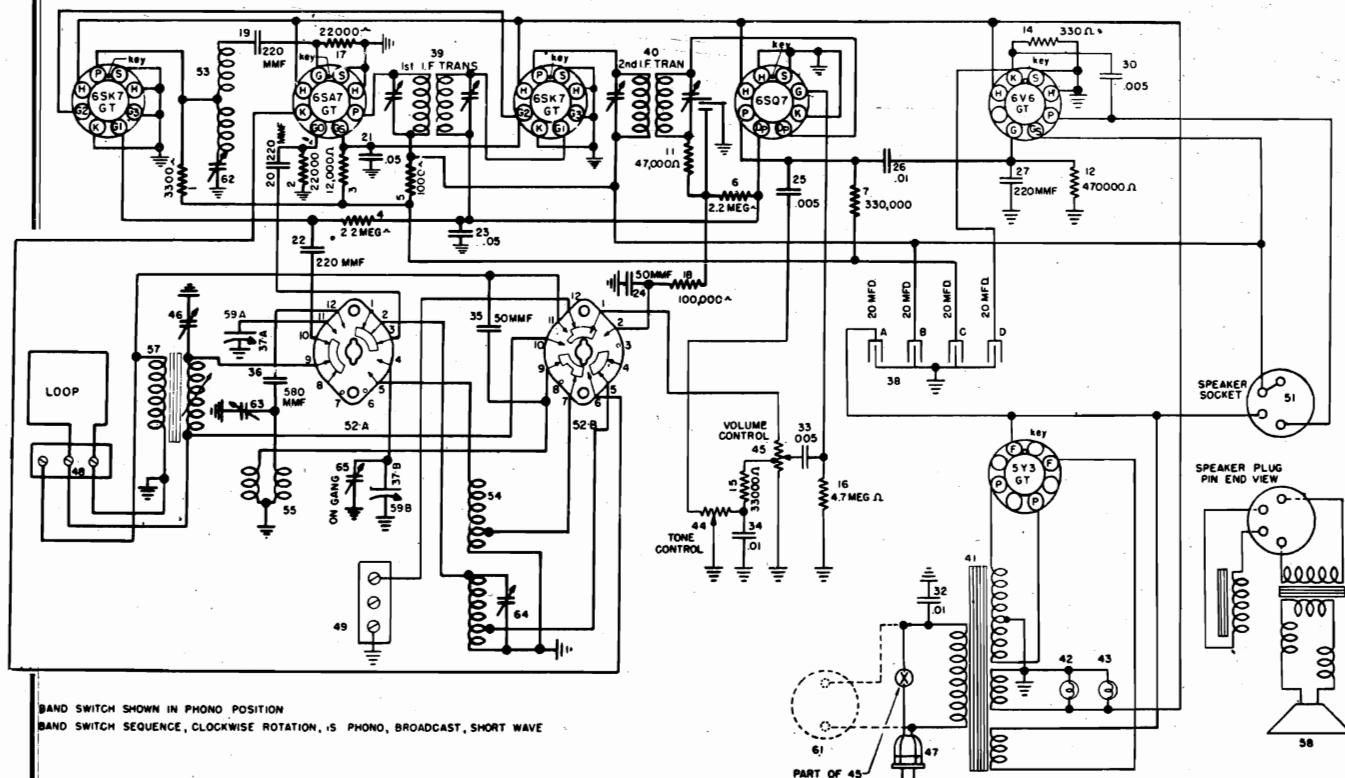
For English translation, see Crosley 56TX-L

Orden de Ajustes	SALIDA DEL OSCILADOR			Interrupor de Bandas	Sintonia Cuadrante	Ajuste a Maximum
	Frecuencia en KC	En serie con	A			
1	455	200 mmfd	Ant	Izquierda	1,620	A y B
2	15,300	400 ohms	Ant	Derecha	15,300	C
3	15,000	400 ohms	Ant	Derecha	15,000	D
4	1,400	200 mmfd	Ant	Izquierda	1,400	E y F

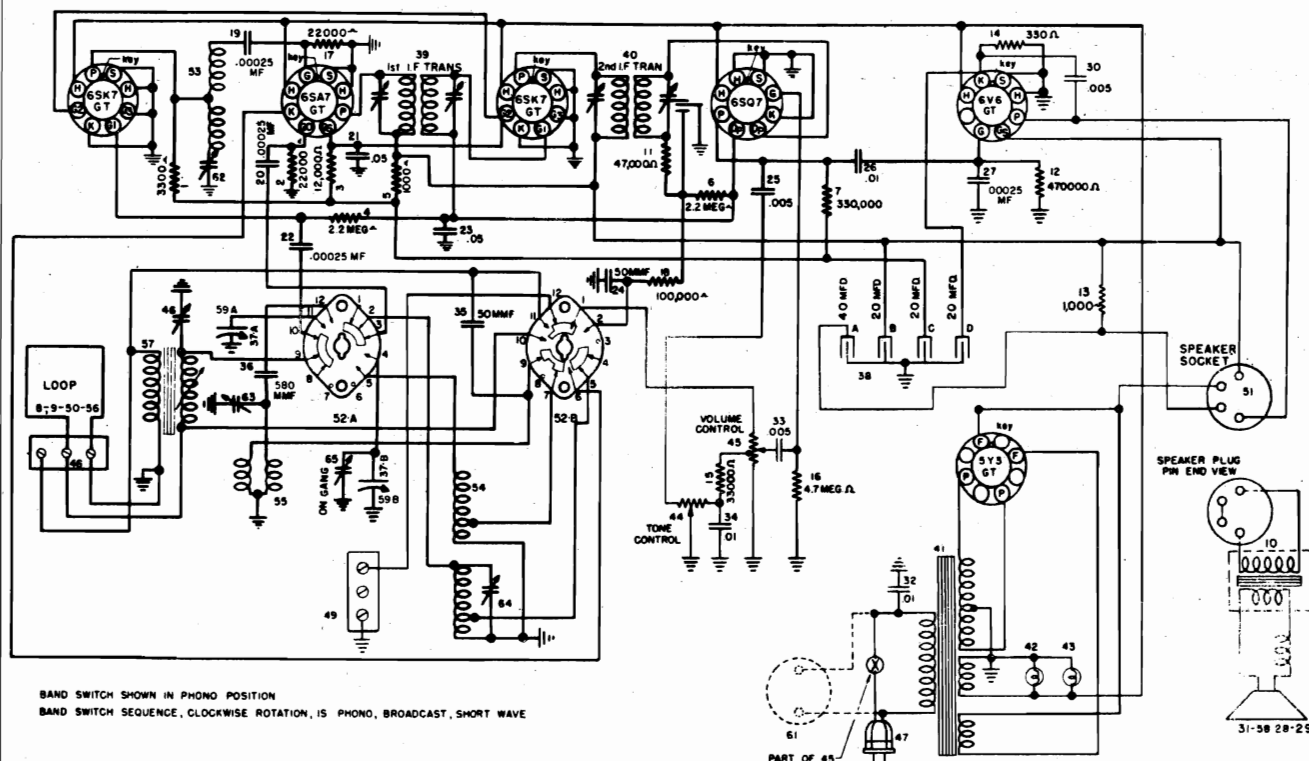
**Nota:** Cuando ajuste el trimer (C) de onda corta asegúrese que el circuito sea ajustado a la frecuencia correcta y no en la imagen que es 910 kilociclos más baja en el receptor. Para chequear: Sintonice la frecuencia del oscilador, aumente la salida del oscilador y sintonice la imagen en el receptor, la imagen debe ser más débil que la fundamental y estar 910 KC más abajo. Si no se puede sintonizar la imagen, el trimer del oscilador está mal ajustado, es decir el oscilador quizás esté ajustado a la imagen o algún armónico de la frecuencia del oscilador. El pico correcto es el segundo que se escuche cuando se abre el tornillo de ajuste después de cerrarlo por completo.

MODELS 66CS, 66CSM  
MODEL 66CS(s)

CROSLEY DIV.  
AVCO MFG. CORP.

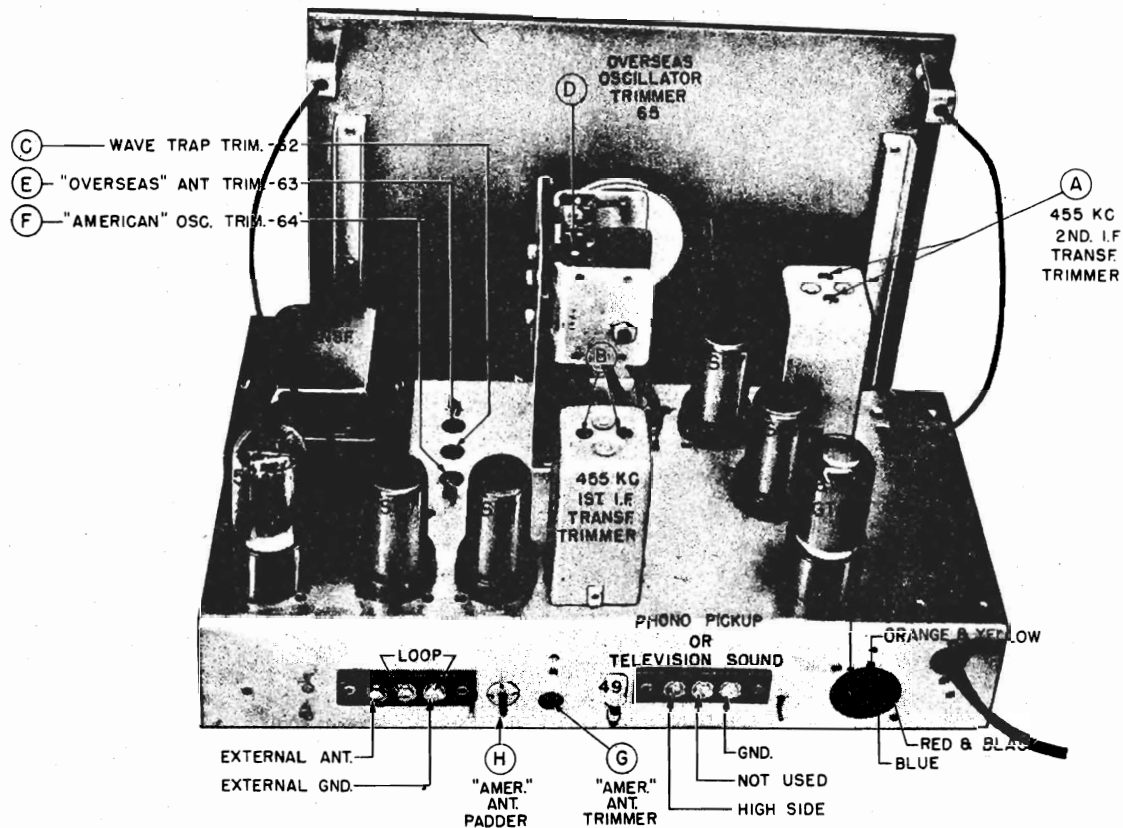


September, 1946 SCHEMATIC DIAGRAM—MODELS 66CS, 66CSM



December, 1946

MODEL 66CS (s)

CROSLEY DIV.  
AV COMFG. CORP.MODELS 66CS, 66CSM  
Model 66CS(s)

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

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series With	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1620	A & B
2	455	200 mmf.	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf.	Ant.	A	1620	F
6	1400	200 mmf.	Ant.	A	1400	G
7	600	200 mmf.	Ant.	A	600	H
8	1400	200 mmf.	Ant.	A	1400	Recheck G

\*Adjust for Minimum Output (Wave Trap).

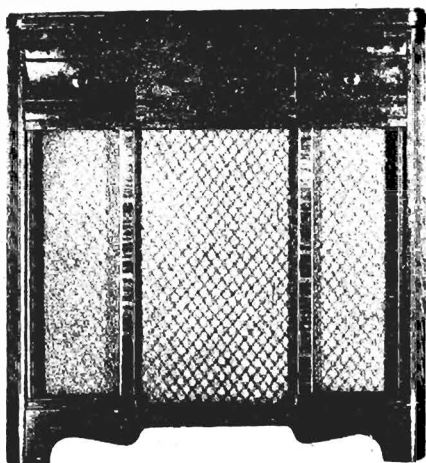
NOTE: When aligning the "Overseas" oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: tune in the generator frequency, then increase the generator output and tune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



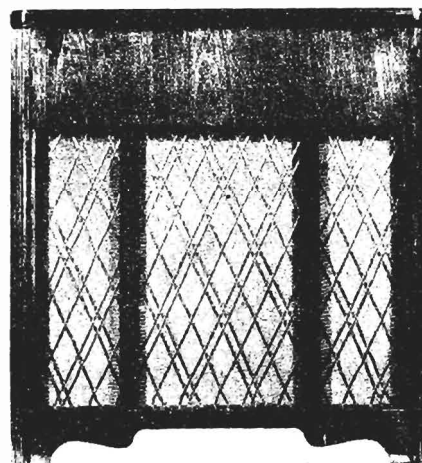
MODELS 66CS, 66CSM  
MODEL 66CS(s)

CROSLEY DIV.  
AV CO MFG. CORP.

66CS



66CSM



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

**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

**INTERMEDIATE FREQUENCY:** 455 kc.

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

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

**POWER CONSUMPTION:** 60 watts maximum.

**POWER OUTPUT:** 4.5 watts minimum.

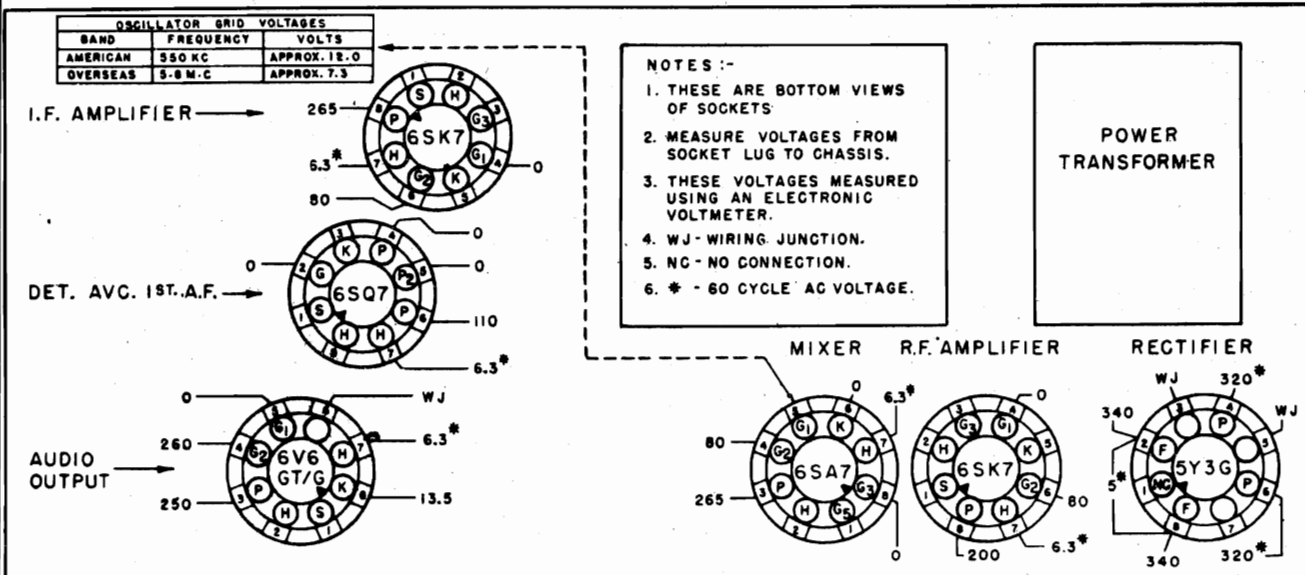
**VOLTAGE DROP ACROSS SPEAKER FIELD:** 76 volts.

**RESISTANCE OF SPEAKER FIELD:** 900 ohms.

**TUBE COMPLEMENT:**

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

**DIAL BULB:** Type 51, 7.5 volts, .25 amp.

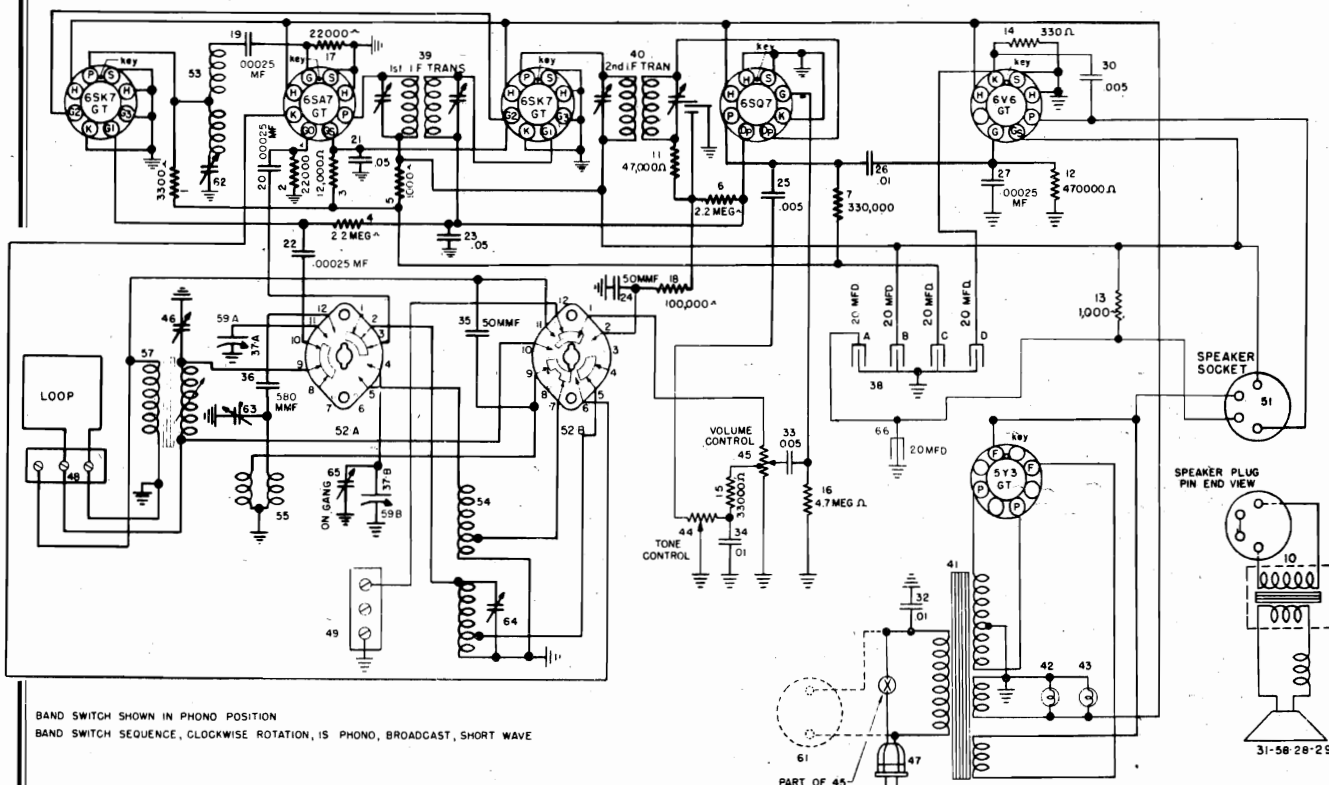


**SOCKET VOLTAGE TOLERANCE: 10%**





## MODEL 66TC-S

CROSLEY DIV.  
AVCO MFG. CORP.

BAND SWITCH SHOWN IN PHONO POSITION

BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE

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

**FREQUENCY RANGE:** American Broadcast Band: 540 to 1600 kc. (Selector switch at A.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector switch at 0.)

**INTERMEDIATE FREQUENCY:** 455 kc.

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

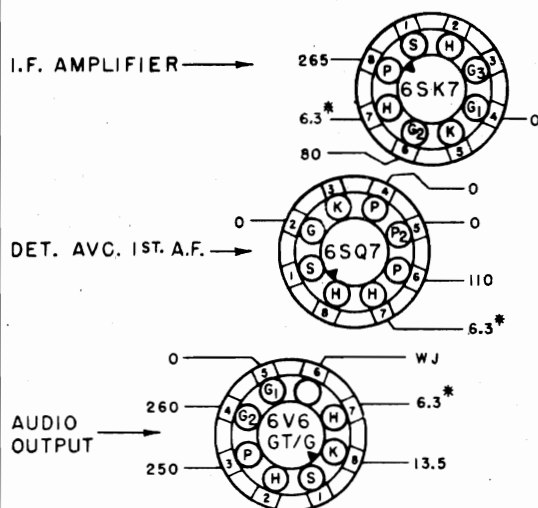
**VOLTAGE RATING:** 110-120 volts.

**POWER CONSUMPTION:** 60 watts maximum.

**POWER OUTPUT:** 4.5 watts minimum.

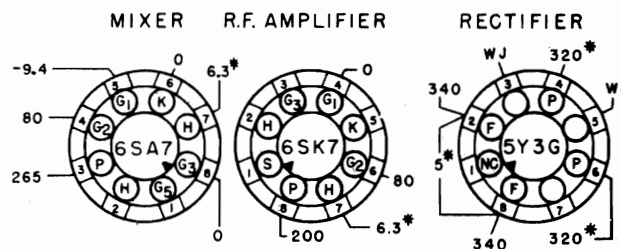
**VOLTAGE DROP ACROSS SPEAKER FIELD:** 76 volts. WITH E.M. SPEAKER

**RESISTANCE OF SPEAKER FIELD:** 900 ohms.



## NOTES:-

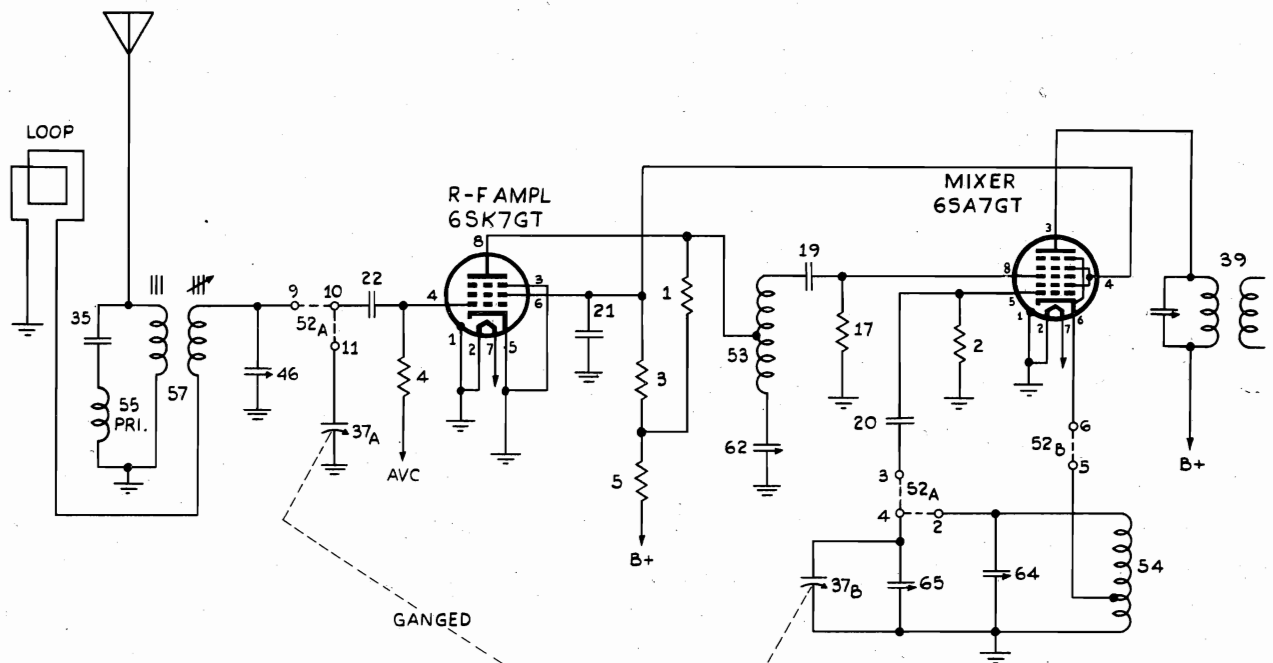
1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO CHASSIS.
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. \* - 60 CYCLE AC VOLTAGE.

POWER  
TRANSFORMER

Socket Voltage Tolerance: 10%

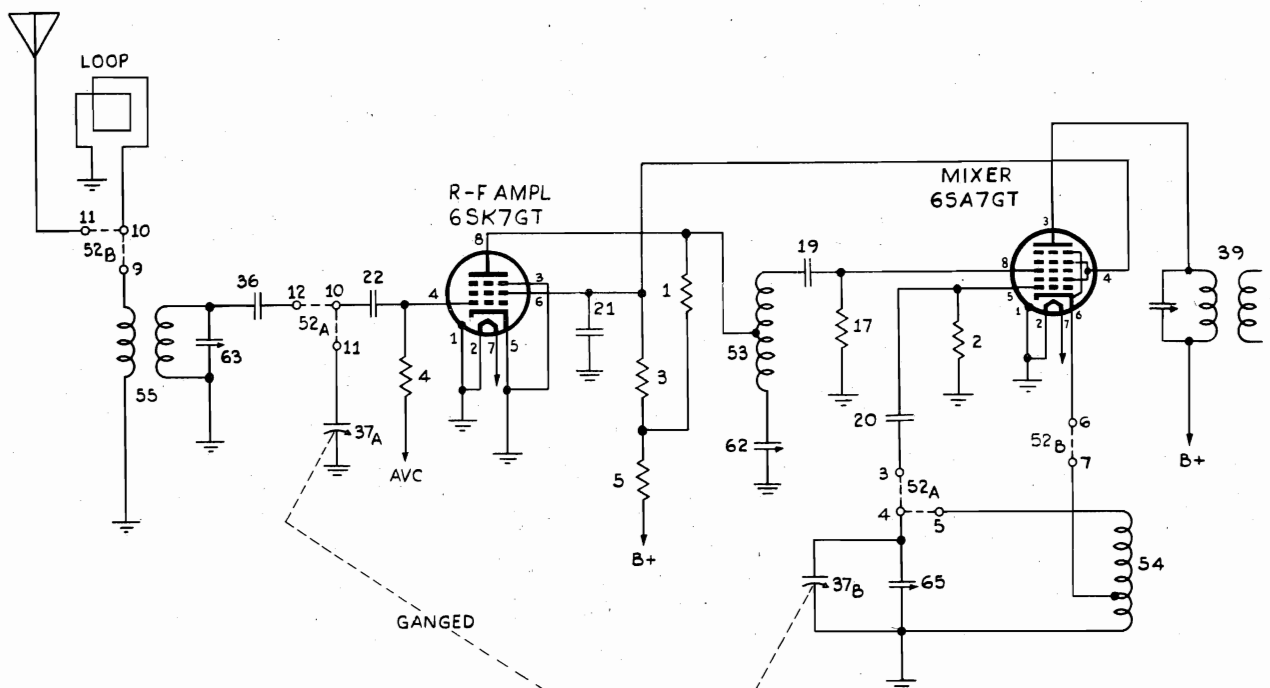
CROSLLEY DIV.  
AVCO MFG. CORP.

MODEL 66TC-S



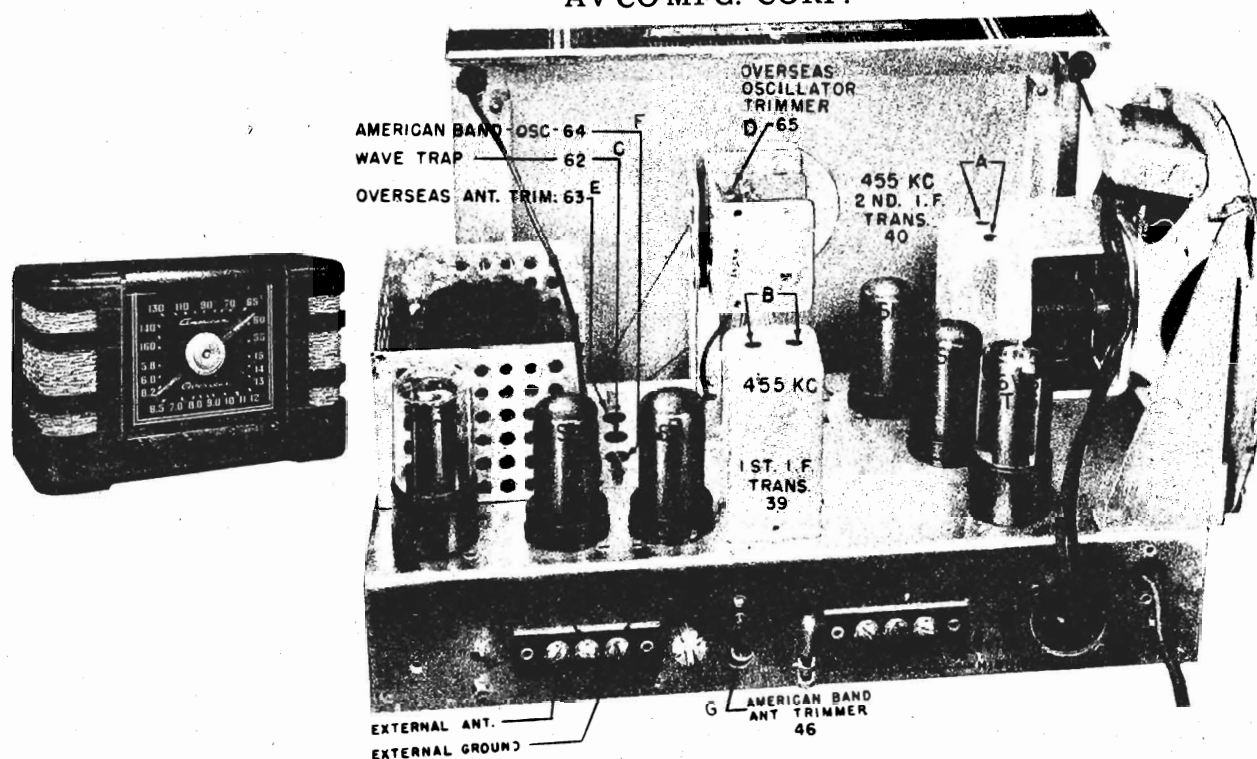
BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
BROADCAST BAND  
540 - 1600 KC

NOTE:  
1<sup>ST</sup> POSITION (PHONO)  
NOT SHOWN



BAND-SWITCH SHOWN  
AT 3<sup>RD</sup> POSITION CLOCKWISE.  
SHORT WAVE BAND  
5.8 - 15 MC

MODEL 66TC-S

CROSLEY DIV.  
AV COMFG. CORP.

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

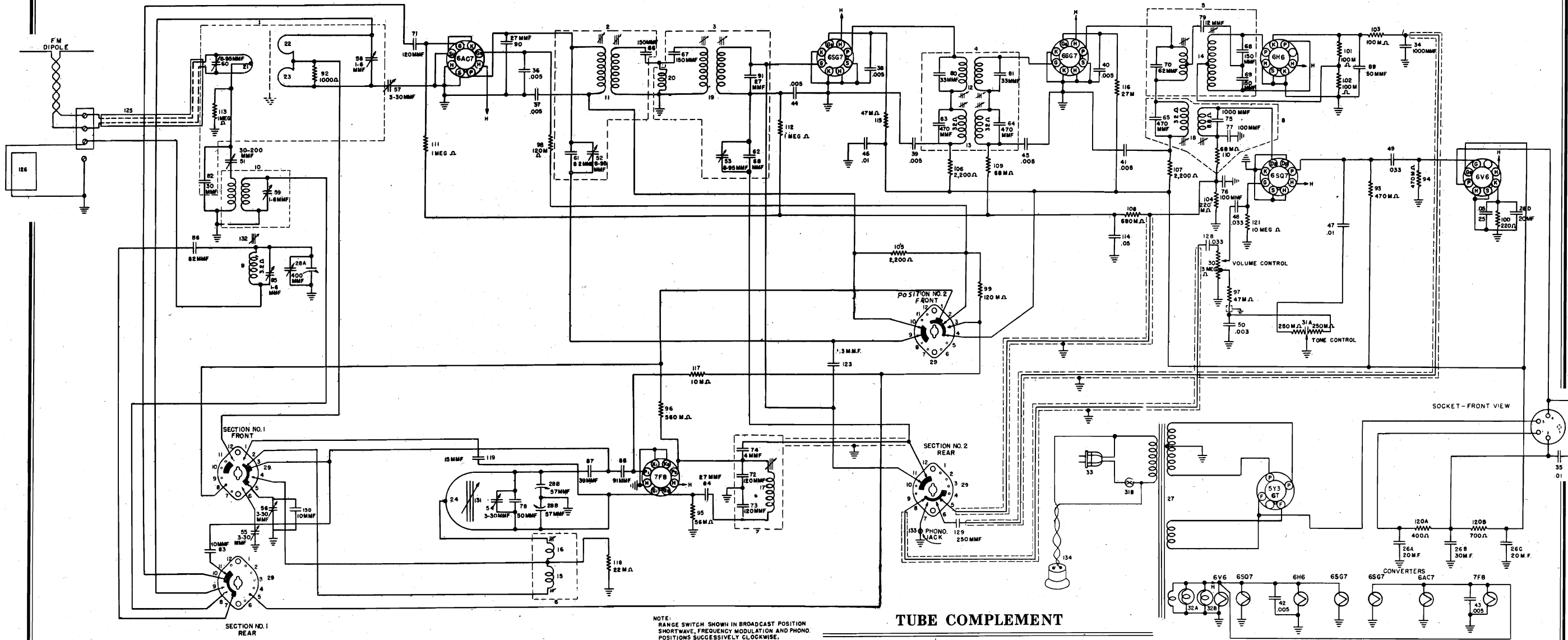
Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf	Ant.	A	1620	A & B
2	455	200 mmf	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf	Ant.	A	1620	F
6	1400	200 mmf	Ant.	A	1400	G
7	600	200 mmf	Ant.	A	600	H

\*Adjust for minimum output (wavetrap).

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

CROSLLEY DIV.  
A VCOMFG. CORP.

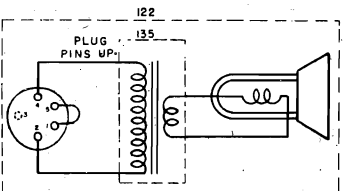
November, 1946



NOTE:  
RANGE SWITCH SHOWN IN BROADCAST POSITION.  
SHORTWAVE, FREQUENCY MODULATION AND PHONO.  
POSITIONS SUCCESSIVELY CLOCKWISE.

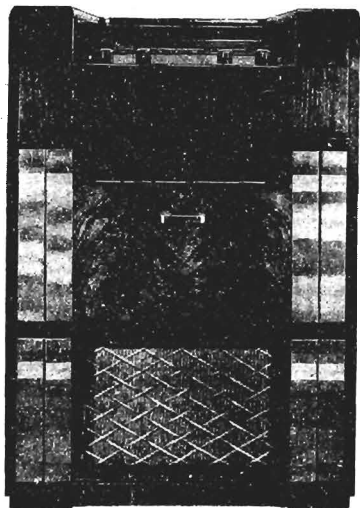
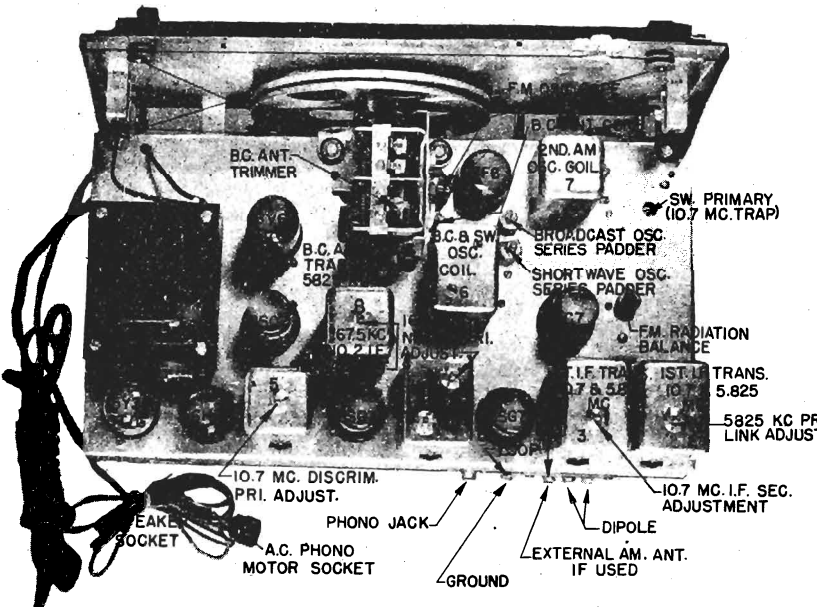
TUBE COMPLEMENT

Type	Function
6AC7	1st A.M. Mixer—FM Mixer
7F8	1st and 2nd A.M. OSC.— F.M. OSC.
6SG7	2nd A.M. Mixer— 1st I. F. Ampl. F.M.
6SG7	I. F. Ampl. A. M., 2nd I. F. Ampl. F. M.
6H6	F. M. Detector (Discriminator)
6SQ7	A. M. Det. AVC, 1st A. F. Ampl.
6V6 GT/G	Output
5Y3 GT/G	Rectifier



Band: 88.1 to 107.9 mc. Channel 201 to 300 (Selector Switch at FM position).  
**INTERMEDIATE FREQUENCY:** Broadcast Band: 167.5 and 5825 kc  
**FREQUENCY MODULATION BAND:** 10.7 mc.  
**POWER SUPPLY:** 60 cycle a.c. only.  
**VOLTAGE RATING:** 105-125 volts.  
**POWER CONSUMPTION:** 85 watts maximum at normal power supply voltage (117), 20 watts additional for record changer.  
**POWER OUTPUT:** 80 watts minimum at 3.2. ohm load.

**TYPE:** Eight-tube, three-band, Superheterodyne.  
**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch at AM position). Overseas Short-Wave Band: 9.45 to 11.9 mc. (Selector Switch at SW position). Frequency Modulated

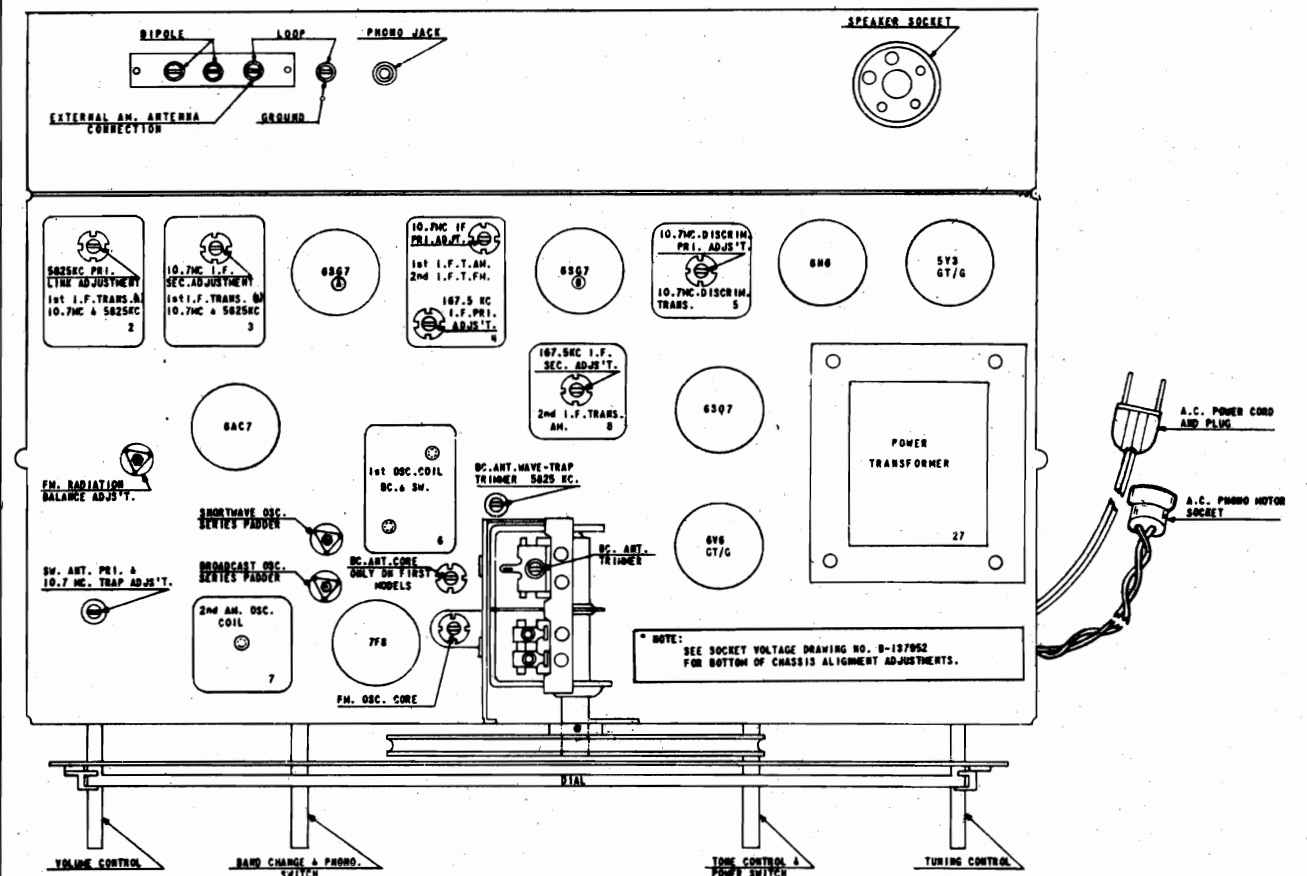
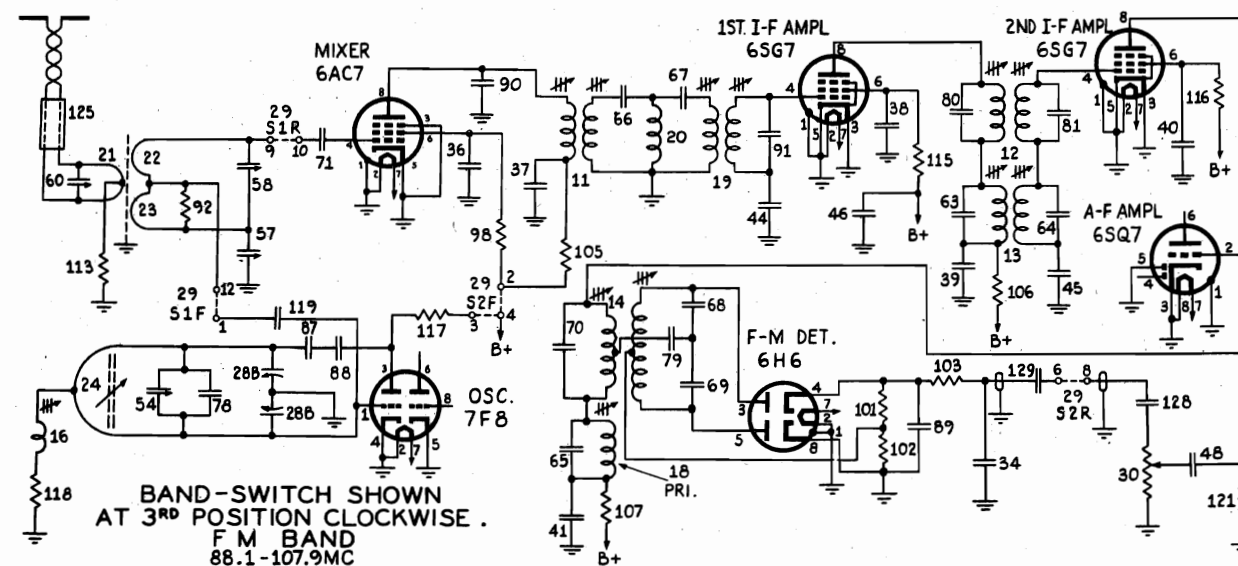
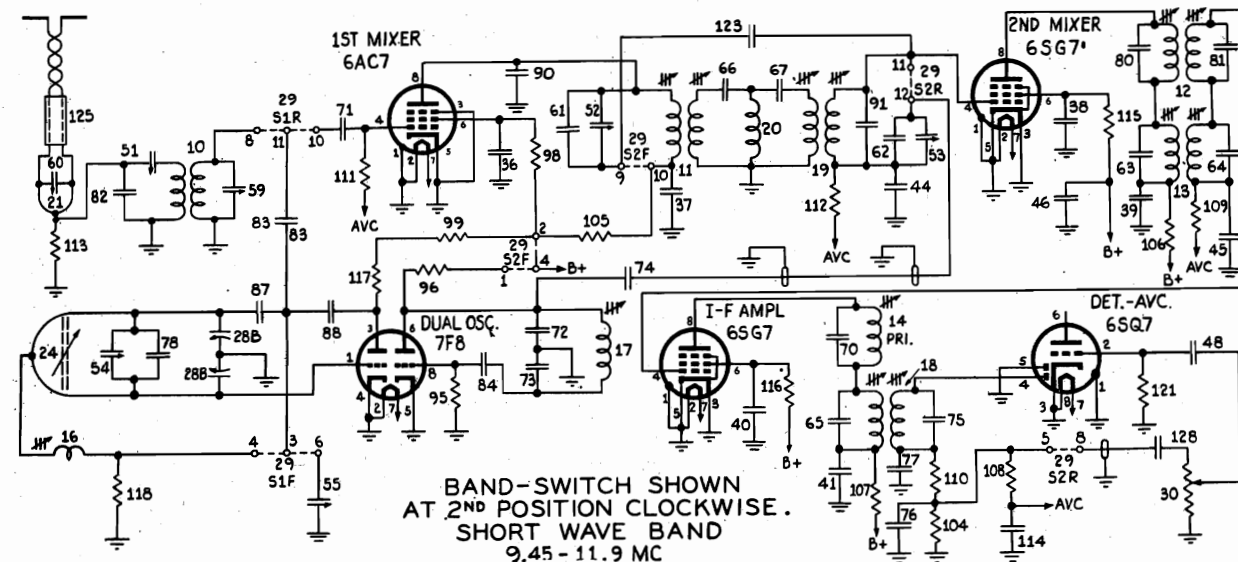
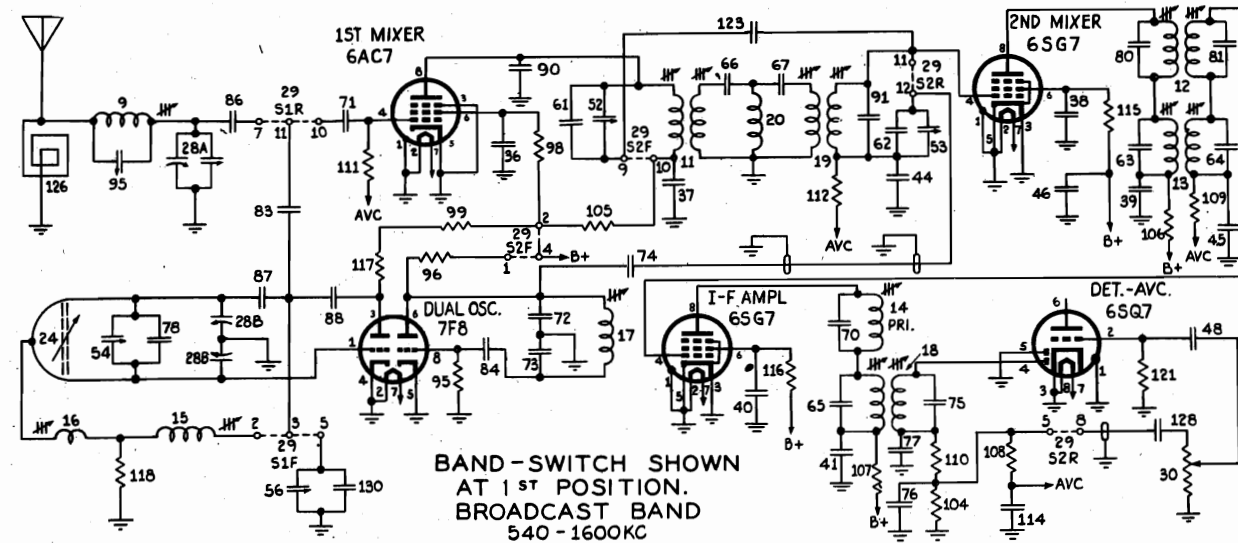


Model 86CR Uses Walnut Cabinet  
Model 86CS Uses Mahogany Cabinet

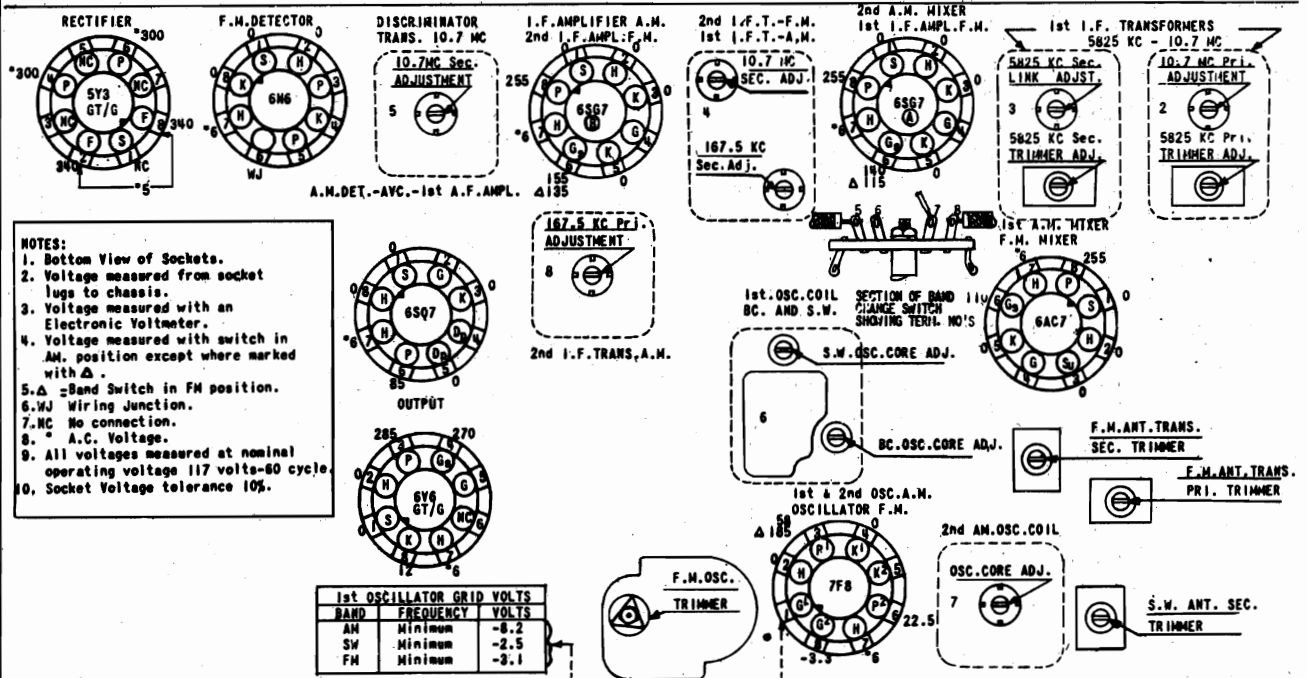
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### SOCKET VOLTAGE CHART





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**ALIGNMENT CHART (Output Meter Method)**

Align- ment Se- quence	Signal Frequency	Generator Output in Series with	To	Position of Range Tuning Dial Switch or Tuning Cap.		Adjust	Osc. Freq.	Remarks
1.	167.5 KC.	0.1 MFD	2nd I.F. Grid 6SG7 B	S. W.	Open	2nd I.F. Trans. 8	.....	.....
2.	167.5 KC.	0.1 MFD	1st I.F. Grid 6SG7 A	S. W.	Open	1st I.F. Trans. 4	.....	.....
3.	10.7 MC.	30 MMF	2nd I.F. Grid 6SG7 B	F. M.	Open	Discriminator Trans. 5	.....	.....
4.	10.7 MC.	30 MMF	1st I.F. Grid 6SG7 A	F. M.	Open	2nd I.F. 10.7 Trans. 4	.....	.....
5.	10.7 MC.	30 MMF	See Procedure	F. M.	Open	1st I.F. 10.7 Trans. 2 & 3	.....	Signal Generator Ground Connection as Short as Possible
6.	5825 KC.	30 MMF	1st I.F. Grid 6SG7 A	S. W.	Open	2nd A.M. Osc. Core 7	167.5 KC. Above	.....
7.	5825 KC.	30 MMF	*Link Coupling on 10.7 I.F. 2	S. W.	Open	5825 KC. I.F. Trans. 3	167.5 KC. Above	*Short Lead Between Transformers 2 & 3
8.	5825 KC.	30 MMF	6AC7 Grid	S. W.	Open	5825 KC. I.F. Trans. 2	167.5 KC. Above	.....
9.	100 MC.	78 ohm Dummy	F.M. Dipole Ant. Terms.	F. M.	Channel 261	Osc. Core & Trim. F.M. Ant. Trims. Pri. & Sec.	10.7 MC. Above	See Circuit Under the Title "Alignment Equipment"
10.	87.9 MC.	78 ohm Dummy	F.M. Dipole Ant. Terms.	F. M.	Closed	F.M. Osc. Core	10.7 MC. Above	.....
11.	107.9 MC.	78 ohm Dummy	F.M. Dipole Ant. Terms.	F. M.	Channel 800	F.M. Osc. Trimmer	10.7 MC, Above	.....
12.	Disconnect Generator Connect Field Strength Meter			F. M.	Channel 215	Radiation Bal. Trimmer (Null Point)	.....	See Paragraph on Field Strength Meter, Under "Alignment Equip."
13.	9.6 MC.	30 MMF	One FM. Ant. Term.	S. W.	9.6 MC.	S.W. Oscillator Series Padder	5825 KC. Above	Disconnect Field Strength Meter Con- nect Signal Generator
14.	11.8 MC.	30 MMF	One FM. Ant. Term.	S. W.	11.8 MC.	S. W. Oscillator Core	5825 KC. Above	.....
15.	10.7 MC.	30 MMF	One F.M. Ant. Term.	S. W.	10.7 MC.	S. W. Ant. Pri. & Sec. Padder	.....	.....
16.	10.7 MC.	30 MMF	One F.M. Ant. Term.	F. M.	10.7 MC.	S. W. Primary (10.7 MC. Trap)	.....	Adjust for Null Point
17.	535 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	Closed	B. C. Oscillator Series Padder	5825 KC. Above	.....
18.	1620 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	Open	B. C. Oscillator Core	5825 KC. Above	.....
19.	1400 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	1400 KC.	B. C. Antenna Trimmer	.....	.....
20.	600 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	600 KC.	B. C. Antenna Core	.....	First Models Only. Omitted in Later Mod
21.	5825 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	1400 KC.	B. C. Wave Trap Trimmer	.....	Adjust for Null Point

## ALIGNMENT PROCEDURE

1. This receiver has been aligned at the factory for best performance, and no attempt should be made to re-align this receiver unless the proper test equipment is available.
2. Turn the tuning condenser to full mesh, against stop, and set the dial pointer to reference point which is Channel 200 on the dial.
3. Set tone control knob to the treble position, (extreme right).
4. When output meter is used, connect across voice coil: (3.2 ohms).
5. Feed an R. F. Signal modulated 30%; at 400 cycles to the receiver as indicated on the alignment chart; connect signal generator ground terminal to the chassis of the receiver, except where noted.
6. When F. M. Signal generator is used, a 30% modulated signal is equal to 22.5 kilocycles deviation.
7. Turn volume control knob to maximum clockwise position and adjust signal generator output to produce a noticeable output meter reading, (approx. 500 mw.). Keep signal generator output as low as possible to prevent excessive AVC action in the receiver.
8. The low impedance "Signal Web" antenna should remain connected at all times.

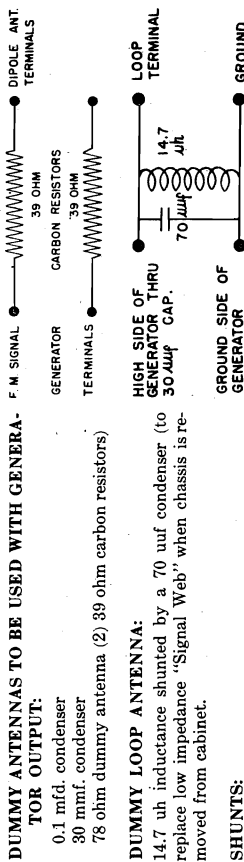
## ALIGNMENT EQUIPMENT

### FOR OUTPUT METER ALIGNMENT

Signal Generator AM with 400 cycle modulated signal to cover 167.5 KC to 108 MC.

Suitable output meter.

Field strength meter.



### SHUNTS:

5000 ohm carbon resistor in series with a 0.1 mfd. condenser.  
Hairpin shunting shunt composed of 2' of No. 14 bare tinned wire.

### FIELD STRENGTH METER:

The Field Strength Meter may consist of a D. C. 100 microampere (full scale) meter shunted by a 1000 uf mica by-pass condenser; a crystal rectifier is connected in series with the meter and a five foot, 75 ohm twisted pair for leads. The open end of the twisted pair is connected to the dipole antenna terminals. Circuit for the field strength meter is given below:



## OUTPUT METER ALIGNMENT

Use this procedure in conjunction with alignment chart. Sequence numbers correspond to numbers on alignment chart. Refer to alignment chart first for connection of signal generator and control settings, then follow procedure

### 167.5 KC I. F. TRANSFORMER ALIGNMENT: (For maximum output)

1. (a) Shunt primary of transformer No. 8 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from ground to link between transformers No. 5 and 8. Adjust secondary of 2nd I. F. Transformer No. 8 (above chassis).
- (b) Shunt secondary of transformer No. 8 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from diode plate (Pin No. 4) of the 6SG7 to shielded lead junction on transformer and adjust primary of 2nd I. F. Transformer No. 8 (bottom of chassis).
2. (a) Connect signal generator to grid of 1st I. F. 6SG7 (A).
- (b) Shunt primary of transformer No. 4 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from plate of the 6SG7 (A) to the transformer side of the 2200 ohm resistor (106). Adjust secondary of 1st I. F. Transformer No. 4 (bottom of chassis).
- (c) Shunt secondary of transformer No. 4 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from the grid of the 6SG7 (B) to transformer side of the 68,000 ohm resistor (109). Adjust primary of 1st I. F. Transformer No. 4 (top of chassis).

### 10.7 MC. DISCRIMINATOR TRANSFORMER ALIGNMENT:

3. (a) Adjust discriminator transformer No. 5 secondary (bottom of chassis) padder for null point.
- (b) Tune signal generator for maximum output meter reading, approximately 75 to 100 KC. off of the 10.7 megacycle null point and note output meter reading. Retune signal generator to the opposite side of the 10.7 megacycle null point to maximum reading on the output meter reading. If the two readings are not equal, adjust discriminator primary padder until equal output meter readings and equal peak spacing are obtained on both sides of the 10.7 megacycle null point.

### 10.7 MC. I. F. TRANSFORMER ALIGNMENT:

4. (a) Set signal generator to peak on high side of 10.7 MC. and adjust 10.7 MC. primary (top) and secondary (bottom) of transformer No. 4 for maximum output and note output meter reading.
- (b) Set signal generator to peak on low side of 10.7 MC. and note output meter reading. If readings are unequal, readjust primary and secondary slightly until output meter readings and peak spacings are equal on both sides of the 10.7 MC. null point.
5. (a) Connect signal generator output to either lug of the F.M. ANTENNA Transformer Primary Trimmer lead length to a minimum. Shielded cable of generator output should not be draped near under side of chassis.
- (b) Set signal generator to peak on high side of 10.7 MC. and adjust 10.7 MC. primary on transformer No. 2 (bottom of chassis), and 10.7 MC. secondary on transformer No. 3 (top of chassis) for maximum output, and note reading on output meter.
- (c) Set signal generator to peak on low side of 10.7 MC. and note output meter reading. If meter readings are not equal, readjust primary and secondary until equal readings are obtained on the peaks on both sides of 10.7 MC. Peaks should appear approximately 80 KC. on each side of 10.7 MC.

### 5825 KC. I. F. TRANSFORMER ALIGNMENT:

6. (a) Turn core adjustment-screw on bottom of 2nd A. M. Oscillator Coil No. 7 until core is out of coil. DO NOT USE FORCE.
- (b) Turn core adjustment in until first peak (maximum output) is obtained.
7. (a) Connect signal generator output to link coupling (see chart).
- (b) Adjust 5825 KC. secondary trimmer and 5825 KC. secondary link adjustment on bottom of 1st I. F. Transformer No. 3 and retune 2nd A. M. Oscillator coil No. 7; adjust alternately for maximum output.
8. (a) Connect signal generator output to 6AC7 grid (see chart).
- (b) Adjust 5825 KC. primary trimmer on bottom and 5825 KC. primary link adjustment on top of 1st I. F. Transformer No. 2 for maximum output.



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## FREQUENCY MODULATED BAND ALIGNMENT:

9. (a) Pre-set F. M. Oscillator iron core (131) located on the top of the chassis to midway position.
- (b) Pre-set F. M. radiation balance adjustment (57) on top of the chassis to approximately two turns from the closed position.
- (c) Set signal generator to 100 megacycles A. M. modulated at 400 cycles.
- (d) Set dial pointer to channel 261 (100 MC).
- (e) Adjust F. M. oscillator trimmer (54) (bottom of chassis) to maximum output (on sets without oscillator trimmer, adjust oscillator core) but keep signal generator output as low as possible.
- (f) Short circuit F. M. Antenna primary trimmer (60) with hairpin shorting shunt.
- (g) Adjust F. M. Antenna secondary trimmer (58) on bottom of chassis for maximum output.
- (h) Transfer shorting shunt to F. M. Antenna secondary trimmer (58), and adjust F. M. Antenna primary trimmer (60) for maximum output.
- (i) Remove shorting shunt.

NOTE: ON SETS WITHOUT OSCILLATOR TRIMMER CONDENSER, OMIT STEPS 10 AND 11.

10. (a) Set signal generator to 87.9 MC. amplitude modulated at 400 cycles.
- (b) If set does not tune to 87.9 MC. (Channel 200) adjust F. M. Oscillator core in slowly until 87.9 MC. signal is tuned in.

11. (a) Set signal generator to 107.9 MC. amplitude modulated at 400 cycles.
- (b) Set dial pointer to channel 300 and adjust F. M. Oscillator trimmer (54) for maximum output.
- (c) Repeat steps 10 and 11 until frequency shift stops.

NOTE: TOO MUCH COVERAGE ON F. M. BAND INDICATES CAPACITY OF OSCILLATOR TRIMMER CONDENSER SET TOO HIGH.

## F. M. RADIATION BALANCE ADJUSTMENT:

12. (a) Disconnect signal generator and connect Field Strength Meter to the dipole antenna terminals. (See paragraph on Field Strength Meter under title "Alignment Equipment".)
- (b) Set dial pointer to channel 215.
- (c) Adjust F. M. Radiation Balance Trimmer (57) (on top of chassis) to null point. If this trimmer adjustment is changed more than a quarter turn repeat step 9 (f) to (i), and 12.

## SHORTWAVE ALIGNMENT:

13. (a) Set signal generator to 9.6 MC. Amplitude Modulated at 400 cycles.
- (b) Turn volume control to maximum.
- (c) Adjust shortwave oscillator series padder (55) on top of chassis for maximum output with dial pointer set at 9.6 MC.
14. (a) Set signal generator to 11.8 MC. Amplitude Modulated at 400 cycles.
- (b) Set dial pointer to 11.8 MC.
- (c) Adjust shortwave oscillator core on bottom of chassis for maximum output.
- Repeat steps 13 (a) and (c) and 14 (a), (b) and (c) until dial tracks at 9.6 and 11.8 MC.
15. (a) Set signal generator to 10.7 MC. Amplitude Modulated at 400 cycles.
- (b) Shunt shortwave Antenna Primary Padder (51) (lug connected to coil) to chassis with shorting clip.
- (c) Retune set to 10.7 MC. signal, increase signal generator output if necessary.
- (d) Adjust shortwave antenna secondary trimmer (59) for maximum output while rocking gang.
- (e) Remove shorting clip.
- (f) Shunt across shortwave antenna secondary trimmer (59) with shorting clip.
- (g) Retune radio to 10.7 MC. signal, increase signal generator output, if necessary.
- (h) Adjust SW. antenna primary padder (51) (top of chassis) for maximum output while rocking gang.
- (i) Remove shorting clip.

## WAVE TRAP ADJUSTMENT (10.7 MC.):

16. (a) Turn band switch to F. M. position.
- (b) Connect field strength meter from signal generator side of 30 mmf. cond. to chassis.
- (c) Increase or decrease signal generator output until field strength meter reads between 10 and 15 microvolts.
- (d) Adjust SW. Antenna primary padder (51) for lowest reading on Field Strength Meter. Make this adjustment slowly, otherwise the dip may be passed unnoticed when a highly damped meter is used.
- (e) Disconnect Field Strength Meter.

## BROADCAST BAND ALIGNMENT:

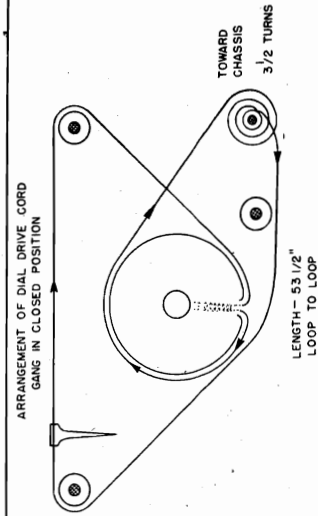
17. (a) Connect dummy loop: (14.7 uh) to Signal Web terminal and ground terminal.
- (b) Connect Signal Generator in series with a 30 mmf. condenser to high side of dummy loop.
- (c) Preset Broadcast Antenna Wave Trap (85) on top of chassis to approximately two turns from the closed position.
- (d) Set signal generator to 535 KC. Amplitude Modulated.
- (e) Set dial pointer to 535 KC. (tuning condenser gang closed).
- (f) Adjust Broadcast Oscillator Series Padder (56), on top of chassis, for maximum output.
18. (a) Set signal generator to 1620 KC.
- (b) Set dial pointer to 1620 KC. (tuning condenser gang to minimum capacity, but not against stop).
- (c) Adjust Broadcast Oscillator core on the bottom of chassis for maximum output.
- (d) Repeat steps 17 (d) to 18 (c) until frequency shift stops.
19. (a) Set signal generator to 1400 KC.
- (b) Tune receiver to 1400 KC. maximum output.
- (c) Adjust Broadcast Antenna Trimmer on top of tuning condenser gang for maximum output.
20. (a) Set signal generator to 600 KC.
- (b) Tune receiver to 600 KC. maximum output.
- (c) Adjust Broadcast Antenna Core (132), on top of chassis, for maximum output while rocking gang.

NOTE: B. C. ANTENNA CORE IN FIRST MODELS ONLY. OMIT STEP 20 WHEN ALIGNING LATER MODELS.

## 5825 KC. WAVE TRAP ADJUSTMENTS:

21. (a) Set signal generator to 5825 KC. Amplitude Modulated.
- (b) Set dial pointer to approximately 1400 KC. and retune signal generator to maximum output.
- (c) Adjust signal generator output to approximately midscale reading on output meter.
- (d) Adjust Broadcast Antenna Wave Trap Trimmer (85) for lowest reading on output meter.

NOTE: All air trimmers should be locked in position by applying a drop of household cement on the screw threads.



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Item No.	Part No.	Description	Item No.	Part No.	Description	Item No.	Part No.	Description	Part No.	Description
1	AC-136171	Transformer Assy. (F. M. Antenna)	53	Part of Item #3	Condenser, Trimmer (6.825 mc. Second-ary)	108	39294-30	Resistor, 680,000 ohm, 1/2 w.	D-136252	Dial Glass
2	AC-136264	Transformer, 10.7 MC. and 5.825 MC. I. F. (A)	54	W-136964	Condenser, Air-Trimmer (F. M. Osc.)	109	39294-24	Resistor, 68,000 ohm, 1/2 w.	W-136201	Clip, Dial Glass
3	AC-136081	Transformer, 10.7 MC. and 5.825 MC. I. F. (B)	55	W-136964	Series, Padder	110	Part of Item #8	Resistor, 68,000 ohm, 1/2 w.	W-136853	Cushion, Rubber (Dial Glass)
4	AC-136276	Transformer, 10.7 MC. and 167.5 KC. I. F.	56	W-136964	Condenser, Air-Trimmer (B. C. Osc.)	111	39294-31	Resistor, 1 megohm, 1/2 w.	W-136176	Pointer, Dial
5	AC-136268	Transformer, 10.7 MC. and 167.5 KC. I. F.	57	W-136964	Series, Padder	112	39294-31	Resistor, 1 megohm, 1/2 w.	W-51752	Spring, Dial Drive Cord
6	AC-136309	Coil Assy., 1st Oscillator (B.C. & S.W.)	58	W-136964	Condenser, Air-Trimmer (F. M. Radiation Balance)	113	39001-17	Resistor, 1 megohm, 1/2 w.	W-136178	Shaft, Drive
7	AC-136390	Coil Assy., 2nd Oscillator	59	Part of Item #1	Condenser, Trimmer (F. M. Ant. Second-ary)	114	39001-17	Condenser, .05 mfd., 600v., paper	W-51071	Ring, Shaft Retaining
8	AC-136261	Transformer, 167.5 KC., Diode	60	Part of Item #1	Condenser, Trimmer (S.W. Ant. Second-ary)	115	39014-42	Resistor, 47,000 ohm, 1/2 w.	W-134916	Washer, Spring
9	AW-136444	Coil Assy., S.W. Antenna	61	Part of Item #1	Condenser, Trimmer (F. M. Ant. Primary)	116	39014-42	Resistor, 27,000 ohm, 1/2 w.	W-136979	Puller, Idle (Large Stud)
10	AB-136444	Coil Assy.	62	Part of Item #1	Condenser, 82 mfd., 300v., ceramic	117	39015-37	Resistor, 10,000 ohm, 1 w.	W-136574	Puller, Idle (Small Stud)
11	Part of Item #2	Coil Assy.	63	Part of Item #2	Condenser, 68 mfd., 300v., ceramic	118	39014-41	Resistor, 22,000 ohm, 1/2 w.	W-131154-1	Cutter, External
12	Part of Item #4	Coil Assy.	64	Part of Item #2	Condenser, 470 mfd., 300v., mica	119	W-137021	Resistor, 15 mfd., 600v., ceramic	AB-136243	Pulley & Hub Assy., Variable Condenser
13	Part of Item #4	Coil Assy.	65	Part of Item #2	Condenser, 470 mfd., 300v., mica	120	39294-37	Resistor (Wirewound), 700 ohm, 4w., Sect.	C-136222	Bracket, Variable Condenser Mtg.
14	Part of Item #6	Coil Assy.	66	Part of Item #2	Condenser, 150 mfd., 500v., mica	121	39294-37	Resistor, 10 megohm, 1/2 w.	W-134955	Grommet, Variable Condenser Mtg.
15	Part of Item #6	Coil Assy.	67	Part of Item #2	Condenser, 150 mfd., 500v., mica	122	C-136974	Speaker & Transformer Assy.	39172-200	Screw, Chassis Mtg. (Front)
16	Part of Item #6	Coil Assy.	68	Part of Item #2	Condenser, 150 mfd., 500v., mica	123	AW-136911	Terminal Board	W-136111	Mounting Rubber, Chassis (Front)
17	Part of Item #7	Coil Assy.	69	Part of Item #2	Condenser, 150 mfd., 500v., mica	124	W-137143	Transmission Line, 76 ohm	W-46580	Nut, Tee (Chassis Mtg.)
18	Part of Item #7	Coil Assy.	70	Part of Item #2	Condenser, 150 mfd., 500v., mica	125	AW-137220	Loop Assy., Antenna	R-137101	Cabinet (86CR)
19	Part of Item #7	Coil Assy.	71	Part of Item #2	Condenser, 150 mfd., 500v., mica	126	39001-17	Condenser, .05 mfd., 600v., paper	R-137277	Pull, Drawer
20	Part of Item #7	Coil Assy.	72	Part of Item #2	Condenser, 150 mfd., 500v., mica	127	39001-17	Condenser, 250 mfd., 600 v., paper	W-137201	Cabinet (86CS)
21	Part of Item #7	Coil Assy.	73	Part of Item #2	Condenser, 150 mfd., 500v., mica	128	39001-17	Condenser, 10 mfd., 300v., ceramic	W-137022	Knob, 86CR (Band Switch, or Tone Con-rol)
22	Part of Item #7	Coil Assy.	74	Part of Item #2	Condenser, 150 mfd., 500v., mica	129	39001-17	Condenser, 10 mfd., 300v., ceramic	W-137350	Knob, 86CS (Band Switch, or Tone Con-rol)
23	Part of Item #7	Coil Assy.	75	Part of Item #2	Condenser, 150 mfd., 500v., mica	130	39012-50	Iron Core (B.C. Ant.)	W-135009	Knob, 86CS (Dial Tuning, or Volume Control)
24	W-136179	Coil, F. M. Oscillator	76	Part of Item #7	Condenser, 120 mfd., 300v., ceramic	131	39012-50	Connector, Phone Pickup	W-137249	Knob, 86CS (Dial Tuning, or Volume Control)
25	39001-17	Condenser, 20 mfd., 400v. (Section)	77	Part of Item #7	Condenser, 120 mfd., 300v., ceramic	132	W-137213	Cable and Plug Assy., Phone	D-134945-1	Record Changer (Model "K")
26	B-137023	Condenser, 30 mfd., 300v. (Section)	78	Part of Item #7	Condenser, 100 mfd., 600v., mica	133	E-138131-2	Transformer (only), Output	AW-137333	Shielded Wire & Plug Assy. (Phono)
27	B-137023	Condenser, 30 mfd., 300v. (Section)	79	Part of Item #7	Condenser, 100 mfd., 600v., mica	134	W-137213	Transformer (only), Output	W-134955	Nut, Tee (Record Changer Mtg.)
28	B-137023	Condenser, 30 mfd., 300v. (Section)	80	Part of Item #7	Condenser, 100 mfd., 600v., mica	135	W-137213	Transformer (only), Output	W-134955	Nut, Spring Lock (Record Changer Mtg.)
29	B-137023	Condenser, 30 mfd., 300v. (Section)	81	Part of Item #7	Condenser, 100 mfd., 600v., mica				AW-137232	Screw and Washer Assy. (Record Changer Mtg.)
30	B-137023	Condenser, 30 mfd., 300v. (Section)	82	Part of Item #7	Condenser, 100 mfd., 600v., mica				C-137173	Album, 86CR (12" Record)
31	B-137023	Condenser, 30 mfd., 300v. (Section)	83	Part of Item #7	Condenser, 100 mfd., 600v., mica				C-137236	Album, 86CS (10" Record)
32	B-137023	Condenser, 30 mfd., 300v. (Section)	84	Part of Item #7	Condenser, 100 mfd., 600v., mica				C-137294	Album, 86CS (10" Record)
33	B-137023	Condenser, 30 mfd., 300v. (Section)	85	Part of Item #7	Condenser, 100 mfd., 600v., mica				AB-134935	Needle, Floating Jewel Assy.
34	B-137023	Condenser, 30 mfd., 300v. (Section)	86	Part of Item #7	Condenser, 100 mfd., 600v., mica					
35	B-137023	Condenser, 30 mfd., 300v. (Section)	87	Part of Item #7	Condenser, 100 mfd., 600v., mica					
36	B-137023	Condenser, 30 mfd., 300v. (Section)	88	Part of Item #7	Condenser, 100 mfd., 600v., mica					
37	B-137023	Condenser, 30 mfd., 300v. (Section)	89	Part of Item #7	Condenser, 100 mfd., 600v., mica					
38	B-137023	Condenser, 30 mfd., 300v. (Section)	90	Part of Item #7	Condenser, 100 mfd., 600v., mica					
39	B-137023	Condenser, 30 mfd., 300v. (Section)	91	Part of Item #7	Condenser, 100 mfd., 600v., mica					
40	B-137023	Condenser, 30 mfd., 300v. (Section)	92	Part of Item #7	Condenser, 100 mfd., 600v., mica					
41	B-137023	Condenser, 30 mfd., 300v. (Section)	93	Part of Item #7	Condenser, 100 mfd., 600v., mica					
42	B-137023	Condenser, 30 mfd., 300v. (Section)	94	Part of Item #7	Condenser, 100 mfd., 600v., mica					
43	B-137023	Condenser, 30 mfd., 300v. (Section)	95	Part of Item #7	Condenser, 100 mfd., 600v., mica					
44	B-137023	Condenser, 30 mfd., 300v. (Section)	96	Part of Item #7	Condenser, 100 mfd., 600v., mica					
45	B-137023	Condenser, 30 mfd., 300v. (Section)	97	Part of Item #7	Condenser, 100 mfd., 600v., mica					
46	B-137023	Condenser, 30 mfd., 300v. (Section)	98	Part of Item #7	Condenser, 100 mfd., 600v., mica					
47	B-137023	Condenser, 30 mfd., 300v. (Section)	99	Part of Item #7	Condenser, 100 mfd., 600v., mica					
48	B-137023	Condenser, 30 mfd., 300v. (Section)	100	Part of Item #7	Condenser, 100 mfd., 600v., mica					
49	B-137023	Condenser, 30 mfd., 300v. (Section)	101	Part of Item #7	Condenser, 100 mfd., 600v., mica					
50	B-137023	Condenser, 30 mfd., 300v. (Section)	102	Part of Item #7	Condenser, 100 mfd., 600v., mica					
51	B-137023	Condenser, 30 mfd., 300v. (Section)	103	Part of Item #7	Condenser, 100 mfd., 600v., mica					
52	B-137023	Condenser, 30 mfd., 300v. (Section)	104	Part of Item #7	Condenser, 100 mfd., 600v., mica					
53	B-137023	Condenser, 30 mfd., 300v. (Section)	105	Part of Item #7	Condenser, 100 mfd., 600v., mica					
54	B-137023	Condenser, 30 mfd., 300v. (Section)	106	Part of Item #7	Condenser, 100 mfd., 600v., mica					
55	B-137023	Condenser, 30 mfd., 300v. (Section)	107	Part of Item #7	Condenser, 100 mfd., 600v., mica					

\*These parts will replace the original equipment parts.

CHANNEL NUMBERS TO MEGACYCLES

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

Channel No.	Frequency in Megacycles
200	87.9
205	88.9
210	89.9
215	90.9
220	91.9
225	92.9
230	93.9
235	94.9
240	95.9
245	96.9
250	97.9

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

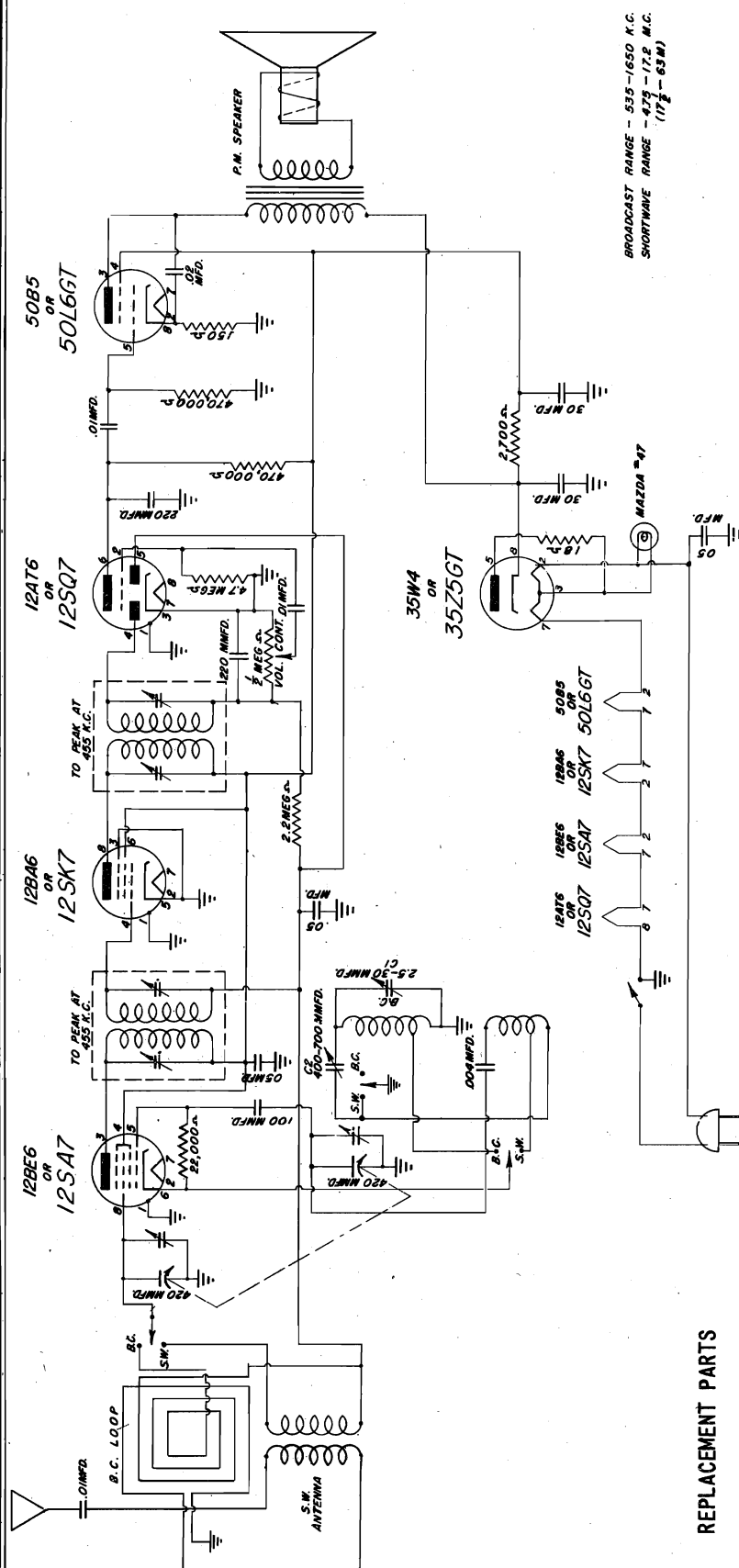
**MODEL: A-507**



ALL FILAMENT VOLTAGES MEASURED ACROSS SOCKET  
TERMINALS. OTHER VOLTAGES MEASURED FROM SOCKET  
TERMINAL TO GROUND WITH A 1000.Ω PER VOLT  
VOLTMETER.

Compliments of [www.nucow.com](http://www.nucow.com)

DEWALD RADIO MFG. CORP.



BROADCAST RANGE - 535-1650 K.C.  
SHORTWAVE RANGE - 475-17.2 M.C.  
(17½-63M)

**CABINET**  
**4004**

**KNOB**  
**4037**

**BACK**  
**4018**

**IF MINIATURE USE**

1	TUBES
1	35Z5GT
1	50L6GT
1	12SA7
1	12SK7
1	12SQ7

TO 105-125K  
40-60 ~  
UNLESS OTHERWISE SPECIFIED

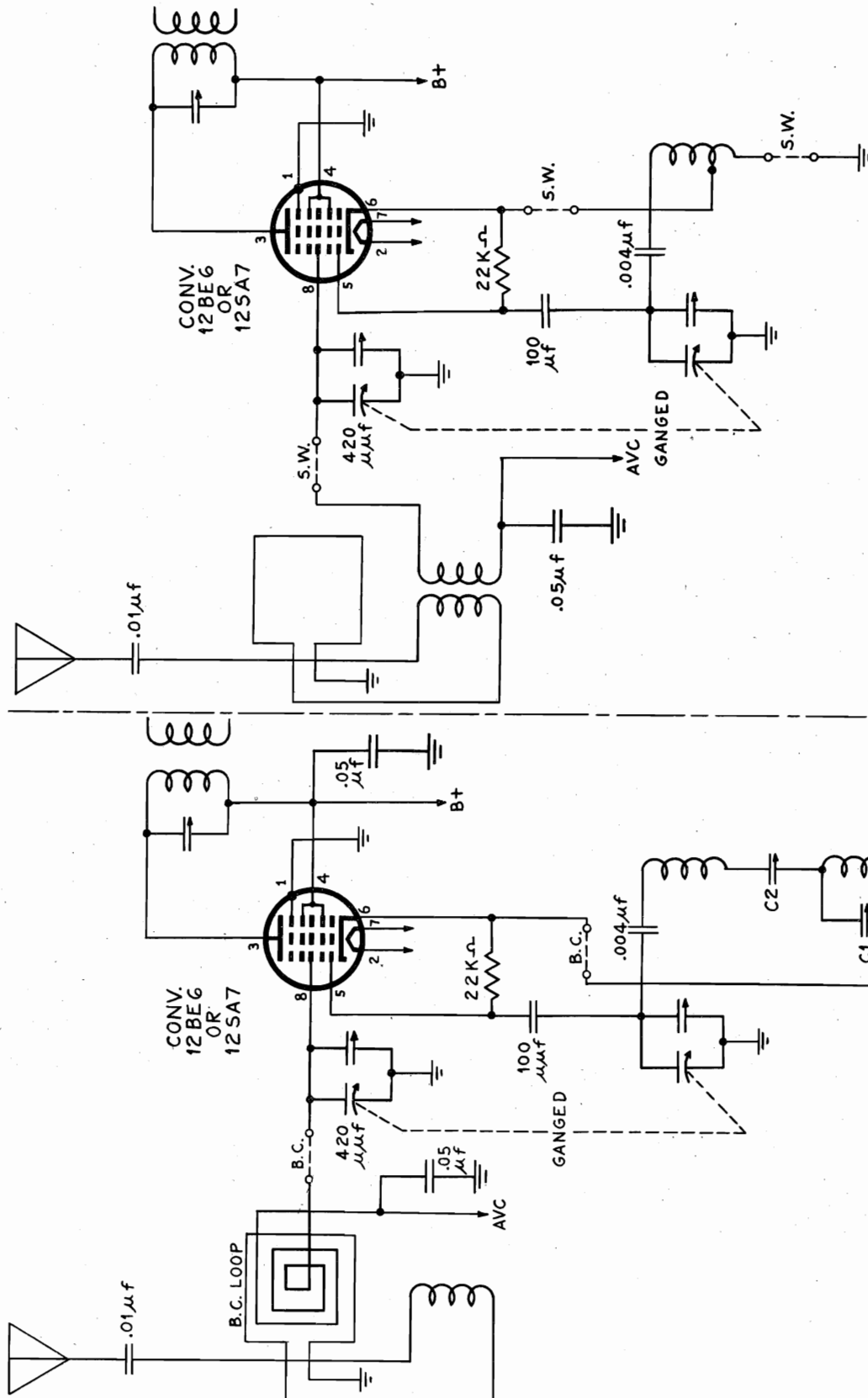
## REPLACEMENT PARTS

- |      |                      |
|------|----------------------|
| 1016 | loop ant.            |
| 1017 | B.C. oscillator coil |
| 1018 | S.C. oscillator coil |
| 1009 | S.W. ant. coil       |
| 1000 | 1st I.F. coil        |
| 1002 | 2nd detector I.F.    |
| 2014 | variable condenser   |
| 2002 | comb. electrolytic   |
| 2000 | paper condenser      |
| 2012 | ceramic condenser    |
| 3000 | 1/4 W. resistor      |
| 3003 | 1/2 W. resistor      |
| 3004 | 2 W. resistor        |
| 6003 | dial scale           |
| 9001 | dial back plate      |
| 8001 | pilot lamp assembly  |
| #47  | pilot lamp           |
| #20  | dial cord            |
| 9762 | drive spring         |
| 9918 | bushing              |
| 9900 | shaft                |
| 7000 | speaker              |
| 8017 | wave band switch     |
| 5000 | line cord            |
| 2011 | padder condenser     |
| 3002 | comb. volume control |

To calibrate receiver connect the output of signal generator in series with a 200 MMFD fixed condenser to the flexible antenna lead attached to the loop antenna. Connect the low side of signal generator through a 1/10 mfd. condenser to receiver chassis. The wave band switch should be in the broadcast position. Adjust signal generator to 455 Kilocycles and adjust both I.F. transformers to maximum signal. Open the receiver variable condenser for minimum capacity. Turn the band switch to short wave position. Set signal generator at 17.2 Megacycles. Peak oscillator section of receiver to maximum signal. Next set signal generator at 16 Megacycles. Tune in this signal. Adjust R.F. section of receiver variable condenser for maximum signal strength. The low frequency end of the dial is automatically adjusted by a fixed padding condenser. Next turn band switch to broadcast position. Rotate drive shaft until variable condenser is in minimum capacity position. Adjust signal generator to 1650 Kilocycles. Adjust the broadcast oscillator trimmer screw (C-1) until maximum signal from generator is heard. To adjust the low frequency, set the signal generator and receiver to 600 Kilocycles. Peak the broadcast padder (C-2) for maximum output. The variable condenser should be rocked during the operation. Keep the signal generator output as low as possible when making all of these measurements. It is extremely necessary in making the short wave adjustments, that the fundamental oscillator signal be tuned in and not the image frequency, which will fall below the fundamental.

DEWALD RADIO MFG. CORP.

MODEL A-509



BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE  
SHORT WAVE BAND  
4.75 - 17.2 MC.

BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION  
BROADCAST BAND  
535-1650 KC.

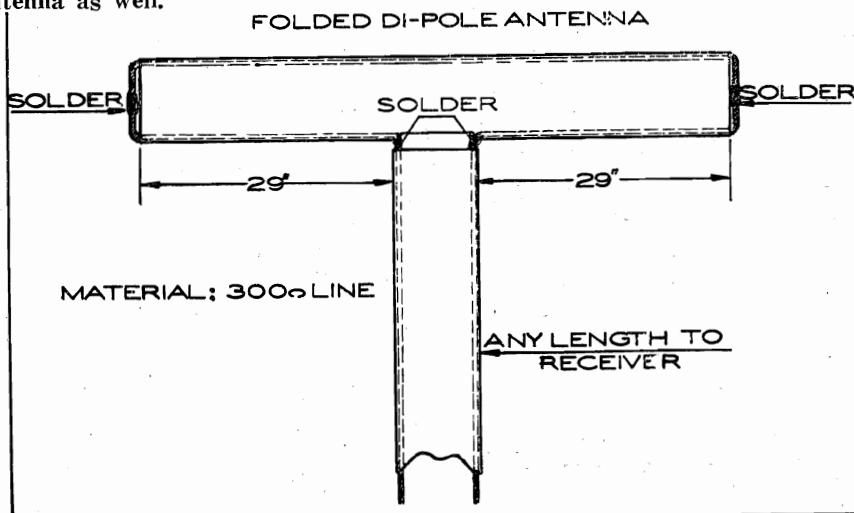




## FM TUNER

## EDWARD'S FM RADIO CORP.

In most metropolitan locations an indoor antenna may be all that is necessary. This by all means should be tried first, unless a suitable F.M. type outdoor antenna is already available. A very satisfactory indoor antenna may be improvised from a piece of 300 ohm flat type transmission line. (Same material as the antenna connection coming out from the tuner.) Cut the piece to a length of 60 inches. Then short circuit both ends. Then in the exact center cut one side of the line and use the two resulting ends to connect to the antenna line coming from the tuner. The antenna may be fastened to a molding or to a piece of wood with thumb tacks. (See diagram.) It is also advisable to try positioning the antenna at various angles and positions, so as to favor most desired stations. This applies to an outdoor antenna as well.



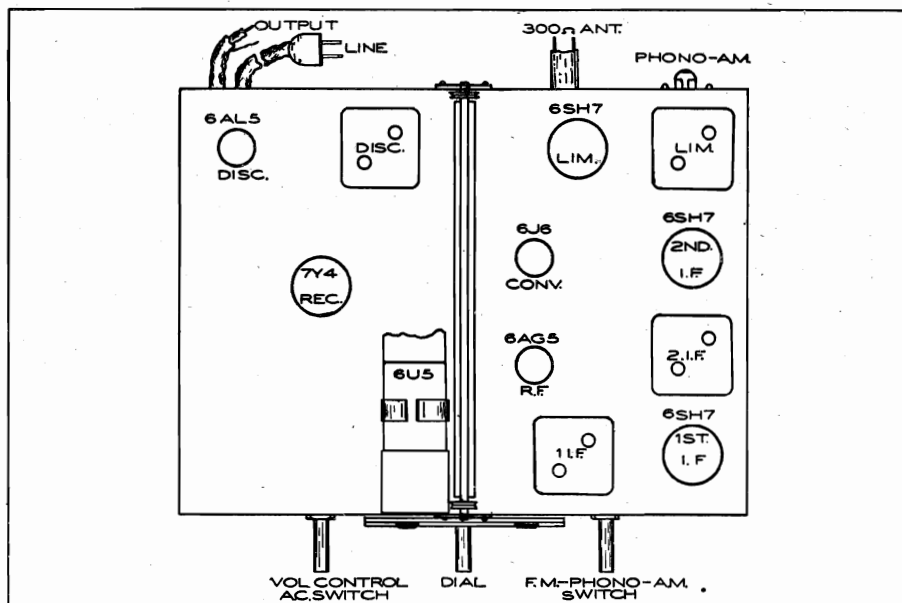
If this indoor antenna should prove unsatisfactory for your location, any standard half wave dipole F.M. outdoor antenna may be used. A 300 ohm transmission line should be used to couple to the tuner.

Any high quality audio system may be employed. Connection can be made to the phono connection provided for on most better radio receivers. Volume may be controlled either directly at the tuner by means of the volume control provided for on the receiver or amplifier, whichever is more convenient. A phono input is provided in the rear of the tuner. The selector switch in the front may be used to switch from F.M. to phono, all connections then being permanent. If desired an A.M. tuner may be connected to the rear phono jack instead of a phono pickup.

After the tuner is in operation for about 10 minutes each time it is turned on it may be necessary to retune to compensate for a slight temperature rise drift. This will not be necessary thereafter. Tuning should be so done as to get maximum closing of the target on the 6U5 tuning eye mounted directly on the dial. However the ear should be the final judge of the exact dial position. This point will always be in the region of maximum tuning eye closing.

The output line is high impedance 500,000 ohms.

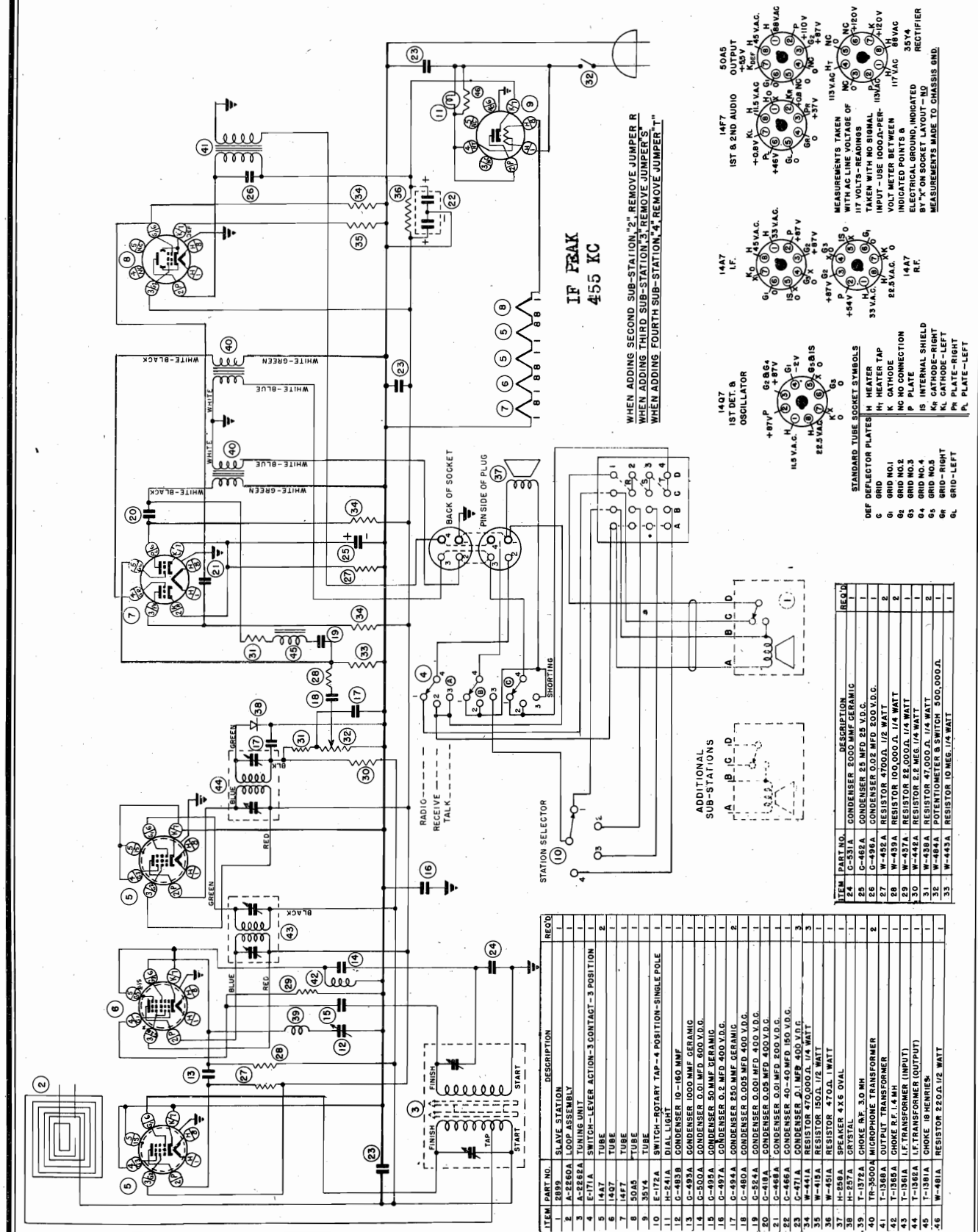
It should be ascertained that the 6J6 and 6AG5 miniature tubes mounted under the chassis are firmly in their sockets before attempting to operate the tuner.





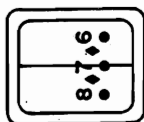
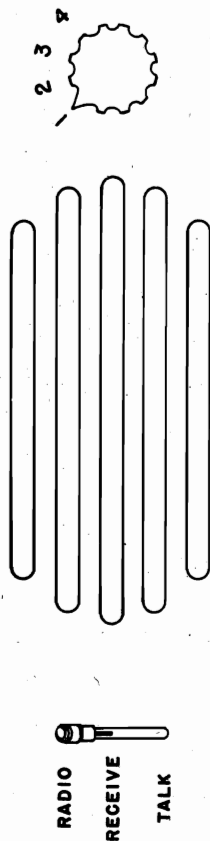
## ELECTRONIC LABORATORIES, INC.

## Radio Utiliphone,

MODEL 76RU,  
Chassis 2865

Radio Utiliphone,  
MODEL 76RU,  
Chassis 2865

ELECTRONIC LABORATORIES, INC.



**VOLUME, ON-OFF** Turn knob to the right to turn Radio-Utiliphone on. A click will be heard - wait 30 seconds for tubes to heat. Continue to turn the knob to the right to increase volume.

The Volume, ON-OFF switch must be turned on to operate both the radio, and the utiliphone.

**DIAL** Standard Broadcast Band - 540 to 1620 Kilocycles. Calibrated in kilocycles. Shadow indicator behind moving dial.

**TUNING** Radio Turn knob until desired station is heard. Rotate slowly back and forth until signal is strongest and clearest. Reduce or increase signal by using the volume control.

**RADIO-RECEIVE-TALK SWITCH**

This is a lever switch with a fixed position at "Radio" and "Receive", and a spring return from "Talk" to "Receive". To operate the radio, set the switch to the position marked "Radio".

To talk on the utiliphone, push the lever to "Talk" and hold in position while talking. To listen, release lever and let it swing back to "Receive" position.

**SUB-STATION SELECTOR SWITCH**

This is a four position switch with positions marked 1, 2, 3, and 4 indicating sub-stations 1, 2, 3, and 4 respectively. Set the sub-station selector switch for the desired station.

Model 7S Sub-Stations are each equipped with a push-to-talk switch, which is normally in the listen position. In order to talk from any sub-station, this switch must be depressed and held down while talking.

**IF THE RADIO-UTILIPHONE FAILS TO OPERATE**

**FIRST** - Check power supply by connecting a lamp to the outlet, or by connecting the radio-utiliphone in another socket.

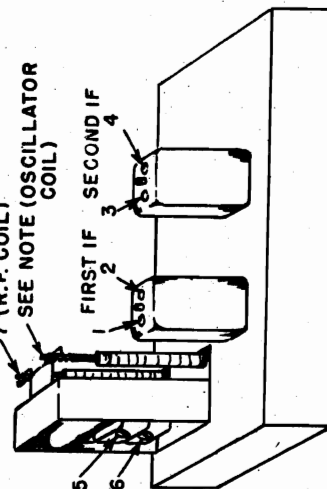
**SECOND** - When used on DC, if the radio does not operate, even though the tubes are lighted, reverse the plug in the socket to provide correct polarity.

# **SERVICE DATA—ALIGNMENT NOTES**

**A. MECHANICAL ALIGNMENT:**— The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding. (Note:—The distance 1 and 2 should be measured from mounted end of the slug.)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

7 (R.F. COIL)  
SEE NOTE (OSCILLATOR COIL)



**THIRD** - See if tubes are lighted after the radio-utiliphone has been turned on for almost a minute. Tubes in the Electronic Model 76RU are connected so that if one tube is loose in its socket, or defective, none of the tubes will light.

See that tubes are pushed into sockets. If they still fail to light, have them checked by your local radio dealer.

**IF THE UTILIPHONE FAILS TO OPERATE**, but the radio does operate, check the following:

**FIRST** - Check the setting of the sub-station selector switch.

**SECOND** - Check for loose interconnecting wires.

**THIRD** - Check for correct connections between stations. Example: - Be sure the same wire is connected from Row 1 - Terminal "A" to Station 1 - Terminal "A", etc.

Any difficulties that are not corrected by following the above instructions should be referred to a competent serviceman.

## ELECTRONIC LABORATORIES, INC.

Radio Utiliphone,  
MODEL 76RU,  
Chassis 2865

## B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F. adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

## C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F. input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F. coil slug by rotation in the Tinnerman nut to maximum output.

NOTE: Alternately adjust R.F. trimmer and R. F. slug until maximum output is reached at both 1400 KC and 700 KC as instructed in paragraphs C4 and C5.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

## SPECIFICATIONS

Power consumption..... 35 Watts  
(At 117 volts AC Supply)  
Power Output- 1.1 Watts 10% Distortion  
1.6 Watts Max.  
Selectivity----49 KC Broad at  
1000 times Signal  
Intermediate Frequency..... 455 KC  
Speaker..... 4"x6" Oval  
Tuning Frequency Range..540 to 1620 KC  
Sensitivity (For .05 Watt output-external Antenna) 15 microvolts average

## ALIGNMENT PROCEDURE-

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

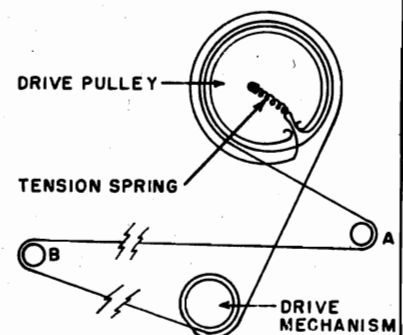
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR			DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING				
I.F. 455 KC	Grid of RF tube 14A7	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	
I.F. 455 KC	Grid of RF tube 14A7	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Out	Adjust Osc. #5 for Max. Signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 1400KC	Adjust RF trimmer #6 for Max. Signal	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. Signal (care should be taken not to disturb carriage position of tuner)	Alternately adjust R.F. trimmer and R.F. slug until maximum output is reached at both 1400 KC and 700 KC as instructed above.

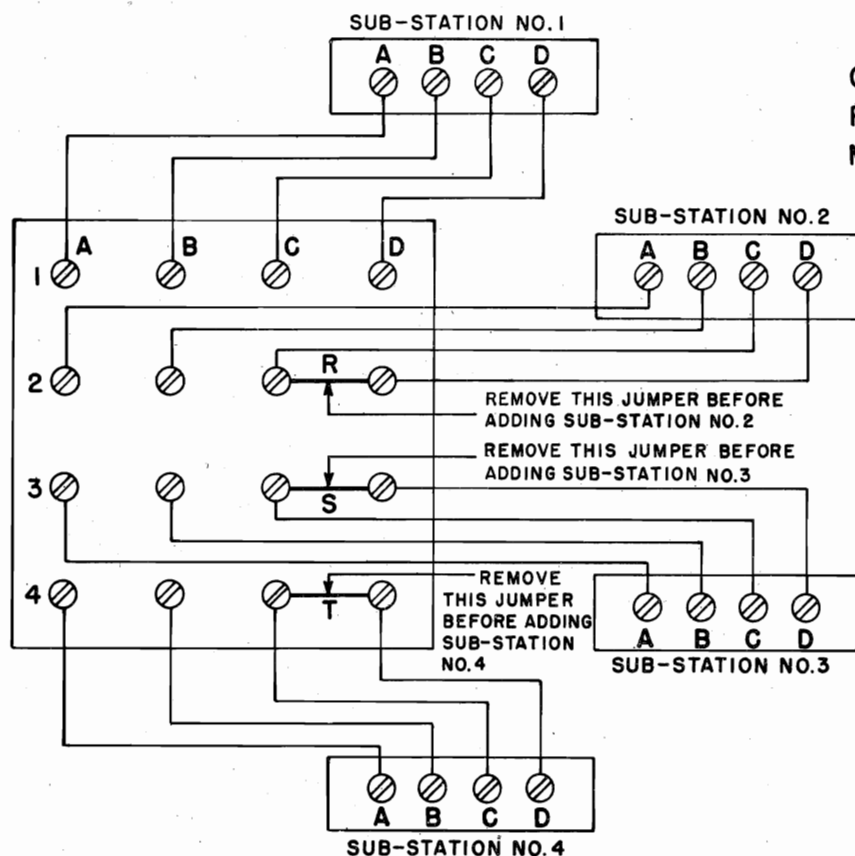
## DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 41" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string. Attach dial pointer to cord.



## MODEL 76RU

## ELECTRONIC LABORATORIES, INC.



## TO CONNECT TWO OR MORE SUB-STATIONS

The Model 76RU Radio-Utiliphone is supplied, by the manufacturer, set up to operate one sub-station. If more than one sub-station is to be installed, be sure to read all instructions before starting to connect the stations.

Terminal board on the 76RU, is marked 1, 2, 3, 4, and A, B, C, D. The numbers 1, 2, 3, and 4 indicate stations, the letters A, B, C and D indicate the four terminals which are to be used for connections to the sub-stations.

Stations must be connected in sequence as marked. IF ONLY ONE STATION IS TO BE USED, IT MUST BE CONNECTED TO THE SET OF TERMINALS MARKED "1".

THE SAME WIRE MUST BE CONNECTED BETWEEN TERMINALS HAVING THE SAME MARKINGS:-

Terminal 1A (on Model 76RU) to Terminal A on No. 1 Sub-Station  
Terminal 1B (on Model 76RU) to Terminal B on No. 1 Sub-Station  
Terminal 1C (on Model 76RU) to Terminal C on No. 1 Sub-Station  
Terminal 1D (on Model 76RU) to Terminal D on No. 1 Sub-Station

Be certain that jumpers R, S, and T are in place per diagram.

## LINE VOLTAGE

Model 76RU Radio-Utiliphone operates only on a power supply of 105-125 volts AC, 50 to 60 cycles, or 105-125 volts DC. If in doubt about your line voltage, check with your local power company before connecting the Radio-Utiliphone.

If there seems to be an excessive amount of hum when operating the radio on AC, reverse the position of the line plug in the socket.

On DC operation, if the radio does not operate within one minute after it is connected, reverse the position of the line plug in the socket.

Model 7S Sub-Station requires no electrical power connection.

## LOCATION

If two units are located in the same room and are too close together, they may "sing" due to acoustic feedback. By experimenting, it is possible to change the position of the units so that this feedback is eliminated.

## INSTALLATION CONNECTION, MODEL 76RU RADIO-UTILIPHONE AND MODEL 7S SUB-STATIONS

Model 76RU Radio-Utiliphone and Model 7S Sub-Stations are interconnected by using the four-conductor wire furnished. (Additional lengths, up to approximately 500 feet may be used. This is available in 50 foot lengths.) The wire supplied with the equipment is color coded for convenience in making connections. Connections on each unit are made to screws on the terminal boards provided. (See connection diagram.)

The terminal board on the Sub-Station is located on the back of the cabinet, and on the radio-utiliphone, it is located on the back of the chassis inside of the cabinet. Remove four screws in the corners of the back cover. The back cover may then be pulled away from the cabinet far enough to permit access to the terminal board.

Wires must be clean and free of insulation before making connections. To insure a good connection, the wire should be wrapped completely around the screw terminal. Screw should then be tightened so that wires are held securely in place. Faulty connections of any kind may interfere with operation.

## TO CONNECT ONE SUB-STATION

Sub-Stations must always be connected in sequence as marked on the terminal board. If two sub-stations are used, they must be connected to the terminals marked "1" and "2". Before connecting station No. 2, remove jumper "R" (refer to connection diagram). Then connect wires between terminals #2A, #2B, #2C, and #2D and Terminals A, B, C, and D of No. 2 sub-station. IF ONE STATION IS LATER REMOVED, THE REMAINING STATION MUST THEN BE CONNECTED TO THE TERMINALS MARKED "1", AND JUMPER "R" MUST BE REPLACED.

Three sub-stations must be connected to terminals #1, #2 and #3. Before connecting station #3, remove jumper "S" (refer to connection diagram). Then connect wires between terminals #3A, #3B, #3C and #3D, and terminals A, B, C, and D of No. 3 sub-station. If the third station is later removed, the two remaining stations must be connected to terminals marked "1" and "2", and jumper "S" must be replaced.

Before connecting station No. 4, remove jumper "T" (refer to connection diagram). Then connect wires between terminals #4A, #4B, #4C, and #4D, and terminals A, B, C, and D of No. 4 sub-station. If fourth station is later removed, the three remaining stations must be connected to terminals #1, #2 and #3, and jumper "T" must be replaced.

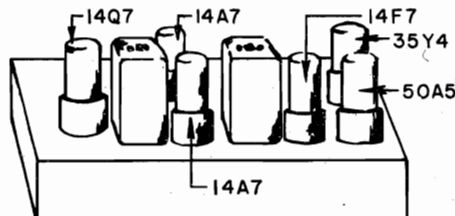
## TUBES AND DIAL LAMP

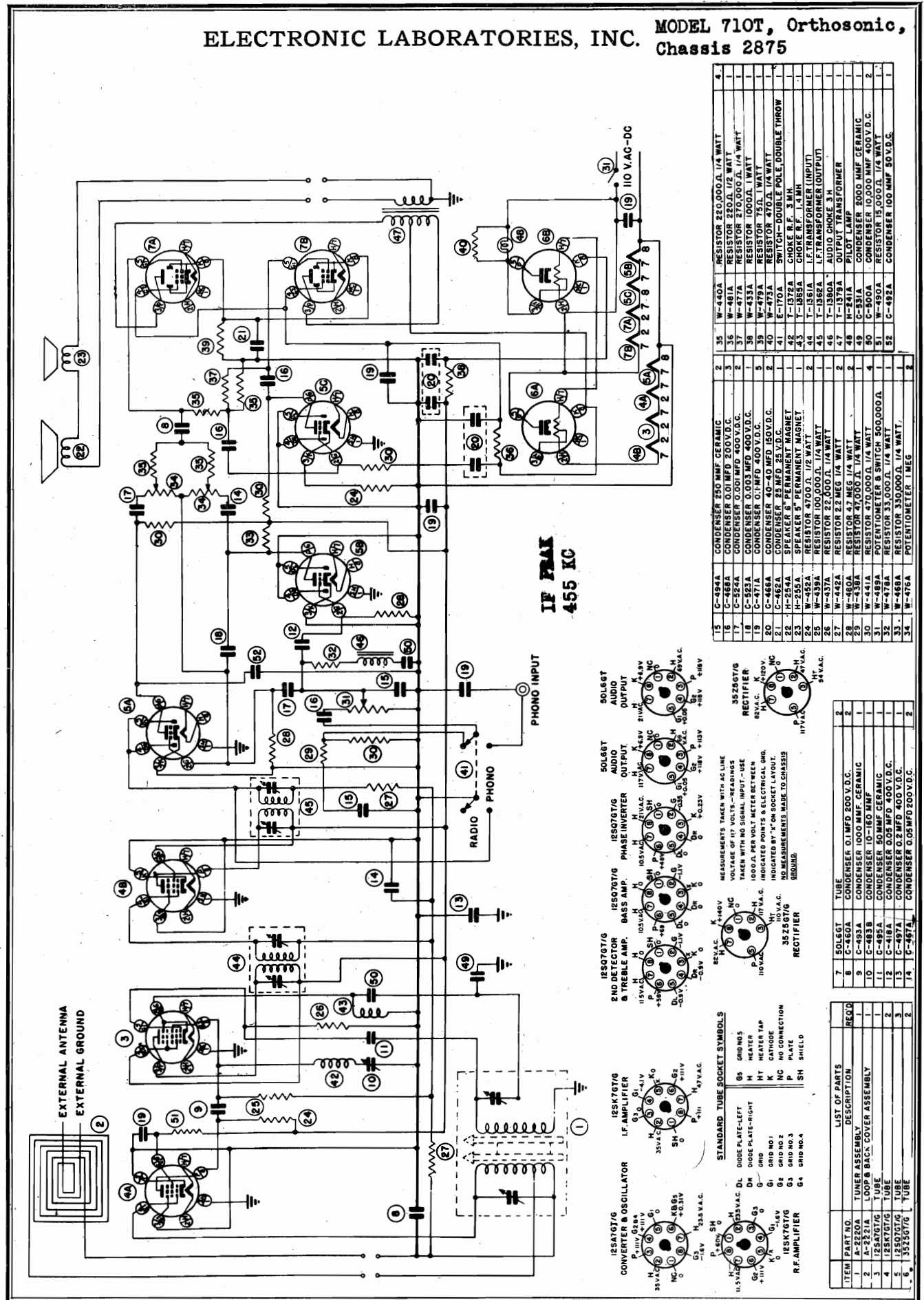
The type and position of tubes are shown in illustration.

All tubes and the dial lamp MUST be in the socket to operate the radio-utiliphone.

CAUTION - If a dial lamp burns out, it should be replaced at once. A hole in the bottom of the cabinet provides access to the dial lamp so that it may be replaced without removing chassis from the cabinet.

Use only a #47 dial lamp.





# MODEL 710T

## ELECTRONIC LABORATORIES, INC.

**DIAL** Standard Broadcast Band. 540 to 1620 Kilocycles. Calibrated in channel numbers. Add a zero to the dial number to obtain the kilocycle number.

**VOLUME, ON-OFF** Turn knob to the right to turn radio on. A click will be heard - wait 30 seconds for tubes to heat. Continue to turn the knob to the right to increase the volume.

This control acts as a master volume control after treble and bass response has previously been set by the treble and bass controls. If the treble and bass controls are both turned completely off (counter-clockwise) there will be no volume to the final amplifier and therefore no sound will be heard.

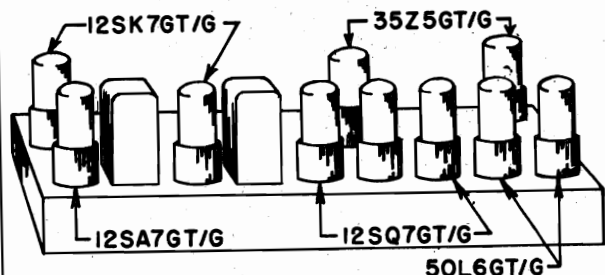
**TUNING** Turn knob until desired station is heard. Rotate slowly back and forth until signal is strongest and clearest. Reduce or increase signal by using the volume control.

**TUBES AND DIAL LAMP** The type and position of tubes are shown in illustration.

All tubes and the dial lamp MUST be in the socket to operate the radio.

**CAUTION** - If a dial lamp burns out, it should be replaced at once. A hole in the bottom of the cabinet provides access to the dial lamp so that it may be replaced without removing chassis from the cabinet.

Use only a No. 47 dial lamp



**MECHANICAL ALIGNMENT:-** The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding.  
(Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

**BASS** This control adjusts the volume output from the bass amplifier. For balanced reception, this control should be turned completely on (clockwise). If less than normal is desired, the bass response can be lowered by turning the knob counter-clockwise until desired response is obtained.

**TREBLE** This control adjusts the volume output from the treble amplifier. For balanced reception, this control should be turned completely on (clockwise). If less treble response than normal is desired, or if unusually noisy reception conditions are encountered, this control should be turned counter-clockwise until desired response is obtained.

**TREBLE AND BASS CONTROLS** Since these controls actually regulate the volume output of separate channels, it should be noted that if both bass and treble controls are turned to the off position, there will be no output from the speaker regardless of the position of the master volume control.

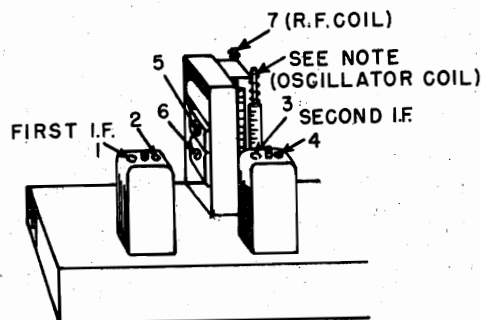
**ANTENNA** A High Q Loop Antenna is built into the cabinet of the Electronic Model 710T Orthosonic Radio. No other antenna is usually required for reception of local or powerful stations. Since directional effects are obtained by using only the built-in loop antenna, the signal pickup may be increased and interference from nearby stations decreased, by changing the position of the radio until the signal is at a maximum.

### LINE VOLTAGE

Electronic Model 710T Orthosonic Radio operates only on a power supply of 105-125 volts A.C. 50 to 60 cycles, or 105-125 volts D.C. If in doubt about your line voltage, check with your local power company before connecting the radio.

If there seems to be an excessive amount of hum when operating the radio on A.C., reverse the position of the line plug in the socket.

On D.C. operation, if the radio does not operate within one minute after it is connected, reverse the position of the line plug in the socket.



### CONTROLS



ORTHO SONIC

## ELECTRONIC LABORATORIES, INC.

## I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F. adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.7 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap by turning clockwise to the minimum signal.

## R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.7 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F. input to keep signal output voltage below 0.7 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F. coil slug by rotation in the Tinnerman nut to maximum output.

NOTE: Alternately adjust R.F. trimmer and R.F. slug until maximum output is reached at both 1400 kc. and 700 kc. as instructed in paragraphs C4 and C5.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

## SPECIFICATIONS

Power consumption..... 60 Watts  
(At 117 volts AC Supply)  
Power Output- 3.5 Watts Max.  
2.5 Watts 10% Distortion  
Selectivity----45 KC Broad at  
1000 times Signal  
Intermediate Frequency..... 455 KC  
Speakers..... 4 1/2" PM Dynamic  
6" PM Dynamic  
Tuning Frequency Range.. 540 to 1620 KC  
Sensitivity (For .05 Watt output-external Antenna) 10 microvolts average

## ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

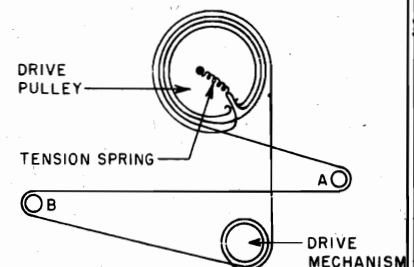
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR			DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING				
I.F. 455 KC	Grid of RF tube 12SK7 GTG	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting
I.F. 455 KC	Grid of RF tube 12SK7 GT/G	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Out	Adjust Oso. #5 for Max. signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 1400KC	Adjust RF trimmer #6 for Max. Signal.	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. Signal (care should be taken not to disturb carriage position of tuner)	Alternately adjust R.F. trimmer and R.F. slug until Maximum output is reached at both 1400 KC and 700 KC as instructed above.

## DRIVE CORD REPLACEMENT

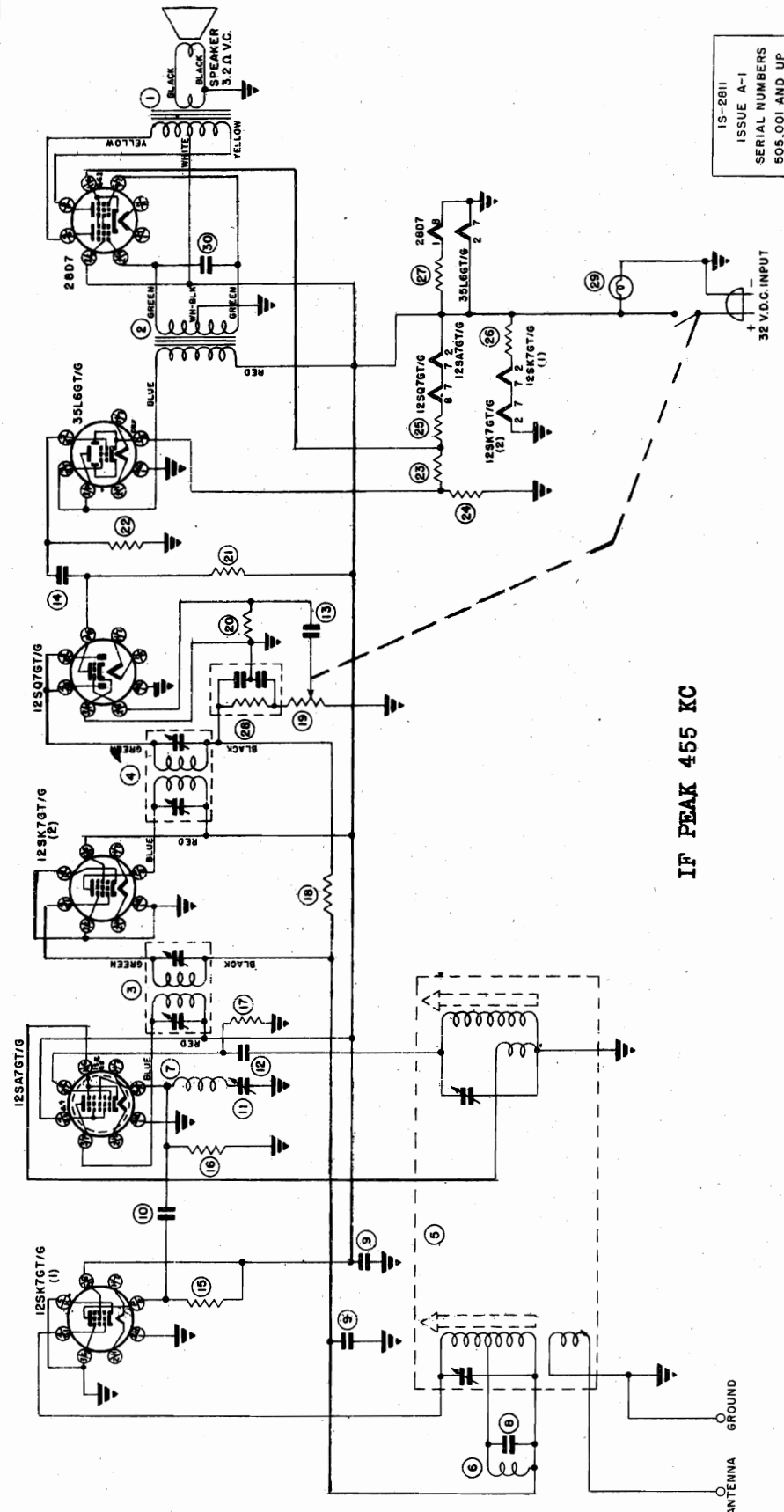
Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string. Attach dial pointer to cord.





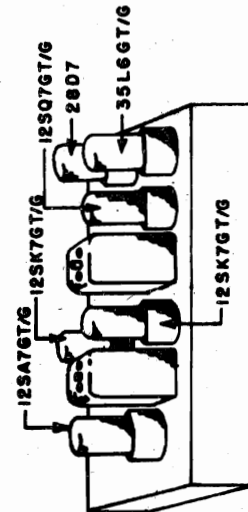
MODEL 2811

ELECTRONIC LABORATORIES, INC.



15	W-492A	RESISTOR 4700Ω 1/2 WATT	1
16	W-442A	RESISTOR 2.2 MEGΩ 1/4 WATT	1
17	W-437A	RESISTOR 22,000Ω 1/4 WATT	1
18	W-417A	RESISTOR 1 MEGΩ 1/2 WATT	1
19	W-444A	POTENTIOMETER & SWITCH 500,000Ω	1
20	W-443A	RESISTOR 10 MEGΩ 1/4 WATT	1
21	W-440A	RESISTOR 220,000Ω 1/4 WATT	1
22	W-441A	RESISTOR 470,000Ω 1/4 WATT	1
23	W-78B	RESISTOR 51Ω 1/2 WATT	1
24	W-494A	RESISTOR 15Ω 2 WATT	1
25	W-175A	RESISTOR 22Ω 1 WATT	1
26	W-493A	RESISTOR 47Ω 1 WATT	1
27	W-190A	RESISTOR 10Ω 2 WATT	1
28	A-2297A	DIODE FILTER UNIT	1
29	M-266A	DIAL LIGHT-36 VOLT	1
30	C-524A	CONDENSER 0.001 MFD 400 V.D.C.	1

ITEM	PART NO.	DESCRIPTION	REQ'D
1	T-1385A	OUTPUT TRANSFORMER	1
2	T-1386A	DRIVER TRANSFORMER	1
3	T-1361A	I.F. TRANSFORMER	1
4	T-1362A	I.F. TRANSFORMER	1
5	A-2309A	TUNER ASSEMBLY	1
6	T-1367A	CHOKE 304 MICROHENRIES	1
7	T-1372A	CHOKE 3 MILLIHENRIES	1
8	C-541A	CONDENSER 12 MMF CERAMIC	1
9	C-460A	CONDENSER 0.1 MFD 200 V.D.C.	2
10	C-493A	CONDENSER 1000 MMF-CERAMIC	1
11	C-483B	CONDENSER 10-160 MMF	1
12	C-495A	CONDENSER 50 MMF-CERAMIC	1
13	C-480A	CONDENSER 0.005 MFD 400 V.D.C.	1
14	C-468A	CONDENSER 0.01 MFD 200 V.D.C.	1



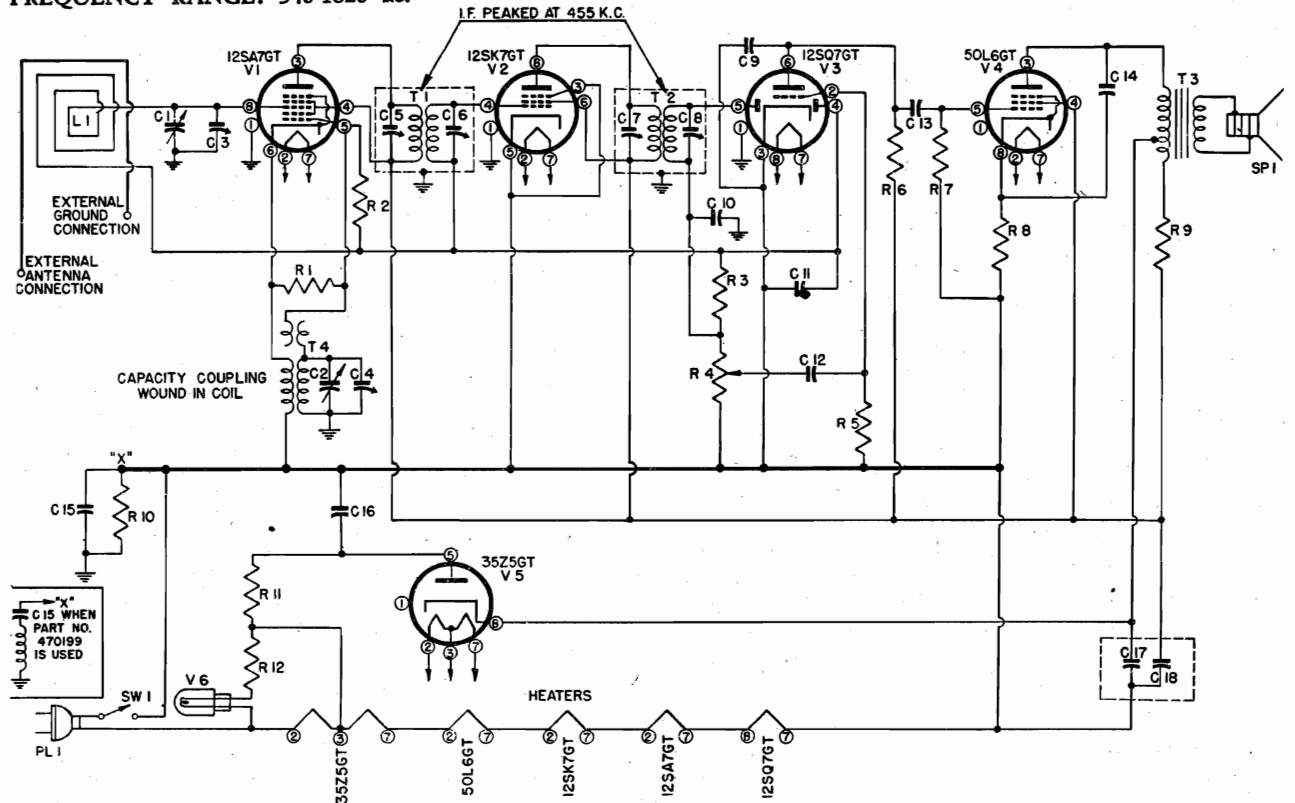


# EMERSON RADIO & PHONO. CORP.

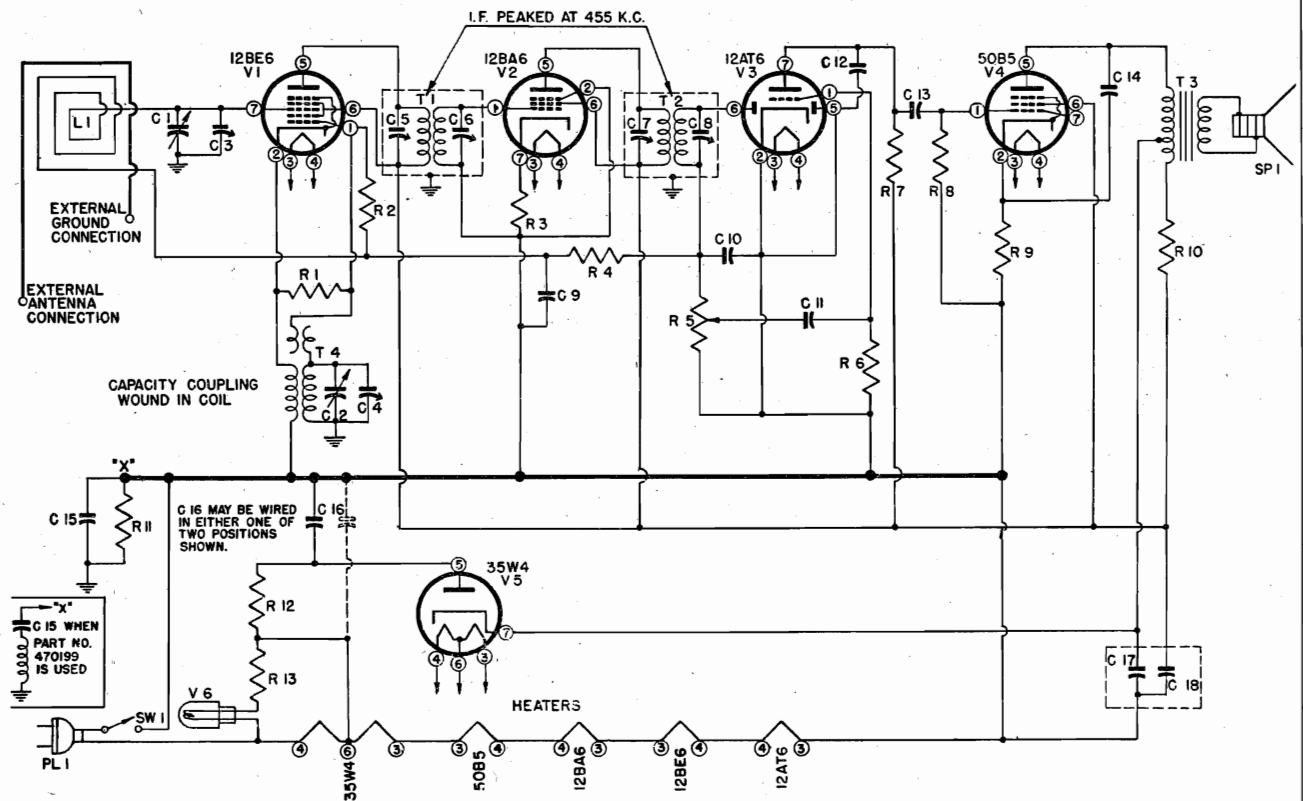
MODELS 503, 510, 510A, 520, 539  
Chassis 120000, 120029, 120030,  
120032, 120035, 120044

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram of Chassis Models 120000, 120029, 120030, 120044



Schematic Circuit Diagram of Chassis Models 120032, 120035

MODELS 503, 510, 510A, 520, 539  
 MODELS 507, 509, 518, 522, 535  
 MODELS 525, 552  
 MODELS 543, 544

## EMERSON RADIO &amp; PHONO. CORP.

## ALL MODELS

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—.

## Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmer for the antenna and the trimmer for the oscillator coil are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (\*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
12SA7			89	89	*—10			*—1.6
12SK7				*—1.6		89		89
12SQ7		*—0.7		*—1.6	—0.5	37.5		
50L6GT			110	89				6.2
35Z5GT				116		116		117
12BE6	*—8.0				92	92	*—1.3	
12BA6					92	92	1.7	
12AT6	*—0.6					*—0.45	*44	
50B5		5.65			110	92		
35W4	115						115	

\* Not supplied separately.

† Specify part number when ordering.

## CABINET AND DIAL PARTS

MODEL--507, 509, 518, 522, 535

140015 Cabinet (Model 507)  
 140016 Cabinet (Model 509)  
 140034 Cabinet (Model 518)  
 140007 Cabinet (Model 522)  
 140070 Cabinet (Model 535)  
 450060 Back, molded (Model 507)  
 450080 Back, molded (Models 509, 518)  
 450050 Back, molded (Model 522)  
 560110 Back masonite (Model 507)  
 560220 Back, masonite (Models 509, 518)  
 560120 Back, masonite (Model 522)  
 575047 Back, wood (Model 535)  
 450000 Handle  
 460140 Knob (Models 507, 518, 535)  
 460470 Knob (Model 509)  
 460150 Knob (Model 522)

531009 Drive pulley  
 280003 Drive shaft  
 520499 Dial backplate (Models 507, 509, 518, 522)  
 520024 Dial backplate (Model 535)  
 520350 Dial crystal, stamped (Models 507, 509, 522), or  
 520190 Dial crystal, stamped (Models 507, 509, 522)  
 520440 Dial crystal (Model 518)  
 520025 Dial crystal (Model 535)  
 525080 Dial pointer (Models 507, 509, 518, 522)  
 525130 Dial pointer (Model 535)  
 411040 Pointer hub (Model 535)

MODELS 503, 510, 510A, 520, 539

## EMERSON RADIO &amp; PHONO. CORP.

CHASSIS 120000, 120029, 120030, 120044

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900170	Two-gang variable condenser (chassis 120000)	L1	700200	Loop antenna, or
C1, C2	900319	Two-gang variable condenser (chassis 120030 and 120044)	L1	700210	Loop antenna
C1, C2	900290	Two-gang variable condenser (chassis 120029)	*PL1		Plug, part of line cord
*C3, C4		Trimmers, part of variable condenser	R1	310810	22,000 ohms, ¼ watt resistor
*C5, C6, } C7, C8 }		Trimmers, part of i-f transformers	R2, R5	397000	15 meg., ½ watt resistor
C9	920170	0.001 mfd., 600 volt condenser	R3	321330	3.3 meg., ¼ watt resistor
C10	910000	0.00022 mfd. mica condenser	R4	390010	0.5 meg. volume control
C11	920040	0.1 mfd., 200 volt condenser	R6, R7	321130	470,000 ohms, ¼ watt resistor
C12	920010	0.002 mfd., 600 volt condenser	R8	340290	150 ohms, ½ watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R9	370490	1,000 ohms, 1 watt resistor
C15	920050	0.2 mfd., 200 volt condenser, or	R10	321050	220,000 ohms, ¼ watt resistor
C15	470199	0.2 mfd., 200 volt assembly (used only with midget i-f transformers 720525 and 720529)	R11	340050	15 ohms, ½ watt resistor
C16	920030	0.05 mfd., 400 volt condenser	R12	340010	10 ohms, ½ watt resistor
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser	SP1	180000	P.M. speaker
L1	700000	Loop antenna, or	*SW1		Line switch on volume control
			T1	720000	First i-f transformer, or
			T1	720525	First i-f transformer, midget
			T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
			T4	716010	Oscillator coil
				583010	Line cord

## CHASSIS 120032, 120035

C1, C2	900319	Two-gang variable condenser	R1	310810	22,000 ohms, ¼ watt resistor
*C3, C4		Trimmers, part of variable condenser	R2, R6	397000	15 meg., ½ watt resistor
*C5, C6, } C7, C8 }		Trimmers, part of i-f transformers	R3	340310	180 ohms, ½ watt resistor
C9	920040	0.1 mfd., 200 volt condenser	R4	321290	2.2 meg., ¼ watt resistor
C10	910000	0.00022 mfd. mica condenser	R5	390010	0.5 meg. volume control
C11	920010	0.002 mfd., 600 volt condenser	R7, R8	321130	470,000 ohms, ¼ watt resistor
C12	920170	0.001 mfd., 600 volt condenser	R9	340290	150 ohms, ½ watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R10	370490	1,000 ohms, 1 watt resistor
C15	920050	0.2 mfd., 200 volt condenser, or	R11	321050	220,000 ohms, ¼ watt resistor
C15	470199	0.2 mfd., 200 volt assembly (used only with midget i-f transformers 720525 and 720529)	R12	340050	15 ohms, ½ watt resistor
C16	920030	0.05 mfd., 400 volt condenser	R13	340010	10 ohms, ½ watt resistor
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser	SP1	180000	P.M. speaker
L1	700000	Loop antenna, or	*SW1		Line switch on volume control
L1	700210	Loop antenna	T1	720000	First i-f transformer, or
*PL1		Plug, part of line cord	T1	720525	First i-f transformer, midget
			T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
			T4	716010	Oscillator coil
				583010	Line cord

## CABINET AND DIAL PARTS

\* Not supplied separately.

† Specify part numbers when ordering

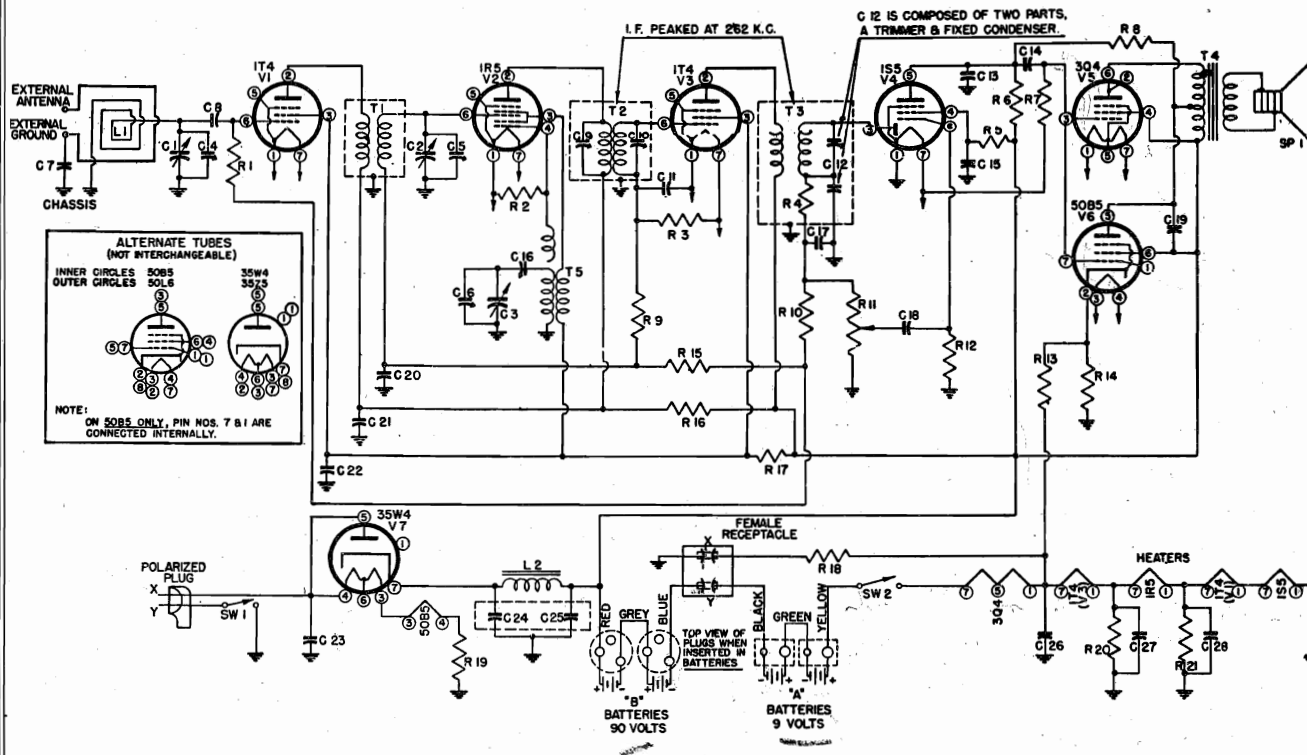
807000	Pilot light	520470	Dial crystal, printed (Chassis 120030, 120035)
280103	Drive shaft	460140	Knob (Model 503)
520019	Dial backplate, 320° dial numbers (Chassis 120000)	460470	Knob (Models 510, 539)
520500	Dial backplate, 180° dial numbers (Chassis 120029)	460150	Knob (Model 520)
412600	Dial backplate, plain (Chassis 120035, 120030)	450230	Ivory plastic front, square holes, (Model 520)
410004	Dial backplate, plain (Chassis 120032, 120044)	450250	Ivory plastic front, round holes, (Model 520)
520513	Dial face, paper (Chassis 120032, 120044)	450330	Black plastic front, square holes, (Model 510)
525010	Pointer (Chassis 120000, 120029)	450350	Black plastic front, round holes, (Model 510)
525090	Pointer (Chassis 120030, 120032, 120035, 120044)	140001	Cabinet (Model 503)
520080	Dial crystal (Chassis 120000, 120029, 120032, 120044)	140000	Cabinet (Model 520)
		140005	Cabinet (Model 510, 510A)
		140069	Cabinet (Model 539)

The color coding of the i-f transformer leads is as follows:

Grid—green  
Grid return—black

Plate—blue  
B+—red

Chassis 120000, 1200029, 120030, 120044 use metal or glass tubes. Chassis 120032 and 120035 use miniature tubes. Model 510A only uses chassis 120035.

**MODEL 505**  
**Chassis 120020**
**EMERSON RADIO & PHONO. CORP.**


Schematic Circuit Diagram Model 505, Chassis 120020

**Chassis 120020**

C1, C2, C3	900080	Three-gang variable condenser	R2	310970	100,000 ohms, 1/4 watt resistor
*C4, C5, C6		Trimmers, part of variable condenser	*R4		47,000 ohms, 1/4 watt resistor
C7, C18	920010	0.002 mfd., 600 volt condenser	R6, R7	321130	470,000 ohms, 1/4 watt resistor
C8, C11	920060	0.05 mfd., 200 volt condenser	R8	311250	1.5 meg., 1/4 watt resistor
*C9, C10		Trimmers, part of first i-f transformer	R10	321290	2.2 meg., 1/4 watt resistor
*C12		Trimmer and fixed condenser, part of second i-f transformer	R11	390020	0.5 meg. volume control
C13	910050	0.0004 mfd. mica condenser	R12	321450	10 meg., 1/4 watt resistor
C14, C21	920020	0.02 mfd., 400 volt condenser	R13	310130	33 ohms, 1/4 watt resistor
C15, C19	920090	0.01 mfd., 400 volt condenser	R14	310730	10,000 ohms, 1/4 watt resistor
C16	900110	Padding condenser	R16	340630	3,900 ohms, 1/2 watt resistor
C17	910010	0.00011 mfd. mica condenser	R17	340770	15,000 ohms, 1/2 watt resistor
C20, C22, C28	920100	0.02 mfd., 200 volt condenser	R18	340510	1,200 ohms, 1/2 watt resistor
C23	920030	0.05 mfd., 400 volt condenser	R19	394110	213 ohms, 6 watt resistor
C24, C25	925050	20-40 mfd., 150 volt dual electrolytic condenser	R20	310570	2,200 ohms, 1/4 watt resistor
C26	925090	100 mfd., 25 volt electrolytic condenser	R21	310450	680 ohms, 1/4 watt resistor
C27	920110	0.25 mfd., 100 volt condenser	SP1	180006	P.M. speaker
L1	700090	Loop antenna	*SW1		Line switch on volume control
L2	737010	Filter choke	*SW2		Battery switch on volume control
R1, R3, R5, R9	311330	3.3 meg., 1/4 watt resistor	T1	713000	R.F. coil
			T2	720170	First i-f transformer
			T3	720410	Second i-f transformer
			T4	734140	Output transformer
			T5	716030	Oscillator coil

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Battery Type	Number Required	Eveready Part No.	Rayovac Part No.	Burgess Part No.
4 1/2 volt "A"	2	746 (plug-in type)	P83A or EM-83 (plug-in type)	3G (plug-in type)
45 volt "B"	2	482 Minimax (plug-in type)	—	—

## EMERSON RADIO &amp; PHONO. CORP.

MODELS 505, 523

Chassis 120020, 120041

An oscillator with frequencies of 262, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Plug the receiver into the power supply in such a way that the ground side of the power line is connected to the receiver B—.

### Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C6) is on the middle section of the variable condenser.

The interstage coil (T1) is the shielded coil located under the chassis. Its trimmer (C5) is on the front section of the variable condenser.

The trimmer for the loop antenna (C4) is on the last section of the variable condenser (the section nearest the loop).

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted next to the loop. The second i-f transformer (T3) is mounted next to the dial.

The series padder, C10 for chassis 120002 and C16 for chassis 120020 and 120041, is located on the chassis near the 1T4 tube.

### I-f Alignment

Rotate the variable condenser to the minimum capacity position. Feed 262 kc to the converter grid and adjust the three i-f trimmers for maximum response. The signal should be fed through a 0.1 mfd. condenser.

### Interstage Alignment

1. Set the dial indicator to 1425 kc, feed 1425 kc to the r-f grid, and adjust the oscillator and interstage trimmers for maximum response.
2. Set the dial indicator to 600 kc, feed 600 kc to the r-f grid, and adjust the oscillator padding trimmer by rocking in the signal for maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

The color coding of the i-f transformer leads is as follows:

Grid—green

Grid return—black

Plate—blue

B+—red

### CABINET AND DIAL PARTS

525090	Pointer	520200	Escutcheon (Model 523)
410929	Pointer hub	140002	Cabinet (Model 505)
531009	Drive pulley	140053	Cabinet (Model 523)
280133	Drive shaft	460470	Knob, black
520039	Dial backplate (Model 505)	460140	Knob, brown
520505	Dial backplate (Model 523)	450001	Handle, or
460040	Dial crystal (Model 505)	450280	Handle
520080	Dial crystal (Model 523)		

\* Not supplied separately.

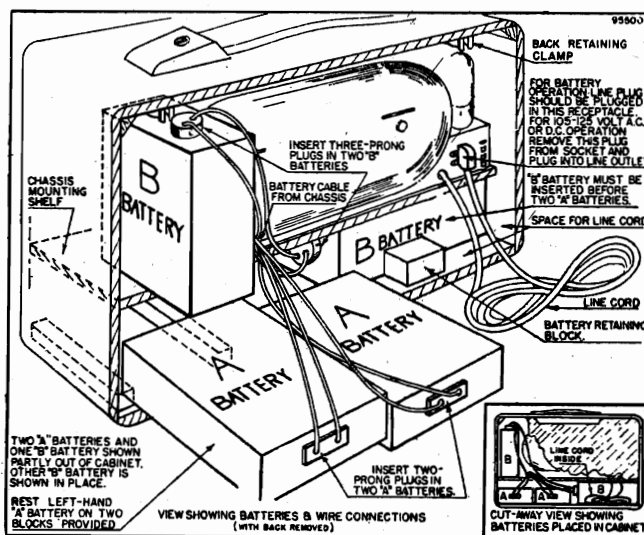
† Specify part numbers when ordering. When in doubt of chassis or model also include complete serial number.

### Loop Alignment

Connect the test oscillator to a coil composed of three or four turns of wire wound in a loop approximately 12" in diameter. This coil should be held parallel to and in line with the receiver's loop at a distance of 15 to 20 inches.

1. Radiate a signal at 1425 kc, tune in the signal on the receiver, and adjust the loop trimmer for maximum response.
2. Radiate signal at 600 kc, tune in the signal on the receiver, and adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

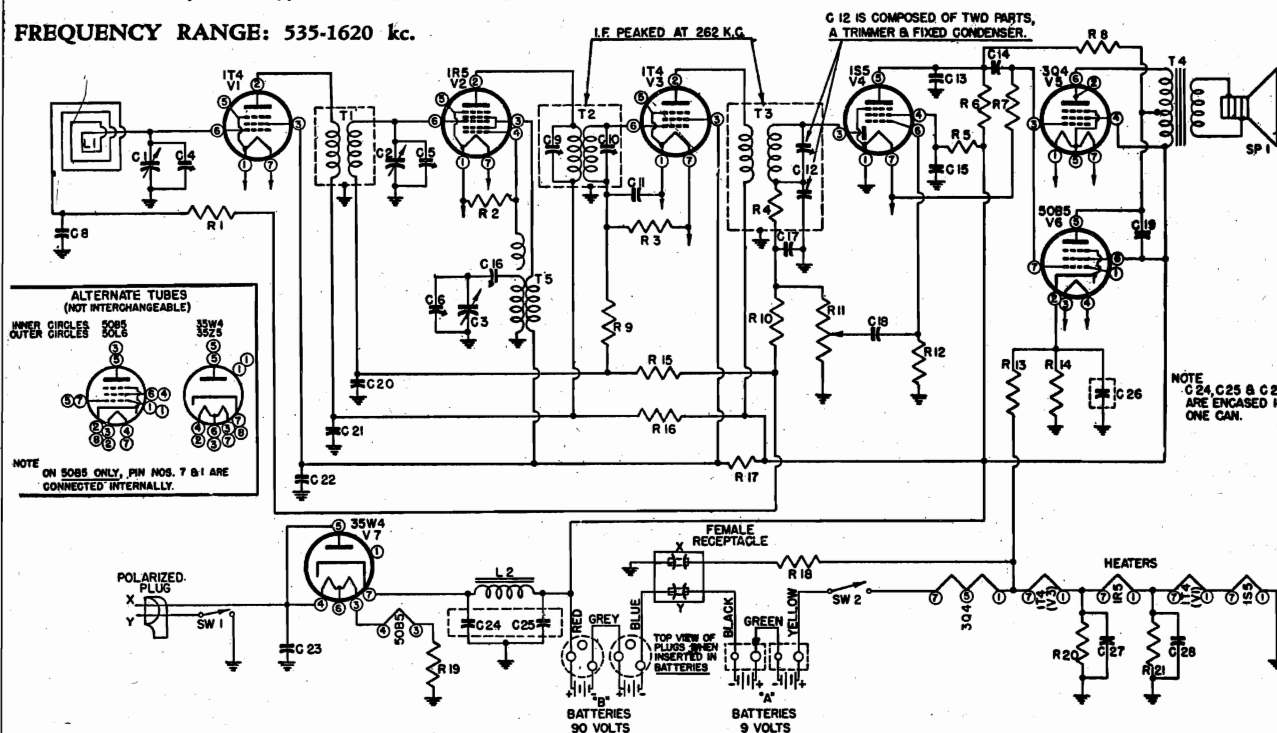
### Battery Installation



### External Antenna

For loop antennas that do not have external antenna connection, wind one turn of insulated wire around or across the loop. Connect one end to an outside aerial. Connect the other end of a good ground or to chassis through a 0.002 mfd. condenser.

**MODELS 505, 523**  
**Chassis 120041**
**EMERSON RADIO & PHONO. CORP.**
**TYPE:** Three-way (battery, a.c.-d.c.) portable superheterodyne.

**FREQUENCY RANGE:** 535-1620 kc.


Schematic Circuit Diagram Models 505-523, Chassis 120041

**Chassis 120041**

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2, C3	900080	Three-gang variable condenser	*R4		47,000 ohms, ¼ watt resistor, part of second i-f transformer
*C4, C5, C6		Trimmers, part of variable condenser	R6, R7	321130	470,000 ohms, ¼ watt resistor
C8, C14, C20, C21, C22, C28	920020	0.02 mfd., 400 volt condenser	R8	311250	1.5 meg., ¼ watt resistor
*C9, C10		Trimmers, part of first i-f transformer	R10	321290	2.2 meg., ¼ watt resistor
C11	920060	0.05 mfd., 200 volt condenser	R11	390020	0.5 meg. volume control
*C12		Trimmer and fixed condenser, part of second i-f transformer	R12	321450	10 meg., ¼ watt resistor
C13	910050	0.0004 mfd. mica condenser	R13	310130	33 ohms, ¼ watt resistor
C15, C19	920090	0.01 mfd., 400 volt condenser	R14	310730	10,000 ohms, ¼ watt resistor
C16	900110	Padding condenser	R16	340630	3,900 ohms, ½ watt resistor
C17	910010	0.00011 mfd. mica condenser	R17	340770	15,000 ohms, ½ watt resistor
C18	920010	0.002 mfd., 600 volt condenser	R18	340510	1,200 ohms, ½ watt resistor
C23	920030	0.05 mfd., 400 volt condenser	R19	394110	213 ohms, 6 watt resistor, or
C24, C25, C26	925210	Electrolytic condenser: C24, C25—20-40 mfd., 150V.; C26—100 mfd., 25 V.	R20	394170	213 ohms, 10 watt resistor
C27	920110	0.25 mfd., 100 volt condenser	R21	310570	2,200 ohms, ¼ watt resistor
L1	700233	Loop antenna	R22	310450	680 ohms, ¼ watt resistor
L2	737067	Filter choke	SP1	180012	P.M. speaker
R1, R3, R5, R9, R15	311330	3.3 meg., ¼ watt resistor	*SW1		Line switch on volume control
R2	310970	100,000 ohms, ¼ watt resistor	*SW2		Battery switch on volume control
			T1	713012	R.F. coil
			T2	720500	First i-f transformer, or
			T3	720510	First i-f transformer
			T4	720490	Second i-f transformer, or
			T5	720520	Second i-f transformer
				734150	Output transformer
				716030	Oscillator coil

Model 505 uses chassis 120002, 120020, 120041. Model 523 uses chassis 120041.

**IMPORTANT**—Where excessive tube burn-out is encountered, the 50B5 tube should be replaced *only* with a new Emerson tube bearing the designation 274 on the tube base.

**POWER CONSUMPTION:** 30 watts (line operation).

**CURRENT DRAIN:**

"A" Battery—0.053 amp.

"B" Battery—0.013 amp.

## EMERSON RADIO &amp; PHONO. CORP.

MODELS 505,523

MODELS 525,552

## MODEL--505,523

The following voltage readings are d-c measurements taken with a line voltage of 117 volts, 60 cycles from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (\*), which should be taken with a d-c vacuum-tube voltmeter. The readings with the volume control set at minimum and the variable condenser closed. All voltages are d.c. positive unless indicated otherwise. Voltages for 3Q4 are given for battery operation only. Readings for 50L6 and 35Z5 can be determined from 50B5 and 35W4 by referring to schematic diagram for proper pin connections.

## Chassis 120002

TUBE TYPE	PIN NUMBER							
	1	2	3	4	5	6	7	8
1T4	1.2	88	56		1.2	*0.3	2.4	
1R5	2.4	88	56	-8	2.4	*1.5	3.7	
1T4	3.7	98	56		3.7	*2.3	4.9	
1S5			*0.3	*19	*50	*0.2	1.2	
3Q4	4.9	92	*1.1	98	4.9	92	4.9	
117N7			92	*1.1	98	6.25		125

## Chassis 120020

TUBE TYPE	PIN NUMBER						
	1	2	3	4	5	6	7
1T4	1.32	90	50		1.32	*0.2	2.55
1R5	2.55	90	50	*7.0	2.55		3.85
1T4	3.85	98	50		3.85	*1.9	5.25
1S5			*0.35	*24	*46	*0.1	1.32
3Q4	6.1	88	*1.2	90	7.6	88	9.0
50B5	1.2	6.6	83AC	33AC	90	98	*1.2
35W4	1.32		83AC	117AC	117AC	108AC	129

## Chassis 120041

TUBE TYPE	PIN NUMBER						
	1	2	3	4	5	6	7
1T4	1.32	90	50		1.32	*0.2	2.55
1R5	2.55	90	50	*7.0	2.55		3.85
1T4	3.85	98	50		3.85	*1.9	5.25
1S5			*0.35	*24.0	46.0	*0.1	132
3Q4	6.1	88	*1.2	90	7.6	88	9.0
50B5	1.2	6.6	33AC	83AC	90	98.0	1.2
35W4			83AC	117AC	117AC	108AC	129

## MODEL-- 525,552

## VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (\*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Take readings with the volume control set at minimum and the variable condenser closed.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
12SA7			89	89	*10			*1.6
12SK7				*1.6		89		89
12SQ7		*0.7		*1.6	-0.5	37.5		
50L6GT			110	89				6.2
35Z5GT				116		116		117

## CABINET AND DIAL PARTS

807000	Dial light	520080	Crystal
507217	Dial light socket	520200	Escutcheon
531059	Drive pulley	140052	Cabinet (Model 525)
280103	Drive shaft	140102	Cabinet (Model 552)
520500	Dial backplate	460470	Knob
525010	Dial pointer	430300	Knob, with indicator dot

† Specify part numbers when ordering.

\* Not supplied separately.

## POWER CONSUMPTION:

30 watts for the receiver.

20 watts for the phono motor.

The color coding of the i-f transformer leads is as follows:

Grid return—black  
Grid—greenPlate—blue  
B—red

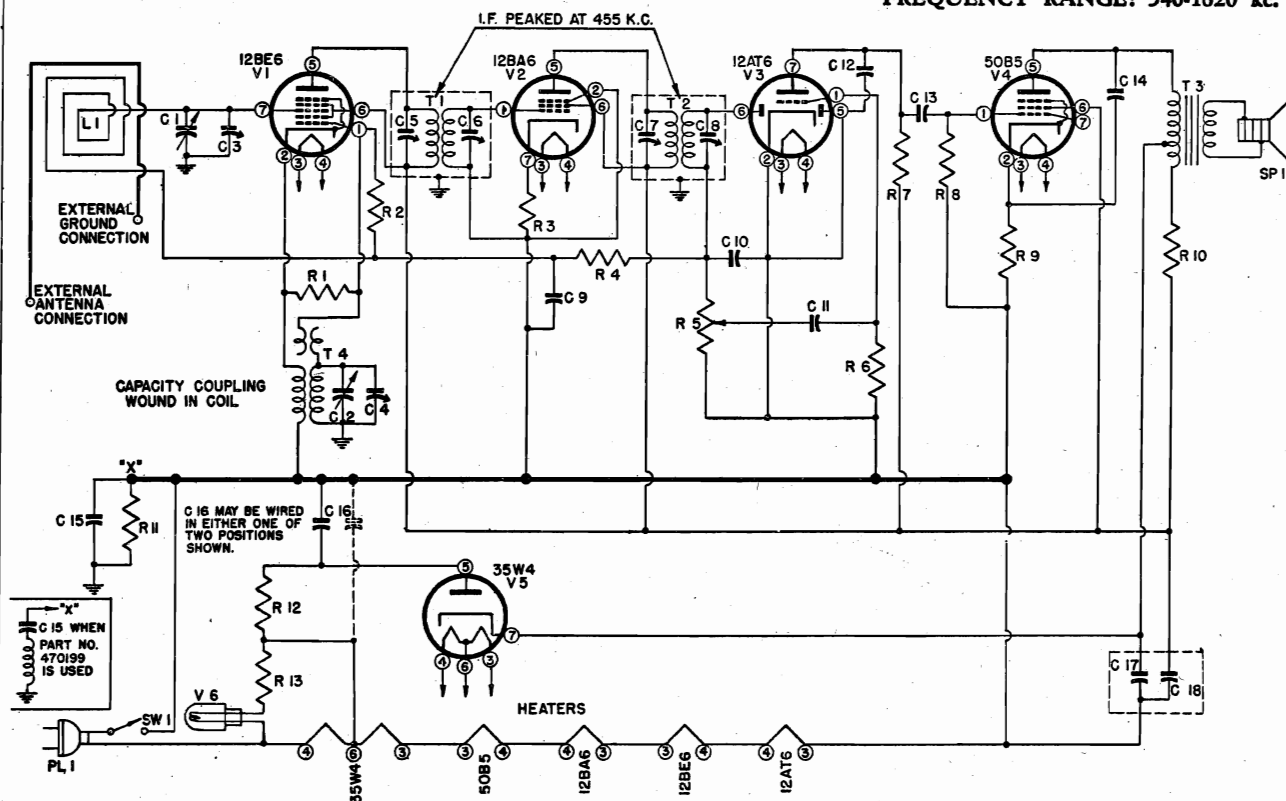


MODELS 507, 509, 518, 522, 535  
Chassis 120004, 120045

# EMERSON RADIO & PHONO. CORP.

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram for Chassis 120004 and 120045

## CHASSIS 120004 AND 120045

C1, C2	900160	Two-gang variable condenser	R1	310810	22,000 ohms, 1/4 watt resistor
*C3, C4		Trimms, part of variable condenser	R2, R6	397000	15 meg., 1/2 watt resistor
*C5, C6, C7, C8		Trimms, part of i-f transformers	R3	340310	180 ohms, 1/2 watt resistor
C9	920040	0.1 mfd., 200 volt condenser	R4	321290	2.2 meg., 1/4 watt resistor
C10	910000	0.00022 mfd. mica condenser	R5	390000	0.5 meg. volume control
C11	920010	0.002 mfd., 600 volt condenser	R7, R8	321130	470,000 ohms, 1/4 watt resistor
C12	920240	0.0005 mfd., 600 volt condenser	R9	340290	150 ohms, 1/2 watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R10	370490	1,000 ohms, 1 watt resistor
C15	920050	0.2 mfd., 200 volt condenser (Used when T1 and T2 are 720000 and 720100 respectively), or	R11	321050	220,000 ohms, 1/4 watt resistor
C15	479199	0.2 mfd., 200 volt condenser (Used when T1 and T2 are 720525 and 720529 respectively)	R12	340050	15 ohms, 1/2 watt resistor
C16	920030	0.05 mfd., 400 volt condenser	R13	340010	10 ohms, 1/2 watt resistor
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser, or	SP1	180000	P.M. speaker
C17, C18	925000	30-50 mfd., 150 volt dual electrolytic condenser	*SW1		Line switch on volume control
L1	700000	Loop antenna, or	T1	720000	First i-f transformer, or
L1	700200	Loop antenna	T1	720525	First i-f transformer, midget
*PL1		Power plug, part of line cord	T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
			T4	716010	Oscillator coil
				807000	Pilot light, Mazda No. 47
				507090	Pilot light socket
				583010	Line cord

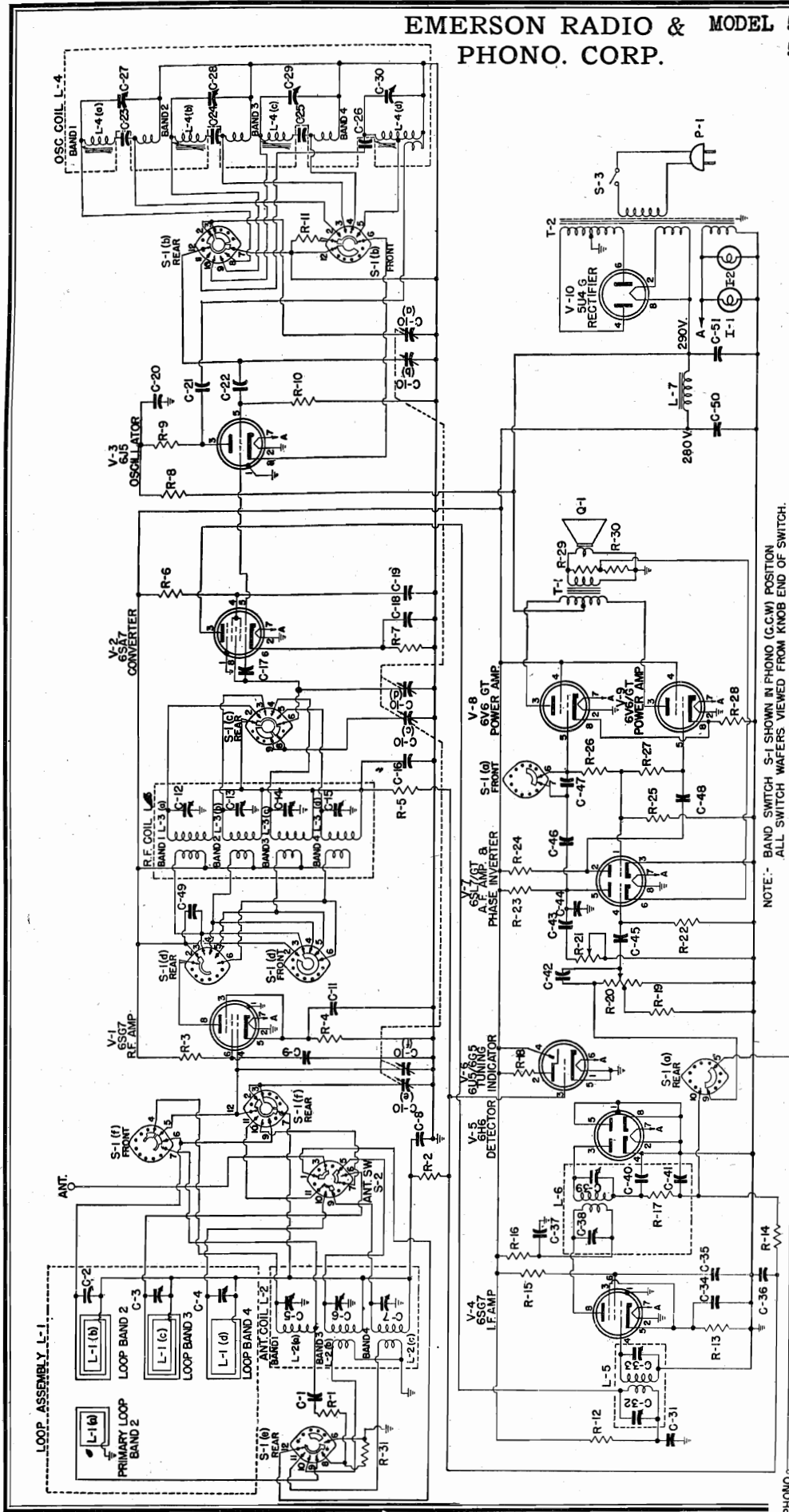
The color coding of the i-f transformer leads is as follows:

Grid—green  
Grid return—black

Plate—blue  
B+—red



# EMERSON RADIO & MODEL 524, Chassis 120011 PHONO. CORP. 524-2, Chassis 120022



## TYPE OF TUBES:

- 2—6SG7, pentode r-f amplifier and i-f amplifier
- 1—6SA7, pentagrid modulator
- 1—6J5, triode oscillator
- 1—6H6, diode detector, a.v.c
- 1—6SL7, dual triode audio amplifier and inverter
- 2—6V6GT, beam power push-pull output
- 1—5U4G, rectifier
- 1—6U5/6G5, tuning indicator

POWER SUPPLY: 50-60 cycle A.C.

VOLTAGE RATING:

- Model 524—105-125 volts
- Model 524-2—105-125 volts and 210-250 volts
- POWER CONSUMPTION: 100 watts

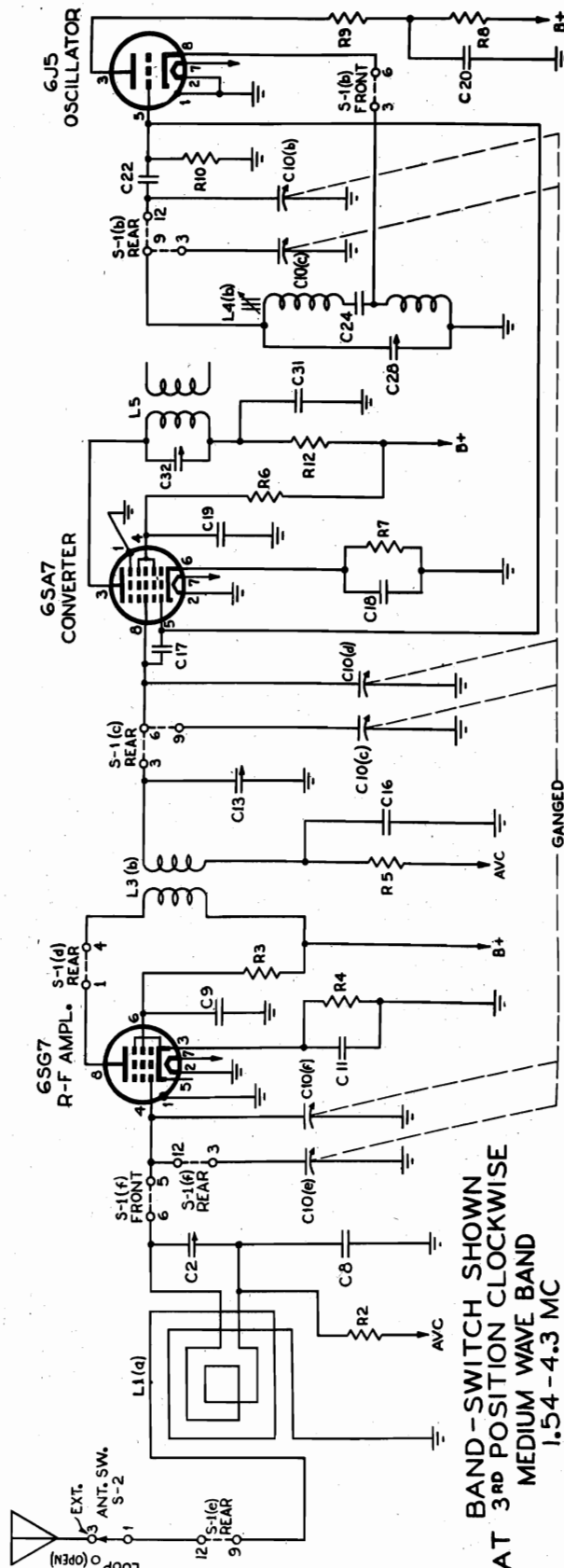
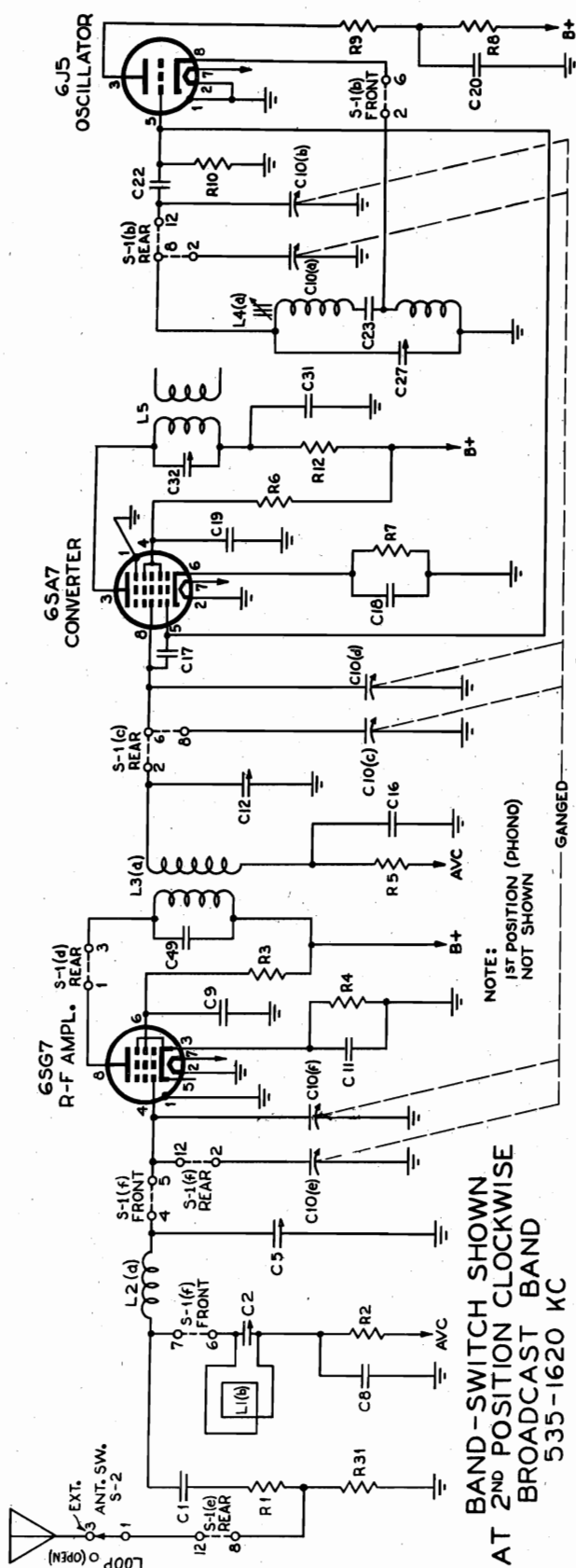
TYPE: Four band superheterodyne.

FREQUENCY RANGE:

- Broadcast—535-1620 Kilocycles (185-560 Meters)
- Medium Wave—1.54-4.3 Megacycles (69.8-195 Meters)
- Short Wave—4.15-10.4 Megacycles (28.9-72.3 Meters)
- Short Wave—10.1-22.7 Megacycles (13.2-29.7 Meters)

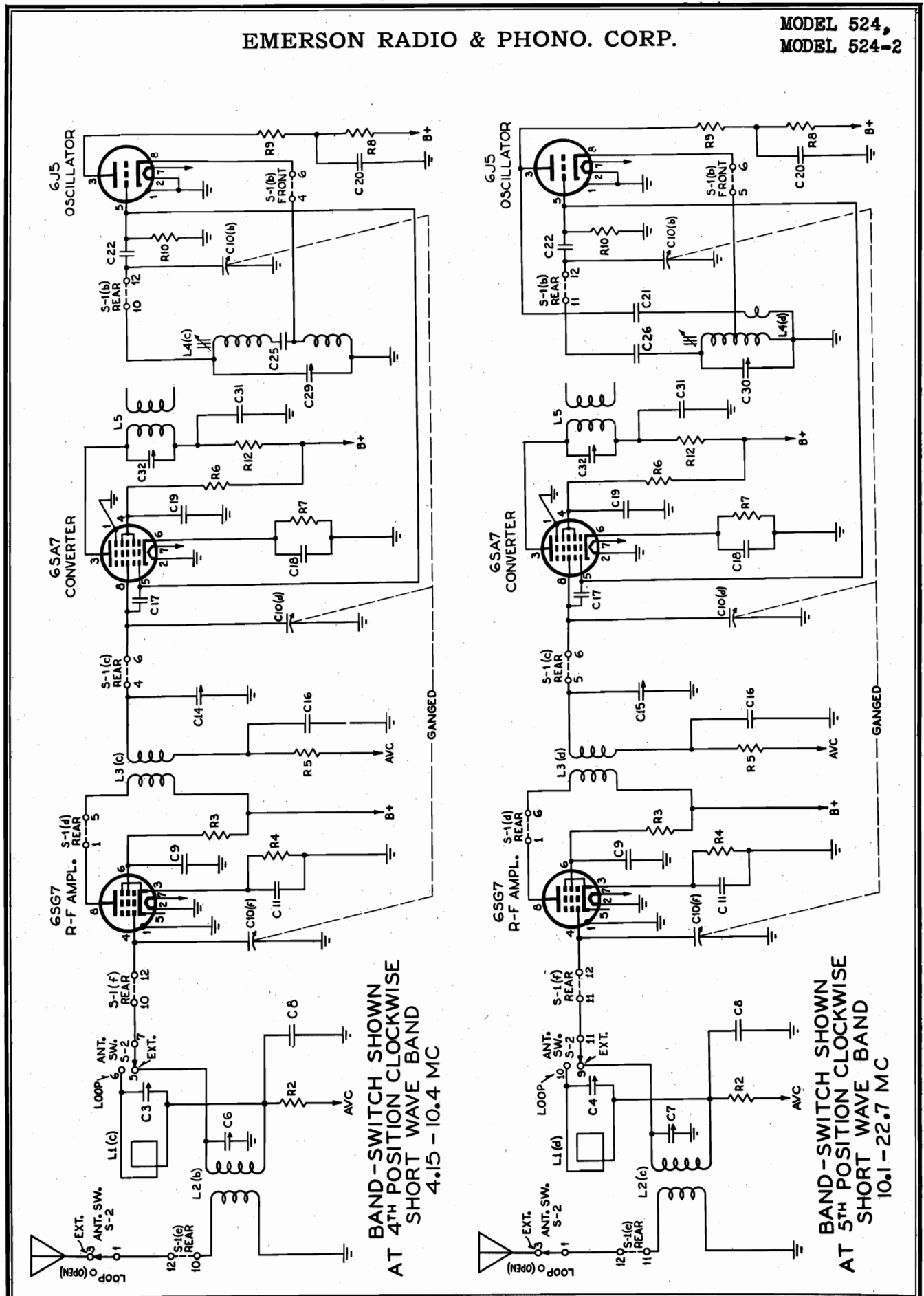
MODEL 524  
MODEL 524-2

EMERSON RADIO & PHONO. CORP.



EMERSON RADIO & PHONO. CORP.

MODEL 524,  
MODEL 524-2



MODEL 524  
MODEL 524-2

## EMERSON RADIO &amp; PHONO. CORP.

## ADJUSTMENTS

A signal generator or oscillator is required, containing the following radio frequencies, amplitude modulated:

455 kc for intermediate frequencies  
Band 1—600 kc, 1000 kc, 1500 kc  
Band 2—1600 kc, 2.5 mc, 4 mc  
Band 3—4.5 mc, 6 mc, 10 mc  
Band 4—11 mc, 13 mc, 22 mc

An output meter should be connected across the voice coil of the speaker (3.5 ohms).

Always use as weak a test signal as possible when aligning receiver.

## R-f Alignment

- For Band 1 (540-1620 kc): Set rear antenna and loop switch to antenna position. Apply strong 1500 kc signal through 200 mfd. dummy antenna to antenna binding post in cabinet back. Set pointer to 1500 kc on dial and adjust oscillator trimmer to maximum on output meter. Reduce signal to normal output in the output meter and adjust r-f trimmer and antenna trimmer to maximum on output meter. Set pointer to 600 kc. apply 600 kc signal and adjust iron core to maximum on output meter by "rocking" variable condenser slightly to "track" oscillator with antenna and r-f. With 1500 kc applied, reset pointer at 1500 kc, and readjust only the oscillator trimmer.

## Location of Coils and Trimmer Adjustments

The first i-f transformer is adjacent to the 6SG7 i-f tube, V-4. The trimmers are accessible through the top of the shield can.

The second i-f transformer is adjacent to the 6H6 tube. The trimmers are accessible through the top of the shield can.

The antenna transformer for all bands is located at the rear of the chassis behind the variable condenser. Trimmers for three bands are located on the top of the transformer for external antenna operation. For loop operation, the trimmers are located on the loop accessible from the back of the cabinet.

The r-f and amplifier transformer is located on the side of the chassis toward the rear. Adjustments for all four bands are located on the top of the shield can.

The oscillator transformer is located at the side of the chassis toward the front. There are two adjustments on this stage for each band. Four iron cores protrude from the top of the shield and four trimmer adjustments are located on the side of the shield.

- Bands 2, 3 and 4: Repeat same procedure as on Band 1 using following frequencies for alignment:

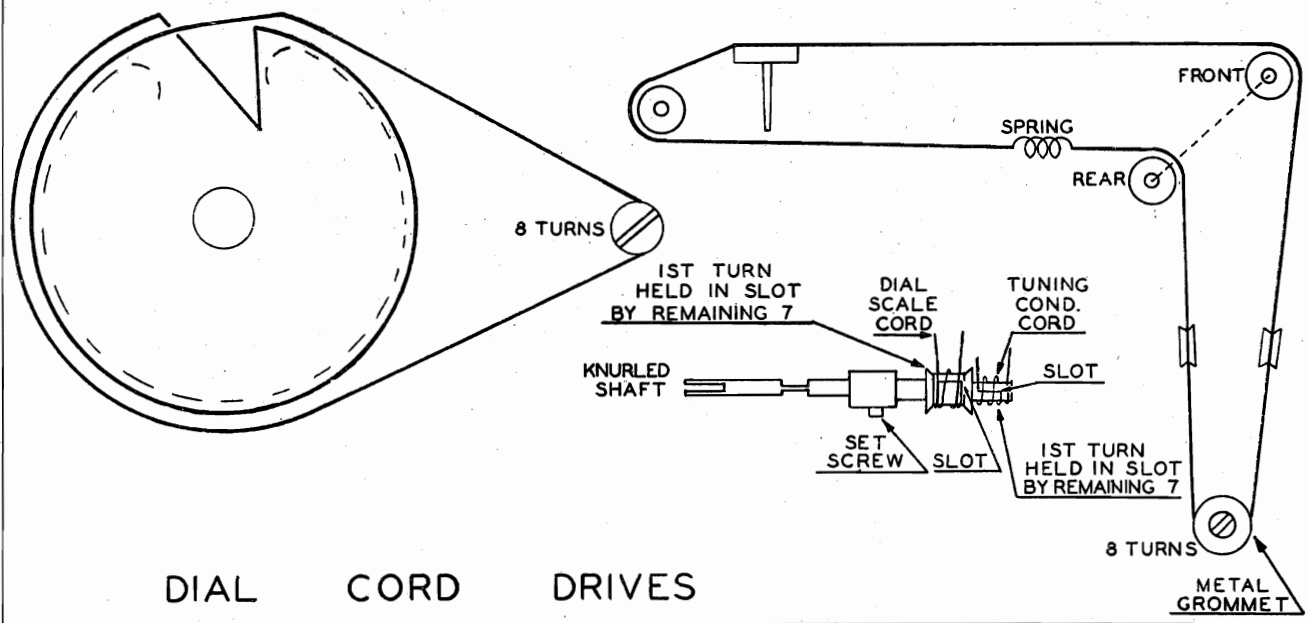
	High frequency	Low frequency
Band 2	4 mc	1.7 mc
Band 3	10 mc	5 mc
Band 4	20 mc	11 mc

- For loop circuit adjustments operate antenna-loop switch to loop position and adjust trimmers on loop at high-frequency alignment points of each band. Use a few turns of wire about six to eight inches in diameter, connected to oscillator and placed approximately 18 inches away from receiver loop as coupling device to radiate a signal into loop. It is not necessary to readjust r-f or oscillator for loop circuit adjustment since they do not change from antenna adjustment indicated above.

## I-f Alignment

- Set variable condenser to highest frequency and range switch to broadcast position.
- Apply 455 kc to converter stator terminal in center section of variable condenser.
- Adjust all four trimmers of the two i-f transformers to maximum on output meter.

- It should be noted that oscillator frequency on all bands is 455 kc (i-f frequency) above carrier frequency as indicated on dial scale. Stator of each gang of variable condenser is composed of two separate sections. The two sections are connected in parallel on Bands 1 and 2. Bands 3 and 4 use only largest section.



# EMERSON RADIO & PHONO. CORP. REPLACEMENT PARTS LIST

MODEL 524  
MODEL 524-2

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1	910180	0.001 mfd., 500 volt mica condenser	L1	700110	Loop assembly
*C2, C3, C4		Trimmers, part of loop assembly	L2	710020	Antenna coil
*C5, C6, C7		Trimmers, part of antenna coil	L3	713010	R-F coil
C8, C16	920060	0.05 mfd., 200 volt condenser	L4	716110	Oscillator coil
C9, C19, C35, C43, C46, C48	920210	0.01 mfd., 600 volt condenser	L5	720330	First i-f transformer
C10a, b, c, d, e, f	900200	Three-gang variable condenser	L6	720340	Second i-f transformer
C11, C18, C34	920040	0.1 mfd., 200 volt condenser	L7	737030	Filter choke
*C12, C13, C14, C15		Trimmers, part of r-f coil	P1	583180	Line cord and plug
C17	915040	0.68 mmfd., 500 volt ceramic condenser	Q1	180024	P.M. speaker
C20	925030	16 mfd., 300 volt electrolytic condenser	R1	310430	560 ohms, ¼ watt resistor
C21	910170	0.003 mfd., 500 volt mica condenser	R2, R5, R25	321050	0.22 meg., ¼ watt resistor
C22, C42, C44, C49	910100	0.0001 mfd., 500 volt mica condenser	R3, R15	370910	56,000 ohms, 1 watt resistor
C23	915030	0.00056 mfd. silver mica condenser	R4, R13	320290	150 ohms, ¼ watt resistor
C24	915020	0.0015 mfd. silver mica condenser	R6	397080	22,000 ohms, 2 watt resistor
C25	915010	0.003 mfd. silver mica condenser	R7	310350	270 ohms, ¼ watt resistor
C26	915000	0.0068 mfd. silver mica condenser	R8, R9	340650	4,700 ohms, ½ watt resistor
*C27, C28, C29, C30		Trimmers, part of oscillator coil	R10	310810	22,000 ohms, ¼ watt resistor
C31, C37	920270	0.05 mfd., 600 volt condenser	R11	320730	10,000 ohms, ¼ watt resistor
*C32, C33		Trimmers, part of first i-f transformer	R12, R31	320650	4,700 ohms, ¼ watt resistor
C36	920090	0.01 mfd., 400 volt condenser	R14	321210	1 meg., ¼ watt resistor
*C38, C39		Trimmers, part of second i-f transformer	R16	310650	4,700 ohms, ¼ watt resistor
*C40, C41		50 mmfd. condenser, part of second i-f transformer	*R17		4,700 ohms, ¼ watt resistor, part of second i-f transformer
C45	920230	0.005 mfd., 600 volt condenser	R19	310830	27,000 ohms, ¼ watt resistor
C47	920240	0.0005 mfd., 600 volt condenser	R20	390070	0.5 meg., ½ watt volume control
C50	925010	40 mfd., 400 volt electrolytic condenser	R21	390360	0.5 meg., ½ watt volume control, or
C51	925220	40 mfd., 400 volt electrolytic condenser	R21	390080	0.5 meg., ½ watt volume control
I1, I2	807020	Pilot light, Mazda No. 44	R22	321450	10 meg., ¼ watt resistor
			R23, R24	351050	0.22 ohms, ½ watt resistor
			R26, R27	311050	0.22 ohms, ¼ watt resistor
			R28	394140	180 ohms, 2 watt wire-wound resistor
			R29	320410	470 ohms, ¼ watt resistor
			R30	310070	18 ohms, ¼ watt resistor
			S1	510280	7-wafer, 5-position band switch
			S2	510290	3-pole double throw antenna switch
			*S3		Line switch, part of volume control R20
			T1	734160	Output transformer
			T2	730000	Power transformer (Chassis 120011)
			T2	730010	Power transformer (Chassis 120022)

## CABINET AND DIAL PARTS

140004	Cabinet	280043	Drive shaft pulley
620030	Knob	411361	Dial bracket
620012	Knob, with indicator dot	520006	Dial glass
587040	Drive cord spring	470035	Dial bracket assembly (left)
525110	Pointer	470032	Dial bracket assembly (right)
280023	Drive shaft	507219	Dial light assembly
280033	Clutch shaft		

\* Not supplied separately.

† Specify part numbers when ordering. When in doubt of chassis or model also include complete serial number.

## VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings. Readings indicated by an asterisk (\*) are a.c. Line voltage is 117.5 volts, 60 cycles a.c. Set volume control at minimum and variable condenser to 1000 kc.

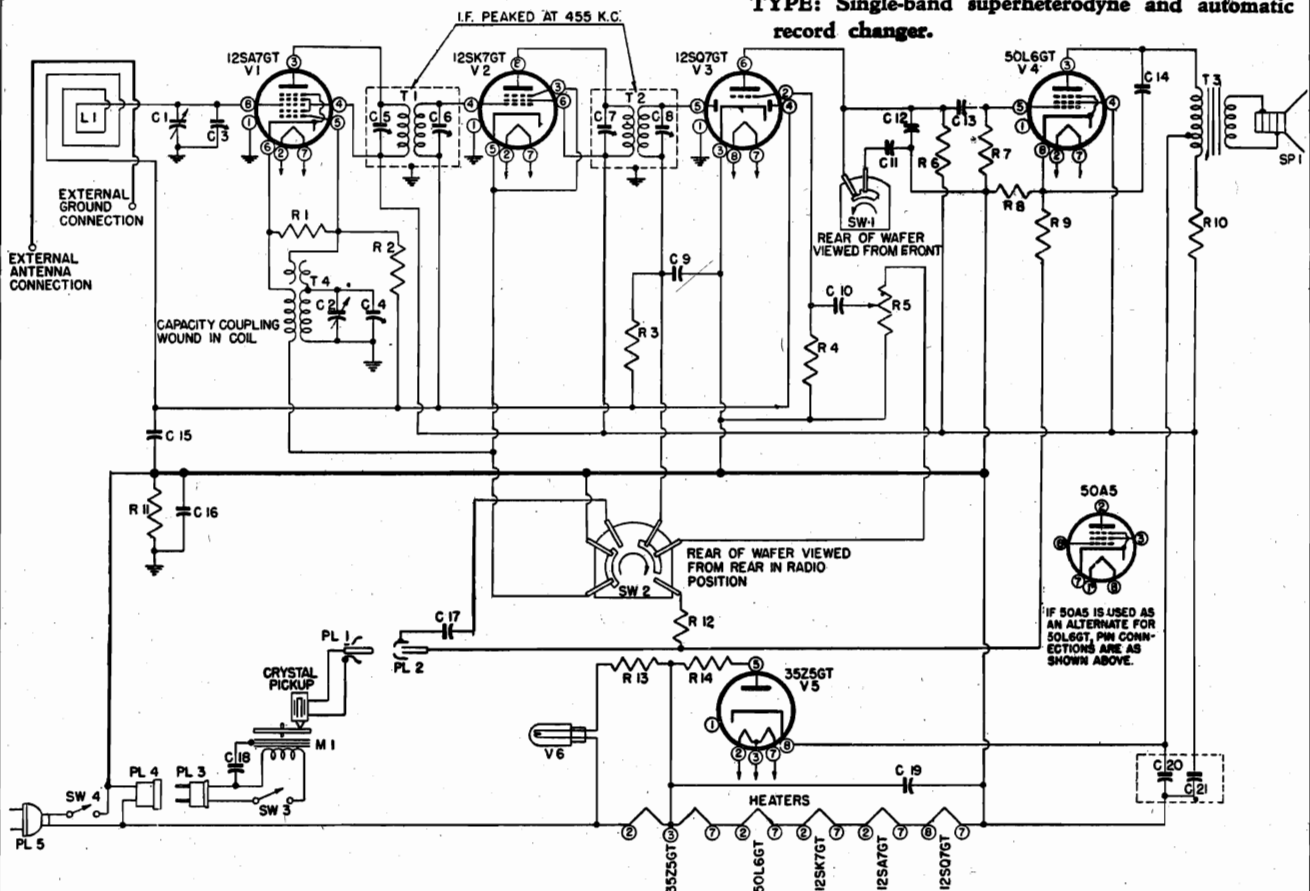
TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
6SG7 (V1)			1.6		1.6	130	*6.3	280
6SA7			275	90	—0.02	2.4	*6.3	
6J5			215		—0.02		*6.3	
6SG7 (V4)			1.5		1.5	120	*6.3	280
6H6			—0.04				*6.3	
6SL7		70		—0.04	60			*6.3
6V6 (V8, V4)			285	280			*6.3	17
5U4G		290		*285		*285		290

Voltage readings for 6U5/6G5 measured at lead terminals are as follows: black—0; green—0.04; red—280; brown—0; black—6.3.

MODELS 525,552  
Chassis 120037

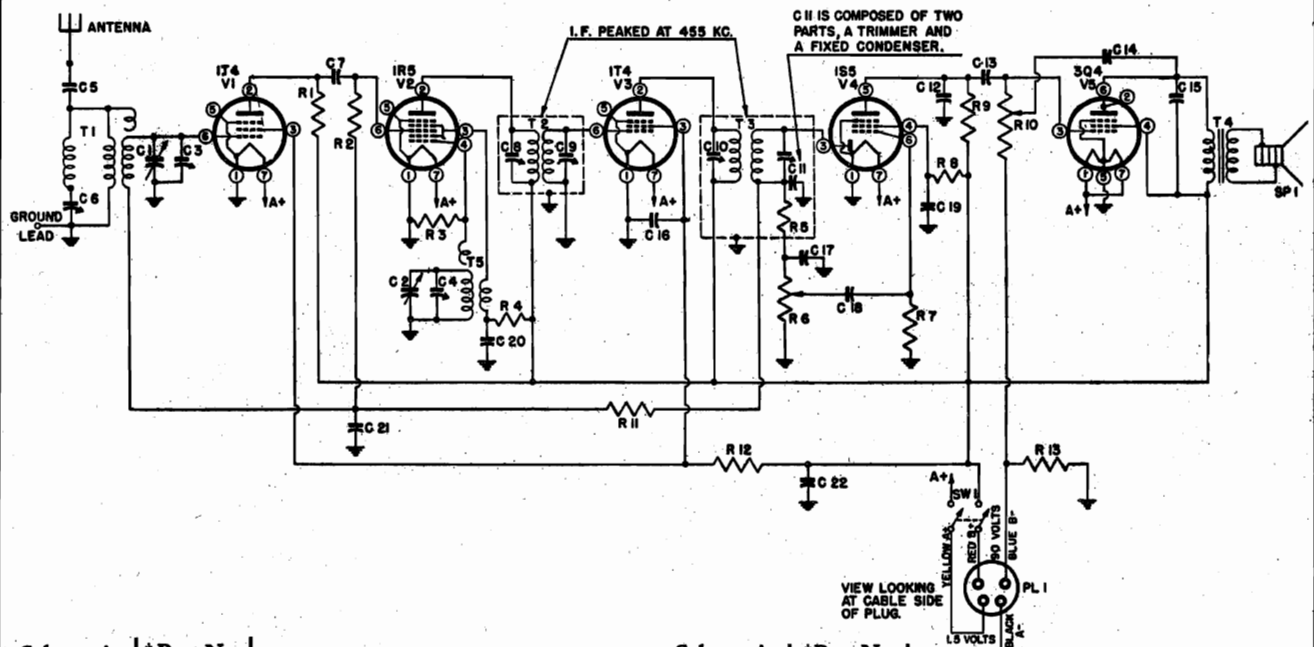
## EMERSON RADIO &amp; PHONOGRAPH CORP.

TYPE: Single-band superheterodyne and automatic  
record changer.



Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900290	Two-gang variable condenser	PL2	508010	Pickup socket
*C3, C4		Trimmmers, part of variable condenser	*PL3		Polarized male plug, part of record changer
*C5, C6, C7, C8 }		Trimmmers, part of i-f transformers	PL4	585070	Female plug and cable
C9	910000	0.00022 mfd. mica condenser	*PL5		Power plug, part of line cord
C10	920010	0.002 mfd., 600 volt condenser	R1	310810	22,000 ohms, ¼ watt resistor
C11	920515	0.002 mfd., 400 volt condenser	R2, R4	397000	15 meg., ½ watt resistor
C12	920240	0.0005 mfd., 600 volt condenser	R3	321330	3.3 meg., ¼ watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R5	390010	0.5 meg. volume control
C15	920040	0.1 mfd., 200 volt condenser	R6, R7	321130	470,000 ohms, ¼ watt resistor
C16	920050	0.2 mfd., 200 volt condenser (used only when T1 and T2 are 720000 and 720100 respectively)	R8	340290	150 ohms, ½ watt resistor
C17, C19	920030	0.05 mfd., 400 volt condenser	R9	321290	2.2 meg., ¼ watt resistor
C18	922090	0.05 mfd., 400 volt condenser (used up to serial No. 8,550,551), or	R10	370490	1,000 ohms, 1 watt resistor
C18	922101	0.05 mfd., 400 volt condenser (used after serial No. 8,550,551)	R11	321050	220,000 ohms, ¼ watt resistor
C20, C21	925267	30-50 mfd., 150 volt dual electrolytic condenser (used up to serial No. 8,550,551), or	R12	321210	1 meg., ¼ watt resistor
C20, C21	925110	30-50 mfd., 150 volt dual electrolytic condenser (used after serial No. 8,550,551)	R13	340010	10 ohms, ½ watt resistor
L1	700000	Loop antenna, or	R14	340050	15 ohms, ½ watt resistor
L1	700200	Loop antenna, or	SP1	180000	P.M. speaker
L1	700210	Loop antenna	SW1	510130	Tone control switch
M1	819019	Automatic record changer	SW2	510390	Phono-radio switch
PL1	505040	Connector plug	*SW3		Motor switch, part of record changer
			*SW4		Line switch on volume control
			T1	720000	First i-f transformer, or
			T1	720525	First i-f transformer
			T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer
			T3	734200	Output transformer
			T4	716010	Oscillator coil

# EMERSON RADIO & PHONO. CORP. **MODELS 531, 532, 533** Chassis 120040



Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900070	Two-gang variable condenser	R2	321130	470,000 ohms, ¼ watt resistor
*C3, C4		Trimmers, part of variable condenser	R3	320970	100,000 ohms, ¼ watt resistor
C5, C15	920170	0.001 mfd., 600 volt condenser	*R5		47,000 ohms, ¼ watt resistor, part of second i-f transformer
*C6		Trimmer, part of antenna transformer	R6	390180	0.5 meg. volume control
C7, C12	910000	0.00022 mfd. mica condenser	R7	321450	10 meg., ¼ watt resistor
*C8, C9, C10		Trimmers, part of i-f transformer	R8, R11	321330	3.3 meg., ¼ watt resistor
*C11		Trimmer and fixed condenser, part of second i-f transformer	R9	321210	1 meg., ¼ watt resistor
C13, C16, C19, C20	920100	0.02 mfd., 200 volt condenser	R10	390280	0.4 meg. tone control
C14	910250	0.00005 mfd. mica condenser	R12	310770	15,000 ohms, ¼ watt resistor
C17	910010	0.00011 mfd. mica condenser	R13	310410	470 ohms, ¼ watt resistor
C18	920515	0.002 mfd., 400 volt condenser	SP1	180008	P.M. speaker
C21	920040	0.1 mfd., 200 volt condenser	SW1	510401	Battery switch, or
C22	925003	16 mfd., 150 volt electrolytic condenser	SW1	510001	Battery switch
PL1	585311	Battery plug and cable assembly, or	T1	710001	Antenna transformer and trap
PL1	585312	Battery plug and cable assembly	T2	720530	First i-f transformer
R1, R4	310730	10,000 ohms, ¼ watt resistor	T3	720531	Second i-f transformer
			T4	734203	Output transformer
			T5	716001	Oscillator coil

\* Not supplied separately.

† Specify part numbers when ordering.

Battery replacement — Replace battery pack with one of the following types: Eveready No. 748 or No. 758, Rayovac No. AB82, Burgess No. 17GD60, General No. 60D10L, or Bright Star No. 6105.

## MODELS 531, 532, 533

## EMERSON RADIO &amp; PHONOGRAPH CORP.

The following voltage readings are d-c measurements from tube socket pin to chassis. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (\*), which should be taken with a d-c vacuum-tube voltmeter. All voltages are positive unless otherwise indicated.

TUBE	PIN NUMBER						
	1	2	3	4	5	6	7
1T4(V1)		55	52	82		*—3	1.5
1R5		82	57	*—11.0		*—4	1.5
1T4(V3)		82	52			*—4	1.5
1S5		—6.2	*—45	*18	10	*—3	1.5
3Q4		80.0	*—6.2	82	1.5	80	

An oscillator with frequencies of 455, 600, and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turn down the output of the test oscillator as the alignment of the receiver progresses.

### I-f and Trap Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 6) of the 1R5 tube through a 0.1 mfd. condenser.
3. Adjust the four i-f trimmer screws (C8, C9, C10, C11) for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a 0.002 mfd. condenser may be used as a substitute) and adjust the wave-trap trimmer for minimum response.

The color coding of the i-f transformer leads is as follows:

Grid—green                      Plate—blue  
Grid return—black              B+—red

### Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C4) is on the front section of the variable condenser.

The trimmer for the antenna (C3) is on the rear section of the variable condenser.

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted in back of the speaker. The second i-f transformer (T3) is mounted next to the output transformer.

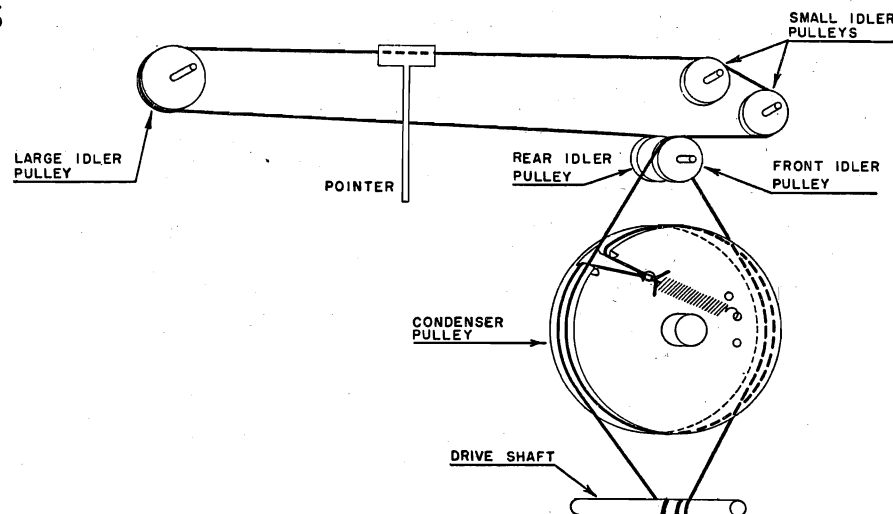
The 455 kc wave-trap is part of the antenna coil assembly, which is located on the underside of the chassis.

### R-f Alignment

Feed 1620 kc through a standard broadcast dummy antenna to the antenna lead (A 0.0002 mfd. condenser may be used as a substitute). Adjust oscillator trimmer (C4). Move pointer to 1425 kc and feed 1425 kc signal. Adjust antenna trimmer (3C) for maximum response.

### CABINET AND DIAL PARTS

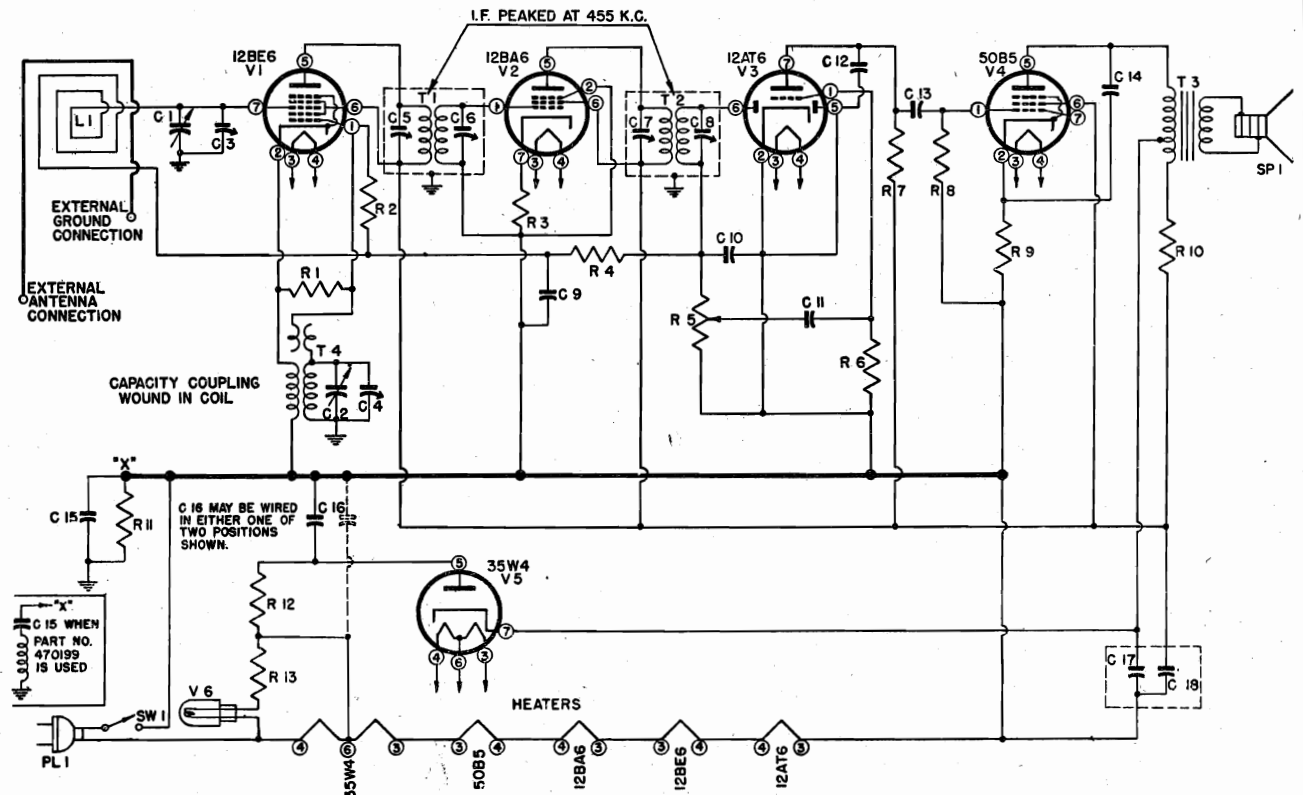
560190	Rear cover (Model 533)
280313	Drive shaft
520360	Dial backplate
520450	Dial Glass
525012	Dial pointer
140062	Cabinet (Model 531)
140029	Cabinet (Model 532)
140051	Cabinet (Model 533)
460140	Knob (Model 531)
460470	Knob (Model 532, 533)
560200	Rear cover (Model 532)



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.



# EMERSON RADIO & PHONOGRAPH CORP. MODELS 543,544 Chassis 120046



Schematic Circuit Diagram Chassis 120046

## CHASSIS 120046

C1, C2	900013	Two-gang variable condenser	R2, R6	397000	15 meg., ½ watt resistor
*C3, C4		Trimners, part of variable condenser	R3	340310	180 ohms, ½ watt resistor
*C5, C6, C7, C8		Trimners, part of i-f transformers	R4	321290	2.2 meg., ¼ watt resistor
C9	920040	0.1 mfd., 200 volt condenser	R5	390015	0.5 meg. volume control
C10	910000	0.00022 mfd. mica condenser	R7, R8	321130	470,000 ohms, ¼ watt resistor
C11	920010	0.002 mfd., 600 volt condenser	R9	340290	150 ohms, ½ watt resistor
C12	920240	0.0005 mfd., 600 volt condenser	R10	370490	1,000 ohms, 1 watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R11	321050	220,000 ohms, ¼ watt resistor
C15	920050	0.2 mfd., 200 volt condenser (used when T1 and T2 are 720000, and 720100 respectively), or	R12	340050	15 ohms, ½ watt resistor
C15	470199	0.2 mfd., 200 volt assembly (used when T1 and T2 are 720525 and 720529 respectively)	R13	340010	10 ohms, ½ watt resistor
C16	920030	0.05 mfd., 400 volt condenser	SP1	180000	P.M. speaker
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser	*SW1		Line switch on volume control
L1	700000	Loop antenna	T1	720000	First i-f transformer, or
*PL1		Power plug, part of line cord	T1	720525	First i-f transformer, midget
R1	310810	22,000 ohms, ¼ watt resistor	T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
			T4	716010	Oscillator coil
				583010	Pilot light
				807000	Line cord
				507090	Pilot light socket

## CABINET AND DIAL PARTS

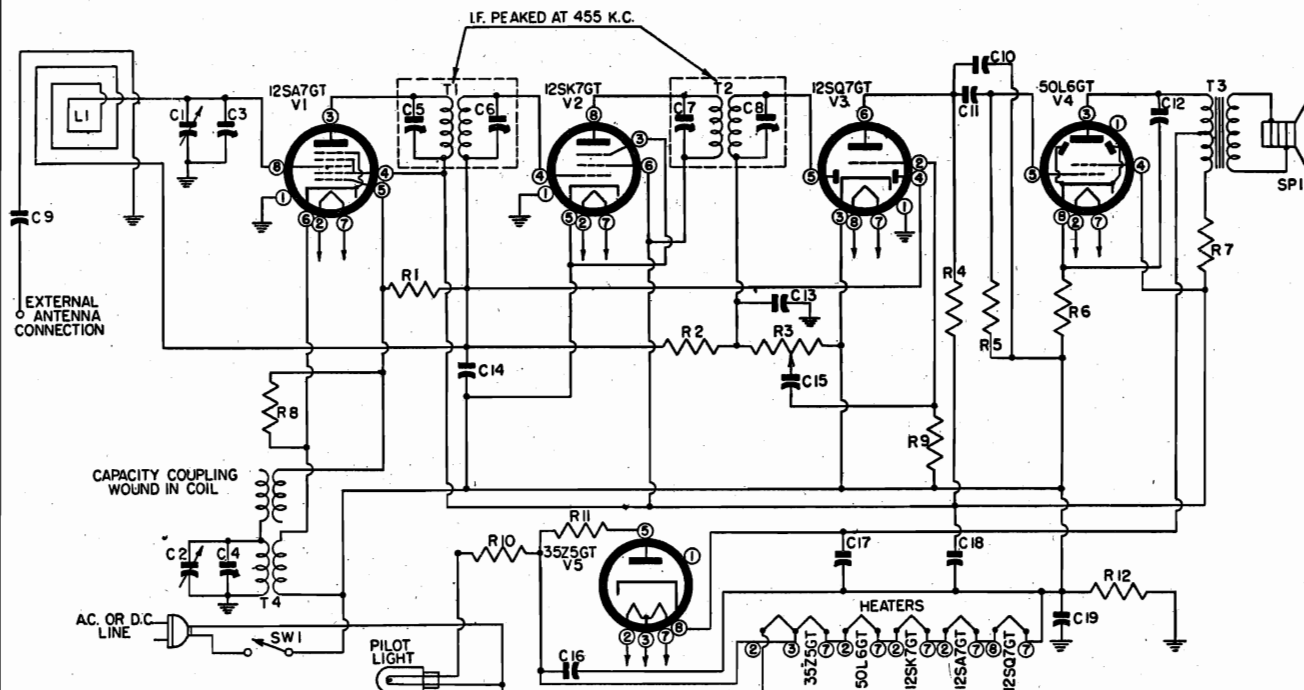
280024	Drive shaft	140082B	Cabinet, black
520033	Dial face	410090	Metal grille
525015	Dial pointer	520034	Dial crystal
140080B	Cabinet, ivory	460470	Knob

MODELS 543,544  
Chassis 120052

## EMERSON RADIO &amp; PHONOGRAPH CORP.

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram Chassis 120052

## CHASSIS 120052

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900160	Two-gang variable condenser	R3	390015	0.5 meg. volume control
*C3, C4		Trimmer, part of variable condenser	R4, R5	321130	470,000 ohms, ¼ watt resistor
*C5, C6, {		Trimmmers, part of i-f transformers	R6	340290	150 ohms, ½ watt resistor
C7, C8 }			R7	370490	1000 ohms, 1 watt resistor
C9, C15	920010	0.002 mfd., 600 volt condenser	R8	310810	22,000 ohms, ¼ watt resistor
C10	920240	0.0005 mfd., 600 volt condenser	R10	340010	10 ohms, ½ watt resistor
C11, C12	920020	0.02 mfd., 400 volt condenser	R11	397040	15 ohms, 1 watt wire-wound resistor
C13	910000	0.00022 mfd. mica condenser	R12	321050	220,000 ohms, ¼ watt resistor
C14	920040	0.1 mfd., 200 volt condenser	SP1	180000	P.M. speaker
C16	920030	0.05 mfd., 400 volt condenser	*SW1		Line switch on volume control
C17, C18	925000	30-50 mfd., 150 volt dual electrolytic condenser	T1	720000	First i-f transformer
C19	920050	0.02 mfd., 200 volt condenser	T2	720100	Second i-f transformer
L1	700000	Loop antenna, or	T3	734000	Output transformer
L1	700200	Loop antenna	T4	716010	Oscillator coil
R1, R9	397000	15 meg., ¼ watt resistor		583010	Line cord
R2	321330	3.3 meg., ¼ watt resistor		807000	Pilot light
				507090	Pilot light socket

† Specify part numbers when ordering.

\* Not supplied separately.

The color coding of the i-f transformer leads is as follows:

Grid—green  
Grid return—black

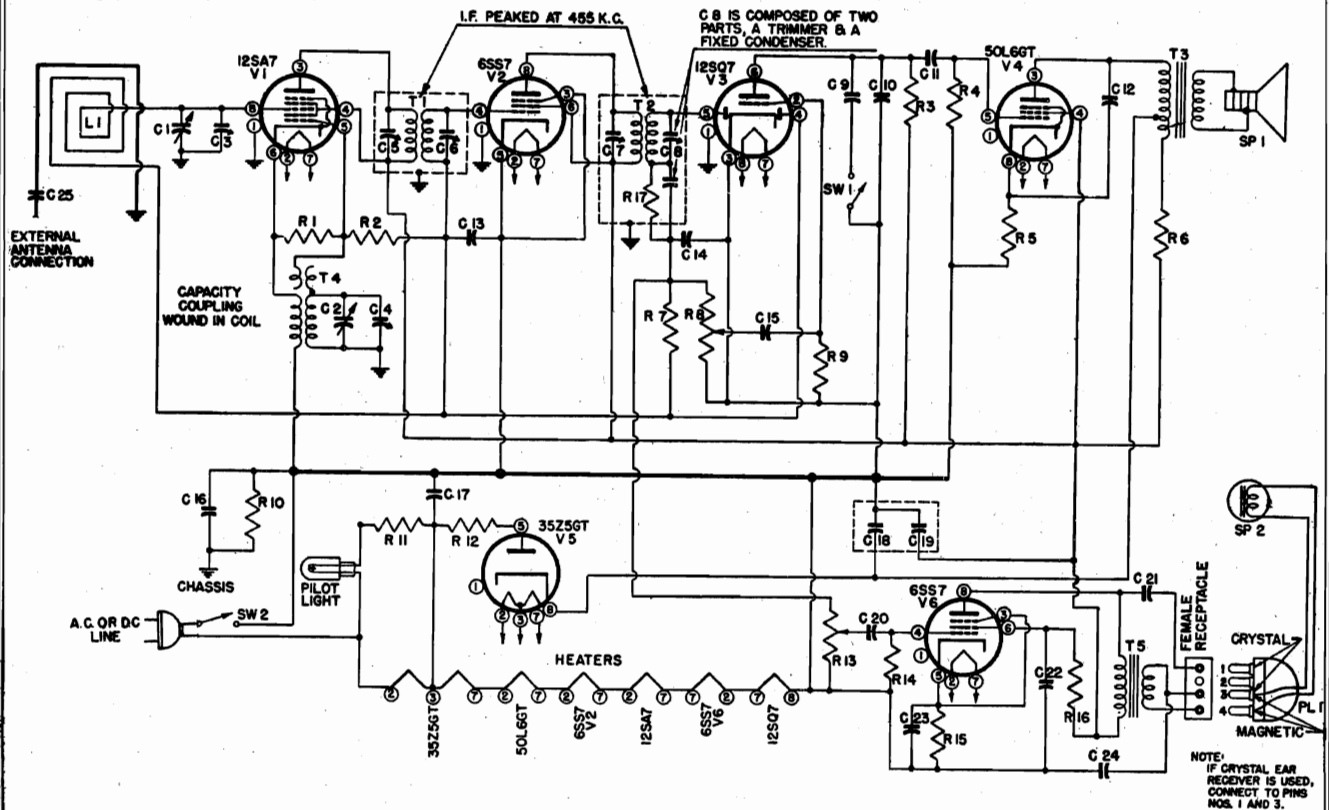
Plate—blue  
B+—red

## EMERSON RADIO &amp; PHONOGRAPH CORP.

MODELS 1002, 1003  
Chassis 129003

TYPE: Single-band superheterodyne with hearing aid receiver.

FREQUENCY RANGE: 540-1620 kc.



Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900070	Two-gang variable condenser	R13	390180	0.5 meg. volume control (sets below 8,767,450), or
*C3, C4		Trimmers, part of variable condenser	R13	390014	2 meg. volume control (sets 8,767,450 and higher)
*C5, C6, C7, C8		Trimmers, part of i-f transformers	R15	340410	470 ohms, ½ watt resistor
C9, C15, C20, C25	920010	0.002 mfd., 600 volt condenser	R16	351050	220,000 ohms, ½ watt resistor (sets below 8,767,450), or
C10	920240	0.0005 mfd., 600 volt condenser	R16	340970	100,000 ohms, ½ watt resistor (sets 8,767,450 and higher)
C11, C12, C21	920020	0.02 mfd., 400 volt condenser	SP1	180008	P.M. speaker
C13	920040	0.1 mfd., 200 volt condenser	SP2	829001	Telex ear receiver (name imprinted), or
C14	910010	0.00011 mfd. mica condenser	SP2	829002	American Earphone ear receiver (no imprint)
C16	920050	0.2 mfd., 200 volt condenser	SW1	510120	Tone control switch
C17, C24	920030	0.05 mfd., 400 volt condenser	*SW2		Line switch on volume control
C18, C19	925011	50-50 mfd., 150 volt dual electrolytic condenser	T1	720380	First i-f transformer
C22	920060	0.05 mfd., 200 volt condenser	T2	720390	Second i-f transformer
C23	925180	10 mfd., 25 volt electrolytic condenser	T3	734080	Output transformer (used with speaker)
L1	700000	Loop antenna	T4	716070	Oscillator coil (sets below 8,767,450), or
R1	340810	22,000 ohms, ½ watt resistor	T4	716005	Oscillator coil (sets 8,767,450 and higher)
R2, R9	397000	15 meg., ½ watt resistor	T5	734001	Output transformer (used with ear receiver)
R3, R4	351130	470,000 ohms, ½ watt resistor		807000	Pilot light
R5	340290	150 ohms, ½ watt resistor		507215	Pilot light socket
R6	370490	1000 ohms, 1 watt resistor		583150	Line cord
R7, R14	351330	3.3 meg., ½ watt resistor			
R8	390190	0.5 meg. volume control			
R10	351050	220,000 ohms, ½ watt resistor			
R11	340010	10 ohms, ½ watt resistor			
R12	340050	15 ohms, ½ watt resistor			

## MODELS 1002, 1003

## EMERSON RADIO &amp; PHONOGRAPH CORP.

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—

**R-f Alignment**

1. Connect the oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser (C3, C4) for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (\*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

	PIN NUMBER							
TUBE	1	2	3	4	5	6	7	8
12SA7			89	89	*1.0			*1.6
6SS7 (V2)				*1.6		89		89
12SQ7		*0.7		*1.6	*0.5	*52.0		
50L6GT			110	89				6.2
35Z5GT				116				117
6SS7 (V6)			1.4		1.4	*40.0		89

**Location of Coils and Trimmer Adjustments**

The first i-f transformer (T1) is mounted on top of the chassis deck at the rear and to the right of the variable condenser. The trimmers (C5, C6) are accessible through holes in the top of the can.

The second i-f transformer (T2) is mounted on top of the chassis to the right of the speaker. The trimmers (C7, C8) are accessible through holes in the top of the can.

The trimmer for the antenna (C3) and the trimmer for the oscillator coil (C4) are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil (T4) is located underneath the chassis. The loop antenna acts as the antenna coil.

**I-f Alignment**

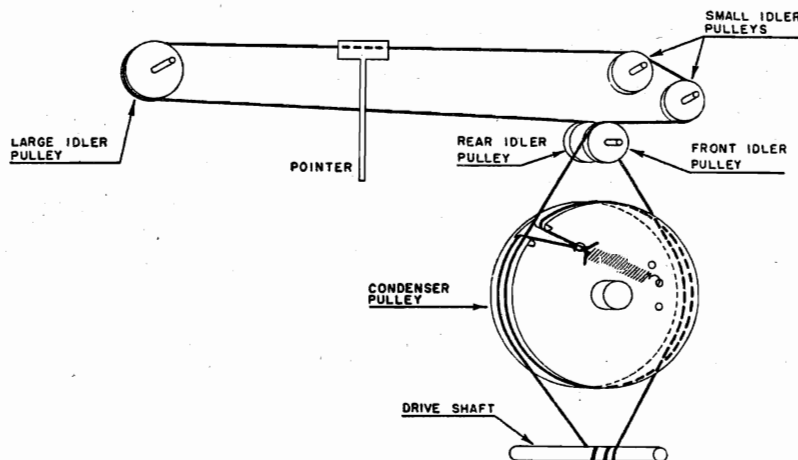
1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) and adjust the four i-f trimmers (C5, C6, C7, C8) for maximum response.

The color coding of the i-f transformer leads is as follows:

Grid—green                      Plate—blue  
Grid return—black              B+—red

**CABINET, DIAL AND ACCESSORY PARTS**

520480	Dial backplate
280313	Drive shaft
520450	Dial glass
525012	Pointer
140029	Cabinet (Model 1002)
560101	Cabinet back (Model 1002)
460470	Knob (Model 1002)
140054	Cabinet (Model 1003)
460140	Knob (Model 1003)
470222	Plug and cable with ear receiver, complete
585315	Plug and cable (for ear receiver 829001)
585122	Plug and cable (for ear receiver 829002)
508115	Socket for ear receiver plug
460005	Ear mold, or
460006	Ear mold
505057	Plug, less cover and screw
505058	Plug cover
204116	Machine screw
470220	Under-pillow speaker, with plug
829003	Under-pillow speaker, less plug



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.



SCREW

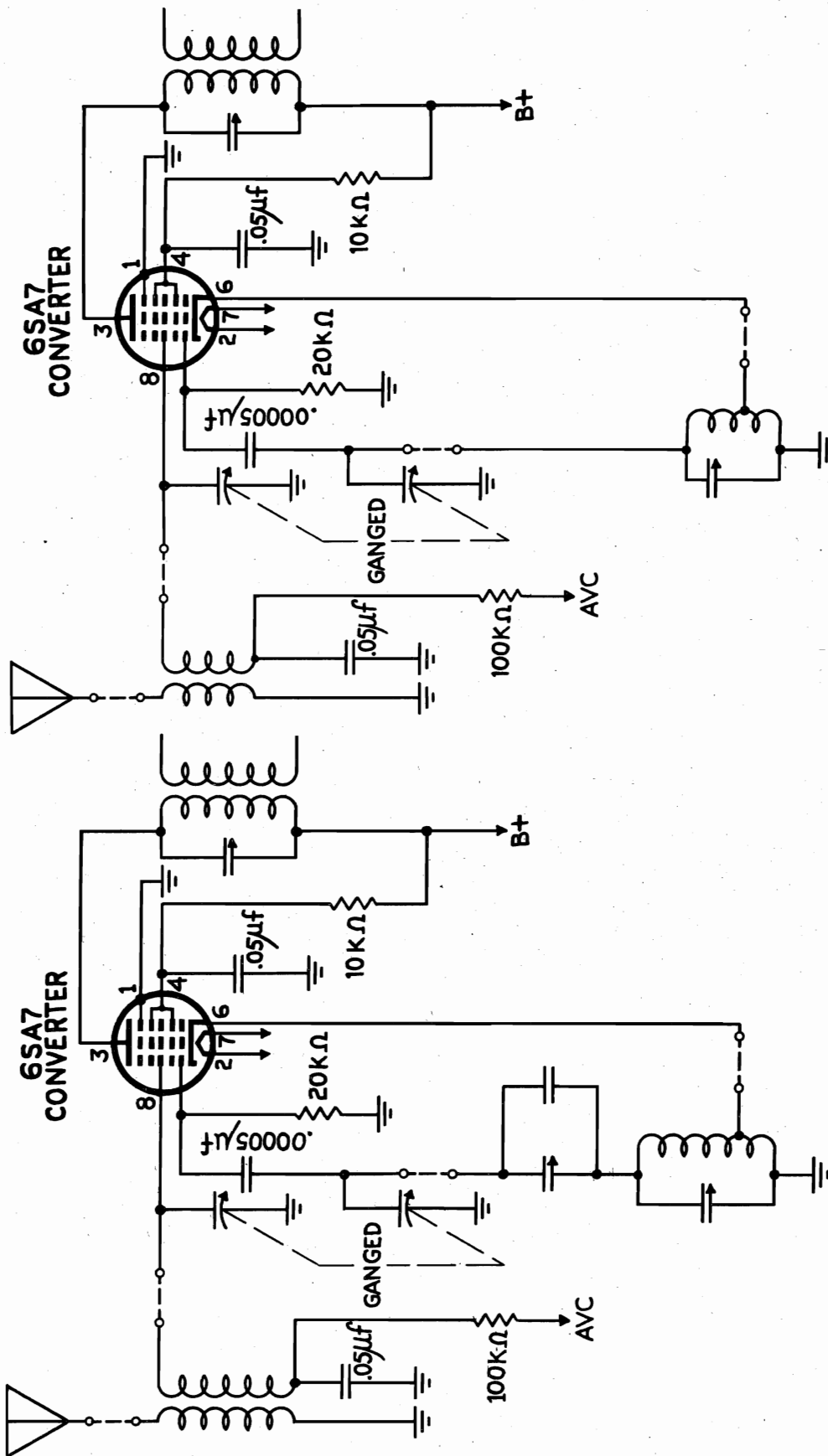
## FLOOR MODEL

# "clarified schematics"

PAGE 16-2 EMOR

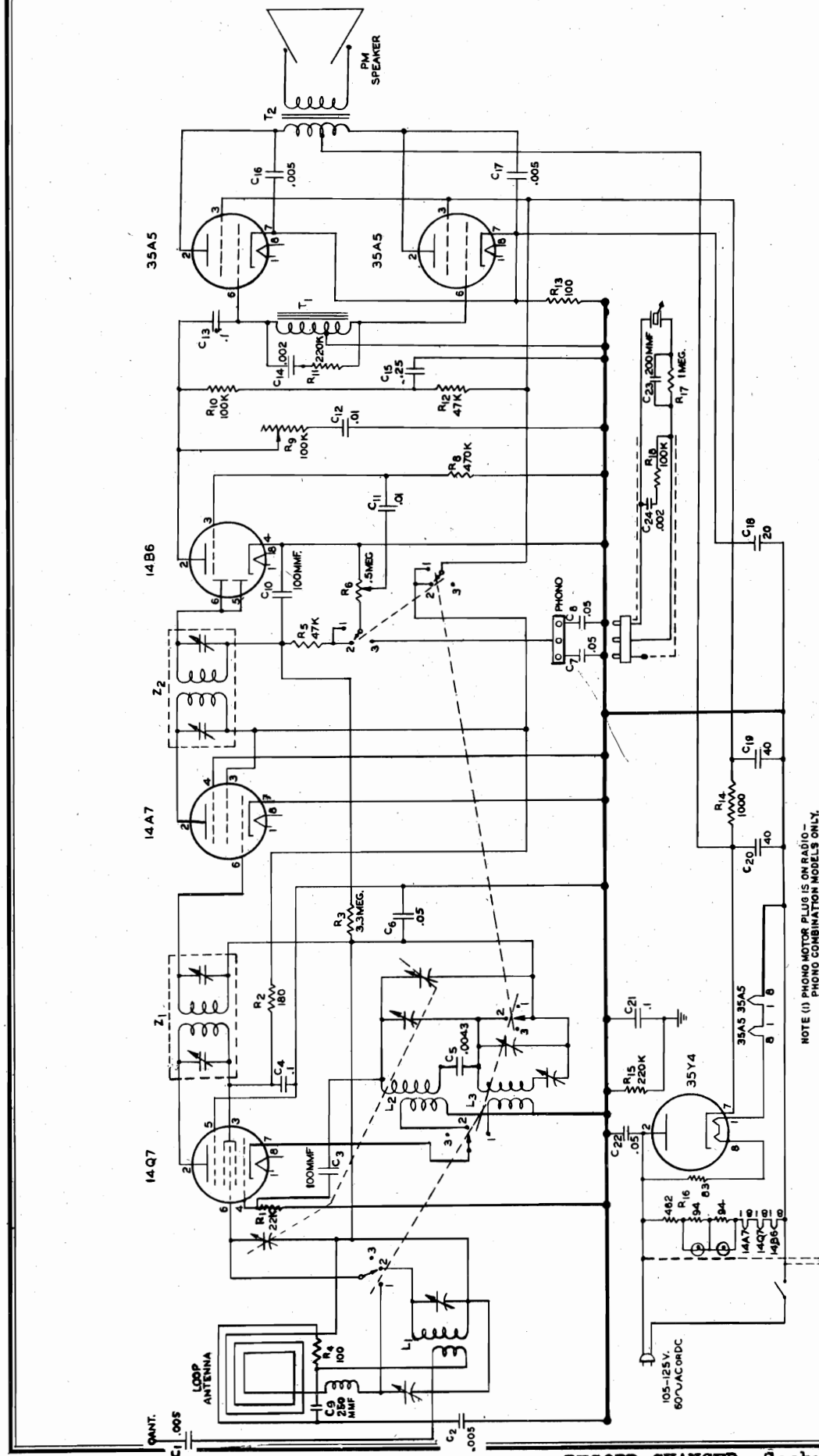
MODEL 100

EMOR RADIO, LTD.



BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION.  
BROADCAST BAND  
550-1700 KC.

BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
SHORT WAVE BAND  
4.7-20 MC.



7-10-46

REVISIONS

Circ. revised  
C9,R4,R7 deleted  
R17 was 2 meg.  
Nov. 4, 1946 app.

NOTE (1) PHONO MOTOR PLUG IS ON RADIO-  
PHONO COMBINATION MODELS ONLY.

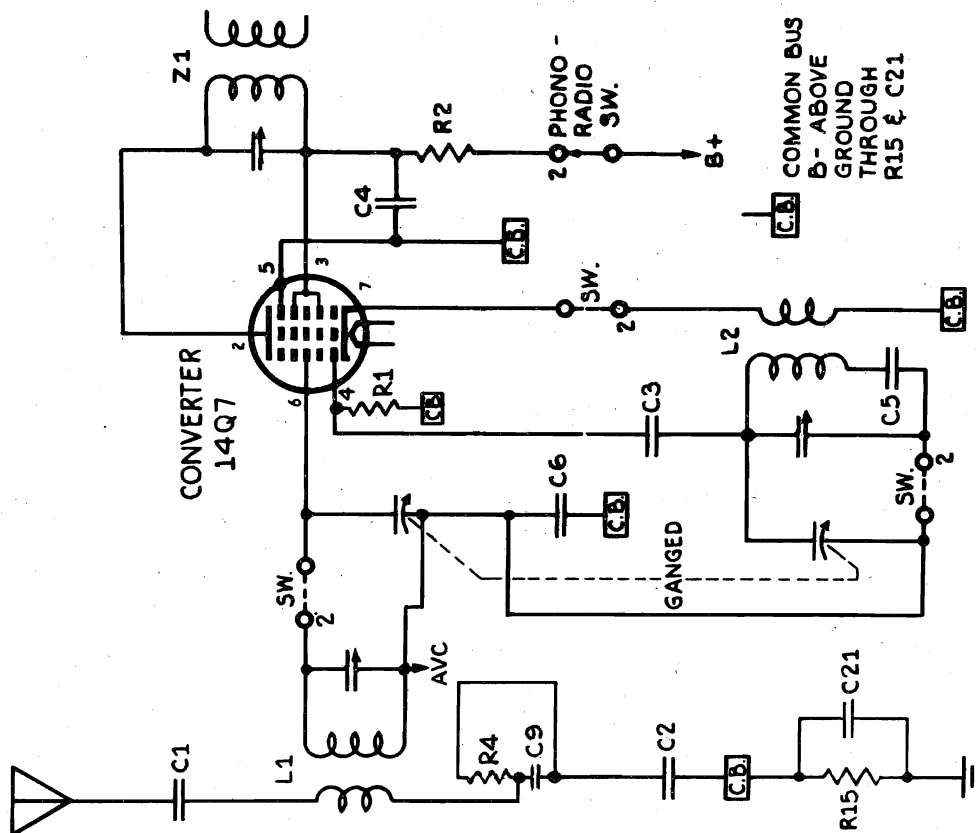
PHONO MOTOR PLUG  
NOTE 1

# "clarified schematics"

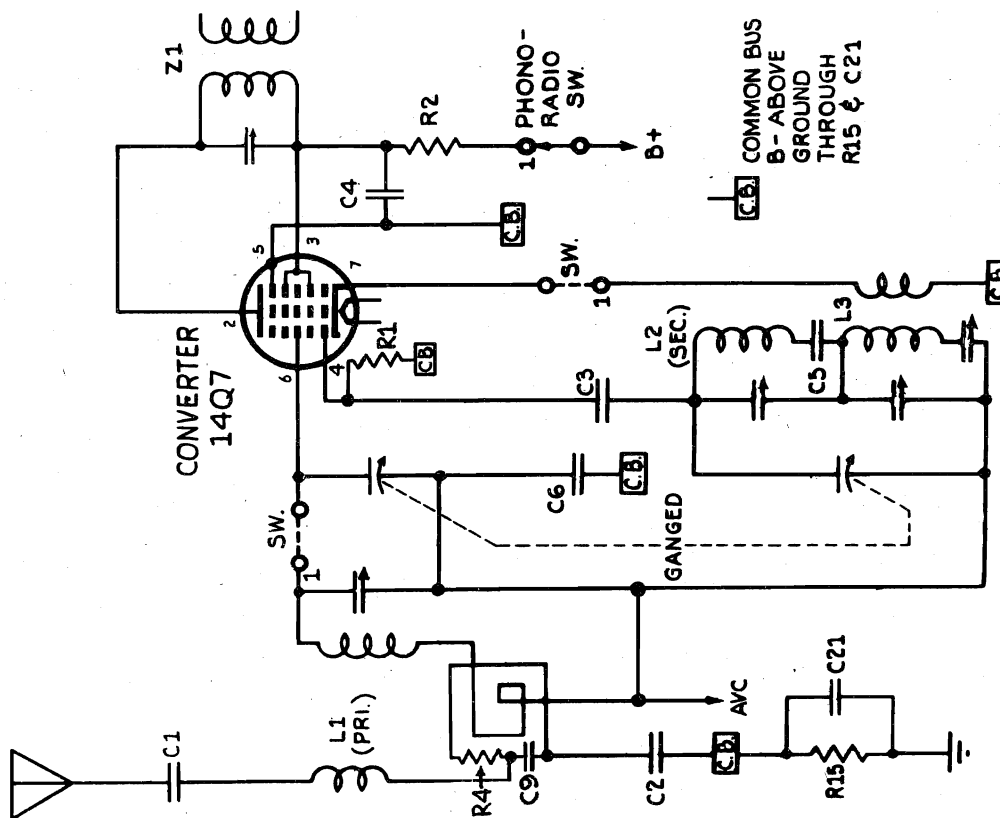
PAGE 16-2 ESPEY

CHASSIS FJ-97A, Revised

ESPEY MFG. CO. INC.

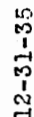


BAND - SWITCH SHOWN  
AT 2ND POSITION.  
SHORT WAVE BAND  
5.5 - 18 MC.



BAND - SWITCH SHOWN  
AT 1ST POSITION.  
BROADCAST BAND





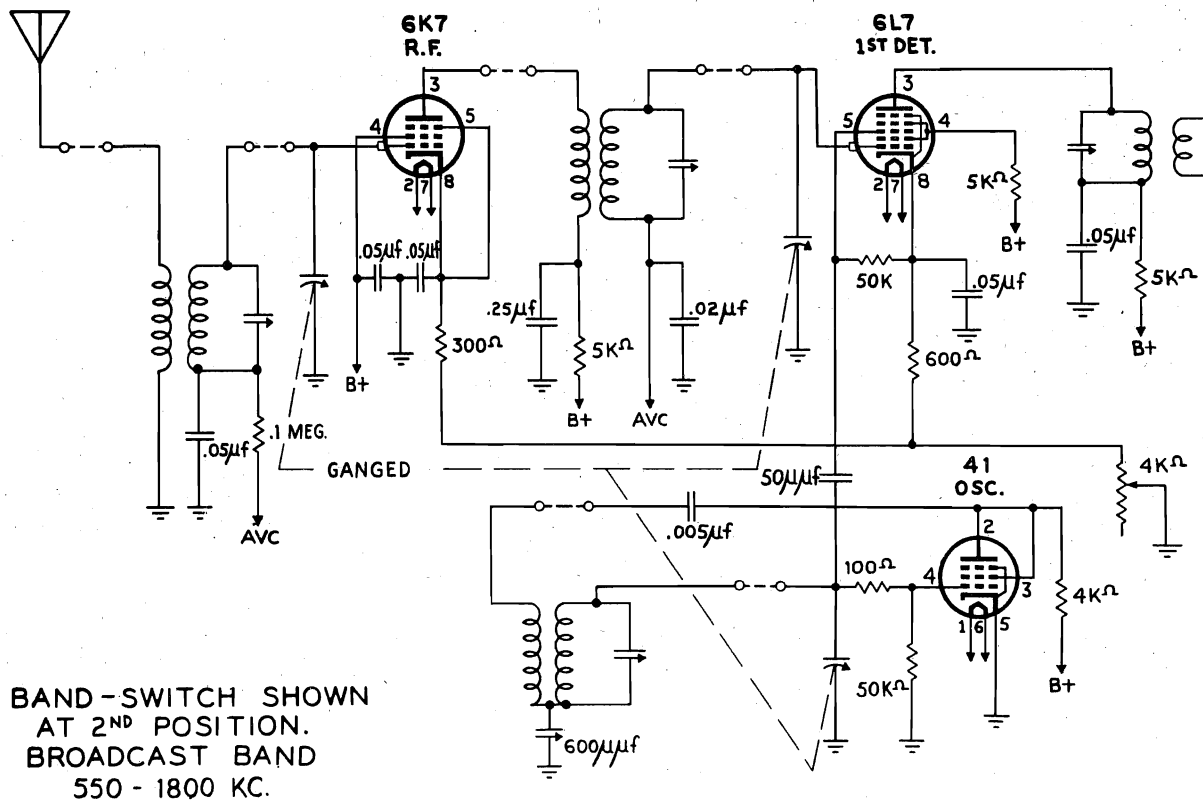
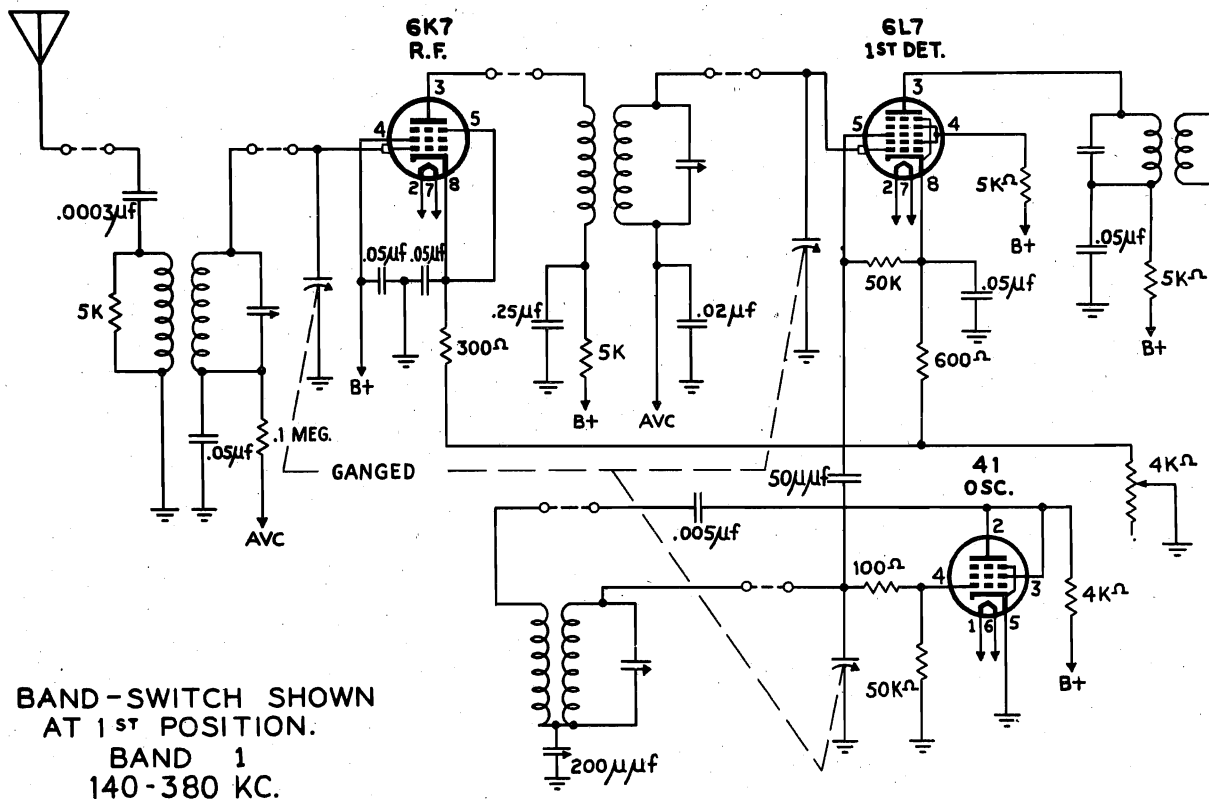
Compliments of [www.nucow.com](http://www.nucow.com)

# "clarified schematics"

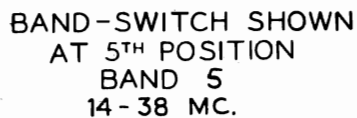
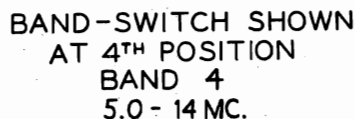
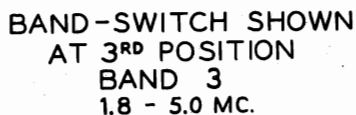
PAGE 16-4 ESPEY

MODEL 5181

ESPEY MFG. CO. INC.

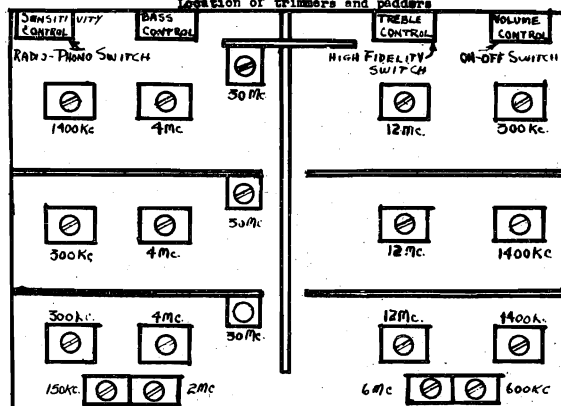
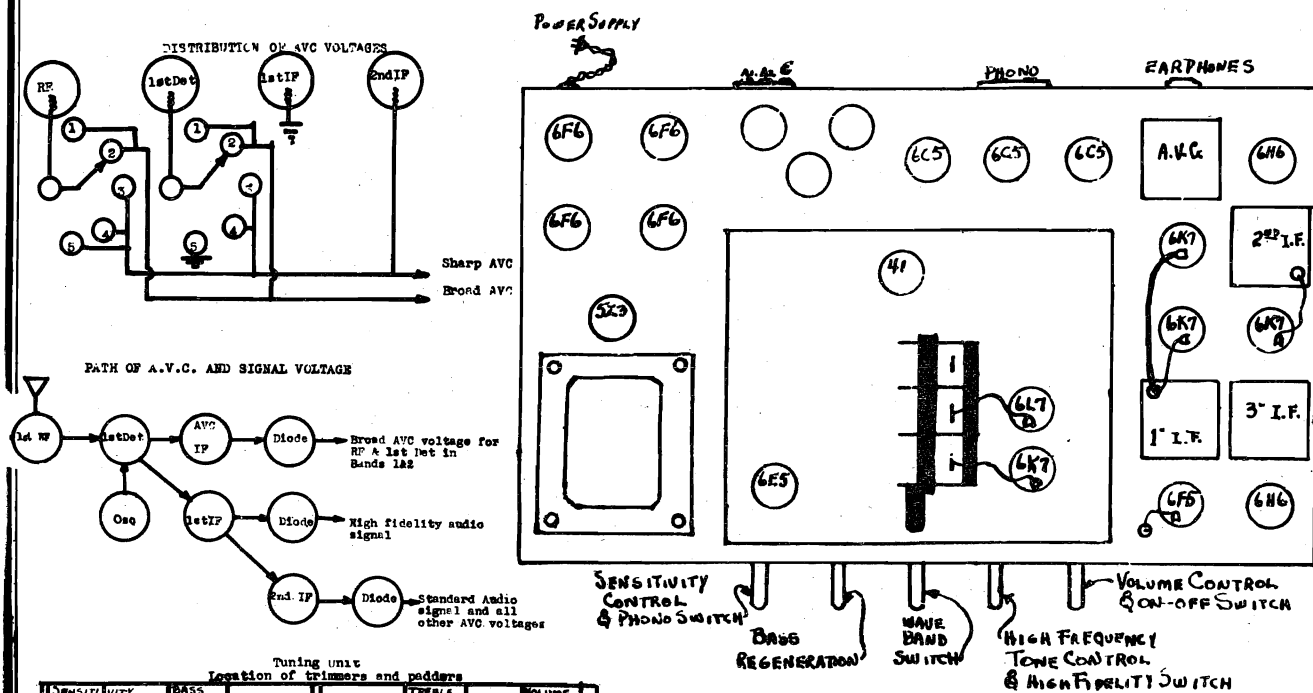


MODEL 5181



MODEL 5181

ESPEY MFG. CO. INC.



Numerals indicate frequencies at which the various trimmers and padders are adjusted.

Alignment with Output Meter

- Short either side of the broadcast R. F. coil trimmer to ground. Remove the first detector (6L7) grid cap and apply a 456 K. C. modulated signal. The fidelity switch must be in the sharp position (left). Remove the oscillator tube (41). Align the trimmers of the third, second and first I. F. transformers for maximum output in the order given.
- Amplified A. V. C. and Band 2 adjustment:  
Put the cap back on the 6L7. Place the 41 in its socket. Set dial at 1400 K. C. feed 1400 K. C. signal from the generator to the set. Adjust oscillator, R. F. and antenna trimmers for maximum signal. Remove the short from the Broadcast K. F. coil trimmer being careful not to alter the setting of either the set or generator. Set both A. V. C. I. F. trimmers for minimum output. Now turn dial to 600 K. C. and feed a 600 K. C. signal from generator and adjust padder while rocking variable slightly back and forth for best adjustment. Repeat 1400 adjustment.

#### ADJUSTMENT OF OTHER BANDS

- Band 1**  
Oscillator, R. F., and antenna trimmers are adjusted at 300 K. C. The padder is adjusted at 150 K. C. Repeat 300 K. C. adjustment.
- Band 3**  
Oscillator, R. F., and antenna trimmers are adjusted at 4 M. C. The padder is adjusted at 2 K. C. Repeat 4 M. C. adjustment.

#### Socket Voltage Readings

No Signal	Maximum Sensitivity	Meter 1000 ohms per volt
Tubes	Heater Volts	S. G. Cathode Plate Cathode Current ma.
6K7 R. F.	6.3	76 1.7 230 6
6L7 1st Det.	6.3	76 2.2 220 4
41 Osc.	6.3	0 160 17
6K7 1st I. F.	6.3	90 2.4 230 8
6K7 2nd I. F.	6.3	90 2 210 7
6K7 A.V.C.	6.3	90 2.2 230 7
6F5 1st Audio	6.3	.8 70 2
6G5 Phase Inverter	6.3	2.1 65 1
6E5 2nd Audio	6.3	6.6 230 6
6B6 3rd Audio	6.3	Bias 38 V 0 340 22
5Z3 Rectifier	5	350 400-400 140
6A5 Tuning Eye	6.3	0 90 3

Voltage Rating: 105-125 Volts A. C. 50-60 Cycles

Power Consumption: 160 Watts

Type and Number of Tubes: 4-6K7, 4-6F6, 3-6G5, 2-6H6, 1-5Z3, 1-6F5, 1-6L7, 1-6E5, 1-41

Frequency Ranges: Band 1 140-380 K. C.  
Band 2 550-1800 K. C.  
Band 3 1800-5000 K. C.  
Band 4 5000-14,000 K. C.  
Band 5 14,000-38,000 K. C.

Alignment Frequencies: 150, 300, 456, 600, 1400, 2000, 4000, 6000, 16,000, 30,000 K. C.

#### Band 4

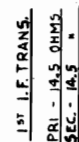
Oscillator, R. F., and antenna trimmers are adjusted at 12 M. C. The padder is adjusted at 6 M. C. Repeat 12 M. C. adjustment.

#### Band 5

Oscillator, R. F., and antenna trimmers are adjusted at 30 M. C. The padder on this band is fixed.

It is of the utmost importance when making all adjustments to keep the output of the generator just high enough to give a readable deflection on the output meter. If strong signals are used in alignment, your adjustments will be of very little value. This does not apply to the amplified A. V. C. adjustments where a strong signal is necessary.

5-11-36



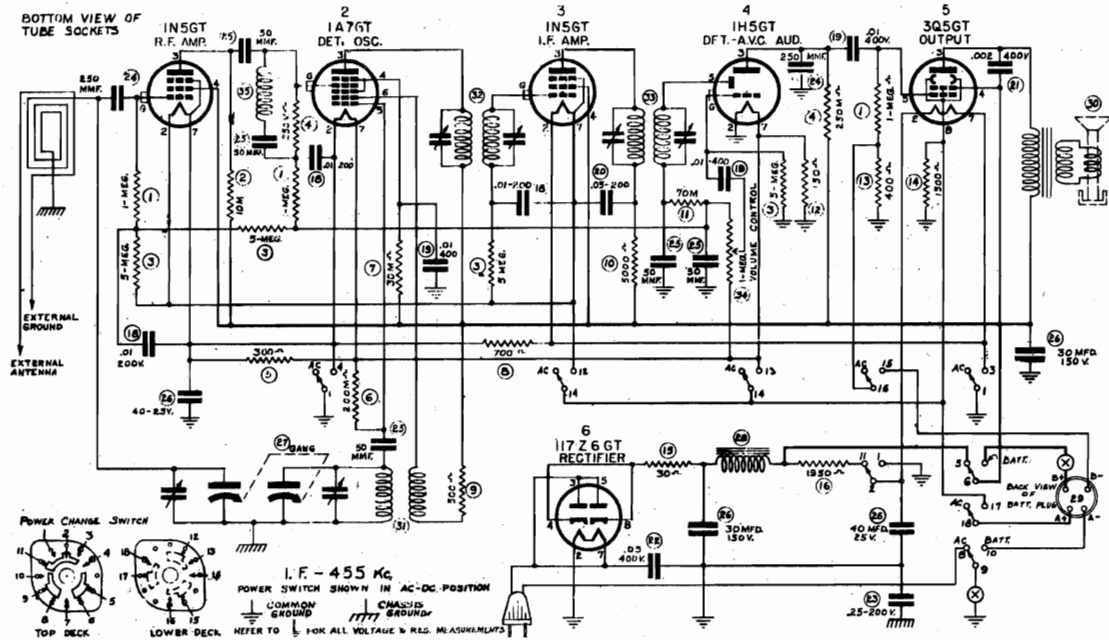
REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION
30.1	CARB. RES. - 3,000 OHMS - 1/2 W. 10%	32.152	MICA COND. - .0005 MF. $\pm$ 10%	45.501	VOLUME CONTROL - 1/4 MEG	46.2533	VARIABLE COND.
24.152	" " " " 20%	25.152	" " " " "	"	" " " " "	"	" " " " "
30.31	" " " " "	25.153	" " " " "	"	" " " " "	"	" " " " "
4.30.7	" " " " "	26.15.19	" " " " "	"	" " " " "	"	" " " " "
5.30.0	" " " " "	"	" " " " "	"	" " " " "	"	" " " " "
5.30.3	" " " " "	27.15.5	" " " " "	"	" " " " "	"	" " " " "
6.30.26	" " " " "	"	" " " " "	"	" " " " "	"	" " " " "
7.30.26	" " " " "	29.120.1	PILOT LIGHTS " 8 V. 25 A.	"	" " " " "	"	" " " " "
8.30.23	" " " " "	30.125.1	PHONO JACK	"	" " " " "	"	" " " " "
9.30.20	" " " " "	"	PADDING COND. 450 - 500 MMF	"	" " " " "	"	" " " " "
10.30.23	" " " " "	31.25.1	TOPE CONTROL - 200,000 OHMS	"	" " " " "	"	" " " " "
11.30.22	" " " " "	32.55.19	" " " " "	"	" " " " "	"	" " " " "
12.30.23	" " " " "	33.10.2	TUBULAR COND. 1 MF. 200 WV	"	" " " " "	"	" " " " "
13.20.6	ANTENNA COIL	34.10.2	" " " " "	"	" " " " "	"	" " " " "
14.316.6	OSCILLATOR -	35.10.2	" " " " "	"	" " " " "	"	" " " " "
15.3870	1st I.F.	36.10.3	" " " " "	"	" " " " "	"	" " " " "
16.3985	2nd I.F.	37.10.4	" " " " "	"	" " " " "	"	" " " " "
17.40.1	CHOKE - 300 OHMS	38.10.4	" " " " "	"	" " " " "	"	" " " " "
18.20.34	ELECTRO. COND. BLOCK - 16 MF. 100 MV	39.10.5	" " " " "	"	" " " " "	"	" " " " "
19.28.34	" " " " "	"	" " " " "	"	" " " " "	"	" " " " "
20.34.4	" " " " "	"	" " " " "	"	" " " " "	"	" " " " "
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45.501	VOLUME CONTROL - 1/4 MEG	46.2533	VARIABLE COND.	47.3047	CARB. RES. - 625 OHMS - 1/2 W. 10%	48.30.48	" " " " "
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## FARNSWORTH TELEV. &amp; RADIO CORP.

MODEL BT-68



WATTS  
VOLTAGE

AT 117 VOLTS A.C.  
A.C.

30  
105-125

Ref. No.	Old Part No.	New Part No.	DESCRIPTION	List Price
1	771-24	77218	1 Meg ½ Watt	\$.15
2	771-14	77212	10 M Ohms ½ Watt	.15
3	773-27	77272	4.7 Megs ½ Watt	.15
4	773-21	77216	220 M Ohms ½ Watt	.15
5	77-90	77260	330 Ohms ½ Watt	.15
6	77-89	77216	220 M Ohms ½ Watt	.15
7	77-85	77267	33 M ½ Watt	.15
8	77-83	77262	1000 Ohms ½ Watt	.15
9	77-94	77261	470 Ohms ½ Watt	.15
10	77-93	77211	4700 Ohms ½ Watt	.15
11	77-88	77214	100 M Ohms ½ Watt	.15
12	774-1	77234	150 Ohms ½ Watt Wire Wound	.15
13	77-81	77261	470 Ohms ½ Watt	.15
14	771-10	77263	1500 Ohms ½ Watt	.15
15	77-79	77257	33 Ohms ½ Watt	.15
16	77-86	77086	1950 Ohms 5 Watt	.50
17	253-2	25215	.1 Mfd. 600 V.	.15
18	25-94	25194	.01 Mfd. 600 V.	.15
19	255-1	25194	.01 Mfd. 600 V.	.15
20	256-1	25196	.05 Mfd. 600 V.	.15
21	255-4	25185	.002 Mfd. 600 V.	.15
22	255-2	25196	.05 Mfd. 600 V.	.25
23	256-3	25054	.25 Mfd. 200 V.	.25
24	253-2	25187	250 M. M. F. Mica	.15
25	253-5	25193	50 M. M. F. Mica	.15
26	25-61	25061	Elec. Condenser 2-30 Mfd.—150 V., 2-40 Mfd. 25 V.	1.60
27	26-64	26064	Gang Tuning Condenser	2.40
28	38-202	38202	Choke	.90
29	80-70	80070	Battery Plug	.10
30	81-70	81070	Speaker and Output Transformer	4.30
31	38-197	38197	Oscillator Coil	.50
32	38-199	38199	1st. I. F. Transformer	1.30
33	38-201	38201	2nd. I. F. Transformer	1.60
34	78-27	78027	Volume Control 1 Meg	1.10
35	38-198	38198	Wave Trap Coil	.45
	90-43	90043	Power Change Switch	1.50
	59-66	59066	Knobs	.15
	31-89	31089	Dial Scale	.20
	11-83	11083	Dial Pointer	.15
	27-137	27137	Line Cord	.35
	56-411	56411	Escutcheon	1.35

Prices subject to change without notice.

THIS SIX TUBE AC-DC OR FIVE TUBE BATTERY OPERATED PORTABLE RECEIVER HAS A BUILT IN LOOP ANTENNA. AN OUTSIDE ANTENNA MAY BE CONNECTED BY LOOSENING THE SCREW IN THE LOWER RIGHT HAND CORNER OF THE BACK COVER. A GROUND SHOULD BE CONNECTED TO THE SCREW IN THE LOWER LEFT HAND CORNER WHEN AN OUTSIDE ANTENNA IS USED.

## ALIGNMENT

A SIGNAL GENERATOR CALIBRATED AT 455 Kc., 1400 Kc., AND 1730 Kc., IS NECESSARY TO PROPERLY ALIGN THIS RECEIVER. AFTER ALIGNING THE I.F. STAGES, REPLACE RECEIVER IN CABINET AND FASTEN LOOP IN NORMAL POSITION BEFORE ALIGNING THE R.F. END THROUGH THE OPENINGS IN THE END OF THE CABINET. THESE OPENINGS ARE CLOSED BY SNAP FASTENERS. THE OSCILLATOR TRIMMER IS NEAREST THE FRONT PANEL AND THE LOOP TRIMMER IS DIRECTLY BEHIND IT.

## TABULATION FOR ALIGNMENT

STEPS	USE IN SERIES WITH GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	.02MFD IN EACH LEAD CONNECT HIGH SIDE OF GENERATOR TO GRID CAP OF 1A7G TUBE	455 Kc.	QUIET POINT	2ND I.F. TRIMMERS	TOP OF I.F. TRANS.	MAXIMUM OUTPUT
				1ST I.F. TRIMMERS		
2.	LOOP**	1730 Kc.	MINIMUM	OSCILLATOR TRIMMER*	SEE NOTE BELOW	
3.	LOOP**	1400 Kc.	1400 Kc. & ROCK GANG	LOOP TRIMMER*		

\*SEE PRECEEDING PARAGRAPH FOR LOCATION OF TRIMMERS.

\*\*LOOP TO CONSIST OF FIVE TO TEN TURNS OF INSULATED WIRE WOUND ON A THREE OR FOUR INCH FORM TO BE CLOSELY COUPLED TO THE LOOP ANTENNA IN THE RECEIVER.

SUGGESTED BATTERY 1 GENERAL 60A-4L 1 RAY-O-VAC AB-87

1 BURGESS 6FA-60

## VOLTAGE AND RESISTANCE DATA

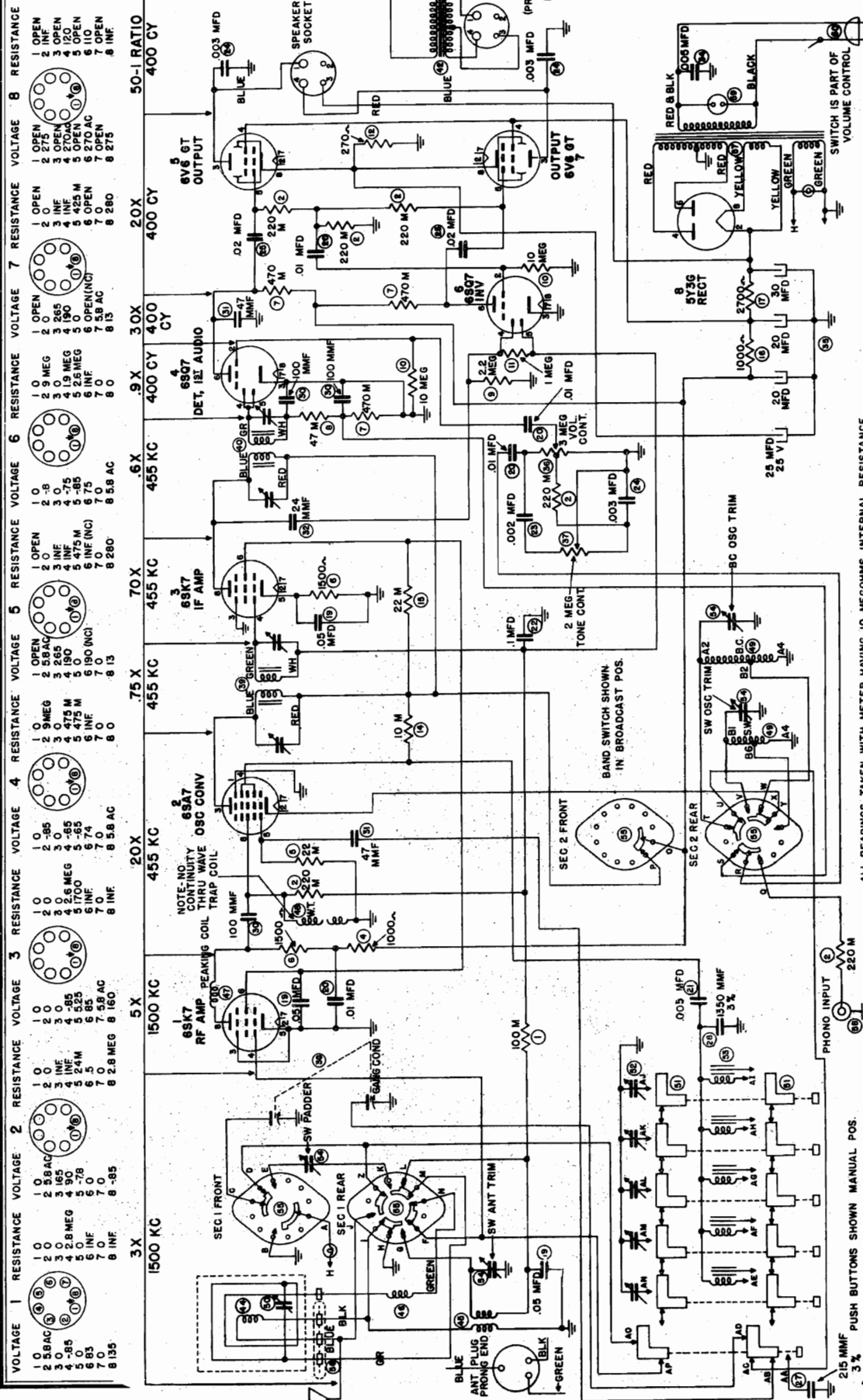
	1	2	3	4	5	6	7	8	Cap.
1 - 1N5GT									
Volts	open	4.2	97	100	0	16	2.8	open	1.8
Res.	open	61	3500	2500	0	6 meg.	40	open	1.5 meg.
2 - 1A7GT									
Volts	open	2.8	100	64	1.8	100	1.4	100	1.8
Res.	open	40	2500	2500	200M	2500	22	2500	1.5 meg.
3 - 1N5GT									
Volts	0	5.6	100	100	open	0	4.2	open	0
Res.	open	80	2500	2500	0	0	61	0	5 meg.
4 - 1H5GT									
Volts	open	0	47	0	0	47	1.4	open	0
Res.	open	0	1 meg.	0	1 meg.	1 meg.	22	open	5 meg.
5 - 3Q5GT									
Volts	open	8.4	93	100	0	open	5.6	9	
Res.	open	9.5	2500	2000	1 meg.	open	80	75	
6 - 117Z6GT									
Volts	open	117 AC	117 AC	123	117 AC	0	0	123	
Res.	open	500	500	2500	500	0	0	2500	

NOTES: On d-c voltage readings meter should have internal resistance of at least 10 megohms. Readings taken with no signal. Line voltage 117 V. A. C.



# MODELS EK-C81, EK-C82, FARNSWORTH TELEV. & RADIO CORP. EK-083, EK-681

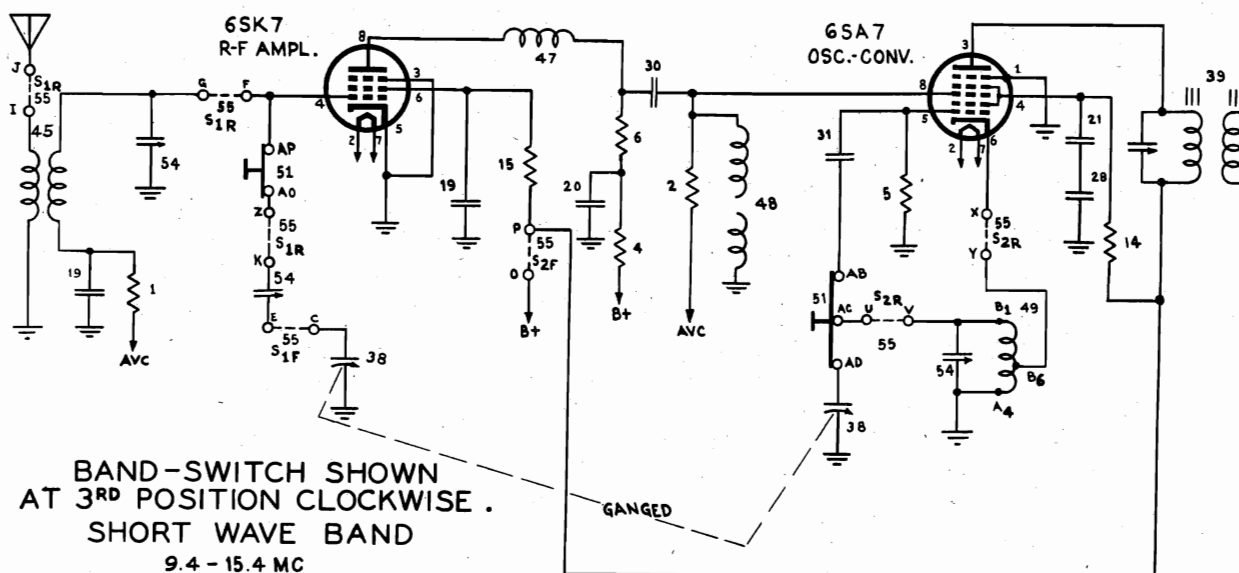
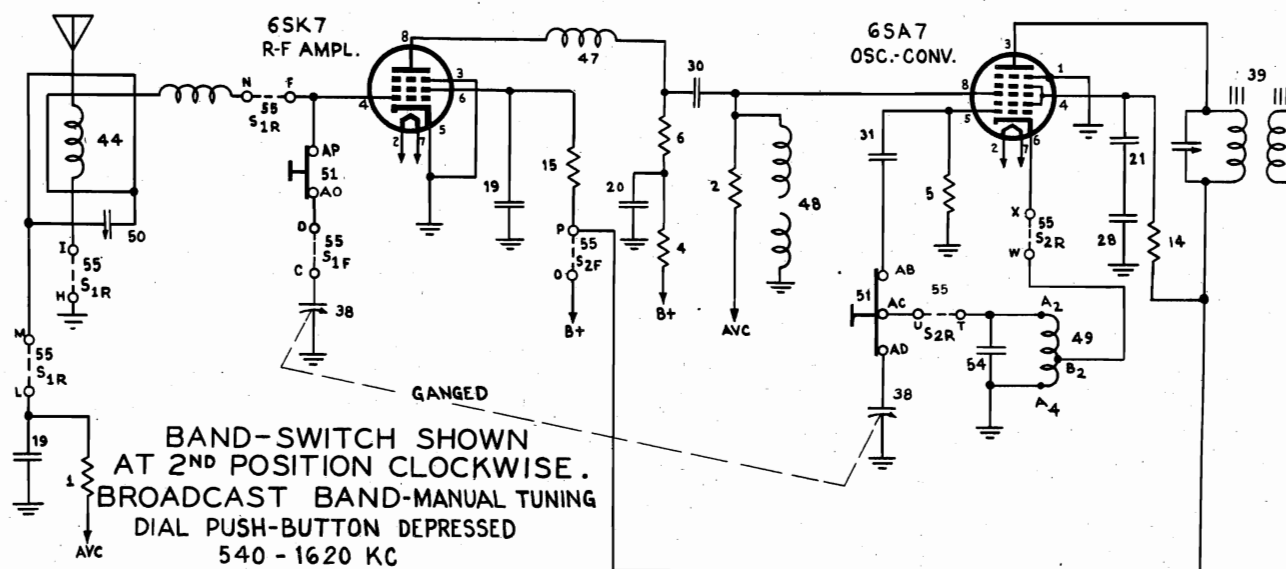
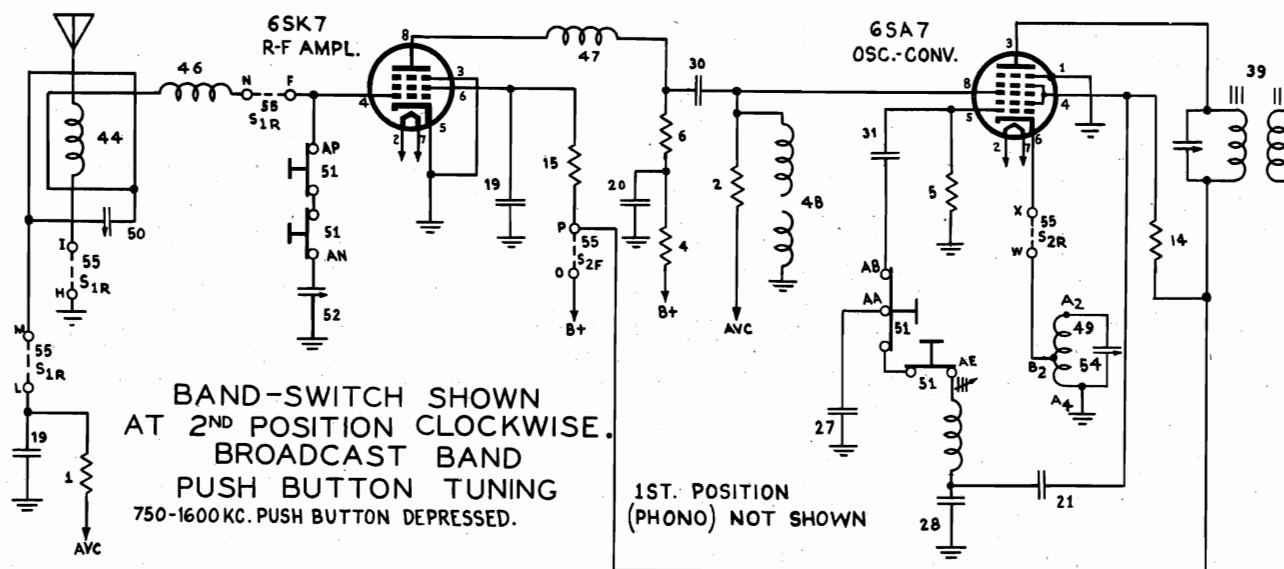
Chassis  
C-156, C-157,  
C-193



# "clarified schematics"

PAGE 16-4 FARNSWORTH

MODELS EK-081, EK-082, FARNSWORTH TELEV. & RADIO CORP.  
EK-083, EK-681





MODELS GK-140.

FARNSWORTH TELEV. &amp; RADIO CORP.

GK-141.

GK-142, GK-143, GK-144,

Preliminary

## FM GAIN MEASUREMENTS

## EQUIPMENT REQUIRED

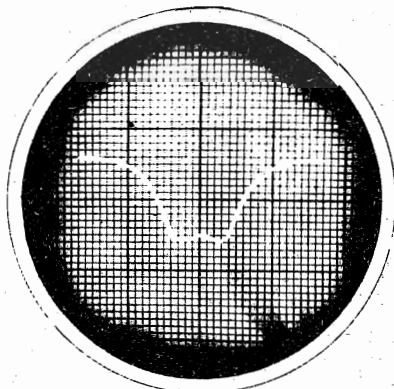
FM Signal Generator, modulated at 400 cycles,

22.5 Kc deviation.

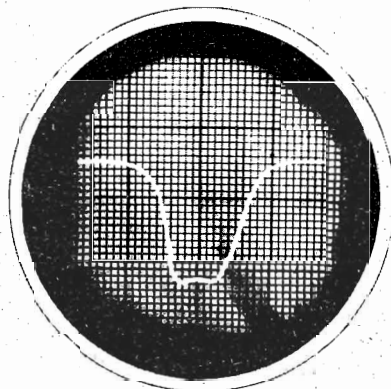
Output Meter.

Output meter connected across secondary of out-  
put transformer, 4 ohms impedance. Signal gen-  
erator connected at gang capacitor. Volume con-  
trol, Bass control and Treble control at maximum.

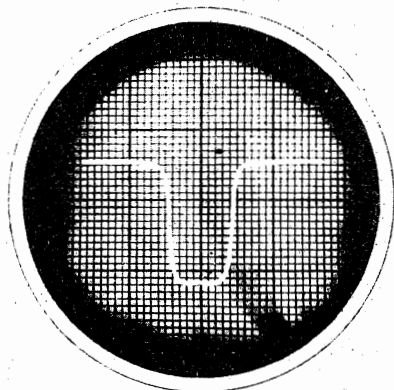
SIGNAL GENER- ATOR TO	DUMMY	MICROVOLTS INPUT	OUTPUT	GAIN
Ant.	330 ohms	20	.5 watt	1.5X
RF	.1 Mfd.	30	.5 watt	
Conv. Grid	.1 Mfd.	130	.5 watt	4.33X



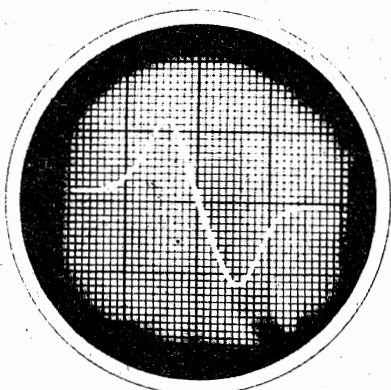
(1)



(2)



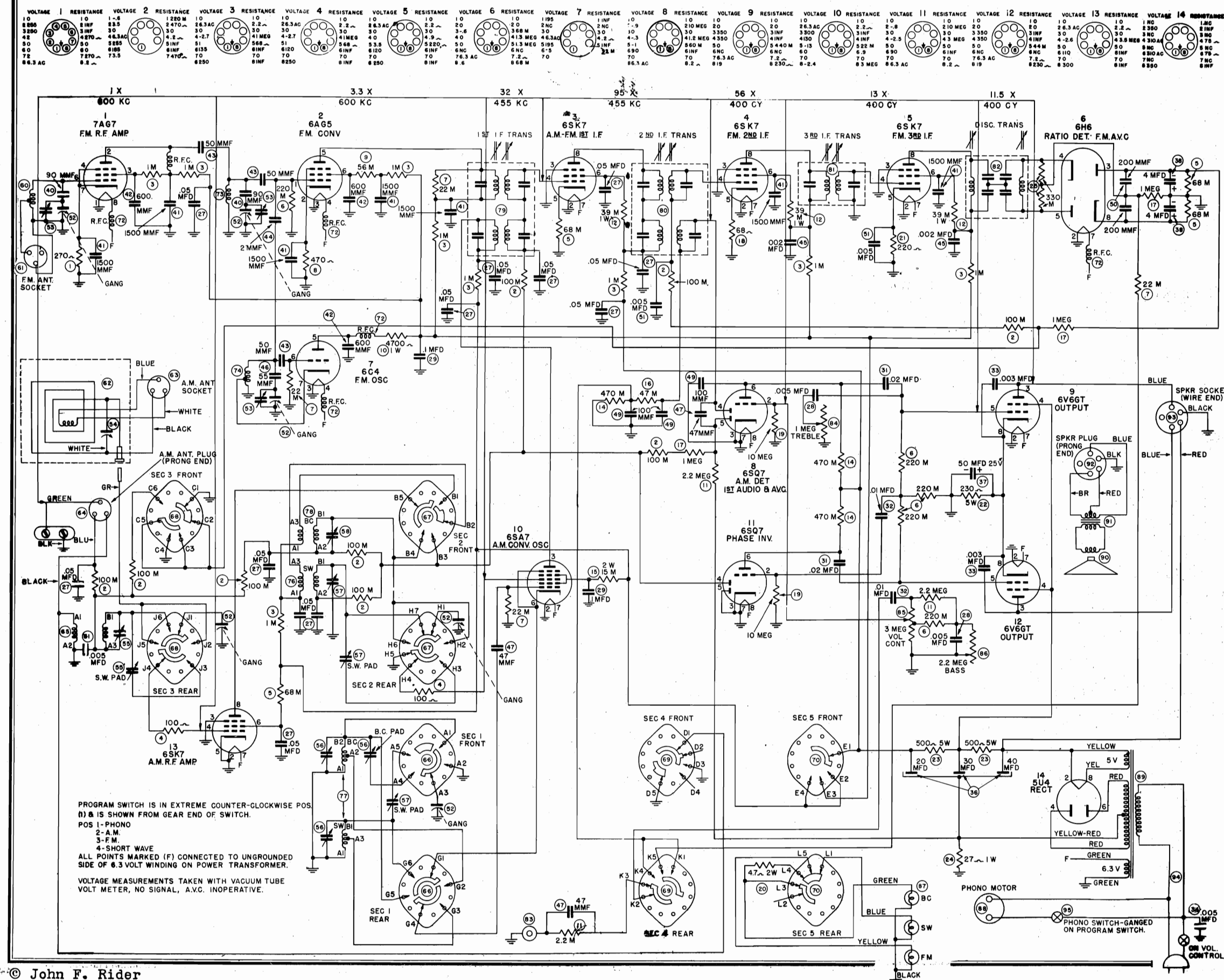
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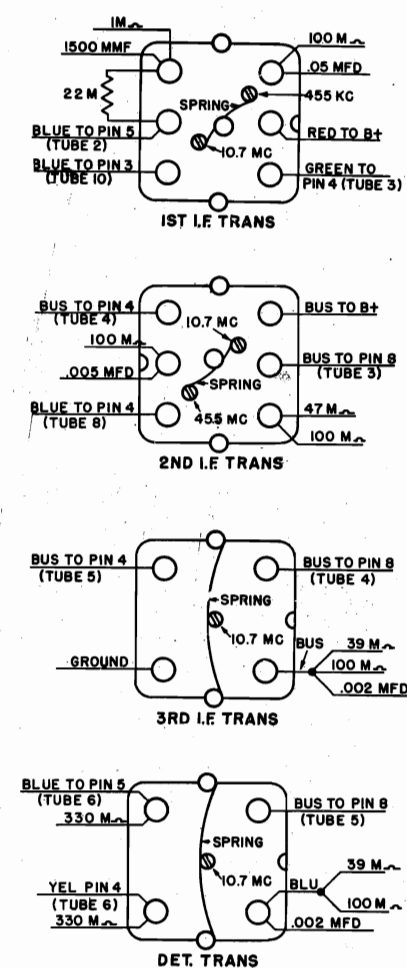
(4)

F-M  
ALIGNMENT  
OSCILLOGRAMS

These curves were obtained under ideal conditions and show curves to be expected. They should be duplicated as nearly as practicable.



**BOTTOM VIEW OF I.F. CANS**

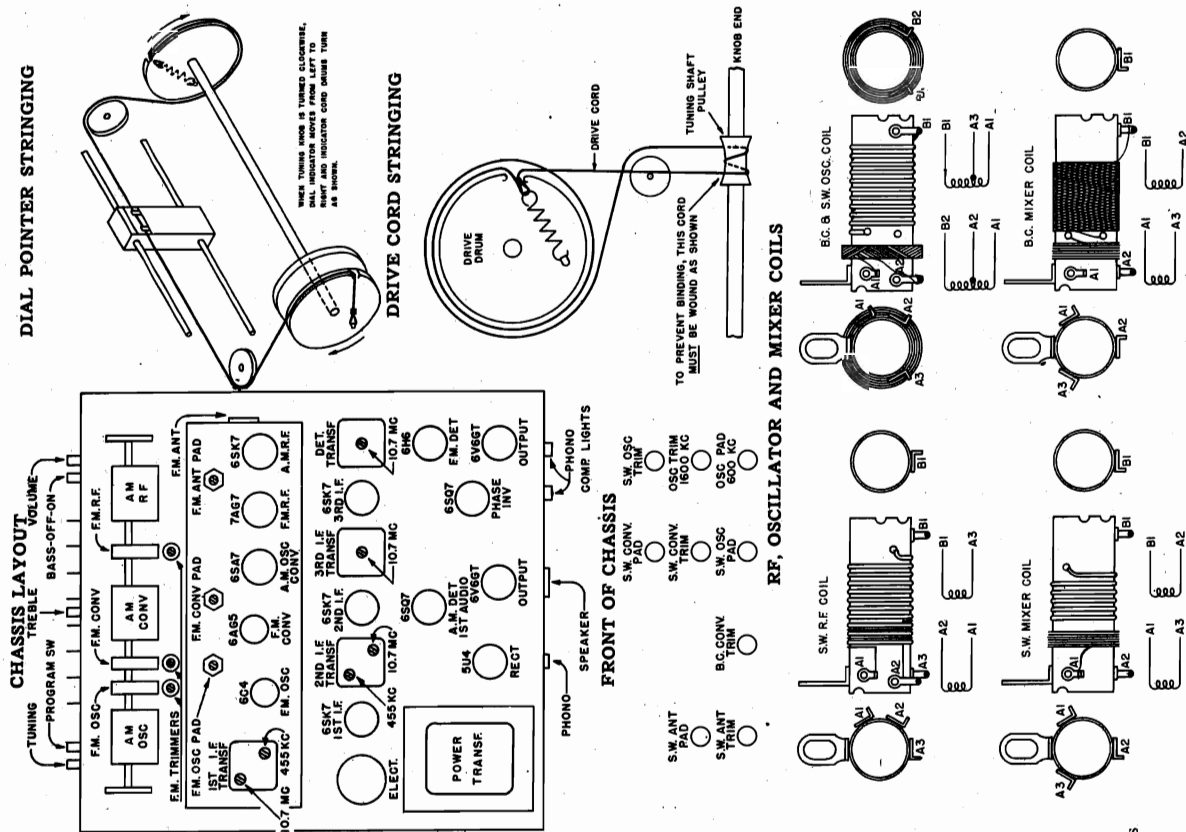
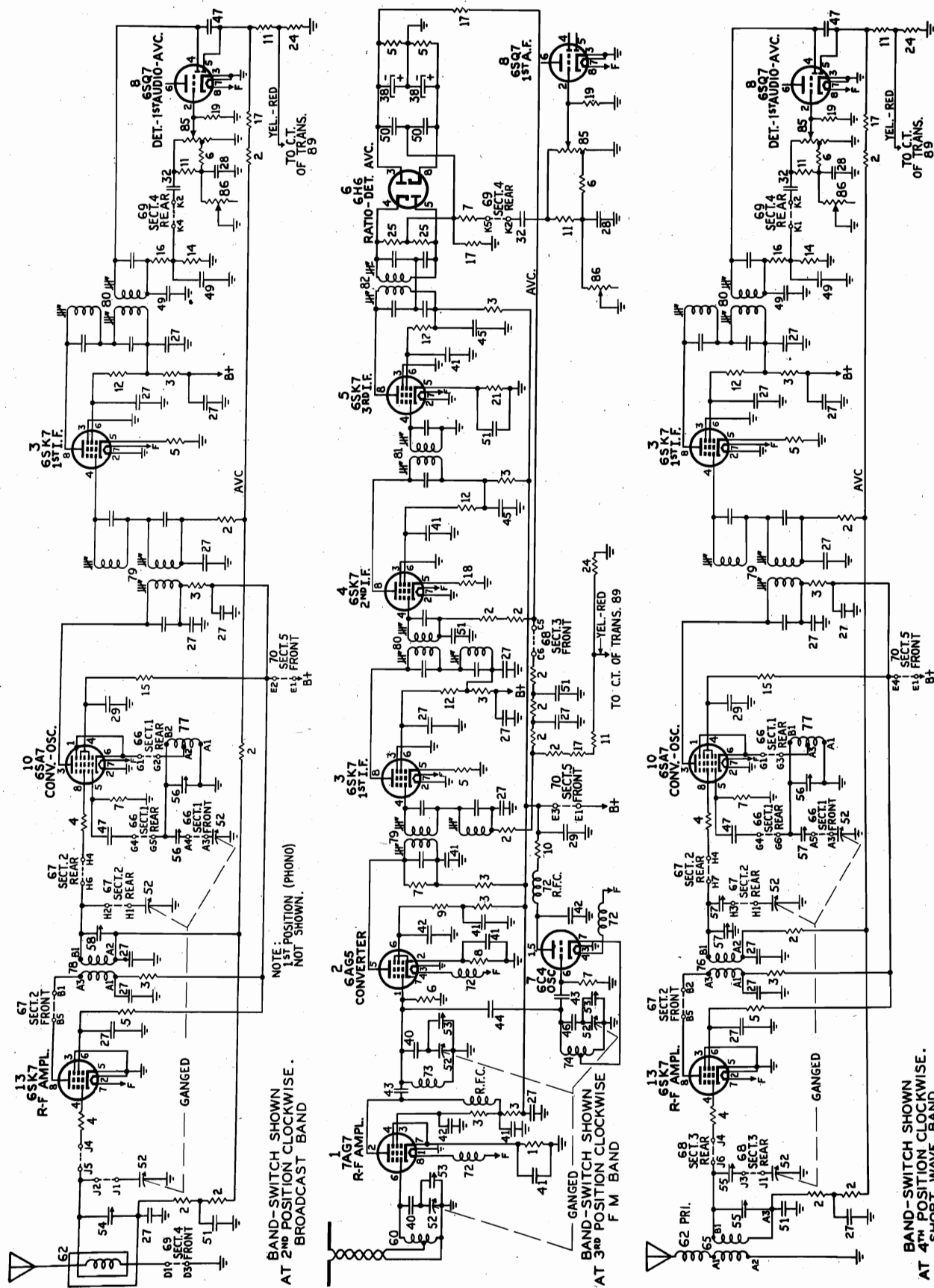


PROGRAM SWITCH IS IN EXTREME COUNTER-CLOCKWISE  
 (1) & IS SHOWN FROM GEAR END OF SWITCH.

- POS 1-PHONO
- 2-A.M.
- 3-F.M.
- 4-SHORT WAVE

ALL POINTS MARKED (F) CONNECTED TO UNGROUNDED  
 SIDE OF 6.3 VOLT WINDING ON POWER TRANSFORMER.

VOLTAGE MEASUREMENTS TAKEN WITH VACUUM TUBE  
 VOLT METER, NO SIGNAL, A.V.C. INOPERATIVE.



TABULATION FOR AM ALIGNMENT				
STEPS	CONNECT GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST TO OBTAIN
1	Set Tone and Volume Controls at Maximum			
2	Grid Conv. tube	455 Kc	Quiet Point	2nd. I.F. Slugs
3				1st. I.F. Slugs
4	RF of GANG	1500 Kc	1500 Kc	BC Osc. Trimmer
5		600 Kc	600 Kc	BC Mixer Trimmer
6	Check dial calibration at several frequencies. If not reasonably correct, adjust oscillator paddler. See Note 1			
7	Check dial calibration at several frequencies. If not reasonably correct, adjust oscillator paddler. See Note 1			
8	Ext. Ant. Binding Post	1500 Kc	1500 Kc	Loop Trimmer

#Through RMA dummy antenna.

\* This adjustment should be made while gang is rocked.

SHORT WAVE RF						
Place Band Switch in Short Wave position.						
9	Through 400 ohm resistor		External Antenna	15 MC	15 MC	SW Osc. Trimmer See Note 2
10						SW Conv. Trimmer
11						SW Ant. Trimmer
12				9.4 MC	SW Osc. Padder	
13					SW Conv. Padder	
14			9.4 MC	Image at 10.31 MC	SW Ant. Padder	
15						
16	Recheck Steps 10 to 15 inclusive.					MAXIMUM OUTPUT

NOTE 1. After any adjustment of oscillator paddler, repeat steps 4, 5 and 6.

NOTE 2. Set oscillator trimmer to maximum capacity, then slowly loosen trimmer until 2nd signal is heard.



## FARNSWORTH TELEV. &amp; RADIO CORP.

MODELS  
GK-140, GK-141,  
GK-142, GK-143, GK-144,  
Preliminary

12. Connect 4 MFD electrolytic capacitor that was previously disconnected, and take off load resistor on discriminator primary.
13. Connect oscilloscope to audio output terminal of discriminator. There are several points where contact can be made and can be identified as the circuit connected to the terminal on the terminal board (nearest the discriminator transformer) to which the shielded lead is connected.
14. With sweep signal input to converter grid, align discriminator transformer for conventional discriminator pattern, as in Fig. 4.
15. Connect signal generator to converter tube grid through .1MFD capacitor. An unmodulated signal input of 65 microvolts at 10.7 Mc should develop .55 volt rise on the AVC line with voltohmmyst connected to AVC line through 1 megohm resistor.

### Alternate FM IF Alignment Procedure

Equipment necessary: RF Signal Generator and Vacuum tube voltmeter.

1. Connect V.T.V.M. from ground to audio lead of ratio detector (discriminator). Connect generator tuned to 10.7 mc. to grid of third FM IF tube through 0.1MFD capacity. Use minimum signal necessary for good indication in all following:
2. Turn secondary slug of ratio detector transformer (top slug) out as far as it will turn.
3. Tune primary for maximum output.
4. Connect generator to grid of second FM IF tube.
5. Tune primary and secondary of third FM IF transformer for maximum output.
6. Connect generator to grid of first FM IF tube.
7. Tune primary and secondary of second FM IF transformer for maximum output.
8. Connect generator to converter grid through 10,000 ohm resistor and 0.1 MFD capacitor.
9. Tune primary and secondary of first FM IF transformer for maximum output.
10. Tune secondary of ratio detector transformer for zero or minimum output.
11. The FM IF system should now be aligned. Tuning the signal generator equal amounts on each side 10.7 mc should produce equal deflections of opposite polarity on the VTVM. Deflections unequal by more than 10 per cent or so indicate inaccurate alignment.

### FM RF Alignment

1. Equipment Required:
  - a. RF Signal Generator. Range 88 to 108 MC.
  - b. Output Meter.
  - c. Insulated Screw Driver.
2. Connect RF signal generator in series with 400 ohm carbon resistor to "high" side of FM antenna socket. Connect output meter across voice coil of speaker.
3. Set tuning control for pointer to calibrate at the equivalent of half way between channels 300 and 301.
4. Apply 108 MC Signal.
5. Set converter and antenna trimmers at minimum capacity.
6. Adjust oscillator trimmer by tuning from maximum capacity to first signal that is heard, and peak for maximum output.
7. Adjust antenna and converter trimmers for maximum output.

### Oscilloscope Alignment FM Band

#### FM IF ALIGNMENT

1. Equipment Required: Oscilloscope, 10.7 MC sweep generator, voltmeter, and RF signal generator.
2. Set band switch in FM position.
3. Make connection from vertical deflection amplifier of oscilloscope to pin #3 of 6H6 discriminator tube. Make certain that the 4MFD electrolytic condenser is disconnected from this same circuit. It is necessary that the lead to the oscilloscope be shielded, of low total capacity, and connection to receiver isolated by means of a 1 meg. resistor.
4. Connect sweep generator to last FM IF grid through a .1 MFD coupling capacitor.
5. Load primary of discriminator transformer with resistor of approximately 39000 ohms. Back out secondary slug (top slug) as far as it will turn. Align primary (bottom slug) to obtain curve similar to figure 1. This does not constitute a final alignment of discriminator, but is a convenient expedient to assist in I.F. alignment.
6. Shift connection of sweep signal generator to the grid of the second FM IF tube. NOTE: As alignment moves from stage to stage, reduce input instead of reducing oscilloscope gain.
7. Align third FM IF transformer for a symmetrical flat top pattern. (Fig. 2).
8. Shift signal generator to the grid of the first IF tube.
9. Align second IF transformer in same manner as described in Section 7. Note that the width of the nose of the curve is the same as before, but the sides have become steeper, as in Fig. 3.
10. Connect the signal generator to the grid of the converter tube grid in series with 10,000 ohm resistor and a .1MFD capacitor, or loosely couple by stray capacity of an insulated wire.
11. Align first FM IF transformer in the same manner as in Section 7. Note that the sides of the curve have further steepened, but that the nose of the curve has retained approximately the same width as in Fig. 3.

**SETTING STATION TUNING BUTTONS**  
Allow the set to warm up for about one-half hour before beginning to set the push buttons.

Make a list of the eight stations to be set up.

Move the program switch to proper band for the station to be set-up.

Select a push button for this station.

Remove the push button, exposing the push button lock screw.

Loosen this lock screw with a screw driver. Tune in the desired station with the manual tuning knob.

Push the push button shaft all the way in with the screw driver engaged in the slot in the lock screw.

Firmly tighten the push button locking screw.  
**CAUTION**—Do not use a large handle screw driver as damage may result. We recommend type of screw driver used for knob setscrew.

Continue setting each button the same way.

After all the stations are set up, replace the push buttons and place the station call letter tab found in the call letter kit on the proper button.

### CAUTION

When setting up push buttons it is well to select a time when the stations are not carrying "Chain" programs as adjustments might be made on the wrong stations.

### Alignment of AM Bands

#### EQUIPMENT REQUIRED

A calibrated signal generator having fundamental frequencies from 455 Kc to 15 MC. In addition to the signal generator a crystal calibrator is a great convenience.

The indicating device for showing correct alignment may be a high resistance A.C. voltmeter, a vacuum tube voltmeter or a Cathode Ray oscilloscope.

The A.C. voltmeter can be used either across the voice coil of the loud speaker or if the meter range is high enough, from plate to plate in the output stage (don't forget a condenser (0.1 Mfd.) to keep

the D.C. out of the meter).

Special care must be employed when aligning the short wave band, for the adjustment of the shunt trimmer affects the adjustment of the series pad. At the high frequency end of the band it is possible to peak the oscillator trimmer (and the pad at the low frequency end) at the image so in the alignment instructions we have indicated the fundamental frequency and the correct oscillator setting for the image so by resetting the signal generator it is possible to see if the alignment is correctly made. In each case, the image is found at a frequency 910 Kc. higher than the fundamental.





## FEDERAL TEL. &amp; RADIO CORP.

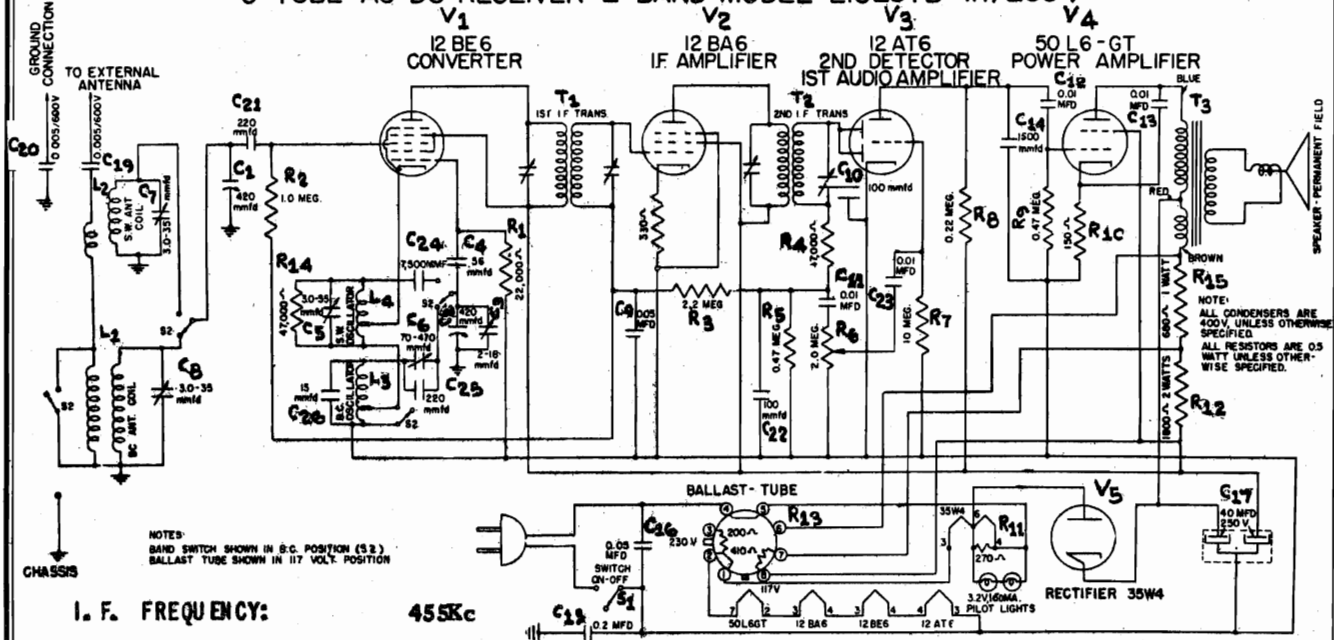
MODEL E1025TB

POWER OUTPUT RATING:  
VOICE COIL IMPEDANCE:  
POWER REQUIREMENTS:  
TUNING RANGES:  
ANTENNA:

For 105-125 v. operation:  
Undistorted 1.1 watts; maximum 1.5 watts. For 210-250 v. operation:  
undistorted 1.9 watts; maximum 2.8 watts.  
3.2 ohms at 400 cycles.

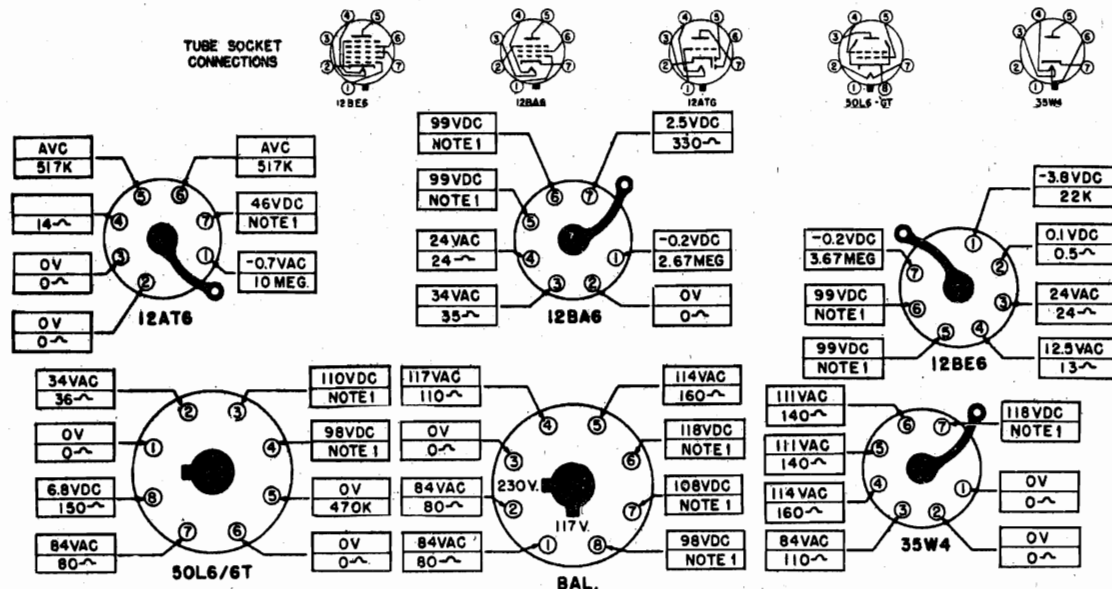
30 Watts at 105-125 volts 50-60 cycles AC, or 105-125 volts DC.  
60 Watts at 210-250 volts, 50-60 cycles AC, or 210-250 volts DC.  
Broadcast Band 540-1600 kilocycles (555-188 m)  
International Short Wave Band 6-18 megacycles (50-16.65 m).  
External.

## 5 TUBE AC-DC RECEIVER-2 BAND-MODEL E1025TB-117/235 V



I. F. FREQUENCY:

455Kc



NOTE 1: RESISTANCE READINGS AT THESE POINTS WILL VARY SINCE THEY ARE IN SERIES WITH THE LEAKAGE RESISTANCE OF THE ELECTROLYTIC CONDENSERS WHICH IS SUBJECT TO CHANGE.

## Voltage and Resistance Analysis Chart

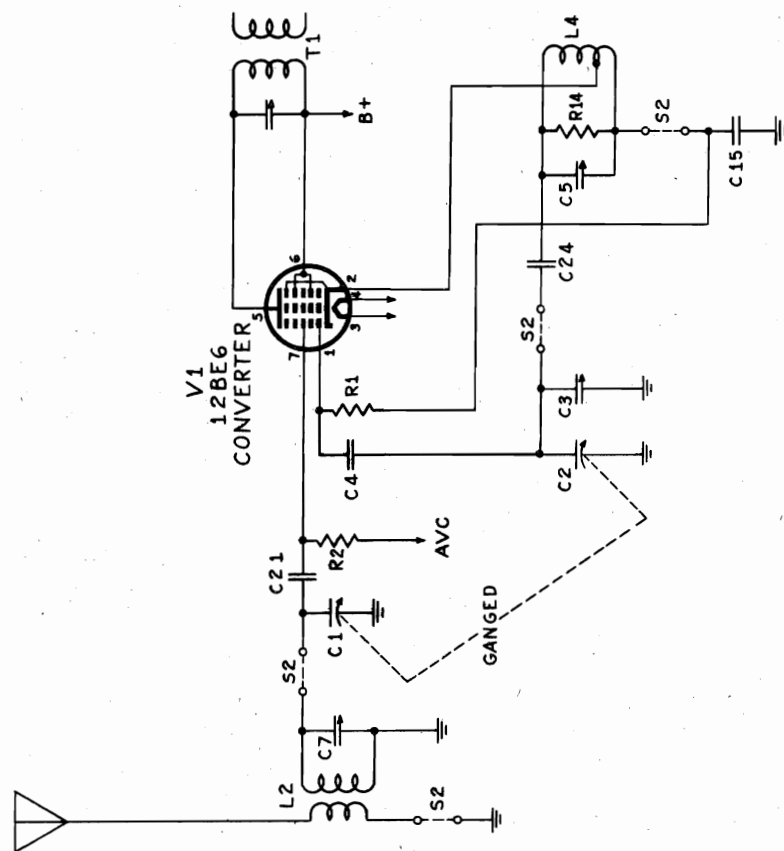
Resistance readings at these points will vary since they are in series with the leakage resistance of the electrolytic condensers which is subject to changes.  
All D.C. measurements were made with a meter having a sensitivity of 20,000 ohms per volt. Ac measurements taken at 1000 ohms per volt.  
Measured values are from socket pin to circuit ground (pin #3 of 12AT6 socket).  
Tolerances of component values make possible a variation of 20% in readings indicated in chart.  
Socket connections are shown as bottom views.

# "clarified schematics"

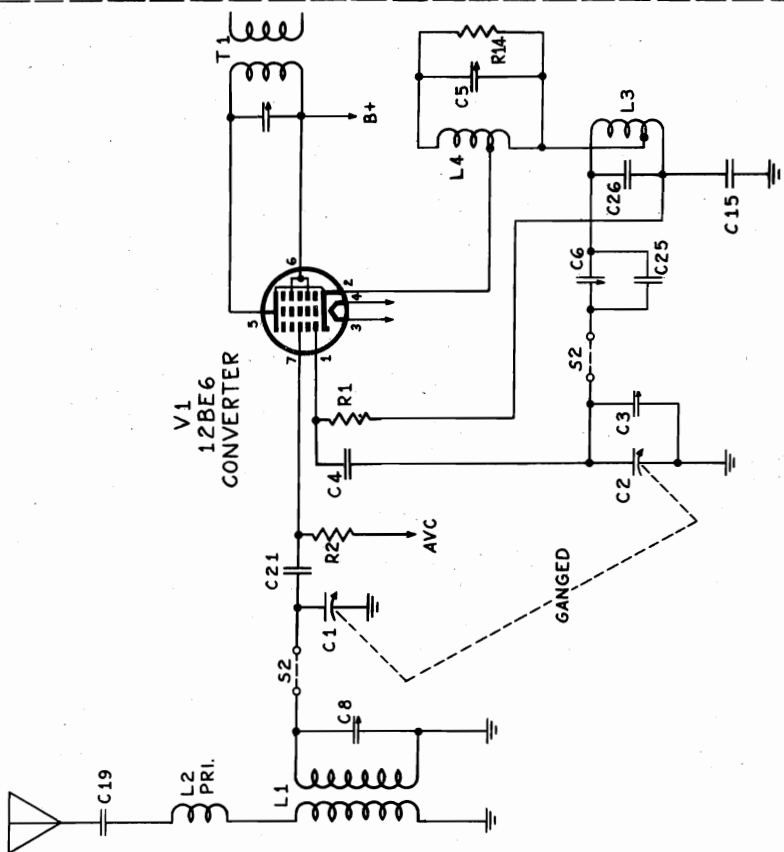
PAGE 16-2 FEDERAL

MODEL E1025TB

FEDERAL TEL. & RADIO CORP.



BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION  
SHORT WAVE BAND  
6-18 MC.



BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION  
BROADCAST BAND  
540-1600 KC.

FEDERAL TEL. &amp; RADIO CORP.

MODEL E1025TB

## ALIGNMENT INSTRUCTIONS

Punch marks are provided on the dial back plate at 600 Kc, 900 Kc, 1500 Kc and 1600 Kc for alignment purposes.

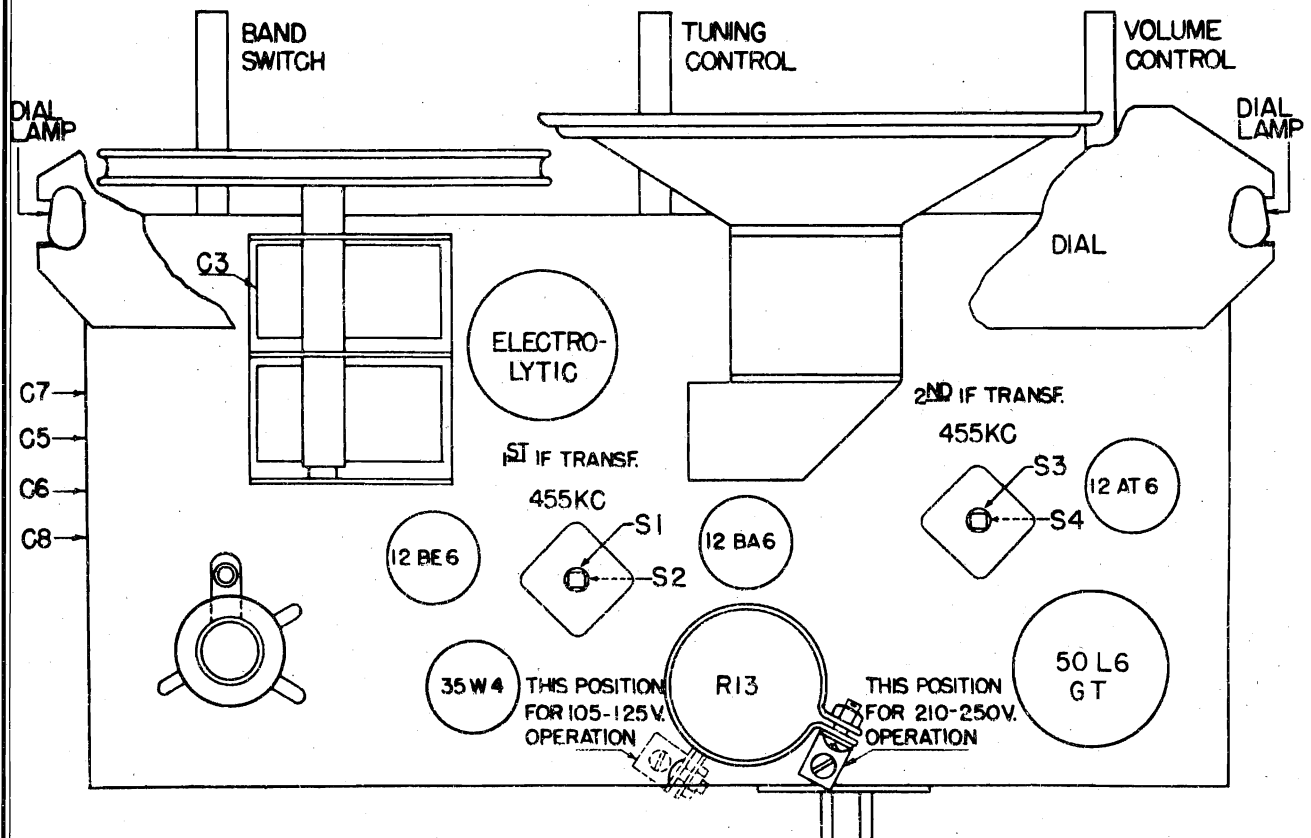
With tuning condenser fully open, set dial pointer to the 1600 Kc punch mark.

Connect output meter across voice coil terminals on speaker frame.

Connect low side of signal generator lead through a .1 mfd coupling condenser to chassis ground.

Connect high side of generator through proper dummy antenna to external antenna lead.

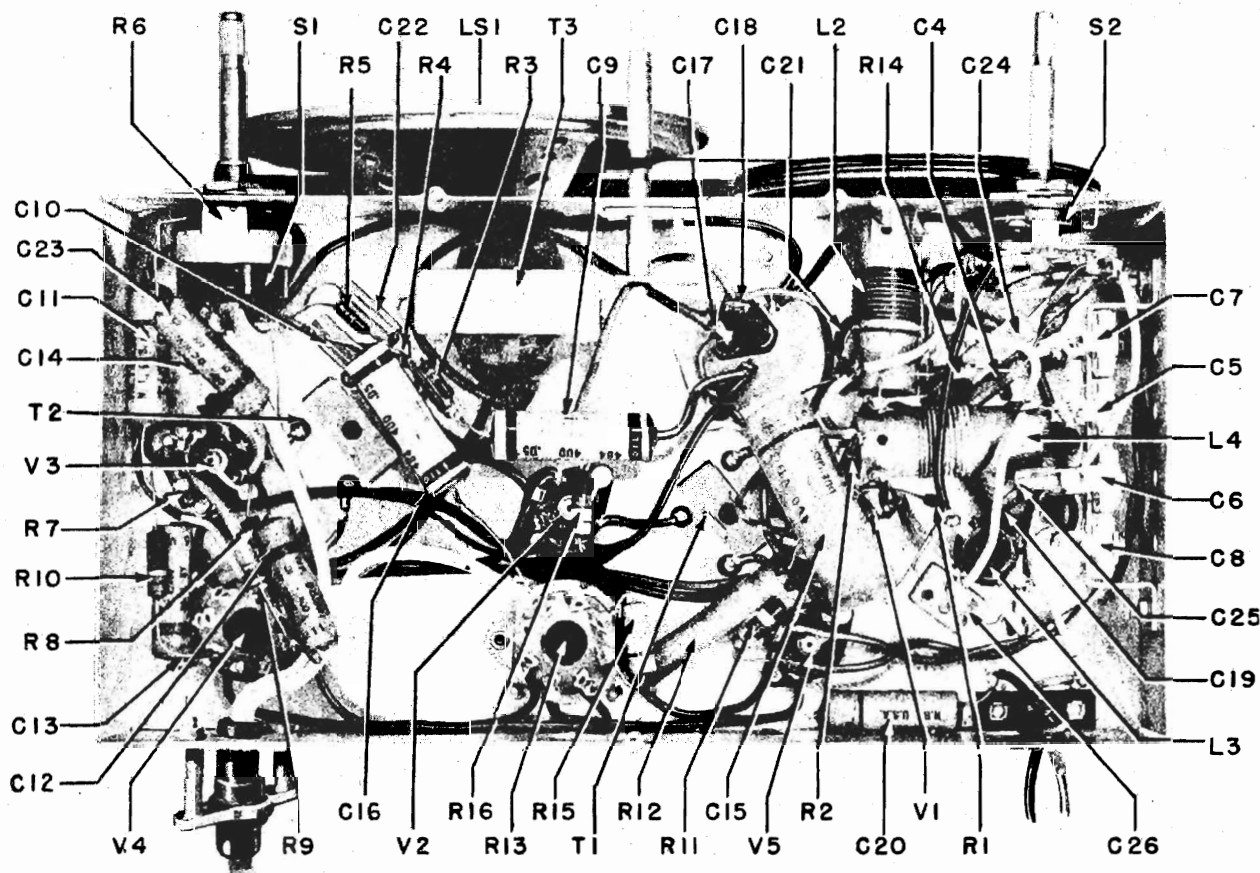
Keep signal generator output at lowest practical level and make the following adjustments for maximum output meter reading in each case.



Top View of Chassis Showing Alignment Adjustment Positions

## ALIGNMENT CHART

DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	ADJUSTMENT POINTS
.1 MFD	455 Kc	B.C.	Tuning Condenser Fully Open	S1, S2, S3, S4
200 MMFD	1600 Kc	B.C.	Tuning Condenser Fully Open	C3
200 MMFD	1500 Kc	B.C.	1500Kc	C8
200 MMFD	600 Kc	B.C.	Rock at 600 Kc	C6
200 MMFD	900 Kc	B.C.	900 Kc	Check Osc. Crossover
400 CHMS	18 Mc	S.W.	Tuning Condenser Fully Open	C5
400 CHMS	17 Mc	S.W.	1500 Kc	C7

SCHEMATIC  
NO. OF PART

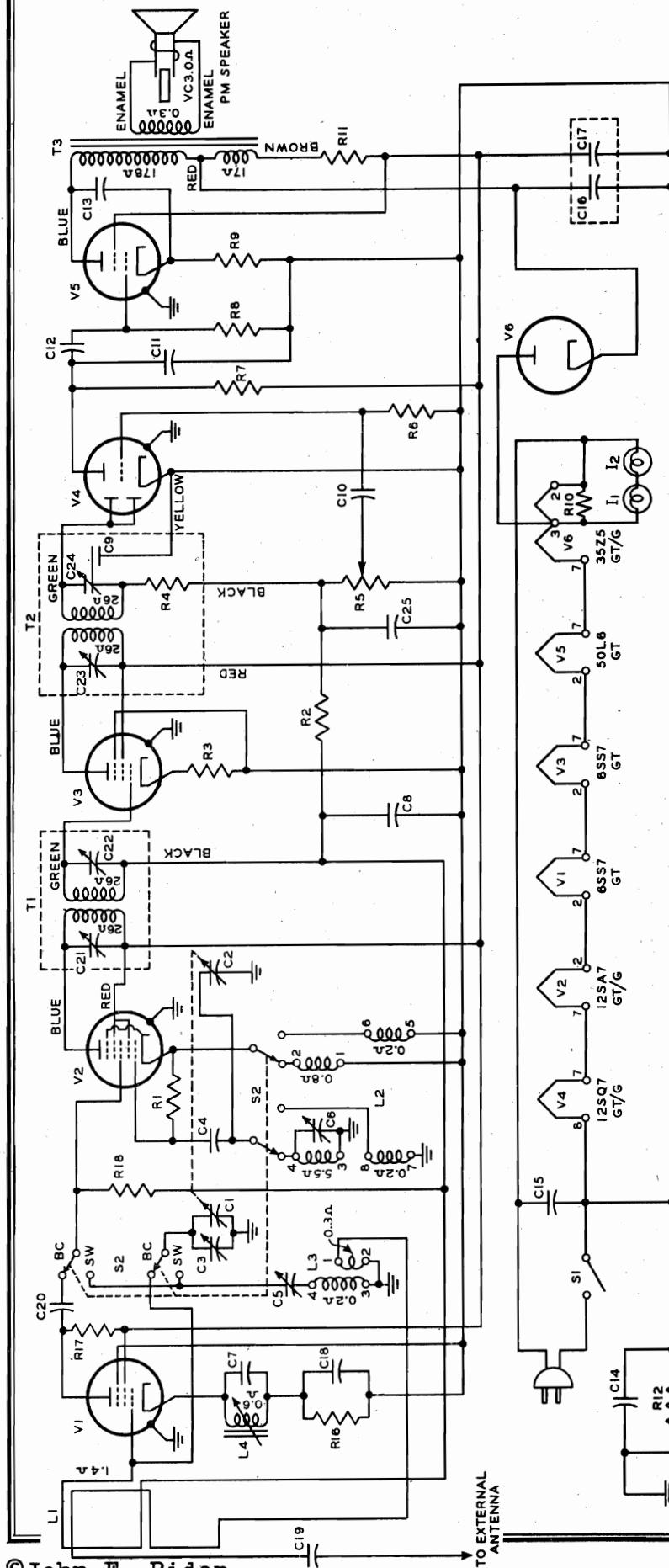
## DESCRIPTION

C1	2 Gang Variable
C2	Part of C1
C3	Part of C2
C4	56 mmfd Mica 10% 500 V D.C. Working
C5	Compression Trimmer 3.0-35 mmfd
C6	Compression Trimmer 70-470 mmfd (Part of C5)
C7	Compression Trimmer 3.0-35 mmfd (Part of C5)
C8	Compression Trimmer 3.0-35 mmfd (Part of C5)
C9	.05 mfd., Tubular, Paper, 400 V D.C. Working
C10	100 mmfd Ceramic, 20%, (Part of T2)
C11	.01 mfd., Paper, Tubular, 400 V D.C. Working
C12	.01 mfd., Paper, Tubular, 400 V D.C. Working
C13	.01 mfd., Paper, Tubular, 400 V D.C. Working
C14	.0015 mfd., Paper, Tubular, 400 V D.C. Working
C15	.2 mfd., Paper, Tubular, 400 V D.C. Working
C16	.05 mfd, Paper, Tubular, 400 V D.C. Working
C17	Electrolytic 2 Section Common Cathode 40 mfd. 250 DCV, Sect. 1
C18	40 mfd. 250 DCV, Sect. 2
C19	Part of C17
C20	.005mfd., Paper, Tubular 600 V D.C. Working
C21	.005 mfd., Paper, Tubular 600 V D.C. Working
C22	220 mmfd., mica, 20% 500 V D.C. Working
C23	100 mmfd, mica, 20% 500 V D.C. Working

SCHEMATIC  
NO. OF PART

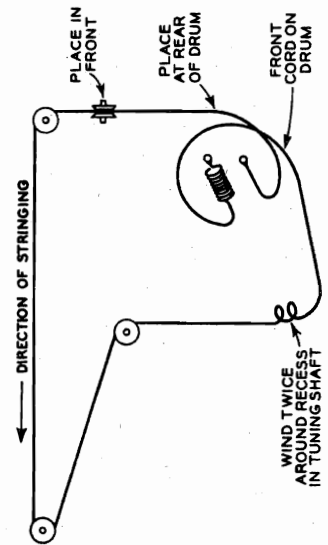
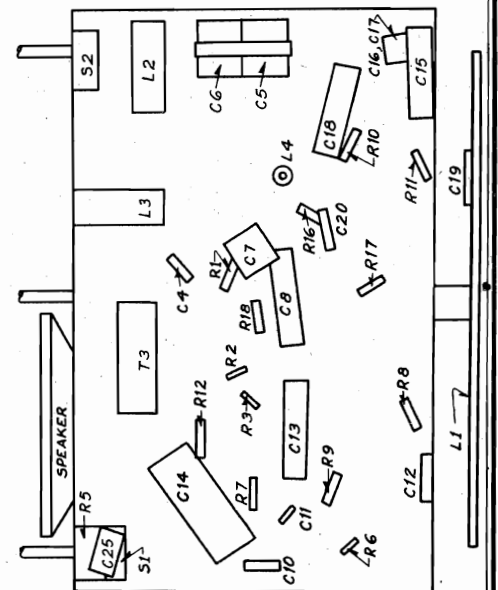
## DESCRIPTION

C23	.01 mfd., Paper, Tubular, 400 V D.C. Working
C24	7500 mmfd., mica, 10% 500 V D.C. Working
C25	220 mmfd., mica, 10% 500 V D.C. Working
C26	15 mmfd., mica, 10% 500 V D.C. Working
L1, 12	3.2 V 160 MA. Miniature Bayonet Base
L1	Pri. Inductance 3600 uh, Sec. Inductance 203.5 uh 1%
L2	Sec. Inductance 1.5 uh, 3%
L3	Sec. Inductance, 98.5 uh, 1%
L4	Sec. Inductance, 1.4 uh, 3%
LS1	5" P.M., 3.2 ohm V.C.
R1	22000 ohms, 20% 1/2 watt carbon
R2	1.0 megohm, 20% 1/2 watt carbon
R3	2.2 megohm, 20% 1/2 watt carbon
R4	47000 ohms, 20% 1/2 watt carbon (Part of T2)
R5	0.47 megohm, 20% 1/2 watt carbon
R6	2.0 megohm, Taper 0.2 megohm at 1/2 rotation, with "ON-OFF" Switch
R7	10.0 megohm, 20% 1 1/2 watt carbon
R8	0.22 megohm, 20%, 1/2 watt carbon
R9	0.47 megohm, 20%, 1/2 watt carbon
R10	150 ohms, 10%, 1/2 watt carbon
R11	270ohms, 10%, 1/2 watt carbon
R12	1800ohms, 5%, 2 watt carbon
R13	410/200 ohms
R14	47000 ohms, 20%, 1/2 watt carbon
R15	680 ohms, 5%, 1 watt carbon
R16	330 ohms, 10%, 1/2 watt carbon
S1	Part of R6
S2	Wafer Switch
T1	Double Tuned, 455 Kc
T2	Double Tuned, 455 Kc
T3	Fri. Imp. 2500 ohms, Sec. Imp. 3.2 ohms, Humbucking Winding
V1	12BE6
V2	12BA6
V3	12AT6
V4	50L6-GT
V5	35W4

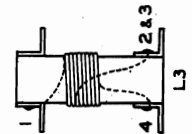


©John F. Rider

IF PEAK 455 KC



Dial Cord Stringing



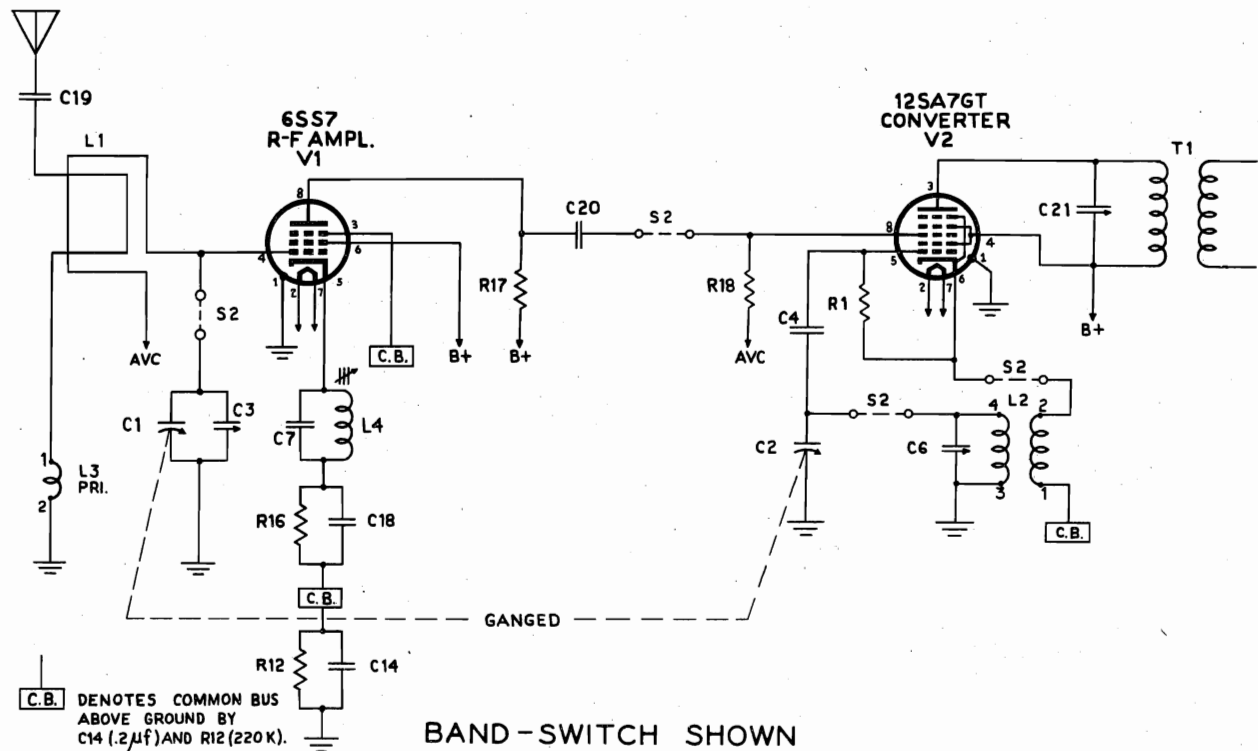
Coil Details

# "clarified schematics"

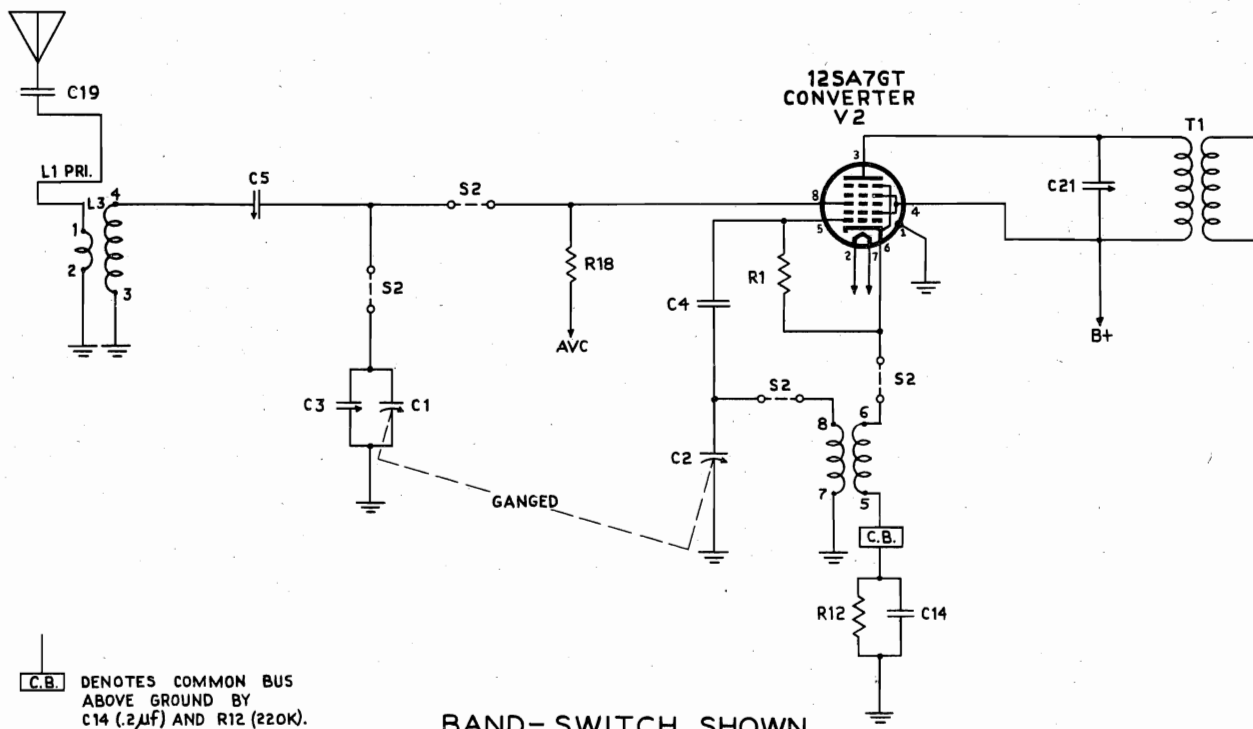
PAGE 16-6 FEDERAL

MODELS 1030T, 1540T

FEDERAL TEL. & RADIO CORP.



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



BAND-SWITCH SHOWN AT 2<sup>ND</sup> POSITION.  
SHORT WAVE BAND  
5.6 - 15.5 MC

## FEDERAL TEL. &amp; RADIO CORP.

MODELS 1030T.1540T

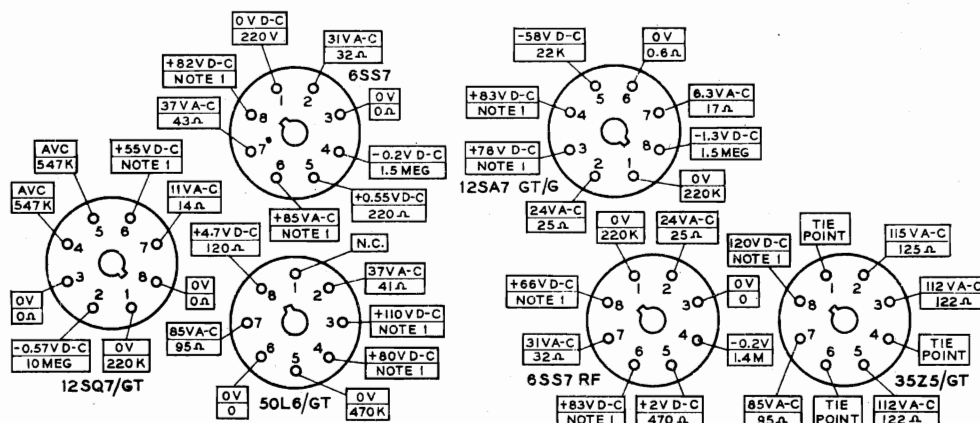


Fig. 4. Voltage and Resistance Analysis Chart

1. Resistance readings at these points will vary since they are in series with the leakage resistance of the electrolytic condensers which is subject to change.
2. All D.C. measurements were made with a meter having a sensitivity of 20,000 ohms per volt. A.C. measurements were made with a 1000 ohms per voltmeter.
3. Measured values are from socket pin to circuit ground. (pin 8 of 12SQ7 socket).
4. Tolerances of component values make possible a variation of  $\pm 20\%$  in readings indicated in chart.
5. Socket connections are shown as bottom views.

SCHEMATIC NO. OF PART	NAME OF PART	DESCRIPTION	FUNCTION
C 1	Capacitor	2 Gang variable	Ant. Tuning
C 2	"	Part of C 1	OSC. Tuning
C 3	"	Part of C 1	Ant. Trimmer
C 4	"	100 mmfd mica $\pm 10\%$ 500 v D.C. working	osc Grid coupling
C 5	"	Compression trimmer 70-470 mmf	S. W. Padder
C 6	"	Compression trimmer 1.6-18 mmf (part of C 5)	B.C. trimmer
C 7	"	3000 mmfd mica $\pm 10\%$ 500 v D.C. working	I.F. trap
C 8	"	.05 mfd, tubular, paper, 400 v D.C. working	AVC bypass
C 9	"	125 mmfd mica, $\pm 25\%$ part of T2	Diode load bypass
C 10	"	.01 mfd, paper, tubular 400 v D.C. working	1st audio coupling
C 11	"	.0015 mfd, mica $\pm 20\%$ 500 v C.C. working	1st audio plate bypass
C 12	"	.01 mfd, paper tubular 400 v D.C. working	2nd audio coupling
C 13	"	.01 mfd, paper tubular 400 v D.C. working	Output tube Plate bypass
C 14	"	.2 mfd paper tubular 400 v D.C. working	Line bypass
C 15	"	.05 mfd paper dielectric 400 v D.C. working	Line bypass
C 16	"	Electrolytic, 2 section Common cathode 40 mfd 150 DCWV Sect. 1 40 mfd 150 DCWV Sect. 2	Filter
C 17	"	Part of C 16	Filter
C 18	"	.1 mfd, paper, tubular 400 v D.C. working	Cathode bypass, rf tube
C 19	"	.002 mfd, paper, tubular, 600 v D.C. working	External Ant. Coupling
C 20	"	470 mmf. mica $\pm 20\%$ 500 v D.C. working	Coupling, Grid of convertor tube
C 21	"	Part of T1	I.F. Trimmer
C 22	"	Part of T1	" " "
C 23	"	Part of T2	" " "
C 24	"	Part of T2	" " "
C 25	"	100 mmf. mica $\pm 10\%$ 500 v D.C. working	Volume Control bypass
I1, I2	Lamp	3.2 v, 160 ma. miniature bayonet base	Dial light
L1	Inductor	200.5 uh $\pm 1$ uh; dist. cap. 12mmf max.	Loop Antenna
L2	"	2 band osc coil assy.	Oscillator Coil
L3	"	SW. RF Coil	Antenna Coil
L4	"	Slug tuned, variation 30-55 uh $\pm 10\%$	I.F. Trap
LS1	Speaker	5" p.m., 3.2 ohm v.c.	Speaker
R1	Resistor	22000 ohms $\pm 20\%$ 1/2 watt carbon	Oscillator grid
R2	"	1.0 megohm $\pm 20\%$ , 1/2 watt carbon	AVC Coupling
R3	"	220 ohms $\pm 20\%$ , 1/2 watt carbon	I.F. Cathode
R4	"	47000 ohms, $\pm 20\%$ , 1/2 watt carbon Part of T2	Volume control decoupling
R5	Potentiometer	500,000 ohms taper 50,000 ohms at 1/2 rotation, with "on-off" switch	Volume control
R6	Resistor	10.0 megohm $\pm 20\%$ , 1/2 watt carbon	1st audio grid
R7	Resistor	0.22 megohm $\pm 20\%$ , 1/2 watt carbon	1st Audio plate
R8	"	0.47 megohm $\pm 20\%$ , 1/2 watt carbon	Output tube grid
R9	"	120 ohms $\pm 10\%$ , 1/2 watt carbon	Output tube cathode
R10	"	270 ohms $\pm 10\%$ , 1/2 watt carbon	Pilot light shunt
R11	"	1500 ohms $\pm 5\%$ , 1 watt carbon	Filter
R12	"	220,000 ohms $\pm 20\%$ , 1/2 watt carbon	Chassis return
R16	"	470 ohms $\pm 20\%$ , 1/2 watt carbon	Cathode R.F. tube
R17	"	4700 ohms $\pm 20\%$ , 1/2 watt carbon	Plate R.F. tube
R18	"	0.1 megohm $\pm 20\%$ , 1/2 watt carbon	Grid of Mixer tube
S1	Switch	Part of R5	"On-Off"
S2	"	4 pole, 2 position	Band-Switch
T1	Transformer	Double tuned, 455 kc.	I.F. input
T2	"	"	I.F. output
T3	"	"	Audio output
V1	Tube	Primary Impedance 2500 ohms, secondary 3.2 ohms, with humbucking winding	R.F. amplifier
V2	"	6SS7 or 6SS7/GT	Converter
V3	"	12SA7/GTG	I.F. amplifier
V4	"	6SS7 or 6SS7/GT	2nd Det. 1st audio
V5	"	12SQ7/GT	Power output
V6	"	50L6/GT	Rectifier
		35Z5/GT	

**POWER REQUIREMENTS:** 30 Watts at 105-125 Volts AC, 50-60 Cycles or 105-125 Volts DC.  
**TUNING RANGE:** 2 Bands. American Broadcast 550-1600 KC.  
 International Short Wave 5.6-15.5 MC.  
**ANTENNA:** Built in loop with facilities for connection to external antenna.

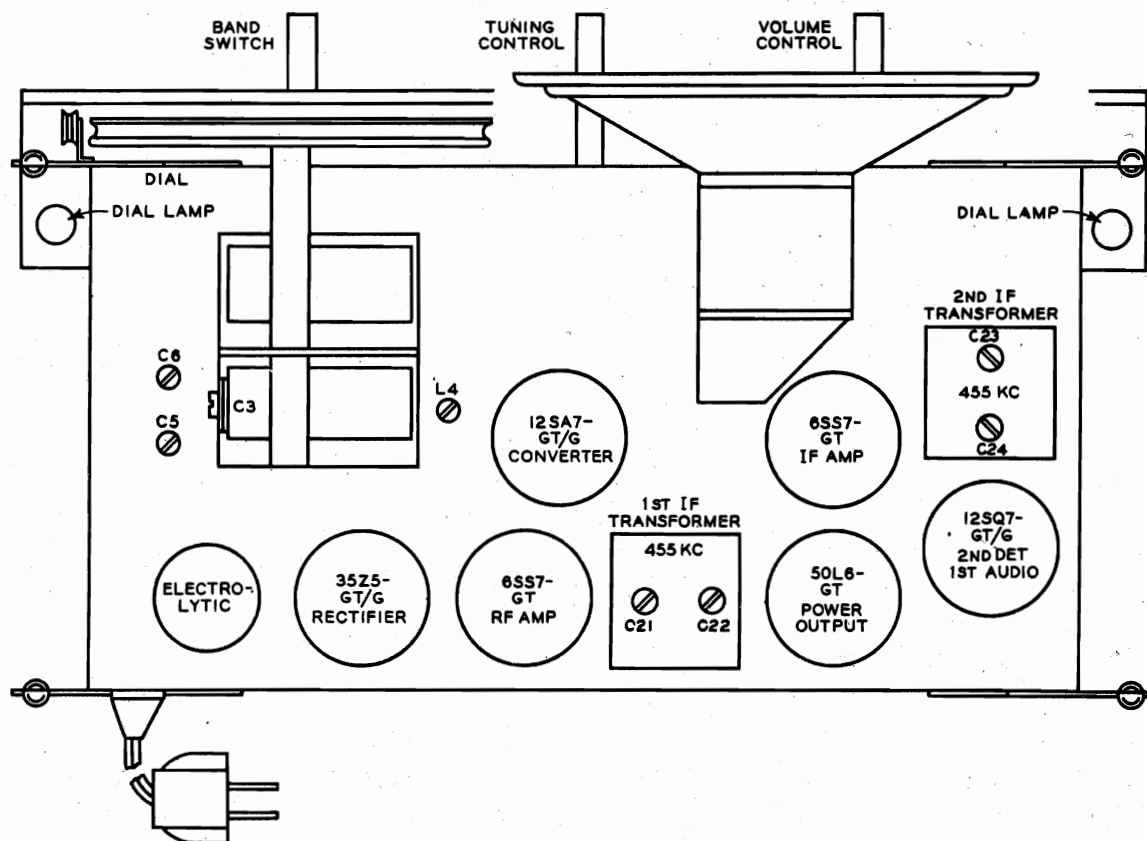


Fig. 1. Top View of Chassis showing Alignment Adjustment Positions.

### ALIGNMENT INSTRUCTIONS

Punch marks are provided on the dial back plate at 600 kc, 1000 kc, 1400 Kc and 1600 Kc for alignment purposes.

With tuning condenser completely open, set dial pointer to 1600 Kc punch mark.

Connect output meter across voice coil terminals on speaker frame.

Connect low side of signal generator lead thru a 0.1 mfd coupling condenser to chassis ground. Connect high side of generator thru proper dummy antenna to the receiver external antenna connection.

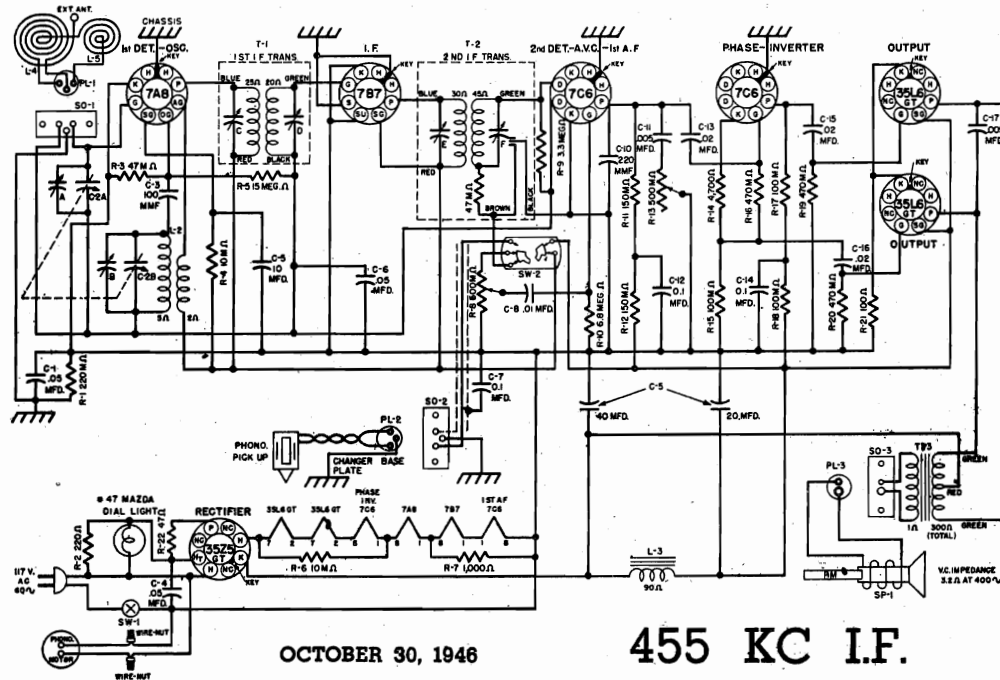
Keep signal generator output at lowest practical level and proceed according to table below.

### ALIGNMENT CHART

DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	ADJUSTMENT POINTS	OUTPUT METER READING
0.1 MFD.	455 Kc	B.C.	Tuning Condenser Open	C24, C23, C22, C21	Max.
0.1 MFD.	455 Kc	B.C.	Tuning Condenser Open	L4	Min.
200 MMFD.	1600 Kc	B.C.	Tuning Condenser Open	C6	Max.
200 MMFD.	1400 Kc	B.C.	1400 Kc	C3	Max.
200 MMFD.	600 Kc	B.C.	600 Kc	L1	Max.
				(Check, adjust if necessary)	
400 ohms	6 Mc	S.W.	6 Mc	C5	Max.



## THE FIRESTONE TIRE &amp; RUBBER CO.



OCTOBER 30, 1946

455 KC I.F.

ALL SOCKETS AND PLUGS SHOWN FROM PIN END VIEW  
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

SYMBOL PART NO.		DESCRIPTION	LIST PRICE	SYMBOL PART NO.		DESCRIPTION	LIST PRICE
CAPACITORS				COILS AND TRANSFORMERS			
C-1	BD410503	Capacitor—.05 Mfd., 400 volt.	.35	L-4, 5	D-57259	Loop Antenna assembly.	\$1.00
C-2A, B	C-57243-1	Capacitor—Variable gang	4.50	L-2	B-56143	Coil—Oscillator assembly	*
C-3	BM74A101	Capacitor—Mica 100 Mmfd. $\pm$ 20%	.35	L-3	B-51726-1	Filter Choke, 80 ma.	2.00
C-4	BD410503	Capacitor—.05 Mfd., 400 volt.	.35	T-1	B-51010-3	Transformer—1st I.F.	2.00
C-5	A-56154	Capacitor—Electrolytic. 40-20-10 Mfd., 150 volt.	1.60	T-2	B-51011-3	Transformer—2nd I.F.	2.50
C-6	BD210503	Capacitor—.05 Mfd., 200 volt.	.30	T-3	B-57253-1	Transformer—Output	1.50
C-7	BD410104	Capacitor—.01 Mfd., 400 volt.	.40	OTHER ELECTRICAL PARTS			
C-8	BD410103	Capacitor—.01 Mfd., 400 volt.	.30	SW-1		Switch—power part of R-8 and R-13.	
C-10	BM74A221	Capacitor—Mica 220 Mmfd. $\pm$ 20%	.40	SW-2	B-56156-1	Switch—Radio-Phono	1.00
C-11	BD610302	Capacitor—.005 Mfd., 600 volt.	.30	SP-1	C-57272	Speaker—6" x 9" Permanent Magnet	*
C-12	BD410104	Capacitor—.01 Mfd., 400 volt.	.40		A-6158	Lamp—Dial Mazda No. 47	.15
C-13	BD410203	Capacitor—.02 Mfd., 400 volt.	.30	MISCELLANEOUS PARTS			
C-14	BD410104	Capacitor—.01 Mfd., 400 volt.	.40	B-57275-1	Background for dial.	*	
C-15	BD410203	Capacitor—.02 Mfd., 400 volt.	.30	A-54848	Bushing—Strain relief (power cord).	.20	
C-16	BD410203	Capacitor—.02 Mfd., 400 volt.	.30	A-56155	Bushing—Tuning control shaft.	*	
C-17	BD610502	Capacitor—.005 Mfd., 600 volt.	.30	E-57270-1	Cabinet	*	
RESISTORS				B-51330-1	Channel rubber—mtg. for Dial scale.	.04	
R-1	BR17B224	Resistor—Carbon, 220,000 Ohms, $\frac{1}{2}$ watt.	.15	B-55402-1	Dial Cable assembly (includes clips at end of cable)	.25	
R-2	BR17C221	Resistor—Carbon, 220 Ohms, $\frac{1}{2}$ watt.	.15	B-57269-1	Dial scale—plastic	*	
R-3	BR17B473	Resistor—Carbon, 47,000 Ohms, $\frac{1}{2}$ watt.	.15	B-51427-2	Grommet—rubber; mtg. for variable gang.	.05	
R-4	BR17B103	Resistor—Carbon, 10,000 Ohms, $\frac{1}{2}$ watt.	.15	B-51124-1	Knob—Volume & switch, tuning or radio-phonograph	.15	
R-5	BR17B156	Resistor—Carbon, 15 Meg., $\frac{1}{2}$ watt.	.15	B-56138-1	Knob—Tone Control	.15	
R-6	BR17E103	Resistor—Carbon, 10,000 Ohms, $\frac{1}{2}$ watt.	.15	BN751V02	Pinnut—No. $\frac{3}{8}$ -32; for mtg., controls.	.02	
R-7	BR17B102	Resistor—Carbon, 1,000 Ohms, $\frac{1}{2}$ watt.	.15	BN770S02	Pinnut—No. 10-24; for mtg., record changer.	.01	
R-8	B-56142-1	Control—Dual Potentiometer, with switch 500,000 Ohms, (V. C.)	2.25	A-57271	Plug—3 Prong—Phono pick-up connection	*	
R-9	BR17B335	Resistor—Carbon, 3.3 Meg., $\frac{1}{2}$ watt.	.15	B-55130-9	Pointer	.15	
R-10	BR17B685	Resistor—Carbon, 6.8 Meg., $\frac{1}{2}$ watt.	.15	B-58069-1	Power Cord	.75	
R-11	BR17B154	Resistor—Carbon, 150,000 Ohms, $\frac{1}{2}$ watt.	.15	BP934G02	Screw—No. 4 x $\frac{1}{2}$ "; for mtg., loop & back.	.03	
R-12	BR17B154	Resistor—Carbon, 150,000 Ohms, $\frac{1}{2}$ watt.	.15	BP928N02	Screw—No. 8 x $1\frac{1}{8}$ "; for mtg., chassis.	.03	
R-13	B-56142-1	Control—500,000 Ohms, (T. C.) part of R-8	*	BS016S09	Screw—No. 10-24 x $1\frac{1}{2}$ "; for mtg., record changer	.04	
R-14	BR17B472	Resistor—Carbon, 4,700 Ohms, $\frac{1}{2}$ watt.	.15	A-56136	Shaft—tuning control	.20	
R-15	BR17B104	Resistor—Carbon, 100,000 Ohms, $\frac{1}{2}$ watt.	.15	A-54726	Socket—octal base	.20	
R-16	BR17B474	Resistor—Carbon, 470,000 Ohms, $\frac{1}{2}$ watt.	.15	A-54900	Socket—local base	.25	
R-17	BR17B104	Resistor—Carbon, 100,000 Ohms, $\frac{1}{2}$ watt.	.15	A-57273	Socket—3 Prong; Phono pick-up & loop antenna	.20	
R-18	BR17B104	Resistor—Carbon, 100,000 Ohms, $\frac{1}{2}$ watt.	.15	A-57258	Socket—2 Prong; speaker connection	.20	
R-19	BR17B474	Resistor—Carbon, 470,000 Ohms, $\frac{1}{2}$ watt.	.15	A-6182-5	Socket—dial lamp (with leads)	.15	
R-20	BR17B474	Resistor—Carbon, 470,000 Ohms, $\frac{1}{2}$ watt.	.15	A-51331	Spring—Mtg. for channel rubbers	.10	
R-21	BR16C101	Resistor—Carbon, 100 Ohms, $\pm$ 10% $\frac{1}{2}$ watt.	.15	A-51787	Spring—dial cable tension	.07	
R-22	BR17G470	Resistor—Carbon, 47 Ohms $\pm$ 20% 2 watt.	.30	A-50147	Spring—conical; for mtg., record changer	.10	
				BF13NT05	Washer—flat; for mtg., record changer.	.02	
				B-50156-1	Washer—rubber; for mtg., record changer.	.04	
				A-54492	Washer—"C"; tuning shaft.	.02	
				A-1089	Washer—cup; variable gang mtg.	.05	
				B-50964-3	Wirenut—phono motor power connection.	.03	

MODEL 4-A-17

THE FIRESTONE TIRE & RUBBER CO.

FREQUENCY RANGE:

540-1600 KC.

POWER SUPPLY

117 volts  
60 cycles A.C.  
55 watts (including changer)

POWER OUTPUT:

Undistorted—1.6 watts  
Maximum —2.2 watts

SPEAKER:

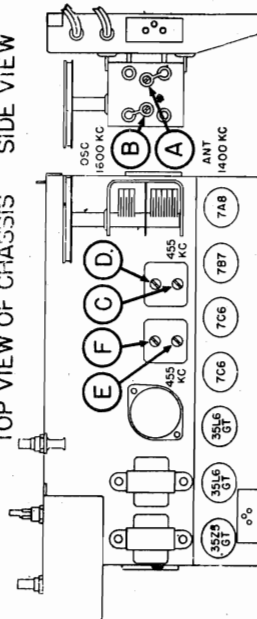
6 x 9 elliptical type PM  
Voice coil impedance—  
3.2 ohms at 400 cycles

1. The chassis, record changer and loop should remain in their normal position in the cabinet when making loop adjustment.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, slide pointer along dial cord to correct position.
3. Connect output meter across speaker voice coil.
4. Connect the ground of signal generator to B-.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Radio-Phono switch in Radio position.

NOTE: For best results, it is advisable to use an isolation transformer between the 117 V. AC line and AC input to receiver.

DUMMY ANT.	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER LETTER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
0.1 Mfd. Condenser	7A8 Grid	455 KC	Any point where it does not affect the signal	F-E D-C	2nd IF 1st IF	Adjust for maximum output. Then repeat adjustment.
0.1 Mfd. Condenser	7A8 Grid	1620 KC	Gang condenser completely out of mesh.	B	Oscillator	Adjust for maximum output.
RMA Loop		1400 KC	Tuned to 1400 Kc. Generator signal	A	Loop Antenna	Adjust for maximum output.

TOP VIEW OF CHASSIS SIDE VIEW



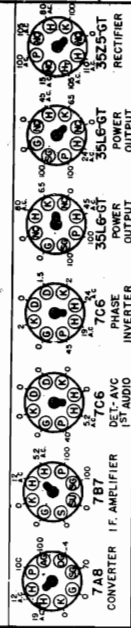
SOCKET VOLTAGES

MEASURED WITH VOLTMETER HAVING SENSITIVITY OF 1000 OHMS PER VOLT  
TONE CONTROL IN CLOCKWISE POSITION  
VOLUME ON FULL WITH NO SIGNAL

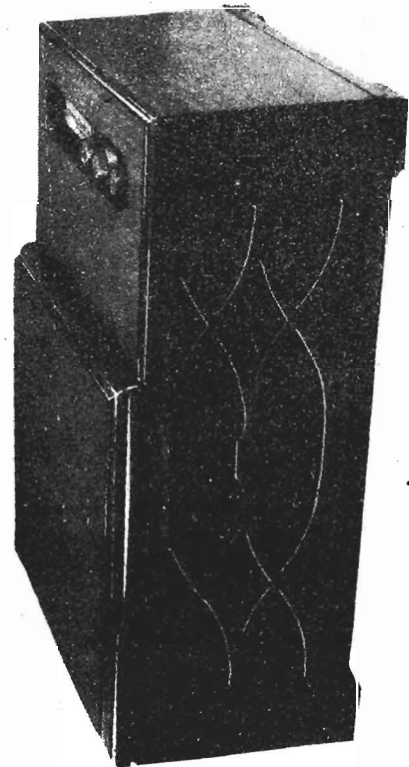
RADIO-PHONO SWITCH IN RADIO POSITION DIAL TUNED TO 540 KC

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE AC. POWER SUPPLY USED FOR THESE MEASUREMENTS.  
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.



REAR OF CHASSIS



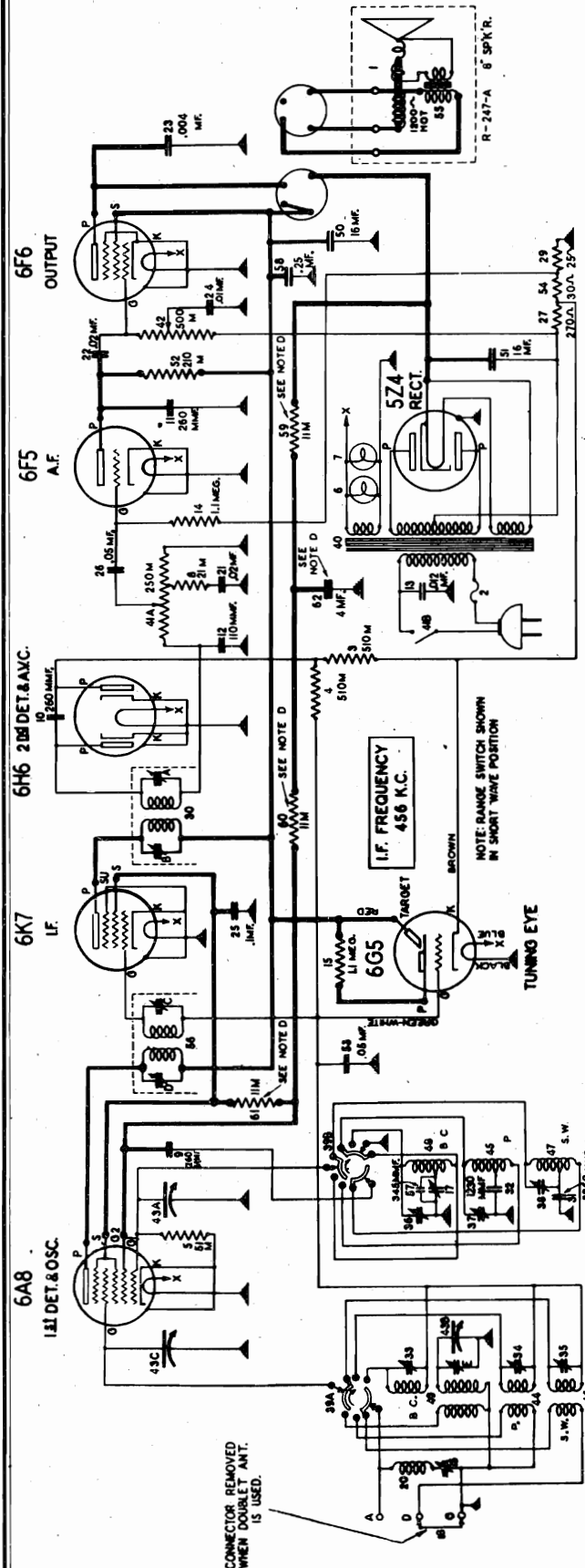
NOTE D: In receivers having serial numbers below 453,400 resistors 59, 60, and 61 are omitted and the screen grids of the 6K7 and 6A8 receive their current through a 26,000 ohm  $\frac{1}{4}$  watt resistor which is connected to the screen grid of the 6F6. The anode grid of the 6A8 is connected in series with a 21,000 ohm  $\frac{1}{4}$  watt resistor to the screen grid of the 6F6. Condenser 62 (4 mfd. 250 V.) is also omitted.

**NOTE B:** The grid bias for the 6A8, 6K7, and the anode voltage of the A.V.C. section of the 6H6 is  $-3.0$  volts measured across resistors 29 and 54.

**NOTE C:** The grid bias for the 6F6 output tube is —17.0 volts measured across resistors 29, 54 and 27.

**IMPORTANT:** Use a high resistance voltmeter of 1,000 ohms per volt.

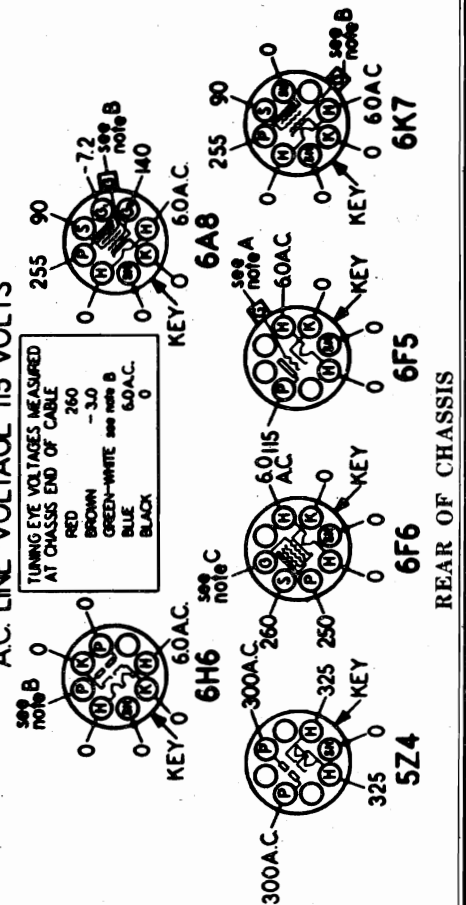
NOTE A: The grid bias for the 6F5 is  $-1.3$  volts measured across resistor 29.



## SOCKET VOLTAGES

VOLUME CONTROL ON FULL ANTENNA GROUNDED  
RANGE SWITCH SET ON BROADCAST POSITION DIAL TUNED TO 530 KC.  
BOTTOM VIEW OF CHASSIS

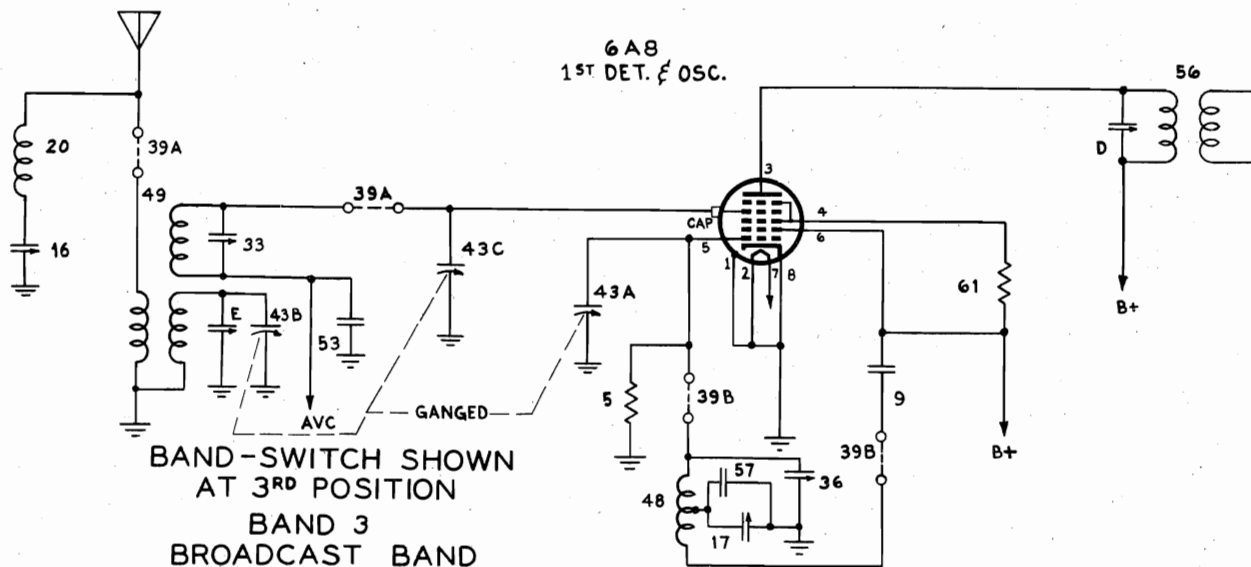
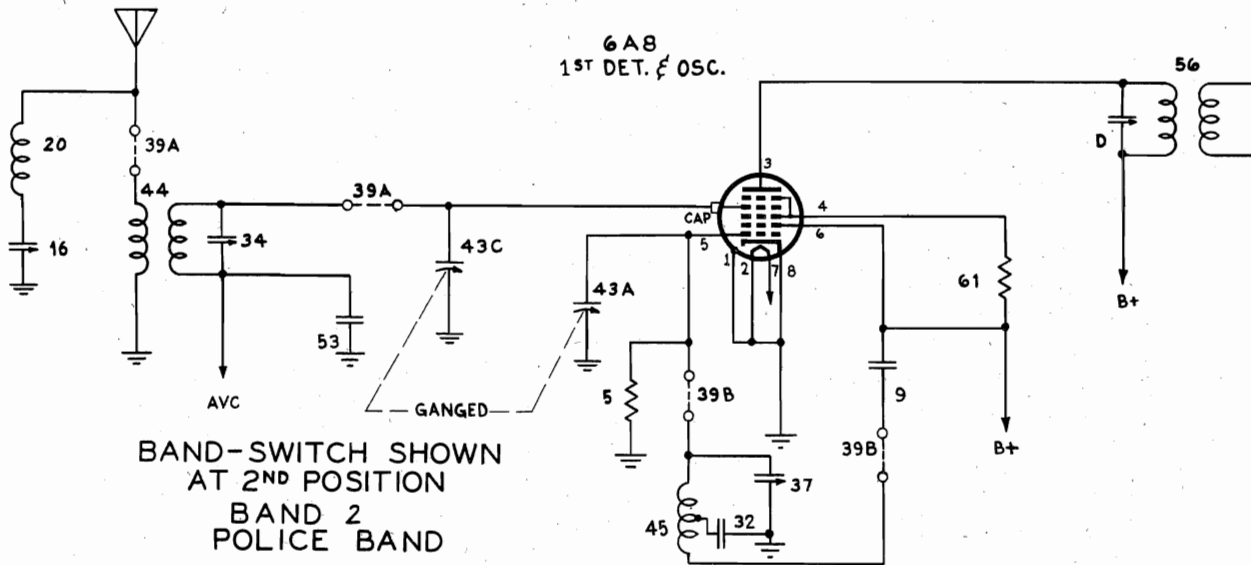
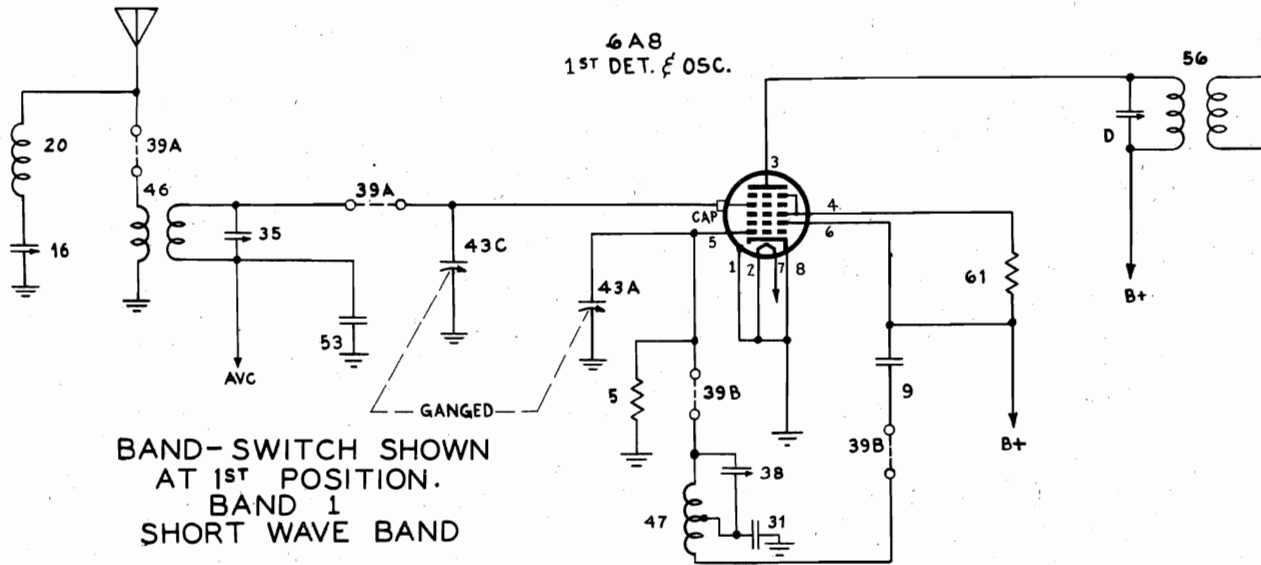
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS  
AC LINE VOLTAGE 115 VOLTS



# "clarified schematics"

PAGE 16-4 FIRESTONE

MODELS 7379-1, 7405-3, THE FIRESTONE TIRE & RUBBER CO.  
7406-1



# THE FIRESTONE TIRE & RUBBER CO.

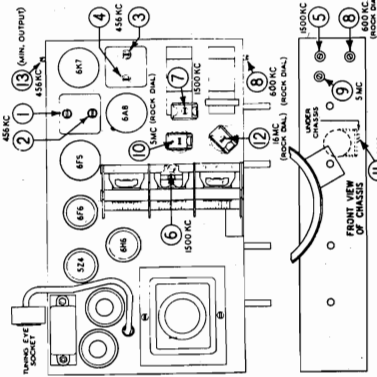
MODELS 7379-1, 7405-3,  
7406-1

**CALIBRATION AND ALIGNMENT**  
**Aligning Equipment**  
For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 456 KC. to 16 MC. are required. Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

**Aligning the I. F. Amplifier**  
Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



## TRIMMER LOCATIONS

Trimmer Number	Alignment Frequency
1. 2nd I.F. transformer trimmer	456 KC.
2. 2nd I.F. transformer trimmer	456 KC.
3. 1st I.F. transformer trimmer	456 KC.
4. 1st I.F. transformer trimmer	456 KC.
5. Broadcast oscillator shunt trimmer	1500 KC.
6. Broadcast antenna shunt trimmer	1500 KC.
7. Broadcast oscillator series pad	600 KC.
8. Police oscillator shunt trimmer	5 MC.
9. Police antenna shunt trimmer	5 MC.
10. Short wave oscillator shunt trimmer	16 MC.
11. Short wave antenna shunt trimmer	16 MC.
12. Wave-trap trimmer	456 KC.

**Broadcast Band Calibration and Alignment**  
With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1,500 KC. and turn the receiver dial pointer to 1,500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 5 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

## Wave-Trap Adjustment

The wave-trap adjusting trimmer, No. 13, is located on the back of the chassis. Leave the test oscillator connected to the A and G terminals through a 400 ohm resistor and set the oscillator at 456 KC. Then adjust the wave-trap trimmer No. 13 for minimum output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

Check the adjustment of trimmers 5, 6, and 7 at 1,500 KC.

## Band No. 2 Calibration and Alignment

Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 9 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Con-

tinue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

## Band No. 3 Calibration and Alignment

Turn the range switch to the extreme counterclockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 11 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther out.

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

## MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

Part Number	Description	List Price
67590	Flat steel mtg. washer	\$.01
84428	Rubber chassis mtg. bushing	.03
84429	10 x 1 1/2 chassis mtg. screw	.03
84430	Phil. 1/2 x 1/4 (25) screws	.01
85066	G.D.A. terminal strip	.20
85321	Ground connector for G.D.A. strip	.01
88056	Fuse mounting	.16
88057	Fuse cover	.06
88675	Speaker socket	.12
88676	Eye cable & plug	.20
89424	Knob; range switch	.22
89425	Knob; volume control	.20
89426	Knob; volume control	.20

## TUNING DRIVE AND DIAL PARTS

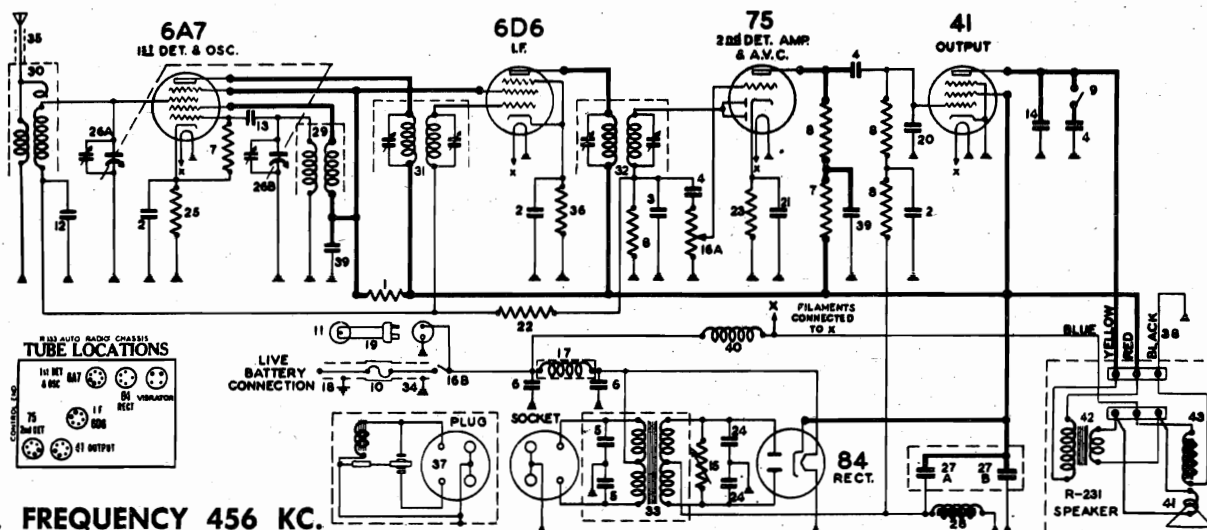
Part Number	Description	List Price
83278	Dial lamp	\$.15
88564	Pointer and stud assembly	.12
88743	Dial drive shaft	.15
88744	Dial drive gear	.06
88745	Dial ring and bushing (for edge lighting)	.30
88748	Escutcheon with glass	.90
88956	No. 2 x 1/4 R.H. wood screw for escutcheon (each)	.165
89283	Escutcheon (each)	.01
89284	Escutcheon (each)	.02
89285	Dial background	.12

Diagram Part Number	Description	List Price
1	E-247-A 8-inch Dynamic Speaker	\$9.00
2	IMPORTANT: Fuse, 1 ampere (USE THIS SIZE ONLY)	
3-4	83072 resistor 50 ohm 1/2 watt carbon	.15
5	83080 resistor 51,000 ohm 1/2 watt carbon	.20
6-7	83278 Pilot lamp, 6-8 volt	.16
8	83286 resistor 21,000 ohm 1/2 watt carbon	.20
9-10-11	83530 250 mfd. mica condenser	.15
12	83531 250 mfd. mica condenser	.16
13	83576 .012 mfd. 1,000 V. shielded condenser	.35
14-15	84235 1.1 meg. 1/2 watt carbon resistor	.20
16	85285 Wave trap trimmer	.40
17	85521 Adding trimmer	.40
18	85521 G.D.A. trimmer	.40
20	88014 Wave trap coil	.50
21-22	88026 .02 mfd. 400 volt paper condenser	.30
23	88926 .004 mfd. 750 volt paper condenser	.24
24	88926 .004 mfd. 400 V. paper condenser	.30
25	88046 .1 mfd. 150 V. paper condenser	.30
26	88189 .05 mfd. 200 volt paper condenser	.35
27	88463 370 ohm 1 watt carbon resist.	.15
28	88466 25 ohm 1 watt wire wound resistor	.15
29	88468 2nd I.F. transformer	2.40
31	88472 3850 mfd. mica condenser	.35
32	88473 1230 mfd. mica condenser	.25
33-35	88477 Trimmer condenser	.12
39A-39B	88480 Range switch	1.90
40	88481 Power transformer, 115 V. 60 cycle	5.00
40	88216 Power transformer, 100 to 240 V.-25 to 133 cycles	11.50
41A	88487 Volume control (250,000 ohm) A.C. line switch	\$1.25
41B	88488 One control (500,000 ohm)	.80
42A to C	88493 Antenna coil (police)	5.85
44	88499 Antenna coil (police)	.85
45	88501 Oscillator coil (police)	.65
46	88502 Antenna coil (S.W.)	.80
47	88504 Oscillator coil (S.W.)	.80
48	88506 Oscillator coil (B.C.)	.55
49	88507 Antenna coil (B.C.)	1.60
50	88511 16 mfd. 300 volt electrolytic condenser	1.10
51	88512 16 mfd. 400 volt electrolytic condenser	1.10
52	88532 210,000 ohm 1/2 watt carbon resistor	.12
53	88534 150 volt 150 volt condenser (low loss)	.25
54	88613 30 ohm 1/2 watt wire wound resistor	.15
55	88529 On-put transformer (on R-247-A speaker)	2.00
56	88466 R-247-A speaker	2.40
40	88216 240 V.-25 to 133 cycles	11.50
57	88564 345 mfd. mica condenser	.25
58	88643 25 mfd. 300 V. paper condens.	.50
59-60	89751 11,000 ohm 1 watt carbon resistor	.12
61	89753 11,000 ohm 1/2 watt carbon resistor	.15
62	89755 4 mfd. 250 volt electrolytic condenser	1.00

Prices Subject To Change Without Notice

MODEL 7383-4

## THE FIRESTONE TIRE &amp; RUBBER CO.



I.F. FREQUENCY 456 KC.

Diag. No.	Part No.	DESCRIPTION	List Price	Diag. No.	Part No.	DESCRIPTION	List Price
1	66875	16,000 ohm 1 watt carbon resistor	\$.50	11	83278	Pilot lamp	\$.15
2	81630	.1 mfd. 100 volt paper condenser	.30	12	83353	.05 mfd. 100 volt paper condenser	.30
3	81812	.00051 mfd. mica condenser	.25	13	83539	.00026 mfd. mica condenser	.25
4	83007	.02 mfd. 600 volt paper condenser	.35	14	83706	.006 mfd. 600 volt condenser	.35
5	83058	.25 mfd. 100 volt paper condenser	.35	15	83725	0-500,000 globar resistor	.45
6	83063	.5 mfd. 100 volt paper condenser	.45	16A	83728	{ Volume control }	1.20
7	83080	51,000 ohm 1/4 watt resistor	.20	16B			
8	83082	260,000 ohm 1/4 watt resistor	.20	17	83730	R. F. Choke	.25
9	83179	Tone Control switch	.30	18	83777	Battery lead and fuse housing	.50
10	83207	Fuse	.05	19	83778	Light cable and plug assembly	.50

Diag. No.	Part No.	DESCRIPTION	List Price
20	83783	.00011 mfd. mica condenser	\$.16
21	83803	12 mfd. 15 volt electrolytic condenser	.80
22	84235	1.1 meg. 1/4 watt resistor	.20
23	84240	4000 ohm 1/4 watt resistor	.20
24	84850	.03 mfd. 750 volt paper condenser	.25
25	84888	300 ohm 1/2 watt resistor	.20
26A	84958	{ Two-gang variable condenser }	4.50
26B			
27A	84961	{ 4 mfd. 400 volt electrolytic condenser }	2.50
27B			
28	84962	Filter choke	1.25
29	84963	Oscillator coil assembly	1.00
30	84969	Antenna coil and shield assembly	1.25
31	84972	1st I.F. transformer assembly	2.75
32	84974	2nd I.F. transformer assembly	2.75
33	84975	Power transformer	3.50
34	84977	Battery lead and cap* (to chassis)	.34
35	84978	Antenna lead	.40
36	84979	250 ohm 1/2 watt resistor	.15
37	84995	Vibrator	5.00
38	85027	Speaker cable	.30
39	85029	.1 mfd. 300 volt paper condenser	.40
40	85048	Filament R.F. Choke	.25
41	85376	Diaphragm and voice coil assembly	2.00
42	85378	Output transformer	2.00
43	85379	Field coil	1.25

Part No.	DESCRIPTION	List Price
17166	Mounting nut	\$.05
83144	15,000 ohm spark plug suppressor	.35
83145	10,000 ohm distributor suppressor	.35
83319	Fuse insulator tube	.02
83737	Top cover knurled nuts	.06
84981	Tube shield section	.08
84982	Tube shield section (slotted)	.08
84983	Spring ring	.02
84984	Case assembly (less covers)	3.50
84987	Speaker grille cloth	.12
84990	Single hole mounting plate	.80
84991	Bottom cover	1.00
84992	Top cover	1.00
85012	Mounting bolt	.06
85026	Dash support washer	.05
15214	Long mtg. strap screw No. 10-32x1 1/4"	\$.01
81214	Flexible casing set screw	.02
83919	Bezel and glass assembly	.50
83920	Pilot light button assembly	.25
84067	Steering column mtg. bracket	.25
84484	Knob (volume and tuning)	.14
85000	Remote control head (less shafts)	6.00
85011	Complete accessories for installation	5.00
85016	Dial face	.25

## FLEXIBLE SHAFTS

Part No.	DESCRIPTION	List Price
84996	Tuning shaft, 24 inches long	\$1.50
84998	Volume control shaft, 24 inches long	1.50
85104	Tuning shaft, 36 inches long	2.00
85105	Volume control shaft, 36 inches long	2.00
85107	Tuning shaft, 30 inches long	2.00
85108	Volume control shaft, 30 inches long	2.00



## THE FIRESTONE TIRE &amp; RUBBER CO.

**POWER SUPPLY PROTECTIVE RESISTOR**

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor (No. 15 in the circuit diagram) which is connected across the high voltage secondary of the power transformer. This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

**CALIBRATION AND ALIGNMENT**

A good modulated oscillator and a sensitive output meter are necessary for the proper calibration and alignment of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point at which to connect to the 41 plate is the yellow lead terminal on the speaker terminal strip.

During all calibration and alignment adjustments, keep the volume control full on.

**I. F. ALIGNMENT**

The I.F. trimmers are located on the top of the I.F. transformers and may be reached by removing the top cover. The modulated oscillator should be set to exactly 456 K.C. and connected from the 6A7 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all four I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

**R. F. ALIGNMENT**

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the trimmer nearest to the shaft end of the gang condenser to give maximum output meter reading.

**DIAL CALIBRATION**

The dial of the Auto Radio is calibrated in kilocycles except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the set should be calibrated when the arrangement of the shafts has been completed. Calibration is accomplished as follows:

Tune in a station of known frequency between 800 and 1100 KC. Insert a screw driver in the slotted end of the dial shaft projecting through the back of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the exact station frequency.

If the set is badly out of calibration, such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below. In order to reach this trimmer the chassis will have to be removed from the case as follows.

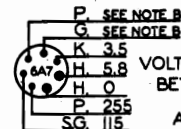
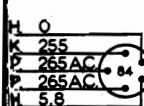
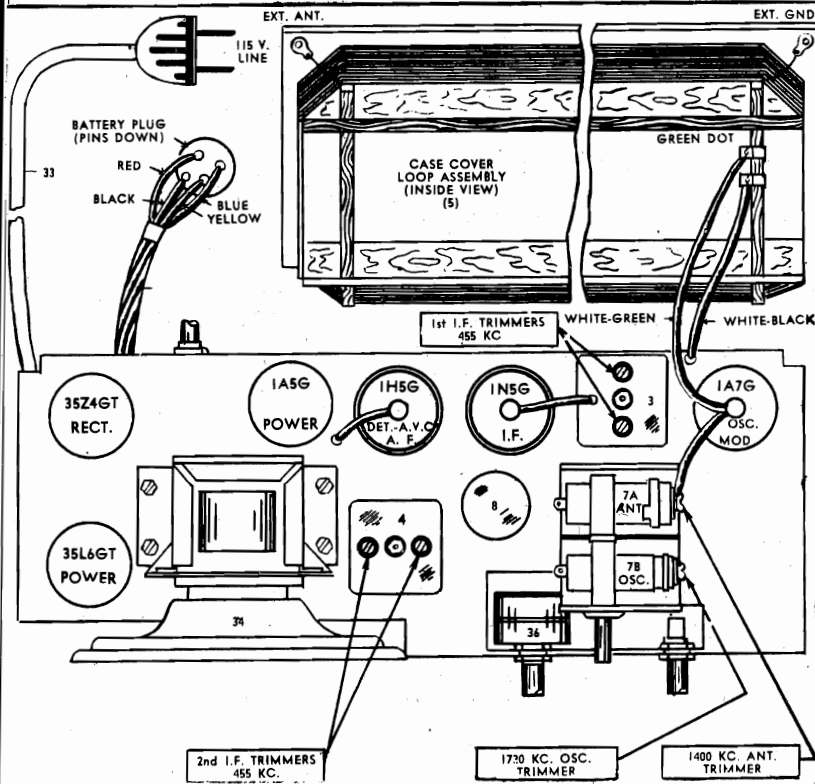
- (1) Remove the flexible shafts and dismount the receiver.
- (2) Remove the four terminals of the speaker cable from the speaker.
- (3) Remove the black antenna lead from the coil and unsolder the coil shield grounding braid.
- (4) Remove the blue dial light lead from the socket terminal.
- (5) Remove the yellow tone control lead from the tone control switch.
- (6) Remove the six slotted chassis fastening screws and slide the chassis out of the case.

Connect a .00025 mfd. condenser in series with the output lead of the test oscillator and the antenna lead lug on the antenna coil and connect the ground lead of the test oscillator to the chassis. Set the test oscillator to exactly 600 KC. Tune the radio set to maximum volume and set the dial to read exactly 6.0 (600 KC.). Then set the test oscillator to exactly 1400 KC. Turn the tuning knob until the dial pointer indicates 14.0 (1400 KC.). Adjust the oscillator shunt trimmer (on the gang condenser second from the control end) until the meter indicates maximum output. Then adjust the other gang condenser trimmer as directed under the R.F. alignment.

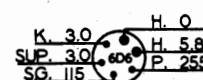
MODEL 7402-6  
MODEL 7383-4

## THE FIRESTONE TIRE &amp; RUBBER CO.

Illus. Part No.	MODEL 7402-6 Part Name	Description	List Price	Illus. Part No.	MODEL 7402-6 Part Name	Description	List Price
1	11824 Cable	Battery with four prong plug	\$0.35	29	9018 Resistor	Carbon 150 Ohm 1/2 Watt	\$0.19
2	10832 Choke	Filter	.85	30	1408 Resistor	Wire Wound, Flexible 25 Ohm 1 1/2 Watt	.19
3	10768 Coil	1st I.F. Transformer	1.05	31	10858 Resistor	Wire Wound, Flexible 200 Ohm 2 Watt	.22
4	10769 Coil	2nd I.F. Transformer	1.10	32	11823 Resistor	Wire Wound 1700 and 20 Ohm	.45
5	11830 Loop	Antenna Assembly complete with frame	1.75	33	11825 Resistor	Line Cord	.90
6	11813 Coil	Oscillator	.65	34	11821 Speaker	P.M. Dynamic 5"	4.00
7	11814 Condenser	Tuning Two Gang	1.65	35	11815 Switch	Voltage Selector	.90
8	11822 Condenser	Tubular Dry Electrolytic (40-40) Mfd. 150 Volt & 20 Mfd. 25-Volt)	1.15	36	11112 Vol. Control	With D.P.S.T. Switch	.90
9	9981 Condenser	Tubular .2 Mfd. 200 Volt	.29	<b>MISCELLANEOUS PARTS</b>			
10	1151 Condenser	Tubular .1 Mfd. 200 Volt	.20	11304 Bulb	6-8 Volt .150 Amp. Type No. 47	\$0.10	
11	1151 Condenser	Tubular .1 Mfd. 200 Volt	.20	11816 Dial Scale	Calibrated Scale	.40	
12	1147 Condenser	Tubular .05 Mfd. 200 Volt	.19	8184 Dial Cord	9" of 18 Lb. Drive Cord	.10	
13	1147 Condenser	Tubular .05 Mfd. 200 Volt	.19	10679 Dial Pointer	For Dial	.15	
14	1147 Condenser	Tubular .05 Mfd. 200 Volt	.19	11084 Dial Shaft	Drive Shaft	.15	
15	1368 Condenser	Tubular .003 Mfd. 400 Volt	.17	8117 Dial Shaft "C"			
16	1368 Condenser	Tubular .003 Mfd. 400 Volt	.17	Washer	Retainer Washer	.02	
17	10762 Condenser	Tubular .002 Mfd. 400 Volt	.19	11818 Dial Crystal	For Dial	.25	
18	9457 Condenser	Tubular .05 Mfd. 400 Volt	.18	11819 Dial Plate	Metal Front Plate over Dial	.40	
19	9458 Condenser	Mica .00025 Mfd.	.21	10884 Indicator Plate	Marked "AC-DC"—"OFF"—"BATT"	.10	
20	9458 Condenser	Mica .00025 Mfd.	.21	10787 Knob	For Tuning and Volume Controls	.08	
21	7934 Condenser	Mica .0001 Mfd.	.21	10907 Knob	For Voltage Selector Control	.10	
22	2705 Resistor	Carbon 2 Megohm 1/2 Watt	.19	10850 Plug	4 Prong for Battery	.10	
23	7998 Resistor	Carbon 1 Megohm 1/2 Watt	.19				
24	2673 Resistor	Carbon 750,000 Ohm 1/2 Watt	.19				
25	6984 Resistor	Carbon 500,000 Ohm 1/2 Watt	.19				
26	3534 Resistor	Carbon 75,000 Ohm 1/2 Watt	.19				
27	9693 Resistor	Carbon 5,000 Ohm 1/2 Watt	.19				
28	6875 Resistor	Carbon 250 Ohm 1/2 Watt	.19				

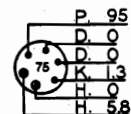
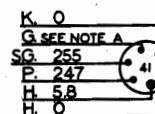


VOLTAGES MEASURED  
BETWEEN SOCKET  
TERMINALS  
AND CHASSIS



BATTERY  
VOLTAGE 6.0

ABBREVIATIONS  
D. DIODE  
G. GRID  
H. HEATER  
K. CATHODE  
P. PLATE  
SG. SCREEN GRID  
SOP. SUPPRESSOR GRID



BOTTOM VIEW OF CHASSIS

## MODEL 7383-4

IMPORTANT: Use high resistance voltmeter of 1000

NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

ohms per volt. Readings will vary depending upon range of meter. Make allowance for battery voltage variations.

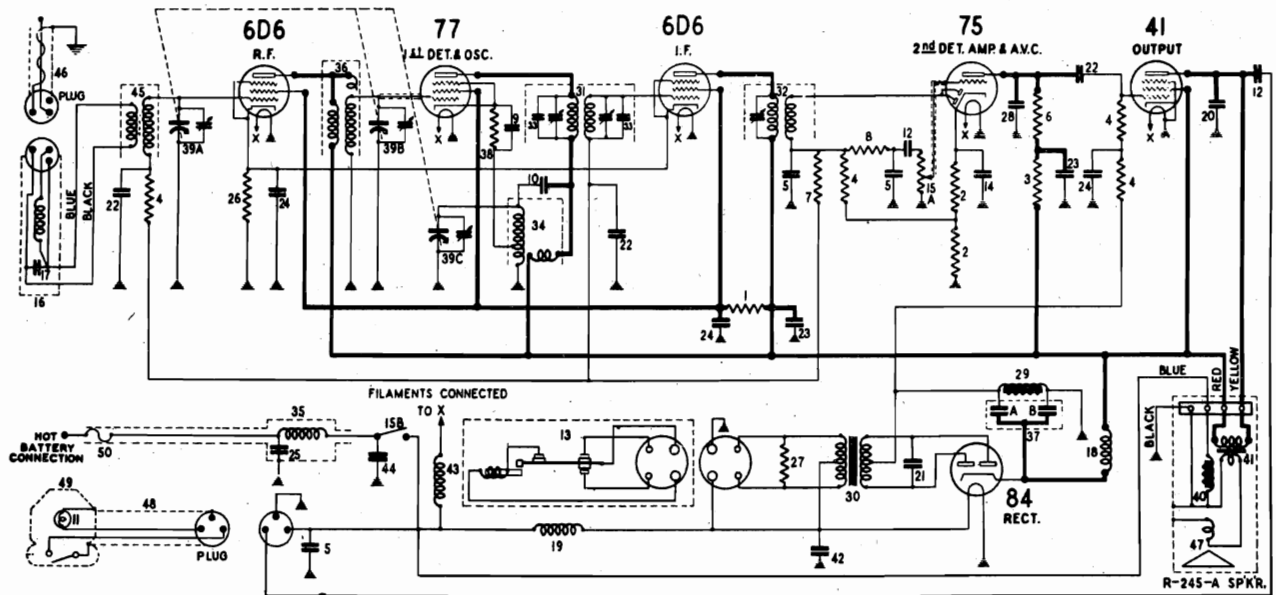
NOTE B: The oscillator grid voltage varies from about —3 at 1500 KC. to —5.0 at 530 KC. The oscillator anode voltage may vary from 115 at 1500 KC. to 120 at 530 KC.



## THE FIRESTONE TIRE &amp; RUBBER CO.

MODEL 7396-1

MODEL 4-A-17



I. F. FREQUENCY 177.5 KC.

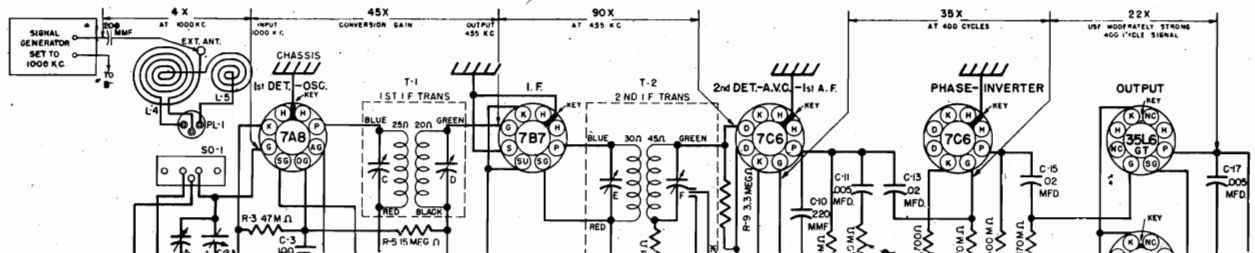
MODEL 7396-1

## APPROXIMATE STAGE GAIN

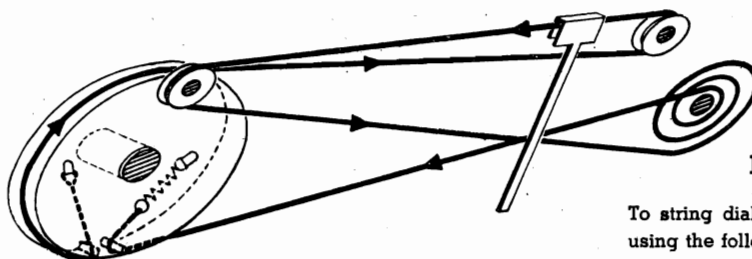
MODEL 4-A-17

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube volimeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 1000 KC signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. Be sure radio is carefully tuned to generator signal. (Use weak signal for sharp tuning.)
3. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

DIAL AND POINTER  
DRIVE CABLE ARRANGEMENT

To string dial cable, set gang condenser to fully meshed position, using the following parts:

- A-51726-1 Spring, cable
- B-55402-1 Cable assembly

## MODEL 7396-1

## THE FIRESTONE TIRE &amp; RUBBER CO.

the set screw in the knob shaft, and by rotating the knob shaft, turn the pointer until it indicates the frequency of the station which has been tuned in. Then re-tighten the set screw and replace the knob. If the set is used with a dash control head other than that for the Ford, calibrate as follows:

Turn the knob to the right as far as it will go, and then turn it to the end in the other direction. It is necessary to continue to turn the knob after the dial pointer reaches the end stop, until the knob will turn no farther. If the set is badly out of calibration, so that when the dial reads correctly at the low frequency end, it is off at the high frequency end, it will be necessary to adjust the oscillator shunt trimmer as explained below. The oscillator shunt trimmer is located on the oscillator section of the gang condenser which can be reached when the receiver bottom cover is removed. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the antenna lead of the receiver. This condenser is essential to the proper adjustment of the antenna stage. Set the test oscillator to exactly 600 KC. Tune the receiver to maximum output. If the control head is of the steering column or Ford dash control type, calibrate at the low end of the dial by setting the pointer to read exactly 60 (600 KC.).

Set the test oscillator to exactly 1400 KC. Turn the gang condenser by means of the tuning knob until the dial pointer indicates 140 (1400 KC.). Adjust the oscillator shunt trimmer (on gang condenser section third from shaft end) for maximum output. Adjust the two trimmers nearest the shaft end as explained under R.F. alignment.

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

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With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

## CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the test oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter may be conveniently connected between the chassis and the yellow lead terminal on pilot light and tone control head socket. You will find that the yellow lead is connected through an .02 mfd. condenser to the plate of the 41 output tube. However, if the output meter is suitable, it should be connected across the speaker voice coil. During all calibration and alignment adjustments, keep the volume control full on.

## I. F. ALIGNMENT

The I.F. trimmers are located on top of the I.F. transformers which may be reached by removing the receiver top cover. Pull out the antenna plug. The test oscillator should be set to exactly 177.5 KC. and connected from the control grid of the 77 to ground. Adjust the test oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station signal is tuned in, since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

## DIAL CALIBRATION

The dial of the control head is calibrated in kilocycles except that one zero is omitted. Sets using the steering column control head or the Ford dash control head are calibrated as follows:

Tune in a station of known frequency between 800 and 1100 KC. Loosen the set screw in the right hand knob and remove the knob. Loosen

## PARTS LIST

Diag. No.	Part No.	Description	List Price
1	66023	60,000 ohm 1 watt carbon resistor	\$0.25
2	67303	2,000 ohm 1/4 watt carbon resistor	.25
3	83080	51,000 ohm 1/4 watt carbon resistor	.25
4	83082	260,000 ohm 1/4 watt carbon resistor	.20
5	83539	200 mfd. mica condenser	.20
6	84198	110,000 ohm 1/4 watt carbon resistor	.20
7	84235	1.1 megohm 1/4 watt carbon resistor	.20
8	84298	10,000 ohm 1/4 watt carbon resistor	.20
9	84833	701 mfd. mica condenser	.25
10	84833	701 mfd. mica condenser	.25
11	85296	Pilot lamp (5.8 volt (Rayonet base))	.18
12	88026	.02 mfd. 400 volt paper condenser	.30
13	88156	Vibrator	3.50
14	88170	10 mfd. 25 volt electrolytic condenser	.35
15A	88171	Volume control 500,000 ohm	.80
15B	88171	Line switch	1.20
16	88172	Antenna Filter	.35
17	88173	50 mfd. mica condenser	.20
18	88181	R. F. choke coil	.40
19	88183	R. F. choke coil (to vibrator)	.25
20	88185	.006 mfd. 600 volt paper condenser	.35
21	88187	.01 mfd. 1500 volt paper condenser	.40
22	88189	.05 mfd. 200 volt paper condenser	.35
23	88191	1 mfd. 300 volt paper condenser	.35
24	88193	25 mfd. 150 volt paper condenser	.35
25	88195	5 mfd. 150 volt paper condenser	.50
26	88203	600 ohm 1/4 watt carbon resistor	.15
27	88204	210 ohm 1/4 watt carbon resistor	.15
28	88206	.0021 mfd. mica condenser	\$.035
29	88210	Filter choke	1.25
30	88213	Power transformer	3.50
31	88222	1st I.F. transformer	2.75
32	88223	2nd I.F. transformer	2.60
33	88233	110 mfd. mica condenser	.25
34	88234	Oscillator coil and shield assembly	1.50
35	88239	"A" filter	1.00
36	88250	R.F. coil and shield assembly	1.50
37A	88256	Electrolytic condenser	2.40
37B	88256	Electrolytic condenser	2.40
38	88257	9,500 ohm 1/4 watt carbon resistor	.15
39 A to C	88258	Three gang variable condenser	6.00
40	88274	Field coil and housing (for R-246-A spr.)	2.50
41	88276	Output transformer	2.00
42	88285	1.25 mfd. 160 volt paper condenser	.80
43	88289	R.F. choke (to filaments)	.20
44	88298	25 mfd. 150 volt paper condenser (low reactance)	.40
45	88312	Antenna coil and shield assembly (iron core)	2.00
46	88327	Antenna cable and plug	1.10
47	88328	Diaphragm and shell assembly (R-246-A spr.)	2.10
48	88339	Pilot light and tone control cable with plug	.90
49	88364	Control head less shell, knobs and shafts	3.50
50	88365	Fuse, 10 amperes	.05
50	83777	Battery lead and fuse housing	.50

## PARTS NOT SHOWN ON CIRCUIT DIAGRAM

INSTALLATION PARTS

Part No. Description List Price

12412 Split lockwasher for receiver mounting

12412 Hex nut for receiver mounting

84990 Receiver mounting plate

85012 Receiver mounting bolt, 1/4" - 13x2"

88326 Complete accessories for installation

88335 Shakeproof lockwasher for receiver mounting

88336 Large flat washer for receiver mounting

88319 Fuse insulator tube

83777 Battery lead and fuse housing

88169 Vibrator shield

88161 Tube shield half section (short)

88162 Tube shield half section (long)

88164 Tube shield cap (long)

88165 Tube shield cap (short)

88297 Speaker mounting screw No. 8 - 32 special head

88319 Self tapping screw No. 8 x 1/4" for receiver cover mtg.

88321 Receiver case assembly (less covers)

88327 Antenna cable

88330 Receiver case cover with tube location label

88350 Interference filter condenser with bracket, .5 mfd., 150 V.

STEERING COLUMN CONTROL HEAD PARTS

88333 Shell for control head (right-hand mounting)

88334 Bracket for control head mounting

88337 Shell mounting screw No. 1 - 72 R.H.M.S.

88338 Knob for control head

88339 Pilot light and tone control cable with plug and socket

88385 Extra length pilot light and tone control cable with plug and socket (43")

88410 Shell for control head (left-hand mounting)

FLEXIBLE SHAFTS

88406 18" tuning and volume control shaft

88407 24" tuning and volume control shaft

88408 30" tuning and volume control shaft

88409 36" tuning and volume control shaft

## SPECIAL ACCESSORIES

88422 Ford distributor condenser

88430 Distributor suppressor

88430 Dome light filter

88431 Shielded loom with connector tip for antenna lead-in

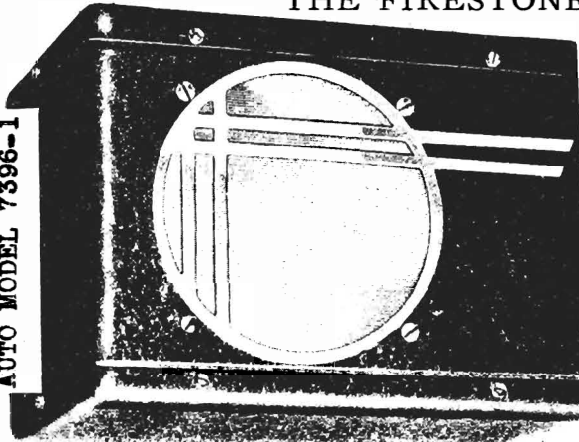
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THE FIRESTONE TIRE & RUBBER CO.

MODEL 7403-1  
MODEL 7396-1

AUTO MODEL 7396-1



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.

## ALIGNMENT PROCEDURE

**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 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.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I. F. ALIGNMENT.** With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. con-

denser. The ground on the test oscillator should be connected to the ground buss, indicated in circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench.

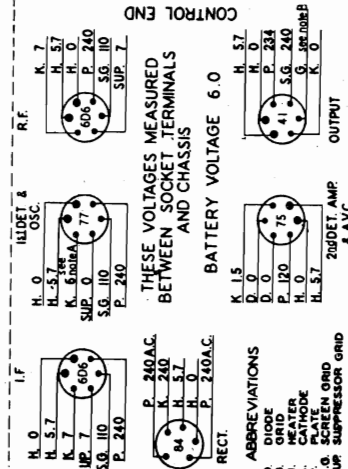
Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

Diag Part No.	Description	List Price	Diag Part No.	Description	List Price
C-9 N-1376	.02 mfd. 400 V.	0.35	R-10 N-1264	500,000 Ohm .5 W.	0.20
C-10 N-3658	{ 40 mfd. 150 W. V. } Electrolytic ..	1.10	R-11 N-3663	150 Ohm .5 W.	0.20
C-11 N-1346	.05 mfd. 400 V.	.40	R-12 N-1377	200,000 Ohm .5 W.	0.20
C-12 N-1346	.05 mfd. 200 V.	.40	R-13 N-3819	1,200 Ohm 1 W.	0.20
C-13 N-3080	.22 mfd. 200 V.	.70	R-14 N-1742	25 Ohm .5 W.	0.20
C-14 N-1345	.05 mfd. 200 V.	.40	R-15 N-3869	30 Ohm 1 W.	0.20
R-1 N-3814	15,000 Ohm .5 W.	.20	R-16 N-1377	200,000 Ohm .5 W.	0.20
R-2 N-3964	2,000 Ohm .5 W.	.20	R-17 N-1262	1 Megohm .5 W.	0.20
R-3 N-1260	50,000 Ohm .5 W.	.20	R-18 N-3784	Antenna Loop Coil .....	.90
R-4 N-1627	20,000 Ohm .5 W.	.20	R-19 N-3298	Oscillator Coil .....	.70
R-5 N-1263	10 Megohm .5 W.	.20	R-20 N-3816	1st I.F. Transformer .....	1.20
R-6 N-1682	3 Megohm .5 W.	.20	R-21 N-3804	2nd I.F. Transformer .....	1.20
R-7 N-1460	30,000 Ohm .5 W.	.20	R-22 N-3782	Output Transformer .....	1.00
R-8 N-4076	0.5 Megohm Volume Control ..	2.25	R-23 N-3781	5" P. M. Speaker .....	3.75
R-9 N-2189	4 . Megohm .5 W.	.20	R-24 N-4025	2 Gang Condenser .....	3.00
N-1958	Rubber line cord .....	0.45	N-4054	Dial scale (glass) .....	\$ .80
N-3812	Wood dowel spacers—loop mounting ..	.10	N-4055	Dial background plate .....	.80
N-3795	Screw—6-32x2 1/4" round head .....	.12	N-4053	Dial pointer .....	.50
N-3642	Washer—fibre—chassis mounting ..	.10	N-3787	Dial drive shaft .....	.50
N-4687	Cabinet back .....	.65	N-3238	Dial drive shaft bushing .....	.40
N-4749	Knobs .....	.20	N-3243	"C" Washer—dial drive shaft retainer ..	.07
N-4386	Clips—dial scale fastening .....	.10	N-2655	Dial drive string .....	.10
N-4696	Speaker baffle .....	.16	N-3925	Dial drive spring .....	.50
N-4697	Grille cloth .....	.22	N-4075	Dial lamp socket .....	.50

MODEL 7403-1

## SOCKET VOLTAGES

### BOTTOM VIEW



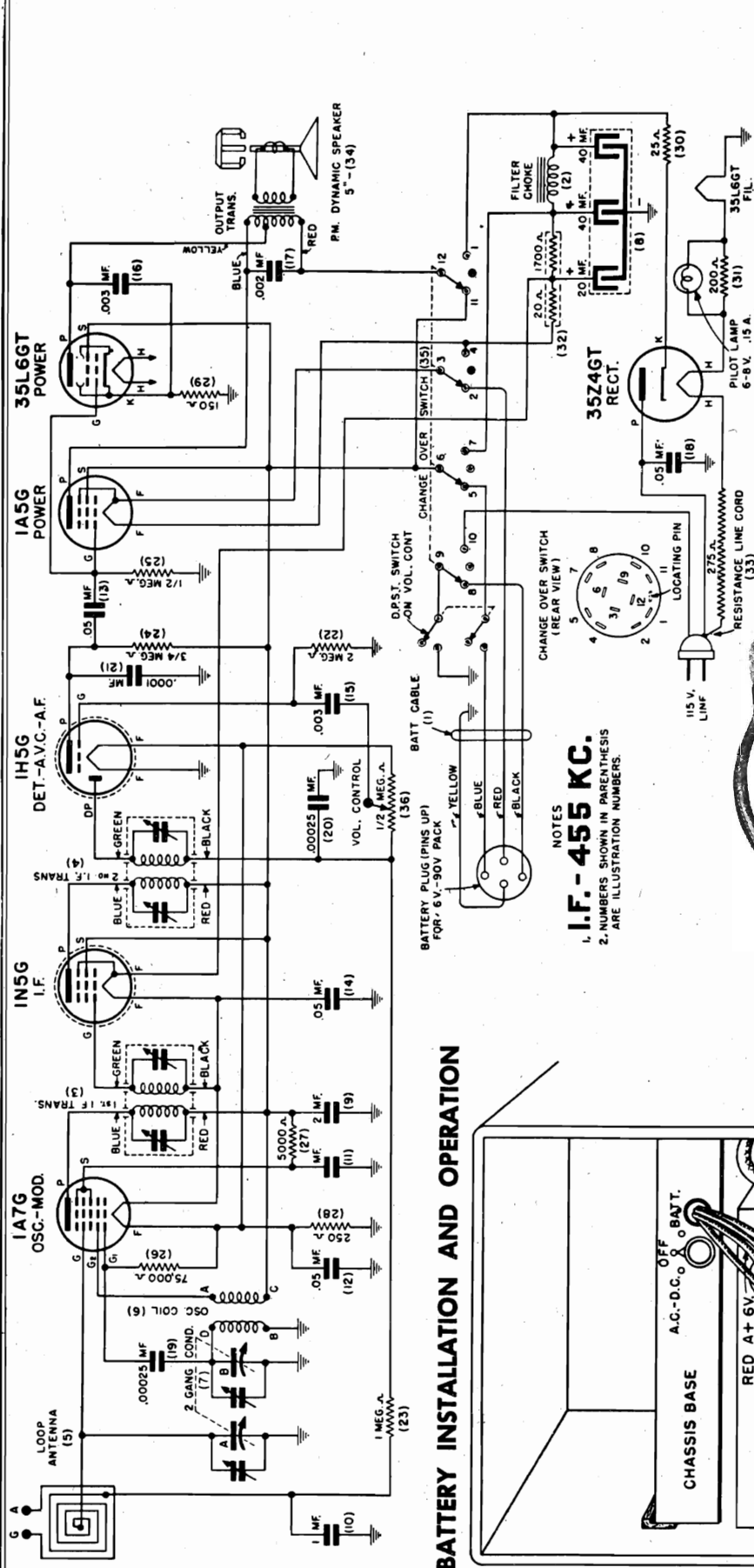
**IMPORTANT:** Use a high resistance voltmeter of 1000 ohms per volt. Make allowances for battery voltage variation.

**NOTE A:** The cathode voltage of the 77 varies from 6 to 10 volts, depending on the gang condenser setting.

**NOTE B:** The grid bias on the 41 output tube is —18 volts, measured from the chassis to the ungrounded filter choke terminal.

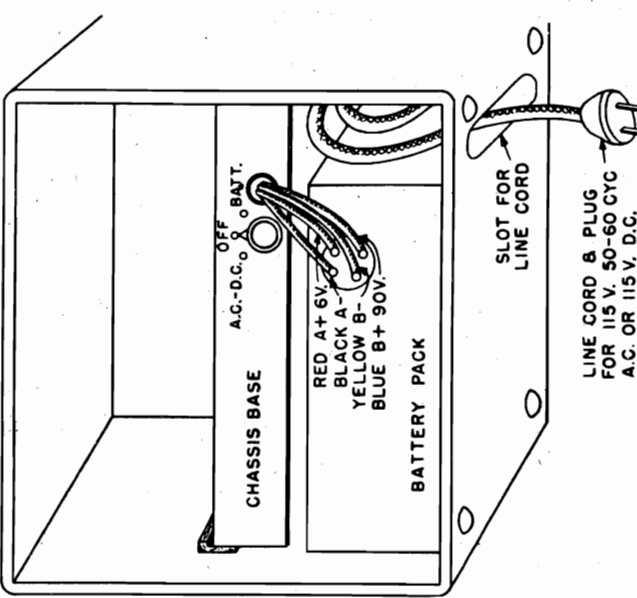
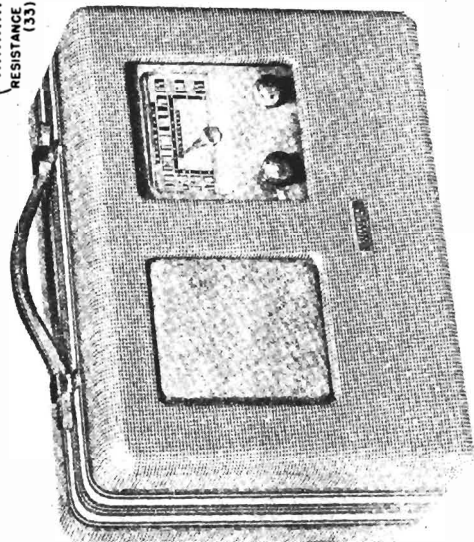
MODEL 7402-6, Roamer

THE FIRESTONE TIRE & RUBBER CO.



**NOTE:** The special heat dissipating line cord used will become warm when the set is in operation. To provide maximum ventilation remove all of the line cord from the receiver cabinet and stretch it out to its full length before operating the set. When disconnecting the line cord from light supply receptacle do not pull on the line cord as this may damage it, but grasp the plug attached to the end of the cord and pull outward on this.

**Do not lengthen or shorten line cord.**  
**ALWAYS PLACE LINE CORD INSIDE CABINET WHEN NOT IN USE.**



**WHEN USING AN EXTERNAL AERIAL A GROUND MUST BE PLACED UNDERNEATH THE SCREW IN THE UPPER LEFT HAND CORNER OF CABINET BACK.**

# THE FIRESTONE TIRE & RUBBER CO. MODEL 7402-6, Roamer

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

**BEFORE ALIGNING, PLACE LOOP AN-**

**TENNA AND THE BATTERY IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.**

**When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.**

Couple test oscillator to receiver loop by:

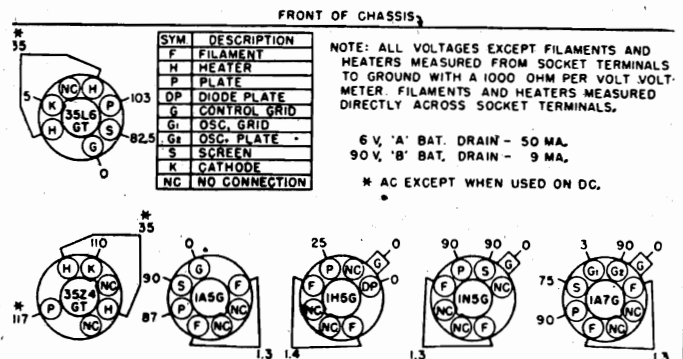
- Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three-inch form and attach across output of test oscillator.
- Place test oscillator loop near set loop—**BE SURE THAT NEITHER MOVES WHILE ALIGNING.**

Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below—and:
	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
(1) Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use small loop to couple test oscillator to receiver loop	Adjust 1730 K.C. oscillator trimmer for maximum output.
(2) Approx. 1400 K.C.	Exactly 1400 K.C.	None	Use small loop to couple test oscillator to receiver loop	Adjust 1400 K.C. antenna trimmer for maximum output.
I. F. Any point where no interfering signal is received	455 K.C.	.02 MFD condenser	High side to grid terminal of 1A7G tube Low side to chassis <b>DO NOT REMOVE CAP.</b>	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.

## SHOULD THE RECEIVER FAIL TO OPERATE CHECK FOR:

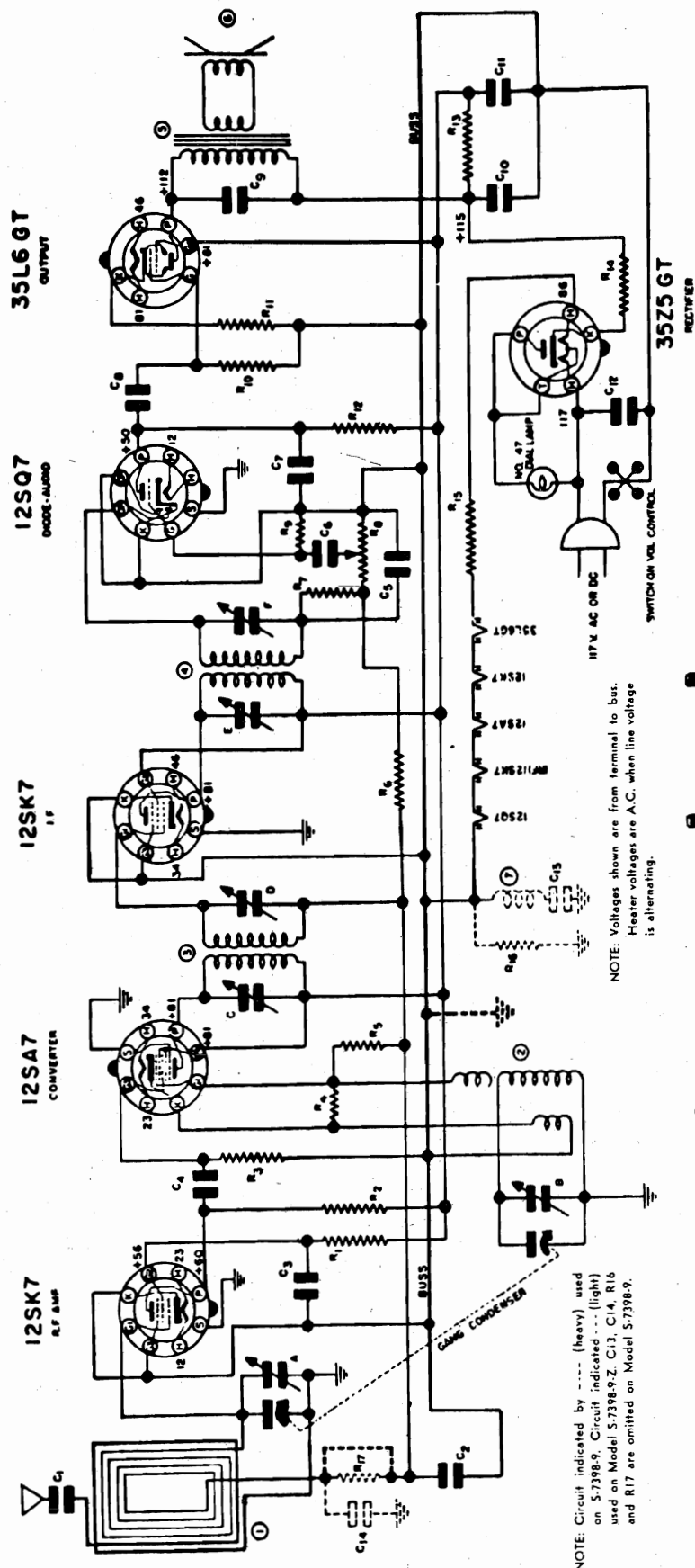
- Weak battery.
- A defective tube.
- Tubes not properly inserted in tube sockets.
- Grid caps not properly inserted on grid terminals on top of tubes.
- Set may not be in correct position—rotate radio to point of greatest volume.
- If set is being operated in an isolated district, an external aerial may be required.

**A NOTICEABLE REDUCTION IN RECEIVER VOLUME**, assuming that all tubes are in good condition, can generally be attributed to a low battery that should be replaced.



MODEL 7403-1, Brilliantone

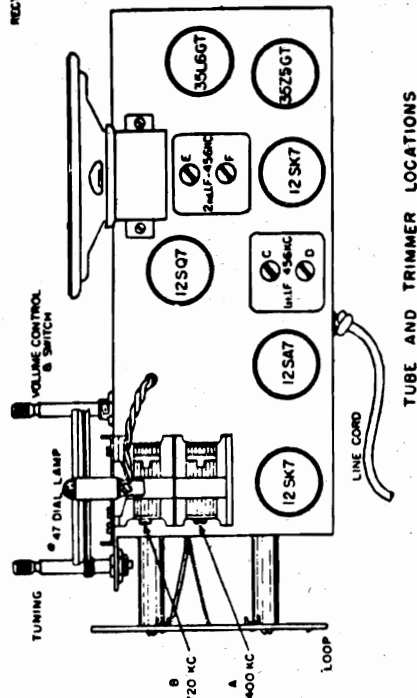
THE FIRESTONE TIRE & RUBBER CO.



I.F.—456 K.C.

6 TUBE A.C.—D.C.  
SUPERHETERODYNE  
SINGLE BAND

DECEMBER 9, 1941



### TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters) and includes the popular 1712 KC police channel.

### GROUND

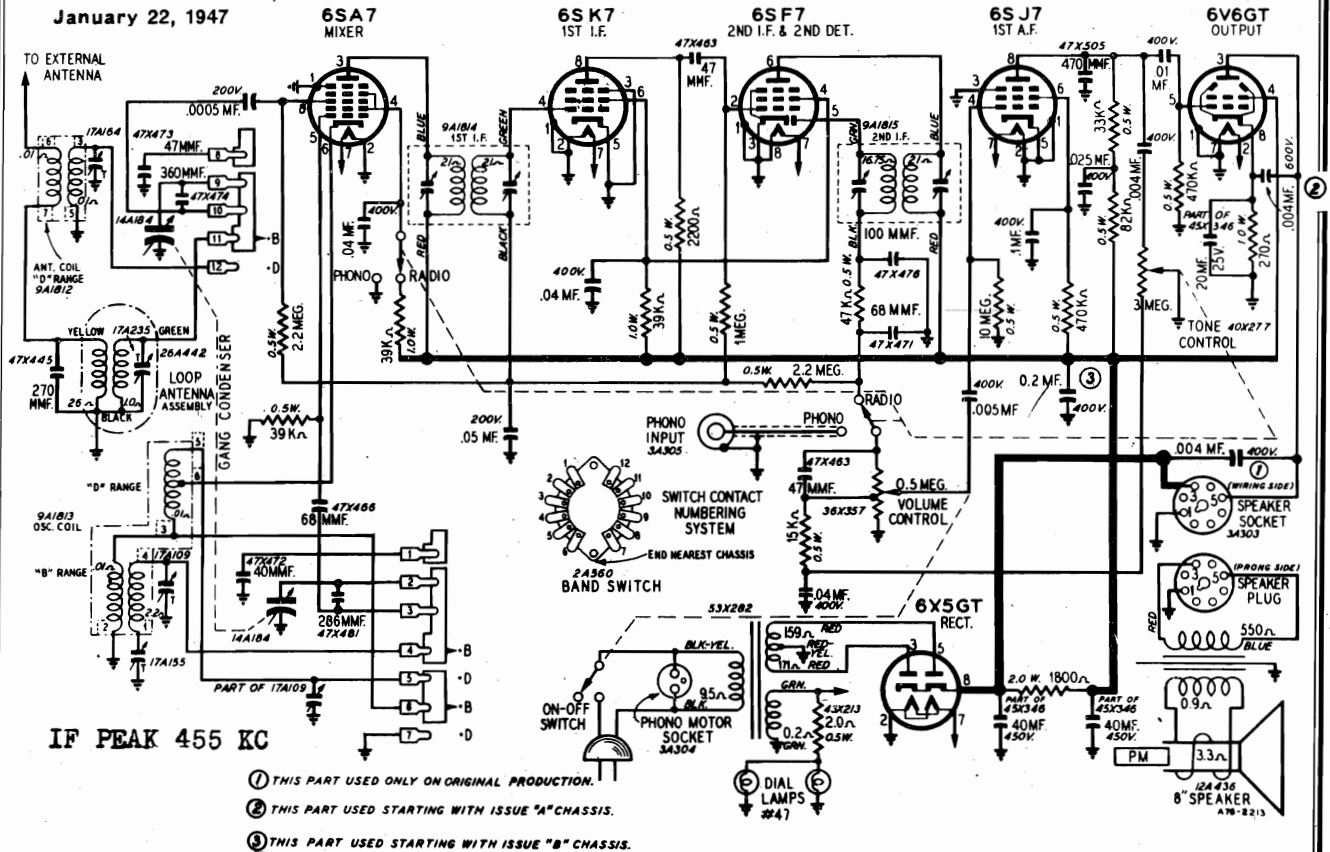
No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.



## GAMBLE-SKOGMO INC.

MODELS 43-7601, 43-7601A,  
43-7601B  
MODEL 43-7602

January 22, 1947



## SUBSTITUTE PARTS LIST

The following parts are used in some receivers only. Check part number on part before ordering and order part originally used in receiver.

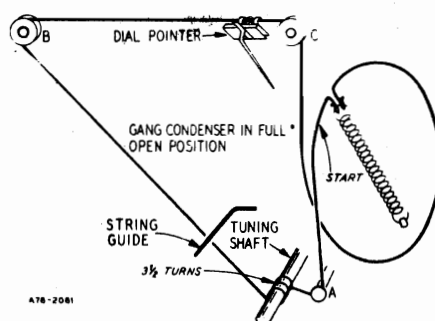
40X282 Tone Control (Substitute for 40X277)

25X1539 Radio-Phono. Switch Lever (When 40X282 is used)  
No. 6-32 x 5/16" Slab Hd. Set Screw (Mtg. 25X1539)

2A161 D.P.D.T. Switch (When 40X282 is used)

## DRIVE CORD REPLACEMENT

To install a new drive cord, turn the large drive pulley until the gang condenser is completely unmeshed. Hook one end of the new drive cord to the tension spring and fasten the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the rim of the drive pulley and run it  $\frac{1}{4}$  turn counterclockwise around the pulley. Pass it around the Idler stud A and wind three turns clockwise around the tuning shaft with the turns progressing away from the chassis. Run the string behind the string guide, around pulleys B and C, down and under the large drive pulley, then counterclockwise around the pulley to the slot in the rim. Hook the end of the cord to the end of the tension spring and turn the tuning shaft a few turns to remove any slack in the cord.



## SPECIFICATIONS

6 Tube Superheterodyne, including rectifier tube  
Power Consumption..... 40 w. normal, 60 w. phono operating (at 117 v. A.C.)  
Selectivity..... 40 kc. broad at 1,000 times signal  
Intermediate Frequency..... 455 kc.  
Speaker..... 8 inch P.M. dynamic  
Tuning Frequency Range..... B range, 540-1,600 kc.; D range, 9-15.5 meg.  
Sensitivity..... B range, 9 mv. avg.; D range, 20 mv. avg.  
(for 0.5 w. output with external antenna)  
Power Supply..... 105-125 v. 60 cycles only  
Power Output..... 4 w. maximum 2.3 w., 10% harmonics  
Record Changer..... Plays ten 12 inch or twelve 10 inch

## CIRCUIT DESCRIPTION

The automatic record changer is connected to the rear of the chassis through jacks marked "Phono" and "Phono Motor." The "Phono" jack is switched in or out of the audio circuit by a switch controlled by the tone control knob. This switch also shorts out the r-f signal when it is turned to the phono position.

MODELS 43-7601, 43-7601A, GAMBLE-SKOGMO INC.

43-7601B

MODEL 43-7602

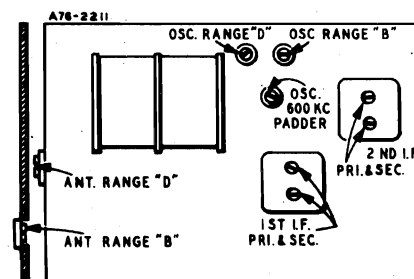
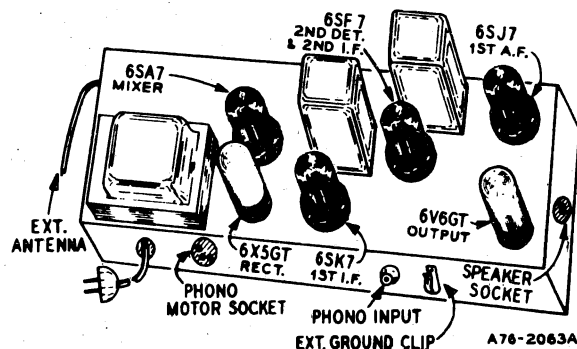
MODEL 43-8576





GAMBLE-SKOGMO INC.

MODELS 43-7601, 43-7601A,  
43-7601B  
MODEL 43-7602



## ALIGNMENT PROCEDURE

Volume Control—Maximum all adjustments.

Connect radio chassis to ground post of signal generator with a short heavy lead.

Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

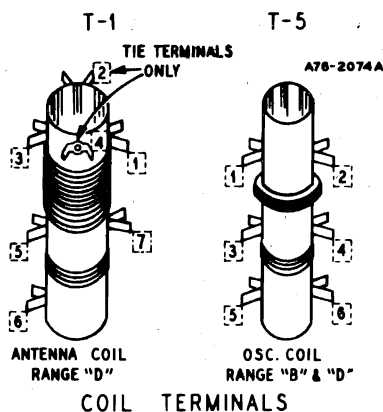
Output Indicating Meter—Non-metallic screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F. RANGE B	455 Kc.	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (Pri.) and (Sec.) 1st I.F. (Pri.) and (Sec.)
	1,620 Kc.	Antenna Lead	100 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B
	1,400 Kc.	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Set Pointer to 1,400 Kc. (See Note A)	Antenna Range B
	600 Kc.	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (600 Kc. Padder) Rock Rotor See Note B
Repeat above steps at 1,620 and 600 Kc. until readjusting the oscillator. Range B Trimmer causes no further improvement of output.						
RANGE D	15,600 Kc.	Antenna Lead	400 ohm	D Range	Turn Rotor to Full Open	Oscillator Range D
	14,000 Kc.	Antenna Lead	400 ohm	D Range	Tune Rotor to Max. Output	Antenna Range D Rock Rotor—See Note B
Reassemble chassis in cabinet.						
LOOP RANGE B	1,400 Kc.	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Antenna Range B

NOTE A—Set pointer at the 1,400 KC. mark on the dial scale. Attach pointer to drive cord.

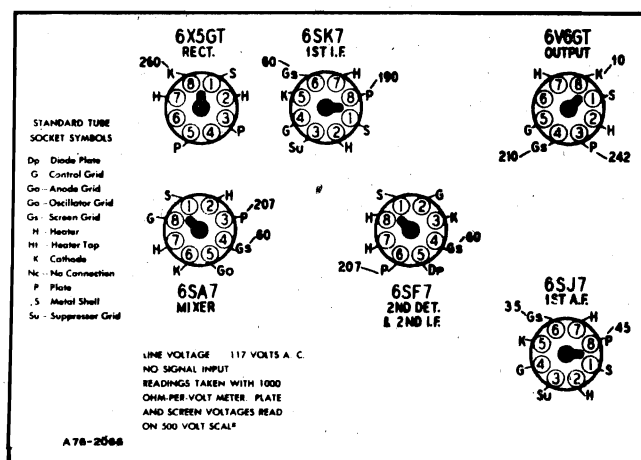
NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.



## CIRCUIT CHANGES

Issue A chassis differ from the original production by the use of a .004 mf 600 volt tubular capacitor connected between the plate and cathode of the output tube instead of the .004 mf 400 volt tubular capacitor originally connected across the primary of the output transformer.

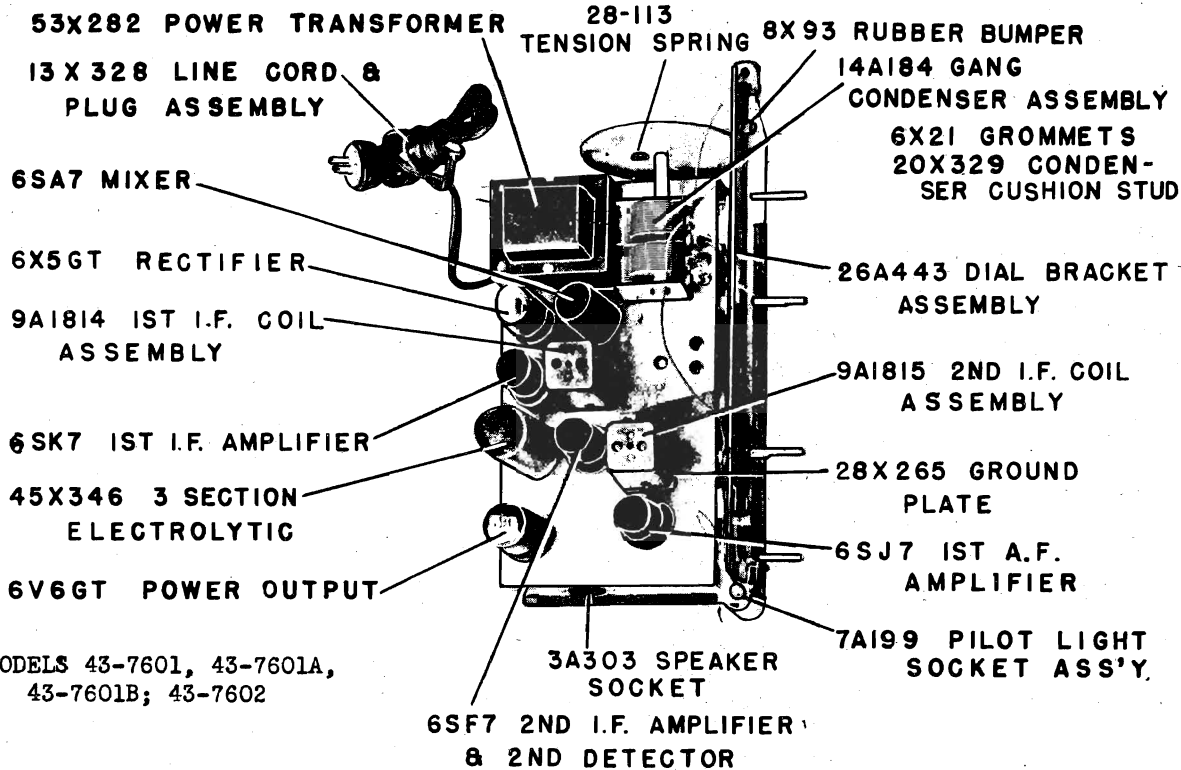
Issue B chassis differ from issue A chassis by the addition of a .2 mf 400 volt tubular capacitor connected from B — to chassis ground as an R-F filter.



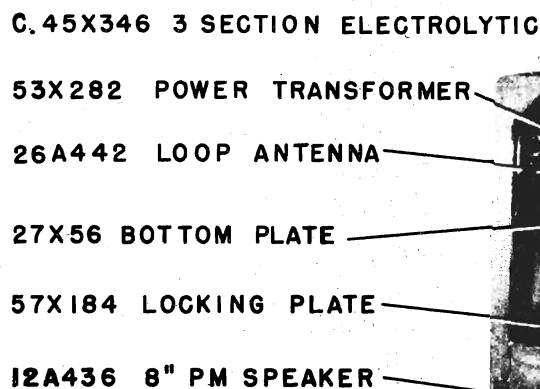
MODELS 43-7601, 43-7601A,  
43-7601B

GAMBLE-SKOGMO INC.

MODEL 43-7602



MODELS 43-7601, 43-7601A,  
43-7601B; 43-7602



5X163 POINTER

10A579 KNOB

10A581 KNOB

58X616 DIAL GLASS

4X353 ESCUTCHEON  
2 X 3 8" SCREW (6)

10A578 KNOB

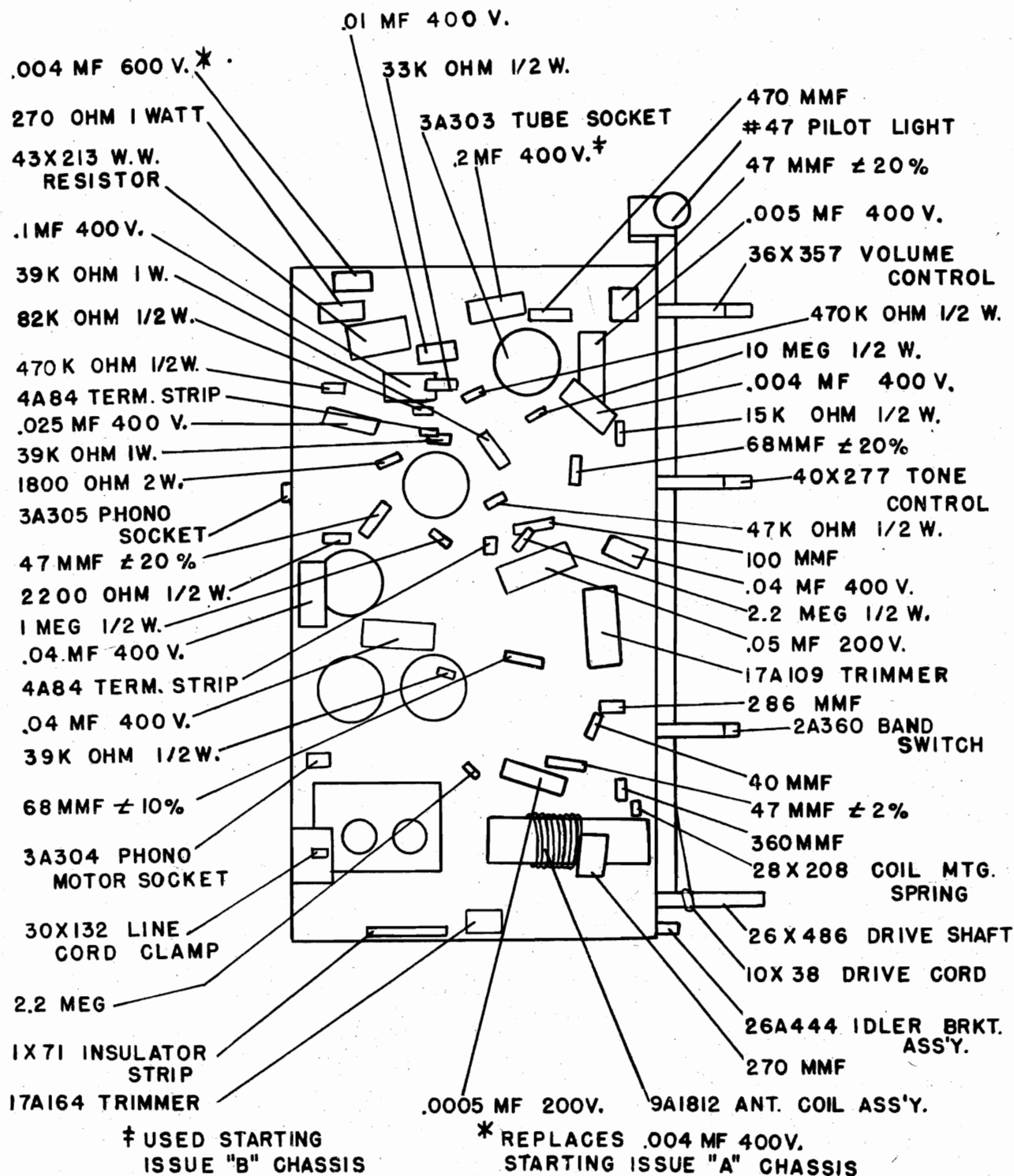
10A583 KNOB

14X371 GRILLE CLOTH

MODELS 43-7601, 43-7601A,  
43-7601B

GAMBLE-SKOGMO INC.

MODELS 43-7601, 43-7601A,  
43-7601B  
MODEL 43-7602



### SUBSTITUTE PARTS LIST

The following parts are used in some receivers only. Check part number on part before ordering and order part originally used in receiver.

40X282	Tone Control (Substitute for 40X277)
25X1539	Radio-Phono. Switch Lever (When 40X282 is used) No. 6-32 x 5/16" Slab Hd. Set Screw (Mtg. 25X1539)
2A161	D.P.D.T. Switch (When 40X282 is used)

MODEL 43-7602

GAMBLE-SKOGMO INC.

4 X 990 ESCUTCHEON  
#2 X 3/8" WOOD  
SCREW (4)

10A622 KNOB

10A621 KNOB

#758 CABINET

14 X 407  
GRILLE CLOTH

58 X 684 DIAL GLASS

15 X 162 POINTER

58 X 615 DIAL BACKGROUND

10A620 KNOB

10A623 KNOB

*SHURE PICKUP CARTRIDGE  
P30-1.*

FRONT VIEW

26A442 LOOP ANTENNA ASSEMBLY

17A234 TRIMMER #16 X 5/8" FLAT  
HEAD BLUED FINISH NAIL (4)

#10 X 1/2 P.K. TYPE "Z" SCREW (4)  
19 X 8 FLAT WASHER (4) MTG. CHASSIS  
27X56 BOTTOM PLATE

WEBSTER CHANGER MODEL #50

12A441 10" P.M. SPEAKER

#10 X 3/4" WASHER HEAD, WOOD  
SCREW (STEEL)

30 X 138  
FAHNSTOCK  
CLIP

3 X 328  
LINE CORD  
AND PLUG

57 X 184  
LOCKING  
PLATE

REAR VIEW

GAMBLE-SKOGMO INC.

MODEL 43-8160

## ALIGNMENT PROCEDURE

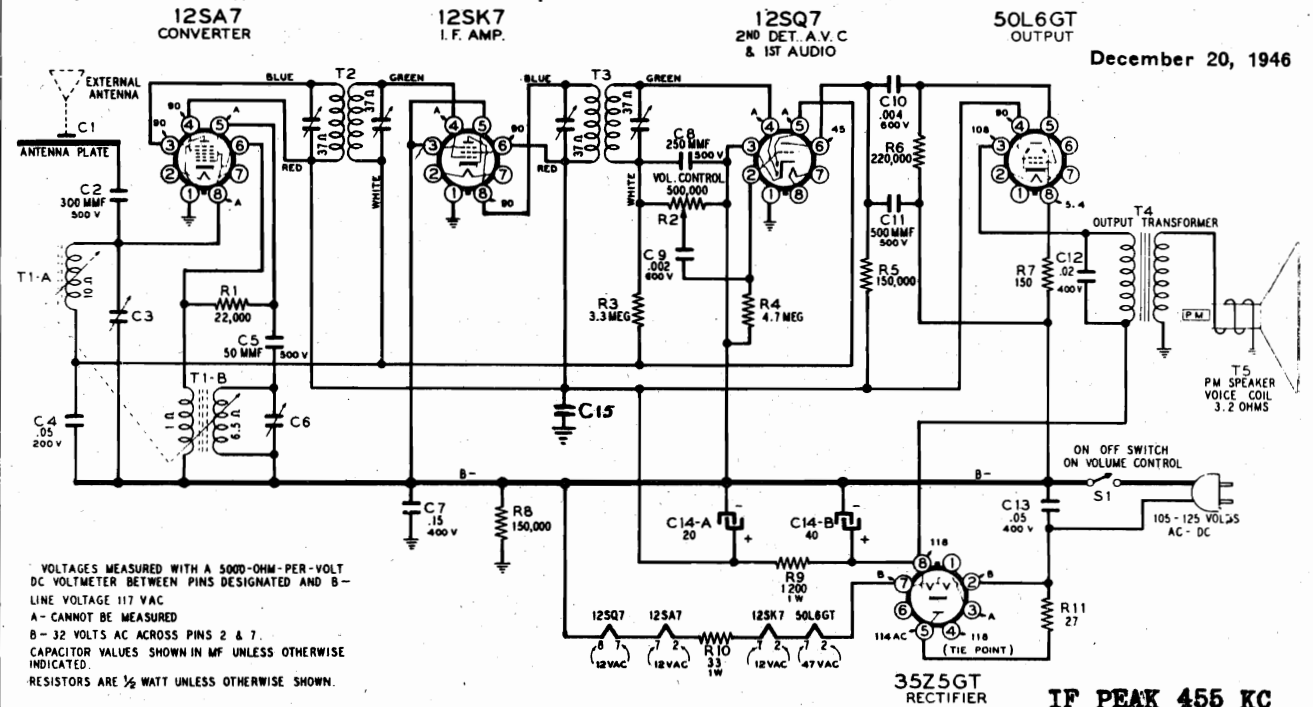
Output meter across 3.2-ohm output load.  
Volume control at maximum for all adjustments.

Align for maximum output.  
Reduce input as needed to keep output near 0.4 volts.

FREQUENCY	SIGNAL GENERATOR COUPLING CAPACITOR	CONNECTION TO RADIO	GROUND CONNECTION	TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
455 kc	.1 mf	Metal-antenna plate	12SQ7 Pin 3 (B—)	Iron cores all the way out	Trimmers on output and input I.F. cans
1720 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C6
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C3
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1400 kc	Adjust position of antenna coil (see coil assembly view)
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1720 kc	Antenna trimmer C3*

\*After the antenna coil has been tracked at 1400 kc, it is necessary to check the antenna trimmer C3 again at 1720 kc. If no appreciable change in trimmer adjustment is necessary, the coil is in track. If the trimmer requires

considerable change, the position of the antenna coil at 1400 kc must be readjusted. These two adjustments should be made several times, until no trimmer adjustment is required at 1720 kc.



## SCHEMATIC DIAGRAM LEGEND

C 1 Antenna plate, walnut color	20 mf. x 150 v.	R 8 150,000 ohms 1/2 w. 20%
C 1 Antenna plate, ivory color	for 60 cycles	R 9 1,200 ohms 1 w. 10%
C 2 300 mmf. 20% mica	Electrolytic 60 mf. x 150 v.	R 10 33 ohms 1 w. 10%
C 3 Dual trimmer 74-136 mmf. (antenna)	40 mf. x 150 v.	R 11 27 ohms 1/2 w. 10%
C 4 .05 mf. 200 v. 25%	for 25 cycles	
C 5 .05 mf. 400 v. 25%		
C 6 95-175 mmf. (oscillator)		
C 7 .15 mf. 400 v. 25%		
C 8 250 mmf. 20% mica		
C 9 .002 mf. 600 v. 25%		
C 10 .004 mf. 600 v. 25%		
C 11 500 mmf. 20% mica		
C 12 .02 mf. 400 v. 25%		
C 13 .05 mf. 400 v. 25%		
C 14-A, B Electrolytic 40 mf. x 150 v.		

## RESISTORS

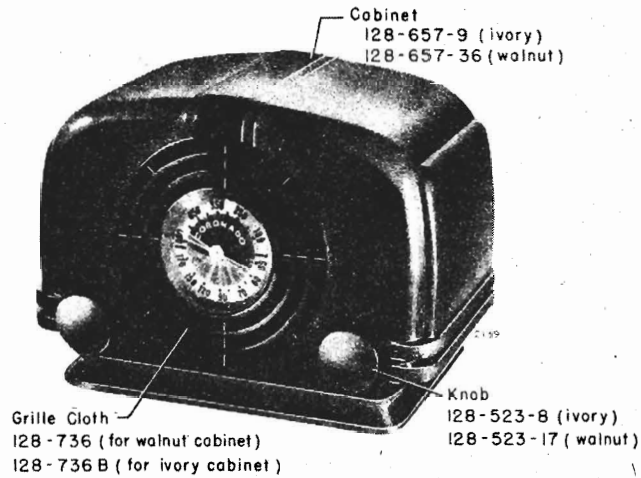
R 1 22,000 ohms 1/2 w. 10%
R 2 Volume control, 500,000 ohms, on-off switch
R 3 3.3 megohms 1/2 w. 20%
R 4 4.7 megohms 1/2 w. 20%
R 5 150,000 ohms 1/2 w. 20%
R 6 220,000 ohms 1/2 w. 20%
R 7 150 ohms 1/2 w. 10%

## MISCELLANEOUS

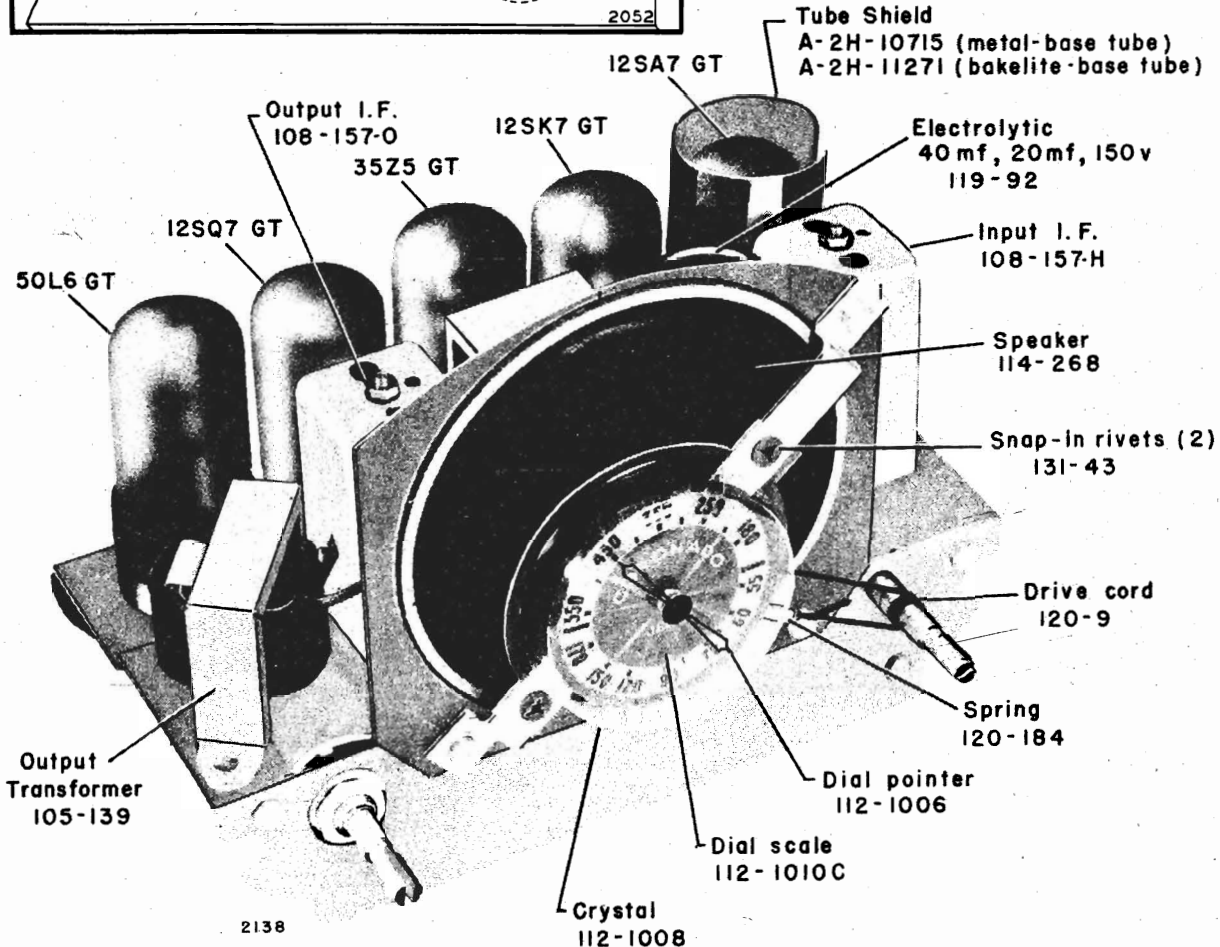
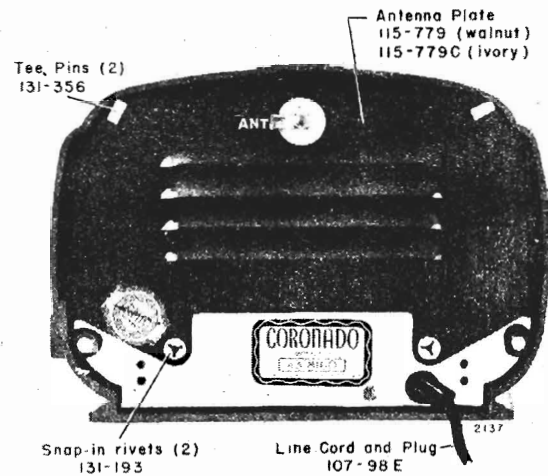
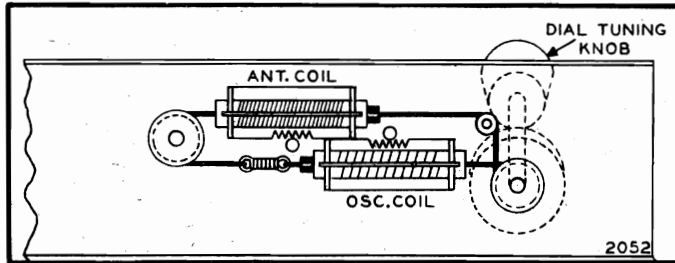
T1A, B Permeability tuning unit complete, including antenna and oscillator coils
T2 Input I.F. coil complete in can. Range of trimmers: 39-73 mmf. each
T3 Output I.F. coil complete in can. Range of trimmers: 39-73 mmf. each
T4 Output transformer
T5 Speaker 4 inch P.M. voice coil impedance, 3.2 ohms

MODEL 43-8160

GAMBLE-SKOGMO INC.



### SLUG TUNER



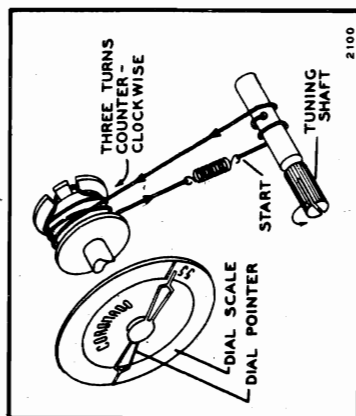
GAMBLE-SKOGMO INC.

MODEL 43-8160

## SPECIFICATIONS

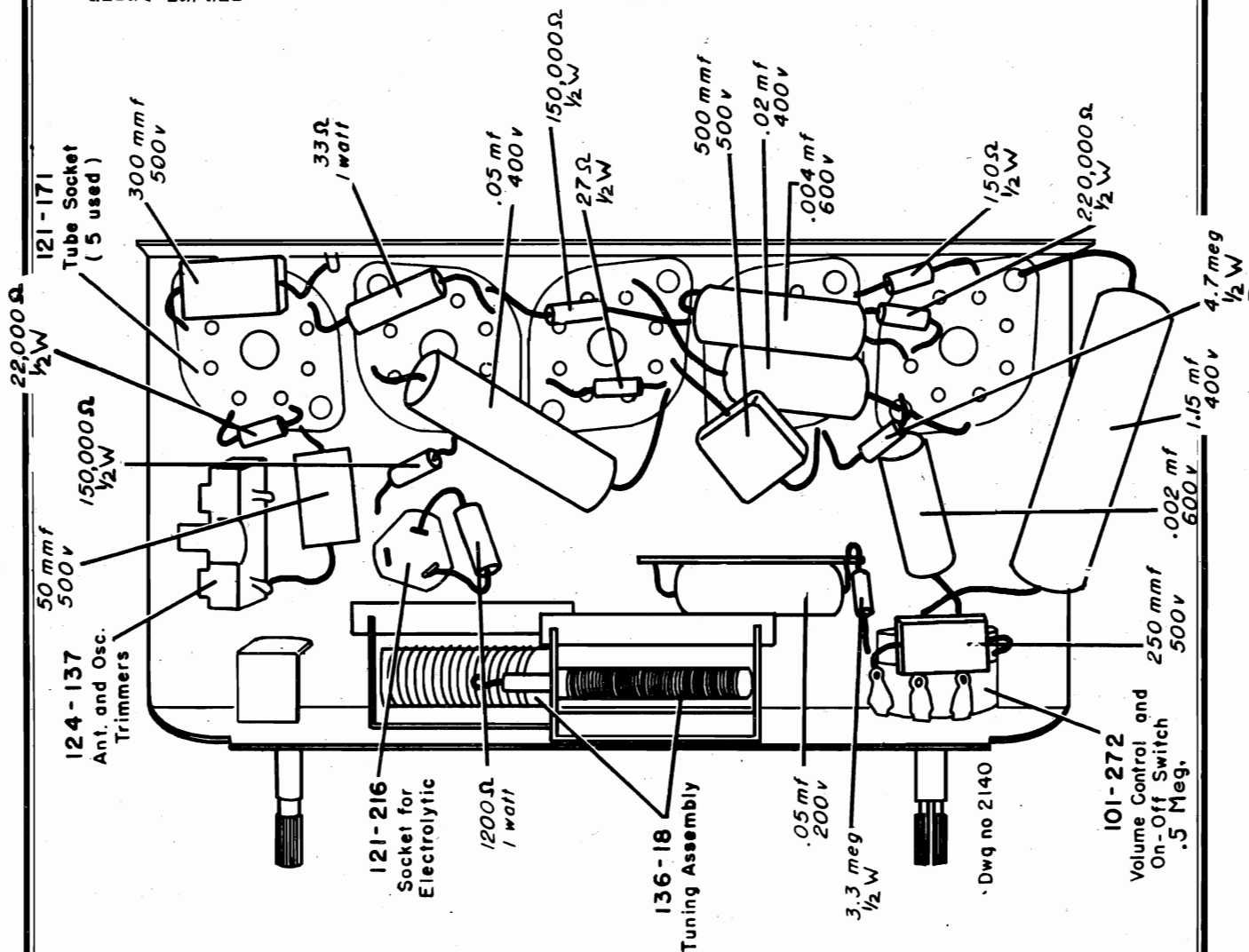
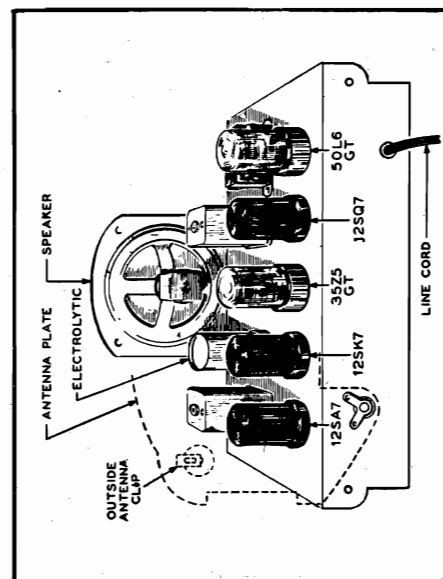
5 Tube Superhetrodyne, including rectifier tube  
 Power Consumption.....28 w.  
 Power Output.....0.80 w. undistorted, 1.5 w. maximum  
 Selectivity.....11 kc. broad at 1,000 times signal at 1,000 kc.  
 Antenna.....Self-contained plate antenna.  
 Also provision for connection of external antenna.  
 Intermediate Frequency.....455 kc.  
 Speaker.....4 inch P.M. voice coil impedance, 32 ohms  
 Tuning.....Two permeability-tuned circuits  
 Sensitivity.....40 mv. avg. for 50 mw. output  
 Frequency Range.....540 to 1,720 kc.  
 Power Supply.....105 to 125 v., A.C.-D.C., 50-60 cycle

## DRIVE CORD REPLACEMENT



1. Turn tuning shaft counter-clockwise.
2. Re-string as shown.
3. Adjust pointer so that the band is covered properly when turning the tuning shaft back and forth.

## CHASSIS VIEW



MODEL 43-8437

GAMBLE-SKOGMO INC.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning.

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output indicating Meter—Non Metallic Screwdriver.

Dummy Antennas—I.R.E.

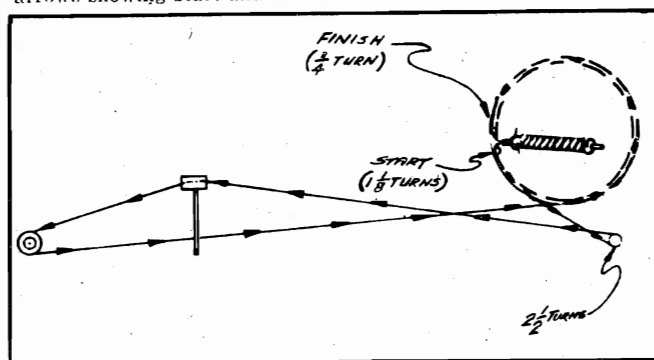
	SIGNAL GENERATOR		DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS
I.F. (See Note A)	FREQUENCY SETTING 455 kc	CONNECTION AT RADIO Apply signal to the converter grid 12SA7 through a .05MFD Condenser	I.R.E. Dummy Antenna	Turn rotor to full open	2nd I.F. (Pri.) & (Sec.) 1st I.F. (Pri.) & (Sec.) Adjust for maximum output
R.F. Alignment	1720 kc	Antenna Lead	I.R.E. Dummy Antenna	Turn rotor to full open	C17B Antenna Trimmer
	1500 kc	Antenna Lead	I.R.E. Dummy Antenna	Set Pointer to 1500 kc (See Note B)	Tune C17A for maximum output

NOTE A—Connect an output meter across the voice coil.

NOTE B—Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

## DRIVE CORD REPLACEMENT

The drive cord can be replaced by carefully following the drawing showing cord replacement. Care should be taken to follow arrows showing start and finish.



FRONT OF CHASSIS

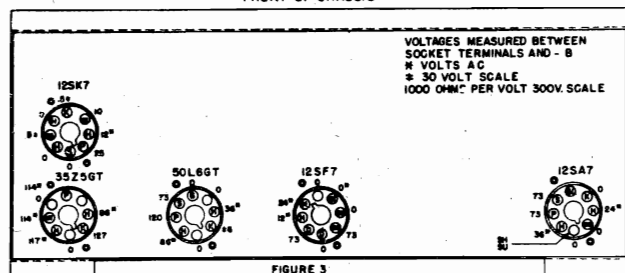


FIGURE 3

BOTTOM VIEW OF CHASSIS

AC LINE VOLTS-117

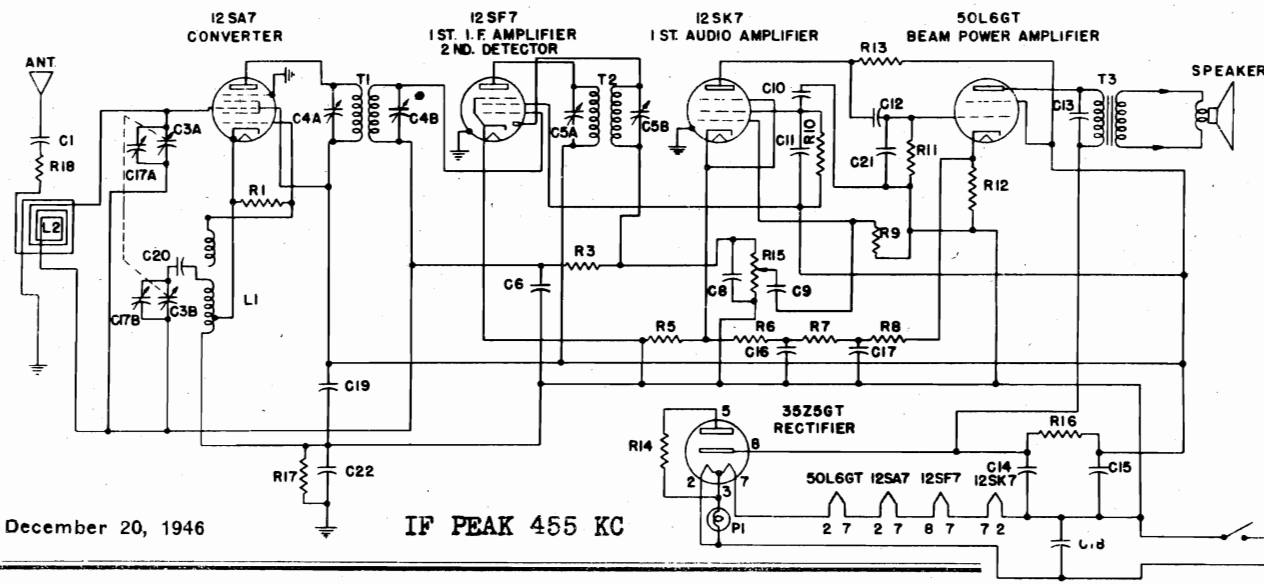
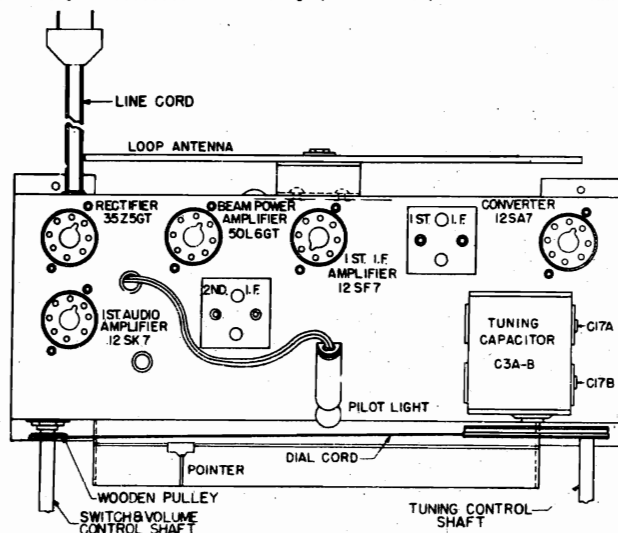
MAX VOLUME

GANG CLOSED

NO SIGNAL

## SPECIFICATIONS

5 Tube Superheterodyne, including rectifier tube	28 w. (at 117 v. A.C.)
Power Consumption	1.5 w. maximum 1 w. 10% harmonics
Power Output	65 kc. broad at 1,000 times signal
Selectivity	455 kc.
Intermediate Frequency	5 1/4 inch P.M. dynamic
Speaker	540 to 1,700 kc.
Tuning Frequency Range	85 mv. avg. (for 0.5 w. output with external antenna)
Sensitivity	



December 20, 1946

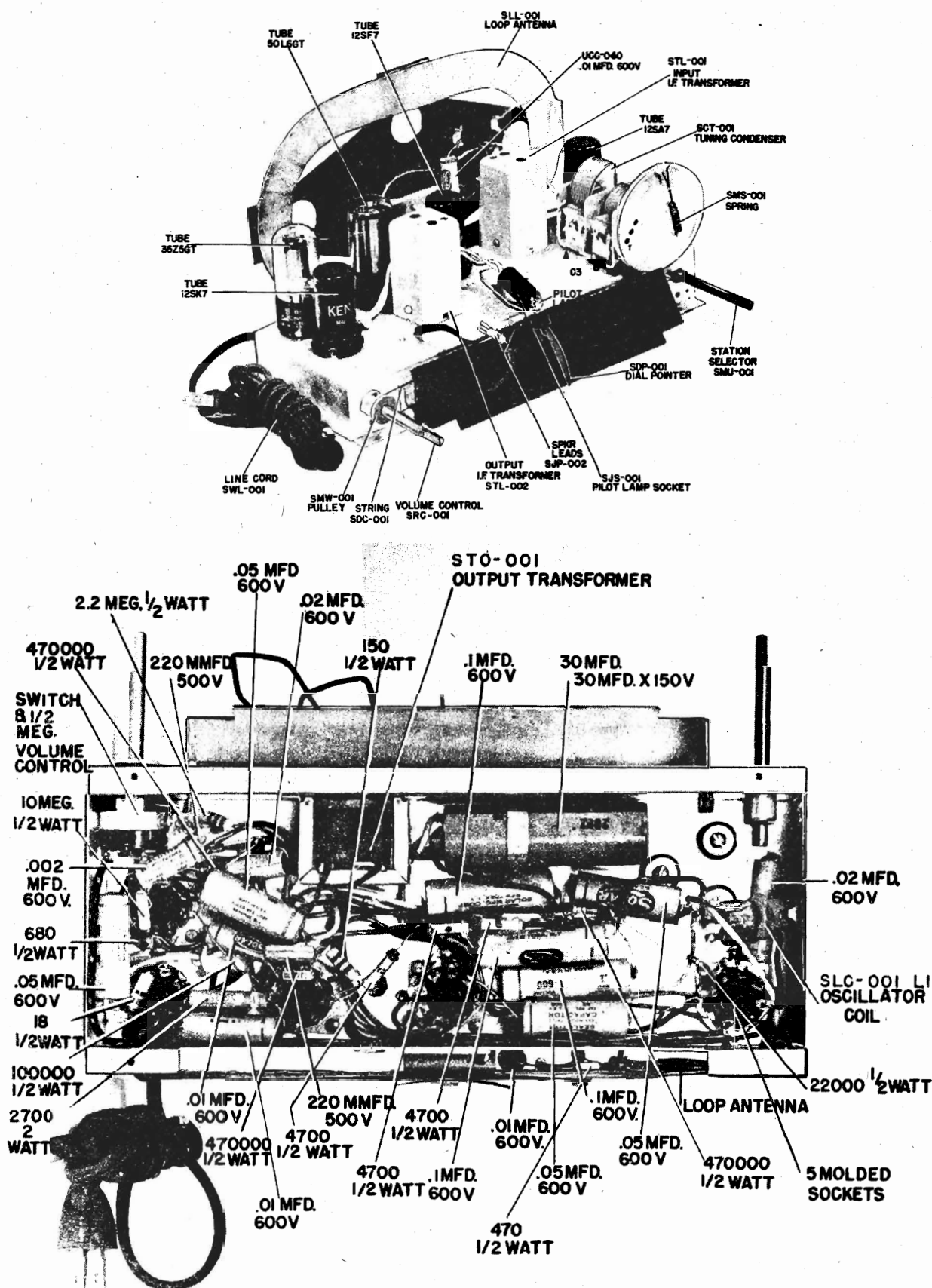
IF PEAK 455 KC

28 WATTS



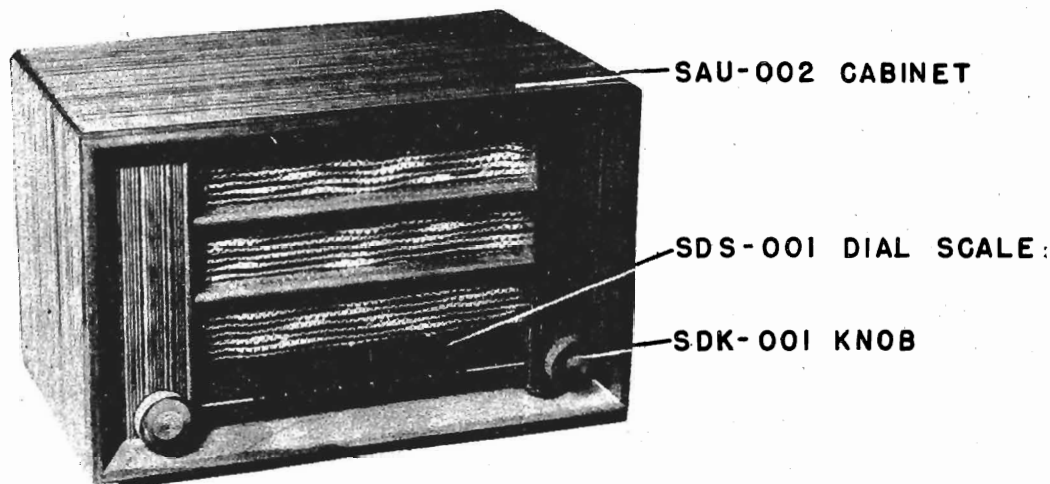
GAMBLE-SKOGMO INC.

MODEL 43-8437

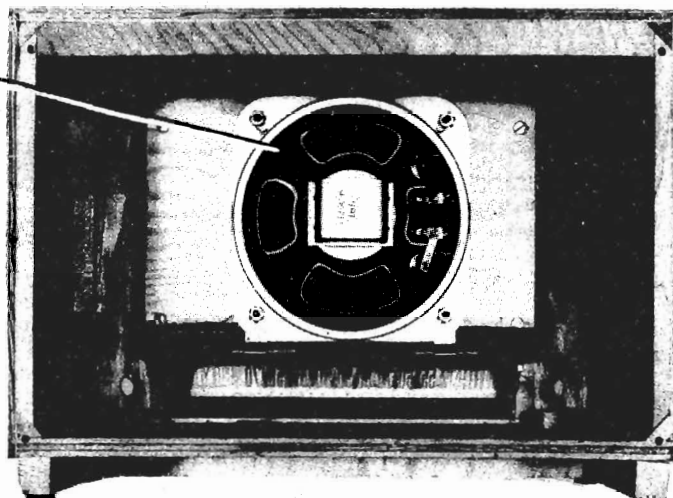
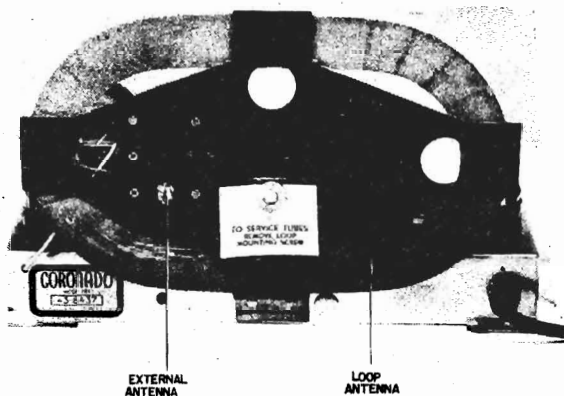


MODEL 43-8437

GAMBLE-SKOGMO INC.



UOP-526 SPEAKER

**PRECAUTION**

If the signal generator is A-C operated, use an isolating transformer between the power supply and radio receiver power input. The use of an isolating capacitor is not recommended, as A-C through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

**REMOVAL OF CHASSIS FROM CABINET**

In order to remove the chassis from the cabinet, pull off the two control knobs, remove the four push pins holding the cabinet-back in place, and take out the four chassis mounting bolts from the bottom of the cabinet. When the chassis has been loosened, disconnect the two clips which connect the chassis to the speaker. The chassis can now be removed from the cabinet.

**SCHEMATIC DIAGRAM LEGEND****RESISTORS**

R 1	220,000 ohm carbon, ½ watt
R 3	2.2 megohm carbon resistor, ½ watt
R 5	680 ohm carbon resistor, ½ watt
R 6	4,700 ohm carbon resistor, ½ watt
R 7	4,700 ohm carbon resistor, ½ watt
R 8	4,700 ohm carbon resistor, ½ watt
R 9	10 megohm carbon resistor, ½ watt
R10	470,000 ohm carbon resistor, ½ watt
R11	470,000 ohm carbon resistor, ½ watt
R12	150 ohm carbon resistor, ½ watt
R13	100,000 ohm carbon resistor, ½ watt
R14	18 ohm carbon resistor, 1 watt
R15	500,000 ohm carbon resistor, ½ watt
R16	2,700 ohm carbon resistor, 2 watt
R17	470,000 ohm carbon resistor, ½ watt
R18	470 ohm carbon resistor, ½ watt

**CONDENSERS**

C 1	.01 mfd. paper capacitor
C 2	47 mmfd. mica capacitor
C 3A	Antenna section
C 3B	Oscillator section
C 6	.05 mfd. paper capacitor
C 8	22 mmfd. mica capacitor
C 9	.002 mfd. paper capacitor
C10	.05 mfd. paper capacitor
C11	.02 mfd. paper capacitor
C12	.01 mfd. paper capacitor
C13	.01 mfd. paper capacitor
C14	30 mfd. 150 v. electrolytic capacitor
C15	30 mfd. 150 v. electrolytic capacitor
C16	.1 mfd. paper capacitor

C17A	Antenna trimmer
C17B	Oscillator trimmer
C18	.05 mfd. paper capacitor
C19	.05 mfd. paper capacitor
C20	.02 mfd. paper capacitor
C21	22 mmfd. mica capacitor
C22	.1 mfd. paper capacitor

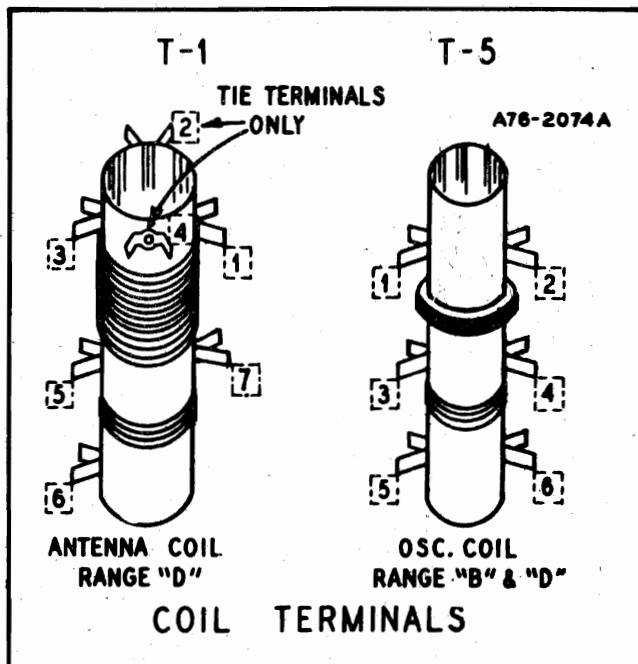
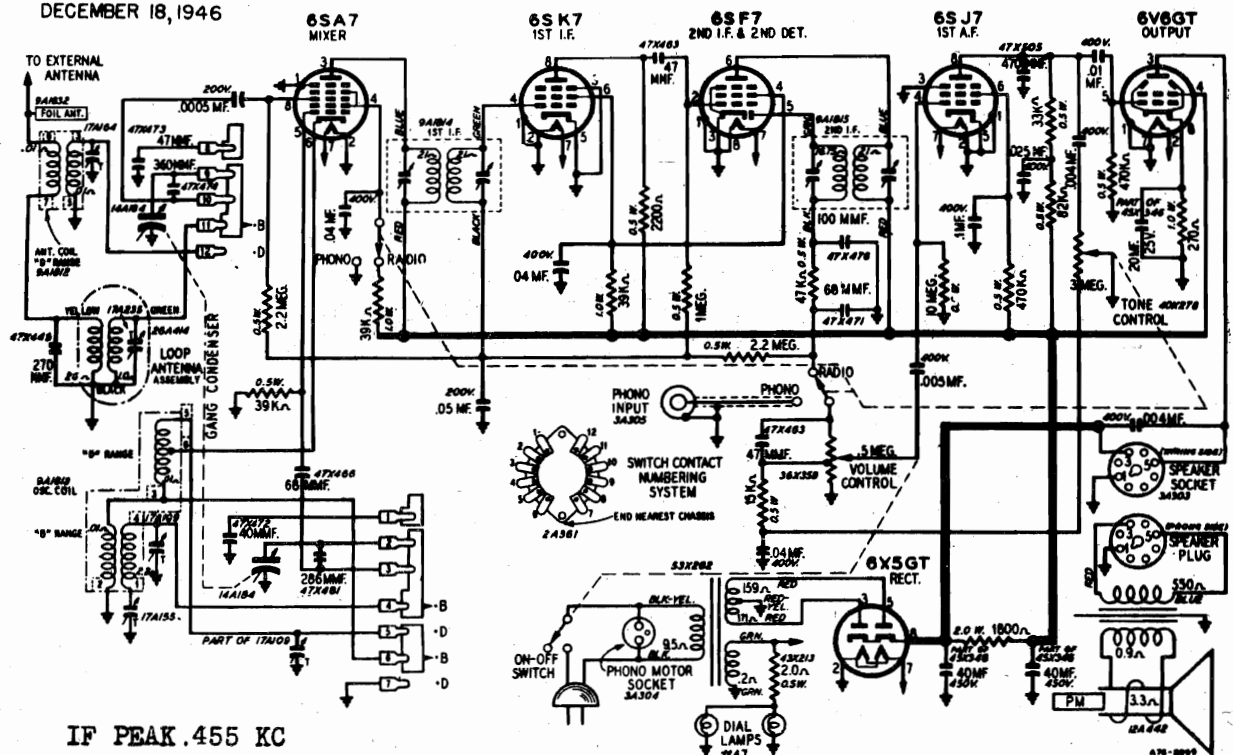
**MISCELLANEOUS**

L1	Oscillator coil
L2	Antenna loop
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
P1	Pilot light—Mazda No. 51

GAMBLE-SKOGMO INC.

MODEL 43-8576

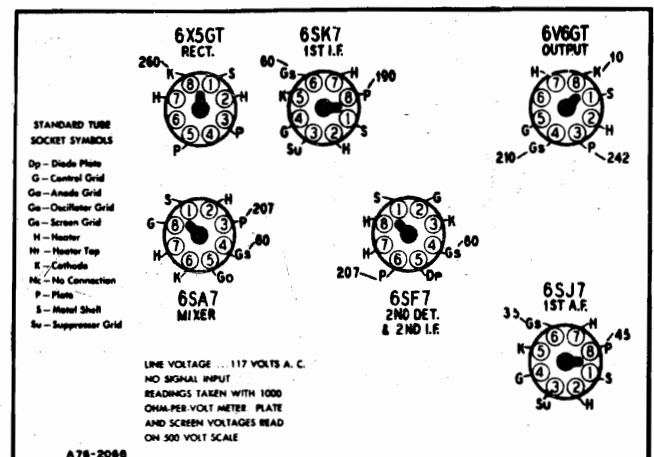
DECEMBER 18, 1946



## CIRCUIT DESCRIPTION

The circuit and tube complement of the receiver are as follows: 1-6SA7 1st Detector and Oscillator, 1-6SK7 1st I-F Amplifier, 1-6SF7 2nd I-F Amplifier and 2nd Detector, 1-6SJ7 1st Audio Amplifier, 1-6V6GT Power Output, 1-6X5GT Rectifier. Two No. 47 dial lamps are used for dial illumination.

A jack is provided at the rear of the chassis for record player or other special service connections. This jack is switched in or out of the audio circuit with a switch controlled by the tone control knob that also shorts out the r-f signal when it is turned to the phono position.



## SPECIFICATIONS

6 Tube Superheterodyne, Including Rectifier Tube

Speaker.....6" PM Dynamic

Intermediate Frequency.....455 Kc.

Selectivity.....40 Kc. Broad at 1,000 Times Signal

Sensitivity (For 0.5 Watt Output, with External Antenna)

B Range.....9 Microvolts Av.

D Range.....20 Microvolts Av.

Power Consumption (at 117 Volts AC) .40 Watts (normal)

Power Output.....

4 Watts, Maximum 2.3 Watts, 10% Harmonics

Tuning Frequency Range

B Range.....540-1600 Kilocycles

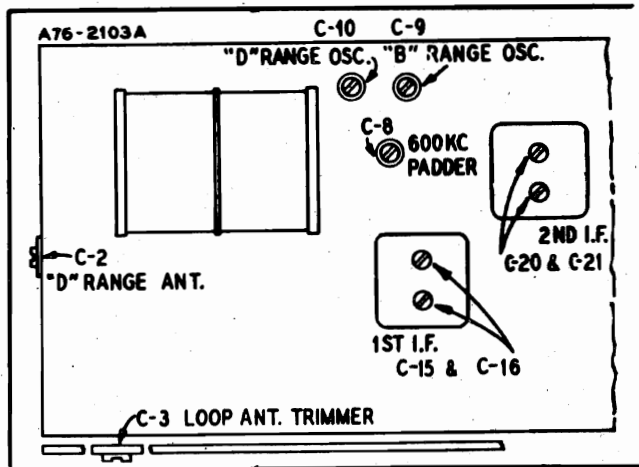
D Range.....9-15.5 Megacycles

MODEL 43-8576

GAMBLE-SKOGMO INC.

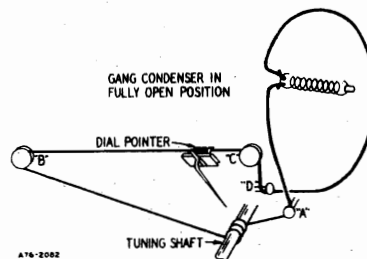
## REMOVAL OF CHASSIS FROM CABINET

After the cabinet back has been taken off, it is necessary to disconnect the white lead from the foil antenna mounted in the top of the cabinet and to loosen the screw and remove the black lead fastened to the lower left rear corner of the chassis. The chassis may then be pulled from the cabinet.



## DRIVE CORD REPLACEMENT

When installing a new drive cord, turn the large drive pulley until the gang condenser plates are fully unmeshed. Hook one end of the new drive cord to the tension spring and hook the tension spring to the tab on the large drive pulley. Pass the cord through the slot in the drive pulley rim and continue one-fourth turn counterclockwise around the drive pulley. Then pass the cord around idler stud A (see illustration) and wind three turns clockwise around the tuning shaft with the turns progressing away from the chassis. Pass the cord over pulleys B and C and around idler stud D. Wrap the cord one-half turn counterclockwise around the large drive pulley and hook the end of the drive cord to the tension spring. It may be necessary to unhook the tension spring from the drive pulley in order to attach the cord, after which it should be again hooked to the drive pulley and the tuning shaft turned a few turns in order to take up the slack in the drive cord.



## ALIGNMENT PROCEDURE

Volume Control—Maximum. All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All-Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screw-driver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

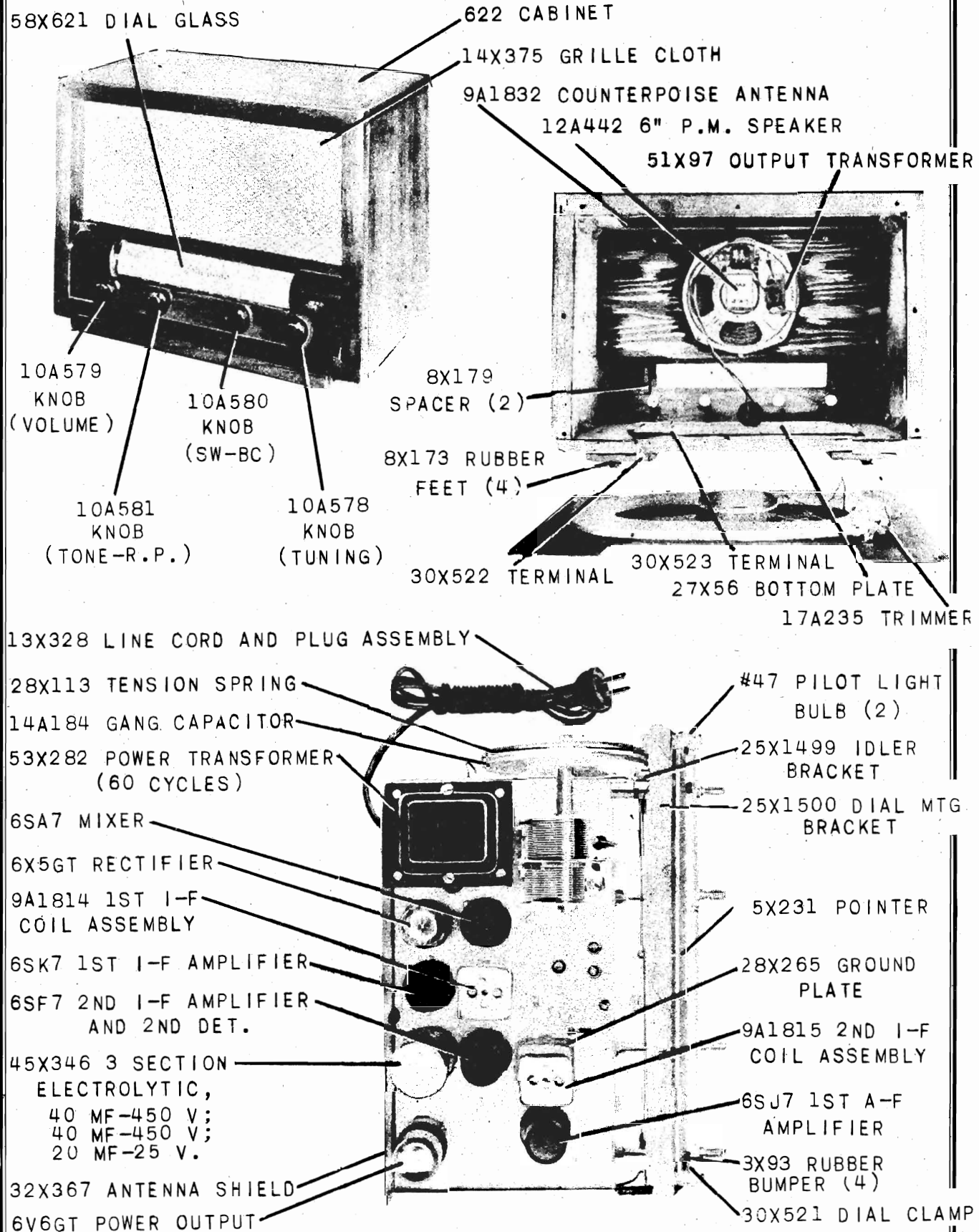
	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	455 Kc.	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C20) & (C21) 1st I.F. (C15) & (C16)
RANGE B	1,620 Kc.	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1,400 Kc.	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Set Pointer to 1,400 Kc. (See Note A)	Ant. Range B (C3)
	600 Kc.	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (C6) Rock Rotor See Note B
Repeat above steps at 1,620 and 600 Kc. until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.						
RANGE D	15,600 Kc. 14,000 Kc.	Antenna Lead Antenna Lead	400 ohm 400 ohm	D Range D Range	Turn Rotor to Full Open Tune Rotor to Max. Output	Oscillator Range D (C10) Ant. Range D (C2)
LOOP RANGE B	1,400 Kc.	Reassemble chassis in cabinet. Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Rock Rotor—See Note B Ant. Range B (C3)

NOTE A—Set pointer at the 1,400 Kc. mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

## GAMBLE-SKOGMO INC.

MODEL 43-8576



MODEL 43-8576

GAMBLE-SKOGMO INC.

19X8 FLAT WASHER

#10 X 1/2" SLOTTED HEX HD. P-K TYPE "Z"  
SCREW (MTG. CHASSIS TO CABINET) (4)

28X292 SNAP BUTTON (7)

3A303 SPEAKER SOCKET

C. .004 MF 200 V

C. .01 MF 400 V

R. 270 $\Omega$  1 W

R., WIRE WOUND  
2 $\Omega$   $\pm$  20% 1/2 W

C. .1 MF 400 V

R. 82,000 $\Omega$  1/2 W

R. 470 $\Omega$  1/2 W

R. 39,000 $\Omega$  1 W

30X138 CLIP

C. .025 MF 400 V

R. 1,800 $\Omega$  2 W

3A305 PHONO  
SOCKET

C. 47 MMF  $\pm$  20%

R. 2,200 $\Omega$  1/2 W

R. 1 MEG. 1/2 W

C. .04 MF  $\pm$  10%  
400 V

4A84 TERMINAL  
STRIP (2)

C. .04 MF 400 V

3A304 PHONO  
MOTOR SOCKET

R. 39,000 $\Omega$  1/2 W

17A155 TRIMMER  
350-430 MMF

30X132 LINE  
CORD CLAMP

R. 2.2 MEG. 1/2

C. .0005 MF 200 V

1X71 INSULATOR  
STRIP

C. 470 MMF  $\pm$  10%

3A303 TUBE SOCKET (6)

C. .005 MF 400 V

C. 47 MMF  $\pm$  20%

36X359 VOLUME CONTROL  
AND SWITCH .5 MEG.

C. .004 MF 400 V

R. 10 MEG. 1/2 W

R. 15,000 $\Omega$  1/2 W

R. 39,000 $\Omega$  1 W

R. 47,000 $\Omega$  1/2 W

40X278 TONE  
CONTROL AND R.P.  
SWITCH

C. .04 MF 400 V

R. 2.2 MEG. 1/2 W

C. 100 MMF  $\pm$  20%

C. .05 MF, 200 V

17A109 TRIMMER  
DUAL 2.5-35 MMF

C. 68 MMF  $\pm$  10%

C. 286 MMF  $\pm$  2%

2A361 BANDSWITCH

9A1813 OSC. COIL

C. 40 MMF  $\pm$  2%

C. 360 MMF  $\pm$  2%

C. 47 MMF  $\pm$  2%

26X487 DRIVE  
SHAFT

C. 270 MMF  $\pm$  10%

9A1812 ANTENNA  
COIL

17A164 TRIMMER  
5-50 MMF



105-125 VOLTS  
AC - DC  
50 - 60 ~

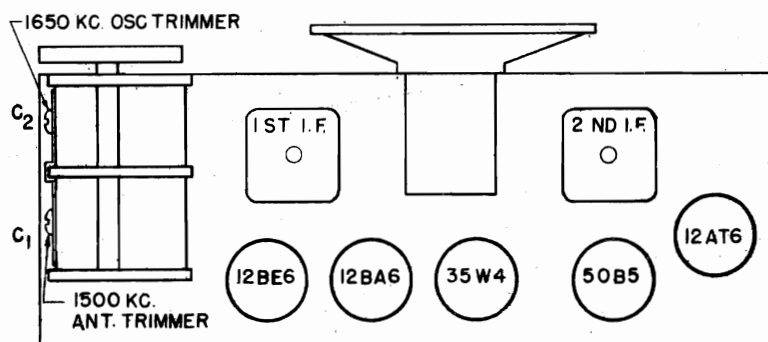
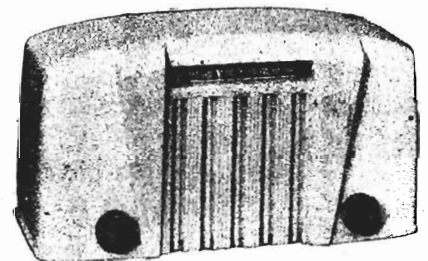
12BE6 12BA6 12AT6 50B5

35W4

IF PEAK-455 KC

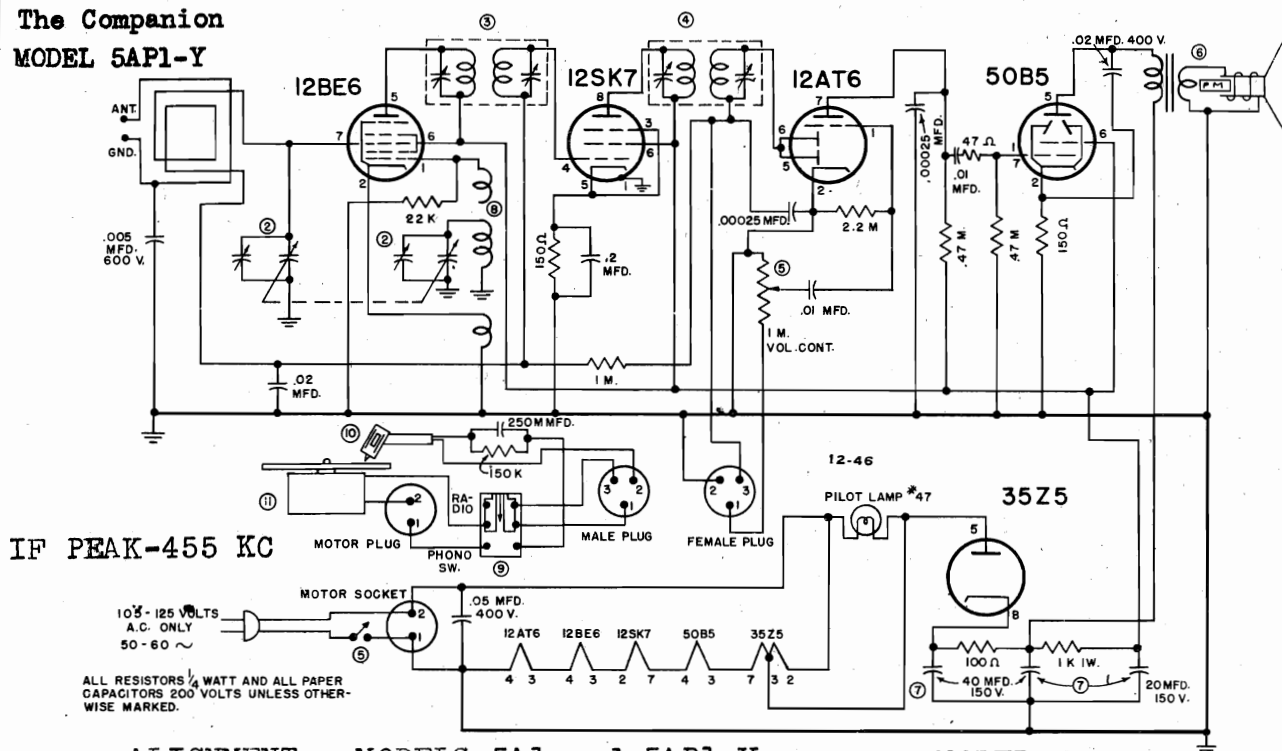
① 1.443 LOOP ASSEMBLY  
② 2.200. 2 GANG VARIABLE COND.  
③ 1.259 1ST I.F. TRANSFORMER  
④ 1.259 2ND I.F. TRANSFORMER  
⑤ 8.200-9 OR 8.200-4 VOLUME CONTROL & SWITCH  
⑥ 30.303 P.M. 4" SPEAKER & OUTPUT TRANS.  
⑦ 5.415-2 ELECTROLYTIC CAP. 20-20-20 MFD.  
⑧ 1.444-1 OSCILLATOR COIL

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



The Ensign  
MODEL 5A1  
The Companion  
MODEL 5AP1-Y

GAROD ELECTRONICS CORP.



IF PEAK-455 KC

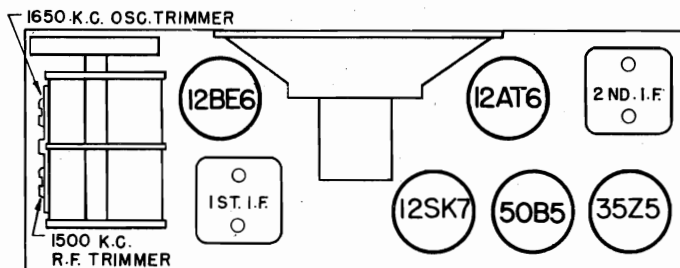
ALIGNMENT - MODELS 5A1 and 5AP1-Y

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

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

MODEL 5AP1-Y

- ① 1.410 LOOP ASSEMBLY
- ② 2.200 2 GANG VARIABLE CONDENSER
- ③ 1.259 1ST. I.F. TRANSFORMER
- ④ 1.259 2ND. I.F. TRANSFORMER
- ⑤ 8.201-2 VOL. CONTROL & SWITCH
- ⑥ 30.301 P.M. 4" SPEAKER & OUTPUT TRANS.
- ⑦ 5.400-8 ELECTROLYTIC CAP. 40-40-20 MFD
- ⑧ 1.402-2 OSCILLATOR COIL
- ⑨ 11.207 D.R.D.T. SWITCH
- ⑩ 36.104 PHONOPICKUP
- ⑪ 36.108 PHONOMOTOR & TURNTABLE



**LINE VOLTAGE:** 105-125 Volts,  
60 Cycles, Alternating Current (AC) only.

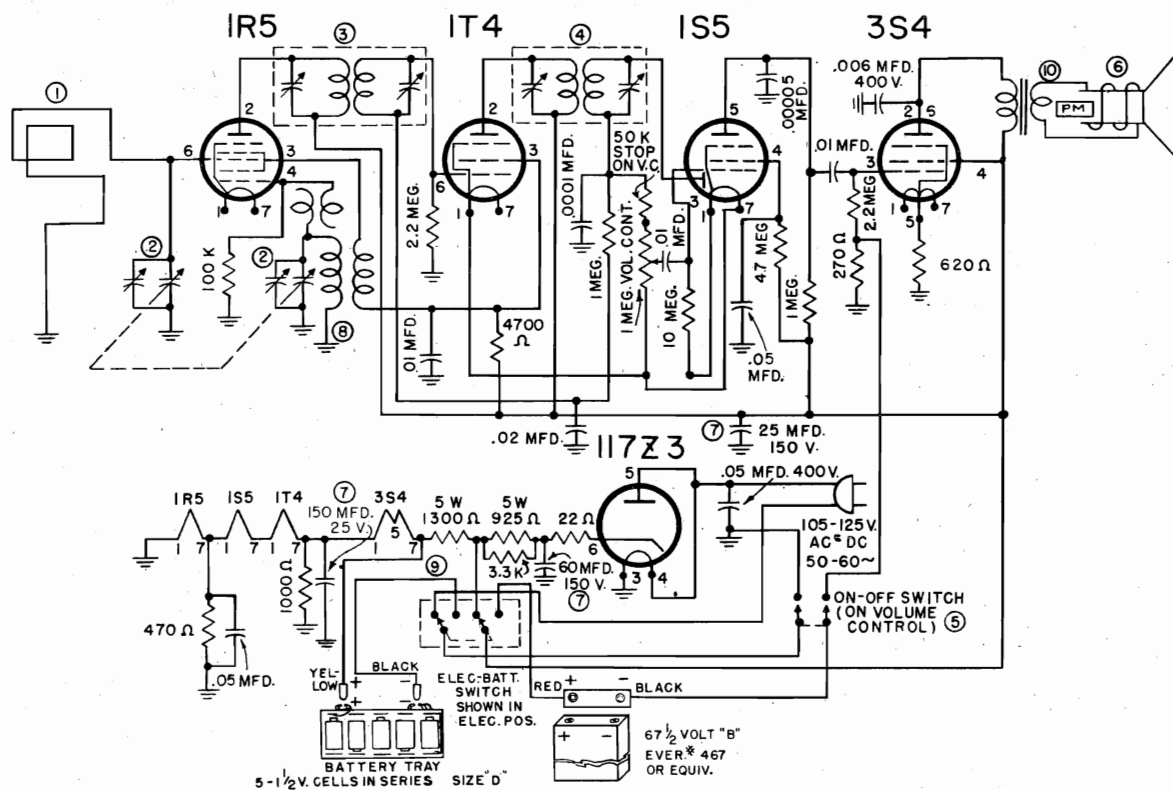
**POWER CONSUMPTION:** 45 Watts.

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



## GAROD ELECTRONICS CORP.

MODELS 5D-3, 5D-3A



ALL RESISTORS  $\frac{1}{4}$  WATT AND  
ALL PAPER CAPACITORS 200  
VOLTS UNLESS OTHERWISE  
MARKED.

K = KILOHMS

I. F. = 455 K C.

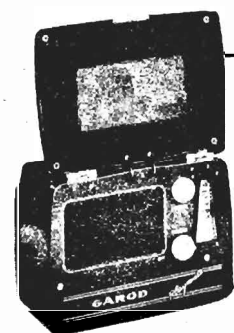
- ① 1.437 LOOP ANTENNA
- ② 2.203 2 GANG VARIABLE CONDENSER
- ③ 1.412 1ST I.F. TRANSFORMER
- ④ 1.413 2ND I.F. TRANSFORMER

- ⑤ 8.200-2 VOLUME CONTROL & SWITCH
- ⑥ 30.313 4" P.M. SPEAKER
- ⑦ 5.400-3 ELECTROLYTIC CAP. 60-25-150 MFD.
- ⑧ 1.414 OSCILLATOR COIL
- ⑨ 11.207 ELECTRIC-BATTERY SWITCH
- ⑩ 9.205 OUTPUT TRANSFORMER

-3-47

### THE FOLLOWING CHANGES IN PARTS ARE MADE FOR MODEL 5D-3

- ① 1.405 LOOP ANTENNA
- ⑥ 30.302  $3\frac{1}{2}$ " P.M. SPEAKER
- ⑨ 11.200 ELECTRIC-BATTERY SWITCH



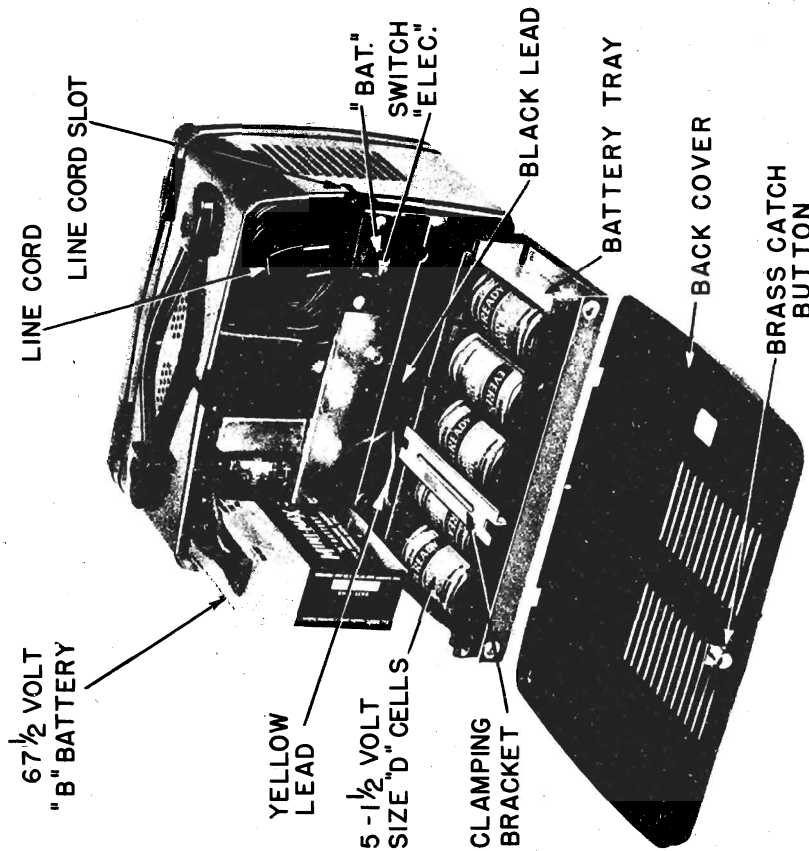
**BATTERY OR LINE VOLTAGE:** This receiver is designed for operation on 105-125 volts, 50-60 cycles either Alternating or Direct Current (AC-DC) and also from self contained batteries.

**POWER CONSUMPTION:** 20 Watts on Electric Operation.

**BATTERY REQUIREMENTS:** The following batteries are required for battery operation:

QUANTITY	TYPE	MANUFACTURER
5	1 1/2 volt "A"	Eveready #950, Burgess #2 or equivalent.
1	67 1/2 volt "B"	Eveready #467, Burgess #XX45 or equivalent.

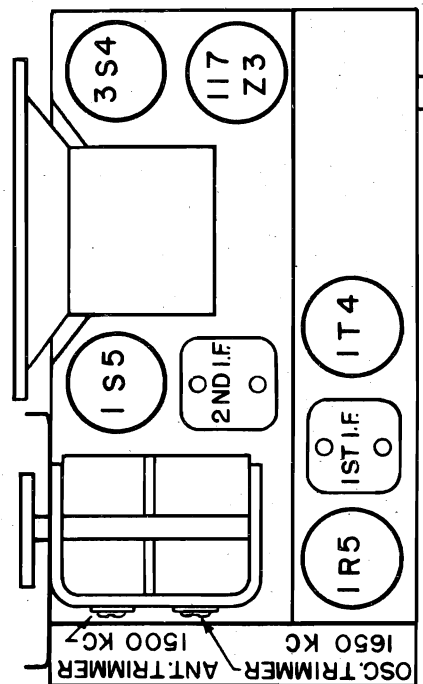
**TUNING RANGE:** Broadcast 540 to 1650 Kilocycles (180 to 555 meters).

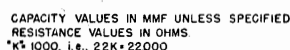


MODEL 5D-3A REAR VIEW  
SHOWING BATTERIES REMOVED FROM CABINET

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

- (1) Set the Signal Generator to 455 KC and connect to the stator lug (front section) of variable capacitor. Extend the loop leads and solder to the lug connecting green wire from Ant. Section of variable capacitor and chassis. Connect the Signal Generator ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the variable capacitor to the extreme counter clockwise position (minimum capacity).
- (2) Adjust the trimmers located at the top of the first and second I. F. transformers for maximum output as indicated on the output meter.
- (3) Loosely couple the Signal Generator lead to the Loop (open position) and set to 1650 KC.
- (4) With the variable capacitor set at the extreme counter clockwise position (minimum capacity), tune in the 1650 KC signal by means of the oscillator trimmer on the variable capacitor (rear section).
- (5) Set the Signal Generator to 1500 KC and turn the tuning control so that this frequency is indicated on the dial. Adjust the antenna trimmer on the variable capacitor (front section) for maximum output.
- (6) Install the chassis into cabinet and check the dial calibration. If further adjustment is required, remove the two plug buttons on the side of the cabinet adjacent to the variable capacitor and adjust the oscillator trimmer as required. Adjust the antenna trimmer for maximum output and replace plug buttons.





## MODEL 180

## GENERAL ELECTRIC CO.

## POWER SUPPLY AND REQUIREMENTS:

(1.5 volts "A", 90 volts "B" pack)

Burgess ..... 17GD60  
 Ray-O-Vac ..... AB-82  
 Eveready ..... 748 or 758  
 General ..... 60 DL-11L

## OPERATING FREQUENCIES:

Broadcast Band ..... 540-1710 kc  
 I-F Amplifier ..... 455 kc

## POWER OUTPUT:

Undistorted ..... 0.15 watt  
 Maximum ..... 0.27 watt

## LOUDSPEAKER:

Type ..... Alnico P.M.  
 Outsider Cone Diameter ..... 6 in.  
 Voice Coil Impedance (400 cycles) ..... 3.2 ohms

## TUBE COMPLEMENT:

Oscillator-Converter ..... Type 1A7GT  
 I-F Amplifier ..... Type 1N5GT  
 Detector-Audio ..... Type 1H5GT  
 Power Output ..... Type 3Q5GT

## ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Oscillator Setting	Pointer Setting On Radio	Adjust For Max. Output
1	1N5GT IF grid in series with .05 mfd.	455 KC	550 KC	1st IF trans. trimmers
2	1A7GT Conv. grid in series with .05 mfd.	455 KC	550 KC	2nd IF trans. trimmers
3	To Ant. Post through 200 mmf. dummy and to Grd. Post.	1500 KC	1500 KC	C7* (osc.) and C3 (R-F)

\*Rock gang condenser when making alignment.

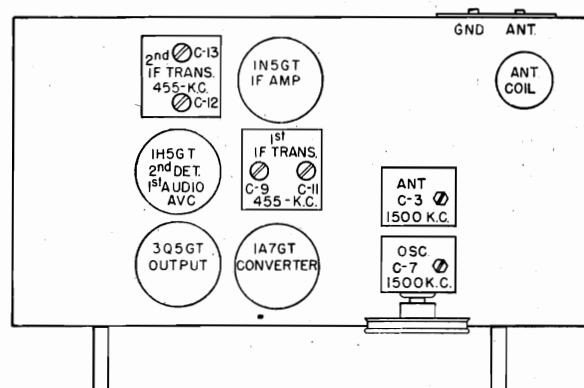
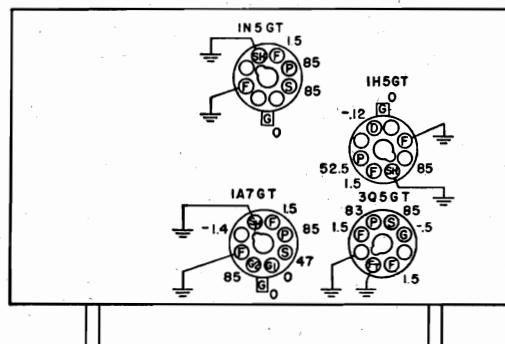


Fig. 1. Tube and Trimmer Location

RSM-1

## REAR OF CHASSIS



## BOTTOM VIEW OF CHASSIS

MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT METER.  
 MEASURED FROM PIN TO CHASSIS.  
 1.5 V "A"-90 V "B" BATTERY PACK. NO SIGNAL INPUT.  
 VOLUME CONTROL AT MAXIMUM.

Fig. 2. Socket Voltage Diagram

## STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

- (1) R-F Stage Gains.  
 Antenna post to 1A7GT grid ..... 6.6 at 1000 kc  
 1A7GT grid to 1N5GT grid ..... 46 at 1000 kc  
 1A7GT grid to 1N5GT grid ..... 60 at 455 kc  
 1N5GT grid to 1H5GT diode plates ..... 80 at 455 kc
- (2) Audio Gain.  
 .06 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately .05 watts output across speaker voice coil.
- (3) D-C voltage developed across oscillator grid resistor (R2) averages 7 volts at 1000 kc.
- (4) Socket Pin Voltages.  
 Figure 2 shows voltages from all tube pins to B-. Voltage readings much lower than those specified may help localize defective components or tubes.

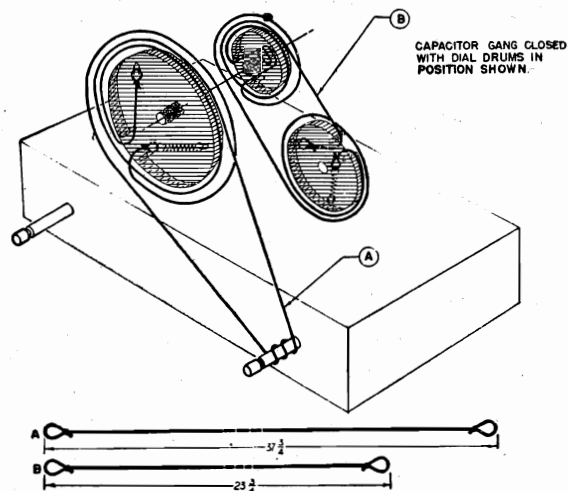
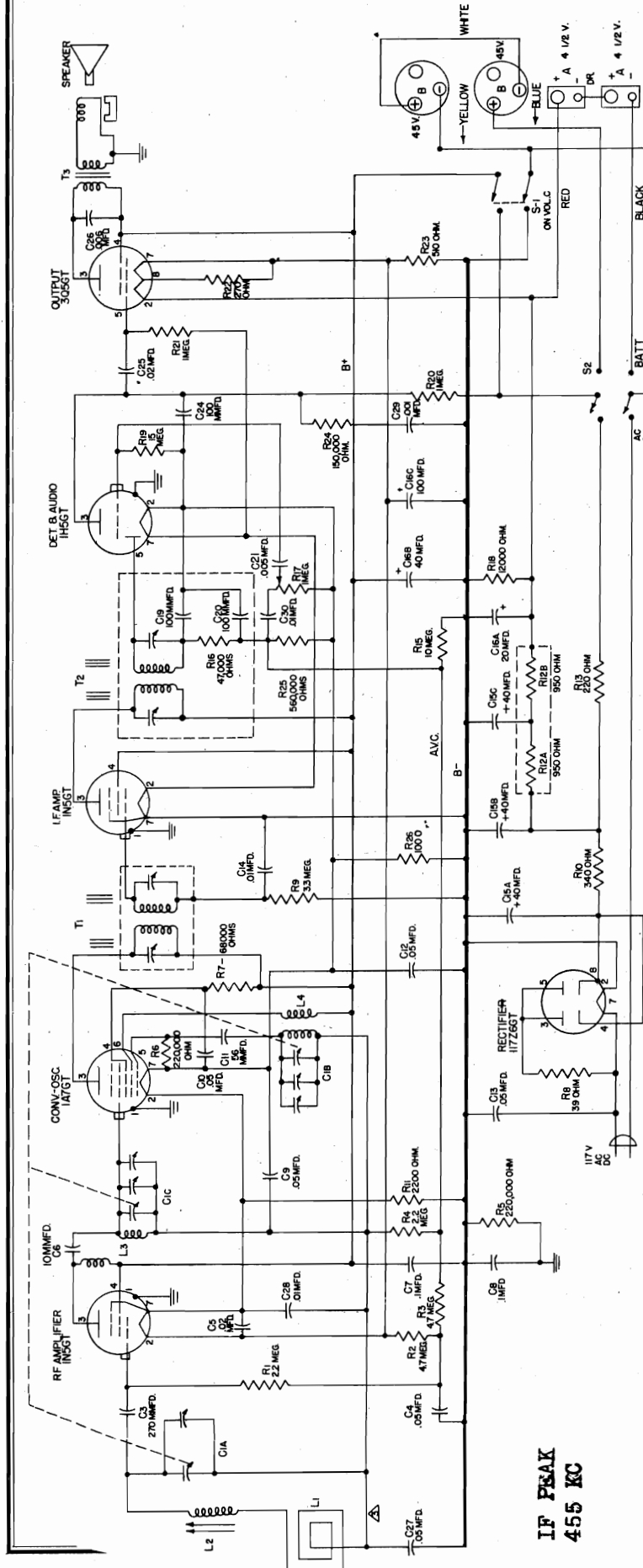


Fig. 3. Dial Stringing

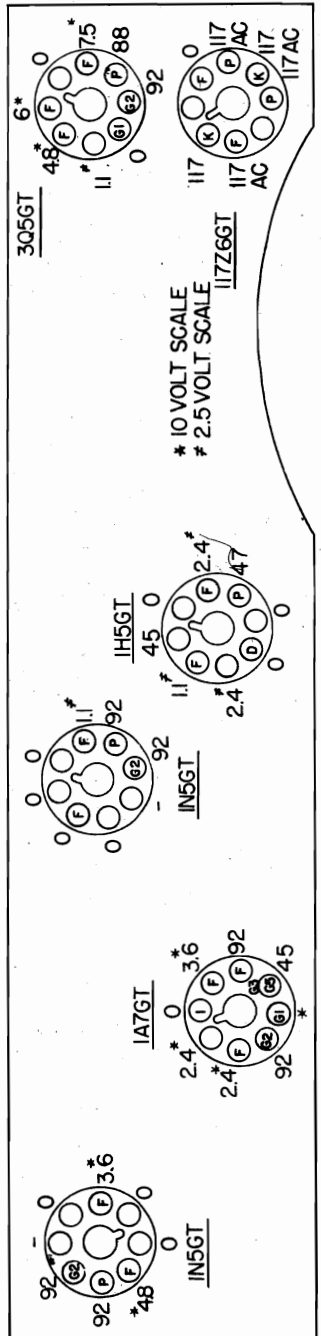
# GENERAL ELECTRIC CO.

MODEL 254



## CONDITIONS OF TEST

MEASUREMENTS TAKEN WITH 20,000 OHMS PER VOLT METER  
 READINGS TAKEN BETWEEN SOCKET PIN 8 & B-  
 A-C LINE VOLTS = 117 V.  
 SWITCH S2 IN AC-DC POSITION



BOTTOM VIEW OF CHASSIS

## MODEL 254

## GENERAL ELECTRIC CO.

**POWER SUPPLY:**

(AC-DC Operation)

Voltage.....105-125 volts

Frequency (on a-c).....50-60 cycles

Power Consumption.....18 watts

(Battery Operation)

2-4½-volt "A" Batteries.. Eveready No. 746 or equivalent

2-45-volt "B" Batteries.. Eveready No. 482 or equivalent

**OPERATING FREQUENCIES:**

Broadcast Band.....540-1620 kc

I-F Amplifier.....455 kc

**POWER OUTPUT:**

Undistorted.....0.15 watts

Maximum.....0.27 watts

**LOUDSPEAKER:**

Type.....Alnico PM

Outside Cone Diameter.....5¼ in.

Voice Coil Impedance (400 cycles).....3.2 ohms

**TUBE COMPLEMENT:**

R-F Amplifier.....1N5GT

Oscillator-Converter.....1A7GT

I-F Amplifier.....1N5GT

Detector-Audio.....1H5GT

Power Output.....3Q5GT

Rectifier.....117Z6GT

**ELECTRICAL CIRCUIT ALIGNMENT****ALIGNMENT FREQUENCIES:**

R-F.....1620, 1500 kc and 600 kc

I-F.....455 kc

**EQUIPMENT REQUIRED:**

1. Test oscillator with tone modulation
2. A-C output meter
3. .05 mfd. paper capacitor
4. Insulated screwdriver

**PROCEDURE—GENERAL.** 1. The alignment procedure is given in table form. All i-f and r-f alignments may be made with the chassis removed from the cabinet. The location of the i-f and r-f adjustments is shown in Figure 1.

2. Adjustment of L2 is accomplished by loosening the lock washer and turning the slug with a screwdriver. Retighten the lock washer, being careful not to turn the slug.

3. For accurate frequency calibration, set the test oscillator at 1000 kc, and turn the dial to tune in maximum a 1000-kc signal. Set pointer to read 100 on the dial, making sure the gang condenser does not turn. This adjustment should be made only after all steps on the alignment chart are carried out.

4. The output meter should be connected across the voice coil terminals on the speaker. The low side of the test oscillator output should be connected to the chassis ground; the high side of the oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the volume control should be at its maximum (clockwise) position. The test oscillator should be attenuated so that the output meter reading doesn't exceed ½ volt.

5. For alignment of the oscillator and r-f trimmers, the input signal should be inductively coupled to the radio

loop antenna by connecting a 4-turn, 6-inch diameter loop of bell wire across the signal generator output terminals, and then locate the loop about one foot from the radio loop antenna. To prevent possible errors in peak readings, the position of the loop with respect to the radio loop antenna should not be changed during any one set of adjustments.

**ALIGNMENT CHART**

Step	Connect Test Oscillator to	Test Oscillator Setting	Pointer Setting on Radio	Adjustment for Maximum Output
1	1N5GT I-F grid in series with .05 mfd	455 kc	550 kc	2nd I-F Trans. (T2) Trimmers
2	1A7GT Conv. grid in series with .05 mfd	455 kc	550 kc	1st I-F Trans. (T1)
3	Repeat Steps 1 and 2			
4	Inductively coupled	1620 kc	Max. freq. cond. open	CIB OSC
5	Inductively coupled	1500 kc	1500 kc	C1A Ant. C1C RF
6	Inductively coupled	600 kc	600 kc	L2 Ant. Loading Coil
7	Inductively coupled	1500 kc	1500 kc	C1A Ant. C1C RF
8	Recheck Steps 5, 6, and 7			

**STAGE GAIN AND VOLTAGE CHECKS**

Stage gain by vacuum tube voltmeter or similar measuring devices may be used to check circuit performances and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings should be taken with low signal input so that the AVC is not effective.

**(1) RF STAGE GAINS.**

1N5GT r-f grid to 1A7GT grid.....25 at 1000 kc  
 1A7GT grid to 1N5GT i-f grid.....25 at 1000 kc  
 1A7GT grid to 1N5GT i-f grid.....30 at 455 kc  
 1N5GT i-f grid to 1H5GT diode plate.....65 at 455 kc

**(2) AUDIO GAIN.**

.06 volt at 400 cycles across volume control (R17) with control set at maximum will give approximately .05 watt output across speaker voice coil.

**(3) DC VOLTAGE DEVELOPED ACROSS OSCILLATOR GRID RESISTOR (R6) AVERAGES 13 VOLTS AT 1000 KC.****(4) SOCKET PIN VOLTAGES.**

Figure 3 shows voltages from all tube pins to B-. Voltage readings much lower than those specified may help localize defective components or tubes.

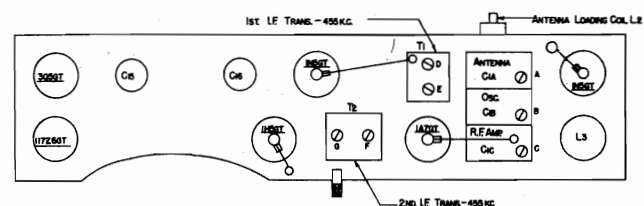


Fig. 1. Tube and Trimmer Location

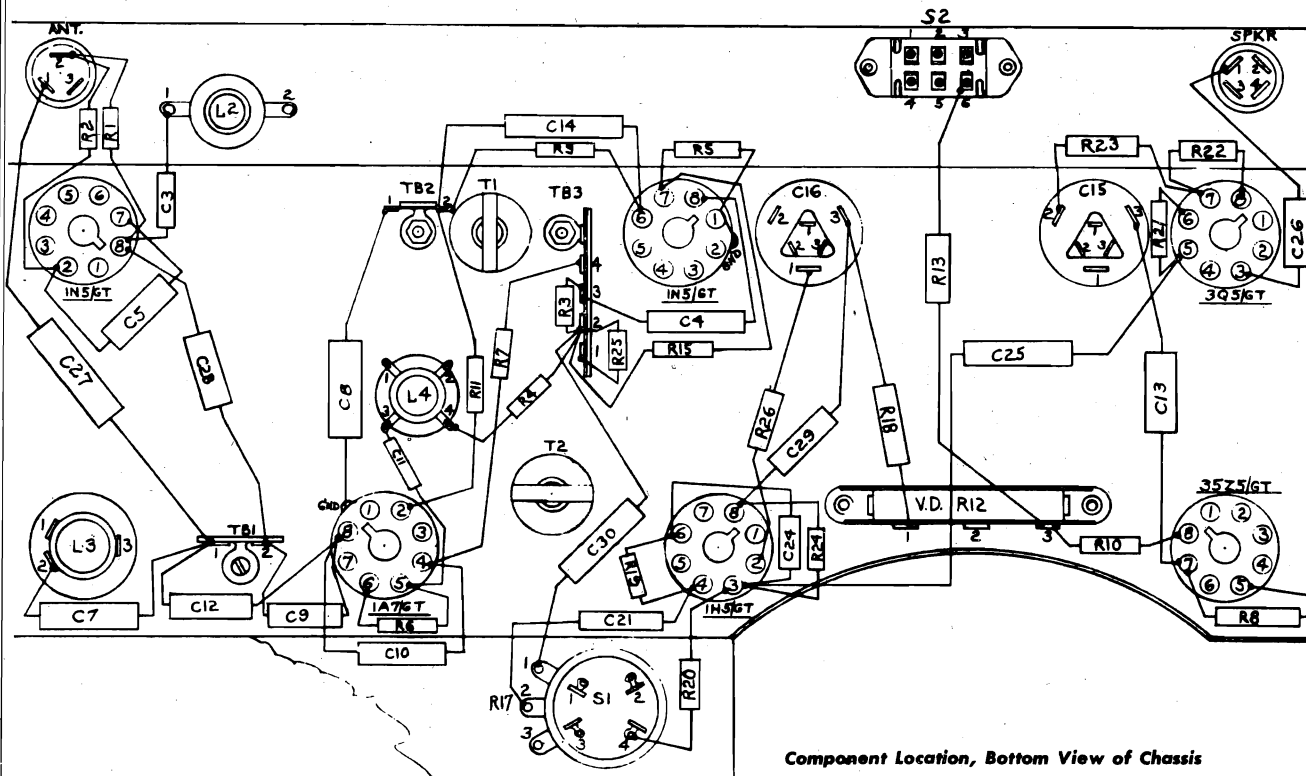
## GENERAL ELECTRIC CO.

MODEL 254

## REPLACEMENT PARTS LIST—MODEL 254

CAT. NO.	SYMBOL	DESCRIPTION	CAT. NO.	SYMBOL	DESCRIPTION
<b>SPECIALIZED REPLACEMENT PARTS (CONT'D)</b>			<b>UNIVERSAL REPLACEMENT PARTS</b>		
SCE-021	C15A, B, C	CAPACITOR—40 mf., 150 v.; 40 mf., 150 v.;	UCC-018	C29	CAPACITOR—0.001 mfd., 400 v., paper
SCT-010	C1A, B, C	40 mf., 150 v.; electrolytic	UCC-025	C14, 28, 30	CAPACITOR—0.01 mfd., 400 v., paper
SDC-002		CONDENSER—Tuning condenser, pulley,	UCC-030	C7, 8	CAPACITOR—0.1 mfd., 400 v., paper
SDK-036		and trimmers	UCC-039	C21, 26	CAPACITOR—0.005 mfd., 400 v., paper
SDP-003		CORD—Dial cord	UCC-041	C5, 25	CAPACITOR—0.02 mfd., 600 v., paper
SDS-012		KNOB—Control knob	UCC-045	C4, 9, 10,	CAPACITOR—0.05 mfd., 600 v., paper
SDW-003		POINTER—Dial pointer		12, 13, 27	
SDX-006		SCALE—Dial scale	UCU-1004	C6	CAPACITOR—10 mmfd., 500 v., mica
SJJ-009		WINDOW—Dial scale window	UCU-1022	C11	CAPACITOR—56 mmfd., 500 v., mica
SJJ-010		DRIVE—Dial drive assembly	UCU-1028	C24	CAPACITOR—100 mmfd., 500 v., mica
SJP-007		CONNECTOR—Female speaker connector	UCU-1038	C3	CAPACITOR—270 mmfd., 500 v., mica
		CONNECTOR—Female antenna connector	UOP-546		LOUDSPEAKER—5 $\frac{1}{4}$ -inch PM speaker
		CONNECTOR—Male 2-contact "A" battery	UOX-008		CONE—Replacement cone
		connector	URD-049	R26	RESISTOR—1000 ohms, $\frac{1}{2}$ w., carbon
SJP-008		CONNECTOR—Male 3-contact "B" battery	URD-057	R11	RESISTOR—2200 ohms, $\frac{1}{2}$ w., carbon
		connector	URD-093	R7	RESISTOR—68,000 ohms, $\frac{1}{2}$ w., carbon
SJP-009		CONNECTOR—Male speaker connector, 4-	URD-101	R24	RESISTOR—150,000 ohms, $\frac{1}{2}$ w., carbon
		contact	URD-105	R5, 6	RESISTOR—220,000 ohms, $\frac{1}{2}$ w., carbon
SJS-031		SOCKET—Octal tube socket	URD-113	R25	RESISTOR—470,000 ohms, $\frac{1}{2}$ w., carbon
SJS-035		SOCKET—Octal tube socket	URD-121	R20, 21	RESISTOR—1 meg., $\frac{1}{2}$ w., carbon
SLA-002	L2	COIL—Antenna loading coil	URD-129	R1, 4	RESISTOR—2.2 meg., $\frac{1}{2}$ w., carbon
SLB-002	L3	COIL—R-F transformer	URD-133	R9	RESISTOR—3.3 meg., $\frac{1}{2}$ w., carbon
SLC-011	L4	COIL—Oscillator coil	URD-137	R2, 3	RESISTOR—4.7 meg., $\frac{1}{2}$ w., carbon
SLL-003	L1	BEAM-A-SCOPE—Loop antenna assembly	URD-145	R15	RESISTOR—10 meg., $\frac{1}{2}$ w., carbon
SMS-012		SPRING—Dial cord spring	URD-149	R19	RESISTOR—15 meg., $\frac{1}{2}$ w., carbon
SMS-013		SPRING—Indicator spring	URE-033	R13	RESISTOR—200 ohms, 1 w., carbon
SMX-014		TRIGGER—Trigger bushing assembly	URE-035	R22	RESISTOR—270 ohms, 1 w., carbon
SRC-044	R17, S1	VOLUME CONTROL—1.0 meg., potentiom-	URE-1042	R23	RESISTOR—510 ohms, 1 w., carbon
		eter and switch	URF-075	R18	RESISTOR—12,000 ohms, 2 w., carbon
SRW-024	R12A, B	RESISTOR—1900 ohms, CT, 5 w., w.w.			
SRW-025	R8	RESISTOR—39 ohms, 5 w., w.w.			
SRW-026	R10	RESISTOR—340 ohms, 5 w., w.w.			
SSS-009	S2	SWITCH—Battery-line selector slide switch			
STL-009	T1	TRANSFORMER—1st I-F transformer			
STL-010	T2	TRANSFORMER—2nd I-F transformer			
STO-007	T3	TRANSFORMER—Output transformer			
SWL-006		CORD—Power cord			
			SAT-001	C16A, B, C	CABINET—Tan finish cabinet
			SCE-020		CAPACITOR—20 mf., 150 v.; 40 mf., 150 v.;
					100 mf., 50 v.; electrolytic

## SPECIALIZED REPLACEMENT PARTS

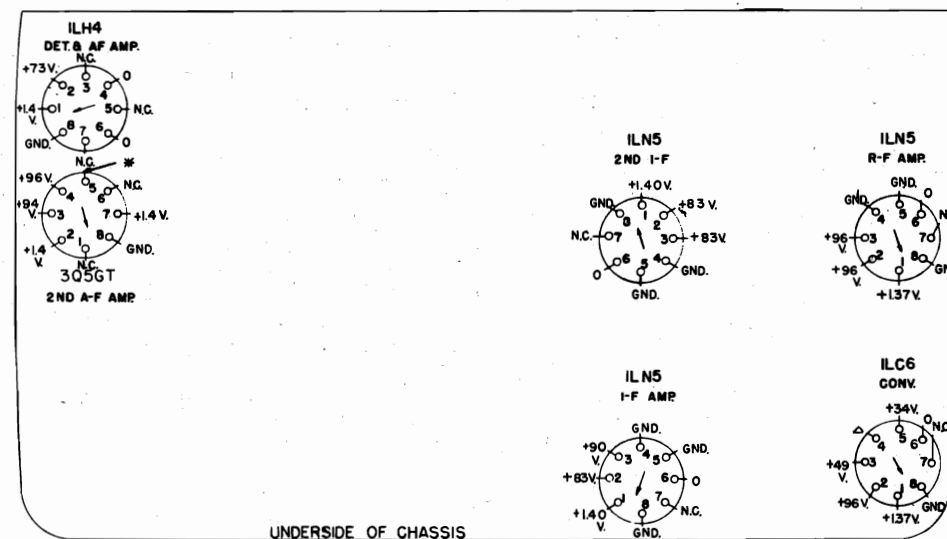
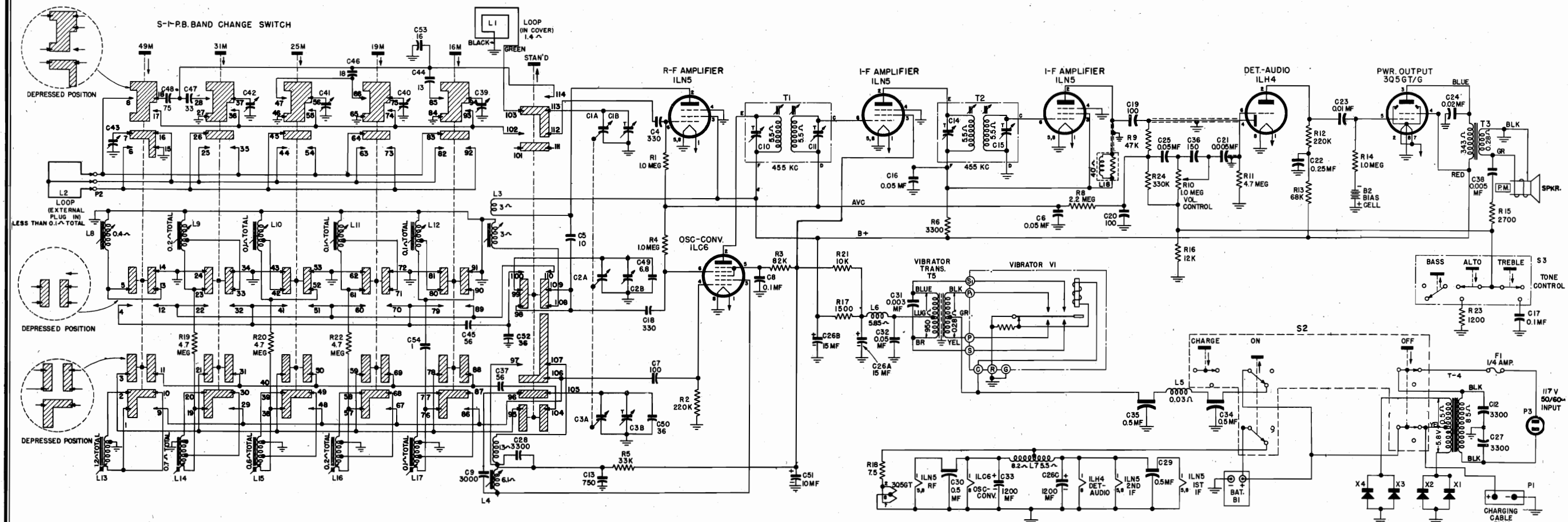






# GENERAL ELECTRIC CO.

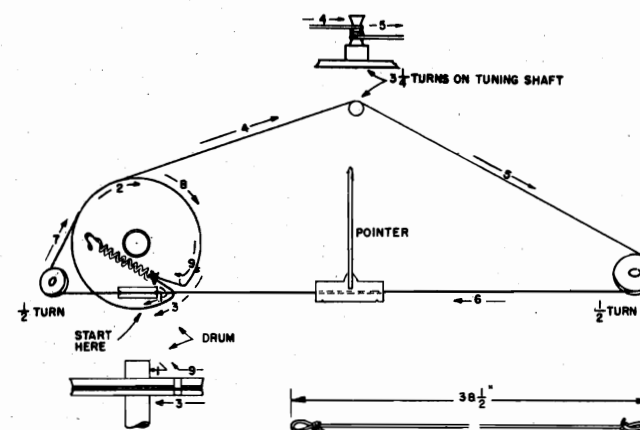
MODEL 260



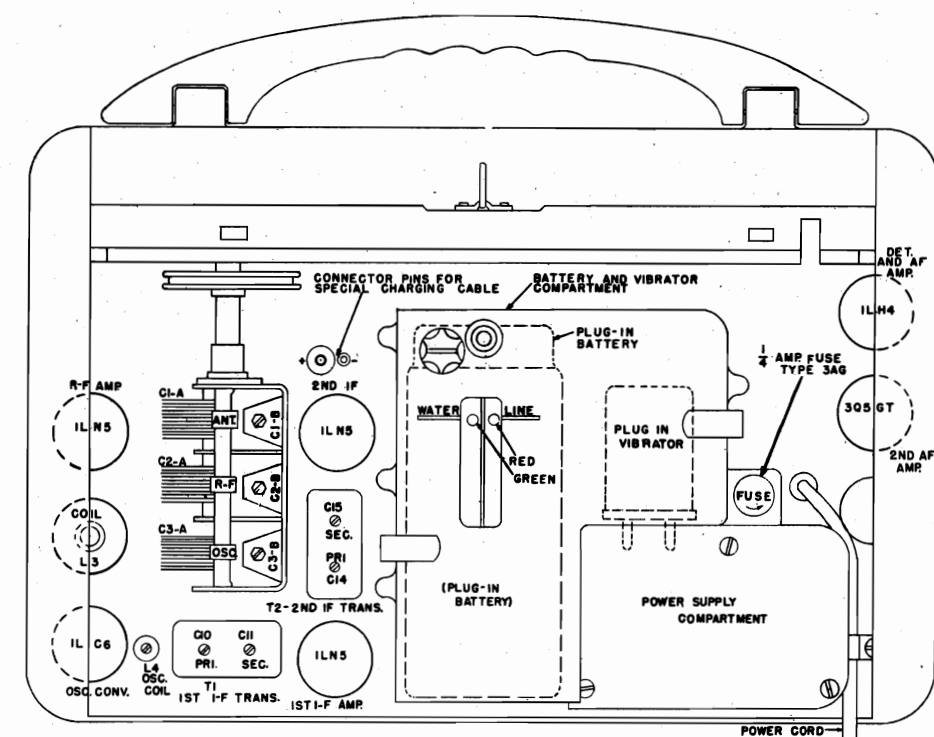
CONDITIONS OF TEST:  
ALL MEASUREMENTS D-C  
MEASUREMENTS MADE TO GROUND  
MEASUREMENTS MADE WITH 20,000 OHM/VOLT METER  
LINE VOLTAGE 117V- BATTERY FULLY CHARGED  
VOL. CONTROL MAX. CLOCKWISE  
TONE CONTROL TREBLE POSITION  
RECEIVER OPERATING ON BROADCAST BAND

NC - NOT CONNECTED TO TUBE  
\* - 4.5V IF MEASURED WITH V.T.M.  
CENTER POST ON ALL LOGICAL TUBES IS GROUND  
Δ READING AFFECTED BY INSTRUMENT

Socket Voltage Diagram



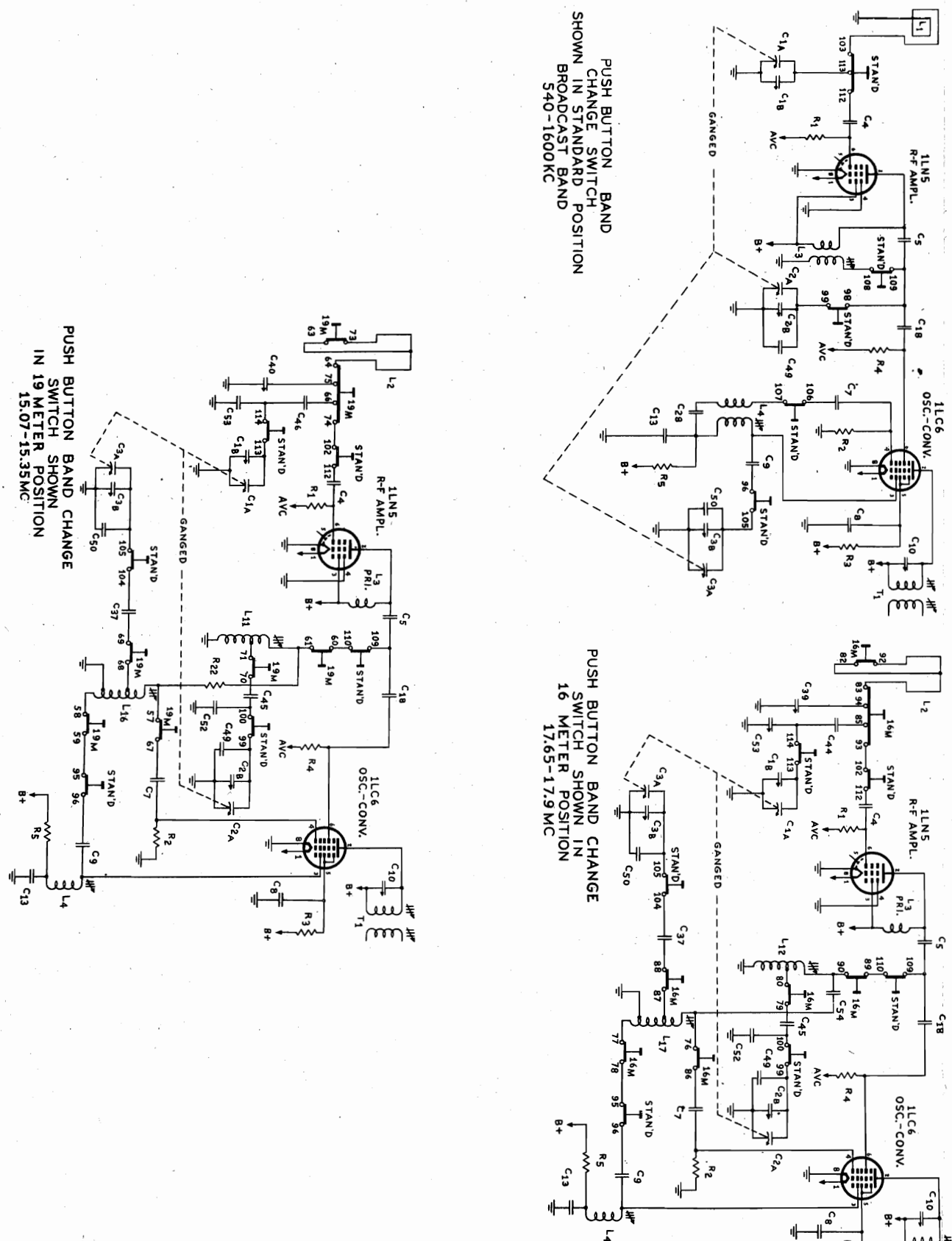
Dial Stringing Diagram



Tube and Trimmer Location

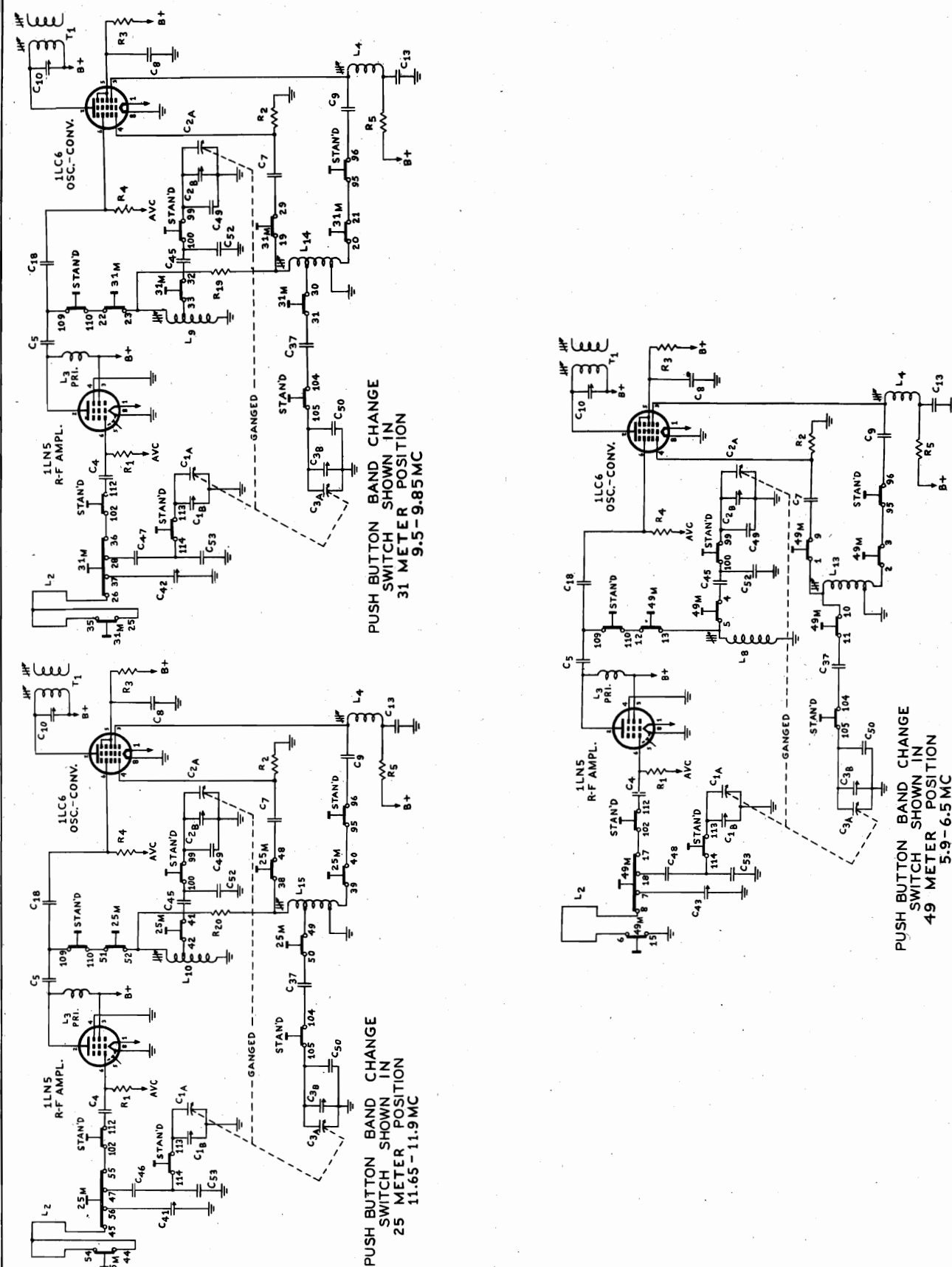
**GENERAL ELECTRIC CO.**

**MODEL 260**



*"clarified schematics"*

GENERAL ELECTRIC CO.



## GENERAL ELECTRIC CO.

MODEL 260

## ELECTRICAL CIRCUIT ALIGNMENT

## 1. EQUIPMENT REQUIRED.

1. Signal Generator with Audio Tone Modulation.
2. A-c output meter, 1 or  $1\frac{1}{2}$  volts full scale, 1000 ohms/volt.
3. Insulated screwdriver.

## 2. ALIGNMENT PROCEDURE.

1. **General.**—The alignment procedure is given in table form for convenience. Reference is made to Figures 3, 5, and 6 for the trimmer locations. The low side of the signal generator should be connected to the chassis of the receiver for i-f alignment; the high side should be connected as indicated in the Alignment Chart. A meter or some other suitable indicating device must be connected to the output of the receiver. Two methods for connecting an output meter are given in later paragraphs.

When aligning the receiver, the Volume Control on the receiver should be turned to its maximum position and the TREBLE push button should be depressed. The output signal of the signal generator should be kept as low as possible at all times; the reading of a meter connected across the voice coil leads of the receiver should be kept below  $\frac{1}{2}$  volt by changing the signal generator output. If the signal level is too high, the AVC becomes effective and alignment errors may result.

The following paragraphs give greater details regarding the connection of the output meter and the signal generator to the receiver during alignment.

2. **Connecting the Output Meter.**—In aligning the receiver, some means for indicating differences in the output voltage will be required. Either of the following methods is satisfactory. The first requires more disassembly of the receiver case than the second, but the second requires additional test equipment.

**Method 1.**—A satisfactory method for indicating differences in output is to connect a rectifier-type a-c meter of 1 or  $1\frac{1}{2}$  volts full scale deflection across the speaker voice coil terminals. To gain access to the speaker, remove the front panel from the radio as previously described. Connect a lead to the green lead that connects to the ungrounded side of the speaker voice coil. Thread this lead through into the rear compartment. The front panel is reinstalled in place so that the stray capacities in the set will be the same as when the set is operating normally. Connect the meter between this lead and ground. A convenient ground connection may be obtained by removing the push-button band change switch escutcheon, and connecting a clip lead to the exposed chassis.

## STAGE GAINS AND VOLTAGE CHECKS

Stage gain measurements may be made with a vacuum tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%.

## 1. R-F and I-F Stage Gains.

- R-F amplifier grid (6) to converter grid (6).....8.0 at 1000 kc
- R-F amplifier grid (6) to converter grid (6).....6.0 at 6100 and 9600 kc
- R-F amplifier grid (6) to converter grid (6).....5.0 at 11.8, 15.2 and 17.8 mc
- Converter grid (6) to 1st IF grid (6).....26 at 455 kc
- Converter grid (6) to 1st IF grid (6).....15 at 1000 kc
- Converter grid (6) to 1st IF grid (6).....15 at 6100 kc, 9600 kc, 11.8 mc, 15.2 mc, and 17.8 mc
- 1st IF grid (6) to 2nd IF grid (6).....69 at 455 kc
- 2nd IF grid (6) to diode plates.....3.9 at 455 kc

## 2. Audio Gain.

The power output across the speaker voice coil should be approximately 50 milliwatts with a 400 cps audio signal of 0.07 volts applied across the volume control, R10 (volume control maximum—TREBLE push button depressed).

## 3. Oscillator Grid Bias.

The d-c voltage developed across the oscillator grid leak (R2) averages 6.5 volts at 1000 kc.

**Method 2.**—The following is an alternate method which eliminates the necessity of removing the front panel of the set, but which requires additional test equipment. Make an indicating device by connecting a 4- to 6-inch diameter magnetic speaker or the high-impedance leads from the output transformer of a good p-m dynamic speaker to the terminals of a rectifier-type microammeter with a full scale deflection of 100 microamperes or less. For convenience, the meter and speaker may be mounted in a small box in such a way that the meter will be visible when the speaker is placed in front of the speaker on the receiver being aligned.

To use this device, place its speaker in front of and about an inch away from the speaker of the receiver being aligned. The meter will then deflect in proportion to the intensity of the sound produced by the speaker, and therefore may be used as an output meter. The meter must not be moved during alignment.

3. **Connecting the Signal Generator.**—For aligning the i-f transformers, the output of the signal generator should be coupled through a 0.05 mf. capacitor to the grid (pin 6) of the 1LC6 oscillator-converter tube. This may be accomplished easily by connecting the capacitor to the stator of C2-A, the middle section of the tuning gang, as this stator is connected to the converter grid through a blocking condenser. The low side of the signal generator output should be connected to the chassis ground to complete the circuit.

For aligning the oscillator, r-f, and loop circuits, the r-f signal should be inductively coupled by means of a three- or four-turn, 6-inch diameter, loop of bell wire across the signal generator output terminals. The loop should be located about one foot from the radio cover, with cover open for broadcast alignment, and about one foot away from the external loop when making the shortwave band alignment. To prevent possible errors in peak-readings, the position of the loop with respect to the receiver should not be changed during any one set of adjustments.

4. **Alignment Suggestions.**—The dial pointer should fall under the extreme left end mark on the dial scale when the gang condenser is fully closed. If necessary, move the dial pointer along the dial drive cord until such registration is obtained.

To gain access to the shortwave oscillator tuning slugs, L13 through L17, remove the snap cover from the bottom of the receiver. The short-wave antenna and converter trimmers are accessible when the push-button band-change switch escutcheon (right-hand side) is removed. When aligning the trimmers on the gang condenser (for broadcast band alignment), close the cabinet back cover and make the adjustments through the snap button openings in the back cover.

The oscillator operates on the high frequency side of the signal on all bands. With this method of operation, and with the dial set at an alignment point, the image response should be heard when the signal generator is tuned to a frequency 910 kc higher than the alignment frequency.

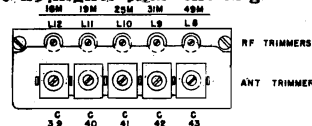


Fig. 5. RF and Antenna Trimmer Location

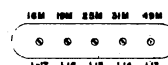


Fig. 6. Oscillator Trimmer Location

MODEL 260

GENERAL ELECTRIC CO.

**ALIGNMENT CHART**

**Depress Treble Push Button**  
**Turn Volume Control to Maximum**

Step	Sig. Gen. Setting	Connect Signal Generator to	Depress Push Button	Dial Scale Setting	Adjust
1	455 kc	Stator of C-2A in series with .05 mf	Standard	Below 550 kc	2nd i-f (T2) trimmers for max.
2	455 kc	Stator of C-2A in series with .05 mf	Standard	Below 550 kc	1st i-f (T1) trimmers for max.
3	1500 kc	Inductively coupled	Standard	1500 kc	**C-3B, C-2B, and C-1B for max in sequence given
4	580 kc	Inductively coupled	Standard	580 kc	* L4 and L3 for max.
5	Repeat Step 3				
6	6.1 mc	Inductively coupled	49 M	6.1 mc	L13 for max.
7	6.1 mc	Inductively coupled	49 M	6.1 mc	* L8 and C43 for max.
8	9.6 mc	Inductively coupled	31 M	9.6 mc	L14 for max.
9	9.6 mc	Inductively coupled	31 M	9.6 mc	* L9 and C42 for max.
10	11.8 mc	Inductively coupled	25 M	11.8 mc	L15 for max.
11	11.8 mc	Inductively coupled	25 M	11.8 mc	* L10 and C41 for max.
12	15.22 mc	Inductively coupled	19 M	15.22 mc	L16 for max.
13	15.22 mc	Inductively coupled	19 M	15.22 mc	* L11 and C40 for max.
14	17.8 mc	Inductively coupled	16 M	17.8 mc	L17 for max.
15	17.8 mc	Inductively coupled	16 M	17.8 mc	* L12 and C39 for max.

\* Alternately peak circuits to obtain peak while rocking gang condenser.

\*\* Remove snap buttons on back cover to permit these adjustments and close back cover while aligning.

NOTE.—The oscillator operates on the high frequency side of the signal on all bands.

**BATTERY INFORMATION**

The receiver uses a 2-volt Willard Radio Battery No. 25-2 or equivalent. It has a 25 ampere-hour capacity and should be cared for in the same manner as any other storage battery.

**Charge Indicator**

The degree of charge of the battery can be determined by raising the back cover of the radio and referring to the charge ball indicators visible through the hole in the metal battery case.

If the battery is fully charged, two indicator balls will be visible at the surface of the liquid in the battery. When the battery discharges, these ball indicators will sink and disappear in the following order:

1. Green indicator sinks when approximately 20 per cent of battery capacity has been discharged.
2. The red ball sinks when battery is 80 per cent discharged.

On charge, the balls rise or float in the reverse order and the charge may be stopped when both balls appear in the opening.

**To Charge Battery**

The battery is charged by merely plugging the receiver power cord in the rated a-c power outlet and depressing the CHARGE push button. Frequent check should be made of the charge indicator and when both indicator balls are visible, the battery is adequately charged. Charging the battery after all indicator balls are visible will not harm the battery except that it will evaporate the water faster. A completely discharged battery will be restored usually within 20 to 30 hours.

When operating the receiver from the a-c house current, the battery floats or is being charged at a slow rate. Thus, if you wish to operate the receiver at the same time that you are charging even a fully discharged battery, plug the power cord in the a-c receptacle and depress the ON push button. Prolonged operation in this manner usually will cause the battery potential to stabilize at some voltage determined by the line voltage and the characteristics of the charging circuit components. The degree of charge obtainable with this method of operation likewise is dependent on the line voltage and the characteristics of the charging circuit components.

**Battery Operating Instructions**

1. Add distilled or tap water in the filler cap at sufficiently frequent intervals to keep liquid level at indicator mark as viewed through opening in battery case. **DO NOT OVER-FILL** as this impairs the nonspill feature.

2. Whenever possible, it is best not to allow the battery to become discharged to the extent that both indicators disappear.

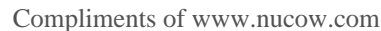
However, if both indicators have sunk, the battery should be recharged immediately or within 24 hours.

3. A battery will continually discharge at a slow rate even when not in use. For this reason, monthly checks should be made of the charge condition, and the battery should be placed on charge when necessary. This will prevent damage to the battery such as freezing during cold weather.

**BATTERY INSTALLATION**

The following instructions should be carefully followed in installing a battery, or replacing an old one:

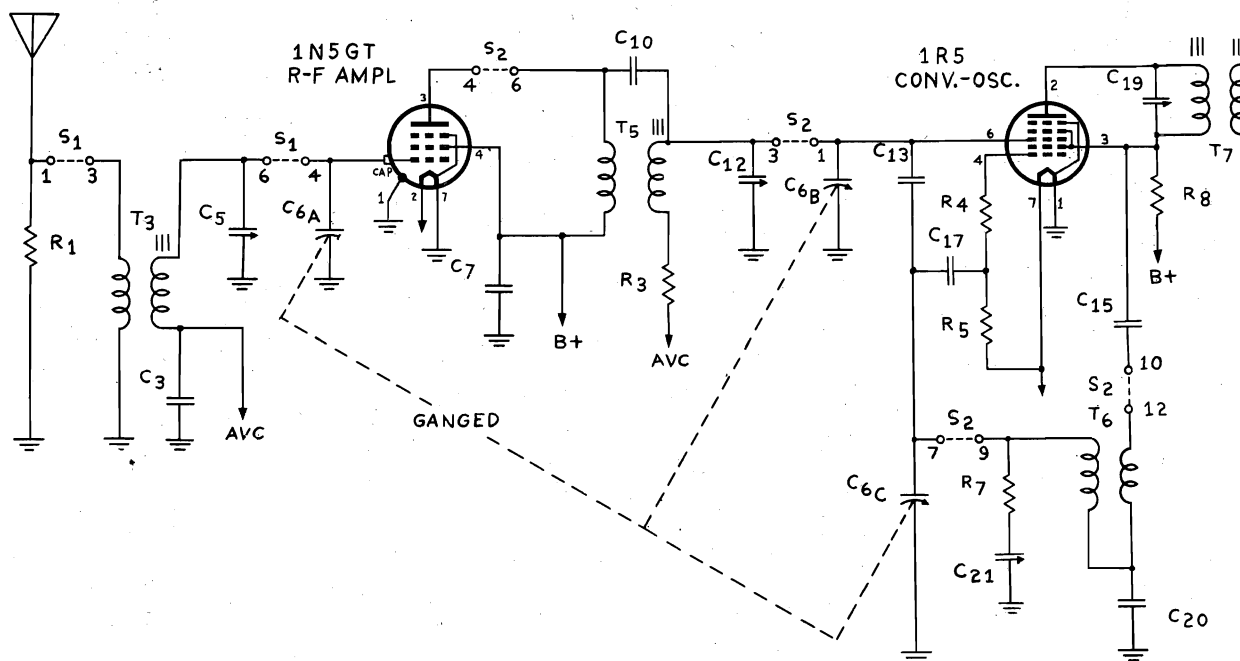
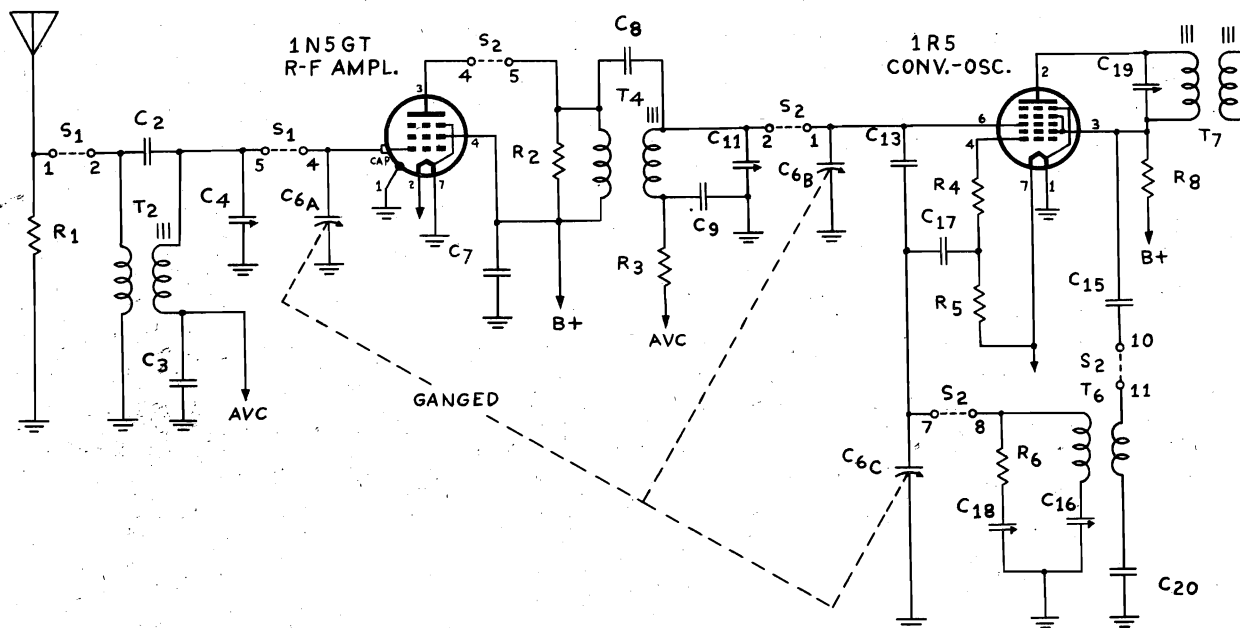
1. Remove new battery from packing carton.
2. If needed, add water to bring liquid level to indicator mark on battery container. **Do not overfill.**
3. Raise back cover on radio, remove battery case cover. The latter is removed by unclipping the two catches. Pry off cover.
4. Unplug old battery if present, and replace with new battery.
5. Place battery on charge, if necessary, as described in a previous paragraph, until both indicators are showing in the opening in the case cover.



# "clarified schematics"

MODEL 280

GENERAL ELECTRIC CO.

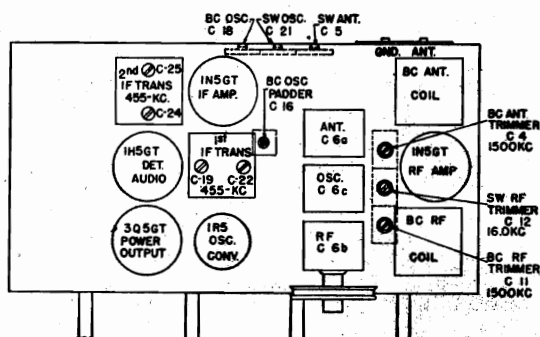


## ELECTRICAL CIRCUIT ALIGNMENT

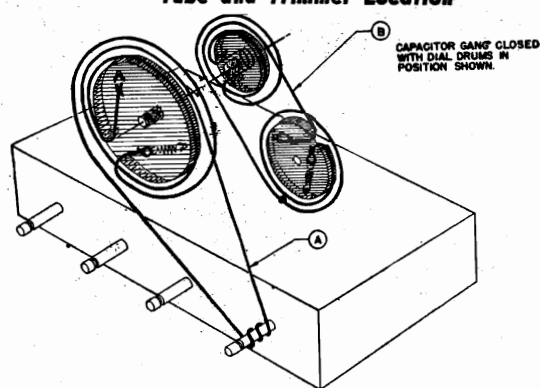
**PROCEDURE—GENERAL.** 1. Connect output meter across loud speaker voice coil terminals.

2. Keep radio volume control at maximum and attenuate test oscillator signal output for low output meter reading.

3. All trimmer adjustments are made with the chassis removed from the cabinet.

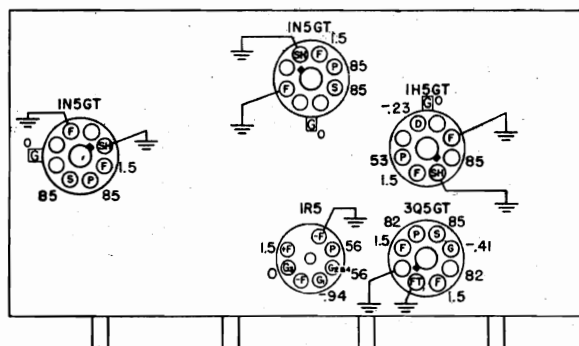


### Tube and Trimmer Location



### Dial Stringing

## REAR OF CHASSIS



BOTTOM VIEW OF CHASSIS  
MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT METER.  
MEASURED FROM PIN TO CHASSIS.  
1.5V"A"-90V"B" BATTERY PACK. NO SIGNAL INPUT  
VOLUME CONTROL AT MAXIMUM.

## Socket Voltages

## ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Oscillator Setting	Pointer Setting On Radio	Adjust For Max. Output
1	1N5GT IF grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	1st IF transformer trimmers
2	1R5 conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	2nd IF transformer trimmers
3	1N5GT RF grid in series with .05 mfd.	1710 KC	HF End	C18 (osc.)
4	1N5GT RF grid in series with .05 mfd.	1500 KC	1500 KC	C11 (conv.)
5	1N5GT RF grid in series with .05 mfd.	600 KC	600 KC	* **C16 (osc. padder)
6	Antenna Post in series with 200 mmf.	1500 KC	1500 KC	C4 (RF)
7	1N5GT RF grid in series with .05 mfd.	18.3 MC	HF End	C21 (osc.)
8	Antenna Post in series with 400 ohms	16.0 MC	16.0 MC	* C12 and C5 (Conv. and R-F)

\*Rock Gang condenser when making alignment.

**\*\*Repeat steps 3 and 4 for best results.**

## STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

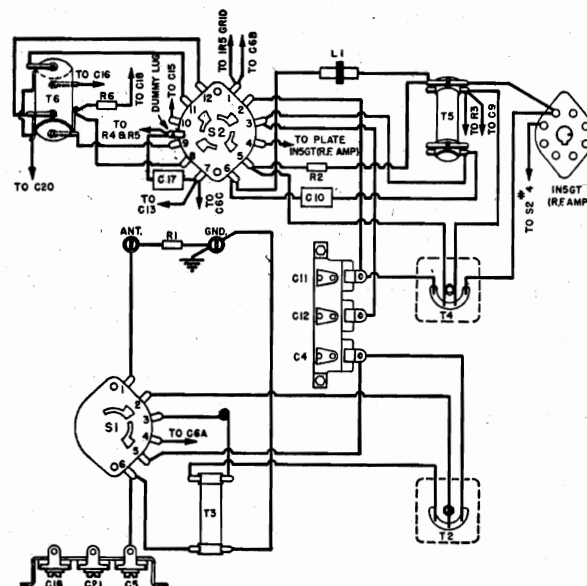
Antenna stage to 1N5GT r-f grid	3 at 1000 kc
1N5GT r-f grid to 1R5	10 at 1000 kc
1R5 grid to 1N5GT i-f grid	46 at 1000 kc
1R5 grid to 1N5GT i-f grid	60 at 455 kc
1N5GT grid to 1H5GT i-f diode plates	80 at 455 kc

(2) Audio Gain.

.06 volt at 400 cycles across volume control (R12) with control set at maximum will give approximately .05 watts output across speaker voice coil.

(3) D-C voltage developed across oscillator grid resistor (R5) averages 8 volts at 1000 kc.

4) Socket Pin Voltages.  
Figure 5 shows voltages from all tube pins to B-. Voltage readings much lower than those specified may help localize defective components or tubes.



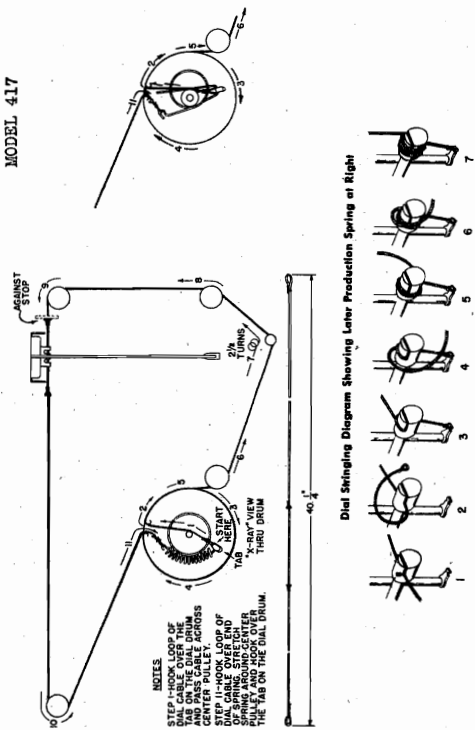
### Switch Wiring



MODEL 280  
MODEL 417

## PARTS LIST - MODEL 280

## PARTS LIST - MODEL 417

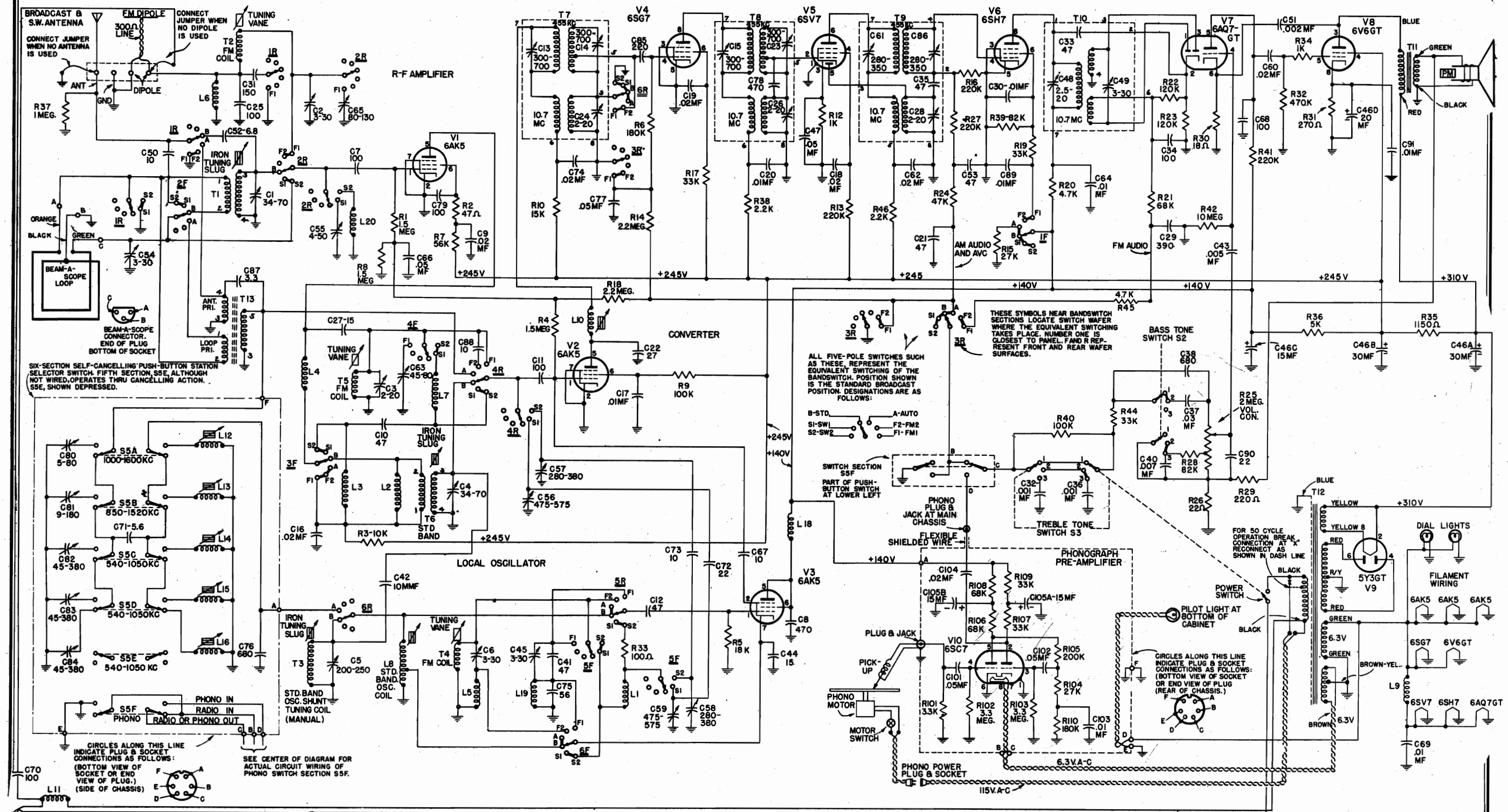
[illegible]

Howl may be caused by a microphonic GAKS converter tube. If this doesn't remedy the condition, the howl is possibly set up in the "gullotine" tuning unit. Apply Vistac to the moving vane of the "gullotine" tuning unit where it contacts the runners so that it is coated for its full length. Use only a small amount. Vistac is obtainable from the Advance Solvent and Chemical Corp., Jersey City, New Jersey.



## GENERAL ELECTRIC CO.

MODEL 417

**ELECTRICAL RATING (INPUT):**

	Rating A5	Rating A6
Voltage.....	100-125	100-125
Frequency.....	50 cycles	60 cycles
Wattage.....	105	105

**OPERATING FREQUENCIES:**

Standard Band.....	540 to 1600 kc
Short Wave 1.....	9.4 to 9.9 mc
Short Wave 2.....	11.6 to 12.1 mc
Frequency Modulation 1.....	42 to 50 mc
Frequency Modulation 2.....	88 to 108 mc
AM I-F Frequency.....	455 kc
FM I-F Frequency.....	10.7 mc

**POWER OUTPUT (117 volts line):**

Undistorted.....	4.0 watts
Maximum.....	5.5 watts

**LOUDSPEAKER:**

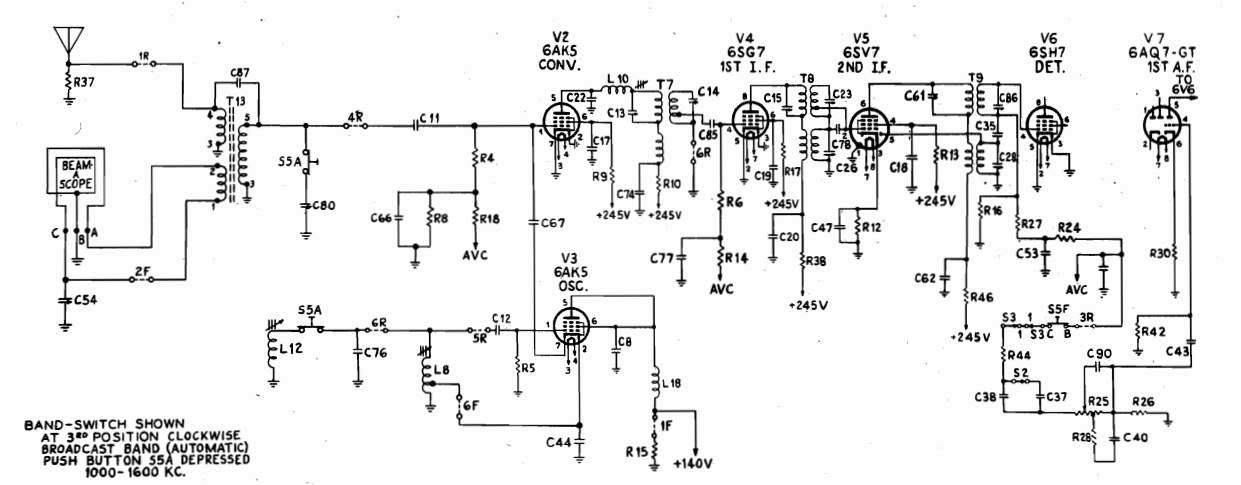
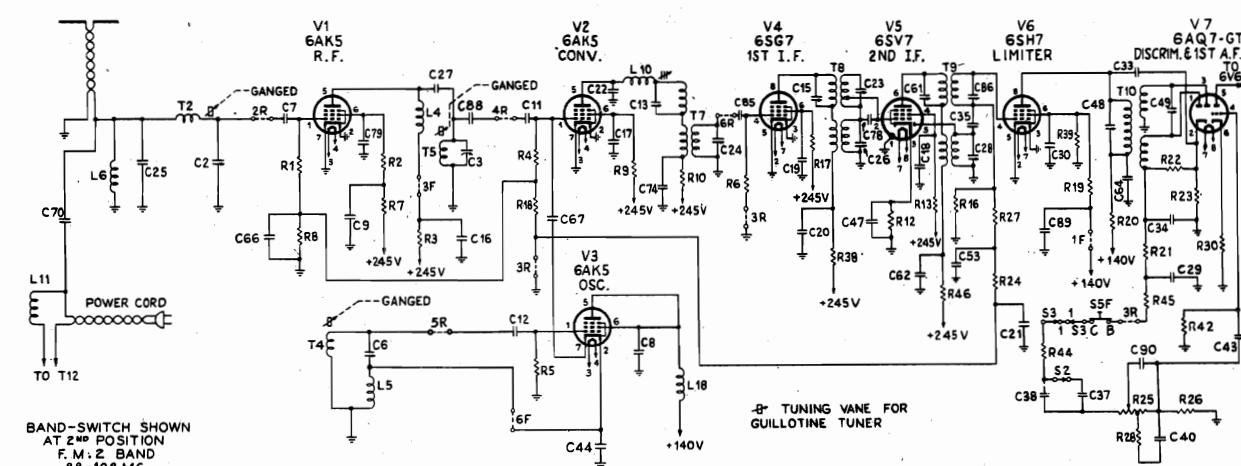
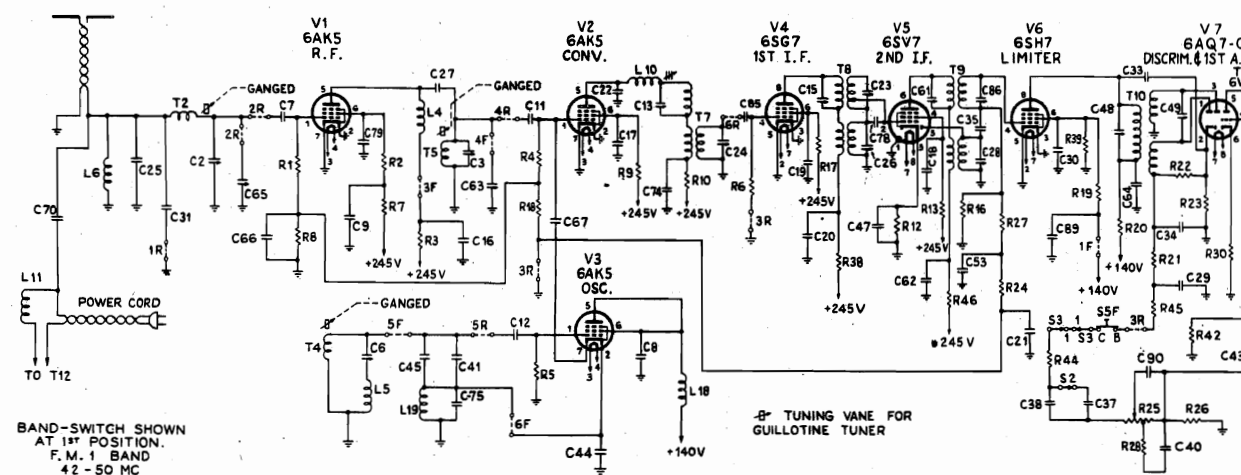
Type.....	Alnico PM
Size.....	12 inches
Voice Coil Impedance (400 cps).....	8 ohms

**PHONOGRAPH PICK-UP:**

Type.....	Variable Reluctance
D-C Resistance.....	250 ohms

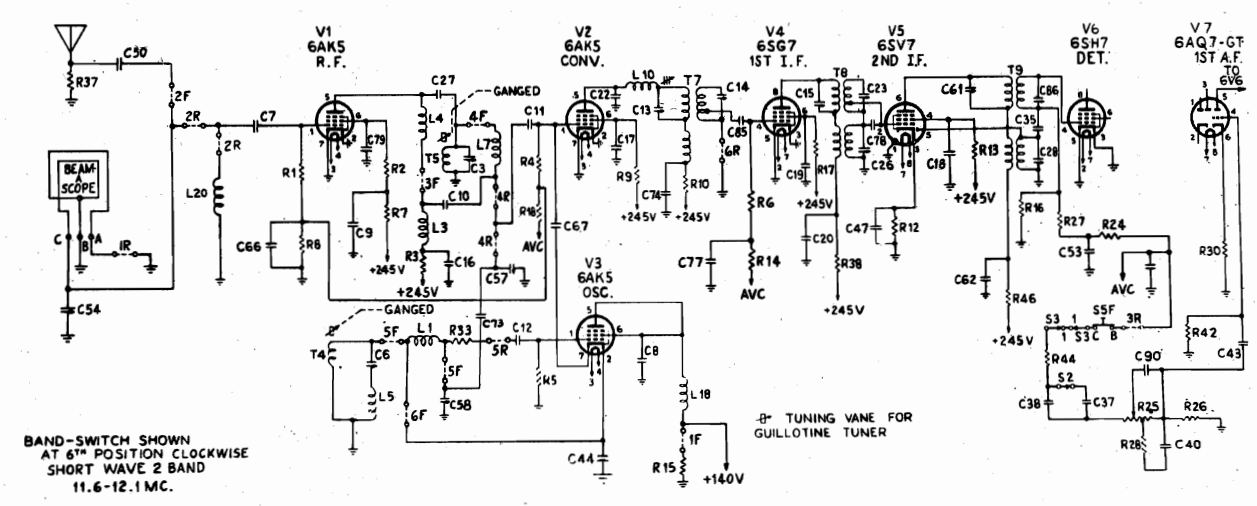
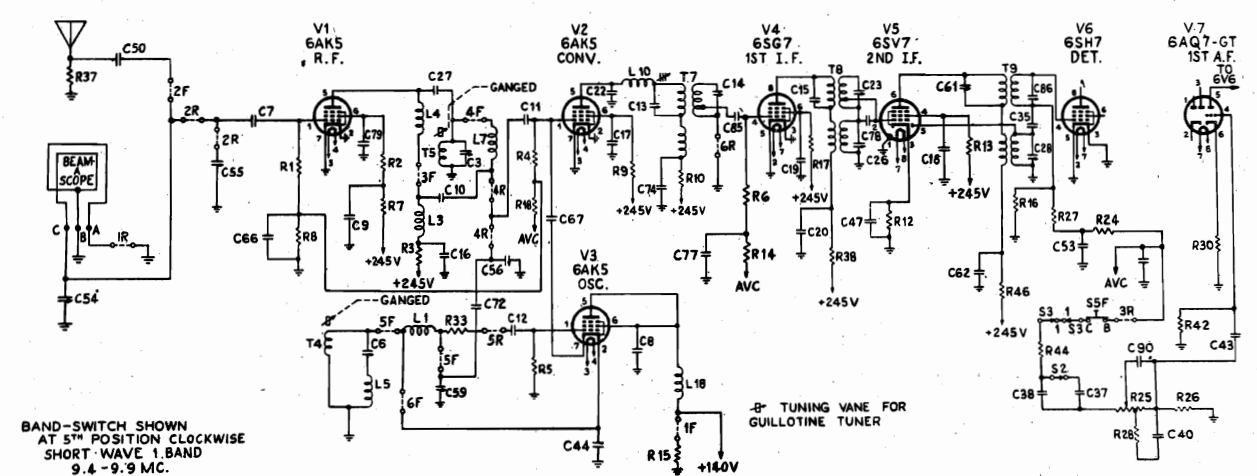
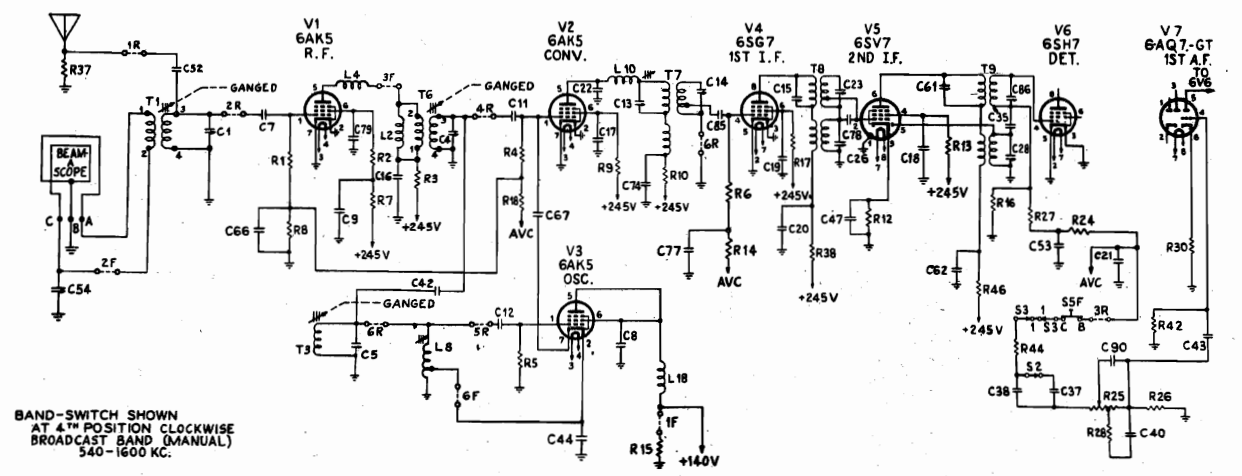
GENERAL ELECTRIC CO.

MODEL 417



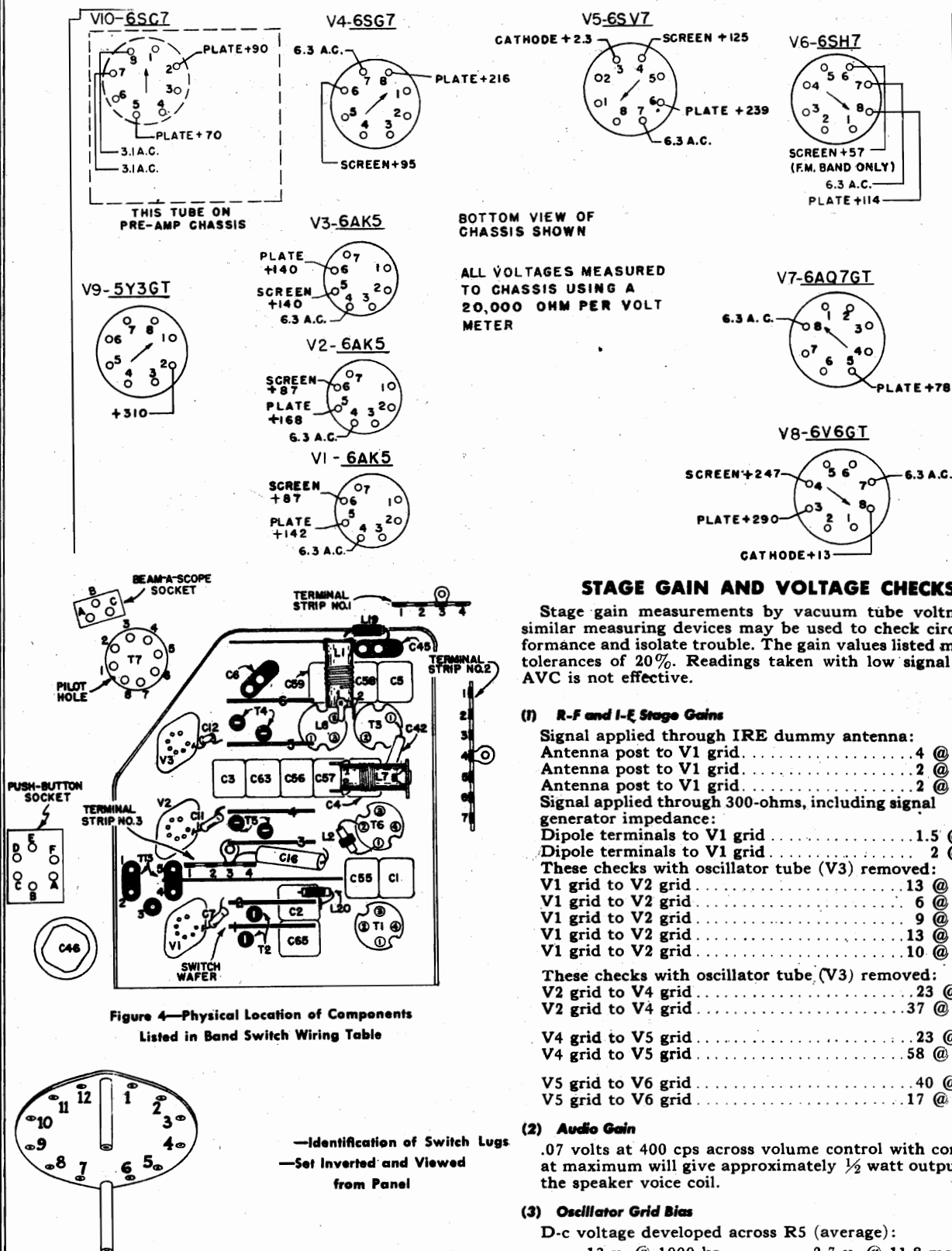
GENERAL ELECTRIC CO.

MODEL 417



## GENERAL ELECTRIC CO.

MODEL 417



BOTTOM VIEW OF CHASSIS SHOWN

ALL VOLTAGES MEASURED TO CHASSIS USING A 20,000 OHM PER VOLT METER

## STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal so that AVC is not effective.

## (1) R-F and I-F Stage Gains

Signal applied through IRE dummy antenna:

Antenna post to V1 grid ..... 4 @ 1000 kc  
 Antenna post to V1 grid ..... 2 @ 9.6 mc  
 Antenna post to V1 grid ..... 2 @ 11.8 mc

Signal applied through 300-ohms, including signal generator impedance:

Dipole terminals to V1 grid ..... 1.5 @ 45 mc  
 Dipole terminals to V1 grid ..... 2 @ 98 mc

These checks with oscillator tube (V3) removed:

V1 grid to V2 grid ..... 13 @ 1000 kc  
 V1 grid to V2 grid ..... 6 @ 9.6 mc  
 V1 grid to V2 grid ..... 9 @ 11.8 mc  
 V1 grid to V2 grid ..... 13 @ 45 mc  
 V1 grid to V2 grid ..... 10 @ 98 mc

These checks with oscillator tube (V3) removed:

V2 grid to V4 grid ..... 23 @ 455 kc  
 V2 grid to V4 grid ..... 37 @ 10.7 mc

V4 grid to V5 grid ..... 23 @ 455 kc  
 V4 grid to V5 grid ..... 58 @ 10.7 mc

V5 grid to V6 grid ..... 40 @ 455 kc  
 V5 grid to V6 grid ..... 17 @ 10.7 mc

## (2) Audio Gain

.07 volts at 400 cps across volume control with control set at maximum will give approximately  $\frac{1}{2}$  watt output across the speaker voice coil.

## (3) Oscillator Grid Bias

D-c voltage developed across R5 (average):

13 v. @ 1000 kc      2.7 v. @ 11.8 mc  
 2.7 v. @ 9.6 mc      5.5 v. @ 45 mc  
 7 v. @ 98 mc

## (4) Socket Pin Voltages

Fig. 8 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

## MODEL 417

## GENERAL ELECTRIC CO.

## ALIGNMENT

## EQUIPMENT REQUIRED:

1. Test Oscillator with tone modulation. (See Table.)
2. D-C Voltmeter or Microammeter. (See notes 2 and 3.)
3. A-C Voltmeter, 2-volts. (See note 6.)
4. Insulated hex wrench,  $\frac{1}{4}$ ". (See steps 1, 10, 13.)
5. 01 MF Paper Capacitor. (See steps 1 to 5.)

7. 400-ohm,  $\frac{1}{2}$  watt resistor. (See steps 16 to 21.)

7. 200 mmf. mica capacitor. (See steps 22 to 28.)

Important detailed instructions and references in connection with the alignment table which follows are keyed in by means of column 7, headed "See Note." The notes are included in numerical order after the table. They are important—refer to them carefully.

ALIGNMENT TABLE

Step	Signal Generator Frequency	Signal Input Point	Band Switch	Dial Setting	Adjust	See Note	Remarks
1	10.7 mc	6SH7 grid thru .01 mf	FM1	.....	C49 for zero**	1, 2	Adjust C49 for <i>zero</i> meter reading. Apply 1 volt signal input.
2	See last column	6SH7 grid thru .01 mf	FM1	.....	Signal Generator	1, 2,	Detune signal generator to point of <i>maximum</i> meter reading.
3	As in step 2	6SG7 grid thru .01 mf	FM1	.....	Peak C48	1, 2	
4	10.7 mc	6SV7 grid thru .01 mf	FM1	.....	Peak C28	1, 3	6AQ7GT tube removed from its socket.
5	10.7 mc	6SG7 grid thru .01 mf	FM1	.....	Peak C26	1, 3	6AQ7GT tube removed from its socket.
6	10.7 mc	Conv. grid directly	FM1	.....	Peak C24 & L10	1, 3, 4	6AQ7GT tube removed from its socket.
7	455 kc	Conv. grid directly	STD	.....	Peak C86 & C61	5, 6	
8	455 kc	Conv. grid directly	STD	.....	Peak C15 & C23	5, 6	
9	455 kc	Conv. grid directly	STD	.....	Peak C13 & C14	5, 6	
10	88 mc	DIPOLE terminals	FM2	88 mc—6.8 to 6.9 in.*	Peak C6**	1, 3, 7, 10	Set dial accurately—then adjust C6.
11	98 mc	DIPOLE terminals	FM2	For max. output	Peak C3	1, 3, 8	Tune dial for maximum output, then peak C3 while rocking dial.
12	98 mc	DIPOLE terminals	FM2	Do not change	Peak C2	1, 3	
13	43 mc	DIPOLE terminals	FM1	43 mc—6 to 6.1 in.*	Peak C45**	1, 3, 7	Set dial accurately—then adjust C45.
14	46 mc	DIPOLE terminals	FM1	For max. output	Peak C63	1, 3, 8	Tune dial for maximum output, then peak C63 while rocking dial.
15	46 mc	DIPOLE terminals	FM1	Do not change	Peak C65	1, 3	
16	11.8 mc	Antenna thru 400-ohms	SW2	11.8 mc—4.5 to 4.6 in.*	Peak C58	5, 6, 7, 10	Set dial accurately—then adjust C58.
17	11.8 mc	Antenna thru 400-ohms	SW2	Do not change	Peak C57	5, 6, 8	Peak C57 while rocking dial.
18	11.8 mc	Antenna thru 400-ohms	SW2	Do not change	Peak C54	5, 6	C54 is located on back apron of chassis.
19	9.6 mc	Antenna thru 400-ohms	SW1	9.6 mc—4.5 to 4.6 in.*	Peak C59	5, 6, 7, 10	Set dial accurately—then adjust C59.
20	9.6 mc	Antenna thru 400-ohms	SW1	Do not change	Peak C56	5, 6, 8	Peak C56 while rocking dial.
21	9.6 mc	Antenna thru 400-ohms	SW1	Do not change	Peak C55	5, 6	
22	1620 kc	Antenna via 200 mmf	STD	Extreme right-hand position	Peak C5	5, 6	

\* Important! See Note 7.

\*\* Use insulated hex wrench,  $\frac{1}{4}$ "

## GENERAL ELECTRIC CO.

ALIGNMENT TABLE (Cont'd)

Step	Signal Generator Frequency	Signal Input Point	Band Switch	Dial Setting	Adjust	See Note	Remarks
23	1620 kc	Antenna via 200 mmf	STD	Extreme right-hand position	Peak C4	5, 6	
24	1620 kc	Antenna via 200 mmf	STD	Extreme right-hand position	Peak C1	5, 6	
25	1500 kc	Antenna via 200 mmf	STD	1500 kc—1.4 to 1.5 in.*	Osc. Coil T3 iron slug	5, 6, 7, 9	T3 iron slug is the rear one on the left side. Adjust for peak.
26	1000 kc	Antenna via 200 mmf	STD	For max. output	Conv. coil T6 iron slug	5, 6, 9	T6 iron slug is the center one on the left side. Adjust for peak.
27	1000 kc	Antenna via 200 mmf	STD	Do not change	R-F coil T1 iron slug	5, 6, 9	T1 iron slug is the front one on the left side. Adjust for peak.
28	580 kc	Antenna via 200 mmf	STD	For max. output	Peak L8	5, 6, 8	Peak L8 while rocking dial.
29							Repeat steps 22 to 28.

\* Important! See Note 7.

## Notes in Connection with Alignment Table

1. Use *unmodulated* signal.
2. Connect 20,000-ohm-per-volt meter from junction of R21 and C29 to chassis. Use ten-volt scale. (Steps 1-3.)
3. Connect 20,000-ohm-per-volt meter from grid pin 4 of 6SH7 to chassis with a 200,000-ohm resistor in series. The resistor must be connected directly to the grid so that capacity loading will be negligible and so that the meter is isolated from the i-f signal voltage. Keep signal generator output down so that the meter indicates not more than one volt at the grid (5 micro-amperes through 200,000-ohms). (Alignment steps 4 to 6, 10 to 15.)
4. Connect signal generator directly to the converter grid at some convenient point. The generator lead must be shielded up to this connection so that not more than 1/16 inch of exposed lead exists. Ground the shield solidly by clamping it firmly to the chassis or a shield as close to the connection as possible. (Steps 6-9.)
5. Use 400-cycle modulation. (Steps 7 to 9, 16 to 28.)
6. Connect a standard output meter across speaker voice coil. Turn volume control fully on. Keep signal gener-

ator output down so that the meter indicates not more than 1/2 watt output (2 volts) during alignment. (Steps 7 to 9, 16 to 28.)

7. If dial scale is not available, index pointer as follows: Turn pointer to right-hand limit of travel. Mark the dial back plate at a reference edge of the pointer slider. Then set pointer by turning dial knob until the indicated dimension exists between the reference edge and the mark.
8. "Rocking" consists of adjusting the indicated adjuster while turning the dial a small amount back and forth through peak output. The object is to find the maximum peak. Rocking is necessary and is permissible only when interlocking circuits are being adjusted.
9. The main tuning iron slugs are suspended from the left side of the tuning "elevator." They are individually adjustable by loosening the locknut and turning the supporting screw into which the suspending wire is soldered.
10. Two oscillator settings will give response. The higher frequency response point is the correct one; the other is the image. If in doubt, start with the trimmer screw loosened completely and adjust for the *first* response.

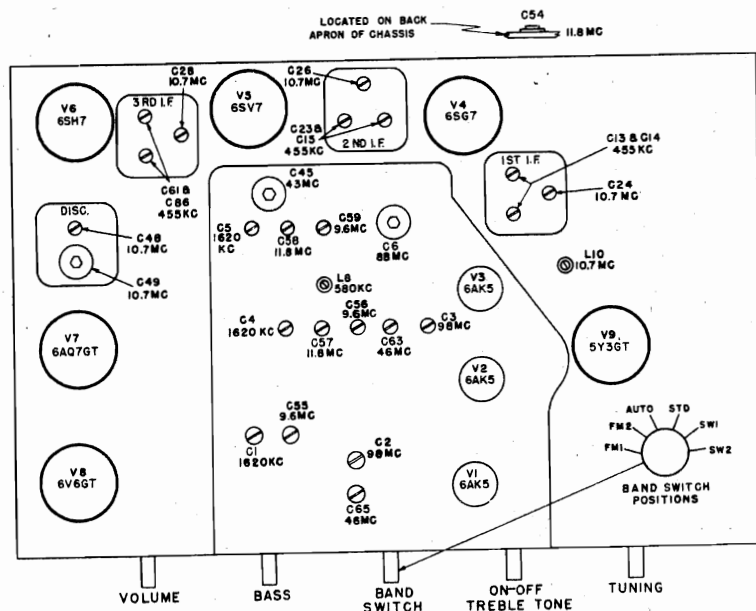
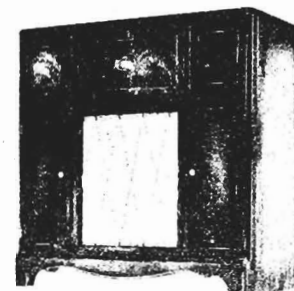


Figure 7—Location of Tubes and Adjusters

## TUBE COMPLEMENT:

R-F Amplifier	6AK5
Converter	6AK5
Oscillator	6AK5
1st I-F Amplifier	6SG7
2nd I-F Amplifier	6SV7
FM Limiter—AM Detector	6SH7
Discriminator—1st A-F Amplifier	6AQ7-GT
Power Amplifier	6V6GT
Phono Pre-Amplifier	6SC7
Rectifier	5Y3GT
Dial Lamp (2)	GE No. 44
Pilot Lamp (bottom of cabinet)	GE No. 47





## MODEL 417

## GENERAL ELECTRIC CO.

## WIRING OF BAND SWITCH

(Wire length given from end to end before stripping)

## SECTION 1

At this lug—	—connect this—	—the other end of which is connected to this—
1	Insulated wire, 5" lg.	Antenna transformer T13, terminal 4
2	a. Insulated wire, 11½" lg. b. Insulated wire, 2" lg. c. Capacitor C50	Antenna terminal at rear of chassis Switch section 1, lug 6 Switch section 2, lug 1
3	Capacitor C52	Switch section 2, lug 3
4	a. Insulated wire, 1½" lg. b. Insulated wire, 14" lg. c. Insulated wire, 5½" lg.	Antenna transformer T1, terminal 1 Beam-a-scope plug, terminal A Antenna transformer T13, terminal 2
5	a. Short bare bus b. Resistor R15	Ground lug on C65 Switch section 1, lug 11
6	See lug 2b, above	
7	Insulated wire, 11" lg.	Terminal strip 1, lug 4
8	Capacitor C31	Front terminal of T2
9	a. Insulated wire, 9" lg. b. Insulated wire, 7" lg.	Terminal strip 2, lug 5 Filter capacitor, C46C
11	See lug 5b, above	

## SECTION 2

At this lug—	—connect this—	—the other end of which is connected to this—
1	See section 1, lug 2c	
3	a. Insulated wire, 2½" lg. b. See section 1, lug 3	Trimmer C1, lug nearer T1
4	Insulated wire, 1½" lg.	Trimmer C55, lug nearer T1
5	Coil L20	Ground lug on trimmer C2
6	Short bare bus	Trimmer C65, left-hand terminal*
7	Short bare bus	Trimmer C2, left-hand terminal*
8	Capacitor C7	Tube socket V1, pin 1
9	Insulated wire, 4" lg.	Antenna transformer T13, terminal 1
10	Insulated wire, 3½" lg.	Antenna transformer T1, terminal 2
11**	Insulated wire, 11½" lg.	Beam-a-scope plug, terminal C

## SECTION 3

At this lug—	—connect this—	—the other end of which is connected to this—
1	Shielded wire, 8¾" lg.	Terminal strip 2, lug 6
2	Insulated wire, 1½" lg.	Switch section 3, lug 12
3	a. Insulated wire, 2½" lg. b. Capacitor C16 c. Choke L3	Converter coil T6, terminal 1 Ground lug on terminal strip 3 Switch section 3, lug 11
4	Insulated wire, 7½" lg.	Terminal strip 2, lug 3
5	Insulated wire, 1½" lg.	Converter coil T6, terminal 2
6	Short bus with spaghetti	Chassis
7	Short bare bus	Terminal strip 3, lug 4
10	Shielded wire, 10½" lg.	Terminal strip 2, lug 2
11	a. See lug 3c, above b. Capacitor C10	Switch section 4, lug 3
12	a. See lug 2, above b. Shielded wire, 7¾" lg.	Push-button socket, Terminal B

## SECTION 4

At this lug—	—connect this—	—the other end of which is connected to this—
1	a. Insulated wire, 5½" lg. b. Insulated wire, 7½" lg.	Antenna transformer T13, terminal 5 Push-button socket, terminal F
2	Insulated wire, 2½" lg.	Trimmer C4, lug nearer T6
3	a. See Section 3, lug 11b b. Short bus with spaghetti c. Short jumper	Coil L7, terminal 2 (toward front) Switch Section 4, lug 4 (adjacent)
4	See lug 3c, directly above	
5**	Short bare bus	Trimmer C63, lug nearer front
6	Capacitor C88	Tuner T5, left-hand terminal*
7	Short bare bus	Tuner T5, left-hand terminal
8	Capacitor C11	Tube socket V2, pin 1
9	a. Capacitor C72 b. Insulated wire, 2½" lg.	Section 5, lug 11 Trimmer C56, front terminal
10	a. Capacitor C73 b. Insulated wire, 2½" lg.	Section 5, lug 12 Trimmer C57, front terminal
12	Bus with spaghetti, 2½" lg.	Coil L7, terminal 1

## SECTION 5

At this lug—	—connect this—	—the other end of which is connected to this—
1	a. Bus with spaghetti, 1¼" lg. b. Resistor R33	Coil L1, terminal 1 Section 5, lug 4
2	a. Insulated wire, 3" lg. b. Insulated wire, 1½" lg.	Coil L8, terminal 1 Section 6, lug 4
4	See Section 5, lug 1b	
5	Bus with spaghetti, 3" lg.	Coil L1, terminal 2
6	a. Bus with spaghetti, 3" lg. b. Bus with spaghetti, 1½" lg.	Capacitor C45, left-hand terminal* Section 5, lug 10
7**	Short bare bus	Tuner T4, left-hand terminal*
8	Capacitor C12	Tube socket V3, pin 1
9	Insulated wire, 4" lg.	Trimmer C5, lug nearer T3
10	a. See Section 5, lug 6b b. Capacitor C41	Section 6, lug 6
11	a. Insulated wire, 3¾" lg. b. See Section 4, lug 9a	Trimmer C59, lug nearer front
12	a. Insulated wire, 3¾" lg. b. See Section 4, lug 10a	Trimmer C58, lug nearer front

## SECTION 6

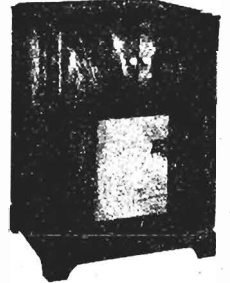
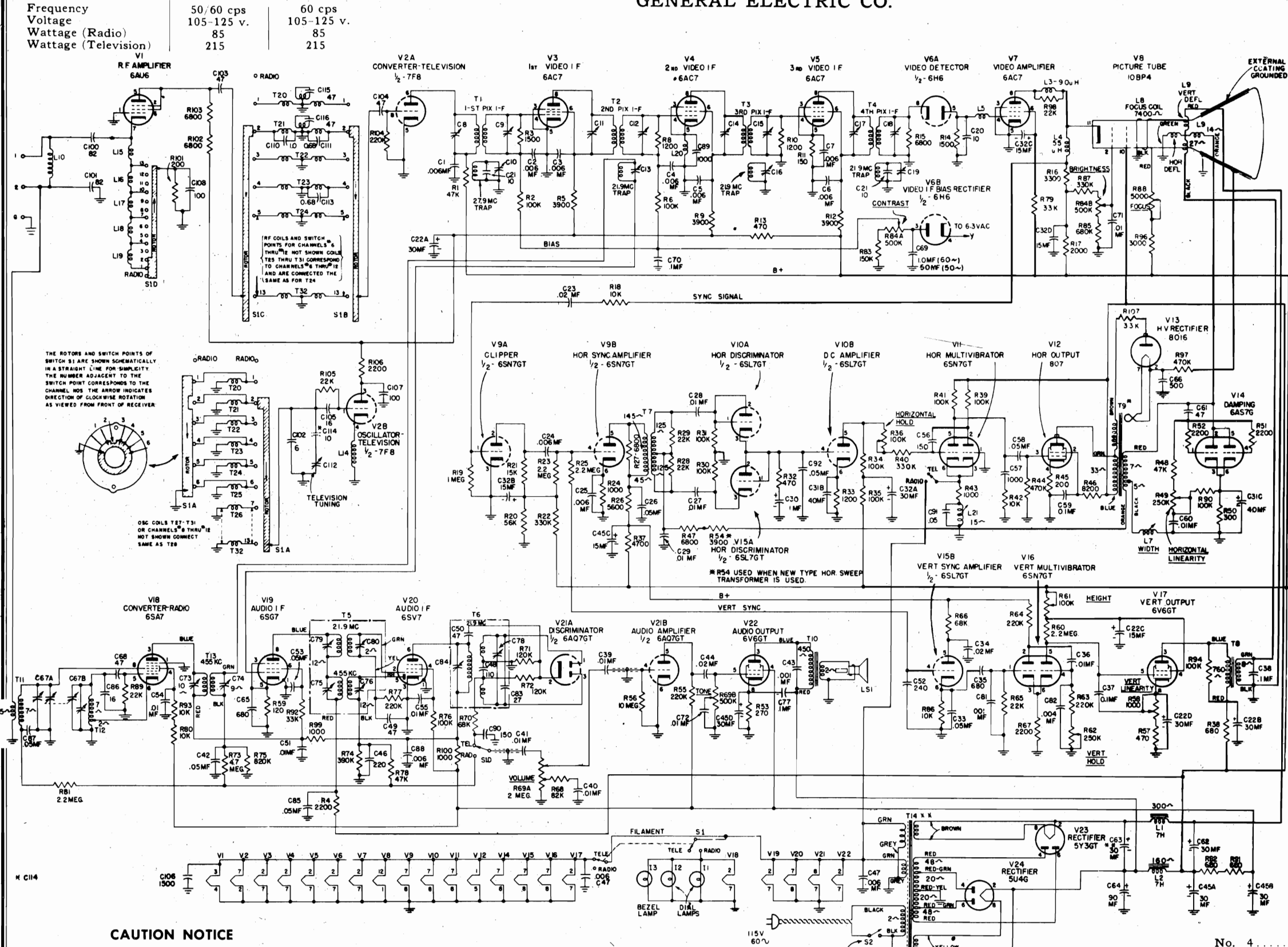
At this lug—	—connect this—	—the other end of which is connected to this—
1	Insulated wire, 4½" lg.	I-F transformer T7, terminal 8
2	Bus with spaghetti, 1½" lg.	Coil L1, terminal 2
4	See Section 5, lug 2b	
5	Insulated wire, 12" lg.	Push-button socket, terminal A
6	a. Bus with spaghetti, 2" lg. b. Capacitor C75 c. See section 5, lug 10b	Trimmer C45, center terminal Ground at C59
7	Short bare bus	Trimmer C6, center terminal
8	Bare bus, 1" lg.	Tube socket V3, pin 7
9	Insulated wire, 2¼" lg.	I-F transformer T7, terminal 5
10	Insulated wire, 2¼" lg.	I-F transformer T7, terminal 3
12	Insulated wire, 3½" lg.	Coil L8, terminal 3

\* Looking from front, chassis inverted.

\*\* Double lug (front and rear) soldered together.

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MODEL 801



- INTERMEDIATE FREQUENCIES:**
- Television Video (carrier freq. equivalent) ..... 26.4 mc
  - Television Audio ..... 21.9 mc
  - Radio ..... 455 kc
- AUDIO POWER OUTPUT:**
- Undistorted ..... 3 watts
  - Maximum ..... 4.5 watts
- LOUDSPEAKER:**
- Type ..... Alnico "PM" Dynamic
  - Size ..... 12 inches
  - Voice Coil Impedance (400 cycles) ..... 3.2 ohms
- PICTURE SIZE:**
- Height ..... 6 inches
  - Width ..... 8 inches
- ANTENNA REQUIREMENTS:**
- Type ..... Folded Dipole
  - Impedance ..... 300 ohms

**CAUTION NOTICE**

THE REGULAR B+ VOLTAGES ARE DANGEROUS AND PRECAUTIONS SHOULD BE OBSERVED WHEN THE CHASSIS IS REMOVED FROM THE CABINET FOR SERVICE PURPOSES. THE HIGH VOLTAGE SUPPLY (8000 v.) AT THE PICTURE TUBE ANODE WILL GIVE AN UNPLEASANT SHOCK BUT DOES NOT SUPPLY ENOUGH CURRENT TO GIVE A FATAL BURN OR SHOCK. HOWEVER, SECONDARY HUMAN REACTIONS TO OTHERWISE HARMLESS SHOCKS HAVE BEEN KNOWN TO CAUSE INJURY. SINCE THE HIGH VOLTAGE IS OBTAINED FROM THE B+ VOLTAGE, CER-

TAIN PORTIONS OF THE HIGH VOLTAGE GENERATING CIRCUIT ARE DANGEROUS AND EXTREME PRECAUTIONS SHOULD BE OBSERVED.

THE PICTURE TUBE IS HIGHLY EVACUATED AND IF BROKEN, GLASS FRAGMENTS WILL BE VIOLENTLY EXPELLED. IF IT IS NECESSARY TO CHANGE THE PICTURE TUBE, USE SAFETY GOGGLES AND GLOVES.

R-F FREQUENCY RANGE:			
Selector Switch Position	Freq. Range	Picture Carrier	Sound Carrier
Radio	540-1600 kc		
No. 1	44- 50 mc	45.25	49.75
No. 2	54- 60 mc	55.25	59.75
No. 3	60- 66 mc	61.25	65.75
No. 4	66- 72 mc	67.25	71.75
No. 5	76- 82 mc	77.25	81.75
No. 6	82- 88 mc	83.25	87.75
No. 7	174- 180 mc	175.25	179.75
No. 8	180- 186 mc	181.25	185.75
No. 9	186- 192 mc	187.25	191.75
No. 10	192- 198 mc	193.25	197.75
No. 11	198- 204 mc	199.25	203.75
No. 12	204- 210 mc	205.25	209.75
No. 13	210- 216 mc	211.25	215.75





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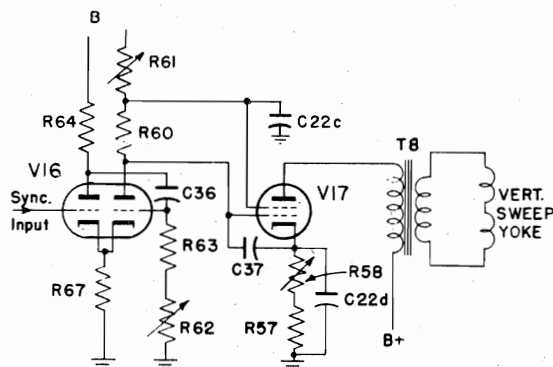


Fig. 7. Vertical Sweep Output

This "kick" voltage is shown in the wave shape shown as a-b in Figure 6. This voltage is generated in the primary winding and is further increased by an additional winding added to the transformer which connects to the rectifier tube plate of V13. The rectifier tube, V13, is a Type 8016 which derives its filament voltage from the horizontal sweep transformer T9 by a single turn around the transformer. Because of the high frequency which is rectified, a 500 mmf capacitor is more than sufficient for filtering purposes.

**9. LOW VOLTAGE POWER SUPPLY**—Two rectifiers are used to supply the required plate current for the television and radio receiver. A Type 5U4G tube, V24, supplies the bulk of the current and makes use of combination inductive and resistance type filter. A Type 5V4G or 5Y3G tube, V23, is used to supply higher voltage to the horizontal output, horizontal multivibrator, and the cathode ray tube 1st anode. This is followed by a choke filter. All filament supply leads except for tubes V19, V20, V21, V22 and the rectifier filaments pass through the band switch so that tubes may be switched ON or OFF when switching from radio to television.

## CIRCUIT ALIGNMENT

**GENERAL**—A complete alignment of the Model 801 television receiver consists of the following individual alignment procedures. These are listed below in the correct sequence of alignment. However, any one alignment may be performed without the necessity of realignment of any one of the other sectional alignments.

1. Broadcast i-f amplifier
2. Broadcast r-f amplifier
3. Television i-f traps
4. Television sound i-f amplifier
5. Video i-f amplifier
6. Oscillator adjustments
7. Television r-f amplifier

The alignment procedure is in table form on pages 8 through 11. The following paragraphs are important suggestions to be followed when attempting alignment and should be read thoroughly before alignment is attempted.

**TEST EQUIPMENT REQUIREMENTS**—To provide the over-all alignment as outlined above, the following test equipment is required.

**1. Cathode Ray Oscilloscope**—This scope should preferably have a 5-inch screen and should preferably have good high frequency response, which will be useful in making waveform voltage measurements on pages 20 and 21.

**2. Signal Generator**—This signal generator must have good frequency stability and be accurately calibrated. It should be capable of covering the following frequency ranges with tone modulation where desired.

- (a) 455 kc for broadcast
- (b) 550-1600 kc for broadcast
- (c) 21.9 mc for video i-f trap
- (d) 27.9 mc for video i-f trap
- (e) 23.0 mc for video i-f marker
- (f) 25.65 mc for video i-f marker
- (g) 26.4 mc for video i-f marker
- (h) 44-110 mc and 174-238 mc for oscillator adjustment and markers for the r-f channel bandwidth measurements.

**3. R-F Sweep Generator**—This should give approximately 0.1-volt output with adjustable attenuation of the output. The output should be flat over wide frequency variations. The frequency coverage should be:

- (a) 20 to 30 mc, with 10 mc sweep width
- (b) 40 to 90 mc, with 25 mc sweep width
- (c) 170 to 220 mc, with 25 mc sweep width

**4. Output Meter**—An output meter with a voltage range 0-2.5 volts a-c.

**ALIGNMENT SUGGESTIONS**—With the exception of the broadcast i-f and r-f trimmers and the FM sound i-f discriminator trimmers, all alignment adjustments are performed from the underside of the chassis. Remove the chassis from the cabinet and turn it on its side with the power transformer down. This is the only safe position in which the chassis will rest and leave all adjustments accessible. The following suggestions apply to each individual alignment procedure.

**1. Broadcast I-F Alignment**—(a) Although the oscilloscope is recommended in the table for indicating the output voltage during alignment, an output meter may be connected across the speaker voice coil as an alternate output indicating device. When this is used, the volume control should be set for maximum volume and then attenuate the signal generator output so as not to cause audio overload.

(b) Use a 200 mmf mica capacitor or standard RMA dummy between the high side of the signal generator and the signal input point, as indicated in the Alignment Table.

**2. Broadcast R-F Alignment**—Apply signal generator input to one of dipole input terminals through a 200 mmf mica capacitor as in (1) above. An output meter may be used in place of the oscilloscope for indicating output. First adjust oscillator trimmer by tuning gang condenser to minimum capacity and aligning oscillator trimmer for maximum with a 1620 kc input signal. Next with 1500 kc input signal, tune in signal, set pointer to 1500 kc calibration then align r-f trimmer for maximum output.

**3. Video I-F Trap Alignment**—The video i-f traps are used to attenuate the sound i-f of the same and adjacent channels from being detected and reproduced as sound bar interference on the picture tube. Misalignment of these traps results in the interference pattern, as shown in Figure 31.

Set the contrast control about half-way up. Turn the Station Selector to channel 13. Connect the oscilloscope through a 10,000-ohm resistor, to the top of the 3300-ohm video load resistor, R16.

Connect the output of an accurately calibrated signal generator with tone modulation to the grid of the converter tube, V2A, through a 200 mmf mica capacitor. The alignment frequencies are:

- T1 (C10)—27.9 mc
- T2 (C13)—21.9 mc
- T3 (C16)—21.9 mc
- T4 (C19)—21.9 mc

The trimmers should be aligned for minimum output, care being taken to get the lowest possible indication at the output. The input signal should be attenuated below saturation of the i-f amplifier tubes at start, then raised as signal is attenuated during alignment.

**4. Television Sound I-F Alignment**—Since the television sound i-f amplifier transformer is slightly overcoupled, alignment by a sweep generator is recommended. Connect the generator through a 200 mmf capacitor to grid (4) of V3. For alignment, connect the oscilloscope through a 100,000 ohm isolating resistor across capacitor C49.

For step 1, insert a 21.9 mc marker signal from an unmodulated signal generator into the same point of input as the sweep generator. This input from the signal generator should be very loosely coupled by clipping the signal generator through insulation to the grid (4) of V3.

Keep the input of the sweep generator low enough so that the sound i-f amplifier does not overload. Check by increasing the output of the sweep; the response curve on the scope should increase in size proportionally. Set Contrast Control to half-advanced position.

The response curve of the amplifier at the grid return of V20 should appear as in Figure 8A.

For discriminator alignment the secondary trimmer, C78, of T6 is aligned by using a tone modulated 21.9 mc signal and listening to the tone at the loudspeaker. The trimmer is adjusted for minimum tone signal output. If the sweep is used for the secondary trimmer alignment, the cross-over should be symmetrical about a 21.9 mc marker and should be a straight line between the alternate peaks, as shown in Figure 8B. Reconnect oscilloscope across the top of the volume control.

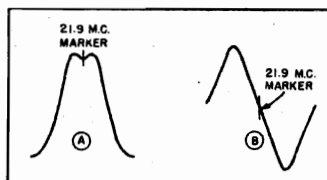


Fig. 8. T-V Audio I-F Curves

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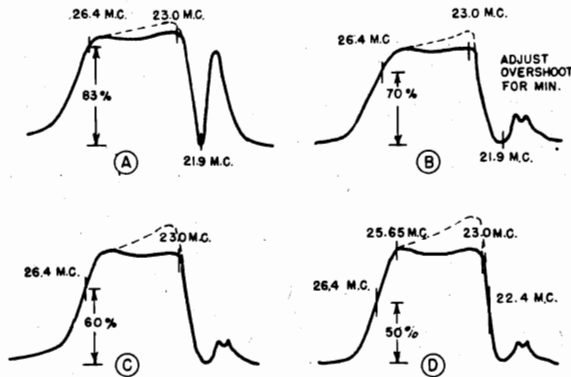


Fig. 9. Video I-F Alignment Curves

With the same sweep input as in step 1, adjust the primary trimmer, C84, of T6 for maximum peak-to-peak amplitude of the positive and negative peaks as shown in Figure 8B.

5. **Video I-F Alignment**—The video i-f amplifier uses transformers which are coupled and loaded to give the proper band-pass characteristic. Before attempting alignment of the video i-f, the sound i-f traps should be aligned as in (3), then do not touch these trimmers when making the video i-f alignment.

Stage-by-stage alignment should be performed so as to duplicate the curves, as shown in Figures 9A, B, C, and D. The markers are used to establish the correct bandwidth and frequency limits.

The trap formed by L20 and C89 in the cathode of V4 is used to reduce the overshoot of the 21.9 mc traps. Adjust the spacing of turns comprising L20 by either pushing them together or separating them so as to give a minimum amplitude to the overshoot.

Connect the sweep generator to the tube grid preceding the transformer to be aligned. Adjust the sweep width for a minimum of 10 mc about the center frequency of the video i-f. The marker frequencies are supplied by a signal generator and sufficient marker signal may be supplied in most cases by merely connecting the high side of the signal generator to the television chassis.

The primary of the transformer preceding the grid where the signal is applied will act as a trap putting a hole in the alignment curves as viewed on the scope unless it is short circuited or detuned. It may be detuned readily by connecting a 100 to 200 mmf capacitor across the primary trimmer or place a temporary short circuit across the primary trimmer. *Be sure to remove this capacitor after the stage is aligned.*

Keep the input of the sweep generator low so as not to overload the video i-f amplifier.

The response curves shown are obtained on an oscilloscope at the junction of L4 and R16. Use a 10,000 resistor in series with the input lead to the oscilloscope.

The contrast control should be advanced approximately to its half-advanced position.

The Selector Switch should be turned to radio position and a temporary jumper put across filament switch wafer so as to keep the television tube filaments lit while in this radio position. If a television position is used, the i-f curve will be affected by the interaction from the r-f coil in the converter tube grid. **NOTE**—When jumper is used, remove B+ from r-f assembly by disconnecting external lead to terminal (2) of r-f assembly, see Fig. 12.

6. **Oscillator Adjustment**—The oscillator coil must be adjusted so that the Television Tuning Condenser, C112, will tune the sound carrier of the television signal at the middle of its range. Set the condenser, C112, to mid-position. Then adjust oscillator coil for channels No. 1 through No. 6 by spreading turns to raise frequency or compressing turns to lower frequency. For channels No. 7 through No. 13, the oscillator coil consists of a single turn. Adjust these coils by spreading the gap to lower frequency or closing the gap to raise frequency in the leads of the coil which run to the terminals.

Apply the signal generator with tone modulation to the antenna input terminals and set the generator to the sound carrier frequency for the channel under alignment. The signal generator must be very accurately calibrated. This can be done by beating its output against a known channel carrier or use a station operating on the channel and tune in the sound.

For output indication, advance the volume control about to mid-position so that the tone modulation or audio modula-

tion on the channel station may be heard through the loud-speaker.

The oscillator coil is located on the coil form or assembly nearest to the front of the switch assembly and is wound of heavier wire than the other coils. This is shown in Figure 10.

7. **R-F Coil Alignment**—The r-f coil assembly is designed for stable, band-pass operation and under normal conditions will seldom require adjustment. In cases where it is definitely known that alignment is necessary (such as when the present coil is damaged and has been changed), do not attempt the adjustment unless suitable equipment is available. When tubes V1 or V2 are changed, alignment of r-f and oscillator may be necessary.

The minimum requirements for correct r-f alignment is to provide the correct band width, and for the response curve to be centered within the limit frequencies shown for each of the individual bands, as shown in Figure 11. It is also necessary that the curve be adjusted for maximum amplitude consistent with correct band width. To provide these minimum requirements, the r-f coils are overcoupled in a very similar manner to the video i-f transformers. However, instead of adjusting capacity to tune the coils, the inductance is varied by moving a few turns. Coupling is also adjustable by moving the entire coil either away from or toward the adjacent coil on the form.

The physical assembly of the coils in the band switch locates the r-f amplifier plate coil at the rear of the switch and the oscillator coil towards the front end. Two types of coils are used—the Channel No. 1 and No. 2 coils have an additional link circuit between the grid and plate coils to provide better image rejection of the FM band (88 to 108 mc) signals on these two channels. These links are tuned by means of two copper rings which are moved along the coil forms for adjustments.

The input sweep signal is applied to the antenna terminal board at the r-f unit. The 300-ohm cable between the antenna terminal board and r-f amplifier input must be disconnected at the r-f unit when making r-f alignment. The marker signal

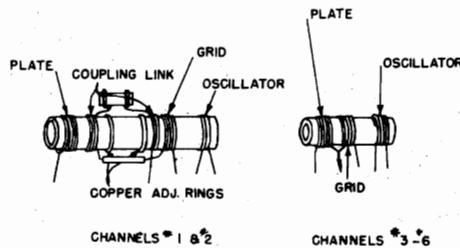


Fig. 10. R-F Coil Assembly

generator may be coupled loosely to the antenna input terminals.

The output r-f response curve is taken off at the junction of R1 and C1. The Contrast Control should be set for minimum for all r-f alignment.

For channels No. 1 and No. 2, the r-f coil should be aligned to give approximately the curve shown in Figure 11A. The high frequency end of curve (at S marker) may be peaked slightly higher than the low frequency end of curve, but the low frequency end should never be aligned with more amplitude than the high frequency end. The markers should be located on the inside of the humps of the curves, the video marker (P) preferably being inside slightly farther than the sound marker (S). Adjustment of the bandwidth is made by moving the plate coil closer to the grid coil or vice-versa. In most cases the sliding of the copper rings will give both the required bandwidth and frequency adjustment. Spread

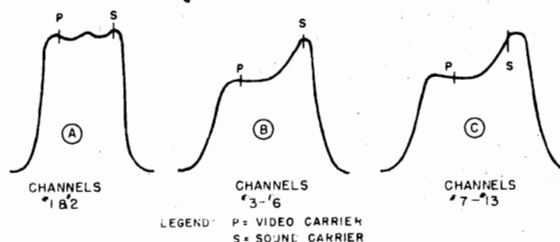


Fig. 11. R-F Alignment Curves

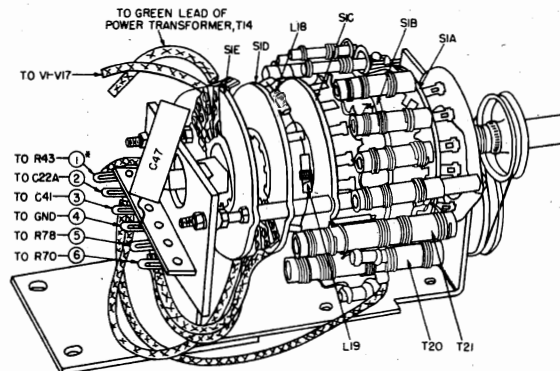
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or squeeze turns in plate and grid coils if the frequency cannot be obtained by sliding the rings. Spreading turns results in a raising of the frequency; while squeezing turns lowers the frequency.

For the remainder of the channels, the adjustment of the plate coil in relation to the grid coil changes the bandwidth while the spreading or squeezing of the plate and grid coil turns results in the raising or lowering of frequency. Only when the plate and grid coils are tuned to the same frequency will the amplitude be greatest with the correct bandwidth. The outside peaks of the r-f response curve should be aligned to the carrier markers. In general it is desirable to have a slight rise on the high frequency (sound carrier) side of the curve, however the rise should not exceed approximately 30 per cent of the low frequency side. A low frequency rise in the response curve is not desirable and must be avoided, as a picture with poor definition will result if this is done.

The upper channel coils (No. 11, No. 12, and No. 13) may have the plate winding reversed from the winding direction of the plate coil of the other transformers. If this is the case, the bandwidth will be increased by separating the plate and grid coils and vice-versa. This condition can be determined by inspection or by the effect on the curve when making the alignment.



\* TERMINAL ① NOT USED ON EARLY PRODUCTION RECEIVERS

Fig. 12. R-F Coil & Switch Assembly

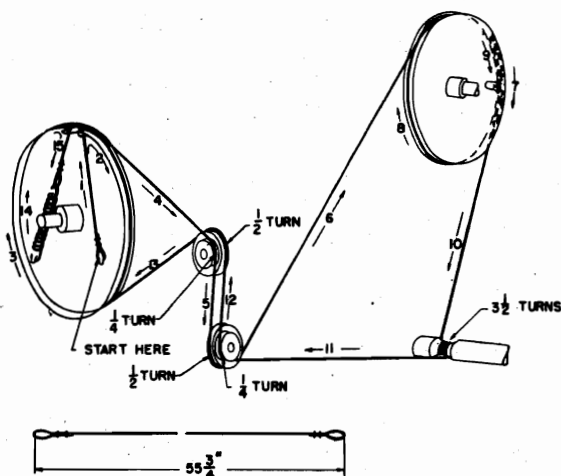


Fig. 15. Radio Tuning, Dial Drive Stringing

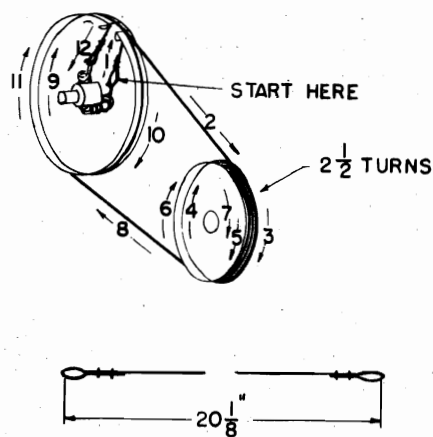


Fig. 16. Television Tuning, Drive Stringing

### MISCELLANEOUS INSTALLATION AND SERVICE ADJUSTMENTS

#### REPLACEMENT OF PICTURE TUBE

To remove the picture tube from the television chassis, remove the picture tube socket and then untape and slide off the ion trap adjustment assembly. The ion trap can be removed readily, if the gap in the assembly is pulled apart slightly with the fingers while attempting to slide it. Loosen the two set screws partially that clamp the left side of the picture tube mounting strap, then slide the strap backward from the top-front rim of the picture tube until the rim of the tube is free from the strap. Carefully pull the tube out through the focus and deflection coils.

To replace a picture tube the reverse procedure should be followed, being careful never to force the picture tube if it sticks or fails to slip into place readily. Investigate and remove the source of the trouble. The picture tube should be oriented so that the anode cap is adjacent to the H.V. rectifier, V13, and the high voltage lead.

Wipe the screen surface of the tube to remove finger marks and dust. **PRECAUTION**—Do not handle, remove, or install a picture tube unless shatterproof goggles and heavy gloves are worn.

#### ION TRAP ADJUSTMENT

The ion trap may be approximately located as shown in Figure 17; however its final adjustment must be made with the television receiver operating.

The approximate adjustment requires that the gaps in the two magnets be lined up with the break in the rubber holder.

**NOTE**—Some ion traps have been magnetized so that it is necessary to rotate the small magnet at 180 degrees to this normal position. Then slide the assembly onto the picture tube neck so that the ion trap assembly slit is at the bottom or top (dependent upon picture tube) and lines up with pin #12 or #6. Slide the assembly forward on the picture tube until it is about the position shown in the illustration. **NOTE**—The wider of the two magnets should be located at the rear or the base end of the picture tube. The final following steps should be taken with the television receiver operating:

1. With Brilliance control advanced, turn ion trap assembly so that gap in rubber holder is faced up or down and lines up with either pin #6 or pin #12. Whichever way gives some illumination, is the correct approximate orientation of assembly. If the tube V16 is removed, it will be found much easier to adjust for maximum illumination since the resultant thin line will illuminate even though the magnets are considerably out of adjustment.

2. Move assembly back and forth and rotating it while viewing screen, adjust for maximum brightness.

3. If illuminated area gets very bright, reduce brightness with control and repeat step 2. If tube V16 was removed as suggested in Step 1, replace it before proceeding with step 4.

4. If any shadowing of the tube neck is present after completing step 3, rotate the small (front) magnet to correct shadow and repeat step 2 and 3. **NOTE**—Badly out-of-line focus coils can also cause neck shadowing. The focus coil should be symmetrical and straight before starting the ion trap adjustment.

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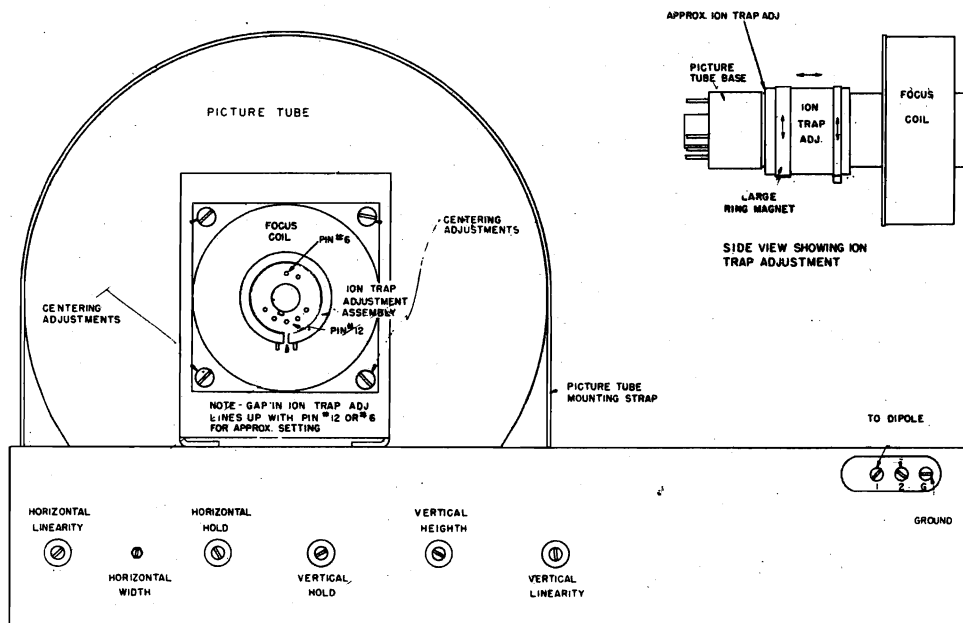


Fig. 17. Location of Installation Adjustment Controls

**CENTERING (FOCUS COIL) ADJUSTMENT**

The four focus coil adjustment screws should all be tightened sufficiently so that the springs are always under tension. Too loose pressure on the springs will result in the picture centering being unstable. These adjustments are not readily available with the back cover in place unless a long screwdriver is used. Since each screw adjustment reacts in both the horizontal and vertical directions, a maladjustment in the centering may have to be corrected by the adjustment of one to four screws.

**DEFLECTION YOKE ADJUSTMENT**

Three set screws permit the deflection yoke to be loosened, permitting limited turning in either direction. If the picture does not line up horizontally or square with the picture tube mask, rotate the yoke until this condition is remedied, then tighten the set screws.

**HORIZONTAL (HOLD) OSCILLATOR SPEED ADJUSTMENT**

The horizontal hold control is a preset adjustment on the rear of the chassis which is used to adjust the speed. In late production receivers, a tuned circuit consisting of L21 and C91 was added to the horizontal oscillator cathode circuit to stabilize the horizontal hold operation. For complete alignment both controls must be adjusted. Check operation first as follows:

**Check on Alignment**—With a normal television signal being received, free from excessive noise, turn the horizontal hold control to the position where the picture locks in horizontally and passes the following tests:

1. With a picture being received, switch the Station Selector to a channel having no program and then back to the desired channel. The picture should immediately lock into position.
2. With a picture being received, turn the television receiver power "off" for two or three seconds and then turn it back "on" again. The picture should come into synchronization within ten seconds after the picture tube has been illuminated.
3. Turn the Station Selector to the "radio" position and allow the television receiver to transfer for two or three minutes to Broadcast reception, and then return to the television channel transmitting a picture. The picture should synchronize within ten seconds after the picture tube becomes illuminated with receivers not equipped with L21. Receivers with L21 should sync immediately upon showing raster.
4. Turn power off for three or four minutes and then turn "ON." The picture should lock-in horizontally within ten seconds after the raster becomes illuminated.

**Minor Adjustments**—If the receiver does not have the tuned circuit consisting of L21 and C91 in the cathode of the horizontal multivibrator, V11, the horizontal hold control, R36, should be adjusted until the above checks can be satisfactorily accomplished. If attempted adjustment of the hold control will not permit all the above checks to be met when the tuned circuit is incorporated, then make the adjustment as outlined under "Complete Realignment."

**Complete Realignment**—Tune in a television signal for optimum sound and adjust for normal contrast.

1. Adjust the Horizontal Hold control to the center of its range.
2. Remove tube V9, and then adjust the iron core of L21 until the picture is approximately synchronized (held in frame) in the horizontal direction.
3. Replace tube V9 and then adjust the Horizontal Hold control until the picture passed all tests as outlined in "Check on Alignment."

**VERTICAL (HOLD) OSCILLATOR SPEED ADJUSTMENT**

This control, R62, is used to lock the picture in synchronism with the transmitted picture in the vertical direction. When the control is maladjusted the picture will slide vertically out-of-frame or lock out-of-frame, giving overlapping vertical images or even double images in the vertical direction. After the picture is locked in vertically on a normal picture, reduce the contrast control until the picture is barely visible, then readjust the control until the picture holds in frame.

**HORIZONTAL LINEARITY AND WIDTH CONTROL**

These controls react on each other so that when one control is adjusted the other may have to be. The adjustment of the linearity control should only be made on a test pattern signal. First, obtain the correct width by adjusting the width control, L7, until the picture extends approximately  $\frac{1}{8}$ -inch outside the edge of the mask on both sides. Next, adjust the Horizontal Linearity control, R49, until the test pattern is symmetrical in the left and right direction. A slight readjustment of the Width control may now be necessary, as well as touching up of the centering adjusting screws.

**VERTICAL LINEARITY AND HEIGHT CONTROL**

The Height control, R61, is adjusted until the picture extends approximately  $\frac{1}{8}$  inch outside the edge of the mask on both top and bottom. Next, adjust the Vertical Linearity control, R58, until the test pattern is symmetrical from top to bottom. Readjustment of the Height and Vertical Hold controls as well as the centering adjustments may be necessary.

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## PRODUCTION CHANGES

The following production changes have taken place up to the time that this service data was compiled. In most cases the change can not be accurately identified with the serial number of the chassis. The order of listing below does not indicate the chronological order of the change.

1. **Power Transformer, T14 and V23**—The original transformer, T14, supplied, gave insufficient B+ voltage (385 volts) when using a Type 5Y3GT rectifier tube, V23. This resulted in a low anode voltage of 7500 volts for the picture tube. To increase this voltage, a Type 5V4G tube was substituted for the 5Y3G tube, V23. At approximately serial number 2500, a new transformer T14 having Stock No. RTP-040 was substituted, which gave the correct B+ voltage of 415 volts when a Type 5Y3G tube was used as V23. This B+ voltage gives an anode voltage to the picture tube of 8500 volts.

2. **Television Tuning Trimmer C112**—For approximately the first 2000 receivers, the tuning trimmer C112 did not quite have the correct tuning range, making it necessary to add a fixed 10 mmf. capacitor C114 in series with it. The shunt capacitor C102 had a value of 4.7 mmf. Later production trimmer, C114, has the correct range. With this new value of trimmer, the shunt capacitor C112 was changed to 6.0 mmf. This shunt capacitor in a few receivers was merely a 5.0 mmf., while in most it will consist of two capacitors; a 5 mmf. and a 1.0 mmf. capacitor in parallel. The early production trimmer has a  $\frac{1}{4}$ -in. O.D. shaft, while the late production trimmer is slightly larger and has a  $\frac{1}{8}$ -in. O.D. shaft.

3. **Tone Control, R69B**—The tone control R69B, on early production receivers was connected in series between the Volume Control R69A, movable arm, and C39. C72 was a 680 mmf. capacitor from C39 to ground. Hum in the audio dependent upon the tone control setting necessitated a revision as shown in the schematic.

4. **Tuned Circuit, L20 and C89**—The capacitor, C89, was originally 240 mmf. and the coil, L20, was fixed-tuned and wound on a resistor form. This was later changed to 1000 mmf. and the coil turns were reduced and made variable, resulting in a higher Q circuit. This change permitted adjustment of the trap as described in the alignment procedure.

5. **Resistor, R87**—This resistor was changed from 100,000 ohms to 330,000 ohms to prevent excessive beam current in the picture tube, V8. This excessive beam current caused the high voltage to be reduced when the Brilliance control was advanced to maximum with the result that the control reduced brightness at end of its clockwise travel instead of increasing brightness.

6. **Resistor, R47**—This resistor has been changed from  $\frac{1}{2}$ -watt to a 1-watt size. In some cases, the original  $\frac{1}{2}$ -watt resistor dissipation is exceeded, especially if the Width control iron core is nearly all the way in the coil, resulting in a reduction in the resistance value. This reduced resistance changes the waveshape across C29 so much that the horizontal multivibrator may lock in at half frequency or not lock at all. It may also result in the resistor burning out.

7. **Change in Horizontal Output Transformer, T9**—A new design horizontal output transformer, T9, was used in late production receivers. This may be identified by the fact that it has two windings instead of the single winding design, as characterized the early production receivers. When the late production transformer is used, a 3900-ohm, 1-watt resistor must be added in series to the existing 6800-ohm, 1-watt resistor, R47. *Do not use a single 1-watt resistor for this.* The capacitor, C66, should be returned to ground when the new type transformer is used.

8. **Horizontal Multivibrator Cathode Switching**—After the first 150 receivers were built, a shorting contact was added to the filament wafer of the Station Selector switch so as to stop the horizontal multivibrator as soon as the Station Selector was switched to "Radio" position. This connects the multivibrator cathode to ground through the filament circuit when switching to "Radio" so that "birdies" are not heard on the broadcast band as the television tubes cool off after switching from television to radio reception.

9. **Screen Resistor, R79**—This resistor was changed from an original 47,000 ohms to 33,000 ohms. This reduces the operating d-c voltage on the plate of V7, and gives greater brightness.

10. **Addition of C21**—A fixed 10 mmf. mica capacitor, C21, was added across C10 so that the trimmer C10 would peak at the center of its range.

11. **Change in R63**—The 330,000 ohm resistor, R63, was changed to 220,000 ohms so that the Vertical Hold control will operate near its mid-adjustment position.

12. **Removal of R95**—To correct a transient which appeared in the vertical retrace as a white line at the top of the picture, the 2200 ohm resistor, R95, in series with capacitor, C37, was removed. The potentiometer, R58, was reconnected as a variable resistance as shown on the schematic.

13. **Value Change of C52**—The original capacity of C52 was 47 mmf. To improve vertical interlace, this capacitor was changed to 240 mmf.

14. **Addition of Tuned Circuit, L21 and C91**—A 15.75 kc tuned circuit was added to the cathode of the horizontal multivibrator, V11. This stabilizes the horizontal AFC circuit to the extent that it prevents picture wiggles on noise pulses and echoes. With this addition, the 240  $\mu$ f capacitor, C56, should be changed to 150 mmf. and the 150,000 ohm resistor, R40, should be increased to 330,000 ohms. This prevents a white line at the left-center of the picture which may result with installation of L21-C91. With addition of L21, the capacitor, C30, was changed from a 40 mfd to a 1.0 mfd, and C92 was changed from 1.0 mfd to a .05 mfd.

15. **Connection of Primary of T11**—On early production receivers the primary of T11 was connected to a mid-tap on choke L10. This connection caused a resonant condition to develop which affected the lower television bands. This was corrected temporarily by shunting a 47 mmf. capacitor between the midtap of L10 and ground. Later the primary of T11 was connected to the junction of L10 and C101 as shown on the schematic.

## 50-CYCLE OPERATION

The supplement schematic diagram, Figure 18, shows the wiring of the power transformer, T14, through the special terminal board installed. Also, it shows the addition of capacitors C98 and C99 required for additional filtering. The changes involved in changing from 60-cycle to 50-cycle operation are listed below:

1. The 50-cycle power transformer, T14, is separated from the chassis and installed on a mounting plate at the base of the cabinet.

2. All filament and high voltage leads are extended on the transformer and terminated at the chassis proper in a terminal board. The connection of these leads through this terminal board is shown in Figure 18. All leads are twisted.

3. A 90 mfd. capacitor, C98, is shunted across C62. A 90 mfd. capacitor, C99, is shunted across C45-A.

4. The bias supply filter capacitor, C69, is changed to a 50 mfd. capacitor.

5. Filament leads to V6, V7, V9, V10, V11, V12, V14, V15, V16, and V17 are twisted. The ground connection is made at one point only for this series of tubes, and the high side is connected through the filament wafer of the band switch.

## TROUBLE SHOOTING

The following is a listing of possible troubles and their cures. This is not intended as a comprehensive coverage of all possible failures but serves to point out some of the more difficult troubles that may be experienced. From time to time this information will be expanded as information becomes available.

## 1. NO RASTER ON PICTURE TUBE

(a) Ion trap adjustment incorrectly made. Assembly on backward or improperly oriented. See ion trap adjustment under "Miscellaneous Preset and Service Adjustments."

(b) Check for waveform at output of T9. If present, the trouble is probably in the Type 8016 rectifier tube or filter circuit. Check for open in high voltage winding of T9. If the V13 tube filament glows yellow, high-voltage is being generated and the trouble will possibly exist in the picture tube, V8.

(c) If there is no waveform at output of T9, check operation of 807, V12, V7, and multivibrator V11 by oscilloscope waveform measurement.

(d) Check that high voltage anode cap is contacting the anode terminal of V8.

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## SOCKET VOLTAGE CHART

NOTE—All d-c measurements taken by a 20,000 ohm/volt meter. Station selector switch at Channel No. 1 unless noted. Contrast control at maximum. Brilliance at minimum.

SYM.	TUBE	PLATE	SCREEN	CATHODE	GRID	PLATE	SCREEN	NOTES
BOL	TYPE	VOLTS	VOLTS	PIN	VOLTS	VOLTS	M.A.	
V1	6AU6	5	140	6	140	7	1.3	7.2
V2A	7F8	6	115	—	5	0	8	4.5*
V2B		3	180	—	4	0	1	0
V3	6AC7	8	150	6	150	5	0	4
V4	6AC7	8	160	6	160	5	0	4
V5	6AC7	8	170	6	170	5	2	4
V6A	6H6	5	0	—	8	0	—	4
V6B		3	8.5	—	4	6.3AC	—	0
V7	6AC7	8	150	6	125	5	0	4
V8	10BP4	CAP	8300*	10	415	11	150	2
V9A	6SN7GT	2	12.5	—	3	0	1	—1
V9B		5	110*	—	6	11	4	6
V10A	6SL7GT	2	—95	—	3	0.5	1	—9.5
V10B		5	42.5	—	6	0.5	4	0.5
V11A	6SN7GT	5	170	—	6	6	4	—25
V11B		2	135	—	3	6	1	0
V12	307	CAP	415	2	345	4	22	3
V13	8016	CAP	—	—	2	8300*	—	—
V14	6AS7GT	2 & 5	0	—	3 & 6	10	1 & 4	—15
V15A	6SL7GT	2	0.5	—	3	7.5	1	0.5
V15B		5	105	—	6	10	4	4
V16A	6SN7GT	2	30	—	3	1.5	1	0
V16B		5	14.5	—	6	1.5	4	4.5
V17	6V6GT	3	195	4	135	8	23.5	5
V18*	6SA7	3	200	4	80	8	0	6
V19	6SG7	8	200	6	110	5	1	4
V20	6SV7	6	195	4	88	2	—0.5	3
V21A	6AQ7GT	1 & 3	0	—	2	0	—	0
V21B		5	75	—	6	0	4	0
V22	6V6GT	3	230	4	200	8	10	5
V23	5Y3GT	4 & 6	315AC	—	2	425	—	—
V24	5U6G	4 & 6	240AC	—	2	250	—	—

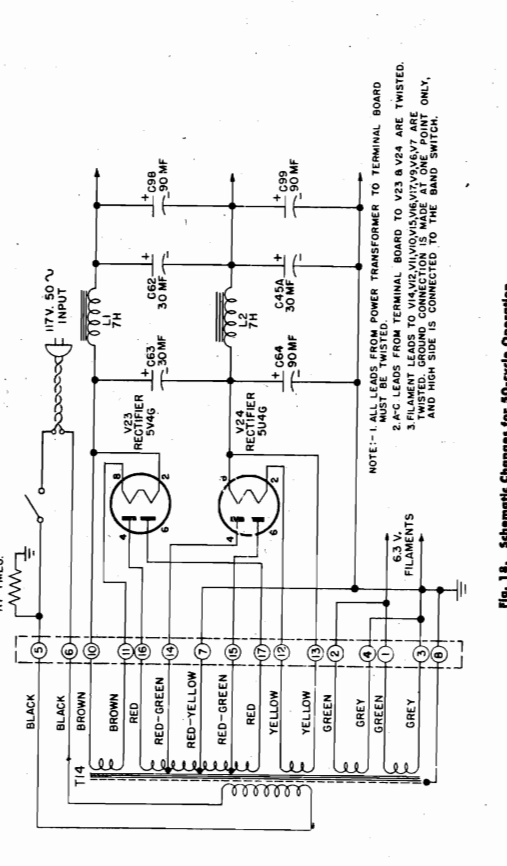


Fig. 18. Schematic Changes for 80-cycle Operation

1. NO RASTER ON PICTURE TUBE (Cont'd)
  - (c) Open Brightness control R83B, R87, or R85.
  - (f) No. B+ voltage at junction L4 and L3.
  - (g) If only two or three thousand volts are generated, check deflection yoke, L9, and Width control, L7, for continuity.
2. RASTER NORMAL, NO PICTURE OR SOUND
  - (a) Oscillator V2B defective, or oscillator coil resonates out of band.
  - (b) Defective antenna or lead-in.
  - (c) Converter, r-f amplifier, or first video i-f amplifier stage defective.
3. PICTURE NORMAL, NO SOUND
  - (a) 21.9 mc audio i-f amplifier, discriminator, or audio amplifier defective.
  - (b) Oscillator V2B off frequency.
  - (c) Defective speaker.
4. RASTER NORMAL, SOUND NORMAL, NO PICTURE
  - (a) Video i-f amplifier (after 1st i-f) inoperative.
  - (b) Resistor R83, R33, or C30, picture control, defective or open.
  - (c) Screen by-pass C32C open or shorted.
5. NORMAL PICTURE AND SOUND, NO HORIZONTAL OR VERTICAL SYNC.
  - (a) Check for signal input waveform at grid (1) of V9A. Defective V9A or plate circuit components.
  - (b) Operation of receiver with Contrast control advanced too far.
6. PICTURE NORMAL, NO VERTICAL SYNC.
  - (a) Check grid of V15B for normal waveform.
  - (b) Check speed of vertical multivibrator. Should be capable of free running speed less than 60 cps.
  - (c) Check V15B circuit components.
7. PICTURE NORMAL, NO HORIZONTAL SYNC.
  - (a) Check AFC transformer, T7.
  - (b) Check alignment of L21 and C91.
  - (c) Check socket voltages and waveforms of V10B and V11.
  - (d) Check resistor R47 for correct value.
8. VERTICAL OR NO HORIZONTAL DEFLECTION
  - (a) Check waveform and socket voltages of output and multivibrator sweep circuits.
  - (b) Check output transformer and yoke for continuity.
9. ONE OR MORE HORIZONTAL WHITE LINES AT TOP OF PICTURE
  - (a) Check for Production Change #12.
10. RIPPLE ON EDGE OF PICTURE
  - (a) Reflections on antenna lead-in.
  - (b) Instability of horizontal AFC circuit. See Production Change #14.
  - (c) Defective capacitor, C30.
11. RASTER EDGE NOT STRAIGHT—KEYTONEING
  - (a) Defective yoke.
  - (b) Defective sweep transformer.
  - (c) Improperly adjusted ion trap adjustment assembly.
12. PICTURE JUMPY
  - (a) Operation at too high contrast control setting.
  - (b) Defective regular rate sideways, check capacitor C30, R33, picture control, or change #14.
  - (c) If left of picture litters, change 801 sweep tube, V12.
  - (d) Noisy sweep or sync circuit tubes.
13. POOR INTERLACE OF VERTICAL SWEEP
  - (a) Check Production Change #13.
14. POOR PICTURE DETAIL
  - (a) Mismatch in antenna or lead-in.
  - (b) Misalignment of i-f or r-f circuits.
  - (c) Defective chokes L3, L4 or L5 in video amplifier.
  - (d) Make sure that focus control operates on both sides of proper focus point.
  - (e) Overload of video amplifier, check contrast control operation.
15. PICTURE CANNOT BE CENTERED
  - (a) Move focus coil back by loosening all four adjustment screws.
16. FOCUS CONTROL AT END OF TRAVEL
  - (a) Short out resistor, R96.
  - (b) Check for correct B+ voltages.



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ALIGNMENT TABLE

Before attempting the following tabular alignment procedure, read the preceding section "ALIGNMENT SUGGESTIONS"

STEP NO.	SIGNAL GENERATOR FREQUENCY	SIGNAL INPUT POINT	CONNECT OSCILLOSCOPE TO CHASSIS &	STATION SELECTOR SWITCH	DIAL SETTING	ADJUST	REMARKS
(1) BROADCAST I-F ALIGNMENT							
1	455 kc with tone modulation	Not Used	Junction C41 & R69A	Radio	550 kc	C75 & C76 for max. output	
2	455 kc with tone modulation	Not Used	Junction C41 & R69A	Radio	550 kc	C73 & C74 for max. output	
(2) BROADCAST R-F ALIGNMENT							
1	1500 kc with tone modulation	Not Used	Ant. terminals thru 200 mmf	Radio	1500 kc	C57B osc. trimmer for maximum output	* Tune gang condenser to minimum capacity setting.
2	1500 kc with tone modulation	Not Used	Ant. terminals thru 200 mmf	Radio	1500 kc	C67A r-f trimmer for maximum output	** If pointer does not fall on the 1500 kc calibration when the 1500 kc signal is tuned in, adjust pointer on dial cord until it does.
(3) TELEVISION I-F TRAP ALIGNMENT							
1	21.9 mc with tone modulation	Not Used	Junction L4 & R16	Channel #13	—	C19 on T4 for minimum output	Connect 10,000 ohms in series with oscilloscope input lead.
2	21.9 mc with tone modulation	Not Used	Junction L4 & R16	Channel #13	—	C16 on T3 for minimum output	
3	21.9 mc with tone modulation	Not Used	Junction L4 & R16	Channel #13	—	C13 on T2 for minimum output	
4	27.9 mc with tone modulation	Not Used	Junction L4 & R16	Channel #13	—	C10 on T1 for minimum output	
(4) TELEVISION SOUND I-F AMPLIFIER ALIGNMENT							
1	21.9 mc unmodulated	21.9 mc with 2 mc sweep width	Junction of R77 & C49	Channel #13	—	C79 & C80 for max. amplitude and symmetry try at 21.9 mc	Detune C84 on T5; then adjust C79 & C80. Adjust for max. amplitude and symmetry about 21.9 mc marker as shown in Fig. 8A.
2	21.9 mc with tone modulation	Not Used	Grid (4) of V3	Channel #13	—	C78 for minimum tone output	With volume control half-actuated, adjust C78 for minimum tone output.
3	Not Used	21.9 mc with 2 mc sweep width	Junction of C41 & R69A	Channel #13	—	C84 for max. peak to peak amplitude	Peak trimmer so that the positive and negative peaks have max. peak to peak amplitude. See Fig. 8B.
4	Repeat steps 2 and 3.						

ALIGNMENT TABLE (CONT'D)

STEP NO.	SIGNAL GENERATOR FREQUENCY	SIGNAL INPUT POINT	CONNECT OSCILLOSCOPE TO CHASSIS &	STATION SELECTOR SWITCH	DIAL SETTING	ADJUST	REMARKS
(5) VIDEO I-F AMPLIFIER ALIGNMENT							
1	23.0 mc & 26.4 mc marker	20-30 mc sweep	Grid (4) of V5	Channel #13	—	C17 and C18 for max. amplitude, bandwidth, and correct positioning of markers.	Shunt C14, T3 primary trimmer with a 100 mmf capacitor. See Fig. 9A.
2	23.0 mc & 26.4 mc marker	20-30 mc sweep	Grid (4) of V4	Channel #13	—	C14 and C15 for max. amplitude, bandwidth, and correct positioning of markers.	Remove 100 mmf capacitor from C14, and shunt C11, T2 primary trimmer, with it. See Fig. 9B.
3	23.0 mc & 26.4 mc marker	20-30 mc sweep	Grid (4) of V4	Channel #13	—	Adjust L20 for minimum overshoot	See Fig. 9B. Either spread or squeeze turns together to give minimum amplitude of overshoot.
4	23.0 mc & 26.4 mc marker	20-30 mc sweep	Grid (4) of V3	Channel #13	—	C11 and C12 for max. amplitude, bandwidth, and correct position of markers	Remove 100 mmf capacitor from C11, and shunt C11, T2 primary trimmer, with it. See Fig. 9C.
5	23.0 mc & 26.4 mc marker	20-30 mc sweep	Grid (4) of V3	Channel #13	—	Readjust L20 for minimum overshoot	See Fig. 9C. Repeat procedure as in step 3, except for point of signal input.
6	23.0 mc, 26.4 mc, & 25.65 mc	20-30 mc sweep	Grid (8) of V1A	Radio*	—	C8 and C9 for max. amplitude, bandwidth, and correct position of markers	Remove 100 mmf capacitor from C8. See Fig. 9D. * Jump filament switch with clip lead so that tube filaments will be lit. Remove B+ from r-f assembly.
(6) OSCILLATOR COIL ADJUSTMENT							
1	49.75 mc with tone modulation	—	Antenna terminals	Channel #1	—	Turns of osc. coil, T20.	Make sure that C112 is at mid-position of travel. Use sound output as indicator.
2	59.75 mc with tone modulation	—	Antenna terminals	Channel #2	—	Turns of osc. coil, T21.	Same as for Step #1.
3	65.75 mc with tone modulation	—	Antenna terminals	Channel #3	—	Turns of osc. coil, T22.	Same as for Step #1.
4	71.75 mc with tone modulation	—	Antenna terminals	Channel #4	—	Turns of osc. coil, T23.	Same as for Step #1.
5	81.75 mc with tone modulation	—	Antenna terminals	Channel #5	—	Turns of osc. coil, T24.	Same as for Step #1.
6	87.75 mc with tone modulation	—	Antenna terminals	Channel #6	—	Turns of osc. coil, T25.	Same as for Step #1.
7	179.75 mc with tone modulation	—	Antenna terminals	Channel #7	—	Lead gap of oscillator coil, T26.	Same as for Step #1.

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ALIGNMENT TABLE (CONT'D)

STEP NO.	SIGNAL GENERATOR FREQUENCY	SIGNAL POINT	CONNECT SCOPE TO CHASSIS &	STATION SWITCH	DIAL TING	ADJUST	REMARKS	STEP NO.	SIGNAL GENERATOR FREQUENCY	SIGNAL POINT	CONNECT SCOPE TO CHASSIS &	STATION SWITCH	DIAL TING	ADJUST	REMARKS
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(A) OSCILLATOR COIL ADJUSTMENT (Cont'd)

8	185.75 mc with tone modulation	Antenna terminals	—	Channel #8	—	Lead gap of oscillator coil, T27.	Same as for Step #1.	5	Markers 171.25 mc & 81.75 mc	Channel #5 Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #5	—	For max. amplitude and for recommended response	See Fig. 11B for resultant alignment curve.
9	191.75 mc with tone modulation	Antenna terminals	—	Channel #9	—	Lead gap of oscillator coil, T28.	Same as for Step #1.	6	Markers 171.25 mc & 81.75 mc	Channel #6 Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #6	—	For max. amplitude and for recommended response	See Fig. 11B for resultant alignment curve.
10	197.75 mc with tone modulation	Antenna terminals	—	Channel #10	—	Lead gap of oscillator coil, T29.	Same as for Step #1.	7	Markers 171.25 mc & 81.75 mc	Channel #7 Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #7	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
11	203.75 mc with tone modulation	Antenna terminals	—	Channel #11	—	Lead gap of oscillator coil, T30	Same as for Step #1.	8	Markers 181.25 mc & 185.75 mc	Channel #8 Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #8	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
12	209.75 mc with tone modulation	Antenna terminals	—	Channel #12	—	Lead gap of oscillator coil, T31.	Same as for Step #1.	9	Markers 187.25 mc & 191.75 mc	Channel #9 Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #9	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
13	215.75 mc with tone modulation	Antenna terminals	—	Channel #13	—	Lead gap of oscillator coil, T32.	Same as for Step #1.	10	Markers 193.25 mc & 197.75 mc	Channel #10 Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #10	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.

(7) R-F COIL ALIGNMENT

1	Markers 45.25 mc & 48.75 mc	Channel #1 Antenna terminals with 25 mc sweep	Junction R1 and C1	Channel #1	—	For max. amplitude and for recommended response	See Fig. 11A for resultant alignment curve.	11	Markers 209.25 mc & 203.75 mc	Channel #11 Antenna terminals with 25 mc sweep	Junction R1 and C1	Channel #11	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
2	Markers 55.25 mc & 58.75 mc	Channel #2 Antenna terminals with 25 mc sweep	Junction R1 and C1	Channel #2	—	For max. amplitude and for recommended response	See Fig. 11A for resultant alignment curve.	12	Markers 205.25 mc & 209.75 mc	Channel #12 Antenna terminals with 25 mc sweep	Junction R1 and C1	Channel #12	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
3	Markers 61.25 mc & 65.75 mc	Channel #3 Antenna terminals with 25 mc sweep	Junction R1 and C1	Channel #3	—	For max. amplitude and for recommended response	See Fig. 11B.	13	Markers 211.25 mc & 215.75 mc	Channel #13 Antenna terminals with 25 mc sweep	Junction R1 and C1	Channel #13	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.

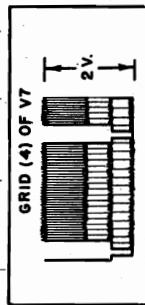


Fig. 35. Video Output of Deflector (Osc. Synced at Half of Vert. Sweep Speed)

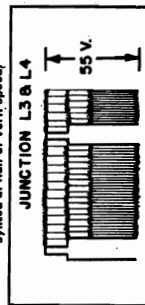


Fig. 36. Video Output of V7 (Osc. Synced at Half of Vert. Sweep Speed)



Fig. 37. Clipper Output (Osc. Synced at Half of Vert. Sweep Speed)

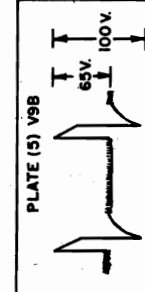


Fig. 38. Sync Amplifier Output (Osc. Synced at Half of Vert. Sweep Speed)

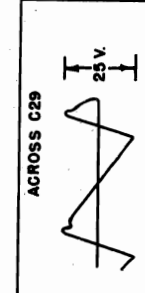


Fig. 39. A.L.C. Sawtooth (Osc. Synced at Half of Vert. Sweep Speed)



Fig. 40. Discriminator Voltage (Osc. Synced at Half of Vert. Sweep Speed)

WAVEFORM MEASUREMENTS

The waveforms shown in Figures 35 through 39 represent measurements on the oscilloscope. The oscilloscope has been adjusted for a normal picture with correct Contrast, Height, Width and Linearity. Most measurements must be made when a signal is being received.

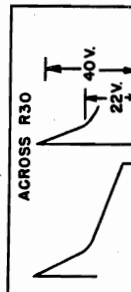


Fig. 41. Discriminator Voltage (Osc. Synced at Half of Vert. Sweep Speed)



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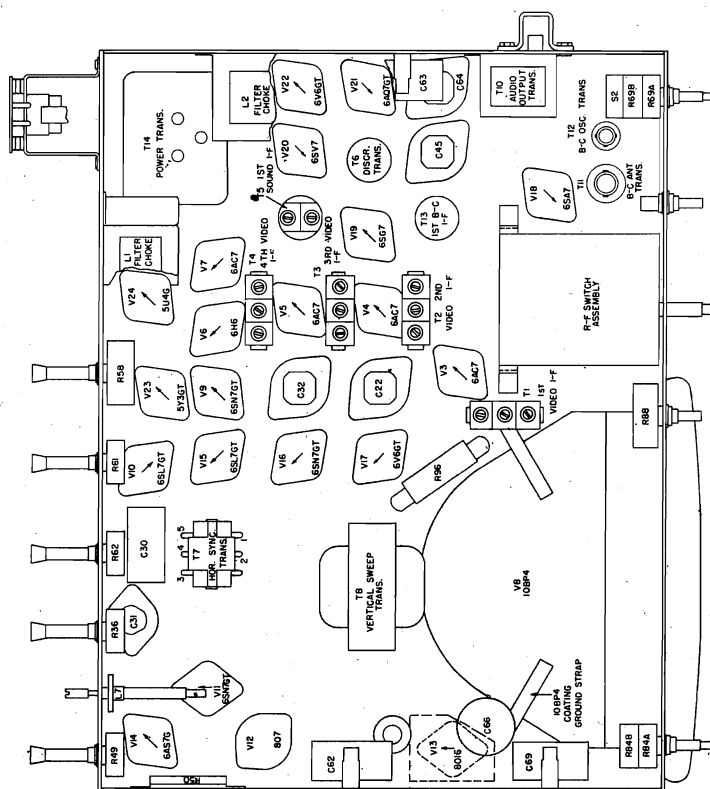


Fig. 14. Component Location, Bottom View of Chassis

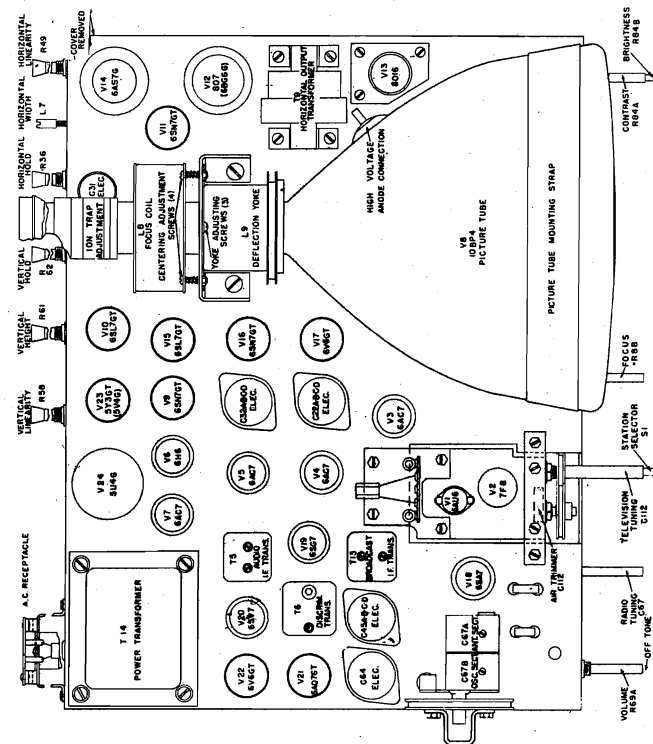


Fig. 13. Component Location, Top View of Chassis

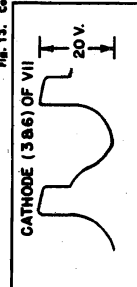


Fig. 42. Hor. M-V Cathode (Osc. Synced at Half of Hor. Sweep Speed)

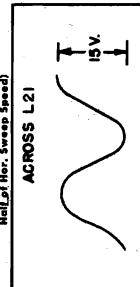


Fig. 43. Cathode Tuned Circuit (Synced at Half of Hor. Sweep Speed)

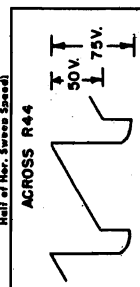


Fig. 44. Hor. M-V Output (Osc. Synced at Half of Hor. Sweep Speed)

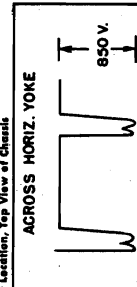


Fig. 45. Hor. Yoke Input (Osc. Synced at Half of Hor. Sweep Speed)

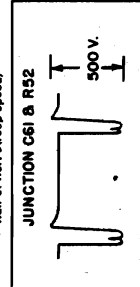


Fig. 46. V14 Control Voltage (Osc. Synced at Half of Hor. Sweep Speed)

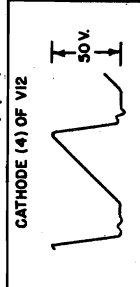


Fig. 47. 807 Cathode (Osc. Synced at Half of Hor. Sweep Speed)

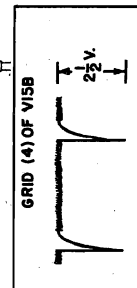


Fig. 48. Vert. Sync at V15B (Osc. Synced at Half of Vert. Sweep Speed)

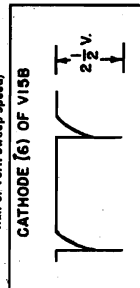


Fig. 49. Vertical Sync of Cathode V15B (Osc. Synced at Half of Vert. Sweep Speed)

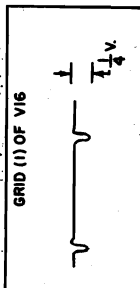


Fig. 50. Vert. Sync at Grid of M-V (Osc. Synced at Half of Vert. Sweep Speed)

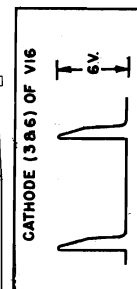


Fig. 51. Vert. M-V Cathode (Osc. Synced at Half of Vert. Sweep Speed)

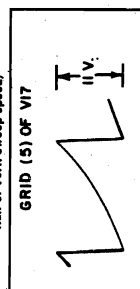


Fig. 52. Vert. M-V Output (Osc. Synced at Half of Vert. Sweep Speed)

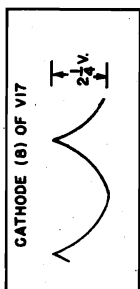


Fig. 53. Vert. Output Cathode (Osc. Synced at Half of Vert. Sweep Speed)

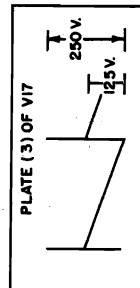


Fig. 54. Vert. Output of V17 (Osc. Synced at Half of Vert. Sweep Speed)

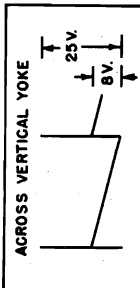


Fig. 55. Vert. Yoke Input (Osc. Synced at Half of Vert. Sweep Speed)

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## UNIVERSAL REPLACEMENT PARTS

UCC-011	C42, 87	CAPACITOR—.05 mfd., 200 v., paper
UCC-017	C30, 69	CAPACITOR—1.0 mfd., 200 v., paper (C69 for 60-cycle receiver only)
UCC-025	C27, 28	CAPACITOR—.01 mfd., 400 v., paper
UCC-035	C43, 81	CAPACITOR—.001 mfd., 600 v., paper
UCC-040	C36, 39, 40, 41, 51, 54, 55, 60, 71, 79, 72	CAPACITOR—.01 mfd., 600 v., paper
UCC-041	C23, 34, 44	CAPACITOR—.02 mfd., 600 v., paper
UCC-045	C26, 33, 53, 58, 85, 92	CAPACITOR—.05 mfd., 600 v., paper
UCC-048	C37, 38, 59, 70, 77	CAPACITOR—.10 mfd., 600 v., paper
UCU-520	C50	CAPACITOR—47 mmf., mica
UCU-1014	C83	CAPACITOR—27 mmf., mica
UCU-1048	C35, 65	CAPACITOR—680 mmf., mica
UCU-1052	C57, 89	CAPACITOR—1000 mmf., mica
UCU-1504	C20, 21	CAPACITOR—10 mmf., mica
UCU-1520	C49, 51, 68	CAPACITOR—47 mmf., mica
UCU-1526	C100, 101	CAPACITOR—82 mmf., mica
UCU-1532	C90, 56	CAPACITOR—150 mmf., mica
UCU-1536	C46	CAPACITOR—220 mmf., mica
UCU-2538	C52	CAPACITOR—240 mmf., mica
UCW-1020	C103, 104	CAPACITOR—47 mmf., ceramic
UCW-1026	C86, 105	CAPACITOR—16 mmf., ceramic
URP-1206	LS1	LOUDSPEAKER—12-inch PM speaker
URX-005		CONE—Replacement speaker cone assembly
URD-027	R59	RESISTOR—120 ohms, $\frac{1}{2}$ w., carbon
URD-029	R11	RESISTOR—150 ohms, $\frac{1}{2}$ w., carbon
URD-049	R24, 43, 99, 100	RESISTOR—1000 ohms, $\frac{1}{2}$ w., carbon
URD-057	R4, 51, 52, 67	RESISTOR—2200 ohms, $\frac{1}{2}$ w., carbon
URD-073	R18, 42, 86	RESISTOR—10,000 ohms, $\frac{1}{2}$ w., carbon
URD-077	R21	RESISTOR—15,000 ohms, $\frac{1}{2}$ w., carbon
URD-081	R8, 89, 28, 29	RESISTOR—22,000 ohms, $\frac{1}{2}$ w., carbon
URD-085	R92	RESISTOR—33,000 ohms, $\frac{1}{2}$ w., carbon
URD-089	R78, 79	RESISTOR—47,000 ohms, $\frac{1}{2}$ w., carbon
URD-091	R20	RESISTOR—50,000 ohms, $\frac{1}{2}$ w., carbon
URD-093	R66, 70	RESISTOR—68,000 ohms, $\frac{1}{2}$ w., carbon
URD-095	R68	RESISTOR—82,000 ohms, $\frac{1}{2}$ w., carbon
URD-097	R2, 6, 94, 39, 41, 76	RESISTOR—100,000 ohms, $\frac{1}{2}$ w., carbon
URD-099	R71, 72	RESISTOR—120,000 ohms, $\frac{1}{2}$ w., carbon
URD-101	R83	RESISTOR—150,000 ohms, $\frac{1}{2}$ w., carbon
URD-105	R55, 77, 63, 64	RESISTOR—220,000 ohms, $\frac{1}{2}$ w., carbon
URD-109	R22, 87, 40	RESISTOR—330,000 ohms, $\frac{1}{2}$ w., carbon
URD-111	R74	RESISTOR—390,000 ohms, $\frac{1}{2}$ w., carbon
URD-113	R44, 97	RESISTOR—470,000 ohms, $\frac{1}{2}$ w., carbon
URD-117	R85	RESISTOR—680,000 ohms, $\frac{1}{2}$ w., carbon
URD-119	R75, 79	RESISTOR—820,000 ohms, $\frac{1}{2}$ w., carbon
URD-121	R7, 19	RESISTOR—1.0 meg., $\frac{1}{2}$ w., carbon
URD-129	R23, 25, 81, 60	RESISTOR—2.2 meg., $\frac{1}{2}$ w., carbon
URD-137	R73	RESISTOR—4.7 meg., $\frac{1}{2}$ w., carbon
URD-145	R56	RESISTOR—10.0 meg., $\frac{1}{2}$ w., carbon
URD-1041	R32, 57	RESISTOR—470 ohms, $\frac{1}{2}$ w., carbon
URD-1051	R33, 8, 10	RESISTOR—1200 ohms, $\frac{1}{2}$ w., carbon
URD-1053	R14, 3	RESISTOR—1500 ohms, $\frac{1}{2}$ w., carbon
URD-1059	R15, 27	RESISTOR—4800 ohms, $\frac{1}{2}$ w., carbon
URD-1097	R34, 35	RESISTOR—100,000 ohms, $\frac{1}{2}$ w., carbon
URE-035	R53	RESISTOR—270 ohms, 1 w., carbon
URE-045	R38	RESISTOR—680 ohms, 1 w., carbon
URE-065	R37	RESISTOR—4700 ohms, 1 w., carbon
URE-067	R26	RESISTOR—5600 ohms, 1 w., carbon
URE-089	R1, 48	RESISTOR—47,000 ohms, 1 w., carbon
URE-097	R90	RESISTOR—100,000 ohms, 1 w., carbon
URE-1056	R17	RESISTOR—2000 ohms, 1 w., carbon
URE-1063	R5, 9, 12, 54	RESISTOR—3900 ohms, 1 w., carbon
URF-041	R13	RESISTOR—470 ohms, 2 w., carbon
URF-045	R82, 91	RESISTOR—680 ohms, 2 w., carbon
URF-071	R46	RESISTOR—8200 ohms, 2 w., carbon
URF-073	R80, 93	RESISTOR—10,000 ohms, 2 w., carbon
URF-1061	R16	RESISTOR—3300 ohms, 2 w., carbon

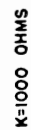
## SPECIALIZED REPLACEMENT PARTS

RAB-040		BACK—Cabinet back cover
RAL-001		BEZEL—Pilotlight bezel, bottom of cabinet
RAV-033		CABINET—Model 801 cabinet (less hardware)
RCC-002	C1, 2, 3, 4, 5, 6, 7, 24, 25, 47, 88	CAPACITOR—.006 mfd., 600 v., paper
RCC-038	C82	CAPACITOR—.004 mfd., 600 v., paper
RCE-017	C64	CAPACITOR—90 mfd., 450 v., electrolytic
RCE-018	C31A, B, C	CAPACITOR—40 mfd., 40 mfd., 25 v., electrolytic
RCE-019	C45A, B, C, D; 22A, B, C, D	CAPACITOR—30 mfd., 30 mfd., 15 mfd., 450 v.; 30 mfd., 15 v., electrolytic
RCE-020	C32A, B, C, D	CAPACITOR—30 mfd., 15 mfd., 15 mfd., 15 mfd., 450 v., electrolytic
RCE-021	C62, 63	CAPACITOR—30 mfd., 300 v., electrolytic
RCE-048	C69	CAPACITOR—50 mfd., 25 v., electrolytic (used on 50-cycle receivers only)
RCN-001	C110	CAPACITOR—1 mmf., miniature
RCN-002	C111, 113	CAPACITOR—0.68 mmf., miniature
RCN-003	C66	CAPACITOR—500 mmf., electrolytic
RCS-001	C9L	CAPACITOR—.05 mfd., 200 v., paper
RRC-023	R84A, B	POTENTIOMETER—500,000 ohms, $\frac{1}{2}$ w., (Brightness control); 500,000 ohms, $\frac{1}{2}$ w., (Contrast control)
RRC-024	R58	POTENTIOMETER—1000 ohms, 2 w., w.w., (Vertical Linearity)
RRC-025	R88	POTENTIOMETER—5000 ohms, 4 w., w.w., (Focus control)
RRC-034	L7	CHOKE—Variable choke (Horizontal size)
RRD-1032	R101	RESISTOR—200 ohms, $\frac{1}{2}$ w., carbon
RRD-1057	R106	RESISTOR—2200 ohms, $\frac{1}{2}$ w., carbon
RRD-1081	R105	RESISTOR—22,000 ohms, $\frac{1}{2}$ w., carbon
RRD-1097	R30, 31	RESISTOR—100,000 ohms, $\frac{1}{2}$ w., carbon
RRD-1105	R104	RESISTOR—220,000 ohms, $\frac{1}{2}$ w., carbon
RRE-1069	R102, 103, 47	RESISTOR—6800 ohms, 1 w., carbon
RRW-011	R50	RESISTOR—300 ohms, 7.4 w., wirewound
RRW-012	R96	RESISTOR—900 ohms, 7.4 w., wirewound
RTD-003	T6	TRANSFORMER—FM i-f discriminator
RTL-023	T1	TRANSFORMER—1st video i-f transformer

## SPECIALIZED REPLACEMENT PARTS (Cont'd)

RCT-013	C67A, B	CONDENSER—2-section broadcast tuning condenser
RCW-2001	C102	CAPACITOR—5 mmf., ceramic
RCW-026	C106	CAPACITOR—1500 mmf., ceramic
RCW-1028	C107, 108	CAPACITOR—100 mmf., ceramic
RCY-015	C112	CONDENSER—Television tuning condenser
RDC-029		CORD—Television tuning drive cord
RDC-027		CORD—Broadcast dial cord
RDD-007		HUB AND DRUM ASSEMBLY—On Broadcast dial
RDD-008		DRUM AND SHAFT ASSEMBLY—For Broadcast dial
RDD-009		DRUM—Dial drive pointer drum and shaft assembly for B-C tuning
RDK-071		KNOB—Control knob for Radio Tuning or Focus
RDK-072		KNOB—Control knob for Television Tuning
RDK-073		KNOB—Control knob for Station Selector
RDK-074		KNOB—Control knob for Volume or Contrast
RDE-075		KNB—Control knob Off-Tune or Brightness
RDL-002		LIGHT—Pilot light, Mazda No. 44, 6-8 v., 0.25 A., frosted for B-C tuning scale
RDM-006		MASK—Picture tube mask
RDP-023		POINTER—Broadcast dial pointer and hub assembly
RDS-034		GLASS—Broadcast dial glass
RDW-004		GLASS—Picture tube safety glass
RDZ-028		SCALE—Broadcast dial scale assembly
RHC-008		CLIP—Clip for holding tubular capacitors
RHG-006		GROMMET—Power cord grommet
RHM-016		CLIP—B-C oscillator coil clip
RHM-028		CLIP—B-C r-f coil clip
RHX-010		HARDWARE—Hardware for mounting gang condenser
RJC-001		PIN—Speaker lead contact pin
RJC-007		CONNECTOR—High voltage anode connector for picture tube
RJJ-005		RECEPTACLE—A-C receptacle (male) on chassis
RJP-015		PLUG—A-C plug (on back cover)
RJS-012		PLATE—Mounting plate for electrolytic capacitor (small size)
RJS-030		SOCKET—Octal base tube socket
RJS-037		PLATE—Mounting plate for electrolytic capacitor (large size)
RJS-041		SOCKET—Miniature tube socket for 6AU6
RJS-042		SOCKET—Local tube socket for 7F8
RJS-057		TUBE SOCKET—5-pin socket for 807
RJS-058		SOCKET—Tube socket for picture tube
RJS-059		SOCKET—Dial scale pilot lamp socket
RJS-064		SOCKET—Bezel pilot lamp socket
RJX-014		SWITCH—R-F coil assembly completely wired and aligned (including tubes)
RLA-007	T11	TRANSFORMER—B-C antenna transformer
RLC-012	T12	TRANSFORMER—B-C oscillator transformer
RLD-001	L9	COIL—Deflection coil
RLF-005	L1	CHOKE—7 h., 75 ma. filter choke
RLF-006	L2	CHOKE—7 h., 140 ma. filter choke
RLF-008	L8	COIL—Focus coil
RLF-009	L10	CHOKE—Broadcast choke coil
RLI-003	L18	CHOKE—R-F amplifier cathode choke
RLI-006	L15, 19	CHOKE—R-F amplifier cathode choke
RLI-007	L3 and L98	CHOKE—90 uh. video choke
RLI-008	L4	CHOKE—55 uh. video choke
RLI-009	L5	CHOKE—Video detector choke
RLI-011	T26	COIL—R-F and oscillator coil (Band 7)
RLI-012	T27	COIL—R-F and oscillator coil (Band 8)
RLI-013	T28	COIL—R-F and oscillator coil (Band 9)
RLI-014	T29	COIL—R-F and oscillator coil (Band 10)
RLI-015	T30	COIL—R-F and oscillator coil (Band 11)
RLI-016	T31	COIL—R-F and oscillator coil (Band 12)
RLI-017	T32	COIL—R-F and oscillator coil (Band 13)
RLI-019	L14	CHOKE—Oscillator cathode choke
RLI-031	L21	CHOKE—Cathode choke assembly
RLM-003	T22	COIL—R-F and oscillator coil (Band 3)
RLM-004	T23	COIL—R-F and oscillator coil (Band 4)
RLM-005	T24	COIL—R-F and oscillator coil (Band 5)
RLM-006	T25	COIL—R-F and oscillator coil (Band 6)
RLM-008	T20	COIL—R-F and oscillator coil (Band 1)
RMB-009	T21	COIL—R-F and oscillator coil (Band 2)
RMP-004		BUSHING—B-C tuning shaft bushing
RMR-004		CLIP—Dial window clip
RMM-039		RUBBER—Channel rubber for dial
RMM-040		CUSHION—Picture tube cushion.
RMM-041		TRAP—Ion trap assembly
RMM-042		SHIELD—Tube base shield for 7F8 tube
RMS-004		SHIELD—Tube base shield for television tube
RMS-109		SPRING—Television tuning drive cord tension spring
RMS-110		SPRING—For focus coil assembly
RMS-111		STRAP—Safety strap for picture tube
RMW-027		SPRING—B-C drive cord tension spring
RMW-035		PULLEY—Idle pulley for B-C drive cord, $\frac{1}{2}$ in. O. D.
RMX-100		PULLEY—Idle pulley for B-C drive cord, $\frac{1}{2}$ in. O. D.
RMX-101		SHAFT—B-C tuning shaft assembly and "C" washer
RRC-020	R36, 61	SHAFT—Television tuning shaft and pulley assembly
RRC-021	R49, 62	POTENTIOMETER—100,000 ohms, 2 w., (Hor. Hold and Height)
RRC-022	R69A, B	POTENTIOMETER—250,000 ohms, $\frac{1}{2}$ w., (Hor. Linearity and Vertical Hold)
RTL-024	T2	POTENTIOMETER—2 meg., $\frac{1}{2}$ w., (Volume control); 500,000 ohms, $\frac{1}{2}$ w., (Tone control)
RTL-025	T3	TRANSFORMER—2nd video i-f transformer
RTL-027	T13	TRANSFORMER—3rd video i-f transformer
RTL-033	T4	TRANSFORMER—455 kc i-f transformer
RTL-034	T5	TRANSFORMER—4th video i-f transformer
RTM-001	T7	TRANSFORMER—Composite 455 kc and 10.7 mc i-f transformer
RTO-016	T8	TRANSFORMER—AFC synchronizing transformer
RTO-017	T10	TRANSFORMER—Vertical sweep output
RTO-032	T14	TRANSFORMER—Audio output transformer
RTP-037		TRANSFORMER—Horizontal sweep output (50 cycles)
RTP-040		TRANSFORMER—Power transformer (60 cycles)
RWL-004		CORD—Power cord
RWL-010		CORD—Power cord assembly, includes female plug

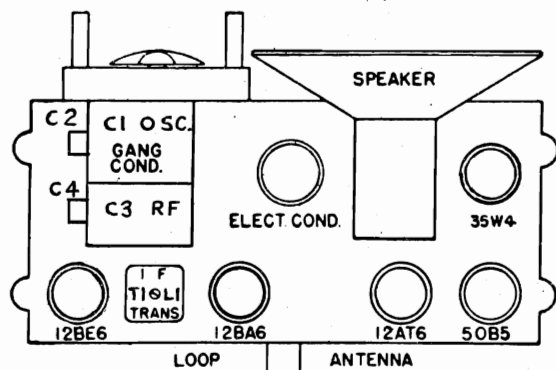
APPROX. GAIN PER STAGE USING CHANALYST.  
WITH A FIXED BIAS OF 3 VOLTS.



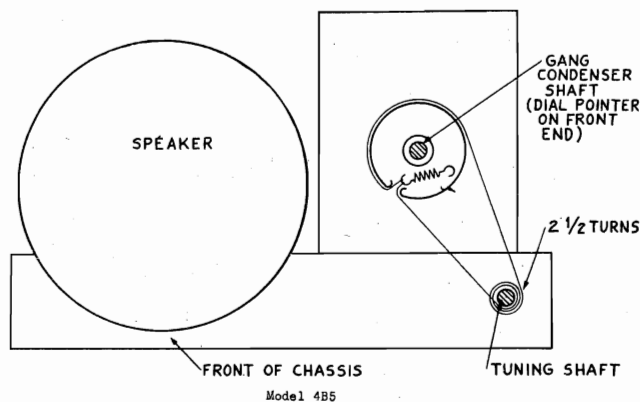
MODEL 4B5  
 MODEL 5B5, MODEL 9A5,  
 MODEL 23A6, MODEL 24B6,  
 MODEL 25B5

## GENERAL TELEV. &amp; RADIO CORP.

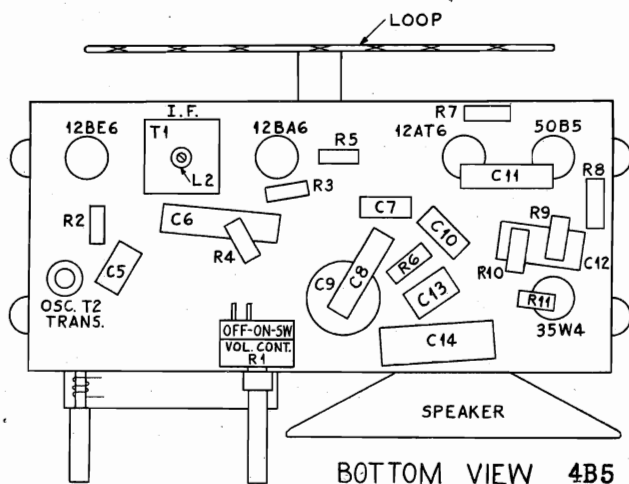
DIAL CORD DRIVE - MODELS 4B5, 5B5, 9A5,  
 23A6, 24B6, 25B5



TUBE LAYOUT 4B5



Model 4B5



BOTTOM VIEW 4B5

SOCKET 12BB6 CONV.	PIN	VTVM	20,000Ω/P.V.	1,000Ω/P.V.	RESISTANCE 10K
	1	-6	-6	-6 ON 100V SCALE -3.5 ON 10V SCALE	0
	2	0	0	0	0
	3	AC	AC	AC	45Ω
	4	AC	AC	AC	30Ω
	5	+82	+82	+82	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	-1.0	-0.5	-0.2	3 MEGS
12BA6 I.F. AMPL.	1	-1.0	-0.5	-0.2	3 MEGS
	2	0	0	0	0
	3	AC	AC	AC	25Ω
	4	AC	AC	AC	15Ω
	5	+25	+24	+22	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	0	0	0	0
12AT6 DET. AVG AUDIO	1	-0.5	-0.2	0	10 MEGS
	2	0	0	0	0
	3	0	0	0	0
	4	AC	AC	AC	15Ω
	5	-0.5	-0.2	0	500K
	6	-0.5	-0.2	0	500K
	7	+40	+38	+15	OVER 5 MEGS
50B5 AUDIO OUTPUT	1	0	0	0	500K
	2	+5	+5	+5	150Ω
	3	AC	AC	AC	85Ω
	4	AC	AC	AC	35Ω
	5	+120	+120	+120	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	--	--	--	--
35W4 RECT	1	AC	AC	AC	110Ω
	2	--	--	--	--
	3	AC	AC	AC	85Ω
	4	AC	AC	AC	115Ω
	5	AC	AC	AC	115Ω
	6	AC	AC	AC	110Ω
	7	+125	+125	+125	OVER 5 MEGS

ALL VOLTAGE AND RESISTANCE MEASUREMENT MADE WITH RESPECT TO CHASSIS GROUND  
 AND WITH A LINE VOLTAGE OF 116 V. A. C.

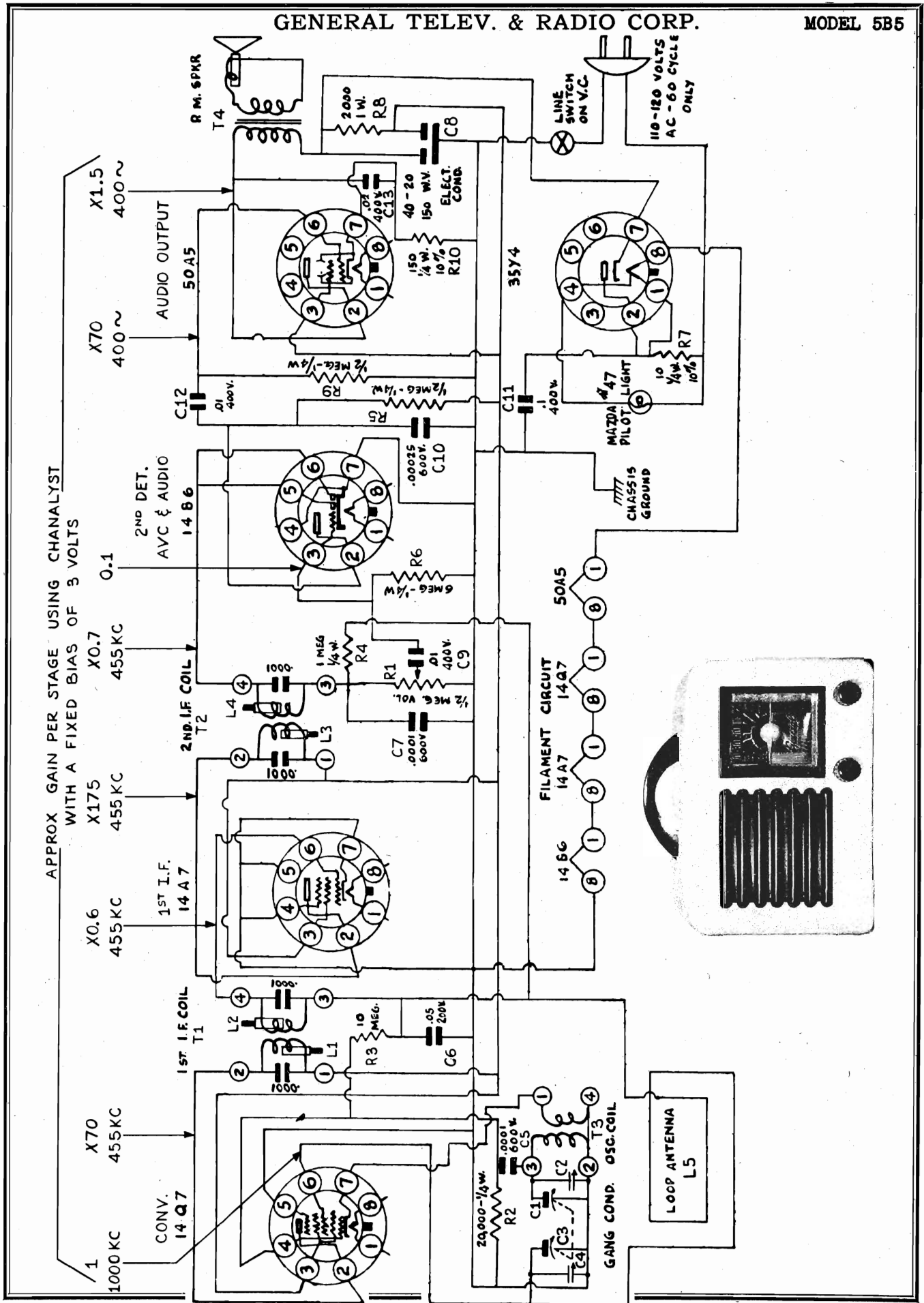
## ALIGNMENT - 4B5

THE CHASSIS MUST BE REMOVED FROM THE CABINET IN ORDER TO ALIGN THE RECEIVER. CONNECT THE OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE MODEL 1150 LOOP, AND COUPLE LOOSELY TO THE RECEIVER LOOP. SET THE RECEIVER VOLUME CONTROL AT MAXIMUM.

THE TUNING CONDENSER PLATES SHOULD BE FULLY MESHED WHEN THE DIAL POINTER IS AT THE INDEX MARK AT THE LOW FREQUENCY END OF THE DIAL. THE SIGNAL GENERATOR OUTPUT SHOULD BE SUFFICIENT TO GIVE HALF SCALE DEFLECTION ON THE LOWEST SCALE OF THE OUTPUT METER. SET THE SIGNAL GENERATOR TO 455 KC. ADJUST THE I.F. TUNING SLUGS FOR MAXIMUM METER DEFLECTION IN THE FOLLOWING SEQUENCE: L2, L1. SET THE GENERATOR AND RECEIVER TO 700 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT. SET THE GENERATOR AND RECEIVER TO 1400 KC AND ADJUST LOOP TRIMMER C4 FOR MAXIMUM OUTPUT.

GENERAL TELEV. & RADIO CORP.

MODEL 5B5

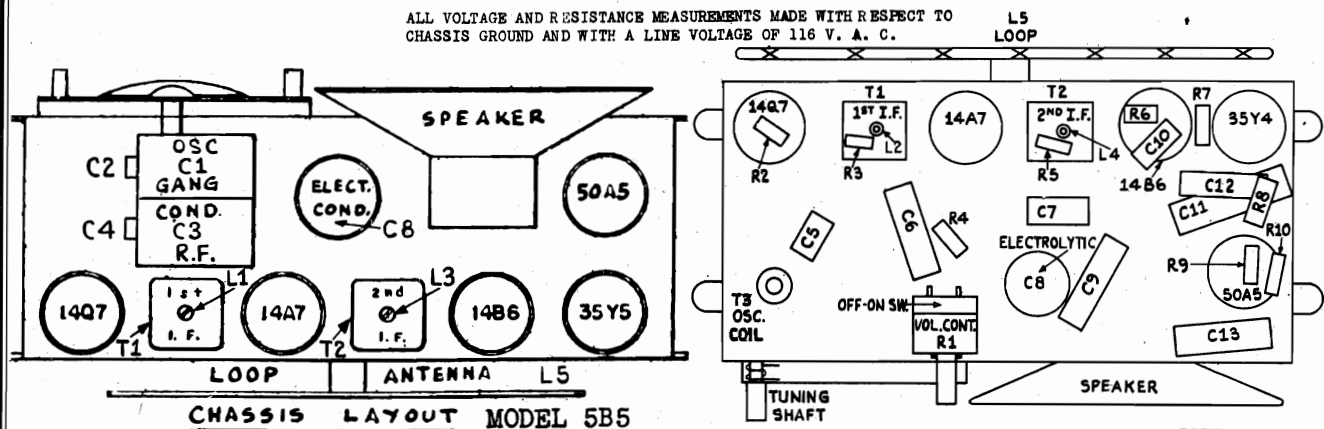


MODEL 5B5  
MODEL 9A5  
MODEL 24B6  
MODEL 23A6  
MODEL 25B5

## GENERAL TELEV. &amp; RADIO CORP.

Model 5B5						
SOCKET	PIN	VTVM	20,000 $\Omega$ /P.V.	1,000 $\Omega$ /P.V.	RESISTANCE	
14Q7 CONV.	1	AC	AC	AC	40 $\Omega$	
	2	+86	+86	+86	OVER 5 MEGS	
	3	+86	+86	+86	OVER 5 MEGS	
	4	-12	-10	-7	20K	
	5	0	0	0	0	
	6	-1.5	-1.0	-0.2	1 MEG	
	7	0	0	0	1 $\Omega$	
	8	AC	AC	AC	25 $\Omega$	
14A7 I.F.	1	AC	AC	AC	15 $\Omega$	
	2	+86	+86	+86	OVER 5 MEGS	
	3	+86	+86	+86	OVER 5 MEGS	
	4	0	0	0	0	
	5	0	0	0	0	
	6	-1.5	-1.0	-0.2	1 MEG	
	7	0	0	0	0	
	8	AC	AC	AC	25 $\Omega$	
14B6 2ND DET. AVC AND AUDIO	1	AC	AC	AC	15 $\Omega$	
	2	+58	+52	+40 ON 100OV RANGE +12 ON 100V RANGE	OVER 5 MEGS	
	3	-1.0	-0.6	-0.13	5.5 MEGS	
	4	--	--	--	--	
	5	-1.0	-0.6	-0.3	400K	
	6	-1.0	-0.6	-0.3	400K	
	7	0	0	0	0	
	8	0	0	0	0	
50A5 AUDIO OUTPUT	1	AC	AC	AC	85 $\Omega$	
	2	+120	+120	+120	OVER 5 MEGS	
	3	+86	+86	+86	OVER 5 MEGS	
	4	--	--	--	--	
	5	--	--	--	--	
	6	0	0	0	OVER 5 MEGS	
	7	+5.0	+5.0	+5.0	150 $\Omega$	
	8	AC	AC	AC	35 $\Omega$	
35Y4 RECT.	1	AC	AC	AC	120 $\Omega$	
	2	AC	AC	AC	120 $\Omega$	
	3	--	--	--	--	
	4	AC	AC	AC	110 $\Omega$	
	5	AC	AC	AC	110 $\Omega$	
	6	AC	AC	AC	0	
	7	+125	+125	+125	OVER 5 MEGS	
	8	AC	AC	AC	85 $\Omega$	

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO  
CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.



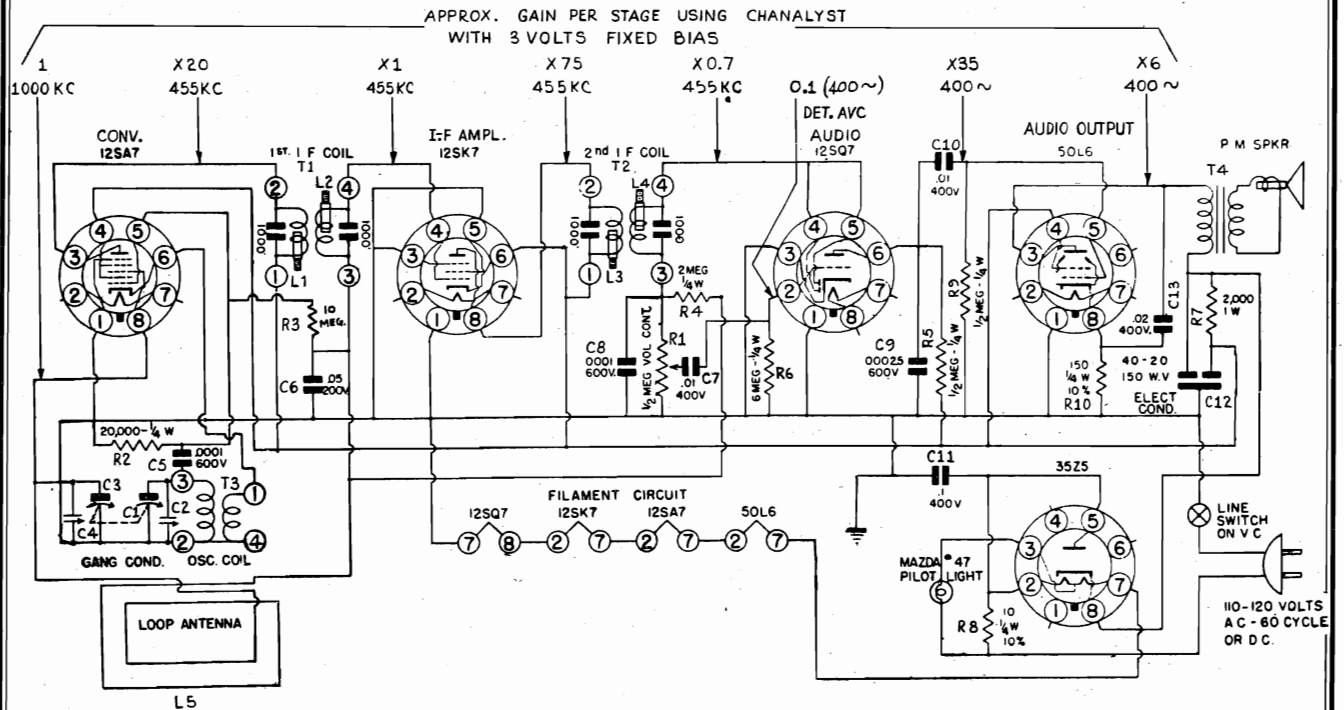
CHASSIS LAYOUT MODEL 5B5

BOTTOM VIEW MODEL 5B5

ALIGNMENT - MODELS 5B5, 9A5, 23A6, 24B6, 25B5

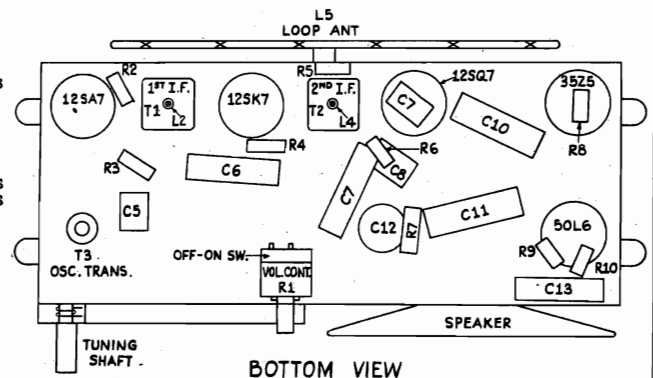
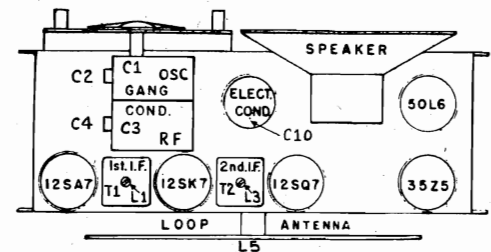
THE CHASSIS MUST BE REMOVED FROM THE CABINET IN ORDER TO ALIGN THE RECEIVER. CONNECT THE OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE MODEL 1150 LOOP, AND COUPLE LOOSELY TO THE RECEIVER LOOP. SET THE RECEIVER VOLUME CONTROL AT MAXIMUM. THE TUNING CONDENSER PLATES SHOULD BE FULLY MESHED WHEN THE DIAL POINTER IS AT THE INDEX MARK AT THE LOW FREQUENCY END OF THE DIAL. THE SIGNAL GENERATOR OUTPUT SHOULD BE JUST SUFFICIENT TO OBTAIN HALF SCALE DEFLECTION ON THE LOWEST SCALE OF THE OUTPUT METER. SET THE SIGNAL GENERATOR TO 455 KC. ADJUST THE I.F. TUNING SLUGS FOR MAXIMUM OUTPUT IN THE FOLLOWING SEQUENCE: L4, L3, L2, L1. SET THE GENERATOR AND RECEIVER TO 1600 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT. SET THE GENERATOR AND RECEIVER TO 1400 KC AND ADJUST R.F. TRIMMER C4 FOR MAXIMUM OUTPUT.

# GENERAL TELEV. & RADIO CORP.



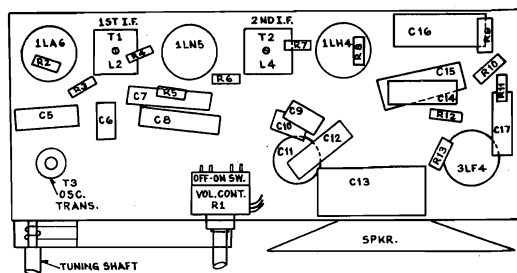
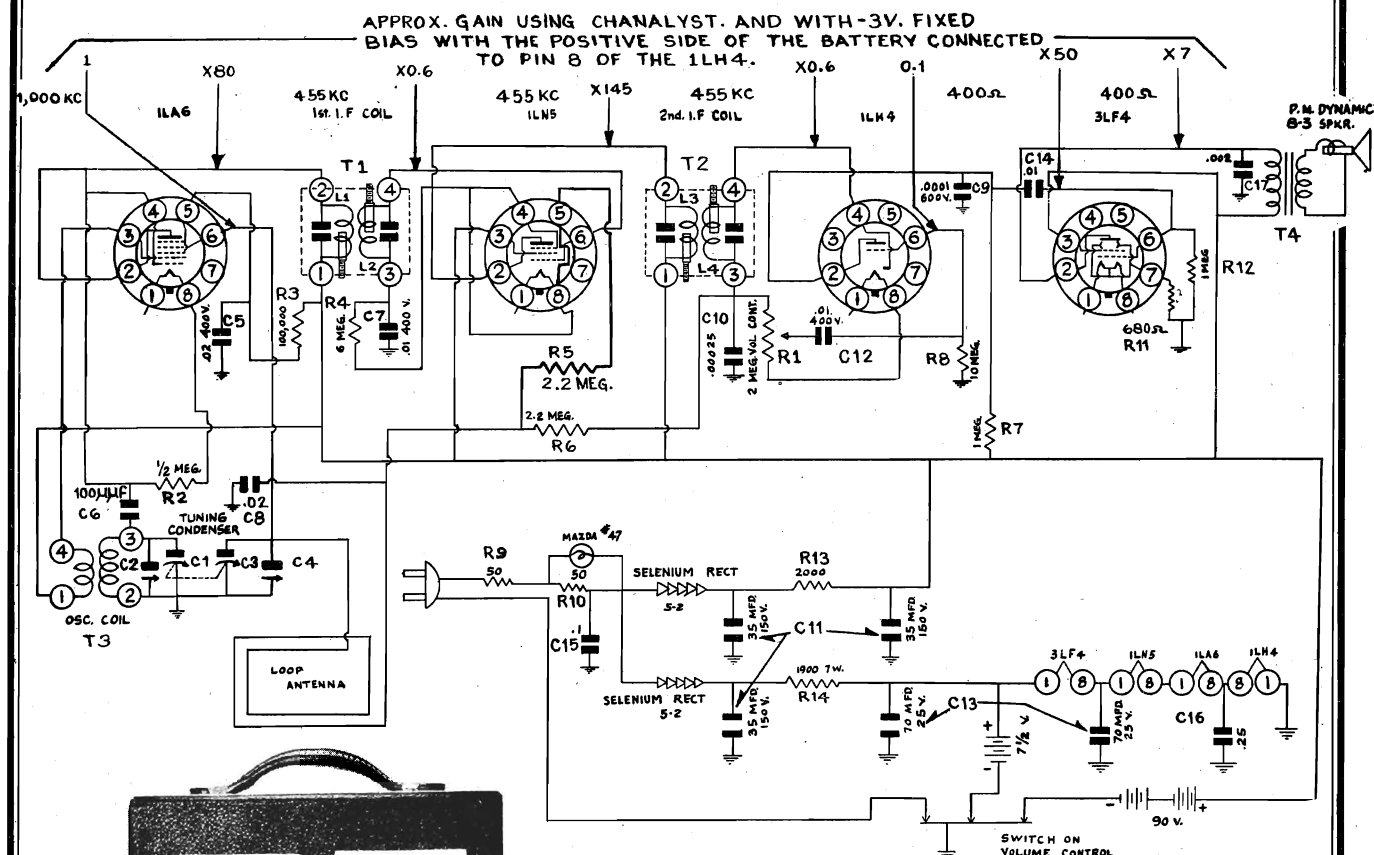
SOCKET	PIN	VTVM	20,000 $\Omega$ /P2	1,000 $\Omega$ /P2	RESISTANCE
12SA7GT CONV.	1	0	0	0	0
	2	AC	AC	AC	25 $\Omega$
	3	+78	+78	+76	OVER 5 MEGS
	4	+78	+78	+76	OVER 5 MEGS
	5	-9	-8	-4.5	17K
	6	0	0	0	1 $\Omega$
	7	AC	AC	AC	40 $\Omega$
	8	-6	-2	-0.5	1.3 MEGS
12SK7GT I-F AMPL.	1	0	0	0	0
	2	AC	AC	AC	15 $\Omega$
	3	0	0	0	0
	4	-2	-0.8	-0.4	1.3 MEGS
	5	0	0	0	0
	6	+78	+78	+76	OVER 5 MEGS
	7	AC	AC	AC	25 $\Omega$
	8	+78	+78	+76	OVER 5 MEGS
12SQ7GT DET. AVC AUDIO	1	0	0	0	0
	2	-1	-0.8	-0.4	6MEGS
	3	0	0	0	0
	4	-1.5	-0.4	-0.2	400K
	5	-1.5	-0.4	-0.2	400K
	6	+48	+46	+12	OVER 5 MEGS
	7	AC	AC	AC	15 $\Omega$
	8	AC	AC	AC	0
50L6GT AUDIO OUTPUT	1	0	0	0	0
	2	AC	AC	AC	40 $\Omega$
	3	+115	+115	+115	OVER 5 MEGS
	4	+75	+75	+75	OVER 5 MEGS
	5	0	0	0	550K
	6	--	--	--	--
	7	AC	AC	AC	80 $\Omega$
	8	+5	+5	+5	150 $\Omega$
35Z5GT	1	--	--	--	--
	2	AC	AC	AC	120 $\Omega$
	3	AC	AC	AC	110 $\Omega$
	4	--	--	--	--
	5	AC	AC	AC	120 $\Omega$
	6	AC	AC	AC	120 $\Omega$
	7	AC	AC	AC	90 $\Omega$
	8	+115	+115	+115	OVER 5 MEGS

"NOTE" ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

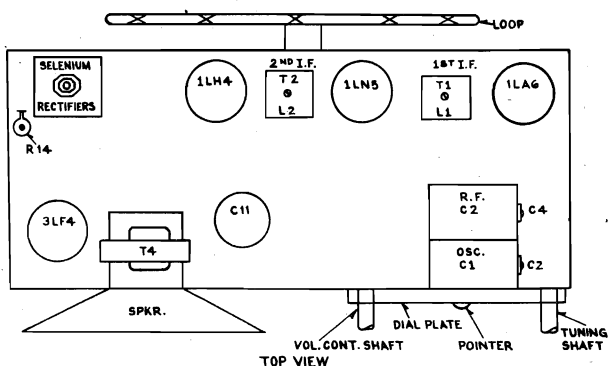


MODEL 23A6

## GENERAL TELEV. &amp; RADIO CORP.



BOTTOM VIEW



TOP VIEW

SOCKET	PIN	VTVM	20,000 $\Omega$ /P.V.	1,000 $\Omega$ /P.V.	RESISTANCE
1LA6	1	+3.5	+3.4	+3.4	24 $\Omega$
	2	+100	+100	+100	500K TO 1 MEG
	3	+100	+100	+100	500K TO 1 MEG
	4	-2	-0.2	0	500K
	5	+40	+40	0	500K TO 1 MEG
	6	+0.5	+0.2	+32	1.5 MEG
	7	--	--	--	--
	8	+1.8	+1.7	+1.7	14 $\Omega$
1LN5	1	+5.3	+5.2	+5.2	34 $\Omega$
	2	+100	+100	+100	500K TO 1 MEG
	3	+100	+100	+100	500K TO 1 MEG
	4	+3.5	+3.4	+3.4	24 $\Omega$
	5	+3.5	+3.4	+3.4	24 $\Omega$
	6	+2.5	+0.2	0	6 MEGS
	7	+1.5	+0.2	0	1.5 MEGS
	8	+3.5	+3.4	+3.4	24 $\Omega$
1LH4	1	0	0	0	0
	2	+56	+48	+8	1.5 MEG TO 2 MEGS
	3	+8.2	+8	+8	52 $\Omega$
	4	+0.7	+0.2	0	1.2 MEGS
	5	--	--	--	--
	6	-0.2	0	0	10 MEGS
	7	--	--	--	--
	8	+1.8	+1.7	+1.7	14 $\Omega$
3LF4	1	+8.2	+8	+8	52 $\Omega$
	2	+98	+98	+96	500K TO 1 MEG
	3	+100	+100	+100	500K TO 1 MEG
	4	--	--	--	--
	5	+130	+130	+130	500K TO 1 MEG
	6	0	0	0	1.3 MEGS
	7	+6.6	+6.4	+6.4	44 $\Omega$
	8	+5.3	+5.2	+5.2	36 $\Omega$

SELENIUM RECTIFIERS USED FOR A AND B SUPPLY

FILAMENT SUPPLY = 8.2 V. D. C.  
PLATE SUPPLY = 130V

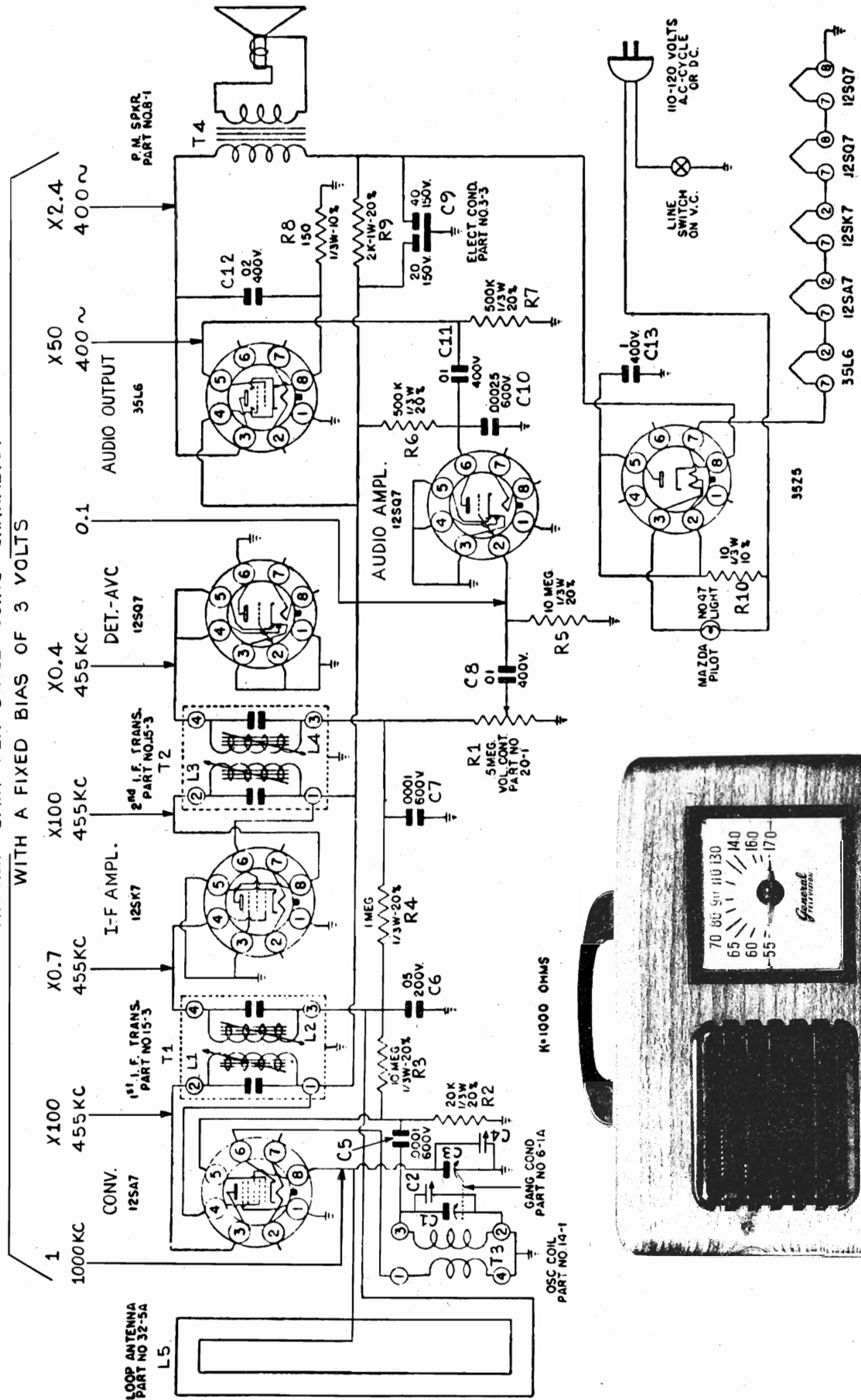
ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.



GENERAL TELEV. & RADIO CORP.

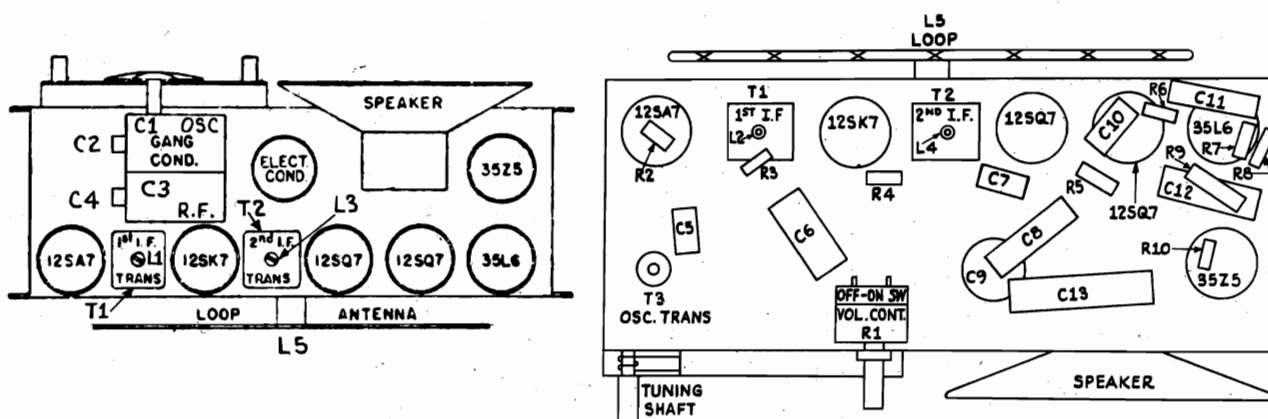
MODEL 24B6

APPROX GAIN PER STAGE USING CHANNELYST  
WITH A FIXED BIAS OF 3 VOLTS



## MODEL 24B6

## GENERAL TELEV. &amp; RADIO CORP.



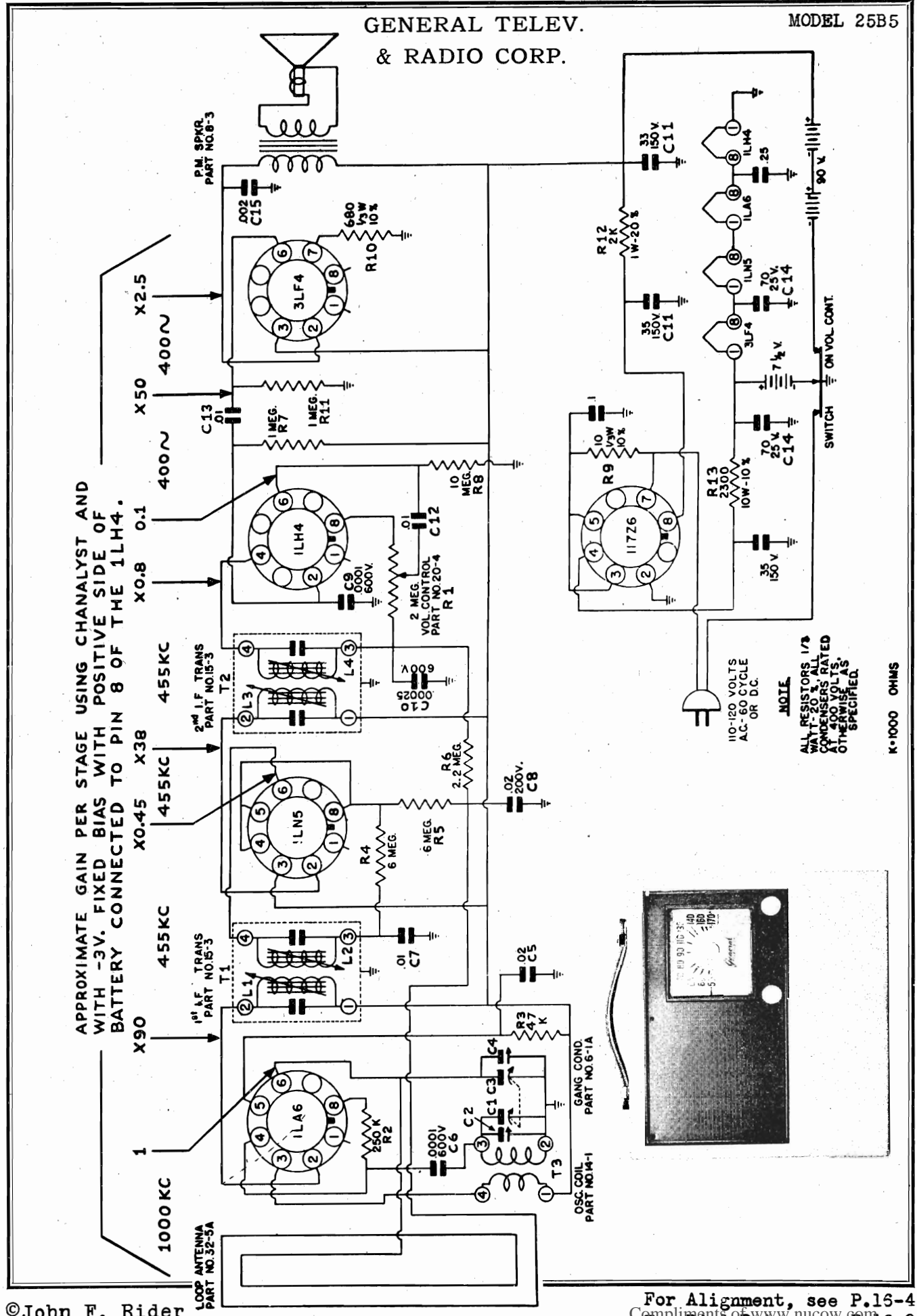
## BOTTOM VIEW

SOCKET	PIN	VTVM	20,000 $\Omega$ /P.V.	1,000 $\Omega$ /P.V.	RESISTANCE
12SA7 CONV.	1	0	0	0	0
	2	AC	AC	AC	70
	3	+84	+84	+84	OVER 5 MEGS
	4	+84	+84	+84	OVER 5 MEGS
	5	-11	-10	-9 ON 100V SCALE -5 ON 10V SCALE	17K
12SK7 I-F AMPL	6	0	0	0	1.2 $\Omega$
	7	AC	AC	AC	70 $\Omega$
	8	-1.5	-0.6	-0.4	1 MEG
	1	0	0	0	0
	2	AC	AC	AC	30 $\Omega$
	3	0	0	0	0
	4	-1.5	-0.6	-0.4	1 MEG
	5	0	0	0	0
12SQ7 DET AVC	6	+84	+84	+84	OVER 5 MEGS
	7	AC	AC	AC	45 $\Omega$
	8	+84	+84	+84	OVER 5 MEGS
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	-0.5	-0.4	-0.2	450K
	5	-0.5	-0.4	-0.2	450K
12SQ7 AUDIO AMPL.	6	0	0	0	0
	7	AC	AC	AC	30 $\Omega$
	8	AC	AC	AC	20 $\Omega$
	1	0	0	0	0
	2	-0.8	-0.6	-0.2	9 MEG
	3	0	0	0	0
	4	0	0	0	0
	5	0	0	0	0
35L6 AUDIO OUTPUT	6	+52	+48	+14	OVER 5 MEG
	7	AC	AC	AC	15 $\Omega$
	8	0	0	0	0
	1	0	0	0	0
	2	AC	AC	AC	55 $\Omega$
	3	+125	+125	+125	OVER 5 MEGS
	4	+84	+84	+84	OVER 5 MEGS
	5	0	0	0	525K
35Z5 RECT.	6	--	--	--	--
	7	AC	AC	AC	90 $\Omega$
	8	+4.5	+4.5	+4.5	150 $\Omega$
	1	--	--	--	--
	2	AC	AC	AC	120 $\Omega$
	3	AC	AC	AC	110 $\Omega$
	4	AC	AC	AC	0
	5	AC	AC	AC	120 $\Omega$
	6	AC	AC	AC	115 $\Omega$
	7	AC	AC	AC	85 $\Omega$
	8	+130	+130	+130	OVER 5 MEGS

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO  
CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V.A.C.

GENERAL TELEV.  
& RADIO CORP.

MODEL 25B5

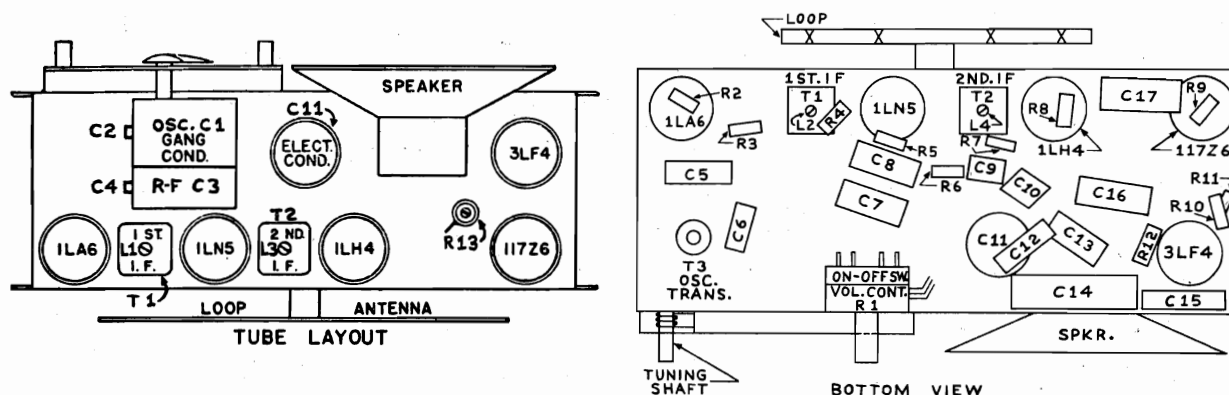


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For Alignment, see P.16-4  
For Dial Data, see P.16-2

MODEL 25B5

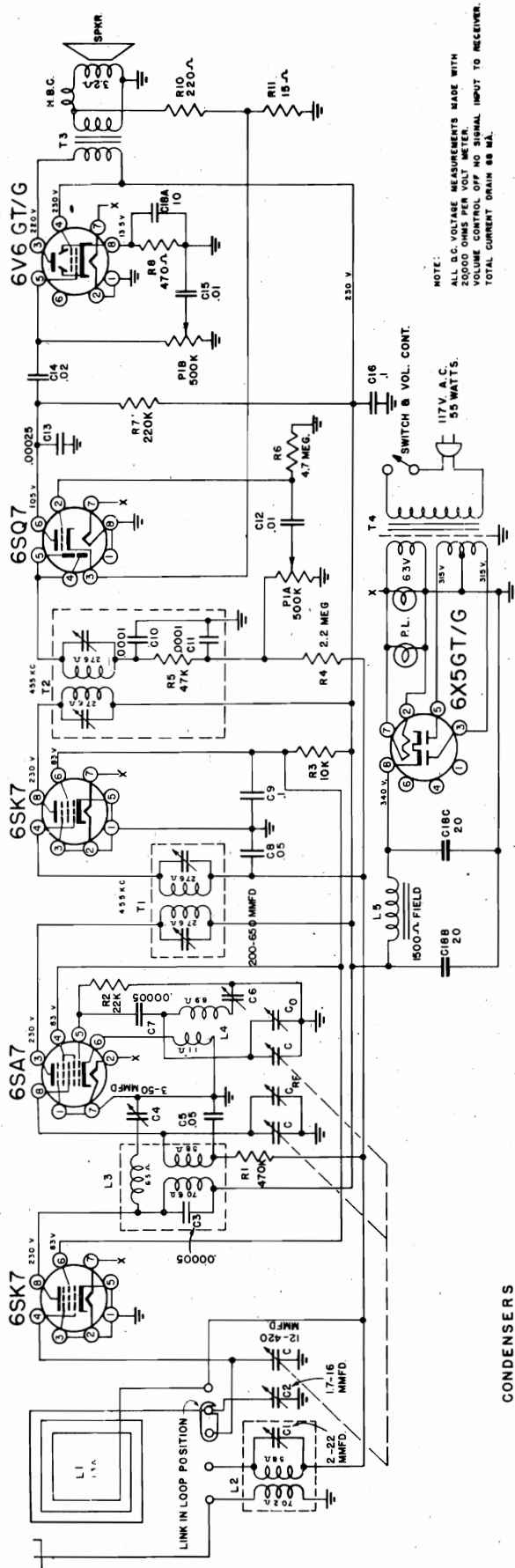
## GENERAL TELEV. &amp; RADIO CORP.



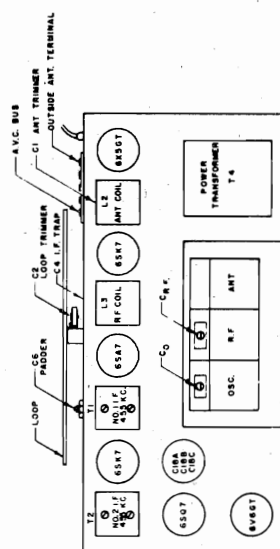
SOCKET	PIN	VTVM	20,000 $\Omega$ /P2	1,000 $\Omega$ /P2	RESISTANCE
1LA6 CONV.	1	+3.5	+3.4	+3.4	50 $\Omega$
	2	+110	+110	+110	OVER 5 MEGS
	3	+110	+110	+110	OVER 5 MEGS
	4	-3	-0.6	0	280K
	5	+58	+57	+48	OVER 5 MEGS
	6	+1.3	0	0	2.7 MEGS
	7	--	--	--	--
	8	+1.7	+1.7	+1.7	30 $\Omega$
1LN5 I-F AMPL	1	+4.8	+4.7	+4.7	60 $\Omega$
	2	+110	+110	+110	OVER 5 MEGS
	3	+110	+110	+110	OVER 5 MEGS
	4	+3.3	+3.2	+3.2	50 $\Omega$
	5	+3.3	+3.2	+3.2	50 $\Omega$
	6	+2.5	0	0	6 MEGS
	7	+1.3	0	0	2.6 MEGS
	8	+3.4	+3.2	+3.2	50 $\Omega$
1LH4 DET AVC AUDIO	1	0	0	0	0
	2	+62	+55	+40	OVER 5 MEGS
	3	+7.4	+7.1	+7.1	70 $\Omega$
	4	+0.6	+0.2	0	1.5 MEGS
	5	0	0	0	0
	6	-0.4	0	0	8 MEGS
	7	--	--	--	--
	8	+1.7	+1.6	+1.6	30 $\Omega$
3LF4 AUDIO OUTPUT	1	+7.3	7.2	7.2	70 $\Omega$
	2	+107	+107	+107	OVER 5 MEGS
	3	+110	+110	+110	OVER 5 MEGS
	4	--	--	--	--
	5	+118	+118	+118	OVER 5 MEGS
	6	0	0	0	1 MEG.
	7	+6.2	+6	+6	55 $\Omega$
	8	+5	+4.8	+4.8	50 $\Omega$
117Z6GT RECT.	1	--	--	--	--
	2	0	0	0	0
	3	AC	AC	AC	250 $\Omega$
	4	+125	+125	+125	2.5K
	5	AC	AC	AC	250 $\Omega$
	6	--	--	--	--
	7	AC	AC	AC	240 $\Omega$
	8	+142	+140	+140	OVER 5 MEGS

VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND  
AND WITH A LINE VOLTAGE OF 116 V. A. C.





NOTE:  
ALL D.C. VOLTAGE MEASUREMENTS MADE WITH  
20000 OHMS PER VOLT METER.  
VOLUME CONTROL OFF NO SIGNAL INPUT TO RECEIVER.  
TOTAL CURRENT DRAIN 88 MA.



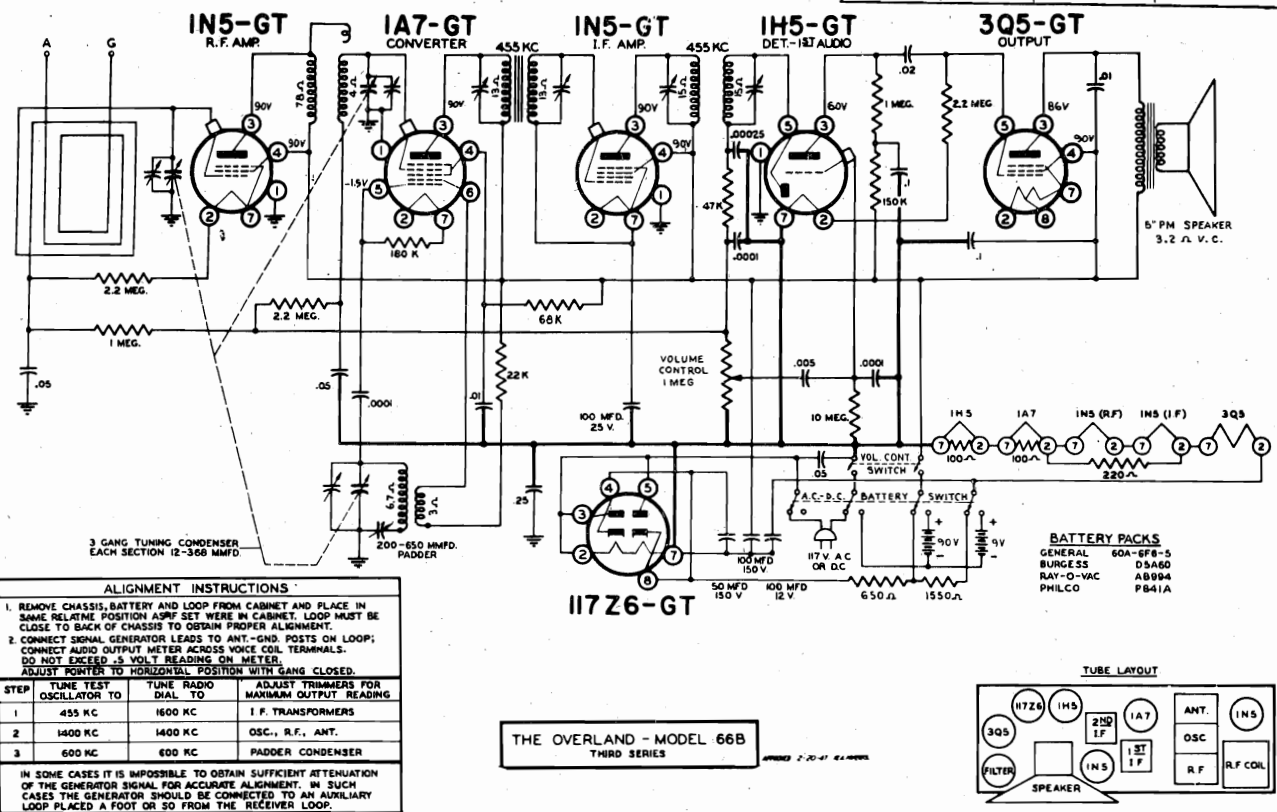
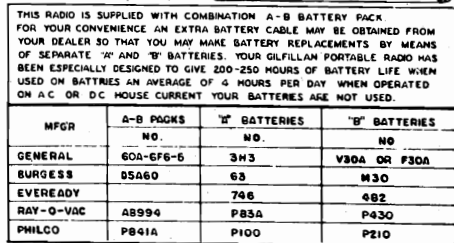
ALIGNMENT PROCEDURE			
STEPS	TUNE TEST	TURN RADIO DIAL TO —	ADJUST TRIMMERS FOR —
1	OSC. TO —	NO. 1 & NO. 2	CONDENSER GANG
2	455 KC	455 KC	OSC. TRIMMER C <sub>1</sub>
3	1600 KC	1600 KC	R.F. TRIMMER C <sub>11</sub>
4	800 KC	800 KC	ANT. TRIMMER C <sub>1</sub>
5	REPEAT STEP 3		PODDER C <sub>6</sub>
6	DISCONNECT SIGNAL GENERATOR, CHANGE ANTENNA JUMPER FOR LOOP OPERATION, TUNE RADIO TO SOME STATION NEAR 800 KC AND ADJUST LOOP TRIMMER C <sub>2</sub> (LOCATED ON LOOP) FOR MAXIMUM VOLT-METER READING		HOOK GANG.

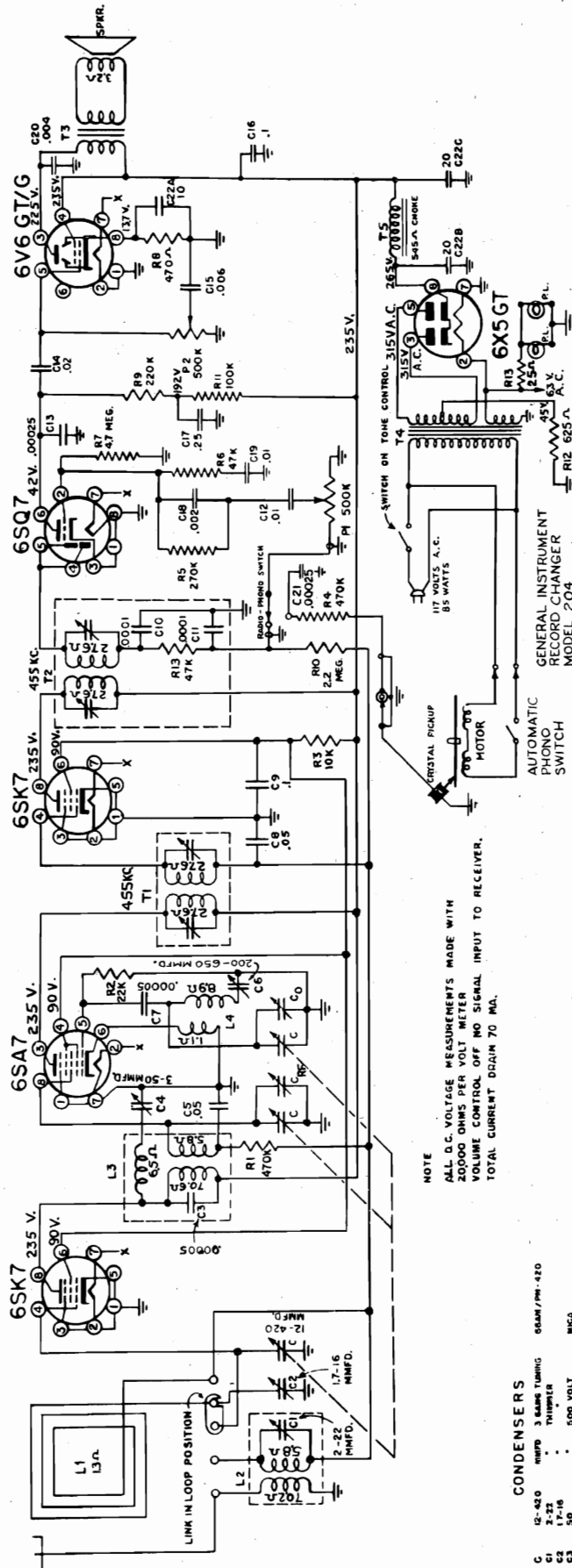
### CONDENSERS

TYPE	VALUE	MATERIAL
C1	500K	66AM-480
C2	12-480	66AM-480
C3	17-18	66AM-480
C4	50	66AM-480
C5	50	66AM-480
C6	500	66AM-480
C7	500	66AM-480
C8	500	66AM-480
C9	500	66AM-480
C10	500	66AM-480
C11	500	66AM-480
C12	500	66AM-480
C13	500	66AM-480
C14	500	66AM-480
C15	500	66AM-480
C16	500	66AM-480
C17	500	66AM-480
C18	500	66AM-480
C19	500	66AM-480
C20	500	66AM-480

### RESISTORS 10%

TYPE	VALUE	MATERIAL
R1	270K	66AM-480
R2	270K	66AM-480
R3	10K	66AM-480
R4	2.2 MEG	66AM-480
R5	47K	66AM-480
R6	47K	66AM-480
R7	47K	66AM-480
R8	47K	66AM-480
R9	47K	66AM-480
R10	47K	66AM-480
R11	47K	66AM-480
R12	47K	66AM-480
R13	47K	66AM-480
R14	47K	66AM-480
R15	47K	66AM-480
R16	47K	66AM-480
R17	47K	66AM-480
R18	47K	66AM-480
R19	47K	66AM-480
R20	47K	66AM-480





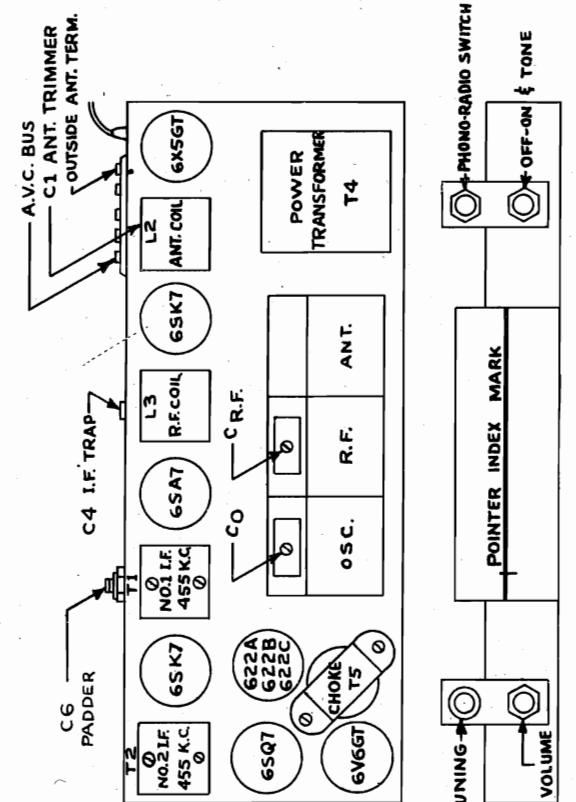
NOTE  
ALL D.C. VOLTAGE MEASUREMENTS MADE WITH  
20,000 OHMS PER VOLT METER  
VOLUME CONTROL OFF NO SIGNAL INPUT TO RECEIVER.  
TOTAL CURRENT DRAIN 70 MA.

#### CONDENSERS

ITEM	VALUE	TOLERANCE	TYPE
C1	10-420	±20%	WMPD 3-6MM TUNING
C2	17-16	±20%	TRIMMER
C3	50	±20%	500 VOLT
C4	3-50	±20%	TRIMMER
C5	100-600	±20%	WMPD 3-6MM TUNING
C6	200-600	±20%	WMPD 3-6MM TUNING
C7	50	±20%	500 VOLT
C8	100	±20%	500 VOLT
C9	100	±20%	500 VOLT
C10	100	±20%	500 VOLT
C11	100	±20%	500 VOLT
C12	100	±20%	500 VOLT
C13	100	±20%	500 VOLT
C14	100	±20%	500 VOLT
C15	100	±20%	500 VOLT
C16	100	±20%	500 VOLT

#### RESISTORS ±20%

ITEM	VALUE	TOLERANCE	TYPE
R1	470K	±20%	WIRE WOUND
R2	22K	±20%	WIRE WOUND
R3	10K	±20%	WIRE WOUND
R4	10K	±20%	WIRE WOUND
R5	270K	±20%	WIRE WOUND
R6	470K	±20%	WIRE WOUND
R7	470K	±20%	WIRE WOUND
R8	470K	±20%	WIRE WOUND
R9	470K	±20%	WIRE WOUND
R10	470K	±20%	WIRE WOUND
R11	470K	±20%	WIRE WOUND
R12	470K	±20%	WIRE WOUND
R13	470K	±20%	WIRE WOUND
R14	470K	±20%	WIRE WOUND
R15	470K	±20%	WIRE WOUND
R16	470K	±20%	WIRE WOUND
R17	470K	±20%	WIRE WOUND
R18	470K	±20%	WIRE WOUND
R19	470K	±20%	WIRE WOUND
R20	470K	±20%	WIRE WOUND



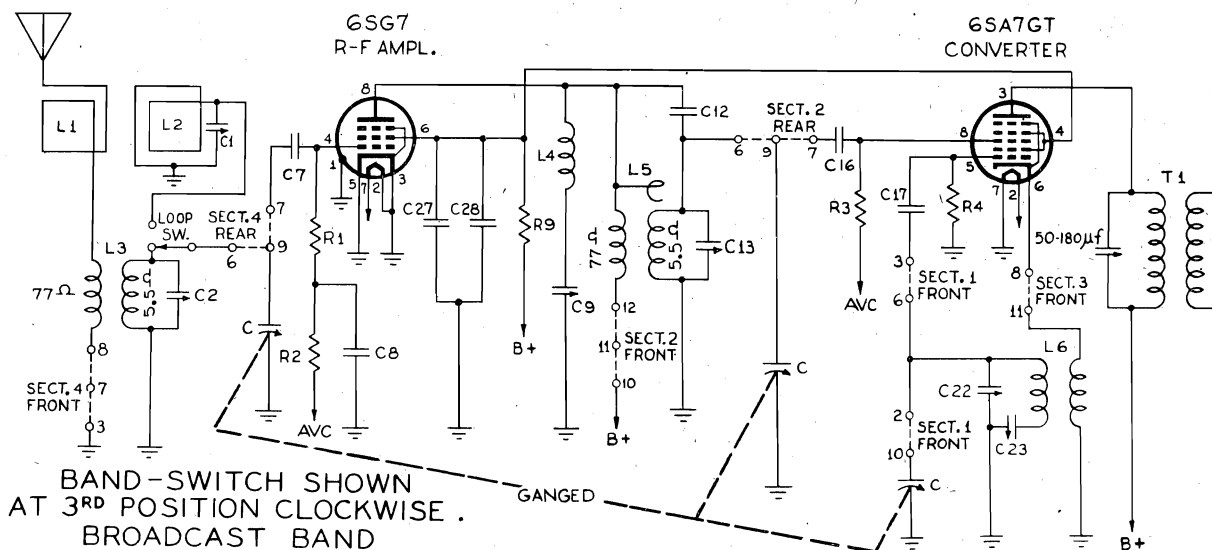
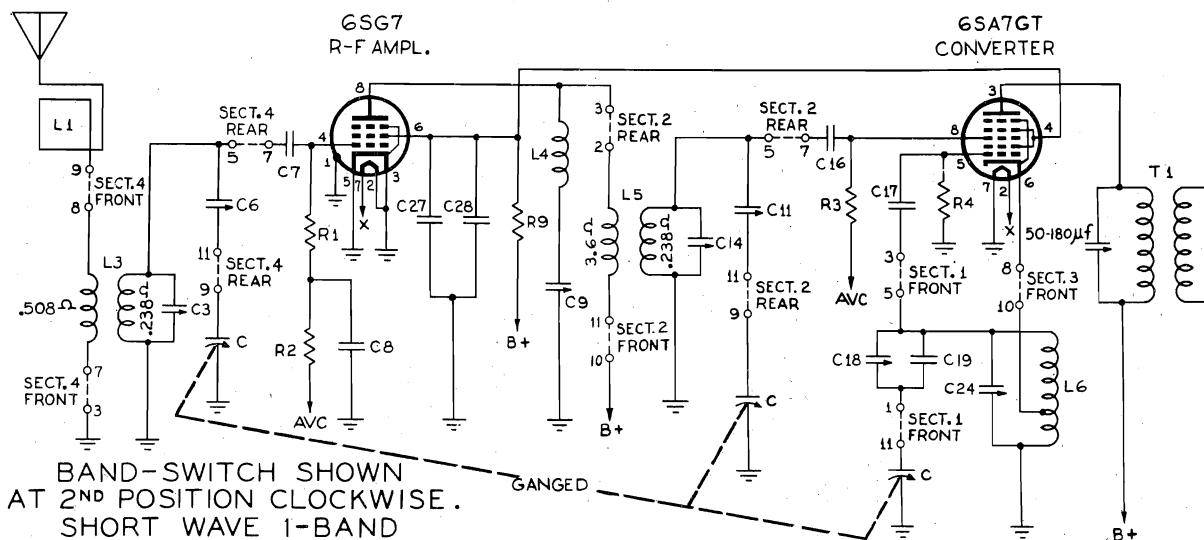
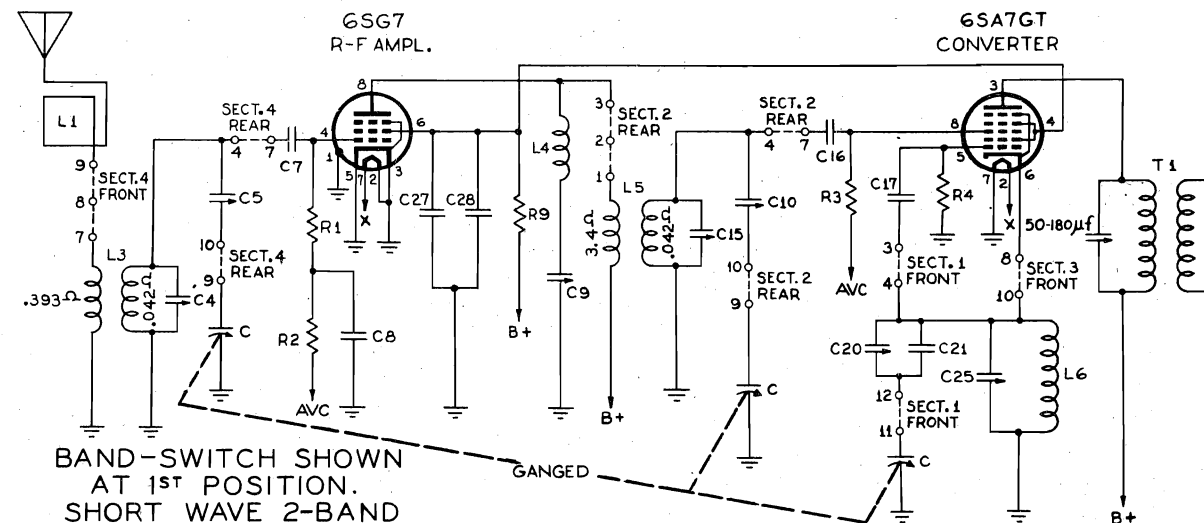
STEPS	ALIGNMENT PROCEDURE
1	CONNECT JUMPER ON ANTENNA BINDING POST FOR OUTSIDE ANTENNA RECEPTION. CONNECT SIGNAL GENERATOR TO ANTENNA TERMINAL THRU A .0001 MFD. CONDENSER. USE MINIMUM GENERATION SIGNAL SC THAT A.K.C. VOLTMETER READING DOES NOT EXCEED MORE THAN APPROXIMATELY 1 VOLT. CONNECT RCA VOLTMETER TUBE VOLTAGE TO A.C. BUS
2	TUNE TEST OSC. TO — TURN RADIO DIAL TO — CONDENSER C4G FULLY MESSED SET POINTER TO HIDE MARK ON DIAL I.F. TRAP C4
3	1500 K.C. OSC. TRIMMER C4G R.F. TRIMMER C4F ANT. TRIMMER C1
4	600 K.C. PADDOR C6 ROCK C4G
5	REPEAT STEP 3
6	DISCONNECT SIGNAL GENERATOR, CHANGE ANTENNA JUMPER FOR LOOP OPERATION TUNE RADIO TO SOME STATION NEAR 1500 K.C. AND ADJUST LOOP TRIMMER C2 (LOCATED ON LOOP) FOR MAXIMUM VOLTAGE READING





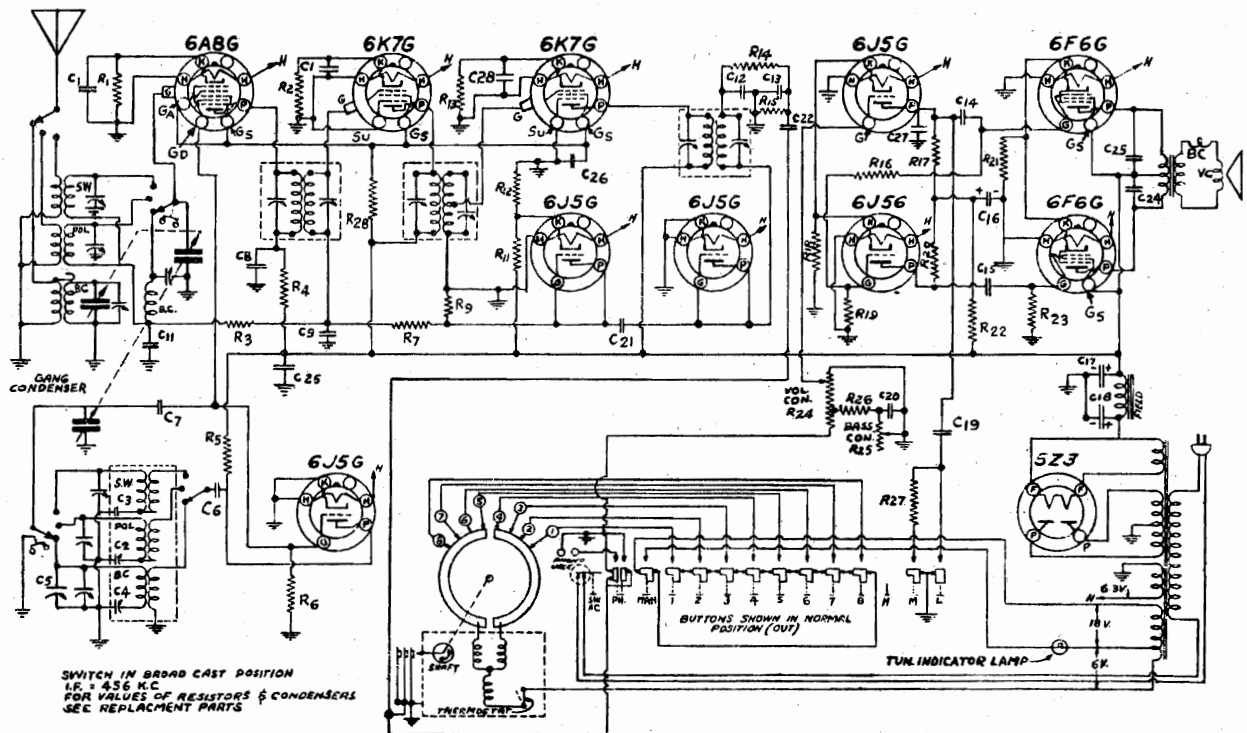
## MODEL 86 Series

GILFILLAN BROS. INC.



MODEL R-635

B. F. GOODRICH CO.



## 11A REPLACEMENT PARTS LIST

## PAPER CONDENSERS

C 1—P148	.05	Mfd.	200 V.
C 2		Police Band Padder—	
		(.0008—.0016 Mfd.)	
C 4		Broadcast Band Padder—	
		(.003—.0006 Mfd.)	
C 6—P1322	.005	Mfd.	600 V.
C 8—P276	.1	Mfd.	400 V.
C 9—P148	.05	Mfd.	200 V.
C11—P142	.1	Mfd.	200 V.
C14—P334	.05	Mfd.	400 V.
C15—P334	.05	Mfd.	400 V.
C19—P334	.05	Mfd.	400 V.
C20—P1322	.005	Mfd.	600 V.
C22—P148	.05	Mfd.	200 V.
C23—P1322	.005	Mfd.	600 V.
C24—P1322	.005	Mfd.	600 V.
C25—P276	.1	Mfd.	400 V.
C26—P276	.1	Mfd.	400 V.
C28—P148	.05	Mfd.	200 V.

## MICA CONDENSERS

C 3—P1683	.004	Mfd.
C 7—P480	.0001	Mfd.
C12—P480	.0001	Mfd.
C13—P480	.0001	Mfd.
C21—P1382	.00025	Mfd.
C27—P480	.0001	Mfd.

## ELECTROLYTIC CONDENSERS

C16 }	P1939	Dual Electrolytic
C17 }		
C18—P1937		Electrolytic

## ADJUSTABLE CONDENSERS

P1918A Variable Condenser  
P2743 Gang Trimmer Strip  
P1682 Oscillator Padder Condensers

## RESISTORS

R 1—P140	500	Ohm	1/4 Watt
R 2—P1950	350	Ohm	1/4 Watt 10 %
R 3—P139	250,000	Ohm	1/4 Watt
R 4—P481	3,000	Ohm	1/4 Watt
R 5—P673	10,000	Ohm	1/2 Watt
R 6—P417	50,000	Ohm	1/4 Watt
R 7—P137	500,000	Ohm	1/4 Watt
R 9—P137	1,000,000	Ohm	1/4 Watt
R11—P2731	25,000	Ohm	1 Watt
R12—P278	600	Ohm	1/4 Watt
R13—P1950	350	Ohm	1/4 Watt
R14—P417	50,000	Ohm	1/4 Watt
R15—P139	250,000	Ohm	1/4 Watt
R16—P1220	200,000	Ohm	1/4 Watt
R17—P166	25,000	Ohm	1/4 Watt
R18—P376	750	Ohm	1/4 Watt
R19—P258	15,000	Ohm	1/4 Watt
R20—P166	25,000	Ohm	1/4 Watt
R21—P2732	220	Ohm	2 Watt
R22—P167	10,000	Ohm	1/4 Watt
R23—P139	250,000	Ohm	1/4 Watt
R24	Volume Control—		
	2,000,000	Ohms	
R25	Bass Control—		
	1,000,000	Ohms	
R26—P1217	60,000	Ohm	1/4 Watt
R27—P167	10,000	Ohm	1/4 Watt
R28—P165	25,000	Ohm	1/4 Watt
R29	Speaker Field—600	Ohm	

## TRANSFORMERS AND COILS

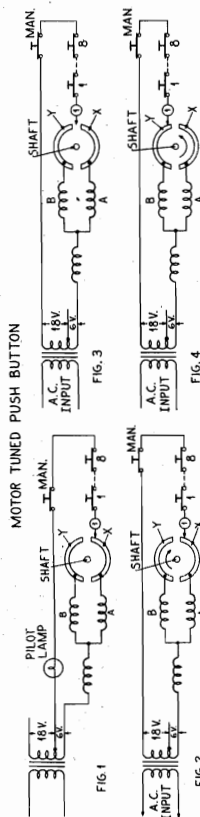
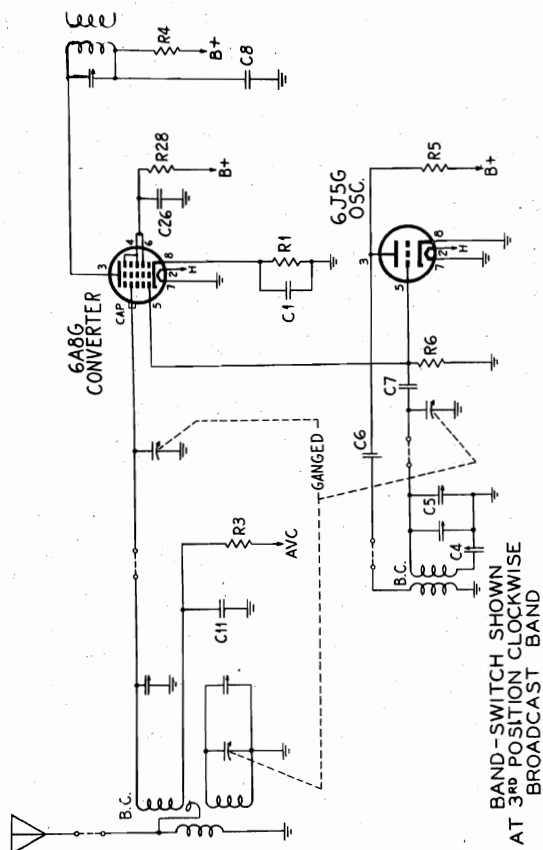
P2710	Power Transformer
P1930	1st I.F. Transformer
P2704	2nd I.F. Transformer
P2711	3rd I.F. Transformer
G5794	Oscillator Coil Assembly
G5310	Police and Short Wave Antenna Coil
G5347	Broadcast Antenna Coil

## MISCELLANEOUS

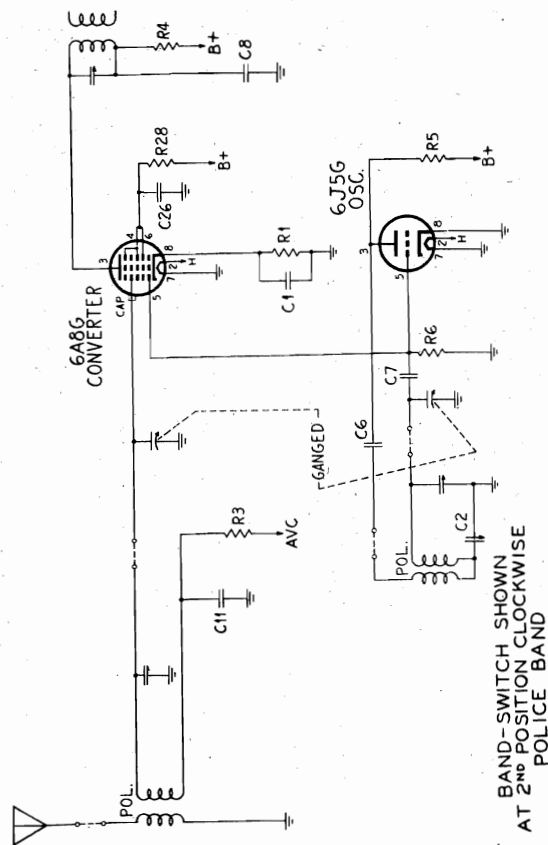
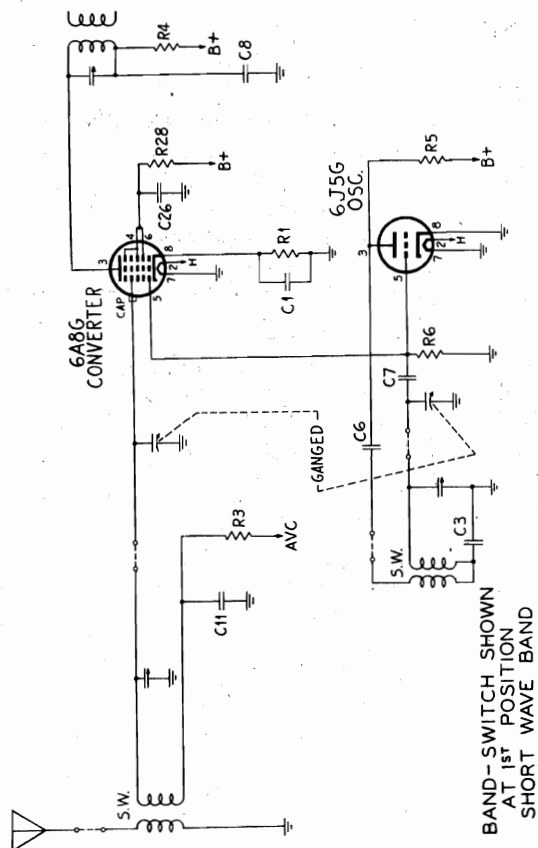
P1928	Tube Socket
P1153	5Z3 Socket
P945	Speaker Socket
P2705	Volume Control
P2706	Bass Control
G5788	Band Switch and Lead Assembly
P929	A.C. Line Cord
P1455	Tube Shield
P1456	Tube Shield Base
P2716	12" Dynamic Speaker
P2694	Push Button Switch
3	Pilot Light Socket
1504	Pilot Light Bulb
10	Electric Motor
P2689	Rubber Drive Belt
P2688	Dial Scale
P2644	Dial Pointer
G5462	Lower Segment Adjustment Bracket and Contact
G5463	Upper Segment Adjustment Bracket and Contact

MODEL R-635

B. F. GOODRICH CO.

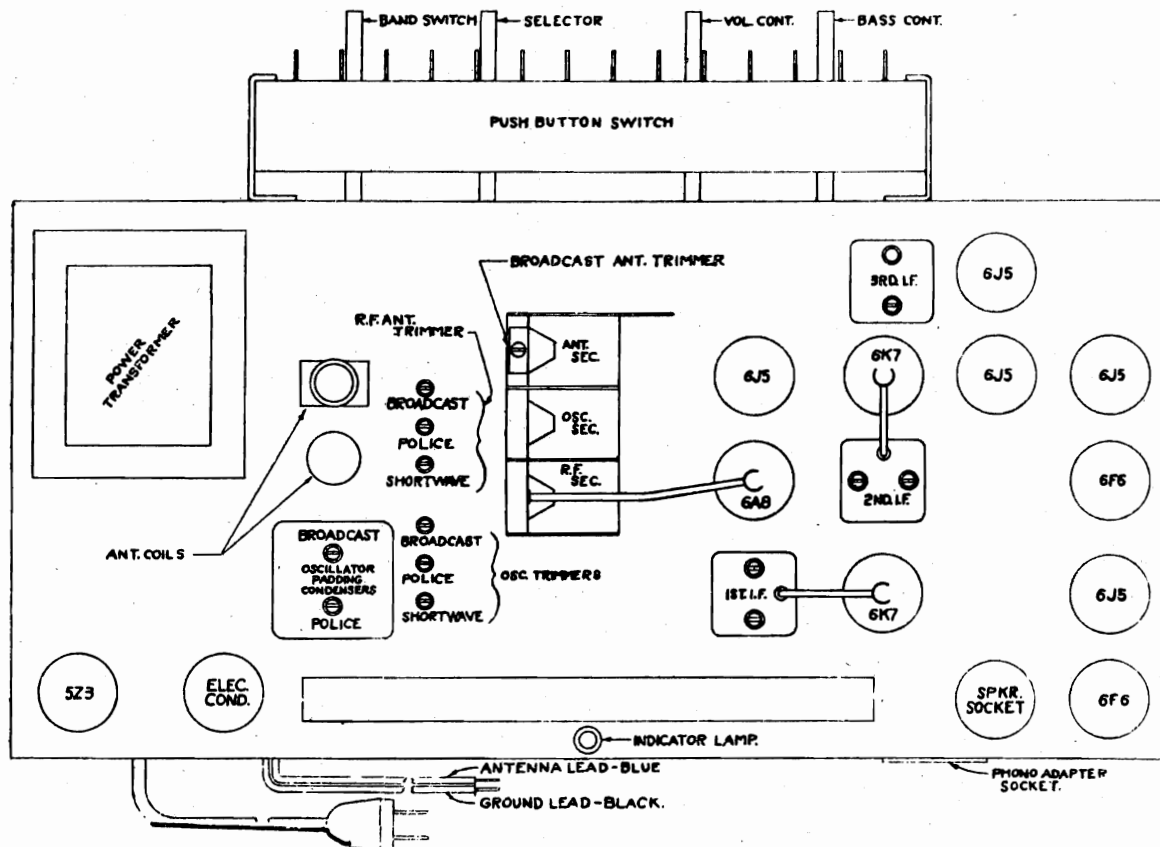


NOTES: FIGS. 1, 2, 3 AND 4 SHOW SCHEMATICALLY THE SETTING UP AND AUTOMATIC TUNING OF PUSHBUTTON NO. 1. THE OTHER PUSHBUTTONS FOLLOW THIS PATTERN BUT AREN'T SHOWN FOR CLARITY OF DIAGRAM. FIG. 1 SHOWS THE SETTING UP OF PUSHBUTTON 1, WITH THE MANUAL AND NO. 1 BUTTONS DEPRESSED. THE PILOT LAMP WILL LIGHT, BEING ENERGIZED ACROSS THE 6-V. TAP THROUGH THE MOTOR WINDING (A), ROTOR PLATE X, CONTACT 1, AND THE PUSHBUTTONS. WHEN BUTTON NO. 1 IS ADJUSTED TO THE CORRECT FREQUENCY, THE PILOT LAMP GOES OUT BECAUSE CONTACT 1 IS THEN POSITIONED BETWEEN PLATES X AND Y, SIMILAR TO FIG. 3, WHICH BREAKS THE ELECTRICAL CONTACT. IN ORDER TO TUNE TO STATION 1 AUTOMATICALLY, PUSHBUTTON 1 IS DEPRESSED, ENERGIZING THE MOTOR ACROSS 18-V AS SHOWN IN FIG. 2. SINCE THE (A) WINDING IS ENERGIZED, THE MOTOR WILL TURN PLATES X AND Y IN DIRECTION OF ARROW SHOWN UNTIL CONTACT IS BROKEN, WHICH WILL OCCUR WHEN PLATES REACH POSITION SHOWN IN FIG. 3. IF THE MOTOR DOES NOT STOP FAST ENOUGH, THEN PLATES X AND Y, WHICH ARE MECHANICALLY GANGED BY THE SHAFT TO THE TUNING CAPACITORS, WILL TURN TOO FAR, PUTTING THE STATION OUT OF TUNE BUT IF THEY DO ROTATE TOO MUCH THEY MUST ASSUME THE POSITION SHOWN IN FIG. 4 WHICH THEN ENERGIZES THE OTHER (B) WINDING OF THE MOTOR, REVERSING THE DIRECTION OF ROTATION UNTIL IT COMES TO A STOP AT ITS CORRECTLY TUNED POSITION SHOWN IN FIG. 3.



MODEL R-635

B. F. GOODRICH CO.



## ALIGNMENT DATA AND SERVICING

### GENERAL DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. 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.

### CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

### I.F. ALIGNMENT

With the wave switch in the Broadcast Band and the gang condenser set at minimum push in the white button until it locks. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align the six I.F. trimmers to peak or maximum reading on the output meter.

### BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The

signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

### POLICE BAND ALIGNMENT

The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police, antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

### SHORT WAVE BAND ALIGNMENT

The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

MODEL R-635

B. F. GOODRICH

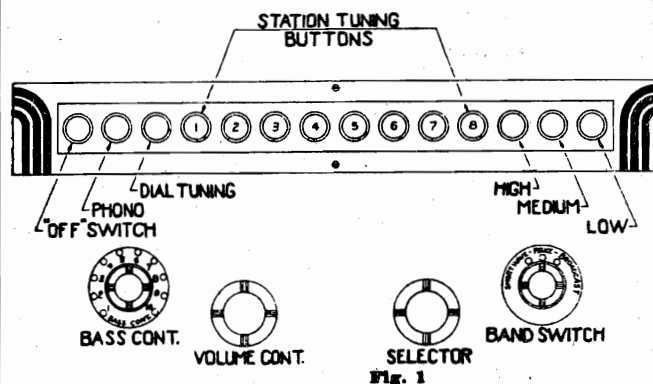
## INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER

It is very important to read the following instructions carefully before attempting to adjust the electric tuner. The electric tuner is made up of three integral units:

**PUSH BUTTON SWITCH:** The push button switch consists of eight (8) brown push buttons flanked on either side by three (3) white push buttons.

**SELECTOR MECHANISM:** The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

**ELECTRIC MOTOR:** The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.



### SETTING UP STATIONS

The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the dial tuning button; tune in the station of the **lowest frequency**, using the station selector knob. Now hold the dial tuning button in and press in button number one (1). (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidentally happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call disc and insert into the recess of button number one. Push one of the clear celluloid discs into the recess also, over the station call disc. Now release button number one by pressing the dial tuning button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two. Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call disc and celluloid disc into the window of button number two.

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. Note: In the window above the white button, insert the word "OFF" found in the call letter sheet.

### NOTE:

In the recesses of the white push buttons insert the words found in the call letter sheet as shown in Figure 1.

## HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the dial tuning button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. Note: Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above.

To change from electric tuning to manual selecting, simply press in the dial tuning button. When the dial tuning button is in, the set may be tuned as a conventional receiver. Note: If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast, the station last selected by button will automatically tune in by itself.

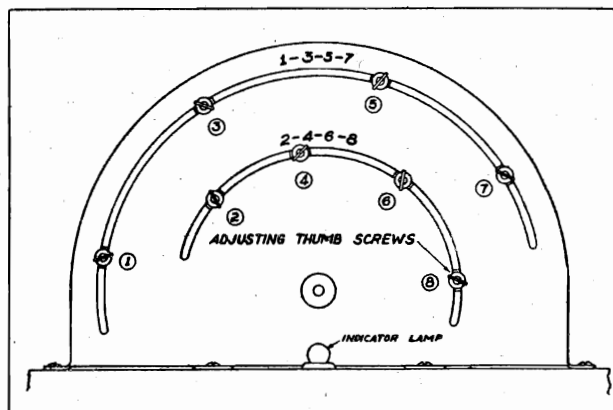
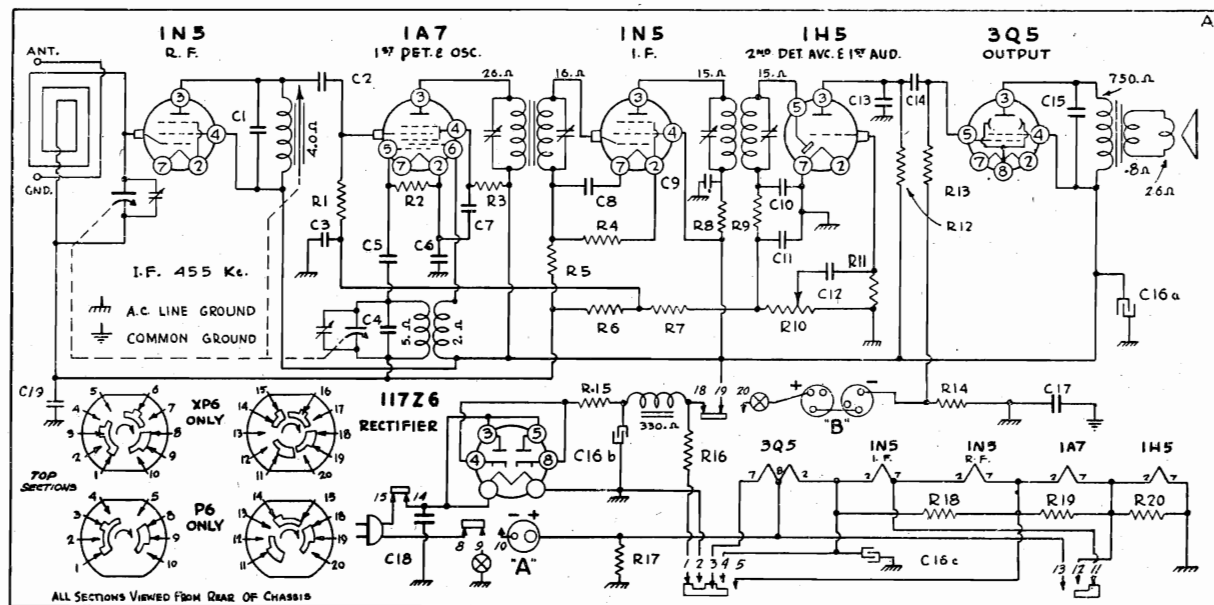


Fig. 2

## B. F. GOODRICH

MODEL R-661



Late Model.

Power switch in line position. Common ground is chassis ground.

## CONDENSERS

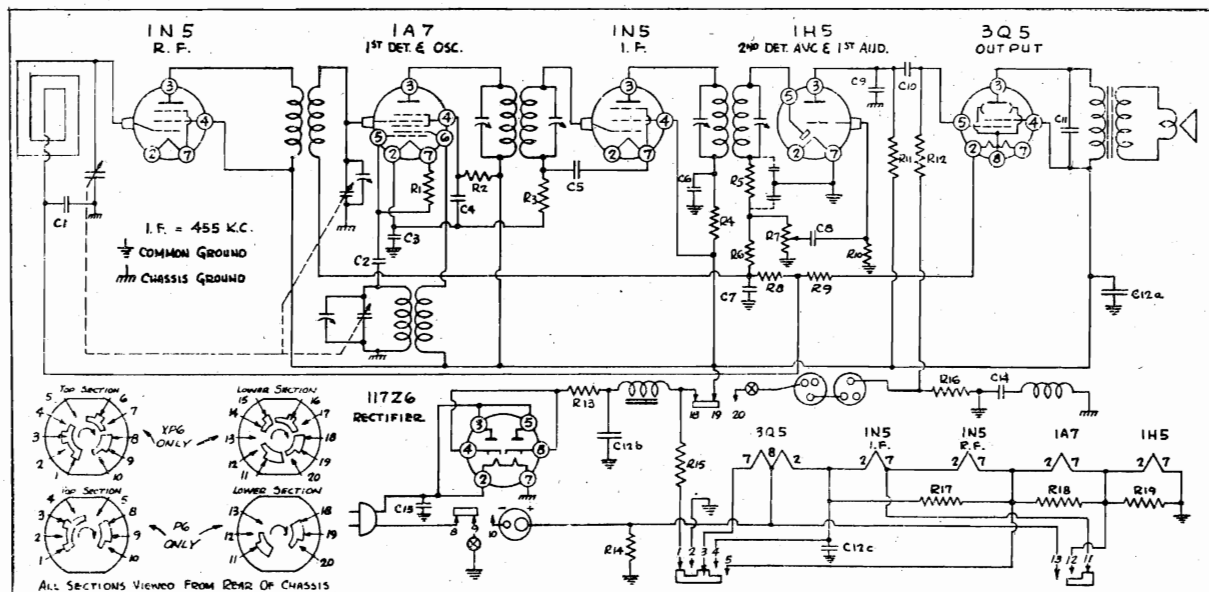
No.	Ohms	Watts
H1	100,000	1/2
H2	200,000	1/2
H3	5,000,000	1/2
H4	5,000,000	1/2
H5	5,000,000	1/2
H6	5,000,000	1/2
H7	3,000,000	1/2
H8	5,000	1/2
H9	70,000	1/2
H10	1,000,000	V.C.

No.	Ohms	Watts
R11	15,000,000	1/2
R12	1,000,000	1/2
R13	2,000,000	1/2
R14	400	1/2
R15	22	1/2
R16	2,150	5
R17	3,000	1/2
R18	500	1/2
R19	200	1/2
R20	110	1/2

## RESISTORS

No.	Capacity (Mfd.)	Volts
C1	.000387	Silver Mica
C2	.00025	Mica
C3	.01	400
C4	.000015	Mica
C5	.000005	Mica
C6	.25	200
C7	.01	400
C8	.01	400
C9	.05	400
C10	.00005	In I.F. Can

No.	Capacity (Mfd.)	Volts
C11	.0001	Mica
C12	.01	400
C13	.00025	Mica
C14	.01	400
C15	.002	600
C16a	.40	150
C16b	.30	150
C16c	100	25
C17	.1	400
C18	.05	400
C19	.05	200



Early Model.

## RESISTORS

No.	Ohms	Watts
R1	200,000	1/2
R2	50,000	1/2
R3	5,000,000	1/2
R4	5,000	1/2
R5	70,000	1/2
R6	3,000,000	1/4
R7	1,000,000	V.C.
R8	5,000,000	1/2
R9	10,000,000	1/4
R10	15,000,000	1/2

No.	Ohms	Watts
R11	1,000,000	1/2
R12	2,000,000	1/2
R13	22-10%	1/2
R14	1,000	1/2
R15	2,150-10%	5
R16	400-10%	1/2
R17	500-10%	1/2
R18	200-10%	1/2
R19	110-10%	1/2

No.	Capacity (Mfd.)	Volts
C1	.05	200
C2	.00005	Mica
C3	.25	200
C4	.01	400
C5	.001	600
C6	.05	400
C7	.05	200
C8	.001	600

## CONDENSERS

No.	Capacity (Mfd.)	Volts
C9	.00025	Mica
C10	.001	600
C11	.002	600
C12a	50. Elect.	150
C12b	30. Elect.	150
C12c	100. Elect.	25
C13	.05	400
C14	.2	200

1942

## B. F. GOODRICH

MODEL R-661

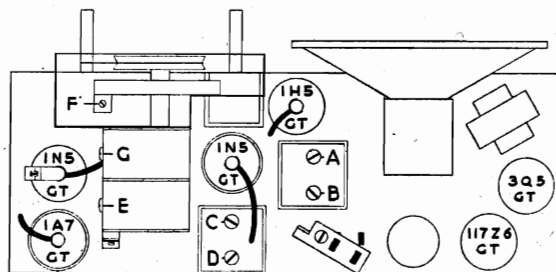


FIG. 1 TOP VIEW

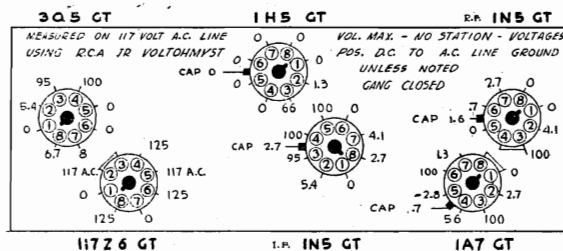


FIG. 2 VOLTAGE CHART

STEP	Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Controls to—	Set Radio Controls to—	Adj. Following Trimmers to Max. Output
<b>1</b>	Grid 1A7 GT	.1	455 Kc	1600 Kc.	A, B, C, D, I. F.
<b>2</b>	Grid 1N5 GT	.1	1600 Kc.	1600 Kc.	E Osc.
<b>3</b>	Grid 1A7 GT	.1	1400 Kc.	1400 Kc.	F — R. F. (Gang Early) on (Slug Late)
<b>4</b>	Loop Radiator	Two feet from Radio No Connection	1400 Kc.	1400 Kc.	G Ant.

Use Aerometer or three turn loop in series with 400 ohm resistor 10" diameter on Signal Generator in Step 4.

## REPLACEMENT PARTS LIST

## PAPER CONDENSERS

P1193 .002 mfd. 600 volt.....	.20
P164 .01 mfd. 400 volt.....	.25
P148 .05 mfd. 200 volt.....	.20
P334 .05 mfd. 400 volt.....	.40
P276 .1 mfd. 400 volt.....	.40
P141 .25 mfd. 200 volt.....	.30

## MICA CONDENSERS

P5209 .000015 mfd.....	.20
P1382 .00005 mfd.....	.20
P480 .0001 mfd.....	.20
P817 .00025 mfd.....	.20
P1599 .000367 mfd. silver.....	.65

or  
P5200 .000367 mfd. special..... .60

## ELECTROLYTIC CONDENSERS

## VARIABLE CONDENSERS

P4860A { 40 mfd. 150 volt } 1.60
{ 30 mfd. 150 volt }
{ 100 mfd. 25 volt }

## VARIABLE RESISTORS

P4820 R10 1 meg. Volume control.....	1.25
<b>TRANSFORMERS AND COILS</b>	
G6543 R.F. Coil and Mtg. Bracket.....	.55
P5203 Oscillator Coil.....	.65
P3967 Oscillator Coil (Early).....	.65
P4818 1st I.F. Transformer.....	1.50
P4819 2nd I.F. Transformer.....	1.70

P5187 Gang Condenser, 2 gang.....	3.50
P4817 Gang Condenser, 3 gang.....	3.50

## RESISTORS

P5268 R15 22 ohm ½ w (wirewound).....	.20
---------------------------------------	-----

P3801 R20 110 ohm ½ w.....	.20
P3806 R19 200 ohm ½ w.....	.20
P3816 R14 400 ohm ½ w.....	.20
P3820 R18 500 ohm ½ w.....	.20
P4856 R16 2,150 ohm 5 w (wirewound).....	.60

P3833 R17 3,000 ohm ½ w.....	.20
P3836 R8 5,000 ohm ½ w.....	.20
P3853 R3 50,000 ohm ½ w.....	.20
P3857 R9 70,000 ohm ½ w.....	.20
P3860 R1 100,000 ohm ½ w.....	.20
P3864 R2 200,000 ohm ½ w.....	.20
P3882 R12 1,000,000 ohm ½ w.....	.20
P3883 R13 2,000,000 ohm ½ w.....	.20
P4663 R7 3,000,000 ohm ½ w.....	.20
P3886 R4,R5,R6 5,000,000 ohm ½ w.....	.20
P3891 R11 15,000,000 ohm ½ w.....	.20

## MISCELLANEOUS

P4583 Tube Socket.....	.20
P5206 Electrolytic Mounting Base.....	.15
P5194 Drive shaft.....	.20
P1399 Horseshoe Washer (for drive shaft) ½ doz.....	.15
P2925 Takeup Spring.....	.15
P1585 Snap button for scale ½ doz.....	.15
P4435 Dial Pointer.....	.20
P4816 Dial Background.....	.25
P4876 Knob.....	.20
P4695 Escutcheon.....	1.75
P4833 Indicator disc.....	.20
P929A Line cord.....	.65
P3557 Line cord clamp.....	.15
P3017 Two-prong battery plug.....	.15

P3016 Three-prong battery plug..... .15

P470 Grid clip.....	.05
P3571 Tube shield.....	.15
G6538 Drum and cam assembly.....	.30
P5193 Left hand dial bracket.....	.20
P6546 Lever arm assembly.....	.20
P5005 Spring.....	
P5032 Spacer.....	} Lever mounting
P5197 Washer.....	
P931 Screw.....	hdw. set .10
P4979 Iron Slug.....	.40
P5192 Right hand dial bracket.....	.25
P4852 I.F. Shield.....	.20

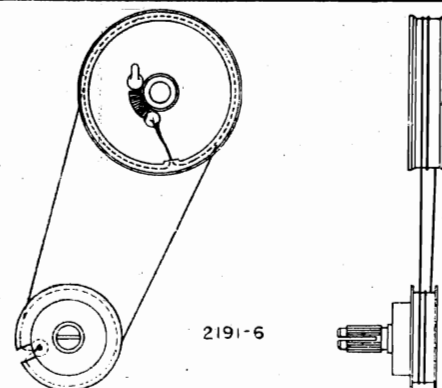
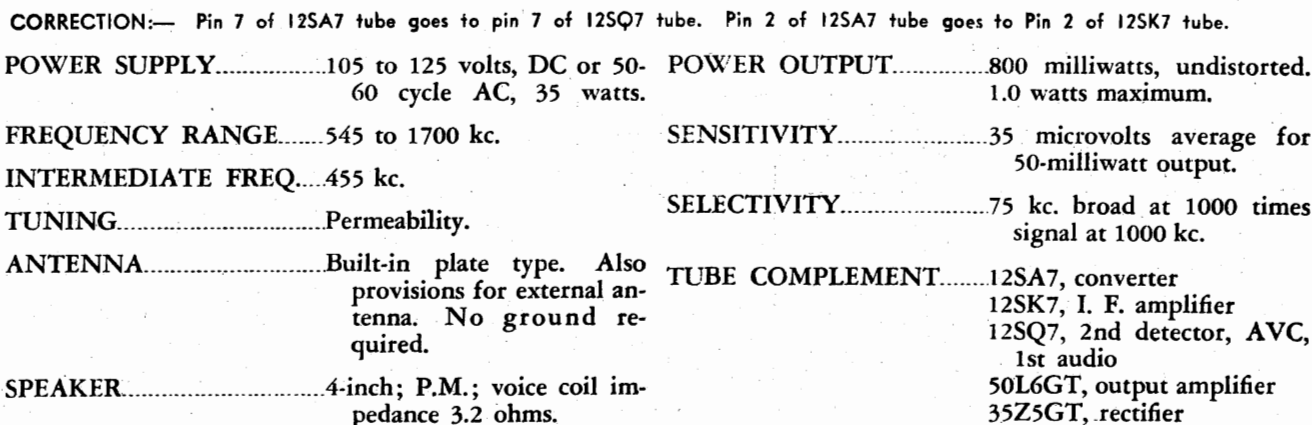
All prices quoted are list and subject to the usual trade discount.

A handling charge of \$.25 will be made on all orders under \$.75 list.

Shipments are F.O.B. our factory. When remitting in advance please include postage.

Price are subject to change without notice.

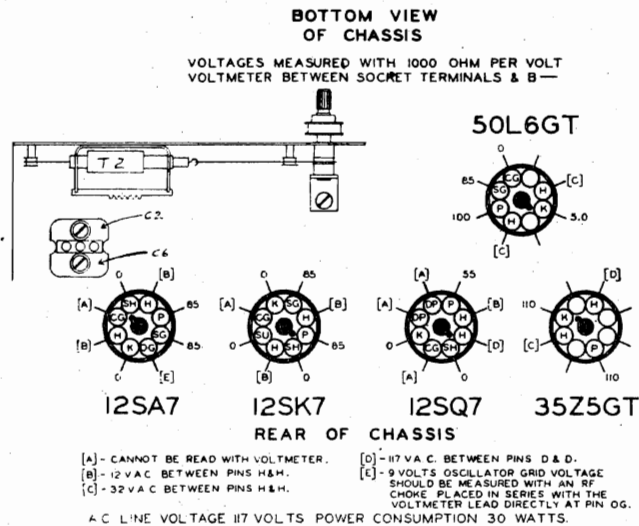
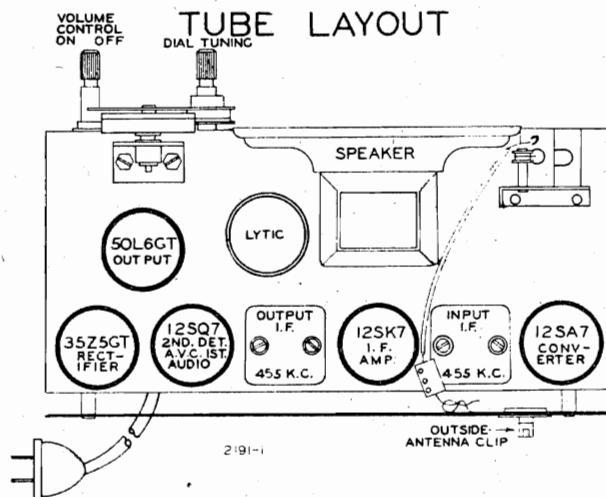




### Dial Stringing View

MODELS 500, 501, Series A

W. T. GRANT CO.



Chassis View

Voltage Chart

**ALIGNMENT PROCEDURE**

(Refer to Chassis View and Voltage Chart for location of trimmers)

Output meter across 3.2-ohm output load.

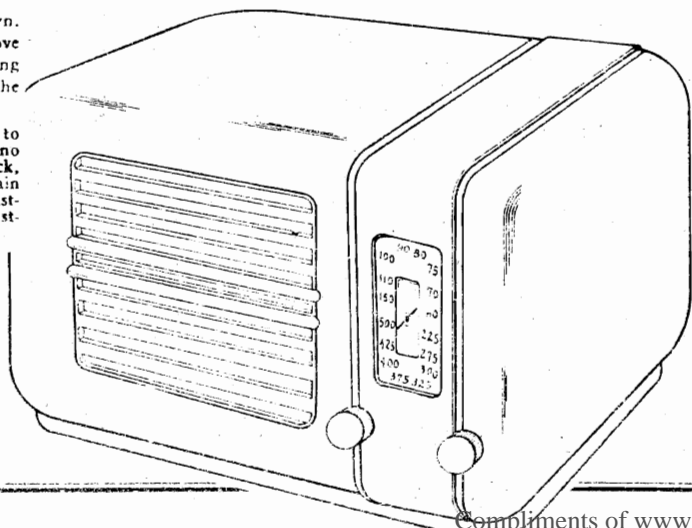
Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

- Volume control at maximum for all adjustments.
- Chassis must be removed from cabinet for proper alignment.

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Dummy Antenna	Connection to Radio	Ground Connection		
455 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Trimmers on output and input I.F. cans
1720 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C6
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C2
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1400 kc	Adjust position of ant. coil (see coil assembly view)
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1720 kc	Antenna trimmer C2

The antenna coil assembly is made so that it is movable up or down. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

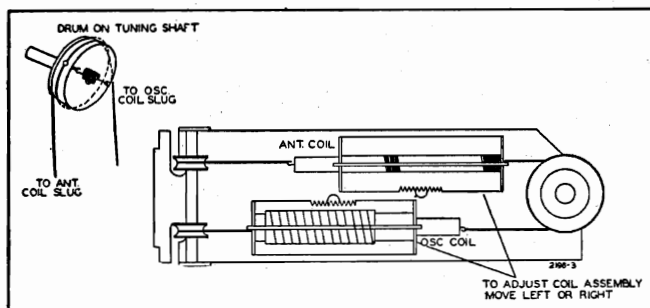
After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C2) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.



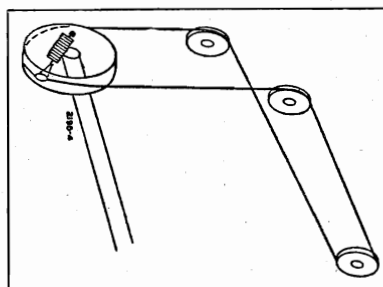


MODELS 502,503, Series A

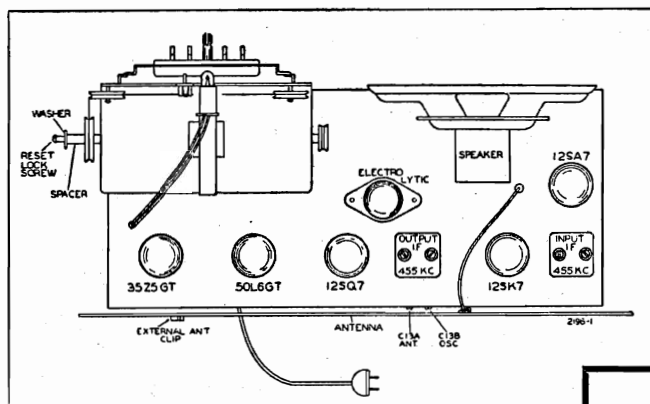
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Coil View



Dial Stringing View



Chassis View

**DIAL LIGHT**—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp, first remove the buttons which hold the back to the cabinet. The Chassis View illustration shows the location of the dial lamp. Pull the lamp bracket toward the rear of the radio. The lamp can now be removed and replaced. Use a 6- to 8-volt lamp, type T-47.

**• NOTE ON TUBE REPLACEMENT**

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

**ALIGNMENT PROCEDURE**

(Refer to Chassis View for location of trimmers)

Output meter across 3.2-ohm output load.

Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

- Volume control at maximum for all adjustments.
- Chassis must be removed from cabinet for proper alignment.

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Dummy Antenna	Connection to Radio	Ground Connection		
455 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Trimmers on output and input I.F. cans
1700 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C13-B
1700 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron Cores all the way out	Antenna trimmer C13-A
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1400 kc	Adjust position of ant. coil (see coil assembly view)
1700 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C13-A

The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C13-A) adjustment again at 1700 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1700 Kc.

## W. T. GRANT CO.

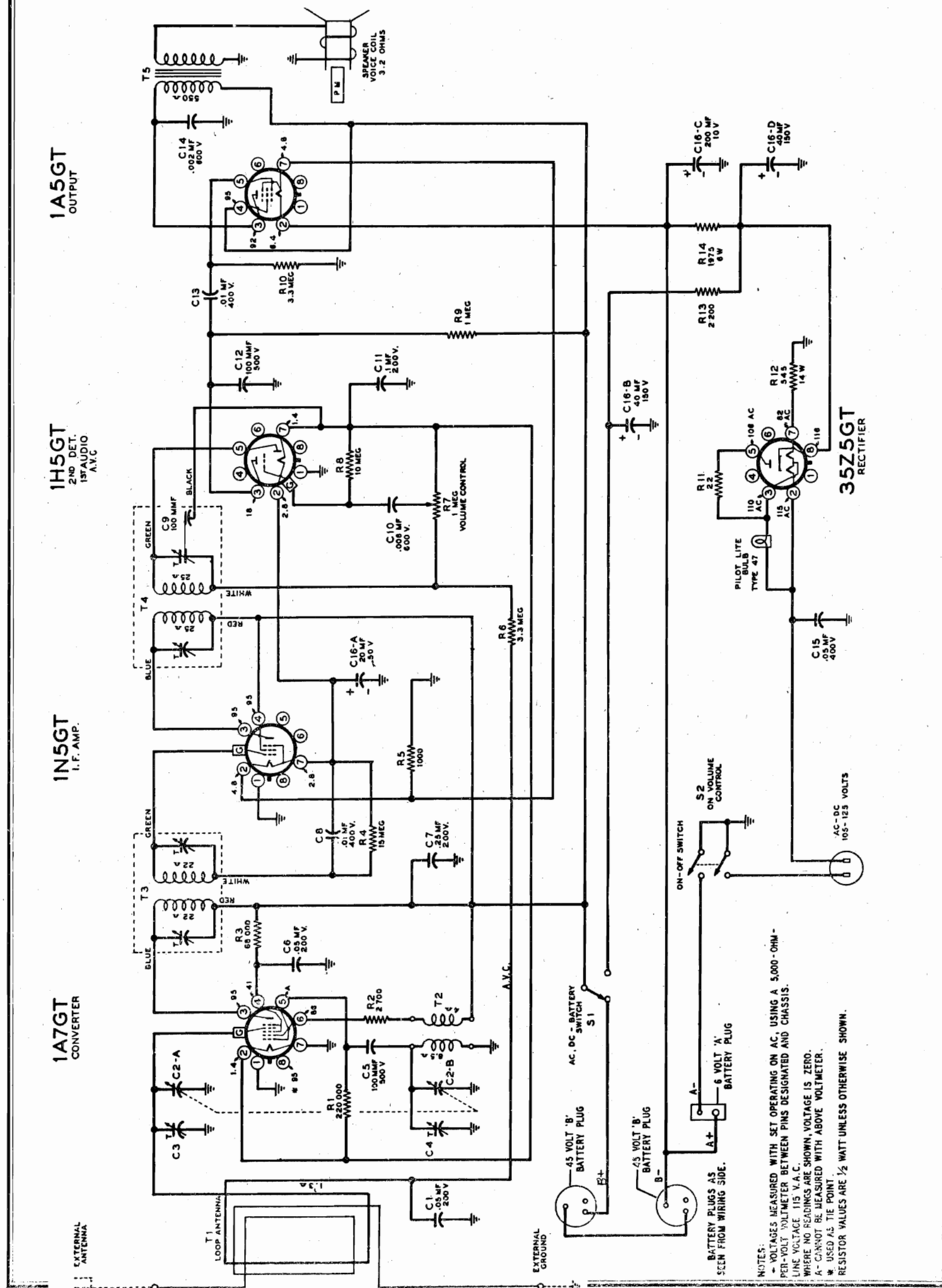
MODELS 502, 503, Series A

MODELS 500, 501, Series A

Models 502 and 503—Series A				Models 500 and 501—Series A			
Reference No.	Part No.	Description	Reference No.	Part No.	Description	Ref. No.	Part No.
<b>CAPACITORS</b>				<b>CAPACITORS*</b>			
C11-A	11992	Electrolytic—20 mf; 40 mf x 150 volts	C18	C-8D-10788	.004 x 600 Volt Tubular Condenser	T4-C12-C13	108157C
C11-B		For use on 60 cycles	C19, C15	C-8D-10761	.01 x 400 Volt Tubular Condenser	T2	110126
C11-A	11993	Electrolytic—40 mf; 60 mf x 150 volts	C16	C-8D-10813	.05 x 400 Volt Tubular Condenser	T1	111136B
C11-B		For use on 25 cycles	C8, C9	C-8D-10770	.05 x 200 Volt Tubular Condenser		
C13-A	124151	Dual Trimmer—Ant. and OSC	C15	C-8D-10789	.002 x 600 Volt Tubular Condenser		
C13-B			C7	C-8D-10953	.15 x 400 Volt Tubular Condenser		
C9	C-8D-10770	.05 Mf x 200 Volts—Tubular	C10, C11	119-92	20 Mfd—40 Mfd x 150 Volt Elec- trolytic (For 60 Cycle)		
C7, 8	C-8D-10761	.01 Mf x 400 Volts—Tubular	C2, C6	124100	Trimmer (Antenna; Oscillator)		
C12	C-8D-10813	.05 Mf x 400 Volts—Tubular	C17	C-8F6-121	.00047 Mica Condenser		
C5	C-8D-10778	.002 Mf x 600 Volts—Tubular	C14	C-8F3-10	.00022 Mica Condenser		
C10	C-8D-10953	.15 Mf x 400 Volts—Tubular	C5	C-8F3-11	.00033 Mica Condenser		
C6	C-8F3-12	470 Mmf, 20% Mica	C1	C-8F3-6	.00047 Mica Condenser		
C4	C-8F3-10	220 Mmf, 20% Mica	<b>RESISTORS</b>				
C2	C-8F3-11	330 Mmf, 20% Mica	R4	C-9B1-34	3.3 megohm, 1/2 watt resistor		
C3	C-8F3-6	47 Mmf, 20% Mica	R9	C-9B1-29	470M ohm, 1/2 watt resistor		
<b>*RESISTORS</b>				R2, R8	C-9B1-26	150M ohm, 1/2 watt resistor	
R4	101-238	Volume Control (500 K) and Switch	R10	C-9B1-52	150 ohm, 1/2 watt resistor		
S1	A-10A-11306	Volume Control (500 K) and Switch	R1	C-9B1-78	22M ohm, 1/2 watt resistor		
R8	C-9B1-52	150 Ohms 1/2 Watt 10%	R6	C-9B1-35	4.7 megohm, 1/2 watt resistor		
R7, 9	C-9B1-27	220K Ohms 1/2 Watt 20%	R3	C-9B2-63	1200 ohm, 1 watt resistor		
R5	C-9B1-35	4.7 Megohms 1/2 Watt 20%	R7	C-9B1-42	22 ohm, 1/2 watt resistor		
R3	C-9B1-34	3.3 Megohms 1/2 Watt 20%	R11	C-9B2-44	33 ohm, 1 watt resistor		
R1	C-9B1-78	22K Ohms 1/2 Watt 10%	R5, S1	101196	Volume control and on-off switch (500M ohm)		
R10	C-9B2-64	1500 Ohms 1 Watt 10%	<b>COILS</b>				
R2	C-9B1-47	56 Ohms 1/2 Watt 10%	T4	108157L	Input I. F. Coil Complete in Can		
R12	C-9B2-4	33 Ohms 1 Watt 20%	T5	108157N	Output I. F. Coil Complete in Can		
R6	C-9B2-4	470K Ohms 1/2 Watt 10%	T2, T3	112877	Antenna and Oscillator Coil Tuning Assembly R-F. Choke		
R11	C-9B1-43	27 Ohms 1/2 Watt 10%	<b>SOCKETS</b>				
<b>SOCKETS</b>				121210	Eight Prong Octal Socket		
				121216	Bakelite Socket Base for Filter Condenser		
				<b>SPEAKER</b>			
				T7	114225	Five Inch P.M. Dynamic Speaker	
				T6	105108E	Output Transformer for Speaker	
				<b>MISCELLANEOUS</b>			
				10798D	Line Cord and Plug		
				120389	Coiled Tension Spring (For Coil Assembly)		
				P1	107249	6-8 Volt Pilot Lite Bulb—Type T47	
				107274	Socket Assembly for Pilot Lite		
				107205	Insulating Shield for Pilot Lite Socket		
				134101	Rubber Feet for Bottom of Cabinet		
				T1, C1	128386-S-1	Back for Cabinet—Walnut	
				T1, C1	128-586-S	Back for Cabinet—Ivory	
				131193	Snap-in Rivets to Fasten Back		
				128333-18	Bakelite Cabinet—Dark Walnut		
				128333-9	Bakelite Cabinet—Ivory Color		
				128162-17	Knob for Volume Control—Walnut		

MODEL 510, Series A

W. T. GRANT CO.



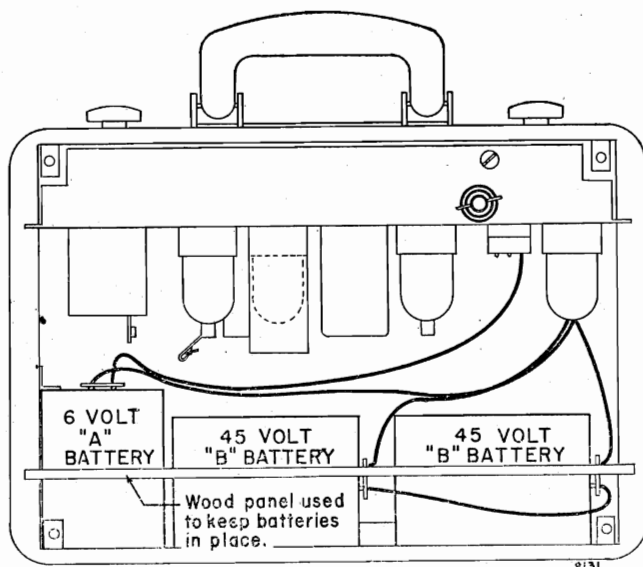
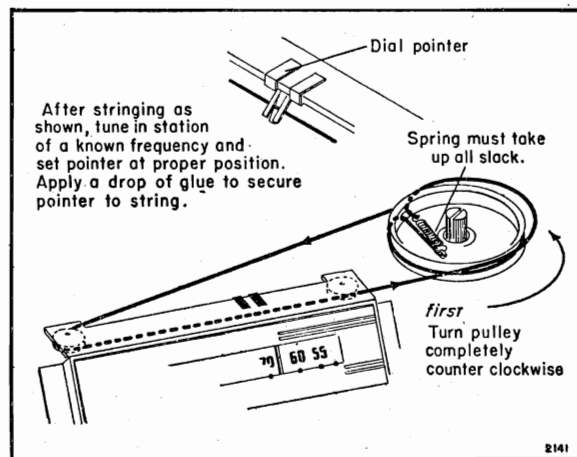
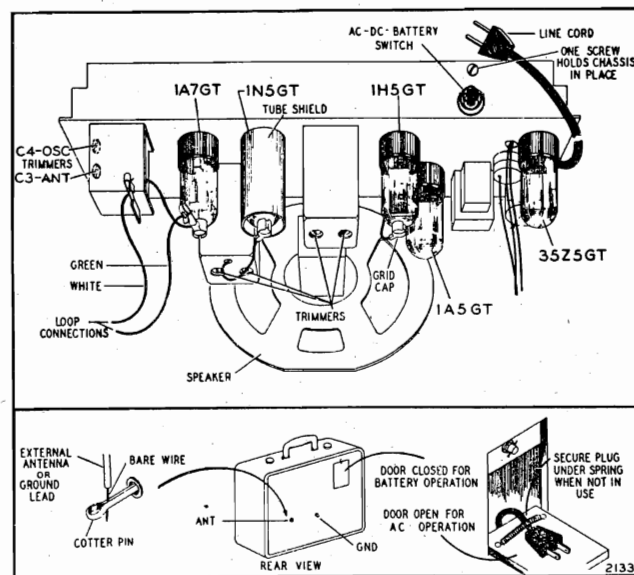
NOTES:  
- VOLTAGES MEASURED WITH SET OPERATING ON AC, USING A 5,000-OHM-  
PER-VOLT VOLTMETER BETWEEN PINS DESIGNATED AND CHASSIS.  
- LINE VOLTAGE 115 V.A.C.  
- WHERE NO READINGS ARE SHOWN, VOLTAGE IS ZERO.  
- A- CANNOT BE MEASURED WITH ABOVE VOLTMETER.  
- \* USED AS TIE POINT.  
- RESISTOR VALUES ARE 1/2 WATT UNLESS OTHERWISE SHOWN.

W. T. GRANT CO.

MODEL 510, Series A

**ELECTRICAL SPECIFICATIONS**

<b>Power Supply</b> .....	105 to 125 volts, DC or 50-60 cycle AC, 30 watts. Battery: A—6 volts, 58 ma. B—90 volts, 9 ma.
<b>Frequency Range</b> .....	530 to 1650 kc.
<b>Intermediate Freq.</b> .....	455 kc.
<b>Tuning</b> .....	Two-gang capacitor.
<b>Antenna</b> .....	Built-in loop. Provisions also for external antenna and ground.
<b>Speaker</b> .....	5-inch; P.M.; voice coil impedance 3.2 ohms.
<b>Power Output</b> .....	80 milliwatts undistorted. 180 milliwatts maximum.
<b>Sensitivity</b> .....	30 microvolts average for 50-milliwatt output.
<b>Selectivity</b> .....	43 kc broad at 1000 times signal at 1000 kc.

**Battery Installation****Replacement of Dial Pointer Drive Cord****Chassis View, Showing Tube Location****ALIGNMENT PROCEDURE**

- Output meter across 3.2-ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	.1 mf	1A7GT grid cap*	Chassis	Rotor full open (plates out of mesh)	Input and output trimmers on IF cans
1650 kc	.1 mf	1A7GT grid cap*	Chassis	Rotor full open (plates out of mesh)	Oscillator trimmer C4
1400 kc†	200 mmf	External antenna clip	External ground clip	1400 kc	Antenna trimmer C3

\* If loop is not connected when making this adjustment, substitute a 1-megohm resistor across the loop leads.

† For this adjustment chassis should be remounted in cabinet and loop connected. Antenna trimmer can be reached through a hole in the side of the cabinet.

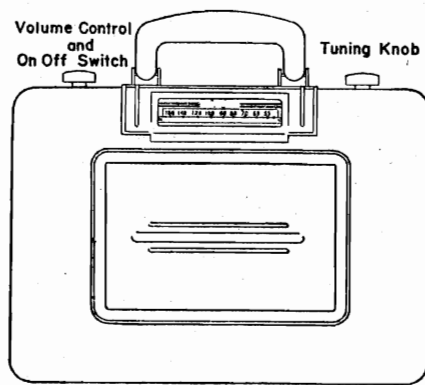
## MODEL 510, Series A

## W. T. GRANT CO.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CAPACITORS</b>			<b>COILS AND TRANSFORMERS</b>		
C2-A, C2-B, C3, C4	B-8A-10246	Two gang, including antenna and oscillator trimmers. Range of gang: 14-452 mmf (ant) and 10-198 (osc).	T1	B-13E-10250	Loop antenna assembly
C16-A-B-C-D	119-123	Electrolytic; 20 mf x 50 volts; 40 mf x 150 volts; 200 mf x 10 volts; 40 mf x 150 volts.	T2	A-13D-10239	Oscillator coil
C15	C-8D-10813	.05 mf x 400 volts tubular	T3	108201	Input I.F. transformer. Range of trimmers: 53-97 mmf each.
C14	C-8D-10789	.002 mf x 600 volts tubular	T4, C9	108200	Output I.F. transformer. Range of trimmers: 39-71 mmf each.
C11	C-8D-10771	.1 mf x 200 volts tubular	T5	105127	Output transformer
C1, C6	C-8D-10770	.05 mf x 200 volts tubular	<b>MISCELLANEOUS</b>		
C10	C-8D-10785	.006 mf x 600 volts tubular	114240B	Speaker, 5-inch, P.M.	
C7	C-8D-10775	.25 mf x 200 volts tubular	120406	"B"-battery cable assembly	
C8, C13	C-8D-10761	.01 mf x 400 volts tubular	120407	"A"-battery cable assembly	
C5, C12	C-8F3-8	.0001 mf x 500 volts 20% mica	121171	Tube socket	
C9	C-8F3-8	.0001 mf x 500 volts 20% mica (Part of 2nd I.F. coil assembly.)	125153	Line-battery switch	
<b>RESISTORS*</b>			120417	Spring for line-battery switch	
R1	C-9B1-27	220,000 ohms, 1/2 watt, 20%	107-363	Line cord and plug	
R2	C-9B1-67	2,700 ohms, 1/2 watt, 10%	115396B	Tube shield	
R3	C-9B1-84	68,000 ohms, 1/2 watt, 10%	B-6D-11301	Dial scale	
R4	C-9B1-302	15 megohms, 1/2 watt, 20%	112925	Diffuser	
R5	C-9B1-62	1,000 ohms, 1/2 watt, 10%	A-2M-7758	Snap-in rivets for diffuser and dial scale	
R6, R10	C-9B1-34	3.3 megohms, 1/2 watt, 20%	131-307	Cotter pin	
R7, S2	101252	Volume control (1 megohm) and on-off switch	112922	Dial pointer	
R8	C-9B1-37	10 megohms, 1/2 watt, 20%	120-214	Drive cord for dial pointer (20")	
R9	C-9B1-31	1 megohm, 1/2 watt, 20%	120197	Spring for drive cord	
R11	C-9B1-42	22 ohms, 1/2 watt, 10%	107249	Pilot light, 6-8 volts, type T-47	
R12	130343	545 ohms, 14 watts, 5%	107362	Socket assembly for pilot light	
R13	C-9B1-66	2,200 ohms, 1/2 watt, 10%	128641	Cabinet back	
R14	130344	1,975 ohms, 6 watts, 5%	120410	Spring for securing line cord plug	
			112910-1	Escutcheon for dial	
			128643	Escutcheon for grille	
			128645	Knob, tuning	
			128647	Knob, volume	
			131253	Snap-in rivet, for trimmer hole	
			13448B	Rubber grommet for trimmer hole	
			112-928	Drive pulley	

\*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt  
RMA value—220,000 ohms, 20%, 1/2 watt  
Pre-standardized value—50 mmf, 500 volts, 20%  
RMA value—47 mmf, 500 volts, 20%



**BATTERY REPLACEMENT** — Run-down batteries are indicated when (1) the volume cannot be brought up to the desired level; (2) the tone of the radio is "mushy" (not clear); or (3) reception fails completely. If you are in doubt as to whether the batteries are faulty, have your radio dealer check them for you.

If the batteries need replacement, get two 45-volt "B" batteries (size: 3 1/2" x 2 1/4" x 4 1/2") and one 6-volt "A" battery (size: 2 5/8" x 2 5/8" x 4").

**PILOT LIGHT** — If the pilot lamp burns out, the set should not be operated on AC or DC power until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube.

**TUBES**—Tubes which have weakened with age may cause poor or erratic reception; therefore have the tubes tested periodically and replace those which are weak. To remove the

tubes, first remove the back of the cabinet. Pull the grid caps from the tops of the 1A7GT, 1N5GT, and 1H5GT tubes (see Chassis View). Then remove the tube shields where present. When removing a tube, rock it back and forth gently while pulling it out of its socket.

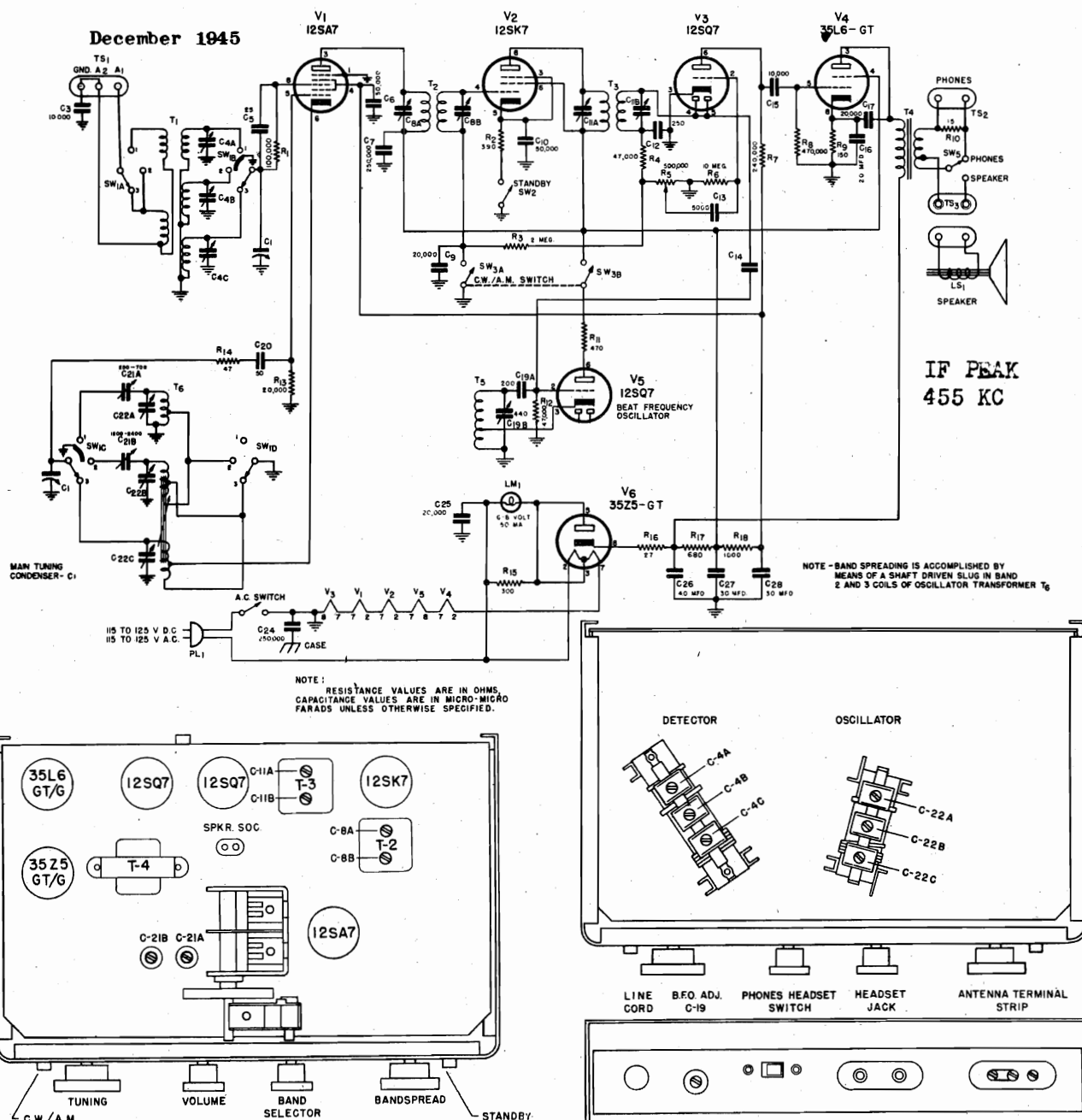
When replacing tubes, grid caps, and shields, refer to the Chassis View illustration to make sure that the replacements are properly made.



## THE HALLICRAFTERS CO.

MODEL EC-1B, Echophone

December 1945



Listed below in table form, are the alignment frequencies and adjustments necessary to align the receiver. CAUTION - Do not connect signal generator ground directly to the chassis, connect it to the "G" terminal of the antenna terminal strip.

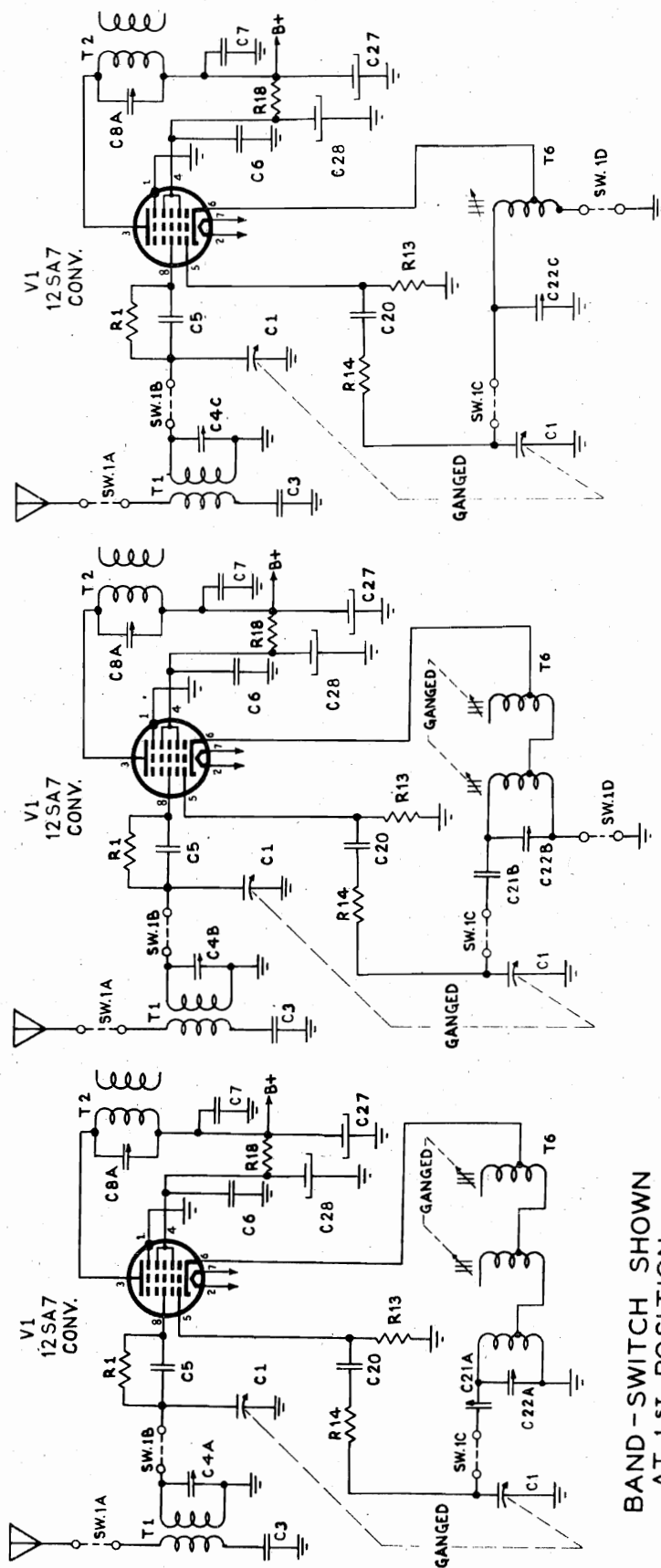
NOTE - Set BANDSPREAD dial at "0" before attempting alignment. (Slug should be between Band 1 and Band 2 coils.)

## ALIGNMENT DATA

BAND	Signal Generator Frequency	Dummy Antenna	Adjust Pads	Adjust Trimmers
I-F	455 kc.	None	None	C-8A, C-8B, C-11A, C-11B
BFO	455 kc.	None	Adjust capacitor C-19 for zero beat.	
1	600 kc. 1800 kc.	330 ohm 330 ohm	C-21A None	None C-22A, C-4A
2	2.4 mc. 7.0 mc.	330 ohm 330 ohm	C-21B None	None C-22B, C-4B
3	No low frequency adjustment on this band. 28 mc.	330 ohm	None	C-22C, C-4C

MODEL EC-1B, Echophone

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

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

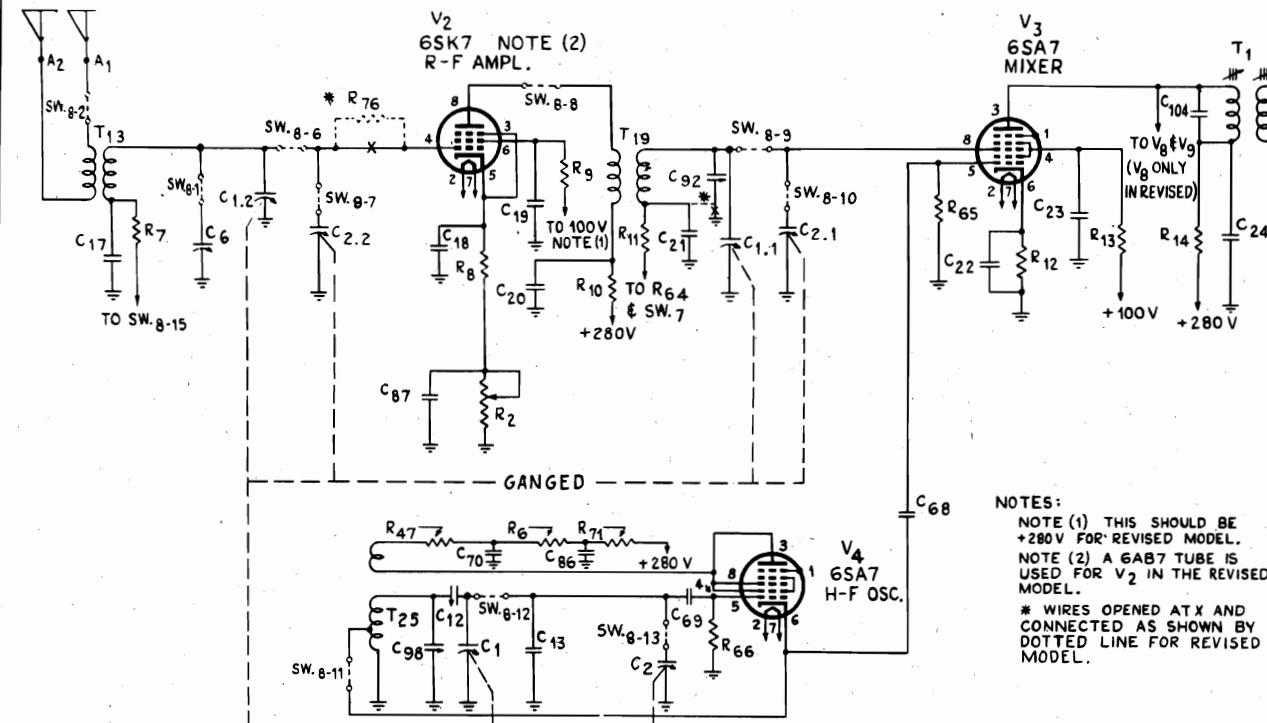
BAND-SWITCH SHOWN  
AT 3<sup>RD</sup> POSITION CLOCKWISE  
BAND 3

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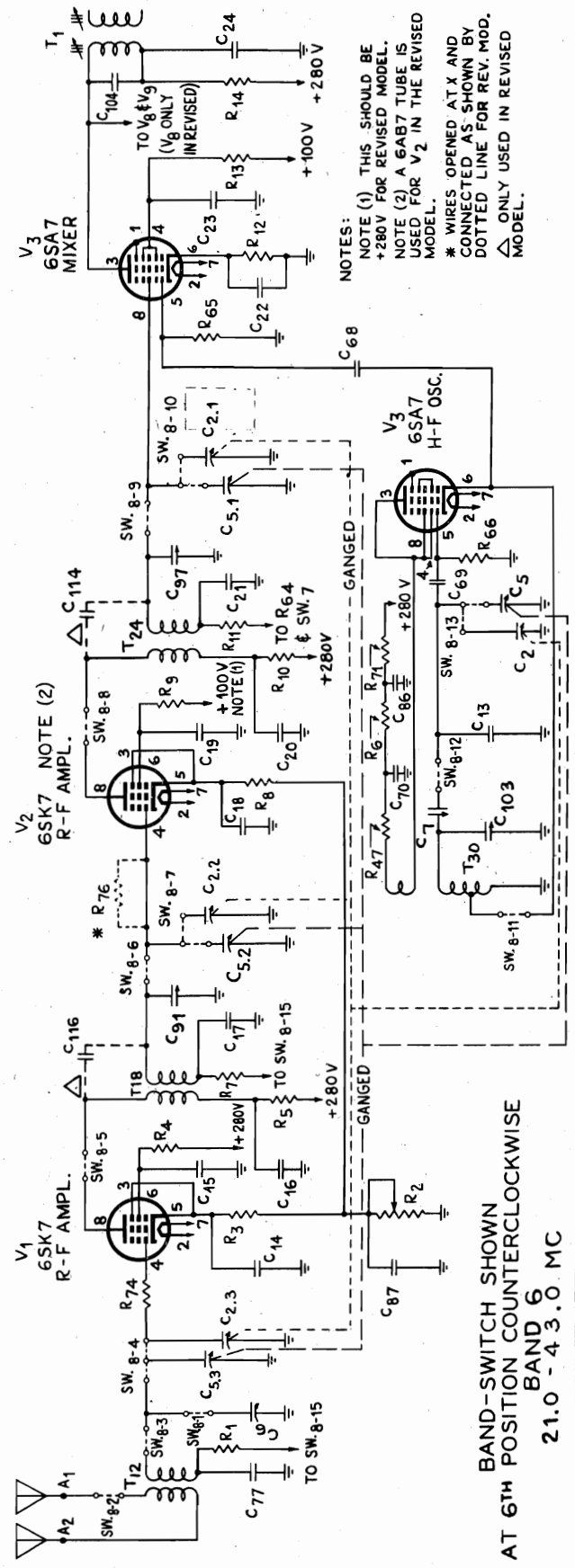
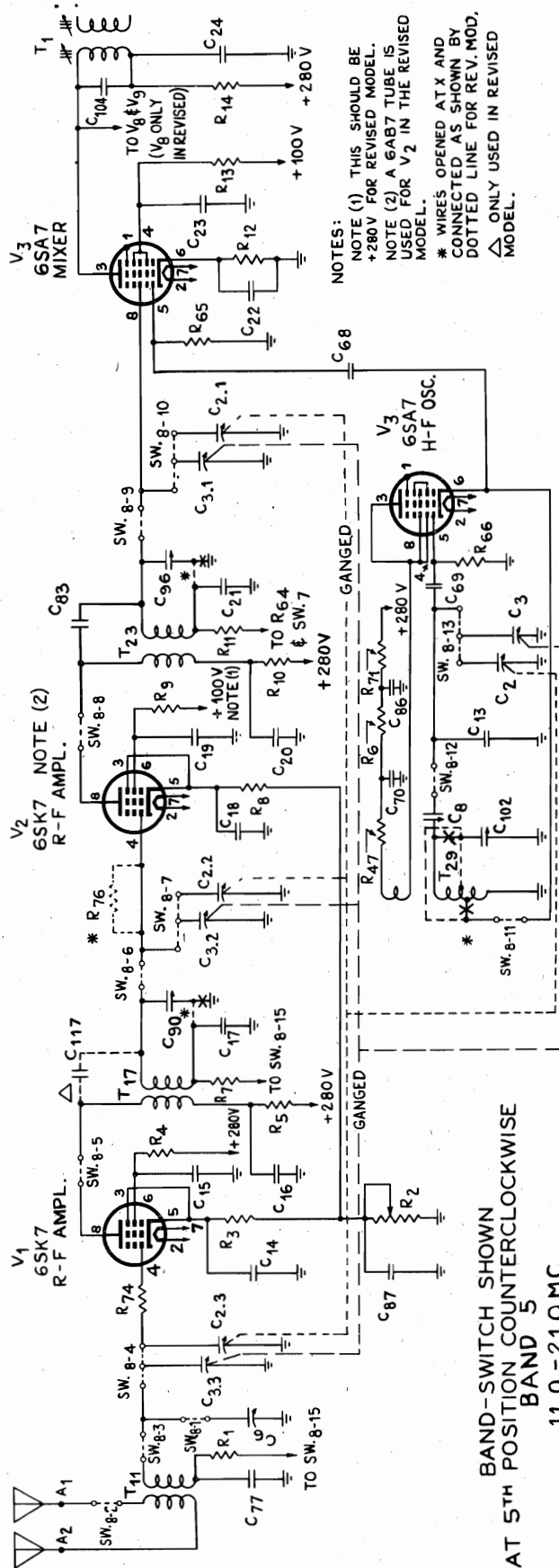
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MODEL SX-28A,  
Super Skyrider



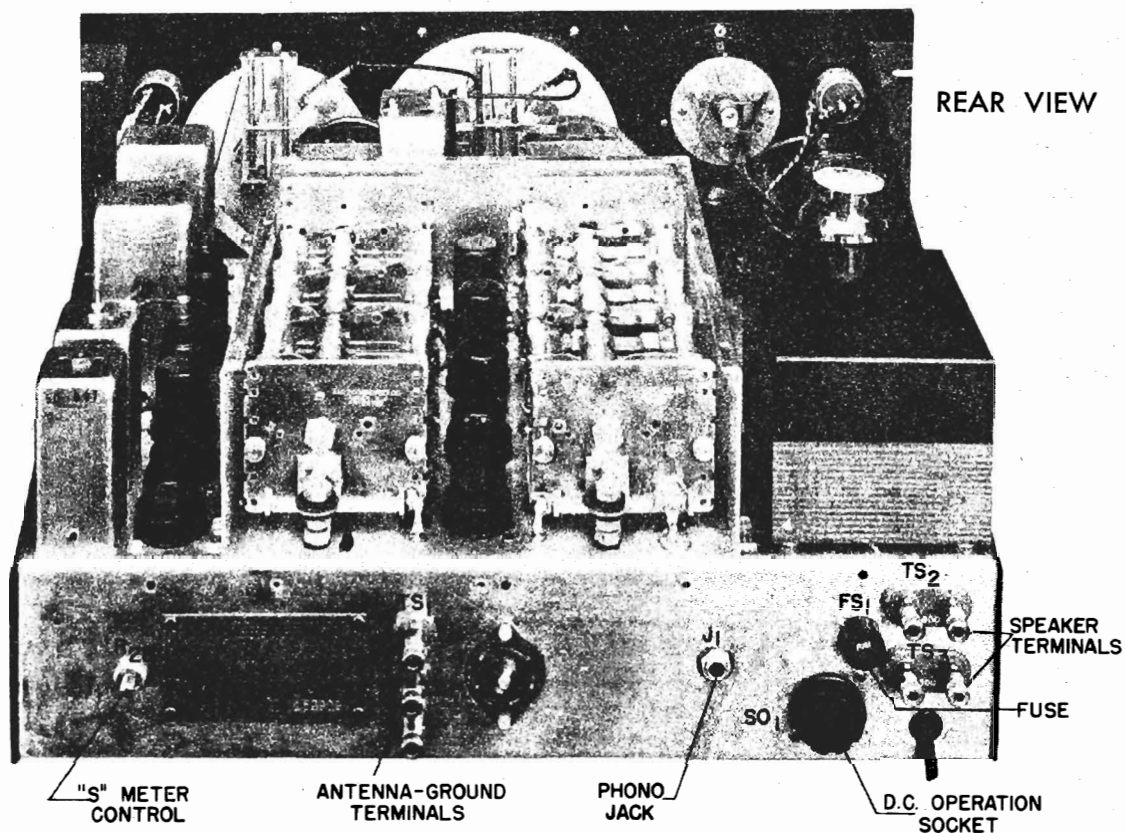
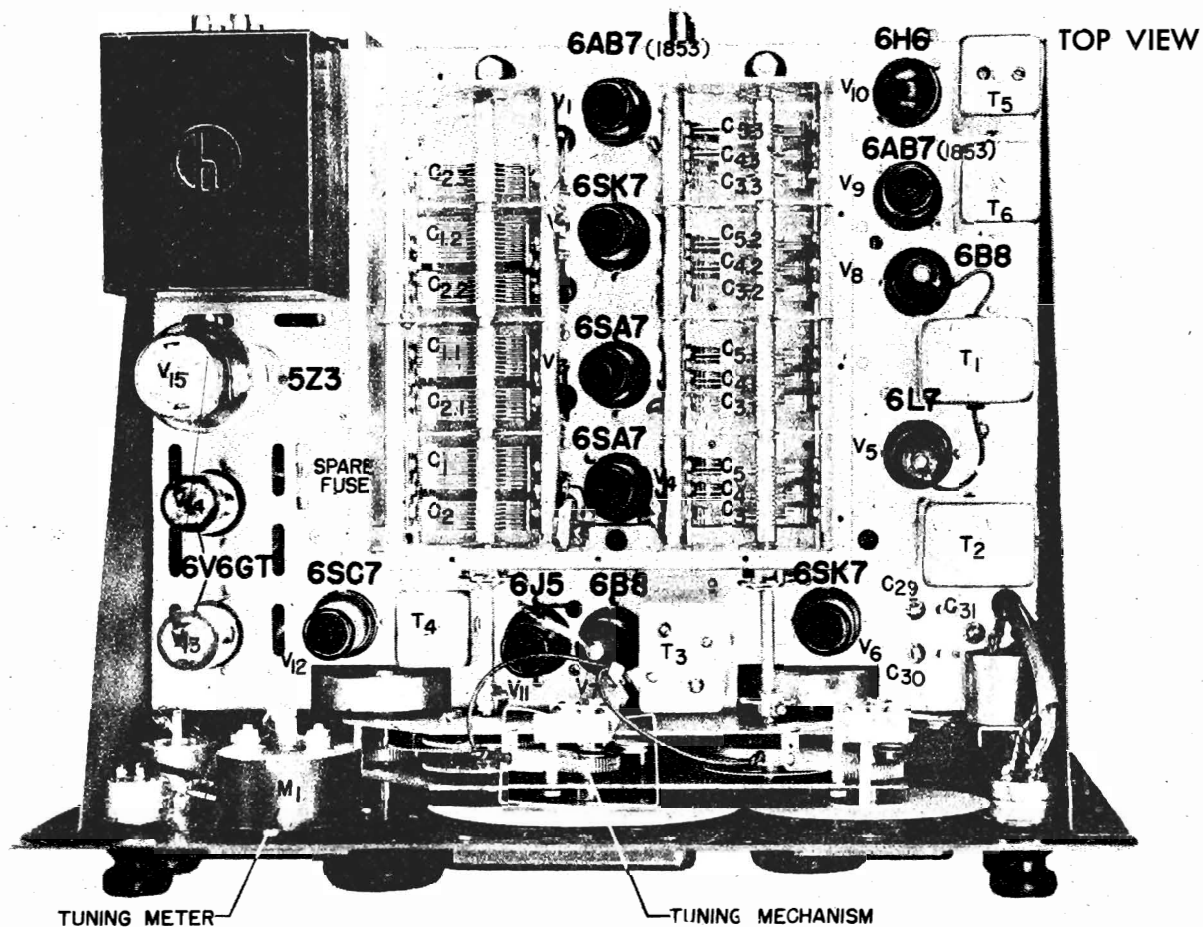
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Super Skyrider



MODEL SX-28A,  
Super Skyrider

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## THE HALLICRAFTERS CO.

MODEL SX-28A,  
Super SkyriderTERMINALS AND CONNECTIONS ON  
REAR OF RECEIVER

## (1) SPEAKER

On the rear apron of the receiver's chassis appear two terminal strips for connecting either a 500 or 5000 ohm speaker to the receiver. Should a matching HALLICRAFTERS Bass-Reflex speaker be used with the receiver, it should be connected to the 5000 ohm terminals. The 500 ohm terminals can be connected to a speaker or other load of that impedance value.

## (2) ANTENNA

To the terminals marked A1-A2 and G should be connected the antenna you have chosen to use with the model SX-28-A receiver.

Very satisfactory results throughout the tuning range of the SX-28-A will be obtained with a conventional inverted "L" Marconi type of antenna 75 to 100 feet long including lead-in. This antenna should be erected as high as possible and removed from surrounding objects. Be sure that the antenna is insulated from the ground at all points. When this type of antenna is used it is connected to terminal A-1. The jumper between A-2 and G should remain connected.

In the event a doublet antenna is used with the model SX-28-A SUPER SKYRIDER receiver, the two wires of the doublet lead-in should be connected to terminals A1 and A2. The jumper between A2 and G can remain connected or removed, depending upon its effect on favorable reception.

A ground can be used if desired and should be connected to the G terminal. Connecting the receiver to a good ground (cold water pipe or 6 foot rod driven in moist soil) might improve reception and reduce noise. Under normal conditions no noticeable difference will exist so a ground is suggested only if it aids reception.

Should you wish to have a separate antenna for some one short wave frequency or band, a half-wave antenna cut to the proper length for the desired frequency will prove very effective. The following formula will give the length of the  $\frac{1}{2}$  wavelength antenna depending on the desired frequency.

$$\text{Length in feet} = \frac{463}{\text{frequency in megacycles}}$$

or, for example, a half wave 40 meter antenna would be  $\frac{463}{7} = 66.14$  feet long.

The antenna should preferably be of solid soft drawn enameled copper wire for ease in handling. The center of the wire is cut and an insulator inserted at that point. The twisted pair, or open wire transmission line, is then soldered to each 33 foot length, after the enamel has been scraped off, directly on either side of this center insulator. The other end of the transmission line should be connected to A1 and A2 on the receiver. It should be remembered that such an antenna has directional properties broadside to its length and should be so oriented if maximum pickup from a certain direction is to be expected.

In designing transmission line systems for a more accurate match of the line to the antenna input circuit, it will be helpful to know that the approximate antenna input impedance of the receiver is 400 ohms.

## (3) PHONO-JACK

The Phono-Jack enables you to use the high fidelity audio amplifier of the receiver for phonograph record or transcription play-back purposes. A high impedance crystal or magnetic pick-up arm should be used for this purpose and connected to a standard headphone plug. This plug is then inserted in the PHONO-JACK when record playing is desired. The receiver is inoperative to radio signals, when the plug is in the phono-jack.

The volume of the audio amplifier is varied by rotating the AF Gain control until the proper level is obtained. Removal of the plug from the Phono-Jack once more places the RF and IF portions of the receiver in operation.

## (4) DC POWER SOCKET

The octal socket on the rear of the chassis is used when it is necessary to furnish power to the receiver from a direct current source. For conventional AC operation, the shorting plug must remain in the DC OPERATION SOCKET. The shorting plug is removed for battery or vibrapack operation. A similar plug to the shorting plug is then wired, as shown in Fig. 13, and inserted in the octal socket.

A "B" supply capable of delivering 270 volts at 150 milliamperes is necessary for successful operation. Refer to the section on receiver specifications for the total battery drain for DC operation.

In addition to its function as connector for a DC supply, this socket also serves as an outlet for a remote stand-by switch. If the remote stand-by switch or relay is connected between pins #1 and #5 on the shorting plug and the SEND-RECEIVE switch on the front panel of the receiver is set at SEND, the remote switch or relay will control the operation of the receiver in the same manner as the SEND-RECEIVE switch.

## (5) "S" METER ZERO SET

"S" METER CONTROL is obtained by varying the knurled knob appearing on the left hand chassis apron edge. This control enables you to properly set the "S" Meter to zero. In order to make the adjustment correctly, the RF GAIN CONTROL must be advanced clockwise as far as it will go. In addition, the switch directly below the bandsread hand-wheel must be in the AVC—ON Position. When these conditions have been complied with, remove the antenna from the Receiver and then adjust the S meter control until the S meter reads zero. Reconnecting the antenna to the receiver will then make the meter indicate the relative carrier strength of each incoming signal as various signals are tuned in.

## B OPERATION

Each control of the Model SX-28-A SUPER SKYRIDER receiver performs a definite function that contributes to the outstanding reception capabilities of the unit. Full appreciation of the receiver is to be expected only after you have become familiar with each of the controls and the effect their operation has on the receiver's performance.

The large calibrated main dial shows the frequencies covered throughout the 6 band, 550 kc to 43 mc frequency range of the receiver. They are as follows:

Band 1—550	to 1,600 kilocycles
Band 2—	1.6 to 3.0 megacycles
Band 3—	3.0 to 5.8 megacycles
Band 4—	5.8 to 11.0 megacycles
Band 5—	11.0 to 21.0 megacycles
Band 6—	21.0 to 43.0 megacycles

(1) The BANDSWITCH, directly below the main dial, will place the proper set of coils in the circuit to cover the desired frequency. The main dial is turned by the large handwheel which is equipped with a micrometer scale for maximum accuracy in resetting or logging purposes. Of particular interest is the locking clutch which will be found directly below the handwheel. This feature will allow you to lock the main dial after a desired signal has been tuned in. Subsequent movement of the handwheel will not detune the receiver because the control is provided with a clutch which disengages the handwheel once the dial lock has been set.

The International Shortwave broadcast bands are indicated on the main dial by heavier lines showing the frequencies on which these transmissions will be heard.

The Amateur band setting positions of the main dial are indicated by a small 0 appearing over the red numbers which identify each amateur band. The hairline on the main dial window should be set so that it intersects this small circle when the main dial is placed in position for the desired amateur band.

(2) The BANDSPREAD dial is calibrated for the 10-20-40 and 80 meter amateur bands. When tuning on the 160 meter band the main dial should be used.

Note: The calibration on the main dial will be accurate only if the bandsread condenser is set at minimum capacity which is indicated by a setting of 100 on the bandsread logging scale. It should be recognized that if the bandsread condenser is left at any other setting but 100, that small amount of bandsread condenser capacity, added to the main tuning dial calibration because the receiver is calibrated with the Bandsread condenser set at minimum capacity. The portions of the amateur bands on which type A3, or telephone, transmissions will be heard are underscored with another dark line.

The numbered outer edge of the bandsread dial will prove to be of great help for logging or pre-setting purposes when the bandsread tuning control is used for easier tuning on frequencies other than those covered by the amateur bands.

When "bandsreading" any frequency throughout the tuning range of the receiver remember the main dial must then be set to a slightly higher frequency than the desired signal. The difference depends on the amount of bandsread condenser capacity used and the frequency of the received signal.

When switching from one range to another, an indicator moves vertically behind both the main and bandsread dials. Tuning fatigue is thereby greatly minimized by focusing attention on only the frequencies covered by that particular setting of the bandswitch.

The translucent, indirectly lighted dials are easily read and so arranged that parallax is reduced to an absolute minimum.

To operate the receiver adjust the following controls in the order in which they are mentioned:

(3) The TONE CONTROL turns the receiver on and off and in addition emphasizes either the base or treble frequencies to the extent required by various receiving conditions. The effect the Tone Control has on the fidelity of reproduction is shown in Fig. 10.

(4) Place the SEND-RECEIVE switch in the RECEIVE position—have the ANL control off (turned to the left until the switch operates).

Place the bandswitch in position .55 to 1.65 mc, which will then enable you to tune in stations on the standard Broadcast Band.

(5) Rotate the RF GAIN control to the right until #9 on the skirt of the control appears under the panel marker. (The RF Gain must be full ON as above indicated before the S meter will indicate correctly.) So that the S meter will be properly connected in the circuit, the AVC-BFO switch appearing to the lower right of the bandsread handwheel, must be in the AVC ON position.

(6) Note: The Antenna Trimmer control is operated on all Bands. Proper adjustment of this control is indicated by the maximum signal.

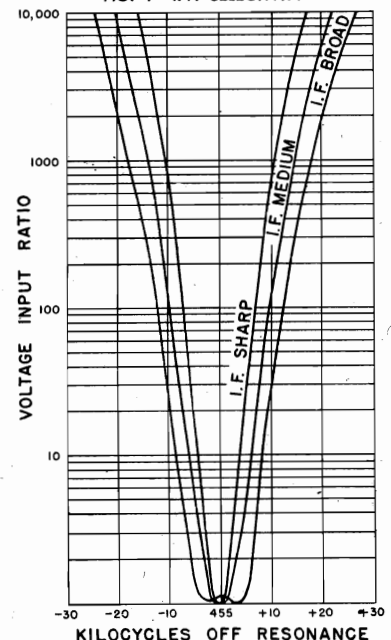
(7) After complying with the above conditions, the AF GAIN control should be advanced to the right until the desired volume is obtained. Tuning the receiver by operating the main dial handwheel will now allow you to pick up stations throughout the .55 to 1.65 mc tuning range of the Broadcast band. Maximum deflection of the S Meter will indicate when each station is accurately tuned in.

When covering the short-wave or higher frequency bands the above procedure should be followed—except that greater care should be used because it is so easy to completely pass over a station.

The other controls on the model SX-28-A SUPER SKYRIDER receiver will enable you to obtain the best results from the receiver once you have become used to their effects on the reception of various types of signals.

(8) The SELECTIVITY control acts as a shutter or gate and varies the width of the path on which signals reach the second detector of the receiver. Six different selectivity steps are provided so that you can successfully cope with different degrees of interference. Reference to Fig. 1 and Fig. 4 will show, graphically, how the control trims the width of the signal so that what interference might be present in the signal's skirts or sidebands is effectively clipped off. Should an interfering signal lap over into the desired signal, adjustment of the SELECTIVITY control, will reduce that interference.

FIG. 1—I. F. SELECTIVITY



Once more refer to Fig. 1 and Fig. 4 and recognize the fact that with the control set in the BROAD IF position, the signal proper and all its parts, which are combined in the side bands, or skirts, will be passed to the 2nd detector, audio amplifier, and then Speaker. As the selectivity of the receiver is increased from BROAD-IF to XTALSHARP, the gate, or admittance path, is so narrowed that only the main portion of the signal is allowed to pass through. This fact and its effect on the quality of reproduction is readily appreciated by listening to a signal and noting the reduction in higher frequency response in the more selective settings of the switch. (See Fig. 10 and Fig. 11)

At this point, it is suggested that the CRYSTAL SHARP setting be used only in cases of extreme interference—the receiver must then be tuned exactly to the signal. Only then will the signal be intelligible because you have clipped off its sidebands in which the sibilants and overtones are embodied.

The CRYSTAL SHARP position of the selectivity switch is to be used principally for the reception of code, or CW, signals. By proper associated operation of the CRYSTAL PHASING control true single signal operation and the maximum in selectivity can be obtained (crystal circuit discussed in detail in the summary of related circuits). See Fig. 3.

## MODEL SX-28A, Super Sky rider

THE HALLICRAFTERS CO.

## (3) THE IF AMPLIFIER

The IF Amplifier of the Model SX-28-A was designed with a view towards permanency of adjustment under conditions of extreme changes in temperature and humidity as well as unusual mechanical vibration.

The first two IF Transformers are permeability tuned. In comparing this type of transformer with one having compression mica tuning condensers, it must be remembered that it takes many more turns of the adjusting screw to cause the equivalent change in tuning of the permeability tuned type. Hence a slight change in the position of the screw will have negligible effect upon the tuning. The adjusting screw is under spring tension thereby making it impossible to turn under vibration.

The diode transformer is air-tuned with two variable condensers each with a lump capacity of 50 mmf and variable of 50 mmf. These air trimmers are also under spring tension so that they can withstand considerable vibration. Being of the air tuned type, their capacity change is negligible with wide changes in humidity. Reference to the Schematic will show that the IF transformers are expanded in two steps—thereby enabling medium or full reproduction of the higher frequencies to be obtained.

## (4) VARIABLE SELECTIVITY

Six ranges of selectivity are provided in the model SX-28-A receiver. They are:

- 1—Broad IF—(for high fidelity reception)
- 2—Medium IF—(more selectivity—less highs)
- 3—Sharp IF—(reduces annoying interference—far less highs)
- 4—Crystal Broad—(Similar to Sharp IF but cleaner cutting of side bands)
- 5—Crystal Medium—(next selectivity step to #4—greatly increased sideband cutting—more pronounced crystal "Slot" for interference—very little highs present)
- 6—Crystal Sharp—(position of extreme selectivity—practically no sideband content—very pronounced crystal "slot")

The graphic effects of the different steps of selectivity on a signal are shown in Fig. 1 and Fig. 4.

(5b)

## CRYSTAL

The CRYSTAL FILTER and holder are wired directly into the receiver and do not plug in as heretofore. In this manner exceptional crystal filter action is obtained because of the elimination of the capacity and losses of a socket. So mounting the crystal prevents possible change in polarity which would occur if the crystal were improperly inserted in the circuit.

The size of the crystal has been carefully determined to allow the BROAD CRYSTAL position to tune as broadly as possible. The capacity of the crystal holder has been reduced to a minimum through the use of a specially designed polystyrene holder.

## (5) CRYSTAL FILTER CIRCUIT

In positions 1, 2, 3 the crystal is short circuited. In position 4 the short across the crystal is opened and the iron core in the secondary of the transformer is adjusted for Broad Crystal Action and at this point is accurately tuned to the crystal frequency. Due to the close coupling of the secondary to the crystal, the sharply rising resonance curve of the crystal causes, in contrast, a sharply falling resonance curve in the secondary. The combined action of these two characteristics results in a relatively broad resonance curve for the CRYSTAL BROAD selectivity setting. In the MEDIUM CRYSTAL No. 5 position,  $C_{28}$  is adjusted for selectivity midway between the BROAD and CRYSTAL SHARP settings. (See Fig. 2 and Fig. 4)

In position 6, or CRYSTAL SHARP, the trimmer  $C_{30}$  is adjusted for the Sharpest crystal action. Under this condition, the Secondary is slightly detuned from the resonant crystal frequency sufficiently so that its resonance curve is not greatly affected by the crystal but still coupled tightly enough so that it can transfer energy to the crystal circuit. When this point is reached it is indicated by a rise in the output. Two such points of increased output will normally occur—one for each adjustment of the secondary on either side of the resonant frequency of the crystal.

FIG. 2—CRYSTAL FILTER SCHEMATIC

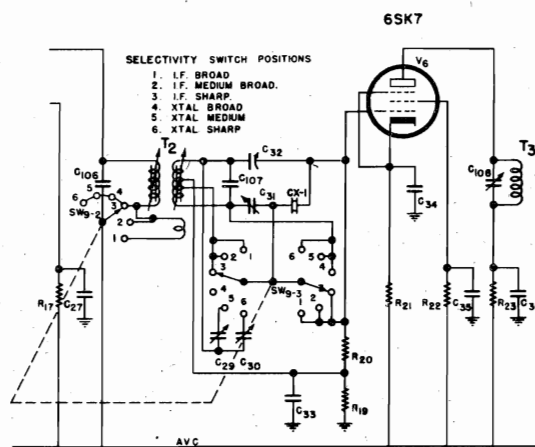


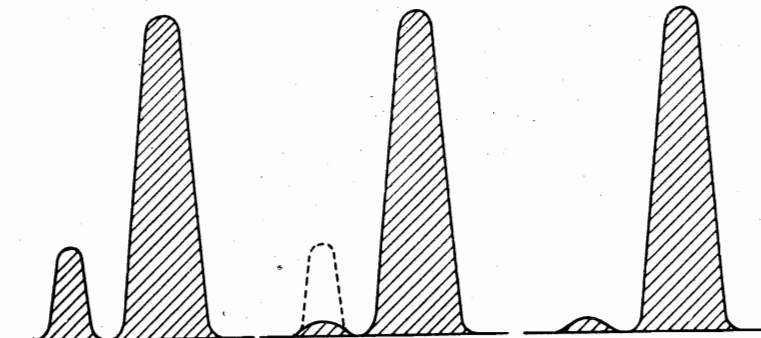
FIG. 3—SINGLE SIGNAL OPERATION

(5a)

## SINGLE SIGNAL ADJUSTMENT

It is extremely simple to attain single signal reception with the SX-28-A. First, turn on the BFO to the desired Beat Note and turn the selectivity switch to the XTAL SHARP position. Pick a good solid CW signal, preferably a commercial station because a commercial is likely to stay on long enough for you to complete the phasing adjustment for single signal reception.

You will find on tuning across this signal that it has two amplitudes. Tune first to the weaker of these two amplitudes. Now, turn the PHASING control until this weaker of the two amplitudes is reduced to a minimum. (If the weaker amplitude appears on the right the above procedure still holds.) Then tune to stronger of the two amplitudes and adjust the BFO control to a tone most pleasing to you. This adjustment for single signal selectivity will hold with no further adjustment unless you change the phasing control. (See Fig. 3.)



With Selective Switch in XTAL Sharp position identify the weaker amplitude—Tune Receiver to the weaker.

Adjust phasing control carefully until this weaker amplitude is reduced to a minimum.

Retune Receiver to the stronger amplitude and then adjust pitch control until you get note most pleasing to copy.



## THE HALLICRAFTERS CO. MODEL SX-28A, Super Skyrider

## (9) CRYSTAL PHASING CONTROL

The Phasing Control is in the circuit on three positions of the selectivity control namely—XTAL Sharp, XTAL Medium and XTAL Broad.

The control is used to remove heterodyne interference as well as to minimize other forms of interference having a predominance of high frequency components—such as static and interference from electrically operated devices.

(10) The A.N.L., or *Automatic Noise Limiter*, materially contributes to the satisfactory operation of the receiver by limiting objectionable interference caused by ignition systems or other man made causes of electrical disturbances. With the A.N.L. control retarded to the left as far as it will go, or until the A.N.L. switch is heard to operate—the noise limiter circuit is not functioning. Turning the control to the right closes the switch which is mounted on the control. The noise limiter is now operating. Progressively turning the control clockwise varies the threshold at which the noise limiter starts to take hold. The setting at which the control will be left depends entirely on the type and amount of interference present as well as the signal strength. The noise limiter should be judiciously adjusted because through its operation the desired signal can even be eliminated or badly distorted which destroys its usefulness. Only after you have become familiar with the operation of this control by actual practice can you determine how far it should be advanced before the best compromise between noise and signal is obtained. (See Fig. 6.)

(11) The AVC-BFO OFF-ON switch performs a dual function. The AVC circuit should be operating for the reception of telephone, or modulated, signals in order to reduce fading to a minimum. As previously mentioned, the functioning of the S Meter is dependent upon AVC action so the switch must be in the AVC ON position when the S meter is used to measure relative carrier intensity.

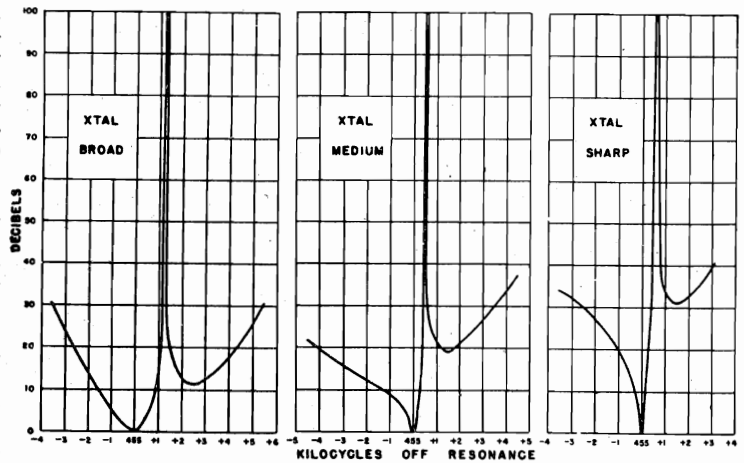
Inasmuch as the AVC circuit levels all signals to a predetermined value (See Fig. 7) no one signal can overload the receiver and cause distortion. At times, in searching for distant or weak signals, it might be desirable to use the full sensitivity of the Model SX-28-A. In that case place the AVC switch in the AVC OFF position. Remember that with the receiver operating with no AVC action, strong signals will overload the input circuit with resultant distortion. Under such a condition of operation the sensitivity of the set must be then controlled, manually, by properly retarding the RF Gain control until you have reached the point below which overloading takes place.

The other function of this switch is to turn on the Beat Frequency oscillator. When receiving code signals, a beat note is absolutely essential. With the BFO switch in the ON position, each signal tuned in will be accompanied with a beat note or whistle. For proper adjustment of the BFO control which appears directly under the TONE CONTROL the following procedure is suggested. Set the BFO control to zero, now tune in a signal either voice or code. If a code signal is received, only the carrier or thump of the signal will be audible because no beat note is present. Be sure that you have the signal accurately resonated. Now, without retuning the receiver, rotate the BFO control until a beat note of the desired pitch is obtained. You now have introduced a beat note which differs from the IF frequency of the receiver, namely 455 kc, by the frequency of the audible signal. Variation of the BFO control will allow you to change the pitch, or frequency, of the oscillator which will prove to be of help under various conditions of interference.

(12) Directly under the BFO control will be seen the BASS IN-OUT Switch. With this switch in the BASS IN position you will have normal audio fidelity. Placing the switch in the BASS OUT position, the audio filter CH<sub>2</sub> is inserted. The effect of this filter on the band of frequencies passed is shown Fig. 11. This filter will contribute greatly to the intelligibility of the received signal when the receiver is operated in the advanced positions of selectivity.

(13) The Head Phone Jack is connected to a tap on the output transformer. The signal in the headphones is of the proper volume for satisfactory communications reception. Since no direct current is present in the headphone circuit crystal type phones can be used.

FIG. 4—CRYSTAL SELECTIVITY



## (1) THE 2-STAGE PRESELECTOR

The RF AMPLIFIER, or pre-selector, of the Model SX-28-A SUPER SKYRIDER has 1-6AB7, 1-6SK7 tubes in cascade on Bands 3, 4, 5, and 6. On Bands 1 and 2 more than one stage is unnecessary to obtain the required image ratio and reduction of spurious interference. With two RF stages using three pre-selection circuits, the band width would be narrowed to such an extent that even expanding the IF Amplifier to its utmost would still not provide high-fidelity reception. The modern communications receiver requires two stages of preselection on the higher frequencies to accomplish only one primary object—satisfactory image rejection.

The Model SX-28-A has an image ration of 20 to 1 at 28 mc—350 to 1 at 14 mc and a proportionately increasing ratio as the frequency is lowered. While the two RF stages are principally needed to obtain such image ratios they also perform two other useful functions—more favorable signal to noise ratio and slightly increased selectivity.

Examining the coil assembly will immediately show how rigidly it is constructed and what care has been taken to completely shield each section from the other. The manner in which the RF and antenna coils are tuned on bands 3, 4, 5, and 6 will be interesting. Rather than push turns to compensate for variations in inductance, each coil is permeability tuned. This results in exact adjustment of inductance with improved tracking and gain as the result. On Bands 1 and 2 the inductance of the antenna coils is sufficiently large so that lead length differences do not cause any noticeable inductance change.

## 2) THE OSCILLATOR AND CONVERTER

A separate 6SA7 tube is used as the High Frequency Oscillator in the Model SX-28-A SUPER SKYRIDER. This tube proves desirable in this function because of its very high value of transconductance which enables the oscillator to operate with very little coupling to the coil. This feature reduces the unfavorable effects of tube variations and voltage fluctuations on the tuned circuit. The HF Oscillator is coupled to the 6SA7 converter tube at the Cathode Tap—a point where variations of operating parameters of the converter tube will least affect the 6SA7 Oscillator. A 6SA7 tube is used in the Mixer Circuit because tests indicated that changes in operating voltages caused less reflection in the injector grid loading than would occur in most converter tubes. Another feature in favor of the 6SA7 tube is that a negative loading is applied to the tuned circuit feeding its control grid. This characteristic improves the gain and selectivity of the tuned circuit which in turn improves the image and signal to noise ratio.

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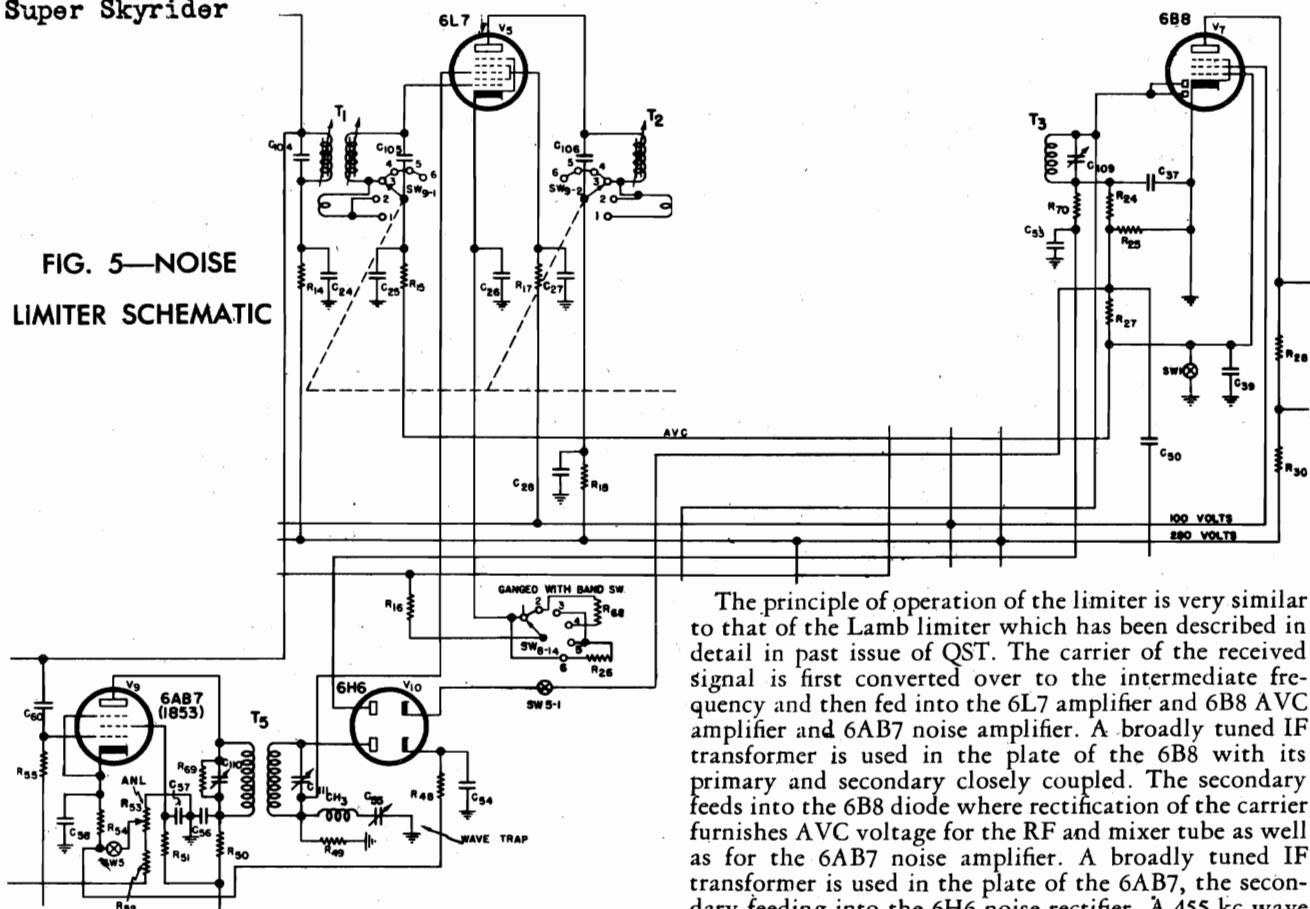
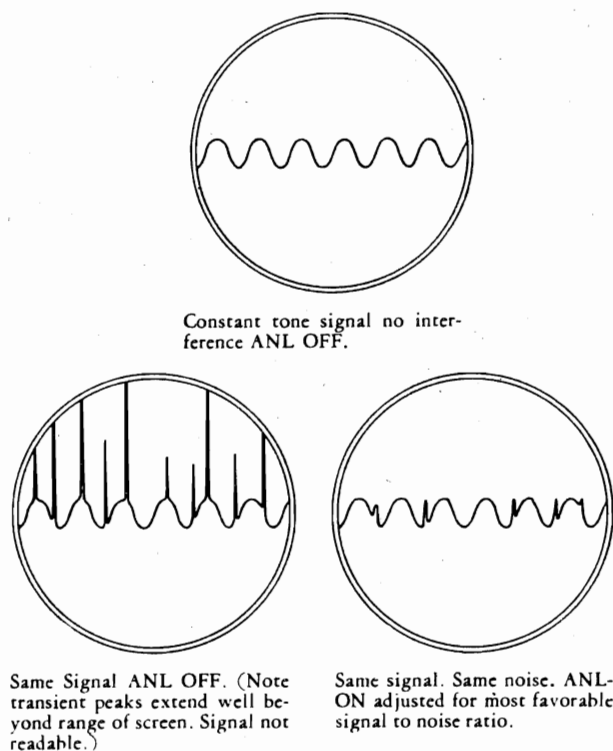
FIG. 5—NOISE  
LIMITER SCHEMATIC

FIG. 6—NOISE LIMITER ACTION



The principle of operation of the limiter is very similar to that of the Lamb limiter which has been described in detail in past issue of QST. The carrier of the received signal is first converted over to the intermediate frequency and then fed into the 6L7 amplifier and 6B8 AVC amplifier and 6AB7 noise amplifier. A broadly tuned IF transformer is used in the plate of the 6B8 with its primary and secondary closely coupled. The secondary feeds into the 6B8 diode where rectification of the carrier furnishes AVC voltage for the RF and mixer tube as well as for the 6AB7 noise amplifier. A broadly tuned IF transformer is used in the plate of the 6AB7, the secondary feeding into the 6H6 noise rectifier. A 455 kc wave trap (CH4 and C55) is used which allows the passage of the higher audio frequencies without attenuation. In the form of further explanation of our approach toward noise elimination, it must be remembered that noise in general is composed of a random mixture of high and low frequencies. Of this mixture the predominating higher frequencies are the most objectionable. It is to our advantage to retain the high frequency components. Thus, these transients will be allowed to rise to a point far above the carrier level with the result that they will be applied to the injector grid of the 6L7 tube without being reduced in value. Transients, such as ignition interference having a steep wave front, consist largely of high frequency components. The voltage applied to the grid of the 6L7 tube has a negative polarity because of the 6H6 noise rectifier. By varying the ANL control, we raise or lower the negative voltage applied to the 6L7 tube until it is barely sufficient to overcome the noise impulses applied to the grid of this tube without allowing the modulation peaks of the carrier to become badly distorted.

If the noise limiter adjustment permits too great a value of transient voltage to be applied to the 6L7 injector grid, detection will take place and rectified components of this modulated carrier will appear in the 6L7 plate circuit. This effect will appear as distortion in the output of the receiver. If, on the other hand, not enough noise voltage is applied, then the momentary decrease in sensitivity will not be great enough to stop the noise from getting through and some of it will appear in the plate circuit of the 6L7 tube and consequently in the output of the receiver. As a result the noise limiter must be carefully adjusted to the particular carrier and noise level being received. (See Fig. 6)

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FIG. 10—AUDIO FIDELITY CURVE

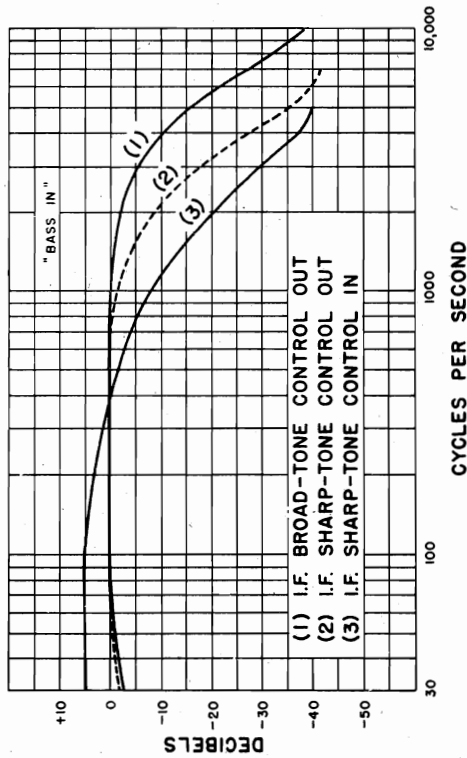
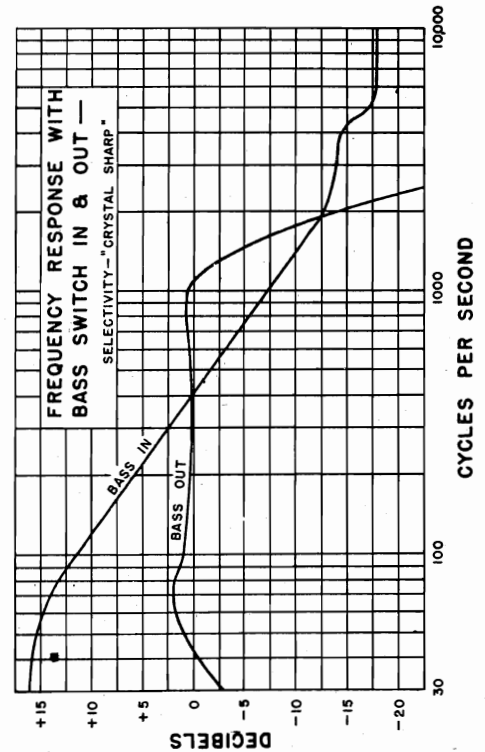


FIG. 11—AUDIO FILTER CURVE



The following measurements made with a 20,000 ohms per volt meter and taken from the socket terminal indicated to ground or receiver chassis. Antenna and ground were disconnected from the receiver when these measurements were taken and the RF and AF gain controls set at maximum. "DL" means Dead Lug but will indicate voltage when used as a tie. Normal tolerance allows a variation of  $\pm 10\%$  from the indicated values.

TUBE	FUNCTION	SOCKET TERMINALS							
		1	2	3	4	5	6	7	8
V <sub>1</sub> -6AB7	RF Amp. (1)	...	...	...	0.1	4.15	170	6.3	227
V <sub>2</sub> -6SK7	RF Amp. (2)	...	...	4.35	0.1	4.35	105	6.3	279
V <sub>3</sub> -6SA7	Mixer	...	...	250	100	0.12	4.1	6.3	...
V <sub>4</sub> -6SA7	HF Osc.	...	...	116	116	0.3	...	6.3	116
V <sub>5</sub> -6L7	IF Amp. (1) Noise Limiter	...	...	245	102	...	...	6.3	4
V <sub>6</sub> -6SK7	IF Amp. 2	...	...	4	...	4	107.5	6.3	235
V <sub>7</sub> -6B8	2nd Det. S Meter Tube	...	...	17.2	-255	-255	108	6.3	...
V <sub>8</sub> -6B8	AVC Amp.	...	...	225.5	0.2	0.2	107	6.3	2
V <sub>9</sub> -6AB7	Noise Amp.	...	...	...	0.7	1.1	150	6.3	225
V <sub>10</sub> -6H6	Noise Rectifier	...	...	...	1	...	17.6 DL	6.3	...
V <sub>11</sub> -6J5	Beat Osc.	...	...	140	...	-7.4	...	6.3	...
V <sub>12</sub> -6SC7	1st Audio Amp.	...	140	...	...	137	1.4	6.3	...
V <sub>13</sub> -6V6GT	P.P. Audio Amp.	...	...	310	290	...	198 DL	6.3	17
V <sub>14</sub> -6V6GT	P.P. Audio Amp.	...	...	310	290	...	...	6.3	17
V <sub>15</sub> -5Z3	Rectifier *	320	340 AC	340 AC	320	...	...	...	...

\* 5 V. AC between Terminals 1 & 4

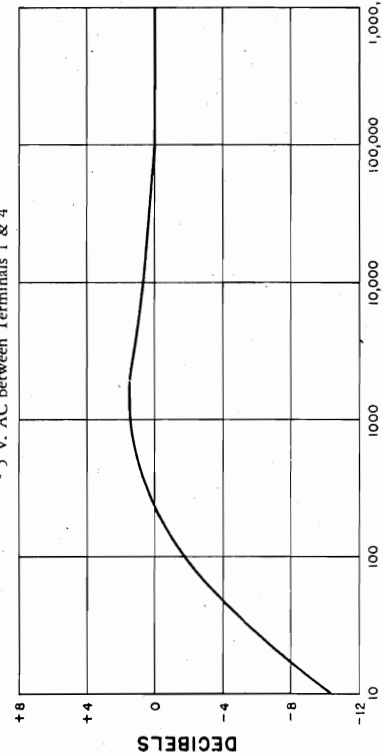
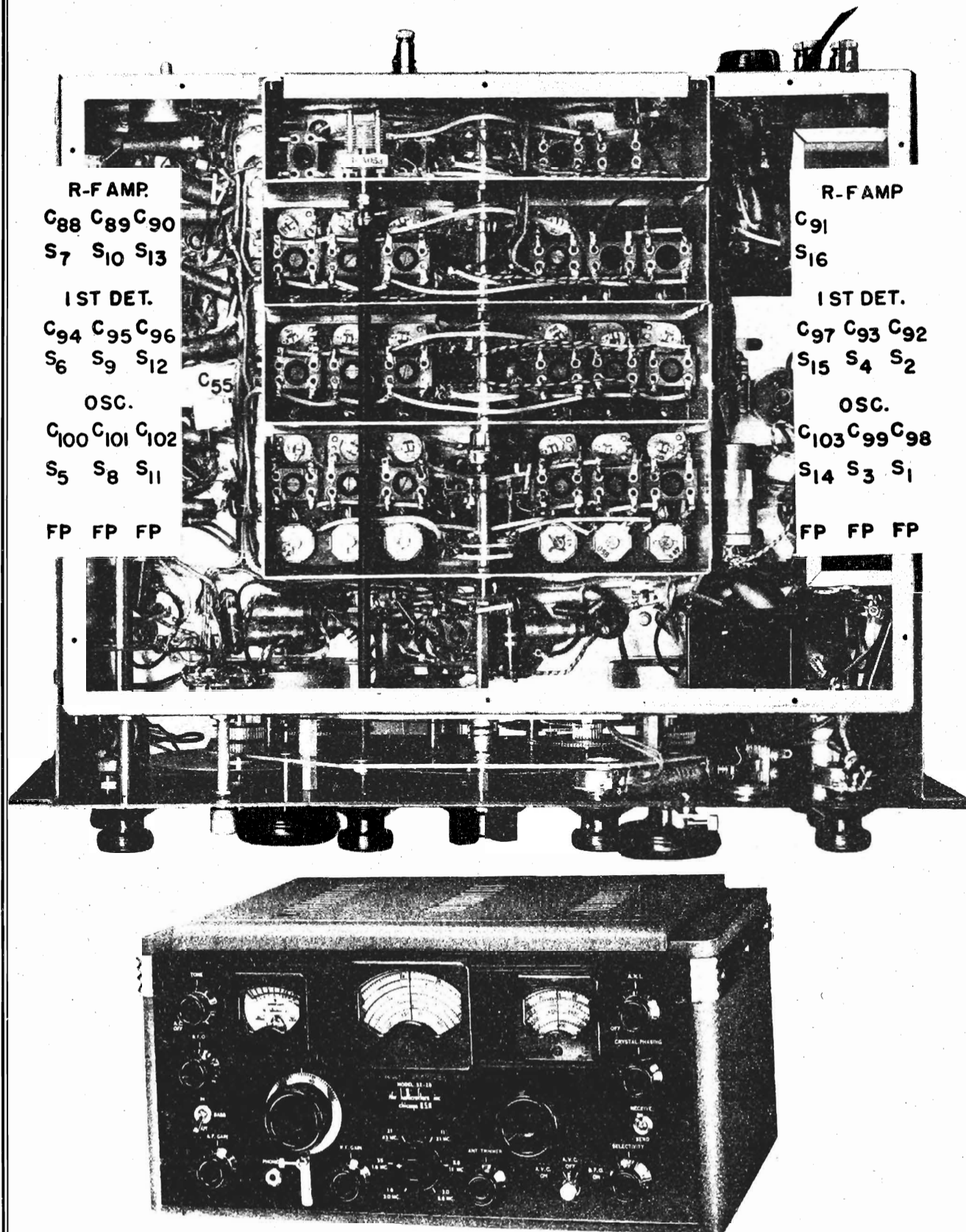


FIG. 7—A.V.C. CURVE—AT 3 MC.

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FIG. 12—RF AND OSC ADJUSTMENT LOCATION AND ALIGNMENT PROCEDURE



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triode is fed to the grid of the other 6SC7 triode section, thereby giving two output voltages in opposite phase suitable for exciting the push-pull 6V6GT output amplifier.

## THE POWER SUPPLY

The power supply in the Model SX-28A is quite normal except that it supplies voltage for the 6V6GT output tubes directly from the rectifier or before the filter output. Voltage fluctuations in the receiver are greatly reduced—increasing the audio output of the receiver and stabilizing the operation of all circuits.

The filter circuit consisting of a total of 60 mfd of capacity plus an additional filter in the 6SC7 plate supply and a 12 henry choke keep the hum level of the receiver in excess of 60 dB below maximum output. The power transformer is built to withstand continuous operation at 250 degrees F but has been designed to run at approximately 160 degrees F under normal conditions.

## SPECIFICATIONS

## Tubes:

- 1-6AB7 1st RF Amplifier
- 1-6SK7 2nd RF Amplifier
- 1-6SA7 Mixer
- 1-6SA7 HF Oscillator
- 1-6L7 1st IF Amplifier Noise Limiter
- 1-6SK7 2nd IF Amplifier
- 1-6B8 2nd Detector and S meter tube
- 1-6B8 AVC Amplifier
- 1-6AB7 Noise Amplifier
- 1-6H6 Noise Rectifier
- 1-6J5 Beat Oscillator
- 1-6SC7 1st Audio Amplifier
- 1-6V6GT Push-Pull Output Amplifiers
- 1-5Z3 Rectifier

Power Consumption—AC operation—18 amp. at 6 volts or 108 watts

Power Output—8 watts undistorted

Sensitivity—(for 500 milliwatts output) varies between the limits of 6 to 20 microvolts over the entire frequency range of the receiver.

Selectivity—IF broad (high fidelity) 12 kc 2 x 1000 x 4.1 kc 22 kc

Frequency Range RF—Note: These are the actual frequencies covered corresponding to nominal figures indicated on the front panel.

Frequency response AF (audio filter out)—broad IF—tone control high—70 to 3000 cycles  $\pm$  2 1/2 dB

Speaker Output Impedances—500 and 500 ohms

Intermediate Frequency—455 kc

Table cabinet dimensions—20 1/2" long x 10" high x 14 1/4" deep

Relay Rack dust cover dimensions—14 1/2" deep x 17 3/8" long x 8 3/4" high

Panel dimensions—19" x 8 3/4"

Chassis dimensions—17 3/8" x 13 1/2"

Weight—(unpacked)—75 lbs. packed 97 lbs.

## AVC ACTION

A double AVC system is used. The RF and mixer tubes are operated by the broadly tuned carrier coming through only three tuned IF circuits. The final signal, however, passes through six-tuned IF circuits. As a result, when the signal is slightly detuned, the receiver output has dropped considerably. This results in a reduction of between-action noise and a more sharply defined aural tuning action.

## "S" OR SIGNAL INTENSITY METER

The approximate dB per S unit equivalent is 6 dB's. As is known, a dB, or decibel, is a unit of change in signal level and is defined as being the least change to change the average "3DB" the least change in the signal level when listening to sounds varying in both amplitude and pitch. By comparison, a variation of one S unit on the meter will indicate a change of two decibels steps in signal level. Quantitatively, a dB gain or loss is equal to  $20 \log \left( \frac{E_1}{E_2} \right)$  where  $E_1$  = input voltage and  $E_2$  = output voltage.

## THE SECOND DETECTOR

As will be noted, a diode type of second detector is used in the Model SX-28A. Its choice was prompted by the fact that such a detector is capable of handling large percentages of modulation with very little distortion. This is due to the output of the diode being easily filtered (IF removed). In addition, the rectified output contains a DC component which can be used for AVC purposes.

## THE BEAT FREQUENCY OSCILLATOR

The BFO is tuned on with the switch below the bandspread handwheel and adjusted by the skirted knob directly below the tone control. The BFO circuit, as will be seen by referring to Fig. 13, is the well known Hartley oscillator. It will be noticed that a plate dropping resistor is used to compensate for plate voltage variations. An increase in receiver voltage causes an increase in the plate current of the oscillator. This increase in turn causes the voltage drop across the resistor to increase, thus maintaining a more constant voltage at the plate of the beat oscillator tube. A favorable ratio of capacity to inductance is used. The fixed tank capacity has been artificially aged by alternately exposing it to very high and then low temperatures. In this manner any residual strains of the component parts are removed and the capacity of the condenser remains constant. The BFO coil is permeability tuned which further reduces the possibility of drift which would occur should a compression variable be used to resonate the circuit. Proper location of the Beat Oscillator tube and its associated components plus excellent shielding and mechanical rigidity do much to keep stray fields from being established. Little BFO leakage is to be expected in the Model SX-28A so "leakage" or BFO harmonics will not prove to be bothersome.

## THE AUDIO AMPLIFIER

The second or output stage of the audio amplifier in the Model SX-28A receiver uses two 6V6GT tubes connected in push-pull. These tubes are driven by the 6SC7 double triode. One of the triode sections of the 6SC7 tube is used as the inverter to the 6V6GT tubes. A portion of the signal from the plate circuit of the first 6SC7

parent when the correct adjustment has been reached. Switch to "Xtal Sharp" and adjust  $C_{50}$  for maximum output while varying signal generator frequency. Two points of maximum output will be noted corresponding to two adjustments of  $C_{50}$ . Either one of these points may be used at which to correct adjustment. A sharply peaked tone will result at the correct adjustment.

Switch to "Xtal Medium" and adjust  $C_{50}$  till the output is midway between the outputs reached while aligning the "Xtal Sharp" and "Xtal Broad" positions. The apparent sharpness of tone should be midway between the "Sharp" and "Broad" positions.

Switch again to "Xtal Sharp" and set the signal generator to exact crystal frequency. Set BFO front panel control to a tone of approximately 1000 cycles. Switch again to "Sharp IF" and carefully realign the IF transformers as earlier described in the first paragraph of these instructions.

(2) BFO Adjustment: Set front panel control to zero—BFO switch ON—Signal Generator tuned to crystal frequency—selectivity switch in IF Sharp position—now, adjust screw on top of T4, after loosening lock nut, to zero best. (See Fig. 8)

(3) Noise Limiter and AVC Amplifier Adjustment: Have the controls set as before except that the AVC switch is now in the ON position. Connect a high resistance type voltmeter across R49 which is connected between terminal #5 of the 6L7 tube and chassis. Connect a 50,000 ohm resistor across primary of T5 (Red and Blue leads). Set generator at 455 kc as for IF alignment. Connect generator to grid of 6AB7 tube (pin #4). Rotate ANL control all the way to the right, or position #9. Adjust screw on top of T5 for maximum indication on DC meter connected across R47. Reconnect generator, as for IF alignment, to mixer grid of 6SA7 tube. Remove 50,000 ohm resistor which was inserted across primary of T5 during alignment. Remove grid clip off top of 6L7 tube. With generator set at 455 kc and ANL control at extreme right adjust wave trap trimmer C55 for minimum signal as indicated on output meter. (See Fig. 8 and Fig. 12 for location of adjustments).

With generator connected to 6SA7 mixer grid as above, replace 6L7 grid and turn ANL control to extreme left until switch clicks. Connect high resistance DC meter across 6B8 diode filter condenser C64. Adjust screw on top of T6 for maximum indication on DC meter across C64.

(4) For RF and oscillator adjustment location and alignment procedure see Fig. 12.

## Equipment Needed for Alignment:

1—An all wave signal generator which will provide an accurately calibrated signal at the test frequencies indicated.

2—Output indicating meter connected to 5000 ohm output terminals.

3—Non-metallic screw driver.

4—Dummy antenna of 200 mmf and also 400 ohm carbon resistor.

Setting of controls prior to alignment—IF and RF. Tone control at maximum high frequency position (#9)—BFO at 0—Bass switch at Bass IN—AF Gain at #9—RF Gain at #9—Band switch—IF alignment position .55 to 1.6 band—RF alignment depending on band aligned.

Selectivity control at sharp IF—Send-Receive switch in Receive—Crystal phasing at #3 on left side—ANL—OFF at 0—AVC OFF.

Important: Have bandspread control so logging scale reads 100.

Antenna trimmer adjusted for Maximum gain at each RF alignment point on all bands.

(1) 455 KC—IF Alignment: Tune main dial to 1400 kc on .55 to 1.6 mc band. Connect the hot lead from the signal generator to 6SA7 mixer terminal #8—Ground to chassis. Roughly adjust the aligning screws of T1, the lower screw of which is accessible through hole in right mounting bracket, for maximum gain. Now adjust lower screw on T2 (do not adjust upper screw). Also adjust C31 and the air trimmer condensers at the top of T5 for maximum gain. (See Fig. 8 for location of IF adjustments)

Switch to Crystal Broad Position—Turn on BFO and adjust to a tone of about 1000 cycles. Vary the frequency of the signal generator while adjusting the top screw on T2 until the output goes through a maximum, dips down and starts going up again. Adjust the phasing control for maximum selectivity and then back off the top screw on T2 until the output reaches a minimum value between the two maximum values first noted. The frequency of the signal generator should be varied over a small range while adjusting the top screw of T2. A swishing note, in contrast to the usual sharp crystal tone will be apparent.

Connect hot lead of signal generator to A—through dummy antenna shown in table. Leave jumper connected between A1 and G. Ground of Generator to Chassis. "RF" indicates fixed pad—do not adjust.

Band	Rec. Dial Setting	Sig. Gen. Freq.	Dummy Antenna	HIGH FREQUENCY END Adjust Osc. With	Adjust Trimmers for Max. Gain	LOW FREQUENCY END Adjust Osc. With	Permeability Tuned By
1	1.5 mc	1.5 mc	200 mmf	$C_{58}$	$C_{62}$	$S_1$	$S_2$
2	3.0	3.0	400 ohms	$C_{59}$	$C_{63}$	$S_3$	$S_4$
3	1.8	1.8	400 ohms	$C_{60}$	$C_{64}$	$S_5$	$S_6$
4	10.0	10.0	400 ohms	$C_{61}$	$C_{65}$	$S_7$	$S_8$
5	20.0	20.0	400 ohms	$C_{62}$	$C_{66}$	$S_9$	$S_{10}$
6	36.0	36.0	400 ohms	$C_{63}$	$C_{67}$	$S_{11}$	$S_{12}$
	24.0	24.0	400 ohms	$C_{64}$	$C_{68}$	$S_{13}$	$S_{14}$



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REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR.'S. PART NO.	REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR.'S. PART NO.
R <sub>1</sub>	Resistor, 100,000 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE104K	C <sub>1</sub>	Capacitor, variable, 4 unit gang, each unit consists of 2 sections, except unit 4 at rear which contains only one section (section #2), air dielectric, special; Section #1-min. cap. 16.3 mmfd., max. cap. 187.5 mmfd. (C <sub>1</sub> , C <sub>1.1</sub> , C <sub>1.2</sub> ); Section #2-min. cap. 21.5 mmfd., max. cap. 250.0 mmfd. (C <sub>2</sub> , C <sub>2.1</sub> , C <sub>2.2</sub> , C <sub>2.3</sub> ).	RC	48B050
R <sub>2</sub>	Resistor, variable, 10,000 ohm $\pm$ 20% carbon, type 35	CT	25C066	C <sub>1.1</sub>			
R <sub>3</sub>	Resistor, 330 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE331K	C <sub>1.2</sub>			
R <sub>4</sub>	Resistor, 27,000 ohm $\pm$ 10%, 1 watt, carbon	ASA	RC31AE273K	C <sub>2</sub>			
R <sub>5</sub>	Resistor, 1000 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE102K	C <sub>2.1</sub>			
R <sub>6</sub>	Resistor, 6,800 ohm $\pm$ 10%, 2 watt, carbon	ASA	RC41AE682K	C <sub>2.2</sub>			
R <sub>7</sub>	Same as R <sub>1</sub>			C <sub>2.3</sub>			
R <sub>8</sub>	Same as R <sub>5</sub>			C <sub>3</sub>			
R <sub>9</sub>	Same as R <sub>5</sub>			C <sub>3.1</sub>	Capacitor, variable, 4 unit gang, each unit consists of 3 sections, air dielectric, special; Section #1-min. cap. 6 mmfd., max. cap. 16 mmfd. (C <sub>3</sub> , C <sub>3.1</sub> , C <sub>3.2</sub> , C <sub>3.3</sub> ); Section #2-min. cap. 6.5 mmfd., max. cap. 21.5 mmfd. (C <sub>4</sub> , C <sub>4.1</sub> , C <sub>4.2</sub> , C <sub>4.3</sub> ); Section #3-min. cap. 6.5 mmfd., max. cap. 27 mmfd. (C <sub>5</sub> , C <sub>5.1</sub> , C <sub>5.2</sub> , C <sub>5.3</sub> ).	RC	48B051
R <sub>10</sub>	Resistor, 2700 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE272K	C <sub>3.2</sub>			
R <sub>11</sub>	Same as R <sub>1</sub>			C <sub>3.3</sub>			
R <sub>12</sub>	Resistor, 390 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE391K	C <sub>4</sub>			
R <sub>13</sub>	Same as R <sub>5</sub>			C <sub>4.1</sub>			
R <sub>14</sub>	Same as R <sub>10</sub>			C <sub>4.2</sub>			
R <sub>15</sub>	Same as R <sub>1</sub>			C <sub>4.3</sub>			
R <sub>16</sub>	Resistor, 270 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE271K	C <sub>5</sub>			
R <sub>17</sub>	Same as R <sub>5</sub>			C <sub>5.1</sub>			
R <sub>18</sub>	Same as R <sub>10</sub>			C <sub>6</sub>	Capacitor, variable, min. cap. 3.5 mmfd., max. cap. 50 mmfd., air dielectric, ceramic insulation, type 22	RC	48A053
R <sub>19</sub>	Same as R <sub>1</sub>			C <sub>7</sub>	Capacitor, 2980 mmfd. adjustable $\pm$ 5%, mica dielectric, steel mtg. frame, special	UE	44B110
R <sub>20</sub>	Resistor, 470,000 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE474K	C <sub>8</sub>	Capacitor, 2400 mmfd. adjustable $\pm$ 5%, mica dielectric, steel mtg. frame, special	UE	44B109
R <sub>21</sub>	Resistor, 270 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE271K	C <sub>9</sub>	Capacitor, 2240 mmfd. adjustable $\pm$ 5%, mica dielectric, steel mtg. frame, special	UE	44B108
R <sub>22</sub>	Same as R <sub>5</sub>			C <sub>10</sub>	Capacitor, 1700 mmfd. adjustable $\pm$ 5%, mica dielectric, steel mtg. frame, special	UE	44B107
R <sub>23</sub>	Same as R <sub>10</sub>			C <sub>11</sub>	Capacitor, 822 mmfd. adjustable $\pm$ 5%, mica dielectric, steel mtg. frame, special	UE	44B106
R <sub>24</sub>	Same as R <sub>1</sub>			C <sub>12</sub>	Capacitor, 541 mmfd. adjustable $\pm$ 5%, mica dielectric, steel mtg. frame, special	UE	44B105
R <sub>25</sub>	Same as R <sub>20</sub>			C <sub>13</sub>	Capacitor, adjustable, 5 mmfd. $\pm$ 0.2 mmfd. at 25° C., capacity change -0.02 mmfd. per ° C., type S-2739	UE	44A062
R <sub>26</sub>	Resistor, 1,000 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE102K	C <sub>14</sub>	Capacitor, 0.02 mfd. -10 + 40%, 400 V.D-C working, paper dielectric	SP	46AW203J
R <sub>27</sub>	Same as R <sub>20</sub>			C <sub>15</sub>	Same as C <sub>14</sub>		
R <sub>28</sub>	Resistor, 100 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE101K	C <sub>16</sub>	Capacitor, fixed, 0.02 mfd. -10 + 40%, 600 V. D-C working, paper dielectric	SP	46AY203J
R <sub>29</sub>	Resistor, variable, 500 ohm $\pm$ 20%, carbon, type 25	CT	25C022	C <sub>17</sub>	Capacitor, fixed, 0.05 mfd. -10 + 40%, 200 V. D-C working, paper dielectric	SP	46AU503J
R <sub>30</sub>	Resistor, 27,000 ohm $\pm$ 10%, 2 watt, carbon	ASA	RC41AE273K	C <sub>18</sub>	Same as C <sub>14</sub>		
R <sub>31</sub>	Resistor, two sections; section #1 (R <sub>31</sub> ), 11,000 ohm $\pm$ 10%, $\frac{1}{2}$ watt; section #2 (R <sub>32</sub> ) 4,000 ohm $\pm$ 10%, 7 watts; metal clad, wire wound	CS	24A046	C <sub>19</sub>	Same as C <sub>14</sub>		
R <sub>32</sub>				C <sub>20</sub>	Same as C <sub>16</sub>		
R <sub>33</sub>	Resistor, variable, 500,000 ohm $\pm$ 20%, carbon	CT	25C065	C <sub>21</sub>	Same as C <sub>17</sub>		
R <sub>34</sub>	Same as R <sub>5</sub>			C <sub>22</sub>	Same as C <sub>14</sub>		
R <sub>35</sub>	Resistor, variable, 500,000 ohm $\pm$ 20%, carbon type AE-35-500M	CT	25C064	C <sub>23</sub>	Same as C <sub>14</sub>		
R <sub>36</sub>	Same as R <sub>1</sub>			C <sub>24</sub>	Same as C <sub>16</sub>	ASA	CM30A222K
R <sub>37</sub>	Same as R <sub>1</sub>			C <sub>25</sub>	Capacitor, fixed, 2200 mmfd. $\pm$ 10%, 500 V. D-C working, mica dielectric		
R <sub>38</sub>	Resistor, 47,000 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE473K	C <sub>26</sub>	Same as C <sub>17</sub>		
R <sub>39</sub>	Resistor, 180,000 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE184K	C <sub>27</sub>	Same as C <sub>14</sub>		
R <sub>40</sub>	Resistor, 270,000 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE274K	C <sub>28</sub>	Same as C <sub>16</sub>		
R <sub>41</sub>	Same as R <sub>40</sub>			C <sub>29</sub>	Capacitor, variable, min. cap. 2 mmfd., max. cap. 6 mmfd., ceramic dielectric, special mtg. bracket, type B-820-202	CRL	44A079
R <sub>42</sub>	Resistor, 220 ohm $\pm$ 10%, 2 watt, wire wound, type BW2	IRC	24BV221E	C <sub>30</sub>	Capacitor, variable, min. cap. 4 mmfd., max. cap. 20 mmfd., ceramic dielectric, special mtg. bracket, type B-820-304	CRL	44A078
R <sub>43</sub>	Resistor, 20,000 ohm $\pm$ 5%, 2 watt, carbon	ASA	RC41AE203J	C <sub>31</sub>	Same as C <sub>30</sub>	RC	48A059
R <sub>44</sub>	Resistor, 5,000 ohm $\pm$ 20%, 10 watt, wire wound, vitreous enamel, type CC	U	24BG502F	C <sub>32</sub>	Capacitor, variable, min. cap. 3.0 mmfd., max. cap. 25 mmfd., air dielectric, ceramic insulation, type 22-7		
R <sub>45</sub>	Same as R <sub>43</sub>			C <sub>33</sub>	Same as C <sub>14</sub>		
R <sub>46</sub>	Same as R <sub>38</sub>			C <sub>34</sub>	Same as C <sub>17</sub>		
R <sub>47</sub>	Resistor, 10 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE100K	C <sub>35</sub>	Same as C <sub>14</sub>		
R <sub>48</sub>	Same as R <sub>1</sub>			C <sub>36</sub>	Same as C <sub>16</sub>	ASA	CM20A470K
R <sub>49</sub>	Resistor, 1 megohm $\pm$ 10%, $\frac{1}{2}$ watt carbon,	ASA	RC21AE105K	C <sub>37</sub>	Capacitor, fixed, 47 mmfd. $\pm$ 10%, 500 V. D-C working, mica dielectric		
R <sub>50</sub>	Resistor, 560 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE561K	C <sub>38</sub>	Not used		
R <sub>51</sub>	Resistor, 20,000 ohm $\pm$ 5%, 1 watt, carbon	ASA	RC31AE203J	C <sub>39</sub>	Same as C <sub>14</sub>		
R <sub>52</sub>	Same as R <sub>38</sub>						
R <sub>53</sub>	Resistor, variable, 50,000 ohm $\pm$ 20%, carbon with DPST switch, type WR-35	CT	25C067				
R <sub>54</sub>	Resistor, 33 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE330K				
R <sub>55</sub>	Same as R <sub>20</sub>						
R <sub>56</sub>	Same as R <sub>5</sub>						
R <sub>57</sub>	Same as R <sub>1</sub>						
R <sub>58</sub>	Resistor, 180 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE181K				
R <sub>59</sub>	Same as R <sub>1</sub>						
R <sub>60</sub>	Same as R <sub>40</sub>						
R <sub>61</sub>	Same as R <sub>20</sub>						
R <sub>62</sub>	Same as R <sub>20</sub> . Part of transformer T <sub>1</sub> . Shown for reference only.						
R <sub>63</sub>	Same as R <sub>10</sub>						
R <sub>64</sub>	Same as R <sub>20</sub>						
R <sub>65</sub>	Same as R <sub>38</sub>						
R <sub>66</sub>	Same as R <sub>38</sub>						
R <sub>67</sub>	Same as R <sub>50</sub>						
R <sub>68</sub>	Resistor, 1,200 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE122K				
R <sub>69</sub>	Same as R <sub>1</sub>						
R <sub>70</sub>	Same as R <sub>49</sub>						
R <sub>71</sub>	Resistor, 4700 ohm $\pm$ 10%, 1 watt, carbon	ASA	RC31AE472K				
R <sub>72</sub>	Same as R <sub>50</sub>						
R <sub>73</sub>	Not used						
R <sub>74</sub>	Same as R <sub>47</sub>						

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REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR.'S. PART NO.	REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR.'S. PART NO.
C <sub>40</sub>	Capacitor, fixed, 470 mmfd. $\pm 10\%$ , 500 V. D-C working, mica dielectric	ASA	CM35A512J	C <sub>104</sub>	Capacitor, fixed, 275 mmfd., silver mica. Part of transformer T <sub>1</sub> . Shown for reference only.		
C <sub>41</sub>	Capacitor, fixed, one unit of dual unit, 40 mfd. - 10 $\pm$ 40%, 25 V. D-C working, electrolytic (See C <sub>44</sub> )			C <sub>105</sub>	Capacitor, fixed, 125 mmfd., silver mica. Part of transformer T <sub>2</sub> . Shown for reference only.		
C <sub>42</sub>	Same as C <sub>16</sub>			C <sub>106</sub>	Capacitor, fixed, 85 mmfd., silver mica. Part of transformer T <sub>2</sub> . Shown for reference only.		
C <sub>43</sub>	Capacitor, fixed, 5100 mmfd. $\pm 5\%$ , 300 V. D-C working, mica dielectric	ASA	CM20A471K	C <sub>108</sub>	Capacitor assembly; fixed capacitor, 25 mmfd. $\pm 5\%$ , silver mica; variable capacitor, min. cap. 70 mmfd., max. cap. 90 mmfd., ceramic dielectric; both capacitors connected in parallel to form assembly. Part of transformer T <sub>3</sub> . Shown for reference only.		
C <sub>44</sub>	Capacitor, fixed, one unit of dual unit, 10 mfd. - 10 $\pm$ 40%, 300 V. D-C working, electrolytic (See C <sub>41</sub> )	SP	42A032	C <sub>109</sub>			
C <sub>45</sub>	Capacitor, fixed, 0.05 mfd. - 10 $\pm$ 40%, 400 V. D-C working, paper dielectric	46AW503J		C <sub>110</sub>	Capacitor, variable, compression type, 80 mmfd., (nominal), mica dielectric. Part of transformer T <sub>5</sub> . Shown for reference only.		
C <sub>46</sub>	Same as C <sub>45</sub>			C <sub>111</sub>			
C <sub>47</sub>	Capacitor, fixed, one unit of dual unit, 40 mfd. - 10 $\pm$ 40%, 5 V. D-C working, electrolytic (See C <sub>48</sub> )	SP	42A031	C <sub>112</sub>	Capacitor, fixed, 100 mmfd. $\pm 10\%$ , 500 V. D-C working mica. Part of transformer T <sub>6</sub> . Shown for reference only.		
C <sub>48</sub>	Capacitor, fixed, one unit of dual unit, 30 mfd. - 10 $\pm$ 40%, 400 V. D-C working, electrolytic in same container with C <sub>47</sub>			C <sub>113</sub>	Capacitor, fixed, 25 mmfd. $\pm 10\%$ , 500 V. D-C working, mica. Part of transformer T <sub>6</sub> . Shown for reference only.		
C <sub>49</sub>	Capacitor, fixed, 30 mfd. - 10 $\pm$ 40%, 450 V. D-C working, electrolytic, type D8290	SP	42A030	C <sub>114</sub>	Capacitor, fixed, 10 mmfd. $\pm 10\%$ , 500 V. D-C working, ceramic dielectric, -0.00075 mmfd./mmfd./deg. Cent. temp. coeff., type class D modified	CRL	47A041
C <sub>50</sub>	Same as C <sub>14</sub>			T <sub>1</sub>	Transformer, I-F, 455KC, primary and secondary tuned by adjustable iron core, secondary has expander winding, special	SI	50B082
C <sub>51</sub>	Capacitor, fixed, 0.01 mfd. - 10 $\pm$ 40%, 600 V. D-C working, paper dielectric	SP	46AY103J	T <sub>2</sub>	Transformer, I-F, 455KC, primary and secondary tuned by adjustable iron core, secondary tapped for crystal filter and variable band width, primary has expander winding, special	SI	50B081
C <sub>52</sub>	Same as C <sub>51</sub>			T <sub>3</sub>	Transformer, I-F, 455KC, primary and secondary tuned by variable capacitor, iron core coils, type 3365	SWI	50B083
C <sub>53</sub>	Same as C <sub>17</sub>			T <sub>4</sub>	Transformer, 455KC, tuned by adjustable iron core, special	SWI	54B014
C <sub>54</sub>	Same as C <sub>45</sub>			T <sub>5</sub>	Transformer, I-F, 455KC, primary and secondary tuned by variable capacitor, iron core coils special	SWI	50B097
C <sub>55</sub>	Capacitor, variable, compression type, 50 mmfd. (nominal), mica dielectric, type SW-1530	SWI	53A012	T <sub>6</sub>	Transformer, I-F, 455KC, primary tuned by adjustable iron core, secondary untuned air core, special	SWI	50B080
C <sub>56</sub>	Same as C <sub>16</sub>						
C <sub>57</sub>	Same as C <sub>14</sub>						
C <sub>58</sub>	Same as C <sub>17</sub>						
C <sub>59</sub>	Same as C <sub>17</sub>						
C <sub>60</sub>	Same as C <sub>37</sub>						
C <sub>61</sub>	Capacitor, fixed, 250 mmfd. $\pm 20\%$ , 500 V. D-C working, mica dielectric, type 1468. Part of transformer T <sub>1</sub> . Shown for reference only.						
C <sub>62</sub>	Same as C <sub>14</sub>						
C <sub>63</sub>	Same as C <sub>17</sub>						
C <sub>64</sub>	Capacitor, fixed, 100 mmfd. $\pm 10\%$ , 500 V. D-C working, mica dielectric	ASA	CM20A101K	T <sub>7</sub>	Transformer, power, standard; primary, 117 V. A-C, single phase, 50/60 cycles; secondary, 580 V. A-C @ 185 ma., center tapped; 6.3 V. A-C @ 5.5 amperes, 5 V. A-C @ 3 amperes, type 6K53	GT	52B033
C <sub>65</sub>	Same as C <sub>14</sub>						
C <sub>66</sub>	Same as C <sub>17</sub>						
C <sub>67</sub>	Same as C <sub>16</sub>						
C <sub>68</sub>	Same as C <sub>37</sub>						
C <sub>69</sub>	Same as C <sub>37</sub>						
C <sub>70</sub>	Same as C <sub>35</sub>						
C <sub>71</sub>	Same as C <sub>64</sub>						
C <sub>72</sub>	Capacitor, variable, min. cap. 5 mmfd., max. cap. 25 mmfd., air dielectric, special	RC	48A064	T <sub>8</sub>	Transformer, A-F, primary, 10,000 ohm winding center tapped; secondary, 5000 ohm winding tapped at 500 and 100 ohms, iron core, type 3A347	GT	55B009
C <sub>73</sub>	Capacitor, fixed, 500 mmfd. $\pm 5\%$ , 500 V. D-C working, silver mica, type 1469, Part of transformer T <sub>4</sub> . Shown for reference only.	A	47BT501D	T <sub>9</sub>	Transformer, R-F, range 3.0-5.8 megacycles, air core, special	SWI	51B568
C <sub>74</sub>	Capacitor, fixed, 0.01 mfd. - 10 $\pm$ 40%, 600 V. D-C working, paper dielectric, braided leads, type AB	SP	46A021	T <sub>10</sub>	Transformer, R-F, range 5.8-11.5 megacycles, air core, special	SWI	51B569
C <sub>75</sub>	Capacitor, 2 mmfd., twisted leads			T <sub>11</sub>	Transformer, R-F, range 10.5-21 megacycles, air core, special	SWI	51B570
C <sub>76</sub>	Same as C <sub>25</sub>			T <sub>12</sub>	Transformer, R-F, range 21-43 megacycles, air core, special	SWI	51B571
C <sub>77</sub>	Same as C <sub>17</sub>			T <sub>13</sub>	Transformer, R-F, range .55-1.6 megacycles, air core, special	SWI	51B566
C <sub>78</sub>	Not used			T <sub>14</sub>	Transformer, R-F, range, 1.6-3.0 megacycles, air core, special	SWI	51B567
C <sub>79</sub>	Not used			T <sub>15</sub>	Transformer, R-F, range, 3.0-5.8 megacycles, adjustable iron core, special	SWI	51B572
C <sub>80</sub>	Not used			T <sub>16</sub>	Transformer, R-F, range 5.8-11.5 megacycles, adjustable iron core, special	SWI	51B573
C <sub>81</sub>	Not used			T <sub>17</sub>	Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special	SWI	51B574
C <sub>82</sub>	Capacitor, fixed, 2.5 mmfd. $\pm 20\%$ , 500 V. D-C working, bakelite dielectric		49A001	T <sub>18</sub>	Transformer, R-F, range 21-42 megacycles, adjustable iron core, special	SWI	51B575
C <sub>83</sub>	Not used			T <sub>19</sub>	Transformer, R-F, range .55-1.6 megacycles, adjustable iron core, special	SWI	51B576
C <sub>84</sub>	Not used			T <sub>20</sub>	Transformer, R-F, range 1.6-3.0 megacycles, adjustable iron core, special	SWI	51B577
C <sub>85</sub>	Same as C <sub>40</sub>			T <sub>21</sub>	Transformer, R-F, range 3.0-5.8 megacycles, adjustable iron core, special	SWI	51B578
C <sub>86</sub>	Capacitor, fixed, 0.25 mfd. - 10 $\pm$ 40%, 200 V. D-C working, paper dielectric	SP	46AT254J	T <sub>22</sub>	Transformer, R-F, range 5.8-11.5 megacycles adjustable iron core, special	SWI	51B579
C <sub>87</sub>				T <sub>23</sub>	Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special	SWI	51B580
C <sub>88</sub>	Capacitor, variable, min. cap. 4 mmfd., max. cap. 20 mmfd., ceramic insulation, temp. coeff. - 0.005 mmfd./°C., type 820-B	CRL	44A102	T <sub>24</sub>	Transformer, R-F, range 21-42 megacycles, adjustable iron core, special	SWI	51B581
C <sub>89</sub>	Same as C <sub>88</sub>			T <sub>25</sub>	Transformer, R-F, range .55-1.6 megacycles, adjustable iron core, special	SWI	51B582
C <sub>90</sub>	Same as C <sub>88</sub>			T <sub>26</sub>	Transformer, R-F, range 1.6-3.0 megacycles, adjustable iron core, special	SWI	51B583
C <sub>91</sub>	Same as C <sub>88</sub>			T <sub>27</sub>	Transformer, R-F, range 3-5.8 megacycles, adjustable iron core, special	SWI	51B584
C <sub>92</sub>	Capacitor, variable, min. cap. 2.5 mmfd., max. cap. 6 mmfd., ceramic insulation, temp. coeff. 0.0005 mmfd./°C, special	CRL	44A119	T <sub>28</sub>	Transformer, R-F, range 5.8-11.5 megacycles, adjustable iron core, special	SWI	51B585
C <sub>93</sub>	Same as C <sub>88</sub>						
C <sub>94</sub>	Same as C <sub>88</sub>						
C <sub>95</sub>	Same as C <sub>88</sub>						
C <sub>96</sub>	Same as C <sub>88</sub>						
C <sub>97</sub>	Same as C <sub>88</sub>						
C <sub>98</sub>	Same as C <sub>88</sub>						
C <sub>99</sub>	Same as C <sub>88</sub>						
C <sub>100</sub>	Same as C <sub>88</sub>						
C <sub>101</sub>	Same as C <sub>88</sub>						
C <sub>102</sub>	Same as C <sub>88</sub>						
C <sub>103</sub>	Same as C <sub>88</sub>						

**MODEL SX-28A,  
Super Sky rider**
**THE HALLICRAFTERS CO.**

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFG. CODE	CONTR.'S REF. PART NO./SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR.'S PART NO.	
T <sub>29</sub>	Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special	SWI	51B586	V <sub>1</sub> Tube, pentode type 6AB7	RCA	90X6AB7	
T <sub>30</sub>	Transformer, R-F, range 21-42 megacycles, adjustable iron core, special	SWI	51B587	V <sub>2</sub> Tube, triple-grid super-control amplifier, type 6SK7	RCA	90X6SK7	
SO <sub>1</sub>	Socket, octal, female, low loss mica-filled bakelite insulation, type MIP8T	AP	6A042	V <sub>3</sub> Tube, multi-electrode pentagrid converter, type 6SA7	RCA	90X6SA7	
TS <sub>1</sub>	Terminal strip, black bakelite, marked "A <sub>2</sub> " "A <sub>1</sub> ", special	H	8A039	V <sub>4</sub> Same as V <sub>3</sub>	RCA	90X6L7	
TS <sub>2</sub>	Terminal strip, black bakelite, marked "5000", special	H	8A040	V <sub>5</sub> Tube, multi-electrode pentagrid mixer amplifier, type 6L7	RCA	90X6B8	
TS <sub>3</sub>	Terminal strip, black bakelite, marked "500", special	H	8A041	V <sub>6</sub> Same as V <sub>5</sub>			
				V <sub>7</sub> Tube, duplex-diode pentode, type 6B8			
				V <sub>8</sub> Same as V <sub>7</sub>			
				V <sub>9</sub> Same as V <sub>1</sub>	RCA	90X6H6	
				V <sub>10</sub> Tube, twin diode, type 6H6			
				V <sub>11</sub> Tube, triode, type 6J5	RCA	90X6J5	
CH <sub>1</sub>	Inductor, 13 henries $\pm 10\%$ , @ 100 milliamperes D-C, d-c resistance 300 ohms $\pm 10\%$ , iron core, type 1D25	GT	56B008	V <sub>12</sub> Tube, twin triode, type 6SC7	RCA	90X6SC7	
CH <sub>2</sub>	Inductor, 4 henries $\pm 10\%$ d-c resistance 220 ohms $\pm 10\%$ , iron core, type 10C5	ST	55A010	V <sub>13</sub> Tube, beam power amplifier, type 6V6GT	RCA	90X6V6GT	
CH <sub>3</sub>	Inductor, universal winding, iron core, designed to resonate at 455KC with 47 mmfd. $\pm 7\%$ across the coil, type 774	SWI	53B012	V <sub>14</sub> Same as V <sub>13</sub>	RCA	90X6Z3	
				V <sub>15</sub> Tube, full wave high vacuum rectifier; type 5Z3			
TROPICALIZED PARTS LIST							
			R <sub>31</sub>	Resistor, two sections; section #1 (R <sub>31</sub> ) 10,000 ohm $\pm 10\%$ , 2 watts; section #2 (R <sub>32</sub> ) 4,000 ohm $\pm 10\%$ , 8 watts; metal clad, wire wound, type MW 5	IRC	24A822	
J <sub>1</sub>	Jack, single circuit, switching type, single pole double throw, 1 pair contacts normally closed, bushing 3/8-32 x 5/16" long, type 503C	U	36B003	T <sub>3</sub> Transformer, I-F, 455 KC., primary and secondary tuned by adjustable capacitors, fixed iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, special	SWI	50B132	
J <sub>2</sub>	Jack, switching type, single pole double throw, 1 pair contacts normally closed, bushing 3/8-32 x 3/8" long, type ST-627A	U	36B011	T <sub>4</sub> Transformer, 455 KC., tuned by adjustable iron core, winding vacuum wax impregnated and dipped in zophar #1598, special	SWI	54B020	
FS <sub>1</sub>	Fuse, 1.5 amperes @ 250 V., 4AG, glass enclosed, type 1041	LF	39A320	T <sub>5</sub> Transformer, I-F, 455 KC., primary and secondary tuned by adjustable capacitors, air core, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, trimmers heat cycled at nominal capacity setting (80 mmfd.) and humidity stabilized, special	SWI	50B131	
PL <sub>1</sub>	Plug, octal, male, bakelite body, jumpers connect terminals 6 and 7, and terminals 3 and 4, type CP-8	AP	35A003	T <sub>6</sub> Transformer, I-F, 455 KC., primary tuned by adjustable iron core, secondary untuned air core, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, special	SWI	50B130	
PL <sub>2</sub>	Plug and line cord assemble, 2 conductor rubber covered #18 copper stranded wire moulded rubber plug at one end, length 6 feet	E	87A078	T <sub>7</sub> Transformer, power, standard; primary, 115 V. A-C, single phase, 50/60 cycles; secondary #1, to provide 290 V. A-C @185 milliamperes with a 5Z3 rectifier and a 30 mfd. input capacitor, center tapped; secondary #2, 6.3 V. A-C @5.5 amperes; secondary #3, 5 V. A-C @3 amperes; windings and core vacuum wax impregnated; transformer potted in a high melting point compound, type 6K64	SWI	50B130	
M <sub>1</sub>	Meter 0.5 milliamperes, 8.8 ohms internal resistance, pointer swing 90 degrees, special mtg bracket, special	BE	82A070	T <sub>8</sub> Transformer, A-F; primary, 10,000 ohm winding, center tapped; secondary, 5000 ohm winding tapped at 500 and 100 ohms, iron core, entire unit dionized in Korite #4, type 3A517	GT	52B045	
CX <sub>1</sub>	Crystal, frequency 455KC $\pm 5$ KC, type CF6	BL	19A123	CH <sub>1</sub> Inductor, 13 henries $\pm 15\%$ @100 milliamperes D-C, d-c resistance 300 ohms $\pm 10\%$ , iron core, winding impregnated with vacuum wax, entire unit dipped in Korite #4, type 1D34	GT	56B035	
SW <sub>1</sub>	Switch, rotary selector, single section, 3 position, shorting type rotor contacts, bakelite wafer, shaft 2-1/16" long x 1/4" dia., bushing 1/4" deep, type H	OM	60B052	SW <sub>1</sub>	Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x 1/4" dia., bushing 1/4" deep, type H	OM	60B144
SW <sub>2</sub>	Switch, SPST, toggle action, located on rear of resistor R <sub>35</sub>			SW <sub>2</sub>	Switch, SPST, bat handle toggle, rated 3 amperes @ 250 V., type 21350GA	CH	60A138
SW <sub>3</sub>	Switch, SPST, bat handle toggle, rated 3 amperes @ 250 V., type 21350GA	HH	60A103	SW <sub>3</sub>	Switch, SPST, bat handle toggle, rated 3 amperes @250 V., type 8280 15/32 bushing		
SW <sub>4</sub>	Switch, DPST, toggle action, located on the rear of resistor R <sub>33</sub>			SW <sub>4</sub>	Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x 1/4" dia., bushing 1/4" deep, type H	OM	60B144
SW <sub>5</sub>	Same as SW <sub>1</sub>			SW <sub>5</sub>	Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x 1/4" dia., bushing 1/4" deep, type H	OM	62B033
SW <sub>6</sub>	Same as SW <sub>1</sub>			SW <sub>6</sub>	Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x 1/4" dia., bushing 1/4" deep, type H	OM	60B144
SW <sub>7</sub>	Same as SW <sub>1</sub>			SW <sub>7</sub>	Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x 1/4" dia., bushing 1/4" deep, type H	OM	62B033
SW <sub>8</sub>	Switch, rotary selector, 3 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B025	SW <sub>8</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
SW <sub>9</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type 18908-H2	OM	62B013	SW <sub>9</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
SW <sub>10</sub>	Same as SW <sub>8</sub> , SW <sub>9</sub> and SW <sub>7</sub>			SW <sub>10</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
SW <sub>11</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts type H	OM	62B015	SW <sub>11</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
SW <sub>12</sub>	Switch, rotary selector, single section, 6 position, shorting type rotor contacts, bakelite wafer, type 23586-H	OM	62B023	SW <sub>12</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
SW <sub>13</sub>	Switch, rotary selector, 3 section, 6 position, shorting type rotor contacts, bakelite wafers, shaft 2-3/8" long x 1/4" dia., bushing 1/4" deep, type 22659-H3	OM	60B048	SW <sub>13</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
SW <sub>14</sub>	Switch, SPDT, bat handle toggle, rated 1 ampere @ 250 V. and 3 amperes @ 125 V., type 20994KF	HH	60A102	SW <sub>14</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
LM <sub>1</sub>	Lamp 6.3 V. @ 250 milliamperes, bayonet base type 44	GE	39A003	SW <sub>15</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
LM <sub>2</sub>	Same as LM <sub>1</sub>			SW <sub>16</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B031
LM <sub>3</sub>	Lamp, 6.3 V. @ 150 milliamperes, bayonet base type 47	GE	39A004	SW <sub>17</sub>	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B032



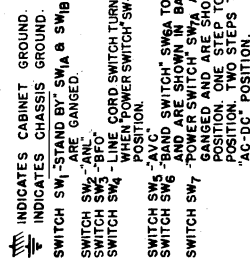
## THE HALLICRAFTERS CO.

MODEL SX-28A,  
Super Sky rider

SW <sub>8-14</sub>	} Switch, rotary selector, single section, 6 position, wax impregnated bakelite wafer, section is assembled to strut, type H	OM	60B135
SW <sub>8-15</sub>			
SW <sub>9-1</sub>	} Switch, rotary selector, 3 section, 6 position, wax impregnated bakelite wafers, shorting type rotar contacts shaft 2-5/8" long x 1/4" dia., bushing 1/4" deep, type	.OM	60B134
SW <sub>9-2</sub>			
SW <sub>9-3</sub>		CH	60A139
SW <sub>10</sub>	Switch, SPDT, bat handle toggle, 3 amperes @125 V., type 8282 15/32 bushing		

## INDEX TO PARTS MANUFACTURERS

<u>SYMBOL</u>	<u>MANUFACTURER</u>	<u>SYMBOL</u>	<u>MANUFACTURER</u>
A	Aerovox Corp. New Bedford, Mass.	H	The Hallicrafters Co. Chicago, Illinois
AP	American Phenolic Corp. Cicero, Illinois	HH	Hart & Hegeman Elec. Co. Hartford, Conn.
ASA	Any manufacturer meeting the applicable American Standard Association specification	IRC	International Resistance Co. Philadelphia, Pa.
BE	Beede Electrical Inst. Co. Penacook, N. H.	LF	Littlefuse Inc. Chicago, Illinois
BL	Bliley Electric Co. Erie, Pa.	OM	Oak Mfg. Co. Chicago, Illinois
CH	Cutler-Hammer Inc. Milwaukee, Wis.	RC	Radio Condenser Camden, N. J.
CM	Chicago Molding Co. Chicago, Illinois	RCA	R. C. A. Mfg. Co. Harrison, N. J.
CRL	Centralab Milwaukee, Wis.	SI	F. W. Sickles Co. Springfield, Mass.
CS	Clarostat Mfg. Co. Brooklyn, N. Y.	SP	Sprague Specialties Co. North Adams, Mass.
CT	Chicago Telephone Supply Co. Elkhart, Ind.	ST	Standard Transformer Corp. Chicago, Illinois
E	Essex Wire Co. Chicago, Illinois	SWI	S. W. Inductor Chicago, Illinois
GE	General Electric Co. Schenectady, N. Y.	U	Utah Radio Products Co. Chicago, Illinois
GT	General Transformer Corp. Chicago, Illinois	UE	Underwood Elec. Co. Chicago, Illinois

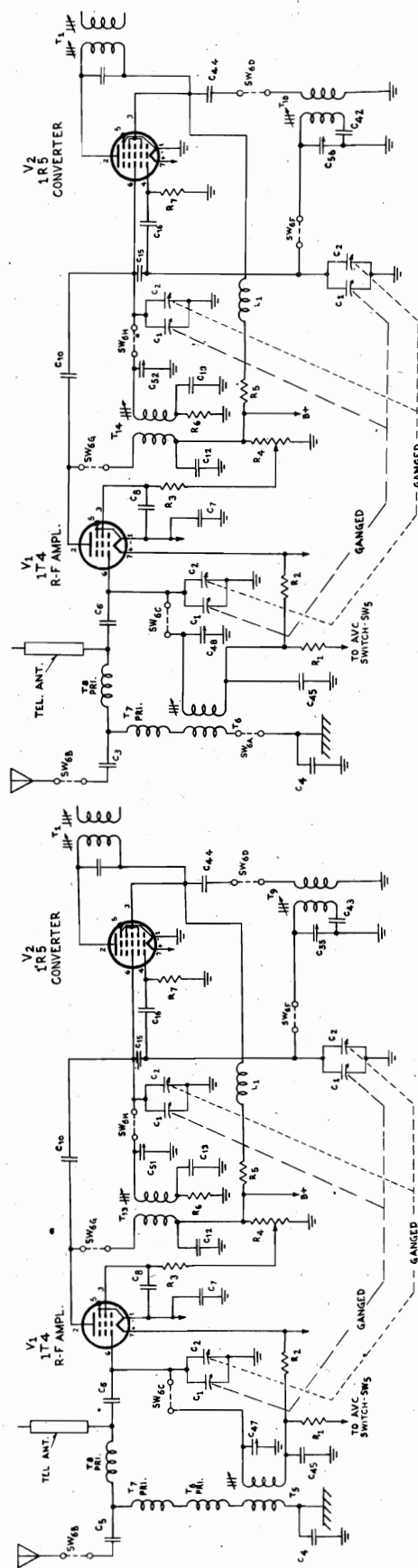


RESISTOR R4 - "R-F GAIN" CONTROL  
RESISTOR R14 - "A-F GAIN" (VOLUME) CONTROL  
INTERMEDIATE FREQUENCY - 455 KC

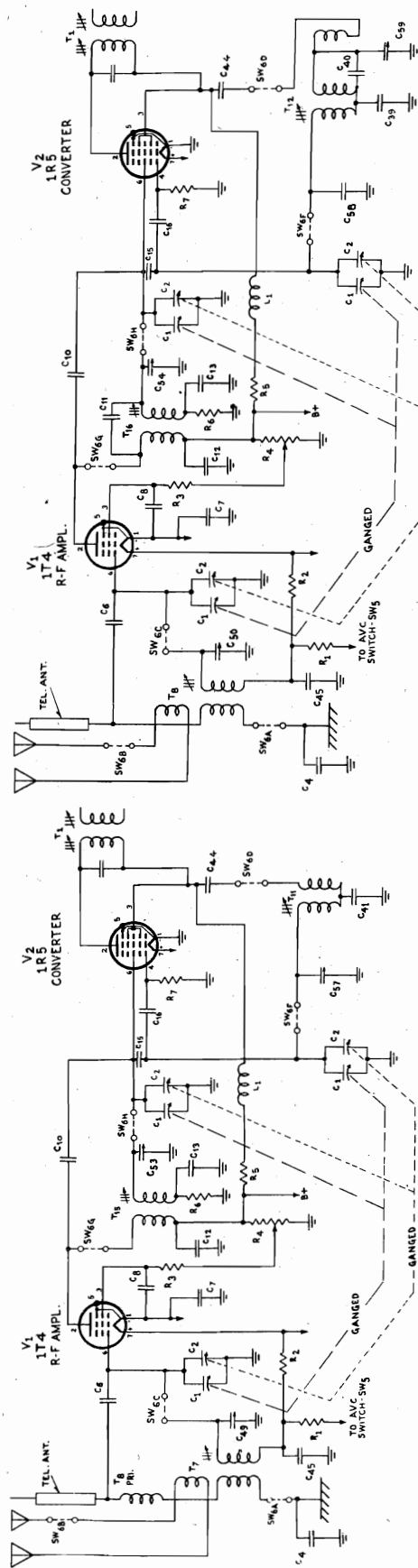
**June 9, 1944**

THE HALLICRAFTERS CO.

MODEL S-39, Skyranger



/// DENOTES CABINET GROUND  
⊥ DENOTES CHASSIS GROUND

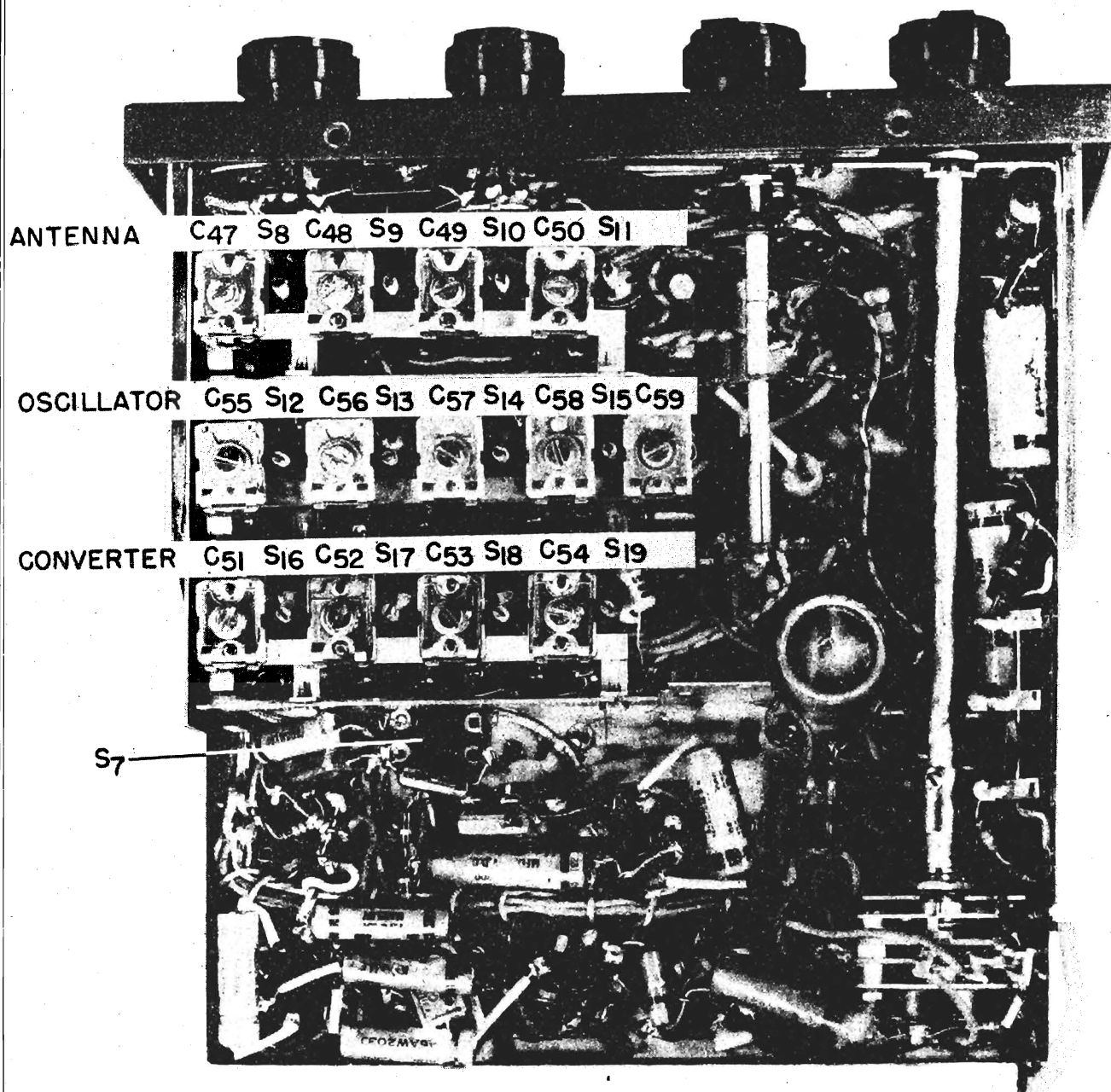


/// DENOTES CABINET GROUND  
⊥ DENOTES CHASSIS GROUND

BAND-SWITCH SHOWN AT 3<sup>RD</sup> POSITION CLOCKWISE. BAND 3. 4.5 MC - 11 MC.

BAND-SWITCH SHOWN AT 4<sup>TH</sup> POSITION CLOCKWISE. BAND 4. 11.5 MC - 30 MC.

MODEL S-39, Skyranger THE HALLICRAFTERS CO.



BOTTOM VIEW OF CHASSIS

TUBE	TYPE	PURPOSE
V <sub>1</sub>	1T4	R-F amplifier
V <sub>2</sub>	1R5	Converter and oscillator
V <sub>3</sub>	1P5GT	First i-f amplifier
V <sub>4</sub>	1P5GT	Second i-f amplifier
V <sub>5</sub>	1H5GT	Detector, A-V-C and first audio amplifier
V <sub>6</sub>	3Q5GT	Audio amplifier
V <sub>7</sub>	35Z5GT	Rectifier
V <sub>8</sub>	1H5GT	Beat frequency oscillator and automatic noise limiter
V <sub>9</sub>	35Z5GT	Rectifier

## THE HALLICRAFTERS CO.

MODEL S-39, Skyrainger

F-4. TABLE OF TUBE SOCKET VOLTAGES

Measured from socket pin to ground with 1000 ohm-per-volt meter  
All voltages are D-C unless otherwise specified.

Pin Number										Cap.
Tube	1	2	3	4	5	6	7	8		
Battery Supply										
V <sub>1</sub> 1T4	2-62	87	84	NC	2-62	0	4-1	X	X	
V <sub>2</sub> 1R5	0	65	65	0	0	0	1-5	X	X	
V <sub>3</sub> 1P5GT	0	2-7	87	60	NC	1-5	1-5	NC	0	
V <sub>4</sub> 1P5GT	0	2-8	88	88	NC	X	1-4	NC	0	
V <sub>5</sub> 1H5GT	0	1-45	62	NC	0	X	0	NC	0	
V <sub>6</sub> 3Q5GT	NC	7-4	84	88	0	X	4-4	5-9	X	
V <sub>7</sub> 3Z5GT	NC	0	NC	X	0	X	0	0	X	
V <sub>8</sub> 1H5GT	0	4-4	*70	NC	0	X	2-8	NC	3-5	
V <sub>9</sub> 3Z5GT	NC	0	NC	X	0	X	0	0	X	
117 Volts AC										
V <sub>1</sub> 1T4	2-6	103	92	NC	2-7	0	4-2	X	X	
V <sub>2</sub> 1R5	0	75	75	0	0	0	1-5	X	X	
V <sub>3</sub> 1P5GT	0	2-5	105	75	NC	1-45	1-45	NC	0	
V <sub>4</sub> 1P5GT	0	2-95	102	105	NC	X	1-55	NC	0	
V <sub>5</sub> 1H5GT	0	1-5	70	NC	0	X	0	NC	0	
V <sub>6</sub> 3Q5GT	NC	7-6	100	110	0	X	4-6	6-1	X	
V <sub>7</sub> 3Z5GT	NC	0	7-8 A-C	X	114A-C	X	33-5 A-C	110	X	
V <sub>8</sub> 1H5GT	0	4-3	*82-5	NC	0	X	2-95	NC	3-5	
V <sub>9</sub> 3Z5GT	1115 A-C	33-5 A-C	43 A-C	X	114A-C	1115 A-C	65 A-C	110	X	
120 Volts DC										
V <sub>1</sub> 1T4	2-8	103	92	NC	2-8	0	4-2	X	X	
V <sub>2</sub> 1R5	0	72	72	0	0	0	1-5	X	X	
V <sub>3</sub> 1P5GT	0	2-8	103	72	NC	1-15	1-5	NC	0	
V <sub>4</sub> 1P5GT	0	3-2	102	102	NC	X	1-6	NC	0	
V <sub>5</sub> 1H5GT	0	1-6	87	NC	0	X	0	NC	0	
V <sub>6</sub> 3Q5GT	NC	7-7	100	103	0	X	4-8	6-3	X	
V <sub>7</sub> 3Z5GT	NC	0	7-3	X	118	X	35	110	X	
V <sub>8</sub> 1H5GT	0	4-8	*85	NC	0	X	3-2	NC	4	
V <sub>9</sub> 3Z5GT	1120	35	43	X	118	120	70	110	X	

NC - No Connection.

X - No pin.

\* - With BFO switch at ON.

† - Tie lug.

## E-1. RECEIVER ALIGNMENT -

(a) Equipment needed to align the receiver -

Signal generator to cover 455 KC to 30 MC  
Non-metallic screwdriver  
Output meter with a phone plug connector  
.1 mfd. condenser  
6-5 mfd. condenser. (Dummy antenna)

(b) Setting of controls for I-F alignment -

ANL, AVC and BFO switches at OFF  
STAND BY switch at ON  
A.F. and R.F. GAIN controls set at maximum gain  
BAND SWITCH at #1 Band  
POWER SWITCH at BAT. (power cord removed from wall socket)  
BANDSPREAD TUNING at "0"  
Telescoping antenna completely collapsed.

(c) I-F alignment (455 KC) -

Remove top and bottom cover for access to internal components  
Have external antenna plug PL<sub>2</sub> out of socket S<sub>01</sub>  
Connect "hot" lead of signal generator through the .1 mfd condenser to the lug on rear stator section of main tuning condenser (C<sub>1</sub>).

Connect "ground" lead of signal generator to chassis  
Plug output meter plug in the phone jack (J<sub>1</sub>)  
Set MAIN TUNING dial at 1500 KC

Band #1  
Tune signal generator to 455 KC.  
Adjust slugs S<sub>1</sub> to S<sub>6</sub> inclusive for maximum output. Refer to figure 4 for location of the adjusting screws on transformers T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>.

Repeat adjustments of slugs S<sub>1</sub> generator to extended section of S<sub>6</sub> to peak all the i-f transformers for maximum output.

Connect "hot" lead of signal generator to extended section of the telescoping antenna through the 6-5 mfd dummy antenna condenser.

Connect ground side of generator to chassis  
Without disconnecting the signal generator, after completing the alignment, adjust the MAIN TUNING dial of receiver and signal generator frequency as shown in the alignment chart.

Set BFO switch at ON  
Remove modulation from the signal generator  
Adjust tuning slug S<sub>7</sub> to desired pitch (Approx. 1000 cycles).  
Slug S<sub>7</sub> is located under the chassis just in back of the coil shield plate.

Note: It is possible to adjust the B-F-O pitch without the use of the signal generator. Tune in a c-w signal to exact resonance with the BFO switch set at OFF. Set BFO switch at ON and adjust pitch to the tone desired by turning slug S<sub>7</sub>. Replace top cover after aligning the I-F and B-F-O transformers.

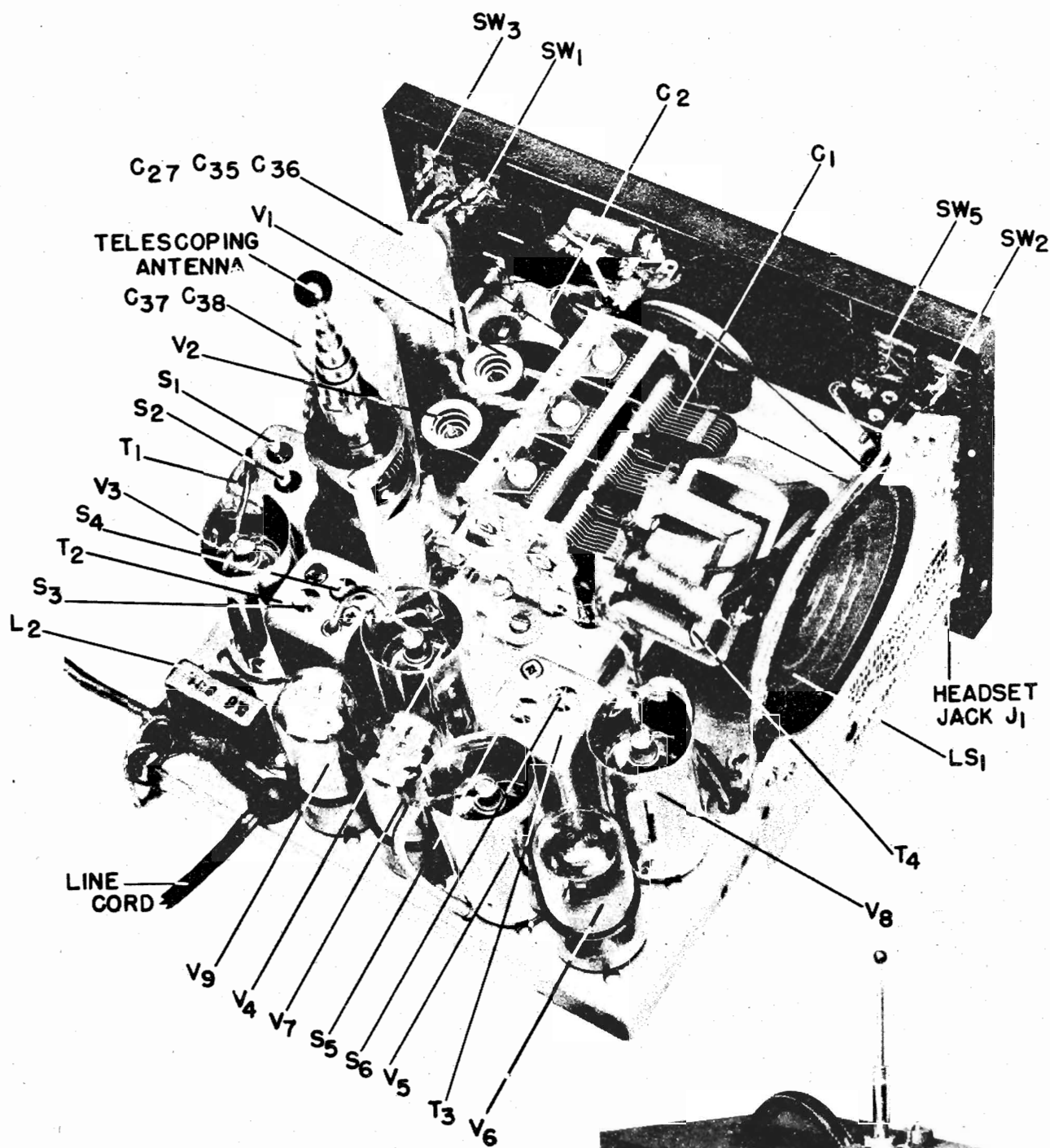
Note: Only one section of the telescoping antenna shall extend above the top cover of the receiver. (This procedure is necessary to obtain an accurate calibration for the receiver when aligning with the dummy antenna of 6.5 mfd.) The receiver's top cover must be fastened down for the following adjustments.

Setting of controls for R-F alignment -

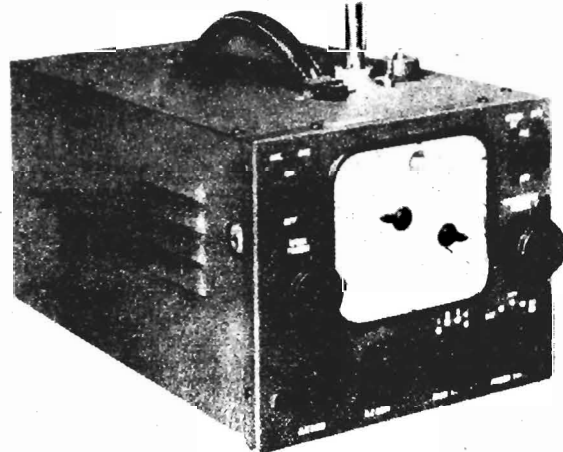
ANL, AVC and BFO switches at OFF  
STAND BY switch at ON  
A.F. and R.F. GAIN controls set at maximum gain  
BAND SWITCH at Band to be aligned (See alignment chart)  
POWER SWITCH at BAT. (power cord removed from wall socket)  
BANDSPREAD TUNING at "0"  
Telescoping antenna is collapsed except for bottom section  
R-F alignment -  
Leave output meter plug in phone jack (J<sub>1</sub>)

## ALIGNMENT CHART

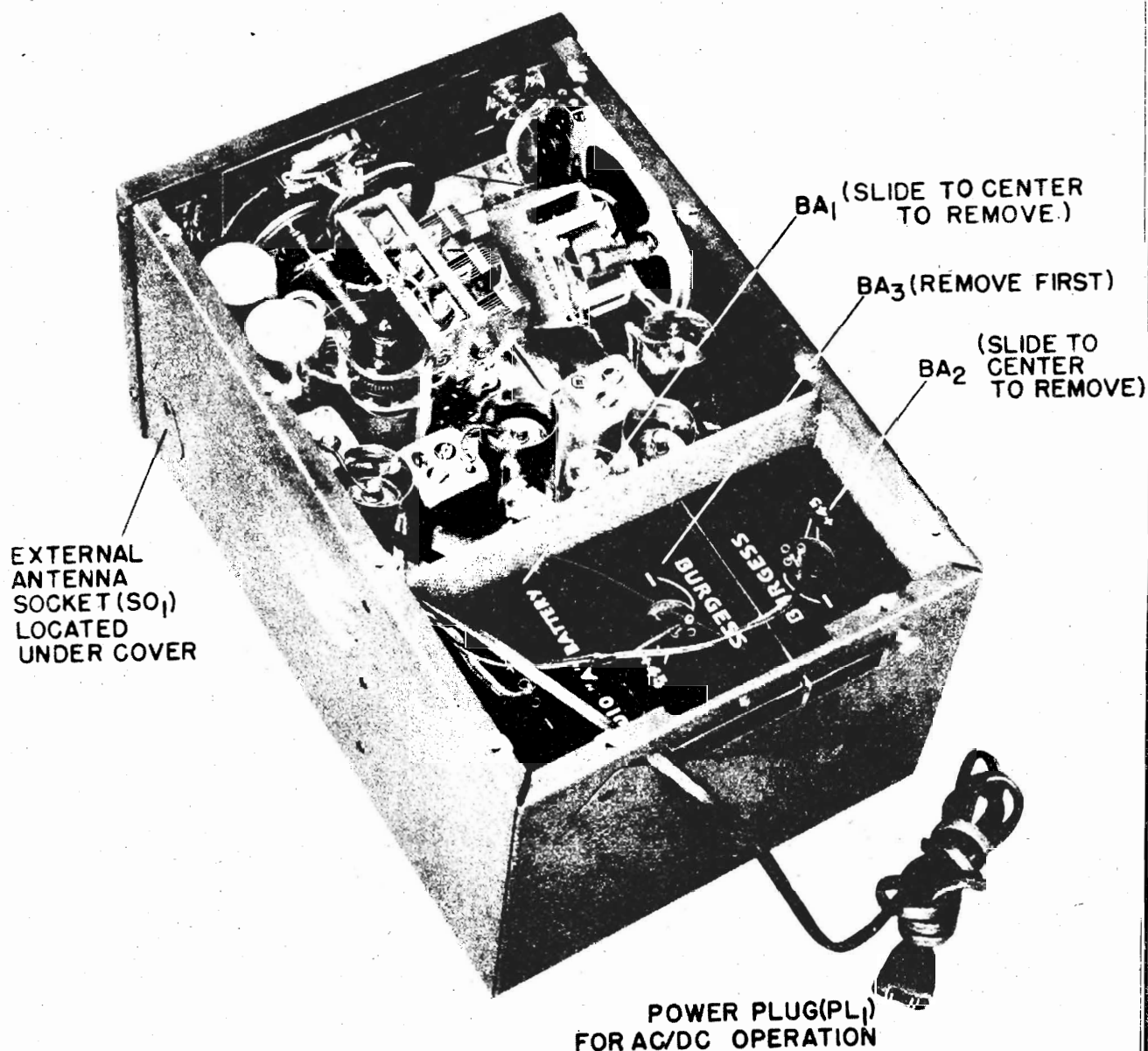
BAND	SIGNAL GENERATOR FREQUENCY AND "MAIN TUNING" DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT		OSCILLATOR FREQUENCY RELATIVE TO SIGNAL FREQUENCY
		OSCILLATOR SECTION	ANTENNA AND CONVERTER SECTIONS	
1	1-4 MC	C <sub>55</sub>	C <sub>47</sub> and C <sub>51</sub>	455 KC Above
	.6 MC	S <sub>12</sub>	S <sub>8</sub> and S <sub>16</sub>	455 KC Above
2	4-0 MC	C <sub>56</sub>	C <sub>48</sub> and C <sub>52</sub>	455 KC Above
	2-0 MC	S <sub>13</sub>	S <sub>9</sub> and S <sub>17</sub>	455 KC Above
3	10-0 MC	C <sub>57</sub>	C <sub>49</sub> and C <sub>53</sub>	455 KC Above
	5-0 MC	S <sub>14</sub>	S <sub>10</sub> and S <sub>18</sub>	455 KC Above
4	28-0 MC	C <sub>58</sub>	C <sub>50</sub> and C <sub>54</sub>	455 KC Below
	14-0 MC	S <sub>15</sub> C <sub>59</sub>	S <sub>11</sub> and S <sub>19</sub>	455 KC Below



TOP VIEW.



## THE HALLICRAFTERS CO. MODEL S-39, Skyranger



MODEL S-39 RECEIVER, REAR VIEW, COVER REMOVED, SHOWING POWER CORD COMPARTMENT AND BATTERY COMPARTMENT.

**A-3. POWER SUPPLIES** - Two separate and independent power supplies are incorporated in the receiver, namely an internal battery supply and a rectifier-filter type of supply for use with an external a-c/d-c source.

The battery supply consists of two 45-volt "B" batteries (BA<sub>2</sub> and BA<sub>3</sub>) connected in series, and one 6-volt "A" battery (BA<sub>1</sub>) all of which are located in the back section of the carrying-case cabinet. See figure 6.

The a-c/d-c supply consists of two type 35Z5GT rectifier tubes (V<sub>7</sub> and V<sub>9</sub>) and the associated filter (L<sub>2</sub>, C<sub>35</sub> and C<sub>27</sub>) and filament voltage dropping resistors (R<sub>32</sub>, R<sub>33</sub>, R<sub>34</sub> and R<sub>35</sub>). This supply may be used whenever commercial power lines, delivering 110-to 117-volts A-C or D-C are accessible. Refer to Section D for operating instructions.

The supply to be used is selected from the front panel by POWER SWITCH, SW<sub>7</sub>. Refer to figure 2 for circuit details.

## MODEL S-39, Skyranger

## THE HALLICRAFTERS CO.

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR S. PART NO.	REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR'S. PART NO.
R <sub>1</sub>	Resistor, 2.2 megohm $\pm$ 10%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE225K	C <sub>8</sub>	Capacitor, 0.01 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AP	SP	46AW103J
R <sub>2</sub>	Same as R <sub>1</sub>						
R <sub>3</sub>	Resistor, 8,200 ohm $\pm$ 10%, $\frac{1}{4}$ watt, carbon	ASA	RC21AE822K				
R <sub>4</sub>	Resistor, variable, $\frac{1}{2}$ megohm $\pm$ 20%, carbon	CT	25C071	C <sub>9</sub>	Same as C <sub>8</sub>		
R <sub>5</sub>	Resistor, 4,000 ohm $\pm$ 10%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE472K	C <sub>10</sub>	Capacitor, adjustable, min. cap. 5 mmfd., max. cap. 6.5 mmfd., 500 V. D-C working, temp. coeff. -.00075 mmfd./mmfd./degree Cent., ceramic dielectric, type 807-Q04	CRL	47A005
R <sub>6</sub>	Same as R <sub>1</sub>						
R <sub>7</sub>	Resistor, 100,000 ohm $\pm$ 10%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE104K				
R <sub>8</sub>	Resistor, 1.0 megohm $\pm$ 10%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE105K	C <sub>11</sub>	Same as C <sub>10</sub>		
R <sub>9</sub>	Same as R <sub>1</sub>			C <sub>12</sub>	Same as C <sub>7</sub>		
R <sub>10</sub>	Resistor, 51,000 ohm $\pm$ 5%, $\frac{1}{2}$ watt, carbon	ASA	RC21AE513J	C <sub>13</sub>	Same as C <sub>7</sub>		
R <sub>11</sub>	Same as R <sub>1</sub>						
R <sub>12</sub>	Same as R <sub>8</sub>			C <sub>14</sub>	Capacitor, 3 mmfd., twisted wire leads		
R <sub>13</sub>	Same as R <sub>7</sub>						
R <sub>14</sub>	Resistor, variable, $\frac{1}{2}$ megohm $\pm$ 20%, carbon	CT	25C070	C <sub>15</sub>	Capacitor, 2 mmfd., twisted wire leads		
R <sub>15</sub>	Resistor, 10 megohm $\pm$ 20%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE106M				
R <sub>16</sub>	Same as R <sub>7</sub>			C <sub>16</sub>	Same as C <sub>3</sub>		
R <sub>17</sub>	Resistor, 470,000 ohm $\pm$ 20%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE474M	C <sub>17</sub>	Same as C <sub>7</sub>		
R <sub>18</sub>	Same as R <sub>17</sub>			C <sub>18</sub>	Same as C <sub>8</sub>		
R <sub>19</sub>	Same as R <sub>17</sub>			C <sub>19</sub>	Not used		
R <sub>20</sub>	Resistor, 47,000 ohm $\pm$ 20%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE473M	C <sub>20</sub>	Same as C <sub>7</sub>		
R <sub>21</sub>	Same as R <sub>20</sub>			C <sub>21</sub>	Capacitor, 100 mmfd. $\pm$ 20%, 500 V. D-C work- ing, mica dielectric	ASA	CM20A101M
R <sub>22</sub>	Not used						
R <sub>23</sub>	Not used			C <sub>22</sub>	Capacitor, 0.004 mfd. -10 + 40%, 600 V. D-C working, paper dielectric, type 684	A	46AZ402J
R <sub>24</sub>	Resistor, 24 ohm $\pm$ 5%, 1 watt, carbon	ASA	RC31AE240J				
R <sub>25</sub>	Resistor, 330 ohm $\pm$ 5%, 9 watt, wire wound, candohm, type FH	MT	24A829	C <sub>23</sub>	Capacitor, 0.1 mfd. -10 + 40%, 200 V. D-C working, paper dielectric, type 284	A	46AU104J
R <sub>26</sub>	Not used			C <sub>24</sub>	Same as C <sub>8</sub>		
R <sub>27</sub>	Resistor, 1000 ohm $\pm$ 10%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE102K				
R <sub>28</sub>	Not used.			C <sub>25</sub>	Capacitor, 0.005 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type 484	A	46AW502J
R <sub>29</sub>	Resistor, 560 ohm $\pm$ 10%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE561K				
R <sub>30</sub>	Same as R <sub>29</sub>			C <sub>26</sub>	Capacitor, 0.02 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AB	SP	46AW203J
R <sub>31</sub>	Not used						
R <sub>32</sub>	Same as R <sub>27</sub>			C <sub>27</sub>	Capacitor, 60 mfd. -10 + 50%, 150 V. D-C working, electrolytic, one section of 3 section unit, 6 prong plug-in assembly, type 10B336	IC	45A065
R <sub>33</sub>	Resistor, 820 ohm $\pm$ 10%, 1 watt, carbon	ASA	RC31AE821K				
R <sub>34</sub>	Resistor, 1645 ohm $\pm$ 10%, tapped at 800 ohm, 7.4 watt, 2 unit, wire wound, unit #1 800 ohm (R <sub>34</sub> ), unit #2 845 ohm (R <sub>35</sub> ), candohm, type MW-2	IRC	24A044	C <sub>28</sub>	Capacitor, 0.02 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AB	SP	46AW203J
R <sub>35</sub>							
R <sub>36</sub>	Resistor, 820 ohm $\pm$ 10%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE821K				
R <sub>37</sub>	Not used.			C <sub>29</sub>	Same as C <sub>28</sub>		
R <sub>38</sub>	Same as R <sub>24</sub>			C <sub>30</sub>	Capacitor, 3 turn twisted wire leads		
R <sub>39</sub>	Resistor, 1.5 megohm $\pm$ 20%, $\frac{1}{4}$ watt, carbon	ASA	RC10AE155M	C <sub>31</sub>	Same as C <sub>21</sub>		
R <sub>40</sub>	Resistor, 450 ohm tapped at 87 ohm, 7 watt, 2 unit, wire wound, unit #1 363 ohm (R <sub>40</sub> ), unit #2 87 ohm (R <sub>41</sub> ) candohm, special	MT	24A819	C <sub>32</sub>	Capacitor, 510 mmfd. $\pm$ 5%, 500 V. D-C work- ing, mica dielectric	ASA	CM20A511J
R <sub>41</sub>							
R <sub>42</sub>	Same as R <sub>7</sub>			C <sub>33</sub>	Same as C <sub>7</sub>		
C <sub>1</sub>	Capacitor, variable, 3 section, 2 unit, unit #1-(C <sub>1</sub> ), max. cap. per section 352 mmfd., air dielectric, unit #2-(C <sub>2</sub> ) max. cap. per section 22 mmfd. air dielectric, each unit has separate drive shaft to which pulleys are fixed, type 945-3-20	48B055		C <sub>34</sub>	Capacitor, 0.05 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type 484	A	46AW503J
C <sub>2</sub>							
C <sub>3</sub>	Capacitor, 51 mmfd. $\pm$ 5%, 500 V. D-C work- ing, low loss mica dielectric	ASA	CM20C510J	C <sub>35</sub>	Capacitor, 30 mfd. -10 + 50%, 150 V. D-C working, electrolytic, one part of triple unit - refer to C <sub>27</sub>		
C <sub>4</sub>	Capacitor, 0.1 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type 484	A	46AV104J	C <sub>36</sub>	Capacitor, 100 mfd. -10 + 65%, 5 V. D-C working, electrolytic, one part of triple unit - refer to C <sub>27</sub>		
C <sub>5</sub>	Capacitor, 15 mmfd. $\pm$ 20%, 500 V. D-C work- ing, temp. coeff. -.00075 mmfd./mmfd./degree Cent., ceramic dielectric, type 809-Q47	CRL	47A027				
C <sub>6</sub>	Capacitor, 10 mmfd. $\pm$ 20%, 500 V. D-C work- ing, temp. coeff. -.00075 mmfd./mmfd./degree Cent., ceramic dielectric, type 811-Q13.	CRL	47A028	C <sub>37</sub>	Capacitor, dual, 120 mfd. -10 + 50%, 150 V. D-C working (C <sub>38</sub> ), 60 mfd. -10 $\pm$ 65%, 5 V. D-C working (C <sub>37</sub> ), unit hermetically sealed 4 prong plug-in assembly, type 10B335	IC	45A066
C <sub>7</sub>	Capacitor, 0.05 mfd. -10 + 40%, 200 V. D-C working, paper dielectric, type AB	SP	46AU503J	C <sub>38</sub>			
				C <sub>39</sub>	Capacitor, 4300 mmfd. $\pm$ 5%, 500 V. D-C work- ing, mica dielectric	ASA	CM35A432J
				C <sub>40</sub>	Capacitor, 240 mmfd. $\pm$ 5%, 500 V. D-C work- ing, mica dielectric	ASA	CM20A241J



## THE HALLICRAFTERS CO.

## MODEL S-39, Skyranger

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR.'S. PART NO.	REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR.'S. PART NO.
C <sub>41</sub>	Capacitor, 2000 mmfd. $\pm 5\%$ , 500 V. D-C working, mica dielectric	ASA	CM30A202J	SW <sub>7</sub>	Switch, rotary selector, 3 position, single OM section, non-shorting type contacts, has a type 8030-K4 toggle action, SPST A-C switch ganged on rear of assembly "ON" position full clockwise, type H	OM	60A162
C <sub>42</sub>	Capacitor, 910 mmfd. $\pm 5\%$ , 500 V. D-C working, mica dielectric	ASA	CM30A911J	SO <sub>1</sub>	Socket, female, 4 contacts, bakelite insulation, wafer type, brass contacts, 2 mtg. holes with $\frac{1}{4}$ " mtg. centers, type 2642	CN	10A080
C <sub>43</sub>	Capacitor, 390 mmfd. $\pm 5\%$ , 500 V. D-C working, mica dielectric	ASA	CM20A391J	PL <sub>1</sub>	Plug with line cord, 2 conductor, rubber insulation, #18 ga. stranded copper wire, length 6 feet, 2 prong spring type molded on plug, special	E	87A078
C <sub>44</sub>	Same as C <sub>8</sub>			BA <sub>1</sub>	Battery, 6 V. D-C, 2 hole socket, 3-7/8" x 2-15/16" x 5/8", type P698A	ROV	27A010
C <sub>45</sub>	Same as C <sub>7</sub>			BA <sub>2</sub>	Battery, 45 V. D-C, combination "B" socket, 4-1/8" x 2-9/16" x 5-5/16", type P5303	ROV	27A009
C <sub>46</sub>	Capacitor, 0.5 mfd. -1C + 40%, 200 V. D-C working, paper dielectric		46AT504J	BA <sub>3</sub>	Same as BA <sub>2</sub>		
C <sub>47</sub>	Capacitor, 4 unit assembly, mica dielectric, compression type adjustment, trimmers mounted on a single metal strip, 3 units with min. cap. 2.7 mmfd., max. cap. 35 mmfd. (C <sub>47</sub> , C <sub>49</sub> , C <sub>50</sub> ) 1 unit with min. cap. 1.5 mfd., max. cap. 10 mmfd. (C <sub>48</sub> special	UE	44A064	J <sub>1</sub>	Jack, single circuit, normally closed, brass U mechanism, bakelite insulation, type 1J102	U	36A002
C <sub>48</sub>				LS <sub>1</sub>	Loudspeaker; 4 inch O.D. permanent magnet dynamic, includes transformer T <sub>4</sub> in the assembly, type 4-OM-11A	OT	85B009
C <sub>49</sub>				LM <sub>1</sub>	Lamp, indicator, 1-1/8" leads, clear glass bulb type 4 $\frac{1}{2}$ , type NE-7	GE	39A007
C <sub>50</sub>				V <sub>1</sub>	Tube, pentode, type 1T4	RCA	90X1T4
C <sub>51</sub>	Same as C <sub>47</sub> , C <sub>48</sub> , C <sub>49</sub> , C <sub>50</sub> , assembly. C <sub>51</sub> , C <sub>52</sub> , C <sub>53</sub> , same as C <sub>47</sub> , C <sub>48</sub> , C <sub>50</sub> ; and C <sub>52</sub> same as C <sub>48</sub>			V <sub>2</sub>	Tube, pentagrid converter, type 1R5	RCA	90X1R5
C <sub>52</sub>				V <sub>3</sub>	Tube, type, 1P5GT	RCA	90X1P5GT
C <sub>53</sub>				V <sub>4</sub>	Same as V <sub>3</sub>		
C <sub>54</sub>				V <sub>5</sub>	Tube, diode triode, type 1H5GT	RCA	90X1H5GT
C <sub>55</sub>	Capacitor, 5 unit assembly, mica dielectric, compression type adjustment, trimmers mounted on a single metal strip, 2 units with min. cap. 1.5 mmfd., max. cap. 10 mfd. (C <sub>55</sub> and C <sub>58</sub> ), 2 units with min. cap. 2.7 mmfd., max. cap. 35 mmfd. (C <sub>55</sub> and C <sub>56</sub> ), 1 unit with min. cap. 25 mmfd., MAX. 140 mmfd. (C <sub>59</sub> ), special	UE	44A092	V <sub>6</sub>	Tube, beam power amplifier, type 3Q5GT	RCA	90X3Q5GT
C <sub>56</sub>				V <sub>7</sub>	Tube, half-wave high-vacuum rectifier, type 35Z5GT	RCA	90X35Z5GT
C <sub>57</sub>				V <sub>8</sub>	Same as V <sub>5</sub>		
C <sub>58</sub>				V <sub>9</sub>	Same as V <sub>7</sub>		
C <sub>60</sub>	Not used						
C <sub>61</sub>	Same as C <sub>40</sub>						
C <sub>62</sub>	Same as C <sub>21</sub>						
T <sub>1</sub>	Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 80 mmfd., primary and secondary are tuned by adjustable iron cores, special	SI	50A086		FOR TROPICAL RECEIVERS USE THE ABOVE PARTS		
T <sub>2</sub>	Same as T <sub>1</sub> except for length of leads	SI	50B157	T <sub>1</sub>	Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, special (Note: T <sub>1</sub> differs from T <sub>2</sub> and T <sub>3</sub> in the length of the wire leads)	SI	50A150
T <sub>3</sub>	Same as T <sub>1</sub> , except for length of leads	SI	50B158				
T <sub>4</sub>	Transformer, A-F, primary to match the output of the type 3Q5GT tube, part of speaker assembly LS <sub>1</sub> . Shown for reference only			T <sub>2</sub>	Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, special (Note: T <sub>2</sub> differs from T <sub>1</sub> and T <sub>3</sub> in the length of the wire leads)	SI	50A159
T <sub>5</sub>	Transformer, R-F, 4 unit assembly, tunes from .55 MC. to 30 MC. in 4 bands with condenser C <sub>1</sub> and C <sub>2</sub> , inductance adjusted by movable iron cores.	SWI	51B301				
T <sub>6</sub>							
T <sub>7</sub>							
T <sub>8</sub>							
T <sub>9</sub>	Transformer, R-F, 4 unit assembly, tunes from .55 MC. to 30 MC. in 4 bands with condensers C <sub>1</sub> and C <sub>2</sub> , inductance adjusted by movable iron cores	SWI	51B303				
T <sub>10</sub>							
T <sub>11</sub>							
T <sub>12</sub>							
SW <sub>2</sub>	Switch, DPST, slide action, bakelite insulation, steel mtg. plate with 2 holes having 1-1/8" mtg. centers, type 71	OM	60A061	L <sub>1</sub>	Reactor, R-F, inductance 170 microhenries, air core, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, type 3485	SWI	53A057
SW <sub>3</sub>	Same as SW <sub>2</sub>			L <sub>2</sub>	Reactor, filter, d-c resistance 250 ohms $\pm$ 20%, max. load current 30 milliamperes, inductance 3.6 henrys at 30 milliamperes, vacuum wax impregnated and flash dipped in Hollowax #2012, type 1A1251 modified	GT	56B051
SW <sub>4</sub>	Switch, SPST, toggle action, refer to SW <sub>7</sub>						
SW <sub>5</sub>	Switch, SPDT, slide, bakelite insulation, brass solder lugs, steel mtg. plate with 2 holes having 1-1/8" mtg. centers, type 77	OM	60A130	SW <sub>6</sub>	Switch, rotary selector, 4 position, 3 section, shorting type contacts, bushing $\frac{1}{4}$ " long, terminal 6 of section 2 front and rear are electrically connected, type RM	MA	60B179
SW <sub>6</sub>	Switch, rotary selector, 4 position, 3 section, shorting type contacts, bushing $\frac{1}{4}$ " long, type RM	MA	60B160				

MODEL S-39, Skyraenger

THE HALLICRAFTERS CO.

RECOMMENDED ANTENNA INSTALLATIONS

MFR. CODE CONTR.'S. PART NO.

NAME OF PART AND DESCRIPTION

REF. SYMBOL

SI 50A151

Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2012, special, (Note T<sub>3</sub> differs from T<sub>1</sub> and T<sub>2</sub> in the length of the wire leads)

T<sub>3</sub>

SWI 51B648

Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser C<sub>1</sub> and C<sub>2</sub>, inductance adjusted by movable iron cores, wax impregnated with Hallowax #2012

T<sub>5</sub>  
T<sub>6</sub>  
T<sub>7</sub>  
T<sub>8</sub>

SWI 51B650

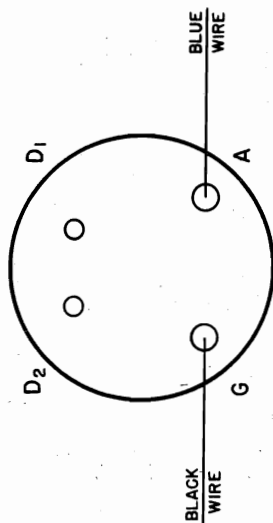
Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser C<sub>1</sub> and C<sub>2</sub>, inductance adjusted by movable iron cores, wax impregnated with Hallowax #2012

T<sub>9</sub>  
T<sub>10</sub>  
T<sub>11</sub>  
T<sub>12</sub>

SWI 51B649

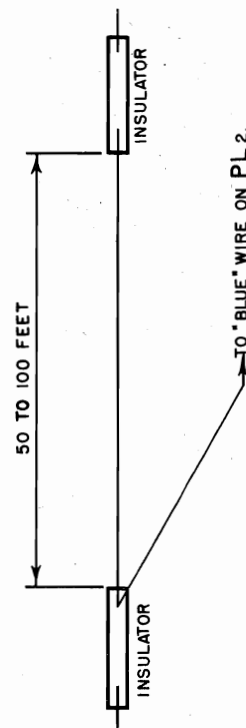
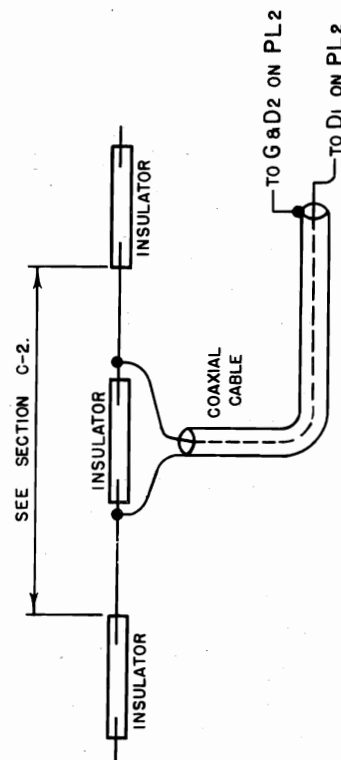
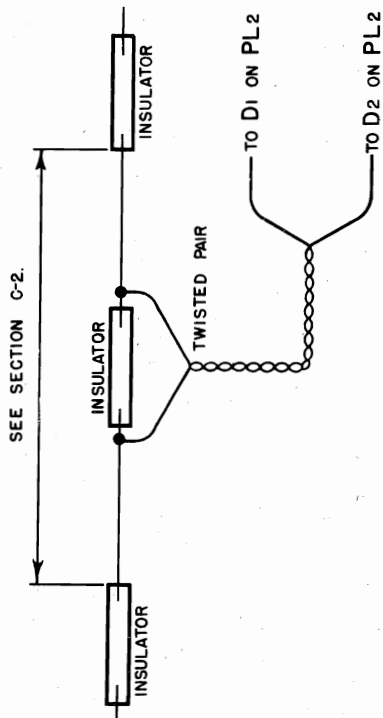
Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser C<sub>1</sub> and C<sub>2</sub>, inductance adjusted by movable iron cores, wax impregnated with Hallowax #2012

T<sub>13</sub>  
T<sub>14</sub>  
T<sub>15</sub>  
T<sub>16</sub>



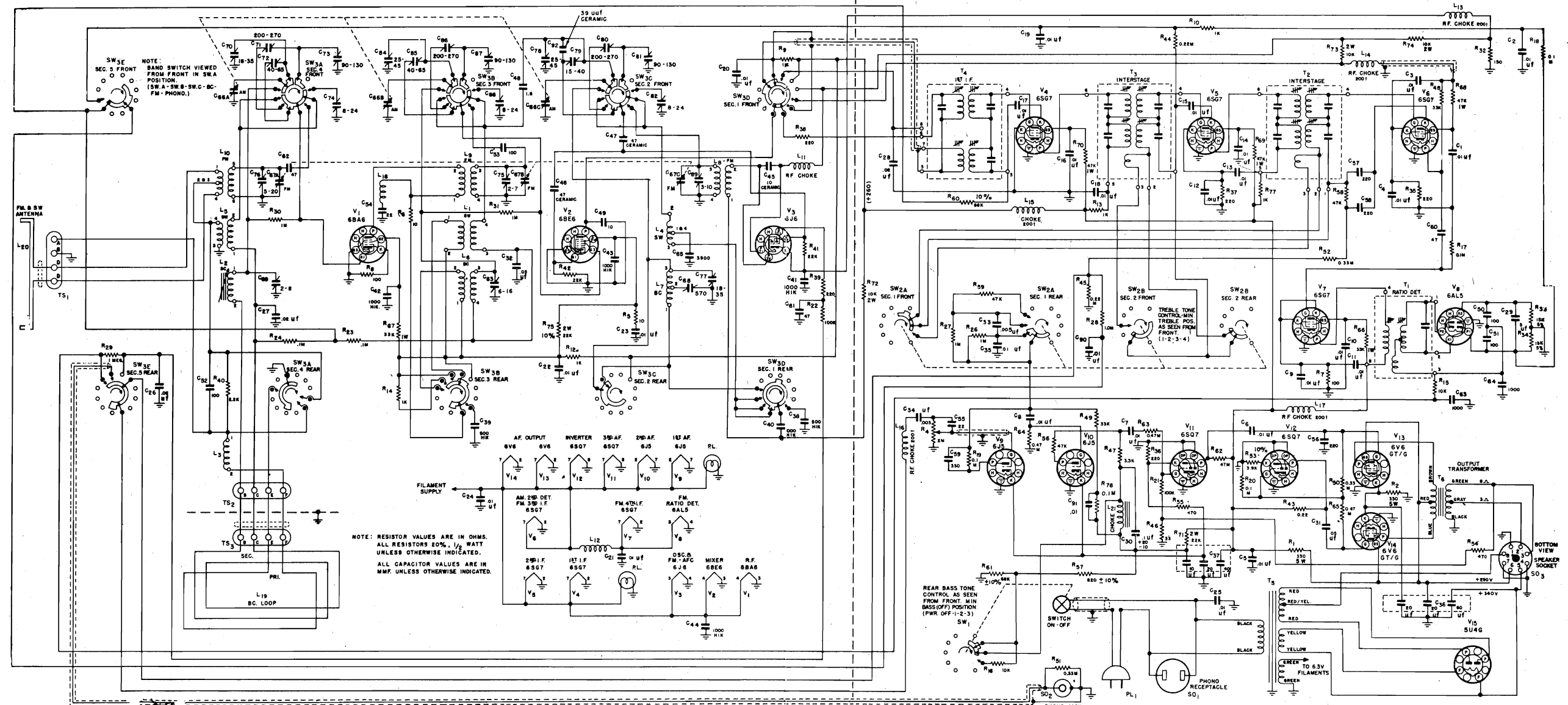
PL2  
PIN VIEW

NOTE: PL2 IS SUPPLIED WIRED AS ABOVE



THE HALLICRAFTERS CO.

MODELS EC-403, EC-404,  
Echophone



**BUTTON SETTING:**

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

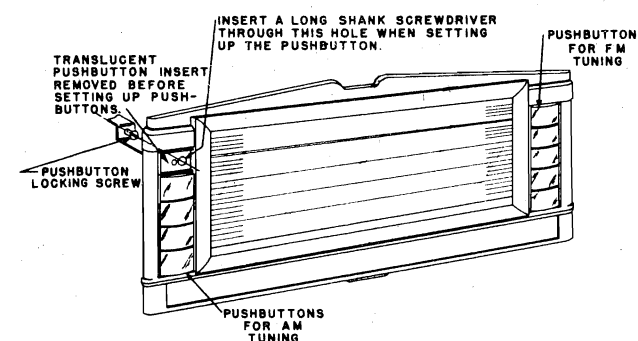
Tuning Range.....	(BC)	540 kc — 1700 kc
	(A)	15 mc — 18 mc
	(B)	9 mc — 12 mc
	(C)	5.8 mc — 18 mc
	(FM)	88 mc — 108 mc

Intermediate Frequency.....455 kc

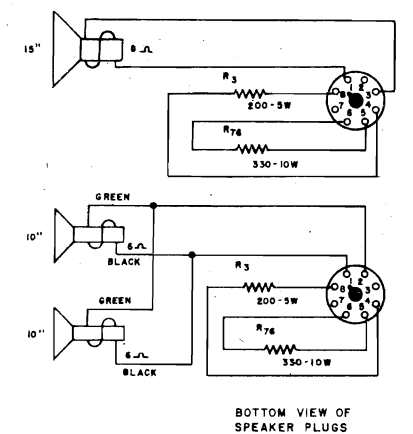
Intermediate Frequency.....10.7 mc

Power Supply.....105-125 V. 60 cycle AC

Power Consumption.....180 watts

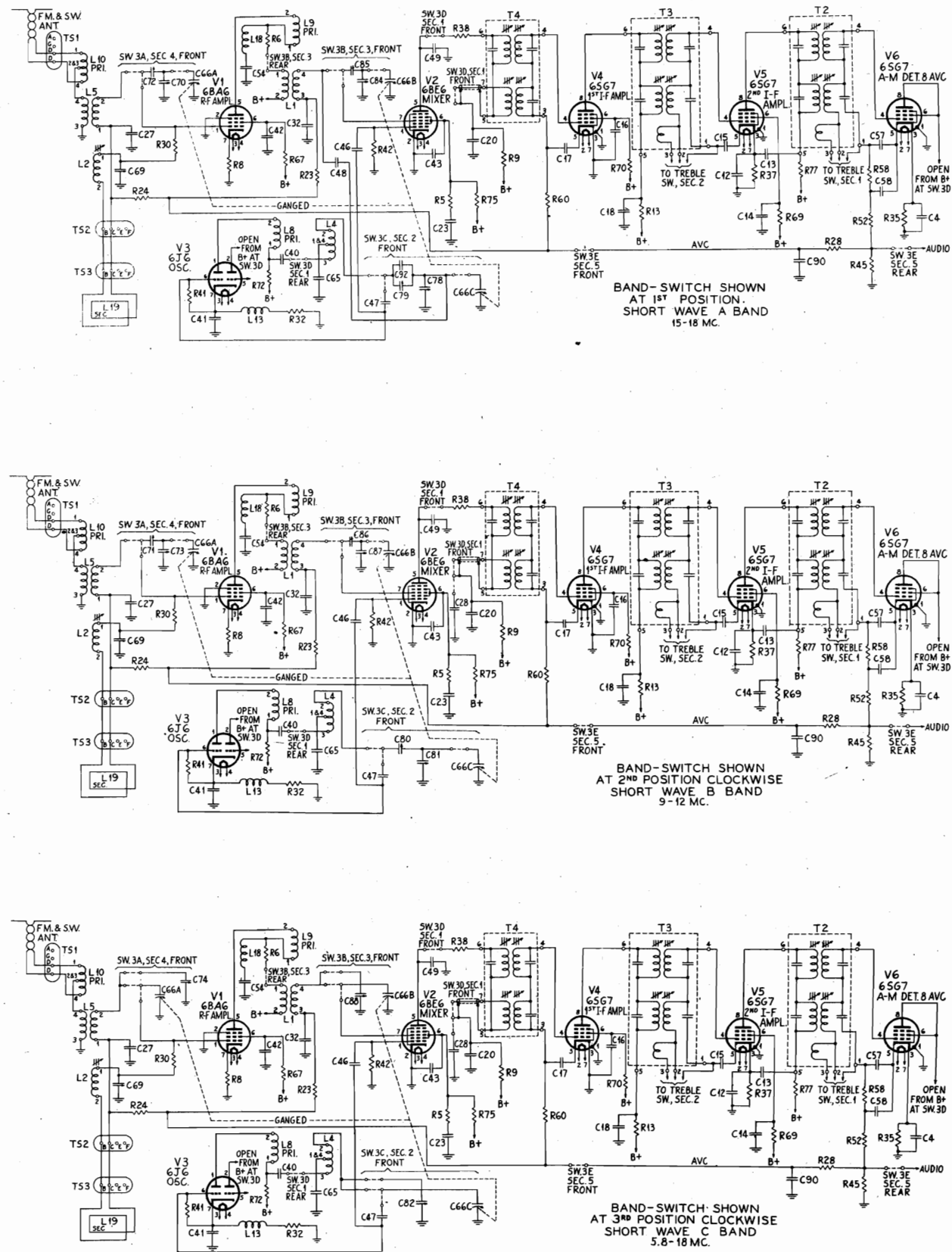


**Fig. 1. View showing pushbutton setup.**

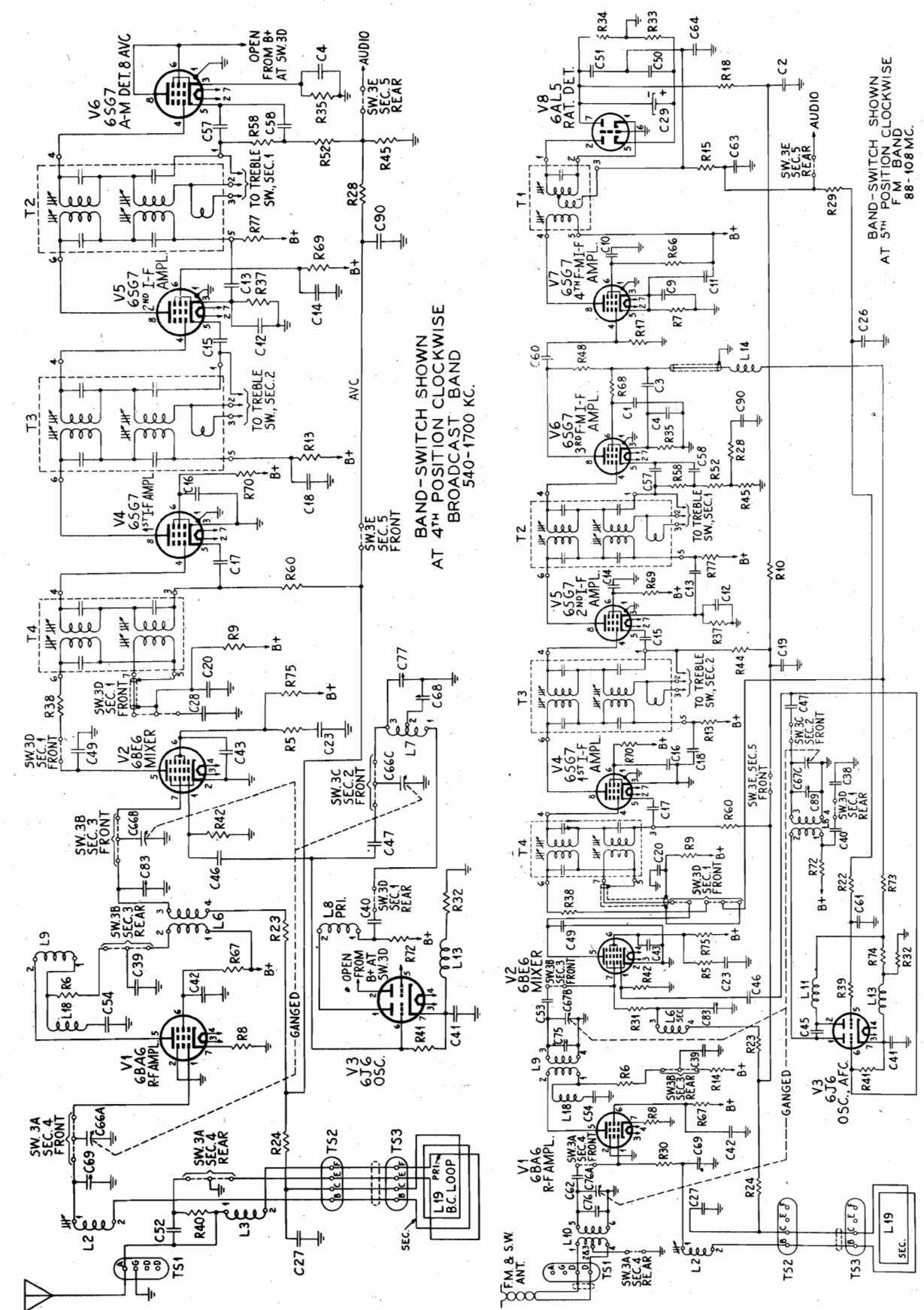


BOTTOM VIEW OF  
SPEAKER PLUGS

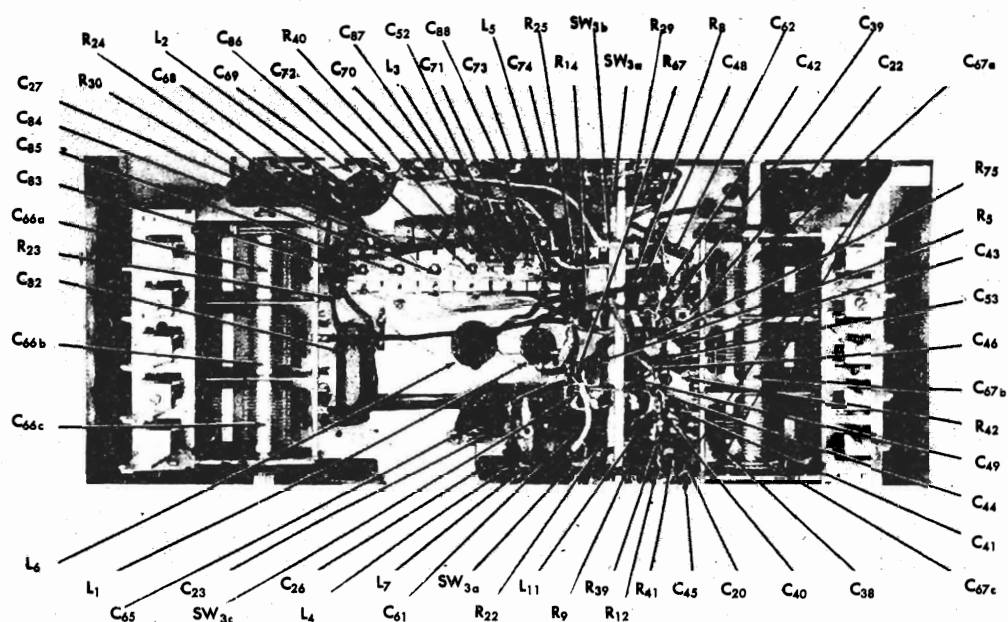
THE HALLICRAFTERS CO. MODELS EC-403, EC-404, Echophone



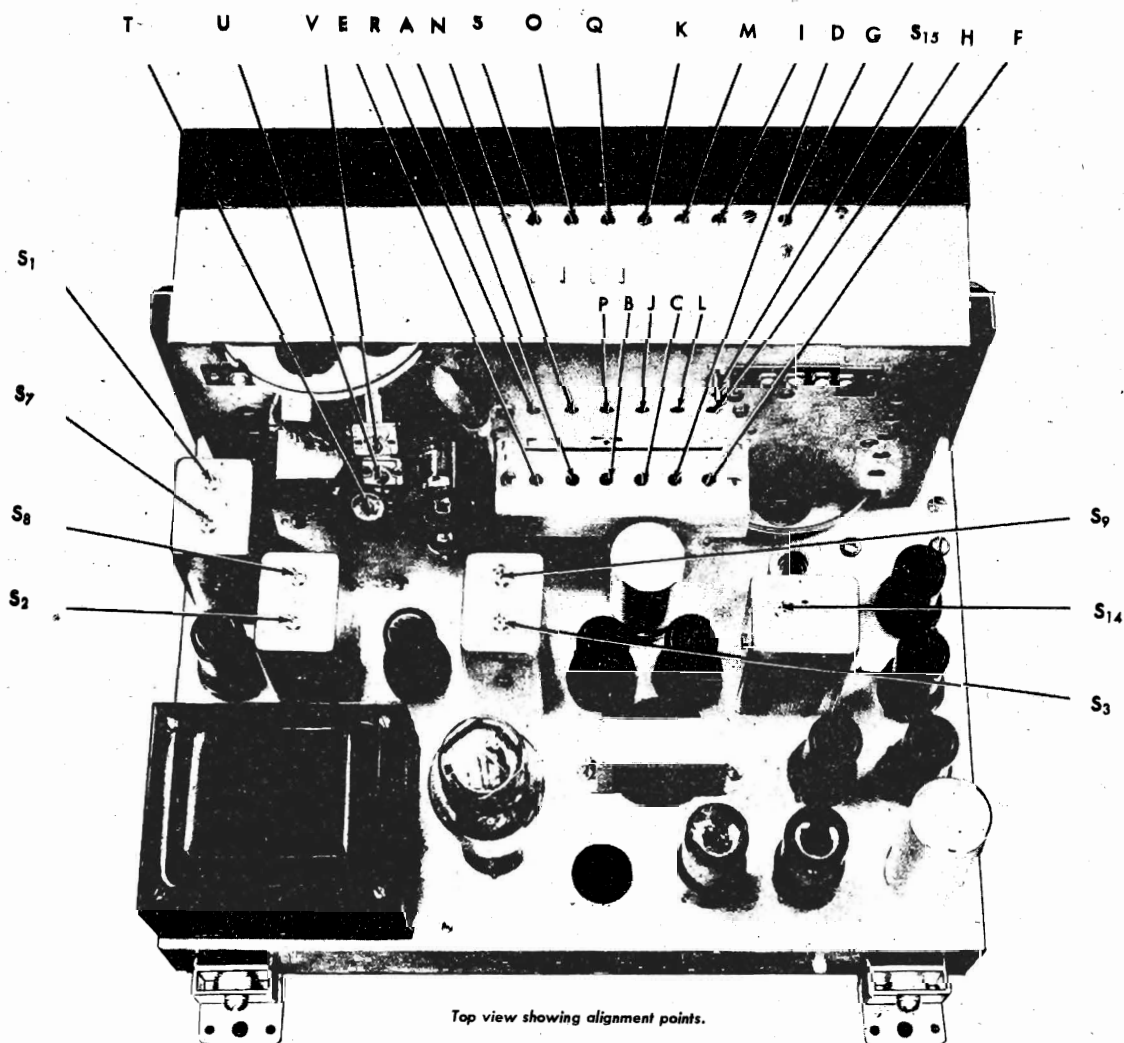
MODELS EC-403, EC-404, THE HALLICRAFTERS CO. Echophone



## THE HALLICRAFTERS CO.

MODELS EC-403, EC-404,  
Echophone


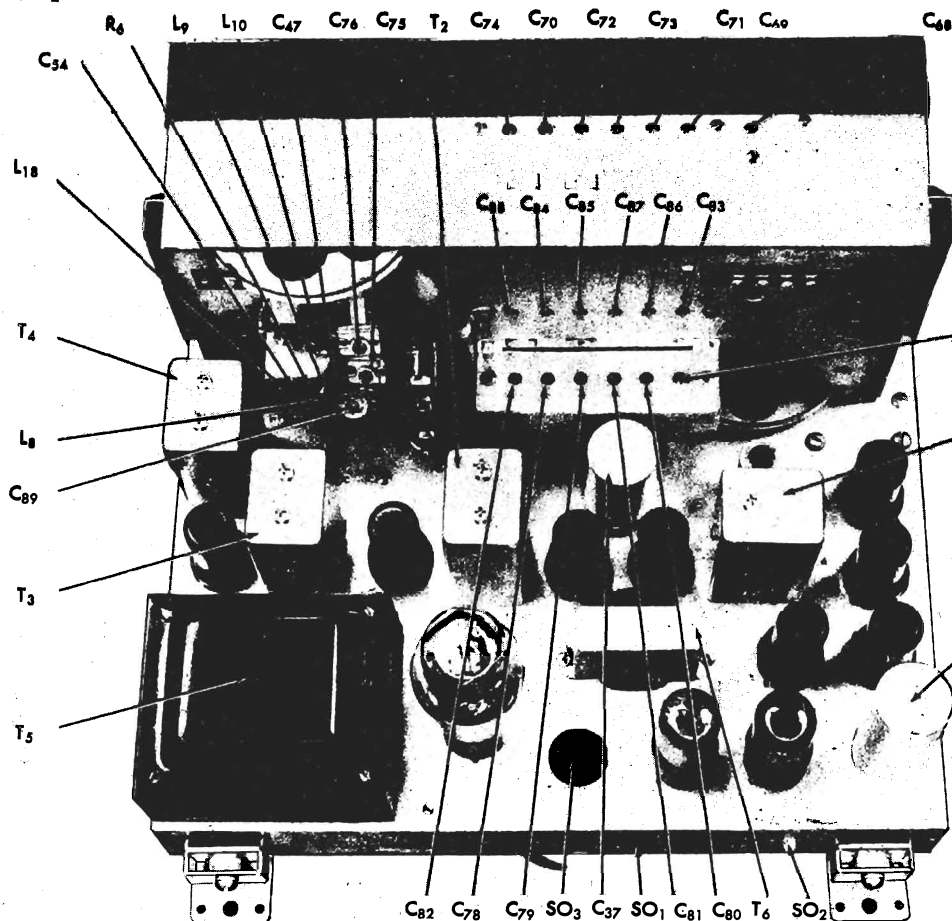
Back view of R.F. chassis showing component location.



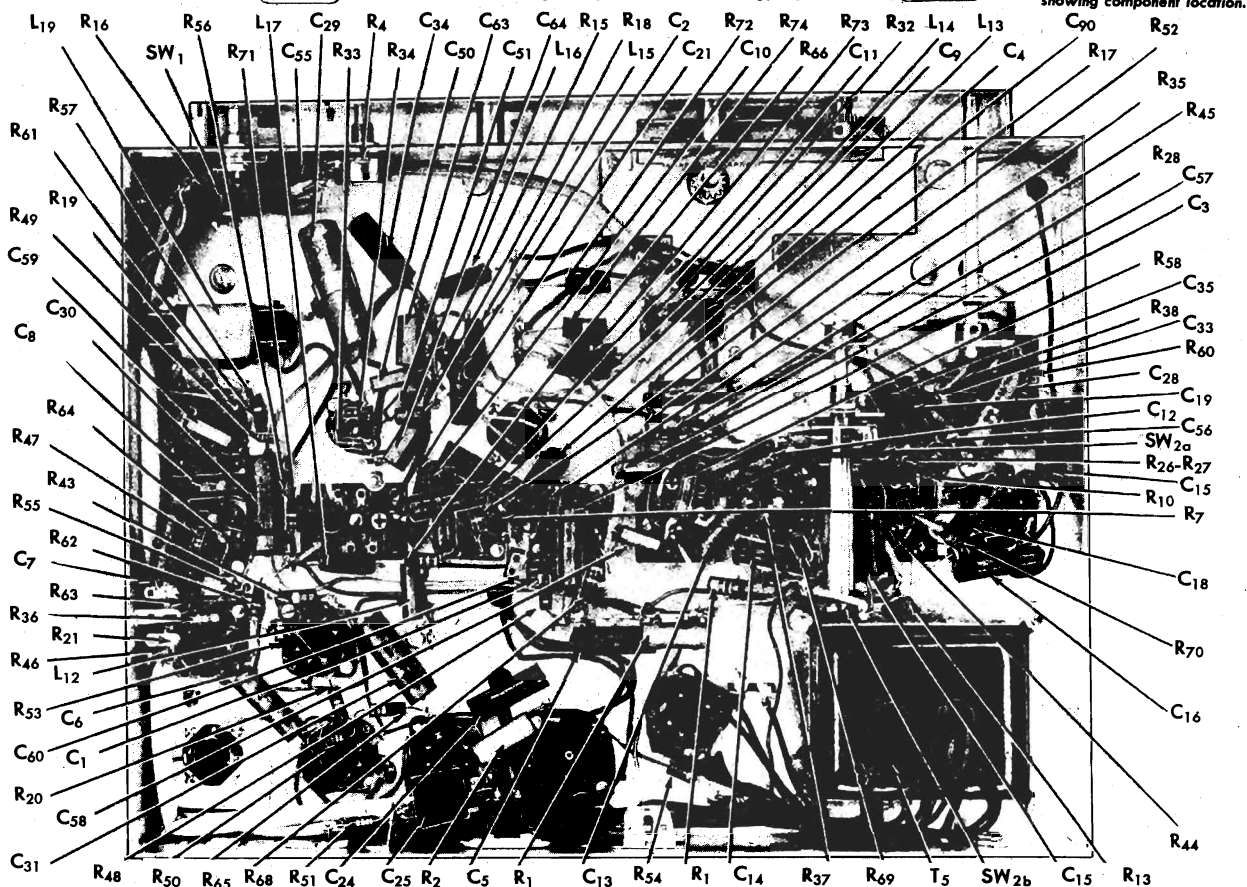
Top view showing alignment points.

MODELS EC-403, EC-404,  
Echophone

THE HALLICRAFTERS CO.



Top view showing  
component location.

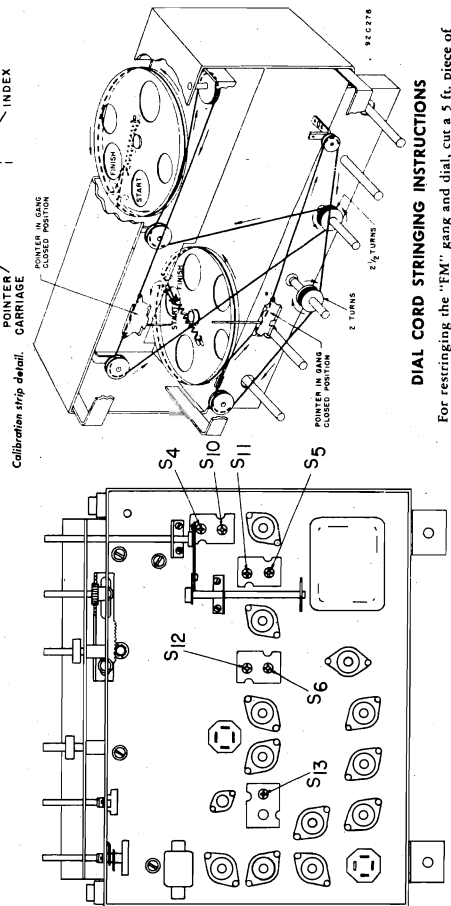
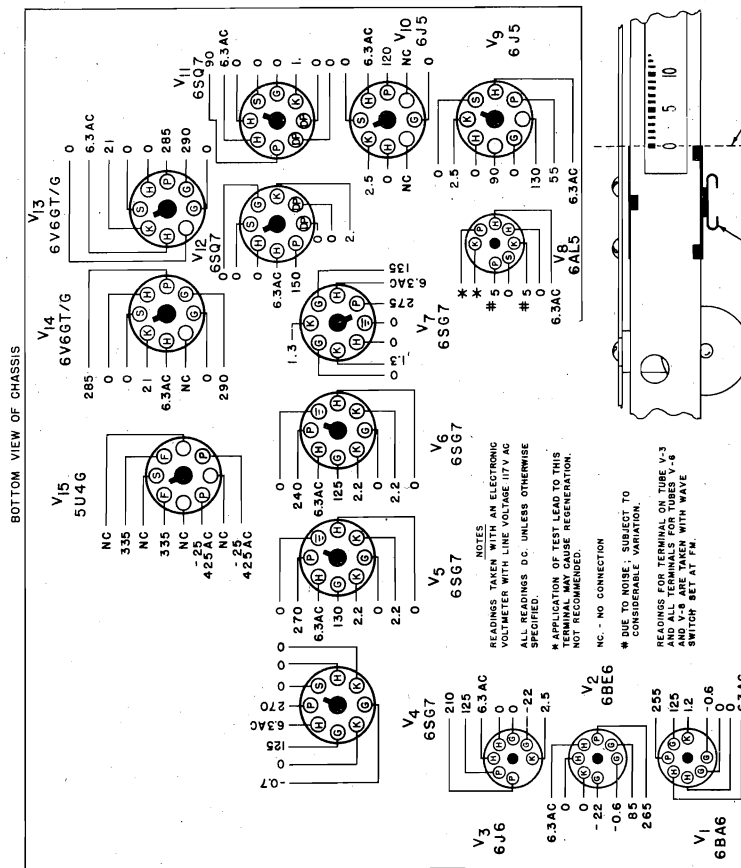


Bottom view of receiver  
showing component location.



# THE HALLICRAFTERS CO.

MODELS EC-403, EC-404,  
Echophone



## DIAL CORD STRINGING INSTRUCTIONS

For restringing the "FM" gang and dial, cut a 5 ft. piece of 9 lb. test dial cord and proceed as indicated in Fig. 9. For restringing the "AM" gang and dial, cut a 4 1/2 ft. piece of dial cord and proceed as indicated in Fig. 9.

## ALIGNMENT PROCEDURE

Removal of the receiver chassis from the cabinet requires the use of other calibration means than the dial glass. Calibration strips mounted on the pointer rails are provided for alignment purposes.

In order to see these calibration strips, it is necessary that the dial plate (brown metal cover) be removed in the following order:

1. Pull out dial pointers.
2. Remove seven self-tapping screws holding dial plate to chassis.
3. Remove the Right hand and Left hand. Dial lamp assemblies fastened by one self-tapping screw each.
4. Remove dial plate.

With the variable condensers fully "meshed," the right hand side of the pointer carriage will be indexed to "0" on the calibration strips (see fig. 5). Proceed with alignment of the receiver as indicated on the alignment chart.

**NOTE:** This receiver has AUTOMATIC FREQUENCY CONTROL employed on the "FM" band in order to compensate for mechanical variations in the push-button mechanism. Correction factor is approximately 5 times; "take hold" characteristics are: "Before" 100 kc and "Release" before 450 kc at .1 volt input signal.

Standard RMA dummy consisting of a 200 mmf condenser in series with a 20 ohm r-f choke which is shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.

## ALIGNMENT PROCEDURE

Steps	Signal Generator Thru .01 Mfd to:	Sig. Gen. Tuned to:	Receiver Tuned to:	Cal. No.	Adjust the Following Slugs/Trimmers for:
"AM" 1. 2nd i.f. control grid	455 kc		"BC" Band 1000 kc	55	S3 and S6, Max. output
2. 1st i.f. control grid	455 kc		1000 kc	55	S2 and S5, Max. output
3. 1st Det. control grid	455 kc		1000 kc	55	S1 and S4, Max. output
<b>NOTE:</b> Set "Bass" control at No. 1, and "Treble" control at No. 4, read output for maximum AVC voltage, using a VTVM or 20,000 ohms volt meter connected to pin No. 7 of the 6AL5 audio detector tube to ground.					
"FM" 4. 2nd i.f. control grid	10.7 mc		"FM" Band Mid-scale	55	S9, S12, S13 Max. output
5. 1st i.f. control grid	10.7 mc		Mid-scale	55	S8 & S11 Max. output
6. 1st Det. control grid	10.7 mc		Mid-scale	55	S7, S10 Max. output
<b>NOTE:</b> For ratio detector alignment, clip output meter to C-34 leading to audio control potentiometer and ground.					
7. 1st Det. control grid	10.7 mc		Mid-scale	55	S14 for "0" audio voltage

8. Standard RMA dummy ant. to:	1500 kc		"BC" Band 1500 kc	82	"F," Calibration
9. "A," "G,"	1500 kc		1500 kc	82	"H," Max. output
10. "A," "G,"	1500 kc		1500 kc	82	"I," Max. output
11. "A," "G,"	600 kc		600 kc	15.5	"G," Calibration
12. "A," "G,"	600 kc		600 kc	15.5	S15, Max. output
13. "A," "G,"	12 mc		"B" Band 12 mc	91.5	"C," Calibration
14. "A," "G,"	12 mc		12 mc	91.5	"J," Max. output
15. "A," "G,"	12 mc		12 mc	91.5	"K," Max. output
16. "A," "G,"	9 mc		9 mc	6.5	"D," Calibration
17. "A," "G,"	9 mc		9 mc	6.5	"L," Max. output
18. "A," "G,"	9 mc		9 mc	6.5	"M," Max. output
19. "A," "G,"	18 mc		"A" Band 18 mc	94.5	"A," Calibration
20. "A," "G,"	18 mc		18 mc	94.5	"N," Max. output
21. "A," "G,"	18 mc		18 mc	94.5	"O," Max. output
22. "A," "G,"	15 mc		15 mc	7.5	"B," Calibration
23. "A," "G,"	15 mc		15 mc	7.5	"P," Max. output
24. "A," "G,"	15 mc		15 mc	7.5	"Q," Max. output
25. "A," "G,"	16 mc		"C" Band 16 mc	84	"E," Calibration
26. "A," "G,"	16 mc		16 mc	84	"R," Max. output
27. "A," "G,"	16 mc		16 mc	84	"S," Max. output
28. Two 150 ohm resistors to "D," "D,"	108 mc		"FM" Band 108 mc	83.5	"T," Calibration
29. "D," "D,"	108 mc		108 mc	83.5	"U," Max. output
30. "D," "D,"	108 mc		108 mc	83.5	"V," Max. output

MODELS EC-403, EC-404,  
Echophone

## THE HALLICRAFTERS CO.

## SERVICE PARTS LIST

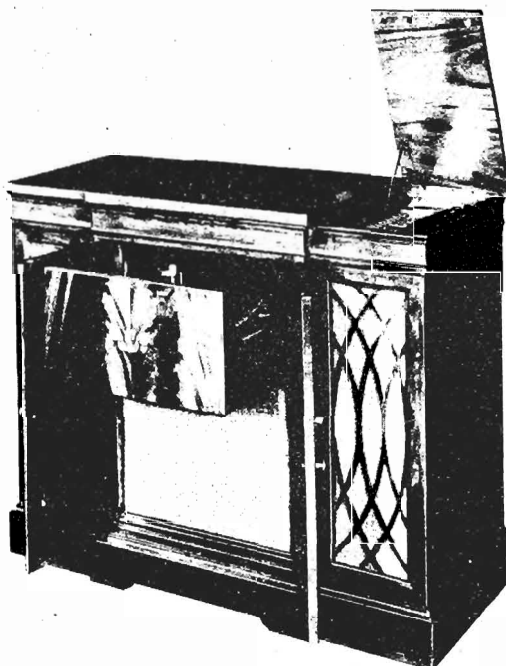
Illustration No.	Description	Hallcrafters Part No.
<b>CABINET PARTS</b>		
	Mahogany, cabinet.....	66F341
	Walnut, cabinet.....	66F342
<b>TRANSFORMERS AND COILS</b>		
T1	Freq. detector trans. FM.....	50C208
T2, 3	Interstage I.F. trans.....	50C209
T4	1st I.F. trans.....	50C210
L1	R.F. Coil, short wave.....	51B905
L2	Loading coil, ant., BC.....	51B906
L3	Loop loading coil.....	51B907
L4	Osc. coil, short wave.....	51B908
L5	Ant. coil, short wave.....	51B909
L6	R.F. Coil, B.C.....	51B910
L7	Osc. coil, B.C.....	51B911
L8	Osc. coil, FM.....	51B914
L9	R.F. coil, FM.....	51B915
L10	Ant. coil, FM.....	51B916
L11	Plate choke.....	53B008
L12	Filament choke.....	53B009
L13, 14, 15, 16, 17	R.F. choke.....	53A106
L18	R.F. choke.....	53A115
L19	BC-SW loop ant.....	57D106
L20	FM dipole ant.....	57C108
T5	Power transformer.....	52C132
T6	Output transformer.....	55B086
L21	Audio choke.....	56B082
<b>CONDENSERS</b>		
C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 90, 91,	.01 mfd. 600 v. tubular.....	46AZ103F
C26, 27, 28	.02 mfd 600 v. tubular.....	46AV203F
C30	.1 mfd 200 v. tubular.....	46AU104H
C31, 32	.05 mfd 600 v. tubular.....	46AY503F
C33	.002 mfd 600 v. tubular.....	46AZ202J
C34, 35	.003 mfd 600 v. tubular.....	46AZ202J
C38, 39	500 uuf ceramic.....	47A147
C40, 41, 42, 43, 44, 16	1000 uuf ceramic.....	47A148
C45	10 uuf ceramic.....	47A149
C46, 47	47 uuf ceramic.....	47A150
C48	1.5 uuf "Gimmick," wire.....	Not Supplied
C49	10 uuf 500 v. mica, 10%.....	CM20A100K
C50, 51, 52, 53	100 uuf 500 v. mica.....	CM20A101M
C54	22 uuf 500 v. mica, 10%.....	CM20A220K
C55	22 uuf 500 v. mica.....	CM20A220M
C56, 57, 58	220 uuf 500 v. mica.....	CM20A221M
C59	330 uuf 500 v. mica.....	CM20A331M
C60, 61, 62	47 uuf 500 v. mica.....	CM20A470M
C63, 64	1000 uuf 500 v. mica.....	CM30A102M
C65	3900 uuf 500 v. mica.....	CM35A392J
C36	60-20 mfd 450 v. electrolytic.....	45B099
C37	20 mfd 30 v. electrolytic.....	45B100
	40-10 mfd 450 v. electrolytic.....	45B100
	20 mfd 30 v. electrolytic.....	45B100
C29	5 mfd. 50 v. electrolytic.....	45A108
C68	570 uuf trimmer.....	44A189
C75	Trimmer, FM, RF.....	44A192
C89	Trimmer, FM, Osc.....	44A193
C76	Trimmer, FM, Ant.....	44A194
C69, 70, 71, 72, 73, 74	Trimmer assembly, ant.....	44B190
C77, 78, 79, 80, 81, 82	Trimmer assembly, Osc.....	44B195
C83, 84, 85, 86, 87, 88	Trimmer assembly, RF.....	44B196
C67a-b-c	Variable condenser, "FM".....	48C175
C66a-b-c	Variable Condenser, "AM".....	48C176
C92	39 uuf, Ceramic.....	CC30SH390M

## RESISTORS

R1, 2	330 ohm, 5W WW.....	24A864
R76	330 ohm 10 W WW.....	24BG331E
R3	200 ohm 5W WW.....	24A865
R4	2 meg. volume control.....	25A571
R5, 6	10 ohm, 1/2 W.....	RC20AE100M
R7, 8	100 ohm, 1/2 W.....	RC20AE101M
R9, 10, 11, 12, 13, 14, 77	1000 ohm, 1/2 W.....	RC20AE102M
R15, 16	10,000 ohm 1/2 W.....	RC20AE103M
R17, 18, 19, 20, 21, 22, 23, 24, 25, 78	100,000 ohm 1/2 W.....	RC20AE104M
R26, 27, 28, 29, 30, 31	1 meg. 1/2 W.....	RC20AR105M
R32	150 ohm 1/2 W.....	RC20AE151M
R33, 34	15,000 ohm 1/2 W.....	RC20AE153J
R35, 36, 37, 38, 39	220 ohm, 1/2 W.....	RC20AE221M
R40	2200 ohm, 1/2 W.....	RC20AE222M
R41, 42	22,000 ohm, 1/2 W.....	RC20AE223M
R43, 44, 45	220,000 ohm, 1/2 W.....	RC20AE224M
R46	33 ohm, 1/2 W.....	RC20AE330M
R47, 48	3300 ohm, 1/2 W.....	RC20AE332M
R49	33,000 ohm, 1/2 W.....	RC20AE333M
R50, 51, 52	330,000 ohm, 1/2 W.....	RC20AE334M
R53	3900 ohm, 1/2 W (10%).....	RC20AE392K
R54, 55	470 ohm, 1/2 W.....	RC20AE471M
R56	4700 ohm, 1/2 W.....	RC20AE472M
R57	820 ohm, 1/2 W.....	RC20AE821K
R58, 59	47,000 ohm, 1/2 W.....	RC20AE473M

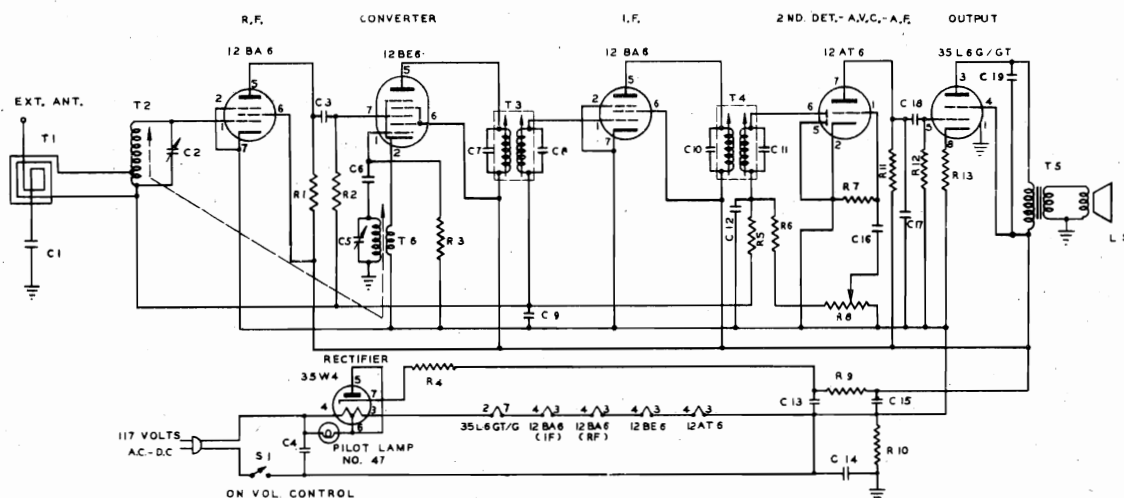
## SERVICE PARTS LIST (Continued)

Illustration No.	Description	Hallcrafters Part No.
<b>RESISTORS (Continued)</b>		
R60, 61	68,000 ohm, 1/2 W.....	RC20AE683K
R62, 63, 64, 65	470,000 ohm, 1/2 W.....	RC20AE474M
R66, 67	33,000 ohm, 1 W.....	RC30AE333M
R68, 69, 70	47,000 ohm, 1 W.....	RC30AE473M
R71	68,000 ohm, 1 W.....	RC30AE683M
R72, 73, 74	10,000 ohm, 2 W.....	RC40AE103M
R75	22,000 ohm, 2 W.....	RC40AE223K
<b>MISCELLANEOUS</b>		
SW1	Bass, on and off, complete.....	60B265
SW2	Treble, complete.....	60B264
SW3	Band switch, 5 sec. 6 pos.....	60C266
	Phono motor receptacle.....	10A015
	Phono pick-up jack.....	36A034
	Speaker socket.....	6A190
	Octal socket, (tube).....	6A190
	Miniature socket.....	6A276
	Pilot light socket and bracket, L.H.....	86A046
	Pilot light socket and bracket, R.H.....	86A047
	Pointer carriage.....	67B645
	Tube shield spring retainer.....	69A104
	Shield base.....	69A169
	Dial cord.....	38A014
	Line cord and plug.....	87A1570
	Pilot lamp.....	39A004
	Pointer, FM.....	82A120
	Pointer, AM.....	82A121
	Insert, pointer, FM.....	17A022
	Insert, pointer, AM.....	17A023
	Push-button.....	17B028
	Speaker, PM, 15".....	85C045
	Speaker, PM, 10".....	85C043 No. 1 85C047 No. 2
	Knob, with index.....	15B093
	Knob.....	15B096
	Push-button insert.....	17A027
	Call letters.....	17A025
	Record changer.....	115C002-2
	Dial glass, lower.....	22B179
	Dial glass, upper.....	22B178
	Escutcheon.....	7D039
<b>TUBES</b>		
V15	5U4G Rectifier.....	90X5U4G
V8	6AL5 FM Freq. detector.....	90X6AL5
V1	6BA6 RF amplifier.....	90X6BA6
V2	6BE6 1st detector.....	90X6BE6
V9, 10	6J5 1st and 2nd audio amp.....	90X6J5
V3	6J6 H.F. osc. and FM AFC.....	90X6J6
V4, 5, 6, 7	6SG7 1st and 2nd I.F., AM 2nd det., FM 3rd and 4th I.F.....	90X6SG7
V13, 14	6V6GT/G push pull audio amp.....	90X6V6GT
V12, 11	6S07 Inverter and 3rd audio amp.....	90X6S07





## HOFFMAN RADIO CORP.

MODELS A202, A309,  
Chassis 119

## MODELS A202 &amp; A309

## DESCRIPTION

Hoffman Models A202 and A309 are electrically identical and differ in cabinet design only. The receiver consists of a 6-tube broadcast band AC-DC Superheterodyne incorporating a built-in loop antenna.

## SPECIFICATIONS

Tuning Range	540 Kc to 1650 Kc
Intermediate Frequency	455 Kc.
Power Supply	115 V. D.C. or 115 V. A.C. 50-60 C.P.S.
Power Consumption	28 Watts
Undistorted Audio Output	.6 Watt
Maximum Audio Output	.9 Watt
Loudspeaker	5-inch round P.M.

## NORMAL OPERATING CURRENTS

35W4	Cathode Current	60 Ma.
35L6	Cathode Current	30 Ma.

Meter inserted in circuit at cathode.

SYMBOL	DESCRIPTION	HOFFMAN No.
C1	.005 Mfd. 600 Volt Tubular Paper	4102
C2, C5	Dual Padder 280 Mmf. Per Section	4307
C3, C6	100 Mmf. $\pm 20\%$ Mica	4000
C4	.05 Mfd. 400 Volt Tubular Paper	4101
C7, C8	100 Mmf. $\pm 10\%$ Ceramic	4012
C9	.05 Mfd. 200 Volt Tubular Paper	4100
C10, C11	100 Mmf. $\pm 10\%$ Ceramic	4012
C12	270 Mmf. $\pm 20\%$ Mica	4001
C13, C15	Dry Electrolytic (30-50 Mfd./150 V.)	4201
C14	.2 Mfd. 200 Volt Paper Tubular	4108
C16	.005 Mfd. 600 Volt Paper Tubular	4102
C17	270 Mmf. $\pm 20\%$ Mica	4001
C18	.005 Mfd. 600 Volt Tubular Paper	4102
C19	.02 Mfd. 400 Volt Tubular Paper	4106
LS	5" PM Loudspeaker	9003
R1	2200 Ohm $\pm 20\%$ 1/2 Watt	4512
R2, R6	47,000 Ohm $\pm 20\%$ 1/2 Watt	4504
R3	22,000 Ohm $\pm 20\%$ 1/2 Watt	4501
R4	47 Ohm $\pm 20\%$ 1/2 Watt	4508
R5	2.2 Megohm $\pm 20\%$ 1/2 Watt	4502
R7	10 Megohm $\pm 20\%$ 1/2 Watt	4505
R8	.5 Megohm Pot. with Switch (Volume)	4802
R9	500 Ohm $\pm 10\%$ 5 Watt	4700
R10, R12	.47 Megohm $\pm 20\%$ 1/2 Watt	4506
R11	.22 Megohm $\pm 20\%$ 1/2 Watt	4500
R13	150 Ohm $\pm 20\%$ 1/2 Watt	4510
S1	On-Off Switch (on Volume Control)	
T1	Antenna Loop	5238
T2	R.F. Coil	55203
T3	Input I.F. Transformer (455 Kc.)	55201
T4	Output I.F. Transform (455 Kc.)	55202
T5	Audio Output Transformer	5101
T6	Oscillator Coil	55204

## NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

PIN NO.	1	2	3	4	5	6	7	8
12BA6(R.F.)	— .45	0.	25. A.C.	37.5 A.C.	+65.	+80.	0.	
12BE6	4.6*	0.	12.5 A.C.	25. A.C.	+80.	+80.	0.	
12BA6 (I.F.)	— .45	0.	37.5 A.C.	50. A.C.	+80.	+80.	0.	
12AT6	—1.5*	0.	0.	12.5 A.C.	0.	—15.	+37.5	
35L6	0.	85 A.C.	+75 D.C.	+80. D.C.	0.	0.	50. A.C.	+4.6
35W4	115 A.C.	0.	85. A.C.	115. A.C.	110. A.C.	110. A.C.	+110. D.C.	

D.C. voltages measured with 1000 ohm/volt meter  
A.C. voltages measures with 1000 ohm/volt meter  
All voltages measured with reference to B-Line voltage 115.

\* These readings taken with V. T.V. M.

NOTE: The above readings are obtained with no signal input to receiver.

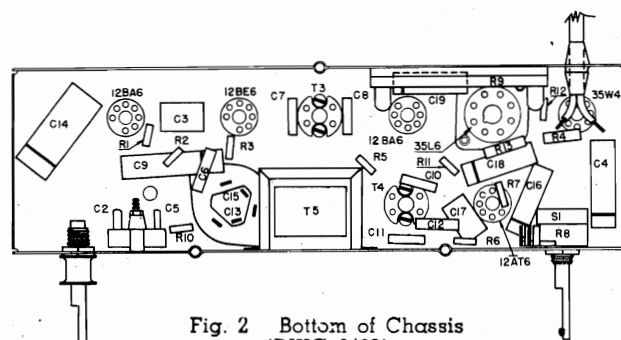


Fig. 2 Bottom of Chassis  
(DWG 6468)

MODELS A202, A309  
MODEL B400

## HOFFMAN RADIO CORP.

## A202, A309

## ALIGNMENT PROCEDURE

## CAUTION:

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows:

## EQUIPMENT REQUIRED:

1. Signal Generator.
2. Output Meter with 2.5 Volt Scale.
3. .25 Mfd. Condenser.

## I.F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 volt scale.
2. Connect output of signal generator directly to 12BE6 control grid; connect ground side of generator to chassis of receiver through .25 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. slugs (first T4 and then T3) for maximum reading on output meter.

Note: Keep signal level low, just enough to keep maximum reading on lower half of meter scale. Tuning condenser plates should be all the way out; volume control should be on full. After adjustment, put a drop of wax on each I.F. tuning slug to hold it in place.

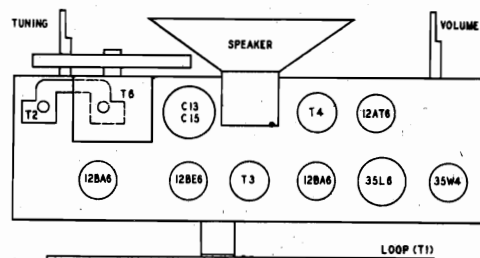


Fig. 1 Top of Chassis  
(DWG 1023-4)

## R.F. ALIGNMENT:

control slugs

1. Set receiver tuning condenser with plates all the way in.
2. Set signal generator on 540 Kc (modulated) and connect generator output to antenna post on receiver. The ground side of the generator should be connected to receiver B through a .25 Mfd. condenser.
3. Tune in signal by adjusting oscillator trimmer C5.
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer for maximum output.
6. Set signal generator on 1650 Kc and check signal with tuning condenser plates all the way out.
7. Set signal generator on 1470 Kc.
8. Tune in signal on receiver and adjust rf trimmer C2 for maximum reading on output meter. Feed only enough signal from the generator to keep maximum reading on lower half of meter scale.
9. Recheck at 600 Kc, 1000 Kc and 1410 Kc for tracking and readjust as required.

## DIAL ADJUSTMENT:

To set the dial on calibration, pick up a station of known frequency near the center of the dial and move the pointer by hand as required.

## B400

## ALIGNMENT PROCEDURE

## CAUTION:

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows:

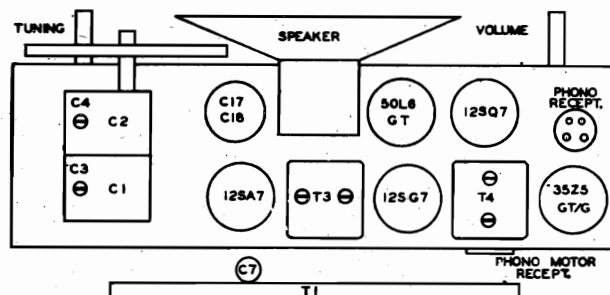
## EQUIPMENT REQUIRED:

1. Signal Generator.
2. Output Meter with 2.5 Volt Scale.
3. .1 Mfd. Condenser.

## I. F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 volt scale.
2. Connect output of signal generator directly to antenna post on loop; connect ground side of generator to chassis of receiver through .1 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T4 and then T3) for maximum reading on output meter.

NOTE: Keep signal level low, just enough to keep maximum reading on lower half of meter scale. Tuning condenser plates should be all the way out, volume control should be on full.



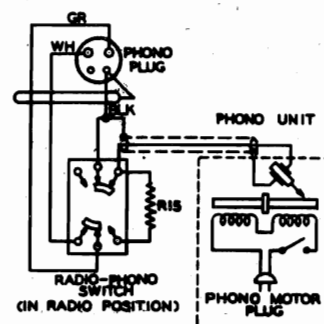
## R.F. ALIGNMENT:

1. Set tuning condenser with plates completely out.
2. Set signal generator at 1650 Kc (modulated) and feed its output into a loop of wire about 6" in diameter. Place this loop about one foot away from and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer (C4).
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer (C4) for maximum output.
6. Set signal generator at 1400 Kc and tune in signal with tuning condenser.
7. Adjust antenna trimmer (C3) while rocking gang condenser for maximum reading on output meter. Feed only enough signal from generator to keep maximum reading on lower half of meter scale.

## DIAL ADJUSTMENT:

To set the dial on calibration, tune in a station of known frequency near the center of the dial and move the pointer by hand as required.

MODEL B400, Chassis 118



Hoffman model B400 is a table model radio-phonograph combination. The radio section consists of a 5-tube AC-DC superheterodyne receiver with a built-in loop antenna. The phonograph section consists of an automatic record changer which plays either fourteen 10-inch records or twelve 12-inch records at one loading. The record changer may also be operated manually.

Tuning Range .....	540 Kc to 1650 Kc
Intermediate Frequency .....	455 Kc
Power Supply .....	115 V. D.C. or A.C. 50-60 C.P.S.
Power Consumption .....	48 Watts
Audio Output .....	1.25 Watts

**Fig. 3 Bottom of Chassis**

### NORMAL OPERATING CURRENTS

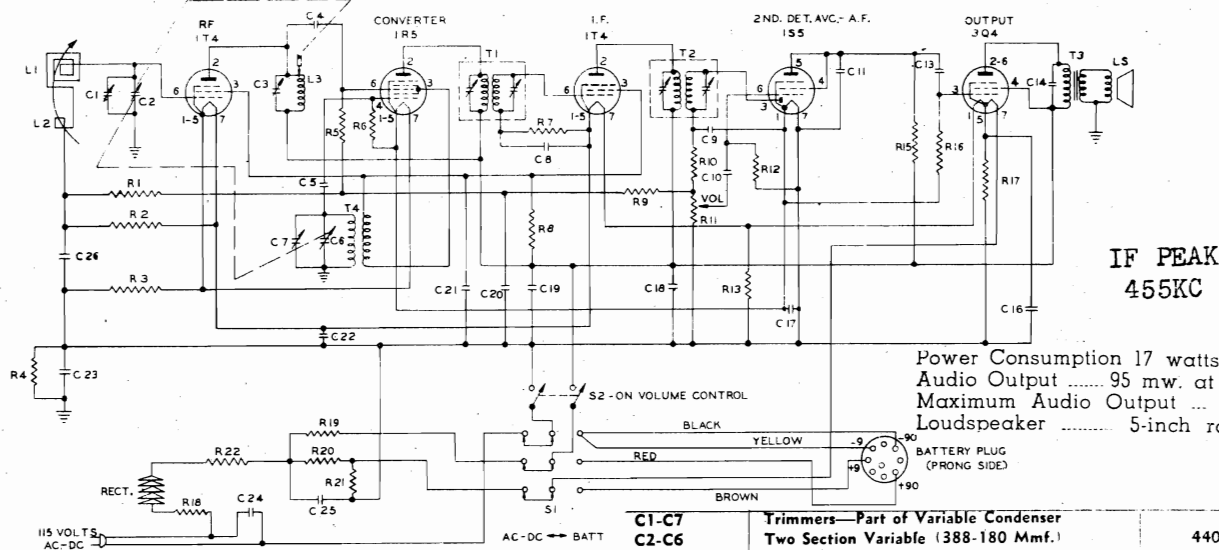
Cathode Current	57 Ma
Cathode Current	33 Ma

D.C. voltages measured with 20,000 ohm/volt meter.  
A.C. voltages measured with 1,000 ohm/volt meter.  
All voltages measured with reference to B—.  
Line voltage 117.

**NOTE:** The above readings are obtained with no signal input to the receiver, radio-phonograph switch in the RADIO position, and volume control full on.

## MODEL A700, Chassis 110S

## HOFFMAN RADIO CORP.



Power Consumption 17 watts at 117 V.  
 Audio Output ..... 95 mw. at 10% dist.  
 Maximum Audio Output ... 225 mw.  
 Loudspeaker ..... 5-inch round P.M.

In order to align the receiver properly, remove the chassis from the cabinet and remove the bottom plate from the chassis.

**I. F. Alignment**

1. Connect output meter across speaker voice coil; set meter on 1-volt scale.
2. Connect output of signal generator to trimmer C3 (blue wire on trimmer located at rear of chassis). The ground side of the signal generator should be connected to B- through a .1 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T2 and then T1) for maximum reading on output meter.  
 NOTE: Keep signal level low, just enough to keep the maximum reading on the output meter at 0.4 volt or less; tuning gang should be set with plates all the way out; volume control full on.
4. Replace bottom cover plate.

**R. F. Alignment**

1. Leave tuning gang with plates all the way out.
2. Set signal generator on 1650 Kc (modulated) and feed generator output into a loop of wire approximately 6" in diameter. Place the loop about one foot away and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer C7.
4. Adjust output of signal generator to obtain deflection of .4 volt or less on output meter.
5. Adjust oscillator trimmer for maximum output.
6. Set Signal generator to 1400 Kc and tune in signal with tuning condenser.
7. Adjust loop antenna trimmer C1 and R. F. Coil assembly for maximum output. The R. F. coil adjustment is made by loosening the coil mounting clamp and sliding the coil up or down as required.
8. Set signal generator and tuning gang to 600 Kc and adjust R. F. trimmer C3 for maximum output.
9. Go back to 1400 Kc to check tracking and readjust at 1400 Kc and 600 Kc as required.

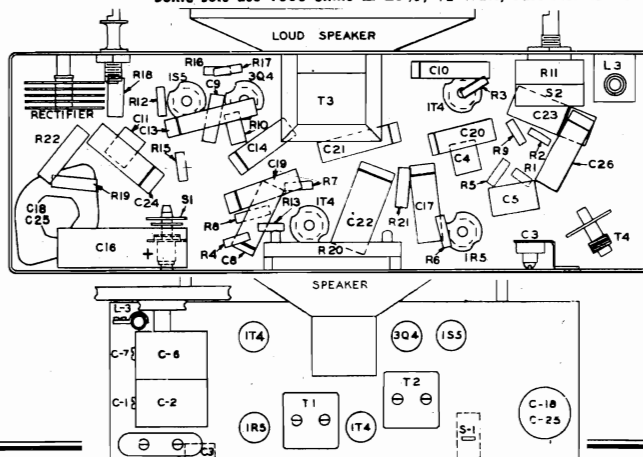
PIN NO.	1	2	3	4	5	6	7	8
IT4 (RF)	2.6	84	65		2.6		3.9	
IR5	1.3	84	64	-5.0*	1.3	3*	2.6	
IT4 (RF)	3.9	84	65	1.2*	3.9	1.5*	5.2	
IS5	1.3	0	.5*	20*	1	-.5*	0	
3Q4	5.2	84	-1.3*	84	6.5	84	7.8	

NOTE: All voltages are measured with reference to B- (black wires on volume control switch) and no signal input to receiver.

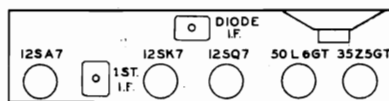
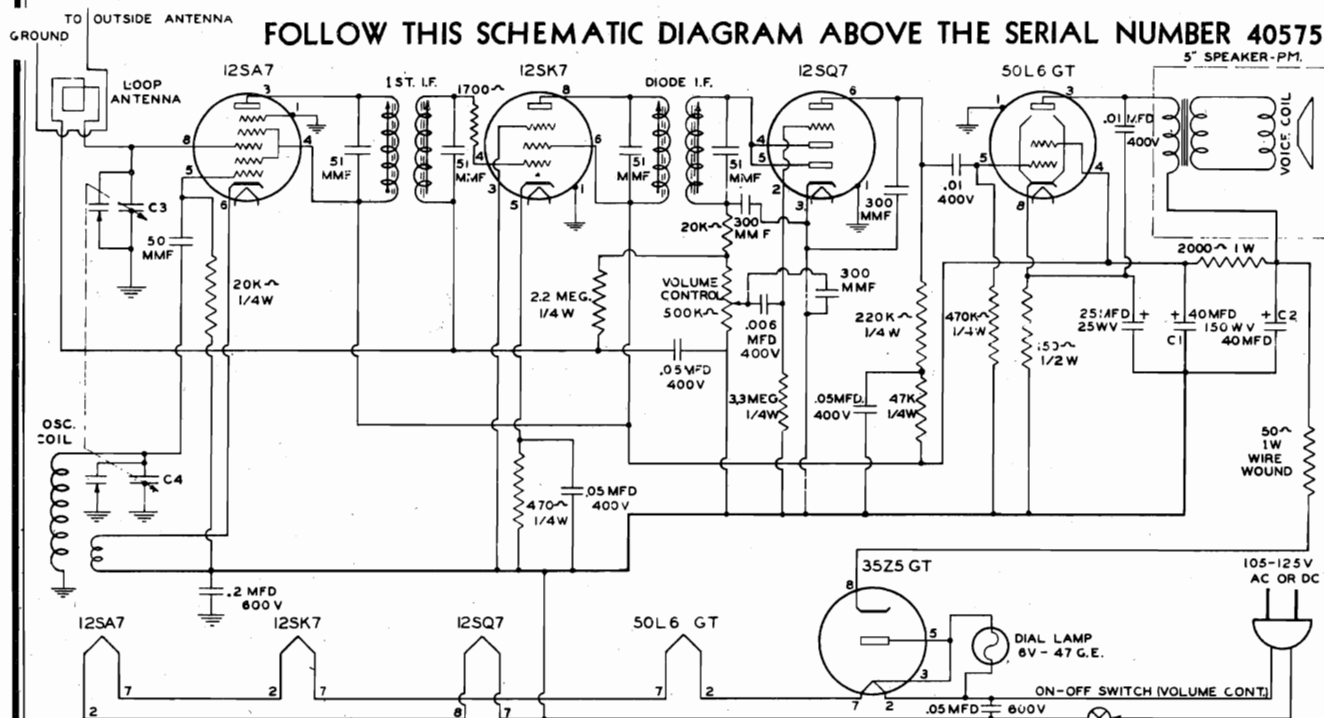
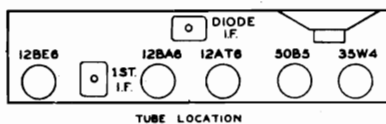
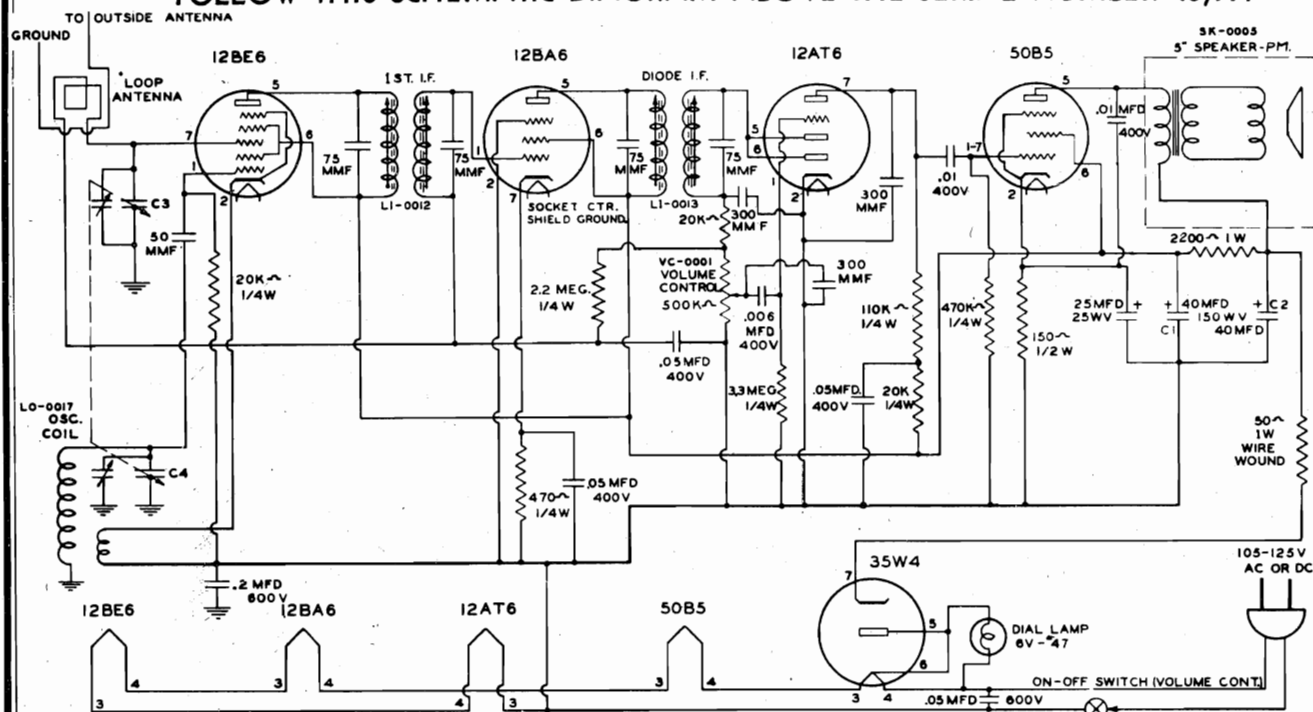
\* These readings must be taken with a V. T. V. M.

C1-C7	Trimmers—Part of Variable Condenser	4401
C2-C6	Two Section Variable (388-180 Mmf.)	4306
C3	60-260 Mmf. Mica Trimmer	4000
C4-C9-C11	.0001 Mfd. Mica	4009
C5	47 Mfd. Mica	4112
C8-C26	.01 Mfd. 400 Volt Tubular Paper	4102
C10-C12-C13-C14	.005 Mfd. 600 Volt Tubular Paper	
C15-C16	100 Mfd. 25 Volt Dry Electrolytic	4204
C17-C19-C20-C21	.05 Mfd. 200 Volt Tubular Paper	4100
C18-C25	Dry Electrolytic Condenser (30-50 Mfd. 150-150 Volt)	4201
C22-C23	.2 Mfd. 200 Volt Tubular Paper	4108
C24	.05 Mfd. 400 Volt Tubular Paper	4101
L1	Antenna Loop	55208
L2	Antenna Loop Compensator	5250
L3	R.F. Coil Permeability Tuned	5245
L5	5 1/4" P.M. Speaker	9019
R1-R14	3.3 Megohm, 1/2 Watt	4535
R2-R7-R9-R16	2.2 Megohm, 1/2 Watt	4502
R3	680 Ohms, 1/2 Watt	4514
R4	.47 Megohm, 1/2 Watt	4506
R5-R15	1 Megohm, 1/2 Watt	4513
R6-R10	.1 Megohm, 1/2 Watt	4511
R8	3900 Ohms ± 10%, 1/2 Watt	4527
R11	1 Megohm Potentiometer with D.P.S.T. Switch (Volume)	4808
R12	10 Megohm, 1/2 Watt	4505
R13*	820 Ohm ± 10%, 1/2 Watt	4533
R17	1500 Ohm, 1/2 Watt	4534
R18-R22	47 Ohm, 2 Watt	4532
R19	1000 Ohm, 1 Watt	4522
R20	1500 Ohm, 6 1/2 Watt ± 5% Wirewound	4701
R21	470 Ohm, 1 Watt ± 10%	4531
S1	AC/DC Battery Switch Plug Operated	6010
S2	On-Off Switch (on Volume Control)	
T1	Input I.F. Transformer (455 K.C.)	5242
T2	Output I.F. Transformer (455 K.C.)	5243
T3	Output Audio Transformer	5104
T4	Oscillator Coil	5244
Rect.	Selenium Rectifier	9517

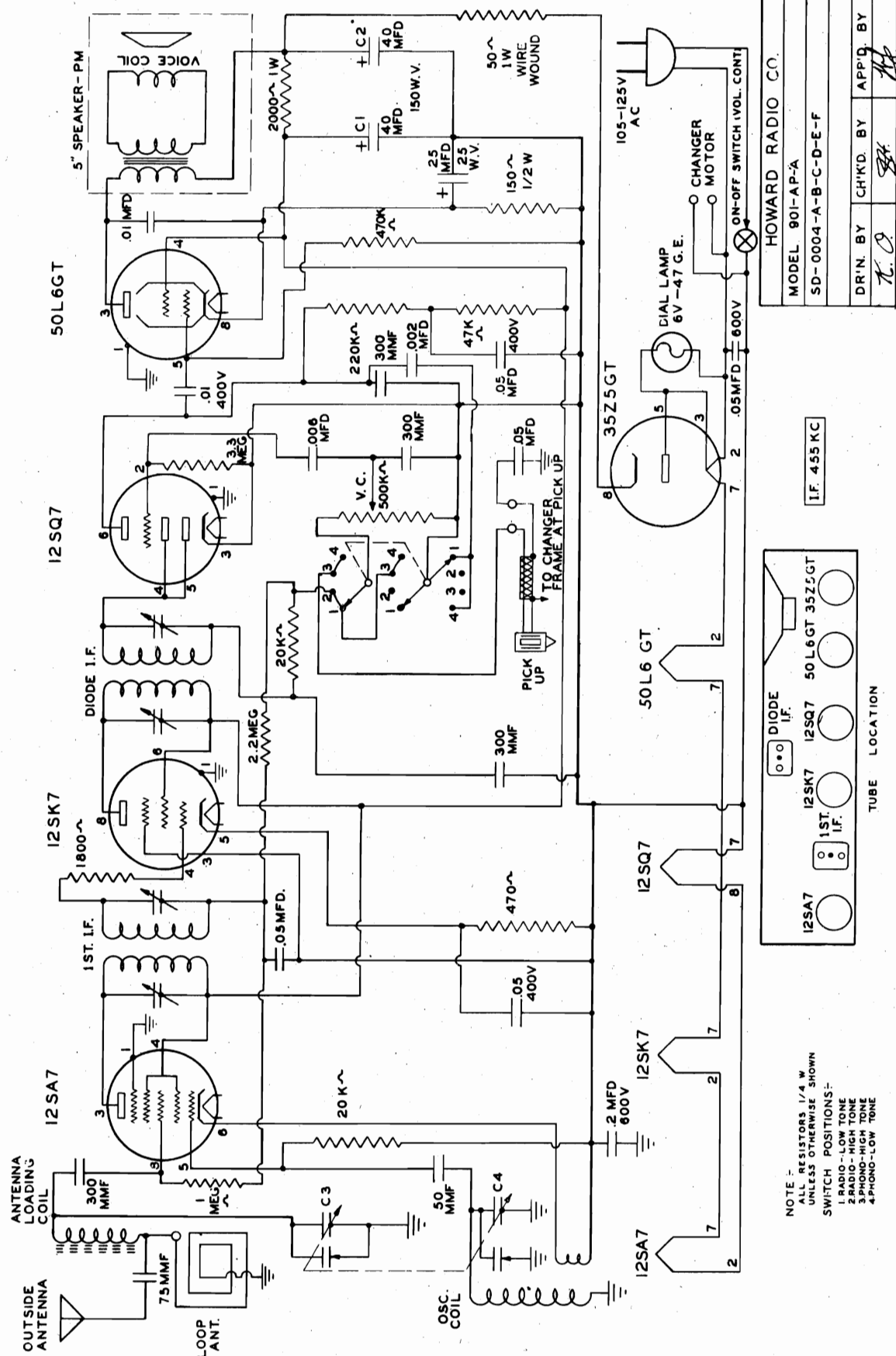
\* Some sets use 1000 ohms ± 20%, 1/2 Watt, Part No. 4542.



## HOWARD RADIO CO.

MODEL 901-A  
MODEL M901-A**FOLLOW THIS SCHEMATIC DIAGRAM ABOVE THE SERIAL NUMBER 45,771**

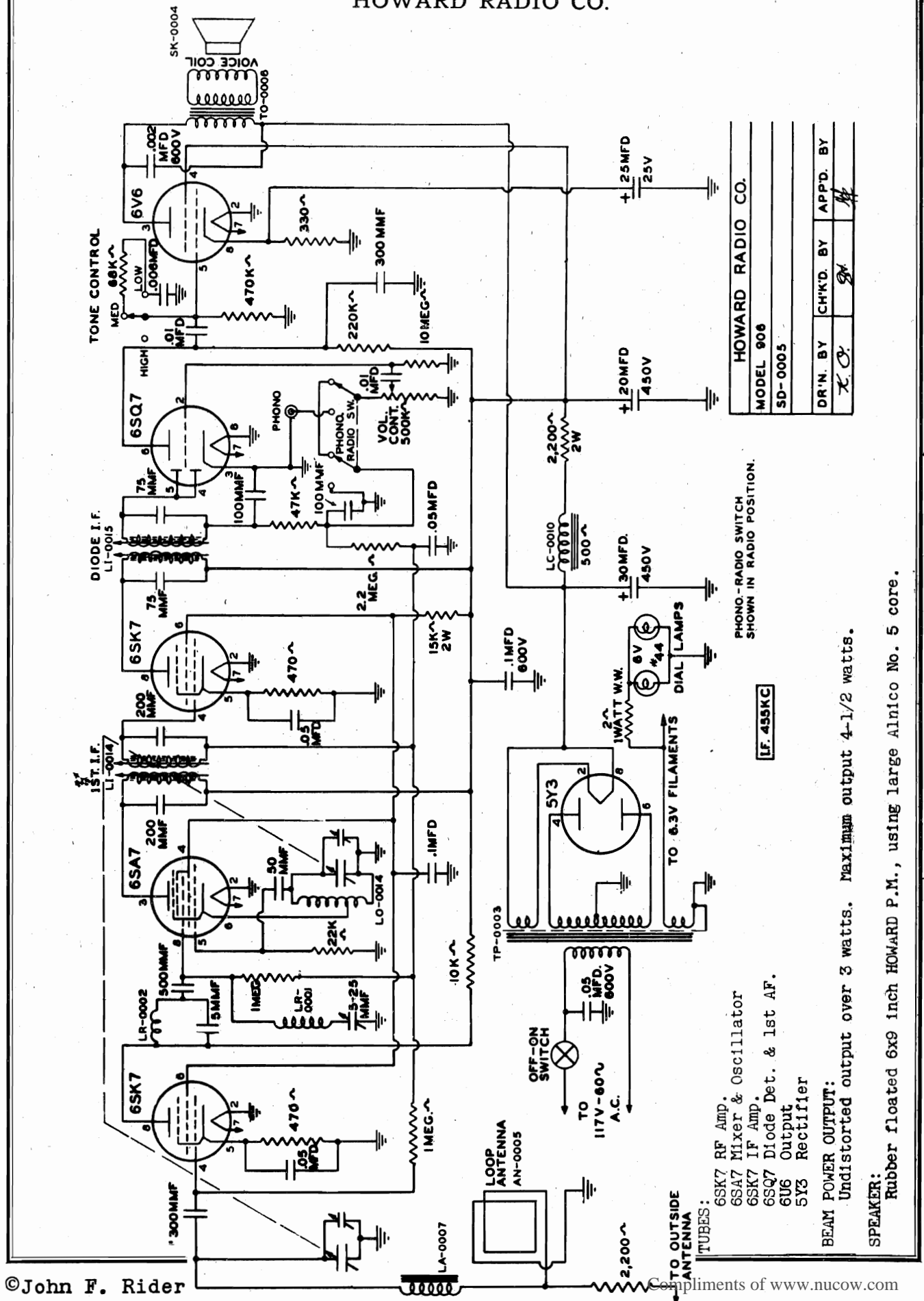
HOWARD RADIO CO.			
MODEL 901-AP-A			
SD - 0004-A-B-C-D-E-F			
DR'N. BY	CH'KD. BY	APPD. BY	
<i>W. P.</i>	<i>W. P.</i>	<i>W. P.</i>	



**FOLLOW THIS SCHEMATIC DIAGRAM ABOVE THE SERIAL NUMBER 13000**

MODEL 906

HOWARD RADIO CO.



HOWARD RADIO CO.			
MODEL 906			
SD-0005			
DR'N. BY	CHKD. BY	APPD. BY	
K. O.	SH		

PHONO-RADIO SWITCH  
SHOWN IN RADIO POSITION.

[LF. 455KC]

- TUBES:
- 6SK7 RF Amp. & Oscillator
  - 6SA7 Mixer & Oscillator
  - 6SQ7 IF Amp.
  - 6SQ7 Diode Det. & 1st AF.
  - 6U6 Output
  - 5Y3 Rectifier

BEAM POWER OUTPUT:  
Undistorted output over 3 watts. Maximum output 4-1/2 watts.

SPEAKER:  
Rubber floated 6x9 inch HOWARD P.M., using large Alnico No. 5 core.



## ALIGNMENT CHART—MODELS 906 AND 906C

Set controls at indicated positions before following alignment chart.

Tone switch high  
Volume control on full  
Set dial between stations  
Radio phono control at

DUMMY ANTENNA	SIG. GEN. CONNECTION TO	GEN. FREQ.	BAND POSITION	DIAL SETTING	ORDER OF TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	SEE NOTE
.05 Mfd.	Grid of 6SA7	455 KC	BC	Off Station	①②③④	I.F. Peak to Max. Output	A
.05 Mfd.	Ant.	455 KC	BC	Off Station	⑤	Null	B
400 Ohm. Resistor	"A" Ant. Post	1400 KC	BC	1400 KC	⑥⑦	BC Osc. and RF	C

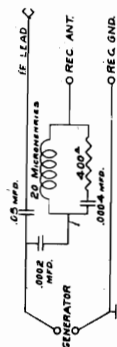
NOTE A. The I.F. adjustments are iron core slug tuning and it should not be necessary to move them very far in either direction from the factory setting, since they are of a very stable nature.

**NOTE B.**

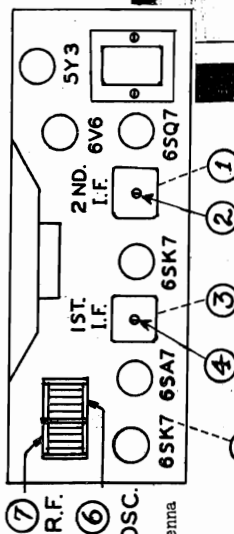
**NOTE B.** Important. Connect the signal generator to the antenna screw on the outside of the radio chassis and keep the metal of the chassis between the generator lead and the wave trap coil. Use your signal generator in a turned up powerful position and adjust the wave trap trimmer to null.

NOTE C. Set dial at 1400 KC. Adjust oscillator and R.F. trimmer for maximum sensitivity.

**RECOMMENDED DUTY ANTENNA.** Although the values as shown in above table for antenna load may be satisfactory, we urgently recommend the circuit as shown at the right to properly take care of the various frequencies to accomplish the correct alignment.

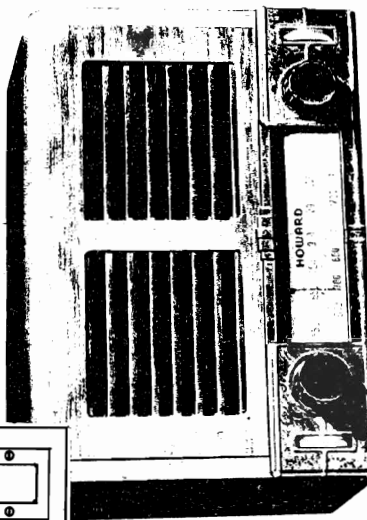


## TUBE LAYOUT



**NOTE**

Wave Trap adjustment is located beneath chassis at this point. Adjustments 1 & 3 also beneath chassis.



MODEL 906

## DIAL AND CONTROL ACCESSORIES

## SOCKET VOLTAGE READINGS - 906 AND 906C

Voltage readings taken from ground with voltage at line set at 110 volts A.C. These readings were taken with a vacuum tube voltmeter of the VoltOhmyst type.

TUBE	FUNCTION	CATH.	SC.	PLATE	B+
6SK7	R.F. . . .	1.B	* 79.	* 210.	*
		5	6	8	
6SA7	Converter .		79.	230.	3
			4		
6SK7	1st. I.F. .	2.3	79.	240.	8
		5	6		
6SQ7	Det. & 1st. Audio. . .			115.	6
6V6	Output. . .	11.	235.	225.	3
		8	4		
5X3	Rectifier .				285
					8

\* Socket Terminal Number.

Voltage drop across filter choke 10 volts.

## PARTS LIST - 906

## CONTROLS

VC-0005 Volume Control with Switch  
or  
VC-0006 Volume Control with Switch

## CONDENSERS

4G-0004     Tuning Gang with Gears and Drive Hub.  
CE-0009     Capacitor - Electrolytic 30-20-20 mfd. 450 volts or the following 3 capacitors:  
CE-0005     Capacitor - 25 mfd. 25 volts.  
CE-0011     Capacitor - 30 mfd. 450 volts.  
CE-0012     Capacitor - 20 mfd. 450 volts.

COILS

AN-0005 Loop Antenna  
LA-0007 Loop Load Coil  
LI-0014 1st IF Transformer in can  
LI-0015 2nd IF Transformer in can  
LO-0014 Oscillator Coil  
LR-0001 Wave Trap 455 KC  
LR-0002 Untuned RF Coil

CABINET

CM-0008 Cabinet complete  
 AS-0240 Metal Grill Assembly (1 used)  
 BC-0003 Wood Baffle used with above item  
 or  
 MC-0026 Plastic Grill (2 used)

LINE CORD

CA-0038 Line Cord - 6 ft and Moulded Plug

## TRANSFORMERS

TQ-0006 Speaker Output Transformer  
 TP-0003 Power Transformer - 60 cycle 110  
 volt  
 LC-0010 Power Choke (500 ohm D.C.)

## TUBE COMPLEMENT

Tube	Tube (2 used)
TU-5Y3	
TU-63K7	
TU-6SA7	
TU-6SQ7	
TU-6V6	

## SOCKETS

S0-0010	Phono Socket
S0-0017	Tube Socket
TTB-0007	Terminal Strip

## SWITCHES

SW-0009 Radio Phono Switch D.P.D.T.  
SW-0010 Tone Switch - 3 position

CABINET

CW-0008	Cabinet complete
AS-0240	Metal Grill Asse
BC-0003	Wood Baffle used
	or
MC-0026	Plastic Grill (2

LINE CORD

CA-0038 Line Cord - 6 ft



MODEL 906C

HOWARD RADIO CO.

TB-0007	Terminal Strip, external antenna
SO-0010	Phono and Speaker Socket (female)
SO-0012	Power Socket 110 V.
TL-0005	Phono Speaker Plug (male)
	SWITCHES
SW-0009	Radio Phono Switch DPDT
SW-0010	Tone Switch - 3 position
	CABINET
CW-0009-1	Cabinet - Mahogany
CW-0009-2	Cabinet - Blonde
AA-0008-1	Drawer Sub-assembly (Mahogany)
AA-0008-2	Drawer Sub-assembly (Blonde)
AW-0015	Carriage Assembly
	AUTOMATIC RECORD CHANGER
PH-0003	Record Changer VM400
	LINE CORD
CA-0039	Line Cord - 8 ft. and Moulded Plug
CA-0043	Line Cord & Plug 42" long for record changer motor
	DIAL AND CONTROL ACCESSORIES
AS-0213	Tuning Shaft Assembly
AS-0217	Dial Pointer Assembly
AR-0019	Dial Light Bracket Assembly - right side
AR-0024	Dial Light Bracket Assembly - left side
SP-0010	Dial Drive Spring
FR-0062	Dial Glass Snaps
DC-0001	Dial Drive Cord 52" long
CR-0001	Rubber Grommets for tuning gang & Mounting Bracket
DG-0008	Calibrated Lucite Dial 550 KC at right
LS-0002	#44 Blue Bead Pilot Lamp
ES-0004-1	Metal Escutcheon (Mahogany)
ES-0004-2	Metal Escutcheon (Blonde)
	KNOBES
AR-0042	Thumb Wheel Assembly (Tone Control)
AR-0043	Thumb Wheel Assembly (Radio Phono)
KB-0015-1	Knob for Radio (Walnut)
KB-0015-3	Knob for Radio (Blonde)
KB-0014-1	Knob for Drawer (Mahogany)
KB-0014-2	Knob for Drawer (Blonde)
	SPEAKER
SK-0004	Speaker 9" Elliptical P.M.

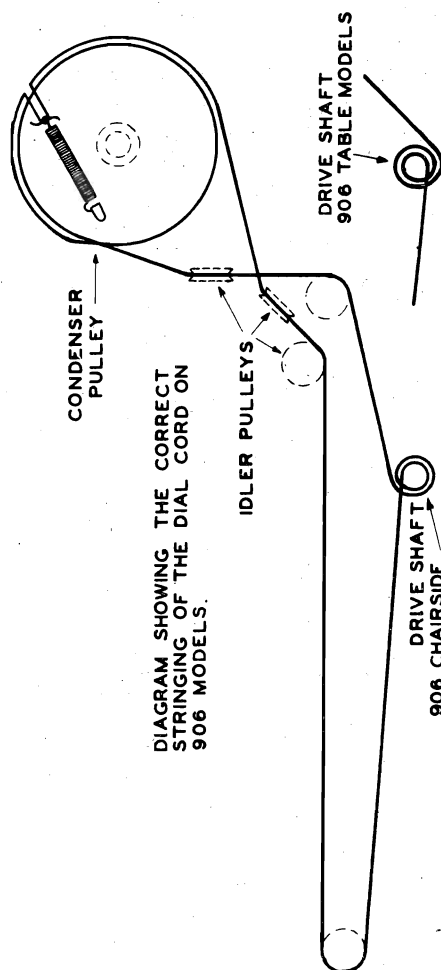


DIAGRAM SHOWING THE CORRECT STRINGING OF THE DIAL CORD ON 906 MODELS.

906 CHAIRSIDE MODELS  
TO REMOVE RADIO CHASSIS FROM CABINET

Take knobs off volume control and tuning control by loosening set screws. Remove the wood screws that are located inside the record storage space at the top rear of cabinet. The entire top wood panel lifts out by pushing upward inside the storage space one inch, and then remove panel by lifting to the rear of the cabinet. After the panel is removed, it is easy to see the mounting bolts that hold the chassis.

TO REMOVE DRAWER

Pull the drawer out to its full extremity. Place your hands (one on each side) beneath the drawer about 3 inches from the back and feel along the track until you hit two little metal flaps that are the stops for the drawer. Lift these up with your index fingers and the drawer can then be pulled right out of the cabinet.

PARTS LIST

VC-0005	Volume Control with A.C. Switch	LA-0007	Loop Load Coil
VC-0006	Volume Control with A.C. Switch or	LI-0014	1st I.F. Transformer in can - iron slug tuned
	CONDENSERS	LI-0015	2nd I.F. Transformer in can - iron slug tuned
AC-0004	Tuning Gang with Gears and Drive Hub	LI-0021	1st I.F. Transformer - air trimmers
CE-0009	Capacitor - Electrolytic 30-20 M.F.D. 450 V. - 25 M.F.D. 25 V.	LI-0022	2nd I.F. Transformer - air trimmers
CE-0005	Capacitor - 25 M.F.D. 25 V.	LO-0014	Oscillator Coil
CE-0011	Capacitor - 30 M.F.D. 450 V.	LR-0001	Wave Trap 455 KC
CE-0012	Capacitor - 20 M.F.D. 450 V.	LR-0002	Untuned RF Coil
	COILS	TO-0006	Speaker Output Transformer
AN-0006	Loop Antenna (low impedance)	TP-0003	Power Transformer - 60 cycle 110 V.
		LC-0010	Power Choke - 500 Ohm. D.C.
			SOCKETS AND PLUGS
		SO-0017	Tube Socket

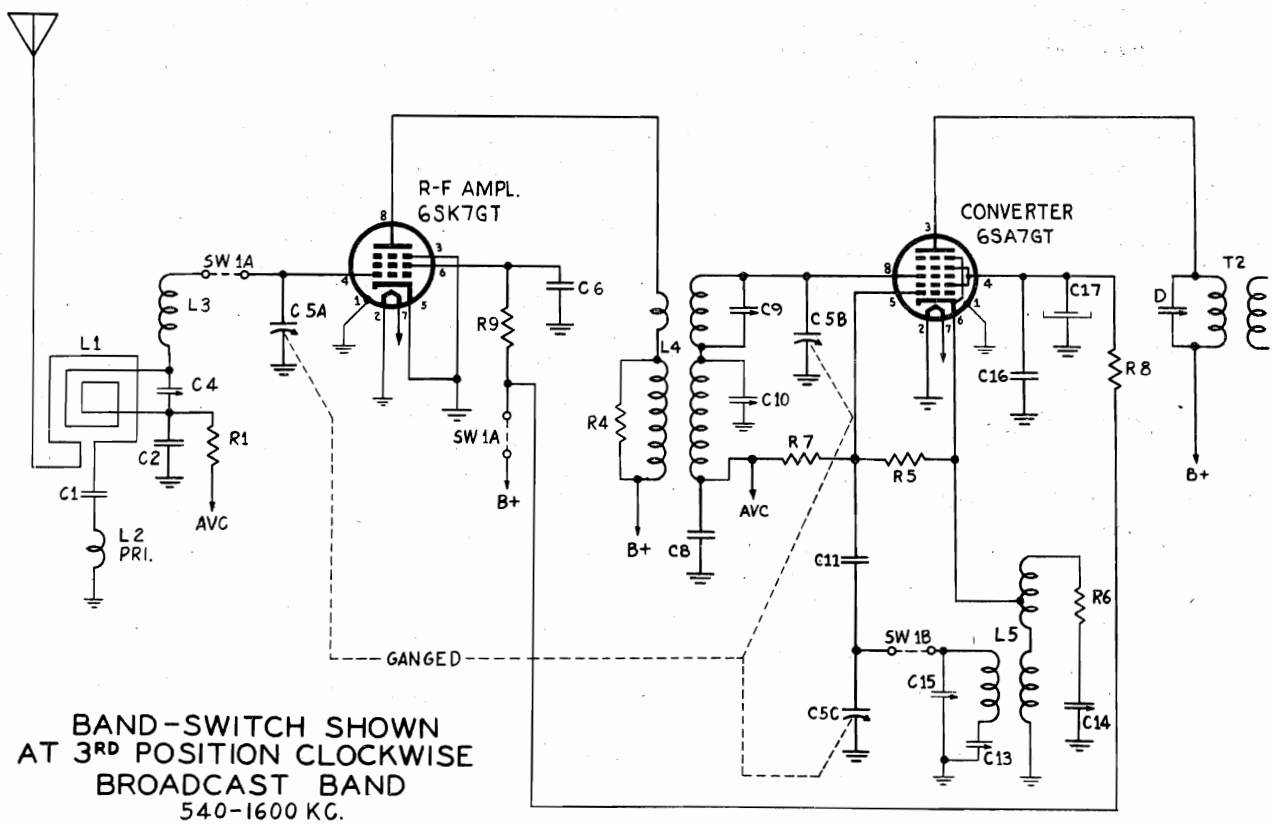
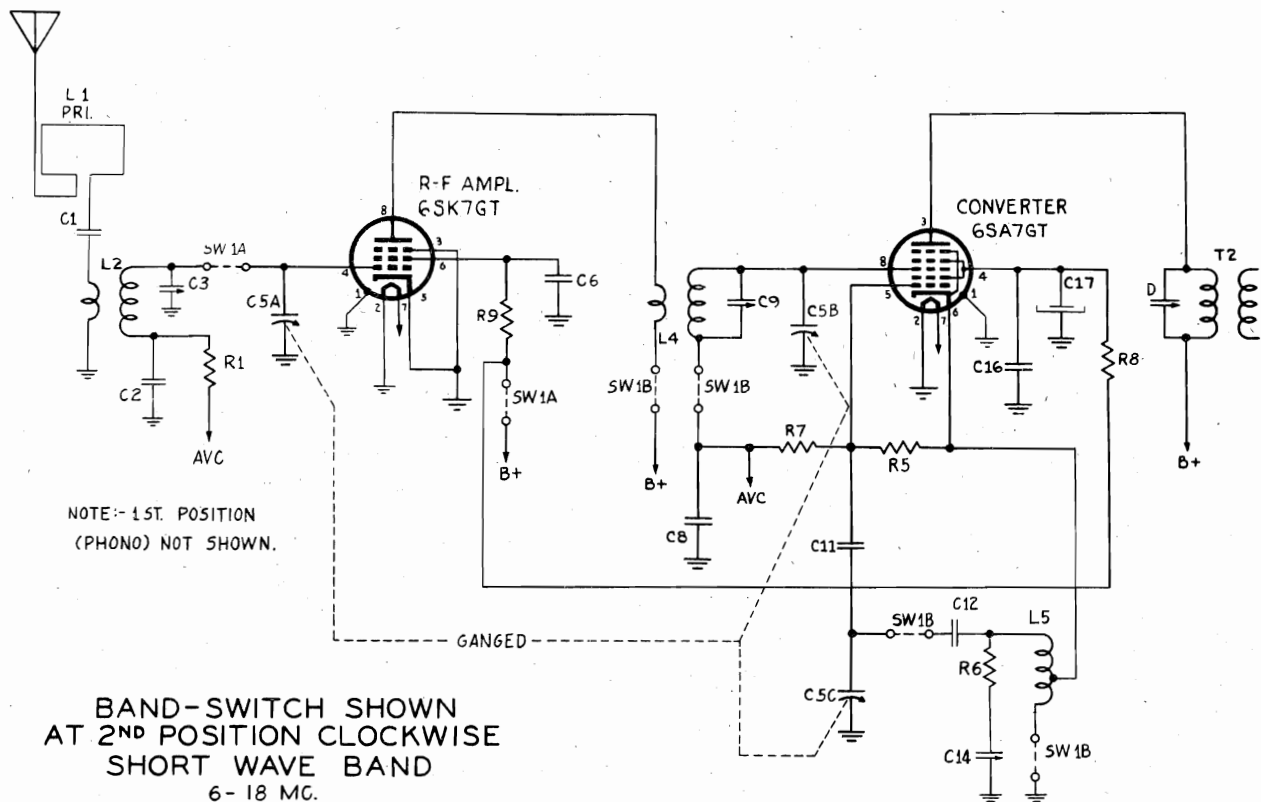


# "clarified schematics"

PAGE 16-2 DETROLA

MODEL 582

INTERNATIONAL DETROLA CORP.



MODEL 582

INTERNATIONAL DETROLA CORP

MODEL 582  
MODEL 7270**Electrical and Mechanical Specifications**

Frequency Range.....540-1600 kc., 6-18 mc. Power Output (Undistorted).....1.8 watts  
 Intermediate Frequency.....455 kc. Power Output (Maximum).....3.75 watts  
 Power Supply.....105-125 volts, 60 cycle AC Rated Power Input.....65 watts at 115 volts  
 Loudspeaker.....8-inch, Dynamic Tuning Drive Ratio.....6 to 1  
 V.C. Impedance.....3.5 ohms at 400 cycles

**ALIGNMENT PROCEDURE**

The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter.

A non-metallic screwdriver.

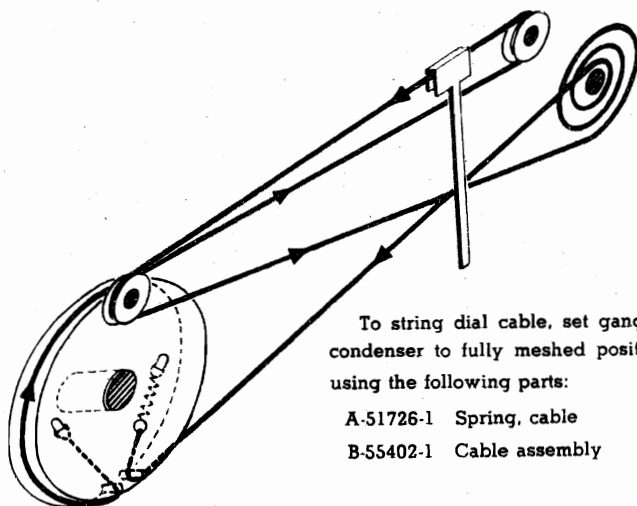
Dummy antenna: .1 mfd. — 400 ohm resistor — RMA loop.

**NOTE:** Intermediate Frequency and Oscillator Adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the RF grid circuit. The loop alignment

must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to the loop may be substituted for RMA loop.

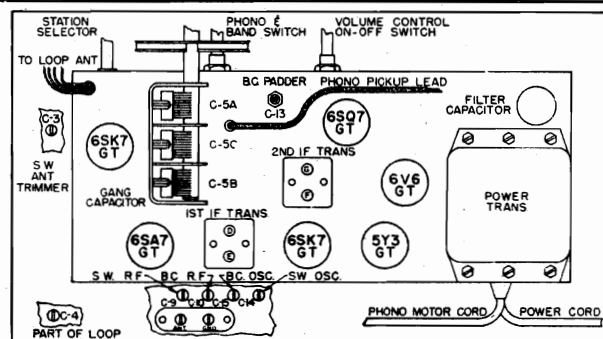
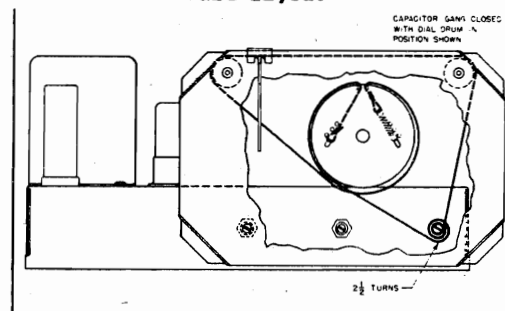
CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd.	18.3 mc.	Short wave	HF end	C-14	Set limit of band
6SK7GT RF grid	.1 mfd.	16 mc.	Short wave	16 mc.	C-9	Align RF
Antenna post	400 ohms	16 mc.	Short wave	16 mc.	C-3	Align antenna
6SK7GT RF grid	.1 mfd.	1620 kc.	Broadcast	HF end	C-15	Set limit of band
6SK7GT RF grid	.1 mfd.	1400 kc.	Broadcast	1400 kc.	C-10	Align RF
6SK7GT RF grid	.1 mfd.	600 kc.	Broadcast	600 kc.	C-13	Rock gang and adjust to maximum
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	C-4	Align antenna

MODEL 7270

**DIAL AND POINTER  
DRIVE CABLE ARRANGEMENT**

To string dial cable, set gang condenser to fully meshed position, using the following parts:

- A-51726-1 Spring, cable
- B-55402-1 Cable assembly

**Tube Layout****Dial Mechanism**

## SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	107	6AC	255
6SA7GT	Converter	0	6AC	250	103	0	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	105	6AC	237
6SQ7GT	Det.—AVC—1st Audio	0	0	0	0	0	34	6AC	0
6V6GT	Power Output	0	0	235	250	0	0	6AC	13
5Y3GT	Rectifier	0	310	0	300 AC	0	300 AC	0	310

**NOTE:** The above glass tubes are interchangeable with their metal equivalent.

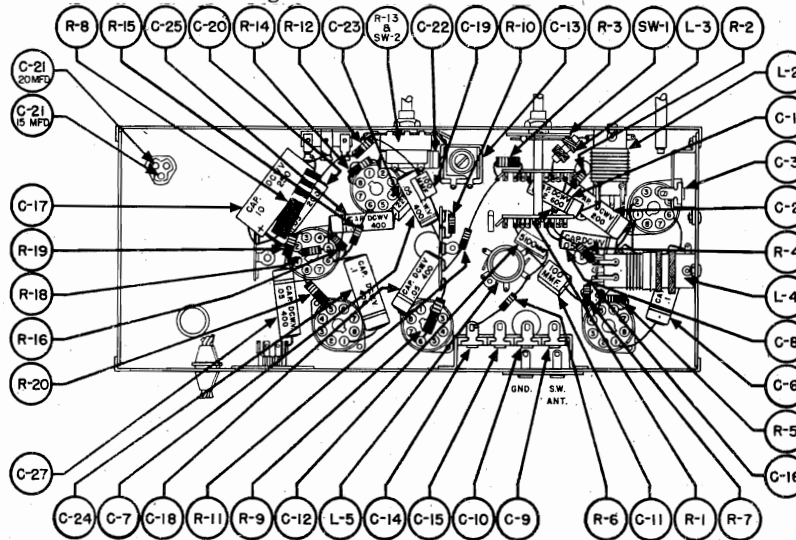
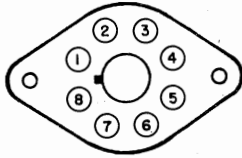
**NOTE:** Band switch in "Broadcast" position.

All voltages measured from chassis to socket contact indicated. DC voltages measured with a 1000 ohm-per-volt meter.

All voltages are positive DC unless otherwise marked.

Volume control full on. No signal.

Line voltage 117 volts AC.



## Parts Layout

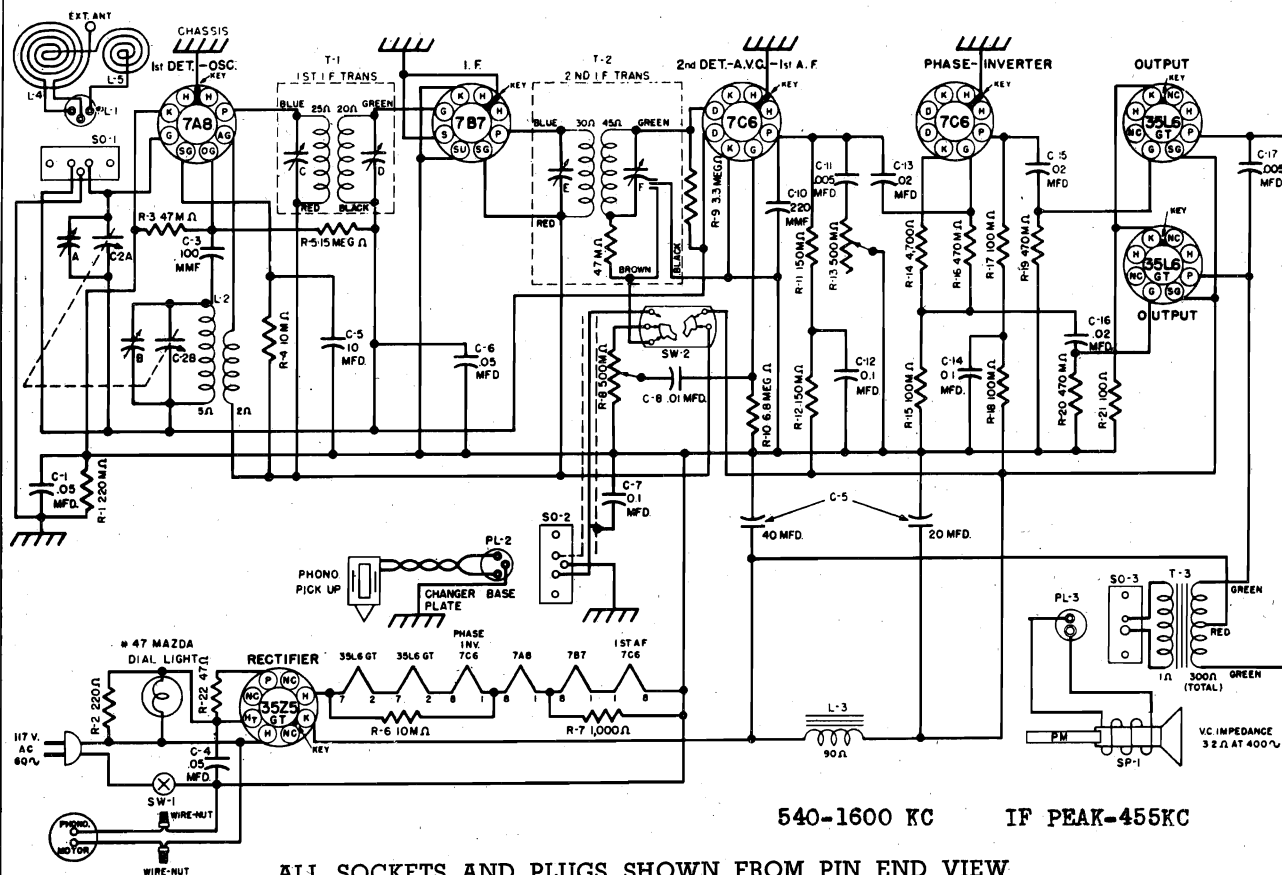
## Chassis Model 582

Symbol	Part No.	Description	Symbol	Part No.	Description
C-2, 8, 20	BD210503	Capacitor, Paper, .05 mfd., 200 v.	A-54847		Cord, Power, 6 ft.
C-22	BD410103	Capacitor, Paper, .01 mfd., 400 v.	B-51162-7		Shaft, Dial Drive
C-6, 24	BD410104	Capacitor, Paper, .1 mfd., 400 v.	A-51163		Clip, Spring
C-25	BD410203	Capacitor, Paper, .02 mfd., 400 v.	A-51260		Shield, Tube
C-16, 18, 29, 7	BD410503	Capacitor, Paper, .05 mfd., 400 v.	A-51331		Spring, Dial Bracket
C-1	BD610202	Capacitor, Paper, .002 mfd., 600 v.	A-51356		Cap., Electrolytic, 15-20-20 mfd.
C-12	BM58D512	Capacitor, Mica, 5100 mmf.	C-51401-2		Capacitor, Variable, 3-section
C-11, 19	BM78A101	Capacitor, Mica, 100 mmf.	T-2	B-51416-1	Transformer Assembly, 1st IF
C-23	BM78A221	Capacitor, Mica, 200 mmf.	T-3	B-51417-1	Transformer Assembly, 2nd IF
R-20	BR16E391	Resistor, 390 ohm, 1 w.	C-17	A-51419	Cap., Electrolytic, 10 mfd., 250 v.
R-4, 11	BR17B102	Resistor, 1000 ohm, 1/3 w.	L-5	B-51420	Coil Assembly, Oscillator
R-12	BR17B103	Resistor, 10M ohm, 1/3 w.	T-1	C-51421	Transformer, Power
R-1, 16	BR17B104	Resistor, 100M ohm, 1/3 w.	L-4	B-51425	Coil Assembly, RF
R-6	BR17B150	Resistor, 15 ohm, 1/3 w.	C-13	A-51428-5	Capacitor, Padder
R-19	BR17B153	Resistor, 15M ohm, 1/3 w.	L-2	B-51430	Coil Assembly, S.W. Antenna
R-7	BR17B156	Resistor, 15 megohm, 1/3 w.	R-13	B-51445-3	Control, Volume & Sw., 500M ohm
R-5	BR17B223	Resistor, 22M ohm, 1/3 w.	C-9, 10, 14, 15	A-51656	Capacitor Assembly, Trimmer (4)
R-15	BR17B224	Resistor, 220M ohm, 1/3 w.	C-3	A-51657	Capacitor Assem., Trimmer (Spec.)
R-10	BR17B335	Resistor, 3.3 megohm, 1/3 w.		A-51787	Spring, Cable
R-18	BR17B474	Resistor, 470M ohm, 1/3 w.		A-51801	Rivet, Pronged (for dial cable)
R-2, 14	BR17B685	Resistor, 6.8 megohm, 1/3 w.	SW-1	B-51952-1	Switch, Band
R-3	BR17E222	Resistor, 2200 ohm, 1 w.	SP-1	C-51961	Speaker, 8-inch Dyn., 485 ohm
R-9	BR17E223	Resistor, 22M ohm, 1 w.	L-3	B-51968	Coil Assembly, Antenna Loading
R-8	BR17G153	Resistor, 15M ohm, 2 w.		A-57464	Sheet, Service
	A-2163	Cable, Drive		A-54848	Bushing, Strain Relief
	A-9285	Lamp, Pilot, Mazda No. 44			



## INTERNATIONAL DETROLA CORP.

MODEL 7270

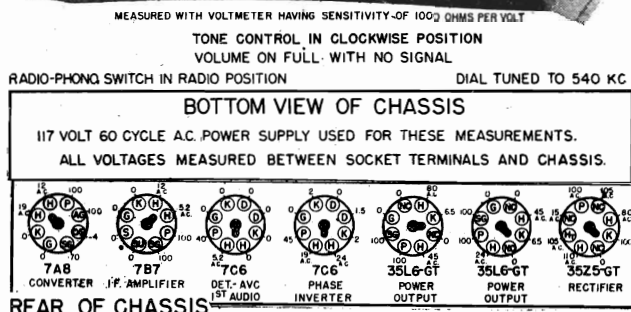
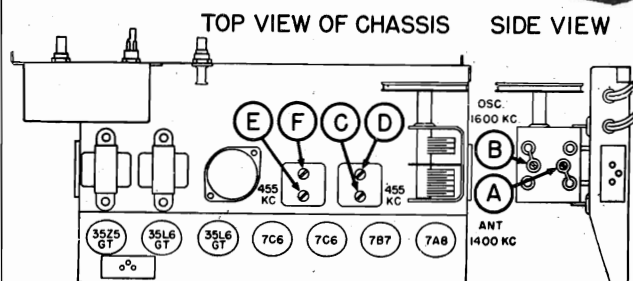
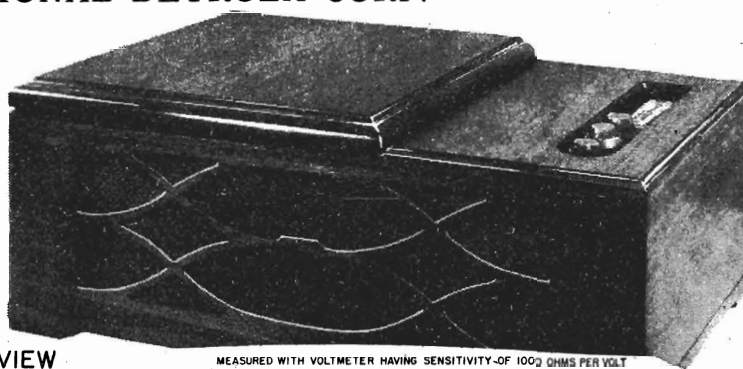


540-1600 KC IF PEAK-455KC

ALL SOCKETS AND PLUGS SHOWN FROM PIN END VIEW  
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

SYMBOL	PART NO.	DESCRIPTION	LIST PRICE	SYMBOL	PART NO.	DESCRIPTION	LIST PRICE
CAPACITORS				COILS AND TRANSFORMERS			
C-1	BD410503	Capacitor—.05 Mfd., 400 volt.	.35	L-4, 5	D-57259	Loop Antenna assembly	\$1.00
C-2A, B	C-57243-1	Capacitor—Variable gang	4.50	L-2	B-56143	Coil—Oscillator assembly	*
C-3	BM74A101	Capacitor—Mica 100 Mmfd. $\pm 20\%$	.35	L-3	B-51726-1	Filter Choke, 80 ma.	2.00
C-4	BD410503	Capacitor—.05 Mfd., 400 volt.	.35	T-1	B-51010-3	Transformer—1st I.F.	2.00
C-5	A-56154	Capacitor—Electrolytic 40-20-10 Mfd., 150 volt.	1.60	T-2	B-51011-3	Transformer—2nd I.F.	2.50
C-6	BD210503	Capacitor—.05 Mfd., 200 volt.	.30	T-3	B-57253-1	Transformer—Output	1.50
C-7	BD410104	Capacitor—.01 Mfd., 400 volt.	.30	OTHER ELECTRICAL PARTS			
C-8	BD410103	Capacitor—.01 Mfd., 400 volt.	.30	SW-1	B-56156-1	Switch—power part of R-8 and R-13	1.00
C-10	BM74A221	Capacitor—Mica 220 Mmfd. $\pm 20\%$	.40	SW-2	C-57272	Switch—Radio-Phono	*
C-11	BD610502	Capacitor—.005 Mfd., 600 volt.	.30	SP-1	A-6158	Speaker—6" x 9" Permanent Magnet	.15
C-12	BD410104	Capacitor—.01 Mfd., 400 volt.	.30	Lamp—Dial Mazda No. 47			
C-13	BD410203	Capacitor—.02 Mfd., 400 volt.	.30				
C-14	BD410104	Capacitor—.01 Mfd., 400 volt.	.30	MISCELLANEOUS PARTS			
C-15	BD410203	Capacitor—.02 Mfd., 400 volt.	.30	B-57275-1	Background for dial	*	
C-16	BD410203	Capacitor—.02 Mfd., 400 volt.	.30	A-54848	Bushing—Strain relief (power cord)	.20	
C-17	BD610502	Capacitor—.005 Mfd., 600 volt.	.30	A-56155	Bushing—Tuning control shaft	*	
RESISTORS				E-57270-1	Cabinet	*	
R-1	BR17B224	Resistor—Carbon, 220,000 Ohms, $\frac{1}{2}$ watt.	.15	B-51330-1	Channel rubber—mtg. for Dial scale	.04	
R-2	BR17C221	Resistor—Carbon, 220 Ohms, $\frac{1}{2}$ watt.	.15	B-55402-1	Dial Cable assembly (includes clips at end of cable)	.25	
R-3	BR17B473	Resistor—Carbon, 47,000 Ohms, $\frac{1}{2}$ watt.	.15	B-57269-1	Dial scale—plastic	*	
R-4	BR17B103	Resistor—Carbon, 10,000 Ohms, $\frac{1}{2}$ watt.	.15	B-51427-2	Grommet—rubber; mtg. for variable gang	.05	
R-5	BR17B156	Resistor—Carbon, 15 Meg., $\frac{1}{2}$ watt.	.15	B-51124-1	Knob—Volume & switch, tuning or radio-phonograph	.15	
R-6	BR17E103	Resistor—Carbon, 10,000 Ohms, 1 watt.	.15	B-56138-1	Knob—Tone Control	.15	
R-7	BR17B102	Resistor—Carbon, 1,000 Ohms, $\frac{1}{2}$ watt.	.15	BN751V02	Pinnut—No. $\frac{3}{32}$ ; for mtg. controls	.02	
R-8	B-56142-1	Control—Dual Potentiometer, with switch 500,000 Ohms, (V. C.)	2.25	BN770S02	Pinnut—No. 10-24; for mtg., record changer	.01	
R-9	BR17B335	Resistor—Carbon, 3.3 Meg., $\frac{1}{2}$ watt.	.15	A-57271	Plug—3 Prong—Phono pick-up connection	*	
R-10	BR17B685	Resistor—Carbon, 6.8 Meg., $\frac{1}{2}$ watt.	.15	B-55130-9	Pointer	.15	
R-11	BR17B154	Resistor—Carbon, 150,000 Ohms, $\frac{1}{2}$ watt.	.15	B-58069-1	Power Cord	.75	
R-12	BR17B154	Resistor—Carbon, 150,000 Ohms, $\frac{1}{2}$ watt.	.15	BP934G02	Screw—No. 4 x $\frac{1}{2}$ "; for mtg., loop & back	.03	
R-13	B-56142-1	Control—500,000 Ohms, (T. C.) part of R-8	.15	BP928N02	Screw—No. 8 x $1\frac{1}{2}$ "; for mtg., chassis	.03	
R-14	BR17B472	Resistor—Carbon, 4,700 Ohms, $\frac{1}{2}$ watt.	.15	BS016S09	Screw—No. 10-24 x $1\frac{1}{2}$ "; for mtg., record changer	.04	
R-15	BR17B104	Resistor—Carbon, 100,000 Ohms, $\frac{1}{2}$ watt.	.15	A-56136	Shaft—tuning control	*	
R-16	BR17B474	Resistor—Carbon, 470,000 Ohms, $\frac{1}{2}$ watt.	.15	A-54726	Socket—octal base	.20	
R-17	BR17B104	Resistor—Carbon, 100,000 Ohms, $\frac{1}{2}$ watt.	.15	A-54900	Socket—octal base	.25	
R-18	BR17B104	Resistor—Carbon, 100,000 Ohms, $\frac{1}{2}$ watt.	.15	A-57273	Socket—3 Prong; Phono pick-up & loop antenna	.20	
R-19	BR17B474	Resistor—Carbon, 470,000 Ohms, $\frac{1}{2}$ watt.	.15	A-57258	Socket—2 Prong; speaker connection	.20	
R-20	BR17B474	Resistor—Carbon, 470,000 Ohms, $\frac{1}{2}$ watt.	.15	A-6182-5	Socket—dial lamp (with leads)	.15	
R-21	BR16C101	Resistor—Carbon, 100 Ohms, $\pm 10\%$ $\frac{1}{2}$ watt.	.15	A-51331	Spring—Mtg., for channel rubbers	.10	
R-22	BR17G470	Resistor—Carbon, 47 Ohms $\pm 20\%$ 2 watt.	.30	A-51787	Spring—dial cable tension	.07	
PRICES SUBJECT TO CHANGE WITHOUT NOTICE				A-50147	Spring—conical; for mtg., record changer	.10	
				BF13NT05	Washer—flat; for mtg., record changer	.02	
				B-50156-1	Washer—rubber; for mtg., record changer	.04	
				A-54492	Washer—"C"; tuning shaft	.02	
				A-1089	Washer—cup; variable gang mtg.	.05	
				B-50964-3	Wirenut—phono motor power connection	.03	

\*PRICE AVAILABLE UPON REQUEST



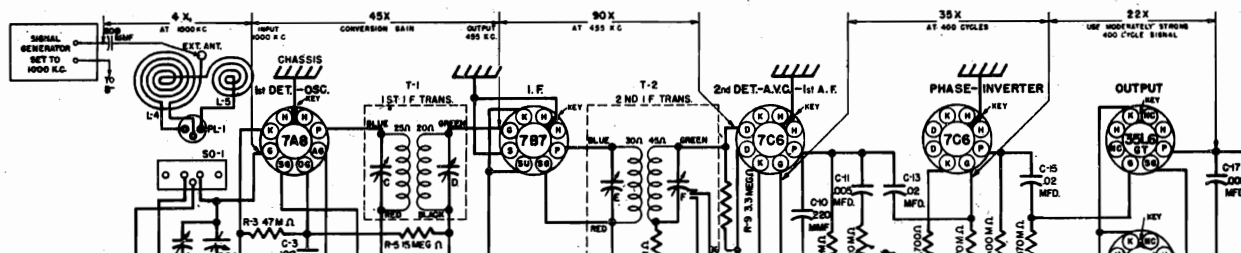
1. The chassis, record changer and loop should remain in their normal position in the cabinet when making loop adjustment.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial.  
If it is set incorrectly, slide pointer along dial cord to correct position.
3. Connect output meter across speaker voice coil.
4. Connect the ground of signal generator to B-.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Radio-Phono switch in Radio position.

**NOTE:** For best results, it is advisable to use an isolation transformer between the 117 V. AC line and AC input to receiver.

DUMMY ANT.	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER LETTER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
0.1 Mfd. Condenser	7A8 Grid	455 KC	Any point where it does not affect the signal	F-E D-C	2nd IF 1st IF	Adjust for maximum output. Then repeat adjustment.
0.1 Mfd. Condenser	7A8 Grid	1620 KC	Gang condenser completely out of mesh.	B	Oscillator	Adjust for maximum output.
RMA Loop		1400 KC	Tuned to 1400 kc Generator signal	A	Loop Antenna	Adjust for maximum output.

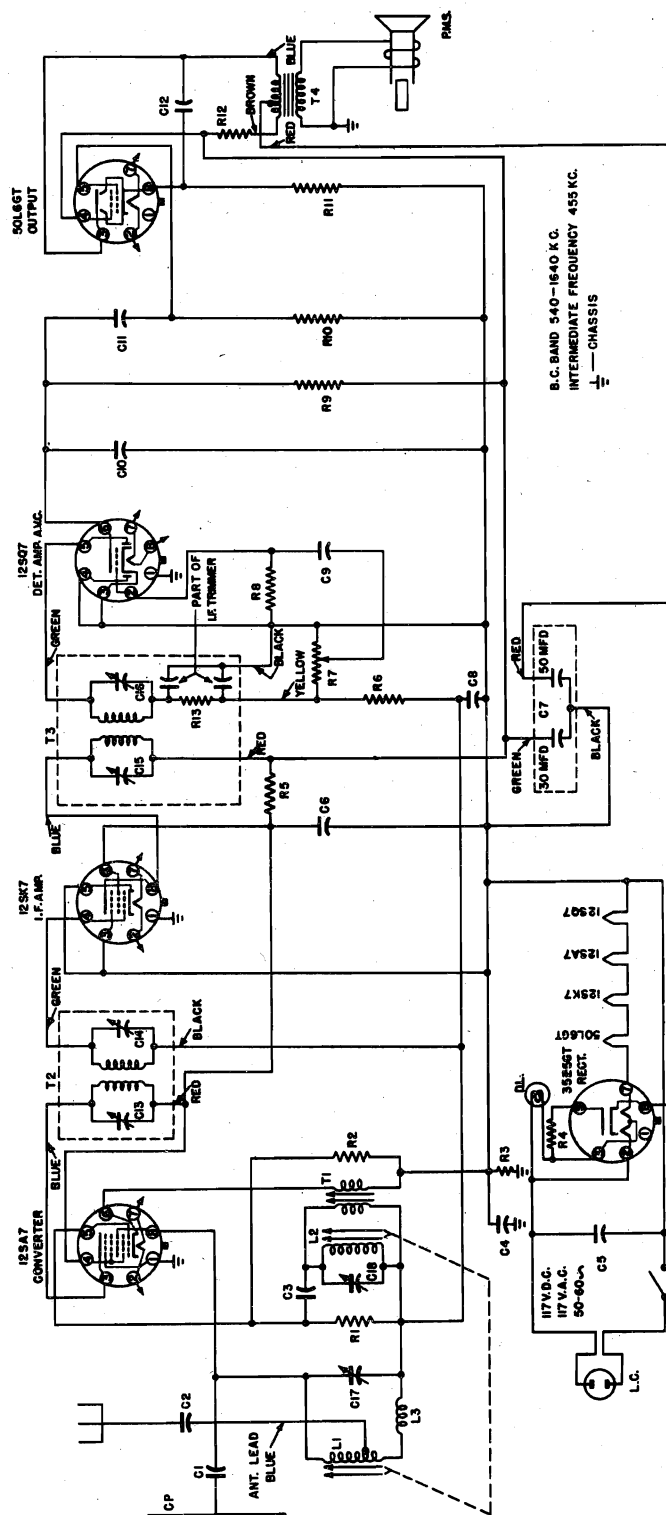
Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 1000 KC signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. Be sure radio is carefully tuned to generator signal. (Use weak signal for sharp tuning.)
3. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

JULY 1, 1946

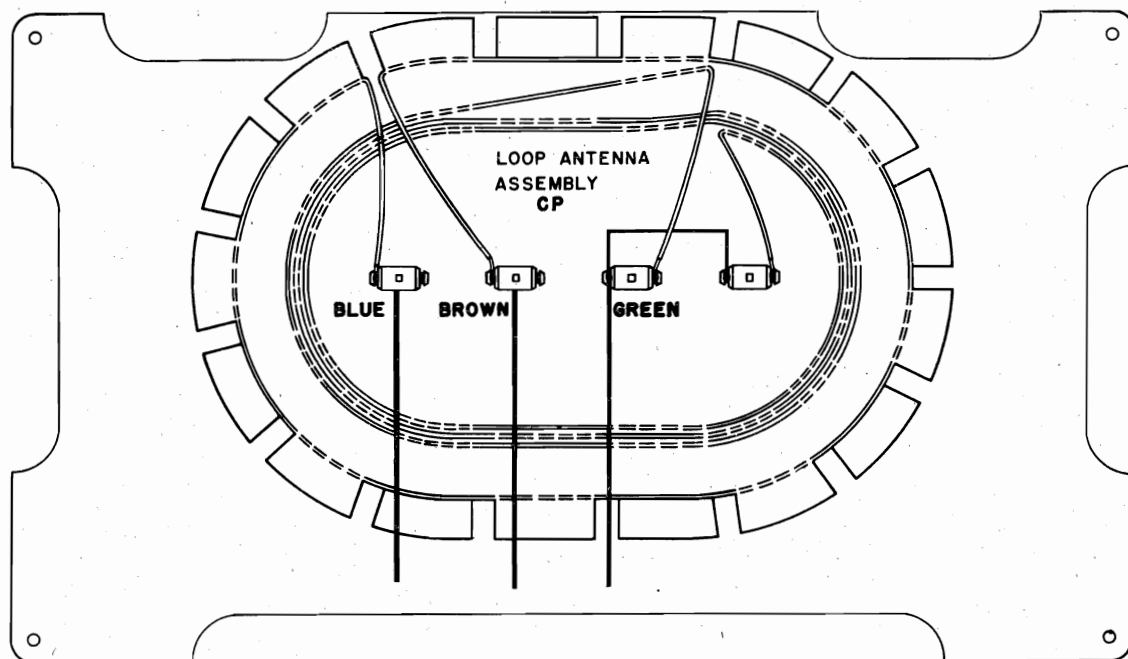


PART NO.	DESCRIPTION	DWG. SYM.	PART NO.	DESCRIPTION
55496	15 meg. $\frac{1}{2}$ w. carbon resistor	CP	52570	Antenna Assy. LOOP
R1				Oscillator Transformer Assy.
55479	22,000 ohm $\frac{1}{2}$ w. carbon resistor	T1	54282	#1 I.F. Transformer Assy.
R2				#2 I.F. Transformer Assy.
55485	220,000 ohm $\frac{1}{2}$ w. carbon resistor	T2	53350	Output Transformer
R3				22 mmfd. Mica Capacitor
55460	15 ohm $\frac{1}{2}$ w. carbon resistor	T3	53361	22 mmfd. Mica Capacitor
R4				47 mmfd. Mica Capacitor
55475	4,700 ohm $\frac{1}{2}$ w. carbon resistor	T4	52531	22 mmfd. Mica Capacitor
R5				22 meg. $\frac{1}{2}$ w. carbon resistor
55491	2.2 meg. $\frac{1}{2}$ w. carbon resistor	C1	56053	22 mmfd. Mica Capacitor
R6				47 mmfd. Mica Capacitor
56340	500,000 ohm vol. control & line sw.	C2	56053	1 mfd. 400 v. Paper Capacitor
R7, S1				.05 mfd. 600 v. Paper Capacitor
R8	2.2 meg. $\frac{1}{2}$ w. carbon resistor	C3	56055	1 mfd. 400 v. Paper Capacitor
R9	470,000 ohm $\frac{1}{2}$ w. carbon resistor	C4	56631	1 mfd. 400 v. Paper Capacitor
R10	470,000 ohm $\frac{1}{2}$ w. carbon resistor	C5	56656	50 - 30 mfd. 150 v. Electrolytic Capacitor
R11	150 ohm $\frac{1}{2}$ w. carbon resistor	C6	56631	.05 mfd. 200 v. Paper Capacitor
55466	1.50 ohm $\frac{1}{2}$ w. carbon resistor	C7	52325	.02 mfd. 200 v. Paper Capacitor
55674	1,200 ohm $\frac{1}{2}$ w. carbon resistor	C8	56600	220 mmfd. Mica Capacitor
R12	47,000 ohm $\frac{1}{2}$ w. carbon resistor	C9	56596	.004 mfd. 200 v. Paper Capacitor
55481				.05 mfd. 400v. Paper Capacitor
L1, L2	Slug tuner & pulley assy.	C10	56059	#1 I.F. Trimmers (Part of assy.)
C17, C18	Antenna loading coil	C11	56589	#2 I.F. Trimmers (Part of assy.)
L3	Line cord	C12	56628	
53091	Dial light, type 47	C13, C14		
53091	0.1.	C15, C16		
53560	5" Permanent magnet speaker			

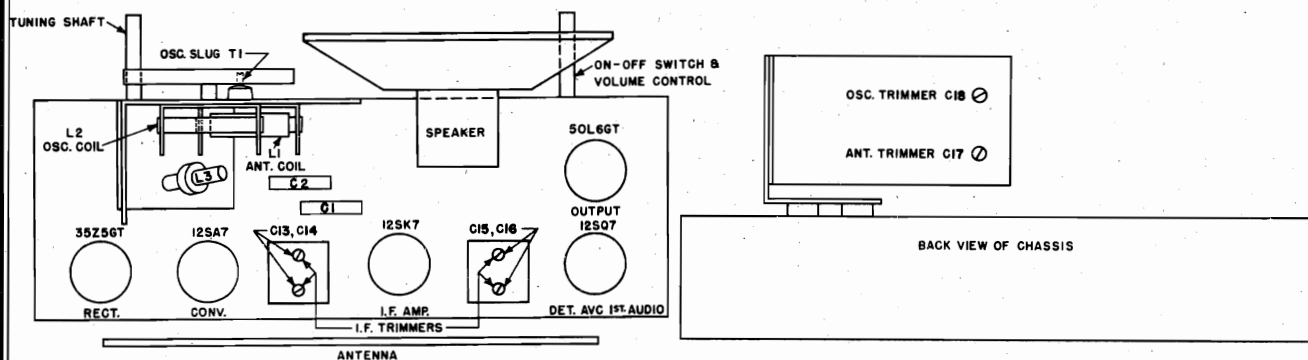
MODELS 565, 565BL, 566,  
567, 568

LEAR, INC.

### LOOP WIRING DIAGRAM



### CHASSIS DIAGRAMS



### ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	TRIMMER	REMARKS
1	Set dial pointer at 1620 KC with tuning unit drive turned fully clockwise against stop.						
2	2nd IF	Pin No. 8 of 12SA7 and B-	.05 mf.	455 KC	1620 KC	C15,16	Max. Output
3	1st IF					C13,14	Max. Output
4	Osc. Trim	Antenna lead (blue wire) and B-	200 mmf.	1620 KC	1620 KC	C18	Max. Output
5	Ant. Trim			1500 KC	1500 KC	C17	Max. Output
6	Osc. Slug			600 KC	600 KC	T1	Max. Output*
7	Repeat adjustments in operations 5 and 6 until no further increase in output is obtained.						

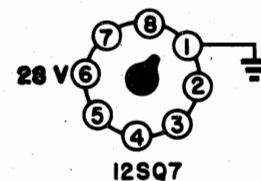
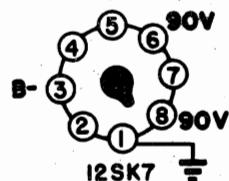
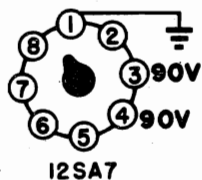
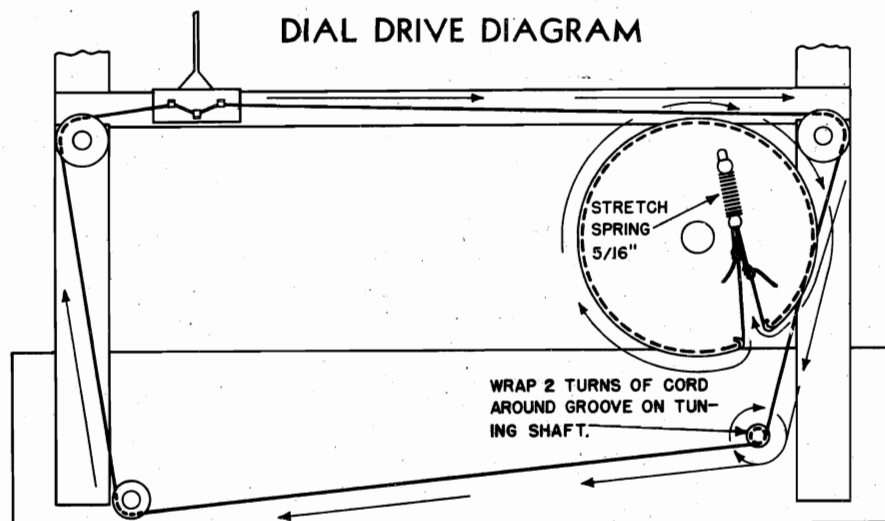
\* Rock dial tuner slightly while adjusting

Notes: Connect output meter to voice coil circuit.  
Volume control on full for all adjustments.  
Signal generator gain control at minimum for satisfactory output meter reading.

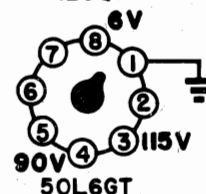
LEAR, INC.

MODELS 565, 565BL, 566,  
567, 568

## DIAL DRIVE DIAGRAM



ALL VOLTAGES SHOWN ARE D.C. MEASUREMENTS  
TAKEN FROM B- WITH A 1000 OHM PER VOLT  
VOLTMETER. SET OPERATING ON 117V, 60 ~ WITH  
VOLUME CONTROL ON FULL.  
ALLOW  $\pm 10\%$  ON ALL MEASUREMENTS.



TUNING SHAFT

BOTTOM VIEW OF CHASSIS

ON-OFF SWITCH &  
VOLUME CONTROL

## VOLTAGE CHART

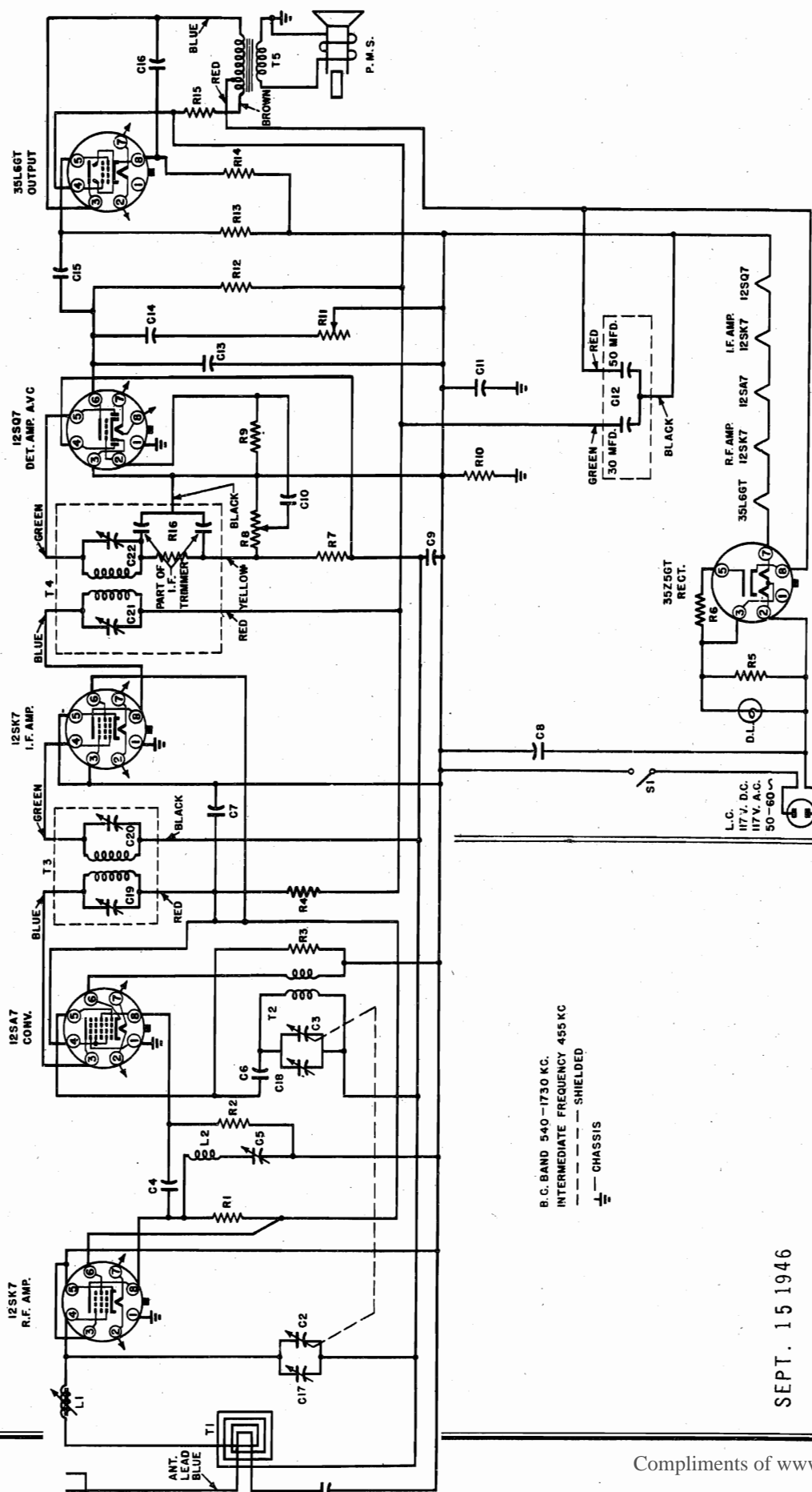
Line voltage: 117 volts, 60 cycles (AC)

Position of volume control: On full (with no signal)

TUBE	FUNCTION	Voltage of each socket prong to B- (Prong No. 3 of 12SK7)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
12SA7	Oscillator - Converter	0	-	90	90	0	0	-	0
12SK7	I-F Amplifier	0	-	0	0	0	90	-	90
12SQ7	Detector - AVC - 1st. Audio	0	0	0	0	0	28	-	-
50L6	Beam Power Amplifier	0	-	115	90	0	0	-	6
35Z5	Rectifier	-	-	-	-	110 AC	-	-	117

Notes: voltage readings are for schematic diagram in this bulletin. Allow  $10\% \pm$  on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. Voltages are DC unless otherwise specified. All voltages measured from prong No. 3 of 12SK7 tube socket, or B-.

**LEAR, INC.**



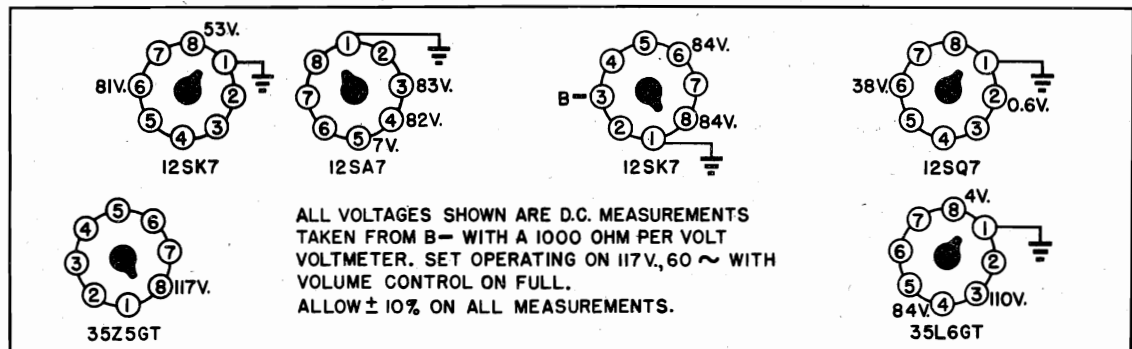
SEPT. 15 1946

LEAR, INC.

MODELS 662,663,665,6618  
MODEL 6617PC

MODELS 662,663,665,6618

## CHASSIS VOLTAGE CHART



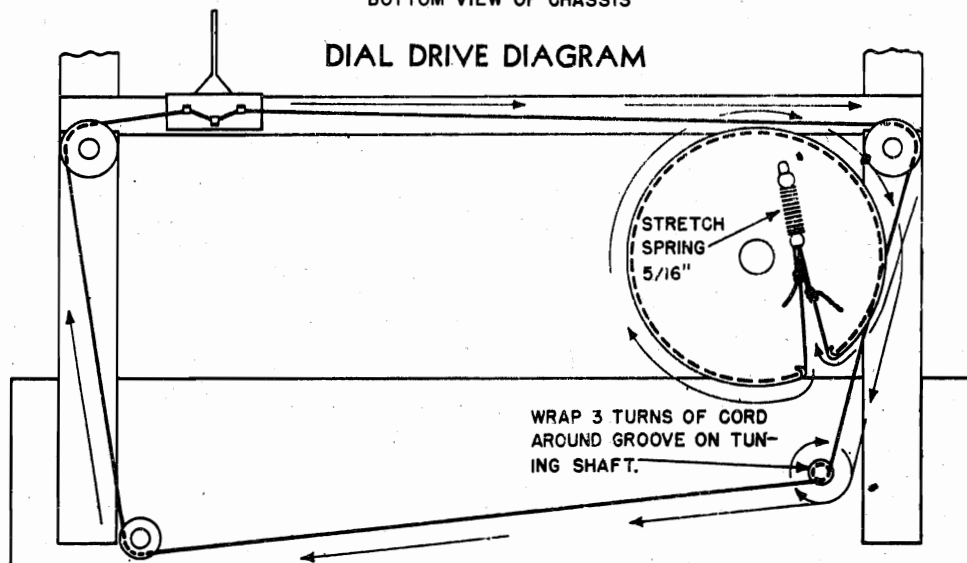
TUNING SHAFT

TONE CONTROL

ON-OFF SWITCH &  
VOLUME CONTROL

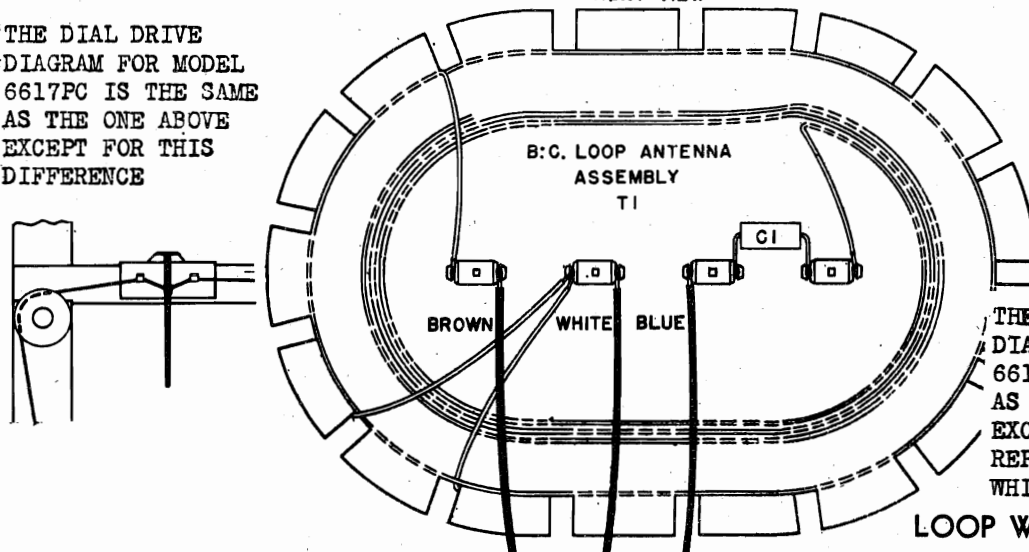
BOTTOM VIEW OF CHASSIS

## DIAL DRIVE DIAGRAM



FRONT VIEW

THE DIAL DRIVE  
DIAGRAM FOR MODEL  
6617PC IS THE SAME  
AS THE ONE ABOVE  
EXCEPT FOR THIS  
DIFFERENCE



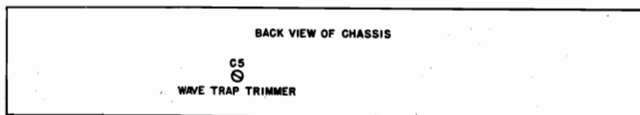
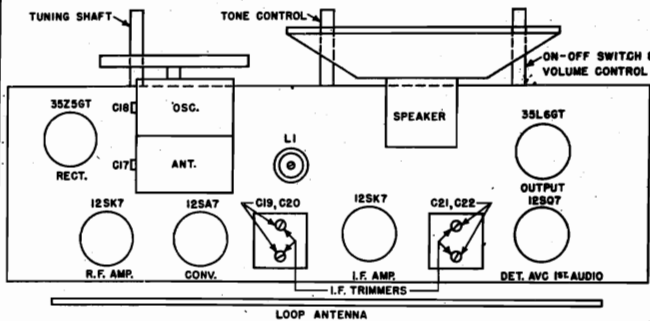
THE LOOP WIRING  
DIAGRAM FOR MODEL  
6617PC IS THE SAME  
AS THE ONE ON THE LEFT  
EXCEPT THAT BROWN IS  
REPLACED BY WHITE AND  
WHITE BY BROWN

## LOOP WIRING DIAGRAM

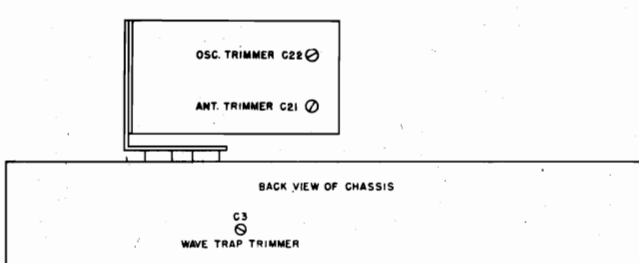
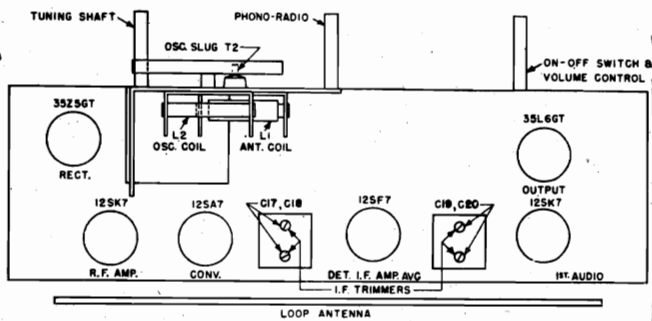


MODELS 662,663,665,6618  
MODEL 6617PC

LEAR INC.



MODELS 662,663,665,6618



MODEL 6617PC

## ALIGNMENT CHART MODELS 662,663,665,6618

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL AND CONDENSER SETTING	TRIMMER	REMARKS
1	Set dial pointer to last mark at low frequency and of dial with gang condenser closed						
2	2nd IF	Pin No. 8 of 12SA7 and B-	.05mf.	455 KC	open	C21, C22	Max. Output
3	1st IF					C19, C20	Max. Output
4	Wave trap	Antenna lead (Blue wire) and B-	200 mmf.	455 KC	open	C5	Max. Output
5	Osc. trim.			1500 KC	1500 KC	C18	Max. Output
6	Ant. trim.			1500 KC	1500 KC	C17	Max. Output
7	Load. Coil			600 KC	600 KC	Slug in LI	Max. Output
8	Repeat adjustments in operations 5 and 6 until no further increase in output is obtained.						

Notes: Connect output meter to voice coil circuit.  
Volume control on full for all adjustments.  
Signal generator gain control at minimum for satisfactory output meter reading.

## ALIGNMENT CHART MODEL 6617PC

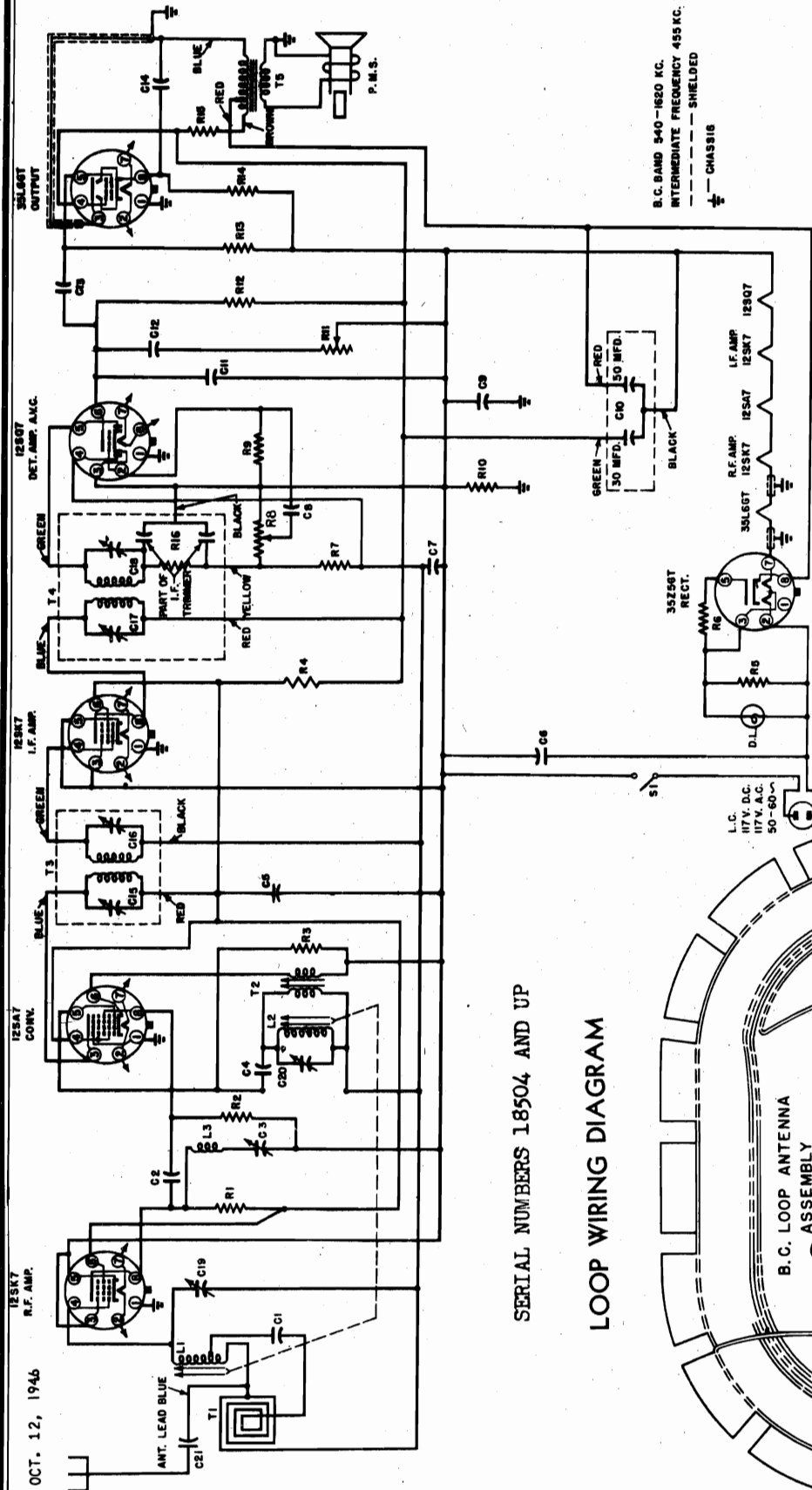
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	TRIMMER	REMARKS
1	Set dial pointer at 1620 KC with tuning unit drive turned fully clockwise against stop.						
2	2nd IF	Pin No. 8 of 12SA7 and B-	.05 mf.	455 KC	1620 KC	C19, C20	Max. Output
3	1st IF					C17, C18	Max. Output
4	Wave Trap	Antenna lead (blue wire) and B-	200 mmf.	455 KC	1620 KC	C3	Min. Output
5	Osc. Trim			1620 KC	1620 KC	C22	Max. Output
6	Ant. Trim			1500 KC	1500 KC	C21	Max. Output
7	Osc. Slug			600 KC	600 KC	T2	Max. Output*
8	Repeat adjustments in operations 5 and 6 until no further increase in output is obtained.						

\* Rock dial tuner slightly while adjusting T2.

Notes: Connect output meter to voice coil circuit.  
Volume control on full for all adjustments.  
Signal generator gain control at minimum for satisfactory output meter reading.

LEAR, INC.

MODELS 6614,6615,6616,6619

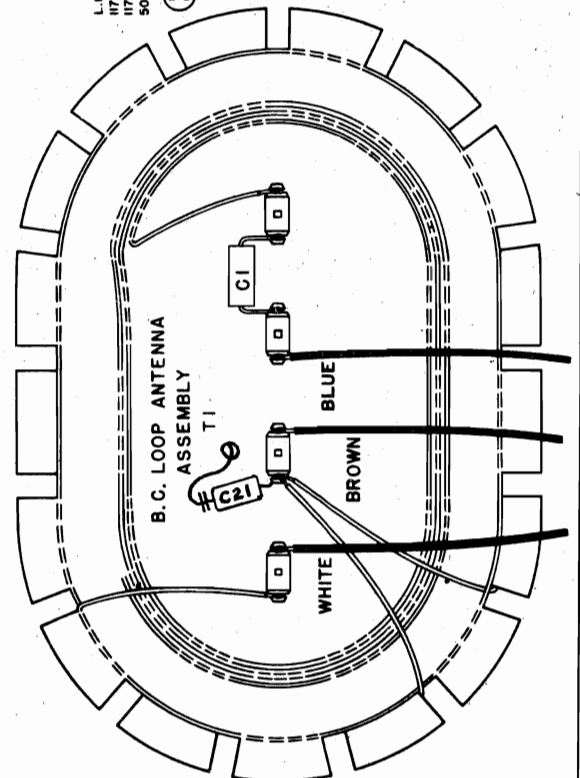


B.C. BAND 540-1620 KC.  
INTERMEDIATE FREQUENCY 455 KC.  
--- SHIELDED  
--- CHASSIS

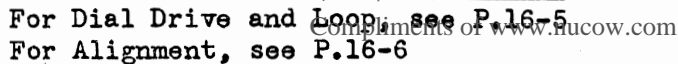
R1	55412	2,700 OHM 1/2 W. CARBON RESISTOR
R2	55485	220,000 " " " "
R3	55478	32,000 OHM " " " "
R4	55489	470 " " " "
R5	55466	15 " " " "
R6	55480	2.2 MEG. " " " "
R7	55490	500,000 OHM VOL. CONTROL & LINE SW.
R8	55490	500,000 OHM VOL. CONTROL & LINE SW.
R9	55490	500,000 OHM VOL. CONTROL & LINE SW.
R10	55485	220,000 " " " "
R11	55439	220,000 OHM " " " "
R12	55487	470,000 " " " "
R13	55487	470,000 " " " "
R14	55466	150 " " " "
R15	55940	1200 " " " "
R16	55940	47,000 " " " "
R17	54284	SLUG TUNER & PULLEY ASSY.
R18	55016	R.F. WAVE TRAP
R19	53091	LINE CORD
R20	70355	DIAL LIGHT, TYPE AT
R21	53450	5" PERMANENT MAGNET SPEAKER
T1	54493	LOOP ANTENNA ASSEMBLY
T2	54282	OSCILLATOR TRANSFORMER ASSEMBLY
T3	53350	NO. 1 L.F. " " " "
T4	53361	" " " " " "
T5	52531	OUTPUT " " " "
C1	56075	1000 MMFD. MICA CAPACITOR
C2	56057	100 MMFD. MICA CAPACITOR
C3	52556	WAVE TRAP TRIMMER ASSEMBLY
C4	56057	100 MMFD. MICA CAPACITOR
C5	56805	2 MFD. 200V. PAPER CAPACITOR
C6	56856	" " " " " "
C7	56800	" " " " " "
C8	56596	" " " " " "
C9	56631	" " " " " "
C10	52326	30-50 MFD. 150V. ELECTROLYTIC
C11	56059	220 MMFD. MICA CAPACITOR
C12	56842	.002 MFD. 600V. PAPER CAPACITOR
C13	56589	.004 " " " "
C14	56628	.05 " " " "
C15	56628	" " " " " "
C16	56628	" " " " " "
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C99	56628	" " " " " "
C100	56628	" " " " " "

SERIAL NUMBERS 18504 AND UP

LOOP WIRING DIAGRAM



**LEAR, INC.**



# FRONT

FIRST ISSUE—MARCH, 1947

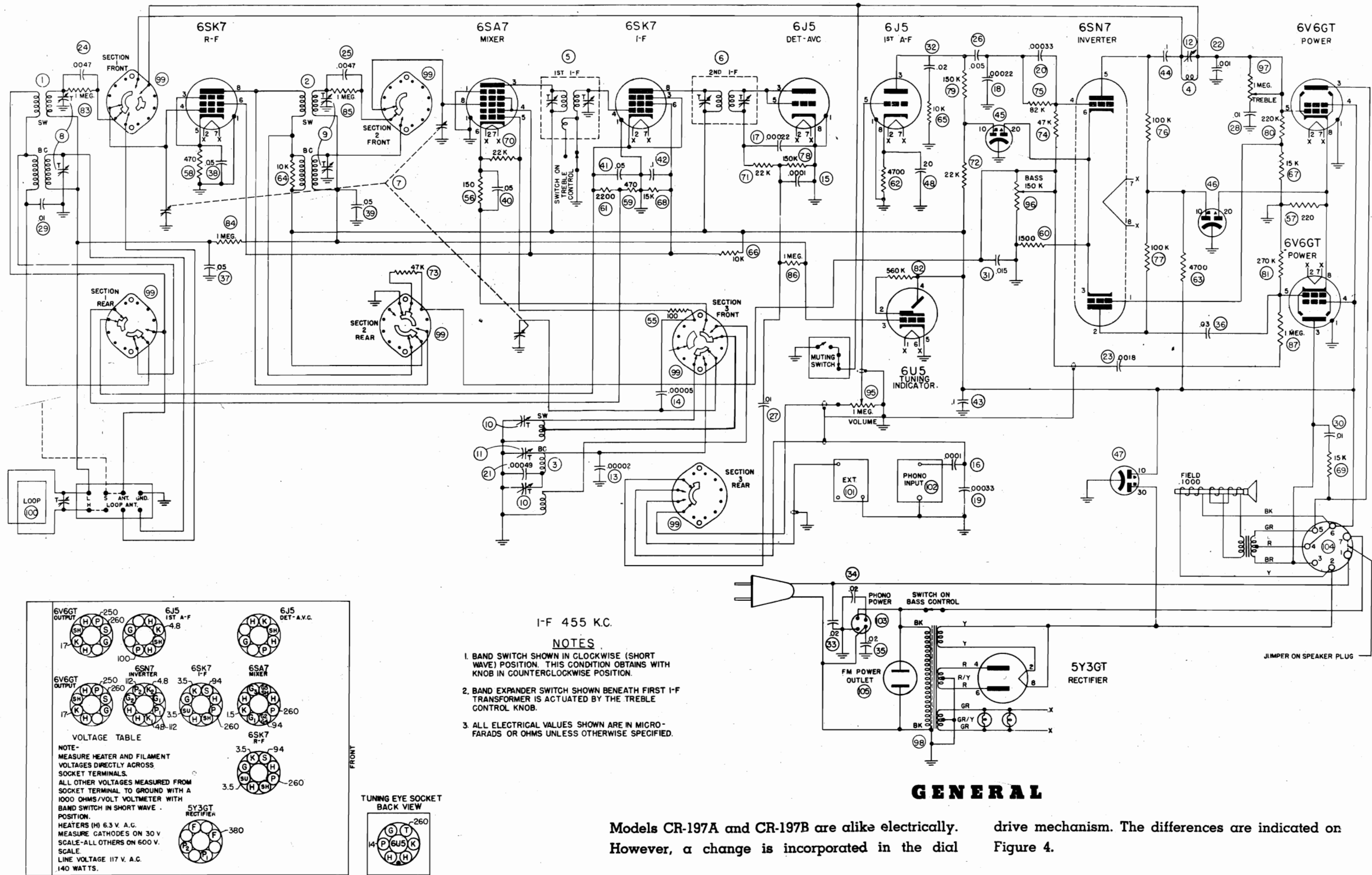
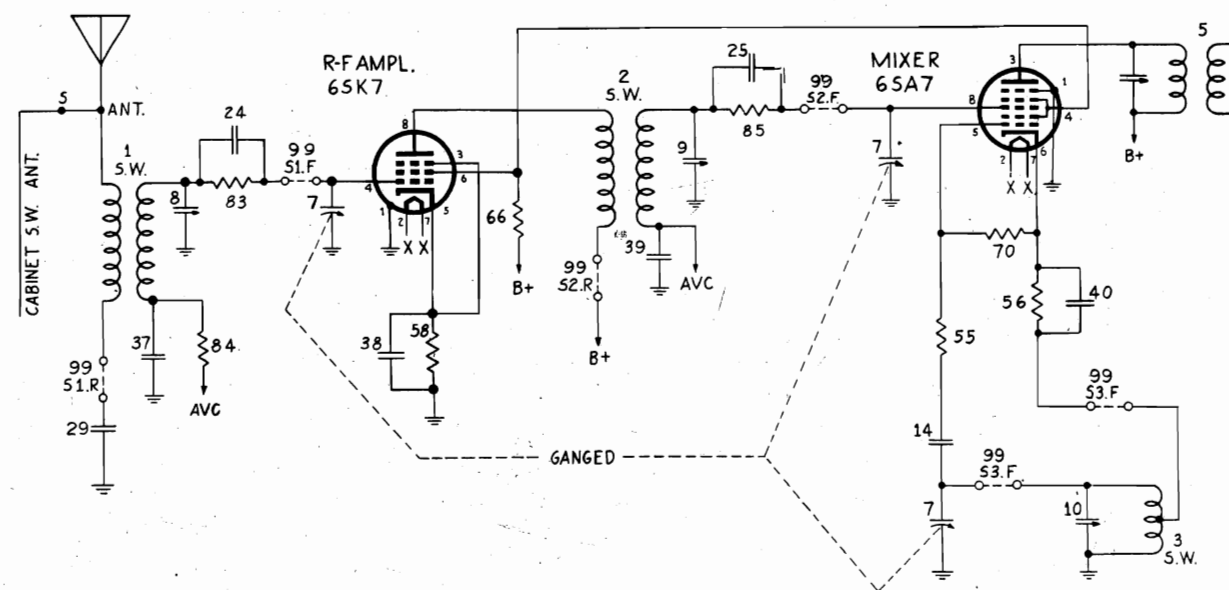
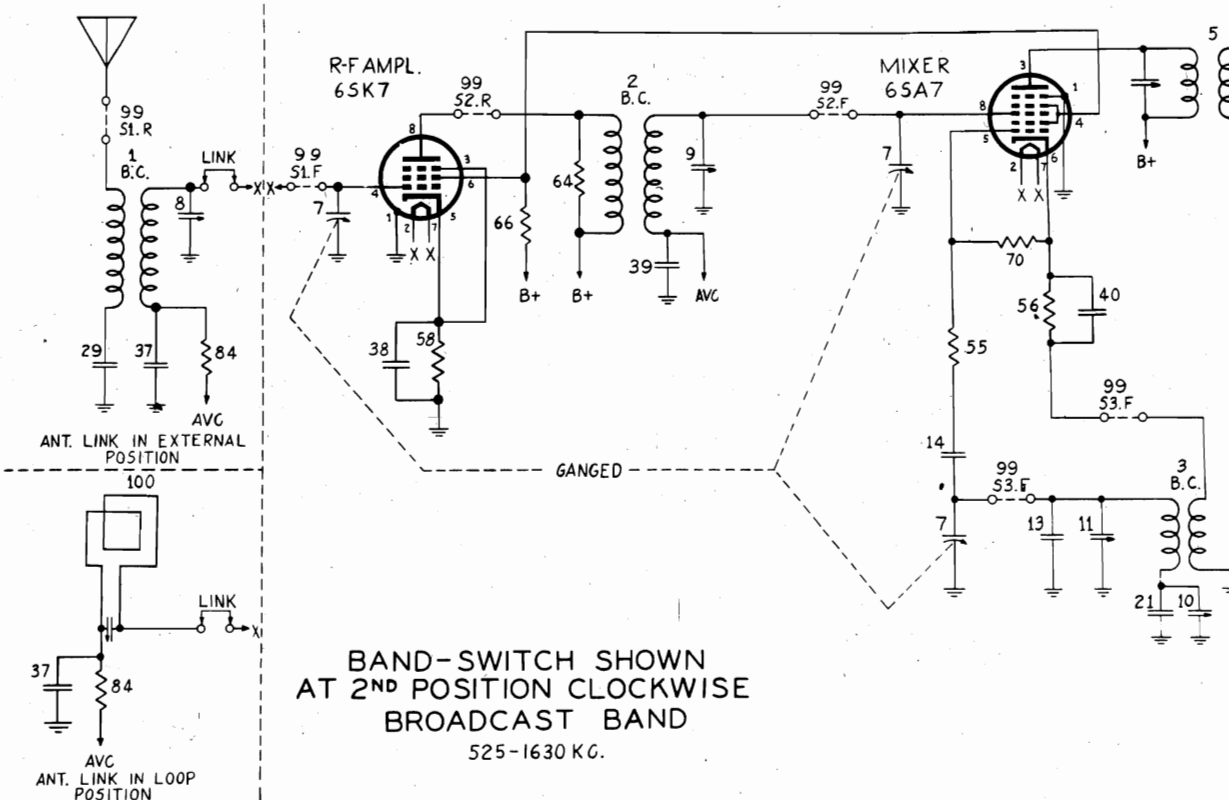


FIGURE 6



BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION  
SHORT WAVE BAND  
4.95-18.4 MC.



BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE  
BROADCAST BAND  
525-1630 KC.

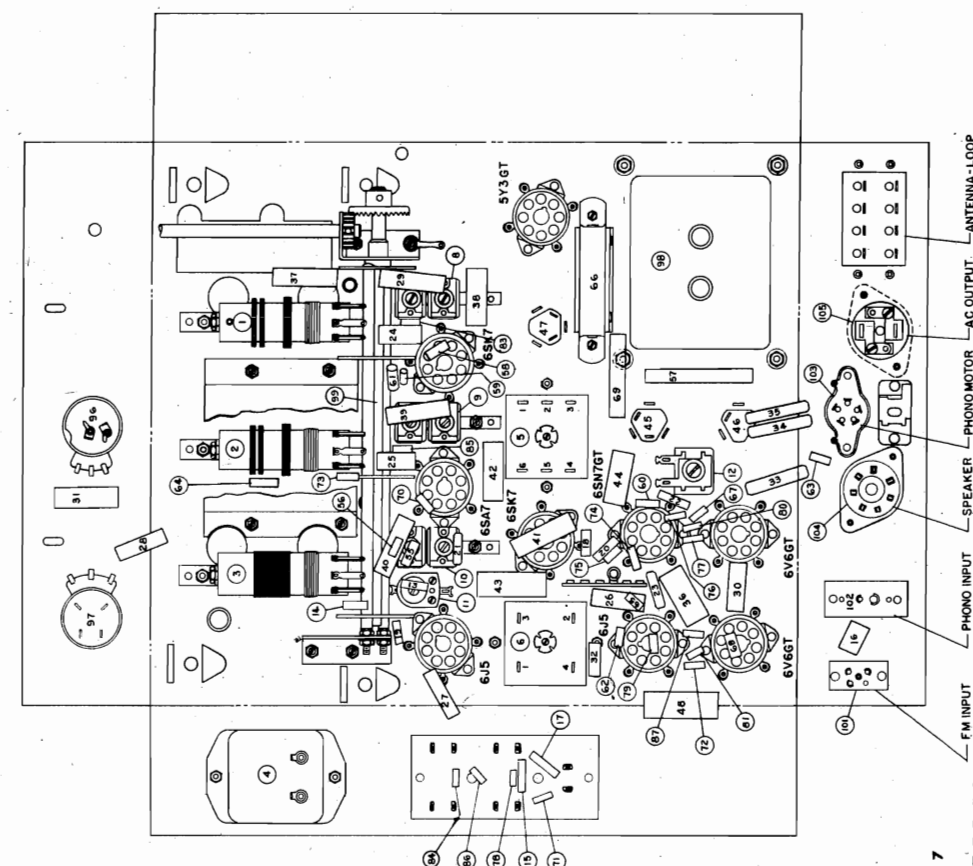
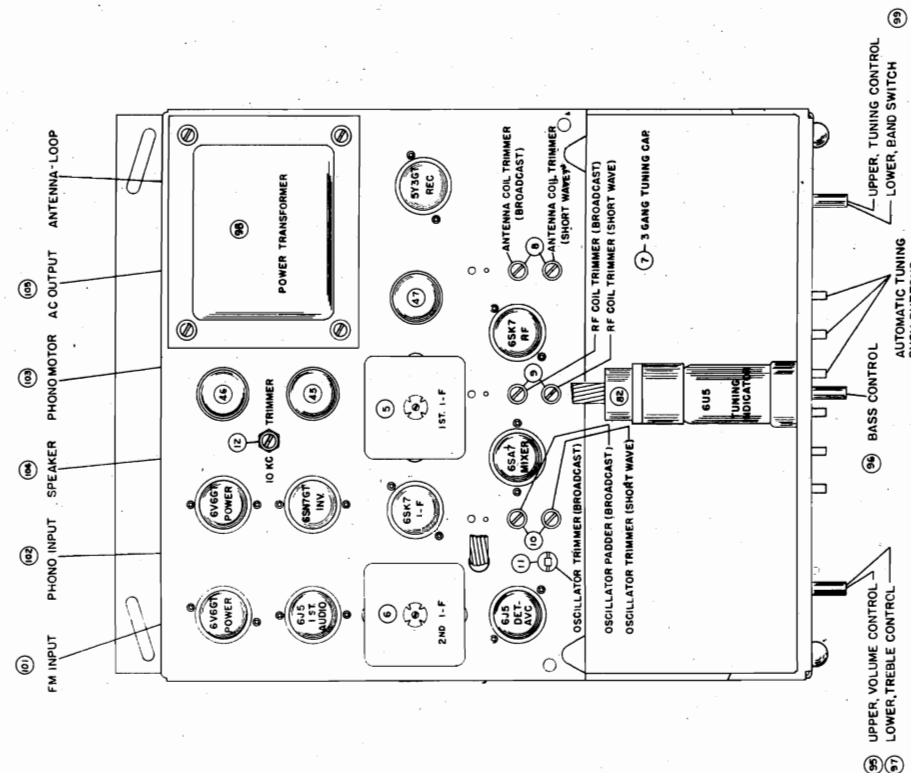


FIGURE 7

**SPECIFICATIONS**

Detector and AVC	6B5
First Audio	6B5
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6V6GT
Rectifier	5Y3GT
Tuning Indicator	6US
Dial lamp	Model No. 44
Speakers:	
Field coil resistance	1000 ohms
Voice coil impedance (400 cycles)	3.0 ohms
Output transformer	8,000/3 ohms



Power supply	117 volts 50/60 cycles AC
Power consumption	85 watts
Power output	12 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	525-1630 kc.
Short Wave band	4.95-18.4 mc.
Tubes:	
R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7

# THE MAGNAVOX CO. MODELS CR-197, CR-197A, CR-197B MODELS CR-198, CR-198A, CR-198B

- by one of the push buttons, using the Dial Tuning knob. Be sure to set the Selectivity Switch to Sharp Tune and observe that the shaded portion of the green circle in the tuning indicator is as narrow as possible.
3. Press inward on the Dial Tuning knob (without turning it to the left or right) to hold the station in tune and press one of the push button knobs in as far as it will go—while holding it in this position, tighten the push button knob by turning it clockwise as far as possible.
4. Insert the correct tab with the call letters of the selected station in the space provided and proceed with setting up the remaining push buttons in the same manner. Stations should be set up on the push buttons in the order of their frequency so that the lowest frequency station is tuned by the button at the extreme left of the assembly; the highest frequency station should be selected by the button at the right end.

## SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

<b>STAGE GAINS*</b>	
Antenna Post to Converter Grid at:	
600 kc.	4.1
6 mc.	1.85
R-F to Converter Grid at:	
600 kc.	14.3
6 mc.	2.8
R-F on Converter to I-F Grid at:	
600 kc.	46
6 mc.	42
I-F on Converter Grid to I-F Grid at:	
455 kc.	60
I-F Grid to Detector Plate at:	
455 kc.	BDCST
	30
<b>OSCILLATOR OUTPUT VOLTAGE</b>	
The DC voltage developed across Oscillator Grid Resistor (48) at:	
600 kc.	6.6
6 mc.	5.3

## AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output\*\* at 400 cycles is .0075 volt with Band Selector Switch in BDCST setting.

\* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .25 watt speaker output. \*\* Output is measured by a high resistance AC millimeter across the voice coil of a 16 ohm speaker.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

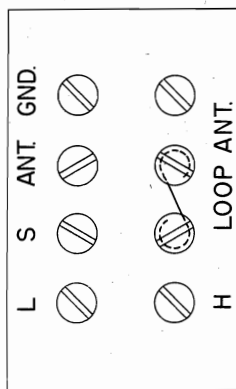


FIGURE 2

## SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer, the 15 mc. r-f trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

## 10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

## SETTING THE PUSH BUTTONS

1. Loosen each of the push button knobs several turns.
2. Select a station that is to be automatically tuned

## Method for Removing Chassis from Cabinet

THE DATA ON THIS ENTIRE PAGE ALSO APPLIES TO THE CR-198 SERIES Model CR-197 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small

## ALIGNMENT PROCEDURE

On some models of the CR-197 chassis, the two i-f trimmers are located in the top of the respective i-f transformers, while in others one trimmer is accessible from the top and the other from the bottom of each transformer as shown in the layout diagram, Figure 7.

## Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The link on the antenna terminal board must be set in the ANT position as shown in Figure 1.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "P" shown on Figure 3 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 800 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator podder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc., adjust the 1400 kc. oscillator trimmer, the 1400 kc. r-f trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. podder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the link on the antenna terminal board to the LOOP position as shown in Figure 2. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

## I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

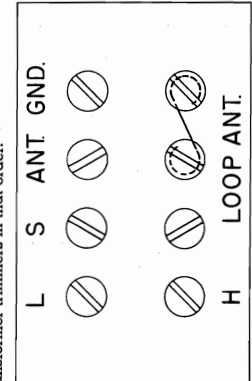


FIGURE 1

### DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 3 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical—see Figure 3. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewing from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D". If this hole is not approximately 45 degrees back from vertical as shown on Figure 3, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct

method for tying this knot is shown as an inset on Figure 3. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then wound in the lower pulley "B" around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C", and over the top of pulley "D". Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow  $\frac{1}{4}$ " to  $\frac{5}{16}$ " of cable between the spring and the inside rim of pulley "D". Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

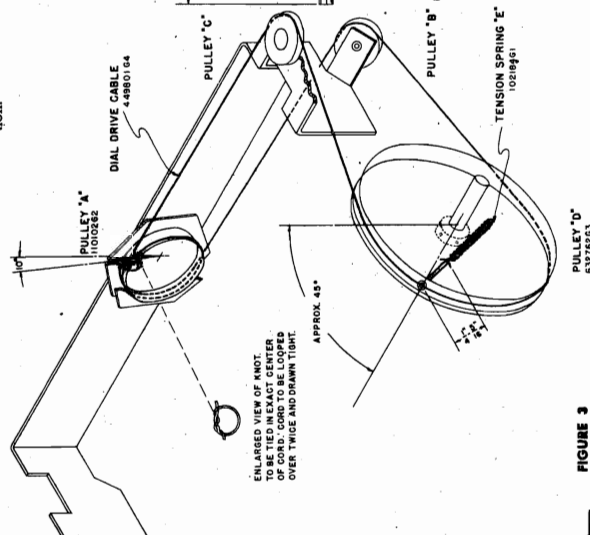


FIGURE 3

### CONDENSER GANG DRIVE ADJUSTMENTS

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 4 and 5 are correct; otherwise, the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring and Flywheel in the order shown on Figure 5. The distance between the front of the Drive Collar and the front of the Tuning Shaft must be  $1\frac{1}{4}$  inches as specified on Figure 4. Install the Flywheel on the rear of the Tuning Shaft and slide it forward until it nearly touches the edge of the Drive Wheel; then tighten one of the set screws in the Flywheel hub. Insert a .010" gauge between the Flywheel and the Pin, and while holding the gauge in this position, loosen the set screw in the Flywheel hub that was previously tightened. The Compression Spring should force the Flywheel back against the gauge—when this occurs, tighten both set screws in the Flywheel hub.

2. Adjust the Muting Switch contact clearance by

loosening the two screws in the Contact Bracket and sliding the bracket in the required direction until a  $1/16$ " clearance is obtained. If this adjustment cannot be obtained in the manner prescribed, bend the Contact Bracket until proper clearance is realized.

3. The Drive Wheel is properly located on its shaft when its edge nearest the hub is in line with the outside edge of the Drive Collar as shown on Figure 5. Two Allen set screws in the Drive Wheel hub provide a means of adjusting the position of this wheel.

4. When the adjustment outlined in paragraph 2 is correct, the proper contact clearance will automatically be obtained when the Muting Switch is set to "unmeshed" while the push buttons are being set. While pressure is applied to any one of the push buttons while they are being set up, a pressure applied simultaneously to the Tuning Control knob will cause the Muting Switch contacts to open. Detailed instructions on setting up these push buttons are shown elsewhere in this bulletin.

5. If the push button shafts at both ends do not engage the Treadle Bar as shown on Figure 5, the three screws in the Treadle Bar must be loosened and the Treadle Bar should be moved until the required condition is obtained.

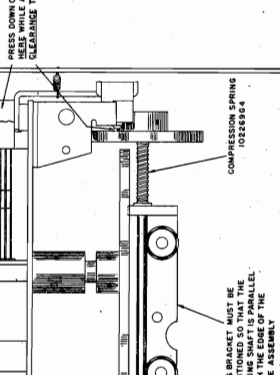


FIGURE 4

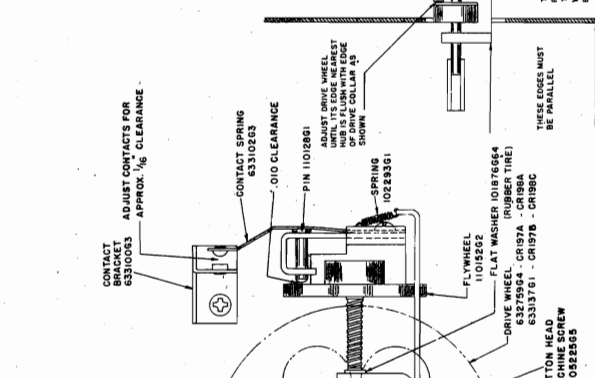


FIGURE 5



# THE MAGNAVOX CO. MODELS CR-197, CR-197A, CR-197B MODELS CR-198, CR-198A, CR-198B

## PARTS LIST

MODELS CR-197, CR-197A, CR-197B

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.	REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, Antenna, two band	360273G1	48	Capacitor, electrolytic, 20 mfd, 25V	270027G2
2	Coil Assembly, r-f, two band	360274G1	55	Resistor, composition, 100 ohms, $\frac{1}{2}$ W	230084G7
3	Coil Assembly, Oscillator, two band	360275G1	56	Resistor, composition, 150 ohms, $\frac{1}{2}$ W	230084G8
4	Coil Assembly, 10KC filter	360278G1	57	Resistor, composition, 220 ohm, $2W \pm 10\%$	230064G54
5	Transformer, First i-f	360024G1	58	Resistor, composition, 470 ohms, $\frac{1}{2}$ W	230084G11
6	Transformer, Second i-f	360025G1	59	Resistor, composition, 470 ohms, $\frac{1}{2}$ W	230084G11
7	Capacitor, Variable, three-gang, tuning	260071G1	60	Resistor, composition, 1500 ohms, $\frac{1}{2}$ W	230084G14
	Push button assembly for 260071G1 capacitor	260063G1	61	Resistor, composition, 2200 ohms, $\frac{1}{2}$ W	230084G15
8	Capacitor, Variable, two-gang trimmer	260021G1	62	Resistor, composition, 4700 ohms, $\frac{1}{2}$ W	230084G17
9	Capacitor, Variable, two-gang trimmer	260021G1	63	Resistor, composition, 4700 ohms, $\frac{1}{2}$ W	230084G17
10	Capacitor, Variable, two-gang trimmer	260021G1	64	Resistor, composition, 10,000 ohms, $\frac{1}{2}$ W	230084G19
11	Capacitor, Variable, Oscillator padder	260067G3	65	Resistor, composition, 10,000 ohms, $\frac{1}{2}$ W	230084G31
12	Capacitor, Variable, 10 KC trimmer	250008G1	66	Resistor, Wire wound, 10,000 ohms, $3W \pm 10\%$	240035G2
13	Capacitor, Ceramic, 20 mmf	250088G32	67	Resistor, composition, 15,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ W	230084G187
14	Capacitor, Ceramic, 50 mmf	250088G24	68	Resistor, composition, 15,000 ohms, 2 W	230086G20
15	Capacitor, molded mica, 100 mmf $\pm 20\%$	250159G98	69	Resistor, composition, 15,000 ohms, 1 W	230085G20
16	Capacitor, molded mica, 100 mmf $\pm 10\%$	250159G82	70	Resistor, composition, 22,000 ohms, $\frac{1}{2}$ W	230084G21
17	Capacitor, molded mica, 220 mmf $\pm 10\%$	250159G100	71	Resistor, composition, 22,000 ohms, $\frac{1}{2}$ W	230084G21
18	Capacitor, molded mica, 220 mmf $\pm 20\%$	250159G100	72	Resistor, composition, 22,000 ohms, $\frac{1}{2}$ W	230084G21
19	Capacitor, molded mica, 330 mmf $\pm 10\%$	250159G88	73	Resistor, composition, 47,000 ohms, $\frac{1}{2}$ W	230084G23
20	Capacitor, molded mica, 330 mmf $\pm 10\%$	250159G88	74	Resistor, composition, 47,000 ohms, $\frac{1}{2}$ W	230084G23
21	Capacitor, silvered mica, 490 mmf $\pm 1\%$	250085G32	75	Resistor, composition, 82,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ W	230084G85
22	Capacitor, molded mica, 1000 mmf $\pm 20\%$	250160G82	76	Resistor, composition, 100,000 ohms, $\frac{1}{2}$ W	230084G25
23	Capacitor, molded mica, 1800 mmf $\pm 10\%$	250160G67	77	Resistor, composition, 100,000 ohms, $\frac{1}{2}$ W	230084G25
24	Capacitor, molded mica, 4700 mmf $\pm 2\%$	250160G5	78	Resistor, composition, 150,000 ohms, $\frac{1}{2}$ W	230084G26
25	Capacitor, molded mica, 4700 mmf $\pm 2\%$	250160G5	79	Resistor, composition, 150,000 ohms, $\frac{1}{2}$ W	230084G26
26	Capacitor, paper .005 mfd, 400V	250152G30	80	Resistor, composition, 220,000 ohms $\pm 5\%$ , $\frac{1}{2}$ W	230084G215
27	Capacitor, paper .01 mfd, 200V	250152G18	81	Resistor, composition, 270,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ W	230084G91
28	Capacitor, paper .01 mfd, 200V	250152G18	82	Resistor, composition, 560,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ W	230084G95
29	Capacitor, paper .01 mfd, 600V	250152G38	83	Resistor, composition, 1 megohm, $\frac{1}{2}$ W	230084G31
30	Capacitor, paper .01 mfd, 600V	250152G38	84	Resistor, composition, 1 megohm, $\frac{1}{2}$ W	230084G31
31	Capacitor, paper .015 mfd, 200V	250152G70	85	Resistor, composition, 1 megohm, $\frac{1}{2}$ W	230084G31
32	Capacitor, paper .015 mfd, 200V	250152G70	86	Resistor, composition, 1 megohm, $\frac{1}{2}$ W	230084G31
33	Capacitor, molded paper, .02 mfd, 600V	250129G3	87	Resistor, composition, 1 megohm $\pm 10\%$ , $\frac{1}{2}$ W	230084G98
34	Capacitor, molded paper, .02 mfd, 600V	250129G3	95	Control, Volume, 1 megohm	220044G23
35	Capacitor, molded paper, .02 mfd, 600V	250129G3	96	Control, Bass, 150,000 ohm with Power Switch	220045G6
36	Capacitor, paper, .03 mfd, 400V	250152G25	97	Control, Treble, 1 megohm with Band Expander Switch	220071G2
37	Capacitor, paper, .05 mfd, 200V	250152G15	98	Transformer, Power, 117 V., 50/60 cycle	30034G1
38	Capacitor, paper, .05 mfd, 200V	250152G15	99	Switch, Rotary, Band Selector	16012G1
39	Capacitor, paper, .05 mfd, 200V	250152G15	100	Antenna Loop Assembly	*
40	Capacitor, paper, .05 mfd, 200V	250152G15	101	Socket, FM Input	180060G1
41	Capacitor, paper, .05 mfd, 200V	250152G15	102	Socket, Phonograph Input	189741G1
42	Capacitor, paper, .1 mfd, 200V	250152G13	103	Socket, Phonograph Motor	180501G5
43	Capacitor, paper, .1 mfd, 400V	250152G22	104	Socket, Speaker	180504G1
44	Capacitor, paper, .1 mfd, 400V	250152G22	105	Socket, FM Power	180428G1
45	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6		Dial Glass Assembly	150291G1
46	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6			
47	Capacitor, electrolytic, 10-30 mfd, 450V	270023G2			

## PARTS LIST

MODELS CR-198, CR-198A, CR-198B

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.	REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, Antenna, two band	360273G1	55	Resistor, composition, 100 ohms, $\frac{1}{2}$ W	230084G7
2	Coil Assembly, r-f, two band	360274G1	56	Resistor, Wire wound, 125 ohms, 5 W	240021G11
3	Coil Assembly, Oscillator, two band	360275G1	57	Resistor, composition, 150 ohms, $\frac{1}{2}$ W	230084G8
4	Coil Assembly, 10KC filter	360278G1	58	Resistor, composition, 470 ohms, $\frac{1}{2}$ W	230084G11
5	Transformer, First i-f	360024G1	59	Resistor, composition, 470 ohms, $\frac{1}{2}$ W	230084G11
6	Transformer, Second i-f	360025G1	60	Resistor, composition, 1000 ohms, $2W \pm 10\%$	230064G62
7	Capacitor, Variable, three gang, tuning	260071G1	61	Resistor, composition, 1500 ohms, $\frac{1}{2}$ W	230084G14
	Push Button assembly for 260071G1	260063G1	62	Resistor, composition, 2200 ohms, $\frac{1}{2}$ W	230084G15
8	Capacitor, Variable, two gang trimmer	260021G1	63	Resistor, composition, 4700 ohms, $\frac{1}{2}$ W	230084G17
9	Capacitor, Variable, two gang trimmer	260021G1	64	Resistor, composition, 4700 ohms, $\frac{1}{2}$ W	230084G17
10	Capacitor, Variable, two gang trimmer	260021G1	65	Resistor, composition, 10,000 ohms, $\frac{1}{2}$ W	230084G19
11	Capacitor, Variable, Oscillator padder	260067G3	66	Resistor, Wire wound, 10,000 ohms, $\pm 10\%$ , 3 W	240035G2
12	Capacitor, Variable, 10KC trimmer	250008G1	67	Resistor, composition, 15,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ W	230084G187
13	Capacitor, Ceramic, 20 mmf	250088G32	68	Resistor, composition, 15,000 ohms, 2 W	230086G20
14	Capacitor, Ceramic, 50 mmf	250088G24	69	Resistor, composition, 15,000 ohms, 1 W	230085G20
15	Capacitor, molded mica, 100 mmf $\pm 20\%$	250159G98	70	Resistor, composition, 22,000 ohms, $\frac{1}{2}$ W	230084G21
16	Capacitor, molded mica, 100 mmf $\pm 10\%$	250159G82	71	Resistor, composition, 22,000 ohms, $\frac{1}{2}$ W	230084G21
17	Capacitor, molded mica, 220 mmf $\pm 10\%$	250159G100	72	Resistor, composition, 22,000 ohms, $\frac{1}{2}$ W	230084G21
18	Capacitor, molded mica, 220 mmf $\pm 20\%$	250159G100	73	Resistor, composition, 47,000 ohms, $\frac{1}{2}$ W	230084G23
19	Capacitor, molded mica, 330 mmf $\pm 10\%$	250159G88	74	Resistor, composition, 47,000 ohms, $\frac{1}{2}$ W	230084G23
20	Capacitor, silvered mica, 490 mmf $\pm 1\%$	250085G32	75	Resistor, composition, 82,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ W	230084G85
21	Capacitor, molded mica, 1000 mmf $\pm 20\%$	250160G82	76	Resistor, composition, 100,000 ohms, $\frac{1}{2}$ W	230084G25
22	Capacitor, molded mica, 1800 mmf $\pm 10\%$	250160G67	77	Resistor, composition, 100,000 ohms, $\frac{1}{2}$ W	230084G25
23	Capacitor, molded mica, 4700 mmf $\pm 2\%$	250161G5	78	Resistor, composition, 150,000 ohms, $\frac{1}{2}$ W	230084G26
24	Capacitor, molded mica, 4700 mmf $\pm 2\%$	250161G5	79	Resistor, composition, 150,000 ohms, $\frac{1}{2}$ W	230084G26
25	Capacitor, paper .005 mfd, 400V	250152G30	80	Resistor, composition, 220,000 ohms, $\pm 5\%$ , $\frac{1}{2}$ W	230084G215
26	Capacitor, paper .01 mfd, 200 V	250152G18	81	Resistor, composition, 270,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ W	230084G91
27	Capacitor, paper .01 mfd, 200V	250152G18	82	Resistor, composition, 560,000 ohms, $\pm 10\%$ , $\frac{1}{2}$ W	230084G95
28	Capacitor, paper .01 mfd, 600V	250152G38	83	Resistor, composition, 690,000 ohms, $\frac{1}{2}$ W	230084G30
29	Capacitor, paper .01 mfd, 600V	250152G38	84	Resistor, composition, 1 megohm, $\pm 10\%$ , $\frac{1}{2}$ W	230084G31
30	Capacitor, paper .015 mfd, 200V, $\pm 10\%$	250152G70	85	Resistor, composition, 1 megohm, $\frac{1}{2}$ W	230084G31
31	Capacitor, molded paper, .02 mfd, 600V	250129G3	86	Resistor, composition, 1 megohm, $\frac{1}{2}$ W	230084G31
32	Capacitor, molded paper, .02 mfd, 600V	250129G3	87	Resistor, composition, 1 megohm, $\frac{1}{2}$ W	230084G31
33	Capacitor, molded paper, .02 mfd, 600V	250129G3	88	Resistor, composition, 1 megohm, $\frac{1}{2}$ W	230084G31
34	Capacitor, molded paper, .02 mfd, 600V	250129G3	95	Control, Volume, 1 megohm	220044G23
35	Capacitor, paper, .03 mfd, 400V	250152G25	96	Control, Bass, 150,000 ohm with Power Switch	220045G6
36	Capacitor, paper, .05 mfd, 200V	250152G15	97	Control, Treble, 1 megohm with Band Expander Switch	220071G2
37	Capacitor, paper, .05 mfd, 200V	250152G15	98	Transformer, Power, 117 V., 50/60 cycle	30035G1
38	Capacitor, paper, .05 mfd, 200V	250152G15	99	Switch, Rotary, Band Selector	160172G1
39	Capacitor, paper, .05 mfd, 200V	250152G15	100	Antenna Loop Assembly	*
40	Capacitor, paper, .05 mfd, 200V	250152G15	101	Socket, FM Input	180060G1
41	Capacitor, paper, .1 mfd, 200V	250152G13	102	Socket, Phonograph Input	189741G1
42	Capacitor, paper, .1 mfd, 400V	250152G22	103	Socket, Phonograph Motor	180501G5
43	Capacitor, paper, .1 mfd, 400V	250152G22	104	Socket, Speaker	180504G1
44	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6	105	Socket, FM Power	180428G1
45	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6		Dial Glass Assembly	150291G1
46	Capacitor, electrolytic, 10-30 mfd, 450V	270023G2			
47	Capacitor, electrolytic, 20 mfd, 25V	270027G2			

\*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the Style Number of the instrument when ordering a replacement loop antenna assembly.

The schematic diagram illustrates a vacuum tube radio receiver circuit, specifically designed for the broadcast band (525-1630 KC). The circuit is divided into several functional sections:

- Antenna Input Section:** The top left shows the antenna input with a 99 51.R resistor and a 1 B.C. (Broadcast Coupling) component. The bottom left shows the antenna input with a 100 100 component and a 37 37 component. The antenna link is shown in the external position (top) and the loop position (bottom).
- R-F Amplifier Section:** The central section features an R-F amplifier tube (6SK7) with a 99 51.F resistor and a 7 7 component. The antenna link is shown in the external position (top) and the loop position (bottom).
- Mixer Section:** The right section features a mixer tube (6SA7) with a 99 52.F resistor and a 7 7 component. The mixer is shown in the external position (top) and the loop position (bottom).
- Power Supply Section:** The bottom right shows the power supply section with a 3 B.C. (Broadcast Coupling) component and a 20 20 component. The power supply is shown in the external position (top) and the loop position (bottom).

The diagram includes various component values and labels, such as 99 51.R, 1 B.C., 99 51.F, 7 7, 99 52.F, 3 B.C., 20 20, 100 100, 37 37, 86, 58, 36, 66, 65, 38, 57, 70, 55, 14, 13, 11, 10, and 2. The antenna link is shown in the external position (top) and the loop position (bottom). The power supply is shown in the external position (top) and the loop position (bottom).

**BAND-SWITCH SHOWN AT 2<sup>ND</sup> POSITION CLOCKWISE BROADCAST BAND 525-1630 KC.**

FIRST ISSUE—JANUARY, 1947

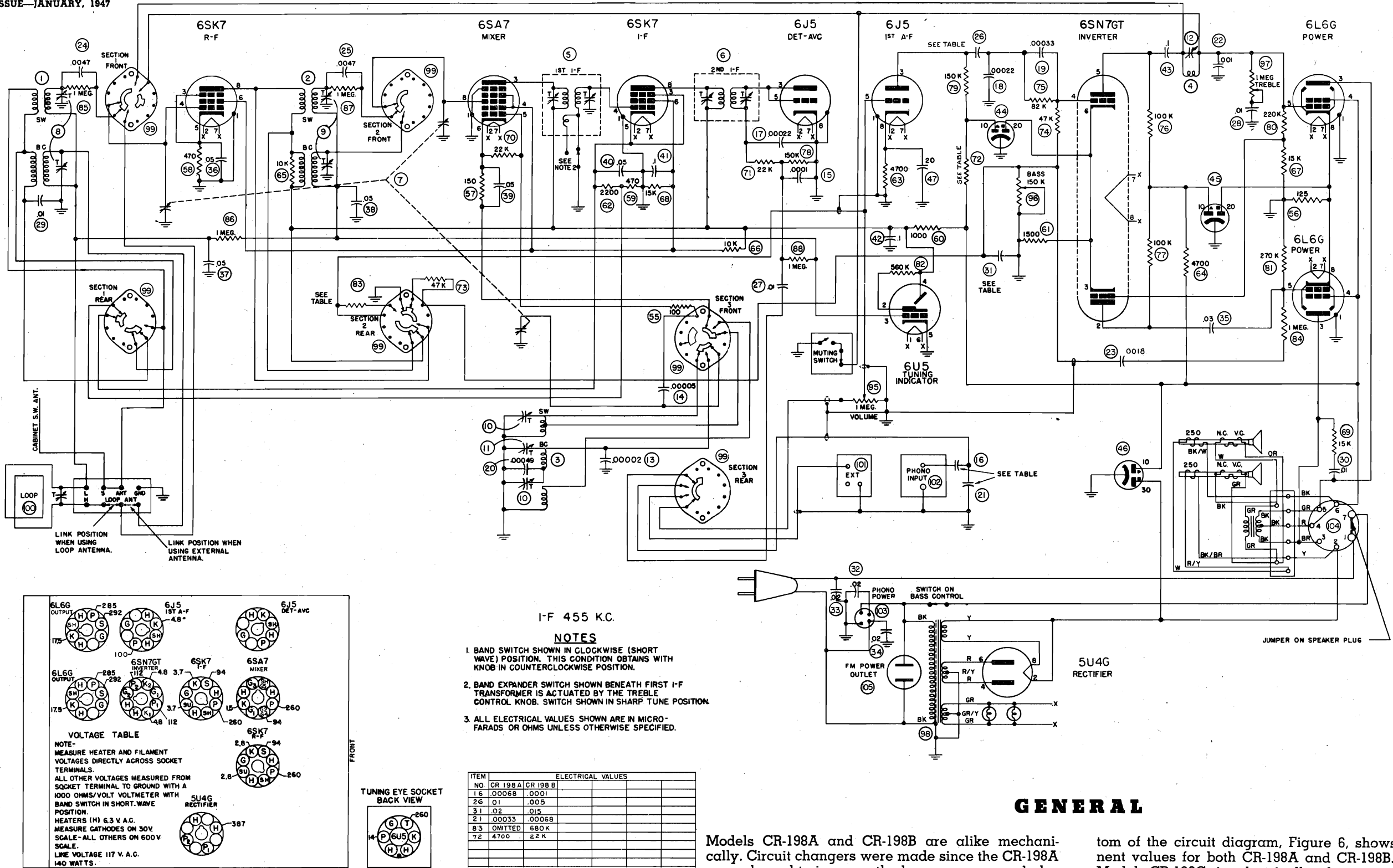
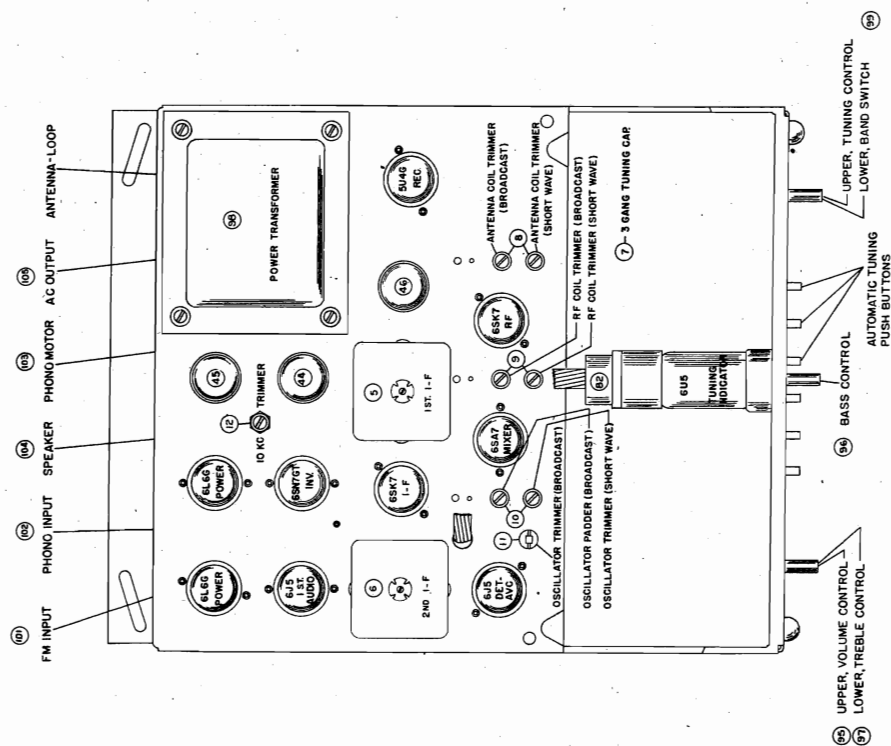


FIGURE 6



## SPECIFICATIONS

Detector and AVC.	61S
First Audio	61S
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6L6G
Rectifier	504G
Tuning Indicator	6U5
Diode lamps.	Mazda No. 44
Decoders:	
Field coil resistance.	No. 582815
250 ohms	No. 582847
Voice coil impedance (400 cycles).	250 ohms
5.7 ohms	5.4 ohms
None	5.4 ohms
Output transformer	None



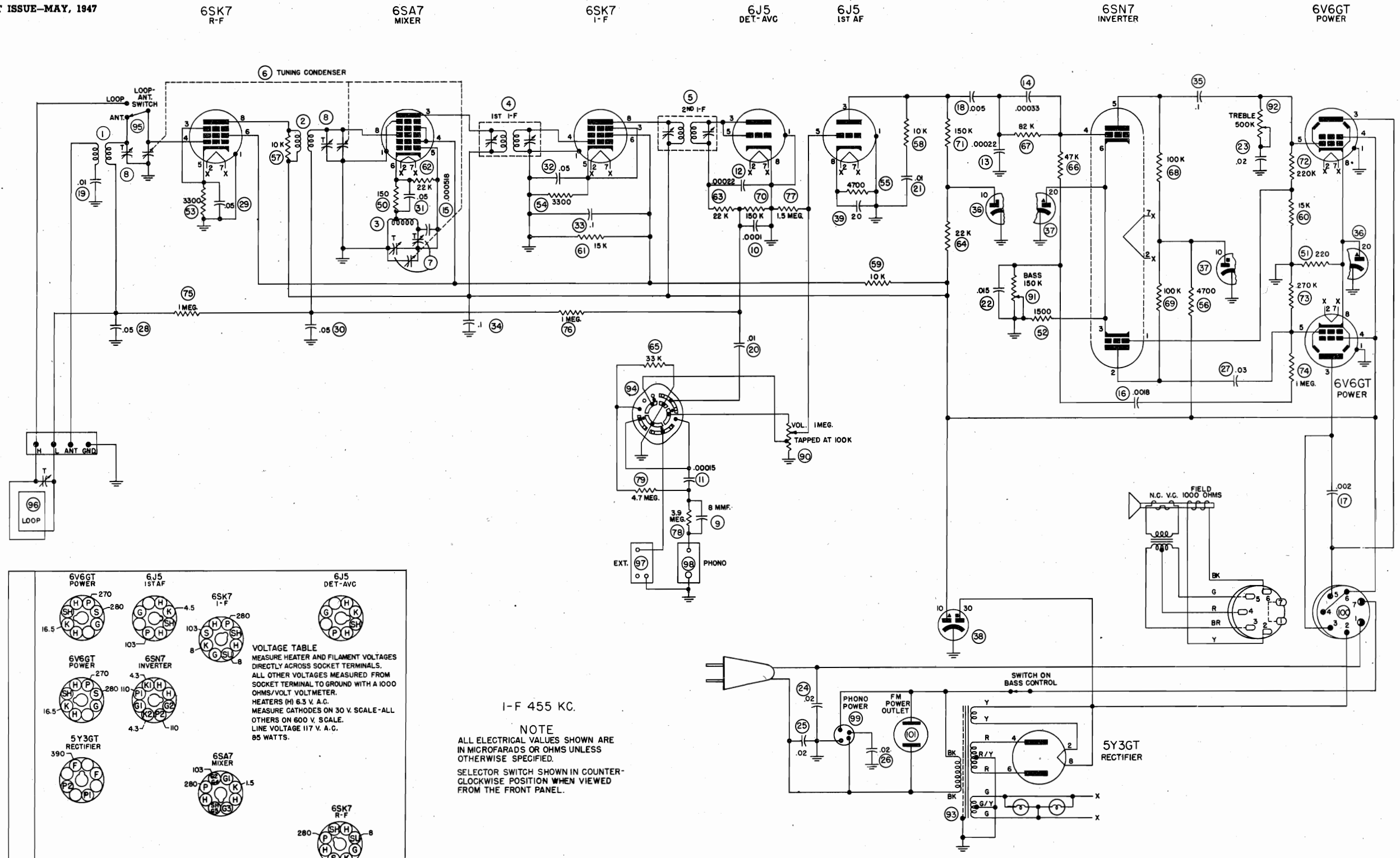
Power supply	117 volts 60 cycles AC
Power consumption	140 watts
Power output	20 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	525-1800 kc.
Short Wave band	4.95-18.4 mc.
Tubes:	
R.F. Amplifier	6SK7
Converter	6SA7
I.F. Amplifier	6SK7

## PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna	360279G1
2	Coil assembly, r-f	360280G1
3	Coil assembly, oscillator	360281G1
4	Transformer, first i-f	363700G1
5	Transformer, second i-f	363700G1
6	Capacitor, variable, three-gang tuning	260074G1
7	Capacitor, variable, two-gang trimmer	260021G1
8	Capacitor, variable, two-gang trimmer	260078G1
9	Capacitor, 8 mmf.	250164G1
10	Capacitor, molded mica, 100 mmf. $\pm 20\%$	250159G8
11	Capacitor, molded mica, 150 mmf. $\pm 10\%$	250159G84
12	Capacitor, molded mica, 220 mmf. $\pm 20\%$	250159G100
13	Capacitor, molded mica, 220 mmf. $\pm 20\%$	250159G100
14	Capacitor, molded mica, 330 mmf. $\pm 10\%$	250159G88
15	Capacitor, silvered mica, 518 mmf. $\pm 1\%$	250085G35
16	Capacitor, molded mica, 1800 mmf. $\pm 10\%$	250160G67
17	Capacitor, paper, .002 mfd. 600 V.	250152G44
18	Capacitor, paper, .005 mfd. 600 V.	250152G41
19	Capacitor, paper, .01 mfd. 200 V.	250152G18
20	Capacitor, paper, .01 mfd. 200 V.	250152G18
21	Capacitor, paper, .01 mfd. 400 V.	250152G27
22	Capacitor, paper, .015 mfd. $\pm 10\%$ 200 V.	250152G70
23	Capacitor, paper, .02 mfd. 200 V.	250152G17
24	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
26	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
27	Capacitor, paper, .03 mfd. 400 V.	250125G25
28	Capacitor, paper, .05 mfd. 200 V.	250152G15
29	Capacitor, paper, .05 mfd. 200 V.	250152G15
30	Capacitor, paper, .05 mfd. 200 V.	250152G15
31	Capacitor, paper, .05 mfd. 200 V.	250152G15
32	Capacitor, paper, .05 mfd. 200 V.	250152G15
33	Capacitor, paper, .1 mfd. 200 V.	250152G13
34	Capacitor, paper, .1 mfd. 400 V.	250152G22
35	Capacitor, paper, .1 mfd. 400 V.	250152G22
36	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25 V.	270023G6
37	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25 V.	270023G6
38	Capacitor, electrolytic, 10-30 mfd. 475 V.	270023G2
39	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
40	Resistor, Composition, 150 ohm, $\frac{1}{2}$ W.	230084G8
41	Resistor, wire wound, 220 ohm, $\pm 10\%$ , 2 W.	230064G54
42	Resistor, composition, 1500 ohm, $\frac{1}{2}$ W.	230084G14
43	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
44	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
45	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
46	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
47	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
48	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
49	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
50	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
51	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
52	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
53	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
54	Resistor, composition, 3300 ohm, $\frac{1}{2}$ W.	230084G16
55	Resistor, composition, 4700 ohm, $\frac{1}{2}$ W.	230084G17
56	Resistor, composition, 4700 ohm, $\frac{1}{2}$ W.	230084G17
57	Resistor, composition, 10,000 ohm, $\frac{1}{2}$ W.	230084G19
58	Resistor, composition, 10,000 ohm, 1 W.	230085G19
59	Resistor, wire wound, 10,000 ohm $\pm 10\%$ , 3 W.	240035G2
60	Resistor, composition, 15,000 ohm $\pm 5\%$ , $\frac{1}{2}$ W.	230084G187
61	Resistor, composition, 15,000 ohm, 2 W.	230086G20
62	Resistor, composition, 22,000 ohm, $\frac{1}{2}$ W.	230084G21
63	Resistor, composition, 22,000 ohm, $\frac{1}{2}$ W.	230084G21
64	Resistor, composition, 22,000 ohm, $\frac{1}{2}$ W.	230084G21
65	Resistor, composition, 33,000 ohm, $\frac{1}{2}$ W.	230084G22
66	Resistor, composition, 47,000 ohm, $\frac{1}{2}$ W.	230084G23
67	Resistor, composition, 82,000 ohm, $\pm \frac{1}{2}$ W.	230084G85
68	Resistor, composition, 100,000 ohm, $\frac{1}{2}$ W.	230084G25
69	Resistor, composition, 100,000 ohm, $\frac{1}{2}$ W.	230084G25
70	Resistor, composition, 100,000 ohm, $\frac{1}{2}$ W.	230084G26
71	Resistor, composition, 150,000 ohm, $\frac{1}{2}$ W.	230084G26
72	Resistor, composition, 220,000 ohm, $\pm 5\%$ , $\frac{1}{2}$ W.	230084G215
73	Resistor, composition, 270,000 ohm, $\pm 10\%$ , $\frac{1}{2}$ W.	230084G91
74	Resistor, composition, 1 megohm, $\pm 10\%$ , $\frac{1}{2}$ W.	230084G98
75	Resistor, composition, 1 megohm, $\frac{1}{2}$ W.	230084G31
76	Resistor, composition, 1 megohm, $\frac{1}{2}$ W.	230084G31
77	Resistor, composition, 1.5 megohm, $\frac{1}{2}$ W.	230084G32

THE MAGNAVOX CO.

FIRST ISSUE-MAY, 1947



I-F 455 KC.  
NOTE  
ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.  
SELECTOR SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION WHEN VIEWED FROM THE FRONT PANEL.

FIGURE 2



METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-199 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across the Oscillator Grid Resistor at:

600 kc. .... 12 V.  
or 0.55 ma. through 22,000 ohm Oscillator Grid Resistor (62).

AUDIO GAIN

Voltage required across the Volume Control to produce .05 watt speaker output\*\* at 400 cycles is .011 volt with Input Selector Switch in RAD setting.

\*Values of 20% are permissible. All readings made with sufficient input signal to cause 100% modulation.

\*\* .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of speaker.

DIAL CORD REPLACEMENT

Two separate drive cables are used in the CR-199 dial assembly. One cable is used to transmit the motion from the tuning knob to the large pulley that is coupled to the condenser gang; the other cable actuates the dial pointer whenever the large pulley on the condenser gang is rotated. Separate instructions for replacing either of these cables is given in the following paragraphs.

CONDENSER DRIVE CABLE REPLACEMENT

Remove dial assembly after taking out two screws on each side of chassis. Slip a one-half inch length of sleeving into a 42-inch length of dial cable. Tie the two ends to the loop end of the cable spring "E" securely so that the cable doubled measures 20 3/4 inches end to end including spring.

Place spring hook in bottom hole and draw cable through slot of pulley "C". Loop one end of cable around pulley "C" in a clockwise direction in front of condenser drive cable (viewing chassis from front) then loop the remaining end around pulley in a counterclockwise direction. Secure both ends of cable to chassis at edge of pulley slot with scotch tape, keeping piece of sleeving on remaining loop of cable.

I-F ALIGNMENT

1. Connect the output of the signal generator to the control grid (pin No. 8) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the input selector switch to RAD.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The Ant-Loop switch on top of the chassis must be in the ANT setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS\*

Antenna Post to R-F Grid at:	4.88
600 kc.	
R-F Grid to Converter Grid at:	4.7
600 kc.	
R-F on Converter to I-F Grid at:	42.6
600 kc.	
I-F on Converter Grid to I-F Grid at:	50.7
455 kc. (gang closed).	
I-F Grid to Detector Plate at:	72
455 kc.	

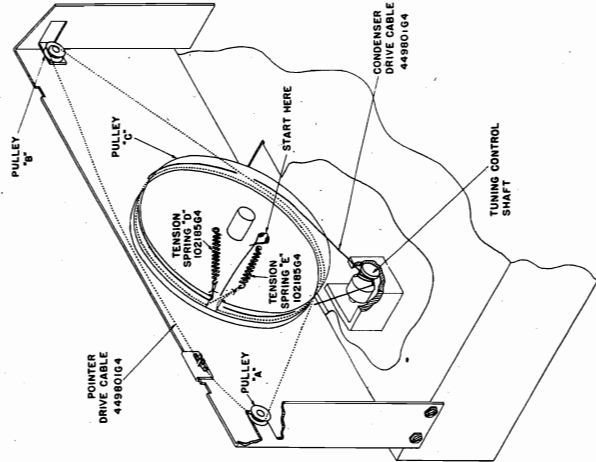


FIGURE 1

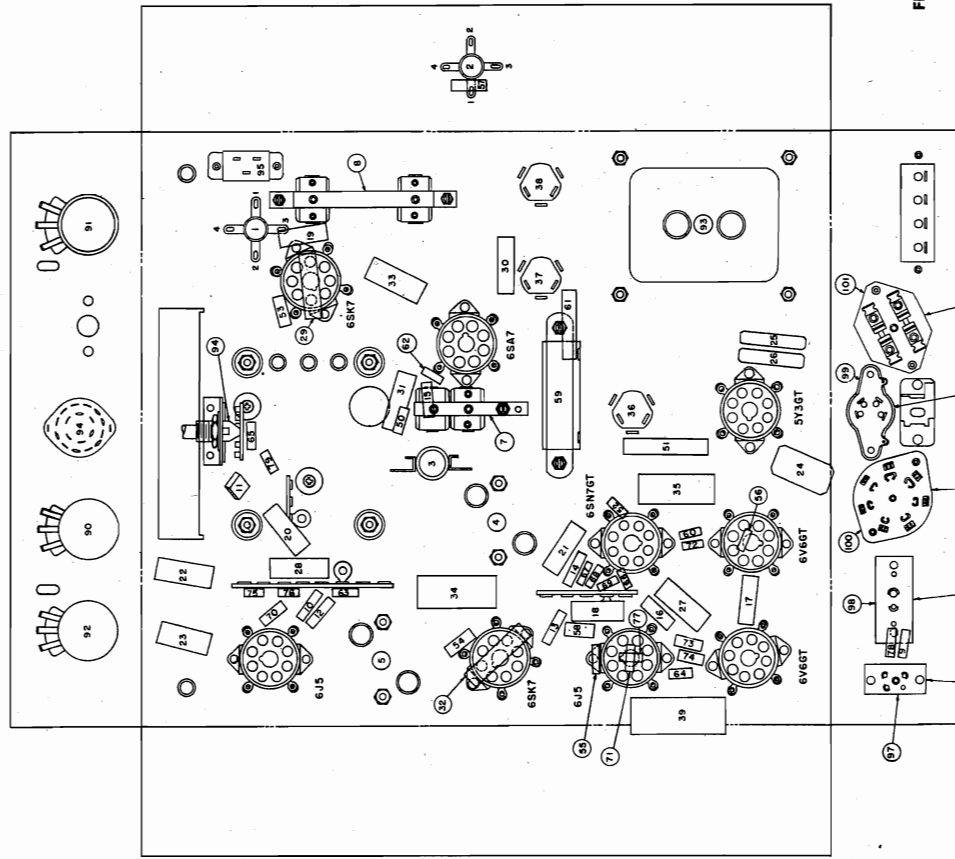
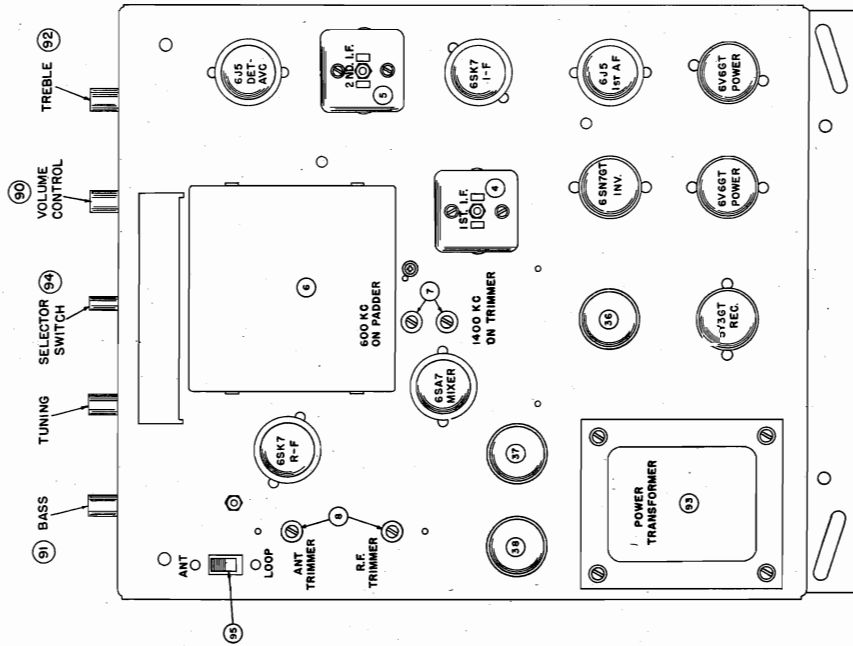
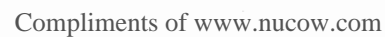


FIGURE 3



SPECIFICATIONS

Power supply.....117 volts 50/60 cycles AC	Converter.....6SA7	Rectifier.....5Y3GT
Power consumption.....85 watts	I-F Amplifier.....6SK7	Dial lamps.....Mazda No. 44
Power output.....10 watts	Detector and AVC.....6J5	Speakers:
Intermediate frequency.....455 kc.	First Audio.....6J5	Field coil resistance.....1000 ohms
Tuning frequency range.....534-1620 kc.	Inverter.....6SN7GT	Voice coil impedance (400 cycles).....3.0 ohms
Tubes:	Power output (push-pull stage).....(2) 6V6GT	Output transformer.....8,000/3 ohms
R-F Amplifier.....6SK7		





MODELS 5A445, 5A445R

## MAJESTIC RADIO &amp; TELEV. CORP.

PARTS LIST			C20	
ITEM	DESCRIPTION	PART NO.		
R1 R4	22,000 OHM, 20%, 1/4 WATT.....	9-184	220 MMFD. $\pm 20\%$ , 500V	6-151
R2	220,000 OHM, 20%, 1/4 WATT.....	9-182	.04 MFD. $\pm 20\%$ , 400V	5-58
R3	3.3 MEGOHM, 20%, 1/4 WATT.....	9-206	1ST I.F. TRANSFORMER.....	3-116
R5	VOLUME CONTROL WITH SWITCH, $\frac{1}{2}$ MEGOHM	13-28	2ND I.F. TRANSFORMER.....	3-117
R6	10 MEGOHM, 20%, 1/4 WATT.....	9-160	OSCILLATOR COIL ASSEMBLY.....	3-158
R7	330,000 OHM 20%, 1/2 WATT.....	9-89	OUTPUT TRANSFORMER.....	12-20
R8	470,000 OHM 20%, 1/4 WATT.....	9-207	SPEAKER.....	22-32
R9	150 OHM, 20%, 1 WATT.....	9-251	DIAL SCALE.....	117-66
R10	1200 OHM, 10%, 1 WATT.....	9-216	DIAL CORD TENSION SPRING.....	129-29
R11	2200 OHM, 10%, 1/2 WATT.....	02-100	DIAL POINTER.....	135-14
R12	18,000 OHM, 20%, 1/4 WATT.....	9-269	SWITCH, PHONO-RADIO.....	11-52
C1, C17.	.01 MFD. $\pm 40\%$ -10%, 200V.....	5-57	LOOP ANTENNA AND BACK COVER.....	20-30
C21	GANGED TUNING CONDENSER.....	7-24	KNOB-TUNING.....	128-54
C2, C3, C5	TRIMMER (PART OF GANG CONDENSER)	5-40	KNOB, RADIO-PHONO.....	128-55
C6, C7.	20-40 MFD 150V ELECTROLYTIC.....	19-24	KNOB, VOLUME.....	128-56
C10, C19.	20 MFD ELECTROLYTIC CONDENSER 150V.	19-32	PILOT LIGHT JEWEL.....	127-205
C22	.002 MFD. $\pm 40\%$ -10%, 200V.....	5-52	PILOT LIGHT SHIELD.....	23-45
C8, C9.			PILOT LIGHT, #47.....	26-2
C12, C13.			PHONO MOTOR RECEPTACLE.....	15-98
C11			CABINET, MODEL 5A445R.....	115-22
C4			ESCUTCHEON, MODEL 5A445R.....	122-38
C14			CABINET, MODEL 5A445.....	115-18
C15, C16.			DIAL CRYSTAL AND ESCUTCHEON, MODEL 5A445.....	122-33

## ALIGNMENT

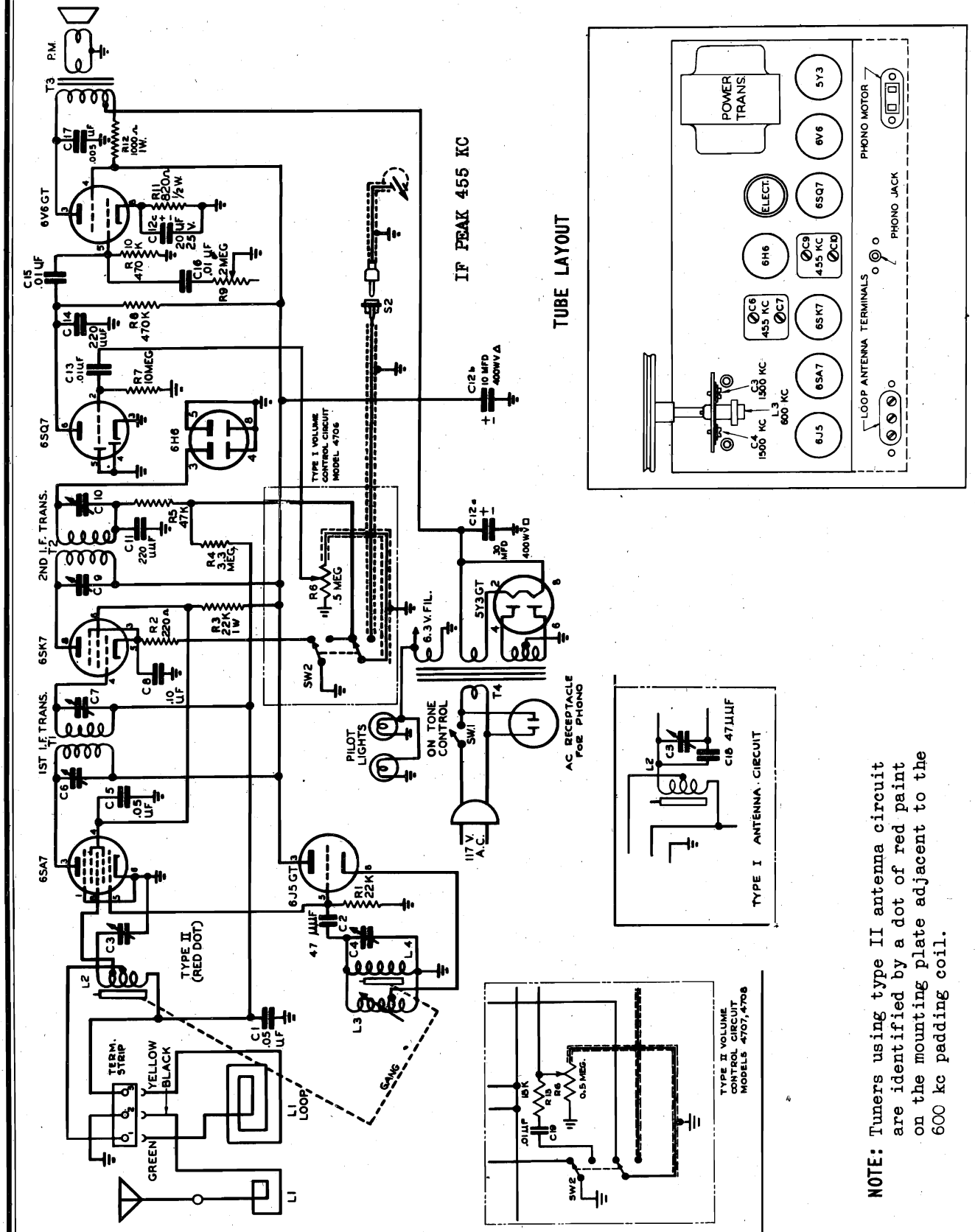
BEFORE ALIGNING, SET THE DIAL POINTER AS FOLLOWS: OPEN THE TUNING GANG CONDENSER (PLATES FULLY OPEN) SET DIAL POINTER SO THAT IT IS IN LINE WITH THE LAST MARK AT THE HIGH FREQUENCY END OF THE DIAL SCALE

WHILE ALIGNING THIS RECEIVER, TURN THE VOLUME CONTROL FULL ON, AND KEEP THE SIGNAL GENERATOR OUTPUT AS LOW AS POSSIBLE TO PREVENT AVC ACTION AND FALSE READINGS

STEP	DUMMY ANT.	TEST OSC. CONNECTION	TEST OSC. FREQUENCY	RECEIVER DIAL	ADJUST	REMARKS
1	.01 MFD	12SA7 GRID (PIN NO 5)	455 KC. MODULATED	ANY QUIET SPOT	C13, C12, C9, C8 FOR MAX. OUTPUT	REPEAT IN REVERSE ORDER
2	.....	Loop*	1500 KC MODULATED	150	C5 FOR MAXIMUM OUTPUT	
3	.....	Loop*	1500 KC MODULATED	150	C2 FOR MAXIMUM OUTPUT	ROCK GANG WHILE ADJUSTING
4	REPEAT COMPLETE ALIGNMENT PROCEDURE CAREFULLY					

\* MAKE A TWO OR THREE TURN LOOP ABOUT 12 INCHES IN DIAMETER. CONNECT TO OUTPUT TERMINALS OF THE SIGNAL GENERATOR. PLACE THIS LOOP IN A PLANE PARALLEL TO THE RECEIVER LOOP ANTENNA AND ABOUT A FOOT AWAY FROM THE RECEIVER LOOP. IMPORTANT: WHEN MAKING RF ADJUSTMENTS, THE RECEIVER LOOP ANTENNA SHOULD BE SPACED FROM THE CHASSIS EXACTLY AS WHEN THE RECEIVER IS IN THE CABINET.

## MAJESTIC RADIO &amp; TELEV. CORP.

MODELS 7C432, 7C447  
Chassis 4706, 4707

MODELS 7C432, 7C447

Chassis 4706, 4707

## MAJESTIC RADIO &amp; TELEV. CORP.

VOLTAGE TABLE

TUBE	PLATE	SCREEN	CATHODE
6SA7 (conv.)	244	74	--
6J5 (osc.)	244	--	--
6SK7 (I.F.)	244	74	1.6
6SQ7 (A.F.)	75		
6V6 (out)	268	243	11

NOTE: All voltages measured to ground with 1,000 Ohm per volt meter; line 117 v.a.c. values may vary 10 per cent.

## CRITICAL LEAD DRESS:

1. Green lead from r.f. coil on tuner to pin 8 of the 6SA7 socket should be dressed well over toward the 6J5 socket, around the ceramic condenser C2.
2. Plate leads (BLUE) of both I.F. transformers should be laid down against the chassis.
3. Grid leads (GREEN) of both I.F. transformers should be dressed up away from the chassis as far as possible.
4. The .01 mfd. 400 v. condenser (C13) from the volume control to the 6SQ7 grid should be dressed as far over as possible toward the electrolytic condenser.
5. The .005 mfd. 600 v. condenser (C17) from the 6V6 plate to ground should be dressed as far away from C13 as possible.

Before aligning, close the tuner (slugs fully into the coils). Set the pointer to extreme left-hand mark on the dial.

When making r.f. adjustments, connect to the output of the signal generator a loop, about 12 inches in diameter, consisting of two or three turns of wire. Place this loop in a plane parallel to that of the receiver loop antenna and about a foot away from it. The receiver loop antenna should be in about the same position relative to the chassis as it is when installed in the cabinet.

While aligning, keep the volume control full on and the signal generator output no higher than is necessary to obtain an output indication.

USE ONLY ALL PLASTIC OR FIBRE SCREWDRIVER ON THE 600 KC PADDING COIL. INSERTION OF THE SLIGHTEST BIT OF METAL INTO THIS COIL WILL DETUNE THE CIRCUIT.

STEP	DUMMY ANTENNA	TEST OSCILLATOR CONNECTION	TEST OSCILLATOR FREQUENCY	RECEIVER DIAL	ADJUST FOR MAXIMUM	NOTES
1	.01 MFD. 6SA7 GRID	455 KC	ANY QUIET SPOT	C10, C9	REPEAT IN REVERSE ORDER	
2	LOOP	1500 KC.	600 KC.	150	C3, C4	ROCK TUNER WHILE ADJUSTING
3	LOOP	1500 KC.	600 KC.	60	L3	DO NOT READJUST C3
4	LOOP	1500 KC.	600 KC.	150	C4	
5	REPEAT STEPS 3 & 4					

## PART NO.

## DESCRIPTION

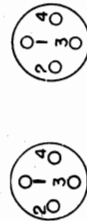
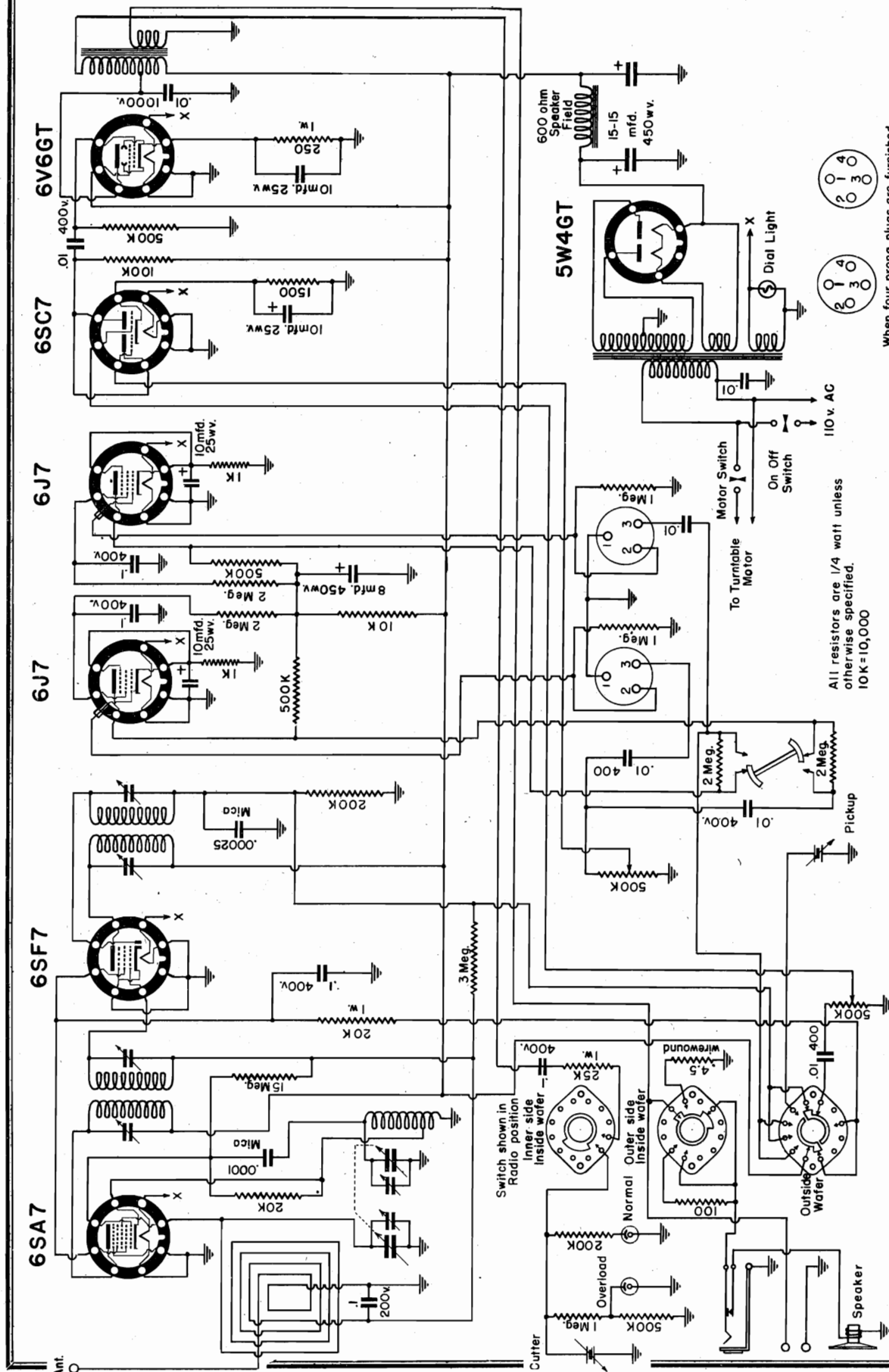
C1	.05 mfd., + 40% - 10% 200 volt, paper
C2	47 mfd. 20% 500 volts, ceramic
C3, C4	Trimers, part of tuning unit
C5	.05 mfd., 30% 600 v. paper
C6, C7	Trimers, part of T1
C8	.1 mfd + 40% - 10% 200 volts, paper
C9, C10	Trimers, part of T2
C11, C14	220 mfd. 20% 500 volts, mica
C12a, b, c	30-10-20 mfd., 400-400-25 volts, electrolytic
C13	.01 mfd., + 20% - 10% 200 volts, paper
C15, C16	.01 mfd., + 30% - 10% 400 volts, paper
C17	.005 mfd 20% 600 volts, paper
C18	47 mfd 20% 500 volts ceramic
C19	.01 mfd., + 40% - 10% 200 v., paper
R1	22,000 ohms, 20%, 1/3 watt
R2	220 ohms, 20%, 1/3 watt
R3	22,000 ohms, 10%, 1 watt
R4	3.3 megohms, 20%, 1/3 watt
R5	47,000 ohms, 20%, 1/3 watt
R6	Volume control, .5 megohms
R7	10 megohms, 20%, 1/3 watt
R8	470,000 ohms, 20%, 1/2 watt
R9	Tone control, 2 megohm, (with switch)
R10	470,000 ohms, 20%, 1/3 watt
R11	820 ohms, 10%, 1/2 watt
R12	1,000 ohms, 20%, 1 watt
R13	18,000 ohms, 20%, 1/4 watt
T1	1st I.F. transformer, inc. C6 & C7
T2	2nd I.F. transformer, inc. C9 & C10
T3	Output transformer (chassis 4706)
T4	Output transformer (chassis 4707)
SW2	Power assembly
	Tuner assembly
	Speaker, Model 7C432
	Speaker, Model 7C447
	Loop antenna assembly, Model 7C432
	Loop antenna assembly, Model 7C447
	Phono-radio switch
	Phono motor receptacle
	Pilot light, Mazda #47
	Knobs
	Escutcheon, Model 7C447
	Dial scale, Model 7C432
	Dial scale, Model 7C447
	Dial pointer
	Dial cord spring
	Dial cord assembly
	Cabinet, Model 7C432
	Cabinet, Model 7C447

## Model 7C447 - REMOVING CHASSIS FROM CABINET:

Always slide the chassis out through the BACK of the cabinet, NEVER through the bottom. On some cabinets there is a reinforcing block in the rear, lower left corner. Remove this block by removing the two wood screws before removing chassis.

MEISSNER MFG. DIV.-  
MAGUIRE INDUSTRIES INC.

MODEL 9-1065



When four prong plugs are furnished the jacks are connected as follows: Lug No. 1 is grounded, Lug No. 2 is connected to the grid, Lug No. 3 to the coupling cond., Lug No. 4 is blank.

MEISSNER MFG. CO.  
DIVISION OF MAGUIRE INDUSTRIES INC.  
MT. CARMEL, ILL.

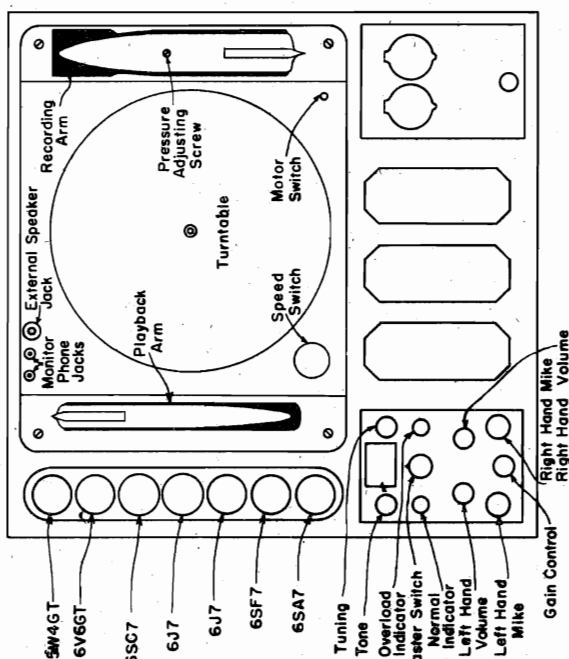
All resistors are 1/4 watt unless otherwise specified.  
10K=10,000

**RADIO-PHONO-RECORDER**  
**DUAL SPEED TURNTABLE**  
**I-F=456KC**

## MODEL 9-1065

MEISSNER MFG. DIV.-  
MAGUIRE INDUSTRIES INC.

92076	Antenna coil (Loop)
01710	Oscillator coil
02072	Input I-F transformer
02074	Output I-F transformer
19851	Power transformer
19847	D. P. S. T. waver switch
19843	5 Position switch
19842	Motor switch
19696	Tone control with switch
19828	Volume control
18162	2-gang Variable cond.
16124	15-15 mfd. 450 wv. Electrolytic
24126	10-10 mfd. 25 wv. Electrolytic
16113	8 mfd. 450 wv. Electrolytic
15143	.1 mfd. 400 v. paper condenser
15142	.1 mfd. 200 v. paper condenser
14181	.05 mfd. 400 v. paper condenser
16136	.01 mfd. 1000 v. paper condenser
14110	.01 mfd. 400 v. paper condenser
18107	.01 mfd. line condenser
14102	.00025 mfd. mica condenser
16198	4.5 ohm candohm resistor
15152	100 ohm 1/4 w. resistor
14191	1,000 ohm 1/4 w. resistor
14194	1,500 ohm 1/4 w. resistor
14143	10,000 ohm 1/4 w. resistor
14169	20,000 ohm 1/4 w. resistor
14190	20,000 ohm 1 w. resistor
14144	100,000 ohm 1/4 w. resistor
14170	200,000 ohm 1/2 w. resistor
14155	500,000 ohm 1/4 w. resistor
18152	1 megohm 1/4 w. resistor
24127	2 megohm 1/4 w. resistor
17146	3 megohm 1/4 w. resistor
18166	15 megohm 1/4 w. resistor
19846	Dial Scale
19628	Neon Indicators
19695	Speaker
19821	Motor turntable
19470	Jack
19468	Pin Jack
19855	Microphone
19856	Microphone Plug



POWER SUPPLY .....110-125 volts 50-60 cycles A.C.

## OPERATING VOLTAGES

Below is given the voltage measured from the tube pins shown—to chassis, using a 1000 ohm per volt meter, line volts 117. It should be remembered that variations of as much as several percent from the voltages shown in the chart, do not necessarily indicate trouble, since variation in line voltage, variation of resistors within the allowable tolerance, etc. all effect the operating voltages.

POWER CONSUMPTION .....110 Watts including motor

INTERMEDIATE FREQUENCY .....456 KC

ALIGN .....1400 KC

PAD .....No adjustment necessary

NEON VOLUME INDICATORS .....GE T-2

DIAL LIGHT .....Any 6-8 Volt type—Bayonet Base

## VOLTAGE CHART

Tubes	# 1 Pin	# 2 Pin	# 3 Pin	# 4 Pin	# 5 Pin	# 6 Pin	# 7 Pin	# 8 Pin
6SA7	—	—	260	80	—	—	6.3 AC	—
6SF7	—	—	—	80	—	260	6.3 AC	—
6J7	—	—	60 *	—	.4	250	6.3 AC	.4
6J7	—	—	60 *	—	.4	250	6.3 AC	.4
6SC7	—	125	—	—	125	1.7	6.3 AC	—
6V6 GT	—	—	230	260	—	—	6.3 AC	—
5W4GT	—	310	—	320 AC	—	320 AC	—	310

Note: Line voltage=117 volts \* Measured on 1000 volt range. † Very low reading on 1000 volt range. Switch to be in RADIO position for all readings

# MEISSNER MFG. DIV.- MAGUIRE INDUSTRIES INC.

## OPERATION

The following chart is designed to give the user of the Meissner Radio-Recorder a quick insight of the functions of the various controls. For best results the notes and instructions following the chart should be read and followed, since the chart alone cannot contain all the information essential to the proper use of the equipment.

In the top row of the chart are listed the five functions of the unit, corresponding to the five positions of the selector switch in the center of the control panel. In the left hand column are listed the different controls and other devices on the control panel. By glancing down any vertical column it can be immediately determined what con-

trols and indicators are in use for that position of the selector switch.

In operating the Meissner Radio-Recorder as a radio receiver, a record player, a recorder, or a public address system, there are certain precautions that must be observed and also several special hook-ups that may be used to get the best results and to take advantage of the full flexibility of which the unit is capable. These are listed under sub-headings following, and should be studied carefully before attempting to operate the equipment, and should also be referred to often until the user is fully acquainted with his equipment and all functions it will perform.

Position of Selector Switch	Radio Only	Phono Playback	Record Mike	Record Radio	Public Address
Tuning	Radio Tuning	_____	_____	Radio Tuning	_____
Tone	Tone Control & Line Switch				
Normal and Overload	_____	_____	Volume Level Indicators	Volume Level Indicators	_____
Volume (Left Hand)	Volume Control for Left Hand Mike				
Volume (Right Hand)	Radio Volume Control	Phono Volume Control	Volume Control for Right Hand Mike	Radio Volume Control	Volume Control for Right Hand Mike
Mike (Left Hand)	Input for Mike, External Radio, or External Phono				
Mike (Right Hand)	_____	_____	Input for Mike Ext. Phono Ext. Radio	_____	Input for Mike Ext. Phono Ext. Radio
Gain	Gain Control for using different types of Microphones				

## POWER SUPPLY

This Radio-Recorder is designed to operate from a 110-125 volt 50-60 cycle alternating current supply. Never attempt to operate it from other source of supply—serious damage to the equipment is almost sure to occur.

## LINE SWITCH

The line switch for the unit is located on the tone control. The switch for the turntable is located in the front, right hand corner of the turntable base. The turntable will not operate unless both the master switch on the tone control and the motor switch are turned on.

## ADJUSTMENT CUTTER ARM HEIGHT

The cutter arm height is adjusted at the factory for a standard  $\frac{1}{8}$ " stylus. If recoring blanks of the usual home recording type are used, the cutter arm height should not have to be changed. If recording blanks of unusual thickness are used, it will be necessary to re-adjust the cutter arm height. For instructions for performing this adjustment, refer to the section of this instruction sheet entitled SERVICE NOTES.

## CUTTER ARM PRESSURE

Variation in the hardness of different record coatings may require different cutting pressures for different makes of records.

The normal depth of cut produces a width of groove approximately equal to the width of the uncut portion left between grooves. When changing kinds or make of records examine a portion of the new record after having made a trial cutting to see if it approaches this condition. If not, refer to the SERVICE NOTES of this sheet and make the proper adjustment according to the instructions given there.

## REPRODUCING NEEDLES

In choosing the correct reproducing needles to use, it should be kept in mind that while most any good make of reproducing needle is satisfactory for reproducing commercial records, the same is not true with home recordings. The material used to make instantaneous recording blanks is necessarily softer than the material used in commercial records and is more easily damaged by a reproducing needle which is not properly made to fit the groove in the record. There are a number of good needles on the market made especially for reproducing instantaneous recordings and one of these should be chosen.

## RECORDING SPEED

Two recording speeds are provided on the Meissner Radio-Recorder, 78 RPM and 33 $\frac{1}{3}$  RPM. In general it may be said that the 78 RPM speed is for quality, the 33 $\frac{1}{3}$  RPM speed for economy.

The 33 $\frac{1}{3}$  RPM speed is not recommended where the best fidelity is desired. It will be found that at the center of the record, made at this speed, music loses its brilliance and does not have the high frequency notes recorded faithfully. The same is true of speech recordings but to a much lesser degree, since the high frequencies contained in voice are negligible. Thus when recording long speeches the 33 $\frac{1}{3}$  RPM speed offers the advantage of being able to record for longer time intervals without interruptions to change records, as well as the advantage of record economy. For instance, a 10 inch record when operated at 78 RPM will record 4 $\frac{1}{2}$  minutes of program material, while at 33 $\frac{1}{3}$  RPM it will record 10 minutes of program material.

In other cases where the best fidelity is not essential, it may be found that the economy of the lower recording speed is more desirable than the better quality of the higher speed.

The switch that controls the turntable speed is located on the front left-hand corner of the turntable base.

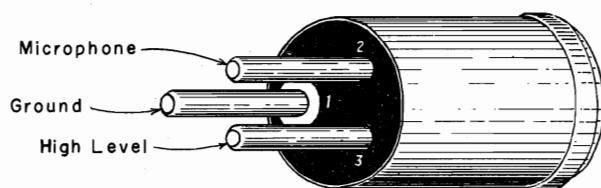
MODEL 9-1065

MEISSNER MFG. DIV.-  
MAGUIRE INDUSTRIES INC.

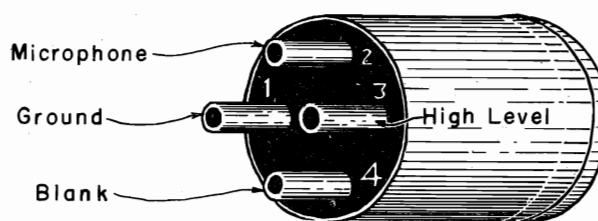
## INPUT OTHER THAN MICROPHONES

In many cases it may be desirable to introduce external input to the amplifier other than that from the microphone. For either recording or Public Address work it may be desirable to feed in the output of (a) an external radio (b) FM Tuner (c) external phono pickup or other electronic devices. Such sources are considered high level inputs and the gain switch should be set accordingly.

Any high level input may be introduced into either of the mike jacks through a plug like the extra plug supplied with the unit and should be connected as shown below.



Some trouble may be experienced in the making of instrumental recordings. There may be heard what appears to be distortion but due to the fact that the ordinary room does not have the accoustical properties of a recording studio there will be room reverberation. The ear does not notice this at the time but the microphone will. Frequently this trouble is corrected by the use of contact microphones. Placed directly on the sounding boards of the instrument, (Piano, Violin etc.), it gives a true reproduction of the tones and overtones produced by the instrument.



## CUTTING ARM ADJUSTMENTS

### CUTTING ARM HEIGHT

1. Place on the turntable an uncut record of the type that is to be used for recording.

2. Place stylus in the cutting head. Insert it as far as it will go, rotate it until the long flat on the shank of the stylus faces the stylus screw, then firmly tighten the screw.

3. Raise the cutter arm well up from its rest, swing it over the record and carefully lower it so that the stylus rests on the record near the center (which should not be revolving). Observe the position of the stylus screw in the slot in the cutter arm. If the screw is approximately in the middle of the slot no adjustment of the cutter arm height is required, but if the stylus screw is close to either the top or the bottom of the slot the arm should be adjusted in the following manner:

(a) Lift the cutter arm into a vertical position. Underneath the arm will be found a machine screw on which the arm rests. The adjustment of this screw is preserved by a lock nut. Loosen the lock nut and rotate this screw until the stylus screw occupies the center position in the slot when the cutter arm is in the recording position, then tighten the lock nut and again check the position of the stylus screw to see that the adjustment has not been disturbed by tightening the lock nut.

(b) Cut a few blank grooves (volume control at zero) while watching the stylus screw to see that as the record revolves, the stylus screw does not approach either end of the slot. If this condition holds true, the height of the cutter arm is properly adjusted until a new stylus is used having a length a great deal different than the stylus used in the original adjustment, or unless records of a new thickness are used that are sufficiently different from the original rec-

ords to require readjustment of cutter arm height. NEVER ATTEMPT TO MAKE A RECORDING WITH MORE THAN ONE DISC ON THE TURNTABLE.

If the normal position of the screw is too high, the entire weight of the cutting arm is placed on the stylus when the stylus screw hits the top of the slot. This heavy weight will cause the stylus to dig into the record base and ruin at least the record and in all probability the stylus as well.

### CUTTING PRESSURE

Variation in the hardness of different record coatings may require different cutting pressures for different makes of records.

The normal depth of cut produces a width of groove approximately equal to the width of the uncut portion left standing between grooves. Examine the blank grooves cut during the preliminary adjustment to see whether they approach this condition. If not, the adjusting screw exposed through the top of the cutting arm can be changed quite easily to accomplish the desired result. If the cut is too light, the playback needle may not "track" and may jump out of the groove and scratch across the record. If the cut is too heavy the stylus may cut over into the adjacent groove on loud notes, or in cutting one groove, the stylus may push some of the wall material into the previously cut groove producing what is called an "echo", although when played back the "echo" precedes rather than follows the normally recorded sound.

The most common error in adjusting cutting pressure is making the cutting pressure greater than necessary, which increases the wear on the stylus, increases echo, and increases the difference in speed between recording and playback.



## MEISSNER MFG. DIV.- MAGUIRE INDUSTRIES INC.

### MAKING A RECORD

The first attempt at cutting a record may best be done by recording from the microphone. After having plugged the microphone into the left-hand mike jack, turn on the line switch and set the selector switch to "Record Mike", speak into the microphone in a normal tone of voice about four to six inches away from it and adjust the left hand volume control until the "normal" neon indicator is flashing most of the time but the "overload" neon indicator flashes only occasionally. Touch a finger lightly to the needle in the cutting head and you will feel the needle vibrate in accordance with the sound impressed on the microphone.

In placing the recording disc on the turntable make certain that the drive pin enters the hole provided for it in all recording discs. NEVER PUT ON OR REMOVE A DISC WHILE TURNTABLE IS ROTATING. To do otherwise will injure the drive mechanism. ALWAYS HAVE TURNTABLE IN MOTION BEFORE LOWERING CUTTING STYLUS DOWN ON DISC as the stylus may easily be damaged if this care is not taken.

Pick up the cutting head, swing it over the record and lower it gently onto the record at the desired starting point. Permit two or three grooves to be cut before beginning the recording so that when the record is played back it will not be essential that the pickup start at the beginning of the first groove in order to reproduce the beginning of the recording. During the entire recording very careful attention should be paid to the volume indicators as explained in the section "Volume Indicators." Note: The mechanism which traverses the cutting head is engaged when the cutting head is lowered onto the record. Never attempt to force the cutting head sideways. Lift it first, which will disengage the cross-feed mechanism and allow the arm to be swung freely into any desired position. Lowering the arm onto its rest does not engage the cross-feed because the mechanism does not operate at such a great radius. For the same reason, the recorder will not cut 12 inch discs.

When the recording is finished, the "thread" that the stylus has cut out of the disc must be removed before the record is played. The best device for this purpose is a camels hair brush with which the thread is "picked up" rather than merely brushed to the center for manual removal, but if no brush is available, a wad of cotton, a piece of soft cloth or even a finger drawn lightly over the disc may be used to gather the thread around the spindle where it can be easily removed. The "thread" should be deposited in some fireproof container since many of the "Instantaneous Recording" discs are coated with highly inflammable cellulose nitrate (celluloid) although there are others coated with cellulose acetate (safety film) which do not require such precautions. It is very wise operating procedure to assume that all "threads" are inflammable and to dispose of them accordingly.

### EXTERNAL ANTENNA

A built in loop antenna is supplied with the unit. This antenna should give excellent results in localities reasonably near the stations to be received. However, in some localities the performance of loop antennas is not entirely satisfactory and for this reason provision has been made for connecting an external antenna.

A lead will be found in the microphone compartment to which an external antenna may be connected. No ground connection is necessary.

### PUBLIC ADDRESS SYSTEM

The amplifier in the unit has ample power for many applications as a public address amplifier. When coverage of an area greater than that of a medium sized room in a home is desired, it is best to use an external speaker connected as explained under EXTERNAL SPEAKERS. Such a speaker should be mounted in a baffle or carrying case and a little experiment in its placement will soon show how best results may be obtained.

When using the unit as a public address system, it will be found that if the speaker is operated near the microphone the sound from the speaker will feed back into the microphone causing a "howl". This is true in any PA system and may be remedied by (a) removing the loud speaker farther from the microphone (b) reducing the volume (c) using a directional microphone turned so that its direction of greatest pickup is away from the loud speaker.

### EXTERNAL SPEAKER

If it is desired to use an external speaker instead of the one in the unit, provision is made for doing so. The voice coil of an external speaker may be plugged into the phone plug jack located on the back side of the turntable base. The voice coil impedance of the external speaker should be 6 to 8 ohms. This cuts out the internal speaker voice coil and substitutes the voice coil of the external speaker. An external speaker so used must either be of the permanent magnet type or of the electrodynamic type with self-contained field supply.

The advantages of such an arrangement are that for use as a public address system, the speaker may be placed in a remote position away from the amplifier to get better sound coverage in a room or building, at the same time, reducing the tendency for microphonic feed back from the speaker to the microphone when high output is desired.

### MIXING

The input from the left hand mike jack may be superimposed on any other input to the system at any time by merely turning up the left hand volume control. The input from this jack may be fed in any time regardless of the setting of the selector switch. Before attempting to make a recording by mixing in the input from this channel, it will be well to do a little experimenting with the setting of the two volume controls to assure that the signals from the two input channels have the correct relative levels when they reach the cutting head. This may be done by adjusting each volume control while the other is turned to zero, adjusting to the correct level by observing the neon indicators and noting the setting of the volume control knob. After the correct setting for each has been determined in this way, set each volume control knob to its correct position and make the recording.

### MICROPHONES

Microphones in general, as far as sensitivity is concerned, may be divided into two classes: (a) High level and (b) Low level. Ordinarily quality microphones will be found to fall in the low level classification. The crystal microphone supplied with this unit is this high quality low level type. The single button carbon type with transformer and battery and the contact microphones are high level microphones. Other high level sources will be discussed under the head, input other than microphone.

A gain switch has been provided to allow the use of high or normal input to the amplifier. When recording with a low level input the gain switch should be set on the High Gain position and when using a high level input, it should be set on the normal gain position.

### RE-RECORDING

Many novel effects may be obtained by Re-Recording, that is after a record is cut it may be placed on an external record player, the output of whose pickup head is fed into the right hand mike jack of the recorder. This should be fed in by a specially wired plug as shown above. As the record is being played on the record player and re-recorded on

the Recorder, input from the Recorder microphone may be superimposed on it by turning up the left hand volume control. As an example of the novel effects obtainable, a person might record a song, re-record it, mixing in his own voice while re-recording, thus sing a duet with himself.

MODEL 9-1065

## MEISSNER MFG. DIV.- MAGUIRE INDUSTRIES INC.

### RECORDING STYLI

Recording styli are made of three general types of material, ordinary hard steel, special tool steel and alloy such as Stellite or equivalent, or they may be made of the still harder material, sapphire. When samples of all three types of styli are in good condition, it can usually be demonstrated that the steel styli, either regular steel or tool steel, produce about equal surface noise, while the sapphire stylus will usually produce less.

The advantage of the special alloy steel stylus over the regular steel stylus is longer playing life, but this is accomplished at a sacrifice in ability to withstand abuse. The same thing applies to sapphire styli only to a much greater extent because the sapphire is quite brittle and can easily be chipped.

The two accidents most likely to damage a stylus are:

(1) Dropping the cutting arm so that the stylus strikes some surface thereby chipping or breaking the stylus.

(2) Cutting through the record coating into the base material.

The latter may be caused by poor quality or damaged records, either by cutting through thin spots that may exist, or by digging in after the stylus has been thrown off of the record surface by bumps or hard spots.

From the foregoing, it seems that in general home recording service, especially if the equipment may be handled by many people, as at parties, amateur dramatics, amateur concerts etc., it is more economical to use good quality regular steel styli that can be discarded without regret if accidentally damaged, rather than to invest in a supposedly long-lived high priced stylus, whose life may be greatly shortened by the careless act of some well meaning but uninformed person.

### RECORD BLANKS

The Meissner Radio-Recorder is designed to cut records up to 10 inches in diameter and to play records up to 12 inches in diameter.

"Instantaneous Recording" phonograph discs are comparatively new and consequently their manufacturer is far from being standardized. The only rule for selection is that of experience, either personal or that of your dealer. The record that performs best for you on your recorder is the best for you to use. Concentrate on that particular brand if you wish to produce consistently good recordings.

The most important characteristics of a record are listed below to be used as a guide in comparing and selecting records:

1. The blank should cut a clean shiny groove and produce a continuous thread. Records which produce a rough and dull looking groove, or which powder the material cut out of the groove, or which break the thread up into many pieces, or that produce a "sticky" thread, are not good records.

2. The "needle scratch" should be low. Generally the record producing the smoothest looking grooves will give the lowest needle scratch, but a more reliable method of testing is to cut a few blank grooves at the same radius with the same stylus on each of the records to be compared, and then to play them successively with the same setting of the volume control for all records, selecting the one producing the least volume of scratch, provided that its other characteristics are acceptable.

3. "Rumbel" is produced on some records having very flexible base materials. This is especially true of paper records. It is almost axiomatic that if a high quality recording is desired a paper (or other very flexible) base record should not be used, however, because of the economy that such discs offer they probably will enjoy the maximum volume of sale.

4. The "ageing" characteristics of records is a factor influencing the production of consistently good recordings but is somewhat difficult for the home recordist to check unless he is on the lookout for such differences and is a keen observer. Some records cut beautifully at a certain age and less well both before and after that time. Others cut well only when relatively fresh, while still others will not cut well until they have aged some time. This ageing characteristic may explain why a certain make of record may give excellent results at one time and not at another.

5. High Frequency Response is a characteristic in which wide variation can be expected. The variation between some makes of records is so great that only the most casual listening test is required to distinguish the record with good high-frequency response from that with poor high-frequency response. Such a test should, of course, be made with the same stylus, the same type of program, and the same type of play-back needle. Preferably the test should be made with live program material having a reasonable percentage of high-frequency notes. If the program is obtained from

the radio, the tuning should be adjusted to produce a reasonable percentage of high notes and should not be changed between the several test runs because the tuning of most sets has a considerable influence on the high-frequency response.

6. Groove depth should be uniform. If there is any great difference in cutting depth a definite "pattern" will be evident on the record and the variable load on the motor will tend to produce a "wow" or unsteadiness in tone.

### VOLUME INDICATORS

ONE OF THE MOST IMPORTANT PHASES OF RECORDING IS CLOSE ATTENTION TO THE PROPER RECORDING VOLUME. THE BEST OPERATION IS OBTAINED WHEN THE "NORMAL" NEON INDICATOR IS LIT AS MUCH OF THE TIME AS POSSIBLE WHILE THE "OVERLOAD" NEON INDICATOR FLASHES ONLY AT RARE INTERVALS. A close control of program level is required to achieve such results but every bit of effort expended in the attempt will be well worth while.

If the volume is too high, it will cause distortion to be recorded on the disc. Once this distortion is recorded, no playback amplifier, however perfect it may be, can reproduce the program without distortion. Too much volume while recording will also cause overcutting, that is cutting into an adjoining groove, and may damage the cutting stylus itself.

If the recording level is too low, the surface noise is exaggerated and the playback has to be made with a high setting of the volume control. In the extreme case of very low recording volume, the volume control on playback may have to be set so high that a low frequency "microphonic howl" may be set up that can be eliminated only by turning down the volume control or by playing the record on an electric phonograph that has the speaker well isolated from the turntable and pickup.

When a musical program of a limited range of volume levels is being recorded, the volume control should be set so that the maximum volume operates the "overload" indicator only at very rare intervals. If the program has a very wide range of level, the volume will have to be turned up somewhat in the softest passages and reduced in the loudest passages. Such a practice is standard in professional recording and is the only way in which, for example, the tremendous volume range of a symphony orchestra from a single instrumental solo to full orchestra can be recorded without having the loud passages "cut over" into adjacent grooves, or having the softest passages covered up by needle scratch.

It will be helpful when recording to keep in mind that the volume indicators are giving a direct indication of the volume level being applied to the cutting head.

### TONE CONTROL WHEN RECORDING

The setting of the tone control when recording is partly a matter of choice and preference of the operator but it might well be pointed out here that usually the most satisfactory recordings are made with the tone control turned to the counter-clockwise position. There are exceptions to this and the operator, after a little experience in handling the equipment will learn what setting of the tone control is required for any particular set of conditions.

### MONITORING

There are several conditions under which it is desirable to be able to listen to the output of the amplifier when the speaker must of necessity be in-operative. The one such condition most commonly encountered is when recording from the self contained radio receiver, and is automatically taken care of in the switching. When the selector switch is turned to the "Record Radio" position, the speaker is put into the circuit but is operated at reduced volume. Thus the operator may hear the program material at the same time it is being recorded and can determine when the recordings should be stopped etc.

Other conditions under which it may be desirable to monitor the amplifier output are:

1. When recording from an external radio.

2. When recording from two mikes. The operator may desire to listen to the actual signal that is being applied to the cutting head to keep the levels from the two mikes equal.

3. When operating as a PA system using a remote speaker. If the remote speaker is located some distance away or in another room, the operator can use monitoring phones to adjust volume level etc.

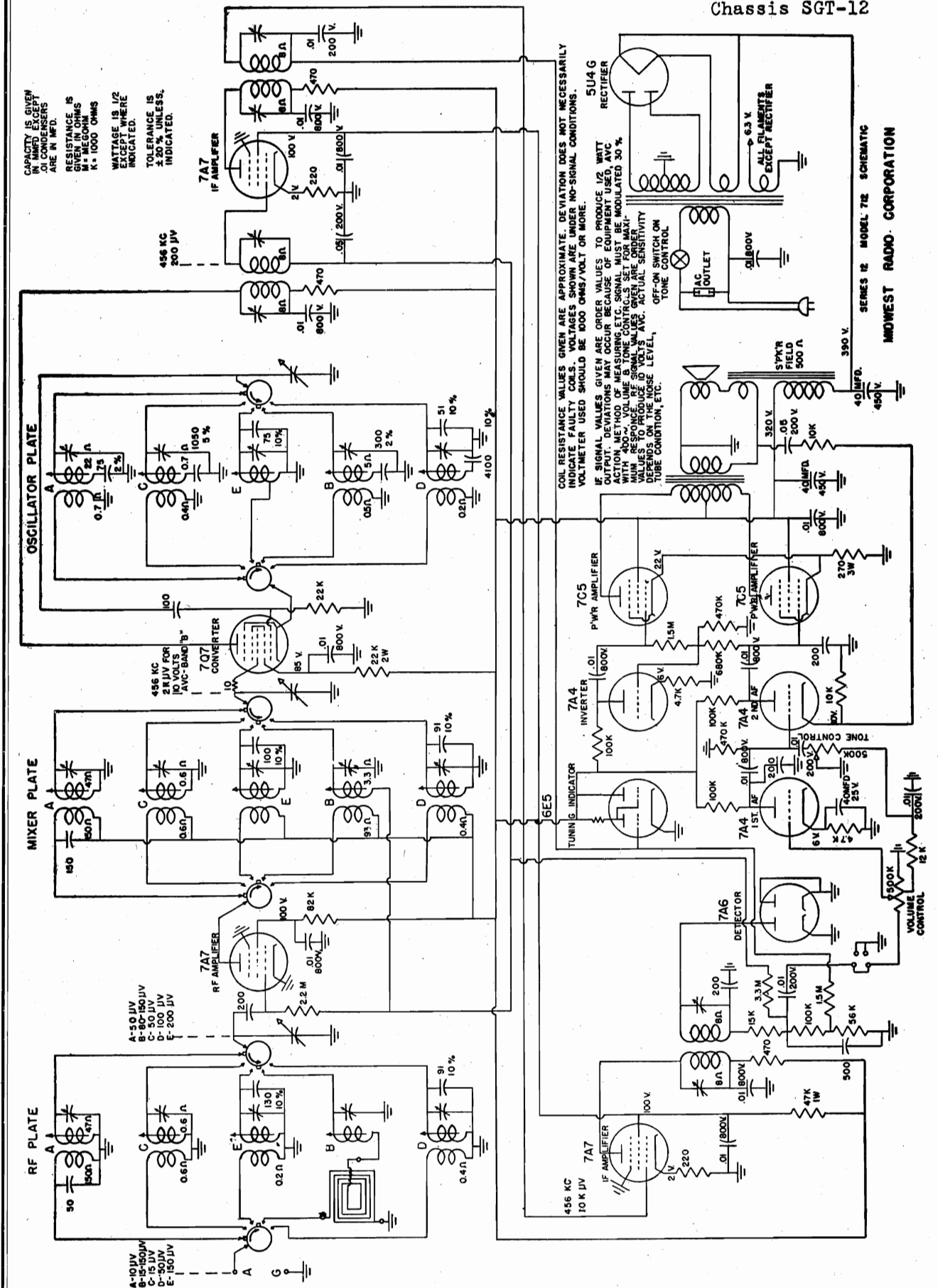
Provision is made for plugging in high-impedance headphones for monitoring. They should plug into the Phone tip jacks located on the left hand rear side of the turntable base. Only high impedance phones should be used.

CAPACITY IS GIVEN  
IN MMFD EXCEPT  
OI CONDENSERS  
ARE IN MFD.

RESISTANCE IS  
GIVEN IN OHMS  
M = MEGOHM  
K = 1000 OHMS

WATTAGE IS 1/2  
EXCEPT WHERE  
INDICATED.

TOLERANCE IS  
± 20 % UNLESS  
INDICATED.



**SERIES 12 MODEL 712 SCHEMATIC**

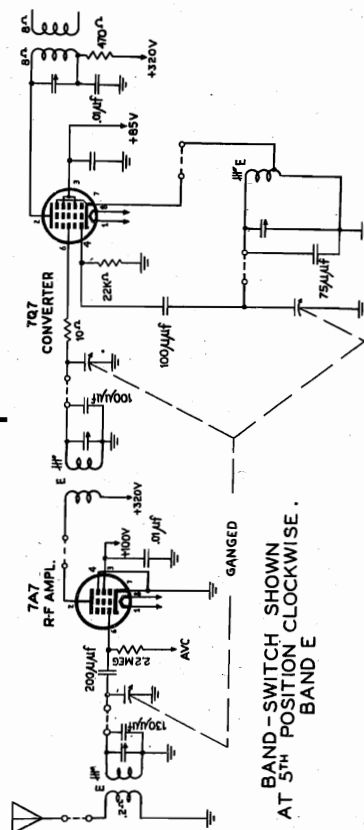
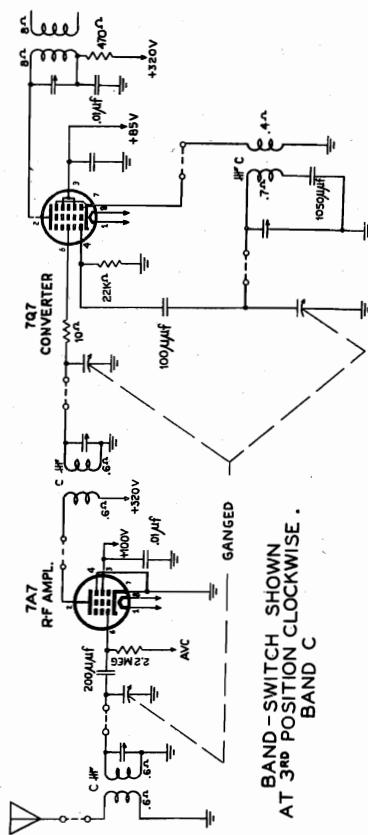
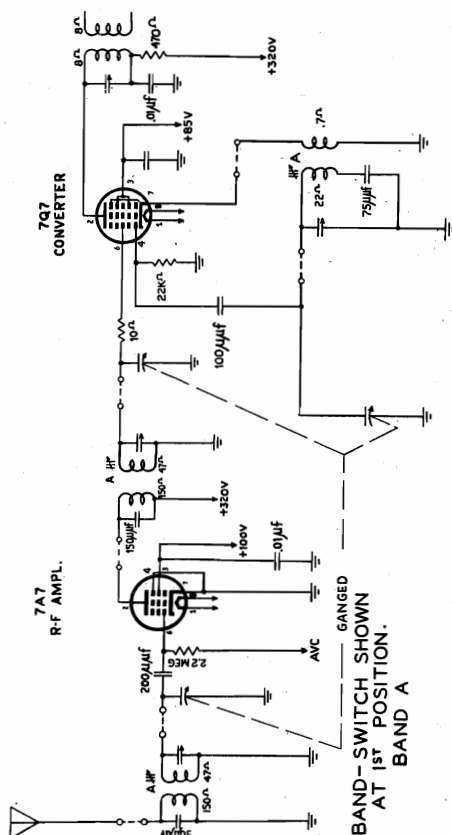
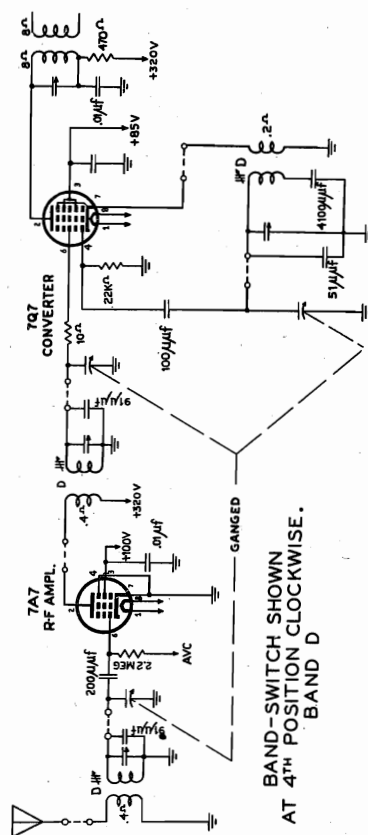
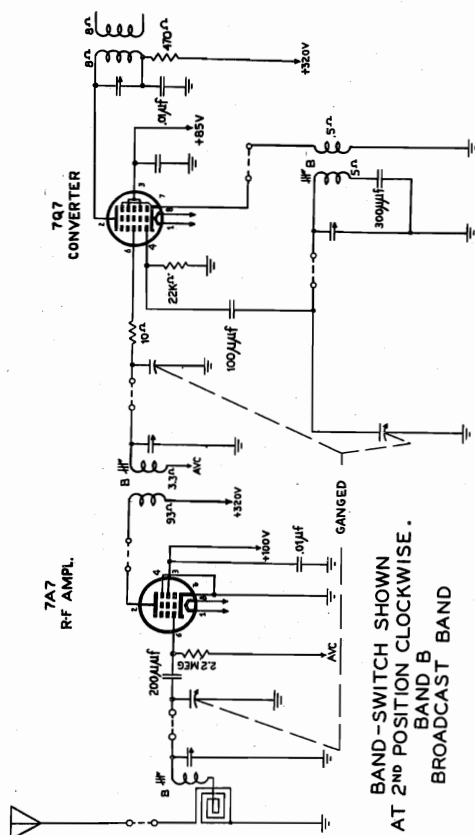
**MIDWEST RADIO CORPORATION**

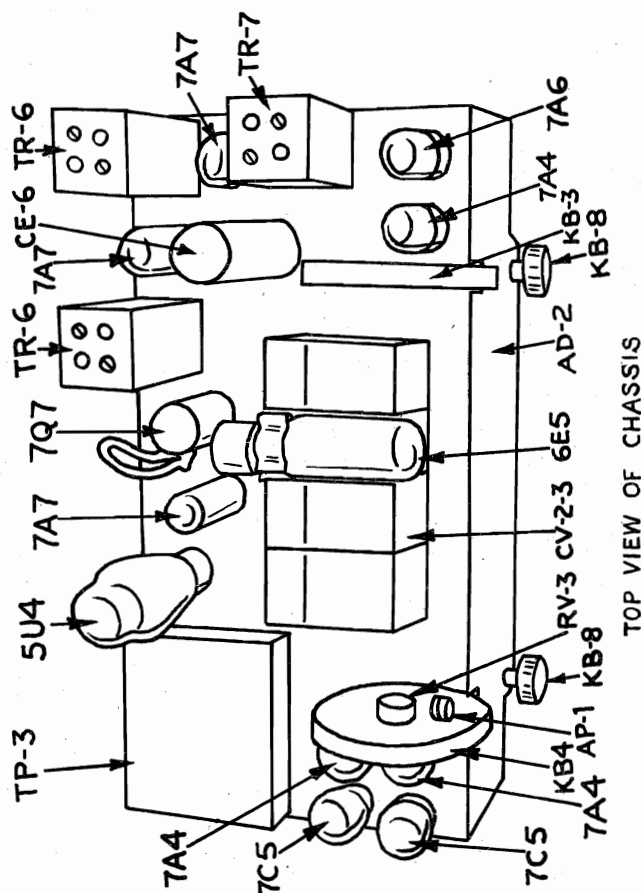
# "clarified schematics"

PAGE 16-2 MIDWEST

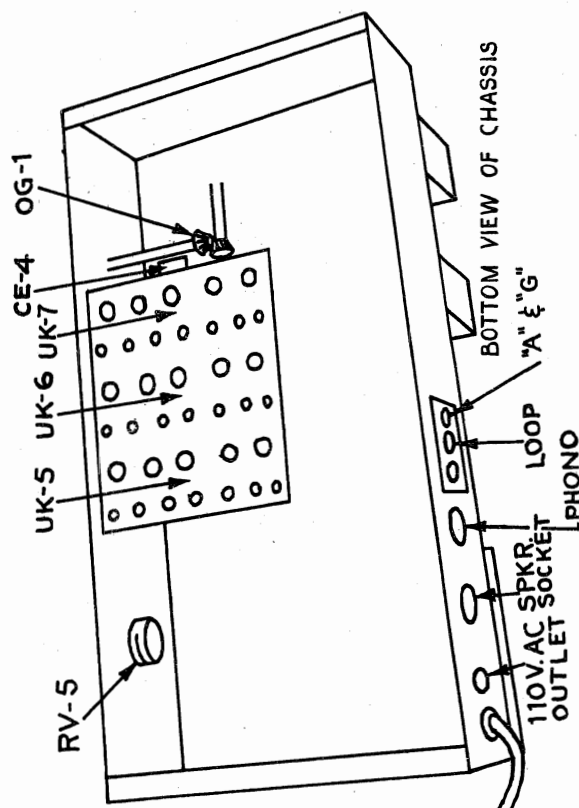
MODEL 712

MIDWEST RADIO CORP.





TOP VIEW OF CHASSIS



ALIGNMENT CHART

Coupling	Signal	Band Switch	Dial	Adjustment
To converter grid thru .05 mfd capacitor	456 KC	B	1000 KC	Peak 1st, 2nd & 3rd IF trimmers.
To "A" on antenna-ground terminal strip through 200 mmfd. and 400 ohms in series.	400 KC	A	400 KC	Peak RF, converter and oscillator trimmers marked "A".
	150 KC	A	150 KC	Peak RF, converter and oscillator cores marked "A".
	1600 KC	B	1600 KC	Peak "B" trimmers. Loop must be plugged in.
	550 KC	B	550 KC	Peak "B" cores except RF. Loop must be plugged in.
	4.7 MC	C	4.7 MC	Peak "C" trimmers.
	1.6 MC	C	1.6 MC	Peak "C" cores.
	10 MC	D	10 MC	Peak "D" trimmers.
	5 MC	D	5 MC	Peak "D" cores.
	22 MC	E	22 MC	Peak "E" trimmers.
	11.5 MC	E	11.5 MC	Peak "E" cores.

**ALIGNMENT** — The schematic includes the various signal strengths necessary for standard output of 0.5 watt for I. F. measurement, except at the converter grid. The output indicator may be an audio frequency meter across the voice coil or a vacuum tube voltmeter at the avc. For 0.5 watt the voltage at the voice coil is 1.5 volts or 2.5 to 3.5 volts avc. if a 30% modulated signal is used.

I. F. alignment should be made with the band switch on B, pointer turned to 1000KC and signal coupled to the mixer grid through a .05 mfd. condenser. Trim the three I. F. transformers for maximum reading at avc.

R. F. alignment should be made with meter across avc. There is no inter-action between bands. The only precaution is that a dummy antenna be used between the generator and the antenna post on the receiver. This may be simply a 200 micro micro farad condenser in series with a 400 ohm resistor. The B band RF padder, 550 KC, is very broad and should not be adjusted. The loop must be plugged in when adjusting the B band RF trimmer, 1600 kc.

R. F. signal values given on the schematic will produce 10 volts of avc. This rather high level of signal is given to assure that the noise level will be overcome.

MODEL 712  
MODELS 716, 716A

MIDWEST RADIO CORP.

**SERVICE** — Series 12, Model 712, is a straight forward design, containing no trick circuits. Servicing of the coil plates or IF transformers should be avoided, except under special conditions, and rather than attempt to repair these assemblies a replacement should be ordered.

The Midwest Radio Corporation is anxious to help the service technician in every way; inquiries for special data will be promptly answered and your comments will be most welcome.

## PARTS LIST

Part	Description
AD-2	Dial
AE-1	Eacutcheon
AK-2	Coil plate cover
AP-1	Wood pulley
AP-6	Pointer
AS-1	Wood pulley mtg. stud
CE-6	Filter condenser 40-40
CE-4	Cathode by pass 40 mfd. 25v.
*CV-2-3	Tuning gang
EG-2	Speaker grommet
ES-12	Tube shield
HE-1	Speaker mtg. eyelet
IL-1	Panel lamp 6-8 volts
KB-3	Tuning knob
KB-4	Volume control knob
KB-8	Tone or Band knob
KB-6	Push buttons, set of 7
OG-1	Miter gear, pair
OS-3	Dial string spring
PC-3	Loop plug
PC-4	Phonograph plug
RV-3	Volume control
RV-5	Tone control
*SP-2	Speaker, 14 inch
TP-3	Power transformer
TP-4	Universal power transformer
*TR-6	1st IF and 2nd IF Transformer
*TR-7	3rd IF transformer
*TR-6	1st IF and 2nd IF transformer
*TR-7	3rd IF transformer
*UK-5	R.F. Coil plate
*UK-6	Mixer coil plate
*UK-7	Oscillator coil plate

Note: Order resistors and condensers by value, tolerance and wattage or voltage.

Note: When ordering include serial number of chassis, since Midwest records of changes in parts specifications are kept by that number.

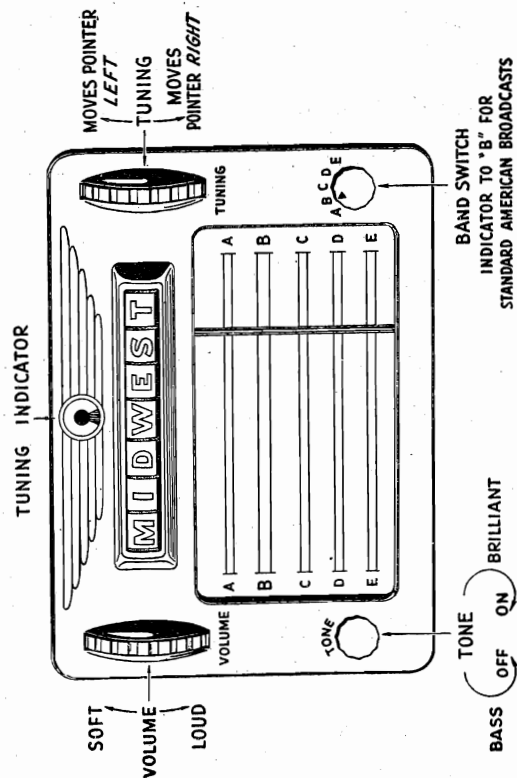


Figure 1. Series 12 Operating Controls

Note: Modulate the signal with 400 cycles 30%. The output indicator must be a VTUM on the avc. The IF sensitivity figures shown on the schematic are for 1/2 watt output except at converter grid; the voltage of the voice coil is 1.5 and the avc. voltage is between 7.5 and 3.5 for 1/2 watt output. The RF and IF alignment should be done with an avc. indicator only. The schematic shows RF signal values to produce 10 volts avc.

MODELS 712, 716, 716A

**DIAL STRINGING** — Use a light weight flexible dial cord when replacing worn or broken cord such as Beven-Wilcox FSN-25-12.

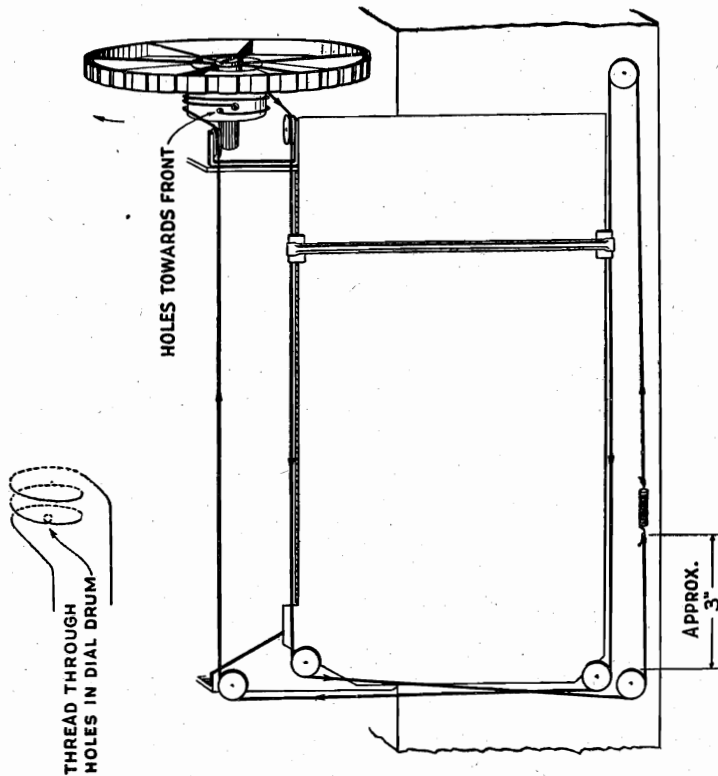


Figure 4. Series 12 Dial Stringing

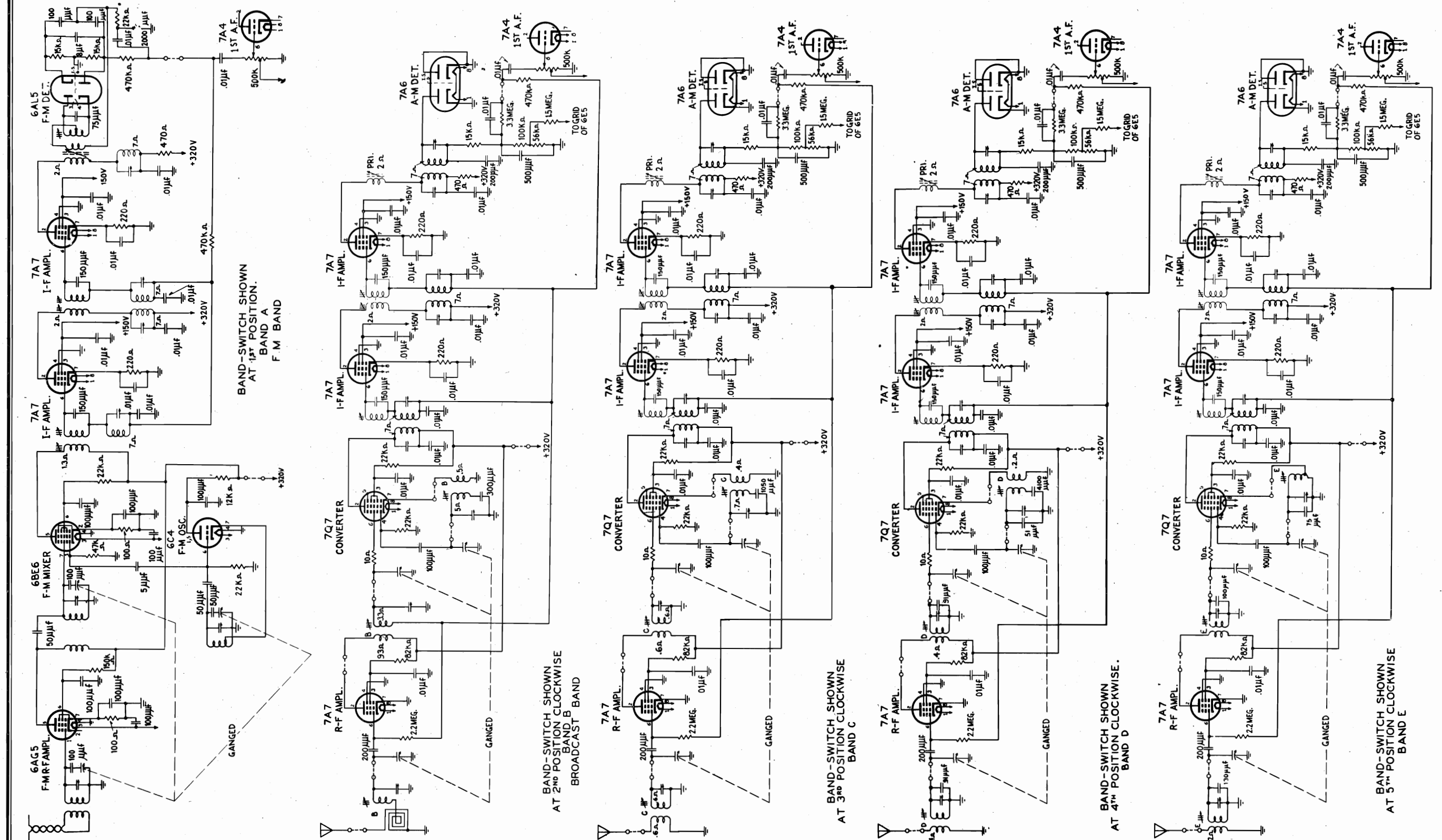
Care must be taken to assure travel room for the SPRING. If the dial is strung with parts approximately as shown in Figure 4, there will not be too much adjustment necessary. The final step should be to set the pointer after replacing the dial, at the low frequency end of the dial in line with the end of the calibration base line. Use a small piece of gummed tape on the string so that clamping the pointer does not cut the dial cord.

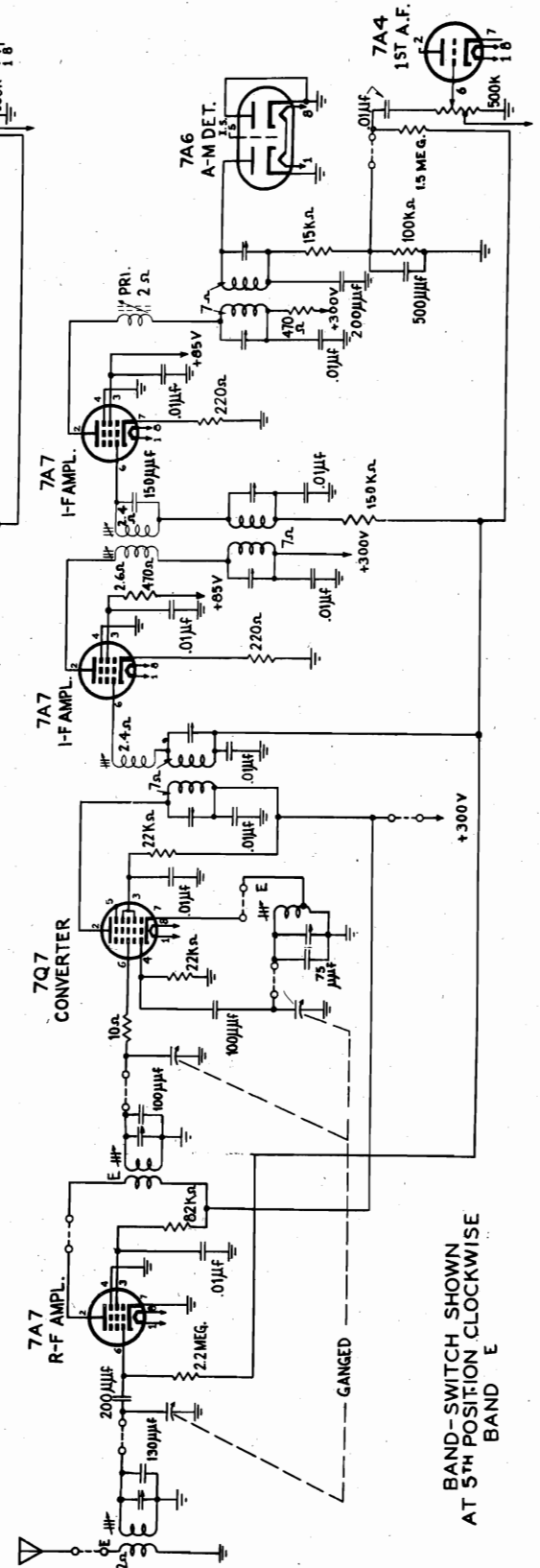
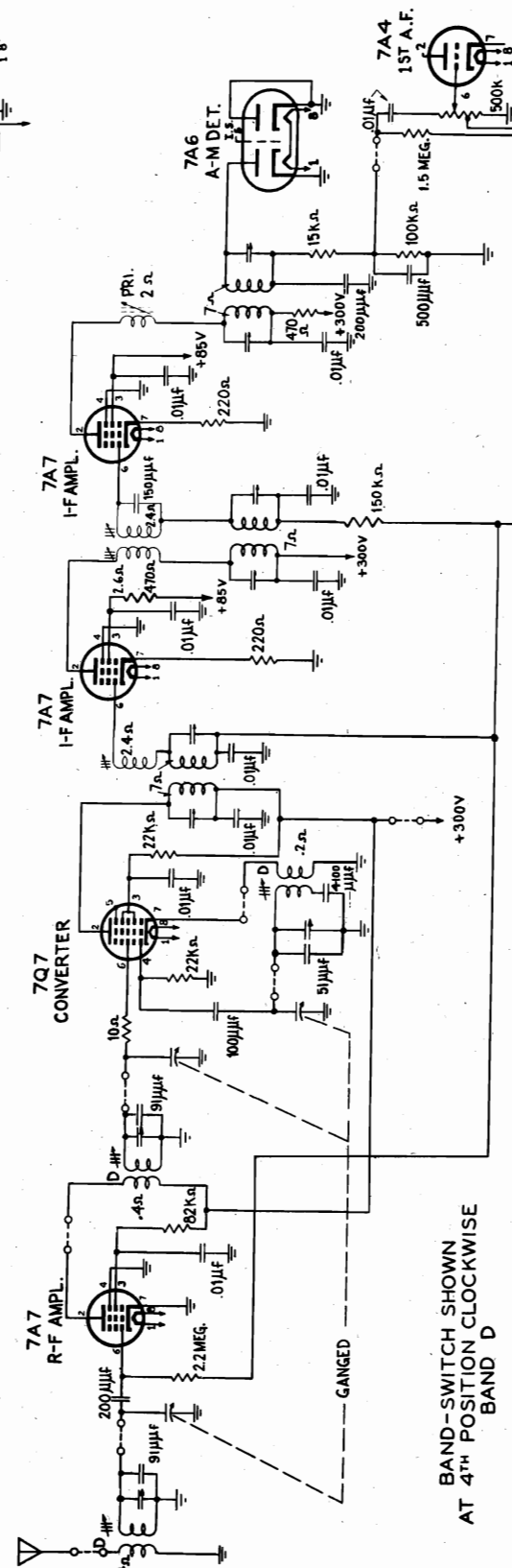
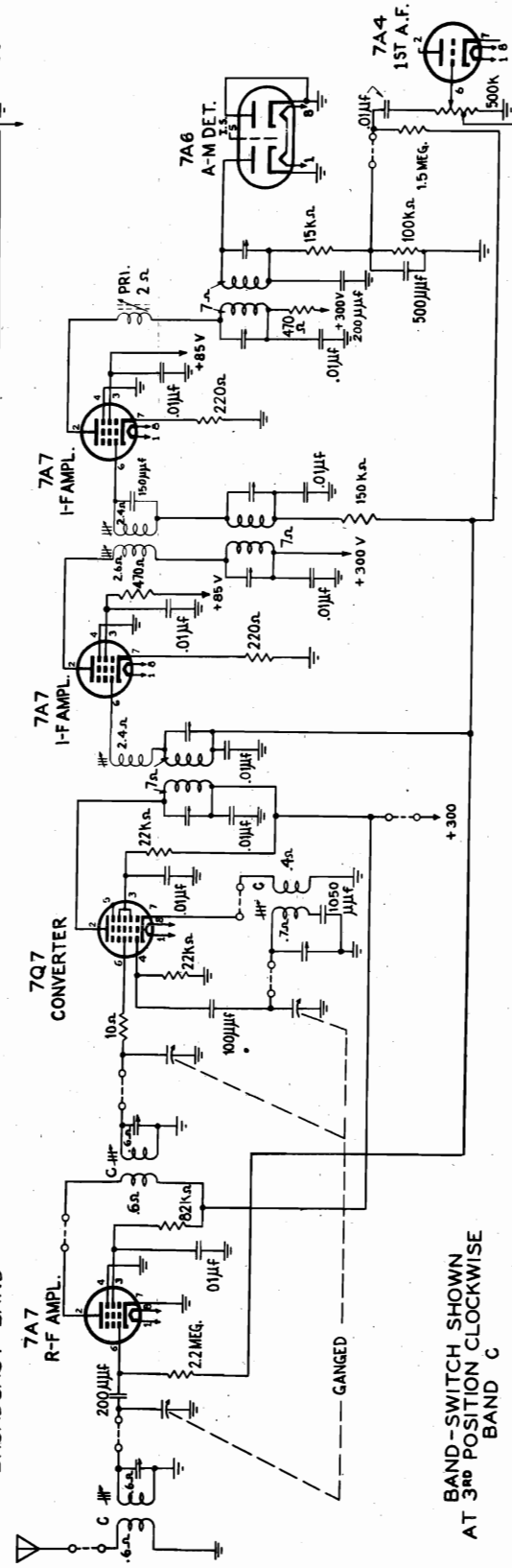
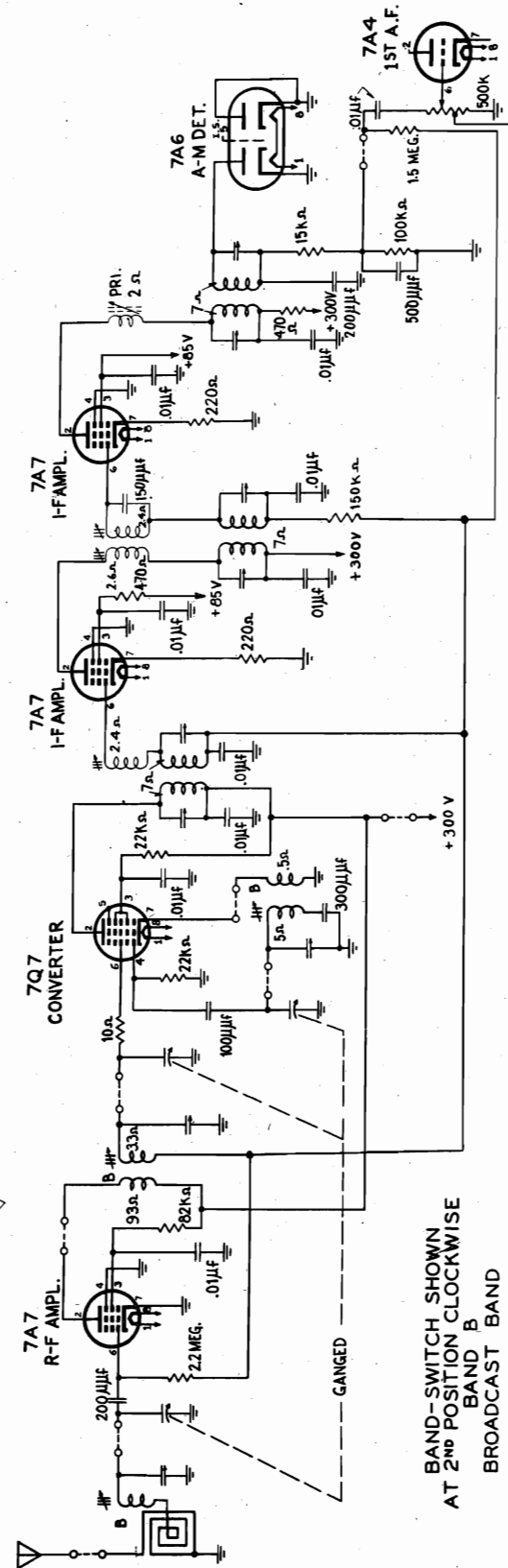
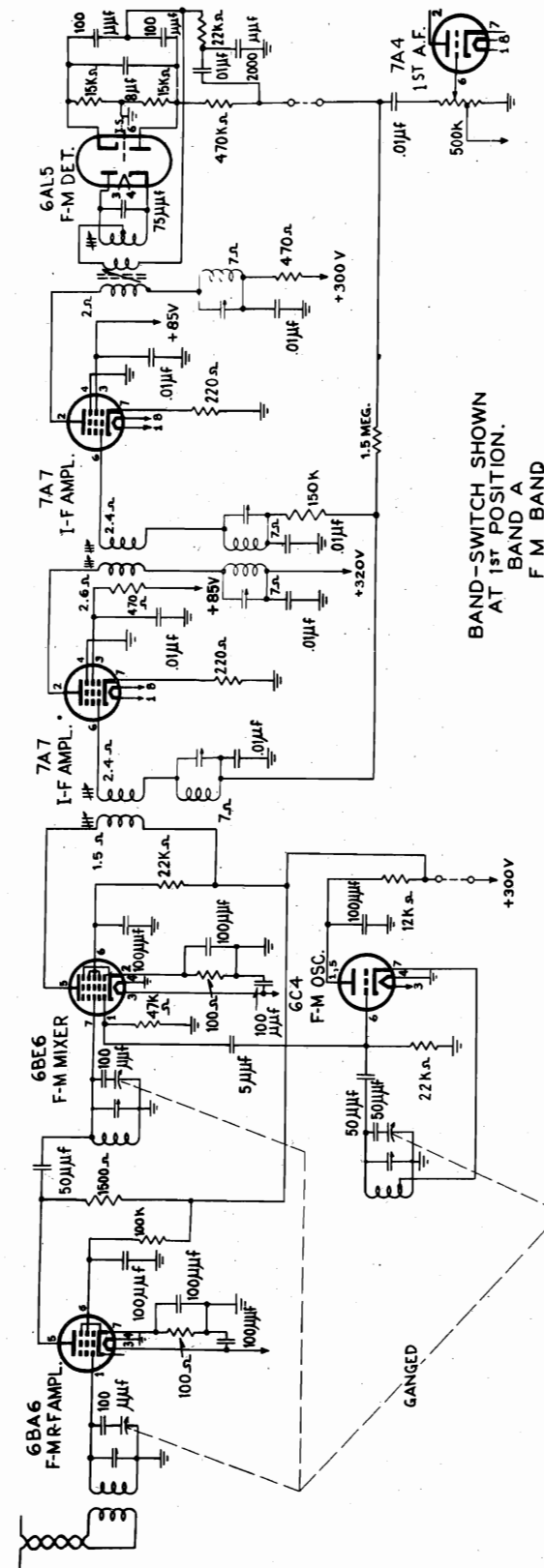












**PUSH BUTTONS** — The push buttons are for your convenience in selecting stations without the bother of making the exact tuning adjustments necessary for best reception. There are seven buttons and each button may be set for a station. The station may be at any point on the dial.

It is not recommended that the buttons be used for short wave stations.

To set the push buttons this exact procedure should be followed. A small screw driver will be needed.

1. Turn on the receiver and allow at least three minutes to warm up.  
2. Remove the push button by pulling straight out. A hooked instrument will assist in removing the end buttons.

3. Loosen the LOCK SCREW at least one half turn.

4. Using the screw driver with the blade in the screw slot, push the mechanism in firmly. Hold in during step 5. The mechanism may bind at first. Use sufficient force to break loose so that the push button and tuning control are independent.  
5. Tune the pointer past the desired station then back to the desired station and make the tuning adjustment as carefully as you know how.

6. Tighten the LOCK SCREW.

7. Check the setting of this push button by tuning away from the station manually, then pushing in firmly. Pushing the button must return the pointer to the position it had when the LOCK SCREW was tightened. If the station is not now tuned in perfectly repeat the steps 2 to 6 carefully.

8. Adjust each of the seven buttons, or as many as you wish to set, exactly as outlined above.

Any button can be set for any pointer position, however, you may find it more desirable to select the button nearest the pointer position so that each successive adjustment moves the pointer in the same direction. That is, the "M" button will be set for a station at the left of the dial, the "W" button will set for a station near the center, etc.

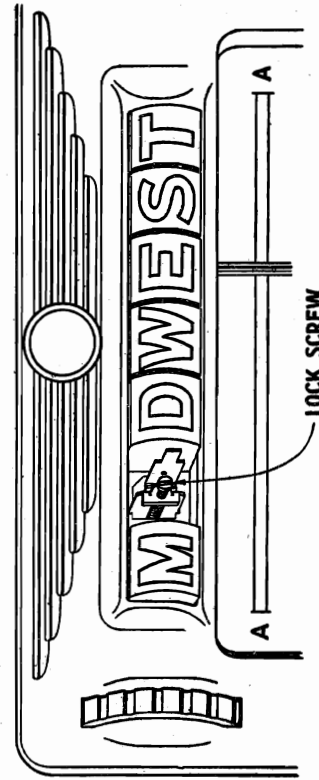


Figure 4. Push Button Mechanism

**ALIGNMENT** — Refer to the alignment chart for step by step procedure. It is preferable to align the FM IF stages with an AM or CW Signal. It should be noted that all adjustment are made for peak avc reading except the secondary of the third transformer. At this point, if you use an AM signal, it may be tuned for minimum audio signal; or the discriminator voltage may be used, reading it with a VTVM, and the secondary may be adjusted to the zero voltage. There may be some discrepancy between these methods, and if it is not excessive, is of no importance; it is simply an indication of the exactness of equivalent capacitive and inductive coupling balance in the transformer.

The FM RF alignment should be made using an FM signal and either avc or audio for peaking. In doing this alignment, or when feeding the IF signal into the FM mixer grid, care must be taken not to move the wiring. If the wiring is displaced so as to affect the inductance of the RF circuits it is difficult to re-establish the RF-Oscillator tracking.

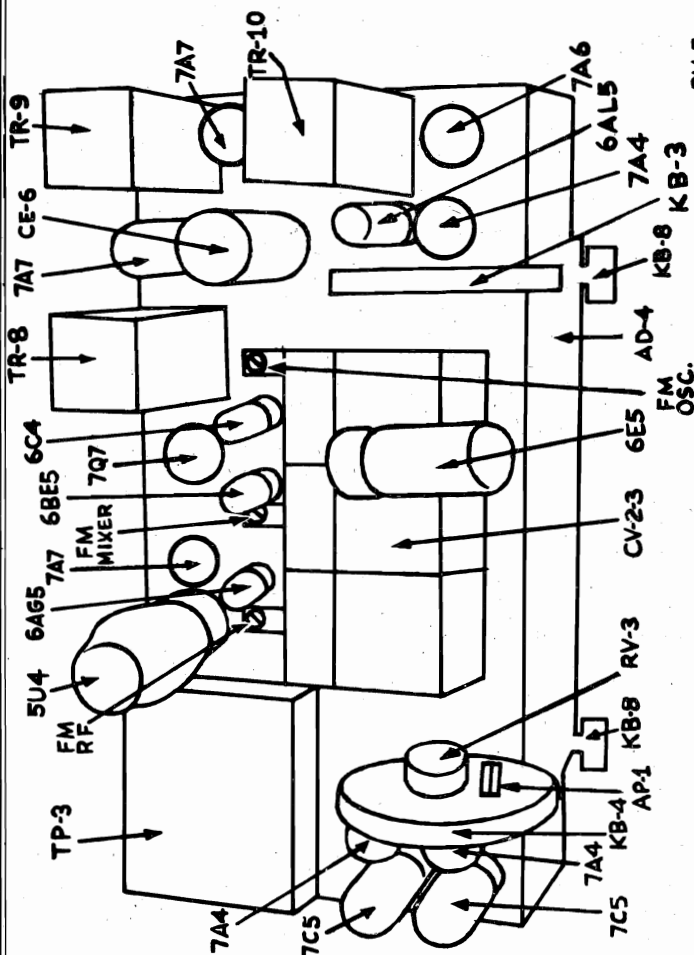
The AM, RF and IF alignment should be done with a VTVM across the avc. The recommended signal value is one which will generate 10 volts of avc. When aligning the "B" band the loop must be plugged in and you need not adjust the RF padder core. The RF padder is very broad and can be aligned only if the converter grid lead is connected to an RF type VTVM as indicator; this will usually involve a signal level greater than is normally available.

Coupling	Signal	Band Switch	Dial	Adjustment
To 7Q7 converter grid through .05 mfd. capacitor.	456 KC AM	B	1000 KC	Peak 1st, 2nd and 3rd IF trimmers on top of IF cans.
To "A" on antenna ground terminal strip through 200 mfd. and 400 ohms in service.	1600 KC AM	B	1600 KC	Peak RF, converter and oscillator trimmers marked "B".
	550 KC AM	B	550 KC	Peak converter and oscillator padder cores marked "B". Loop must be plugged in. Do not adjust RF.
	4.7 MC AM	C	4.7 MC	Peak "C" trimmers.
	1.6 MC AM	C	1.6 MC	Peak "C" cores.
	10 MC AM	D	10 MC	Peak "D" trimmer
	5 MC AM	D	5 MC	Peak "D" cores.
	22 MC AM	E	22 MC	Peak "E" trimmer.
	11.5 MC AM	E	11.5 MC	Peak "E" cores.
To 6BE6 mixer grid direct.	10.7 MC AM or CW	A	100 MC	Peak core adjustments for avc (around 3 volts) at 1st, 2nd and primary of 3rd IF. Adjust secondary of 3rd IF for audio null from 30% amplitude modulated 10.7 MC IF signal.
To "D" and "D" on doublet terminal strip above "A-G" strip through a pair 150 ohm resistors.	105 MC FM	A	105 MC	Peak RF mixer and oscillator trimmers for avc or audio.

\*Read text for use of CW for FM-IF alignment.

**SERVICE** — Series 16, Model 716, is a straight forward design, containing no trick circuits. Servicing of the coil plates or IF transformers should be avoided, except under special conditions, and rather than attempt to repair these assemblies a replacement should be ordered.

- KB-4—Volume control knob
- KB-8—Tone or Band knob
- KB-6—Push buttons, set of 7
- OG-1—Miter gear, pair
- OS-3—Dial string spring
- PC-3—Loop plug
- PC-4—Phonograph plug
- RV-3—Volume control
- RV-5—Tone control
- \*SP-2—Speaker, 14 inch
- TP-3—Power transformer
- TP-4—Universal power transformer
- \*TR-8—1st IF transformer
- \*TR-9—2nd IF transformer
- \*TR-10—3rd IF transformer
- \*UK-8—R.F. Coil plate
- \*UK-9—Mixer coil plate
- \*UK-10—Oscillator coil plate

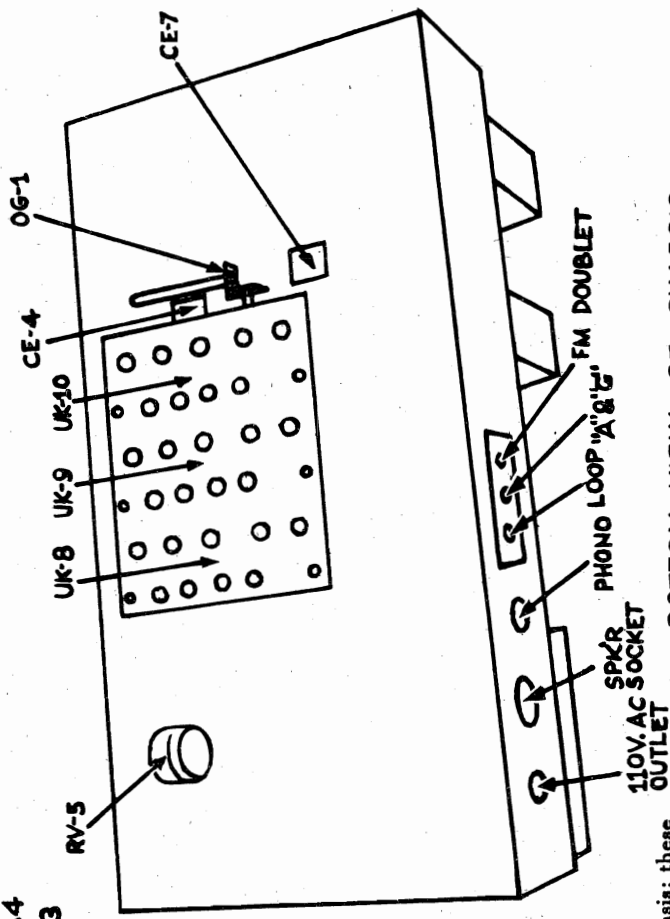


TOP VIEW OF CHASSIS

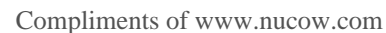
PARTS LIST

Part	Description
AD-4	Dial
AE-1	Escutcheon
AK-2	Coil plate cover
AP-1	Wood pulley
AP-6	Pointer
AS-1	Wood pulley mtg. stud
CE-6	Filter condenser 40-40
CE-4	Cathode by pass 40 mfd. 25v.
CE-7	Electrolytic 8 mfd. 150v.
*CV-2-3	Tuning gang
EG-2	Speaker grommet
ES-12	Tube shield
HE-1	Speaker mtg. eyelet
IL-1	Panel lamp 6-8 volts
KB-3	Tuning knob

REPLACEMENT PARTS — Certain parts are available on an exchange basis; these are shown on the parts list with an "\*"



BOTTOM VIEW OF CHASSIS



## VOLTAGE MEASUREMENT

All reading in AC-DC position of power selector switch with 20,000 ohms per meter. Readings taken are referred to ground.

11723

PIN	AC	DC	RESISTANCE IN OHMS
1	117V	—	540
2	—	120V	2000
3	117V	—	500
4	—	—	—
5	117V	—	500
6	120V	—	2000
7	—	—	—

3Q4

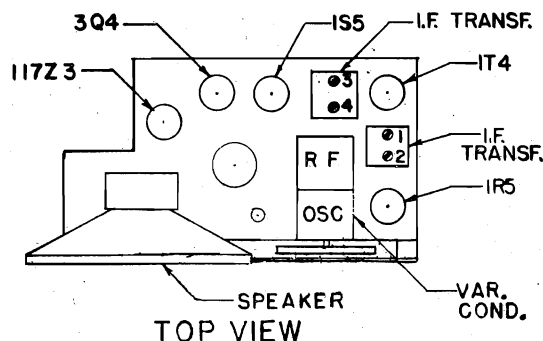
PIN	DC	RESISTANCE IN OHMS	PIN	DC	RESISTANCE IN OHMS
1	4.8V	50	1	—	—
2	86V	2000	2	—	—
3	—	500,000	3	—	400,000
4	88V	1500	4	19V	3,000,000
5	6V	50	5	7.8V	1,500,000
6	86V	2000	6	—	10,000,000
7	7.6V	70	7	1.5V	260

1T4

PIN	DC	RESISTANCE IN OHMS	PIN	DC	RESISTANCE IN OHMS
1	1.5V	260	1	3.3V	45
2	88V	1500	2	88V	1500
3	88V	1500	3	88V	1500
4	—	2,000,000	4	—	85
5	1.6V	—	5	1.6V	45
6	—	2,200,000	6	—	—
7	3.3V	45	7	2.3V	50

## CORRECTIONS

1. Servicing Notes Section: Stator large section gang open to read: Stator large section gang closed.
2. Voltage Measurements Section: 20,000 ohms per meter to read: 20,000 ohms per volt D. C. 1,000 ohms per volt A. C. meter 11723 to read: 11723
3. Schematic Diagram Section: No S-Id C 18: .1 mfd, 200 volts to read: .1 mfd, 400 volts 1000 mfd - 6v D.C. Pin # 1 of V2 to ground.



## SPECIFICATIONS

## ELECTRICAL CHARACTERISTICS

Tuning Range: Standard Broadcast 540-1640 KCS

Power Supply: Direct Current 105-125 volts or alternating current 105-125 volts, 50-60 Cycle or Batteries.

Power Consumption: AC or DC—12 watts

Battery Complement: 2—4½ Volt "A" Batteries  
Eveready No. 746 or equivalent.2—45 Volt "B" Batteries  
Eveready No. 482 or equivalent.

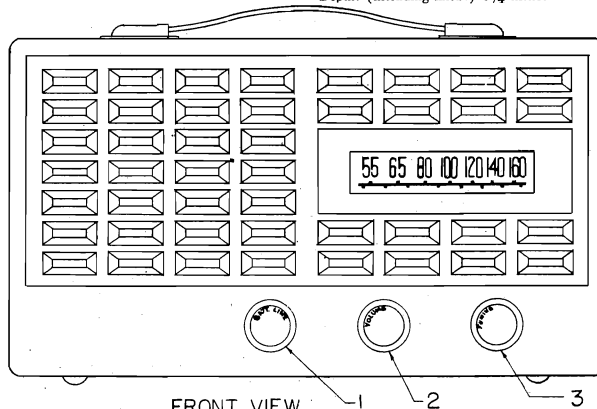
Tube Complement: IR5—Converter

IT4—I. F. Amplifier

IS5—2nd Det.—AVC—1st Audio

3Q4—Power Amplifier

11723—Rectifier

Mechanical Characteristics: Dimensions — Height: (including feet) 7⅞ inches  
Width: 13 inches  
Depth: (including knobs) 6¼ inches

## SERVICING NOTES

All specifications and measurements based on 117 Volts, 60 Cycles, and all readings based on a 20,000 ohms per volt meter. All readings are taken with volume control (switch No. 2) in maximum clockwise position. Apply the lowest signal level from the signal generator.

Output: 50 mw into a 3.2 ohm voice coil impedance.

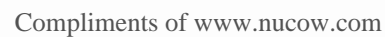
Approximate reading 0.4 Volt.

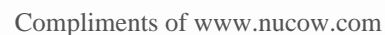
**I. F. ALIGNMENT:** With signal generator, set a 455 KC, apply signal through a .1 MFD condenser dummy to R.F. grid of converter (IR5) or the stator of RF section of the variable condenser (condenser must be fully meshed). Peak I.F. trimmers 1, 2, 3, 4 (top view diagram) to give maximum reading on output meter connected across voice coil. (Note: If for any possible reason the signal does not come through indicating the receiver is way out of alignment, apply the signal to the grid of the I.F. Amplifier (IT4) and tune signal in by trimmers 3, 4 of second I.F. Transformer. Peak for maximum and once this stage is tuned, repeat above procedure.)

**R.F. Alignment:** With signal generator, set at 1400 KC, apply signal through a dummy antenna (200 mmf condenser) to the antenna loop wire. Set dial of receiver to 1400 KC and peak trimmers 5 & 6 to give maximum reading of output meter. Then set signal generator at 600 KC and tune receiver to 600 KC mark on dial. This setting should fall on calibrated point.

Generator Connection	Dummy Ant.	Freq.	Adj. Trimmers	Output	Sensitivity uv.
Stator large section gang open	.1 MFD cond.	455 KC	1, 2, 3, 4	Max.	120
Antenna loop wire	200 mmf cond.	1400 KC	5 & 6	Max.	50
Antenna loop wire	200 mmf	600 KC	Variable Plates	Max.	150







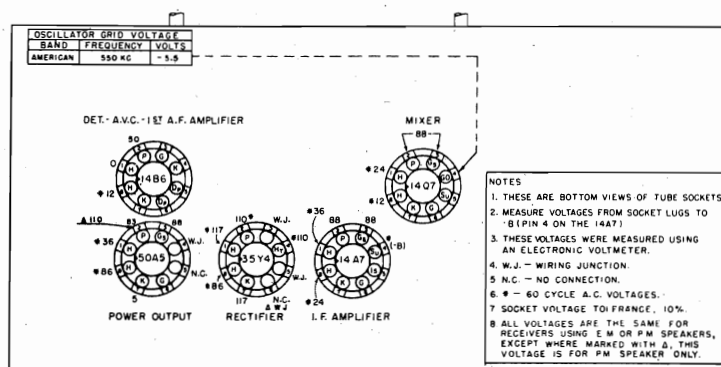
When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity. Reversing the position of the power plug when alternating current is used may reduce power hum. UNDER NO CIRCUMSTANCES SHOULD A GROUND BE CONNECTED TO THIS RECEIVER.

Figures in first column correspond to figures in Schematic Diagram

ITEM No.	PART No.	DESCRIPTION	ITEM No.	PART No.	DESCRIPTION
1	W-48858	Bulb (dial), Type 47, 6.3 v., .15 amp.	28	39294-29	Resistor, 470,000 ohm, $\frac{1}{2}$ w.
2	C-132300-1	Cable and Plug (power)	29	39294-8	Resistor, 150 ohm, $\frac{1}{2}$ w.
3	AC-135209	Ant. Loop and Back Assy. (TA56M, TW56M)	30A	C-135127	Control, Volume (1 megohm) } Assy.
	AC-135253	Ant. Loop and Back Assy. (TC56M)	30B		Switch (power) }
4	AW-135195	Oscillator Coil Assembly	31	B-135077	Transformer (output)
5	AW-137665	Transformer (1st I.F.)	33	W-137367	Resistor, 47 ohm, 1 w.
6	AW-137667	Transformer (2nd I.F.)	34	Part of Item 26	Resistor, 47,000 ohm, $\frac{1}{2}$ w.
7A	B-135202	Condenser (variable) } Two		W-135371	Socket (tube)
7B		Condenser (variable) } Section		39017-5	Socket (dial light)
7C	Part of Item 17A	Condenser (trimmer)		AB-135135	Plate Assembly (dial)
7D	Part of Item 17B	Condenser (trimmer)		W-135074	Pulley (idler)
9	39001-65	Condenser, .05 mfd., 200 v., paper		B-135094	Pointer (dial)
10	39001-65	Condenser, .05 mfd., 200 v., paper		B-135075	Shaft (drive)
12	39001-73	Condenser, 250 mmf., 600 v., paper		W-134916	Washer (spring)
13	39001-10	Condenser, 3300 mmf., 600 v., paper		W-51071	Ring (retaining)
14	39001-63	Condenser, .022 mfd., 200 v., paper		W-131154-1	Cotter (external)
15	39001-63	Condenser, .022 mfd., 200 v., paper		W-51752	Spring (drive cord)
17	B-136768	Speaker		W-134055	Grommet
18	39001-65	Condenser, .05 mfd., 200 v., paper		W-135164	Bumper
19A	B-136770	Condenser, 50 mfd., 150 v. } Two Section		W-136630	Trimount Stud
19B		Condenser, 30 mfd., 150 v. } Elect. Filter		R-135163	Cabinet (TA56M)
20	39294-38	Resistor, 15 megohm, $\frac{1}{2}$ w.		AW-135245	Cabinet (TW56M)
21	39294-21	Resistor, 22,000 ohm; $\frac{1}{2}$ w.		D-135235	Cabinet (TC56M)
23	39294-34	Resistor, 3.3 megohm, $\frac{1}{2}$ w.		B-135461	Dial Glass
24	39294-8	Resistor, 150 ohm, $\frac{1}{2}$ w.		W-135391	Knob (TA56M, TC56M)
25	39015-26	Resistor, 1200 ohm, 1 w.		W-135390	Knob (TW56M)
26	39294-35	Resistor, 4.7 megohm, $\frac{1}{2}$ w.		W-132124	Trimount Stud (TA56M, TW56M)
27	39294-29	Resistor, 470,000 ohm, $\frac{1}{2}$ w.			

MODELS TA56M, TC56M, MONITOR EQUIPMENT CORPORATION  
TW56M

## SOCKET VOLTAGE CHART



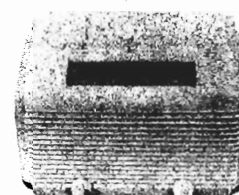
TC56M



TA56M



TW56M



## DESCRIPTION

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

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

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** a.c.—d.c.

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

**POWER CONSUMPTION:** 35 watts nominal.

**POWER OUTPUT:** 1 watt minimum.

## TUBE COMPLEMENT:

Type	Function
14Q7	Mixer
14A7	I.F. Amplifier
14B6	Detector; AVC, 1st A.F. Amplifier
50A5	A.F. Power Output
35Y4	Rectifier

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

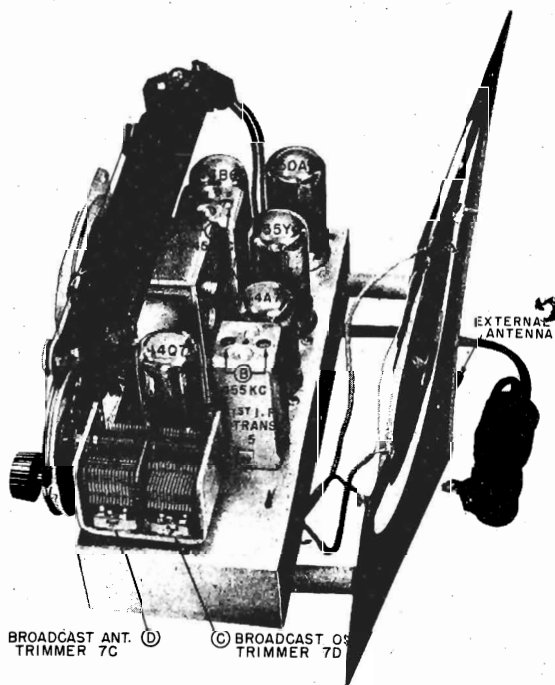
## ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil,
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

## ALIGNMENT CHART

Alignment adjustment locations are shown in Chassis, Side View at the right.

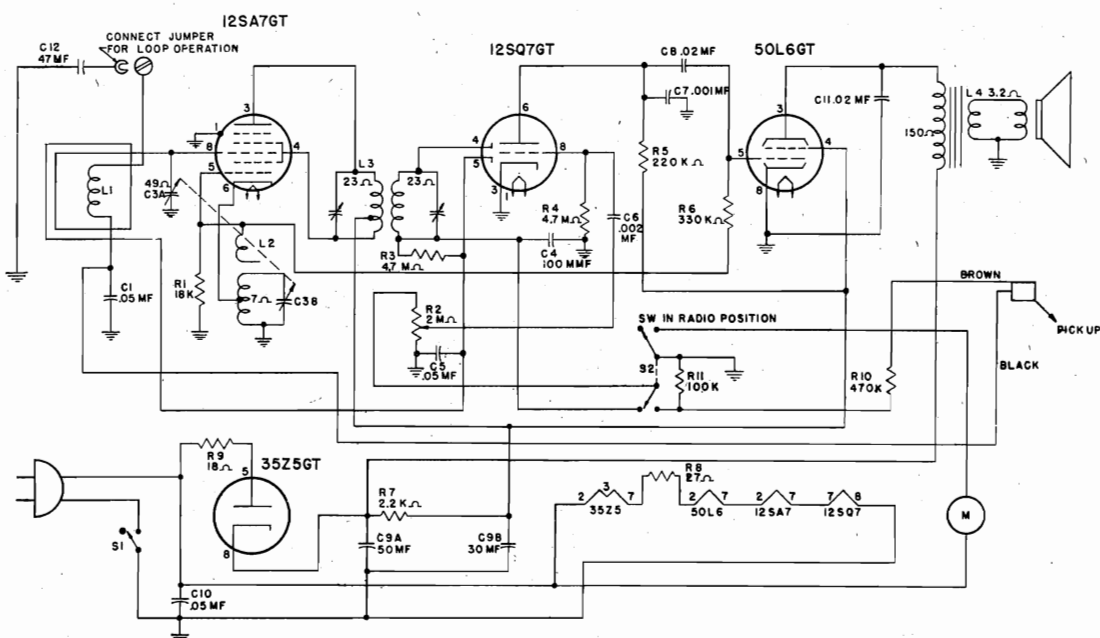
Alignment sequence	Signal Gen. Output			Position of Tuning Dial	Adjust for max. output
	Frequency in KC	In Series with	To		
1	455	200 mmf.	Ant.	1620	A & B
2	1620	200 mmf.	Ant.	1620	C
3	1400	200 mmf.	Ant.	1400	D



CHASSIS, SIDE VIEW

## MONITOR EQUIPMENT CORPORATION

MODEL M-403



Tuning range ..... 530 to 1600 kc

Intermediate frequency ..... 455 kc

Power consumption ..... 30 watts

Selectivity ..... 1. A.C.A.—3 to 1. 2. A.C.A.—12.5 to 1

Sensitivity (for 0.5 watt output):

Loop ..... 8000 microvolts per meter average

Antenna ..... 800 microvolts average

Power output (in voice coil):

Undistorted ..... 0.8 watts

Maximum ..... 2.5 watts

Ref. No.	Part No.	Description
<b>Capacitors</b>		
C1-C10		Paper, .05 mfd 400 volts
C6		Paper, .002 mfd 400 volts
C8-C11		Paper, .02 mfd 400 volts
C5		Paper, .05 mfd 200 volts
C7		Paper, .001 mfd 500 volts
C4		Ceramic 100 mmfd 500 volts
C12		Ceramic 47 mmfd 500 volts
C3	1675	Variable Air—2 gang
C9	2073	Electrolytic, 50-30 mfd 150 volts
<b>Resistors</b>		
R2	2480	Control, volume with switch, 2 meg-ohms
R1		18000 ohms, 1/4 watt
R3, R4		4.7 meg ohms, 1/4 watt
R5, R10		220,000 ohms, 1/4 watt
R6		330,000 ohms, 1/4 watt
R7		2200 ohms, 2 watts
R8		27 ohms, 1/2 watt
R9		18 ohms, 1/2 watt
R11		100,000 ohms, 1/4 watt

Ref. No.	Part No.	Description
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**Coils and Transformers**

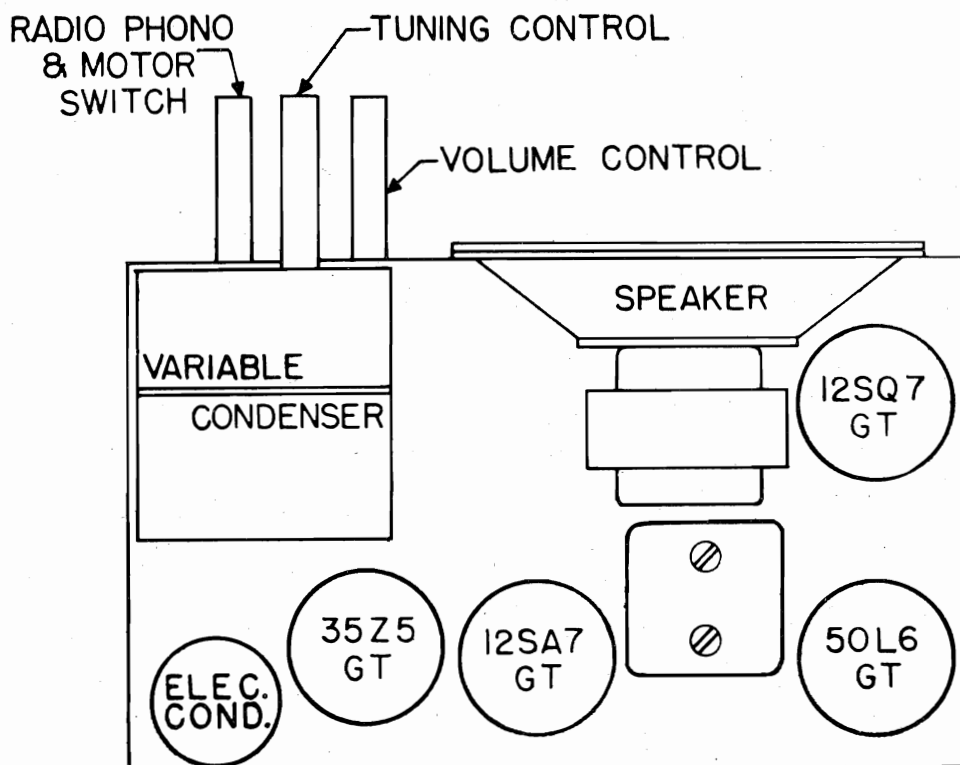
L1	28186	Back cover with loop
L2	28184	Oscillator coil
L3	3376	I.F. transformer
L4	1300	Output transformer

**Miscellaneous**

		Cord, line 6 ft.
39160		Knob, tuning
39161		Knob, volume
5877		Speaker
T470		Cabinet, wood
54314		Tuning knob washer
		Phono-needle
346-5		Walsco back clips
18110		Sockets, wafer octal
3828		Switch, phono-radio
		Phono motor and 8-inch turntable
		Phono crystal, L-26

\* The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences in both resistors and capacitors follows:

Pre-standardized value—50,000 ohms, 1/3 watt, 10%  
 RMA value—47,000 ohms, 1/2 watt, 10%  
 Pre-standardized value—200 mmf, 500 volts, 20%  
 RMA value—220 mmf, 500 volts, 20%

TUBE LOCATION**ALIGNMENT PROCEDURE**

(Refer to Chassis View)

- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Connect ground post of signal generator to chassis.

SIGNAL GENERATOR			TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
Frequency	Dummy Antenna	Connection to Radio		
455 kc	0.1 mf	Stator of antenna section of gang	Any	Trimmers on I.F. can
1590 kc	* *	* *	Rotor full open (plates out of mesh)	Oscillator trimmer
1590 kc	* *	* *	Rotor full open (plates out of mesh)	Antenna trimmer

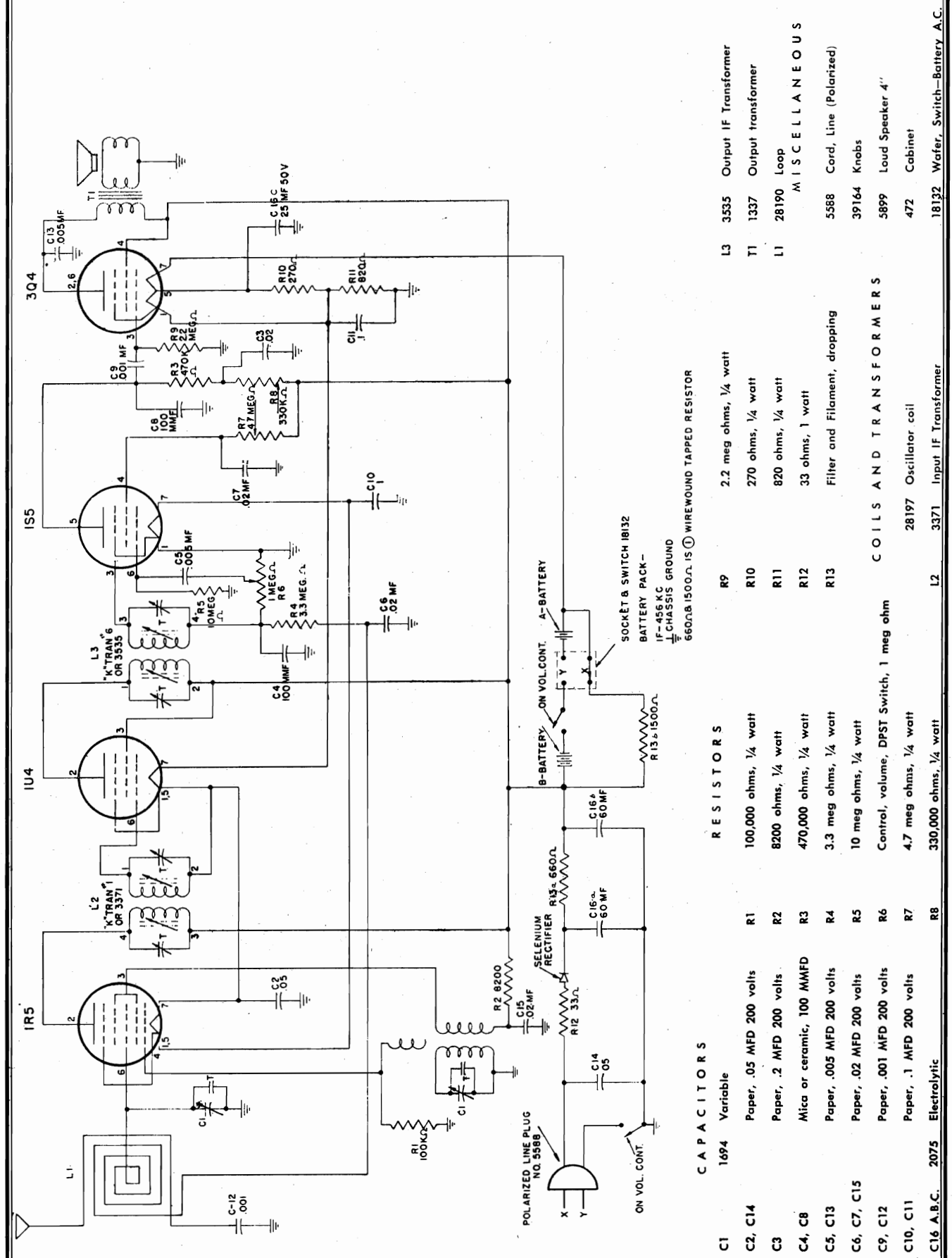
\* \* Run a wire from output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

To remove the chassis from the cabinet, proceed as follows: Make sure the line cord is disconnected from the power receptacle. Remove the phonograph turntable and motor by unscrewing the three mounting screws on the phono motor. If the back has not been removed, pull out the four fasteners with which the back is mounted. Pull the volume and tuning knobs off their shafts. Remove the three mounting screws on the bottom of the cabinet. The chassis can then be slipped out of the cabinet.

This receiver is designed to operate without a ground. NO ATTEMPT SHOULD BE MADE TO USE ONE.

## MONITOR EQUIPMENT CORPORATION

MODEL M-510





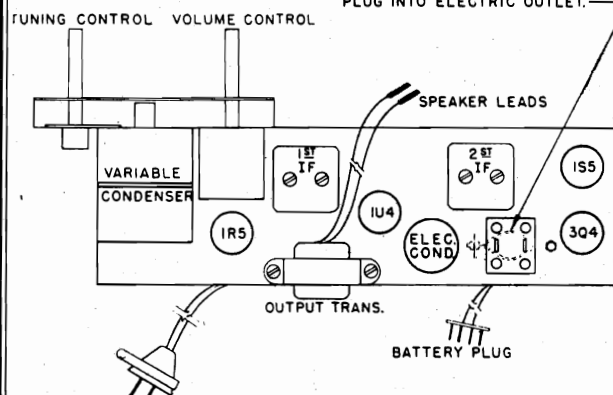
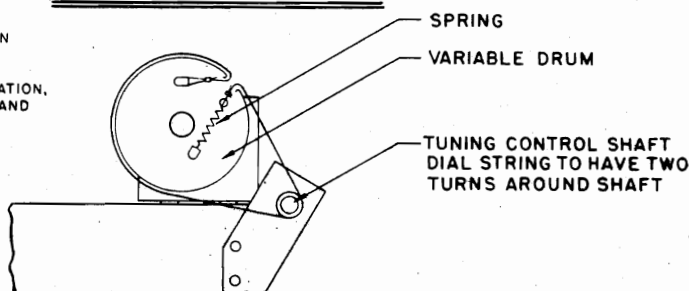
MODEL M-510

## MONITOR EQUIPMENT CORPORATION

TUBE LOCATION

FOR BATTERY OPERATION PLUG LINE CORD IN THIS RECEPTACLE AS SHOWN BY DOTTED OUTLINE OF PLUG.

FOR 105-125 VOLT A.C. OR D.C. OPERATION, REMOVE THIS PLUG FROM SOCKET AND PLUG INTO ELECTRIC OUTLET.

DIAL STRINGING DIAGRAM**ALIGNMENT PROCEDURE**

- Output Meter across 3.2 ohm output load
- Volume control at maximum
- Align for maximum output. Reduce input as needed to keep output near 0.05 watts
- Connect ground post of signal generator to chassis

**SIGNAL GENERATOR**

Frequency	Connection to Radio	Dummy Antenna	Tuner Setting	Adjust for Maximum Output (in order shown)
455 KC	Center of antenna section of Gang	0.2 mf	Any	Trimmers on I.F. Can
•1500 KC	**	**	Set pointer at second dot from end. On dial pan	Oscillator Trimmer on Gang.
1500 KC	**	**	Set pointer at second dot from end. On dial pan	R.F. Trimmer on Gang

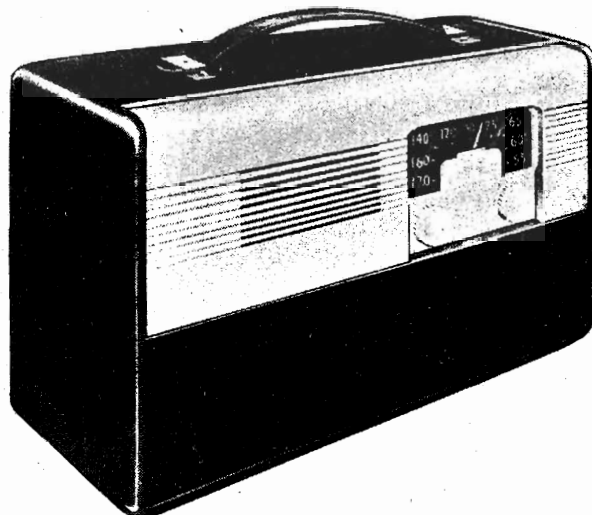
\*\* Run a wire from Output Terminal of the Generator near the Receiver. However, no connection is made between the signal generator and the Receiver.

Tuning Range ..... 540-1600  
 Intermediate Frequency ..... 455 KC  
 Power Consumption ..... 15 Watts  
 Selectivity ..... A.C.A. 12-1

Sensitivity (For 0.05 Watt Output) .... 300 Microvolts per Meter Average  
 Power Output (in voice coil):  
     Undistorted ..... 130 Watts  
     Maximum ..... 300 Watts

This receiver is designed to operate without a ground.  
**NO ATTEMPT SHOULD BE MADE TO USE ONE.**

To remove the chassis from the cabinet, proceed as follows:— Make sure the line cord is disconnected from the power receptacle. Remove the back and disconnect the wires to the loop antenna. Pull the volume and tuning knobs off their shafts. Remove the two mounting screws which hold the chassis mounting shelf in place. The chassis with the mounting shelf can now be slipped out of the cabinet. To remove the chassis from the chassis mounting shelf, it is only necessary to remove the three mounting screws on the bottom of the shelf.



**EXTERNAL ANTENNA**

**GREEN**

**WHITE**

**1A7GT CONVERTER**

**IN5GT R.F. AMP.**

**IN5GT I.F. AMP.**

**IH5GT 2ND DET. A.V.C. & 1ST. AUD.**

**3Q5GT OUTPUT.**

**PM SPEAKER 3.2 OHMS**

**NOTES:**

- VOLTAGES MEASURED WITH A 1000 OHMS PER VOLT D.C. METER BETWEEN CHASSIS AND POINTS DESIGNATED.
- CAPACITOR VALUES IN MFD. UNLESS OTHERWISE INDICATED.
- RESISTOR AND COIL VALUE IN OHMS.
- WHERE VALUE OF COILS IS NOT SHOWN, RESISTANCE IS LESS THAN ONE OHM.
- ALL RESISTORS ARE RATED AT 1/2 WATT,  $\pm 20\%$ .

**VIEW OF COILS. TERMINAL END.**

**GRID** (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

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**DOT, HOLE OR SLOT.** (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

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**VIEW OF COILS. TERMINAL END.** (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

**TOP VIEW OF PLUG** (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (8

NOTE—Resistor - 68,000 Ohm in Screen Circuit of 1A7GT Tube, Replaced With 33,000 Ohm.

Voltage at Terminal #4 on 1A7GT Tube Increased to 48 (Average).  
SELECTIVITY ... Over-all band width 35 KC at 1000 X  
signal at 1000 KC.

**SENSITIVITY . . . 12 Microvolts for 50 Milliwatts output.**

**POWER OUTPUT . . . 150 M. W. undistorted 330 M. W. maximum.**

**LOUD SPEAKER . . . 5 inch diameter P. M. Magnet 2.15 oz. Alnico V. Voice coil 3.2 ohms impedance.**

TUBE COMPLEMENT . . . 1N5GT (RF), 1A7GT (Det.-Osc.), 1N5GT (IF), 1H5GT (Det.-Audio), 3Q5GT (Pwr.)

## ELECTRICAL SPECIFICATIONS

**BATTERY USED . . .** (Wards 62-57): Battery dimensions, 16 x 6 $\frac{5}{8}$  x 4 $\frac{1}{2}$ ". "A" 1 $\frac{1}{2}$  volts. "B" 90 volts. "A" current 300 M. A., B current 11.5 M. A.

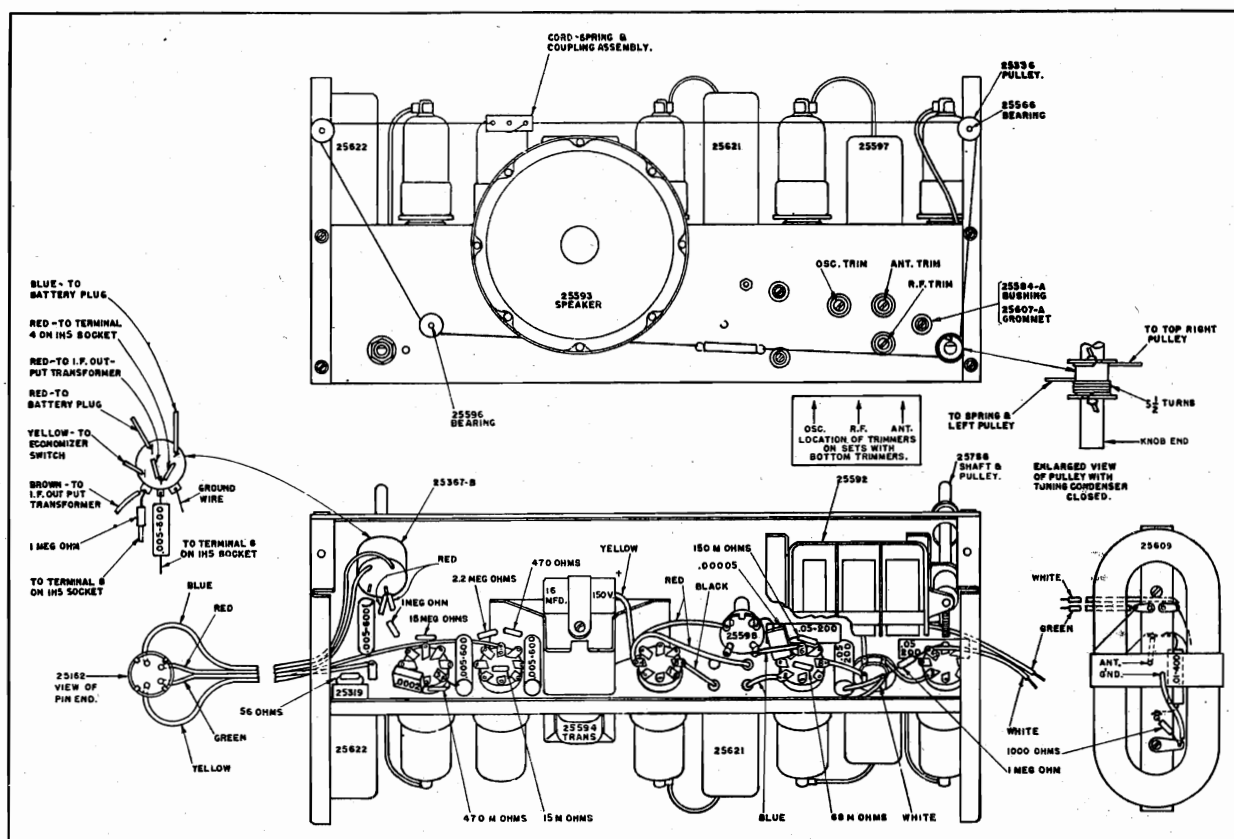
TUNING RANGE . . . 535-1620 KC.  
INTERMEDIATE-FREQUENCY . . . 455 KC.

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MONTGOMERY WARD



**REMOVAL OF CHASSIS**—If it is found necessary for any reason to remove the radio chassis from the cabinet, proceed as follows: Remove knobs by pulling straight off, disconnect battery by removing plug, and remove two screws inserted through bottom of cabinet. Chassis can be removed now. (Note—After installing chassis in cabinet see that the bakelite strip attached to dial cord is engaged with the pin on the dial pointer.)



### ALIGNMENT PROCEDURE

(Position of trimmers shown above)

- Output meter across 3.2-ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Loop antenna should be connected to receiver and in its proper position when making adjustments.

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RADIO	GROUND CONNECTION		
455 KC	.1	Grid Cap of 1N5GT (I.F.)	To Chassis	Capacitor full open (plates out of mesh)	2 trimmers on output IF can T5 (25622)
455 KC	.1	Grid Cap of 1A7GT	To Chassis	Capacitor full open (plates out of mesh)	2 trimmers on input IF can T4 (25621)
1620 KC	200 Mmf	Antenna Lead	To Chassis	Capacitor full open (plates out of mesh)	Oscillator trimmer C3 on gang
1400 KC	200 Mmf	Antenna Lead	To Chassis	Set dial pointer at 1400 KC	Antenna and R. F. trimmers C1, C2 on gang

MODEL 54KP-1209B

MODEL 64WG-1207A

MODEL 64WG-1804C

## MONTGOMERY WARD

## RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the MODEL 54 KP-1209B

speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 kc and 455 kc signals modulated 30% with a 400-cycle audio signal. Variations of plus or minus 25% are usually permissible.

The volume control must be set to maximum.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RADIO	GROUND CONNECTION	
1000 KC	200 Mmf or RMA Dummy Antenna	External Antenna Clip	To Ground Lead	12 uv
1000 KC	.1 Mfd.	Grid (Top Connection) of R. F. Amp. (1N5)	To Chassis	20 uv
1000 KC	.1 Mfd.	Grid (Top Connection) of Converter (1A7)	To Chassis	220 uv
455 KC	.1 Mfd.	Grid (Top Connection) of Converter (1A7)	To Chassis	125 uv
455 KC	.1 Mfd.	Grid (Top Connection) I. F. Amp. (1N5)	To Chassis	6000 uv
400 Cycles	.1 Mfd.	Grid (Top Connection) Audio Amp. (1H5)	To Chassis	.1 v.
400 Cycles	.1 Mfd.	Grid (Pin) of Output Amp. (3Q5)	To Chassis	1.5 v.

MODEL 74WG-1207B 64WG-1207A &amp; B

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Antenna Lead	Chassis	10 microvolts
1000 kc	.05 mf	1R5 Mixer, Pin 6	Chassis	30 microvolts
455 kc	.05 mf	1R5 Mixer, Pin 6	Chassis	25 microvolts
455 kc	.05 mf	1U4 1st I-F, Pin 6	Chassis	400 microvolts
455 kc	.05 mf	1U4 2nd I-F, Pin 6	Chassis	3500 microvolts
400 cycles	.05 mf	1S5 1st A-F, Pin 6	Chassis	.031 volt
400 cycles	.05 mf	3Q4 Output, Pin 3	Chassis	2.7 volts

MODEL 64 WG-1804C

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna— External antenna clip	Chassis	19.5 microvolts
1000 kc	.05 mf.	12SA7 Mixer—Pin 8	Point "X" (12SK7 Pin 3)	150 microvolts
455 kc	.05 mf	12SA7 Mixer—Pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SF7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf	12SJ7 1st A-F—Pin 4	Same as above	.042 volt
400 cycles	.05 mf	35L6GT Output—Pin 5	Same as above	1 volt

## MONTGOMERY WARD REPLACEMENT PARTS INFORMATION

HOW TO ORDER PARTS — When ordering, specify applicable, and CHASSIS MODEL number. The model PART number, schematic diagram reference number when number appears on a label on the chassis.

### REPLACEMENT PARTS LIST

Use Only Genuine Factory Replacement Parts

Ref. No.	Part No.	Description	Qty. Used In Set
<b>CAPACITORS</b>			
C1, C2, C3	25592	3 Gang Tuning Capacitor Including Trimmers	1
C4	25600	Electrolytic 16 Mfd. 150 V.	1
	8661	.05 Mfd. 200 V. Tubular	3
	8583	.01 Mfd. 400 V. Tubular	1
	14061	.005 Mfd. 600 V. Tubular	3
	14370	200 Mmf. Mica	1
	17091	50 Mmf. Mica	1
<b>RESISTORS</b>			
R1	25367	Control-Volume Including On-Off Switch	1
	14365	15 Megohm $\frac{1}{2}$ Watt 20%	1
	25134	2.2 Megohm $\frac{1}{2}$ Watt 20%	1
	8766	1 Megohm $\frac{1}{2}$ Watt 20%	2
	25042	470,000 Ohm $\frac{1}{2}$ Watt 20%	1
	14616	150,000 Ohm $\frac{1}{2}$ Watt 20%	1
NOTE—	25040	68,000 Ohm $\frac{1}{2}$ Watt 20%	1
	17164	15,000 Ohm $\frac{1}{2}$ Watt 20%	1
	25414	1,000 Ohm $\frac{1}{2}$ Watt 20%	1
	25085	470 Ohm $\frac{1}{2}$ Watt 20%	1
	25613	.56 Ohm $\frac{1}{2}$ Watt 10% (Wire Wound)	1
<b>TRANSFORMERS AND COILS</b>			
T1	25609	Loop Antenna (Includes Mounting Strips and Terminals)	1
T2	25598	Coil - Oscillator	1
T3	25597	Coil - RF (Includes Shield Can and 10 Mmf Condenser)	1
T4	25621	Transformer - IF Input (Complete in Can)	1
T5	25622	Transformer - IF Output (Complete in Can - Includes 2 100 Mmf Capacitors Built-In With Trimmers)	1
T6	25594	Transformer - Speaker (Includes Mounting Clamp)	1

Ref. No.	Part No.	Description	Qty. Used In Set
<b>SPEAKER</b>			
T7	25593	5" P. M. Speaker	1
<b>SWITCHES</b>			
S1		Part of Volume Control	
S2	25319	S. P. S. T. Slide Switch	1
<b>DIAL AND TUNING PARTS</b>			
	25566	Bearing - Short (For Upper Wood Pulleys)	2
	25596	Bearing - Long (For Lower Wood Pulley)	1
	25767	Cord - Dial (Includes Spring and Pointer Coupling)	1
	25336	Pulley - Wood	3
	25809	Plate - Assembly (Includes Dial Backing Plate with Brackets, Track, and Pointer)	1
	25586	Pointer	1
	25581	Track (For Pointer)	1
	25590	Scale - Dial	1
	25766	Shaft - Tuning (Includes "Spool" Pulley)	1
	25774	Screw - Set 8-32 x $\frac{1}{8}$ (Used in Worm Gear of Tuning Condenser)	1
	25654	Screw - Wood #4 x $\frac{1}{4}$ (Mounting Dial Back Plate)	4
<b>MISCELLANEOUS</b>			
	25553	Back - Chassis (Removable Back Plate)	1
	25591	Cabinet - Wood	1
	25603	Cap - Grid	4
	25605	End - Chassis	2
	25696	Knob - Bakelite	2
	25612	Plug - 4 Prong (For Battery Cable)	1
	25620	Socket - Octal, For Tubes	5
	25618	Screw - 10-32 x $\frac{7}{8}$ (For Mounting Chassis)	2

\*The values of the resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally

well with resistors of either group. An illustration of the difference follows:

Pre-standardized value - 50,000 ohms,

RMA value - 47,000 ohms,

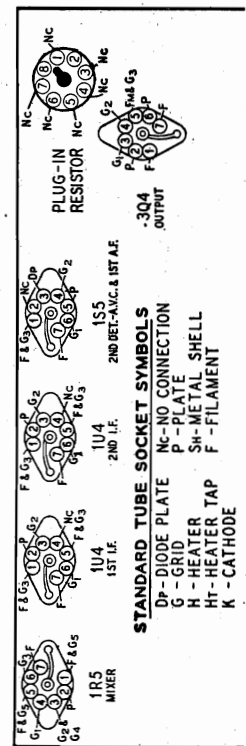
NOTE—#25040 resistor replaced with #25144 resistor  
33,000 ohm.  $\frac{1}{2}$  watt 20%.



The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage..... 117 volts AC  
Volume control..... maximum  
Signal input..... none

**A variation of  $\pm 10\%$  is usually permissible.**



MODELS 64WG-1052B,  
74WG-1052B

## MONTGOMERY WARD

## RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volt AC

across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Output variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna— External antenna clip	Chassis	20 microvolts
1000 kc	.05 mf.	1R5 Mixer—Pin 6	Point "X" (1S5 Pin 1)	30 microvolts
*455 kc	.05 mf.	1R5 Mixer—Pin 6	Same as above	15 microvolts
455 kc	.05 mf.	1U4 1st I-F—Pin 6	Same as above	440 microvolts
455 kc	.05 mf.	1U4 2nd I-F—Pin 6	Same as above	2200 microvolts
400 cycles	.05 mf.	1S5 1st A-F—Pin 6	Same as above	.022 volt
400 cycles	.05 mf.	3Q4 Output—Pin 3	Same as above	1.8 volts

\*Short out the oscillator section of the gang condenser while making this measurement.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antenna—.1 mf., 50 mmf.

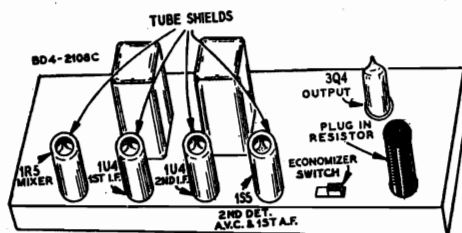
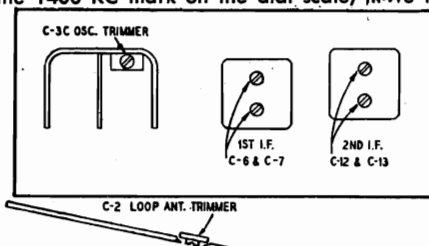
SIGNAL GENERATOR				CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM See Trimmer Illustration
Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	.1 mf	Control Grid 1U4—1st I-F Pin 6	Point "X" At Electrolytic Capacitor Black Lead	Turn Rotor to full open	2nd I-F (C13) & (C12)
455 kc	.1 mf	Control Grid 1R5—Mixer Pin 6 See Note C	Same as above	Turn Rotor to full open	1st I-F (C7) & (C6)
1620 kc	.1 mf	Control Grid 1R5—Mixer Pin 6	Same as above	Turn Rotor to full open	Oscillator (C3C)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	External Ground connection on loop	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note B	Antenna (C2)

NOTE A—Re-assemble chassis in cabinet and close the cabinet back before making adjustment.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, move the pointer on

the string to the 1400 KC mark.

NOTE C—Short out the oscillator section of the gang condenser for this adjustment only.





## MONTGOMERY WARD

MODELS 64WG-1052B,  
74WG-1052B

## MODEL 64WG-1052B, 74WG-1052B

**OPERATING VOLTAGES**—Chassis for Models 64WG-1052B and 74WG-1052B are available for operation on the following power supplies:

105-125 Volts AC 50-60 Cycles or  
105-125 Volts DC  
Wards Battery (A Section 9 Volts  
Pack No. 62-35/B Section 90 Volts  
Pack No. 62-35)

## REPLACEMENT PARTS LIST

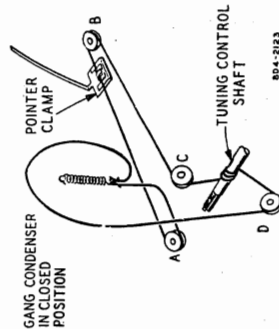
Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description	Qty. Used in Set
<b>CAPACITORS</b>			
C-2	17A123	1.5 mfd/12 mfd Trimmer	1
C-3	14A186	Gang Capacitor with Drive Pulley	1
C-4	47X476	Moulded	3
C-10	47X476	Moulded	1
C-17	47X463	Part of T-3 (1st I.F. Transformer)	1
C-5	47X463	Moulded	1
C-6	47X463	Moulded	1
C-7	47X463	Moulded	1
C-8	47X463	Moulded	1
C-28	B66403	.04 mfd 200 V Tubular	3
C-29	B66403	.04 mfd 200 V Tubular	3
C-11A	45X348	120 mfd 150 V Dry	1
C-11B	45X348	130 mfd 55 V electrolytic	1
C-12	47X112	50 mfd 500 V electrolytic	1
C-13	47X112	50 mfd 500 V electrolytic	1
C-14	47X112	50 mfd 500 V electrolytic	1
C-15	47X112	50 mfd 500 V electrolytic	1
C-16	47X112	50 mfd 500 V electrolytic	1
C-17	47X112	50 mfd 500 V electrolytic	1
C-18	47X112	50 mfd 500 V electrolytic	1
C-19	47X112	50 mfd 500 V electrolytic	1
C-20	47X112	50 mfd 500 V electrolytic	1
C-21	47X112	50 mfd 500 V electrolytic	1
C-22	47X112	50 mfd 500 V electrolytic	1
C-23	47X112	50 mfd 500 V electrolytic	1
C-24	47X112	50 mfd 500 V electrolytic	1
C-25	47X112	50 mfd 500 V electrolytic	1
C-26	47X112	50 mfd 500 V electrolytic	1
C-27	47X112	50 mfd 500 V electrolytic	1
C-28	47X112	50 mfd 500 V electrolytic	1
C-29	47X112	50 mfd 500 V electrolytic	1
C-30	47X112	50 mfd 500 V electrolytic	1
C-31	47X112	50 mfd 500 V electrolytic	1
C-32	47X112	50 mfd 500 V electrolytic	1
C-33	47X112	50 mfd 500 V electrolytic	1
C-34	47X112	50 mfd 500 V electrolytic	1
C-35	47X112	50 mfd 500 V electrolytic	1
C-36	47X112	50 mfd 500 V electrolytic	1
C-37	47X112	50 mfd 500 V electrolytic	1
C-38	47X112	50 mfd 500 V electrolytic	1
C-39	47X112	50 mfd 500 V electrolytic	1
C-40	47X112	50 mfd 500 V electrolytic	1
C-41	47X112	50 mfd 500 V electrolytic	1
C-42	47X112	50 mfd 500 V electrolytic	1
C-43	47X112	50 mfd 500 V electrolytic	1
C-44	47X112	50 mfd 500 V electrolytic	1
C-45	47X112	50 mfd 500 V electrolytic	1
C-46	47X112	50 mfd 500 V electrolytic	1
C-47	47X112	50 mfd 500 V electrolytic	1
C-48	47X112	50 mfd 500 V electrolytic	1
C-49	47X112	50 mfd 500 V electrolytic	1
C-50	47X112	50 mfd 500 V electrolytic	1
C-51	47X112	50 mfd 500 V electrolytic	1
C-52	47X112	50 mfd 500 V electrolytic	1
C-53	47X112	50 mfd 500 V electrolytic	1
C-54	47X112	50 mfd 500 V electrolytic	1
C-55	47X112	50 mfd 500 V electrolytic	1
C-56	47X112	50 mfd 500 V electrolytic	1
C-57	47X112	50 mfd 500 V electrolytic	1
C-58	47X112	50 mfd 500 V electrolytic	1
C-59	47X112	50 mfd 500 V electrolytic	1
C-60	47X112	50 mfd 500 V electrolytic	1
C-61	47X112	50 mfd 500 V electrolytic	1
C-62	47X112	50 mfd 500 V electrolytic	1
C-63	47X112	50 mfd 500 V electrolytic	1
C-64	47X112	50 mfd 500 V electrolytic	1
C-65	47X112	50 mfd 500 V electrolytic	1
C-66	47X112	50 mfd 500 V electrolytic	1
C-67	47X112	50 mfd 500 V electrolytic	1
C-68	47X112	50 mfd 500 V electrolytic	1
C-69	47X112	50 mfd 500 V electrolytic	1
C-70	47X112	50 mfd 500 V electrolytic	1
C-71	47X112	50 mfd 500 V electrolytic	1
C-72	47X112	50 mfd 500 V electrolytic	1
C-73	47X112	50 mfd 500 V electrolytic	1
C-74	47X112	50 mfd 500 V electrolytic	1
C-75	47X112	50 mfd 500 V electrolytic	1
C-76	47X112	50 mfd 500 V electrolytic	1
C-77	47X112	50 mfd 500 V electrolytic	1
C-78	47X112	50 mfd 500 V electrolytic	1
C-79	47X112	50 mfd 500 V electrolytic	1
C-80	47X112	50 mfd 500 V electrolytic	1
C-81	47X112	50 mfd 500 V electrolytic	1
C-82	47X112	50 mfd 500 V electrolytic	1
C-83	47X112	50 mfd 500 V electrolytic	1
C-84	47X112	50 mfd 500 V electrolytic	1
C-85	47X112	50 mfd 500 V electrolytic	1
C-86	47X112	50 mfd 500 V electrolytic	1
C-87	47X112	50 mfd 500 V electrolytic	1
C-88	47X112	50 mfd 500 V electrolytic	1
C-89	47X112	50 mfd 500 V electrolytic	1
C-90	47X112	50 mfd 500 V electrolytic	1
C-91	47X112	50 mfd 500 V electrolytic	1
C-92	47X112	50 mfd 500 V electrolytic	1
C-93	47X112	50 mfd 500 V electrolytic	1
C-94	47X112	50 mfd 500 V electrolytic	1
C-95	47X112	50 mfd 500 V electrolytic	1
C-96	47X112	50 mfd 500 V electrolytic	1
C-97	47X112	50 mfd 500 V electrolytic	1
C-98	47X112	50 mfd 500 V electrolytic	1
C-99	47X112	50 mfd 500 V electrolytic	1
C-100	47X112	50 mfd 500 V electrolytic	1

**HOW TO ORDER PARTS**—Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Parts should be ordered from the nearest Wards Retail Store, Catalog Order office or Mail Order House.

## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully closed position. Use a new cord 30" long and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue around pulley rim 1/4 turn clockwise. Wind three turns clockwise (viewed from rear of chassis) around tuning control shaft. The turns must progress toward rear of chassis. Pass cord around pulley D and continue 1/4 turn clockwise around large drive pulley. Pass cord through the slot in the pulley rim then stretch the tension spring and tie free end of cord to it. Cut off any excess string.

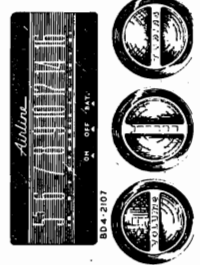


## ELECTRICAL SPECIFICATIONS

Power Supply....."A" Battery Supply—9 Volts, 50 Ma.  
"B" Battery Supply—90 Volts, 11 Ma. or 105-125 volts AC, 50-60 cycles, 10 watts or 105-125 volts DC Ward's Battery Pack No. 62-35  
Battery Pack.....540-1600 KC  
Frequency Range.....At 1000 KC, 53 KC wide at 1000 times signal  
Selectivity.....(for .05 watt output with external antenna) 20 microvolts average  
Sensitivity.....0.3 watt maximum  
Power Output.....0.125 watt 10% distortion  
Loud Speaker.....5 1/2" PM dynamic  
Voice Coil Impedance.....3.2 ohms at 400 cycles

## REMOVAL OF CHASSIS FROM CABINET

Pull off the three control knobs and disconnect the battery plug. Unwrap the power cord from the radio at the top of the cabinet if necessary. Remove the four screws that fasten the chassis to the cabinet (2 on the outside at each end of the cabinet). Tip the chassis slightly forward and at the same time withdraw it from the cabinet.



## MISCELLANEOUS

12A443	5 1/2" P.M. Speaker complete with Output Transformer	1
12A443	Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)	1
25A1019	Output Transformer (Specify part number and letters stamped on speaker)	1
3A303	Selenium Rectifier and Housing	1
3A303	Assembly	1
3A312	Socket-Octal (8 prong) Moulded	1
3A312	Tube Socket (Miniature)	5
3A312	Tube Shield	4
2A175	On-Off Switch (Economy)	1
2A203	Changeover Switch (AC-DC, Battery Switch)	1
13X429	Battery Cable and Plug Assembly—Grille Cloth 4 1/2"x6 1/2" (42W)	1
10A595	Knob, Switch	1
10A596	Knob, Tuning	1
10A597	Knob, Volume	1
11X117	Line Cord and Plug Assembly—Shield, Volume Control and Switch (Paper)	1
32X368	Shield, Volume Control and Switch (Metal)	1

## RESISTORS

Ref. No.	Part No.	Description	Qty. Used in Set
R-1	B83225	2.2 meg.	2
R-2	B83104	100 K	1
R-3	B84123	12 K	1
R-4	B83335	3.3 meg.	2
R-5	B84153	15 K	1
R-6	B84152	1500	2
R-7	B84152	1500	2
R-8	B84152	1500	2
R-9	B84152	1500	2
R-10	B84152	1500	2
R-11	B84152	1500	2
R-12	B84152	1500	2
R-13	B84152	1500	2
R-14	B84152	1500	2
R-15	B84152	1500	2
R-16	B84152	1500	2
R-17	B84152	1500	2
R-18	B84152	1500	2
R-19	B84152	1500	2
R-20	B84152	1500	2
R-21	B84152	1500	2
R-22	B84152	1500	2
R-23	B84152	1500	2

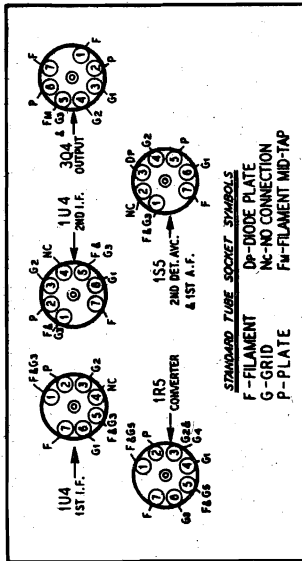
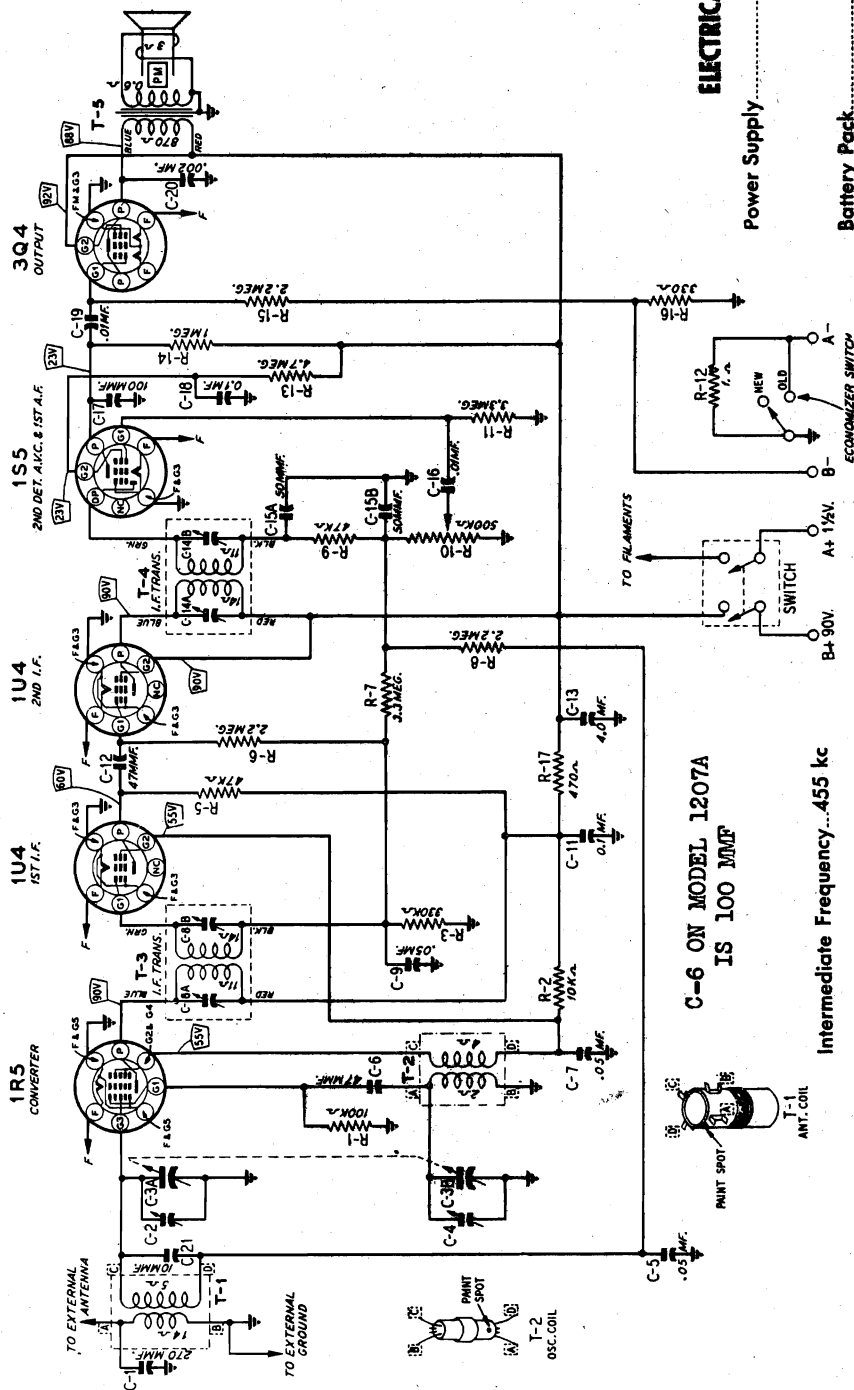
MODELS 64WG-1207A,  
64WG-1207B,  
74WG-1207B

# MONTGOMERY WARD

## ELECTRICAL SPECIFICATIONS

Power Supply "A" Battery Supply 1½ volts, 220 Ma.  
"B" Battery Supply 90 volts, 12 Ma.  
Battery Pack Wards Battery Pack 62-51 or 62-57

Frequency Range 540-1600 kc  
Selectivity At 1,000 kc, 40 kc broad at 1,000 times signal  
Sensitivity (For .05 watt output and with external antenna) 10 microvolts average  
Power Output .23 watts maximum  
Loud Speaker .1 watt 10% distortion  
Voice Coil Impedance 5" PM dynamic 3.2 ohms at 400 cycles



## TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and the chassis. All readings, except those for the 1S5 tube, were taken with a 1000 ohm-per-volt meter and read on a 500 volt scale. The plate and screen voltages for the 1S5 tube were read with a vacuum tube voltmeter. Conditions of measurement are:

Battery voltages under load.....B, 90 volts  
Volume control.....A, 1½ Volts  
Signal input.....maximum  
A variation of ±10% is usually permissible.

MONTGOMERY WARD

MODELS 64WG-1207A,  
64WG-1207B,  
74WG-1207B

## ALIGNMENT PROCEDURE

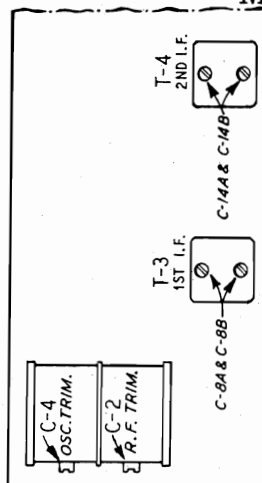
Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.  
Output Indicating Meter; Non-Metallic Screwdriver.  
Dummy Antenna—.1 mf., 50 mmf.

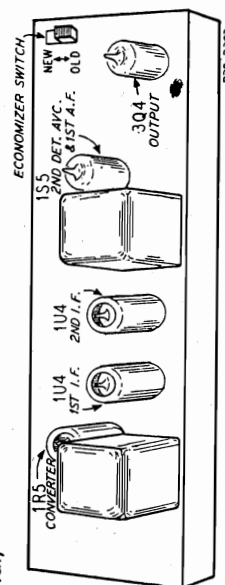
SIGNAL GENERATOR			RECEIVER	
Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection	Adjust Trimmers for Maximum Output (See Trimmer Illustration)
455 kc	.1 mf	Control Grid 1R5 Mixer Pin 6	Chassis	2nd I-F C-14A and C-14B 1st I-F C-8A and C-8B
1620 kc	.1 mf	Control Grid 1R5 Mixer Pin 6	Chassis	Oscillator C-4
1400 kc	50 mmf	External Antenna lead	Chassis	Antenna C-2



NOTE A—Tune in a 1400 kc signal. If the pointer is not at the 1400 kc mark on the dial, move it along the string to 1400 kc.

## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position and use a new drive cord 35" long. Tie one end of the new cord to the tension spring and hook the other end of the tension spring over the tab on the large drive pulley. Pass the cord through the opening in the drive pulley rim and continue  $\frac{3}{4}$  turn clockwise around the pulley rim. Pass the cord in front of the string guide, under the tuning shaft and wind  $2\frac{3}{4}$  turns around the shaft with the turns progressing toward the chassis. Run the cord up and over the idler stud A, around pulley B, over idler stud C and then wind  $\frac{1}{2}$  turn clockwise around the large drive pulley. Pass the cord through the opening in the pulley rim, stretch the tension spring and tie the free end of the cord to it. Rotate the tuning shaft several times in order to take up any slack in the drive cord. If the installation is satisfactory cut off any excess string and attach the dial pointer.



MODELS 64WG-1207A,  
64WG-1207B,  
74WG-1207B  
MODEL 64WG-1804C

## MONTGOMERY WARD

Ref. No.	Part No.	Description	Qty. Used in Set
<b>TRANSFORMERS AND COILS</b>			
T-1	26A445	"B" Range loop antenna assembly...	1
T-2	9A1805	Oscillator coil assembly.....	1
T-3	9A1775	1st I-F Transformer and can assembly	1
T-4	9A1776	2nd I-F Transformer and can assembly	1
T-5	51X116	Output Transformer.....	1
<b>RESISTORS</b>			
		Ohms Watts	
R-1	8B4332	3300 0.5 Carbon.....	1
R-2	8B5104	100,000 0.5 Carbon.....	1
R-3	8B4393	39,000 0.5 Carbon.....	1
R-4	8B5225	2.2 meg 0.5 Carbon.....	1
R-5	8B5473	47,000 0.5 Carbon.....	1
R-6	36X347	500,000 Volume control and switch	1
R-7	8B4153	15,000 C.S. Carbon.....	1
R-8	8B5475	4.7 meg. 0.5 Carbon.....	1
R-9	8B4474	470,000 0.5 Carbon.....	1
R-10	8B4333	33,000 0.5 Carbon.....	1
R-11	8B4823	82,000 0.5 Carbon.....	1
R-12	8B5474	470,000 0.5 Carbon.....	1
R-13	8B3181	180 0.5 Carbon.....	1
R-14	8B4274	270,000 0.5 Carbon.....	1
R-15	8B4390	39 2.0 Carbon.....	1
R-16	8B4270	27 0.5 Carbon.....	1
R-17	8B4152	1500 1.0 Carbon.....	1
R-20	8B5471	470 0.5 Carbon.....	1
<b>DIAL AND DRIVE ASSEMBLY</b>			
6X21		Rubber grommet	3
20X329		Cond. cushion stud mfg.....	3
58X667		Dial.....	1
25X1461		Dial bracket.....	1
26A446		Pointer bracket assembly.....	1
15X217		Pointer.....	1
25X1398		Pilot light bracket.....	1
7A192		Pilot light socket assembly.....	1
		Pilot light No. 47.....	1
		42" drive cord.....	1
28X95		Drive cord tension spring.....	1
26X464		Drive shaft.....	1
19X192		"C" washer for drive shaft.....	2
41X81		Dial light diffuser.....	1
25X1385		Holder, light diffuser.....	1
4X884		Escutcheon.....	1
25X1460		Escutcheon mounting bracket.....	2
<b>MISCELLANEOUS</b>			
12A431		4" x 6" speaker with mounting bracket	1
		Cone and voice coil assembly (specify part number and letters stamped on speaker).....	1
3A303		Tube socket—octal (8 prong) molded	5
3A421		Tube socket with shield.....	1
10A297		Knob (walnut) on-off switch, volume control and tuning.....	2

Ref. No.	Part No.	Description	Qty. Used in Set
<b>MISCELLANEOUS</b>			
12A443		5" P.M. Speaker with Mfg. Bracket.....	1
		Cone and Voice Coil Assembly (Specify part no. and letters stamped on speaker).....	1
26A432		Dial Bracket Assembly Complete with Dial, Bracket, Clamps, Pulleys and Crystal.....	1
28X95		Drive Card Tension Spring.....	1
15X224		35" Drive Cord.....	1
26X483		Pointer.....	1
6X19		Rubber Grommet.....	3
20X329		Cond. Cushion Stud {Mfg. Gang Cond.	3
2A175		On-Off Switch (Economizer).....	1
3A312		Miniature Tube Socket.....	5
32X221		Tube Shield.....	3
13X555		Battery Cable Assembly.....	1
10A530		Knob (Volume).....	1
10A531		Knob (Tuning).....	1

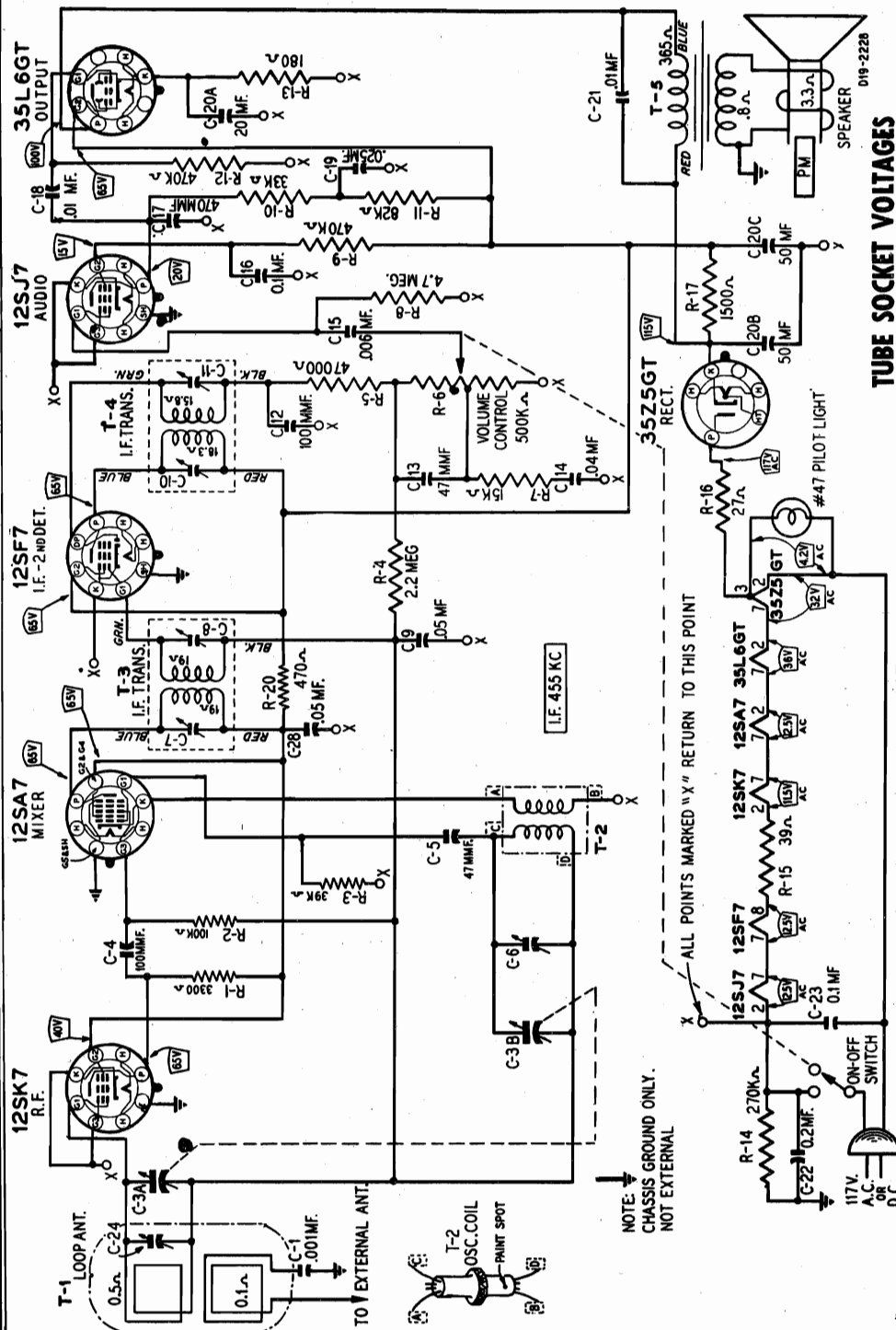
**OPERATING VOLTAGES**—Chassis for Model 64WG-1804C are available for operation on the following power supplies: 105-125 volts AC, 50-60 cycles or 105-125 volts DC.

Ref. No.	Part No.	Description	Qty. Used in Set
<b>CAPACITORS</b>			
C-1	D67102	.001 mf 400 V Tubular.....	1
C-3A	26A402	Gang condenser and pulley assembly	1
C-4	47X476	100 mmf Molded.....	2
C-5	47X446	47 mmf Molded.....	1
C-6		Part of C-3	1
C-7		Part of T-3, 1st I-F Transformer	1
C-9	B6503	.05 mf 200 V Tubular.....	1
C-10		Part of T-4, 2nd I-F Transformer	1
C-11	47X463	47 mmf Molded.....	1
C-14	B67403	.04 mf 200 V Tubular.....	1
C-15	B67402	.006 mf 200 V Tubular.....	1
C-16	B66104	.1 mf 200 V Tubular.....	1
C-17	47X467	470 mmf Molded.....	1
C-18	B66103	.01 mf 200 V Tubular.....	2
C-19	B67253	.025 mf 200 V Tubular.....	1
C-20A		20 mf 25 V Dry electrolytic	1
C-20B	45X344	50 mf 150 V condenser.....	1
C-20C		50 mf 150 V	1
C-22	B67204	0.2 mf 200 V Tubular.....	1
C-23	D67104	.1 mf 400 V Tubular.....	1
C-24	17A123	1.5-12 mmf Trimmer.....	1
C-28	B67503	.05 mf 200 V Tubular.....	1

**OPERATING VOLTAGES**—Chassis for Model 64WG-1207A are available for operation on the following power supply: Battery..... Wards Battery Pack {A Section 1½ Volts No. 62-51 or 62-57 } B Section 90 Volts

Ref. No.	Part No.	Description	Qty. Used in Set
<b>CAPACITORS</b>			
C-1	47X445	270 mmf Molded.....	1
C-2		Part of C-3 (Gang Capacitor)	1
C-3	26A431	Gang Capacitor and Pulley Assembly	1
C-5	B66503	.05 mf 200 V Tubular.....	3
C-7			
C-9			
C-6	47X476	100 mmf Molded.....	2
C-17		Part of T-3 1st I-F Transformer	1
C-8A			
C-8B			
C-11	B66104	0.1 mf 200 V Tubular.....	2
C-18			
C-12	47X463	47 mmf Molded.....	1
C-13	45X250	4.0 mf 100 V Dry Electrolytic.....	1
C-14A		Part of T-4 2nd I-F Transformer	1
C-14B			
C-15A			
C-15B	47X112	50 mmf Dual Mica.....	1
C-16	B66103	.01 mf 200 V Tubular.....	2
C-19			
C-20	B66202	.002 mf 200 V Tubular.....	1
C-21	47X111	10 mmf Molded.....	1
<b>TRANSFORMERS AND COILS</b>			
T-1	9A1800	Antenna Coil Assembly.....	1
T-2	9A1853	Oscillator Coil Assembly.....	1
T-3	9A1801	1st I-F Transformer and Can Assembly	1
T-4	9A1802	2nd I-F Transformer and Can Assembly	1
T-5	51X128	Output Transformer.....	1
<b>RESISTORS</b>			
		Ohms Watts Material	
R-1	8B5104	100k 0.5 Carbon.....	1
R-2	8B4103	10k 0.5 Carbon.....	1
R-3	8B5334	330k 0.5 Carbon.....	1
R-5	8B4473	47k 0.5 Carbon.....	1
R-6	8B4225	2.2 meg. 0.5 Carbon.....	2
R-8	B84335	3.3 meg. 0.5 Carbon.....	1
R-7	8B5473	47k 0.5 Carbon.....	1
R-9			
R-10	36X355	500k Volume Control & Switch	1
R-11	8B5335	3.3 meg. 0.5 Carbon.....	1
R-12	43X95	1.0 0.5 (5½" Resist. Wire)	1
R-13	8B5475	4.7 meg. 0.5 Carbon.....	1
R-14	8B5105	1.0 meg. 0.5 Carbon.....	1
R-15	8B5225	2.2 meg. 0.5 Carbon.....	1
R-16	8B4331	330 0.5 Carbon.....	1
R-17	8B5471	470 0.5 Carbon.....	1

## MONTGOMERY WARD

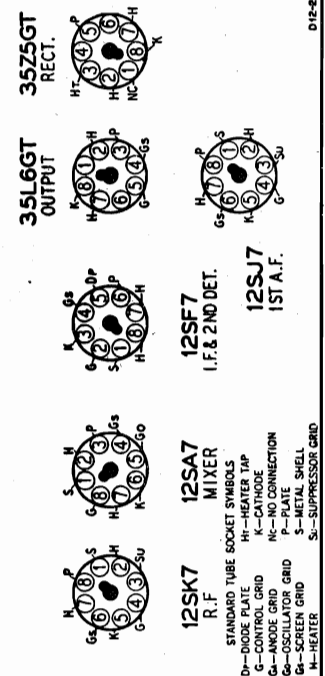


## TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC  
Volume control.....maximum  
Signal input.....none  
A variation of  $\pm 10\%$  is usually permissible.



MODEL 64WG-1804C

## MONTGOMERY WARD ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibration paragraph.

Volume Control—Maximum All Adjustments.

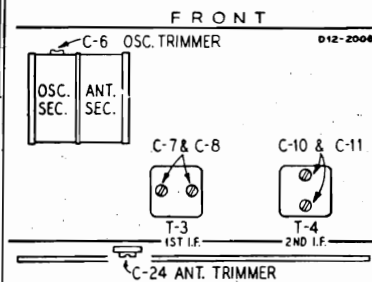
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.



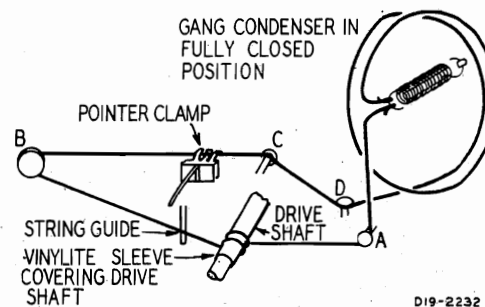
**NOTE A:**—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	Turn Rotor to full open	2nd I-F (C10) & (C11)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	Turn Rotor to full open	1st I-F (C7) & (C8)
1620 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	Turn Rotor to fully open position	Oscillator (C6)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	Turn Rotor to 1400 kc Index Line. See Note A	Antenna (C24)

### DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully closed position. Use a new drive cord 42" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot on the drive pulley rim, around stud A and wind two turns clockwise (from front of chassis) around the tuning shaft. Turns must progress away from chassis. Pass cord around pulley B and studs C and D. Pass cord under drive pulley and wind 1 3/4 turns counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess cord.

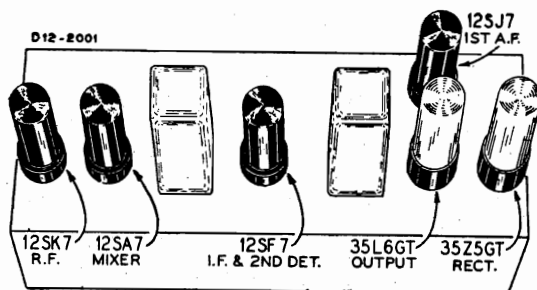
Attach the dial pointer to the cord and position as instructed in paragraph DIAL CALIBRATION.



### DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration)



### ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC, 50-60 cycles, 35 watts or 105-125 volts DC

Selectivity.....At 1000 KC, 50 KC wide at 1000 times signal

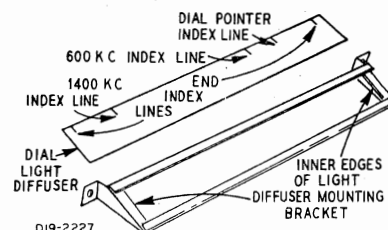
Sensitivity.....(for .05 watt output with external antenna) 15 microvolts average

Power Output.....1.3 watts maximum  
.75 watt 10% distortion

Loud Speaker.....4"x 6" PM dynamic

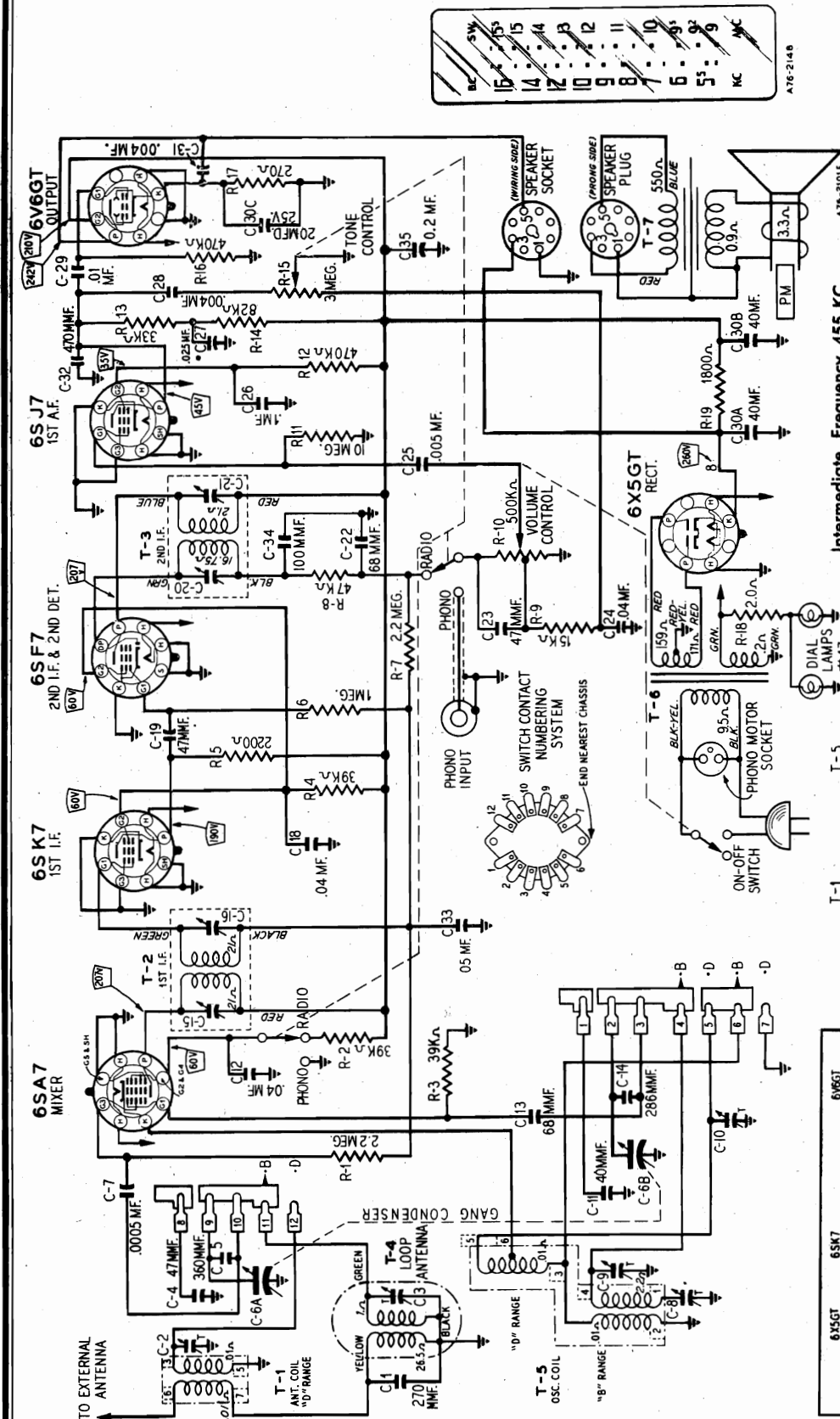
Voice Coil Impedance...3.2 ohms at 400 cycles

The 1400 KC index line is for use when aligning the receiver.



MONTGOMERY WARD

MODELS 64WG-2010A,  
64WG-2010B,  
74WG-2010B



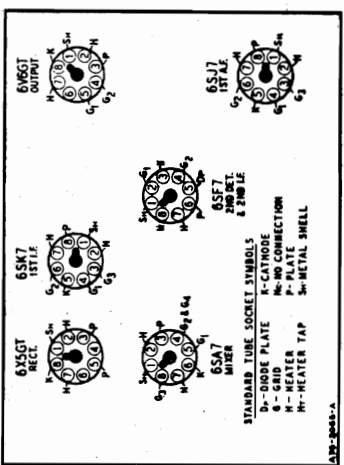
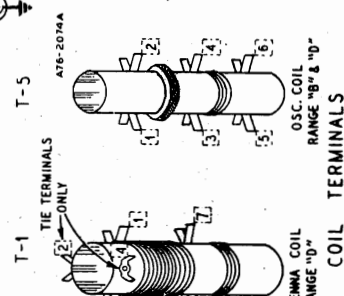
Intermediate Frequency .455 KC

TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....	117 volts AC
Volume control.....	maximum
Signal input.....	none
A variation of ± 10% is usually permissible.	



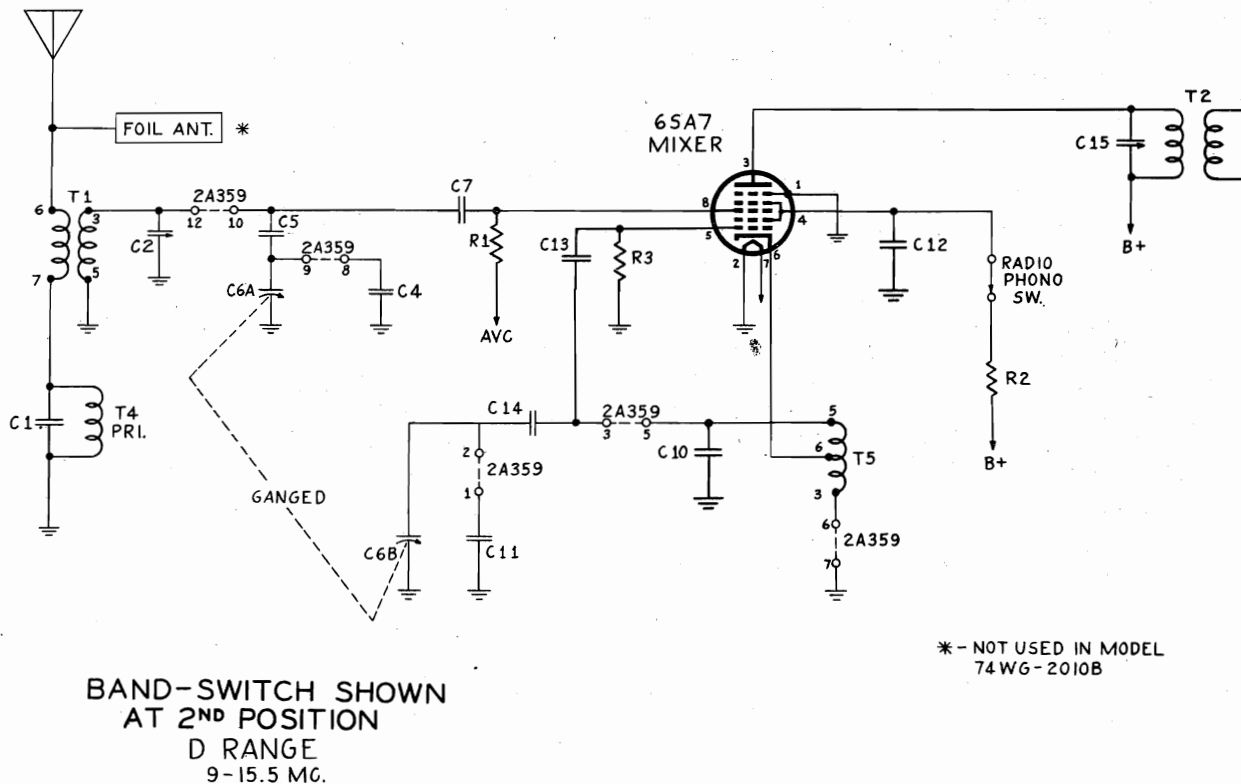
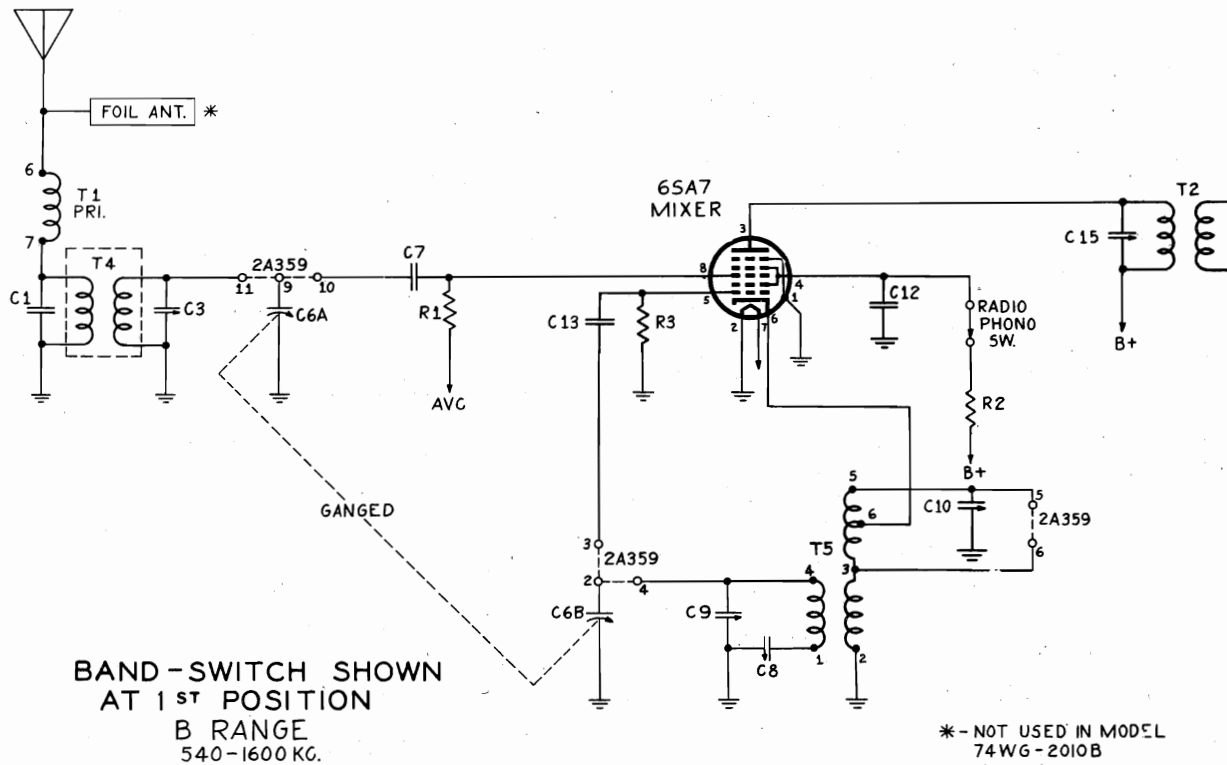


# "clarified schematics"

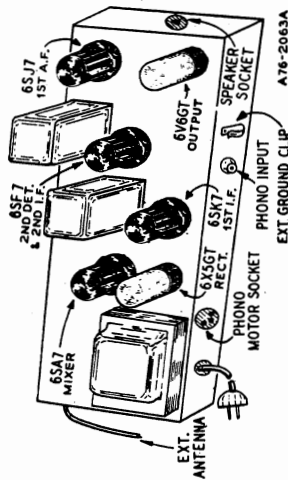
PAGE 16-14 MONT-WARD

MODELS 64WG-2010A,  
64WG-2010B,  
74WG-2010B

MONTGOMERY WARD

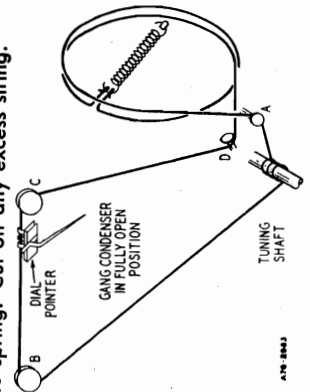


Volume Control—Maximum All Adjustments.  
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.  
Allow Chassis and Signal Generator to "Heat Up" for several minutes.  
The following equipment is required for aligning:  
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.  
Output Indicating Meter; Non-Metallic Screwdriver.  
Dummy Antennas—1 mf., 100 mmf., and 400 ohms.



Should it be desired to use the radio and record player on a 50 cycle power supply, it will be necessary to slip a 50 cycle conversion spring over the motor drive shaft on the record player. This conversion spring is listed in the parts list; however, alternate motor sources have been used for the changer and it will be necessary to check the motor assembly number stamped on the motor mounting plate and then order the conversion spring listed in the parts list under that motor.

Turn the gang condenser to the fully open position. Use a new drive cord 46" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue one and one-half turns counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three and one-half turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord around pulleys B and C and around idler stud D. Wrap cord counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess string.



	SIGNAL GENERATOR		Band Switch Setting	Condenser Setting	Adjust Trimmers to Maximum
	Frequency Setting	Connection at Radio			
I-F	455 kc	6SA7, Pin 8	.1 mf	Turn Rotor to Full Open	2nd I-F (C-20) & (C-21) 1st I-F (C-15) & (C-16)
RANGE B	1620 kc	Antenna Lead	100 mmf	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 kc	Antenna Lead	100 mmf	Tune Rotor to Max. Output. Set Indicator to 1400 KC. See Note A	Antenna Range B (C3)
	600 kc	Antenna Lead	100 mmf	Tune Rotor to Max. Output	600 kc (C8) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement in output.					
RANGE D	15.6 mc	Antenna Lead	400 Ohm	Turn Rotor to Full Open	Oscillator Range D (C10)
	14 mc	Antenna Lead	400 Ohm	Tune Rotor to Max. Output	Antenna Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	1400 kc	Reassemble chassis in cabinet. Antenna Lead	100 mmf	Tune Rotor to Max. Output	Antenna Range B (C3)

After each range is completed, repeat the procedure as a final check.

**NOTE A**—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

**NOTE B**—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Power Supply.....	105-125 volts AC, 60 cycles, 40 watts. (60 watts phono operating)
Frequency Range.....	B range—540-1600 KC D range—9 to 15.5 MC
Sensitivity.....	(for .5 watt output) with external antenna B range—9 microvolts average D range—20 microvolts average
Power Output.....	4 watts maximum 2.3 watts, 10% distortion
Loud Speaker.....	6" PM dynamic
Voice Coil Impedance.....	3.2 ohms at 400 cycles

### RECEIVER STAGE SENSITIVITIES

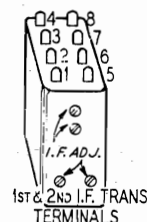
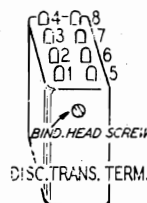
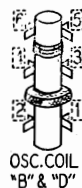
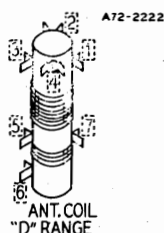
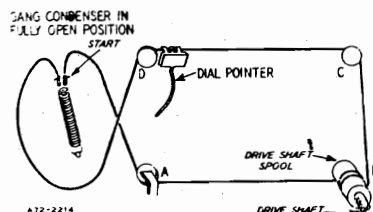
MODEL 74WG-2010B 64WG-2010A & B

1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

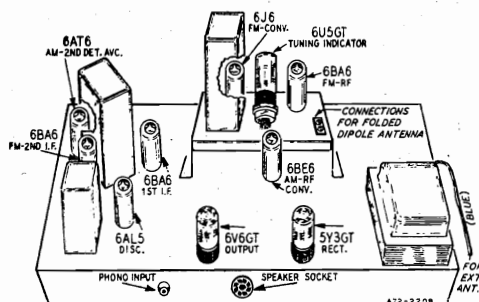
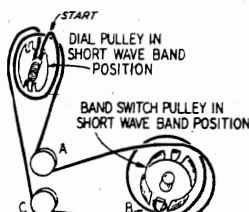
SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead	Chassis	9 microvolts
1000 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	42 microvolts
455 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	40 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1075 microvolts
455 kc	.05 mf	6SF7 2nd I-F, Pin 2	Same as above	3900 microvolts
400 cycles	.05 mf	6SJ7 1st A-F, Pin 4	Same as above	.08 volt
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.75 volts

MODEL 74WG-2505A, 2705A

Use a new 10X60 drive cord assembly or a new length of cord 50 inches long for the installation. Install the cord as shown in the illustration winding two turns counterclockwise around the drive shaft spool with the turns progressing towards the front end of the drive shaft. After completing the installation rotate the drive shaft a few turns to take up the slack in the cord.



Use a new 10X61 drive cord assembly or a new length of cord 21 inches long for the installation. Both the dial pulley and the band switch pulley must be turned to the short wave band positions as shown in the illustration. Install the new cord exactly as shown then change the position of the band switch several times and note the movement of the dial.



Power Supply.....	105-125 volts AC 50-60 cycles, 80 watts	AM Sensitivity.....	(For .5 watt output with external antenna) Broadcast, 12 microvolts average Short Wave, 20 microvolts average
Frequency Ranges.....	Broadcast 540-1600 KC Frequency Modulation 88-108 MC Short Wave 9-15.5 MC	FM Sensitivity.....	(For .5 watt output) 25 microvolts average
Selectivity.....	AM—40 KC broad at 1000 times signal, measured at 1000 KC I.F. FM—225 KC broad at 2 times down I.F. FM—700 KC broad at 200 times down	Power Output.....	5.2 watts maximum 3.5 watts 10% distortion
		Loud Speaker.....	10" Electro Dynamic
		Voice Coil Impedance.....	3.2 ohms 400 cycles

## MONTGOMERY WARD

MODELS 64WG-2010A,  
64WG-2010B, 74WG-2010B  
MODEL 74BR-1812A

## MODEL 74BR-1812A

HOW TO ORDER PARTS—When ordering, specify PART applicable, and CHASSIS MODEL number. The model number, schematic diagram reference number when

### REPLACEMENT PARTS LIST

Use Only Genuine Factory Replacement Parts

Ref. No.	Part No.	Description	Qty. Used in Set
C21, 18	C-8F5-12	470 mmd x 500 v., 20% mica	2
C20, 33, 34	C-8F1-10	220 mmd x 500 v., 20% mica	3
C44	C-4J-11388	.05 mmd x 600 v., 20% mica	1
C26-27-39	C-8G-12449	3000 mmd, 20% ceramic-in-sulated	6
C14, 16, 28	C-8G-12159	30 mmd, 500 volts, 5%, ceramic	6
C41, 42, 43	C-8G-11789	10 mmd, 10% ceramic	6
C51	C-8G-11891	51 mmd, 5% ceramic	2
C16-17	C-8G-12160	91 mmd, 5% ceramic	2
C29-32	C-8F5-224	91 mmd, 5%, silver mica	2
R4	C-981-87	120K ohms, 1/2 watt, 10%	1
R15	C-981-73	820K ohms, 1/2 watt, 10%	1
R16	C-981-77	8K ohms, 1/2 watt, 10%	1
R17	C-981-77	43K ohms, 1/2 watt, 10%	1
R18	C-981-77	43K ohms, 1/2 watt, 10%	1
R24	C-982-82	39K ohms, 1 watt, 10%	1
R28	C-982-81	10K ohms, 1 watt, 10%	1
R7	B-9C-11489	wound	1
R30	C-981-78	22K ohms, 1/2 watt, 10%	1
R21	C-981-78	22K ohms, 1/2 watt, 10%	1
R22	C-981-55	270 ohms, 1/2 watt, 10%	1
R14, 25, 29	C-981-15	2200 ohms, 1/2 watt, 20%	3
R8	C-981-107	5.6 megohms, 1/2 watt, 10%	1
R9, 10	C-981-31	1 megohm, 1/2 watt, 20%	2
R11	C-981-50	100 ohms, 1/2 watt, 10%	1
R12	C-981-50	100 ohms, 1/2 watt, 10%	1
R13	C-981-50	100 ohms, 1/2 watt, 10%	1
R17	C-981-27	220K ohms, 1/2 watt, 20%	1
R14	C-981-37	10 megohms, 1/2 watt, 20%	1
R27	C-981-54	220 ohms, 1/2 watt, 10%	1
R22	C-981-94	470K ohms, 1/2 watt, 10%	1
R11	C-981-79	27K ohms, 1/2 watt, 10%	1
R23	C-981-58	470 ohms, 1/2 watt, 10%	1
T3	A-13D-1285	B.C. oscillator coil	1
T4	C-203-11743	Input I.F. coil combination	1
T5	C-203-11746	2nd I.F. coil combination	1
T6	C-203-11744	assembly, 455 kc and 10.7 mc	1
T10	C-203-11745	3rd I.F. coil assembly 10.7 mc	1
T11, C55	C-13E-1287	Ratio detector I.F. coil assembly 10.7 mc assembly with I.O. mmd cond. C-8G-12408	1
T7	B-12C-11253	Transformer for speaker	1
T9	B-12A-11259	Power transformer—105-125 volts AC, 60 cycles primary	1
T8	C-18B-12404	Electrodynamic speaker, 6 x 9 in., less output transformer	1
P1	A-46A-11839	Speaker	1
	A-2D-11883	Reflector	1
	A-15B-11538	Antenna socket	1
	A-15B-11272	Antenna socket	1
	A-15B-10440	8-prong, octal tube socket	2
	A-15C-10718	7-prong, miniature tube socket	5
	A-2H-10718	Shield can	5
	A-2H-10718	Shield can	5
	A-23A-10344	Line cord rack	1

HOW TO ORDER PARTS—Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or Mail Order House.

### REPLACEMENT PARTS INFORMATION

OPERATING VOLTAGES—Chassis for Model 74WG-2010B are available for operation on the following power supply:

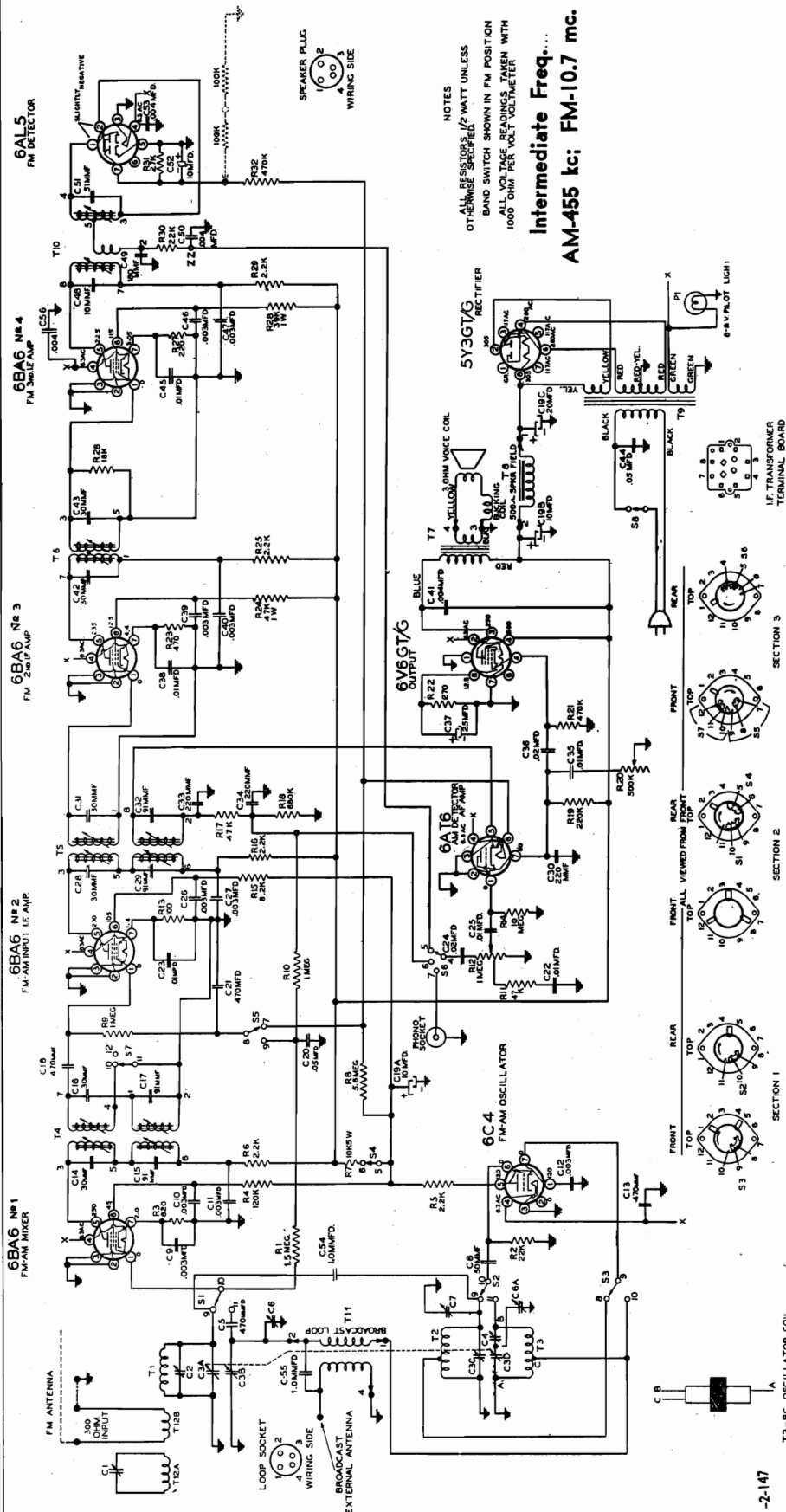
105-125 volts AC, 60 cycles

### REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

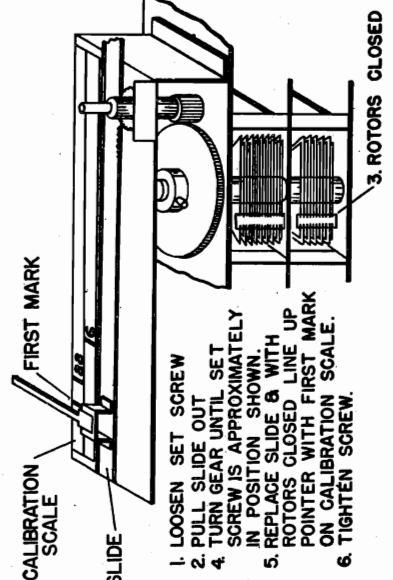
Ref. No.	Part No.	Description	Qty. Used in Set
C1	47K445	270 mmd, 500 v., 20% mica	1
C2	17A164	500 mmd, 500 v., 20% mica	1
C3	17A123	1.5-12 mmd, 500 v., 20% mica	1
C4	47K473	47 mmd, 500 v., 20% mica	1
C5	47K473	360 mmd, 500 v., 20% mica	1
C6	14A178	Gang Condenser with Drive Pulley	1
C7	86K501	.0005 mf, 200 V. Tubular	1
C8	17A155	300-430 mmd, 500 v., 20% mica	1
C9	17A109	2.5-35 mmd, 500 v., 20% mica	1
C10	47K472	40 mmd, 500 v., 20% mica	1
C11	D66403	.04 mf, 400 V. Tubular	1
C12	47K466	68 mmd, 500 v., 20% mica	1
C13	47K481	286 mmd, 500 v., 20% mica	1
C14	47K481	286 mmd, 500 v., 20% mica	1
C15	Part of T2 (1st I.F. Coil Assembly)		1
C16	47K463	47 mmd, 500 v., 20% mica	2
C17	Part of T3 (2nd I.F. Coil Assembly)		1
C18	47K471	68 mmd, 500 v., 20% mica	1
C19	47K471	68 mmd, 500 v., 20% mica	1
C20	47K471	68 mmd, 500 v., 20% mica	1
C21	47K471	68 mmd, 500 v., 20% mica	1
C22	47K471	68 mmd, 500 v., 20% mica	1
C23	47K471	68 mmd, 500 v., 20% mica	1
C24	47K471	68 mmd, 500 v., 20% mica	1
C25	47K471	68 mmd, 500 v., 20% mica	1
C26	47K471	68 mmd, 500 v., 20% mica	1
C27	47K471	68 mmd, 500 v., 20% mica	1
C28	47K471	68 mmd, 500 v., 20% mica	1
C29	47K471	68 mmd, 500 v., 20% mica	1
C30	47K471	68 mmd, 500 v., 20% mica	1
C31	47K471	68 mmd, 500 v., 20% mica	1
C32	47K471	68 mmd, 500 v., 20% mica	1
C33	47K471	68 mmd, 500 v., 20% mica	1
C34	47K471	68 mmd, 500 v., 20% mica	1
C35	47K471	68 mmd, 500 v., 20% mica	1
R1	882225	2.2 meg, 0.5 watt	2
R2	882225	2.2 meg, 0.5 watt	2
R3	882225	2.2 meg, 0.5 watt	2
R4	882225	2.2 meg, 0.5 watt	2
R5	882225	2.2 meg, 0.5 watt	2
R6	882225	2.2 meg, 0.5 watt	2
R7	882225	2.2 meg, 0.5 watt	2
R8	882225	2.2 meg, 0.5 watt	2
R9	882225	2.2 meg, 0.5 watt	2
R10	882225	2.2 meg, 0.5 watt	2
R11	882225	2.2 meg, 0.5 watt	2
R12	882225	2.2 meg, 0.5 watt	2
R13	882225	2.2 meg, 0.5 watt	2
R14	882225	2.2 meg, 0.5 watt	2
R15	882225	2.2 meg, 0.5 watt	2
R16	882225	2.2 meg, 0.5 watt	2
R17	882225	2.2 meg, 0.5 watt	2
R18	882225	2.2 meg, 0.5 watt	2
R19	882225	2.2 meg, 0.5 watt	2

USES SEEBURG MODEL "K" RECORD CHANGER



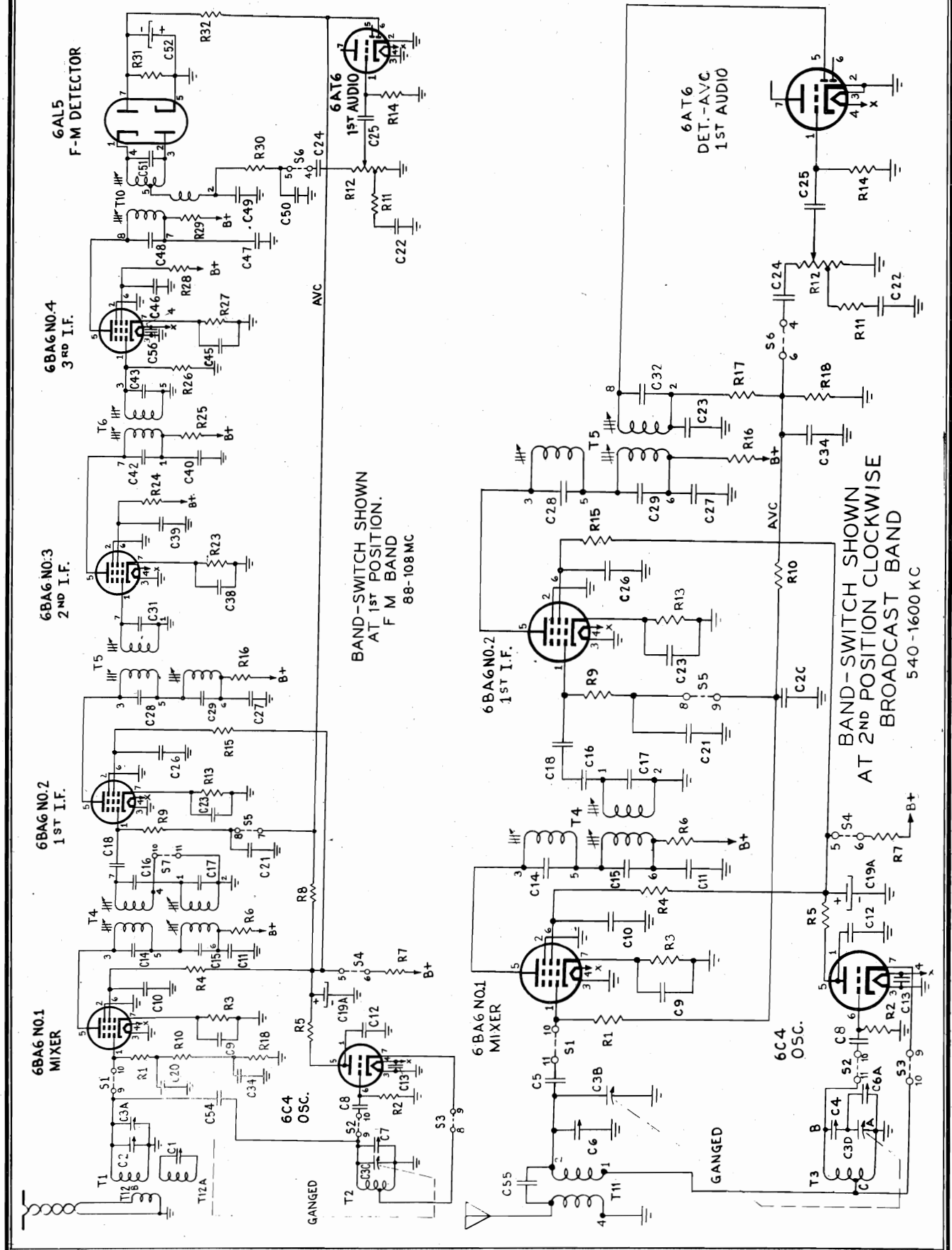
NOTES  
ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED  
BAND SWITCH SHOWN IN FM POSITION  
ALL VOLTAGE READINGS TAKEN WITH 1000 OHM PER VOLT VOLTMETER

Intermediate Freq....  
AM-455 kc; FM-10.7 mc.



1. LOOSEN SET SCREW
2. PULL SLIDE OUT
3. TURN GEAR UNTIL SET SCREW IS APPROXIMATELY IN POSITION SHOWN
4. REPLACE SLIDE & WITH ROTORS CLOSED LINE UP POINTER WITH FIRST MARK ON CALIBRATION SCALE.
5. TIGHTEN SCREW.
6. TIGHTEN SCREW.

Power Supply	105 to 125 volts, AC, 50-60-cycles; 85 watts.
Frequency Ranges	Broadcast Band—540 to 1600 kc. FM band—88 to 108 mc.
Selectivity	AM-50 kc. broad at 1000 times signal, measured at 1000 kc.
AM Sensitivity	I.F. FM-180 kc. broad at 2 times down. I.F. FM-290 kc. broad at 10 times down. (For .5 watt output with external antenna)—20 microvolts average (For .5 watt output)—15 microvolts average.
FM Sensitivity	Power Output 3.5 watts 10% distortion. 7 watts maximum.
Loud Speaker	6" x 9" oval electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles.



**ALIGNMENT PROCEDURE***Broadcast Band Section I.F. and R. F.*

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of  $\frac{1}{2}$  watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a  $\frac{1}{2}$ -watt output with the speaker connected. The volume control

must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycles audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.

**AM - I. F. ALIGNMENT**

*Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.*

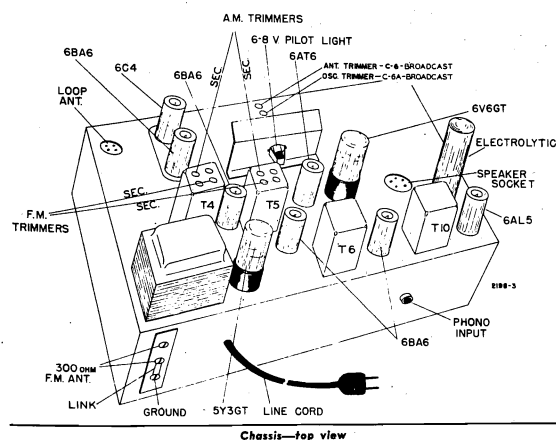
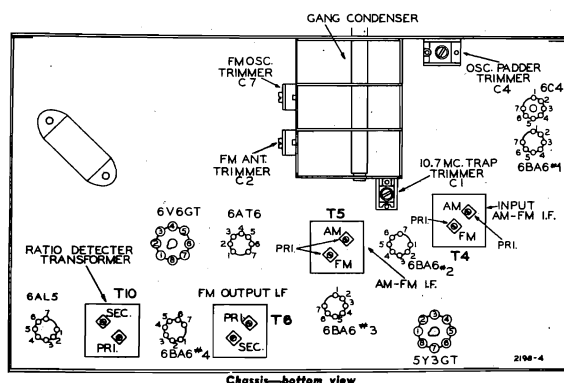
SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENT TO BE MADE	ADJUST FOR
455 Kc. Use 2100 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Primary and Secondary of T5 AM windings. See top and bottom views	Maximum output Should be $\frac{1}{2}$ watt
455 Kc. Use 64 microvolts	Pin No. 1 of 6BA6 No. 1 and ground	Primary and Secondary of T4 AM windings. See top and bottom views	Maximum output Should be $\frac{1}{2}$ watt
400 cycles. Use 63 millivolts	Pin No. 1 of 6AT6 and ground	None	Maximum output Should be $\frac{1}{2}$ watt

**BROADCAST BAND - R. F. ALIGNMENT**

*Check Pointer so that it is Exactly Over Calibration Marker to the Extreme Left When Gang is Fully Closed. For Adjustment Loosen Set Screw on Large Gear. (see dial mechanism illustration.)*

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST
1400 Kc. Use 15 microvolts	Antenna and Ground	200 mmf.	C6A for maximum $\frac{1}{2}$ watt
600 Kc. Use 25 microvolts	Antenna and Ground	200 mmf.	C4 for maximum $\frac{1}{2}$ watt
1400 Kc.	Antenna and Ground	200 mmf	C6 See Note

NOTE: Recheck first two adjustments after this adjustment because of inter-locking effects.





## MONTGOMERY WARD

MODEL 74BR-1812A

## ALIGNMENT PROCEDURE

FM Band Section. I.F. and R.F.

## IMPORTANT

No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment.

All components used in this radio are extremely stable and the tuned circuits should require no adjustment over long periods of time.

## NOTE

The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground". In other words, the meter, when used as a vacuum tube voltmeter, can have both the positive and negative sides connected to points above ground and still give true readings.

A standard AM signal generator is required.

## FM - I. F. ALIGNMENT

Band Switch in FM Position. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUSTMENT TO BE MADE	ADJUST FOR
10.7 Mc. Use about .1 volt	Pin No.1 of 6BA6 no. 4 and ground	Pin no. 7 of 6AL5 and ground	Primary of T10	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No.1 of 6BA6 no. 4 and ground	See note "A"	Secondary of T10	Zero. Use zero center scale. See note "B"
10.7 Mc. Use about 4000 microvolts	Pin No.1 of 6BA6 no. 3 and ground	Pin no. 7 of 6AL5 and ground	Primary and Secondary of T6	Resonance should be about 3 volts
10.7 Mc. Use about 150 microvolts	Pin No.1 of 6BA6 no. 2 and ground	Pin no. 7 of 6AL5 and ground	Primary and Secondary of 10.7 mc. windings of T5. See top and bottom views	Resonance should be about 3 volts
10.7 Mc. Use 3000 microvolts	FM Antenna input and ground	Pin no. 7 of 6AL5 and ground	Primary and Secondary of 10.7 mc. windings of T4. See top and bottom views	Resonance should be about 3 volts. See Note "C"
10.7 Mc.	FM Antenna input and ground	Pin no. 7 of 6AL5 and ground	C1	Minimum response. This is a trap circuit

## NOTES ON FM—I.F. ALIGNMENT:

NOTE "A" Connect two resistors, 100K OHMS each, from Pin No. 7 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid point of the resistors and point zz.

NOTE "B" If T10 has been tampered with, it is possible that no

crossover point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL: Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

NOTE "C" The input microvolts specified is based on the trap circuits being adjusted.

## FM - R. F. ALIGNMENT

Check Pointer so that it is Exactly Over Calibration Marker to the Extreme Left When Gang is Fully Closed. For Adjustment Loosen Set Screw on Large Gear. (see dial mechanism illustration.)

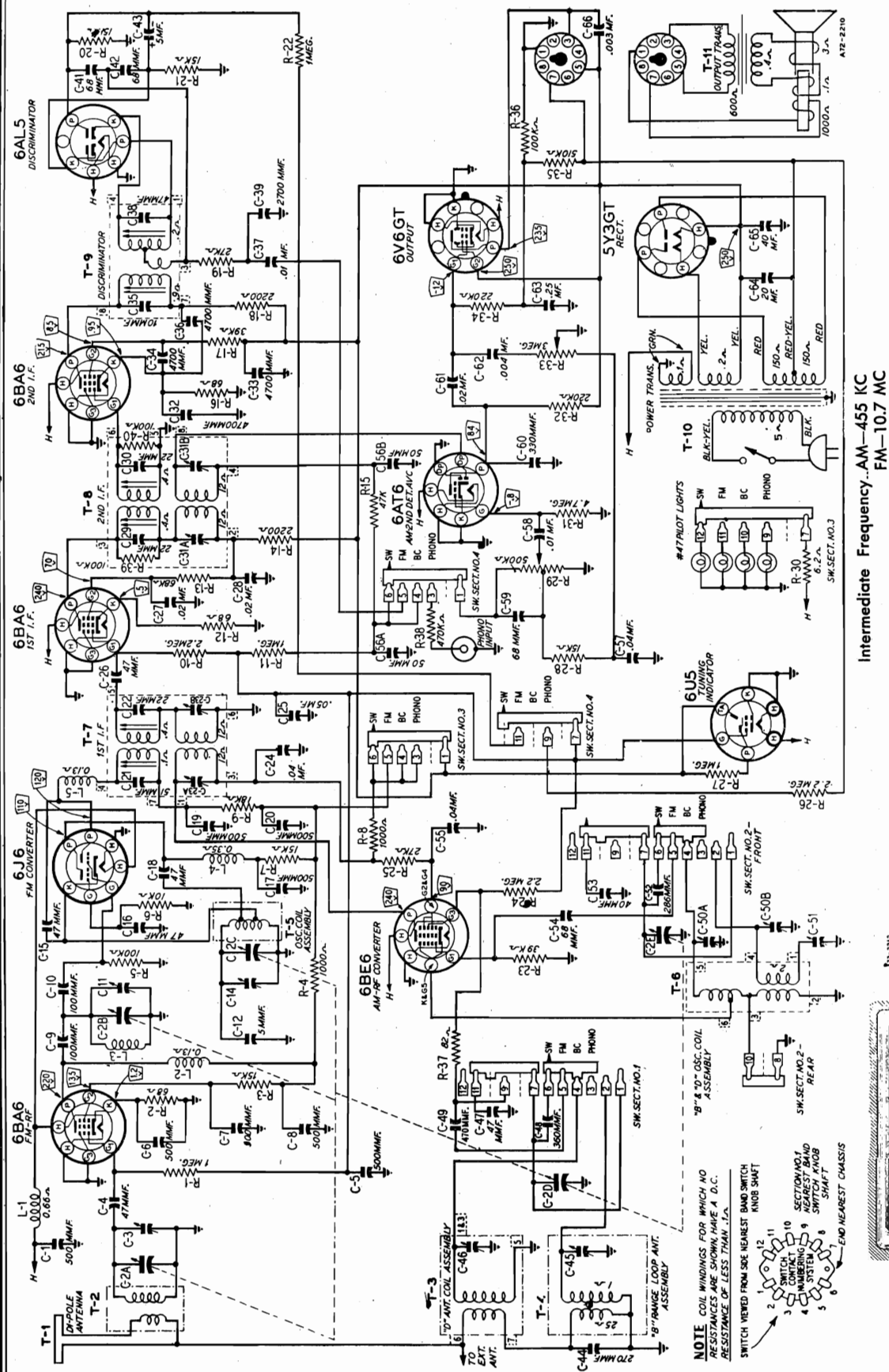
SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUST TO
100 Mc. Use about 15 microvolts	FM Antenna lead	300 ohms	C7 Osc. C2 Ant.	Pin No. 7 of 6AL5 and Ground	Resonance about 3 volts

NOTE: If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is

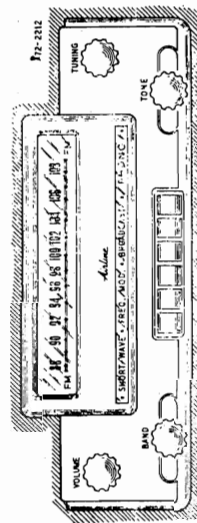
to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt meter as above for resonance indication. A weak carrier, however will not produce 3 volts.

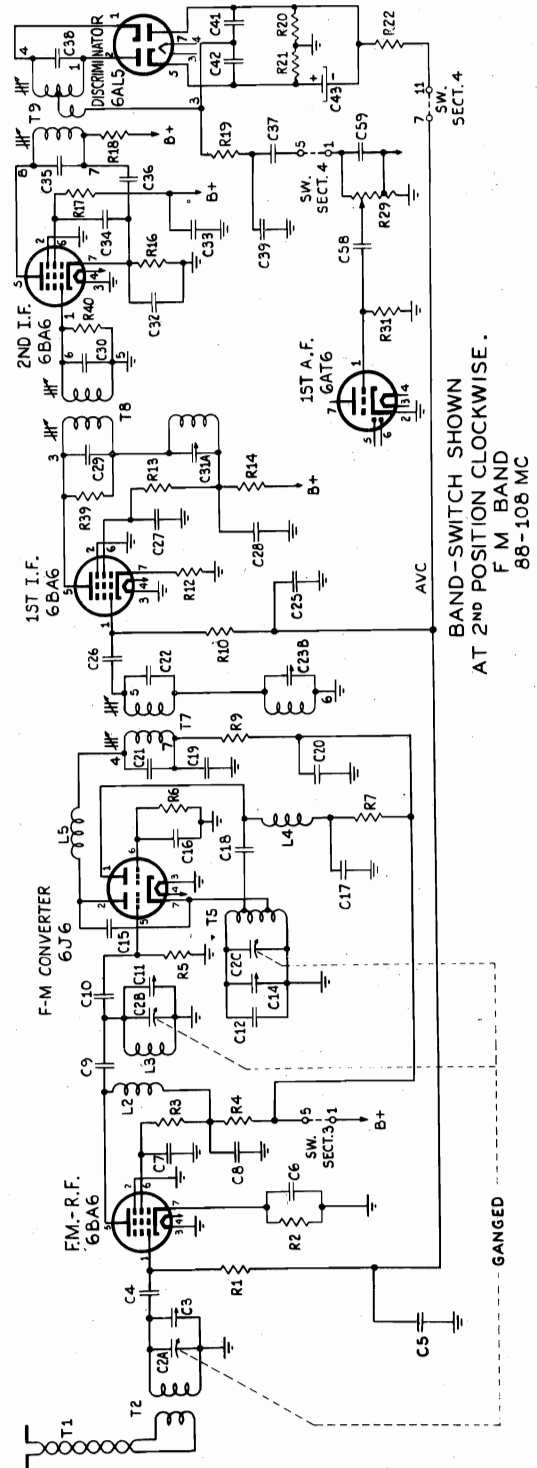
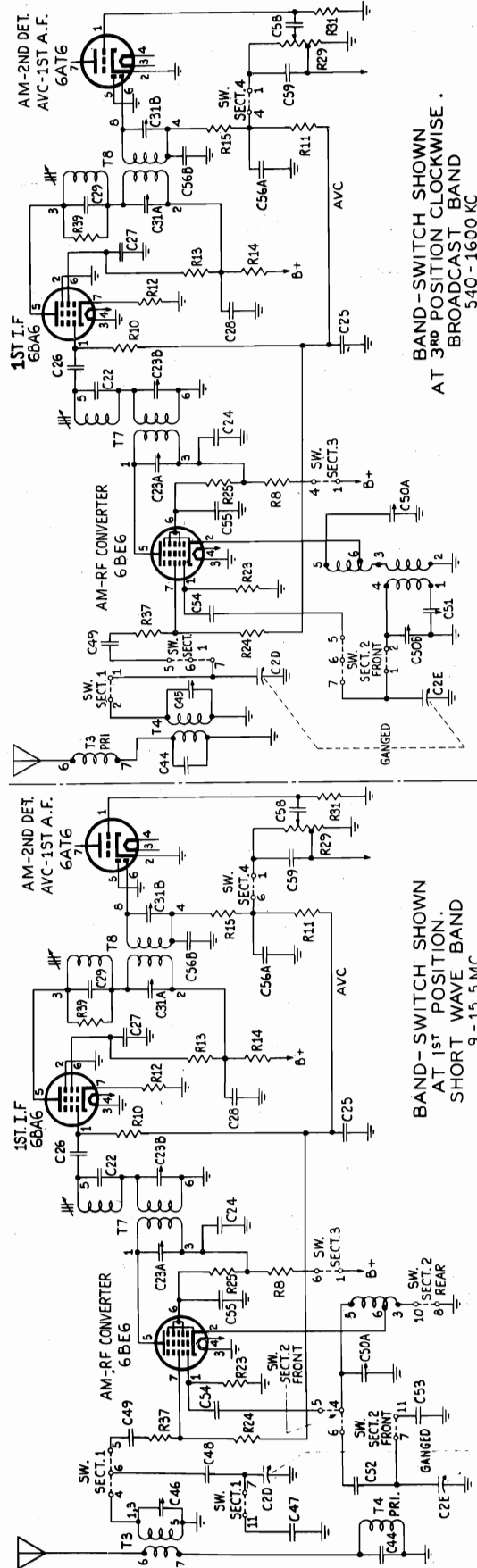
**MODELS** 74WG-2505A,  
74WG-2705A

**MONTGOMERY WARD**



Intermediate Frequency..AM-455 KC  
FM-10.7 MC





MODELS 74WG-2505A,  
74WG-2705A

MONTGOMERY WARD

ALIGNMENT PROCEDURE  
FM STAGES

Allow chassis and signal generator to warm up for several minutes. The following equipment is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.

Non-metallic screwdriver.

Dummy Antennas and I-F Loading Resistor—.01 mf, 300 ohms and 5000 ohms.

Zero center scale DC vacuum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.)

	SIGNAL GENERATOR		DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUSTMENT FOR MAX. METER DEFLECTION
	FREQUENCY SETTING	CONNECTION AT RADIO				
Discriminator	10.7 MC Note B	6BA6 2nd I-F Pin 1 and Chassis	.01 mf	FM	Rotor to Full Open	Disc. Pri. ① Note A
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc. Sec. Note C ②
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc. Pri. ① Note A
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc. Sec. Note C ②
I-F	10.7 MC	6BA6 1st I-F, Pin 1 and Chassis	.01 mf	FM	Same as above	2nd I-F Pri. Note A and D ③ 2nd I-F Sec. Note A and E ④
	10 MC	Connect to the FM-RF Gang Condenser terminal on underside of chassis	.01 mf	FM	Same as above	1st I-F Pri. ⑤ 1st I-F Sec. ⑥ Note A
Recheck I-F Adjustments in order given						
R-F & Osc.	108.4	Disconnect dipole and connect generator to dipole terminals with resistor in series	300 ohms	FM	Rotor to full open	Oscillator C-14
	104.5	Same as above	300 ohms	FM	Tune Rotor for Max. AVC voltage	R.F. C-11
	104.5	Same as above	300 ohms	FM	Same as above	.Ant. C-3
Recheck R-F and Osc. Adjustments in order given						

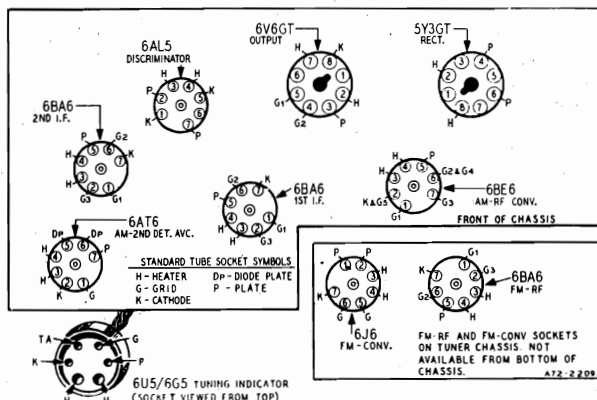
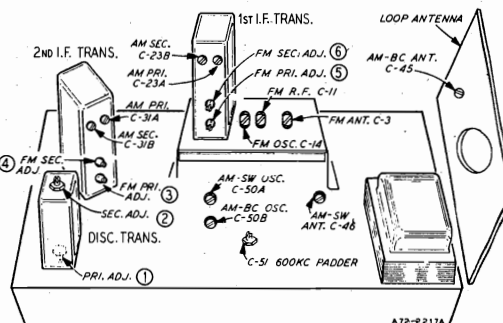
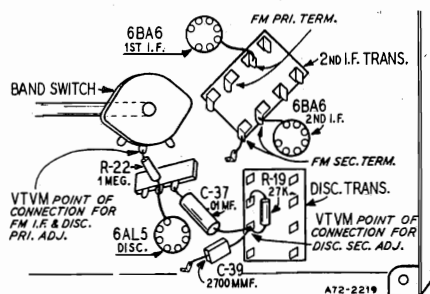
Note A—Test Equipment connections are as given in the table. The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the AVC line at the 1 megohm resistor R-22 and the band switch terminal (as shown in the illustration) for all adjustments except the discriminator secondary adjustment, for which see Note C.

Note B—A signal of .1 volt must be fed into the receiver for this adjustment.

Note C—Disconnect zero center DC vacuum tube voltmeter from AVC and reconnect to junction of R-19, C-37 and C-39 (See illustration). Adjust for zero voltage indication.

Note D—Before adjusting Pri. core connect 5000 ohm load resistor across the 2nd I-F. secondary terminals, (See illustration).

Note E—Disconnect 5000 ohm load resistor from secondary terminals and reconnect across the 2nd I-F. primary terminals, (See illustration).



## TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage.....117 Volts AC

Signal Input.....None

A variation of  $\pm 10\%$  is usually permissible.

## MONTGOMERY WARD

MODELS 74WG-2505A,  
74WG-2705ARECEIVER STAGE SENSITIVITIES  
AM AND AUDIO STAGES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output.

The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations in sensitivity of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RECEIVER	GROUND CONNECTION	
1000 KC	200 mmf or RMA Dummy Antenna	External Antenna Lead	Chassis	25 Microvolts
1000 KC	.05 mf	6BE6 Converter Pin 7	Chassis	60 Microvolts
455 KC	.05 mf	6BE6 Converter Pin 7	Chassis	58 Microvolts
455 KC	.05 mf	6BA6 1st I-F Pin 1	Chassis	2400 Microvolts
400 cycles	.05 mf	6AT6 1st A-F Pin 1	Chassis	.05 Volt
400 cycles	.05 mf	6V6GT Output Pin 5	Chassis	2.8 Volts

## FM STAGES

The table below lists the sensitivity for the FM stages of the receiver. The receiver must be tuned to 98 MC for all readings. Measurements are based on a .5 watt output the same as for the AM and Audio stage measurements.

The signal source must be an accurately calibrated signal generator capable of supplying a 98 MC signal modulated by a 400 cycle audio signal. For these measurements the generator must be adjusted for a 22.5 KC deviation. This will correspond to 30% AM modulation.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
FREQUENCY	COUPLING TO RECEIVER	CONNECTION TO RECEIVER	GROUND CONNECTION	
98 MC	300 ohms	External Antenna Terminal	External Ant. Terminal	30 microvolts
10.7 MC	.01 mf	6BA6 1st I-F Pin 1	Chassis	1200 microvolts
10.7 MC	.01 mf	6BA6 2nd I-F Pin 1	Chassis	37,000 microvolts

ALIGNMENT PROCEDURE  
AM BROADCAST AND SHORT WAVE BAND

Volume Control—Maximum all Adjustments. Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead. Allow Chassis and Signal Generator to "Heat Up" for several minutes. The following equipment is required for aligning: An All Wave Signal

Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.  
Dummy Antennas—.1 mf, 200 mmf, and 400 ohms.

SIGNAL GENERATOR		DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM	
FREQUENCY SETTING	CONNECTION AT RADIO					
I-F	455 kc	6BE6 Pin 7	.1 mf	Broadcast	Rotor Fully Open	2nd I-F C-31B & C-31A 1st I-F C-23B & C-23A
Broadcast	1620 kc	External ant. lead	200 mmf	Broadcast	Rotgr Fully Open	Oscillator C-50B
	1400 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output Set pointer to 1400 kc See Note A	Antenna C-45
	600 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output and Rock See Note B	600 Kc padder C-51
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer C-50B causes no further improvement in output.						
Short Wave	15.5 MC	External antenna lead	400 ohm	Short Wave	Rotor Fully Open	Oscillator C-50A
	15 MC	External antenna lead	400 ohm	Short Wave	Turn Rotor to Max. Output	Antenna C-46
Reassemble chassis in cabinet						
Broadcast	1400 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output	Antenna C-45

After each range is completed, repeat the procedure as a final check.  
Note A—If the pointer is not at 1400 KC on the dial, reset pointer at the 1400 KC mark on the dial scale.

Note B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

MODELS 74WG-2505A,  
74WG-2705A

## MONTGOMERY WARD

Ref. No.	Part No.	Description	Qty. Used in Set
<b>MISCELLANEOUS</b>			
12A270	10" ED. Speaker complete with out-put transformer	1	1
	Cone and voice coil assembly (speakers stamped on speaker)	1	1
	Output transformer (specify part number and letters stamped on speaker)	3	3
3A303	Tube socket—octal (8 prong) molded	5	5
3A425	Tube socket—miniature	7	7
32X386	Tube shield—miniature	2	2
3A427	Tube socket—miniature (for FM R.F. and Converter Tubes)	1	1
13X549	Cable and socket assembly—tuning indicator	1	1
3A305	Phono Socket—single pin	1	1
3A304	Phono motor socket	1	1
2A367	Band switch	1	1
13X328	Line cord and plug assembly	1	1
10A513	Knob—tuning-band-tone	3	3
10A509	Knob—volume control and switch	1	1
22X220	Push Button	6	6
26A439	Push Button Spring	6	6
4X870	Escutcheon Assembly	1	1
	Escutcheon Eye	1	1
<b>DIAL AND DRIVE ASSEMBLY</b>			
26A435	Dial Bracket Assembly	1	1
58X590	Dial	1	1
58X591	Dial Background	1	1
13X221	Pointer	1	1
26A438	Dial Drum Assembly	2	2
26X200	Dial Drum Shaft	1	1
26A440	Pulley and Eccentric Assembly (for Dial Drum Shaft)	1	1
26A437	Pulley Assembly (for Band Switch)	1	1
26X469	Band Switch Shaft	1	1
24X553	Pinion Gear (for Band Switch Shaft)	1	1
26A441	Crown Gear Assembly (for Mig. to Band Switch)	1	1
26A434	Idle Bracket Assembly	1	1
25X1389	Drive Shaft Bracket	1	1
26X467	Drive Shaft	1	1
24X551	Drive Shaft Spool	1	1
10X60	Drive Cord and Clip Assembly (Band Change)	1	1
28X524	Tension Spring (Band Change)	1	1
10X61	Drive Cord and Clip Assembly (Dial Drive)	1	1
28X530	Tension Spring (Dial Drive)	1	1
7A209	Indicator Light Socket Assembly	4	4
41X22	Indicator Light Shield	4	4
7A187	Pilot Light Socket Assembly (Dual)	1	1
41X35	Pilot Light Shield	2	2
	No. 47 Pilot Light	6	6
25X498	Tuning Eye Clamp	1	1
25X1396	Tuning Eye Bracket	1	1

Ref. No.	Part No.	Description	Qty. Used in Set
RESISTORS (Cont.)			
R-9	C85183	18K	1
R-10		1.0	Carbon
R-24	885225	2.2 meg	3
R-26			
R-13	C84683	68K	1
R-14	885222	2200	2
R-18			
R-15	885473	47K	1
R-17	C84393	39K	1
R-19	884273	27K	1
R-20			
R-21	893153	15K	2
R-23	884393	39K	1
R-25	C84273	27K	1
R-27	Part of 13X549	Cable and Socket assembly	1
R-29	3A3263	500K	1
R-30	43X217	6.2	1
R-31	885475	4.7 meg	1
R-32	885224	220K	2
R-34			
R-33	40X259	3.0 meg	1
R-35	883314	510K	1
R-36	883104	100K	1
R-37	884820	82	1
R-38	885474	470K	1
R-39			
R-40	884104	100K	2
TRANSFORMERS AND COILS			
L-1	9A1881	Filament Choke Assembly	1
L-2	9A1880	FM Mixer Plate Choke	2
L-3	9A1874	R.F. Coil	1
L-4	9A1882	FM Oscillator Plate Choke	1
T-1	9A1900	Di-Pole Antenna	1
T-2	9A1875	Antenna Coil Assembly	1
T-3	9A1812	"D" Antenna Coil Assembly	1
T-4	26A436	"B" Range Loop Antenna Assembly	1
T-5	9A1873	Oscillator Coil Assembly	1
T-6	9A1813	"B" and "D" Oscillator Coil Assembly	1
T-7	9A1876	1st IF Coil Assembly	1
T-8	9A1877	2nd IF Coil Assembly	1
T-9	9A1895	Discriminator Coil Assembly	1
T-10	53X286	Power Transformer (60 cycle)	1
T-10	53X287	Power Transformer (25 cycle)	1
T-10	53X288	Power Transformer (40 cycle)	1
T-11		Output Transformer (see miscellaneous)	1

**HOW TO ORDER PARTS**—Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Ward's Retail Store, Catalog Order office or Mail Order House.

## REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

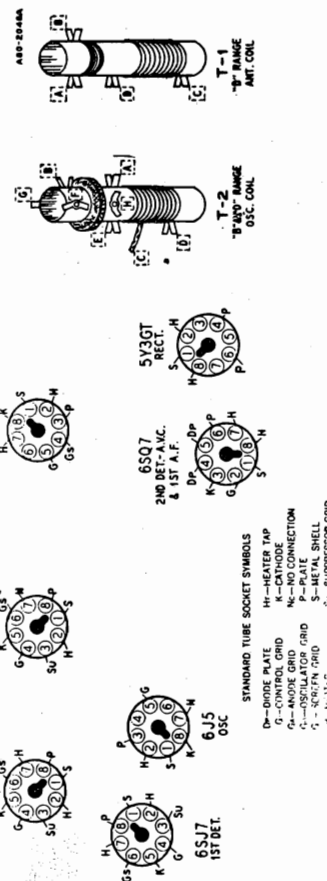
Ref. No.	Part No.	Description	Qty. Used in Set
<b>CAPACITORS</b>			
C-1			
C-5			
C-8	47X496	500 mmf	8
C-17		Ceramic	
C-19			
C-20			
C-2	26A433	Tuner & Gang Condenser Assembly	1
C-3	17A249	5-35 mmf	1
C-4		Trimmer	1
C-16	47X495	47 mmf	3
C-26		Ceramic	
C-9	47X497	100 mmf	2
C-10		Ceramic	
C-11	17A247	3.12 mmf	2
C-12	47X500	5 mmf	2
C-13	47X499	47 mmf	2
C-18	47X498	47 mmf	1
C-21	47X460	51 mmf	1
C-29	47X467	22 mmf	3
C-30		Ceramic	
C-32A			
C-31A	17A248	70-150 mmf	2
C-31B		Dual Trimmer	
C-24	D6A403	.04 mf	2
C-25	B6A503	.05 mf	1
C-27	D6A203	.02 mf	3
C-61			
C-32			
C-33	47X491	4700 mmf	4
C-34		Molded	
C-35	47X489	10 mmf	1
C-37	E6A103	.01 mf	2
C-38		200 V Tubular	
<b>RESISTORS</b>			
R-1	885105	1 meg	3
R-2		0.5	Carbon
R-12	885680	68	0.5
R-16			
R-3	885153	1.5K	0.5
R-28			
R-4	885102	1K	0.5
R-5	885104	100K	0.5
R-6	884103	10K	0.5
R-7	D85153	15K	2.0



Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

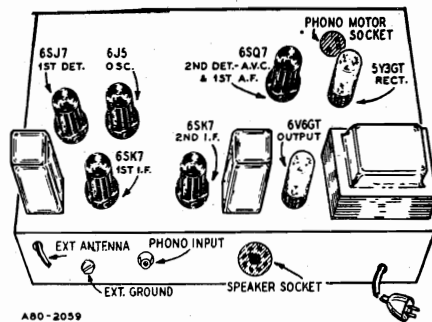
The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC  
Volume control.....maximum  
Signal input.....none  
A variation of  $\pm 10\%$  is usually permissible.





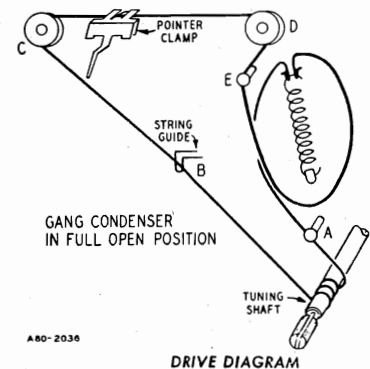
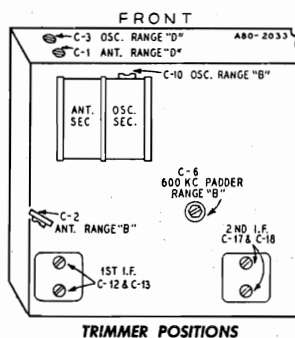




### 50 CYCLE OPERATION

If it is desired to use the radio and record player on a 50 cycle power supply, it will be necessary to replace the metal drive pulley on the record player motor shaft with a 50 cycle pulley. This pulley is listed in the parts list.

To change the pulley, turn the record selector post to the 12" position and lift the turntable off the record changer. Loosen the set screw holding the drive pulley on the motor shaft and remove the old pulley. Install the new 50 cycle pulley and replace the turntable.



### ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed. Output Indicating Meter; Non-Metallic Screwdriver. Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	Condenser Setting	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SJ7, Pin 4	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C17) & (C18) 1st I-F (C12) & (C13)
RANGE B	1600 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C10)
	1400 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A	Antenna Range B (C2)
	600 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output	600 kc (C6) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1600 and 600 kc until readjusting the oscillator Range B Trimmer (C10) causes no further improvement in output.						
RANGE D	18,300 kc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3)
	17,000 kc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Antenna Range D (C1) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output	Antenna Range B (C2)

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set

pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

## REPLACEMENT PARTS INFORMATION

**OPERATING VOLTAGES** Chassis for Model 74WG-2703A, are available for operation on the following power supply:  
105-125 volts AC, 60 cycles

**HOW TO ORDER PARTS** Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or mail Order House.

### REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description	Qty. Used in Set
<b>CAPACITORS</b>			
C-1	17A163	2.25 mfd. Ant. "D" Range Tuner	1
C-2	17A149	2.25 mfd. Osc. "D" Range Tuner	1
C-3	17A149	1.812 mfd. Loop aerial Tuner	1
C-4	46X289	.00475 180 V. Tubular	1
C-5	47X482	20 mfd. Molded	1
C-6	17A234	300-450 mfd. 600 k. Padder	1
C-7	D67301	.0005 mfd. 400 V. Tubular	1
C-8	866203	.02 200 V. Tubular	2
C-9	47X463	.47 mfd. Molded	1
C-10	47X463	Part of gang condenser C-16	1
C-11	D66403	.04 mfd. 400 V. Tubular	2
C-12		Part of 1st I-F Assembly	1
C-13	866503	.05 mfd. 200 V. Tubular	1
C-14	47X277	10 mfd. Molded	1
C-15	17A150	Gang condenser assembly	1
C-16		Part of 2nd I-F Assembly	1
C-17		50 mfd. Dual Mica	1
C-18	47X112	.01 mfd. 200 V. Tubular	1
C-19	866103	.25 mfd. 200 V. Tubular	1
C-20	47X468	Molded	1
C-21	D66203	.02 mfd. 400 V. Tubular	2
C-22		200 V. Tubular	1
C-23	866402	.004 mfd. 200 V. Tubular	1
C-24	D66302	.003 mfd. 400 V. Tubular	1
C-25	866534	.25 mfd. 200 V. Tubular	1
C-26	45X277	40 mfd. 400 V. Dry electrolytic	1
C-27		20 mfd. 450 V. Ceramic	1
C-28	47X182	7 mfd. Ceramic	1
<b>RESISTORS</b>			
R-1	885225	2.2 meg. 0.5 Carbon	2
R-2	884393	39,000 0.5 Carbon	1
R-3	884222	2200 0.5 Carbon	1
R-4	C94103	10,000 1.0 Carbon	1
R-5	884272	2700 0.5 Carbon	1
R-6	884683	68,000 0.5 Carbon	1
R-7	C84393	39,000 1.0 Carbon	1
R-8	885105	1.0 meg. 0.5 Carbon	1
R-9	885473	47,000 0.5 Carbon	1
R-10	36X311	500,000 Volume control, ON/OFF switch	1
R-11	885475	4.7 meg. 0.5 Carbon	1
R-12	885474	470,000 0.5 Carbon	1
R-13	885534	330,000 0.5 Carbon	1
R-14	40X259	3 meg. Tone control	1
R-15	883913	91,000 0.5 Carbon	1
R-16	883624	620,000 0.5 Carbon	1
R-17	885221	220 0.5 Carbon	1

Ref. No.	Part No.	Description	Qty. Used in Set
<b>TRANSFORMERS AND COILS</b>			
T-1	9A1451	Antenna transformer assembly "D"	1
T-2	9A1452	Outtuner coil assembly	1
T-3	9A1810	1st I-F Transformer and can assembly	1
T-4	9A1811	2nd I-F Transformer and can assembly	1
T-5	51X97	Output transformer	1
T-6	53X235	117 volt, 60 cycle standard power transformer	1
T-7	9A1395	"B" Band loop antenna	1
<b>MISCELLANEOUS</b>			
12A455		10" Electro dynamic speaker	1
3A303		Cone and voice coil assembly (Specify part number and letter stamped on speaker)	1
3A323		Speaker socket-oval (8 prong) molded	7
3A304		Phone motor socket	1
3A305		Single pin-tip socket (phone)	1
10A579		Knob (Volume control)	1
10A578		Knob (Tuning)	1
10A619		Knob (Band control)	1
13X328		Line cord and plug assembly	1
2A177		Band and phone switch	1
8X59		Rubber chassis cushions (chassis to cabinet)	4
<b>DIAL AND DRIVE ASSEMBLY</b>			
25X839		Gang mounting bracket	1
6X26		Rubber cushioning	4
20X347		Can. cushion studs	4
19X432		Flat washer	4
26A459		Pulley Mtg. Plate Assem. Complete with idler pulleys, idler studs, brace bracket, string guide and dial back-board	1
58X681		Dial scale glass	1
30X184		Glass cleop	2
4X962		Dial acutcheon	1
		No. 2 x 3/4 Phillips Fr. oval hd. flat bronze (screws for acutcheon mounting)	5
15X190		Pointer	1
10X59		Drive card	1
28X113		Drive card tension spring	1
26X336		Drive shaft	1
23X580		Drive shaft bracket	1
19X192		IC- washers for drive shaft	2
7A142		Dial light socket assembly	2
41X75		Dial light (No. 31)	2
		Light shield	2
<b>TYPE W-28AIII RECORD CHANGER PARTS</b>			
		W-15X084-6 Motor assembly, 60 cycle, 115 volt	1
		Asstic L-75 Crystal cartridge	1
		W41P544-4 50 cycle drive pulley	1

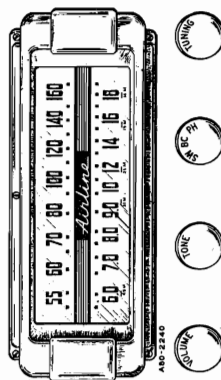
### RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts usually permissible.

Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	INPUT FOR .5 WATT OUTPUT
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead	Chassis	2.3 microvolts
1000 kc	.05 mf	6S/7 1st Detector, Pin 4	Same as above	17 microvolts
455 kc	.05 mf	6S/7 1st Detector, Pin 4	Same as above	13.0 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1300 microvolts
455 kc	.05 mf	6SK7 2nd I-F, Pin 4	Same as above	3400 microvolts
400 cycles	.05 mf	6SQ7 1st A-F, Pin 2	Same as above	.07 volt
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.8 volts

### ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC, 60 cycles, 55 watts normal, 72 watts phono operating  
Frequency Range.....B range—540-1600 KC  
D range—571 to 18.3 MC  
Selectivity.....43 KC broad at 1000 times signal, 1000 KC (for .5 watt output) with external antenna  
Sensitivity.....B range—2.5 microvolts average  
D range—12 microvolts average  
Power Output.....3.5 watts maximum  
2 watts, 10% distortion  
Loud Speaker.....Electro dynamic  
Voice Coil Impedance...3.2 ohms at 400 cycles



## MOTOROLA, INC.

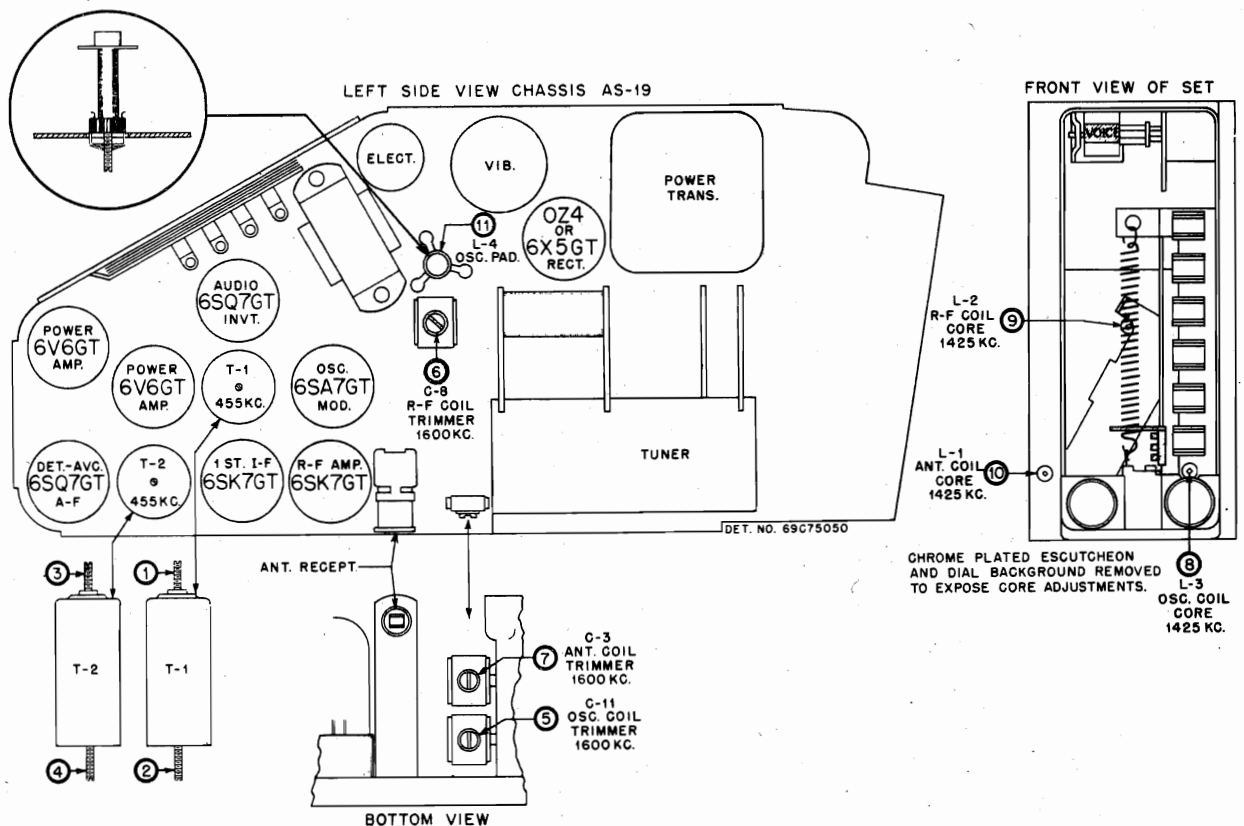


FIGURE 5. TUBE AND TRIMMER LOCATION DETAIL.

## ALIGNMENT TABLE

Refer to Figure 5 for location of trimmers and adjustable iron cores.

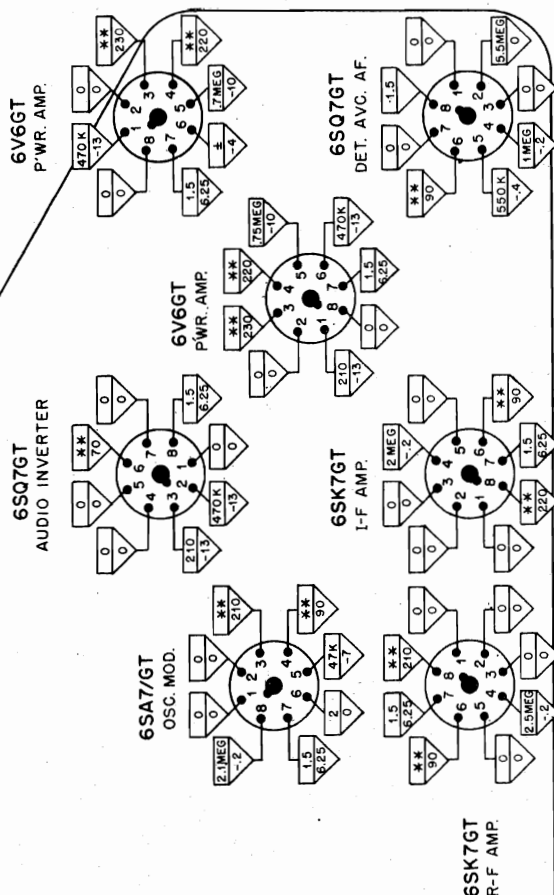
STEP	TUNER POSITION SET TO	DUMMY ANTENNA	SIGNAL GENERATOR LEAD CONNECTED TO	SIG. GEN. SET AT	ADJUST FOR PEAK ON OUTPUT METER
1.	High frequency end (cores out)	.1 mfd. at Sig. Gen.	Osc.-Mod. grid (#5 pin)	455 Kc	#1 and 2 P & S in T-1 #3 and 4 P & S in T-2
2.	High frequency end, 60 mmf. at tuning shaft against stop. Cores should be set to project 1-1/8" from cans.	60 mmf. at Sig. Gen. in series in set to project 1-1/8" 21" long coax lead.	Antenna Receptacle	1600 Kc	#5 Osc. trimmer C-11 #6 R.F. trimmer C-8 #7 Ant. trimmer C-3
3.	EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward.	"	"	1425 Kc	#8 Osc. Core of L-3 #9 R.F. Core of L-2 #10 Ant. Core of L-1
4.	EXACTLY four more full turns in (as indicated by knob setscrew)	"	"	Power turned OFF	#11 Osc. Pad core of L-4 for maximum noise.
5.	Assemble and install receiver in car and connect car antenna. Turn the dial to approximately 1400 Kc (not to a local station) and adjust antenna trimmer for maximum noise. This adjustment is referred to as Antenna Padder in Figure 7.				

NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3, and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with.

MOTOROLA, INC.

Power Input: 10 A. at 6.3V  
(including speaker field)

Power Output: 9 watts



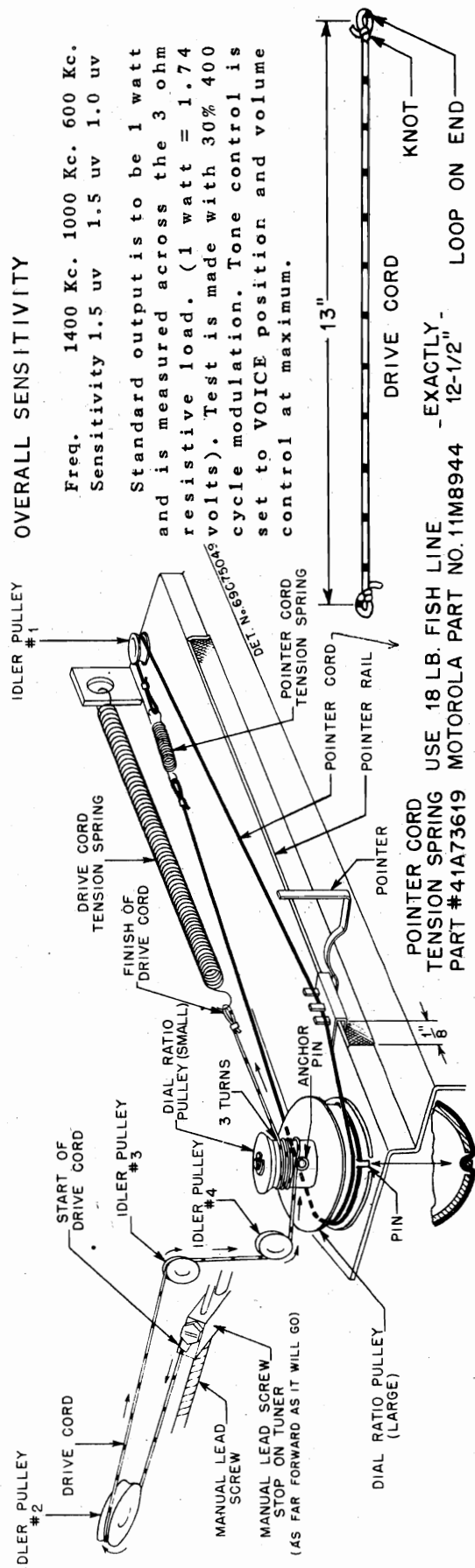
DET. NO. 63C75052

## VOLTAGE AND RESISTANCE DIAGRAM

## OVERALL SENSITIVITY

Freq. 1400 Kc. 1000 Kc. 600 Kc.  
Sensitivity 1.5 uv 1.5 uv 1.0 uv

Standard output is to be 1 watt and is measured across the 3 ohm resistive load. ( $1 \text{ watt} = 1.74 \text{ volts}$ ). Test is made with 30% 400 cycle modulation. Tone control is set to VOICE position and volume control at maximum.



USE 18 LB. FISH LINE  
MOTOROLA PART NO. 11M8944  
- EXACTLY -  
12-1/2"

**MODEL CR6**

**MOTOROLA, INC.**

## ELIMINATION OF IGNITION INTERFERENCE

- a. Install distributor suppressor.
- b. Install generator condenser.

Mount the generator condenser on the generator frame, under the ground lead screw. Connect the space tip end of the condenser wire under the battery terminal of the generator. **WARNING: Do not connect the condenser wire to the field terminal.**

- c. Install hood bonds.

Remove one of drive screws that holds the cloth tape along the rear edge of the hood. Insert Hood Bond under tape so hole lines up with hole drive screw was in, put in self-tapping screw and fold back over tape so rough points of hood bond are against under side of hood when hood is closed.

## ADDITIONAL MOTOR NOISE HINTS

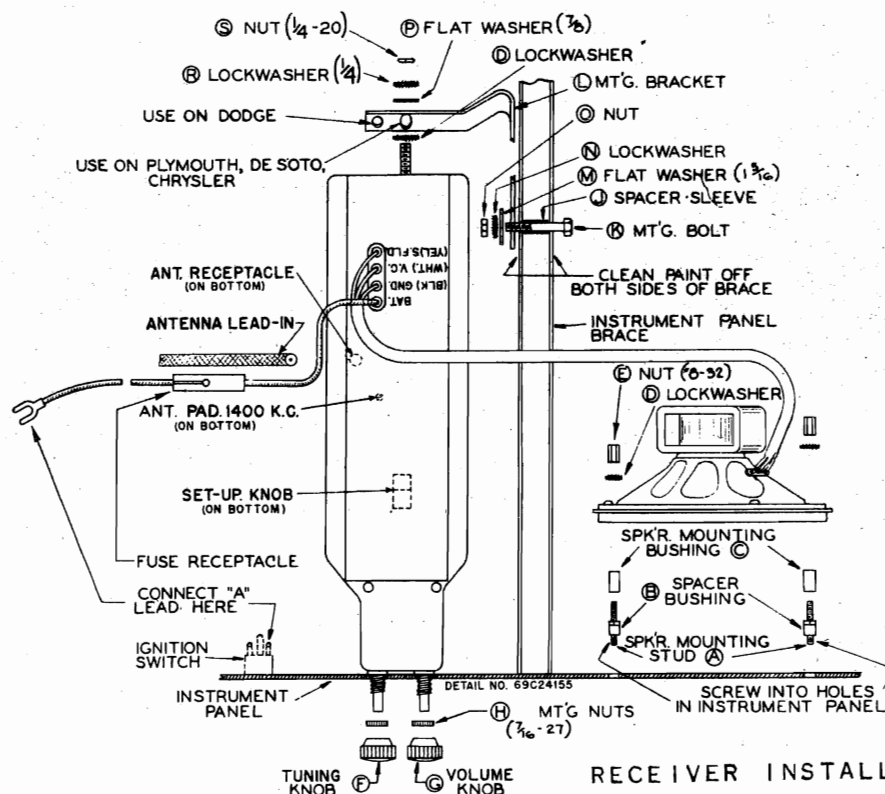
In most cars, the steps outlined above will completely take care of ignition interference. However, there are occasions when additional corrections are needed. Below are listed some suggestions which may be helpful in curing these unusual cases.

- a. When checking the car for motor noise, clamp the hood down tight.

b. Motorola Hood Bonds (Part No. 39A4205) should be installed at the shoulders so that the hood makes a good-ground to the cowl of the car on the side the antenna is mounted.

- c. Wheel static can be cured by installing static collectors in the front hub caps. (Part No. 9A20513).

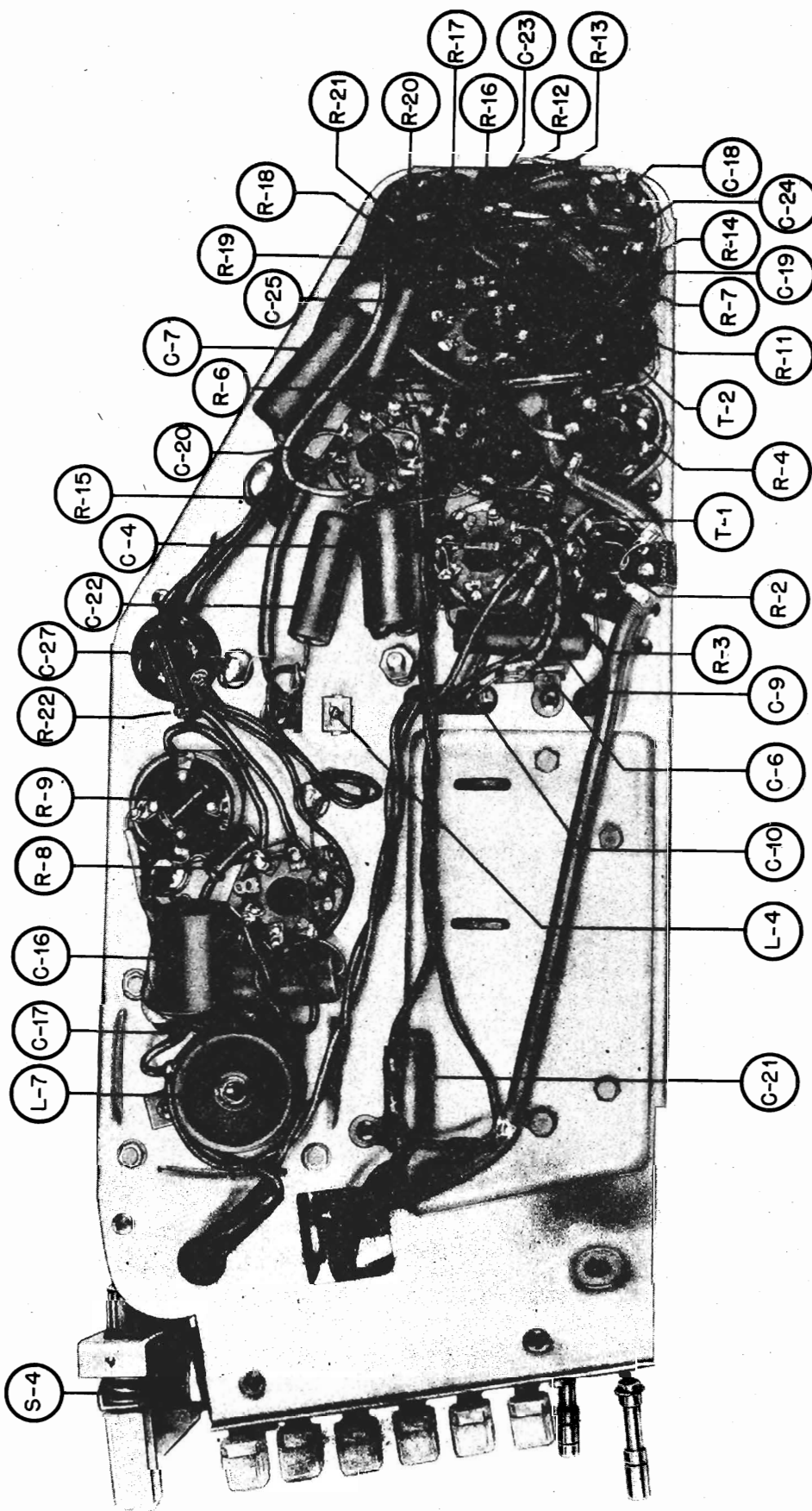
- d. If required, install an ammeter condenser, (Part No. 8K4661).



RECEIVER INSTALLATION DETAIL

MODEL CR6

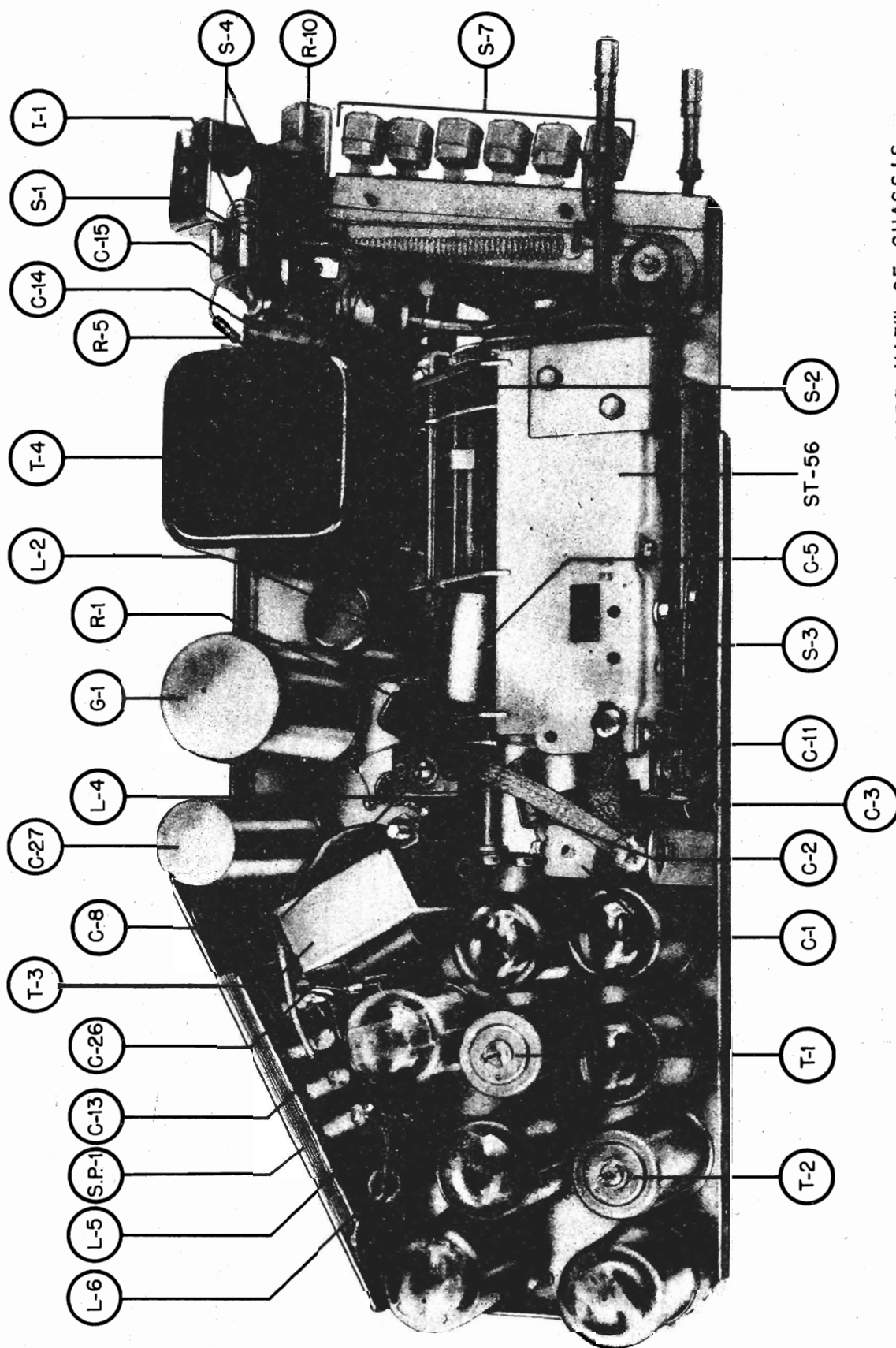
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RIGHT SIDE VIEW OF CHASSIS



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LEFT SIDE VIEW OF CHASSIS.

MODEL CR6  
MODEL PD6  
MODELS FD6, NH6

MOTOROLA, INC.

## SETTING THE PUSH BUTTONS

### PROCEDURE

- a. Turn ON the receiver
- b. Press the manual button marked "M"
- c. Turn the tuning knob until the desired station is tuned in.
- d. Press the number one button.
- e. Turn the set-up lever CLOCK-WISE (right) as far as it will go and release allowing it to return.
- f. Turn the tuning knob until the previously noted program is heard. (The dial will not indicate the station to which the button is set.)

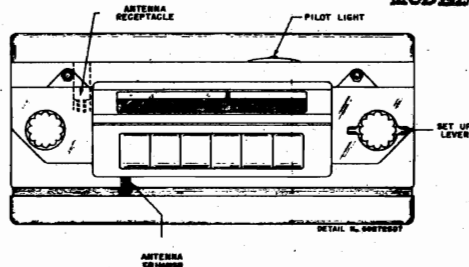
NOTE: The dial pointer may reach the end of the dial scale before the desired station is received. However, continue turning the tuning knob until the station is received. The dial pointer mechanism will not be affected.

- g. Press the "M" button and the "1" button is set.

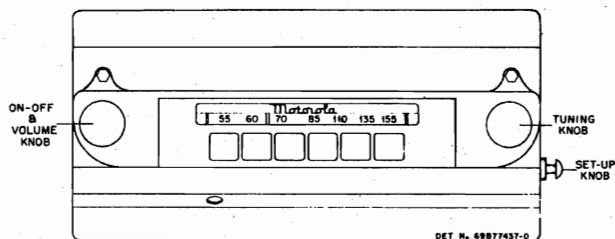
NOTE: Check the setting of the automatic button by tuning in the desired station, having the "M" button pushed in and then push the automatic button, either button should give the same volume and clarity.

- h. Repeat the above procedure, steps b and through g for each of the push buttons.

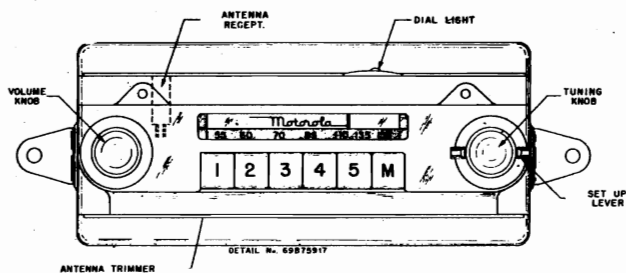
MODEL NH6



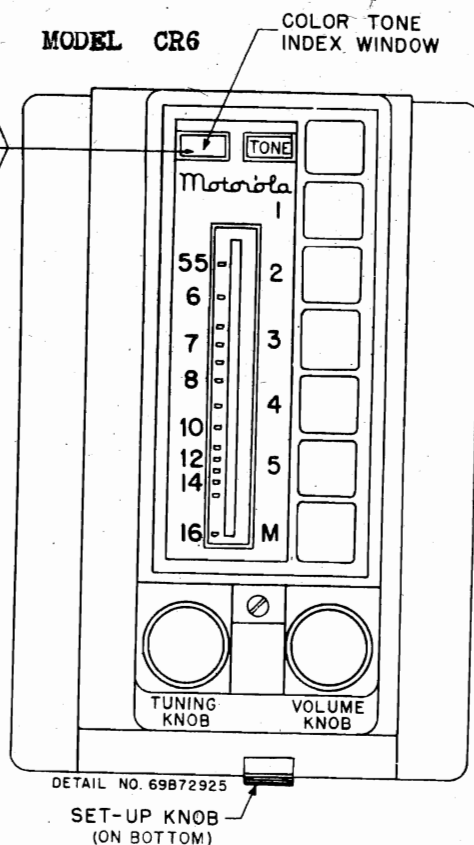
MODEL PD6



MODEL FD6



MODEL CR6



## MOTOROLA, INC.

MODEL CR6	MODEL 405
MODELS CT6,OE6,PC6	MODEL 505
MODELS FD6,NH6	MODEL 605
MODEL PD6	MODEL 705

Two types of I.F.-Diode transformers have been used. The assemblies, if necessary, with same transformer shields for the late type as in the receiver. units have a powdered iron sleeve whereas none was used with the early I.F.-Diode transformers. See Figure 5.

Replace transformer coil as- The capacitor across each winding of both types of I.F.-Diode transformers is a dual 100 mmf. wafer type silver mica,

The late transformer or which is a part of the transformer shield assemblies are not inter-changeable with the early ones. Although a late transformer and EARLY SETS shield can be used to replace an early transformer and shield combination, it is not recommended because of difficulty in replacing shields which are staked to the chassis. Do not attempt to intermix the transformers and shields. If the wrong combination of transformer and shield is used, the transformer will not peak at the I.F. frequency of assembly: 455 Kc.

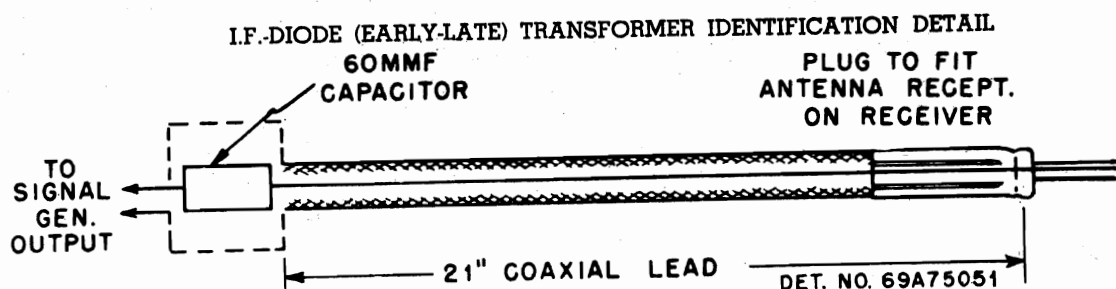
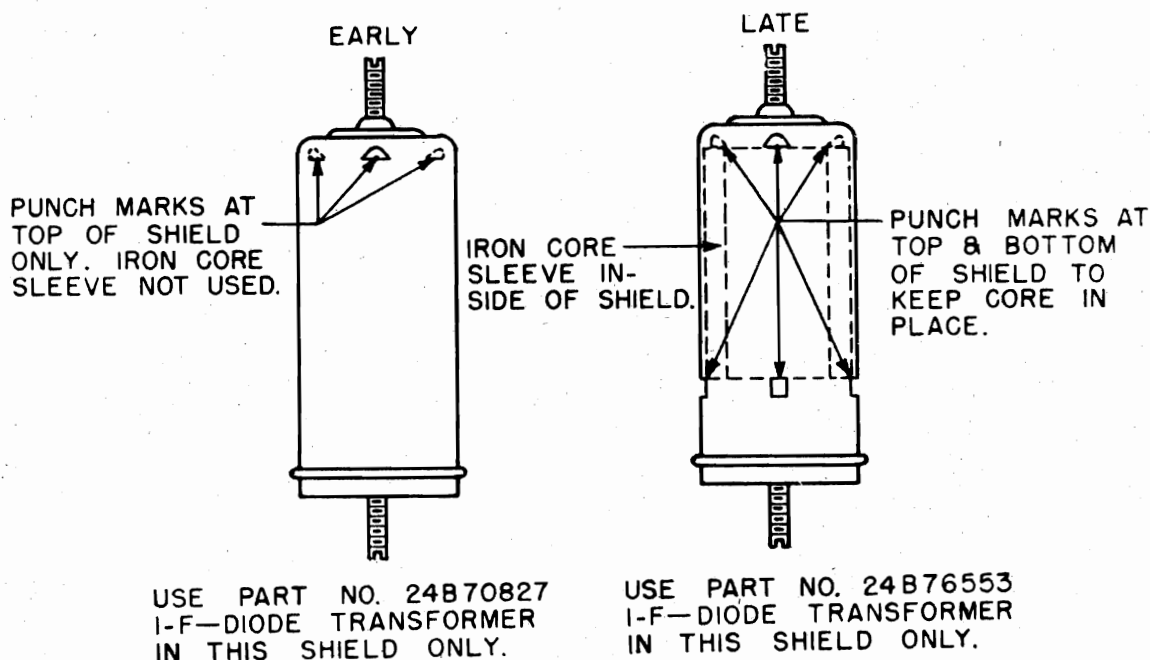


FIGURE 2. DUMMY ANTENNA CONSTRUCTION DETAIL

## MODEL CR6

## MOTOROLA, INC.

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
C-1	21A20877	Capacitor, fixed: metal mica; 90 mmf	C-26	8K13165	Capacitor, fixed: paper; .003 F-1	F-1	65K4537	Fuse: 20 amp; type 3AG	1X71047	Core & Palnut Assembly (I.F. & diode coil top tuning iron core with nut)
C-2	8A4529	Capacitor, fixed: paper; .006 mf 100 V	C-27	23A75429	Capacitor, electrolytic: 20-201-1 mf 400 V, 20 mf 25V	0-1	48S3533	Vibrator, non-sync.	1X71048	Core & Clip Assembly (I.F. & diode bottom tuning iron core & clip)
C-3	20A70801	Capacitor, variable: mica; 50-180 mmf	NOTE: Unless otherwise specified, all Resistors are 20%.				1A71881	solenoid tuner ST-56 Service Manual before replacing.		Lead, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on other end.
C-4	8A14791	Capacitor, fixed: paper; .05 mf 400 V	R-1	6R0032	Resistor, fixed: carbon; 470,000 1/2W Ins.	L-2	1A71881	Coil, antenna or R.F. (See Manual before replacing).	1X4985	Lead, fuse: 20" long; fuse receptacle on one end, spade lug on other end.
C-5	8A19133	Capacitor, fixed: paper; .5 mf 100 V	R-2	6R0075	Resistor, fixed: carbon; 100,000 1/2W Ins.	L-3	1A71879	Coil, oscillator. (See Manual before replacing).	1X4984	Lead, speaker: 3 conductor rubber covered lead with insulated pin terminals on one end
C-6	8A14791	Capacitor, fixed: paper; .05 mf 400 V	R-3	6R0056	Resistor, fixed: carbon; 47,000 1/2W Ins.	L-4	24A70227	solenoid tuner ST-56 Service Manual before replacing.	1X27819	Pointer & Slider Assembly
C-7	8K13166	Capacitor, fixed: paper; .1 mf 400 V	R-4	6R0106	Resistor, fixed: carbon; 10,000 1W N.I.			Coil, oscillator padder: includes mounting clip and adjustable iron core.	1X72125	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together
C-8	20A70801	Capacitor, variable: mica; 50-180 mmf	R-5	6R0028	Resistor, fixed: carbon; 22,000 1/2W Ins.	L-5	24K70840	Coil, "A" choke	1X74106	Receptacle, antenna: metal ferrule with ins. contact
C-9	21K70720	Capacitor, fixed: mica; 5 mmf	R-6	6R0147	Resistor, fixed: carbon; 330 1W Ins.	L-6	24K75325	Coil, dial light & speaker field choke: 9 turns #16 yellow wire		Socket, tube: 4 prong (vibrator socket)
C-10	21R6513	Capacitor, fixed: mica; 50 mmf 300 V	R-7	6R0004	Resistor, fixed: carbon; 1 meg. 1/2W Ins.	L-7	24A70199	Coil, "A" choke: with mounting bracket	9A6788	Socket, tube: octal; plain
C-11	20A70214	Capacitor, variable: mica; 30-60 mmf	R-8	6R0005	Resistor, fixed: carbon; 50 1/2W N.I.	S-1	Part of R-10 Switch; SPST (Part of volume control R-10)		9A70185	Socket, tube: octal; shielded type (for R.F. & I.F. amp)
C-12	21A71872	Capacitor, fixed: ceramic; 400 mmf	R-9	6R0005	Resistor, fixed: carbon; 50 1/2W N.I.	S-2	40B70862	Switch, selector	1X74142	Speaker Assembly: includes mounting plate and connecting cable
C-13	8A17028	Capacitor, fixed: paper; .5 mf 100 V	R-10	18A71825 or 18A70172	Resistor, variable: carbon; .5 meg. with SPST switch	S-3	1B70944	Switch Assembly, solenoid	50B71900	Speaker: 8" electro; 3 ohm V.C. less mtg. plate and lead
C-14	8K23690	Capacitor, fixed: paper; .01 mf 400 V	R-11	6R0056	Resistor, fixed: carbon; 47,000 1/2W Ins.	S-4	1X74087	Switch, tone control: with brackets; complete		
C-15	8K23690	Capacitor, fixed: paper; .01 mf 400 V	R-12	6R0027	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.	S-5	40A70831	Switch, mute		
C-16	8A17028	Capacitor, fixed: paper; .5 mf 100 V	R-13	6R0118	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.	S-7	1K73225	Spark plate assembly		
C-17	8A12840	Capacitor, fixed: paper; .006 mf 1000 V	R-14	6R0015	Resistor, fixed: carbon; 220,000 1/2W Ins.	S.P.1	1X75194	Transformer, I.F. or diode: 455 kc; iron core tuned; less shield can. (Used in early sets only)		
C-18	21A70176	Capacitor, fixed: mica; dual 120 mmf	R-15	6R0015	Resistor, fixed: carbon; 220,000 1/2W Ins.	T-1	24B70827	less shield can. (Used in early sets only)		
C-19	21R6513	Capacitor, fixed: mica; 50 mmf 300 V	R-16	6R0004	Resistor, fixed: carbon; 1 meg. 1/2W Ins.	T-2		Transformer, I.F. or diode: 455 kc; iron core tuned; less shield can. (Used in early sets only)		
C-20	21R6538	Capacitor, fixed: mica; 1000 mmf 500 V	R-17	6R0253	Resistor, fixed: carbon; 150 10K 1W N.I.			Transformer, output	50B74948 or 50B74041	Suppressor, distributor
C-21	8A4736	Capacitor, fixed: paper; .002 mf 400 V	R-18	6R0614	Resistor, fixed: carbon; 56 10K 1/2W Ins.			Transformer, power	6X17117	Switch, tone: consists of switch leafs, contacts and insulator assembly only.
C-22	8K13166	Capacitor, fixed: paper; .1 mf 400 V	R-19	6R0032	Resistor, fixed: carbon; 470,000 1/2W Ins.	T-3	25K72044	Accessories, Group CR6: includes all parts necessary to install receiver in car, except speaker assembly and receiver mounting bracket.	1X74109	Tone Indicator Assembly: consists of clear plastic indicator drum; bakelite cam and ratchet, and colored tone strip
C-23	8K23690	Capacitor, fixed: paper; .01 mf 400 V	R-20	6R0407	Resistor, fixed: carbon; 220,000 10K 1/2W Ins.			Capacitor, generator cord, Assembly: dial pointer cord	1X74080	Tuner, Model ST-56- CR6 (com plate)
C-24	21R6648	Capacitor, fixed: mica; 250 mmf 500 V	R-21	6R0414	Resistor, fixed: carbon; 270,000 10K 1/2W Ins.		8A4491	Capacitor, generator cord		
C-25	8K23690	Capacitor, fixed: paper; .01 mf 400 V	R-22	6R0194	Resistor, fixed: carbon; 1000 1W N.I.		1X74111	Cord, Assembly: drive cord; with lug on one end		

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MODELS CT6, OE6, PC6

## SETTING THE PUSH BUTTONS

1. Turn ON the receiver.
2. Press the push button marked "M"
3. Turn the tuning knob until the desired station is tuned in. (Make mental note of the program)
4. Press the number one button.
5. Turn the set-up lever CLOCK-WISE (right) as far as it will go and release, allowing it to return.
6. Turn the tuning knob until the previously heard program is heard. (The dial will not indicate the station to which the button is set).

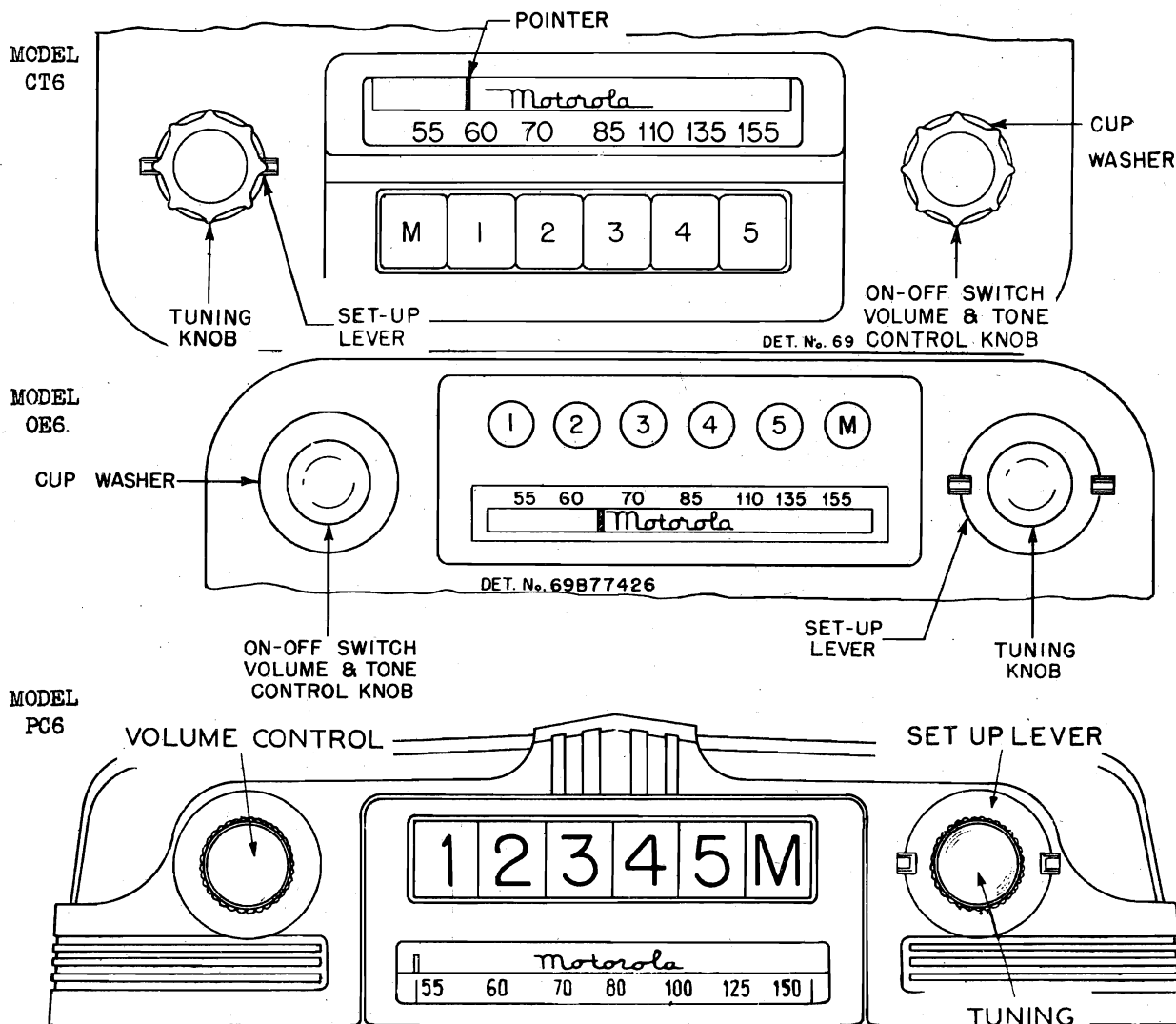
NOTE: The dial pointer may reach the end of the dial scale before

the desired station is received. However, continue turning the tuning knob until the station is received. The dial pointer mechanism will not be affected.

7. Press the "M" button and the number one push button is set.

NOTE: Check the setting of the automatic button by tuning in the desired station having the "M" button pushed in, and then push the automatic button that is set to the same station that was tuned in manually, either button should give the same volume and clarity. Any difference indicates that the push button was not set correctly.

8. Repeat the above procedure, steps 2 through 7 for each of the push buttons.



MODELS CT6, OE6, PC6

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**WARNING: CHECK VOLTAGE REGULATOR**

Many late cars develop exceedingly high voltage due to improper adjustment of voltage regulator, which shortens the life of radio tubes, vibrator, electrical accessories and headlights. When

voltage exceeds 7.3 volts with motor running at about 35 miles per hour and no load on battery, have the voltage regulator adjusted for maximum voltage of 7.3 volts under a no load condition.

**TO REPLACE DIAL LIGHT**

It will be necessary to remove set from car when replacing dial light. Pry out large snap

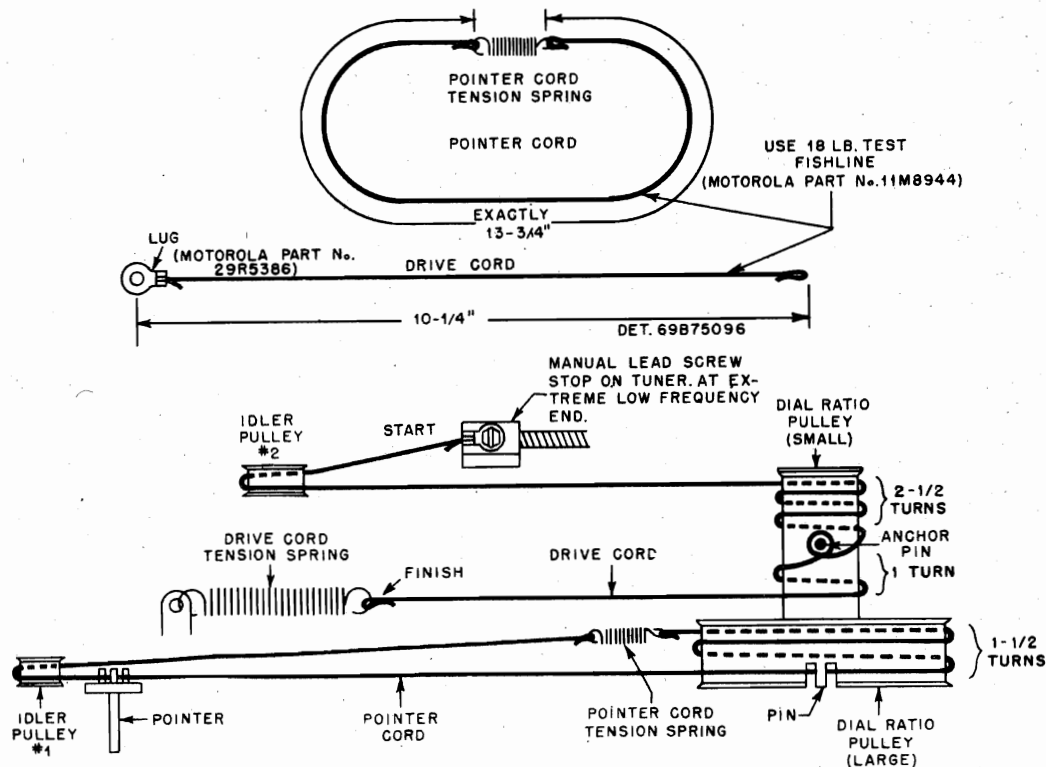
button directly under push-button "M" and replace with a #44 bayonet base pilot lamp.

**POINTER AND DRIVE CORD REPLACEMENT****PREPARE RECEIVER AS FOLLOWS**

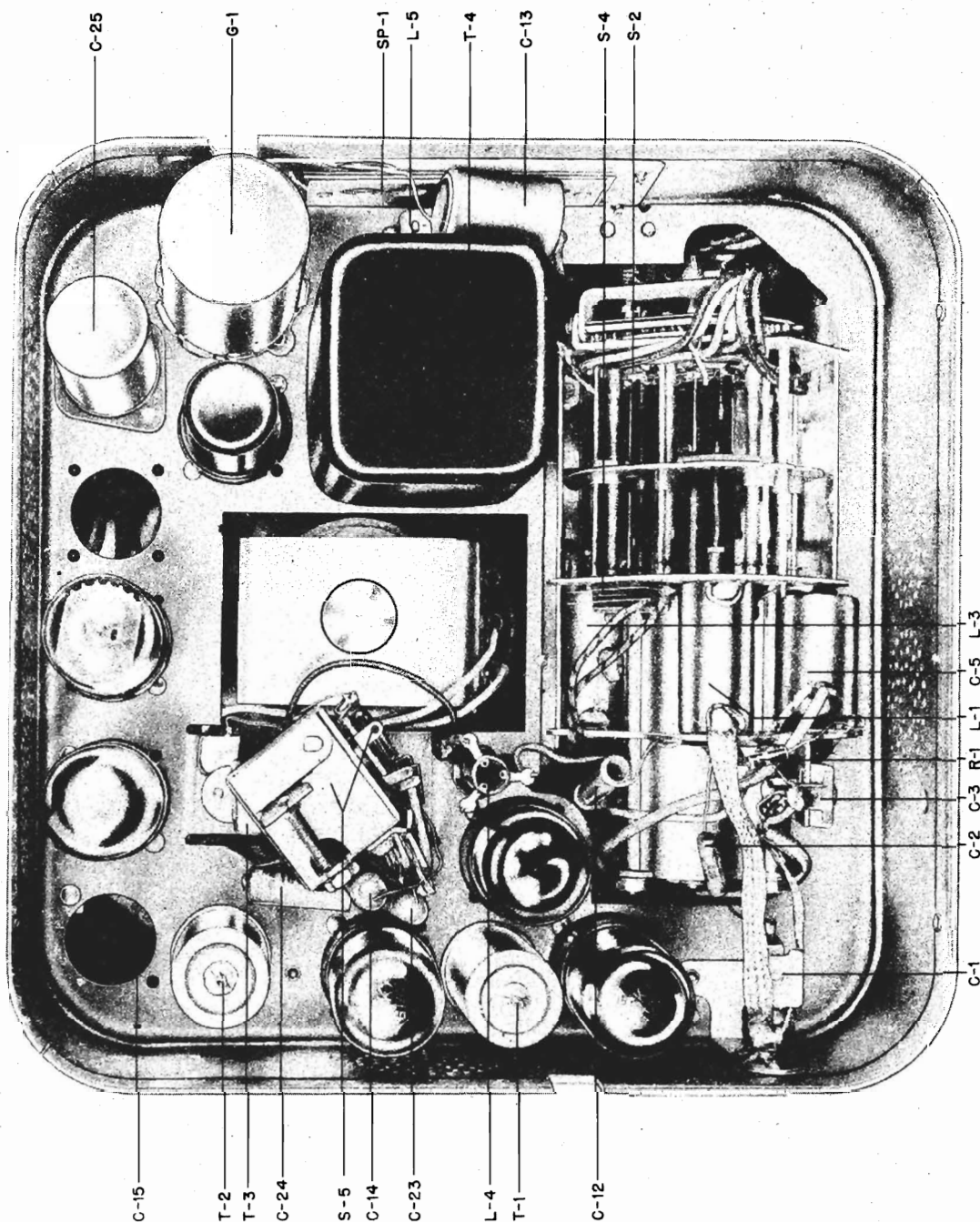
1. Remove the front cover.
2. Remove the dial background. Two snap-in eyelets hold it in position.
3. Remove the push button assembly. Four screws hold it in position. Do not unsolder any

wire leads; just lay the push button assembly on top of the set.

4. The pointer & drive cords are now fully exposed. If only the pointer cord is to be replaced, temporarily remove the drive cord from dial ratio pulley to make the pointer cord more readily accessible.

**POINTER AND DRIVE CORD RESTRINGING DETAIL**

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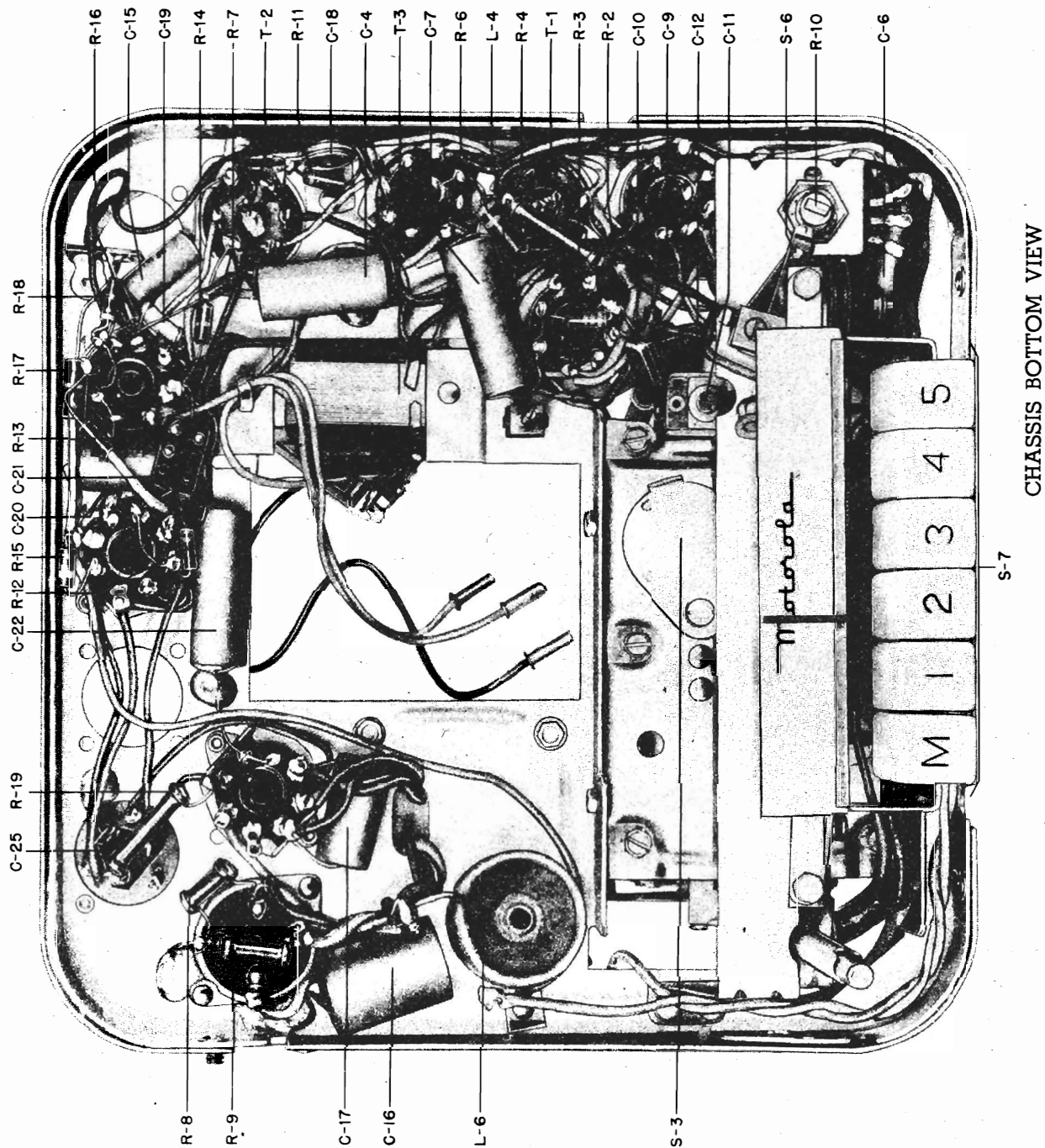


CHASSIS TOP VIEW



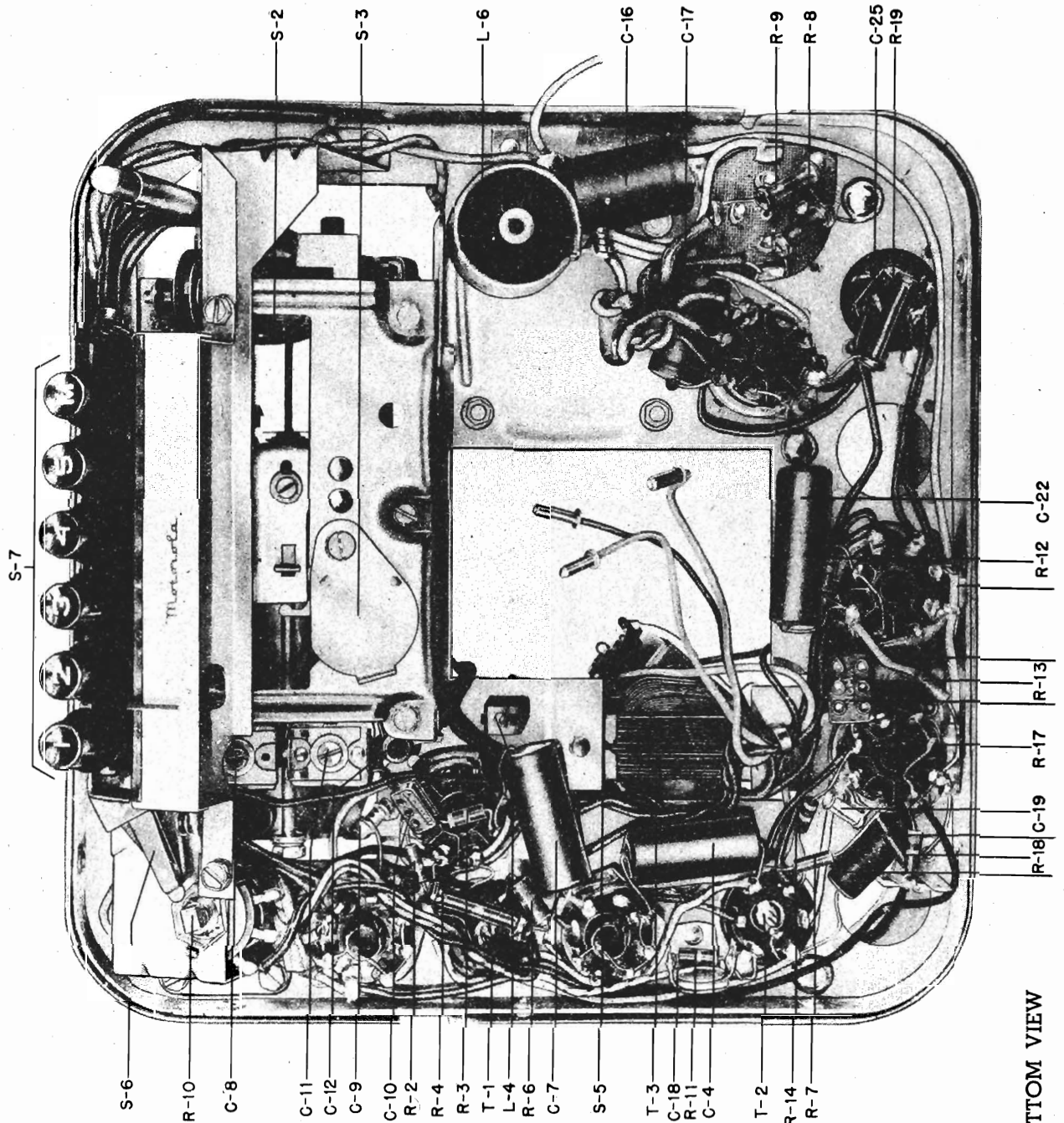
MODEL CT6

MOTOROLA, INC.





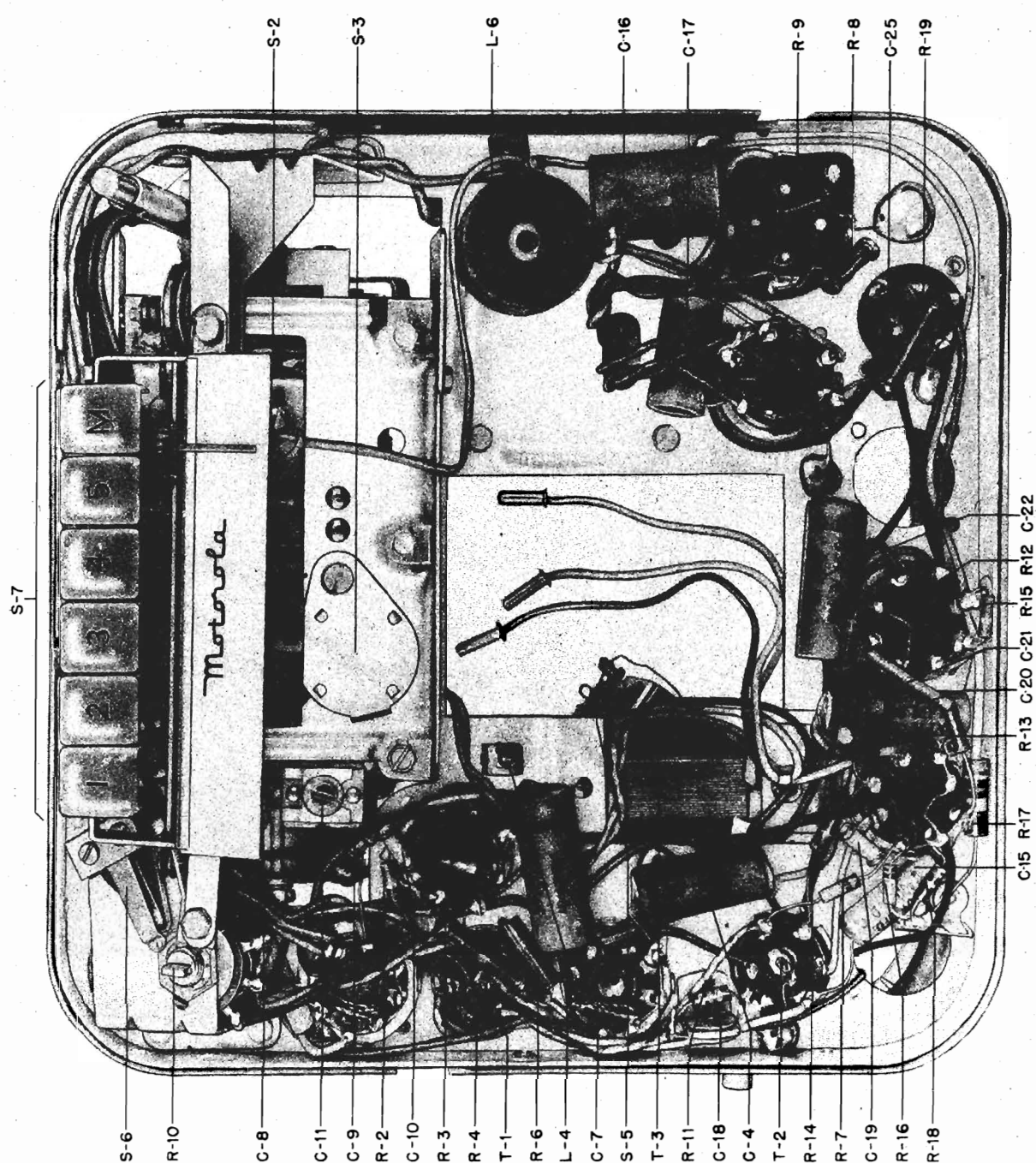
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CHASSIS BOTTOM VIEW

MODEL PC6

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CHASSIS BOTTOM VIEW

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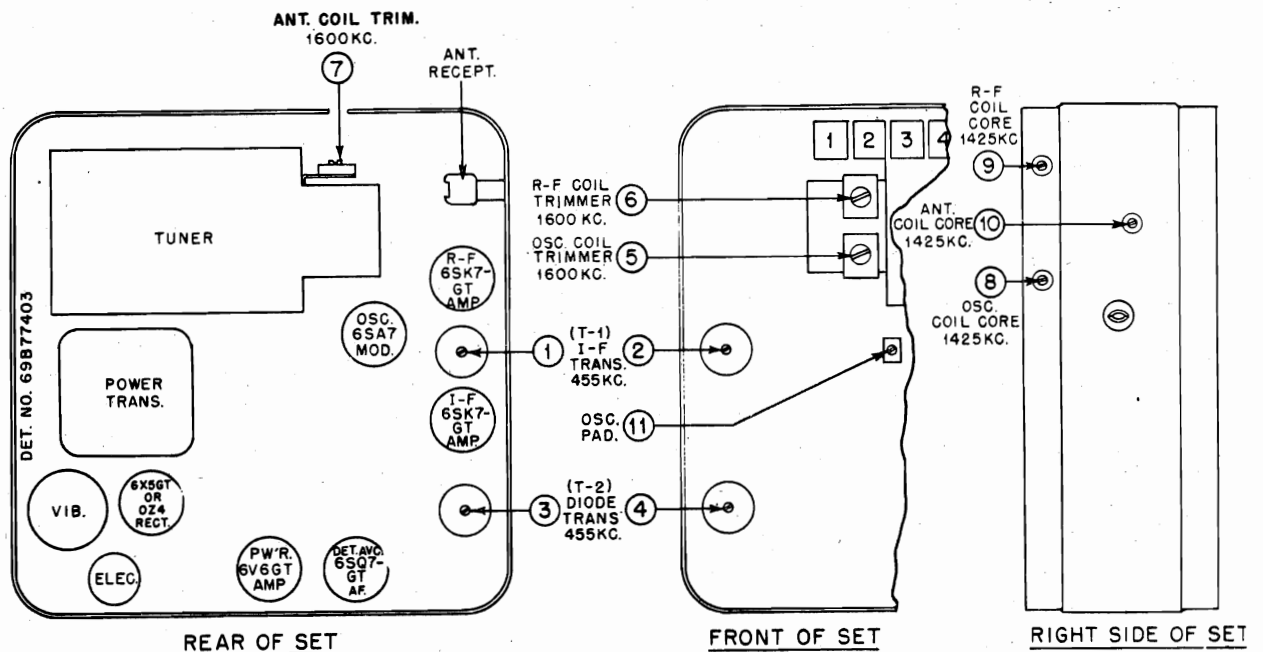
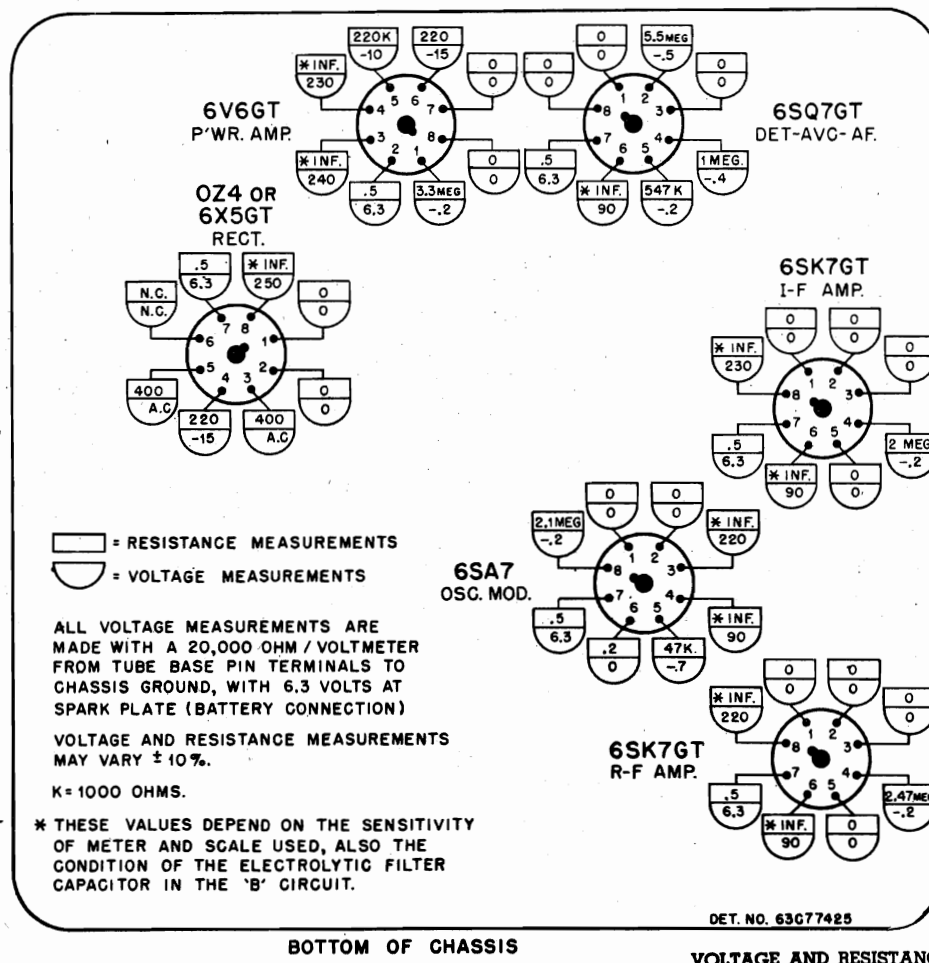


FIGURE 3. TUBE AND TRIMMER LOCATION DETAIL



BOTTOM OF CHASSIS

VOLTAGE AND RESISTANCE DIAGRAM

MODELS CT6,OE6,PC6  
MODELS FD6,NH6  
MODEL 405,MODEL 505  
MODEL 605,MODEL 705

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STEP	TUNER POSITION SET TO	DUMMY ANTENNA	SIGNAL GENERATOR LEAD CONNECTED TO	SIG. GEN. SET AT	ADJUST FOR PEAK ON OUTPUT METER
1.	High frequency end (cores out)	.1 mfd. at. Sig. Gen.	Osc Mod grid (#5 pin)	455 Kc	#1 and 2 P & S in T-1 #3 and 4 P & S in T-2
2.	High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans. *	60 mfd. at. Sig. Gen. in series with 21" long coax lead.	Antenna receptacle	1800 Kc	#5 Osc. coil trimmer #6 R.F. coil trimmer #7 Ant. coil trimmer
3.	EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward *	"	"	1425 Kc	#8 Osc. coil core #9 R.F. coil core #10 Ant. coil core
4.	EXACTLY four more full turns in (as indicated by knob set screws)	"	"	Power turned Off.	#11 Osc. Pad. core for maximum noise

NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3, and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with.

Assemble receiver and peak antenna trimmer (#7) to car antenna. The antenna trimmer is located at the top of the receiver and is inaccessible when the receiver is installed behind instrument panel, therefore, it is necessary to adjust antenna trimmer before final installation. Proceed by laying set on floor of car, connect antenna and "A" leads, tune set to a spot around 1400 kc that is free of stations and adjust antenna trimmer for maximum noise. The antenna should be fully extended.

IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.

#### TUNING RANGE

535 to 1600 K.C.

I. F. Frequency - 455 kc.

#### ELECTRICAL CHARACTERISTICS

Power Input: 6 Amp. at 6.3V (with P.M. dynamic type speaker)  
7.5 Amp. at 6.3V (with electrodynamic type speaker)

Power Output: 5.6 watts (max.)

#### OVERALL SENSITIVITY

Frequency	1400 Kc	1000 Kc	600 Kc
Sensitivity	1.4uv	1.6uv	1.4 uv

Standard output is to be 1 watt and is measured across the 3 ohm resistive load. (1 watt = 1.74 volts). Test is made with 30% 400 cycle modulation. Tone control is set to voice position (high) and volume control at maximum. Signal is fed through 60 mfd. dummy to antenna connector of set through 21" coaxial lead. See Figure 2 for dummy antenna detail.

#### ALIGNMENT

##### EQUIPMENT REQUIRED

1. A special tool for adjusting the tuner cores. Use alignment tool, Motorola Part No. 68A76278.

2. A small screwdriver for I.F. and R.F. Alignment.

3. A modulated signal generator 3. that can be accurately tuned to the frequencies indicated in the alignment chart.

4. A special dummy antenna for R.F. alignment. Construct dummy antenna per instructions given in Figure 2. The 21" coaxial lead needed in its construction is the same type as used for lead-in on Motorola car antenna.

5. A low range output meter.

6. A special tuner gauge, Motorola Part No. 66X76825, for accurately setting tuner to exact alignment frequencies is available. Instructions on its use come with the gauge. Receiver can be aligned without using gauge, but use of gauge will help you to do a speedier and more accurate job.

##### PROCEDURE

1. Remove the front and rear covers. All adjustments are now exposed. Refer to Figure 3 for their location.

2. Turn the receiver on and allow it to warm up for a few minutes. Press the "M" button to place automatic tuner in manual tuning position.

3. Connect the output meter across the speaker voice coil.

4. Set receiver volume control at maximum and tone control to voice position (high position).

5. Refer to the following alignment chart for procedure.

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MODELS CT6, PC6, OE6

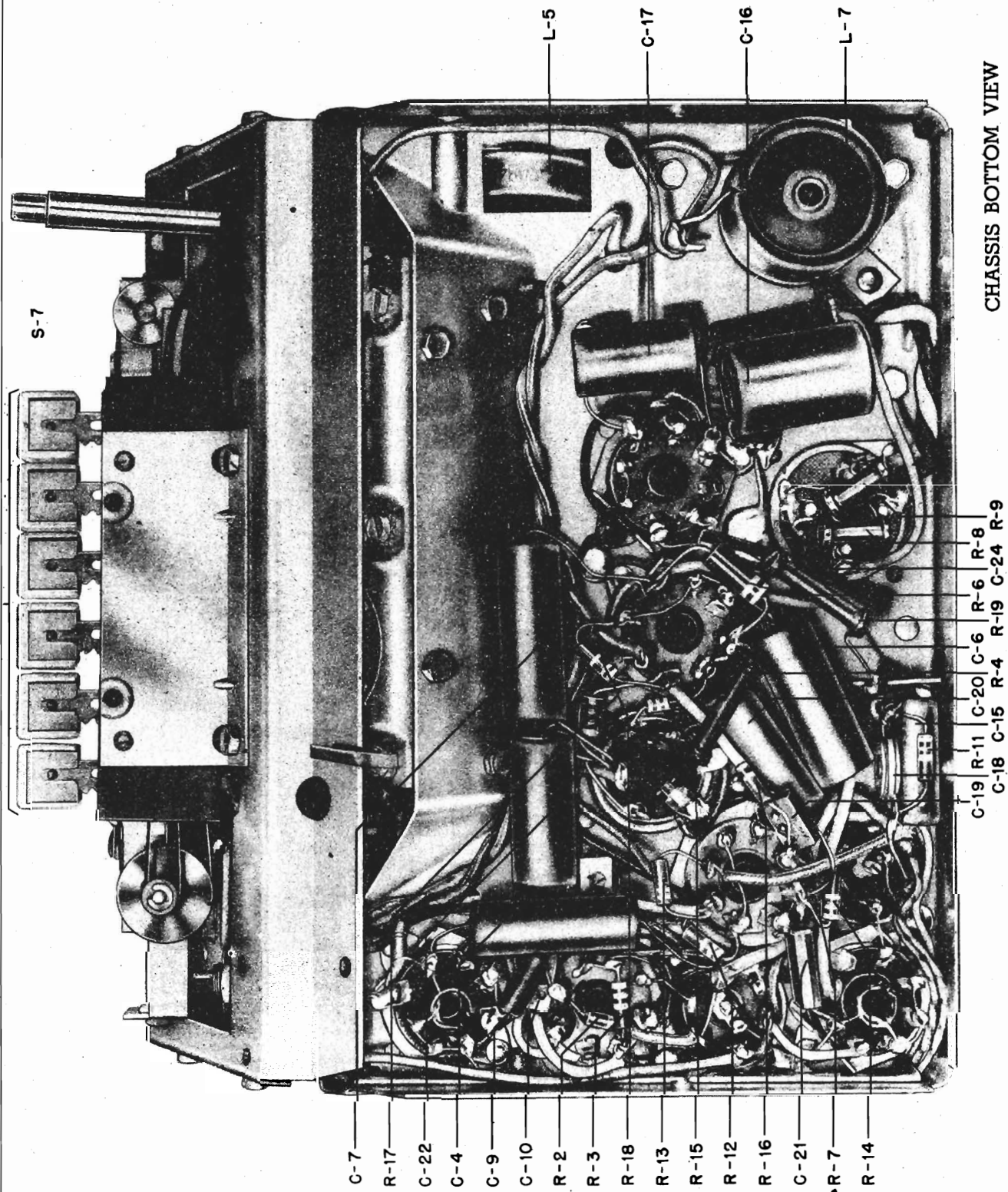
## MOTOROLA, INC.

PARTS LIST - MODELS CT6, PC6, OE6			REF NO.	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	
REF NO.	PART NO.	DESCRIPTION	R-4	6RQ108	Resistor, fixed: carbon; 10,000 1W N.I.	9A12705	Plate, electrolytic capacitor mtg.: bakelite wafer	
C-1	21A20877	Capacitor, fixed: metal mica; 90 mmf	R-5	6R028	Resistor, fixed: carbon; 22,000 1/2W Ins.	1X74288	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together	
C-2	8A4529	Capacitor, fixed: paper; .006 mf. 100V	R-6	6R6147	Resistor, fixed: carbon; 330 1W Ins.	1X74338	Shaft Assembly, tuning control: consists of manual tuning shaft with gear, cam and shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer	
C-3	20A70601	Capacitor, variable: mica; 50-180 mmf.; with mounting bracket	R-7	6R0004	Resistor, fixed: carbon; 1 meg 1/2W Ins.	9A70208	Socket, tube: 4 prong (vibrator socket)	
C-4	8A14791	Capacitor, fixed: paper; .05 mf. 400V	R-8	6R0005	Resistor, fixed: carbon; 50 1/2W N.I.	9A6788	Socket, tube: octal; plain	
C-5	8A19133	Capacitor, fixed: paper; .5 mf. 100V	R-9	6R0005	Resistor, fixed: carbon; 50 1/2W N.I.	9A70165	Socket, tube: octal; shielded type	
C-6	8A14791	Capacitor, fixed: paper; .05 mf. 400V	R-10	18A71925 or 18A70172	Resistor, variable: carbon; 500,000 with S.P.S.T. switch; tapped at 50,000 ohms; less shaft	50B73808	Speaker, dynamic: 6"; 3 ohm V.C.	
C-7	8K13166	Capacitor, fixed: paper; .1 mf. 400V	R-11	6R0556	Resistor, fixed: carbon; 47,000 1/2W Ins.	8X4141	Suppressor distributor	
C-8	20A70601	Capacitor, variable; mica; 50-180 mmf.; with mounting bracket	R-12	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.	1X74336	Tuner, Model ST-56-CT6 (complete)	
C-9	21K70720	Capacitor, fixed: mica; 5 mmf. 500V	R-13	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.	ADDITIONAL PARTS LIST - MODEL PC6		
C-10	21R6515	Capacitor, fixed: mica; 50 mmf. 300V	R-14	6R032	Resistor, fixed: carbon; 470,000 1/2W Ins.	8K4661	Capacitor, ammeter	
C-11	20A70214	Capacitor, variable; mica; 30-60 mmf.; with mounting bracket	R-15	6R015	Resistor, fixed: carbon; 220,000 1/2W Ins.	8A4491	Capacitor, generator	
C-12	21A71872	Capacitor, fixed: ceramic; 400 mmf. 5% 500V	R-16	6R0004	Resistor, fixed: carbon; 1 meg 1/2W Ins.	11M8944	Cord, dial: 18 lb; black	
C-13	8A17028	Capacitor, fixed: paper; .5 mf. 100V	R-17	6R3990	Resistor, fixed: carbon; 180 10% 1W Ins.	1X74305	Dial Background & Strip Assembly: plastic; with reinforcing strip	
C-14	8K23690	Capacitor, fixed: paper; .01 mf. 400V	R-18	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.	1X74304	Dial Light & Bracket Assembly: with 5-1/2" lead	
C-15	8K23690	Capacitor, fixed: paper; .01 mf. 400V	R-19	6R6184	Resistor, fixed: carbon; 1000 1W N.I.	1X4895	Lead Assembly, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on the other	
C-16	8A19133	Capacitor, fixed: paper; .5 mf. 100V	R-18	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.	1X74932	Lead Assembly, fuse: 20" long; fuse retainer on one end, ammeter clip on other end	
C-17	8A12840	Capacitor, fixed: paper; .006 mf. 1600V	R-19	6R6184	Resistor, fixed: carbon; 1000 1W N.I.	1X73886	Pointer & Slider Assembly	
C-18	21A70176	Capacitor, fixed: mica; dual 120 mmf.	S-1	40B70952	ON-OFF switch (part of volume control R-10)	1X74268	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together	
C-19	21R6513	Capacitor, fixed: mica; 50 mmf. 300V	S-2	1B70944	Switch, solenoid: with mounting plate	1X74299	Shaft Assembly, tuning: consists of manual tuning shaft with gear, cam and shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer	
C-20	8A71911	Capacitor, fixed: paper; .03 mf. 400V	S-3	40B70952	Switch, selector	9A70208	Socket, 4 prong	
C-21	21R6648	Capacitor, fixed: mica; 250 mmf. 500V	S-4	40A70931	Switch, mute	9A6788	Socket, tube: octal; plain	
C-22	8A13166	Capacitor, fixed: paper; .1 mf. 400V	S-5	1X71470	Relay, MR-5 Tone control: complete	9A70165	Socket, tube: octal; shielded type	
C-23	8A71909	Capacitor, fixed: paper; .004 mf. 400V	S-6	1X70877	Magnet, tone relay	50B73808	Speaker, dynamic: 6" 3 ohm V.C.	
C-24	8A71910	Capacitor, fixed: paper; .006 mf. 400V	S-7	40B71363	Switch, tone control actuating	1X74336	Tuner, Model ST-56-PC6 (complete)	
C-25	25A75429	Capacitor, electrolytic: 20-20 mf. 35V-1 400V, 20 mf. 25V	S-7	1X73625	Switch Assembly, push button	ADDITIONAL PARTS LIST - MODEL OE6		
F-1	65K4637	Fuse: 20 Amp.; type 3AG	S-7	1X73625	Switch Assembly, push button	8A4491	Capacitor, generator	
G-1	48B3333	Vibrator: full wave; non-synch.	T1 & T2	24B70827	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in early sets only)	1X74273	Dial Background and Strip Assembly: translucent white plastic; with metal reinforcing strip	
I-1	65X10867	Bulb: 6-8V, .25 Amp., tubular bayonet; type #44	T1 & T2	24B70827	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only)	1X4895	Lead Assembly, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on other end.	
L-1	1A71881	Coil, antenna or R.F. (specify color of paint dots on old coil when ordering)	T1 & T2	24B70827	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only)	1X4894	Lead Assembly, fuse: 20" long; fuse receptacle on one end, spade lug on other end	
L-2	1A71881	Coil, antenna or R.F. (specify color of paint dots on old coil when ordering)	T-3	25A72258	Transformer, output: with bracket	1X73732	Pointer and Slider Assembly	
L-3	1A71879	Coil, oscillator (specify color of paint dots on old coil when ordering)	T-4	25B70950	Transformer, power	1X74268	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together	
L-4	24A70227	Coil, oscillator padder: includes mounting clip and adjustable iron core	ADDITIONAL PARTS LIST - MODEL CT6				49A73808	Pulley, cord: brass, 5/16 diameter (pointer cord idler pulley)
L-5	24A74954	Coil, "A" choke	8K4661	Capacitor, ammeter		9A70208	Socket, 4 prong	
L-6	24A70199	Coil, "A" choke: with mounting bracket	8A4491	Capacitor, generator		9A6788	Socket, tube: octal; plain	
R-1	6R032	Resistor, fixed: carbon; 470,000 1/2W Ins.	11M8944	Cord, dial: 18 lb; black		1X74263	Shaft Assembly, tuning: includes manual tuning shaft with gear, cam & shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer.	
R-2	6R075	Resistor, fixed: carbon; 100,000 1/2W Ins.	1X74729	Dial Background & Strip Assembly: plastic; with re-inforcing strip.				
R-3	6R056	Resistor, fixed: carbon; 47,000 1/2W Ins.	1X74352	Dial Light & Bracket Assembly				
			1X74932	Lead Assembly, fuse: 20" long; fuse retainers on one end, ammeter clip on other end				
			1X4895	Lead Assembly, battery: 10" long; male ferrule on one end				
			1X76898	Lead-in, antenna extension: 20" long		1X74336	Tuner, Model ST-56-OE6 (complete)	



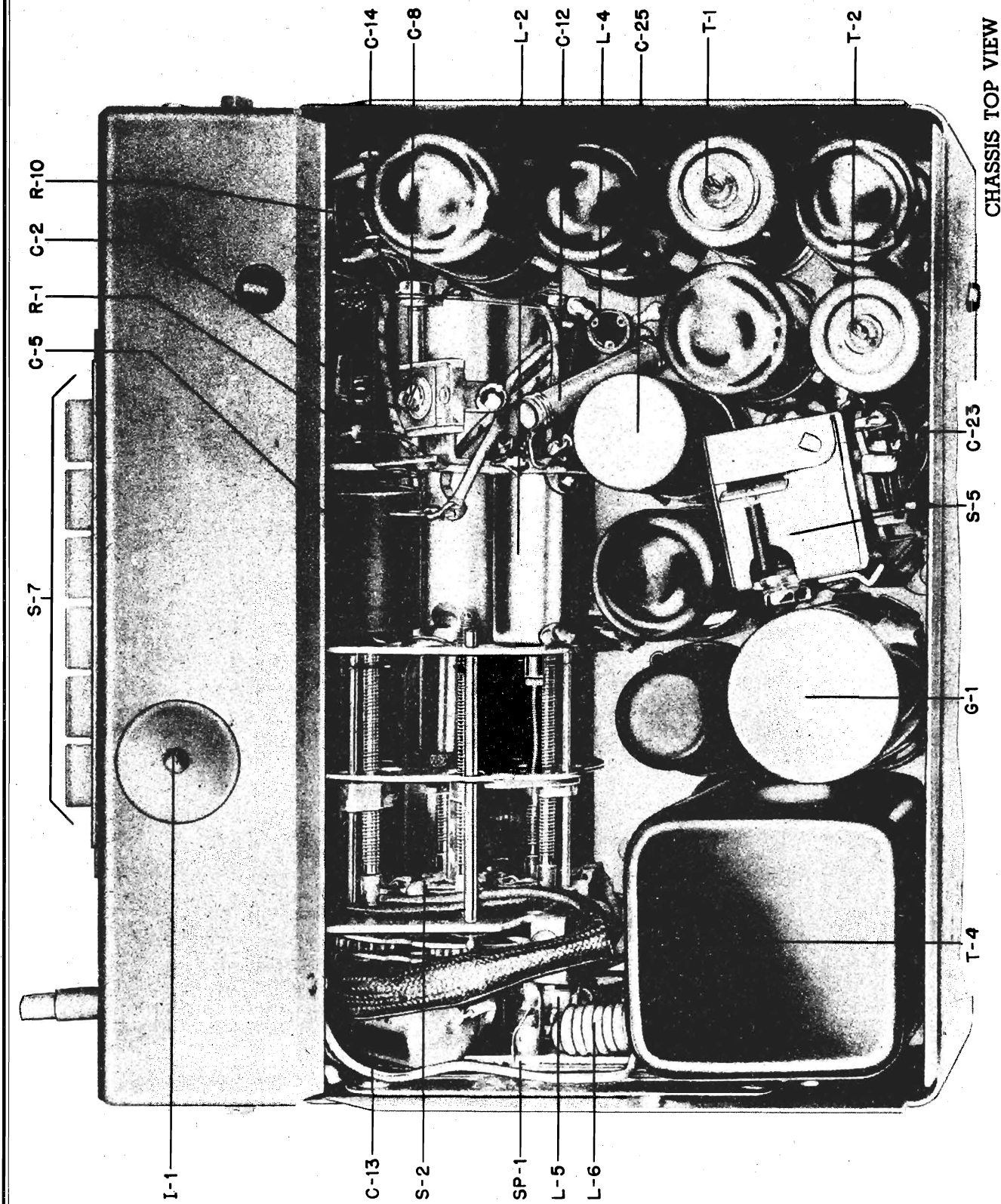
MODELS FD6, NH6

MOTOROLA, INC.



CHASSIS BOTTOM VIEW

MOTOROLA, INC.



MODELS FD6,NH6

MOTOROLA, INC.

**WARNING: CHECK VOLTAGE REGULATOR**

Many late cars develop exceedingly high voltage due to improper adjustment of voltage regulator, which shortens the life of radio tubes, vibrator, electrical accessories and headlights. When voltage exceeds 7.3

volts with motor running at about 35 miles per hour and no load or battery, have the voltage regulator adjusted for maximum voltage of 7.3 volts under a no load condition.

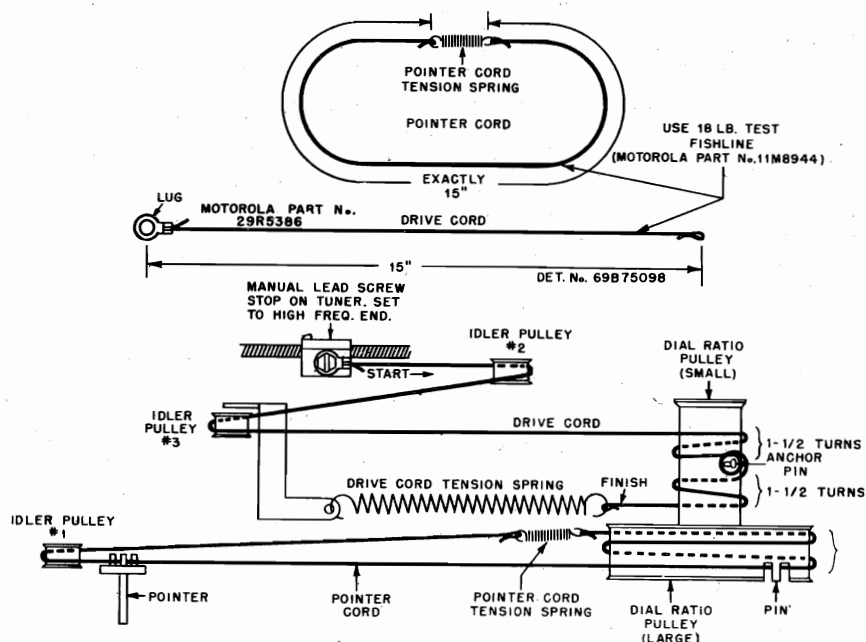
**TO REPLACE DIAL LIGHT**

It will be necessary to remove set from car when replacing dial light. Pry off the large plug button directly over the "M" push

button and replace with a #44 miniature bayonet base pilot lamp.

**POINTER AND DRIVE CORD REPLACEMENT****PREPARE RECEIVER AS FOLLOWS**

1. Remove the escutcheon.
2. Remove the push button assembly. Two screws hold it in position. Do not unsolder any wire leads; just lay the push button assembly on top of the set..
3. The pointer & drive cords are now fully exposed. If only the pointer cord is to be replaced, temporarily remove the drive cord to make the pointer cord more readily accessible.

**POINTER AND DRIVE CORD RESTRINGING DETAIL.**



## MOTOROLA, INC.

MODELS FD6, NH6

Hash, Ripple and Mechanical Vibration in Model FD-6.

Some Model FD-6's have been troubled by hash, ripple and mechanical vibration. These conditions can be remedied by dressing leads, changing the position of the screen by-pass capacitor (C06) and adding a copper washer to the hash choke.

**Hash:** Remove Capacitor C-6 from its present location and mount it between electrolytic capacitor and the 6SA7 tube along side of the oscillator paddler ad-

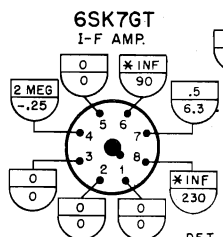
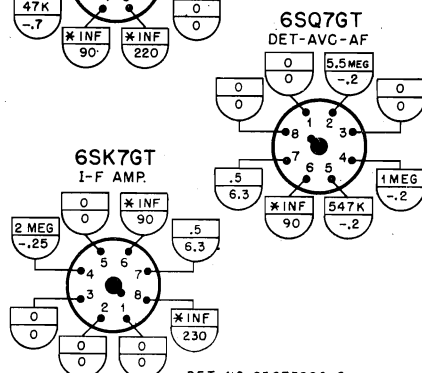
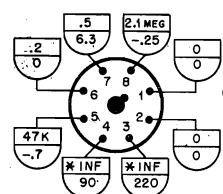
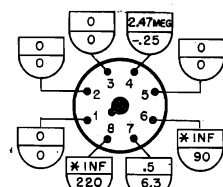
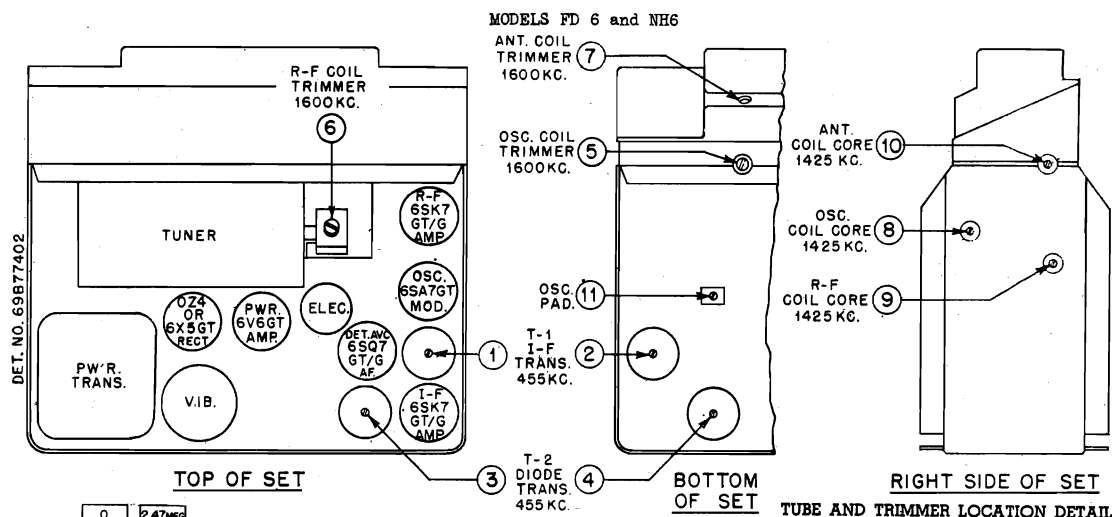
justment screw. It is a tight fit but there is room for it.

Dress the vibrator leads (black and green) into the opening in the chassis base. Next, dress the hot "A" (yellow) lead away from the black and green vibrator leads.

**Ripple:** Ripple may be reduced by removing the chassis from the housing and removing the nose of the set exposing the volume control. Unsolder the grounded lug of the volume control from the bracket. Attach a lead to this lug and run it back

to the cathode terminal of the 6SQ7 tube socket.

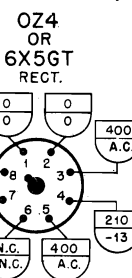
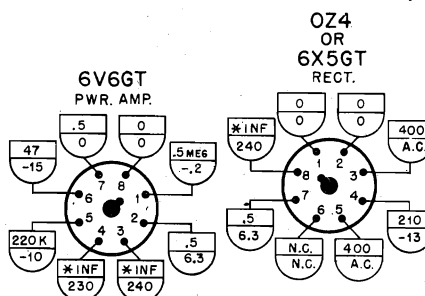
**Mechanical Vibration:** A magnetic field is set up by the hash choke which in some instances causes a mechanical vibration (buzz). This condition can be eliminated by soldering a copper washer, Motorola Part Number 4S8203, (15/16 - 7/32 x .025) on top (end) of the hash choke. Solder the washer to the hash choke eyelet.



DET. NO. 63C75992-0

VOLTAGE AND RESISTANCE DIAGRAM

□ = RESISTANCE MEASUREMENTS.  
○ = VOLTAGE MEASUREMENTS.



ALL VOLTAGE MEASUREMENTS ARE MADE WITH A 20,000 OHM/VOLTMETER FROM TUBE BASE PIN TERMINALS TO CHASSIS GROUND, WITH 6.3 VOLTS AT SPARK PLATE (BATTERY CONNECTION)

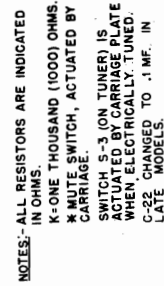
VOLTAGE AND RESISTANCE MEASUREMENTS MAY VARY  $\pm 10\%$ .

K=1000 OHMS.

\* THESE VALUES DEPEND ON THE SENSITIVITY OF METER AND SCALE USED, ALSO THE CONDITION OF THE ELECTROLYTIC FILTER CAPACITOR IN THE 'B' CIRCUIT.

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	
C-1	21A20877	Capacitor, fixed: metal mica; 90 mmf	R-7	6R6004	Resistor, fixed: carbon; 1 meg-1/2W; Ins.	46A72155	Stud, dial ratio pulley: brass; 1/8" diameter x 51/64" long	
C-2	8A4529	Capacitor, fixed: paper; .006 mf. 100V	R-8	6R6005	Resistor, fixed: carbon; 50-1/2W; N. I.	6A78613	Suppressor, distributor	
C-3	20A70601	Capacitor, variable: mica; 50-180 mmf.; with mounting bracket	R-9	6R6005	Resistor, fixed: carbon; 50-1/2W; N. I.	28K5405	Terminal, insulated pin: black; (speaker ground terminal)	
C-4	8A14791	Capacitor, fixed: paper; .05 mf. 400V	R-10	18A71925 or 18A70172	Resistor, variable: carbon; .5 meg; with S.P.S.T. switch; tapped at 50,000 ohms; less shaft	14A74228	Insulator, switch: armite; 4" x 2-7/16"	
C-5	8A19133	Capacitor, fixed: paper; .5 mf. 100V	R-11	6R6056	Resistor, fixed: carbon; 47,000-1/2W; Ins.	36B72165	Knob, station set-up: die cast; polished chrome finish	
C-6	8A14791	Capacitor, fixed: paper; .06 mf. 400V	R-12	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W; Ins.	36K73406	Knob, control: with setscrew; (volume & tuning)	
C-7	8K13166	Capacitor, fixed: paper; .1 mf. 400V	R-13	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.	28R5366	Lug, soldering: #4 hot-tin dipped (used on one end of drive cord)	
C-8	20A70601	Capacitor, variable: mica; 50-180 mmf.; with mounting bracket	R-14	6R6032	Resistor, fixed: carbon; 470,000-1/2W; Ins.	1X4894	Lead Assembly, fuse: 20" long; fuse retainer on one end, spade lug on other end	
C-9	21K70720	Capacitor, fixed: mica; 5 mmf. 500V	R-15	6R6015	Resistor, fixed: carbon; 220,000-1/2W; Ins.	1X4895	Lead Assembly, battery: 10" long, male connector on one end, insulated pin terminal on other end	
C-10	21R6513	Capacitor, fixed: mica; 50 mmf. 300V	R-16	6R6004	Resistor, fixed: carbon; 1 meg 1/2W; Ins.	1X76859	Lead Assembly, speaker: 2 conductor with black & white insulated pin terminals	
C-11	20A70214	Capacitor, variable: mica; 30-60 mmf.; with mounting bracket	R-17	6R6390	Resistor, fixed: carbon; 180 10% 1W Ins.	1X27619	Lead Assembly, speaker: 3 conductor, with black, white & yellow insulated pin terminals	
C-12	21A71872	Capacitor, fixed: ceramic; 400 mmf. 5% 500V	R-18	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.	1X72203	Plate, speaker mounting: includes speaker gasket	
C-13	8A17028	Capacitor, fixed: paper; .5 mf. 100V	R-19	6R6164	Resistor, fixed: carbon; 1000 1W N. I.	1X72248	Pointer & Slider Assembly	
C-14	8K23690	Capacitor, fixed: paper; .01 mf. 400V	S-1		ON-OFF switch (part of volume control R-10)	1X74268	Pulley Assembly, dial ratio: one large and one small pulley assembled together	
C-15	8K23690	Capacitor, fixed: paper; .01 mf. 400V	S-2	1B70944	Switch, solenoid: with mounting plate	49A73907	Pulley, cord: 1/2" groove	
C-16	8A19133	Capacitor, fixed: paper; .5 mf. 100V	S-3	40B70952	Switch, selector	1X70846	Receptacle Assembly, antenna: metal ferrule with insulated contact	
C-17	8A12840	Capacitor, fixed: paper; .006 mf. 1600V	S-4	40A70931	Switch, mute	34B72259	Scale, dial; plastic	
C-18	21A70176	Capacitor, fixed: mica; dual 120 mmf.	S-5	1X71470	Relay, NR-5 Tone Control: complete	8K19266	Capacitor, distributor	
C-19	21R6513	Capacitor, fixed: mica; 50 mmf. 300V	S-6	40B71383	Switch, tone control	8A4491	Capacitor, generator	
C-20	8A71911	Capacitor, fixed: paper; .03 mf. 400V	S-7	1K73625	Switch Assembly, push button	42A51461	Clamp, electrolytic capacitor mounting	
C-21	21R6648	Capacitor, fixed: mica; 250 mmf. 500V	SP-1	1X75194	Spark Plate Assembly	42A4215	Clip, vibrator grounding	
C-22	8A13166	Capacitor, fixed: paper; .1 mf. 400V	T-1 & T-2	24B70827	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in early sets only)	11M8944	Cord, dial: 18 lb; black	
C-23	8A71909	Capacitor, fixed: paper; .004 mf. 400V		or		1X75221	Dial Background & Strip Assembly: plastic with reinforcing strip	
C-24	8A71910	Capacitor, fixed: paper; .006 mf. 400V	24B76553		Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only)	1X75319	Dial Light Assembly: miniature bayonet base socket riveted to large plug button; with 12" lead	
C-25	23A75429	Capacitor, electrolytic: 20-20mf. 400V, 20 mf. 25V	T-3	25A72258	Transformer, output: with bracket	13C72265	Escutcheon, front plate: polished chrome finish (less dial scale and retaining frame)	
E-1	1X75200	Tuner, Model St-56 - FDS - NH6 FDS: complete	T-4	25B70950	Transformer, power	587805	Eyelet, snap-in: steel (dial background strip mounting)	
F-1	65K4637	Fuse: 20 Amp.; type 3AG	MODEL FDS - ADDITIONAL PARTS				7C74211	Frame, dial scale retaining
G-1	46B3333	Vibrator: full wave; non-sync.	1X75223		Shaft Assembly, volume control: brass shaft with bakelite washer at one end	14K74155	Insulator, electrolytic: fishpaper; 3-7/64 x 2-5/8"	
I-1	65X10867	Bulb: 6-8V, .25 Amp., tubular bayonet; type #44	47A73635		Shaft, volume control: hairpin shaped; 29/32" long (fits into volume control)	14X51112	Insulator, fuse: fibre tube	
L-1	1A71881	Coil, antenna or R.F. (specify color of paint dots on old coil when ordering)	26B70107		Shield, coil (for T-1 & T-2; use with 24B70827 I.F.-diode)	MODEL NH6 - ADDITIONAL PARTS		
L-2	1A71881	Coil, antenna of R. F. (specify color of paint dots on old coil when ordering)	1A71049		Shield and Iron Core Sleeve Assembly (for T-1 & T-2; use with 24B76553 I.F.-diode transformers only)	11M8944	Cord, dial: 18 lb. black	
L-3	1A71879	Coil, oscillator (specify color of						

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**WARNING:** Many late model cars develop exceedingly high voltage due to improper adjustment of voltage regulator which shortens the life of radio tubes, vibrators and headlights. When voltage exceeds 7.3 volts with motor running.

For I-F transformer notes, see P.16-7  
For push button data, see P.16-6

## MODEL PD6

## MOTOROLA, INC.

## ALIGNMENT

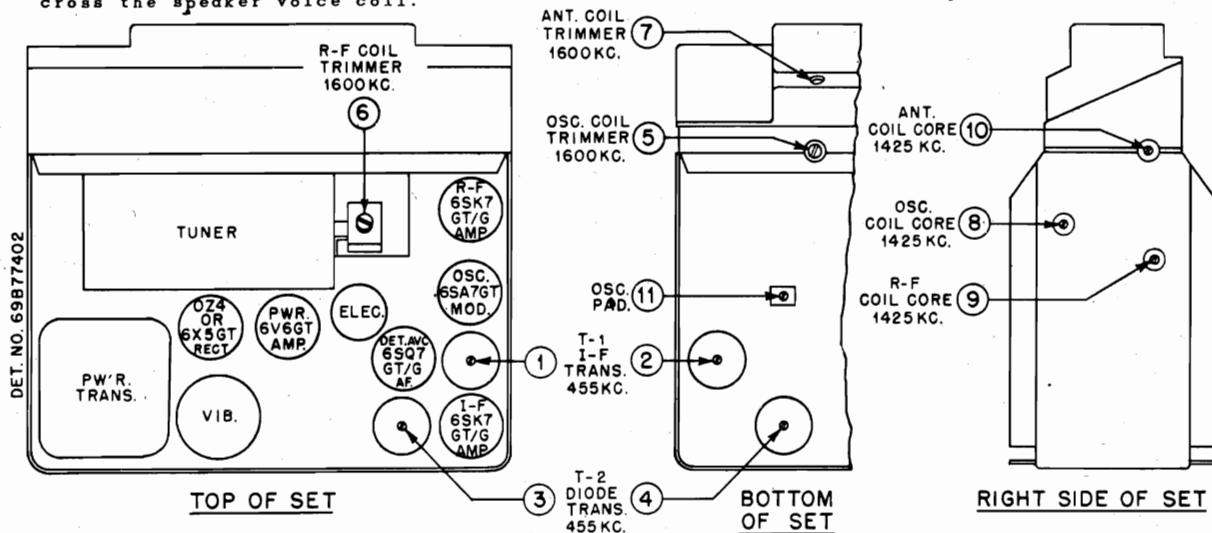
## PROCEDURE

1. Remove the top and bottom covers. All adjustments are now exposed. Refer to Figure 3 for their location.
2. Turn the receiver on and allow it to warm up for a few minutes. Press the "M" button to place automatic tuner in manual tuning position.
3. Connect the output meter across the speaker voice coil.

4. Set receiver volume control at maximum and tone control to voice position (high position).

5. Refer to the following alignment chart for procedure.

**IMPORTANT:** Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.



TUBE AND TRIMMER LOCATION DETAIL

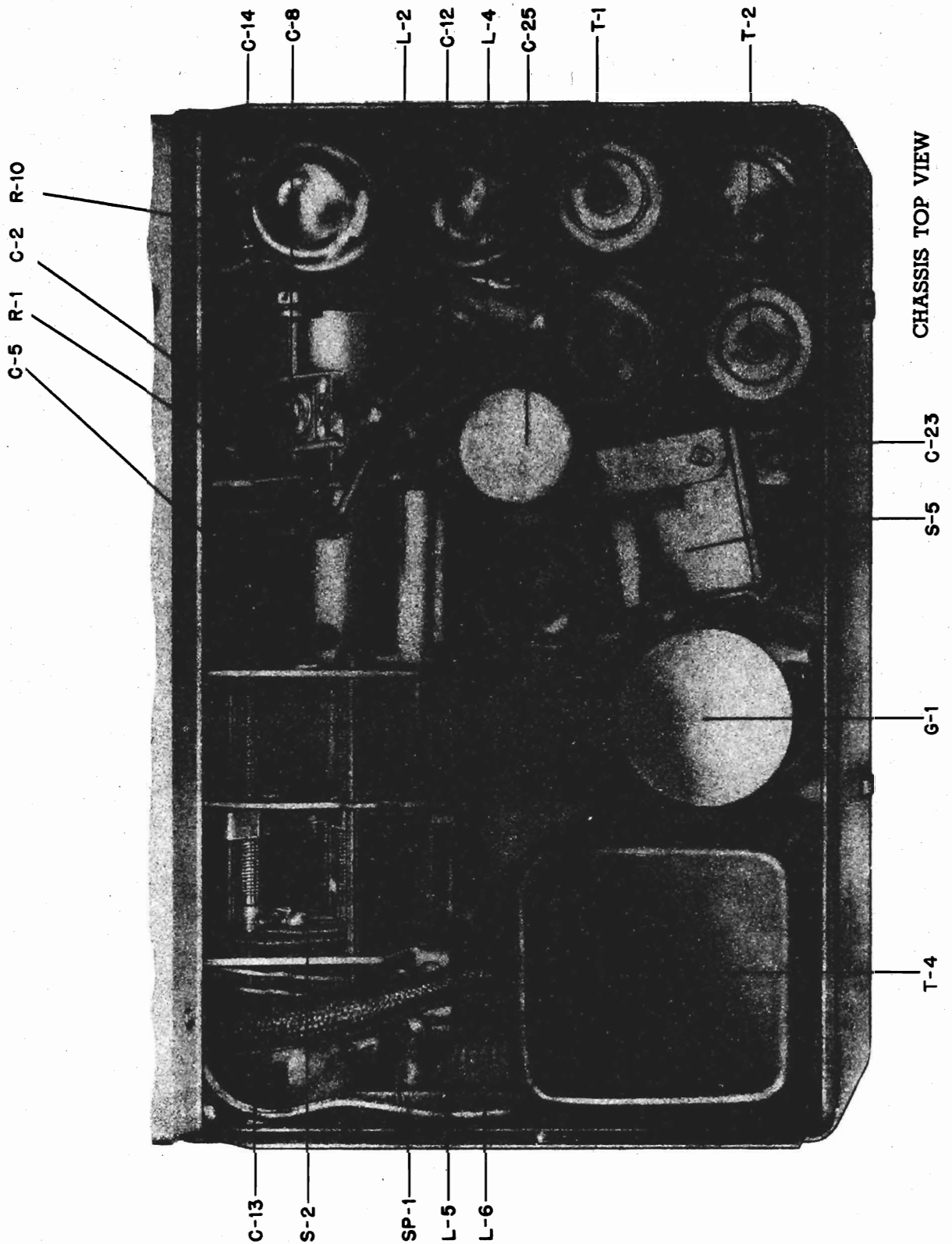
Step	Tuner Position Set to	Dummy Antenna	Signal Generator Lead Connected to	Sig. Gen. Set at	Adjust for Peak on Output Meter
1.	High frequency end	.1 mfd. at Sig. Gen.	Osc. Mod grid (#5 pin)	455 Kc	#1 and 2, P & S in T-1 #3 and 4, P & S in T-2
2. *	High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans.	60 mmf. at Sig. Gen. in series with 21" long coax lead.	Antenna Receptacle	1600 Kc	#5 Osc. coil trimmer #6 R.F. coil trimmer #7 Ant. Coil trimmer
3. *	EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward.	"	"	1425 Kc	#8 Osc. coil core #9 R.F. coil core #10 Ant. coil core
4.	EXACTLY four more full turns in (as indicated by knob setscrew)	"	"	Power turned Off	#11 Osc. Pad. core for maximum noise

NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3 and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with.

5. Assemble receiver and peak antenna trimmer (#7) to car antenna. The antenna trimmer is inaccessible when the receiver is installed behind instrument panel, therefore, it is necessary to adjust antenna trimmer before final installation. Proceed by laying set on floor of car, connect antenna and "A" leads, tune set to a spot around 1400 kc that is free of stations and adjust antenna trimmer for maximum noise. The antenna should be fully extended.

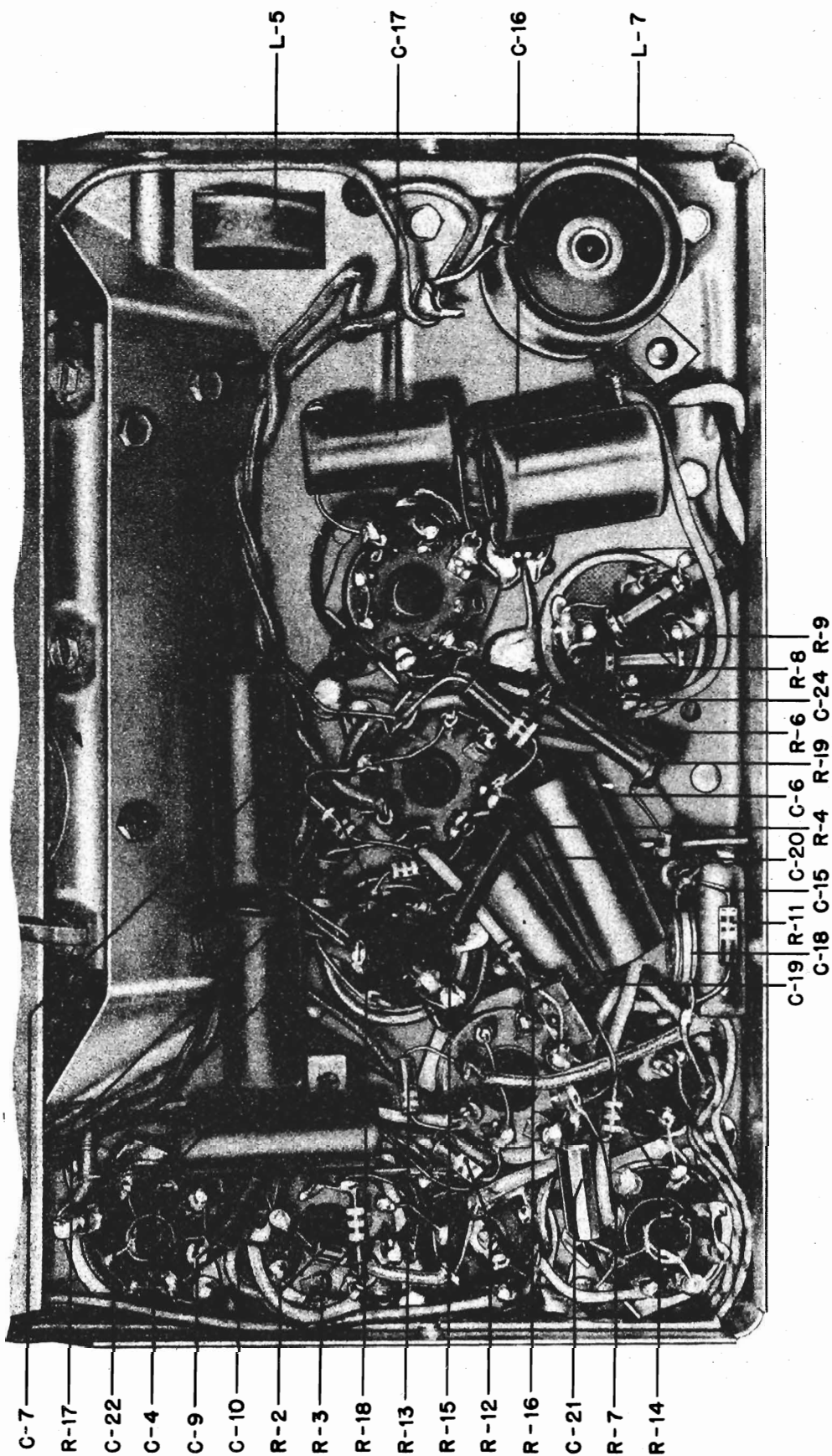
MODEL PD6

MOTOROLA, INC.



MODEL PD6

MOTOROLA, INC.



CHASSIS BOTTOM VIEW

## MOTOROLA, INC.

MODEL PD6

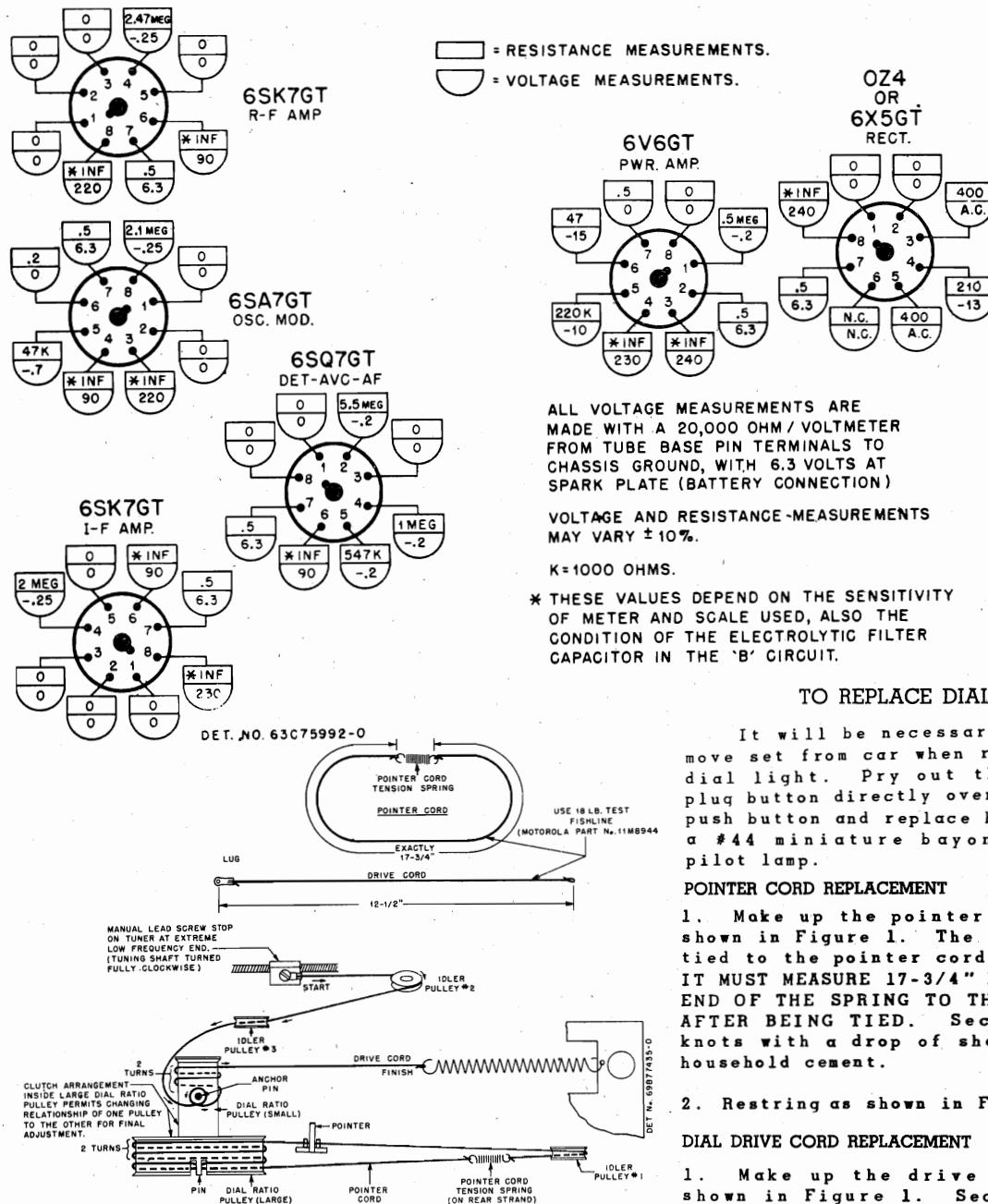


FIGURE 1. POINTER AND DRIVE CORD RESTRINGING DETAIL

## POINTER AND DRIVE CORD REPLACEMENT

## PREPARE RECEIVER AS FOLLOWS

1. Remove the escutcheon and push button assembly. Four screws hold it in position. Do not unsolder any wire leads; just lay the escutcheon and push button assembly to one side.

2. The pointer cord is now fully exposed. If only the pointer

cord is to be replaced, temporarily remove the drive cord to make the pointer cord more readily accessible.

3. To reach drive cord, it will be necessary to remove stamped front of receiver in addition to escutcheon.

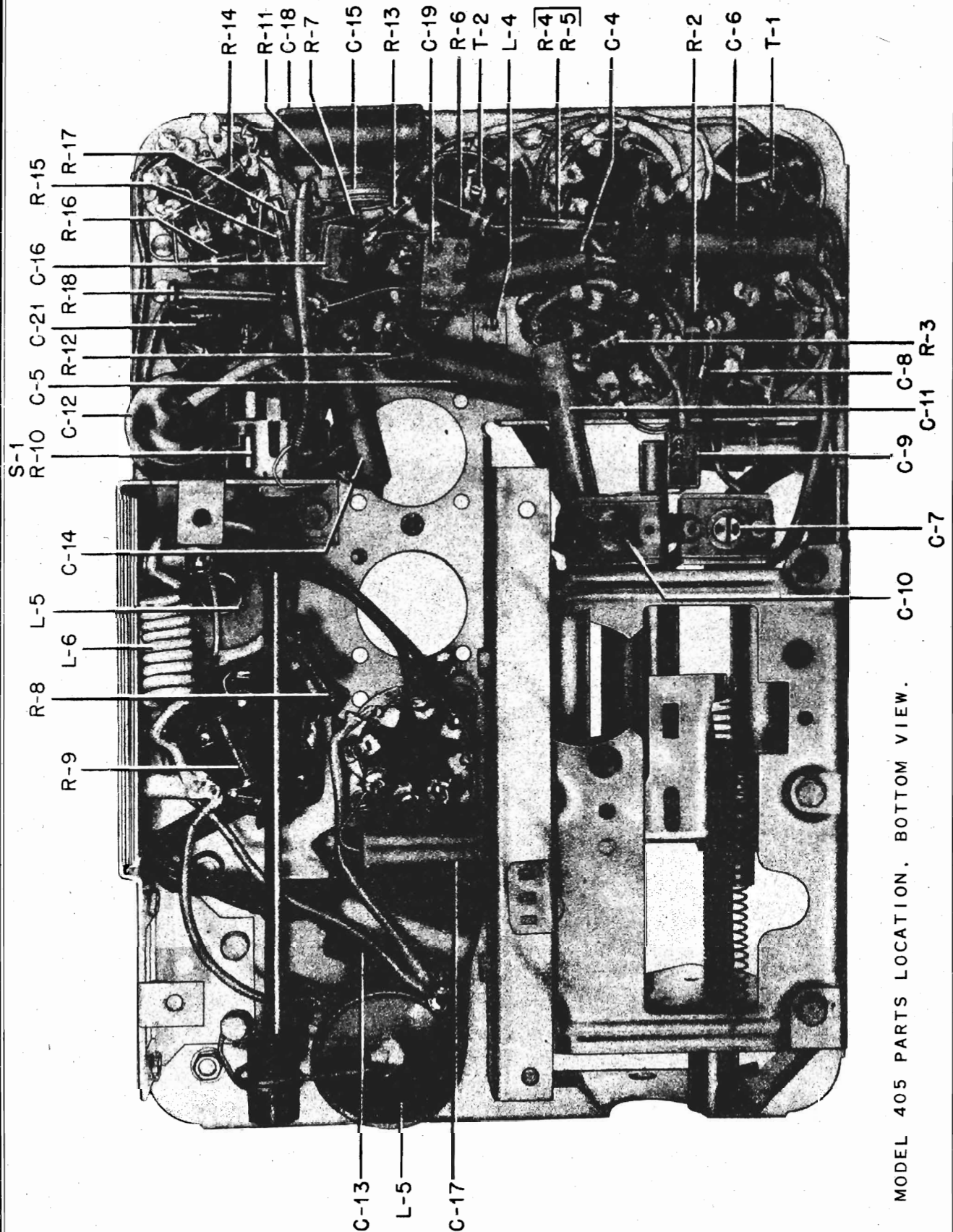


## MODEL PD6

## MOTOROLA, INC.

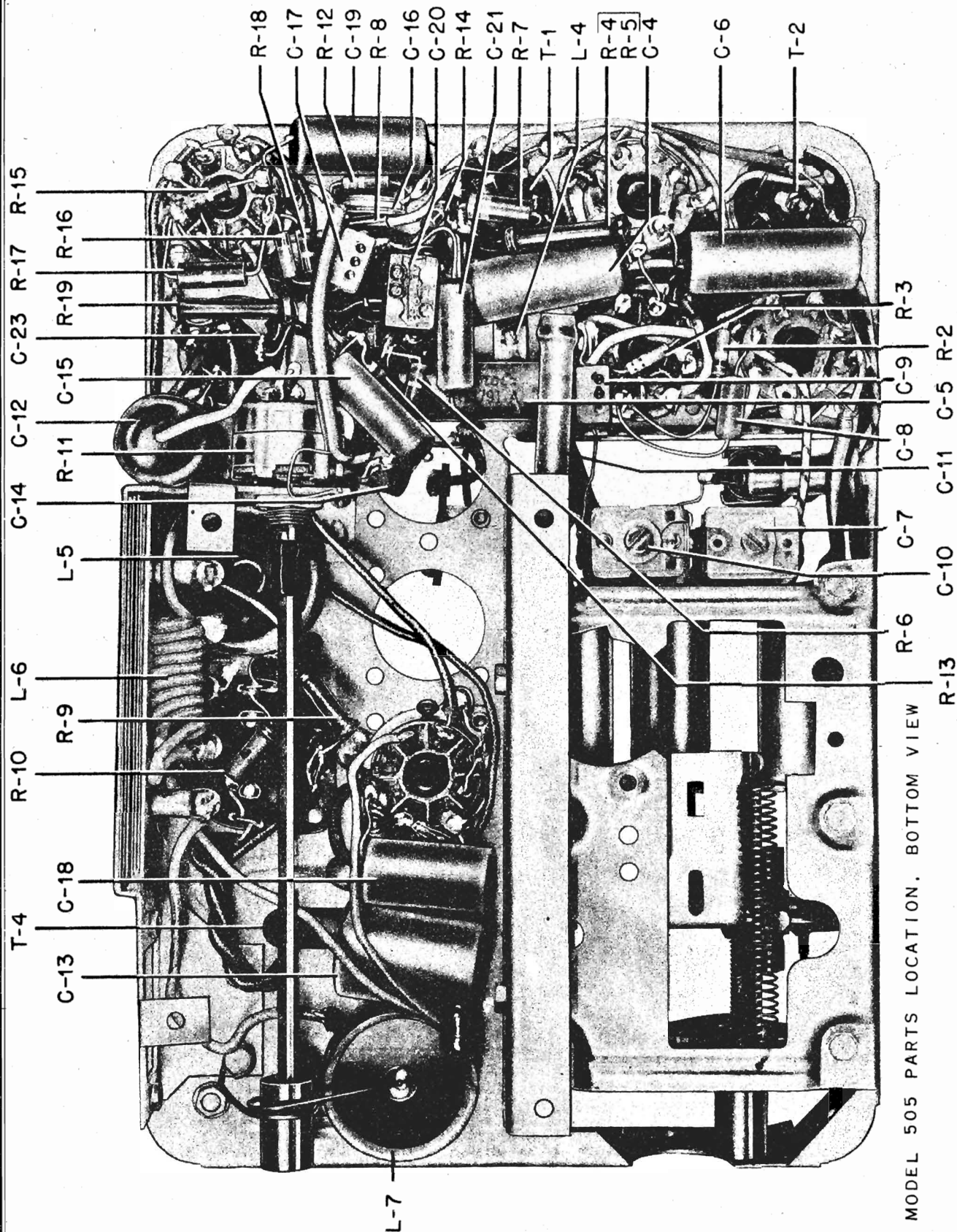
REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
C-1	21A20877	Capacitor, fixed: metal mica; 90 mmf.	L-2	1A71881	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)	S-1	ON-OFF switch (part of volume control R-10)
C-2	8A4529	Capacitor, fixed: paper; .008 mf. 100V	L-3	1A71879	Coil, oscillator (specify color of paint dots on old coil when ordering)	S-2	1B70944 Switch, solenoid; with mounting plate
C-3	20A70601	Capacitor, variable: mica; 50-180 mmf.; with mounting bracket	L-4	24A70227	Coil, oscillator padder; includes mounting clip and adjustable iron core	S-3	40B70952 Switch, selector
C-4	8A14791	Capacitor, fixed: paper; .05 mf. 400V	L-5	24K70840	Coil, "A" choke	S-4	40A70931 Switch, mute
C-5	8A19133	Capacitor, fixed: paper; .5 mf. 100V	L-6	24K73535	Coil, choke: dial light and speaker field; 9 turns #16 yellow wire	S-5	1X71470 Relay, MR-5 Tone Control; complete
C-6	8A14791	Capacitor, fixed: paper; .05 mf. 400V	L-7	24A70199	Coil, "A" choke: with mounting bracket	S-6	40B71383 Switch, tone control
C-7	8K13186	Capacitor, fixed: paper; .1 mf. 400V	R-1	6R6032	Resistor, fixed: carbon; 470,000-1/2W Ins.	S-7	1K73625 Switch Assembly, push button
C-8	20A70601	Capacitor, variable; mica; 50-180 mmf.; with mounting bracket	R-2	6R6075	Resistor, fixed: carbon; 100,000-1/2W Ins.	SP-1	1X75194 Spark Plate Assembly
C-9	21K70720	Capacitor, fixed: mica; 5 mmf. 500V	R-3	6R6056	Resistor, fixed: carbon; 47,000-1/2W; Ins.	T-1 & T-2	24B70827 Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in early sets only)
C-10	21R6513	Capacitor, fixed: mica; 50 mmf. 300V	R-4	6R6106	Resistor, fixed: carbon; 10,000-1W; N. I.	24B76553	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only)
C-11	20A70214	Capacitor, variable; mica; 30-60 mmf.; with mounting bracket	R-5	6R6028	Resistor, fixed: carbon; 22,000-1/2W; Ins.	T-3	25A72258 Transformer, output; with bracket
C-12	21A71872	Capacitor, fixed: ceramic; 400 mmf. 5% 500V	R-6	6R6147	Resistor, fixed: carbon; 330-1W; Ins.	T-4	25B70950 Transformer, power
C-13	8A17028	Capacitor, fixed: paper; .5 mf. 100V	R-7	6R6004	Resistor, fixed: carbon; 1 meg-1/2W; Ins.	64A4491	Capacitor, generator
C-14	8K23690	Capacitor, fixed: paper; .01 mf. 400V	R-8	6R6005	Resistor, fixed: carbon; 50-1/2W; N. I.	1X4895	Lead Assembly, battery 10" long; insulated bushing and contact eyelet on one end, insulated pin on the other end
C-15	8K23690	Capacitor, fixed: paper; .01 mf. 400V	R-9	6R6005	Resistor, fixed: carbon; 50-1/2W; N. I.	1X74932	Lead Assembly; 20" long; fuse retainer on one end, ammeter clip on other end
C-16	8A19133	Capacitor, fixed: paper; .5 mf. 100V	R-10	18A71925 or 18A70172	Resistor, variable: carbon; .5 meg; with S.P.S.T. switch; tapped at 50,000 ohms; less shaft	1X76959	Lead Assembly, speaker; 2 conductor; with black and white insulated pin terminals
C-17	8A12840	Capacitor, fixed: paper; .006 mf. 1600V	R-11	6R6056	Resistor, fixed: carbon; 47,000-1/2W; Ins.	1X27619	Lead Assembly, speaker; 3 conductor; with black, white and yellow insulated pin terminals
C-18	21A70176	Capacitor, fixed: mica; dual 120 mmf.	R-12	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W; Ins.	64A24794	Plate, dial scale retainer
C-19	21R6513	Capacitor, fixed: mica; 50 mmf. 300V	R-13	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.	1X72011	Plate, speaker mounting; includes speaker gasket
C-20	8A71911	Capacitor, fixed: paper; .03 mf. 400V	R-14	6R6032	Resistor, fixed: carbon; 470,000-1/2W; Ins.	1K75353	Pointer & Slider Assembly
C-21	21R6648	Capacitor, fixed: mica; 250 mmf. 500V	R-15	6R6015	Resistor, fixed: carbon; 220,000-1/2W; Ins.	1X74268	Pulley Assembly, dial ratio; consists of one large and one small pulley assembled together
C-22	8A13186	Capacitor, fixed: paper; .1 mf. 400V	R-16	6R6004	Resistor, fixed: carbon; 1 meg 1/2W; Ins.	49A73807	Pulley, cord: 1/8" groove
C-23	8A71909	Capacitor, fixed: paper; .004 mf. 400V	R-17	6R6390	Resistor, fixed: carbon; 180 10% 1W Ins.	1X75405	Shaft Assembly, tuning; consists of tuning shaft with gear, "C" washer, miter gear bracket and manual drive bearing
C-24	8A71910	Capacitor, fixed: paper; .006 mf. 400V	R-18	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.	1X75328	Shaft Assembly, volume control; brass; with bakelite washer at one end
C-25	23A75429	Capacitor, electrolytic; 20-20 mf. 400V, 20 mf. 25V	R-19	6R6184	Resistor, fixed: carbon; 1000 1W N. I.	47A73635	Shaft, volume control: hairpin shaped; 29/32" long (fits into volume control)
E-1	1X75200	Tuner, Model St-56 - PD6 - NH6 PD6: complete				9A6788	Socket, tube: octal; plain
F-1	65K4637	Fuse: 20 Amp.; type 3AG				9A70185	Socket, tube: octal; shielded type
G-1	48B3333	Vibrator: full wave; non-sync.				9A70208	Socket, tube: 4 prong
I-1	65X10867	Bulb: 6-8V, .25 amp., tubular bayonet; type #44				50B71900 or 50B76589	Speaker, dynamic: 6"; 3 ohm v.c.
L-1	1A71881	Coil, antenna or R.F. (specify color of paint dots on old coil when ordering)					

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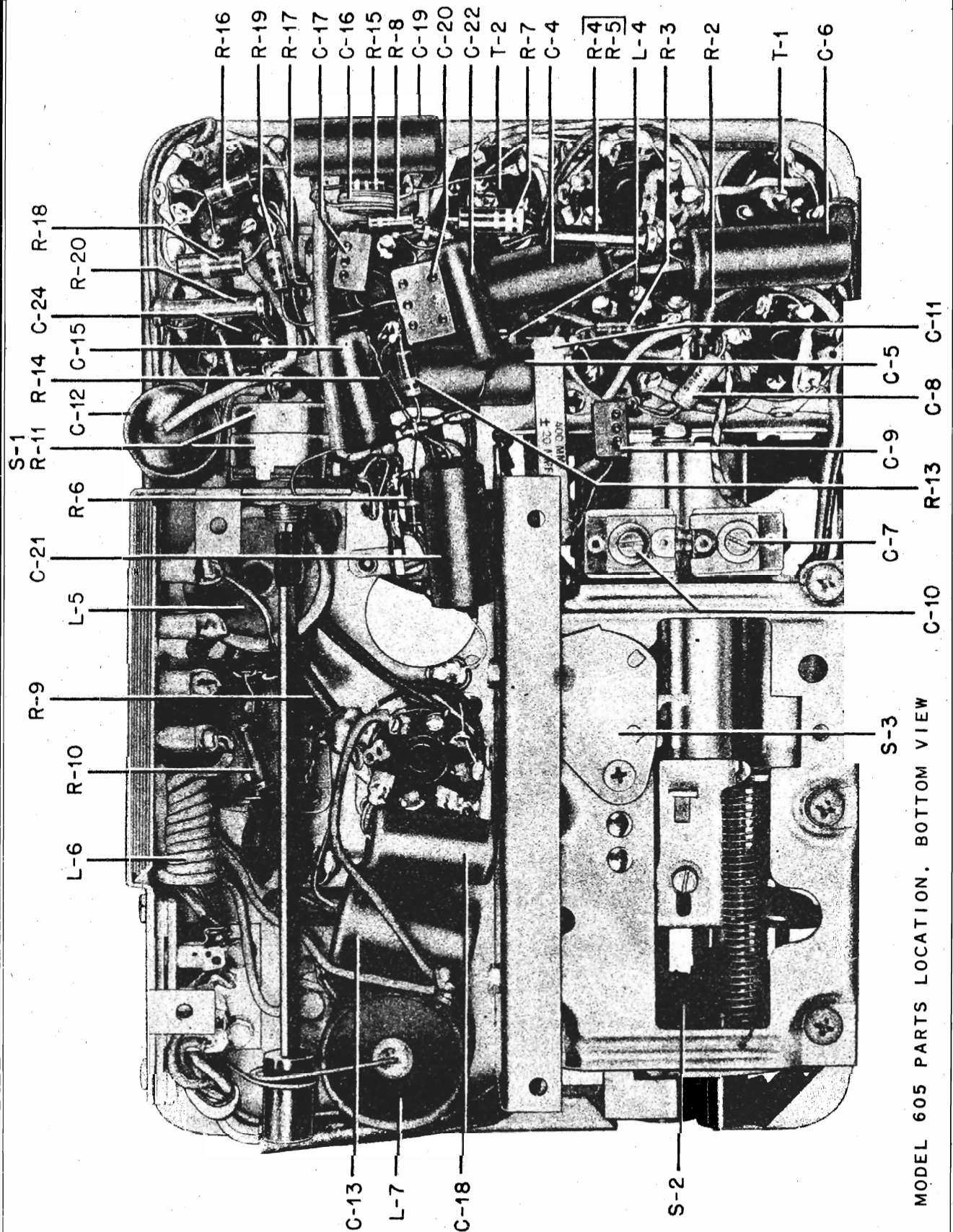
MODEL 505

MOTOROLA, INC.



MODEL 505 PARTS LOCATION, BOTTOM VIEW

MOTOROLA, INC.

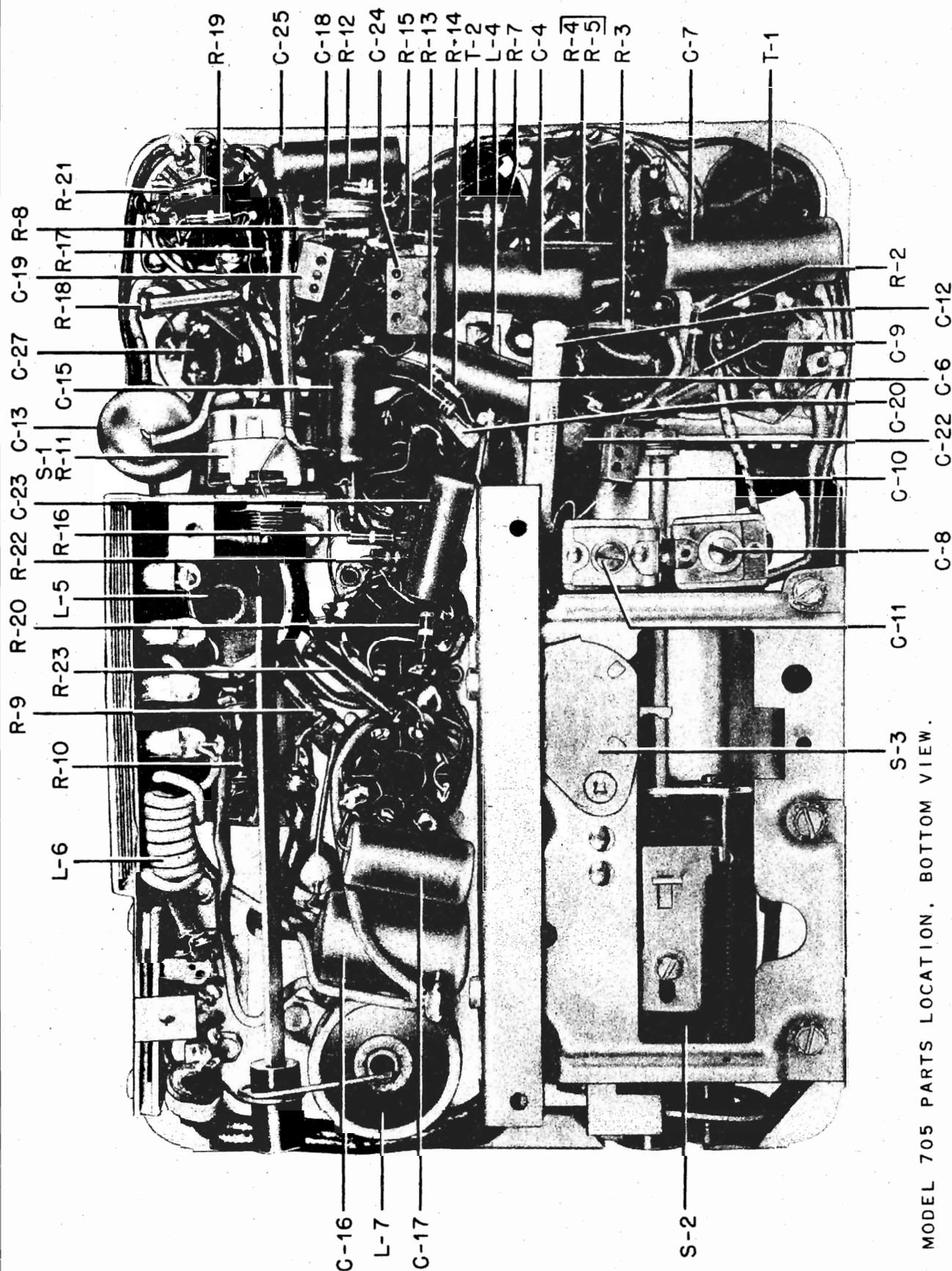


MODEL 605 PARTS LOCATION, BOTTOM VIEW



MODEL 705

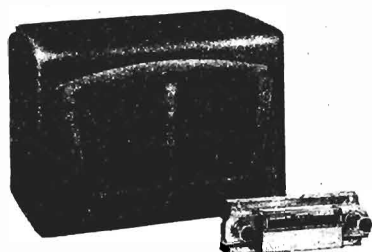
MOTOROLA, INC.



MODEL 705 PARTS LOCATION, BOTTOM VIEW.

**MOTOROLA, INC.**

MODEL 405, MODEL 505  
MODEL 605, MODEL 705



## MODEL 405

**MODEL 405**

Current drain - 7.5 amps at 6.3  
volts

Power output - 5.6 watts

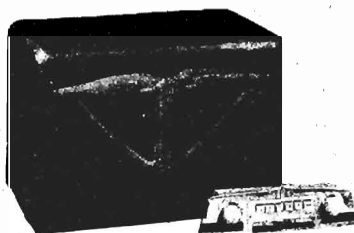
Frequency	1400 kc	1020 kc	600 kc
Max. Sensitivity	1.4 uv	1.3 uv	1.1 uv

**MODEL 605**

Current drain - 7.5 amps at 6.3 volts

Power output - 5.6 watts

Frequency	1400 kc	1020 kc	600 kc
Max. Sensitivity	1.4 uv	1.6 uv	1.45 uv



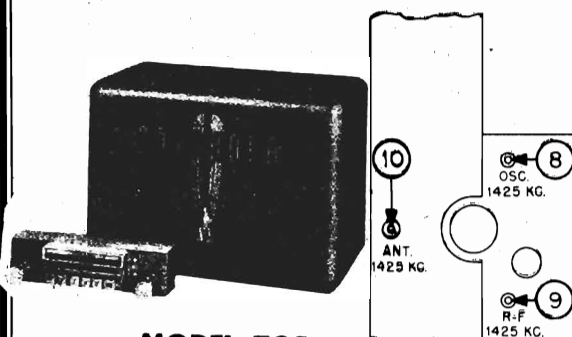
## MODEL 605

**MODEL 705**

Current drain - 10 amps at 6.3 volts

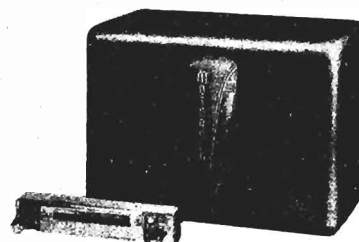
Power output - 9 watts

Frequency	1400 kc	1000 kc	600 kc
Max. Sensitivity	1.5 uv	1.6 uv	.9 uv



## MODEL 705

END VIEW



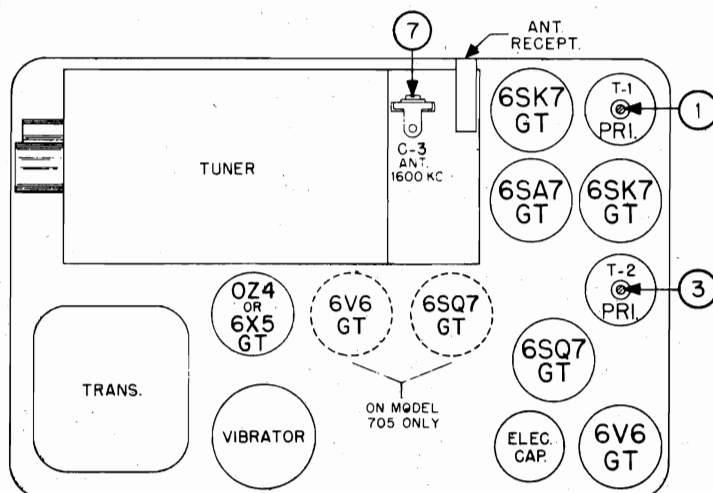
## MODEL 505

**MODEL 505**

Current drain - 7.5 amps at 6.3  
volts

Power output - 5.6 watts

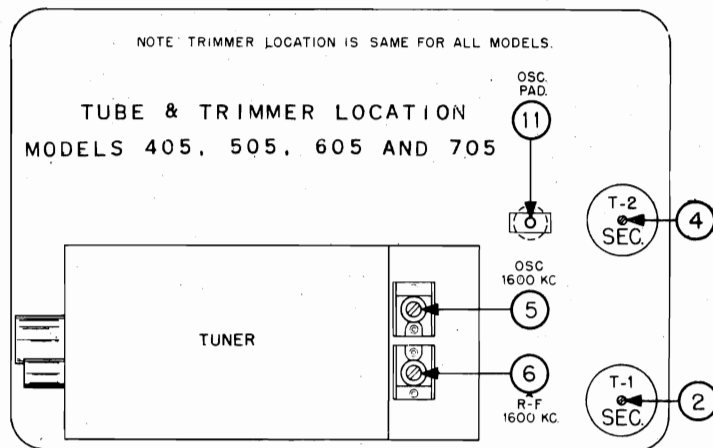
Frequency	1400 kc	1000 kc	600 kc
Max. Sensitivity	1.5 uv	1.4 uv	1.5 uv



TOP VIEW

NOTE: TRIMMER LOCATION IS SAME FOR ALL MODELS.

TUBE & TRIMMER LOCATION  
MODELS 405, 505, 605 AND 705



DET. NO. 69C75046

**BOTTOM VIEW**

MODEL 605  
MODEL 705

MOTOROLA, INC.

PROCEDURE FOR SETTING UP PUSHBUTTONS (MODELS 605 & 705)

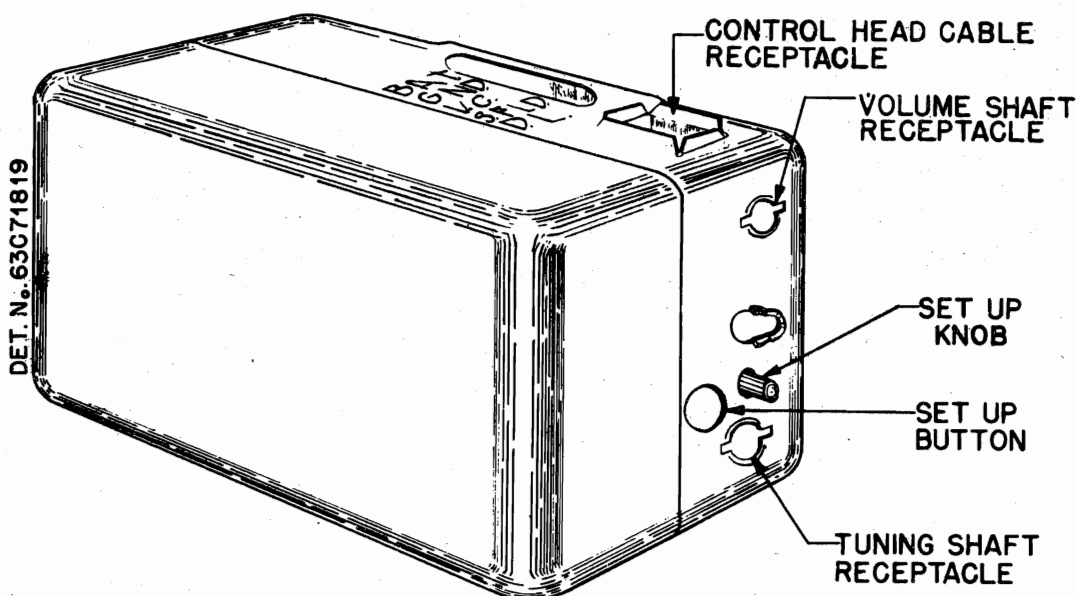
1. Receiver must be turned on for heads, the push-buttons latch a few minutes before setting when pressed in.  
up push-buttons.
2. Extend antenna fully.
3. Press manual button "M" on the control head till tuner in the receiver stops cycling.
4. Turn tuning knob on the control head till the desired station is heard. (Make mental note of the program).
5. Keep volume low, so that you can tell when a station is tuned in correctly.
6. Press desired button in and hold till tuning mechanism completes its operation.
7. Press "set-up button" in till click is heard (see Figure 4)
8. Turn "set-up knob" till previously noted program is heard. See Figure 4
9. Press the "M" button and that station is set.
10. Repeat the above procedure for each additional station desired.

**IMPORTANT:**

To check whether push-buttons were set accurately, press the "M" button in, tune in a station manually that is set to a push-button, then press the push-button in that was set to that station. There should be no difference in quality or volume when a push-button is set correctly. Make this check for each push-button.

**NOTE:**

It will be necessary to hold the push-button in only when an early type of control head is used. On later model control



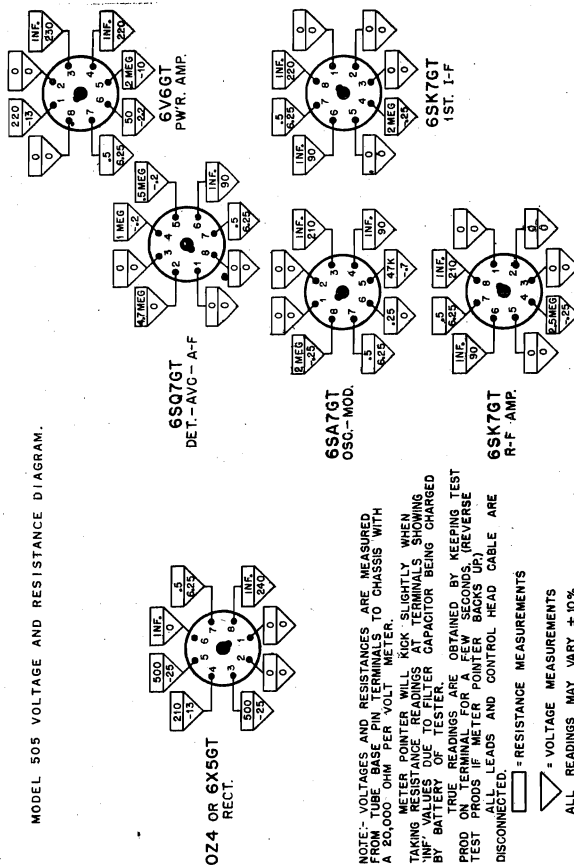
LOCATION OF "SET-UP BUTTON" AND "SET-UP KNOB:"  
FIGURE 4 PUSH-BUTTON MODELS 605, AND 705.



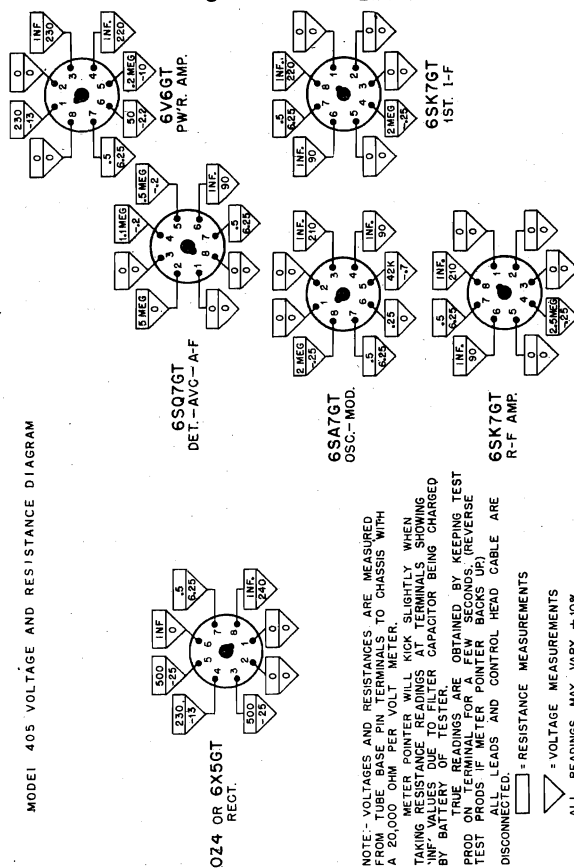
MOTOROLA, INC.

MODEL 405, MODEL 505  
MODEL 605, MODEL 705

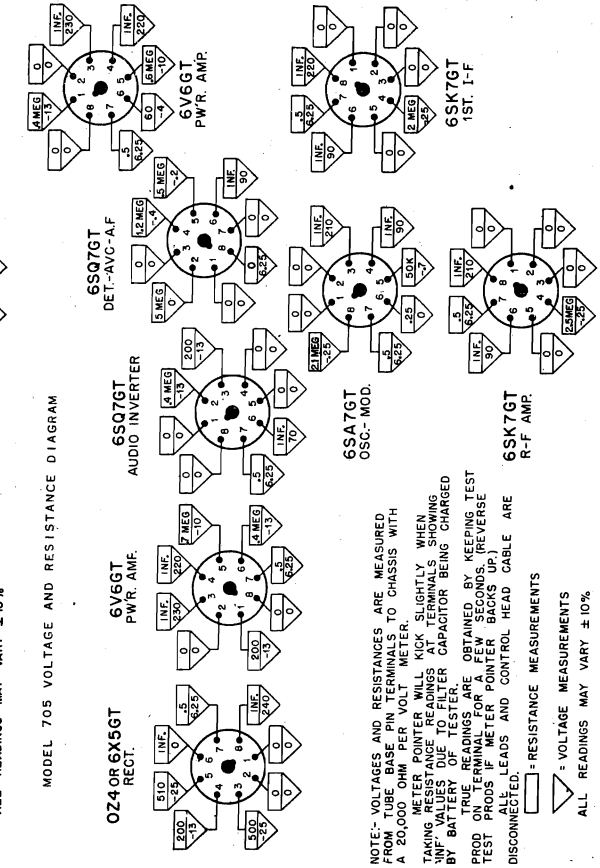
MODEL 505 VOLTAGE AND RESISTANCE DIAGRAM.



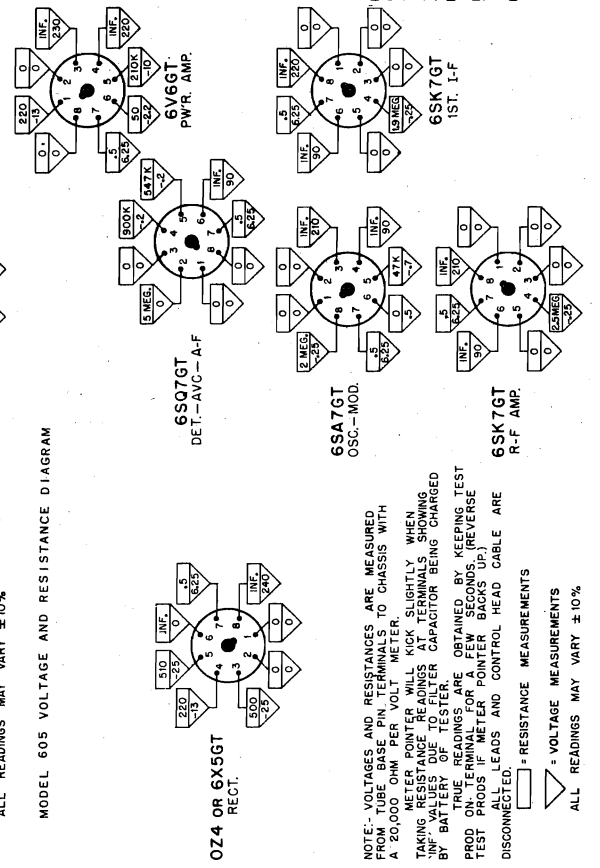
MODEL 405 VOLTAGE AND RESISTANCE DIAGRAM



MODEL 705 VOLTAGE AND RESISTANCE DIAGRAM



MODEL 605 VOLTAGE AND RESISTANCE DIAGRAM



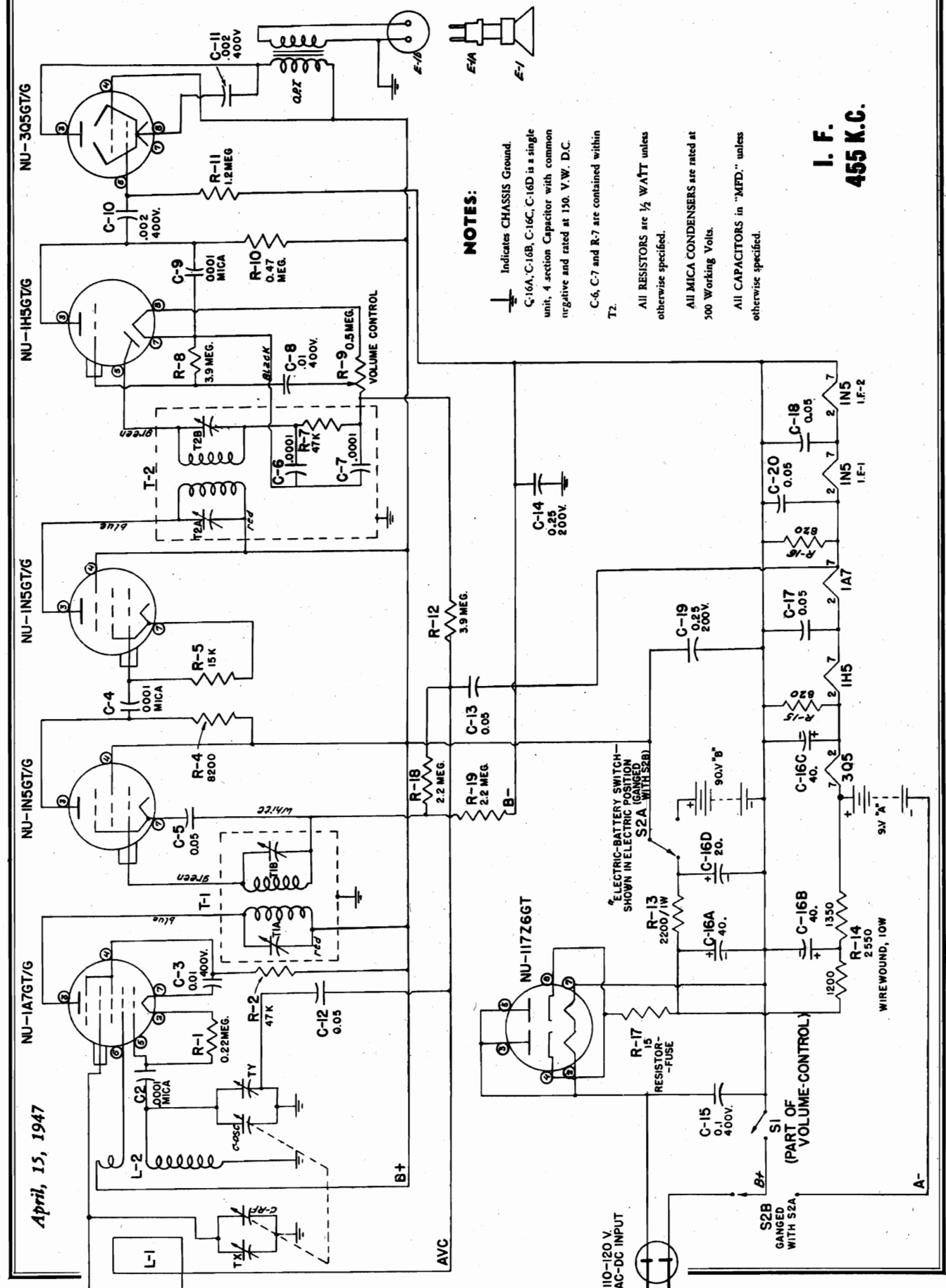
MODEL 405, MODEL 505,  
MODEL 605, MODEL 705

MOTOROLA, INC.

REF.	PART NO.	DESCRIPTION	MODELS USED ON 406 506 606 706	REF.	PART NO.	DESCRIPTION	MODELS USED ON 406 506 606 706
* C-1	21420677	Capacitor, fixed: metal; .05 mf.	*	* L-1	1471881	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)	* R-15 680352
* C-2	844289	Capacitor, fixed: paper; .006 mf. 300V	*	* L-2	1471881	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)	* R-16 684390
* C-3	20470060	Capacitor, variable: mica; 50-180 mf.; with mounting bracket	*	* L-3	1471879	Coil, oscillator (specify color of paint dots on old coil when ordering)	* R-16 680616
* C-4	8414791	Capacitor, fixed: paper; .05 mf. 400V	*	* L-4	24470227	Coil, vacuum tube; includes mounting clip and adjustable iron core	* R-16 680604
* C-5	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* L-5	24470240	Coil, 5A choke	* R-17 686560
* C-6	8414791	Capacitor, fixed: paper; .05 mf. 400V	*	* L-6	24470258	Coil, dial lift and speaker field choke; 9 turn #10 yellow wire	* R-17 686560
* C-7	8415166	Capacitor, fixed: paper; .1 mf. 400V	*	* L-7	24470199	Coil, 5A choke; with mounting bracket	* R-17 686560
* C-8	20470060	Capacitor, variable: mica; 50-180 mf.; with mounting bracket	*	* R-1	680332	Resistor, fixed: carbon; 470,000	* R-17 680604
* C-9	20470060	Capacitor, variable: mica; 50-180 mf.; with mounting bracket	*	* R-2	680676	Resistor, fixed: carbon; 100,000	* R-18 684184
* C-10	21470720	Capacitor, fixed: mica; 5 mf.	*	* R-3	680666	Resistor, fixed: carbon; 47,000	* R-18 686560
* C-11	21470720	Capacitor, fixed: mica; 5 mf.	*	* R-4	680628	Resistor, fixed: carbon; 22,000	* R-18 684390
* C-12	8414791	Capacitor, fixed: paper; .05 mf. 300V	*	* R-5	680628	Resistor, fixed: carbon; 22,000	* R-18 684390
* C-13	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-6	680628	Resistor, fixed: carbon; 22,000	* R-18 684390
* C-14	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-7	680604	Resistor, fixed: carbon; 1 meg	* R-18 684390
* C-15	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-8	680604	Resistor, fixed: carbon; 1 meg	* R-18 684390
* C-16	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-9	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-17	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-10	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-18	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-11	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-19	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-12	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-20	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-13	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-21	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-14	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-22	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-15	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-23	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-16	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-24	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-17	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-25	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-18	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-26	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-19	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-27	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-20	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-28	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-21	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-29	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-22	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-30	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-23	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-31	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-24	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-32	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-25	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-33	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-26	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-34	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-27	680605	Resistor, fixed: carbon; 50	* R-18 684390
* C-35	8414791	Capacitor, fixed: paper; .05 mf. 100V	*	* R-			

## NATIONAL UNION RADIO CORP.

MODEL G-613



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## MODEL G-613

## NATIONAL UNION RADIO CORP.

## SPECIFICATIONS:

**CIRCUIT**—Superheterodyne—A.C.-D.C.—Battery  
Automatic Volume Control

**ANTENNA**—Self-Contained plug-in Loop

**TUNING**—Broadcast Band 540-1650 K.C.

**POWER SUPPLY**—105-120 Volts A.C. or D.C. or Batteries  
Consumption approx. 25 Watts (Electric operation)

**BATTERY COMPLEMENT**—2 NU-A835 "A" Batteries—2 NU-B862 "B" Batteries

**TUBE COMPLEMENT**—1 NU-1A7GT Converter  
2 NU-1N5GT I.F.  
1 NU-1H5GT Detector  
1 NU-3Q5GT Power Amplifier  
1 NU-117Z6GT Rectifier

**CABINET**—(Approx.) 13" Wide, 6" Deep, 10 $\frac{5}{8}$ " High (Not incl. Carrying Handle)

## PARTS LIST

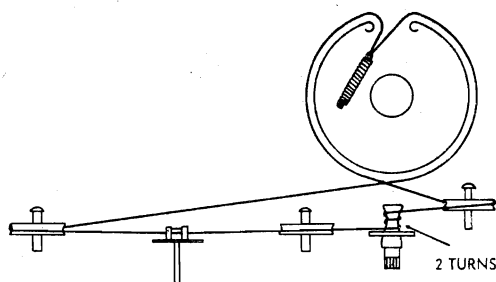
SYMBOL	DESCRIPTION	FACTORY PART NO.	NOTES
E-1	Speaker	EH-6-3	Less Output Transf.
L-1	Loop Antenna	LL-3	
T-1	1st I.F. Transf.	TM2-12	
T-2	2nd I.F. Transf.	TM2-13	
O.P.T.	Output Transf.	TA7-1	For 3Q5GT
C-RF C-OSC	2 gang Variable Capacitor	CV-6	
C16A, B, C, D	Quadruple—Single Unit Electrolytic Capacitor	CEI-4A81	
R-9	Volume Control	RP5-2	
R-17	Resistor Fuse		
S2A, B	Switch	SS-1	
	Dial Pointer	NP-3	
	Dial Scale	ND-12	
	"A" Battery Plug	PM2-1	
	"B" Battery Plug	PM2-2	
E-1a	Speaker Plug	PM1-2	Male Section
E-1b	Speaker Plug	PM1-1	Female Section
	Cabinet	CCCD-613	
	Back Panel	AP-8	
	Window	NW-1	
	Handle	HK-27	

## ALIGNMENT PROCEDURE

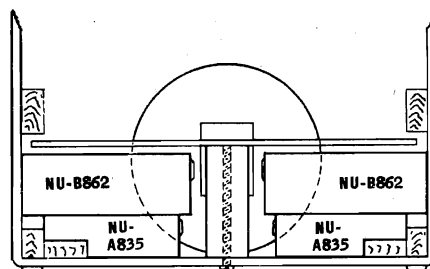
## PRELIMINARY.

(a) Set VOLUME CONTROL to the FULL ON position; (b) OUTPUT METER across voice coil; (c) Maintain SIGNAL GENERATOR output at MINIMUM consistent with a readable Output meter indication; (d) Follow sequence indicated below.

SEQUENCE	DUMMY ANTENNA	DIAL SETTING	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR SETTING	ADJUST TRIMMERS	NOTES
1 I.F.	.01 mfd.	At HIGH frequency end of scale. (Min. Capacity)	High side to stator lug of C-RF. Low side to B—	455 K.C.	T2a T2b T1a T1b	Adjust Trimmers for MAX. output reading
2 OSC.	3 turn coil of #18 or #20 insulated wire on 7" or 8" diameter LOOSELY Coupled to loop Antenna in Receiver.	Pointer at extreme RIGHT HAND END of dial scale (Min. Capacity)	Across Dummy Antenna	1700 K.C.	TY	Adjust Trimmer for MAX. output reading
3 R.F.	Same as in 2 above	1550 K.C.	Across Dummy Antenna	1550 K.C.	TX	Adjust Trimmer for MAX. output reading



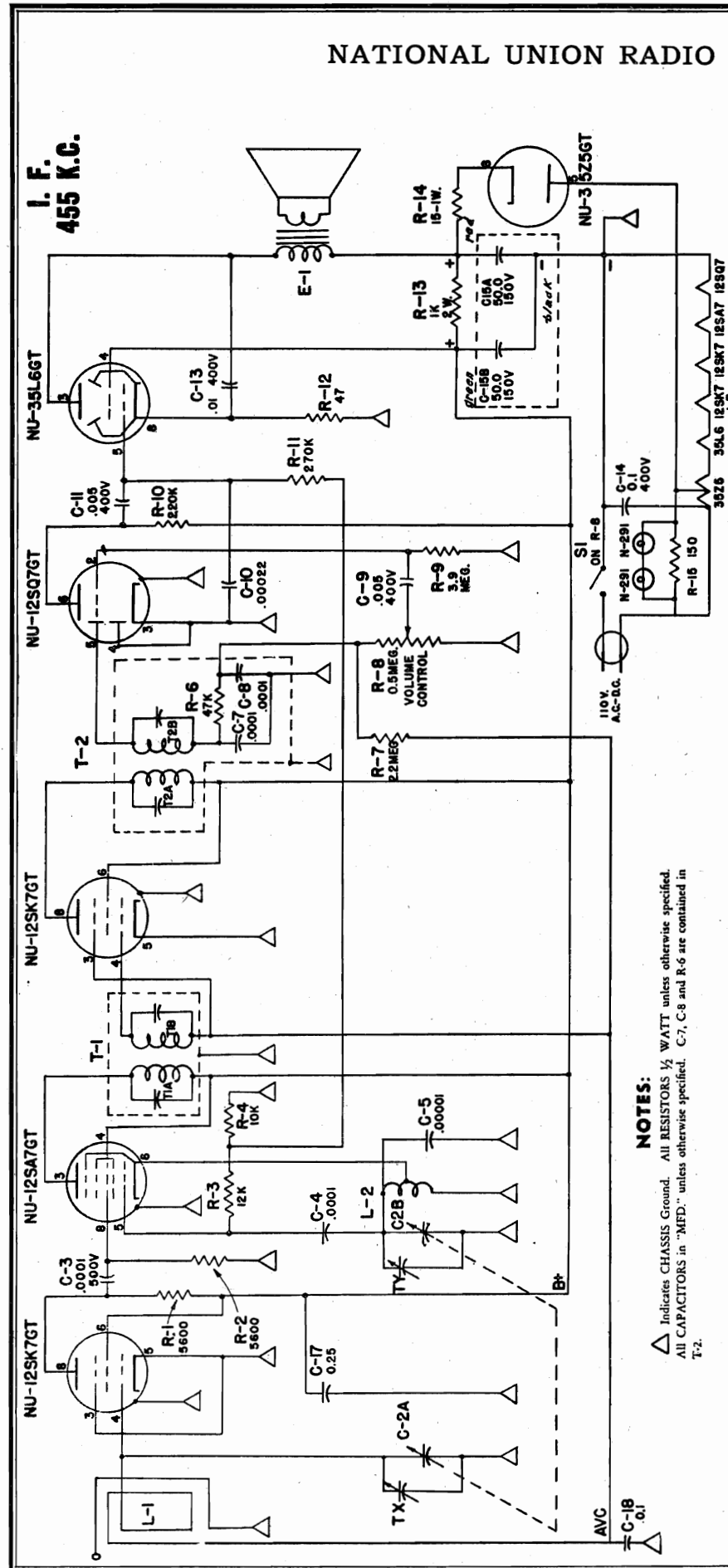
DIAL CORD DRIVE ASSEMBLY



BATTERY INSTALLATION

MODEL G-615

# NATIONAL UNION RADIO CORP.



## NOTES:

△ Indicates CHASSIS Ground. All RESISTORS 1/2 WATT unless otherwise specified. All CAPACITORS in "MED." unless otherwise specified. C-7, C-8 and R-6 are contained in T-2.

## SPECIFICATIONS:

**CIRCUIT**—A.C.-D.C. Superheterodyne—Tuned R.F. Stage—Auto-Tube Complement—1 NU-12SK7GT R.F. Amp. 1 NU-12SA7GT Converter

**ANTENNA**—Self-contained Loop—Coupling for External Antenna

**TUNING**—Broadcast Band—535 K.C. to 1620 K.C.—2 Gang Variable Capacitor

**POWER SUPPLY**—105-125 Volts, 60 cycles A.C.—105-125 Volts, Direct Current—Approx. 30 Watts Consumption

**PANEL LAMP**—2 N-291 (2.9V/17A) Bayonet

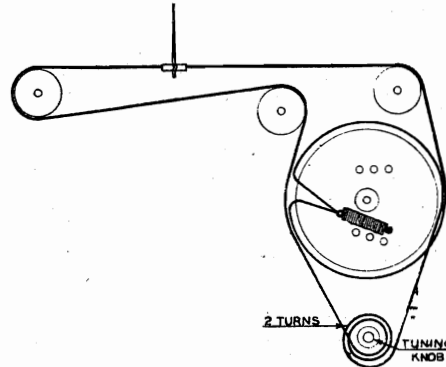
**CABINET**—Approximate Dimensions 13 1/4" Wide, 8 3/8" High, 6 1/2" Deep

MODEL G-615

## NATIONAL UNION RADIO CORP.

## PARTS LIST

SYMBOL	DESCRIPTION	FACTORY PART NO.	NOTES
E-1	Complete Assembly (O.P. Transf. and P.M. Speaker)	EH6-2	Replacement of complete assembly is advisable if either part fails
Loop	Loop Antenna	LL-15	
L-2	Oscillator Coil	LO-2	
T-1	1st I.F. Trans.	TM2-1	
T-2	2nd I.F. Trans.	TM2-3	
R-8	Vol. Control With Switch (S-1)	RP5-2	NU-500M-C8 may be used as a replacement
C2-A C2-B	2 Gang Variable Capacitor	CV-16	
C1E C1B	Electrolytic Capacitor 50-50/150	CE-85	
	Dial Lamps 2.9 Volt .170 Amp.		N 291
	Dial Scale (Glass)	ND-17-2	
	Dial Pointer	ND-1-2	
	Dial Lamp Socket	JS13-163	

DIAL DRIVE  
ASSEMBLY

## ALIGNMENT PROCEDURE

## PRELIMINARY.

- (a) Adjust the DIAL POINTER along the dial cord to the position opposite the first right-hand punch mark on the dial backing-plate, with the tuning condenser gang completely out of mesh (Minimum Capacity); (b) Set VOLUME CONTROL to the FULL ON position; (c) Maintain SIGNAL GENERATOR output at MINIMUM consistent with a readable Output Meter indication; (d) OUTPUT METER across voice coil; (e) Follow sequence indicated below.

SEQUENCE	DUMMY ANTENNA	DIAL SETTING	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR SETTING	ADJUST TRIMMERS	NOTES
1 I.F.	.01 mfd.	At HIGH frequency end of scale. (Min. Capacity)	High side to stator lug of C2-A Low side to B—	455 K.C.	T2a T2b T1a T1b	Adjust Trimmers for MAX. output reading
2 OSC.	3 turn coil of #18 or #20 insulated wire on 7" or 8" diameter LOOSELY Coupled to loop Antenna in Receiver	Pointer at extreme RIGHT HAND END of dial scale (Min. Capacity) Pointer will be in line with FIRST punch mark at right	Across Dummy Antenna	1700 K.C.	TY	Adjust Trimmer for MAX. output reading
3 R.F.	Same as in 2 above	Pointer in line with punch mark SECOND from right	Same as in 2 above	1520 K.C.	TX	Adjust Trimmer for MAX. output reading
4	Same as in 2 above	At LOW frequency end of scale (Max. Capacity)	Same as in 2 above	530 K.C.	None	530 K.C. signal should be picked up at or near this dial setting. Check operation in Seq. 2 if signal is not picked up

## REINSTALLING CHASSIS (AFTER ALIGNMENT):—

- 5
- With chassis still on the bench, set dial pointer at the minimum capacity end of travel.
  - Slide chassis into cabinet and adjust its position so that the dial pointer is opposite and in line with the FIRST calibration mark at the right-hand end of the GLASS DIAL SCALE.
  - Tighten the chassis hold down screws.
  - Tuning should now track so that peak signal is attained at the proper frequency calibration on the glass dial scale.

NOBLITT-SPARKS INDUSTRIES INC.

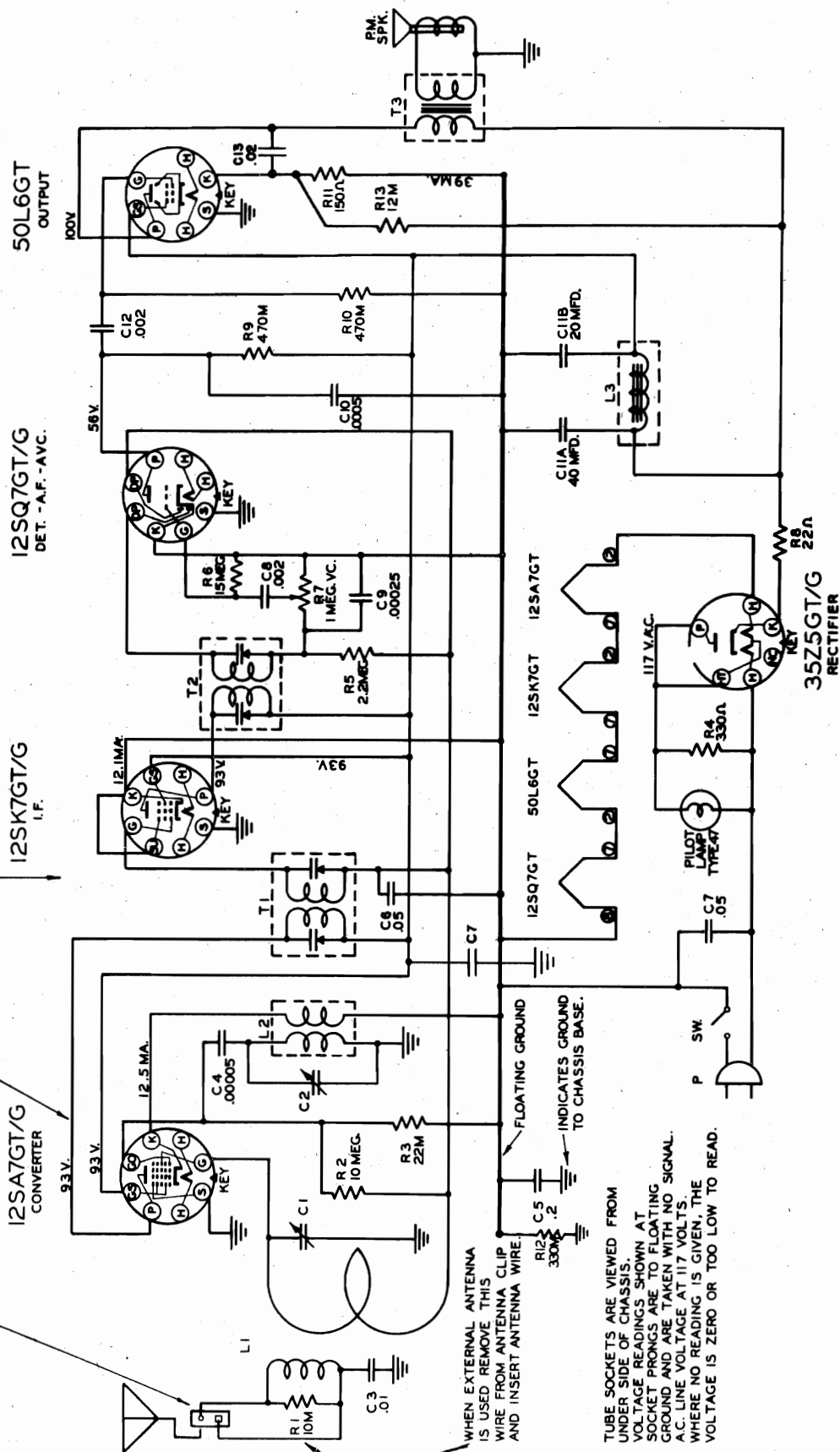
MODELS 552N, 552AN  
555, 555A

## IF PEAK 455 KC

APPROX. INPUT REQUIRED FOR 50 MILLIWATTS STANDARD OUTPUT.

300 UV/M - 1400 KC	19 UV - 1400 KC
3000 UV/M - 1000 KC	75 UV - 1000 KC
4000 UV/M - 600 KC	450 UV - 600 KC

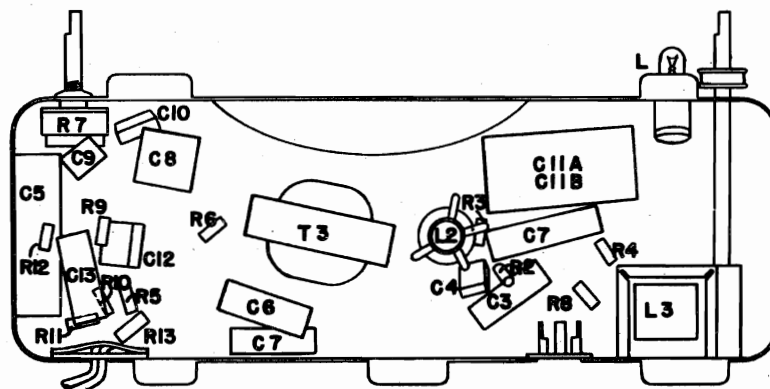
WITH STANDARD LOOP AT ANTENNA CLIP





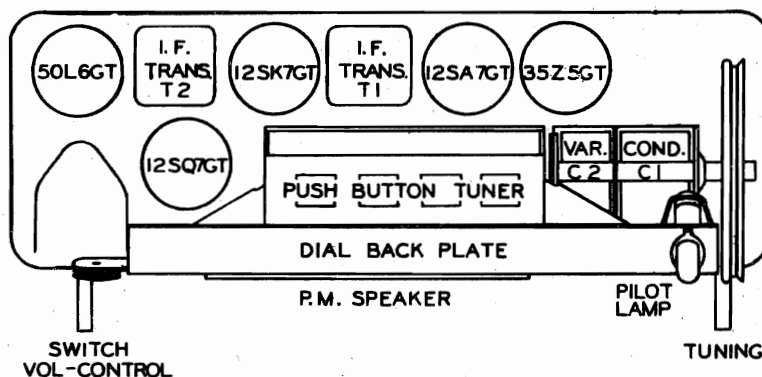
MODELS 552N, 552AN,  
555, 555A

NOBLITT-SPARKS INDUSTRIES INC.



LOCATION OF PARTS UNDER CHASSIS

LOOP ANTENNA



TUBE LAYOUT OUTLINE

ALIGNMENT PROCEDURE

PRELIMINARY:

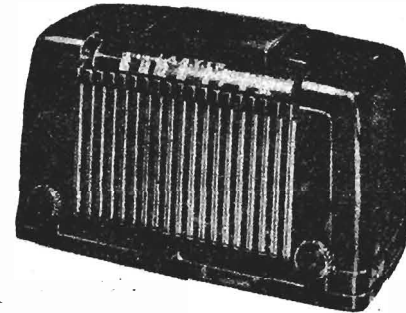
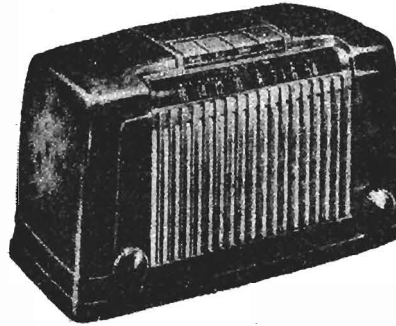
Output meter connection ..... Across Speaker Voice Coil  
 Output meter reading to indicate 200 milliwatts (Standard output) ..... .8 Volt  
 Generator Modulation ..... 30% 400 cycles  
 Position of Volume Control ..... Fully clockwise  
 Position of dial pointer with variable condenser fully closed ..... See Note below

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION HIGH SIDE	GENERATOR CONNECTION GROUND LEAD	ADJUST TRIMMERS IN ORDER SHOWN	TRIMMER FUNCTION
Open	455 KC	.05 mfd.	Mixer grid	Floating Ground	T2-T1	IF
1400 KC	1400 KC	50 mmf.	Ant. Clip	Floating Ground	C2	Oscillator
1400 KC	1400 KC	50 mmf.	Ant. Clip	Floating Ground	C1	Ant.

NOTES:

1. To Set Pointer: There are 4 notches cut in the dial scale backing plate for calibration marks at 540; 600; 1400 & 1620 KC. Set the dial pointer at the 540 KC mark at the right-hand end of the dial plate with the variable completely closed.
2. Place set loop in the same position and at the same distance with respect to the back of the chassis as it would be when the set is mounted in the cabinet, during alignment of the RF stage. (1 7/16" from back of chassis to front of long loop strip).
3. If a standard test loop is used with the Signal Generator for alignment of the receiver the black wire will be left in the antenna clip. When the generator lead is connected to ant. clip the black wire is removed from the clip.
4. 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.

## NOBLITT-SPARKS INDUSTRIES INC.

MODELS 552N, 552AN  
555, 555A

## FREQUENCY RANGE

Broadcast ..... 540-1600 kc  
 IF ..... 455 kc

## TUBES &amp; FUNCTIONS

12SA7 ..... Mixer-oscillator  
 12SK7 ..... IF Amp.  
 12SQ7GT ..... DET-AVC-AP  
 50L6GT ..... Output  
 35Z5GT ..... Rectifier

## POWER SUPPLY

105-125 Volts AC-DC, 35 Watts

## POWER OUTPUT

Undistorted ..... 1.1 Watts  
 Maximum ..... 2.4 Watts  
 Plate load ..... 2000 ohms

## 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. & Volume  
 2. Right knob ..... Tuning

## PHYSICAL DIMENSIONS

Length ..... 11 $\frac{1}{2}$  inches  
 Height ..... 6 $\frac{1}{2}$  inches  
 Depth ..... 6 $\frac{1}{2}$  inches

Models 552N and 555 are in walnut cabinets. Models 552AN and 555A are in ivory cabinets. Models 555 and 555A have push buttons. Models 552N and 552AN do not have push buttons.

## THE HEATER CIRCUIT.

The heaters of all of the tubes are connected in series, accordingly if one tube burns out the others will not light. It is necessary to replace only the burned out tube, the others will then light. The burned out tube can be located through the fact that the full line voltage will appear across its heater prongs.

To obtain best results always rebalance receiver after replacing tubes.

## POSITION OF POWER CORD PLUG.

On AC, the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. On DC, the receiver will work in only one position of the plug in its receptacle.

## 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 will improve reception. The Black wire should be removed from the antenna clip before the antenna is connected.

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

## CIRCUIT CHANGES.

On some sets C4 condenser is connected from Plate to Screen Grid instead of from Plate to Cathode of the output tube.

C-10, .05 uf condenser from screen grid of 12SA7 tube to chassis was added after the start of production to prevent oscillation.

MODELS 552N, 552AN

555, 555A

## NOBLITT-SPARKS INDUSTRIES INC.

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.

Parts shipments are F.O.B. Columbus, Indiana. Terms of sale are the same as those applying to finished Arvin products.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
R1	C20060-103	Resistor, 10,000 ohm, $\frac{1}{2}$ watt	.10	Spk.	C19393	4" P. M. Speaker	4.25
R2	C20060-106	Resistor, 10 megohm, $\frac{1}{2}$ watt	.10	P	B20064-3	Line Cord & Plug Assy	1.00
R3	C20060-223	Resistor, 22,000 ohm, $\frac{1}{2}$ watt	.10		E19301	Cabinet, Walnut (Model 555)	5.00
R4	C20060-331	Resistor, 330 ohm, $\frac{1}{2}$ watt	.10		E19302	Cabinet, Ivory (Model 555A)	5.50
R5	C20060-225	Resistor, 2.2 megohm, $\frac{1}{2}$ watt	.10		E19303	Cabinet, Walnut (Model 552N)	5.00
R6	C20060-156	Resistor, 15 megohm, $\frac{1}{2}$ watt	.10		E19304	Cabinet, Ivory (Model 552AN)	5.50
R7	C19389	Volume Control & Switch	1.00		A19401	Dial Crystal Mtg. Clip	.05
R8	C20060-220	Resistor, 22 ohm, $\frac{1}{2}$ watt	.10		A19410	Ant. Loop Retainer Brkt.	.05
R9, R10	C20060-474	Resistor, .47 megohm, $\frac{1}{2}$ watt	.10		C19408	Dial	1.00
R11	C20060-151	Resistor, 150 ohm, $\frac{1}{2}$ watt	.10		A19391-1	Knob, Walnut	.20
R12	C20060-334	Resistor, 330,000 ohm, $\frac{1}{2}$ watt	.10		C19422	Speaker Baffle	.15
R13	C20070-123	Resistor, 12,000 ohm, 1 watt	.15		*C19348-1	Call Letter Sheets (3)	.50
C1, C2	*E19359	Var. Condenser, 2 gang	8.00		A19414	Carton	.80
	**C19840	Var. Condenser, 2 gang	3.65		A19391-2	Knob, Ivory	.20
C3	C20068-103	Condenser, .01 uf, 400 V.	.25		*A19276	P. B. Knobs, Walnut	.25
C4	C20065-500	Condenser, .00005 uf, 500 V.	.25		*A19275	P. B. Knobs, Ivory	.30
C5	A19765	Condenser, .2 uf, 400 V.	.35		*A19346	P. B. Knob Shaft	.05
C6	C20067-503	Condenser, .05 uf, 200 V.	.25		A19344-3	Idler Pulley	.05
C7	C20068-503	Condenser, .05 uf, 400 V.	.25		A19344-2	Idler Pulley	.05
C8, C12	C20068-202	Condenser, .002 uf, 400 V.	.20		A19364	Dial Pointer	.15
C9	C20065-251	Condenser, .00025 uf, 500 V.	.25		A19205	Capacitor Mtg. Clip	.10
C10	C20065-501	Condenser, .0005 uf, 500 V.	.40		A20149-2	Dial Cord Spring	.10
C11A, C11B	A19360	Elect. Cond., 40-20 uf, 150 V.	1.25		A19361	Hair Pin Clip	.05
C13	C20068-203	Condenser, .02 uf, 400 V.	.25		A19132	Dial Drive Cord	.10
L1	AC19207-1	Ant. Loop Assy.	1.50		A19351	Dial Light Bulb	.20
L2	AC19354-1	Sec. Coil	.60		A18254-1	Tube Sockets	.15
L3	AC19357-1	Iron Core "B" Choke	1.00		A19233-1	Tube Sockets	.15
T1	AC19355-1	1st I. F. Coil	1.95		A19234	Ant. Loop Socket	.10
T2	AC19356-1	2nd I. F. Coil	1.95		A19396	Dial Light Socket Assy.	.35
T3	AC19358-1	Output Transformer	1.25		AA19423-1	Tuning Shaft Assy.	.25
					A19252	Ant. Conn. Plug	.10

\* used only on 555 and 555A.

\*\* used only on 552N and 552AN.

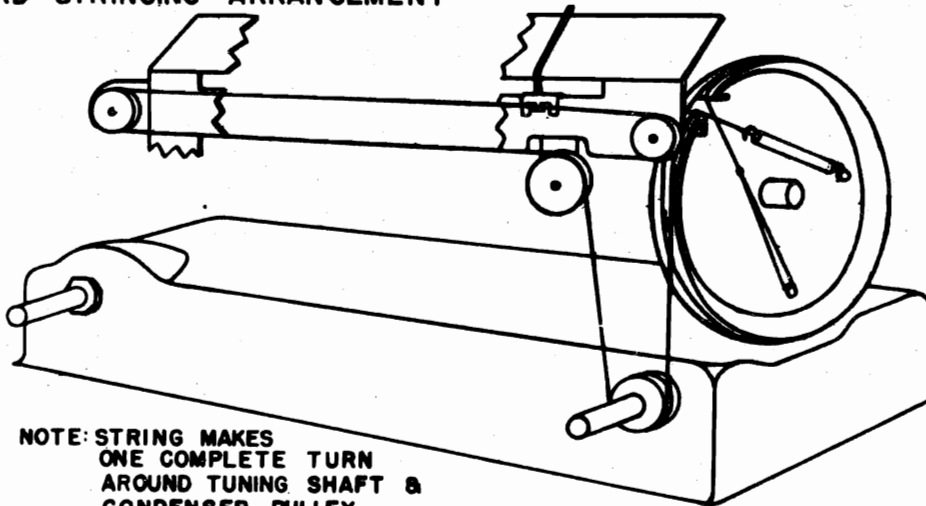
## INSTRUCTIONS FOR SETTING UP PUSH BUTTONS:

Allow the receiver to remain on for ten to fifteen minutes before making the push button adjustments.

Each of the push buttons should be set to a desired station in the following manner:

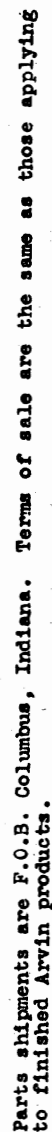
1. Make a list of the four local stations for which push button tuning is desired and punch out the corresponding call letters from the call letter sheets.
2. Lift each button and insert a call letter tab into the slot at the side of the button, centering it in the front opening.
3. Lift a push button and insert a screw driver in the slotted screw head just below the button. Press down and loosen the locking screw by turning it to the left about two turns.
4. While holding the screw all the way down with the screw driver, tune in the desired station by hand with the tuning knob. Turning the tuning knob back and forth slightly either side of the station while holding the screw down will help to obtain a precise setting.
5. Tighten the screw, keeping it pushed all the way down while tightening it.
6. Check for accuracy by moving the pointer off the station about an inch and retuning it by depressing the push button set up for that station. If the setting is not accurate, repeat the foregoing procedure.
7. Follow the same procedure for each of the remaining buttons.
8. Should you desire to change your selection of stations, the old call letters can be removed from the buttons by pushing them out with a penknife, nail file or eraser on a pencil and repeating steps 3 to 8.

## DIAL CORD STRINGING ARRANGEMENT



NOTE: STRING MAKES  
ONE COMPLETE TURN  
AROUND TUNING SHAFT &  
CONDENSER PULLEY

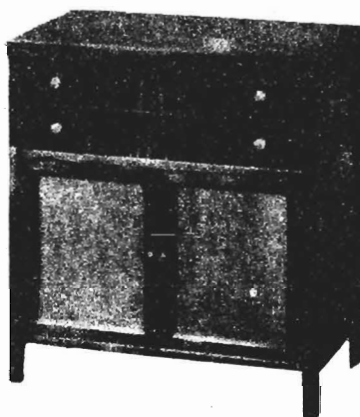
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REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32	C33	C34	C35	C36	C37	C38	C39	C40	C41	C42	C43	C44	C45	C46	C47	C48	C49	C50	C51	C52	C53	C54	C55	C56	C57	C58	C59	C60	C61	C62	C63	C64	C65	C66	C67	C68	C69	C70	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91	C92	C93	C94	C95	C96	C97	C98	C99	C100	C101	C102	C103	C104	C105	C106	C107	C108	C109	C110	C111	C112	C113	C114	C115	C116	C117	C118	C119	C120	C121	C122	C123	C124	C125	C126	C127	C128	C129	C130	C131	C132	C133	C134	C135	C136	C137	C138	C139	C140	C141	C142	C143	C144	C145	C146	C147	C148	C149	C150	C151	C152	C153	C154	C155	C156	C157	C158	C159	C160	C161	C162	C163	C164	C165	C166	C167	C168	C169	C170	C171	C172	C173	C174	C175	C176	C177	C178	C179	C180	C181	C182	C183	C184	C185	C186	C187	C188	C189	C190	C191	C192	C193	C194	C195	C196	C197	C198	C199	C200	C201	C202	C203	C204	C205	C206	C207	C208	C209	C210	C211	C212	C213	C214	C215	C216	C217	C218	C219	C220	C221	C222	C223	C224	C225	C226	C227	C228	C229	C230	C231	C232	C233	C234	C235	C236	C237	C238	C239	C240	C241	C242	C243	C244	C245	C246	C247	C248	C249	C250	C251	C252	C253	C254	C255	C256	C257	C258	C259	C260	C261	C262	C263	C264	C265	C266	C267	C268	C269	C270	C271	C272	C273	C274	C275	C276	C277	C278	C279	C280	C281	C282	C283	C284	C285	C286	C287	C288	C289	C290	C291	C292	C293	C294	C295	C296	C297	C298	C299	C300	C301	C302	C303	C304	C305	C306	C307	C308	C309	C310	C311	C312	C313	C314	C315	C316	C317	C318	C319	C320	C321	C322	C323	C324	C325	C326	C327	C328	C329	C330	C331	C332	C333	C334	C335	C336	C337	C338	C339	C340	C341	C342	C343	C344	C345	C346	C347	C348	C349	C350	C351	C352	C353	C354	C355	C356	C357	C358	C359	C360	C361	C362	C363	C364	C365	C366	C367	C368	C369	C370	C371	C372	C373	C374	C375	C376	C377	C378	C379	C380	C381	C382	C383	C384	C385	C386	C387	C388	C389	C390	C391	C392	C393	C394	C395	C396	C397	C398	C399	C400	C401	C402	C403	C404	C405	C406	C407	C408	C409	C410	C411	C412	C413	C414	C415	C416	C417	C418	C419	C420	C421	C422	C423	C424	C425	C426	C427	C428	C429	C430	C431	C432	C433	C434	C435	C436	C437	C438	C439	C440	C441	C442	C443	C444	C445	C446	C447	C448	C449	C450	C451	C452	C453	C454	C455	C456	C457	C458	C459	C460	C461	C462	C463	C464	C465	C466	C467	C468	C469	C470	C471	C472	C473	C474	C475	C476	C477	C478	C479	C480	C481	C482	C483	C484	C485	C486	C487	C488	C489	C490	C491	C492	C493	C494	C495	C496	C497	C498	C499	C500	C501	C502	C503	C504	C505	C506	C507	C508	C509	C510	C511	C512	C513	C514	C515	C516	C517	C518	C519	C520	C521	C522	C523	C524	C525
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MODEL 665

## NOBLITT-SPARKS INDUSTRIES INC.



## FREQUENCY RANGE

Broadcast ..... 540-1600 kc  
 IF ..... 455 kc

## TUBES &amp; FUNCTIONS

6SS7 ..... RF Amp.  
 12SA7 ..... Mixer-oscillator  
 6SS7 ..... IF Amp.  
 12SQ7GT ..... DET-AVC-AF  
 50L6GT ..... Output  
 35Z5GT ..... Rectifier

## POWER SUPPLY

105-125 Volts AC , 55 Watts

## POWER OUTPUT

Undistorted ..... 1 Watt  
 Maximum ..... 2.2 Watts  
 Plate load ..... 2000 ohms

## SERVICE HINTS AND CIRCUIT CHANGES

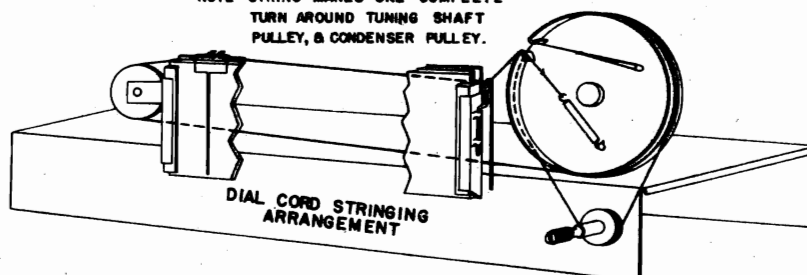
On AC, the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. Do not attempt to operate on DC.

For service information on the record changer see "Automatic Record Changer Service Instructions, Model 205", which should be filed with this bulletin.

## CIRCUIT CHANGES MADE SINCE THE START OF PRODUCTION.

1. C3B and C3C have been interchanged, and Filter Choke L3 changed from Part No. AC19589-1 to AC21073-1 to reduce hum.
2. The filament string arrangement has been changed. The original order was 35Z5; 6SS7 IF; 12SA7; 6SS7 RF; 50L6; and 12SQ7. If frequent burnout of the 6SS7 IF tube is encountered on these sets, the filaments should be rewired to correspond with the present Schematic Diagram.
3. 1 Megohm Resistor, R13 in grid circuit of converter tube replaced by 100M Resistor, R15 to eliminate hum modulation. R15 is connected from grid to floating ground, R13 was connected from grid to AVC.
4. Condensers C5, .0005 mfd., 500 V., across Volume Control, and C7, .002 mfd., 400 V., on Tone Control, replaced by C14, .00025 mfd., 600 V., and C13, .005 mfd., 400 V. respectively, to improve tone quality.

NOTE: STRING MAKES ONE COMPLETE  
 TURN AROUND TUNING SHAFT  
 PULLEY, & CONDENSER PULLEY.



## LOUD SPEAKER

Type: Permanent magnet  
 Size: 8 inch  
 Voice coil impedance ..... 3.2 ohms

## CHASSIS FEATURES

Automatic Record Changer  
 Automatic Volume Control  
 Built-in Loop  
 Underwriters Listed

## OPERATING CONTROLS, LEFT TO RIGHT

1. Volume
2. Radio-Phono Sw.
3. ON-OFF - TONE
4. Tuning

## PHYSICAL DIMENSIONS

Length ..... 30 1/2 inches  
 Height ..... 33 1/4 inches  
 Depth ..... 16 1/2 inches

## ALIGNMENT PROCEDURE

Output meter connection .....	Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output) .....	.8 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 rectangular mark at left edge of dial

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for *Max. Output	Function of Trimmer
Open	455	.05 mfd.	12SA7 Grid (Stator of rear section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
Open	455	.05 mfd.	RF Grid	*Adj. L4 for min. output	Wave Trap
1400	1400	.00005 mfd.	Antenna connection on back of loop	C2; C1, trimmers on Front & Rear sections of Variable Condenser	Osc. Ant.
600	600	.00005 mfd.	Antenna connection on back of loop	**Adj. antenna section plates of variable cond. for Max. output	Antenna

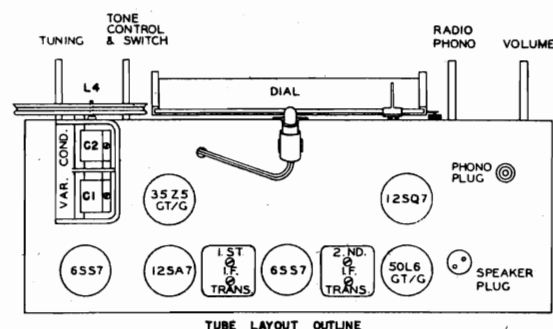
IP. - 455 Kc. -----	2600 uv	Mixer 1000 Kc. -----	75 uv
Mixer 455 Kc. -----	80 uv	Antenna 1400 Kc. -----	70 uv

\*\*\*AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED.

The outside plates on the antenna section of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

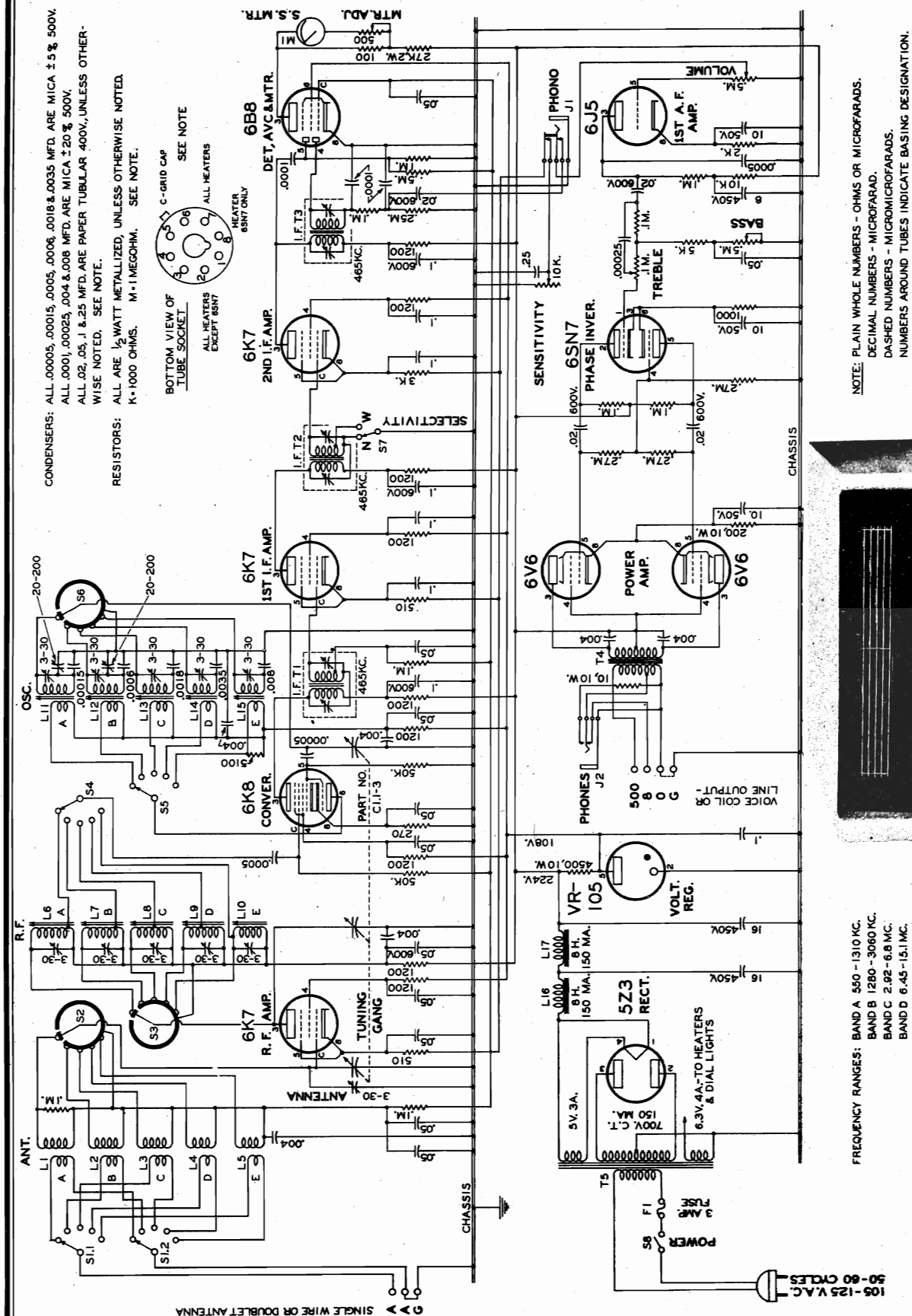
The condenser should be checked for any possible shorting of the plates after the alignment is completed.







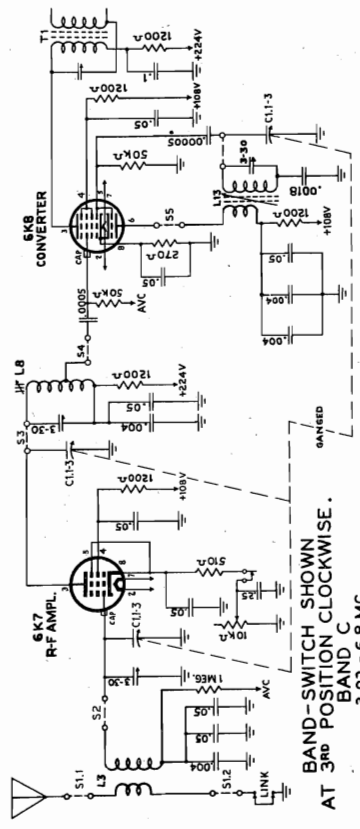
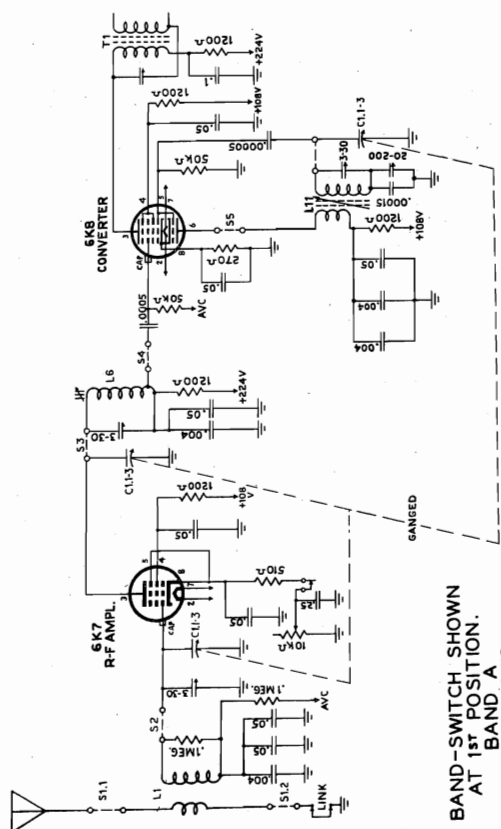
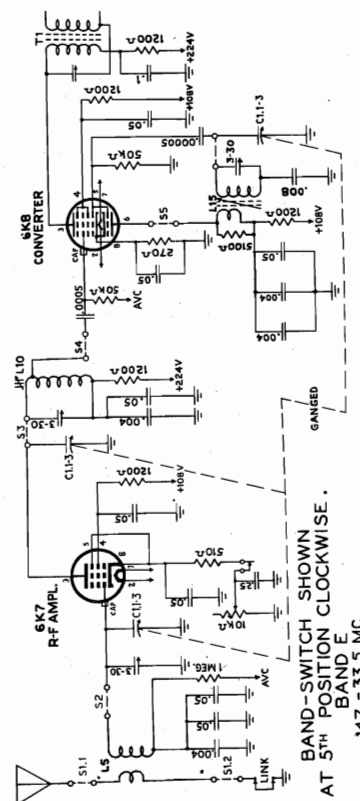
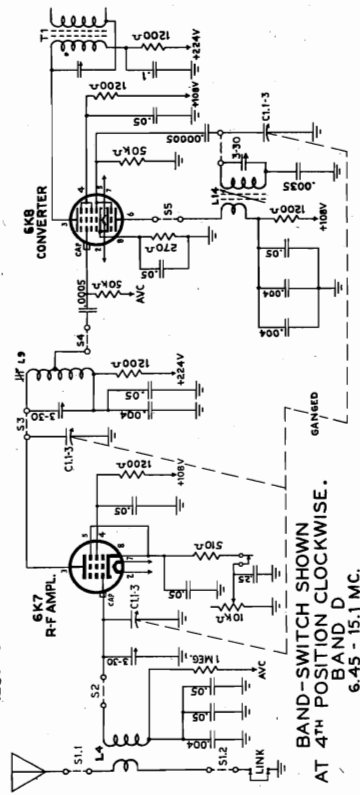
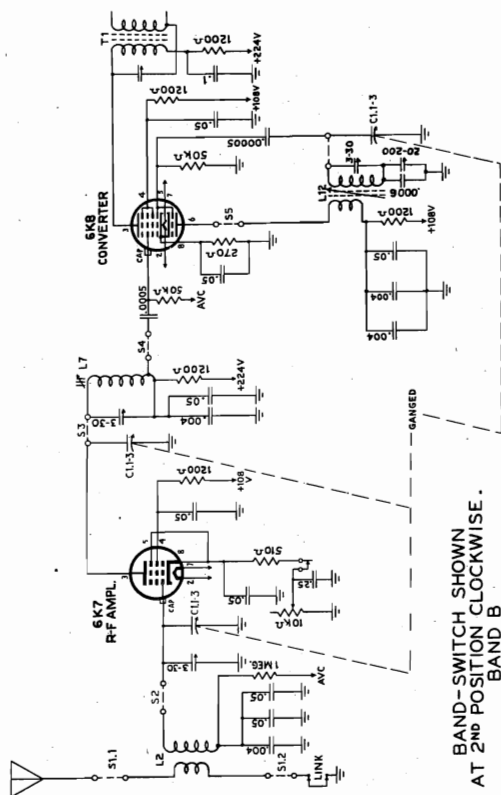
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# "clarified schematics"

MODEL N605-E

NORTHERN RADIO COMPANY

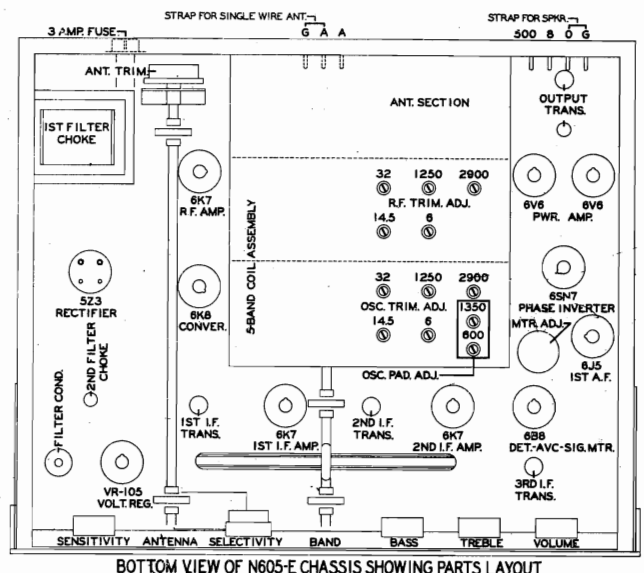


**ALIGNMENT:** Alignment of this receiver will not be necessary unless a component part of the tuned circuits is replaced or the adjustments have been tampered with. When alignment is necessary, the following conditions must be observed before proceeding:

- | FILE NO. 605E-12-1 |                              | ALIGNMENT CHART      |                        |                 |   | 12-46       |
|--------------------|------------------------------|----------------------|------------------------|-----------------|---|-------------|
| STEP               | CONNECT<br>DUMMY<br>ANT. TO- | SET SIG.<br>GEN. TO- | SET<br>BAND<br>SW. TO- | SET DIAL<br>TO- | ADJUST FOR<br>MAXIMUM S.S.<br>METER READING | SEE<br>NOTE |
| 1                  | CONV. 6K8<br>GRID CAP        | 465 KC               | A                      | QUIET<br>POINT  | ALL I. F. TRIMMERS                          | 1,2 & 6     |
| 2                  | "A" TERM.                    | 600 KC               | A                      | 600 KC          | OSC. 600 PAD, ANT.<br>TRIM & RF 600 SLUG    | 1 & 3       |
| 3                  | "A" TERM.                    | 1250 KC              | A                      | 1250 KC         | OSC. 1250 TRIM, ANT.<br>TRIM & RF 1250 TRIM |             |
| 4                  | "A" TERM.                    | 1350 KC              | B                      | 1350 KC         | OSC. 1350 PAD, ANT.<br>TRIM & RF 1350 SLUG  | 1 & 3       |
| 5                  | "A" TERM.                    | 2900 KC              | B                      | 2900 KC         | OSC. 2900 TRIM, ANT.<br>TRIM & RF 2900 TRIM |             |
| 6                  | "A" TERM.                    | 3.5 MC               | C                      | 3.5 MC          | OSC. 3.5 SLUG, ANT.<br>TRIM & RF 3.5 SLUG   | 1 & 4       |
| 7                  | "A" TERM.                    | 6.0 MC               | C                      | 6.0 MC          | OSC. 6.0 TRIM, ANT.<br>TRIM & RF 6.0 TRIM   | 1 & 4       |
| 8                  | "A" TERM.                    | 7.2 MC               | C                      | 7.2 MC          | OSC. 7.2 SLUG, ANT.<br>TRIM & RF 7.2 SLUG   | 1 & 4       |
| 9                  | "A" TERM.                    | 14.5 MC              | D                      | 14.5 MC         | OSC. 14.5 TRIM, ANT.<br>TRIM & RF 14.5 TRIM | 1 & 4       |
| 10                 | "A" TERM.                    | 17 MC                | E                      | 17 MC           | OSC. 17 SLUG, ANT.<br>TRIM & RF 17 SLUG     | 1 & 4       |
| 11                 | "A" TERM.                    | 32 MC                | E                      | 32 MC           | OSC. 32 TRIM, ANT.<br>TRIM & RF 32 TRIM     | 1,4 & 5     |

1. Trimming and padding steps for each band should be repeated several times as each adjustment affects the other a small percentage. The SIGNAL STRENGTH (S.S.) meter is used as a tuning indicator, with a signal input sufficient to give one-half scale deflection.
2. A very large input, 100,000 microvolts or more, may be required to force a signal through the I.F. stages if seriously detuned. The dummy antenna can be connected to the I.F. grids as an alternative if sufficient signal is not available.
3. *Do not adjust A and B band oscillator coil slugs.* Use padding condensers only for dial calibration.
4. Above 3.5 mc. care must be taken to avoid image frequencies.

5. A small amount of interlock between Osc. and RF stages is present above 30 mc. Use a strong signal for aligning, rock the tuning condenser slightly while making the "RF-32 trim" adjustment and set this adjustment approx. 1/4 turn towards maximum C past the apparent optimum setting.
6. One trimmer of the 3rd I.F. transformer will be found to give maximum output at minimum meter reading and should be adjusted correspondingly.

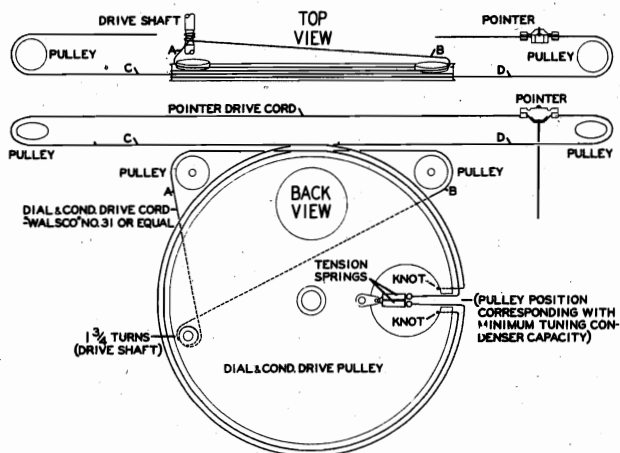


## MODEL N605-E

## NORTHERN RADIO COMPANY

Before attempting any maintenance disconnect the power cable (cord), remove the four screws holding the back plate, remove three screws in the back lip of the chassis and slide the chassis out of the cabinet.

All tubes should be checked in a mutual-conductance type tester and replacements made accordingly. Regardless of test results, tubes having been in service more than two years should be replaced to avoid unnecessary maintenance expense. Tube sockets are stamped for quick identification. Dial lights are Mazda type 47 and should be replaced whenever other maintenance work is done. Ready access to the center pilot light may be had by rotating the dial until the hole in the pulley is behind the light. Whenever the type 6B8 is replaced it will be necessary to reset the tuning meter as follows: set BAND switch on "C", SENSITIVITY control at minimum, disconnect antenna, set mechanical zero on meter, turn on POWER switch and after warm-up set METER ADJ. control for zero.



DIAL AND TUNING CONDENSER DRIVE MECHANISM

## SPECIFICATIONS

## FREQUENCY RANGES:

Overall	550 Kc to 33.5 Mc (546 to 8.96M)
Band A	550 Kc to 1310 Kc (546 to 228.8M)
Band B	1280 Kc to 3060 Kc (234 to 98.1M)
Band C	2.92 Mc to 6.8 Mc (102.7 to 44.1M)
Band D	6.45 Mc to 15.1 Mc (46.5 to 19.8M)
Band E	14.7 Mc to 33.5 Mc (20.4 to 8.96M)

INTERMEDIATE FREQUENCY.....465 Kc.

POWER OUTPUT.....7 Watts, undistorted

OUTPUT IMPEDANCE.....8 and 500 ohms

## TUBE COMPLEMENT:

(1) 6K7	R.F. Amplifier
(2) 6K8	Converter (1st Detector-Oscillator)
(3) 6K7	1st I.F. Amplifier
(4) 6K7	2nd I.F. Amplifier
(5) 6B8	2nd Detector, A.V.C. & Signal Meter
(6) 6J5	1st A.F. Amplifier
(7) 6SN7	Phase Inverter
(8-9) 6V6G	Push-Pull Power Amplifier
(10) VR105	Voltage Regulator
(11) 5Z3	Plate Power Rectifier

TEST READINGS: Test readings are taken under the following conditions:

- SENSITIVITY (R.F. Gain) control full on—clockwise.
- SELECTIVITY switch in W (Wide) position.
- BASS and TREBLE controls off—counterclockwise.
- Antenna disconnected—no signal tuned in.
- Band switch in Band B position for voltage readings.
- A.C. line voltage—117 volts.

FILE NO. 605E-13-1		TEST READINGS				12-46
TUBE	STAGE	PLATE VOLTAGE	SCREEN VOLTAGE	CATHODE VOLTAGE	GRID VOLTAGE	SEE NOTE
6K7	R.F. AMP.	216	106	3.5	.6	1,2&3
6K8	CONVERTER OSC. SECTION	220 104	100 --	2.8 --	.6 1.8-8.0	1,2&3 1,2,3&4
6K7	1ST. I.F. AMP.	220	106	7	.6	1,2&3
6K7	2ND I.F. AMP.	215	106	3.7	0	1&2
6B8	2ND DET. & A.V.C. SECTION. SIG. STRENGTH METER SECTION	-- 43	-- 108	-- 0	0 6	 1,2,3&5
6J5	1ST A.F. AMP.	75	--	2.9	0	1&2
6SN7	PHASE INVERTER	82	--	3.1	0	1&2
6V6	POWER OUTPUT	219	224	12.5	0	1,2&6
VR105	VOLTAGE REG.	108	--	0	--	1&2
5Z3	RECTIFIER	350	--	--	--	1,2&7

## Notes:

- All voltages shown are in respect to chassis.
- Plate, screen and cathode voltages read with 20,000 ohm/volt meter.
- Control grid voltage read with VTVM having a d.c. input resistance of 11 megohms.
- Oscillator grid voltage varies between limits over various bands.
- Grid of 6B8 (AVC bus) varies from .5 to .9 V. over all bands.
- Readings shown are applicable to either tube or section of dual tube.
- Reading taken with .05—600 V. cond. in series with "hor" meter lead.

AUDIO RESPONSE.....Normal response (bass and treble controls off) within plus or minus 2.5 db. from 100 to 10,000 cycles.

BASS &amp; TREBLE BOOST.....10 db. above normal

## POWER SUPPLY RATING:\*

105-125 Volts, A.C., 50-60 cycles.....85 Watts

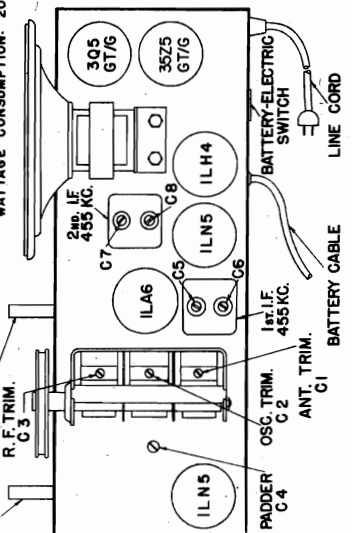
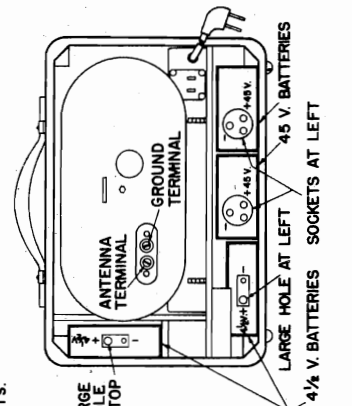
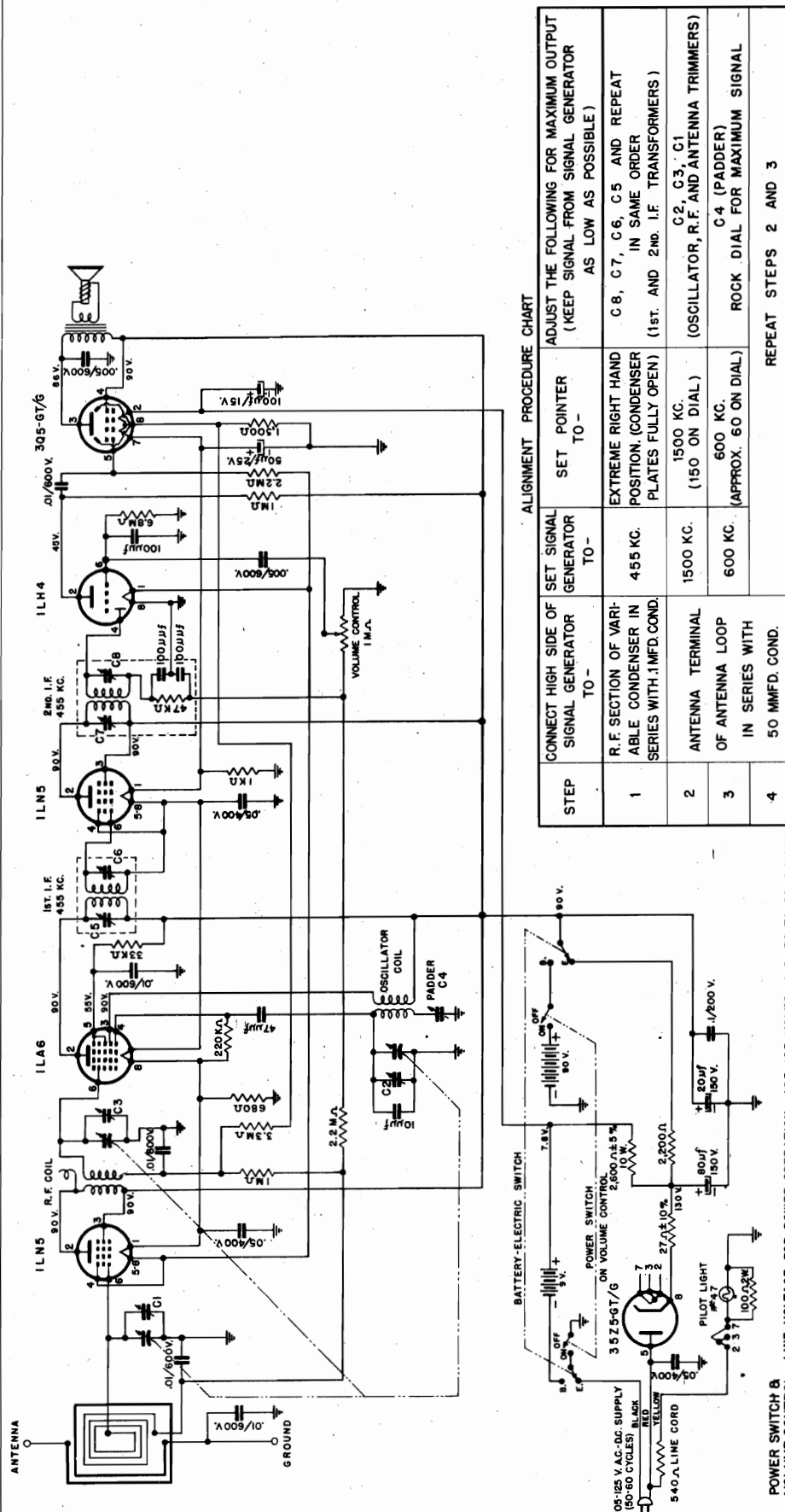
CABINET DIMENSIONS.....17-3/4" Wide; 9-1/2" High;  
14-7/8" Deep

NET WEIGHT.....45 lbs.

\*On special order, the N605-E Receiver can be supplied for 115-230 volt, A.C. operation.

## OLYMPIC RADIO &amp; TELEV. INC.

MODEL 6A-606



Frequency Range 530 - 1700 kc.

## MODEL 6A-606

## OLYMPIC RADIO &amp; TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

**ALIGNMENT**

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

**BATTERIES**

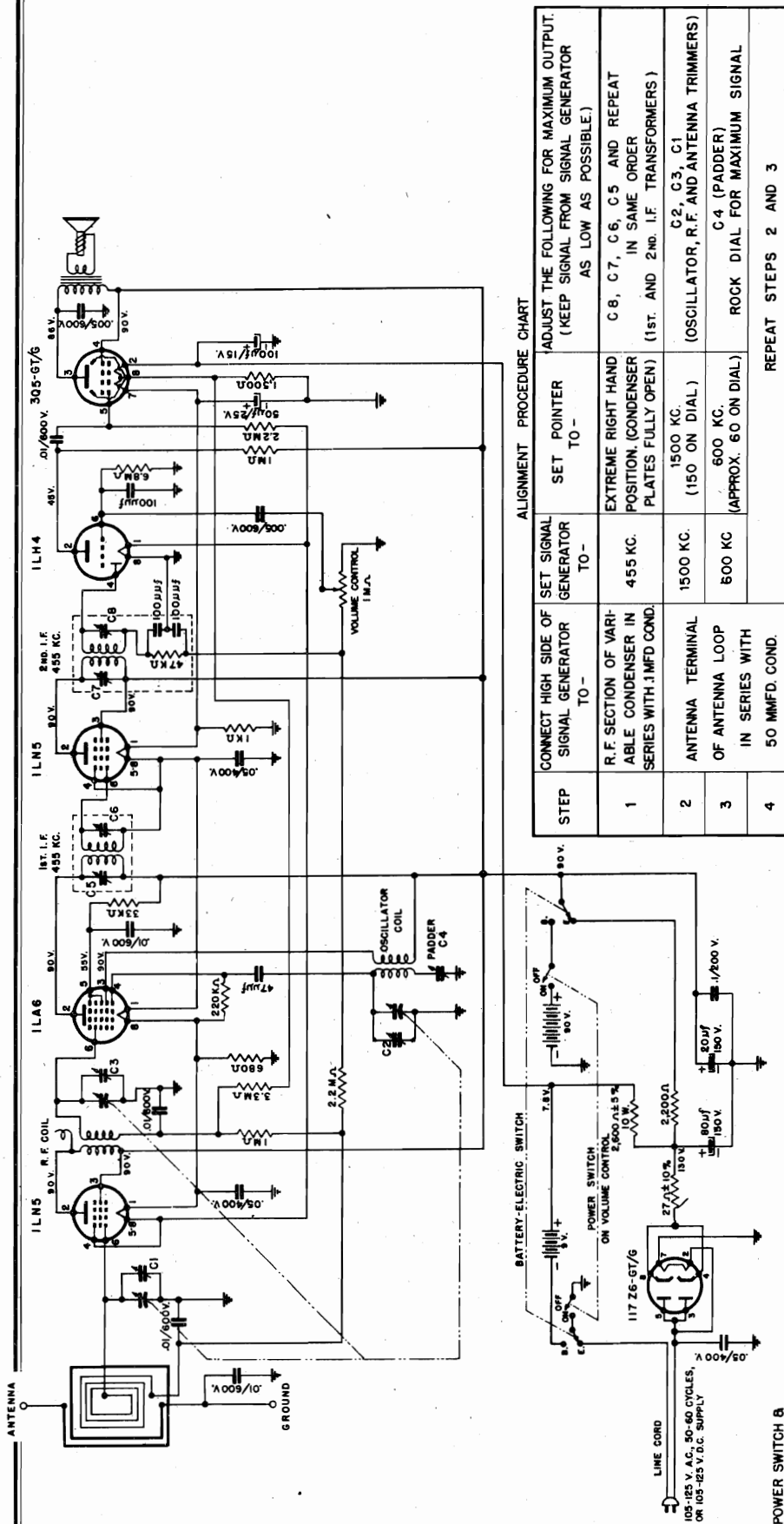
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

**REPLACEMENT PARTS**

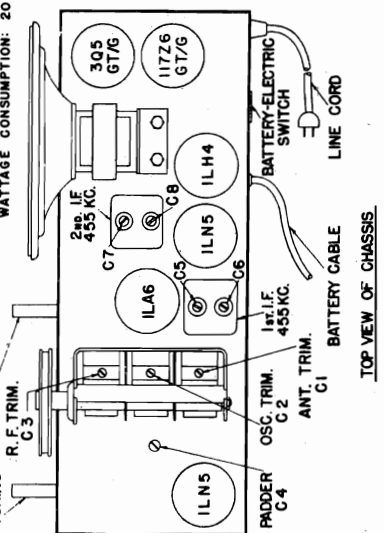
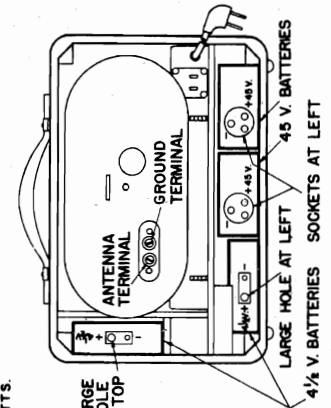
Part No.	Description	Part No.	Description
BK-405	Bracket-Resistor mounting bracket	RCPI0W6502A	Condenser-.005/600WV paper tubular condenser
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)	RE-407	Resistor-2600 ohms $\pm 5\%$ 10 watt resistor
CA-229	Cabinet-portable cabinet	REB102M	Resistor-1000 ohms $\pm 20\%$ ½ watt resistor
CB-335	Cable-battery cable	REB105M	Resistor-1 megohm $\pm 20\%$ ½ watt resistor
CL-177	Coil-oscillator coil	REB152M	Resistor-1500 ohms $\pm 20\%$ ½ watt resistor
CL-630	Coil-R.F. coil	REB222M	Resistor-2200 ohms $\pm 20\%$ ½ watt resistor
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser	REB224M	Resistor-220,000 ohms $\pm 20\%$ ½ watt resistor
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser	REB225M	Resistor-2.2 megohms $\pm 20\%$ ½ watt resistor
CR-299	Crystal-dial crystal	REB270K	Resistor-27 ohms $\pm 10\%$ ½ watt resistor
CT-388	Condenser-220-680 mmfd padder condenser	REB333M	Resistor-33,000 ohms $\pm 20\%$ ½ watt resistor
CV-146	Condenser-3 gang variable condenser (with pulley)	REB335M	Resistor-3.3 megohms $\pm 20\%$ ½ watt resistor
DL-391	Dial-metal dial scale	REB681M	Resistor-680 Ohms $\pm 20\%$ ½ watt resistor
ES-274-1	Escutcheon-moulded escutcheon	REB685M	Resistor-6.8 megohms $\pm 20\%$ ½ watt resistor
KN-260	Knob-walnut knob	RED101M	Resistor-100 ohms $\pm 20\%$ 2 watt resistor
KN-261	Knob-walnut knob with dot	SK-476	Speaker-5" P.M. Speaker with output transformer
LC-315	Line Cord-540 ohms resistance line cord	SO-572	Socket-pilot light socket assembly
LP-178	Loop-Antenna	SP-191	Spring-Drive shaft retaining spring
PO-395	Pointer-dial pointer	SW-185	Switch-battery-electric D.P.D.T. slide switch
PT-576	Control-volume control 1 megohm with D.P.S.T. switch	TR-707	Transformer-I.F. 455 K.C. input-Transformer
RCM20A100M	Condenser-10 mmfd $\pm 20\%$ mica condenser	TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter
RCM20A101M	Condenser-100 mmf $\pm 20\%$ mica condenser		
RCM20A470M	Condenser-47 mmfd $\pm 20\%$ mica condenser		
RCPI0W2104A	Condenser-.1/200WV paper tubular condenser		
RCPI0W4503A	Condenser-.05/400WV paper tubular condenser		
RCPI0W6103A	Condenser-.01/600WV paper tubular condenser		

# OLYMPIC RADIO & TELEV. INC.

MODEL 6B-606



- NOTES:**
1. ALL RESISTORS  $\pm 20\%$  TOLERANCE,  $\frac{1}{2}$  WATT, UNLESS OTHERWISE SPECIFIED.
  2. ALL MICA CONDENSERS  $\pm 20\%$  TOLERANCE.
  3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS  $\pm 10\%$ , EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN  $\pm 5\%$ . ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.



**Frequency Range 530 - 1700 kc.**



WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

### ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

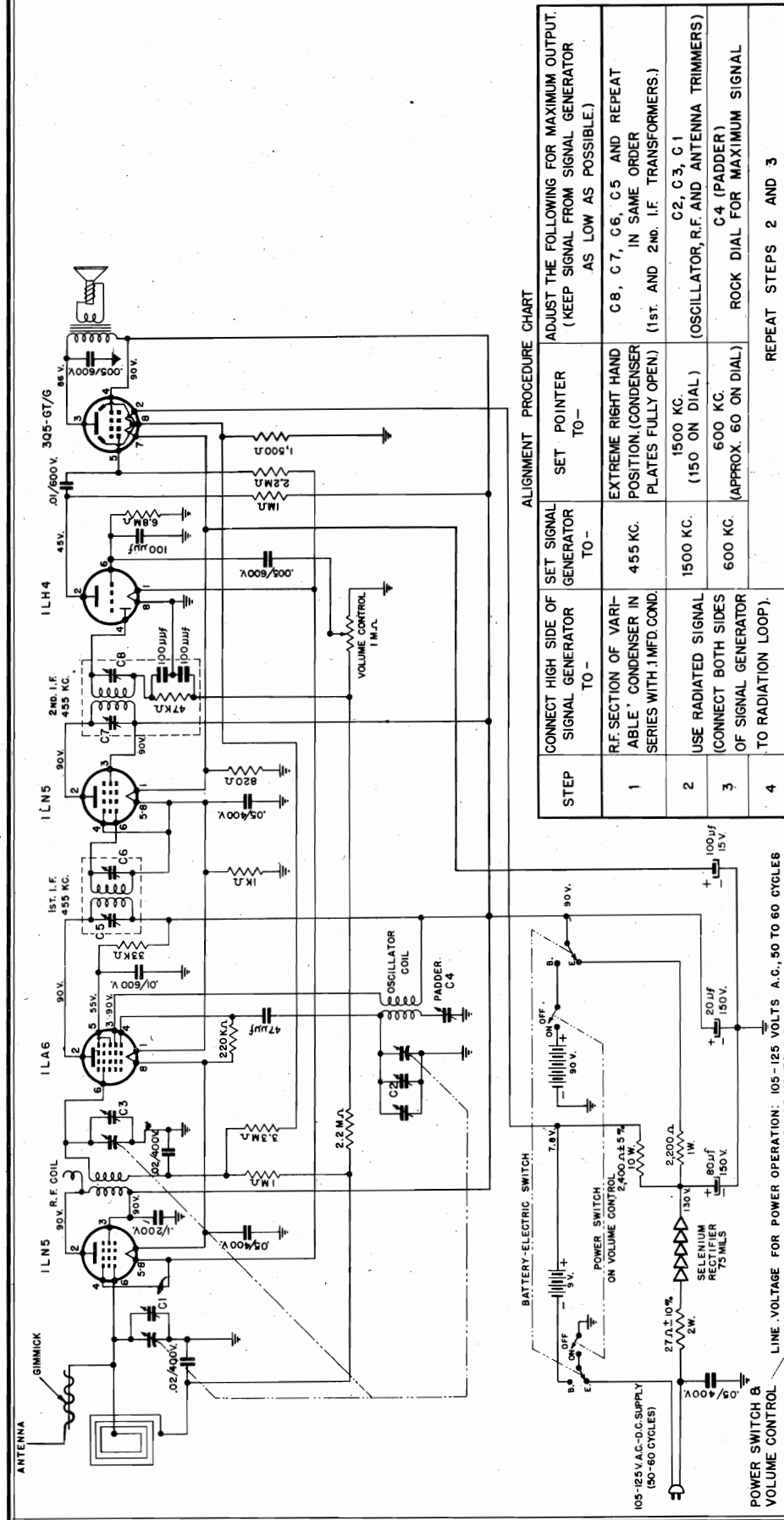
Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

### BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

### REPLACEMENT PARTS

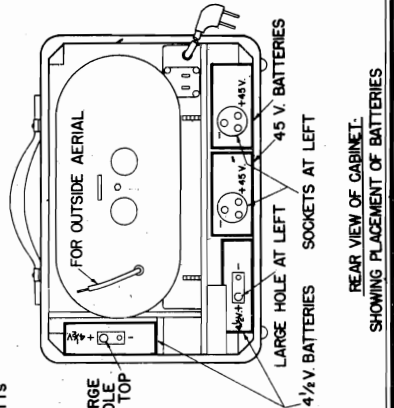
Part No.	Description	Part No.	Description
BK-405	Bracket-Resistor mounting bracket	RCPI0W6502A	Condenser-.005/600WV paper tubular condenser
		RE-407	Resistor-2600 ohms $\pm 5\%$ 10 watt resistor
CA-229	Cabinet-portable cabinet	REB102M	Resistor-1000 ohms $\pm 20\%$ ½ watt resistor
CB-335	Cable-battery cable	REB105M	Resistor-1 megohm $\pm 20\%$ ½ watt resistor
CL-177	Coil-oscillator coil	REB152M	Resistor-1500 ohms $\pm 20\%$ ½ watt resistor
CL-630	Coil-R.F. coil	REB222M	Resistor-2200 ohms $\pm 20\%$ ½ watt resistor
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser	REB224M	Resistor-220,000 ohms $\pm 20\%$ ½ watt resistor
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser	REB225M	Resistor-2.2 megohms $\pm 20\%$ ½ watt resistor
CR-299	Crystal-dial crystal	REB270K	Resistor-27 ohms $\pm 10\%$ ½ watt resistor
CT-388	Condenser-220-680 mmfd padder condenser	REB333M	Resistor-33,000 ohms $\pm 20\%$ ½ watt resistor
CV-146	Condenser-3 gang variable condenser (with pulley)	REB335M	Resistor-3.3 megohms $\pm 20\%$ ½ watt resistor
DL-391	Dial-metal dial scale	REB681M	Resistor-680 Ohms $\pm 20\%$ ½ watt resistor
ES-274-I	Escutcheon-moulded escutcheon	REB685M	Resistor-6.8 megohms $\pm 20\%$ ½ watt resistor
KN-260	Knob-walnut knob	RED101M	Resistor-100 ohms $\pm 20\%$ 2 watt resistor
KN-261	Knob-walnut knob with dot	SK-476	Speaker-5" P.M. Speaker with output transformer
LP-178	Loop-Antenna		
PO-395	Pointer-dial pointer	SP-191	Spring-Drive shaft retaining spring
PT-576	Control-volume control 1 megohm with D.P.S.T. switch	SW-185	Switch-battery-electric D.P.D.T. slide switch
RCM20A101M	Condenser-100 mmf $\pm 20\%$ mica condenser	TR-707	Transformer-I.F. 455 K.C. input-Transformer
RCM20A470M	Condenser-47 mmfd $\pm 20\%$ mica condenser	TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter
RCPI0W2104A	Condenser-.1/200WV paper tubular condenser		
RCPI0W4503A	Condenser-.05/400WV paper tubular condenser		
RCPI0W6103A	Condenser-.01/600WV paper tubular condenser		



ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	SET POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH 1 MFD. COND.	455 KC.	EXTREME RIGHT HAND POSITION (CONDENSER PLATES FULLY OPEN)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS.)
2	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP).	1500 KC.	1500 KC. (150 ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3		600 KC.	600 KC. (APPROX. 60 ON DIAL)	C4 (PADDER)
4				ROCK DIAL FOR MAXIMUM SIGNAL
				REPEAT STEPS 2 AND 3

- NOTES:
1. ALL RESISTORS  $\pm 20\%$  TOLERANCE,  $\frac{1}{2}$  WATT, UNLESS OTHERWISE SPECIFIED.
  2. ALL MICA CONDENSERS  $\pm 20\%$  TOLERANCE
  3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS  $\pm 10\%$ , EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN  $\pm 5\%$ .
- ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117  $\pm 1$ , 60 CYCLES, A.C.



Frequency Range 535 - 1650 kc.

## MODEL 7-526

## OLYMPIC RADIO &amp; TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

To insure proper alignment, it is suggested to use a radiated signal. To radiate a signal connect a loop of about 6" to 8" diameter 1 turn of #14 or #12 wire across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned at a distance of about 8" or 10".

**ALIGNMENT**

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

**BATTERIES**

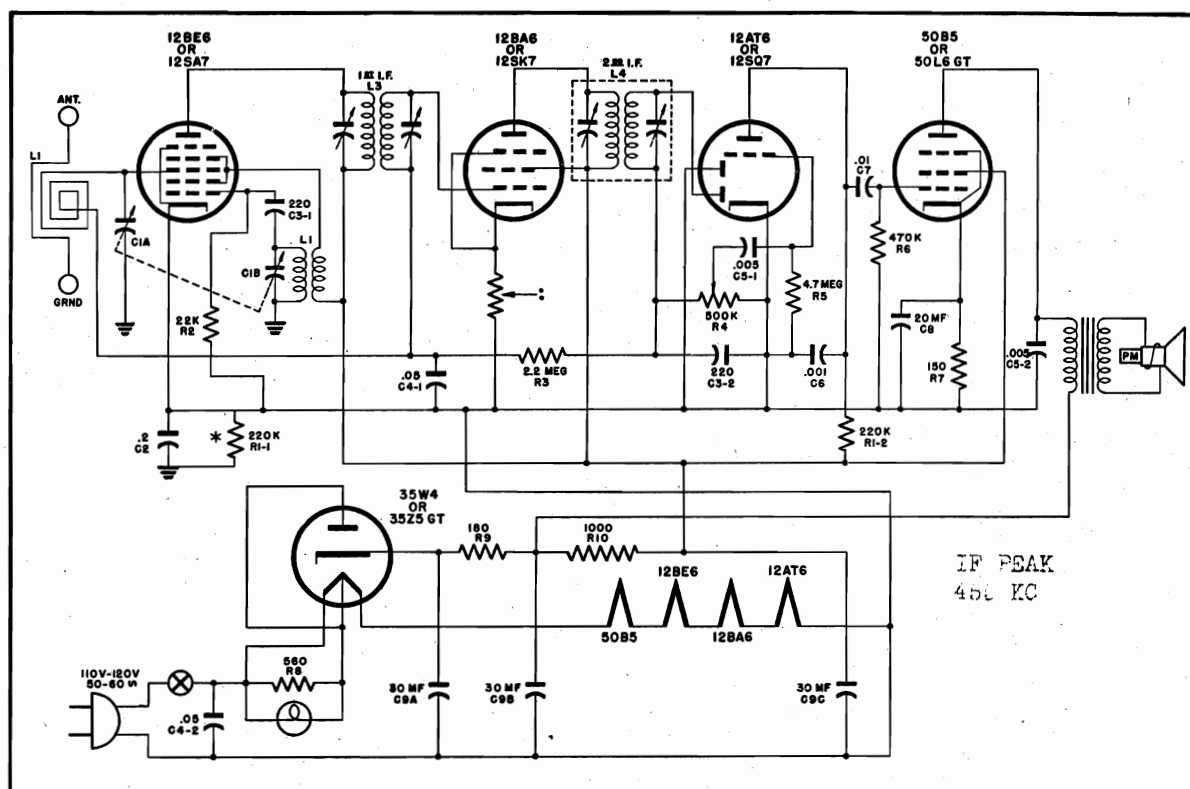
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

**REPLACEMENT PARTS**

Part No.	Description	Part No.	Description
BK-405	Bracket-resistor mounting bracket	RE-879	Resistor-2400 ohms $\pm 5\%$ 10 watt resistor
CA-229	Cabinet-portable cabinet	REB102M	Resistor-1000 ohms $\pm 20\%$ ½ watt resistor
CB-335	Cable-battery cable	REB105M	Resistor-1 megohm $\pm 20\%$ ½ watt resistor
CL-954	Coil-r-f coil	REB152M	Resistor-1500 ohms $\pm 20\%$ ½ watt resistor
CL-957	Coil-oscillator coil	REB224M	Resistor-220,000 ohms $\pm 20\%$ ½ watt resistor
CO-182	Condenser-80/20/150 W.V. & 100/15 W.V. elect. condenser	REB225M	Resistor-2.2 megohms $\pm 20\%$ ½ watt resistor
CT-388	Condenser-220/680 mmfd. padder condenser	REB333M	Resistor-33,000 ohms $\pm 20\%$ ½ watt resistor
CV-816	Condenser-3 gang variable condenser	REB335M	Resistor-3.3 megohms $\pm 20\%$ ½ watt resistor
DL-872	Dial-metal dial scale	REB685M	Resistor-6.8 megohms $\pm 20\%$ ½ watt resistor
ES-274-1	Escutcheon-molded escutcheon	REB821M	Resistor-820 ohms $\pm 20\%$ ½ watt resistor
KN-352	Knob-walnut knob	REC222M	Resistor-2200 ohms $\pm 20\%$ 1 watt resistor
KN-947	Knob-walnut knob with dot	RED270K	Resistor-27 ohms $\pm 10\%$ 2 watt resistor
LP-993	Loop-antenna	RF-770	Rectifier-75 mils selenium rectifier
PO-395	Pointer-dial pointer	SK-476	Speaker-5" P.M. speaker
PT-576	Control-volume control	SP-191	Spring-drive shaft retaining spring
RCM20A101M	Condenser-100 mmfd. $\pm 20\%$ mica condenser	SP-295	Spring-pointer drive spring
RCM20A470M	Condenser-47 mmfd. $\pm 20\%$ mica condenser	SW-185	Switch-battery electric slide switch
RCP10W2104A	Condenser-.1/200 W.V. tubular paper condenser	TR-707	Transformer-455 kc first I.F. transformer
RCP10W4203A	Condenser-.02/400 W.V. tubular paper condenser	TR-708	Transformer-455 kc second I.F. transformer with diode filter
RCP10W4503A	Condenser-.05/400 W.V. tubular paper condenser		
RCP10W6103A	Condenser-.01/600 W.V. tubular paper condenser		
RCP10W6502A	Condenser-.005/600 W.V. tubular paper condenser		

PACKARD BELL CO.

MODEL 5DA



\*R1-1, 220,000 ohm resistor, is used only in sets utilizing metal, octal base tubes.

\*180 ohm ½ watt resistor used for sets employing miniature glass tubes.

### TABLE OF REPLACEABLE PARTS

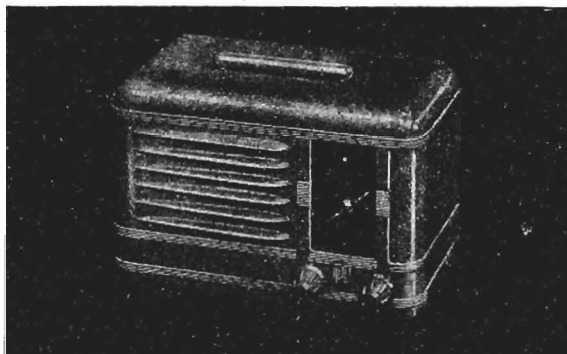
PART NO. REF. SYMBOL DESCRIPTION

21004-AL			Cabinet, plastic: ivory
21004-BG			Cabinet, plastic: walnut
23503	C1A,B		Capacitor, variable
23018	C2		Capacitor, paper: .2 Mfd., 200 volt
23228	C3-1		Capacitor, mica: 220 Mmf., 20%
	C3-2		
23009	C4-1		Capacitor, paper: .05 Mfd., 400 volt
	C4-2		
23004	C5-1		Capacitor, paper: .005 Mfd., 600 volt
	C5-2		
23001	C6		Capacitor, paper: .001 Mfd., 600 volt
23006	C7		Capacitor, paper: .01 Mfd., 600 volt
24032	C8		Capacitor, electrolytic: 3 X 30 Mfd.
	C9A,B & C		150 volt & 20 Mfd., 25 volt
28013			Clip, electrolytic
29308	L1		Loop, antenna
29203	L2		Coil, oscillator
29002	L3		Coil, 1st I.F.: 455 KC
29004D	L4		Coil, 2nd I.F.: 455 KC
32012-AB			Cord, AC:6' brown rubber
32011-AL			Cord, AC:6' white plastic
38032			Dial scale, stationized
38047			Dial scale, export
49009-AL			Handle, ivory
49009-AG			Handle, walnut
52027A-AL			Knob, plastic: ivory
52021A-BG			Knob, plastic: walnut
54002			Dial, lamp, bayonet base: T-47
55003			Crystal, dial
62000B			Panel, loop
68126			Instruction label

PART NO. REF. SYMBOL DESCRIPTION

73049	R1-1		Resistor, carbon: 220,000 ohms, 20%, ½ watt
	R1-2		
73041	R2		Resistor, carbon: 22,000 ohms, 10%, ½ watt
73055	R3		Resistor, carbon: 2.2 megohms, 20%, ½ watt
25001A	R4		Control, volume: 500,000 ohms, with AC switch
73057	R5		Resistor, carbon: 4.7 megohms, 20%, ½ watt
73051	R6		Resistor, carbon: 470,000 ohms, 20%, ½ watt
73081	R7		Resistor, carbon: 150 ohms, 10%, 1 watt
73022	R8		Resistor, carbon: 560 ohms, 10%, ½ watt
73077	R9		Resistor, carbon: 180 ohms, 10%, 1 watt
73071	R10		Resistor, carbon: 1000 ohms, 10%, 1 watt
77015			Shaft, dial drive
79002			Socket, tube: octal base, 8 prong wafer type
79012			Socket, tube: 8 prong miniature
79033			Socket, dial lamp: bayonet base
78029B			Shield, cabinet: paper
83004			Speaker, permanent magnet: 4"
84001			Spring, dial drive
84016			Spring, handle
89411			Transformer, output

AN EARLY RUN OF THESE RECEIVERS UTILIZED MINIATURE GLASS TUBES, CONSEQUENTLY THE INFORMATION SHOWN HAS BEEN COMPILED TO ACCOMMODATE MINIATURE GLASS OR OCTAL BASE TUBES.



### SPECIFICATIONS

- Overall Dimensions:**  
 Height . . . . . 6"  
 Width . . . . . 9 1/4"  
 Depth . . . . . 5"  
 Weight . . . . . 5 1/2 lbs.
- Electrical Rating:**  
 Line Voltage . . . 110-120 volts AC-DC  
 Power Consumption . . . 28 watts
- Tuning Frequency Range:**  
 540 to 1740 KC
- Intermediate Frequency:**  
 455 KC
- Electrical Power Output:**  
 Maximum . . . 1.7 watts
- Loudspeaker:**  
 Type . . . Permanent Magnet  
 Outside Cone Diameter . . . 4"  
 Voice Coil Impedance . . . 3.2 ohms at 400 cycles  
 Magnet Rating . . . 1.0 Oz. Alnico 5
- Tubes:**
- | Tube                  | Function            |
|-----------------------|---------------------|
| No. 1 12BE6 or 12SA7  | Frequency Converter |
| No. 2 12BA6 or 12SK7  | I. F. Amplifier     |
| No. 3 12AT6 or 12SQ7  | Detector Amplifier  |
| No. 4 50B5 or 50L6-GT | Power Amplifier     |
| No. 5 35W4 or 35Z5-GT | Rectifier           |

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to ground buss.—A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to ground buss.\*—Volume Control maximum.—No signal.—117 volts A.C. line voltage.—All voltages shown are positive D.C. unless otherwise noted.  
 \*NOTE: Filament voltages should be measured across the filament of the tube.

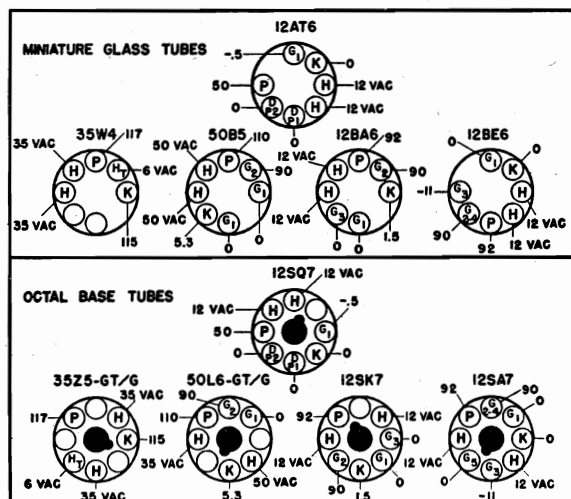


FIGURE 1—SOCKET VOLTAGES

### GENERAL INFORMATION

Model 5DA is a superheterodyne receiver employing five tubes and a permanent magnet speaker. This model is for operation on AC or DC current and is enclosed in a plastic cabinet.

### SPECIAL SERVICE INFORMATION

#### Stage Gain Measurements:

Measurements taken with volume control maximum. — AVC shorted out.  
 Standard Output . . . 50 milliwatts  
 Dummy antenna . . . 200 Mmf.  
 Converter Grid to 1st I.F. Grid . . . 71X at 1000 KC  
 Converter Grid to 1st I.F. Grid . . . 78X at 455 KC  
 1st I.F. Grid to 2nd Detector . . . 77X at 455 KC  
 Overall Audio Gain . . . 375X at .5 watts 400 cycles

#### Oscillator Grid Voltages:

At 117 volts AC line voltages. — Measurements made with an A.C. vacuum tube voltmeter input loading above 10 megohms.  
 600 KC . . . 15 volts AC    1500 KC . . . 20 volts AC

#### D.C. Resistance Measurements:

1st I.F. Coil  
 Primary . . . 17.5 ohms    Secondary . . . 17.5 ohms  
 2nd I.F. Coil  
 Primary . . . 14.5 ohms    Secondary . . . 14.5 ohms  
 Oscillator Coil  
 Primary . . . 1.2 ohms    Secondary . . . 4.5 ohms

### ALIGNMENT PROCEDURE

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

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

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

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

### ALIGNMENT CHART

CONNECT STEP	TEST OSC. TO	TEST OSC. SETTING	ADJUST POINTER FOR MAX. SETTING	FOR MAX. OUTPUT
1	Mixer Grid & Grd. .01 Mfd. Cap.	455 KC	540 KC	Trimmers A, B, C, & D
2	Standard* Test Loop	1740 KC	1740 KC	Trimmer E to 1740 KC
3	Standard* Test Loop	1500 KC	1500 KC	Trimmer F
4	Standard* Test Loop	600 KC	600 KC	Loop

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

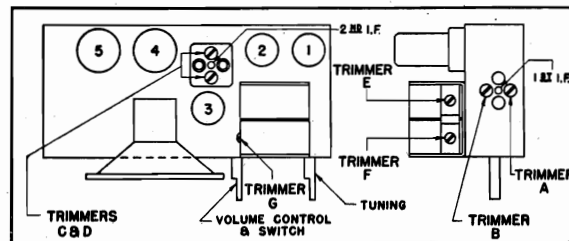
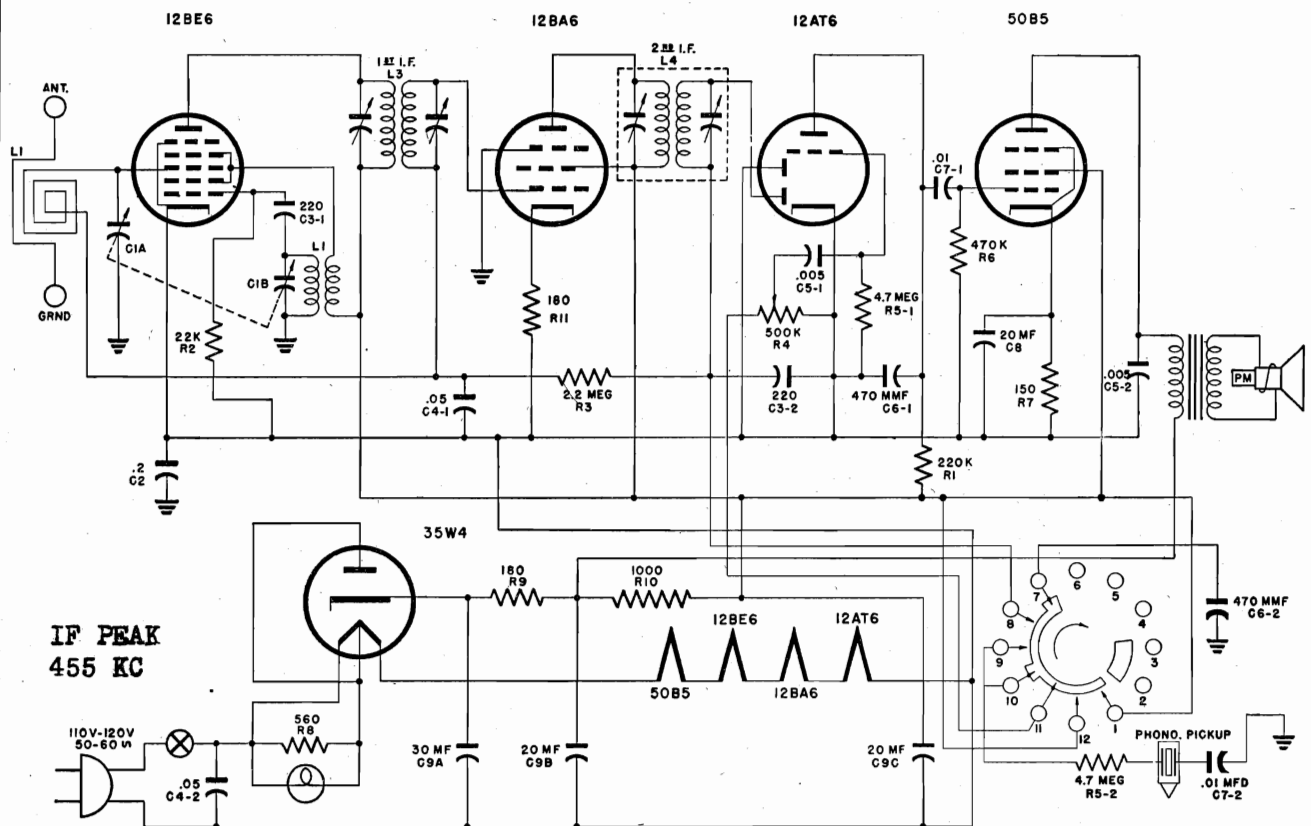


FIGURE 2—TRIMMER LOCATION



PART NO.	REF. SYMBOL	DESCRIPTION	PART NO.	REF. SYMBOL	DESCRIPTION
18004A		Bracket, pilot light	65042A		Plate, paper: dial
18012		Pick-up rest	66013		Plug, phono
20001B		Button plug	66008		Plug, phono motor
21027B		Cabinet, power cord holder	67005		Pointer, dial
21046C		Cabinet, wood: fabricoid covered	73049	R1	Resistor, carbon: 220,000 ohms, 20%, ½ watt
23503	C1A & B	Capacitor, variable: two gang with pulley	73041	R2	Resistor, carbon: 22,000 ohms, 10%, ½ watt
23018	C2	Capacitor, paper: .2 Mfd., 200 volt	73055	R3	Resistor, carbon: 2.2 megohms, 20%, ½ watt
23228	C3-1	Capacitor, mica: 220 Mmf., 20%	25001A	R4	Control, volume: 500,000 ohms, with AC switch
	C3-2		73057	R5-1	Resistor, carbon: 4.7 megohms, 20%, ½ watt
23009	C4-1	Capacitor, paper: .05 Mfd., 400 volt		R5-2	
	C4-2		73051	R6	Resistor, carbon: 470,000 ohms, 20%, ½ watt
23004	C5-1	Capacitor, paper: .005 Mfd., 600 volt	73081	R7	Resistor, carbon: 150 ohms, 10%, 1 watt
	C5-2		73022	R8	Resistor, carbon: 560 ohms, 10%, ½ watt
23916	C6-1	Capacitor, mica: 470 Mmf., 20%	73077	R9	Resistor, carbon: 180 ohms, 10%, 1 watt
	C6-2		73071	R10	Resistor, carbon: 1000 ohms, 10%, 1 watt
23006	C7-1	Capacitor, paper: .01 Mfd., 600 volt	73016	R11	Resistor, carbon: 180 ohms, 10%, ½ watt
	C7-2		77017		Shaft, dial drive
24032	C8	Capacitor, electrolytic: 30 Mfd., 2 x	78019		Shield, AC switch
	C9A,B&C	20 Mfd., 150 WV & 25 Mfd., 25 WV	78026		Shield, phono plug
28013		Clip, electrolytic	79004		Socket, phono
29320	L1	Loop antenna	79007		Socket, phono motor
29203	L2	Coil, oscillator	79012		Socket, tube: 7 prong miniature
29002	L3	Coil, 1st I.F.: 455 KC	79033		Socket, dial lamp: bayonet base
29004D	L4	Coil, 2nd I.F.: 455 KC	83004		Speaker, permanent magnet: 4"
32012-AB		Cord, AC: 6' brown rubber	84001		Spring, dial drive
38044B		Dial scale, stationized	86005B		Switch, rotary: radio-phono
38053		Dial scale, export	86701A		Switch, slide: AC phono motor
41002		Escutcheon, AC switch	89411		Transformer, output
52014		Knob, bar			
54002		Lamp, dial: bayonet base			
55008		Crystal, dial			
58012		Motor, phono			
59003		Needle, phono: permanent, osmium tip			
62030A		Panel, cabinet			
62031A		Panel, motor			
63023		Pick-up arm			
63024		Pick-up cartridge			



## SPECIFICATIONS

## Overall Dimensions:

Width . . . . . 15"      Depth . . . 13 1/8"  
Height . . . . . 7 3/4"      Weight . . . 15 lbs.

## Electrical Rating:

Line Voltage . . . 110-120 volts AC  
Power Consumption . . . 43 watts

Tuning Frequency Range: Intermediate Frequency:  
540 to 1740 KC      455 KC

## Electrical Power Output:

Maximum . . . 1.7 watts

## Loudspeaker:

Type . . . Permanent Magnet  
Outside Cone Diameter . . . 4"  
Voice Coil Impedance . . . 3.2 ohms at 400 cycles  
Magnet Rating . . . 1.0 Oz. Alnico 5

## Tubes:

12BE6 Frequency Converter  
12BA6 I. F. Amplifier  
12AT6 Detector Amplifier  
50B5 Power Amplifier  
35W4 Rectifier

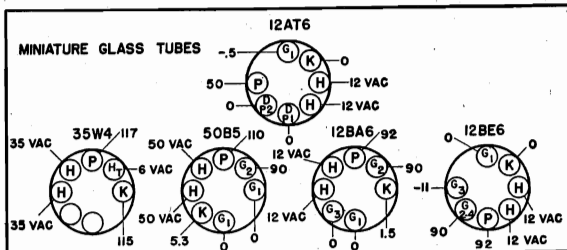


FIGURE 1—SOCKET VOLTAGES

All D.C. voltages measured from socket contacts to ground buss with a vacuum tube voltmeter. — A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to ground buss.\* — volume control maximum. — No Signal. — 117 A.C. line voltage. — All voltages shown are positive D.C. unless otherwise noted.

\*NOTE: Filament voltages should be measured across the filament of the tube.

## GENERAL INFORMATION

Model 568 is a combination superheterodyne receiver and phonograph. This model employs a permanent magnet speaker and a specially designed "Hi-Q" loop antenna. The model is capable of playing ten or twelve-inch records and is enclosed in a fabricoid covered carrying case.

**IMPORTANT:** While it is true this model uses a conventional "AC-DC" circuit, it must be confined to AC operation due to the AC phonograph motor.

**NOTE:** The 3 position Radio-Phono switch shown in the Schematic Diagram was used in the major portion of this model. A very small quantity utilized a 4 position switch. The overall wiring differs very little; the extra position on the 4 position switch provides a "Radio-Tone" position.

## SPECIAL SERVICE INFORMATION

## Stage Gain Measurements:

Measurements taken with volume control maximum. — AVC shorted out.

Standard Output . . . 50 milliwatts

Dummy Antenna . . . 200 Mmf.

Converter Grid to 1st I.F. Grid . . . 71X at 1000 KC

Converter Grid to 1st I.F. Grid . . . 78 X at 455 KC

1st I.F. to 2nd Detector . . . 77X at 455 KC

Overall Audio Gain . . . 375X at .5 watts 400 cycles

## Oscillator Grid Voltages:

600 KC . . . 15 volts AC      1500 KC . . . 20 volts AC

## DC Resistance Measurements:

1st I.F. Coil  
Primary . . . 17.5 ohms      Secondary . . . 17.5 ohms

2nd I.F. Coil  
Primary . . . 14.5 ohms      Secondary . . . 14.5 ohms

Oscillator Coil  
Primary . . . 1.2 ohms      Secondary . . . 4.5 ohms

## ALIGNMENT PROCEDURE

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

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

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

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

## ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER ADJUST SETTING FOR MAX. OUTPUT
1	Mixer Grid & Grd. .01 Mfd. Cap.	455 KC	540 KC Trimms A, B, C & D
2	Standard* Test Loop	1740 KC	1740 KC Trimmer E to 1740 KC
3	Standard* Test Loop	1500 KC	1500 KC Trimmer F
4	Standard* Test Loop	600 KC	600 KC Loop

\*NOTE: Hazeltine Standard Test Loop or a reasonable substitute.

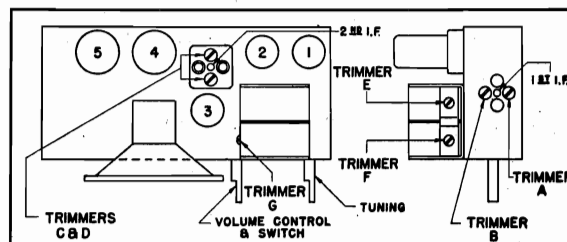
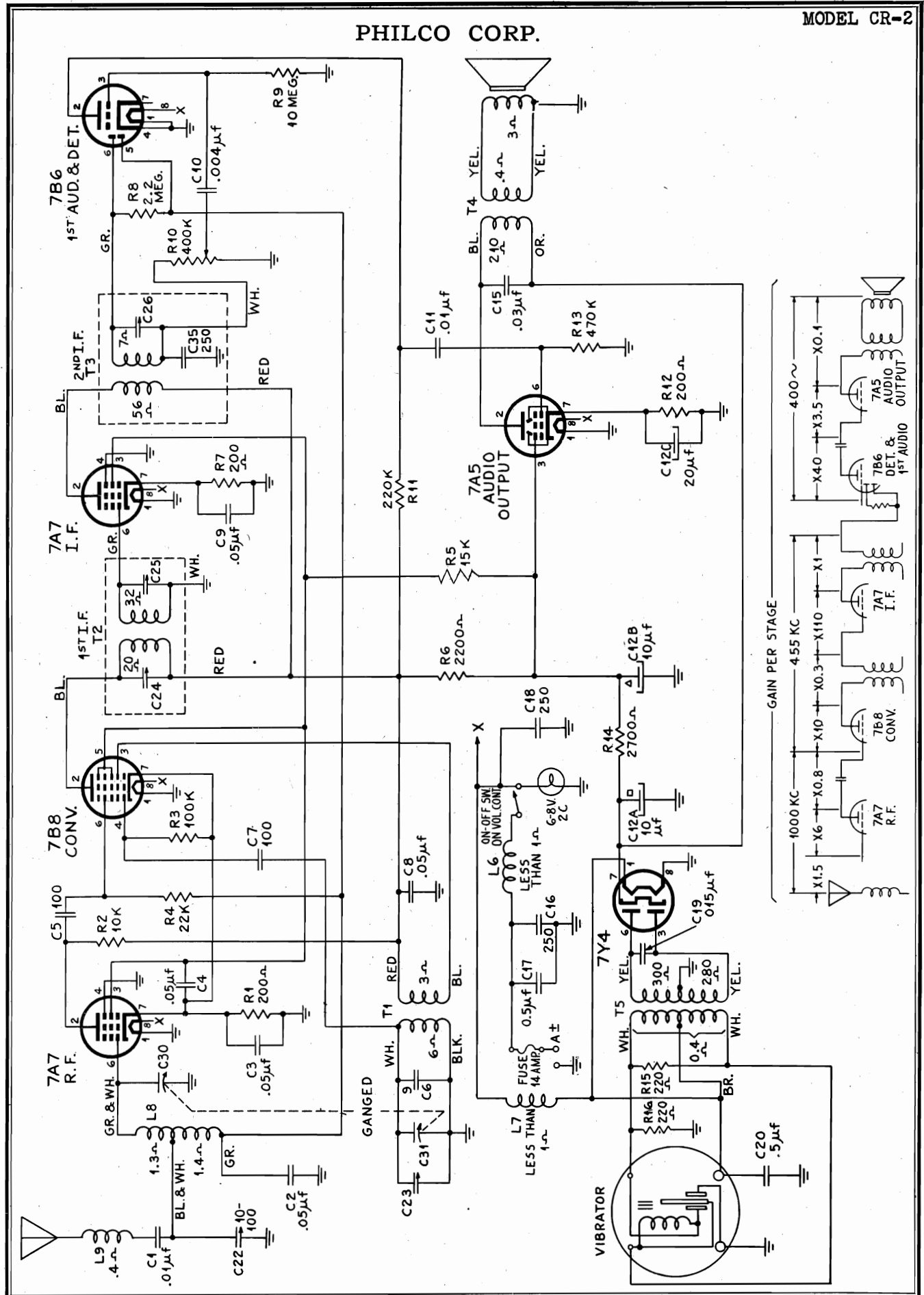
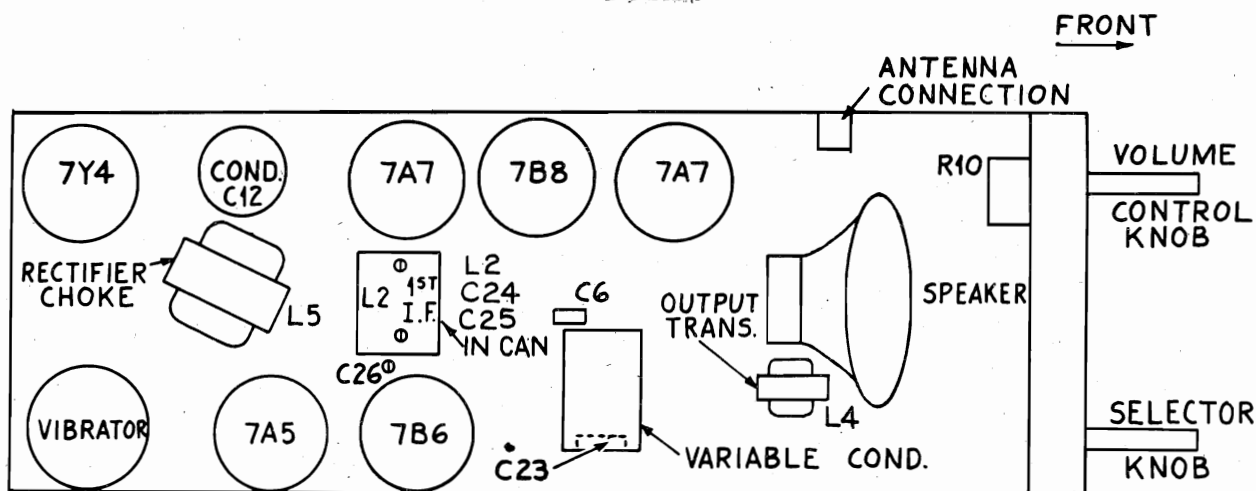


FIGURE 2—TRIMMER LOCATION

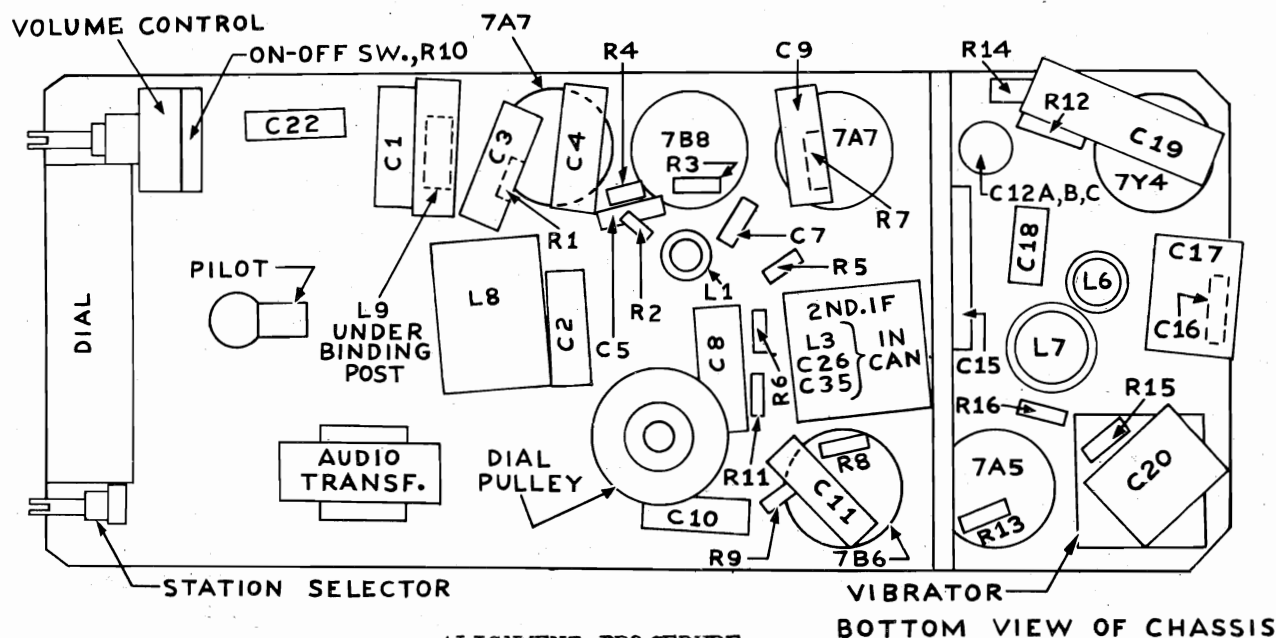


PHILCO CORP.





TOP VIEW OF CHASSIS



ALIGNMENT PROCEDURE

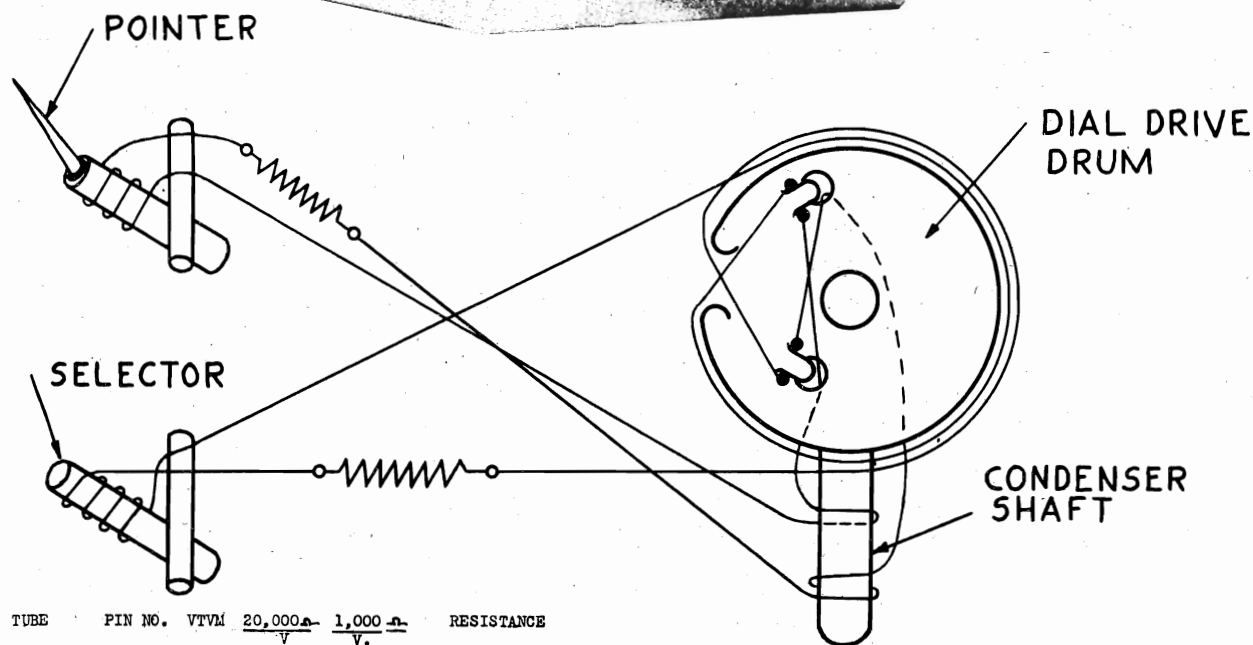
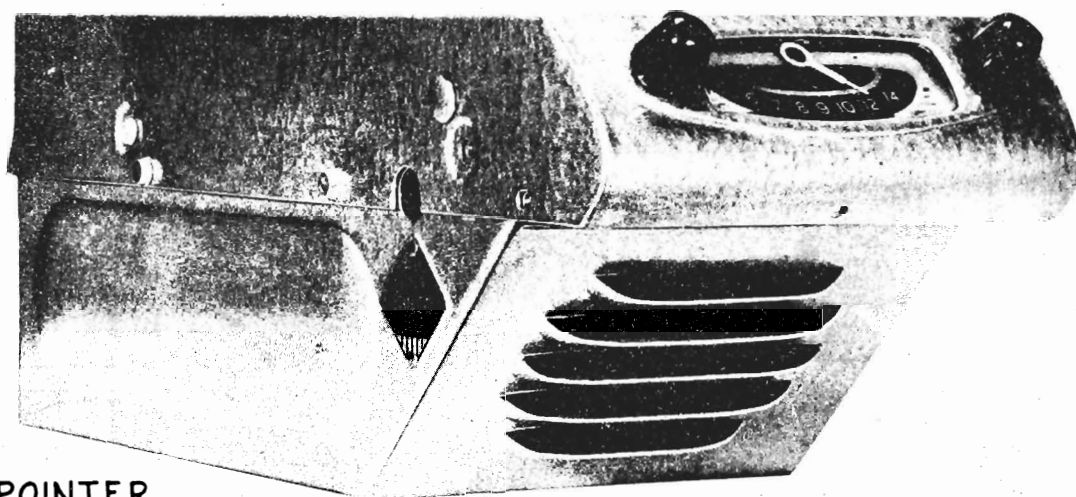
BOTTOM VIEW OF CHASSIS

CONNECT AN OUTPUT METER ACROSS THE VOICE COIL AND THE SPEAKER. CONNECT A SIGNAL GENERATOR THRU A .01 mf CONDENSER TO THE ANTENNA LEAD. MESH THE VARIABLE TUNING CONDENSER FULLY. (PIN 4 OF THE 7B8 SHOULD BE GROUNDED WHILE ALIGNING THE IF STAGE) SET THE SIGNAL GENERATOR TO 455 KC. TURN THE VOLUME CONTROL OF THE RECEIVER TO MAXIMUM. TURN UP THE OUTPUT OF THE SIGNAL GENERATOR SO THAT THERE IS A SMALL DEFLECTION ON THE OUTPUT METER. NOW ADJUST IF TRIMMERS C26, C25 AND C24 FOR A MAXIMUM DEFLECTION ON THE METER.

TO ALIGN THE OSCILLATOR STAGE, CONNECT THE SIGNAL GENERATOR THRU A 50 MMF CONDENSER TO THE ANTENNA LEAD. TUNE BOTH THE RECEIVER AND THE SIGNAL GENERATOR TO 1600 KC. TURN UP THE OUTPUT OF THE SIGNAL GENERATOR SO THAT THERE IS A SMALL DEFLECTION ON THE OUTPUT METER. ADJUST OSCILLATOR TRIMMER C23, FOR A MAXIMUM DEFLECTION ON THE METER.

TO ALIGN RF STAGE FOLLOW ABOVE PROCEDURE EXCEPT THAT THE RECEIVER AND SIGNAL GENERATOR ARE TUNED TO 1400 KC AND TRIMMER C22 IS ADJUSTED FOR MAXIMUM DEFLECTION ON THE OUTPUT METER.

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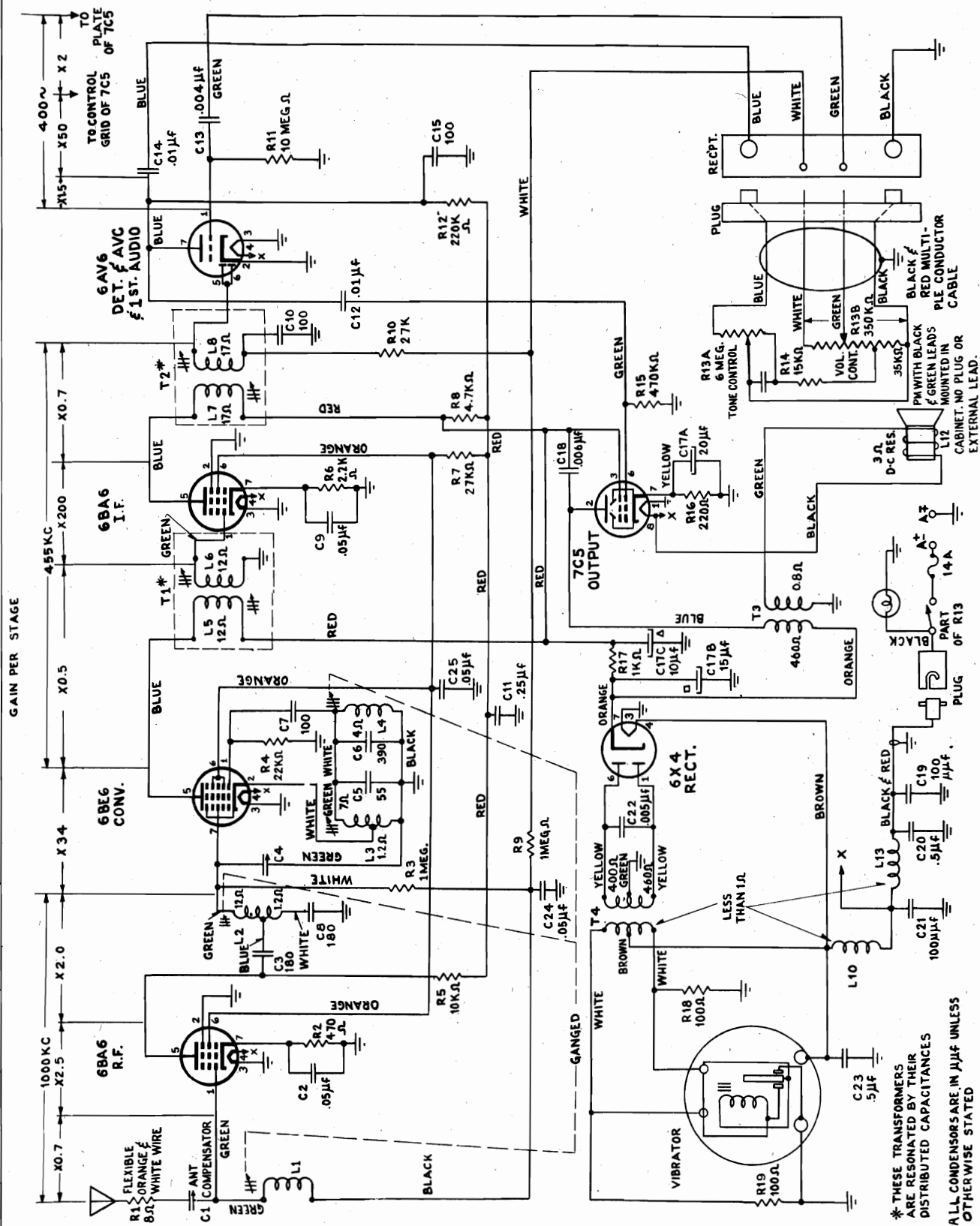
TUBE	PIN NO.	VTVM	20,000 $\Omega$ V	1,000 $\Omega$ V	RESISTANCE
7 A 7 RF	1	0	0	0	0
	2	55V.	51V.	46V.	OVER 5 MEG.
	3	47V.	46V.	43V.	OVER 5 MEG.
	4	0	0	0	0
	5	0	0	0	0
	6	-1.2V.	35V.	-.04V.	2.7 MEG.
	7	1.1V.	1V.	1V.	200 $\Omega$
	8	6.2V.	6V.	6.1V.	.3 $\Omega$
7 B 8 CONVERTER	1	0	0	0	0
	2	78V.	77V.	72V.	OVER 5 MEG.
	3	78V.	77V.	72V.	OVER 5 MEG.
	4	-12V.	-8.3V.	-3.3V.	125 K
	5	47V.	46V.	48V.	OVER 5 MEG.
	6	-1.05V.	.16V.	-.01V.	2.8 MEG.
	7	1.15V.	1V.	1V.	200 $\Omega$
	8	6.2V.	6V.	6V.	.3 $\Omega$
7 A 7 IF	1	0	0	0	0
	2	78V.	76V.	71V.	OVER 5 MEG.
	3	48V.	46V.	43V.	OVER 5 MEG.
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	30 $\Omega$
	7	1.15V.	1V.	1V.	210 $\Omega$
	8	6.2V.	6V.	6V.	.3 $\Omega$
7 B 6 DET. & 1st AUDIC 2	1	0	0	0	0
	2	57V.	54V.	23V.	OVER 5 MEG.
	3	-.95V.	-.36V.	-.1V.	OVER 5 MEG.
	4	0	0	0	.2 $\Omega$
	5	-1V.	-.28V.	-.03V.	2.7 MEG.
	6	-1.2V.	-.42V.	-.05V.	380 K.
	7	0	0	0	0
	8	6.2V.	6V.	6V.	.3 $\Omega$

7A5 AUDIO OUTPUT	1	0	0	0	0
	2	124V.	124V.	120V.	OVER 30 MEG.
	3	95V.	97V.	90V.	OVER 30 MEG.
	4	—	—	—	—
	5	—	—	—	—
	6	.05V.	0	0	650 K
	7	6.3V.	6V.	6V.	210 $\Omega$
	8	6.2V.	6V.	6V.	.3 $\Omega$
7Y4 RECTIFIER	1	6.2V.	6V.	6.1V.	.3 $\Omega$
	2	—	—	—	—
	3	A C	A C	A C	240 $\Omega$
	4	—	—	—	—
	5	—	—	—	—
	6	A C	A C	A C	260 $\Omega$
	7	130V.	120V.	120V.	OVER 5 MEG.
	8	0	0	0	0
VIBRATOR	1	0	0	0	0
	2	6V.	5.7V.	6V.	.6 $\Omega$
	3	6V.	5.7V.	6V.	.6 $\Omega$
	4	6.2V.	5.9V.	6.2V.	.4 $\Omega$

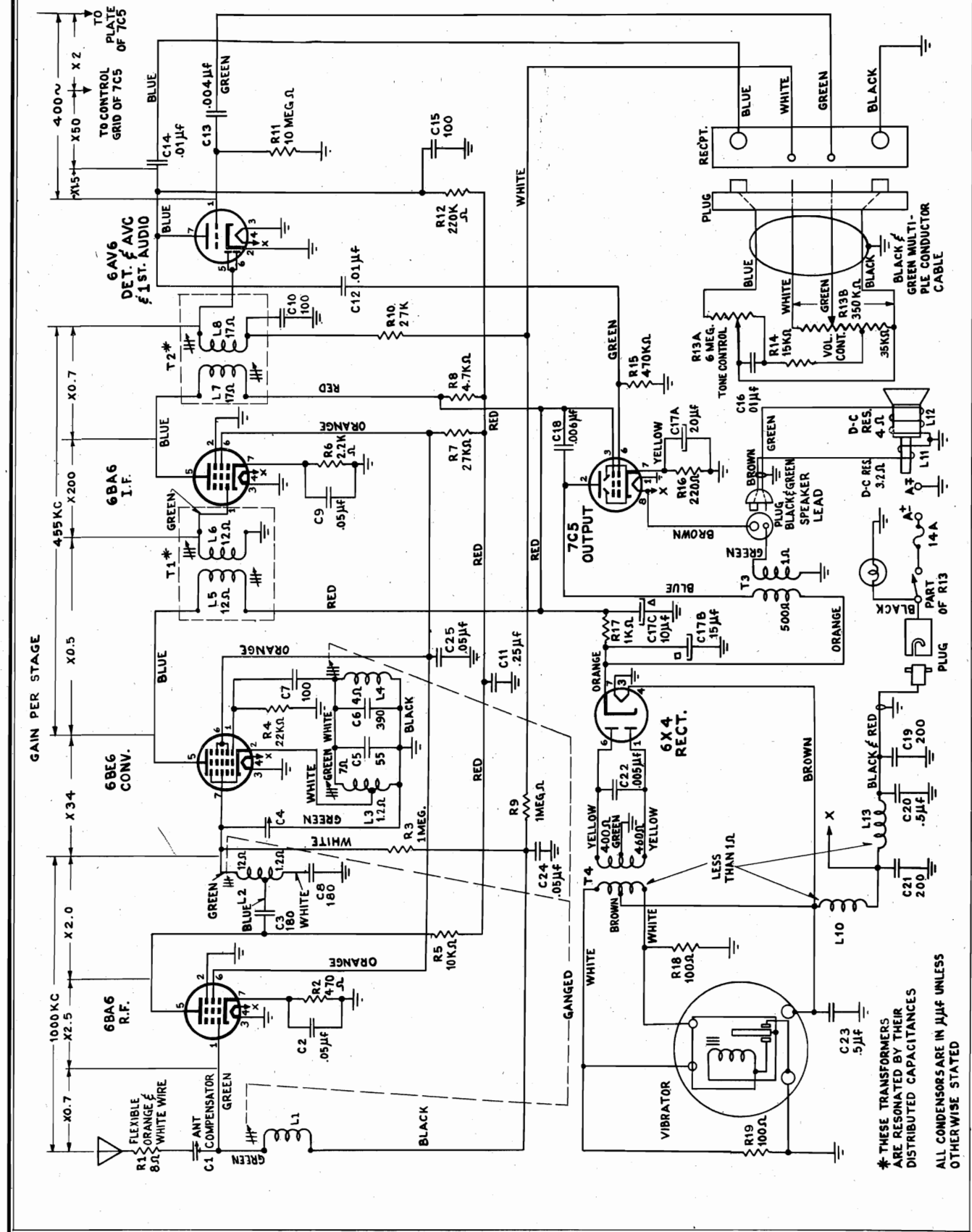
VOLTAGE MEASURED WHEN "A" VOLTAGE = 6.4V.,  
THE CONDENSER FULLY MESHED AND VOLUME CONTROL AT MINIMUM.

MODEL CR-4

PHILCO CORP.



PHILCO CORP.



PHILCO CORP.

ALIGNMENT PROCEDURE

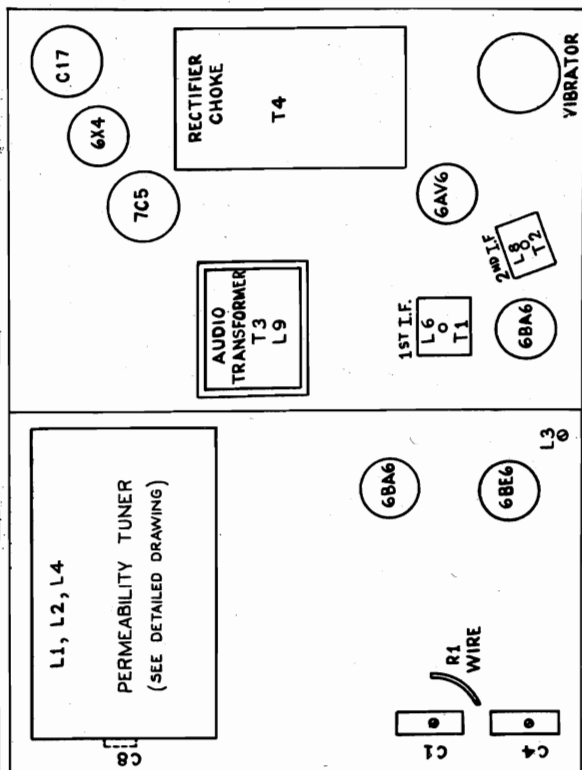
TO ALIGN SET, CONNECT ALL LEADS AND CABLES FROM THE CONTROL UNIT TO THE CHASSIS HOUSING. CONNECT THE SPEAKER TO THE CHASSIS HOUSING. CONNECT THE OUTPUT METER TO THE VOICE COIL OF THE SPEAKER. SET RECEIVER VOLUME CONTROL TO MAXIMUM. CONNECT THE SIGNAL GENERATOR THROUGH A .01 MF CONDENSER TO THE ANTENNA LEAD OF THE RECEIVER. TUNE RECEIVER TO ITS LOWEST FREQUENCY. (TUNING SLUG INSERTED IN COIL AS FAR AS POSSIBLE.

SET SIGNAL GENERATOR TO 455KC AND SET THE OUTPUT SO THAT A DEFLECTION ON THE OUTPUT METER IS JUST NOTICEABLE. ADJUST SLUGS L8, L7, L6, AND L5 (IN ORDER GIVEN) FOR A MAXIMUM DEFLECTION ON THE METER.

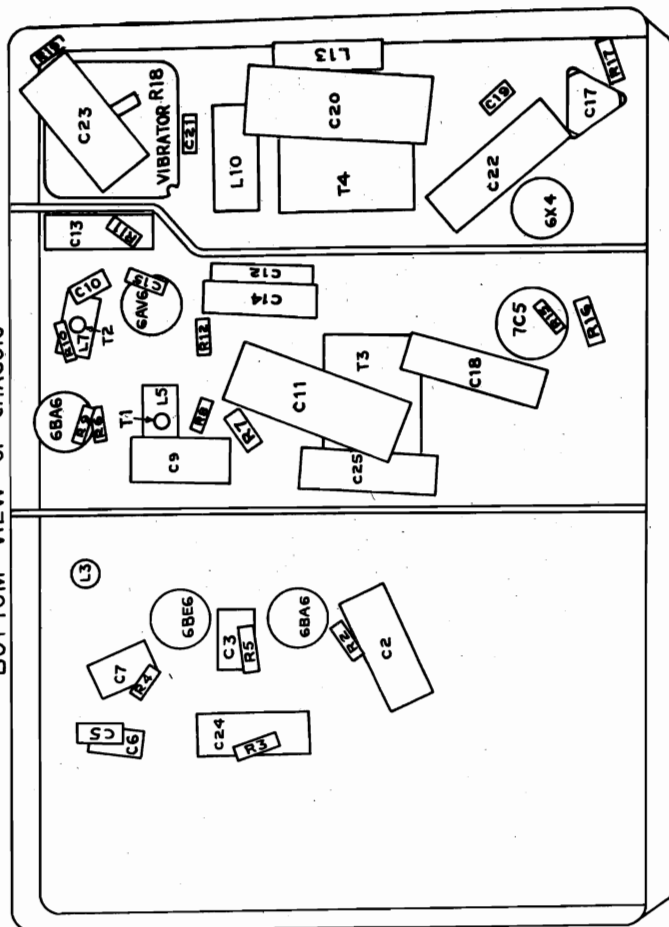
NEXT CONNECT THE SIGNAL GENERATOR THROUGH A 50MMF CONDENSER TO THE ANTENNA LEAD. SET THE SIGNAL GENERATOR AND THE RECEIVER TO 600KC. THE VOLUME OF THE RECEIVER SHOULD BE AT MAXIMUM AND THE OUTPUT OF THE SIGNAL GENERATOR IS GREAT ENOUGH SO THAT A DEFLECTION IS JUST POSSIBLE ON THE OUTPUT METER. ADJUST L3 FOR MAXIMUM DEFLECTION.

REPEAT THE ABOVE SETUP AT 800KC, AND ADJUST C4 FOR MAXIMUM DEFLECTION.

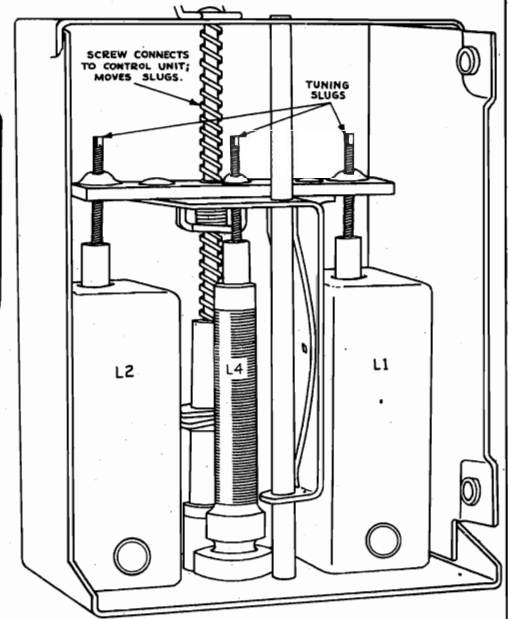
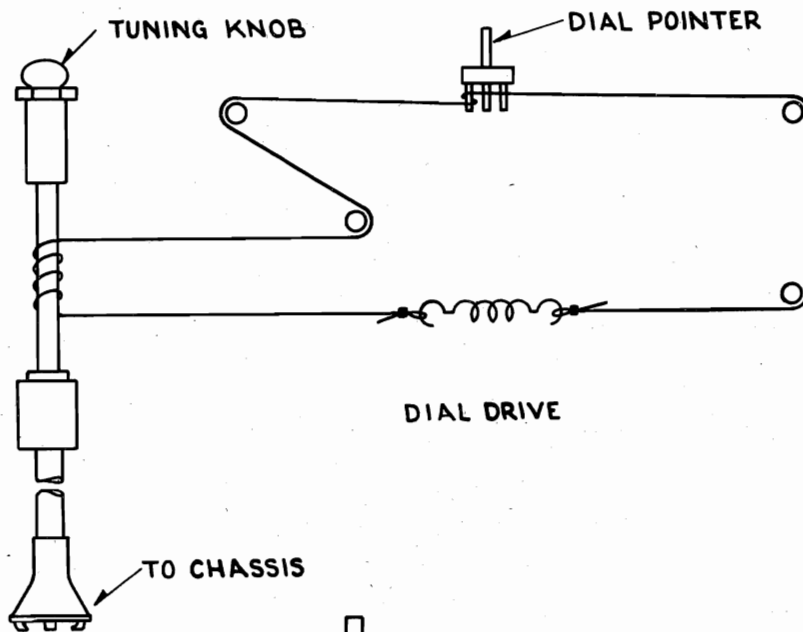
REPEAT ABOVE SETUP AT 1400KC AND ADJUST C1 FOR MAXIMUM DEFLECTION.



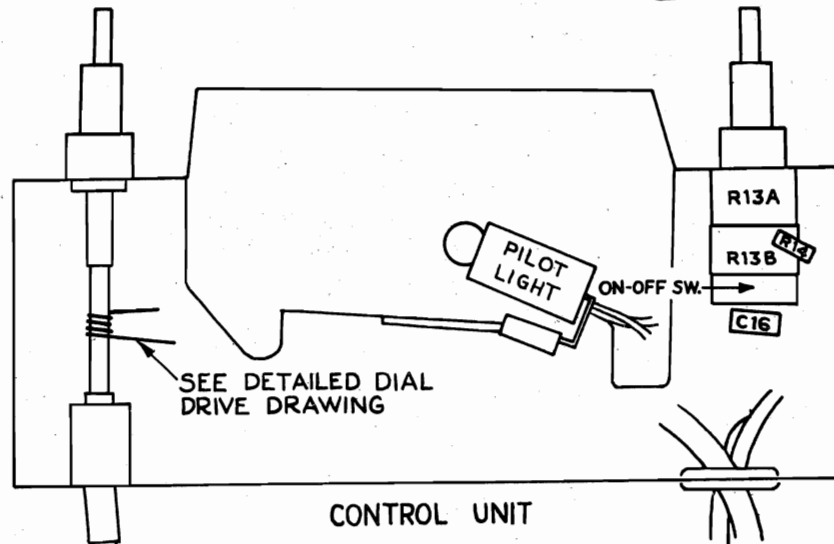
TOP VIEW OF CHASSIS  
BOTTOM VIEW OF CHASSIS



PHILCO CORP.



PERMEABILITY TUNER



CONTROL UNIT

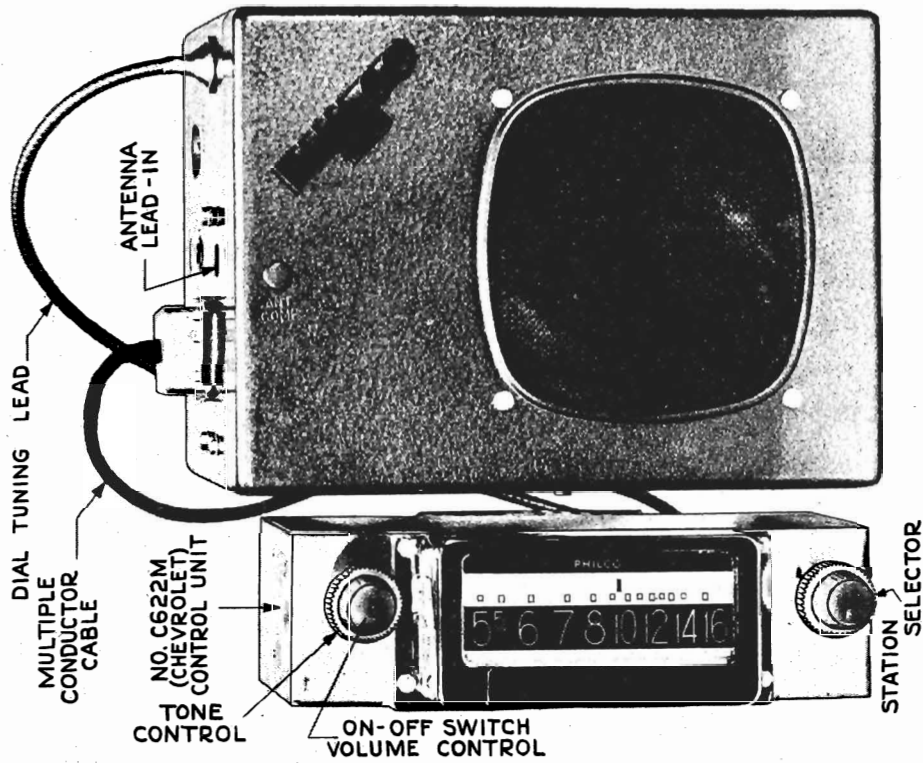
TUBE	PIN NO.	VTVM	20,000 $\Omega$	1,000 $\Omega$	RESISTANCE	7 C 5 AUDIO OUTPUT	1	0	0	0	
6 B A 6 RF	1	-0.65V	-2 V	0 V.	1.2 MEG.	2	220V	210V.	200V.	OVER 5 MEG.	
	2	0V	0 V.	0 V.	0	3	220V	210V.	200V.	OVER 5 MEG.	
	3	0V	0 V.	0 V.	0	4	235V	230V	220V	OVER 5 MEG.	
	4	5.5V	5.3V.	5.4V.	0.5 $\Omega$	5	—	—	—	—	
	5	166V	160V.	160V.	OVER 5 MEG.	6	0.05V	0V.	0V	400 K	
	6	60V	58V	52V.	OVER 5 MEG.	7	7.7V	8V.	8V	210 $\Omega$	
	7	1.44 V	1.3 V.	1.3 V.	500 $\Omega$	8	5.5V	5.3	5.5V	0.4 $\Omega$	
6 B E 6 CONV	1	-3.5V	-2.5V	-1.2V.	24 K	6 X 4 RECTIFIER	1	A.C.	A.C.	A.C.	460 $\Omega$
	2	0V.	0V.	0V.	1.4 $\Omega$		2	0V	0V.	0V.	0
	3	0V	0V.	0V.	0		3	0V	0V.	0V.	0
	4	5.5V	5.3V	5.4V	0.5 $\Omega$		4	5.4V	5.2V.	5.3V.	0.5 $\Omega$
	5	220V	220V.	200V.	OVER 5 MEG.		5	—	—	—	—
	6	60V	59V.	51V.	OVER 5 MEG.		6	A.C.	A.C.	A.C.	420 $\Omega$
	7	-0.6V	-0.1V.	0V.	2.2 MEG.		7	237V	220V.	220V.	OVER 5 MEG.
6 B A 6 IF	1	0V	0V	0V	17.5 $\Omega$	VIBRATOR	1	0V	0V.	0V.	0
	2	0V	0V	0V	0		2	5.3V	5.0V	5.2V	.8 $\Omega$
	3	0V	0V	0V	0		3	5.3V	5.0V	5.2V	.8 $\Omega$
	4	5.5V	5.4V	5.4V	0.4 $\Omega$		4	5.4V	5.2V	5.3V	.6 $\Omega$
	5	220V	210V	210V	OVER 5 MEG.						
	6	60V	58V	52V	OVER 5 MEG.						
	7	3.5V	3.0V	2.8V	2K						
6 A V 6 DET & 1ST AUDIO	1	-0.7V	-0.4V.	-0.1V	10 MEG						
	2	0V	0V.	0V.	0						
	3	0V	0V	0V.	0						
	4	5.5V	5.3V.	5.4V.	0.4 $\Omega$						
	5	-0.75V	-0.5V.	-0.2V.	280 $\Omega$						
	6	-0.75V	-0.5V.	-0.2V.	300 K						
	7	105V	100V	54V	OVER 5 MEG.						

VOLTAGE MEASURED WHEN "A" VOLTAGE = 6.0 V, TUNING SLUG AT LOWEST FREQUENCY, VOLUME CONTROL AT MINIMUM, TONE CONTROL FULLY CLOCKWISE.

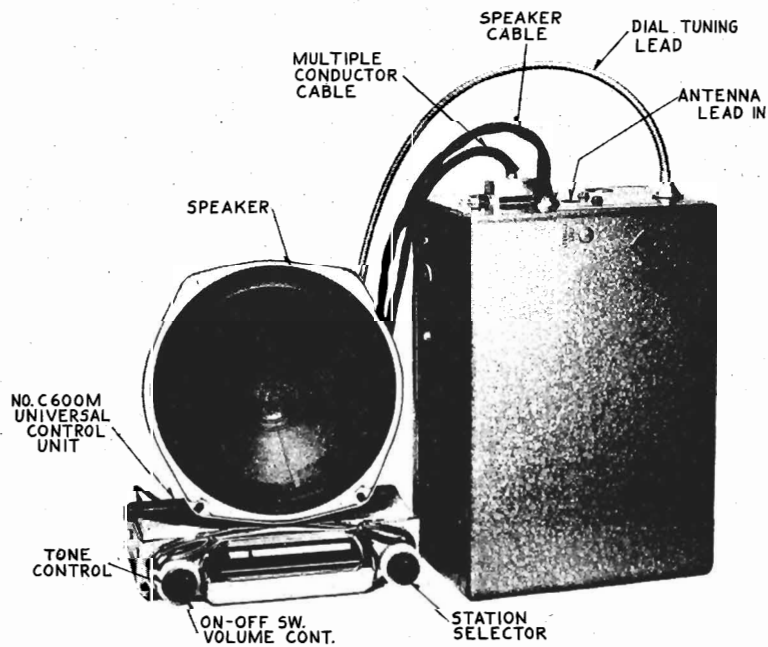


PHILCO CORP.

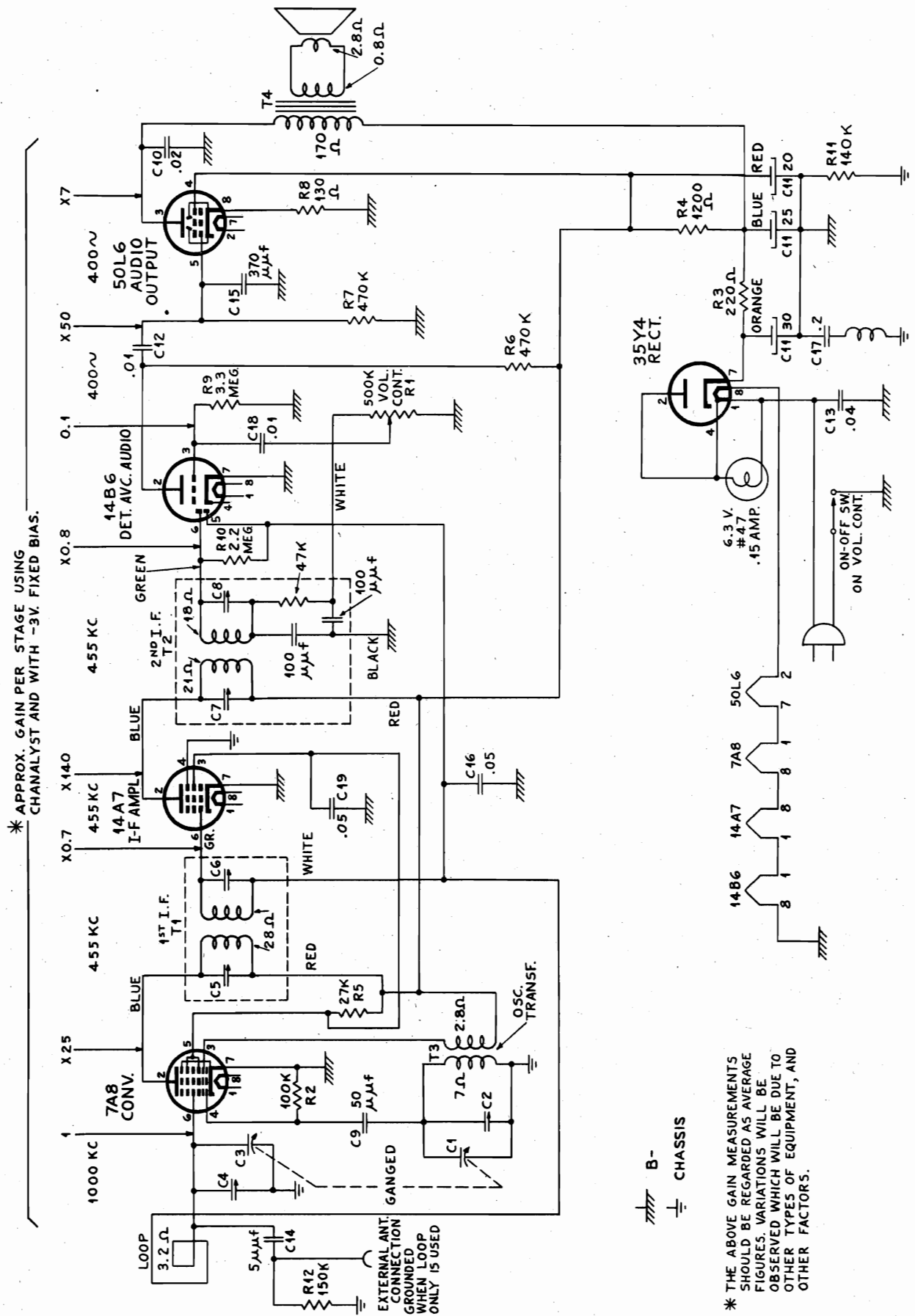
CR-4



CR-6



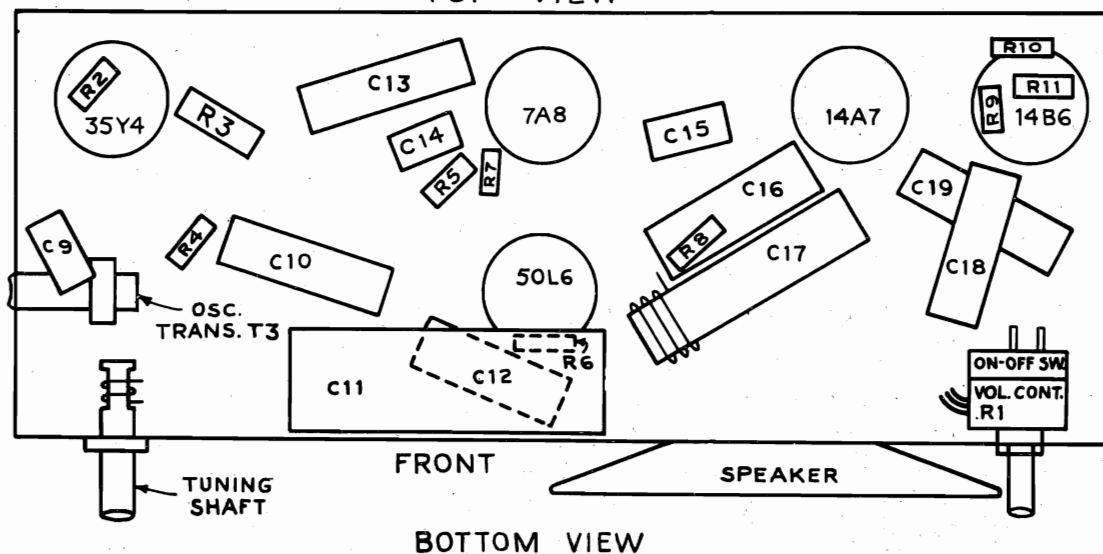
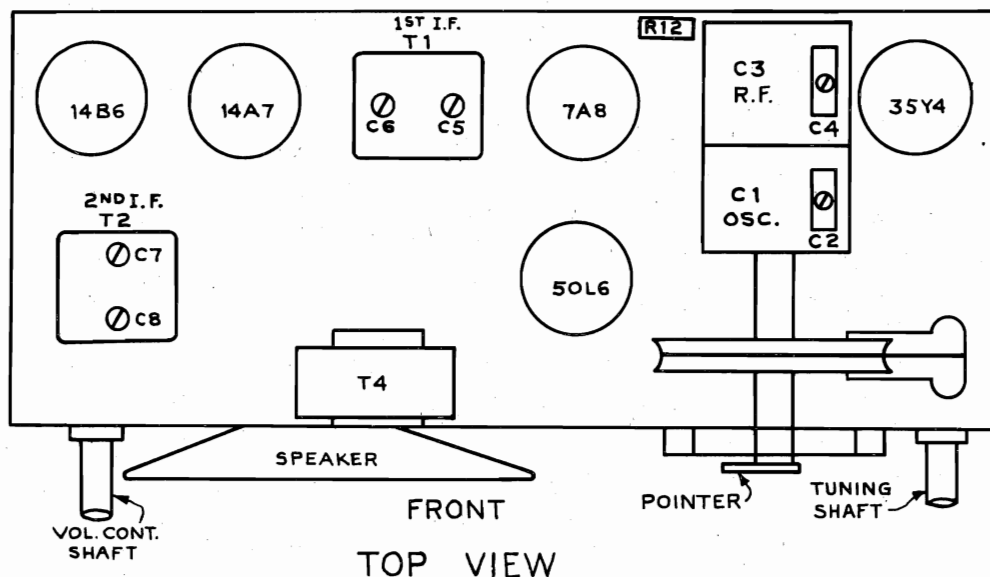
PHILCO CORP.



\* THE ABOVE GAIN MEASUREMENTS SHOULD BE REGARDED AS AVERAGE FIGURES, VARIATIONS WILL BE OBSERVED WHICH WILL BE DUE TO OTHER TYPES OF EQUIPMENT, AND OTHER FACTORS.

MODEL 46-200

PHILCO CORP.



## ALIGNMENT

Remove the chassis from the cabinet and connect the output meter to the left terminal (High) and the center terminal (Low) of the three lug terminal strip on the rear of the chassis.

Connect the Signal generator to the standard Hazeltine loop, Model 1150 and couple it loosely to the receiver loop.

Set the Volume at maximum, and fully mark the tuning condenser.

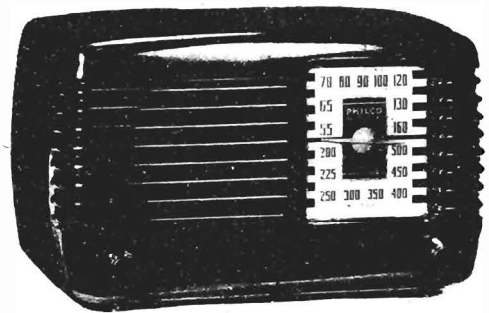
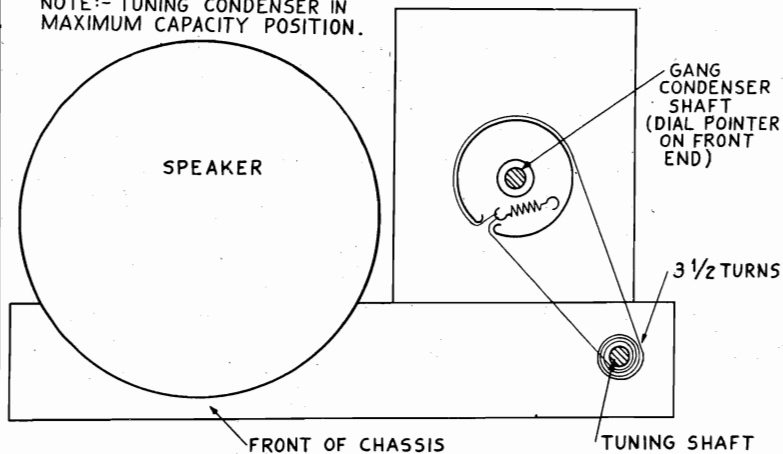
The output of the signal generator should be just sufficient to give a readable deflection on the output meter.

Set the signal generator to 455 KC and adjust the IF trimmers for maximum output in the following order: C8, C7, C6, C5.

Set the signal generator and receiver to 1600 KC and adjust the oscillator trimmer C2 for maximum output.

Set the signal generator and receiver to 1400 KC and adjust the RF trimmer C4 for maximum output.

## PHILCO CORP.

NOTE:- TUNING CONDENSER IN  
MAXIMUM CAPACITY POSITION.

SOCKET	PIN	VTVM	20,000 $\Omega$ / P.V.	1,000 $\Omega$ / P.V.	RESISTANCE
7A8 CONV.	1	AC	AC	AC	30 $\Omega$
	2	100	100	100	OVER 2 MEGS.
	3	100	100	100	OVER 2 MEGS.
	4	-12	-8.6	-4.2	900 K
	5	44	44	38	OVER 2 MEGS.
	6	-1	-0.8	-0.4	2.8 MEGS.
	7	0	0	0	0
	8	AC	AC	AC	24 $\Omega$
14A7 I-F AMPL.	1	AC	AC	AC	12 $\Omega$
	2	100	100	100	OVER 2 MEGS.
	3	43	43	38	OVER 2 MEGS.
	4	0	0	0	0
	5	0	0	0	0
	6	-1	-0.8	-0.4	2.8 MEGS.
	7	0	0	0	0
	8	AC	AC	AC	24 $\Omega$
14B6 DET. A.V.C. AUDIO	1	AC	AC	AC	12 $\Omega$
	2	56	54	16	OVER 2 MEGS.
	3	-1	-0.6	-0.4	3 MEGS.
	4	0	0	0	0
	5	-1	-0.8	-0.4	2.8 MEGS.
	6	-1	-0.6	-0.3	5.2 MEGS.
	7	0	0	0	0
	8	0	0	0	0
50L6GT AUDIO OUTPUT	1	56	54	16	OVER 2 MEGS.
	2	AC	AC	AC	75
	3	105	105	105	OVER 2 MEGS.
	4	100	100	100	OVER 2 MEGS.
	5	0	0	0	400 K
	6	-1	-0.8	-0.4	2.8 MEGS.
	7	AC	AC	AC	32 $\Omega$
	8	6	6	6	130 $\Omega$
35Y4	1	AC	AC	AC	105 $\Omega$
	2	AC	AC	AC	105 $\Omega$
	3	-12	-8.6	-4.2	90 K
	4	AC	AC	AC	105
	5	100	100	100	OVER 2 MEGS.
	6	0	0	0	0
	7	125	125	125	OVER 2 MEGS.
	8	AC	AC	AC	75 $\Omega$

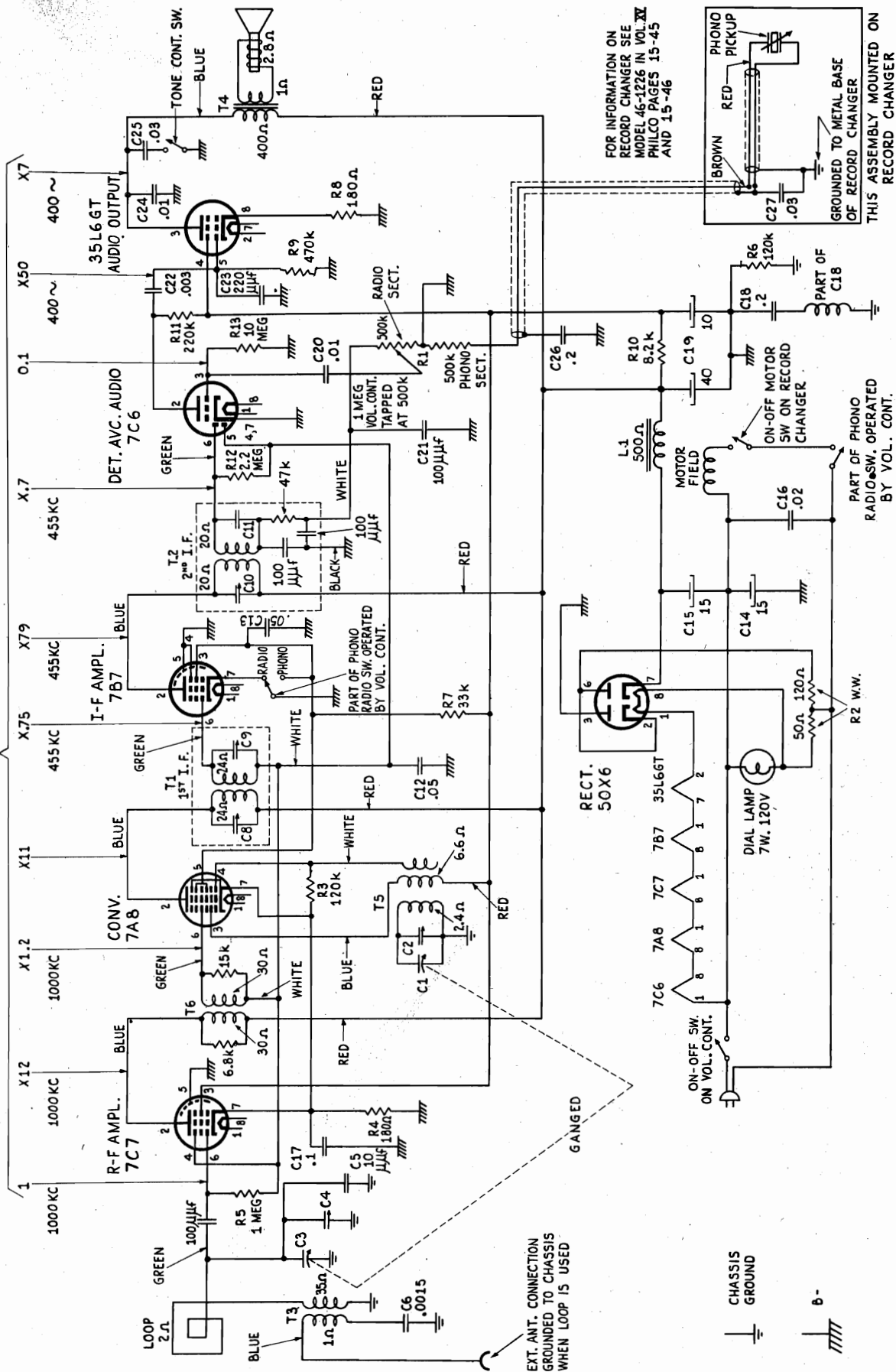
All voltage and resistance measurements made with respect to B-.  
And with a line voltage of 116 V.A.C.

There is a resistance of 140 K. between B- and chassis ground.

MODEL 46-1203

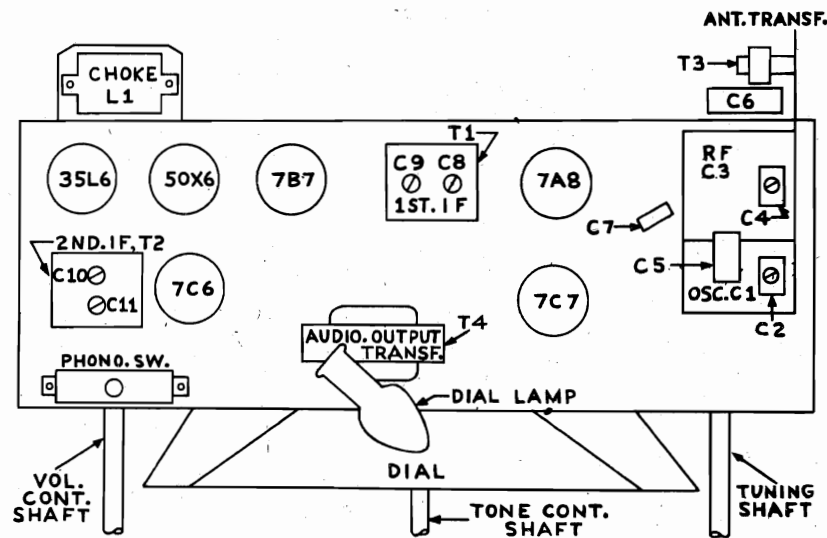
PHILCO CORP.

APPROX. GAIN PER STAGE USING CHANNELYST  
AND WITH A FIXED BIAS OF -3 VOLTS

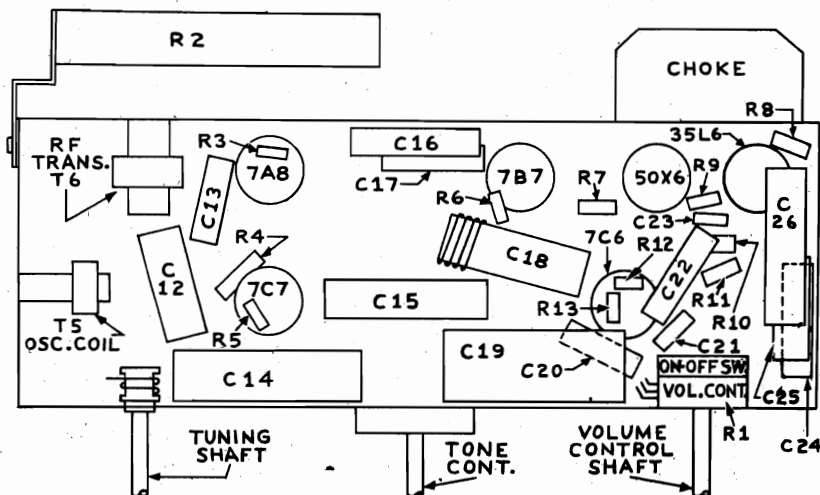


PHILCO CORP.

MODEL 46-1203



TOP VIEW



BOTTOM VIEW

### ALIGNMENT

This receiver may be aligned with the chassis in the cabinet.

Connect the output meter to the center terminal (Low) and the right terminal (High) of the three lug terminal strip mounted on the rear of the chassis.

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

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

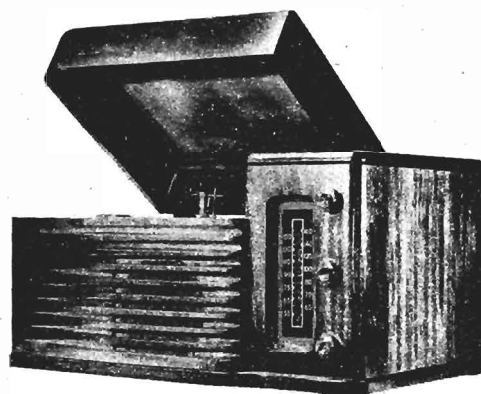
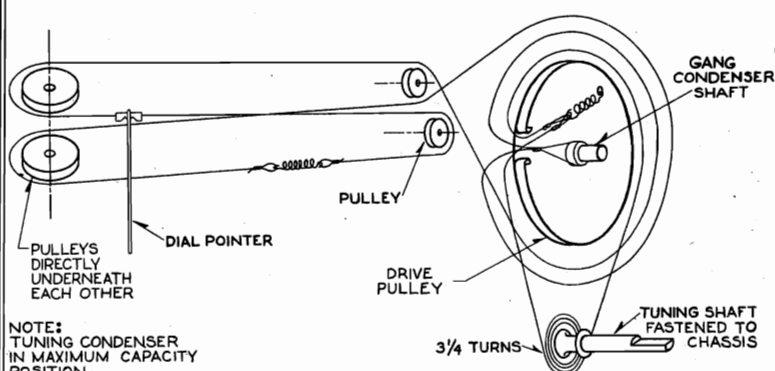
Set the signal generator to 455 KC and adjust the IF trimmers for maximum output in the following order: C11, C10, C9, C8.

Set the signal generator and receiver to 1600 KC and adjust the oscillator trimmer C2 for maximum output.

Set the signal generator and receiver to 1400 KC and adjust the RF trimmer C4 for maximum output.

MODEL 46-1203

PHILCO CORP.



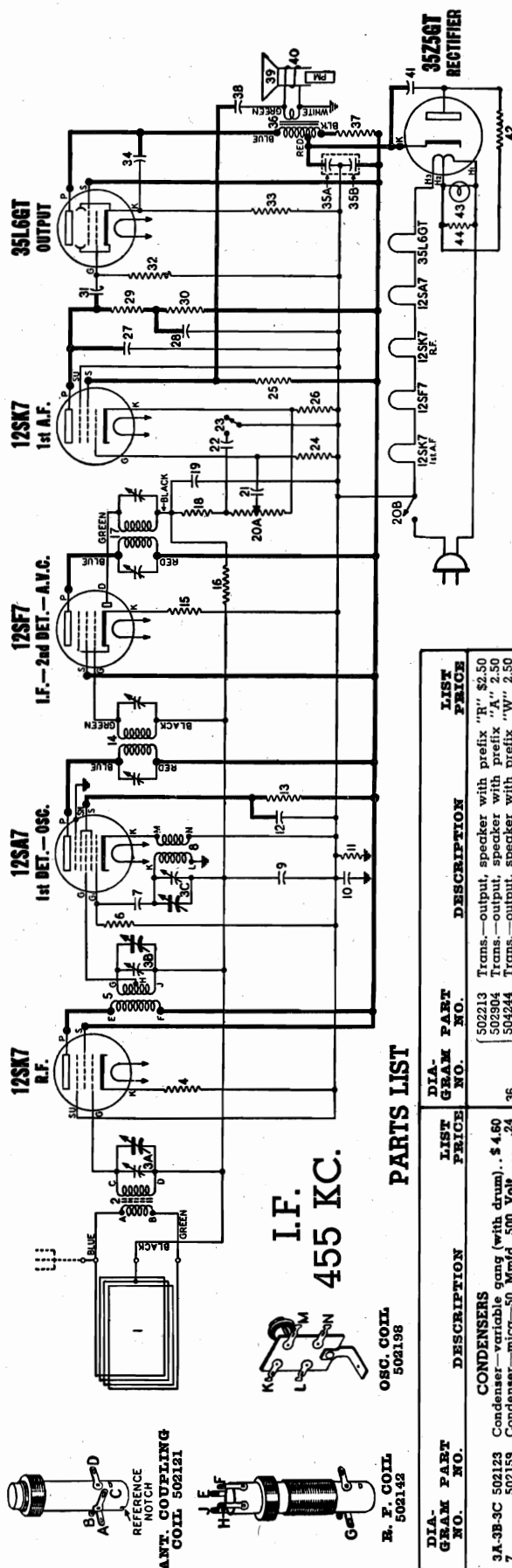
SOCKET	PIN NO.	VTVM	20,000 $\Omega$ / P.V.	1,000 $\Omega$ / P.V.	RESISTANCE
7C7 RF	1	100 V	100 V	100 V	OVER 5 MEG
	2	170 V	165 V	165 V	OVER 5 MEG
	3	115 V	108 V	108 V	OVER 5 MEG
	4	-4.5 V	-2.2 V	-2 V	2.8 MEG
	5	0 V	0 V	0 V	0
	6	-1.3 V	-0.3 V	0 V	3.8 MEG
	7	1.3 V	0.8 V	.8 V	190 $\Omega$
	8	100 V	100 V	100 V	OVER 5 MEG
7A8 CONVERTER	1	100 V	100 V	100 V	OVER 5 MEG
	2	167 V	160 V	160 V	OVER 5 MEG
	3	113 V	110 V	110 V	OVER 5 MEG
	4	-12.5 V	-4.4 V	-2 V	130 K
	5	65 V	65 V	56 V	OVER 5 MEG
	6	-4.5 V	-2 V	-0.2 V	2.8 MEG
	7	1.3 V	0.8 V	0.9 V	190 $\Omega$
	8	100 V	100 V	100 V	OVER 5 MEG
7B7 IF	1	100 V	100 V	100 V	OVER 5 MEG
	2	170 V	160 V	160 V	4.4 MEG
	3	65 V	65 V	57 V	4.6 MEG
	4	0 V	0 V	0 V	0
	5	0 V	0 V	0 V	0
	6	-1.5 V	-0.4 V	-0.2 V	2.8 MEG
	7	0	0	0	0
	8	100 V	100 V	100 V	OVER 5 MEG
7C6 AVC DETECTOR	1	100 V	100 V	100 V	OVER 5 MEG
	2	78	74	35	OVER 5 MEG
	3	-0.8 V	-0.5 V	-0.2 V	10 MEGS.
	4	0 V	0 V	0 V	0
	5	-4.4 V	-1.2 V	-0.2 V	2.8 MEG
	6	-4.3 V	-1.5 V	-0.8 V	600 K
	7	0 V	0 V	0 V	0
	8	100 V	100 V	100 V	OVER 5 MEG
35L6GT/G	1	0 V	0 V	0 V	0
	2	100 V	100 V	100 V	OVER 5 MEG
	3	155 V	150 V	150 V	OVER 5 MEG
	4	118 V	115 V	115 V	OVER 5 MEG
	5	0 V	0 V	0 V	500 K
	6	173 V	165 V	165 V	OVER 5 MEG
	7	100 V	100 V	100 V	OVER 5 MEG
	8	7.9 V	7.6 V	7.8 V	190 $\Omega$
50X6 RECTIFIER	1	100 V	100 V	100 V	OVER 5 MEG
	2	100 V	100 V	100 V	OVER 5 MEG
	3	0 V	0 V	0 V	0
	4	173 V	170 V	170 V	OVER 5 MEG
	5	120 V	115 V	110 V	OVER 5 MEG
	6	100 V	100 V	100 V	OVER 5 MEG
	7	200 V	200 V	200 V	OVER 5 MEG
	8	100 V	100 V	100 V	OVER 5 MEG

With respect to B-: Line Voltage 116 V

On-Off switch in off position Volume control at minimum

Radio-Phono switch on radio Tone control in left (counterclockwise position)





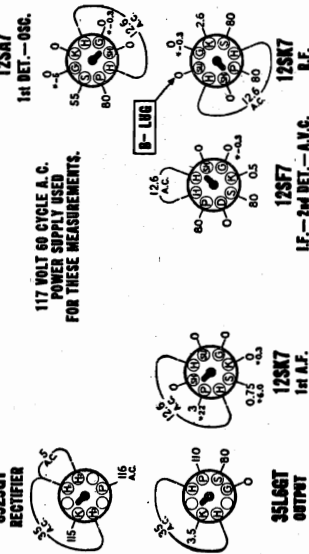
## SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (\*).

VOLUME ON FULL WITH NO SIGNAL

### **BOTTOM VIEW OF CHASSIS**

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B-LUG.



## REAR OF CHASSIS

\*—Measured with vacuum tube voltmeter

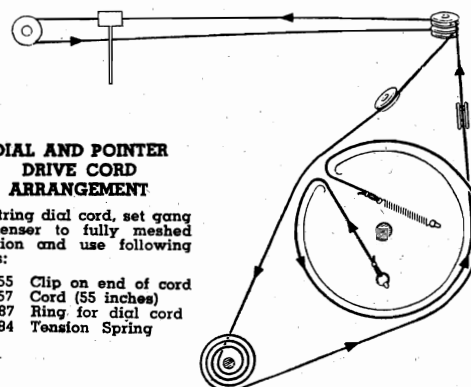
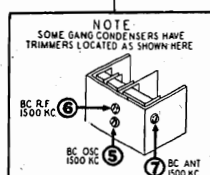
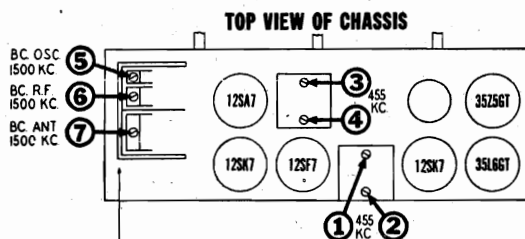
## PARTS LIST

[illegible]

## ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.

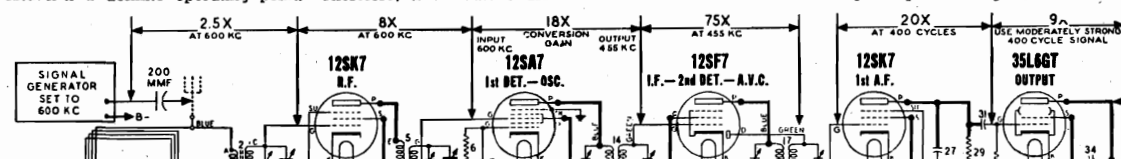


## APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

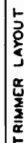
1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. **IMPORTANT:** Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.

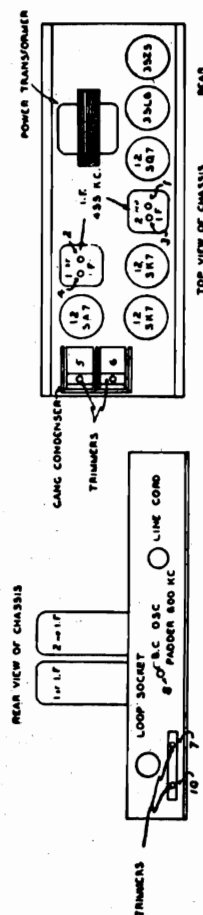


Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

IF PEAK  
455 KC



C - C<sub>1</sub> VARIABLE CONDENSER \* 20-29  
BAND SWITCH "S" SHOWN IN SHORTWAVE  
POSITION.  
ALL RESISTORS  $\frac{1}{2}$  WATT AND ALL CONDENSERS  
400 V. UNLESS OTHERWISE INDICATED



PILOT RADIO CORPORATION  
LONG ISLAND CITY, N.Y. U.S.A.  
SCHEMATIC DIAGRAM  
T-411-1

DATE: 1-1-60

APPROVED BY:  
*W. J. ...*

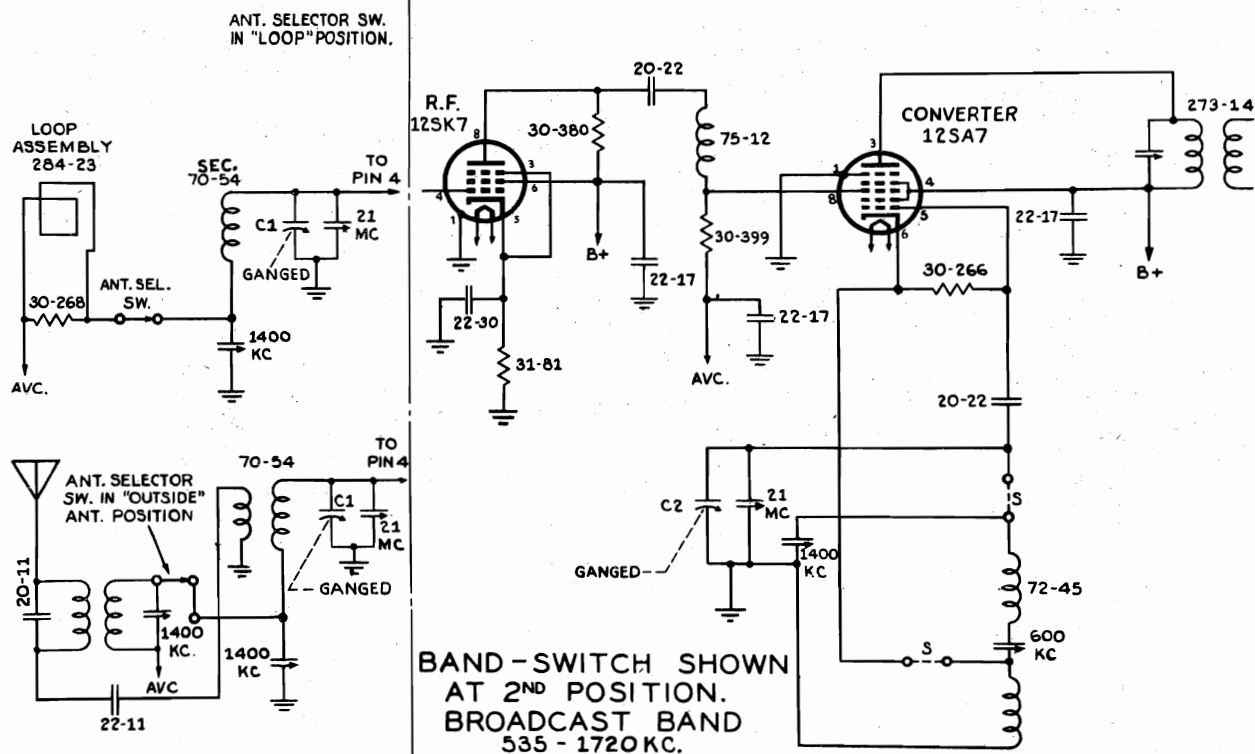
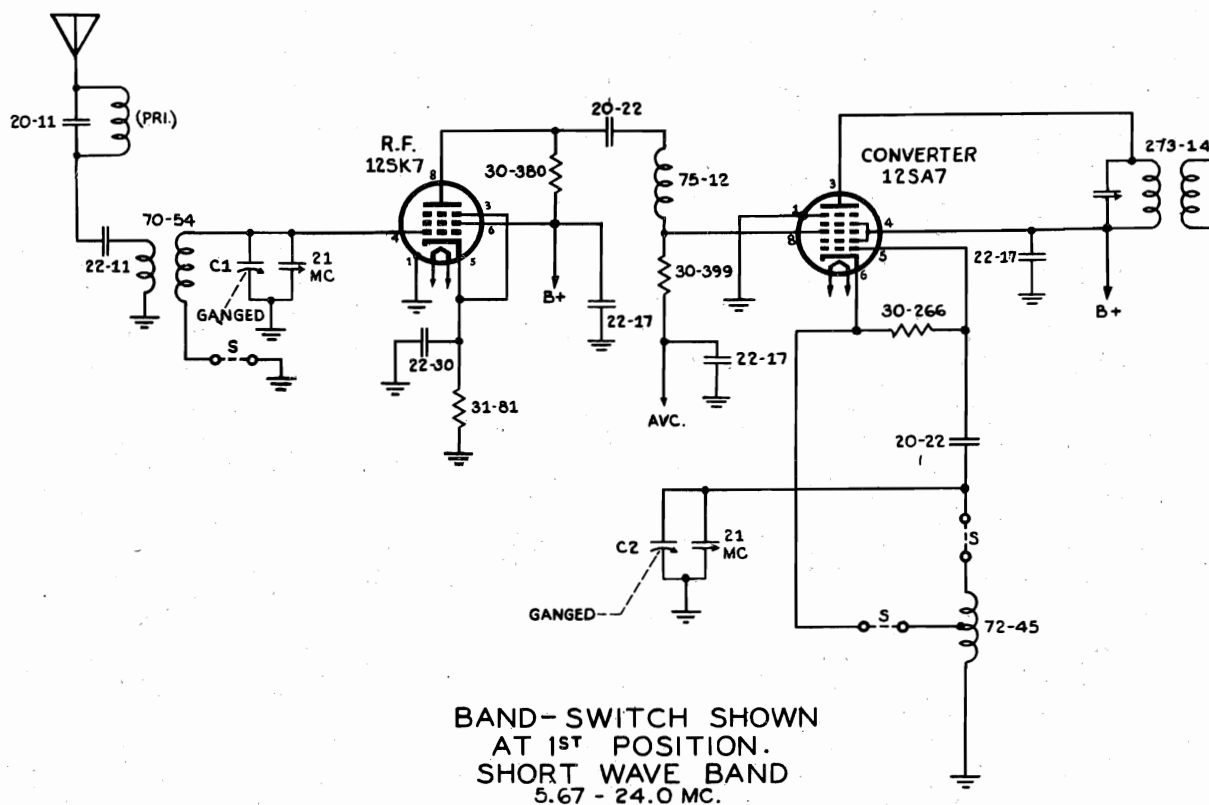
ON: 1-1-60

# "clarified schematics"

PAGE 16-2 PILOT

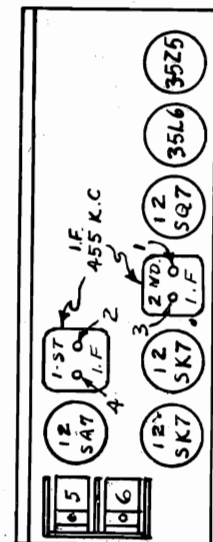
MODEL T-411-U

PILOT RADIO CORP.

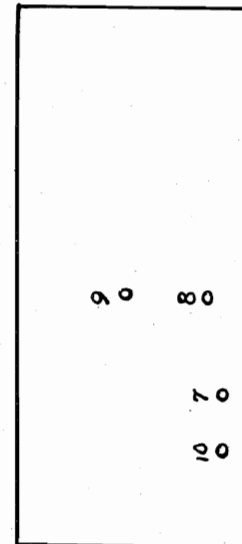


## ALIGNMENT CHART

STEP	CIRCUIT ALIGNED	RECEIVER		SIGNAL GENERATOR		DUMMY ANTENNA	ADJUSTMENTS (All maximum output)
		BAND SWITCH	DIAL POINTER	FREQUENCY	CONNECTION		
1	IF	BC	Low end of dial	455 KC	Grid of 12SK7 RF	0.1 mfd.	#1, 2, 3, 4
2	SW	SW	E	21 MC	Antenna Post	400 ohm carbon resistor	First #5 Then #6
3	BC	BC	D	1400 KC	Antenna Post	200 mmfd. mica capacitor	#7
4	BC	BC	C	600 KC	Antenna Post	200 mmfd. mica capacitor	#8
5	Repeat steps 3 and 4						
6	BC	BC	Set for broadcast station near 1400 KC				#9 and #10



TOP



**BACK**

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

This is to prevent the automatic volume control of the receiver from interfering with accurate alignment.

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

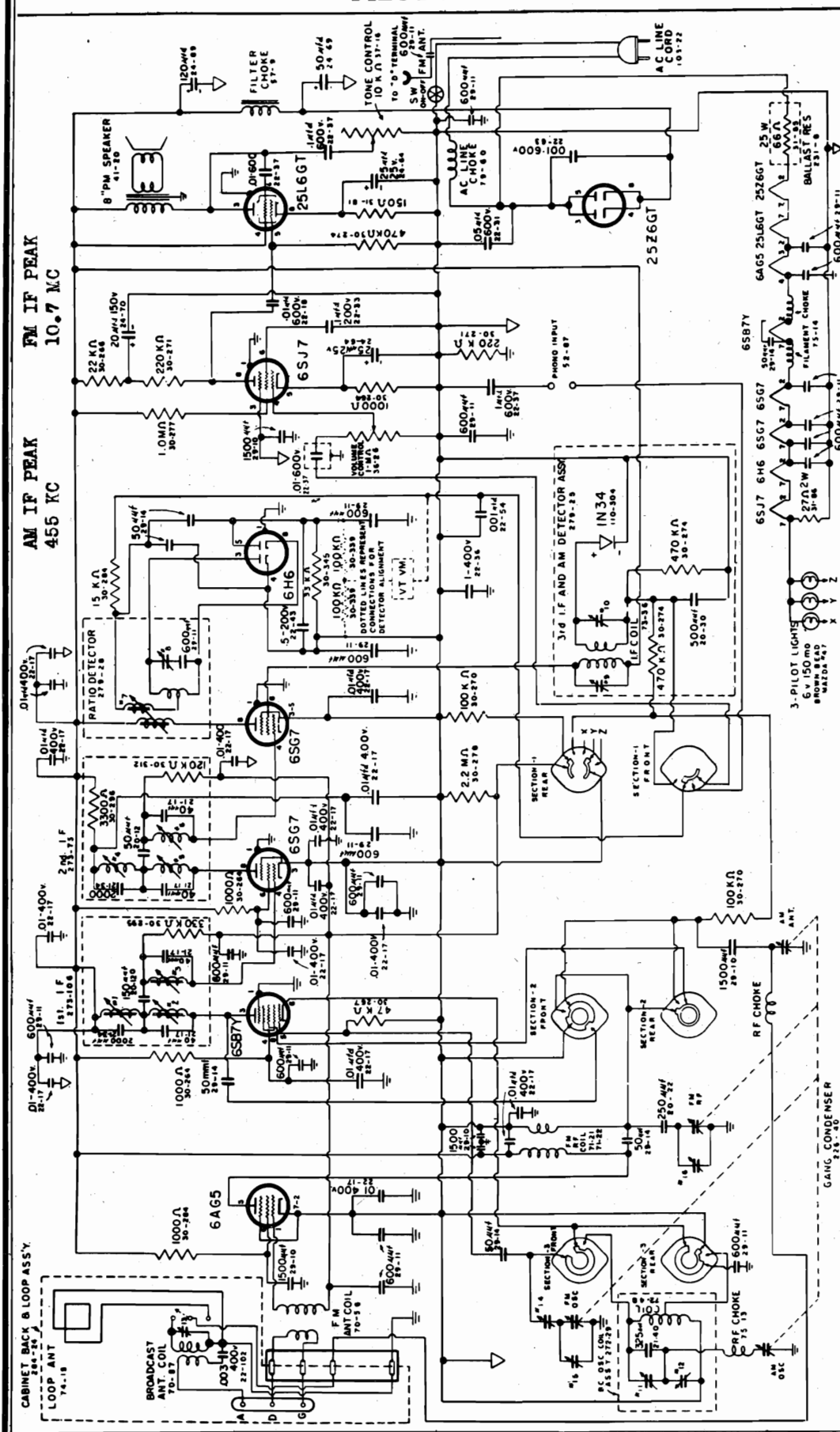
## TUNING RANGE

Broadcast Band—535 to 1720 kc or 174 to 561 meters.  
Short Wave Band—5.67 to 24.0 mc or 12.5 to 53.6 meters.

E	—	21.0 MC
D	—	1400 KC
C	—	600 KC
B	—	6.0 MC
A	—	535 KC

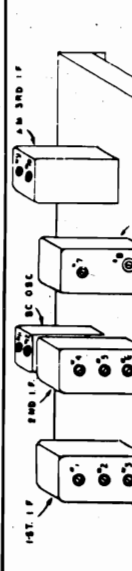
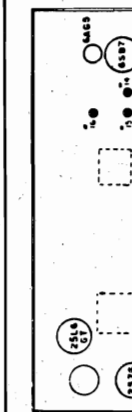
MODEL T-521

PILOT RADIO CORP.



**NOTES**  
 Band Switch Shown in F M Position  
 All Resistors 1/2 Watt @  
 All Condensers 400 Volts  
 Unless Otherwise Specified.  
 ⚡ = Ground

9-AM 3rd IF 455 Kc, Primary  
 10-AM 3rd IF 455 Kc, Secondary  
 11-BC Osc Pad  
 12-BC Osc Pad  
 13-BC Trimmer (on rear cover)  
 14-FM Osc Pad  
 15-FM Osc Trimmer  
 16-FM R.F. Trimmer

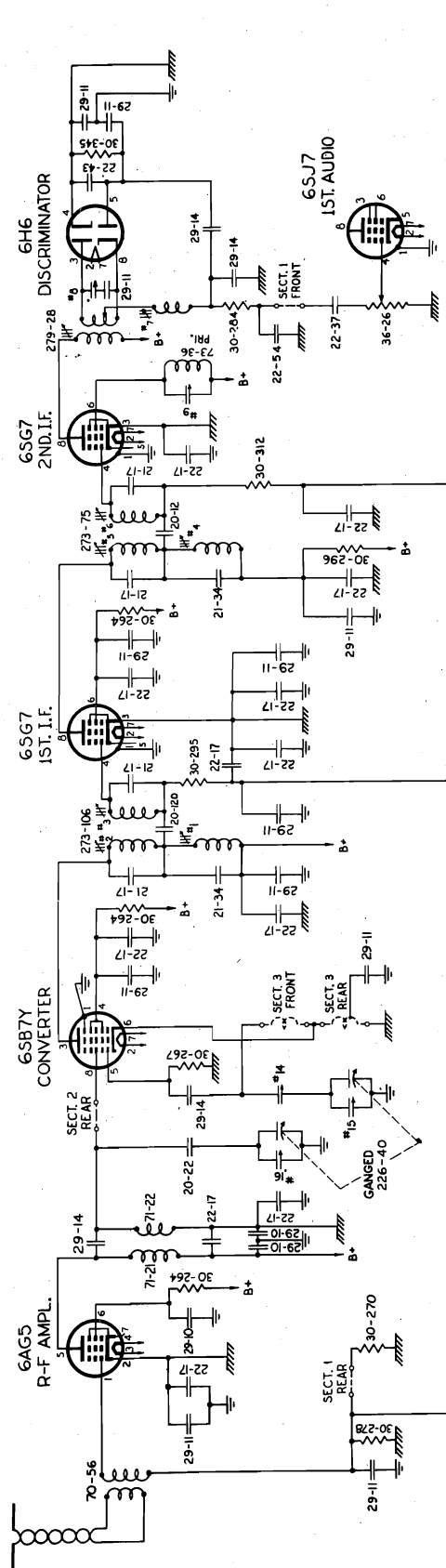




**ALIGNMENT ADJUSTMENTS**

BOTTOM VIEW

TOP - REAR VIEW

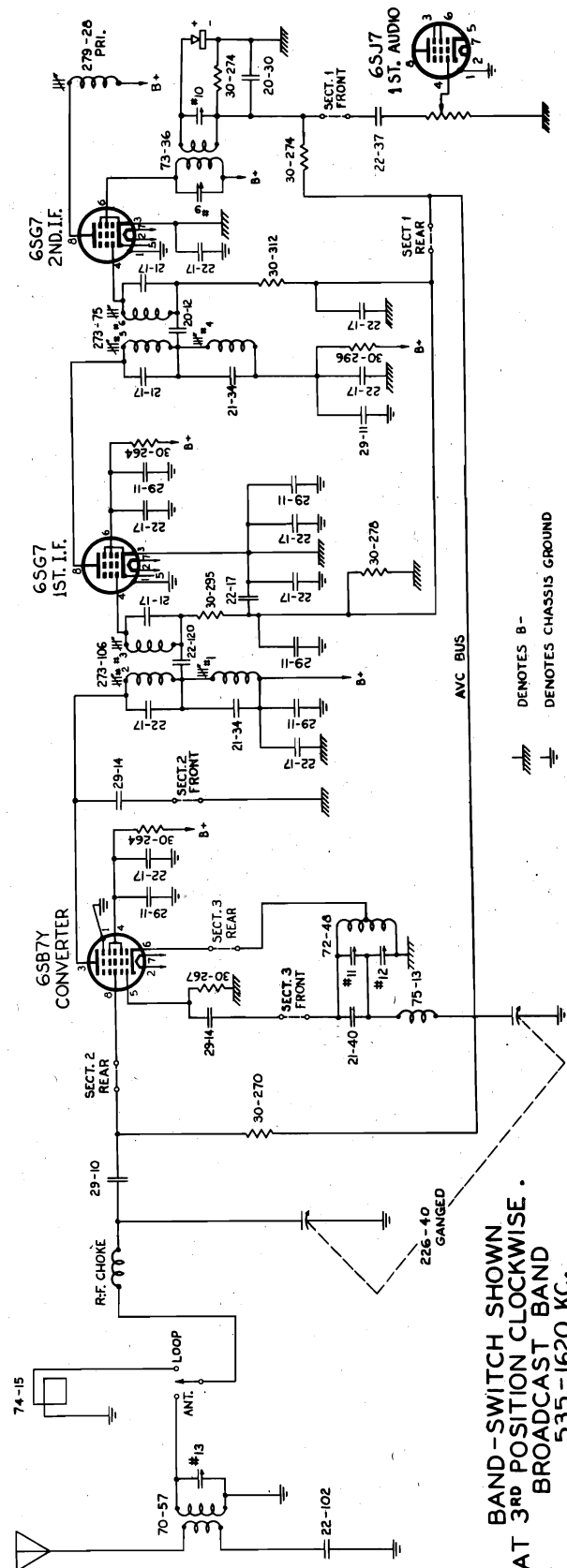
PILOT RADIO CORP.



 DENOTES B-  
 DENOTES CHASSIS GROUND

NOTE:  
1ST. POSITION (PHONO)  
NOT SHOWN

BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
F M BAND  
88-108 MC.



 DENOTES B -  
 DENOTES CHASSIS GROUND

BAND-SWITCH SHOWN  
AT 3<sup>RD</sup> POSITION CLOCKWISE.  
BROADCAST BAND  
535-1620 KC.

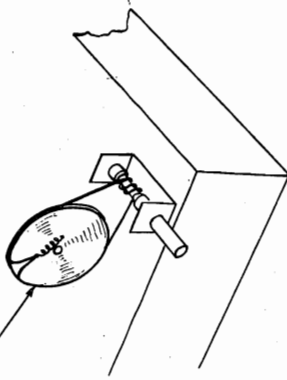
MODEL T-521

PILOT RADIO CORP.

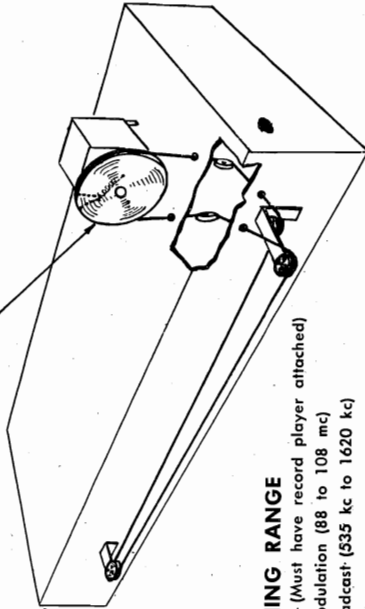
**ALIGNMENT CHART**  
(FOLLOW SEQUENCE AS INDICATED)

CIRCUIT ALIGNED	RECEIVER		SIGNAL GENERATOR		METER CONNECTIONS		TRIMMER OR SLUG ADJUST	PROCEDURE
	BAND SWITCH	DIAL POINTER	FREQ.	CONNECTIONS	TYPE See List			
AM I.F.	BC	55	455 KC	Through .1 MFD cap. to Grid of 6SB7Y	A	Across Voice-Coil of Speaker	1, 4, 9, 10	Adjust for Maximum Output
FM I.F.	FM	88	10.7 MC	Through .1 MFD cap. to Grid of 6SB7Y	A	Across Voice-Coil of Speaker	2, 3, 5, 6, 7, 8	Adjust for Maximum Output
Radio- detector	FM	88	10.7 MC	Through .1 MFD cap. to Grid of 6SB7Y	B	From: Junction of two 100K resistors connect- ed across 47K load re- sistor of the ratio de- tector. To: Audio output of ratio detector. (See Circuit Diagram)	8	Adjust meter to zero. (Check proper zero set. Meter should register reverse polarity when trimmer is turned slightly to the right, and then to the left of zero out- put)
Broadcast R.F.	BC	150	1500 KC	Through 200 mmf. cap. to Antenna "A" Post on back.	A	Across Voice-Coil of Speaker	12, 13	Adjust for maximum output
	BC	60	600 KC	Through 200 mmf. cap. to Antenna "A" Post on back.	A	Across Voice-Coil of Speaker	11	Adjust for maximum output while rocking variable condenser
6 REPEAT STEPS 4 AND 5 AND REPLACE BOTTOM COVER OF CHASSIS								
Frequency Modulation R.F.	FM	106	106 MC	To "D" and "G" Antenna Terminals	A	Across Voice-Coil of Speaker	15, 16	Adjust for maximum output
	FM	90	90 MC	To "D" and "G" Antenna Terminals	A	Across Voice-Coil of Speaker	14	Adjust for maximum output
9 REPEAT STEPS 7 AND 8								

FRONT SECTION OF PULLEY



REAR SECTION OF PULLEY

**TUNING RANGE**

Band (1) — Phonograph — (Must have record player attached)  
 Band (2) — Frequency Modulation (88 to 108 mc)  
 Band (3) — Standard Broadcast (535 kc to 1620 kc)

**FM Antenna**

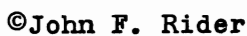
Special attention should be given to the selection of the antenna used on F.M. The receiver as shipped from the factory contains a built-in "line-cord" aerial that is connected by a spade lug to terminal "D" on the rear of the receiver. This aerial will be found satisfactory for many conditions.

Improved results on weak or distant stations, or in locations unfavorable to F.M. reception, can be had by using the "Pilot" F.M. antenna, packed with each set.

To install the special "Pilot" F.M. antenna, connect the spade lugs at the base of the "T" shaped aerial to terminals "D" and "G" on the rear of the receiver. The two remaining ends may be stretched out under a rug or fastened to a moulding. Try to locate a favorable position in the room, preferably near the window, in order to take advantage of the directional effect of this antenna.

In rare cases, where the receiver is located a great distance from the station or is centrally located in a steel building, an outside dipole antenna may be found necessary. Where an outside dipole is used, the ends of the lead-in, should be connected to "D" and "G" terminals on the rear of the receiver.





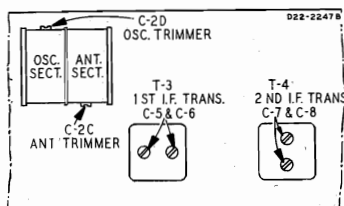
MODELS 5D15WG-5015,  
5D25WG-5025, Puritan

THE PURE OIL CO., U.S.A.

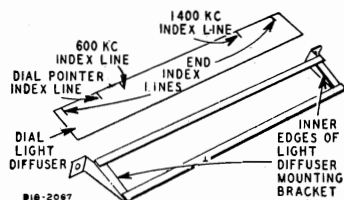
## SPECIFICATIONS

5 Tube Superheterodyne, including Rectifier Tube  
 Tuning Frequency Range.....540 to 1600 KC  
 Power Consumption.....30 watts (At 117 volts AC)

Power Output.....1.5 watt maximum, .9 watt (10% distortion)  
 Intermediate Frequency.....455 KC  
 Speaker.....5" PM Dynamic



## DIAL CALIBRATION



In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped to prevent movement of the diffuser strip. To position

## ALIGNMENT PROCEDURE

Check dial pointer position, see DIAL CALIBRATION paragraph.

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter: Non-Metallic Screw-driver.

Dummy Antennas—.1 mf., 50 mmf.

Blocking Condenser—.1 mf.

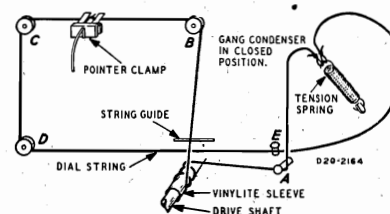
SIGNAL GENERATOR			GANG CONDENSER		ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	
455 KC	Control Grid 12SK7—I.F. Prong No. 4	Chassis Base Through .1 mf. Condenser	.1 mf.	Turn Rotor to full open	2nd I.F. (C-7) & (C-8)
455 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C-5) & (C-6)
1620 KC	Control Grid 12SA7—1st Det. Prong No. 8	External Ground Clip On Loop	.1 mf.	Turn Rotor to full open	Oscillator (C-2D)
1400 KC	External Antenna Clip On Loop	Same As Above	50 mmf.	Turn dial to 1400 KC. See Note A	Antenna (C-2C)

the dial pointer, turn the large drive pulley to the maximum counterclockwise position. The dial pointer should be directly over the dial pointer index line. (See illustration).

installed, stretch the tension spring and tie free end of cord to spring.

## DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 10X48 drive cord assembly, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind 2 1/4 turns counterclockwise around the tuning shaft with the turns progressing away from the chassis. After string is



## REPLACEMENT PARTS LIST

NOTICE: There is a model number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

## MISCELLANEOUS

12A432 5" Speaker  
 3A303 Tube Socket, Octal (8 prongs) Molded  
 10A287 Knob (Brown)  
 10A300 Knob (Ivory)  
 55X255 Cabinet (Ivory)  
 55X313 Cabinet (Brown)  
 28X292 Snap Buttons (mounting loop to cabinet)  
 14X334 Speaker Baffle  
 13X328 Line Cord Assembly

## TRANSFORMERS AND COILS

9A1916 T-1 "B" Range Loop Antenna Assembly  
 9A1914 T-2 Oscillator Coil Assembly  
 9A1808 T-3 1st I-F Coil Assembly  
 9A1809 T-4 2nd I-F Coil Assembly  
 51X132 T-5 Output Transformer

## CAPACITORS

14A194 { C-2A, C-2B, C-2C, C-2D } Gang Condenser Assembly  
 { C-5, C-6 } Part of T-3 (1st I-F Coil)  
 { C-7, C-8 } Part of T-4 (2nd I-F Coil)  
 47X112 C-9A, C-9B 50-50 mmf. Dual Mica  
 B66103 C-11, C-13 .01 mf. 200V. Tubular  
 47X468 C-12 220 mmf. Molded  
 D66502 C-14 .005 mf. 400V. Tubular  
 D66503 C-16 .05 mf. 400V. Tubular  
 45X341 { C-17A, C-17B } 50 mf. 150V. Dry Electrolytic  
 B66503 C-18 .05 mf. 200V. Tubular

## RESISTORS

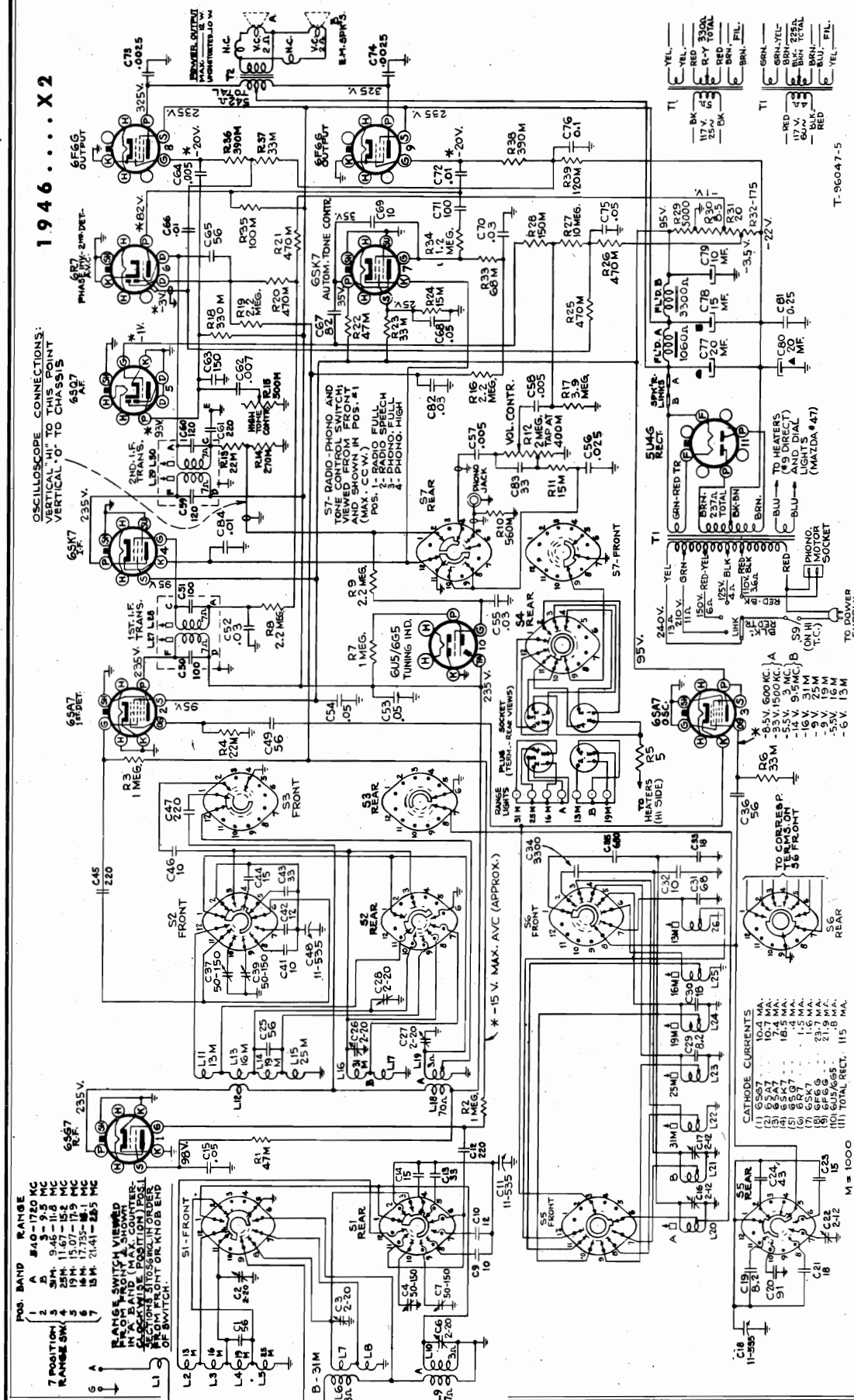
B84223 R-1 22,000 ohms .5 watt Carbon  
 B85225 R-2 2.2 meg. .5 watt Carbon  
 B85473 R-3 47,000 ohms .5 watt Carbon  
 36X352 R-4 500,000 ohms Volume control and line switch  
 B85685 R-5 6.8 meg. .5 watt Carbon  
 B84474 R-6 470,000 ohms .5 watt Carbon

B85474 R-7 470,000 ohms .5 watt Carbon  
 B84151 R-8 150 ohms .5 watt Carbon  
 B84270 R-10 27 ohms .5 watt Carbon  
 C85152 R-11 1500 ohms 1.0 watt Carbon

## DIAL AND DRIVE ASSEMBLY

26A466 Pointer Bracket Assembly complete with light diffuser holder, string guide and idler pulleys  
 41X74 Dial light diffuser  
 15X223 Pointer  
 6X21 Rubber Grommet } Mts. gang condenser  
 20X329 Cond. Cushion Stud  
 26X482 Drive shaft  
 19X192 "C" Washer (for drive shaft)  
 10X48 Drive cord assembly  
 28X95 Drive cord tension spring  
 7A194 Pilot light socket assembly  
 No. 47 Pilot light  
 58X688 Dial clamp (upper)  
 30X508 Dial clamp (lower)

OSCILLOSCOPE CONNECTIONS:  
VERTICAL "HI" TO THIS POINT



NOTE: In some sets and on some replacement units, the power transformer lead color code may vary from that shown above. On universal transformers (Rating D), the primary start may be black, the 110 v. tap black/yellow, and the link, black/red. The primary leads on the 25 and 60 cycle transformers (Ratings A and B) may be black. Secondaries of the three transformers would be—rectifier filament, yellow—high voltage, red—high voltage center tap, red/yellow—amplifier filament, green. In case of doubt, identify windings by resistance or voltage measurements.

**NOTE:** On some sets C52, C55, C70 or C82 may be .025 mfd.

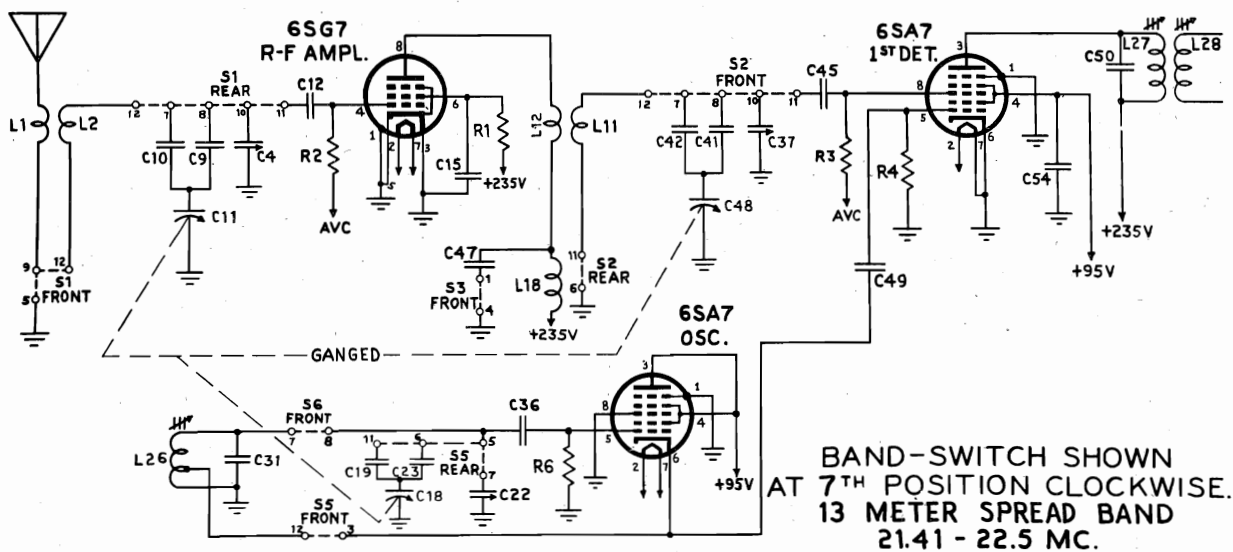
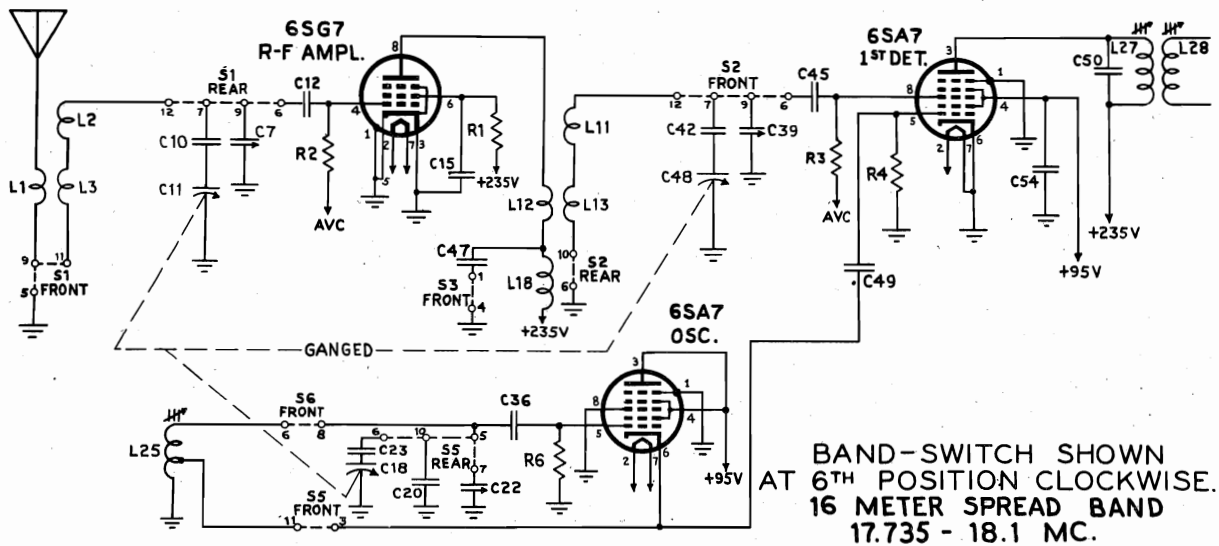
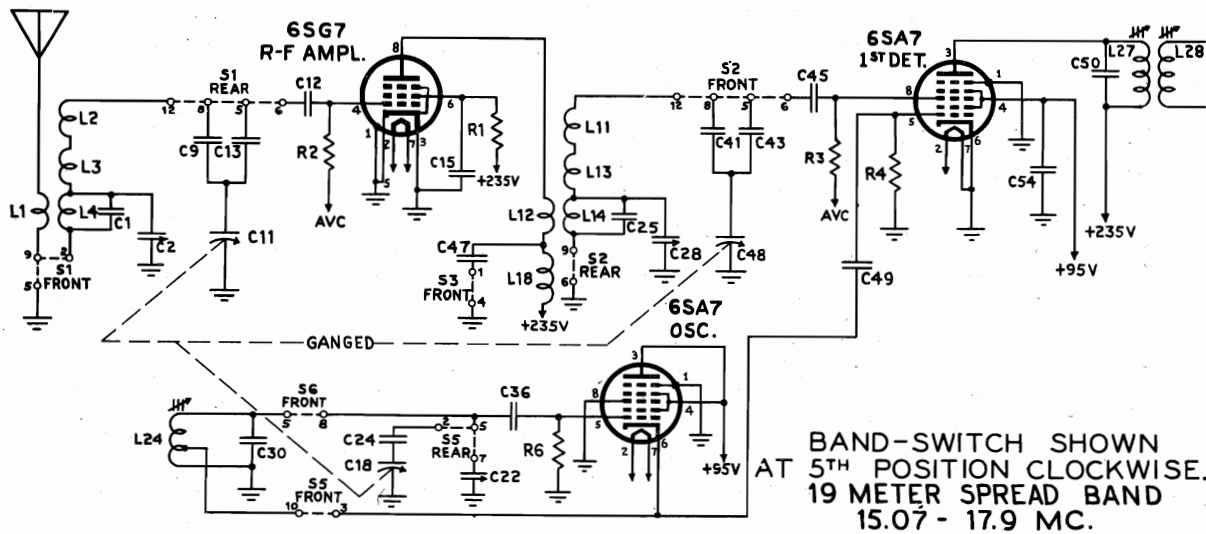
\* MEASURED WITH  
CHALALYST OR VOLT-  
OHMYST.

# "clarified schematics"

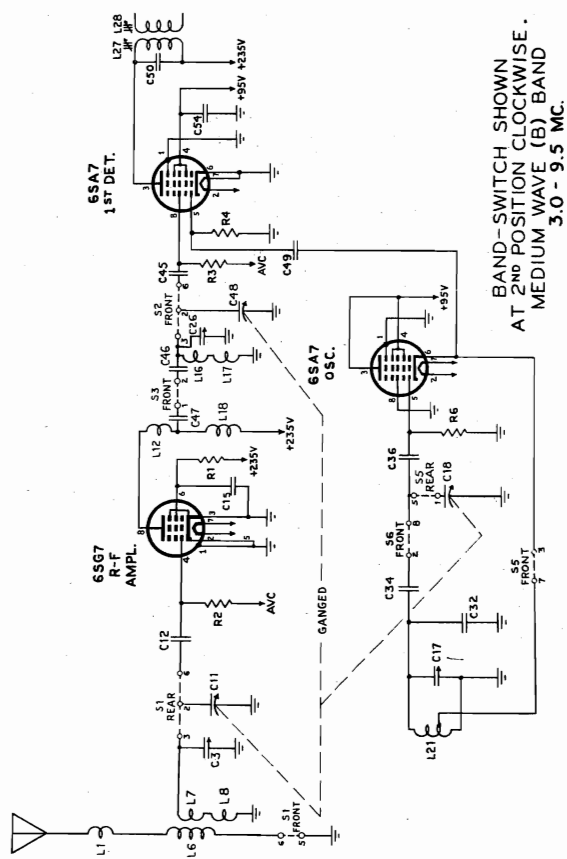
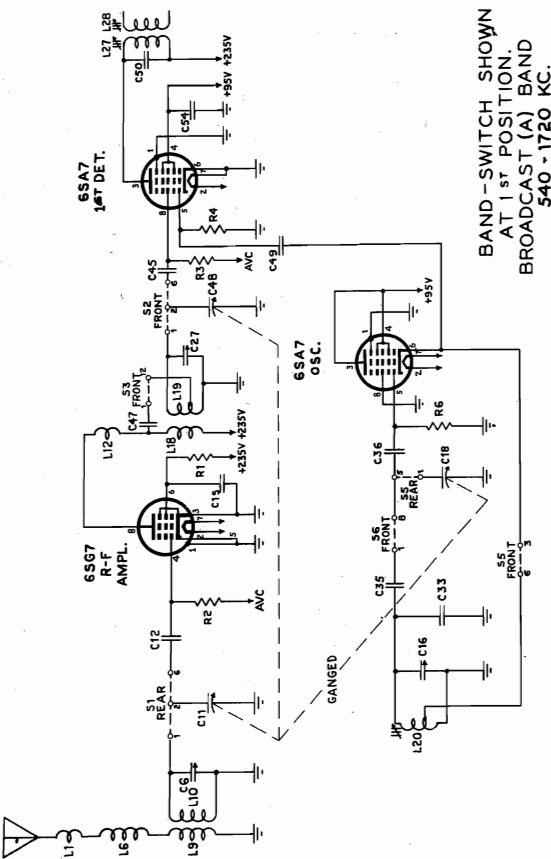
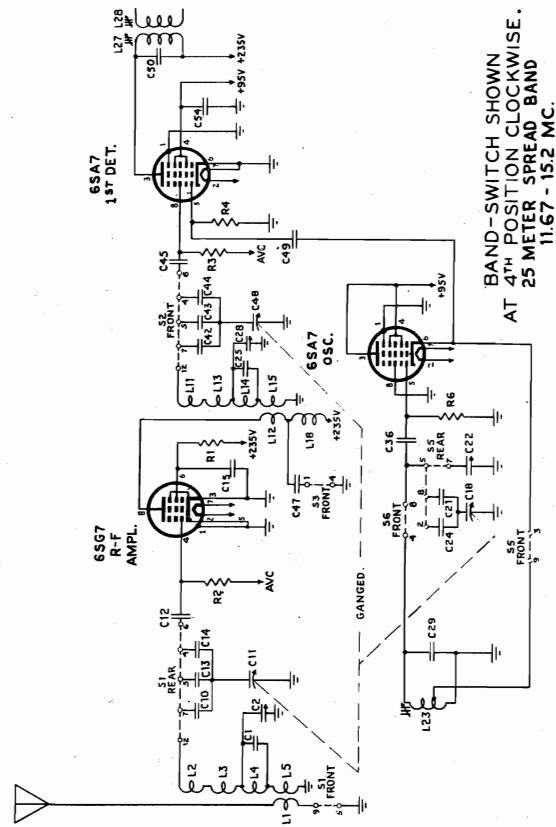
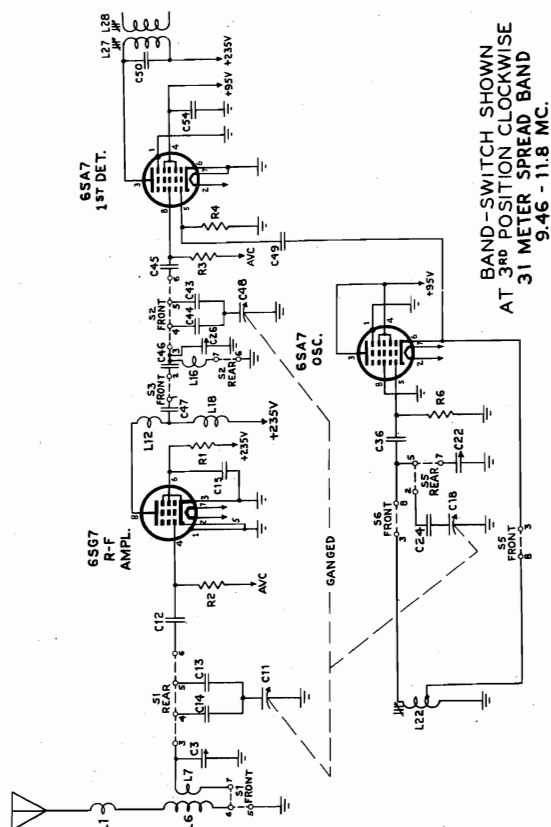
PAGE 16-2 RCA

MODEL Q36

RCA MFG. CO.



RCA MFG. CO.



## Alignment Procedure

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

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

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

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

As the first step in r-f alignment, check the position of the drum, it should correspond to that shown in the Dial Indicator and Drive Mechanism drawing when the gang condenser plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

**Receiver Dial with Calibration Scale.**—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial drawing.

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

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

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

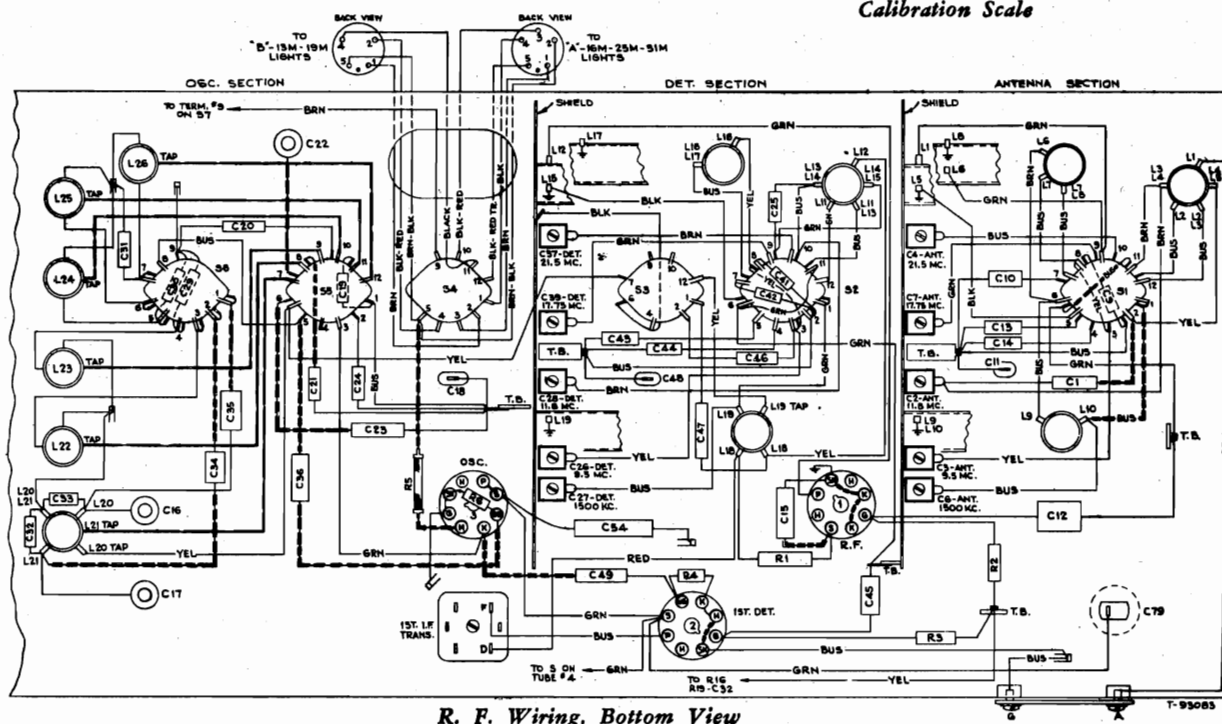
When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the oscillator coil magnetite-core for each band should be retouched so that the stations come in at the correct points on the dial.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with the indicator to the line under "Spread Bands" on the glass dial plate with the gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

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

SPREAD BANDS						
550	17.735	9.46	11.67	15.07	21.41	3.00
600	17.74	9.48	11.70	15.10	21.43	90m
700	17.75	9.55	11.80	15.20	21.45	4.00
800	17.76	9.60	11.90	15.30	21.47	4.50
900	17.78	9.70	12.00	15.40	21.50	60m
1000	17.80	10.0	12.5	15.7	21.60	5.50
1100	17.82	10.2	12.7	15.8	21.70	49m
1200	17.85	10.4	13.2	16.2	21.80	6.50
1300	17.90	10.6	13.4	16.4	21.90	40m
1500	18.0	11.0	14.2	17.0	22.1	8.00
1700	18.1	11.8	15.2	17.9	22.5	9.50
H C MC MC MC MC MC MC						
(A) (16) (31) (25) (19) (13) (B)						

Receiver Dial with Calibration Scale



R. F. Wiring, Bottom View

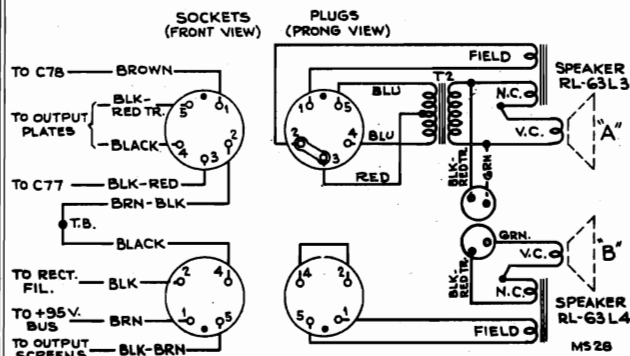
RCA MFG. CO.

## Alignment Procedure

## Precautionary Lead Dress.—

1. All leads in the R.F. assembly should be dressed away from coils, switch assemblies, capacitors, shield plates, and mounting plates.
2. All capacitors in the R.F. assembly should be dressed apart from each other and away from the Range Switch drive shaft.
3. All indicating light cable leads to S4 should be dressed toward the shield plate and away from all other leads and components.

4. Leads and components connected to the oscillator, and 1st Detector tube sockets must not impede the flexible mounting.
5. The green lead from pin 4 of the oscillator tube socket to pin 4 of the 1st Detector should be dressed close to C54.
6. All excess power transformer leads should be dressed back between transformer and rear chassis apron and close to chassis base.
7. The capacitors that connect the volume control and tone control should be dressed away from other parts.



## Loudspeaker Connections

**Loudspeaker.**—It is essential that the two speaker cones move in and out together, i.e. in phase. For an outline of test methods refer to RCA Victor Supplementary Information—No. 5 "Speaker Phasing."

## ALIGNMENT TABLE

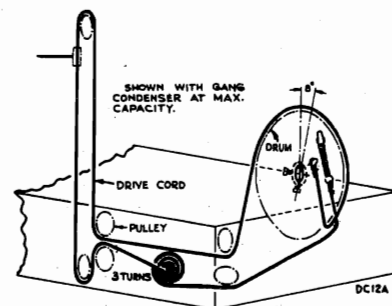
Steps	Connect the high side of test osc. to—	Tune test osc. to—	Turn Range Switch to—	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (35°)	L30-L29 2nd I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L28-L27 1st I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (154°)	C16 (osc.) C27 (det.) C6 (ant.)
4		600 kc	"A" Band	600 kc (35°)	L20° Rock in
5	Repeat steps 3 and 4 until aligned				
6	Antenna terminal in series with 300 ohms	9.5 mc	"31M" Band	9.5 mc (30°)	L22 (osc.)* C26 (det.) C3 (ant.)
7		11.8 mc	"31M" Band	11.8 mc (170°)	C22 (osc.)**
8	Repeat steps 6 and 7				
9		9.5 mc	"B" Band	9.5 mc (175.5°)	C17 (osc.)**
10		11.8 mc	"25M" Band	11.8 mc (43°)	L23 (osc.)* C28 (det.) C2 (ant.)
11	Antenna terminal in series with 300 ohms	15.2 mc	"19M" Band	15.2 mc (50°)	L24 (osc.)*
12		17.75 mc	"16M" Band	17.75 mc (58°)	L25 (osc.)*** C39 (det.) C7 (ant.)
13		21.5 mc	"13M" Band	21.5 mc (77°)	L26 (osc.)*** C37 (det.) C4 (ant.)

\* If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

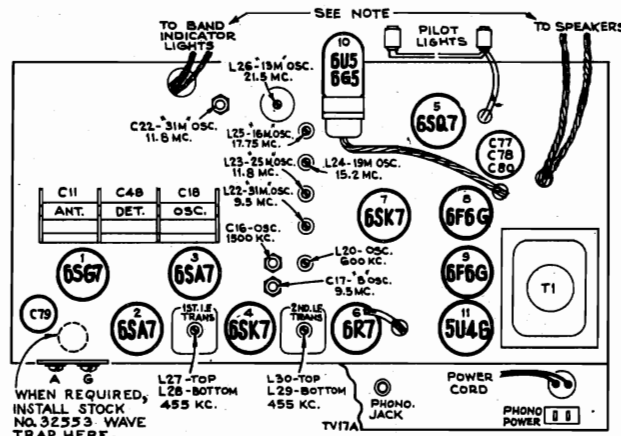
\*\* Use minimum capacity peak if two can be obtained.

\*\*\* If two peaks can be obtained use the one obtained when the core screw is farthest in (clockwise).

NOTE: Oscillator tracks above signal on all except the 16M and 13M bands.



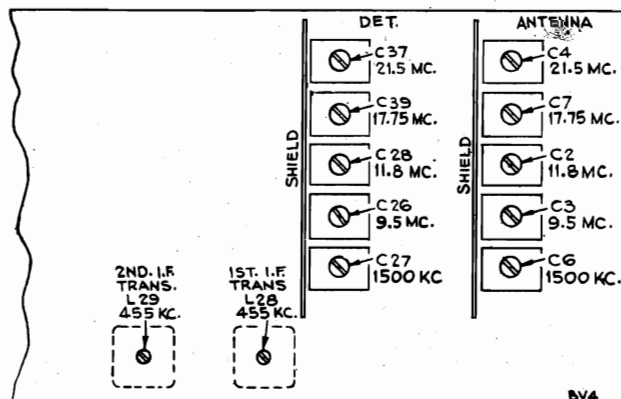
## Dial-Indicator and Drive Mechanism



## Tube and Trimmer Locations (Top View)

**Caution.**—The sockets used on the band indicator light cables are identical to those used on the speaker cables. In connecting, care should be taken to assure that the cables are plugged to the proper units.

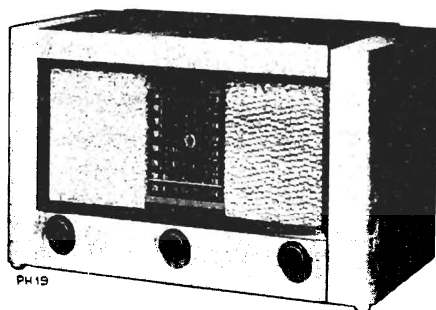
**Use of Wave Trap.**—Should interference from a powerful nearby station require the use of a wave trap, install a Stock No. 32553 trap behind antenna and ground terminal board as indicated above. Connect coil lug to antenna connection, ground connection is made to chassis through coil mounting foot.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



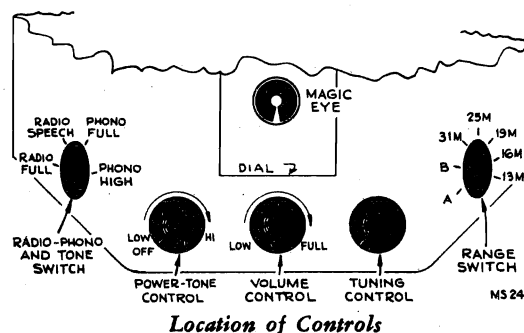
## Trimmer Locations (Bottom View)

## MODEL Q36

RCA MFG. CO.



Model Q36



## Specifications

## Frequency Ranges

Standard Broadcast ("A" Band) .....	540-1,720 kc (556-174 m)
Medium Wave ("B" Band) .....	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band .....	9.46-11.8 mc (31.7-25.4 m)
"25" Meter Spread Band .....	11.67-15.2 mc (25.7-19.8 m)
"19" Meter Spread Band .....	15.07-17.9 mc (19.9-16.8 m)
"16" Meter Spread Band .....	17.735-18.1 mc (16.9-16.6 m)
"13" Meter Spread Band .....	21.41-22.5 mc (14.0-13.4 m)
Intermediate Frequency .....	455 kc

## Tube Complement

(1) RCA-6SG7 .....	R-F Amplifier
(2) RCA-6SA7 .....	1st Detector
(3) RCA-6SA7 .....	Oscillator
(4) RCA-6SK7 .....	I-F Amplifier
(5) RCA-6SQ7 .....	A-F Amplifier
(6) RCA-6R7 .....	Phase Inverter, 2nd Detector
(7) RCA-6SK7 .....	Automatic Tone Control
(8) RCA-6F6G .....	Power output
(9) RCA-6F6G .....	Power output
(10) RCA-6U5/6G5 .....	Tuning indicator
(11) RCA-5U4G .....	Rectifier
Pilot Lamps .....	9-type 47; 6.3 volts, 0.15 amps.

## Power Output Rating

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

## Loudspeakers

One Model RL-63L3 and one model RL-63L4	
Type (Electrodynamic) .....	8 inches
V-C Impedance at 400 c.p.s. ....	2.2 ohms

## Automatic Tone Control.—

The Model Q36 incorporates a circuit for automatically attenuating noise and selective fading distortion components.

Basically the circuit is a combination of a high pass filter and variable inverse feedback controlled by the AVC voltage.

Capacitor C71 (100 mmf.) and resistor R34 (1.2 meg.) couple the plate of the 6R7 (tube 6) to the grid of the 6SK7 (tube 7). The plate of this tube is connected to the grid of the 6SQ7 (tube 5) through capacitor C67 (82 mmf.). The grid bias for the 6SK7 (tube 7) is obtained from the AVC bus through R16 (2.2 meg.) and R33 (68M).

The values of C71, R34, C67 and R33 are such that this inverse feedback loop passes only the high audio frequencies therefore they are the frequencies that are attenuated in the output of the audio system. The amount of attenuation of the "highs" is controlled by the negative voltage on the AVC bus.

When the incoming signal is weak the AVC voltage is close to zero, the gain of the ATC 6SK7 is large and the attenuation of the highs is a maximum; when the incoming signal is strong the AVC voltage becomes more negative thus decreasing the gain

## Victrola Attachment

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

A 110-volt outlet for Victrola attachment is available on back of the chassis.

## Cabinet Dimensions

Height .....	14 $\frac{3}{4}$ inches
Width .....	24 $\frac{3}{4}$ inches
Depth .....	12 $\frac{7}{8}$ inches
Net Weight .....	approx. 49 pounds
Shipping Weight .....	approx. 56 pounds
Chassis Base Dimensions (inches) Height, 3 $\frac{1}{2}$ ; Length, 22; Depth 13	
Over-all Chassis Height .....	12 $\frac{3}{4}$ inches
Tuning Drive Ratio .....	25 to 1

## Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A .....	105 to 125, nominal 117	25 to 60	135
Rating B .....	105 to 125, nominal 117	50 to 60	135
Rating D .....	(See below)	40 to 60	135

110 position ....	100 min. ....	115 max.
125 position ....	115 min. ....	135 max.
150 position ....	135 min. ....	165 max.
210 position ....	190 min. ....	230 max.
240 position ....	220 min. ....	260 max.

Note: Shipped in 240-volt position. To change, remove round cover on top of transformer case and move link to required position.

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

and thereby increasing the high frequency response of the audio system. The cathode of the 6SK7 (tube 7) is grounded only when S7 is switched to either "Radio" position; the ATC circuit is inoperative when S7 is in either of the "Phono" positions.

With an R.F. input of 100 microvolts the audio frequency response at 2000 cycles is down approximately 20 db. as compared to the response obtained with an RF input of 10,000 microvolts.

If desired, the amount of high frequency attenuation at a particular value of input signal below approximately 10,000 microvolts may be varied by changing the value of R33. Increasing R33 will increase the attenuation of the "highs"; decreasing R33 will decrease the attenuation.

A quick check of the operation of the circuit may be made by tuning in a weak station and then pulling the 6SK7 (tube 7) out of its socket, a very noticeable increase in the high frequency audio response will indicate that the circuit is functioning properly.

As can be well appreciated by the foregoing explanation of ATC operation, it is desirable to use an antenna with good signal pickup when full fidelity is required. Short length antennas should be avoided whenever possible.



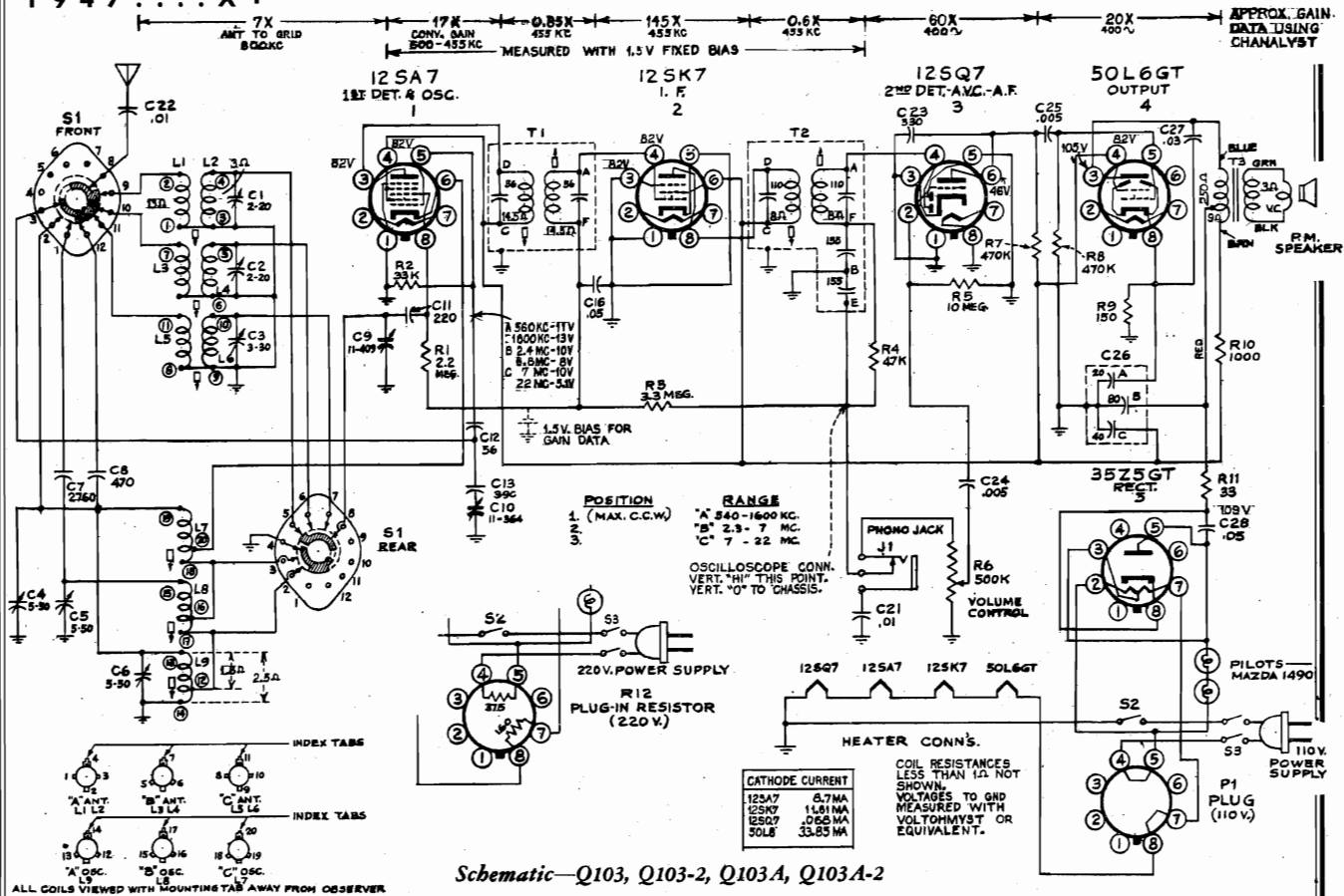


MODELS Q103, -2, A, A-2, Ch. RC1044

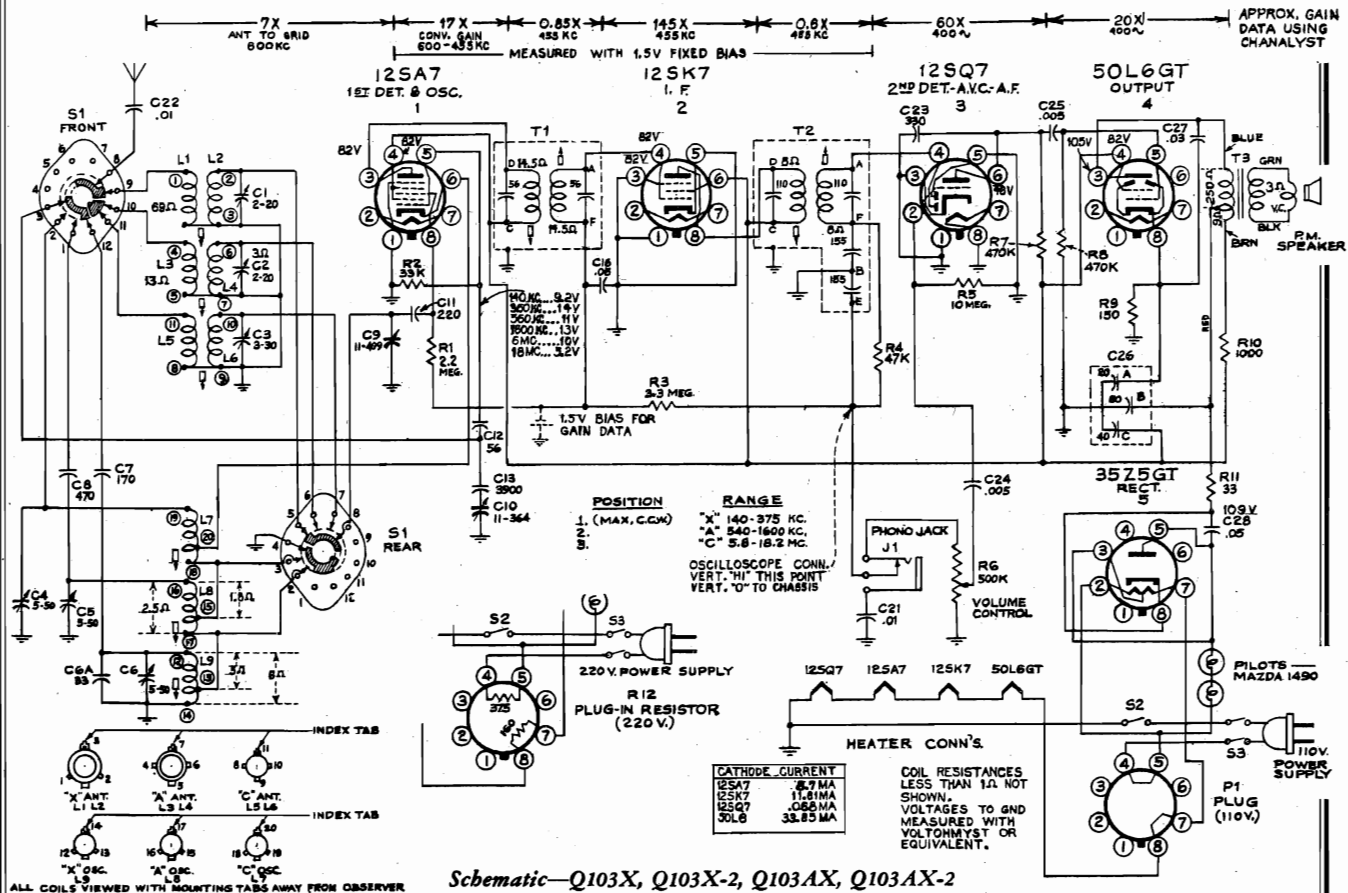
MODELS Q103X, -2, AX, AX-2, Ch. RC1044B

1947.....X1

RCA MFG. CO.



Schematic—Q103, Q103-2, Q103A, Q103A-2



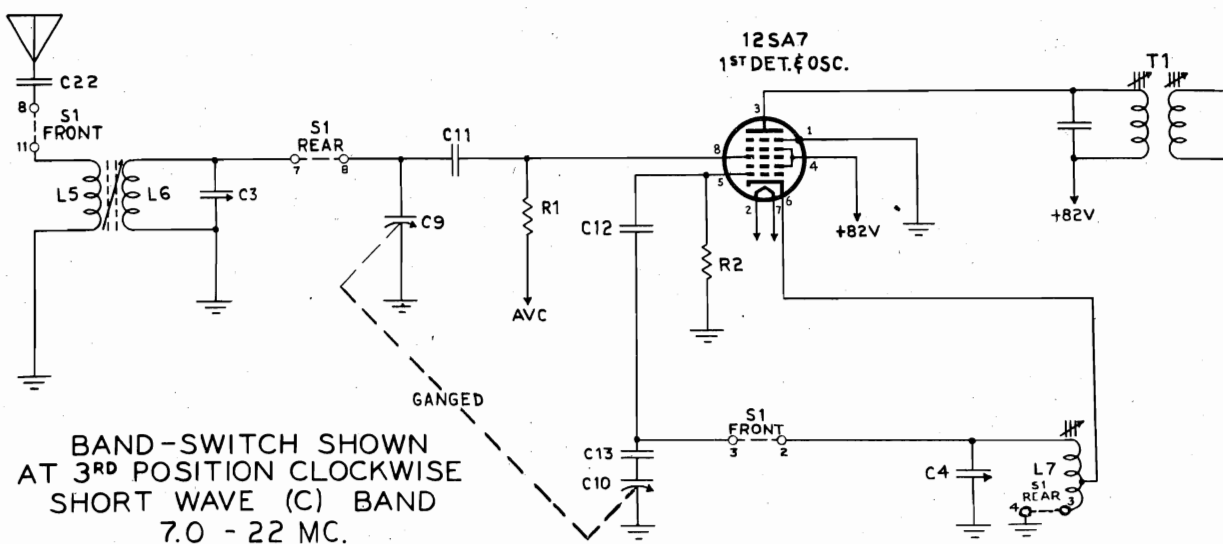
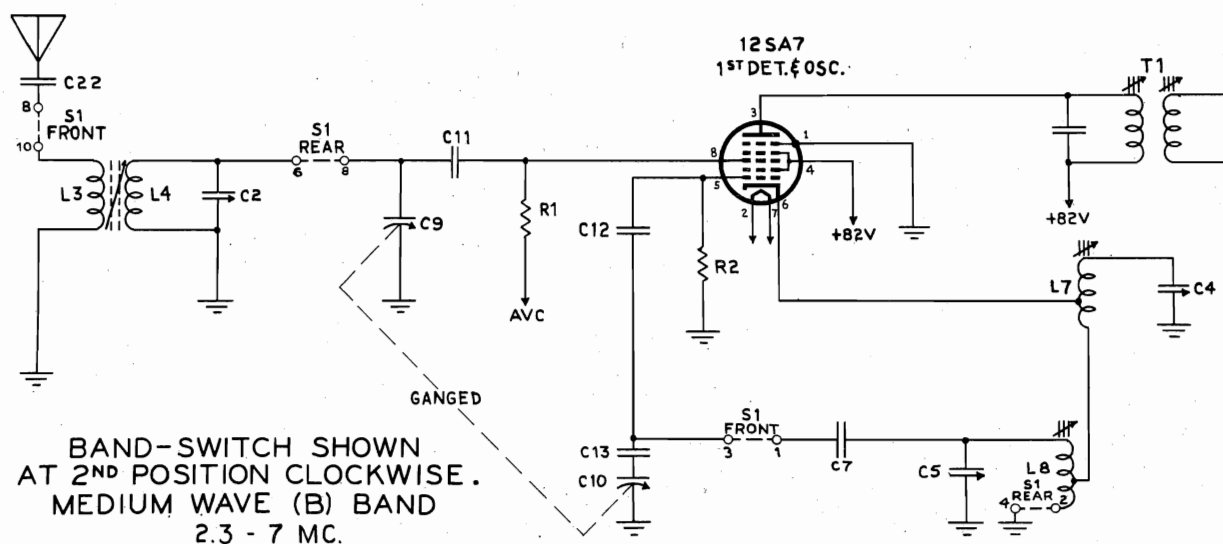
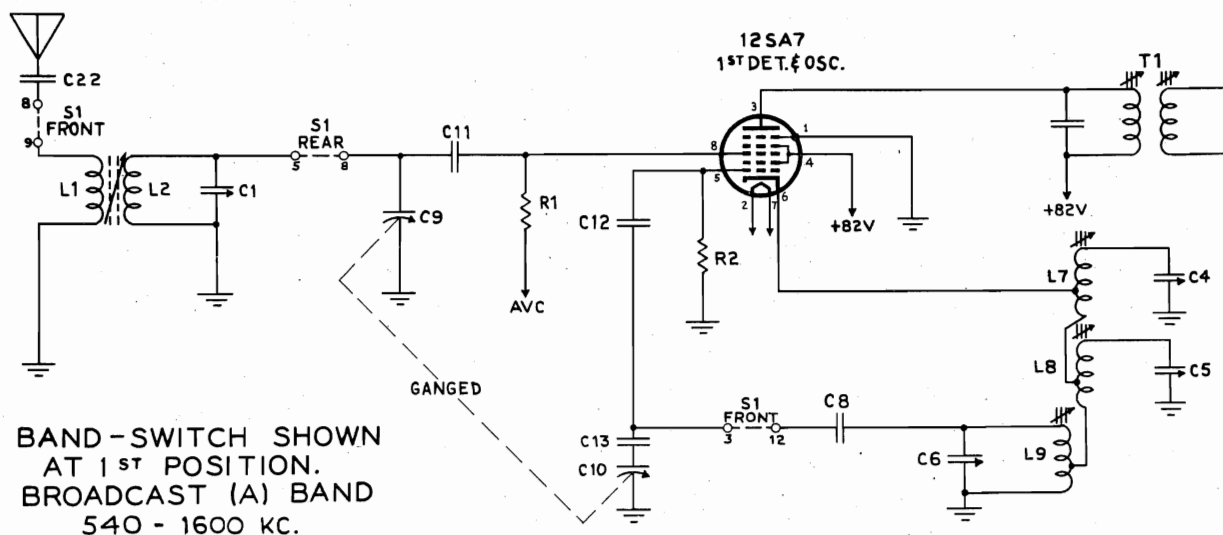
Schematic—Q103X, Q103X-2, Q103AX, Q103AX-2

# "clarified schematics"

RCA PAGE 16-9

RCA MFG. CO.

MODELS Q103, -2, A, A-2

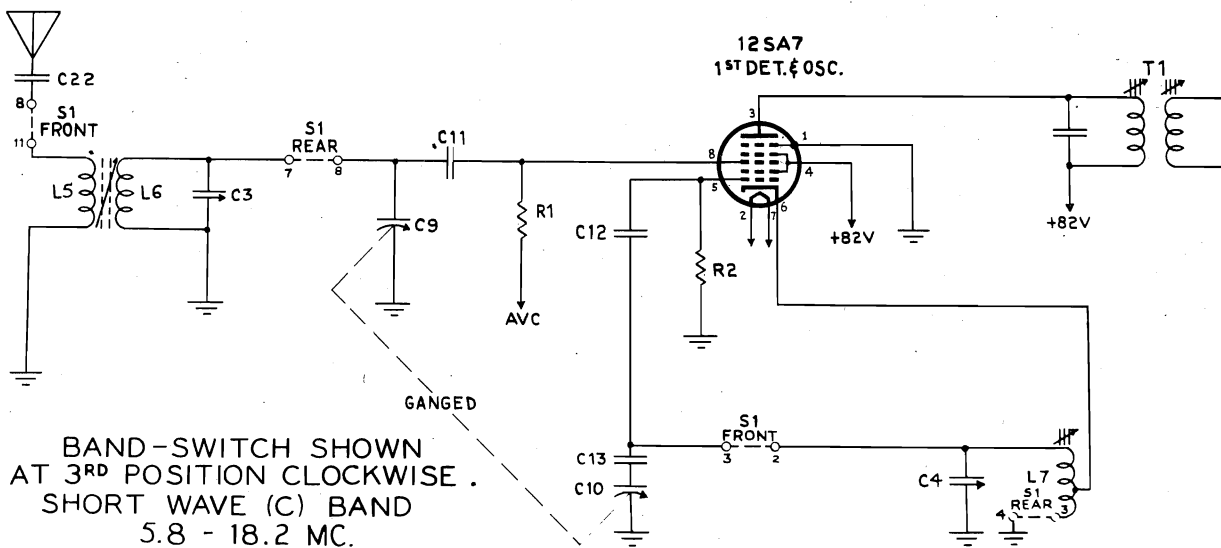
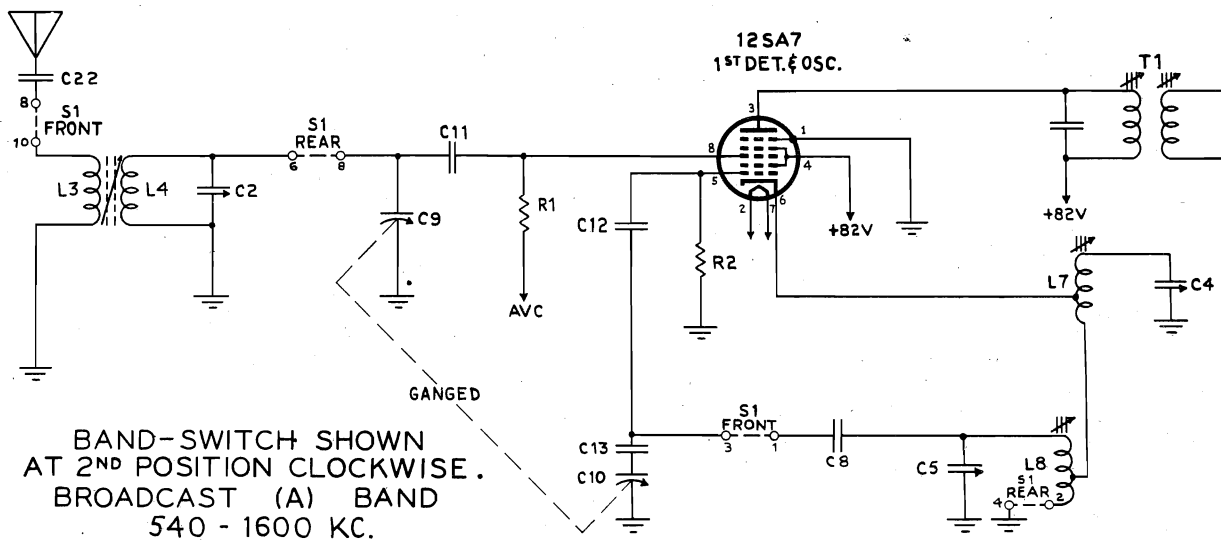
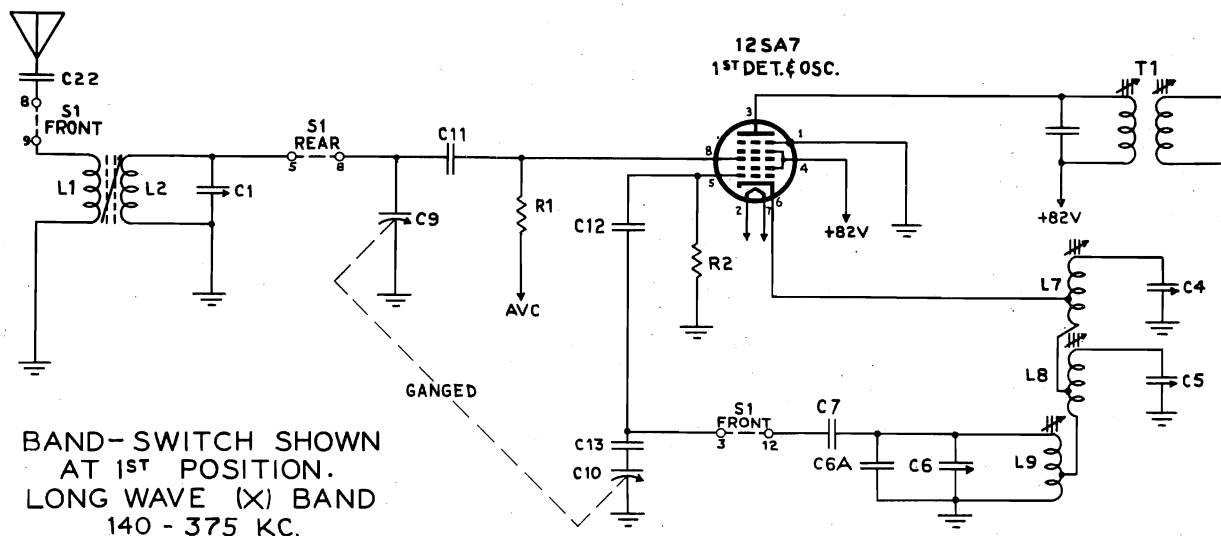


# "clarified schematics"

PAGE 16-10 RCA

MODELS Q103X, -2, AX, AX-2

RCA MFG. CO.





MODELS Q103,-2,A,A-2  
MODELS Q103X,-2,AX,AX-2

RCA MFG. CO.

### Specifications

#### Frequency Ranges Chassis No. RC-1044

Standard Broadcast ("A" Band)..... 540-1600 kc (555-187 m)  
Medium Wave ("B" Band)..... 2.3-7.0 mc (130-42.2 m)  
Short Wave ("C" Band)..... 7.0-22 mc (42.2-13.6 m)

#### Frequency Ranges Chassis No. RC-1044B

Long Wave ("X" Band)..... 140-375 kc (2,222-780 m)  
Standard Broadcast ("A" Band)..... 540-1600 kc (555-187 m)  
Short Wave ("C" Band)..... 5.8-18.2 mc (51.7-16.5 m)

Intermediate Frequency..... 455 kc

#### RCA Tube Complement

(1) RCA-12SA7..... 1st Detector-Oscillator  
(2) RCA-12SK7..... 1-F Amplifier  
(3) RCA-12SQ7..... 2nd Detector, A.V.C., and A-F Amplifier  
(4) RCA-50L6GT..... Power Output  
(5) RCA-35Z5GT..... Rectifier

#### Power Supply Ratings (D-C or 50 to 60 cycles A-C)

Q103, Q103-2, Q103X, Q103X-2—105-125 volts..... 30 watts  
Q103A, Q103A-2, Q103AX, Q103AX-2—210-250 volts..... 60 watts

#### Power Output Rating

Undistorted..... .9 watts  
Maximum..... 1.5 watts

#### Loudspeaker

Type..... 4 x 6 in. elliptical PM  
Voice Coil Impedance..... 3.4 ohms at 400 cycles

Tuning Drive Ratio..... 20 to 1

#### Dimensions (Inches)

	Width	Height	Depth
Cabinet (Outside).....	15	9 $\frac{1}{4}$	7
Chassis Base (Outside).....	13	2 $\frac{1}{2}$	4 $\frac{1}{2}$
Chassis Overall.....	13	9 $\frac{1}{4}$	4 $\frac{1}{2}$
Weight Net.....			9 lbs.
Weight Shipping.....			11 lbs.

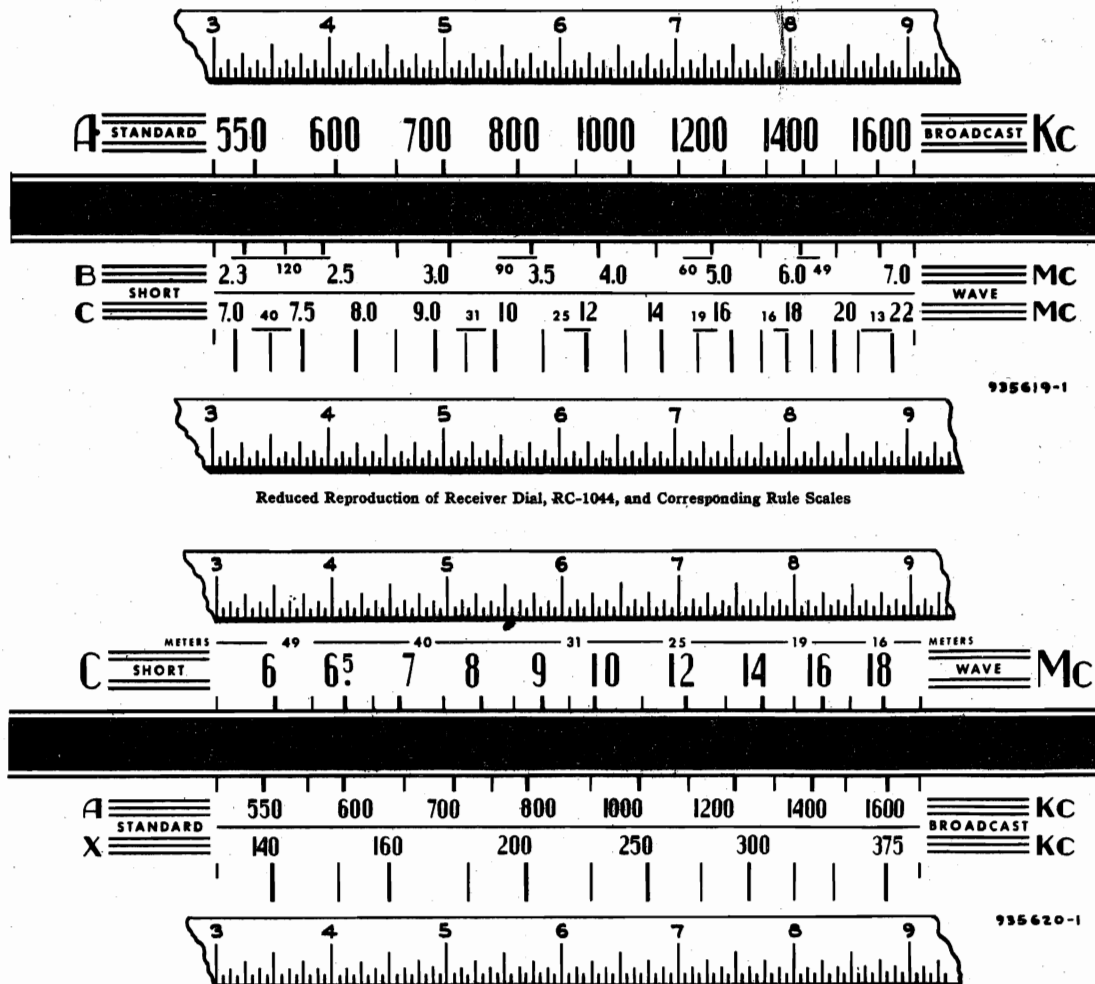
**Phonograph Attachment.**—A jack is provided on the bottom of the chassis for connection to a phonograph. The cable from the attachment should be terminated in a Stock No. 31048 plug. Plug must be removed when radio is in use.

When the phonograph is in use the volume control on the radio should be at minimum.

**Plug-In Resistor.**—Either a plug-in resistor or a shorting plug is used with these sets. The plugs are physically interchangeable and may be used to convert the set from 110 to 220 volts or from 220 to 110 volts. DANGER—Do not attempt to use these sets on 220 volts unless the plug-in RESISTOR is used. If the shorting plug is in place, serious damage will result. Consult the instrument label for original rating.

**Disassembly.**—Remove the screws holding the chassis bottom plate to the cabinet. Remove the chassis from the cabinet by removing the knobs and tilting the cabinet so that the chassis will slide back and out. Looking at the chassis from the front, a switch is visible on the left apron in the rear. This is an interlock switch. The set will not function out of the cabinet unless this switch is closed. A small screw through the interlock actuating arm and the hole in the chassis bottom plate will serve to keep the switch closed. When the chassis is replaced in the cabinet, remove the screw so that the switch will function.

Model	Bands	Power Supply	Cabinet
Q103	"A" "B" "C"	110V	Brown
Q103A	"A" "B" "C"	220V	Brown
Q103-2	"A" "B" "C"	110V	Ivory
Q103A-2	"A" "B" "C"	220V	Ivory
Q103X	"A" "B" "C"	110V	Brown
Q103AX	"A" "B" "C"	220V	Brown
Q103X-2	"A" "B" "C"	110V	Ivory
Q103AX-2	"A" "B" "C"	220V	Ivory



The corresponding position of the dial indicator in inches, from the left hand edge of the dial plate, for any frequency can be determined by drawing a line from the frequency to a point on the bottom rule scale passing through the same point on the top rule scale. For example 600 kc on the dial scale corresponds to a dial indicator setting of  $4\frac{1}{4}$  from the left hand edge of the dial plate, etc. Read instructions under "Alignment Procedure."

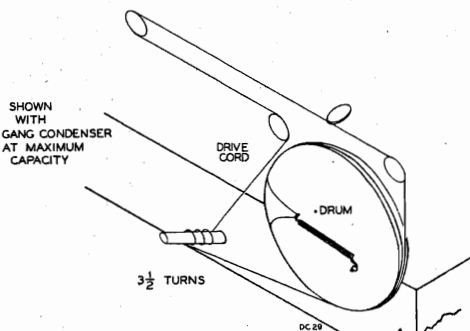
RCA MFG. CO.

MODELS Q103, -2, A, A-2  
MODELS Q103X, -2, AX, AX-2

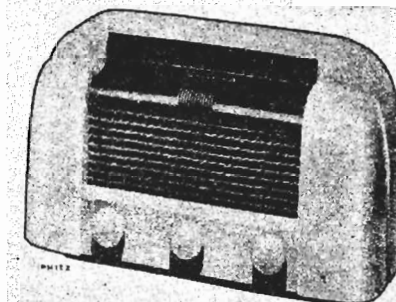
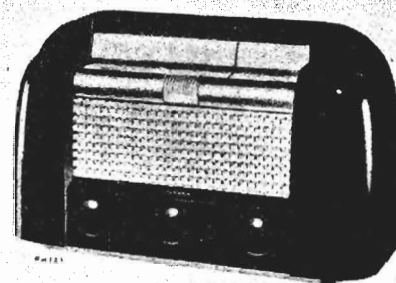
## PRECAUTIONARY LEAD DRESS

1. Dress output plate capacitor and output transformer leads down next to chassis.
2. Dress 12SQ7 grid resistor down next to chassis, and away from power ground wire to switch.
3. Dress lead from 2nd I-F transformer to volume control down to chassis and away from adjacent parts.
4. Keep grid end of R1 as short as possible.

**POWER SUPPLY POLARITY.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.



Dial-Indicator and Drive Mechanism

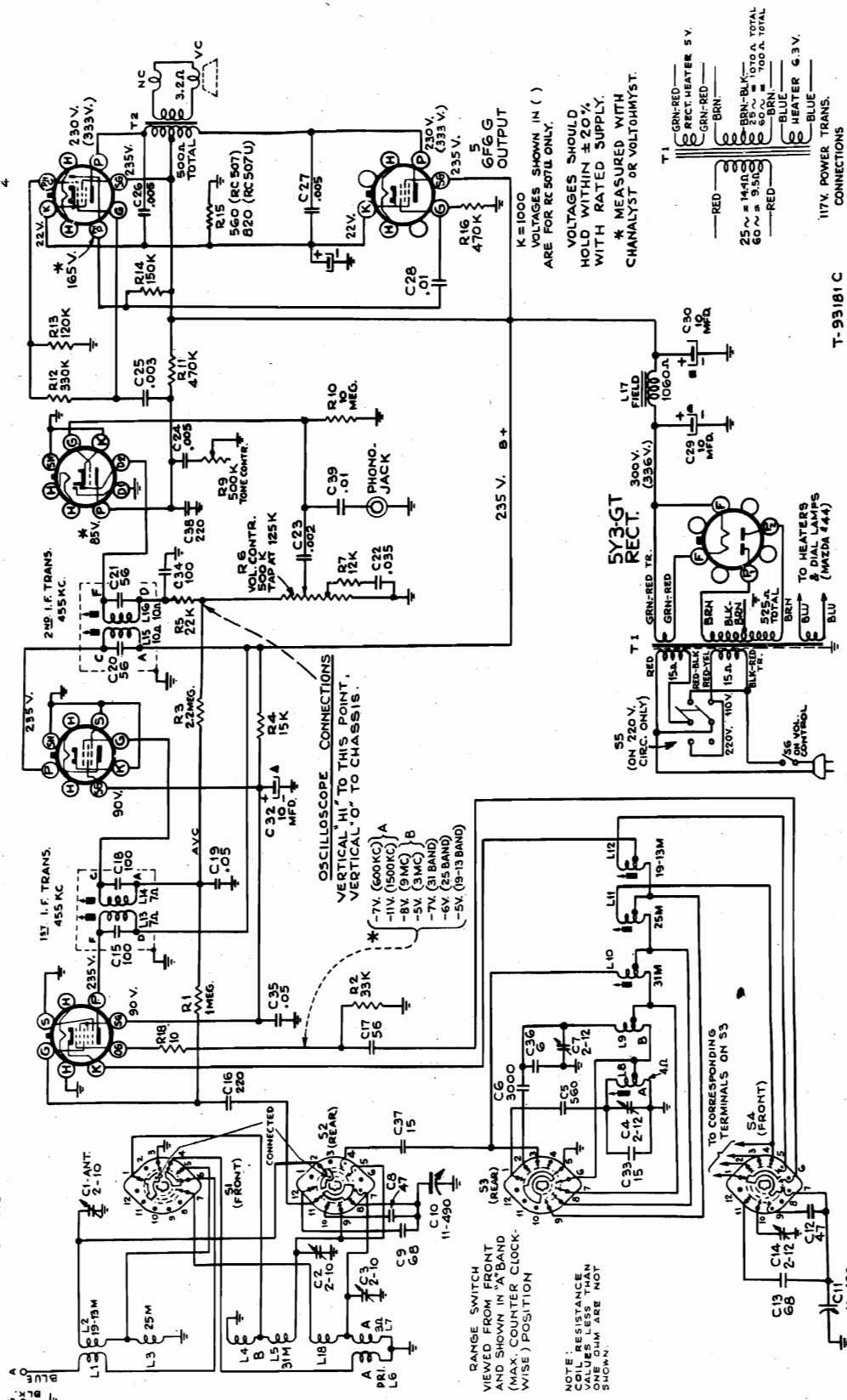
Q103-2, Q103A-2  
Q103X-2, Q103AX-2Q103, Q103A  
Q103X, Q103AX

## Replacement Parts

STOCK NO.	DESCRIPTION	STOCK NO.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b>		
	RC-1044—Q103, Q103-2, Q103A, Q103A-2	30649	Resistor—2.2 megohms, 1/2 watt (R1)
	RC-1044B—Q103AX, Q103AX-2, Q103X, Q103X-2	31417	Resistor—3.3 megohms, 1/2 watt (R3)
*72306	Capacitor—Mica trimmer, 3-30 mmf. (C3)	30992	Resistor—10 megohms, 1/2 watt (R5)
*72307	Capacitor—Mica trimmer, 5-50 mmf. (C4)	*72577	Shaft—Tuning knob shaft
39616	Capacitor—Mica, 33 mmf. (C6A for Q103AX, Q103AX-2, Q103X, Q103X-2)	71115	Socket—Lamp socket
39622	Capacitor—Mica, 56 mmf. (C12)	*72295	Socket—Phono-input socket (J1)
*72794	Capacitor—Ceramic, 170 mmf. (C7 for Q103AX, Q103AX-2, Q103X, Q103X-2)	37605	Socket—Tube socket
39636	Capacitor—Mica, 220 mmf. (C11)	31319	Socket—Tube socket
72571	Capacitor—Mica, 330 mmf. (C23)	70390	Spring—Drive cord spring
*72814	Capacitor—Ceramic, 470 mmf. (C8)	*72745	Switch—Interlock switch, slide type, D.P.D.T. (S3)
*72305	Capacitor—Mica trimmer, comprising 2 sections of 2-20 mmf. and 2 sections of 5-50 mmf. (C1, C2, C5, C6)	*72304	Switch—Range switch (S1)
*72795	Capacitor—Mica, 2760 mmf. (C7 for Q103, Q103-2, Q103A, Q103A-2)	*72545	Transformer—First I. F. transformer (T1)
*72637	Capacitor—Mica, 3900 mmf. (C13)	70918	Transformer—Second I. F. transformer (T2)
*71699	Capacitor—Molded paper, .005 mfd., 400 volts (C24, C25)	*72296	Transformer—Output transformer (T3)
71770	Capacitor—Molded paper, .01 mfd., 400 volts (C21, C22)	33726	Washer—"C" washer for tuning shaft
*72815	Capacitor—Molded paper, .03 mfd., 400 volts (C27)		<b>SPEAKER ASSEMBLIES</b>
*71702	Capacitor—Molded paper, .05 mfd., 400 volts (C16, C28)	922258-2	
*72281	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts, 1 section of 40 mfd., 150 volts and 1 section of 20 mfd., 25 volts (C26)	71058	Speaker—4" x 6" P.M. speaker complete with cone and voice coil
*72576	Coil—Antenna coil, "A" band (L1, L2 for Q103 and Q103A, Q103-2, Q103A-2; L3, L4 for Q103AX, Q103X, Q103X-2, Q103AX-2)		NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
*72298	Coil—Antenna coil, "B" band for Q103, Q103-2, Q103A, and Q103A-2 (L3, L4)	71122	Baffle—Speaker baffle
*72299	Coil—Antenna coil, "C" band for Q103, Q103-2, Q103A, and Q103A-2 (L5, L6)	*71123	Bottom—Case bottom
*72276	Coil—Antenna coil, "C" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L5, L6)	Y1354	Cabinet—Brown plastic cabinet for Q103, Q103A, Q103X, Q103AX
*72297	Coil—Antenna coil, "X" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L1, L2)	Y1355	Cabinet—Ivory plastic cabinet for Q103-2, Q103A-2, Q103X-2, Q103AX-2
*72575	Coil—Oscillator coil, "A" band (L9 for Q103, Q103A, Q103-2, Q103A-2, L8 for Q103AX, Q103X, Q103X-2, Q103AX-2)	*72578	Clamp—Dial clamp (2 required)
*72302	Coil—Oscillator coil, "B" band for Q103, Q103-2, Q103A, and Q103A-2 (L8)	*72686	Decal—Power switch decal
*72303	Coil—Oscillator coil, "C" band for Q103, Q103-2, Q103A, and Q103A-2 (L7)	*72687	Decal—Range switch decal for Q103AX, Q103AX-2, Q103X, Q103X-2
*72274	Coil—Oscillator coil, "C" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L7)	*72747	Decal—Range switch decal for Q103, Q103-2, Q103A and Q103A-2
*72300	Coil—Oscillator coil, "X" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L9)	*72609	Dial—Glass dial scale for Q103, Q103A, Q103-2, Q103A-2
*72294	Condenser—Variable tuning condenser (C9, C10)	*72610	Dial—Glass dial scale for Q103AX, Q103X, Q103X-2, Q103AX-2
38410	Control—Volume control and power switch (R6, S2)	71127	Foot—Cabinet foot (walnut) for Q103, Q103A, Q103AX, Q103X (4 required)
34662	Cord—Drive cord (approx. 56" overall length)	71128	Foot—Cabinet foot (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2 (4 required)
70384	Drum—Drive drum	70473	Knob—Tuning knob (walnut) for Q103, Q103A, Q103AX, Q103X
72283	Grommet—Rubber grommet for mounting tuning condenser and speaker	70474	Knob—Tuning knob (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2
70429	Grommet—Rubber grommet for mounting tube socket	*72549	Knob—Volume control or range switch knob (walnut) for Q103, Q103A, Q103AX, Q103X
*72547	Indicator—Station selector indicator	*72550	Knob—Volume control or range switch knob (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2
71116	Lamp—Dial lamp, Mazda No. 1490	71126	Nut—Speed nut to fasten hand grip screen (4 required)
*72548	Plate—Dial back plate complete with drive cord pulleys	*72291	Plug—Shorting plug for Q103, Q103-2, Q103X, Q103X-2
36230	Pulley—Drive cord pulley	*72308	Resistor—Plug-in resistor for Q103A, Q103A-2, Q103AX and Q103AX-2 (R12)
71290	Resistor—33 ohms, 1 watt (R11)	71125	Screen—Protective screen for hand grip
30880	Resistor—150 ohms, 1/2 watt (R9)	*72746	Slide—Interlock switch actuating slide
71916	Resistor—1000 ohms, 1 watt (R10)	30900	Spring—Retaining spring for knobs
30685	Resistor—33,000 ohms, 1/2 watt (R2)	71130	Spring—Retaining spring for front strip
30787	Resistor—47,000 ohms, 1/2 watt (R4)	71129	Strip—Finished strip for cabinet front
30648	Resistor—470,000 ohms, 1/2 watt (R7, R8)	34373	Washer—"C" washer to hold interlock actuating

\*This is the first time this Stock No. has appeared in Service data.

1946 . . . . . X7  
BOTTOM VIEW OF  
TUBE SOCKETS

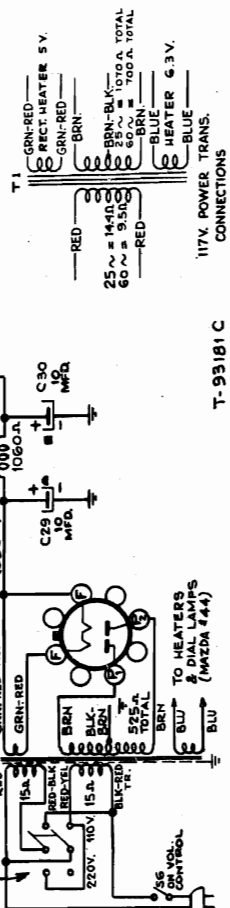


(See separate diagram for Chassis No. RC-507U Power Supply Circuit)

#### Precautionary Lead Dress

All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches. All oscillator coil leads must be kept apart from each other and other leads and parts. Blue plate lead of 2nd I.F. transformer must be dressed down close to chassis and made as short as possible. Power transformer leads to the 110-220 volt switch must be dressed away from the audio circuits. A.C. leads to the power switch must be twisted and dressed up towards the end of chassis apron and kept away from the volume control circuits.

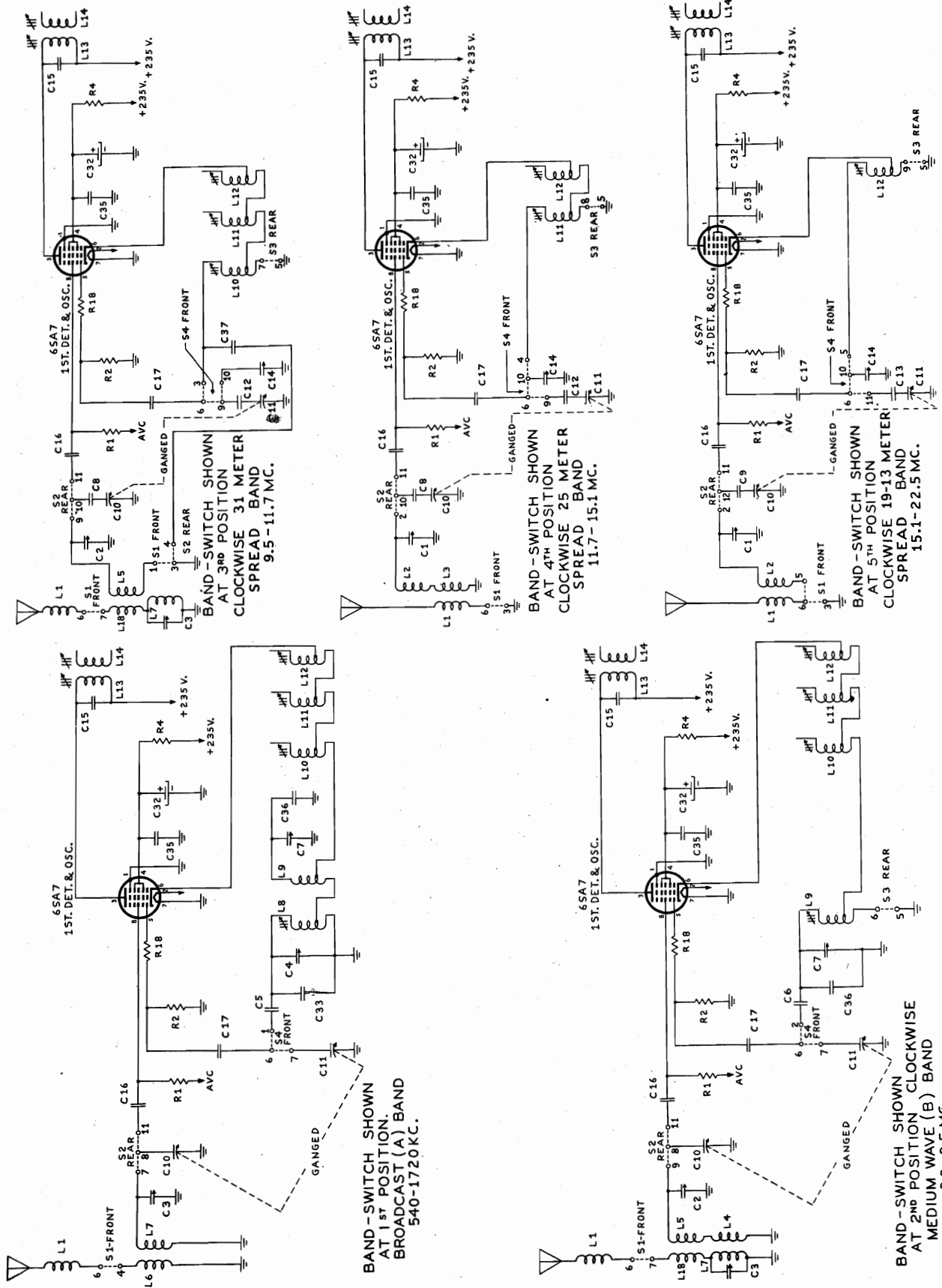
NOTE: In some sets and on some replacement units, the power transformer color code may vary from that shown above. On universal transformers (Rating C), the primary No. 1 start may be black; primary No. 1 finish black/yellow; primary No. 2 start black/green; primary No. 2 finish black/red. On the 25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





RCA MFG. CO.

MODEL Q121



## Alignment Procedure

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

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

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

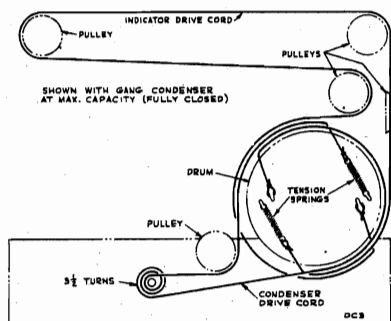
**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser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

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

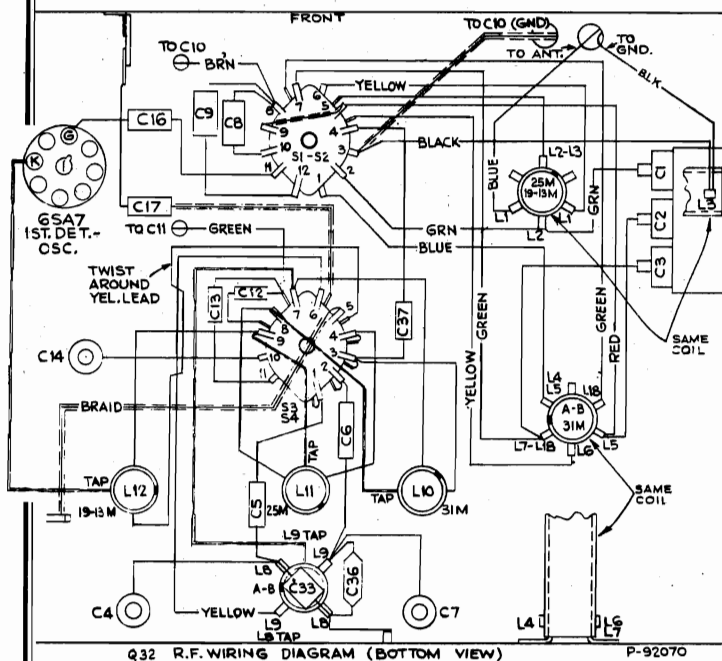
To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

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

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



Dial-Indicator and Drive Mechanism



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

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

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

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

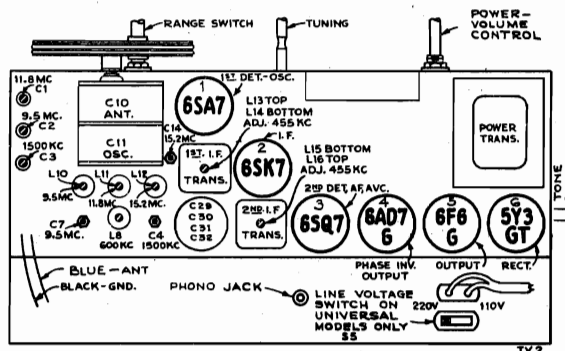
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L15 and L16 2nd I-F Trans.
2	6SA7 1st Det. grid in series with .01 mfd.				L13 and L14 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25 M	138.5°	L11 (osc.)** C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13 M	156°	L12 (osc.)**
7	Ant. lead in series with 200 mmf.	9.5 mc	31 M	156°	L10 (osc.)** C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)***
9		1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10	600 kc	150°		L8 (osc.) (Rock gang)	
11	Repeat steps 9 and 10				

\* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

\*\* If two peaks can be obtained use the one obtained when the core screw is farthest out (counter-clockwise).

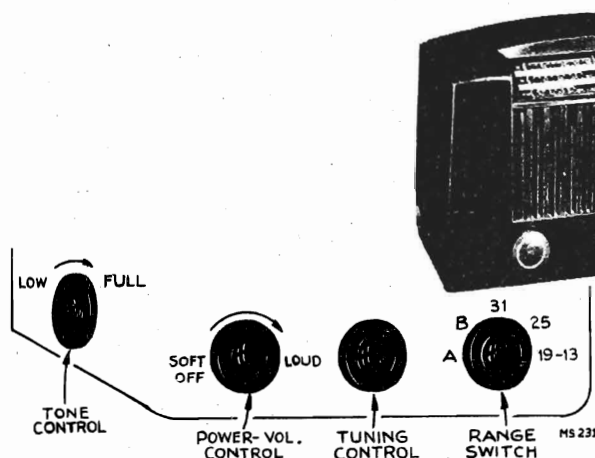
\*\*\* Peak at minimum capacity if two peaks can be obtained.

**NOTE:** Oscillator tracks above signal on all bands.

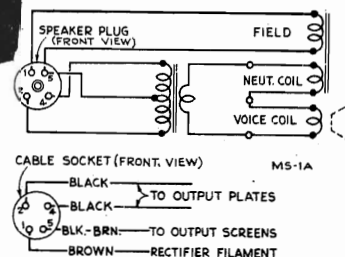


Tube and Trimmer Locations

RCA MFG. CO.



Location of Controls



Connections and Colors of Loudspeaker and Cable for Chassis No. RC-507

## Electrical and Mechanical Specifications

Chassis No. RC-507U differs from Chassis No. RC-507 in that it is equipped with a permanent magnet dynamic loudspeaker. Other

than the loudspeaker and required changes to the power supply filter, and output tubes bias circuits, the chassis are identical.

## Frequency Ranges

Standard Broadcast ("A" Band) .....	540-1,720 kc (556-174 m)
Medium Wave ("B" Band) .....	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band .....	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band .....	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band .....	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency ..... 455 kc

## Tube Complement

(1) RCA-6SA7 .....	1st Detector-Oscillator
(2) RCA-6SK7 .....	I-F Amplifier
(3) RCA-6SQ7 .....	2nd Detector, A-F Amplifier, A.V.C.
(4) RCA-6AD7-G .....	Phase Inverter, Power Output
(5) RCA-6F6-G .....	Power Output
(6) RCA-5Y3-GT .....	Rectifier

## Power Output Rating

Undistorted .....	3 watts
Maximum .....	3.5 watts

## Loudspeaker

Chassis No. RC-507 .....	Identification No. 92517-1
Type (Electrodynamic) .....	6½ inches
V-C Impedance at 400 c.p.s. ....	3.4 ohms
Chassis No. RC-507U .....	Identification No. 92570-1
Type (P.M. dynamic) .....	6½ inches
V-C Impedance at 400 c.p.s. ....	3.4 ohms

## Cabinet Dimensions (Inches)

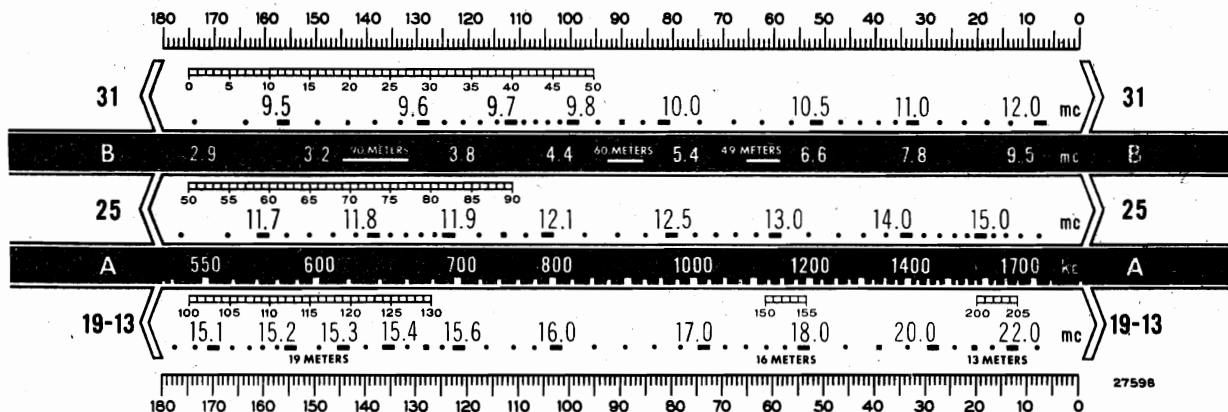
	Height	Width	Depth
Q121 (Plastic) .....	10 $\frac{7}{8}$	16 $\frac{1}{4}$	7 $\frac{5}{8}$
Net Weight (pounds) .....	21		
Shipping Weight (pounds) .....	25		
Chassis Base Dimensions (inches)	Height, 2 $\frac{3}{4}$ ; Width, 15 $\frac{1}{2}$ ;	Depth, 5 $\frac{1}{4}$	
Over-all Chassis Height .....	9 $\frac{1}{4}$ inches		
Tuning Drive Ratio .....	25 to 1		

## Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105 to 125 volts, 117 nominal	25 to 60	65
Rating B	105 to 125 volts, 117 nominal	50 to 60	65
Rating C	{ 105 to 125 volts, 117 nominal 210 to 250 volts, 234 nominal }	50 to 60	65
(Shipped in 210-250 volt position)			

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

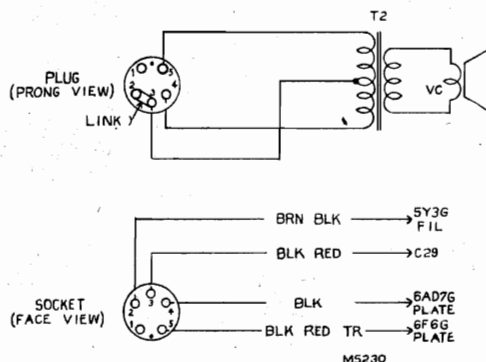
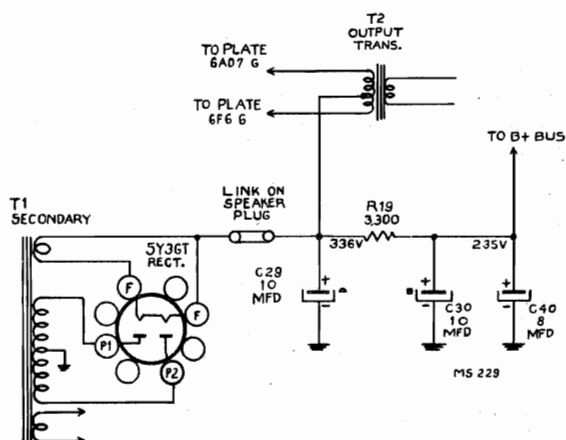
When Phonograph is not in use its plug should be removed. When Phonograph is in use the volume control on the radio should be at minimum and, if necessary, tune set off frequency from any very strong station.



## Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

RCA MFG. CO.



### Connections and Colors of Loudspeaker and Cable for Chassis No. RC-507U

### Chassis No. RC-507U Power Supply Circuit Diagram

## Replacement Parts

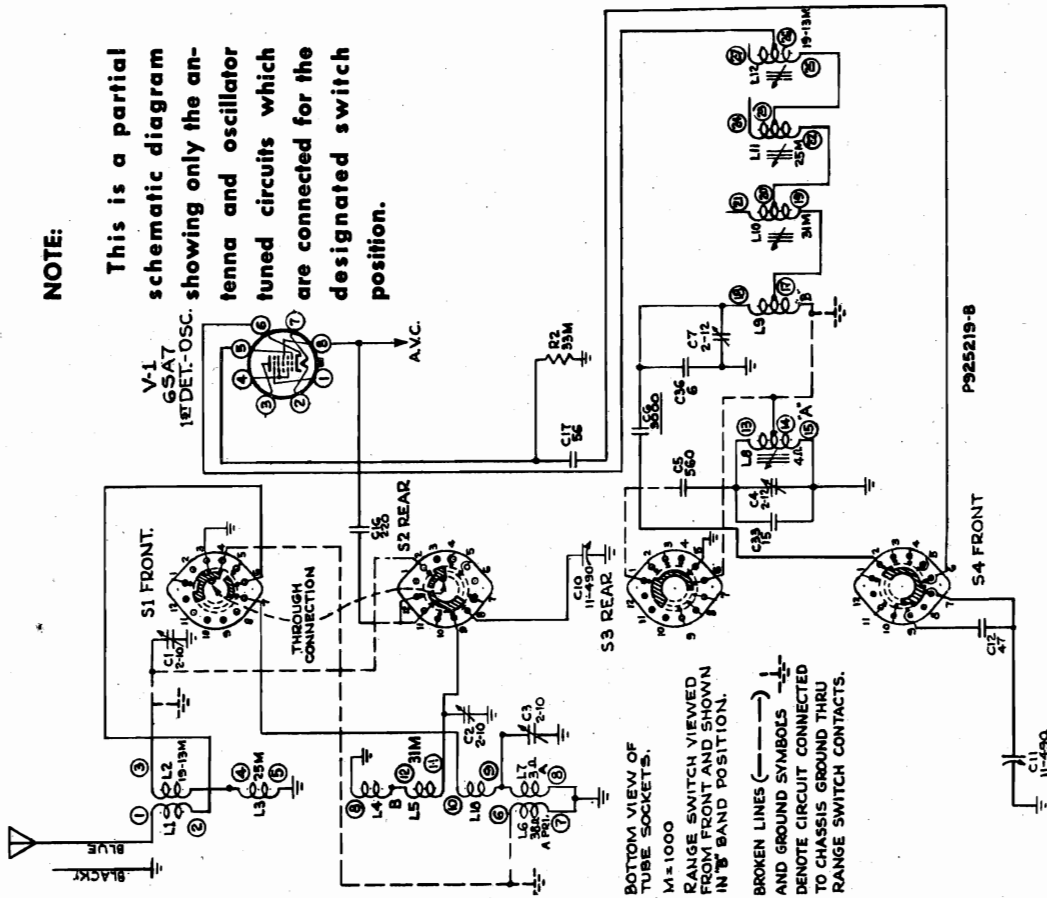
NOTE: The replacement parts listed below are applicable to both chassis except where specifically indicated.

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b> RC-507 and RC-507U		
35622	Bracket—Flywheel and tuning shaft mounting support	30493	Resistor—150,000 ohms, ½ watt (R14)
37976	Bracket—Support bracket for tone control	14983	Resistor—330,000 ohms, ¼ watt (R12)
35642	Calibrator—Drive drum calibrator	30648	Resistor—470,000 ohms, ½ watt (R11, R16)
12714	Capacitor—Air trimmer, 2-12 mmf. (C4, C7, C14)	30652	Resistor—1 megohm ¼ watt (R1)
34654	Capacitor—Mica trimmer, comprising three sections of 2.5-10 mmf. (C1, C2, C3)	30649	Resistor—2.2 megohms, ¼ watt (R3)
35646	Capacitor—Ceramic, 6 mmf. (C36)	30992	Resistor—10 megohms, ¼ watt (R10)
36012	Capacitor—Ceramic, 15 mmf. (C37)	14350	Screw—#8-32 square head set screw for drive drum
39041	Capacitor—Ceramic, 18 mmf. (C33)	35633	Shaft—Extension shaft for range switch
70582	Capacitor—Ceramic, 47 mmf. (C8, C12)	35637	Shaft—Tuning knob shaft
39622	Capacitor—Mica, 56 mmf. (C17)	31364	Socket—Lamp socket
35645	Capacitor—Ceramic, 68 mmf. (C13)	14278	Socket—Phono input socket
70586	Capacitor—Mica, 68 mmf. (C9)	31251	Socket—Tube socket
39628	Capacitor—Mica, 100 mmf. (C15, C18, C34)	31261	Spring—Retaining spring for oscillator coils core and studs
39636	Capacitor—Mica, 220 mmf. (C16, C38)	31418	Spring—Tension spring for drive or indicator cord
70667	Capacitor—Mica, 560 mmf. (C5)	35640	Support—Drive cord pulley support complete with one pulley
70687	Capacitor—Mica, 3000 mmf. (C6)	35639	Support—Drive cord pulley support complete with three pulleys
70585	Capacitor—Tubular, .0015 mfd., 1500 volts (C23)	35621	Switch—Range switch (S1, S2, S3, S4)
70644	Capacitor—Tubular, .0025 mfd., 700 volts (C25)	32827	Switch—Voltage change switch (S5)
70627	Capacitor—Tubular, .005 mfd., 500 volts (C24)	35636	Transformer—First I-F transformer (L13, L14, C15, C18)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C27, C26)	35628	Transformer—Second I-F transformer (L15, L16, C20, C21)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C28, C39)	32852	Transformer—Power transformer, 117 or 235 volt, 50 to 60 cycle (Rating "C") (T1)
70614	Capacitor—Tubular, .035 mfd., 400 volts (C22)	35588	Transformer—Power transformer 117 volt, 25 to 60 cycle (Rating "A") (T1)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C19, C35)	2917	Washer—"C" washer to fasten tuning shaft
33014	Capacitor—Electrolytic, comprising 3 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts (C29, C30, C31 C32)	33726	Washer—"C" washer to fasten idler pulley
72139	Capacitor—Electrolytic, 8 mfd., 450 volts (RC-507U only) (C40)		<b>SPEAKER ASSEMBLY</b> Stamped 92517-1J (For RC-507 only)
35632	Coil—Antenna coil, "A", "B" and 31 meter bands (L4, L5, L6, L7 L18)	70578	Cone—Cone and voice coil assembly
35631	Coil—Antenna coil, spread band (L1, L2, L3)	5118	Plug—4 prong male speaker plug
35623	Coil—Oscillator coil, "A" and "B" band (L8, L9)	70583	Speaker—6½" E.M. speaker complete with cone and voice coil, less output transformer and plug
35624	Coil—Oscillator coil, 19-13 meter band (L12)	70584	Transformer—Output transformer (T2)
35625	Coil—Oscillator coil, 25 meter band (L11)		
35626	Coil—Oscillator coil, 31 meter band (L10)		
35619	Condenser—Variable tuning condenser (C10, C11)		
35629	Control—Tone control (R9)		<b>SPEAKER ASSEMBLY</b> Stamped 92570-1J (For RC-507U only)
35620	Control—Volume control and power switch (R6, S6)	72425	Speaker—6½" P.M. speaker complete with cone and voice coil, less output transformer and plug
32634	Cord—Drive cord (approx. 28" overall length)	31539	Plug—5 prong speaker plug
34662	Cord—Indicator cord (approx. 53" overall length)	70584	Transformer—Output transformer (T2)
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil		
31259	Core—Adjustable core and stud for 19-13 meter band, 25 meter band and 31 meter band oscillator coils		
35627	Drum—Drive drum less calibrator		
35638	Flywheel—Tuning shaft flywheel		
70930	Grommet—Rubber grommet for mounting tuning condenser (4 required)		
5040	Plug—4 contact female plug for speaker cable (RC-507 only)		<b>MISCELLANEOUS</b>
12493	Plug—5 contact female plug for speaker cable (RC-507U only)	*72143	Back—Cabinet back
35641	Pulley—Drive cord pulley	70833	Board—Baffle board and grille cloth
35630	Pulley—Idler pulley	Y1382	Cabinet—Plastic cabinet
34761	Resistor—10 ohms, ¼ watt (R18)	70579	Decal—Trade mark decal
30735	Resistor—560 ohms, 1 watt (RC-507 only) (R15)	35654	Dial—Glass dial scale
39050	Resistor—820 ohms, 1 watt (RC-507U only) (R15)	35647	Frame—Dial frame only less indicator and dial
48674	Resistor—3,300 ohms, 4 watt (RC-507U only) (R19)	70580	Indicator—Station selector indicator
30436	Resistor—12,000 ohms, ¼ watt (R7)	35651	Knob—Range switch knob
35595	Resistor—15,000 ohms, 3 watt (R4)	35652	Knob—Range indicator knob
30492	Resistor—22,000 ohms, ¼ watt (R5)	35650	Knob—Tone control knob
30685	Resistor—33,000 ohms, ¼ watt (R2)	34489	Knob—Tuning or volume control knob
30180	Resistor—120,000 ohms, ¼ watt (R13)	11891	Lamp—Dial lamp, Mazda 44
		14270	Spring—Retaining spring for knobs #34489, 35650 or 35651
		4982	Spring—Retaining spring for knob #35652



**NOTE:**

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.

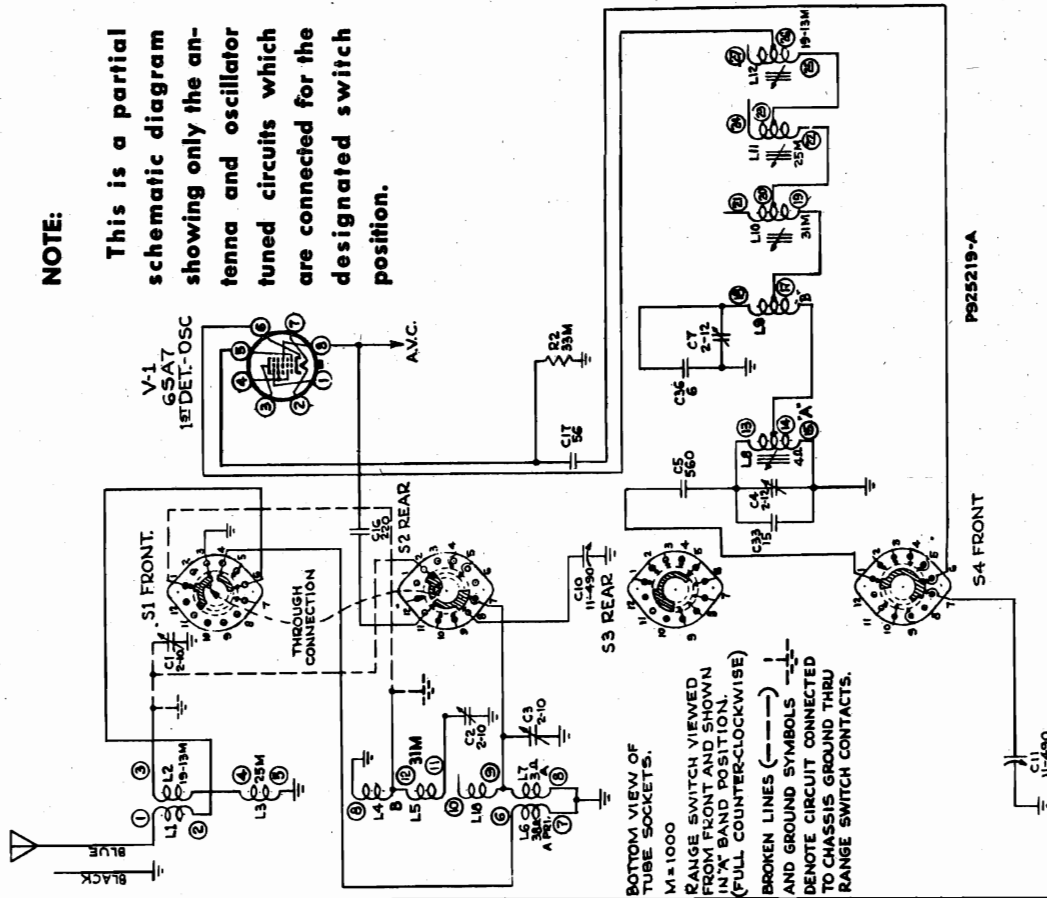


Simplified Schematic Diagram  
Antenna & Oscillator Circuits

"B Band"

**NOTE:**

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.



Simplified Schematic Diagram  
Antenna & Oscillator Circuits

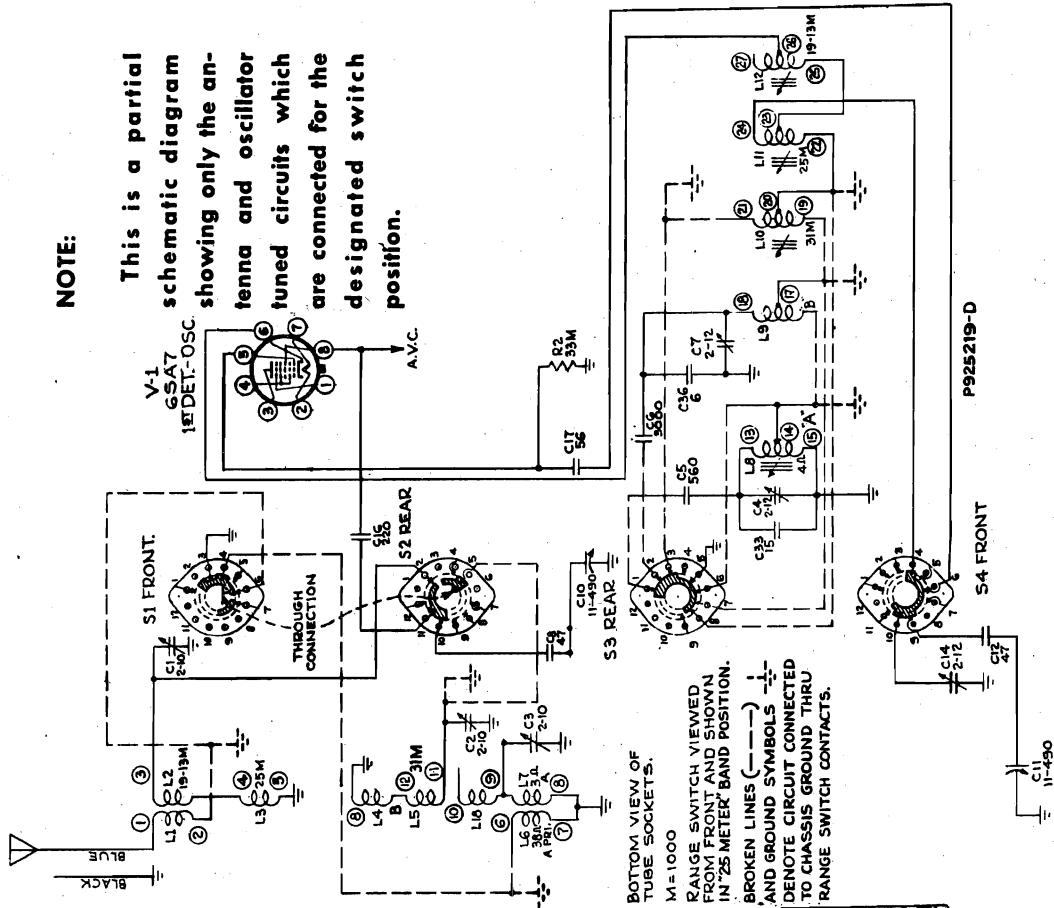
"A Band"

RCA MFG. CO.

MODEL QB13

NOTE:

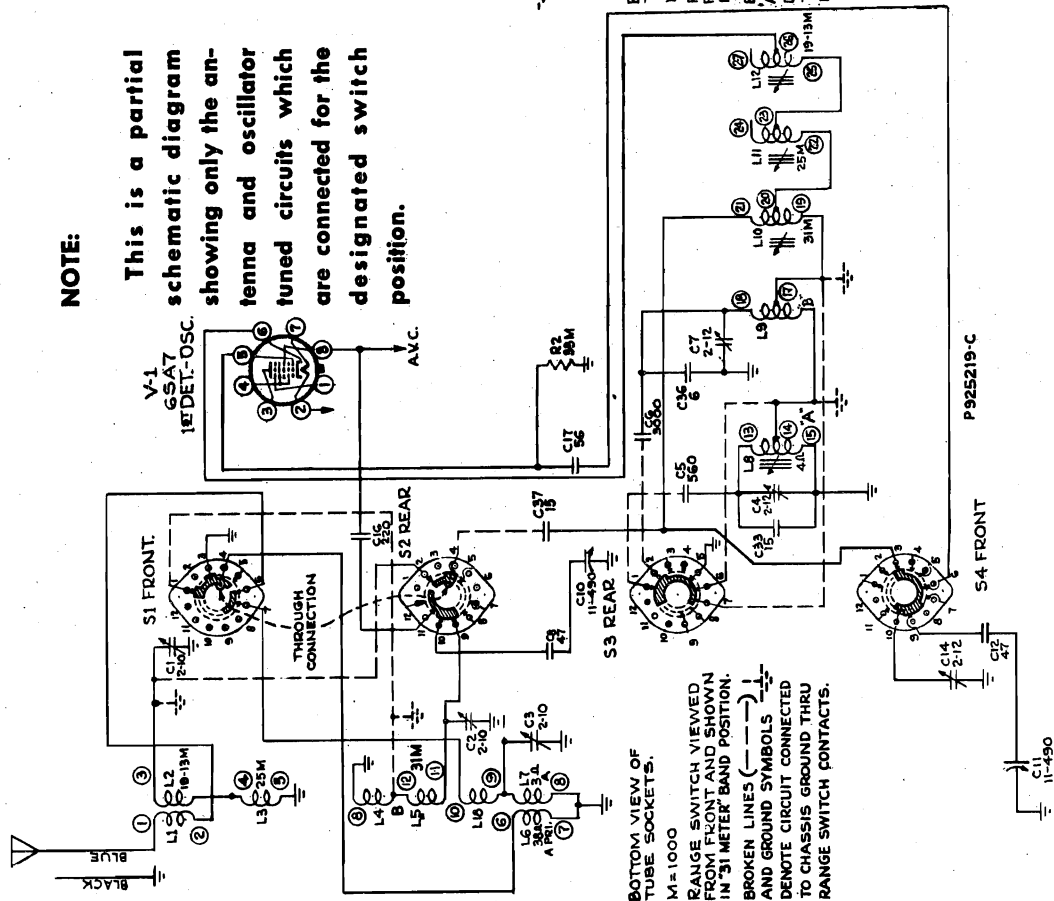
This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.



Simplified Schematic Diagram  
Antenna & Oscillator Circuits  
"25 Meter Band"

NOTE:

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.



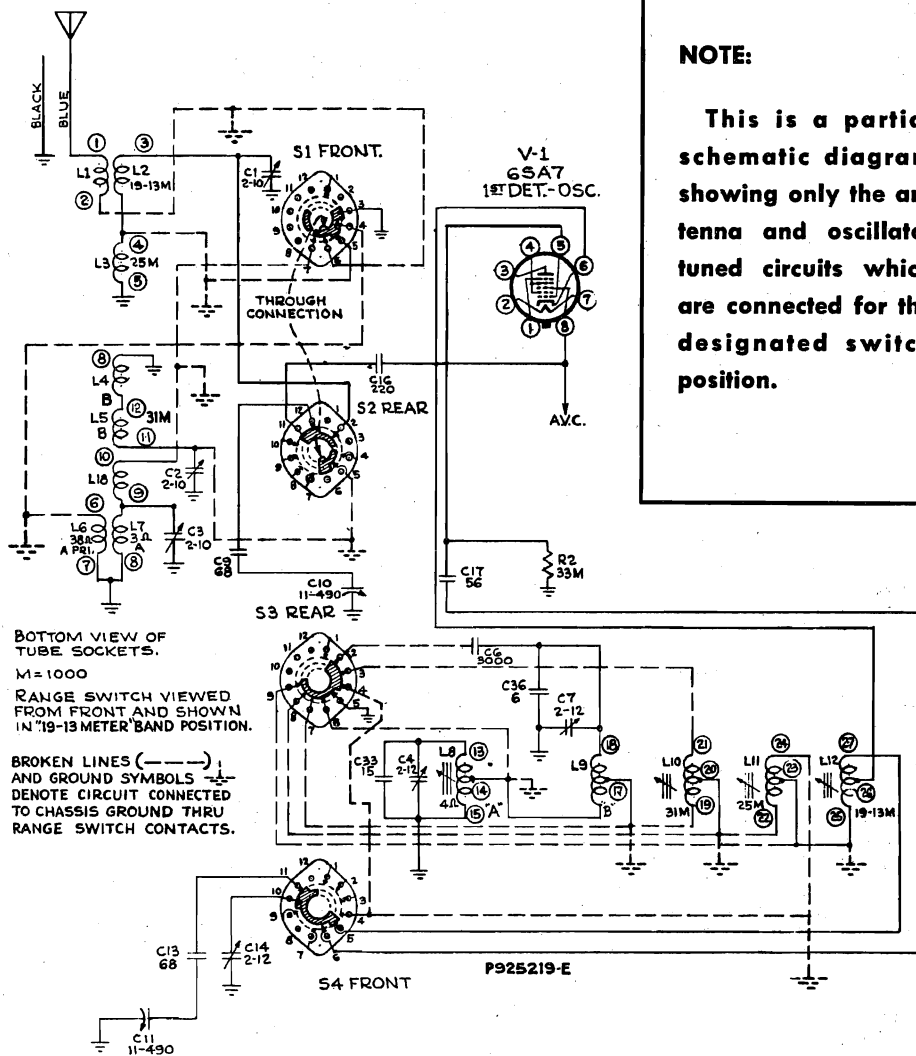
Simplified Schematic Diagram  
Antenna & Oscillator Circuits  
"31 Meter Band"

# "clarified schematics"

PAGE 16-22 RCA

MODEL QB13

RCA MFG. CO.



## NOTE:

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.

Simplified Schematic Diagram  
Antenna & Oscillator Circuits

"19-13 Meter Band"



## RCA MFG. CO.

## Alignment Procedure

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

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

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

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

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

**Receiver Dial with Calibration Scale.**—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial with calibration scale drawing.

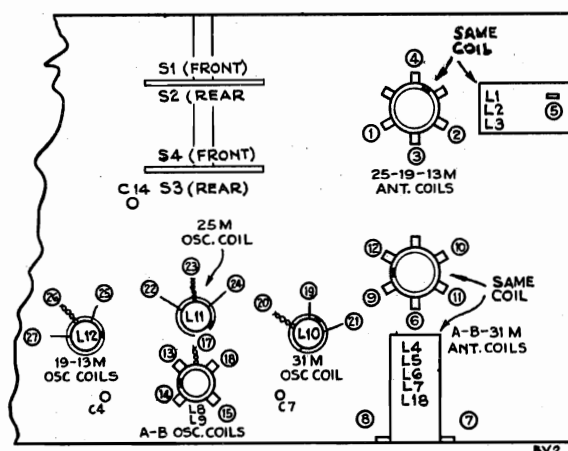
**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a clip for attachment to the cable.

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

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

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

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



Coil and Band Switch Locations (Bottom Chassis View)

## Precautionary Lead Dress.

1. Twist yellow lead from terminal 14 of L8 to terminal 6 of S3 with the lead from terminal 27 of L12 to terminal 5 of S4.
2. All other oscillator coil leads must be kept apart from each other as well as from other leads and parts. No two leads may be less than 1/4 inch apart.
3. The lead from the tap on 19-13M oscillator coil to pin number 6 (K) of 6SA7 socket should be dressed up and away from all parts as far as possible.
4. Condensers C8, C9 and C16 must be as far away from all metal parts as possible.
5. All leads from the antenna coil to the range switch should be dressed together.

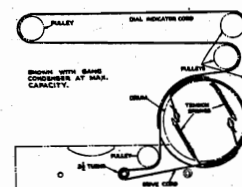
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid in series with .01 mfd.	455 kc	A	Quiet point near 180°	L16—L15 2nd I-F transformer
2	1st Det. grid, in series with .01 mfd.				L14—L13 1st I-F transformer
3		11.8 mc		138.5°	L11 (osc.)*
4		15.2 mc	25M	17°	C14 (osc.)*
5		Repeat steps 3 and 4.			
6	Ant. lead in series with 300 ohms	15.2 mc	19-13M	156°	L12 (osc.)*
7		9.5 mc	31M	156°	L10 (osc.)*
8		9.5 mc	B	11.5°	C7 (osc.)*
9		1,500 kc	A	26°	C4 (osc.)*
10	Ant. lead in series with 200 mmf.	600 kc		150°	L8 (osc.)* (Rock gang.)
11		Repeat steps 9 and 10.			

\*If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

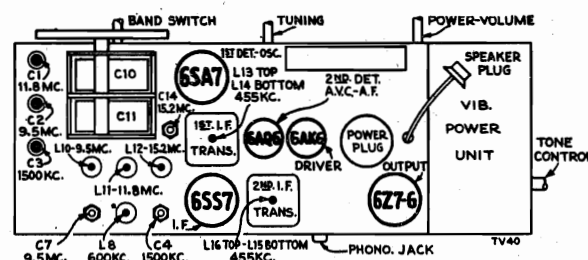
\*\*Use minimum capacity peak if two can be obtained.

\*\*\*Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

NOTE: Oscillator tracks above signal on all bands.



Dial-Indicator and Drive Mechanism

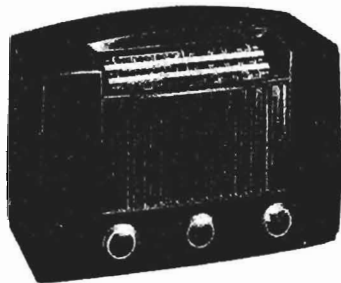


Tube and Trimmer Locations (Top Chassis View)

6. The green lead from pin 4 (SG) of 6SA7 socket to pin 6 (SG) of 6SS7 socket should be dressed down against the chassis and away from the I.F. terminals.
7. All leads and parts must clear the tuning flywheel by at least 1/4 inch.
8. The leads to the power switch should be twisted together and dressed away from other leads and parts as much as possible.
9. Capacitor C34 must be mounted edgewise and close to the chassis with the leads as short as possible.
10. The green lead from term. C of 1st I-F trans to pin 4 (G) of 6SS7 must be short and close to chassis under all other leads.

MODEL QB13

RCA MFG. CO.



### Electrical and Mechanical Specifications

#### Frequency Ranges

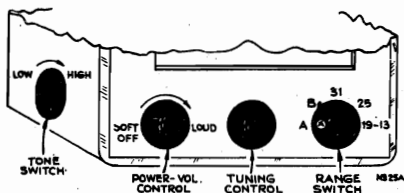
Standard Broadcast ("A" Band).....	540-1,720 kc (555-174 m)
Medium Wave ("B" Band).....	2.9-9.5 mc (103-31.6 m)
"31" Meter Spread Band.....	9.5-12 mc (31.6-25 m)
"25" Meter Spread Band.....	11.7-15 mc (25.6-20 m)
"19-13" Meter Spread Band.....	15.1-22 mc (19.9-13.6 m)

Intermediate Frequency.....455 kc

#### RCA Tube Complement

RC-529A	RC-612
(1) RCA-6SA7	RCA-6SA7.....1st-Det.—Osc.
(2) RCA-6S7*	RCA-6S7.....I-F Amplifier
(3) RCA-6T7-G*	RCA-6AQ6.....2nd-Det., A.V.C., and 1st Audio
(4) RCA-6J7	RCA-6AK6.....Driver
(5) RCA-6Z7-G	RCA-6Z7G.....Power Output

\*In some units, a 6K7 may be substituted for the 6S7 and a 6Q7 in place of the 6T7G.



Location of Controls

#### Power Supply Rating

With vibrator power supply unit (RS-115):  
6.3 volts, total current drain \*RC-529A.....3.35 amperes  
RC-612.....3.2 amperes

\*If both tube substitutions are made, the total current consumption will be increased to 3.65 Amperes.

#### Power Output

	RC-529A	RC-612
Undistorted.....	3.1 watts	2.1 watts
Maximum.....	4.5 watts	3.1 watts

#### Loudspeaker (92519-1)

Type.....6½ inch, permanent-magnet dynamic  
Voice-coil Impedance at 400 cycles.....3.4 ohms

	Height	Length	Depth
Cabinet Dimensions { QB11.....	11¼"	17¼"	7¼"
{ QB12 & QB13.....	10¼"	16¼"	7¼"

Net Weight { QB11.....21.5 lbs.  
{ QB12 & QB13.....20.0 lbs.

Tuning Drive Ratio.....25:1

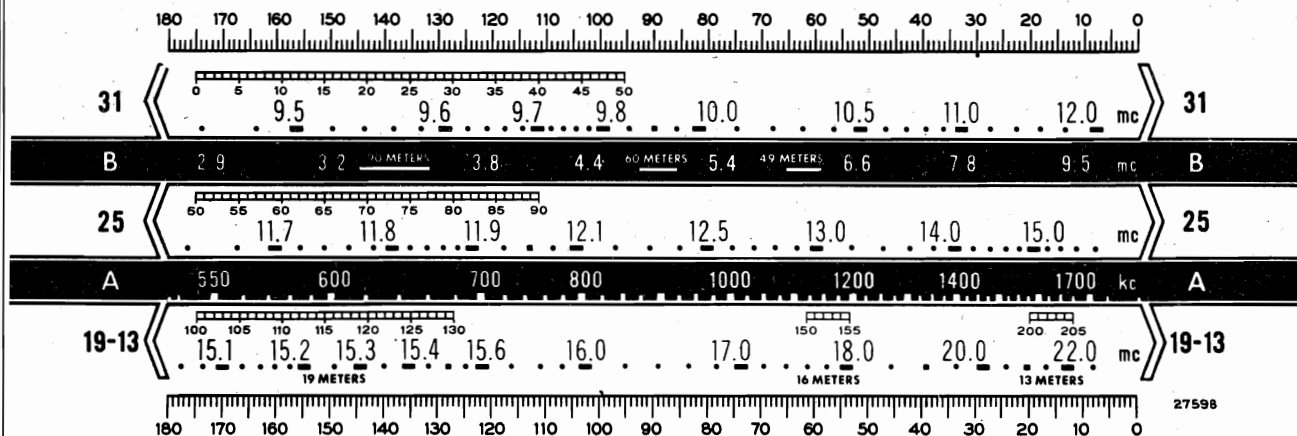
#### Phonograph Attachment

A jack is provided on the rear of chassis for connecting a Phonograph attachment to the audio amplifying circuit.

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

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

### RECEIVER DIAL WITH CALIBRATION SCALE

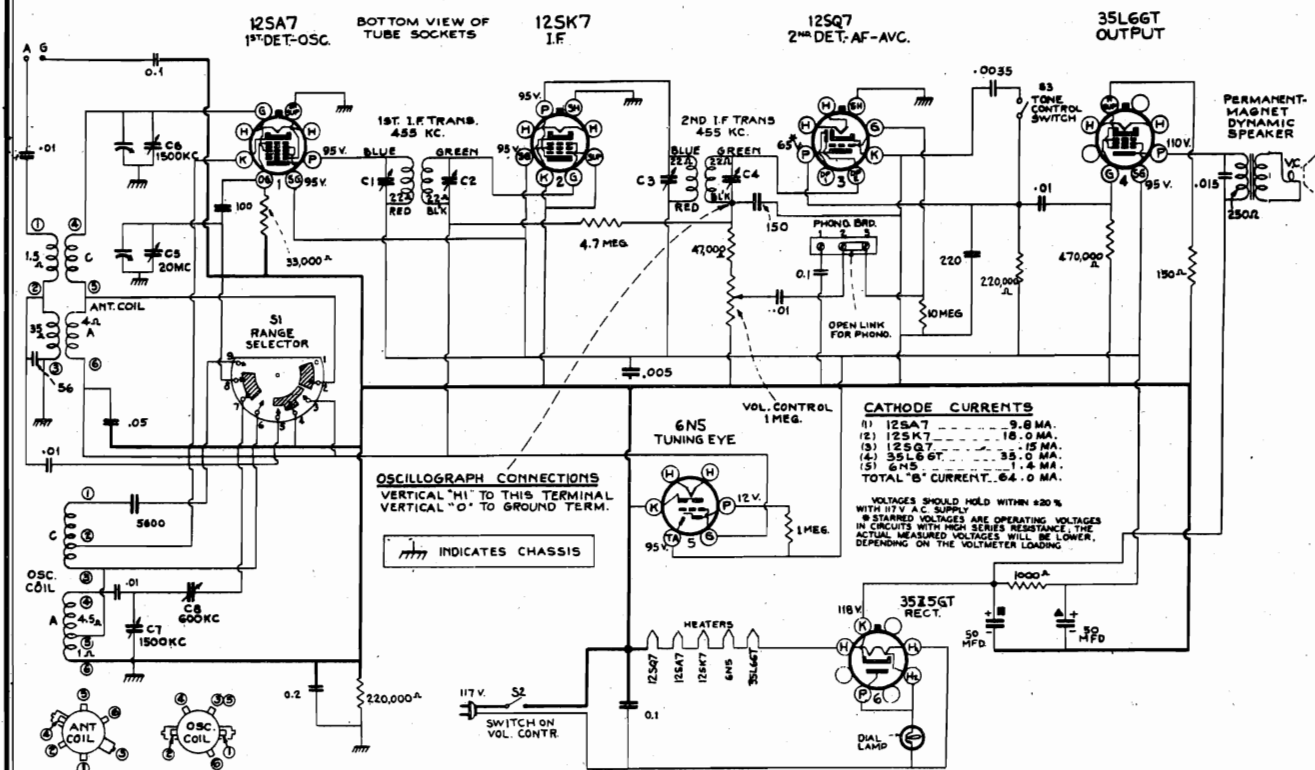


Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

RCA MFG. CO.

MODEL X60, Chassis RC474D

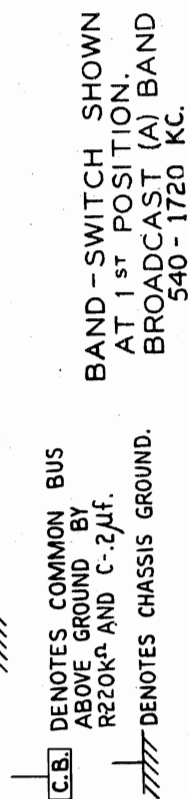
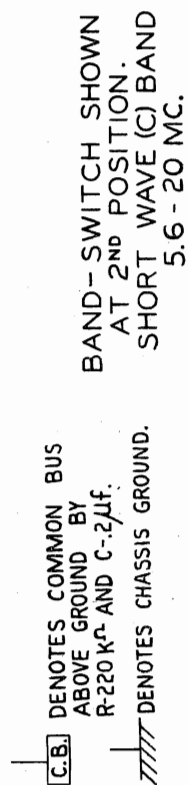


STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
<b>CHASSIS ASSEMBLIES (RC474D)</b>			
33719	Belt—Push button adjusting belts.....	14284	Resistor—22,000 ohms, 1/10 watt.....
34024	Board—"Antenna-Ground" board.....	13998	Resistor—22,000 ohms, 1/2 watt.....
34025	Board—"Radio-Phono" board.....	12454	Resistor—33,000 ohms, 1/2 watt.....
33731	Button—Push button.....	12412	Resistor—47,000 ohms, 1/2 watt.....
30766	Cap—Rubber shield for Magic Eye.....	12264	Resistor—220,000 ohms, 1/2 watt.....
33629	Capacitor—Trimmer capacitor comprising of 2 sections (C7, C8).....	12285	Resistor—470,000 ohms, 1/2 watt.....
12723	Capacitor—56 mmfd., moulded mica.....	30271	Resistor—4.7 megohm, 1/2 watt.....
12720	Capacitor—100 mmfd., moulded mica.....	13601	Resistor—10 megohm, 1/2 watt.....
12725	Capacitor—150 mmfd., moulded mica.....	33438	Screw—Magic Eye clip screw.....
12694	Capacitor—220 mmfd., moulded mica.....	33725	Shaft—Tuning knob drive shaft and retainer...
13895	Capacitor—5,600 mmfd., moulded mica.....	31365	Socket—Dial lamp socket.....
30303	Capacitor—.0035 mfd., 700 volts.....	13871	Socket—Magic Eye socket.....
33584	Capacitor—.005 mfd., 1,200 volts.....	31319	Socket—Tube socket.....
4937	Capacitor—.01 mfd., 500 volts.....	31418	Spring—Tuning condenser drive cord spring...
11315	Capacitor—.015 mfd., 400 volts.....	33720	Spring—Push arm return spring.....
4870	Capacitor—.025 mfd., 400 volts.....	33946	Switch—Range switch (S1).....
32787	Capacitor—.05 mfd., 400 volts.....	34336	Switch—Tone control switch (S3).....
4839	Capacitor—.1 mfd., 400 volts.....	33722	Transformer—First i-f transformer (C1, C2)...
34505	Capacitor—.2 mfd., 300 volts.....	34026	Transformer—Second i-f transformer (C3, C4)...
34212	Capacitor—Comprising 2 sections of 50 mfd., each, 150 volts.....	33726	Washer—"C" washer for drive shaft.....
30716	Clip—Magic Eye clip.....	<b>SPEAKER ASSEMBLIES (RL 85-2)</b>	
33732	Coil—Antenna coil.....	32907	Cap—Cone center dust cap.....
33733	Coil—Oscillator coil.....	34554	Cone—Speaker cone and voice coil.....
33635	Condenser—Tuning condenser and drum assembly	84803	Transformer—Output transformer.....
33631	Control—Volume control and power switch...	<b>MISCELLANEOUS ASSEMBLIES</b>	
32634	Cord—Tuning condenser drive cord.....	31456	Cover—8-protective covers for push button markers.....
33633	Indicator—Station selector pointer.....	34270	Dial—Glass dial scale.....
11765	Lamp—Dial lamp—Mazda No. 51.....	33637	Escutcheon—Dial and button escutcheon.....
33734	Plate—Dial plate complete less condenser and button.....	30863	Knob—Tuning, tone, range or volume control...
30880	Resistor—150 ohms, 1/2 watt.....	33973	Marker—1 set push button markers.....
30152	Resistor—1,000 ohms, 1 watt.....	30900	Spring—Retaining spring for knob or button...

**Short-Wave Sensitivity:**

Where insufficient sensitivity is noted on the short-wave band of Model X-60, addition of capacity coupling of 3 or 4 mmfd. between signal and oscillator grids of converter tube will usually restore normal sensitivity to entire band. This coupling can be effected in several ways:

- Unsolder one grid lead, take several turns around other lead to give desired capacity, resolder.
- Twist several turns of insulated wire around both grid leads to give desired value of capacity coupling.
- Install a 3 to 4 mmfd. capacitor between tube grids.



## RCA MFG. CO.

## Electrical and Mechanical Specifications

## FREQUENCY RANGES

Standard Broadcast..... 540-1,720 kc  
 Short Wave..... 5.6-20 mc  
 Intermediate Frequency..... 455 kc  
 Number of Push Buttons..... Six

## TUBE COMPLEMENT

(1) RCA-12SA7..... First Detector-Oscillator  
 (2) RCA-12SK7..... I-F Amplifier  
 (3) RCA-12SQ7..... Second Detector, A-F, and A.V.C.  
 (4) RCA-35L6GT..... Power Output  
 (5) RCA-6N5..... Magic Eye  
 (6) RCA-35Z5GT..... Rectifier  
 Dial Lamp..... Mazda No. 51, 7.5 volts, 0.20 amp.

## POWER OUTPUT (125 volts, 60 cycle supply)

Undistorted..... 0.8 watts  
 Maximum..... 1.4 watts

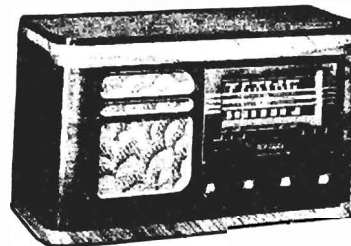
## POWER SUPPLY RATINGS

A-C Rating..... 105-125 volts, 50-60 cycles, 35 watts  
 D-C Rating..... 105-125 volts, direct current, 35 watts

## LOUDSPEAKER (RL 85-2)

Type..... 5-inch permanent magnet dynamic  
 V.C. impedance at 400 cycles..... 4.5 ohms

Cabinet Dimensions (inches)..... Height 9 1/2 Width 16 Depth 7  
 Chassis Base Dimensions (inches)..... 2-3/16 12 1/2 5 1/2  
 Overall Chassis Height..... 6 1/2 inches  
 Shipping Weight..... 15 pounds  
 Tuning Drive Ratio..... 10:1



## Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Pull off the push-buttons and loosen the push-button rods with a small screwdriver.
2. Check to be sure the link connection on back of chassis is in "Radio" position (connected between terminals 2 and 3).

3. Press in push-button No. 1 (left) as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the rod. Do not tighten more than 1/4 turn after the screw begins to grip or damage to the mechanism may result.

4. Replace the push-button on its shaft.

5. Proceed in a similar manner for the remainder of the push-buttons.

6. Insert the station marker tabs in the recesses above the push-buttons.

## Alignment Procedure

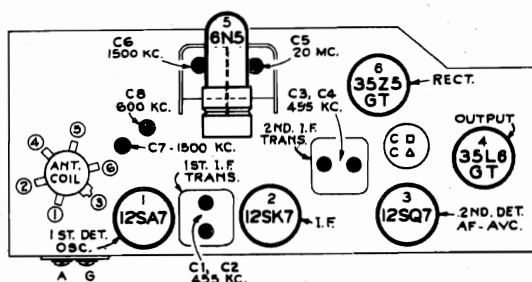
Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic drawing.

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

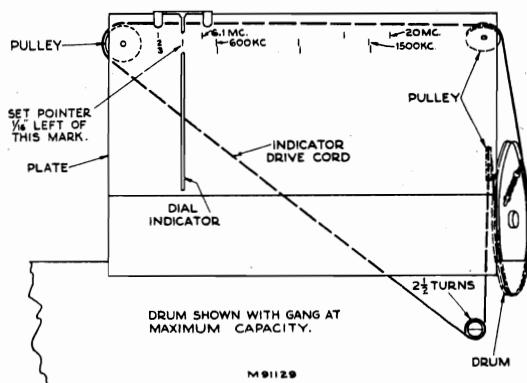
Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground binding post, and keep the output as low as possible to avoid A.V.C. action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, 6.1 mc, and 20 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point 1/16 inch to the left of the mark at the extreme left (low frequency) end of the dial scale.



Tube and Trimmer Locations



Dial-Indicator and Drive Mechanism

Steps	Connect the high side of the test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Antenna terminal	455 kc	"A" Band Quiet Point between 550-750 kc	C3 and C4 (2nd I-F trans.)
2				C1 and C2 (1st I-F trans.)
3	Antenna terminal in series with 300 ohms	20 mc	"C" Band 20 mc calibration mark	C5 (osc.) *
4	Antenna terminal in series with 200 mmf.	1,500 kc	"A" Band 1,500 kc calibration mark	C7 (osc.) C8 (ant.)
5		600 kc	"A" Band 600 kc calibration mark	C8 (osc.) Rock gang
6	Repeat step 4			

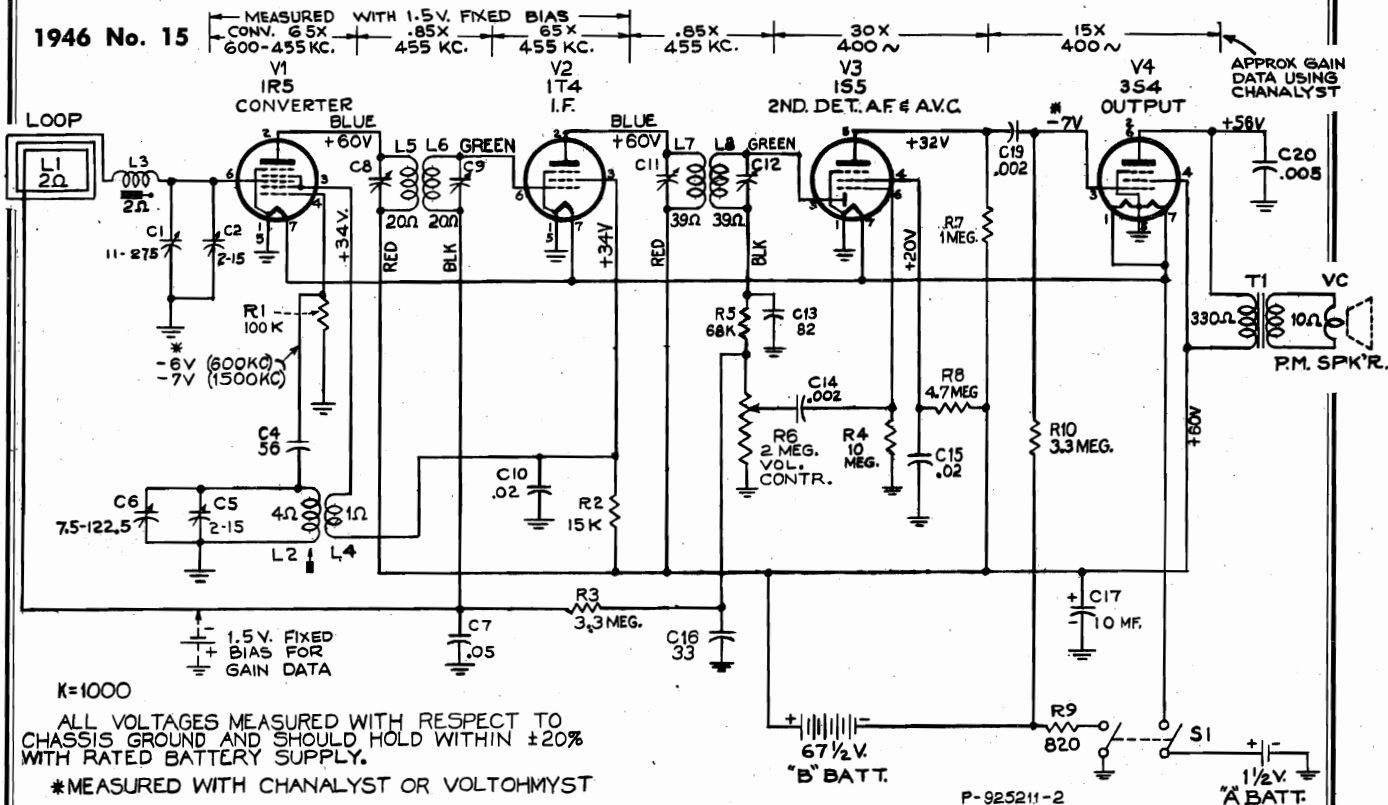
\* Use minimum peak if two can be obtained. Check to determine that C5 has been adjusted properly by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

Note: Oscillator tracks above signal on both bands.

MODEL 54B5, Chassis RC1047

RCA MFG. CO.

IF PEAK 455 KC



## Alignment Procedure

**Test Oscillator.**—Connect test oscillator as indicated in chart keeping the output as low as possible to avoid A V C action.

**Output Meter.**—Connect a high resistance AC voltmeter in series with a .1 mfd capacitor from top lug of TB1 (plate of 3S4) to ground. Turn volume control to maximum position.

Fig. 1 shows the modifications necessary to convert a case into a convenient shield to be used as a substitute for the regular case in the Ant. Osc. alignment.

When using the dummy case for the osc. alignment, the loop assembly must be raised slightly so that osc. trimmer becomes accessible.

Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	lug of C2, (located on rear of gang) through a .01 mfd. capacitor	455 kc	Quiet point near 1,600 kc	C11, C12 2nd I-F trans.
2		455 kc	Quiet point near 1,600 kc	C8, C9 1st I-F trans.
3	**Antenna coupling loop thru 200 mmf. capacitor	1,600 kc	1,600 kc	C5 (osc.)
4		1,500 kc	1,500 kc	C2 (ant.)
5		600 kc	600 kc	L2 (osc.) (Rock gang)
6	Repeat steps 4 and 5 for final adjustments.			

\*The IF transformers can be aligned with chassis out of case.

\*\*Steps 3, 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the back. This loop should be approximately one turn of 6 x 3½ inches coupled to the signal generator through a 200 mmf. capacitor, and loosely coupled to the receiver loop antenna at about 1½ inches distance, so as not to disturb the receiver loop inductance. Ground test oscillator through .1 mf. capacitor to receiver chassis.

## CRITICAL LEAD DRESS

1. Dress blue, green and black leads of second IF transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.
2. Cross the green and the black leads inside the first IF transformer can, keeping the green lead to the outside. Load coil bracket is to separate the blue and the green leads.

3. Dress audio coupling capacitor C14 and the lead to the volume control up and underneath shelf supporting the output transformer.

4. Wire in the three capacitors pyramided behind the speaker with enough space behind the battery holder to allow holder to move when battery is replaced. Dress the ground leads of these capacitors to keep from shorting the off-on switch.

5. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor C17.

6. Keep blue and red leads of output transformer above the mounting shelf.

7. Dress all leads as far as possible from loading coil.

8. Dress leads to gang as far as possible from all metal parts.

9. Dress loop leads to keep from interfering with battery replacement.

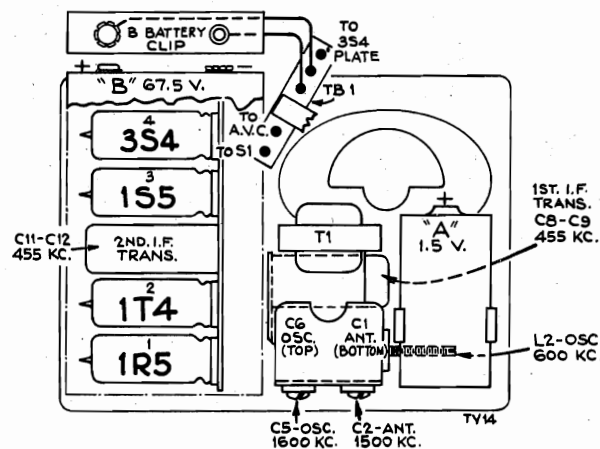


Fig. 4

## NOTE:

A rubber band should be placed around each tube for cushioning. Dirty tube contacts may be mistaken for a defective tube.

## Replacement of Component Parts

- Slide back cover towards handle.
- Remove both batteries.
- Pry tubes out of sockets by gently wedging small screwdriver between base of tubes and sockets.

- a. Slide back cover towards handle.
- b. Remove, either or both, the "A" and "B" battery as the case may warrant. The "B" battery snap fasteners can best be removed by inserting a screwdriver under the snap fastener strip and prying upward.

- a. Remove "A" and "B" batteries (see item II).
- b. Unsolder loop leads from terminals on battery holder.
- c. Remove four mounting screws "B" in the four corners as indicated in fig. 2 and lift off.

- a. Remove loop.
- b. Remove the two screws "H" holding the switch bracket.
- c. Remove the two chassis mounting screws "A", fig. 2.

- a. Remove volume control knob by loosening set screw and pull.
- b. Unsolder voice coil leads, and remove the two mounting screws "C", fig. 2.
- c. Slide speaker out.

- Remove speaker and keep it clear of metal particles.
- Drill out mounting rivet, and bend tabs (when replacing use small screw).
- Unsolder leads and lift out.

- Unsolder copper strip under 3S4 tube.
- Remove two screws (F) holding tube shelf to front plate. These screws are located between tubes 1R5 and 1T4, also 3S4 and 1S5. Rubber shock mounts may stick on studs, pry loose.
- Remove nut (G) beneath tube shelf below second I-F transformer.
- Remove screw (G) beneath the negative terminal of "A" battery holder, and also screw (G) adjacent to volume control below "A" battery holder.
- Carefully invert the chassis.
- Remove volume control wheel (loosen set screw and pull off).
- Lift the mounting plate off.

- a. Remove "A" battery holder.
- b. Unsolder volume control leads.
- c. Remove chassis mounting plate (see item VII).
- d. Remove volume assembly by bending tabs and lifting out.

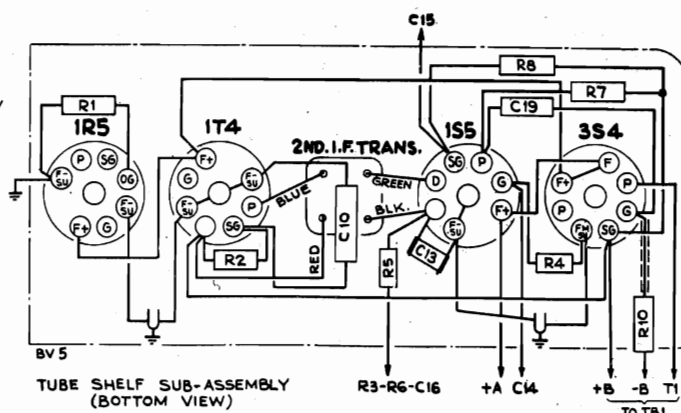
- Remove battery holder.
- Remove chassis mounting plate.
- Unsolder oscillator coil leads.
- Remove coil by unsnapping spring mounting clips from angle bracket.

- a. Remove speaker.
- b. Unsolder four leads from 1st I-F transformer.
  1. Blue to plate of 1R5 tube.
  2. Green to grid of 1T4 tube.
  3. Red to B + terminal of 5 lug terminal board adjacent to output transformer.
  4. Black to AVC terminal of same strip as above.
- c. Remove connections as required from two lug terminal board adjacent to 1st I-F transformer to permit this terminal board to be moved to a position free of the 1st I-F transformer.
- d. Unsolder and bend mounting tabs straight on the I-F transformer can. These tabs are immediately below the 2nd I-F transformer on tube shelf.
- e. Slip 1st I-F transformer forward toward volume control and out.

- Carefully remove the two 0.02 uf C10, C15 capacitors.
- Carefully depress the two leads (B+ and A+) near the I-F transformer case mounting lugs and unsolder these tabs from the tube mounting shelf and bend out.
- Unsolder the blue (plate of 1T4), green (grid of 1S5), red (B+ on terminal board), and black leads.
- Remove 2nd I-F transformer.

- Remove chassis mounting plate (see item VII).
- Unsolder leads to tuning gang.
- Loosen loading coil if necessary.
- Remove two mounting screws and lift out.

1. One Phillips No. 1 screwdriver.
2. One small insulated alignment tool.
3. Allen wrench for a #6 set screw. (Use to remove volume control wheel.)





## MODEL 54B5

RCA MFG. CO.



## Specifications

Frequency Range.....	550-1,600 kc
Intermediate Frequency.....	455 kc
Power Supply	
Type Battery	Current Consumption
"A"—1.5 volt	
RCA-VS 036 or VS 001 }	0.25 amperes
" B"—67.5 volts	
RCA-VS 016 }	8.5 milliamperes
Power Output.....	Undistorted 0.05 watts..... Maximum 0.12 watts
Loudspeaker	
Type Permanent-Magnet Dynamic Elliptical.....	2 x 3 in.
Voice Coil Impedance.....	11½ ohms at 1000 cycles

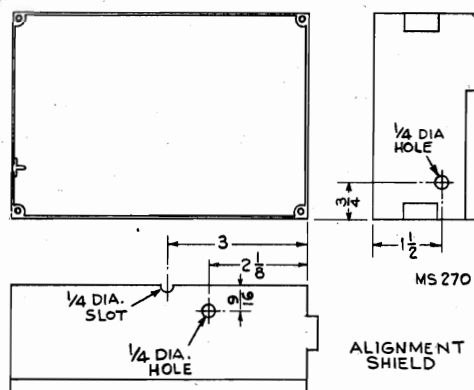


Fig. 1

## Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b> RC 1047		
70423	Band—Rubber band for tubes	*72230	Support—Tube support less tube socket and transformer
70444	Board—Speaker terminal board (5 contact)	*72231	Switch—Power switch (S1)
70445	Board—Terminal board (1 contact)	70440	Transformer—Output transformer (T1)
33111	Capacitor—Ceramic, 33 mmf. (C16)	70442	Transformer—First I. F. transformer (L5, L6, C8, C9)
71924	Capacitor—Ceramic, 56 mmf. (C4)	70437	Transformer—Second I. F. transformer (L7, L8, C11, C12)
71514	Capacitor—Ceramic, 82 mmf. (C13)		<b>SPEAKER ASSEMBLY</b> 92523-3W RL95-4
72315	Capacitor—Tubular, .002 mfd., 150 volts (C14, C19)		
70627	Capacitor—Tubular, .005 mfd., 600 volts (C20)	70428	Speaker—2 x 3" P.M. speaker complete with cone and voice coil
70453	Capacitor—Tubular, .02 mfd., 100 volts (C10, C15)		<b>NOTE:</b> If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
71013	Capacitor—Tubular, .05 mfd., 400 volts (C7)		<b>MISCELLANEOUS</b>
36718	Capacitor—Electrolytic, 10 mfd., 60 volts (C17)		
*72215	Coil—Loading coil (L3)	*72233	Back—Case back
70443	Coil—Oscillator coil (L2, L4)	*72238	Case—"Jewel Box" case less front cover and divider strip
*72227	Condenser—Variable tuning condenser (C1, C2, C5, C6)	*72241	Cover—Front cover only less screen
*72228	Control—Volume control (R6)	*72243	Frame—Loop frame only less loop winding
70429	Grommet—Rubber grommet to mount tube support assembly (2 required)	*72235	Handle—Carrying handle
*72229	Holder—Battery holder	*72232	Knob—Tuning knob
*72225	Insulator—Insulator for chassis panel	*72234	Link—Link for carrying handle (2 required)
*72226	Knob—Volume control knob	*72244	Loop—Loop winding only (L1)
*72224	Panel—Front panel	*72237	Mounting—One set of hardware to mount chassis
14076	Resistor—820 ohms, ¼ watt (R9)	*72242	Screen—Front cover screen only
36714	Resistor—15,000 ohms, ¼ watt (R2)	*72240	Screw—Drive screws for Divider strip and front panel (total of 4 required)
14138	Resistor—68,000 ohms, ¼ watt (R5)	*72236	Screw—Flat head screw for mounting loop (4 required)
3252	Resistor—100,000 ohms, ¼ watt (R1)	70425	Spring—Tuning knob spring clip
30652	Resistor—1 megohm, ¼ watt (R7)	*72239	Strip—Divider strip
31417	Resistor—3.3 megohms, ¼ watt (R3, R10)		
30931	Resistor—4.7 megohms, ¼ watt (R8)		
30992	Resistor—10 megohms, ¼ watt (R4)		
70527	Screw—#6-32 x 3/8" set screw for volume control knob		
70436	Socket—Tube socket		

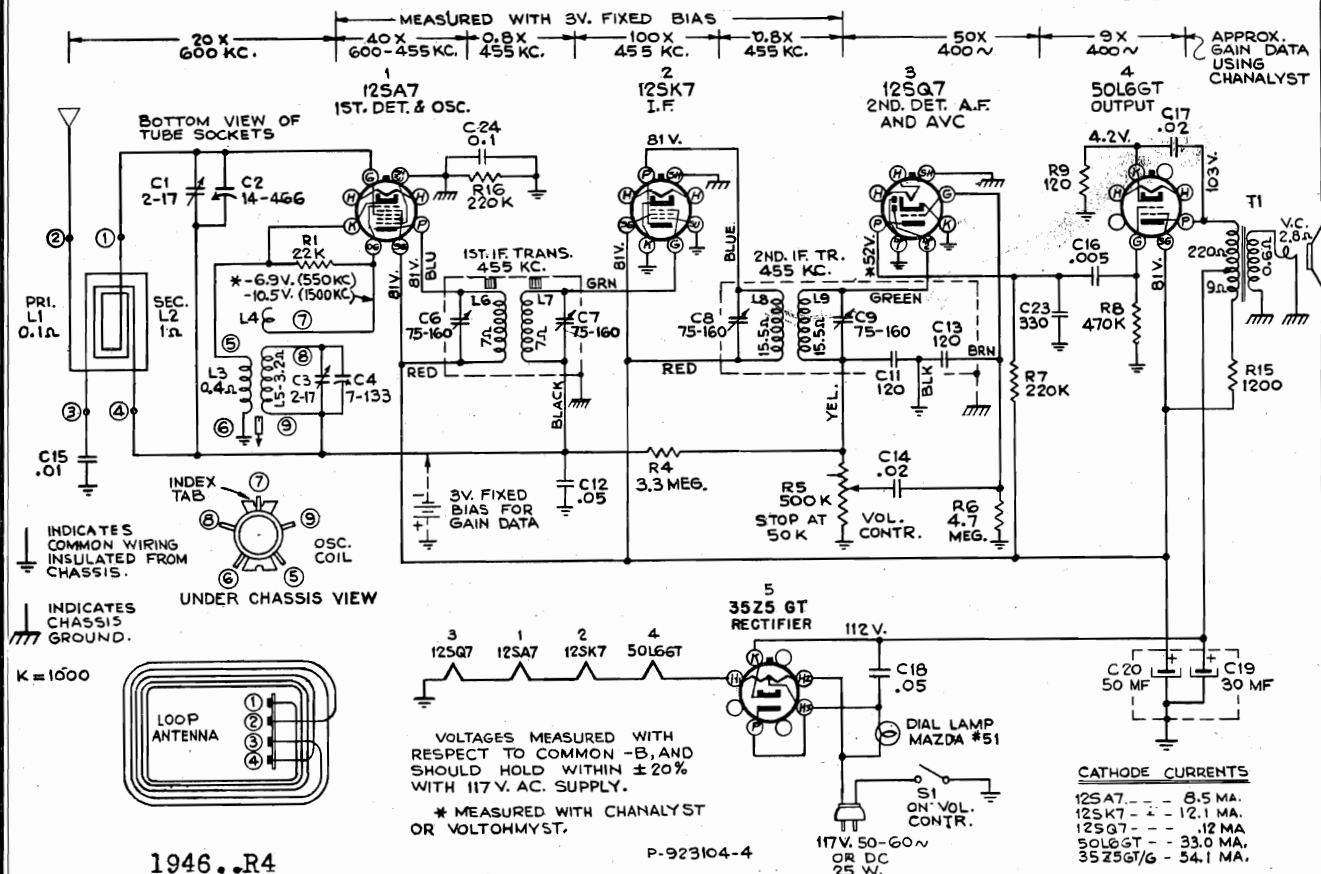
\*This is the first time this Stock No. has appeared in Service Data.



RCA MFG. CO.

MODELS 61-8, 61-9,  
Chassis RC1034

IF PEAK 455 KC



## Alignment Procedure

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

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

**Calibration Scale.**—The glass tuning dial may be removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

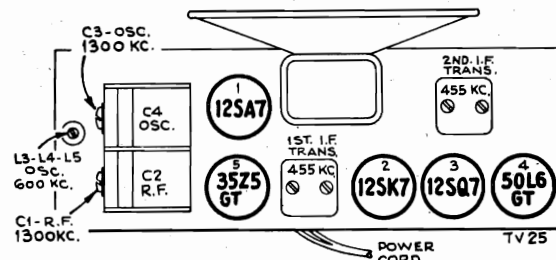
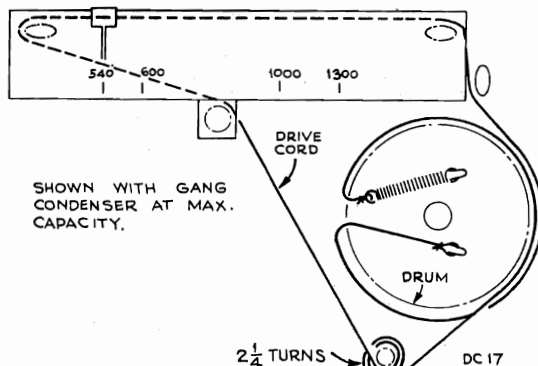
**Dial Backing Plate.**—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

**Dial Pointer.**—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

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

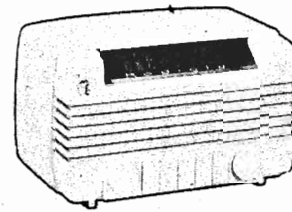
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	C8 and C9 2nd I-F transformer
2	Stator of C2 through 0.1 mfd.			*C6 and C7 1st I-F transformer
3	Ant. lead in series with 200 mmfd.	1,300 kc	1,300 kc	C3 (osc.) C1 (ant.)
4		600 kc	600 kc "A" Band	L5 (osc.) Rock gang
5	Repeat steps 3 and 4			

\*Do not readjust C8 or C9 when test oscillator is connected to C2.





61-8  
(Brown Plastic)



61-9  
(Ivory Plastic)

### Specifications

Frequency Range.....	540-1600 kc
Intermediate Frequency.....	455 kc
Power Output	
Undistorted.....	1.0 watt
Maximum.....	1.5 watts
Tube Complement	
(1) RCA Radiotron 12SA7.....	Converter
(2) RCA Radiotron 12SK7.....	I-F Amplifier
(3) RCA Radiotron 12SQ7.....	2nd Det., A.V.C., and A-F Amplifier
(4) RCA Radiotron 50L6GT.....	Power Output
(5) RCA Radiotron 35Z5GT.....	Rectifier
Pilot Lamp.....	Mazda No. 51, 6-8 volts, 0.2 amp.
Loudspeaker (922258-1)	
Type.....	4" x 6" PM
V. C. Impedance.....	3.4 ohms at 400 cycles
Cabinet Dimensions	Height Width Depth
Cabinet (Outside).....	7" 11 3/4" 7 1/2"
Shipping Weight.....	9 lbs.
Tuning Drive Ratio.....	20:1
Power Supply Rating	
105-125 volts, AC, 50 or 60 cycles, or DC.....	30 watts

**POWER SUPPLY POLARITY.**—For operation on DC, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On AC, reversal of the plug may reduce hum.

#### Critical Lead Dress

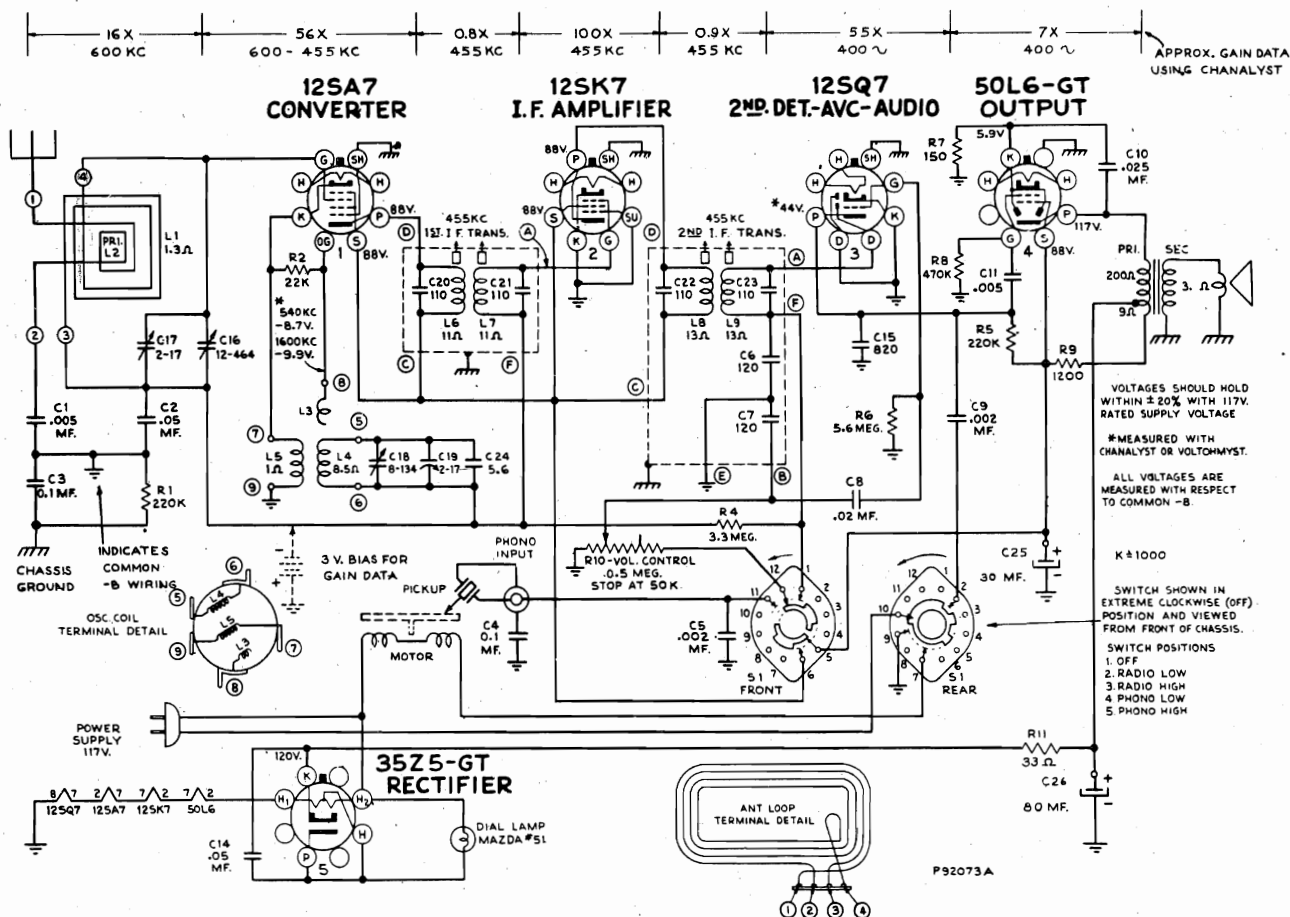
1. Dress blue and green leads of both I-F transformers back in shield cans, leaving them as short as possible.
2. Dress all heater leads next to chassis.
3. Dress power cord toward output transformer away from volume control and audio circuits.
4. Dress capacitor (C14) toward switch and parallel to chassis length.
5. Dress capacitor (C16) back against rear chassis apron.
6. Dress capacitor (C17) over and towards 50L6 socket perpendicular to capacitor (C14) and (C16).
7. Dress pilot lamp leads over second I-F transformer and away from tubes.
8. Dress blue lead from output transformer against front apron and away from I-F leads.
9. Dress contact on oscillator section of gang-condenser back away from oscillator coil (L3, 4, 5) adjustment.

### Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b> RC 1034		
70389	Bearing—Tuning knob shaft bearing	34449	Socket—Lamp socket
39640	Capacitor—Mica, 330 mmf. (C23)	37605	Socket—Tube socket—moulded
70606	Capacitor—Tubular, .005 mfd., 400 volts (C16)	70390	Spring—Drive cord tension spring
70610	Capacitor—Tubular, .01 mfd., 200 volts (C15)	70465	Transformer—First I.F. transformer (L6, L7, C6, C7)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C14, C17)	70466	Transformer—Second I.F. transformer (L8, L9, C8, C9, C11, C13)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C12, C18)	70385	Transformer—Output transformer (T1)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C24)	33726	Washer—"C" washer for tuning knob shaft
70408	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C19, C20)		<b>SPEAKER ASSEMBLY</b> 922258-1
70477	Coil—Oscillator coil (L3, L4, L5)		
70463	Condenser—Variable tuning condenser complete with drum (C1, C2, C3, C4)	70470	Speaker—4" x 6" P.M. elliptical speaker complete
70322	Control—Volume control and power switch (R5, S1)		NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
32634	Cord—Drive cord (approximately 38")		<b>MISCELLANEOUS</b>
70464	Drum—Drive drum		
70469	Indicator—Station selector indicator	*71794	Back—Cabinet back for Radiola 61-8
11765	Lamp—Dial lamp—Mazda 51	*71795	Back—Cabinet back for Radiola 61-9
70468	Loop—Antenna loop (L1, L2)	Y1365	Cabinet—Brown plastic cabinet for Radiola 61-8
70462	Plate—Dial back plate complete with drive cord pulleys less dial	Y1366	Cabinet—Ivory plastic cabinet for Radiola 61-9
36230	Pulley—Drive cord pulley	70475	Clamp—Dial clamp (1 set)
30189	Resistor—120 ohms, 1/4 watt (R9)	*71796	Dial—Glass dial scale
6134	Resistor—1200 ohms, 1 watt (R15)	37831	Fastener—Push fastener (1 set) for cabinet back
30492	Resistor—22,000 ohms, 1/4 watt (R1)	70474	Knob—Control knob—ivory—for Radiola 61-9
14583	Resistor—220,000 ohms, 1/4 watt (R7, R16)	70473	Knob—Control knob—mottled walnut—for Radiola 61-8
30648	Resistor—470,000 ohms, 1/4 watt (R8)	30900	Spring—Retaining spring for knob
31417	Resistor—3.3 megohms, 1/4 watt (R4)		
30931	Resistor—4.7 megohms, 1/4 watt (R6)		
70467	Shaft—Tuning knob shaft		

\*THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

RCA MFG. CO.

MODEL 62-1, Chassis RC1017A,  
RC-1017B

## Replacement Parts—Radio Only

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	<b>CHASSIS ASSEMBLIES</b> RC 1017A RC 1017B	70388	Shaft—Tuning knob shaft
70389	Bearing—Tuning knob shaft bearing	34449	Socket—Lamp socket
70407	Button—Plug button (2 required)	35787	Socket—Phono input socket
70997	Capacitor—Mica, 5.6 mmf. (C24)	27605	Socket—Tube socket—moulded
39650	Capacitor—Mica, 820 mmf. (C15)	70390	Spring—Drive cord tension spring
70601	Capacitor—Tubular, .002 mfd., 400 volts (C5, C9)	70396	Spring—Volume control gear tension spring
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1, C11)	70394	Switch—Power or radio phono switch
70611	Capacitor—Tubular, .02 mfd., 400 volts (C8)	70386	Transformer—First I.F. transformer
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10)	70387	Transformer—Second I.F. transformer
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2, C14)	70385	Transformer—Output transformer
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4)	33726	Washer—"C" washer for tuning knob shaft
*72312	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 80 mfd., 150 volts (C25, C26)	70406	Washer—Spring washer for volume control
70403	Coil—Oscillator coil		<b>SPEAKER ASSEMBLY</b> 922279-1
70383	Condenser—Variable tuning condenser complete with drum	70405	Speaker—4" x 6" P.M. speaker complete
72756	Control—Volume control	70470	Speaker—4" x 6" elliptical P.M. speaker complete with cone and voice coil
32634	Cord—Drive cord (approx. 48" overall length)		<b>SPEAKER ASSEMBLY</b> 922258-2
70392	Cord—Power cord	71058	Speaker—4" x 6" P.M. elliptical speaker complete with cone and voice coil
70384	Drum—Drive drum		NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
70397	Gear—Power or radio-phono switch gear		<b>MISCELLANEOUS</b>
70395	Gear—Volume control gear and spring assembly	70398	Clamp—Dial clamps (1 set)
70404	Indicator—Station selector indicator	70709	Dial—Glass dial
70391	Insulator—Bakelite insulator for phono input socket	71595	Feet—Rubber feet (4 required)
11765	Lamp—Dial lamp	70707	Hinge—Lid hinge (2 required)
*72311	Loop—Antenna loop	70401	Knob—Power switch and radio-phono switch knob
70382	Plate—Dial back plate complete with pulleys less dial	70400	Knob—Tuning knob
30868	Plug—2 contact female plug for "AC" cable	70399	Knob—Volume control knob
36230	Pulley—Drive cord pulley	71815	Mounting—One set of hardware consisting of four springs, two spring washers and two rubber washers to mount record changer
*72313	Resistor—33 ohms, 1 watt (R11)	14270	Spring—Retaining spring for knobs
30880	Resistor—150 ohms, 1/4 watt (R7)	71824	Stud—Stud and screw to mount lid hinge (1 set)
6134	Resistor—1200 ohms, 1 watt (R9)	39545	Support—Lid support
30492	Resistor—22,000 ohms, 1/4 watt (R2)		
14583	Resistor—220,000 ohms, 1/4 watt (R1, R5)		
30648	Resistor—470,000 ohms, 1/4 watt (R8)		
12928	Resistor—3.3 megohms, 1/4 watt (R4)		
31455	Resistor—5.6 megohms, 1/4 watt (R6)		
14974	Screw—#8-32 x 3/16" long set screw for lower gear		

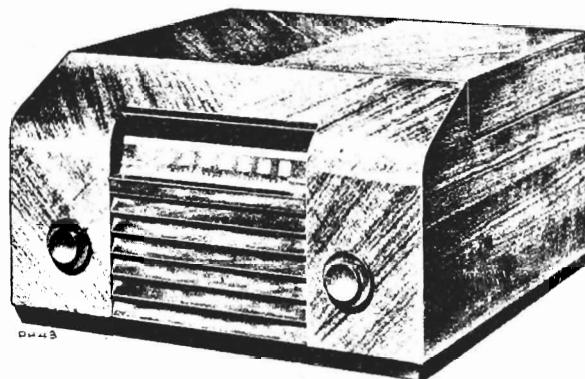
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## Electrical and Mechanical Specifications

### Five-Tube, Single-Band, Superheterodyne Receiver

Frequency Range ..... 540-1,600 kc  
 Intermediate Frequency ..... 455 kc  
 Power Output  
 Undistorted ..... 1.5 watts  
 Maximum ..... 2.4 watts  
 Loudspeaker (922279-1) "PM" or 922258-2  
 Size ..... 4 x 6 inch, elliptical  
 V.C. Impedance ..... 3.4 ohms at 400 cycles  
 Power Supply Rating  
 105-125 volts, AC, 60 cycles ..... 60 watts  
**IMPORTANT** Do not plug instrument into a d-c supply.

	Height	Width	Depth
Cabinet dimensions (inches) .....	10½	17¼	17¼
Chassis overall (inches) .....	6⅝	14	6¼
Chassis base (inches) .....	1⅝	14	3¾
Tuning Drive Ratio .....	14:1		



### Phonograph

Type ..... Automatic (960260-2)  
 Record Capacity ..... Twelve 10-in., Ten 12-in.  
 Turntable Speed ..... 78 r.p.m.  
 Type Pickup ..... Crystal  
 Motor Power Consumption ..... 25 watts

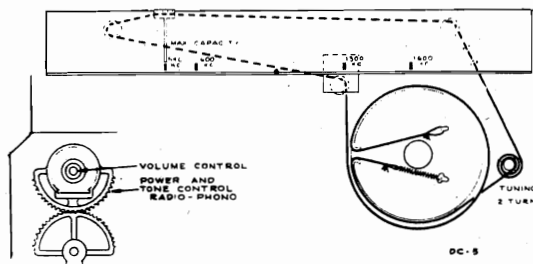
## Alignment Procedure

**CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.**

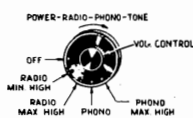
Take off both wooden strips on bottom of cabinet by removing wood screws before loosening chassis bolts.

### CRITICAL LEAD DRESS.—

1. All filament wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress all exposed leads away from each other and away from chassis to prevent short circuits.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.



**Dial Pointer Adjustment.**—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.



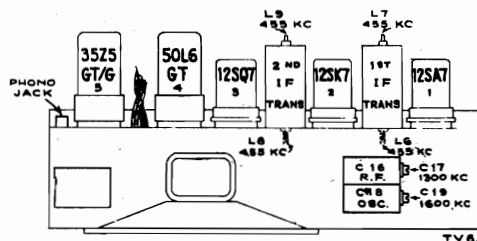
Control Positions

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

**Output Meter.**—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

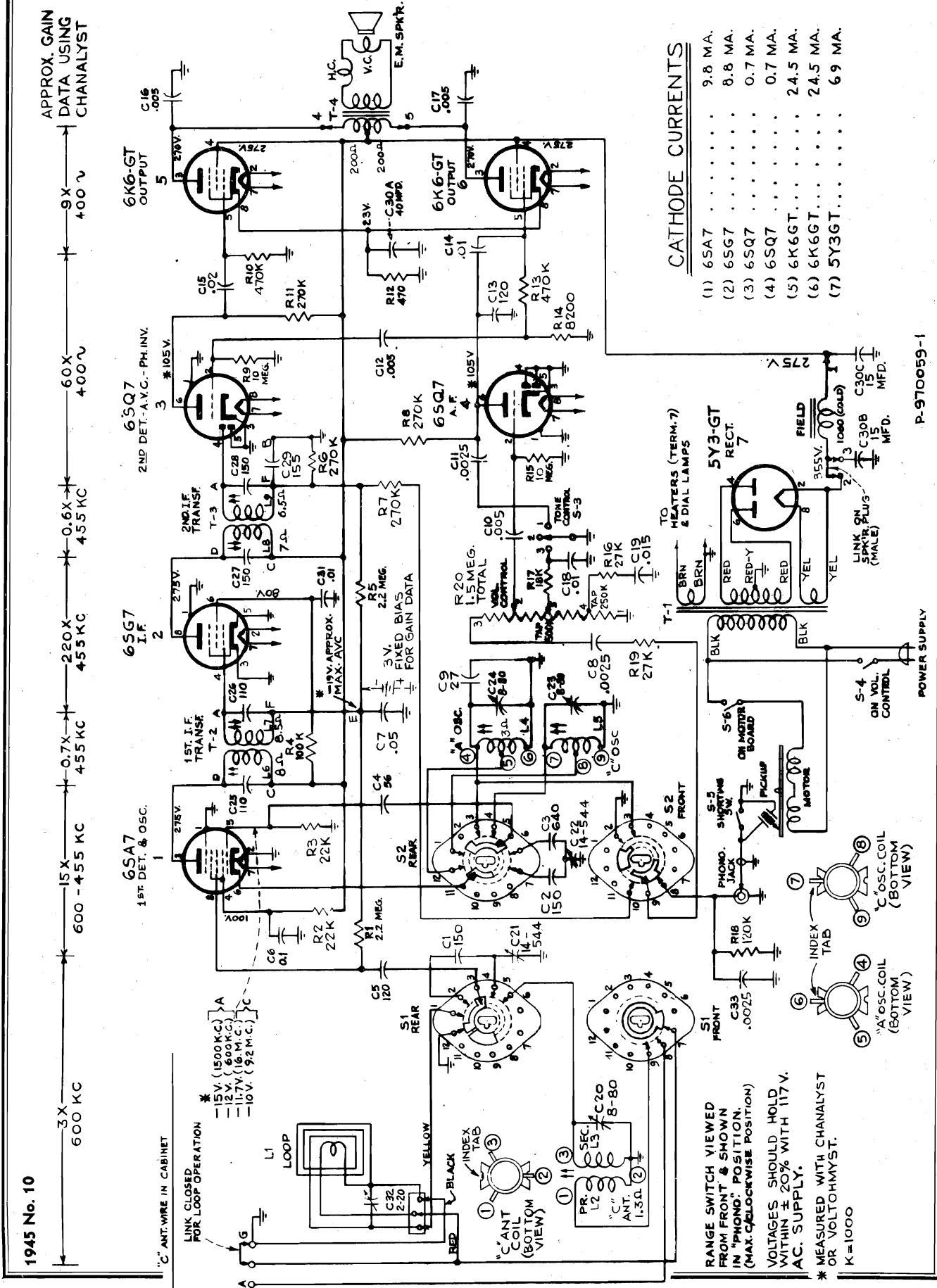
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 1600 kc end of dial	L8 and L9 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			L6 and L7 1st I.F. transformer
NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET				
3	Antenna terminal in series with 220 mmfd.	1600 kc	Gang at minimum	C19 (osc.)
4	Radiated signal 1300 kc		Signal frequency	C17 (ant.)
5	Repeat steps 3 and 4.			

\* Do not readjust L8 or L9 when test oscillator is connected to 1st Det.



**Power Supply.**—Although this model employs an ac-dc chassis, it is not suitable for use on d.c., as this would damage the motor. Reversal of plug in outlet receptacle may reduce hum.

APPROX. GAIN  
DATA USING  
CHANALYST

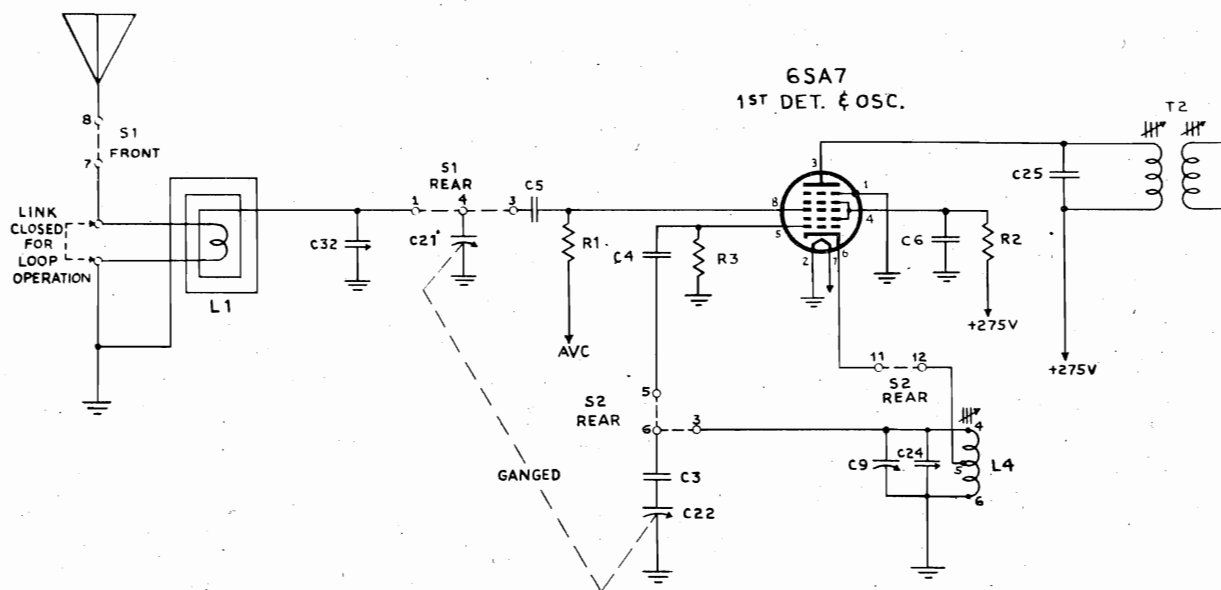


# "clarified schematics"

PAGE 16-36 RCA

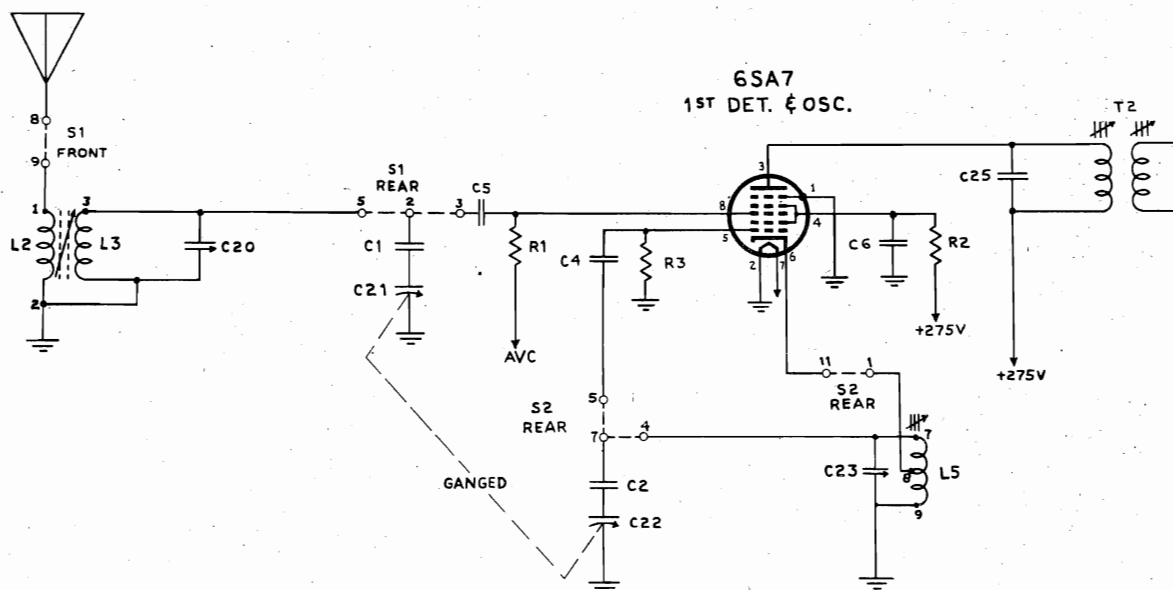
MODELS 67V1, 67AV1

RCA MFG. CO.



BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE.  
BROADCAST BAND  
540 - 1600 KC.

NOTE:  
1<sup>ST</sup> POSITION (PHONO)  
NOT SHOWN.

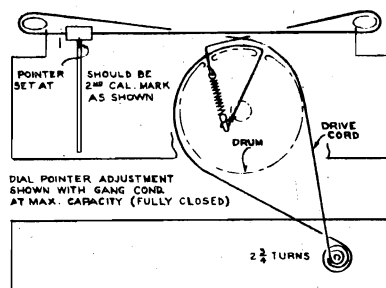


BAND-SWITCH SHOWN  
AT 3<sup>RD</sup> POSITION CLOCKWISE.  
SHORT WAVE BAND  
9.2 - 16 MC.



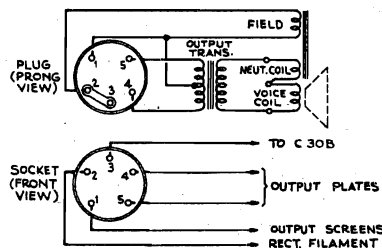
Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SG7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	L8, L9 (2nd I-F Trans.)
2	6SA7 grid in series with .01 mfd.			L6, L7 (1st I-F Trans.)
3	Yellow lead on loop in series with 200 mmfd. (link closed)	1,400 kc.	Broadcast 1400 kc.	C24 (osc.)
4		600 kc.	Broadcast 600 kc.	L4 (osc.) Rock gang
5		Repeat steps 3 and 4.		
6	Antenna terminal in series with .47 mmfd.	15.2 mc.	Short Wave 15.2 mc.	C23 (osc.)* C20 (ant.)
7		9.5 mc.	Short Wave 9.5 mc.	L5 (osc.) L3 (ant.)
8		Repeat steps 6 and 7		
9	Install and connect chassis in cabinet with link closed. Tune in a radiated signal of 1400 kc. on broadcast band and peak C32 on loop.			

Oscillator tracks 455 kc. above signal on both bands.



### DIAL INDICATOR AND DRIVE MECHANISM

**"C" Band Reception.**—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C20 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer C20 for best reception on 31-meter band.



## SPEAKER CONNECTIONS

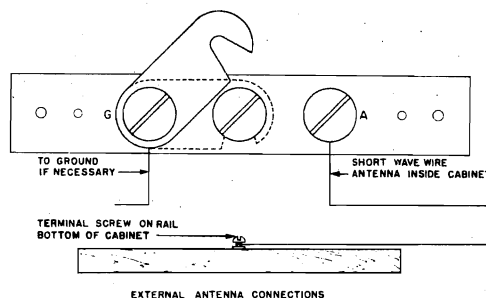
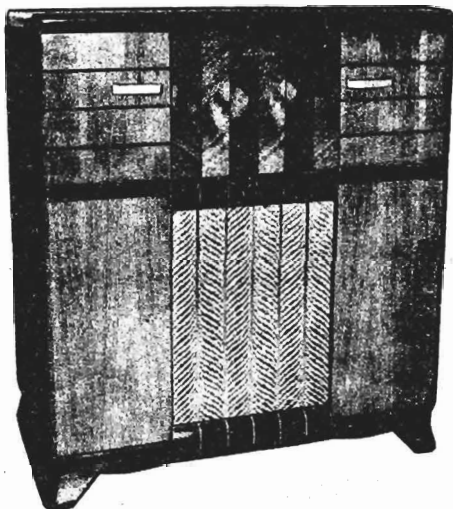


FIG. 3

**WHEN USING EXTERNAL ANTENNA, OPEN LINK AND CONNECT LEAD-IN TO TERMINAL SCREW.**

## RCA MFG. CO.



## Critical Lead Dress:

1. Dress speaker cable leads down next to chassis.
2. Dress output plate capacitors next to chassis.
3. Dress plate lead of output tube away from grid of audio amplifier.
4. Dress all a-c leads away from volume control down next to chassis.
5. Dress R16 away from a-c leads at on-off switch.
6. Dress R2 away from side of chassis.

**Note.**—In order to remove the chassis from the cabinet, remove the knobs and the connecting cables, then unscrew the four slotted hex head screws from the two "L" brackets bolted to the rear of the chassis. The chassis may then be slid out toward the bottom rear of the cabinet. Do not remove the hinge screws or the two large nuts in the rear of the chassis. When replacing the chassis, make sure that the tapered pins on the front of the chassis fit into the holes on the metal runners screwed to the cabinet door.

## Specifications

## Circuit Description

The receiver is a seven tube superheterodyne employing push-pull power output. AVC is applied to the converter and i-f tubes. The broadcast band utilizes a standard loop antenna, and the short wave antenna is a wire tacked in the cabinet.

## Dimensions

	Cabinet	Chassis (overall)
Height (inches)	34	5 $\frac{5}{8}$
Width (inches)	31	11 $\frac{1}{8}$
Depth (inches)	16 $\frac{1}{4}$	8
Tuning Drive Ratio		14:1

## Frequency Ranges

Standard Broadcast "A"	540-1,600 kc
Short Wave "C"	9.2-16 mc

Intermediate Frequency ..... 455 kc

## Tube Complement

(1) RCA-6SA7	1st Det., Oscillator
(2) RCA-6SG7	I-F Amplifier
(3) RCA-6SQ7	2nd Det., A. V. C. and Phase Inverter
(4) RCA-6SQ7	A-F Amplifier
(5) RCA-6K6-GT	Power Output
(6) RCA-6K6-GT	Power Output
(7) RCA-5Y3-GT	Rectifier

## Power Supply Rating (including Phono Motor)

105-125 volts, 60 cycles ..... 95 watts

Pilot Lamps ..... (2) Mazda No. 51, 6-8 volts, 0.2 amp.

Compartment Lamp ..... (1) Mazda No. 55, 6-8 volts, 0.4 amp.

## Loudspeaker

Electrodynamic ..... 92566-1W

Size ..... 12-inch

V. C. impedance at 400 cycles ..... 2.2 ohms

## Power Output Rating

Undistorted ..... 5 watts

Maximum ..... 6.5 watts

## Phonograph

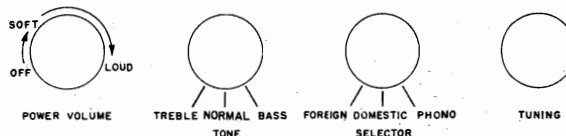
Type ..... Automatic 960260-1

Record Capacity ..... Twelve 10-in., Ten 12-in.

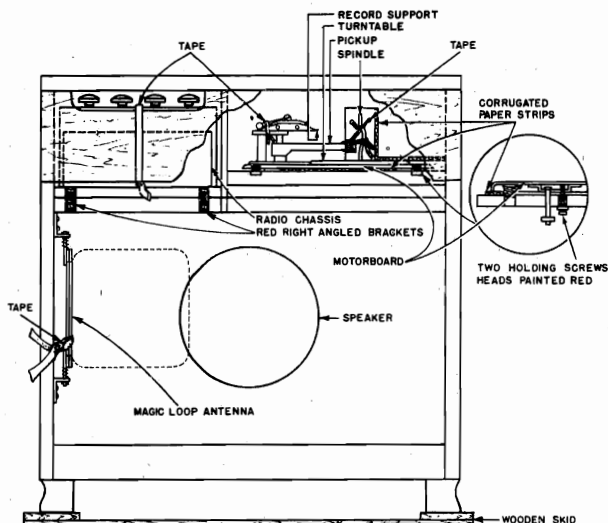
Turntable ..... 78 r.p.m. type

Type Pickup ..... Crystal

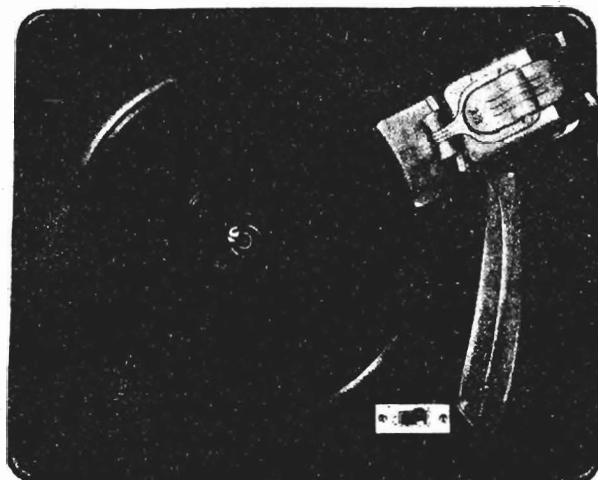
Motor Power consumption (115 v., 60 cycles) ..... 30 watts



## FRONT PANEL CONTROLS

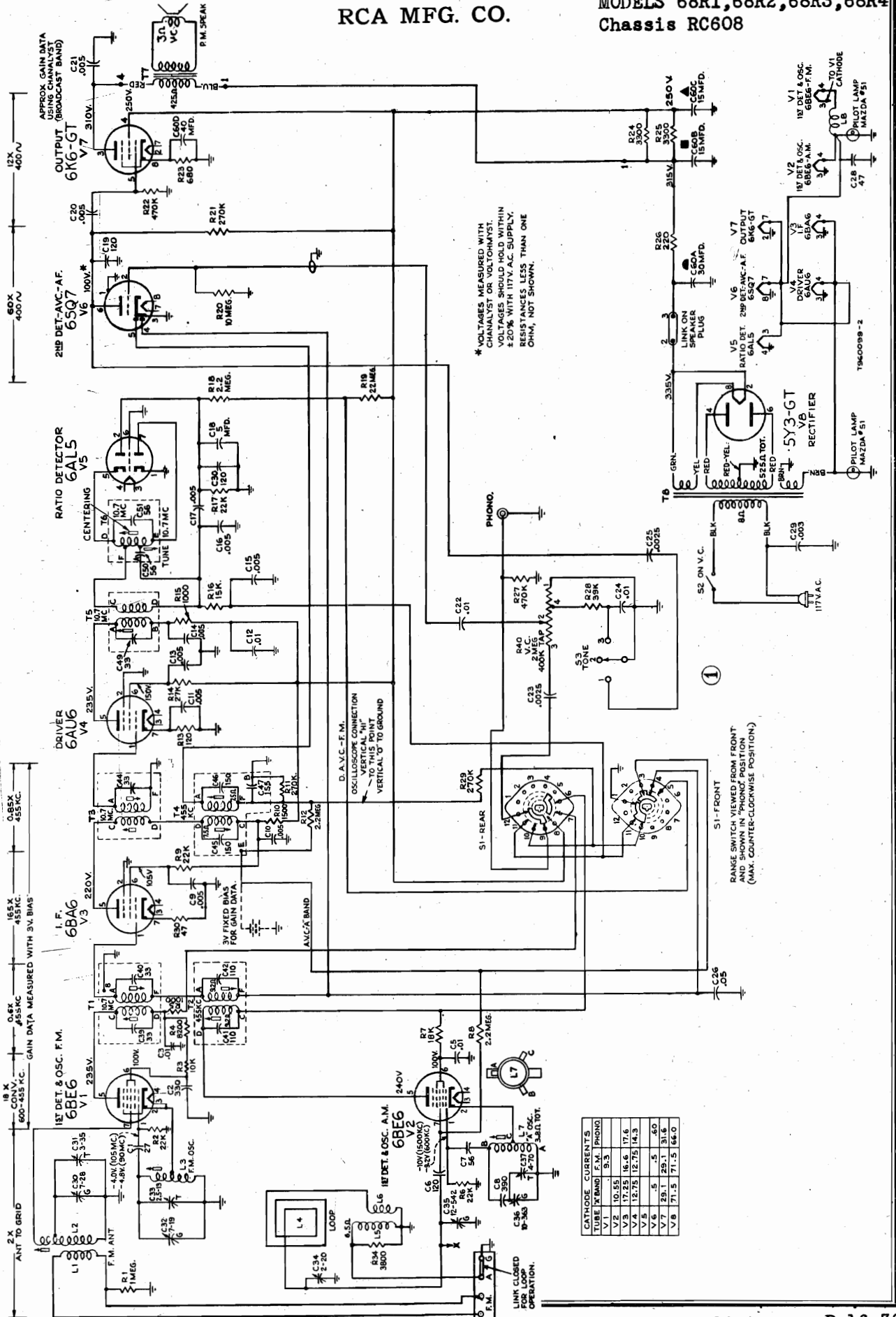


BACK VIEW

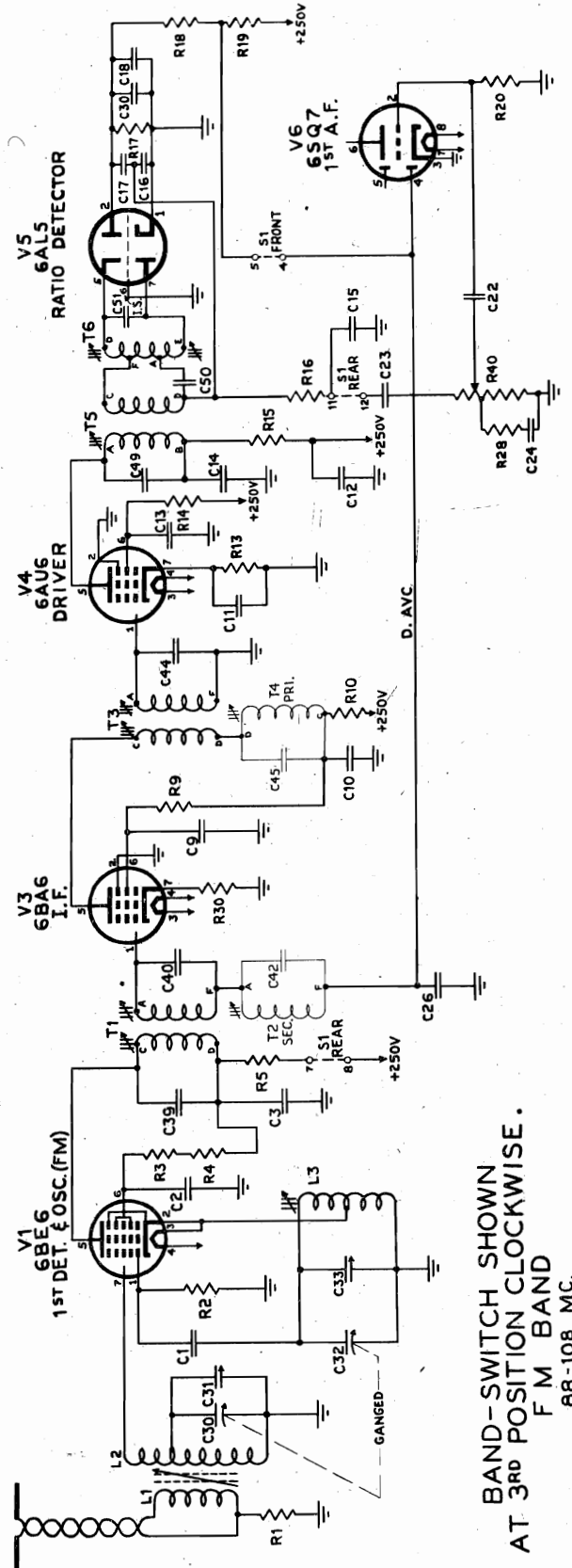
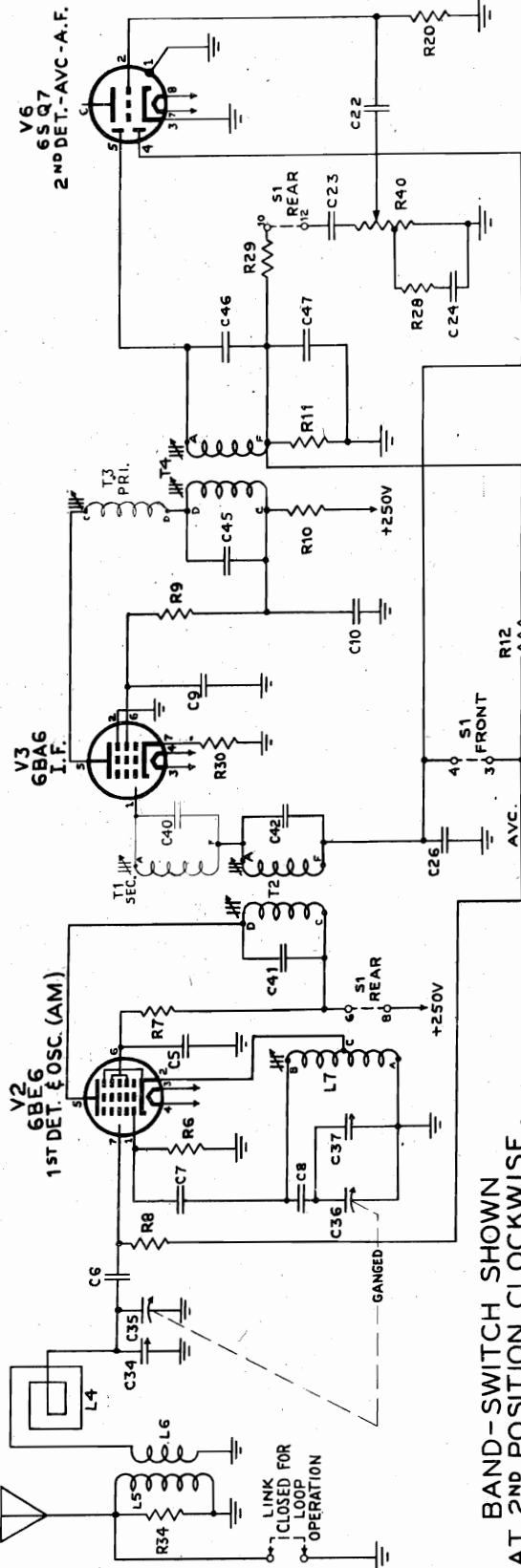




\*This is the first time this Stock No. has appeared in print!

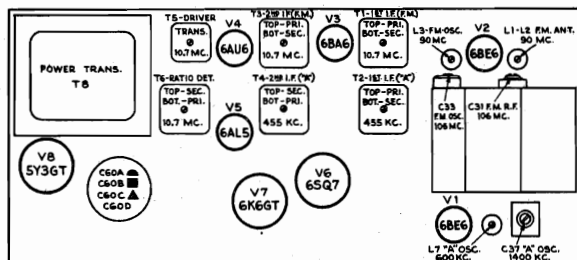


RCA MFG. CO.



MODELS 68R1, 68R2,  
68R3, 68R4

RCA MFG. CO.



Tube and Trimmer Locations (Top View)

## FM I.F. R.F. Alignment\*

Range Switch in FM Position

Steps	Connect the high side of the test-osc. to—	Connect the ground side of the test-osc. to—	Tune test-osc. to—	Radio dial turned to—	Adjust
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. electrolytic condenser, C18, and the common lead of the meter to chassis ground.				
2	To one terminal of the FM antenna in series with .01 mfd.	To the other terminal of the FM antenna.	10.7 mc. 30% mod. at 400 cycles. (AM)	Maximum capacity. (Fully meshed)	†T3, bottom core for maximum d-c across C 18. Load the plate winding of T3 with a 680 ohm resistor.‡
3	Same as 2.				T3, top core for maximum d-c across C 18. Load the grid winding of T3 with the 680 ohm resistor used in Step 2.
4	Same as 2.				T1, bottom core for maximum d-c across C 18. Load the plate winding of T1 with the 680 ohm resistor.
5	Same as 2.				T1, top core for maximum d-c across C 18. Load the grid winding of T1 with the 680 ohm resistor.
6	To one terminal of the FM antenna in series with a 120 ohm resistor.	To the other terminal of the antenna in series with a 120 ohm resistor.	106 mc.	106 mc.§	Condensers C33 and C31 for maximum d-c output across C18.
7	Same	Same	90 mc.	90 mc.	Coils L2 and L3 for maximum d-c output across C18.
8	Repeat steps 6 & 7 until further adjustment no longer improves calibration.				

\*Correct alignment of the 455 kc. I.F. requires that the 10.7 mc. FM I.F. be aligned previously.

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

‡When the windings are loaded it may be necessary to increase the 10.7 mc input since the gain will decrease resulting in a small or no reading across C18. This reading should be maintained at 2-4 volts, by adjusting the input, as each transformer is aligned.

§Completely mesh the gang and see that the pointer goes to mechanical maximum calibration point at low end of band. (Reference mark on dial back plate).

## Alignment Procedure

## Test Oscillator—

For all alignment operations, unless specified, keep the output as low as possible to avoid A.V.C. action. Ground lead of test-osc. to chassis ground, unless specified.

## Output Meter—

To correctly observe the point of minimum a-f output, it is necessary to connect an output meter across the voice coil, and turn the receiver volume control to maximum.

## "A" Band Alignment\*

Range Switch in BC Position

Steps	Connect the high side of the test osc. to—	Tune test osc. to—	Turn the radio dial to—	Adjust for max. peak output.
1	AM converter grid, pin 1, 6BE6 in series with .01 mfd.	455 kc.	"A" Band Quiet point at high freq. end.	†T4—Top core T4—Bottom core
2				T2—Bottom core T2—Top core
3	Antenna lead in series with 200 mmf.	1400 kc.	"A" Band 1400 kc calibration pt.	C37—Osc. C34—Ant. (Loop)
4		600 kc.	"A" Band 600 kc calibration pt.	L7—Osc. Rock in.
5	Repeat steps 3 and 4 until aligned			
6	When chassis is installed, readjust C34 on the loop for max. output at 1400 kc.			

\*Correct alignment of the 455 kc. I.F. requires that the 10.7 mc. FM I.F. be aligned previously.

†Align T4 and T2 by means of alternate loading. Use a 47,000 ohm resistor instead of a 680 ohm resistor. Alternate loading is explained in "FM I.F.-R.F. Alignment."

## FM Ratio Detector Alignment

Range Switch in FM Position

Steps	Connect the high side of the test osc. to—	Tune test-osc. to—	Turn volume control to—	Adjust
1	Connect a 680 ohm resistor between pins 5 & 7 of the ratio detector tube 6AL5. Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. electrolytic condenser, C18. The common lead of the meter to ground.			
2	Driver grid, pin 1, of the 6AU6 in series with .01 mfd.	10.7 mc. 30% mod. 400 cycles (AM) Approx. .25 Volt output	Maximum Volume	*Driver transformer, T5 for maximum d-c across C18.
3	Remove the meter leads and disconnect the 680 ohm resistor from the 6AL5. Connect two 68,000 ohms ( $\pm 1\%$ ) resistors in series, across the 22,000 ohm ratio detector load resistor, R17. Connect the common lead of the VoltOhmyst to the center point of the 68,000 ohm resistors, and the d-c probe to terminal "A" of the ratio detector transformer, T6. Set the meter to the 0-30 VDC scale.			
4	Same as in Step 2.	Same as in Step 2. Approx. .25 Volt output.	Maximum volume.	†T6 bottom core for zero d-c balance. T6 top core for min. audio output.‡
5	Reconnect VoltOhmyst as in Step 1, omitting 680 ohm resistor.			
6	Repeat Step 2.			
7	Remove ALL connections.			

\*Approximately 14.5 volts.

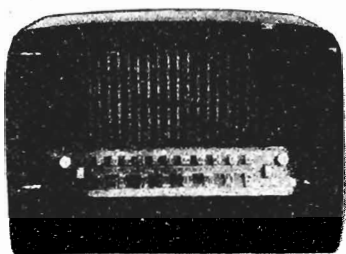
†Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

‡The zero d-c balance and the minimum a-f output should occur at the same point. If such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the VoltOhmyst, and the output meter, hooked across the voice coil, for the point at which both zero d-c and minimum a-f output occur.

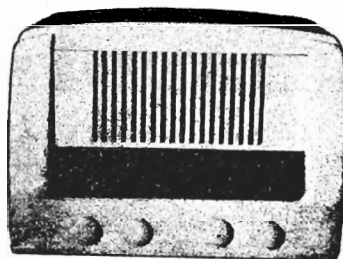
Note:—Two or more points may be found which will satisfy the condition required in Step 4. T6 top core should be correctly adjusted when approximately  $\frac{1}{4}$  inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum a-f and zero d-c is reached.

MODELS 68R1, 68R2,  
68R3, 68R4

RCA MFG. CO.



68R1



68R2



68R3



68R4

**Circuit Description**

These receivers are eight tube, table model, superhetrodyne radios, incorporating two separate converters, one for the FM band and the other for the broadcast band. The range switch has a position in which these models can be operated as a phonograph sound channel.

**Ratio Detector—**

These sets utilize a FM detector known as the "Ratio Detector." This type of circuit eliminates the necessity for a limiting stage preceding the detector, and has an inherent insensitivity to amplitude modulated signals. It is desirable, that before attempting to service these receivers, that this type of circuit be completely understood. Special care should be taken in alignment, and all precautions should be carefully observed.

**Note:**—Two antennas, a loop for broadcast reception and a folded dipole for FM, are contained in the cabinet. Because of the directional characteristic of these antennas, it may be necessary, when interference is encountered, to rotate the cabinet until a point of minimum interference is found. In some locations, a phenomenon known as "Multi-Path Reception" exists which produces distortion on FM. This is not a fault of the receiver. If this condition is suspected, remove the set to another location, and check it there. An external FM antenna, such as the RCA Dipole and Reflector, Stock #225, will eliminate, or appreciably reduce this effect.

**Standard Broadcasts—**

To install an external antenna for Standard Broadcasts, the link on the terminal board on the chassis in the back of the cabinet must be opened. Then connect the antenna, which should be a wire 40 to 60 feet long, to the terminal marked "A". A connection from "G" to ground should not be necessary but may be advantageous.

**Electrical and Mechanical Specifications****Frequency Range**

Broadcast ("A" Band)..... 540-1600 kc.  
Frequency Modulation (FM Band)..... 88-108 mc.

**Intermediate Frequency**

Broadcast..... 455 kc.  
Frequency Modulation..... 10.7 mc.

**Tube Complement**

(1) RCA 6BE6..... 1st Det. & Osc. FM  
(2) RCA 6BE6..... 1st Det. & Osc. AM  
(3) RCA 6BA6..... I-F Amplifier  
(4) RCA 6AU6..... Driver  
(5) RCA 6AL5..... Ratio Detector  
(6) RCA 6SQ7..... 2nd Det., A.V.C., and A-F Amplifier  
(7) RCA 6K6 GT..... Power Output  
(8) RCA 5Y3 GT..... Rectifier

**Power Supply Rating**

105-125 volts, 60 cycles..... 64 watts

**Pilot Lamps**..... (2) Mazda No. 51, 6-8 volts, 0.2 amp.

**Loudspeaker 940923-7**

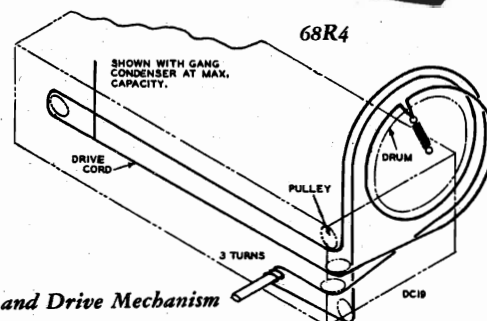
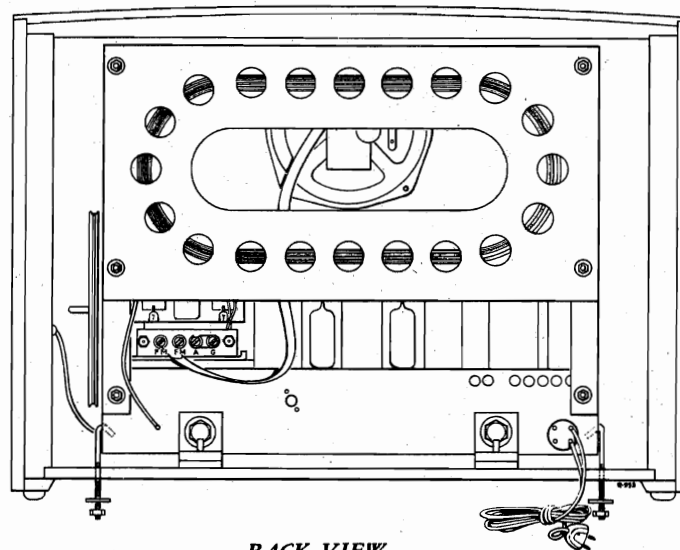
Size..... 5" x 7" elliptical PM  
V.C. Impedance..... 3.4 ohms at 400 cycles

**Power Output**

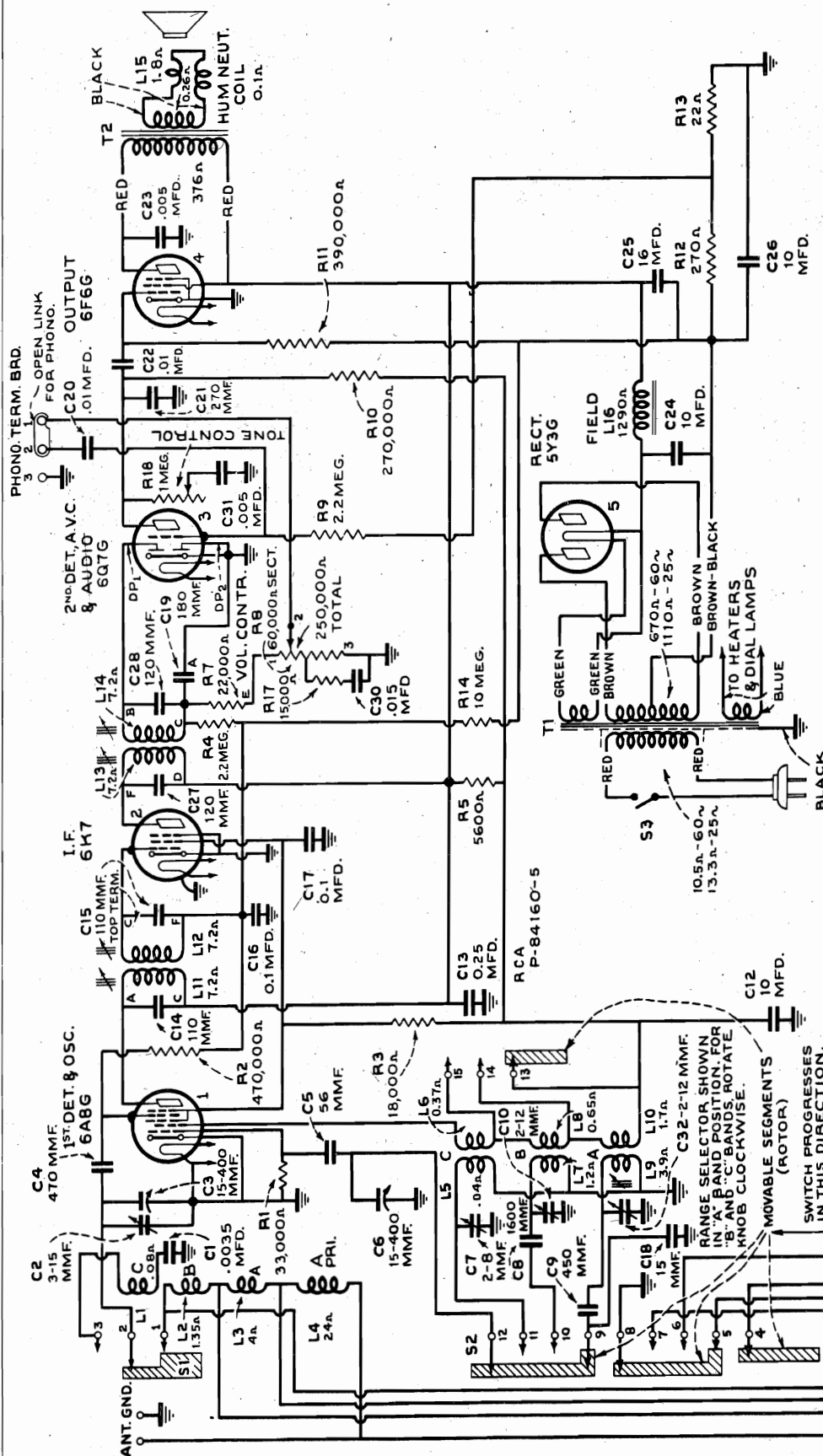
Undistorted..... 2.0 watts  
Maximum..... 4.0 watts

**Critical Lead Dress**

1. Dress capacitor C-1 near chassis base.
2. Dress lead from pin No. 5, No. 1 6BE6 to terminal C<sub>1</sub> of transformer T1, as near the bottom of the FM shelf as possible.
3. Dress capacitor C-23 next to chassis.
4. The lead from capacitor C-23 to the high side of the volume control must be dressed next to chassis along front apron.
5. Dress resistor R-20 near chassis base.

*Dial-Indicator and Drive Mechanism***BACK VIEW**

6. Dress all a-c leads away from volume control.
7. Solder FM antenna coil primary leads to terminal board with as short a lead length as practical.
8. Make all FM leads as short as possible. Dress of all other leads should be similar to original wiring.
9. The lead from pin No. 2, 6BA6, to ground must be dressed as close to the base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length, nor the point at which it is grounded to the chassis should be changed.

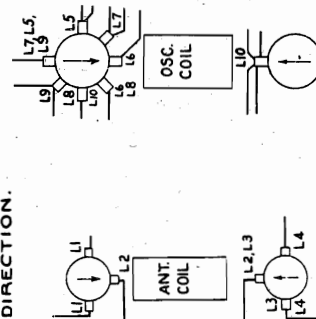


# Radiotron Cathode Currents

Measured with Milliammeter Connected at Tube Socket

## Cathode Terminals

(1) RCA-6A8-G.....	12.7 ma.
(2) RCA-6K7.....	8.2 ma.
(3) RCA-6Q7-G.....	0.35 ma.
(4) RCA-6F6-G.....	38 ma.
(5) RCA-5Y3-G.....	59.5 ma.

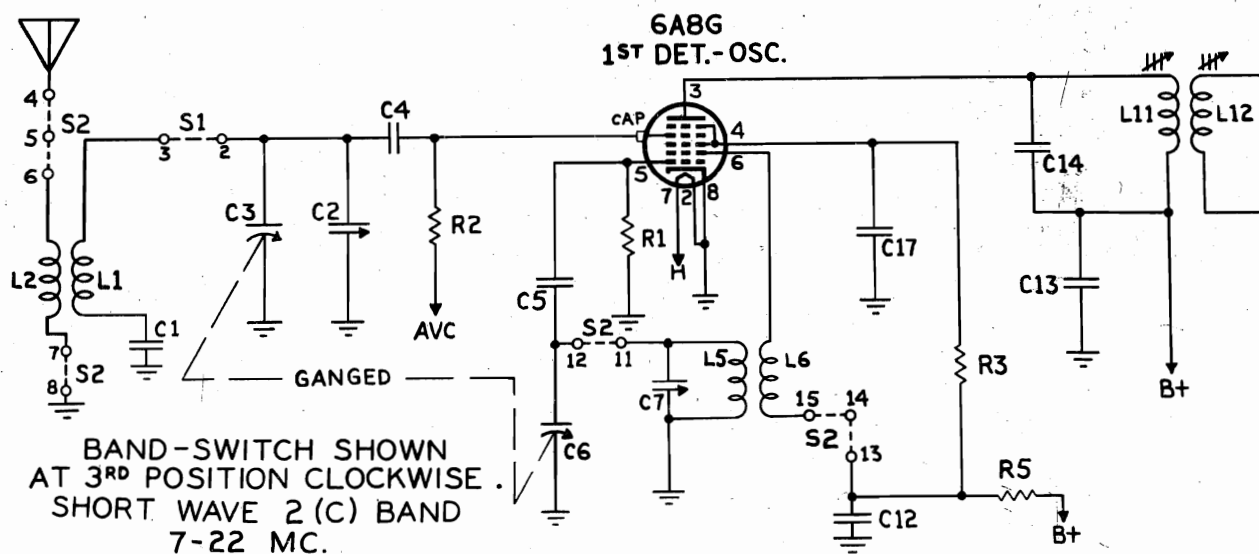
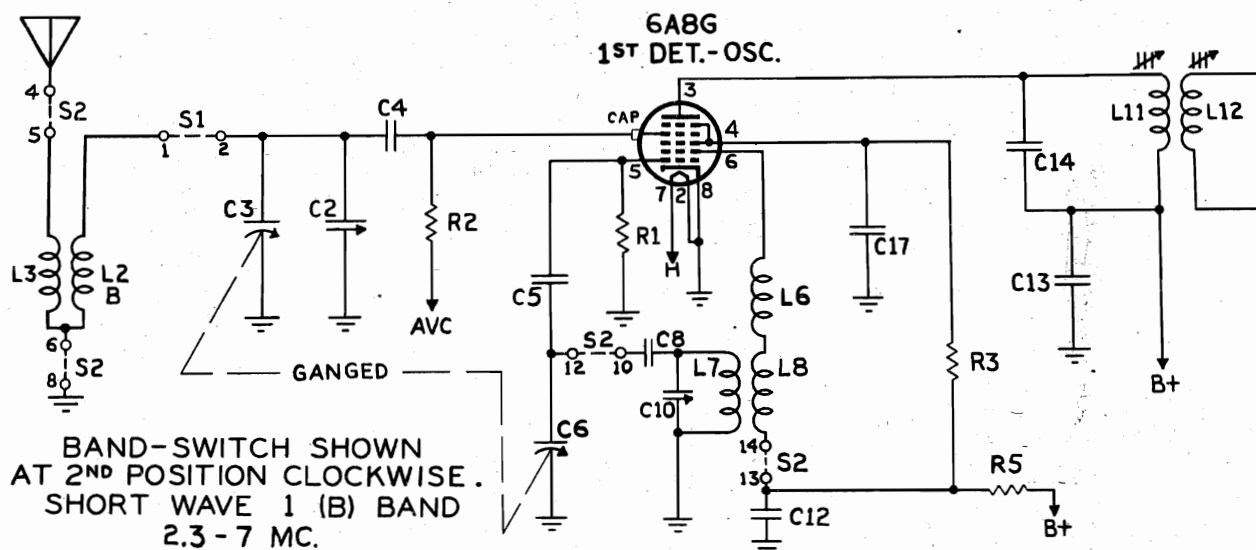
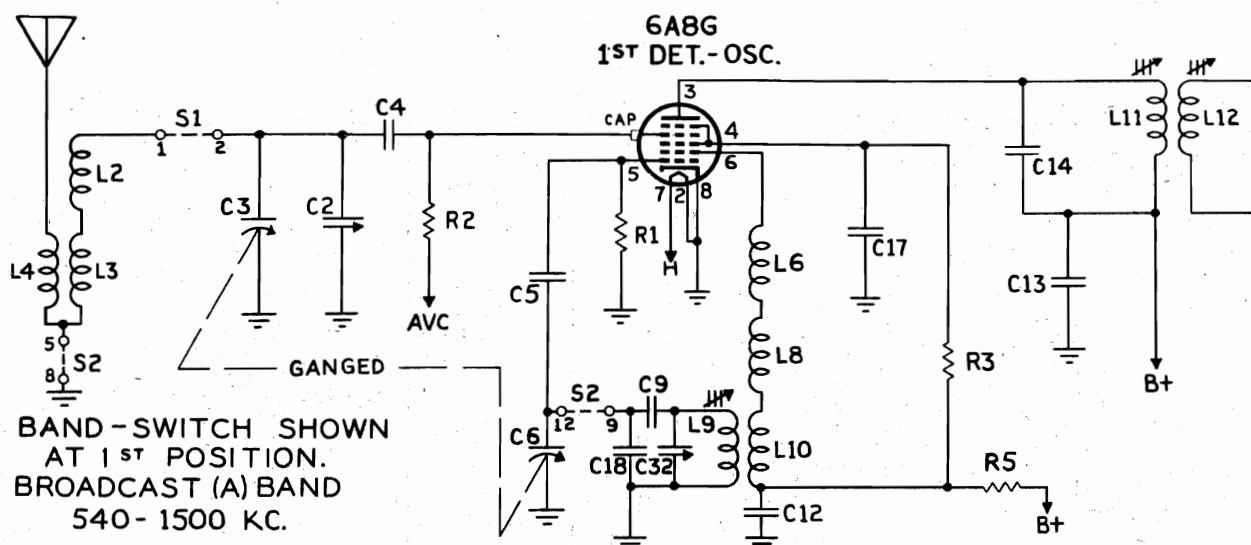


# "clarified schematics"

RCA PAGE 16-45

MODEL 85T8

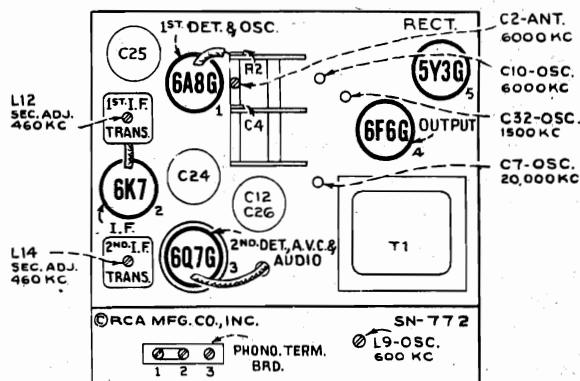
RCA MFG. CO.





# Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position. The pointer is soldered in place on the drive cable.

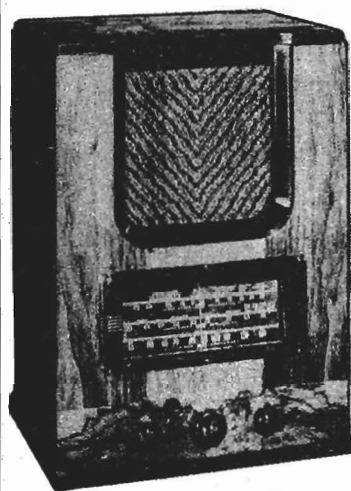


-Radiotron, Coil and Trimmer Locations

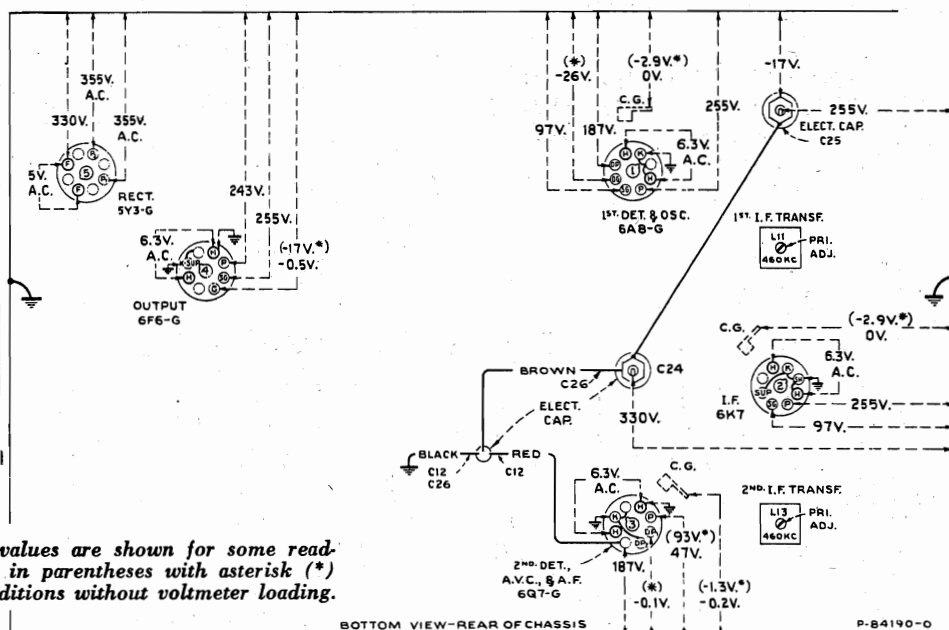
STEP	CONNECT HIGH SIDE OF TEST OSC. TO -	TUNE TEST OSC TO -	TURN RADIO DIAL TO	ADJUST THE FOLLOWING FOR MAX. OUTPUT
1	I-F Grid in series with 0.01 mfd	480 Kc	Quiet point near 600 Kc "A" Band	L14 L13 2nd I-F Trans.
2	1st Det. Grid in series with 0.01 mfd			L12 L11 1st I-F Trans.
3	Antenna in series with 300 ohms	6000 Kc	6000 Kc "B" Band	C10 C2 Osc. Ant.
4		20000 Kc	20000 Kc "C" Band	C7 Osc.
5	Antenna in series with 200 mmfd	1500 Kc	1500 Kc "A" Band	C32 Osc.
6		600 Kc	600 Kc "A" Band	L9 L-F Osc. Rock Gang
7		Repeat Step 5		

▲ Use maximum capacity peak.

Osc. tracks 480 Kc below signal on "C" Band.



Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (\*) indicates operating conditions without voltmeter loading.



-Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")  
No signal being received—Volume control minimum—Tone control optional



## RCA MFG. CO.

## Electrical Specifications

## FREQUENCY RANGES

"Standard Broadcast" (A)..... 540-1,500 kc  
 "Short Wave—1" (B)..... 2,300-7,000 kc  
 "Short Wave—2" (C)..... 7,000-22,000 kc

## INTERMEDIATE FREQUENCY.....

## RADIOTRON COMPLEMENT

(1) RCA-6A8-G..... First Detector—Oscillator  
 (2) RCA-6K7..... Intermediate Amplifier  
 (3) RCA-6Q7-G... Second Detector, A.V.C., and A-F Amp.  
 (4) RCA-6F6-G..... Power Output  
 (5) RCA-5Y3-G..... Full-Wave Rectifier

PILOT LAMPS (2)..... 6.3 volts, 0.25 amp.

## POWER OUTPUT RATING

Undistorted..... 2.5 watts  
 Maximum..... 4.5 watts

## R-F ALIGNMENT FREQUENCIES

"Short Wave—1" (B)..... 6,000 kc (osc., ant.)  
 "Short Wave—2" (C)..... 20,000 kc (osc.)  
 "Standard Broadcast" (A)..... 600 kc (osc.), 1,500 kc (osc.)

## POWER SUPPLY RATINGS

Rating A..... 105-125 volts, 50-60 cycles, 75 watts  
 Rating B..... 105-125 volts, 25-60 cycles, 75 watts  
 Rating C.... 105-125/200-250 volts, 50-60 cycles, 75 watts

## LOUDSPEAKER

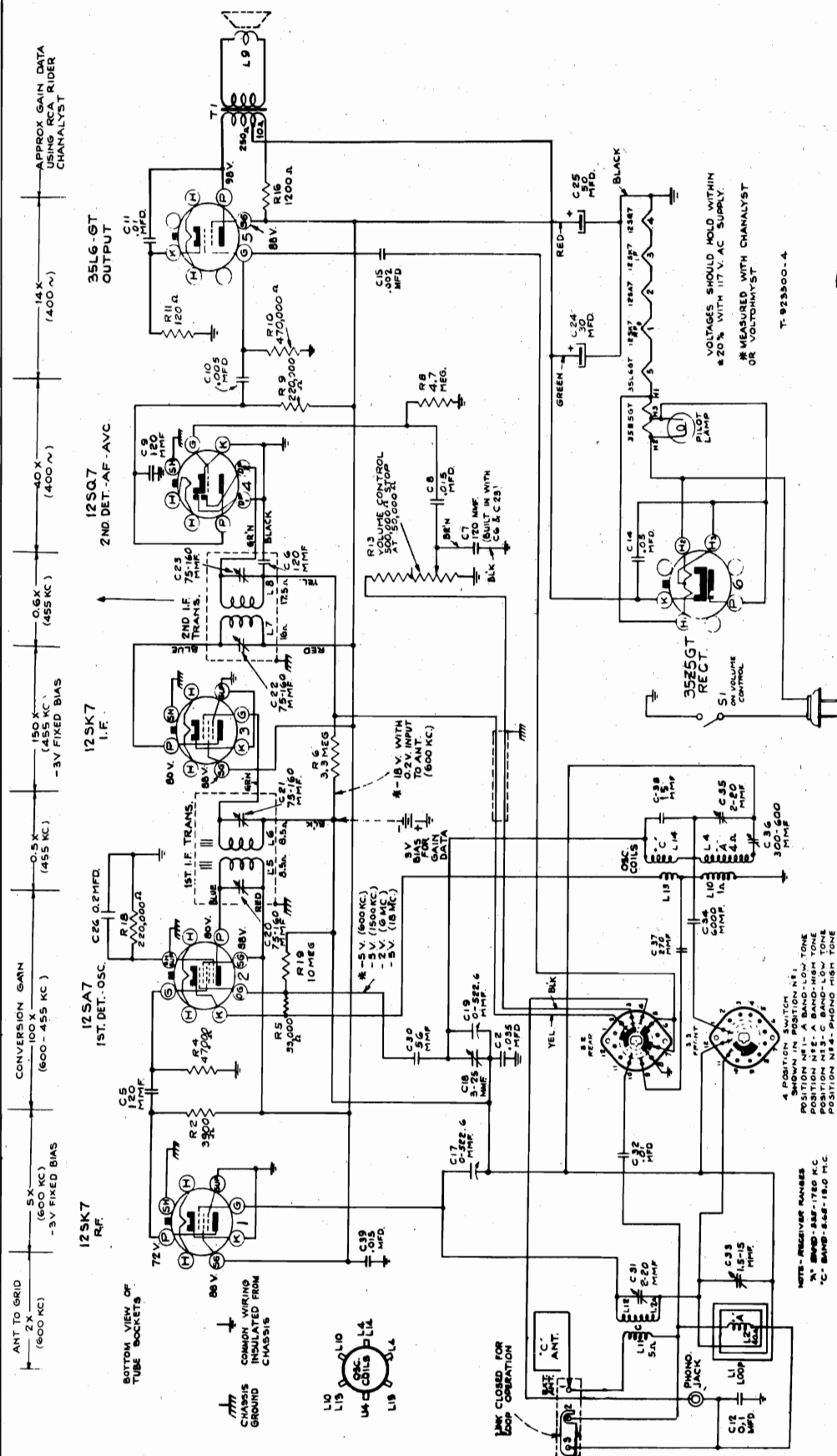
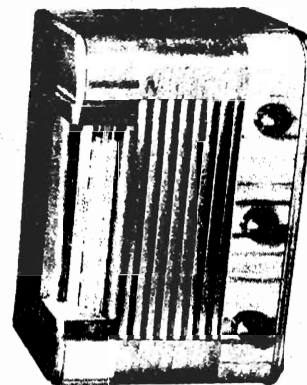
Type..... 8-inch Electrodynamic  
 V.C. Impedance..... 2.2 ohms at 400 cycles

## REPLACEMENT PARTS

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
<b>RECEIVER ASSEMBLIES</b>			
14380	Arm—Hub and arm for operating band indicator shutter—fastens on range switch shaft	30151	Resistor—18,000 ohms, insulated, 1 watt (R3)
14352	Belt—Station selector drive belt	14284	Resistor—22,000 ohms, carbon type, 1/10 watt (R7)
13216	Board—Antenna and ground terminal board	12454	Resistor—33,000 ohms, insulated, 1/2 watt (R1)
12717	Board—Phonograph terminal board	12199	Resistor—270,000 ohms, insulated, 1/2 watt (R10)
12607	Cap—Top shield cap for first i-f transformer	13005	Resistor—390,000 ohms, carbon type, 1/10 watt (R11)
12581	Cap—Top shield cap for second i-f transformer	11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R2)
11350	Cap—Grid contact cap	11626	Resistor—2.2 meg., carbon type, 1/2 watt (R4, R9)
12807	Capacitor—Adjustable trimmer (short) (C7)	13601	Resistor—10 meg., insulated, 1/2 watt (R14)
12714	Capacitor—Adjustable trimmer (medium) (C32)	30582	Retainer—Band indicator disc retainer
12896	Capacitor—15 mmfd. (C18)	14343	Ring—Retaining ring for range switch shaft
12723	Capacitor—56 mmfd. (C5)	14350	Screw—No. 8-32 x 3/16-inch square-head set screw for drum, Stock No. 30584; arm, Stock No. 14380, and pulley, Stock No. 30587
14262	Capacitor—110 mmfd. (C14, C15)	14340	Shaft—Drive pulley and knob shaft—fastens on range-switch shaft
12404	Capacitor—120 mmfd. (C27, C28)	3682	Shield—Radiotron shield
12406	Capacitor—180 mmfd. (C19)	12008	Shield—I-f transformer shield can
12488	Capacitor—270 mmfd. (C21)	5119	Socket—3-contact speaker cable socket
12812	Capacitor—450 mmfd. (C9)	11196	Socket—8-contact Radiotron socket
30433	Capacitor—470 mmfd. (C4)	14114	Socket—Dial lamp socket
30592	Capacitor—1,600 mmfd. (C8)	12007	Spring—Retaining spring for core, Stock No. 12006
30303	Capacitor—.0035 mfd. (C1)	30585	Spring—Tension spring for pointer cord
4838	Capacitor—.005 mfd. (C23, C31)	30588	Spring—Tension spring for idler pulley
14393	Capacitor—.01 mfd. (C20, C22)	30620	Switch—Range switch (S1, S2)
11315	Capacitor—.015 mfd. (C30)	30574	Tone control and power switch (R18, S3)
4839	Capacitor—.01 mfd. (C16, C17)	14376	Transformer—First i-f transformer (L11, L12, C14, C15)
12484	Capacitor—.025 mfd. (C13)	14308	Transformer—Second i-f transformer (L13, L14, C19, C27, C28, R7)
11203	Capacitor—10 mfd. (C24)	30571	Transformer—Power transformer, 105-125 volts, 25-80 cycles (T1)
30577	Capacitor Pack—Comprising two sections, each 10 mfd. (C12, C26)	30617	Transformer—Power transformer, 105-125 and 200-250 volts, 50-60 cycles (T1)
5212	Capacitor—16 mfd. (C25)	30575	Volume Control (R8)
4358	Clamp—Mounting clamp for capacitor pack, Stock No. 30577	<b>REPRODUCER ASSEMBLIES (RL-63F-1)</b>	
30621	Coil—Antenna coil (L1, L2, L3, L4)	14356	Board—3-contact reproducer terminal board
30579	Coil—Oscillator coil (L5, L6, L7, L8, L9, L10)	13866	Cap—Cone center dust cap
30573	Condenser—2-gang variable tuning condenser (C2, C3, C6)	12012	Coil—Field coil (L16)
30586	Cord—Station selector indicator pointer cord	11469	Coil—Hum neutralizing coil (L17)
12800	Core—Adjustable core and stud for oscillator coil	12642	Cone—Reproducer cone and dust cap (L15)
12006	Core—Adjustable core and stud for i-f transformers	5118	Plug—3-contact male plug for reproducer
30622	Dial—Station selector dial scale	14360	Reproducer—Complete
30581	Disc—Band indicator disc with celluloid window	14358	Screw—Screw, washer, and lockwasher to hold core in yoke
30572	Drive—Vernier drive shaft and pinion gear for variable condenser	14365	Transformer—Output transformer (T2)
30584	Drum—Station-selector drive-cord drum with set screws	14367	Washer—Spring washer to hold field coil
30583	Indicator—Station-selector indicator pointer and holder assembly	<b>MISCELLANEOUS ASSEMBLIES</b>	
5226	Lamp—Dial lamp	30593	Escutcheon—Dial escutcheon and crystal
14028	Nut—Jamb nut for adjustable capacitor, Stock Nos. 12807 and 12714	14359	Knob—Station selector knob
30587	Pulley—Drive-belt pulley for condenser shaft	14269	Knob—Tone control, volume control, or range-switch knob
14636	Pulley—Drive-belt idler pulley	14267	Screw—Chassis mounting screw and washer assembly
14525	Resistor—22 ohms, carbon type, 1/2 watt (R13)	14270	Spring—Retaining spring for knob, Stock No. 14269
13819	Resistor—270 ohms, insulated, wire-wound, 1.1 watt (R12)	4982	Spring—Retaining spring for knob, Stock No. 14359
11298	Resistor—5,600 ohms, carbon type, 1 watt (R5)		
12695	Resistor—15,000 ohms, insulated, 1/2 watt (R17)		

MODEL 515

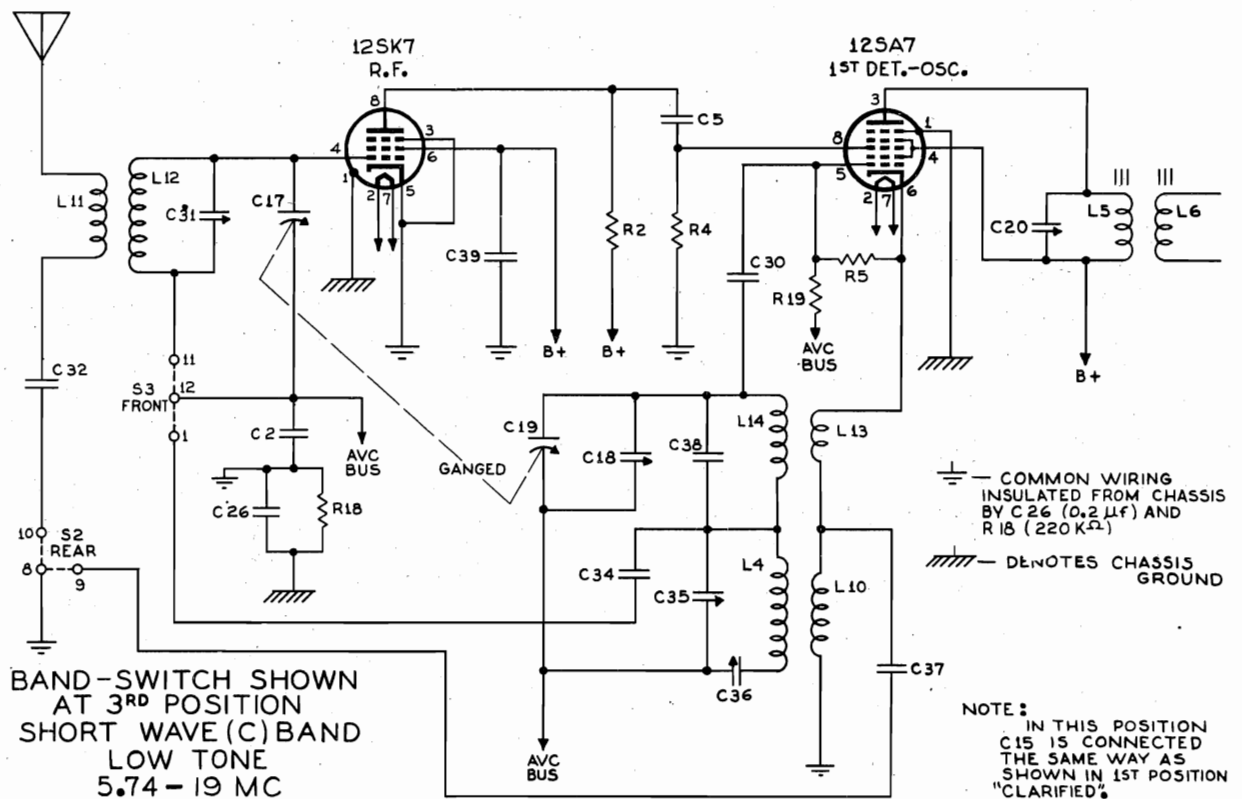
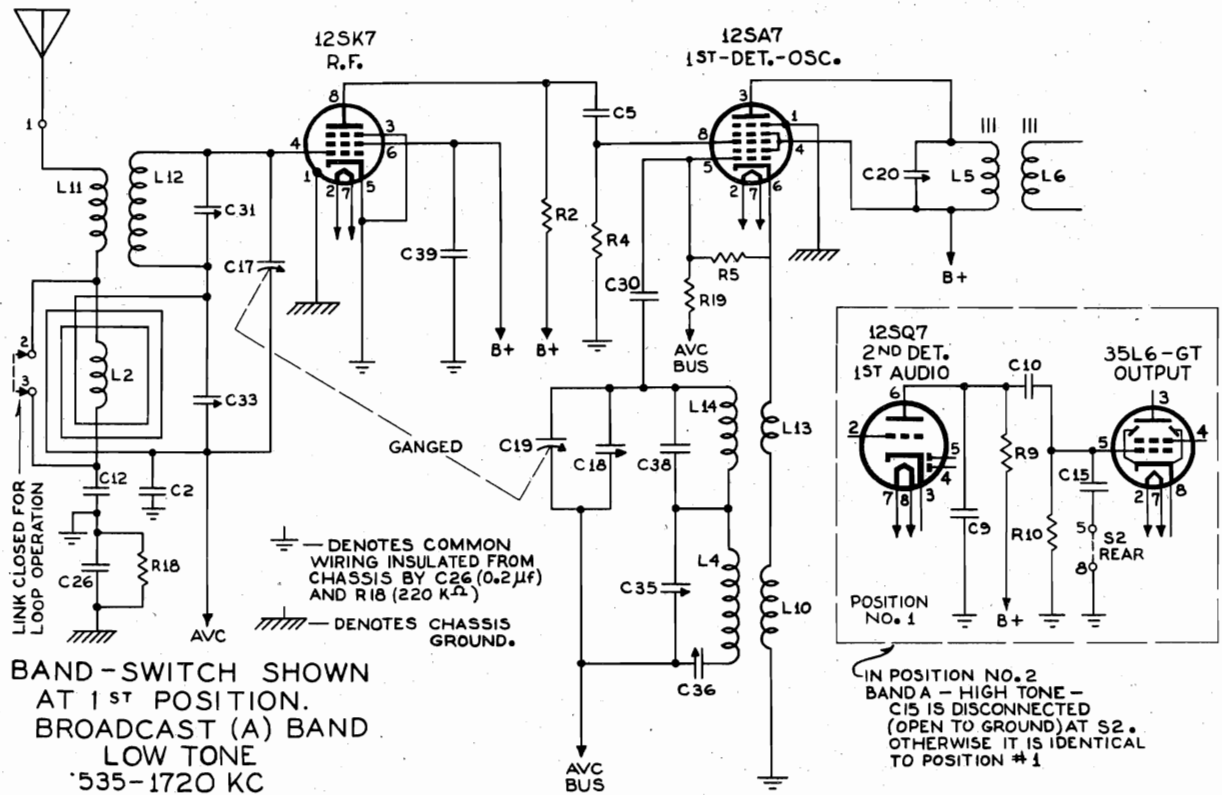
RCA MFG. CO.



Specifications

FREQUENCY RANGE.....	535-1,720 kc
Intermediate Frequency.....	5,74-19 mc
POWER SUPPLY RATINGS	
AC Rating.. 105-125 volts, direct current, or 50-60 cycles, 30 watts	
POWER OUTPUT (125 volt, 60 cycle supply)	
Undistorted..... 0.9 watts	Maximum..... 1.4 watts
LOUDSPEAKER (RL-81-B2).....	5-inch permanent-magnet dynamic
Voice Coil Impedance at 400 cycles.....	4 ohms

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.



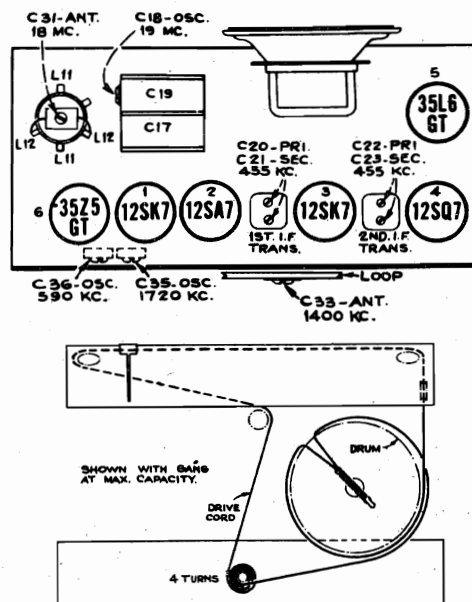
## Alignment Procedure

**Calibration Scale.**—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.

Steps	Connect the high side of test-osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	I-F grid in series with 0.1 mfd.	455 kc	"A" Band Quiet Point 1,800 kc end of dial	C23, C22 2nd I-F Trans.
2	1st Det. grid in series with 0.1 mfd.			C21, C20 1st I-F Trans.
3	Ant. terminal in series with 47 mmfd.	19 mc	"C" Band 19 mc	C18 (osc.)

Steps	Connect the high side of test-osc. to—	Tune test osc. to	Turn radio dial to—	Adjust the following for max. peak output—
4	Radiated Signal, 18 mc		"C" Band Resonance on Signal	C31 (ant.)
5	Radiated Signal, 6.1 mc			L12*
6	Ant. terminal in series with 200 mmfd.	1,720 kc	"A" Band 1,720 kc	C35 (osc.)
7	Radiated signal 1,400 kc (Link closed)		Resonance on Signal	C33 (ant.)
8	Ant. terminal in series with 200 mmfd.	590 kc	"A" Band 590 kc	C36 (osc.)
9	Repeat steps 6, 7 and 8			

\* Adjust by dressing proximity of AVC lead to coil.



### Precautionary Lead Dress.—

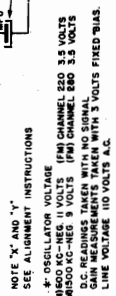
1. Dress all capacitors, leads, etc., coming close to osc. coil rigidly and as far as possible from it.
2. Dress blue lead from loop trimmer against loop and around outside of 35Z5GT tube.
3. Dress leads of 120 mmfd. capacitor from terminal board to grid of 12SA7 as short and direct as possible.
4. Dress blue lead from SW ant. coil through same hole in base through which green lead from stator of rear section of the variable condenser passes.

## Replacement Parts

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

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
<b>CHASSIS ASSEMBLIES (RC-1000C)</b>					
36947	Board—"Antenna-Ground" and phono input board	.25	6134	Resistor—1,200 ohms, 1 watt	.22
35998	Capacitor—Mica trimmer for loop	.25	12955	Resistor—3,900 ohms, 1/2 watt	.20
36880	Capacitor—Mica trimmer—1 section 2-20 mmfd. and 1 section 300-800 mmfd.	.60	12454	Resistor—33,000 ohms, 1/2 watt	.20
11859	Capacitor—Adjustable trimmer—3-30 mmfd.	.25	12412	Resistor—47,000 ohms, 1/2 watt	.20
12896	Capacitor—15 mmfd.	.35	12264	Resistor—220,000 ohms, 1/2 watt	.20
12723	Capacitor—56 mmfd.	.35	30648	Resistor—470,000 ohms, 1/2 watt	.20
12724	Capacitor—120 mmfd.	.35	12928	Resistor—3.3 meg., 1/2 watt	.20
12488	Capacitor—270 mmfd.	.35	30271	Resistor—4.7 meg., 1/2 watt	.20
31405	Capacitor—6,000 mmfd.	.75	30992	Resistor—10 meg., 1/2 watt	.20
34508	Capacitor—.0018 mfd.	.25	36897	Shaft—Tuning knob shaft	.10
33584	Capacitor—.005 mfd.	.25	34449	Socket—Dial lamp socket	.30
4937	Capacitor—.01 mfd.	.25	31251	Socket—Tube socket	.25
11315	Capacitor—.015 mfd.	.20	31418	Spring—Drive cord spring	.05
5198	Capacitor—.035 mfd.	.20	36881	Switch—Range switch	1.25
32787	Capacitor—.05 mfd.	.20	36232	Transformer—First I.F. transformer	1.50
4839	Capacitor—.01 mfd.	.30	36233	Transformer—Second I.F. transformer	1.50
34505	Capacitor—.02 mfd.	.30	36800	Transformer—Output transformer	1.30
36301	Capacitor—Electrolytic comprising 1 section of 30 mfd. 150 volts, and 1 section of 50 mfd. 150 volts	1.25	33726	Washer—"C" washer to hold tuning shaft	.02
35713	Coil—Antenna coil	.75	<b>SPEAKER ASSEMBLIES (RL-81B2)</b>		
35096	Coil—Loop primary coil	.50	35570	Cone—Cone complete with voice coil	1.20
36937	Coil—Oscillator coil	.85	37612	Speaker—6-inch permanent magnet speaker complete with cone and voice coil—less output transformer	3.50
36876	Condenser—Two gang variable tuning condenser	3.00	<b>MISCELLANEOUS ASSEMBLIES</b>		
36242	Control—Volume control and power switch	1.50	36302	Back—Cabinet back—less red lead wire and terminal	.15
32634	Cord—Drive cord (approx. 50 inches long overall)	.10	36873	Clamp—Dial clamp	.10
36237	Drum—Tuning condenser drive cord drum	.25	37929	Dial—Glass dial scale	.10
37068	Indicator—Station selector indicator	.20	37831	Fastener—Push-on fastener	.10
36882	Loop—Antenna loop complete	2.00	37386	Knob—Range switch knob	.25
36877	Loop—Loop winding only—less support, primary coil, and trimmer	.55	36541	Knob—Tuning or volume control knob	.20
37928	Plate—Dial back plate complete	1.00	11765	Lamp—Dial lamp, Mazda No. 51	.15
36230	Pulley—Drive cord pulley	.04	11349	Spring—Retaining rings for knobs	.05
30189	Resistor—120 ohms, 1/2 watt	.20			

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.



FM IF PEAK  
10.7 KC

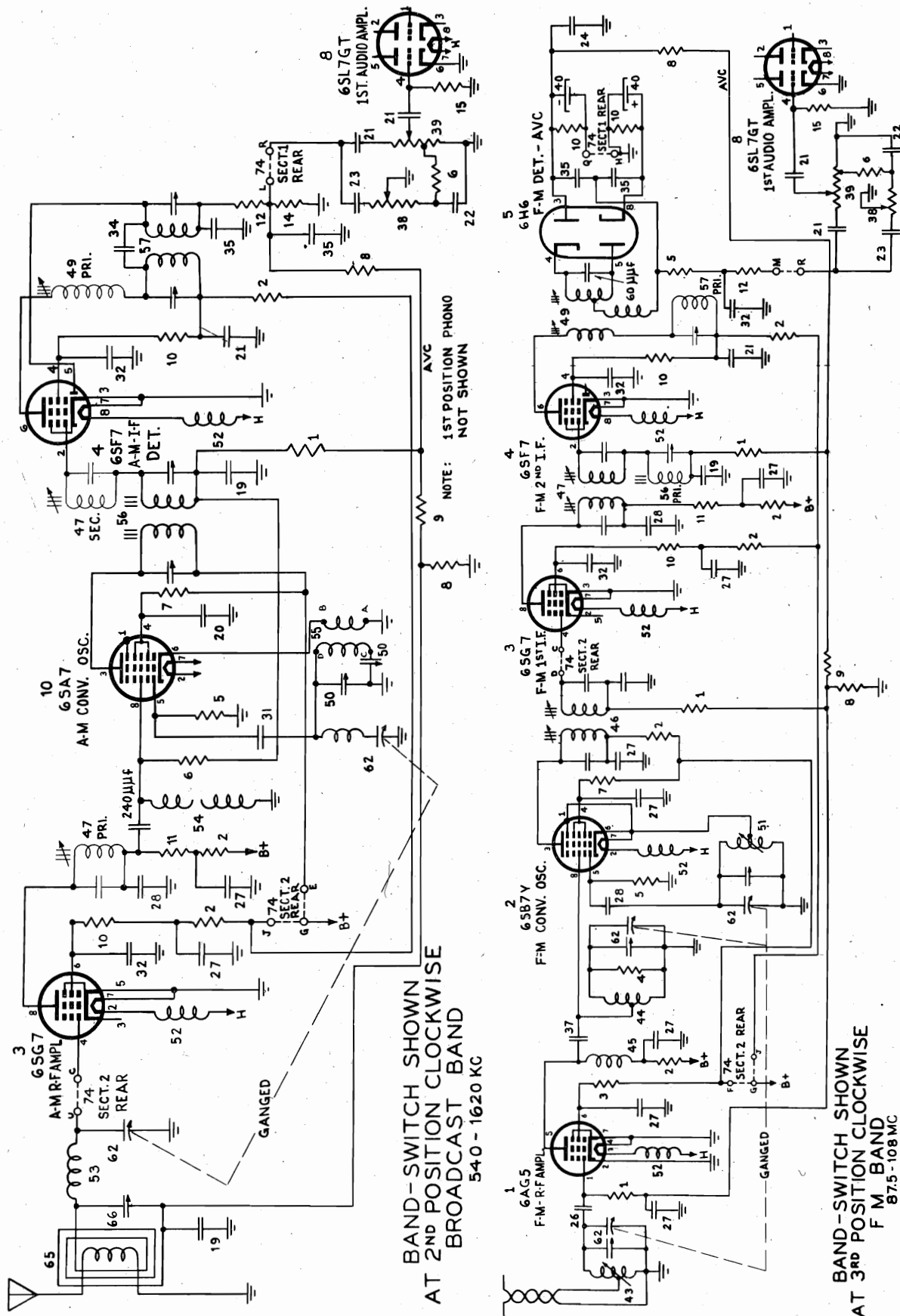
AM IF PEAK  
455 KC

# "clarified schematics"

PAGE 16-2 BRUNSWICK

MODELS SF-6810, T-4000,  
T-4000-1/2, D-6876

RADIO & TELEV. INC.



## BROADCAST AND FM COILS

MODELS SF-6810, T-4000,  
T-4000-1/2, D-6876

RADIO & TELEV. INC.

## OSCILLOSCOPE ALIGNMENT OF FM BAND

A. Equipment required will be an oscilloscope, a frequency modulated signal generator covering the range 87.5 to 108.5 mc on fundamentals, a sweep generator producing a signal of 10.7 mc and sweeping at least 150 kc each side of 10.7 mc, and an output meter.

B. The vertical or "Y" axis terminals of the oscilloscope should be connected between pin 3 of the 6H6 discriminator and ground. The sweep voltage of the sweep generator should be fed to the horizontal or "X" axis terminals of the 6SF7 tube through a condenser of approximately 3300 mmfd.

C. Remove the negative lead of the 4 mfd. electrolytic from pin #3 of 6H6 socket. Remove 6SL7 tube from socket. Turn the set on and turn both the tone control and the volume control all the way to the right. Detune the secondary of the third FM I.F. transformer by turning the bottom slug screw out as far as possible. Adjust the primary, top slug screw, until pattern (a) appears on the oscilloscope. Adjust the secondary, bottom slug screw, until pattern "b" is obtained on the oscilloscope and until both sides of this pattern are symmetrical.

D. Remove the 10.7 mc output of the sweep generator from the grid of the 6SF7 tube and connect to the grid of the 6SG7. Align the second FM I.F. transformer as in paragraph "C".

E. Connect the 10.7 ms output of the sweep generator to the signal grid of the 6SB7Y (pin 8). Detune secondary of the first FM I.F. transformer and tune primary as before for pattern (a). Tune secondary for pattern "c" and make both sides of pattern as symmetrical as possible. This completes alignment of the FM I.F. transformers.

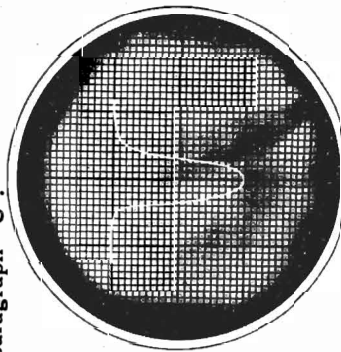
F. Reconnect the negative lead of the 4 mfd. electrolytic to pin #3 of the 6H6 socket and move the oscilloscope leads to pin #6 of the 6H6 socket and ground. With the sweep generator connected to the 6SB7Y signal grid as before, the discriminator pattern (d) should appear on the oscilloscope if the I.F. alignment instructions have been followed carefully. Remove the oscilloscope and sweep generator leads and reinstall 6SL7 tube in socket. Never adjust AM I.F. transformers without rechecking FM I.F. alignment.

G. Connect the 87.5 to 108.5 mc signal generator to the antenna socket of the receiver through a 300 ohm resistor. The generator should be frequency modulated at some frequency in the audible range. Connect output meter across secondary of output transformer. Tune receiver to channel 300 on FM dial. With signal generator set at 107.9 mc adjust oscillator trimmer condenser, third from front, for maximum read-

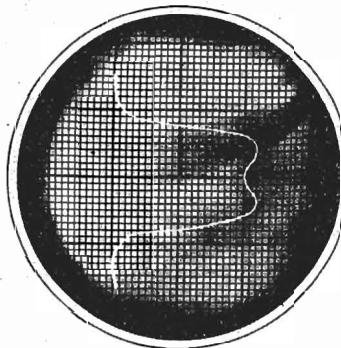
ing on output meter. Set signal generator to 87.9 mc and tune receiver to channel 200 on FM dial. Adjust oscillator coil screw, third from front, (see chassis layout) for maximum reading on output meter. Recheck oscillator setting for channel 300.

Tune signal generator and receiver to 5 mc (channel 285 approx.). Adjust converter signal grid trimmer condenser, second from front, for maximum reading on output meter. Tune signal generator and receiver to 92 mc, (channel 220 approx.) and adjust converter coil screw, (second from front), to maximum reading on output meter. Recheck converter trimmer setting at 105 mc (channel 285 approx.).

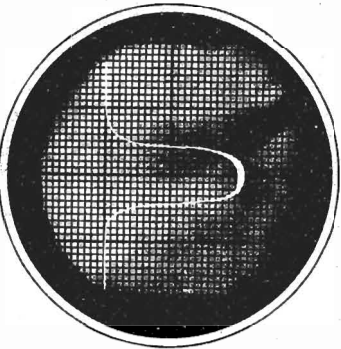
I. Repeat operations of paragraph (G) for antenna trimmer condenser and coil. This completes FM R.F. alignment.



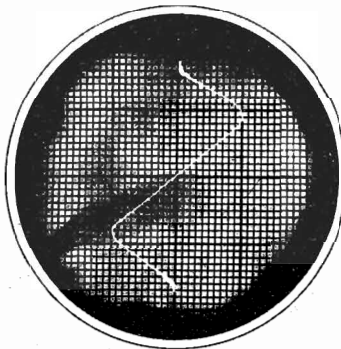
A



B



C



D



MODELS SF-6810, T-4000,  
T-4000-1/2, D-6876

RADIO &amp; TELEV. INC.

## ALIGNMENT INSTRUCTIONS AM BAND

An output meter and a signal generator calibrated at 455 Kc., 600 Kc., 1500 Kc. and 1600 Kc., are required to properly align these receivers on AM band. Keep the output of the signal generator as low as possible to prevent AVC action and false settings. Connect the high side of the generator to the blue wire found at rear of set and low side to the black wire.

STEPS	DUMMY ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED
1					SET VOLUME AND TONE CONTROLS AT MAXIMUM
2		455 Kc.	Minimum	2nd. I.F. Trimmers *	Top of I.F. Transformers
3				1st. I.F. Trimmers *	
4	200 MMF.	1600 Kc.	1600 Kc.	B. C. Osc. Trimmer	See Chassis Layout
5		1500 Kc.	1500 Kc.	B. C. R. F. Trimmer	On Loop
6		600 Kc.	600 Kc. Rock Gang	600 Kc. Padder	See Chassis Layout
7				Recheck 1500 Kc.	

\* Recheck after FM alignment.

## ALTERNATE FM ALIGNMENT PROCEDURE

Necessary Equipment:  
Signal Generator  
Voltmyst

Connect Voltmyst from ground to pin 6 of 6H6 (audio, marked X on Schematic). Connect generator tuned to 10.7 mc. to pin #4 on 6SG7. Turn secondary slug of 3rd FM I.F. (closest to chassis) out as far as it will go. Tune Primary of 3rd I.F. for maximum negative voltage. Next tune Secondary slug for zero voltage. (As Sec. slug is tuned voltage will go up slowly then start decreasing rapidly, tune slug till it reaches zero). Next connect voltmeter between ground and pin #5 (marked Y on Schematic) on 6H6 socket (AVC). Turn Secondary slug of 2nd FM I.F. out as far as it will turn. Tune primary for maximum negative voltage. Then tune secondary for maximum negative voltage. Move generator to pin #8 of 6SB7Y socket. Follow same procedure as on 2nd I.F. for the 1st. I.F. transformer. I.F. is now aligned.

With Voltmyst still connected between ground and pin #3 on 6H6 socket, connect generator between ground and small pin of dipole antenna socket. Use very short leads on generator and a 300 ohm resistor as a dummy antenna. Set generator at 87.5 mc and gang closed. Adjust oscillator slug for maximum voltage. Adjust generator to 108.5 mc and gang to minimum and adjust oscillator trimmer for maximum voltage. Go back and check low frequency end. Next set generator at 92 mc, tune in signal on receiver, approximately 220 on dial. Adjust converter and antenna slug for maximum voltage output. Set generator at 105 mc. Tune in signal on receiver, approximately 280 on dial. Tune converter and antenna trimmer for maximum voltage output. Check adjustment of antenna and converter slugs at 92 mc.

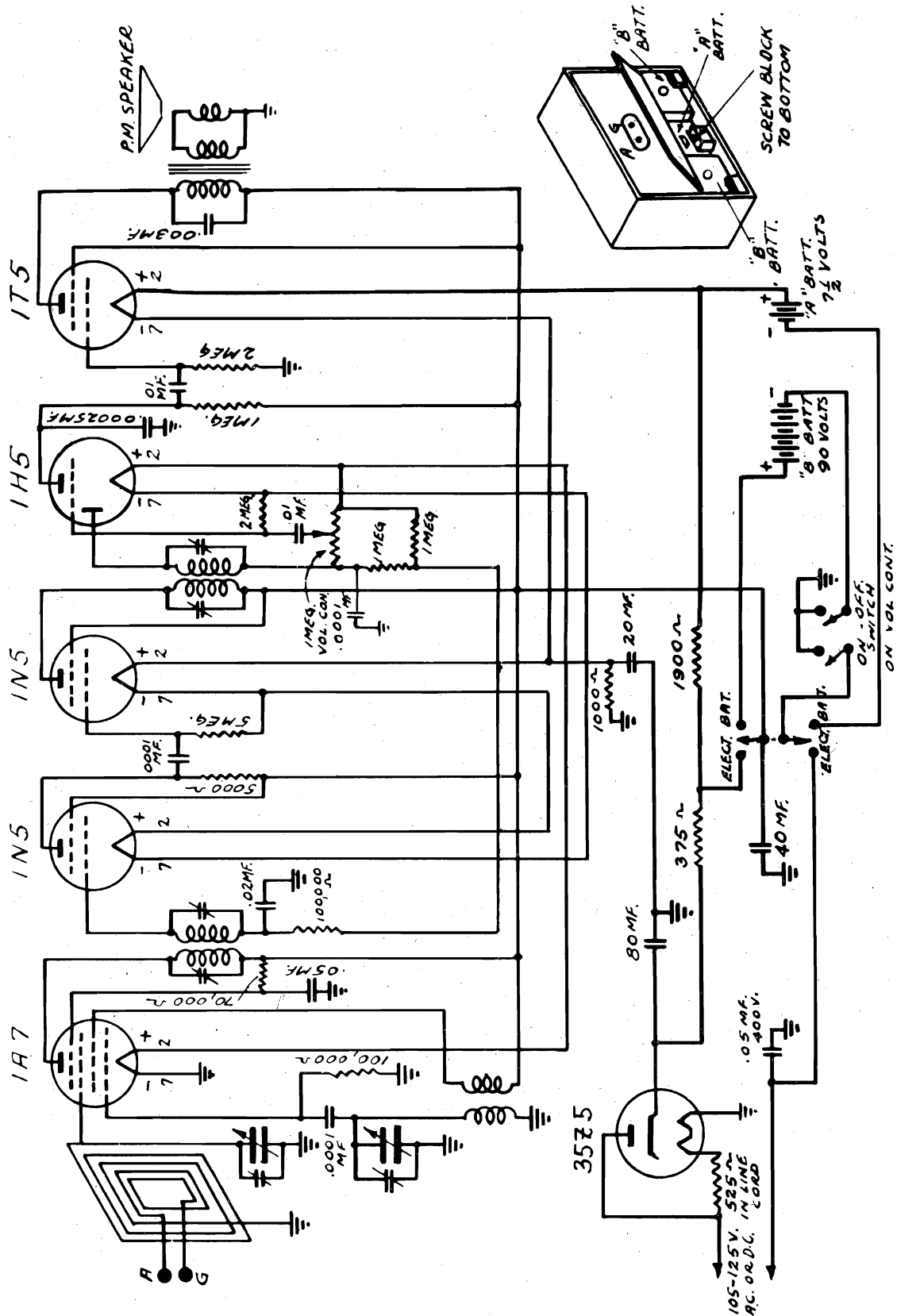
## MODEL SF-6810—PARTS LIST

Ref. No.	Part No.	DESCRIPTION	List Price
1	77214	100M Ohms	\$ .15
2	77262	1000 Ohms	.15
3	77265	15 M Ohms	.15
4	77212	10 M Ohms	.15
5	77216	220 M Ohms	.15
6	77218	10 M Ohms 2 Watt	.25
7	77013	1 Megohm	.15
8	77218	4.7 Megohms	.15
9	77272	33 M Ohms	.15
10	77267	4700 Ohms	.15
11	77211	47 M Ohms	.15
12	77217	470 M Ohms	.15
13	77274	10 Megohms	.15
14	77243	2700 Ohm Molded Resistor 4.7 Watt	.50
15	77189	1000 Ohms, 2 Watt	.25
16	77204	1000 Ohms, 600 Volt	.20
17	25183	.05 Mfd. 600 Volt	.15
18	25183	.01 Mfd. 600 Volt	.20
19	25184	.003 Mfd. 600 Volt	.15
20	25185	.002 Mfd. 600 Volt	.15
21	25215	.1 Mfd. 600 Volt	.20
22	25215	.005 Mfd. Butter Capacitor, 600 Volt	.20
23	25233	1500 MMF Ceramic Capacitor	.25
24	25273	30 MMF Ceramic Capacitor, N-150	.30
25	25229	47 MMF Mica Capacitor	.20
26	25271	4000 MMF Ceramic Capacitor	.65
27	25227	4 MMF Ceramic Capacitor	.50
28	25232	100 MMF Mica Capacitor	.20
29	25232	100 MMF Mica Capacitor, N-750	.80
30	78072	Tone Control, 3 Megohms	1.10
31	78120	Volume Control, 3 Megohms	.80
32	25216	4 Mfd., 50 V. Electrolytic Capacitor	3.10
33	25214	Electrolytic Capacitor 20 Mfd., 20 Mfd., 30 Mfd., 450 volt, 25 Mfd., 25 Volt	1.05
34	38690	FM Converter Coil	1.05
35	38691	FM Converter Coil	1.05
36	58471	1st. FM I.F. Transformer	3.75
37	38683	2nd. FM I.F. Transformer	4.05
38	38684	3rd. FM I.F. Transformer	4.55
39	38685	4th. FM I.F. Transformer	1.05
40	38692	5th. FM I.F. Transformer	.25
41	38661	Heater Choke	.50
42	38645	Antenna Loading Coil	.55
43	38484	Wave Trap Coil	.55
44	38694	BC Oscillator Coil	2.40
45	38694	1st. AM I.F. Transformer	7.90
46	38682	2nd. AM I.F. Transformer	4.55
47	94204	Output Transformer	20.05
48	94195	Speaker	8.95
49	81126	Gang Capacitor	1.15
50	26237	FM Dipole and Plug	6.65
51	11325	FM Dipole Socket	.35
52	38835	Loop Antenna	.10
53	26031	Loop Antenna Trimmer	2.65
54	80256	Loop Antenna Socket	.10
55	80252	Antenna 3-Prong Plug	.10
56	90214	Band Switch Socket	.15
57	42140	Diode Input Socket	.15
58	80385	Diode Lamp 20 Ma.	1.10
59	80385	Speaker Socket	.75
60	27118	Line Cord	2.95
61	11274	Phono AC Socket	1.35
62	31385	Glass Dial	.25
63	14089	Aluminum Background	.25
64	17019	Drive Drum	.25
65	05089	Drive Cord (42 inches) and springs	.25
66	67444	Knob	.25
67	80325	Mica Filled Octal Socket for 6SB7Y	.15
68	80325	Molded Octal Socket for Rectifier	.10
69	80339	2-Prong FM A Plug	.10
70	80362	Miniature Tube Socket	1.85
71	80319	Pickup Cable	22.147
72	22147	Phono Needle	1.20



RADIO WIRE TELEVISION

MODEL BP-12



SCHEMATIC CIRCUIT DIAGRAM  
MODEL BP-12

I.F. = 455 K.C.

This receiver will operate either from batteries contained within the case or from the regular Electric mains (AC or DC) on voltages from 105 to 125. A self-contained antenna is built in and will give good performance from stations not too remote. Where signal strength is poor or where reception from great distances is required, Antenna (A) and Ground (G) terminals are provided. These are located on the rear of the case. An antenna from 50 to 100 feet long may be used.

**BATTERIES** - The following batteries are required where no electric power is available:

7½ Volt "A" - USALITE #687, BURGESS #G5, GENERAL #5-H-5 - or equivalent  
(4-3/8" X 3½" X 2-3/4") - 1 Required

45 Volt "B" - USALITE #624, BURGESS #B30, GENERAL #V-30-B, EVEREADY #762  
ADVANCE #267 - or equivalent  
(5-11/32" X 2-17/32" X 4-3/16") - 2 Required

**TO INSTALL BATTERIES** - Access to the battery compartment may be had by opening the bottom flap on the back of the cabinet. Insert the "B" batteries on each side, slide the "A" into place, then screw the wood block to the bottom to hold batteries. (See diagram).

With the ELEC-BATT switch on the front panel in the BATT position, the receiver is now ready for operation as a portable unit. When prolonged operation in the "ELECTRIC" position is contemplated (as during the winter season), it is advisable to remove the batteries and store them in a cool, dry place. DO NOT leave exhausted batteries in the carrying case as chemical action may expand the batteries and make it difficult to remove them.

**WAVE BAND:** The range covered is as follows:  
175 - 555 METERS (1720 - 540 KC)

#### OPERATION

##### BATTERY

After the batteries have been installed in accordance with the instructions given above, set the slide switch on the front of the cabinet to the right.

##### ELECTRIC

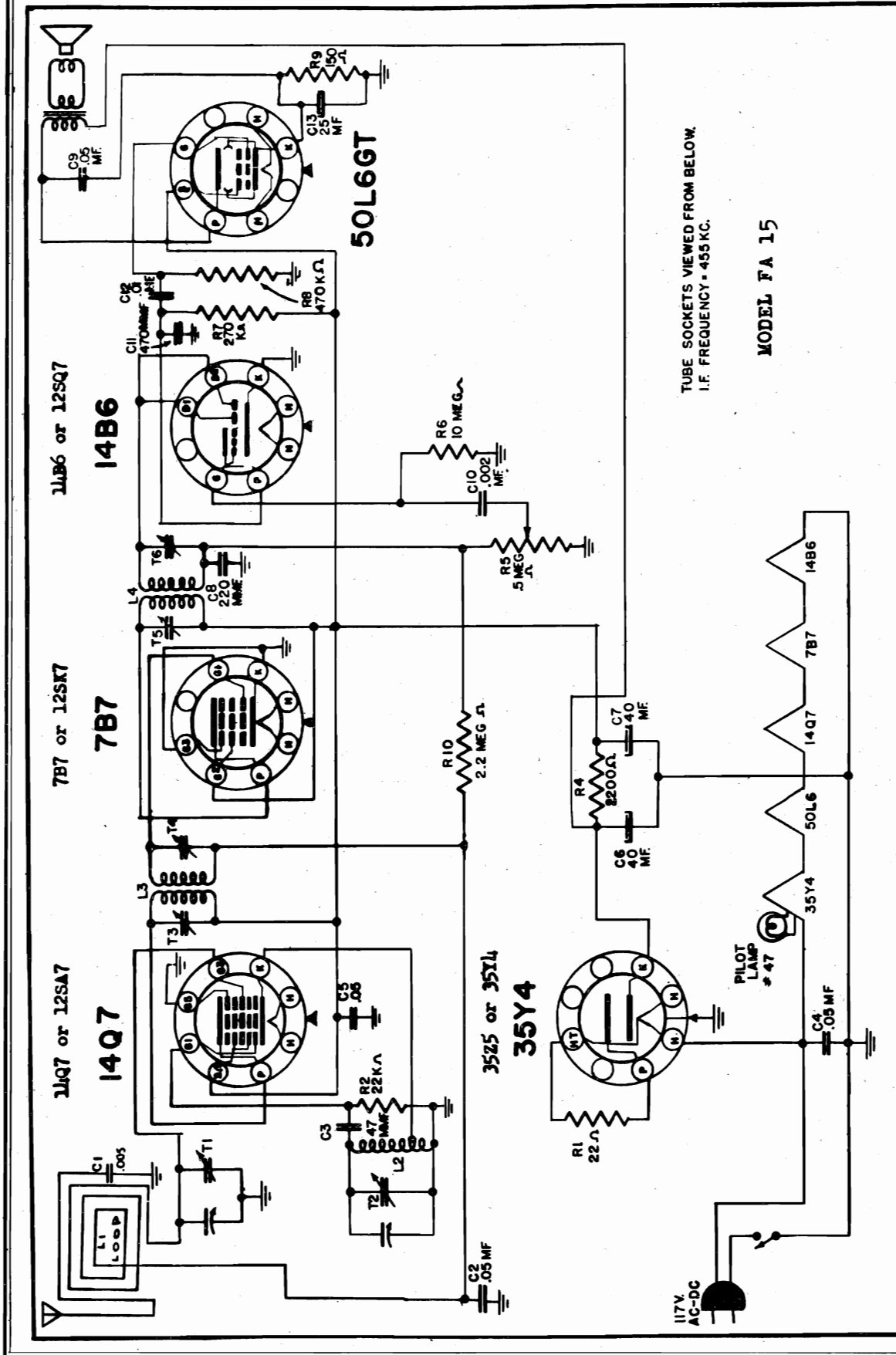
Open the small door on the rear of the cabinet providing access to the power cord which can be plugged into any outlet (105 to 125 Volts AC or DC.) Slide the switch on the front of the cabinet to the left.

The receiver may now be operated by turning the LEFT hand knob to the right, (Clockwise). The Volume is turned up and the station tuned in. (Right hand knob). By rotating the cabinet slowly (when the self-contained loop is used) maximum signal with minimum noise may be obtained. The direction effect is lost when a large antenna is used, but in this case, ample signal is obtained to be heard above the noise level. The volume is adjusted for the desired level.

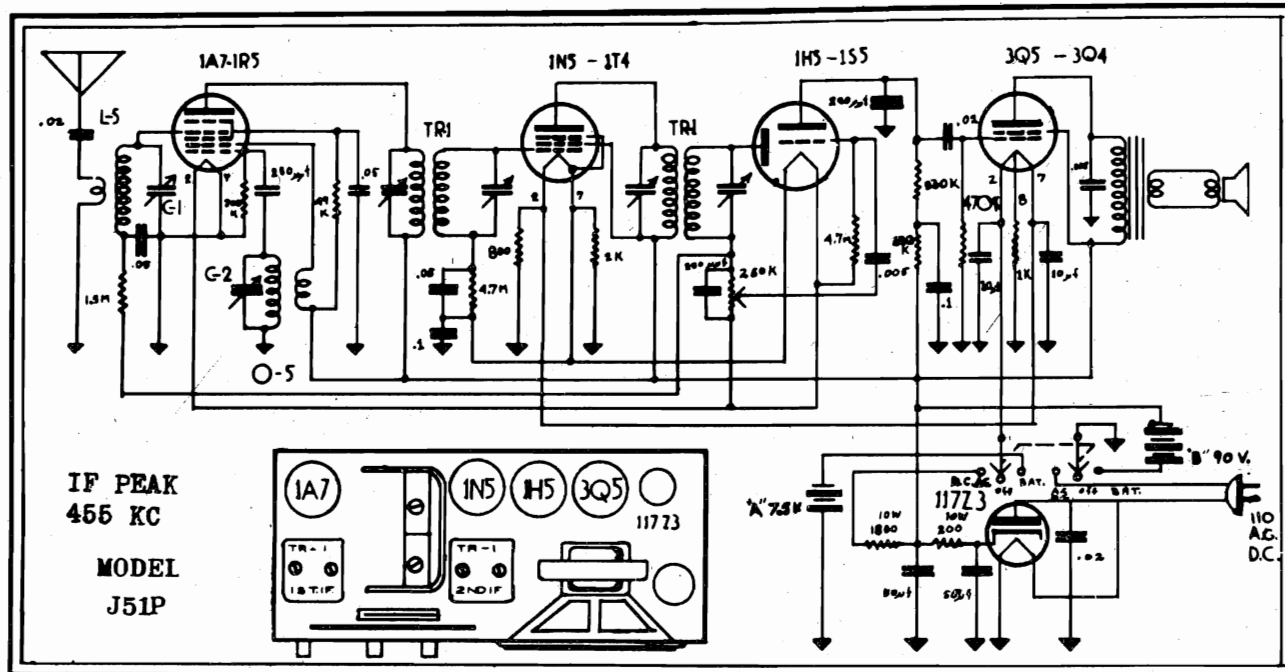
**NOTE:-** When this set is to be operated from the 115-125 Volt DC line and no signal can be tuned in with the power switch in the "ELECTRIC" position, reverse the plug in the light socket one-half turn. When operating on AC, a slight hum may be heard on some stations. Reversing the line plug one-half turn in the socket will alleviate this condition.

# RADIO WIRE TELEVISION

MODEL FA-15



C-1	Paper, .005 mfd., 400 volts	R-2	22,000 ohms, 2 W.	R-9	150 ohms, 1 W.
C-2	Paper, .05 mfd., 400 volts	R-4	2200 ohms, 1/2 W.	R-10	2.2 Megohms, 1/4 W.
C-3	Mica, .47 mfd., 500 volts	R-5	Volume Control & Switch	L-1	Loop Aerial
C-4	Paper, .05 mfd., 400 volts	R-6	10 Megohms, 1/4 W.	L-2	Oscillator Coil
C-5	Paper, .05 mfd., 400 volts	R-7	270,000 ohms, 1/2 W.	L-3	First I-F Transformer
C-6, C-7, C-13	Electrolytic, 40x40, 150 V, 25 mfd., 25V.	R-8	470,000 ohms, 1/2 W.	L-4	Second I-F Transformer
C-8	Mica, 220 mmfd., 500 volts				
C-9	Paper, .05 mfd., 400 volts				
C-10	Paper, .002 mfd., 400 volts				
C-11	Mica, .470 mfd., 500 volts				
C-12	Paper, .01 mfd., 400 volts				
R-1	22 ohms, 1/2 W.				



This is a portable, 5-tube superheterodyne radio, designed for operation from a self-contained battery pack or a power line of 115 volts AC or DC current. It has a tuning range from 550 to 1700 kilocycles.

### power supply

The battery pack is a standard pack made by the Eveready Company (No. 754). The Burgess equivalent is the Burgess No. G6M60 or the Ray O Vac equivalent. The life of the packs depend on how often the radio is used on batteries.

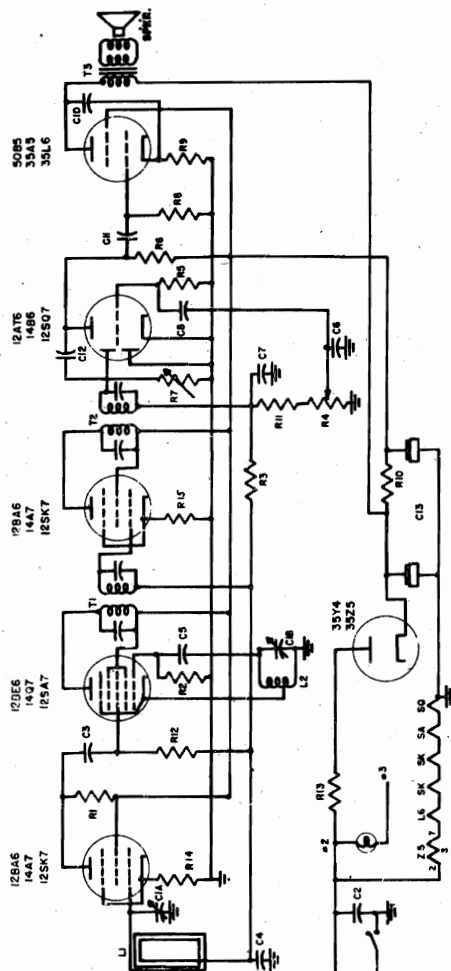
**CAUTION:** When NOT in use, be SURE that the center knob is in the OFF position, else batteries will be damaged or drained, affecting the operation. If reception becomes weak or distorted, have the batteries checked by your dealer or service man.

THE INTERMEDIATE FREQUENCY IS 455 KC. TO ALIGN, SET THE OSCILLATOR TO 550 AND 1650 KC, ALIGNING THE RF AT 1500 KC.

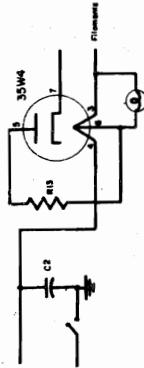
**TUBES:** The following tubes, together with their substitutes in certain models, are used: 1A7 or 1R5 Mixer-Oscillator, 1N5 or 1T4 IF Amplifier, 1H5 or 1S5 Detector-RF Amplifier-AVC, 3Q5 or 3Q4 Power Amplifier or Audio Amplifier, and 117Z3 rectifier.

# RADIO WIRE TELEVISION

MODEL MC-11

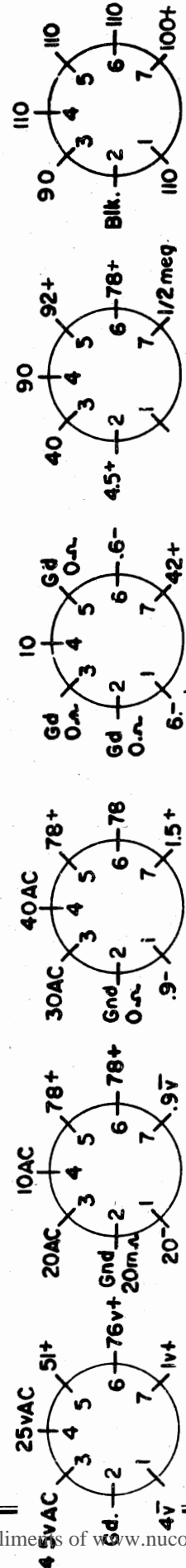


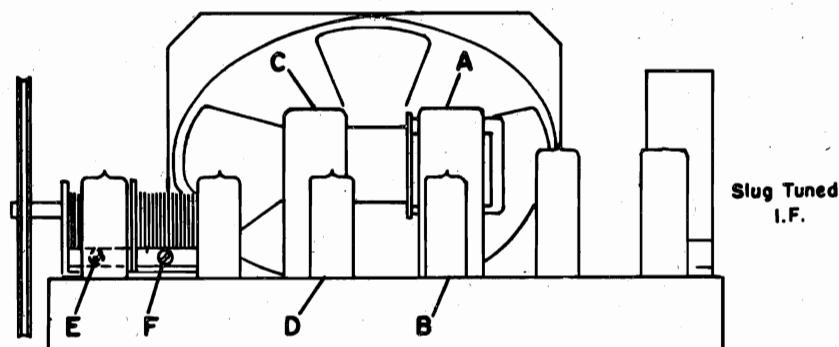
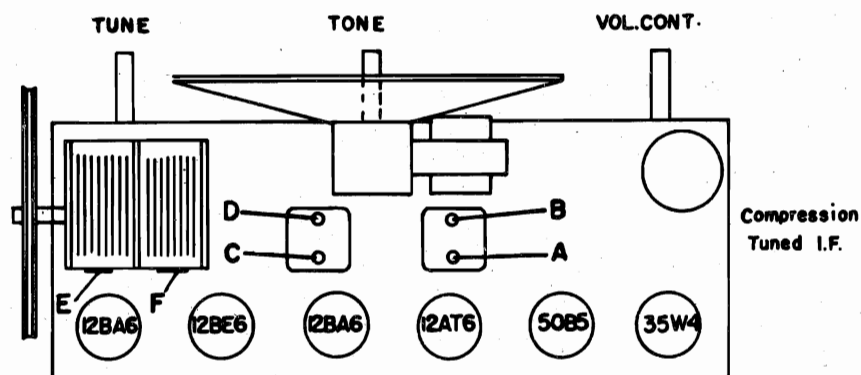
IF PEAK  
455 KC



CIRCUIT SYMBOL	PART NO.	DESCRIPTION
C1	CV-10009	Condenser, Variable with Pulley.
C2	CP-14503	Condenser, Paper .05 Mfd. 400 volts.
C3	CH-15250	Condenser, Mica 25 mmf. 500 volts.
C4	CP-12503	Condenser, Paper .05 Mfd. 200 volts.
C5	CH-15500	Condenser, Mica 50 mmf. 500 volts.
C6-C7	CH-15251	Condenser, Mica 250 mmf. 500 volts.
C8, C11	CP-14103	Condenser, Paper .01 mfd. 400 volts.
C10	CP-14203	Condenser, Paper .02 mfd. 400 volts.
C12	CP-14302	Condenser, Paper .003 mfd. 400 volts.
C13	CL-10007	Condenser, Electrol. 50/30 mfd. 150 volts.
L1	AL-10010	Loop Antenna.
L2	TRC-10000D	Coil, Oscillator
R1	RC-34701	Resistor, Carbon 4700 ohm 1/2 watt.
R2	RC-32202	Resistor, Carbon 22000 ohm 1/2 watt.
R3	RC-32204	Resistor, Carbon 2.2 megohm 1/2 watt.
R4	VC-11105	Control, Volume 1 megohm with switch.
R5	RC-31005	Resistor, Carbon 10 megohm 1/2 watt.
R6	RC-32203	Resistor, Carbon 220,000 ohm 1/2 watt.
R7	VC-13105	Control, Tone 1 megohm.
R8, R12	RC-34703	Resistor, Carbon 470,000 ohm 1/2 watt.
R9, R14	RC-31500	Resistor, Carbon 150 ohm 1/2 watt.
R10	RC-41001	Resistor, Carbon 1000 ohm 1 watt.
R11	RC-31003	Resistor, Carbon 100,000 ohm 1/2 watt.
R13	RC-30220	Resistor, Carbon 22 ohm 1/2 watt.
R15	RC-33300	Resistor, Carbon 330 ohm 1/2 watt.
SPKR	SO-10002	Speaker, Oval 4 x 6.
T1	TS-10000	Transformer, I. F. Input.
T2	TS-10001	Transformer, I. F. Output.
T3	TO-10000	Transformer, Output.

All grid voltages measured with 200,000 ohms per volt meter and other voltages with 1000 ohms per volt meter.





Tubes used (6) 12BA6 RF amplifier; 12BE6 converter; 12BA6 IF amplifier; 12AT6 Det., AVC, AF; 50B5 power output; and 35W4 rectifier.

Power supply 110-125 volts AC/DC.

Tuning Range—Broadcast 550 Kc to 1720 Kc Rating .24 amp @ 117 volts AC/DC.

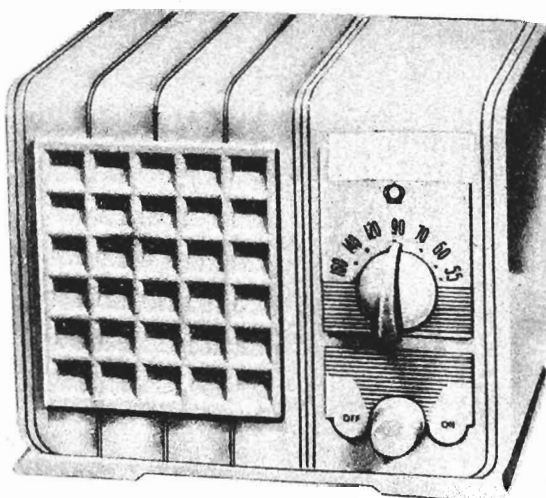
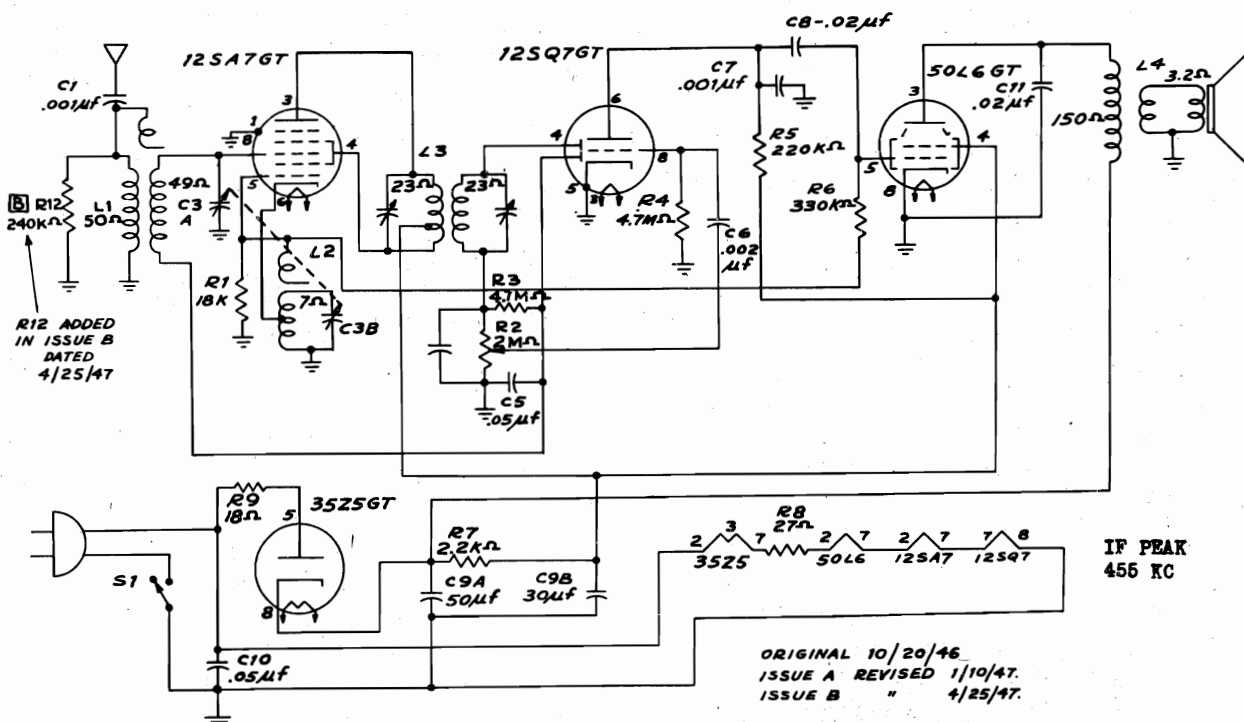
### ALIGNMENT INSTRUCTIONS — READ CAREFULLY

Use isolation transformer if available. If not, connect a capacitor in series with low side to chassis. Volume control should be at a maximum and output of signal generator no higher than necessary to obtain output reading. Use insulated alignment screwdriver for adjusting.

Dummy Antenna	Signal Generator Coupling	Signal Generator Frequency	Gang Condenser Position	Output Meter	Adjust	Remarks
.05 Mfd.	High side of Mixer tube Grid (12BE6)	455 Kc	Stator Turned out to minimum Capacity position	Across Voice Coil	A, B, C, D	Adjust for maximum output. If isolation transformer is not used, reduce dummy ant. to .001 MFD. to reduce hum modulation.
	Loop	1720 Kc	Stator Turned out to minimum Capacity position	Across Voice coil	E	Fashion loop from few turns of wire and radiate signal into set. Adjust for maximum output.
	Loop	1500 Kc	Tune gang to resonance	Across Voice coil	F	Fashion loop from few turns of wire and radiate signal into set. Adjust for maximum output.



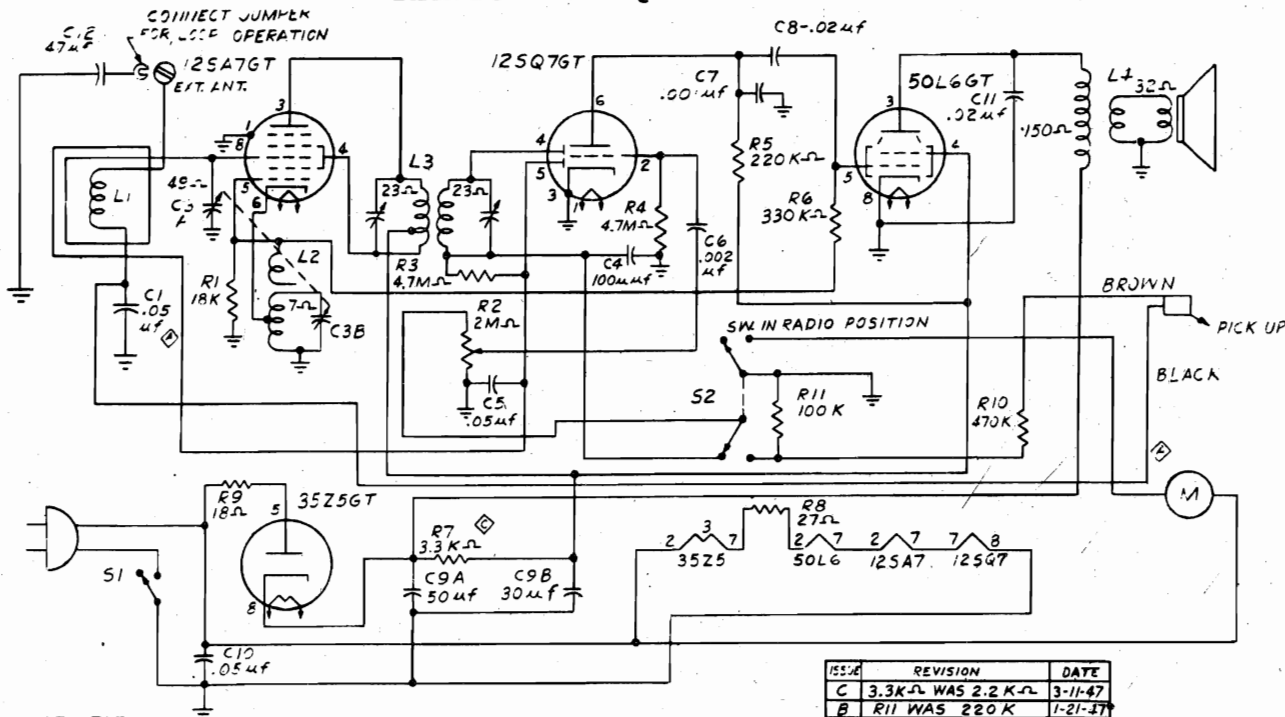
## RADIONIC EQUIPMENT CO.



DESCRIPTION		PRICE
Paper condenser	.05/400 v.	.21
"	.01/"	.18
"	.002/"	.17
"	.02/"	.18
"	.05/200 v.	.19
"	.005/"	.17
"	.001/500 v.	.18
Mica	100 mmf	.19
"	47	.17
Resistor	10K ohm 1/4 w.	.05
"	4.7 meg ohm 1/4 w.	.05
"	220 ohm 1/4 w.	.05
"	2200 ohm 2 w.	.18
"	18 ohm 1/4 w.	.05
"	47 " 1 w.	.10
"	330K ohm 1/4 w.	.05

	DESCRIPTION	PRICE
5877	Plastic cabinet walnut	2.40
39156	Speaker and output transformers	3.19
39157	Plastic knob tuning	.30
62192	" volume	.13
	Cabinet back	.25
	Instruction book	.05
1673	Variable condenser	3.65
2073	Electrolytic condenser unit 50-30 mf 150 v.	1.60
2479	Volume control with switch 2 meg ohm	1.20
28182	Antenna coil	1.05
28184	Oscillator coil	.75
3376	I.F. transformer	2.05
5580	Antenna hank	.37
	Line cord	.75

# RADIONIC EQUIPMENT CO.

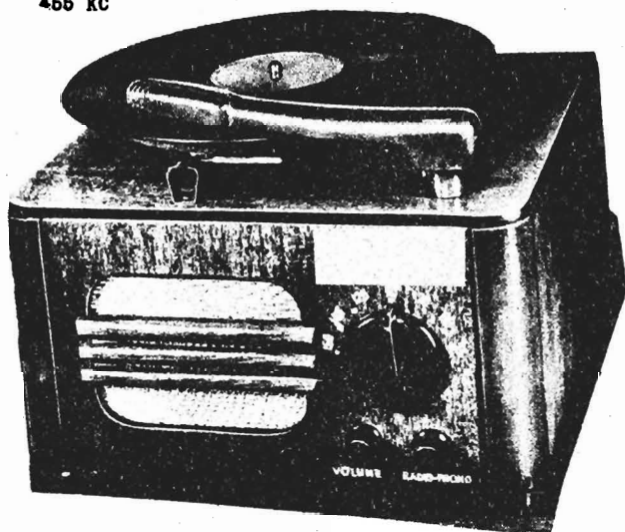


REV.	REVISION	DATE
C	3.3KΩ WAS 2.2KΩ	3-11-47
B	R11 WAS 220K	1-21-47
A	C2 (GROUND REMOVED-C1 WAS .001-BLK. LEAD BETWEEN XTAL & C1 ADDED)	1-14-47

## DESCRIPTION

## PRICE

Paper condenser	.05 mf	400 v.	.21
"	.002	200 v.	.17
"	.02	"	.18
"	.05	"	.19
"	.001	"	.17
Ceramic 100 mmf	500 volts		.18
16K ohms $\frac{1}{4}$ w.			.15
4.7 meg ohms $\frac{1}{4}$ w.			.15
220K			.15
2200	2 W.		.18
18	$\frac{1}{2}$ W.		.15
47	1 W.		.15
330K	$\frac{1}{4}$ W.		.15
470K	$\frac{1}{4}$ W.		.15



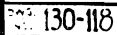
## DESCRIPTION

## PRICE

A403	Cabinet, wood loss lid	13.35
5877	Speaker and output transformer	3.31
39160	Knob, tuning wood	.30
39161	Knob, (volume, phono-radio)	.15
59307	Instruction book	.05
1675	Variable condenser	4.00
2073	Electrolytic condenser unit 50-30 mf/150 v.	1.70
2480	Volume control 2 meg with switch	1.20
28184	Oscillator coil	.75
28185	Antenna coil (chassis 470-1)	.80
3376	I.F. transformer	2.20
28186		
28189	Loop and loading coil (chassis 470-2)	1.75
5559	Line cord	.75
3828	Switch radio/phono	.85
6343	Pick-up arm and rest	7.65
6418	Motor and turntable 8"	8.70
	Lifetime needle	1.30



**MODEL 900**



REGAL ELECTRONICS CORP.

900

P. M.  
SPEAKER  
110-101

004 MFD. 200V. ANTENNA

30-107

125G7 125H7 14A7

250 MMFD.

4700Ω

100 K Ω

WAVE TRAP

30-106

30-104

125A7 14Q7

30-105

125K7 14A7

30-105

125Q7 14B6

35L6 35A5

10-120 V. AC, D.C. SUPPLY 45-101

ON-OFF SWITCH

PILOT LAMP \*47

REGAL ELECTRONICS CORP. 1049

P.M. SPEAKER 110-101

REGAL ELECTRONICS CORP. 1049

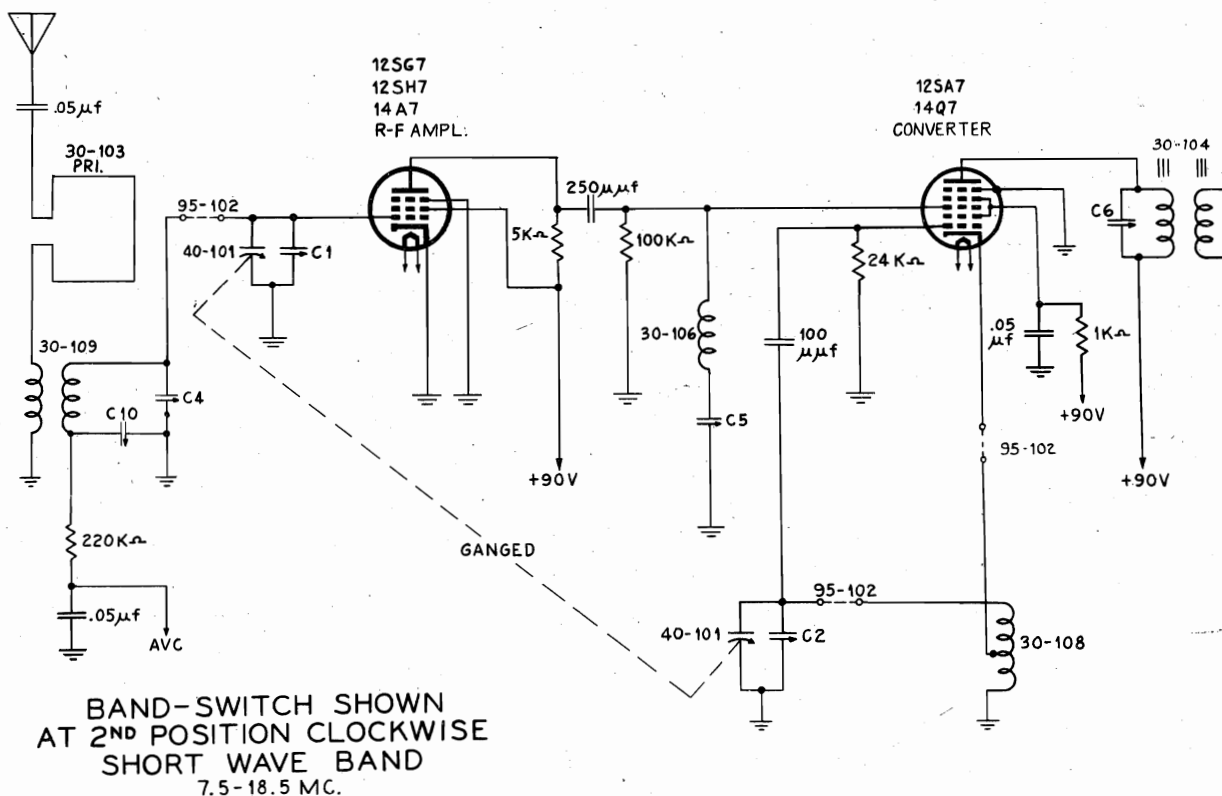
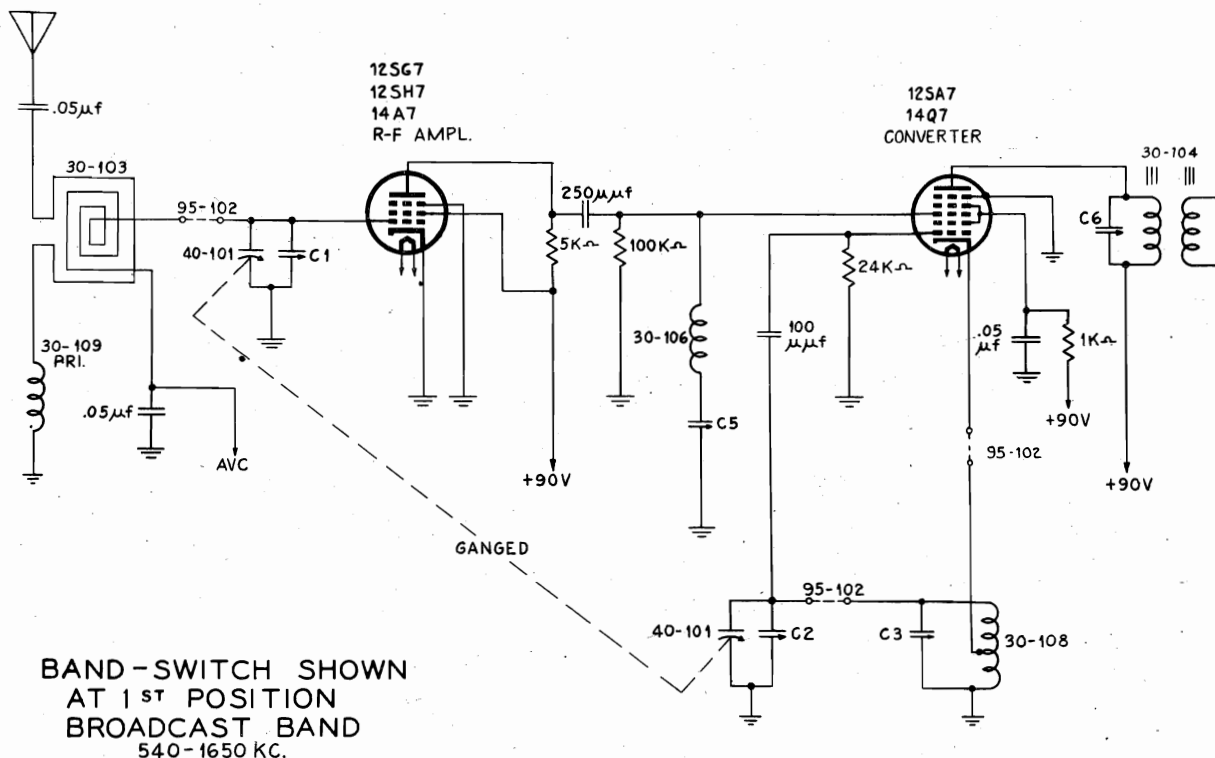
P.M.  
SPEAKER  
110-101

# "clarified schematics"

REGAL ELECTRONICS CORP.

REGAL PAGE 16-3

MODEL 900

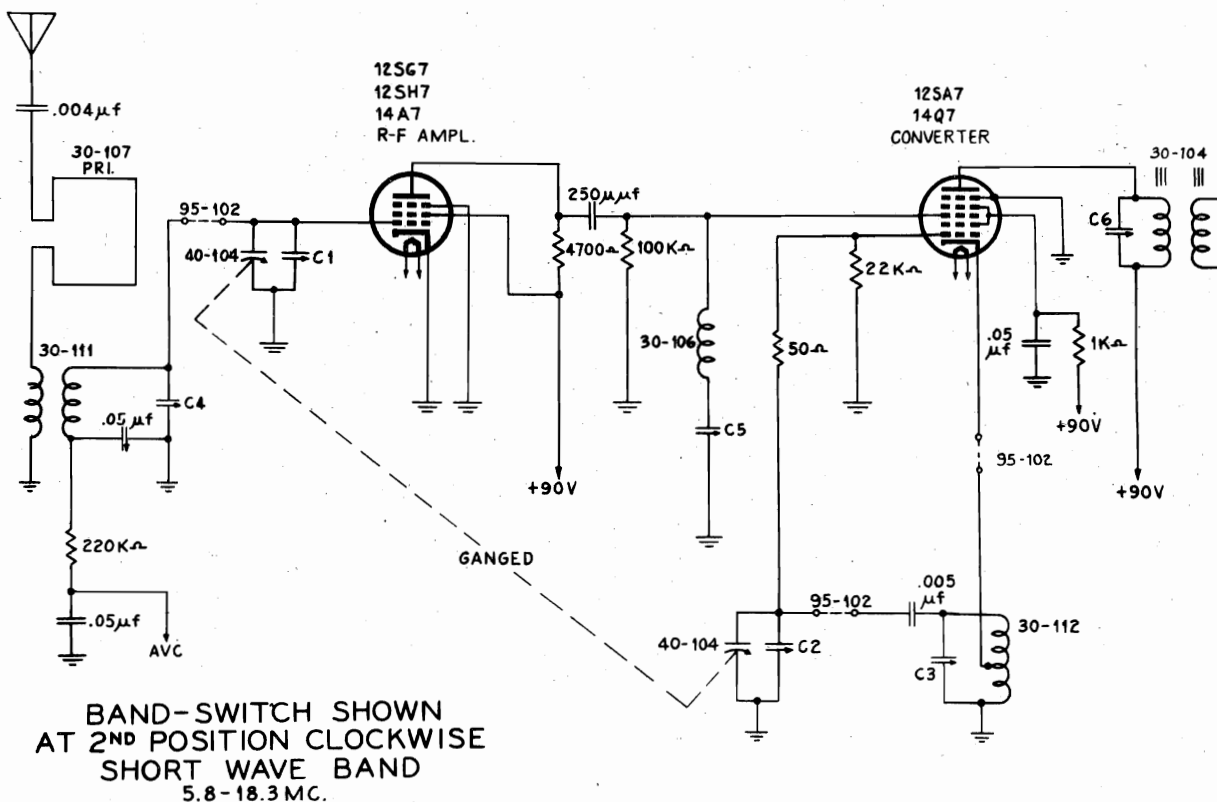
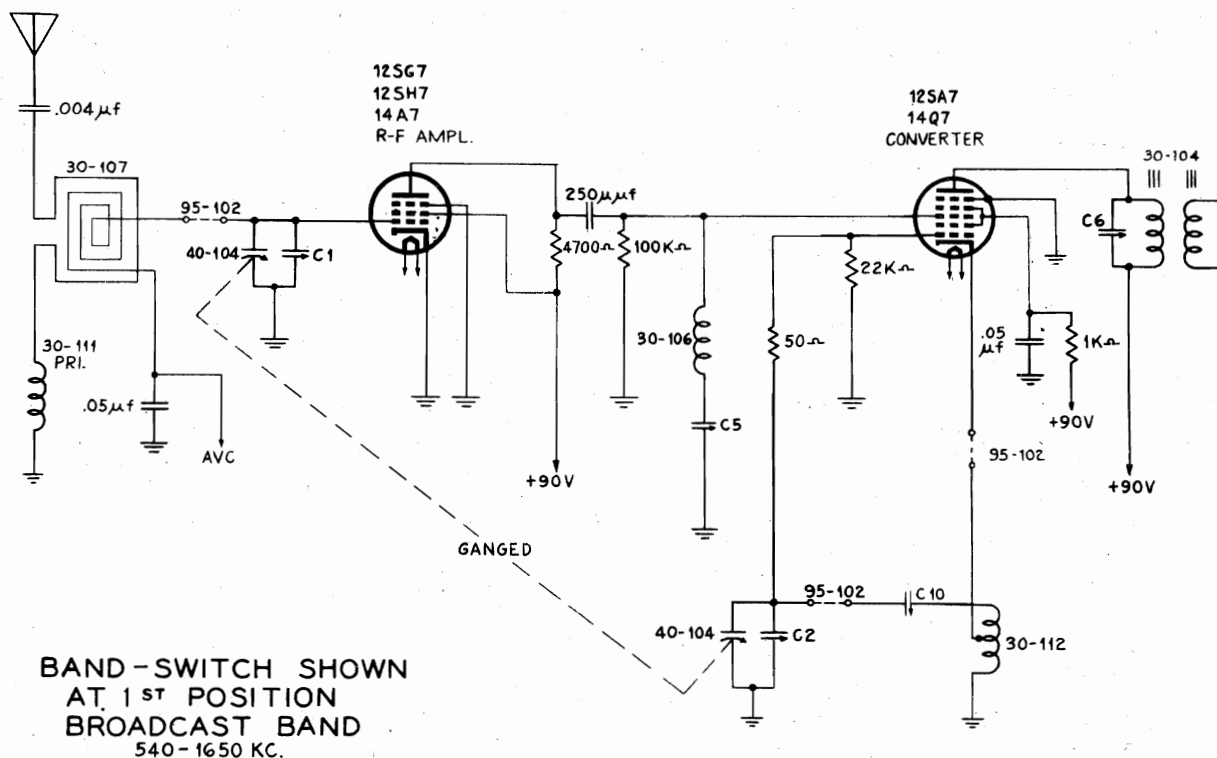


# "clarified schematics"

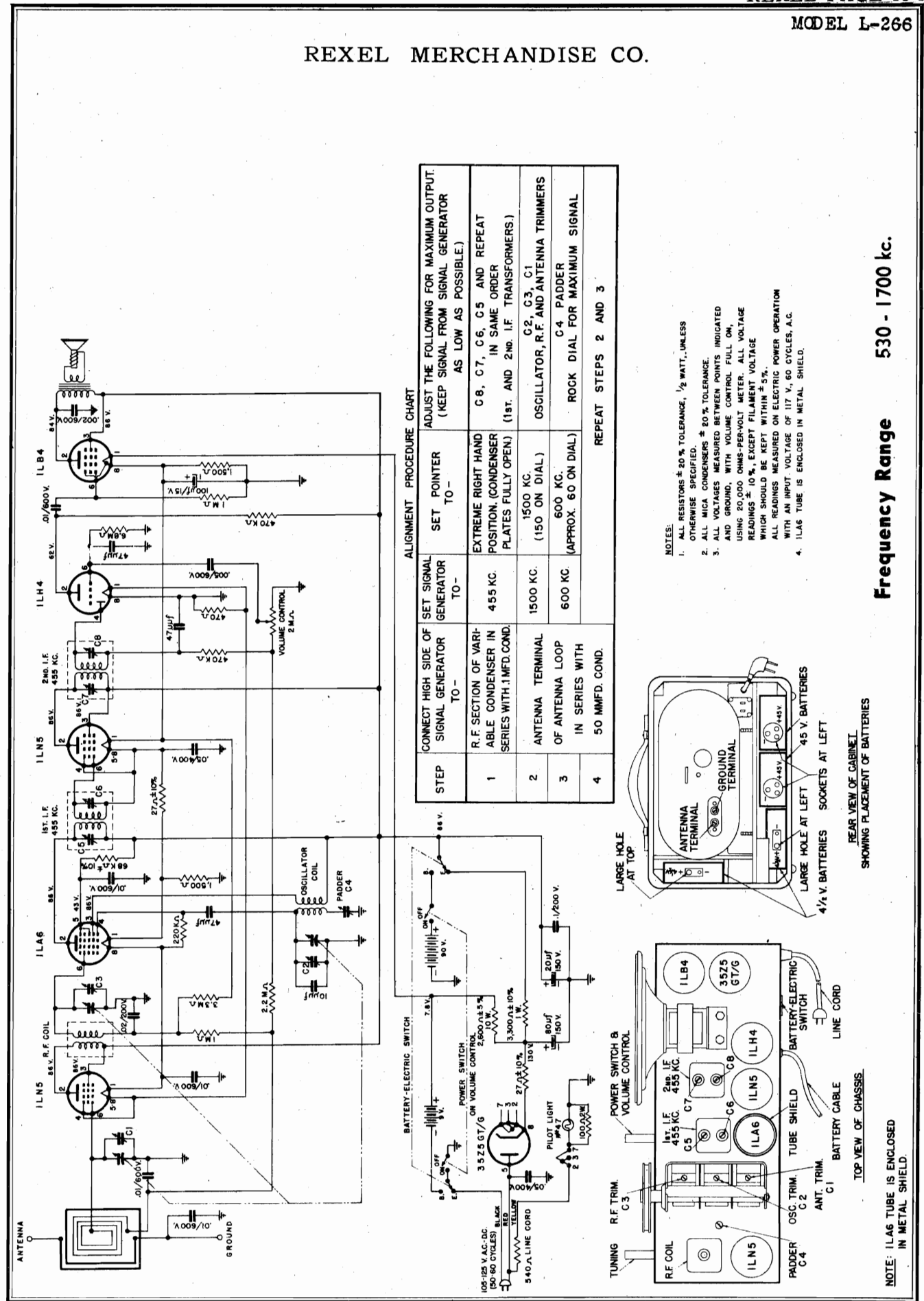
PAGE 16-4 REGAL

MODEL 1049

REGAL ELECTRONICS CORP.



# REXEL MERCHANDISE CO.



## REXEL MERCHANDISE CO.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

**ALIGNMENT**

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

**BATTERIES**

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

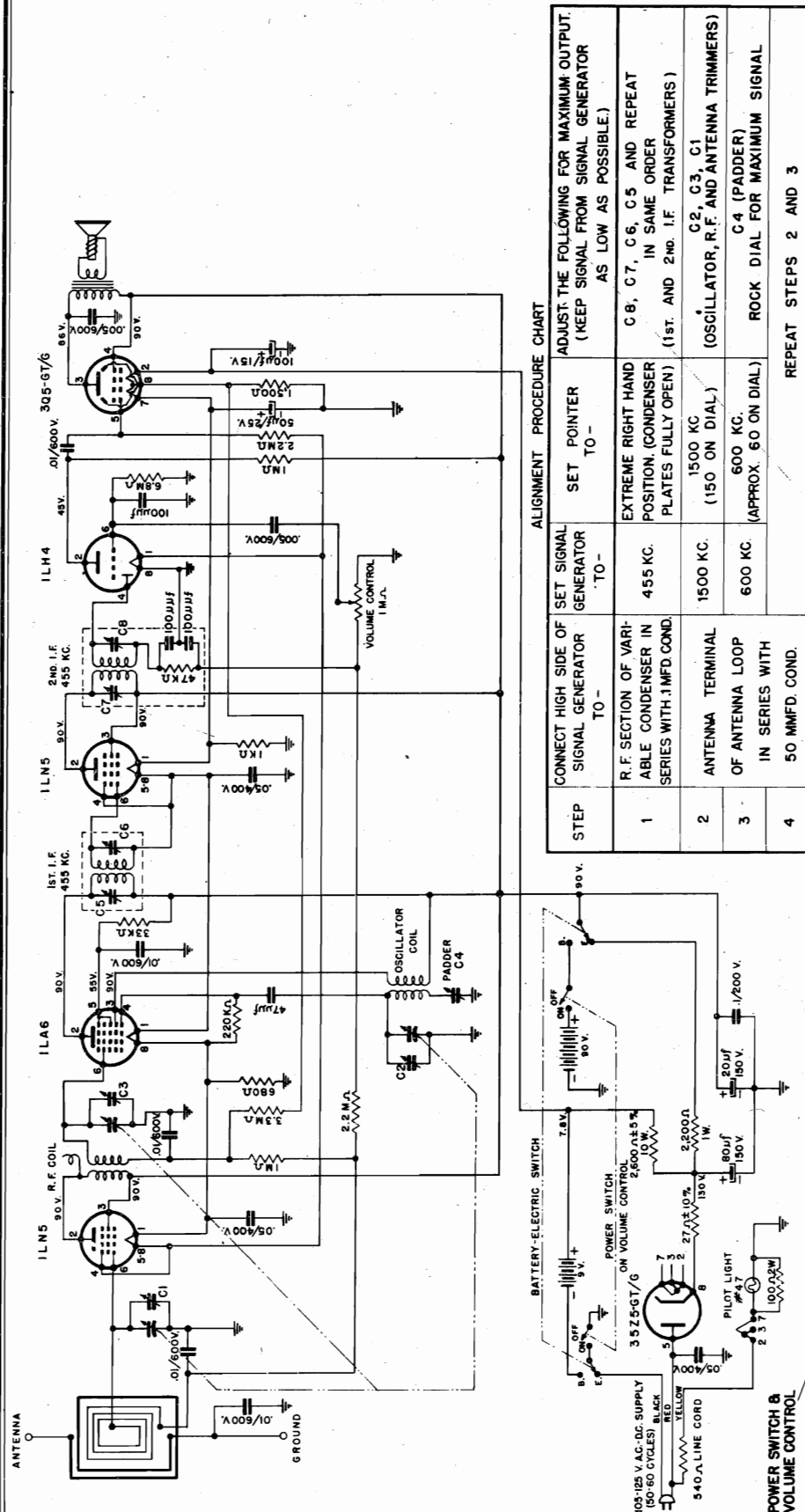
**REPLACEMENT PARTS**

Part No.	Description	Part No.	Description
BK-405	Bracket-Resistor mounting bracket	RCPI0W6502A	Condenser-.005/600WV paper tubular condenser
BT-232	Battery-4½ volt battery (A)	RE-407	Resistor-2600 ohms $\pm 5\%$ 10 watt resistor
BT-233	Battery-45 volt battery (B)	REB105M	Resistor-1 megohm $\pm 20\%$ ½ watt resistor
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)	REB152M	Resistor-1500 ohms $\pm 20\%$ ½ watt resistor
CA-472	Cabinet-portable cabinet	REB224M	Resistor-220,000 ohms $\pm 20\%$ ½ watt resistor
CB-335	Cable-battery cable	REB225M	Resistor-2.2 megohms $\pm 20\%$ ½ watt resistor
CL-176	Coil-R.F. coil, shielded	REB270K	Resistor-27 ohms $\pm 10\%$ ½ watt resistor
CL-177	Coil-oscillator coil	REB335M	Resistor-3.3 megohms $\pm 20\%$ ½ watt resistor
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser	REB471M	Resistor-470 ohms $\pm 20\%$ ½ watt resistor
CR-299	Crystal-dial crystal	REB474M	Resistor-470,000 ohms $\pm 20\%$ ½ watt resistor
CT-388	Condenser-220-680 mmfd padder condenser	REB683K	Resistor-68,000 ohms $\pm 10\%$ ½ watt resistor
CV-146	Condenser-3 gang variable condenser (with pulley)	REB685M	Resistor-6.8 megohms $\pm 20\%$ ½ watt resistor
DL-391	Dial-metal dial scale	REC332K	Resistor-3300 ohms $\pm 10\%$ 1 watt resistor
ES-274-3	Escutcheon-moulded escutcheon	RED101M	Resistor-100 ohms $\pm 20\%$ 2 watt resistor
KN-260	Knob-walnut knob	SD-607	Shield-Tube Shield
KN-261	Knob-walnut knob with dot	SK-156	Speaker-5" P.M. Speaker with output transformer
LC-315	Line Cord-540 ohms resistance line cord	SO-572	Socket-pilot light socket assembly
LP-178	Loop-Antenna	SP-191	Spring-Drive shaft retaining spring
PO-395	Pointer-dial pointer	SW-185	Switch-battery-electric D.P.D.T. slide switch
PT-383	Control-volume control 2 megohms with D.P.S.T. switch	TR-186	Transformer-I.F. 455 K.C. Transformer
RCM20A100M	Condenser-10 mmfd $\pm 20\%$ mica condenser		
RCM20A470M	Condenser-47 mmfd $\pm 20\%$ mica condenser		
RCPI0W2104A	Condenser-.1-200WV paper tubular condenser		
RCPI0W2203A	Condenser-.02/200WV paper tubular condenser		
RCPI0W4503A	Condenser-.05/400WV paper tubular condenser		
RCPI0W6103A	Condenser-.01/600WV paper tubular condenser		
RCPI0W6202M	Condenser-.002/600WV paper tubular condenser		

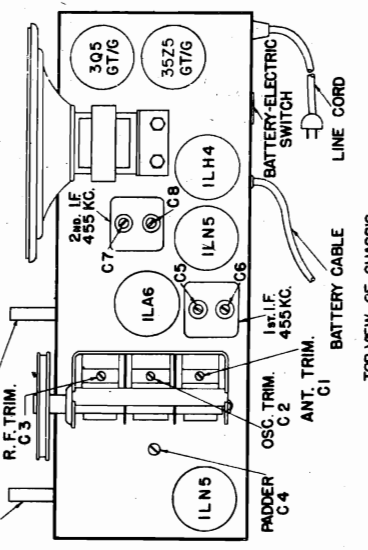
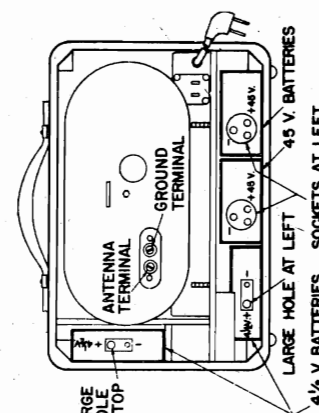


REXEL MERCHANDISE CO.

MODEL L-266-A



- NOTES:
1. ALL RESISTORS  $\pm 20\%$  TOLERANCE,  $\frac{1}{2}$  WATT, UNLESS OTHERWISE SPECIFIED.
  2. ALL MICA CONDENSERS:  $\pm 20\%$  TOLERANCE.
  3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND. WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS  $\pm 10\%$ , EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN  $\pm 5\%$ .
- ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V, 60 CYCLES, A.C.



Frequency Range 530 - 1700 kc.

REAR VIEW OF CABINET SHOWING PLACEMENT OF BATTERIES

TOP VIEW OF CHASSIS

## MODEL L-266-A

## REXEL MERCHANDISE CO.

## WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

## ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

## BATTERIES

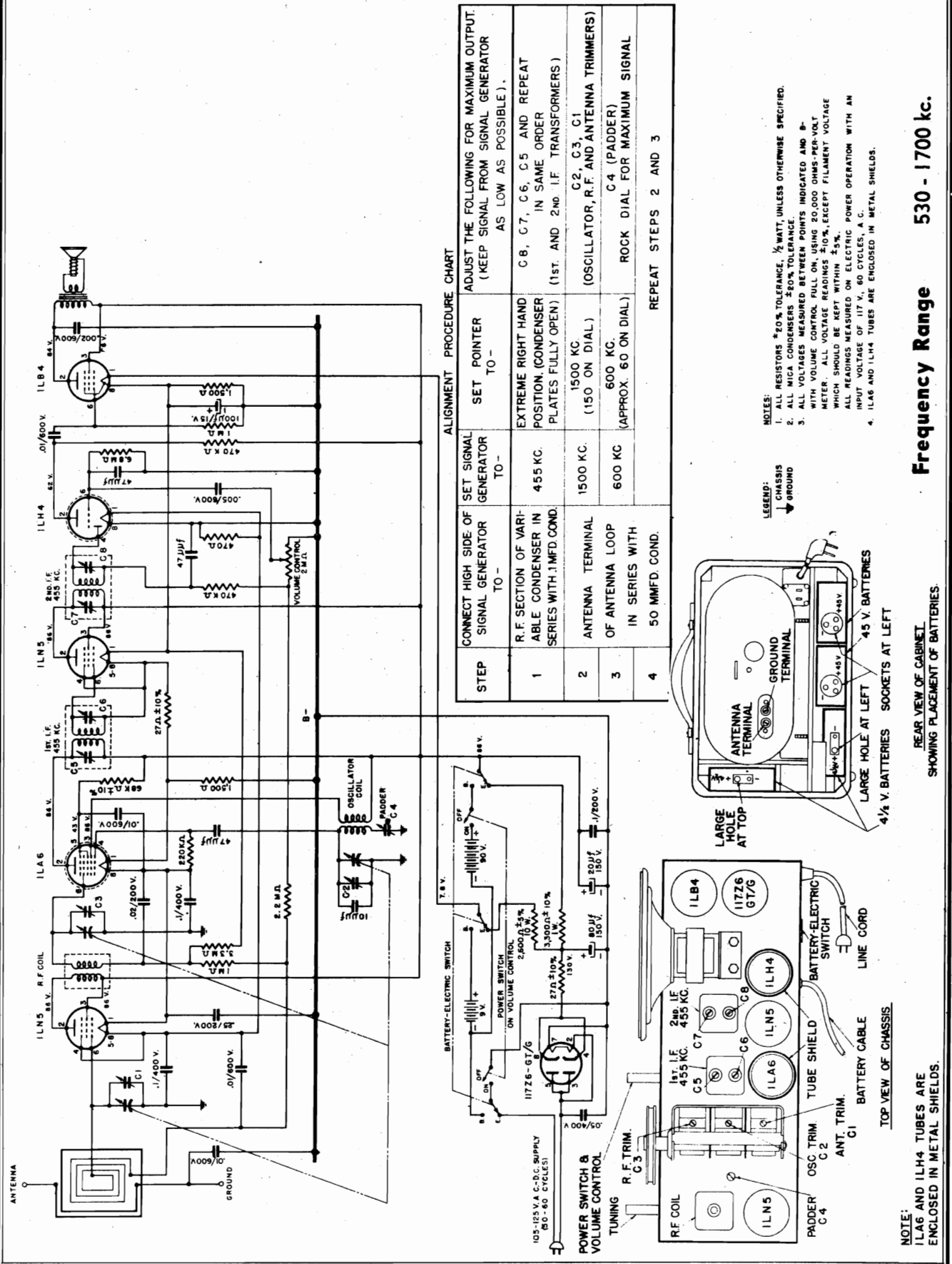
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

## REPLACEMENT PARTS

Part No.	Description	Part No.	Description
BK-405	Bracket-Resistor mounting bracket	RCPI0W6502A	Condenser-.005/600WV paper tubular condenser
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)	RE-407	Resistor-2600 ohms $\pm 5\%$ 10 watt resistor
CA-472	Cabinet-portable cabinet	REB102M	Resistor-1000 ohms $\pm 20\%$ ½ watt resistor
CB-335	Cable-battery cable	REB105M	Resistor-1 megohm $\pm 20\%$ ½ watt resistor
CL-177	Coil-oscillator coil	REB152M	Resistor-1500 ohms $\pm 20\%$ ½ watt resistor
CL-630	Coil-R.F. coil	REB224M	Resistor-220,000 ohms $\pm 20\%$ ½ watt resistor
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser	REB225M	Resistor-2.2 megohms $\pm 20\%$ ½ watt resistor
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser	REB270K	Resistor-27 ohms $\pm 10\%$ ½ watt resistor
CR-299	Crystal-dial crystal	REB333M	Resistor-33,000 ohms $\pm 20\%$ ½ watt resistor
CT-388	Condenser-220-680 mmfd padder condenser	REB335M	Resistor-3.3 megohms $\pm 20\%$ ½ watt resistor
CV-146	Condenser-3 gang variable condenser (with pulley)	REB681M	Resistor-680 Ohms $\pm 20\%$ ½ watt resistor
DL-391	Dial-metal dial scale	REB685M	Resistor-6.8 megohms $\pm 20\%$ ½ watt resistor
ES-274-3	Escutcheon-moulded escutcheon	REC 222M	Resistor-2200 ohms $\pm 20\%$ 1 watt resistor
KN-260	Knob-walnut knob	RED101M	Resistor-100 ohms $\pm 20\%$ 2 watt resistor
KN-261	Knob-walnut knob with dot	SK-476	Speaker-5" P.M. Speaker with output transformer
LC-315	Line Cord-540 ohms resistance line cord	SO-572	Socket-pilot light socket assembly
LP-178	Loop-Antenna	SP-191	Spring-Drive shaft retaining spring
PO-395	Pointer-dial pointer	SW-185	Switch-battery-electric D.P.D.T. slide switch
PT-576	Control-volume control 1 megohm with D.P.S.T. switch	TR-707	Transformer-I.F. 455 K.C. input-Transformer
RCM20A101M	Condenser-100 mmf $\pm 20\%$ mica condenser	TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter
RCM20A470M	Condenser-47 mmfd $\pm 20\%$ mica condenser		
RCPI0W2104A	Condenser-.1/200WV paper tubular condenser		
RCPI0W4503A	Condenser-.05/400WV paper tubular condenser		
RCPI0W6103A	Condenser-.01/600WV paper tubular condenser		

REXEL MERCHANDISE CO.

MODEL L-266-U



MODEL L-266-U

## REXEL MERCHANDISE CO.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

**ALIGNMENT**

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

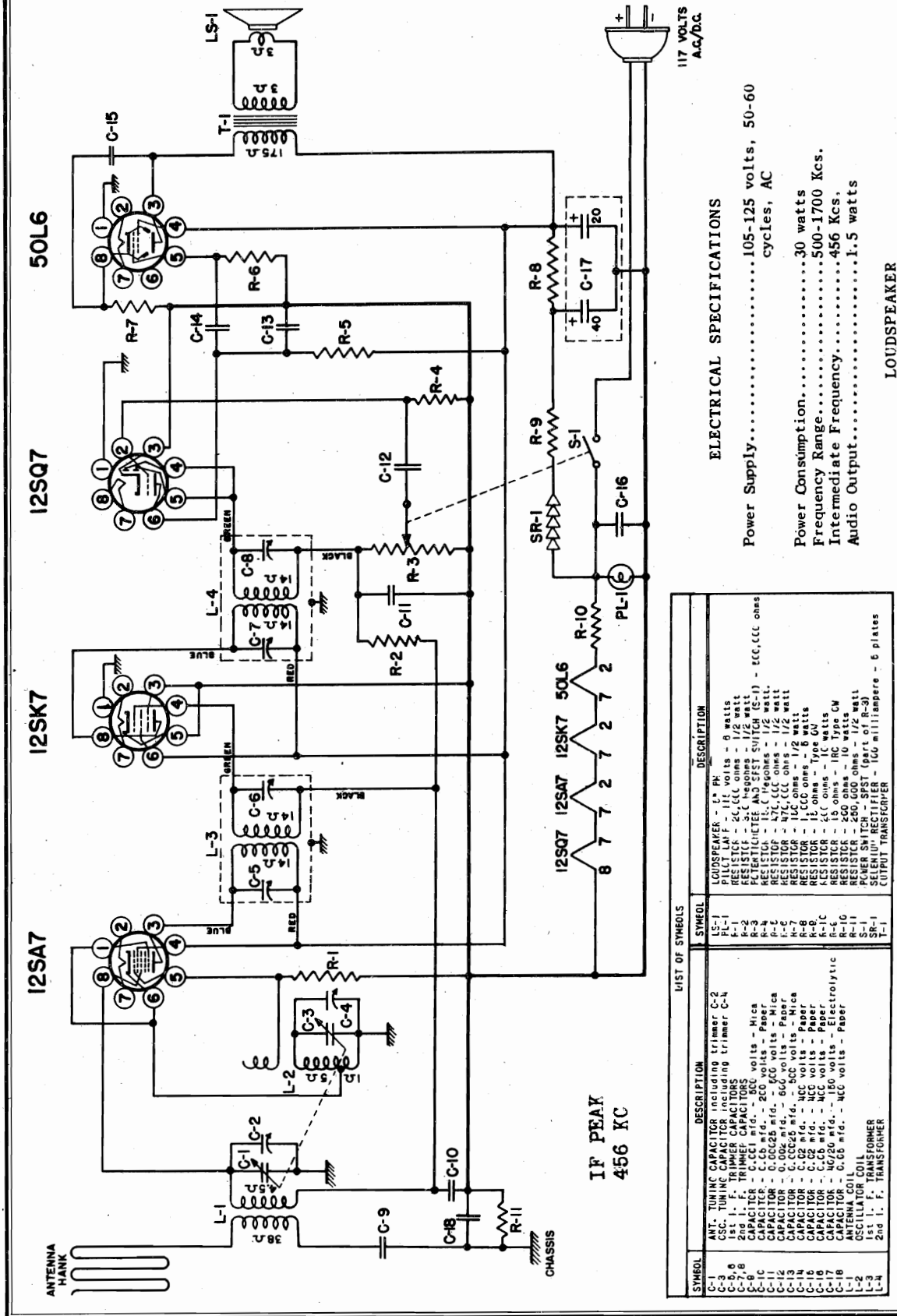
**BATTERIES**

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

**REPLACEMENT PARTS**

Part No.	Description	Part No.	Description
BK-405	Bracket-Resistor mounting bracket	RCPI0W6202M	Condenser-.002/600W.V. paper tubular condenser
CA-472	Cabinet-portable cabinet	RCPI0W6502A	Condenser-.005/600W.V. paper tubular condenser
CB-335	Cable-battery cable	RE-407	Resistor-2600 ohms $\pm 5\%$ 10 watt resistor
CL-176	Coil-R.F. coil, shielded	REB105M	Resistor-1 megohm $\pm 20\%$ ½ watt resistor
CL-177	Coil-oscillator coil	REB152M	Resistor-1500 ohms $\pm 20\%$ ½ watt resistor
CO-182	Condenser-80/20/150W.V. & 100/15W.V. electrolytic condenser	REB224M	Resistor-220,000 ohms $\pm 20\%$ ½ watt resistor
CR-299	Crystal-dial crystal	REB225M	Resistor-2.2 megohms $\pm 20\%$ ½ watt resistor
CT-388	Condenser-220-680 mmfd padder condenser	REB270K	Resistor-27 ohms $\pm 10\%$ ½ watt resistor
CV-146	Condenser-3 gang variable condenser (with pulley)	REB335M	Resistor-3.3 megohms $\pm 20\%$ ½ watt resistor
DL-391	Dial-metal dial scale	REB471M	Resistor-470 ohms $\pm 20\%$ ½ watt resistor
ES-274-1	Escutcheon-moulded escutcheon	REB474M	Resistor-470,000 ohms $\pm 20\%$ ½ watt resistor
KN-260	Knob-walnut knob	REB683K	Resistor-68,000 ohms $\pm 10\%$ ½ watt resistor
KN-261	Knob-walnut knob with dot	REB685M	Resistor-6.8 megohms $\pm 20\%$ ½ watt resistor
LC-223	Line Cord	REC332K	Resistor-3300 ohms $\pm 10\%$ 1 watt resistor
LP-178	Loop-Antenna	SD-607	Shield-Tube Shield
PO-395	Pointer-dial pointer	SK-156	Speaker-5" P.M. Speaker with output transformer
PT-383	Control-volume control 2 megohms with D.P.S.T. switch	SP-191	Spring-Drive shaft retaining spring
RCM20A100M	Condenser-10 mmfd $\pm 20\%$ mica condenser	SW-193	Switch-battery-electric T.P.D.T. slide switch
RCM20A470M	Condenser-47 mmfd $\pm 20\%$ mica condenser	TR-186	Transformer-I.F. 455 K.C. Transformer
RCPI0W2104A	Condenser-.1/200W.V. paper tubular condenser		
RCPI0W2203A	Condenser-.02/200W.V. paper tubular condenser		
RCPI0W2254A	Condenser-.25/200W.V. paper tubular condenser		
RCPI0W4104L	Condenser-.1/400W.V. paper tubular condenser		
RCPI0W4503A	Condenser-.05/400W.V. paper tubular condenser		
RCPI0W6103A	Condenser-.01/600W.V. paper tubular condenser		

RYAN SALES CO.



ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts, 50-60 cycles, AC  
Power Consumption.....30 watts  
Frequency Range.....500-1700 Kcs.  
Intermediate Frequency.....456 Kcs.  
Audio Output.....1.5 watts

LOUDSPEAKER

Permanent Magnet.....5" Diameter  
INSTALLATION FACILITIES PROVIDED  
Power.....5' cord and plug  
Antenna.....10' indoor type  
Ground.....None required

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
C-1	ANT. TUNING CAPACITOR including trimmer C-2	LS-1	LOUDSPEAKER - 1" PH
C-3	OSC. TUNING CAPACITOR including trimmer C-4	R-1	PILIT LAMP - 112 volts - 6 watts
C-5	1st I. F. TRIMMER CAPACITOR	R-2	RESISTOR - 25,000 ohms - 1/2 watt
C-6	2nd I. F. TRIMMER CAPACITOR	R-3	RESISTOR - 100,000 ohms - 1/2 watt
C-7	1st A. F. TRIMMER CAPACITOR	R-4	RESISTOR - 100,000 ohms - 1/2 watt
C-8	2nd A. F. TRIMMER CAPACITOR	R-5	RESISTOR - 100,000 ohms - 1/2 watt
C-9	1st A. F. TRIMMER CAPACITOR	R-6	RESISTOR - 100,000 ohms - 1/2 watt
C-10	2nd A. F. TRIMMER CAPACITOR	R-7	RESISTOR - 100,000 ohms - 1/2 watt
C-11	1st A. F. TRIMMER CAPACITOR	R-8	RESISTOR - 100,000 ohms - 1/2 watt
C-12	2nd A. F. TRIMMER CAPACITOR	R-9	RESISTOR - 100,000 ohms - 1/2 watt
C-13	1st A. F. TRIMMER CAPACITOR	R-10	RESISTOR - 100,000 ohms - 1/2 watt
C-14	2nd A. F. TRIMMER CAPACITOR	R-11	RESISTOR - 100,000 ohms - 1/2 watt
C-15	1st A. F. TRIMMER CAPACITOR	R-12	RESISTOR - 100,000 ohms - 1/2 watt
C-16	2nd A. F. TRIMMER CAPACITOR		
C-17	1st A. F. TRIMMER CAPACITOR		
L-1	ANTENNA COIL		
L-2	OSCILLATOR COIL		
L-3	1st I. F. TRANSFORMER		
L-4	2nd I. F. TRANSFORMER		
T-1	POWER SUPPLY TRANSFORMER		

TUBE COMPLEMENT

Converter and Oscillator.....12SA7  
I. F. Amplifier.....12SK7  
Detector-AVC-Audio.....12SQ7  
Power Output.....50L6GT  
Rectifier.....Selenium  
Dial Lamp.....Mazda #656

# RYAN SALES CO.

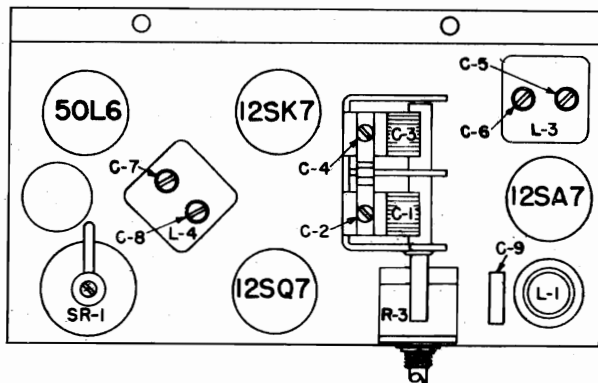


FIG. 1 - Tube and Trimmer Locations (Top View)

## ALIGNMENT PROCEDURE

### Alignment Frequencies:

I.F. ....456 Kcs.  
R.F. ....1500 Kcs.

### I. F. Alignment:

Connect output meter across the voice coil. Turn the receiver volume control to maximum. Connect high side of the alignment oscillator, through a .05 mfd. capacitor, to the converter grid.

Set alignment oscillator at 456 Kcs. and adjust output to give the lowest conveniently readable indication on the output meter. Adjust trimmers C-7 and C-8 in 2nd I.F. transformer to give maximum indication on output meter. Repeat this procedure for trimmers C-5 and C-6 in the 1st I.F. transformer. Repeat procedure to check accuracy.

### R. F. Alignment:

Retain output meter connected as above and receiver volume control set at maximum. Connect alignment oscillator to antenna.

Set alignment oscillator at 1500 Kcs. and place in operation. Rotate receiver tuning capacitor (C-1 and C-3) to give maximum signal indication on output meter. Adjust output of alignment oscillator to give the lowest conveniently readable indication on the output meter. Adjust oscillator trimmer C-4 to peak the signal indication on output meter. Then, adjust antenna trimmer C-2 to further peak the signal. Repeat procedure to check accuracy.

Trimmer locations are shown in Figure 1.

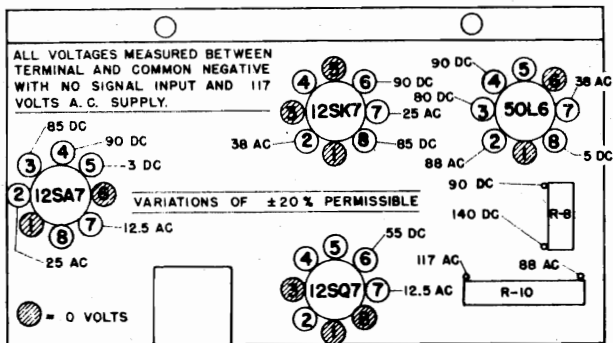


FIG. 2 - Socket Terminal Voltages (Bottom View)

## NOTES:

An electronic voltmeter may be connected to the AVC bus and used for alignment indication in lieu of the output meter across the voice coil.

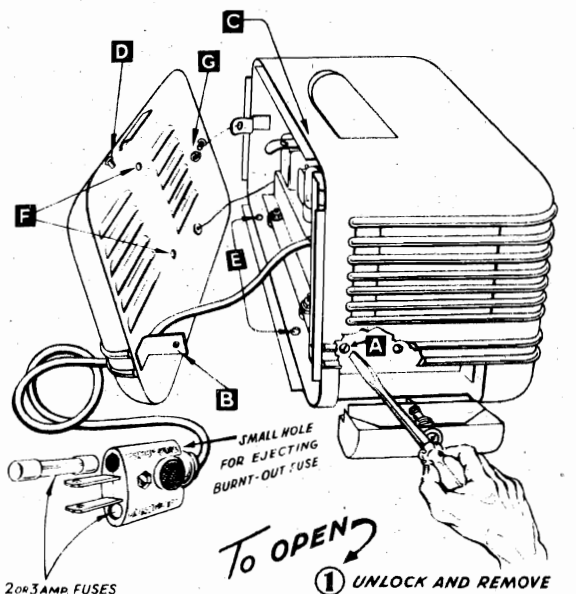
An electronic voltmeter or a voltmeter with a minimum resistance of 20,000 ohms per volt should be used for voltage measurements.

The polarity of the power connection must be correct when operating the receiver on direct current. If the receiver does not operate when the power plug is first inserted, remove and re-insert in opposite position. Reversal of plug position on alternating current supply may reduce hum in some cases.

If the ELECTONE is to be used in a location remote from broadcasting stations or the reception of distant stations is desired, an outdoor antenna and a ground connection may be utilized. The outdoor antenna should be connected to the indoor antenna and the ground lead to the chassis.

## GENERAL DESCRIPTION

The Model C5TS3 ELECTONE is a four tube and rectifier super-heterodyne broadcast entertainment receiver designed for operation from either a direct or alternating current power source. The circuit utilizes multi-unit tubes and incorporates automatic volume control. The chassis is enclosed in an all-metal cabinet of modern styling and having the following dimensions: Width 12"; Depth 7"; Height 7".



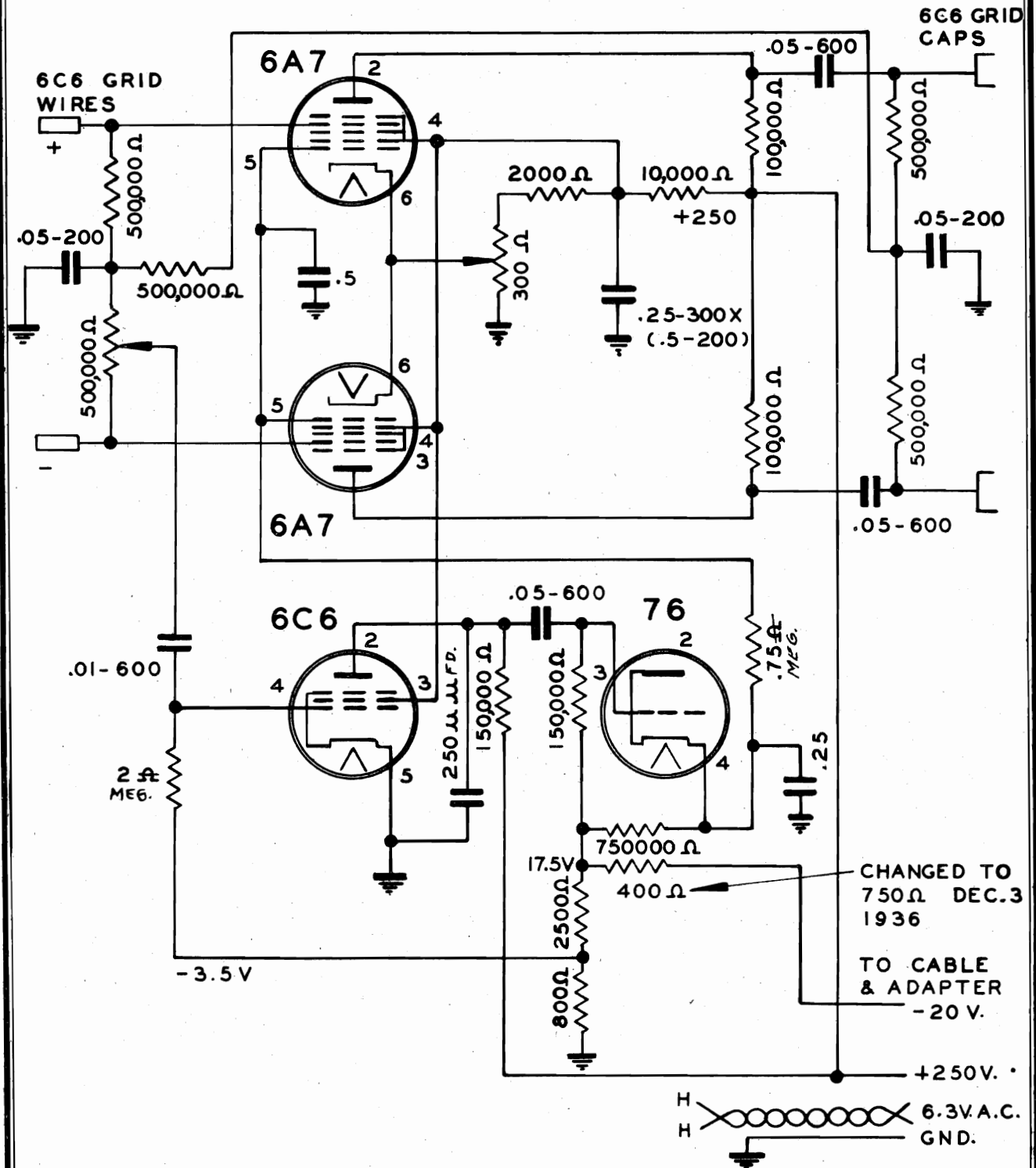
- ① UNLOCK AND REMOVE COIN BOX
- ② UNSCREW A TO RELEASE BRACKET B
- ③ APPLY PRESSURE AT C TO UNFASTEN PIN D
- ④ UNSCREW NUT G WITH SOCKET WRENCH

— FOR PERMANENT MOUNTING —  
USE SCREW HOLES E FOR TABLE MOUNTING  
USE SCREW HOLES F FOR WALL MOUNTING  
(USE THICK WASHERS (HALF INCH) BETWEEN RADIO AND TABLE OR WALL)

SCOTT RADIO LABS. INC.

MODEL IMPERIAL All Wave

NOV. 30, 1936

REVISED  
VOL. RANGE EXPANDERSCOTT RADIO LABORATORIES INC.  
CHICAGO 40 ILLINOIS

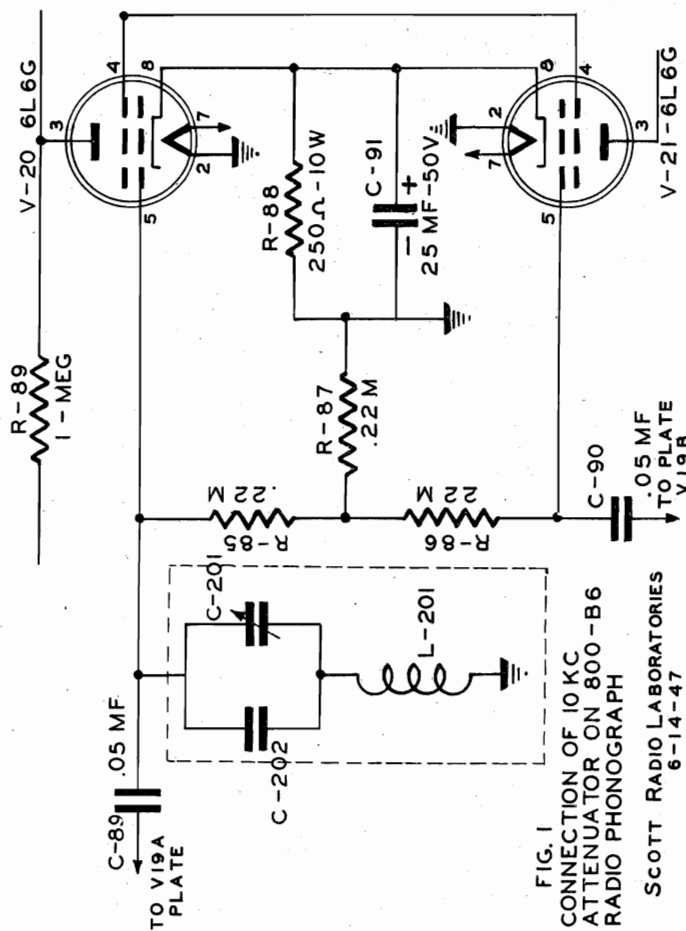


FIG. 1  
CONNECTION OF 10 KC  
ATTENUATOR ON 800-B6  
RADIO PHONOGRAPH  
SCOTT RADIO LABORATORIES  
6-14-47

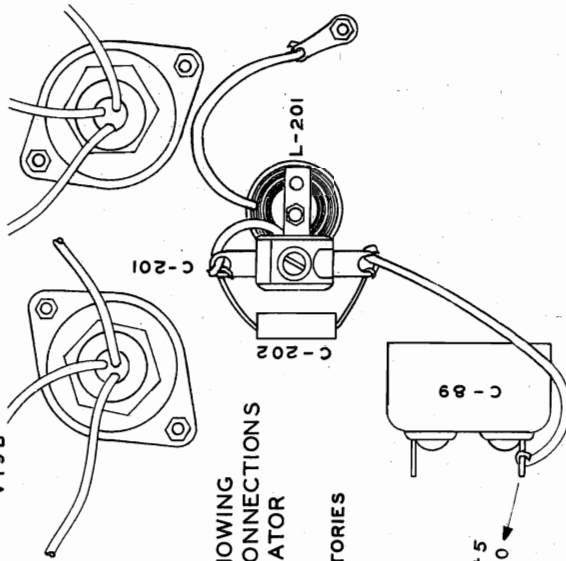


FIG. 2  
CUTAWAY VIEW SHOWING  
LOCATION AND CONNECTIONS  
OF 10 KC ATTENUATOR  
SCOTT RADIO LABORATORIES  
6-12-47

PIN #5  
V-20

10 KC Attenuator for  
Model 800-B6 Radio-Phonograph

For use in locations where trouble is encountered from a 10 KC whistle caused by two adjacent channel stations, an attenuator unit is provided which is easily installed and wired into the grid circuit of the 6L6G tube V-20 in the power supply unit of the Model 800-B6 Radio-Phonograph.

The attenuator unit is installed in the power supply unit adjacent to the terminal strip which holds the 6L6G tube V-19A. The capacitor C-89 is fastened to the base using the screw, nut and lockwasher furnished as shown in Figure 2. It is necessary to drill one hole for mounting the choke. The most convenient location being the center mounting hole of the output transformer which is not used for mounting the transformer. The trimmer capacitor C-101 is mounted on the top of the choke with this same screw and nut. Capacitor C-202 is connected directly across the trimmer capacitor C-201, one lead of choke L-201 is then connected to one side of trimmer capacitor C-201, the other side of C-201 is connected to contact No. 5 of 6L6G tube socket V-20 with a short length of wire, the other lead of choke L-201 is then grounded preferably to a lug fastened under one of the output transformer mounting nuts.

The filter is tuned to resonance either by operating the receiver and adjusting the trimmer capacitor C-201 until the 10 KC whistle disappears, or is at minimum level, or by using an audio generator connected to the PHONO-GND terminal strip, adjusting the receiver as for record changer operation, then by use of a meter connected across the secondary of the output transformer and with the audio generator adjusted to provide a 10,000 cycle signal. The filter is adjusted for minimum reading on the meter.

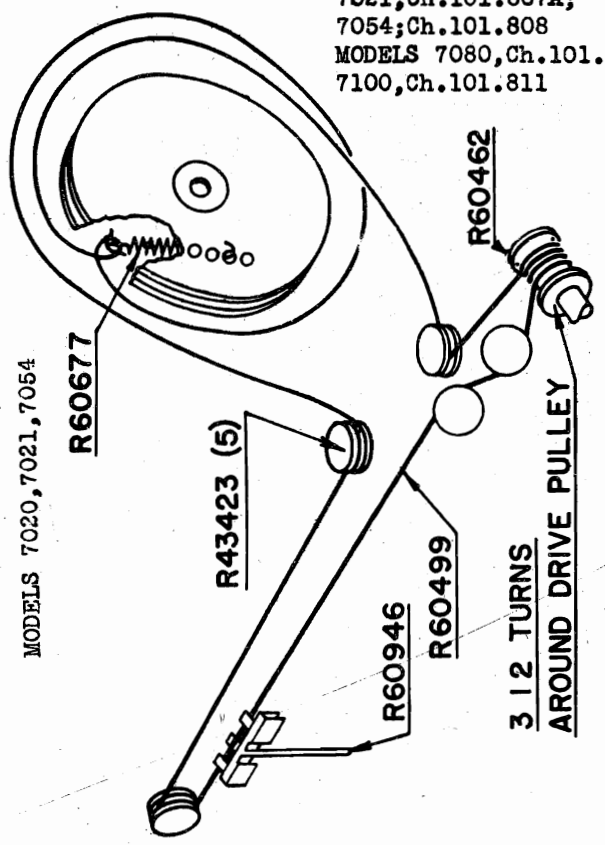
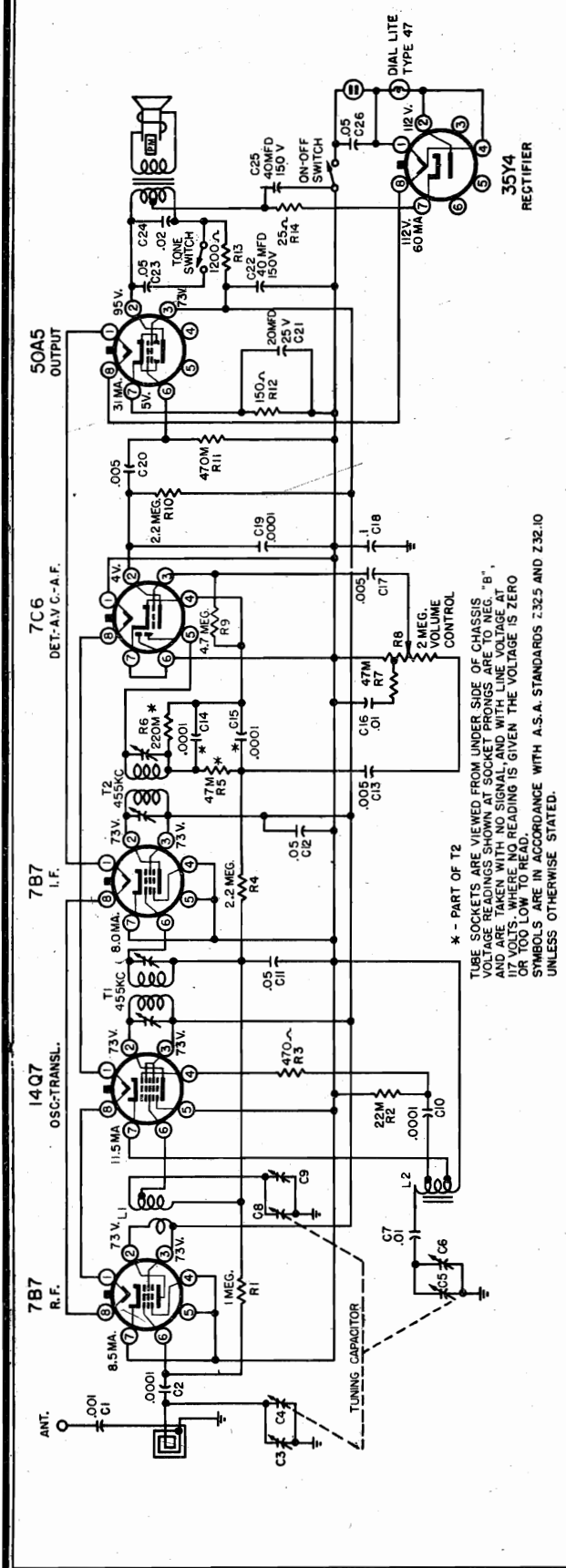
Although the adjustment of trimmer capacitor C-201 is not extremely critical, caution must be taken to set the audio generator to exactly 10,000 cycles since the width of the attenuated band is very narrow, and maximum attenuation at 10 KC can be obtained only if the audio generator is adjusted to this frequency.

Parts List for 10 KC Attenuator Unit		
Symbol	Description	Part No.
C-201	Capacitor, mica compression trimmer 30-200 MF	15E2675
C-202	Capacitor, silver mica, 1000 MF plus or minus 10% 500 V DC wkgl., bakelite case	15A36
L-201	Inductor, 200 MH ± 1000 CPS, DC resis. 525 ohms, air core, mounted on wood dowel	17E2676
Quan.	Hardware	Part No.
1	Screw - 6-32 x 2" RHNPS	77E2177
1	Nut - 6-32 x 1/2" hex	59A177
1	Washer - #6 external tooth lock	95A255



SEARS ROEBUCK & CO.

MODELS 7020, Ch. 101.807;  
7021, Ch. 101.807A;  
7054, Ch. 101.808  
MODELS 7080, Ch. 101.809;  
7100, Ch. 101.811



MODELS 7020, 7021, 7054

MODELS 7020, 7021, 7054, 7080, 7100

ALIGNMENT PROCEDURE

Output Meter Connection.....Across Loud Speaker Voice Coil  
Output Meter Reading to Indicate .05 Watts (Standard Output).....0.4 Volts  
Generator Ground Lead Connection.....I. F. Alignment - Negative B Lead  
Dummy Antenna Value to be in Series with Generator Output.....See Chart Below  
Connection of Generator Output Lead.....See Chart Below  
Generator Modulation.....30%, 400 Cycles  
Position of Volume Control.....Fully on  
Position of Tone Control.....Treble  
Position of Pointer with Tuner Fully Closed.....Last Line Below 540 Calibration Mark

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS IN ORDER SHOWN	TRIMMER FUNCTION
Closed	455 KC	0.1 Mfd.	Translator Grid	T2-T1	I. F.
1500 KC	1500 KC	.0002 Mfd.	Antenna	C6	Oscillator
1500 KC	1500 KC	.0002 Mfd.	Antenna	C9	R. F.
1500 KC	1500 KC	.0002 Mfd.	Antenna	C3	Antenna

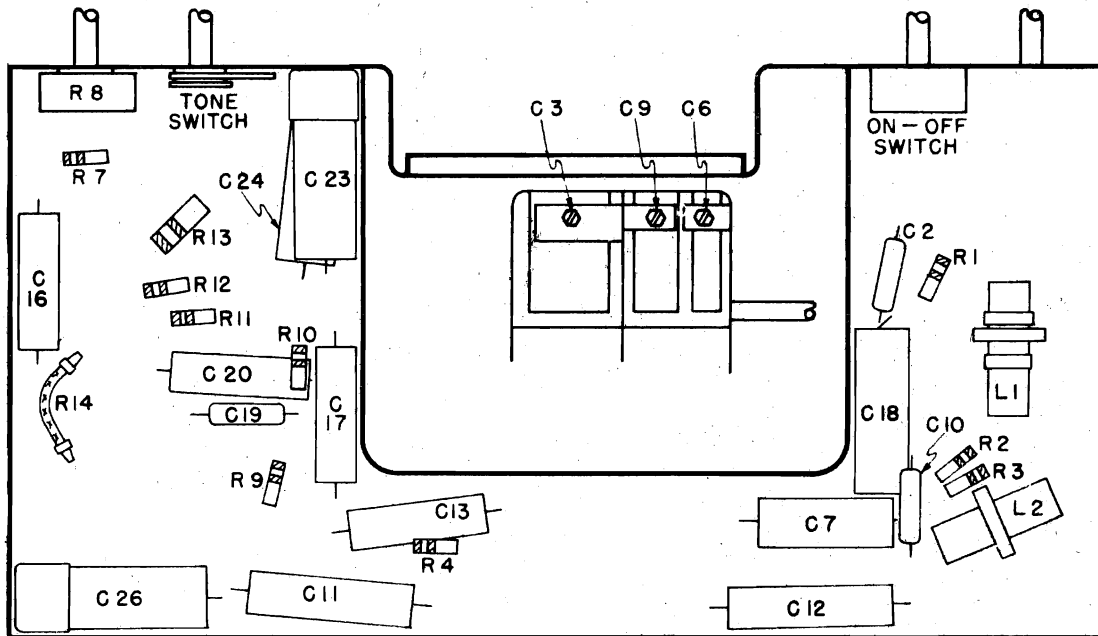
IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.  
The Alignment Procedure should be repeated step by step in the original order for greatest accuracy.  
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

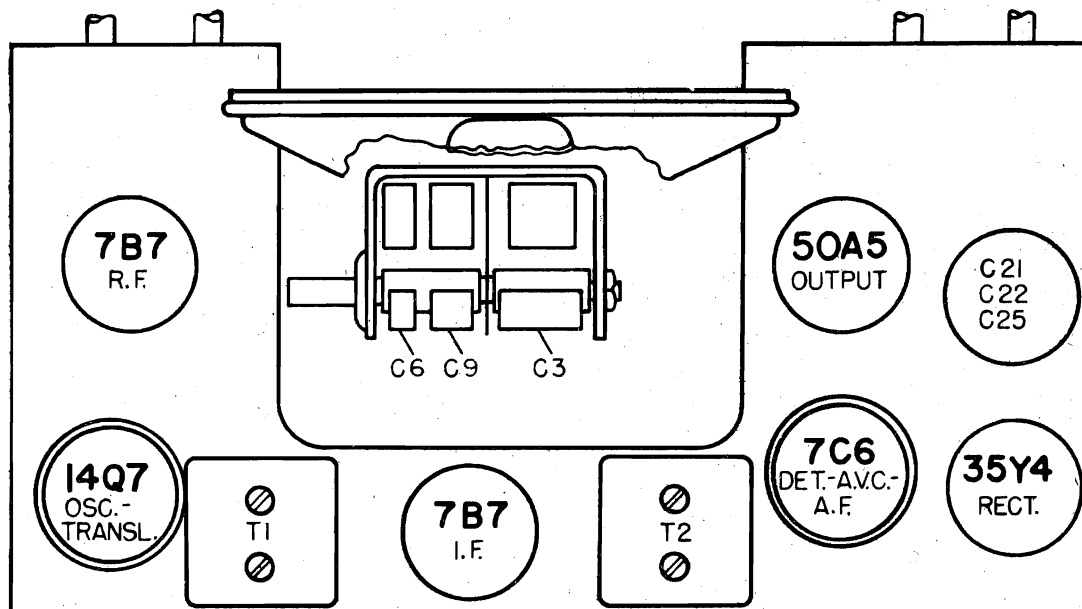
Power Output Undistorted 1.1 Watts Maximum 1.9 Watts

MODELS 7020, 7021, 7054

SEARS ROEBUCK & CO.



LOCATION OF PARTS UNDER CHASSIS



LOCATION OF PARTS ON TOP OF CHASSIS

**Power Supply:**

All models available.....117 Volts DC 25-60 Cycles AC 30 Watts

**Frequency Range:**

Broadcast.....540-1600 KC

Difference between 101.807 and 101.807-A

101.807-A same as 101.807 except ivory cabinet instead of brown.

**Recommended Antenna Equipment:**

Catalog #6703 Conventional Antenna  
Catalog #6704 Noise Reducing Antenna  
Catalog #6705 Greatest Reception and Noise Reduction Antenna

## SEARS ROEBUCK &amp; CO.

MODELS 7020,7021,7054

## MODEL 101.807, 101.807A

## HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
  - (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
  - (2) THE CHASSIS NUMBER, which is 101.807 or 101.807-A. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
 

Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.

## REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SEARS LIST PRICE EACH	MU CODE	SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SEARS LIST PRICE EACH	MU CODE
	R60426	Button - Push, Brown (101.807)	.11			R60484	Knob - Volume, Ivory (101.807-A)	.14	
	R60486	Button - Push, Ivory (101.807-A)	.14			R60494	Knob - On-Off, Brown (101.807)	.14	
	R61846	Button - Snap	.02			R60483	Knob - On-Off, Ivory (101.807-A)	.14	
	R60415	Cabinet - Brown (101.807)	4.17	AO		R20963	Lamp - Dial #47	.18	
	R60950	Cabinet - Ivory (101.807-A)	5.40	AO		R54529	Leaflet - Instruction	.20	
C4,C5,C8	R60413	Capacitor - Variable Tuning	5.35			R60541	Loop Assembly with Back Cover	2.08	AO
C1		Capacitor - .001 Mfd. 600 V.	.15			R60464	Plunger and Yoke Assembly	.43	
C7		Capacitor - .01 Mfd. 600 V.	.18			R60946	Pointer - Dial	.09	
C11,C12		Capacitor - .05 Mfd. 200 V.	.21			R43423	Pulley - Wood	.01	
C13,C17,C20		Capacitor - .005 Mfd. 600 V.	.17	R14	R40232	Resistor - Glasohm, 25 Ohm, 1 Watt	.14		
C16		Capacitor - .01 Mfd. 400 V.	.18	R1		Resistor - 1 Megohm, 1/3 Watt	.15		
C18		Capacitor - .1 Mfd. 200 V.	.27	R2		Resistor - 22,000 Ohm, 1/3 Watt	.15		
C23,C26		Capacitor - .05 Mfd. 600 V.	.26	R3		Resistor - 470 Ohm, 1/3 Watt	.15		
C24		Capacitor - .02 Mfd. 600 V.	.27	R4,R10		Resistor - 2.2 Megohm, 1/3 Watt	.15		
C2,C10,C19		Capacitor - .0001 Mfd. Mica	.20	R7		Resistor - 47,000 Ohm, 1/3 Watt	.15		
C21,C22,C25	R60416	Capacitor - Electrolytic, 40 Mfd. 150 V.	1.91	R9		Resistor - 4.7 Megohm, 1/3 Watt	.15		
		40 Mfd. 150 V., 20 Mfd. 25 V.		R11		Resistor - 470,000 Ohm, 1/3 Watt	.15		
	R61836	Cloth - Grille, Gold (101.807)	.34	R12		Resistor - 150 Ohm, 1/3 Watt	.15		
	R60952	Cloth - Grille, Tan (101.807-A)	.43	R13		Resistor - 1200 Ohm, 1 Watt	.21		
L1	R60465	Coil - R. F.	1.25		R60462	Shaft - Tuning Assembly	.17		
L2	R60448	Coil - Oscillator	1.53		R57049	Socket - Tube	.13		
	R60430	Control - Volume - 2 Megohm	.80		R60401	Socket - Pilot Lamp	.29		
	R16706	Cord - Power	.77		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER				
	R60540	Covers - Tab	.01		R60431	Speaker - P. M. 5"	6.76	AO	
	R60548	Covers - Dial	.14		R60674	Cone and Voice Coil	2.51		
	R60446	Dial	.23		R60675	Output Transformer	2.74		
	R60461	Drum and Pinion Assembly	.68		R60427	Spring - Extension	.06		
	R60459	Gear and Hub Assembly	.46		R60437	Spring - Compression	.01		
	R60444	Grille - Cabinet	.83		R60499	String - Dial Drive Assembly	.31		
	R60455	Knob - Tone, Brown (101.807)	.14		R60447	Switch - Tone	.68		
	R60485	Knob - Tone, Ivory (101.807-A)	.14		R60432	Switch - On-Off	.63		
	R60456	Knob - Tuning, Brown (101.807)	.14		R60474	Tab - Station	.26		
	R60480	Knob - Tuning, Ivory (101.807-A)	.14		R60417	Transformer - 1st I. F.	2.24		
	R60457	Knob - Volume, Brown (101.807)	.14	T1	R60418	Transformer - 2nd I. F.	2.71		

## MODEL 101.808

## HOW TO ORDER PARTS

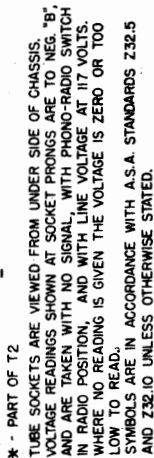
1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
  - (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
  - (2) THE CHASSIS NUMBER, which is 101.808. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
 

Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.
5. In all correspondence relating to cabinets, always mention the source code letter stamped into the upper rear rail of consoles or the bottom of table models, and the CATALOG NUMBER shown on the sticker on the back, bottom or inside of cabinet.

## REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SEARS LIST PRICE EACH	MU CODE	SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SEARS LIST PRICE EACH	MU CODE
	R60486	Button - Push	.14		R60549	Loop Assembly with Back Cover	\$ 2.12		AO
	R61846	Button - Snap	.01		R60464	Plunger and Yoke Assembly	.43		
C4,C5,C7	R60413	Capacitor - Variable Tuning	5.35		R60946	Pointer - Dial	.09		
C1		Capacitor - .001 Mfd. 600 V.	.15		R43423	Pulley - Wood	.01		
C7		Capacitor - .01 Mfd. 600 V.	.18		R40232	Resistor - Glasohm, 25 Ohm, 1 Watt	.14		
C11,C12		Capacitor - .05 Mfd. 200 V.	.21	R4		Resistor - 1 Megohm, 1/3 Watt	.15		
C13,C17,C20		Capacitor - .005 Mfd. 600 V.	.17	R2		Resistor - 22,000 Ohm, 1/3 Watt	.15		
C16		Capacitor - .01 Mfd. 400 V.	.18	R3		Resistor - 470 Ohm, 1/3 Watt	.15		
C18		Capacitor - .1 Mfd. 200 V.	.27	R4,P10		Resistor - 2.2 Megohm, 1/3 Watt	.15		
C24		Capacitor - .02 Mfd. 600 V.	.27	R7		Resistor - 47,000 Ohm, 1/3 Watt	.15		
C23,C26		Capacitor - .05 Mfd. 600 V.	.26	R9		Resistor - 4.7 Megohm, 1/3 Watt	.15		
C2,C10,C25		Capacitor - .0001 Mfd. Mica	.20	R11		Resistor - 470,000 Ohm, 1/3 Watt	.15		
C21,C22,C25	R60416	Capacitor - Electrolytic, 40 Mfd. 150 V.	1.91	R12		Resistor - 150 Ohm, 1/2 Watt	.15		
		40 Mfd. 150 V., 20 Mfd. 25 V.		R13		Resistor - 1200 Ohm, 1 Watt	.21		
L1	R60465	Coil - R. F.	1.25		R60462	Shaft - Tuning Assembly	.17		
L2	R60448	Coil - Oscillator	1.53		R57049	Socket - Tube	.13		
	R60430	Control - Volume - 2 Megohm	.80		R60401	Socket - Pilot Lamp	.29		
	R16706	Cord - Power	.77		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER				
	R60540	Covers - Tab	.01		R61627	Speaker - P. M. 5"	6.76		AO
	R60548	Covers - Dial	.14		R61634	Cone and Voice Coil	2.51		
	R60579	Dial	.23		R61635	Output Transformer	2.74		
	R60461	Drum and Pinion Assembly	.68		R60427	Spring - Extension	.06		
	R60487	Scotchman	1.25		R60437	Spring - Compression	.01		
	R60459	Gear and Hub Assembly	.46		R60499	String - Dial Drive Assembly	.31		
	R60485	Knob - Tone	.14		R60447	Switch - Tone	.68		
	R60460	Knob - Tuning	.14		R60432	Switch - On-Off	.63		
	R60484	Knob - Volume	.14		R60474	Tab - Station	.26		
	R60483	Knob - On-Off	.14		R60417	Transformer - 1st I. F.	2.24		
		Lamp - Dial Mazda Type #47	.18	T1	R60418	Transformer - 2nd I. F.	2.71		
	P54534	Leaflet - Instruction	.20	T2					



**Power Supply:**

**All models available..**

117 Volts 60 Cycles AC 60 Watts

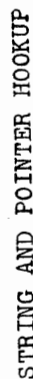
**Frequency Range:**

Broadcast... 540-1600 KC

**Recommended Antenna Equipment:**

**Catalog #6703 A Conventional Antenna**  
**Catalog #6704 Noise Reducing Antenna**  
**Catalog #6705 Greatest Reception and**  
**Noise Reduction Antenna**

Uses Record Changer 101.203-1



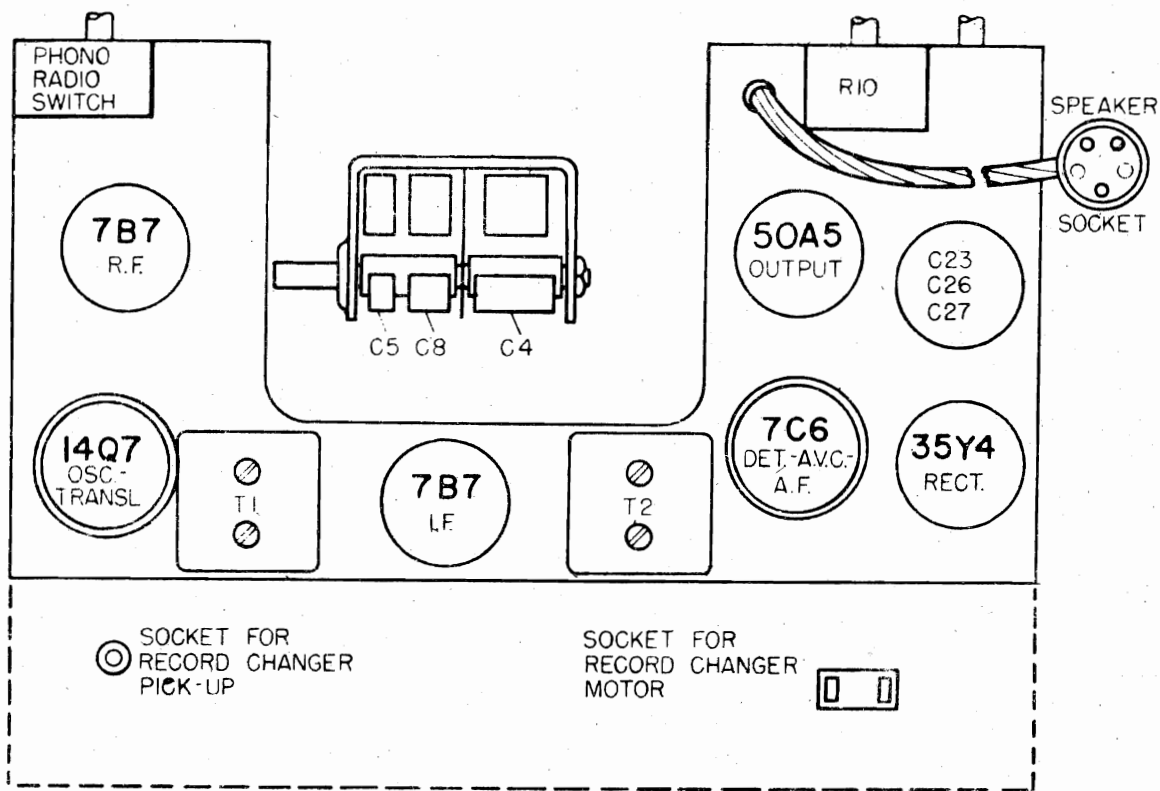
RECORD CHANGER:  
General instrument 205, RCD.CH.15-5

For parts list, see P.16-8

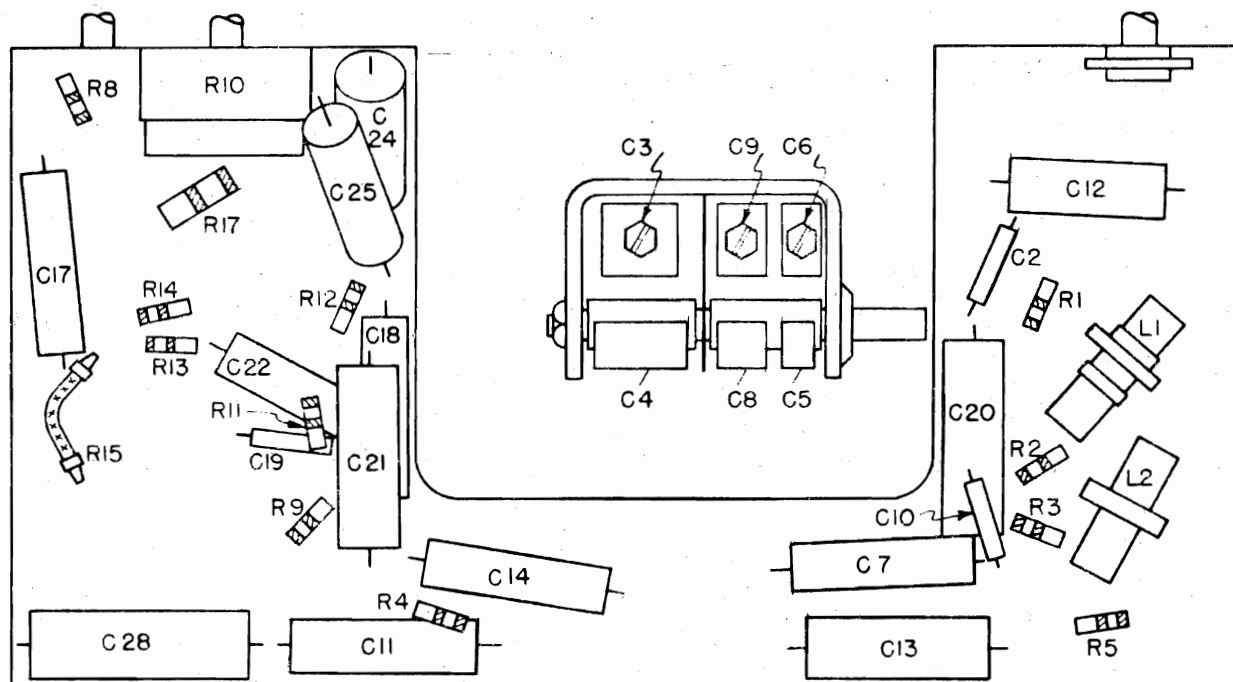
1st, see P.16-8

SEARS ROEBUCK & CO.

MODELS 7080, 7100

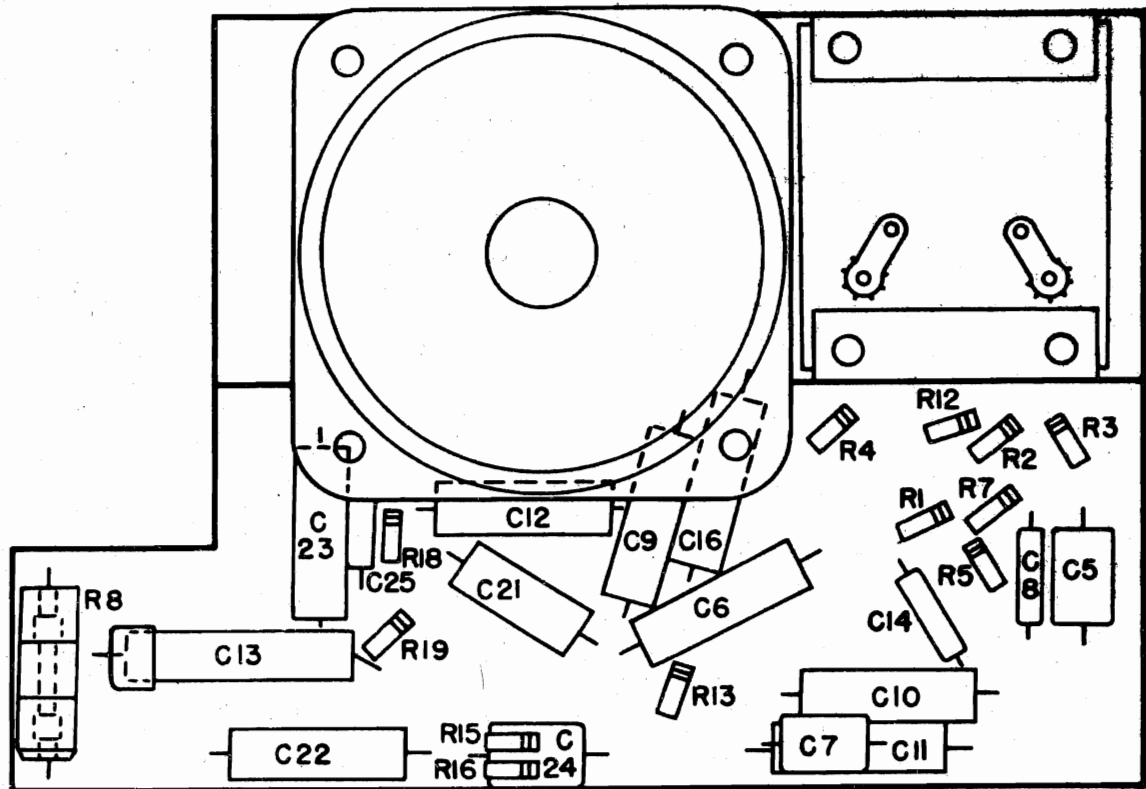


LOCATION OF PARTS ON TOP OF CHASSIS

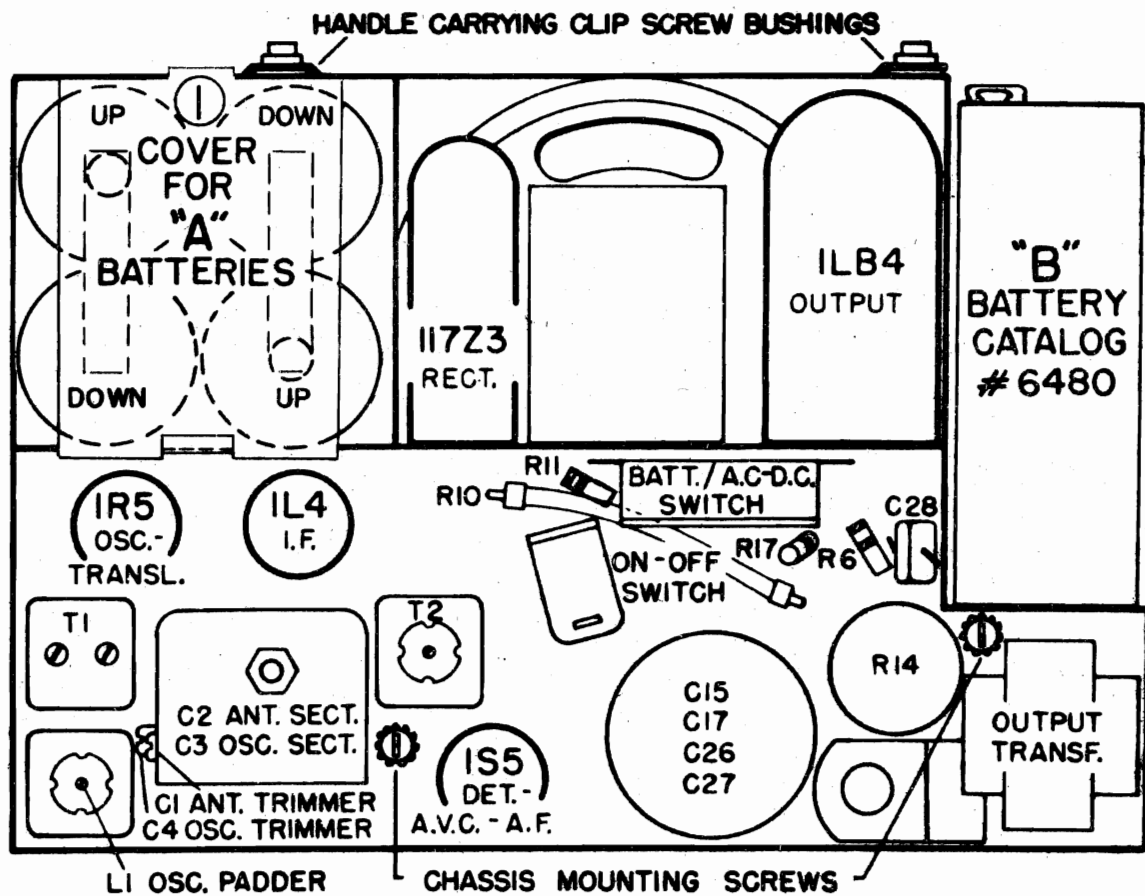


LOCATION OF PARTS UNDER CHASSIS





PARTS LAYOUT - FRONT



PARTS LAYOUT - BACK

MODELS 7165, 7166  
MODELS 7080, 7100

SEARS ROEBUCK &amp; CO.

## SPECIFICATIONS

Power Supply:  
4 Large Flashlight "A" Batteries  
1 #6480 - 67.5 Volt "B" Battery  
105-125 Volts AC or DC

Frequency Range  
CHASSIS DIFFERENCES: Chassis 101.823 and 101.823A are mounted by two machine screws through the chassis. (See Page 2 "Parts Layout Back" for location of mounting screws.) Chassis 101.823-1 and 101.823-1A are mounted by one machine screw through the outside bottom of the case into the chassis. Both types of chassis are held at the top by machine screws through the carrying handle escutcheons.

## HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:  
(1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
- (2) THE CHASSIS NUMBER, which is 101.823 or 101.823-A. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:  
Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of 44%, unless otherwise noted in the M. U. Code Column. Refer to "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of Mark-up Code.

## REMOVING CHASSIS FROM CASE:

1. Open front cover, turn tuning knob to low frequency stop (54 on dial).
2. Remove volume and tuning knobs and dial pointer.
3. Close front cover.
4. Remove two screws holding carrying handle clips.
5. Open back cover.
6. Remove batteries.
7. Unsolder loop lead from variable capacitor and pull this lead out of the vinylite protective tubing.
8. Unsolder second loop lead at ground lug.
9. Remove two chassis mounting screws (See Tube and Battery Layout Illustration).
10. Pull chassis carefully from the case as far as it will go keeping the chassis square with the case.
11. Insert a screw driver or similar tool between chassis and case at the hinges and carefully bend the case to allow carrying strap screw anchors (riveted to the chassis) to clear hinges (See Parts Layout Front Illustration).
12. Pull chassis again squarely until speaker housing holds at the hinge side of the case.
13. Insert the screw driver between chassis and case at or near the speaker housing and gently pry the case to allow speaker to clear. The chassis can then be lifted clear of the case.

## REPLACING CHASSIS INTO CASE:

- To replace the chassis into the case the above procedure should be reversed and the following precautions taken:
1. Dress the loop leads in such manner as not to cut insulation against the edge of the chassis or case.
  2. Guide the "on off" switch button through the hole in the front panel.

## HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:  
(1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
- (2) THE CHASSIS NUMBER, which is 101.811. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:  
Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of 44%, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.
5. In all correspondence relating to cabinets, always mention the source code letter stamped into the upper rear rail of consoles or the bottom of table models, and the CATALOG NUMBER shown on the sticker on the back, bottom or inside of cabinet.

## REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

## 101.823, 101.823-1. IMPORTANT ALIGNMENT NOTES 101.823A, 101.823-1A

An isolation transformer between the power source and the receiver is recommended during any service or alignment operation which requires that service equipment be connected to the receiver. Failure to observe this precaution might damage service equipment.

\*The variable should be rocked back and forth a degree or two while making the 600 KC adjustment.

The Alignment Procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

## ALIGNMENT PROCEDURE

Output Meter Connection.....Across Speaker Voice Coil  
Output Meter Reading to Indicate 40 Milliwatts.....0.4 Volts  
Generator Ground Lead Connection.....To B- through 1 Mfd. Capacitor  
Connection of Generator Output Lead.....See Chart Below  
Position of Volume Control.....Fully On (Clockwise)  
Position of Pointer with Variable Fully Closed.....To right of 540 KC Calibration Mark

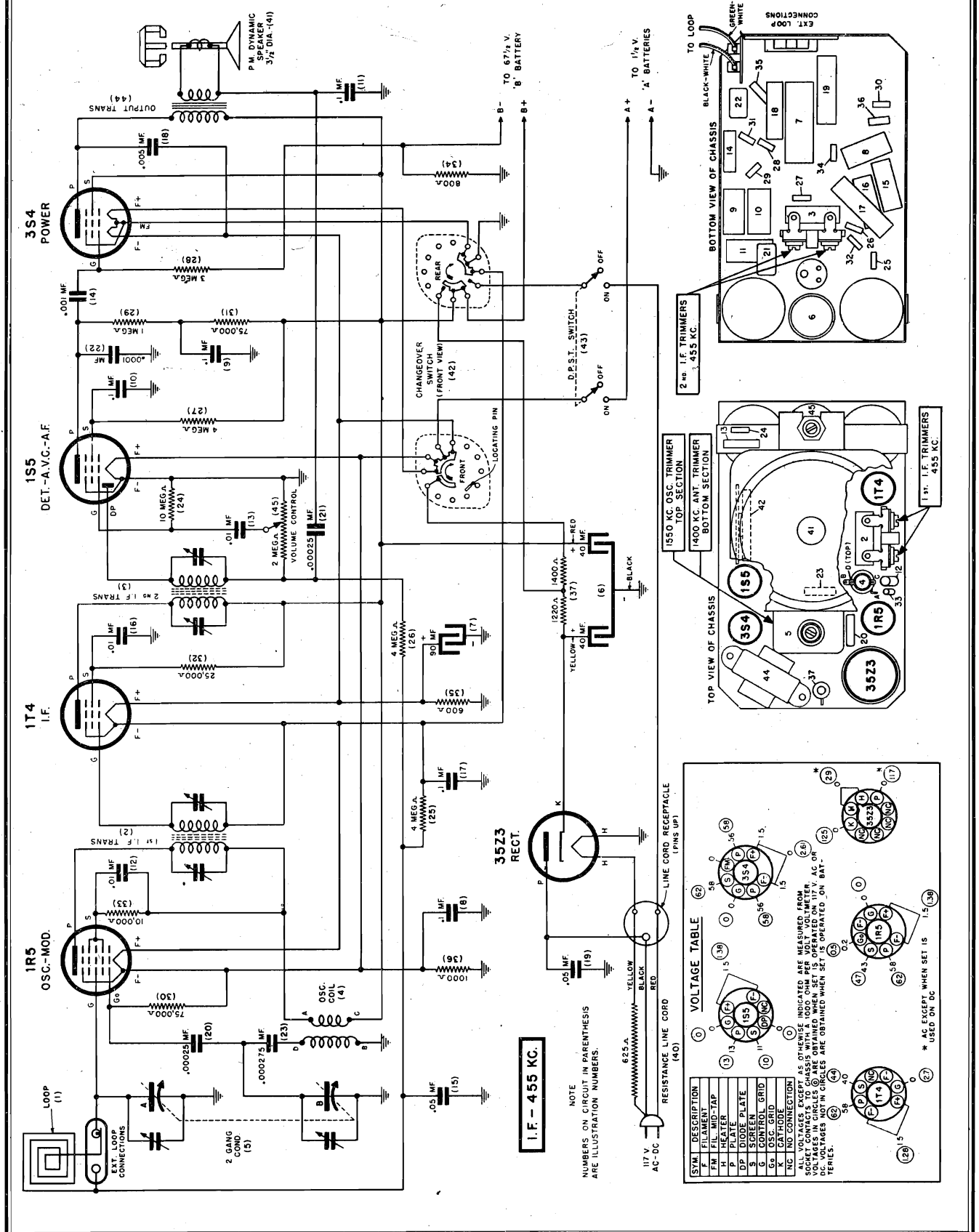
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS IN ORDER SHOWN	TRIMMER FUNCTION
Closed	455	0.05 Mfd.	IR5 Translator	T2-T1	I. F.
Open	1610	0.05 Mfd.	Grid	C4	Oscillator
1400	1400	0.05 Mfd.	Hazeltine Loop	C1	Antenna
*600	600	0.05 Mfd.	Hazeltine Loop	L1	Padder

## MODEL 101.809, 101.811

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	AMPS LIST PRICE	REPAIR PARTS LIST
C4, C8, C5	R1361	Button - Snap	0.01	
C7	R6043	Capacitor - .001 Mfd. 600 V.	0.12	
C11, C12, C13	R6050	Capacitor - .01 Mfd. 600 V.	0.18	
C15, C16, C22	R6051	Capacitor - .005 Mfd. 200 V.	0.17	
C17	R6052	Capacitor - .01 Mfd. 400 V.	0.18	
C20	R6053	Capacitor - .1 Mfd. 200 V.	0.27	
C21	R6054	Capacitor - .1 Mfd. 200 V.	0.22	
C23, C28	R6055	Capacitor - .02 Mfd. 600 V.	0.27	
C24	R6056	Capacitor - .0001 Mfd. Mica	0.20	
C25, C10, C19	R60416	Capacitor - Electrolytic, 20 Mfd. 25 V	1.91	
C23, C28, C27	R60416	Capacitor - .150 V., 40 Mfd. 150 V.	1.91	
L2	R6045	Coil - Oscillator	1.25	
L3	R6046	Coil - Tuning	1.53	
R16	R60516	Control - Tone and On-Off	1.08	
R10	R60517	Control - Volume - 2 Megohm	0.97	
	R60518	Dial - Power	0.26	
	R60523	Drum - Drum and Bushing Assembly	0.42	
	R60520	Escutcheon - Plastic	1.19	
	R60522	Knob - Tone - On-Off	0.14	
	R60480	Knob - Tuning	0.14	
	R60484	Knob - Volume	0.14	
	R54571	Leaflet - Instruction Type #47	0.20	
	R60985	Loop - Assembly with Board	2.26	
R1	R61199	Pointer - Dial	0.11	
R2	R61199	Pointer - Dial	0.11	
R3	R61199	Pointer - Dial	0.11	
R4	R61199	Pointer - Dial	0.11	
R5	R61199	Pointer - Dial	0.11	
R6	R61199	Pointer - Dial	0.11	
R7	R61199	Pointer - Dial	0.11	
R8	R61199	Pointer - Dial	0.11	
R9	R61199	Pointer - Dial	0.11	
R10	R61199	Pointer - Dial	0.11	
R11	R61199	Pointer - Dial	0.11	
R12	R61199	Pointer - Dial	0.11	
R13	R61199	Pointer - Dial	0.11	
R14	R61199	Pointer - Dial	0.11	
R15	R61199	Pointer - Dial	0.11	
R16	R61199	Pointer - Dial	0.11	
R17	R61199	Pointer - Dial	0.11	
R18	R61199	Pointer - Dial	0.11	
R19	R61199	Pointer - Dial	0.11	
R20	R61199	Pointer - Dial	0.11	
R21	R61199	Pointer - Dial	0.11	
R22	R61199	Pointer - Dial	0.11	



SENTINEL RADIO CORP.



## ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required, make the adjustment marked (1) first, (2) next. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA AND BATTERIES IN THE SAME POSITION THEY WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1550 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator assisting at:	Attach output of test oscillator to:	
Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to lug on stator of gang condenser to which loop lead is connected	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1 - Exactly 1550 K.C.	Exactly 1550 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1550 K. C. oscillator trimmer for maximum output.
2 - Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.

## BATTERY INSTALLATION

The plastic case is made in two sections. To install batteries in receiver, push the slide lock button underneath the carrying handle and gently separate the case.

Place the batteries in the exact position shown on the diagram.

Press the snap buttons on the end of the short flexible wire leads into the terminals on top of "B" battery.

After batteries have been installed, gently press the two sections of the case together and lock in place with slide button underneath case handle.

**WHEN INSTALLING BATTERIES BE CAREFUL NOT TO INJURE ANY OF THE EXPOSED RADIO PARTS.**

## BATTERY LIFE

The life of the batteries depends on the number of hours the set is operated.

Based on average usage, the flashlight "A" batteries will supply approximately ten hours' service—the "B" battery approximately forty hours' service.

Because the "A" batteries become exhausted much faster than the "B" battery, six to eight "A" batteries may be used during the life of a single "B" battery.

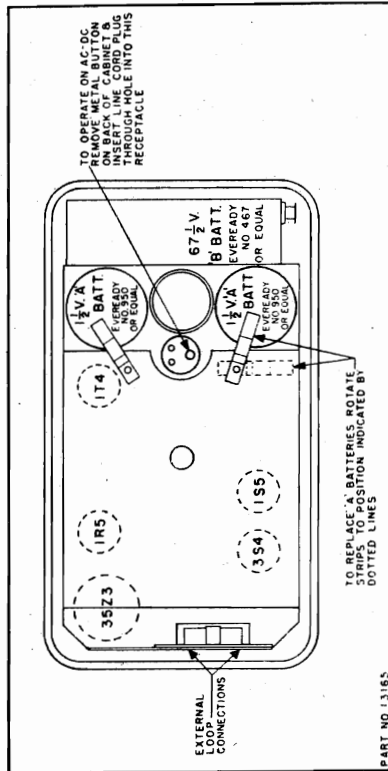
Be sure to try new "A" batteries before replacing the "B" battery.

## 115 VOLT D.C. OR 115 VOLT 50-60 CYCLE ELECTRIC INSTALLATION AND OPERATION

To operate the receiver on 110-120 volt direct current or 50-60 cycle alternating current, just:

- (a) Remove metal button on back of cabinet and insert plug on end of AC-DC line cord into receptacle in back of the small hole that will be exposed when metal button is removed.
- (b) Place battery or AC-DC selector knob in AC/DC position.

If the radio does not operate on "DC" current after approximately one minute, remove the plug on the end of radio set power cord from the house current receptacle, turn it half way around (180°) and reinsert it into the power receptacle.

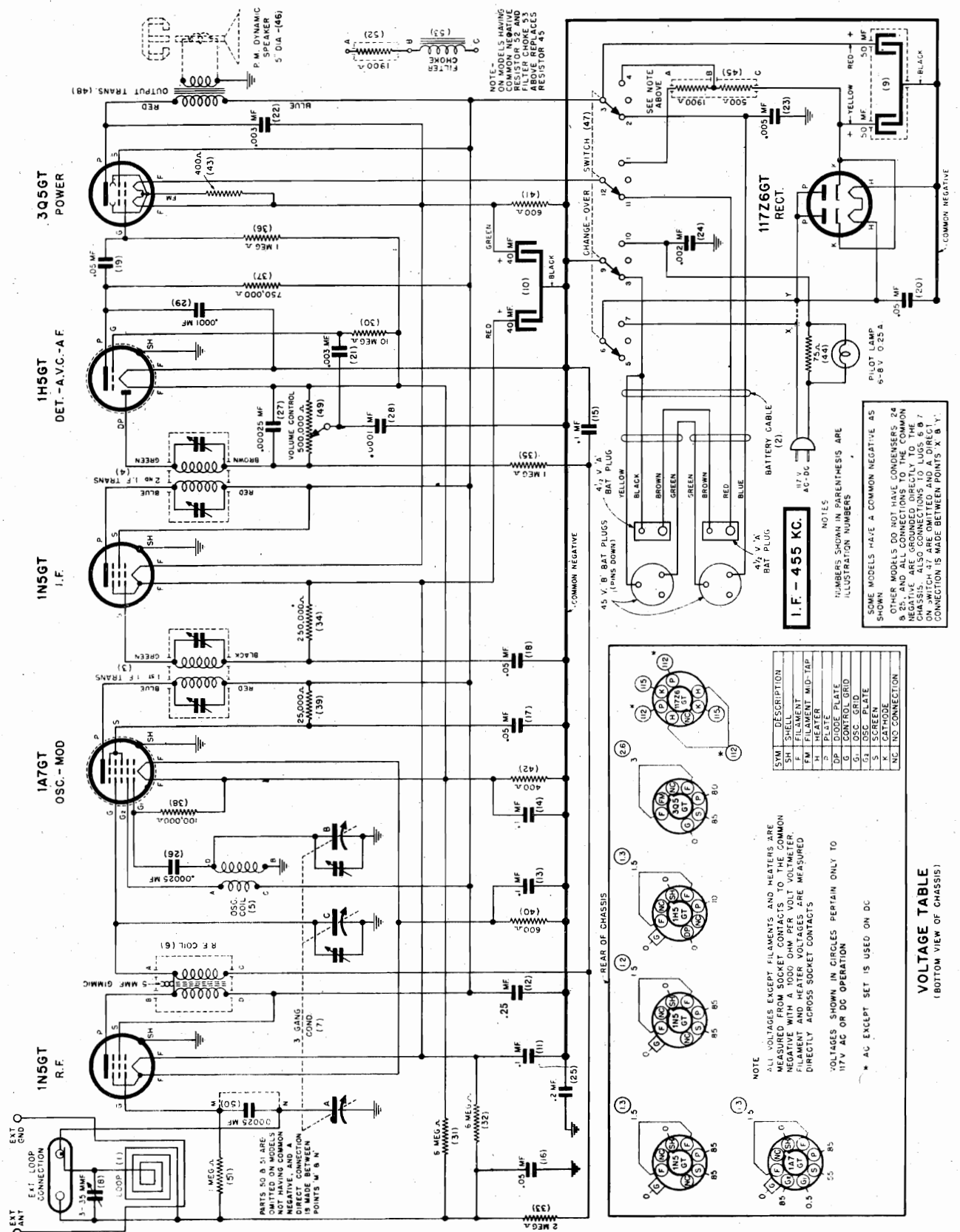


THIS RECEIVER CAN BE OPERATED EITHER WITH DRY BATTERIES OR FROM 110-120 VOLT DIRECT CURRENT OR 50-60 CYCLE ALTERNATING CURRENT.

THUS THE SET MAY BE OPERATED ON FARMS, IN SUMMER CAMPS, HUNTING LODGES, BOATS, OR IN ANY ISOLATED DISTRICTS WHERE ELECTRIC SERVICE IS NOT AVAILABLE BY USING BATTERIES. WHERE 110-120 VOLT DIRECT CURRENT OR 50-60 CYCLE ALTERNATING CURRENT IS AVAILABLE, THE RADIO MAY BE OPERATED DIRECT FROM THE ELECTRIC LINES WITHOUT USING THE BATTERIES OR MAKING ANY CHANGE IN THE RECEIVER.

WHEN THE "BATTERY OR AC-DC" SWITCH KNOB IS IN THE AC-DC POSITION THE BATTERIES ARE ENTIRELY DISCONNECTED AND THE SET RECEIVES ALL ITS POWER FROM THE AC OR DC ELECTRIC LINE.

## SENTINEL RADIO CORP.



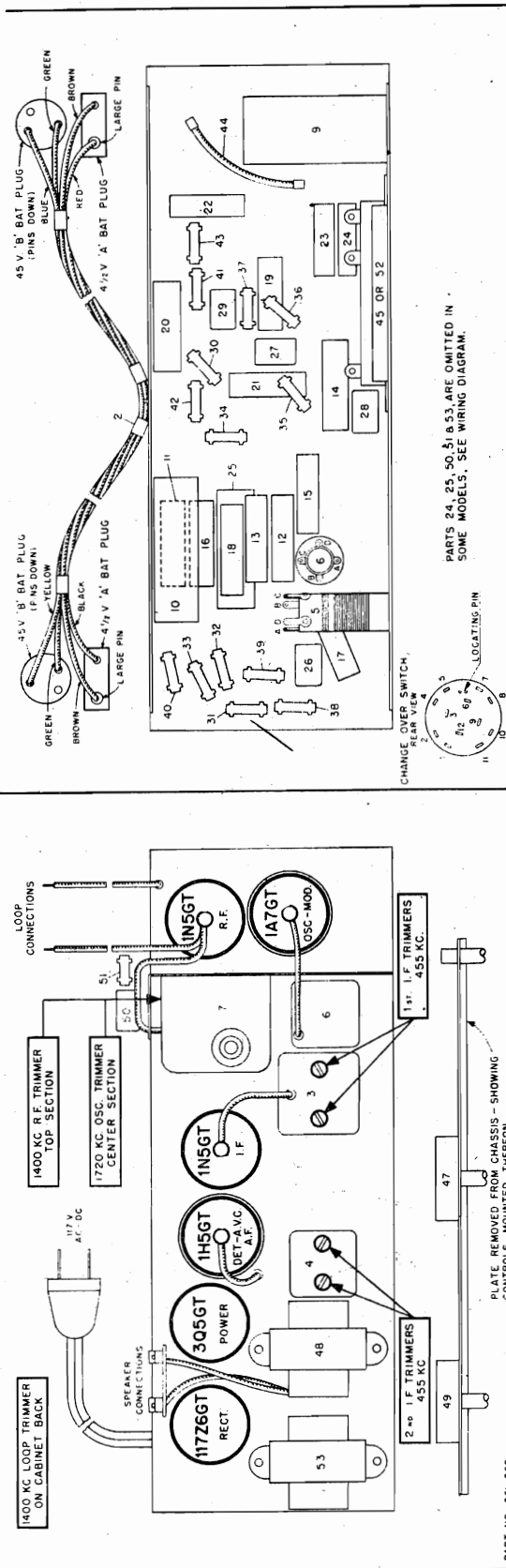
# ALIGNMENT PROCEDURE

PART NO. 13335-202A

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna and R.F. trimmers, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Set receiver dial to:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below:
	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:
Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 1A7GT tube. Do not remove cap.
<b>1</b>	Exactly 1730 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.
<b>2</b>	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.



## VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE WITH BATTERIES OR ON EITHER 110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT (AC) OR 110-120 VOLTS DIRECT CURRENT (DC). IMPORTANT—If hum is high when set is operated on A.C. current, reverse position of set power cord plug in house current socket.

## GROUND

WHEN AN EXTERNAL AERIAL IS ATTACHED TO THE RADIO A GOOD GROUND MUST BE USED. A wire placed underneath the lower left hand screw on back of cabinet and firmly attached to a metal stake driven two to four feet in moist ground, or attached to a cold water pipe will provide a suitable ground.

## CONTROLS

## BATTERY INSTALLATION AND OPERATION

## 115 VOLT D.C. OR 115 VOLT 50-60 CYCLE ELECTRIC INSTALLATION AND OPERATION

To operate the receiver on 110-120 volt direct current or 50-60 cycle alternating current, just:

(a) Bring line cord through opening in bottom of cabinet.

- (a) Bring line cord through opening in bottom of cabinet.
- (b) Insert line cord plug into 110-115 volt AC or DC electric power socket.
- (c) Rotate voltage selector knob to left hand AC/DC position. If the radio does not operate on DC current after approximately one minute remove the plug on the end of radio line cord from the house current receptacle, turn it half way around (180°) and reinsert it into the power receptacle.



TO INSTALL BATTERIES REMOVE BACK FROM CABINET, AND PLACE BATTERIES AS SHOWN. OPERATION BRING LINE CORD THROUGH OPENING IN BOTTOM OF CABINET. ALWAYS KEEP BACK ON CABINET.

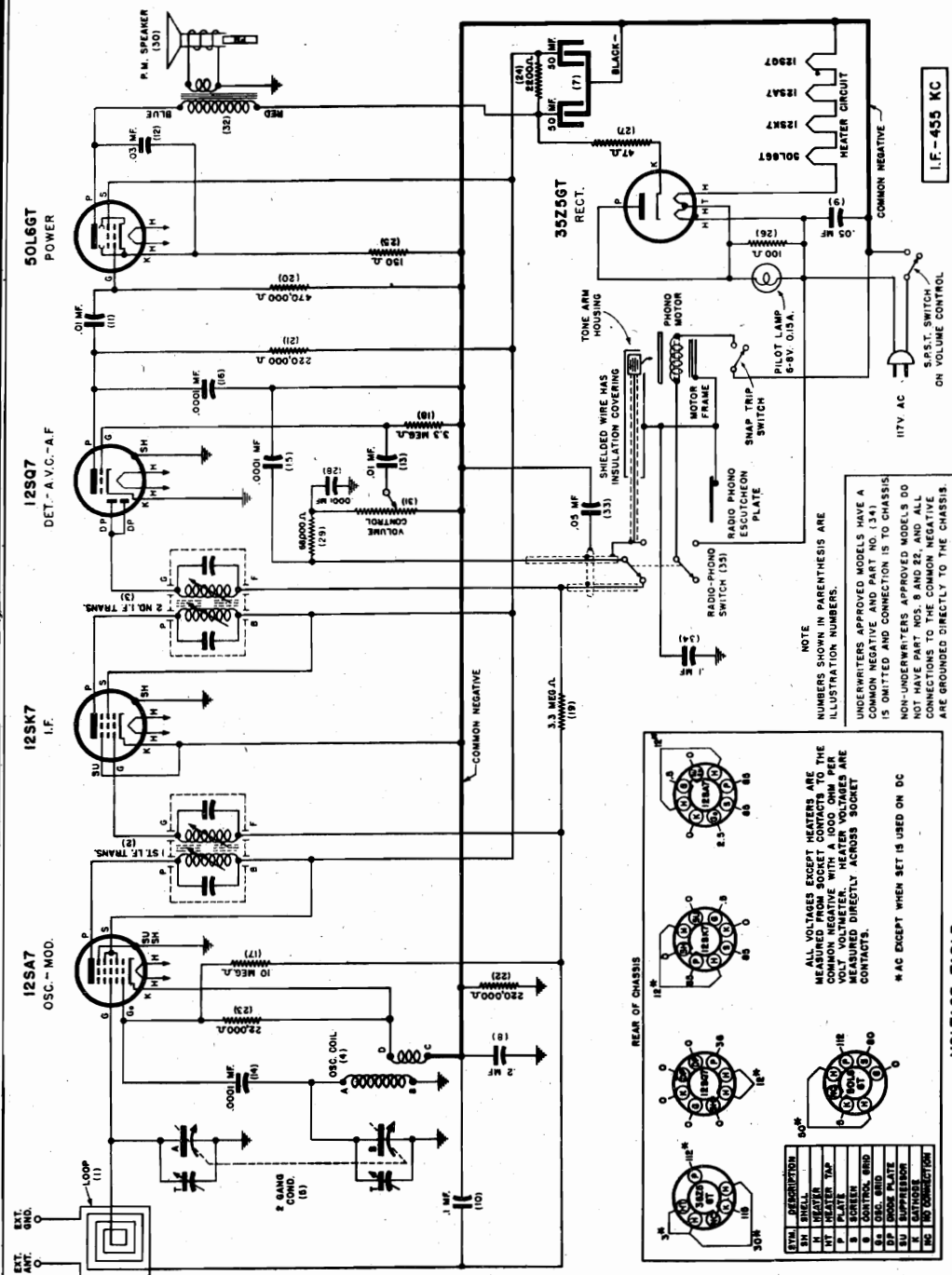
## PARTS LIST

Illus. Part No.	Part Name	Description	List Price
1	Loop Assembly		
2	Antenna	Battery with 2 Three Prong "B" and 2 Two Prong "A" Plugs.	\$1.50
3	Cable	First I.F. Transformer.	.55
4	Coil	Second I.F. Transformer.	.75
5	Coil	Oscillator—used in Models not having common ground	.60
6	Coil	Oscillator—used in Models having common ground	.60
7	Coil	R.F. Coil (Three Gang)	.50
8	Condenser	Trimmer (Dry Elec. 50-50 M.F.)	2.20
9	Condenser	Tubular Dry Elec. (50-50 Mfd. 150 Volt)	.75
10	Condenser	Tubular Dry Elec. (40-40 Mfd. 25 Volt)	.50
11	Condenser	Tubular .0025 Mfd. 200 Volt	.20
12	Condenser	Tubular .001 Mfd. 200 Volt	.20
13	Condenser	Tubular .0005 Mfd. 200 Volt	.20
14	Condenser	Tubular .00025 Mfd. 200 Volt	.20
15	Condenser	Tubular .0001 Mfd. 200 Volt	.20
16	Condenser	Tubular .00005 Mfd. 200 Volt	.20
17	Condenser	Tubular .000025 Mfd. 200 Volt	.20
18	Condenser	Tubular .00001 Mfd. 200 Volt	.20
19	Condenser	Tubular .000005 Mfd. 200 Volt	.20
20	Condenser	Tubular .0000025 Mfd. 200 Volt	.20
21	Condenser	Tubular .000001 Mfd. 200 Volt	.20
22	Condenser	Tubular .0000005 Mfd. 200 Volt	.20
23	Condenser	Tubular .00000025 Mfd. 200 Volt	.20
24	Condenser	Tubular .0000001 Mfd. 200 Volt	.20
25	Condenser	Tubular .00000005 Mfd. 200 Volt	.20
26	Condenser	Tubular .000000025 Mfd. 200 Volt	.20
27	Condenser	Tubular .00000001 Mfd. 200 Volt	.20
28	Condenser	Tubular .000000005 Mfd. 200 Volt	.20
29	Condenser	Tubular .0000000025 Mfd. 200 Volt	.20
30	Condenser	Tubular .000000001 Mfd. 200 Volt	.20
31	Condenser	Tubular .0000000005 Mfd. 200 Volt	.20
32	Condenser	Tubular .00000000025 Mfd. 200 Volt	.20
33	Condenser	Tubular .0000000001 Mfd. 200 Volt	.20
34	Condenser	Tubular .00000000005 Mfd. 200 Volt	.20
35	Condenser	Tubular .000000000025 Mfd. 200 Volt	.20
36	Condenser	Tubular .00000000001 Mfd. 200 Volt	.20
37	Condenser	Tubular .000000000005 Mfd. 200 Volt	.20
38	Condenser	Tubular .0000000000025 Mfd. 200 Volt	.20
39	Condenser	Tubular .000000000001 Mfd. 200 Volt	.20
40	Condenser	Tubular .0000000000005 Mfd. 200 Volt	.20
41	Condenser	Tubular .00000000000025 Mfd. 200 Volt	.20
42	Condenser	Tubular .0000000000001 Mfd. 200 Volt	.20
43	Condenser	Tubular .00000000000005 Mfd. 200 Volt	.20
44	Condenser	Tubular .000000000000025 Mfd. 200 Volt	.20
45	Condenser	Tubular .00000000000001 Mfd. 200 Volt	.20
46	Condenser	Tubular .000000000000005 Mfd. 200 Volt	.20
47	Condenser	Tubular .0000000000000025 Mfd. 200 Volt	.20
48	Condenser	Tubular .000000000000001 Mfd. 200 Volt	.20
49	Condenser	Tubular .0000000000000005 Mfd. 200 Volt	.20
50	Condenser	Tubular .00000000000000025 Mfd. 200 Volt	.20
51	Condenser	Tubular .0000000000000001 Mfd. 200 Volt	.20
52	Condenser	Tubular .00000000000000005 Mfd. 200 Volt	.20
53	Condenser	Tubular .000000000000000025 Mfd. 200 Volt	.20
54	Condenser	Tubular .00000000000000001 Mfd. 200 Volt	.20
55	Condenser	Tubular .000000000000000005 Mfd. 200 Volt	.20
56	Condenser	Tubular .0000000000000000025 Mfd. 200 Volt	.20
57	Condenser	Tubular .000000000000000001 Mfd. 200 Volt	.20
58	Condenser	Tubular .0000000000000000005 Mfd. 200 Volt	.20
59	Condenser	Tubular .00000000000000000025 Mfd. 200 Volt	.20
60	Condenser	Tubular .0000000000000000001 Mfd. 200 Volt	.20
61	Condenser	Tubular .00000000000000000005 Mfd. 200 Volt	.20
62	Condenser	Tubular .000000000000000000025 Mfd. 200 Volt	.20
63	Condenser	Tubular .00000000000000000001 Mfd. 200 Volt	.20
64	Condenser	Tubular .000000000000000000005 Mfd. 200 Volt	.20
65	Condenser	Tubular .0000000000000000000025 Mfd. 200 Volt	.20
66	Condenser	Tubular .000000000000000000001 Mfd. 200 Volt	.20
67	Condenser	Tubular .0000000000000000000005 Mfd. 200 Volt	.20
68	Condenser	Tubular .00000000000000000000025 Mfd. 200 Volt	.20
69	Condenser	Tubular .0000000000000000000001 Mfd. 200 Volt	.20
70	Condenser	Tubular .00000000000000000000005 Mfd. 200 Volt	.20
71	Condenser	Tubular .000000000000000000000025 Mfd. 200 Volt	.20
72	Condenser	Tubular .00000000000000000000001 Mfd. 200 Volt	.20
73	Condenser	Tubular .000000000000000000000005 Mfd. 200 Volt	.20
74	Condenser	Tubular .0000000000000000000000025 Mfd. 200 Volt	.20
75	Condenser	Tubular .000000000000000000000001 Mfd. 200 Volt	.20
76	Condenser	Tubular .0000000000000000000000005 Mfd. 200 Volt	.20
77	Condenser	Tubular .00000000000000000000000025 Mfd. 200 Volt	.20
78	Condenser	Tubular .0000000000000000000000001 Mfd. 200 Volt	.20
79	Condenser	Tubular .00000000000000000000000005 Mfd. 200 Volt	.20
80	Condenser	Tubular .000000000000000000000000025 Mfd. 200 Volt	.20
81	Condenser	Tubular .00000000000000000000000001 Mfd. 200 Volt	.20
82	Condenser	Tubular .000000000000000000000000005 Mfd. 200 Volt	.20
83	Condenser	Tubular .0000000000000000000000000025 Mfd. 200 Volt	.20
84	Condenser	Tubular .000000000000000000000000001 Mfd. 200 Volt	.20
85	Condenser	Tubular .0000000000000000000000000005 Mfd. 200 Volt	.20
86	Condenser	Tubular .00000000000000000000000000025 Mfd. 200 Volt	.20
87	Condenser	Tubular .0000000000000000000000000001 Mfd. 200 Volt	.20
88	Condenser	Tubular .00000000000000000000000000005 Mfd. 200 Volt	.20
89	Condenser	Tubular .000000000000000000000000000025 Mfd. 200 Volt	.20
90	Condenser	Tubular .00000000000000000000000000001 Mfd. 200 Volt	.20
91	Condenser	Tubular .000000000000000000000000000005 Mfd. 200 Volt	.20
92	Condenser	Tubular .0000000000000000000000000000025 Mfd. 200 Volt	.20
93	Condenser	Tubular .000000000000000000000000000001 Mfd. 200 Volt	.20
94	Condenser	Tubular .0000000000000000000000000000005 Mfd. 200 Volt	.20
95	Condenser	Tubular .00000000000000000000000000000025 Mfd. 200 Volt	.20
96	Condenser	Tubular .0000000000000000000000000000001 Mfd. 200 Volt	.20
97	Condenser	Tubular .00000000000000000000000000000005 Mfd. 200 Volt	.20
98	Condenser	Tubular .000000000000000000000000000000025 Mfd. 200 Volt	.20
99	Condenser	Tubular .00000000000000000000000000000001 Mfd. 200 Volt	.20
100	Condenser	Tubular .000000000000000000000000000000005 Mfd. 200 Volt	.20
101	Condenser	Tubular .0000000000000000000000000000000025 Mfd. 200 Volt	.20
102	Condenser	Tubular .000000000000000000000000000000001 Mfd. 200 Volt	.20
103	Condenser	Tubular .0000000000000000000000000000000005 Mfd. 200 Volt	.20
104	Condenser	Tubular .00000000000000000000000000000000025 Mfd. 200 Volt	.20
105	Condenser	Tubular .0000000000000000000000000000000001 Mfd. 200 Volt	.20
106	Condenser	Tubular .00000000000000000000000000000000005 Mfd. 200 Volt	.20
107	Condenser	Tubular .000000000000000000000000000000000025 Mfd. 200 Volt	.20
108	Condenser	Tubular .00000000000000000000000000000000001 Mfd. 200 Volt	.20
109	Condenser	Tubular .000000000000000000000000000000000005 Mfd. 200 Volt	.20
110	Condenser	Tubular .0000000000000000000000000000000000025 Mfd. 200 Volt	.20
111	Condenser	Tubular .000000000000000000000000000000000001 Mfd. 200 Volt	.20
112	Condenser	Tubular .0000000000000000000000000000000000005 Mfd. 200 Volt	.20
113	Condenser	Tubular .00000000000000000000000000000000000025 Mfd. 200 Volt	.20
114	Condenser	Tubular .0000000000000000000000000000000000001 Mfd. 200 Volt	.20
115	Condenser	Tubular .00000000000000000000000000000000000005 Mfd. 200 Volt	.20
116	Condenser	Tubular .000000000000000000000000000000000000025 Mfd. 200 Volt	.20
117	Condenser	Tubular .00000000000000000000000000000000000001 Mfd. 200 Volt	.20
118	Condenser	Tubular .000000000000000000000000000000000000005 Mfd. 200 Volt	.20
119	Condenser	Tubular .0000000000000000000000000000000000000025 Mfd. 200 Volt	.20
120	Condenser	Tubular .000000000000000000000000000000000000001 Mfd. 200 Volt	.20
121	Condenser	Tubular .0000000000000000000000000000000000000005 Mfd. 200 Volt	.20
122	Condenser	Tubular .00000000000000000000000000000000000000025 Mfd. 200 Volt	.20
123	Condenser	Tubular .0000000000000000000000000000000000000001 Mfd. 200 Volt	.20
124	Condenser	Tubular .005 Mfd. 200 Volt	.20
125	Condenser	Tubular .0025 Mfd. 200 Volt	.20
126	Condenser	Tubular .001 Mfd. 200 Volt	.20
127	Condenser	Tubular .0005 Mfd. 200 Volt	.20
128	Condenser	Tubular .00025 Mfd. 200 Volt	.20
129	Condenser	Tubular .0001 Mfd. 200 Volt	.20
130	Condenser	Tubular .005 Mfd. 200 Volt	.20
131	Condenser	Tubular .0025 Mfd. 200 Volt	.20
132	Condenser	Tubular .001 Mfd. 200 Volt	.20
133	Condenser	Tubular .0005 Mfd. 200 Volt	.20
134	Condenser	Tubular .00025 Mfd. 200 Volt	.20
135	Condenser	Tubular .0001 Mfd. 200 Volt	.20
136	Condenser	Tubular .005 Mfd. 200 Volt	.20
137	Condenser	Tubular .0025 Mfd. 200 Volt	.20
138	Condenser	Tubular .001 Mfd. 200 Volt	.20
139	Condenser	Tubular .0005 Mfd. 200 Volt	.20
140	Condenser	Tubular .00025 Mfd. 200 Volt	.20
141	Condenser	Tubular .0001 Mfd. 200 Volt	.20
142	Condenser	Tubular .005 Mfd. 200 Volt	.20
143	Condenser	Tubular .0025 Mfd. 200 Volt	.20
144	Condenser	Tubular .001 Mfd. 200 Volt	.20
145	Condenser	Tubular .0005 Mfd. 200 Volt	.20
146	Condenser	Tubular .00025 Mfd. 200 Volt	.20
147	Condenser	Tubular .0001 Mfd. 200 Volt	.20
148	Condenser	Tubular .005 Mfd. 200 Volt	.20
149	Condenser	Tubular .0025 Mfd. 200 Volt	.20
150	Condenser	Tubular .001 Mfd. 200 Volt	.20
151	Condenser	Tubular .0005 Mfd. 200 Volt	.20
152	Condenser	Tubular .00025 Mfd. 200 Volt	.20
153	Condenser	Tubular .0001 Mfd. 200 Volt	.20
154	Condenser	Tubular .005 Mfd. 200 Volt	.20
155	Condenser	Tubular .0025 Mfd. 200 Volt	.20
156	Condenser	Tubular .001 Mfd. 200 Volt	.20
157	Condenser	Tubular .0005 Mfd. 200 Volt	.20
158	Condenser	Tubular .00025 Mfd. 200 Volt	.20
159	Condenser	Tubular .0001 Mfd. 200 Volt	.20
160	Condenser	Tubular .005 Mfd. 200 Volt	.20
161	Condenser	Tubular .0025 Mfd. 200 Volt	.20
162	Condenser	Tubular .001 Mfd. 200 Volt	.20
163	Condenser	Tubular .0005 Mfd. 200 Volt	.20
164	Condenser	Tubular .00025 Mfd. 200 Volt	.20
165	Condenser	Tubular .0001 Mfd. 200 Volt	.20
166	Condenser	Tubular .005 Mfd. 200 Volt	.20
167	Condenser	Tubular .0025 Mfd. 200 Volt	.20
168	Condenser	Tubular .001 Mfd. 200 Volt	.20
169	Condenser	Tubular .0005 Mfd. 200 Volt	.20
170	Condenser	Tubular .00025 Mfd. 200 Volt	.20
171	Condenser	Tubular .0001 Mfd. 200 Volt	.20
172	Condenser	Tubular .005 Mfd. 200 Volt	.20
173	Condenser	Tubular .0025 Mfd. 200 Volt	.20
174	Condenser	Tubular .001 Mfd. 200 Volt	.20
175	Condenser	Tubular .0005 Mfd. 200 Volt	.20
176	Condenser	Tubular .00000000000000000000000000000	

## MISCELLANEOUS PARTS

Bulb	Cord
6 ft. 250 Amp. Dial Light No.	\$0.10
24" of No. 18 L.B. Drive Cord	.15
Dial Shaft	.15
Dial Card	.20
Dial Pointer	.10
Dial AC-Dial Battery Indicator	.35
Dial Calibrated Scale	.30
Dial Crystal	.10
Three Prong "B"	.08
Two Prong "A"	.08
Metal Control Face Plate for Cabinet	1.00

# SENTINEL RADIO CORP.



## GROUND

When a regular aerial is used, best result will be obtained with a ground attached to the black lead coming out of the rear of the chassis.  
**WARNING** — DO NOT ATTACH A GROUND DIRECT TO THE RADIO CHASSIS—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS WILL CAUSE A SHORT AND POSSIBLE DAMAGE.

## DIAL LIGHT

It is normal for the dial light to be dim for approximately 60 seconds after set is turned "on" and then attain normal brilliance—also, on very loud signals the light may fluctuate.  
When replacing light, always use a 6.3 volt .150 ampere dial light.

**VOLTAGE TABLE**  
(BOTTOM VIEW OF CHASSIS)

WTA	DESCRIPTION	WTA	DESCRIPTION
1	117V. 117V.	11	117V. 117V.
2	117V. 117V.	12	117V. 117V.
3	117V. 117V.	13	117V. 117V.
4	117V. 117V.	14	117V. 117V.
5	117V. 117V.	15	117V. 117V.
6	117V. 117V.	16	117V. 117V.
7	117V. 117V.	17	117V. 117V.
8	117V. 117V.	18	117V. 117V.
9	117V. 117V.	19	117V. 117V.
10	117V. 117V.	20	117V. 117V.

## LOOP AERIAL

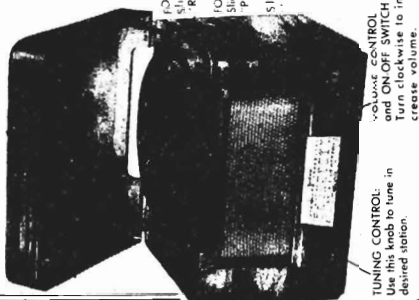
THE LOOP AERIAL SUPPLIED with the radio should provide ample reception in average locations.  
Loop aerials are directional—the volume of a weak station may be improved, or undesired electrical noise may be reduced, by lifting and turning the radio to a different position. A trial will reveal position of best reception with least interference.

## OUTSIDE AERIAL

If the radio is used in shielded areas or located a great distance from broadcast stations, the volume of some or all stations may not be ample, in which case it would be necessary to ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT OF THE REAR OF THE CHASSIS.

## INSTRUCTIONS FOR PLAYING A 7", 10" OR 12" RECORD:

- LIFT CABINET LID AND PLACE RECORD ON TURNABLE.
- SLIDE RECORD SIZE SELECTOR BUTTON TO PROPER POSITION. FOR 12" RECORD, SLIDE BUTTON TO 12" POSITION. SLIDE BUTTON TO 10" POSITION. SLIDE BUTTON TO 7" POSITION. MARKED 10" AND SLIDE TO 7" POSITION.
- PLACE "RADIO-PHONO" SWITCH IN PHONO POSITION.
- CLOSE LID—THIS WILL AUTOMATICALLY START RECORD PLAYING. WHEN RECORD HAS BEEN COMPLETELY PLAYED, THE LID WILL AUTOMATICALLY TURN OFF RECORD TO PLAY SAME RECORD AGAIN. JUST LIFT LID ALL THE WAY UP AND RE-CLOSE.
- TO PLAY ANOTHER RECORD, REPLACE RECORD ON TURNABLE AND PROCEED AS ABOVE.
- DO NOT HAVE MORE THAN ONE RECORD ON TURNABLE.



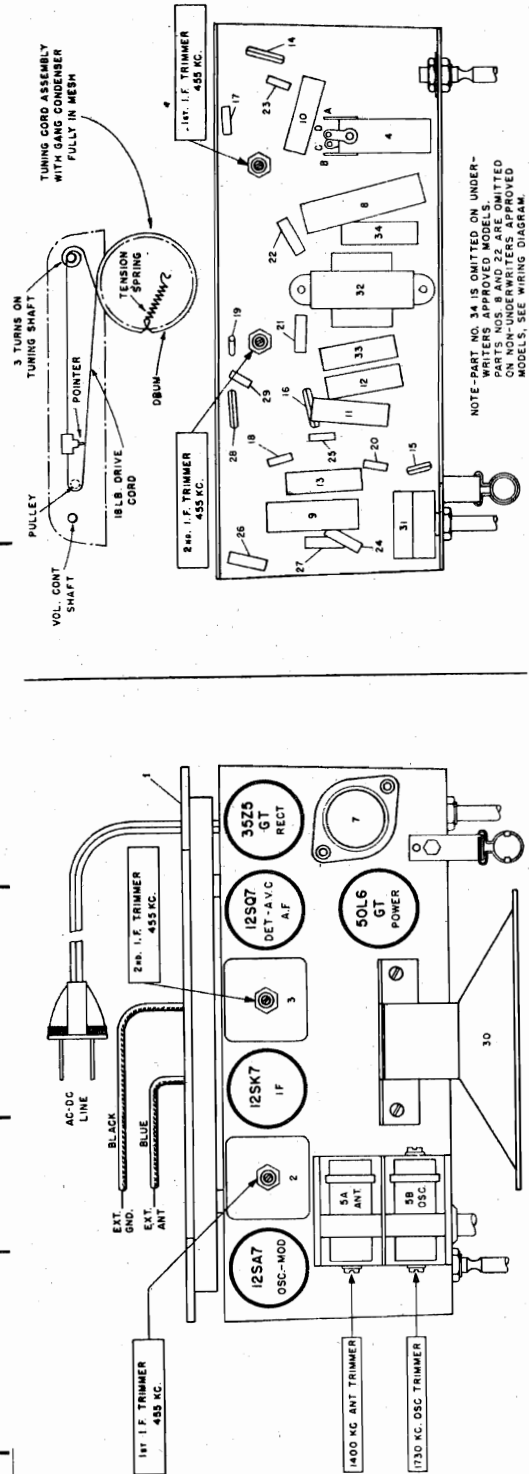
**ALIGNMENT PROCEDURE**

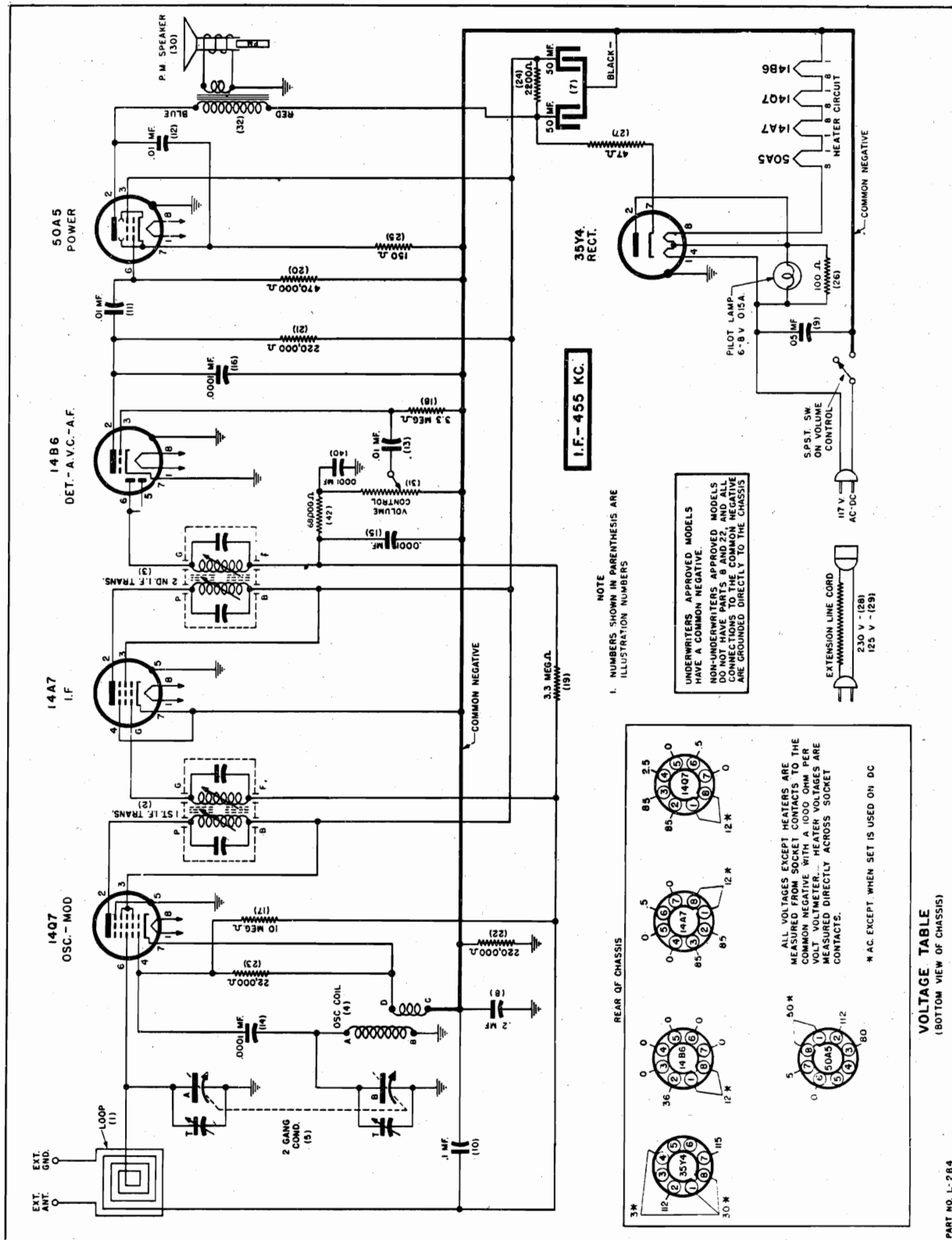
For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

- Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.
- Use an accurately calibrated test oscillator with some type of output measuring device.
- PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

Steps	Set receiver dial to:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
3	Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Adjust 1730 K. C. oscillator trimmer for maximum output.
				While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.







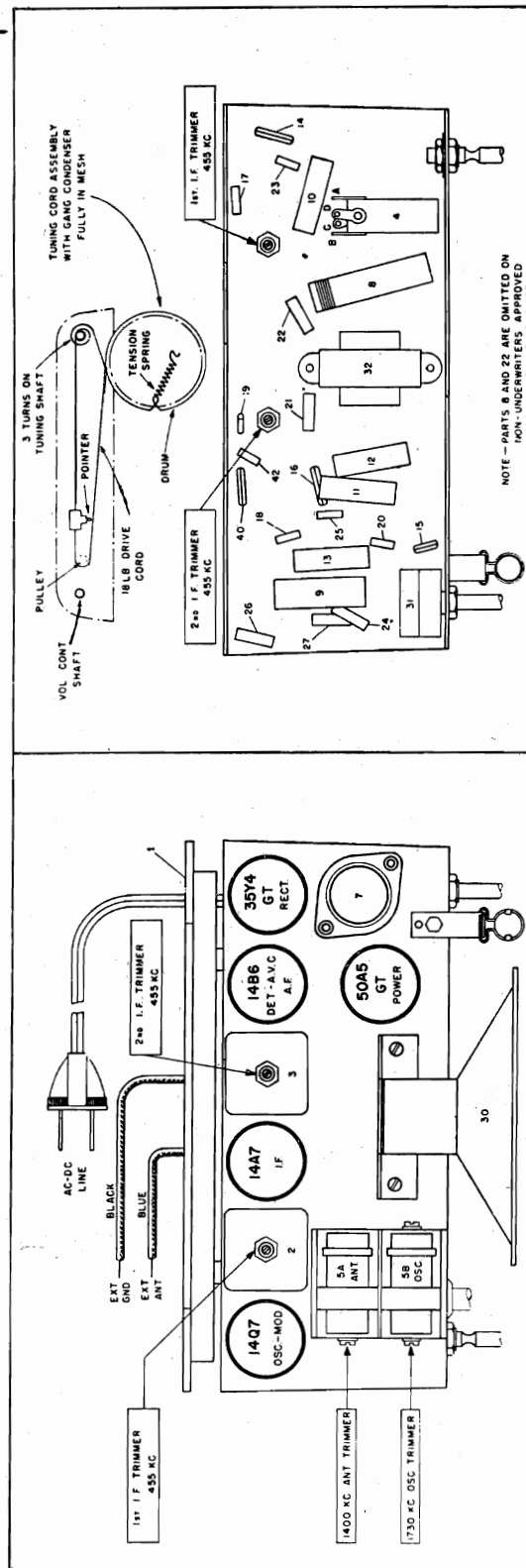
## ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

- (a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.
- (b) Use an accurately calibrated test oscillator with some type of output measuring device.
- (c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

Steps	Set receiver dial to:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Attach output of test oscillator to:	
1	Any point where no interfering signal is received.	455 K. C.	Use dummy antenna in series with output of test oscillator consisting of:  .02 MFD. condenser	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Exactly 1400 B. C.	.00025 MFD. condenser	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.



## SENTINEL RADIO CORP.

MODELS L-284I, L-284NA,  
L-284NI, L-284NR, L-284W  
MODEL 247

MODEL L-284W, L-284I, L-284NI, L-284NA, L-284NR  
VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON EITHER:  
110-120 VOLTS 50-60 CYCLES ALTERNATING  
CURRENT (AC) OR 110-120 VOLTS DIRECT CURRENT  
(DC). IF THE RADIO DOES NOT OPERATE AFTER  
APPROXIMATELY ONE MINUTE, REMOVE THE PLUG  
ON THE END OF THE RADIO LINE CORD FROM THE  
POWER RECEPTACLE, TURN IT HALF WAY AROUND  
AND RE-INSERT IT INTO THE RECEPTACLE.

## DIAL LIGHT

IT IS NORMAL FOR THE DIAL LIGHT TO BE DIM  
FOR APPROXIMATELY 60 SECONDS AFTER SET IS  
TURNED "ON" AND THEN ATTAIN NORMAL BRILLIANCE  
-ALSO, ON VERY LOUD SIGNALS THE LIGHT MAY  
FLUCTUATE.

ALWAYS USE A 6.3 VOLT .150 AMPERE DIAL  
LIGHT.

## PARTS LIST

Ill. No.	Part No.	Part Name	Description	List Price
1	20E24	Antenna	Loop	.17
2	20E21	Coil	1st I.F. Transformer	2.75
2	20E26	Coil	1st I.F. Transformer	.19
3	20E22	Coil	2nd I.F. Transformer	2.75
3	20E21-2	Coil	2nd I.F. Transformer	.22
4	20E162	Coil	Oscillator	.95
5	24E2	Condenser	Tuning, 2 Gang (3 Hole Mtg.)	3.40
5	24E18	Condenser	Tuning, 2 Gang (2 Hole Mtg.)	.24
7	25E1	Condenser	Dry Electrolytic, 50-50 Mfd. 150 V.	4.00
8	23E421	Condenser	Tubular, .2 Mfd. 400 Volts	1.40
9	23E418	Condenser	Tubular, .05 Mfd. 400 Volts	.30
10	23E418	Condenser	Tubular, .1 Mfd. 400 Volts	.24
11	23E211	Condenser	Tubular, .01 Mfd. 200 Volts	.18
12	23E211	Condenser	Tubular, .01 Mfd. 200 Volts	.18
13	23E211	Condenser	Tubular, .01 Mfd. 200 Volts	.18
14	23E39	Condenser	Mica, .0001 Mfd.	.25
15	23E39	Condenser	Mica, .0001 Mfd.	.25
16	23E39	Condenser	Mica, .0001 Mfd.	.25
16	23E39	Condenser	Mica, .0001 Mfd.	.25

## MISCELLANEOUS PARTS

Part No.	Part Name	Description	List Price
7E31-1	Cabinet	Walnut Plastic	\$3.35
7E31-2	Cabinet	Ivory Plastic	4.85
7E1-1	Cabinet	Amber Catalin	17.00
7E1-5	Cabinet	Ivory Catalin	17.00
7E1-6	Cabinet	Red Catalin	17.00
7E70	Cabinet Back	For Catalin Cabinet	.20
7E32	Cabinet Back	For Walnut & Ivory Plastic Cabinets	.15
41E1	Cord	6 Ft. Rubber Line Cord	.40
20E12	Dial Plate	Dial Back Plate Assem. Less Scale	.70
4E1	Dial Cord	30" of 18 Lb. Dial Drive Cord	.15
40E1	Pilot Lamp	6-8 Volt .150 Amp. Type 47 Lamp	.10

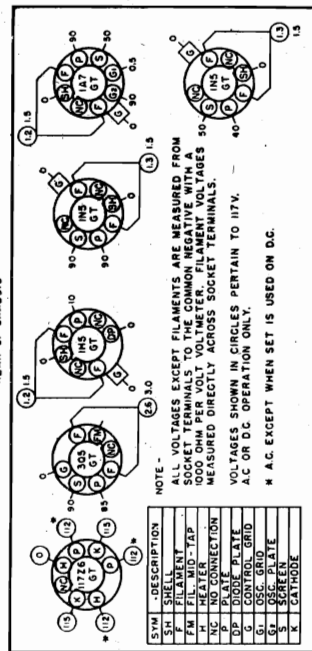
## MODEL 247

Illus. Part No.	Part Name	Description	List Price
1	13276	Antenna	Loop Assembly Mounted in Lid Cover \$1.50
2	13263	Coil	First I.F. Transformer
3	13263	Coil	Second I.F. Transformer
4	13263	Coil	Oscillator
5	13263	Coil	Tuning, 2 Gang
6	13263	Coil	Tuning, 2 Gang
7	13263	Coil	Dry Electrolytic, 50-50 Mfd. 150 V.
8	13263	Coil	Tubular, .2 Mfd. 400 Volts
9	13263	Coil	Tubular, .05 Mfd. 400 Volts
10	13263	Coil	Tubular, .1 Mfd. 400 Volts
11	13263	Coil	Tubular, .01 Mfd. 200 Volts
12	13263	Coil	Tubular, .01 Mfd. 200 Volts
13	13263	Coil	Tubular, .01 Mfd. 200 Volts
14	13263	Coil	Mica, .0001 Mfd.
15	13263	Coil	Mica, .0001 Mfd.
16	13263	Coil	Mica, .0001 Mfd.
17	13263	Coil	Mica, .0001 Mfd.
18	13263	Coil	Mica, .0001 Mfd.
19	13263	Coil	Mica, .0001 Mfd.
20	13263	Coil	Mica, .0001 Mfd.
21	13263	Coil	Mica, .0001 Mfd.
22	13263	Coil	Mica, .0001 Mfd.
23	13263	Coil	Mica, .0001 Mfd.
24	13263	Coil	Mica, .0001 Mfd.
25	13263	Coil	Mica, .0001 Mfd.
26	13263	Coil	Mica, .0001 Mfd.
27	13263	Coil	Mica, .0001 Mfd.
28	13263	Coil	Mica, .0001 Mfd.
29	13263	Coil	Mica, .0001 Mfd.
30	13263	Coil	Mica, .0001 Mfd.
31	13263	Coil	Mica, .0001 Mfd.
32	13263	Coil	Mica, .0001 Mfd.
33	13263	Coil	Mica, .0001 Mfd.
34	13263	Coil	Mica, .0001 Mfd.
35	13263	Coil	Mica, .0001 Mfd.
36	13263	Coil	Mica, .0001 Mfd.
37	13263	Coil	Mica, .0001 Mfd.
38	13263	Coil	Mica, .0001 Mfd.
39	13263	Coil	Mica, .0001 Mfd.
40	13263	Coil	Mica, .0001 Mfd.
41	13263	Coil	Mica, .0001 Mfd.
42	13263	Coil	Mica, .0001 Mfd.
43	13263	Coil	Mica, .0001 Mfd.
44	13263	Coil	Mica, .0001 Mfd.
45	13263	Coil	Mica, .0001 Mfd.
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55	13263	Coil	Mica, .0001 Mfd.
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59	13263	Coil	Mica, .0001 Mfd.
60	13263	Coil	Mica, .0001 Mfd.
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62	13263	Coil	Mica, .0001 Mfd.
63	13263	Coil	Mica, .0001 Mfd.
64	13263	Coil	Mica, .0001 Mfd.
65	13263	Coil	Mica, .0001 Mfd.
66	13263	Coil	Mica, .0001 Mfd.
67	13263	Coil	Mica, .0001 Mfd.
68	13263	Coil	Mica, .0001 Mfd.
69	13263	Coil	Mica, .0001 Mfd.
70	13263	Coil	Mica, .0001 Mfd.
71	13263	Coil	Mica, .0001 Mfd.
72	13263	Coil	Mica, .0001 Mfd.
73	13263	Coil	Mica, .0001 Mfd.
74	13263	Coil	Mica, .0001 Mfd.
75	13263	Coil	Mica, .0001 Mfd.
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79	13263	Coil	Mica, .0001 Mfd.
80	13263	Coil	Mica, .0001 Mfd.
81	13263	Coil	Mica, .0001 Mfd.
82	13263	Coil	Mica, .0001 Mfd.
83	13263	Coil	Mica, .0001 Mfd.
84	13263	Coil	Mica, .0001 Mfd.
85	13263	Coil	Mica, .0001 Mfd.
86	13263	Coil	Mica, .0001 Mfd.
87	13263	Coil	Mica, .0001 Mfd.
88	13263	Coil	Mica, .0001 Mfd.
89	13263	Coil	Mica, .0001 Mfd.
90	13263	Coil	Mica, .0001 Mfd.
91	13263	Coil	Mica, .0001 Mfd.
92	13263	Coil	Mica, .0001 Mfd.
93	13263	Coil	Mica, .0001 Mfd.
94	13263	Coil	Mica, .0001 Mfd.
95	13263	Coil	Mica, .0001 Mfd.
96	13263	Coil	Mica, .0001 Mfd.
97	13263	Coil	Mica, .0001 Mfd.
98	13263	Coil	Mica, .0001 Mfd.
99	13263	Coil	Mica, .0001 Mfd.
100	13263	Coil	Mica, .0001 Mfd.

\*NOTE:—Resistors part No. 13142, Oscillator Coil and 14100 Ohm sections Resistor Nos. 13140, 13266 and 13150 Resistors in latest production. It is important to remember that the 13142 and 13261 Oscillator Coils and 13150 Mica, .00025 Mfd. Condenser cannot be interchanged. When 13261 Coil is used the .00025 Mfd. Padder Condenser 13302 must be used. With 13152 Oscillator Coil the .00025 Mfd. Condenser cannot be interchanged. When 13261 Coil is used the .00025 Mfd. Padder Condenser 13302 must be used. See types part No. 13261 Oscillator Coil and 13302 Mica, .00025 Condenser can be identified by the letter "A" which will be found stamped on the back of the chassis.

## PARTS LIST

List Price	Part No.	Part Name	Description	List Price
.18	13152	Battery Spring	"A" Battery Contacts	.05
.18	13162	Bottom Plug	Bottom Plug for Cabinet	.25
.18		Cabinet	Top Section of Cabinet Only	1.50
.18		Cabinet	Bottom Section of Cabinet Only	1.50
.18	12735	Chassis	Transmit Studs for Metal Bottom	.10
.18	12535	Chassis	Plate (Pls. of 12)	.10
.18	12741	Handle Ring	For Cabinet Handle to Cabinet	.35
.18		Keob Printer	Printer (Pls. of 2)	.10
.35	12785	Keob	For Vending	.15
.18	12786	Keob	For Vending	.15
.18	12787	Keob	For Vending	.15
.18	12840	Lift	Left Lift Bar	.05
1.00	12818	Lift Bar	Left Lift Bar	.05
1.00	12758	Lift Assembly	Left Lift Bar With Two Helves of Cabinet Together	.05
.18		Leak Jack	Extrnal Leak Jack	.15
.18	13147	Plug	Three Prong Male Used as Resistor	.12
.75	13164	Socket	Line Cord	.35
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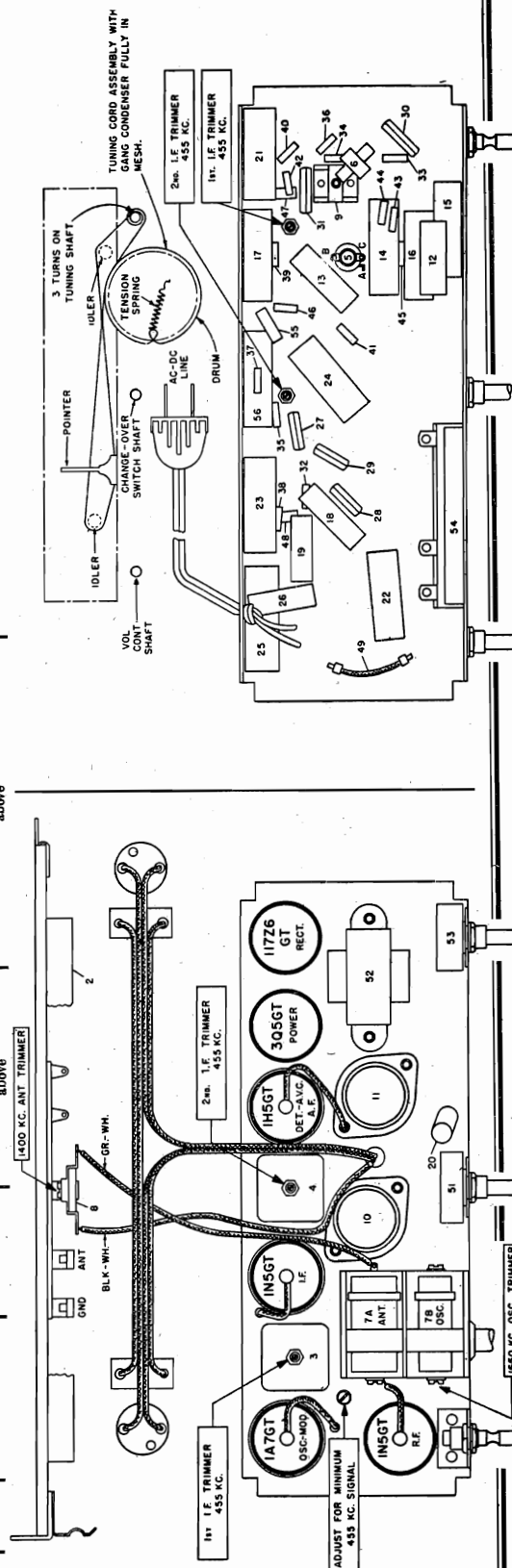


Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third, etc.

**Before starting alignment:**

- (a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.
- (b) Use an accurately calibrated test oscillator with some type of output measuring device.
- (c) WHEN ADJUSTING 1650 KC OSCILLATOR TRIMMER AND 455 KC TRIMMER remove chassis from cabinet and disconnect the white-green and white-black loop connection wires from the 1400 KC loop antenna trimmer. Attach a 1 megohm resistor across these wires and feed output of test oscillator across the 1 megohm resistor.
- (d) THE 1400 KC LOOP ANTENNA TRIMMER is accessible through hole in cabinet back. It should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet and the back IN CLOSED position. When aligning the 1400 KC trimmer connect test oscillator output to the "ANT" and "GND" clips that are attached to the inside of the cabinet back.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1A7GT tube. Low side to chassis (if non-Underwriter Approved) or Common Negative (if Underwriter Approved).	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	See paragraph (C) above	See paragraph (C) above	Adjust R. F. coil trimmer for <u>minimum</u> 455 K. C. signal.
3	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1650 K. C. oscillator trimmer for maximum output.
4	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.



## SENTINEL RADIO CORP.

MODELS 285P, 1U285P

## PARTS LIST

Illus. No.	Part No.	Part Name	Description	Illus. No.	Part No.	Part Name	Description
1	20E79	Cable	Battery with 2 "B" and 2 "A" Plugs.....	27	23E39	Condenser	Mica, .0001 Mfd.....
2	20E82	Coil	Honey Comb Type Loop with Back.....	28	23E39	Condenser	Mica, .0001 Mfd.....
		or		29	23E39	Condenser	Mica, .0001 Mfd.....
2	20E160-1	Coil	Flat Type Loop with Back.....	30	23E42	Condenser	Mica, .00025 Mfd.....
3	20E53	Coil	1st I.F. Transformer.....	31	23E42	Condenser	Mica, .00025 Mfd.....
4	20E54	Coil	2nd I.F. Transformer.....	32	27E106	Resistor	Carbon, 10 Megohm, 1/3 W.....
5	20E52	Coil	Oscillator.....	33	27E685	Resistor	Carbon, 6.8 Megohm, 1/3 W.....
6	2E19	Coil	R. F. ....	34	27E685	Resistor	Carbon, 6.8 Megohm, 1/3 W.....
7	24E2	Condenser	Tuning, 2 Gang, 2 Hole Mtg—with Pulley	35	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.....
		or		36	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 W.....
7	24E18	Condenser	Tuning, 2 Gang, 3 Hole Mtg—with Pulley	37	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.....
8	24E3	Condenser	Trimmer, 3-35 MMF.....	38	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.....
9	24E3	Condenser	Trimmer, 3-35 MMF.....	39	27E1002	Resistor	Carbon, 270,000 Ohm, 1/3 W.....
10	25E4	Condenser	Dry Elec. 40-40 Mfd. 25 Volt.....	40	27E104	Resistor	Carbon, 100,000 Ohm, 1/3 W.....
		or		41	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 W.....
10	25E18	Condenser	Dry Elec. 50-50 Mfd. 150 Volt, Und. Approved Models only.....				Und. App'd Only.....
11	25E1	Condenser	Dry Elec. 50-50 Mfd. 150 Volt.....	42	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 W.....
		or		43	27E473	Resistor	Carbon, 47,000 Ohm, 1/3 W.....
11	25E17	Condenser	Dry Elec. 40-40 Mfd. 25 Volt, Und. Approved Models only.....	44	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 W.....
				45	27E561	Resistor	Carbon, 560 Ohm, 1/3 W.....
12	23E216	Condenser	Tubular, .05 Mfd. 200 Volt.....	46	27E561	Resistor	Carbon, 560 Ohm, 1/3 W.....
13	23E216	Condenser	Tubular, .05 Mfd. 200 Volt.....	47	27E391	Resistor	Carbon, 390 Ohm, 1/3 W.....
14	23E218	Condenser	Tubular, .1 Mfd. 200 Volt.....	48	27E391	Resistor	Carbon, 390 Ohm, 1/3 W.....
15	23E218	Condenser	Tubular, .1 Mfd. 200 Volt.....	49	27E1001	Resistor	Flexible Wire Wound 75 Ohm, 2 W.....
16	23E218	Condenser	Tubular, .1 Mfd. 200 Volt.....	50	1E12	Speaker	5" PM.....
17	23E218	Condenser	Tubular, .1 Mfd. 200 Volt.....	51	29E5	Switch	Changeover.....
18	23E406	Condenser	Tubular, .003 Mfd. 400 Volt.....	52	22E9	Transformer	Output.....
19	23E406	Condenser	Tubular, .003 Mfd. 400 Volt.....			or	
20	23E408	Condenser	Tubular, .005 Mfd. 400 Volt.....	52	22E7	Transformer	Output—Und. Approved Models only.....
21	23E416	Condenser	Tubular, .05 Mfd. 400 Volt.....	53	28E6	Volume Control	1 Megohm.....
22	23E416	Condenser	Tubular, .05 Mfd. 400 Volt.....			or	
23	23E416	Condenser	Tubular, .05 Mfd. 400 Volt.....	53	28E12	Volume Control	1 Megohm—Und. Approved only.....
24	23E418	Condenser	Tubular, .1 Mfd. 400 Volt.....	54	27E1000	Resistor	Fixed Wire Wound 2 Sect. Candohm.....
25	23E421	Condenser	Tubular, .2 Mfd. 400 Volt Und. App'd Only	55	27E104	Resistor	Carbon, 100,000 Ohm, 1/3 W.....
26	23E405	Condenser	Tubular, .002 Mfd. 400 Volt.....	56	23E218	Condenser	Tubular, .1 Mfd. 200 Volt.....
				58	27E680	Resistor	Carbon 68 Ohm 1/3 W.....

## MISCELLANEOUS PARTS

Part No.	Part Name	Description	Part No.	Part Name	Description
20E79	Battery Cable	Complete with "A" & "B" Batt. Plugs.....	48E1	Dial Escutcheon	Plastic Escutcheon.....
17E3-2	"A" Battery Plug	2 Prong "A" Battery Plug.....	36E15	Dial Scale	Calibrated Dial Scale.....
17E3-5	"B" Battery Plug	3 Prong "B" Battery Plug.....	65E2	Dial Spring	Tension Spring for Drive Cord.....
7E43-1	Cabinet	Complete Cabinet, less Back.....	68E5	Dial Shaft	Dial Drive Shaft.....
7E44-1	Cabinet Back	Back only, for Honey-Comb Type Loop.....	35E10	Dial Pointer	For Dial.....
7E87-1	Cabinet Back	Back only, for Flat Type Loop.....	37E21-1	Knob	Marked "AC-DC-OFF-BATT".....
20E78	Dial Plate Assem.	Dial Back Plate.....	37E21-3	Knob	
9E4	Dial Crystal	Acetate Crystal.....	20E25	Pilot Lamp	Pilot Lamp Socket Assembly.....
4E1	Dial Cord	18 lb. Dial Drive Cord.....	40E2	Pilot Lamp	6-8 Volt .250 Amp. Type No. 44 Lamp.....

## ELECTRIC OPERATION

To operate the receiver on 110 to 120 Volt direct current or 110 to 120 Volt, 50 to 60 Cycle, alternating current:

(A) Open hinged cabinet back outward by pulling on the tab attached to the right side of the back, then take out the power line cord, and reclose back.

(B) Insert line cord plug into 110 to 120 Volt AC or DC electric power outlet.

(C) Turn voltage selector knob to center "AC-DC" position.

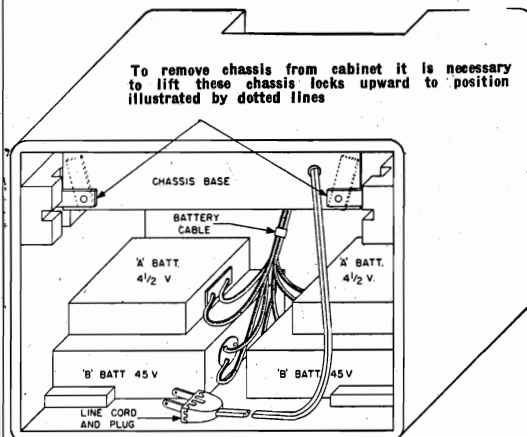
If the current supply is DIRECT CURRENT and the radio does not play after it has been turned on for approximately one minute, reverse radio plug connection at electric power receptacle.

## INSTALLATION OF REQUIRED BATTERIES

Diagram shows proper location and connections of the following required types of batteries.

2 Sentinel number 38A 4½ Volt "A" Batteries or equivalent such as Ray-O-Vac type 83A, etc.

2 Sentinel number 3870 45 Volt "B" Batteries or equivalent such as Ray-O-Vac type 7830.



TO INSTALL BATTERIES, OPEN CABINET BACK AND PLACE BATTERIES AS SHOWN.

FOR AC/DC OPERATION, BRING LINE CORD THROUGH OPENING IN RIGHT SIDE OF CABINET BACK.

ALWAYS KEEP BACK CLOSED.

## POWER SUPPLY

THIS RADIO CAN BE OPERATED ON EITHER:

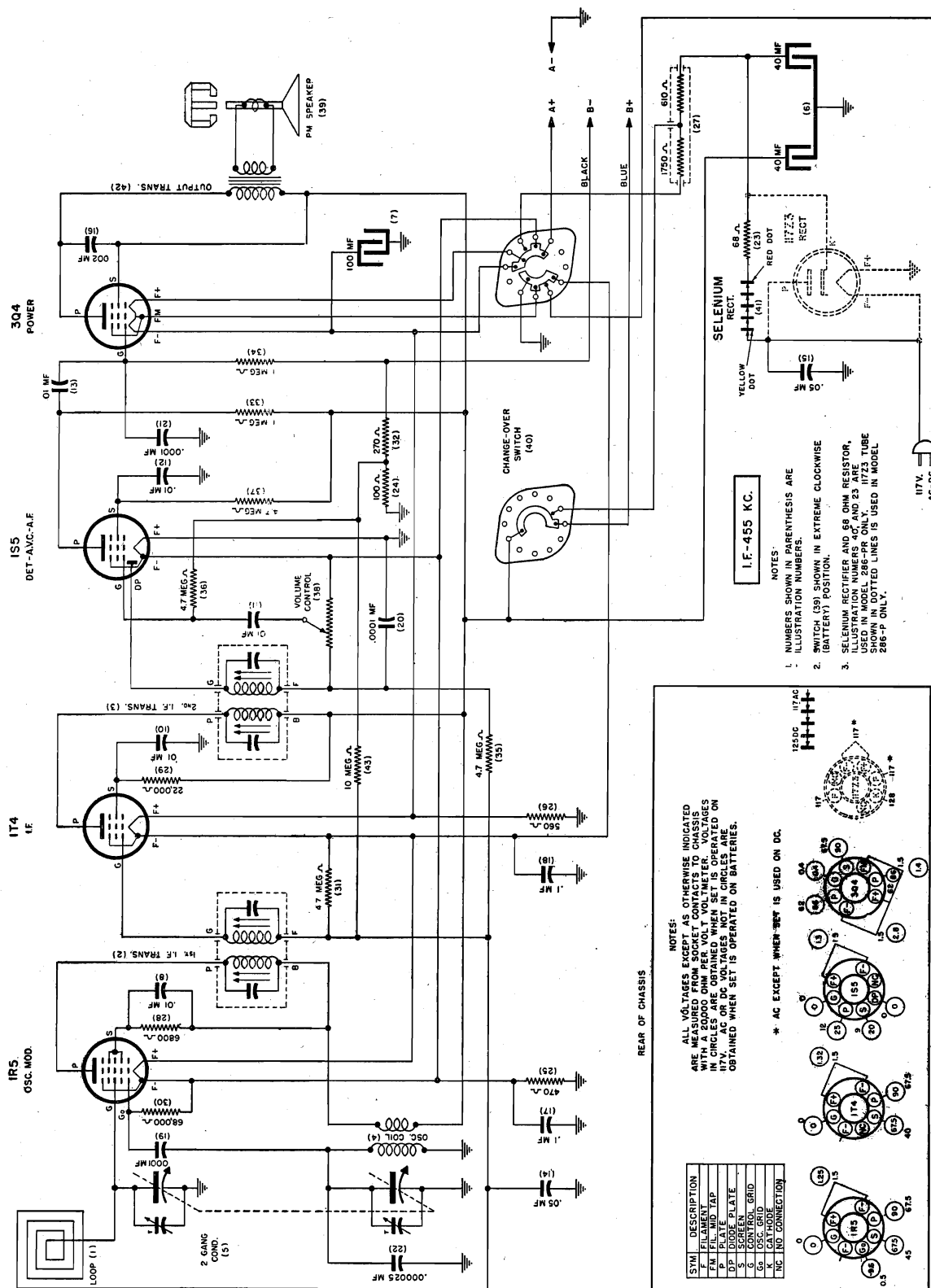
110 TO 120 VOLTS DIRECT CURRENT

OR

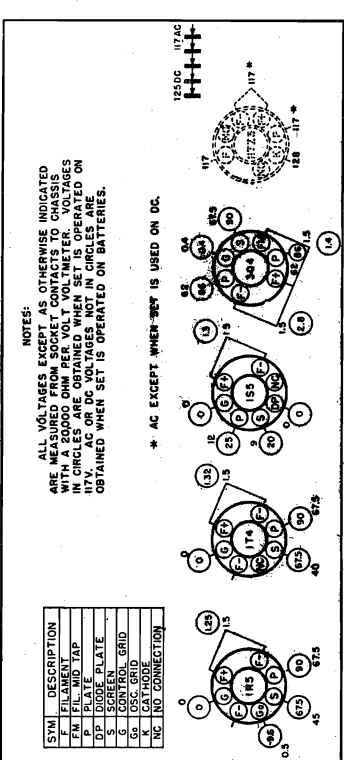
110 TO 120 VOLT, 50 TO 60 CYCLE ALTERNATING CURRENT

OR

BATTERIES—2 - 4½ VOLT "A" AND 2 - 45 VOLT "B"



- NOTES:
1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
  2. SWITCH (39) SHOWN IN EXTREME CLOCKWISE (BATTERY) POSITION.
  3. SELENIUM RECTIFIER AND 68 OHM RESISTOR, ILLUSTRATION NUMBERS 42 AND 23 ARE USED IN MODEL 286-PR ONLY. I723 TUBE SHOWN IN DOTTED LINES IS USED IN MODEL 286-P ONLY.



## SENTINEL RADIO CORP.

MODELS 286P, 286PR

**ALIGNMENT PROCEDURE**

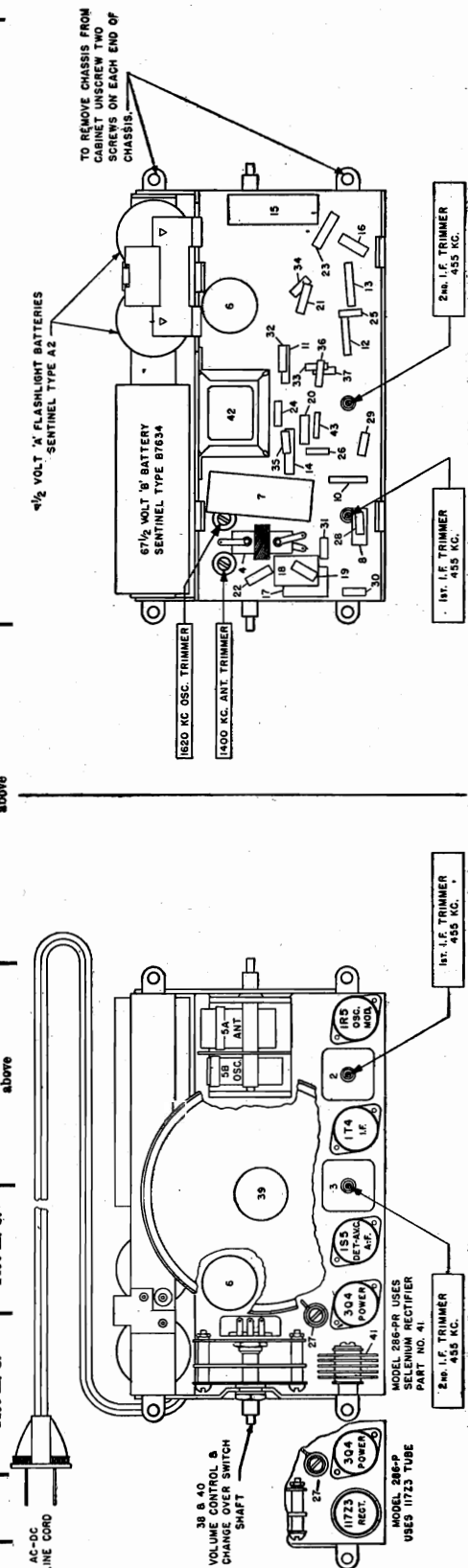
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure, read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third.

**ALWAYS HAVE METAL BOTTOM PLATE MOUNTED ON CHASSIS WHEN ALIGNING SET.**

Before starting alignment:

- (A) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the bottom edge of the large 5 in the 55 calibration number at the low frequency end of the dial scale. If dial indicator does not point exactly to the bottom edge of the large 5, move knob to correct position.
- (B) Use an accurately calibrated test oscillator with some type of output measuring device.
- (C) WHEN ADJUSTING THE 1620 KC OSCILLATOR TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the loop. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.
- (D) THE 1400 KC LOOP ANTENNA TRIMMER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet, and the loop in an upright position. When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Set receiver dial to:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to minimum capacity	Exactly 1620 K. C.	See paragraph (C) above	Adjust 1620 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.





## PARTS LIST

Illus. No.	Part No.	Part Name	Description	List Price	Illus. No.	Part No.	Part Name	Description	List Price
1	20E134	Antenna	Loop with Cabinet Lid Assem.....	\$3.55	24	27E101-7	Resistor	Carbon, 100 Ohm, 1/4 W.....	.07
2	20E125	Coil	1st I.F. Transformer.....	3.00	25	27E471-7	Resistor	Carbon, 470 Ohm, 1/4 W.....	.06
3	20E125	Coil	2nd I.F. Transformer.....	3.00	26	27E561-7	Resistor	Carbon, 560 Ohm, 1/4 W.....	.06
4	20E127	Coil	Oscillator.....	1.00	27	27E1003	Resistor	Wire Wound 1750 and 610 Ohms, 7 W.....	.85
5	24E20	Condenser	Tuning, 2 Gang.....	3.40	28	27E682-7	Resistor	Carbon, 6,800 Ohm, 1/4 W.....	.06
6	25E13	Condenser	Tubular, Dry Elect. 40-40 Mfd. 150 Volt.....	1.15	29	27E223-7	Resistor	Carbon, 22,000 Ohm, 1/4 W.....	.06
7	25E12	Condenser	Tubular, Dry Elect. 100 Mfd. 10 Volt.....	.80	30	27E683-7	Resistor	Carbon, 68,000 Ohm, 1/4 W.....	.06
8	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.....	.40	31	27E475-7	Resistor	Carbon, 4.7 Megohm, 1/4 W.....	.06
10	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.....	.40	32	27E271-7	Resistor	Carbon, 270 Ohm, 1/4 W.....	.08
11	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.....	.40	33	27E105-7	Resistor	Carbon, 1 Meg Ohm, 1/4 W.....	.06
12	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.....	.40	34	27E105-7	Resistor	Carbon, 1 Meg Ohm, 1/4 W.....	.06
13	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.....	.40	35	27E475-7	Resistor	Carbon, 4.7 Meg Ohm, 1/4 W.....	.06
14	23E2004-7	Condenser	Tubular, .05 Mfd. 150 V.....	.40	36	27E475-7	Resistor	Carbon, 4.7 Meg Ohm, 1/4 W.....	.06
15	23E416	Condenser	Tubular, .05 Mfd. 400 V.....	.25	37	27E475-7	Resistor	Carbon, 4.7 Meg Ohm, 1/4 W.....	.06
16	23E2004-2	Condenser	Tubular, .002 Mfd. 150 V.....	.40	38	28E14	Vol. Control	2 Megohm.....	.80
17	23E2004-8	Condenser	Tubular, .1 Mfd. 150 V.....	.45	39	1E19	Speaker	4 Inch P.M.....	4.00
18	23E2004-8	Condenser	Tubular, .1 Mfd. 150 V.....	.45	40	29E11	Switch	Power Selector.....	2.25
19	23E9	Condenser	Mica, .0001 Mfd.....	.20	41	57E1	Rectifier	Selenium (Used in Model 286PR only).....	2.00
20	23E9	Condenser	Mica, .0001 Mfd.....	.20		OR		Selenium (Round Type) used in Model 286PR only.....	2.00
21	23E9	Condenser	Mica, .0001 Mfd.....	.20	42	22E16	Transformer	Output.....	2.25
22	23E8	Condenser	Mica, .000025 Mfd.....	.23	27E106-7	Resistor	Carbon, 10 Megohm, 1/4 W.....		.06
23	27E680-2	Resistor	Carbon, 68 Ohm 1/2 W. (used in Model 286PR only).....	.0743					

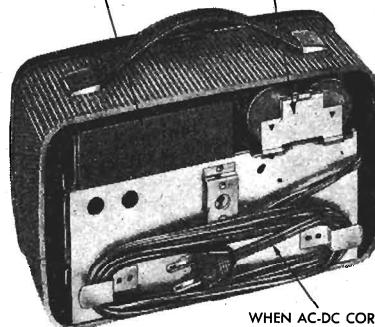
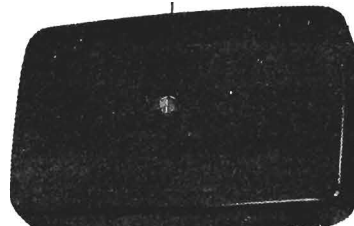
## MISCELLANEOUS PARTS

Part No.	Part Name	Description	List Price	Part No.	Part Name	Description	List Price
20E128	"A" Batt. Con. Bracket Assembly	With 4 No. 10E43 Trimount Studs.....	.60	30E25-1	Cab. Center Section	Less Lid and Bottom Assemblies, with Handle, Spkr. Screen, Lid Catch & Push Button.....	4.30
20E130-1	Cab. Assembly	Complete Cabinet Assembly with Lid & Loop, Handle, Lid Catch & Push Button Assembly & Bottom Assembly.....	9.00	20E131	Chassis Plate	Bottom Shield Plate for Chassis.....	.85
20E134	Cab. Lid. Assembly	Lid Assembly with Loop and Hinges.....	3.55	20E136-1	Hinge	Hinge & Spring Assembly with 2 No. 82E36-F10 No. 4 24x1/4 Mtg. Screws.....	.40
20E135-1	Cab. Bottom	Bottom Assem. with Locking Slotted Head Stud.....	2.10	37E44-1	Knob	Calibrated Dial Knob.....	.88
				37E34-1	Knob	"Off-AC-DC-Batt.".....	.85
				37E32-1	Knob	Tuning and Volume Knobs.....	.53
				20E129	"B" Batt. Connector	B- and B+ Batt. Connector Assembly.....	.50

## HARDWARE

Part No.	Part Name	Description	List Price	Part No.	Part Name	Description	List Price
15E41	Lid Catch Bracket	Bracket for Mounting Lid Catch, With 2 No. 82E3-F10 Screws.....	.12	78E142-F50	Screw	No. 2 56x3/16 Rec. Oval Hd. B.M.....	1.25/C
20E138	Lid Catch	Lid Catch with Screw.....	.25	82E3-F10	Screw	No. 4 24x1/4 Rec. Hd. Type 25.....	.93/C
37E35-1	Lid Catch Button	Button for Lid Catch with No. 13E3-F10 No. 4 40x1/4 Hex Screw and No. 11E3-F10 Lockwasher.....	.14	82E36-F10	Stud	No. 6 20x5/16 Rec. Hd. Type 25.....	2.25/C
55E22-1	Handle	Leather.....	.50	10E43	Stud	Trimount for Mounting Chassis Bottom Shield.....	1.15/C
55E21-1	Handle Bracket	Bracket for Mounting Handle.....	.25	65E8	Spring	Trimount for Mounting "A" Batt. Contact Brkt. Assem.....	1.15/C
71E42-F10	Screw	No. 4 40x3/16 Slot B.H.I.M.....	.30/C	66E12-1	Screen	Lid Index Spring.....	.09

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

67½ Volt "B" Battery  
SENTINEL Type B7634TWO 1½ Volt "A" Batteries  
SENTINEL Type A2  
TO REMOVE: Press lightly  
on battery contact plate.FOR AC-DC OPERATION  
Remove back, unwind line  
cord from reel, place in  
slot and close back.WHEN AC-DC CORD IS NOT  
IN USE, WIND ON REEL.TO REMOVE CABINET BACK  
Turn slotted screw with  
thin dime or screw driver  
and gently separate.

## VOLTAGE SELECTOR

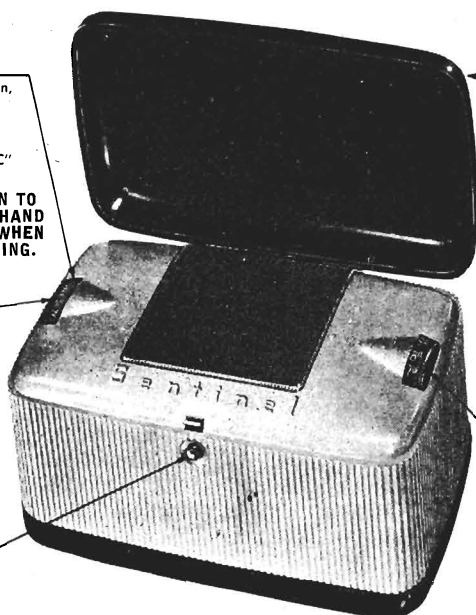
For BATTERY operation,  
turn to maximum right  
hand "BATT" position.For AC-DC operation,  
turn to middle "AC-DC"  
position.BE SURE TO TURN TO  
MAXIMUM LEFT HAND  
"OFF" POSITION WHEN  
THROUGH LISTENING.

## VOLUME CONTROL

Turn clockwise to  
increase volume.

## TO OPEN LID

Depress this button.



## LOOP AERIAL

Always have Loop in  
upright position  
when operating set.

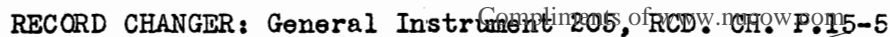
## TUNING CONTROL

Use this control to  
tune receiver to  
desired station.

## INSTALLATION OF REQUIRED BATTERIES

Diagram shows proper location and connections of the following  
required types of batteries:Two SENTINEL, Type A2, 1½ Volt "A" batteries, or equivalent,  
such as Ray-O-Vac Type No. 2, Eveready 750, etc.One SENTINEL Type B7634, 67½ Volt "B" battery, or equivalent,  
such as Ray-O-Vac Type 4367, Eveready 467, etc.



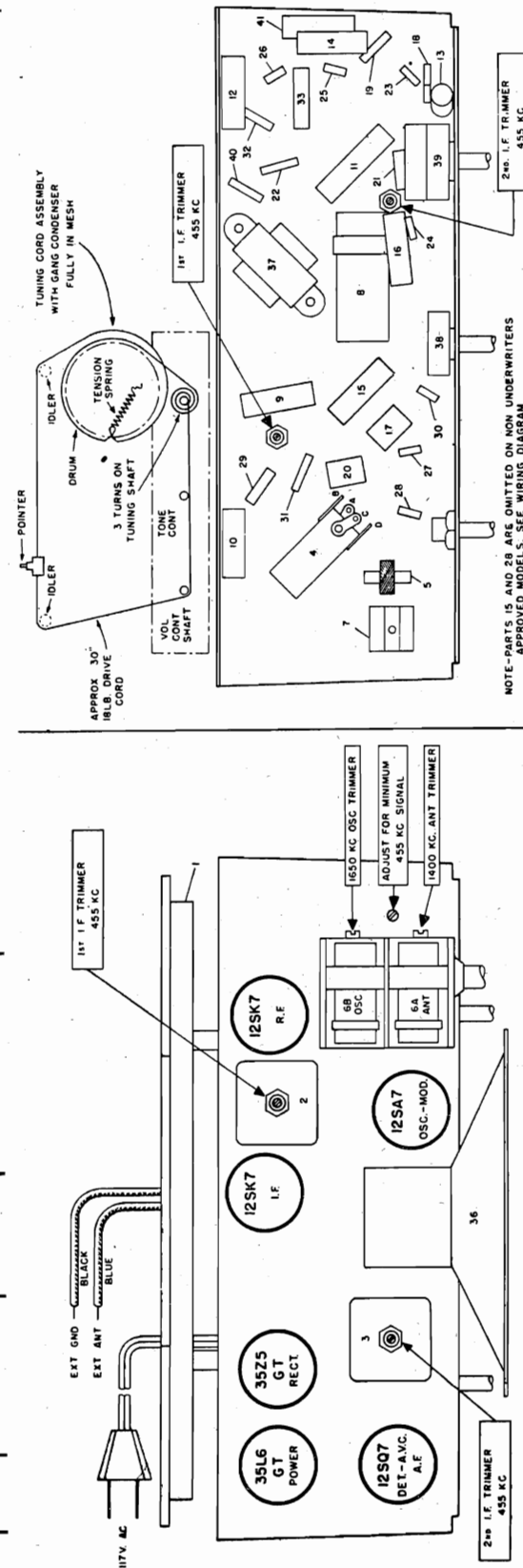


## ALIGNMENT PROCEDURE

For Alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET. BE SURE THAT IT DOES NOT MOVE WHILE ALIGNING.

When adjusting 1650 kilocycle oscillator trimmer, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, connect test oscillator to loop external antenna and ground connections with a .0002 Mfd. condenser in series with antenna lead.

TEST OSCILLATOR				Refer to parts layout diagram for location of trimmers mentioned below:
Steps	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	
	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
1	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	.0002 Mfd. Condenser	Adjust R. F. coil trimmer for <u>minimum</u> 455 K. C. signal.
2	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.	.0002 Mfd. Condenser	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	.0002 Mfd. Condenser	Adjust 1400 K. C. antenna trimmer for maximum output.



## SENTINEL RADIO CORP.

MODELS 293CT, 1U293CT  
MODELS 284GA, 1U284GA

## RADIO PARTS LIST

## MODEL 293-CT, 1U-293-CT

Illus. No.	Part No.	Description	List Price
1	20E67	Antenna Loop & Mounting Assembly	\$1.70
2	20E21	1st I. F. Transformer	2.75
or			
2	20E261	1st I. F. Transformer	2.75
3	20E22	2nd I. F. Transformer	2.75
or			
3	20E261-2	2nd I. F. Transformer	2.75
4	20E64	Oscillator	1.10
5	2E19	R. F. Choke	.65
6	24E8	Tuning, 2 Gang	3.50
or			
6	24E6	Tuning, 2 Gang	3.50
7	24E3	Trimmer, (3-35 MMF Working)	.32
8	25E6	Tubular, Dry Elect. 50-50 Mfd. 150 V.	1.15
9	23E216	Tubular, .05 Mfd. 200 V.	.18
10	23E211	Tubular, .01 Mfd. 200 V.	.18
11	23E416	Tubular, .05 Mfd. 400 V.	.20
12	23E411	Tubular, .01 Mfd. 400 V.	.18
13	23E408	Tubular, .005 Mfd. 400 V.	.18
14	23E408	Tubular, .005 Mfd. 400 V.	.18
15	23E421	Tubular, 2 Mfd. 400 V. (1U293CT Only)	.30
16	23E405	Tubular, .002 Mfd. 400 V.	.18
17	23E37	Mica, .0005 Mfd.	.22
18	23E39	Mica, .0001 Mfd.	.25
19	23E39	Mica, .0001 Mfd.	.25
20	23E42	Mica, .00025 Mfd.	.25
21	23E42	Mica, .00025 Mfd.	.25
22	27E101-2	Resistor	.08
23	27E335	Resistor	.07
24	27E335	Resistor	.07
25	23E474	Resistor	.07
26	27E474	Resistor	.07
27	27E224	Resistor	.08
28	27E224	Resistor	.08
(1U-293CT Only)			
29	27E473	Resistor	.07
30	27E223	Resistor	.08
31	27E822	Resistor	.07
32	27E151	Resistor	.07
33	27E102-3	Resistor	.11
36	1E1	Speaker	4.00
37	22E8	Transformer	1.70
38	28E8	Tone Control	.60
39	28E7	Volume Control	.80
40	27E470-2	Resistor	.08
41	23E416	Condenser	.20
42	20E203	Switch	.70

## GROUND

When a regular aerial is used, best results will be obtained with a ground attached to the black lead coming out of the rear of the chassis.

**WARNING—DO NOT ATTACH A GROUND DIRECT TO THE RADIO CHASSIS OR RECORD CHANGER.** Any external ground connection to any metal part of the chassis or record changer may cause a short and possible damage.

## FUNCTION OF CONTROLS

**THE LEFT HAND KNOB** controls the volume control and off-and-on switch.

**THE RIGHT HAND KNOB** is the station selector.

**THE CENTER KNOB** is the tone control.

**THE "PHONO-RADIO" SWITCH** is located in the lower left hand corner of the record-changer compartment.

## MODEL 284GA, 1U284GA

## PARTS LIST

Illus. No.	Part No.	Description	Part Name	Part No.	Description
1	20E24	Loop	Resistor	24	27E222-3
2	20E21	1st I. F. Trans.	Resistor	25	27E151
2	20E261	1st I. F. Trans.	Resistor	26	27E101
3	20E22	2nd I. F. Trans.	Resistor	27	27E470-2
3	20E261-2	2nd I. F. Trans.	Condenser	28	23E39
4	20E162	Oscillator	Resistor	29	27E683
5	24E2	Tuning, 2 Gang (3 Hole Mfg.)	Speaker	30	1E9
5	24E18	Tuning, 2 Gang (2 Hole Mfg.)	Vol. Control	31	28E1
7	25E18	Dry Elect. (50-50 Mfd.) 150 V.	Transformer	32	22E2
7	25E18	Dry Elect. (50-50 Mfd.) 150 V.	Condenser	33	23E416
8	23E421	Condenser	Condenser	34	23E418
9	23E416	Condenser	Switch	35	20E203-2
10	23E418	Condenser	Switch	35	20E203-4
11	23E211	Condenser	OR		
12	23E414	Condenser	Radio Phono D.P.D.T. Und. App'd only		
13	23E211	Condenser			
14	23E39	Condenser			
15	23E39	Condenser			
16	23E39	Condenser			
17	23E106	Resistor			
18	27E335	Resistor			
19	27E335	Resistor			
20	27E474	Resistor			
21	27E224	Resistor			
22	27E224	Resistor			
23	27E223	Resistor			

## MISCELLANEOUS PARTS

Part No.	Description	List Price
40E1	6-8 Volt, .150 Amp. Dial Light, #47	.10
6E2	Tension Spring	.02
4E1	30" of 18 lb. Drive Cord	.15
20E225-7	Dial Drive Shaft, with "C" Washer, Assem.	.40
20E65	Dial Back Plate	.90
36E16	Dial Scale	.60
35E13	Dial Pointer	.15
37E21-17	Knob	.10
20E184-1	Socket Assem.	.55
20E185-1	Socket Assem.	.64

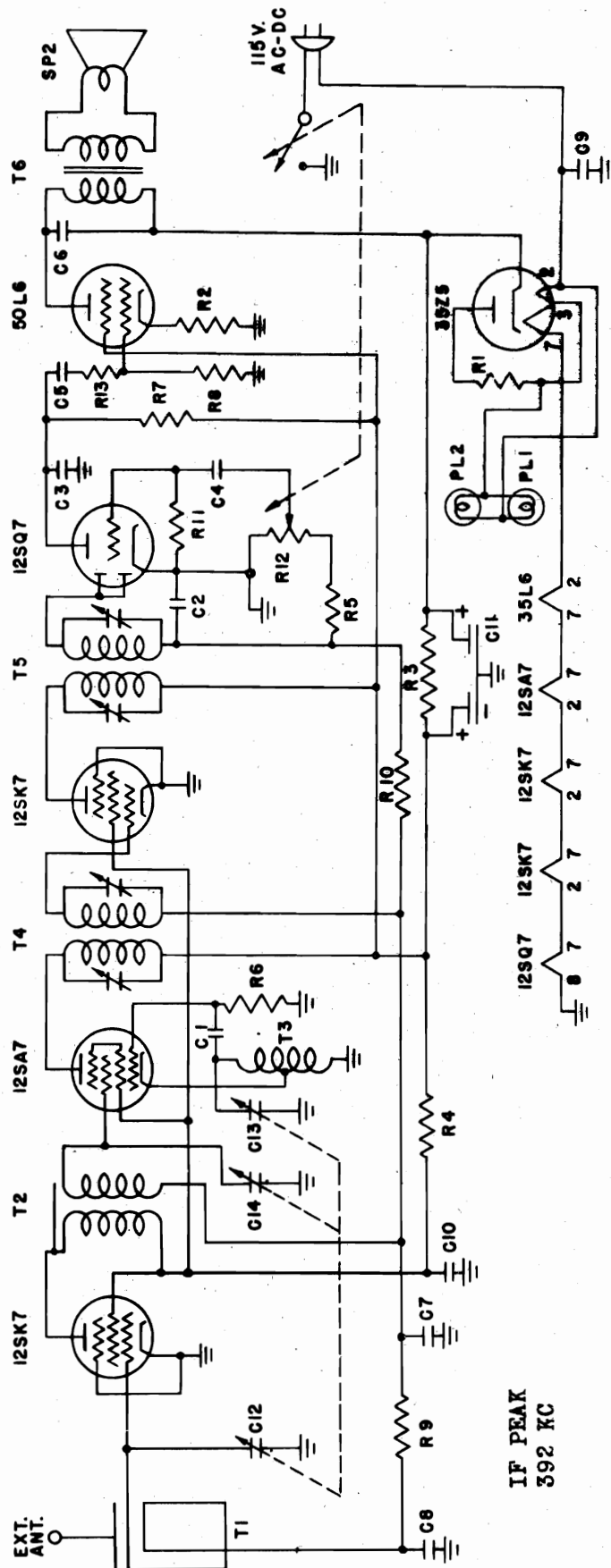
## MISCELLANEOUS PARTS

Part No.	Description	Part Name
7E106	Complete Cabinet	Cabinet
7E59	Cabinet Back	Cabinet Back
41E1	Line Cord	Line Cord
SE14-1	Dial Plate Assembly	Dial Plate Assembly
4E1	Dial Cord	Dial Cord
36E10-2	Dial Shaft	Dial Shaft
20E225-3	Dial Scale	Dial Scale
35E8	Dial Pointer	Dial Pointer
6E2	Dial Spring	Dial Spring
37E21-1	Knob	Knob
20E43	Pilot Lamp	Pilot Lamp
40E1	Pilot Lamp	Pilot Lamp



## SETCHELL CARLSON INC.

MODEL 427

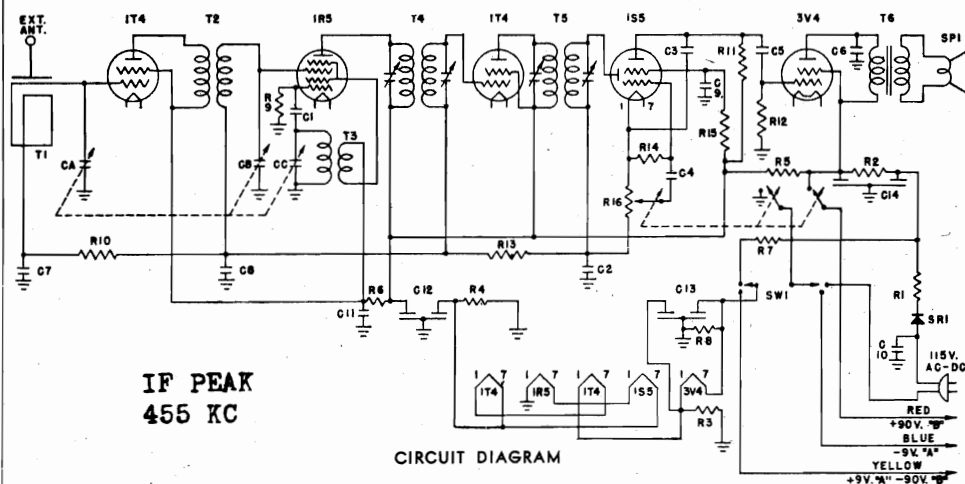


T1 - LOOP ANTENNA  
 T2 - R F COIL  
 T3 - OSC. COIL  
 T4 - INPUT IF COIL 392 KC  
 T5 - OUTPUT IF COIL 392 KC  
 T6 - O.P. TRANSFORMER

PL1 - NO. 47 PILOT LAMP  
 PL2 - " " "  
 SP2 - 6" P.M. DYNAMIC SPEAKER

C1 - .0001 MFD. 400V. CONDENSER TOL. 10%  
 C2 - .0001 " " " "  
 C3 - .0001 " " " "  
 C4 - .006 " " " "  
 C5 - .01 " " " "  
 C6 - .02 " " " "  
 C7 - .05 " " " "  
 C8 - .05 " " " "  
 C9 - .05 " " " "  
 C10 - .1 " " " "  
 C11 - 50+50 " 150V.  
 C12 - ANT. SECTION OF GANG CONDENSER  
 C13 - OSC " " " "  
 C14 - R.F. " " " "

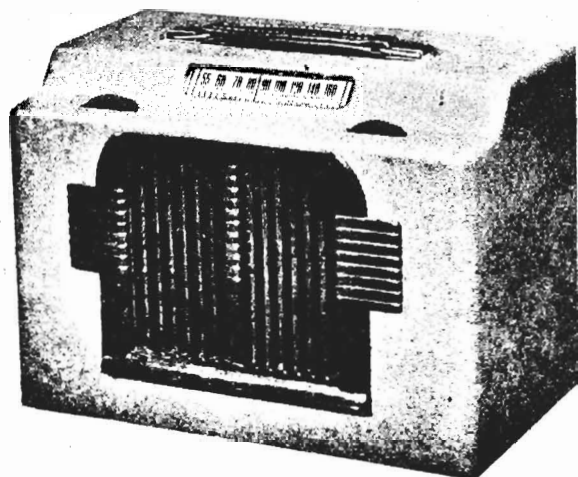
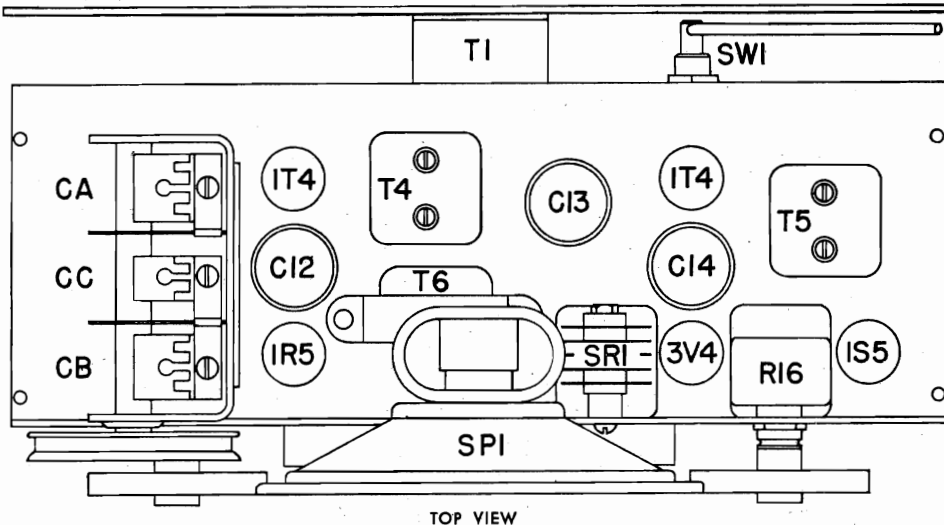
R1 - 25 OHMS 1/2 WATT RESISTOR TOL. 10%  
 R2 - 180 " " " "  
 R3 - 1200 " " " "  
 R4 - 15M " " " "  
 R5 - 50M " 1/3 " " "  
 R6 - 50M " " " "  
 R7 - 500M " " " "  
 R8 - 1MEG " " " "  
 R9 - 1MEG " " " "  
 R10 - 2MEG " " " "  
 R11 - 5MEG " " " "  
 R12 - 500M " POT. WITH SWITCH  
 R13 - 100M " 1/3 WATT RESISTOR TOL. 0%



R1	—100	OHM	—5	W. RESISTOR
R2	—150	OHM	—1	W. RESISTOR
R3	—700	OHM	—1	W. RESISTOR
R4	—1200	OHM	—1/2	W. RESISTOR
R5	—3000	OHM	—1/2	W. RESISTOR
R6	—5000	OHM	—1/3	W. RESISTOR
R7	—2000	OHM	—10	W. RESISTOR
R8	—25 M	OHM	—1/3	W. RESISTOR
R9	—100M	OHM	—1/3	W. RESISTOR
R10	—1Meg.	OHM	—1/3	W. RESISTOR
R11	—1Meg.	OHM	—1/3	W. RESISTOR
R12	—1Meg.	OHM	—1/3	W. RESISTOR
R13	—2Meg.	OHM	—1/3	W. RESISTOR
R14	—5Meg.	OHM	—1/3	W. RESISTOR
R15	—5Meg.	OHM	—1/3	W. RESISTOR
R16	—500M	OHM	—	POT. & 2 P SW.
C1	—0.001	MFD.	400 V.	CONDENSER
C2	—0.001	MFD.	400 V.	CONDENSER
C3	—0.001	MFD.	400 V.	CONDENSER
C4	—0.004	MFD.	400 V.	CONDENSER
C5	—0.004	MFD.	400 V.	CONDENSER
C6	—0.004	MFD.	400 V.	CONDENSER
C7	—0.05	MFD.	200 V.	CONDENSER
C8	—0.05	MFD.	200 V.	CONDENSER
C9	—0.05	MFD.	200 V.	CONDENSER
C10	—0.05	MFD.	400 V.	CONDENSER
C11	—1	MFD.	200 V.	CONDENSER
C12	—50 + 50	MFD.	150 V.	CONDENSER
C13	—50 + 50	MFD.	150 V.	CONDENSER
C14	—50 + 50	MFD.	150 V.	CONDENSER
C A-B-C	—3	GANG.		CONDENSER

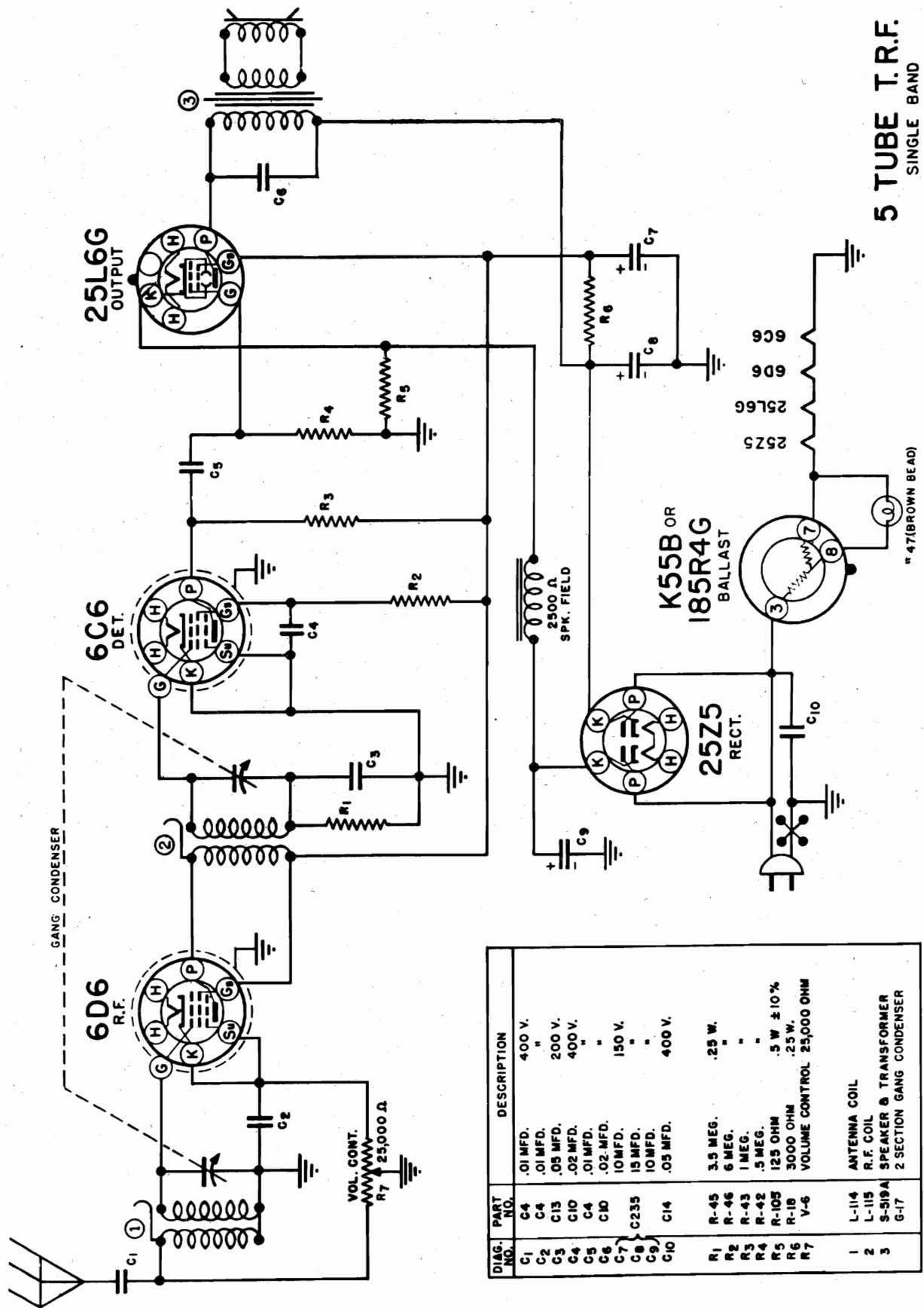
T1 — LOOP ANTENNA  
T2 — R. F. COIL  
T3 — OSC. COIL  
T4 — 455 KC. IF. COIL  
T5 — 455 KC. IF. COIL  
T6 — OUTPUT TRANSFORMER  
SP1 — 5" PM SPEAKER  
SW1 — 2 POLE 2 POS. SWITCH  
SRI — SELENIUM RECTIFIER

ALIGNMENT PROCEDURE  
I. F. Alignment 455 KC (Connect to IR5 Grid) Loop and R. F. Alignment—1400, 1000 and 600 KC. Dial Pointer Setting—535 KC with fully closed condenser.



- Three-gang tuning condenser (selectivity).
- Tuned R. F. stage (sensitivity).
- Super-het circuit.
- Band coverage—540 KC to 1650 KC.
- Five miniature tubes—1—IT4-RF, 1—IR5-Mixer, 1—IT4-IF, 1—IS5-Det. and 1st Audio, 1—3V4-Pr. output. Plus selenium rectifier (6-tube performance).
- Instant heating—no waiting for tube warm-up.
- Battery life—approximately 170 hours. Burgess No. F6A60, Eveready No. 753, Ray-O-Vac No. AB994.
- Trigger switch automatically prevents battery drain when operating on A.C. or D.C.
- Five-inch P. M. dynamic speaker—1.47 oz. Alnico 5.
- Sealed filter for long-life hum-free operation.
- Finger-tip controls.
- Inverted aluminum chassis.
- Heavy leather snap-down handle.
- Weight with batteries 12 1/2 lbs.
- Size: 11 3/4" wide, 6 3/4" deep, 8 1/4" high.
- Color optional: Brown with walnut grille or maroon with ivory grille.

## SONORA RADIO &amp; TELEV. CORP MODEL A-11. Chassis A

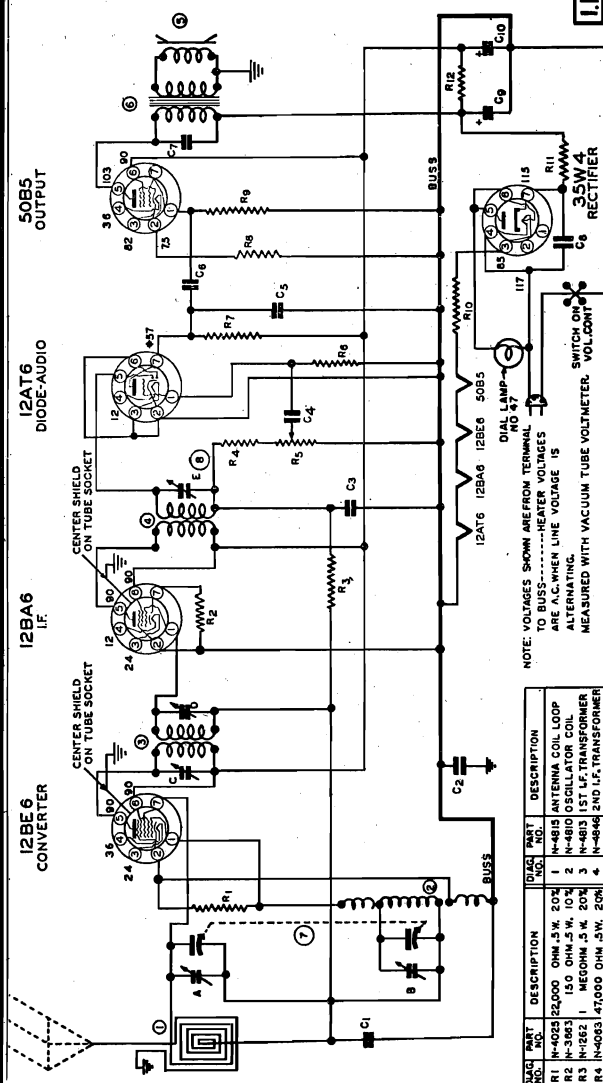


DIAG. NO.	PART NO.	DESCRIPTION
C1	G4	.01 MFD. 400 V.
C2	C4	.01 MFD. "
C3	C13	.05 MFD. 200 V.
C4	C10	.02 MFD. 400 V.
C5	C4	.01 MFD. "
C6	C10	.02 MFD. 150 V.
C7	C235	10 MFD. "
C8	C10	.05 MFD. 400 V.
C9	C10	.05 MFD. 400 V.
C10	C10	.05 MFD. 400 V.
R1	R-45	3.5 MEG.
R2	R-46	6 MEG.
R3	R-43	1 MEG.
R4	R-42	.5 MEG.
R5	R-105	125 OHM .5 W ± 10 %
R6	R-18	3000 OHM .25 W.
R7	V-6	VOLUME CONTROL 25,000 OHM
1	L-114	ANTENNA COIL
2	L-115	R.F. COIL
3	S-519A	SPEAKER & TRANSFORMER
	G-17	2 SECTION GANG CONDENSER

## ALIGNMENT PROCEDURE FOR

MODEL RBMU-176, RK/RKRU-215

## SCHEMATIC FOR MODEL RBMU-176



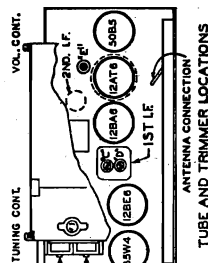
## ALIGNMENT PROCEDURE

**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.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I.F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective position on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12BE6) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.



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.

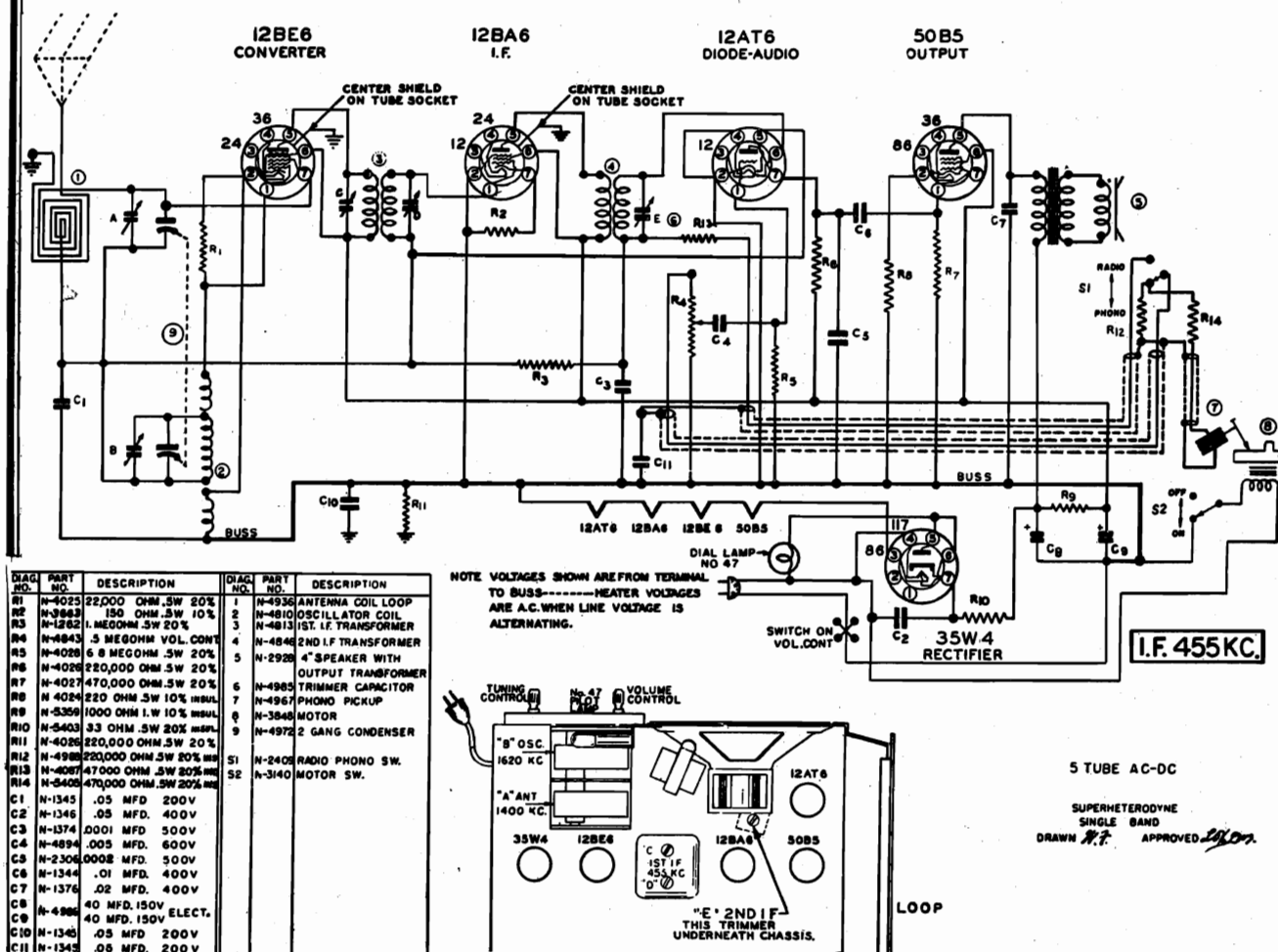
**NOTE:** IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS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

Q	NO.	DESCRIPTION	Q	NO.	DESCRIPTION
R1	N-4023	22,000 OHM 5W. 10%	1	N-4815	ANTENNA COIL LOOP
R2	N-3483	150 OHM 5W. 10%	2	N-4810	OSCILLATOR COIL
R3	N-262	1 MEG OHM 5W. 20%	3	N-4813	1ST LF TRANSFORMER
R4	N-4063	47,000 OHM 5W. 20%	4	N-4846	2ND LF TRANSFORMER
R5	N-4063	47,000 OHM 5W. 20%	5	N-4318	4" SPEAKER
R6	N-4028	8.5 MEG OHM 5W. 20%	6	N-3889	OUTPUT TRANSFORMER
R7	N-4028	8.5 MEG OHM 5W. 20%	7	N-4028	500,000 OHM 5W. 20%
R8	N-5032	220 OHM 5W. 10%	8	N-4046	500,000 OHM 5W. 20%
R9	N-4028	8.5 MEG OHM 5W. 20%	9	N-4028	500,000 OHM 5W. 20%
R10	N-3431	33 OHM 5W. 20%	10	N-4028	500,000 OHM 5W. 20%
R11	N-3431	33 OHM 5W. 20%	11	N-4028	500,000 OHM 5W. 20%
R12	N-3358	1000 OHM 1W. 10%	12	N-4028	500,000 OHM 5W. 20%
C1	N-3445	.05 MFD. 200V.	13	N-3445	.05 MFD. 200V.
C2	N-3445	.05 MFD. 200V.	14	N-3445	.05 MFD. 200V.
C3	N-4894	.0005 MFD. 600V.	15	N-4894	.0005 MFD. 600V.
C4	N-4894	.0005 MFD. 600V.	16	N-4894	.0005 MFD. 600V.
C5	N-4894	.0005 MFD. 600V.	17	N-4894	.0005 MFD. 600V.
C6	N-1344	.01 MFD. 400V.	18	N-1344	.01 MFD. 400V.
C7	N-1376	.02 MFD. 400V.	19	N-1376	.02 MFD. 400V.
C8	N-1346	.05 MFD. 150V. ELECT.	20	N-1346	.05 MFD. 150V. ELECT.
C9	N-3302	50 MFD. 150V. ELECT.	21	N-3302	50 MFD. 150V. ELECT.



## SONORA RADIO &amp; TELEV. CORP.

MODELS RGMF-212-230



## CONNECTING THE UNIT

Before connecting the unit, be sure that your house is wired for the voltage and current for which the set is designed. If in doubt, call your local power company for the necessary information. Connecting the set to a supply outlet furnishing the wrong type of current will result in improper operation or damage.

**POWER SUPPLY.** This Radio-Phonograph is designed to operate on an alternating current supply (AC) ranging from 110 to 120 volts.

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.

## 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.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I. F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near

The current must be 60 cycles. Never plug into a D.C. outlet.

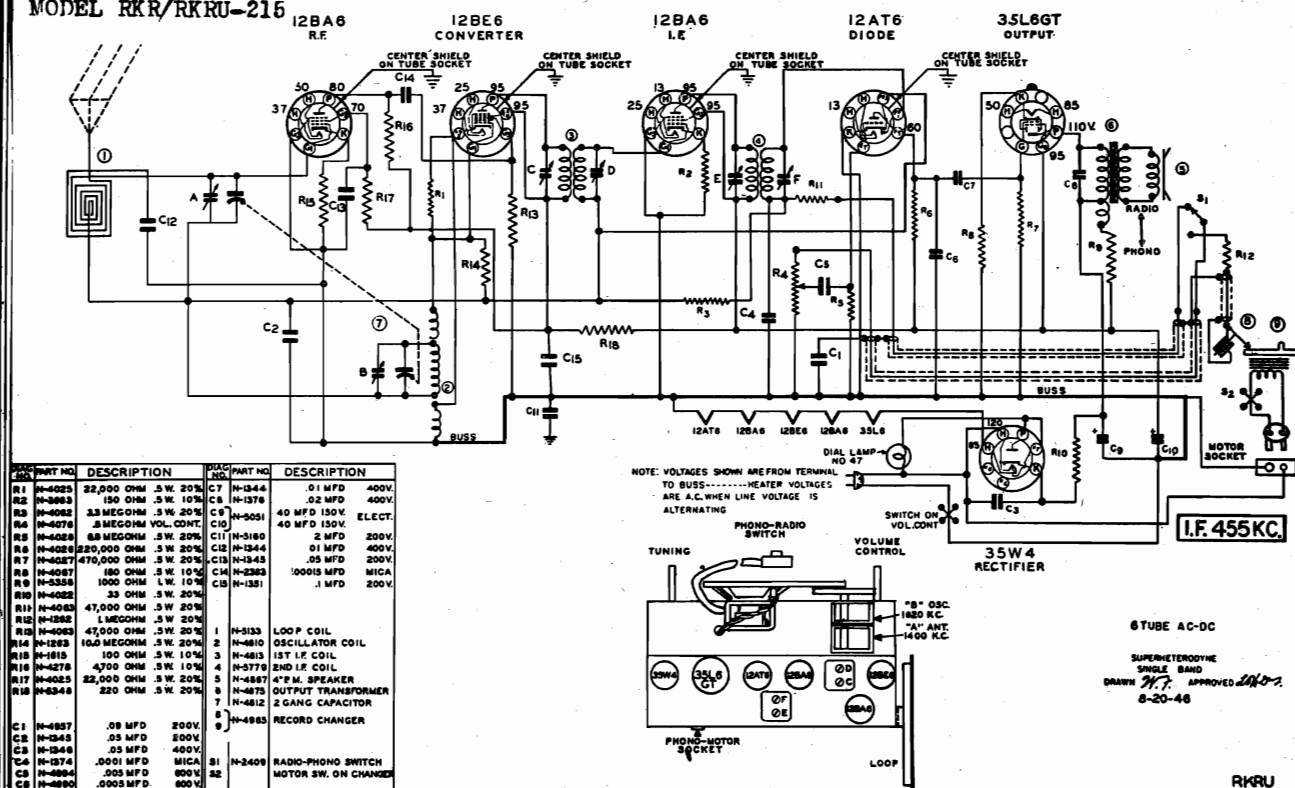
**GROUND.** No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

**CAUTION.** Do not place receiver on hot objects such as stoves, radiators, etc. Heat will damage the internal components of the unit.

the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the converter tube through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next — set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODEL RKR/RKRU-215



## CONNECTING THE UNIT

Before connecting the unit, be sure that your house is wired for the voltage and current for which the set is designed. If in doubt, call your local power company for the necessary information. Connecting the set to a supply outlet furnishing the wrong type of current will result in improper operation or damage.

**POWER SUPPLY.** This Radio-Phonograph is designed to operate on an alternating current supply (AC) ranging from 110 to 120 volts.

MODEL WA/WAU

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.

## 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 1720 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.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I.F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang

**The current must be 60 cycles. Never plug into a D.C. outlet.**

**GROUND.** No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

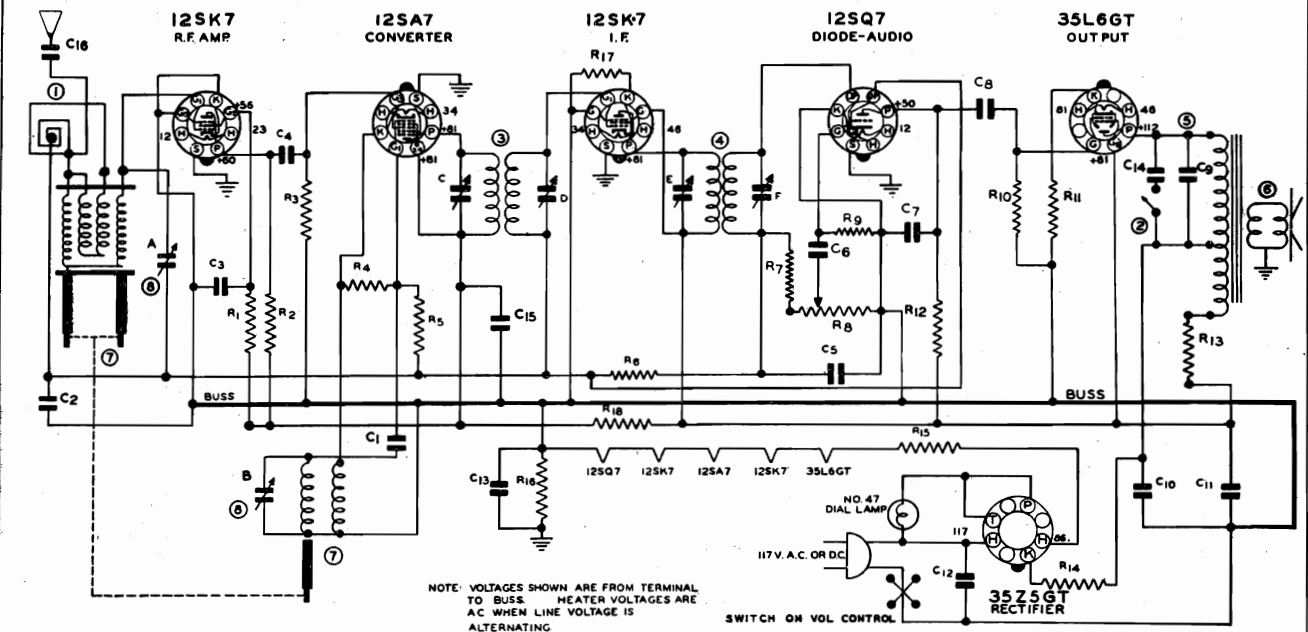
**CAUTION.** Do not place receiver on hot objects such as stoves, radiators, etc. Heat will damage the internal components of the unit.

condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or 1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

## SONORA RADIO &amp; TELEV. CORP.

MODELS RQ-222, RQU-222



PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
C1 N-1342	50 MMFD MICA	R6 N-4082	33 MEGOHM 5W 20%
C2 N-1345	.05 MFD 200V	R7 N-4083	47,000 OHM 5W 20%
C3 N-1345	.05 MFD 200V	R8 N-5026	.05 MEGOHM VOL. CONT.
C4 N-2383	150 MMFD MICA	R9 N-4081	47 MEGOHM 5W 20%
C5 N-1374	100 MMFD MICA	R10 N-4027	470,000 OHM 5W 20%
C6 N-4894	.005 MFD 600V -15+40%	R11 N-4067	180 OHM 5W 10%
C7 N-4890	.0005 MFD 600V -25+60%	R12 N-4888	220,000 OHM 5W 10%
C8 N-1344	.01 MFD 400V	R13 N-5823	1500 OHM 1W 10%
C9 N-1344	.01 MFD 400V	R14 N-4022	33 OHM 5W 20%
C10 N-3058	40 MFD 150 W.V. ELECTRO	R15 N-4828	33 OHM 1W 10%
C11 N-3058	40 MFD 150 W.V. LYTC	R16 N-4026	220,000 OHM 5W 20%
C12 N-1348	.05 MFD 400V	R17 N-4022	33 OHM 5W 20%
C13 N-5160	.2 MFD 200V -10+10%	R18 N-4066	470 OHM 5W 10%
C14 N-1346	.05 MFD 400V		
C15 N-1351	.1 MFD 200V -10+20%		
C16 N-1342	50 MMFD MICA		
R1 N-5351	22,000 OHM 5W 10%	1 N-5374	LOOP COIL
R2 N-4278	4,700 OHM 5W 10%	2 N-4942	1ST IF. TRANSFORMER
R3 N-4087	47,000 OHM 5W 10%	3 N-5371	2ND IF. TRANSFORMER
R4 N-5351	22,000 OHM 5W 10%	5 N-4875	OUTPUT TRANSFORMER
R5 N-5624	15 MEGOHM 5W 10%	6 N-4868	5 SPEAKER
		7 N-5640	PERMEABILITY TUNER
		8 N-5552	2 SECTION TRIMMER

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.

## ALIGNMENT PROCEDURE

**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 1000 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.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I. F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the pointer at right end of dial adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**PERMEABILITY TUNER ALIGNMENT.** To align the tuner requires four separate steps which must be followed in the order given.

1. **Marking Test Points on Dial Plate.** Use an accurate scale or ruler.

Make a pencil mark at 1-13/16 inches and another at 4-3/16 inches from the right hand edge of the dial plate.

2. **Location of Pointer.** Turn right hand knob all the way to the right. This moves the slugs to the left out of the coils.

The pointer should be at the 1-13/16 inch mark. If the pointer is not in this position, slide pointer on string and crimp in place.

3. **Oscillator Alignment.** Connect the test oscillator to the grid of the 12SA7 tube through a .05 or .1 mfd. condenser. Set test oscillator at 1620 KC, turn right hand knob all the way to the right and adjust oscillator trimmer "B" for maximum signal.

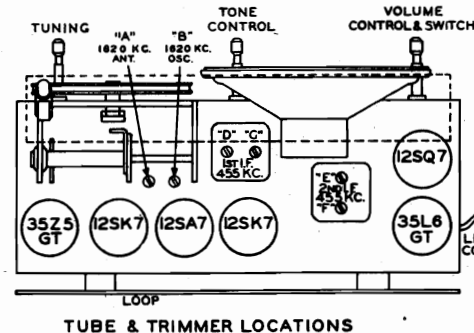
Set test oscillator at 1000 KC, tune in signal using right hand knob. Pointer should now be at the 4-3/16 inch mark in dial plate. If not, adjust oscillator tuning slug (located beneath chassis) so that 1000 KC comes in at this mark.

4. **Antenna Alignment.** Connect the test oscillator to the antenna lead through a 100 mfd (.0001) condenser.

Set the test oscillator at 1620 KC, turn right hand knob all the way to the right and adjust antenna trimmer "A" for maximum signal.

Set test oscillator at 1000 KC. Tune in signal using right hand knob. Adjust antenna tuning slugs (located above chassis) for maximum signal.

In adjusting these slugs, it is best to turn one core about a half turn, then remove the hand or tool and tune in the signal. Repeat this until the adjustment for maximum signal is reached. Keep the two antenna slugs as even as possible.

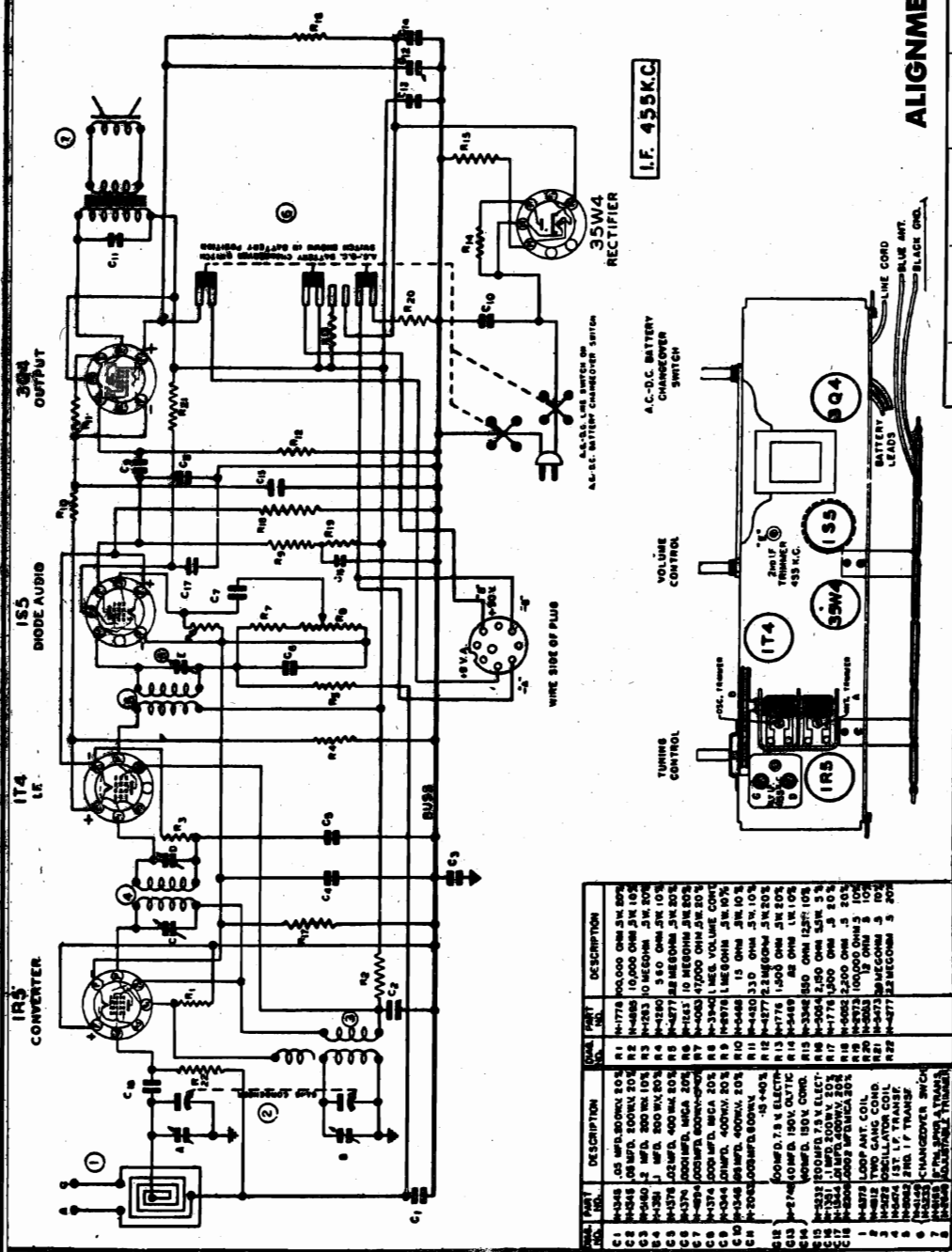


TUBE &amp; TRIMMER LOCATIONS

I.F. 455 KC.

6 TUBE A.C.-D.C.  
SUPERHETERODYNE  
SINGLE BAND

DRAWN BY M.P. APPROVED *[Signature]*  
JUNE 1, 1946



# ALIGNMENT

Oper- ation	Connect Oscillator To:	Dummy Ant.	Set Osc. To:	Set Dial To:	Adjust Trimmers	Purpose
1	Converter Grid	.05 MFD.	455 KC	Min. Cap.	C, D, E	Align IF
2	Antenna	100 MMF.	1620 KC	Min. Cap.	B	Set Oscillator
3	Antenna	100 MMF.	1400 KC	1400 KC	A	Adjust Ant.
4	Antenna	100 MMF.	600 KC	600 KC	....	Check Calibration

**BATTERY.** To install a new battery or replace an old one, remove the screws holding the back in place and lift off the back. Remove the battery and pull out the plug. Insert plug in new battery and place battery in bottom of cabinet. Replace back.

The batteries listed below are satisfactory for service in your receiver. They are combination "A" and "B" packs having 90 volts "B" and 7½ volts "A".

Type Number

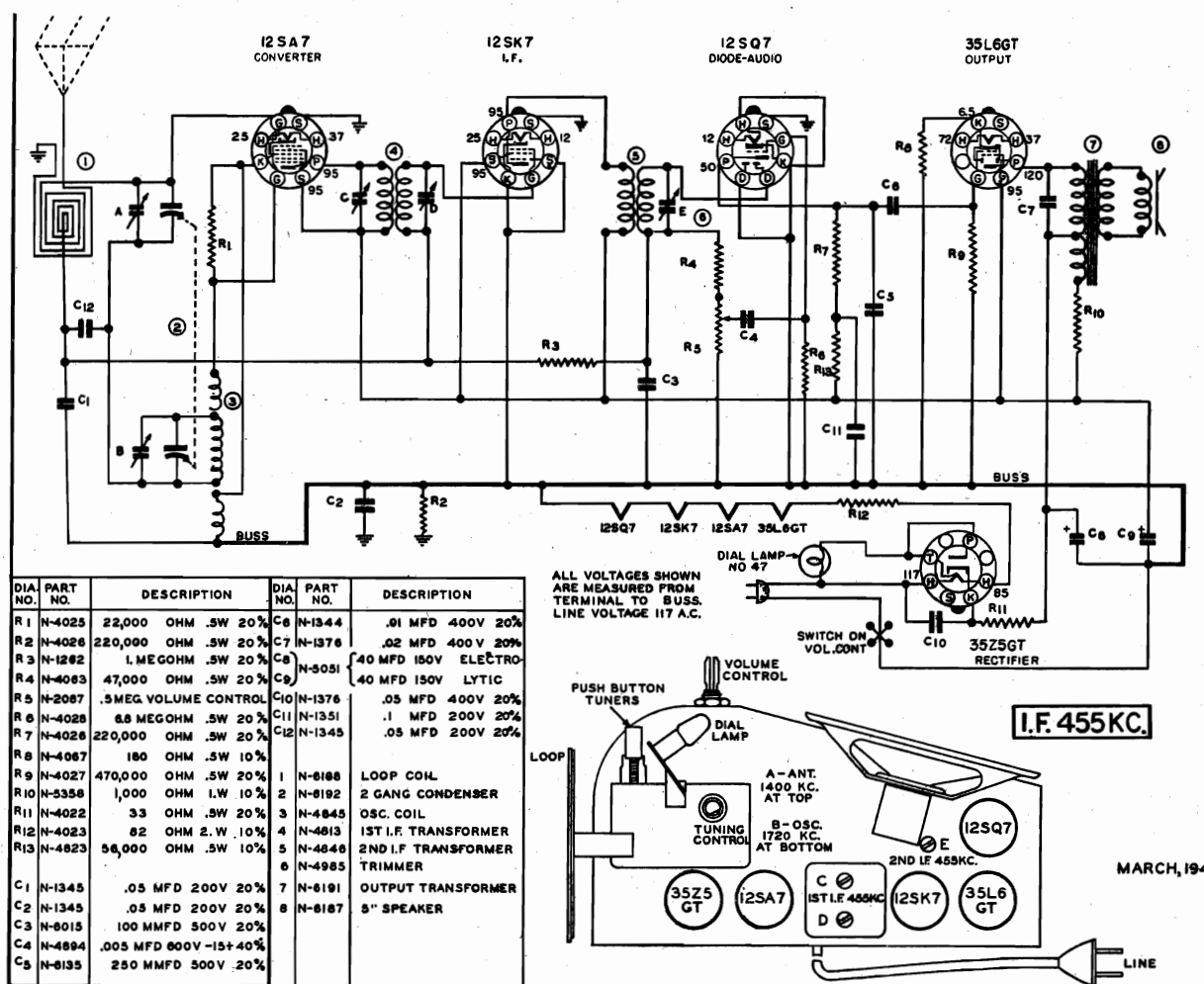
F6A60  
G6M60  
754  
60B6F5-5  
AB878  
AB994

Manufacturer

Burgess  
Burgess  
Eveready  
General Dry Battery  
Ray-O-Vac  
Ray-O-Vac

## SONORA RADIO &amp; TELEV. CORP.

MODELS WA, WAU



## AUTOMATIC TUNING

Automatic tuning is a standard feature on this Model. It provides instantaneous selection of any four favorite stations by simply depressing a button. The automatic unit is wholly mechanical in operation and of rugged construction to assure greater accuracy over a longer period of time.

**ADJUSTMENT.** All adjustments are simply made from the front of the cabinet using an ordinary screw driver.

To make adjustments remove all four buttons, which pull off readily. The center buttons should be removed first, since by depressing the adjacent buttons with thumb and finger a firm grip may be secured on either center button. The top and bottom buttons can then be easily removed.

Loosen the screw of the desired button and with the manual tuning knob tune to any desired station. Hold the manual tuning knob in position and depress the button shaft as far as possible. With the button fully depressed, tighten the screw firmly.

Be sure the push button knob is held down in position while being tightened.

After the stations are adjusted, it is advisable to check each button to assure sufficient tightening.

To assure accurate adjustment, the volume control should be set

at a moderate level and the station tuned in slowly to a point of maximum volume and clarity.

It is not necessary to follow any particular sequence of stations since each button is adjustable to any station.

With each button definitely set and securely tightened to the selected station, the tuner is ready for operation.

**OPERATION.** With the set turned on to a moderate level of volume, the automatic tuner is operated by merely pressing a button set to the desired station.

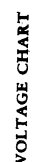
Station selection may be made automatically or manually at will, since the manual tuning control functions integrally with the automatic unit.

The station call letter tabs enclosed in the Operating Instruction Sheet envelope should be inserted into the slot of the push-buttons, using designations corresponding to the station selected for each button. After inserting call letter tabs, the buttons may be replaced.



**BROADCAST BAND ALIGNMENT.** Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

P.A.  
6F6GT  
456 KC.  
INTERMEDIATE FREQUENCY  
BOTTOM VIEW OF ALL SOCKET CONNECTIONS



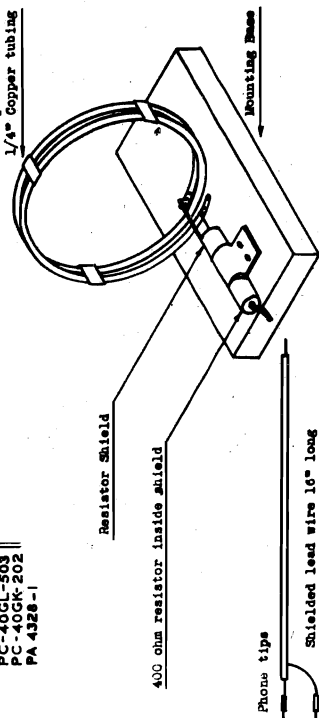
TUBE	FUNCTION	Voltage of Socket Prongs to Ground see prong nos. on schematic								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8.	
6SA7GT	Converter	0	0	230	85	**	**	6.8*	-4.6	
6SR7GT	I.F. Amp.		6.2*	0	-4.5	0	65	0	230	
6SQ7GT	2nd. Det. A.V.C.	0	-95	-9	-1.2	-1.2	125	6.2*	0	
6F6GT	P.A.	0	6.2*	215	230	**	-1.9	0	15	
5Y6GT	Rect.	0	260	0	280	0	280	0	290	

Volts readings are for schematic diagram on back of sheet. Allow 15%  $\pm$  on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are  $\pm$  DC voltages.

\*AC volts.

\*\*Cannot be measured with 20,000 Ohms per volt voltmeter

\*\*Cannot be measured with 20,000 Ohms per volt voltmeter.



## SPECIFICATIONS

Two loops of  $1/4$ " copper tubing  $8^{\circ}$  in diameter spaced  $1/4$ " apart with 400 ohms resistor in series. Connecting cable and resistor must be shielded. The loop should be spaced twice the diameter of the loop from the receiver being aligned to prevent an over modulated signal and poor alignment of the receiver.



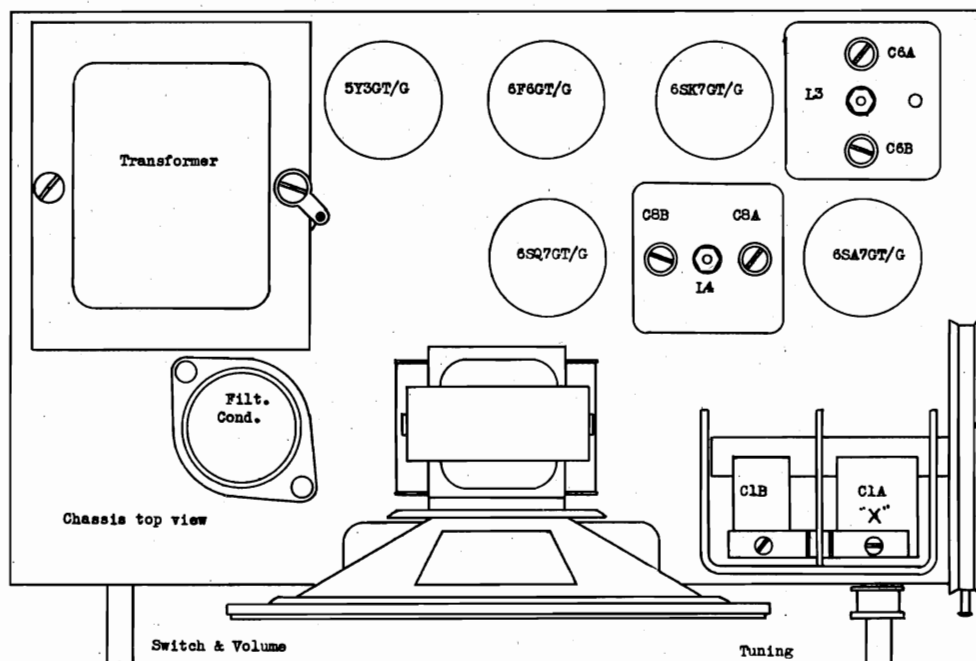
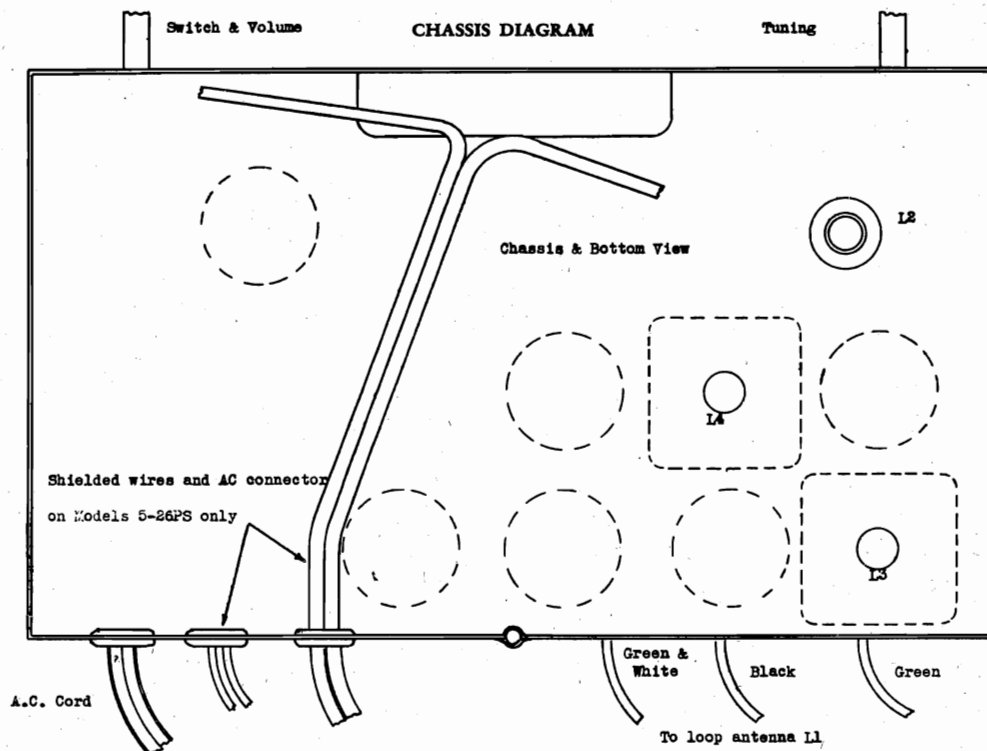
MODELS 5-26,  
5-26X, 5-26PS

## THE SPARKS WITHINGTON CO.

## ALIGNMENT DATA

OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING CONDENSER SETTING	TRIMMER	REMARKS
1	Set pointer to last calibration mark at low end of dial with condenser gang fully closed.						
2	I.F.	*	.02MFD	456 KC	Open	C8A&B	Peak accurately
						C6A&B	Peak accurately
3	Broadcast	**	Driver Loop	1500 KC	1500 KC	C2B Osc.	Peak accurately
						C2A Ant.	Peak accurately
4	(Repeat operation No. 3)						
5	(Check calibration at 600 KC, 900 KC and 1500 KC)						
6	(Check operations 1 to 5 inclusive)						

Notes: \* X on chassis diagram.  
\*\* Driver loop see diagram below.





## 455 K.C.

**INTERMEDIATE FREQUENCY**  
**BOTTOM VIEWS OF ALL SOCKET CONN**

In case it is desired to use the type of output meter which usually is connected to the plate circuit of an output tube the diagram shown in Fig. 7 should be noted. The output transformer in this circuit is identical to the regular output transformer part No. B-8326 used in the Model 6FL receiver.

Diagram of the output transformer for the 6X4 tube. The primary winding is connected to the "VOICE COIL TERMINAL" and the "OUTPUT TRANSFORMER" output. The secondary winding is connected to the "OUTPUT METER LEADS" and the "TO CASE OF RECEIVER" terminal. The transformer is labeled "PRI." and "SEC.".

Fig. 6 shows the correct way to string the dial cord. Unless the dial cord is strung properly it may have a tendency to jump off the pulley or otherwise operate improperly.

**FIG. 6**

SENSOR DRIVE  
PULLEY


NOTE: DIAL CORD MUST  
BE STRUNG SO THAT  
ROTOR PLATES TOUCH  
STOPS (OPEN OR CLOSED)  
JUST BEFORE STOP ON  
TUNING SHAFT PULLEY  
MEETS STOP SCREW. 

DIAGRAM SHOWS PULLEYS AND DIAL CORD IN CORRECT POSITION WITH CONDENSER FULLY CLOSED

## DIAL CORD

FIG. 7

**VOICE COIL  
TERMINAL**

04 OHM 00 PRI.  
SEC.

## OUTPUT METER LEADS

Compliments of [www.nucow.com](http://www.nucow.com)

## **ALIGNMENT INSTRUCTIONS**

**Note:** The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

## CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

Dummy antenna should be used throughout the entire alignment procedure. The correct dummy antenna is composed of two 220 mmf. condensers (SPARTON Part C-720-389). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6F1 is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 7 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

## I-F ALIGNMENT

1. Set signal generator at 455 KC and connect through the dummy antenna to the receiver.

2. Adjust trimmers C-14 A&B and C-13 A&B to maximum response. (See Fig. 2)
3. Adjust code rejector trimmer C-6 for minimum response. (See Fig. 2).

## R-F ALIGNMENT

1. Turn the manual tuning knob until the variable condenser plates are completely out of mesh (1600 KC).
2. Set signal generator 1600 KC.
3. Adjust oscillator trimmers C-2B for maximum response. (See Fig. 4).

4. Set signal generator to 1400 KC and rotate the manual tuning control until a signal is heard.
5. Adjust the antenna trimmer C-20 (See Fig. 5) for maximum response.
6. After receiver has been installed in car the antenna trimmer (C-20) must be adjusted for maximum response on a weak station at or near 1400 KC.

### MISCELLANEOUS DATA

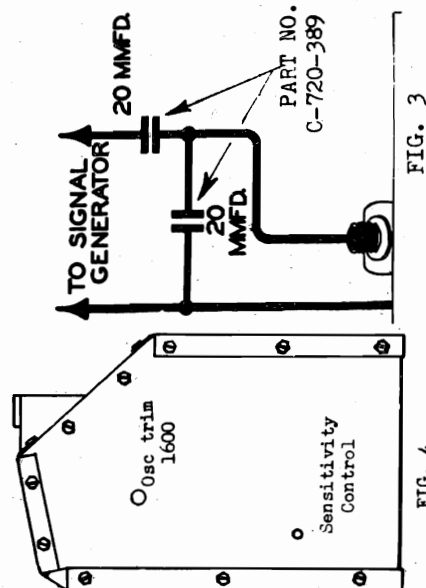
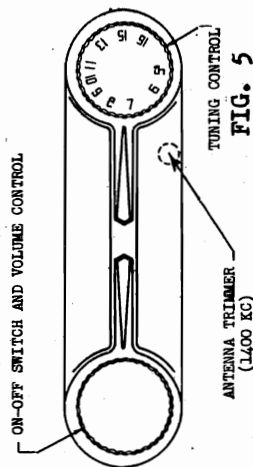
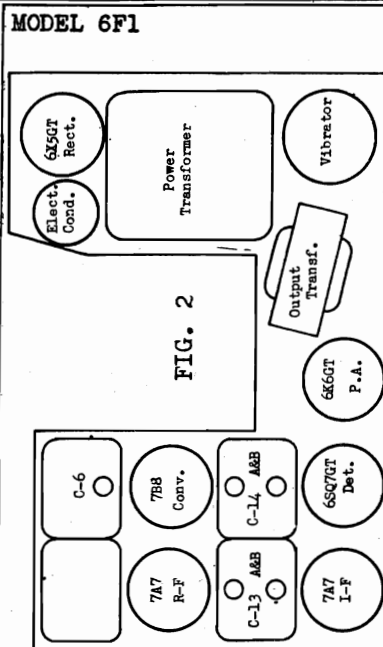
**TEST JACK**

It will be noted that a test jack is provided in the output circuit. The jumper must be connected to the jack in order to have the loud speaker operate properly. This jumper may be conveniently removed to permit the connection of an output meter to the voice coil side of the output transformer.

Sensitivity: 7 microvolts at 1 watt output.

Tuning Range: 540 to 1600 KC.

**Current Consumption: 8.5 amps.**



Power Output: 3.5 watts measured at voice coil.

**Speaker:** Full electro dynamic (5 inch.)

## THE SPARKS WITHINGTON CO.

MODEL 6F1  
MODEL 6F1D

## MODEL 6F1 VOLTAGE CHART

Input Voltage: 6.6 volts at panel. Volume Control Full On with Antenna Disconnected

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A7	R-F Amplifier	H 0	P 187	Gs 68	Gsu 3.8	S 0	G 0	K 3.8	H 6.4
7B8	Osc - Converter	H 0	P 225	Ga 137	Go -10	Gs 68	G 0	K 3.8	H 6.4
7A7	I-F Amplifier	H 0	P 244	Gs 68	Gsu 2.6	S 0	G 0	K 2.6	H 6.4
6SQ7 GT	Det - AVC - 1st A-F	S 0	G 0	K 0	Dp 0	Dp 0	P 98	H 6.4	H 0
6K6G T	Power Amplifier	S 0	H 0	P 255	Gs 242	G 0	-	H 6.4	K 18.
6X5G T	Rectifier	S 0	H 0	P 320*	-	P 320*	-	H 6.5	K 275

Notes: Voltage readings are for schematic diagram on page 3. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All D-c measurements made with 20000 ohms per volt voltmeter. All A-c voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are - D-c volts. \*Indicates AC volts.

Explanation of Symbols: H - Heater, P - Plate, Ga - Oscillator Anode, Go - Oscillator Grid, Gs - Screen Grid, Gsu - Suppressor Grid, S - Shield, Dp - Diode Plate, K - Cathode.

## VOLTAGE CHART

## MODEL 6F1D

Input Voltage: 6.6 volts at panel. Volume Control Full On with Antenna Disconnected

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A7	R-F Amplifier	H 0	P 153	Gs 72	Gsu 3.5	S 0	G -.1	K 3.5	H 6.3*
7B8	Osc - Converter	H 0	P 205	Ga 130	Go -7	Gs 72	G -.1	K 3.5	H 6.3*
7A7	I-F Amplifier	H 0	P 227	Gs 72	Gsu 2.6	S 0	G 0	K 2.6	H 6.3*
7B6	Det-AVC-1st A-F	H 0	P 94	G -.5	K 0	Dp 0	Dp -.1	K 0	H 6.3*
7C5	Power Amplifier	H 0	P 250	Gs 230	-	-	G 0	K 12	H 6.3*
7Y4	Rectifier	H 0	-	P 275*	-	-	P 275*	K 255*	H 6.4*

Notes: Voltage readings are for schematic diagram on page . Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All D-c measurements made with 20000 ohms per volt voltmeter. All A-c voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are - D-c volts. \*Indicates AC volts.

Explanation of Symbols: H - Heater, P - Plate, Ga - Oscillator Anode, Go - Oscillator Grid, Gs - Screen Grid, Gsu - Suppressor Grid, S - Shield, Dp - Diode Plate, K - Cathode.

MODEL 6FLD

THE SPARKS WITHINGTON CO.

INTERMEDIATE FREQUENCY 455 K.C.

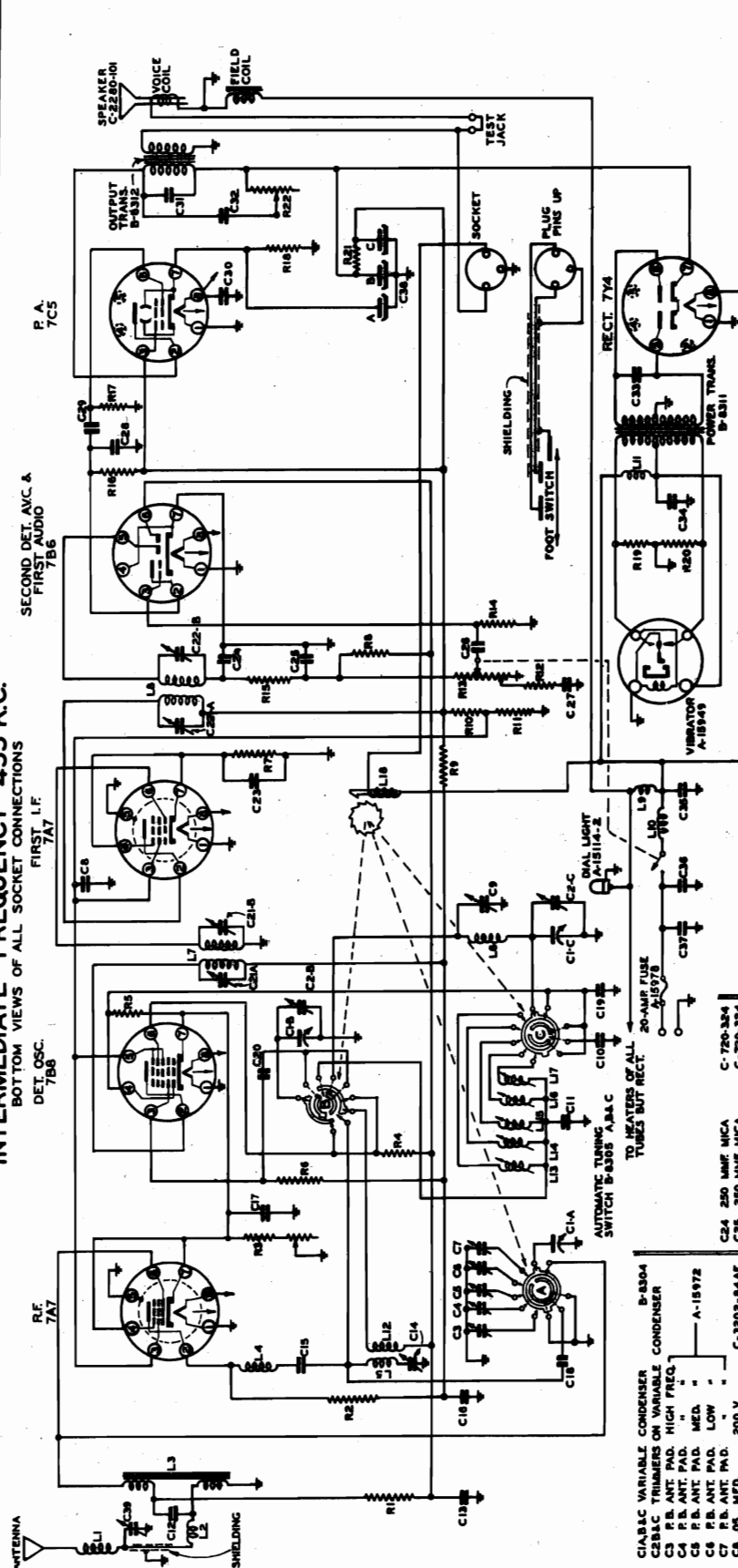
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

DET. OSC. 7B6

FIRST I.F. 7A7

SECOND DET. AVC. & FIRST AUDIO 7B6

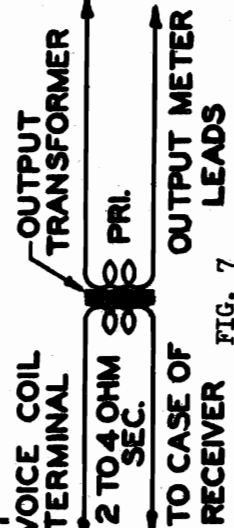
P.A. 7C5



LI1 ANT. SPARK CHOKES	A-20000	LI3 PR. OSC. HI FREQ.	A-15971
LI2 ANT. SPARK CHOKES	A-15971	LI4 PR. OSC. MED.	A-15971
LI3 ANT. SPARK CHOKES	A-15971	LI5 PR. OSC. LOW	A-15971
LI4 ANT. SPARK CHOKES	A-15971	LI6 PR. OSC. LOW	A-15971
LI5 ANT. SPARK CHOKES	A-15971	LI7 PR. OSC. LOW	A-15971
LI6 ANT. SPARK CHOKES	A-15971	LI8 SOLENOID	B-8315
LI7 ANT. SPARK CHOKES	A-15971		
LI8 ANT. SPARK CHOKES	A-15971		
LI9 ANT. SPARK CHOKES	A-15971		
LI10 ANT. SPARK CHOKES	A-15971		
LI11 ANT. SPARK CHOKES	A-15971		
LI12 ANT. SPARK CHOKES	A-15971		
LI13 ANT. SPARK CHOKES	A-15971		
LI14 ANT. SPARK CHOKES	A-15971		
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LI79 ANT. SPARK CHOKES	A-15971		
LI80 ANT. SPARK CHOKES	A-15971		
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LI82 ANT. SPARK CHOKES	A-15971		
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LI87 ANT. SPARK CHOKES	A-15971		
LI88 ANT. SPARK CHOKES	A-15971		
LI89 ANT. SPARK CHOKES	A-15971		
LI90 ANT. SPARK CHOKES	A-15971		
LI91 ANT. SPARK CHOKES	A-15971		
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LI94 ANT. SPARK CHOKES	A-15971		
LI95 ANT. SPARK CHOKES	A-15971		
LI96 ANT. SPARK CHOKES	A-15971		
LI97 ANT. SPARK CHOKES	A-15971		
LI98 ANT. SPARK CHOKES	A-15971		
LI99 ANT. SPARK CHOKES	A-15971		
LI100 ANT. SPARK CHOKES	A-15971		

TEST JACK

It will be noted that a test jack is provided in the output circuit. The jumper must be connected to the jack in order to have the loud speaker operate properly. This jumper may be conveniently removed to permit the connection of an output meter to the voice coil side of the output transformer.



In case it is desired to use the type of output meter which usually is connected to the plate circuit of an output tube the diagram shown in Fig. 7 should be noted. The output transformer in this circuit is identical to the regular output transformer part No. B-8312 used in the Model 6FLD receiver.

THE SPARKS WITHINGTON CO.

MODEL 6FLD

## ALIGNMENT INSTRUCTIONS

Note: The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

## CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

Dummy antenna should be used through out the entire alignment procedure. The correct dummy antenna is composed of two 20 mmf. condensers (SPARTON Part C-720-389). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6FLD is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 7 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

## I-F ALIGNMENT

1. Turn selector switch to the No. 1 ('Automatic') position (580 KC).
2. Set signal generator at 455 KC and connect through the dummy antenna to the receiver.

3. Adjust trimmers C-22 A&B and C-21 A&B to maximum response. (See Fig. 2).
4. Adjust code rejector trimmer C-14 for minimum response. (See Fig. 2).

## R-F ALIGNMENT

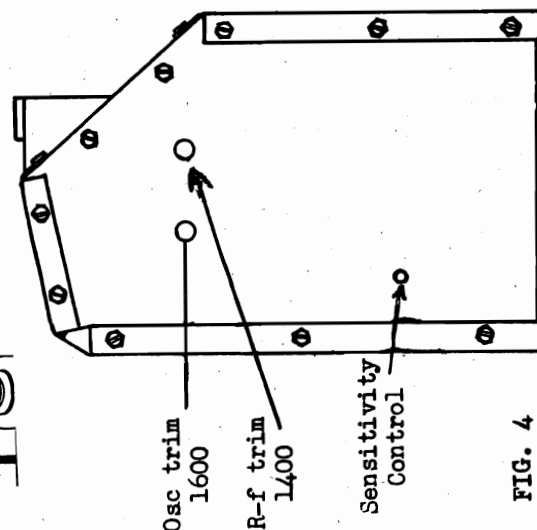
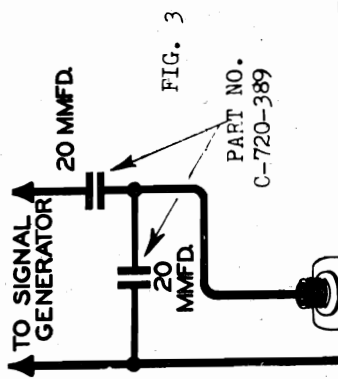
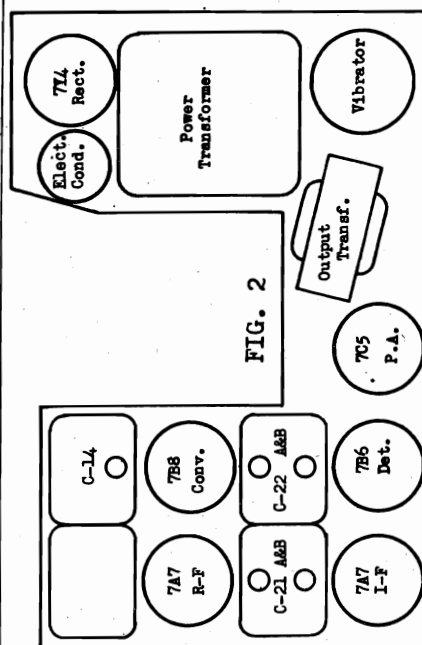
1. Turn selector switch to "Manual Tuning" (D).
2. Turn the manual tuning knob until the variable condenser plates are completely cut of mesh (1600 KC).
3. Set signal generator 1600 KC.
4. Adjust oscillator trimmer C-2C for maximum response. (See Fig. 4).
5. Set signal generator to 1400 KC and rotate the manual tuning control until a signal is heard.
6. Adjust R-F trimmer C-2B (See Fig. 4) and the antenna trimmer C-39 (See Fig. 4) or maximum response.

7. Set the signal generator to 600 KC and rotate the manual tuning control until a signal is heard.

8. The variable condenser should then be rocked slightly while adjusting the oscillator padder condenser C-9. (See Fig. 5).

9. Repeat adjustments described in step 6 to make sure that condensers C-2B and C-39 are peaked for maximum response.

10. After receiver has been installed in car the antenna trimmer (C-39) must be adjusted for maximum response on a weak station at or near 1400 KC.



## MODEL 6F1D

THE SPARKS WITHINGTON CO.

## SETTING THE ROTO-SELECTOR

1. Turn receiver on and allow it to operate for approximately  $\frac{1}{2}$  hour. (This is necessary in order that the operating temperature may reach normal and to be assured of accurate adjustment).

2. Remove the plastic escutcheon over the tuning control by first pulling off the three (3) knobs and removing the lock nuts on the tuning and volume control shafts. With the escutcheon removed, the automatic adjusting screws become accessible as shown in Fig. 5. The adjustments are easily made by means of a small screw driver.

3. Select five stations within the frequency range shown under each set of adjustment screws in Fig. 5.

4. With the selector switch in the "D" position, tune in manually the broadcast station to be set up on position No. 1 and identify the program. Note: Due to the net-work programs broadcast by many stations, it is advisable to wait until the station announces its call letters before completing the adjustments.

5. With the desired station accurately tuned in turn selector switch to the No. 1 position. Now using the screw driver turn the top screw at position No. 1 until the station selected is brought in with the loudest volume, then adjust the larger screw at the bottom until maximum volume is obtained. Note: Stations of the higher frequencies are tuned in by turning the screws to the left (counter-clockwise). Lower frequency stations are tuned by turning the screws to the right (clockwise).

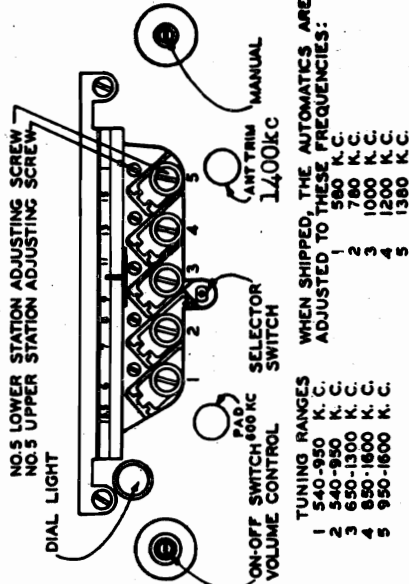


FIG. 5

6. Proceed with setting up the remaining four stations in the same manner as described under paragraphs 4 and 5.

7. Recheck the screws for each station to make sure that each one of the selected stations is tuned in as accurately as possible. It is advisable for the final rechecking of adjustments to be made in an area of low signal strength or in some known "dead spot", where radio signals are difficult to receive.

## SOLENOID PLUNGER

The solenoid plunger is fully lubricated at the factory and normally no special lubrication service will be required. However, it is good practice to place one or two drops of lubricant on the plunger at such times as the receiver may be in the service shop. Use only Super Pyroil "B" as a plunger lubricant. It is readily obtainable from any auto supply house or from the factory.

## DIAL CORD

Fig. 6 shows the correct way to string the dial cord. Unless the dial cord is strung properly it may have a tendency to jump off the pulley or otherwise operate improperly.

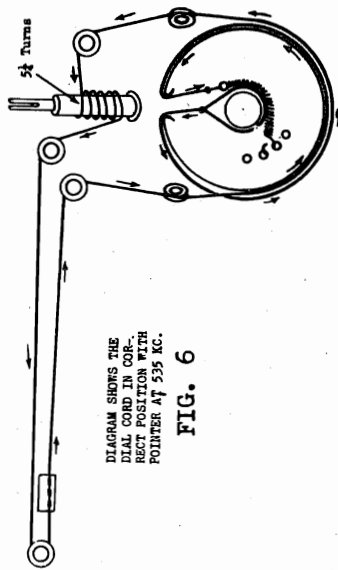


DIAGRAM SHOWS THE DIAL CORD IN CORRECT POSITION WITH PULLEY AT 555 KC.

FIG. 6

## ELECTRICAL SPECIFICATIONS

**Sensitivity:** 7 microvolts at 1 watt output.

**Power Output:** 4.5 watts measured at voice coil.

**Speaker:** Full electro dynamic (7 inch diameter).

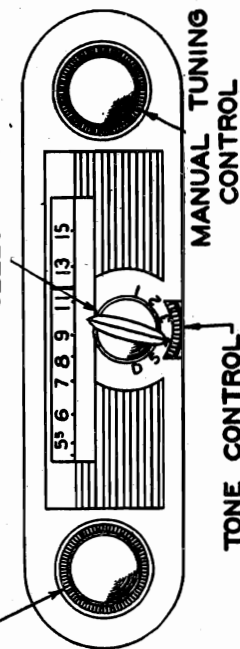
**Robo-Selector Tuning:** Automatic tuning for five stations.

**Current Consumption:** 8.5 amps.

**Foot Control Switch (Optional):** Automatic tuning for five stations and automatic reduction of volume by floor-mounting foot control switch.

**VOLUME CONTROL AND OFF ON SWITCH**

**SELECTOR KNOB**







MODEL 6F2D

THE SPARKS WITHINGTON CO.

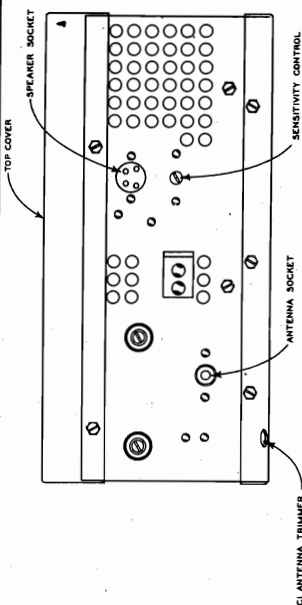


FIG. 4 BACK VIEW OF SET

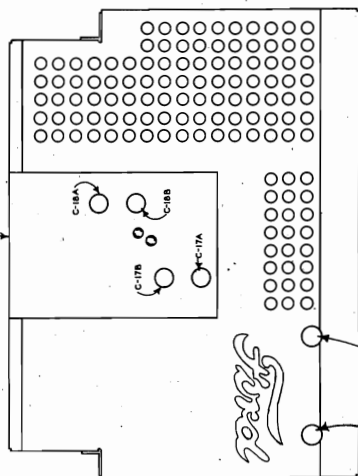


FIG. 5

TO SIGNAL GENERATOR

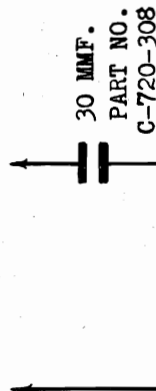


FIG. 3

2. Set the signal generator at 265 KC and connect through the dummy antenna to the receiver.

3. Adjust trimmers C-18 A&B and C-17 A&B for maximum response. (See Fig. 5.)

R-F ALIGNMENT

1. Tune the set to 1610 KC by rotating the tuning knob as far as it will go clockwise.

2. Set the signal generator to 1610 KC.

3. Adjust the oscillator trimmer C-11, the RF trimmer C-7 and the antenna trimmer C-1 for maximum response, in the sequence given. (See Fig. 4 & 5 for trimmer locations.)

4. After the receiver has been installed in the car the antenna trimmer C-1 must be adjusted for maximum response with the set tuned to a weak station near 1600 KC.

SOLENOID PLUNGER

The solenoid plunger is fully lubricated at the factory and normally no special lubrication service will be required. However, it is good practice to place one or two drops of lubricant on the plunger at such times as the receiver may be in the service shop. Use only Super Pyroil "B" as a plunger lubricant. It is readily obtainable from any auto supply house or from the factory.

DIAL CORD

The dial pointer should be so adjusted that when the iron slugs are in the maximum out position with respect to the coils the dial pointer should be the pointer width to the right hand side of 1600 KC on the dial scale.

ALIGNMENT INSTRUCTIONS

Note: The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

A dummy antenna should be used through out the entire alignment procedure. The correct dummy antenna is composed of one 20 mmf. condenser (SPARTON Part C-720-389) and one 30 mmf. condenser (SPARTON Part C-720-308). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6F2D is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 6 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

I-F ALIGNMENT

1. Index the tuner to dial position and tune the set to 550 KC.



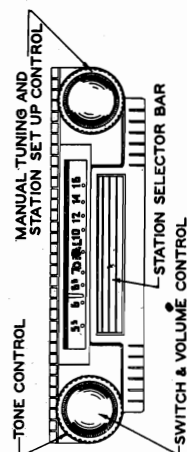
## THE SPARKS WITHINGTON CO.

MODEL 6F2D

## SETTING THE ADJUST-O-MATIC TUNER

1. Turn receiver on and allow it to operate for approximately  $\frac{1}{2}$  hour. (This is necessary in order that the operating temperature may reach normal and to be assured of accurate adjustment).
2. With the tuning knob in its normal position and the tuner indexed so that the word DIAL in the pointer background is illuminated, the set is ready for manual operation.
3. By indexing the tuner with the push bar the first automatic position is ready for setting up. The station is tuned in by retracting the manual knob and tuning to the desired station as indicated by the dial pointer.
4. The manual knob should then be pushed back to its normal position.
5. The next automatic position may then be indexed and the desired station set up in the same manner as mentioned in paragraph 3 and 4.
6. After all five automatic positions are set up the manual knob should be returned to its normal position. If desired, the manual position may also be set up and used as an automatic position. Any station may be set up in any desired automatic position.

Note: Due to the net-work programs broadcast by many stations, it is rather difficult to determine the station until the station call letters have been announced.



Input Voltage: 6.6 Volts. Volume Control Full on with Antenna Disconnected

TUBE	FUNCTION	Voltage of socket prongs to gnd. (See schematic dia.)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A7	R-F Amplifier	H 0	P 132	Gs 112	Gsu 0	S 0	G -.03	K 2.9	H 6.25
7B8	Osc-Converter	H 0	P 208	Ga 142	Go -.75	Gs 60	G -.03	K 2.9	H 6.25
7A7	I-F Amplifier	H 0	P 223	Gs 62	Gsu 0	S 0	G 0	K 2.1	H 6.25
6SQ7GT	Det-AVC-1st AF	S 0	G -.22	K 0	Dp -.3	Dp -.3	P 95	H 6.25	H 0
6V6GT	Power Amplifier	-	H 0	P 235	Gs 225	G 0	-	H 6.25	K 12
6X5GT	Rectifier	-	H 0	P 230*	-	P 230*	-	H 6.2	K 250

Notes: Voltage readings are for schematic diagram on page 3. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are + DC volts. \*Indicates AC volts. Explanation of Symbols: H-Heater, P-Plate, Gs-Oscillator Anode, Go-Oscillator Grid, Gs-Screen Grid, Gsu-Suppressor Grid, S-Shield, Dp-Diode Plate, K-Cathode.

## OUTPUT METER

Sensitivity: 6 microvolts at 1 watt output.

In case it is desired to use the type Power Output: 4.5 watts measured at of output meter which usually is connected to the plate circuit of an output tube

the diagram shown in Fig. 6 should be noted.

The output transformer in this circuit is identical to the regular output transformer part No. B-8312-1 used in the Model 6F2D receiver.

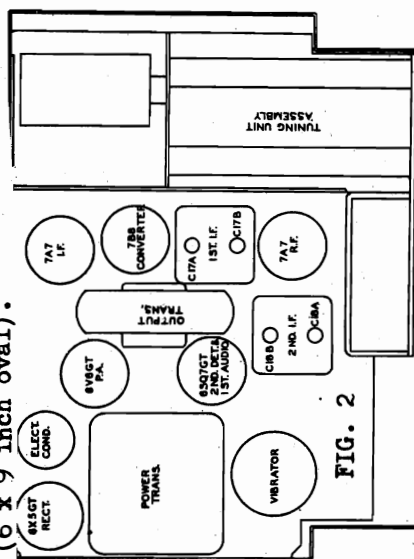
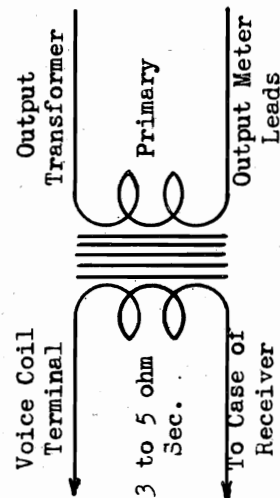
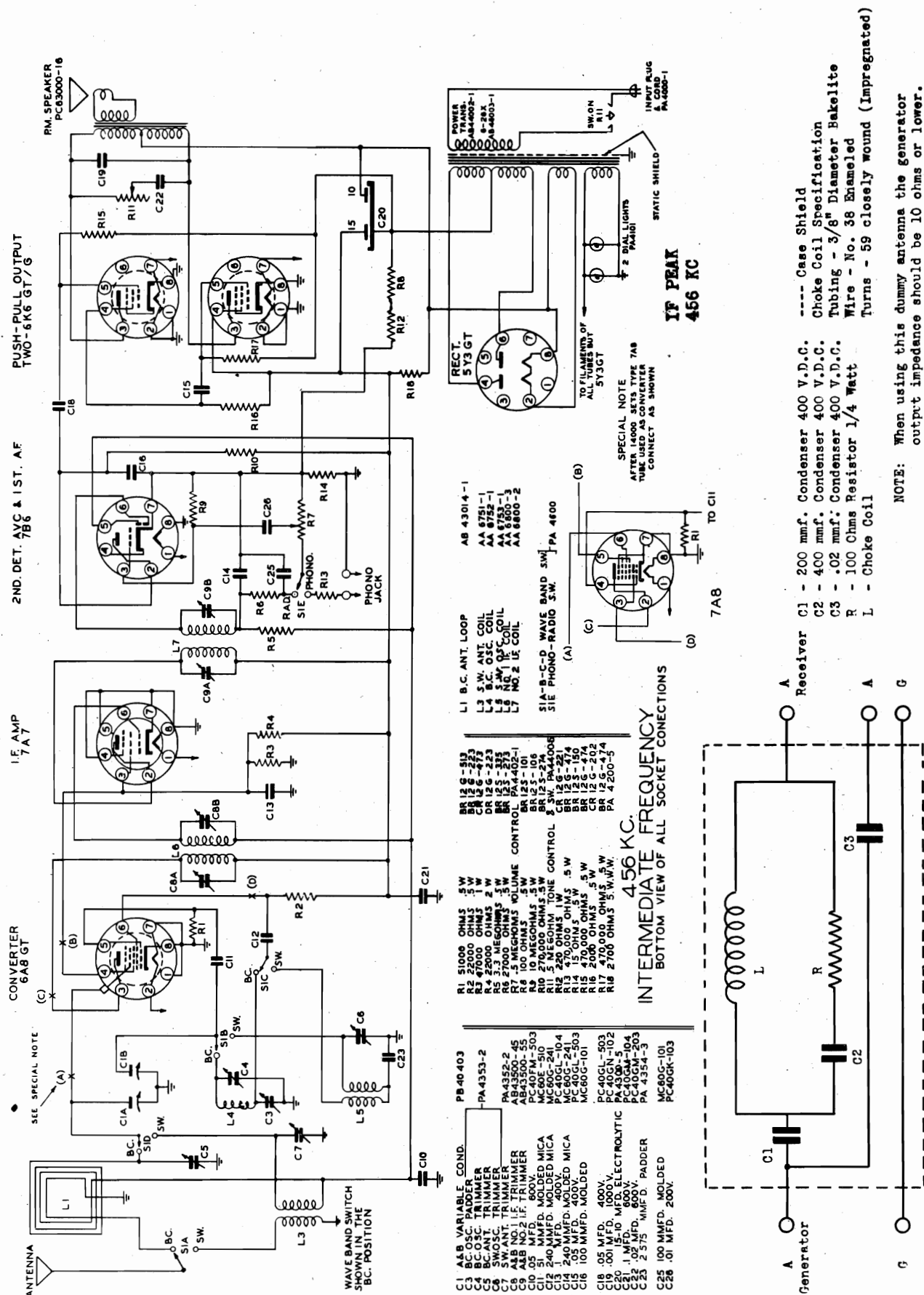


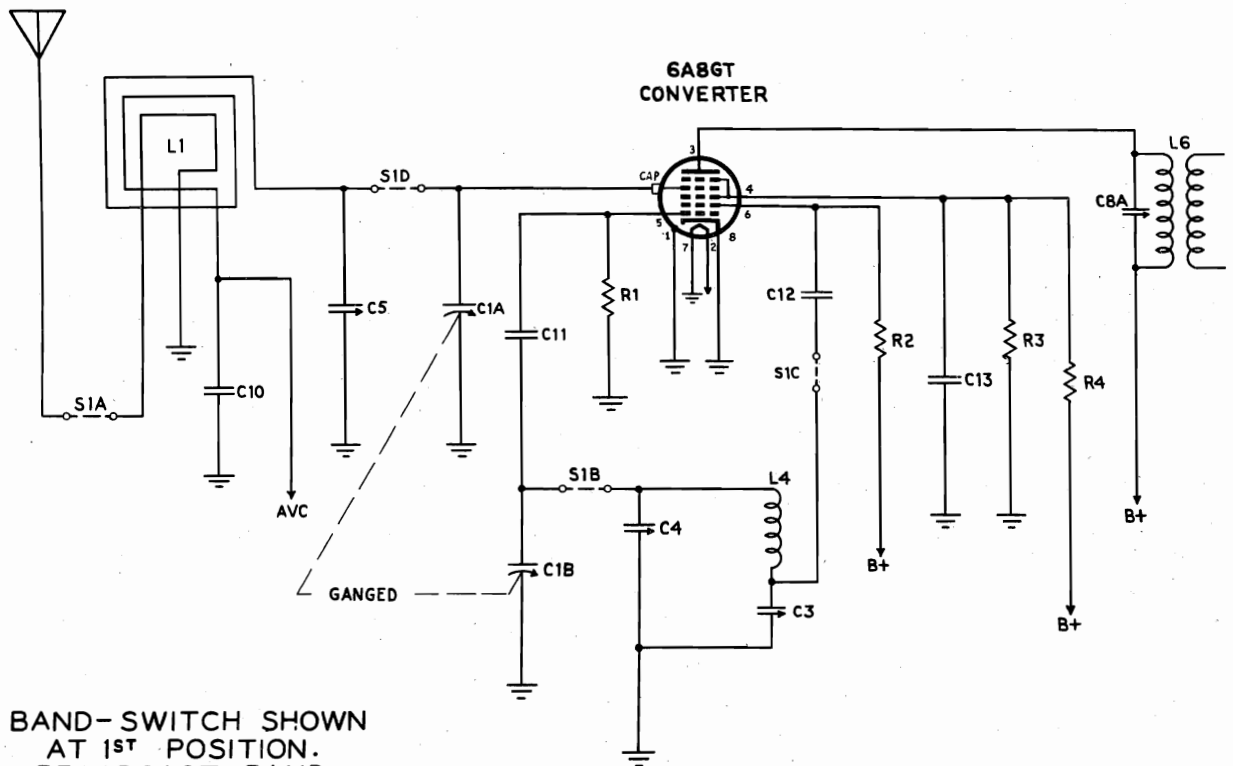
FIG. 2

THE SPARKS WITHINGTON CO.

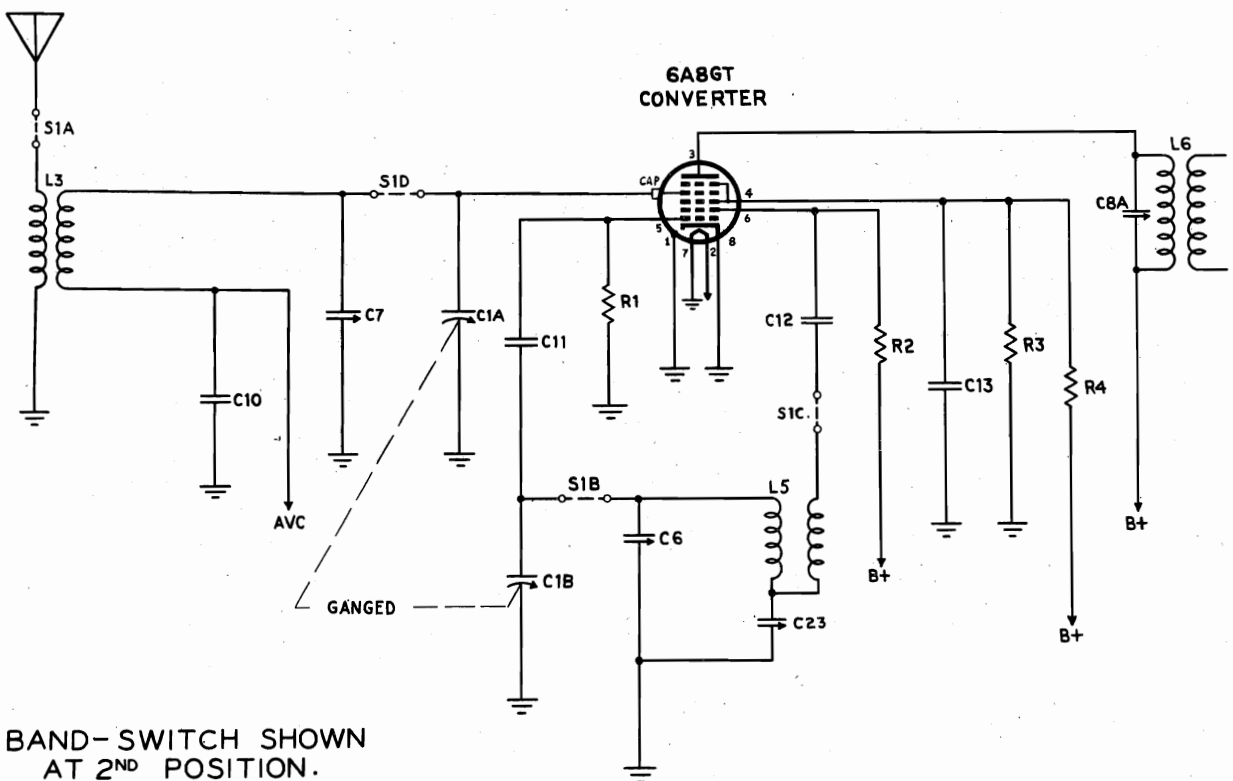


THE SPARKS WITHINGTON CO.

MODELS 6-26, 6-26PA



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



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

MODELS 6-26, 6-26PA

THE SPARKS WITHINGTON CO.

**C3, C4, C5, C6, REFER  
TO TRIMMERS ON THE  
RIGHT SIDE OF CHASSIS  
IN THE BOTTOM VIEW.**

**ALIGNMENT CHART**

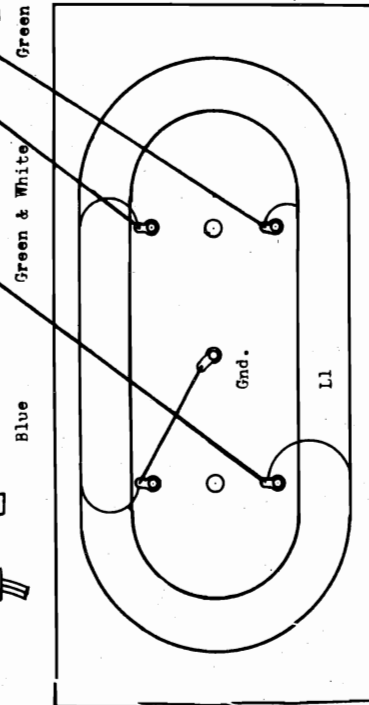
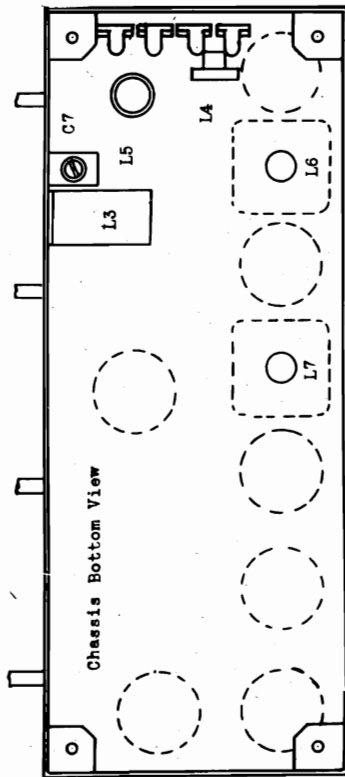
OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING CONDENSER SETTING	TRIMMERS	REMARKS
1				Set dial pointer even with L.H. stop line with condenser gang fully closed.				
2	I.F.	G.C. 6A8GT	.02 MFD.	456 KC.	BC	OPEN	C9 A & B C8 A & B	Peak Accurately Peak Accurately
3	BC	Driver Loop	.	1500 KC.	BC	1500 KC.	C4 Osc.Trim. C5 Ant.Trim.	Peak Accurately Peak Accurately
4				600 KC.	BC	600 KC.	C3 Osc.Pad.	Peak Accurately
5				(Repeat Operation #3)				
6	S.W.	"A" on Antenna Strip	.	18 MC.	S.W.	18 MC.	C6 Osc.Trim. C7 Ant.Trim.	Peak Accurately ***
7				Osc. padder C23 is precision set at the factory and should not be readjusted in the field.				
8				(Repeat Operation #6)				
9				Check calibration at 6 MC., 11 MC., and 18 MC.				
10				Check Operations 1 to 6 inclusive.				

NOTES: \* Driver Loop. See manual 5, Bulletin 1-1 for diagram.  
\*\* Standard Dummy. See diagram below.  
\*\*\* Rock dial while making this adjustment.

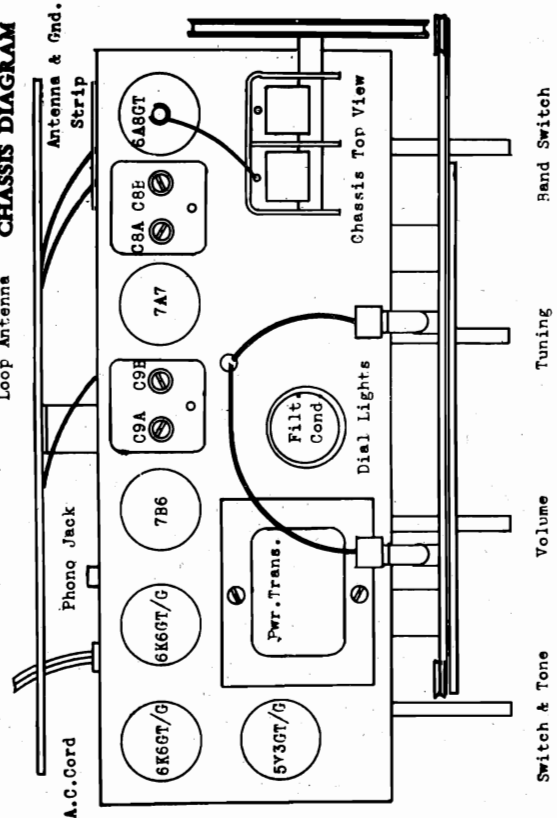
**VOLTAGE CHART**

Line Voltage: 117 Volts AC		Position of Volume Control: Full with set tuned to quiet channel.		Position of Band Switch: Broadcast		Voltage of Socket Terminals to Ground See Proper "on Schematic.									
TUBE	FUNCTION	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	G.Cap.					
6A8GT/5	Converter	0	6.4*	233	87.5	6.6	150	C	0	-.98					
7A7	I.F. Amplifier	6.4*	233	85	0	0	-1.03	C	0	-					
7B6	2nd. det. AVC. 1st A.F.	6.4*	97.5	-1.15	-1.0	-1.15	-1.23	-1.0	C	-					
6K6GT/5	Phase Invt. output	0	0	217.5	217.5	**	0	6.4*	13.5	-					
6K6GT/5	Push-Pull Output	0	0	217.5	230	**	0	6.4*	13.5	-					
5Y3GT/5	Rectifier	0	237.5	C	320	0	320	0	237.5	-					

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% / or - on all measurements.  
Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.  
\* AC volts.  
\*\* Cannot be measured with 20,000 ohms/volt voltmeter.

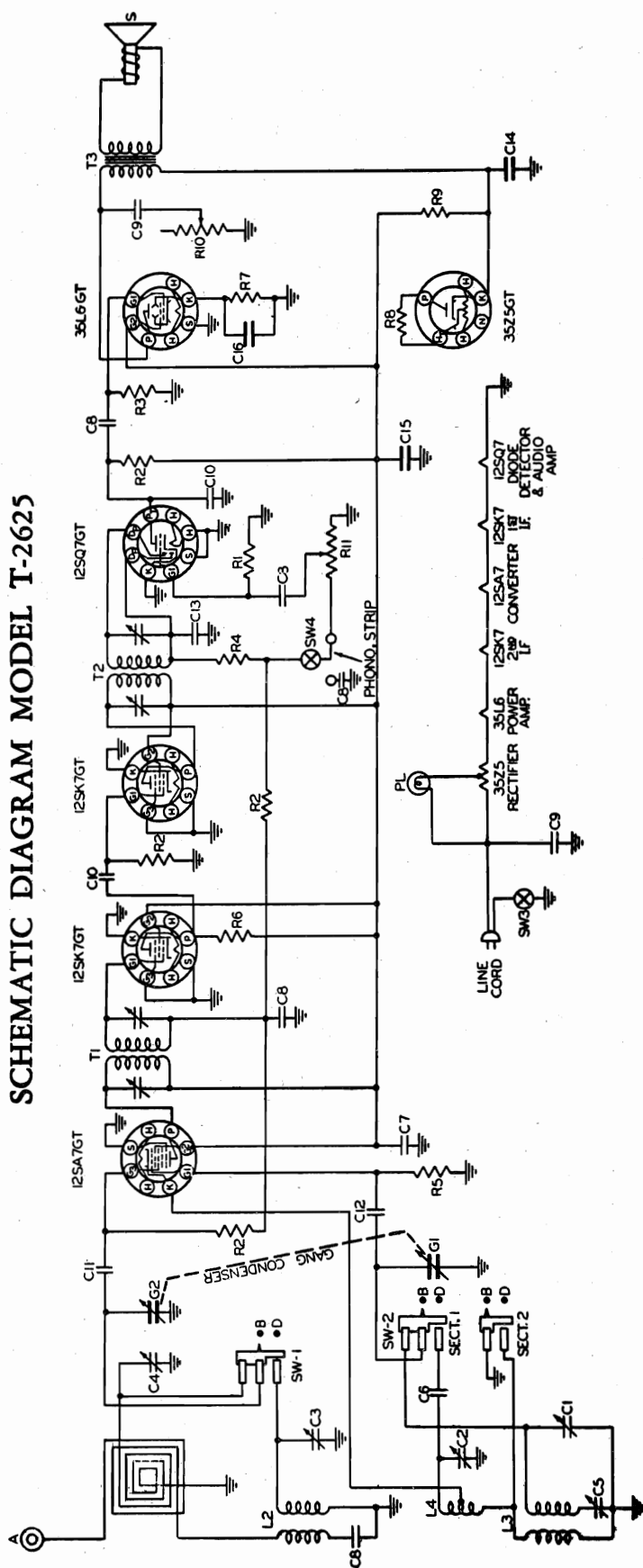


**CHASSIS DIAGRAM**



## SPIEGEL

SCHEMATIC DIAGRAM MODEL T-2625



PART NO	SCHEMATIC LOCATION	DESCRIPTION	PART NO	SCHEMATIC LOCATION	DESCRIPTION
3-2	R1	2 MEG. 1/2 W 20% RESISTOR	12SK7GT	T1	INPUT IF TRANSFORMER
3-6	R2	1 MEG. . . . .	16-39	T2	OUTPUT IF TRANSFORMER
3-1	R3	500K. . . . .	16-40	T3	OUTPUT TRANSFORMER (ON SPKR)
3-4	R4	50K. . . . .	14-307	SW1	BAND SWITCH
3-16	R5	30K. . . . .	28-303	SW3	ON-OFF SWITCH ON VOL. CONTROL
3-32	R6	1700. . . . .	47	PL	PHONO JACK & SWITCH
3-34	R7	100. . . . .	12SA7GT	PL	PILOT LIGHT
3-174	R8	50. . . . .	12SK7GT	12SK7GT	CONVERTER
3-37	R9	2500. . . . .	40-306	12SK7GT	1B & 2B IF
5-31	R10	25K. . . . .	35L6GT	35L6GT	DIODE DETECTOR & AUDIO AMP.
5-30	R11	1M. . . . .	35Z5GT	35Z5GT	POWER AMPLIFIER
9-305	C1	BC OSC. TRIMMER COND.	C1	C1	RECTIFIER
9-47	C2	SW ANT. TRIMMER COND.	10-304	C2	OSCILLATOR TUNING COND.
9-27	C3	BC ANT. TRIMMER COND.			
	C4	BC OSC. PADDER COND.			
	C5	2 MEG. 1/2 W 20% RESISTOR			
	C6	1 MEG. . . . .			
	C7	500K. . . . .			
	C8	50K. . . . .			
	C9	30K. . . . .			
	C10	1700. . . . .			
	C11	100. . . . .			
	C12	50. . . . .			
	C13	2500. . . . .			
	C14	25K. . . . .			
	C15	1M. . . . .			
	C16	BC OSC. TRIMMER COND.			
	L1	SW ANT. TRIMMER COND.			
	L2	BC ANT. TRIMMER COND.			
	L3	BC OSC. PADDER COND.			
	L4	2 MEG. 1/2 W 20% RESISTOR			
	S	1 MEG. . . . .			

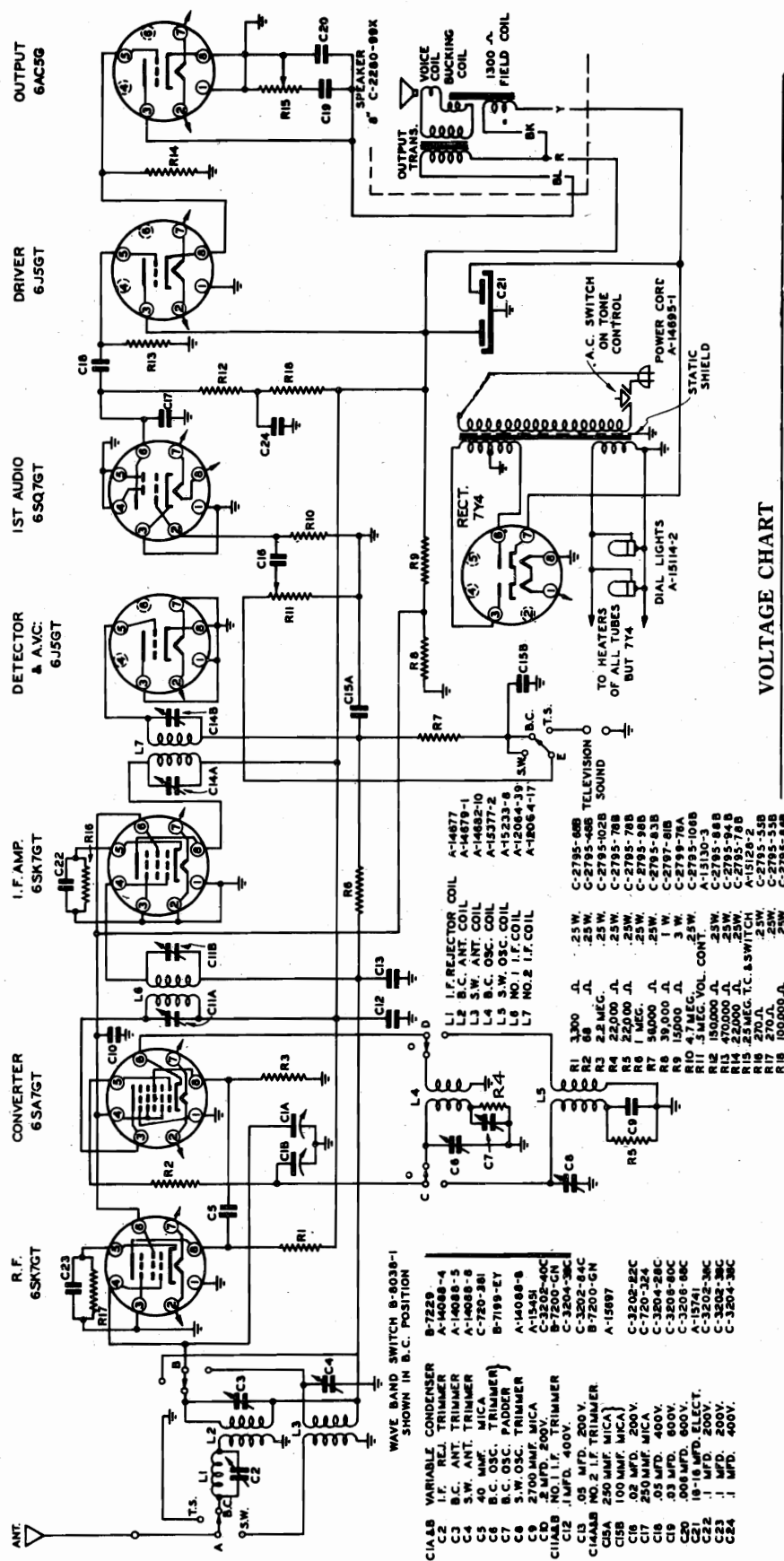
DESIGNED BY *RF* APPROVED BY *RF*  
MARCH 2, 1952





MODEL 831

## SPIEGEL



## VOLTAGE CHART

Position of Volume control: Full with Antenna disconnected  
Position of Band Switch: Broadcast

Line voltage: 117 volts

## MODEL 831

INTERMEDIATE FREQUENCY 456 K.C. Tube  
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

Function	Voltage of socket prongs to Gnd. (Prong no's. on Schematic)							
	No 1	No 2	No 3	No 4	No 5	No 6	No 7	No 8
6SK7GT R-f Amplifier	0	0	0	**	1.6	76	6.2*	237
6SA7GT Oscillator-Converter	0	0	0	24.5	76	0	**	0
6SK7GT I-f Amplifier	0	0	0	0	1.6	76	6.2*	24.5
6J5GT Detector-AVC	0	0	0	0	**	155	6.2*	0
6SQ7GT 1st Audio Amplifier	0	**	0	0	0	60	6.2*	0
6J5GT Audio Driver	0	0	255	77	0	0	6.2*	11
6AC5G Power Amplifier	0	0	240	0	11	0	6.2*	0
774 Rectifier ***	0	0	300*	0	0	300*	0	0

\* AC volts

\*\* Cannot be measured with 1000 ohms/volt voltmeter.

\*\*\* Tube removed from socket to enable test prods. to reach socket prongs.

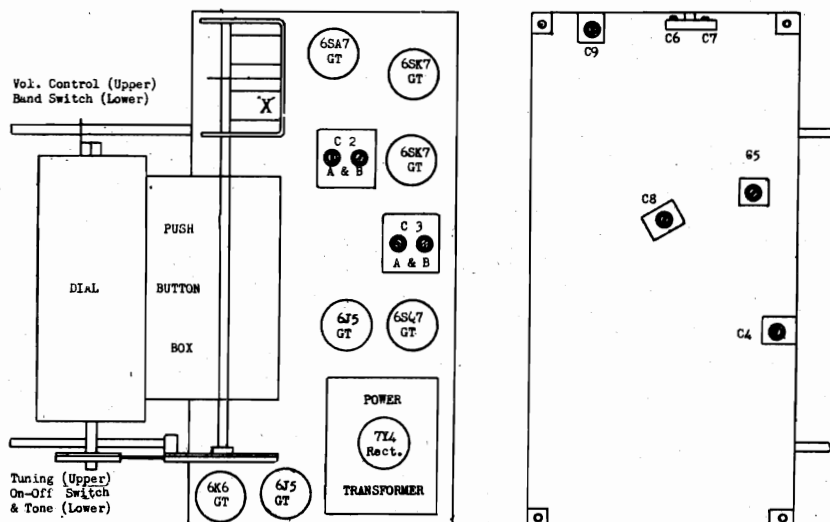
August 1, 1940





MODEL 831

## SPIEGEL



TOP VIEW OF CHASSIS

ALIGNMENT CHART

BOTTOM VIEW OF CHASSIS

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial drum so that last mark on BC scale is directly toward front of set when condenser plates are fully meshed.)							
2	I-F.	*	.1 mf.	456 KC	BC	Open	C3 A&B	2nd I-F
3	Rejector	Ant.	200 mf.	456 KC	BC	Closed	C2 A&B	1st I-F
4	Broad-cast Band	Ant.	200 mf.	1500 KC	BC	1500 KC	C4	Adjust to minimum
5				600 KC	BC	600 KC	C6 Osc.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
8	Shortwave Band	Ant.	*	18 MC	SW	18 MC	C9 Osc.	Rock dial while adjusting for maximum output
9	(Check calibration and sensitivity at 6 MC and 18 MC)							
10	(Check operations 1 to 9 inclusive)							

Notes: \*Connect to point "X" on Variable Condenser. See drawing below.  
 \*\*100 ohm and 200 mf. in series

## ADJUSTING THE PUSH-BUTTON TUNER

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.
2. Any tab may be used for any button, but it is usually more convenient for the operator if the tabs are arranged in sequence so that the tab for the lowest frequency station (station having lowest number of kilocycles [K. C.]) will be at the low frequency end of the dial.
3. Using a small screwdriver or other tool that will fit the screw in the end of the button, push the button in as far as it will go and turn to the right or left until the dial pointer has moved to the desired station frequency. Be sure the button is pushed all the way in and the station is tuned in accurately.
4. Repeat the procedure in Paragraph 3 for each of the remaining five buttons.
5. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned properly.
6. Insert the proper tab in each button by pressing it in position.
7. Any of the six stations to which the push-button tuner has been adjusted may now be received simply by pushing the button for the desired station.

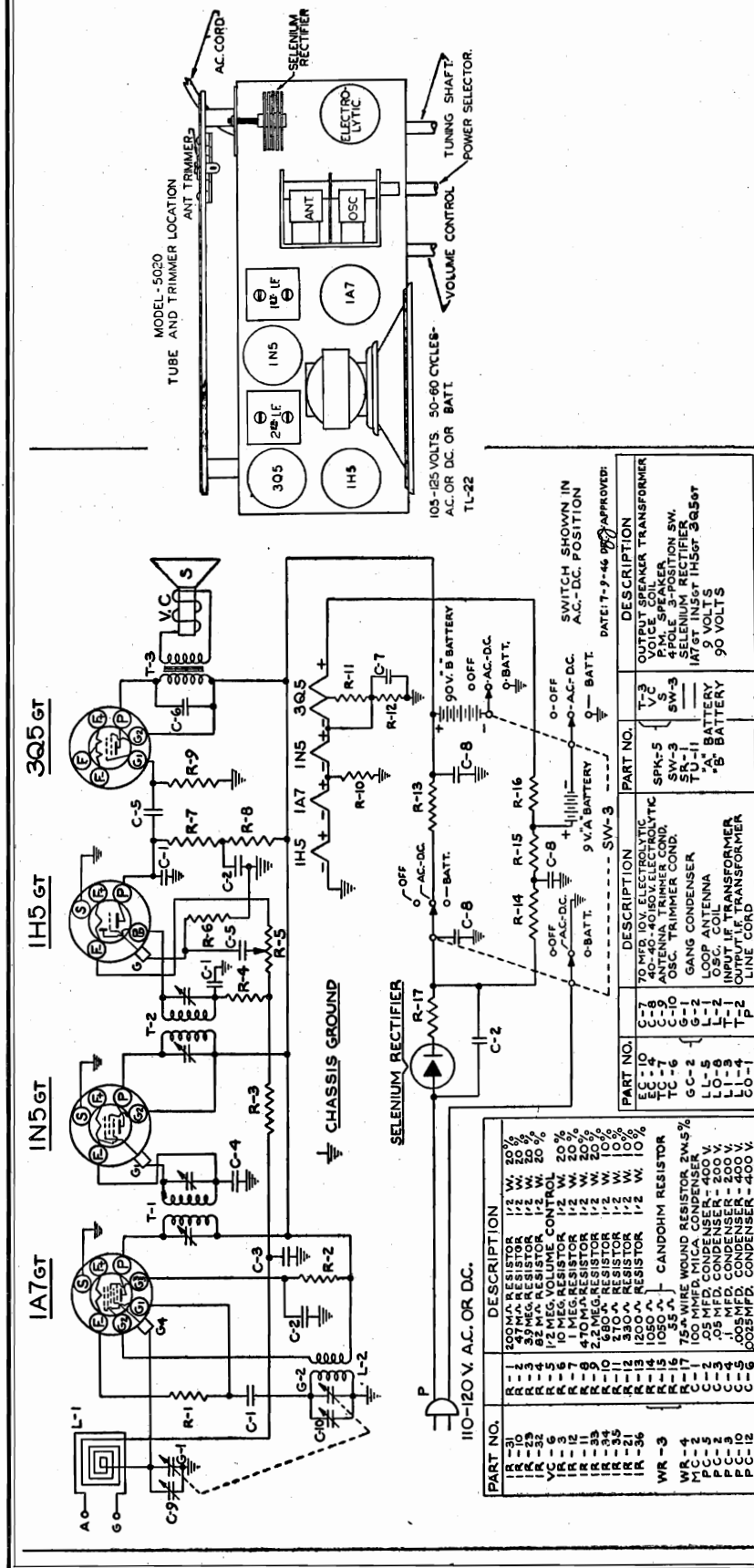
The tuning range of each band is as follows.

Position of Band Selector Switch	Dial Scale	Meters	or	Kilocycles	or	Megacycles
"B" Broadcast	Right hand .....	545 to 187		550 to 1600		.55 to 1.6
"S" Short-Wave	Left hand.....	50 to 16.6		6000 to 18000		6. to 18

"T" (Use pin jacks at back of chassis for phono or television sound.)

## SPIEGEL

MODEL 5020



## ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

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

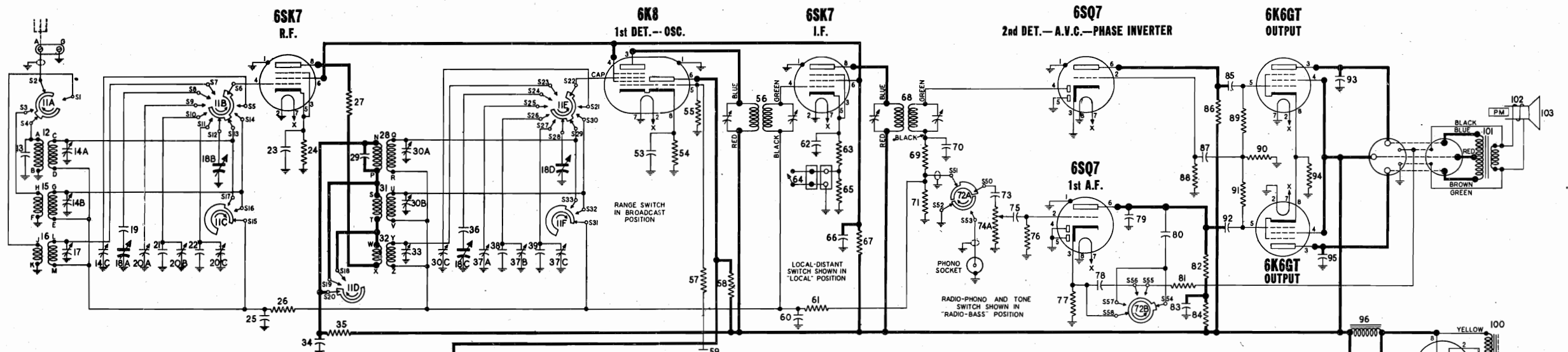
**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC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

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

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

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



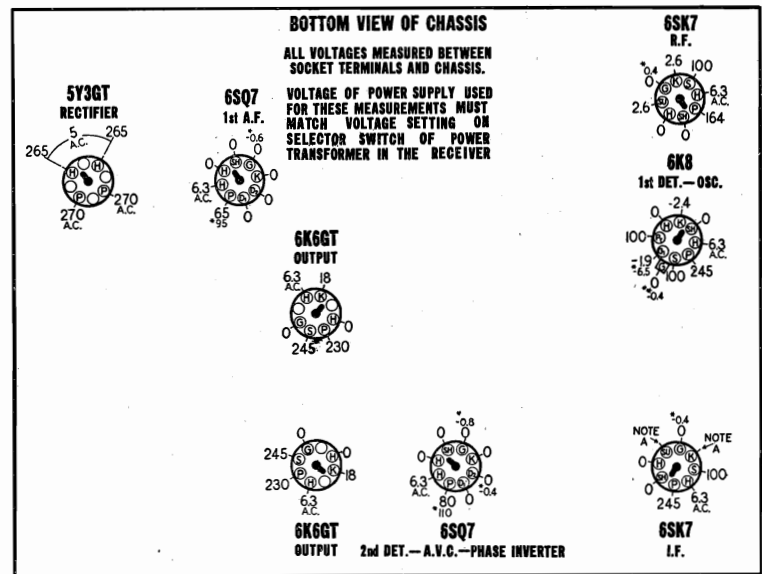


### SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (\*). The (\*) symbol designates a vacuum tube voltmeter measurement.

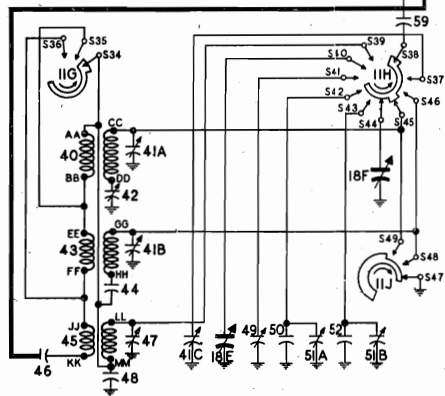
BE SURE THAT SWITCH ON POWER TRANSFORMER IS SET TO POSITION WHICH MOST NEARLY MATCHES LINE VOLTAGE

RADIO-PHONO AND TONE SWITCH IN "RADIO-BASS" POSITION  
VOLUME ON FULL WITH NO SIGNAL  
DIAL TUNED TO 540 KC  
BAND SWITCH IN BROADCAST POSITION



### REAR OF CHASSIS

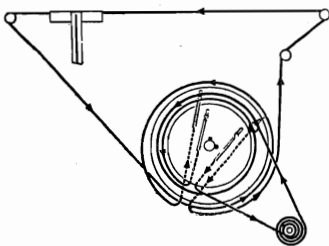
NOTE A: The voltage at the cathode or suppressor terminals of this tube is 13 volts when Local-Distant switch is in "Local" position and 2.4 volts when switch is set to "Distant" position.



### DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

- 113177 Tension Spring
- 114955 Clip on end of cord
- 119087 Ring
- 502773 Cord (8 feet)
- 4 1/2 ft. for pointer drive
- 3 1/2 ft. for tuning drive



### AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

### I.F. 455 KC.

### STAGE GAIN MEASUREMENT PROCEDURE

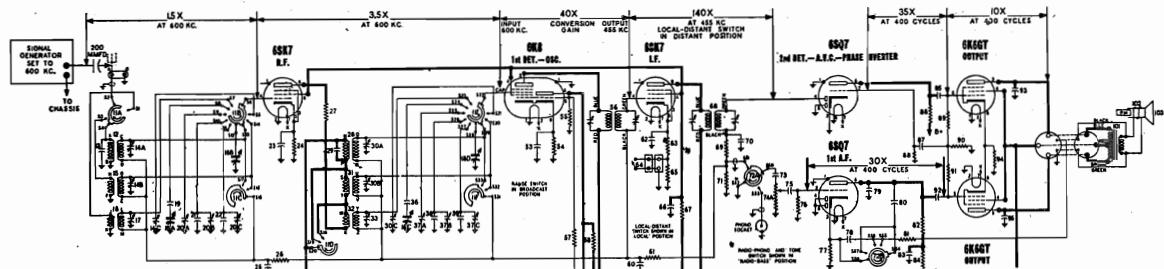
**REQUIRED INSTRUMENTS:** The amount of amplification or "gain" of each of the stages of this receiver may be measured with an A.C. Vacuum Tube Voltmeter or a "channel" type instrument containing a tuned and calibrated amplifier.

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

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

black lead of the 1st I.F. transformer and connect the positive battery lead to the receiver chassis.

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



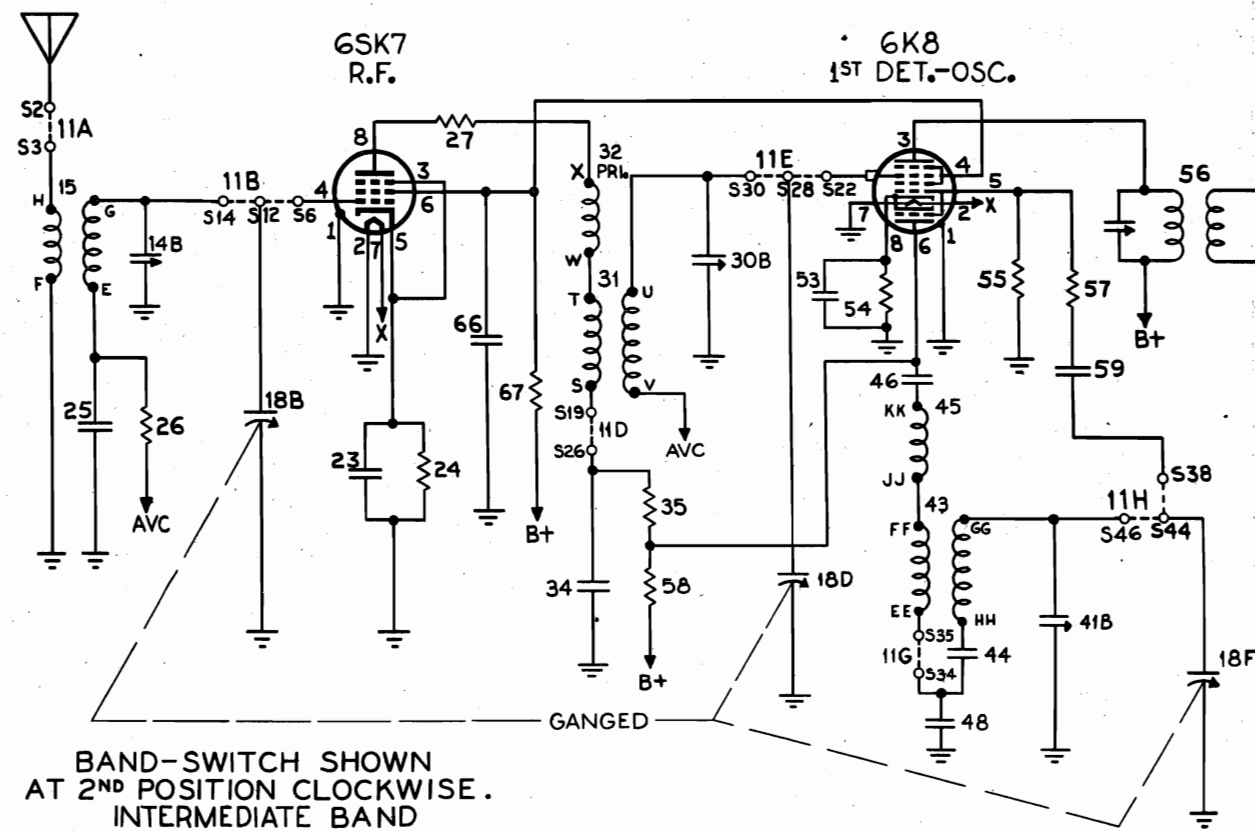
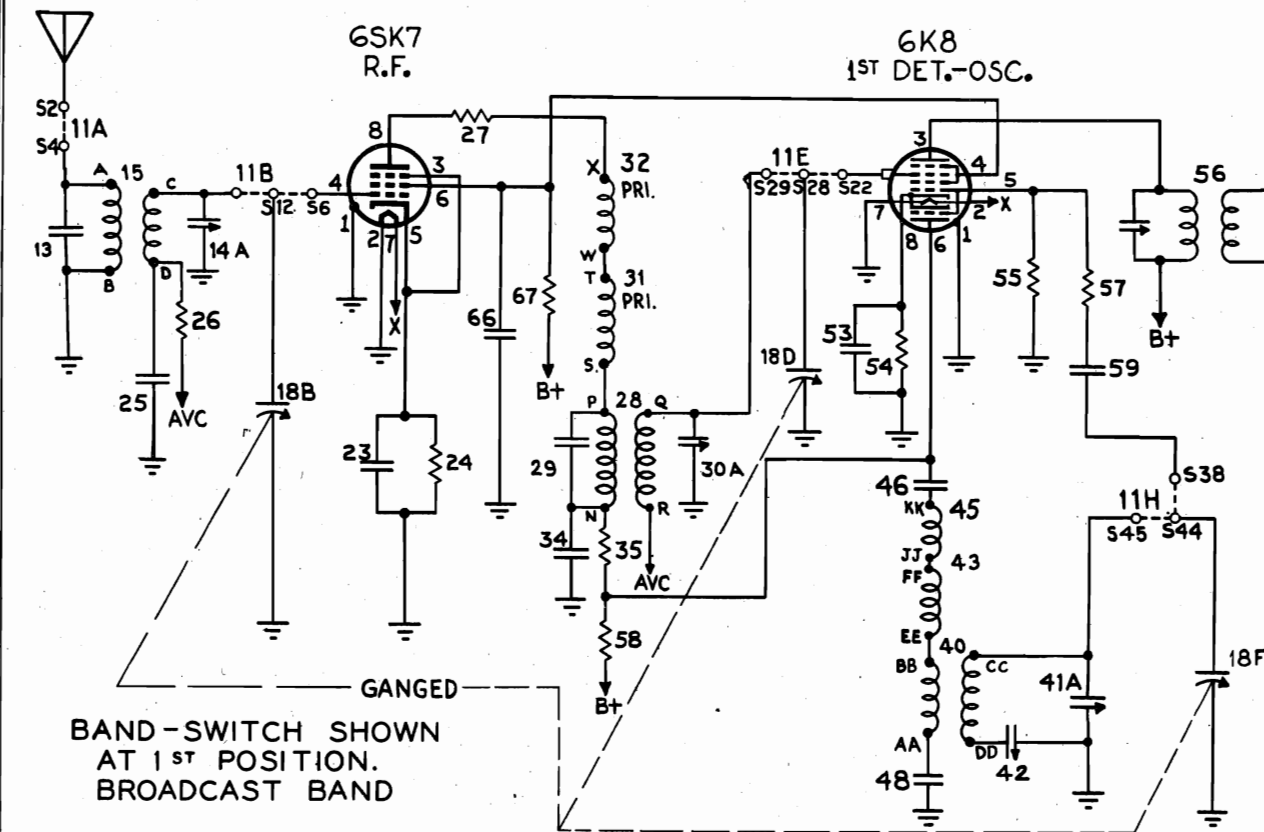
**DIFFERENCES** in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

# "clarified schematics"

STEW. WAR PAGE 16-3

STEWART WARNER CORP.

MODEL 9010-A

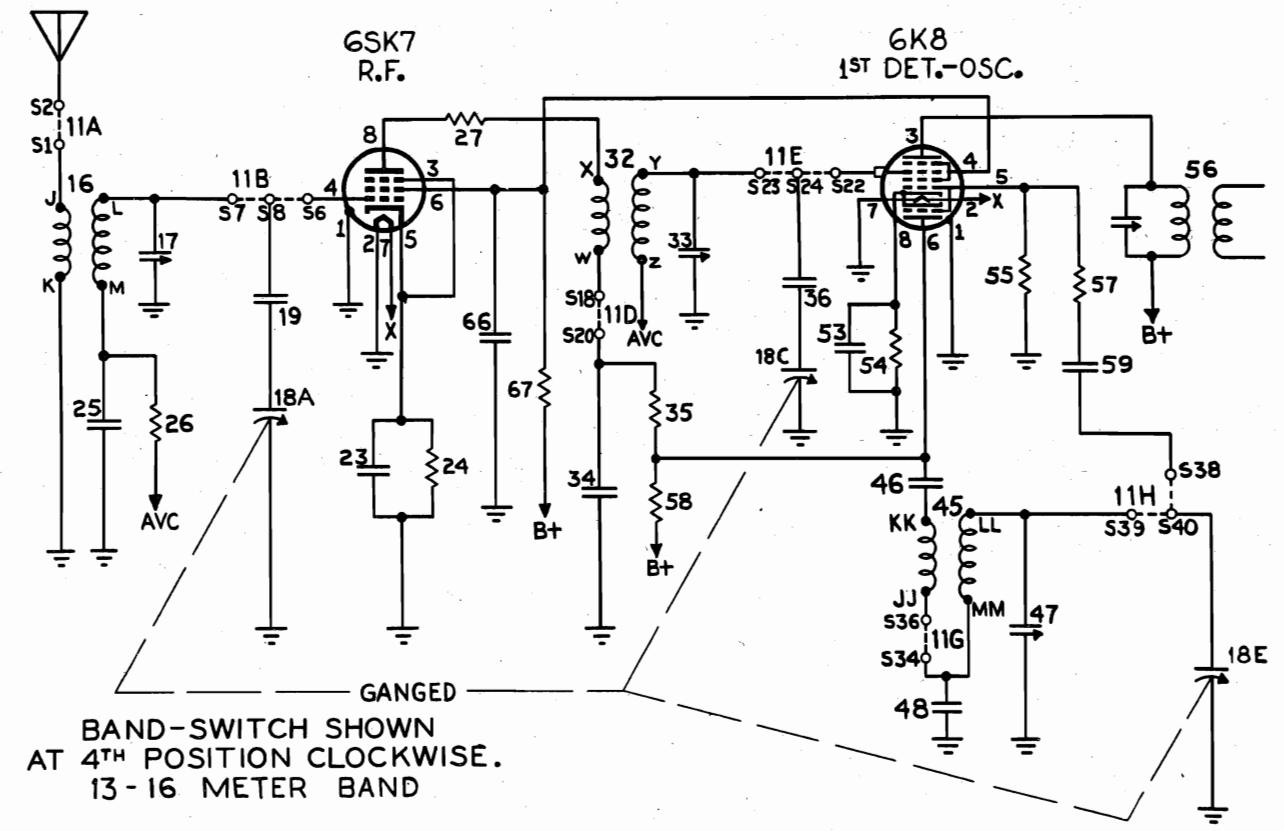
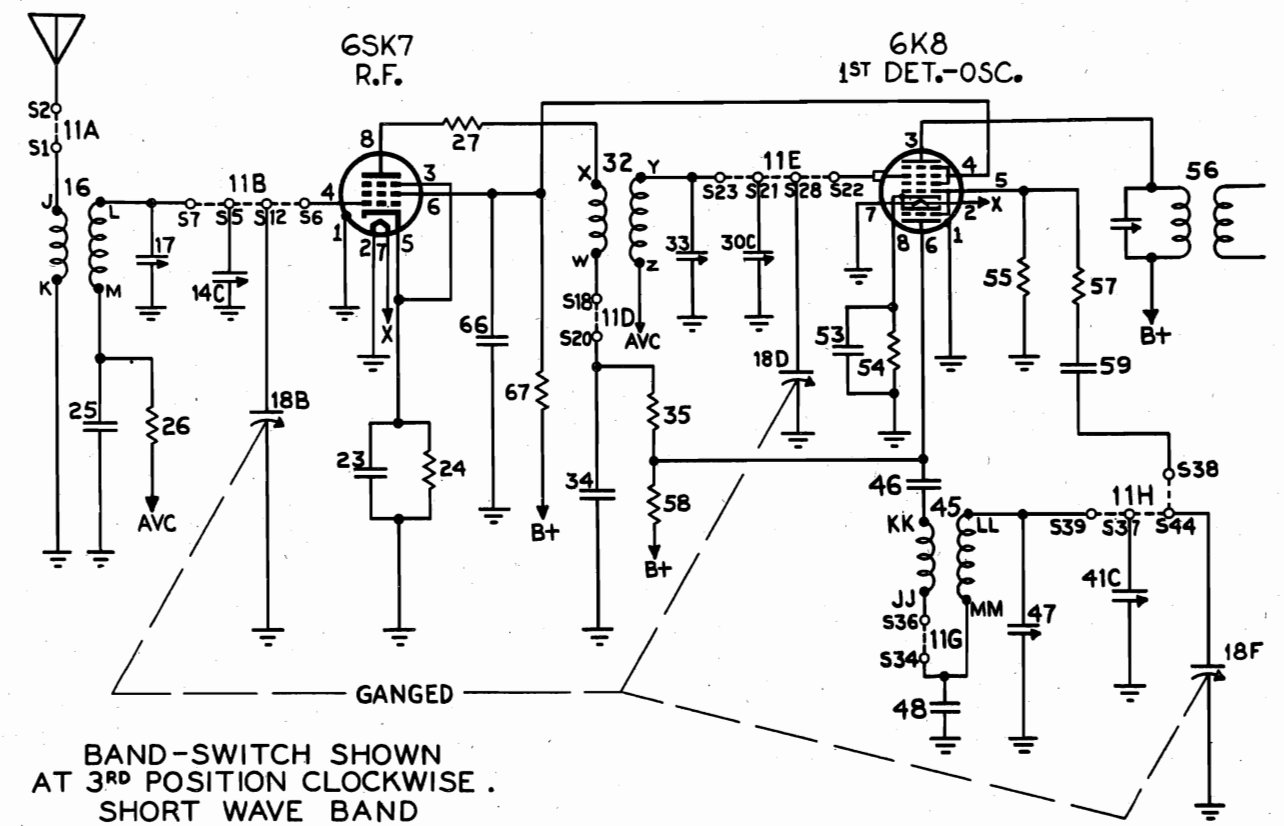


PAGE 16-4 STEW. WAR

MODEL 9010-A

# "clarified schematics"

STEWART WARNER CORP.

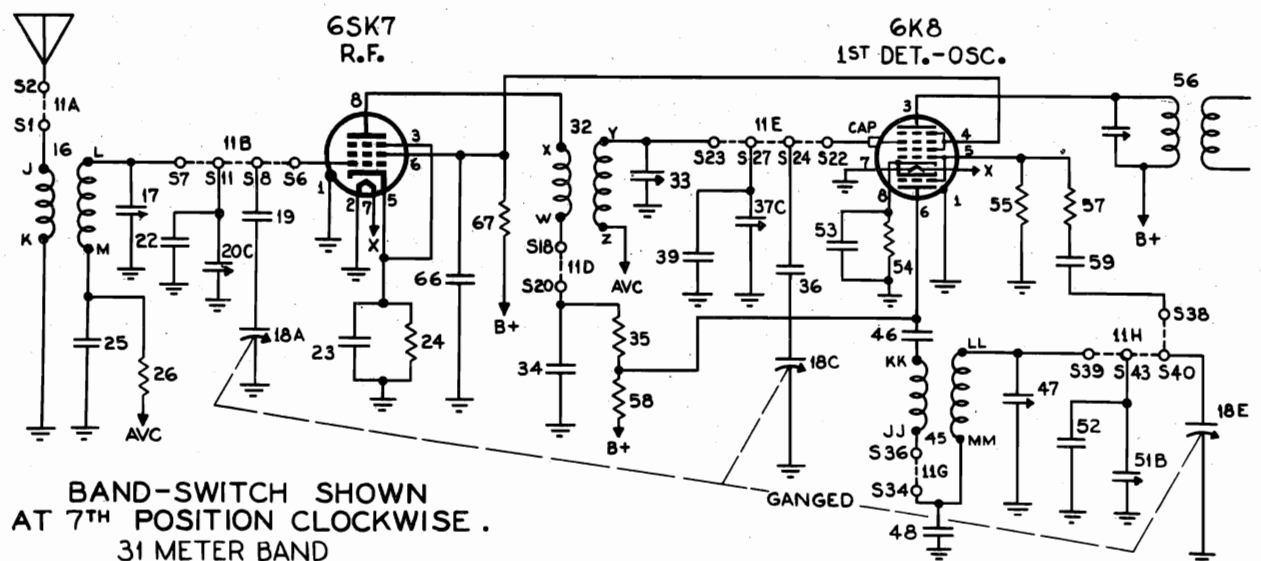
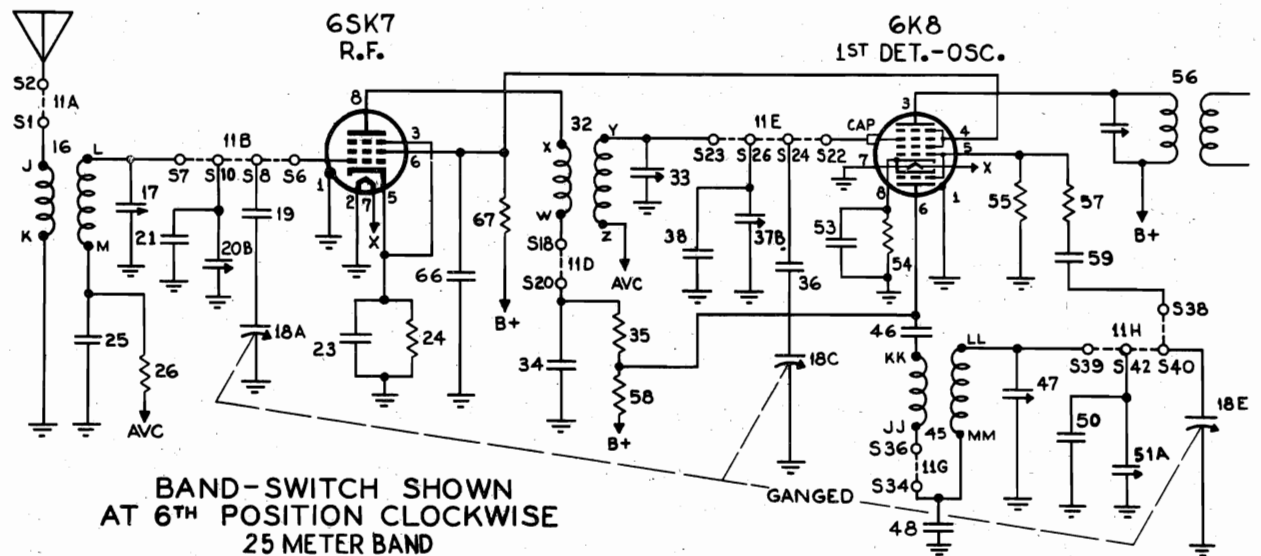
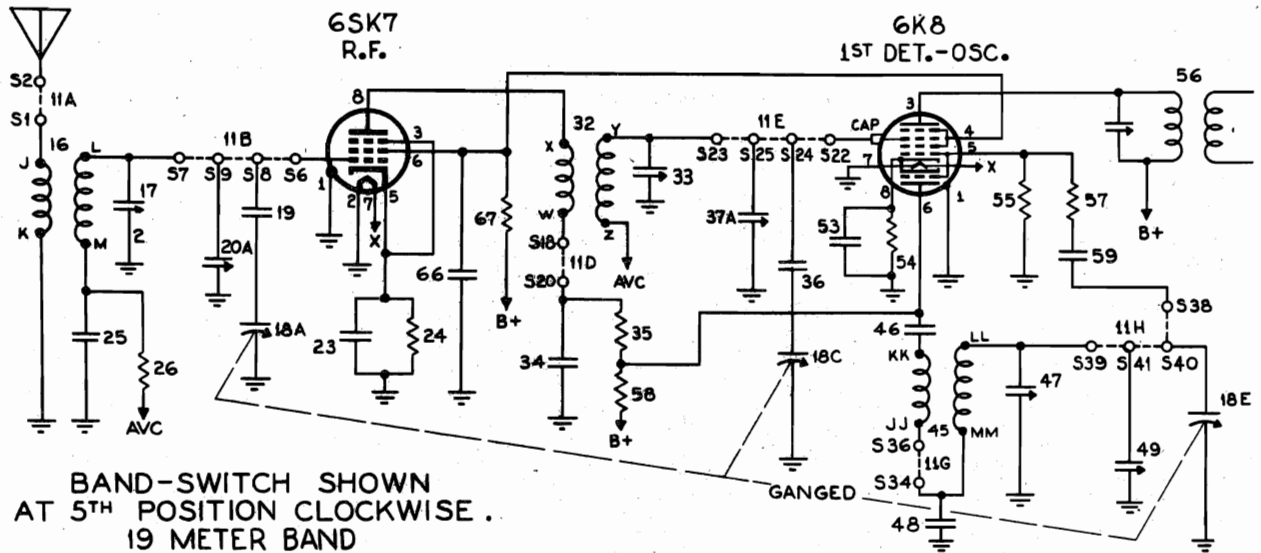


# "clarified schematics"

STEW. WAR PAGE 16-5

STEWART WARNER CORP.

MODEL 9010-A



## ALIGNMENT PROCEDURE

1. When gang condenser is fully meshed, dial pointer should be in the position indicated by the last division below 550 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
2. Connect on output meter across the speaker voice coil or from the plate of the 6K6GT tube to chassis through a 0.1 Mfd. condenser.
3. Connect the ground lead of the signal generator to the receiver chassis.
4. Set volume control to maximum volume position and use a weak signal from the signal generator.
5. Set Radio-Phono and Tone switch to "Radio-Bass" position.
6. Set Local-Distant switch to "Distant" position.

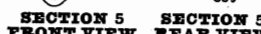
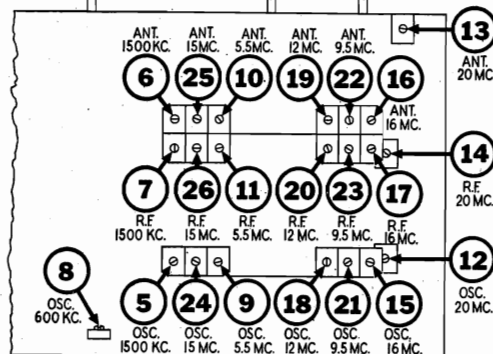
**IMPORTANT:** Align this receiver in exactly the order shown below. The 13-16 Meter band must be aligned before any of the other short wave bands.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Cap of 6K8	455 KC	Broadcast (*Position 1)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	"A" terminal at rear of chassis.	1500 KC	Broadcast (*Position 1)	1500 Kc.	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	"A" terminal at rear of chassis.	1500 KC	Broadcast (*Position 1)	Tune to 1500 Kc. generator signal.	6	Broadcast Antenna	Adjust for maximum output.
					7	Broadcast R.F.	
200 MMFD. Mica Condenser	"A" terminal at rear of chassis.	600 KC	Broadcast (*Position 1)	Tune to 600 Kc. generator signal.	8	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	"A" terminal at rear of chassis.	Repeat adjustment of trimmers 5, 6, and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	5.5 MC	Intermediate (*Position 2)	5.5 Mc.	9	Intermediate Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 4.6 MC. If image does not appear, realign at 5.5 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	5.5 MC	Intermediate (*Position 2)	Tune to 5.5 Mc. generator signal.	10	Intermediate Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					11	Intermediate R.F.	
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	20 MC	13-16 Meter (*Position 4)	20 Mc.	12	13-16 Meter Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 19.1 MC. If image does not appear, realign at 20 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	20 MC	13-16 Meter (*Position 4)	Tune to 20 Mc. generator signal.	13	13-16 Meter Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					14	13-16 Meter R.F.	
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	16 MC	19 Meter (*Position 5)	16 Mc.	15	19 Meter Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear, realign at 16 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	16 MC	19 Meter (*Position 5)	Tune to 16 Mc. generator signal.	16	19 Meter Antenna	Adjust for maximum output.
					17	19 Meter R.F.	
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	12 MC	25 Meter (*Position 6)	12 Mc.	18	25 Meter Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 Mc, with trimmer screw farther out. Recheck image.



\* Position 1 corresponds to extreme counter-clockwise setting of band switch. Succeeding positions are numbered in ascending order as switch is rotated clockwise.

### BOTTOM VIEW OF CHASSIS



MODEL 9010-A  
MODEL 9013-A

STEWART WARNER CORP

## PARTS LIST

ORDER PARTS FROM YOUR STEWART-WARNER DISTRIBUTOR ONLY

DIA-GRAM PART NO.	MODEL 9010-A DESCRIPTION	LIST PRICE
<b>CONDENSERS</b>		
13 ..... 502787	Condenser—mica 100 Mmfd. 500 volt. ....	\$0.24
14A, B, C 502753	Condenser—trimmer assembly A—1.6 to 18 Mmfd. B—1.6 to 18 Mmfd. C—3 to 35 Mmfd.	1.25
17 ..... 502758	Condenser—trimmer; 1.6 to 18 Mmfd. ....	.35
18A to E 502749	Condenser—variable gang	9.00
19 ..... 502778	Condenser—ceramic 200 Mmfd. 500 volt. ....	.40
20A, B, C 502754	Condenser—trimmer assembly A—3 to 35 Mmfd. B—3 to 35 Mmfd. C—1.6 to 18 Mmfd.	1.25
21 ..... 502779	Condenser—ceramic 56 Mmfd. 500 volt. ....	.45
22 ..... 502788	Condenser—mica 130 Mmfd. 500 Volt. ....	.45
23 ..... 502806	Condenser—.05 Mfd. 200 volt. ....	.36
25 ..... 502806	Condenser—.05 Mfd. 200 volt. ....	.36
29 ..... 502787	Condenser—mica 100 Mmfd. 500 volt. ....	.24
30A, B, C 502753	Condenser—trimmer assembly A—1.6 to 18 Mmfd. B—1.6 to 18 Mmfd. C—3 to 35 Mmfd.	1.25
33 ..... 502758	Condenser—trimmer; 1.6 to 18 Mmfd. ....	.35
34 ..... 502807	Condenser—.05 Mfd. 400 volt. ....	.37
36 ..... 502778	Condenser—ceramic 200 Mmfd. 500 volt. ....	.40
37A, B, C 502754	Condenser—trimmer assembly A—3 to 35 Mmfd. B—3 to 35 Mmfd. C—1.6 to 18 Mmfd.	1.25
38 ..... 502779	Condenser—ceramic 56 Mmfd. 500 volt. ....	.45
39 ..... 502788	Condenser—mica 130 Mmfd. 500 volt. ....	.45
41A, B, C 502753	Condenser—trimmer assembly A—1.6 to 18 Mmfd. B—1.6 to 18 Mmfd. C—3 to 35 Mmfd.	1.25
42 ..... 502922	Condenser—trimmer; 300 to 600 Mmfd. ....	.85
44 ..... 502791	Condenser—mica 1600 Mmfd. 500 volt. ....	.80
46 ..... 502792	Condenser—mica 4000 Mmfd. 500 volt. ....	.80
47 ..... 502756	Condenser—trimmer; 2 to 6 Mmfd. ....	.60
48 ..... 502793	Condenser—mica 5600 Mmfd. 500 volt. ....	1.15
49 ..... 502757	Condenser—trimmer; 6.5 to 35 Mmfd. ....	.60
50 ..... 502167	Condenser—ceramic 68 Mmfd. 500 volt. ....	.40
51A, B ..... 502755	Condenser—trimmer assembly A—3 to 35 Mmfd. B—1.6 to 18 Mmfd.	90
52 ..... 502789	Condenser—mica 160 Mmfd. 500 volt. ....	.45
53 ..... 502806	Condenser—.05 Mfd. 200 volt. ....	.36
59 ..... 502790	Condenser—mica 200 Mmfd. 500 volt. ....	.24
60 ..... 502806	Condenser—.05 Mfd. 200 volt. ....	.36
62 ..... 502806	Condenser—.05 Mfd. 200 volt. ....	.36
66 ..... 502807	Condenser—.05 Mfd. 400 volt. ....	.37
70 ..... 502787	Condenser—mica 100 Mmfd. 500 volt. ....	.24
73 ..... 502802	Condenser—.004 Mfd. 600 volt. ....	.30
75 ..... 502802	Condenser—.004 Mfd. 600 volt. ....	.30
78 ..... 502808	Condenser—.25 Mfd. 200 volt. ....	.45
79 ..... 502787	Condenser—mica 100 Mmfd. 500 volt. ....	.24
80 ..... 502803	Condenser—.006 Mfd. 600 volt. ....	.30
83 ..... 502809	Condenser—.25 Mfd. 400 volt. ....	.36
85 ..... 502805	Condenser—.02 Mfd. 400 volt. ....	.36
87 ..... 502804	Condenser—.01 Mfd. 400 volt. ....	.30
92 ..... 502805	Condenser—.02 Mfd. 400 volt. ....	.36
93 ..... 502802	Condenser—.004 Mfd. 600 volt. ....	.30
95 ..... 502802	Condenser—.004 Mfd. 600 volt. ....	.30
97A, B ..... 502720	Condenser—electrolytic A—15 Mfd. 400 volt B—20 Mfd. 400 volt	2.10
<b>RESISTORS</b>		
24 ..... 502125	Resistor—carbon 220 ohms 1/4 watt. ....	.12
26 ..... 502134	Resistor—carbon 470,000 ohms 1/4 watt. ....	.12
27 ..... 502478	Resistor—carbon 1000 ohms 1/4 watt. ....	.12
35 ..... 502795	Resistor—carbon 4700 ohms 1/2 watt. ....	.12
54 ..... 502125	Resistor—carbon 220 ohms 1/4 watt. ....	.12
55 ..... 502131	Resistor—carbon 47,000 ohms 1/4 watt. ....	.12
57 ..... 502794	Resistor—carbon 68 ohms 1/4 watt. ....	.12
58 ..... 502801	Resistor—carbon 39,000 ohms 1/2 watt. ....	.12
61 ..... 502135	Resistor—carbon 2.2 Meg. 1/4 watt. ....	.12
63 ..... 502125	Resistor—carbon 220 ohms 1/4 watt. ....	.12
65 ..... 502796	Resistor—carbon 8200 ohms 1/4 watt. ....	.12
67 ..... 502981	Resistor—carbon 15,000 ohms 2 watt. ....	.25
69 ..... 502131	Resistor—carbon 47,000 ohms 1/4 watt. ....	.12
71 ..... 502134	Resistor—carbon 470,000 ohms 1/4 watt. ....	.12
74A, B ..... 502750	Volume control—with switch; 2 meg. ....	1.50
76 ..... 502136	Resistor—carbon 10 meg. 1/4 watt. ....	.12
77 ..... 502794	Resistor—carbon 68 ohms 1/4 watt. ....	.12
81 ..... 502126	Resistor—carbon 470 ohms 1/4 watt. ....	.12
82 ..... 502133	Resistor—carbon 220,000 ohms 1/4 watt. ....	.12
84 ..... 502132	Resistor—carbon 100,000 ohms 1/4 watt. ....	.12
86 ..... 502133	Resistor—carbon 220,000 ohms 1/4 watt. ....	.12
88 ..... 502136	Resistor—carbon 10 meg. 1/4 watt. ....	.12
89 ..... 502133	Resistor—carbon 220,000 ohms 1/4 watt. ....	.12
90, 91 ..... 502133	Resistor—carbon 220,000 ohms 1/4 watt. ....	.12
94 ..... 502813	Resistor—wire wound 300 ohms 2 watt. ....	.25
<b>COILS AND TRANSFORMERS</b>		
12 ..... 502710	Coil—BC. antenna	2.10
15 ..... 502713	Coil—Int. antenna	1.40
16 ..... 502716	Coil—S.W. antenna	1.40

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

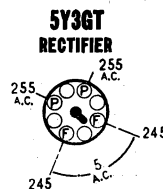
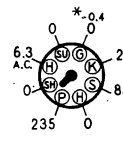
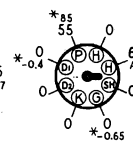
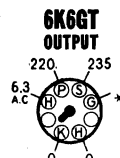
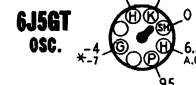
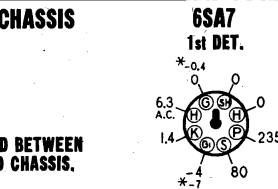
DIA-GRAM PART NO.	DESCRIPTION	LIST PRICE
28 ..... 502711	Coil—BC. R.F.	2.30
31 ..... 502714	Coil—Int. R.F.	1.50
32 ..... 502717	Coil—S.W.R.F.	1.40
40 ..... 502712	Coil—BC. oscillator	1.80
43 ..... 502715	Coil—Int. oscillator	1.80
45 ..... 502718	Coil—S.W. oscillator	1.70
56 ..... 502725	Transformer—1st I.F.	2.15
68 ..... 502726	Transformer—2nd I.F.	2.15
96 ..... 502751	Coil—filter choke	4.60
100 ..... 502747	Transformer—power	12.50
101 ..... 502776	Transformer—output for M-502775 spkr.	2.75
<b>OTHER ELECTRICAL PARTS</b>		
11A to J ..... 502748	Switch—band	7.00
64 ..... 502916	Switch—local-distant	.80
72A, B ..... 502719	Switch—tone control	1.40
98, 99 ..... 110629	Lamp—dial (Mazda No. 44) 6.3V 0.25 Amps.	.15
102 ..... 502775	Speaker—P.M. dynamic (8 inch)	12.50
103 ..... 502777	Cone & voice coil for M-502775 speaker	3.00
<b>MISCELLANEOUS</b>		
502724	Background for dial	.35
160026	Base for mtg. electrolytic condenser	.04
500420	Clamp—for dial glass	.15
112745	Clip—coil mtg.	.01
114955	Clip—retainer on end of dial cord	.01
502773	Cord—dial drive (8 ft. required)	.05
502921	Dial scale—glass	2.25
117029	Drum—for dial drive	.70
501458	Knob—tone or band switch	.16
501449	Knob—volume or tuning	.15
502762	Plug—for Local-Distant switch	.15
502772	Pointer	.50
81145	Retaining ring for tuning shaft	.01
113087	Ring for dial cord	.01
113463	Rubber pad for mtd. chassis	.03
116584	Rubber spacer for mtg. dial scale	.02
85827	Screw—No. 8-32 for dial drum	.02
112874	Screw—No. 10 x 1 1/8 for mtg. chassis	.03
504990	Shaft—tuning control	.12
502770	Socket—for dial lamp	.18
502761	Socket—for Local-Distant switch	.20
502769	Socket—for speaker	.30
114876	Socket—octal base	.15
160039	Socket—phono. plug	.08
113177	Spring—dial cord tension	.08
502767	Terminal strip—"A G"	.18
500487	Washer—felt for knobs	.01
111456	Washer—spring washer for tuning shaft	.005

## SOCKET VOLTAGES

Measured with voltmeter having sensitivity of  
1000 ohms per volt except where indicated by (\*).

BE SURE THAT SWITCH ON POWER TRANSFORMER IS SET TO POSITION  
WHICH MOST NEARLY MATCHES LINE VOLTAGE  
VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC.  
BAND SWITCH IN BROADCAST POSITION

## MODEL 9013-A BOTTOM VIEW OF CHASSIS

ALL VOLTAGES MEASURED BETWEEN  
SOCKET TERMINALS AND CHASSIS.

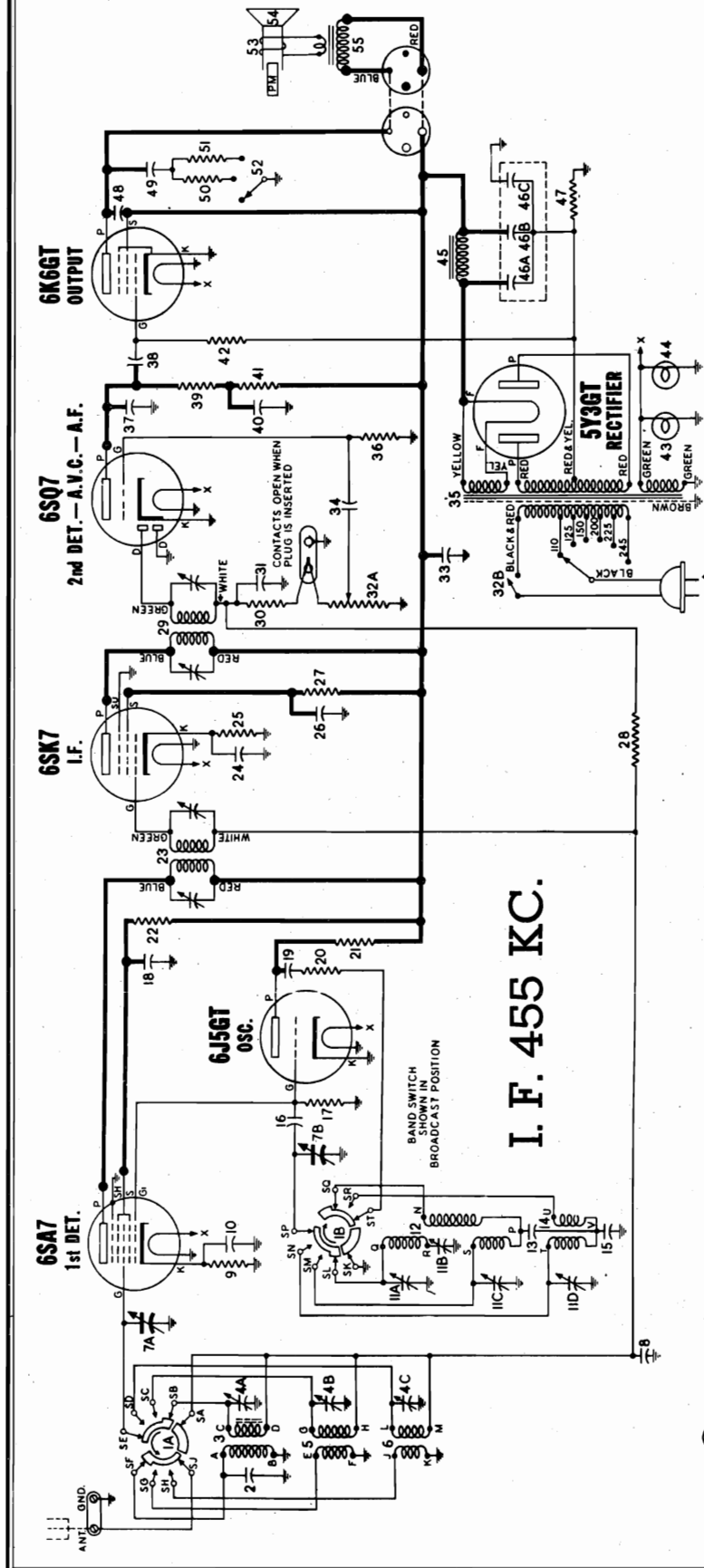
## REAR OF CHASSIS

\*—Measured with vacuum tube voltmeter.

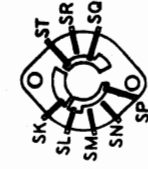
NOTE:—The 6K6GT grid bias of —17 volts can be measured across resistor No. 47

STEWART WARNER CORP.

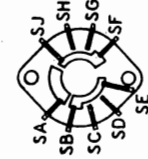
MODEL 9013-A



I. F. 455 KC.

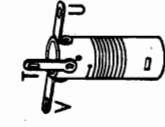


REAR SECTION  
REAR VIEW



FRONT SECTION  
REAR VIEW

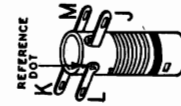
BAND SWITCH  
504028



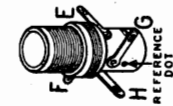
S.W. OSCILLATOR  
COIL  
504037



BC. & INT.  
OSCILLATOR  
COIL  
504040



S.W. ANTENNA  
COIL  
504036

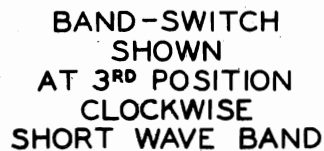
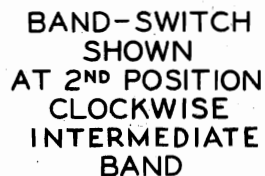


INT. ANTENNA  
COIL  
504039



BC. ANTENNA  
COIL  
504038

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



## STEWART WARNER CORP.

MODEL 9013-A

## PARTS LIST

ORDER PARTS FROM YOUR STEWART-WARNER DISTRIBUTOR ONLY

DIA. GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE	DIA. GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
<b>CONDENSERS</b>				<b>RESISTORS</b>			
2	502931	Condenser—mica 100 Mmld. 500 volt.	\$0.24	9	502125	Resistor—carbon 220 Ohms 1/4 watt.	\$0.12
4A, B, C	504030	Condenser—trimmer assembly		17	502130	Resistor—carbon 22,000 Ohms 1/4 watt.	.12
		A—1.6 to 18 Mmld.	.90	20	502794	Resistor—carbon 68 Ohms 1/4 watt.	.12
		B—1.6 to 18 Mmld.		21	504047	Resistor—carbon 22,000 Ohms 1/2 watt.	.12
		C—3 to 35 Mmld.		22	502466	Resistor—carbon 33,000 Ohms 1 watt.	.16
7A, B	504026	Condenser—variable gang	4.50	25	502125	Resistor—carbon 220 Ohms 1/4 watt.	.12
8	504049	Condenser—mica 4,300 Mmld. 500 volt.	.36	27	504048	Resistor—carbon 56,000 Ohms 1/2 watt.	.12
10	502806	Condenser—.05 Mfd. 200 volt.	.36	28	502135	Resistor—carbon 2.2 Meg. 1/4 watt.	.12
11 (A,B) 504031		Condenser—trimmer assembly	1.40	30	502131	Resistor—carbon 47,000 Ohms 1/4 watt.	.13
		A—3 to 35 Mmld.		32A	504029	Volume control 1 Meg. (with switch)	.12
		B—300 to 600 Mmld.		36	502136	Resistor—carbon 10 Meg. 1/4 watt.	.12
		C—1.6 to 18 Mmld.		39	502132	Resistor—carbon 220,000 Ohms 1/4 watt.	.12
13	504049	Condenser—mica 4,300 Mmld. 500 volt.	1.30	41	502132	Resistor—carbon 100,000 Ohms 1/4 watt.	.12
15	504049	Condenser—mica 4,300 Mmld. 500 volt.	.18	42	502134	Resistor—carbon 470,000 Ohms 1/4 watt.	.25
18	502807	Condenser—.01 Mfd. 400 volt.	.36	47	502137	Resistor—wire wound 330 Ohms 2 watt.	.12
19	502804	Condenser—.01 Mfd. 400 volt.	.36	50	502291	Resistor—carbon 4,700 Ohms 1/4 watt.	.12
24	502806	Condenser—.05 Mfd. 400 volt.	.36	51	502141	Resistor—carbon 560 Ohms 1/4 watt.	.12
26	502807	Condenser—.05 Mfd. 400 volt.	.36	<b>COILS AND TRANSFORMERS</b>			
31	502831	Condenser—mica 100 Mmld. 500 volt.	.24	3	504038	Coil—BC antenna	\$1.85
33	504220	Condenser—.01 Mfd. 600 volt.	.36	4	504039	Coil—Int. Band antenna coil	1.50
34	504051	Condenser—.004 Mfd. 400 volt.	.24	5	504036	Coil—S.W. antenna	1.25
37	502790	Condenser—.02 Mfd. 400 volt.	.36	6	504040	Coil—BC and Int. Band Oscillator	1.80
38	502805	Condenser—.02 Mfd. 400 volt.	.36	12	504037	Coil—S.W. Oscillator	1.25
40	502807	Condenser—electrolytic	2.20	14	504024	Transformer—1st I.F.	2.60
46A, B, C	504033	Condenser—electrolytic		23	504075	Transformer—2nd I.F.	1.60
		A—20 Mfd. 400 volt.		29	504072	Transformer—power	1.60
		B—10 Mfd. 400 volt.		35	502751	Choke coil	4.60
		C—20 Mfd. 25 volt.		45	502751	Choke coil	4.60
48	504051	Condenser—.004 Mfd. 400 volt.	.24	55	504763	Transformer—output for W-504056 spkr.	2.75
49	504050	Condenser—.05 Mfd. 600 volt.	.36	<b>MISCELLANEOUS PARTS</b>			
<b>CONDENSERS</b>				504054	Background for dial	\$0.10	
<b>CONDENSERS</b>				504034	Base for mfg. electrolytic condenser	.04	
<b>CONDENSERS</b>				119559	Clamp—dial glass	.08	
<b>CONDENSERS</b>				112745	Clip—coil mounting	.01	
<b>CONDENSERS</b>				114955	Clip—retainer on end of dial cord	.01	
<b>CONDENSERS</b>				502773	Cord—dial drive (66 in. required) per ft.	.05	
<b>CONDENSERS</b>				504055	Dial scale—glass	1.30	
<b>CONDENSERS</b>				504109	Pin—on dial drive	.20	
<b>CONDENSERS</b>				504109	Pin—on dial drive	.20	
<b>CONDENSERS</b>				501449	Knob—volume or tuning	.15	
<b>CONDENSERS</b>				501458	Knob—tone or band switch	.16	
<b>CONDENSERS</b>				502601	Pointer	.18	
<b>CONDENSERS</b>				81145	Retaining ring for tuning shaft	.01	
<b>CONDENSERS</b>				119087	Ring for dial cord	.01	
<b>CONDENSERS</b>				113463	Rubber pad—chassis mtg.	.03	
<b>CONDENSERS</b>				116584	Rubber spacer for mtg. dial scale	.02	
<b>CONDENSERS</b>				112874	Screw—8-32 for dial drum	.02	
<b>CONDENSERS</b>				112818	Socket—octal lamp with lead	.18	
<b>CONDENSERS</b>				112818	Socket—octal lamp with lead	.18	
<b>CONDENSERS</b>				160392	Socket—octal lamp with lead	.18	
<b>CONDENSERS</b>				504035	Socket—speaker	.09	
<b>CONDENSERS</b>				113177	Spring—dial cord tension	.09	
<b>CONDENSERS</b>				502767	Terminal strip—"GND-ANT"	.18	
<b>CONDENSERS</b>				504044	Terminal strip—phono	.22	
<b>CONDENSERS</b>				114156	Washer—spring washer for tuning shaft	.005	
<b>CONDENSERS</b>				500487	Washer—felt; for knobs	.01	

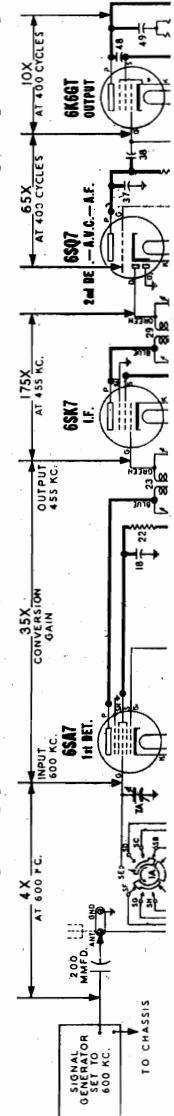
## PRICES SUBJECT TO CHANGE WITHOUT NOTICE

## APPROXIMATE STAGE GAIN DATA

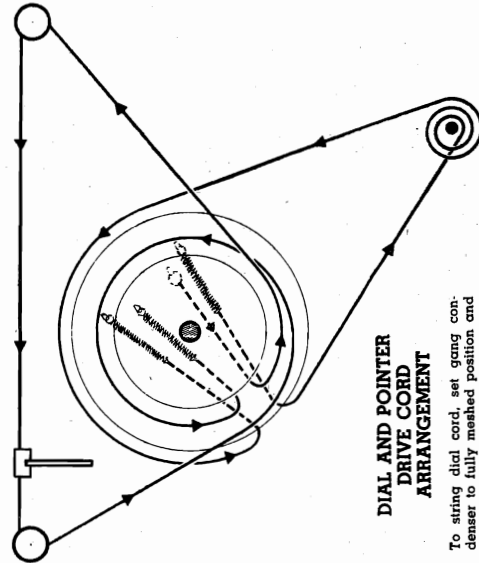
Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

- For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes).
- For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1 1/2 volt cells in series) to A.V.C. lead at terminal D of BC antenna coil (#3). Then connect positive battery terminal to chassis. This provides a definite operating point.
- Be sure radio is carefully tuned to generator signal (use weak frequency before making measurements).
- When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

- 113177 Tension Spring
- 114955 Clip on end of cord
- 119087 Ring (66 inches)
- 502773 Cord (66 inches)
- 30 inches for pointer drive
- 30 inches for tuning drive

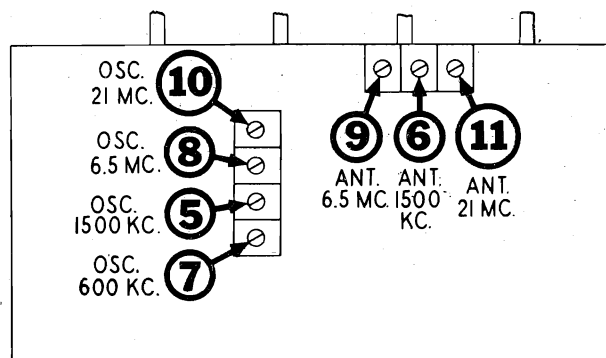
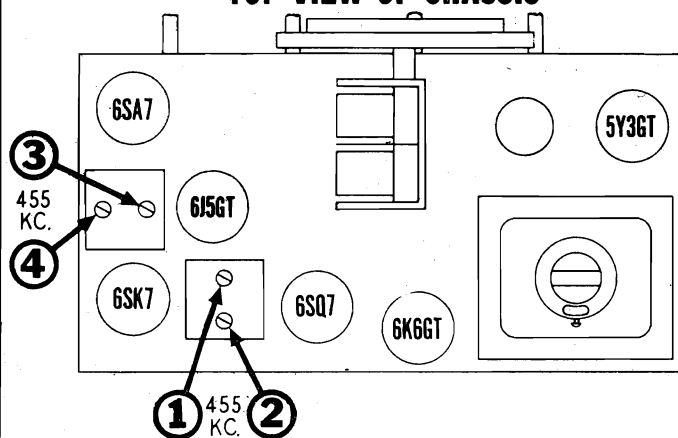
## ALIGNMENT PROCEDURE

1. When gang condenser is fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
2. Connect on output meter across the speaker voice coil or from the plate of the 6K6GT tube to chassis through a 0.1 Mfd. condenser.
3. Connect the ground lead of the signal generator to the receiver chassis.
4. Set volume control to maximum volume position and use a weak signal from the signal generator.

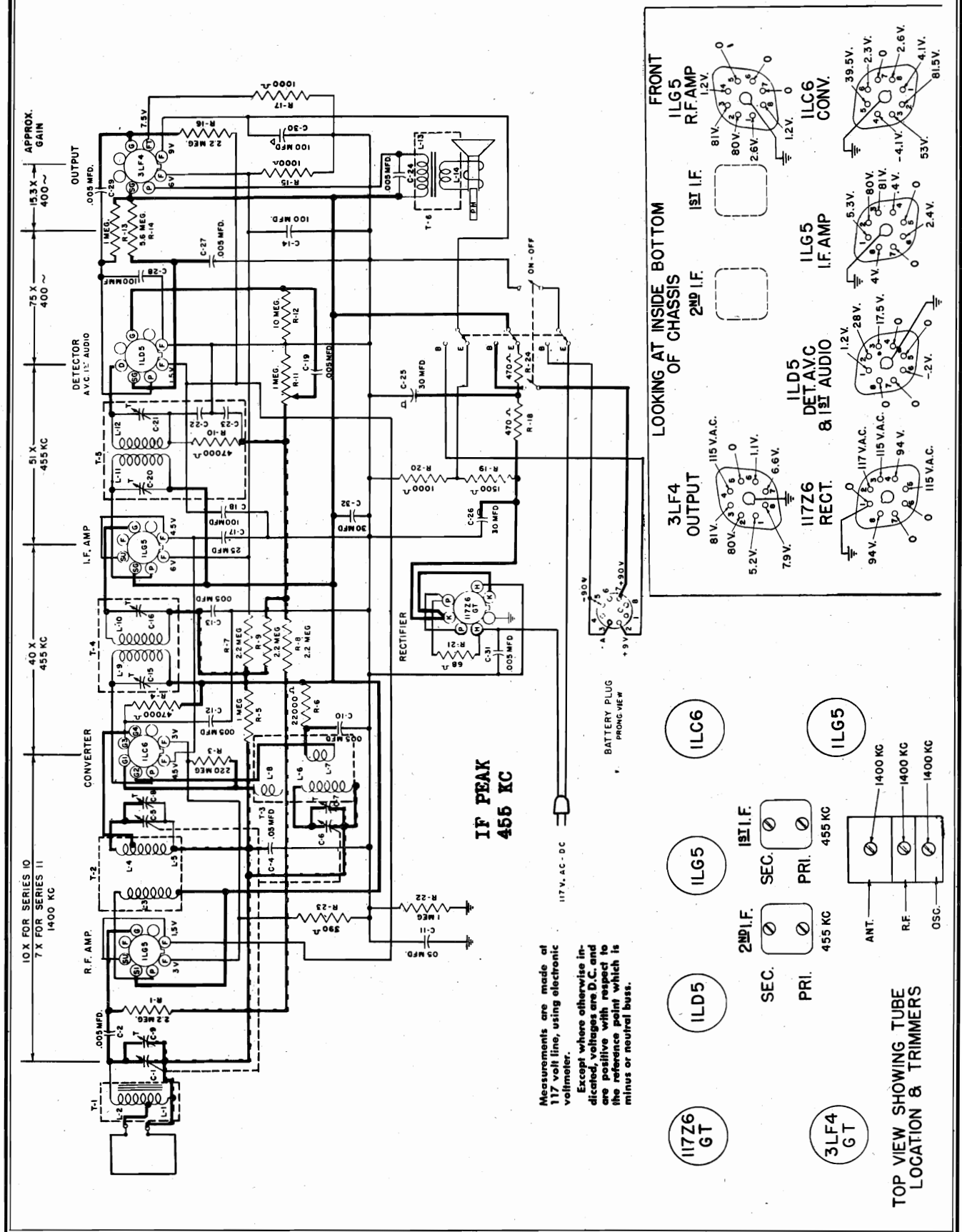
DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
1 MFD. Condenser	Lug on front section of gang.	455 KC.	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2 3-4	2nd I.F. 1st I.F.	Adjust for maximum output. Then repeat adjustment.
200 MMFD. Mica Condenser	"ANT" terminal at rear of chassis.	1500 KC	Broadcast (counter-clockwise)	1500 Kc.	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	"ANT" terminal at rear of chassis.	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 Kc. generator signal.	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	"ANT" terminal at rear of chassis.	600 KC	Broadcast (counter-clockwise)	Tune to 600 Kc. generator signal.	7	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	"ANT" terminal at rear of chassis.	6.5 MC	Intermediate (middle)	6.5 Mc.	8	Intermediate Oscillator	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 5.6 Mc. If image does not appear, realign at 6.5 Mc. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"ANT" terminal at rear of chassis.	6.5 MC	Intermediate (middle)	Tune to 6.5 Mc. generator signal.	9	Intermediate Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	"ANT" terminal at rear of chassis.	21 MC	Short wave (clockwise)	21 Mc.	10	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 20.1 Mc. If image does not appear, realign at 21 Mc. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"ANT" terminal at rear of chassis.	21 MC	Short wave (clockwise)	Tune to 21 Mc. generator signal.	11	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

TOP VIEW OF CHASSIS

BOTTOM VIEW OF CHASSIS

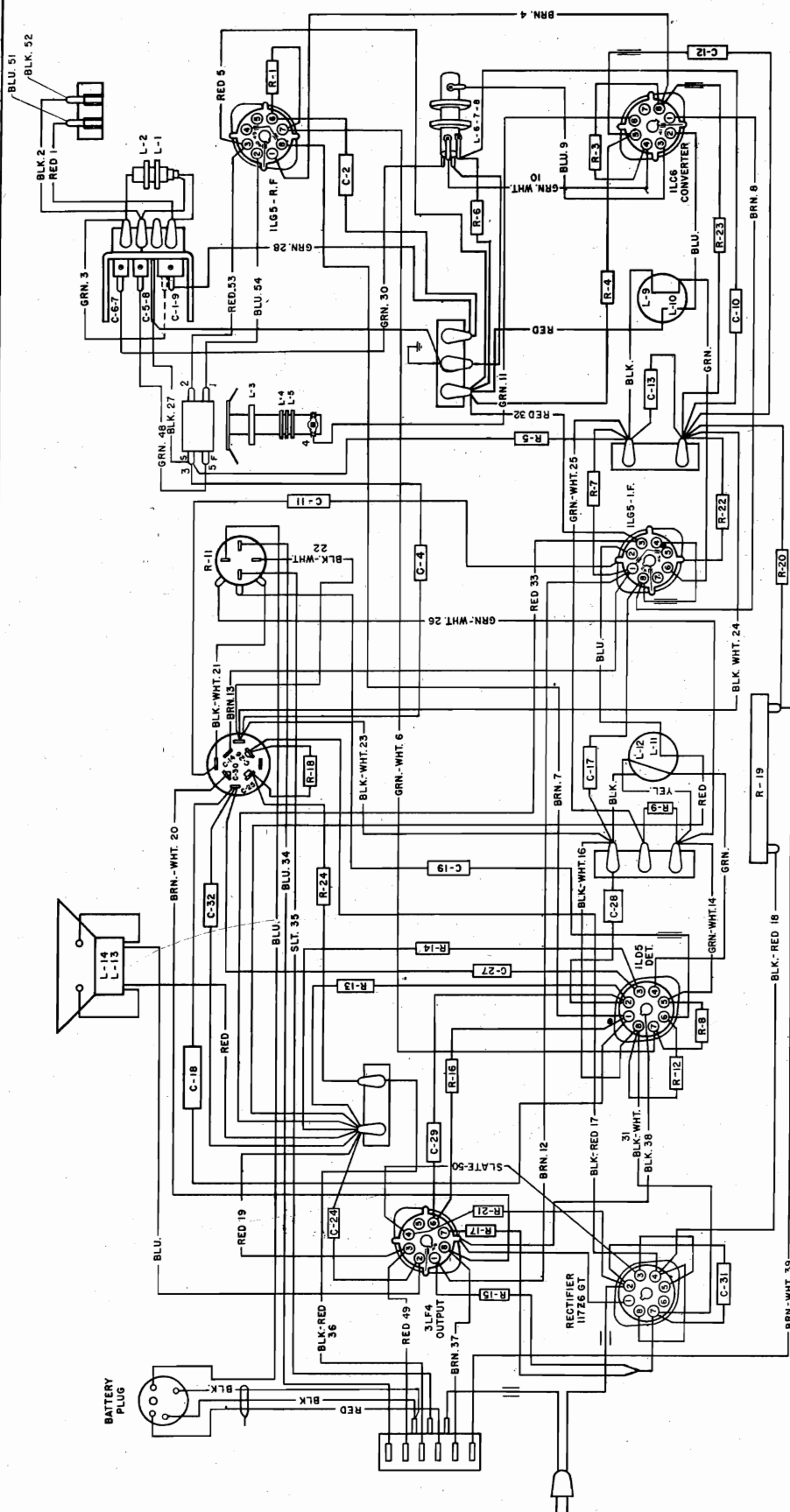


## STROMBERG CARLSON CO.



MODEL 1105

STROMBERG CARLSON CO.

**WIRING DIAGRAM**

1LH4 designation above it. On future production the screen dropping resistor and bypass capacitor R-14-(5.6 Meg.) and C-27 (.005 Mfd.) will be omitted from the chassis. These part numbers are 28200 and 27760.

In cases where microphonism is due to the 1LD5 tube, a 1LH4 should be employed. This change requires no rewiring or removal of chassis from cabinet. This is a direct substitute.

When this tube is replaced, the tube label on the back of the chassis should be changed by crossing out the 1LD5 which is indicated on the label and marking in the

No. 12, there will be no screen voltage reading on terminal number three.

Note on all 1105 Receivers:

In some cases oscillation will be present over a major portion of the band. To cure this reverse antenna loop leads. The pin terminals have been coded red and black. Disregard coding.

On all receivers bearing series



## STROMBERG CARLSON CO.

## ALIGNING

**Never realign unless absolutely necessary.**

Use a good signal generator modulated at 400 or 1000 cycles with variable output voltage. Use a sensitive output meter across the voice coil of the speaker. Always align using the smallest possible input from the signal generator. A strong signal makes adjustments approximate. Always have volume control "full on".

Refer to Location Chart on page two for trimmer locations.

## Aligning Procedure (follow this order exactly)

## Intermediate Frequency Adjustments

The built-in loop should remain connected to the antenna and ground terminals. (or use a dummy loop).

1. Turn the tuning control to the extreme low frequency position (Variable capacitor plates all the way in).
2. Connect both signal generator leads to an 8 inch radiating loop (1 turn).

Place the radiating loop close to the antenna of the receiver. The antenna in the 1105 is built around the carrying case.

3. Introduce a modulated signal of 455 KC to the radiating loop.

4. Adjust the I.F. aligners for maximum output in the following order:

- A. Secondary of second I.F. Transformer
- B. Primary of second I.F. Transformer
- C. Secondary of first I.F. Transformer
- D. Primary of first I.F. Transformer

## Dial Pointer Adjustment

Align the two arrow pointers, located at the extreme ends of the dial, horizontal with respect to the chassis base.

## Radio Frequency Adjustments

The built-in antenna should remain connected to the antenna and ground terminals of the receiver.

1. Leave signal generator and radiating loop connected in same position as for I.F. Transformer.
2. Set signal generator and receiver tuning dial to 1400 kilocycles. Arrow on dial scale indicates 1400 kilocycles.
3. Adjust the oscillator, radio frequency and antenna trimmers for maximum output.
4. Set both the signal generator's frequency and the receiver's tuning dial to 600 kilocycles and check calibration.

Note: If the calibration is off at 600 kilocycles, operations 2 and 3 may be repeated until the best results are obtained.

## IDENTIFICATION TABLE

Model	Chassis	Cabinet	Speaker
1105	112009	108025	155013

## SPECIFICATIONS

Voltage Rating.....105-125 Volts  
Type of Circuit.....Superheterodyne  
Tuning Range.....540 Kc. to 1600 Kc.  
Number and type of Tubes—6

- 1—11G5.....R.F. Amplifier
- 1—11C6.....Converter
- 1—11G5.....I.F. Amplifier
- 1—11D5.....Demodulator, A.V.C., 1st Audio
- 1—31F4.....Power Output
- 1—11Z6GT.....Rectifier

Input Power Rating.....25 Watts  
Input Power Frequency.....25-60 Cycles AC-DC  
Intermediate Frequency.....455 Kc.  
Speaker Voice Coil Impedance at 400 Cycles 3.5 Ohms  
Speaker.....PM  
Power Output ... 170 Milliwatts AC; 180 Milliwatts Batt.

## Resistors

27407	R-6
28153	R-23
28154	R-18-24
28158	R-15-17
28177	R-4
28183	R-3
28191	R-5-13-22
28195	R-1-7-8-9-16
28200	R-14
28203	R-12
45529	R-20
114310	R-10
145007	R-11
149015	R-19
149206	R-21

## Capacitors

27760	C-2-10-12-13-19-24-27-29-31
34800	C-28
40632	C-4-11
110001	C-1-9-5-8-6-7
110010	C-18
111008	C-14-25-26-30
111013	100 mfd., 30 mfd., 30 mfd., 100 mfd. Electrolytic
110421	C-32
	30 mfd. Electrolytic
	C-17
	.25 mfd.

## Transformers, and Coils

114001	T-2 (L-3-4-5)
114023	T-1 (L-1-2)
114024	T-3 (L-6-7-8)
114025	R.F. Coil used on Series 10
	See Note Page 4
114309	T-4 (L-9-10-C-15-16)
114310	T-5 (L-11-12-C-20-21-22-23-R-10)
	2nd I.F. Transformer
155006	Speaker Cone Assembly
155011	Output Transformer
155013	Speaker Assembly

## Miscellaneous

22,000 Ohm	30151	Socket, Tube 117Z6
390 Ohm	33218	Cord, AC
470 Ohm	34590	Socket, Tube (4)
1,000 Ohm	109008	Cable Plug Assembly, Battery
47,000 Ohm	116001	Contact Strip, Antenna
.22 Meg.	122010	Dial Scale
1. Meg.	124002	Cord, Dial Drive
2.2 Meg.	131001	Grommet, Variable Mounting
5.6 Meg.	131003	Grommet, Tube Socket 11D5
10. Meg.	144005	Indicator, Off-On
1,000 Ohm 1 W	150011	Shaft, Dial Drive
47,000 Ohm	151015	Shield, Tube
1. Meg. Volume Control	152008	Socket, Tube 11D5
Off-On Switch	156009	Spring, Indicator
1,500 Ohm Voltage Divider	158008	Switch, AC-Batt.
68 Ohm 2 W	159011	Cord Tip, Antenna Red
	159012	Cord Tip, Antenna Black
	168004	Battery Pack

## Knobs and Cabinet Parts

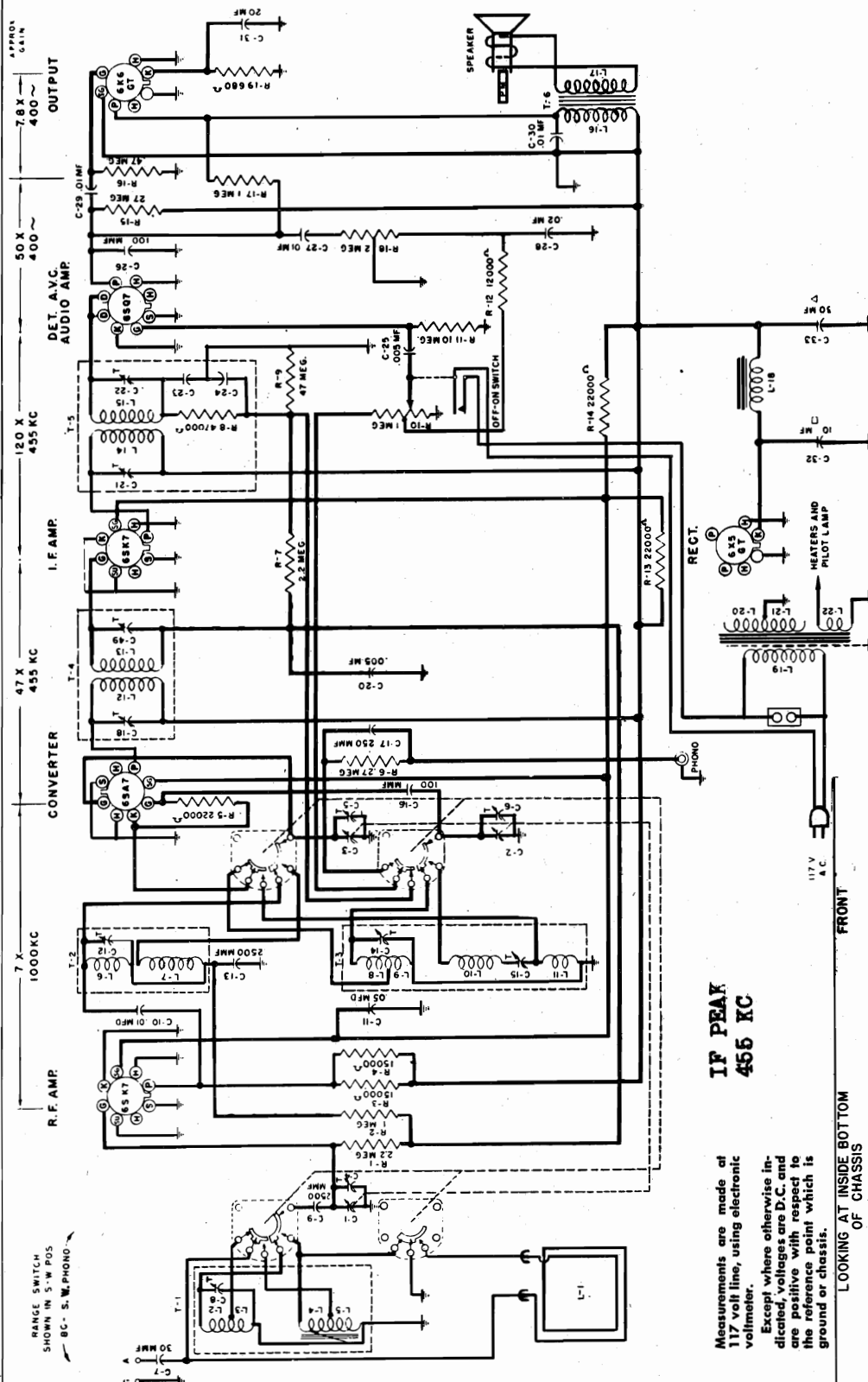
24135	Tips, Felt
130013	Grille
132041	Handle, Carrying
132042	Handle, Panel
134015	Knob (2)
138007	Lens, Dial

Series 10 employed R.F. Coil 114025. This has been superseded by coil No. 114001. Rewire to use 114001 as shown on Schematic and Wiring Diagram.

**NOTE—When ordering replacement parts always specify series number as well as model and part number. Series number is stamped on back of chassis.**

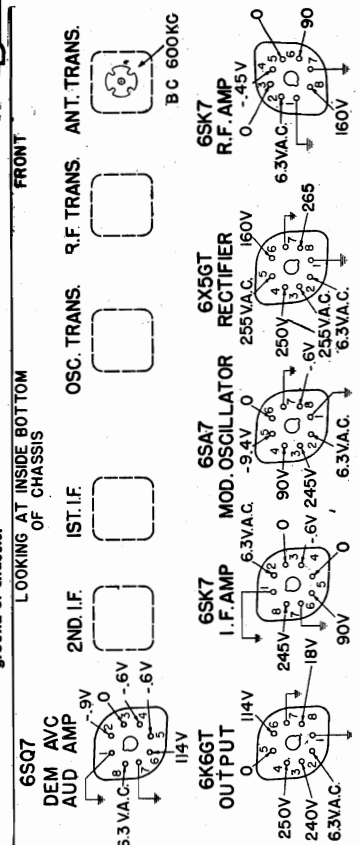
MODEL 1110

STROMBERG CARLSON CO.



IF PEAK  
455 KC

Measurements are made at 117 volt line, using electronic voltmeter.  
Except where otherwise indicated, voltages are D.C. and are positive with respect to the reference point which is ground or chassis.



Capacitors

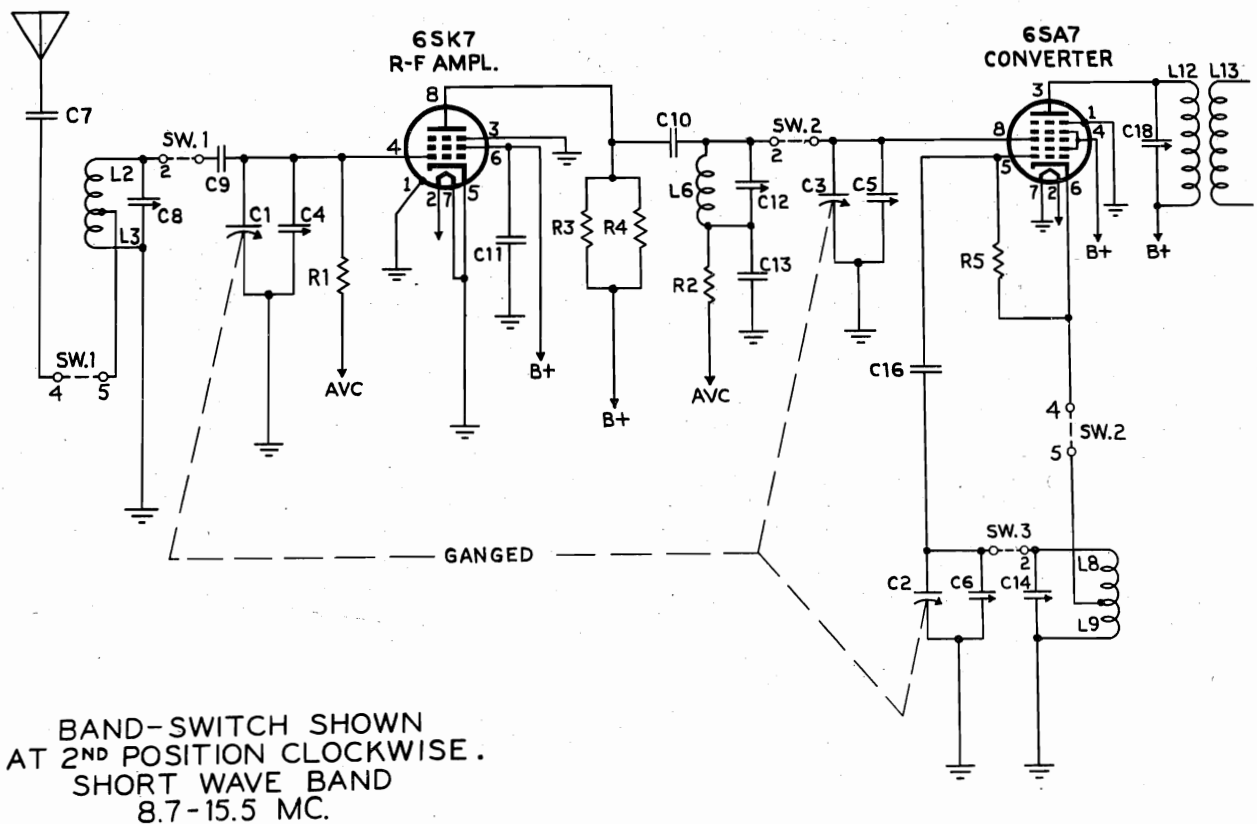
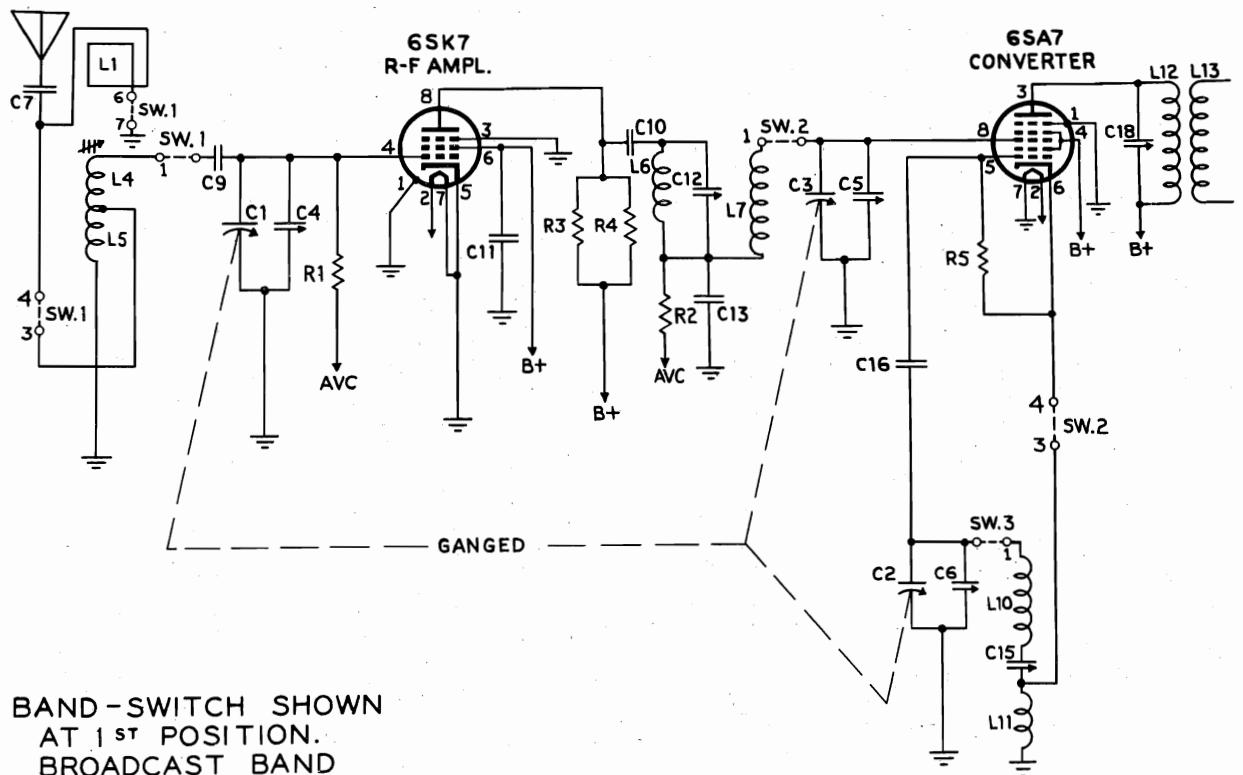
22,000 Ohm	C-17	25376	250 mmf.
12,000 Ohm	C-18	25484	.02 mf.
.27 Meg.	C-19	25485	.01 mf.
.47 Meg.	C-20	27760	.005 mf.
1 Meg.	C-21	29559	2500 mmf.
2.2 Meg.	C-22	34800	100 mmf.
10 Meg.	C-23	34889	30 mmf.
Tone Control	C-24	40632	.05 mf.
Volume Control, Off-On	C-25	110010	Variable Capacitor
22,000 Ohm	C-26	111004	20-10-30 mfd. Electrolytic
680 Ohm	C-27		
15,000 Ohm	C-28		

Resistors

27407	R-5
28171	R-12
28184	R-6-15
28187	R-8-9-16
28191	R-2-17
28195	R-1-7
28203	R-11
145004	R-18
145005	R-10
149011	R-13-14
149174	R-19
149186	R-3-4

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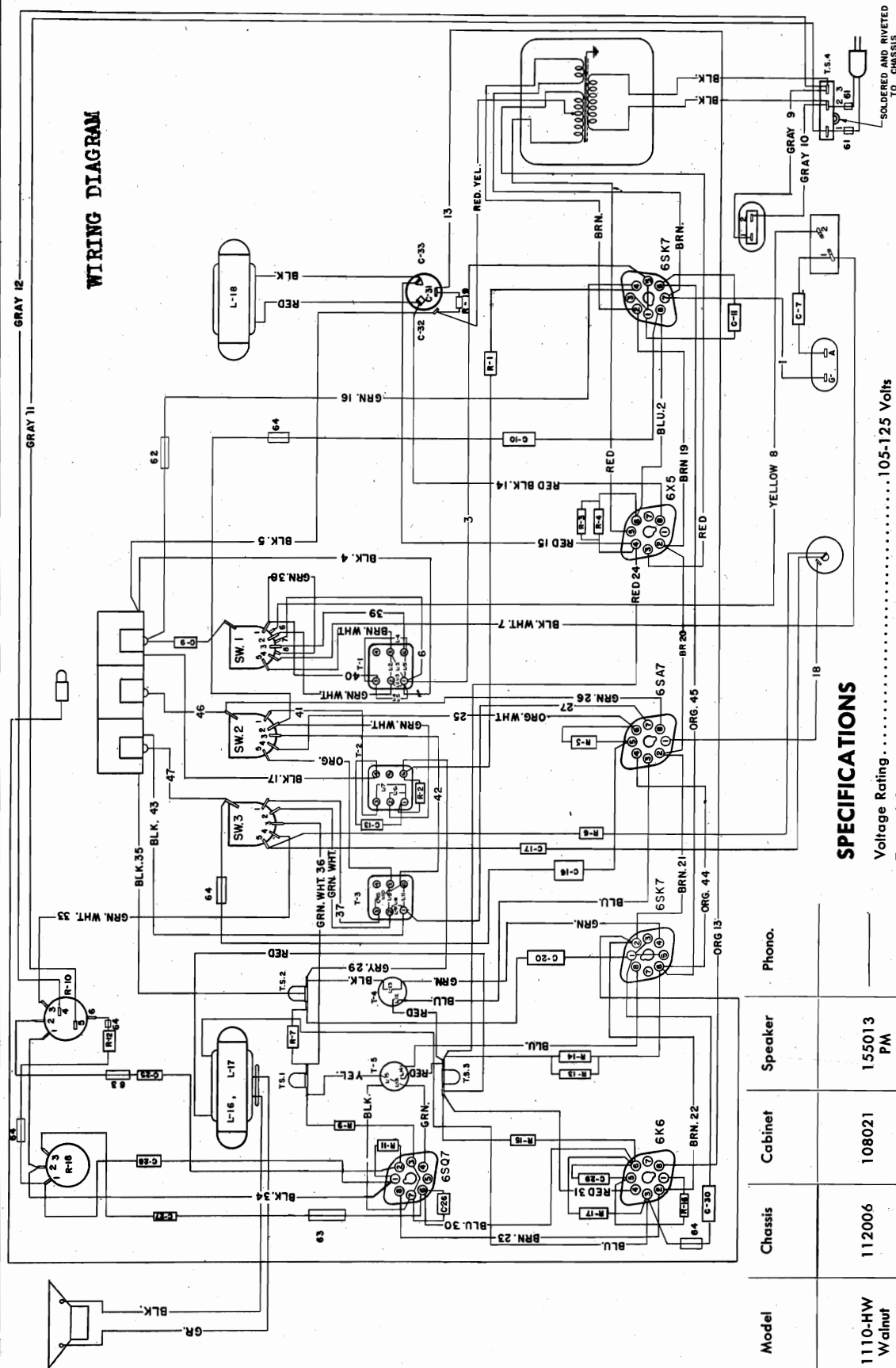
MODEL 1110



MODEL 1110

STROMBERG CARLSON CO.

WIRING DIAGRAM

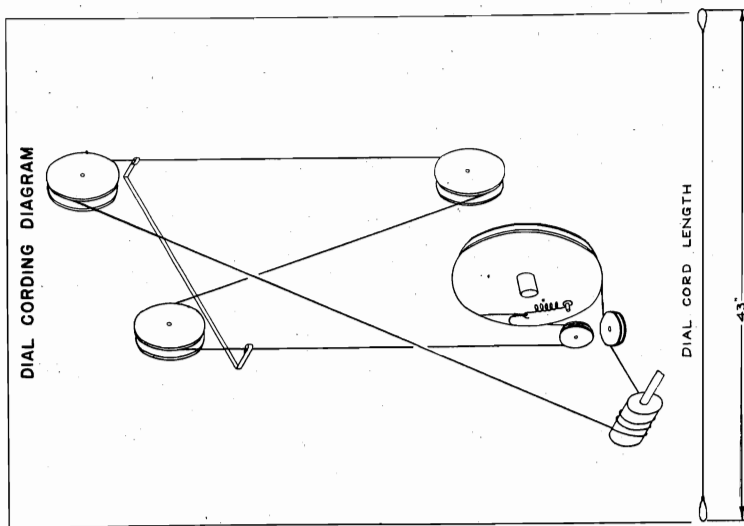


SPECIFICATIONS

Voltage Rating.....105-125 Volts  
 Type of Circuit.....Superheterodyne  
 Tuning Range..S.W. 8.7—15.5 MC. Broadcast 540 KC.—1600 KC.  
 Input Power Rating.....Radio 45 Watts, Phono. 60 Watts  
 Input Power Frequency.....60 Cycles AC  
 Intermediate Frequency.....455 KC.  
 Speaker Voice Coil Impedance.....at 400 Cycles 3.5 Ohms  
 Power Output.....2 Watts

Model	Chassis	Cabinet	Speaker	Phono.
1110-HW Walnut	112006	108021	155013 PM	
1110-PTW Walnut	112006	108023	155013 PM	148007

## STROMBERG CARLSON CO.



PART No. 124003

**Transformers, and Coils**

114011	T-1 (L-2-3-4-5) (C-8)	Antenna Coil
114012	T-2 (L-6-7) (C-12)	R.F. Coil
114013	T-3 (L-8-9-10-11) (C-14-15)	Oscillator Coil
114307	T-4 (L-12-13) (C-18-49)	1st I.F. Transformer
114308	T-5 (L-14-15) (C-21-22-23-24-R-8)	2nd I.F. Transformer
155006	L-18	Speaker Cone
155013	T-6 (L-16-17)	PM Speaker Assembly
161001	L-19-20-21-22	Choke
161207		Output Transformer
161402		Power Transformer

**Knobs and Cabinet Parts**

32224	Knob—Volume, Tone, Tuning
35725	Knob—Range
80874	Decal—Tone, Volume-Off-on, Stations, Range
80875	Grille and Baffle, Assembly—Left Hand
80876	Grille and Baffle, Assembly—Right Hand
80877	Lid Support
80878	Hinge
107003	Push Button
125005	Escutcheon and Lens, Dial

**Radio Frequency Adjustments****Standard Broadcast Range.**

**Antenna must remain connected for R.F. adjustments.**

1. With the signal generator output lead connected to the Antenna and Ground terminal of the receiver, tune the signal generator frequency and receiver tuning dial to 1400 KC.
2. Adjust the oscillator, R.F. and antenna trimmers of the gang condenser for maximum signal.
3. Set the signal generator frequency and receiver tuning dial to 600 KC.
4. Adjust the 600 KC. padding condenser in oscillator coil shield for maximum signal.
5. Adjust the iron core in antenna transformer for maximum output. (Underside of chassis)
6. Repeat the above procedure until no further change is required.

**Radio Frequency Adjustments****Short Wave Range**

1. Set the range switch to Short Wave position.
2. Set the signal generator frequency and receiver tuning dial to 14 MC.
3. Connect the output of the signal generator to the antenna terminal on the chassis.
4. Adjust the oscillator, R.F. and antenna trimmers for maximum output.
5. Repeat the above procedure until no further change is required.

24135	Felt Tips
26122	Antenna—Ground Strip
28694	Socket, Pilot
29956	Lamp, Pilot
32048	Socket, A.C. Outlet
32075	Pulley, Small
32076	Pulley, Medium
32077	Pulley, Large
33218	Cord, A.C.
34421	Connector, Photo
40546	Clip, Pulley
80881	Crystal Cartridge (L-70)
101047	Back
122007	Dial Scale
124005	Dial Card
129003	Gear Assembly, Switch Drive
143001	Plug, Antenna
144004	Pointer, Dial
146025	Station Call Letters
150007	Shaft Assembly, Dial Drive
150008	Shaft, Switch Drive
152002	Socket, Tube
152005	Socket, Loop
156008	Spring, Dial Cord

**ALIGNING**

**Never realign unless absolutely necessary.**

Use a good signal generator modulated at 400 or 1,000 cycles, with variable output voltage and a sensitive output meter across the voice coil of the speaker.

Always align using the lowest possible input from the signal generator. A strong signal makes adjustments approximate.

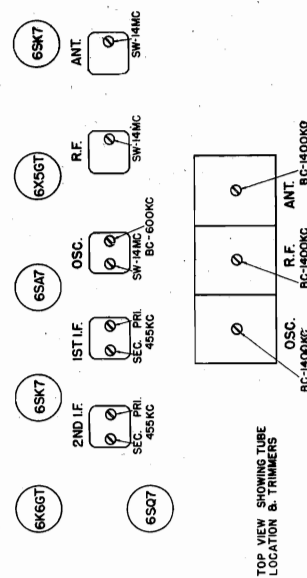
Always have the volume control "full on."

**Aligning Procedure (follow this order exactly)****Intermediate Frequency Adjustments.**

1. Set range switch to Standard Broadcast Position.
2. Tune set to extreme high frequency end of dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 KC. to the grid of the 6SA7 Converter tube (middle section of gang condenser) using a 0.1 mfd. capacitor in series with the output lead of the signal generator.
5. Adjust the I.F. aligners for maximum output in the following order:
  - a. Secondary of second I.F. transformer.
  - b. Primary of second I.F. transformer.
  - c. Secondary of first I.F. transformer.
  - d. Primary of first I.F. transformer.

**Dial Pointer Adjustment**

With plates of the gang tuning capacitor fully engaged make certain that the dial pointer is in a horizontal position directly on the calibration marks located at the low frequency end of dial scale. Adjust the dial pointer if necessary.

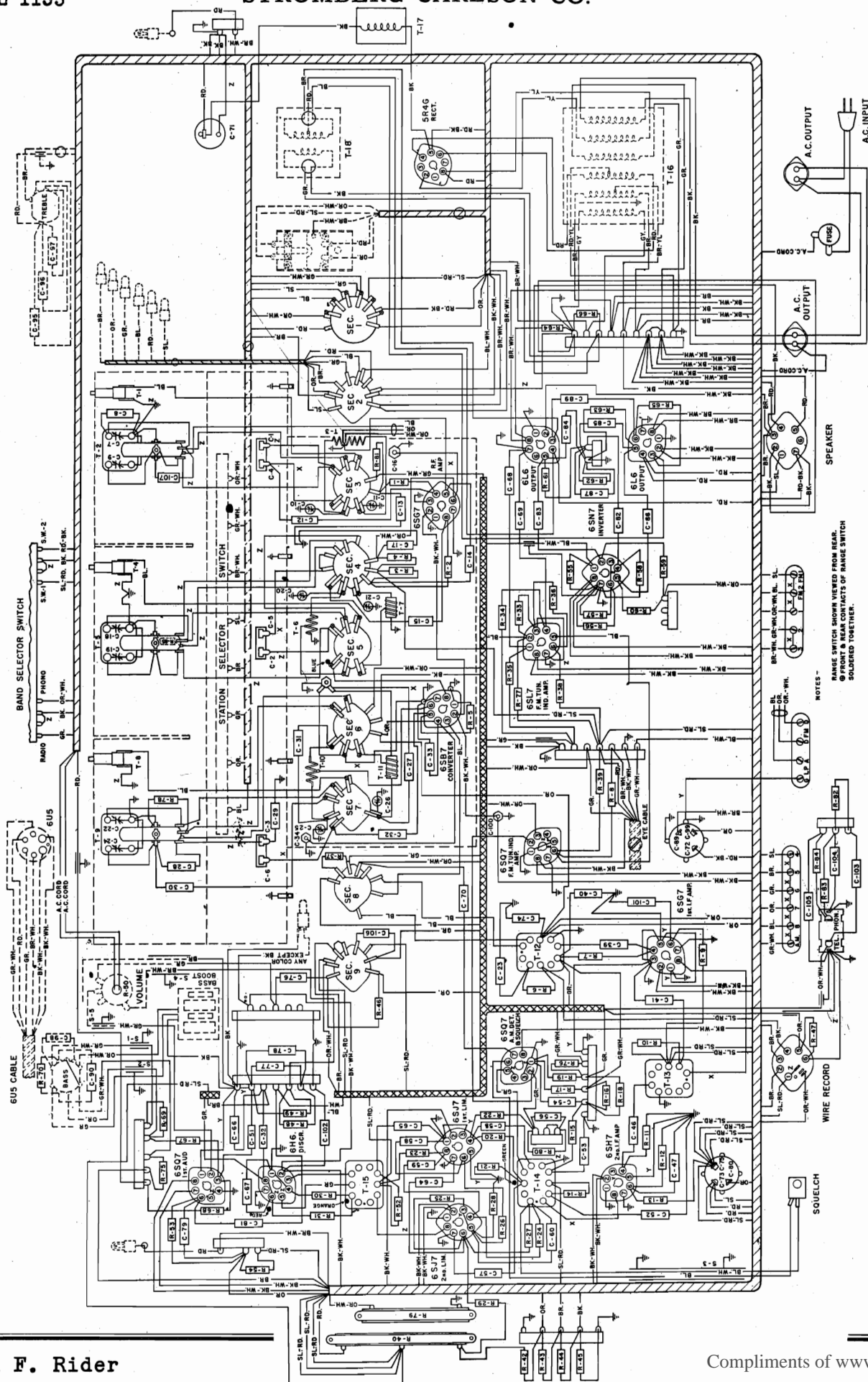
**Switches**

145005	Volume Control, Off-on Switch
158004	Range Switch

MODEL 1135

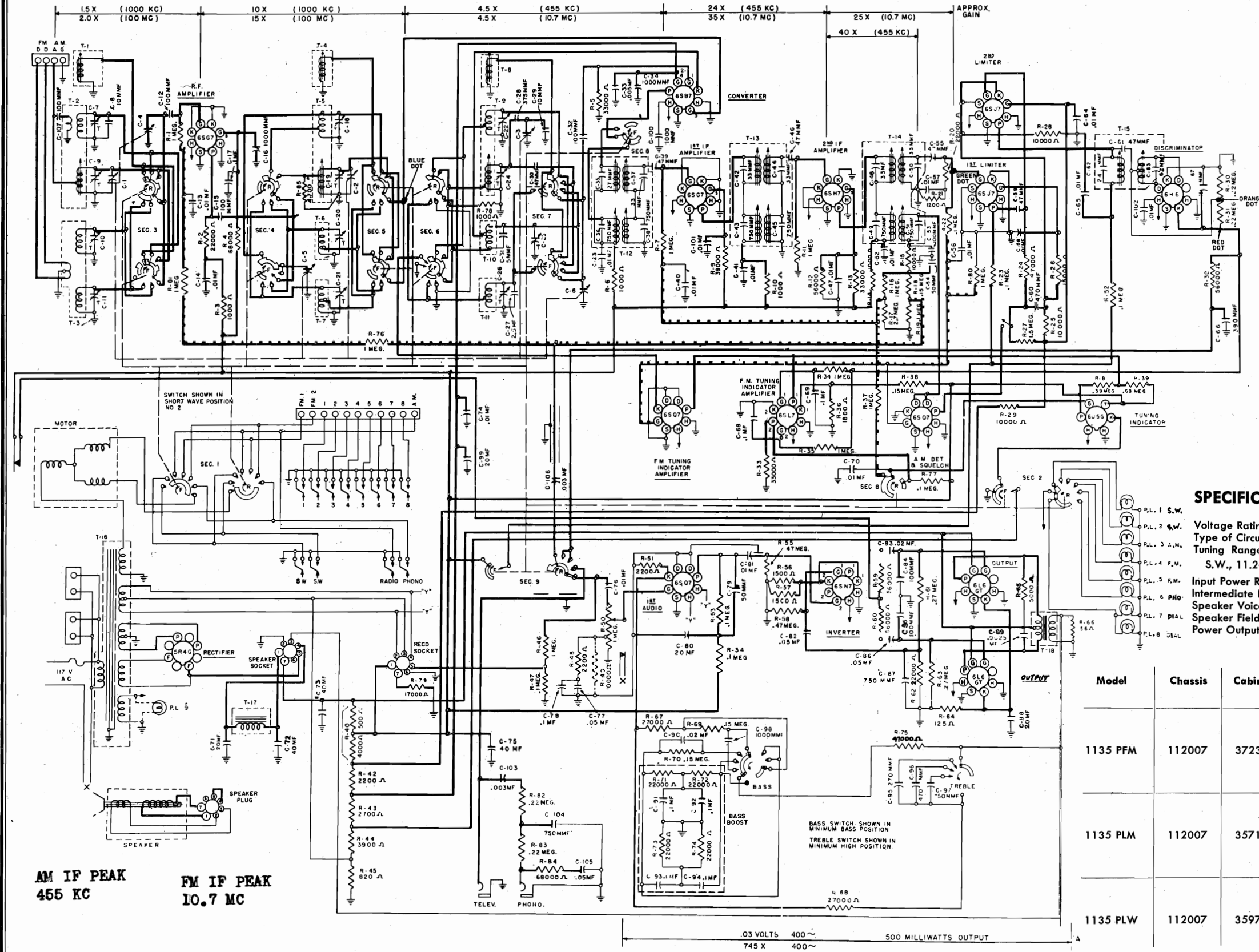
STROMBERG CARLSON CO.

WIRING DIAGRAM



NOTES -  
 RANGE SWITCH SHOWN VARIOUS FROM REAR  
 FRONT & REAR CONTACTS OF RANGE SWITCH  
 SOLDERED TOGETHER.

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AM IF PEAK  
455 KC

FM IF PEAK  
10.7 MC

SPECIFICATIONS

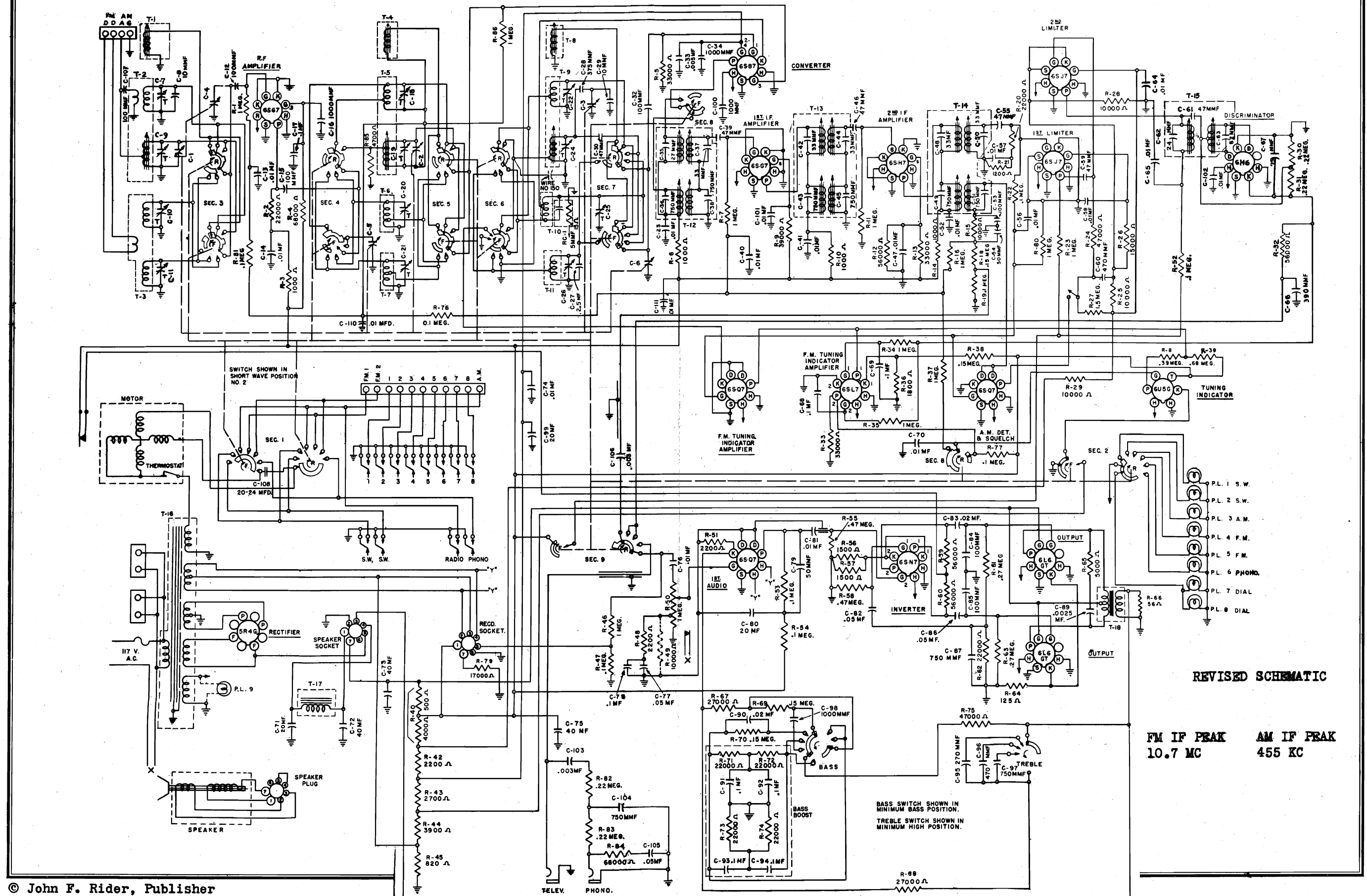
Voltage Rating.....105-125 Volts  
Type of Circuit.....Superheterodyne  
Tuning Range... Broadcast, 540-1620 KC.—S.W., 8.8—10.2 MC.  
S.W., 11.2—12.6 MC.—FM (2) 42-50 MC.—FM (1) 88-108 MC.  
Input Power Rating.....235 Watts  
Intermediate Frequency.....AM, 455 KC. FM-10.7 MC.  
Speaker Voice Coil Impedance at 400 Cycles.....10 Ohms  
Speaker Field Resistance.....210 Ohms  
Power Output.....19 Watts less than 10% Distortion

Model	Chassis	Cabinet	Speaker	Phono
1135 PFM	112007	37237	155019	148002 & 41613
1135 PLM	112007	35717	155019	41613
1135 PLW	112007	35978	155019	41613



MODEL 1135A

STROMBERG CARLSON CO.

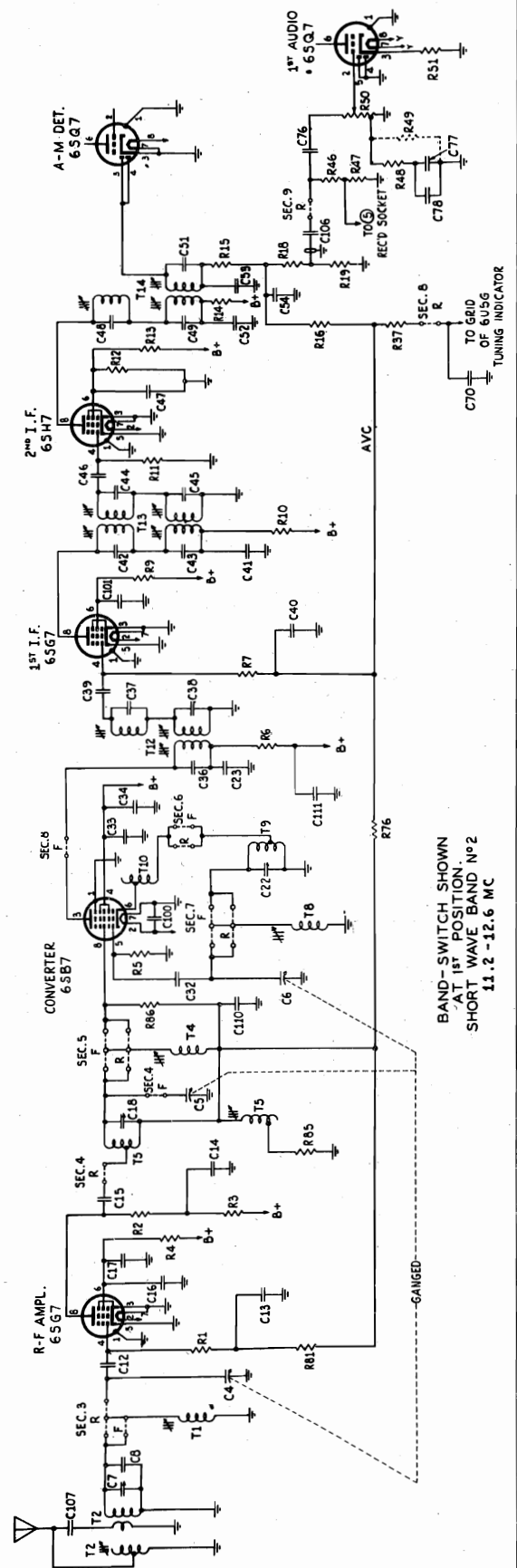
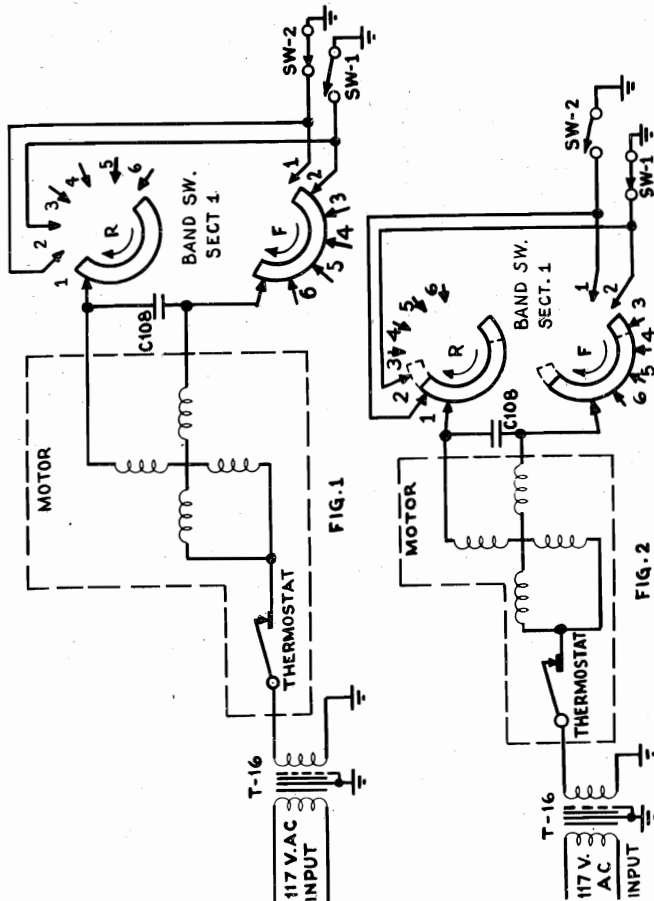




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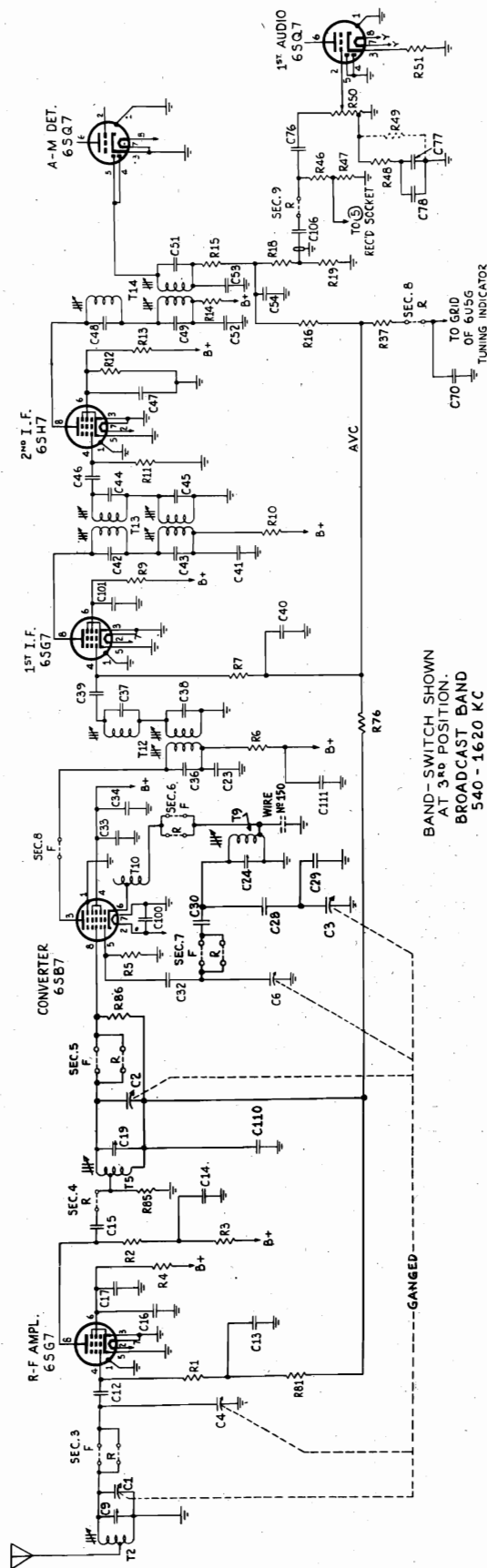
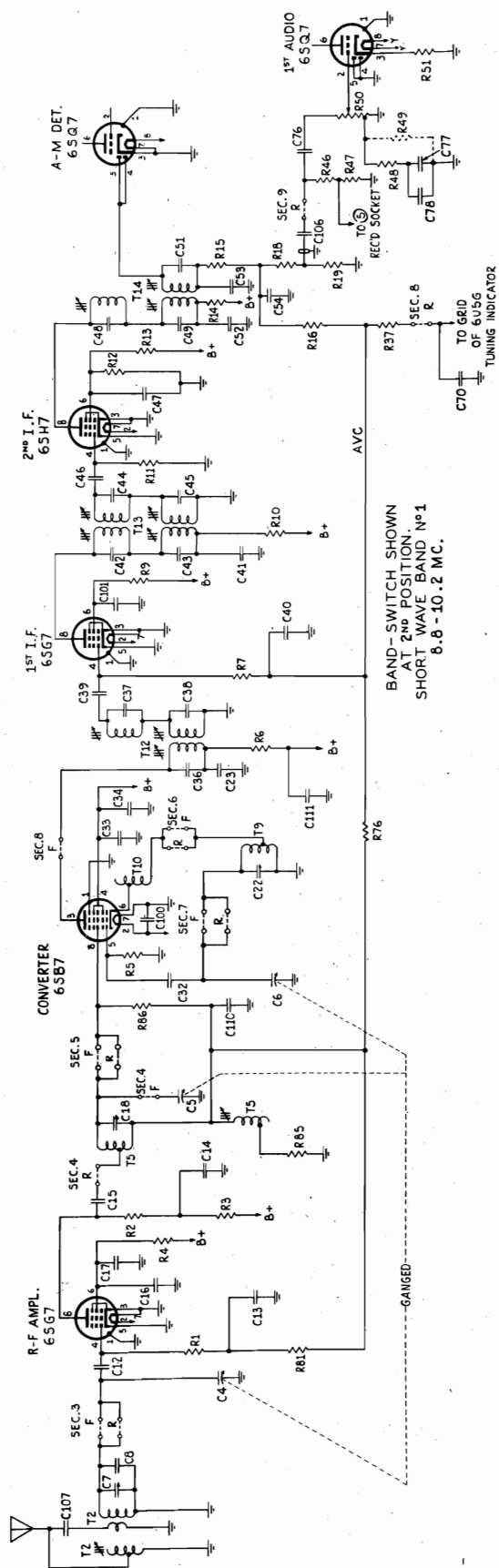
NOTES: - FIGS. 1 AND 2 SHOW SCHEMATICALLY HOW THE BAND SWITCH IS ROTATED BY THE MOTOR WHEN THE DESIRED PUSHBUTTON IS DEPRESSED. PUSHBUTTONS 1 (SHORT WAVE 2-BAND) AND 2 (SHORT WAVE 1-BAND) ARE THE ONLY ONES SHOWN FOR CLARITY OF DIAGRAM. THE OTHER PUSHBUTTONS OPERATE IN A SIMILAR MANNER. FIG. 1 SHOWS THE MOTOR AT REST WITH THE BAND SWITCH AT SW-2 POSITION, NO. 1 BUTTON DEPRESSED. IF SW-1 BAND IS DESIRED THEN NO. 2 BUTTON IS CLOSED AND NO. 1 - OPENS, THIS PUTS A GROUND THROUGH SECTION 1-P OF THE BAND SWITCH ON ONE WINDING OF THE MOTOR, COMPLETING THE CIRCUIT; WHICH CAUSES THE MOTOR TO TURN THE BAND SWITCH IN THE DIRECTION OF THE ARROWS SHOWN TO POSITION OF FIG. 2 (SOLID LINES). THE GROUND WILL THEN BE DISCONNECTED FROM THE MOTOR WINDING, OPENING THE CIRCUIT AND CAUSING THE MOTOR TO STOP. IF THE MOTOR DOESN'T STOP FAST ENOUGH, AND THE BAND SWITCH IS ROTATED TOO FAR, THEN IT WILL HAVE TO ASSUME THE POSITION SHOWN IN DOTTED LINES. THIS WILL PUT A GROUND ON THE OTHER WINDING OF THE MOTOR, THROUGH CONTACT 2 OF SECTION 1-R OF THE BAND SWITCH, MAKING THE MOTOR REVERSE ITS DIRECTION OF ROTATION TO ITS NORMAL POSITION (SOLID LINES) FOR SW-1.

MOTOR BREAKDOWN FOR MODEL 1135A ONLY



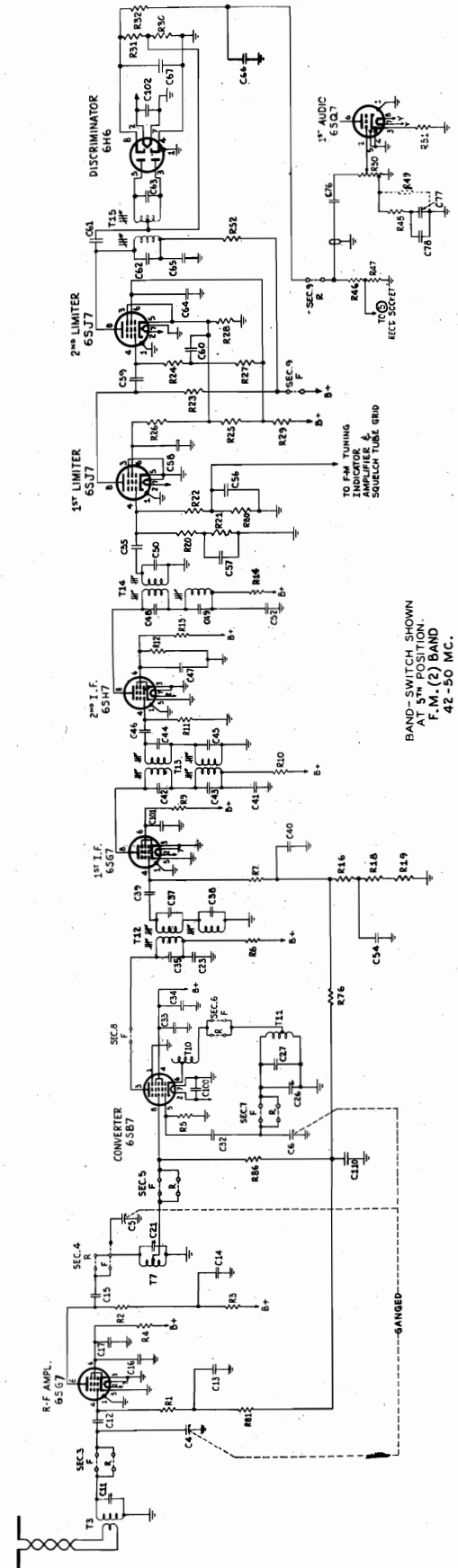
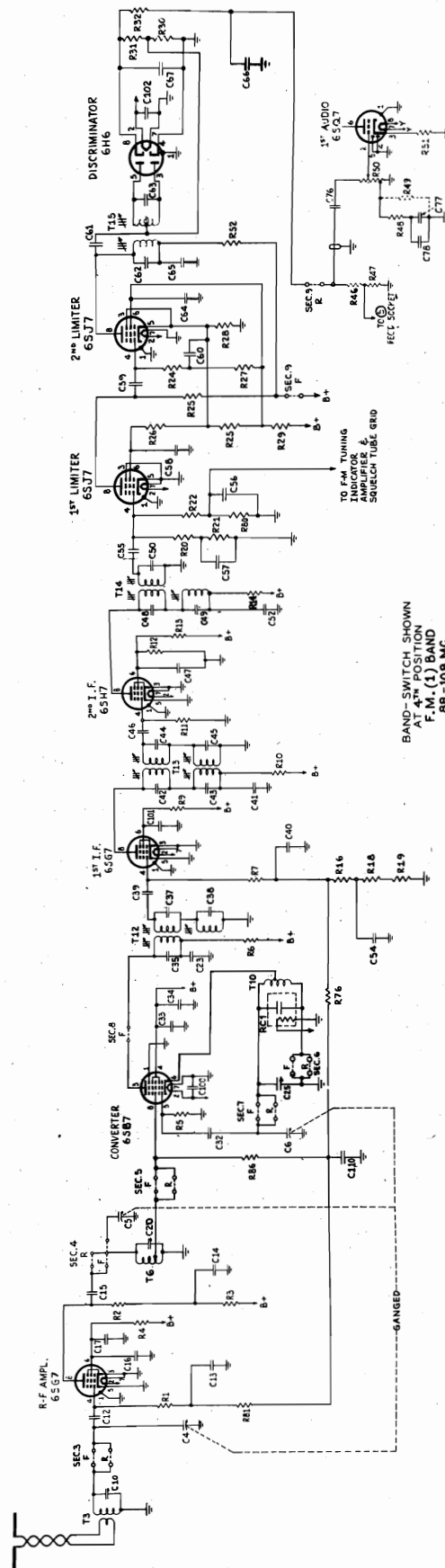
MODEL 1135A

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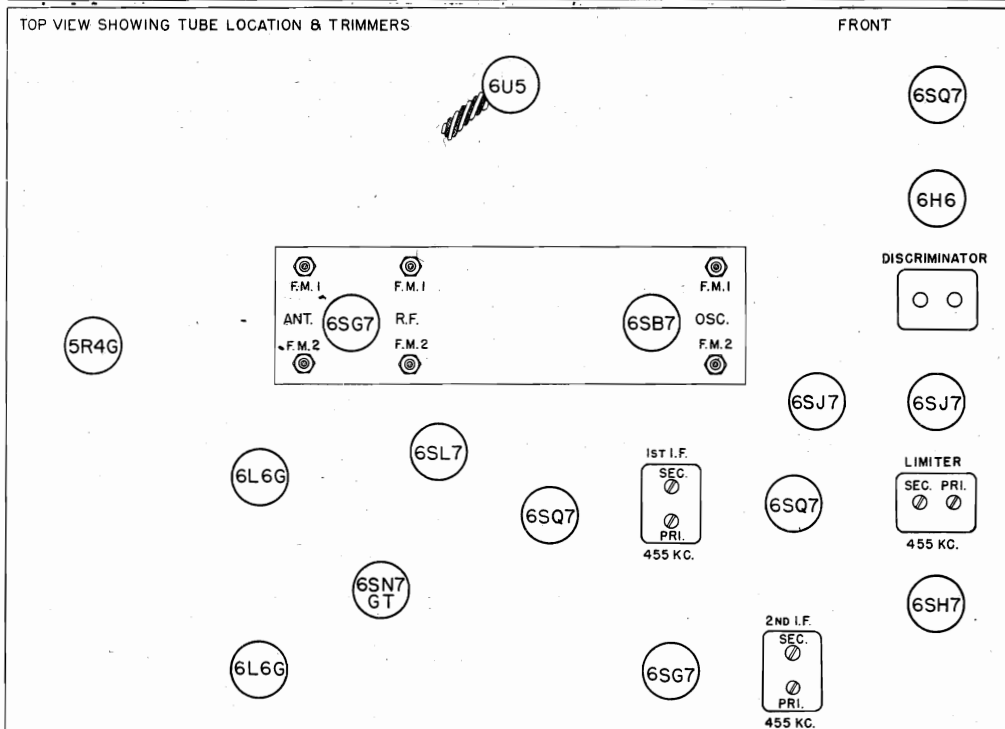
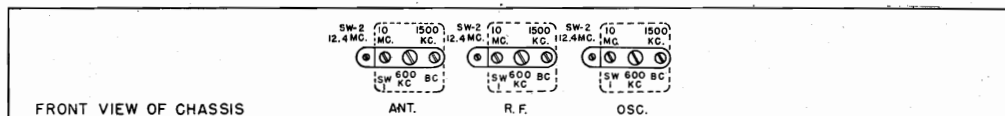
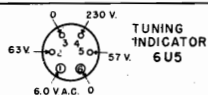
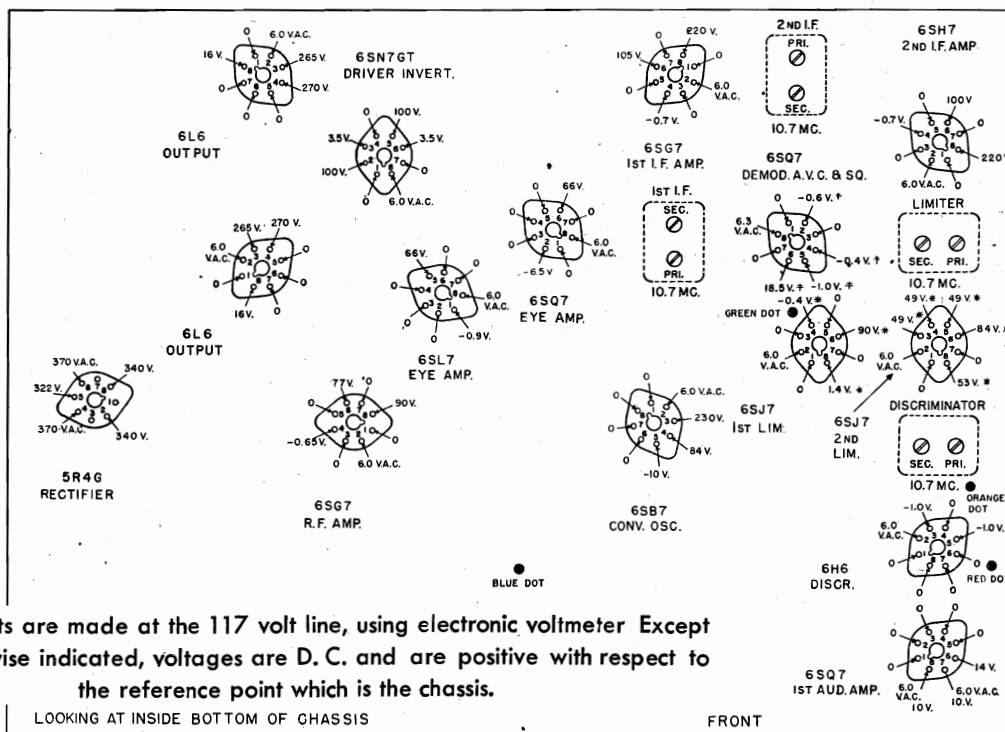
MODEL 1135A



MODEL 1135

STROMBERG CARLSON CO.

# LOCATION CHARTS TUBES, TRIMMERS AND VOLTAGE



## STROMBERG CARLSON CO.

MODEL 1135

**ALIGNING****Never realign unless absolutely necessary.**

Refer to "Location Chart" for alignment adjusters. Allow set to warm up 10 to 15 minutes before attempting to align.

Always align using the smallest possible input from the signal generator. A strong signal makes adjustments approximate.

Always have volume full on.

The alignment of this receiver does not require special equipment or information; however, it is well to adhere to the standard procedure as outlined.

The required equipment is: 1 Electronic Voltmeter, 1 Output Meter, 1 Standard Signal Generator, 1 High Frequency Signal Generator, 1 No. 80777 Aligning Tool.

**ALIGNING PROCEDURE (follow this order exactly)****Intermediate Frequency Adjustments****Amplitude Modulation**

The I.F. aligners that are used to adjust the amplitude modulation (AM) channel are found on the top side of the chassis. They consist of 6 adjustable iron cores used to tune the inductance of the 1st, 2nd and 3rd I.F. transformers (161202, 161200, 161201). These cores are found inside the plastic tubes protruding from the top of the I.F. transformers and are equipped with small screwdriver slots.

**Caution:** These cores are made of high quality R.F. iron and are fragile; therefore care must be used in adjusting them.

1. Connect the signal generator to the modulator grid, terminal number 8 of the 6SB7 converter tube which is connected to the wave band switch, and is identified by a blue dot.
2. Connect the output meter across the voice coil of the speaker (green and black wires from cable).
3. Adjust the signal generator to 455 KC. Use 30% modulation at 400 cycles.
4. Adjust volume control full on.
5. Adjust tone control to maximum high, minimum bass.
6. Adjust range switch to standard broadcast band, actuate any AM. push button.
7. Adjust the tuning selector to approximately 600 KC.
8. Adjust I.F. cores for maximum output with a reduced signal input.

**Frequency Modulation**

The I.F. Aligners may be found from the underside of the chassis. The adjusters are 6 iron cores used to tune the

inductance of the high frequency coils.

1. Connect the signal generator to the modulator grid, terminal number 8 of the 6SB7 converter tube, which is connected to the wave band switch, and is identified by a blue dot.

2. Connect the electronic voltmeter to the junction of the 22,000 ohm and the 100,000 ohm resistors in the first limiter grid circuit identified by a green dot. This junction point will be found underneath the limiter shield.

3. Adjust the voltmeter to the lowest negative voltage scale.

4. Actuate push button on extreme right of row of eight.
5. Adjust the tuning selector to approximately 21 on this band.

6. Adjust the signal generator to 10.7 megacycles. No modulation is required.

7. Adjust the cores for maximum output of the voltmeter. Reduce the input signal and readjust until the maximum output is secured for minimum input. (Approximately 1 volt output).

**Discriminator Alignment (FM)**

**Caution: Discriminator secondary must be zeroed at same generator setting used for FM I.F. alignment.**

1. Connect the signal generator to the grid of the second I.F. tube, terminal No. 4 of the 6SH7.
2. Connect the electronic voltmeter to the center of the diode load resistors at the point indicated by the orange dot.
3. Adjust the primary for maximum output with .1 volt from signal generator set at 10.7 megacycles.
4. Switch the electronic voltmeter to the high side of the diode load resistors, identified by a red dot.
5. Adjust the secondary for zero output.
6. Swing generator to 75 KC. higher and 75 KC. lower in frequency and note the plus and minus voltage. If these voltage values are not approximately equal, repeat operations 3, 4 and 5.

**R.F. Adjustment—Amplitude Modulation**

**The Broadcast band should be adjusted first.**

**The built-in loop should remain connected to the antenna and ground terminals.**

1. Connect the signal generator to the AM antenna terminals leaving the loop antenna connected. A 400 ohm resistor must be used in series with the signal generator. Use of a 30% modulated signal of 400 cycles is recommended.
2. Adjust the signal generator to 1500 KC.
3. Adjust station selector to 1500 KC.

4. Adjust range switch to AM Broadcast. Actuate any AM push button.

5. Adjust the oscillator, R.F. and antenna trimmer for maximum output.

6. Reduce the input signal and readjust the trimmers until the maximum output is secured for minimum input.

7. Adjust station selector to 600 KC.

8. Set signal generator to 600 KC.

9. Adjust iron cores in oscillator, R.F. and antenna coils for maximum output.

10. Repeat 1500 KC. and 600 KC. alignments until no further change is required.

**R.F. Adjustment—Short Wave (9-10 MC. Band)**  
**The built-in loop should remain connected to the antenna and ground terminals.**

1. Connect the signal generator to the antenna and ground terminals of the receiver using a 400 ohm resistor.

2. Set the dial pointer to 10 MC.

3. Adjust signal generator to 10 MC.

4. Actuate left S.W. push button.

5. Adjust oscillator, R.F., and antenna trimmer for maximum output. (No further alignment is required on this band.)

**R.F. Adjustment—Short Wave (11.2-12.6 MC. Band)**

1. Connect the signal generator to the antenna and ground terminals of the receiver using a 400 ohm resistor in series with the signal generator.

2. Set dial pointer to 12.4 MC.

3. Adjust signal generator to 12.4 MC.

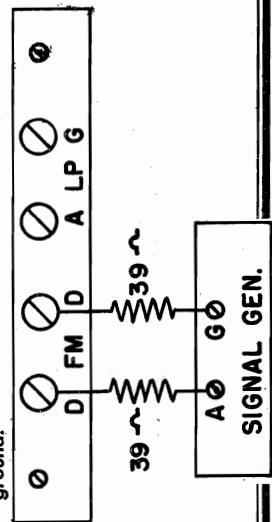
4. Actuate right S.W. push button.

5. Adjust oscillator, R.F. and antenna iron cores for maximum output.

**R.F. Adjustments—Frequency Modulation**

**Align the FM (2) Band first.**

1. Set dial pointer to channel 90 (49 MC.)
2. Connect the signal generator to FM dipole terminals using 39 ohm resistors as indicated (disconnect dipole antenna). Connect signal generator ground to chassis ground.



MODEL 1135

STROMBERG CARLSON CO.

CANNOT EMPHASIZE TOO STRONGLY THAT THAT ALL THE BENEFITS TO BE DERIVED FROM THE DYNATENNA CAN ONLY BE REALIZED IF ALL THE TUNED CIRCUITS ARE IN RESONANCE.

- 1 - AFTER DYNATENNA HAS BEEN INSTALLED AND PROPERLY CONNECTED TO THE RECEIVER TUNE IN THE WEAKEST STATION THAT CAN BE HEARD OR ONE IN OR NEAR THE CENTER OF THE FREQUENCY BAND ASSIGNED TO YOUR AREA.

- 2 - IN THE CASE OF RECEIVERS THAT HAVE TUNING EYE TUBES (1135), REMOVE THE TUBE FROM HOLDER IN ORDER THAT IT MAY BE SEEN FROM BACK OF SET.

- 3 - ADJUST ANTENNA AND RF-FM TRIMMERS (SEE CHART BELOW) FOR GREATEST DEFLECTION OF EYE. IN THE CASE OF SETS THAT DO NOT HAVE AN EYE TUBE, SOME ADJUSTMENT IS MADE. OPTIMUM SIGNAL STRENGTH IS DETERMINED BY INCREASE IN RATIO OF AUDIBLE SIGNAL TO NOISE LEVEL.

FRONT

63H7

TOP VIEW SHOWING TUBE LOCATION & TRIMMERS

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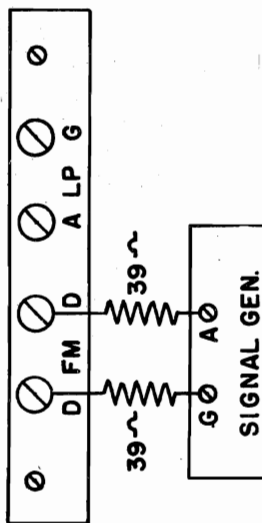
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3. Set signal generator to 49 MC.
4. Actuate FM (2) push button (extreme right hand button in row of 8 buttons).
5. Connect electronic voltmeter to the junction of the 22,000 and the 100,000 ohm resistors in the first limiter grid circuit (identified by green dot).
6. Adjust oscillator R.F. and antenna trimmers for maximum output on electronic voltmeter.

**FM (1) Band**  
Adjust the same as the FM (2) band using 106 MC., setting the dial pointer to channel 290. Connect the generator to the dipole input using 39 ohm resistors as indicated. Actuate 3rd push button from right in row of 8 buttons. Connect signal generator ground to chassis ground. Note reverse signal generator connection.



**Dial Pointer Adjustment**

Check dial pointer to see that it is aligned with the two diamond shaped markers at the extreme left of the dial scale, when the variable capacitor plates are completely engaged.

IN ALMOST EVERY LOCATION FM PERFORMANCE IS IMPROVED WITH THE ADDITION OF A DYNATENNA. IN REMOTE OR FRINGE AREAS THIS FOLDED DIPOLE IS A MUST IF GOOD RESULTS ARE TO BE EXPECTED FROM THE STATIONS NOW ON THE AIR.

WHEN INSTALLING A DYNATENNA, IT IS MOST IMPORTANT THAT THE INSTRUCTIONS BE FOLLOWED VERY CLOSELY. GET IT HIGH, STAY AWAY FROM METAL CONDUCTORS OF ALL TYPES, AND ORIENT IT CAREFULLY. AFTER FOLLOWING THESE FUNDAMENTALS CLOSELY, THERE ARE SIMPLE ADJUSTMENTS THAT MAY BE MADE THAT WILL ADD TO THE OVERALL GAIN CONSIDERABLY, AS FOLLOWS:

**Cabinet Parts**

PF	PL
29597	Labyrinth
35852	Screws, Escutcheon Mtg.
37083	Key Pull
37139	Decal, Station
37140	Decal Off-On, Volume
37145	Lid Support
37149	Drawer Pull
—	Grille Cloth—W—
37169	Grille Cloth—M—
37239	Socket, Phono. Compartment
37240	Lamp, Phono. Compartment
37242	Block, Lamp and Switch Mtg.
37579	Escutcheon
38442	Bullet Catch with Strike
39200	Piano Hinge
80681	Stop Hinge
—	Phono. Drawer and Tracks
108036	Phono. Panel
—	Phono. Drawer Track Right
—	Phono. Drawer Track Left
150024	Metal Grille
801401	Lamp Cap, Bullseye

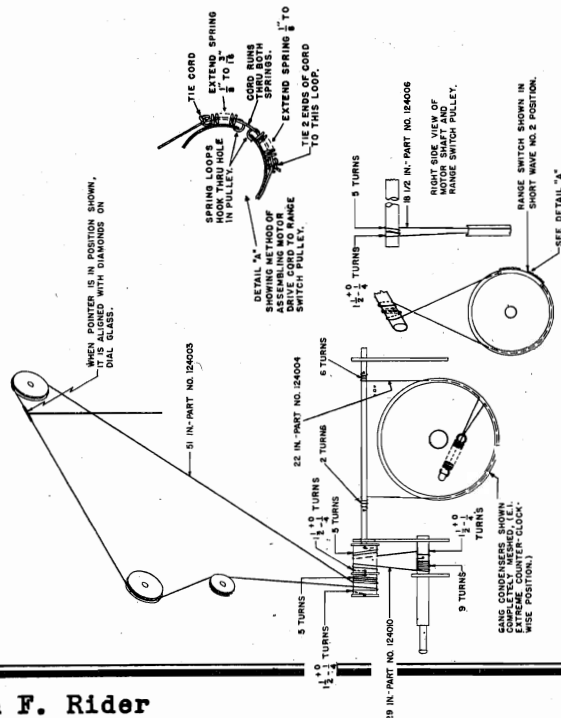
**Knobs—Push Buttons**

Part No.	
32156	Push Button
32172	Lens, Push Button
32224	Off-On, Volume
35866	Call Letter Kit
37007	Indicator Lever, Tone
37093	Tuning
121007	"S.W." Push Button Tab
121008	"Radio" Push Button Tab
121009	"Record" Push Button Tab

**Controls—Switches**

Part No.	
37238	Phono. Compartment Switch
145002	1 Meg. Volume Control and Switch
158005	Tone Switch, Bass
158006	Tone Switch, Treble
158014	Squelch Switch
158019	Switch, S.W., Radio, Phono

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**NOTE**—When ordering replacement parts always specify series number as well as model and part number. Series number is stamped on back of chassis.

[illegible]

\*Band Switch, Sockets, Variable Capacitor, R.F. Coils are a complete R.F. Assembly. Sold as a unit only.







## SPECIFICATIONS

## CABINET:

Height	5¾ inches
Width	10½ inches
Depth	4¾ inches

## ELECTRICAL RATING (INPUT):

Voltage	105-125 volts, a-c
Frequency	60 cycles
Wattage	30 watts

## TUNING FREQUENCY (RADIO):

Broadcast Band	540-1600 kc
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## POWER OUTPUT (117 VOLTS LINE):

Undistorted	1.5 watts
Maximum	2.2 watts

## LOUDSPEAKER:

Type	Alnico P.M.
Outside Cone Diameter	4 inch
Voice Coil Impedance (400 Cycles)	3.5 ohms

## TUBE COMPLEMENT:

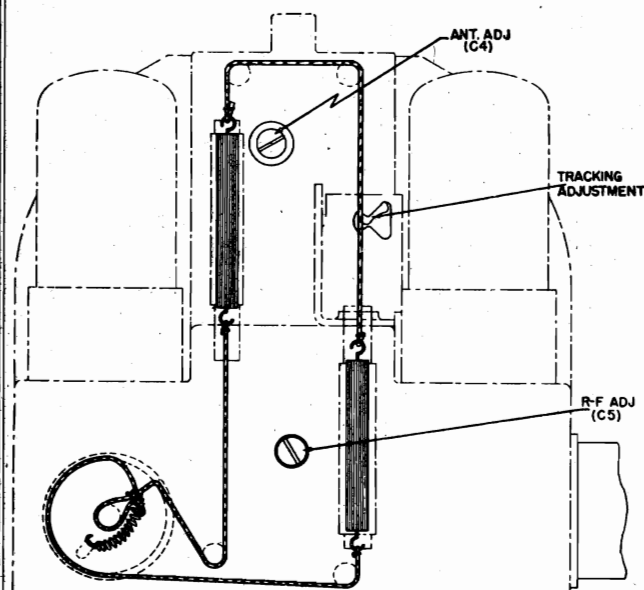
R-F Amplifier	Type 12SG7
Detector-Audio	Type 12SQ7
Output Power	Type 50L6GT
Rectifier	Type 35Z5GT

Note: Order tubes from Tube Division, Replacement Parts Section, General Electric Co., Schenectady, N. Y.

## RADIO CIRCUIT ALIGNMENT

## ALIGNMENT FREQUENCIES

R-F	1620 kc and 580 kc
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## Drive Stringing and Trimmer Location

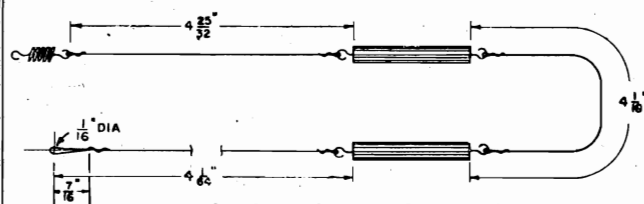
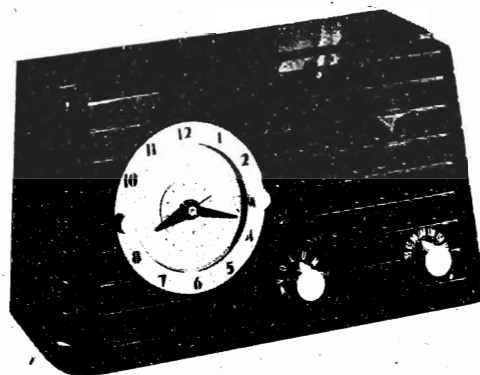


Fig. 2. Drive Cord Assembly



## EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full scale.
3. 100 mmf. mica capacitor.
4. Insulated screwdriver.

## PROCEDURE

1. Connect test oscillator through 100 mmf. to antenna lead; connect output meter across the loudspeaker voice coil leads.
2. Turn dial pointer as far clockwise as it will go.
3. Set test oscillator to 1620 kc with tone modulation. Keeping the radio volume control set for maximum and attenuating test oscillator so that the output meter reading never exceeds 1¼ volts, trim antenna (C4) and RF (C5) trimmers for maximum output.
4. Set test oscillator to 580 kc with tone modulation. While rocking tuning control in vicinity of this dial calibration, adjust tracking adjustment platform up or down to give maximum output meter reading.
5. Recheck 1620 calibration adjustment. If RF (C5) trimmer has to be changed appreciably for maximum output, recheck step 4.

## GENERAL

## DRIVE CORD REPLACEMENT

When replacing the drive cord, it is essential that the measurements shown in Figure 2 be maintained very accurately, otherwise alignment and dial calibration difficulties will be experienced. Use a 3/2-inch diameter nylon jacketed cord, Part No. RDC-015, for replacement.

## RADIO STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings are taken with low signal input.

## (1) R-F Stage Gains.

Antenna lead to 12SG7 grid	8 at 1000 kc
12SG7 grid to 12SQ7 diode plate	50 at 1000 kc

## (2) Audio Gain.

0.06 volts at 400 cycles across volume control (R4) with control set at maximum will give approximately ½-watt output across speaker voice coil.

## (3) Socket Pin Voltages.

Figure 4 shows voltages from all points to B-. Voltage readings much lower than those specified may help localize defective components or tubes.

## TELECHRON, INC.

MODEL 8H59, Musalarm

## RADIO REPLACEMENT PARTS LIST—MODEL No. 8H59

(Order from G-E Co., Specialty Division, Wolfe St. Plant, Syracuse, N. Y.)

CAT. NO.	SYMBOL	DESCRIPTION	CAT. NO.	SYMBOL	DESCRIPTION
<b>UNIVERSAL G-E RADIO REPLACEMENT PARTS</b>			<b>SPECIALIZED G-E REPLACEMENT PARTS</b>		
UCC-039	C8	CAPACITOR—0.005 mfd., 600 v., paper	RAB-016		COVER—Cabinet back cover
UCC-045	C2, 3	CAPACITOR—0.05 mfd., 600 v., paper	RAU-009		CABINET—Plastic cabinet
UCG-543	C6	CAPACITOR—430 mmf., silver mica	RCC-039	C9	CAPACITOR—0.005 mfd., 600 v., paper
UCU-512	C1	CAPACITOR—22 mmf., mica	RCC-041	C10	CAPACITOR—0.02 mfd., 600 v., paper
UCU-532	C16	CAPACITOR—150 mmf., mica	RCC-045	C14	CAPACITOR—0.05 mfd., 600 v. paper
UCU-536	C7, 15	CAPACITOR—220 mmf., mica	RCE-031	C11A, B, C	CAPACITOR—40 mfd., 150 v.; 30 mfd., 150 v.; 20 mfd., 25 v.; electrolytic
UIC-001		CEMENT—Speaker cement	RCY-007	C4	TRIMMER—140-175 mmf., antenna trimmer
UOP-405	SP1	LOUDSPEAKER—4-inch PM speaker	RCY-008	C5	TRIMMER—270-375 mmf.; r-f trimmer
UOX-009		CONE—Speaker replacement cone	RDC-015		CORD—Tuning drive cord (bulk)
URD-015	R1	RESISTOR—39 ohms, $\frac{1}{2}$ w., carbon	RDK-028		KNOB—Volume or tuning knob
URD-029	R8	RESISTOR—150 ohms, $\frac{1}{2}$ w., carbon	REI-004		CORE—Powdered iron tuning core
URD-033	R13	RESISTOR—220 ohms, $\frac{1}{2}$ w., carbon	RHJ-001		ASSEMBLY—Tuning shaft assembly and spacer
URD-089	R3	RESISTOR—47,000 ohms, $\frac{1}{2}$ w., carbon	RIT-005		COVER—Electrolytic cardboard cover (inner and outer)
URD-097	R10	RESISTOR—100,000 ohms, $\frac{1}{2}$ w., carbon	RJS-003		SOCKET—Tube socket
URD-113	R7, 12	RESISTOR—470,000 ohms, $\frac{1}{2}$ w., carbon	RLA-005	L1, 2	COIL—Antenna or R-F coil
URD-121	R6	RESISTOR—1.0 megohm, $\frac{1}{2}$ w., carbon	RMB-003		BUSHING—Drive shaft bushing
URD-129	R2	RESISTOR—2.2 megohms, $\frac{1}{2}$ w., carbon	RMS-034		SPRING—Drive cord tension spring
URD-145	R5	RESISTOR—10.0 megohms, $\frac{1}{2}$ w., carbon	RMX-006		PULLEY—Drive pulley
URE-057	R9	RESISTOR—2,200 ohms, 1 w., carbon	RRW-003	R14	RESISTOR—22 ohms, 1 w., wirewound
			RWL-009	R11	RESISTOR—18 ohms, 1 w., glassohm W.W.
					CORD—Power cord

NOTE: See page 1 for tube complement

## CLOCK REPLACEMENT PARTS LIST—MODEL No. 8H59

(Order from Telechron Inc., Ashland, Mass.)

CAT. NO.	SYMBOL	DESCRIPTION	CAT. NO.	SYMBOL	DESCRIPTION
C35X84		Bezel 2 $\frac{1}{8}$ " Rd. Gold Color	C17X8	12	Cam Shaft Assem.
C58X16		Crystal 2 $\frac{1}{8}$ " Rd.	C16X14	13	Sweep Second Hand Shaft Assem.
C61X701		Dial	C40X78	18	Switch Lever Assem.
C34X111	4	Front Plate Assem.	C44X38	24	Rotor Unit (M1630)
C32X130		Hands (Hr. and Min.) Maroon Lacquer	C45X69	27	Field and Coil Assem.
C31X27		Hand (Sweep Sec.) Gold Color	C40X202	25	Spreader Post
C55X4		Alarm Disc	C64X1	2 and 22	Front Plate Screws
C59X221		Numeral Color Ring (Maroon)	C35X39	21	Base Plate Assem.
C4X6	3	Knob—Alarm Set—Ivory Color Plastic	C40X252	11	Cam Friction Washer
C40X75	1	Knob—Switch—Ivory Color Plastic	C1X1	26	Motor Mtg. Screws (4-40X1 $\frac{1}{8}$ " Rd. Hd.)
C3X49	14	Knob—Time Set—Stat. Bronze Color	C1X2	26	No. 1204 Lockwasher
C11X8	15	Alarm Set Shaft Assem.	C40X76	23	Switch Assem.
C10X115	7	Time Set Shaft Assem.			
C40X73	19	Switch Shaft Assem.			
C40X260	20	Switch Shaft Spacer			
C40X261	6	Time Set Shaft Spacer			
C40X262	5	Time Set Shaft Spacer (at Front Plate)			
C40X263	17	Alarm Set Shaft Spacer			
C14X15	10	Minute Hand Sleeve Assem.			
C13X11	9	Hour Hand Sleeve Assem.			
C15X3	8	Alarm Hand Sleeve Assem.			
C40X77	16	Intermediate Gear and Shaft Assem.			

## PARTS OF SWITCH ASSEMBLY

C40X79		Upper Contact Spring Assem.
C40X80		Lower Contact Spring Assem.
C1X6		Screw (4-40X $\frac{3}{8}$ " Rd. Hd.)
C1X43		Hex Nut (4-40)

## CLOCK INSTRUCTIONS

## 1. CONTACT ADJUSTMENT

- Set switch to "Alarm" position so that cam follower rests on timing cam. Contacts shall be adjusted to .017" min. gap.
- With switch in "Off" position, contacts shall remain open as in "A" and there shall be clearance between cam follower and cam.
- With switch in "On" position, contacts shall be closed.
- Set switch to "Alarm" position, turn alarm set knob until cam follower drops into slot of timing cam. The 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 a noticeable amount before the contacts separate, the pressure is sufficient.
- To insure that contacts close, connect a small lamp in series with the switch assembly when testing.

## 2. TIMING

- Set minute and hour hands to 12 o'clock.
- Set timer dial so that the 12 o'clock mark lines up with small line on the dial. In this position the indicator on the hour hand should also line up with the line on the dial.
- Adjust timer for contact closure at 6:55 o'clock when dial is set for alarm to operate at 7:00 o'clock. On repeat tests the contacts shall close at 6:55, plus or minus 3 minutes. At all other settings, the contacts shall close within 12 minutes ahead or 2 minutes after the time for which the dial is set.

## 3. VIBRATOR ADJUSTMENT

- Vibrator shall start buzzing 10 minutes plus or minus 5 minutes after contact closure occurs.
- When vibrator is in "Shut-off" position the shut-off spring shall

lift the vibrator sufficiently above the cam, so that the cam will not contact vibrator in any position.

- Adjust vibrator for maximum sound.
- Vibrator shall be shut off before completion of buzzing period.

## 4. NOISE PREVENTION

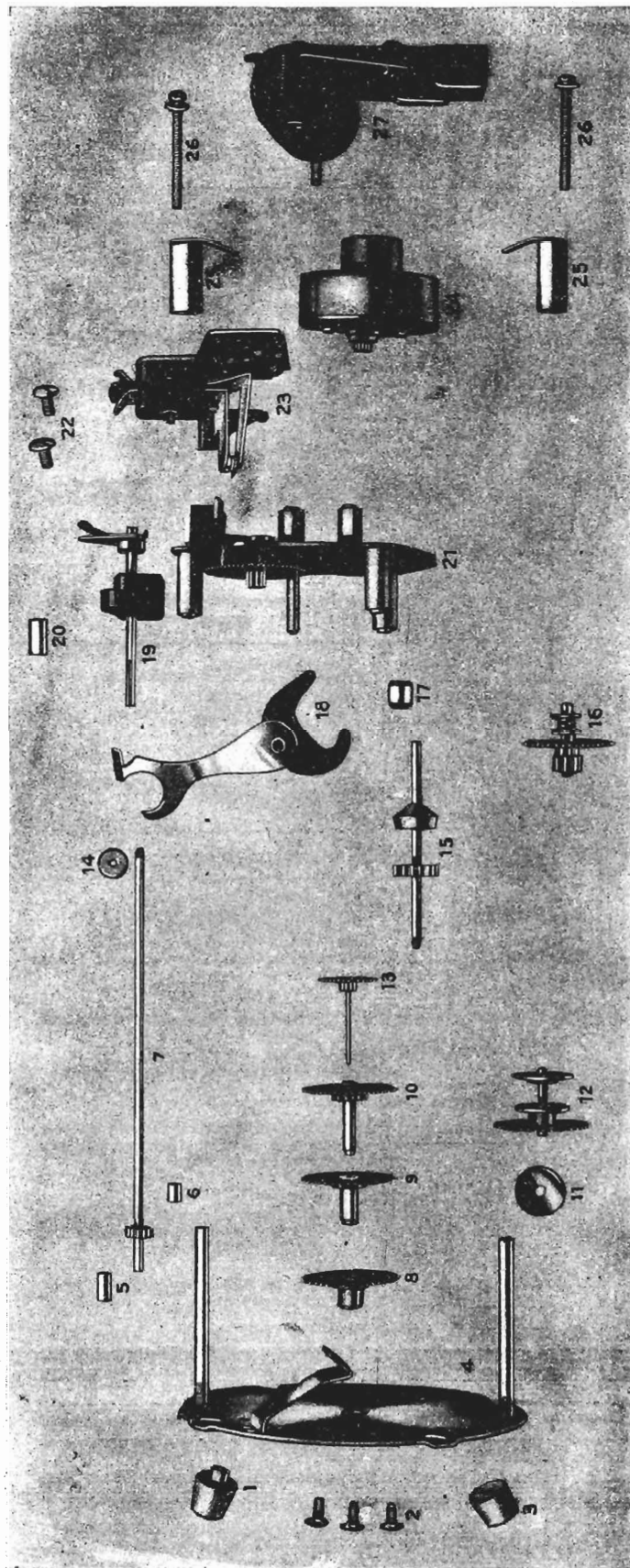
Vistac has been applied to such parts as are specified in notes under exploded view of movement. When the parts specified are replaced, a very small amount of Vistac should be applied.

## 5. GENERAL

- Alarm set knob to be sufficiently tight on shaft to permit setting of "Alarm" disc in clockwise or counter-clockwise direction, but shall loosen when cam is turned against vibrator.
- Switch knob shall turn freely.
- Alarm disc shall not rub against the dial in any position. Prongs must be fully seated in alarm set groove.

## 6. CAUTION

- This radio alarm clock will operate satisfactorily only on a circuit supplied with regulated alternating current of the voltage and frequency stamped on name plate.
- If clock loses time, or hour and minute hands fail to rotate, check clearance of time setting shaft from case back or any obstruction behind the Musalarm. This shaft must be allowed to rotate while clock is in operation.
- It is common practice for people to disconnect their radios during a thunder storm, or to use the outlet for a vacuum cleaner, or when moving furniture in housecleaning. The clock will, of course, stop when disconnected and start immediately when plugged in again. However, it will be necessary to reset the clock to the proper time if disconnected for any reason.



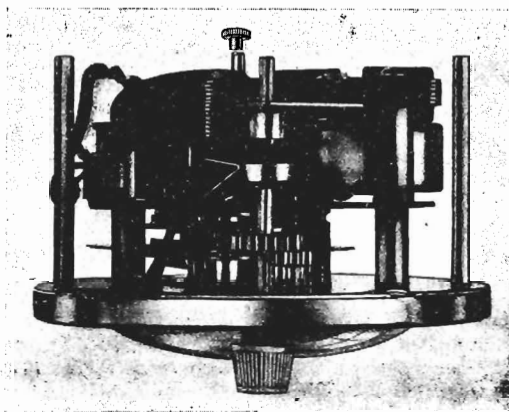
## EXPLODED VIEW OF H21 MOVEMENT

1. Switch Knob (C40X75)
2. Front Plate Screws (C64X1)
3. Alarm Set Knob (C4X6)
4. Front Plate Assem. (C34X111)
5. Time Set Shaft Spacer (C40X262)
6. Time Set Shaft Spacer (C40X261)
7. Time Set Shaft Assem. (C10X115)
8. Alarm Hand Sleeve Assem. (C15X3)
9. Hour Hand Sleeve Assem. (C13X11)
10. Minute Hand Sleeve Assem. (C14X15)
11. Cam Friction Washer (C40X252)
12. Cam Shaft Assem. (C17X8)
13. Sweep Second Shaft Assem. (C16X14)
14. Time Set Knob (C3X49)
15. Alarm Set Shaft Assem. (C11X8)
16. Intermediate Gear Shaft Assem. (C40X77)
17. Alarm Set Shaft Spacer (C40X263)
18. Switch Lever Assem. (C40X78)

19. Switch Shaft Assem. (C40X73)
20. Switch Shaft Spacer (C40X260)
21. Base Plate Assem. (C35X39)
22. Front Plate Screws (C64X1)
23. Switch Assem. (C40X76)
24. Rotor Unit M1630 (C44X38)
25. Spreader Posts (C40X202)
26. Motor Mtg. Screws (C1X1)
27. Field and Coil Assem. (C45X69)

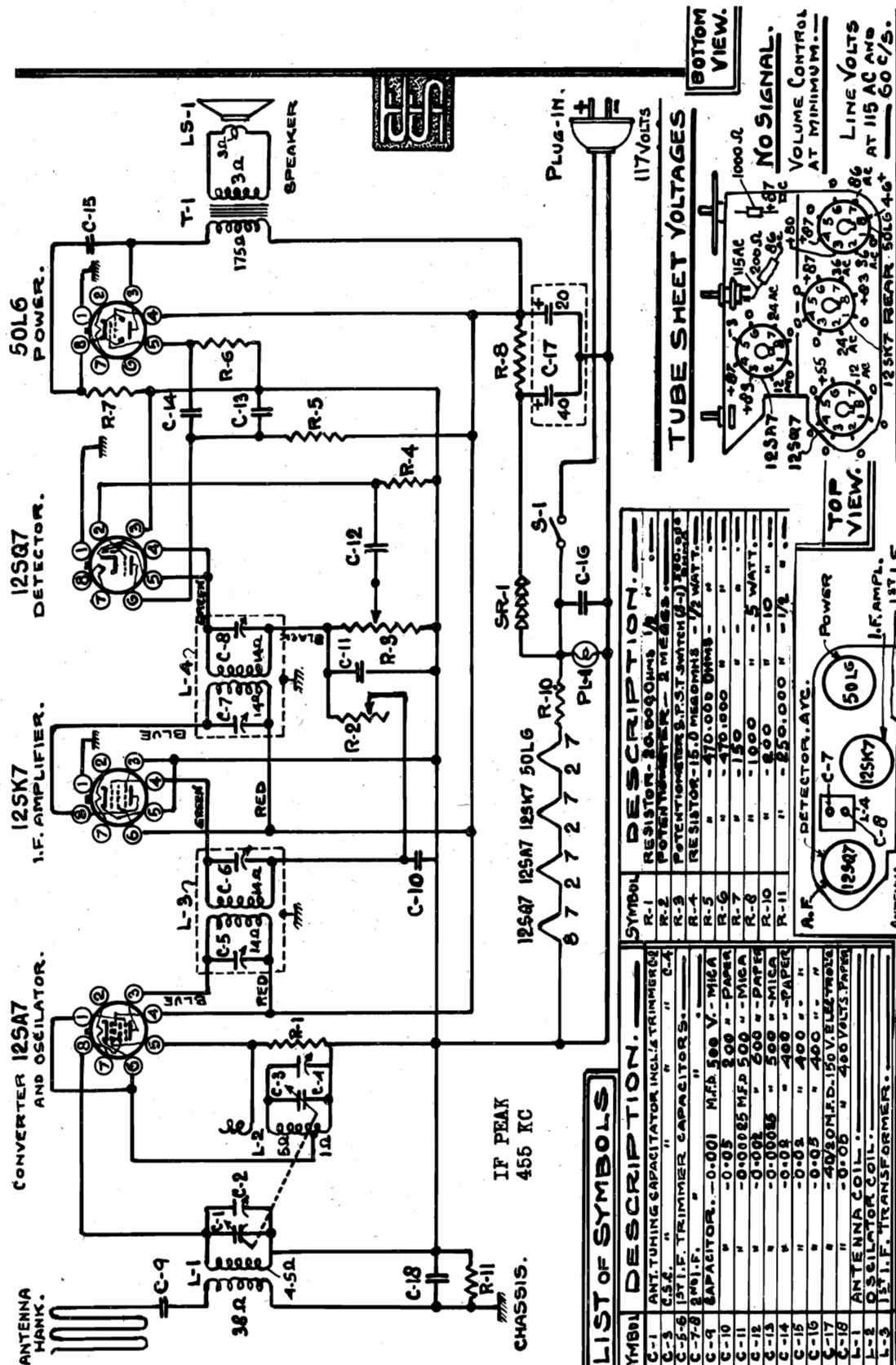
"Vistac" has been applied to the following parts of the clock movement:

1. Time set shaft before assembling, and time set shaft spacers where they touch front plate and base plate.
  2. Base plate stud where the switch lever touches it.
  3. Both ends of the shaft for the intermediate gear and shaft assembly.
  4. Switch lever assembly where it touches the front plate.
- If it is necessary to replace any of the above parts, a very small amount of "Vistac" should be applied.



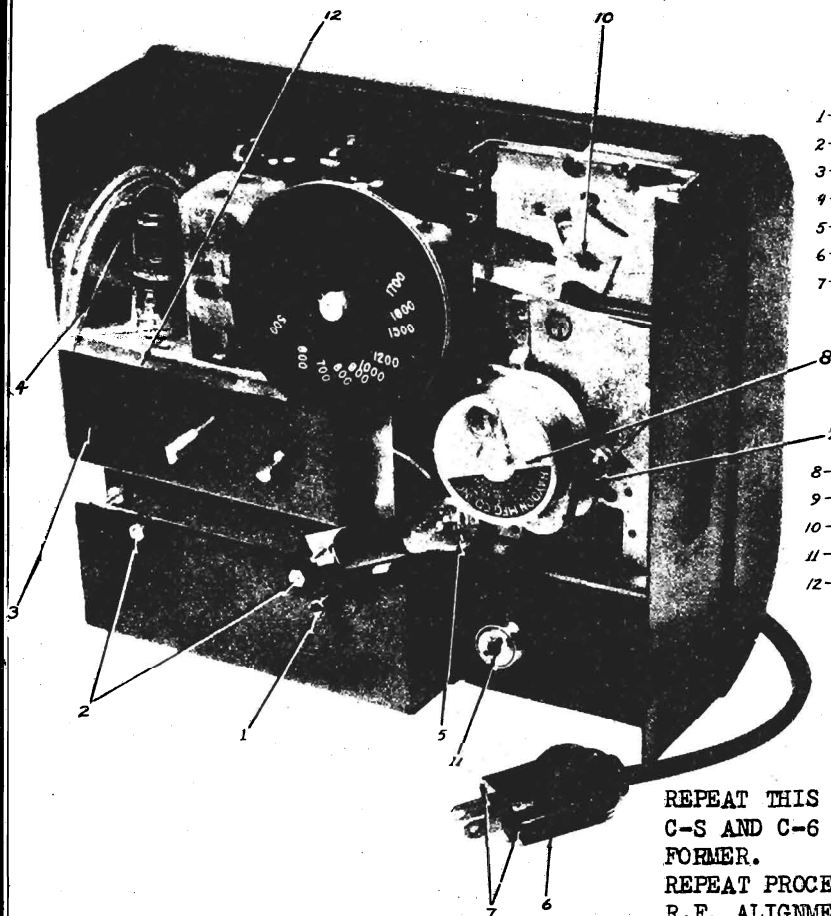
H21 Movement Assembly

TELECOIN CORP.



MODEL M5TS4

TELECOIN CORP.



- 1-NUT FOR CABINET STUD-TYPE LOCK.
- 2-HEX NUTS SECURING CHASSIS TO CABINET BACK.
- 3-CONTROL KNOB PANEL.
- 4-ANTENNA WIRE.
- 5-110 VOLT 6 WATT DIAL LAMP.
- 6-FUSE PLUG AND CORD.
- 7-2-110VOLT FUSES 2 OR 3 AMPS. EJECT BY PUSHING OUT WITH PENCIL OR SCREWDRIVER FROM REAR.
- 8-110 VOLT 60 CYCLE TIMER MOTOR.
- 9-TIMER ON-OFF SWITCH.
- 10-SLUG REJECTOR ASSEMBLY.
- 11-COIN BOX LOCK.
- 12-ADJUSTABLE MAXIMUM VOLUME CONTROL UNDER PANEL. (R-2 ON SCHEMATIC)

#### ELECTRICAL SPECIFICATIONS

POWER SUPPLY. 105-125 V.-50/60 CYCL. AC  
 POWER CONSUMPTION - 30 WATTS  
 FREQUENCY RANGE 500-1700 KCS.  
 INTERMEDIATE FREQUENCY 455 KCS.  
 AUDIO OUTPUT 1.5 WATTS  
 TIMER.--60 CYCLES. 110 VOLTS - AC.

#### LOUD SPEAKER

PERMANENT MAGNET...4" DIAMETER.

#### ALIGNMENT PROCEDURE

##### ALIGNMENT FREQUENCIES:

I.F. 455 KCS. R.F. 1700 KCS.  
 I.F. ALIGNMENT:  
 CONNECT OUTPUT METER ACROSS THE VOICE COIL.--TURN THE RECEIVER VOLUME CONTROL TO MAXIMUM.  
 CONNECT HIGH SIDE OF ALIGNMENT OSCILLATOR, THROUGH A.05 MFD CAPACITOR, TO THE CONVERTER GRID.  
 SET ALIGNMENT OSCILLATOR AT 455 KCS AND ADJUST OUTPUT TO GIVE THE LOWEST CONVENIENTLY READABLE INDICATION ON THE OUTPUT METER .  
 ADJUST TRIMMERS C-7 AND C-8 IN 2ND I.F. TRANSFORMER TO GIVE MAXIMUM INDICATION ON OUTPUT METER.--

REPEAT THIS PROCEDURE FOR TRIMMERS C-5 AND C-6 IN THE 1ST I.F. TRANSFORMER.

REPEAT PROCEDURE TO CHECK ACCURACY.--

##### R.F. ALIGNMENT :

RETAIN OUTPUT METER CONNECTED AS ABOVE AND RECEIVER VOLUME CONTROL SET AT MAXIMUM.--

CONNECT ALIGNMENT OSCILLATOR TO ANTENNA.--

SET ALIGNMENT OSCILLATOR AT 1700 KCS. AND PLACE IN OPERATION.

ROTATE RECEIVER TUNING CAPACITOR (C-1 AND C-3 TO GIVE MAXIMUM SIGNAL INDICATION ON OUTPUT METER.

ADJUST OUTPUT OF ALIGNMENT OSCILLATOR TO GIVE THE LOWEST CONVENIENTLY READABLE INDICATION ON THE OUTPUT METER.

ADJUST OSCILLATOR TRIMMER C-4 TO PEAK THE SIGNAL INDICATION ON OUTPUT METER.-- THEN ADJUST ANTENNA TRIMMER C-2 TO FURTHER PEAK THE SIGNAL.--

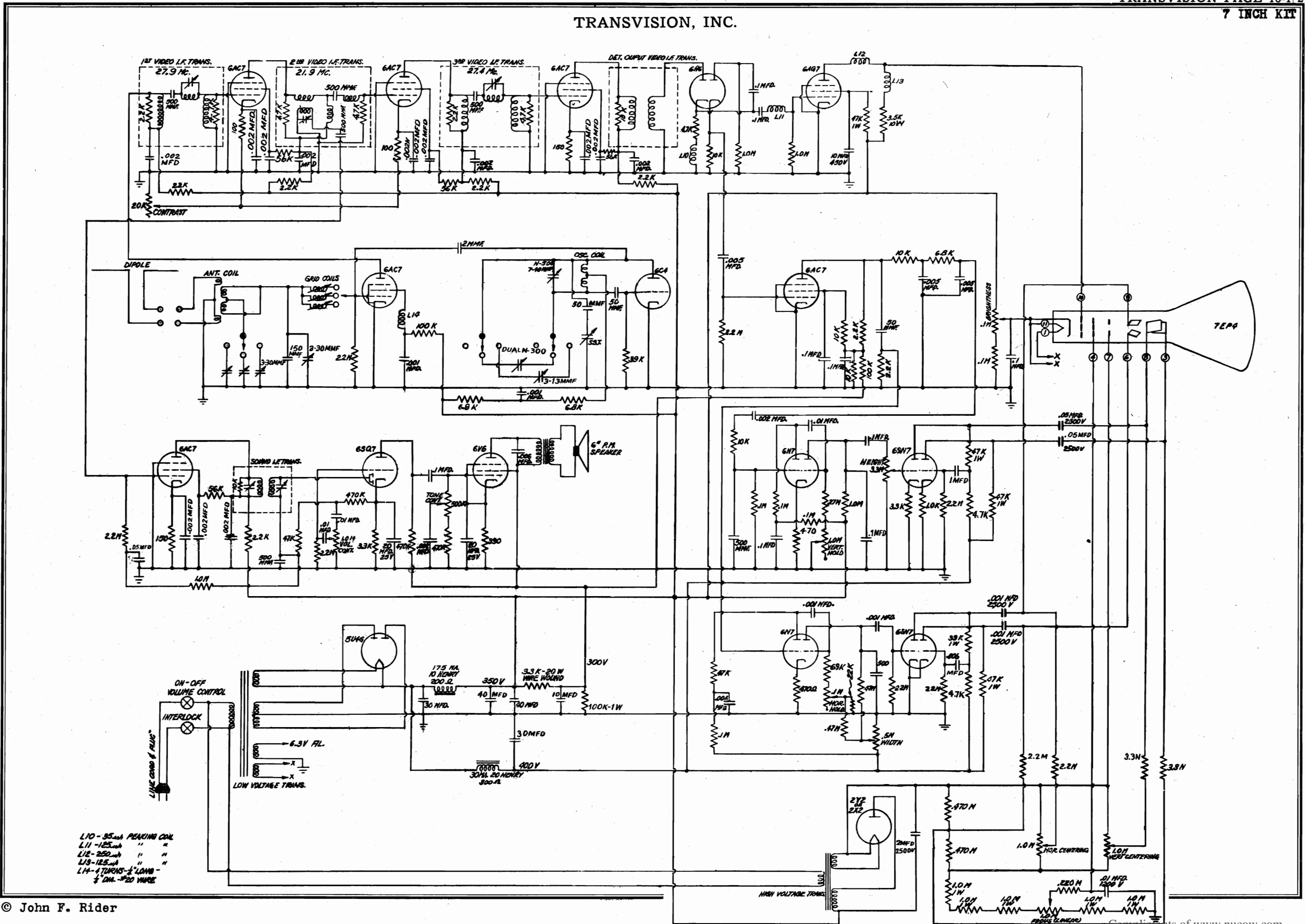
REPEAT PROCEDURE TO CHECK ACCURACY-- TRIMMER LOCATIONS ARE SHOWN IN

#### NOTES

AN ELECTRONIC VOLTMETER MAY BE CONNECTED TO THE AVC BUS AND USED FOR ALIGNMENT INDICATION IN LIEU OF THE OUTPUT METER ACROSS THE VOICE COIL.

AN ELECTRONIC VOLTMETER OR A VOLTMETER WITH A MINIMUM RESISTANCE OF 20,000 OHMS PER VOLT SHOULD BE USED FOR VOLTAGE MEASUREMENTS.

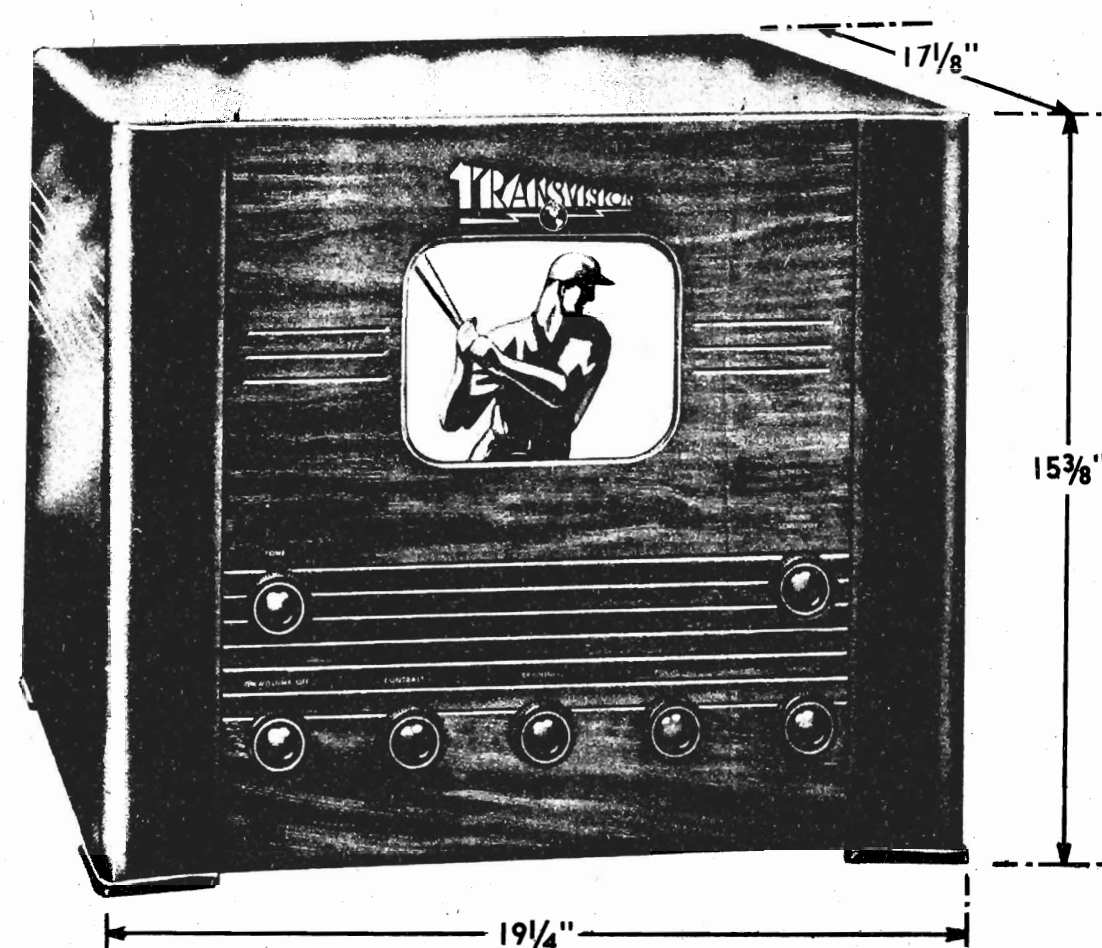
TRANSVISION, INC.





TRANSVISION, INC.

7 INCH KIT



The tube lineup in the RF section is a 6AC7 mixer and a 6C4 local oscillator. This stage has been carefully designed for flat response to the entire 6.5 megacycles of all channels and, despite compactness is also capable of surprising gain.

In the video IF section there are three stages, each using a 6AC7. The Audio Intelligence is picked off of the second IF transformer by a trap tuned to 21.9 megacycles and fed into a sound IF stage that uses another 6AC7. A 6SQ7 demodulator-amplifier and a 6V6 power amplifier comprise the audio section, while the video detection and amplification are achieved by a 6HG and 6AG7 respectively.

The sync separator is still another 6AC7 and it fires 6N7 multivibrators in both the vertical and horizontal sweep circuits. The 6SN7's that follow are push-pull amplifiers. Low voltage rectification employs a 5A4G while a 2X2 (or 2Y2) rectifies the high voltages. The picture tube is the type 7EP4.

Perhaps the most striking feature of the IF section is the system of fixed, double-tuned trap coupling. This method not only obviates the need for a signal generator, but, in spite of the high IF frequency, it simultaneously affords satisfactory gain over a 3.5 megacycle bandpass that is obtained by heavy damping. The only tuning imposed upon the constructor at all involves trimmers in the trap circuits. In the second IF can, for example, the 21.9 megacycle trap is simply adjusted for maximum output (audio), while the two remaining trimmers are set for greatest brightness.

7 INCH KIT

TRANSVISION, INC.

The selection of a relatively high intermediate frequency was dictated by image considerations. This choice fixes the various image frequencies in channels that for the present are inactive, thereby evading this problem despite the inherently poor image rejection power of television receivers in general. Measurements have indicated that at these high image frequencies conventional tubes like the 6AC7 became inoperative and in this curious manner introduce acceptable rejection properties.

A noteworthy wiring precaution that preserves IF gain at its highest possible level concerns the use of a single ground for each IF stage. This common ground is a lug securely fastened to the appropriate socket under the #1 pin. In this manner, spurious voltages that frequently reduce gain are effectively eliminated. Excellent response in the video circuit is derived through the use of low resistance in the detector circuits and through a carefully designed series-shunt peaking arrangement in both the input and output of the section.

In the audio section, demodulation is accomplished by means of slope detection, while ample volume is provided by the two stages of amplification that follow. A tone control is also included. The salient feature of the sync separator is the exceedingly low voltages employed, a provision that affords maximum limiting.

Because of the latitude present in sweep design, it is always of interest to discuss what considerations have guided final circuit decisions. The primary one, of course, pertains to the selection of impulse generator. Greater flexibility is naturally permitted in the vertical section because of its lower frequency and, consequently, the advantages of a multivibrator can be utilized here without further ado.

The problem of stability, however, must be considered more cautiously in horizontal design. Initial plans, therefore, tentatively called for another multivibrator in the horizontal section. Surprisingly enough, the instability that actually materialized appeared to be closely connected with the interference problem, such as ignition disturbances, for example. Investigation soon focused attention upon the long time constant of the capacity grid leak arrangement originally coupling the differentiating network to the 6N7 multivibrator. At any rate, a direct connection from differentiator to grid, together with a further lowering of the differentiator time constant, succeeded in reducing the problem to such negligible proportions that the multivibrator proved completely acceptable.

A common expedient used in the rectifier circuits to provide the kinescope with an extra 350 volts deserves a word of comment. Generally, the low side of the high voltage rectifier is returned directly to ground. But since this procedure has the disadvantage of losing the potential available in the low voltage section, it appeared sensible to connect the two rectifier circuits in series. As a precaution against noise pickup, the low side of the high voltage supply was tied to a 350 volt terminal point safely distant from the RF unit. No ill effects developed and, because of the additional voltage, the kinescope performance was materially improved.

A final consideration that demands special attention in the kit field concerns adequate protection against the high voltages present. For the under surface of the chassis, an interlock switch and a bottom plate are provided, while for the top surface a ceramic cap insulates the connection to the anode of the 2X2. The last protective measure is the use of bakelite shafts, attached, of course, to all controls possessing high voltage connections.

Despite the simplicity of design employed to make the TRANSVISION TELEVISION KIT the ideal set for the inexperienced assembler to construct, no modern television technique was omitted. As a result, we have a television kit easy to construct into a set which, when complete, provides the user with a quality television receiver.



# ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

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

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

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

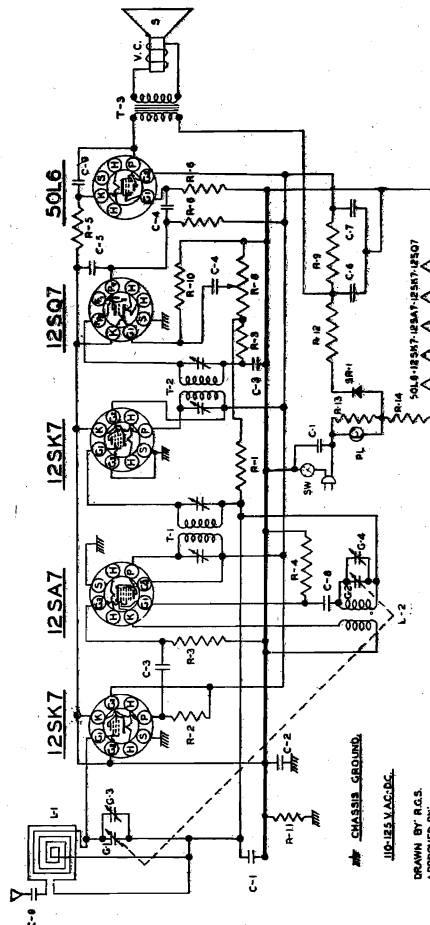
**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

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

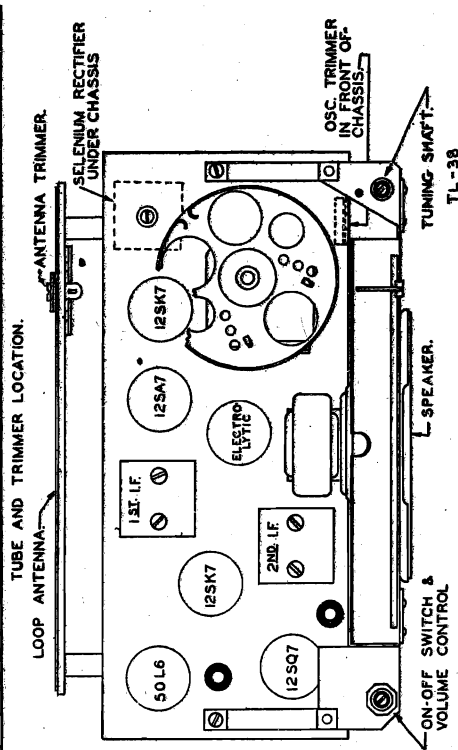
**CAUTION:** Always predetermine voltage of power source. Never try to plug this receiver into a 220 volt line, as this will cause serious damage.

**INSTALLATION:** Unwind the power cord and plug into a convenient outlet. This receiver is equipped with a sensitive loop antenna and under ordinary conditions no external antenna would be required.

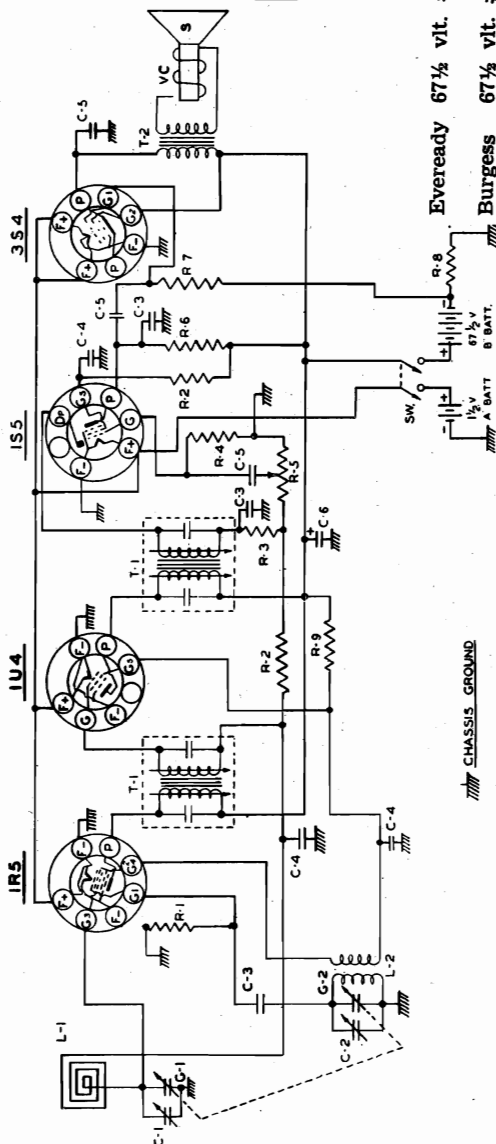
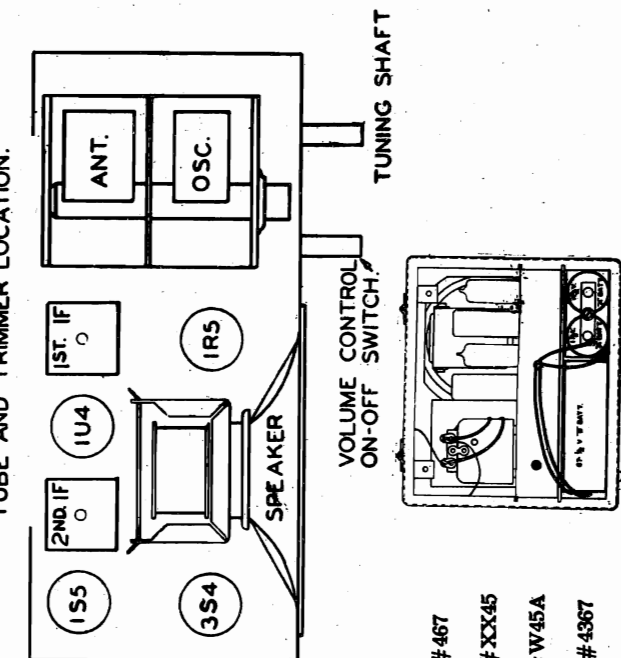
Due to the directional qualities of the loop antenna the reception of some stations may be improved by placing the receiver in different positions.



PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
IR-23	15MΩ RESISTOR 1/2 W 20	MC-5	1000MFD 50V ELECTROLYTIC	GC-2	100MΩ GANG CONDENSER
IR-24	15MΩ RESISTOR 1/2 W 20	MC-6	1000MFD 50V ELECTROLYTIC	TC-7	ANT. TRIMMER CONDENSER
IR-25	15MΩ RESISTOR 1/2 W 20	MC-7	1000MFD 50V ELECTROLYTIC	TC-8	OSC. TRIMMER CONDENSER
IR-26	15MΩ RESISTOR 1/2 W 20	MC-8	1000MFD 50V ELECTROLYTIC	SW-1	SWITCH ON VOLUME CONTROL
IR-27	15MΩ RESISTOR 1/2 W 20	MC-9	1000MFD 50V ELECTROLYTIC	TU-25	50L6
IR-28	15MΩ RESISTOR 1/2 W 20	MC-10	1000MFD 50V ELECTROLYTIC	VR-4	30C/3W 5%
IR-29	15MΩ RESISTOR 1/2 W 20	MC-11	1000MFD 50V ELECTROLYTIC	SP-1	SELENIUM RECTIFIER
IR-30	15MΩ RESISTOR 1/2 W 20	MC-12	1000MFD 50V ELECTROLYTIC		
IR-31	15MΩ RESISTOR 1/2 W 20	MC-13	1000MFD 50V ELECTROLYTIC		
IR-32	15MΩ RESISTOR 1/2 W 20	MC-14	1000MFD 50V ELECTROLYTIC		
IR-33	15MΩ RESISTOR 1/2 W 20	MC-15	1000MFD 50V ELECTROLYTIC		
IR-34	15MΩ RESISTOR 1/2 W 20	MC-16	1000MFD 50V ELECTROLYTIC		
IR-35	15MΩ RESISTOR 1/2 W 20	MC-17	1000MFD 50V ELECTROLYTIC		
IR-36	15MΩ RESISTOR 1/2 W 20	MC-18	1000MFD 50V ELECTROLYTIC		
IR-37	15MΩ RESISTOR 1/2 W 20	MC-19	1000MFD 50V ELECTROLYTIC		
IR-38	15MΩ RESISTOR 1/2 W 20	MC-20	1000MFD 50V ELECTROLYTIC		
IR-39	15MΩ RESISTOR 1/2 W 20	MC-21	1000MFD 50V ELECTROLYTIC		
IR-40	15MΩ RESISTOR 1/2 W 20	MC-22	1000MFD 50V ELECTROLYTIC		
IR-41	15MΩ RESISTOR 1/2 W 20	MC-23	1000MFD 50V ELECTROLYTIC		
IR-42	15MΩ RESISTOR 1/2 W 20	MC-24	1000MFD 50V ELECTROLYTIC		
IR-43	15MΩ RESISTOR 1/2 W 20	MC-25	1000MFD 50V ELECTROLYTIC		
IR-44	15MΩ RESISTOR 1/2 W 20	MC-26	1000MFD 50V ELECTROLYTIC		
IR-45	15MΩ RESISTOR 1/2 W 20	MC-27	1000MFD 50V ELECTROLYTIC		
IR-46	15MΩ RESISTOR 1/2 W 20	MC-28	1000MFD 50V ELECTROLYTIC		
IR-47	15MΩ RESISTOR 1/2 W 20	MC-29	1000MFD 50V ELECTROLYTIC		
IR-48	15MΩ RESISTOR 1/2 W 20	MC-30	1000MFD 50V ELECTROLYTIC		
IR-49	15MΩ RESISTOR 1/2 W 20	MC-31	1000MFD 50V ELECTROLYTIC		
IR-50	15MΩ RESISTOR 1/2 W 20	MC-32	1000MFD 50V ELECTROLYTIC		
IR-51	15MΩ RESISTOR 1/2 W 20	MC-33	1000MFD 50V ELECTROLYTIC		
IR-52	15MΩ RESISTOR 1/2 W 20	MC-34	1000MFD 50V ELECTROLYTIC		
IR-53	15MΩ RESISTOR 1/2 W 20	MC-35	1000MFD 50V ELECTROLYTIC		
IR-54	15MΩ RESISTOR 1/2 W 20	MC-36	1000MFD 50V ELECTROLYTIC		
IR-55	15MΩ RESISTOR 1/2 W 20	MC-37	1000MFD 50V ELECTROLYTIC		
IR-56	15MΩ RESISTOR 1/2 W 20	MC-38	1000MFD 50V ELECTROLYTIC		
IR-57	15MΩ RESISTOR 1/2 W 20	MC-39	1000MFD 50V ELECTROLYTIC		
IR-58	15MΩ RESISTOR 1/2 W 20	MC-40	1000MFD 50V ELECTROLYTIC		
IR-59	15MΩ RESISTOR 1/2 W 20	MC-41	1000MFD 50V ELECTROLYTIC		
IR-60	15MΩ RESISTOR 1/2 W 20	MC-42	1000MFD 50V ELECTROLYTIC		
IR-61	15MΩ RESISTOR 1/2 W 20	MC-43	1000MFD 50V ELECTROLYTIC		
IR-62	15MΩ RESISTOR 1/2 W 20	MC-44	1000MFD 50V ELECTROLYTIC		
IR-63	15MΩ RESISTOR 1/2 W 20	MC-45	1000MFD 50V ELECTROLYTIC		
IR-64	15MΩ RESISTOR 1/2 W 20	MC-46	1000MFD 50V ELECTROLYTIC		
IR-65	15MΩ RESISTOR 1/2 W 20	MC-47	1000MFD 50V ELECTROLYTIC		
IR-66	15MΩ RESISTOR 1/2 W 20	MC-48	1000MFD 50V ELECTROLYTIC		
IR-67	15MΩ RESISTOR 1/2 W 20	MC-49	1000MFD 50V ELECTROLYTIC		
IR-68	15MΩ RESISTOR 1/2 W 20	MC-50	1000MFD 50V ELECTROLYTIC		
IR-69	15MΩ RESISTOR 1/2 W 20	MC-51	1000MFD 50V ELECTROLYTIC		
IR-70	15MΩ RESISTOR 1/2 W 20	MC-52	1000MFD 50V ELECTROLYTIC		
IR-71	15MΩ RESISTOR 1/2 W 20	MC-53	1000MFD 50V ELECTROLYTIC		
IR-72	15MΩ RESISTOR 1/2 W 20	MC-54	1000MFD 50V ELECTROLYTIC		
IR-73	15MΩ RESISTOR 1/2 W 20	MC-55	1000MFD 50V ELECTROLYTIC		
IR-74	15MΩ RESISTOR 1/2 W 20	MC-56	1000MFD 50V ELECTROLYTIC		
IR-75	15MΩ RESISTOR 1/2 W 20	MC-57	1000MFD 50V ELECTROLYTIC		
IR-76	15MΩ RESISTOR 1/2 W 20	MC-58	1000MFD 50V ELECTROLYTIC		
IR-77	15MΩ RESISTOR 1/2 W 20	MC-59	1000MFD 50V ELECTROLYTIC		
IR-78	15MΩ RESISTOR 1/2 W 20	MC-60	1000MFD 50V ELECTROLYTIC		
IR-79	15MΩ RESISTOR 1/2 W 20	MC-61	1000MFD 50V ELECTROLYTIC		
IR-80	15MΩ RESISTOR 1/2 W 20	MC-62	1000MFD 50V ELECTROLYTIC		
IR-81	15MΩ RESISTOR 1/2 W 20	MC-63	1000MFD 50V ELECTROLYTIC		
IR-82	15MΩ RESISTOR 1/2 W 20	MC-64	1000MFD 50V ELECTROLYTIC		
IR-83	15MΩ RESISTOR 1/2 W 20	MC-65	1000MFD 50V ELECTROLYTIC		
IR-84	15MΩ RESISTOR 1/2 W 20	MC-66	1000MFD 50V ELECTROLYTIC		
IR-85	15MΩ RESISTOR 1/2 W 20	MC-67	1000MFD 50V ELECTROLYTIC		
IR-86	15MΩ RESISTOR 1/2 W 20	MC-68	1000MFD 50V ELECTROLYTIC		
IR-87	15MΩ RESISTOR 1/2 W 20	MC-69	1000MFD 50V ELECTROLYTIC		
IR-88	15MΩ RESISTOR 1/2 W 20	MC-70	1000MFD 50V ELECTROLYTIC		
IR-89	15MΩ RESISTOR 1/2 W 20	MC-71	1000MFD 50V ELECTROLYTIC		
IR-90	15MΩ RESISTOR 1/2 W 20	MC-72	1000MFD 50V ELECTROLYTIC		
IR-91	15MΩ RESISTOR 1/2 W 20	MC-73	1000MFD 50V ELECTROLYTIC		
IR-92	15MΩ RESISTOR 1/2 W 20	MC-74	1000MFD 50V ELECTROLYTIC		
IR-93	15MΩ RESISTOR 1/2 W 20	MC-75	1000MFD 50V ELECTROLYTIC		
IR-94	15MΩ RESISTOR 1/2 W 20	MC-76	1000MFD 50V ELECTROLYTIC		
IR-95	15MΩ RESISTOR 1/2 W 20	MC-77	1000MFD 50V ELECTROLYTIC		
IR-96	15MΩ RESISTOR 1/2 W 20	MC-78	1000MFD 50V ELECTROLYTIC		
IR-97	15MΩ RESISTOR 1/2 W 20	MC-79	1000MFD 50V ELECTROLYTIC		
IR-98	15MΩ RESISTOR 1/2 W 20	MC-80	1000MFD 50V ELECTROLYTIC		
IR-99	15MΩ RESISTOR 1/2 W 20	MC-81	1000MFD 50V ELECTROLYTIC		
IR-100	15MΩ RESISTOR 1/2 W 20	MC-82	1000MFD 50V ELECTROLYTIC		



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



## ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

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

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

**SECOND STEP:** With the leads from the generator still connected as in IF alignment, adjust the generator to 1400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

**THIRD STEP:** Remove the generator leads from the gang condenser.

Replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn over the outside of the cabinet. With the receiver and the generator still set at 1400 KC increase the generator output. Adjust the Antenna trimmer through the back of the chassis until a maximum signal is noted on the output meter.

No further adjustment should be necessary as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

**NOTE:** When the antenna trimmer is adjusted at 1400 KC., the chassis as well as the "A" and "B" batteries must be in normal position in the cabinet to reflect the proper loop impedance.

## BATTERY SERVICING

**To replace the batteries in this receiver loosen and remove the screw in the back of the cabinet. Remove the back.**

To the right looking at the rear of the cabinet is the "A" or flashlight battery assembly. Remove the battery assembly from the cabinet. Loosen the screw in the cross arm assembly until the batteries may be removed. Replace with fresh batteries and retighten the screw making sure that the battery center caps fit into the small recesses in the ends of the cross arm.

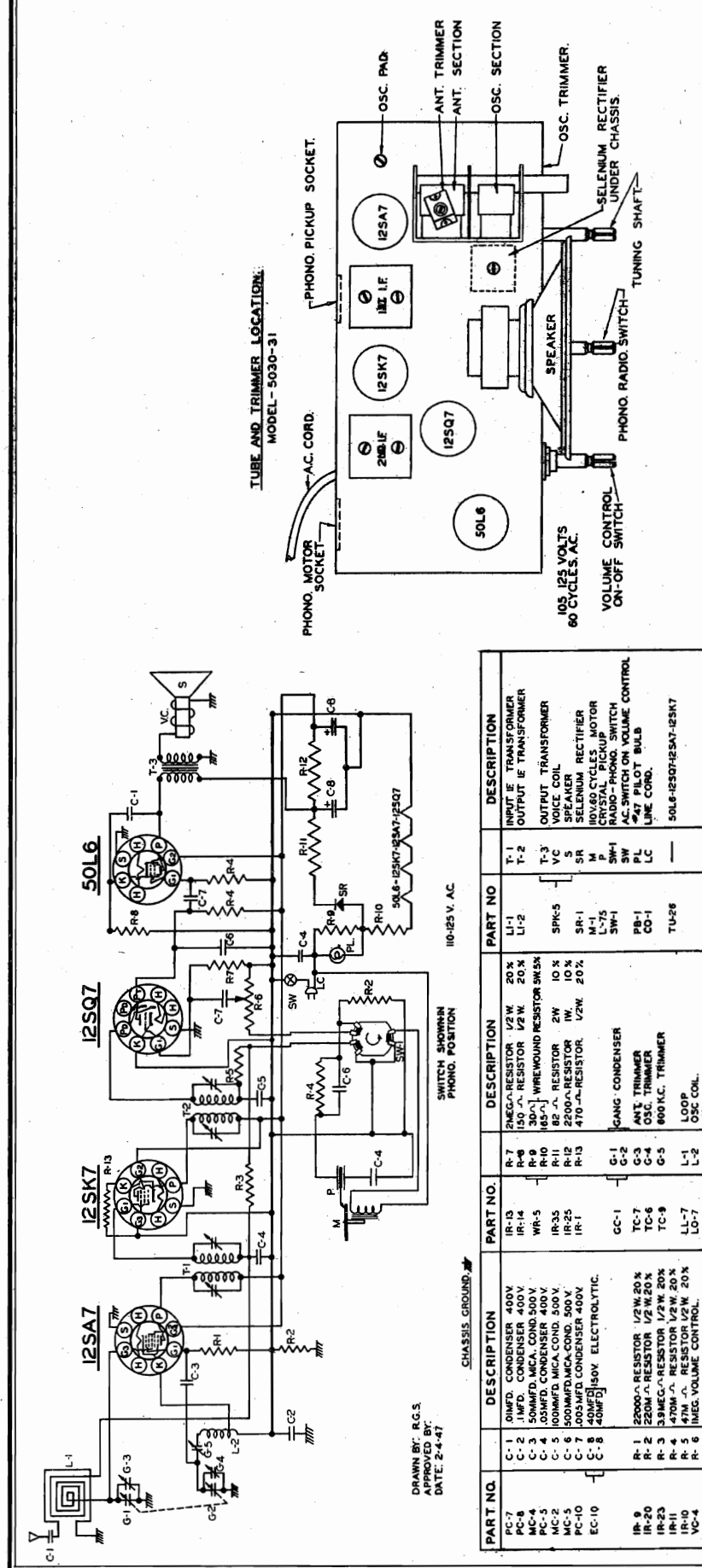
To replace the "B" battery, remove it from the cabinet. Disconnect the fasteners from the battery. Replace with a fresh battery and reconnect the fasteners. When replacing the "B" battery in the cabinet, make sure that the terminal end of the battery faces the end of the cabinet.

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

**CAUTION:** If the batteries in the receiver wear out from use and the receiver refuses to operate make sure that the volume control is turned all the way to the left in "OFF" position, until the batteries can be replaced. If the switch is left in the "ON" position this will cause the battery cells to burst and they will leak into the receiver which may ruin the component parts.

PART NO	DESCRIPTION	PART NO	DESCRIPTION
IR-20	20M $\Omega$ RESISTOR 1/2W	G-1	GANG CONDENSER
IR-21	20M $\Omega$ RESISTOR 1/2W	G-2	
IR-22	20M $\Omega$ RESISTOR 1/2W	G-3	
IR-23	20M $\Omega$ RESISTOR 1/2W	G-4	
IR-24	20M $\Omega$ RESISTOR 1/2W	LL-8	LOOP ANTENNA
IR-3	10M $\Omega$ RESISTOR 1/2W	LL-9	OSC COIL
IR-4	10M $\Omega$ RESISTOR 1/2W	LL-10	OSC COIL
IR-5	10M $\Omega$ RESISTOR 1/2W	L-1	IF TRANSFORMER
IR-13	2.2M $\Omega$ RESISTOR 1/2W	L-2	IF TRANSFORMER
IR-14	2.2M $\Omega$ RESISTOR 1/2W	SW	DPST SWITCH ON VOLUME CONTROL
IR-15	2.2M $\Omega$ RESISTOR 1/2W		
IR-16	2.2M $\Omega$ RESISTOR 1/2W	T-2	SPEAKER TRANSFORMER
IR-17	2.2M $\Omega$ RESISTOR 1/2W	VC	OSC COIL
IR-18	2.2M $\Omega$ RESISTOR 1/2W	SPK-8	8" SPEAKER
IR-19	2.2M $\Omega$ RESISTOR 1/2W		
IR-25	20M $\Omega$ RESISTOR 1/2W		
IR-26	20M $\Omega$ RESISTOR 1/2W		
IR-27	20M $\Omega$ RESISTOR 1/2W		
IR-28	20M $\Omega$ RESISTOR 1/2W		
IR-29	20M $\Omega$ RESISTOR 1/2W		
IR-30	20M $\Omega$ RESISTOR 1/2W		
IR-31	20M $\Omega$ RESISTOR 1/2W		
IR-32	20M $\Omega$ RESISTOR 1/2W		
IR-33	20M $\Omega$ RESISTOR 1/2W		
IR-34	20M $\Omega$ RESISTOR 1/2W		
IR-35	20M $\Omega$ RESISTOR 1/2W		
IR-36	20M $\Omega$ RESISTOR 1/2W		
IR-37	20M $\Omega$ RESISTOR 1/2W		
IR-38	20M $\Omega$ RESISTOR 1/2W		
IR-39	20M $\Omega$ RESISTOR 1/2W		
IR-40	20M $\Omega$ RESISTOR 1/2W		
IR-41	20M $\Omega$ RESISTOR 1/2W		
IR-42	20M $\Omega$ RESISTOR 1/2W		
IR-43	20M $\Omega$ RESISTOR 1/2W		
IR-44	20M $\Omega$ RESISTOR 1/2W		
IR-45	20M $\Omega$ RESISTOR 1/2W		
IR-46	20M $\Omega$ RESISTOR 1/2W		
IR-47	20M $\Omega$ RESISTOR 1/2W		
IR-48	20M $\Omega$ RESISTOR 1/2W		
IR-49	20M $\Omega$ RESISTOR 1/2W		
IR-50	20M $\Omega$ RESISTOR 1/2W		
IR-51	20M $\Omega$ RESISTOR 1/2W		
IR-52	20M $\Omega$ RESISTOR 1/2W		
IR-53	20M $\Omega$ RESISTOR 1/2W		
IR-54	20M $\Omega$ RESISTOR 1/2W		
IR-55	20M $\Omega$ RESISTOR 1/2W		
IR-56	20M $\Omega$ RESISTOR 1/2W		
IR-57	20M $\Omega$ RESISTOR 1/2W		
IR-58	20M $\Omega$ RESISTOR 1/2W		
IR-59	20M $\Omega$ RESISTOR 1/2W		
IR-60	20M $\Omega$ RESISTOR 1/2W		
IR-61	20M $\Omega$ RESISTOR 1/2W		
IR-62	20M $\Omega$ RESISTOR 1/2W		
IR-63	20M $\Omega$ RESISTOR 1/2W		
IR-64	20M $\Omega$ RESISTOR 1/2W		
IR-65	20M $\Omega$ RESISTOR 1/2W		
IR-66	20M $\Omega$ RESISTOR 1/2W		
IR-67	20M $\Omega$ RESISTOR 1/2W		
IR-68	20M $\Omega$ RESISTOR 1/2W		
IR-69	20M $\Omega$ RESISTOR 1/2W		
IR-70	20M $\Omega$ RESISTOR 1/2W		
IR-71	20M $\Omega$ RESISTOR 1/2W		
IR-72	20M $\Omega$ RESISTOR 1/2W		
IR-73	20M $\Omega$ RESISTOR 1/2W		
IR-74	20M $\Omega$ RESISTOR 1/2W		
IR-75	20M $\Omega$ RESISTOR 1/2W		
IR-76	20M $\Omega$ RESISTOR 1/2W		
IR-77	20M $\Omega$ RESISTOR 1/2W		
IR-78	20M $\Omega$ RESISTOR 1/2W		
IR-79	20M $\Omega$ RESISTOR 1/2W		
IR-80	20M $\Omega$ RESISTOR 1/2W		
IR-81	20M $\Omega$ RESISTOR 1/2W		
IR-82	20M $\Omega$ RESISTOR 1/2W		
IR-83	20M $\Omega$ RESISTOR 1/2W		
IR-84	20M $\Omega$ RESISTOR 1/2W		
IR-85	20M $\Omega$ RESISTOR 1/2W		
IR-86	20M $\Omega$ RESISTOR 1/2W		
IR-87	20M $\Omega$ RESISTOR 1/2W		
IR-88	20M $\Omega$ RESISTOR 1/2W		
IR-89	20M $\Omega$ RESISTOR 1/2W		
IR-90	20M $\Omega$ RESISTOR 1/2W		
IR-91	20M $\Omega$ RESISTOR 1/2W		
IR-92	20M $\Omega$ RESISTOR 1/2W		
IR-93	20M $\Omega$ RESISTOR 1/2W		
IR-94	20M $\Omega$ RESISTOR 1/2W		
IR-95	20M $\Omega$ RESISTOR 1/2W		

## TRAVLER RADIO &amp; TELEVISION



## ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

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

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

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

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

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

**POWER SOURCES:** This combination will operate on an alternating (AC) current only, of 110 to 125 volts at 60 cycles.

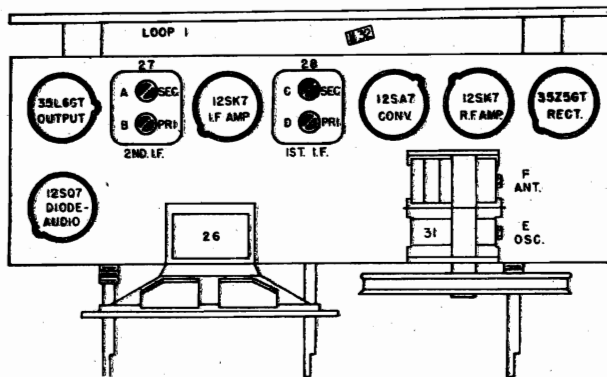
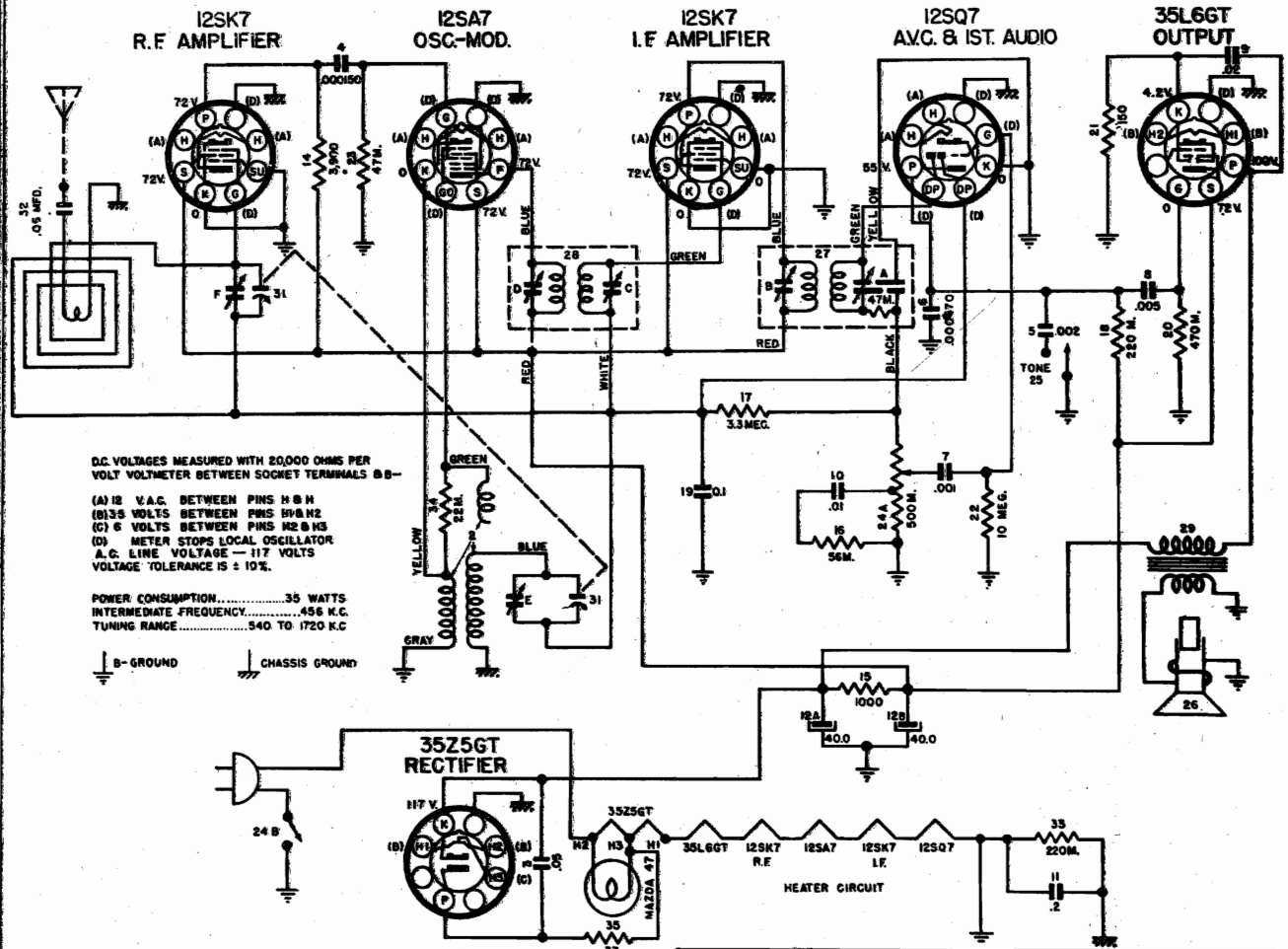
**CAUTION:** Always predetermine voltage of power source. Never try to plug this combination into a 220 volt line, as this will cause serious damage.

Never try to operate this combination on 50 cycle current, as this will cause the motor to rotate at an incorrect speed. The normal speed is 78 R.P.M., (revolutions per minute) and to insure proper reproduction of recordings 60 cycle current must be used.

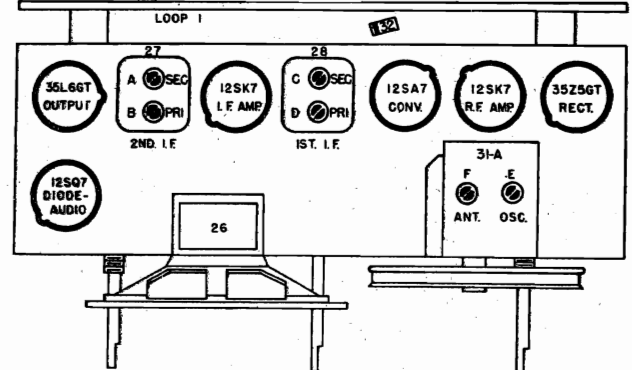
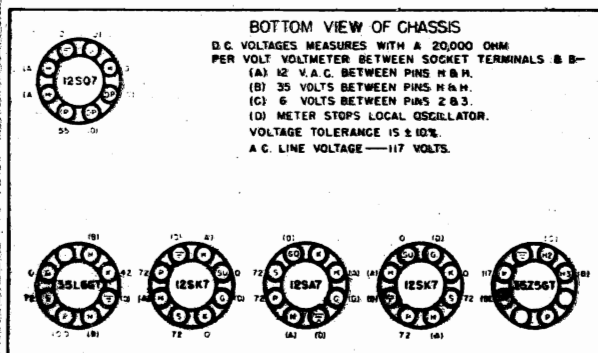
Never plug this combination into a direct current (DC) source as this will seriously damage the motor which has been designed for AC operation only.



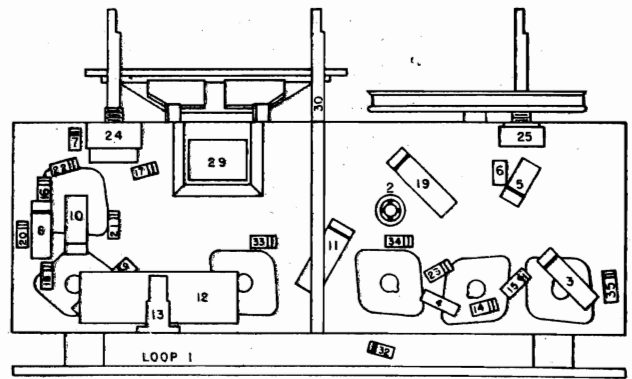
# UNITED MOTORS SERVICE CORP. MODELS R-1227, R-1228, (DIV. OF GEN. MOTORS) R-1229



PARTS LAYOUT — TUBE VIEW  
TRIMMERS ON SIDE OF TUNING CONDENSER

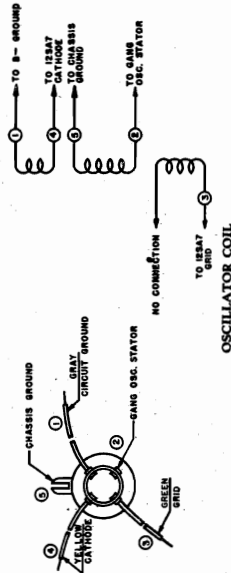
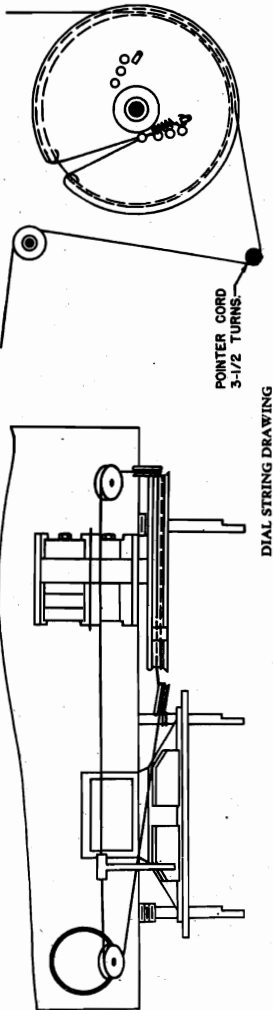


PARTS LAYOUT — CHASSIS VIEW  
TRIMMERS ON TOP OF TUNING CONDENSER



# MODELS R-1227, R-1228, UNITED MOTORS SERVICE CORP. R-1229 (DIV. OF GEN. MOTORS)

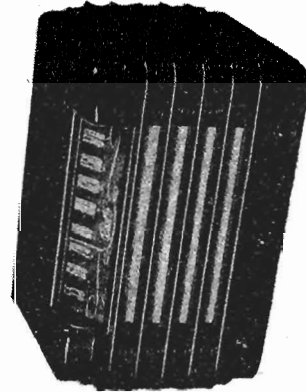
Some receivers are made using a gang condenser having the trimmers on the side of the condenser and some with the trimmers on the top of the condenser. Two Parts Layout drawings are used to illustrate this difference.



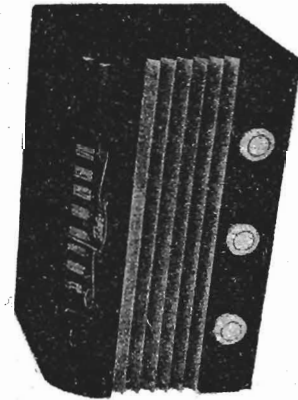
## ALIGNMENT PROCEDURE

Output Meter Connections ..... Across Voice Coil Winding  
Generator Ground ..... To Chassis through .01 MFD  
Dummy Antenna ..... In Series with generator  
Volume Control Position ..... Fully on

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator To	Adjust Signal Generator To	Turn Radio Dial To	Adjust Trimmers
1	.02 Mfd.	12SA7 Grid (Pin #8)	456 KC	Quiet Point near H. F. end	A-B (2nd IF Trans) C-D (1st IF Trans)
2	.000200 Mfd.	Ant. lead	1720 KC	1720 KC	E (Osc.)
3	.000200 Mfd.	Ant. lead	1400 KC	1400 KC	F (Ant.)



Models R-1227 and R-1228



Model R-1229

Illustration No.	Service Part No.	Description
1	1217138	Antenna Assy. — Loop and Buck Cover — Models R-1227 and R-1228, (Includes Condenser #31)
2	1216937	Antenna Assy. — Loop and Buck Cover — Model R-1229 (Includes Condenser #32)
3	1216915	Oscillator Coil Complete
4	1217135	Heater Cord
5	1216905	Heater Cord

Illustration No.	Service Part No.	Description
6	E101	55 Mfd. 600 V. Tubular
7	E102	500,000 Ohm 1/2 W. Insulated
8	G701	.002 Mfd. 600 V. Tubular
9	E103	.000470 Mfd. 600 V. Tubular
10	E104	.001 Mfd. 600 V. Tubular
11	E105	.001 Mfd. 600 V. Tubular
12	J508	2 Section Electrolytic

Illustration No.	Service Part No.	Description
13	E104	40 Mfd. 150 V.
14	E105	10 Mfd. 600 V. Tubular
15	1217144	Condenser and Pulley Parts Pkg. (Alternates for 1217141)

Illustration No.	Service Part No.	Description
16	1217415	Resistor (1)
17	E505	Condenser and Pulley Parts Pkg. (Alternates for 1217414)
18	A392	3,000 Ohm 1/2 W. Insulated
19	B102	15,000 Ohm 1/2 W. Insulated
20	A335	3.3 Megohm 1/2 W. Insulated
21	A224	220,000 Ohm 1/2 W. Insulated
22	A474	470,000 Ohm 1/2 W. Insulated
23	A106	10 Megohm 1/2 W. Insulated
24	A473	47,000 Ohm 1/2 W. Insulated
25	A224	220,000 Ohm 1/2 W. Insulated
26	A223	22,000 Ohm 1/2 W. Insulated
27	A330	33 Ohm 1/2 W. Insulated

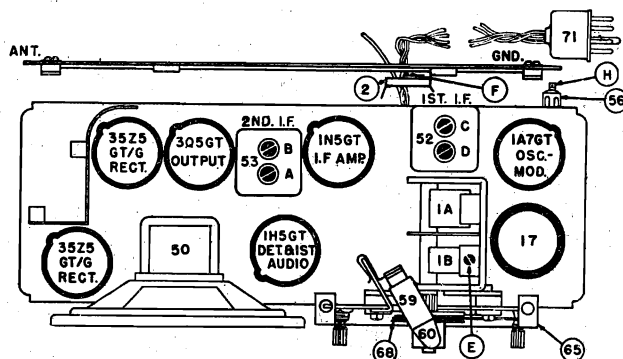
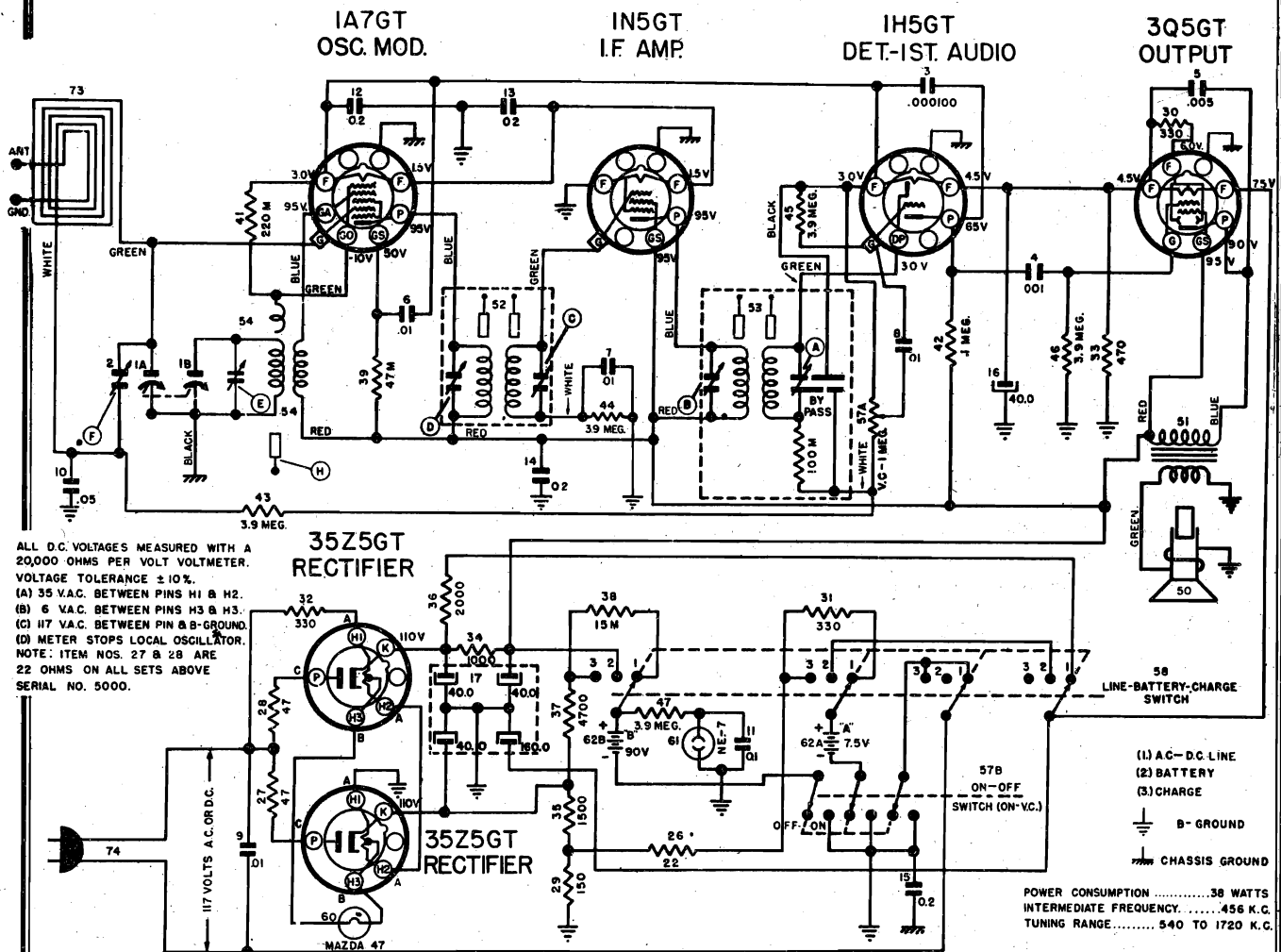
Illustration No.	Service Part No.	Description
28	1218413	12SQ7
29	1218414	12SK7
30	1218415	35LGT
31	1218416	35ZGT
32	1216559	Rectifier
33	1216557	Clip — Condenser
34	1216558	Control — Volume Control and Switch

Illustration No.	Service Part No.	Description
35	1216557	Control — Tone
36	1216558	Lamp — Dial Light (Mazda #47)
37	1216559	Transformer — Output
38	1216560	Transformer — Drive
39	1216561	Spring — Cord Tension
40	1216562	Socket — Dial Light Assy. (Less Lamp)
41	1216563	Socket — Cord Tension
42	1216564	Washer — C-10 (Use With Drive Shaft)

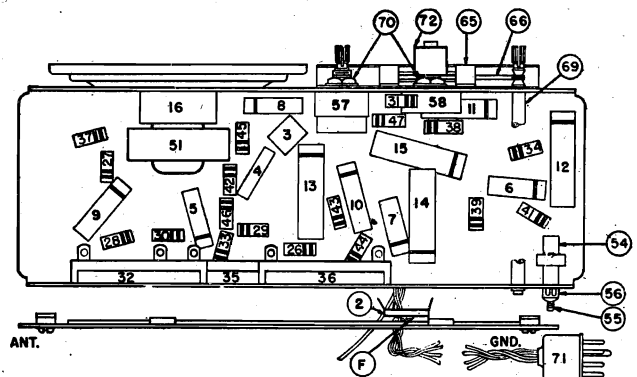
Illustration No.	Service Part No.	Description
43	1217724	Cabinet Parts
44	1217725	Cabinet Assy. — Model R-1227 — Brown Plastic (Complete With Drive Shaft, Clamps and Screws)
45	1217726	Cabinet Assy. — Model R-1228 — White Plastic (Complete With Drive Shaft, Clamps and Screws)
46	1217727	Cabinet Assy. — Model R-1229 — Wood (Complete With Drive Shaft, Clamps and Screws)
47	1217191	Clamp — Dial Glass Model R-1227 and R-1228
48	1216582	Clamp — L. H. — Dial Glass — Models R-1227 and R-1228
49	1217156	Dial Glass — Model R-1227, R-1228 and R-1229
50	1217575	Knob — Brown — Control — Model R-1227
51	1217571	Knob — Ivory — Control — Model R-1228
52	1217572	Knob — Rubber — Control — Model R-1229
53	1217169	Rubber Band — Model R-1227 and R-1228
54	1217169	Screw — Self Tapping — Model R-1227 and R-1228

Power Supply	105/125 volts AC-DC
Power Consumption	35 Watts
Model R-1227	Brown Plastic Cabinet
Model R-1228	White Plastic Cabinet
Model R-1229	Wood Cabinet

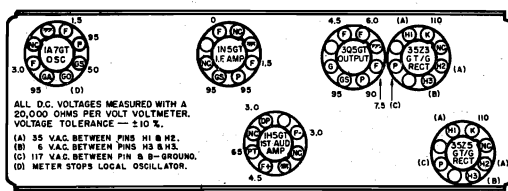
# UNITED MOTORS SERVICE CORP. MODELS R-1408, R-1409 (DIV. OF GEN. MOTORS)



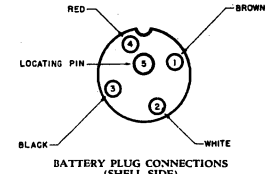
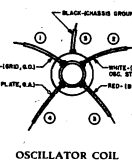
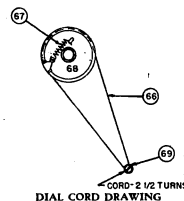
PARTS LAYOUT - TUBE VIEW



PARTS LAYOUT - CHASSIS VIEW



VOLTAGE CHART



# MODELS R-1408, R-1409 UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS) ALIGNMENT PROCEDURE

Output Meter Connections ..... Across Voice Coil Winding  
 Generator Ground ..... To Ground Terminal  
 Dummy Antenna ..... In Series with generator  
 Volume Control Position ..... Fully on  
 Adjust Signal Generator Output to a Minimum for Satisfactory Output Indication.

Steps	Series Condenser Or Dummy Antenna	Connect Signal Generator To	Adjust Signal Generator To	Turn Radio Dial To	Adjust Trimmers
1	0.1 Mfd.	1A7 Grid Cap.***	456 KC	Quiet Point near H. F. end	A-B (2nd IF Trans) C-D (1st IF Trans)
2	.000200 Mfd.	Ant. Terminal	1720 KC	1720 KC	E (Osc.)
3	.000200 Mfd.	Ant. Terminal	1400 KC	1400 KC	F (Ant.)
4*	.000200 Mfd.	Ant. Terminal	600 KC	600 KC	H

\*Rock in Oscillator Core "H" with Signal Generator until maximum output is secured.

Repeat steps 2, 3 and 4 for most accurate alignment.

NOTE: If hum is encountered in output when an AC operated signal generator is used for Step 1, short out the 0.2 mfd condenser (#15) which is connected between B- and the chassis until work is completed. Shorting wire must be removed for normal operation in order to reduce shock hazard.

\*\*\*Connect generator ground to chassis ground.

NOTE: On all sets above Serial No. 5000 the 47 ohm resistors, Illustration No. 27 and 28, have been replaced by 22 ohm resistors to prevent possible overheating if the line voltage is above 120 volts. If replacement becomes necessary, install either a 22 ohm resistor or two 47 ohm resistors in parallel in both locations (Illus. No. 27 and 28).

Illus. No.	Service Part No.	Description
<b>ELECTRICAL PARTS</b>		
<b>COILS</b>		
73	1217555	Antenna Assy. — Loop and Back Cover — Model R-1409
73	1217569	Antenna Assy. — Loop and Back Cover — Model R-1408
54	1217019	Oscillator
52	1216952	1st I. F.
51	1216953	2nd I. F.
<b>CONDENSERS</b>		
1A	1216904	2 Gang Variable
1B		Antenna Section
2	1217250	Oscillator Section
3	G101	Antenna Trimmer (Included in #1217555 and 1217569)
4	E102	.001 Mfd. 600 V. Tubular
5	E102	.005 Mfd. 600 V. Tubular
6	E103	.01 Mfd. 600 V. Tubular
7	E103	.01 Mfd. 600 V. Tubular
8	E103	.01 Mfd. 600 V. Tubular
9	E103	.01 Mfd. 600 V. Tubular
10	E103	.05 Mfd. 600 V. Tubular
11	E104	.01 Mfd. 600 V. Tubular
12	E204	.02 Mfd. 400 V. Tubular
13	E204	.02 Mfd. 400 V. Tubular
14	E204	.02 Mfd. 400 V. Tubular
15	E204	.02 Mfd. 400 V. Tubular
16	J500	40 Mfd. 25 V. Electrolytic
17	1217139	4 Section Electrolytic
17A		40 Mfd. 150 V.
17B		40 Mfd. 150 V.
17C		40 Mfd. 150 V.
17D		160 Mfd. 25 V.
<b>RESISTORS</b>		
26	A220	22 Ohms 1/2 W. Insulated
27	B470	47 Ohms 1/2 W. Insulated
28	B470	47 Ohms 1/2 W. Insulated
29	B151	150 Ohms 1/2 W. Insulated
30	A331	330 Ohms 1/2 W. Insulated
31	A331	330 Ohms 1/2 W. Insulated
32	1216956	330 Ohms 10 W. Candohm
33	A471	470 Ohms 1/2 W. Insulated
34	B102	1,000 Ohms 1/2 W. Insulated
35	1216959	1,500 Ohms 10 W. Candohm
36	1216960	2,000 Ohms 10 W. Candohm
37	B472	4,700 Ohms 1/2 W. Insulated
38	A153	15,000 Ohms 1/2 W. Insulated
39	A473	47,000 Ohms 1/2 W. Insulated
41	A224	220,000 Ohms 1/2 W. Insulated
42	A105	1 Megohm 1/2 W. Insulated
43	A395	3.9 Megohm 1/2 W. Insulated
44	A395	3.9 Megohm 1/2 W. Insulated
45	A395	3.9 Megohm 1/2 W. Insulated
46	A395	3.9 Megohm 1/2 W. Insulated
47	A395	3.9 Megohm 1/2 W. Insulated
<b>MECHANICAL PARTS</b>		
<b>CHASSIS PARTS</b>		
72	1836870	Bushing — Selector Switch
	1217103	Cable Assy. — Battery
66	1212233	Cord — Universal Dial Drive — 48" Length
65	1217501	Dial and Dial Plate Assy.
	7232123	Grommet — Neon Lamp Mig.
70	7231480	Nut — Hex
	1217533	Plug — Mole Chassis
	1217225	Pointer — Dial
74	1217548	Power Cord and Socket
68	1217238	Pulley Assy.
69	1216951	Shaft — Manual Drive
59	1217839	Socket — Dial Light Assy., Less Lamp
	7236279	Socket — Octal Base Tube
67	1217523	Spring — Cord Tension
	7245333	Washer — "C" (Use With #1216951)

## MISCELLANEOUS ELECTRICAL PARTS

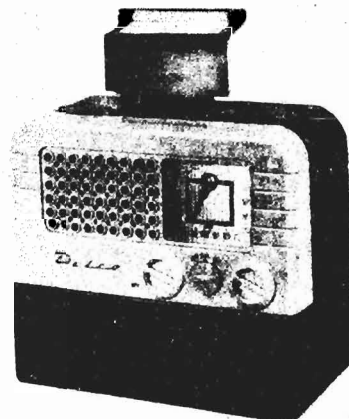
Battery — "A" 7.4 V, "B" 90 V  
 Fastener — Coil Form  
 Iron Core Assembly  
 Lamp — Dial  
 Lamp — Neon Glow  
 Speaker — 5" PM  
 Transfer Switch  
 Transformer Output  
 Volume Control and Switch

## CABINET PARTS

Cabinet — Model R-1409 — Brown Leather  
 Cabinet — Model R-1408 — Cream Leather  
 Front Cover Assy. — Complete — Model R-1409  
 Front Cover Assy. — Complete — Model R-1408  
 Front Cover  
 Grille and Baffle Cloth  
 Mounting Brackets and Screws  
 Dial Crystal  
 Handle Assy. Complete  
 Knob — Power Volume and Tuning Control — Model R-1409  
 Knob — Power Volume and Tuning Control — Model R-1408  
 Knob and Spring — Transfer Switch — Model R-1409  
 Knob and Spring — Transfer Switch — Model R-1408

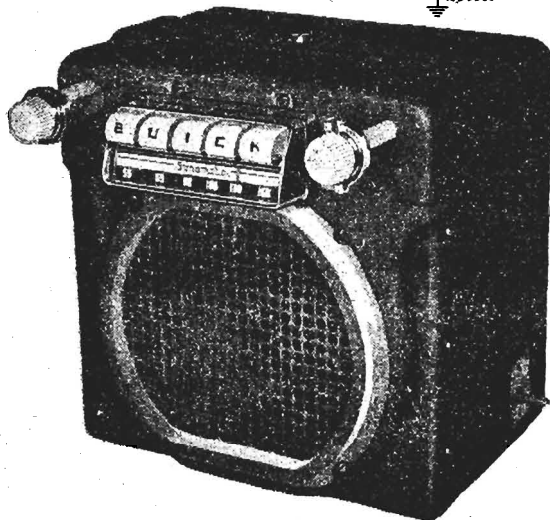
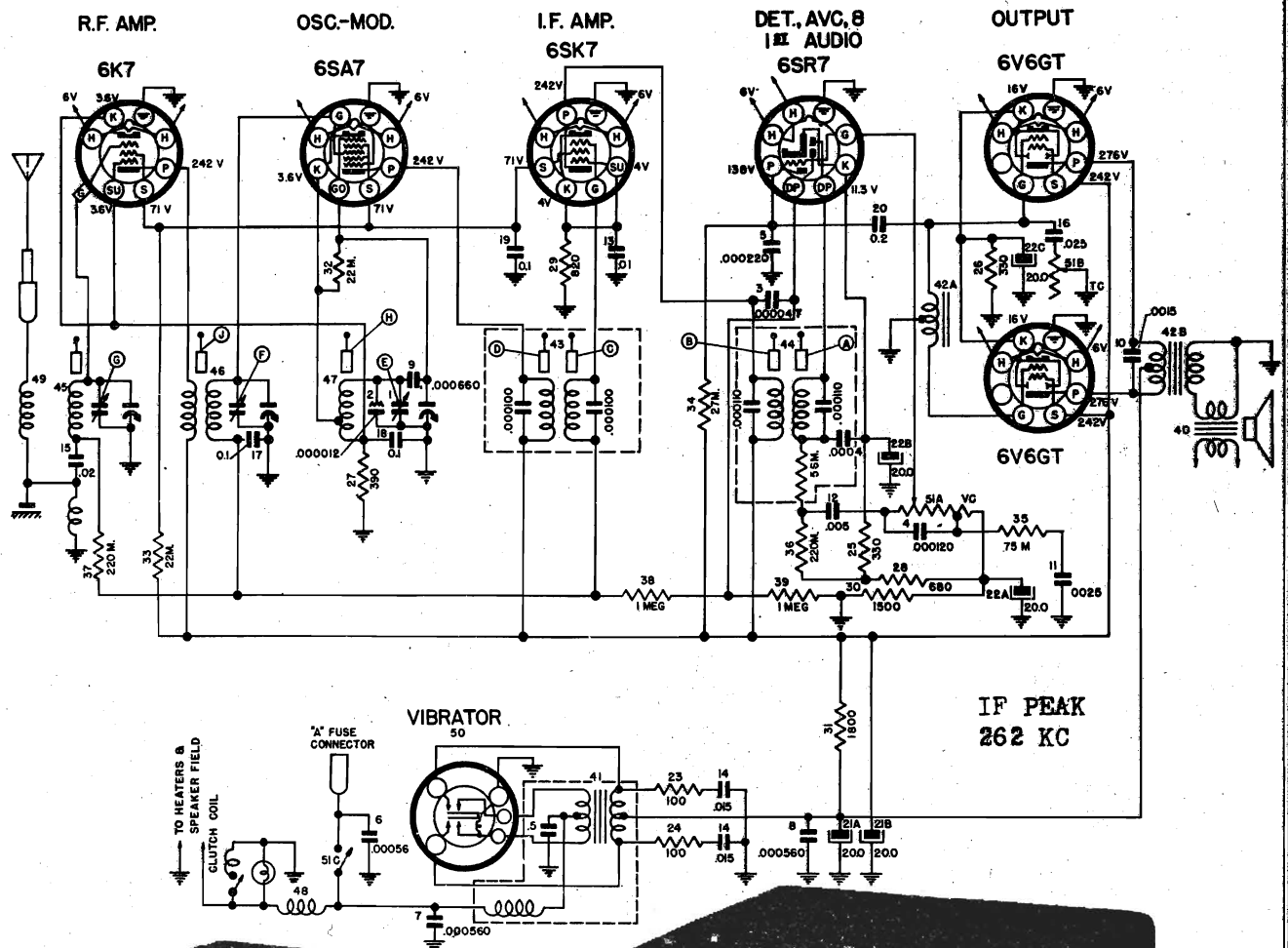
Charging Rate (Battery Charging) "A" — 15 Mils.  
 Charging Rate (Battery Charging) "B" — 4 Mils.  
 Battery Supply, "A" — 7.5 Volts  
 Battery Supply, "B" — 90 Volts  
 Power Supply — 105/125 volts AC-DC  
 Power Consumption — 38 Watts

The only difference between the R-1408 and R-1409 is in cabinet colors. The R-1408 is cream leather and the R-1409 is brown leather.

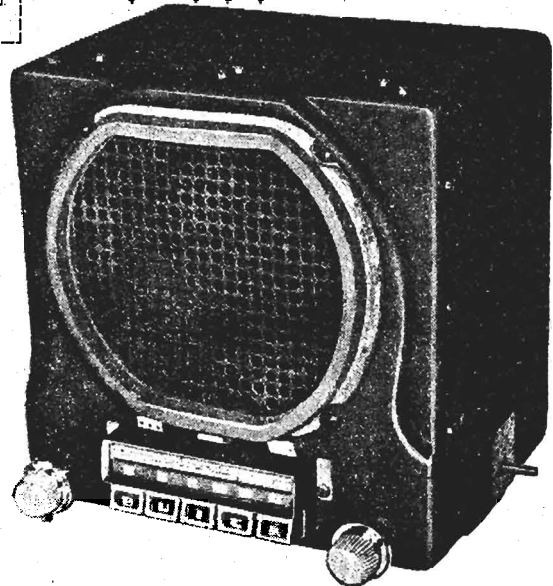




# UNITED MOTORS SERVICE CORP. MODELS 980690, Revised, (DIV. OF GEN. MOTORS) 980733, Buick



MODEL 980733



MODEL 980690

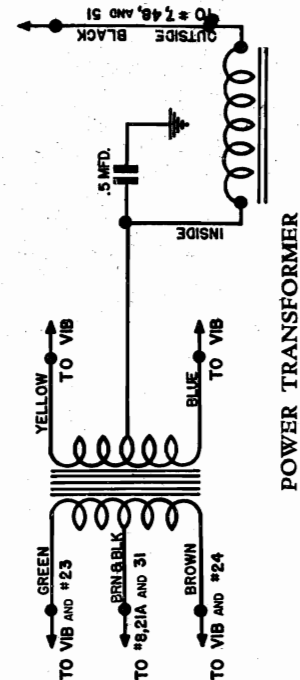
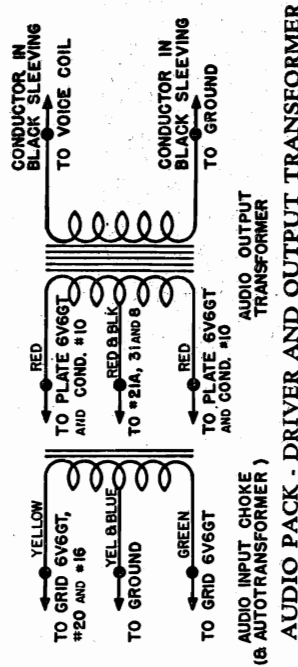
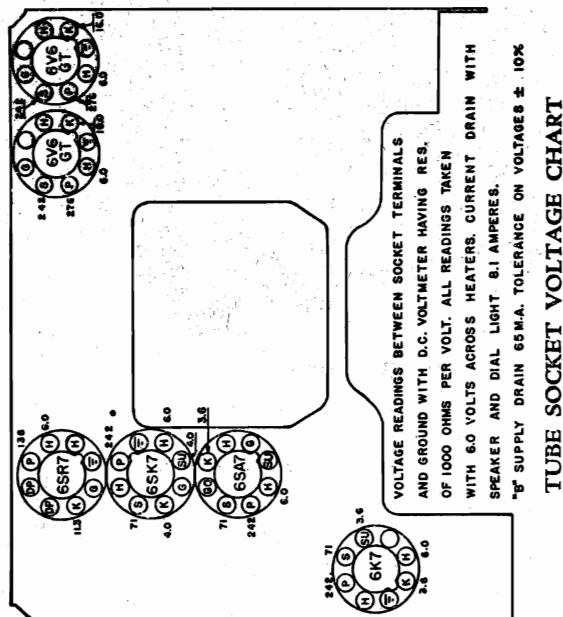
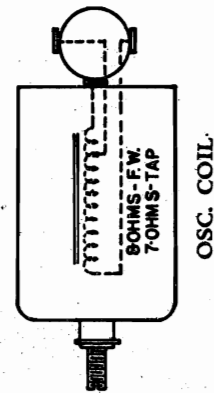
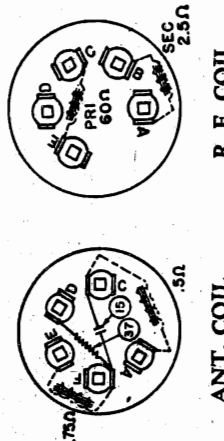
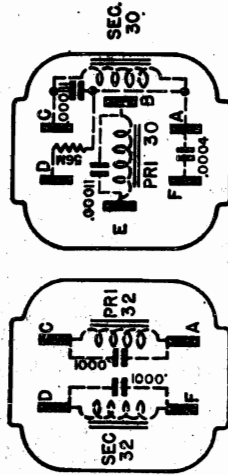
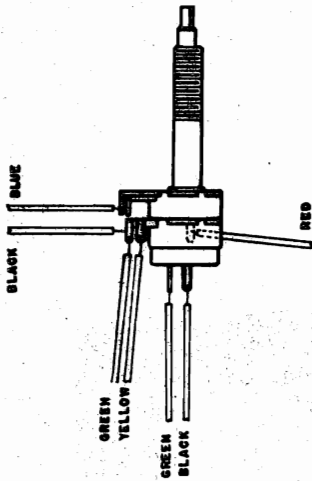
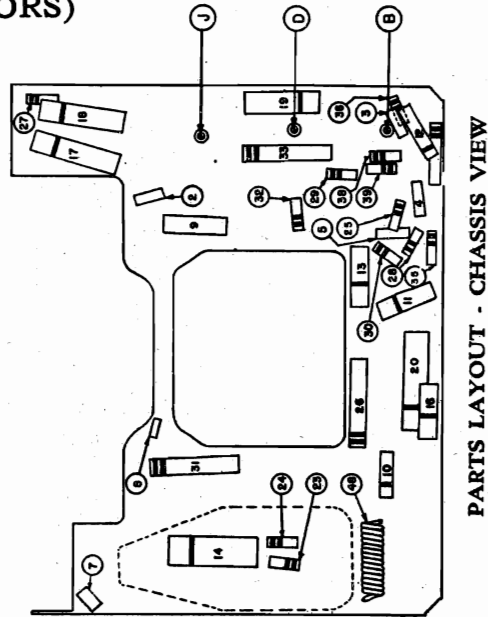
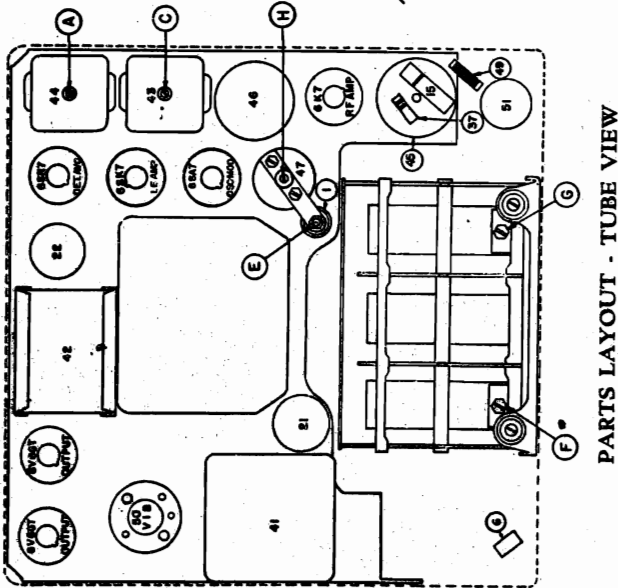
SPEAKER—8" Electro-dynamic.

TUNING—Manual and 5 P. B. Mechanical with electric clutch.

CAR ANTENNA CAPACITY—.000052 to .000068 Mfd.

TUNING RANGE—550-1600 K. C.

MODELS 980690, Revised, UNITED MOTORS SERVICE CORP.  
980733, Buick  
(DIV. OF GEN. MOTORS)



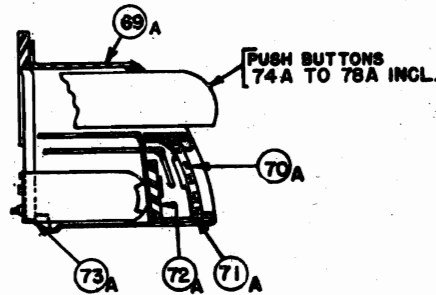
# UNITED MOTORS SERVICE CORP. MODELS 980690, Revised, (DIV. OF GEN. MOTORS) 980733, Buick

## PUSH BUTTON SET-UP

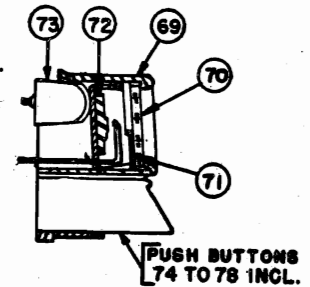
Release holding spring in bottom of button, pull button off. Loosen re-set screw and push in until it bottoms. Tune in desired station while holding in re-set screw. Release and tighten screw. Replace button.

## ALIGNMENT PROCEDURE

Volume control maximum. Signal Generator output minimum for satisfactory output indication (preferably below one watt output).



MODEL 980733



MODEL 980690

## ESCUTCHEON CROSS SECTION

Series Condenser or Dummy Antenna	Connect to	Signal Generator Frequency	Adjust Screws In Order
0.1 Mfd.	Grid side of R. F. Sec. of Gang. Cond.	262 K. C.	A B C D
0.1 Mfd.	Grid side of R. F. Sec. of Gang. Cond.	1615 K. C.	E
.000060 Mfd.	Antenna Connector	1430 K. C.	F G
.000060 Mfd.	Antenna Connector	600 K. C.	H J

Adjust trimmer G to match car antenna (1430 KC) when radio is installed.

## SPECIAL INSTRUCTIONS

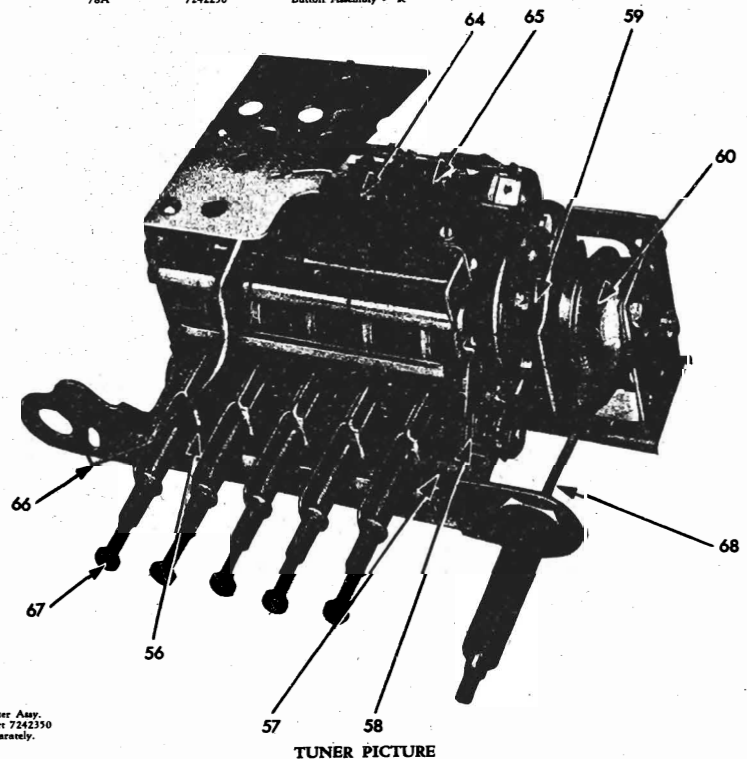
Rock gang condenser back and forth through signal during 600 K. C. adjustment of screws H and J. Repeat Alignment adjustment of trimmers F and G at 1430 K. C. and of cores H and J at 600 K. C.

## SERVICE PARTS LIST

1946 BUICK MODELS 980690 (CONTROLS AT BOTTOM) AND 980733 (CONTROLS AT TOP)

Illus. No.	Service Part No.	Description
<b>CONDENSERS</b>		
1	724039	Oscillator Air Trimmer (Included in Osc. Coil Assembly, Part #7244111)
2	7242450	.000012 Mfd. Compensating
3	723313	.000047 Mfd. Molded
4	7240577	.000120 Mfd. Molded
5	7236105	.000220 Mfd. Molded
6	7240566	.000560 Mfd. Mica
7	7240566	.000560 Mfd. Mica
8	7240566	.000560 Mfd. Mica
9	7235665	.000560 Mfd. Mica - Molded (Alt. for 7240566)
10	7236134	.0015 Mfd. 800 V. Tubular
11	7240578	.0025 Mfd. 400 V. Tubular
12	7230912	.005 Mfd. 600 V. Tubular
13	1208600	.01 Mfd. 600 V. Tubular
14	7236075	.015 x .015 Mfd. 1500 V. Dual-Tubular
15	1210999	.02 Mfd. 400 V. Tubular
16	1211232	.025 Mfd. 400 V. Tubular
17	1207908	.01 Mfd. 400 V. Tubular
18	1207908	.01 Mfd. 400 V. Tubular
19	1207908	.01 Mfd. 400 V. Tubular
20	7240579	.02 Mfd. 400 V. Tubular
21	7240612	Electrolytic - 2 Section 20-20 Mfd. 400 V.
22	7238553	Electrolytic - 3 Section 20-20 Mfd. 25 V.
<b>RESISTORS</b>		
23	1213217	100 Ohms 1/2 W. Insulated
24	1213217	100 Ohms 1/2 W. Insulated
25	1213224	330 Ohms 1/2 W. Insulated
26	1214572	330 Ohms 2 W. Insulated
27	1213482	390 Ohms 1/2 W. Insulated
28	1214543	560 Ohms 1/2 W. Insulated
29	1214544	820 Ohms 1/2 W. Insulated
30	1213237	1,500 Ohms 1/2 W. Insulated
31	1214573	1,600 Ohms 2 W. Insulated
32	1214550	22,000 Ohms 1/2 W. Insulated
33	7240590	22,000 Ohms 2 W. Insulated
34	1213342	27,000 Ohms 1 W. Insulated
35	1213844	68,000 Ohms 1/2 W. Insulated
36	1214555	220,000 Ohms 1/2 W. Insulated
37	1218555	220,000 Ohms 1/2 W. Insulated
38	1213282	1 Megohm 1/2 W. Insulated
39	1213282	1 Megohm 1/2 W. Insulated
<b>MISCELLANEOUS ELECTRICAL PARTS</b>		
40	7240469	Speaker - 8" Electrodynmic
41	7240519	Power Transformer Assembly
42	7240464	Audio Push-Drive and Output Transformer
43	7238546	First I. F. Transformer Assembly
44	7240467	Second I. F. Transformer Assembly
45	7242232	Antenna Coil and Shield Assembly
46	7242238	R. F. Coil Assembly
47	7244111	Oscillator Coil Assembly
48	7241708	"A" Filter Choke
49	7240251	Antenna Choke Coil
50	8630	Vibrator - Synchronous
51	7241967	Volume, Tone Control and Switch (Model 980690)
	7241928	Volume, Tone Control and Switch (Model 980733)
<b>MISCELLANEOUS CHASSIS PARTS</b>		
	7242034	"A" Lead Connector Assembly
	7242035	Antenna Lead Connector Assembly
	7238539	Vibrator Socket
	7236279	Octal Base Tube Socket
	7240408	Dial Light Assembly (Includes Dial Lamp)
	725588	Bulb - Dial Lamp
	1241177	"A" Lead Cable Assembly - Model 980690
	1241178	"A" Lead Cable Assembly - Model 980733
	120151	Fuse
	1208739	Static Collector Assembly
	1880659	Generator Condenser
	1207820	Distributor Suppressor
	1853686	Suppressor Adapter
	1324056	Bracket - R. H. - Model 980690
	1324057	Bracket - L. H. - Model 980690
	1323926	Bracket - R. H. - Model 980733
	1323927	Bracket - L. H. - Model 980733
	1320624	Washer
	120380	Lockwasher
	120375	Hex. Nut
	123291	Screw
<b>TUNER UNIT AND PARTS</b>		
	7242170	Tuner Assembly Complete (Model 980690)
	7242350	Tuner Assembly Complete (Model 980733)
56	7242087	Shaft - Declutching Switch Lever
57	7242110	Declutching Switch Lever Assembly
	7255698	Retainer Spring
	7240292	Spring - Declutching Switch Lever
58	7240197	Switch Assembly - Declutching
	7240396	Drive Drum Assembly
60	7240471	Clutch Assembly Complete
	7237124	Universal Joint Spring

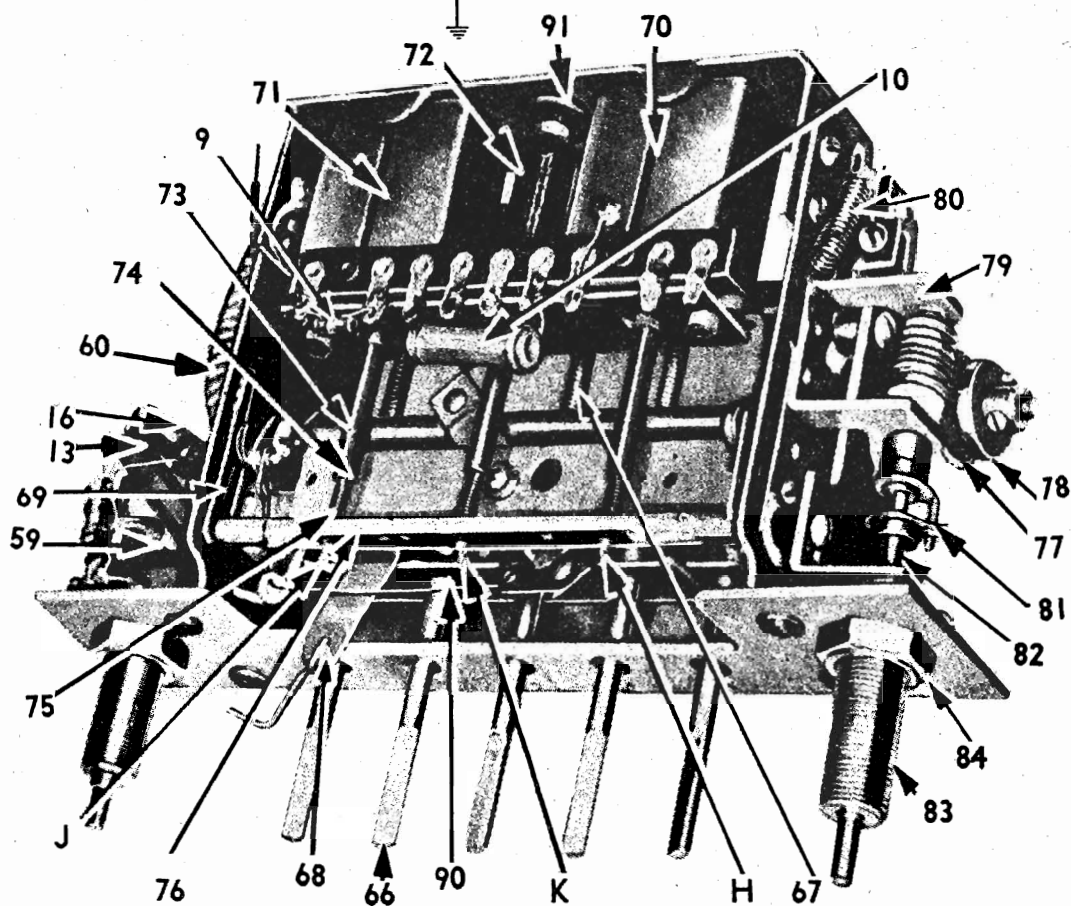
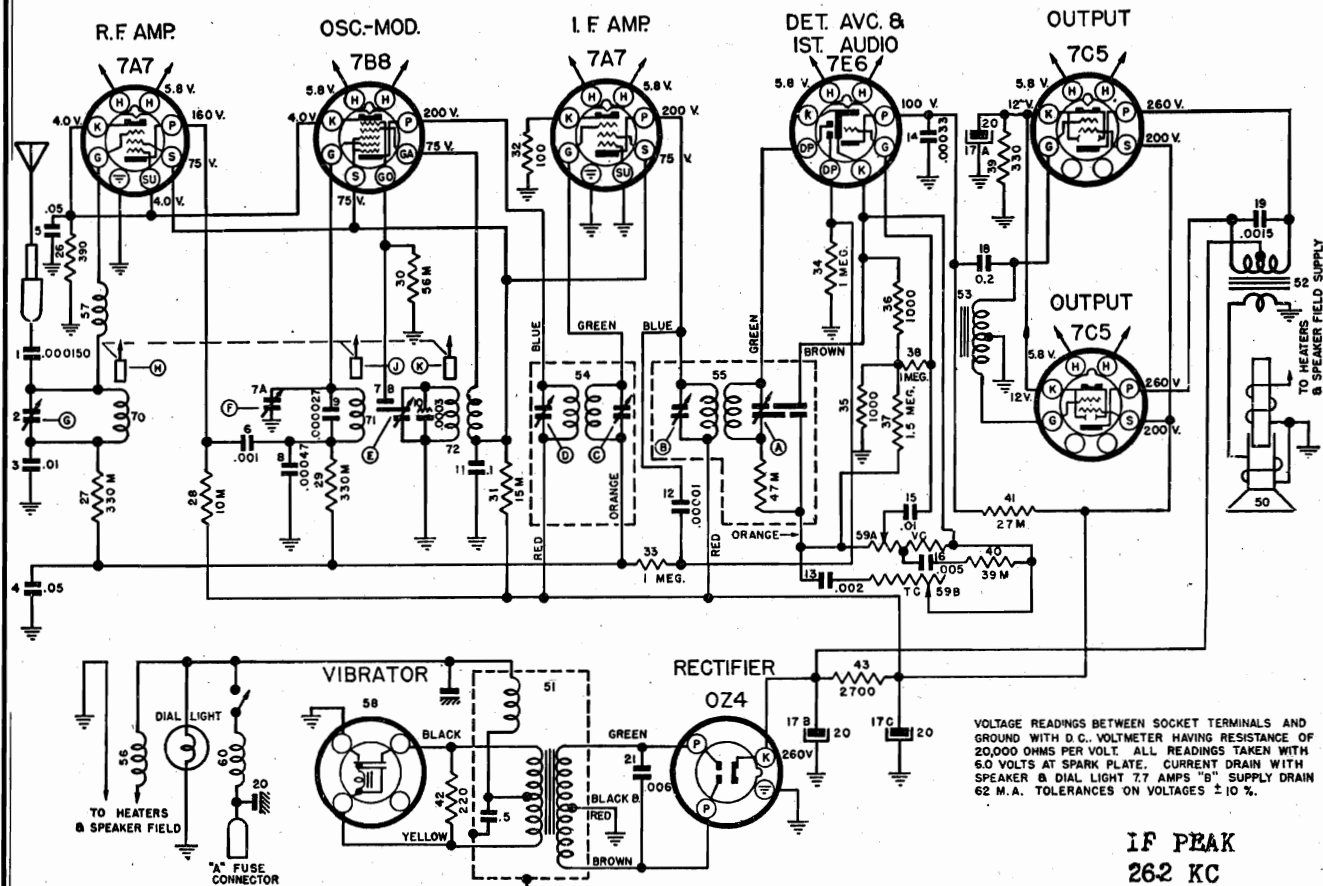
Parts Included in Tuner Assy. Part 7242170 and Part 7242350 which are serviced separately.



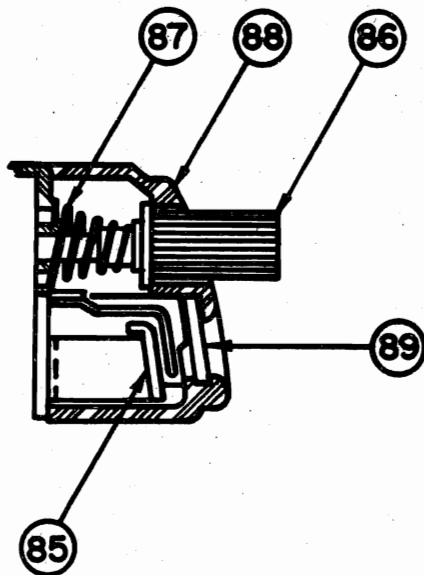
TUNER PICTURE

MODEL 982399,  
Oldsmobile

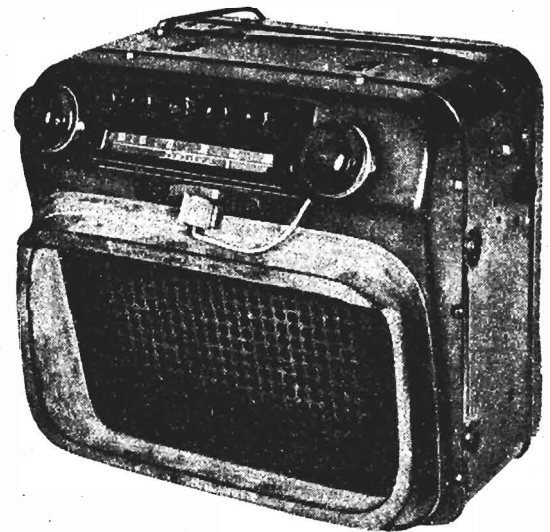
UNITED MOTORS SERVICE CORP.  
(DIV. OF GEN. MOTORS)



# UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS)

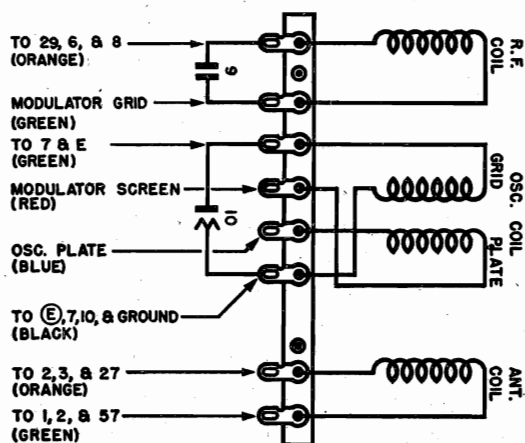
**MODEL 982399,  
Oldsmobile**

**ESCUTCHEON CROSS SECTION**
**PUSH BUTTON SET-UP**

Push button in and latch. Allow to return to normal position. Turn button until desired station is brought in. Do not hold button in while adjusting.

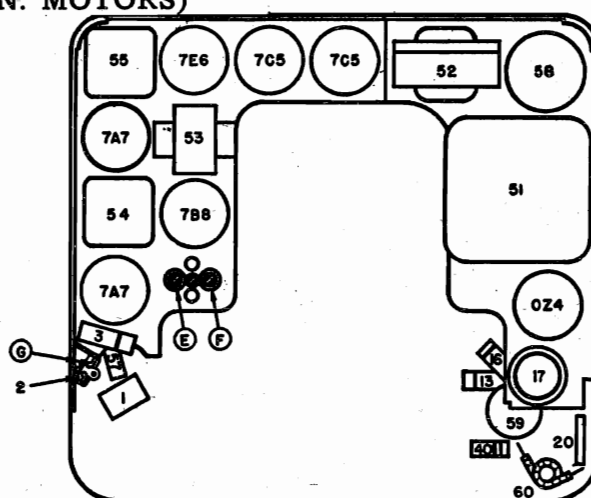

**Model 982399**
**CAR ANTENNA CAPACITY—.000070 Mfd.**

Illus. No.	Service Part No.	Description	Illus. No.	Service Part No.	Description
<b>CONDENSERS</b>			<b>TUNER UNIT AND PARTS</b>		
1	G151	.000150 Mfd. Molded	65	7255472	Tuner Staked Assembly
2	7255662	Antenna Trimmer and Bracket Assy.	66	7255373	Screw — Push Button
3	E103	.01 Mfd. 600 V. Tubular		7240740	Nut — Tuning
4	E503	.05 Mfd. 600 V. Tubular		7241855	Spring — Tuning Nut
5	E503	.05 Mfd. 600 V. Tubular		7239991	"Co" Washer
6	E102	.001 Mfd. 600 V. Tubular	67	7241169	Spring — Return
7	7242322	Dual Trimmer		7242426	Button — Latching
8	G471	.000470 Mfd. Molded		7255370	Spring — Lever Return (L. H.)
9	G270	.000027 Mfd. Molded		7255372	Spring — Lever Return (R. H.)
10	7255494	.000300 Mfd. Compensating		7241039	Spring — Latch Bar
11	E104	0.1 Mfd. 600 V. Tubular	68	7255451	Pointer Assembly Complete
12	G100	.000010 Mfd. Molded		7255713	Spring — Pointer Return
13	E202	.002 Mfd. 600 V. Tubular	69	7241042	Spring — Connecting Link
14	G331	.000330 Mfd. Molded	70	7255408	Antenna Coil Assembly
15	E103	.01 Mfd. 600 V. Tubular	71	7255408	R. F. Coil Assembly
16	E502	.005 Mfd. 600 V. Tubular	72	7255297	Oscillator Coil Assembly
17	M908	Electrolytic 3 Section		7256097	Iron Core Parts Package
17A		20.0 Mfd. 25 V.			Iron Core and Stud Assy.
17B		20.0 Mfd. 450 V.	73		Spring
17C		20.0 Mfd. 450 V.	74		Washer
18	E204	0.2 Mfd. 400 V. Tubular	75		Speed Nut
19	7236134	0.0015 Mfd. 800 V. Tubular	76		Clutch Assembly
20	7241259	Spark Plate	77	7255347	Clutch Jaw-Driver
21	H602	.006 Mfd. 1600 V. Tubular (Buffer)	78	7255330	Bracket and Worm Assy.
<b>RESISTORS</b>			79	7255365	Spring-Slide Bracket Return
26	A391	390 Ohms 1/2 W. Insulated	81	7255348	Coupler and Shaft Assy.
27	A334	330,000 Ohms 1/2 W. Insulated	82	7255350	Manual Control Shaft Assy.
28	B103	10,000 Ohms 1 W. Insulated	83	7255326	Bushing — Manual Shaft
29	A334	330,000 Ohms 1/2 W. Insulated	84	7242048	Hex Nut
30	A563	56,000 Ohms 1/2 W. Insulated	85	7256437	Dial Back Plate
31	C153	15,000 Ohms 2 W. Insulated	86	7255402	Push Button Assy.
32	A101	100 Ohms 1/2 W. Insulated	87	7255397	Spring — Push Button Return
33	A105	1 Megohm 1/2 W. Insulated	88	7255277	Escutcheon Assy.
34	A105	1 Megohm 1/2 W. Insulated	89	7255275	Dial Glass
35	A102	1,000 Ohms 1/2 W. Insulated	90	1212233	Cord-Pointer (48" length)
36	A102	1,000 Ohms 1/2 W. Insulated		7244020	Grommet (Ant. and R. F. Coil)
37	A155	1.5 Megohm 1/2 W. Insulated	91	7244021	Grommet (Oscillator)
38	A105	1 Megohm 1/2 W. Insulated			<b>TUBE COMPLEMENT</b>
39	B331	330 Ohms 1 W. Insulated			7A7 — R. F. Amplifier
40	A393	39,000 Ohms 1/2 W. Insulated			7B8 — Oscillator Modulator
41	B273	27,000 Ohms 1 W. Insulated			7A7 — I. F. Amplifier
42	B221	220 Ohms 1 W. Insulated			7E6 — Det., AVC and First Audio Amp.
43	C272	2,700 Ohms 2 W. Insulated			7C5 — Push-Pull Output
					0Z4 — Rectifier
<b>MISCELLANEOUS ELECTRICAL PARTS</b>			<b>MOUNTING AND INSTALLATION PARTS</b>		
50	7256443	Speaker — 6" x 9" Elliptical — Electro Dynamic			Control Knob Kit
51	7255881	Power Transformer Assy.			Tuning Knob Assembly (2)
52	7240453	Output Transformer Assy.			Tone Control Knob
53	7256432	Input Transformer Assy.			Dummy Knob
54	7242079	First I. F. Transformer Assy.			Hex Nut (1/2 x 28 special) (2)
55	7242533	Second I. F. Transformer Assy.			Washer — Felt (2)
56	7241708	"A" Filter Choke			Washer — Radio Control Shaft (2)
57	7240251	Antenna Choke Coil			Control Washer — Metal Spring
58	8638	Vibrator — Non-Synchronous			"A" Lead and Condenser Assembly (Includes ammeter condenser)
59	7255298	Volume, Tone Control and Switch			Fuse — 15 Amp.
60	7241701	"A" Spark Choke			Tube — Fuse Connector
	5274994	Volume Control Cable			Generator Condenser .5 Mfd.
<b>MISCELLANEOUS CHASSIS PARTS</b>					Distributor Suppressor, 15,000 Ohms
	7255307	Front Cover			Suppressor Adapter
	7256452	Rear Cover Assy.			Static Collector Assy.
	7255257	"A" Lead Assy.			Mounting Bracket — Receiver
	7233944	Vibrator Socket			Bolt — Hex Hd.
	7236279	Octal Base Tube Socket			
	7241356	Local Base Tube Socket			
	1217820	Dial Light Assembly (Less Bulb #187189)			
	187189	Dial Light Bulb			

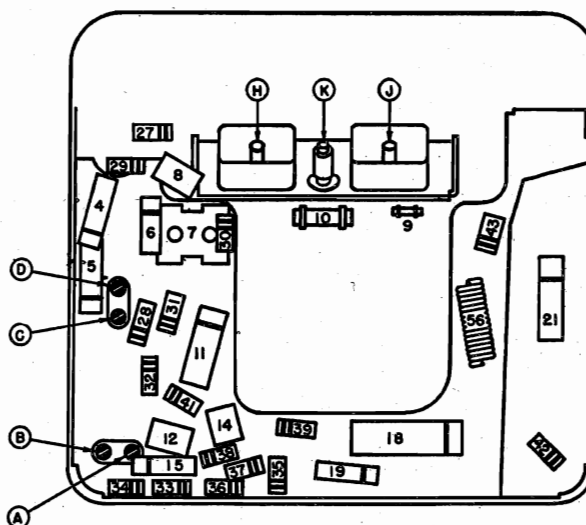
### TUBE SOCKET VOLTAGE CHART



## TUNER COILS



### PARTS LAYOUT—TUBE VIEW



### PARTS LAYOUT—CHASSIS VIEW

**Volume Control Maximum — Tone Control on treble.**

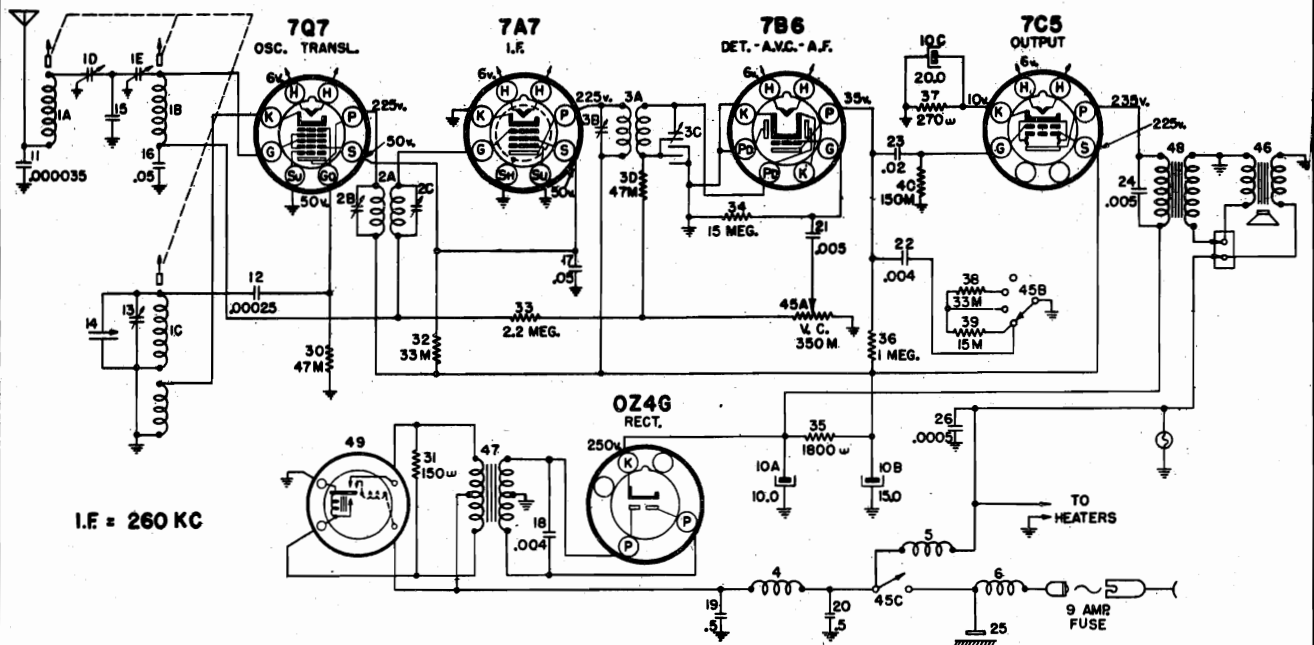
Signal Generator minimum for satisfactory output indication.

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 MFD	Grid side of Trimmer F	262 KC	A B C D
.000070 MFD	Antenna Terminal	1615 KC	E
.000070 MFD	Antenna Terminal	1430 KC	F G

### SPECIAL INSTRUCTIONS

Mechanical alignment of iron cores. Tune to stop at H. F. end of dial. Adjust cores H, J, and K to extend  $1\frac{5}{32}$ " from end of coil form. Adjust trimmers E, F, and G, (1615 KC). Adjust cores H and J for maximum output at 1430 KC. Repeat alignment of trimmers E, F, and G at 1615 KC. Repeat alignment of cores H and J at 1430 KC. Align trimmers F and G at 1430 KC.

# UNITED MOTORS SERVICE CORP. MODEL 984170, Pontiac (DIV. OF GEN. MOTORS)



READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A 1000 OHMS PER VOLT D.C. VOLTMETER. "A" BATTERY - 6.0 VOLTS. CURRENT DRAIN - 6.0 AMPERES. "B" SUPPLY DRAIN - APPROX. 50 MA. ALL READINGS  $\pm 10\%$

Illus. No.	Service Part No.	Description	Service Part No.	Description	RADIO PACKAGE CONTENTS
<b>COILS</b>			<b>CHASSIS PARTS - MISCELLANEOUS</b>		
1	1216539	Tuning Coil & Core Assembly	187189	Bulb - Pilot Light - Mazda #44	504617 "A" Lead & Female Fuse Holder Assy.
1A		Antenna Coil	1215926	Bushing - Station Selector Shaft	1853686 Adaptor - Radio Distributor Suppressor
1B		Grid Coil	1216535	Connector Assembly - Antenna	505629 Bolt - 1/4-20 x 5/8 Hex Hd. Special - Zinc (Receiver to Brace)
1C		Oscillator Coil	1214394	Connector Assembly - "A" Lead	1849161 Capacitor Assembly - Ammeter (.5 Mfd.)
1D		Antenna Trimmer	1215937	Cover - Case Back	1866865 Capacitor Assembly - Generator (.5 Mfd.)
1E		Grid Coil Trimmer	1215927	Cover - Power Supply	147684 Fuse - (9 Amp.) "A" Lead
2	1215916	1st I. F. Assembly	1216536	Dial Pointer & Slide Assembly	509129 Insulator - Radio Distributor Suppressor
2A		I. F. Coil Assembly	1216537	Dial - Window	507505 Knob Assy. - Radio Tuning and Volume Control
2B		Primary Trimmer	7242463	Nut - 1/2-28 Mtg. Spacer	507510 Knob - Radio Dummy
2C		Secondary Trimmer	1863407	Pin Connector - Speaker	507511 Knob - Radio Tone Control
3	1215917	2nd I. F. Assembly	1214471	Pulley - Wood 17/32 OD	7235968 Nut - 1/2-28 Thin Hex - Zinc (Receiver to Instrument Panel)
3A		I. F. Coil Assembly	1214472	Pulley - Wood 7/16 OD	509031 Owners Instruction & Warranty Card
3B		Primary Trimmer	1216587	Push Button Assembly	508583 Plate - Radio Control Finish
3C		Secondary Trimmer	1213685	Screw - Cover Retaining	144722 Screw - #7 x 3/8 Rnd. Hd. Type "A" Self Tapping - Zinc
3D		Resistor 47,000 Ohm	1215932	Shaft Assembly - Front Drive	1207821 Suppressor - Radio Distributor
4	1213663	Hash Choke	1215933	Shaft Assembly - Rear Drive	504618 Tube - Fuse Insulating
5	1214385	Filament Choke	1215936	Socket Assembly - Pilot Light	121753 Washer - 1/4 External Tooth Lock
6	1217193	Spark Choke	7238455	Socket - Lock-In	1299232 Washer - 1/4 Flat Special - Zinc
<b>CAPACITORS</b>			1214420	Socket - Rectifier	7238755 Washer - Radio Dummy Knob - Spring
10	1213868	Electrolytic	1213684	Socket - Vibrator	505630 Washer - Radio Tone Control Knob-Felt
10A		10 Mfd. 350 Volt	1214399	Speaker Gasket - Rubber	
10B		15 Mfd. 300 Volt	1216036	Spring - Core Driving	
10C		20 Mfd. 25 Volt	1215934	Spring - Rear Drive Shaft	
11	1214949	.000035 Mfd. Moulded	1214386	String & Spring Assy.-Pointer Drive	
12	1209055	.000025 Mfd. Moulded	1216538	Tuner Unit - Mechanical, Portion Only	
13	1215925	Oscillator Trimmer			
14	1216540	Compensating 265 Mfd.			
15	1212098	.004 Mfd. 800 Volt			
16	7230592	.05 Mfd. 600 Volt			
17	7230592	.05 Mfd. 600 Volt			
18	1213854	.004 Mfd. 1500 Volt			
19	7240248	.5 Mfd. 100 Volt			
20	7240248	.5 Mfd. 100 Volt			
21	7230912	.005 Mfd. 800 Volt			
22	1212098	.005 Mfd. 800 Volt			
23	1212099	.02 Mfd. 600 Volt			
24	7230912	.005 Mfd. 800 Volt			
25	1212278	Spark 225 Mfd.			
26	1207636	.0005 Mfd. Mica			
			<b>RESISTORS</b>		
			30	1214553	47,000 Ohm 1/2 Watt
			31	1211005	150 Ohm 1 Watt
			32	7242447	33,000 Ohm 1 Watt
			33	1214563	2.2 Megohm 1/2 Watt
			34	1213343	15 Megohm 1/2 Watt
			35	1214573	1800 Ohm 2 Watt
			36	1209885	1 Megohm 1/2 Watt
			37	1213846	270 Ohm 1 Watt
			38	1213845	33,000 Ohm 1/2 Watt
			39	1211089	15,000 Ohm 1/2 Watt
			40	1211163	150,000 Ohm 1/2 Watt
			<b>MISCELLANEOUS ELECTRICAL PARTS</b>		
			45	1216541	Control-Volume-Tone-Switch
			45A		Volume Control 350,000 Ohm
			45B		Tone Control Switch
			45C		On-Off Switch
			46	1214389	Speaker - Electro Dynamic
			47	1214391	Transformer - Power
			48	1215918	Transformer - Output
			49	8638	Vibrator - Plug-In

## PUSH BUTTON SET-UP

Turn counter clockwise - tune in manually - depress loosened button - turn button clockwise to tighten.

**MOUNTING** - All 1946 Pontiac Cars

**TUNING** - Manual and 5 P. B.

**TUBES** - 7Q7, 7A7, 7B6, 7C5, 0Z4G

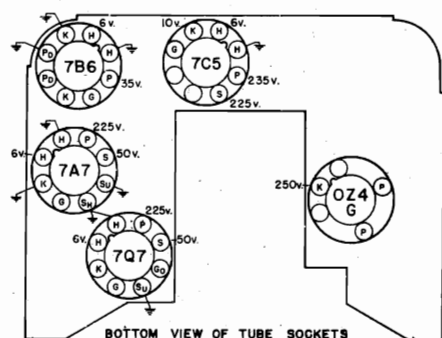
**TUNING RANGE** - 540 KC - 1610 KC

**SPEAKER** - 6" Electro Dynamic

**CAR ANTENNA CAPACITY** - 60 mmfd.

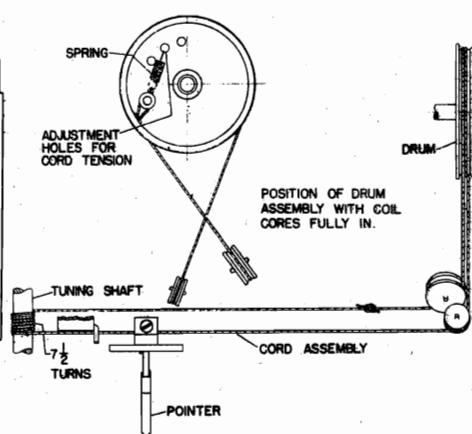


MODEL 984170, Pontiac UNITED MOTORS SERVICE CORP.  
(DIV. OF GEN. MOTORS)

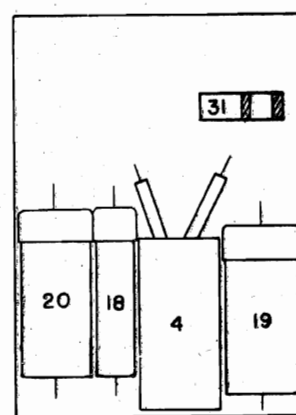


BOTTOM VIEW OF TUBE SOCKETS

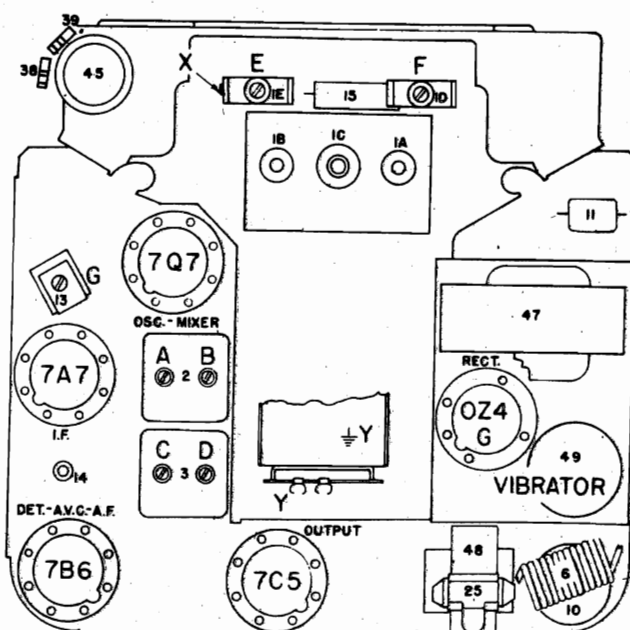
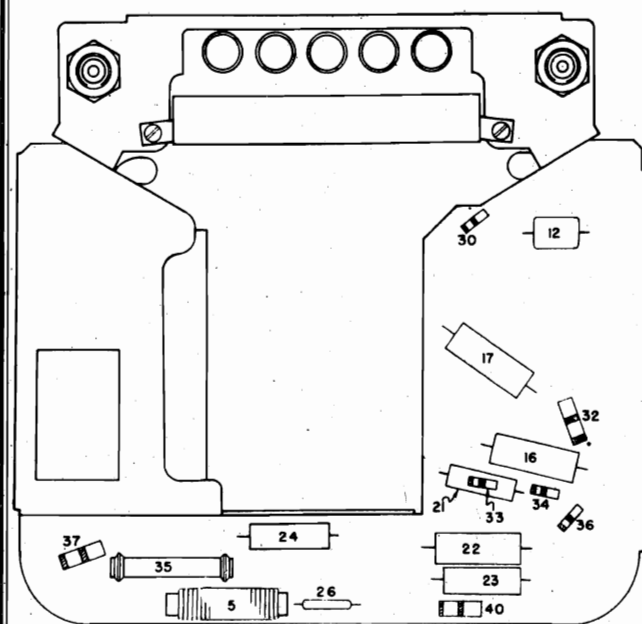
READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6.0 VOLTS. CURRENT DRAIN 6.0 AMPERES; "B" SUPPLY DRAIN APPROXIMATELY 50 M.A. ALL READINGS  $\pm 10\%$ .



DIAL CORD HOOKUP



POWER PACK LAYOUT



PARTS LAYOUT

ALIGNMENT PROCEDURE

Volume Control maximum.

Tone Control on high position.

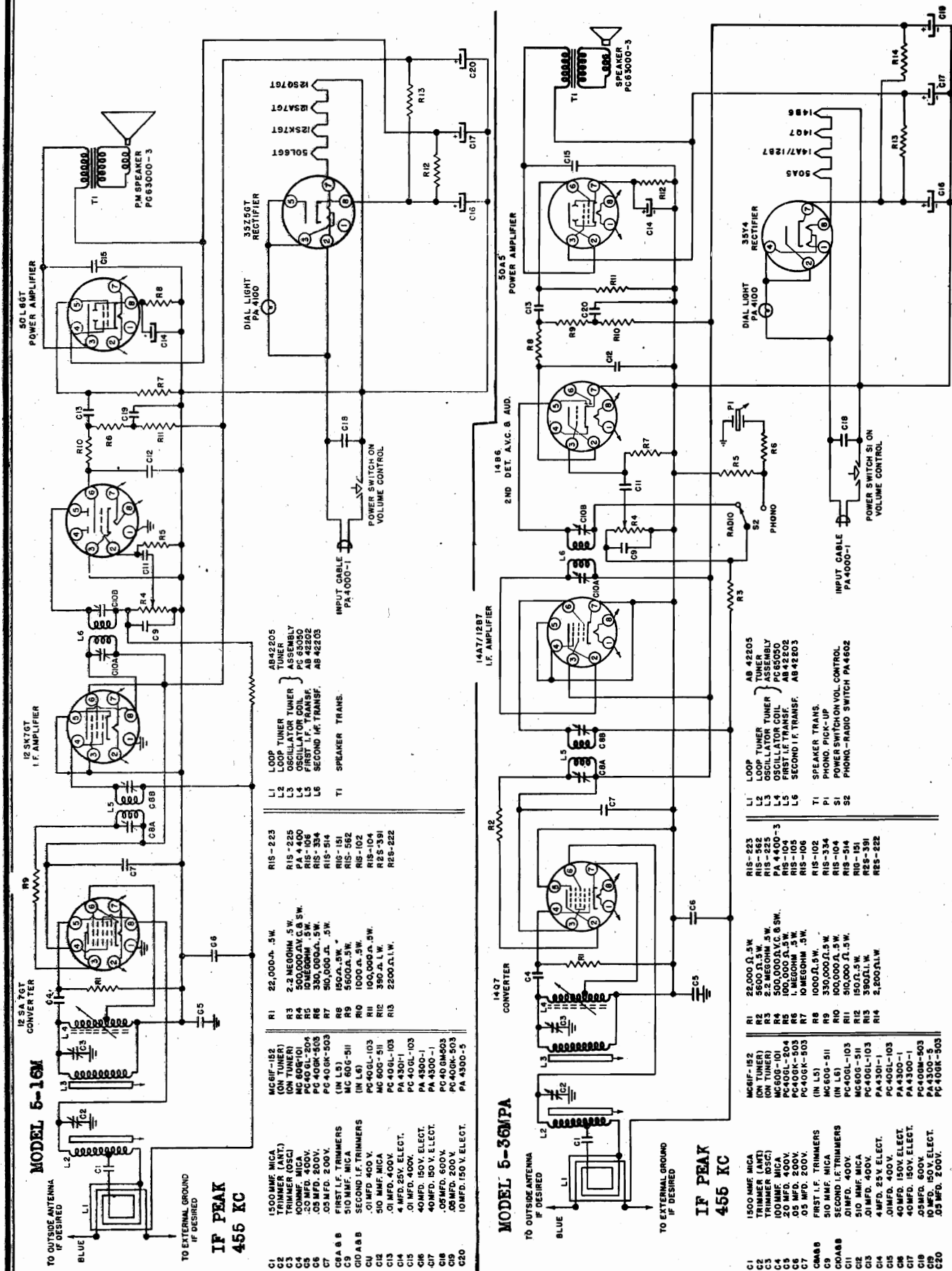
Signal Generator Output minimum for satisfactory output indication.

Series Capacitor Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 mfd.	Terminal X (See Parts Layout)	260 KC	A, B, C, D
.000060 mfd.	Antenna Terminal	1610 KC	G
.000060 mfd.	Antenna Terminal	1400 KC	E, F

Low frequency alignment not required.

Adjust Trimmer F to match car antenna (1400 KC) when radio is installed.







MODELS VP100,VP100A,  
VP101A



VIEWTONE TELEPHONE RECEIVER

ADVENTURER - CONSOLE WITH RADIO AND TELEVISION  
FUTURA - TABLE MODEL

GENERAL DESCRIPTION

THESE MODELS CONSIST OF A 19-TUBE, DIRECT VIEWING TELEVISION RECEIVER. FEATURES OF THE TELEVISION RECEIVER INCLUDE:

SEVEN INCH CATHODE RAY TUBE, SINGLE-STATION, SELECTOR SWITCH WITH FINE TUNING CONTROL; DOUBLE SAFETY PROTECTION WHICH INCLUDES FUSE AND INTERLOCK SWITCH; SAFETY FLEXITE VIEWING WINDOW AND AUTOMATIC GAIN CONTROL.

OPERATION OF THE VIEWTONE TELEVISION RECEIVER

ON THE FRONT OF THE CHASSIS THERE ARE FOUR CONTROLS:

1. VOLUME, OFF-ON.
2. STATION SELECTOR AND FINE TUNING.
3. CONTRAST
4. INTENSITY

THE POWER-VOLUME CONTROL TURNS ON THE POWER FOR THE COMPLETE SET AND ALSO CONTROLS THE VOLUME OF THE SOUND ACCOMPANYING THE PICTURE

THE STATION SELECTOR AND FINE TUNING IS A COAXIAL DUAL CONTROL WHOSE OUTER KNOB SELECTS THE CHANNEL OF THE STATION WHICH IT IS DESIRED TO RECEIVE, THAT IS IN NEW YORK.

CHANNEL	FREQUENCY	STATION
2	54-60	WCBS - TV (C.B.S.)
4	66-72	WNBT (N.B.C.)
5	76-82	WABD (Dumont)

SET THE LARGE KNOB TO THE CORRESPONDING NUMERALS ON THE FRONT OF THE CABINET. THE INNER SECTION OF THIS KNOB IS THEN USED FOR FINE TUNING, AND MAY ELIMINATE RIPPLES AND DISTORTION FROM THE PICTURE. BY TURNING THIS KNOB, BOTH PICTURE AND SOUND ARE TUNED IN SIMULTANEOUSLY.

THE CONTRAST CONTROL VARIES THE BLACK AND WHITE TONES OF THE PICTURE BEING RECEIVED. TURNING THIS CONTROL CLOCKWISE INCREASES THE CONTRAST FROM GRAYS, TO BLACK AND WHITE.

ANTENNA INSTALLATION

THE IMPORTANCE OF A GOOD ANTENNA INSTALLATION CANNOT BE OVEREMPHASIZED. A PROPERLY INSTALLED ANTENNA IS THE DIFFERENCE BETWEEN GOOD OR POOR RECEPTION. AN ANTENNA SHOULD NOT BE INSTALLED PERMANENTLY ON AN APARTMENT OR RESIDENCE ROOF UNTIL THE QUALITY OF PICTURE RECEPTION IS AT ITS BEST. ENOUGH SLACK SHOULD BE ALLOWED IN THE LEAD IN TO FACILITATE MOVEMENT OF THE ANTENNA. A SHIFT OF ONLY A FEW FEET IN ANTENNA POSITION MAY RESULT IN AN ENORMOUS DIFFERENCE IN PICTURE RECEPTION. THE ANTENNA SHOULD BE POSITIONED BROADSIDE TOWARD THE TRANSMITTER. IF A RECEIVER AND REFLECTOR ARRANGEMENT IS USED, THE RECEIVER IS PLACED IN FRONT OF THE REFLECTOR BROADSIDE TOWARD THE STATION.

FOR BEST POSSIBLE RESULTS THE ANTENNA SHOULD BE REMOVED AS FAR AS POSSIBLE FROM HIGHWAYS, HOSPITALS, AND OTHER SOURCES OF INTERFERENCE. AUTOMOBILE IGNITION NOISES AND DIATHERMY MACHINES MAY CAUSE "HERRINGBONES" WHICH DISTORT THE PICTURE BEING RECEIVED.

R. F. ALIGNMENT PROCEDURE

1. REPLACE 6C4 OSCILLATOR TUBE. APPLY OUTPUT OF SIG. GEN. TO ANTENNA TERMINAL OF CHASSIS. CONNECT OUTPUT INDICATING DEVICE TO VIDEO LEAD OF C.R.T. SET OSCILLATOR CONDENSER HALF WAY OPEN.
2. ADJUST OSC. COIL SLUGS SO THAT SOUND OUTPUT IS HEARD AS THE SIG. GEN. IS SET ON THE SOUND CARRIER FREQUENCY OF THE TELEVISION CHANNEL.

CHANNEL	SOUND CARRIER
1	49.75 Mc
2	59.75 Mc
3	65.75 Mc
4	71.75 Mc
5	81.75 Mc
6	87.75 Mc

3. ADJUST ANTENNA COIL SLUGS SO THAT THE OUTPUT INDICATING DEVICE INDICATES MAXIMUM AS THE SIG. GEN. IS SET ON THE FREQUENCIES LISTED BELOW. THESE FREQUENCIES ARE BETWEEN THE SOUND AND THE PICTURE CARRIERS TO GIVE RESPONSE TO BOTH.

CHANNEL	SET ANT. COIL TO
1	47 Mc
2	58 Mc
3	63 Mc
4	70 Mc
5	78 Mc
6	85 Mc

MODELS VP100,VP100A, VP101A

VIEWTONE COMPANY

I. F. ALIGNMENT PROCEDURE

1. REQUIRED: SIGNAL GENERATOR, 8-15 MC  
OUTPUT INDICATOR (OSCILLOSCOPE, V.T.V.M.)  
REMOVE OSCILLATOR TUBE  
TYPE VP100 CHASSIS DISTINGUISHED BY BLACK SERIAL NO.  
TYPE VP100A " " " RED " "  
2. ALIGNMENT OF 4TH I.F. TRANSFORMER.  
APPLY OUTPUT OF SIG. GEN. TO GRID OF THIRD I.F. TUBE.  
TUNE IN SLUG OF TRANS. FOR MAXIMUM DEFLECTION IN INDICATOR CONNECTED TO C.R.T. VIDEO LEAD.  
FREQUENCY: VP100 12.6 Mc  
VP100A 11.5 Mc  
3. ALIGNMENT OF 3RD I.F. TRANSFORMER.  
APPLY OUTPUT OF SIG. GEN. TO GRID OF SECOND I.F. TUBE.  
TUNE BOTTOM SLUG OF I.F. TRANS. FOR MAXIMUM DEFLECTION IN OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAD.  
FREQUENCY: VP100 12.0 Mc  
VP100A 12.0 Mc  
TUNE TOP IRON SLUG OF IF TRANS. FOR MINIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAST  
TRAP FREQUENCY: VP100 8.25 Mc  
VP100A 10.3 Mc  
4. ALIGNMENT OF 2ND I.F. TRANSFORMER.  
APPLY OUTPUT OF SIG. GEN. TO GRID OF 1ST IF AMPLIFIER TUBE. TUNE BOTTOM SLUG OF IF FOR MAXIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO VIDEO LEAD OF C.R.T.  
FREQUENCY: VP100 11.5 Mc  
VP100A 10.3 Mc  
TUNE TOP SLUG OF IF TRANS. FOR MINIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAD. THIS WILL CORRESPOND TO MAXIMUM AUDIO OUTPUT.  
TRAP FREQUENCY: VP100 8.25 Mc  
VP100A 8.25 Mc  
5. ALIGNMENT OF 1ST IF TRANSFORMER.  
APPLY OUTPUT OF SIG. GEN. TO GRID OR CATHODE OF CONVERTER TUBE. TUNE BOTTOM IRON SLUG FOR MAXIMUM DEFLECTION IN OUTPUT.  
FREQUENCY: VP100 10.3 Mc  
VP100A 9.0 Mc  
IN THE MODEL VP100 THERE IS A 14.25 Mc TRAP WHICH IS TUNED FOR MINIMUM DEFLECTION.  
6. ALIGNMENT OF SOUND IF TRANSFORMER.  
APPLY OUTPUT OF SIG. GEN. TO GRID OR CATHODE OF CONVERTER TUBE. TUNE TOP SLUG FOR MAXIMUM SOUND OUTPUT. MAXIMUM SOUND CAN BE DETERMINED BY EAR OR BY APPLYING V.T.V.M. OR OSCILLOSC. TO GRID OF 7C5 AUDIO OUTPUT.  
FREQUENCY: VP100 8.25 Mc  
VP100A 8.25 Mc

VIEWTONE COMPANY

MODELS VP100,VP100A, VP101A

THE INTENSITY CONTROL SHOULD BE TURNED COMPLETELY COUNTER-CLOCKWISE BEFORE TURNING THE SET ON. THIS WILL REDUCE THE ILLUMINATION OF THE INTENSE SPOT THAT APPEARS ON THE CATHODE RAY TUBE BEFORE THE SWEEP CIRCUITS START FUNCTIONING. BY TURNING THE CONTROL CLOCKWISE THE AVERAGE ILLUMINATION, OR BRIGHTNESS OF THE PICTURE IS INCREASED.

ON THE REAR OF THE CHASSIS ARE SEVEN CONTROLS, WHICH ONCE SET, NEED ONLY OCCASIONAL ADJUSTMENT.

THE HORIZONTAL SYNC. CONTROLS THE PICTURE STABILITY. IT SHOULD BE ADJUSTED TO THE ONE POINT WHERE THE PICTURE "LOOKS IN" HORIZONTALLY.

THE HORIZONTAL AMPLITUDE CONTROLS THE SIZE OF THE PICTURE ONCE IT HAS BEEN LOCKED IN.

THE VERTICAL SYNC. SHOULD BE ADJUSTED TO THE POINT WHERE ONLY ONE PICTURE LOOKS IN VERTICALLY.

THE VERTICAL AMPLITUDE CONTROLS THE VERTICAL SIZE OF THE PICTURE.

THESE CONTROLS WHEN ONCE SET REQUIRE ONLY OCCASIONAL ADJUSTMENT, THIS DUE TO THE AGING OR CHANGING OF TUBES.

THE FOCUS CONTROL SHOULD BE ADJUSTED TO THE POINT OF THE GREATEST SHARPNESS OF THE PICTURE

THE HORIZONTAL CENTERING CONTROL ENABLES THE COMPLETE PICTURE TO BE MOVED HORIZONTALLY IN ORDER TO CENTER IT ON THE TUBE.

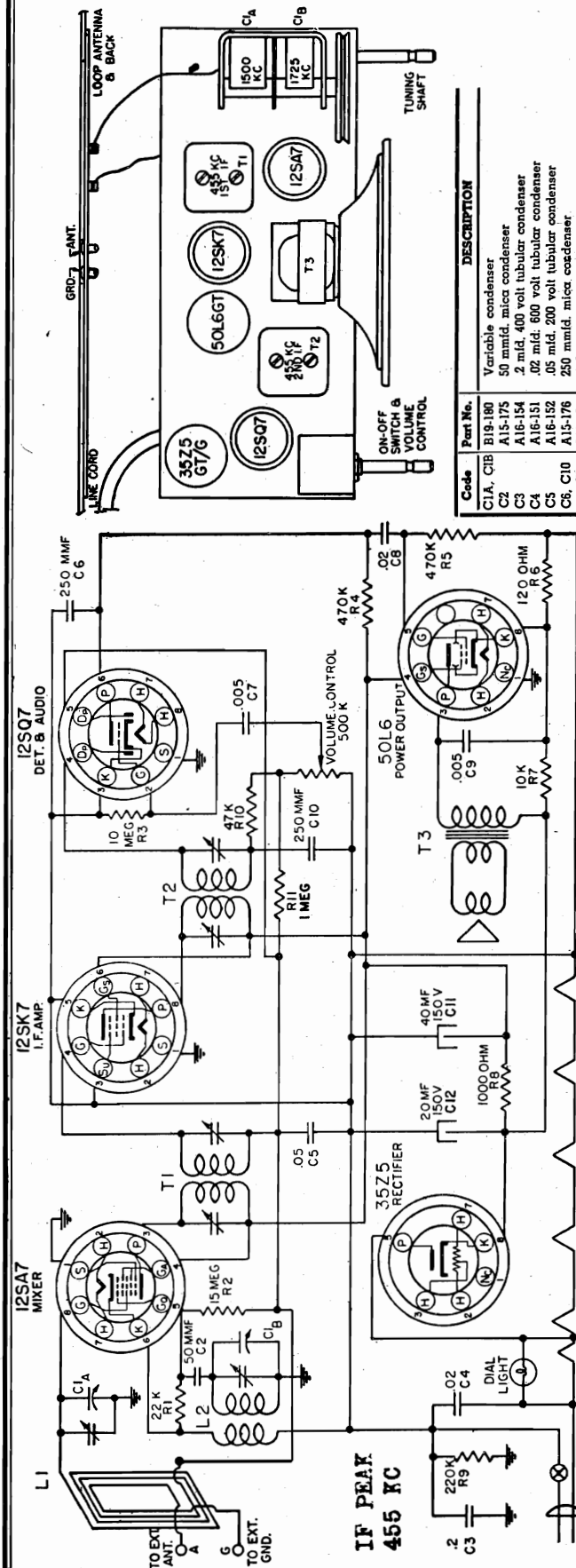
THE VERTICAL CENTERING CONTROL ENABLES THE COMPLETE PICTURE TO BE MOVED VERTICALLY IN ORDER TO CENTER IT ON THE TUBE.

IMPORTANT SAFETY PRECAUTIONS

USE EXTREME CAUTION AT ALL TIMES WHEN SERVICING RECEIVER.

THIS RECEIVER CONTAINS HIGH VOLTAGE (3,000 volts). AN INTERLOCK SWITCH IS PROVIDED AT THE REAR OF THE CHASSIS FOR THE PROTECTION OF THE INDIVIDUAL. IT IS RECOMMENDED THAT ONLY QUALIFIED PERSONNEL BE ALLOWED TO SERVICE THIS RECEIVER.

THE MOST DANGEROUS PORTION OF THE H.V. SUPPLY IS THE PLATE LEAD OF THE 2X2/879 RECTIFIER TUBE.



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

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

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

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

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

Position of Variable	Generator Frequency	Dummy Ant. Mtd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T1	Input I.F.
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T2	Output I.F.
Fully open	1725 KC	.00025	** Ant. terminal on loop	C1B	Oscillator
Tune in signal from generator	1500 KC	.00025	** Ant. terminal on loop	C1A	Antenna

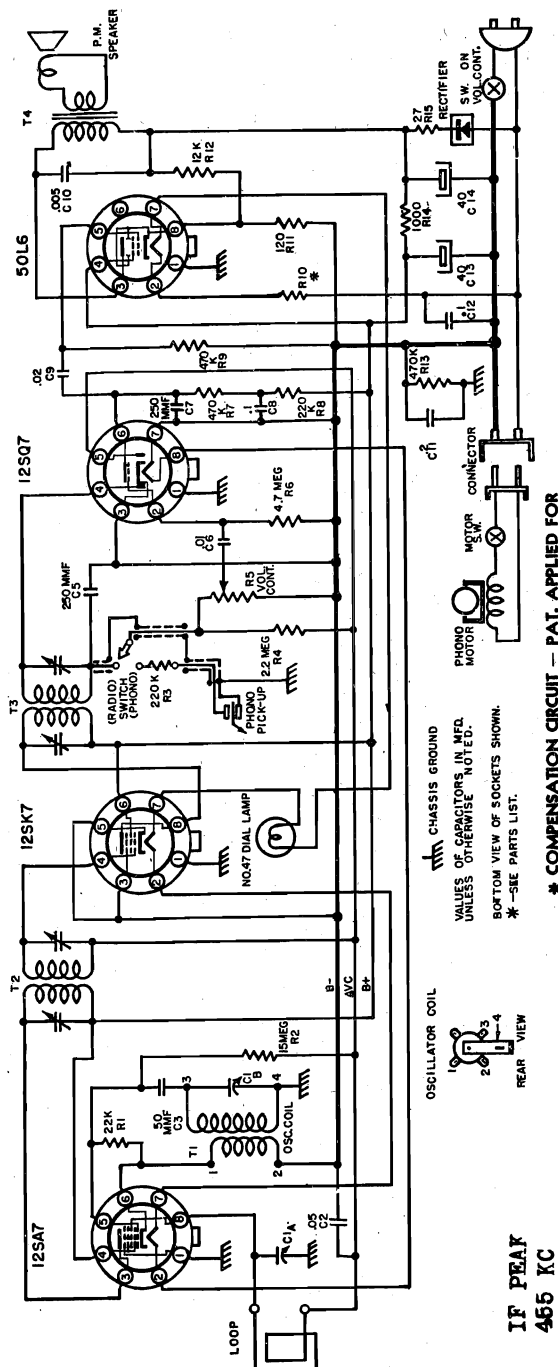
\* Connect ground lead of signal generator to chassis.

\*\* Connect ground lead of signal generator to terminal marked "G" on the back of the loop.

Code	Part No.	DESCRIPTION
C1A, C1B	B10-180	Variable condenser
C2	A15-175	50 mfd. mica condenser
C3	A18-154	2 mfd. 400 volt tubular condenser
C4	A18-151	.02 mfd. 600 volt tubular condenser
C5	A18-152	.05 mfd. 200 volt tubular condenser
C6	C10	250 mfd. mica condenser
C7, C8	A15-176	.005 mfd. 400 volt tubular condenser
C9	A18-153	.02 mfd. 400 volt tubular condenser
C10	A18-150	40 mfd. 150 volt electrolytic condenser
C11	A18-280	20 mfd. 150 volt electrolytic condenser
C12	A18-272	22K ohm 1/3 watt resistor
R1	A60-559	15 megohm 1/3 watt resistor
R2	A60-564	10 megohm 1/3 watt resistor
R3	A60-563	470K ohm 1/3 watt resistor
R4, R5	A60-562	120 ohm 1/3 watt resistor
R6	A60-558	10K ohm 1 watt resistor
R7	A60-598	100 ohm 1/2 watt resistor
R8	A60-598	220K ohm 1/3 watt resistor
R9	A60-595	47K ohm 1/3 watt resistor
R10	A60-598	1 megohm 1/3 watt resistor
R11	B82-40	Antenna, loop
L1	A10-411	Oscillator coil
L2	B10-453	1st I.F. transformer
T1	B10-454	2nd I.F. transformer
T2	A71-22	Output transformer (part of speaker)
T3	A71-22	Core, for volume control
A24-154	A71-22	Dial drive shaft
	A24-154	Volume control and switch

B75-340	5" P.M. speaker with output transformer
B75-343	Alternate speaker
B75-344	Alternate speaker
C83-332	Cabinet back (mahogany)
A83-335	Cabinet back (ivory)
D42-375	Cabinet, molded bakelite (mahogany)
A42-397	Cabinet, molded bakelite (ivory)
B67-466	Dial scale
A52-181	Knob (mahogany)
A52-189	Knob (ivory)
A59-41	Dial pointer
B85-267	Dial diffusing plate

Code	Part No.	DESCRIPTION
C1A, C1B	B13-189	Variable Condenser
C2	A18-152	50 MFD. 50 volt Condenser
C3	A18-153	50 MFD. 50 volt Condenser
C4, C7	A18-150	32 MFD. 400 volt Condenser
C5	A18-176	250 MFD. Mica Condenser
C6	A18-156	.01 MFD. 400 volt Condenser
C8	A18-157	.1 MFD. 200 volt Condenser
C9	A18-153	.005 MFD. 600 volt Condenser
C10	A18-154	.2 MFD. 400 volt Condenser
C11	A18-154	.2 MFD. 400 volt Condenser
C12	A18-154	.2 MFD. 400 volt Condenser
C13, C14	A18-280	40 MFD. 150 volt Electrolytic Condenser
R1	A66-659	22K Ohm 1/2 watt 20% Resistor
R2	A66-659	15 Megohm 1/2 watt 20% Resistor
R3	A66-659	220K Ohm 1/2 watt 20% Resistor
R4	A66-659	2.2 Megohm 1/2 watt 20% Resistor
R5	A66-659	500K Ohm Volume Control with Switch
R6	A66-659	470K Ohm 1/2 watt 20% Resistor
R7, R8, R13	A66-659	470K Ohm 1/2 watt 20% Resistor
R9	A66-719	Special Compensating Resistor, order only from the manufacturer
R10	A66-720	150 Ohm 1/2 watt 10% Resistor
R11	A66-659	12K Ohm 1/2 watt 10% Resistor
R12	A66-659	100K Ohm 1/2 watt 10% Resistor
R14	A66-721	27 Ohm 1/2 watt 10% Resistor
R15	A18-411	Oscillator Coil
T1	A18-411	1.5 F. Transformer
T2	B10-454	2nd 1.5 F. Transformer
T3	B86-230	Output Transformer
T4	A52-189	Knob, Volume
	A52-189	Knob, Tuning
	A52-200	Knob, Photo-Radio
	A52-201	Knob, Photo-Radio
	A52-172	Switch, Photo-Radio
	A52-173	Sum for Variable Condenser
	A52-174	Sum for Variable Condenser
	A52-175	Sum for Variable Condenser
	A52-176	Sum for Variable Condenser
	A52-177	Sum for Variable Condenser
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	A52-271	Sum for Variable Condenser
	A52-272	Sum for Variable Condenser
	A52-273	Sum for Variable Condenser
	A52-274	Sum for Variable Condenser
	A52-275	Sum for Variable Condenser



## ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment. The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

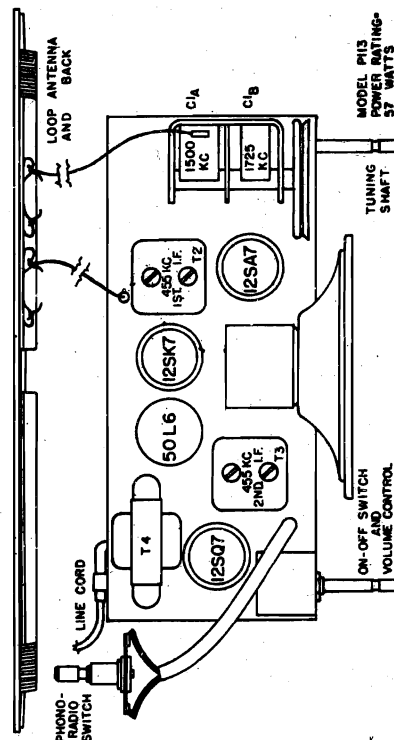
With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s. Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

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

Position of Variable	Generator Frequency	Dummy Ant. Mid.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T2	Input I.F.
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T3	Output I.F.
Fully open	1725 KC	.00025	* 12SA7 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1500 KC	.00025	**Loosely Coupled to Loop	C1A	Antenna

\*Connect ground lead of signal generator to Common "B."

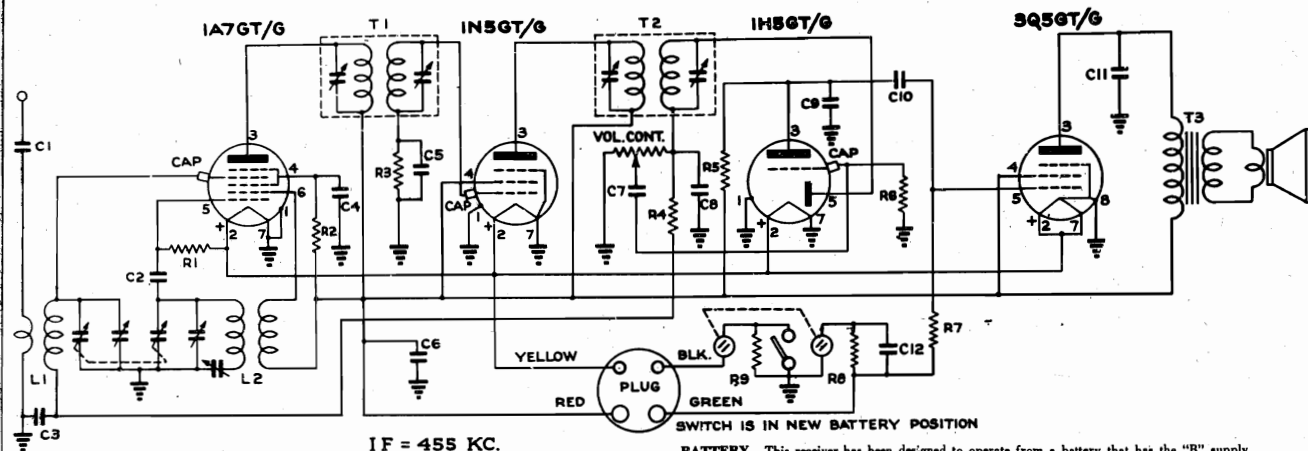
\*\*Do not connect ground lead of signal generator.





## WATTERSON RADIO MFG. CORP.

MODEL 4782



I F = 455 KC.

CODE	PART NO.	DESCRIPTION
C1	6W4	.00005 MICA CONDENSER
C2	6W3	.0005 MICA CONDENSER
C3	5W13	.1 MFD. 400 V. TUBULAR
C4	5W13	.1 MFD. 400 V. TUBULAR
C5	5W7	.02 MFD. 400 V. TUBULAR
C6	5W14	.25 MFD. 400 V. TUBULAR
C7	5W2	.005 MFD. 400 V. TUBULAR
C8	6W2	.00025 MFD. MICA CONDENSER
C9	6W1	.0001 MFD. MICA CONDENSER
C10	5W6	.01 MFD. 400 V. TUBULAR
C11	5W18	.002 MFD. 600 V. TUBULAR
C12	19W11	10 MFD. 50 V. TUBULAR

R1	9W47	220,000 $\Omega$ - 1/2 WATT
R2	9W6	22,000 $\Omega$ - 1/2 WATT
R3	9W55	1 MEGOHM - 1/4 WATT
R4	9W55	1 MEGOHM - 1/4 WATT
R5	9W55	1 MEGOHM - 1/4 WATT
R6	9W63	10 MEGOHM - 1/2 WATT
R7	9W56	2.2 MEGOHM 1/2 WATT
R8	9W32	380 $\Omega$ - 1/4 WATT
R9	9W12	75 $\Omega$ 1/4 WATT

T1	3W24	1ST. I.F. TRANSFORMER
T2	3W25	2ND. I.F. TRANSFORMER
T3	12W2	OUTPUT TRANSFORMER
L1	3W46	ANTENNA COIL
L2	3W45	OSCILLATOR COIL
SP.	22W10B	P.M. SPEAKER
VOL.	13W2	VOLUME CONTROL - 500M $\Omega$

**BATTERY**—This receiver has been designed to operate from a battery that has the "B" supply (90 volts) and the "A" supply (1½ volts) incorporated into a single pack. The batteries recommended to be used with this set are the following:

1. Ray-O-Vac—their No. "AB" 82 Power Pack.
2. Eveready—their No. 748 Power Pack.
3. Burgess—their No. 17G-D60 Power Pack.
4. General—their No. 60DL11L Power Pack.

Either of the above battery packs may be used in conjunction with this receiver, and is to be placed inside and to the rear of the cabinet and the 4 prong plug provided plugged into the socket of the battery pack.

**ANTENNA**—To obtain the excellent performance of which your Watterson Receiver is capable, a good outside antenna must be provided. For best results the antenna should be approximately 75 to 100 feet long, including the lead in, and should be connected to the colored wire coming out of the back of the cabinet. It should be erected as high as possible and as far from surrounding objects as practical.

**GROUND**—A ground connection must be used. A satisfactory ground can be made by connecting the black wire to a nearby cold water pipe by means of an approved clamp, or to a pipe or ground rod driven into the ground.

**BATTERY AND TUBE SAVING SWITCH**—Located on the back of the chassis is a slide type switch identified by the instruction tag "New Battery" and "Old Battery". When using an unused or new battery, the switch must be in the "New Battery" position. After approximately 100 hours of actual use of battery, this switch may be moved to the "Old Battery" position and increased sensitivity and performance obtained.

**OPERATION**—There are two adjustable controls on the front panel of the receiver. The one on the left is the volume control. Turning the volume control knob in a clockwise direction turns the receiver on, and is also a means of adjusting the volume output of the receiver.

**CAUTION**—When not using the receiver, make certain that it is shut off by turning the volume control knob completely to the left until the on-off switch has been thrown. Failure to do this will cause the battery pack to run down.

The knob on the right is the tuning knob and is used to tune any desired station within the broadcast band.

## I. F. Alignment

The I. F. frequency of this receiver is 455 K. C. For realignment, use the following procedure:

Open tuning condenser fully, and set volume control to maximum volume.

Couple an accurately calibrated signal generator to the grid of the 1A7 tube with a .1 mfd. condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 455 K. C. Attenuate the signal generator so that the signal is just audible in the speaker. If possible, an output meter should be used.

Adjust the 2nd I. F. transformer first. Each screw should be adjusted for maximum output. After the 2nd I. F. has been adjusted, the 1st I. F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck both transformers, making sure maximum output has been attained from both I. F.'s.

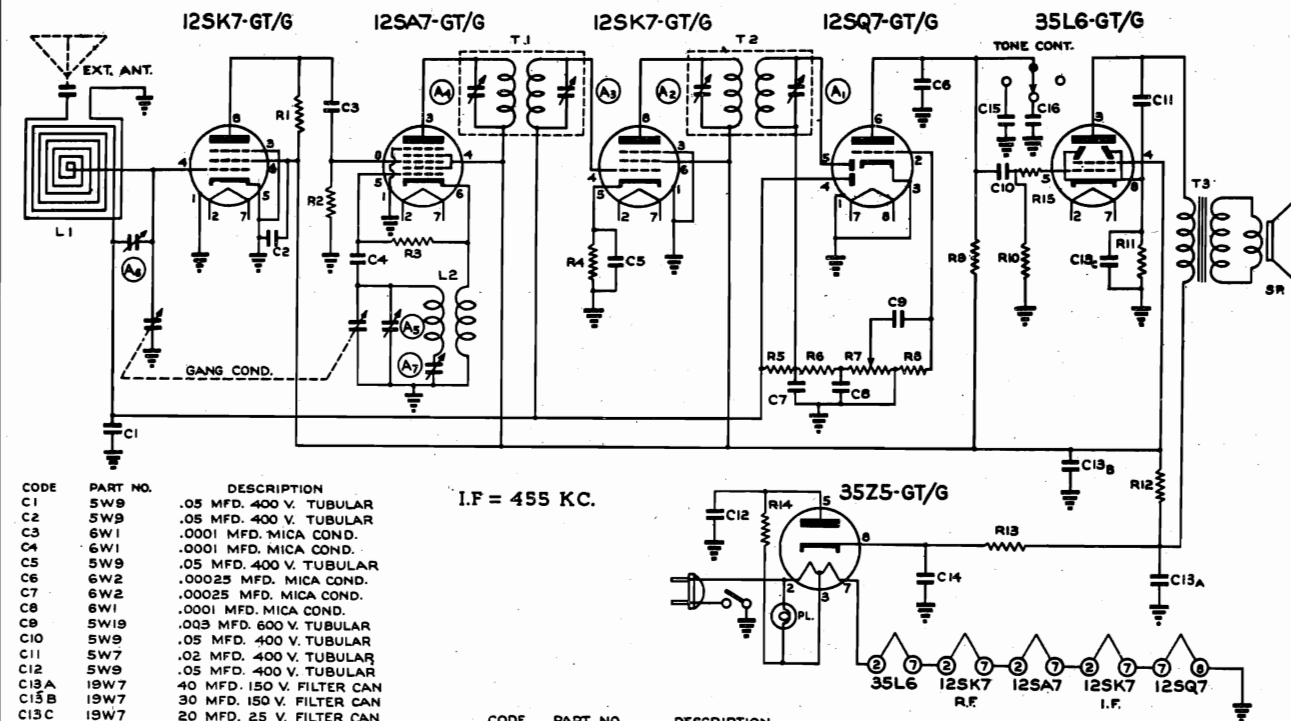
## R. F. Alignment

To align the R. F. section of the receiver, proceed as follows:

1. Connect the "high" side of the signal generator to the antenna lead and the ground lead to radio chassis.
2. Set tuning dial to 1400 K. C. and while feeding a 1400 K. C. signal into receiver adjust the oscillator trimmer (inside adjustment) and antenna trimmer (on top of chassis) for maximum output.
3. Set tuning dial to approximately 600 K. C. and while "rocking" the dial adjust the oscillator padder (nearest edge of chassis) for maximum output.
4. Repeat steps 2 and 3 above.

MODEL 4790

## WATTERSON RADIO MFG. CORP.



I.F. = 455 KC.

CODE	PART NO.	DESCRIPTION
C1	5W9	.05 MFD. 400 V. TUBULAR
C2	5W9	.05 MFD. 400 V. TUBULAR
C3	6W1	.0001 MFD. MICA COND.
C4	6W1	.0001 MFD. MICA COND.
C5	5W9	.05 MFD. 400 V. TUBULAR
C6	6W2	.00025 MFD. MICA COND.
C7	6W2	.00025 MFD. MICA COND.
C8	6W1	.0001 MFD. MICA COND.
C9	5W19	.003 MFD. 600 V. TUBULAR
C10	5W9	.05 MFD. 400 V. TUBULAR
C11	5W7	.02 MFD. 400 V. TUBULAR
C12	5W9	.05 MFD. 400 V. TUBULAR
C13A	19W7	40 MFD. 150 V. FILTER CAN
C13B	19W7	30 MFD. 150 V. FILTER CAN
C13C	19W7	20 MFD. 25 V. FILTER CAN
C14	19W5	30 MFD. 150 V. PAPER FILTER
C15	5W20	.006 MFD. 600 V. TUBULAR
C16	5W17	.001 MFD. 600 V. TUBULAR

CODE	PART NO.	DESCRIPTION
L1	3W31	LOOP - 184 $\mu$ H.
L2	3W28	OSCILLATOR COIL
T1	3W20	1ST. I.F. TRANSFORMER
T2	3W21	2ND. I.F. TRANSFORMER
T3	12W1	OUTPUT TRANSFORMER
PL	26W2	PILOT LIGHT
SP	22W22	SPEAKER
NOTE: R15	5W11	250 $\Omega$ - 1/2 WATT (OMITTED ON SOME MODELS)

R1	9W37	2,200 $\Omega$ - 1/2 WATT RESISTOR
R2	9W28	100,000 $\Omega$ - 1/2 WATT
R3	9W64	22,000 $\Omega$ - 1/2 WATT
R4	9W72	1,000 $\Omega$ - 1/2 WATT
R5	9W56	2.2 MEGOHM - 1/2 WATT
R6	9W52	47,000 $\Omega$ - 1/2 WATT
R7	13W1	.5 MEGOHM VOL. CONT.
R8	9W63	10 MEGOHM - 1/2 WATT
R9	9W62	220,000 $\Omega$ - 1/2 WATT
R10	9W59	470,000 $\Omega$ - 1/2 WATT
R11	9W20	150 $\Omega$ - 1/2 WATT
R12	9W72	1000 $\Omega$ - 1/2 WATT
R13	9W47	220 $\Omega$ - 1 WATT
R14	9W61	22 $\Omega$ - 1/2 WATT

**ANTENNA**—No external antenna is required for the Model 4790 except in remote localities where reception is poor. For proper performance in such a case, an outside antenna approximately 75 feet in length, including lead in, should be connected to the colored antenna lead extending from the back of the set.

**OPERATION**—The three controls on the front panel of the receiver are used as follows: the extreme left control is the on-off switch and volume control; the center control is the tuning control; and the extreme right control is the tone control.

## I. F. Alignment

Connect the low side of an accurately calibrated signal generator through a .1 mfd condenser to the chassis of the receiver and the "high" side of the generator through a .1 mfd. condenser to the R. F. grid (pin 8) of the 12SA7 converter tube. Set the signal generator to 455 Kc. with just enough signal to be audible in the speaker with the receiver volume control full on. If possible, an output meter should be used.

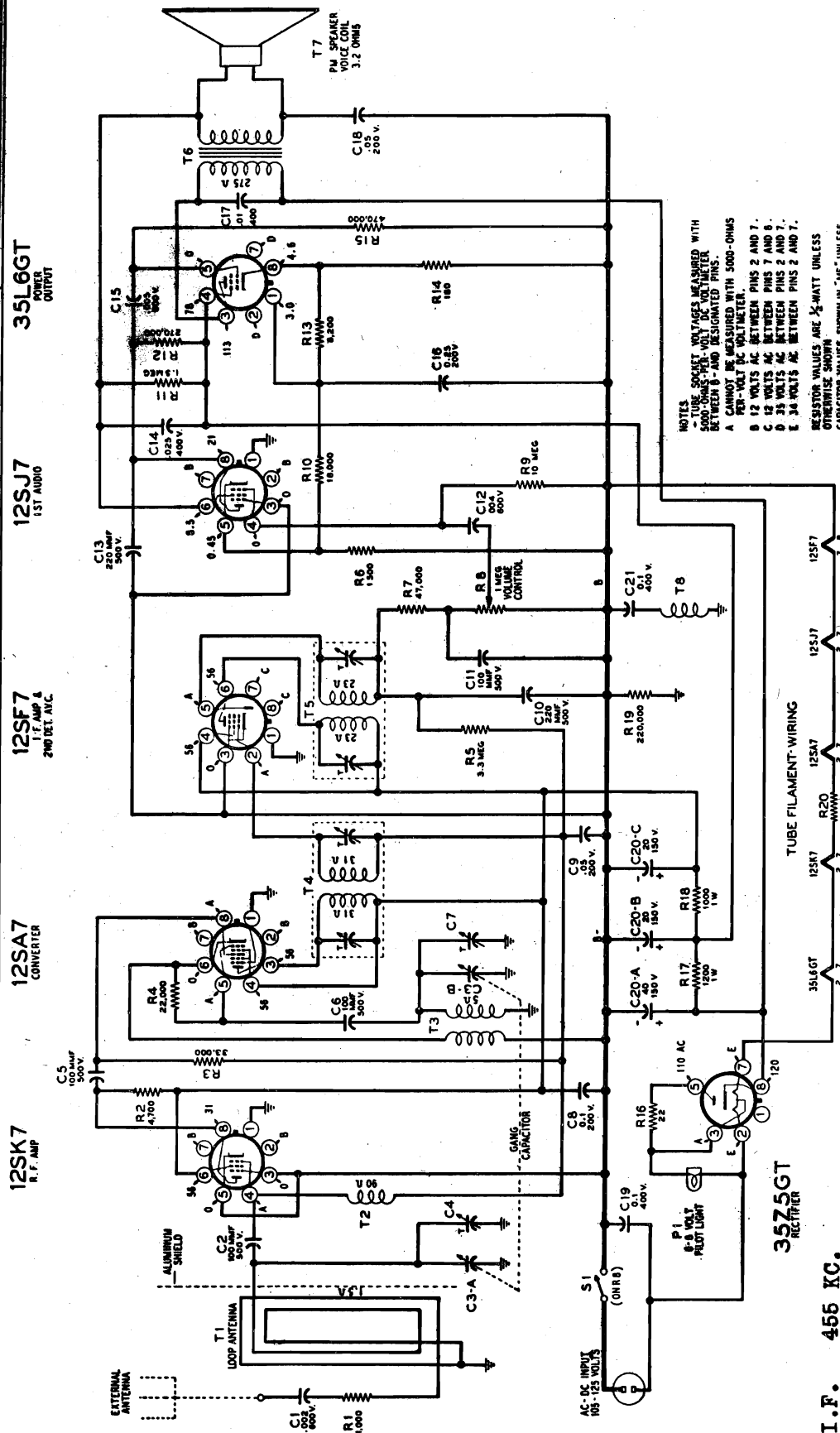
Adjust the second I. F. transformer ( $A_1$  and  $A_2$ ) and then the first I. F. transformer ( $A_3$  and  $A_4$ ) for maximum output. Recheck all adjustments.

## R. F. Alignment

Connect "high" side of signal generator to the antenna lead of the receiver. Set dial pointer to 1400 Kc. on the receiver dial and turn volume control full on. Set signal generator to 1400 Kc. Adjust oscillator trimmer ( $A_5$ ) and then the antenna trimmer ( $A_6$ ) for maximum output. Set signal generator to 600 Kc. and receiver dial to approximately 600 Kc. While "rocking" receiver dial, adjust oscillator padder ( $A_7$ ) for maximum output. Recheck adjustments at 1400 Kc.



WESTERN AUTO SUPPLY CO.



Technical Data

Tuning range	530 to 1600 kc	Sensitivity (for 0.05 watt output)	14 microvolts average
Intermediate frequency	455 kc	Power output (in voice coil)	0.84 watts
Power consumption	30 watts	Undistorted	Maximum
Selectivity	65 kc broad at 1000 x signal at 1000 kc		1.5 watts

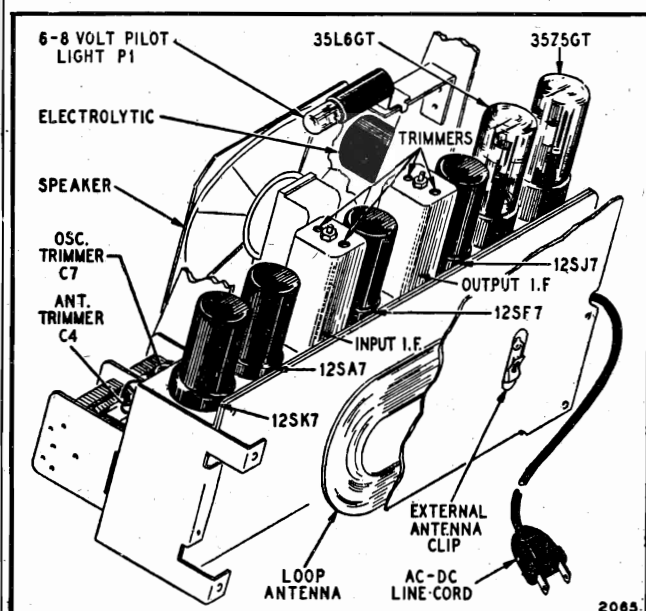
## WESTERN AUTO SUPPLY CO.

## ALIGNMENT PROCEDURE

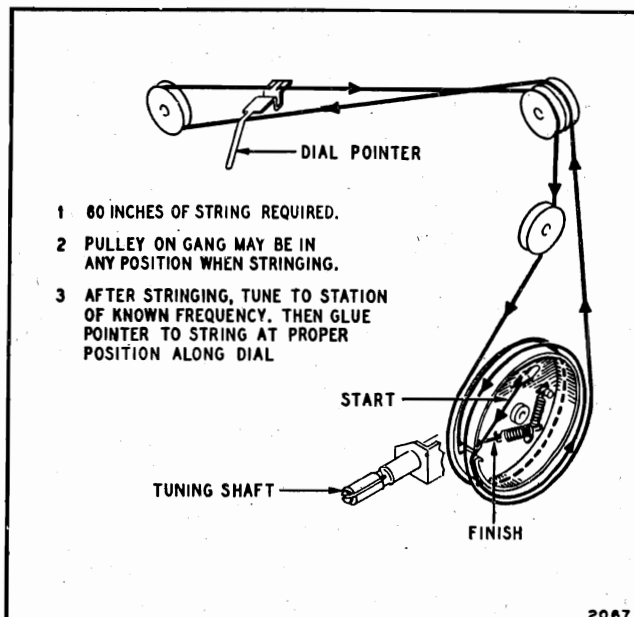
(Refer to Chassis View)

- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Connect ground post of signal generator to B— of radio.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR			TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
Frequency	Dummy Antenna	Connection to Radio		
455 kc	0.1 mf	Stator of antenna section of gang	Rotor full open (plates out of mesh)	Trimmers on output and input I.F. cans
1600 kc	0.1 mf	Stator of antenna section of gang	Rotor full open (plates out of mesh)	Oscillator trimmer C7
1400 kc	200 mmf	External antenna clip	1400 kc	Antenna trimmer C4



Chassis View



Replacing Dial Pointer Drive Cord

## SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select.

1. Turn on the radio.
2. Push out the call letters of the desired stations from the call-letter sheets supplied with this manual.
3. Insert one call letter tab in each of the pushbuttons, preferably but not necessarily in order of frequency (as obtained from your newspaper). Press an acetate tab (supplied in small envelope) into each of the buttons.
4. Rotate the tuning knob to the left (counterclockwise) as far as it will go.
5. On the bottom of the set is a hole through which the pushbutton locking screw can be adjusted. With a screwdriver, check to see if the screw is loose. If it is not, turn it several turns to the left. Then return the set to an upright position.

6. Press the first pushbutton down **all the way**. With one hand hold the button down **firmly** and with the other carefully tune in the desired station. Release the pushbutton.

7. Follow this procedure for each of the five other buttons, adjusting each one for a different station.

8. Rotate the tuning knob as far to the left as it will go. Now tighten the locking screw on the bottom of the radio. **IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.**

9. The pushbuttons are now properly set for automatic tuning. Any of the six stations may now be tuned in simply by pressing the proper button down as far as it will go. If it is desired to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

MODEL D2616  
MODEL D2619

# MODEL D 2616 WESTERN AUTO SUPPLY CO.

Ref. No.	Part No.	Description
<b>CAPACITORS *</b>		
C1	C-8D-10778	.002 mf, 600 volts, +40% -15%
C2,C5	C-8F3-8	100 mmf, 500 volts, 20%, mica
C6,C11		
C-3A,B	B-8A-10827	Two-gang condenser assembly, including antenna and oscillator trimmers. Range of gang: 15-452 mmf (ant.), 10-162 mmf (osc.).
C4,C7		
C8	C-8D-10771	.1 mf, 200 volts, +20% -10%
C9,C18	C-8D-10770	.05 mf, 200 volts, 20%
C10,C13	C-8F3-10	220 mmf, 500 volts, 20%, mica
C12	C-8D-10788	.004 mf, 600 volts, 20%
C14	C-8D-10987	.025 mf, 400 volts, 10%
C15	C-8D-10985	.005 mf, 600 volts, +40% -15%
C16	C-8D-10775	.25 mf, 200 volts, +20% -10%
C17	C-8D-10761	.01 mf, 400 volts, 20%
C19,C21	C-8D-10760	.1 mf, 400 volts, +20% -10%
C20-A,B,C	A-8C-10077	Electrolytic, for 60 cycles; 40 mf x 150 volts, 20 mf x 150 volts, 20 mf x 150 volts
C20-A,B,C	A-8C-10946	Electrolytic, for 25 cycles; 60 mf x 150 volts, 40 mf x 150 volts, 40 mf x 150 volts
<b>RESISTORS *</b>		
R1	C-9B1-62	1000 ohms, 1/2 watt, 10%
R2	C-9B1-70	4700 ohms, 1/2 watt, 10%
R3	C-9B1-80	33,000 ohms, 1/2 watt, 10%
R4	C-9B1-78	22,000 ohms, 1/2 watt, 10%
R5	C-9B1-34	3.3 megohms, 1/2 watt, 20%
R6	C-9B1-64	1500 ohms, 1/2 watt, 10%
R7	C-9B1-82	47,000 ohms, 1/2 watt, 10%
R8,S1	A-10A-10642	Volume control (1 megohm) and on-off switch
R9	C-9B1-37	10 megohms, 1/2 watt, 20%
R10	C-9B1-77	18,000 ohms, 1/2 watt, 10%
R11	C-9B1-32	1.5 megohms, 1/2 watt, 20%
R12	C-9B1-81	270,000 ohms, 1/2 watt, 10%
R13	C-9B1-73	8200 ohms, 1/2 watt, 10%
R14	C-9B1-53	180 ohms, 1/2 watt, 10%
R15	C-9B1-94	470,000 ohms, 1/2 watt, 10%
R16	C-9B1-3	22 ohms, 1/2 watt, 20%
R17	C-9B2-63	1200 ohms, 1 watt, 10%
R18	C-9B2-62	1000 ohms, 1 watt, 10%
R19	C-9B1-90	220,000 ohms, 1/2 watt, 10%
R20	C-9B2-44	33 ohms, 1 watt, 10%
<b>COILS AND TRANSFORMERS</b>		
T1	C-201-10908	Loop antenna assembly (includes cabinet back, capacitor C1 and resistor R1)
T2	A-16A-12161	R.F. choke coil
T3	A-13D-10661	Oscillator coil
T4	B-13B-10091-1	Input I.F. transformer complete in can. Range of trimmers: 45-85 mmf each.
T5	B-13B-10794	Output I.F. transformer complete in can. Range of trimmers: 43-79 mmf each.
T6	B-12C-10623	Output transformer for speaker
T8	A-16A-10792	I.F. choke coil

\*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences in both resistors and capacitors follows:

## NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

Ref. No.	Part No.	Description
<b>DIAL AND TUNING PARTS</b>		
P1	B-6D-10650	Dial scale
	A-6A-10609	Diffuser
	B-2M-7758	Snap-in rivet, for diffuser (2 used)
	A-2G-10639	Dial pointer
	B-53A-10989	String for dial pointer (60")
	A-49A-10887	Spring for dial pointer string
	A-55A-10093	Socket assembly, for dial light
	A-46A-10793	Dial light bulb, 6-8 volts, T-47
	A-3C-10641	Spacer, brass (on extreme left)
	A-3C-10640	Spacer, brass (5 used)
	A-2C-10658	Cam
	A-2C-10611	Washer, D-D, on sides of cams
	29E-1812	Spring washer, on cam shaft
	A-3F-10656	Locking screw for cams
	A-2C-10654	Retainer yoke
T7	A-2C-10655	Cam yoke
	A-2L-10610	Stop arm
	200-10653	Lever assembly (arm and roller)
	A-2C-10607	Gear segment
	A-3B-10643	Gear bushing
	A-3C-10636	Coupling pin, on gear segment
	A-49A-10646	Drum spring, on gear coupling pin
	A-3A-10651	Tuning shaft
	A-3L-7192	Pinion gear on tuning shaft
	A-49A-10628	Lever spring
	<b>MISCELLANEOUS</b>	
	B-18A-10647	P.M., 6" x 4" oval
	A-15B-10440	Socket, octal (for all tubes but 12SK7)
	A-15C-11201	Socket, octal, laminated (for 12SK7)
	B-15B-10076	Mounting plate, for electrolytic
	B-14M-10088	Line cord and plug
	B-2M-11205	Snap-in rivets, for mounting back (5 used)
	A-2M-10096	Split tee-pins, for mounting back (2 used)
	5C-10010-9	Cabinet
	B-5B-10016-8	Knob, volume and tuning
	B-5A-10648-8	Pushbutton
	A-25B-10736	Rubber feet for cabinet
	A-23L-10934	Station call letters, one set
	A-6C-10819	Acetate tabs, for pushbuttons
	A-2H-10715	Tube shield (used with metal-base 12SA7GT tube)
	A-2H-11271	Tube shield (used with bakelite-base 12SA7GT tube)

NOTICE: There is a power rating label on the cabinet. This label specifies the power supply on which the radio may be used, and identifies it as to stock number and model. When ordering parts or writing, give ALL information appearing on label.

- H-244A Speaker 5" PM
- S-608A Tube Socket Octal (8 prong)
- E-164A Knob-tuning and volume
- A-2131 Line Cord and plug

### COILS

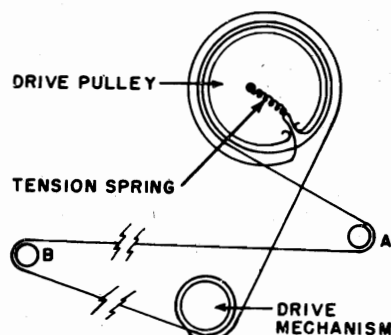
- A-2154B Antenna & Back Cover Assembly
- T-1361A 1st I.F. Transformer 456 KC
- T-1362A 2nd I.F. Transformer 456 KC
- T-1365A R. F. Choke Coil 1.4 MH
- T-1368A Audio Transformer
- T-1372A R.F. Choke Coil 3.0 MH

### CAPACITORS

- C-471A 0.1 mfd, 400 V Tubular
- C-493A 1000 mmf, 350 V Ceramic
- C-494A 250 mmf, 350 V Ceramic
- C-495A 50 mmf, 500 V Ceramic
- C-480A 0.005 mfd, 400 V Tubular
- C-466A 40-40 mfd, 150 V Electrolytic
- C-483A 10-160 mmf Trimmer
- C-496A 0.02 mfd, 200 V Tubular
- C-460A 0.1 mfd, 200 V Tubular
- C-497A 0.2 mfd, 400 V Tubular
- C-500A 0.01 mfd, 400 V Molded

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- W-43A 50 ohm, 10 Watt Wire wound
- W-415A 150 ohm, 0.5 Watt Carbon
- W-452A 4700 ohm, 0.5 Watt Carbon
- W-433A 1000 ohm, 1.0 Watt Carbon
- W-437A 22,000 ohm, 0.25 Watt Carbon
- W-438A 47,000 ohm, 0.25 Watt Carbon
- W-439A 100,000 ohm, 0.25 Watt Carbon
- W-440A 220,000 ohm, 0.25 Watt Carbon
- W-441A 470 ohm, 0.25 Watt Carbon
- W-442A 2.2 megohm, 0.25 Watt Carbon
- W-443A 10 megohm, 0.25 Watt Carbon
- W-444A Switch & Pot, 500,000 ohm, Carbon



### TUNER & DRIVE PARTS

- A-2143E Tuner Assembly
- L-2450A Pulley-Drive
- L-2451A Pulley-Idler
- U-1442A Shoulder Rivet
- H-247B Glass Dial
- H-246A Translucent Screen
- U-1445A Snaps for Screen
- U-1461A Pointer
- U-1444A Spring
- S-599A Pilot Light Socket Assembly
- A-2155A Dial Drive Assembly

## DRIVE CORD REPLACEMENT

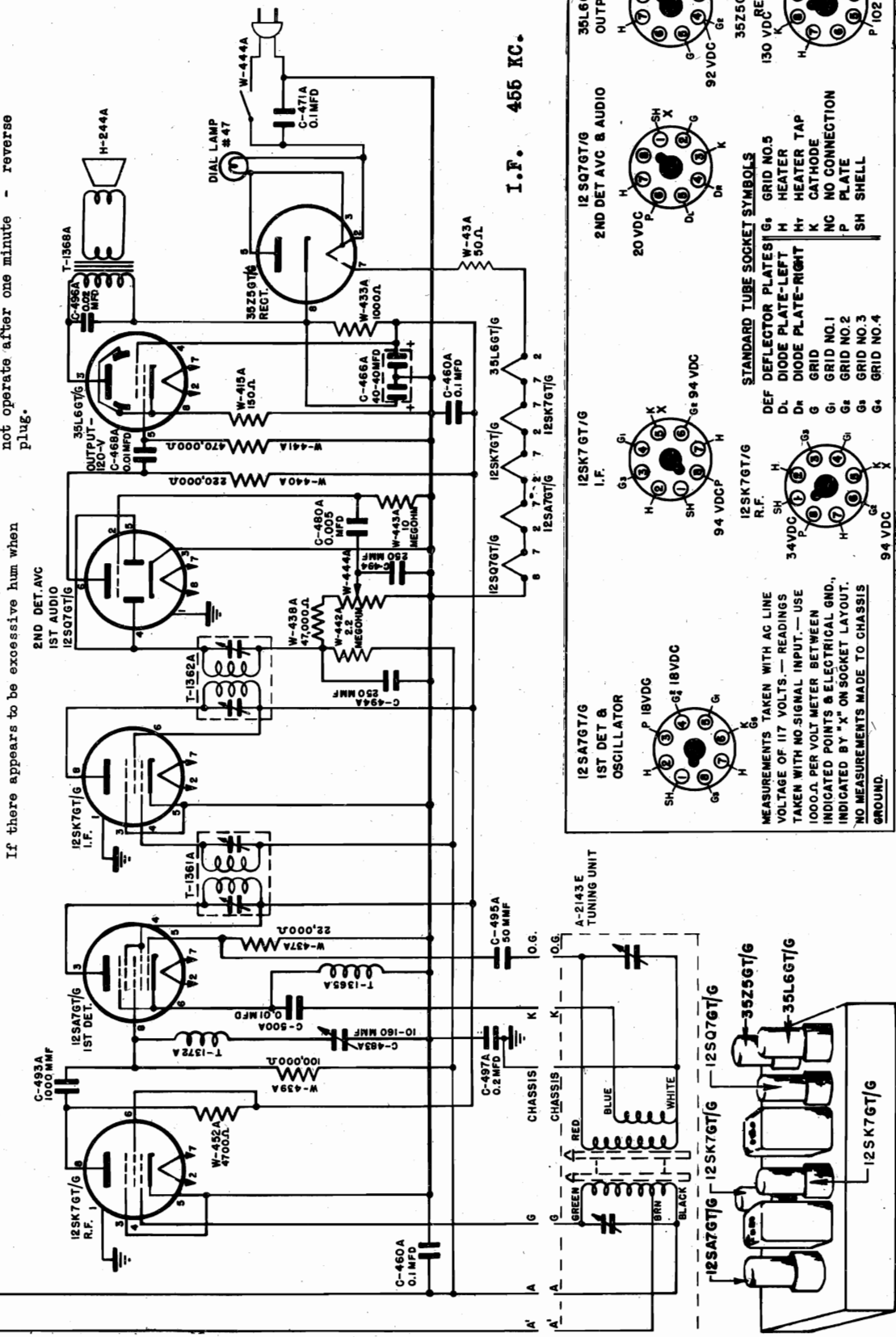
Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string. Attach dial pointer to cord.

MODEL D2819

WESTERN AUTO SUPPLY CO.

using the radio on AC, reverse the plug.  
Leave the plug inserted in the position that results in the least hum.  
Radios for 25 cycle AC operation are so marked.  
DC OPERATION - Insert plug. If set does not operate after one minute - reverse plug.

Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50 to 60 cycles only or 105-125 volts DC. Do not connect the radio to the power source until certain that the power supply is correct for the receiver. If in doubt, telephone your local power company before connecting the receiver.  
If there appears to be excessive hum when



# WESTERN AUTO SUPPLY CO.

5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F. coil slug by rotation in the trimmer nut to maximum output.

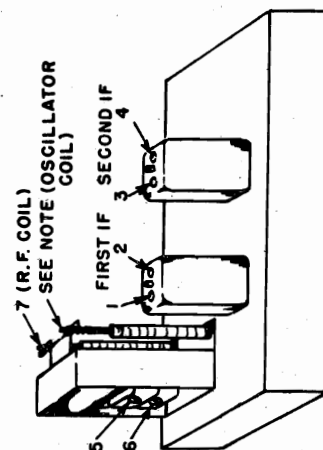
NOTE: If more than one complete turn of the slug is required to obtain maximum signal, return tuner to 1400 kc. position and repeat steps 4 and 5.

If less than one turn is required to obtain the maximum 700 kc. audio output, the R.F. alignment may be considered complete.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

## SPECIFICATIONS

Power consumption..... 35 Watts  
(At 117 volts AC Supply)  
Power Output- 1.6 Watts 10% Distortion  
Selectivity-----49 KC Broad at 1000 times Signal  
Intermediate Frequency..... 455 KC  
Speaker..... 5" PM Dynamic  
Tuning Frequency Range...540 to 1620 KC  
Sensitivity (For .06 Watt output-external Antenna) 20 microvolts average



## ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding. (Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

## B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F. adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

## C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F. input to keep signal output voltage below 0.5 V.

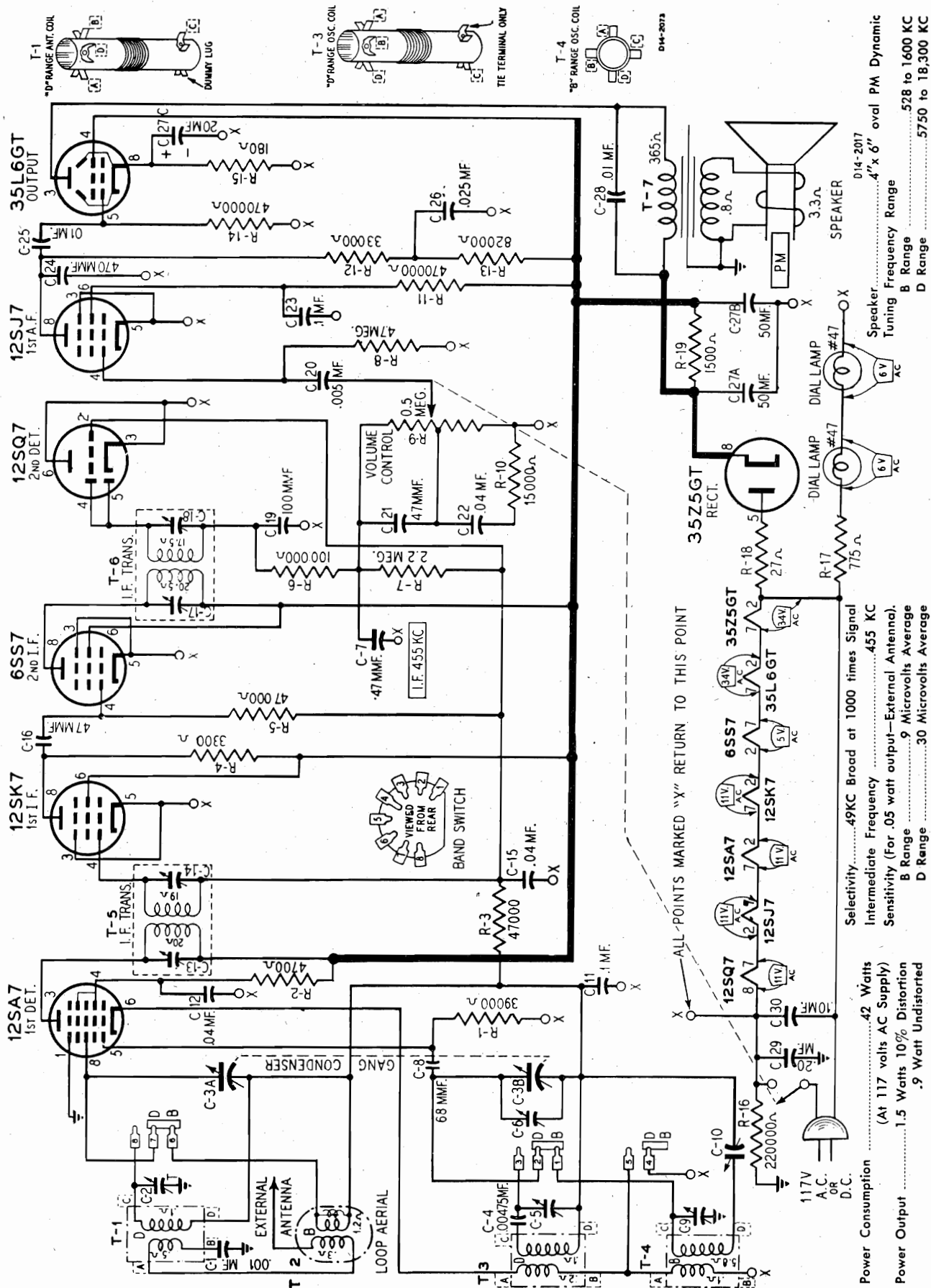
## ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.  
Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.  
Output Indicating Meter; Non-Metallic Screwdriver.  
The equipment in column at right is required for Aligning:

SIGNAL GENERATOR		DUMMY ANTENNA	COUPLING	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
FREQUENCY SETTING	ANTENNA CONNECTION					
I.F. 455 KC	Grid of RF tube 12SK7 to chassis	0.01 mfd	Ground generator to chassis	Out	Adjust for Max. 1, 2, 3 and 4	No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting
I.F. 455 KC	Grid of RF tube 12SK7 to chassis	0.01 mfd	Ground generator to chassis	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	400 ohms in series with Antenna & Gnd. leads	Loop coupling with leads brought out	Out	Adjust Osc. #5 per Max. signal	
1400 KC	Inductive Coupling to Loop	400 ohms in series with Antenna & Gnd. leads	Loop coupling with leads brought out	Dial set for 1400KC	Adjust RF trimmer #6 per Max. Signal.	
700 KC	Inductive Coupling to Loop	400 ohms in series with Antenna & Gnd. leads	Loop coupling with leads brought out	Dial set for 700KC	Adjust RF tuning core #7 for Max. (care should be taken not to disturb carriage position of tuner)	If more than one turn is required, the trimming 1400 KC should be repeated and the 700 KC padding of the tuning core also repeated until correct alignment has been reached

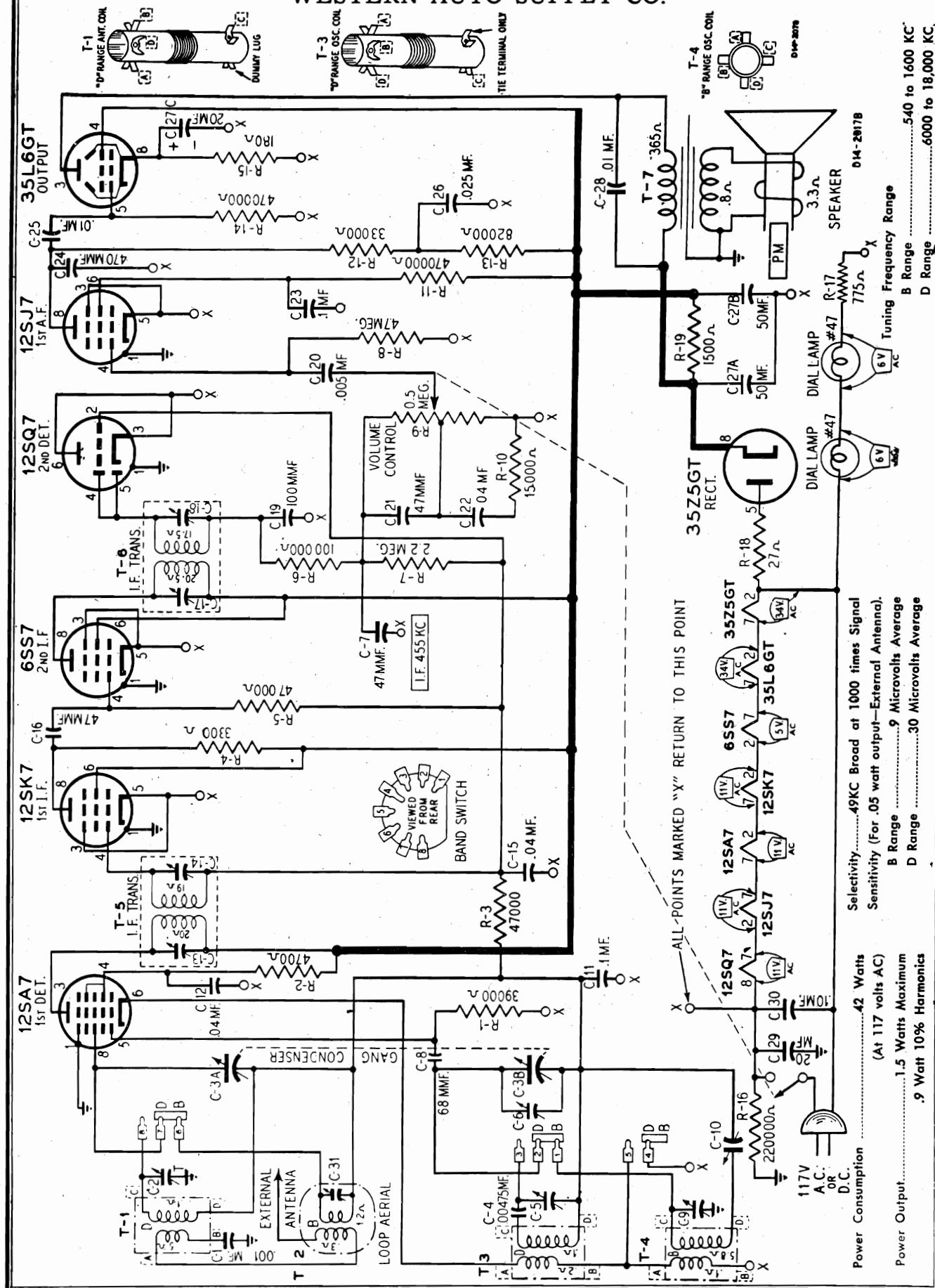
MODELS D2624 Early,  
D2630

WESTERN AUTO SUPPLY CO.



Power Consumption	42 Watts	At 117 volts AC Supply
Power Output	1.5 Watts	10% Distortion
Power Output	.9 Watt	Undistorted
Selectivity	49KC	Broad at 1000 times Signal
Intermediate Frequency	455 KC	
Sensitivity (For .05 watt output—External Antenna).		
B Range	9 Microvolts	Average
D Range	30 Microvolts	Average
Speaker	4" x 6" oval	PM Dynamic
Tuning Frequency Range		
B Range	528 to 1600 KC	
D Range	5750 to 18,300 KC	

WESTERN AUTO SUPPLY CO.



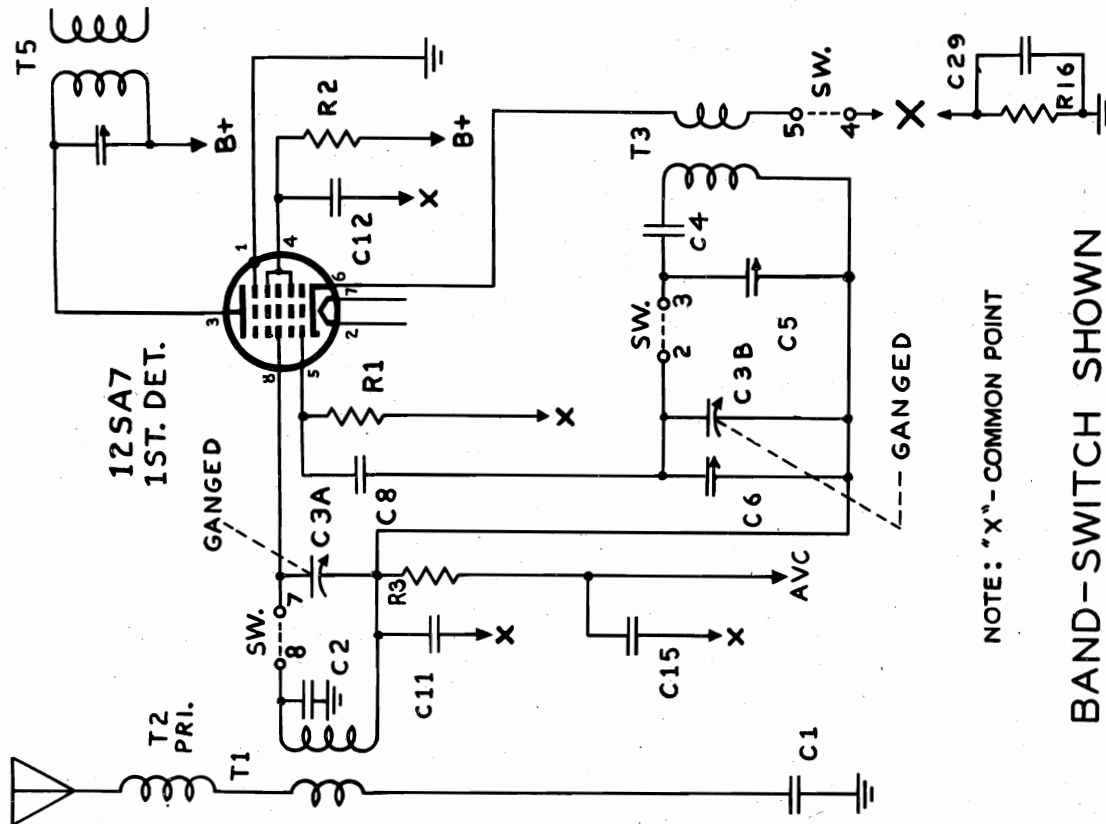


# "clarified schematics"

PAGE 16-8 TRUETONE

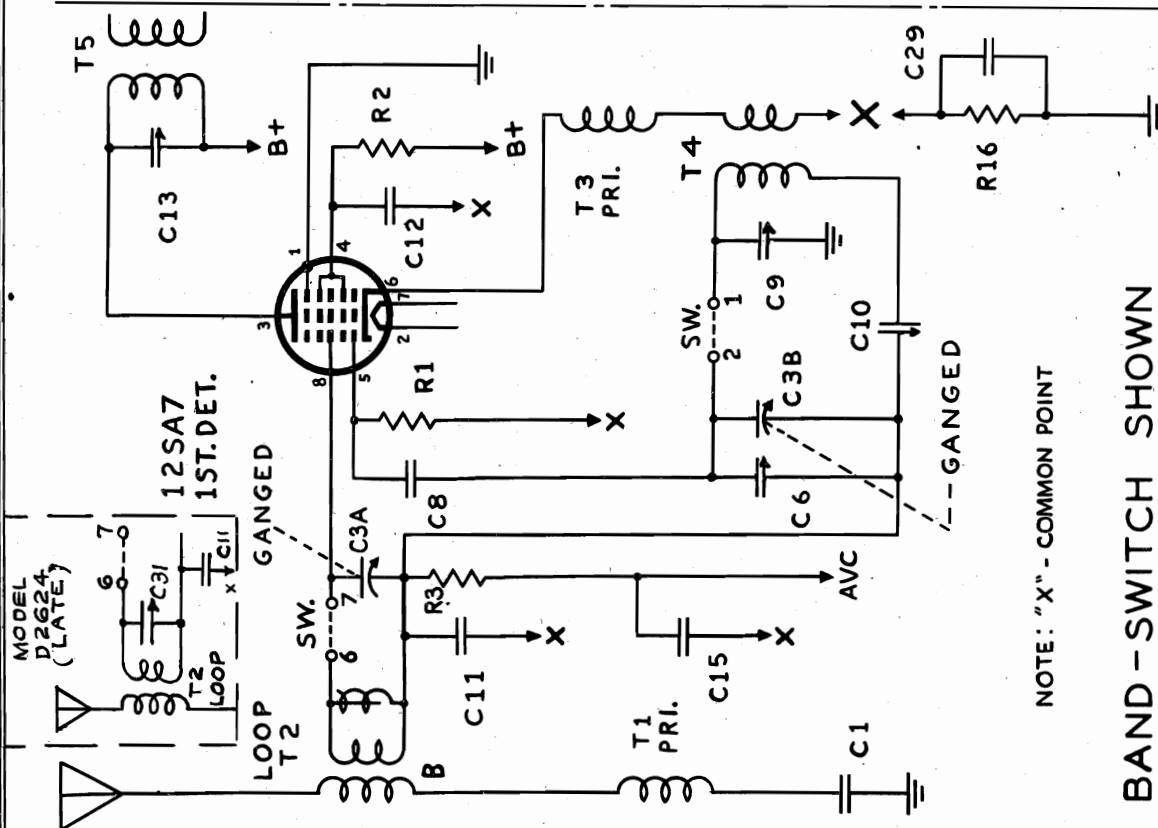
MODELS D2624 Early,  
Late, D2630

WESTERN AUTO SUPPLY CO.



NOTE: "X" - COMMON POINT

BAND-SWITCH SHOWN  
AT 2<sup>ND</sup> POSITION CLOCKWISE  
SHORT WAVE "D" BAND  
5.75-18.3 MC.



NOTE: "X" - COMMON POINT

BAND-SWITCH SHOWN  
AT 1<sup>ST</sup> POSITION.  
BROADCAST "B" BAND  
528-1600 KC.



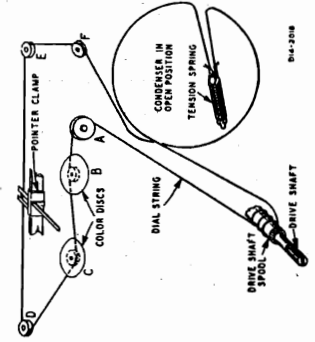
MODELS D2624 Early,  
Late, D2630

# WESTERN AUTO SUPPLY CO.

**Notes:** In late models note D is not used in the alignment procedure. All other data is the same for both models.

BC. Band Early  
528 to 1600 KC  
BC. Band Late  
540 to 1600 KC  
SW. Band Early  
5.75 to 18.3 MC  
SW. Band Late  
6 to 18 MC

16 Meter Band ... 17.1-17.9 MC  
19 Meter Band ... 15.1-15.3 MC  
25 Meter Band ... 11.7-11.9 MC  
31 Meter Band ... 9.5-9.7 MC  
49 Meter Band ... 6-6.2 MC



## ALIGNMENT PROCEDURE

Check Dial Pointer position, see DIAL CALIBRATION paragraph.

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

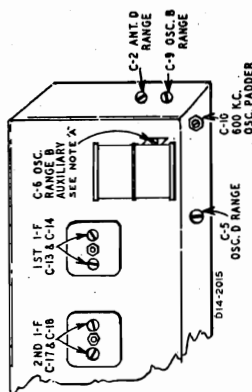
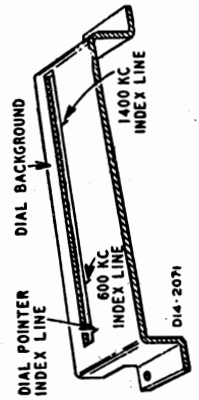
SIGNAL GENERATOR	DUMMY ANTENNA	BAND SWITCH	CONDENSER TO MAXIMUM (See Trimmer Illustration)
FREQUENCY SETTING	CONNECTION	ANTENNA SETTING	SETTING
1. F.	Point "X"	.1 mf.	Turn Rotor to Full 1st I.F. (C13) & (C14) Open
455 KC	Signal Grid at 1st. Det. Connect at Stator of Large Gang Section.	B Range	2nd I.F. (C17) & (C18)

RANGE B	External Antenna Clip	Point "X"	200 mmf.	B Range	Turn Rotor to 1400 KC Index Line. See Note B	Oscillator Range B (C9)
1400 KC	External Antenna Clip	Point "X"	200 mmf.	B Range	Turn Rotor to Max. Output and Reck	See Note C
600 KC	External Antenna Clip	Point "X"	200 mmf.	B Range	Turn Rotor to 1400 KC Index Line. See Note B	Oscillator Range B (C9)
1400 KC	External Antenna Clip	Point "X"	200 mmf.	B Range	Turn Rotor to 1400 KC Index Line. See Note B	Oscillator Range D (C5)
16 MC	External Antenna Clip	Point "X"	400 Ohm	D Range	Turn Rotor to 1400 KC Index Line. See Note B	Ant. Range D (C2)

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial background for this purpose.

To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration.)

The 600 KC and 1400 KC index lines are for use when aligning the receiver.



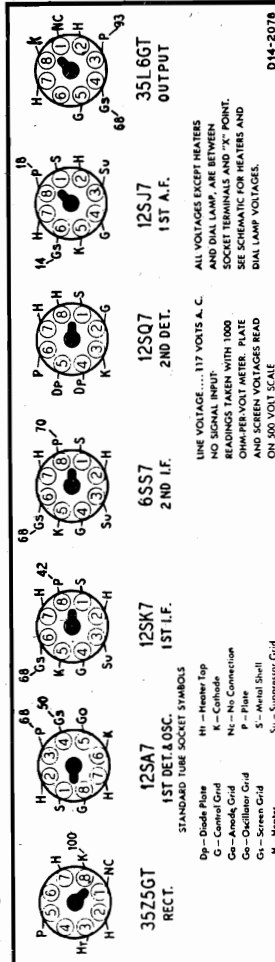
## ALIGNMENT NOTES

**NOTE A**—Adjust Oscillator Range B (C9) trimmer on side of chassis. Oscillator Range B (C6) auxiliary trimmer on gang condenser is adjusted at factory and ordinarily need not be readjusted in the field.

**NOTE B**—Index line is on dial background strip. See DIAL CALIBRATION paragraph.

**NOTE C**—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

**NOTE D**—A "gimmick" capacity is used on the loop antenna in place of a trimmer. This normally requires no adjustment. However, if a new loop antenna is installed it may be necessary to adjust the "gimmick" by increasing or decreasing the number of turns in the "gimmick." Complete the oscillator adjustment (C9) at 1400 KC, then adjust the "gimmick" at the same frequency.



## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new cord 60" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in the pulley rim and continue one half turn counterclockwise, over top of pulley. Wind 3 turns clockwise around wooden drive shaft spool. Turns must progress toward chassis.

MODELS D2624 Early,  
Late, D2630  
MODEL D2644

## WESTERN AUTO SUPPLY CO. REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

12A430 4" x 6" P.M. speaker—with mounting bracket  
Cone and voice coil assembly for speaker  
(specify part number and letters stamped on speaker)  
3A303 Tube Socket—octal (8 prong) molded  
10A520 Knob, tuning  
10A521 Knob, volume } for IVORY cabinet  
10A522 Knob, band  
10A467 Knob, tuning  
10A468 Knob, volume } for WALNUT cabinet  
10A469 Knob, band  
13X546 Line cord and plug  
2A206 Band change switch  
28X292 Snap button (mounting antenna to cabinet)  
No. 6x3/8" P.K. Type "Z" screws (mounting antenna to chassis)

### TRANSFORMERS AND COILS

9A1443 T-1 "D" Range Antenna Coil Assembly  
26A386 T-2 "B" Band Loop Antenna Assembly with  
Trimmer (for Walnut Cabinet)  
26A387 T-2 "B" Band Loop Antenna Assembly with  
Trimmer (for Ivory Cabinet)  
9A1444 T-3 "D" Range Oscillator Coil Assembly  
9A1442 T-4 "B" Range Oscillator Coil Assembly  
9A1793 T-5 1st I-F coil assembly  
9A1794 T-6 2nd I-F coil assembly  
51X118 T-7 Output transformer

**CAPACITORS**  
B67102 C-1 .001 mf 200 V Tubular  
17A152 C-2 2-25 mmf Ant. Range "D" Trimmer  
C-9 2-25 mmf. Osc. Range "B"  
14A148 C-3A Gang capacitor and pulley  
C-3B  
46X289 C-4 .00475 mf 180 V Tubular  
17A174 C-5 2-25 mmf Osc. Range "D" Trimmer  
C-6 Part of C-3  
47X463 C-7 47 mmf Molded  
47X466 C-8 68 mmf Molded  
17A234 C-10 250-325 mmf 600 K.C. Padder  
B66104 C-11 .1 mf 200 V Tubular  
C-23  
C-12  
B66403 C-15 .04 mf 200 V Tubular  
C-22  
C-13, C-14 Part of T-5 (1st I-F coil assembly)  
47X446 C-16, C-21 47 mmf Molded  
C-17, C-18 Part of T-6 (2nd I-F coil assembly)  
C-19 100 mmf Molded  
B66502 C-20 .005 mf 200 V Tubular  
47X467 C-24 470 mmf Molded  
B66101 C-25 .01 mf 200 V Tubular  
C-28  
B67253 C-26 .025 mf 200 V Tubular  
C-27A 50 mf 150 V Dry electrolytic  
C-27B 50 mf 150 V  
C-27C 20 mf 25 V  
D67204 C-29 .20 mf 400 V Tubular  
D66104 C-30 .10 mf 400 V Tubular  
17A123 C-31 1-12 mmf Antenna Range B Trimmer

### RESISTORS

B84393 R-1 Ohms Watts  
39,000 0.5 Carbon  
B84472 R-2 4700 0.5 Carbon  
B85473 R-3 R-5 47,000 0.5 Carbon  
B84332 R-4 3300 0.5 Carbon

B85104 R-6 100,000 0.5 Carbon  
B85225 R-7 2.2 meg 0.5 Carbon  
B85475 R-8 4.7 meg 0.5 Carbon  
36X309 R-9 Volume control and switch  
0.5 megohms  
B84153 R-10 15,000 0.5 Carbon  
B85474 R-11, R-14 470,000 0.5 Carbon  
B84333 R-12 33,000 0.5 Carbon  
B34823 R-13 82,000 0.5 Carbon  
B84181 R-15 180 0.5 Carbon  
B85224 R-16 220,000 0.5 Carbon  
43X214 R-17 775 28 Wire wound  
B84270 R-18 27 0.5 Carbon  
C85152 R-19 1500 1.0 Carbon

### DIAL AND DRIVE ASSEMBLY

6X21 Rubber grommet } Mounting gang {  
20X329 Cond. cushion stud } capacitor {  
15A128 Color disc assembly  
58X588 Dial scale  
58X587 Dial background  
26A384 Pointer bracket assembly complete with  
pins and studs  
15X220 Pointer  
5 ft. Drive cord  
28X113 Drive cord tension spring  
25X580 Drive shaft bracket  
26X465 Drive shaft  
19X192 "C" Washer (for drive shaft)  
24X564 Drive shaft spool  
7A193 Pilot light socket assembly  
No. 47 Pilot light

### Model D2644

### ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.

Connect ground lead of signal generator to radio chassis.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.  
Output meter.

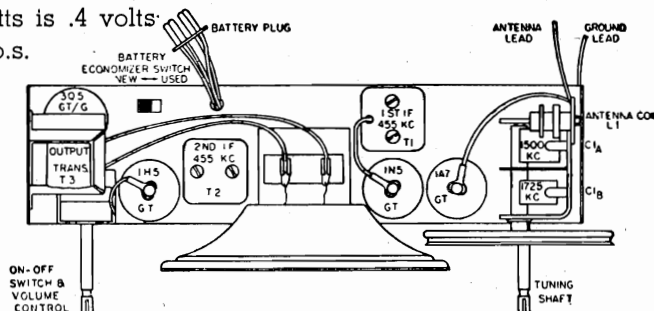
Non metallic screwdriver.

Dummy antennas... .1 mfd.,  
00025 mfd.

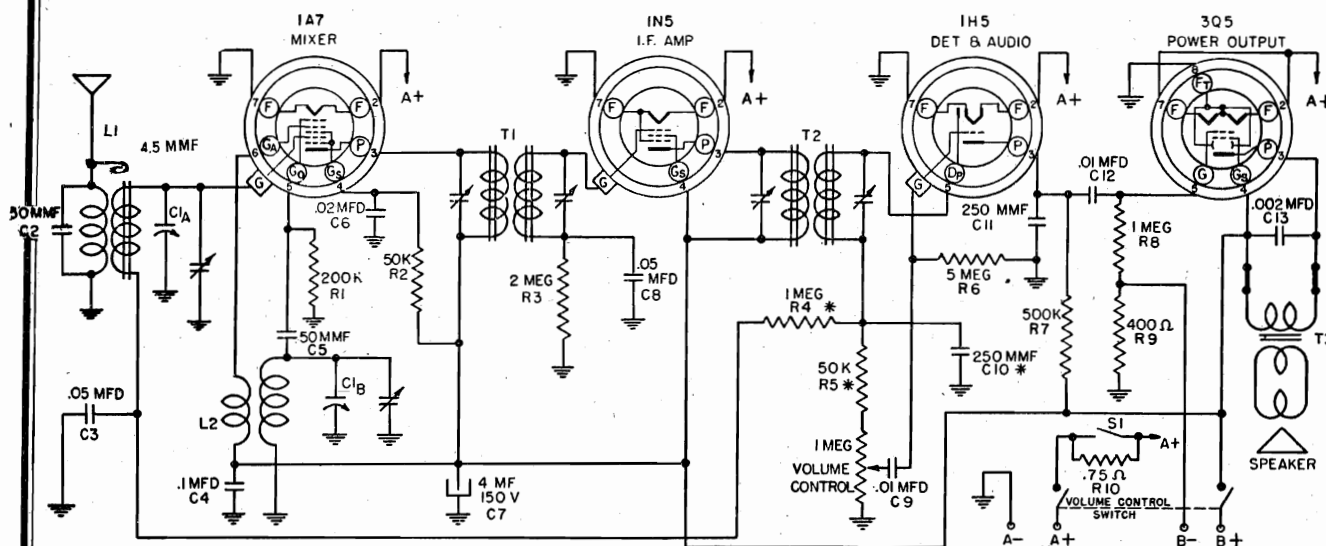
Variable Condenser Setting	Generator Frequency	Dummy Antenna Mfd.	Connection to Radio	Trimmer Adjustment	Trimmer Function
Minimum Capacity (Fully Opened)	455 K.C.	.1	Grid of 1A7GT Tube	Two Trimmers on Top of T2	Output I.F.
Minimum Capacity (Fully Opened)	455 K.C.	.1	Grid of 1A7GT Tube	Two Trimmers on Top of T1	Input I.F.
Minimum Capacity (Fully Opened)	1725 K.C.	.00025	Antenna Lead	C1B	Oscillator Trimmer
Tune in signal From Generator	1500 K.C.	.00025	Antenna Lead	C1A	Antenna Trimmer

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

Frequency Range  
540 to 1725 K.C.  
I.F. Frequency 455 K.C.



## WESTERN AUTO SUPPLY CO.



\* Note: R4, R5, and C10 are part of 2nd I.F. Transformer (T2) and can not be replaced separately.

IF PEAK 455 KC

## PARTS LIST

## CONDENSERS

Circuit Diagram Reference	Part No.	Description
C1A, C1B	B19-185	Variable condenser with Drum
C3, C8	A16-152	.05 mfd. 200 volt tubular condenser
C4	A16-157	.1 mfd. 200 volt tubular condenser
C5	A15-175	50 mmfd mica condenser
C6	A16-150	.02 mfd. 400 volt tubular condenser
C7	A18-273	4 mfd. 150 volt electrolytic condenser
C9, C12	A16-156	.01 mfd. 400 volt tubular condenser
C11	A15-176	250 mmfd mica condenser
C13	A16-155	.002 mfd. 600 volt tubular condenser

## RESISTORS

R1	A60-667	200 K Ohm 1/3 watt resistor—20%
R2	A60-685	50 K Ohm 1/3 watt resistor—20%
R3	A60-684	2 Megohm 1/3 watt resistor—20%
R6	A60-669	5 Megohm 1/3 watt resistor—20%
R7	A60-662	500 K Ohm 1/3 watt resistor—20%
R8	A60-668	1 Megohm 1/3 watt resistor—20%
R9	A60-665	400 Ohm 1/3 watt resistor—10%
R10	A60-691	.75 Ohm 1 watt resistor

## COILS

L1	A10-414	Antenna Coil
L2	A10-415	Oscillator coil
T1	B10-416	1st I.F. Transformer
T2	B10-417	2nd I.F. Transformer

## MISCELLANEOUS

T3	A80-218	Speaker output transformer
S1	A69-164	Battery Economizer switch
	A24-165	Volume control and switch
	B79-335	6 1/4 inch P.M. Speaker
	D42-382	Wood cabinet
	B67-484	Dial scale
	A52-182	Knobs, Walnut Bakelite
	B58-59	Dial pointer
	A84-35	Dial drive shaft and pulley assembly
	A45-118	Battery plug, 4 prong

## VOLTAGE CHART

All voltages measured with a 1000 ohm per volt meter on the 150 volt scale. For the following voltages the "B" battery section of the power pack should read 90 volts under load. Where no voltages are shown the voltage is 0 or is too low to be read with this type of voltmeter.

1A7GT TUBE	PIN NO.	VOLTS
Plate-P—to ground	3	85
Screen-G3 & G5—to ground	4	37
Grid-G2—to ground	6	85
1N5GT TUBE		
Plate-P—to ground	3	85
Screen-G2—to ground	4	85
1H5GT TUBE		
Plate-P—to ground	3	17
3Q5GT TUBE		
Plate-P—to ground	3	83
Screen-G2—to ground	4	85

## SERVICE NOTES

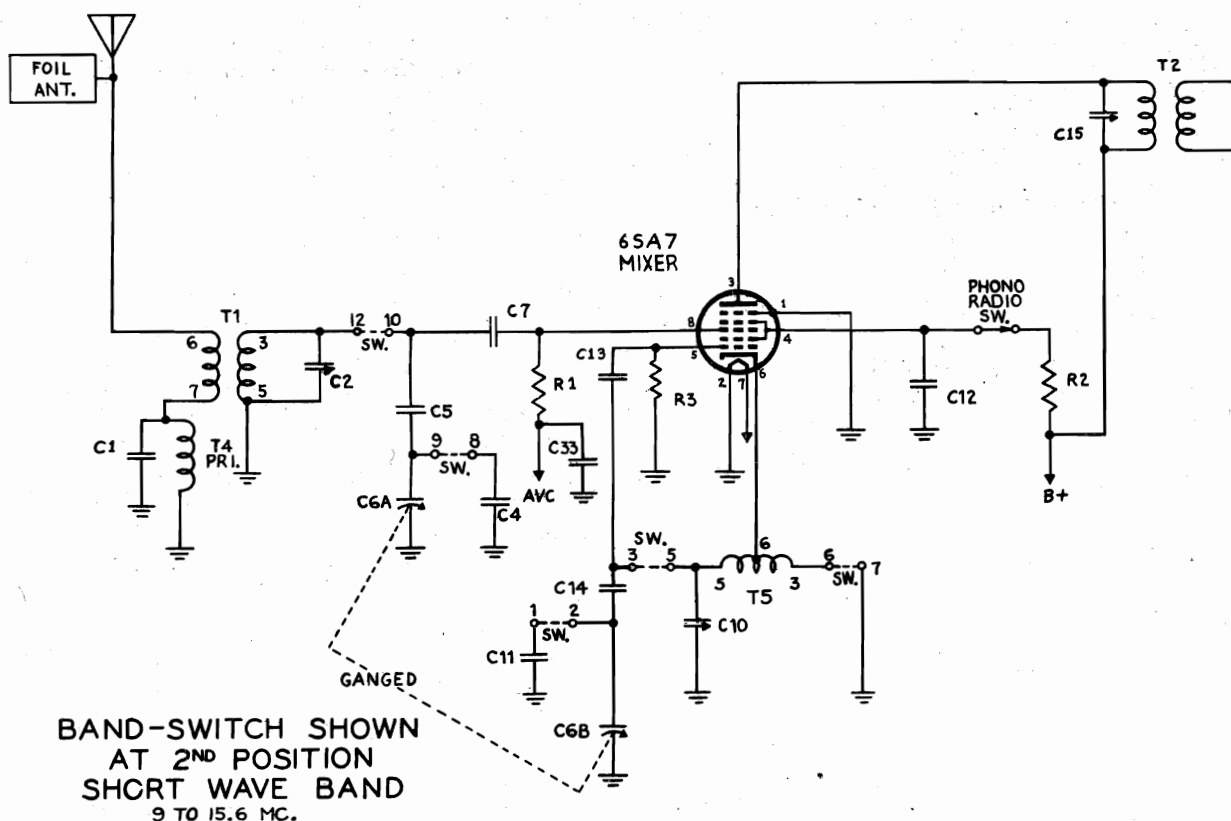
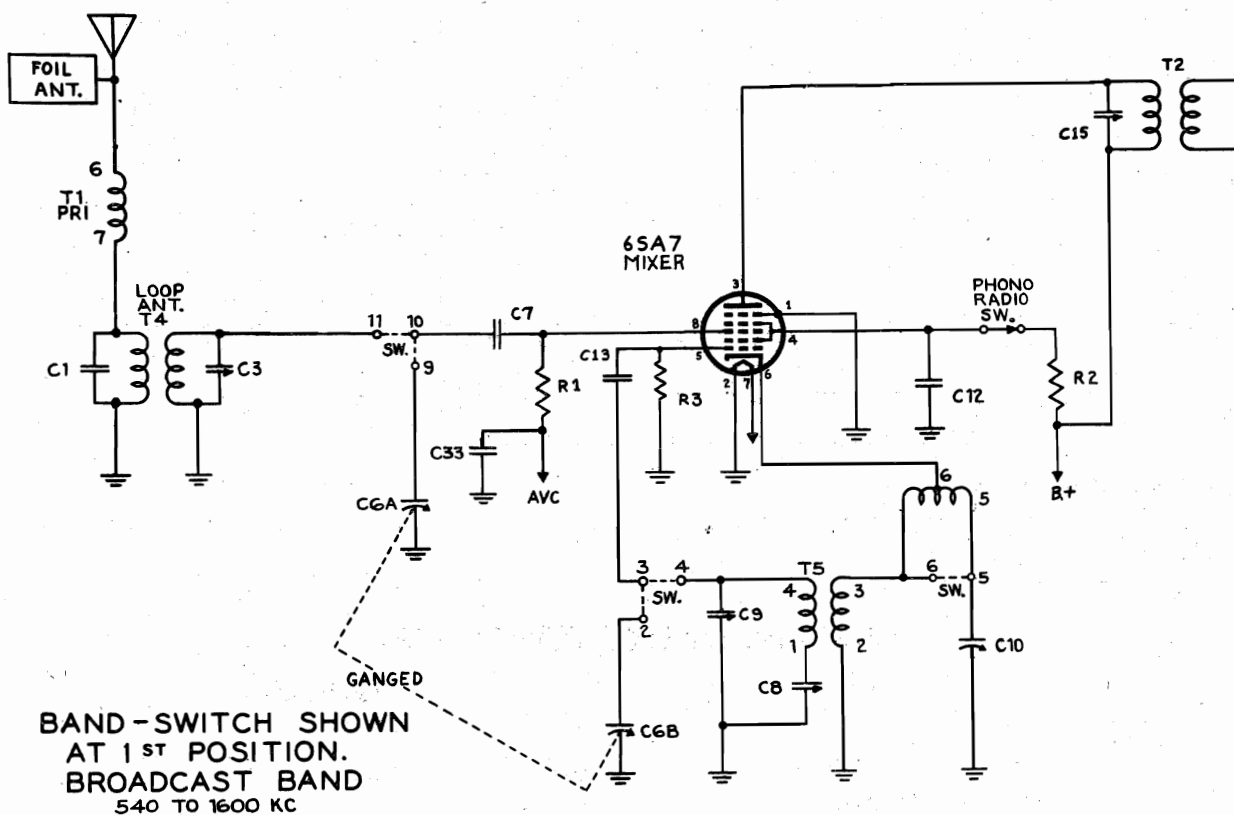
Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt, using the 150 volt scale. These voltages are clearly indicated on the voltage chart.

All voltages should be measured with a new battery or one that gives 90 volts under load.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

[illegible]

WESTERN AUTO SUPPLY CO.



## WESTERN AUTO SUPPLY CO.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:  
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.Output Indicating Meter—Non-Metallic Screwdriver.  
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

ADJUST TRIMMERS TO MAXIMUM							
SIGNAL GENERATOR		BAND SWITCH SETTING		CONDENSER SETTING		ADJUST TRIMMERS TO MAXIMUM	
FREQUENCY SETTING		CONNECTION AT RADIO		DUMMY ANTENNA		CONDENSER SETTING	
I.F.	455 KC	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C20) & (C21) 1st I.F. (C15) & (C16)	
RANGE B	1620 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)	
	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Set Pointer to 1400 KC (See Note A)	Ant. Range B (C3)	
	600 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (C8) Rock Rotor—See Note B	
Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.							
RANGE D	15,600 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)	
	14,000 KC	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Ant. Range D (C2) Rock Rotor—See Note B	
LOOP RANGE B							
Reassemble chassis in cabinet.							
RANGE B	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Ant. Range B (C3)	

## DRIVE CORD REPLACEMENT

The drive cord should be replaced as shown on the accompanying illustration using a .46" drive cord for the purpose. Three turns are to be wound clockwise around the

tuning shaft with the turns progressing away from the chassis. After the cord has been installed, stretch the tension spring and hook the free end to the tab on the drive pulley. Cut off any excess string that may remain.

## REPLACEMENT PARTS LIST

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

## MISCELLANEOUS

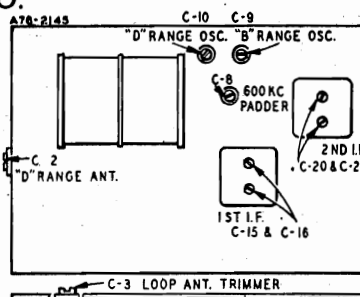
12A442	6" P.M. Speaker Complete with Output Transformer.....
	Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker).....
	Output Transformer (Specify part number and letters stamped on speaker).....
3A303	7 pin socket—cath. (8 prong) moulded.....
3A304	Phono motor socket.....
3A305	Phono socket—single pin tip.....
10A578	Knob (Tuning).....
10A579	Knob (Off-On, Volume).....
10A581	Knob (Tone, Radio-Phono).....
10A580	Knob (SW-BC).....
2A359	Band Change Switch.....
13X328	Line cord and plug assembly.....

## TRANSFORMERS AND COILS

T-1	9A1812	"D" Range Antenna Coil Assembly.....
T-2	9A1814	1st I.F. Coil Assembly.....
T-3	9A1815	2nd I.F. Coil Assembly.....
T-4	9A1831	"B" Range Loop Antenna.....
T-5	9A1813	"B" Range and "D" Range Oscillator Coil Assembly.....
T-6	53X282	117 Volt 60 Cycle Standard Power Transformer.....
T-7		Output Transformer (See Miscellaneous).....

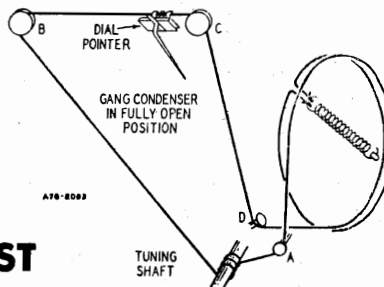
## CAPACITORS

C-1	47X445	270 mmf	Moulded
C-2	17A164	5-50 mmf	Trimmer
C-3	17A123	1-12 mmf	Trimmer
C-4	47X473	47 mmf	Silvered mica
C-5	47X474	360 mmf	Silvered mica
C-6A, C-6B	14A178	Gang Capacitor with drive pulley	
C-7	B66511	.0005 mf	200 V
C-8	17A155	350-430 mmf	Trimmer
C-9, C-10	17A109	2.5-35 mmf	Dual Trimmer
C-11	47X472	40 mmf	Silvered mica
C-12, C-18	D66403	.04 mf	400 V
C-13	47X466	68 mmf	Moulded
C-14	47X481	286 mmf	Silvered mica
C-15, C-16	Part of T-2 (1st I.F. Coil Assem.)		
C-19, C-23	47X463	47 mmf	Moulded
C-20, C-21	Part of T-3 (2nd I.F. Coil Assem.)		
C-22	47X471	68 mmf	Moulded
C-24	D-4403	.04 mf	400 V
C-25	D66502	.005 mf	400 V
C-26	D66104	.10 mf	400 V
C-27	D64253	.025 mf	400 V
C-28, C-31	D66402	.004 mf	400 V
C-29	D66103	.01 mf	400 V
C-30A		40 mf	450 V
C-30B	45X346	40 mf	450 V
C-30C		20 mf	25 V
C-32	47X470	330 mmf	Moulded
C-33	B66503	.05 mf	200 V
C-34	47X476	100 mmf	Moulded



NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.



## RESISTORS

B85225	R-1, R-7	2.2 megohms	0.5 W	Carbon
C84393	R-2, R-4	39 K ohms	1.0 W	Carbon
B84393	R-3	39 K ohms	0.5 W	Carbon
B84222	R-5	2200 ohms	0.5 W	Carbon
B85105	R-6	1 megohm	0.5 W	Carbon
B85473	R-8	47 K ohms	0.5 W	Carbon
B84153	R-9	15 K ohms	0.5 W	Carbon
36X358	R-10	.5 megohm	Volume control and line switch	
B85106	R-11	10 megohms	0.5 W	Carbon
B85474	R-12, R-16	470 K ohms	0.5 W	Carbon
B84333	R-13	33 K ohms	0.5 W	Carbon
B84823	R-14	82 K ohms	0.5 W	Carbon
*40X276	R-15	3.0 megohms	Tone control & Radio-Phono switch	
C84271	R-17	270 ohms	1.0 W	Carbon
43X213	R-18	2.0 ohms	0.5 W	Wire wound
D84182	R-19	1800 ohms	2.0 W	Carbon

## DIAL AND DRIVE ASSEMBLY

26A400	Dial bracket assembly complete with dial glass, background, diffusers, etc.
7A202	Pilot light socket assembly.....
28X113	No. 47 Pilot light.....
	Drive cord tension spring.....
15X150	46" Drive cord (18 lb. test).....
26X485	Pointer.....
19X192	Drive Shaft.....
	"C" Washer (for drive shaft).....
6X21	Rubber Grommet { Mfg. Gang Capacitor }
20X329	Cond. Cushion Stud { }

Speaker	6" PM Dynamic
Selectivity	40 KC Broad at 1000 Times Signal

Sensitivity (For 0.5 Watt Output, with External Antenna)	
B Range	9 Microvolts Average
D Range	20 Microvolts Average

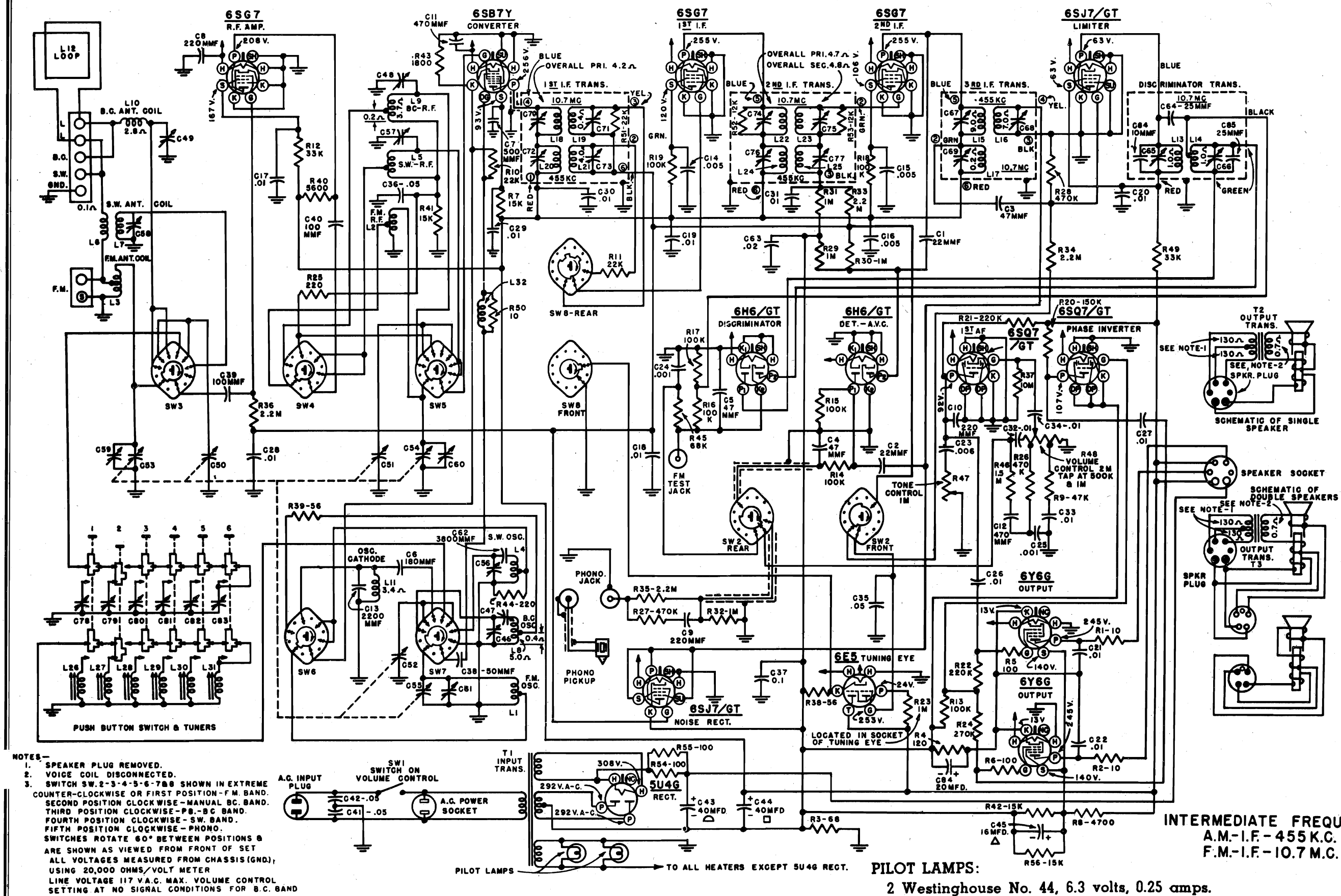
Power Consumption (at 117 Volts AC)	40 Watts (normal) 60 Watts (phono operating)
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Power Output	4 Watts Maximum 2.3 Watts, 10% Harmonics
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Tuning Frequency Range	
B Range	540-1600 Kilocycles
D Range	9-15.5 Megacycles

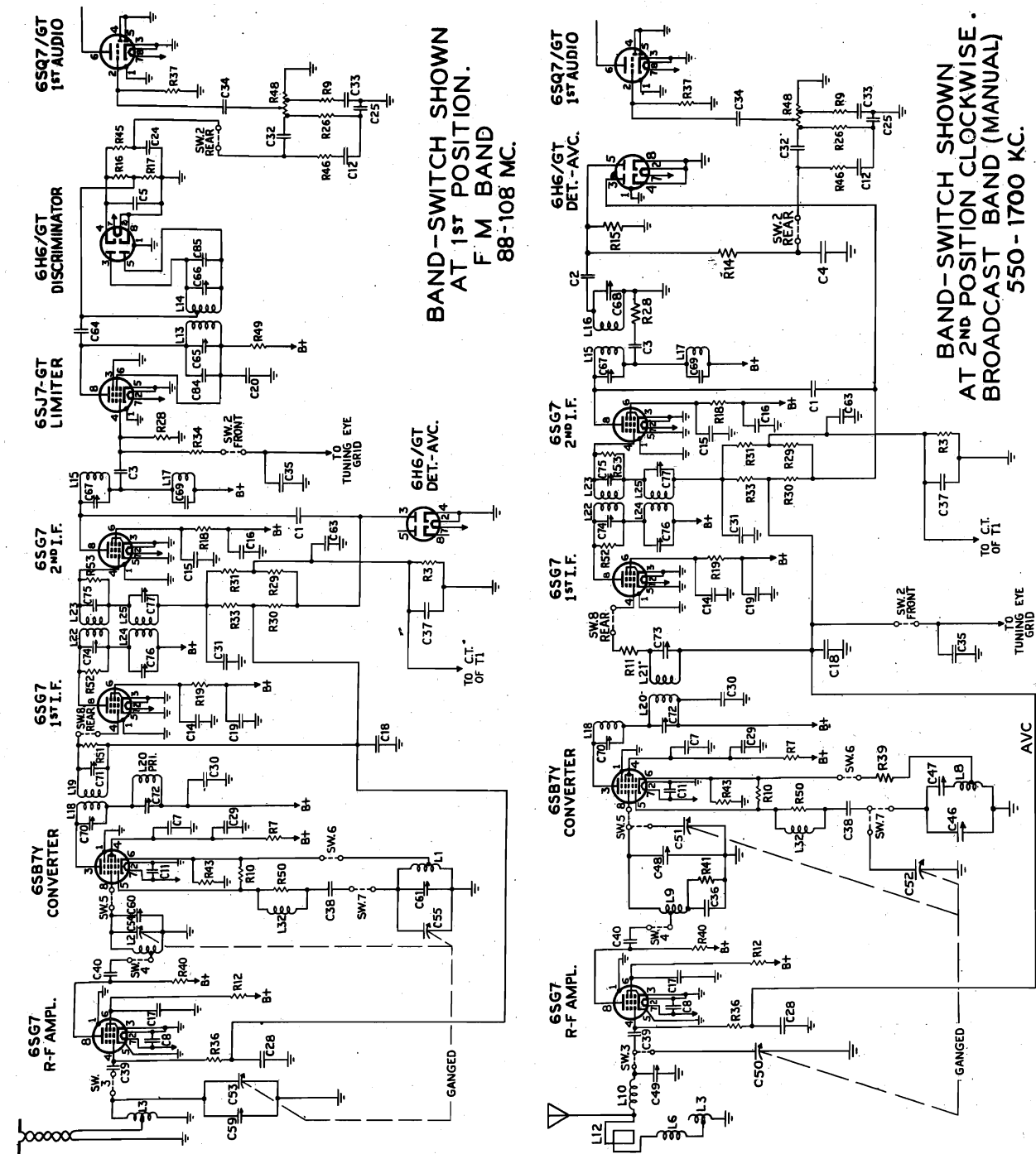


## WESTINGHOUSE ELECTRIC CORP.

MODELS H-113,-114,-  
-116,-117, -119

WESTINGHOUSE ELECTRIC CORP.

MODELS H-113 -114,  
-116,-117, -119

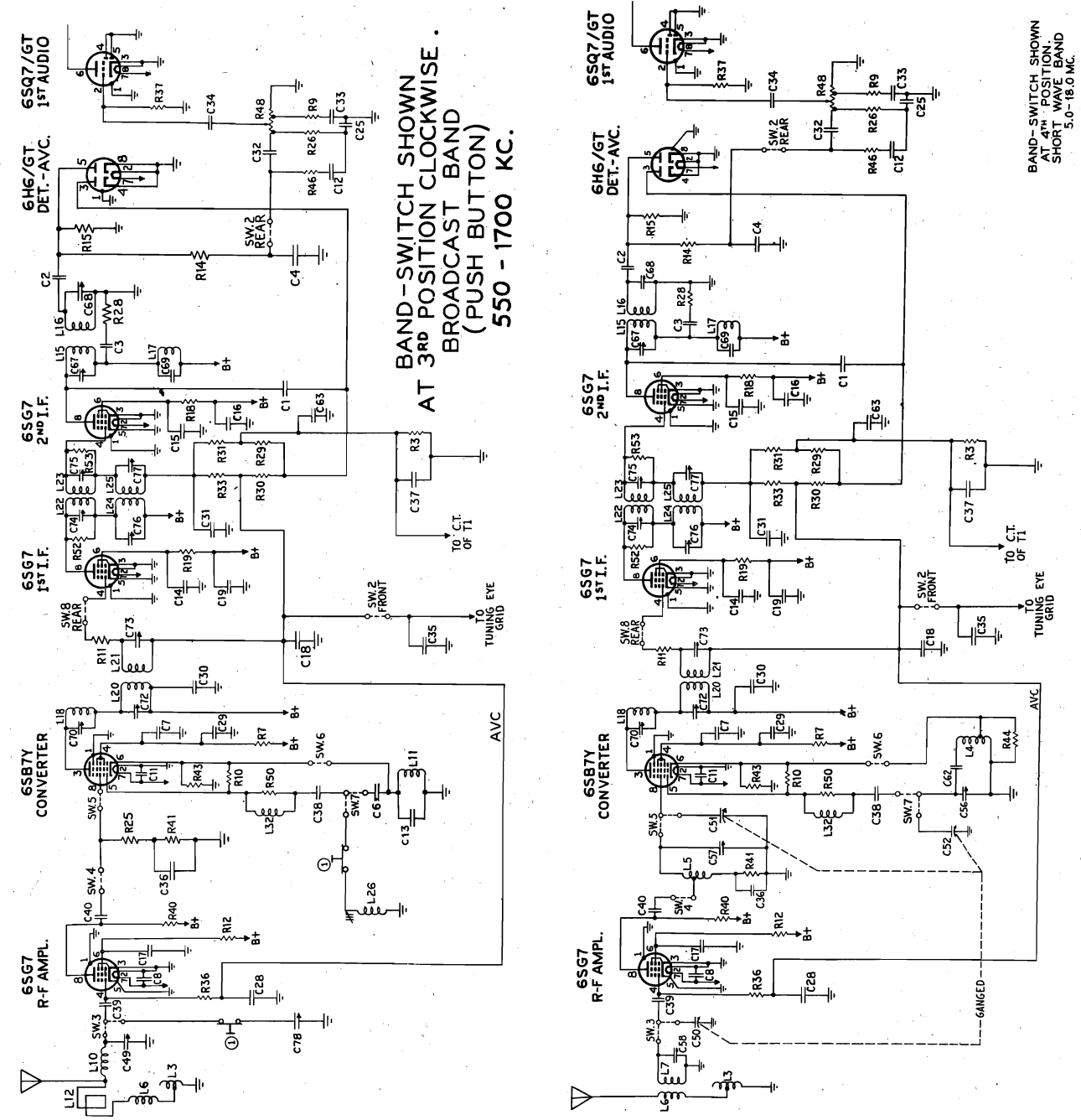


BAND-SWITCH SHOWN  
AT 1ST POSITION.  
F.M. BAND  
88-108 MC.

BAND-SWITCH SHOWN  
AT 2ND POSITION CLOCKWISE.  
BROADCAST BAND (MANUAL)  
550-1700 KC.

WESTINGHOUSE ELECTRIC CORP.

MODELS H-113,-114,-  
-116,-117, -119



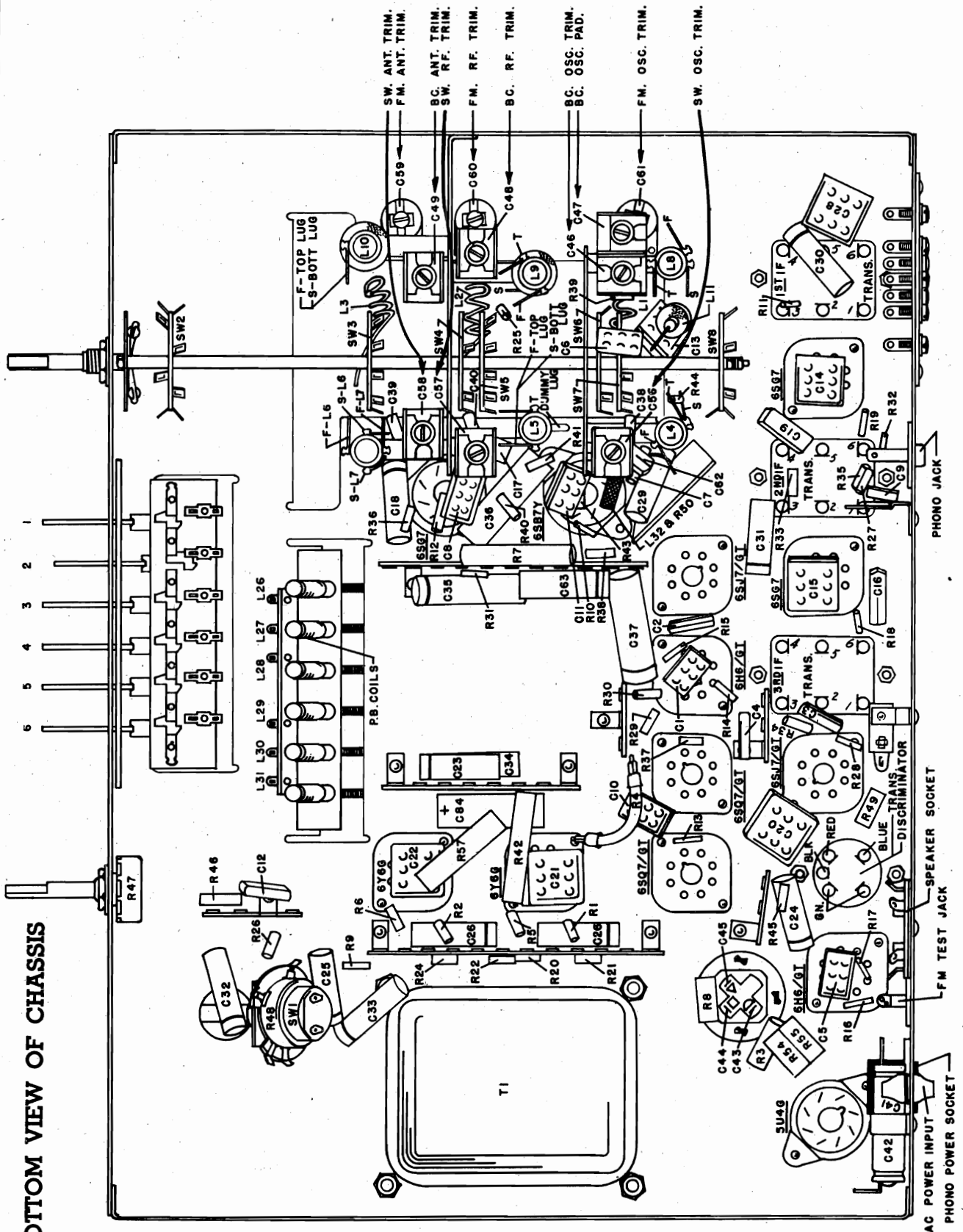
BAND-SWITCH SHOWN  
AT 3RD POSITION CLOCKWISE.  
BROADCAST BAND  
(PUSH BUTTON)  
550-1700 KC.

BAND-SWITCH SHOWN  
AT 4TH POSITION.  
WAVE BAND  
5.0-16.0 MC.



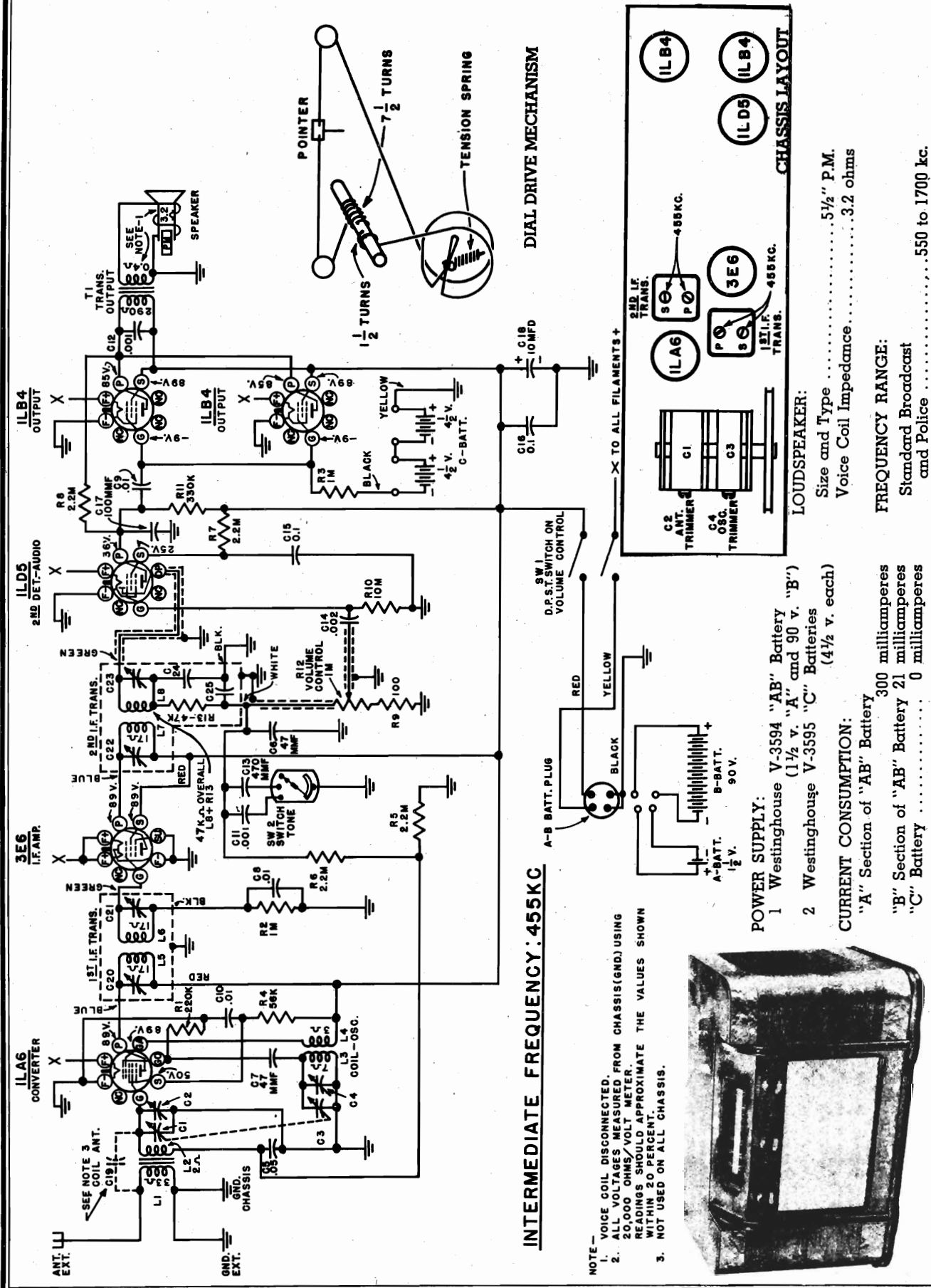
WESTINGHOUSE ELECTRIC CORP. MODELS H-113, -114, -116, -117, -119

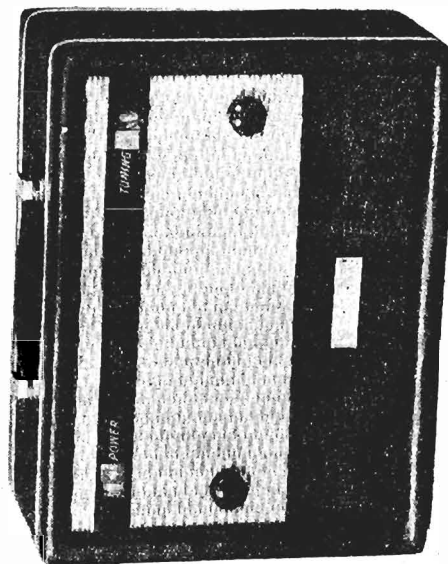
BOTTOM VIEW OF CHASSIS



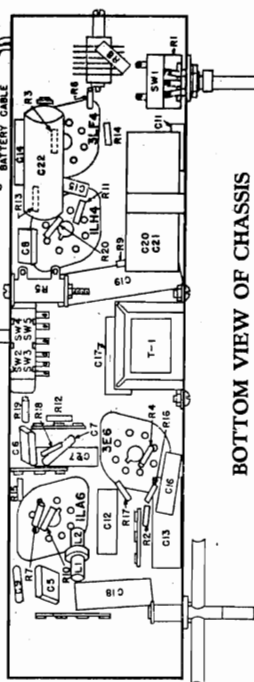
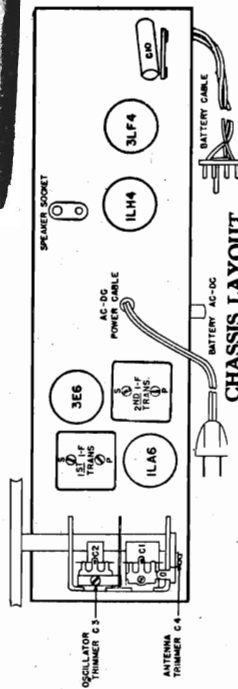








<b>POWER OUTPUT:</b>	
Undistorted .....	200 milliwatts
Maximum .....	400 milliwatts
<b>LOUDSPEAKER:</b>	
Size and Type .....	4" P. M
Voice Coil Impedance .....	3.2 ohms

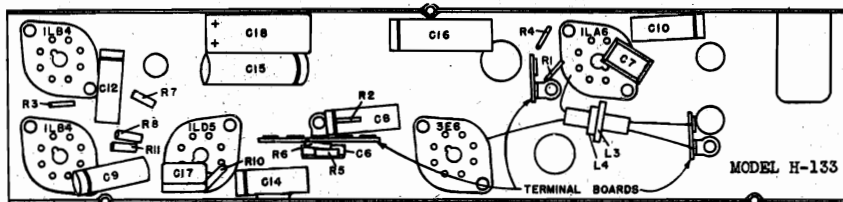


NOTES.

1. SWITCHES "3W.2-3-4-5" ARE SHOWN IN A.C. POSITION.  
2. VOLTAGES MEASURED FROM COMMON NEGATIVE USING  
A 20,000 OHM/VOLT METER. (A.C. OPERATION - 115V. L.I.)

CURRENT CONSUMPTION (Battery Operation):	
"A" Section of "AB" Battery	50 milliamperes
"B" Section of "AB" Battery	12 milliamperes

### BOTTOM VIEW OF CHASSIS

**MODEL H-133**  
**MODEL H-148**
**WESTINGHOUSE ELECTRIC CORP.**


MODEL H-133

ALIGNMENT

MODEL H-148

Before beginning alignment, make certain that the dial pointer aligns with the dot on the extreme high-frequency end of the dial when the tuning capacitor is set for minimum capacity.

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid A.V.C. action.

Step	Connect Signal Generator to—	Signal Generator Frequency	Radio Dial Setting	Adjust
1	3E5 control grid through 0.1 mfd capacitor	455 kc	550 kc	Secondary and Primary trimmers of 2nd I-F trans. for max. output.
2	1L46 control grid through 0.1 mfd capacitor	455 kc	550 kc	Secondary and Primary trimmers of 1st I-F trans. for max. output.
3	Antenna terminal through 200 mmf capacitor	455 kc	550 kc	"Peak" all I-F trimmers.
4	Antenna terminal through 200 mmf capacitor	*1700 kc	*1700 kc	Oscillator trimmer for max. output.
5	Antenna terminal through 200 mmf capacitor	1400 kc	1400 kc	Antenna trimmer for max. output.

\*1600 KC for Model H-148; rest of alignment the same

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

Part Number	Description
V-3603	Background, dial
V-4521	Baffle and Grille Cloth Assy.
V-3594	Battery, "A-B" (1½ v. & 90 v.)
V-3595	Battery, "C" (4½ v.)
V-3590	Bracket var. cap. mtg.
V-1112-2	Cabinet
V-3589	Capacitor, variable, 2 gang (C1, C2, C3, C4)
RC10W2503A	Capacitor, 0.05 mfd. 200 v. (C5)
RC3406-470K	Capacitor, 47 mmf. (C6, C7)
RC10W4103A	Capacitor, 0.01 mfd. 400 v. (C8, C9, C10)
RC10W8103K	Capacitor, 0.001 mfd. 600 v. (C11, C12)
RCM20A471K	Capacitor, 470 mmf. (C13)
RC10W8203A	Capacitor, 0.02 mfd. 200 v. (C14)
RCM20A101M	Capacitor, 100 mmf. (C17)
V-4581	Capacitor, electrolytic, 10 mfd. 150 v. (C18)
V-4783	Capacitor, 4.7 mmf. (C19—not used on all chassis)
V-3582	Clamp, dial mtg.
V-3567	Coil, antenna (L1, L2)
V-3582	Coil, oscillator (L3, L4)
V-3584	Control, volume, 1 meg. (R12) with switch (SW1)
V-4157S-66	Cord, dial drive
V-3586	Decal, OFF
V-3580	Decal, TONE
V-3582	Decal, STATIONS
V-3585	Decal, WESTINGHOUSE
V-3589	Dial, glass

Part Number	Description	MODEL H-133
V-3489	Foot, felt	
V-3588	Grommet, variable cap. mtg.	
V-3582	Jumper, "C" battery	
V-3331-1	Knob, volume (including spring)	
V-3331-2	Knob, tuning (including spring)	
V-3331-3	Knob, tone (including spring)	
Form B466	Operating Instructions	
V-4586	Plug, battery cable	
V-4587	Plug and Cable Assy., battery	
V-1558	Pointer Assy.	
V-3188S	Pulley, 7/16" dia.	
RC10AE224M	Resistor, 220K ¼ w. (R1)	
RC10AE105M	Resistor, 10 meg. ¼ w. (R2, R3)	
RC10AE583M	Resistor, 58K ¼ w. (R4)	
RC10AE235M	Resistor, 2.2 meg. ¼ w. (R5, R6, R7, R8)	
RC10AE101M	Resistor, 100 ohms ¼ w. (R9)	
RC10AE105M	Resistor, 10 meg. ¼ w. (R10)	
RC10AE334M	Resistor, 330K ¼ w. (R11)	
V-3755S-10	Screw, chassis mtg.	
V-3573	Socket, local tube	
V-3601	Speaker, 5¼" P.M.	
V-3248S	Spring, dial drive	
V-3551	Stud and Bracket Assy., pulley	
V-3583	Switch, tone control (SW2)	
V-3574	Terminal Board, 2 lugs	
V-3575	Terminal Board, 3 lugs	
V-3576	Transformer, output (T1)	
V-3577	Transformer, 1st I.F.	
V-3578	Transformer, 2nd I.F.	
V-3237	Washer, cap. var. cap. mtg.	
V-3752S	Washer, felt	
V-3367S-4	Washer, chassis mtg.	

V-3900	Strip, plastic, loop mtg.
V-3572	Switch, battery AC-DC (SW2, SW3, SW4, SW5)
V-4116S	Terminal Board, 1 lug
V-3564	Terminal Board, 2 lugs
V-3564	Terminal Board, 3 lugs
V-3565	Terminal Board, 4 lugs
V-3577	Transformer, 1st I-F (L4, L5, C23, C24)
V-3576	Transformer, 2nd I-F (L6, L7, C25, C26)
V-3568	Transformer, output
V-3567	Washer, phenolic (resistor mtg.)
V-3752S	Washer, felt
V-3919	Washer, flat (chassis mtg.)

**MODEL H-148**

PART NO.	DESCRIPTION
V-3581	Baffle and Grille Cloth Assy.
V-3520	Battery Pack, "AB" (9 v. and 90 v.)
V-3523	Bearing, tuning shaft
V-3544	Bracket Assy. (OFF-ON)
V-3557	Bracket, variable capacitor mtg.
V-1114	Cabinet
V-3558	Capacitor, variable 2 gang (C1, C2, C3)
V-4542	Capacitor, Antenna trimmer (C4)
RCM20A101M	Capacitor, 100 mfd mica (C5, C6, C7, C8)
RCM20A331M	Capacitor, 330 mfd mica (C9)
RC10W6102A	Capacitor, .001 mfd 600 v. (C10, C11)
RC10W2503A	Capacitor, .05 mfd 200 v. (C12)
RC10W2204A	Capacitor, 0.2 mfd 200 v. (C13)
RC10W6502A	Capacitor, .005 mfd 600 v. (C14, C15)
RC10W4103A	Capacitor, .01 mfd 400 v. (C16, C17)
RC10W4503A	Capacitor, .05 mfd 400 v. (C17)
RC10W4104A	Capacitor, 0.1 mfd 400 v. (C18)
RC10W4204K	Capacitor, 0.2 mfd 400 v. (C19)
V-3561	Capacitor, electrolytic, 20 mfd 150 v. (C20) 50 mfd 150 v. (C21)
V-3566	Capacitor, electrolytic cartridge 100 mfd 25 v. (C22)
V-3597	Channel, decorative strip mtg.
V-3537	Clamp, cable
V-3586	Clamp, handle
V-3562	Clamp, spring (electrolytic cap. mtg.)
V-3545	Coil, oscillator (L1, L2)
V-3552	Control, volume (R1) with switch (SW1)
V-4349-1	Cord, A-C power
V-4157S-15	Cord, dial drive
V-3578	Decal, OFF-ON
V-3559	Dial
V-3585	Foot, felt
V-3599	Grille
V-3766	Grommet, fiber
V-3580	Grommet, rubber, square
V-3901	Handle
V-3912	Knob, tuning and volume
V-3914	Label, tube layout
V-5265	Latch Assy., back cover
V-3915	Loop, antenna (L3)
V-3894	Name Plate
V-3904	Panel, metal
V-3574	Plug and Cable Assy., battery
V-4115	Rectifier, selenium
RC10AE651K	Resistor, 650 ohms ¼ w. (R2, R3)
RC10AE821K	Resistor, 820 ohms ¼ w. (R4)
V-3569	Resistor, ballast, 2300 ohms 5 w. (R5)
RC10AE222K	Resistor, 2200 ohms ¼ w. (R6)
RC10AE473K	Resistor, 47K ¼ w. (R7)
RC40AE650M	Resistor, 65 ohms 2 w. (R8)
RC40AE224M	Resistor, 220K ¼ w. (R9, R10)
RC10AE152K	Resistor, 1500 ohms ¼ w. (R11)
RC10AE104K	Resistor, 100K ¼ w. (R12)
RC10AE694K	Resistor, 690K ¼ w. (R13)
RC10AE225M	Resistor, 2.2M ¼ w. (R14, R15)
RC10AE475K	Resistor, 4.7M ¼ w. (R16, R17, R18, R19)
RC10AE105M	Resistor, 10M ¼ w. (R20)
V-3560	Shaft, tuning
V-3599	Shield, plastic front
V-3571	Shield, spiral
V-3570-1	Socket, lock in.
V-3299	Socket, speaker
V-4114	Spacer, sleeve
V-3917	Speaker, 4" P.M.
V-3550	Spring, OFF-ON
V-3555	Spring, coil, for OFF-ON switch
V-3248S	Spring, dial drive
V-3900	Strip, decorative power and tuning

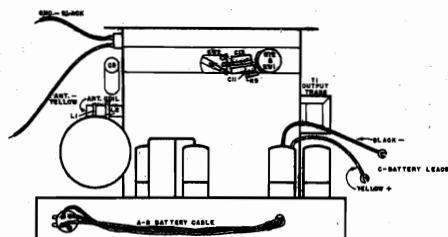


FIG. 3—REAR VIEW OF CHASSIS



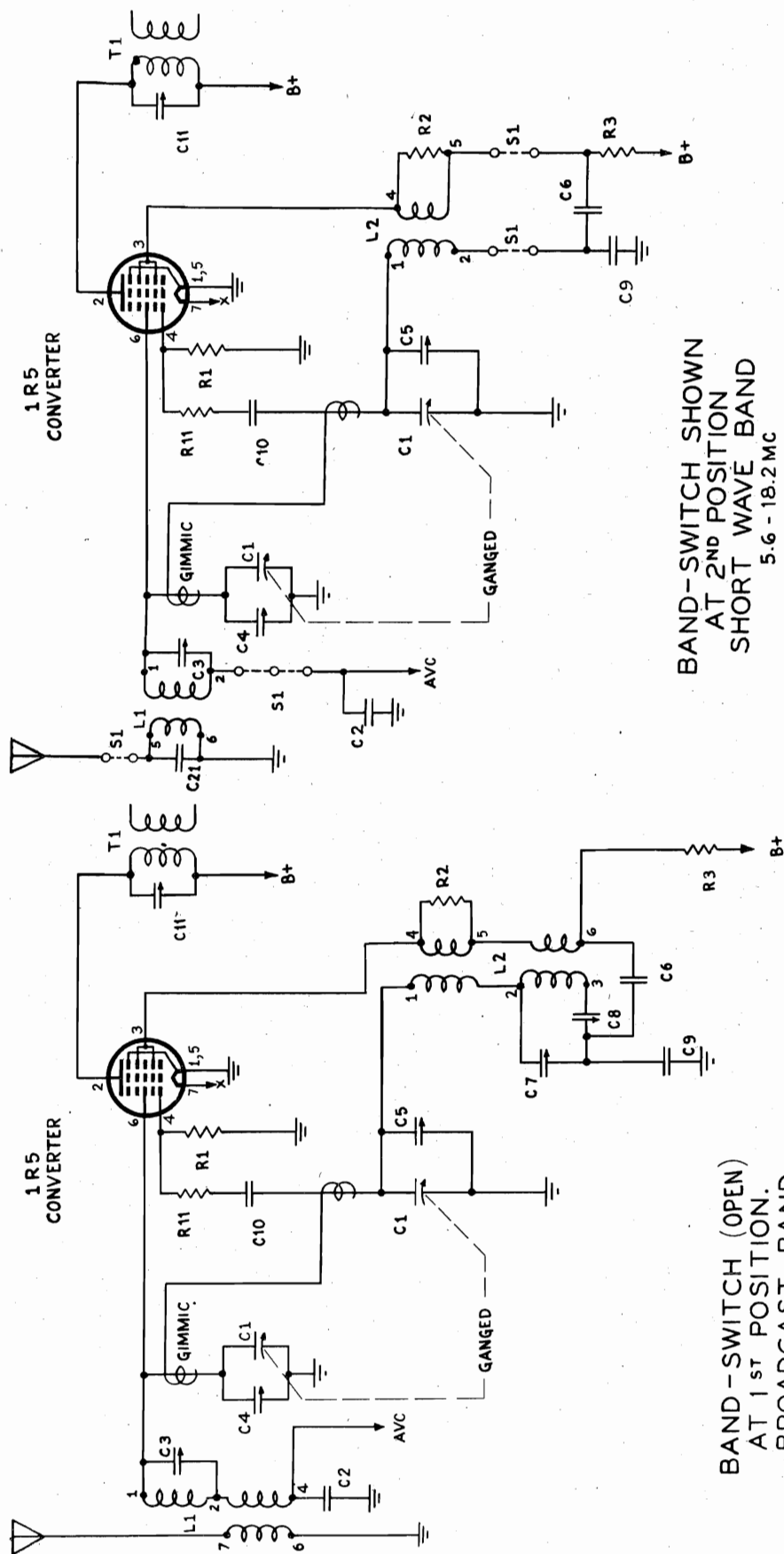


# "clarified schematics"

PAGE 16-2 ZENITH

MODELS 4K040, 4K040G

ZENITH RADIO CORP.

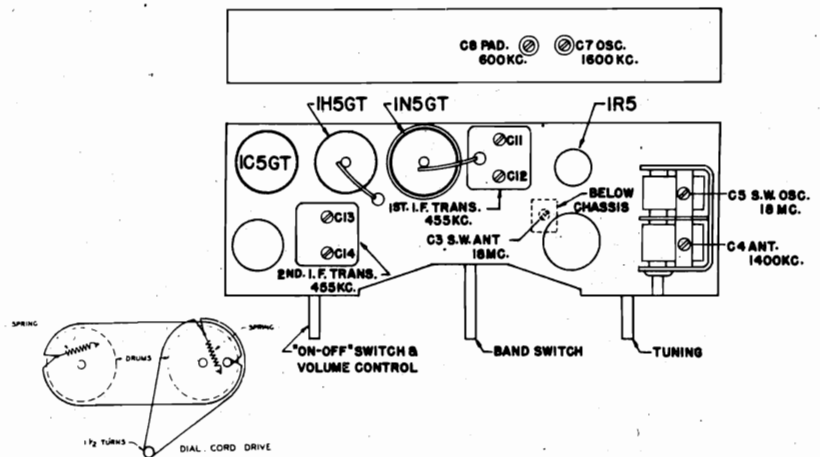




## TO THE SERVICE MAN:

The alignment of this receiver is conventional. An output meter, connected across the voice coil of the speaker, is very helpful in making correct adjustments.

The Guardian Reminder Circuit consist of a 4700 ohm resistor (R2) in series with the low side of the volume control. With this circuit, it is impossible to turn the volume completely off and leave the power on. In some cases where the minimum volume is too high even at the lowest setting of the volume control, R2 may be changed to a lower value or shorted out completely.

TUBE TRIMMER LOCATION AND DIAL CABLE DRAWING  
ALIGNMENT PROCEDURE

OPERATION	CONNECT OSC. TO	DUMMY ANT.	INPUT SIG. FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	BC	600 Kc.	C-11, C-12, C-13, C-14	Align I.F.
2	Ant.-Gnd.	400 ohms	18 Mc.	SW	18 Mc.	C-5	Set Osc. to Scale
3	Ant.-Gnd.	400 ohms	400 ohms	SW	Rock Gang 18 Mc.	C-3	Align Antenna
4	Ant.-Gnd.	200 Mmf.	1600 Kc.	BC	1600 Kc.	C-7	Set Osc. to Scale
5	Ant.-Gnd.	200 Mmf.	1400 Kc.	BC	1400 Kc.	C-4	Align Antenna
6	Ant.-Gnd.	200 Mmf.	600 Kc.	BC	Rock Gang 600 Kc.	C-8	Adjust Padder

## DIAL ASSEMBLY

26-342	Dial Scale.....	.32
46-443	Radiogram Knob (Voice).....	.07
46-444	" " (Treble).....	.07
46-445	" " (Alto).....	.07
46-446	" " (Bass).....	.07
59-122	Off & ON Indicator.....	.12
59-160	Dial Pointer.....	1.14
76-335	Tuning Control Shaft.....	.07
80-183	Indicator Spring.....	.024
80-209	Dial Cord Tension Spring.....	.024
80-471	Tuning Shaft Spring.....	1.31C
93-690	Felt Washer (S-11362).....	.60C
192-90	Dial Crystal.....	.50
196-64	Dial Crystal Gasket.....	.08
59588	Indicator Cam Assem.....	.07
59610	Dial Cord & Eyelet (Pointer).....	.12
59733	Dial Cord & Eyelet (Gang Cond.).....	.07
59751	Pulley & Rivet Assem. (Gang Cond.).....	.12
511362	Pulley & Bushing Assem. (Pointer).....	.11
511558	Vol. & Tuning Knob Assem. (2 used) [46-520].....	.28
512305	Band Switch Knob Assem. (46-598).....	.32

## COILS &amp; CHOKES

95-838	1st I.F. Transformer (T1).....	1.77
95-839	2nd I.F. Transformer (T2).....	1.77
59829	Osc. Coil Assem. (L2).....	1.39
59832	Ant. Coil Assem. (L1).....	1.39

## CONDENSERS

22-162	.0001 Mfd. (C10).....	.600 V. .20
22-182	.00025 Mfd. (C20).....	.600 V. .26
22-196	.01 Mfd. (C15).....	.600 V. .20
22-448	.004 Mfd. (C18).....	.600 V. .20
22-492	.002 Mfd. (C19).....	.600 V. .20
22-684	Dry Electrolytic 8 Mfd. (C16).....	.150 V. .45
22-826	.01 Mfd. (C6).....	.200 V. .20
22-829	.05 Mfd. (C2).....	.200 V. .20
22-887	.001 Mfd. (C17).....	.600 V. .20
22-1022	.005 Mfd. (C9).....	.600 V. .38
22-1206	Two Section Gang (C1).....	2.56
22-1239	Two Section Trimmer (C7 & C8).....	.58
22-1240	Single Section Ceramic Trimmer (C3).....	.20
22-1532	50 Mmf. (C21).....	.500 V. .20

## RESISTORS

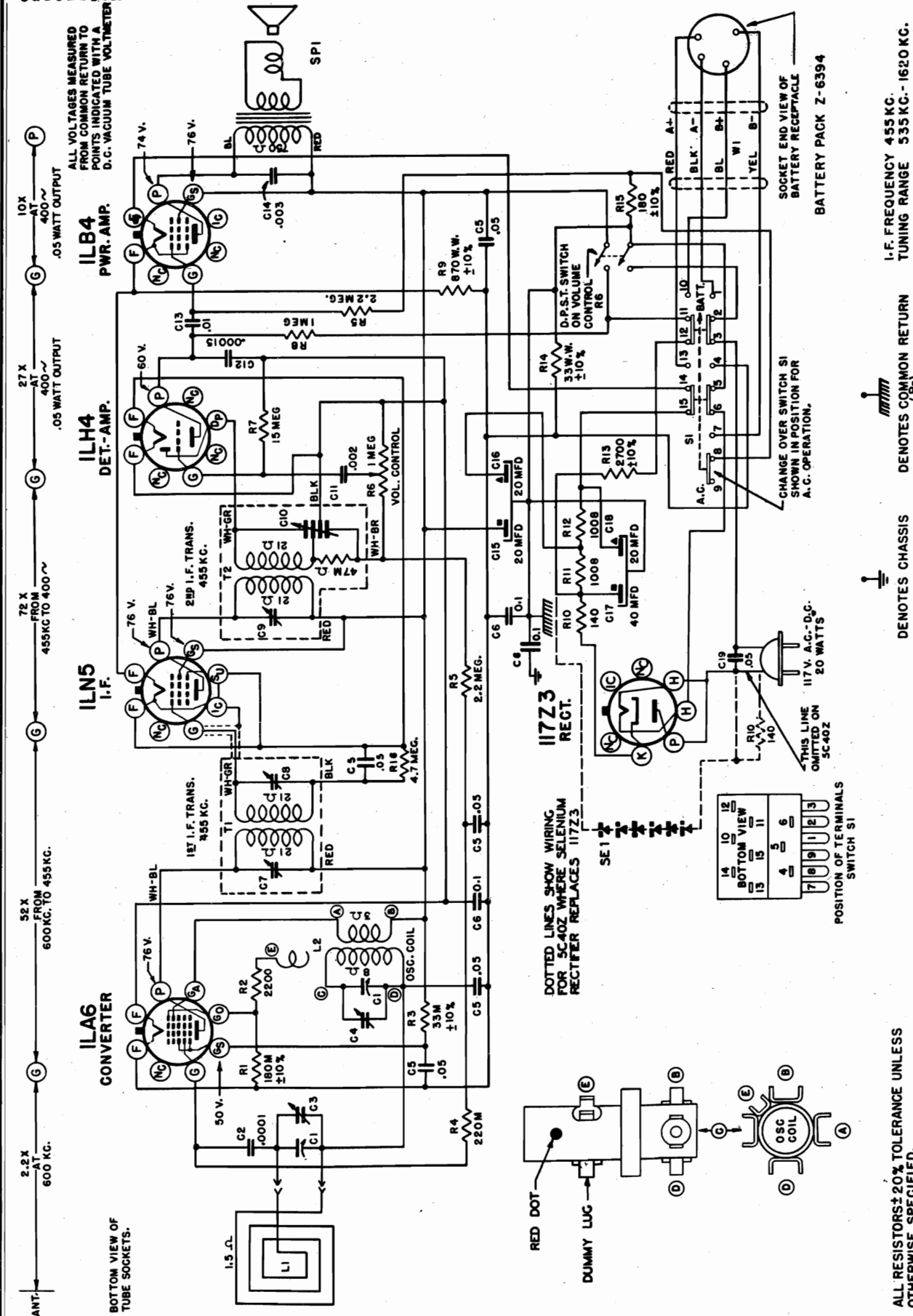
63-260	100M Ohm (R1).....	1/4 Watt .09
63-271	1 Megohm (R6).....	1/4 " .09
63-311	15M Ohm (R3).....	1/4 " .09
63-581	470 Ohm (R10).....	1/4 " .09
63-587	4700 Ohm (R2).....	1/4 " .09
63-594	68M Ohm (R6).....	1/4 " .09
63-600	2.2 Megohm (R9).....	1/4 " .09
63-620	33 Ohm (R11).....	1/4 " .09
63-669	3.9 Megohm (R4).....	1/4 " .09
63-976	15 Megohm (R7).....	1/4 " .09
63-1236	Volume Control & Switch (R5).....	1.81

## MISCELLANEOUS

49-522	6 1/2" P.M. Speaker.....	10.00
	206-522 Output Transformer.....	2.21
	208-522 Cone & Voice Coil.....	2.09
52-190	Speaker Cable.....	.19
54-34	#6-32 x 1/4 x 3/32 Hex Nut.....	.31C
57-11A	Antenna Marker.....	.024
57-11G	Ground Marker.....	.024
57-900	Dial Mtg. Plate.....	.35
57-1159	Radiogram Escutcheon Plate (2 used).....	.18
58-74	Battery Cable Plug.....	.12
70-124	#2 x 3/8 Phillips Hd. Wood Screw - Brass Plated (57-1159).....	1.70C
78-436	Miniature Tube Socket.....	.19
78-611	Octal Base Tube Socket.....	.12
95-279	Band Selector Switch.....	.72
85-284	Radiogram Switch L.H. (Voice & Alto).....	.55
85-288	Radiogram Switch R.H. (Treble & Bass).....	.55
93-125	#6 Internal Shakeproof Lockwasher.....	.31C
93-258	Brown Felt Washer (Knobs).....	.78C
94-295	Steel Bushing (Radiogram) (4 used).....	.036
112-56	#6-1/4 Hex Hd. Self Tapping Screw.....	.55C
114-67	#6-32 x 7/16 Hex Acorn Hd. M.S. Steel N.P. (Radiogram) (4 used).....	.43C
114-162	#8 x 7/8 Hex Acorn Hd. Self Tapping Screw (Chassis Mtg.).....	1.20C
125-17	Rubber Grommets (85-284 & 288).....	.03
125-39	Rubber Grommets.....	.02
126-379	Tube Shield.....	.07
159-14	Plug Buttons (Dial Scale).....	.78C
188-32	Retainer Ring (76-335).....	1.03C
188-34	Retainer Ring (S-11362).....	1.20C
188-48	Control Knob Decorative Ring.....	.035
202-384	Instruction Book.....	.15

MODELS 5G003, Chassis 5C40;  
5G003Z, Chassis 5C40Z

ZENITH RADIO CORP.





ALL RESISTORS  $\pm 20\%$  TOLERANCE UNLESS OTHERWISE SPECIFIED.

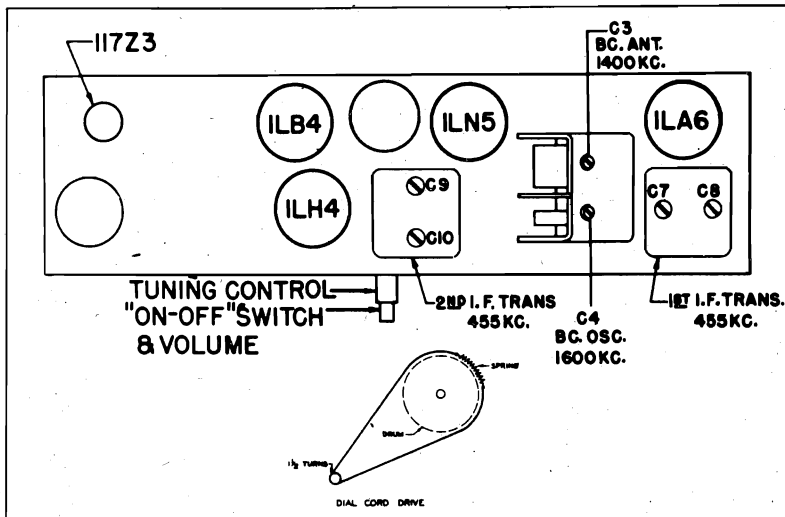
MODELS 5G003, 5G003Z  
MODEL 5G003ZZ

## ZENITH RADIO CORP.

## TO THE SERVICEMAN:

The alignment of chassis 5C40 is conventional and the most accurate alignment will be accomplished if the procedure is followed exactly. The IF frequency is 455 KC and all measurements, voltage, and resistance have been taken with an electronic volt-ohm meter.

Stage by stage gain measurements are for reference purposes only. Gain measurements can seldom be duplicated, and are used only for comparison purposes.



TUBE TRIMMER LOCATION AND DIAL CABLE DRAWING

## ALIGNMENT PROCEDURE

OPERATION	CONNECT OSC. TO	DUMMY ANT.	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455	600	C7, C8, C9 C10	I.F. Alignment
2	Single Turn Loop	--	1600	1600	C4	Set Osc. to scale
3	Coupled Loosely to Wavemagnet	--	1400	1400	C3	Alignment of Antenna

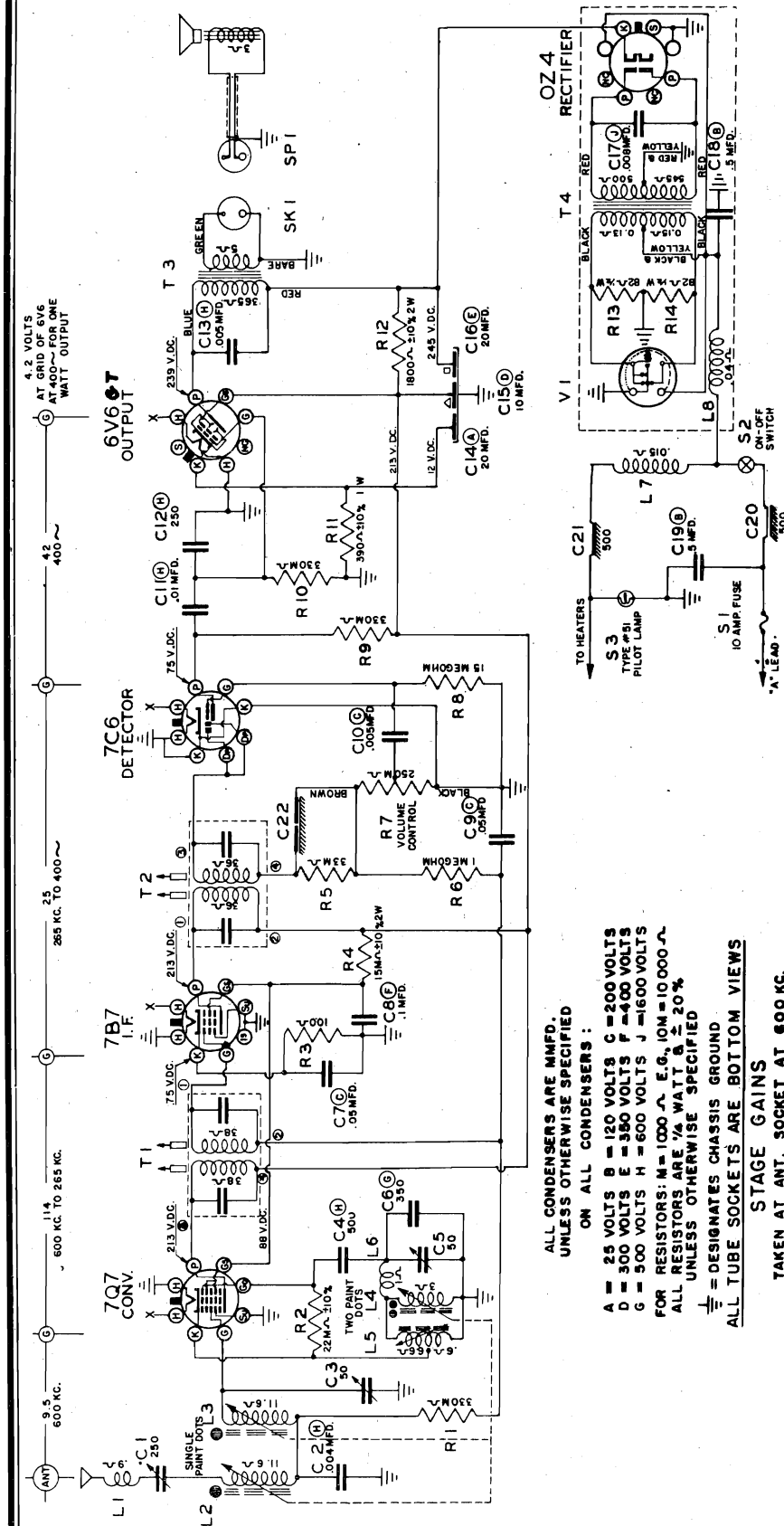
## PARTS LIST

PART NO.	REF. NO.	DESCRIPTION	PRICE	PART NO.	REF. NO.	DESCRIPTION	PRICE
DIAL ASSEMBLY				RESISTORS - continued			
26-366		Dial Scale	.12	63-1097	R9	870 Ohm W. W. Insul.	1 Watt. .24
46-530		Volume Control Knob (Small)	.17	63-1099	R14	33 Ohm W. W. Insul.	1/2 Watt. .21
46-587		Tuning Control Knob (Large)	.11	63-1363	R11-R12	Two Section Candohm (63-1132)	.60
57-1120		Escutcheon Plate	1.00	63-1366	R10	Zipohm	.24
57-1187		Dial Plate	.60	63-1549	R6	Vol. Control & Switch D P S T.	1.81
59-164		Dial Pointer	.19	MISCELLANEOUS			
76-488		Tuning Control Shaft	.28			A. C. Line Cord & Plug (Alt 11-90)	.60
80-365		Tuning Shaft Tension Spring (63-1459)	.03			Reinforcing Brkt. (2 used Handle)	.15
80-508		Dial Cord Tension Spring	.04	11-70		Polystyrene Cabinet Front Less Accessories (Use S-13209)	.19
125-17		Rubber Grommets (22-1450)	.03	12-1322		Battery Socket Cap	.09
147-148		Dial Plate Spacer	.02	14-903		Cabinet Rear Cover Less Accessories (Use S-11999)	.20
159-50		Plug Button (26-366-192-99)	.01			Cabinet Hinge	.20
188-53		Tuning Shaft Retainer Ring	.01	45-51		Handle End Pieces (Die Cast)	.65
192-99		Dial Glass	.20	24-371		4" P M Speaker (Complete)	7.25
196-88		Dial Glass Gasket	.06	40-28		206-540 Output Transformer	1.67
S-11098		Pulley & Bushing Assembly	.33	43-111		208-540 Cone & Voice Coil Assem.	1.73
S-11137		Dial Cord & Eyelet Assembly	.09	49-540		Speed Nut (2 used S-11999)	.02
CHOKES AND COILS				54-224		Chassis Bottom Plate	.24
95-937	T1	First I.F. Transformer	1.85	57-1119		Battery Retaining Strip	.15
95-938	T2	Second I.F. Transformer	1.85	64-98		Rubber Strip (Handle)	.30
S-11830	L2	Osc. Coil Assem. SC40-40Z	.95	64-99		Power Change Over Switch	.82
S-13765	L2	Osc. Coil Assem. SC40ZZ	.95	78-223		Pin Jack Terminal (Gang)	.02
CONDENSERS				78-275		Pin Jack Terminal (Gang)	.02
22-162	C2	.0001 Mfd.	.20	78-400		Radio Shack Spacer Washer (S-11999)	.03
22-196	C13	.01 Mfd.	.20	78-437		Grille Cloth	.15
22-326	C14	.003 Mfd.	.20	78-446		#6 x 5/16 Phillips B H Self Tapping Screw (82-20)	1.80C
22-470	C12	.00015 Mfd.	.20	86-637		#6 x 1/4 Phillips R.H. Self Tapping Screw (40-28)	.02
22-492	C11	.002 Mfd.	.20	86-637		#6 x 5/16 Phillips Stove Hd. Self Tapping Screw (Chassis Mtg.)	.03
22-827	C6	.1 Mfd.	.23	85-267-S1		Spiral Shield	.05
22-829	C5	.05 Mfd.	.20	86-66		Baffle Board (or 139-66)	.08
22-1014	C15 & C16	Dry Electrolytic 20 x 20 Mfd.	.95	86-142		Cover Catch (2 used)	.09
22-1017	C19	.05 Mfd.	.20	89-743		Flexible Handle Sleeve	.40
22-1081	C17 & C18	Dry Electrolytic 40 x 20 Mfd. 150 Volt-25 Volt.	.83	89-743		Instruction Book	.03
22-1450	C1	Two Section Gang SC40-40Z	4.15	110-119		Selenium Rectifier	4.75
22-1653	C1	Two Section Gang SC40ZZ	4.15	112-468		Cabinet Back & Wavemagnet Assem. Complete (24-371)	4.75
RESISTORS				112-533		SC40-SC40Z	
63-271	R8	1 Megohm	.09	112-604		Cabinet Back & Wavemagnet Assem. ZZ Model	6.25
63-296	R4	220 M Ohm	.09	126-482		Front Cabinet & Hinge Assem. (14-903)	.20
63-439	R13	2700 Ohm	.09	139-61		Strap & Rivet Assem. (Handles)	.20
63-579	R2	220 Ohm	.09	156-27			
63-600	R5	2.2 Megohm	.09	159-53			
63-602	R16	4.7 Megohm	.09	202-429			
63-627	R15	180 Ohm	.09	212-2			
63-646	R3	33 M Ohm	.09	S-11999	L1		
63-654	R1	180 M Ohm	.09	S-13767			
63-976	R7	15 Megohm	.09	S-13209			
				S-13210			

Prices subject to change without notice.

25M 4-29-47

ZENITH RADIO CORP.

MODEL 5MX080, Chassis  
5C80, Crosley

ALL CONDENSERS ARE MMFD.  
UNLESS OTHERWISE SPECIFIED  
ON ALL CONDENSERS:

A = 25 VOLTS B = 120 VOLTS C = 200 VOLTS  
D = 300 VOLTS E = 350 VOLTS F = 400 VOLTS  
G = 500 VOLTS H = 600 VOLTS J = 1600 VOLTS  
FOR RESISTORS: M = 1000 Ω, E.g., 10M = 10,000 Ω  
ALL RESISTORS ARE 1/4 WATT & ± 20%  
UNLESS OTHERWISE SPECIFIED

⊥ = DESIGNATES CHASSIS GROUND  
ALL TUBE SOCKETS ARE BOTTOM VIEWS

#### STAGE GAINS

TAKEN AT ANT. SOCKET AT 600 KC.  
AND AT CONVERTER GRID AT 265 KC.

#### DUMMY ANTENNA

30 MMFD SERIES & 30 MMFD. SHUNT AT ANT.  
SOCKET & 0.1 MMFD. SERIES TO CONVERTER GRID

#### BATTERY CONDITIONS

6.3 VOLTS AT STORAGE BATTERY TERMINALS  
WITH POSITIVE GROUND

#### TEST CONDITIONS

VOLUME CONTROL SET AT MAXIMUM  
WITH NO INCOMING SIGNAL  
VOLTAGES READ FROM POINT SHOWN TO  
CHASSIS WITH 1000 OHM PER VOLT METER

SENSITIVITY: 10 microvolts at one  
watt output.

UNDISTORTED POWER OUTPUT: 2 watts measured at the voice coil.

MAXIMUM POWER OUTPUT: 4.25 watts measured at the voice coil.

SPEAKER: 6" x 9" oval, instrument  
panel mounting.

CURRENT CONSUMPTION: 5. amperes

SCHEMATIC DIAGRAM FOR 5 TUBE  
CROSLLEY 5MX080

I.F. 265 KC.  
TUNING RANGE 540 KC. TO 1600 KC.

**CORE OR COIL REPLACEMENT ONLY**

**WARNING:** The following adjustments are to be made ONLY if a core or coil is replaced.

- 1—Replace coil or core.
- 2—Set signal generator to 1675 Kc.
- 3—Connect signal generator leads through dummy, illustrated in Figure 9, to antenna receptacle on the receiver. This is important.
- 4—Set receiver dial to 1600 Kc. (maximum high frequency end of dial).
- 5—Break cement loose on all cores and, using the special tuning wrench part No. S-13064, screw the core completely out of the antenna coil, the converter coil, and the oscillator coil.
- 6—Adjust oscillator trimmer C-5 (Fig. 8) at 1675 Kc.
- 7—Adjust converter trimmer C-3 and antenna trimmer C-1 (Fig. 7 and 8) for maximum output reading.
- 8—Replace cores to their approximate original position.
- 9—Set generator and receiver dial to 1200 Kc.
- 10—Adjust oscillator core L-4 (Fig. 8) to scale at 1200 Kc.
- 11—Adjust the two antenna cores L2 and L3 (Fig. 7) for maximum output reading. Do not adjust trimmers.
- 12—Set signal generator to 600 Kc.

13—If necessary, "rock in" shunt oscillator core L-5 (Fig. 8) for maximum output reading. This should be done only as a last resort, as the core has been set and sealed and should not require adjustment.

14—Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.

15—After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

**IMPORTANT:** After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station near 1200 Kc.

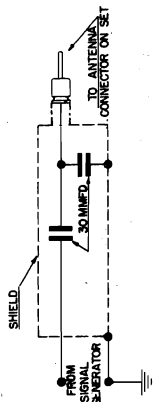


Fig. 9. Dummy Antenna

Fig. 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

**ALIGNMENT**

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

**CAUTION:** Make all alignment adjustments to the receiver with the volume control set at maximum. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

**I. F. ALIGNMENT PROCEDURE**

- 1—Remove top and bottom covers from receiver.
- 2—Set signal generator to 265 Kc.
- 3—Apply signal from generator through a .1 Mfd. dummy to 7Q7 converter grid. (Pin No. 6 on socket.)
- 4—Adjust I.F. slugs A, B, C and D (Figs. 7 and 8), in the order named for maximum output. Repeat the operation to assure accurate alignment.

**R. F. AND OSCILLATOR ALIGNMENT**

1—Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver. This is important.

- 2—Set signal generator to 535 Kc.
- 3—Set dial to 535 Kc. (End of travel, against the stop.)
- 4—Adjust oscillator trimmer C-5 (Fig. 8) for maximum response.
- 5—Set signal generator to 1200 Kc.
- 6—Tune set to 1200 Kc.
- 7—Adjust converter trimmer C-3 (Fig. 7) and Ant. trimmer C-1 (Fig. 8) for maximum response.
- 8—If dial calibration is off after making above adjustments, a correction can be made by turning eccentric screw at fulcrum of dial pointer. (Fig. 7.)

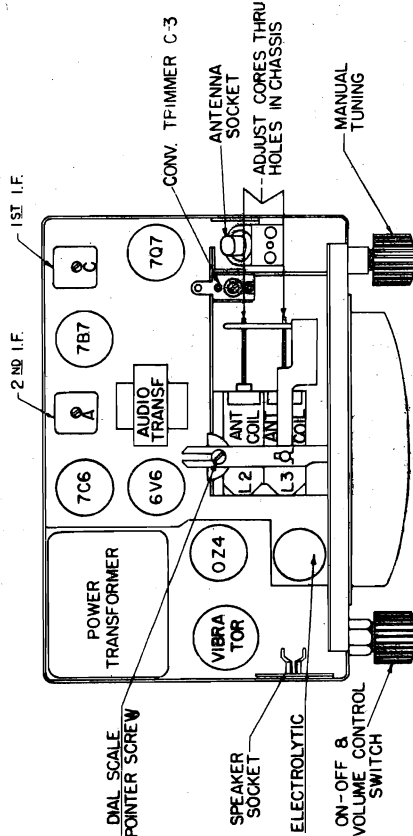


Fig. 7. Top View of Chassis

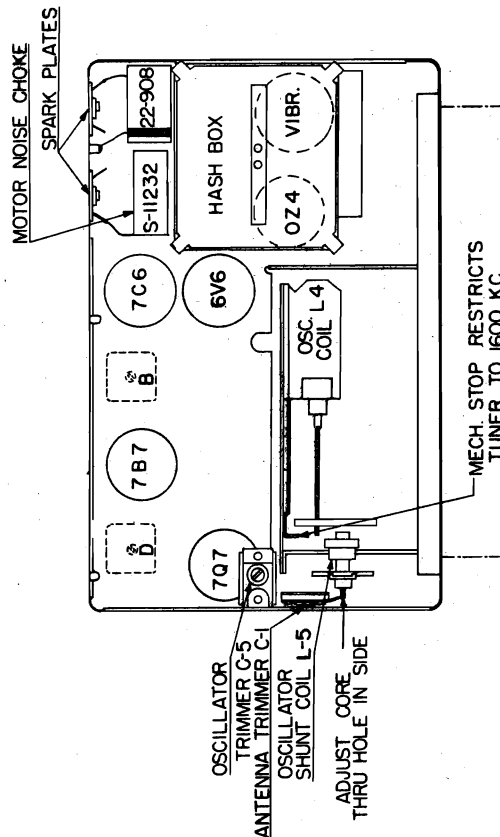
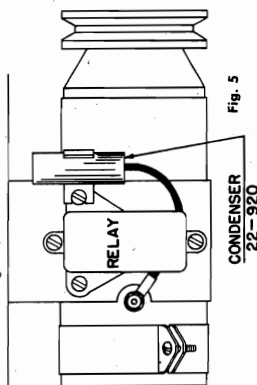


Fig. 8. Bottom View of Chassis

The generator condenser No. 22-920 should be installed as shown below in figure 5.



The motor hood band spring No. 80-145 should be installed as shown in figure 6. Note that the sharp extrusions are facing down toward the front of the car before the hood grounding strip is bent back.

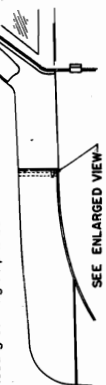


Fig. 6 HOOD SEAL COWL PANEL

GROUNDING STRIP 80-145 SHEET METAL SCREW 112-365

### DIAL AND TUNING MECHANISM ASSEMBLY

Diagram No.	Part No.	Description
	26-380	Dial scale
	57-1228	Escutcheon
	59-180	Dial pointer
	80-329	Gear indexing spring
	80-331	Cross arm return spring
	80-379	Pointer retainer spring
	100-32	Dial light bulb
	149-44	Adjusting spring and core (3 used)
	188-45	Turret screw lock ring
	S10826	Solenoid end plug and brkt. assem.
	S12439	Pointer mtg. brkt. and stud assem.
	S12440	Pointer drive brkt. and stud assem.
	S12447	Dial light socket and wire assem.
	S12594	Manual tuner assem. (final)
	S13156	Tuning and vol. con. knob assem. (46-639 red)
	S13161	Tuning shaft and gear assem.
	S13162	Mtg. plate and retaining strip assem.
	S13178	Cross arm assem.
	S13238	Turret assem.

### CHOKES AND COILS

Diagram No.	Part No.	Description
	20-213	Main hash choke
	95-1003	1st L.F. transformer
	95-1004	2nd L.F. transformer
	S8819	Ant. motor noise choke assem.
	S11040	R. F. coil and shield assem.
	S11229	Osc. series choke assem.
	S11232	Motor noise choke assem.
	S12053	Osc. tuning coil assem.
	S12060	R. F. coil tuning assem. (2 used)
	S13155	Osc. shunt coil assem.
	S13160	Ant. coil and shield assem.

### INTERFERENCE ELIMINATION

There should be no interference from the ignition system if the receiver has been installed according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations.

**IMPORTANT:** Be sure that good contacts are made between the car frame, or body, and the interference condensers. If necessary, clean away paint or dirt with emery paper. Be sure all nuts and bolts are tightened securely.

The distributor suppressor No. 63-1046 and the flexible ground strap No. 83-1335 should be connected as shown in figure 3.

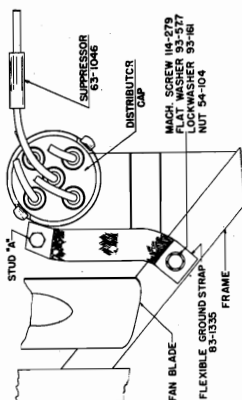


Fig. 3

The fuel gauge condenser No. 22-919 should be installed as shown in figure 4.

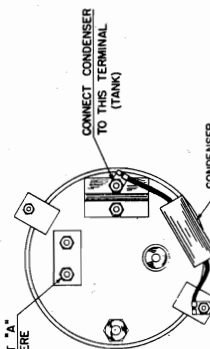


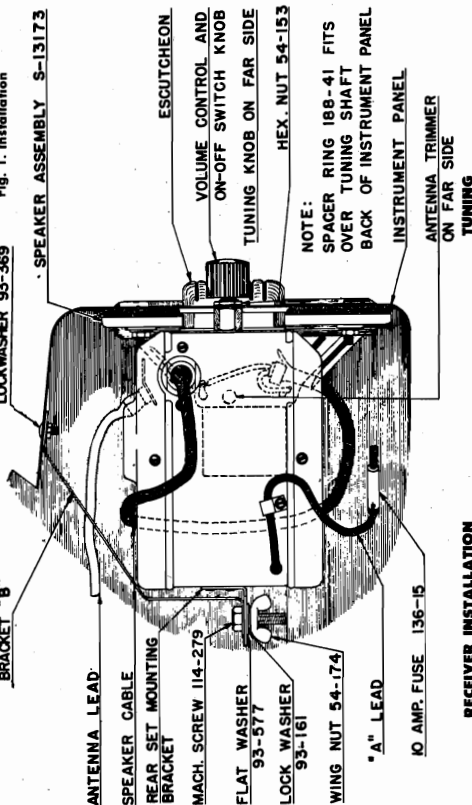
Fig. 4

### MISCELLANEOUS

Diagram No.	Part No.	Description
	52-294	Vol. con. cable and plug
	52-397	Speaker cable and plug
	52-417	Battery cable (use to ammeter)
	52-418	Battery cable (use to ammeter)
	54-184	Set spacer nut (used on 63-1513)
	78-281	Vibrator socket
	78-586	Ant. base tube socket (8 contact)
	78-587	Ant. base tube socket (moulded)
	78-749	Speaker base tube socket
	78-756	Ant. base tube socket
	78-758	Ant. base tube socket
	93-456	Vibrator cushion washer
	95-915	Output transformer
	95-1002	Power transformer
	136-15	10 amp. fuse (3AG)
	190-20	Vibrator
	202-486	Instruction book
	S11391	Ant. con. socket and brkt. assem.

SCREW 112-668  
NUT 54-19  
LOCKWASHER 93-369

Fig. 1. Installation



Turn the tuning knob (Fig. 1) to tune in the desired station. Tune to the exact frequency to prevent distortion. The pointer in front of the illuminated dial scale indicates the frequency to which the receiver is tuned. (Fig. 2)

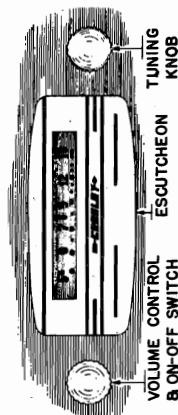


Fig. 2. Front View

Diagram No.	Part No.	Description
	63-942	1.5M ohm 2 watt insl.
	63-1368	1800 ohm W.W. 2 watt insl.
	63-1372	390 ohm W.W. 1 watt insl.
	63-1390	1 megohm 1/4 watt insl.
	63-1391	33M ohm 1/4 watt insl.
	63-1392	330M ohm 1/4 watt insl.
	63-1395	22M ohm 1/4 watt insl.
	63-1399	82 ohm 1/4 watt insl.
	63-1400	15 megohm 1/4 watt insl.
	63-1414	100 ohm 1/4 watt insl.
	63-1513	Vol. con. and sw.

### SPEAKER AND GASKET ASSEMBLY

Diagram No.	Part No.	Description
	S13173	Speaker and gasket assem. (comp.)
	49-576	6" x 9" P.M. speaker
	196-91	Speaker gasket and screen
	208-576	Cone and voice coil assem.

### RECEIVER INSTALLATION

Figures 1 and 2, illustrating the installed receiver, the escutcheon plate, and the control knobs, are given here to assist in the removal and reinstallation of this receiver when service is necessary.

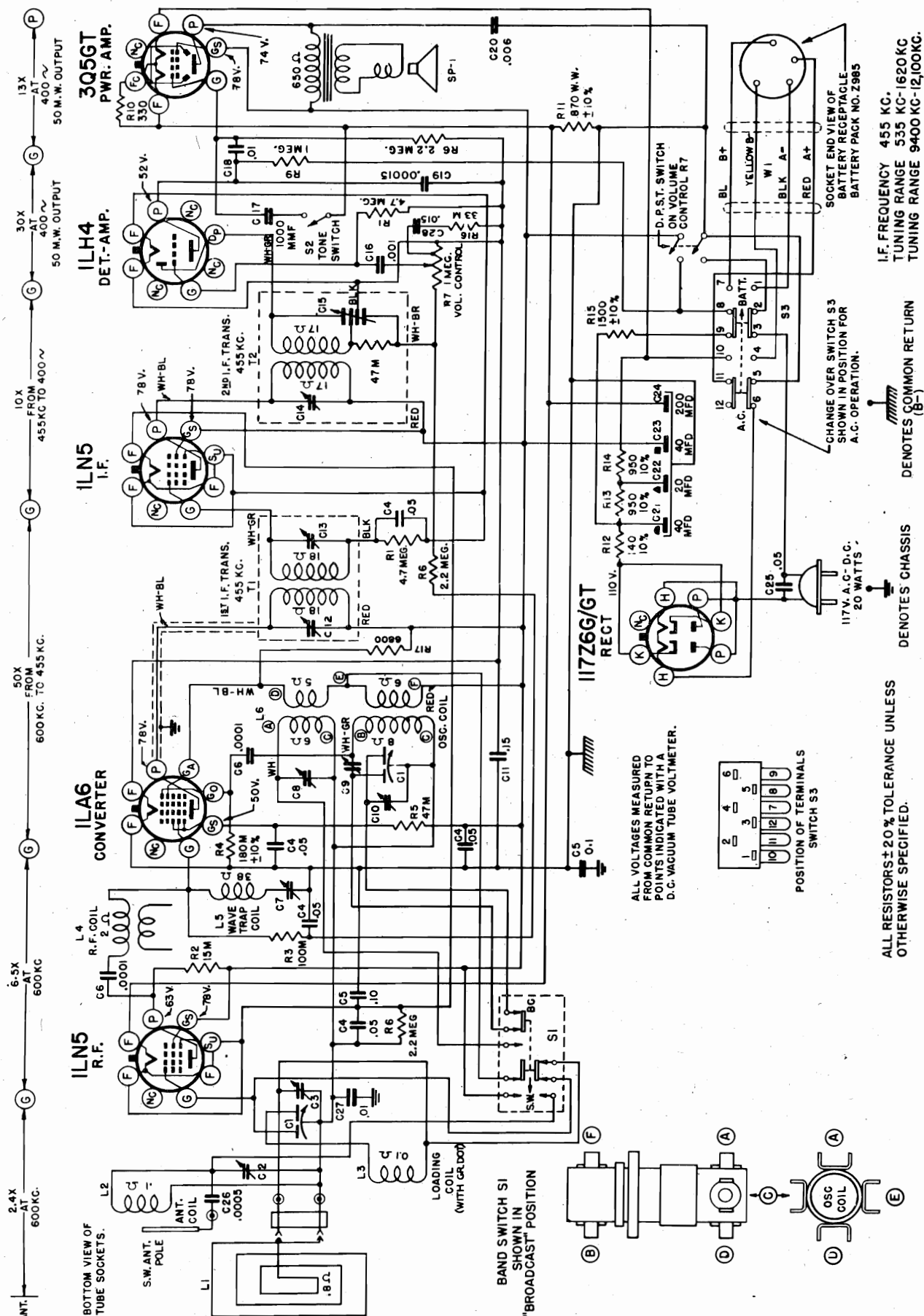
To take the receiver from the car, remove the control knobs and mounting nuts from the front panel, and remove the wing-nut, 54-174, lock washer 93-161, flat washer 93-577, and machine screw 114-279 from the set mounting bracket "B".

The speaker is held to the rear of the panel by four hex. nuts.

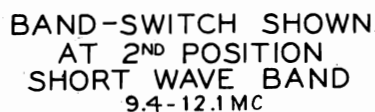
### OFF-ON SWITCH AND VOLUME CONTROL

To turn the receiver on, turn the volume control knob to the right until it clicks and the dial is illuminated. Allow the receiver to reach operating temperature. (Approximately 20 seconds.) To increase the volume, continue to rotate this knob to the right. To turn the receiver off turn the volume control knob to the left until it clicks. (Fig. 2)

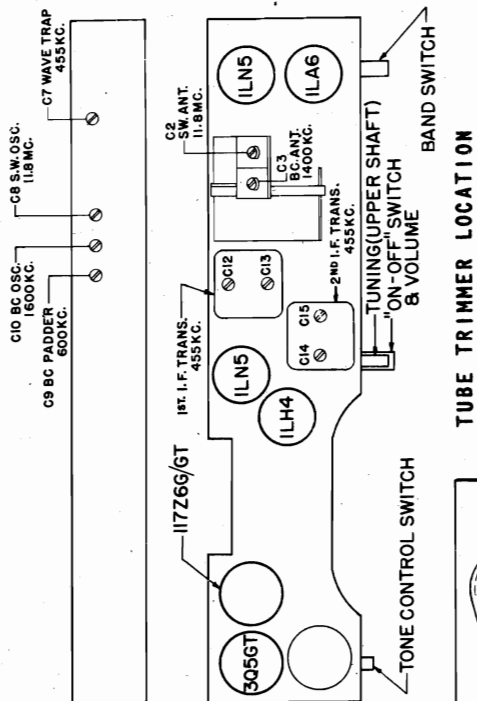
Diagram No.	Part No.	Description
	C-8	22-170 .1 mfd.
	C-12	22-182 250 mfd.
	C-9	22-230 .05 mfd.
	C-4	22-716 500 mfd.
	C-13	22-838 .005 mfd.
	C-10	22-906 .005 mfd.
	C-18	22-908 .5 mfd.
	C-19	22-1170 .01 mfd.
	C-22	Dual 250 mfd. 100 volt
	C-7	22-230 .05 mfd.
	C-2	22-1244 .004 mfd.
	C-3	22-1376 .004 mfd.
	C-15	22-1387 .004 mfd.
	C-14	22-1387 .004 mfd.
	C-11	22-1420 Ant. trimmer
	C-17	22-1448 .008 mfd.
	C-6	22-1641 350 mfd.



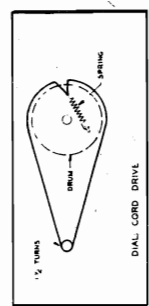




3-10-47



TUBE TRIMMER LOCATION



## DIAL CABLE DRAWING

TO THE SERVICEMAN: THE 6C41 CHASSIS IS A  
AC/DC OR BATTERY OPERATED SUPERHETERODYNE  
TYPE RADIO WITH A STAGE OF RF AMPLIFICATION AND TWO  
TUNING RANGES, .935 TO 160KC AND .9 TO  
12.1 MC. THE CHASSIS IS ISOLATED FROM THE  
CABINET BY A COMMON NEGATIVE MOUNT. THE  
MOST CONVENIENT PLACE TO REACH THIS NEGA-  
TIVE POINT IS THE TERMINAL STRIP TO WHICH  
CONNECTIONS FROM CHASSIS TO ANY CIRCUIT MUST BE  
MADE. THE CHASSIS IS DESIGNED SO THAT WHEN  
IT BECOMES GROUNDED A HUM WILL DEVELOP.

## DIAL CABLE DRAWING

C5 IS CONNECTED. THE DC RESISTANCE FROM CHASSIS TO ANY CIRCUIT MUST BE ALMOST INFINITE. IF ANY CIRCUIT BECOMES SHORTED TO CHASSIS, THE CIRCUIT WILL DEVELOP A SHORTED STRIP TO WHICH THE WAVEMAGNET IS CONNECTED TO THE CHASSIS THROUGH THE HINGES IN THE CABINET SNAPS AND FLEXIBLE LEADS. IF THE RF BECOMES WEAK OR DEAD, CHECK THE RESISTANCE OF THE WAVEMAGNET AT TUNING GAP. THE DC RESISTANCE ACROSS THE TWO LEADS SHOULD BE APPROXIMATELY 1 OHM. IF THE CIRCUIT IS OPEN, RE-MOVE THE TWO SCREWS WHICH HOLD THE WAVEMAGNET TO THE CABINET AND CHECK THE WAVEMAGNET FOR PROPER CONNECTION. ALSO LOOSEN THE SNAP-ON SOCKET FOR THE SHORTED OR BROKEN LEADS.

IF ALIGNMENT: REMOVE THE CHASSIS FROM THE CABINET AND ARRANGE THE UNITS SO THAT THE WAVEMETER CAN BE PLUGGED IN THROUGH A TWO-POLE DUMMY LOAD. TUNE THE GENERATOR TO THE FREQUENCY OF THE SPEAKER (A CORD WITH METERNALNA CRIMES THE VOICE COIL OF THE SPEAKER (TWO PLUGS PROVIDED) AND ADJUST C12, C13, C14 AND C15 FOR MAXIMUM INDICATION ON THE OUTPUT METER. ALWAYS KEEP THE SIGNAL OUTPUT FROM THE GENERATOR JUST HIGH ENOUGH TO GET INDICATION ON THE METER. TOO MUCH SIGNAL WILL CAUSE LOADING AND INACCURATE ALIGNMENT. THE WAVE-TRAP IS ADJUSTED BY COUPLING THE 455KC SIGNAL TO THE WAVEMETER. TURN THE WAVE-TRAP LOOP AND ADJUSTING C7 FOR MINIMUM INDICA-

TURN LOOP LOOSELY. SET THE BAND SWITCH TO SHORT WAVE AND THROUGH A SINGLE RF ALIGNMENT. COUPLE A 11.8 MC SIGNAL TO THE WAVEFORM. C8 AND C2 ARE ADJUSTED TO SCALE AND MAXIMUM OUTPUT. SET THE BAND SWITCH TO STANDARD BROADCAST. SIGNAL GENERATOR TO 1600KC AND LOOSELY COUPLE A ONE TURN LOOP TO THE WAVE MAGNET. C10 IS ADJUSTED TO SCALE. SET SIGNAL GENERATOR AND DIAL SCALE TO 1400 KC. AND ADJUST C3 TO MATCH THE ONE TURN LOOP TO MAXIMUM. A SLIGHT RE-ADJUSTMENT OF C2 AND C10 FINE TUNING THE ONE TURN LOOP. NECESSARY AFTER THE CHASSIS IS 22.118 MC AND C3 AT 1400KC MAY BE NEEDED.

OPERATION	CONNECT TO OSCILLATOR	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
1	CONVERTER GRID	5 MFD	455 KC	BC	600 KC	C12 C13 C14 C15	ALIGN I. F.
2	ONE TURN COUPLED TO WAVEMAGNET		455 KC	BC	600 KC	C7	ADJUST WAVELENGTH TO 100 CM
3	ONE TURN COUPLED TO WAVEMAGNET	EXTENSIVE FULL COUPLED WAVELENGTH	11.8 MC	SW	11.8 MC	C8	SET OSCILLATOR TO SCALE
4	ONE TURN COUPLED TO WAVEMAGNET	EXTENSIVE FULL COUPLED WAVELENGTH	11.8 MC	SW	11.8 MC	C9	ALIGN WAVELENGTH
5	ONE TURN COUPLED TO WAVEMAGNET		1800 KC	BC	1800 KC	C10	SET OSCILLATOR TO SCALE
6	LOOSELY COUPLED TO WAVEMAGNET		1400 KC	BC	1400 KC	C13	ALIGN WAVELENGTH
7	COUPLED TO WAVEMAGNET		600 KC	BC	600 KC	C9	ADJUST PADDER

1. VEMAGNET CABLE A:  
 2. VEMAGNET CABLE A:

S-10865 WAVEMAGNET SUCT. ON CUP ASSEMBLY (OR S-1258) (2 USED)  
S-10867 WAVEMAGNET MTG. STRIP ASSEMBLY (SINGLE SNAP)  
S-11928 WAVEMAGNET WINDING & PLATE ASSEMBLY (L1)  
S-12382 WAVEMAGNET MTG. STRIP ASSEMBLY (THREE SNAP)

**PRICES SUBJECT TO CHANGE WITHOUT NOTICE**

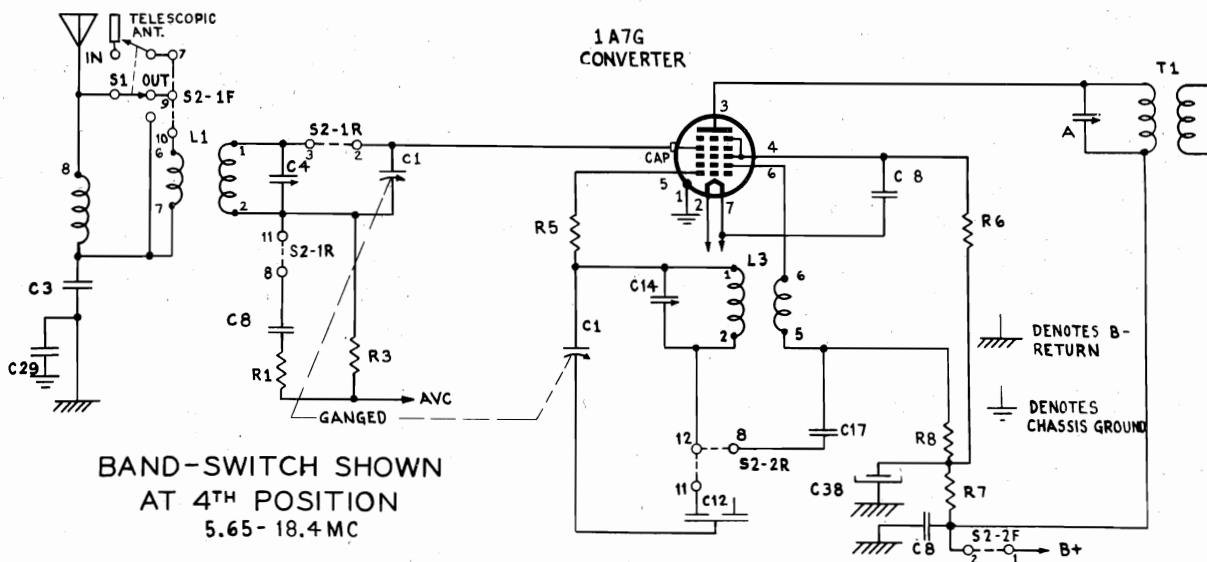
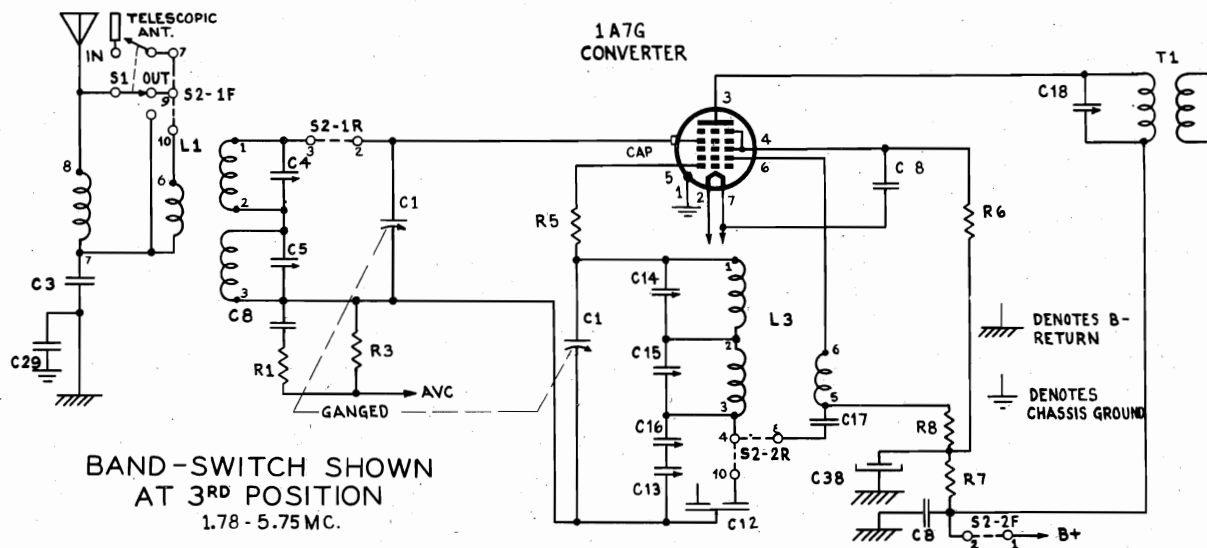
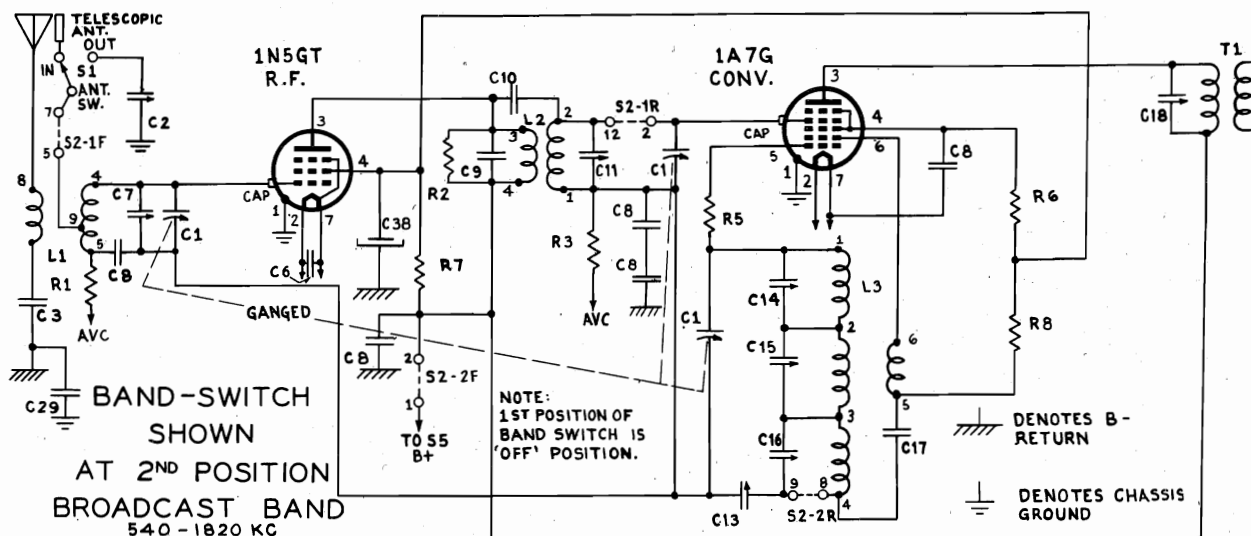


# "clarified schematics"

PAGE 16-14 ZENITH

MODEL 6G038

ZENITH RADIO CORP.

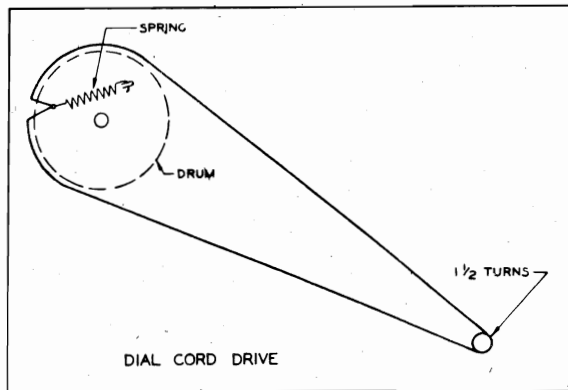


## ZENITH RADIO CORP.

MODEL 6G038

## ALIGNMENT PROCEDURE

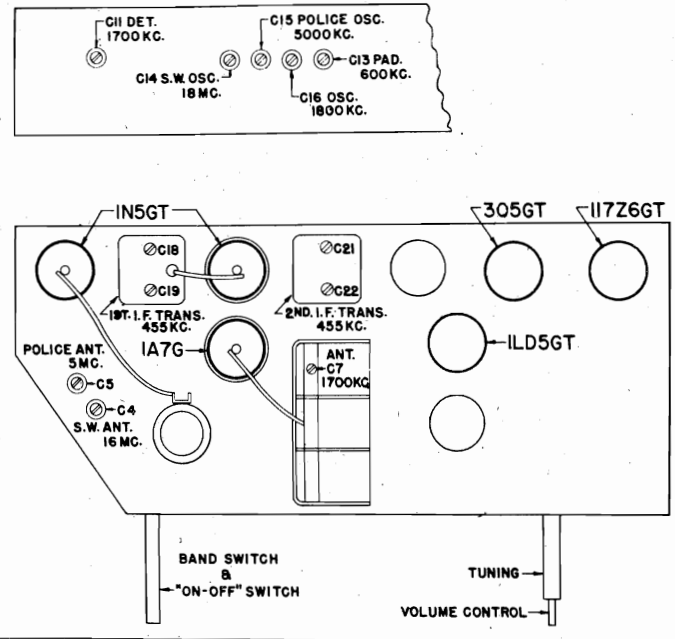
OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter grid	.5 mfd	455 Kc	600 Kc	C18, C19, C21, C22	Align I.F.
2	One turn		18 Mc	18 Mc	C14	Adjust oscillator to scale
3			16 Mc	16 Mc	C4	Adjust for max.
4	Loosely		5 Mc	5 Mc	C15	Adjust oscillator to scale
5	Coupled		5 Mc	5 Mc	C5	Adjust for max.
6	To		1800 Kc	1800 Kc	C16	Adjust oscillator to scale
7	Waverod		1700 Kc	1700 Kc	C11 & C7	Adjust for max.
8			600 Kc	600 Kc	C13	Rock gang and adjust for max.



DIAL CABLE DRAWING

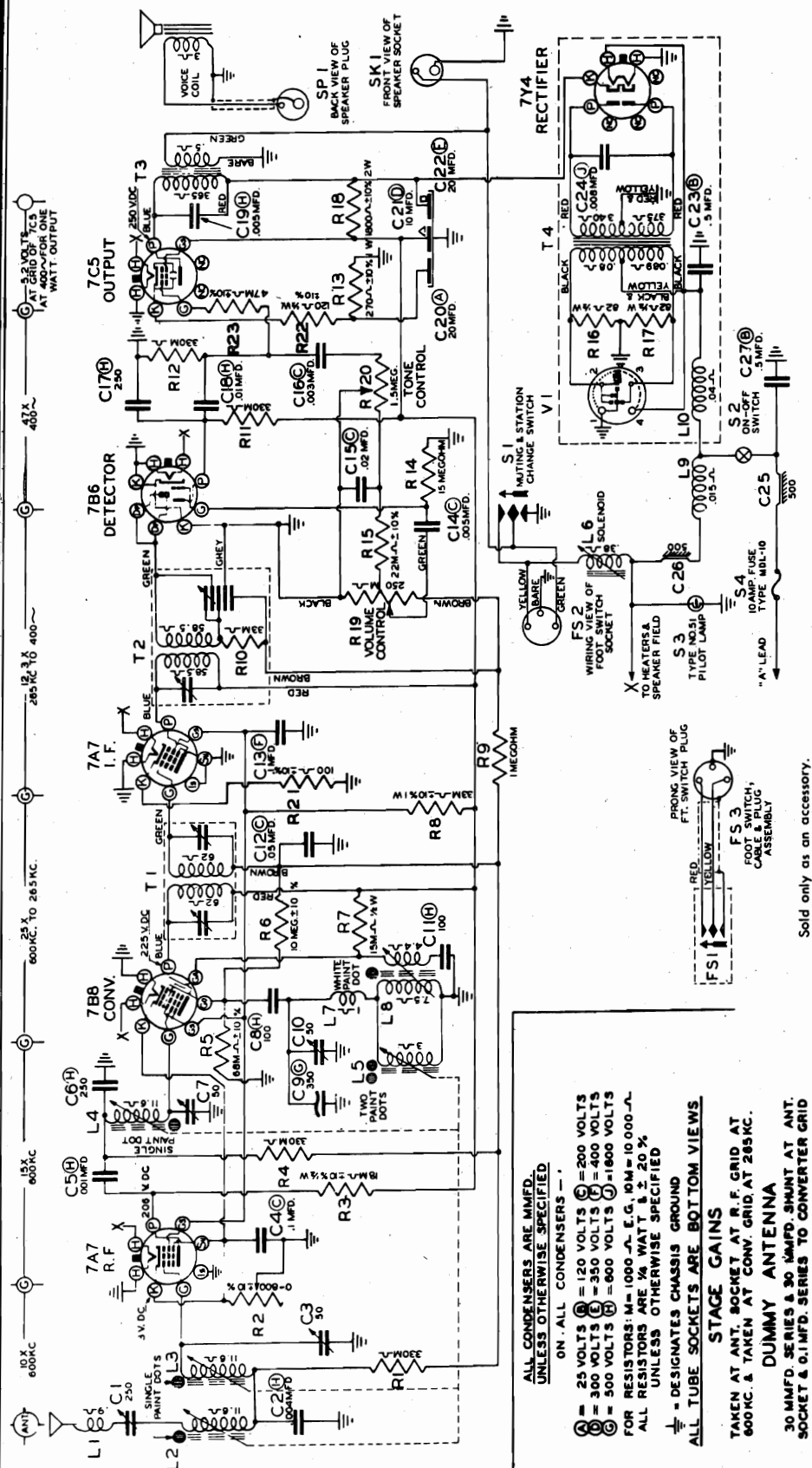
## PARTS LIST

PART NO.	REF. NO.	DESCRIPTION	PRICE
<b>DIAL ASSEMBLY</b>			
59-121		Dial pointer	.19
76-305		Tuning Control shaft	.12
80-69		Dial Cord Tension Spring	.02
80-227		Tuning Shaft Tension Spring	.02
93-482		Black Bakelite Washer (used with 59-121)	.72C
188-27		Retaining Ring (76-305)	1.20C
S-9643		Dial Scale & Indicator Assembly (26-293)	1.20
S-9650		Dial Cord Assembly	.07
MS-586		Pulley & Bracket Assembly	.12
<b>COILS &amp; CHOKES</b>			
95-821	T1	1st I.F. Transformer	1.77
95-822	T2	2nd I.F. Transformer	1.77
S-9689	L3	Oscillator Coil & Wire Assembly	1.26
S-9690	L2	Detector Coil Assembly	1.04
S-11815	L1	Antenna Coil Assembly	1.65
<b>CONDENSERS</b>			
22-162	C23	.0001 Mfd	.20
22-196	C24	.01 Mfd	.20
22-229	C33	.005 Mfd	.20
22-289	C9	50 Mfd	.20
22-303	C10	5 Mfd	.20
22-326	C25	.003 Mfd	.20
22-327	C6	.02 Mfd	.20
22-358	C17	.002 Mfd	.36
22-448	C26	.004 Mfd	.20
22-470	C35	.00015 Mfd	.20
22-492	C30	.002 Mfd	.20
22-827	C28	.1 Mfd	.23
22-829	C8	.05 Mfd	.20
22-830	C32	.02 Mfd	.20
22-887	C31	.001 Mfd	.20
22-900	C12	Dual unit podder	.83
22-954	C34	.00035 Mfd	.16
22-1017	C20	.05 Mfd	.20
22-1047	C36, 37, 38	10-20-30 Mfd. Dry Electrolytic	1.63
22-1144	C13, 14, 15, 16	Four Section Ceramic Trimmer	.83
22-1183	C3	.01 Mfd	.40
22-1217	C1	Three Gang Variable	4.48
22-1230	C4, C5	Two Section Ceramic Trimmer	.38
22-1234	C27, 28	200 Mfd. 10 V. x 40 Mfd. 150 V. Dry Electrolytic	1.92
22-1421	C2, C11	Trimmer Capacitor	.40
<b>RESISTORS</b>			
63-271	R15	1 Megohm	.09
63-577	R5	100 Ohm	.09
63-580	R18	330 Ohm	.09
63-589	R2	10,000 Ohm	.09
63-591	R6	22,000 Ohm	.09
63-593	R10	47,000 Ohm	.09
63-594	R11	68,000 Ohm	.09
63-597	R20	470,000 Ohm	.09
63-600	R3	2.2 Megohm	.09
63-602	R1	4.7 Megohm	.09
63-604	R16	10 Megohm	.09
63-605	R21	1000 Ohm	.10
63-635	R7	3300 Ohm	.09
63-640	R8	8200 Ohm	.09
63-654	R4	180,000 Ohm	.09
63-975	R19	15 Megohm	.09
63-1097	R19	870 Ohm	.24
63-1244	R9	Volume Control	1.20
63-1259	R13, 14	Candohm (2 section)	.43
63-1366	R12	140 Ohm Zipom	.24



## TUBE TRIMMER LOCATION

PART NO.	REF. NO.	DESCRIPTION	PRICE
<b>RADIO ESCUTCHEON PARTS</b>			
S-9995		Radiogran Escutcheon & Knob Assen. L.H. (Complete)	1.20
S-9996		Radiogran Escutcheon & Knob Assen. R.H. (Complete)	1.20
MS-660		Bracket Assembly	.25
S-9590		Knob & Eyelet Assen. (7 used on L.H., 1 on R.H.)	.12
S-9591		Knob & Eyelet Assembly (2 used on R.H. only)	.12
57-911		Tenite Escutcheon (Black) (1 used on L.H. only)	.36
57-912		Tenite Escutcheon (Black) (1 used on R.H. only)	.36
76-337		Knob Shaft	.03
76-338		Knob Spring	.04
80-264		Latch Spring	.72C
114-159		#6 x 1/4" Hex Hd. Self Tapping Screw (2 used)	.72C
156-10		Latch	.36C
<b>MISCELLANEOUS</b>			
11-68		Line Cord & Plug (8 ft. long)	.65
12-782		Volume Control Mounting Bracket	.05
12-787		Tuning Sleeve Support Bracket	.04
12-1082		Antenna Rod Mounting Bracket	.06
15-34		Socket Cap (or 15-67) (Battery Cable)	.07
17-67		Antenna Rod Retaining Clamp	.08
19-77		Cable Retaining Clamp	.01
46-579		Pand Selector Switch Knob	.20
49-464	SP1	8" P.W. Speaker	10.52
57-114		206-464 Output Transformer	1.97
57-116		208-464 Cone & Voice Coil	2.63
57-905		Antenna Lead Marker	.03
57-1103		Ground Lead Marker	.03
57-1103		Dial Escutcheon (for 57-1112) (Part of S-9580 or S-11777)	2.41
70-124		Antenna Knob Escutcheon	.70
72-58		#2 x 3/8" Oval Hd. Wood Screw (Ant. Esc. Mtg.)	1.70C
78-190		#2 x 3/8" Flat Hd. Wood Screw (Dial Esc. Mtg.)	.02
78-229		Speaker Plug Socket	.12
78-396		Electrolytic Capacitor Socket	.03
78-446		Four Contact Socket (Battery Cable)	.12
78-611		Loktal Base Tube Socket (7 contact)	.19
78-671		Octal Base Tube Socket (8 contact)	.12
85-171	S5	Power Switch	.31
85-303	S1	Antenna Switch	.35
85-366	S2	Bona Selector Switch	2.00
93-215		Rubber Washer (Chassis Mtg.)	.07
114-40		#6 x 1/4" Hex Hd. Self Tapping Screw (Radiogran Switch Mtg.)	.55C
114-128		#10-32 x 7/8" Hex Washer Hd. M.S. Steel (Chassis Mtg.) (3 used)	.72C
125-17		#10 x 1-1/16" Hex Washer Hd Self Tapping Screw (Chassis Mtg.) (1 used)	1.81C
126-379		Rubber Grommet	.03
126-382		Tube Shield (for GT type)	.07
192-68		Tube Shield	.08
196-47		Dial Escutcheon Glass (Part of S-11777 or S-9580)	.43
202-398		Dial Escutcheon Gasket	.19
S-8540		Instruction Book	.25
S-9580		Dummy Knob & Set Screw Assembly (46-350)	.24
S-9580		Dial Escutcheon Assembly (for S-11777)	3.01
S-9595	S3, 4	Radiogran Strip & Contact Assembly (2 used)	.31
S-9816		Tuning Control Knob & Set Screw Assembly	.30
S-11251		Telescopic Antenna Assembly	7.85
S-11899		Volume Control Knob Assembly (46-578)	.26



SCHEMATIC DIAGRAM FOR 6 TUBE  
WILLY'S 6MW083  
WITH FOOT CONTROL  
I. F. 265 KC.  
TUNING RANGE 540KC. TO 1600 KC.

SENSITIVITY: ..... 4 microvolts at one  
watt output.

POWER OUTPUT: ..... 5.5 watts measured  
at the voice coil.

SPEAKER: ..... 8" round, mounted  
on firewall.

CURRENT CONSUMPTION: ..... 7.5 amperes

INSTANTANEOUS CURRENT CON-  
SUMPTION DURING AUTOMATIC  
CHANGE CYCLE: ..... 20 amperes

ALL CONDENSERS ARE MMFD.  
UNLESS OTHERWISE SPECIFIED

ON ALL CONDENSERS -

- 25 VOLTS = 120 VOLTS = 200 VOLTS
- 300 VOLTS = 350 VOLTS = 400 VOLTS
- 500 VOLTS = 600 VOLTS = 1800 VOLTS
- FOR RESISTORS: M = 1000 Ω, E.G. 10M = 10,000 Ω
- ALL RESISTORS ARE 1/4 WATT ± 20 %
- UNLESS OTHERWISE SPECIFIED
- ⊥ - DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEWS

#### STAGE GAINS

TAKEN AT ANT. SOCKET AT R.F. GRID AT  
600 KC. & TAKEN AT CONV. GRID AT 265 KC.

#### DUMMY ANTENNA

30 MMFD. SERIES & 30 MMFD. SHUNT AT ANT.  
SOCKET & 0.1MFD. SERIES TO CONVERTER GRID

BATTERY CONDITIONS  
WITH POSITIVE GROUND

#### TEST CONDITIONS

VOL. CONTROL SET AT "MAX." TONE CONTROL  
SET ON "HIGH", WITH NO INCOMING SIGNAL  
VOLTAGES READ FROM POINT SHOWN TO  
CHASSIS WITH 1000 OHM PER VOLT METER

Sold only as an accessory.

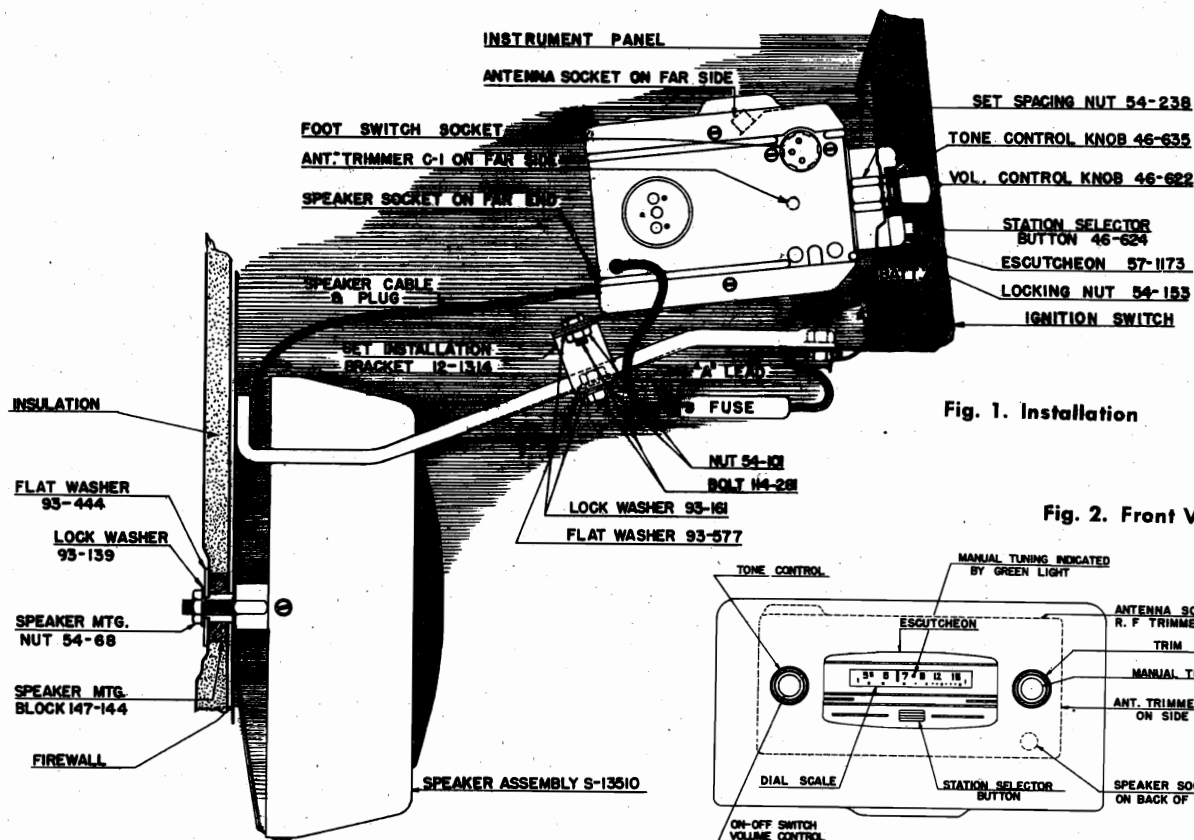
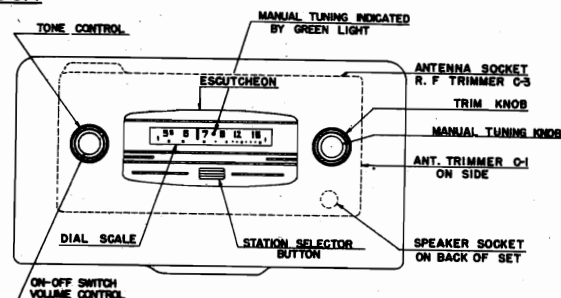


Fig. 1. Installation

Fig. 2. Front View



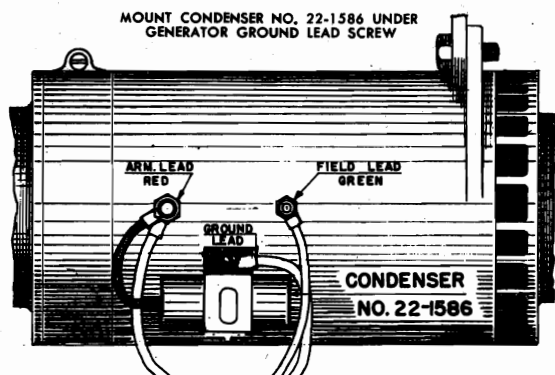
### RECEIVER INSTALLATION

Figures 1 and 2, illustrating the installed receiver, the escutcheon plate, and the control knobs, are given here to facilitate removal and reinstallation of this receiver when service or repair is necessary.

To take the receiver from the car, remove the control knobs and mounting nuts from the front panel, and remove the set installation Bracket No. 12-1314 from the rear set mounting bracket.

### MANUAL TUNING

1. Press the Station Selector push button (Fig. 2) several times or until the green dot in the dial scale is illuminated.
2. Pull the Manual Tuning control knob (right hand) outward and turn to tune in desired station. Be sure to tune to exact frequency to assure the best tone quality.

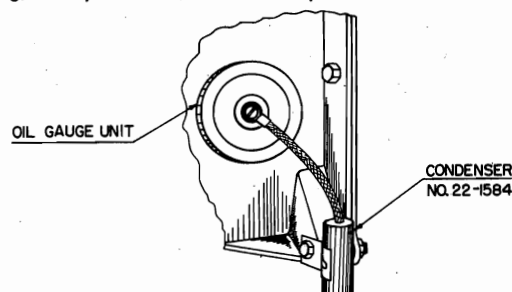


### AUTOMATIC TUNING

There are five automatic tuning positions which may be adjusted to five desired stations. If these positions have not been previously adjusted proceed as follows:

1. Press the station selector push button repeatedly until the green dot in the dial scale is illuminated.
2. Press the button once more to move the mechanism to the No. 1 Position.
3. Pull manual tuning knob outward to engage the automatic mechanism.
4. Select the station desired and tune to its frequency by turning the tuning knob. Tune very carefully for clearest reception.
5. Press the station selector push button, pull the manual tuning knob outward, and tune in the station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5.

When the five automatic positions have been adjusted to the five desired stations as instructed, it is only necessary to press the station selector push button to return to dial tuning, or any one of the stations adjusted on the Automatic.



# CORE OR COIL REPLACEMENT ONLY

**WARNING:** The following adjustments are to be made ONLY if a core or coil is replaced.

- 1—Replace coil or core.
- 2—Set signal generator to 1700 Kc.
- 3—Connect signal generator leads through dummy, illustrated in Figure 9, to antenna receptacle on the receiver.
- 4—Set receiver dial to 1600 Kc. (maximum high frequency end of dial.)
- 5—Screw the core completely out of the antenna coil, the R.F. coil, the converter coil, and the oscillator coil.
- 6—Adjust oscillator trimmer C-11 (Fig. 8) at 1700 Kc.
- 7—Adjust converter trimmer C-7, R.F. trimmer C-3, and antenna trimmer C-1 (Fig. 7 and 8) for maximum output reading.
- 8—Replace cores to their approximate original position.
- 9—Set generator dial and receiver dial to 1200 Kc.
- 10—Adjust oscillator core L-5 (Fig. 8) to scale at 1200 Kc.
- 11—Adjust the antenna core, R.F. core, and converter core (Fig. 7 and 8) for maximum output reading.
- 12—Set signal generator to 600 Kc.
- 13—"Rock in" shunt oscillator coil L-8 (Fig. 8) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the paddler condenser on a ganged condenser receiver.
- 14—Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.
- 15—After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

**IMPORTANT:** After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station near 1200 Kc.

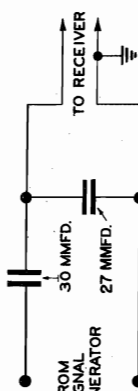


Fig. 9. Dummy Antenna

Fig. 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

## ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

**CAUTION:** Make all alignment adjustments to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

## I.F. ALIGNMENT PROCEDURE

- 1—Remove top and bottom covers from receiver.
- 2—Set signal generator to 265 Kc.
- 3—Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
- 4—Adjust I.F. trimmers, A, B, C and D (Fig. 7) in the order named for maximum output. Repeat the operation to assure accurate alignment.

## R.F. AND OSCILLATOR ALIGNMENT

- 1—Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver.
- 2—Set signal generator to 535 Kc.
- 3—Place set in manual tuning position and set dial to 535 Kc.
- 4—Adjust oscillator trimmer C-11 (Fig. 8) for maximum response.
- 5—Set signal generator to 1200 Kc.
- 6—Tune set to 1200 Kc.
- 7—Adjust converter trimmer C-7 (Fig. 8) and R.F. trimmer C-3 (Fig. 7) for maximum response.
- 8—If dial calibration is off after making above adjustments, a correction can be made by turning the slotted brass screw at the rear of the pointer bracket.

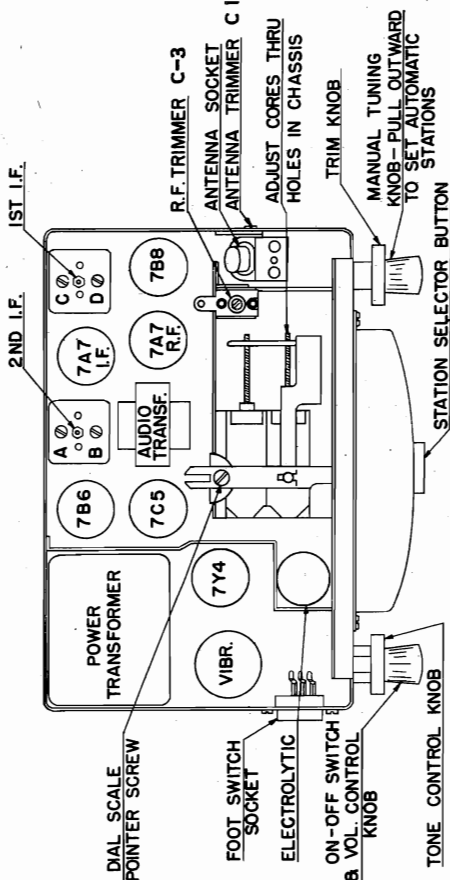


Fig. 7. Top View of Chassis

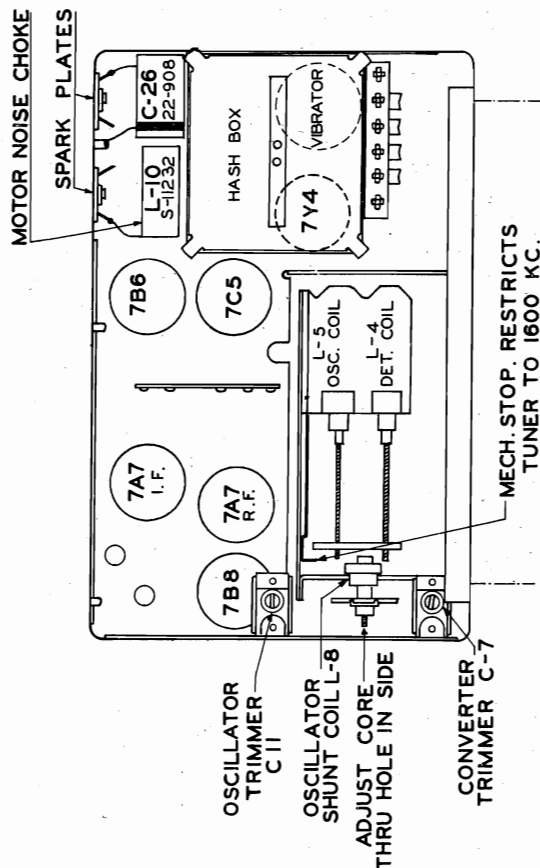


Fig. 8. Bottom View of Chassis



# **PARTS LIST MODEL 6MW083 (CHASSIS 6C83)** **1946 WILLYS OVERLAND LONG DISTANCE RADIO**

## **COILS AND CHOKES**

Diagram No.	Part No.	Description
L 9	20-213	Main Hash Choke
T 1	95-916	1st I.F. Transformer
T 2	95-942	2nd I.F. Transformer
L 1	S8819	Ant. Motor Noise Choke Assem.
L 2	S11040	Ant. & R.F. Coil Assem. (Right Hand)
L 3		
L 4	S11041	Osc. & Converter Coil Assem. (Left Hand)
L 5		
L 7	S11229	Osc. Series Coil Assem.
L 8	S11231	Osc. Shunt Coil Assem.
L10	S11232	Motor Noise Choke Coil Assem.

## **CONDENSERS**

C 8	22-162	100 Mmfd.
C 11		
C 13	22-170	.1 Mfd.
C 17	22-182	250 Mmfd.
C 4	22-190	.1 Mfd.
C 12	22-250	.05 Mfd.
C 19	22-838	.005 Mfd.
C 14	22-906	.005 Mfd.
C 23		
C 27	22-908	.5 Mfd.
C 6	22-1136	250 Mmfd.
C 5	22-1169	.001 Mfd.
C 18	22-1170	.01 Mfd.
C 16	22-1180	.003 Mfd.
C 2	22-1244	.004 Mfd.
C 15	22-1270	.02 Mfd.
C 3	22-1376	R.F. Trimmer
C 7	22-1377	Det. Trimmer
C 10	22-1378	Osc. Trimmer
C 20	22-1387	Dry Electrolytic—20 Mfd. 25 V. x 10 Mfd.—300 V. x 20 Mfd. 350 V.
C 21		
C 22		
C 1	22-1420	Ant. Trimmer
C 9	22-1448	.008 Mfd.
C 24	22-1478	350 Mmfd. Compensator
C 25	22-1553*	Dry Electrolytic—20 Mfd.—25 V.
C 26	22-1554*	Dry Electrolytic—10 Mfd.—300 V. x 20 Mfd.—350 V.
C 25	27-87	Spark Plate
C 26	27-87	Spark Plate

\*Note: It is necessary to use one each 22-1553 and 22-1554 to replace one 22-1387.

## **RESISTORS**

R 2	63-1267	Sensitivity Control (Sub. for 63-1379)
R 18	63-1368	1800 Ohm, 2 Watt Ins. W.W.
R 13	63-1369	270 Ohm, 1 Watt Ins. W.W.
R 2	63-1379	Sensitivity Control
R 9	63-1390	1 Megohm 1/4 Watt.

## **DIAL AND TUNING MECHANISM ASSEMBLY (Continued)**

Diagram No.	Part No.	Description
80-331		Cross Arm Return Spring
80-332		Cam Lever Spring
80-336		Ratchet Gear Return Spring
80-340		Lever Spring
80-341		Kick-off Spring
80-342		Tuning Shaft Spring
80-379		Pointer Retainer Spring
80-445		Flag Spring
83-1030		Return Spring Retainer Strip
83-1039		Solenoid Insulating Strip
86-30		#6 Shakeproof Terminal
93-125		#6 Internal Shakeproof Lockwasher
93-501		#4 Internal Shakeproof Lockwasher
93-631		Retainer Washer
93-650		Brass Washer (.010 x 3/4 x 3/4)
93-706		Neoprene Washer (.020 x 3/4 x 3/4)
93-822		Brass Washer (.008 x .125 x 3/4)
93-849		Shim Washer
94-438		Spacing Bushing
97-193		Lever Stud
97-236		Flag Stud
100-32		Dial Light Bulb
114-63		#6-32 x 3/4 Hex Acorn Hd. M.S.
114-69		#4-40 x 1/4 Hex Acorn Hd. M.S.
114-150		#6-32 x 3/4 Hex Acorn Hd. M.S.
117-83		Tuning Shaft Locking Lever
128-26		Dial Indicator Cam
147-126		Gear & Disc Spacer
149-44		Adjusting Spring & Core
S10826		Solenoid End Plug & Bracket Assem.
S10829		Solenoid & Terminal Assem.
S10381		Ratchet & Bracket Assem.
S10836		Cross Arm Assem.
S11056		Tuning Shaft & Gear Assem.
S11076		Push-Pull Tuner Assem. (complete)
S11082		Turret Assem.
S11271		Solenoid Sw. Assem. (Hand Selector & Muting)
S11391		Antenna Connector Socket & Bracket Assembly
S12438		Mounting Plate & Lever Assem.
S12439		Pointer Mounting Bracket & Stud Assem.
S12440		Pointer Drive Bracket & Stud Assem.
S12447		Dial Light Socket & Wire Assem.
S12909		Indicator Flag & Bracket Assem. (59-186)
S12911		Front Plate & Bushing Assem.

## **MISCELLANEOUS**

19-114	Foot Sw. Cable Retaining Clip
46-624	Selector Sw. Knob
52-294	Vol. Con. Cable
52-398	Battery Cable (Set to Fuse)
57-1173	Battery Cable (Fuse to Ammeter)
78-281	Escutcheon
78-396	Vibrator Socket (for 78-732-733)
78-396	Local Tube Socket (for 78-717-726-729-730)
78-646	Foot Sw. Cable Socket (for 78-406)
78-728	Speaker Cable Socket
80-232	Vol. Con. Knob Retaining Spring
80-454	Selector Knob Spring
95-914	Power Transformer (Alt. for 95-1013)
95-915	Output Transformer
95-1013	Power Transformer
112-310	Foot Sw. Mtg. Screw
136-14	Fuse—10 Amp.—Type MDL—10
190-20	Vibrator
202-430	Instruction Book
S12042	Foot Sw. Cable & Plug Assem.
S-9458	Foot Switch & Plate Assembly

\*Note: Not used in production. Sold only as an accessory.

## **DIAL AND TUNING MECHANISM ASSEMBLY**

26-385	Dial Scale
34-132	Indexing Disc
34-138	Tuning Gear
34-158	Ratchet Gear
56-174	Indicator Pin
57-1077	Protector Plate
59-180	Dial Pointer
76-378	Guide Rod
80-329	Gear Indexing Spring

## **SET INSTALLATION AND SUPPRESSION KIT**

Diagram Part No.	Description
S13597	Set Installation & Suppression Kit (complete)
12-1314	Set Installation Bracket
22-1584	Oil Gauge Cond. (.5 Mfd.—200 V.)
22-1585	Temp. Gauge Cond. (.5 Mfd.—200 V.)
22-1586	Generator Cond. (1 Mfd.—200 V.)
54-68	3/4 x 3/4 x 1/2 Hex Nut
54-104	1/4-20 x 1/2 x 3/4 Hex Nut
54-153	3/4-28 x 1/2 x 1/20 Hex Nut
63-1512	Distributor Suppressor
80-145	Motor Hood Band Spring
93-139	3/4 External Shakeproof Lockwasher
93-161	1/4 External Shakeproof Lockwasher
93-444	1/4 x 3/4 x 1 1/4 Steel Washer
93-577	.062 x 1/4 x 3/4 Steel Washer
112-365	#8 x 1/2 B.H. Sheet Metal Screw
114-281	1/4-20 x 3/4 Hex Hd. M.S.
147-144	Speaker Mounting Spacer
188-41	Spacer Ring

## **KNOB KIT**

S13174	Knob Kit (complete)
S12910	Tuning & Trim Knob Assem.
S13-239	Vol. Con. Knob & Spring Assem.
46-635	Tone Con. Knob

## **SPEAKER AND SPEAKER MOUNTING PARTS**

SP 1	Description
43-131	Speaker Housing
49-566	7.6" PM Speaker & Cable
	208-566 Cone & Voice Coil
54-30	3/4 x 3/4 x 1/4 Hex Nut
74-41	Speaker Screen
93-126	#8 Internal Shakeproof Lockwasher
93-783	Stat. Bronze Steel Washer (1/2 x 3/4 x 3/4)
112-248	-8-32 x 3/4 Oval B.H.M.S.
147-85	Spacer
S13066	Speaker Mounting Bracket & Stud Assem.
S13510	Complete Speaker & Housing Assem.

Note: When ordering cone and voice coil marked \* be sure to add manufacturers' code letter that follows base part number.

**SCHEMATIC DIAGRAM AND PARTS  
LIST FOR 1942 LINCOLN-ZEPHYR  
RECEIVER**

**SENSITIVITY: . . . . . 5 microvolts at one watt output.**

**POWER OUTPUT: . . . . . 7 watts measured at the voice coil.**

**SPEAKER:** ..... 6" x 9" oval, instrument panel mounting.

**CURRENT CONSUMPTION: . . 9.2 amperes**

## INSTANTANEOUS CURRENT CON-

**CHANGE CYCLE: ..... 18.2 amperes**

WAG. NO.	PART NO.	CONDENSERS	PART NO.	RESISTORS	PART NO.	MISCELLANEOUS
1	22-176	LOW REACTOR DIAL 250MM	R1	33,000 OHMS 1/4W ±20%	1	S-10084 ANTENNA COIL
2	22-177	LOW REACTOR PLATE 250MM	R2	33,000 OHMS 1/4W ±20%	2	S-10084 R.F. GRID COIL
3	22-1244	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	3	S-10084 R.F. GRID COIL
4	22-1245	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	4	S-10084 R.F. GRID COIL
5	22-1246	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	5	S-10084 R.F. GRID COIL
6	22-1247	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	6	S-10084 R.F. GRID COIL
7	22-1248	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	7	S-10084 R.F. GRID COIL
8	22-1249	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	8	S-10084 R.F. GRID COIL
9	22-1250	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	9	S-10084 R.F. GRID COIL
10	22-1251	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	10	S-10084 R.F. GRID COIL
11	22-1252	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	11	S-10084 R.F. GRID COIL
12	22-1253	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	12	S-10084 R.F. GRID COIL
13	22-1254	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	13	S-10084 R.F. GRID COIL
14	22-1255	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	14	S-10084 R.F. GRID COIL
15	22-1256	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	15	S-10084 R.F. GRID COIL
16	22-1257	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	16	S-10084 R.F. GRID COIL
17	22-1258	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	17	S-10084 R.F. GRID COIL
18	22-1259	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	18	S-10084 R.F. GRID COIL
19	22-1260	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	19	S-10084 R.F. GRID COIL
20	22-1261	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	20	S-10084 R.F. GRID COIL
21	22-1262	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	21	S-10084 R.F. GRID COIL
22	22-1263	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	22	S-10084 R.F. GRID COIL
23	22-1264	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	23	S-10084 R.F. GRID COIL
24	22-1265	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	24	S-10084 R.F. GRID COIL
25	22-1266	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	25	S-10084 R.F. GRID COIL
26	22-1267	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	26	S-10084 R.F. GRID COIL
27	22-1268	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	27	S-10084 R.F. GRID COIL
28	22-1269	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	28	S-10084 R.F. GRID COIL
29	22-1270	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	29	S-10084 R.F. GRID COIL
30	22-1271	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	30	S-10084 R.F. GRID COIL
31	22-1272	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	31	S-10084 R.F. GRID COIL
32	22-1273	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	32	S-10084 R.F. GRID COIL
33	22-1274	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	33	S-10084 R.F. GRID COIL
34	22-1275	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	34	S-10084 R.F. GRID COIL
35	22-1276	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	35	S-10084 R.F. GRID COIL
36	22-1277	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	36	S-10084 R.F. GRID COIL
37	22-1278	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	37	S-10084 R.F. GRID COIL
38	22-1279	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	38	S-10084 R.F. GRID COIL
39	22-1280	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	39	S-10084 R.F. GRID COIL
40	22-1281	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	40	S-10084 R.F. GRID COIL
41	22-1282	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	41	S-10084 R.F. GRID COIL
42	22-1283	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	42	S-10084 R.F. GRID COIL
43	22-1284	TRIM 6.3% MICA	3	83-131 SENSITIVITY CONTROL	43	S-10084 R.F. GRID COIL
44	22-12					

**TUBE COMPLEMENT:**.....7A7 R.F.,  
7B8 converter, 7A7 I.F., 7B6 Detector  
and 1st Audio, 7A4 Phase Inverter,  
2-7C5 Push pull power output. 7Y4 Rec-  
tifier.

## RECEIVER INSTALLATIONS:

Figures 1-1A-2 and 2A, illustrating the escutcheon plate, control knobs and the installed receivers, are given here to facilitate removal and reinstallation of the receivers when service or repairs are necessary.

Remove the tuning and volume control knobs to expose the 8/32 flat head screws that support the receiver at the top. Remove the lower support brackets "D" next and finally loosen the hook bolts "A" to remove the receiver from the car.

**NOTE:** To set up a station on any automatic position pull the tuning knob out and tune the receiver as in manual tuning. Press the tuning knob in to its original position after the station has been accurately tuned in.

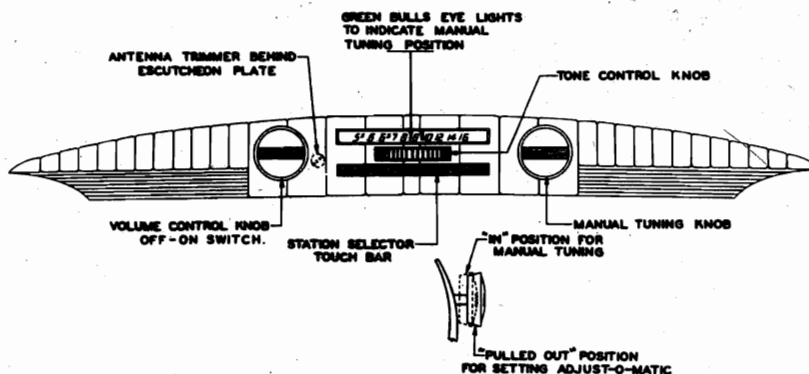


FIG. 1—Zephyr

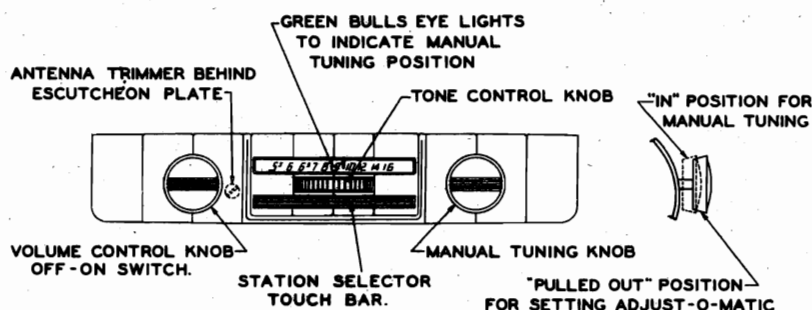


FIG. 1A—Continental

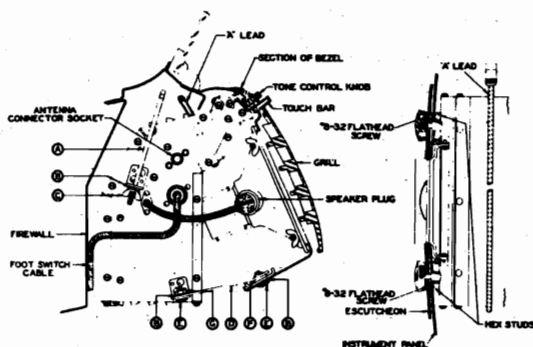


FIG. 2—Zephyr

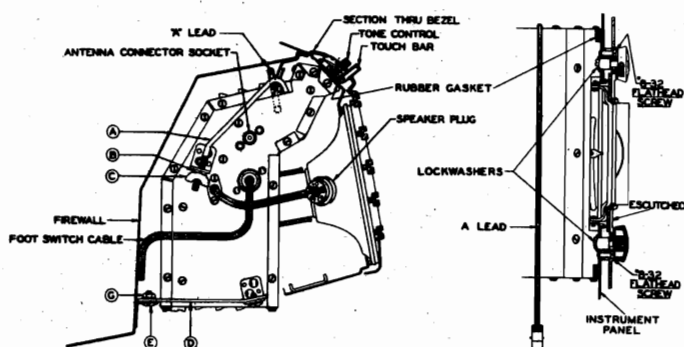


FIG. 2A—Continental

## DELAYED AUTOMATIC MUTING CIRCUIT

Pressing either the Touch-bar or the foot control switch automatically mutes the receiver for the duration of the change cycle. This action is accomplished by applying 6 volts negative to the 7B6 first audio grid through the 1 megohm resistor R-25. (See schematic diagram). This negative voltage blocks the grid of the 7B6 until the voltage bleeds off through the 15 megohm resistor R-12, when the receiver will again operate normally. **NOTE:** The storage battery in the car must be properly polarized to apply the negative muting voltage to the receiver. If the battery polarity is reversed the receiver will not mute and it may become distorted during the change cycle. Always connect the positive (+) terminal of the storage battery or power supply to the receiver case when checking the receiver.

## INTERFERENCE SUPPRESSION

There should be no motor noise or interference from the ignition circuit, if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

The two distributor condensers No. 22-1147 should be installed as shown in Figure 3 below.

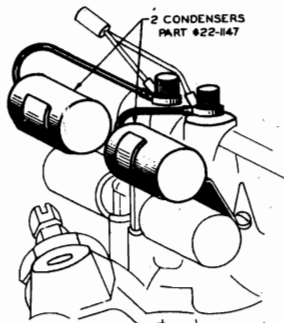


FIG. 3

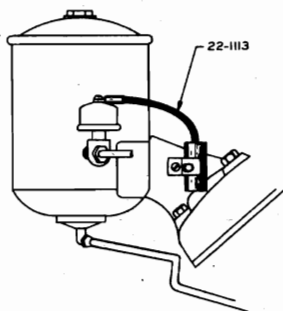


FIG. 4

The oil gauge condenser No. 22-1113 should be installed as shown in Figure 4 above.

The temperature gauge condenser No. 22-1113 should be installed with its bracket fastened under one of the cylinder head bolts as shown in Figure 5 below.

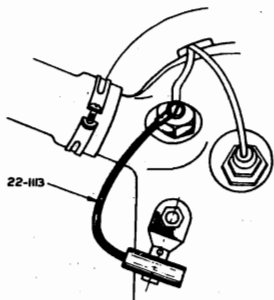


FIG. 5

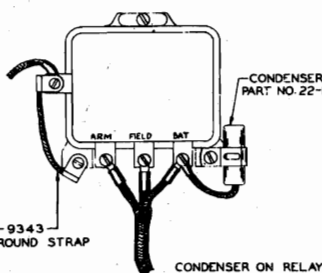


FIG. 6

The No. S-9343 ground strap and the voltage regulator condenser No. 22-1111 should be installed as shown in Figure 6 above. The condenser lead should be connected to the "Batt" terminal.

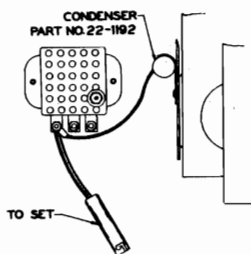
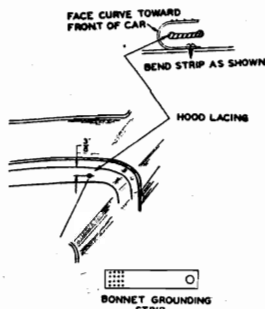


FIG. 7

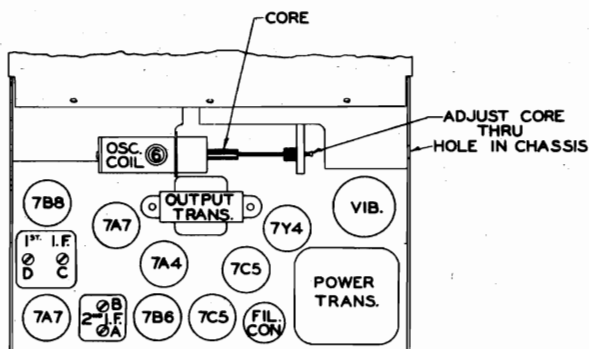
The No. 22-1192 condenser and the "A" lead should be connected together at the terminal strip inside the car above the steering column as shown in Figure 7.

Check the antenna connector and the instrument panel bolts so they make a good ground contact with the car body.



Install the No. 80-145 bonnet grounding strip as illustrated in figure 8.

FIG. 8



TUBE & TRIMMER LAYOUT MOD. 8ML692

FIG. 9

## ALIGNMENT

Maximum performance is dependent upon the accurate alignment of the receiver, so follow the alignment instructions carefully.

**CAUTION:** Make all alignment adjustments to the receiver with the volume control turned full on. Reduce the signal intensity, if necessary, at the signal generator. Connect the output meter across the voice coil.

### I.F. ALIGNMENT PROCEDURE

- 1—Remove the top and bottom covers from the receiver.
- 2—Place the receiver in the Manual tuning position and set the pointer at the low frequency end of the dial. (540 Kc.)
- 3—Set the signal generator at 265 Kc.
- 4—Apply the signal from the generator through a .1 mfd. dummy to the 7B8 converter grid.
- 5—Adjust trimmers A-B-C and D (Fig. 9) for maximum output. Repeat the operation to assure accurate alignment.



## PARTS PRICE LIST

MODEL 8ML692 (CHASSIS 88 03)

LINCOLN

1942 ADJUST-O-MATIC RADIO

28H-18805

## DIAL AND TUNING MECHANISM

12-994	Rear magnet mounting bracket.....	.15
28-314	Dial scale.....	1.00
34-108	Ratchet.....	.25
34-122	Tone control gear.....	.03
35-5	Tone control color drum.....	.15
46-478	Volume control knob.....	.20
57-963	Dial scale background plate.....	.60
80-272	Ratchet lever spring.....	.02
80-274	Tuning coil return spring.....	.05
80-300	Gear indexing spring.....	.03
85-308	Station selector switch.....	.60
93-558	Brass washer.....	.01
97-156	Tone control knob retaining stud.....	.30
100-32	Dial light bulb.....	.07
126-437	Dial light shield.....	.01
126-438	Dial scale light shield.....	.005
126-439	Color organ light shield.....	.02
147-118	Manual automatic bakelite breaker collar.....	.04
187-5	Indicator light rod (lucite).....	.20
188-34	Retaining ring (tuning shaft).....	.01
188-39	Turret screw lock ring.....	.02
188-45	Retaining ring.....	.01
S10108	Ratchet drive lever & spring assembly.....	.35
S10110	Front magnet mounting bracket & detent lever spring assembly.....	.20
S10117	Bracket & index spring assembly.....	.20
S10120	Tuning adjustment screw & grommet assembly.....	.40
S10127	Magnet coil & terminal assembly.....	1.00
S10232	Tuning shaft & gear assembly.....	.35
S10411	Manual automatic selector switch assembly.....	.25
S10415	Turret shaft, screw & stop assembly.....	2.00
S10514	Magnet core, cross arm, pointer drive bracket & stud assembly.....	.30
S10517	Tone control knob assembly (46-478).....	.45
S10518	Dial pointer, stud & bushing assy. (59-138).....	.30
S10521	Manual dial light socket, switch, bracket and stud assembly.....	.75
S10522	Color organ light socket & wire assembly.....	.40
S10523	Dial light socket & wire assembly.....	.40

## RESISTORS

63-238	1M ohm.....	1/4 watt.....	.07
63-271	1 megohm.....	1/4 watt.....	.07
63-282	2200 ohm.....	1/4 watt.....	.07
63-294	68M ohm.....	1/4 watt.....	.07
63-596	330M ohm.....	1/4 watt.....	.07
63-645	27M ohm.....	1/4 watt.....	.07
63-646	33M ohm.....	1/4 watt.....	.07
63-647	39 M ohm.....	1/4 watt.....	.07
63-648	47M ohm.....	1/4 watt.....	.07
63-657	330M ohm.....	1/4 watt.....	.07
63-765	33M ohm.....	1/4 watt insulated.....	.15
63-957	33M ohm.....	1 watt insulated.....	.20
63-976	15 megohm.....	1/4 watt.....	.07
63-1131	Sensitivity control.....	1/4 watt insulated.....	.50
63-1180	15M ohm.....	1/4 watt insulated.....	.17
63-1197	82 ohm.....	1/4 watt.....	.08
63-1201	1800 ohm W.W.....	3 watt insulated.....	.30
63-1202	330 ohm W.W.....	2 watt insulated.....	.30
63-1261	Tone control.....	1.00	
63-1262	Volume control & switch.....	1.50	

## COILS AND CHOKES

20-213	Main hash choke.....	.25
20-242	Oscillator series coil.....	.20
95-871	1st I. F. transformer.....	1.25
95-872	2nd I. F. transformer.....	1.50
S5844	Motor noise choke assembly.....	.15
S8819	Antenna motor noise choke assembly.....	.20
S9762	Untuned R. F. coil & core assembly.....	.50
S10063	Oscillator coil & shield assembly.....	1.10
S10064	R. F. coil & shield assembly.....	1.40
S10095	Oscillator alum. coil assembly.....	.60
S10506	Hector line choke assembly.....	.30

## CONDENSERS

22-162	.0001 mid.....	600 volt.....	.15
22-170	.1 mid.....	400 volt.....	.20
22-182	.00025 mid.....	600 volt.....	.20
22-185	.1 mid.....	200 volt.....	.15
22-190	1 mid.....	200 volt.....	.15
22-250	.05 mid.....	200 volt.....	.15
22-435	.02 mid.....	600 volt.....	.15
22-906	.005 mid.....	200 volt.....	.15
22-908	.5 mid.....	120 volt.....	.25
22-912	.002 mid.....	600 volt.....	.15
22-914	.05 mid.....	600 volt.....	.20
22-1076	Dual spark plate condenser.....	20 78-454	.15
22-1111	Generator condenser.....	45 78-455	.45
22-1113	Oil & water gauge condenser.....	.35 78-467	.35
11-1147	Distributor condenser.....	.35 78-477	.35
22-1192	"A" lead condenser.....	.50 80-246	.50
22-1235	Single section ceramic trimmer.....	.15 80-291	.15
22-1244	.004 mid.....	600 volt.....	.20
22-1247	.008 mid.....	1600 volt.....	.20
22-1248	350 mmid. compensator.....	.40 92-125	.40
22-1270	.02 mid.....	200 volt.....	.15
22-1272	20 mid. 25 volt x 20 mid. 400 volt x 20 mid. 350 volt dry electrolytic.....	1.25 95-873	1.25
22-1275	Single section ceramic trimmer.....	.25 95-874	.25
22-1276	Antenna trimmer.....	.35 114-63	.35

## MISCELLANEOUS

208-493	Dynamic speaker (6" x 9" oval).....	5.00
207-493	Field coil (not replaceable).....	2.00
209-493	Cone & voice coil assembly.....	.20
52-200	Battery cable—fuse to ammeter.....	.45
52-244	Speaker cable—set to fuse.....	.45
52-253	Battery cable—set to fuse.....	.45
52-266	Antenna cable.....	1.70
78-209	Socket—short wave adaptor.....	.10
78-251	Socket—antenna connector.....	.10
78-408	Socket—foot switch.....	.10
78-454	Socket—lokal tube (8 contact).....	.15
78-455	Socket—lokal tube (6 contact).....	.15
78-467	Socket—lokal tube (5 contact).....	.15
78-477	Socket—vibrator.....	.10
80-246	Power transformer ground spring.....	.07
80-291	Muting switch spring.....	.03
89-961	Muting switch insulating strip.....	.35C
89-962	Muting switch insulating strip.....	.30C
92-125	No. 6 internal shokproof lockwasher.....	.25C
95-873	Muting switch fibre washer.....	.03
95-874	Power transformer.....	3.00
114-63	Output transformer.....	1.50
	No. 6/32 x 3/16" Hex acorn Hd. M.S.-N.P.....	.25C

114-149	No. 6 x 3/16" Hex Hd. S.T. screw-N.P.....	.45C
127-39	Muting switch contact.....	.03
127-40	Muting switch contact.....	.03
136-12	Fuse—20 ampere.....	.10
190-15	Vibrator.....	2.95
202-324	Instruction book.....	.15
S9462	Foot control switch & cable assembly.....	2.00

## INSTALLATION KIT ASSEMBLY

S10573	Installation kit complete.....	1.00
12-972	Set installation bracket.....	.07
19-114	Foot switch cable clip.....	.02
54-99	No. 12/24 x 7/16" Hex nut.....	.35C
54-146	No. 10/32 wing nut.....	1.50C
54-151	No. 12/24 wing nut.....	1.50C
64-141	Foot switch installation eyelet.....	.04
71-59	No. 8/32 x 1/2" flat Hd. M.S.-N.P.....	.60C
93-340	No. 3/32 x .255 x 1/2" steel washer.....	.75C
93-372	No. 12 Internal shokproof lock washer.....	.40C
93-524	Foot switch installation washer.....	.04
97-153	Set installation spacer stud.....	.15
112-257	No. 4 x 1/4" R.H. sheet metal screw.....	.50C
112-310	Foot switch mounting screw.....	.85C
112-342	No. 12/24 x 5/8" B.H.M.S.....	.01
112-348	Set installation screw.....	.09

## MOTOR NOISE SUPPRESSION KIT ASSEMBLY

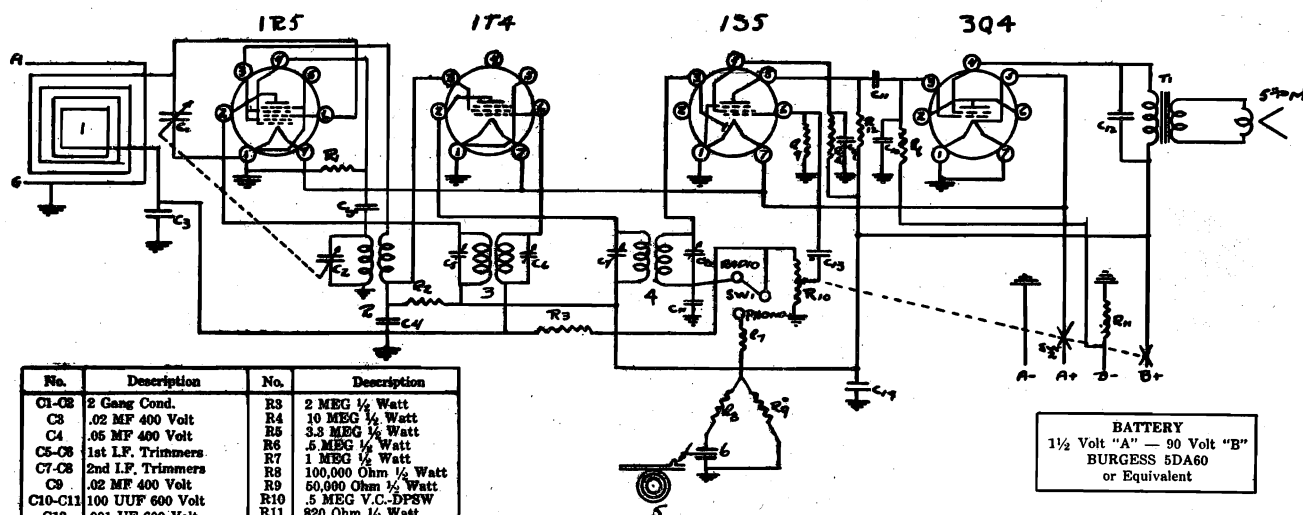
S10574	Motor noise suppression kit complete.....	2.60
S9343	Regulator ground lead assembly.....	.05
12-831	Suppressor condenser bracket.....	1.50C
22-1111	Generator condenser.....	.45
22-1113	Water & oil gauge condenser.....	.35
22-1147	Distributor condenser.....	.35
22-1192	"A" lead condenser.....	.50
83-916	Bonding strip.....	.04
114-39	No. 8 x 1/4" Hex Hd. slotted S.T. screw.....	.50C

## TUNING KNOB KIT ASSEMBLY

S10577	Tuning knob kit complete.....	.55
S10568	Tuning control knob assembly (46-477).....	.35
46-478	Volume control knob.....	.20

All Prices List—Subject to Regular Discount and Change Without Notice—9/15/41.

## ALAMO ELECTRONICS CORP.

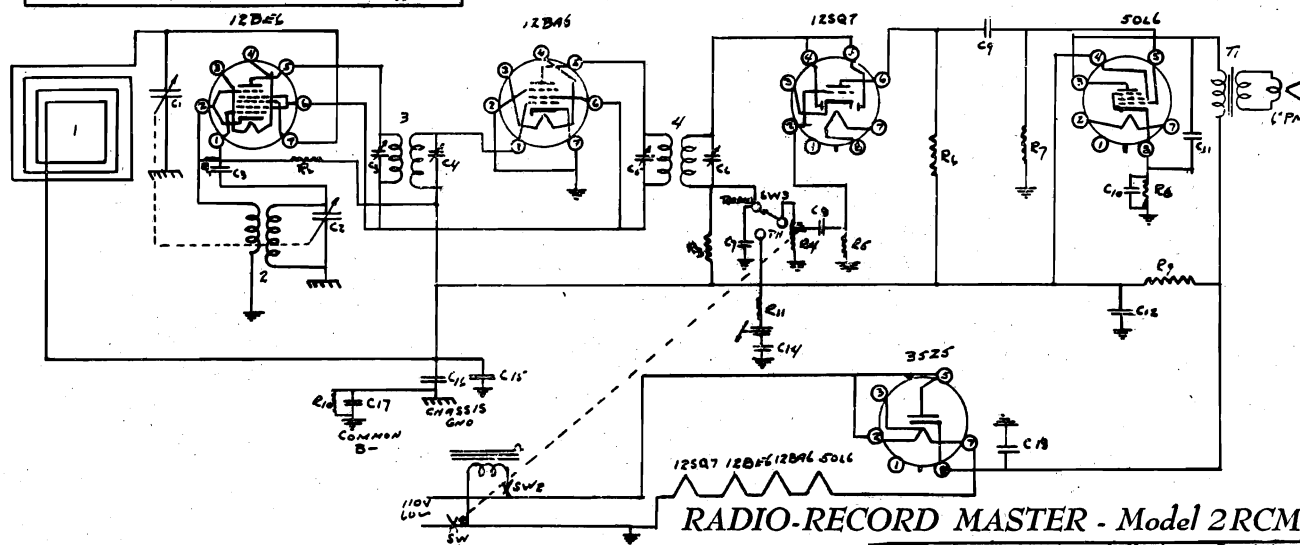
MODEL AEC-3RCMB  
MODEL 2RCM

No.	Description	No.	Description
C1-C2	2 Gang Cond.	R3	2 MEG 1/2 Watt
C3	.02 MF 400 Volt	R4	10 MEG 1/2 Watt
C4	.05 MF 400 Volt	R5	3.5 MEG 1/2 Watt
C5-C6	1st I.F. Trimmers	R6	.5 MEG 1/2 Watt
C7-C8	2nd I.F. Trimmers	R7	1 MEG 1/2 Watt
C9	.02 MF 400 Volt	R8	100,000 Ohm 1/2 Watt
C10-C11	100 UUF 600 Volt	R9	50,000 Ohm 1/2 Watt
C12	.001 UF 600 Volt	R10	.5 MEG V.C.-DPSW
C13	.005 UF 600 Volt	R11	820 Ohm 1/2 Watt
C14	10 MFD 90 Volt	R12	1 MEG 1/2 Watt
C15	50 UUF 600 Volt	1	Loop
R1	100,000 Ohm 1/2 Watt	2	Osc. Coil
R2	18,000 Ohm 1/2 Watt	3	1st I.F.
		4	2nd I.F.
		5	Spring Meter
		6	Crystal Pickup

5-16-47 A.E.C.

App. C.E.

MODEL AEC-3RCMB



RADIO-RECORD MASTER - Model 2RCM

No.	Description	No.	Description
C1 & C2	2 Gang Cond.	1	Loop
C3	50 UUF 600V	2	Osc. Coil
C3 & C4	1st I.F.	4	1st I.F. 455 Kc
C5 & C6	2nd I.F.	3	2nd I.F. 455 Kc
C7	100 UUF 600V	T1	Output Trans.
C8 & C9	.005 MF 600V	SW2	T.T. Power
C10	10 MFD 25V	SW3	Radio-Phone.
C11	.03 MF 400V		
C12 & C13	40 MFD 150V		
C14 & C15	.45 MFD 400V		
C16 & C17	20,000 1/2 Watt		
R1	10 MEG 1/2 Watt		
R2	2 MEG 1/2 Watt		
R3	.5 MEG V.C. & SW1		
R4	4.7 MEG 1/2 Watt		
R5	470,000 1/2 Watt		
R6 & R7	15052 1/2 Watt		
R8	15052 1/2 Watt		
R9	1 MEG 1/2 Watt		
R10			
R11			

5-12-47

AEC

App. C.E.

**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.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the oscillator and loop should be adjusted.

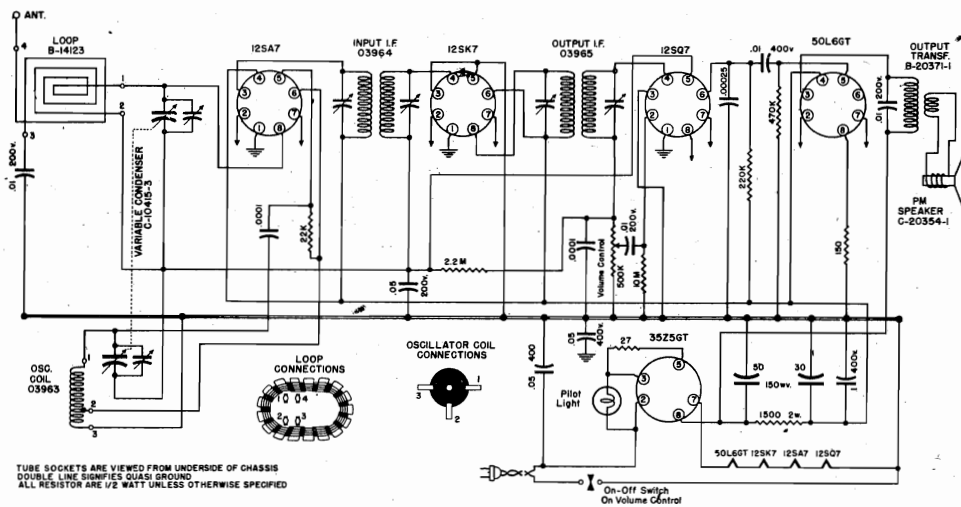
**I.F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12BE6) through a .05 to .1 mfd condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter. Each I.F. has two adjustments at the top of the can.

**LOOP ALIGNMENT.** Connect the test oscillator to a dummy loop which can be made by coiling 2 turns of hookup wire about 6" in diameter. Place this dummy loop about a foot from the loop on the receiver and in the same plane

as the receiver loop. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODEL 40-1500

ALDEN, INC.



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

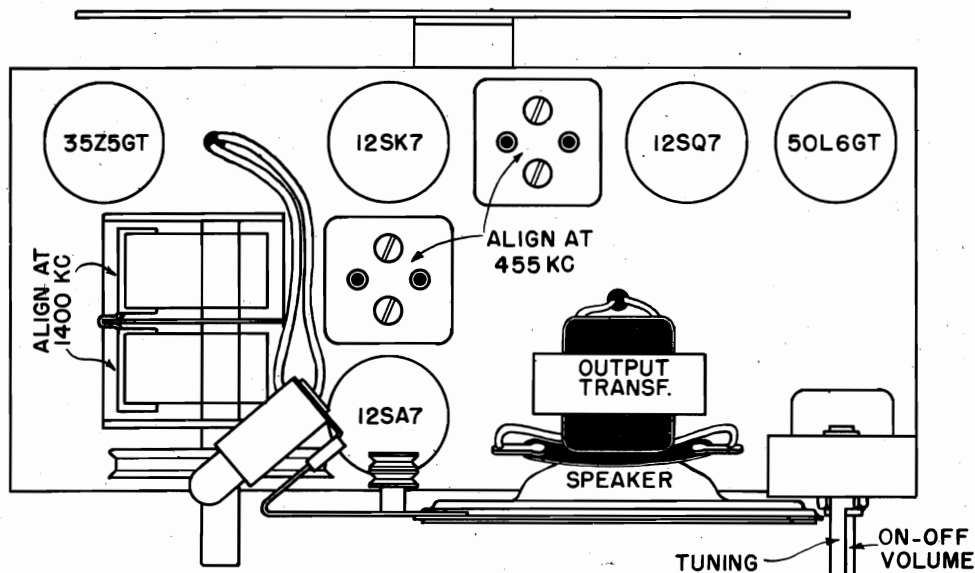
When using A.C. power supply, it will be found that there will be less hum when the line cord plug is in the best position. Try both positions, leaving the plug in the position that produces the least hum.

For the reception of local stations no antenna is necessary, the built-in loop providing sufficient volume. If it is desired to listen to more distant stations, an antenna 50 to 100 feet long should be connected to the flexible lead protruding from rear of the cabinet. Do not use a ground with this receiver.

If the receiver fails to operate, remove the back plate to see that all tubes are pushed down in their respective sockets as illustrated in the tube layout diagram below. Always disconnect line cord plug before making any adjustments inside of cabinet.

Sometimes, when operating this receiver in buildings having steel in their construction, it will be necessary to use an external antenna to provide sufficient volume for satisfactory operation.

## TUBE LAYOUT

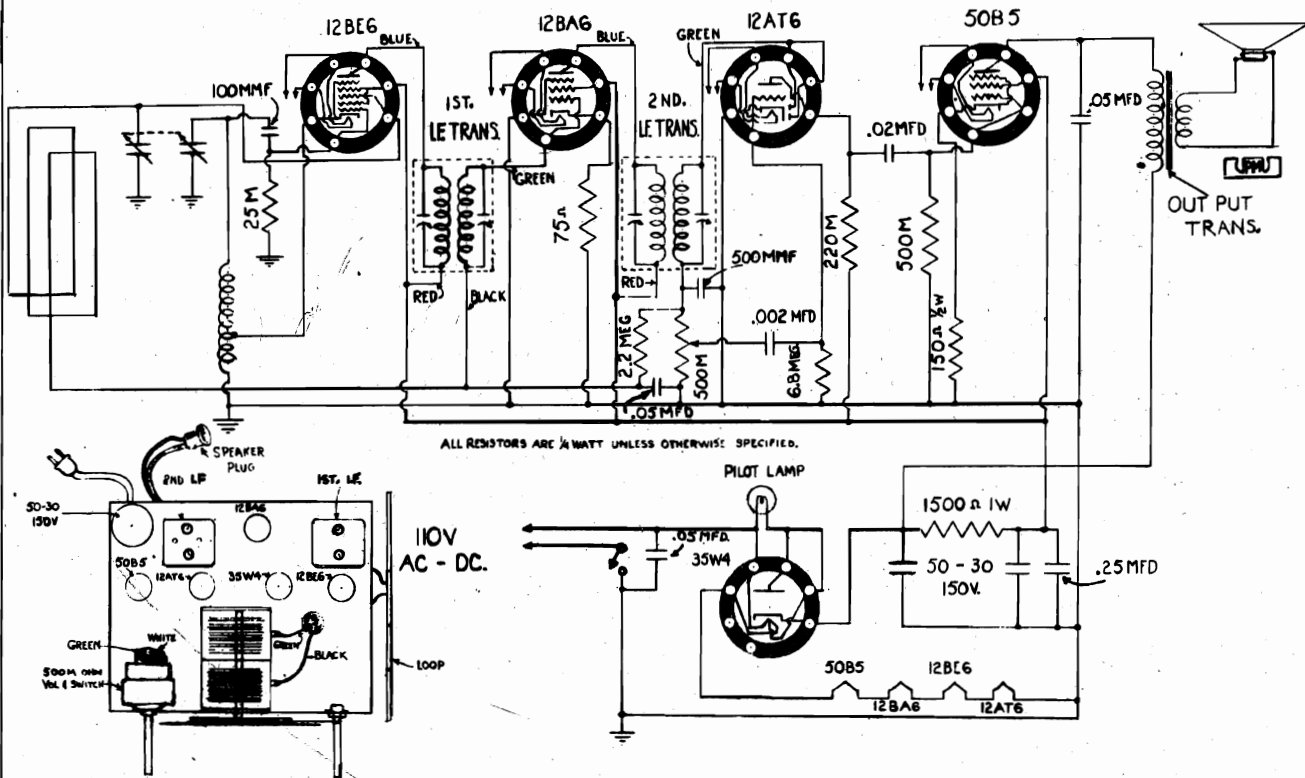






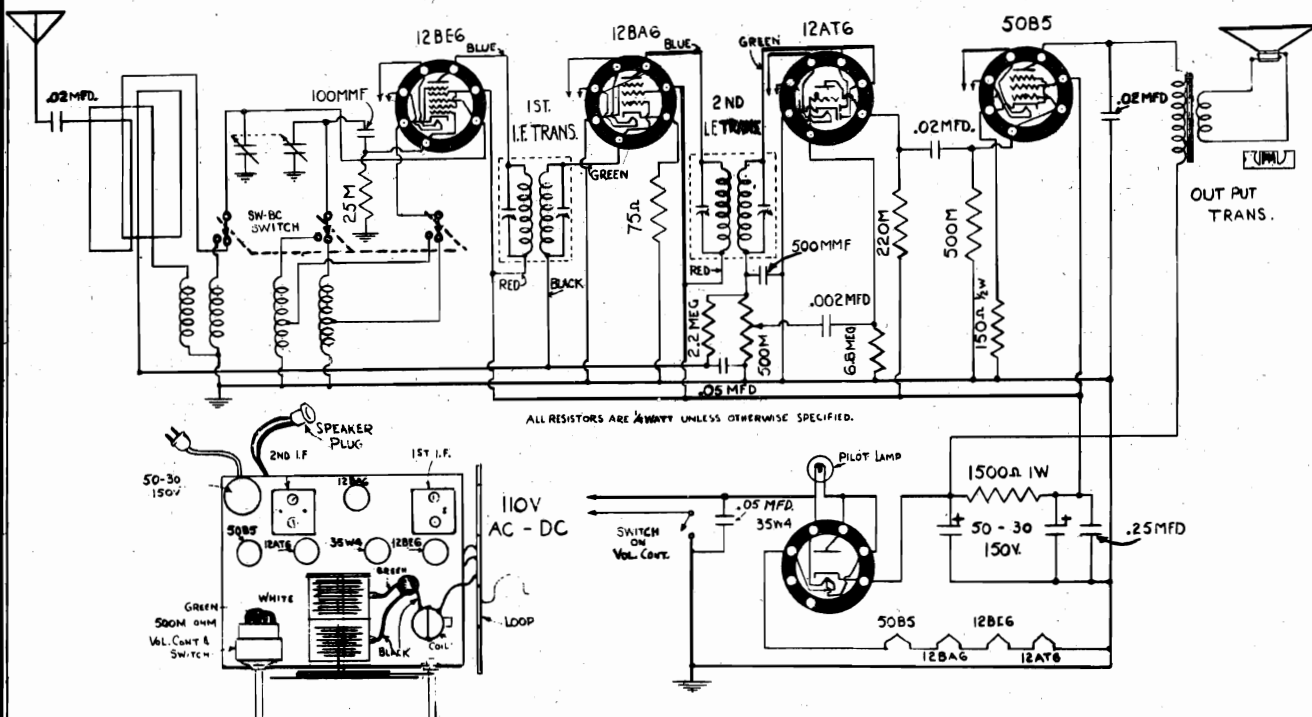
EMPIRE DESIGNING CORP.

MODEL 55  
MODEL 56



MODEL 55

IF PEAK 455 KC

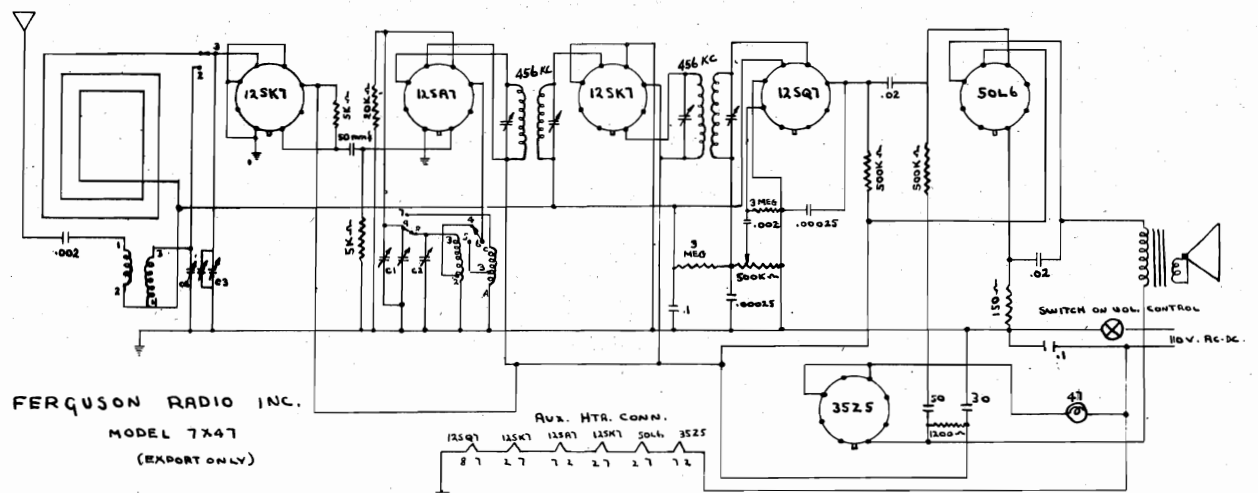
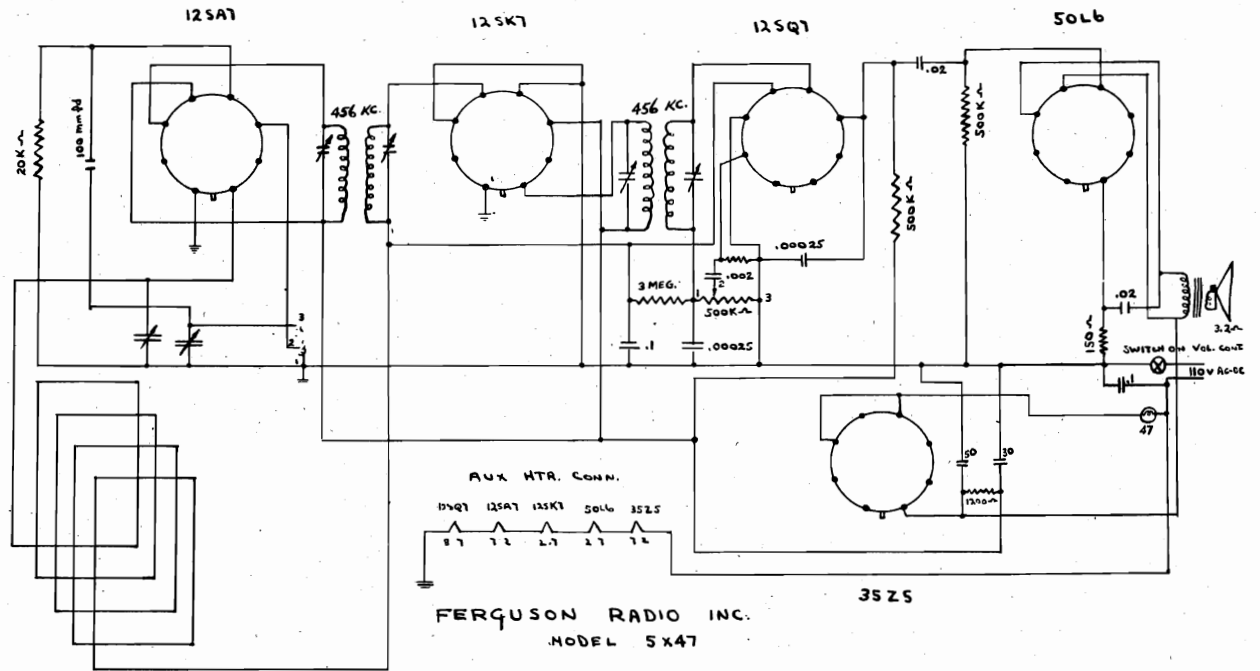


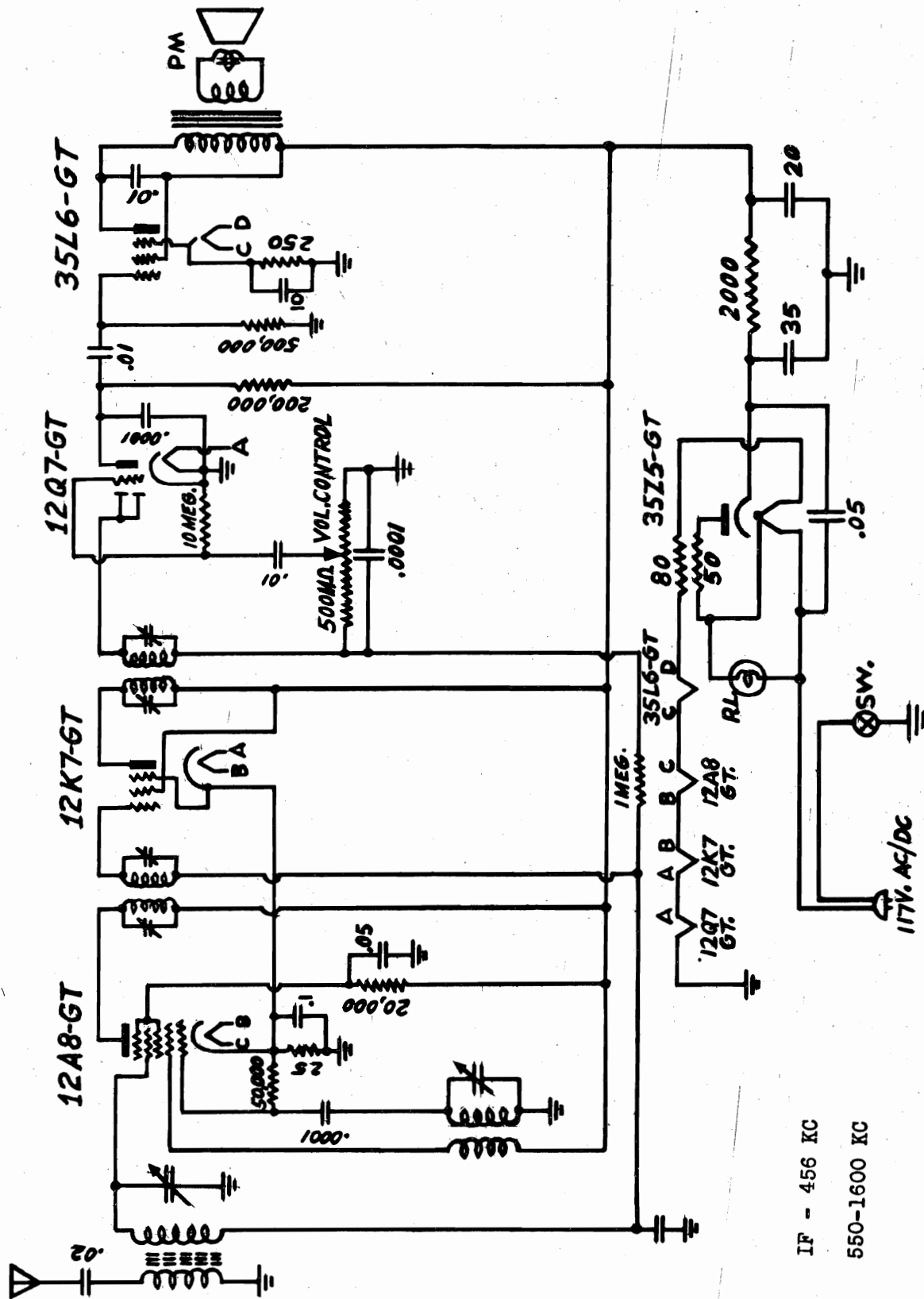
MODEL 56

IF PEAK 455 KC

FERGUSON RADIO CORP.

MODEL 5X47  
MODEL 7X47



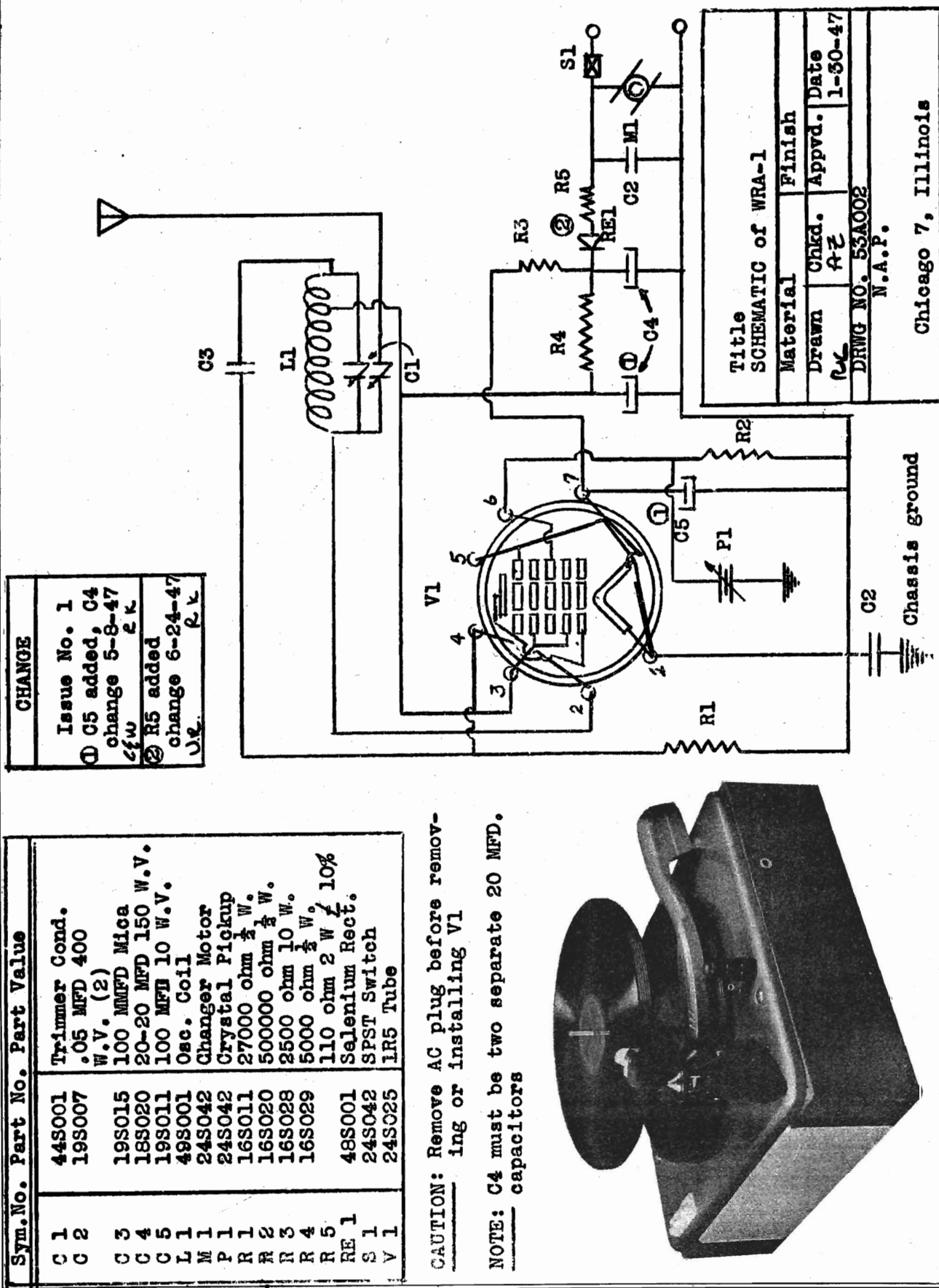


IF - 456 KC

550-1600 KC

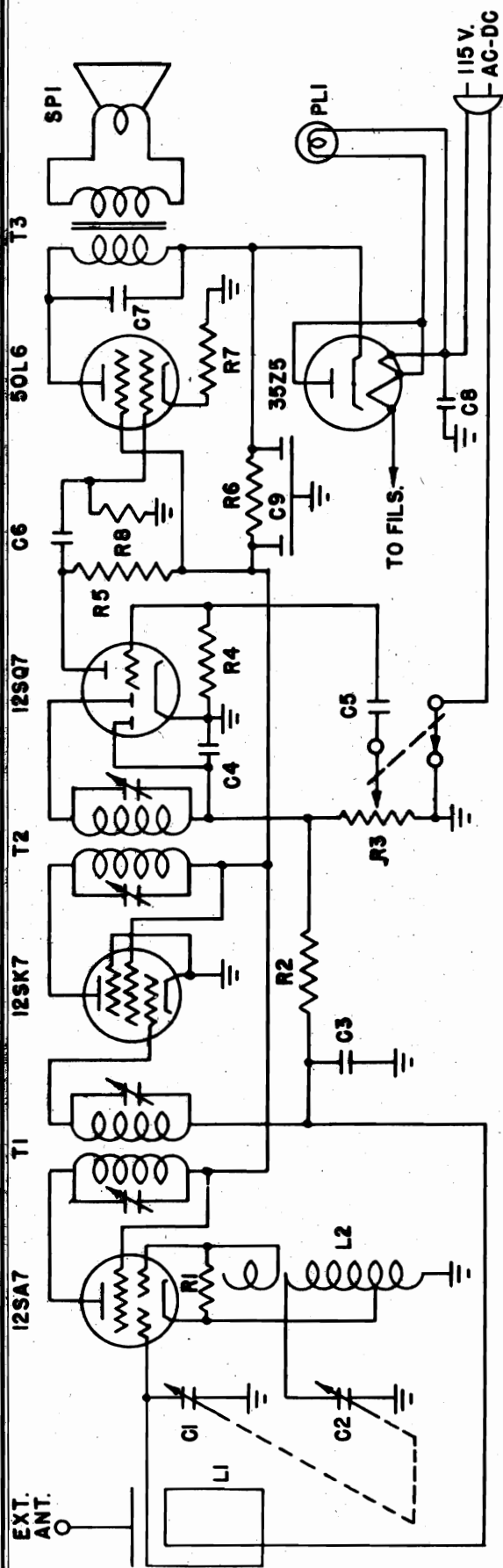
## NATIONAL ACOUSTIC PRODUCTS

MODEL WRA-1



MODEL R-546

NATIONAL CO-OPERATIVES INC.

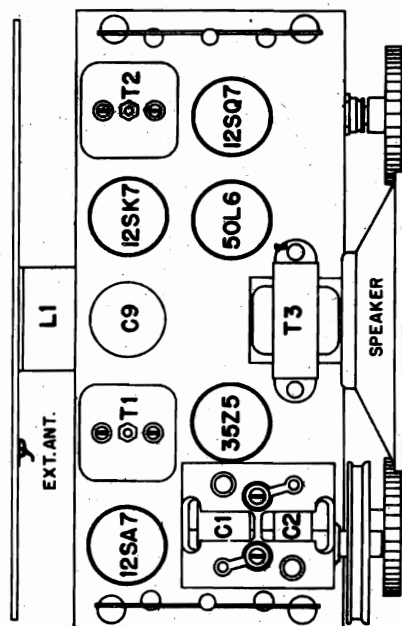
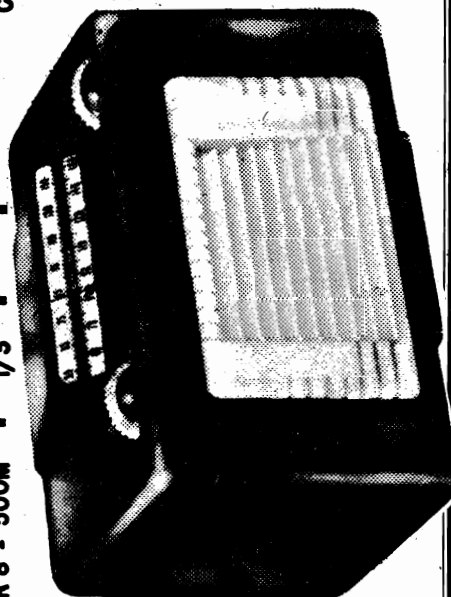


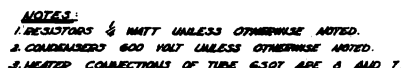
R 1 - 25M OHMS 1/3 WATT RESISTOR  
 R 2 - 5MEG " " "  
 R 3 - 500M " " " POT. WITH SWITCH  
 R 4 - 5MEG " " " 1/3 WATT RESISTOR  
 R 5 - 200M " " " "  
 R 6 - 1200 " " " 1/2 " "  
 R 7 - 150 " " " "  
 R 8 - 500M " " " 1/3 " "

C 1 - ANT. SECTION GANG CONDENSER  
 C 2 - OSC. " " "  
 C 3 - .05 MFD. 200 V. CONDENSER  
 C 4 - .00025 MFD. 500 V. CONDENSER  
 C 5 - .006 MFD. 500 V. CONDENSER  
 C 6 - .01 " " " 400 V.  
 C 7 - .02 " " " "  
 C 8 - .05 " " " "

C 9 - 50-50 MFD. 150 V. CONDENSER  
 L 1 - LOOP ANTENNA  
 L 2 - OSC. COIL  
 T 1 - 465 KC. I.F. TRANSFORMER  
 T 2 - " " " "  
 T 3 - OUTPUT TRANSFORMER  
 PLI - NO. 44 PILOT LIGHT  
 SPI - 5" P.M. SPEAKER

IF PEAK 465 KC





RECEPTION OF LOCAL STATIONS IN THE MAJORITY OF LOCATIONS WILL BE ENTIRELY SATISFACTORY WITH THE BUILT-IN ANTENNA. WHERE GREATER DISTANCE IS REQUIRED OR WHERE RECEIVING CONDITIONS ARE NOT SATISFACTORY WITH THE BUILT-IN ANTENNA, AN OUTSIDE ANTENNA MAY BE USED. THIS OUTSIDE ANTENNA SHOULD BE FROM 50 TO 100 FEET IN LENGTH AND SHOULD BE CONNECTED TO THE TERMINAL MARKED "A", WHICH IS INDICATED ON THE BACK COVER. THIS ANTENNA SHOULD BE RUN IN A STRAIGHT LINE AS POSSIBLE AND BE KEPT CLEAR OF WIRES AND OTHER METAL OBJECTS. A GOOD GROUND CONNECTION TO A WATER PIPE IS ESSENTIAL FOR THE CLAREST RECEPTION. THE ANTENNA SHOULD BE CONNECTED TO THE TERMINAL MARKED "B", WHICH IS ALSO INDICATED ON THE BACK COVER. THE BACK COVER MAY BE TAKEN OFF AFTER THE FOUR SCREWS IN THE CORNERS HAVE BEEN REMOVED.

THE CONTROL ON THE LEFT SIDE OF THE CABINET IS THE

VOLUME CONTROL AND ON-OFF SWITCH WHEN IN THE EXTREME LEFT POSITION. THE RIGHT HAND CONTROL IS THE STATION SELECTOR.

WITH THE LINE CORD CONNECTED, TURN THE VOLUME CONTROL ABOUT ONE-QUARTER TURN TO THE RIGHT AND ALLOW ONE-HALF MINUTE FOR THE TUBES TO PROPERLY HEAT. SELECT THE DESIRED STATION WITH THE TUNING CONTROL. FOR THE BEST REPRODUCTION, THE STATION SELECTOR MUST BE ADJUSTED TO THE CENTER OF THE RANGE ON THE DIAL WITHIN WHICH THE STATION IS HEARD AND THE VOLUME ADJUSTED WITH THE VOLUME CONTROL ONLY.

UNDERSCORED FIGURES ON THE DIAGRAM ARE AVERAGE VOLTAGES FROM THAT PARTICULAR POINT OF THE CIRCUIT TO THE CHASSIS. THESE VOLTAGES ARE FOR A 117 VOLT LINE, AND WITH THE SET TUNED TO NO STATION.

THE INTERMEDIATE FREQUENCY IS 450 K.C. OTHER ALIGN-  
MENT FREQUENCIES ARE INDICATED ON THE CIRCUIT. THE FRE-  
QUENCY RANGE OF THE RADIO IS 540-1730 KILOCYCLES.  
A BUREAU PLUG IS ATTACHED TO THE POWER COORD.

A FUSED PLUG IS ATTACHED TO THE POWER CORD. FUSES MAY BE REMOVED BY INSERTING A SMALL DIAMETER INSTRUMENT (PENCIL, STIFF WIRE, ETC.) IN THE PHONO END OF THE PLUG. IN NO CASE SHOULD A FUSE OF GREATER CAPACITY THAN 3 AMPERE BE USED. LOWER-CAPACITY FUSES SUCH AS 1 AMPERE MAY BE USED, BUT LOWER CAPACITY TYPES MAY BURN OUT MORE FREQUENTLY ON CURRENT SURGES NORMALLY ENCOUNTERED WHEN THE SET IS TURNED ON.

THE CHASSIS IS SECURED BY THE FOUR SCREWS WHICH ARE A PART OF THE FELT FEET. THE CHASSIS MAY BE REMOVED AFTER FIRST TAKING OFF THE BACK AND KNOBS. THE CARRYING HANDLE MUST BE RAISED AS FAR AS POSSIBLE IN ORDER THAT IT WILL CLEAR THE CHASSIS WHILE THE LATTER IS BEING REMOVED.

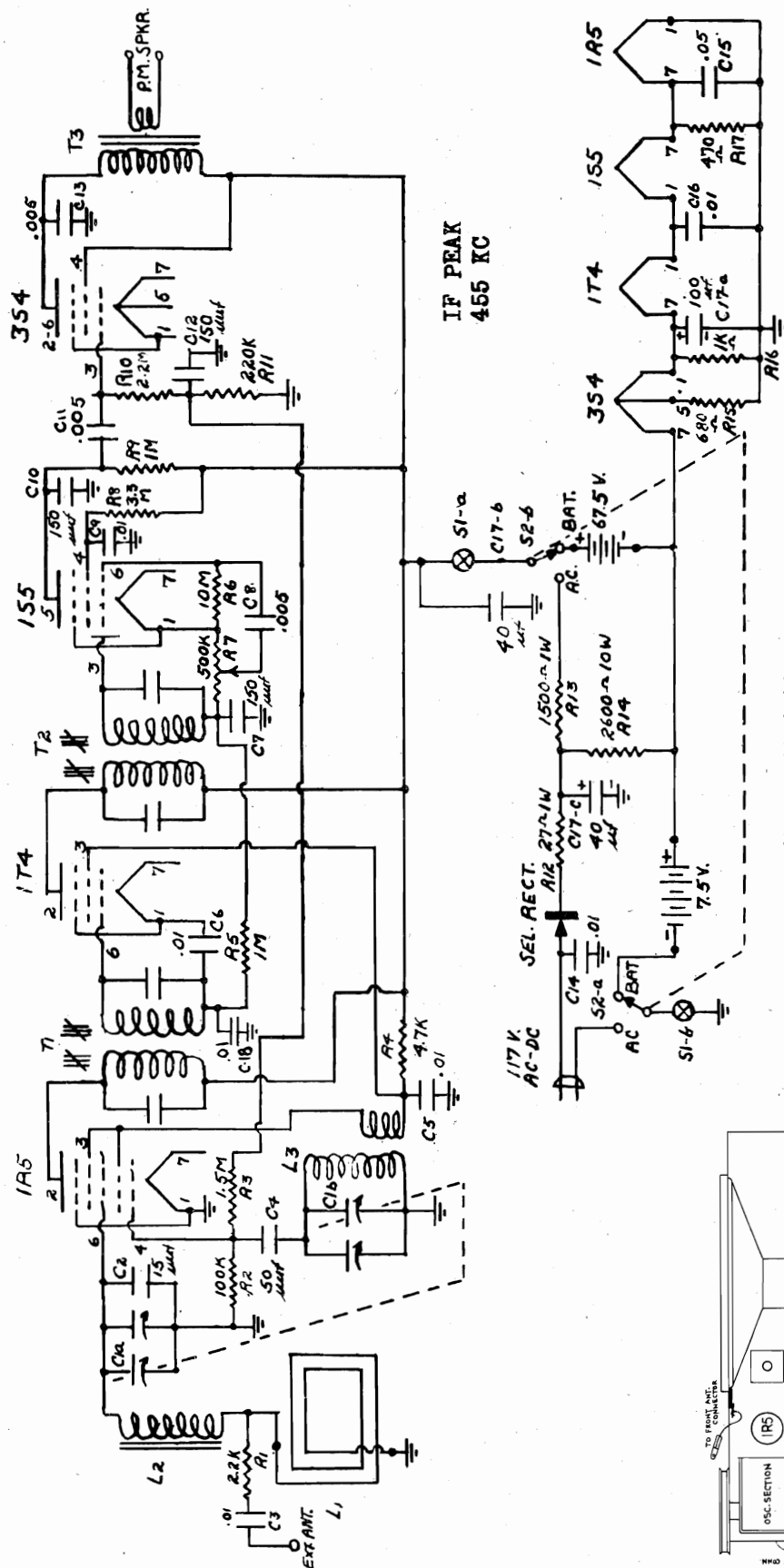
1. If a hum becomes evident after the radio has been operating about 30 minutes, and is more noticeable at low set volumes, it is probably due to loose laminations in the transformer.  
  
To correct, allow the set to warm up for at least one hour, and then tighten the two screws which hold the laminations between the power transformer end-caps.
2. The 4.0 mfd 450 v electrolytic condenser shown in the circuit diagram has been omitted in some sets. It should be added in all cases.
3. In receivers installed in locations where unusual conditions in the ac power supply cause hum, the first filter condenser can be changed from 8.0 mfd to 16 mfd.
4. The power transformer has a grounded shield winding between the primary and secondary. The shield winding ground lead is brought out between the laminations and the end-cap, either at the side or the bottom of the transformer. Frequently the ground lead does not make good contact because the laminations and the end-caps were painted before assembly of the transformers. This will cause static when the connection makes and breaks, and it also allows the power transformer to conduct more of the power-line static into the receiver circuit when the shield is not grounded.

To identify this defect, tune the receiver to a point between stations and tap the power transformer firmly on top and sides. An ungrounded shield will produce noise when jarred.

The easiest and best way to correct this trouble is to make a positive ground of the transformer shield winding by soldering another wire to it which may then be soldered to the radio chassis.

5. Where the radio is used in locations where the line static is unusually bad, one or two .05 mfd 600 v condensers can be added. Installed from both sides of the line to the chassis, or from one side of the line to chassis, or directly across the line. The method which gives best results will depend upon local line conditions, and will have to be determined by experimentation. If the method which gives best results is not effective when the line cord plug is reversed, be sure the radio owner is made aware of this condition and the line cord plug is marked so it can always be inserted with the correct polarity.

MODEL 341T

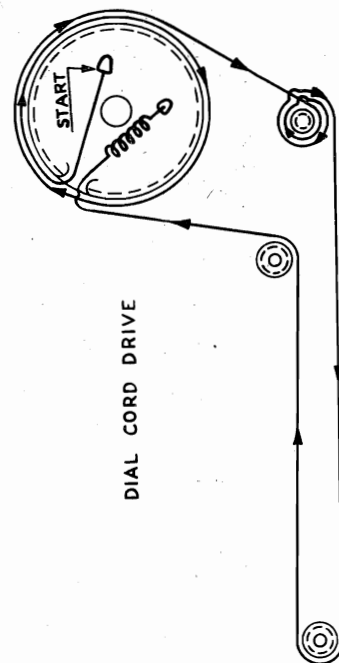
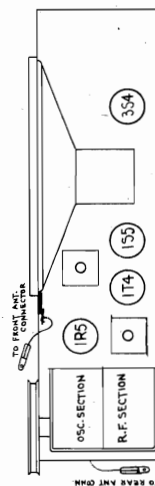


**WARNING:**— Turn dial to 55 before removing Chassis.

**NOTE:**— To remove chassis—remove three screws at bottom of cabinet—remove battery & antenna plugs—remove batteries—pull chassis towards rear & tilt forward.

**ALIGNMENT INSTRUCTIONS:**— Couple signal generator through a .1 M.F.D. capacitor to high side of R.F. section of variable Set generator at 455 K.C. and adjust 2nd I.F. transformer, then 1st I.F. transformer for maximum output. Couple generator to external antenna lead through 200 M.M.F. capacitor. Set receiver dial so that variable is completely unmeshed. Set generator at 1620 K.C. Adjust oscillator trimmer for maximum output. Set generator at 1400 K.C.

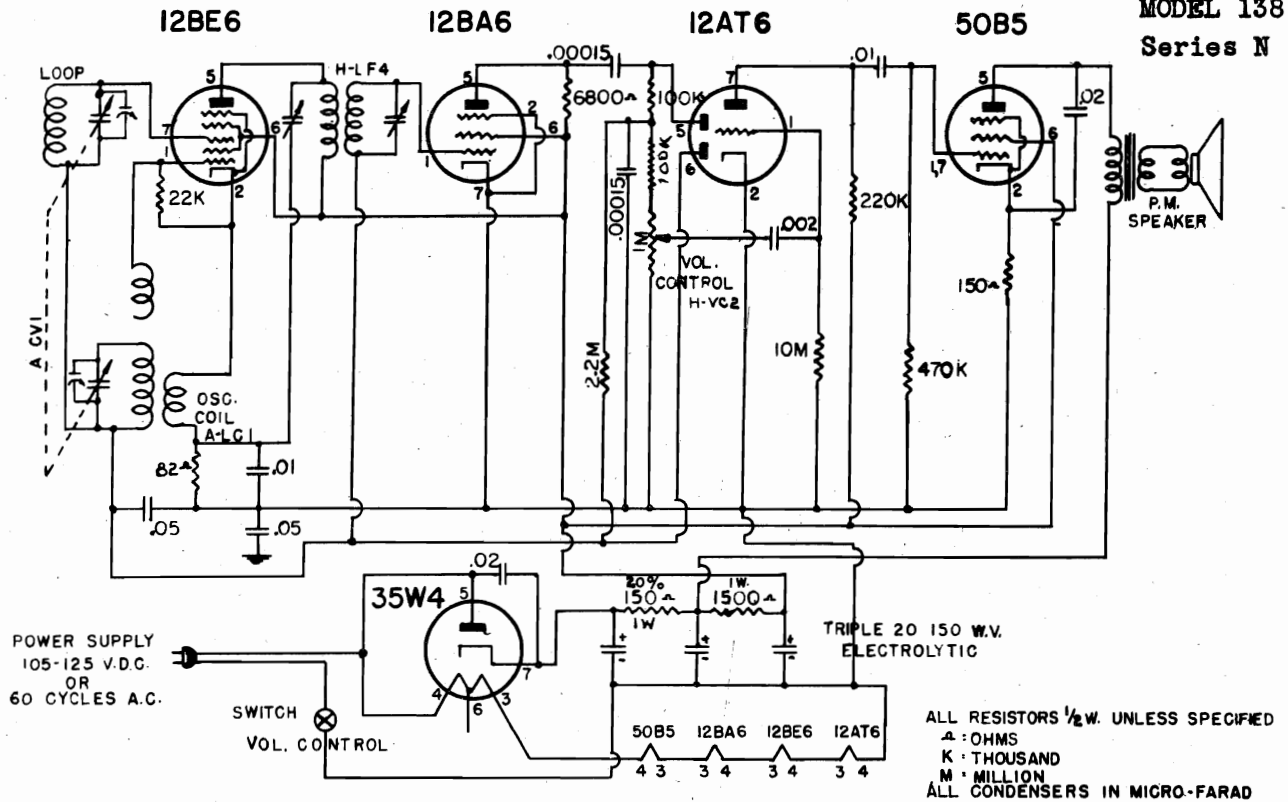
Tune Receiver to 1400 K.C. Place chassis into cabinet and tip forward so that R.F. trimmer is accessible. Adjust R.F. trimmer for maximum output.





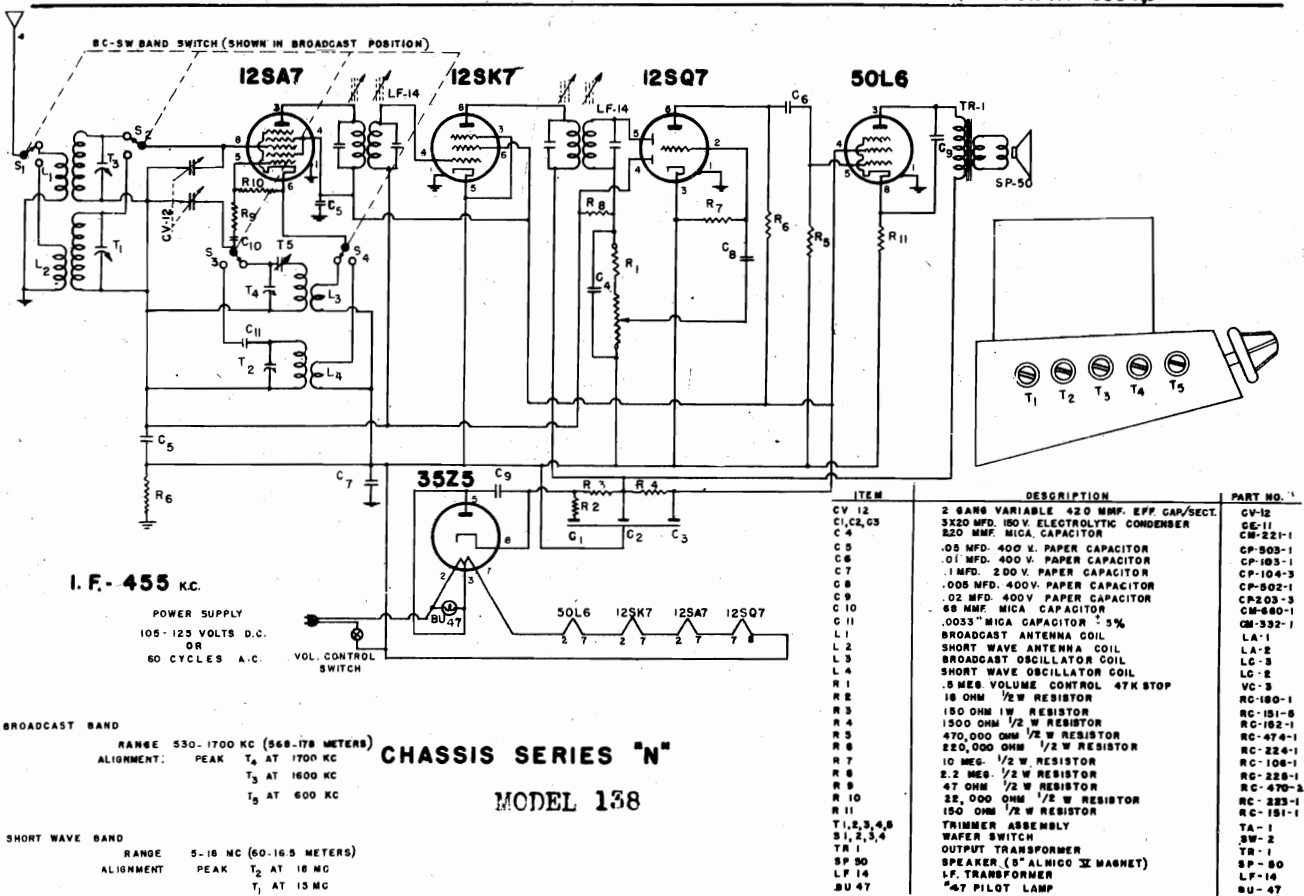
## TELETONE RADIO CORP.

MODEL 135, Dynamite  
Series H  
MODEL 138  
Series N



MODEL 135  
"DYNAMITE" CHASSIS SERIES "H"

I.F. - 455 KC.  
FREQ. RANGE - 530-1700 KC.  
ALIGN AT - 1500 KC.  
TRACK AT - 600 KC.





## ADMIRAL CORPORATION

MODEL RC 170, RC 170 A.

## OPERATING INSTRUCTIONS

**1. SETTING FOR SIZE OF RECORD**

The size of record for which the record changer is set to play is indicated by the position of the size-change knob (96). The record size is stamped on the housing (94) of the head assembly.

To change the setting, slide the size-change knob backward or forward to the numeral corresponding to the size of records to be played. Slide the knob to "M" for manual play.

If the size-change knob does not slide back freely, the setting may be changed by pushing against the front of the record clip (83) when it is in the downward position as shown in Figure 1.

**2. STARTING THE RECORD CHANGER**

To load the Record Changer, lift the record clip (83) to its upright position and place the records on the center post (27). The bottom record is supported by the shoulder of the center post and the push plate (79A).

**Lower the record clip gently, using care not to let it snap onto the records or damage may result.**

## THE CHANGE CYCLE

**6. DESCRIPTION OF CHANGE CYCLE**  
(See Figures 7 and 8)

If at all possible, we recommend that you carefully observe the operation of a changer that is in normal operating condition. It is a good idea to rotate the turntable by hand and repeat the changing cycle until you understand the function of each part.

The changer operates as follows: The changer mechanism is driven during its change cycle by the knurled hub of the turntable rotating the rubber-tired drive wheel (28). During normal playing, the drive wheel is held in a neutral position as illustrated in Fig. 8 so that the indentation prevents the tire from contacting the knurled hub. The drive wheel (28) is held in this position by the trip lever (63) and the stop stud (65) on the main cam (66).

When a record has finished playing and the needle has reached the trip point, the arm control lever roller (48C, Fig. 7) makes contact with reject link (43A), moving the trip arm (43) which releases trip lever (63). The trip lever spring (62) moves trip lever (63) freeing cam stop stud (65) and allows spring (69) to pull the main cam clockwise (bottom view). Since the main cam (66) and the drive wheel (28, Fig. 8) are on the same shaft, the drive wheel is thus turned so its rubber tire is against the knurled hub of the turntable. The turntable now rotates the drive wheel (28) which in turn rotates the main cam (66). Roller (68, Fig. 7) riding on the main cam, moves arm control slide (52), and the raised portion (52A) of this slide raises arm lift shaft (This shaft is 19 on the RC170 and 103 on the RC170A.) which lifts pickup arm from the record. Stud (52C) moving with slide (52) pushes arm control lever (48A) causing the pickup arm to move to the right, clearing the record. The movement of roller (68) also causes trip lever (63) to re-engage in the recess of trip arm (43). Trip spring (61) holds the trip arm (43) and trip lever (63) together.

Roller (70), also riding against main cam (66), moves push-off arm (71). This movement is transmitted through the linkage of 79F, 79D (Fig. 7) to the

Turn the Phono-Motor switch (33) to the ON position. Move the switch button to the left (**REJECT**) momentarily and release. The bottom record will drop to the turntable and the Record Changer will play the entire stack of records automatically.

**3. REJECTING A RECORD**

To reject a record at any time, move the Phono-Motor switch button (33) to the left (**REJECT**).

**4. STOPPING AND UNLOADING**

It is advisable to stop the Record Changer when the Changer mechanism is out of cycle (playing a record). To remove the records, lift the record clip to its upright position and move the pickup arm to the right so that it clears the records. Lift the records straight up by supporting the bottom one. Do not tilt or squeeze the records when lifting.

**5. REPLACING CARTRIDGE AND NEEDLE**

Before replacing, see cartridge service data on page 5.

Remove the old cartridge (3) by getting your finger nails or a small screwdriver under it as shown in Figure 2 and pull down on the **back edge**. Press new cartridge into place again, making sure to push near its back edge where its pins go into the socket.

push-off plate 79A, Fig. 8. (Note that the record stack rests on plate 79A.) The shape of the main cam (66) is such that the push-off plate (79A) first moves back, allowing the bottom record to drop onto the record support plate (79B). Then the push-off plate (79A) slides forward and drops the next record to be played but only after the pickup arm has cleared the record stack. The little slide in the top end of the center post holds back all records other than the bottom one.

As the main cam continues its rotation, the arm control slide (52) moves back following the cam since it is kept in contact with it by slide spring (76). Stud (52C) moving with the arm control slide (52) allows arm control lever (48A) to move back. The tension of the set-down spring (55) moves the arm control lever through set-down lever (54B) and roller (48D). This moves the pickup arm to the set-down point for the record to be played. This set-down point is governed by the set-down adjustment screw (25) for 12-inch records and screw (26) for 10-inch records.

When the record changer is set to play 10-inch records, the arm control lever roller (48D) moving along the edge of the set-down lever (54B) and on reaching the shoulder of the set-down lever, moves this lever and the set-down arm (54) until they are stopped by the set-down adjustment screw (26) making contact with the rear flange of the record changer pan (24). At this point the pick-up arm is above the starting groove and is lowered by the action of the arm control slide as explained above.

When the record changer is set to play 12-inch records, the size change link (75) removes the tension from the change link spring (74) allowing the set-down arm (54) to move so that the set-down adjustment screw (25) makes contact with the rear flange, instead of screw (26). This movement of the set-down arm is caused by spring (55) when the arm is in its change cycle. This changes the set-down of the pick-up arm for 12-inch records.

While the needle is held in position above the starting groove, the safety arm (52B) pushes stud (54A)

MODEL RC 170, RC 170 A.

ADMIRAL CORPORATION

**IMPORTANT**

These two models are very similar. The differences are illustrated in Figures 3 and 4. To be certain which model changer you are servicing, look for the changer model number which appears on the underside of the changer mechanism.

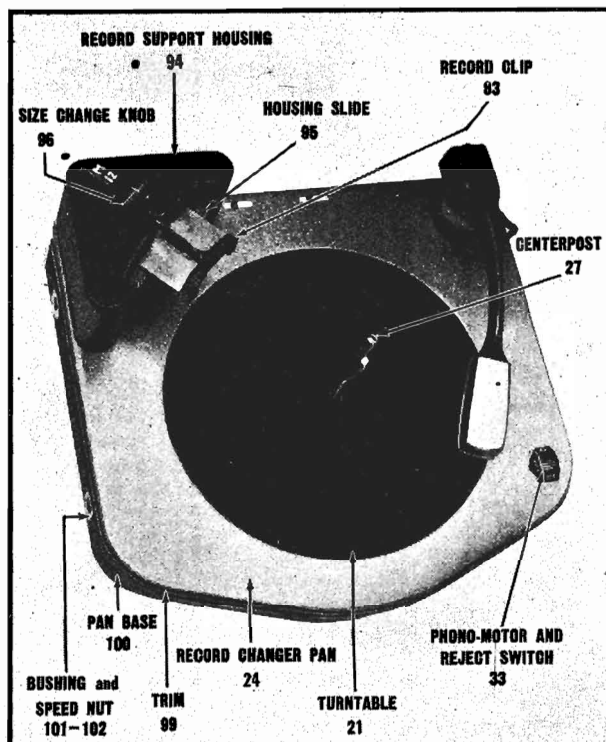


Figure 1. Record Changer, Top View

Figures 3 and 4 show major differences between models RC170 and RC170A. In addition, differences occur in parts carrying reference numbers 49, 50 and 52 (see parts list).

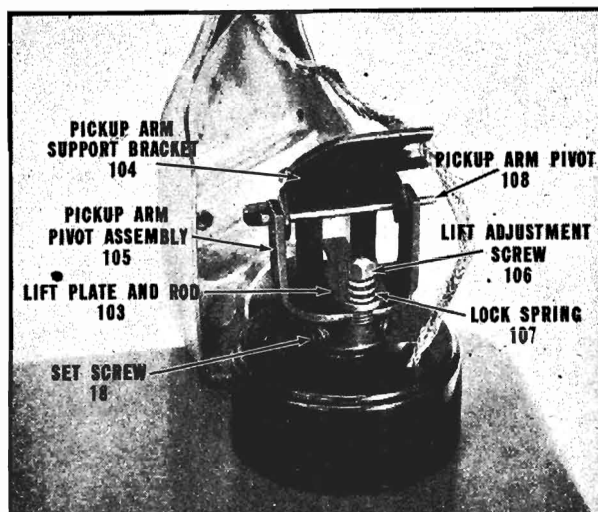


Figure 4. Pickup Arm Hinge Assembly for RC170A

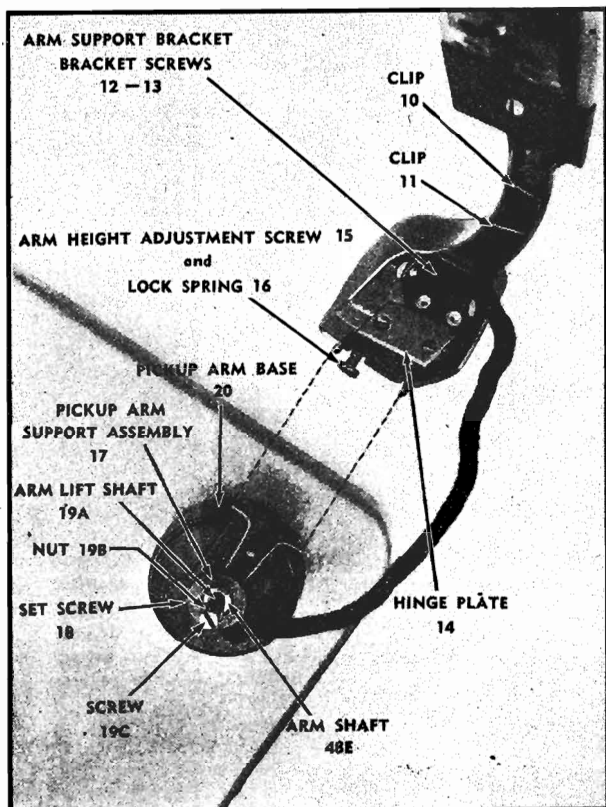


Figure 3. Pickup Arm Hinge Assembly for RC170

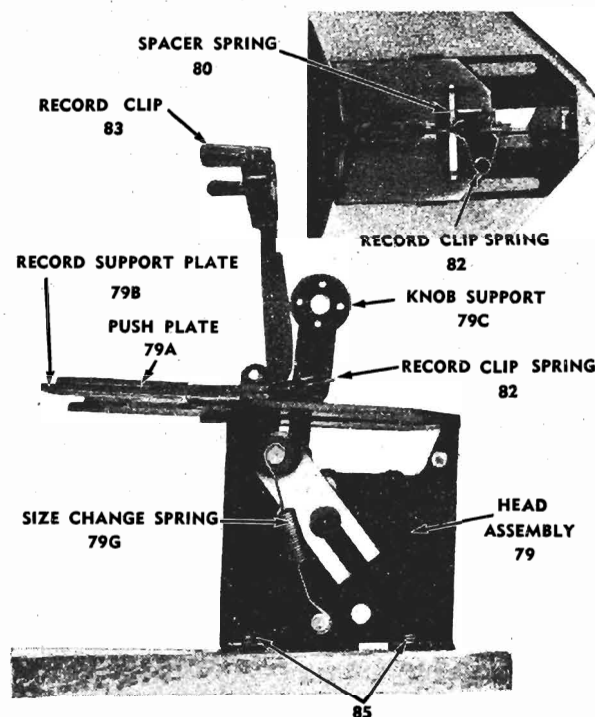


Figure 5. Head Assembly

## ADMIRAL CORPORATION

MODEL RC 170, RC 170 A.

releasing the pickup arm so that it has a free sideward movement to follow the record groove. About one revolution of the turntable after the releasing of the pickup arm, the arm is lowered by the downward movement of arm lift shaft (19).

When the reject is used, the movement of the reject knob (33) forces stud (39A) against the reject link (43A) moving trip arm (43) which releases trip lever (63) and the cycle of record change proceeds in the same manner as for automatic changing.

## ADJUSTMENTS

**TOOLS REQUIRED** { **No. 8 Allen Set Screw Wrench (Part No. P-5825. List price \$0.10)**  
**3/16 inch Open End Wrench (Part No. P-5807. Net price \$0.39)**

### 7. ADJUSTMENT OF SET-DOWN POINT (See Figures 1 and 8)

Adjustments for 10-inch records are made by the screw (26) which can be seen through the right hand slot at the top rear of the record changer. Turning this screw in moves the set-down point of the pickup arm closer to the center post and turning the screw out moves it further away. The proper set-down point is between  $4\frac{5}{8}$ " and  $4\frac{11}{16}$ " from the needle to the near side of the center post.

Adjust the 12-inch set-down with screw (25), Fig. 8. Turning screw (25) in (as seen through the left hand slot) moves the set-down point for 12-inch records further from the center post and turning the screw out moves it closer to the center post. The proper set-down point is between  $5\frac{5}{8}$ " and  $5\frac{11}{16}$ " from the needle to the near side of the center post.

If either adjusting screw has reached the end of its travel so that it is not possible to get a proper setdown, it will be necessary to re-set the assembly (17) or (105) as follows:

#### 7A. SETTING PICKUP ARM SUPPORT ASSEMBLY (17) IN RC170 OR (105) IN RC170A

- Set adjusting screws (25) and (26) half-way in.
- With the set screws (18) loose, move the pickup arm so that the pickup arm cap (2) rests against the top portion (above the shelf) of center post.
- Holding the pickup arm in this position, move the arm control lever (48B) so that it is  $\frac{3}{8}$ " from the rear flange of the pan (24); always keep this spacing less than  $\frac{1}{16}$ " but more than  $\frac{1}{32}$ " (between .04 and .06" is correct).
- Press the arm control lever assembly (48) up into the pickup arm base (20). Press the pickup arm support assembly (17) or (105) down against the pickup arm base (20), leaving a .006 to .008 inch clearance between them. This clearance is necessary to prevent binding. The spring washer (part number 405A27) should be slightly compressed between the top of the pickup arm base and the bottom of the collar.
- Tighten the two set screws (18).
- Make final set-down adjustments with adjustment screws (25) and (26). (See page 2)

#### 8. ADJUSTMENT OF PICKUP POINT (See Fig. 7)

The pick-up or tripping point adjustment is made by screw (45). Turning the screw in brings the pick-up point closer to the center post and turning the screw out moves it further away. The proper pick-up point is between  $1\frac{11}{16}$ " and  $1\frac{3}{4}$ " from the needle to the near edge of the center post.

On the late production of the record changer used with the console radios, a hole has been made in the bottom cover so that this adjustment can be made without removing the bottom cover from the changer. As the table models do not use the bottom cover, this adjustment is easily made.

In adjusting the pick-up point it will be found that an occasional record does not have the groove run in far enough so that the pick-up arm will be carried close enough to the center post to actuate the reject link. If adjustments are made to accommodate these few records, it will be found that the changer starts its change cycle with some normal records before they are finished playing. In adjusting for this type complaint, it is wise to let the customer decide for which side the adjustment should be made.

#### 9. ADJUSTMENT OF PICKUP ARM HEIGHT (See Figures 3 and 4)

Before adjusting arm height, be sure needle is properly adjusted (see paragraph 18).

With the record changer out of cycle and the pick-up arm clear of the turntable, adjust screw (This adjustment screw is 15 on the RC170 and 106 on the RC170A.) so that the tone arm needle is approximately  $\frac{1}{8}$ " above the top of the pan. Turning the screw in raises the arm and turning it out lowers the arm.

The model RC170 also has an adjustment screw (19C) to adjust the maximum height that the pickup arm should reach. The maximum height of the pick-up arm during the change cycle should be from  $1\frac{3}{8}$ " and  $1\frac{1}{2}$ " between the needle and turntable. After making this adjustment tighten locking nut (19B) and again check the adjustment.

#### 10. ADJUSTING DISTANCE BETWEEN HEAD ASSEMBLY (79) AND CENTERPOST (See Figs. 7, 8)

Do not bend the centerpost to make this adjustment; adjust as described below.

The adjustment of the head assembly (79) is made by loosening the three screws. 85. (underneath the changer) and moving the assembly closer or further away from the center post as the case may be. The head assembly is in proper relationship to the center post when it is set with a dimension of  $4\frac{7}{8}$ " from the front edge of the record support plate (79B, Fig. 8) to the rear of the center post (side nearest the record support plate) and at a point on the center post of the same height as the record support plate. This dimension is taken with the changer set to play 10-inch records.

After adjusting, check as follows:

- Place a 10-inch record (with a true center hole) on the centerpost to a point in line with the record support plate (79B). Holding the record horizontal and exerting force on it toward the head assembly, the record should just clear the record support plate (79B). Exerting force away from the head assembly should give a small gap between the record support plate (79B) and the record. **Repeat with a 12-inch record.**
- Load the changer with a stack of records; push record stack toward head assembly. Start the changer mechanism, and check push-off for several 10-inch records. **Repeat for 12-inch records.**

MODEL RC 170. RC 170 A. ADMIRAL CORPORATION

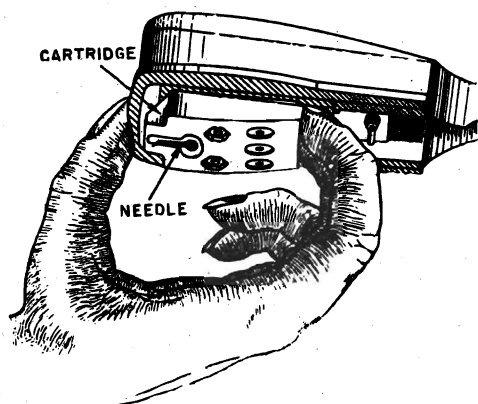


Figure 2: Removing Cartridge by Pulling Down on Back Edge

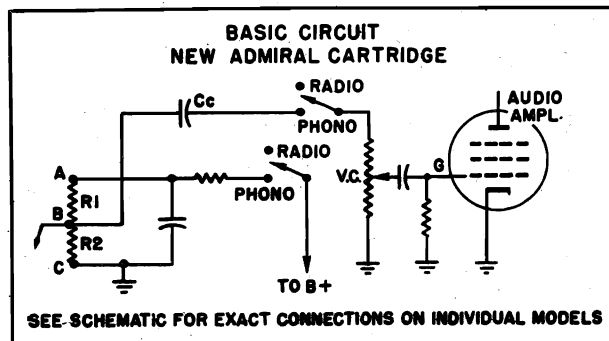


Figure 6. Basic Circuit for New Admiral Cartridge

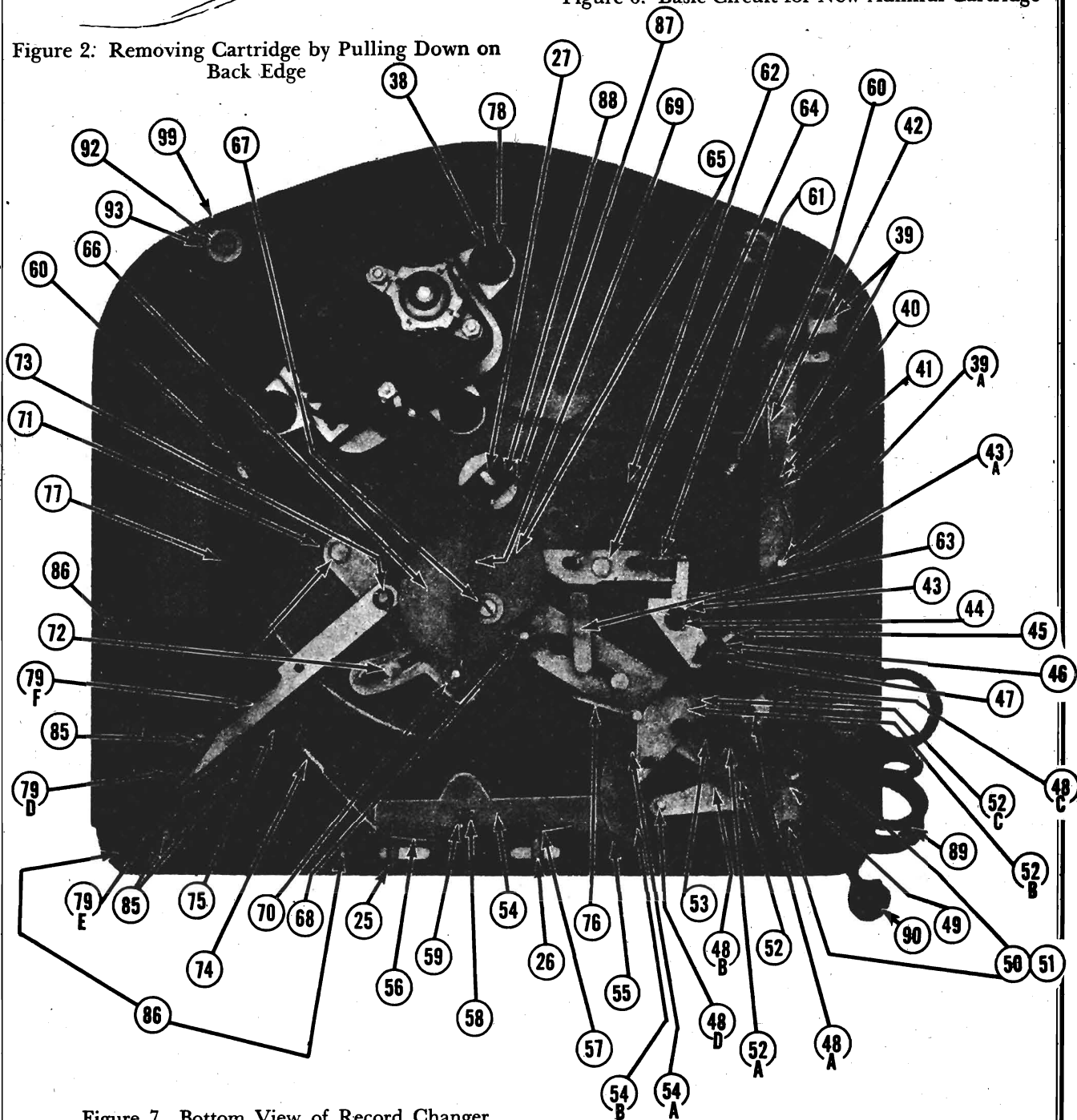


Figure 7. Bottom View of Record Changer

## ADMIRAL CORPORATION

MODEL RC 170, RC 170 A.

Reference numbers 12, 14, 17, and 19 apply to RC 170 only; see Figs. 3 and 4 and note marked † in parts list.

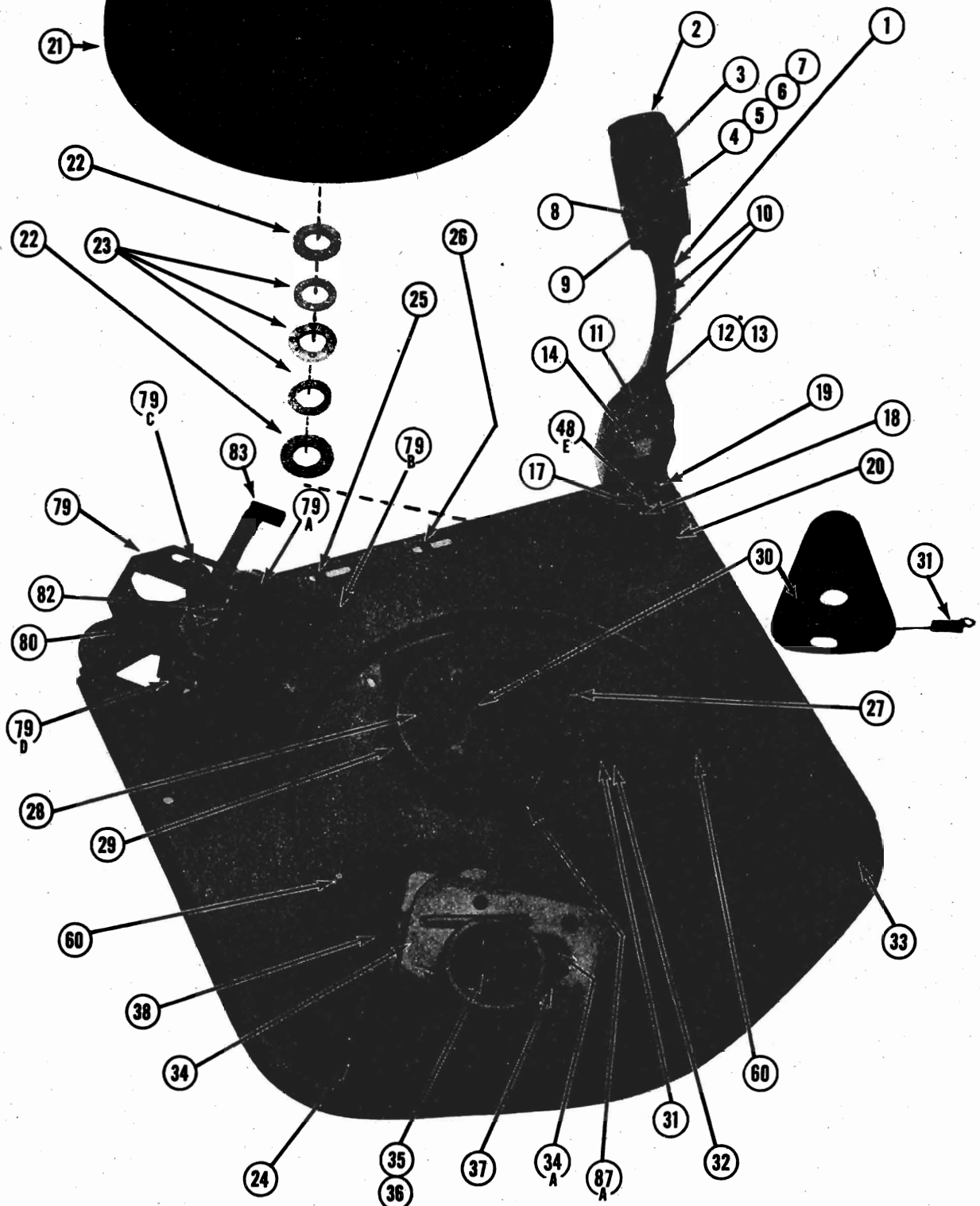


Figure 8. Top View of Record Changer



## MODEL RC 170, RC 170 A.

## ADMIRAL CORPORATION

## SERVICE PARTS LIST FOR RC170 &amp; 170A RECORD CHANGER

Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
1	G400A177	Pickup Arm Casting Only (painted)	52A		Inclined (raised) Portion of Arm Control Slide (part of 52)
2	403B16-1	Pickup Arm Cap (clear plastic)	52B		Safety Arm (part of 52)
3	A1372	Cartridge and Needle	52C		Stud (part of 52)
4	G400A198	Cartridge Holder (socket with contacts)	53	405A58	Relief Spring
5	401A152	Plate (For mounting cartridge holder to pickup arm)	54	G400A152	Set Down Arm Assembly
6	20-312-C2-6	Screw #2-56x5/16" R.H.M.S. (4 required)	54A		Stud (part of 54)
7	2A1-1-6	Nut #2-56 (4 required)	54B		Set Down Lever (part of 54)
8	401A115	Cap Clamp	55	405A56	Set Down Spring
9	20-312-C2-6	Screw for Cap Clamp #2-56x3/8" R.H.M.S.	56	405A44	Lock Spring
10	414A17	Pickup Arm Wire Clip (.359"x.047"; 3 required)	57	405A44	Lock Spring
11	414A17-1	Pickup Arm Wire Clip (.506"x.047"; 1 required)	58	405A22	Spring Washer
12	†401A134	Arm Support Bracket (see note †)	59	405A78	Hairpin Spring
13	65-250-C2-39	Arm Support Bracket Screw #6-32x1/4" B.H.M.S.	60	1A80-5	Mounting Screws
14	†G400A165	Pickup Arm Hinge Plate (see note †)	61	405A68	Trip Spring
15	†65-625-C2-47	Pickup Arm Adjustment Screw #6-32x5/8" (see note †)	62	405A75	Trip Lever Spring
16	†405A70	Lock Spring for Pickup Arm Adjustment Screw (see note †)	63	401A153-1	Trip Lever (includes shoulder rivet #64)
17	†G400A168	Pickup Arm Support Assembly (see note †)	64	402A97	Shoulder Rivet (See Note A)
18	1A43-14	Allen Set Screw #8-32x3/16" Cone Point (2 required)	65		Cam Stop Stud (part of 66)
19	†G400A172	Arm Lift Shaft (includes screw and lock nut) (see note †)	66	G400A163	Main Cam
19A		Arm Lift Shaft	67	85-375-C2-39	Main Cam Screw #8-32x3/8" B.H.M.S.
19B		Nut #6-32	68	415A9	Roller
19C		Screw #6-32x3/8" Fil. H.M.S.	69	405A79	Push Off Arm Spring
20	G400A173	Pickup Arm Base	70	415A9	Roller
21	G400A167	Turntable	71	G400A154-1	Push Off Arm (includes 2 shoulder rivets, #72)
22	412A1	Cork Washer (2 required)	72	402A97	Shoulder Rivet
23	415A2	Thrust Bearing Assembly (replace as a unit)	73	405A78	Hairpin Spring
24	G400A195	Record Changer Pan with Studs and Welded Parts	74	405A54	Change Link Spring
25	402A87	Set Down Adjustment Screw	75	401A159	Size Change Link
26	402A87	Set Down Adjustment Screw	76	405A60	Slide Spring
27	G400B137-1	Center Post (includes 405A62 speed nut)	77	88A8-1	Motor Plug (male)
28	G400A179	Drive Wheel (includes tire)	78	G400A196	Rubber Mounting Grommet and 401A106 fastener (for 407B3-2 and 407B4-2 motor) (3 required)
29	406A13	Drive Wheel Tire Only		G400A203	Rubber Mounting Grommet, spacer, and fastener (for 407B1-2 motor)
30	G400A149-1	Drive Wheel Support Assembly	79	G400A186-1	Head Assembly (includes 79A to 79G; does not include #80, 82 or 83)
31	405A54	Drive Wheel Spring	79A		Push Plate
32	402A76	Spring Stud	79B		Record Support Plate
33	403A23	Reject Knob	79C		Knob Support
33A	405A80	Reject Knob Retaining Spring	79D		Push Off Lever
34	*407B3-2 or **407B1-2 *407B4-2	Motor with Idler Wheel and fasteners; 105-125 V, 60 Cycle	79E	405A69	Size Change Lever Spring
		Motor with Idler Wheel and fasteners; 105-125 V, 50 Cycle	79F		Push Off Link (See Note B)
34A	401A48	Drive Pulley (Part of 34. For motors 407B3, 407B4. In addition, motor 407B4 includes a coil spring, part number 405A32.)	79G	405A57	Size Change Spring
	405A32	50 Cycle Conversion Spring (this spring used to convert 407B3 motor)	80	405A74	Spacer Spring
35	G400A23	Idler Wheel Assembly (used with either 407B3 or 407B4 motor)	82	405A73	Record Clip Spring
	G400A57	Idler Wheel Assembly (for 407B1 motor)	83	G400A190	Record Clip (does not include #405A73, 405A74 springs or 406A16 rubber bumpers)
36	405A15	Hairpin Spring for Idler Wheel	84	406A16	Rubber Bumpers for Record Clip
37	405A14	Spring, Idler Wheel (for 407B3 or 407B4 motor)	85	62-375-C2-39	Screw #6-32x3/8" Fil. H.M.S. (3 required)
	405A67	Spring, Idler Wheel (for 407B1 motor)	86	62-375-C2-39	Screw #6-32x3/8" Fil. H.M.S. (3 required)
38	401A106	Shakeproof Motor Fastener	87	G400A146-1	Center Post Bracket Assembly (includes 1-#405A-62 speed nut)
39	G400A162	Switch and Lever (ON-OFF-REJECT)	88	405A62	Speed Nut for Fastening Center Post
39A		Spring Stud (Part of 39)	89		See Radio Service Manual for Proper Cable and Part Number
40	405A78	Hairpin Spring	90	98A19	Plug, 3 contact
41	405A22	Spring Washer		88A8-5	Plug, 4 contact
42	405A77	Switch Lever Spring	92	G400A197	Mounting Screw (for mounting bottom cover to pan)
43	G400A181	Trip Arm Assembly	93	19A10-3	Mounting Spring (for mounting bottom cover to pan)
43A		Reject Link (part of 43)	94	403C14	Record Support Housing Plastic (does not include #93)
44	405A78	Hairpin Spring	95	403B15	Housing Slide, Blastic
45	402A96	Trip Adjustment Screw	96	403A20	Size Change Knob (2 required)
46	4B1-34-37	Washer (2 required)	97	402A81	Knob Spacer
47	405A76	Adjustment Lock Spring	98	443-312-C2-34	Screw (size change knob) #4-40x5/16" Philips
48	G400A175	Arm Control Lever Assembly	99	403A24	Trim
48A		Arm Control Lever	100	G400A143	Bottom Cover (consoles only)
48B		Arm Control Lever	100A	413A7	Grommet (1") for bottom cover
48C		Arm Control Lever Roller	101	27A24	Bushing in Bottom Cover (consoles only; 4 required)
48D		Arm Control Lever Roller	102	2A10-10-59	Speed Nut for Bushing (consoles only) (4 required)
48E		Pickup Arm Shaft	103	††G400A201	Lift Plate and Rod (See Note ††)
49	401A143	Slide Support (RC170 only)	104	††401A162	Arm Support Bracket (See Note ††)
	401A143-1	Slide Support (RC170A only)	105	††G400A200	Arm Pivot Assembly (See Note ††)
50	402A85-1	Slide Spacer (RC170 only; See Note C)	106	††402A104	Lift Adjusting Screw, #6-32x3/8" cap screw (See Note ††)
	402A85-2	Slide Spacer (RC170A only)	107	††405A81	Lock Spring (See Note ††)
51	C2-1000-C2-39	Spacer Screw #6-32x1" Fil. H.M.S. (2 required)	108	††414A18	Pickup Arm Pivot (See Note ††)
52	G400A159	Arm Control Slide Assembly (RC170 only)	109	405A27	Washer, spring
	G400A159-1	Arm Control Slide Assembly (RC170A only)			

\*407B3-2 and 407B4-2 are the same as #407B3 and 407B4 respectively except that 3 #401A106 fasteners are included.

\*\*407B1-2 is the same as #407B1 except that three spacer washers and three #401A106 fasteners are included.

† Parts marked † are used in the RC170 only. See Figure 3. See Ref. numbers 103, 104, 105, 106, 107, 108 for RC170A parts.

†† Parts marked †† are used in the RC170A only. See Figure 4. See Ref. numbers 12, 14, 15, 16, 17, 19 for RC170 parts.

NOTE A: The rivet (64) has been replaced on the late RC170 and all of the RC170A by a stud the same as spring stud #32. A spring washer (41) and a hairpin spring (40) is used to hold the trip lever (63) in place. The trip lever (63) remains the same in either case.

NOTE B: Three different type push off links (79F) have been used. The one shown in figure 7 is the latest but is now installed with its offset to the rear of the changer. In other words it is turned over on its axis 180°. This latest type can be used on all earlier changers.

NOTE C: The model RC170 uses two different type spacers (50). However, 402A85-1 can be used to replace either type. In re-assembling be sure that the spacer with the cut down section is used near the spring mounting bushing (front).



## ADMIRAL CORPORATION

MODEL RC 170, RC 170 A.

If the setting of the head assembly does not give proper push-off for both 10-inch and 12-inch records, vary the spacing slightly and re-check.

It should be noted that the records do not rest on the record support plate (79B) during normal playing of the changer; but rest on top of the push off plate

(79A). During record change the push off moves back and allows the records to drop to the record support plate (79B). The push off plate now moves forward pushing the bottom record off. The remaining records are being supported by the push off plate itself. This is done to reduce any tendency for two records to drop to the turntable at the same time.

## SERVICE AND REPAIR

### CAUTION

See that the rubber tires on both the drive wheel (28) and the idler wheel (35) are kept clean and free from oil, grease, dirt, or any foreign material. Carbona or carbon tetrachloride may be used for cleaning these parts.

#### 11. REMOVING PLASTIC HOUSING FROM HEAD ASSEMBLY (See Figures 1 and 7)

The housing (94) of the head assembly can be taken off by removing the two size change knobs (96) and the three screws (86). With the record clip (83) in the down position, the housing can be lifted from the assembly. The housing slide (95) will drop out as the housing is removed.

#### 12. REPLACING A PICKUP ARM BASE (See Figures 3, 4 and 7)

When installing a pick-up arm base (20) and before tightening the two screws (51), exert pressure on the base towards the front of the changer and at the same time rotate it in a clockwise (bottom view) direction. Tighten the screws while holding the base in this position. If this is not done properly, the arm control slide (52) may bind between the two slide spacers (50).

After replacing the pickup arm base, re-set the pickup arm support assembly as in paragraph 7A.

#### 13. REPLACING SIZE CHANGE SPRING (See Figure 5)

Whenever it is necessary to remove or replace the size change spring (79G) care must be taken to re-install it in its proper position. See Figure 5 for its mounting position.

#### 14. REPLACING HEAD ASSEMBLY

Remove the assembly housing as explained in No. 11. Release the push-off link (79F) from the push-off arm (71) by removing the hairpin clip (73) and washer. Remove three screws and washers (85) and the assembly is free from the pan.

When re-installing the head assembly, replace the three screws and washers but do not tighten them. Reconnect the push-off link and arm. Adjust the head assembly as explained in paragraph 10.

#### 15. REMOVING TURNTABLE AND BEARING ASSEMBLY

To remove the turntable it is only necessary to grasp the table by its edges and lift up. **Before replacing the turntable, make sure that the recessed part of the drive wheel (28) is towards the centerpost. If necessary, turn drive wheel counter clockwise about a turn so it locks in this position.** The pickup arm should be positioned away from the turntable to avoid the possibility of accidentally tripping the changer mechanism. In replacing the turntable **force**

**is not needed** to seat it. Make sure, however, that the drive wheel of the motor has been pushed in towards the centerpost and that the wheel is making contact with the inner side of the turntable flange. In some cases it may be found that the two cork washers, after considerable use, are compressed so the turntable will rub. To build the stack up, an extra cork washer should be used. This third cork washer may be placed at the top or bottom of the stack.

The washers (22) and thrust bearing assembly (23) are removed by sliding them off of the centerpost. In replacing, have them in the order shown in Figure 8.

#### 16. REMOVING BOTTOM COVER (100)

To remove the bottom cover (100) from the record changer, remove the two rear screws (92) through the bottom. Then press on the front edge of the bottom cover; this frees the changer from the slotted mounting brackets at the front of the bottom cover. To replace bottom cover, reverse above operations.

The changer must float on the springs (93) to prevent microphonic feedback, thus the springs (93) must be re-installed properly. The wider end fits around and hugs the extrusion in the mounting brackets in the bottom cover. The narrow end of the spring fits over the threaded bushing on the changer pan (24). In some changers it has been necessary to add spacer washers beneath the narrow portion of the spring (93) to assure "free floating" of the changer.

#### 17. MOUNTING 407B1 MOTOR TO CHANGER

The model 407B1 motor may be used with this record changer but it is necessary that a fibre or felt washer be used as a spacer between the motor mounting grommet and the changer pan. The No. 401A106 shakeproof motor fastener can be used to then mount the motor.

#### 18. CARTRIDGE (See Figure 6)

The new Admiral pick-up cartridge uses an entirely new principle since it is not a crystal, magnetic, or capacitive device. The pick-up element is made of special rubber which is a high resistance electrical conductor (R-1 & R-2). The resistance varies as the length of the rubber is changed. A Monel metal needle, osmium tipped, is clamped to the center of the resistive rubber as shown at B. As the needle moves back and forth in the record groove, it alternately lengthens the rubber on one side and shortens the rubber on the other side.

A DC voltage is applied at A. The voltage drop from B to C varies as the resistance changes due to the "back and forth" movement of the needle. The varying voltage drop is in reality an alternating voltage of audio frequency. This voltage is applied through the coupling condenser (Cc) to the grid (G) of the audio amplifier tube.

**Trouble Shooting:** If you suspect the cartridge or needle and have a replacement cartridge available, the quickest test is to try the other cartridge. This is very simple since the Admiral cartridge plugs in. Remove

the old cartridge as described on page 1 and plug in the replacement cartridge. If replacing cartridge does not correct the trouble or if no replacement is available, proceed as follows:

1. Make sure radio operates satisfactorily on radio stations.
2. Turn switch to Phono and turn volume control up high. Touch the needle with finger. If a loud hum is heard, circuit from B<sub>1</sub> to G is not open or shorted. If hum is not heard, check circuit from B to G.
3. If hum is heard, check voltage across outer terminals on bottom of cartridge. Generally it should measure from 80 to 100 volts DC. See circuit diagram for individual chassis. If voltage is correct, cartridge should be replaced.
4. If voltage is not correct, check circuit for fault. In case of distortion, check coupling condensers.
5. If the needle is bent, it can be straightened by bending it down so that it projects  $\frac{1}{16}$ " from cartridge. It should then be pressed back several times with a flat object.

Do not attempt to repair cartridges or remove the cap on the cartridge assembly as this will void the warranty.

#### 19. LUBRICATION

Under normal operating conditions, the motor

should never require oiling. The rest of the changer, however, should be lubricated with grease whenever it comes into the shop for repairs or adjustment. A good grade automobile chassis grease may be used for this purpose.

The oilite bearings, used in the turntable hub and pick-up arm base, may be lubricated with SAE No. 20 motor oil.

Care should be taken to prevent any of the lubricant from coming into contact with the drive or idler wheel tires. Also be careful, when using oil, that an excess does not seep into the felt of the turntable.

**Use grease sparingly on stud (64) of trip lever (63); excessive lubricant may cause suction binding and subsequent failure of the trip mechanism.**

#### 20. REPLACEMENT PARTS

In some cases replacement parts from the factory may be a different type than those being replaced. These parts will be of a later production but may be used as replacement parts. In cases where rivets or adapting parts are needed, they will be included with the replacement part.

Note that when replacements involve loosening or removing set screws (18) in assemblies (17) or (105), it will be necessary to re-set the assembly as described in paragraph 7A.

## AERO-METAL PRODUCTS

MODEL 46-A

# OPERATING AND SERVICE INSTRUCTIONS FOR RECORD CHANGER

## MODEL 46-A

### General Specifications

MOTOR VOLTAGE—115 Volts—60-cycles A.C. (**DO NOT USE D.C.**)

MAXIMUM NUMBER OF RECORDS PLAYED AUTOMATICALLY:

Fourteen (14) 10" records

Twelve (12) 12" records

TURNTABLE SPEED --- 78 to 80 R.P.M.

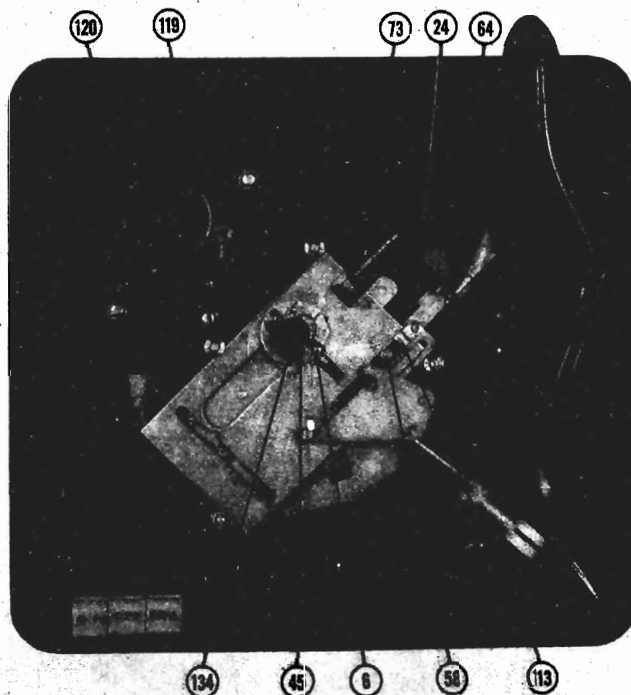


FIGURE 1

### CAUTION

Twelve only 12" or fourteen 10" records may be played, **DO NOT INTERMIX** 12" and 10" records.

**DO NOT CHANGE** CAP playing position unless Changer is out of cycle.

**DO NOT USE FORCE** at any time to either start or stop the Changer mechanism.

**DO NOT LEAVE RECORDS ON SUPPORTS** when Changer is not in use as this will cause the records to warp and hinder the efficiency of the Changer.

For more enjoyable listening and operating performance, always keep records in albums.

The last record in the stack will keep repeating until the Changer is stopped.

**DO NOT OPERATE** the Changer on **D.C. Current**.

Make certain that the center post slide cap is down before loading.

If a record does not have the eccentric inside groove, it will be necessary to use the **REJECT PUSH BUTTON** to play the next record.

With normal use, the needle should not require replacement. **DO NOT DROP** the needle or damage its precision point. **DO NOT REMOVE** and then replace the same needle. Make certain that the needle is securely held in cart-ridge case.

### LOADING

The plastic cap can be moved either forward or backward, from the 10-inch to 12-inch position, or from the 12-inch to the 10-inch position.

The records are placed over the center post, resting on the ledge in the center and on the cap ledge on the outside edge.

Snap pressure clamp down on top record stack.

To place Changer in either 10" or 12" playing position, use the following procedures:

For 10" playing position, lift up the cap at an angle and push the cap forward until the maximum forward motion is reached, then release cap to allow it to fall into place. The Changer is now ready to play 10" records. For 12" playing position, lift up the cap at an angle and pull backwards until the maximum backward position is reached, then release cap to allow it to fall into place. The Changer is now ready to play 12" records.

**NOTE:** The 10" cap position is always in the maximum **FORWARD** position, and the 12" cap position is always in the maximum **BACKWARD** position.

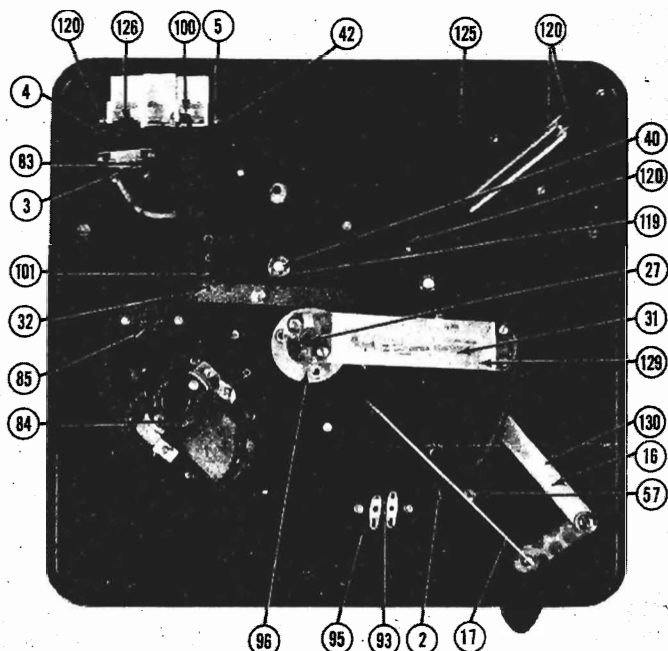


FIGURE 2

**STARTING**

Press down on the push button marked "ON." After the turntable has attained speed, press down on the push button marked "REJ." Hold finger pressure for a few seconds and then release.

The bottom record will fall on the turntable and the Changer will automatically play through the entire stack of records.

**REJECTING**

Press down on the push button marked "REJ." Hold finger pressure for a few seconds and release. A record may be rejected at any time during playing by this simple operation.

**UNLOADING**

Press down on the push button marked "OFF." Set the tone arm on the tone arm rest post. Set the record pressure clamp in an upright position. The played records may now be easily removed by lifting the entire stack of records upward and in a horizontal plane.

**OPERATING CYCLE**

1—Records are placed on offset portion of center post. Tone arm plays through the first record and follows on to the eccentric groove. When needle feeds into a position of  $1\frac{1}{8}$  inches away from center post, the trip which is attached to tone arm link (16) engages and moves pawl lever (23). Clutch arm which is attached to pinion, gear is now released thus engaging turntable clutch. Changing mechanism is now powered.

2—Lift lever roller (73) travels over lift lever (17) raising tone arm off record.

3—End of elongated slot in main slide (21) engages stud (58) on tone arm link (16). The backward motion causes the tone arm to swing clear, allowing record to drop.

4—Push-off stud (68) on slide plate (10) engages push-off arm (10) which in turn retards record cap (89). Record drops from upper shelf to lower shelf. At this point the slide reverses its motion.

5—Stud (68) on slide plate (10) reverses its motion thereby causing record cap to advance. This action pushes the record forward, allowing it to drop off spindle shelf.

6—Spring on return slide (113) engages stud (58) on tone arm link (16). It then moves forward until the stud engages position stop (8) in either 10" or 12" position.

7—Tone arm is now in set down position and is allowed to rest on record when lift lever roller (73) is disengaged from lift lever (17).

8—Tone arm is now resting on record and remains locked for the next half turn.

9—Roller (70) on bottom of large gear (18) pushes position stop (8) until it is clear of stud (58) on tone arm link (16).

10—Pawl lever (23) engages clutch arm thus cutting off power for changing mechanism. Changer will now proceed through playing cycle.

**OPERATION OF PUSH-OFF HEAD**

When record cap (89) is in 12" position the push-off lever (9) is in the forward hole. The 12"-10" lever (11) is free. When record cap (89) is in 10" position the push-off lever (9) is in the rear hole and the 12"-10" lever (11) is pushed forward. This in turn pulls

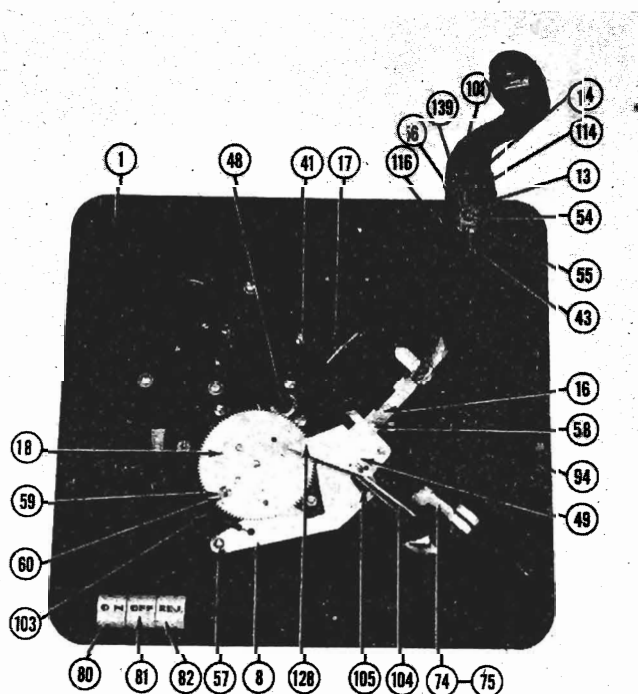


FIGURE 3

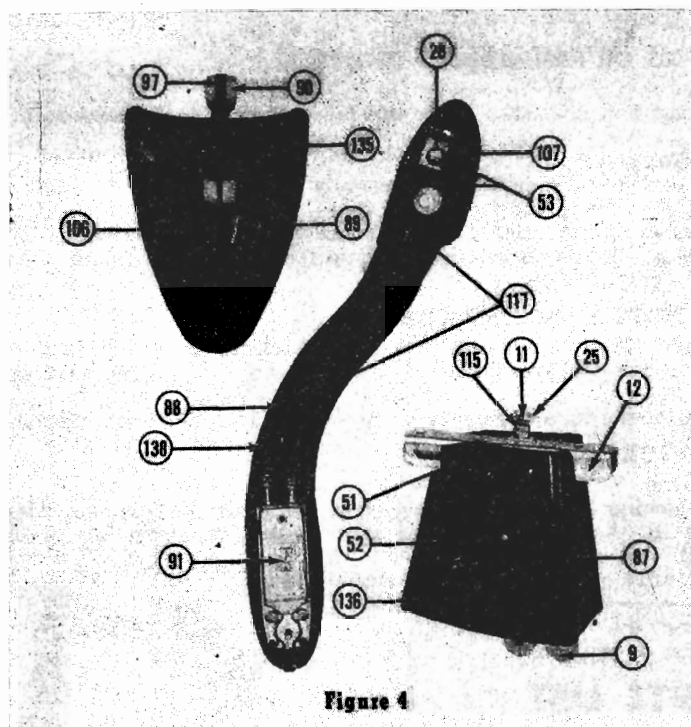


Figure 4

the position stop (8) into the 10" position through the action of the connecting link (16).

### OPERATION OF REJECT LEVER

When reject button (82) is pushed down it moves reject arm (32) through the action of connecting link (100). The reject arm (32) engages tab on bottom of pawl lever (23) thereby engaging the clutch.

### tone ARM ADJUSTMENT

(Vertical)

Tighten screw (77) clockwise to raise tone arm. Counter-clockwise to lower.

(Horizontal)

Operate mechanism by hand, through change cycle, until tone arm rests on turntable. For slight adjustment—turn screw in hole in rear of tone arm clockwise for outward adjustment, counter-clockwise for inward adjustment. For greater adjustment turn hexagon head screw. Place in proper position for set down and tighten screw.

### ADJUSTMENT OF PUSH-OFF HEAD

Be sure center post (45) has not been bent. It should be at right angles to turntable before proceeding with adjustment. To adjust, loosen three screws holding base (87) to base plate (11). Place 10" record on center post (45) so that it rests on shoulder of record cap (89). Be sure the hole in record is directly on top of center post (45). With edge of record

resting on top shelf, move base (87) back or forward until edge of record has 1/32" clearance from back edge of top step. When proper adjustment is made tighten screws in base (87), being certain position is not changed.

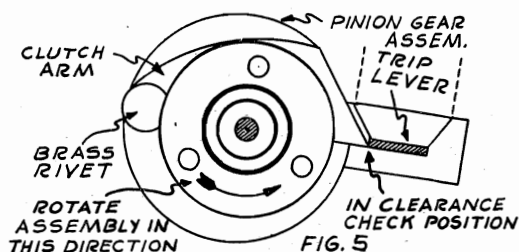


FIG. 5

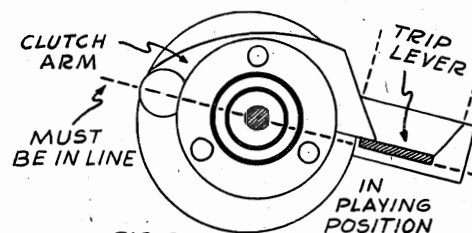


FIG. 6

### TIMING OF GEARS AND CLUTCH ADJUSTMENT TO ADJUST REMOVE TURNTABLE

1—Normal position of large gear, while in playing cycle should be with roller (60) centered in slot at end of slide plate (21). In this position the gear will snap into the index position. (As shown in Figure 1), and clutch will be disengaged.

2—The small pinion gear is indexed correctly when the turntable shaft and clutch assembly is rotated in a counter clockwise direction, with clutch engaged. The end of the clutch arm will be in line with the edge of the trip lever as shown in Figure 5.

3—If pinion gear has been removed from changer proceed as follows. Place large gear in index position. Insert pinion gear with brass rivet opposite trip lever as shown in Figure 6. Clutch arm will be resting on trip lever. If properly timed you will be able to spin turntable and clutch assembly freely. If motion is not free remove assembly and rotate pinion gear one tooth (clockwise direction).

4—For a finer adjustment bend end of trip lever forward or backward. Clutch arm should have smallest clearance possible between turntable and clutch assembly.

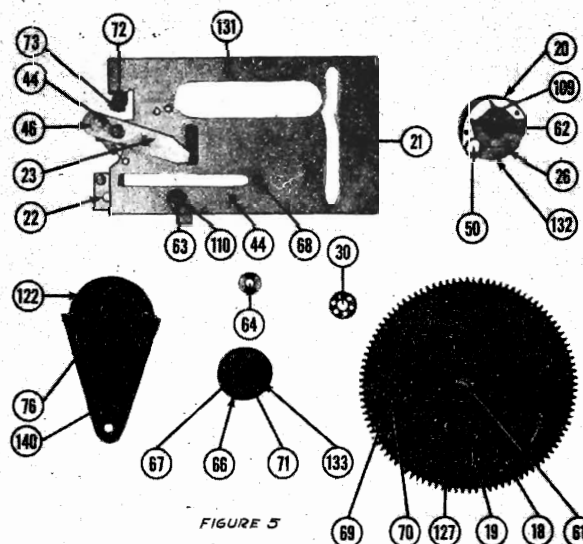


FIGURE 5

**IF CHANGER FAILS TO REJECT OR PUSH RECORD PROPERLY**

- 1—Be sure tone arm shaft has .005 to .010 end play.
  - 2—Be certain trip lever is properly adjusted on tone arm link (16). Move trip lever forward or backward and tighten locking screws.
  - 3—See that there is no excess play in tone arm linkage.
- Also be sure needle is fastened securely in cartridge and cartridge is fastened securely to tone arm.
- If tone arm sets down in 12" position regardless of cap setting, shorten 10"-12" link (105) by bending.
- If tone arm has erratic motion when setting down check to determine if tone arm bracket is free from index washer (33) and that it returns to normal position without end play. If this condition exists free bracket from tone arm lever (34). USE FINE OIL and adjust spring to take out side play.

**TO PREVENT BINDING OF CHANGER**

Remove turntable by removing three screws on top. Revolve turntable hub and clutch by hand. If binding occurs look for bent parts or heavy burrs. If burrs are found remove them with a smooth file. Be certain stud (58) has 1/32" to 1/16" clearance from push-off arm (10).

If it does not have this clearance bend backward to obtain correct dimension. Be sure the four rollers (64) are free.

**LUBRICATION**

Use fine oil sparingly on rollers and other moving parts.

Use light cup grease on bottom of turn table thrust bearing. Remove excess grease from large gear (on cam side). DO NOT UNDER ANY CIRCUMSTANCES OIL MOTOR. Keep turntable and idler wheels free from oil. If oil should get on any of these parts be sure to remove it.

The turntable bearing and center shaft hub are self-lubricating and therefore require no oil.

Grounded side of pick up cartridge is terminal nearest the tone arm.

A.C. connections (85) will fit Allen-502 or EBY-624 plug or equivalent.

**PARTS LIST**

INDEX NO.	DESCRIPTION	PART NO.	INDEX NO.	DESCRIPTION	PART NO.	INDEX NO.	DESCRIPTION	PART NO.
1	Base	1200	52	Push Off Lever Rod	2213		Turntable (only)	3224
2	Lift Pivot Bracket	1201	53	Pick Up Pivot Stud	2215	100	Link—Reject	4201
3	Switch Mounting Bracket	1202	54	Lift Rod	2216	101	Reject Spring	4202
4	Switch Lever	1203	55	Tone Arm Shaft	2217	102	Pawl Spring	4203
5	Push Button Bracket	1204	56	Tone Arm Shaft Hub	2218	103	10"-12" Position Spring	4204
6	Center Post Cap	1205	57	Tone Arm Shoulder Bushing	2219	104	Push Off Link	4205
8	Position Stop	1207	58	Tone Arm Link Stud	2220	105	10"-12" Link	4206
9	Push Off Lever	1208	59	Gear Stud Bearing—Upper	2221	106	Record Clamp Spring	4207
10	Push Off Arm	1209	60	Gear Roller—Upper	2222	107	Tone Arm Mounting Spring	4208
11	12"-10" Lever	1210	61	Gear Shaft	2223	108	Tone Arm Height Spring	4209
12	Push Off Channel	1211	62	Pinion Gear	2224	109	Clutch Spring	4210
13	Tone Arm Adjusting Plate	1212	63	Shoulder Rivet—Large	2226	110	Slide Spring	4211
14	Tone Arm Mounting Bracket	1213	64	Roller	2227		Mounting Spring	4213
15	Tone Arm Lever	1214	65	Spacer	2228	113	Lead-in Spring	4214
16	Tone Arm Link	1215	66	Turntable Hub	2229	114	Tone Arm Adjusting Screw	
17	Lift Lever	1216	67	Oilite Bearing—C. S.	2230		Spring	4215
18	100-tooth Gear	1217	68	Push Off Stud	2231	115	Channel Spring	4216
19	Cam Plate	1218	69	Gear Stud Bearing—Lower	2232	116	Spring Washer	4217
20	Clutch Arm	1219	70	Gear Roller—Lower	2233	117	Lead Clip Spring	4218
21	Main Slide	1220	71	Turntable Shaft	2235	118	1/4" Spring Clip	4219
22	Return Slide	1221	72	Stud Lift Roller	2236	119	3/16" Spring Clip	4220
23	Pawl Lever	1222	73	Lift Lever Roller	2237	120	1/8" Spring Clip	4221
24	Trip	1238	74	Wheel Shaft	2239		Center Post Retainer Spring	4222
25	Washer Push-off Arms	1224	75	Wheel Bushing	2240	121	Spring—Push Down	4223
26	Gear Cam	1225		Contact Pins	2241-A	122	Index—Tone Arm Spring	
27	Center Post Support Plate	1226	76	Bushing—Tone Arm				
28	Square Washer Pickup	1227	77	Screw-Height Adj. (Gulmite Head)				
29	A.C. Cover and Insulator	1228	80	Push Button—On	3200			
30	Ball Bearing Retainer	1229	81	Push Button—Off	3201			
31	Bearing Bracket	1230	82	Push Button—Reject	3202			
	Base Skirt Side	1231	83	Slide Switch	3203			
	Base Skirt Corner	1232	84	Motor	3204			
	Base Skirt Bracket	1233	85	A. C. Plug	3205			
32	Reject Arm	1234		Lead Wire Set—A. C.	3206			
33	Index Washer	1235	86	1/8" Ball Bearing	3207			
34	Tone Arm Lever	1236	87	Record Post	3208			
40	Hub Push-Off	2200	88	Tone Arm	3209			
41	Roller Stud	2201	89	Cap Record	3210			
42	Push Button Shaft	2202	90	Clamp	3211			
43	Tone Arm Bearing	2203	91	Cartridge and Clips	3212			
44	Shoulder Rivets	2204		Needle	3213			
45	Center Post	2205	93	Tone Arm Terminal	3214			
46	Shoulder Rivet	2207		Shielded Cable	3215			
47	Center Post Shaft	2208	94	Tone Arm Rest	3216			
48	Oilite Bearing—T. T.	2209	95	Instrument Panel Spacer	3217			
49	Push Off Plate Shaft	2210	96	Turntable Main Bearing	3218			
50	Large Shoulder Rivet	2211	97	Rubber Wheel	3219			
51	Push Off Slide Rod	2212		Rubber Grommets	3220			

**Parts Listed Below are Sub-Assemblies**

125	Base Spotweld Assembly	9201
126	Switch Mounting Assembly	9202
127	Drive Gear Assembly	9203
128	Push Off Lever Assembly	9204
129	Turntable Bearing Assembly	9205
130	Tone Arm Link Assembly	9206
131	Main Slide Assembly	9207
132	Pinion Gear and Cam Assembly	9210
133	Turntable Shaft and Clutch Assembly	9212
134	Center Post Assembly	9213
135	Record Post and Cap Assembly	9214
136	Record Post Assembly	9215
137	Tone Arm Shaft Assembly	9217
138	Tone Arm Assembly Complete	9218
139	Tone Arm Mounting Assembly	9219
140	Tone Arm Shaft Assembly—New	9226