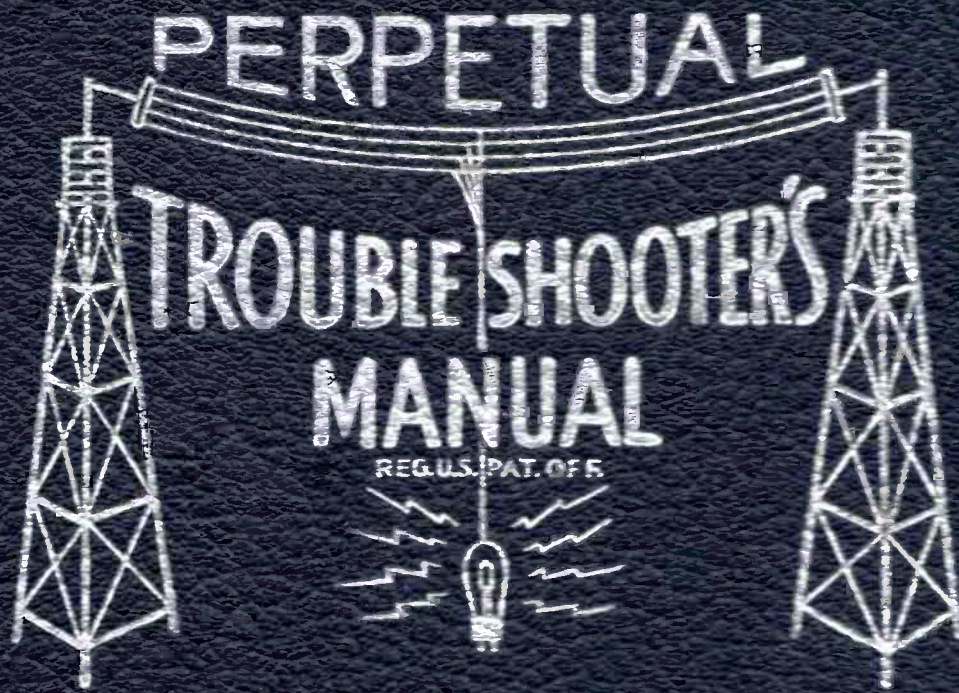
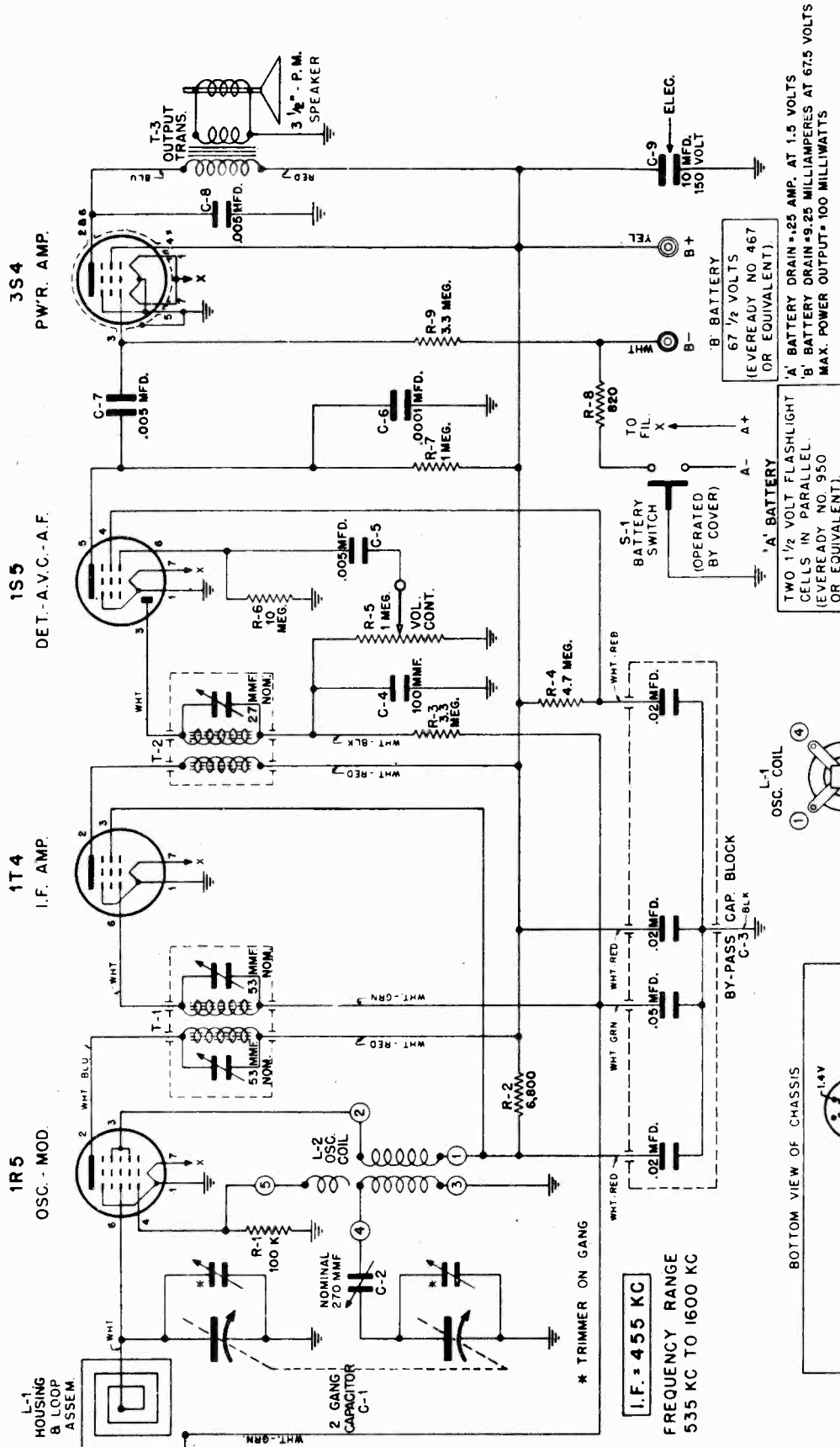


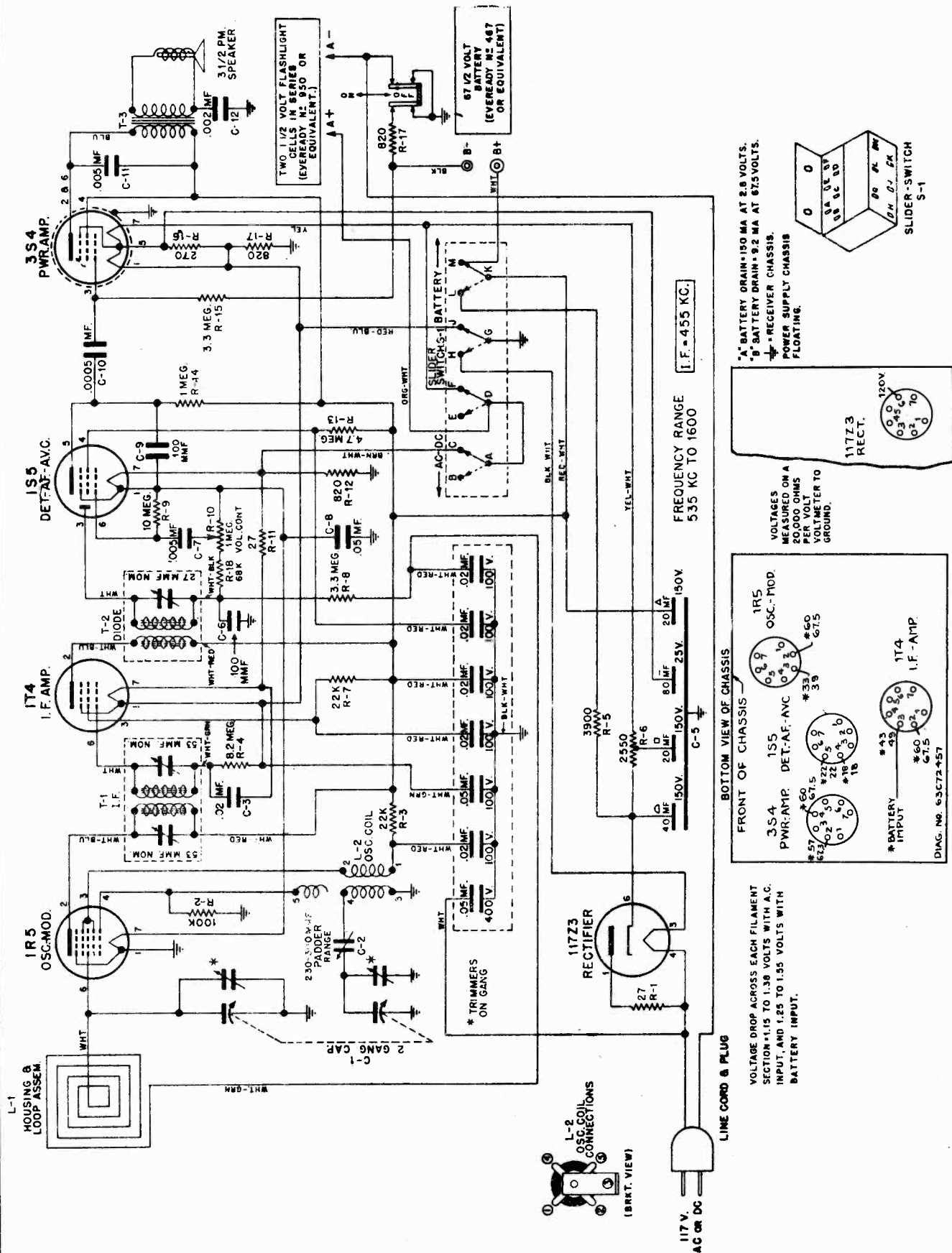
VOLUME XV



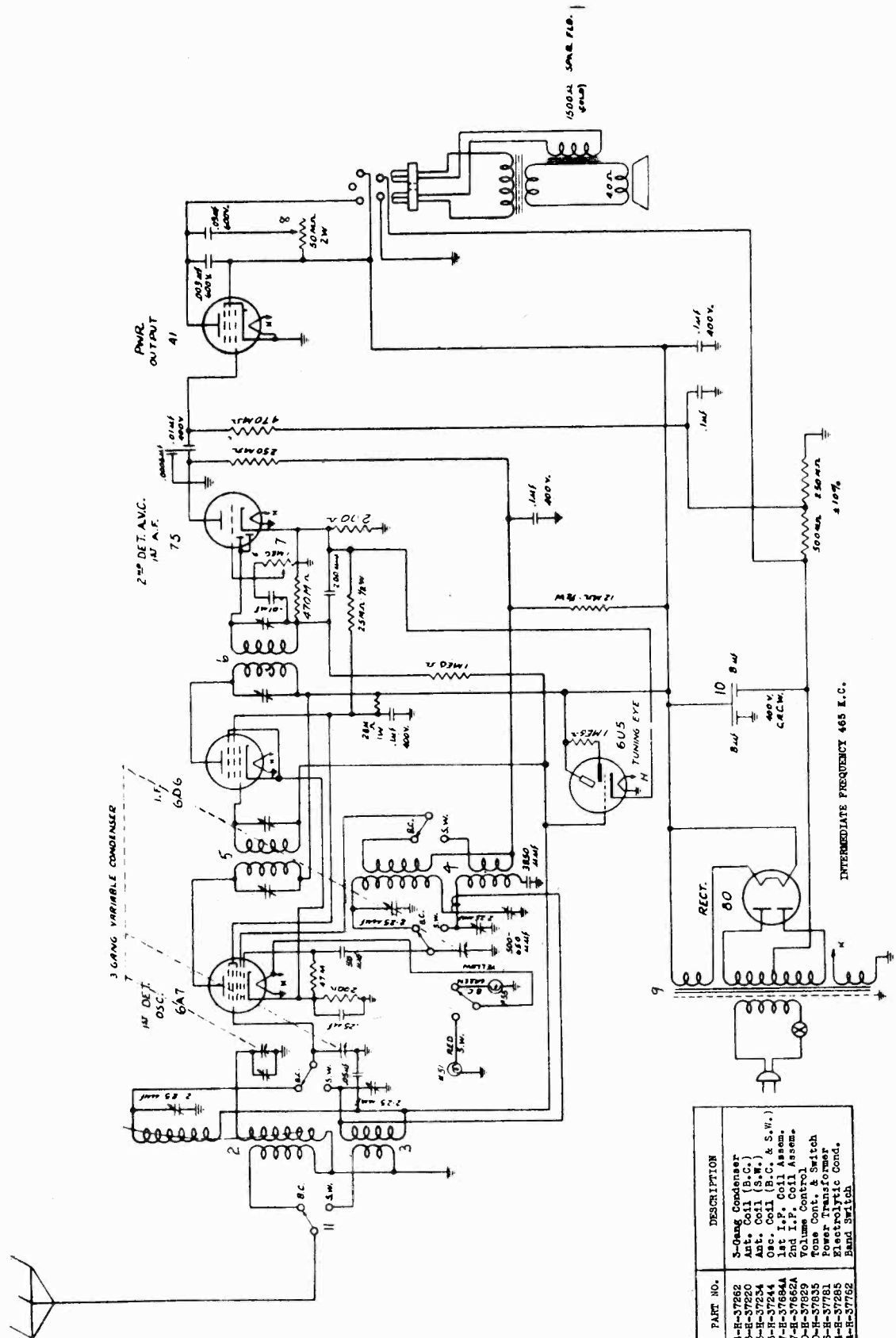
JOHN F. RIDER

GALVIN MFG. CORP.





GALVIN MFG. CORP.

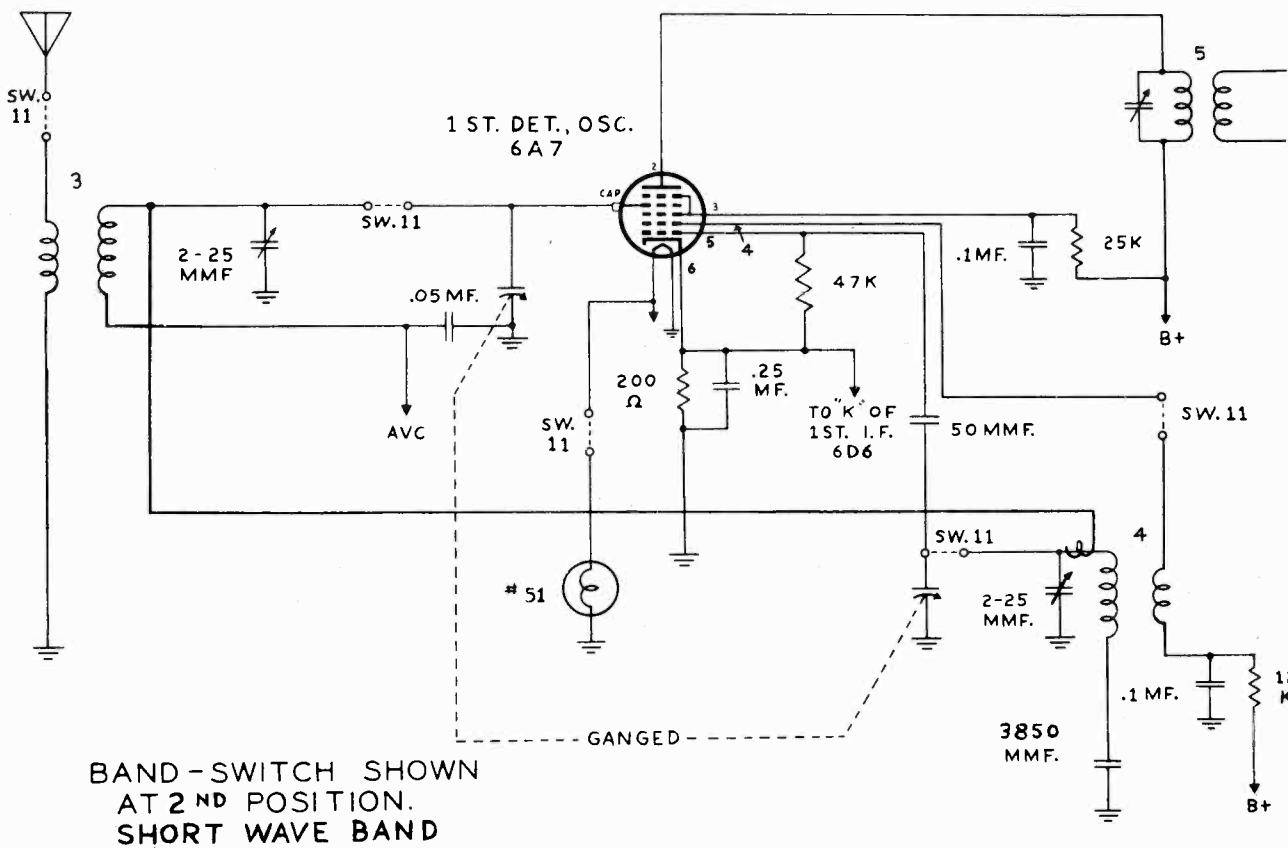
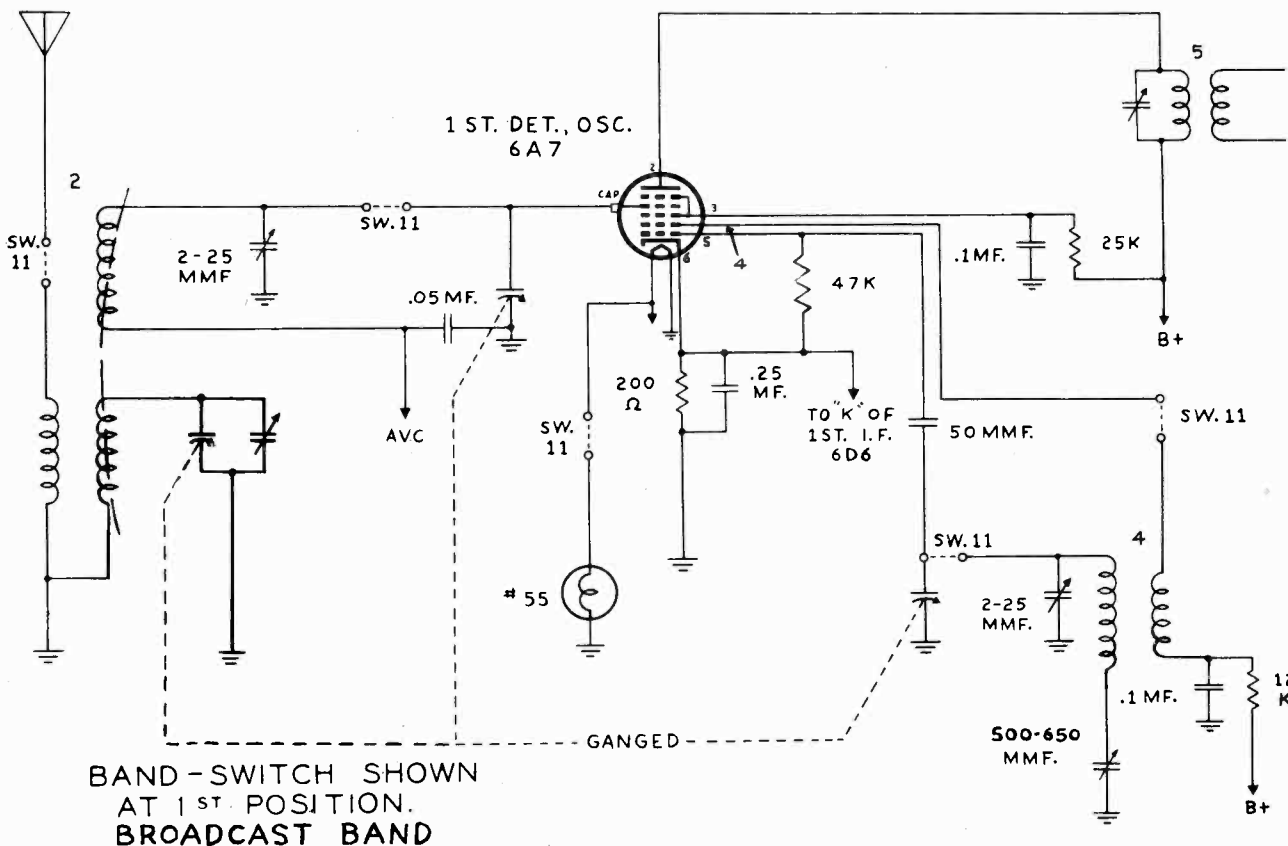


DISC NO.	PART NO.	DESCRIPTION
1	14-R-37262	3-Gang Condenser
2	13-R-37220	Ant. Coil (B.C.)
3	13-R-37234	Ant. Coil (S.W.)
4	13-R-37244	Osc. Coil (S.W.)
5	47-R-37262A	1st I.F. Coil Assm.
6	47-R-37262A	2nd I.F. Coil Assm.
7	60-H-37262A	Volume Control
8	60-H-37262A	Tone Cont. & Switch
9	56-H-37781	Power Transformer
10	14-R-37285	Electrolytic Cond.
11	54-R-37762	Band Switch

"clarified schematics"

MODEL 6A1, Ch. 6-5

GALVIN MFG. CORP.



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MODEL 6A1, Ch. 6-5
 MODELS 52T, 52Y, Ch. B5-1
 MODELS 56T, 56Y, Ch. B5-2

MODEL 6A1 (CHASSIS 6-5)

ALIGNMENT PROCEDURE

CHASSIS 5-1, 5-2, 5-3, 6-1 and 6-5

Connect signal generator to control grid of first detector tube (6A7) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground leads using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. padder, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. Use short wire for pick-up if necessary.)

Turn band switch to "Foreign Programs" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 18.0 MC. Adjust SW OSC. trimmer until 18.0 MC signal is heard.

Set signal generator at 16.0 MC and turn condenser gang to the signal at 16.0 M.C. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

SW padder is fixed (no adjustment necessary.)

NOTE: I.F. Sensitivity at 465 K.C. is 50 microvolts for 50 milliwatts output

Ant. Sensitivity at 600 K.C. is 30 microvolts for 50 milliwatts output (Chassis 5-1)

Ant. Sensitivity at 600 K.C. is 25 microvolts for 50 milliwatts output (Chassis 5-2 and 6-1)

MODELS 52T, 52Y (CHASSIS B5-1)

ALIGNMENT PROCEDURE (CHASSIS B5-1)

1. Connect signal generator to control grid of first detector tube (1C7G) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn condenser gang completely out of mesh.
2. Set signal generator to 465 KC and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.
3. Connect signal generator to antenna and ground leads using a .0002 MF condenser in antenna lead.
4. Set signal generator and receiver dial both at 1700 KC. Adjust osc. trimmer (on condenser gang) until 1700 KC signal is heard.
5. Set signal generator at 1400 KC and turn condenser gang to the signal at 1400 KC. Adjust antenna trimmer (under side of chassis) to point showing highest reading on output meter.

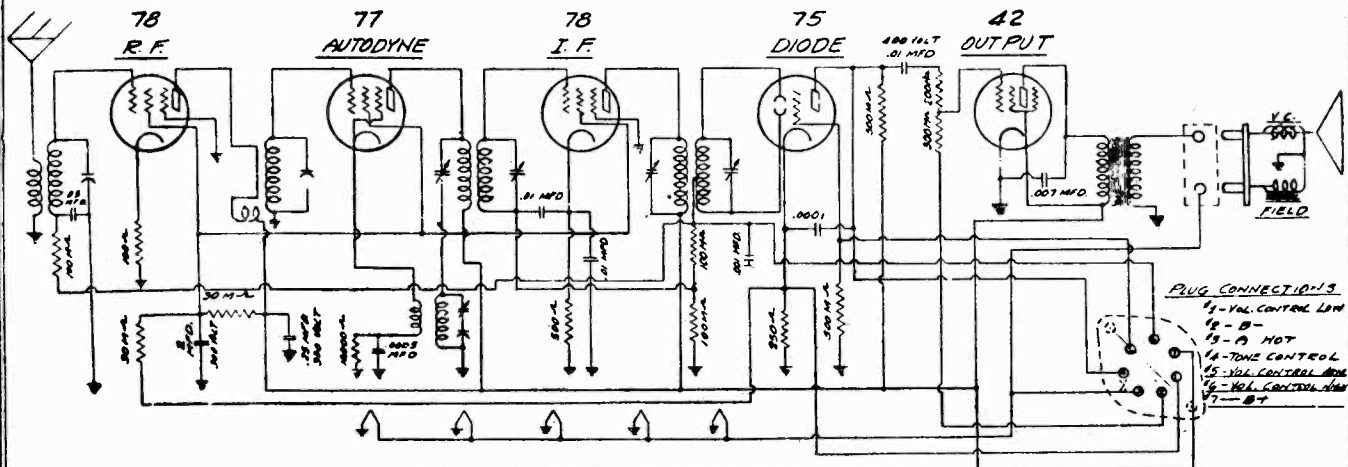
MODELS 56T, 56Y (CHASSIS B5-2)

NOTES ON SHORT WAVE ALIGNMENT

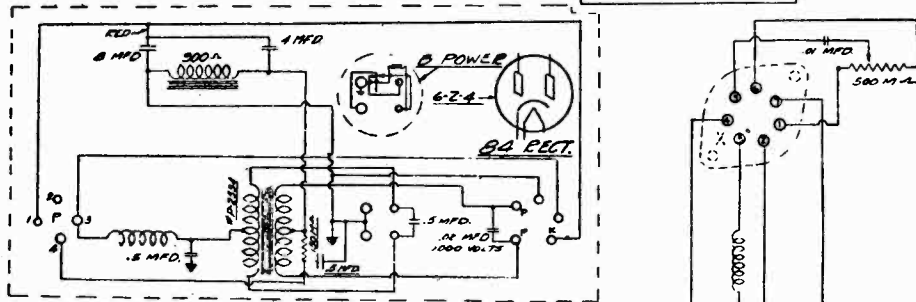
When aligning short-wave bands of Chassis B5-2, check to make sure you are aligning on a fundamental frequency and not on an image. This can be checked as follows: After aligning, turn signal generator to maximum output and swing it to a point 930 KC (double the IF) above the alignment frequency, leaving the condenser gang set at the alignment frequency. If the alignment was correct, you will pick up an image signal at that point. If no image signal is heard, swing generator back to alignment frequency, decrease the capacity of the trimmers until another signal is heard, and repeat the alignment procedure. For example, after aligning a short-wave band at 5.8 MC, an image should be heard when the generator is swung to 6.73 MC. Likewise, after alignment at 18.7 MC, an image should be heard with the signal generator at 19.63 MC. Remember that while making this test, the condenser gang should not be moved with the signal generator, but should remain at the alignment frequency.

MODEL D6
MODEL 6X, Ch. 6-3, 6-6

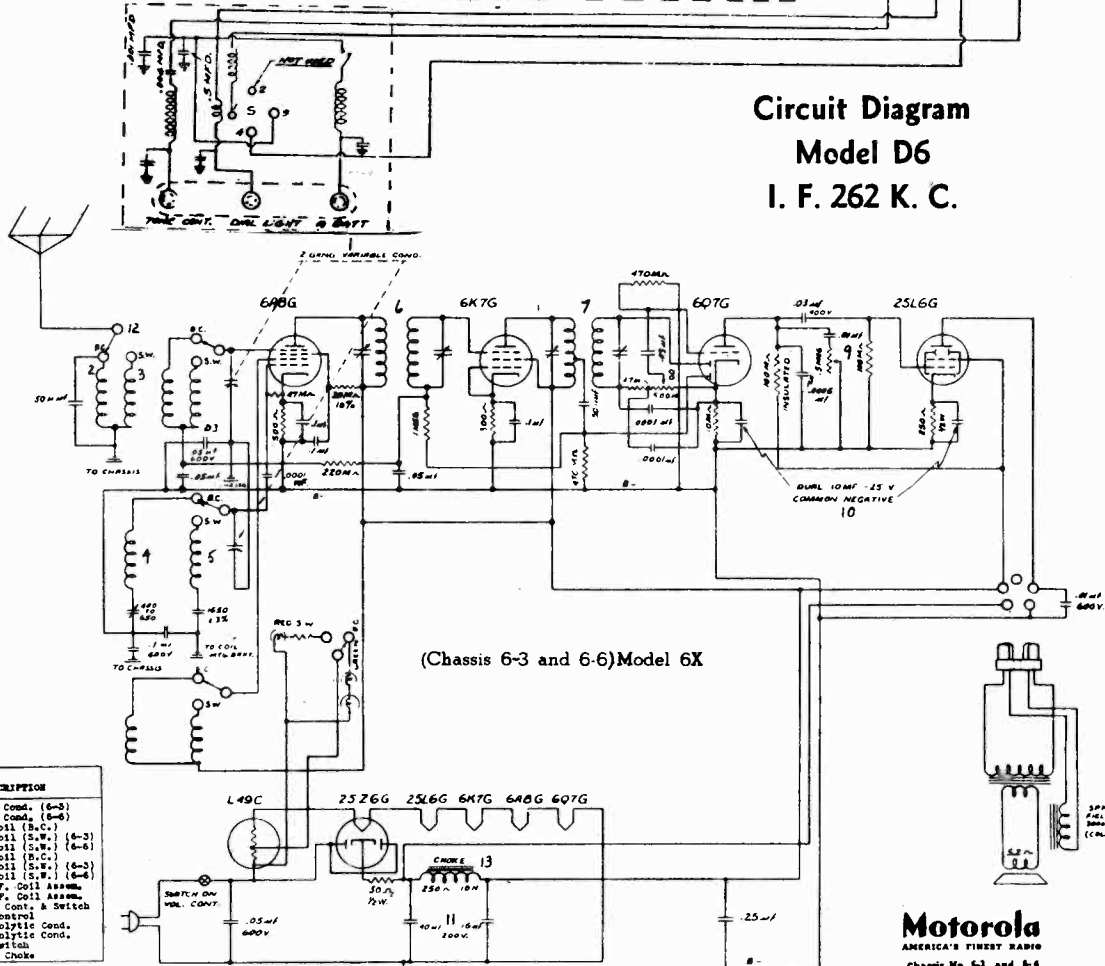
GALVIN MFG. CORP.



PLUG CONNECTIONS:
1 - B - INT
2 -
3 - A - INT
4 - C -



Circuit Diagram
Model D6
I. F. 262 K. C.

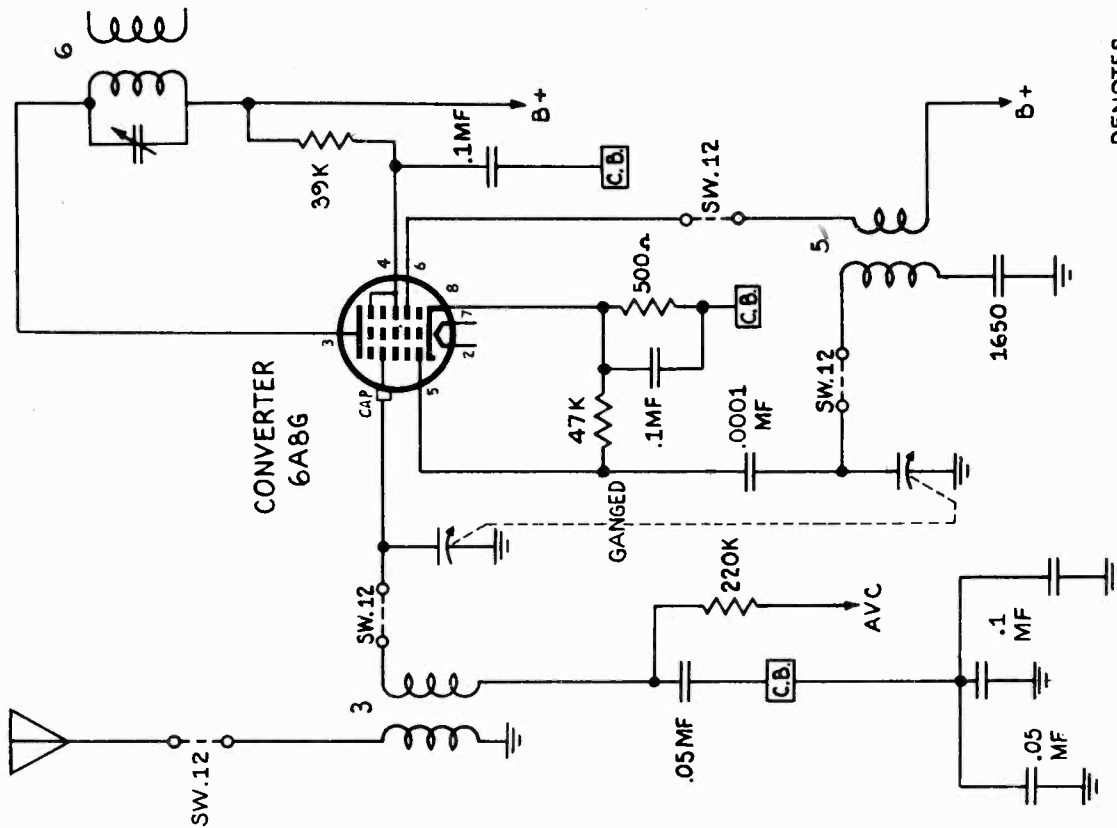


ITEM NO.	PART NO.	DESCRIPTION
1	14-B-37289	2 Ohm Cond. (6-3)
2	14-B-37287	2 Ohm Cond. (6-6)
3	13-B-37251	Ant. Coil (S.W.) (6-3)
4	13-B-37254	Ant. Coil (S.W.) (6-6)
5	13-B-37253	Ant. Coil (S.W.) (6-3)
6	13-B-37256	Ant. Coil (S.W.) (6-6)
7	13-B-37258	Osc. Coil (S.W.) (6-3)
8	13-B-37258	Osc. Coil (S.W.) (6-6)
9	67-B-37687 A	1st I.F. Coil Assm.
10	60-B-37688 A	2nd I.F. Coil Assm.
11	60-B-37683	Volume Cont. & Switch
12	60-B-37684	Tone Control
13	14-B-37284	Electrolytic Cond.
14	14-B-37286	Electrolytic Cond.
15	64-B-37752	Band Switch
16	12-B-37218	Filter Choke

Motorola
AMERICA'S FINEST RADIO
Chassis No. 6-3 and 6-6
(AC-DC)

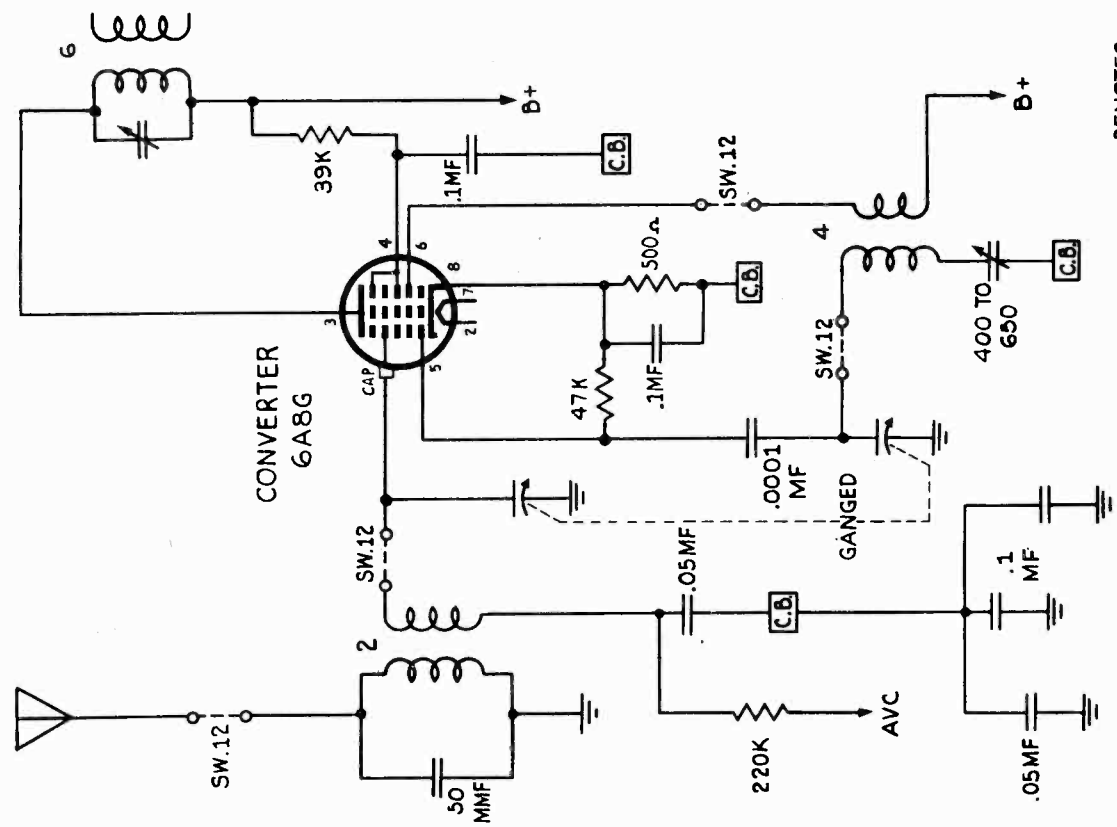
INTERMEDIATE FREQUENCY 465 K.C.

GALVIN MFG. CORP.



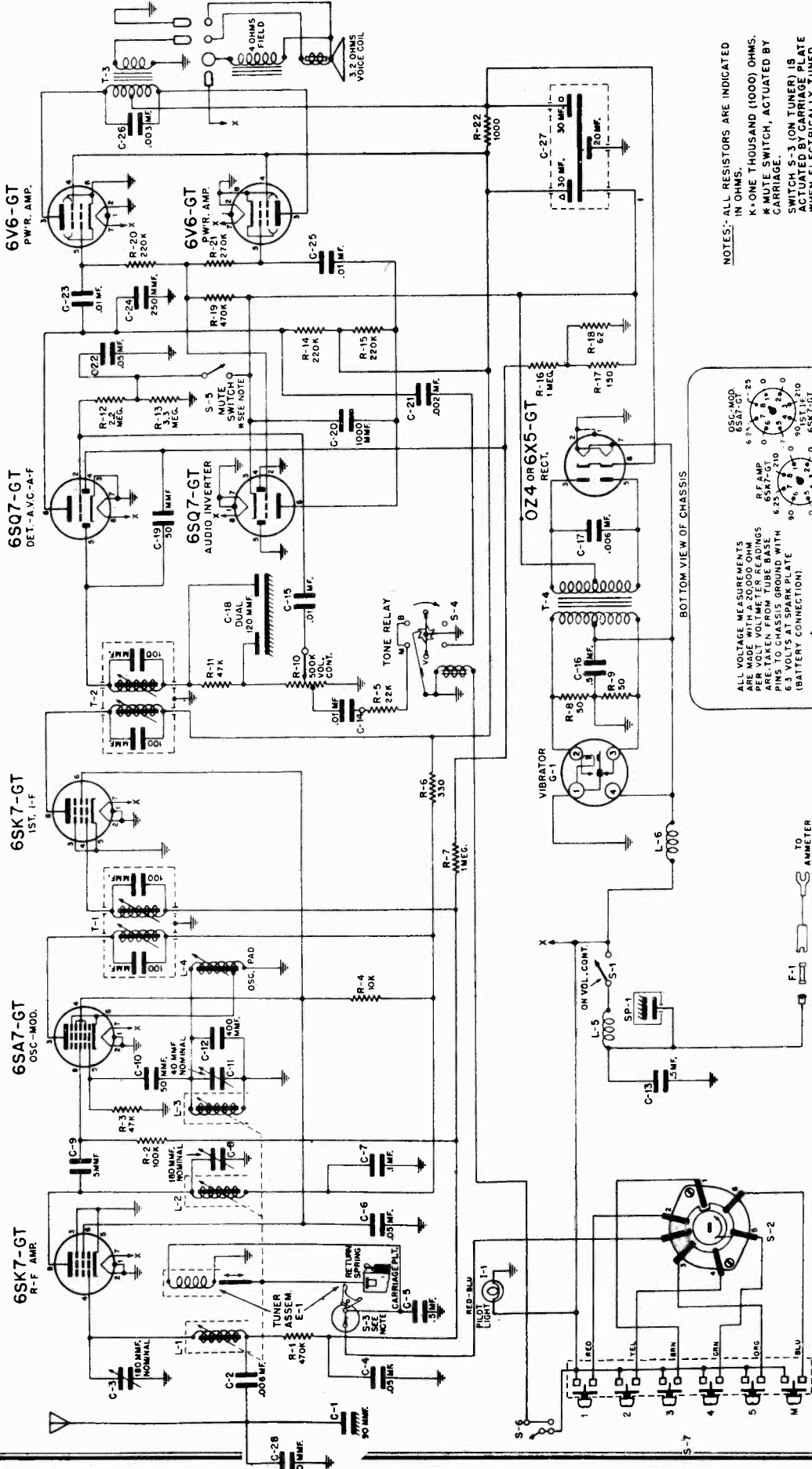
DENOTES COMMON
 [C.B.] BUS B-
 DENOTES CHASSIS
 (GROUND)

BAND - SWITCH SHOWN
 AT 2ND POSITION.
 SHORT WAVE BAND

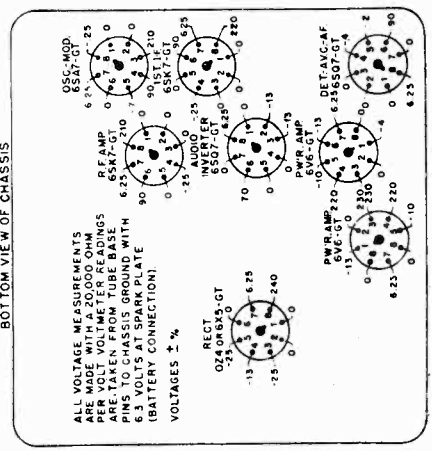


DENOTES COMMON
 [C.B.] BUS B-
 DENOTES CHASSIS
 (GROUND)

BAND - SWITCH SHOWN
 AT 1ST POSITION.
 BROADCAST BAND



NOTES: ALL RESISTORS ARE INDICATED IN OHMS.
 K=ONE THOUSAND (1000) OHMS.
 M=MUTE SWITCH, ACTUATED BY CARRIAGE.
 S=3 (ON TUNER) IS ACTUATED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.



BOTTOM VIEW OF CHASSIS

ALL VOLTAGE MEASUREMENTS PER VOLT. VOLTAGE READINGS ARE TAKEN FROM TUBE BASE PINS TO CHASSIS GROUND WITH 6.3 VOLTS AT SPARK PLATE (BATTERY CONNECTION). VOLTAGES ± %.

MODEL BKG

I.F. • 455 KC
 FREQUENCY RANGE
 535 KC TO 1600 KC

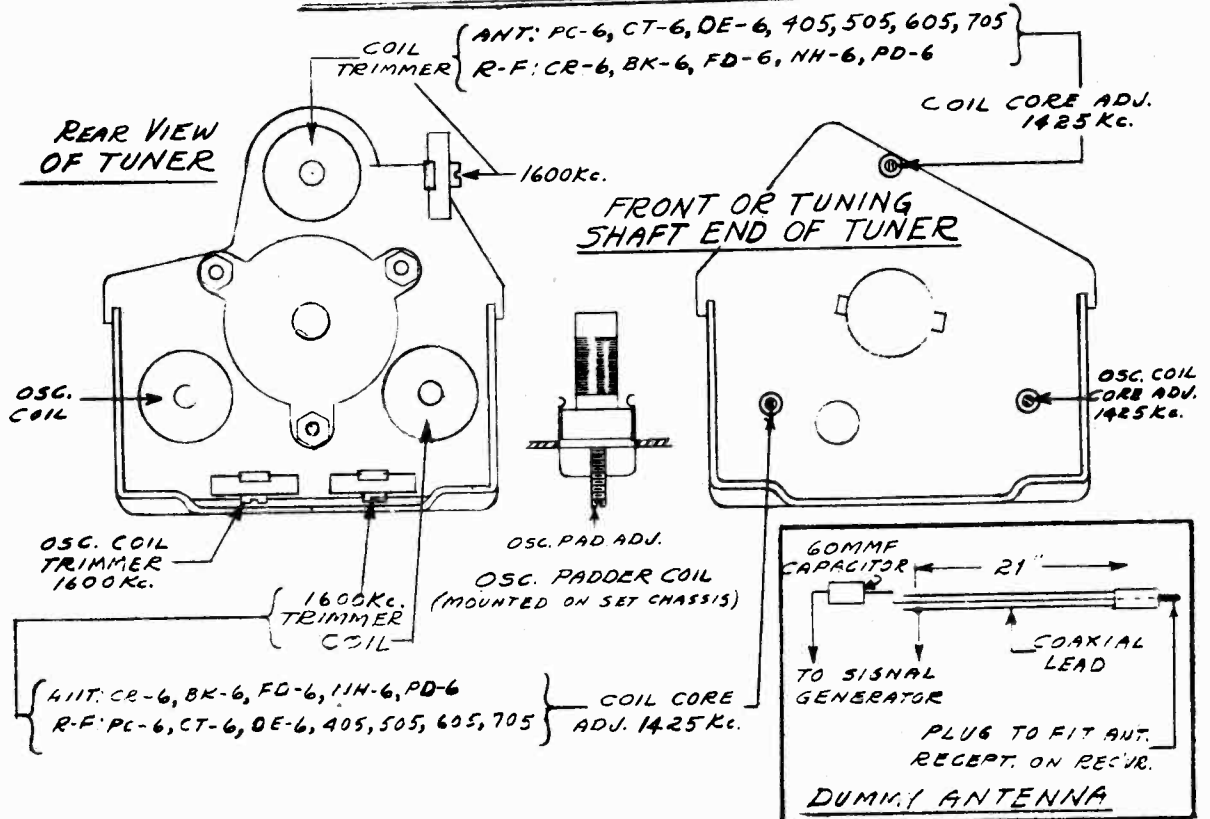
S-4 TONE CONTROL RELAY
 S-2 VOLUME CONTROL KNOB

GALVIN MFG. CORP.

MODEL BK-6
 MODEL CR-6
 MODELS CT-6, OE-6, PC-6
 MODELS FD-6, NH-6
 MODEL 405
 MODEL 505
 MODEL 605
 MODEL 705

Motorola

ALIGNMENT INSTRUCTIONS FOR 1946 AUTO SETS

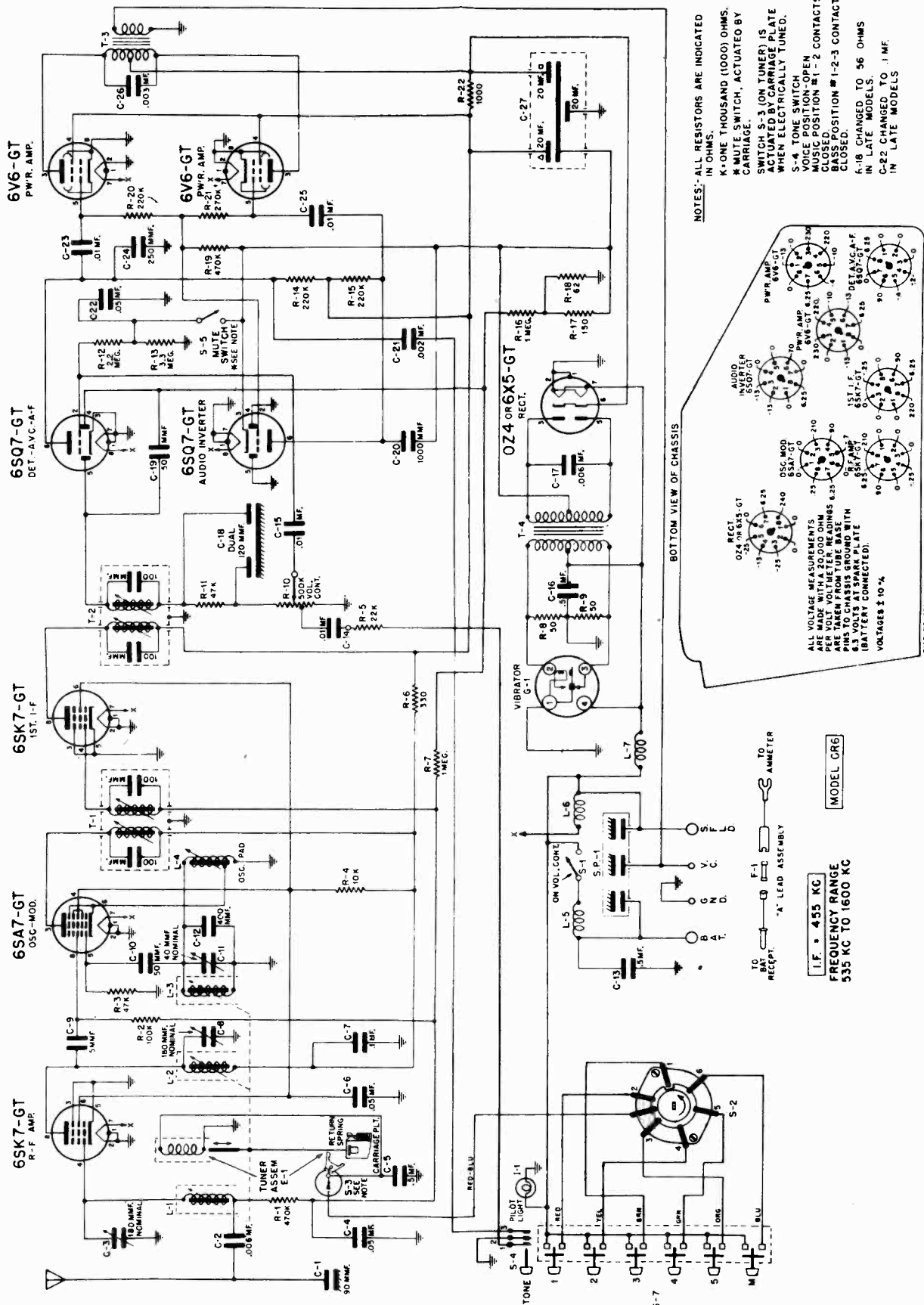


A special tool for adjusting the tuner cores will be required. Use Alignment Tool, Motorola Part Number 66A76278. Keep volume control at maximum throughout alignment. For maximum accuracy, use an output meter connected across the voice coil.

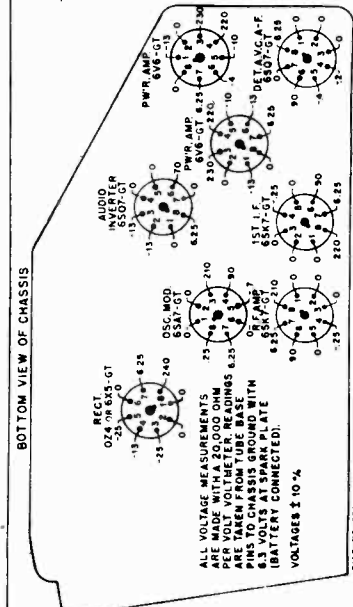
Operations in Order	Tuner Set At	Dummy Antenna	Generator connected to (through dummy)	Adjust following cores or trimmers	Generator Set At
1.	High frequency end.	.1 mf	Osc-Mod grid	Peak: 4 I.F. core screws	455 Kc.
2.	High frequency end (cores are to be projecting 1-1/8" from ends of cans and tuning shaft up against its stop).	60 mmf & 21" coaxial lead. Capacitor to be at generator end. (See Detail)	Antenna Receptacle	Peak: Osc. trimmer R.F. trimmer ANT. trimmer	1600 Kc.
3.	EXACTLY one full turn in from high frequency end, as indicated by marking manual tuning shaft insulated coupling).	"	"	Peak: Osc. core R.F. core ANT. core	1425 Kc.
4.	EXACTLY four more full turns in (as indicated by marking manual tuning shaft insulated coupling)	"	"	Peak: Osc-padder core (mounted on chassis) for maximum noise.	Generator power turned off, but leave generator and dummy antenna connected to antenna receptacle.
5.	1400 Kc.	Install set in car & connect car antenna.	---	Peak: Antenna trimmer for maximum noise.	---

NOTE: If padder core adjustment is too far off, repeat entire procedure (except I.F.). It may be necessary to repeat it more than once if the padder adjustment has been indiscriminately tampered with.

GALVIN MFG. CORP.



NOTES:- ALL RESISTORS ARE INDICATED IN OHMS.
 K= ONE THOUSAND (1000) OHMS.
 M= MUTE SWITCH, ACTUATED BY CARRIAGE.
 SWITCH S-3 (ON TUNER) IS ACTUATED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.
 S-4 TONE SWITCH VOICE POSITION - OPEN CLOSED. BASS POSITION #1 - 2 CONTACTS CLOSED. BASS POSITION #1-2-3 CONTACTS CLOSED.
 A-18 CHANGED TO 56 OHMS IN LATE MODELS.
 C-22 CHANGED TO .1 MF. IN LATE MODELS



ALL VOLTAGE MEASUREMENTS ARE MADE WITH A 20,000 OHM PER DIV. METER. VOLTAGES ARE TAKEN FROM TUNING MEASUREMENT PINS TO CHASSIS GROUND WITH 6.3 VOLTS AT SPARK PLATE (BAT TERRY CONNECTED). VOLTAGES ± 10 %

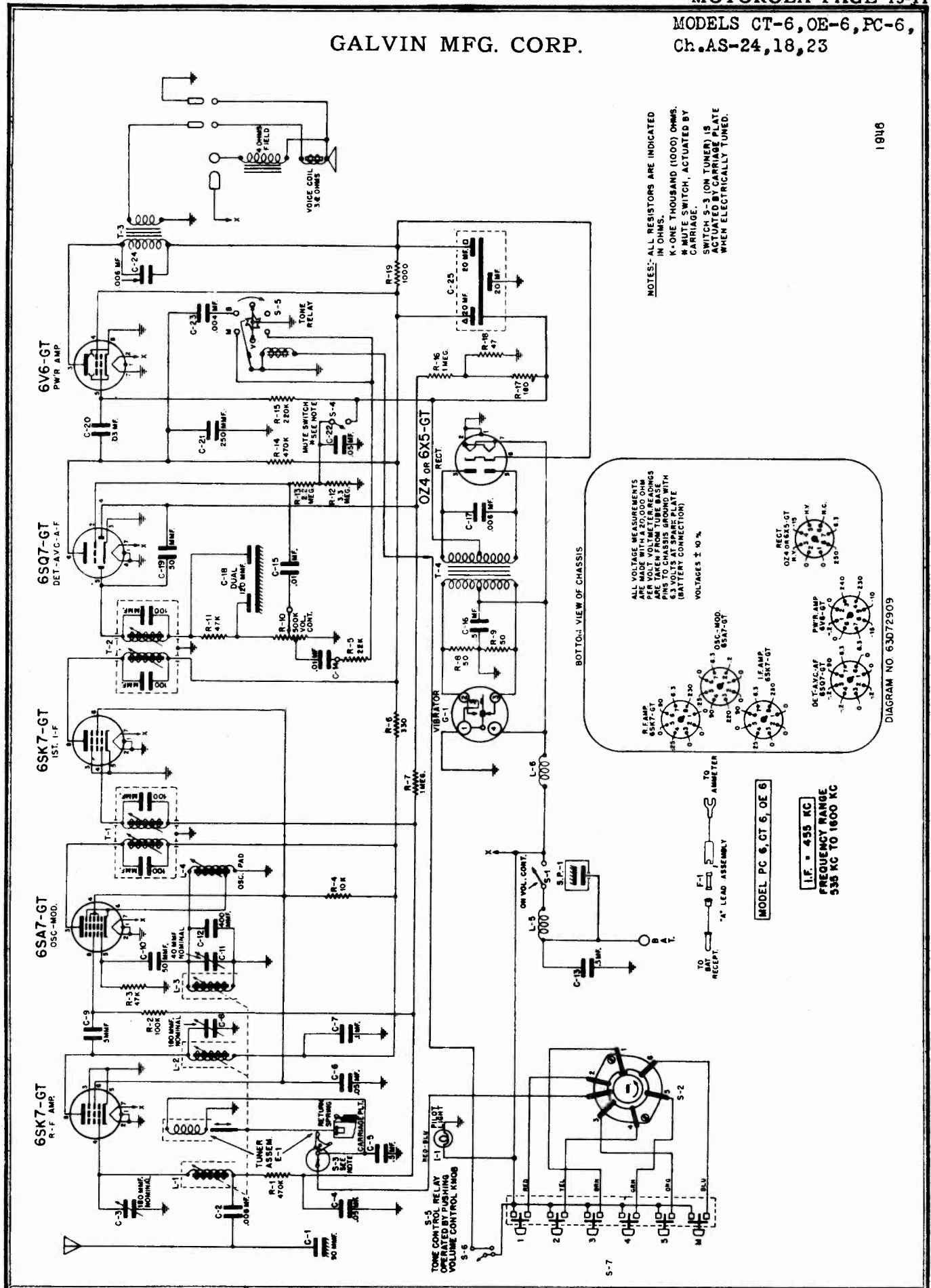
TO BATTERY RECEPT. TO LEAD ASSEMBLY TO AMMETER

MODEL CR6

F.F. = 455 KC
 FREQUENCY RANGE
 535 KC TO 1600 KC

GALVIN MFG. CORP.

MODELS CT-6, OE-6, PC-6,
Ch. AS-24, 18, 23



NOTES: ALL RESISTORS ARE INDICATED IN OHMS.
K-ONE THOUSAND (1000) OHMS.
* MUTE SWITCH, ACTUATED BY SWITCH S-3 (ON TUNER) IS ELECTRICALLY TUNED WHEN ELECTRICALLY TUNED.

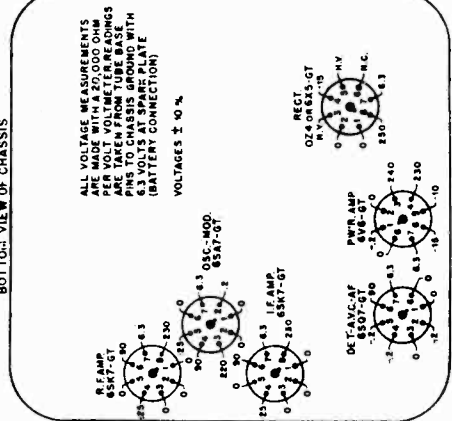
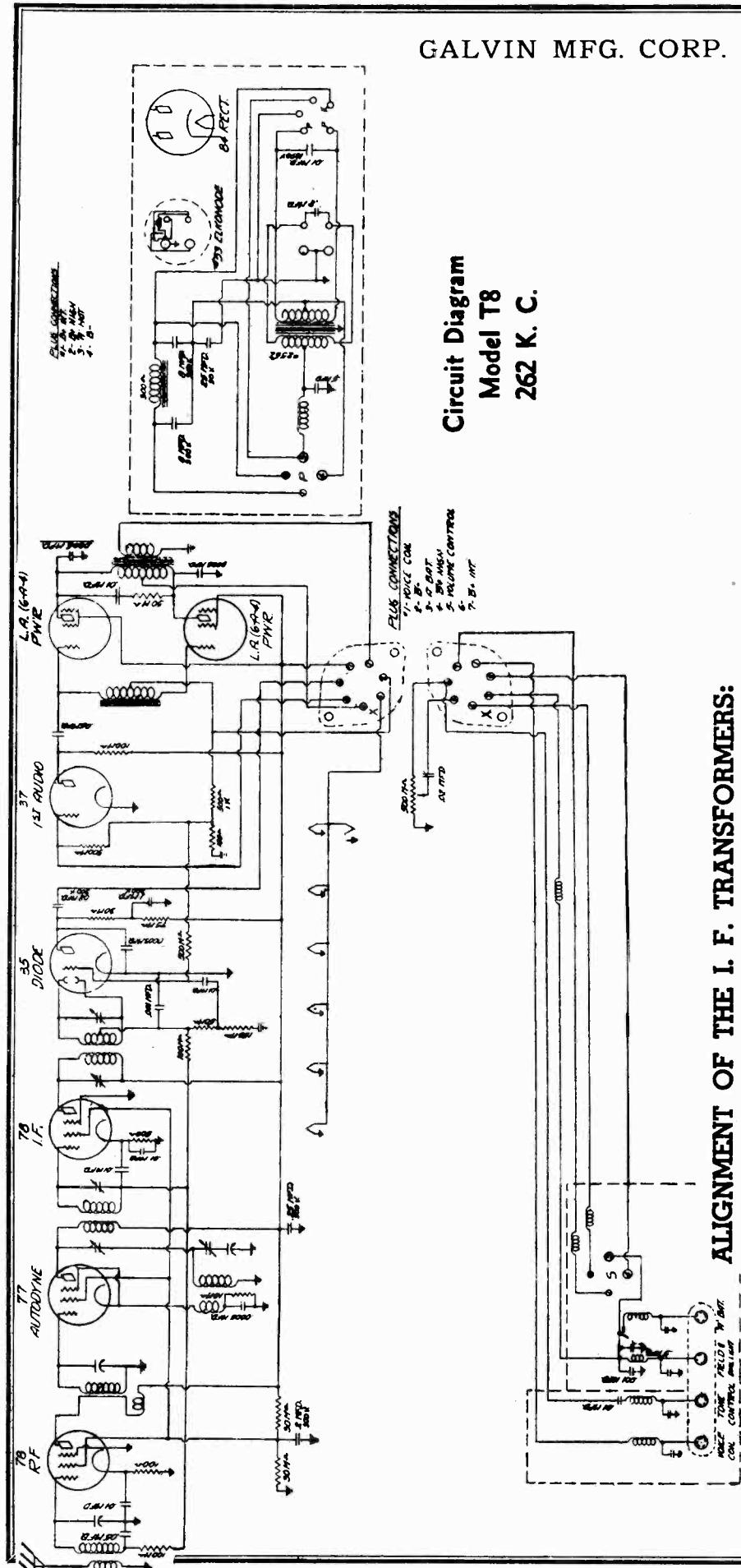


DIAGRAM NO. 63072909

MODEL T 8
MODEL D 6

GALVIN MFG. CORP.



Circuit Diagram
Model T8
262 K. C.

ALIGNMENT OF THE I. F. TRANSFORMERS:

Models No. T8, No. D6, No. 75 and No. 100—Connect the feeder from the oscillator to the grid of the No. 77 autodyne tube. Remove the grid connection and connect a 500 M resistor from grid of the tube to ground.

Rotate the variable condensers to full open position.

Set the oscillator to a frequency of 262 K. C. adjust the I. F. and diode feeder trimmers to obtain maximum reading on the output meter.

ALIGNMENT OF VARIABLE CONDENSERS:

All Models—connect the feeder from a service oscillator to the antenna lead of the set and adjust the oscillator trimmer to 1540 K. C. Next, completely open the condenser, going to minimum capacity, and adjust the oscillator trimmer on the condenser gang for greatest reading on the output meter.

Now set the service oscillator to 1400 K. C. and rotate the variable condenser for a peak reading on the output meter of the signal from the oscillator. Then adjust the R. F. and antenna trimmers on the condenser gang for maximum reading of the output meter.

Next set the service oscillator to 600 K. C. Close the condenser gang until the signal is again tuned in and rotate the condensers back and forth while adjusting the oscillator padder condenser for highest reading on the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

GALVIN MFG. CORP.

MODEL 9-39
 MODELS 65BP1A, 65BP2A,
 65BP3A, 65BP4A

Model 9-39

VOLTAGE CHART

POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
RF *	185	85	-	-
Osc.-Mod.*	185	85	-	100
IF *	185	85	-	-
Det.-Avc.	150	-	-2	-
Output **	235	200	-	-
Rect.	AC	-	250	-

* Bias -3 V from B stick

** Bias -17 V from B stick

Current - 6.5 Amps. at 6.3 Volts

Maximum power output - 3.5 Watts

All readings from chassis ground with 1000 ohms per volt meter.

ALIGNMENT CHART MODELS 65BP1A, 2A, 3A and 4A

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1600 K.C.	200 Mmf.	External Ant.	5	1600 K.C.
3	1400 K.C.	200 Mmf.	External Ant.	6	1400 K.C.
4	1400 K.C.	200 Mmf.	External Ant.	7	1400 K.C.
5	600 K.C.	200 Mmf.	External Ant.	8	600 K.C.

Volume Control Set at Maximum

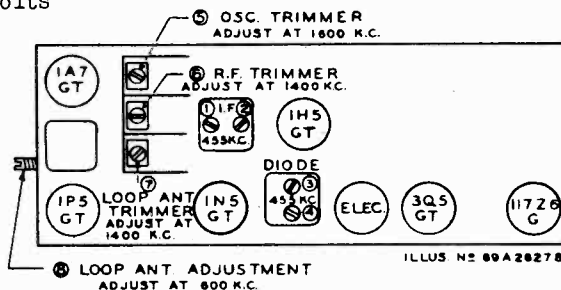
SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 65BP1A, 2A, 3A, and 4A

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
7100	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
185	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
200	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
11	600	R.F. Grid	.1 Mfd.	.5 Meg	.38
2	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum

* .05 Watts = .38 Volts

** Output meter connected across voice coil.



GALVIN MFG. CORP.

ALIGNMENT PROCEDURE

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the oscillator coil can that is covered with Scotch Tape. The original adjustment, made in the factory, should not be tampered with. (Fig. 7 below, shows all trimmer locations.)

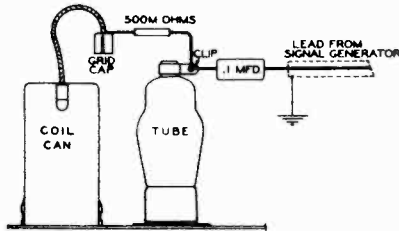
I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A7) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. (See Fig. 6.) Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.

2. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter.

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.



SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (7B) using the same .1 MF condenser and the same 500,000 ohm leak resistance.

2. Set the signal generator at 1560 K.C. and with the condenser gang completely out of mesh adjust the trimmer on the oscillator section of the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. trimmer in the Oscillator coil can for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

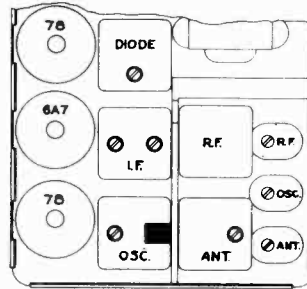
R.F. AND ANTENNA ALIGNMENT

1. Connect the signal generator to the antenna lead through a 40 MF condenser and to chassis ground. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna coil can for the maximum output reading.

2. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna section of the condenser gang for maximum output reading.

3. Adjust the trimmer on the R.F. section of the condenser gang for maximum output reading.

4. Recheck steps 1, 2, and 3, for accuracy.



TRIMMERS

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the top grid terminal of the tube through a .1 MF condenser, with a 500M Ohm resistor connected as a leak resistance between the grid of the tube and the grid cap which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
.25 Volts	400 Cycles	7B Grid	.1 MF	.5 Meg	2.2 Volts
25,000	262 K.C.	7B Grid (I.F.)	.1 MF	.5 Meg	2.2 Volts
700	262 K.C.	6A7 Grid	.1 MF	.5 Meg	2.2 Volts
800	600 K.C.	6A7 Grid	.1 MF	.5 Meg	2.2 Volts
45	600 K.C.	7B Grid (R.F.)	.1 MF	.5 Meg	2.2 Volts
3	600 K.C.	Ant. Lead	40 MF	None	2.2 Volts

* For one watt output.

V.C. Resistance - 5 ohms at 400 cycles.

** Meter connected across voice coil.

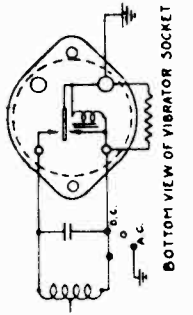
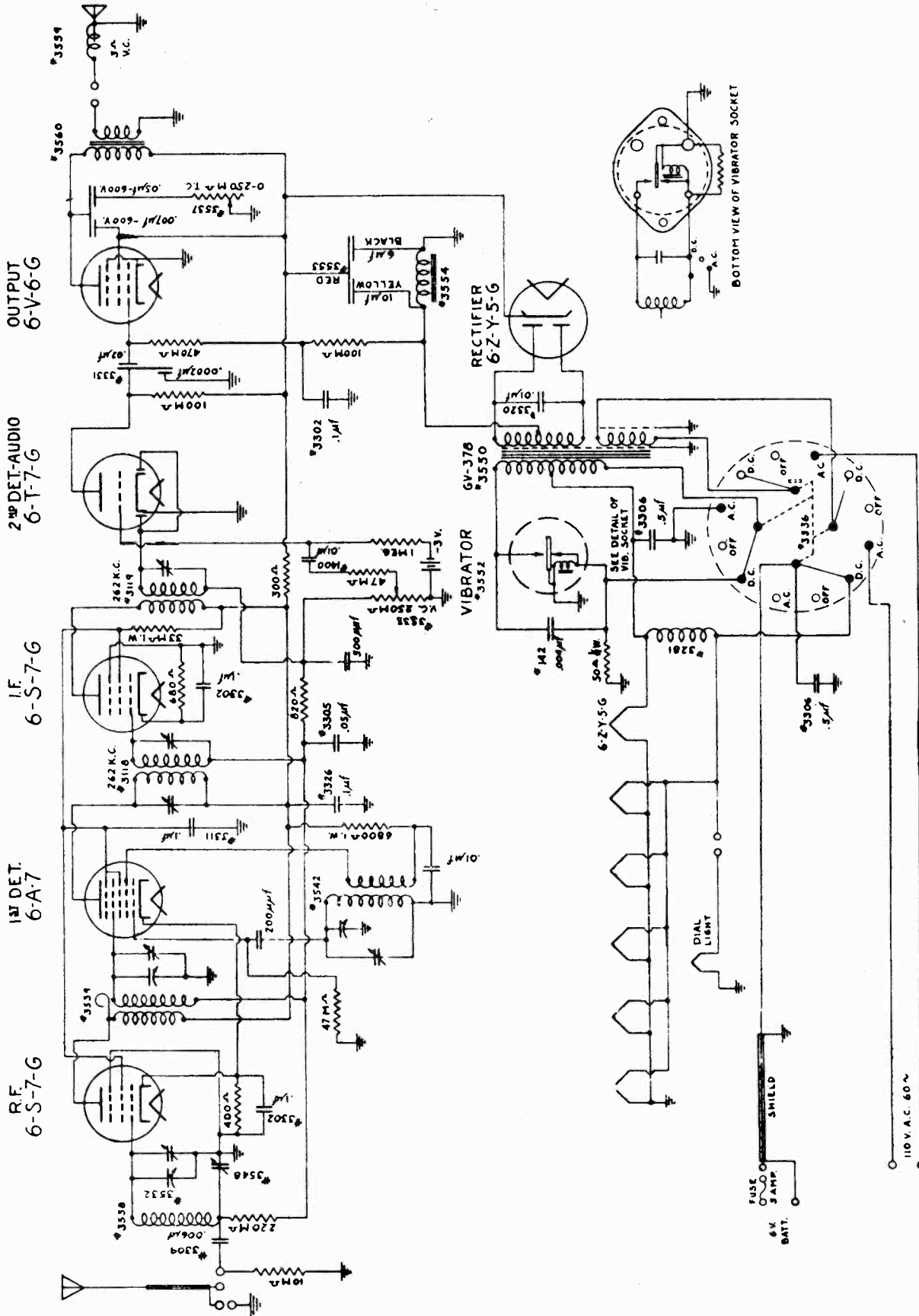
2.2 Volts equals 1 watt output.

GALVIN MFG. CORP.

Diag. No.	Part No.	Description	List Price
		MAJOR PARTS	
34	48A3333	Vibrator.	
33	18A4046	Vol. Cont. & Switch (.5 Meg.)	\$2.50
2	1X4051	R.F. Coil & Shield Assembly	1.00
	1X4070	Spark Plate Assembly	1.50
9	1X4080	"A" Choke Assembly	.60
12	19B4110	Variable Condenser (3 Gang)	.30
8	24A4290	Vibrator Choke	3.65
	23A4835	Dial Light Choke (8T-3/8 I.D.)	.35
11	23A5186	Electrolytic Condenser	1.10
	9B6650	Tube Socket (Saddle Type 41)	.15
	9B6651	Tube Socket (Saddle Type 75)	.15
	9B6652	Tube Socket (Saddle Type 78)	.15
	9B6653	Tube Socket (Saddle Type 84)	.15
	9B6654	Tube Socket (Saddle Type 6A7)	.15
	9B6657	Vibrator Socket (Saddle Type)	.15
	15K12552	Rear Housing (Finished)	1.90
	1X12553	Front Housing & Speaker Assembly	7.25
10	15C12554	Speaker (5" Dynamic)	2.50
	50E12560	Speaker Replacement	3.00
7	25A12569	Output Transformer	1.00
6	25B12570	Power Transformer	1.00
5	1X12602	Diode Coil & Shield Assembly	3.00
4	1X12603	I.F. Coil & Shield Assembly	1.50
3	1X12604	Osc. Coil & Shield Assembly	1.75
1	1X12605	Antenna Coil & Shield Assembly	2.00
		ACCESSORIES	
	9A2370	Dial Light Socket & Shell	.10
	14X2423	Fuse Insulator	.20
	6X4141	Distributor Suppressor	DOZ.
	65X4151	Bulb (6-8 V.-1 1/2 W. Rnd. Bay. Base)	.30
	1X4164	Battery Lead Assembly	.15
	65X4165	Fuse (15 Amp.)	.05
21	1X4170	Antenna Lead Assembly	.75
	1X4171	Flexible Shaft & Housing Assem.	2.00
	1X4181	Dial Light Assembly	.35
	8A4491	Generator Condenser	.40
	1X12561	Receiver Accessories Assembly (Complete)	3.90
	1X12562	Mtg. & Filter Parts Assembly (Complete)	1.00
	9A13070	Antenna Junction Box (Female)	1.10
		CONDENSERS	
16	8A1400	Tubular Condenser (.01-100 V.)	.15
15	8A3305	Tubular Condenser (.05-100 V.)	.15
13	8A3310	Tubular Condenser (1-200 V.)	.15
17	8A3329	Tubular Condenser (.01-.0005-400 V.)	.20
20	8A4020	Tub. Cond. & Strap (.5-100 V.)	.35
18	8A4089	Tubular Condenser (.25-100 V.)	.20
	8A4092	Tub. Cond. & Strap (1-400 V.)	.25
14	8A4529	Tubular Condenser (006-100 V.)	.15
	21B6500	Molded Mica Cond. (500 MUF-20%)	.15
	21B6501	Molded Mica Cond. (200 MUF-20%)	.15
19	9A12565	Tub. Cond. & Strap (.006-1600 V.)	.35
		RESISTORS	
	6B6000	Carbon Resistor (320,000-1/3-20)	DOZ.
	6B6001	Carbon Resistor (67,000-1/2-20)	DOZ.
	6B6002	Carbon Resistor (47,000-1/2-20)	DOZ.
	6B6003	Carbon Resistor (220,000-1/3-20)	DOZ.
31	6B6005	Carbon Resistor (501/2-20)	DOZ.
30	636006	Carbon Resistor (2,200-1-20)	DOZ.
		MISCELLANEOUS	
	14A2371	Ins. Bushing & Contact Eyelet	.15
	41A2372	Backing Coil Spring	DOZ.
	5A13595	Antenna Trimmer Tag	DOZ.
	32K4062	Fibre Spacer Washer	DOZ.
	14X4076	Fuse Backing Washer (Bakelite)	DOZ.
	14X4077	Fuse Ins. Bushing & Cont. Eyelet	DOZ.
	31A4078	Terminal Strip (5 Ins. #4 Mtg.)	.10
	31A4079	Term. Strip (1 Ins. End Mtg.)	.05
	47A4113	Tuning Drive Shaft & Pinion Assembly	.25
	1X4118	Antenna Receptacle Assembly	.10
	37A4163	Rubber Grommet	DOZ.
	37A4187	Condenser Mounting Grommet	DOZ.
	56X4420	Accessories Carton Only	.15
	41A4508	Fuse Backing Coil Spring (Long)	.25
	1X4531	Gang Drive Split Gear Assembly	.30
	41A4532	Split Gear Coil Spring	DOZ.
	39X4817	Shirt Market (Rattle Clip)	DOZ.
	4K4823	Cond. Mtg. Cup Washer (Cop. Pl.)	DOZ.
	10B9405	Copper Rope (259 Str. #36)	PER FT.
	11H9513	Saturated Sleeving (#13 Yel.)	PER FT.
	64K12557	Speaker Screen & Flocking	.60
	32B12558	Speaker Gasket (Cardboard)	.60
	54X12559	Instruction Sheet & Drilling Template	.05
	1X12563	Receiver Carton Assembly	.20
	13K12684	Medallion (Motorola)	.15
	30A13437	Spiral Shield	.05
		PRICES SUBJECT TO CHANGE WITHOUT NOTICE.	

MODEL 10T

GALVIN MFG. CORP.



GALVIN MFG. CORP.

TUNER	USED ON	VOLUME
E-15-T	103K1	12-53
E-16-T	103F1, 103F2	12-57, 12-58
E-19-T	103CK2	12-54
E-22-T	83K1	12-51
E-23-T	83F1, 93F1	12-49, 12-55

APPROXIMATE VOLTAGE AND RESISTANCE READINGS:

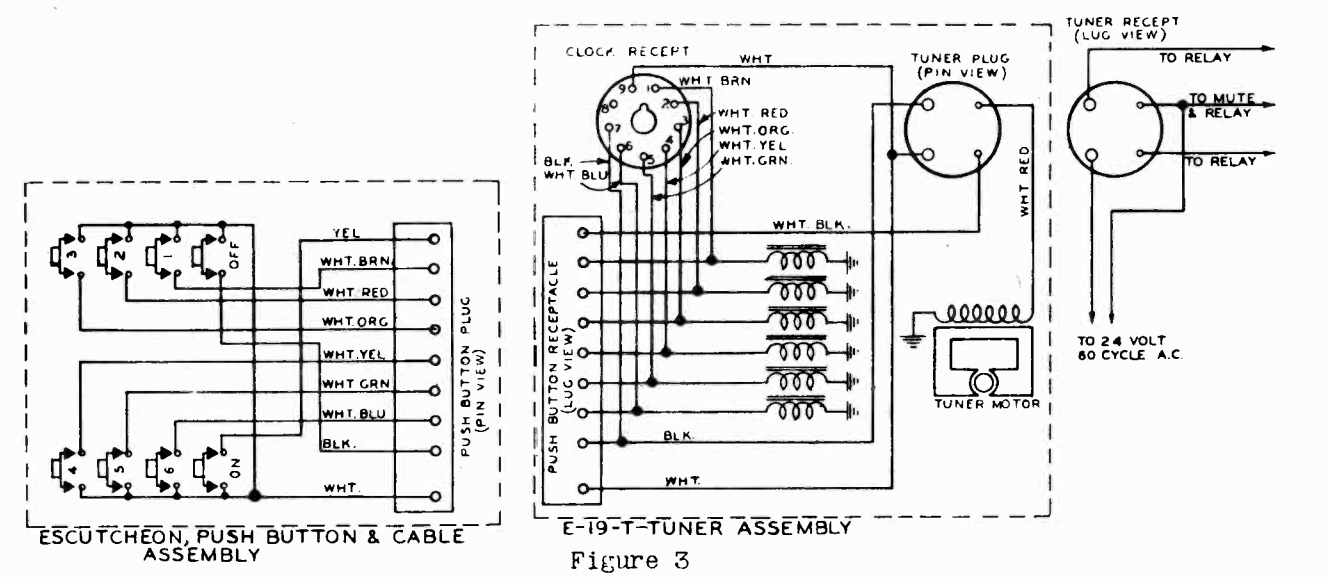
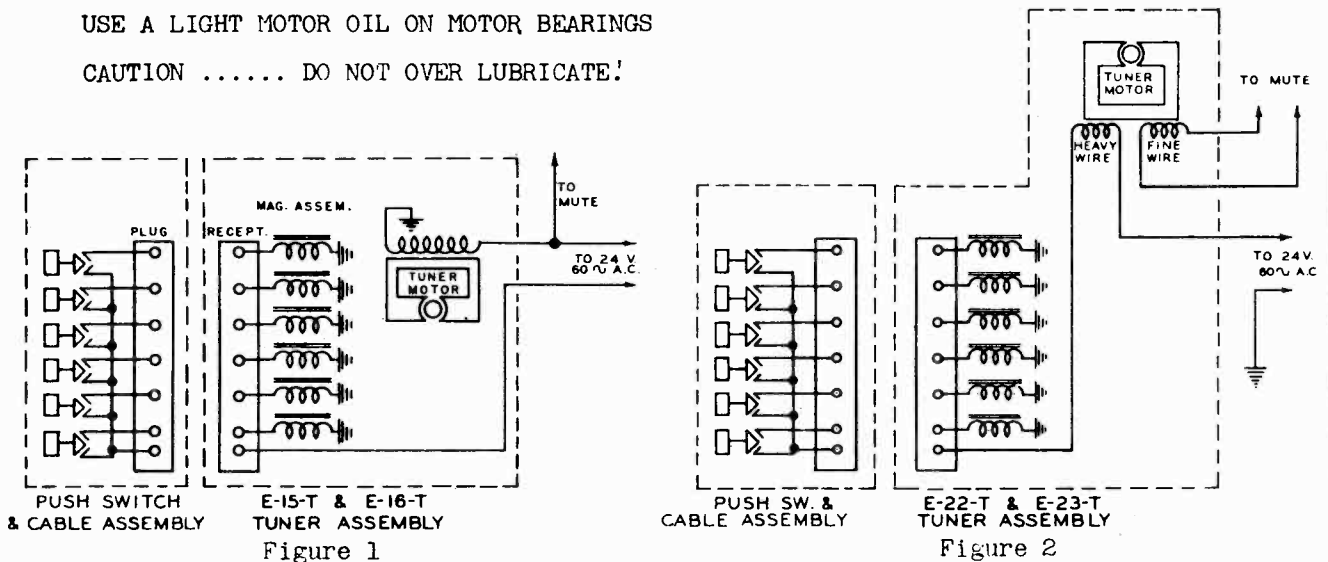
- INPUT TO TUNER: 24V (PUSH BUTTON DEPRESSED)
- VOLTAGE ACROSS MOTOR: 18V (PUSH BUTTON DEPRESSED)
- VOLTAGE ACROSS MAGNET: 6V (PUSH BUTTON DEPRESSED)
- D.C. RESISTANCE OF MAGNETS: .78 Ω (COLD)
- D.C. RESISTANCE OF MOTOR FIELD COIL: .675 Ω (COLD)
- D.C. RESISTANCE OF MUTE WINDING (ON E-22-T & E-23-T ONLY): 23 Ω (COLD)

POINTS OF LUBRICATION:

ALL MOVING PARTS AND BEARINGS (EXCEPT MOTOR BEARINGS AND FIBRE DRIVE GEAR) ARE TO BE LIGHTLY LUBRICATED WITH 11M8930 MILK WHITE GREASE (KEYSTONE #78-6).

USE A LIGHT MOTOR OIL ON MOTOR BEARINGS

CAUTION DO NOT OVER LUBRICATE!



MODELS E15T,E16T,E19T,
E22T,E23T Tuners

GALVIN MFG. CORP.

PARTS PRICE LIST

MODELS E-15-T,E-16-T,E-19-T,E-22-T,E-23-T

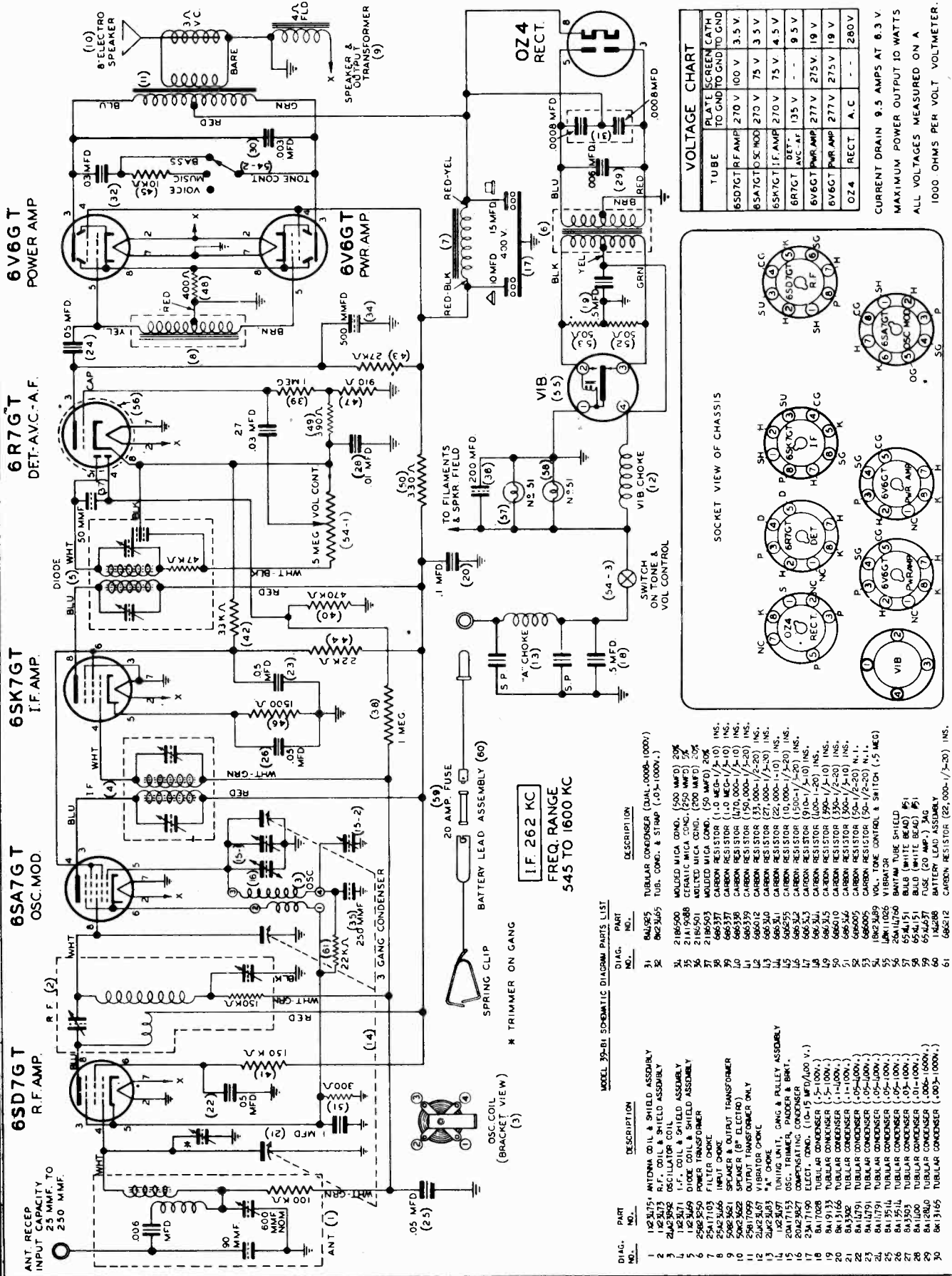
PART NO.	DESCRIPTION	LIST
2S7007	Nut 8-32x1/4 Hex CP (Rods)	.PER C. \$0.50
2S7009	Nut 10-32x3/8 Hex CP (Magnets)	.PER C. .40
3S7100	Set Screw 8-32x3/16 Slab Hd. (Bush.)	.DOZ. .50
3S7163	Screw 8-32x1/4 CP (Fibre Gear)	.PER C. .35
3S7205	Lockscrew 8-32x1/4 CP (Brkt.)	.PER C. .95
3S7247	Lockscrew 6-32x3/16 CP (Mtr.Mtg.)	.PER C. 1.00
3S7257	Screw 8-32x5/8 CP (Brkt.)	.PER C. .65
3S7323	Lockscrew 6-32x3/16 PhBh CP (Gang)	.DOZ. .30
3S7324	Screw 6-32x13/16 CP (Mtr.Mtg.)	.PER C. .55
3S7326	Lockscrew 8-32x3/16 CP (Magnets)	.PER C. .95
4S7562	Washer 7/16-.187-.031 CP (Magnets)	.DOZ. .20
4S7614	Washer 11/16-.171-.037 CP (Brkt.)	.PER C. .70
4S7651	Lockwasher #8 Int. CP (Rods)	.PER C. .50
37A13682	Tuner Mtg. Grommet (Brkt.)	.DOZ. .30
43A13743	Tuner Space Bushing (Brkt.)	.DOZ. .40
9X14302	9 Prong Recept. & Shell (Cable) E19T	.30
1X20751	E19T Electric Tuner Cpt. - 103 CK.	14.50
28K21195	Molded Plug Base (4 prong) E19T.	.10
43A21407	Clutch Bushing 1/4 Brass	.DOZ. .80
4A21408	Clutch Spring Washer 7/16 Bronze	.PER C. .75
4A21409	Clutch Flat Washer 7/16 CP	.PER C. .45
2A21416	Tie Rod Nut 8-32x1/4 Spec. CP.	.DOZ. .25
44A21417	Clutch Pinion 3/8 P.D.	.DOZ. .50
14A21424	Clutch Fibre Washer 7/16	.PER C. .65
19B21431	Variable Condenser (3 gang) E15,19,22T	2.95
59B21434	Tuner Motor (24V-AC) E15,16,19T.	2.80
1X21440	E15T Electric Tuner Cpt. - 103K.	13.00
1X21441	E16T Electric Tuner Cpt. - 103F.	13.30
1X21550	E22T Electric Tuner Cpt. - 83K	13.50
1X21551	E23T Electric Tuner Cpt. - 83F,93F	14.25
1X21554	Magnet & Channel Assembly - E15,22T.	1.35
1B21561	Tuner Magnet Assembly - Black.	.15
1X21576	Fibre Gear, Spring & Bush. Assembly.	.20
4X21577	"C" Washer 1/8" Notched (Rods)	.PER C. .65
1X21579	Split Gear & Bushing Assembly.	.30
2A21766	Motor Spacer Nut 15/32 Hex	.DOZ. .50
1X21825	Channel Brkt. & Recept. Assembly E15,16,22,23T	.40
44A21873	Cond. Drive Pinion 7/8 P.D. Brass.	.20
19B22050	Variable Condenser (3 gang) E16,23T.	2.95
1X22290	Channel Brkt. & Recept. Assembly E19T.	.45
1X22292	Magnets & Channel Assembly E16,23T	1.35
59K22419	Tuner Motor (Mute) E22,23T	3.50
41A22471	Cushion Spring (Fibre Gear)	.DOZ. .50
41A22507	Coil Spring (Armature)	.DOZ. .35
37A22664	Rubber Grommet (Magnets) E19T.	.DOZ. .25
7A22715	Bracket (Gang Support)	.15
1X23009	Magnets & Channel Assembly E19T.	1.95

MODEL E-6-P POWER RELAY
(Used on Model 103-CK2)

2S7048	Nut 10-32x5/16 Hex CP - Magnet	.PER C. .75
3S7163	Screw 8-32x1/4 SLHMS CP	.PER C. .35
3S7326	Lockscrew 8-32x3/16 PlHH CP - Brkt	.PER C. .95
4S7557	Washer 3/8-.171-.031 CP.	.PER C. .30
41A13262	Armature Spring - Switch Guide	.DOZ. .30
41A14244	Armature Spring - Latch.	.DOZ. .40
28X15021	Plug Base - Nine Contact	.15
4A22156	Magnet Adjusting Washer.	.PER C. .70
7A22160	Magnet Mounting Bracket.	.10
1A22164	Tuner Magnet Switch Assembly - 5 leads	.75
1A22165	Rectifier Switch Assembly - 3 leads.	.60
7A22167	Armature Retainer Bracket.	.15
1X22319	Housing & Mtg. Bracket Assembly.	.55
1K22321	Magnet Assembly.	.40
1X22322	Armature & Latch Plate Assembly.	.35
1X22323	Armature & Switch Guide Assembly	.40

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

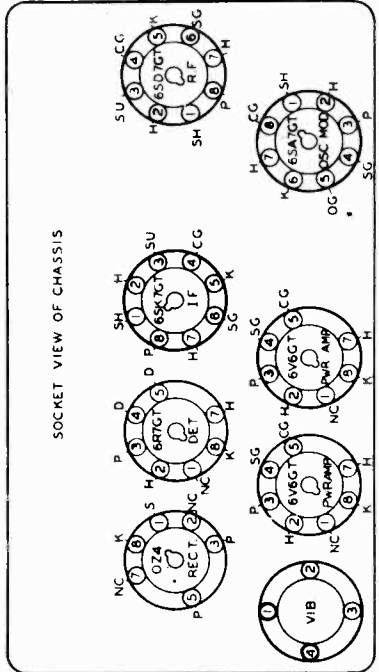
GALVIN MFG. CORP.



VOLTAGE CHART

TUBE	PLATE	SCREEN	CATH TO GND TO GND TO GND
6SD7GT	R.F. AMP	270 V	100 V 3.5 V
6SA7GT	OSC. MOD	270 V	75 V 3.5 V
6SK7GT	I.F. AMP	270 V	75 V 4.5 V
6R7GT	DET. AVC-A.F.	135 V	- - 9.5 V
6V6GT	PRM. AMP	277 V	275 V 19 V
6V6GT	PRM. AMP	277 V	275 V 19 V
OZ4	RECT.	A.C.	- - 280 V

CURRENT DRAIN 9.5 AMPS AT 8.3 V
 MAXIMUM POWER OUTPUT 10 WATTS
 ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER.



I.F. 262 KC
 FREQ. RANGE
 545 TO 1600 KC

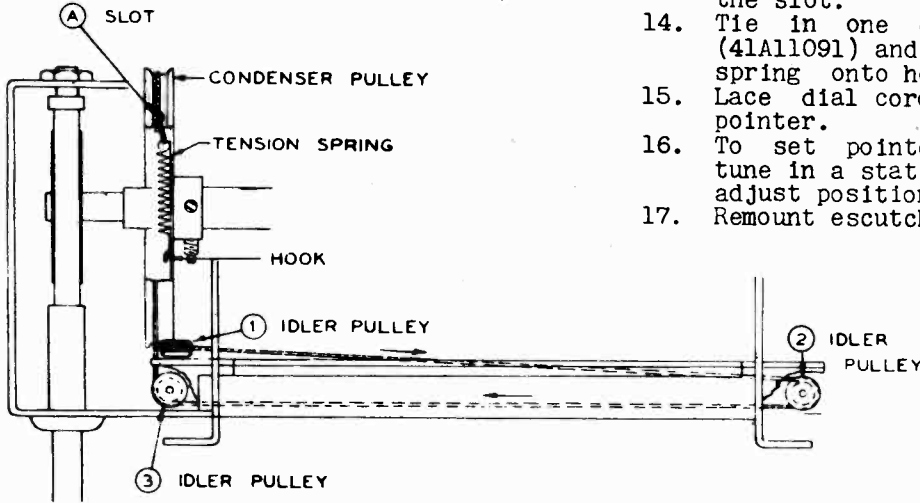
- MODEL 39-B1. SCHEMATIC DIAGRAM PARTS LIST**
- | DIAG. NO. | PART NO. | DESCRIPTION |
|-----------|----------|--|
| 1 | 1423175 | ANTENNA COIL & SHIELD ASSEMBLY |
| 2 | 2423282 | OSCILLATOR COIL |
| 3 | 1423271 | I.F. COIL & SHIELD ASSEMBLY |
| 4 | 1423269 | DIODE COIL & SHIELD ASSEMBLY |
| 5 | 2542350 | POWER TRANSFORMER |
| 6 | 2542350 | INPUT CHOKE |
| 7 | 2542350 | OUTPUT CHOKE |
| 8 | 2542350 | SPEAKER (8" DIAMETER) |
| 9 | 2542350 | OUTPUT TRANSFORMER ONLY |
| 10 | 2542350 | "A" CHOKE |
| 11 | 2423267 | TUNING UNIT, GANG & PULLEY ASSEMBLY |
| 12 | 2423267 | OSC. TRIMMER, PADDER & BART. |
| 13 | 2423267 | RECT. COND. (0.15 MFD/100 V.) |
| 14 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 15 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 16 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 17 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 18 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 19 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 20 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 21 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 22 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 23 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 24 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 25 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 26 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 27 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 28 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 29 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 30 | 2423267 | TUBULAR CONDENSER (.5-100V.) |
| 31 | 640825 | TUBULAR CONDENSER (0.0006-1000V.) |
| 32 | 640825 | TUB. COND. & STAMP (1.03-1000V.) |
| 33 | 2184500 | MOLDED MICA COND. (500 MFD) 25K |
| 34 | 2181988 | CERAMIC MICA COND. (250 MFD) 25K |
| 35 | 2184501 | MOLDED MICA COND. (500 MFD) 25K |
| 36 | 2184501 | MOLDED MICA COND. (500 MFD) 25K |
| 37 | 2184501 | MOLDED MICA COND. (500 MFD) 25K |
| 38 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 39 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 40 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 41 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 42 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 43 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 44 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 45 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 46 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 47 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 48 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 49 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 50 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 51 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 52 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 53 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 54 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 55 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 56 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 57 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 58 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 59 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 60 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |
| 61 | 6463377 | CARBON RESISTOR (1.0 MEG.-1/2-10) INS. |

MODEL 39B-1
MODEL 39B-2

GALVIN MFG. CORP.

MODELS 39B-1 and 39B-2 POINTER CORD

1. Remove the chassis from housing.
2. Pull out the five push-buttons.
3. Remove the four screws which hold the escutcheon and remove same from front cover.
4. Remove broken cord.
5. Rotate condenser gang to fully meshed position.
6. Cut 28 inch length of 30 pound silk fish cord.
7. Thread one end of cord through slot (A). This is the slot nearest the front of chassis when condenser is fully meshed.
8. Run cord up and over rear idler pulley No. 1 in clockwise direction.
9. Continue cord across chassis to idler pulley No. 2 and around it in a clockwise direction.
10. Run cord back across chassis to front idler pulley No. 3 and around it in clockwise direction.
11. Run cord under brake shoe and around condenser pulley to slot (A).
12. Thread through slot (A).
13. Knot both ends of cord securely inside the slot.
14. Tie in one end of tension spring (41A11091) and hook other end of tension spring onto hook in condenser pulley.
15. Lace dial cord through hooks in dial pointer.
16. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
17. Remount escutcheon plate.



SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 39B-2

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
12,000	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
600	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
575	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
30	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
11	600 K.C.	Antenna	***	None	1.74

Volume Control Set at Maximum

Tone Control Set At Voice.

* 1 Watt = 1.74 Volts

** Output meter connected across voice coil.

*** Use Special Dummy Part No. 1X26767 or Booster Coil 24A26751 in series with a 35Mmf. Cond

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 39B-1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
24,500	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
1,100	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
1,200	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
12	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
8	600 K.C.	Antenna	***	None	1.74

Volume Control Set at Maximum

Tone Control Set At Voice

* 1 Watt = 1.74 Volts

** Output meter connected across voice coil.

*** Use Special Dummy Part No. 1X26767 or Booster Coil 24A26751 in series with a 35Mmf. Cond

GALVIN MFG. CORP.

MODEL 39B-1
MODEL 39B-2

MODELS 39B-1 and 39B-2 DIAL CORD INSTRUCTIONS

DIAL DRIVE CORD

Remove the chassis from the housing, and place on service bench with the tubes up. Remove the broken string. Turn the condenser gang to fully meshed position. Cut a length of 30# silk fish cord 26 inches long. Thread one end of cord through slot in drive pulley and with an ordinary paper clip fasten to tuning shaft bracket so the cord will stay in place. In a counter clock-wise direction wind cord one full turn around drive pulley and up to tuning shaft. Wind cord in clock-wise direction 7 turns around tuning shaft and down to drive pulley. In a counter clock-wise direction, wind cord around drive pulley to slot (B). Knot the two ends of cord together inside of drive pulley and fasten one end of spring (41A14759) to cord and the other end to hole in condenser pulley.

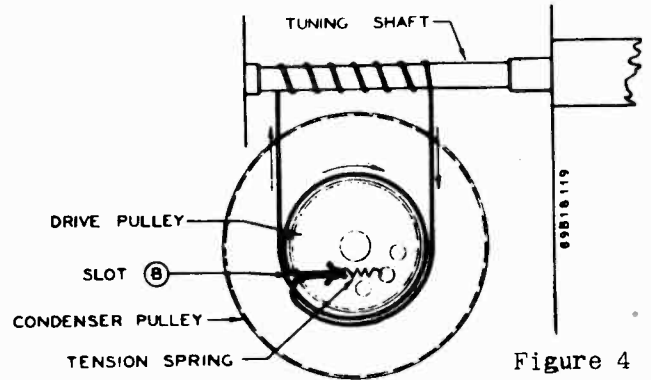
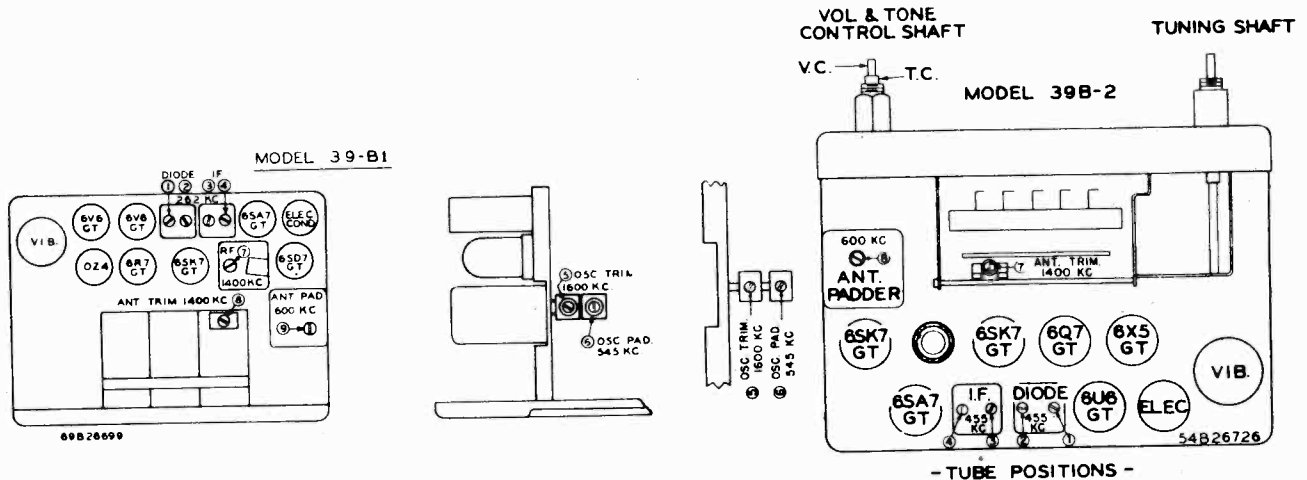


Figure 4

ALIGNMENT CHART MODEL 39B-1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.



ALIGNMENT CHART MODEL 39B-2

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	600 K.C.	*	To Special Dummy	8	600 K.C.

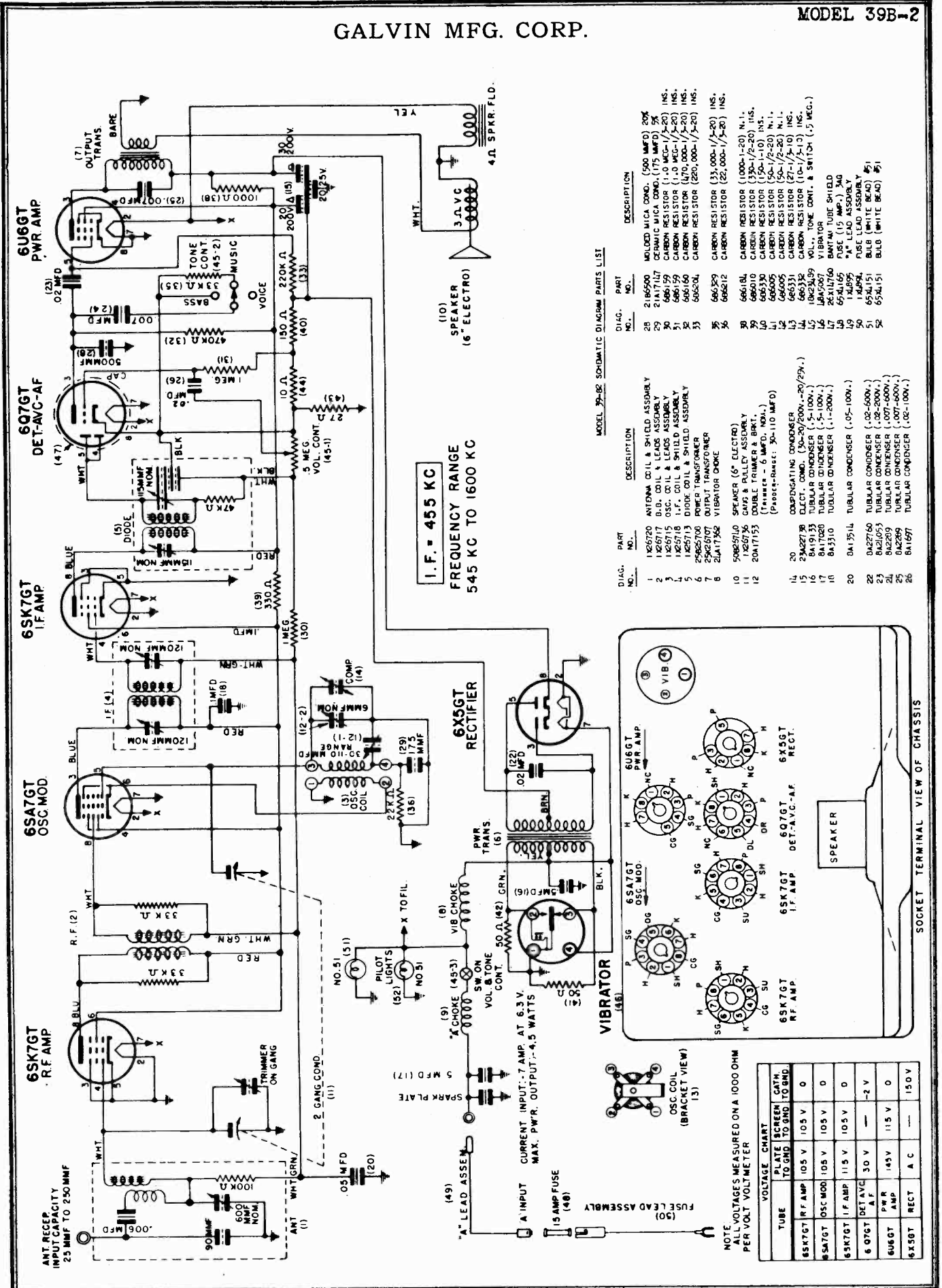
* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

GALVIN MFG. CORP.

MODEL 39B-1

PART NO.	DESCRIPTION	LIST	PART NO.	DESCRIPTION	LIST
MODEL 39B-1			CONDENSERS		
MAJOR PARTS			8A1400	Tubular Condenser .01-100v.	\$.15
49K11026	Vibrator - Black.	\$2.50	8A3302	Tubular Condenser .1-100v. . . . .	.15
25A17103	Filter Choke. . . . .	.75	8A3303	Tubular Condenser .03-100v. . . . .	.20
23A17190	Electrolytic Condenser (FP)	1.00	8A4925	Dual Tub. Cond. .0008-.0008-1000v . . . . .	.25
25B23250	Power Transformer	3.65	21B6500	Molded Mica Condenser 500mmf-20% . . . . .	.15
16C23259	Housing Shell & Back.	2.75	21B6501	Molded Mica Condenser 200mmf-20% . . . . .	.15
25A23466	Input Choke	1.70	21B6503	Molded Mica Condenser 50mmf-20% . . . . .	.15
24K23467	Vibrator Choke.- 6 Pie Wound. . . . .	.50	8A12840	Tubular Condenser .006-1600v. . . . .	.35
1X23468	Oscillator Coil & Leads Assembly. . . . .	.65	8A13014	Condenser-Resistor .006-100v-100K . . . . .	.25
1X23469	Diode Coil & Shield Assembly.	1.50	8K13165	Tubular Condenser .003-1000v. . . . .	.15
1X23471	I.F. Coil & Shield Assembly	1.40	8K13166	Tubular Condenser .1-400v . . . . .	.15
1X23473	R.F. Coil & Leads Assembly.	1.75	8A13514	Tubular Condenser .05-100v. . . . .	.15
1X23475	Antenna Coil & Shield Assembly.	2.75	8A14791	Tubular Condenser .05-400v. . . . .	.15
24K23483	"A" Choke . . . . .	.25	8A17027	Condenser-Resistor .03-100v.-33K. . . . .	.20
1X23487	Front Cover & Bushing Assembly.	1.25	8A17028	Tubular Condenser .5-100v . . . . .	.25
18K23489	Volume & Tone Control	1.50	20A17153	Double Trimmer & Spec. Brkt. . . . .	.35
1X23517	Bottom Housing Assembly . . . . .	.70	20A17935	Antenna Padder - Single . . . . .	.35
50B23621	Speaker & Output Transformer.	5.50	21A19088	Ceramic Condenser 250mmf-5% . . . . .	.20
50B24493	Speaker & Output Transformer.	5.50	8A19133	Tubular Condenser .5-100v . . . . .	.30
50B24929	Speaker & Output Transformer.	5.50	20A22747	Trimmer Diode - Small . . . . .	.40
	Speaker Exchange.	3.25	20A22751	Double Trimmer 120mmf-Nom. - I.F. . . . .	.30
1X24948	Gang, Pulley & Brake Assembly	5.00	20A23102	R. F. Trimmer & Padder. . . . .	.55
			8K23465	Tubular Condenser .03-1000v. & Strap. . . . .	.25
			20A23827	Compensating Condenser. . . . .	.25
ACCESSORIES			RESISTORS		
6X4141	Distributor Suppressor. . . . .	.30	6B6005	Carbon Resistor 50-1/2-20 N.I. . . . .	.60
1X4288	Battery Lead Assembly . . . . .	.40	6B6010	Carbon Resistor 330-1/2-20 Ins. . . . .	.60
8A4491	Generator Condenser . . . . .	.40	6B6012	Carbon Resistor 33,000-1/2-20 . . . . .	.60
65X4637	Fuse 20 AMP 3 AG. . . . .	.05	6B6070	Carbon Resistor 150,000-1/3-20 N.I. . . . .	.60
1X4894	Fuse Lead Assembly - 20". . . . .	.25	6B6212	Carbon Resistor 22,000-1/3-20 Ins. . . . .	.60
1X4895	"A" Lead Assembly - 1C". . . . .	.25	6B6255	Carbon Resistor 10,000-1/3-20 Ins. . . . .	.60
9B6734	Tube Socket - Saddle 4 Prong. . . . .	.15	6B6321	Carbon Resistor 47,000-1/3-20 Ins. . . . .	.60
9B6771	Tube Socket - Saddle Octal. . . . .	.15	6B6337	Carbon Resistor 1 meg-1/3-10 Ins. . . . .	.60
9A6774	Tube Socket - Saddle Octal. . . . .	.15	6B6338	Carbon Resistor 470,000-1/3-10 Ins. . . . .	.60
37A17216	Speaker Gasket. . . . .	.15	6B6339	Carbon Resistor 150,000-1/3-20 Ins. . . . .	.60
1X23520	Receiver Accessories Assembly	1.20	6B6340	Carbon Resistor 27,000-1/3-20 Ins. . . . .	.60
38A23693	Call Letters & Instructions . . . . .	.45	6B6341	Carbon Resistor 22,000-1-10 Ins. . . . .	.10
64K23876	Speaker Screen. . . . .	.25	6B6342	Carbon Resistor 1,500-1/3-20 Ins. . . . .	.60
			6B6343	Carbon Resistor 910-1/3-5 Ins. . . . .	.60
			6B6344	Carbon Resistor 400-1-20 Ins. . . . .	.10
			6B6345	Carbon Resistor 390-1/3-10 Ins. . . . .	.60
			6B6346	Carbon Resistor 300-1/3-10 Ins. . . . .	.60
DIAL & DRIVE			SCREWS, WASHERS		
65X4151	Bulb 6-8v. Rnd. Bay. Clr. #51 . . . . .	.15	2S7003	Nut 8-32x11-32 CP - Spkr. . . . .	.50
43X4326	Steel Ball .125	PER C. .35	2S7022	Nut 1-4x20x7/16 CP - Set Mtg. . . . .	.60
5S7811	Eyelet 5/16 Blk. - Gang Mtg. . . . .	.DOZ. .20	3S7118	Setscrew 8-32x5/16 BO - Knob. . . . .	.90
11M8709	Dial Cord (Blk) 26"-Shaft . . . . .	.YARD .05	3S7160	Screw 8-32x3/16 CP - Slider Brkt. . . . .	.35
11M8744	Dial Cord (Blk. Wht.) 28"-Pntr. . . . .	.YARD .05	3S7454	Screw 8x1/4 PK Z PLHH CP. . . . .	.20
41A11091	Tension Coil Spring - Large . . . . .	.DOZ. .25	3S7456	Housing Screw 8x1/4 ACHD PK A CO. . . . .	.65
37A12691	Rubber Grommet - Gang Mtg. . . . .	.DOZ. .25	3S7457	Screw 8x7/8 CP - Coil Mtg. . . . .	.DOZ. .25
41A14759	Tension Coil Spring - Small . . . . .	.DOZ. .25	3S7461	Screw 8x5/16 CO - Esc . . . . .	.15
7B17002	Cond. Mtg. Bracket - Left . . . . .	.10	3S7499	Screw 8x5/8 CO - Ant.	PER C. 1.00
35A17160	Push Button Strip - Felt. . . . .	.DOZ. .20	4S7609	Washer 1&5/16x.218x.050 CP. . . . .	.DOZ. .35
1B17171	Push Button Plunger Assembly. . . . .	.20	4S7635	Washer 7/8 CP - Set Brkt. . . . .	.DOZ. .25
35A17224	Knob Washer - Felt - Vol.	PER C. .40	4S7657	Lockwasher 8 Ext. BO - Spkr.	PER C. .50
43X17241	Nut Bearing Assembly. . . . .	.DOZ. .35	4S7670	Lockwasher 1/4" Blk. Oxd.-Set Brkt.	PER C. .50
1A23246	Pointer . . . . .	.10	3S8126	Screw 8x1&1/4 CP - Pwr. Trans . . . . .	.DOZ. .20
34A23248	Dial Scale. . . . .	.25	3S8131	Screw 8x1&7/8 SS - Choke. . . . .	.DOZ. .65
64A23249	Dial Retainer Plate . . . . .	.DOZ. .25	3A13748	Screw 8-32x17/32 CP - Gang Mtg. . . . .	.DOZ. .20
47K23492	Tuning Drive Shaft. . . . .	.35	3A17181	Thumbscrew 8-32 CO - Bot. Cvr . . . . .	.DOZ. .25
1X23494	Drive Shaft Brackets Assembly . . . . .	.30	2K17206	Mounting Nut - Front. . . . .	.DOZ. .75
1X23495	Slider, Plunger & Pulley Assembly . . . . .	.45	2K23491	Spacer Nut 1/2-28x5/8 - Vol . . . . .	.15
1X23503	Dial Light Assembly - L.H. . . . .	.10	3A23753	"J" Bolt - Set Mtg. . . . .	.DOZ. .60
1X23504	Dial Light Assembly - R.H. . . . .	.10	4A24373	Tuning Nut Cup Washer . . . . .	.DOZ. .50
1X23518	Dial Scale & Esc. Assembly.	1.50			
1X23519	Push Button Cpt . . . . .	.20			
1X23521	Dial Brkt. & Background Assembly. . . . .	.35			
36B24330	Tone Control Lever 1&9/32 . . . . .	.35	42B5480	Grid Clip - Small - Collar Grip . . . . .	.DOZ. .15
36A24331	Tuning Knob 1/4 Hole. . . . .	.20	38X10544	Plug Button 1/4 CO - Ant. . . . .	.DOZ. .25
36K24332	Volume Knob 3/16 Hole . . . . .	.20	26X14760	Bantam Tube Shield. . . . .	.05
			56X23774	Packing Carton & Fillers. . . . .	.40
MISCELLANEOUS			PRICES SUBJECT TO CHANGE WITHOUT NOTICE		
37A4187	Condenser Mounting Grommet.DOZ. \$.25			
42A4215	Vibrator Grounding ClipDOZ. .75			
4K4823	Cup Washer Cop. Pl.DOZ. .10			

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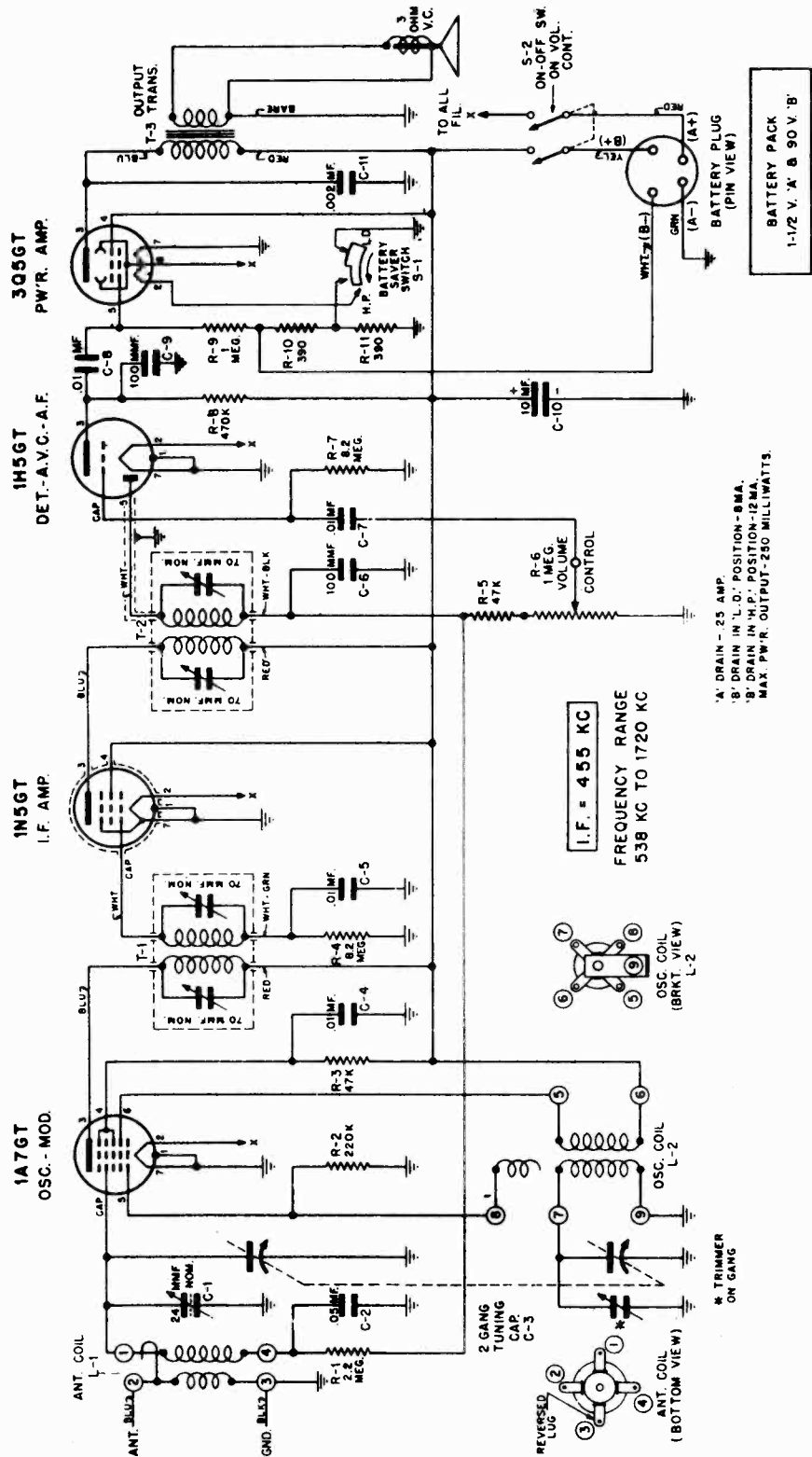


MODEL 39B-2

GALVIN MFG. CORP.

PART NO.	DESCRIPTION	LIST	PART NO.	DESCRIPTION	LIST
MODEL 39B-2			CONDENSERS		
MAJOR PARTS			CONDENSERS		
48A5067	Vibrator	2.50	8A1697	Tubular Condenser .02-100v.	\$.15
24A17362	Vibrator Choke (8 Pie) . . . . .	.35	8A2289	Tubular Condenser .007-600v . . . . .	.20
23A22738	Electrolytic Condenser FP . . . . .	.75	8A3310	Tubular Condenser .1-200v . . . . .	.15
18K23489	Volume & Tone Control	1.50	21B6500	Molded Mica Condenser 500mmf-20%. . . . .	.15
25K26707	Output Transformer	1.00	8A13014	Condenser Res. .006-100v.-100K. . . . .	.25
25B26708	Power Transformer (Shielded)	2.60	8A13514	Tubular Condenser .05-100v . . . . .	.15
1X26713	Diode Coil & Shield Assembly	1.55	8A17028	Tubular Condenser .5-100v . . . . .	.25
1X26715	Osc. Coil & Leads Assembly . . . . .	.65	21A17147	Ceramic Mica Condenser 175mmf . . . . .	.20
1X26717	B.B. Coil & Leads Assembly . . . . .	.85	20A17153	Double Trimmer & Spec. Brkt . . . . .	.35
1X26718	I.F. Coil & Shields Assembly	1.40	20A17935	Antenna Padder - Single . . . . .	.35
1X26720	Antenna Coil & Shield Assembly	2.10	8A19133	Tubular Condenser .5-100v . . . . .	.30
1X26729	Front Cover & Bushing Assembly	1.05	21A20877	Metal Mica Condenser 500mmf-10%. . . . .	.15
50B26740	Speaker 6" Electro.	3.25	20A22747	Diode Trimmer - Small . . . . .	.40
	Speaker Exchange	1.90	20A22751	I.F. Trimmer - Double . . . . .	.30
15K26744	Housing Shell, Back & Brkts	3.00	8A22760	Tubular Condenser .02-600v . . . . .	.15
1X26748	Bottom Cover Assembly . . . . .	.65	8A24033	Tubular Condenser .02-200v . . . . .	.10
1A27101	Gang, Brake & Pulley Assembly	4.65			
ACCESSORIES			RESISTORS		
14X2423	Fuse Insulator - "A" LeadDOZ.	.20	6B6005	Carbon Resistor 50-1/2-20 N.I.DOZ.	.60
6X4141	Distributor Suppressor. . . . .	.30	6E6010	Carbon Resistor 330-1/2-20 Ins.DOZ.	.60
65X4151	Bulb 6-8v. Rnd. Bay. Clr. #51 . . . . .	.15	6B6037	Carbon Resistor 33,000-1/3-20 N.I.DOZ.	.60
65X4165	Fuse 15 AMP 3AG . . . . .	.05	6B6159	Carbon Resistor 1 meg-1/3-20 Ins.DOZ.	.60
1X4872	Battery Lead Assembly . . . . .	.50	6E6150	Carbon Resistor 470,000-1/3-20 N.I.DOZ.	.60
1X4894	Fuse Lead Assembly - 20" . . . . .	.25	6B6184	Carbon Resistor 1,000-1-20 N.I. . . . .	.10
1X4895	Short "A" Lead Assembly - 10" . . . . .	.25	6B6204	Carbon Resistor 220,000-1/3-20 Ins.DOZ.	.60
9B6734	Tube Socket - Saddle 4 Prong. . . . .	.15	6B6212	Carbon Resistor 22,000-1/3-20 Ins.DOZ.	.60
9B6771	Tube Socket - Saddle Octal . . . . .	.15	6B6321	Carbon Resistor 47,000-1/3-20 Ins.DOZ.	.60
1X12820	Antenna Receptacle Assembly . . . . .	.15	6B6329	Carbon Resistor 33,000-1/3-20 Ins.DOZ.	.60
37A18689	Rubber Gasket 2" - Spkr . . . . .	.05	6B6330	Carbon Resistor 150-1-10 Ins. . . . .	.10
1X23503	Dial Light Assembly(Short) - Less Bulb. . . . .	.10	6B6331	Carbon Resistor 27-1/3-10 Ins.DOZ.	.60
1X23504	Dial Light Assembly (Long) - Less Bulb. . . . .	.10	6B6332	Carbon Resistor 10-1/3-10 Ins.DOZ.	.60
1X26759	Receiver Accessories Assembly	1.20			
DIAL & DRIVE			SCREWS, WASHERS ETC.		
5S7811	Eyelet 5/16x.210 Blk. - Gang Mtg.DOZ.	.20	43X4326	Steel Ball .125 . . . . .	.35
11M8709	Dial Cord Blk. 26" - Shaft.YARD	.05	2S7003	Nut 8-32x11/32 CP - Spkr. . . . .	.50
11M8744	Dial Cord Blk.-Wht. 28" - Pntr.YARD	.05	2S7005	Nut 6-32x1/4 CP - B.B. Coil . . . . .	.40
41A11091	Tension Coil Spring - LargeDOZ.	.25	2S7022	Nut 1/4-20x7/16 CP - Set Mtg. . . . .	.60
37A12691	Rubber Grommet - Gang Mtg.DOZ.	.25	3S7118	Setscrew 8-32x5/16 BO - Knob.DOZ.	.90
41A14759	Tension Coil Spring - SmallDOZ.	.25	3S7160	Screw 8-32x3/16 CP - P.P.& P. . . . .	.35
7S17002	Gang Mtg. Bracket - Left. . . . .	.10	3S7457	Screw 8x7/8 CP - Can Mtg.DOZ.	.25
38A17093	Call Letters Tab Cover. . . . .	.05	3S7461	Screw 8x5/16 PK A AH CODOZ.	.15
35A17160	Push Button Pad (Felt) Strip.DOZ.	.20	3S7499	Screw 8x5/8 Cop. Oxd. - Ant. Recept.PER C.	1.00
35A17224	Knob Washer (Felt) 3/64 - VolPER C.	.40	3S7506	Screw 6x1/4 CP - Osc.PER C.	.50
13K23244	Dial Escutcheon - Chrome.	1.25	3S7508	Screw 8x1/4 Blk. - Ant. Coil.PER C.	.65
1A23246	Dial Pointer Assembly . . . . .	.10	4S7573	Washer 11/16-.137 Wrt. - Choke.DOZ.	.15
34A23248	Dial Scale. . . . .	.25	4S7635	Washer 7/8-.281 CP - Set Mtg.DOZ.	.25
64A23249	Dial Retainer PlateDOZ.	.25	4S7657	Lockwasher #8 Ext. BO - Spkr.PER C.	.50
47K23492	Tuning Drive Shaft. . . . .	.35	4S7670	Lockwasher 1/4 Int.-Set Mtg.PER C.	.50
1X23495	Pointer, Plunger & Pulley Assembly. . . . .	.45	3S8126	Screw 8x1&1/4 CP - Pwr. TransDOZ.	.20
1X23518	Dial Scale & Esc. Assembly.	1.50	3S8133	Screw 8x1 SS - Choke.DOZ.	.35
1X23519	Push Button Complete. . . . .	.20	3S13748	Screw 8-32x17/32 CP - Gang Mtg.DOZ.	.20
1X23521	Dial Brkt. & Background Assembly. . . . .	.35	2K17206	Nut 1/2-28x5/8 Brass - Front Mtg.DOZ.	.75
36C24330	Tone Control Lever 1&9/32 . . . . .	.35	43X17241	Nut Bearing Assembly - Tun. ShaftDOZ.	.35
36A24331	Tuning Knob 1/4" . . . . .	.20	2K23491	Spacer Nut 1/2-28x5/8 - Vol . . . . .	.15
36K24332	Volume Knob 3/16" . . . . .	.20	3A23753	"J" Bolt - Set Mtg.DOZ.	.60
38K26752	Push Button Number Tabs . . . . .	.05	4A4333	Tuning Nut Cup WasherDOZ.	.50
MISCELLANEOUS			PRICES SUBJECT TO CHANGE WITHOUT NOTICE		
42A4215	Vibrator Grounding ClipDOZ.	.75			
42B5480	Grid Clip - Small - Collar GripDOZ.	.15			
38X10544	Plug Button 1/4 Cop. Oxd. - AntDOZ.	.25			
26X14760	Bantam Tube Shield.05			
36X26749	Packing Carton & Fillers.40			

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This receiver is a 4 tube battery operated superheterodyne, covering the broadcast band from 538 to 1720 kc. The I.F. frequency is 455 kc.

POWER DRAIN:

- 'A' drain - .25 AMP. at 1.5 V.
- 'B' drain in 'L.D.' position - 8 MA. at 90 V.
- 'B' drain in 'H.P.' position - 12 MA. at 90 V.

MODEL 45B12, Ch. HS-8

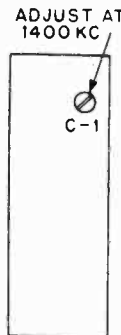
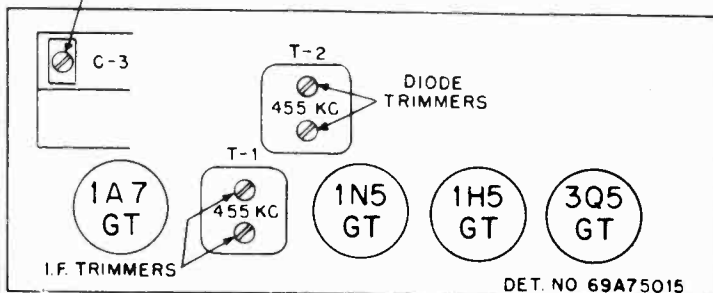
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Turn Battery Saver Switch to 'H.P.' (high power) position. Connect output meter across speaker voice coil (.38V = .05 watts). Volume control set at maximum for all operations. The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008.

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER NO.	GENERATOR SET AT (400~ 30% MODULATED)	AVERAGE INPUT FOR .38V OUTPUT
1. Adjust I.F.'s for maximum	Minimum Capacity	.1 mf	Osc.-Mod. grid	T-1&T-2 (2 trimmers on each)	455. Kc	3750 microvolts to I.F. grid. 80 microvolts to Osc.-Mod. grid.
2. Set Oscillator trimmer	Minimum Capacity	.1 mf	Osc.-Mod. grid	Trimmer on C-3	1720 KC	100 microvolts
3. Adjust R.F. trimmer for maximum	1400 Kc.	200 mmf	Antenna Lead	C-1 ANT. COIL TRIMMER	1400 Kc	10 microvolts

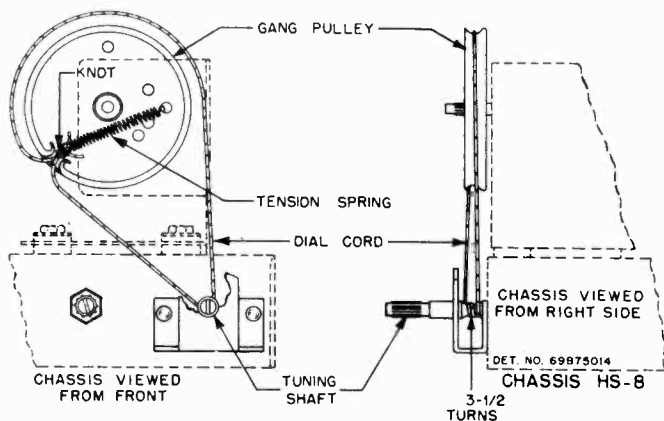
4. Repeat above steps for maximum accuracy.

OSC. TRIMMER
ADJUST AT 1720 KC



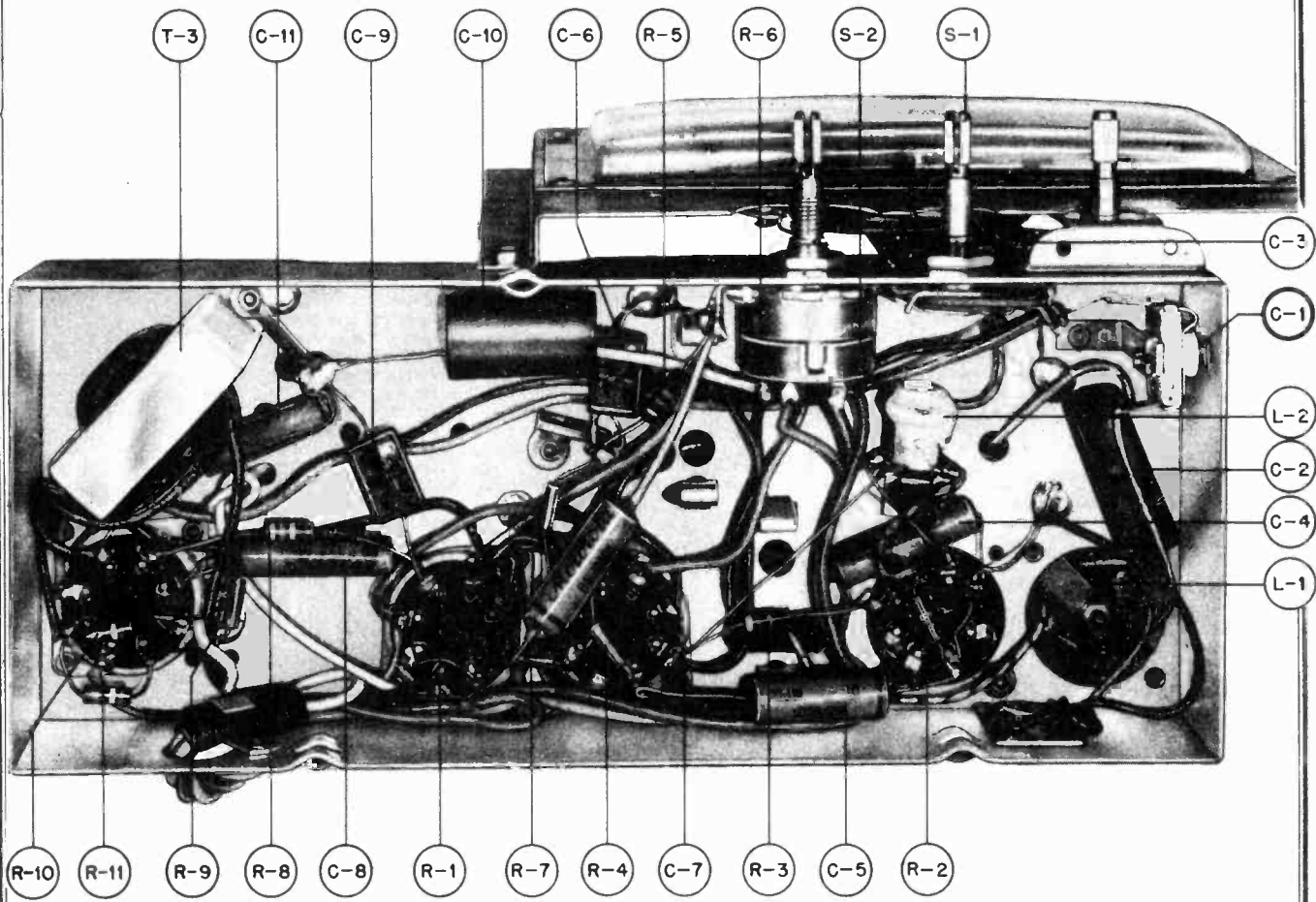
TO REPLACE DIAL CORD

1. Remove set from cabinet by pulling the knobs off and unscrewing the three chassis retaining screws from the bottom.
2. Remove the dial crystal by pushing out the four snap-in eyelets. Avoid damaging crystal and dial scale by pushing the eyelets out from the back. Do not remove the dial scale.
3. Remove the dial pointer by carefully pulling it off.
4. Next the dial plate is taken off by removing two screws.
5. Remove the old cord and replace with a new piece of 24 lb. fish line. See Figure 1. 2. 3. 4.
6. Secure the cord knot with a drop of cement.
7. Reassemble dial mechanism by working in reverse order. The pointer should be adjusted so that it is horizontal and pointing to the low frequency end when the gang capacitor is fully closed.



DIAL CORD LAYOUT

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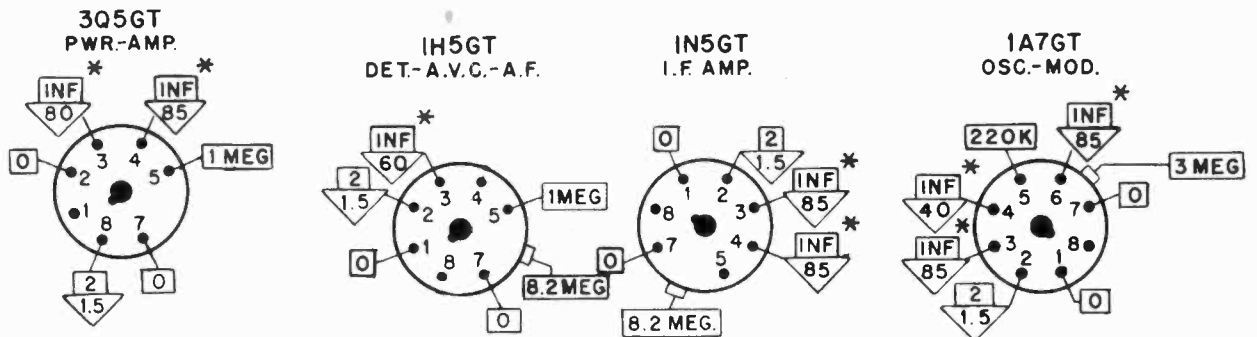


CHASSIS BOTTOM VIEW

VOLTAGES MEASURED ON A 20,000 Ω PER VOLT VOLTMETER TO CHASSIS WITH BATTERY SAVER SWITCH IN H.P. POSITION.

▽ = VOLTAGE MEASUREMENTS
 □ = RESISTANCE MEASUREMENTS.

* DISCONNECT ONE SIDE OF ELECTROLYTIC CAPACITOR C-10 WHEN MAKING RESISTANCE MEASUREMENTS. CHECK ELECTROLYTIC CAPACITOR BY PUTTING POSITIVE OF CAPACITOR TO POSITIVE TERMINAL OF OHM-METER BATTERY. THE RESISTANCE SHOULD BE .5 MEG. OR SO.



BOTTOM VIEW OF CHASSIS

VOLTAGE AND RESISTANCE CHART

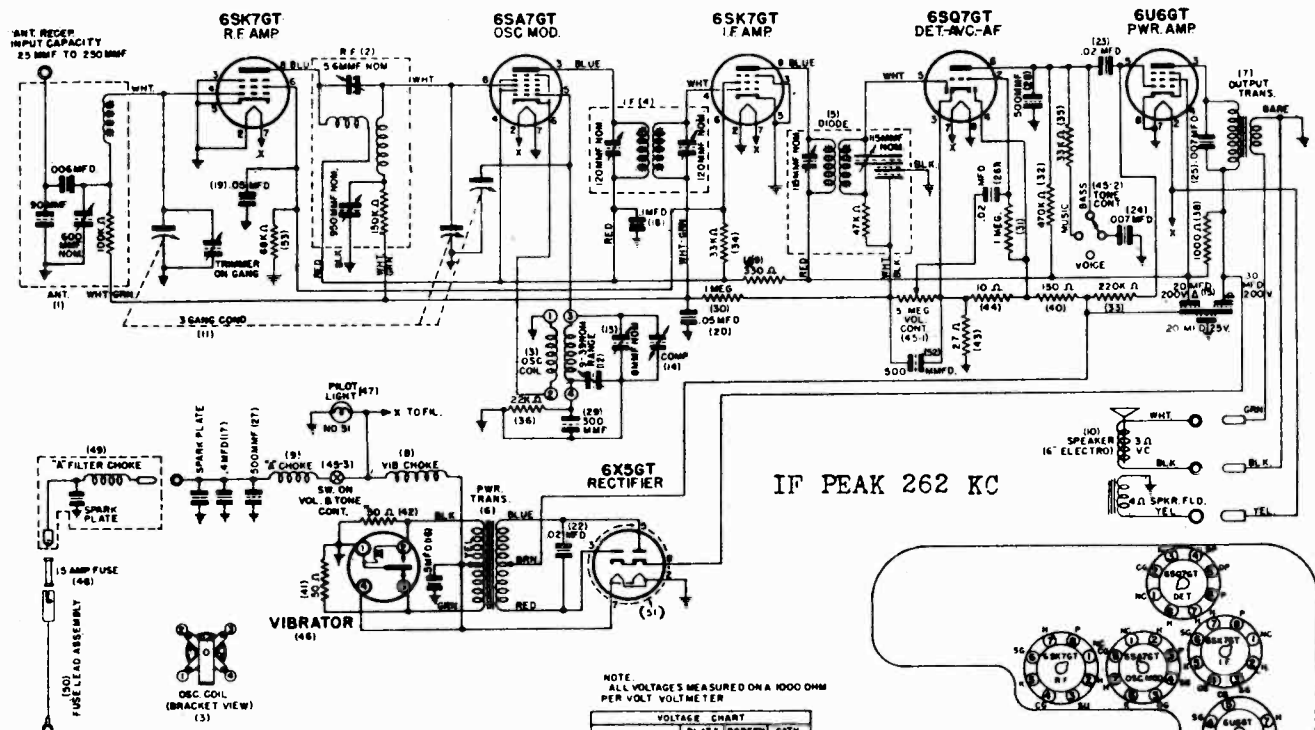
GALVIN MFG. CORP.

REF. PART NO.	PART NO.	DESCRIPTION	LIST	REF. PART NO.	PART NO.	DESCRIPTION	LIST
C-1	20A28941	Capacitor, trimmer: 24 mmf nominal; includes mounting bracket.	.30	R-5	6R6321	Resistor, fixed: carbon; 47,000 20% 1/3W Ins.	doz. .60
C-2	8S9805	Capacitor, fixed: paper; .05 mf 20% 100 VDC.	.20		or 6R6056	Resistor, fixed: carbon; 47,000 20% 1/2W Ins.	
C-3	1X20608	Capacitor, variable: 2 gang. Cut oscillator plates; (includes pulley).	3.70	R-6	16A19979	Resistor, variable: carbon; 1 meg. With DPST switch.	.85
C-4	8S9801	Capacitor, fixed: paper; .01 mf 20% 200 VDC.	.15	R-7	6R6310	Resistor, fixed: carbon; 8.2 meg 20% 1/3W Ins.	doz. .60
C-5	8S9801	Capacitor, fixed: paper; .01 mf 20% 200 VDC.	.15		or 6R3938	Resistor, fixed: carbon; 8.2 meg 20% 1/2W Ins.	
C-6	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC.	.20	R-8	6R6160	Resistor, fixed: carbon; 470,000 20% 1/3W Ins.	doz. .60
C-7	8S9801	Capacitor, fixed: paper; .01 mf 20% 500 VDC.	.15		or 6R6032	Resistor, fixed: carbon; 470,000 20% 1/2W Ins.	
C-8	8S9826	Capacitor, fixed: paper; .01 mf 20% 200 VDC.	.15	R-9	6R6159	Resistor, fixed: carbon; 1 meg 20% 1/3W Ins.	doz. .60
C-9	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC.	.20		or 6R6004	Resistor, fixed: carbon; 1 meg 20% 1/2W Ins.	
C-10	23A14727	Capacitor, electrolytic; 10 mf 150 V.	.75	R-10	6R6345	Resistor, fixed: carbon; 390 10% 1/3W Ins.	doz. .60
	20A20323	Capacitor, trimmer: dual; 70 mmf nominal (in I.F. & diode cans).	.60		or 6R5554	Resistor, fixed: carbon; 390 10% 1/2W Ins.	
	or 20A72754	Capacitor, trimmer: dual; 70 mmf nominal (in I.F. & diode cans).		R-11	6R6345	Resistor, fixed: carbon; 390 10% 1/3 W Ins.	doz. .60
					or 6R5554	Resistor, fixed: carbon; 390 10% 1/2W Ins.	
L-1	24A30442	Coil, antenna: iron core type	2.15	S-1	40A30444	Switch, battery saver: SPDT.	.75
L-2	24A27349	Coil, oscillator.	.85	S-2	Part of R-6	Switch, ON-OFF: DPST.	
R-1	6R6202	Resistor, fixed: carbon; 2.2 meg 20% 1/3W Ins.	doz. .60	T-1	1X28276	Transformer, I.F.: 455 Kc; complete with shield and trimmers.	2.40
	or 6R3927	Resistor, fixed: carbon; 2.2 meg 20% 1/2W Ins.		T-2	1X28277	Transformer, Diode: 455 Kc; complete with shield and trimmers.	2.35
R-2	6R6204	Resistor, fixed: carbon; 220,000 20% 1/3W Ins.	doz. .60				
	or 6R6015	Resistor, fixed: carbon; 220,000 20% 1/2W Ins.		T-3	25X15786	Transformer, output	1.95
R-3	6R6321	Resistor, fixed: carbon; 47,000 20% 1/3W Ins.	doz. .60		1X21246	Battery Cable Assembly	.85
	or 6R6056	Resistor, fixed: carbon; 47,000 20% 1/2W Ins.			7B18748	Bracket, gang mounting	.25
R-4	6R6310	Resistor, fixed: carbon; 8.2 meg 20% 1/3W Ins.	doz. .60		7A14610	Bracket, tuning shaft	.10
	or 6R3938	Resistor, fixed: carbon; 8.2 meg 20% 1/2W Ins.			16C70089	Cabinet, table model: wood (complete)	13.10
	61B27421	Crystal, dial	.50		42K13135	Clamp, cable	doz. .15
	37A14809	Cushion, socket (for 1A7 socket)	doz. .35		35K70089	Cloth, grille (Olek #421.12)	.20
	1X27422	Dial Plate & Indicator Assem.	.85		1X19897	Coil Shield & Clips Assem. (for I.F. & Diode coils)	.35
	587805	Eyelet, Snap-In: .156 x .141; CP (dial scale mtg.)	per/c .70		11M8749	Cord, dial: 24 lb., black	yd. .10
	5A19668	Eyelet, steel: .296 x .212. Cop. Pl. (gang mtg.)	doz. .40	37K20865	Rubber, channel: 9/16 long (for dial plate support bracket)	per/c .80	
	587820	Eyelet, brass: .470 x .129 (spkr. lead tip).	per/c .60	3S2683	Screw: #6 x 3/16 PK Z PLHH; CP (osc. coil mtg.)	per/c 1.00	
	587855	Eyelet, brass: .484 x .156 (spkr. lead tip).	doz. .20	3S7152	Screw: 6-32 x 1/4 SLHHMS; CP (gans & lug mtg.)	per/c .95	
	37A12691	Grommet, rubber (gang cushioning)	doz. .35	3S7350	Screw (lockscrew): 6-32 x 1/4 SLHHMS; CP (gang mtg.)	per/c .80	
	37A14810	Grommet, rubber (1A7 tube socket)	doz. .30	3S7454	Screw: #8 x 1/4 PK Z PLHH; CP (dial plate mtg.)	doz. .20	
	52A27419	Indicator, ON-OFF.	.20	3S7248	Screw: 8-32 x 1/8 Pl HHMS; CP (dial plate mtg.)	per/c .50	
	36A15813	Knob, control: molded; blank (for tuning and volume shafts).	.10	3S7512	Screw: #8 x 1/2 PK Z PLHH; CP (gang brkt mtg.)	per/c .70	
	36K21243	Knob, control: molded; lined (for battery saver switch).	.15	3S8117	Screw: #8 x 1 PK Z SLHW; anti-torque copper pl. (chassis mtg.)	doz. .20	
	487666	Lockwasher, steel: #8 external; CP (osc. coil mtg.)	per/c .35	34B27418	Scale, dial	.30	
	487860	Lockwasher, phosphor bronze: #8 external (spkr. mtg.)	per/c .60	47A14636	Shaft, tuning control	.15	
	29R5207	Lug, soldering (gang gnd.)	doz. .20	26A14760	Shield, tube: bantam (for 1N5)	.05	
	29R5209	Lug, soldering: dumb-bell type (chassis gnd.)	per/c 1.00	9A8738	Socket, tube: octal, saddle (for 1N5, 1H5 & 3Q5)	.15	
	287070	Nut: 5/32 x 1/4, Inverted Palnut (ant. coil mtg.)	per/c .50	9A8766	Socket, tube: octal, wafer (for 1A7)	.15	
	287000	Nut, brass: 8-32 x 5/16 (speaker mtg.)	doz. .25	50B71097	Speaker: 6" PM; 3 ohm V.C.	8.75	
	287051	Nut: 3/8-32 x 9/16, Palnut; CP (volume control)	doz. .30	41A14244	Spring, tension coil (dial cord).	doz. .60	
	28X11368	Plug, 4 prong (for bat cable)	.10	41A19997	Spring, indicator (actuates ON-OFF indicator)	doz. .40	
	52K27662	Pointer, dial	.25	41A72506	Spring, tension (for ON-OFF indicator)	.10	
	587707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)	per/c .45	14A19980	Strip, antenna & ground lead insulating	doz. .30	
	587701	Rivet, steel: 3/16 x .122; Pol. Nkl. (output trans mtg. etc.)	per/c .45	4A70015	Washer "C" (used on tuning shaft)	per/c .70	
	587703	Rivet, steel: 7/32 x .122; Pol. Nkl. (Ant. & Gnd strip mtg.)	per/c .45	487625	Washer, steel: 1/4 x .128 x .018 thick; CP (1A7 tube socket)	per/c .50	
	587732	Rivet, steel: 1/2 x .122; Pol. Nkl. (1A7 tube socket mtg.)	doz. .40	487646	Washer, steel: 11/16 x 3/16 x .085 thick; Cop. Pl. (chassis mtg.)	per/c .80	

Prices Subject To Change Without Notice

GALVIN MFG. CORP.

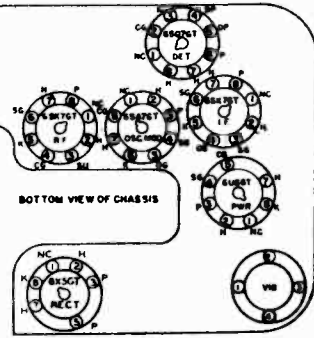
MODEL 46-C, Ch.A06



IF PEAK 262 KC

NOTE: ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

TUBE	PLATE TO GRID	GRID TO GRID
6SK7GT D F AMP	185V	74V
6SA7GT OSC MOD.	118V	115V
6SK7GT I F AMP	120V	74V
6SQ7GT DET AVC A F	36V	-2.5V
6SU6GT P W R AMP	100V	120V
6X5GT RECT.	A.C.	140V



'A' INPUT CURRENT INPUT: .7 AMP. AT 6.3 V. MAX. P.W.R. OUTPUT: .40 WATTS

DIAG. NO. 46

48A5067	Vibrator	2.50	LH30869	Front Cover & Speaker Assy.	5.10
48A5333	Vibrator	2.50		ACCESSORIES	
24A17010	Vibrator Choke	.35	41X2157	Backing Coil Spring	Fuse Rec. PerC .50
23A22738	Electrolytic Condenser FP	.75	14X2423	Fuse Insulator	Doz..20
25A23059	Output Transformer Sub. 1H29746	xxxxx	9X4075	Fuse Receptacle	Doz. .20
25B23068	Power Transformer	2.35	14X4076	Bakelite Washer Fuse Rec.	Doz. .10
24A23092	"A" Choke & Bracket	.35	14X4077	Contact Bushing-Fuse Recept.	Doz. .20
1X23094	Diode Coil & Shield Assy.	1.50	6X4141	Distributor Suppressor	.30
1X23096	IF Coil & Shield Assy.	1.35	65X4151	Bulb 6-3V.25 Amp Bayonet Type	.15
1X23098	R. F. Coil & Shield Assy.	1.30	65X4165	Fuse 15 Amp. 3AG	.05
25B23103	Power Transformer Sub. 25B23068	2.35	9X4168	"A" Lead Male Ferrule	Doz. .25
1X23107	Antenna Coil & Shield Assy.	2.65	8A4491	Generator Condenser	.40
1X24020	Tuning Unit Assy. Cpt. w/dial scale	7.60	8K4661	Ammeter Condenser	.40
1J24021	Tuning Unit & Pulley Assy. Sub. 1H24020xxxxx	39X13513		Static Collector	.10
24A24045	Oscillator Coil & Mtg. Strip	.70	42X15164	Ammeter Bronze Clip	.10
18B24046	Volume & Tone Control & Switch	1.50	36A17205	Tone Control Lever	.40
50B24158	Speaker 6" Electro	3.50	39A17479	Grounding Wiper (Curved)	.05
	Speaker Exchange	2.05	15B24256	Ash Tray Assembly	.45
15K29727	Outer Housing	2.10	7C24336	Receiver Mounting Bracket	.20
15K29730	Front Cover Only	1.70	1H29827	"A" Lead Assy (20")	.15
1J29746	Output Trans. & Eyelet Assy.	1.15	1H30775	Receiver Accessories Kit Assy.	2.15
1H30746	Rear Cover Assy.	1.75	1H30778	Fuse Lead Assy.	.20

MODEL 46-C, Ch. A06

GALVIN MFG. CORP.

ACCESSORIES (Cont'd)

1RS0781	49	Filter Lead A 3'	.45
DIAL & DRIVE PARTS			
41A2372		Dialite Baking Coil Spring	Doz. .10
37A4187		Rubber Grommet-Trimmer Eye Bkt.	Doz. .25
5S7811		Eyelet 5/16 x.210 Blk. Gang Mtg.	Doz. .20
11M6709		Dial Cord 10" Shaft Drive	Yard. .05
11M6744		Dial Cord 22" Pointer Drive	Yard. .05
41A11091		Tension Coil Spring-Large	Doz. .25
60A11579		Dial Light Socket & Clip	.05
37A12691		Rubber Grommet- Gang Mtg.	Doz. .25
41A14759		Tension Coil Spring	Doz. .25
49A18986		Cord Guide Pulley -.218 Brass	Doz. .20
37A17013		Brake Shoe Rubber Tubing	Doz. .20
35A17160		Push Button Pad (Felt)	Doz. .20
35A17294		Knob Washer (Felt) Vol. Shaft Perc.	.40
35A17640		Knob Washer (Felt)-Tun. Shaft	Doz. .15
41A18022		Compression Coil Spring	Perc .50
49A18288		Cord Guide Pulley 7/32 Wood	Doz. .20
41A21885		Brake Arm Torque Spring R.H.	Doz. .75
41E21886		Brake Arm Torque Spring L. H.	Doz. .75
1E23986		Pointer & Slider Assy.	.10
7A23997		Tuning Unit Mtg. Bkkt.	Doz. .20
7A23999		Volume Control Mtg. Bracket	Doz. .40
1K24027		Plunger Pointer & Pulley Assy.	.50
1E24536		Gang Mtg. Bkkt Assy.-R.H.	.30
47A24539		Tuning Drive Shaft	.15
36B25693		Control Knob 1/4" Tuning	.35
36E25694		Control Knob 3/16" Volume	.35
1E30835		Dial Escutcheon Assy.	2.15
1E30836		Scale & Background Assy.	.70
1E30867		Light Socket & Lead Assy Leas Bulb	.10
1E30868		Push Button & Washer Assy.	.15
1E30889		Dial Scale & Strip Assy.	.35
1E30891		Background & Strip Assy.	.25
CONDENSERS			
8A1697	26	Tubular Condenser .02-100V	.15
8A2289	24	Tubular Condenser .007-500V	.20
8A3510	18	Tubular Condenser .1-200V	.15
21P6500	27	Mica Condenser 500MUF.-20%	.15
8A13014	20	Condenser Resistor .006-100V 100K	.25
8A14095	17	Tubular Condenser .05-100V	.15
20A17217	13	Trimmer & Eye Bkkt. 6mm.	.30

CONDENSERS (Cont'd)

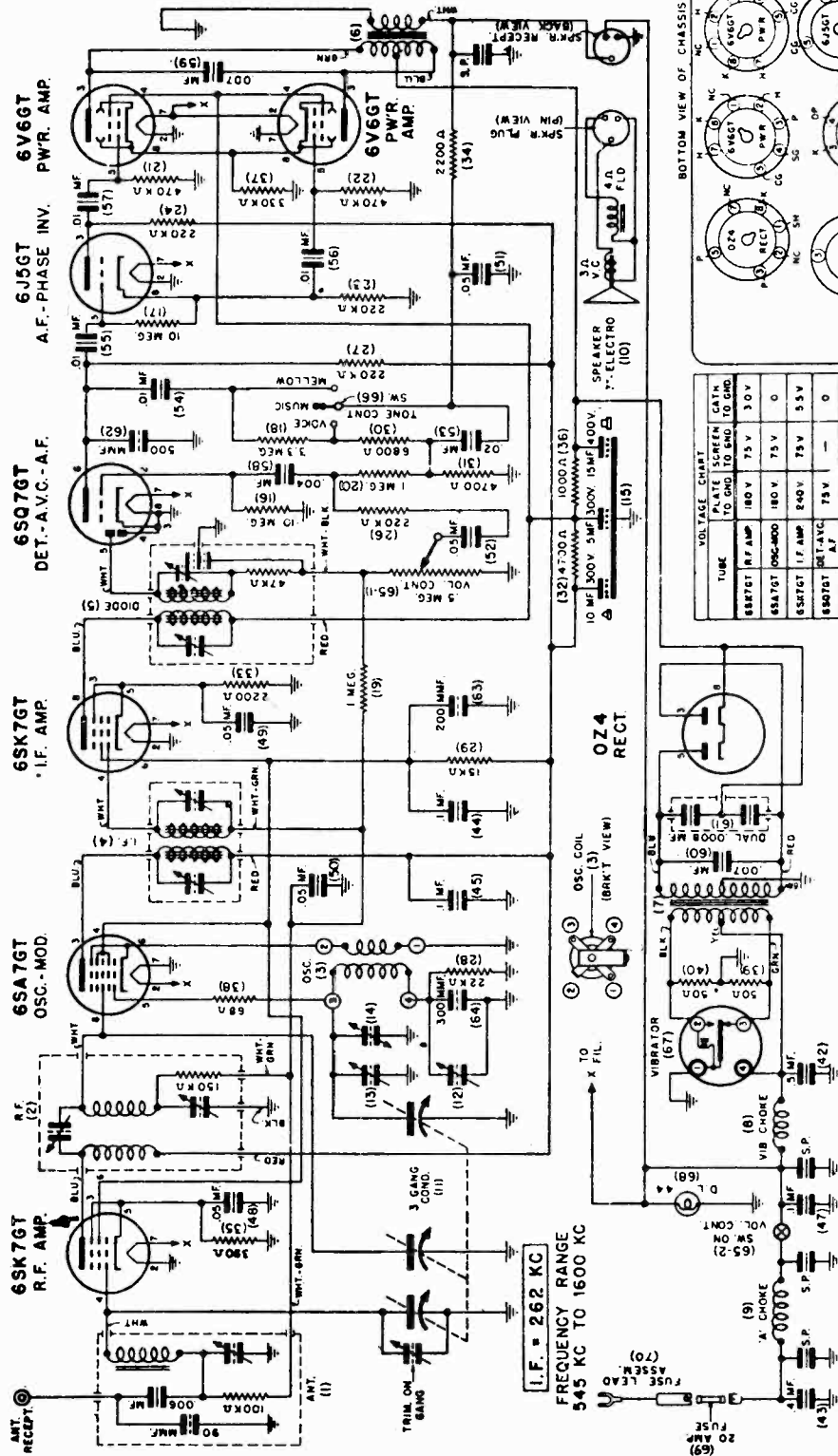
20A17935		Antenna Padder (Single)	.35
21A20877		Metal Mica Condenser 90mmf. 10%	.15
20A22747		Diode Trimmer -Small	.40
20A22751		I. F. Trimmer-Double	.30
8A22760	22	Tubular Condenser .02-600V	.15
20A23102		R. F. Trimmer & Padder	.55
21A23110	29	Ceramic Mica Condenser 300mmf 5%	.25
20A23135	12	Osc. Padder & Eye Bracket	.20
8A23146	19	Tubular Condenser .05-200V	.10
20A23827	14	Compensating Condenser	.25
8A24053	23	Tubular Condenser .02-200V	.10
8A28329	16	Tubular Condenser .5-100V	.40
RESISTORS			
686006	41	Carbon Res. 50-1/2-20 M.I.	Doz. .60
686010	39	Carbon Res. 330-1/2-20 Ins.	Doz. .60
68601E	34	Carbon Res. 33,000-1/2-20	Doz. .60
686159	30	Carbon Res. 1 Meg.-1/3-20 Ins.	Doz. .60
686160	31	Carbon Res. 470,000-1/3-20 NI	Doz. .60
686184	38	Carbon Res. 1,000-1-20-M.I.	.10
686204	33	Carbon Res. 220,000-1/3-20-Ins.	Doz. .60
686212	36	Carbon Res. 22,000-1/3-20-Ins.	Doz. .60
686256	53	Carbon Res. 68,000-1/3-20 Ins.	Doz. .60
686321		Carbon Res. 47,000-1/3-20 Ins.	Doz. .60
686329	35	Carbon Res. 33,000-1/3-20 Ins.	Doz. .60
686330	40	Carbon Res. 150-1-10 Ins.	.10
686331	43	Carbon Res. 27-1/3-10 Ins.	Doz. .60
686332	44	Carbon Res. 10-1/3-10 Ins.	Doz. .60
686339		Carbon Res. 180,000-1/3-20 Ins.	Doz. .60
686456		Carbon Res. 150-1-10 Ins	.10
SCREWS, WASHERS, ETC.			
4K4823		Cup Washer eye Bkkt. Mtg.	Doz. .10
2S7003		Nut 6-32x5/16 Hex CP-Spktr.	Perc .50
2S7005		Nut 6-32x1/4 Hex CP Ant. Coil	Perc .40
2S7022		Nut 1/4-20x7/16 Hex CP Set Mtg.	Perc .60
2S7070		Nut 6-32x1/4 Inv. Pal CP-Coils	Perc .60
2S7093		Nut 6-32x1/4 Pal CP-Coils	Perc .45
3S7160		Screw 8-32x3/16 CP Blunger Assy	Perc .35
3S7163		Screw 8-32x1/4CP Osm.	.35
3S7215		Screw 1/4" PHBMS CP Eye Bkkt.	Doz. .25
3S7217		Screw 1" Brass Ant. Padder Mtg.	Perc .90
3S7224		Screw 1/4" Brass Ant. Core Mtg.	Perc .50
3S7250		Screw 8-32x1" Bra. Choke Mtg.	Perc 1.00
3S7295		Screw 1/4-20x3/4CP Set Mtg.	Doz. .30

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SCREWS, WASHERS, ETC. (Cont'd)

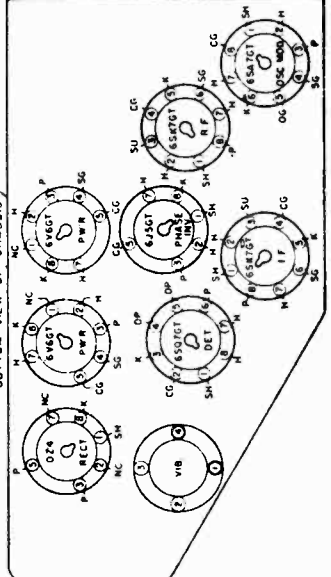
4S7573		Washer 11/16 CP-Choke Mtg.	Doz. .15
4S7635		Washer 7/8 CP -Set Mtg.	Doz. .25
4S7653		Lockwasher 5/16 Int./ext CP-Set Mrg.Doz.	.45
4S7657		Lockwasher #6 Ext. CP-Spktr.	Perc .50
4S7665		Lockwasher #6 Sp. co. Blk.-Ant. Coil	Perc .75
4S7666		Lockwasher #6 Ext. Blk. Ant. Coil	Perc .50
4S7680		Lockwasher #6 Int. PHBr.-Osc.	Perc .55
4S7688		Lockwasher 1/4 Int./ext CP Set Mtg.	Doz. .20
3A13748		Screw 8-32x17/32 CP-Tuner Mtg.	Doz. .20
4A16962		Tuning Unit Cup Washer	Doz. .20
3A16990		Shoulder Screw 6/28 Torque Spring	Doz. .35
2S17206		Nut 1/2-20x5/8 Braas Vol. Cont.	Doz. .75
2K18722		Nut 1/2-20x5/4 Cop. Pl.-Vol. Cont.	Doz. .75
4A19632		Spring Washer 7/16 Tuning Shaft	Doz. .30
4A21577		"C" Washer-Tuning Shaft	Perc .65
4A24047		Spacer Washers Set Mtg.	Doz. .50
4E24124		"C" Washer Push Buttons	Perc .85
4E24207		Flat Washer Chrome Set Mtg.	.05
3A24808		Upset Screw Coils	Doz. .35
4A29614		Cup Washer Set Mtg.	Doz. .45
3S7454		Screw #8x1/4 CP Misc. Mtg.'s	Doz. .20
3S7455		Screw #8x3/8 co. Housing	Doz. .20
3S7457		Screw #8x7/8 CP Coil Mtg.	Doz. .25
3S7461		Screw #8x5/16 CO-Housing	Doz. .15
3S7475		Screw #8x1/4 CP-Esc. Mtg.	Perc .65
3S7499		Screw #8x5/8 CO -Housing	Perc 1.00
MISCELLANEOUS			
4E24215		Vibrator Grounding Clip	Doz. .75
29S2529		Soldering Lug (Long Tab)	Doz. .15
986734		Tube Socket Saddle 4-Prong	.15
986771		Tube Socket Saddle Octal	.15
9A9774		Tube Socket Saddle Octal	.15
5S7820		Eyelet Brass CP Spkr. Lead	Perc .60
5S7824		Eyelet Brass Dial Cord	Perc .25
3SX10544		Plug Button 1/4" Cop Oz.	Doz. .85
9A12735		Elect. Ins. Wafer 1A5/1A	.10
31A14655		Terminal Strip 3 Ins.#3 Mtg.	.06
9E14906		Elect. Ins. Wafer Armita	Doz. .15
37A17899		Sponge Rubber Pad-Rear Cover	Doz. .30
42A18168		Cable Clamp-Filter Lead	Perc .60
42A18169		Cable Clamp-Filter Lead	Perc .60
37C24048		Speaker Gasket Rubber	.45
59A24662		Hood Wiper-Spktr. Gndg.	Doz. .40
26A26283	51	Tube Shield	.05
1E29709		Choke Spark Plate Assy.	.10

GALVIN MFG. CORP.



VOLTAGE CHART
TUBE VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER. S.P. - SPARK PLATE.

TUBE	GRID 1 TO GND	GRID 2 TO GND	GRID 3 TO GND	SCREEN TO GND	PLATE TO GND	SPARK PLATE TO GND
6SK7GT R.F. AMP.	180V	75V	0	75V	0	
6SA7GT OSC.-MOD.	180V	75V	0	75V	5.5V	
6SK7GT I.F. AMP.	240V	75V	0	75V	5.5V	
6SQ7GT DET.-A.V.C.-A.F.	75V	0	0	0	0	
6J5GT A.F.-PHASE INV.	70V	0	0	0	80V	
6V6GT P.W.R. AMP.	250V	240V	19V	19V	19V	
6V6GT P.W.R. AMP.	250V	240V	19V	19V	19V	
6V6GT P.W.R. AMP.	A.C.	A.C.	A.C.	A.C.	250V	



MODELS 47-D1, Ch. A03,
47-D1A

GALVIN MFG. CORP.

PARTS LIST MODEL 47-D1

DIAG. NO.	PART NO.	DESCRIPTION	LIST	PART NO.	DESCRIPTION	LIST	DIAG. NO.
MAJOR PARTS				DIAL & DRIVE (Cont'd.)			
67	48K11026	Vibrator - Blk.	\$2.50	1X23782	Dial Light Assembly Less Bulb	\$0.10	
	1X17346	Choke & Brackets Assembly . . . . .	.60	34B23882	Dial Scale. . . . .	.30	
65	1K17377	Vol. Control & Shaft Assembly	1.00	36A24412	Control Knob. . . . .	.20	
CONDENSERS							
6	25A23649	Output Transformer.	1.25	8A1897	Tubular Condenser .02-100v. . . . .	.15	53
15	23A23651	Electrolytic Condenser. . . . .	.85	8A3302	Tubular Condenser .1-100v. . . . .	.15	47
7	25B23652	Power Transformer	2.80	8A3314	Tubular Condenser .004-120v. . . . .	.20	58
	19B23653	Tuning Unit & Gang - Subs. 1X24944.	XXXX	20A4604	Compensating Trimmer Condenser. . . . .	.35	14
5	1X23654	Diode Coil & Shield Assembly.	1.55	8A4925	Dual Tub. Condenser .0008-.0008-1000v. . . . .	.25	61
4	1X23656	I.F. Coil & Shield Assembly	1.40	21B6500	Molded Mica Condenser 500mmf-20%. . . . .	.15	62
				21B6501	Molded Mica Condenser 200mmf-20%. . . . .	.15	63
2	1X23670	R.F. Coil & Shield Assembly	1.75	8A13014	Condenser Resistor .006-100v.-100K. . . . .	.25	
1	1X23673	Antenna Coil & Shield Assembly.	2.65	8K13166	Tubular Condenser .1-400v. . . . .	.15	44
	1X23675	Osc. Coil & Leads Assembly. . . . .	.65	8A13506	Tubular Condenser .007-1000v. . . . .	.15	59
				8A13514	Tubular Condenser .05-100v. . . . .	.15	48
				8A14095	Tubular Condenser .4-100v. . . . .	.30	43
				8K15166	Tubular Condenser .007-1600v. . . . .	.35	60
	1X23772	Tone Switch Assembly Cpt.	1.30	20A17237	Trimmer & Eye Brkt. 6 mmf . . . . .	.20	13
				20A17935	Antenna Padder - Single . . . . .	.35	
	1X24944	Gang, Pulley & Brake Assembly.	5.10	8A19133	Tubular Condenser .5-100v. . . . .	.30	42
				21A20877	Metal Mica Condenser 90mmf-10%. . . . .	.15	
ACCESSORIES				RESISTORS			
	7B24365	Receiver Mounting Bracket . . . . .	.25	6B6005	Carbon Resistor 50-1/2-20 . . . . .	.60	39
	8A4491	Generator Condenser . . . . .	.40	6B6013	Carbon Resistor 15,000-1-20 N.I. . . . .	.10	29
69	65X4637	Fuse 20 Amp 3 AG. . . . .	.05	6B6070	Carbon Resistor 150,000-1/3-20 N.I. . . . .	.60	
	39X4817	Shirt Marker - Rattle Clip. . . . .	.25	6B6159	Carbon Resistor 1 Meg-1/3-20 Ins. . . . .	.60	19
	43A13743	Spacer Bushing - Short (Spkr.). . . . .	.40	6B6160	Carbon Resistor 470,000-1/3-20 N.I. . . . .	.60	22
	6X17117	Dist. Suppressor - Plug-In. . . . .	.35	6B6184	Carbon Resistor 1000-1-20 N.I. . . . .	.10	36
	1X17263	Antenna Brkt. & Recpt. Assembly . . . . .	.25	6B6201	Carbon Resistor 3.3 meg-1/3-20 Ins. . . . .	.60	18
	1X17358	Speaker Cable & Plug. . . . .	.25	6B6204	Carbon Resistor 220,000-1/3-20 Ins. . . . .	.60	26
	43A17389	Cover Mtg. Spacer Sleeve - Long . . . . .	.10	6B6212	Carbon Resistor 22,000-1/3-20 Ins. . . . .	.60	28
	43A17390	Cover Mtg. Spacer Sleeve - Short. . . . .	.05	6B6254	Carbon Resistor 330-1-10 Ins. . . . .	.10	37
	39A17391	Housing Wiper . . . . .	.PAIR	6B6240	Carbon Resistor 2,200-1/3-20 Ins. . . . .	.60	34
	64B17583	Speaker Screen & Gasket . . . . .	.05	6B6321	Carbon Resistor 47,000-1/3-20 Ins. . . . .	.60	
	43A17931	Receiver Mtg. Sleeve. . . . .	.10	6B6335	Carbon Resistor 1000-1/3-10 Ins. . . . .	.60	
70	1X18174	Fuse Lead Assembly 7" . . . . .	.15	6B6348	Carbon Resistor 10 meg-1/3-20 Ins. . . . .	.60	16
	1X18175	"A" Lead Assembly 18" . . . . .	.15	6B6349	Carbon Resistor 220,000-1/3-10 Ins. . . . .	.60	23
				6B6350	Carbon Resistor 6,800-1/3-10 Ins. . . . .	.60	30
	1X24313	M333 Fuel Gauge Filter. . . . .	.10	6B6351	Carbon Resistor 4,700-1/3-10 Ins. . . . .	.60	31
DIAL & DRIVE				SCREWS, WASHERS, ETC.			
	43X4326	Steel Ball (Tun. Cont.) . . . . .	.35	2S7005	Nut 6-32x1/4 Hex CP - Gang Mtg. . . . .	.40	
	5S7811	Eyelet 5/16x.210 Blk (Gang Mtg.). . . . .	.20	2S7018	Nut 3/8-32x1/2 Hex CP - Vol. Cont . . . . .	.15	
	11M9709	Dial Cord 30# Blk. 10" . . . . .	.YARD	2S7022	Nut 1/4-20x7/16 Hex CP - Set Brkt . . . . .	.60	
	11M9744	Dial Cord 18# Blk.-Whit. . . . .	.YARD	2S7030	Nut 10-24x5/8 Hex Br. - Cvr. Mtg. . . . .	.75	
68	65X10867	Bulb 6-8v. Tub. Bay. Clr. #44 . . . . .	.10	2S7035	Nut 5/16-18x5/8 CP - Set Mtg. . . . .	.20	
	41A11091	Tension Coil Spring (Large) . . . . .	.DOZ.	3S7215	Screw 8-32x3/16 CP - Trimmer. . . . .	.25	
	14A11212	Insulating Bushing (Gang Brkt.) . . . . .	.25	3S7274	Screw 4-36x3/16 CP - Tone Ratchet . . . . .	.15	
	37A12691	Rubber Grommet - Pure Gum (Gang Mtg.) . . . . .	.DOZ.	3S7347	Screw 5-40x1/2 CP - Tone Sw . . . . .	.55	
	41A14759	Tension Coil Spring (Small) . . . . .	.DOZ.	3S7350	Lockscrew 6-32x1/4 CP - T.C. Mtg. . . . .	.80	
	32A16633	Fibre Spacer Washer (P.B.). . . . .	.PER C.	3S7454	Screw 8x1/4 PK Z PLHH CP. . . . .	.20	
	38A16972	Push Button & Stud. . . . .	.15	3S7455	Screw 8x3/8 PK A SLAH CO - Hsg. . . . .	.20	
	43X17241	Nut Bearing Assembly (Tun. Shaft) . . . . .	.35	3S7456	Screw 8x1/4 PK A ACHD Cop. Oxd. . . . .	.65	
	62A17367	Dial Crystal. . . . .	.10	3S7457	Screw 8x7/8 PK A CP - Coil Mtg. . . . .	.25	
	1K17373	Tuning Shaft Assembly . . . . .	.35	3S7499	Screw 8x5/8 PK A Cop. Oxd.-Hsg.	1.00	
	1X17407	Tuning Control Assembly . . . . .	.40				
	38A17410	Call Letters & Instructions . . . . .	.30				
	35A17428	Push Button Cushion (Felt) 6 hole . . . . .	.DOZ.				
	38A17573	Tone Button Tab . . . . .	.05				
	38K17574	Tone Tab Cover. . . . .	.DOZ.				
	38A18447	Push Button Jacket. . . . .	.20				
	60A23728	Dial Background . . . . .	.15				
	1K23766	Dial Pointer. . . . .	.10				
	1X23770	Pointer, Pulley & Mtg. Assembly. . . . .	.30				

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

GALVIN MFG. CORP.

MODELS 47-D1, 47-D1A
MODEL 47-D2

MODEL 47D2 PARTS PRICE LIST
SAME AS MODEL 47D1A EXCEPT:

PART NO.	DESCRIPTION	LIST	PER C.
8A11400	Tubular Condenser .01-100V	.15	
8A22898	Tubular Condenser .007-600V	.20	
14X2423	Fuse Insulator	Doz. .20	
8A3310	Tubular Condenser .1-200V	.15	
14X4077	Contact Bushing Fuse	Doz. .20	
65X1165	Fuse 15 Amp 3AG	.05	
48A5353	Vibrator	2.50	
686610	Carbon Resistor 330-1/2-20 Ins.	Doz. .60	
686054	Carbon Resistor 10,000-1/2-20 Ins.	Doz. .60	
686165	Carbon Resistor 100,000-1/3-20 Ins.	Doz. .60	
686330	Carbon Resistor 150-1-10-Ins.	.10	
686332	Carbon Resistor 10-1/3-10 Ins.	Doz. .60	
6866554	Carbon Resistor 8,200-1/3-10 Ins.	Doz. .60	
686355	Carbon Resistor 39,000-1/3-20 Ins.	Doz. .60	
686356	Carbon Resistor 22-1/3-10 Ins	Doz. .60	
686456	Carbon Resistor 150-1-10-Ins.	.10	
5S7820	Eyellet Speaker Cable Small	Per .60	
5S7855	Eyellet Speaker Cable Large	Per .70	
8A12841	Tubular Condenser .05-300V	.15	
21A12843	Ceramic Condenser 50 mmf-20-100	.15	
31K14509	Terminal Strip 4 Ins. #3 Mtg.	.05	
9K14906	Elect. Ins. Wafer Armite	Doz. .15	
14K16252	Dialite Bushing Contact	Doz. .20	
1X17350	Light Socket & Lead Assy.	.20	
20A18179	Compensating Condenser	.25	
1X20526	Speaker Cable & Tips Assy.	.20	
23A22738	Electrolytic Condenser Fp	.76	
8A22760	Tubular Condenser .02-660V	.15	
25A23059	Output Transformer	1.00	
25B23068	Power Transformer	2.35	
24A23792	Oscillator Coil	.65	
19B23793	Tuning Unit & Gang Sub. 1B23825	xxxx	
25B23794	Power Transformer Sub. 25B23068	2.35	
1X23796	Diode Coil & Shield Assy.	1.55	
1X23798	IF Coil & Shield Assy.	1.49	
1X23905	Antenna Coil & Shield Assy.	2.00	
1X28810	Oscillator Coil & Leads Assy.	.65	
1X23825	Tuning Unit Assy.	4.50	
21A26226	Tubular Ceramic Condenser 50mmf	.10	
39K26814	Grounding Wiper	Doz. .30	
40A26969	Tone Control Switch	.45	
1B2793	Receiver Accessory Kit Assy.	1.76	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 47-D1 Continued

PART NO.	DESCRIPTION	LIST	PER C.
337506	Screw 6x1/4 PK A CP - Osc. Coil . . . . .	.50	
337512	Screw 6x1/2 PK 2 CP - Gang Mtg. . . . .	.70	
337516	Screw 8x3/8 PK A Blk. Oxd.-Wiper.	1.00	
437552	Washer 7/16 CP - Gang Mtg. . . . .	.35	
437613	Washer 3/4 BO - Cover	1.00	
437635	Washer 7/8 CP - Set Brkt. . . . .	.25	
437649	Washer 1 & 5/16 Wrt. CP-Set Mtg. . . . .	.35	
437660	Lockwasher #6 Int. CP - Gang Mtg. . . . .	.60	
437655	Lockwasher 3/8 Split Blk. - V.C. Sw. PER C.	.60	
437657	Lockwasher #8 Ext. BO - Sm. Tone Brkt. PER C.	.50	
437658	Lockwasher #10 Int. Blk. - Cvr. Mtg. PER C.	.35	
437670	Lockwasher 1/4 Int. - Set Brkt. . . . .	.50	
437674	Lockwasher 5/16 Int. CP-Set Mtg. . . . .	.35	
437678	Lockwasher 1/4 Ext. BO - Set Brkt. . . . .	.60	
338126	Screw 8x1 1/4 PK A-Per. Trans. . . . .	.20	
43L1722	"C" Washer 1 1/32 CP - Vol. Cont. . . . .	.35	
3A17588	Cover Mtg. Screw 10-24 Spec. . . . .	.45	
2A17589	Wing Nut 10-24x1 3/8 CO - Cover . . . . .	.30	
1X17921	Screw & Bushing Assembly - Spkr . . . . .	.05	
3A18008	Serrated Cap Screw - Set Mtg. . . . .	.20	
2A20464	Speaker Mounting Nut. . . . .	.20	
4A23716	Camping Washer Plate - Tone Drum . . . . .	.80	
2A24411	Mounting Nut. . . . .	.85	
4A2406	Clutch Spring Washer 7/16 Brz. Per C. . . . .	.75	
6A428678	Trim Strip Chrome	.40	
39B29608	Push Button & Stud Plain	.15	
38E9611	Push Button & Stud Tone	.15	
1B9789	Receiver Access. Kit Assy.	1.86	
15E29795	Housing Shell	1.45	
48A5067	Vibrator	2.50	
48K11026	Vibrator (Black)	2.50	
1X17246	Chokes & Bracket Assy.	.60	
2A117362	Vibrator Choke B Ple	.35	
24A17363	"A" Choke (Optic)	.25	
25A23649	Output Transformer	1.25	
23A23651	Electrolytic Condenser	.85	
25B23652	Power Transformer	2.80	
19B23653	Tuning Unit & Gang Sub. 1B23676	xxxx	
1B23654	Diode Coil & Shield Assy.	1.55	
1X23656	I.F. Coil & Shield Assy.	1.40	
1X23670	R. F. Coil & Shield Assy.	1.75	
37A1197	Rubber Grommet - Trimmer. . . . .	.DOZ. \$0.25	
4K4923	Cup Washer Cop. Pl. - Trimmer. . . . .	.DOZ. .10	
9B6754	Tube Socket Saddle 4 prong. . . . .	.15	
9B6771	Tube Socket Saddle Octal. . . . .	.15	
9A6774	Tube Socket Saddle Octal. . . . .	.15	
38X10544	Plug Button 1/4" Cop. Oxd. . . . .	.DOZ. .25	
14K11244	Insulating Washer - Gang Brkt.	PER C. .05	
7A17549	Vol. Control Mtg. Bracket . . . . .	.05	
24A17542	Vibrator Choke - 8 ple. . . . .	.35	
24A17543	"A" Choke - 2 ple. . . . .	.25	
38X10543	Plug Button (1/2 for 1/16) CO . . . . .	.DOZ. .35	
56X23811	Packing Carton & Fillers. . . . .	.40	
6A411245	Switch Holding Plate - Tone Sw. . . . .	.DOZ. .25	
41A23718	Coil Spring - Large - Tone Drum . . . . .	.DOZ. .30	
45A23713	Ratchet Pawl (Tinned) Tone Drum . . . . .	.DOZ. .30	
7A23720	Indicator Bracket (Small) Center. . . . .	.10	
3A23722	Tone Indicator Strip. . . . .	.10	
1A23723	Pawl Brkt. & Shaft Assembly . . . . .	.10	
1A23742	Tone Control Mtg. Switch. . . . .	.25	
67B23747	Indicator Drum & Cam. . . . .	.25	
41A23759	Coil Spring (Small) Tone Drum . . . . .	.70	
45X23760	Ratchet Pawl (Phos. Brz.) Tone Drum . . . . .	.30	
45X23760	Spacer Bushing - T.C. Mtg. . . . .	.DOZ. .25	
15E29796	R.H. Bottom Cover	1.30	
15E29797	L. H. Top Cover	1.40	
50B29974	Speaker 7" Electro	4.75	
50B29975	Speaker Exchange	2.80	
68E29976	Speaker 7" Electro	4.75	
68E29976	Front Housing	1.85	
1X23673	Antenna Coil & Shield Assy.	2.65	
1X23675	Oscillator Coil & Leads Assy.	.65	
1X23676	Tuning Unit Assy.	6.75	
46A27593	Vibrator (Heavy Duty)	2.50	
15E29795	Housing Shell	1.45	
50B29974	Speaker 7" Electro	4.75	
50B29975	Speaker Exchange	2.80	
1X23677	Vol. Control Shaft & Mtg. Assy.	.90	
1B23677	Bottom Cover Assy R. H.	1.40	
1B23674	Top Cover Assy. L. H.	1.50	

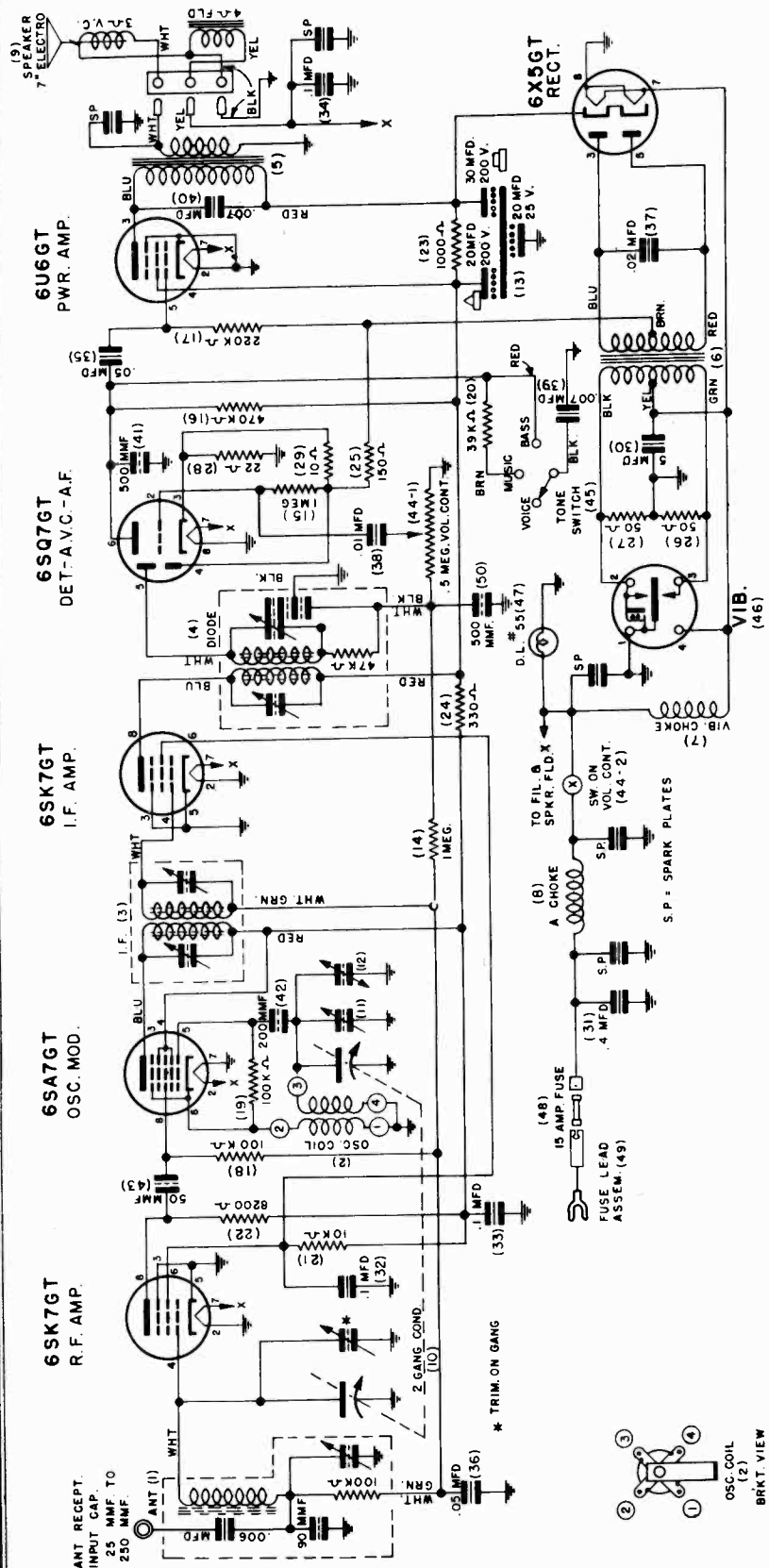
CIRCUIT SAME AS 47 D 1

MODEL 47D1A PARTS PRICE LIST MAJOR PARTS

PART NO.	DESCRIPTION	LIST	PER C.
48A5067	Vibrator	2.50	
48K11026	Vibrator (Black)	2.50	
1X17246	Chokes & Bracket Assy.	.60	
2A117362	Vibrator Choke B Ple	.35	
24A17363	"A" Choke (Optic)	.25	
25A23649	Output Transformer	1.25	
23A23651	Electrolytic Condenser	.85	
25B23652	Power Transformer	2.80	
19B23653	Tuning Unit & Gang Sub. 1B23676	xxxx	
1B23654	Diode Coil & Shield Assy.	1.55	
1X23656	I.F. Coil & Shield Assy.	1.40	
1X23670	R. F. Coil & Shield Assy.	1.75	

MODELS 47-D2, Ch. A17;
47-D2A, Ch. A18

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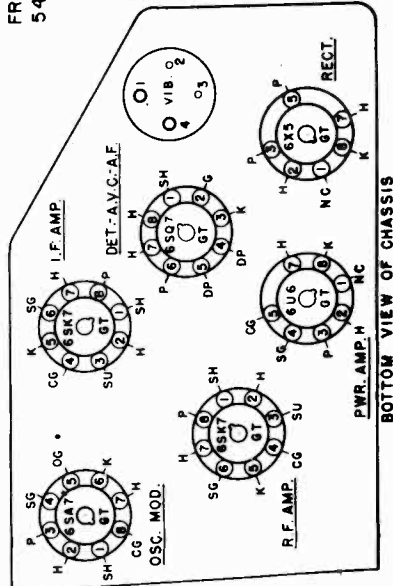


I.F. = 455 KC

FREQUENCY RANGE =
545 KC TO 1600 KC

TUBE	PLATE SCREEN CATH. TO GND TO GND TO GND.
6SK7GT RF AMP	105 V 100V 0
6SA7GT OSC. MOD.	100 V 100V 0
6SK7GT I.F. AMP.	105 V 100 V 0
6SQ7GT DET. A.V.C.	35 V — 1.35 V
6U6GT PWR. AMP.	135 V 105 V 0
6X5GT RECT. A.C.	— 140 V

ALL MEASUREMENTS MADE WITH A 1000 OHM PER VOLT METER

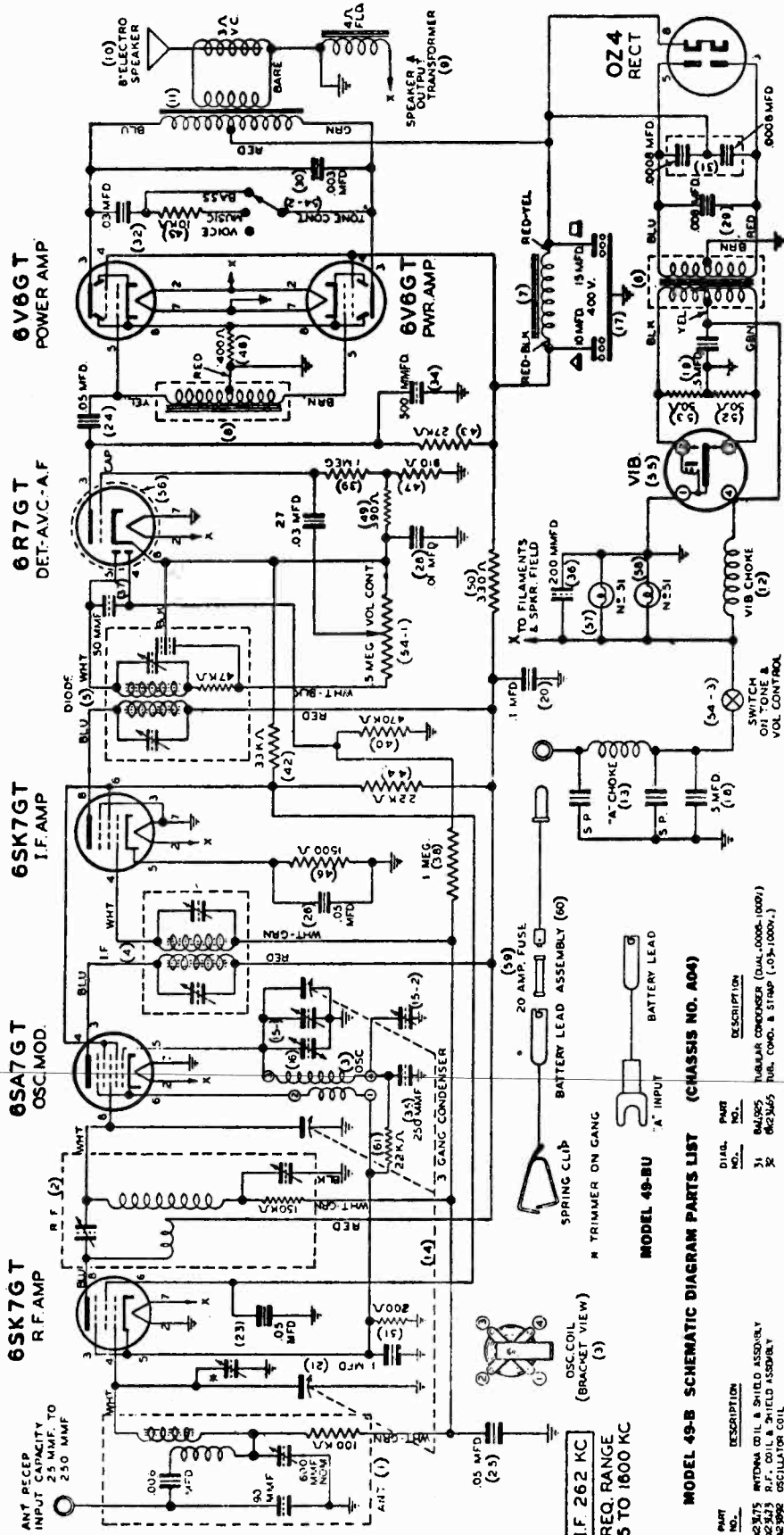


BOTTOM VIEW OF CHASSIS

Part No.	Description	Part No.	Description
1	ANT. RECEPTOR	15	6SK7GT
2	OSC. COIL	16	6SA7GT
3	2 GANG COND.	17	6SK7GT
4	TRIMMER CAP.	18	6SQ7GT
5	500 OHM RES.	19	6U6GT
6	100 OHM RES.	20	6X5GT
7	100 OHM RES.	21	7" SPEAKER
8	100 OHM RES.	22	ANT. CAP.
9	100 OHM RES.	23	1000 OHM RES.
10	100 OHM RES.	24	200 OHM RES.
11	100 OHM RES.	25	100 OHM RES.
12	100 OHM RES.	26	100 OHM RES.
13	100 OHM RES.	27	100 OHM RES.
14	100 OHM RES.	28	100 OHM RES.
15	100 OHM RES.	29	100 OHM RES.
16	100 OHM RES.	30	100 OHM RES.
17	100 OHM RES.	31	100 OHM RES.
18	100 OHM RES.	32	100 OHM RES.
19	100 OHM RES.	33	100 OHM RES.
20	100 OHM RES.	34	100 OHM RES.
21	100 OHM RES.	35	100 OHM RES.
22	100 OHM RES.	36	100 OHM RES.
23	100 OHM RES.	37	100 OHM RES.
24	100 OHM RES.	38	100 OHM RES.
25	100 OHM RES.	39	100 OHM RES.
26	100 OHM RES.	40	100 OHM RES.
27	100 OHM RES.	41	100 OHM RES.
28	100 OHM RES.	42	100 OHM RES.
29	100 OHM RES.	43	100 OHM RES.
30	100 OHM RES.	44	100 OHM RES.
31	100 OHM RES.	45	100 OHM RES.
32	100 OHM RES.	46	100 OHM RES.
33	100 OHM RES.	47	100 OHM RES.
34	100 OHM RES.	48	100 OHM RES.
35	100 OHM RES.	49	100 OHM RES.
36	100 OHM RES.	50	100 OHM RES.
37	100 OHM RES.	51	100 OHM RES.
38	100 OHM RES.	52	100 OHM RES.
39	100 OHM RES.	53	100 OHM RES.
40	100 OHM RES.	54	100 OHM RES.
41	100 OHM RES.	55	100 OHM RES.
42	100 OHM RES.	56	100 OHM RES.
43	100 OHM RES.	57	100 OHM RES.
44	100 OHM RES.	58	100 OHM RES.
45	100 OHM RES.	59	100 OHM RES.
46	100 OHM RES.	60	100 OHM RES.
47	100 OHM RES.	61	100 OHM RES.
48	100 OHM RES.	62	100 OHM RES.
49	100 OHM RES.	63	100 OHM RES.
50	100 OHM RES.	64	100 OHM RES.
51	100 OHM RES.	65	100 OHM RES.
52	100 OHM RES.	66	100 OHM RES.
53	100 OHM RES.	67	100 OHM RES.
54	100 OHM RES.	68	100 OHM RES.
55	100 OHM RES.	69	100 OHM RES.
56	100 OHM RES.	70	100 OHM RES.
57	100 OHM RES.	71	100 OHM RES.
58	100 OHM RES.	72	100 OHM RES.
59	100 OHM RES.	73	100 OHM RES.
60	100 OHM RES.	74	100 OHM RES.
61	100 OHM RES.	75	100 OHM RES.
62	100 OHM RES.	76	100 OHM RES.
63	100 OHM RES.	77	100 OHM RES.
64	100 OHM RES.	78	100 OHM RES.
65	100 OHM RES.	79	100 OHM RES.
66	100 OHM RES.	80	100 OHM RES.
67	100 OHM RES.	81	100 OHM RES.
68	100 OHM RES.	82	100 OHM RES.
69	100 OHM RES.	83	100 OHM RES.
70	100 OHM RES.	84	100 OHM RES.
71	100 OHM RES.	85	100 OHM RES.
72	100 OHM RES.	86	100 OHM RES.
73	100 OHM RES.	87	100 OHM RES.
74	100 OHM RES.	88	100 OHM RES.
75	100 OHM RES.	89	100 OHM RES.
76	100 OHM RES.	90	100 OHM RES.
77	100 OHM RES.	91	100 OHM RES.
78	100 OHM RES.	92	100 OHM RES.
79	100 OHM RES.	93	100 OHM RES.
80	100 OHM RES.	94	100 OHM RES.
81	100 OHM RES.	95	100 OHM RES.
82	100 OHM RES.	96	100 OHM RES.
83	100 OHM RES.	97	100 OHM RES.
84	100 OHM RES.	98	100 OHM RES.
85	100 OHM RES.	99	100 OHM RES.
86	100 OHM RES.	100	100 OHM RES.

MODELS 49-B, Ch. A04;
49-BU, Ch. A11

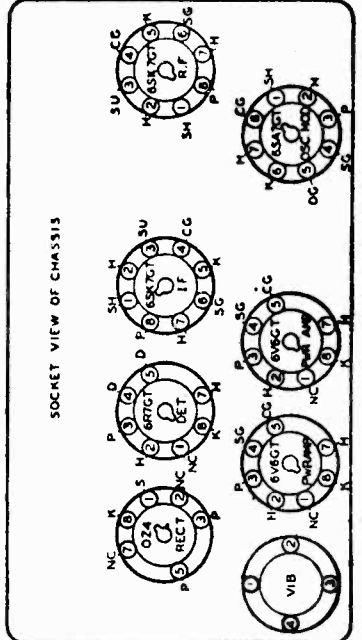
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VOLTAGE CHART

TUBE	PLATE SCREEN CATH. TO GRID TO GND
6SA7GT	270 V 75 V 3.5 V
6SK7GT	270 V 75 V 3.5 V
6R7GT	270 V 75 V 4.5 V
6V6GT	135 V - - 9.3 V
6V6GT	277 V 275 V 19 V
OZ4	RECT. A.C. - - 280 V

CURRENT DRAIN 9.5 AMPS AT 9.3 V
MAXIMUM POWER OUTPUT 10 WATTS
ALL VOLTAGES MEASURED ON A
1000 OHMS PER VOLT VOLTMETER



MODEL 49-B SCHEMATIC DIAGRAM PARTS LIST (CHASSIS NO. A04)

DIAL NO.	PART NO.	DESCRIPTION
1	102175	ANTENNA COIL & SHIELD ASSEMBLY
2	112243	RF COIL & SHIELD ASSEMBLY
3	2145292	OSCILLATOR COIL
4	112271	1" COIL & SHIELD ASSEMBLY
5	112269	DIODE COIL & SHIELD ASSEMBLY
6	294750	PUSH TRANSFORMER
7	254346	IF COIL
8	508261	SPEAKER & OUTPUT TRANSFORMER
9	508262	SPEAKER (P. ELECTRIC)
10	291199	OUTPUT TRANSFORMER ONLY
11	242283	"A" CHOK
12	242284	"A" CHOK
13	112267	TUNING UNIT, GANG & RALLEY ASSEMBLY
14	2011753	OSC. TRIMMER, PHOSPH. & PRT.
15	208282	COMPENSATING CONDENSER
16	208283	ELECTRICAL CAPACITOR (5-100 V.)
17	611708	TUBULAR CONDENSER (1-100V.)
18	611913	TUBULAR CONDENSER (1-100V.)
19	611316	TUBULAR CONDENSER (1-100V.)
20	611316	TUBULAR CONDENSER (1-100V.)
21	611316	TUBULAR CONDENSER (1-100V.)
22	611316	TUBULAR CONDENSER (1-100V.)
23	611316	TUBULAR CONDENSER (1-100V.)
24	611316	TUBULAR CONDENSER (1-100V.)
25	611316	TUBULAR CONDENSER (1-100V.)
26	611316	TUBULAR CONDENSER (1-100V.)
27	611316	TUBULAR CONDENSER (1-100V.)
28	611316	TUBULAR CONDENSER (1-100V.)
29	611316	TUBULAR CONDENSER (1-100V.)
30	611316	TUBULAR CONDENSER (1-100V.)
31	612365	TUBULAR CONDENSER (DUAL-0000-1000)
32	612365	TUB. COND. & STAMP (0.5-1000V.)
33	6186500	MOLDED MICA COND. (500 MFD) 20K
34	2141703	CERAMIC MICA COND. (500 MFD) 50K
35	2182701	MOLDED MICA COND. (500 MFD) 20K
36	2182701	MOLDED MICA COND. (500 MFD) 20K
37	6186500	MOLDED MICA COND. (500 MFD) 20K
38	6186500	MOLDED MICA COND. (500 MFD) 20K
39	6186500	MOLDED MICA COND. (500 MFD) 20K
40	6186500	MOLDED MICA COND. (500 MFD) 20K
41	6186500	MOLDED MICA COND. (500 MFD) 20K
42	6186500	MOLDED MICA COND. (500 MFD) 20K
43	6186500	MOLDED MICA COND. (500 MFD) 20K
44	6186500	MOLDED MICA COND. (500 MFD) 20K
45	6186500	MOLDED MICA COND. (500 MFD) 20K
46	6186500	MOLDED MICA COND. (500 MFD) 20K
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91	6186500	MOLDED MICA COND. (500 MFD) 20K
92	6186500	MOLDED MICA COND. (500 MFD) 20K
93	6186500	MOLDED MICA COND. (500 MFD) 20K
94	6186500	MOLDED MICA COND. (500 MFD) 20K
95	6186500	MOLDED MICA COND. (500 MFD) 20K
96	6186500	MOLDED MICA COND. (500 MFD) 20K
97	6186500	MOLDED MICA COND. (500 MFD) 20K
98	6186500	MOLDED MICA COND. (500 MFD) 20K
99	6186500	MOLDED MICA COND. (500 MFD) 20K
100	6186500	MOLDED MICA COND. (500 MFD) 20K

MODEL 49-B, Ch. A04,
49-BU, Ch. A11

GALVIN MFG. CORP.

MODEL 49-Bu PARTS PRICE LIST
SAME AS MODEL 49-B EXCEPT:

4S7688	Lockwasher 1/4 Int. Ext. Set Mtg.	Doz. .20	15K30749	Welded Shell & Back	3.75
3S8039	Cap Screw 1/4-20x3/8 CP Set Mtg.	Doz. .40	7A30754	Receiver Mounting Bracket R. H.	.15
11M8709	Dial Cord 30 lb. Blk.	Yard .05	7K30755	Receiver Mounting Bracket L. H.	.15
11M8744	Dial Cord 18 lb. Blk. Wht.	Yard .05	50B31086	Speaker & Output Transformer	6.35
37A17285	Light Bracket Band	Doz. .20		Speaker Exchange	3.75
1X24844	Fuse Lead Assy.	.10	1H31143	Battery Lead Assy.	.25
1H29794	Receiver Accessories Kit Assy.	1.25	1J31179	Escutcheon & Pad Assy.	1.60
60A30048	Dial Scale Background	.15	1J31186	Dial Scale & Pads Assy.	.25
18B30314	Volume & Tone Switch	1.70	1J31187	Push Button Assy.	.15
47K30318	Tuning Drive Shaft	.25	1H31192	Background & Strips Assy.	.20
36K30341	Tuning Control Knob 1/4" Hole	.25	50B31555	Speaker & Output Transformer	6.35
36K30342	Volume Control Knob 3/16" Hole	.25		Speaker Exchange	3.75
37A30716	Dial Scale Pad	Per C .80			

MODEL 49-B PARTS PRICE LIST
MAJOR PARTS

48K11026	Vibrator Blk.	2.50	15K30286	Welded Back & Shell	3.75
25B17099	Output Transformer	1.50	18B30643	Volume & Tone Control	1.70
25A17103	Filter Choke	.75		ACCESSORIES	
23A17190	Electrolytic Condenser FF	1.00	41X2157	Backing Coil Spring Fuse Lead	Per .50
25B23250	Power Transformer	3.65	14X2423	Fuse Insulator Fuse Lead	Doz. .20
25A23466	Input Choke	1.70	9X4075	Fuse Receptacle Fuse Lead	Doz. .20
24K23467	Vibrator Choke 6 Pie	.50	14X4076	Backing Washer Fuse Lead	Doz. .10
1X23468	Oscillator Coil & Leads Assy.	.65	14X4077	Contact Bushing Fuse Lead	Doz. .20
1X23469	Diode Coil & Shield Assy	1.50	6X4141	Distributor Suppressor	.30
1X23471	I.F. Coil & Shield Assy.	1.40	9X4168	"A" Lead Male Ferrule	Doz. .25
1X23473	R. F. Coil & Shield Assy.	1.75	1X4288	Battery Lead Assy.	.40
1X23475	Antenna Coil & Shield Assy.	2.75	8A4491	Generator Condenser	.40
24K23483	"A" Choke	.25	65X4637	Fuse 20 Amp 3AG	.05
1X23487	Front Cover & Bushing Assy.	1.25	1X4894	Fuse Lead Assembly 20"	.25
50B23621	Speaker & Output Transformer	5.50	1X4895	"A" Lead Assembly 10"	.25
	Speaker Exchange	3.25	65X12712	Fuse 20 Amp SFE	.05
1X24205	Tuning Unit Assy Cpt. W Dial	6.80	1H29790	Receiver Accessory Kit Assy.	1.20
50B24493	Speaker & Output Transformer	5.50		DIAL & DRIVE PARTS	
50B24929	Speaker & Output Transformer	5.50	41A2372	Dialite Backing Coil Spring	Doz. .10
48A27393	Vibrator Heavy Duty	2.50	65X4181	Bulb 6-8V Rnd. Bay Clr. #51	.15
1H29928	Bottom Cover Assy.	.85	41A11091	Tension Coil Spring Pointer Drive	Doz. .25
1J30145	Trimmers Brkt. & Grommet Assy.	.40	41A14759	Tension Coil Spring Shaft Drive	Doz. .25

GALVIN MFG. CORP.

MODEL 49-B, Ch. A04;
49-BU, Ch. A11

DIAL & DRIVE PARTS (Cont'd)

14K15882	Dialite Contact Bushing	Doz	.20
38A17093	Call Letter Tab Cover		.05
38A17094	Call Letter Backing		.05
35A17160	Push Button Pad Felt	Doz.	.20
1B17171	Push Button Plunger Assy.		.20
60A17178	Dial Light Socket & Bracket		.05
35A17224	Knob Washer Felt	Per C	.40

CONDENSERS

8K13166	Tubular Condenser .1-400V		.15
8A13514	Tubular Condenser .05-100V		.15
8A14791	Tubular Condenser .05-400V		.15
8A17028	Tubular Condenser .5-100V		.25
20A17153	Double Trimmer & Spec.Brkt.		.35
20A17935	Antenna Padder Single		.35
21A19088	Ceramic Condenser 250mmf 5%		.20
8A19185	Tubular Condenser .5-100V		.30
21A20877	Metal Mica Condenser 90mmf 10%		.15
20A22747	Diode Trimmer		.40
20A22751	I. F. Trimmer Double		.30
20A23102	R. F. Trimmer & Padder		.55
20A23827	Compensating Condenser		.25
8K23465	Tubular Cond. & Strap .03-1000V		.25

RESISTORS

6B5558	Carbon Resistor 200-1/3-10 Ins.	Doz.	.60
6B6005	Carbon Resistor 50-1/2-20 N.I.	Doz.	.60
6B6010	Carbon Resistor 330-1/2-20 Ins.	Doz.	.60
6B6012	Carbon Resistor 33,000-1/2-20 Ins.	Doz.	.60
6B6159	Carbon Resistor 1 Meg-1/3-20 Ins.	Doz.	.60
6B6212	Carbon Resistor 22,000-1/3-20 Ins.	Doz.	.60
6B6255	Carbon Resistor 10,000-1/3-20 Ins.	Doz.	.60
6B6321	Carbon Resistor 47,000-1/3-20 Ins.	Doz.	.60
6B6338	Carbon Resistor 470,000-1/3-20 Ins.	Doz.	.60
6B6339	Carbon Resistor 150,000-1/3-20 Ins.	Doz.	.60
6B6340	Carbon Resistor 27,000-1/3-10 Ins.	Doz.	.60
6B6341	Carbon Resistor 22,000-1-10 Ins.		.10
5B6342	Carbon Resistor 1,500-1/3-20 Ins.	Doz.	.60
6B6343	Carbon Resistor 910-1/3-5 Ins.	Doz.	.60
6B6344	Carbon Resistor 400-1-20 Ins.		.10
6B6345	Carbon Resistor 390-1/3-10 Ins.	Doz.	.60
6B6457	Carbon Resistor 22,000-1-10 Ins.		.10

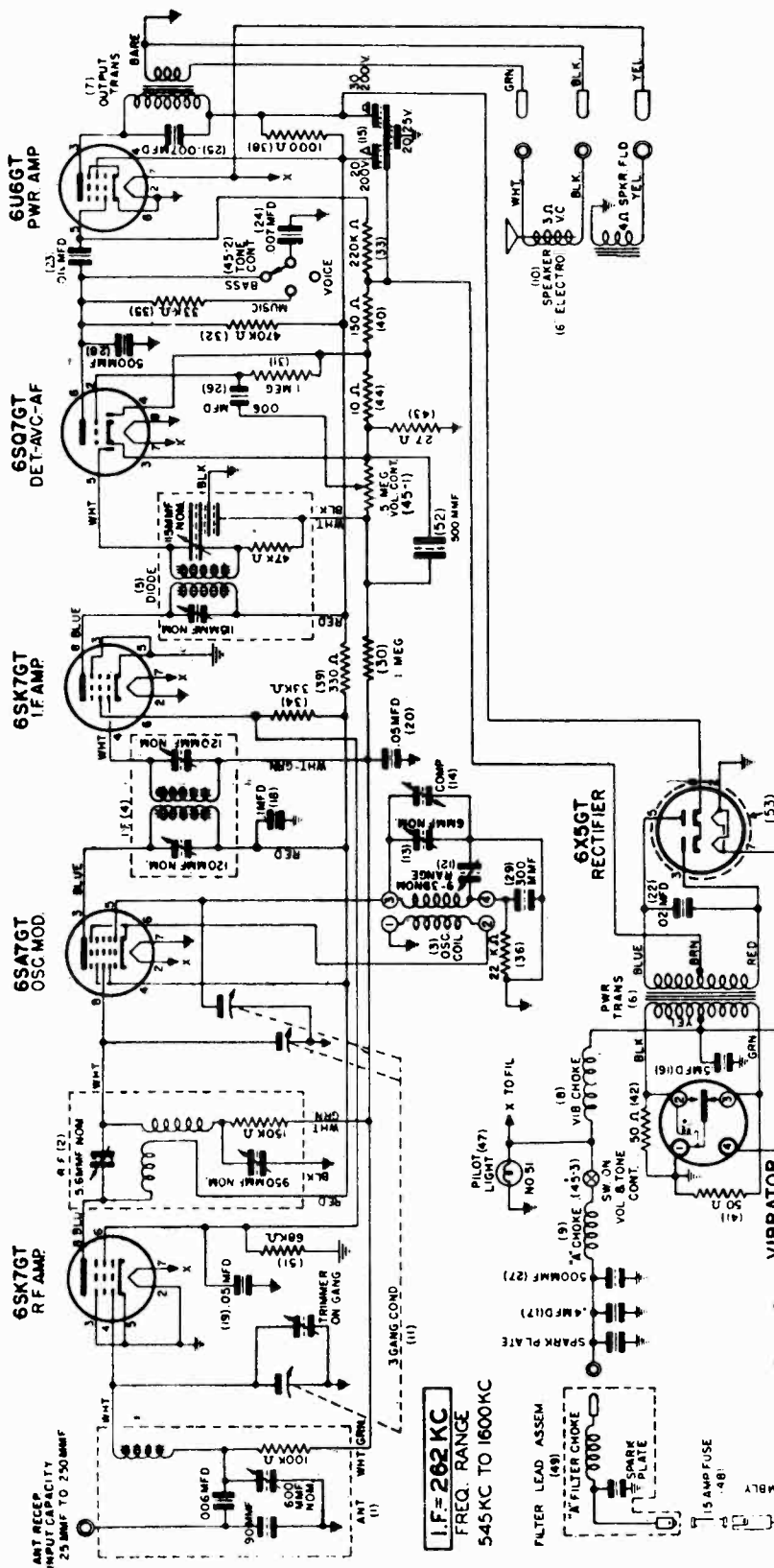
SCREWS, WASHERS, ETC.

4K4823	Cup Washer Cop. Pl Trimmer Mtg.	Doz.	.10
2S7003	Nut 8032x5/16 Hex CP Spkr.	Per C	.50
2S7005	Nut 6-32x1/4 Hex CP Ant. Coil	Per C	.40
2S7022	Nut 1/4-20x7/16 Hex Set Mtg.	Per C	.60
2S7070	Nut 6-32x1/4 Inv. Pal Coils	Per C	.50
2S7093	Nut 6-32x1/4 Pal Cop. Pl Coils	Per C	.45
3S7160	Screw 3/16" CP Plunger Bkt. Mtg.	Per C	.35

SCREWS, WASHERS, ETC. (Cont'd)

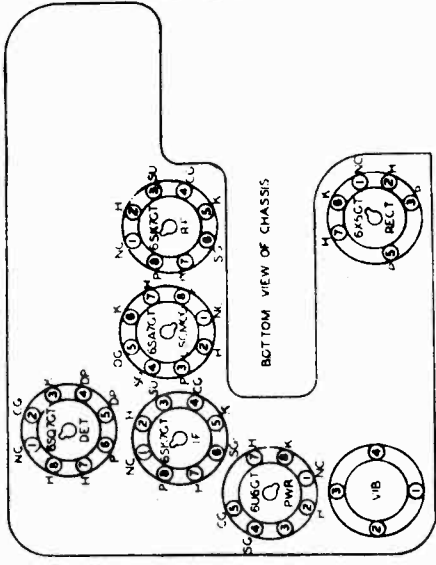
3S7217	Screw 1" Brass Ant. Padder Mtg.	Per C	.90
3S7224	Screw 1/4" Brass Coils	Per C	.50
3S7454	Screw #8x1/4 CP Misc. Mtg.	Doz.	.20
3S7456	Screw #8x1/4 Cop. Ox. Housing	Per C	.65
3S7457	Screw 7/8" CP Coil Mtgs.	Doz.	.25
3S7461	Screw 5/16" Cop Ox. Housing	Doz.	.15
3S7499	Screw 5/8" Cop. Ox. Housing	Per C	.00
3S7506	Screw #6x1/4 CP Osc. Mtg.	Per C	.50
3S7508	Screw 1/4" Blk Tuning Unit Mtg.	Per C	.65
4S7609	Washer 1-5/16" CP Set Mtg	Doz.	.35
4S7635	Washer 7/8" CP Set Mtg.	Doz.	.25
4S7650	Lockwasher #6 Int. CP Eye Bkt. Mtg.	Per C	.50
4S7657	Lockwasher #8 Ext. Spkr.	Per C	.50
4S7665	Lockwasher #6 Spec. Coils	Per C	.75
4S7666	Lockwasher #6 Ext. Ant. Coil	Per C	.50
4S7670	Lockwasher 1/4" Int. -Set Mtg.	Per C	.50
5S7831	Eyelet 13/16" Long-P.B. Plunger	Doz.	.25
3S8126	Screw 1-1/4" CP -Pwr. Trans.	Doz.	.20
3S8131	Screw 1-7/8" SS -Choke Mtg.	Doz.	.65
3A13748	Screw 17/32" CP-Gang Bkt. Mtg.	Doz.	.20
2K18722	Nut Cop. Pl Hex -Vol.Cont.	Doz.	.75
2K23491	Spacer Nut Hex Vol. Cont.		.15
3A23753	"J" Bolt -Set Mtg.	Doz.	.60
4K24124	"C" Washer -Tuning Shaft	Per C	.85
4A24333	Cup Washer -Chrome Tuning Nut	Doz.	.50
MISCELLANEOUS			
31A493	Terminal Strip 2 ins. #2 Mtg.		.05
31A3224	Terminal Strip 3 ins. #3 Mtg.		.10
37A4187	Rubber Grommet-Eye Bkt. Mtg.	Doz.	.25
39X4205	Hood Woper-Power Trans.	Doz.	.25
42A4215	Vibrator Grounding Clip	Doz.	.75
29B5249	Soldering Lug	Per C	.75
29B5265	Soldering Lug.	Doz.	.20
29B5404	Insl. Pin Terminal Rqd "A" Lead		.05
42B5480	Grid Clip Small Collar Grip	Doz.	.15
9B6734	Tube Socket Saddle 4 Prong		.15
9B6771	Tube Socket Saddle Octal		.15
9A6774	Tube Socket Saddle Octal		.15
9A6782	Tube Socket Inverted Octal		.15
38X10544	Plug Button 1/4" Cop. Ox.	Doz.	.25
37A12691	Rubber Grommet Gang Mtg.	Doz.	.25
37X14051	Rubber Sleeve "A" Lead	Doz.	.20
26X14760	Bantam Tube Shield		.05
37A15831	Sponge Rubber Pad- Bottom Cover	Doz.	.45
39A17179	Grounding Wiper-Bottom Cover		.05
37A17216	Speaker Gasket Front Cover		.15
32A18493	Fibre Space Washer Dial Light's	Per C	.35
26A26283	Tube Shield		.05
26C24534	Hash Shield		.05
64K30296	Speaker Screen		.10

Prices subject to change without notice.



MODEL 50-P SCHEMATIC DIAGRAM PARTS LIST (CHASSIS TYPE A05)

DIAG. NO.	PART NO.	DESCRIPTION
1	1422901	ANTENNA COIL & SHIELD ASSEMBLY
2	1422902	OSCILLATOR COIL & LEAD ASSEMBLY
3	1422903	I.F. COIL & SHIELD ASSEMBLY
4	1422904	DIODE COIL & SHIELD ASSEMBLY
5	2563103	POWER TRANSFORMER
6	2563104	OSCILLATOR TRANSFORMER
7	2563105	"A" CHOK & PROCTOR
8	2563106	SPEAKER (5" ELECTRO)
9	5081175	TUNING LIMIT JANG & VALLEY ASSEMBLY
10	1422905	OSC. PLUGGER & PART (S-29 MPD.)
11	1422906	OSC. PLUGGER & PART (S-29 MPD.)
12	2042379	COMPENSATING CONDENSER
13	2562736	ELECT. COND. (30-20/5000-20/25K.)
14	6A42529	TUBULAR CONDENSER (1.5-100K.)
15	6A42530	TUBULAR CONDENSER (1.5-100K.)
16	6A42531	TUBULAR CONDENSER (1.5-100K.)
17	6A42532	TUBULAR CONDENSER (1.5-100K.)
18	6A42533	TUBULAR CONDENSER (1.5-100K.)
19	6A42534	TUBULAR CONDENSER (1.5-100K.)
20	6A42535	TUBULAR CONDENSER (1.5-100K.)
21	6A42536	TUBULAR CONDENSER (1.5-100K.)
22	6A42537	TUBULAR CONDENSER (1.5-100K.)
23	6A42538	TUBULAR CONDENSER (1.5-100K.)
24	6A42539	TUBULAR CONDENSER (1.5-100K.)
25	6A42540	TUBULAR CONDENSER (1.5-100K.)
26	2182200	WELDED RESISTOR (50,000-1/5-40) 1/2W.
27	2182201	WELDED RESISTOR (50,000-1/5-40) 1/2W.
28	2182202	WELDED RESISTOR (50,000-1/5-40) 1/2W.
29	2182203	WELDED RESISTOR (50,000-1/5-40) 1/2W.
30	2182204	WELDED RESISTOR (50,000-1/5-40) 1/2W.
31	2182205	WELDED RESISTOR (50,000-1/5-40) 1/2W.
32	2182206	WELDED RESISTOR (50,000-1/5-40) 1/2W.
33	2182207	WELDED RESISTOR (50,000-1/5-40) 1/2W.
34	2182208	WELDED RESISTOR (50,000-1/5-40) 1/2W.
35	2182209	WELDED RESISTOR (50,000-1/5-40) 1/2W.
36	2182210	WELDED RESISTOR (50,000-1/5-40) 1/2W.
37	2182211	WELDED RESISTOR (50,000-1/5-40) 1/2W.
38	2182212	WELDED RESISTOR (50,000-1/5-40) 1/2W.
39	2182213	WELDED RESISTOR (50,000-1/5-40) 1/2W.
40	2182214	WELDED RESISTOR (50,000-1/5-40) 1/2W.
41	2182215	WELDED RESISTOR (50,000-1/5-40) 1/2W.
42	2182216	WELDED RESISTOR (50,000-1/5-40) 1/2W.
43	2182217	WELDED RESISTOR (50,000-1/5-40) 1/2W.
44	2182218	WELDED RESISTOR (50,000-1/5-40) 1/2W.
45	2182219	WELDED RESISTOR (50,000-1/5-40) 1/2W.
46	2182220	WELDED RESISTOR (50,000-1/5-40) 1/2W.
47	2182221	WELDED RESISTOR (50,000-1/5-40) 1/2W.
48	2182222	WELDED RESISTOR (50,000-1/5-40) 1/2W.
49	2182223	WELDED RESISTOR (50,000-1/5-40) 1/2W.
50	2182224	WELDED RESISTOR (50,000-1/5-40) 1/2W.
51	2182225	WELDED RESISTOR (50,000-1/5-40) 1/2W.
52	2182226	WELDED RESISTOR (50,000-1/5-40) 1/2W.
53	2182227	WELDED RESISTOR (50,000-1/5-40) 1/2W.
54	2182228	WELDED RESISTOR (50,000-1/5-40) 1/2W.
55	2182229	WELDED RESISTOR (50,000-1/5-40) 1/2W.
56	2182230	WELDED RESISTOR (50,000-1/5-40) 1/2W.
57	2182231	WELDED RESISTOR (50,000-1/5-40) 1/2W.
58	2182232	WELDED RESISTOR (50,000-1/5-40) 1/2W.
59	2182233	WELDED RESISTOR (50,000-1/5-40) 1/2W.
60	2182234	WELDED RESISTOR (50,000-1/5-40) 1/2W.
61	2182235	WELDED RESISTOR (50,000-1/5-40) 1/2W.
62	2182236	WELDED RESISTOR (50,000-1/5-40) 1/2W.
63	2182237	WELDED RESISTOR (50,000-1/5-40) 1/2W.
64	2182238	WELDED RESISTOR (50,000-1/5-40) 1/2W.
65	2182239	WELDED RESISTOR (50,000-1/5-40) 1/2W.
66	2182240	WELDED RESISTOR (50,000-1/5-40) 1/2W.
67	2182241	WELDED RESISTOR (50,000-1/5-40) 1/2W.
68	2182242	WELDED RESISTOR (50,000-1/5-40) 1/2W.
69	2182243	WELDED RESISTOR (50,000-1/5-40) 1/2W.
70	2182244	WELDED RESISTOR (50,000-1/5-40) 1/2W.
71	2182245	WELDED RESISTOR (50,000-1/5-40) 1/2W.
72	2182246	WELDED RESISTOR (50,000-1/5-40) 1/2W.
73	2182247	WELDED RESISTOR (50,000-1/5-40) 1/2W.
74	2182248	WELDED RESISTOR (50,000-1/5-40) 1/2W.
75	2182249	WELDED RESISTOR (50,000-1/5-40) 1/2W.
76	2182250	WELDED RESISTOR (50,000-1/5-40) 1/2W.
77	2182251	WELDED RESISTOR (50,000-1/5-40) 1/2W.
78	2182252	WELDED RESISTOR (50,000-1/5-40) 1/2W.
79	2182253	WELDED RESISTOR (50,000-1/5-40) 1/2W.
80	2182254	WELDED RESISTOR (50,000-1/5-40) 1/2W.
81	2182255	WELDED RESISTOR (50,000-1/5-40) 1/2W.
82	2182256	WELDED RESISTOR (50,000-1/5-40) 1/2W.
83	2182257	WELDED RESISTOR (50,000-1/5-40) 1/2W.
84	2182258	WELDED RESISTOR (50,000-1/5-40) 1/2W.
85	2182259	WELDED RESISTOR (50,000-1/5-40) 1/2W.
86	2182260	WELDED RESISTOR (50,000-1/5-40) 1/2W.
87	2182261	WELDED RESISTOR (50,000-1/5-40) 1/2W.
88	2182262	WELDED RESISTOR (50,000-1/5-40) 1/2W.
89	2182263	WELDED RESISTOR (50,000-1/5-40) 1/2W.
90	2182264	WELDED RESISTOR (50,000-1/5-40) 1/2W.
91	2182265	WELDED RESISTOR (50,000-1/5-40) 1/2W.
92	2182266	WELDED RESISTOR (50,000-1/5-40) 1/2W.
93	2182267	WELDED RESISTOR (50,000-1/5-40) 1/2W.
94	2182268	WELDED RESISTOR (50,000-1/5-40) 1/2W.
95	2182269	WELDED RESISTOR (50,000-1/5-40) 1/2W.
96	2182270	WELDED RESISTOR (50,000-1/5-40) 1/2W.
97	2182271	WELDED RESISTOR (50,000-1/5-40) 1/2W.
98	2182272	WELDED RESISTOR (50,000-1/5-40) 1/2W.
99	2182273	WELDED RESISTOR (50,000-1/5-40) 1/2W.
100	2182274	WELDED RESISTOR (50,000-1/5-40) 1/2W.



NOTE: VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

TUBE	PLATE	SCREEN	GRID	TO GND	TO BND
6S07GT	15V	7AV	0		
6SA7GT	15V	15V	0		
6SK7GT	120V	7AV	0		
6S07GT	35V		-2 BV		
6U6GT	140V	120V	0		
6X5GT	RECT.	A C			143V

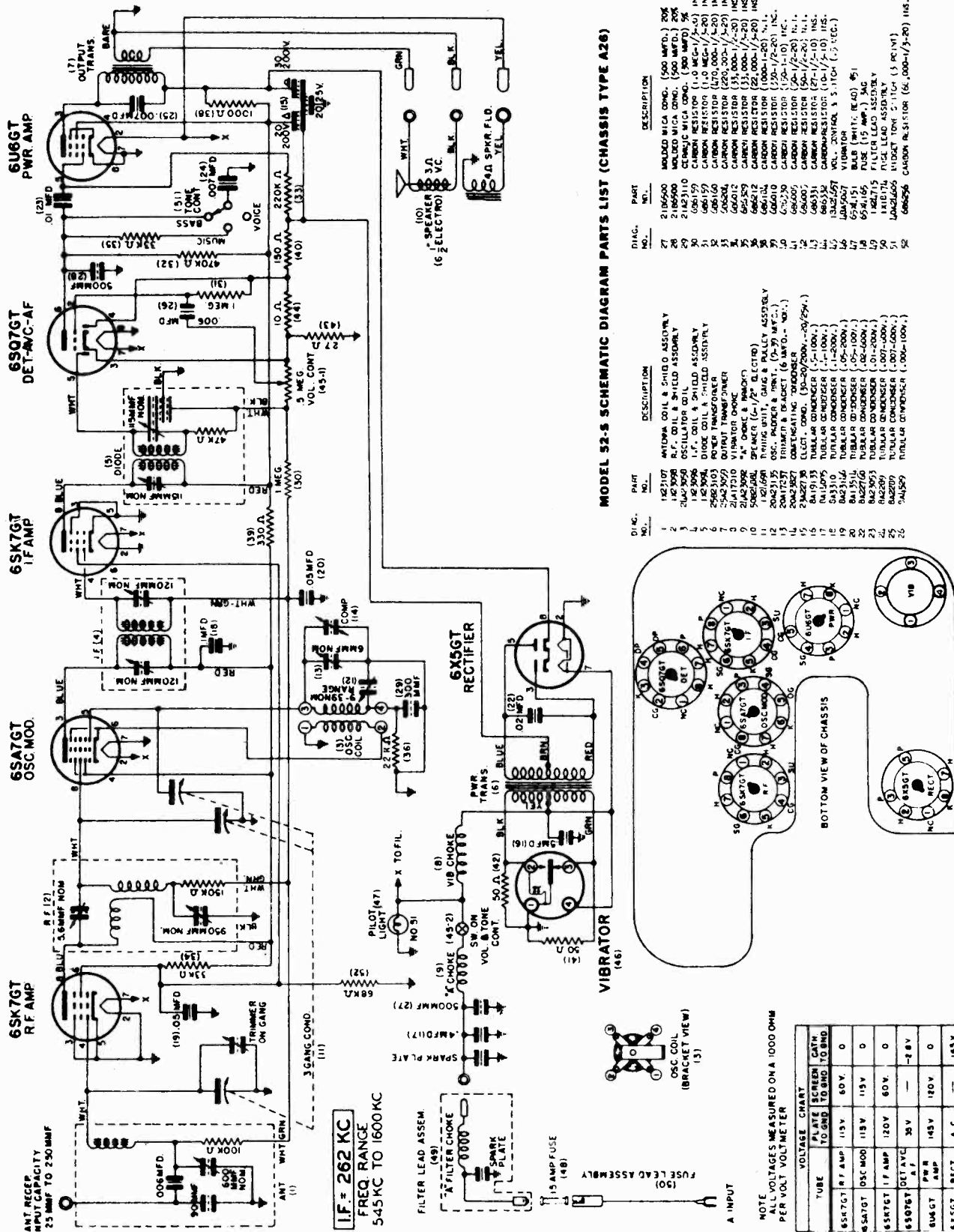
GALVIN MFG. CORP.

Part No.	Description	Quantity	Unit	Price	Notes
48A5067	Vibrator	2.00	Doz.	.25	
24A17010	Vibrator Shake	.35	Doz.	.20	
23A22798	Electrolytic Condenser FF	.75	Doz.	.20	
25A23059	Output Transformer	1.00	Per C	.40	
24B22068	"A" Choke & Shield	2.35	Doz.	.15	
24A25092	I.F. Coil & Shield Assy.	1.35	Doz.	.75	
25B23103	Power Transformer Sub. 25B23068	XXX	Doz.	.75	
13X23632	Instrument Panel Overlay Chrome	.95		.10	
18B23944	Volume & Tone Control & Switch	1.50		.15	
13X23968	Diode Coil & Shield Assy.	1.60		.20	
13X23979	R. F. Coil & Shield Assy.	1.75		.20	
13X23981	Antenna Coil & Shield Assy.	2.65		.45	
13X23988	Osc. Coil & Leads Assy.	.65		1.70	
50B84176	Speaker 6" Electro	3.65		.35	
	Speaker Exchange	2.15		.30	
50B24470	Speaker 6 1/2" Electro	3.65		.30	
13X24950	Gang Pulley & Brake Assy.	5.25		.15	
15E29765	Outer Housing	2.40		.15	
15E29768	Front Cover	1.95		.25	
13X1242	Front Cover & Speaker Assy.	7.70		.15	
13X1244	Rear Cover Assy.	1.90		.20	
ACCESSORIES					
14X2423	Fuse Inulator "A" Lead	Doz.		.20	
6X4141	Distributor Suppressor	.30		.15	
6X4155	Fuse 15 Amp 3AG	.05		.15	
30X4205	Hood Wiper	Doz.		.25	
8A4491	Generator Condenser	.40		.25	
8X4651	Ameter Condenser	.40		.25	
59A17479	Grounding Wiper Curved	.05		.30	
13X2408	Fuse Lead Assy 16"	.15		.20	
37C23651	Speaker Basket Only	.45		.35	
43B23903	Bushing .662-.659-.343 CP Set Mtg.	.10		.65	
39/24562	Grounding Wiper Brass Chas.	Per C		.50	
39X29036	Shirt Marker	1.60		1.00	
13X29791	Receiver Accessories Assy	.30		.85	
13X1241	Filter Lead Assy	.30		.15	
DIAL & DRIVE PARTS					
41A2372	Dialite Backing Coil Spring	Doz.		.15	
587911	Eyelet 5/16x.210 Blk Gang Mtg.	Doz.		.15	
587924	Eyelet 3/16x.100 Brass Dial Cord	Per C		.15	
11M8744	Dial Cord Blk Wnt Patn.	Yard		.15	
11M8977	Dial Cord Nylon Shaft	Yard		.60	
41A11091	Tension Coil Spring Large	Doz.		.70	
80A11579	Dialite Socket & Clip	.05		.10	
65X11854	Bulb 6/3V-15A Tub Ray. Clr. #47	.10		.25	
37A12691	Rubber Grommet Gang Mtg.	Doz.		.20	
3A12748	Locking Screw 8-32x17/32 CP Gr-8	Loz.		.20	
41A14759	Tension Coil Spring Dr. Pul.	Doz.		.25	
14X15252	Dialite Bushing Contact	Doz.		.20	
49A16985	Card Shoe Pulley .218 Brass	Doz.		.20	
37A17013	Knob Guide Rubber	Per C		.40	
55A17224	Knob Washer Felt Vol.	Doz.		.15	
35A17640	Knob Washer Felt Tun.	Per C		.50	
41A18022	Compression Coil Spring P.B. Assy.	Doz.		.20	
49A21741	Cord Pulley 3/8"	Doz.		.75	
41A21955	Brake Arm Torque Spring R. H.	Doz.		.75	
41B21886	Brake Arm Torque Spring L. H.	Doz.		.75	
13X2416	Pointer Assy.	.10		.10	
7B23429	Gang Mtg. Bracket Left	.15		.15	
7B23430	Gang Mtg. Bracket Right	.15		.20	
7A23666	Dialite Mounting Bracket	Doz.		.50	
13X23984	Plunger Pointer & Pulley Assy.	.45		1.70	
13X23986	Dial Background & Bkrt. Assy.	1.70		.35	
36B24556	Tone Control Lever 1x 9/32	Doz.		.30	
7A24680	Tuning Unit Mtg. Bkrt. Strip	.15		.15	
47A24682	Tuning Drive Shaft	.15		.15	
43A24853	Tuner Shaft Mtg. Bushing	.15		.25	
13X24895	Bracket & Pulleys Assy.	.25		.15	
36B25657	Control Knob 3/16"	.15		.20	
36B25665	Push Button & Stud	.15		.20	
8A22289	Tubular Condenser .007-.600V	.15		.15	
8A23010	Tubular Condenser .1-200V	.15		.15	
8A4459	Tubular Condenser .006-100V	.15		.15	
21B6500	Welded Mica Condenser 500mf 20X	.25		.15	
8A13014	Condenser Resistor .006-100V100K	.15		.30	
8A13514	Tubular Condenser .05-100V	.20		.40	
8A14095	Tubular Condenser .4-100V	.20		.35	
20A17937	Trimmer & Eye Bkrt. 6mf.	.25		.40	
20A17945	Antenna Padder Single	.25		.30	
20A20358	Compensating Condenser	.40		.15	
20A22747	Trimmer Diode Small	.15		.10	
20A22751	Double Trimmer I. F.	.55		.25	
8A22760	Tubular Condenser .02-.600V	.15		.20	
-8A23065	Tubular-Condenser .01-.800V	.15		.20	
20A23102	R. F. Trimmer & Padder	.25		.25	
21A23110	Ceramic Mic. Condenser 500mf 5X	.80		.10	
20A23138	Osc. Padder "E" Eye Bracket	.10		.40	
8A23146	Tubular Condenser .05-.200V	.40		.60	
8A23229	Tubular Condenser .5-100V	.60		.60	
RESISTORS					
68B005	Carbon Res. 50-1/2-20 M.I.	Doz.		.10	
68B010	Carbon Res. 350-1/2-20 Ins.	Doz.		.60	
68B012	Carbon Res. 33,000-1/2-20	Doz.		.60	
68B159	Carbon Res. 1 meg-1/5-20 Ins.	Doz.		.60	
68B1748	Carbon Res. 470,000-1/5-20 M. I.	Doz.		.60	
68B184	Carbon Res. 1,000-1/5-20 M. I.	Doz.		.60	
68B194	Carbon Res. 220,000-1/5-20 Ins.	Doz.		.60	
68B212	Carbon Res. 22,000-1/5-20 Ins.	Doz.		.60	
68B256	Carbon Res. 89,000-1/5-20 Ins.	Doz.		.60	
68B321	Carbon Res. 47,000-1/5-20 Ins.	Doz.		.60	
68B329	Carbon Res. 33,000-1/5-20 Ins.	Doz.		.60	
68B330	Carbon Res. 150-1/5-10 Ins.	Doz.		.60	
68B332	Carbon Res. 10-1/5-10 Ins.	Doz.		.60	
68B339	Carbon Res. 150,000-1/5-20 Ins	Doz.		.60	
SCREWS, WASHERS, ETC.					
297003	Nut 8-32x5/16 Hex CP Spkr.	Per C		.50	
297070	Nut 6-32x1/4 Inv. Pal CP Coils	Per C		.50	
357160	Screw 8-32x3/16 CP P.B. & F Assy.	Per C		.35	
357215	Screw 8-32x3/16 CP Trim Mtg.	Doz.		.25	
357250	Screw 8-32x1" Brass Choke	Per C		1.00	
357295	Screw 1/4-20x3/4 CP Set Mtg.	Doz.		.30	
357454	Screw 8x1/4 PK Z PLHR CP	Doz.		.20	
357497	Screw 8x7/8 CP Per. Trans.	Doz.		.25	
357461	Screw 8x5/16 CO Housing	Doz.		.15	
357499	Screw 8x5/8 Cop. Oxd. Ant. Recept.	Per C		1.00	
357506	Screw 8x1/4 PK CP Osc. Mtg.	Per C		.50	
457573	Washer 11/16x.043-.187 CP Choke	Doz.		.15	
457565	Washer 7/8-.281-.060 CP Sat Mtg.	Doz.		.25	
457652	Lockwasher #6 Ext. 80 Spkr	Per C		.50	
457666	Lockwasher #6 Ext. Blk Oxd. Coil	Per C		.50	
457678	Lockwasher 1/4" Ext. CP Set Mtg.	Per C		.60	
457692	Lockwasher 1/2" Int. Blk Vol. Cont.	Doz.		.20	
3A16990	Shoulder Screw 6-32 Spec.	Doz.		.35	
2517206	Nut 1/2-28x5/8 Hex Brass Vol. Cont.doz.	Doz.		.75	
4A19232	Spring Washer 7/16 Tun. Shaft	Doz.		.30	
4A21577	"C" Washer 1/8" Tun. Shaft	Per C		.65	
4A25971	Spacer Washer 3/4" O.D. CP. Prt. Mtg. Doz.	Per C		.35	
4A24124	"C" Washer P.B. Shaft	Per C		.50	
4A24335	Tuning Nut Cup Washer	Doz.		.50	
4A21348	Cup Washer Trim Mtg.	Per C		1.00	
MISCELLANEOUS					
37A1187	Rubber Grommet	Doz		.25	
28B5259	Soldering Lug Long Tab.	Doz.		.15	
98B734	Tube Socket Saddle 4 Prong	Doz.		.15	
98B760	Tube Socket Octal 90° Blk	Doz.		.15	
98B771	Tube Socket Saddle Octal	Doz.		.15	
9A8774	Tube Socket Saddle Octal	Doz.		.15	
9A8782	Tube Socket Inverted Octal	Doz.		.15	
597890	Eyelet .470-1128-.230. Bra. CSF	Per C		.60	
597855	Eyelet 1/2x.156 Bra:CS	Per C		.70	
3A11029	Terminal Strip 3 Ind. #2 Mtg.	Doz.		.10	
3A11054	Plug Button 1/4" Cop. Oxd.	Doz.		.25	

Prices subject to change without notice.

MODEL 52-S

GALVIN MFG. CORP.



MODEL 52-S SCHEMATIC DIAGRAM PARTS LIST (CHASSIS TYPE A26)

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
1	1423107	ANTENNA COIL & SHIELD ASSEMBLY	27	2185500	MOLDED MICA COND. (500 MFSD.) 20K
2	1423108	R.F. COIL & SHIELD ASSEMBLY	28	2185500	MOLDED MICA COND. (500 MFSD.) 20K
3	1423109	OSCILLATOR COIL	29	21423110	CERAMIC MICA COND. (500 MFSD.) 5K
4	1423110	I.F. COIL & SHIELD ASSEMBLY	30	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
5	2542304	DIODE COIL & SHIELD ASSEMBLY	31	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
6	2542305	DIODE COIL & SHIELD ASSEMBLY	32	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
7	5443079	OUTPUT TRANSFORMER	33	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
8	21417210	VIBRATOR DRIVE	34	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
9	2142308	"A" CHOK & WINDING	35	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
10	5482308	SPEAKER (1/2" ELECT.)	36	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
11	2042307	TRIMMER (10K-20K) (50-200K) (50-250K)	37	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
12	2042308	TRIMMER (10K-20K) (50-200K) (50-250K)	38	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
13	2042309	TRIMMER (10K-20K) (50-200K) (50-250K)	39	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
14	2042310	TRIMMER (10K-20K) (50-200K) (50-250K)	40	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
15	2142309	ELECT. COND. (50-200K) (50-250K)	41	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
16	6A1913	TUBULAR CONDENSER (1-100K)	42	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
17	6A1914	TUBULAR CONDENSER (1-100K)	43	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
18	6A1915	TUBULAR CONDENSER (1-100K)	44	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
19	6A1916	TUBULAR CONDENSER (1-100K)	45	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
20	6A1917	TUBULAR CONDENSER (1-100K)	46	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
21	6A1918	TUBULAR CONDENSER (1-100K)	47	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
22	6A1919	TUBULAR CONDENSER (1-100K)	48	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
23	6A1920	TUBULAR CONDENSER (1-100K)	49	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
24	6A1921	TUBULAR CONDENSER (1-100K)	50	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
25	6A1922	TUBULAR CONDENSER (1-100K)	51	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.
26	6A1923	TUBULAR CONDENSER (1-100K)	52	686159	CARBON RESISTOR (1.0 MEG./1/2-20) 1/4" W.

GALVIN MFG. CORP.

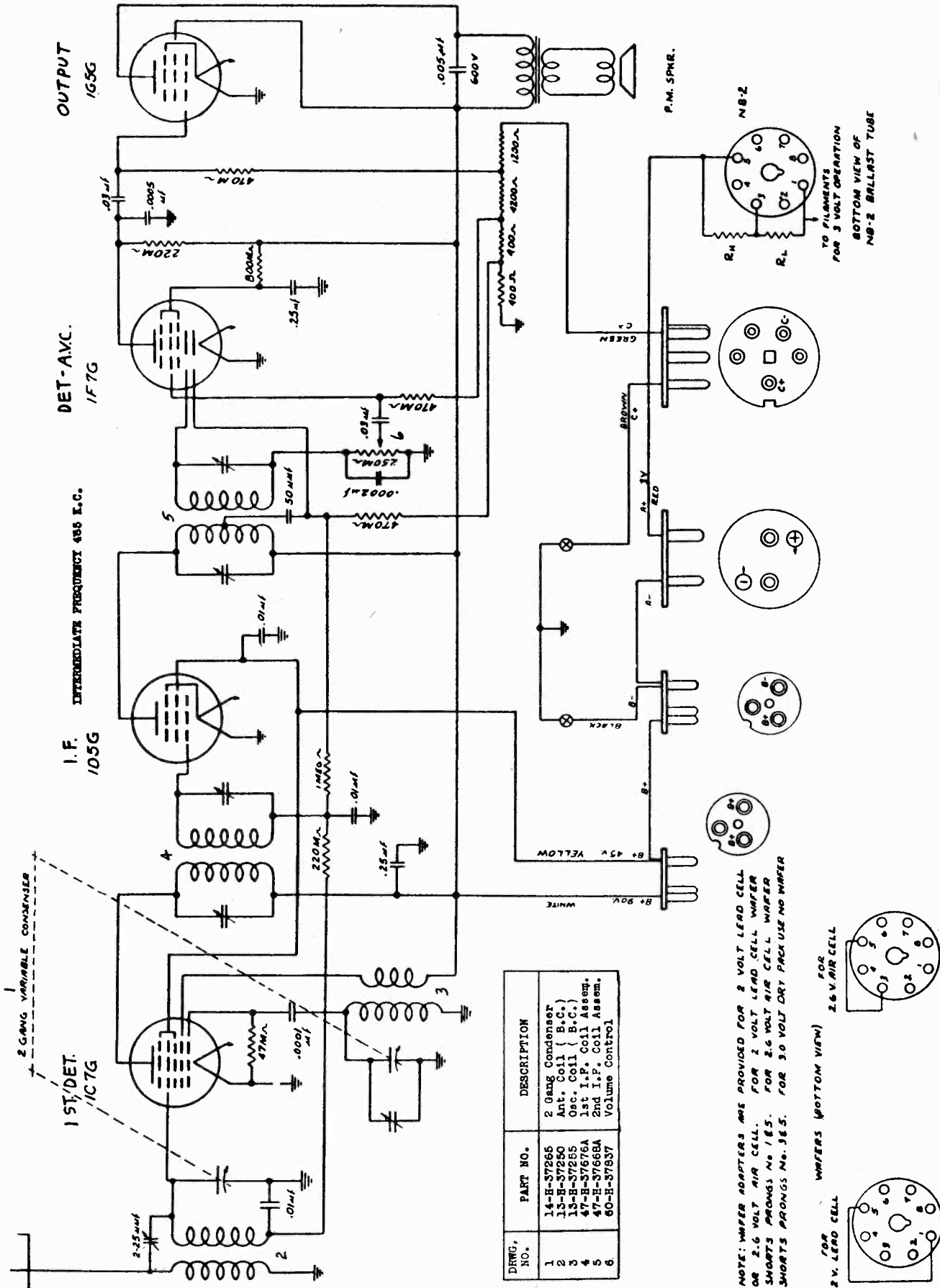
52-S PARTS PRICE LIST
MAJOR PARTS

List			
48A5067	Vibrator	2.50	
48A5333	Vibrator	2.50	
24A17010	Vibrator Choke	.35	
23A22738	Electrolytic Condenser FP.	.75	
24A23058	Oscillator Coil-Ceramic	.40	
25A23059	Output Transformer	1.00	
25B23068	Power Transformer	2.35	
24A23092	"A" Choke & Bracket	.35	
1X23094	Diode Coil & Shield Assembly	1.50	
1X23094	IF Coil & Shield Assembly	1.35	
1X23098	R. F. Coil & Shield Assembly	1.30	
1X23107	Antenna Coil & Shield Assembly	2.65	
1X23143	Oscillator Coil & Leads Assembly	.40	
40A24606	Tone Control Switch-Midget	.40	
18A24657	Volume Control & Switch	.80	
1X24697	Tuning Unit Assembly	7.25	
1X27094	Gang Pulley & Brake Assembly	5.15	
15K29715	Outer Shell	2.50	
15K29718	Front Covers	1.75	
50B30644	Speaker 6 1/2" Electro	3.80	
	Speaker Exchange	2.25	
1X31263	Back Cover Assembly	1.86	
ACCESSORIES			
14X2423	Fuse Insulator "A" Lead	Doz.	.20
9X4075	Fuse Receptacle	Doz.	.20
14X4077	Fuse Insulator Bushin G & Contact Eyelet	Doz.	.20
6X4141	Distributor Suppressor	Doz.	.30
65X4151	Bulb 6-8 Volt 25 Amp Rnd. Bay.		.15
65X4165	Fuse 15 Amp. 3AG		.05
8A4491	Generator Condenser	Doz.	.40
64B4607	Speaker Screen & Flocking		.60
29B5401	Large Pin Terminal .156 x11/16 NP	Doz.	.20
9B6734	Tube Socket Saddle 4 Prong		.15
9B6771	Tube Socket Saddle Octal		.15
1X12820	Antenna Receptacle Assembly		.15
39B17479	Grounding Wiper Curved		.05
1X18174	Fuse Lead Assembly 7"		.15
14A23136	Lead Stabilizer	Doz.	.25
37C24621	Speaker Gasket		.40
1X29792	Receiver Accessories Kit Assembly		1.60
1X31262	Filter Lead Assembly		.55
DIAL & DRIVE PARTS			
41A2157	Backing Coil Spring -Fuse	Per C	.50
41A2372	Dialite Backing Coil Spring	Doz.	.10
5S7811	Eyelet 5/16 x.210 Blk	Doz.	.20
5S7820	Eyelet .470-129 .230 Brass CSP	Per C.	.60
5S7855	Eyelet 1/2x.156 Brass	Per C.	.70
60A11579	Dial Light Socket & Clip Or Erkt.		.05
14K15252	Dialite Bushing Contact	Doz.	.20
37A17013	Brake Shoe Rubber Tubing	Doz.	.20
1B7171	Push Button Plunger Assembly		.20
1X17175	Brake Rod & Arm Assembly		.10
36A17205	Tone Control Lever		.40
7A17282	Dial Light Mounting Bracket		.05
41A21685	Brake Arm Torque Spring R. H.	Doz.	.75
41K21886	Brake Arm Torque Spring L. H.	Doz.	.75
7A23074	Tuning Unit Mounting Bracket Strip	Doz.	.20
35K24149	Felt Washer 7/16x3/16 Blk Vol Knob	Per C.	.75
13D24452	Dial Escutcheon-Chrome		.65
35A24602	Push Button Cushion	Doz.	.45
64A24604	Dial Scale Backing Plate		.10
47A24611	Tuning Drive Shaft		.15
7B24617	Gang Mounting Bracket Left		.20
1X24699	Gang Mounting Bracket Right		.35
1X24702	Slider, Plunger & Pulleys Assembly		.50
1X24703	Dial Background & Bracket Assembly		.35
1X24704	Background Assembly		.30
1K24706	Pointer Slider & Extension		.10
1K24707	Pointer Assembly		.15
34K29719	Dial Scale		.30
38K29752	Push Button & Stud		.15
36K29753	Tuning & Control Knob		.20
1X31260	Dial And Escutcheon Assembly		3.10
1X31261	Push Button Assembly(5)		.70
CONDENSERS			
8A22289	Tubular Condenser .007 600V		.20
8A3310	Tubular Condenser .1 200V		.15
8A4529	Tubular Condenser .006 100V		.15
21B6500	Molded Mica Condenser 500mf 20%		.15
8A13014	Condenser Resistor .006 100V 100K		.25
8A13514	Tubular Condenser.05 100V		.15
8A14096	Tubular Condenser.4 100V		.50
20A17257	Trimmer & Eye Bracket 6 MUF		.20
20A17935	Antenna Padder Single		.35
20A22747	Diode Trimmer Small		.40
20A22751	Double Trimmer 120 Maf Nom.		.30
8A22760	Tubular Condenser .02 600V		.15
8A23053	Tubular Condenser .01 200V		.10
20A23102	R. F. Trimmer & Padder		.55
21A23110	Ceramic Mica Condenser 500 Maf 5%		.25
20A23135	Oscillator Padder & Eye Bracket		.20
8A23146	Tubular Condenser .05 200V		.10
20A23287	Compensating Condenser		.25
8A23289	Tubular Condenser .5 100V		.40
RESISTORS			
6B6005	Carbon Resistor 50-1/2-20 N.I.	Doz.	.60
6B6010	Carbon Resistor 330-1/2-20 Ins.	Doz.	.60
6B6012	Carbon Resistor 33,000-1/2-20	Doz.	.60
6B6159	Carbon Resistor 1 Meg 1/3-20 Ins.	Doz.	.60
6B6160	Carbon Resistor 470,000 1/3 20 N.I.	Doz.	.60
6B6184	Carbon Resistor 1,000-1-20 N.I.		.10
6B6204	Carbon Resistor 220,000 1/3 20 Ins.	Doz.	.60
6B6212	Carbon Resistors 22,000 1/3 20 Ins.	Doz.	.60
6B6256	Carbon Resistors 68,000 1/3 20 Ins.	Doz.	.60
6B6321	Carbon Resistor 47,000 1/3 20 Ins.	Doz.	.60
6B6329	Carbon Resistor 33,000 1/3 20 Ins.	Doz.	.60
6B6330	Carbon Resistor 150-1-10 Ins.		.10
6B6331	Carbon Resistor 27-1/3-10 Ins.	Doz.	.60
6B6338	Carbon Resistor 10-1/3-10 Ins.	Doz.	.60
6B6339	Carbon Resistor 150,000 1/3 20 Ins	Doz.	.60
6B6456	Carbon Resistor 150-1-10- Ins.		.10
SCREWS, WASHERS, ETC.			
14A1374	Extruded Fibre Washer	Doz.	.85
14X4076	Fuse Backing Washer -Bakelite	Doz.	.10
4K4823	Condenser Mounting Cup, Washer Cop. Pl.	Doz.	.10
2S7003	Nut 8/32x5/16 Hex CP.	Per C	.50
2S7018	Nut 3/8 x 1/2 Hex CP Tum Shaft	Doz.	.15
2S7035	Nut 5/16 18x5/8 Sp. Hex CP Fits "JE Bolt	Doz.	.20
2S7087	Speednut .235 x 29/64 Blued	Per C	.75
2S7160	Screw 8G32x 3/16 SLHMS CP Slider Bkt.	Per C	.35
3S7215	Screw 8-32x 3/16 P H BHMS CP	Doz.	.25
3S7250	Screw 8-32x1" PLHMS Brass	Per C	1.00
3S7268	Screw 8-32x 1/4 25/32 SLOHMS CP	Doz.	.25
3S7454	Screw 8x1/4 PK Z PLHH CP	Doz.	.20
3S7455	Screw 8x3/8 PK A SLAH CO For Cab. Back	Doz.	.20
3S7456	Housing Screw 8x1/4 Cop. Oxd. ACHD PKA	Per C	.65
3S7457	Screw 8x7/8 PK A PLHH CP	Doz.	.25
3S7461	Screw 8x5/16 PK A AH CO	Doz.	.15
3S7475	Screw 8x1/4 PK Z SLACHO CP	Per C	.65
3S7499	Screw 8x5/8PK A AH Cop. Oxd. Hsg.	Per C.	1.00
3S7506	Screw 6x1/4 PK Z PLHH CP	Per C	.50
4S7555	Washer 1/4 .128 .032 CP	Per C	.85
4S7573	Chassis Mtg. Washer 11/16 -3/16 .046	Doz.	.15
4S7605	Washer 3/4 .328 .031 CP	Doz.	.35
4S7650	Lockwasher #6 Int. CP.	Per C	.80
4S7657	Lockwasher #8 Ext. B.O.	Per C	.50
4S7666	Lockwasher #6 Ext. Blk.	Per C	.50
4S7668	Lockwasher 3/8 Ext. Blk.	Per C.	.50
4S7678	Lockwasher 5/16 Int. CP Set Mtg.	Per C.	.55
3A13748	Locking Screw Automatic 8-32x17/32 HHCP	Doz.	.20
3A16990	Shoulder Screw 6-32 Spec	Doz.	.35
4A21577	"C" Washer 1/8" Notched	Per C	.65
4K24124	"C" Washer .437 for .250	Per C	.85
35K24148	Felt Washer 1/8 Blk. Tum. Knob	Per C	.85
4A24554	Spring Washer 3/8 HT Tum.	Doz.	.40
4A24723	"C" Washer Tone Cont.	Per C	.55
4K24724	Cup Washer 7/8 .171	Doz.	.55
MISCELLANEOUS			
37A4187	Rubber Grommet	Doz.	.25
42A4215	Vibrator Grounding G Clip	Doz.	.75
29B5239	Soldering Lug (Long Tab)	Doz.	.15
29B5265	Soldering Lug	Doz.	.20
38X10544	Plug Button 1/4" Cop. Oxd.	Doz.	.25
37A12691	Rubber Grommet-(Gang Mtg.)	Doz.	.25
9A12705	Elect. Ins. Wafer 1-5/16		.10
37X14051	Rubber Sleeve	Doz.	.20
31K14509	Terminal Strip 4 ins. #3 Mt.g		.05
9K14906	Elect. Ins. Wafer Armité	Doz.	.15
39A24524	Tube Base Grounding Wiper	Doz.	.20
39A24682	Hood Wiper	Doz.	.40
39X28036	Shirt Marker	Per C	.80

Prices subject to change without notice.

MODELS 52T, 52Y
Ch. B5-1

GALVIN MFG. CORP.



GALVIN MFG. CORP.

MODELS 55X11, 55X12, 55X13,
Ch. HS-1, 55X11A, 55X12A,
55X13A, Ch. HS-50

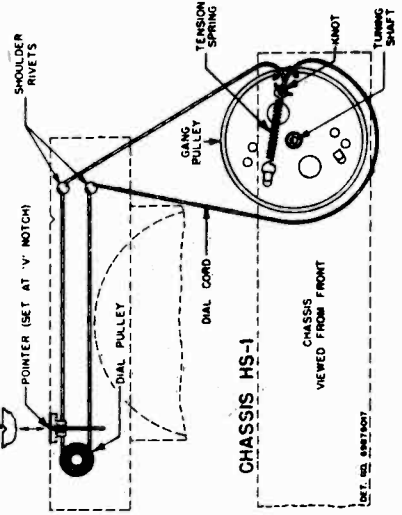
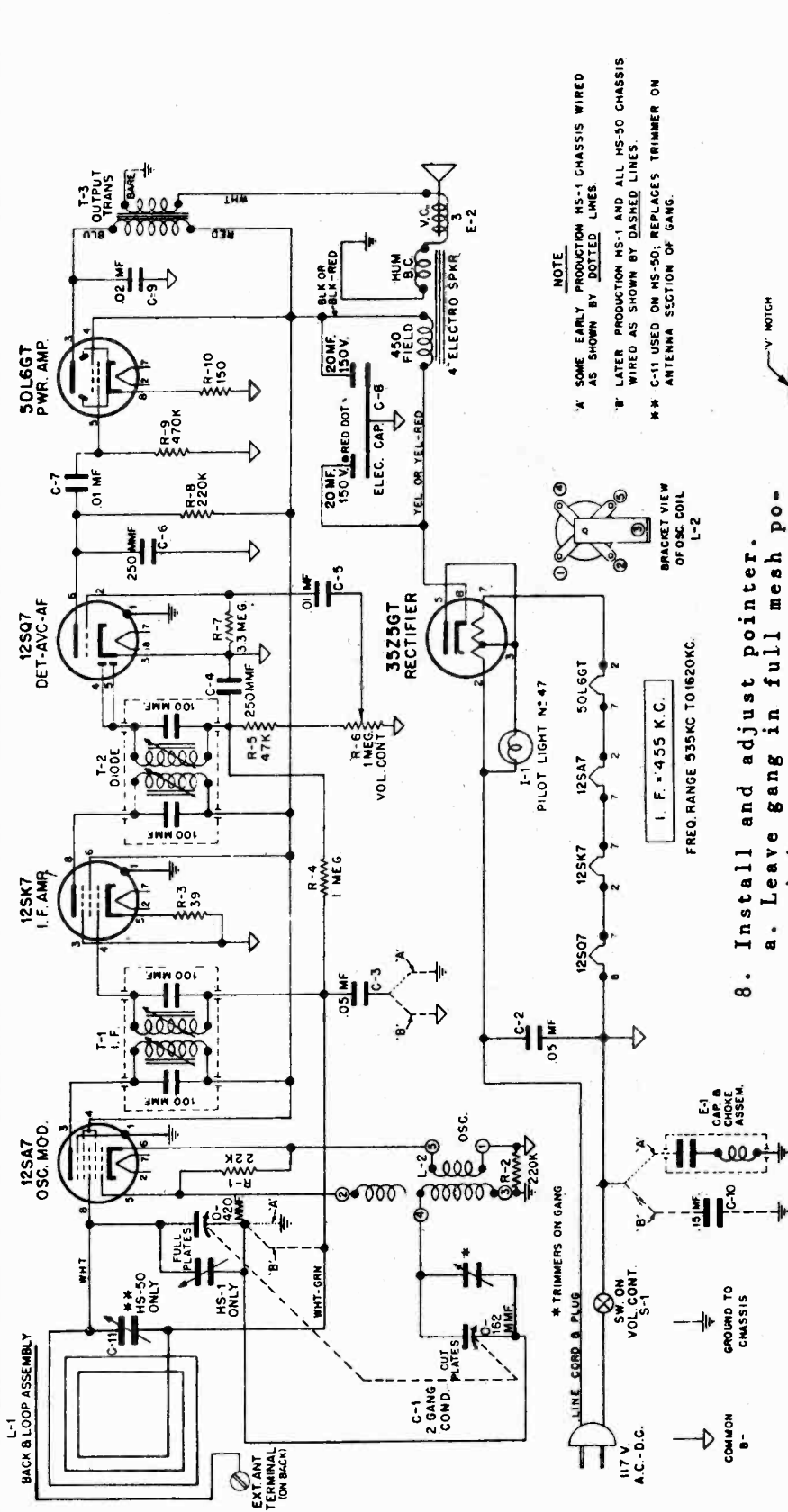


FIGURE 1. DIAL CORD DRIVE (HS-1)

1. Remove the chassis from the cabinet.
 2. Remove the broken cord.
 3. Turn gang to full mesh position.
 4. Cut a 31" length of 18 lb. silk fish cord.
 5. Restring by placing cord around dial pulley, over shoulder rivets, and around gang pulley.
 6. Tie cord to tension spring and fasten spring as shown in illustration.
 7. Place a drop of shellac on cord pointer and adjust pointer.
 8. Leave gang in full mesh position.
- a. Set pointer to "V" notch at low end of the dial.
 - b. Clamp pointer to cord.
 - c. Fix pointer to cord with a drop of shellac.
 - d. The cord must not be too tight or bind, as too much tension will prevent the planetary drive (tuning the shaft) from pulling the pointer. All elements of the pointer and string system must be free running.

MODELS 55X11, 55X12, 55X13,
Ch. HS-1

GALVIN MFG. CORP. .

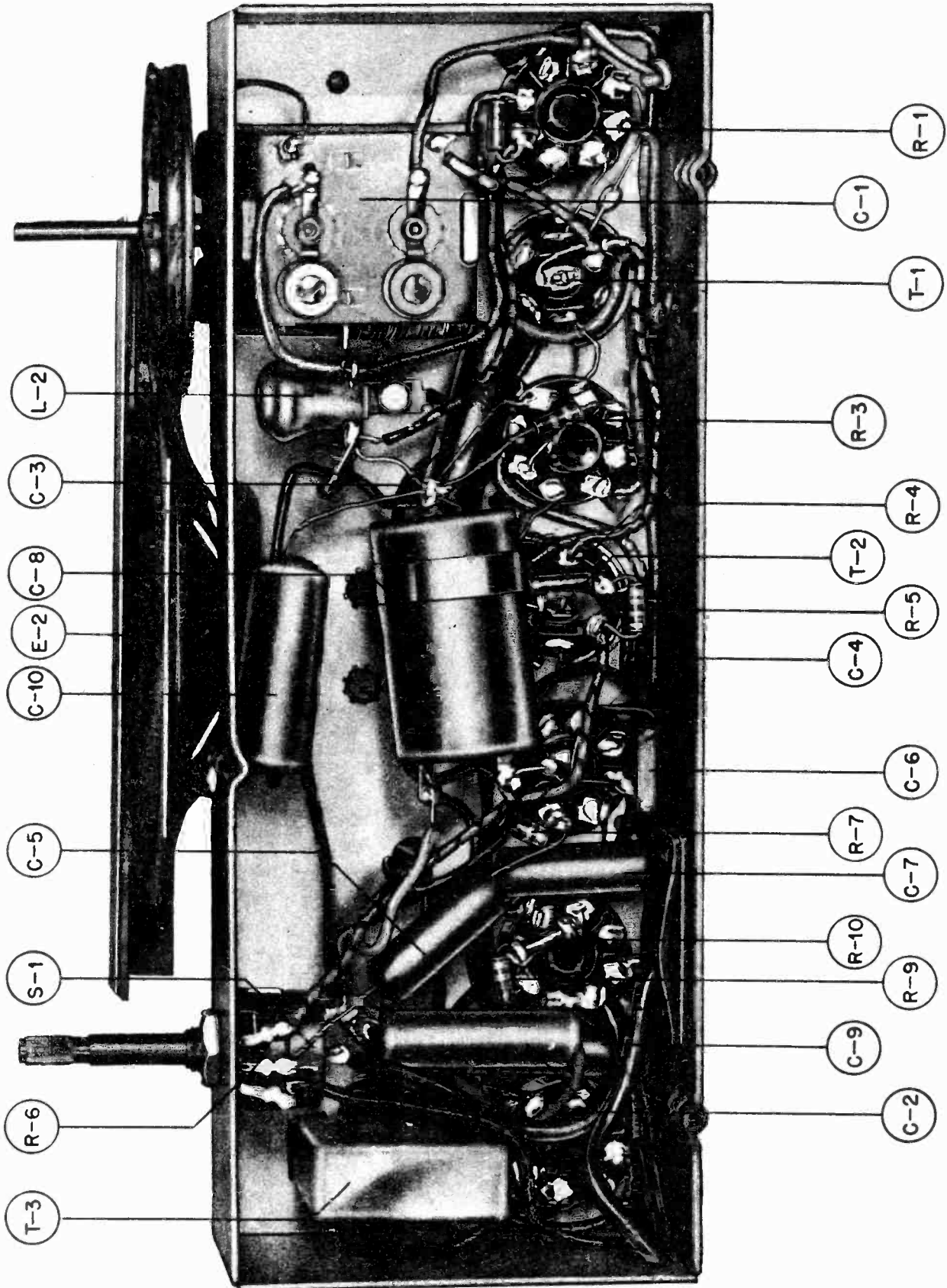


FIGURE 6. BOTTOM VIEW (CHASSIS HS-1)

GALVIN MFG. CORP.

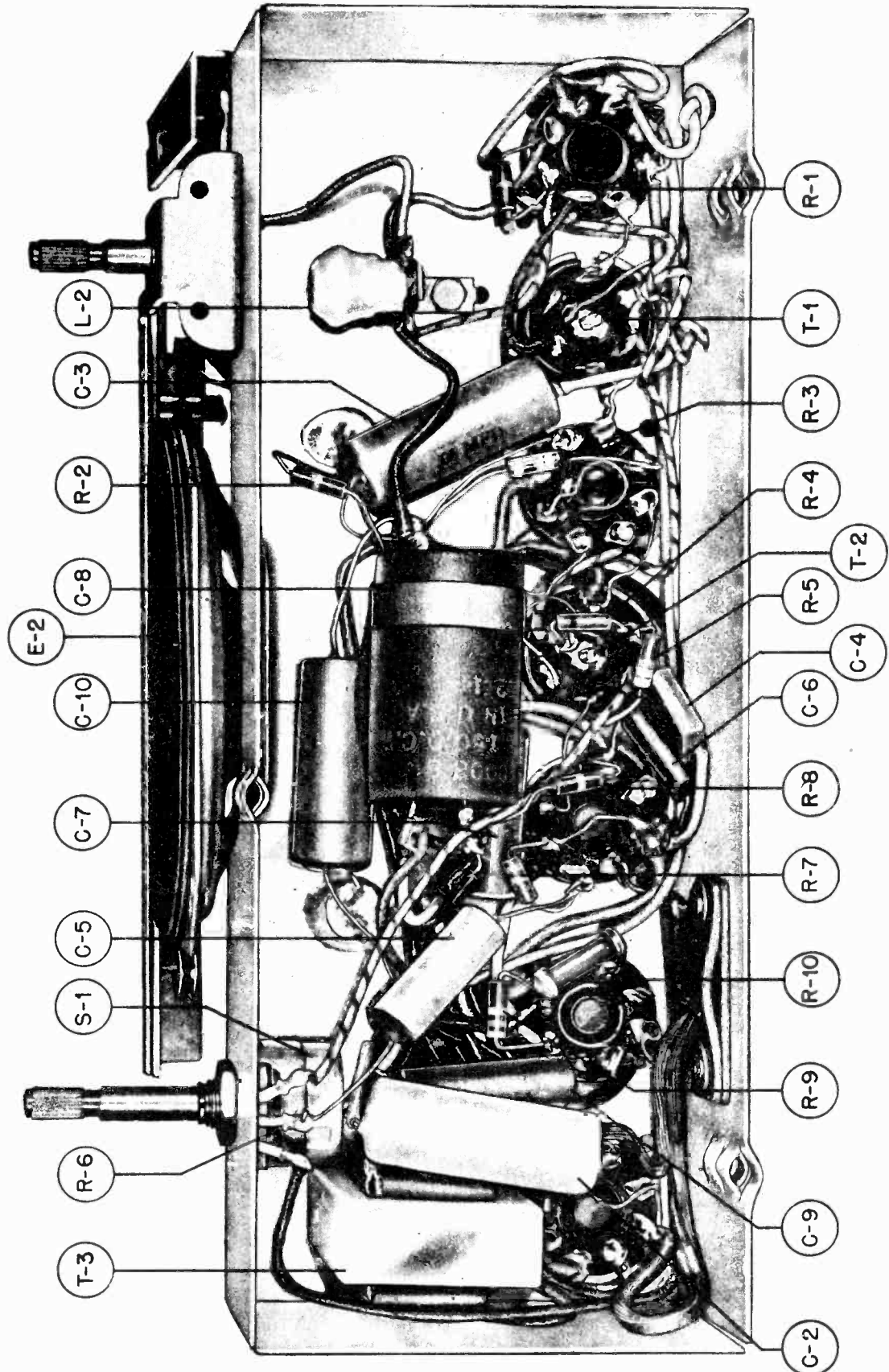


FIGURE 7. BOTTOM VIEW (CHASSIS HS-50)

MODELS 55X11, 55X12, 55X13,
Ch. HS-1; 55X11A, 55X12A, GALVIN MFG. CORP.
55X13A, Ch. HS-50

ALIGNMENT CHART

Connect output meter across speaker voice coil (.38 V = .05 watt)
Volume control set at maximum for all operations
The adjusting screwdriver or alignment tool should be of the
insulated type, such as Motorola Part No. 66A71008

OPERATIONS	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER AT 400~ TO MODULATED	SET AVERAGE MICRO-TRIMMER AT 400~ TO MODULATED	3000 Microvolts to I. F. Grid
1. Align I.F. and Diode for Maximum	Minimum	.1 mf	Osc. Mod. Grid & B-	1-2-3-4	455 Kc	
2. Set Oscillator to dial scale	1620 Kc	.1 mf	Osc. Mod. Grid & B-	5	1620 Kc	45 Microvolts to Osc. Mod Grid thru .1 mf dummy .03 Volts at 400~ to 1st A.F. Grid
3. Align R.F. for Maximum	1400 Kc	None	**Radiation	6	1400 Kc	

4. Repeat above steps for maximum accuracy.

* A convenient point for connection to B₁ is the common terminal of the electrolytic capacitor, located in the middle of the chassis (bottom).
** Connect output of signal generator to a 5" diameter, 3 turn loop. With volume on full, and output meter connected across voice coil, bring loop close enough to receiver loop until output of 50 milliwatts is obtained (38V on output meter). Vary distance between generator and receiver loops to maintain this output during alignment.

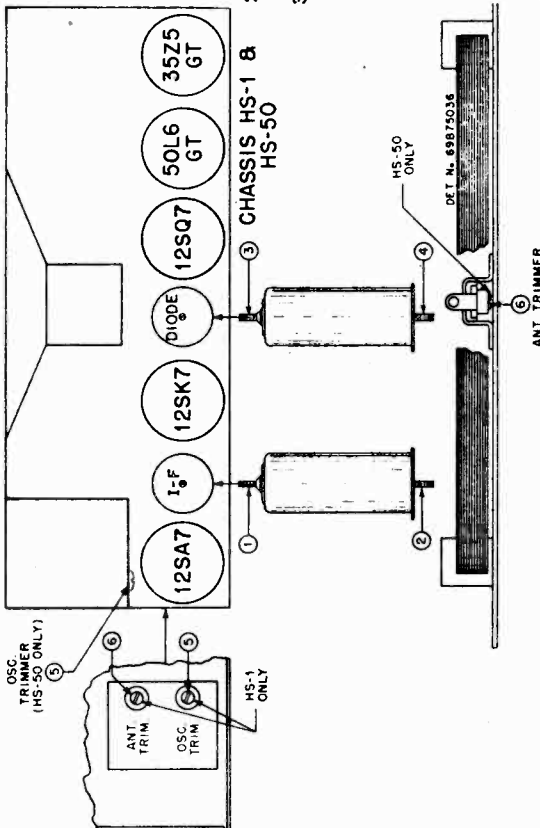


FIGURE 2. TUBE AND TRIMMER LOCATION

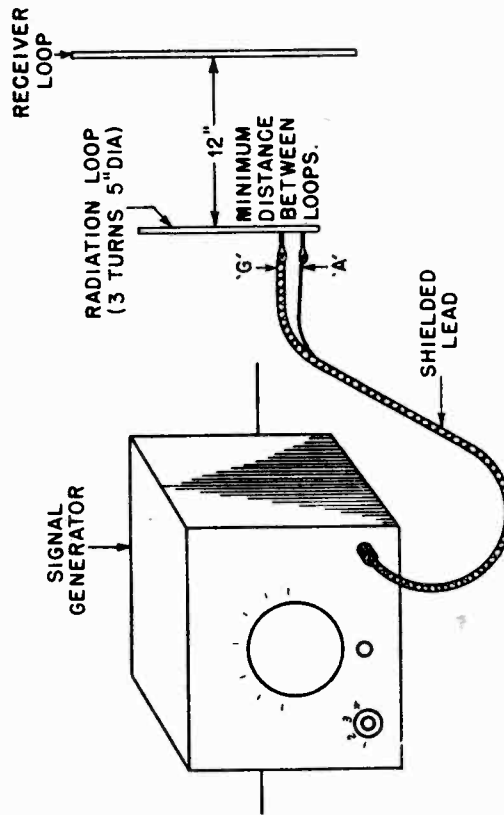
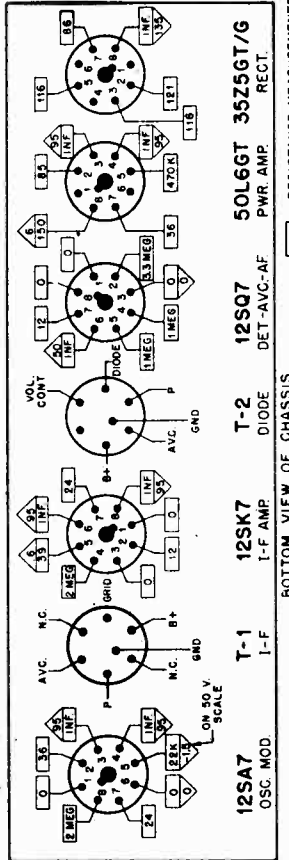


FIGURE 4. METHOD OF RADIATING SIGNAL TO THE RECEIVER



NOTE: ALL VOLTAGES MEASURED ON A 20,000 OHM PER VOLT VOLTMETER TO B₁.
ALL RESISTANCES ARE MEASURED IN OHMS UNLESS OTHERWISE SPECIFIED TO B₁.
K=ONE THOUSAND (1000) OHMS.
B₁ IS INDICATED BY ∇ ON SCHEMATIC DIAG.

□ = RESISTANCE MEASUREMENTS
∇ = VOLTAGE MEASUREMENTS

FIGURE 5. VOLTAGE AND RESISTANCE CHART

Chassis HS-1 is used in Models 55X11, 55X12 and 55X13. Chassis HS-50 is used in Models 55X11A, 55X12A and 55X13A. Models differ in cabinet and hardware (see parts list.) Chassis differ in circuit

GALVIN MFG. CORP.

MODELS 55X11, 55X12, 55X13,
55X11a, 55X12A, 55X13A

EF. PART NO.	DESCRIPTION	LIST	REF. PART NO.	DESCRIPTION	LIST
49A12646	Pulley, Cord: 7/32" groove (dial string 55X11A, 12A & 13A)	.05	387119	Screw, Steel: 6/32 x 1/4 S1 ABHD; Cad.Pl. (Replace gang brkt.)	doz. .35
49A15045	Pulley, Cord: 11/64" groove (dial string 55X11A, 12A & 13A)	doz. .20	387626	Screw, Steel: #8 - 1-1/8 PKA S1 HH; Cad. Pl. (Chassis mtg. 55X13 & 13A)	doz. .30
49A21552	Pulley, Cord: 1/2" groove (dial string)	doz. .20	29A70422	Screw, terminal (loop and back)	doz. .35
or 49A71078			47A72659	Shaft, Tuning (55X11A, 12A & 13A)	.25
5A13896	Rivet, shoulder: .312" Sh; Pol.Nkl. (dial string)	doz. .40	1A71049	Shield and Sleeve Assembly (I.F. & Diode Coils)	.50
5A15045	Rivet, shoulder: .437" Sh; Pol.Nkl. (dial string 55X11A, 12A & 13A)	doz. .20	41A70705	Spring, Coil (used in T1 & T2)	doz. .40
587708	Rivet, Steel: 9/32 x .122; Pol. Nkl. (line cord lock)	per/c .60	41A73619	Spring, Tension Coil (dial cord 55X11A, 12A & 13A)	.05
587707	Rivet, Steel: 5/32 x .122; Pol. Nkl. (tube socket mtg. & C-8 mtg.)	per/c .45	41A22596	Spring, Tension Coil (dial cord 55X11, 12 & 13)	doz. .35
587716	Rivet, Steel: 5/32 x .122; Pol. Nkl. (mounting clip - loop and back)	per/c .45	42A70423	Strap, ground (loop and back)	doz. .25
587718	Rivet, Steel: 3/16 x .122; Ant. Cop. (Terminal strip mtg. loop)	per/c .45	35A70074	Strip, Dial background	.20
34B74430	Scale, dial: glass (55X11A, 12A & 13A)	.60	31K15026	Strip, terminal: 2 Ins. #2 mtg; 3/8" (loop and back 55X11, 12 & 13)	.05
34B70435	Scale, dial: glass (55X11, 12 & 13)	.45	46A72766	Stud, Trimount; black	
387401	Screw, Steel: #2 x 3/8 PHOWS; Ant. Cop. (55X13 & 55X13A dial brkt. mtg.)	.25	9A70070	Socket, Pilot Light and Leads	.25
387506	Screw, Steel: #8 x 1/4 PKZ P1 HH; Cad. Pl. (gang cover and L-2 mtg.)	per/c .50	9A6790	Socket, tube; octal; (for 3525, 50L6, 12SA7, & 12SQ7)	.15
387831	Screw, Steel: 6-32 x 3/8 S1 FHMS; Cad. Pl. (gang mtg. 55X11, 12 & 13)	per/c .45	or 9A6787		
388117	Screw, Steel: #8 x 1 PKZP S1 HHM; Ant. Cop. (Chassis mtg. 55X11, 12, 11A & 12A)	doz. .20	or 9A6788		
			9A6792	Socket, tube; octal; (for 6SK7)	.15
			or 9A70165		
			481770	Washer, brass: .365-.234-.025 (gang mtg. 55X11, 12 & 13)	
			4A70015	Washer "C" (Tuning shaft 55X11A, 12A & 13A)	per/c .70
			4K22505	Washer, paper: 11/16 x 17/64 x 1/32 (under knobs 55X12A)	doz. .20
			35K70480	Washer, paper: 11/16 x 9/64 x 1/32 (used under tuning knob 55X11, 12 & 13)	per/c .95
			35K19943	Washer, paper: 11/16 x 17/64 x 1/32 (used under knobs 55X11A 13A and under volume control 55X11, 12 & 13)	per/c .60
			32A20575	Washer, spacer: 3/8-.171-.062 (Chassis mtg. 55X11 & 12)	per/c .50
			488204	Washer, Steel: 1"-203-.067; Cop.Pl. Chassis mtg. 55X13 & 13A only)	doz. .25
			481719	Washer, Steel: 3/8-.140-.030; Cad.Pl. (Line cord lock mtg.)	per/c .55

- Remove the chassis from the cabinet.
- Remove the broken cord.
- Turn gang to full mesh position.
- Cut a 27" length of 18 lb. silk fish cord.
- Replace new cord as follows:
 - Tie one end of cord to tension spring on gang pulley.
 - Make one complete turn around gang pulley in a counter-clockwise direction.
 - Route the cord under and over shoulder rivets #1 and #2.
 - Route the cord the length of dial scale, around the dial pulley, and over shoulder rivet #3.
 - Make 3-1/2 turns around the tuning shaft in a counter-clockwise direction.
 - Place cord over the bracket pulley and shoulder rivet #4 to the gang pulley.
 - Place cord around the gang pulley counter-clockwise to the tension spring and tie. Place a drop of shellac on the cord knots.
- Install and adjust pointer.
 - Leave gang in full mesh position.
 - Set pointer to "V" notch at low end of the dial.
 - Clamp pointer to cord.
 - Fix pointer to cord with a drop of shellac or household cement.

Prices Subject to Change Without Notice

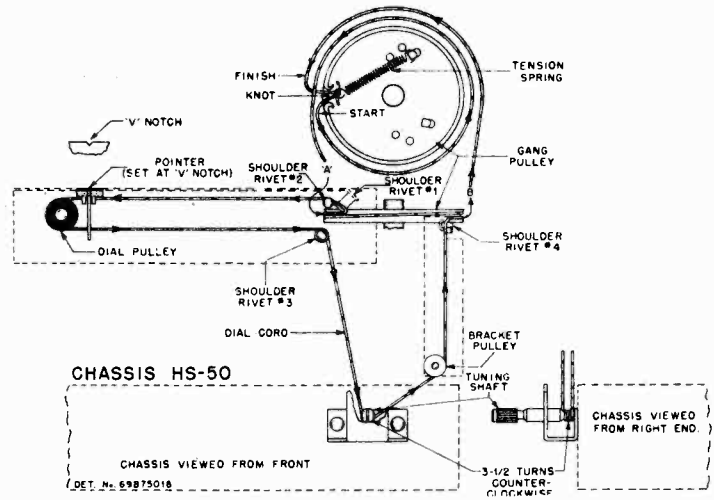


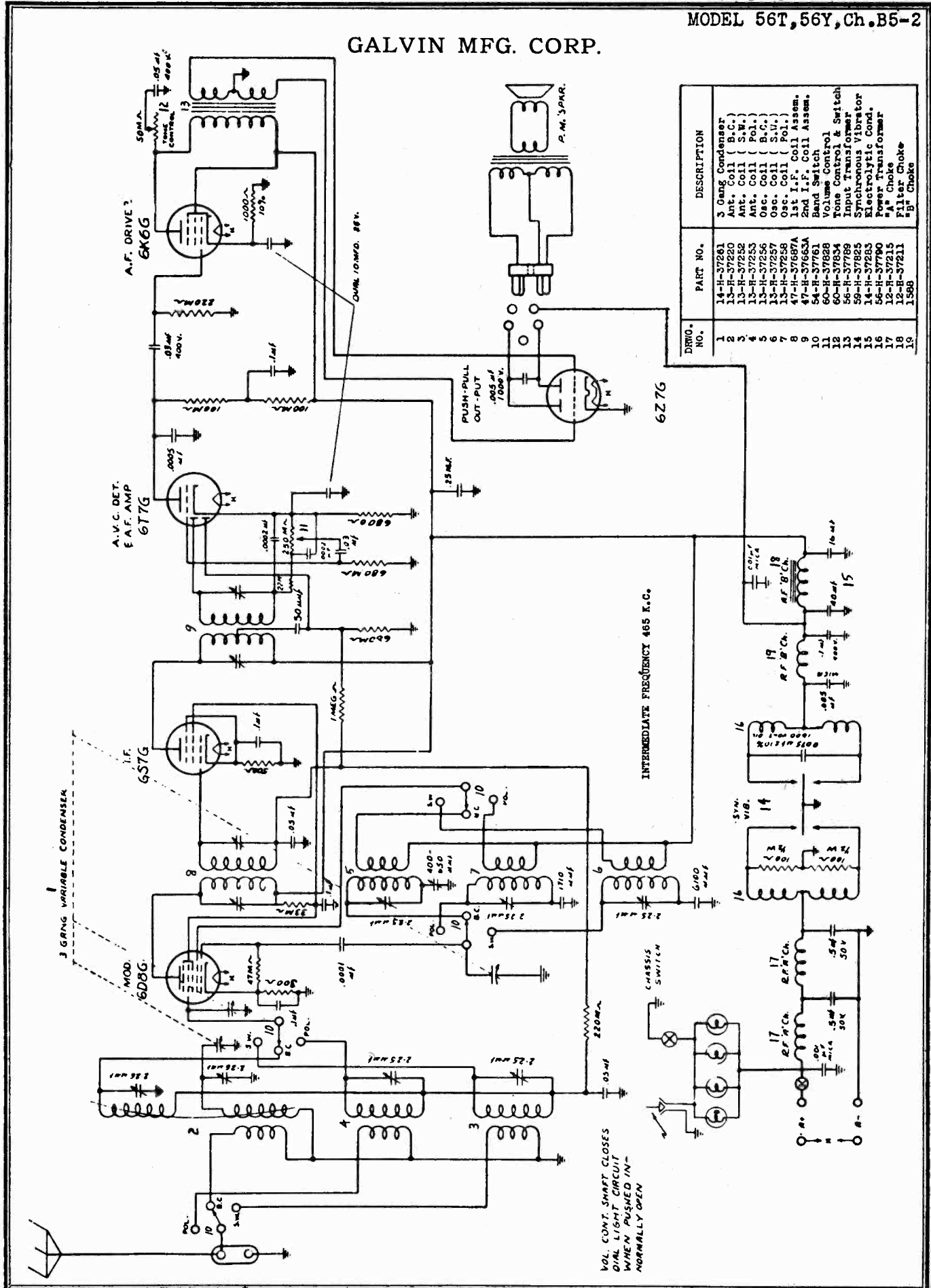
FIGURE 3. DIAL CORD DRIVE (HS-50)

**MODELS 55X11, 55X12, 55X13,
55X11A, 55X12A, 55X13A GALVIN MFG. CORP.**

PARTS PRICE LIST

REF. NO.	PART NO.	DESCRIPTION	LIST	REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	19B70080	Capacitor, variable: 2 gang and pulley assembly (55X11, 12&13)	\$3.90	T-1	24B70531	Transformer, I.F.; 465 Kc; complete less shield	1.05
	or 1X72550	Capacitor, variable: 2 gang and pulley assembly		T-2	24B70533	Transformer, diode; 465 Kc; complete less shield	1.40
C-1	1X74747	Capacitor, variable: 2 gang and pulley assembly (55X11A, 12A & 13A)	3.50	T-3	26B70083	Transformer, output	1.95
C-2	889816	Capacitor, fixed: paper; .05 mf 20% 400 vdc	.20		1X72660	Assembly, pulley and bushing (55X11, 12 & 13 replacement)	
C-3	889816	Capacitor, fixed: paper; .05 mf 20% 400 vdc	.20		1X74748	Assembly, gang mtg. brkt: less gang (55X11A, 12A, 13A)	.30
C-4	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20		1X74738	Assembly dial background mtg. (55X11A, 12A & 13A)	.45
C-5	889809	Capacitor, fixed: paper; .01 mf 20% 400 vdc	.15		1X70084	Bracket, dial brkt. and pulley (55X11, 12 & 13)	.85
C-6	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20		7A72488	Bracket, dial scale retainer; cad. pl (55X13 & 13A)	.05
C-7	889809	Capacitor, fixed: paper; .01 mf 20% 400 vdc	.15		7A14684	Bracket, tuning shaft; cad. pl; (55X11A, 12A & 13A)	.10
C-8	23A70008	Capacitor, fixed: electrolytic; dual 20 mf 160 vdc	1.35		38A10544	Button, plug; 1/4" for 1/16"; cop. oxd. (55X11, 12 & 13)	.80
C-9	889802	Capacitor, fixed: paper; .02 mf 20% 400 vdc	.15		16E70027	Cabinet, plastic; brown finish (55X11)	3.25
C-10	8A72886	Capacitor, fixed: paper; .15 mf 20% 200 vdc	.25		16K70475	Cabinet, plastic; ivory finish (55X12)	4.55
	or 8A75586	Capacitor, fixed: paper; .15 mf 20% 400 vdc			51X70401	Cabinet, walnut veneer (55X13)	10.00
	20A74404	Capacitor, trimmer; includes "A" brkt (loop back) 55X11A, 12A & 13A	.30		16K72776	Cabinet, plastic; brown finish (55X11A)	3.60
	21B70826	Capacitor, fixed: mica; dual (used in T1 & T2)	.45		56K72777	Cabinet, plastic; ivory finish (55X12A)	4.50
E-1	1X70081	Capacitor and choke assembly	.30		16K72779	Cabinet, walnut veneer (55X13A)	10.50
E-2	50B70076	Speaker, electrodynamic; 4 inch (HS-1 & HS-50)	5.45		42B70721	Clip, coil (used on T1 & T2)	doz. .30
	or 50K78379	Speaker, electrodynamic; 4 inch (HS-50 only)			42A18764	Clip, mounting (loop and back)	per/c .95
I-1	65X11854	Bulb: 6.3V - .15A; tubular bayonet #47	.15		35K70445	Cloth, grille (55X13 & 13A)	.10
L-1	24C70439	Coil; antenna loop and panel assembly 55X11	1.60		11M8944	Cord; dial; 18' black; 27"	yd. .10
	24K70440	Coil; antenna loop and panel assembly 55X12	2.25		30A151	Cord. line; 6 ft. and plug	.45
	24K70441	Coil; antenna loop and panel assembly 55X13	2.10		48A70023	Core, Iron and Screw (used in T1 & T2)	.15
	24C74406	Coil; antenna loop and panel 55X11A	2.20		15A70026	Cover, gang (55X11, 12 & 13)	.10
	24C74407	Coil; antenna loop and panel 55X12A	2.10		5A70078	Eyelet, gang mounting (55X11, 12 & 13)	per/c 1.20
L-1	24K74408	Coil; antenna loop and panel (55X13A)	1.00		587805	Eyelet, snap-in; .156 x .141; cad. pl. (dial background)	per/c .70
L-2	24A70424	Coil; oscillator (55X11, 12 & 13)	.85		37K15641	Foot, rubber; 3/4 dia. (55X13 & 13A)	doz. .35
	24A74616	Coil; oscillator (55X11A, 12A & 13A)	.85		5A72880	Grommet; rubber (gang cushion 55X11, 12 & 13)	doz. .50
R-1	6R6028	Resistor; fixed; carbon; 22,000 ohms 20% 1/2W Ins.	doz. .60		37A12891	Grommet; rubber (gang cushion 55X11A, 12A & 13A)	doz. .36
R-2	6R6015	Resistor, fixed; carbon; 220,000 ohms 20% 1/2W. Ins.	doz. .60		36K26724	Knob, control; molded; ivory (volume control 55X12, Tuning and volume 55X12A)	.10
R-3	6R2085	Resistor, fixed; carbon; 39 ohms 10% 1/2W Ins.	doz. .60		38K70486	Knob, control; molded; ivory with clip (Tuning control 55X12)	.15
R-4	6R6004	Resistor, fixed; carbon; 1 megohm 20% 1/2W. Ins.	doz. .60		38A21887	Knob, control; molded; brown (volume control 55X11 & 13 Tuning and volume 55X11A & 13A)	.10
R-5	6R6056	Resistor, fixed; carbon; 47,000 ohms 20% 1/2W. Ins.	doz. .60		36A70447	Knob, control; molded; brown with clip (tuning control 55X11 & 13)	.15
R-6	18A70032	Resistor, variable; carbon; 1 megohm with SPST. switch	1.00		32A24815	Lock, line cord	doz. .50
R-7	6R2118	Resistor, fixed; carbon; 3.3 megohms 20% 1/2W. Ins.	doz. .60		387205	Lockscrew, steel: 8-32 x 1/4 S1 HH: Cad. Pl. (speaker Mtg)	per/c .95
R-8	6R6015	Resistor, fixed; carbon; 220,000 ohms 20% 1/2W. Ins.	doz. .60		487695	Lockwasher; #6 Int. Cad. Pl. (loop and back 55X11, 12 & 13)	doz. .45
R-9	6R6032	Resistor, fixed; carbon; 470,000 ohms 20% 1/2W Ins.	doz. .60		287061	Nut; 3/8-32 x 9/16, Palmnut: C.P. (volume control)	doz. .30
R-10	6R6382	Resistor, fixed; carbon; 150 ohms 10% 1/2 W N.I.	doz. .60		2B70703	Nut, Special Palmnut (used in T1 & T2)	doz. .25
S-1		Switch, SPST; part of R6 (volume control)			2A70775	Nut, Speed; Timmerman #520 (dial brkt. mtg.)	doz. .25
					2A70434	Nut, Speed; Timmerman #156 (dial scale mtg. 55X11, 12 & 13)	doz. .25
					38A25507	Plug, split; 5/8". Cop. Ox. (Back and loop)	doz. .20
					52A71079	Pointer, dial	.20

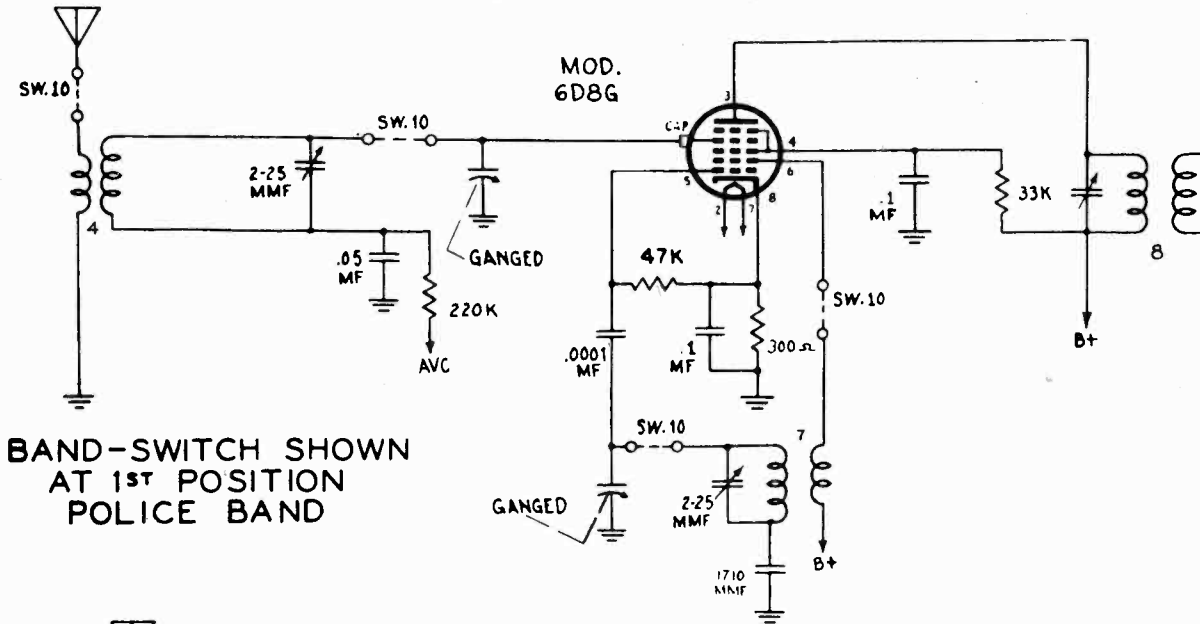
GALVIN MFG. CORP.



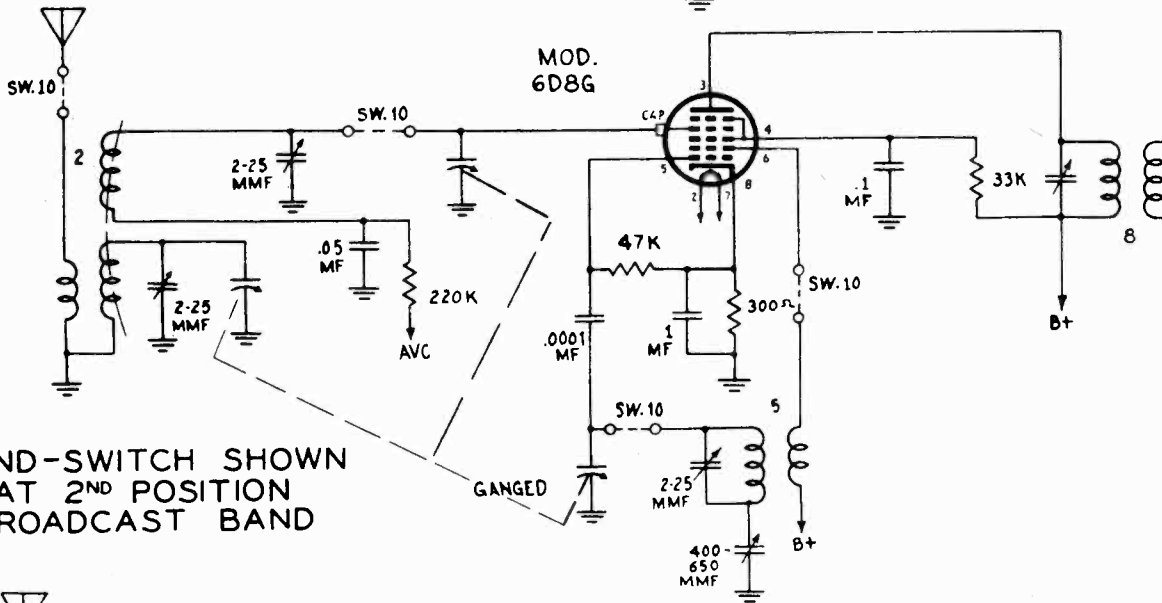
"clarified schematics"

MODELS 56T, 56Y

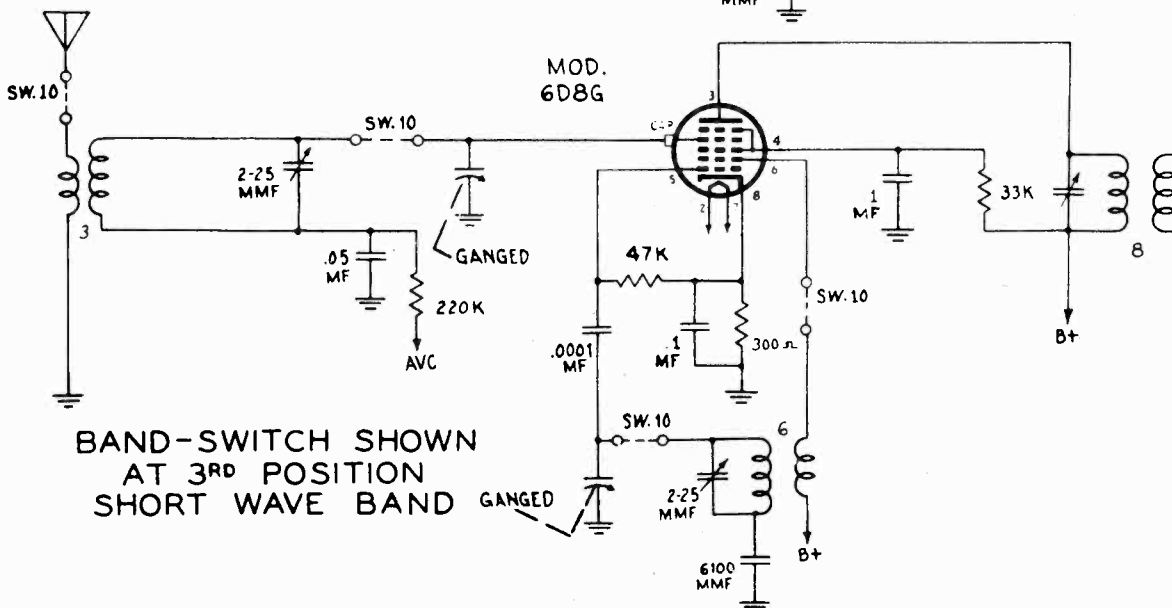
GALVIN MFG. CORP.



BAND-SWITCH SHOWN AT 1ST POSITION
POLICE BAND



BAND-SWITCH SHOWN AT 2ND POSITION
BROADCAST BAND



BAND-SWITCH SHOWN AT 3RD POSITION
SHORT WAVE BAND

GALVIN MFG. CORP.

MODELS 56T, 56Y
Ch. B5-2

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9-Top Grid
6D8G	1st det.-osc.	0	6	150	70	-7.5	150	0	2.0	0
6S7G	I. F.	0	6	150	70	2.6	....	0	2.6	0
6T7G	2nd det.-AVC	X	6	75	0	0	X	0	.8	0
6K6G	A. F.	X	6	145	150	0	....	0	12	....
6Z7G	Output	X	6	160	0	0	160	0	0	....

"X" indicates socket terminals used as dummy tie points.

All voltages measured from point indicated to chassis ground, using 1000 ohms per volt meter.

Battery voltage 6.

Battery drain 2.5 amps. at no signal.

Maximum power output 3 watts.

ALIGNMENT PROCEDURE

Connect signal generator to control grid of first detector tube (6D8G) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground terminals using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector trimmers to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. paddler, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., paddler can be adjusted to maximum noise without rocking gang and without use of signal generator. (Use short wire for pick-up if necessary.)

Turn band switch to "Police and Aircraft" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 7.0 MC. Adjust POLICE OSC. trimmer until 7.0 MC signal is heard.

Set signal generator at 5.8 MC and turn condenser gang to signal at 5.8 MC. Adjust POLICE ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

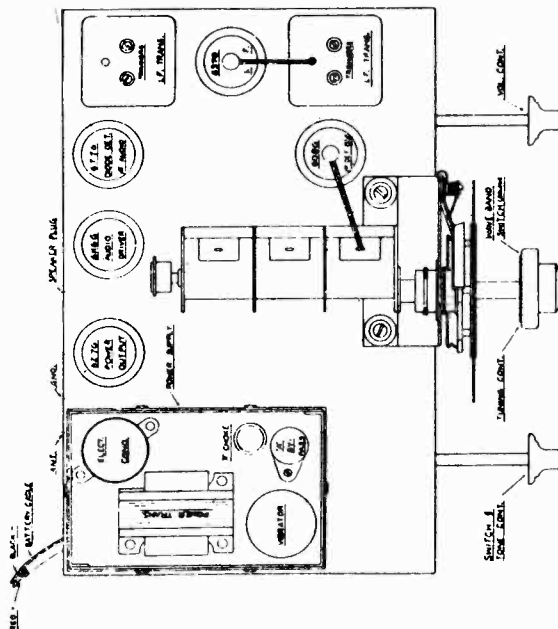
Turn band switch to "Foreign Programs" position, still using 400 ohm carbon resistor in antenna lead to signal generator.

Set signal generator and receiver dial both at 22.0 MC. Adjust SW OSC. trimmer until 22.0 MC signal is heard.

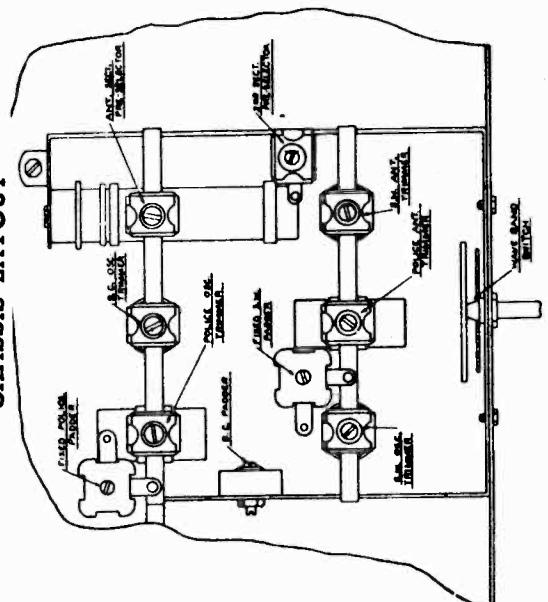
Set signal generator at 18.7 MC. and turn condenser gang to signal at 18.7 MC. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

Padders on "Police" and "Foreign" bands are fixed (no adjustment necessary).

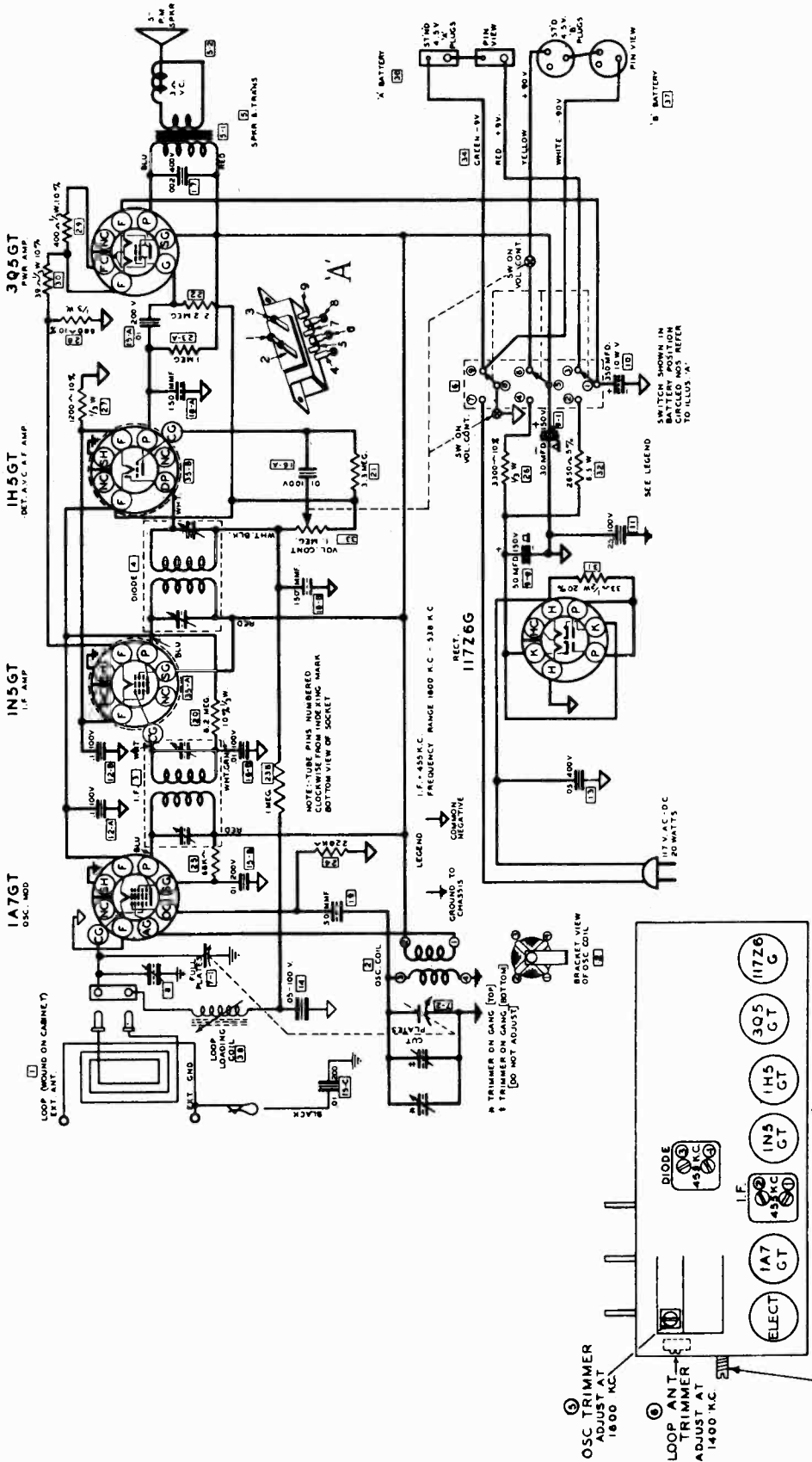
BAND COVERAGE
American Programs 540-1720 KC
Police and Aircraft 2200-7000 KC
Foreign Programs 7,000-22,000 KC



CHASSIS LAYOUT



TRIMMERS



ALIGNMENT CHART MODELS 57BP1A, 2A, 3A, and 4A

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1600 K.C.	200 Mmf.	External Ant.	5	1600 K.C.
3	1400 K.C.	200 Mmf.	External Ant.	6	1400 K.C.
4	600 K.C.	200 Mmf.	External Ant.	7	600 K.C.

Volume Control Set at Maximum

POSITION	PLATE	SCREEN	BIAS
Osc.-Mod.	85	42	1.1
I.F.	85	85	3.7
Det.-AVC.-AF	15	-	2.3
Power	85	87	8.5
Rect.	-	123	-

Line Voltage - 117 Volts A.C.
All voltages measured from socket terminal to common negative using 500 Ohm per volt meter.

- ⑤ OSC TRIMMER ADJUST AT 1800 K.C.
- ⑥ LOOP ANT. TRIMMER ADJUST AT 1400 K.C.
- ⑦ LOOP ANT. ADJUSTMENT ADJUST AT 600 K.C.

GALVIN MFG. CORP.

MODELS 57BPLA, 57BP2A,
57BP3A, 57BP4A

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 57BPLA, 2A, 3A, and 4A

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
4200	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
85	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
95	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
26	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
* .05 Watts = .33 Volts

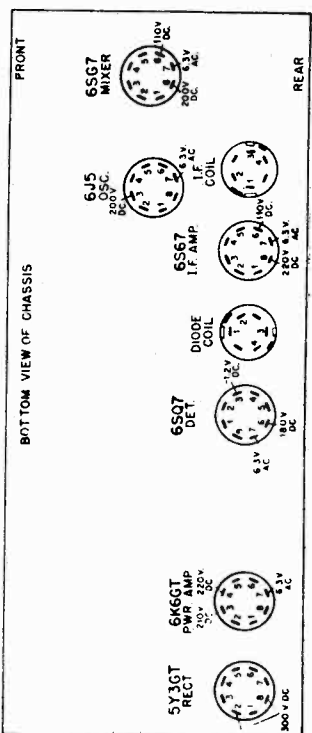
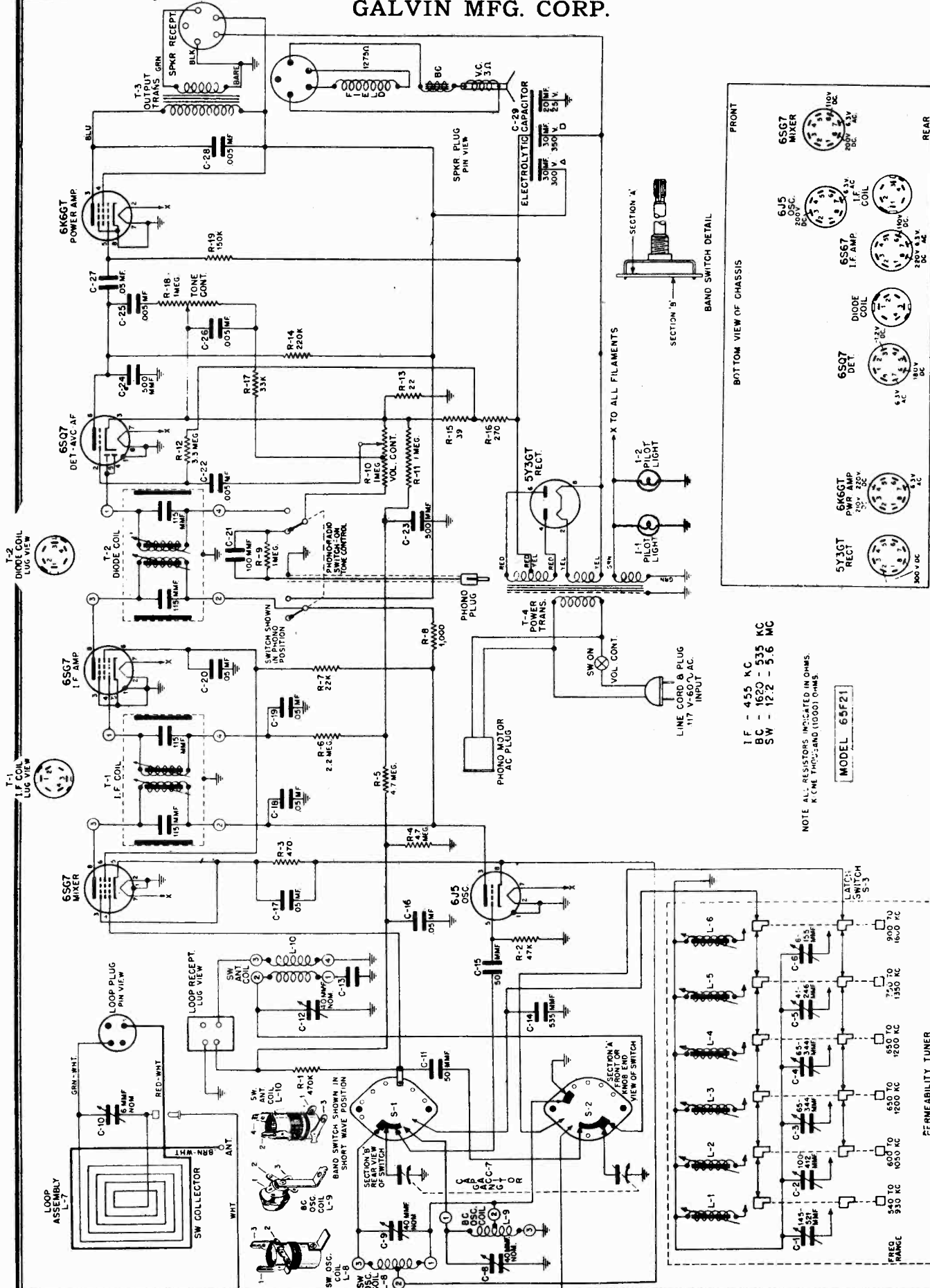
** Output meter connected across voice coil.

MODELS 57BPA1, 2, 3, 4 PARTS PRICE LIST

DRWG. NO.	PART NO.	DESCRIPTION	LIST	DRWG. NO.	PART NO.	DESCRIPTION	LIST
MAJOR PARTS							
6	1X20289	Slider Switch & Bracket Assembly.	\$0.55	13	8S9816	Tubular Condenser .05-400v.	\$0.15
10	23A20318	Elect. Cond. & Strap 350-10v.50	17	8S9824	Tubular Condenser .002-400v.10
9	23A20324	Elect. Condenser FP80	15	8S9825	Tubular Condenser .01-200v.10
33	18K20339	Vol. Control & Switch 1 meg . . . . .	.85	20A20321	I.F. Trimmer - Small. . . . .	.25
7	1X20506	Gang & Pulley Assembly.	1.85	20A20323	Diode Trimmer - Small . . . . .	.30
	19B20507	Variable Condenser - Subs. 1X20505	XXX	8	20A22796	Trimmer & Bracket - 6 mmf15
4	1X20586	Diode Coil & Shield Assembly.	1.35	RESISTORS			
3	1X20588	I.F. Coil & Shield Assembly	1.40	24	6B6003	Carbon Resistor 220,000-1/3-20 N.I.60
2	24A22746	Osc. Coil (Wht-Brn) Ceramic35	29	6B6025	Carbon Resistor 400-1/3-10 N.I.60
38	1X22831	Coil Core & Bracket Assembly - Loop50	22	6B6049	Carbon Resistor 2.2 meg-1/3-20 N.I.60
5	50B22836	Speaker & Output Transformer.	4.20	31	6B6067	Carbon Resistor 33-1/2-20 N.I.60
		Speaker Exchange.	2.45	23	6B6071	Carbon Resistor 1 meg-1/3-20 N.I.60
5-1	25K22838	Output Transformer.85	28	6B6073	Carbon Resistor 680-1/3-10 N.I.60
CABINET PARTS							
	7A14345	Zee Bracket - Cab. Back80	25	6B6125	Carbon Resistor 68,000-1/3-20 N.I.60
	7A15254	Back Mounting Bracket05	21	6B6179	Carbon Resistor 3.3 meg-1/3-20 N.I.60
	55K15738	Handle Clasp - Cop. Oxd20	27	6B6198	Carbon Resistor 1200-1/3-10 N.I.60
	55K16551	Female Latch CO - #3,4A15	26	6B6242	Carbon Resistor 3300-1/3-10 N.I.60
	55K16575	Male Latch - #3,4A.20	30	6B6283	Carbon Resistor 39-1/3-1060
	37A16614	Rubber Foot25	20	6B6297	Carbon Resistor 8.2 meg.-1/3-10 N.I.60
	36A20315	Control Knob (Ivory) Plain - #4A.10	32	17A20578	W.W. Resistor 2650-6.5-5.45
	7A20375	Battery Retainer Bracket - Long05	SCREWS, WASHERS etc.			
	32B20581	Speaker Baffle - Card Board . . . . .	.30	4A1957	Cee Washer .J93 CP - Tun. Shaft . . . . .	.15
	64B20582	Speaker Screen - Plain. . . . .	.15	2S7003	Nut 8-32x11/32 Hex CP . . . . .	.50
	36K20609	Control Knob (Ivory) Marked - #4A . . . . .	.10	2S7050	Nut 6-32 CP - Switch. . . . .	.50
	36K20610	Control Knob (Walnut) Marked - #1,2,3A. . . . .	.10	3S7155	Screw 6-32x3/16 CP - Gang Brkt. . . . .	.35
	36K20611	Control Knob (Walnut) Plain - #1,2,3A . . . . .	.10	3S7205	Screw 8-32x1/4 CP - Spkr. . . . .	.95
	55K20885	Strap Handle - Flat . . . . .	.25	3S7247	Lockscrew 6-32 CP - Gang Brkt	1.00
	35B21021	Grill Cloth . . . . .	.15	3S7248	Screw 8-32 CP - Dial. . . . .	.40
	16D22724	Cabinet (Portable) Cpt. - #3A	9.00	3S7271	Screw 8-32 Brz. - Cab. Back . . . . .	.75
	16K22728	Cabinet (Portable) Cpt. - #4A	9.00	3S7437	Screw 5x3/8 RHWS CO . . . . .	.30
	1X22788	Back & Brackets Assembly - #1,3A. . . . .	.55	3S7454	Screw 8x1/4 CP. . . . .	.20
	1X22792	Back & Brackets Assembly - #2,4A. . . . .	.55	3S7457	Screw 8x7/8 CP - Chassis Mtg. . . . .	.25
	16X22820	Cabinet (Portable) Cpt. - #1A	6.50	3S7475	Screw 8x1/4 CP - Cord Guard . . . . .	.65
	16K22823	Cabinet (Portable) Cpt. - #2A	6.50	3S7506	Screw 6x1/4 CP - Coil Mtg. . . . .	.50
	56X22855	Packing Carbon & Fillers - #3,4A. . . . .	.40	3S7507	Screw 8x5/8 CP - Gang Mtg. . . . .	.70
	56X23002	Packing Carton & Fillers - #1,2A. . . . .	.30	3S7528	Screw 8x3/8 CO - Bat. Brkt. . . . .	.65
				4S7597	Washer 7/16 CP - Dial . . . . .	.35
				3K21134	Speaker Mtg. Screw 8-32x3/4 CP. . . . .	.85
DIAL & DRIVE							
	5S7805	Snap-In Eyelet CP - Dial.70	MISCELLANEOUS			
	11M8944	Dial Cord 18# Black 18" . . . . .	.05	29B5207	Soldering Lug - Gang Mtg. . . . .	.85
	37A12691	Rubber Grommet - Gang Mtg . . . . .	.25	29B5209	Dumbell Lug - Cab	1.00
	41A14244	Dial Cord Tension Spring. . . . .	.40	29B5248	Soldering Lug - Bent - Cab. . . . .	.75
	7A14610	Tuning Shaft Bracket. . . . .	.05	42B5480	Grid Clip - Small - Collar Grip . . . . .	.15
	49A14641	Cord Pulley 2" Cop. Pl. . . . .	.05	42B5526	Fahnstock Clip #15 Bronze - Cab. . . . .	.80
	7B18748	Gang Mtg. Bracket . . . . .	.10	9B6738	Tube Socket - Saddle Octal. . . . .	.15
	5A19658	Eyelet Cop. Pl. - Gang Mtg. . . . .	.40	28X12250	Three Prong Battery Plug. . . . .	.05
	47K20340	Tuning Shaft 1 & 1 1/64. . . . .	.10	42K13135	Cable Clamp . . . . .	.15
	38A20612	"Off" Indicator Button. . . . .	.05	26X14760	Bantam Tube Shield. . . . .	.05
	52K20667	Dial Pointer (Double) Molded. . . . .	.10	31A15433	Terminal Strip 1 Ins. #2 Mtg. . . . .	.05
	61K22389	Dial Crystal. . . . .	.20	9A15642	Two Prong Receptacle. . . . .	.10
	34B22758	Dial Scale. . . . .	.15	38X15757	Plug Button 19/64x25/64 CO. . . . .	.35
	1X22917	Dial Plate & Bracket Assembly . . . . .	.10	42A17040	Line Cord Clamp . . . . .	.05
CONDENSERS							
19	21B6503	Molded Mica Condenser 50mmf-20% . . . . .	.15	7A20317	Switch Mounting Bracket - V.C . . . . .	.15
18	21B6506	Molded Mica Condenser 150mmf-20%. . . . .	.15	30B20329	Line Cord & Small Plug - 6 Ft . . . . .	.35
16	8S9801	Tubular Condenser .01-100v. . . . .	.10	28A20361	Two-Pin Plug Base . . . . .	.30
14	8S9805	Tubular Condenser .05-100v. . . . .	.15	14A20579	Slider Switch Insulator Strip . . . . .	.30
11	8S9810	Tubular Condenser .25-100v. . . . .	.20	32B20583	Line Cord Guard - Fibre . . . . .	.10
12	8S9814	Tubular Condenser .1-100v . . . . .	.15	1X20592	Battery Cable Assembly. . . . .	.20
				1X22787	Bottom Cover & Bracket Assembly . . . . .	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

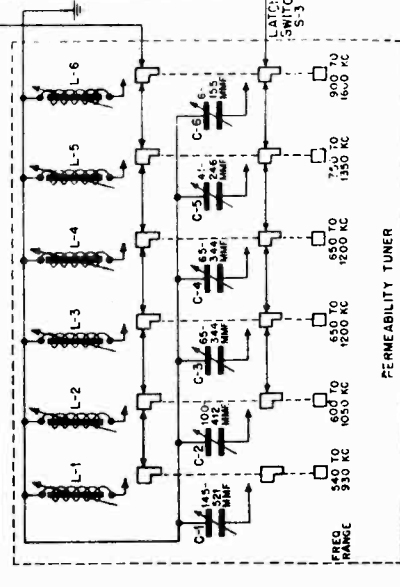
GALVIN MFG. CORP.



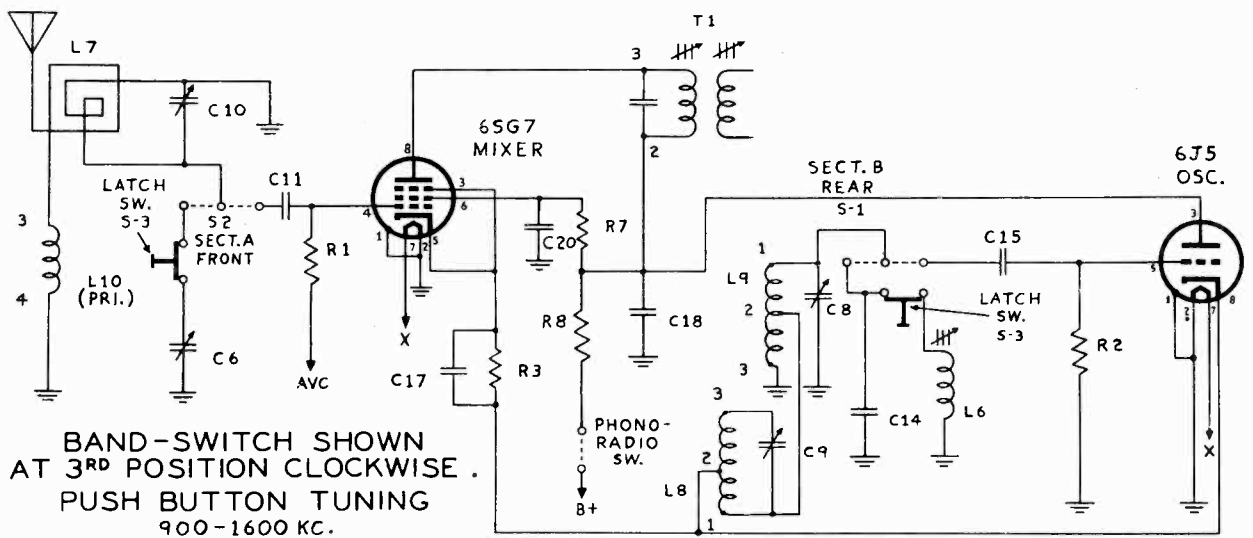
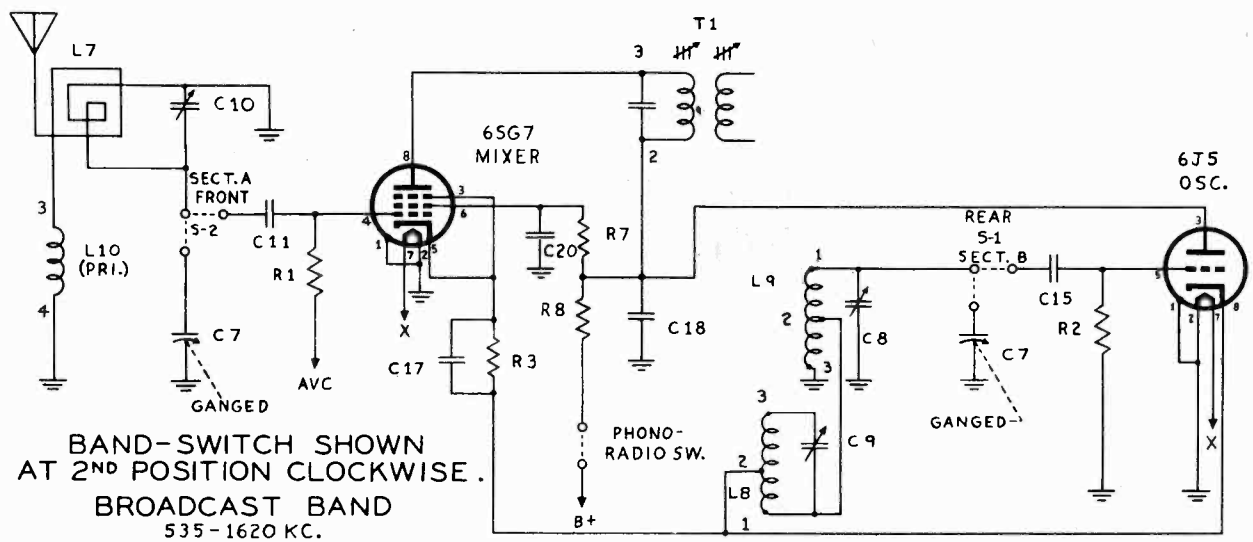
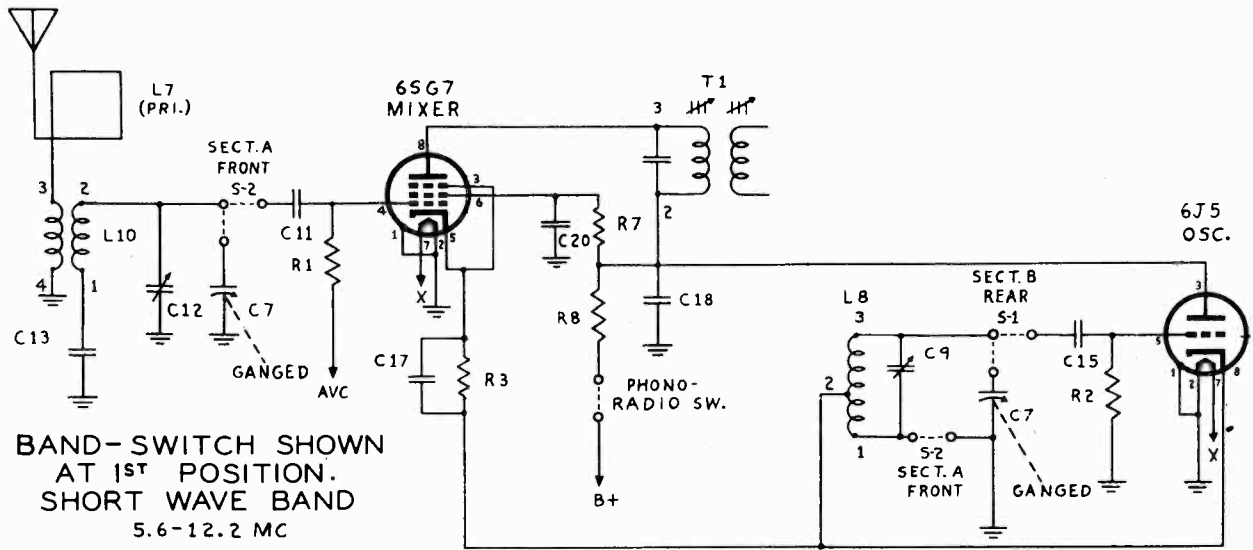
IF - 455 KC
BC - 1620 - 535 KC
SW - 12.2 - 5.6 MC

NOTE: ALL RESISTORS INDICATED IN OHMS.
K = ONE THOUSAND (1000) OHMS.

MODEL 65F21

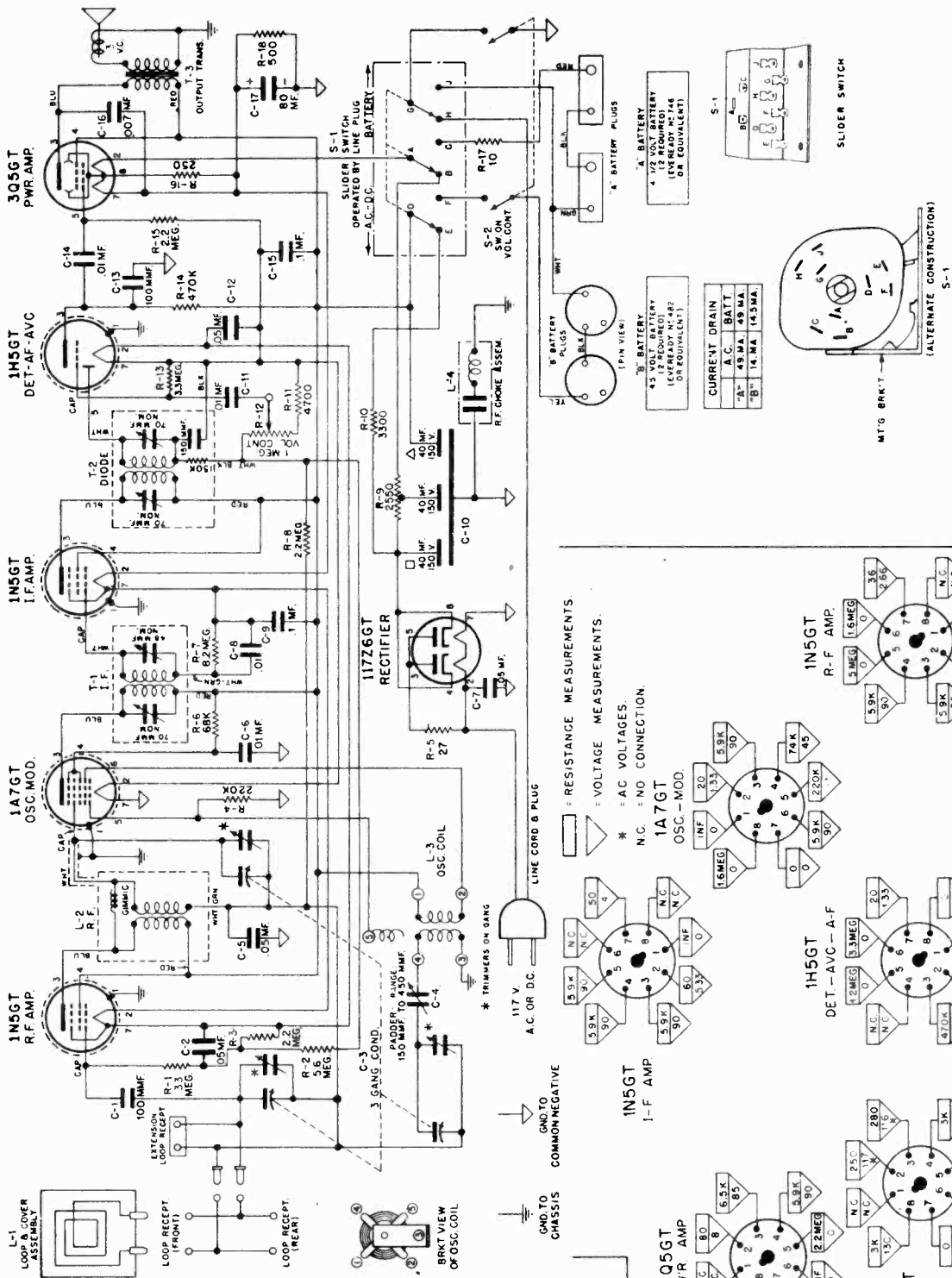


GALVIN MFG. CORP.



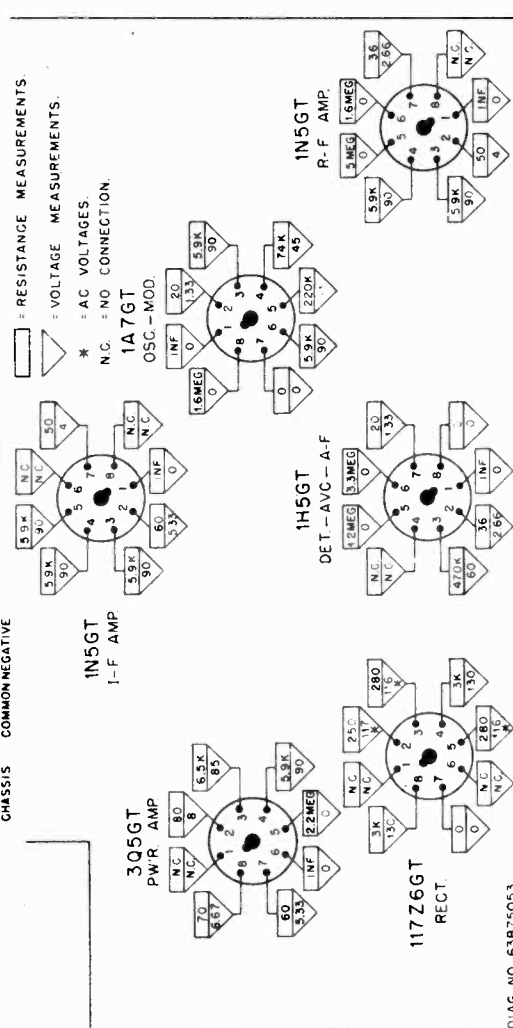
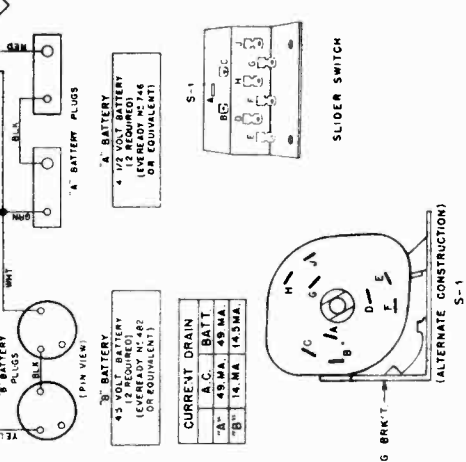
MODELS 65L11, 65L12,
Ch. ES-7

GALVIN MFG. CORP.



I.F. = 455 KC
FREQUENCY RANGE
535 KC TO 1600 KC

NOTE: ALL RESISTORS ARE INDICATED IN OHMS.
K=ONE THOUSAND(1,000)OHMS.



NOTE: VOLTAGES AND RESISTANCES WERE MEASURED FROM TUBE BASE PIN TERMINALS TO B-(\bar{V}) WITH A 20,000 OHM PER VOLT METER.
A TOLERANCE OF $\pm 20\%$ VARIATION FROM INDICATED VOLTAGE MEASUREMENTS IS NORMAL.
VOLTAGE INPUT = 117V A-C

A TOLERANCE OF $\pm 20\%$ IS PERMISSIBLE ON RESISTANCE MEASUREMENTS EXCEPT WHERE RESISTORS CODED WITH A SILVER BAND ARE USED IN SUCH CIRCUITS, THE TOLERANCE IS $\pm 10\%$.
AC-DC BATTERY SWITCH IS TO BE IN AC-DC POSITION.

GALVIN MFG. CORP.

*Connect output of signal generator to a 5" diameter 3 turn loop. See Fig. 1. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained (.38V on output meter). The distance between loops should never be less than 12". Vary distance between generator and receiver loops or adjust generator output to maintain .38V output during alignment.

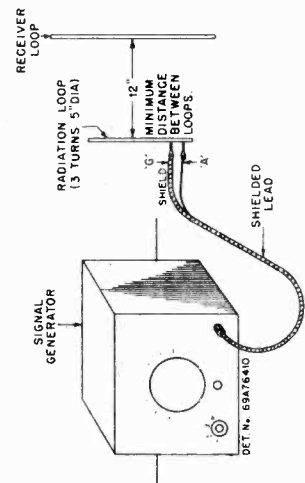


FIGURE 1. METHOD OF RADIATING SIGNAL INTO RECEIVER

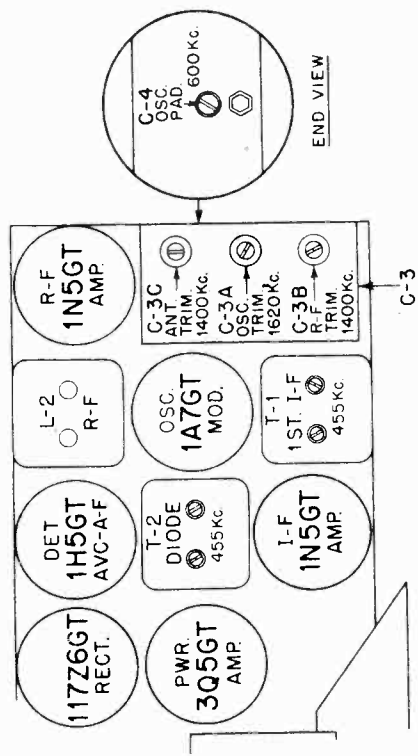
INSTRUCTIONS FOR REMOVING CHASSIS FROM CABINET

- Remove the line cord plug from 117 Volt outlet.
- Remove the batteries.
- Remove the dial plate hold-down screw in the upper left hand corner of the cabinet and the chassis retaining nut located beneath the front center of the chassis.
- Slide the chassis and shelf out of the cabinet.

ALIGNMENT PROCEDURE

Connect output meter across speaker voice coil (.38 V = .05 watts). Volume control set at maximum for all operations. The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008. Chassis bottom plate must be in position on bottom of chassis.

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	GENERATOR SET AT (400% 30% MODULATED)	ADJUST TRIMMER NO.	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
Align I.F.'s for maximum	Minimum Capacity	.1 mf.	Osc.-Mod. grid	455 Kc	T-1&T-2 (2 trimmers on each)	3700 microvolts to I.F. grid. 120 microvolts to Osc.-Mod. grid.
Set Oscillator trimmer	Minimum Capacity	None	Radiation Loop*	1620 Kc	C-3A	
Adjust R.F. trimmer for maximum	1400 Kc.	None	Radiation Loop*	1400 Kc	C-3B	135 microvolts to Osc.-Mod. Grid through .1 mf dummy.
Adjust Oscillator padder for maximum	600 Kc.	None	Radiation Loop*	600 Kc	C-4 (Rock gang capacitor for greatest output)	
Adjust antenna trimmer for maximum with set in cabinet	Approx. 1400 Kc.	None	(Use weak station)	---	C-3C	12 microvolts to F.F. grid through .1 mf dummy.



MODELS 65L11, 65L12,
Ch.HS-7

GALVIN MFG. CORP.

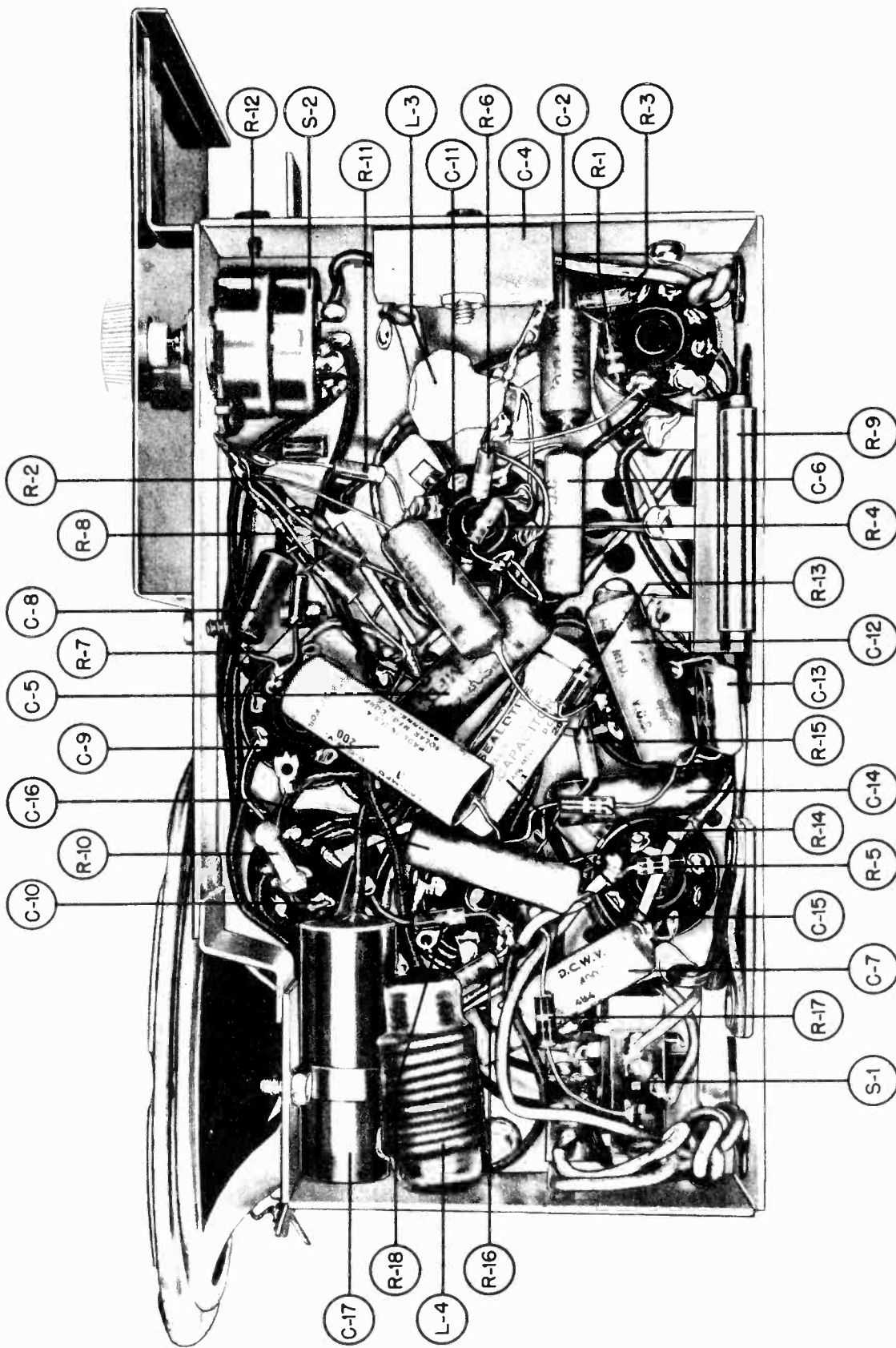
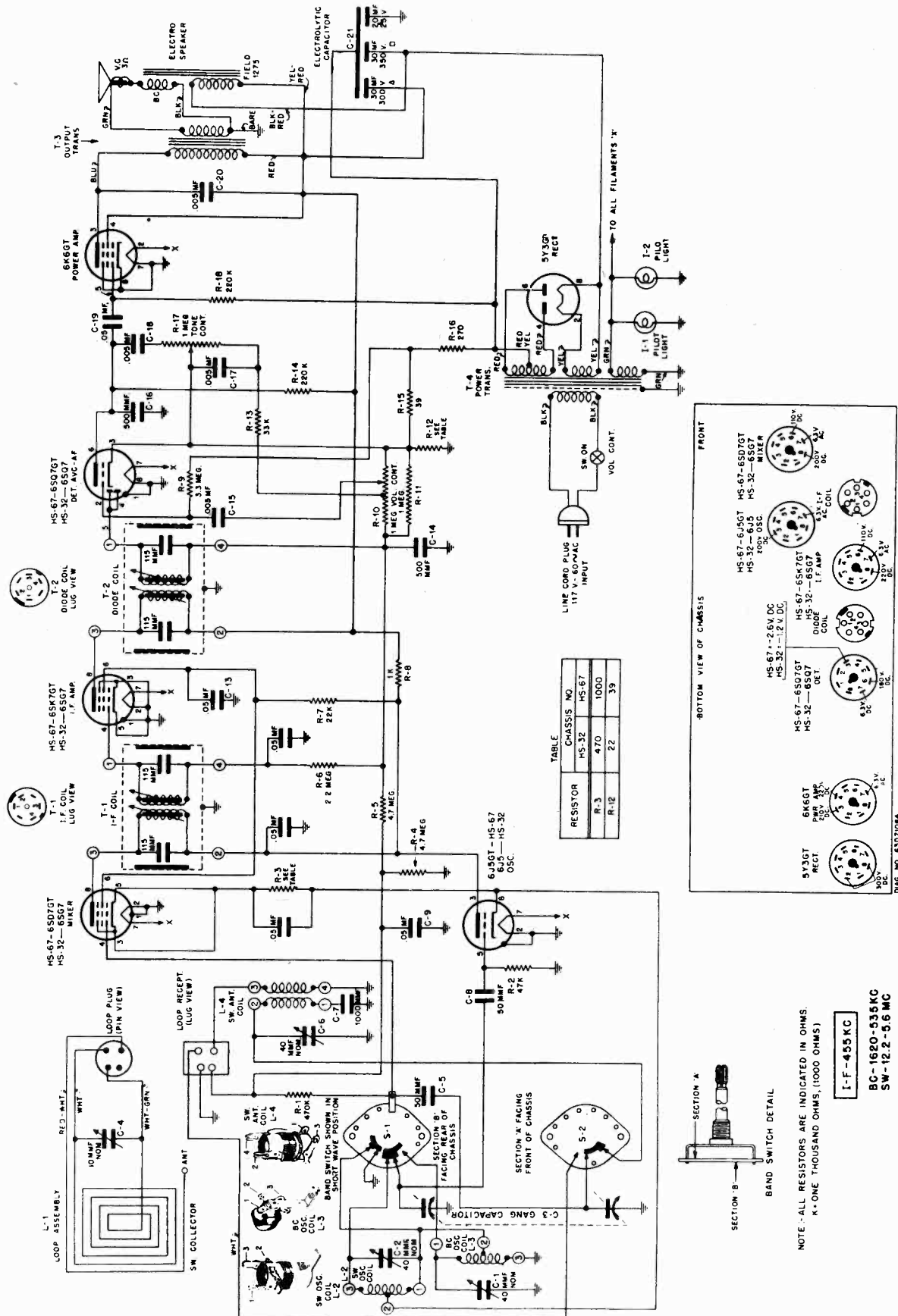


FIGURE 4. CHASSIS BOTTOM VIEW

GALVIN MFG. CORP.

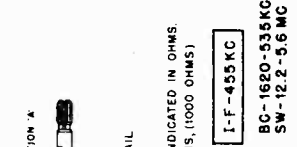
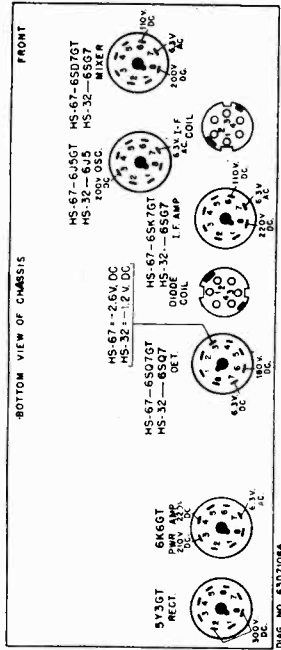
MODELS 65L11, 65L12, Ch.HS-7

REF. NO.	PART NO.	DESCRIPTION	LIST	REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	418641	Capacitor, fixed: mica: 100 mf 20K 500 VDC	.25	R-12	1042682	Resistor, variable: carbon: 1 meg with 500K switch	1.10
C-2	898006	Capacitor, fixed: paper: .05 mf 20K 100 VDC	.20	R-13	688001	Resistor, fixed: carbon: 3.3 meg 20K 1/2 W Ins.	dos. .60
C-3	1482923	Capacitor, variable: 3 meg: has planetary drive	3.20	R-14	686160	Resistor, fixed: carbon: 470,000 20K 1/2 W Ins.	dos. .60
C-4	3012599	Capacitor, paper: 150 to 450 mf range	.40	R-15	686202	Resistor, fixed: carbon: 2.2 meg 20K 1/3 W Ins.	dos. .60
C-5	898016	Capacitor, fixed: paper: .05 mf 20K 400 VDC	.20	R-16	682088	Resistor, fixed: carbon: 250 10K 1/2 W Ins.	dos. .60
C-6	898025	Capacitor, fixed: paper: .01 mf 20K 200 VDC	.10	R-17	686021	Resistor, fixed: carbon: 10 10K 1/2 W Ins.	dos. .60
C-7	898018	Capacitor, fixed: paper: .05 mf 20K 400 VDC	.20	R-18	686461	Resistor, fixed: carbon: 500 10K 1/3 W Ins.	dos. .75
C-8	6425639	Capacitor, fixed: paper: .01 mf 20K 100 VDC	.10	S-1	40427114	Switch, slider: triple pole, double throw	.75
C-9	898006	Capacitor, fixed: paper: .01 mf 20K 200 VDC	.10	or 40P70395		Switch, rotary: triple pole, double throw	
C-10	23425889	Capacitor, electrolytic: 40-40-40 mf 150 V	.15	4-2	Part of R-12	Switch, double pole, single throw (part of R-12)	
C-11	898001	Capacitor, fixed: paper: .01 mf 20K 100 VDC	1.85	T-1	122804	I. F. Coil & Shield Assembly: 455 Kc: complete with trimmer	1.66
C-12	389805	Capacitor, fixed: paper: .05 mf 20K 100 VDC	.20	T-2	122802	Diode coil & Shield Assembly: 455 Kc: complete with trimmer	2.20
C-13	318641	Capacitor, fixed: mica: 100 mf 20K 500 VDC	.25	T-3	3242894	Transformer, output	.05
C-14	898001	Capacitor, fixed: paper: .01 mf 20K 100 VDC	.15		37110814	Band, rubber: (used on tube shields)	st. .20
C-15	898006	Capacitor, fixed: paper: .01 mf 20K 200 VDC	.15		1122916	Battery Lead Assembly, "A": with 2 pin plugs	.30
C-16	8451091	Capacitor, fixed: paper: .007 mf 20K 600 VDC	.20		1172873	Battery Lead Assembly, "B": with 2 three pin plugs	.45
C-17	3425988	Capacitor, electrolytic: 80 mf 25 VDC: with str. strap	.85		782371b	Bracket, gang mounting	.15
	20120323	Capacitor, variable: mica: dual: 70 mf nom. (diode coil tuning)	.60		36115797	Button, plug for 3/8 hole: (cop. oxide finish/cover for antenna trimmer hole)	dos. .25
	20120321	Capacitor, variable: mica: dual: (I. F. coil tuning)	.30		1174392	Cabinet Assembly: complete except for cabinet back and loop & front cover assemblies (65L11)	13.75
L-1	15029445	Loop & Front Cover Assembly: complete with hinges and bar knob (65L11)	2.10		1174390	Cabinet Assembly: complete except for cabinet back and loop & front cover assemblies (65L12)	13.75
	11627468	Loop & Front Cover Assembly: complete with hinges and bar knob (65L12)	1.85		1129442	Cabinet Back Assembly: complete with all hardware (65L11)	.45
L-2	1125905	R. F. Coil & Shield Assembly: complete; also includes external loop receptacle	2.75		1127464	Cabinet Back Assembly: complete with all hardware (65L12)	.45
L-3	24422636	Oscillator coil	.85		4295490	Clips, grid: small; collar grid	dos. .15
L-4	1178571	R. F. Choke assembly: .15 mf capacitor with 15 turn choke	.45		58457484	Clutch, crills	dos. .10
R-1	882201	Resistor, fixed: carbon: 3.3 meg 20K 1/3 W Ins.	dos. .60		30260329	Cord, libra. & small plug: 6 ft. long	.80
R-2	882303	Resistor, fixed: carbon: 5.6 meg 20K 1/3 W Ins.	dos. .75		1122618	Dial scale assembly: includes mounting bracket & crystal	.50
R-3	686202	Resistor, fixed: carbon: 2.2 meg 20K 1/3 W Ins.	dos. .60		5419658	Eyeball, steel: 200 x .812 (gas mtg.)	dos. .40
R-4	686349	Resistor, fixed: carbon: 220,000 10K 1/3 W Ins.	dos. .75		37412681	O-rings, rubber (gang chumions)	dos. .25
R-5	886683	Resistor, fixed: carbon: 27 10K 1/2 W Ins.	dos. .60		58971000	Guard, line cord: fibre	.25
R-6	686266	Resistor, fixed: carbon: 68,000 20K 1/3 W Ins.	dos. .60		36485865	Knob, tuning: white plastic; with spring clip	.10
R-7	686310	Resistor, fixed: carbon: 6.2 meg 20K 1/3 W Ins.	dos. .60		38426464	Knob, volume control: white plastic	.10
R-8	686202	Resistor, fixed: carbon: 2.2 meg 20K 1/3 W Ins.	dos. .60		32424815	Lock, line cord (holds line cord to chassis)	dos. .30
R-9	1742877	Resistor, fixed: wire wound: 2500 5K 5 W	.75		437660	Lockwasher, steel: 16 external; cad. pl. (on coil shield)	dos. .36
R-10	686064	Resistor, fixed: carbon: 3500 20K 1/3 W Ins.	dos. .60		2948201	Leg, soldering: L shaped (used as washer, to hold top of dial scale to cabinet)	perc/c .80
R-11	686039	Resistor, fixed: carbon: 4700 20K 1/2 W Ins.	dos. .60		287050	Wkt. steel: 6-32 x 9/16 hex	perc/c .50
						Palnut (washer)	perc/c .50
						Prices Subject to Change Without Notice	



TABLE

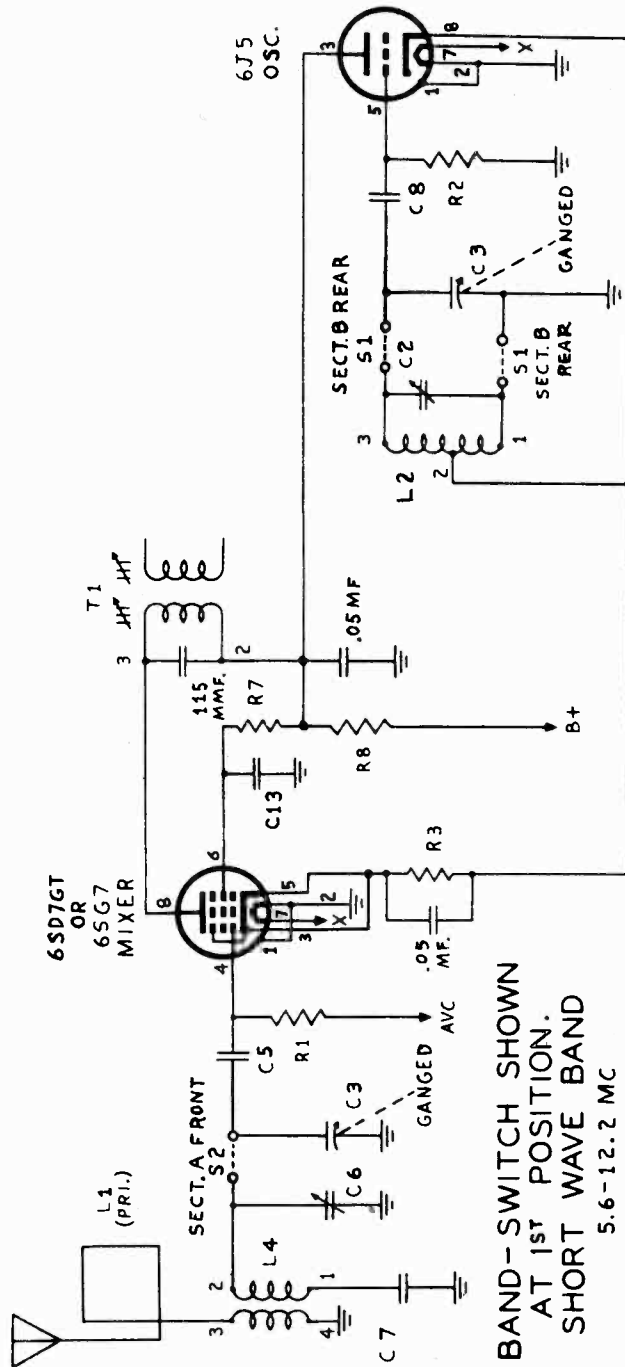
RESISTOR	CHASSIS NO.
R-3	HS-32
R-12	HS-67
R-7	470
R-11	1000
R-12	22
R-13	39



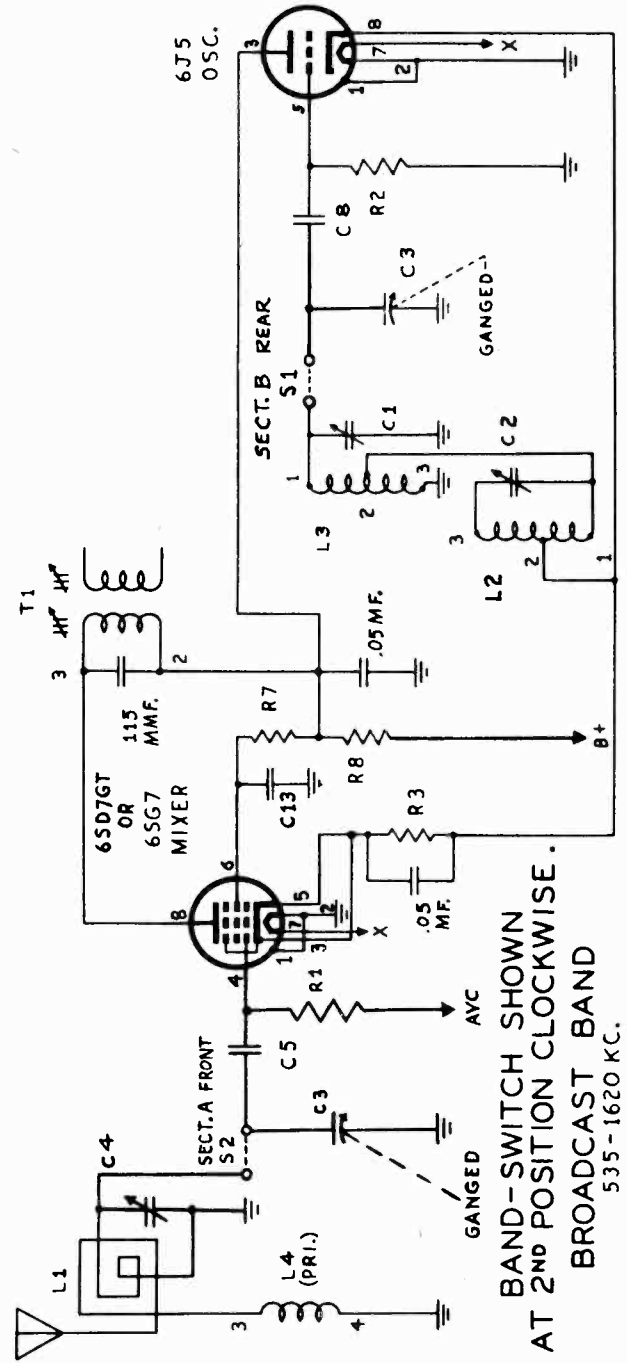
NOTE - ALL RESISTORS ARE INDICATED IN OHMS.
K - ONE THOUSAND OHMS, (1000 OHMS)

I-F-455 KC
BC-1690-535 KC
SW-12.2-5.6 MC

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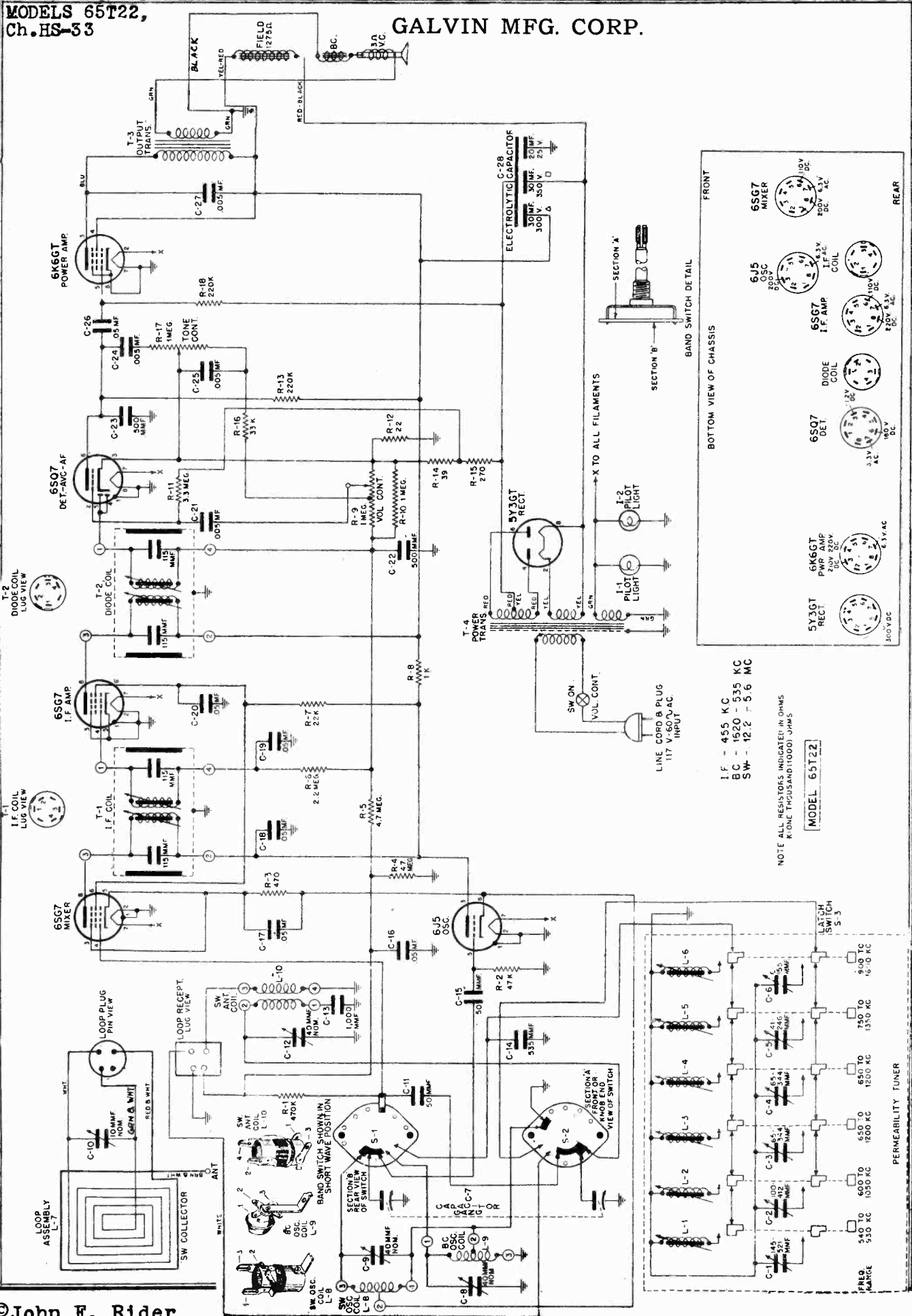
BAND-SWITCH SHOWN
 AT 1ST POSITION.
 SHORT WAVE BAND
 5.6-12.2 MC



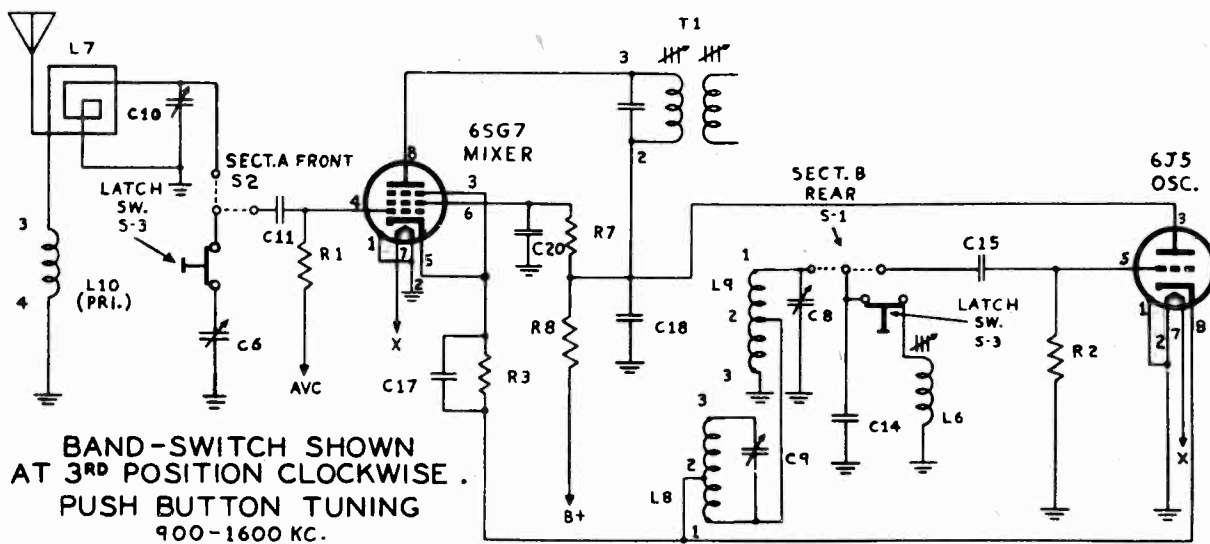
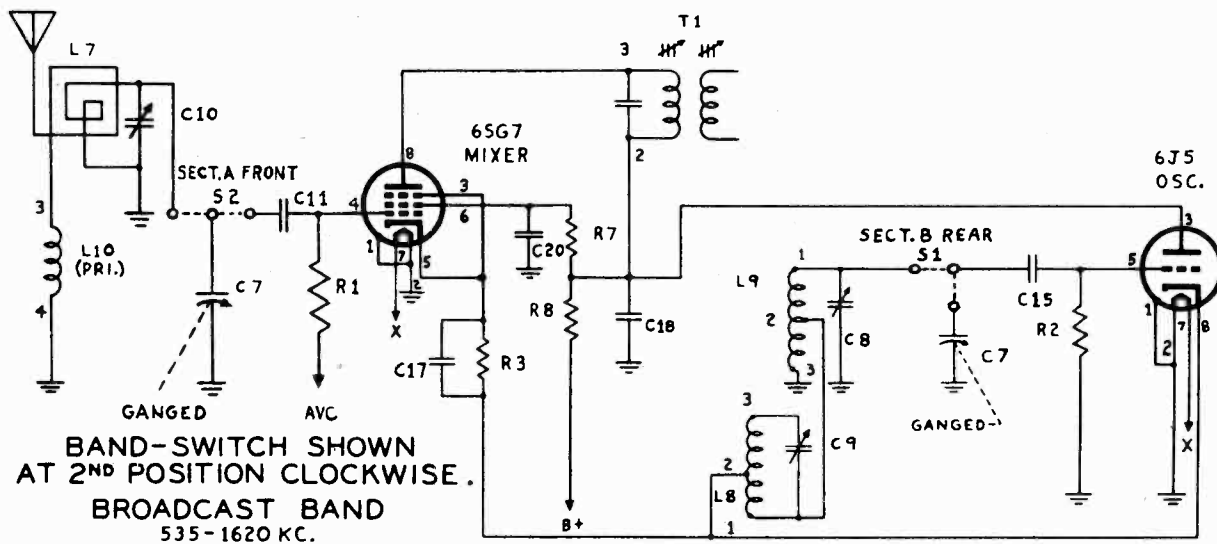
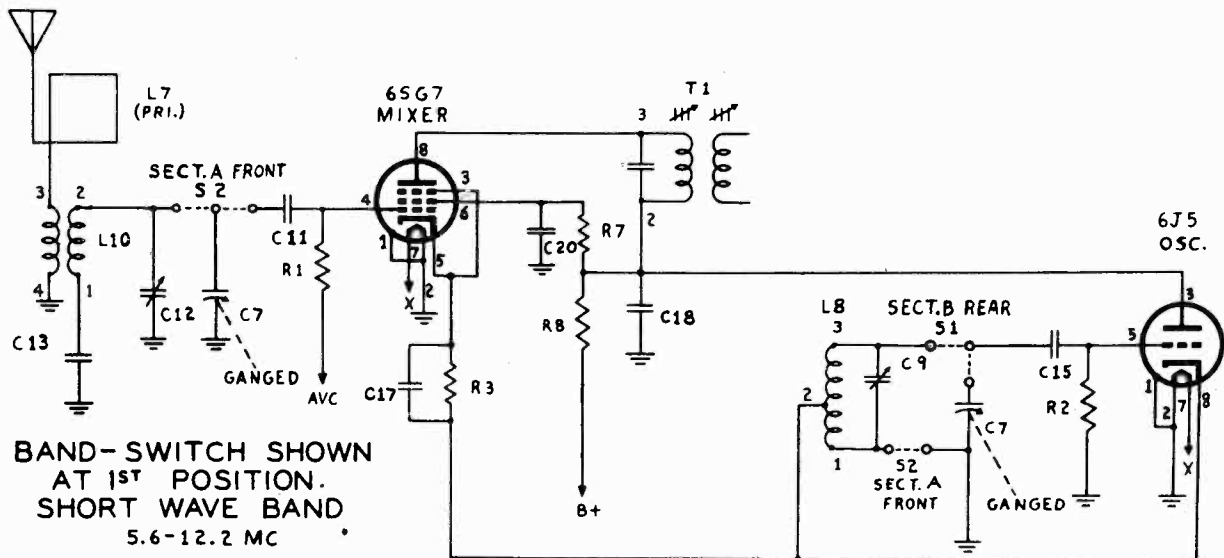
BAND-SWITCH SHOWN
 AT 2ND POSITION CLOCKWISE.
 BROADCAST BAND
 535-1620 KC.

MODELS 65T22,
Ch. HS-33

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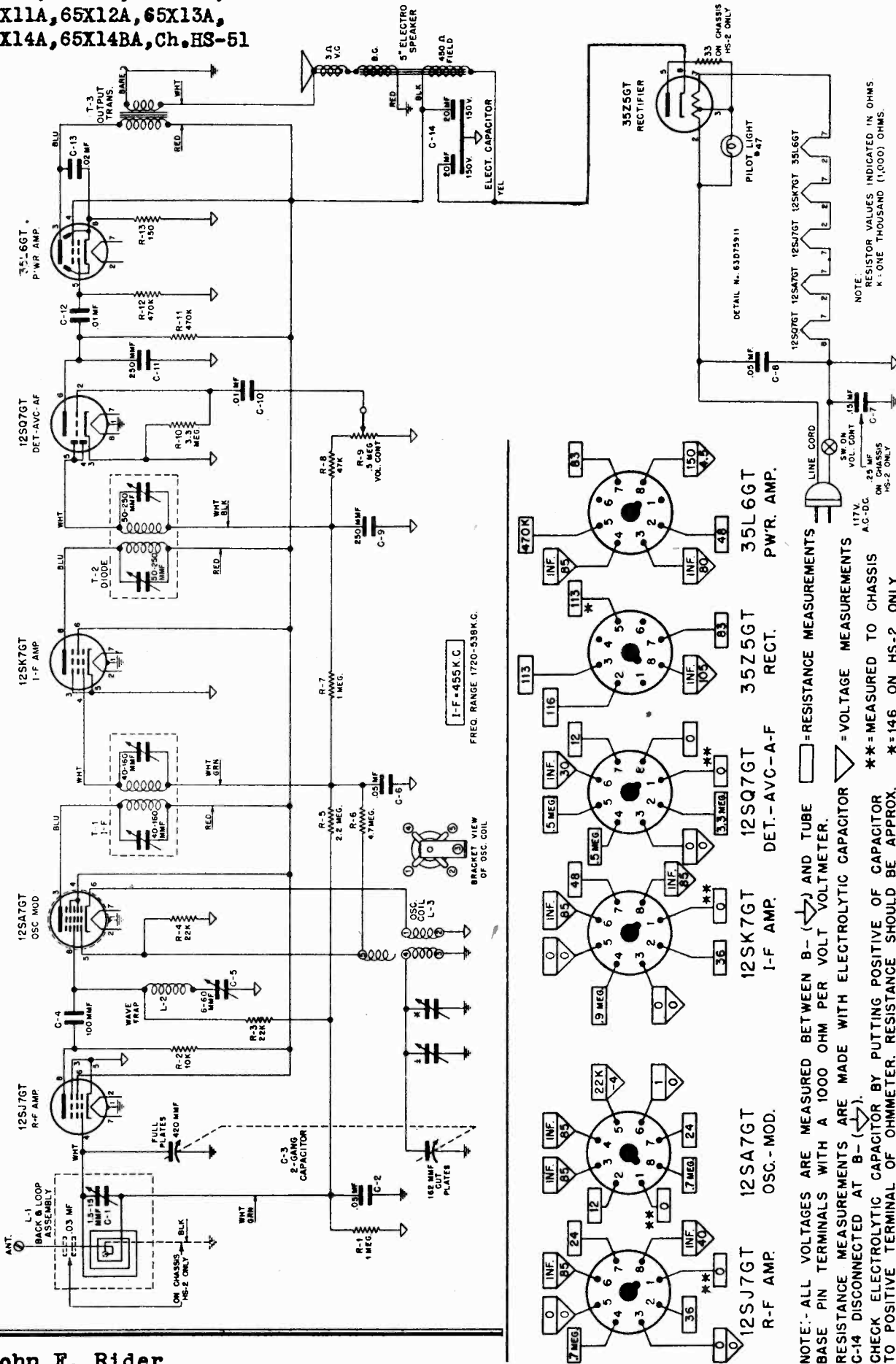


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MODELS 65X11, 65X12, 65X13,
65X14, 65X14B, Ch. HS-2;
65X11A, 65X12A, 65X13A,
65X14A, 65X14BA, Ch. HS-51

GALVIN MFG. CORP.



GALVIN MFG. CORP.

MODELS 65X11, 65X12, 65X13, 65X14, 65X14B, Ch. HS-2; 65X11A, 65X12A, 65X13A, 65X14A, 65X14BA, Ch. HS-51

ALIGNMENT PROCEDURE

Connect output meter across speaker voice coil (.38V = .05 watt) Volume control set at maximum for all operations. The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008

OPERATION IN QDR	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER NO.	GENERATOR SET AT (400 ~ 30% MODULATED)	AVERAGE MICRO-VOLT INPUT FOR .38V OUTPUT
1. Align I.F.'s for maximum	Minimum	.1 mf	Osc.-Mod. grid	T-1 & T-2 (2 trimmers on each)	455 Kc	4000 Microvolts to I. F. Grid
2. Adj. wave-trap for minimum response	Minimum	.1 mf	R.F. Grid	C-5	455 Kc	- - - - -
3. Set Oscillator to dial scale	Minimum	None	Radiation Loop*	C-3	1720 Kc	- - - - -
4. Align R.F. for maximum	1400 Kc	None	Radiation Loop*	C-1 (on loop) Should be adjusted with set in cabinet	1400 Kc	60 microvolts to Osc.-Mod. grid through .1 mf. dummy. 5.5 microvolts to R.F. grid through .1 mf dummy

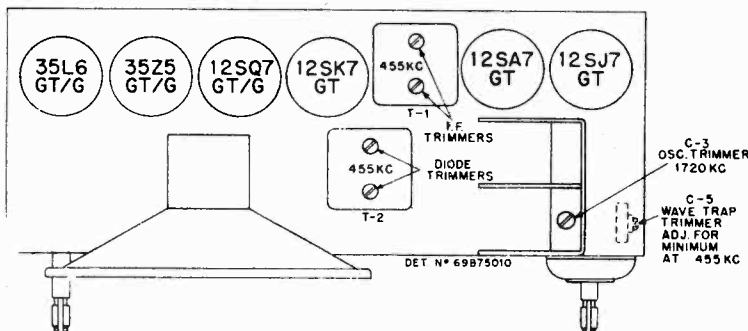
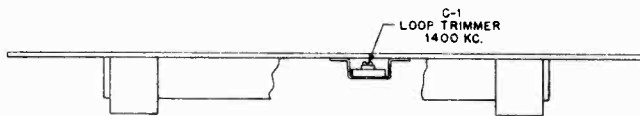
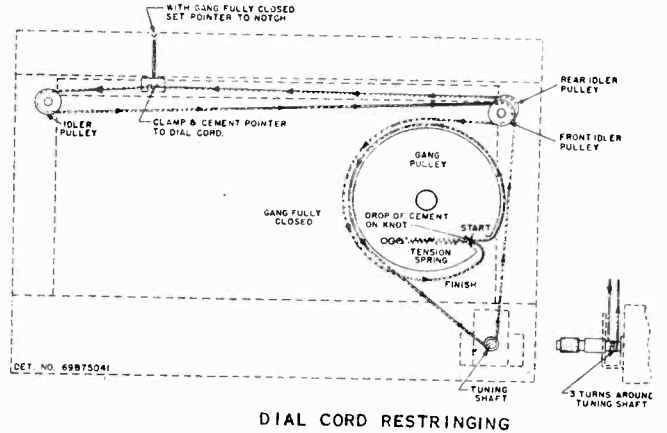
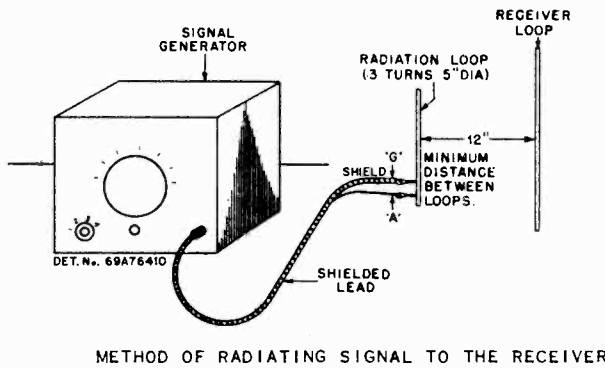
5. Repeat above steps for maximum accuracy.

.31 volt at 400~ to 1st A.F. grid.

* Connect output of signal generator to a 5" diameter 3 turn loop. See Fig. 2. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained (.38V on output meter). The distance between loops should never be less than 12" Vary distance between generator and receiver loops or adjust generator output to maintain 38V output during alignment.

TO REPLACE DIAL CORD:

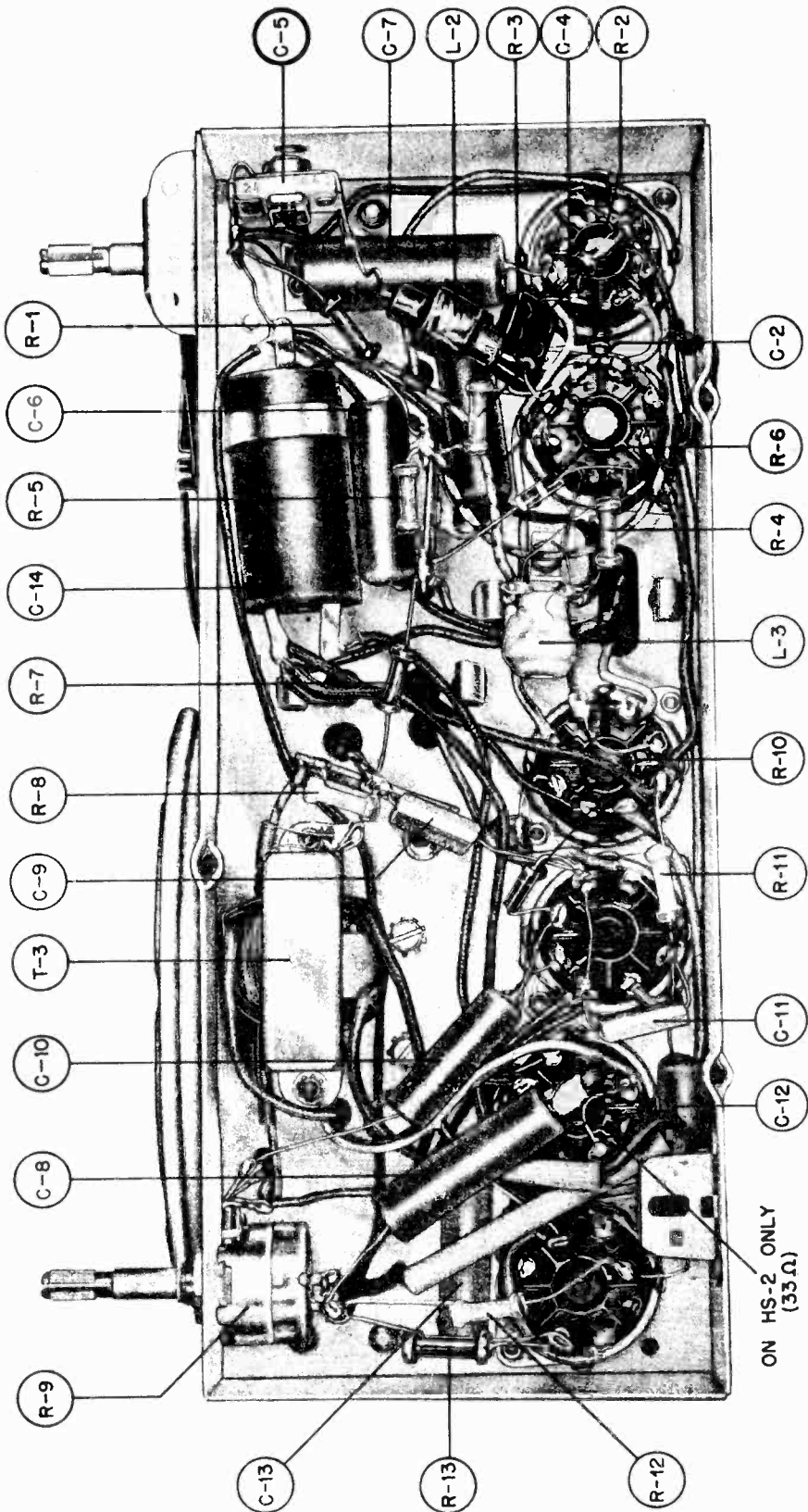
1. Remove loop from cabinet (see instruction on loop back).
2. Remove chassis from cabinet by pulling the knobs off and unscrewing the three chassis retaining screws from the bottom.
3. Remove the old dial cord and replace with a new piece of 18 lb. cord. See Figure 1 for procedure.
4. With the gang fully closed, set pointer to left hand notch of dial background and clamp to cord. In clamping, be careful not to cut the cord.
5. Secure the pointer to cord and dial cord knot with a drop of cement.
6. Reassemble by working in reverse order.



TUBE AND TRIMMER LOCATION

MODELS 65X11, 65X12, 65X13,
65X14, 65X14B, Ch. HS-2;
65X11A, 65X12A, 65X13A,
65X14A, 65X14BA, Ch. HS-51

GALVIN MFG. CORP.



BOTTOM VIEW OF CHASSIS

This receiver is a 6 tube AC-DC superheterodyne, with a self contained loop antenna and a stage of R.F. amplification. The frequency range is 538 to 1720 kc and the I.F. frequency is 455 kc.

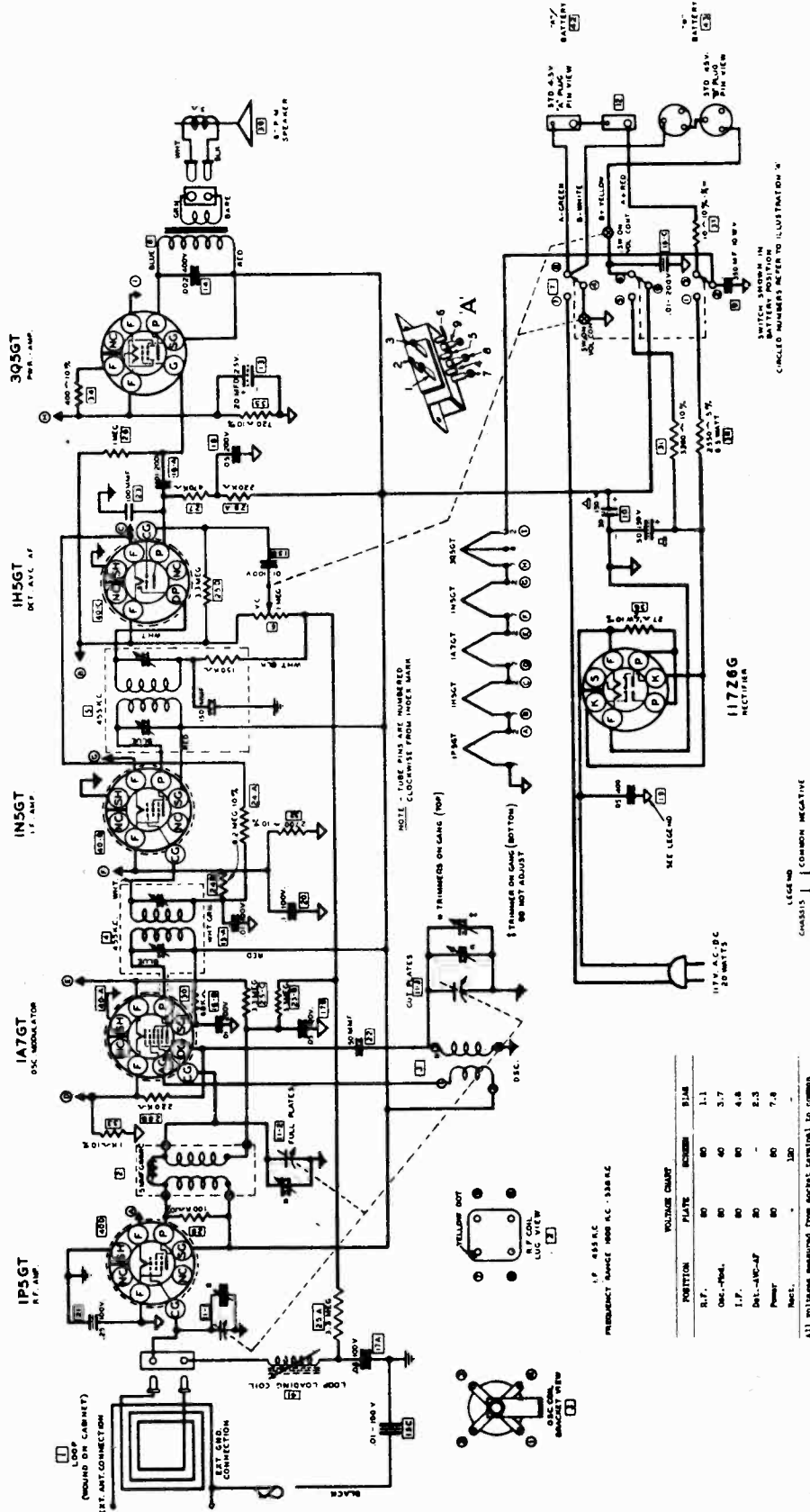
POWER INPUT: 117 V. AC-DC, 30 WATTS.

GALVIN MFG. CORP.

MODELS 65X11, 65X12, 65X13,
65X14, 65X14B, Ch. HS-2;
65X11A, 65X12A, 65X13A,
65X14A, 65X14BA, Ch. HS-51

REF. NO.	PART NO.	DESCRIPTION	LIST	REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	20A18740	Capacitor, trimmer: 1.5-15 mmf; includes "U" mounting bracket	.30	L-1	1X70002	Cabinet back & Loop assembly (65X11)	2.40
C-2	889805	Capacitor, fixed: paper; .05 mf 20% 100 vdc	.20		1X70005	Cabinet back & Loop assembly (65X12)	2.75
C-3	1X26949	Capacitor, variable: 2 gang, cut oscillator plates; includes pulley	3.55		1X70014	Cabinet back & Loop assembly (65X13)	2.85
C-4	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 vdc	.25		1X71739	Cabinet back & Loop assembly (65X14)	2.85
C-5	20A28941	Capacitor, trimmer: 6-60 mmf; includes "L" mounting bracket	.30		1X71776	Cabinet back & Loop assembly (65X14B)	2.85
C-6	889805	Capacitor, fixed: paper; .05 mf 20% 100 vdc	.20	L-2	24A21858	Coil, wave trap	.40
C-7	6A72686	Capacitor, fixed: paper; .15 mf 20% 200 vdc (HS-51)	.25	L-3	24A28942	Coil, oscillator	.40
	or 6A75566	Capacitor, fixed: paper; .15 mf 20% 400 vdc (HS-51)		R-1	6R6071	Resistor, fixed: carbon; 1 meg. 20% 1/3W N.I.	doz. .60
	or 889810	Capacitor, fixed: paper; .25 mf 20% 100 vdc (HS-2)	.25	R-2	6R6113	Resistor, fixed: carbon; 10,000 20% 1/3W N.I.	doz. .60
C-8	889816	Capacitor, fixed: paper; .05 mf 20% 400 vdc	.20	R-3	6R6050	Resistor, fixed: carbon; 22,000 20% 1/3W N.I.	doz. .60
C-9	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20	R-4	6R6050	Resistor, fixed: carbon; 22,000 20% 1/3W N.I.	doz. .60
C-10	889801	Capacitor, dual trimmer: .01 mf 20% 100 vdc	.15	R-5	6R6049	Resistor, fixed: carbon; 2.2 meg 20% 1/3W N.I.	doz. .60
C-11	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20	R-6	6R6446	Resistor, fixed: carbon; 4.7 meg 10% 1/2W Ins.	doz. .60
C-12	889825	Capacitor, fixed: paper; .01 mf 20% 200 vdc	.15	R-7	6R6071	Resistor, fixed: carbon; 1 meg 20% 1/3W N.I.	doz. .60
C-13	889802	Capacitor, fixed: paper; .02 mf 20% 400 vdc	.20	R-8	6R6020	Resistor, fixed: carbon; 47,000 20% 1/3W N.I.	doz. .60
C-14	23A70008	Capacitor, electrolytic: 20-20 mf 150 WV; with mounting strap	1.40	R-8	18A14629	Resistor, variable: carbon; .5 meg. with SPST switch	1.00
	20A14619	Capacitor, dual trimmer: 40-180 mmf each section (In IF can)	.35	or 18A72888	Resistor, variable: carbon; .5 meg. with SPST switch	1.00	
	or 20A72757	Capacitor, dual trimmer: 40-180 mmf each section (In IF can)	.35	R-10	6R2118	Resistor, fixed: carbon; 3.3 meg. 20% 1/2W Ins.	doz. .60
	20K20649	Capacitor, dual trimmer: 50-250 mmf each section (In diode can)	.40	R-11	6R6011	Resistor, fixed: carbon; 470,000 20% 1/3W N.I.	doz. .60
	or 20A72756	Capacitor, dual trimmer: 50-250 mmf each section (In diode can)	.40	R-12	6R6011	Resistor, fixed: carbon; 470,000 20% 1/3W N.I.	doz. .60
	587707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)	per/c .45	R-13	6R6392	Resistor, fixed: carbon; 150 10% 1/3W N.I.	doz. .60
	587716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.)	per/c .45	T-1	1X26946	Transformer, I.F.; 455 Kc; complete with shield and trimmers	1.80
	587701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.)	per/c .45	387526	Screw, steel: #8 x 1-1/8 PKZ S1 HH; plain (set mtg.- wood models)	doz. .30	
	5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)	.30	47A14635	Shaft, tuning control	.15	
	34B25759	Scale, dial: glass (65X11, 65X11-A, 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)	.45	26A26283	Shield, tube	.05	
	34B29469	Scale, dial: glass (65X13 & 65X13-A)	.35	60A25758	Socket, dial light: with mtg. clip and leads.	.20	
	3S7431	Screw, steel: #2 x 1/4 PH RH WS; Cop. Ox. (dial scale mtg.) (65X14, 65X14-A, 65X14B & 65X14-BA)	doz. .20	9A6738	Socket, tube: octal, saddle type	.15	
	3S7526	Screw, steel: #8 x 1-1/8 PKZ S1 HH; plain (set mtg.- wood models)	doz. .30	50B23173	Speaker, electro: 5 inch	5.20	
	47A14635	Shaft, tuning control	.15	or 50B20653	Speaker, electro: 5 inch	5.20	
	26A26283	Shield, tube	.05	287098	Speednut: for .180 round stud (mounts dial scale to escutcheon in 65X13 & 65X13-A)	doz. .20	
	60A25758	Socket, dial light: with mtg. clip and leads.	.20	41A14111	Spring, tension coil (dial cord)	doz. .35	
	9A6738	Socket, tube: octal, saddle type	.15	42A70423	Strap, ground (used behind loop screw terminal)	doz. .25	
	50B23173	Speaker, electro: 5 inch	5.20	31A12847	Strip, terminal: .2 ins. lugs, #3 mtg.	.10	
	or 50B20653	Speaker, electro: 5 inch	5.20	31K15026	Strip, terminal: 2 ins. lugs, #2 mtg.	.05	
	287098	Speednut: for .180 round stud (mounts dial scale to escutcheon in 65X13 & 65X13-A)	doz. .20	29A70422	Terminal, screw (external antenna term. on loop assem.) (Use with ground strap)	doz. .35	
	41A14111	Spring, tension coil (dial cord)	doz. .35	4A70015	Washer, "C" (tuning shaft retain-er)	per/c .70	
	42A70423	Strap, ground (used behind loop screw terminal)	doz. .25	35K19943	Washer, paper: brown (used between knobs and cabinet on dark models)	per/c .60	
	31A12847	Strip, terminal: .2 ins. lugs, #3 mtg.	.10	35K22505	Washer, paper: ivory (used between knobs and cabinet)	per/c .60	
	31K15026	Strip, terminal: 2 ins. lugs, #2 mtg.	.05	587707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)	per/c .45	
	29A70422	Terminal, screw (external antenna term. on loop assem.) (Use with ground strap)	doz. .35	587716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.)	per/c .45	
	4A70015	Washer, "C" (tuning shaft retain-er)	per/c .70	587701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.)	per/c .45	
	35K19943	Washer, paper: brown (used between knobs and cabinet on dark models)	per/c .60	5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)	.30	
				34B25759	Scale, dial: glass (65X11, 65X11-A, 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)	.45	
				34B29469	Scale, dial: glass (65X13 & 65X13-A)	.35	

Prices Subject To Change Without Notice



IF 455 K.C. FREQUENCY TUNING INDICATOR - 11726

POSITION	PLATE	RESISTOR	VALUE
R.F.	80	80	1.1
OSC.-MOD.	80	40	3.7
I.F.	80	80	4.8
DET.-AFC-AF	80	-	2.3
Power	80	80	7.8
Rect.	-	120	-

All voltages measured from socket terminal to common negative using 100K Ohm test voltmeter.

GALVIN MFG. CORP.

MODELS 65BP1A, 65BP2A, 65BP3A, 65BP4A

MODELS 65BP1, 2, 3, 4A

DRWG. NO.	PART NO.	DESCRIPTION	LIST
MAJOR PARTS			
8	25A15786	Output Transformer	\$0.80
7	1X20289	Slider Switch & Brkt. Assembly	.55
9	23A20318	Elect. Cond. & Strap 350-10v.	.50
10	23A20324	Electrolytic Condenser FP	.80
6	18K20339	Volume Control & Switch 1 meg	.85
5	1X20342	Diode Coil & Shield Assembly	1.55
4	1X20344	I.F. Coil & Shield Assembly	1.40
39	50C20392	Speaker 6" P.M.	3.60
		Speaker Exchange	2.10
	50C21172	Speaker 6" P.M.	3.60
		Speaker Exchange	2.10
	19B22734	Variable Condenser - Subs. 1X22749	XXXX
2	1X22740	R.F. Coil & Shield Assembly	1.40
3	24A22746	Osc. Coil - Wht.-Brn.-Ceramic	.35
11	1X22749	Gang & Pulley Assembly	2.85
41	1X22831	Coil Core & Brkt. Assembly (Loading Coil)	.50
13	23A22953	Tub. Elect. Cond.-20-25v. EP	.25

CABINET PARTS

	3S7431	Screw 2x1/4 CO - 65BP3,4A	.DOZ. .20
	55K16573	Handle	.25
	55K16576	Handle Mounting Post	.20
	37A16614	Rubber Foot	.DOZ. .25
	36A20315	Control Knob - Ivory - Plain	.10
	64B20372	Speaker Screen - Plain	.20
	36K20609	Control Knob - Ivory - Marked	.10
	35B21021	Grille Cloth	.15
	36K21049	Bar Knob & Brkt.-Frt. Cover - 65BP3,4A	.20
	55A21099	Sliding Hinge- Frt. Cover - 65BP3,4A	.15
	61K22389	Dial Crystal - 65BP1,2A	.20
	16D22763	Cabinet (Portable) Cpt. - 65BP1A	7.50
	1X22771	Back & Brackets Assembly - 65BP1A	.55
	16K22774	Cabinet (Portable) Cpt. - 65BP2A	7.50
	1X22776	Back & Bracket Assembly - 65BP2A	.55
	61B22798	Escutcheon & Crystal - 65BP3,4A	1.00
	16D22802	Cabinet (Portable) Cpt. - 65BP3A	12.50
	16K22805	Cabinet (Portable) Cpt. - 65BP4A	12.50
	1X22814	Back & Bracket Assembly - 65BP3A	.55
	1X22815	Back & Bracket Assembly - 65BP4A	.55
	56X22861	Packing Carton & Fillers - 65BP1,2A	.30
	56X22867	Packing Carton & Fillers - 65BP3,4A	.35

DIAL & DRIVE

	5S7805	Snap-In Eyelet 1/8x.141 CP	.PER C. .70
	11M8944	Dial Cord 18' Blk. - 18"	.YARD .05
	37A12691	Rubber Grommet - Gang Mtg	.DOZ. .25
	41A14244	Dial Cord Tension Spring	.DOZ. .40
	7A14610	Tuning Shaft Bracket	.05
	7B18748	Gang Mounting Bracket	.10
	5A19658	Eyelet .296 Cop. Pl. - Gang Mtg	.DOZ. .40
	47K20340	Tuning Shaft 1 & 11/64	.10
	38A20612	"Off" Indicator Button	.05
	52K20667	Dial Pointer - Double	.10
	1X22755	Dial Plate & Bracket Assembly	.10
	34B22758	Dial Scale	.15

CONDENSERS

22	21B6503	Molded Mica Condenser 50 mmf-20%	.15
	21B6506	Molded Mica Condenser 150 mmf-20%	.15
23	21B6511	Molded Mica Condenser 100 mmf-20%	.15
15	8S9801	Tubular Condenser .01-100v.	.10
17	8S9805	Tubular Condenser .05-100v.	.15
21	8S9810	Tubular Condenser .25-100v.	.20

DRWG. NO.	PART NO.	DESCRIPTION	LIST
CONDENSERS (Cont'd.)			
20	8S9814	Tubular Condenser .1-100v.	\$0.15
19	8S9816	Tubular Condenser .05-400v.	.15
18	8S9821	Tubular Condenser .05-200v.	.10
14	8S9824	Tubular Condenser .002-400v.	.10
16	8S9825	Tubular Condenser .01-200v.	.10
	20A20321	I.F. Trimmer - Small	.25
	20A20323	Diode Trimmer - 3 Pl. 70 mmf.	.30

RESISTORS

28	6B6003	Carbon Resistor 220,000-1/3-20 N.I.	.DOZ. .60
27	6B6011	Carbon Resistor 470,000-1/3-20 N.I.	.DOZ. .60
34	6B6025	Carbon Resistor 400-1/3-10 N.I.	.DOZ. .60
	6B6030	Carbon Resistor 100,000-1/3-20 N.I.	.DOZ. .60
29	6B6070	Carbon Resistor 150,000-1/3-20 N.I.	.DOZ. .60
26	6B6071	Carbon Resistor 1 meg-1/3-20 N.I.	.DOZ. .60
33	6B6086	Carbon Resistor 1,000-1/3-10 N.I.	.DOZ. .60
30	6B6125	Carbon Resistor 68,000-1/3-20 N.I.	.DOZ. .60
37	6B6132	Carbon Resistor 10-1/2-10 N.I.	.DOZ. .60
25	6B6179	Carbon Resistor 3.3 meg-1/3-20 N.I.	.DOZ. .60
35	6B6192	Carbon Resistor 720-1/3-10 N.I.	.DOZ. .60
36	6B6241	Carbon Resistor 27-1/2-10 N.I.	.DOZ. .60
31	6B6242	Carbon Resistor 3,300-1/3-10 N.I.	.DOZ. .60
32	6B6276	Carbon Resistor 2,700-1/3-20 N.I.	.DOZ. .60
24	6B6297	Carbon Resistor 8.2 meg-1/3-10 N.I.	.DOZ. .60
38	17A20466	W.W. Resistor 2550-6.5-5.	.40

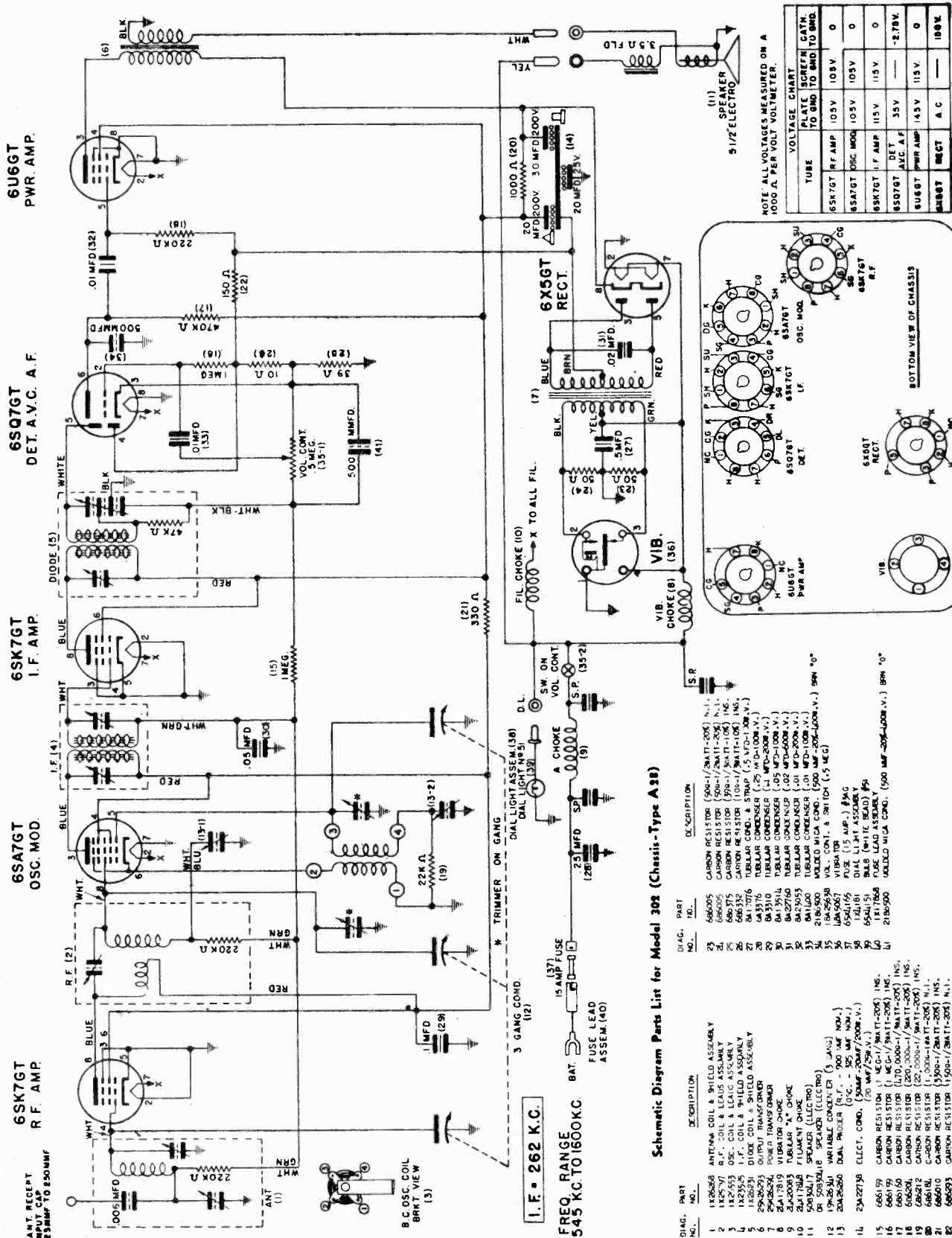
SCREWS & WASHERS

	2S7000	Nut 8-32x11/32 Brass - Spkr	.PER C. .70
	2S7003	Nut 8-32x11/32 CP - Bot. Brkt	.PER C. .50
	3S7155	Screw 6-32x3/16 CP - Gang Brkt	.PER C. .35
	3S7203	Screw 6-32x3/16 CP - Coil Core	.PER C. .60
	3S7248	Screw 8-32x1/8 CP - Dial	.PER C. .40
	3S7271	Screw 6-32x7/16 CO - Loop	.PER C. .75
	3S7350	Lockscrew 6-32x1/4 CP - Gang Brkt	.PER C. .80
	3S7454	Screw 8x1/4 PK Z PIHH CP	.DOZ. .20
	3S7462	Screw 6-32x3/16 CP - Osc. Coil	.PER C. .90
	3S7475	Screw 8x1/4 CP - Cord Guard	.PER C. .65
	3S7528	Screw 8x3/8 CO - Batt. Brkt	.PER C. .65
	4S7597	Washer 7/16 CP - Bot. Brkt	.PER C. .35
	3S7512	Screw 8x1/2 CP - Gang Brkt	.PER C. .70
	4S7660	Lockscrew #8 Ext. Pho. Brz.-Spkr	.PER C. .60

MISCELLANEOUS

	31A504	Terminal Strip 1 Ins. #1 Mtg.	.05
	29B5207	Soldering Lug - Gang Brkt	.PER C. .85
	42B5480	Grid Clip - Small - Collar Grip	.DOZ. .15
	9B6739	Tube Socket - Octal Waferette	.15
	28X12250	Three Prong Battery Plug	.05
	42X13135	Cable Clamp	.DOZ. .15
40	26X14760	Bantam Tube Shield	.05
	7A15254	Back Mounting Bracket	.05
	14A15324	Elect. Insulator Tube	.05
	9A15642	Two Prong Receptacle	.10
	36X15757	Plug Button 3/8x3/16 CO	.DOZ. .35
	42X17040	Line Cord Clamp	.05
	31A20288	Term. Strip - 2 Lrg. Ins. #2 Mtg.	.DOZ. .40
	7A20317	Mounting Bracket - Sw. & Shield	.DOZ. .15
	30B20329	Line Cord & Small Plug - 6 Ft	.35
	32B20332	Line Cord Guard - Fibre	.05
	28A20361	Two-Pin Plug Base	.DOZ. .30
	7A20375	Battery Retainer Brkt. - Long	.05
	1X20592	Battery Cable Assembly	.20
12	1X22769	Bottom Plate & Brkt. Assembly	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



Schematic Diagram Parts List for Model 302 (Chassis - Type A28)

DIAG. PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
1	1426268 ANTENNA COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-20K) N.I.
2	1425741 R.F. COIL & LEAD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-20K) N.I.
3	1425753 OSC. COIL & LEAD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
4	1425755 I.F. COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
5	2042624 I.F. COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
6	2042624 I.F. COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
7	2042624 I.F. COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
8	2042624 I.F. COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
9	2042624 I.F. COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
10	2042624 I.F. COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
11	2042624 I.F. COIL & SHIELD ASSEMBLY	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
12	1942634 VIBRATOR CHOKER (5 LANG)	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
13	2042630 DUAL PRINDER (P.T. - 900 MAF MOD.)	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
14	234-22730 ELECT. COND. (3000PF/2000V.V.)	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
15	660159 CARBON RESISTOR (1/2WATT-20K) INS.	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
16	660159 CARBON RESISTOR (1/2WATT-20K) INS.	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
17	660159 CARBON RESISTOR (1/2WATT-20K) INS.	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
18	660159 CARBON RESISTOR (1/2WATT-20K) INS.	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
19	660159 CARBON RESISTOR (1/2WATT-20K) INS.	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
20	660159 CARBON RESISTOR (1/2WATT-20K) INS.	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
21	660159 CARBON RESISTOR (1/2WATT-20K) INS.	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.
22	660159 CARBON RESISTOR (1/2WATT-20K) INS.	656205	CARBON RESISTOR (500-1/2WATT-10K) INS.

GALVIN MFG. CORP.

MODEL 302
MODEL 352
MODEL 452

MODEL 302

LX26268	Antenna Coil & Shield Assembly	1.55	6B6184	Carbon Res. (1,000-1 Watt 20% NI	.10
LX25797	R. F. Coil & Leads Assembly	.75	6B6010	Carbon Res. (330-1/2-20% Ins.	Doz. .60
LX26553	Osc. Coil & Leads Assembly	.60	6B6293	Carbon Res. (150-1/2-Watt -20% NI	Doz. .60
LX23525	I. F. Coil & Shield Assembly	1.45	6B6005	Carbon Res. (500-1-1/2 Watt 20% NI	Doz. .60
LX26231	Diode Coil & Shield Assembly	1.60	6B6375	Carbon Res. (300-1/3 Watt 10% Ins.	Doz. .60
25K26293	Output Transformer	.80	6B6332	Carbon Res. (10-1/3 Watt 10% Ins.	Doz. .60
25K26294	Power Transformer	2.35	8A17076	Tubular Cond. & Strap .5 MFD 100 W. V.	.30
24A17819	Vibrator Choke	.35	8A3376	Tubular Cond. (.25 MFD 100WV)	.20
24K20083	Tubular "A" Choke	.20	8A3510	Tubular Cond. (.1 MFD 200 W. V.)	.15
24X17848	Filament Choke	.05	8A13514	Tubular Cond. (.05-MFD-100W.V.)	.15
24X30417	Speaker Electro	3.10	8A22760	Tubular Cond. (.02MFD 600 WV)	.15
19K26341	Variable Cond 3Gang	3.15	8A23053	Tubular Cond. (.01 MFD 200 WV)	.10
20A26260	Dual Padder (RF 900 MMF Nom)	.55	8A1400	Tubular Cond. (.01 MFD 100WV)	.15
	(Osc. 325 MMF Nom)		21B6500	Molded Mica Cond. (500 MMF 20%)	.15
23A22738	Elect Cond. (30MMF 20MMF/200W.V)	.75	18A25638	Vol. Cont. & Switch (.5 Meg)	.80
	(20MMF/25 W.V.)		48A5067	Vibrator	2.50
6B6159	Carbon Res. (1 Meg-1/3 Watt -20% Ins.	Doz. .60	65X4165	Fuse (15 Amp) 3AG	.05
6B6160	Carbon Res. (470,000-1/3 Watt 20% Ins.	Doz. .60	LX4181	Dial Light Assembly	.35
6B6204	Carbon Res. (220,000-1/3Watt 20% Ins.	Doz. .60	65X4151	Bulb (White Bead) #51	.15
6B6212	Carbon Res. (22,000-1/3-20% Ins.	Doz. .60	LX17868	Fuse Lead Assembly	.15

MODEL 352

LX26399	Antenna Coil & Shield Assembly	2.60	21B6500	Molded Mica Cond. (500 MMFD 20%)	.15
LX26379	R. F. Coil & Shield Assembly	1.80	21B6503	Molded Mica Cond. (50 MMFD 20%)	.15
24A23892	Oscillator Coil	.60	6B6159	Carbon Resistor (1.0 Meg 1/3-20) Ins.	Doz. .60
LX26385	I. F. Coil & Shield Assembly	1.45	6B6180	Carbon Resistor (470,000-1/3-20 Ins.	Doz. .60
LX26383	Diode Coil & Shield Assembly	1.60	6B6204	Carbon Resistor (220,000-1/3-20 Ins.	Doz. .60
25A26233	Output Transformer	.90	6B6012	Carbon Resistor (33,000-1/2-20 Ins.	Doz. .60
25K26296	Power Transformer	2.45	6B6212	Carbon Resistor (22,000-1/3-20 Ins.	Doz. .60
24A19108	Vibrator Choke	.30	6B6184	Carbon Resistor (1000-1-20 N.I.	.10
24K19109	"A" Choke	.30	6B6010	Carbon Resistor (330-1/2-20 Ins.	Doz. .60
19B26246	Variable Condenser 3 Gang	2.55	6B6330	Carbon Resistor (150-1-10) Ins.	.10
20A26238	Single Padder & Brkt. (325 MMFD Nom.)	.30	6B6005	Carbon Resistor (50-1/2-20 NI	Doz. .60
23A22738	Electrolytic Condenser (30-20/200V-20/25V)	.75	6B6331	Carbon Resistor (27-1/3-10 Ins.	Doz. .60
8A19133	Tubular Condenser (.05-100V)	.30	6B6332	Carbon Resistor (10-1/3-10 Ins.	Doz. .60
8A14095	Tubular Condenser (.4-100V)	.30	18K25639	Vol. Cont. & Switch (.5 Meg)	.90
8A3310	Tubular Condenser (.1-200V)	.15	40A26887	Tone Switch	.45
8A3302	Tubular Condenser (.1-100V)	.15	48K12793	Vibrator	2.50
8A23146	Tubular Condenser (.5-200V)	.10	26A14760	Bantam Shield	.05
8A13514	Tubular Condenser (.05-100V)	.15	65X4165	Fuse (15 Amp.) 3AG	.05
8A22760	Tubular Condenser (.02-600V)	.15	LX4872	Battery Lead Assembly	.50
8A24053	Tubular Condenser (.02-200V)	.10	LX4181	Dial Light Assembly	.35
8A1697	Tubular Condenser (02-100V)	.15	65X4151	Bulb White Bead #51	.15
8A19134	Tubular Condenser (.005-600V)	.20	6B6284	Carbon Resistor (.5,000-1/3-20 Ins.	Doz. .60
8A2289	Tubular Condenser (.007-600V)	.20	21B6500	Molded Mica Cond. (500 MMFD 20%)	.15

MODEL 452

LX26583	Antenna Coil & Shield Assembly	2.50	21B6500	Molded Mica Cond. (500 MMF 20%)	.15
LX26557	R. F. Coil & Shield Assembly	1.75	21A23110	Ceramic Mica Cond. (300 MMF 5%)	.25
LX26556	Osc. Coil & Leads Assembly	.65	21B20877	Metal Mica Cond. (90MMF 10%)	.15
LX26558	I. F. Coil & Shield Assembly	1.20	6B6159	Carbon Res. (1 Meg. 1/3-20 Ins.	Doz. .60
LX26586	Diode Coil & Shield Assembly	1.55	6B6160	Carbon Res. (470,000-1/3-20 Ins.	Doz. .60
25K26487	Power Transformer	2.35	6B6165	Carbon Res. (100,000-1/3-20 Ins.	Doz. .60
25K26623	Output Transformer	1.00	6B6012	Carbon Rgs. (330,000-1/2-20 Ins.	Doz. .60
24A26555	Vibrator Choke	.35	6B6212	Carbon Res. (22,000-1/3-20 Ins.	Doz. .60
24A26554	"A" Choke & Bracket	.35	6B6184	Carbon Res. (1,000-1-20 NI	.10
19B26622	Variable Condenser (3Gang)	3.95	6B6010	Carbon Res. (330-1/2-20 Ins.	Doz. .60
20A23135	Osc. Padder & Brkt. (9-39 MMF)	.20	6B6330	Carbon Res. (150-1-10) Ins.	.10
20A17237	Osc. Trimmer & Brkt. 6 MMF Nom)	.20	6B6005	Carbon Res. (50-1/2-20 NI	Doz. .60
20A23927	Compensating Condenser	.25	6B6331	Carbon Res. (27-1/3-10 Ins.	Doz. .60
23A22738	Elect. Cond. (-30-20/200V-20/25V)	.75	6B6332	Carbon Res. (10-1/3-10 Ins.	Doz. .60
8A19133	Tubular Cond. (.5-100V)	.30	18A25638	Vol. Cont. & Switch .5 Meg.	.80
8A3376	Tubular Cond. (.25-100V)	.20	48K12793	Vibrator Short	2.50
8A3310	Tubular Cond. (.1-200V)	.15	65X4151	Bulb White Bead #51	.15
8A14095	Tubular Cond. (.4-100V)	.30	65X12712	Fuse 20 Amp 3AG	.05
8A23146	Tubular Cond. (.5-200V)	.10	LX4288	Battery Lead Assembly	.40
8A13514	Tubular Cond. (.05-100V)	.15	26X14760	Bantam Tube Shield	.05
8A22760	Tubular Cond. (.02-600V)	.15	26A26283	Bantam Tube Shield	.05
8A1697	Tubular Cond. (.02-100V)	.15	LX22875	Model E-24-T Tuner Assembly	9.50
8A2289	Tubular Condenser (.007-600V)	.20	1X26560	MR-6 Tone Control Relay	1.70
8A4529	Tubular Cond. (.006-100V)	.15	6B6256	Carbon Res. (68,000-1/3-20) Ins.	Doz. .60
2136525	Molded Mica Cond. (800 MMF) 20%	.20	21B6500	Molded Mica Cond. (500 MMF) 20%	.15

Prices subject to change without notice.

GALVIN MFG. CORP.

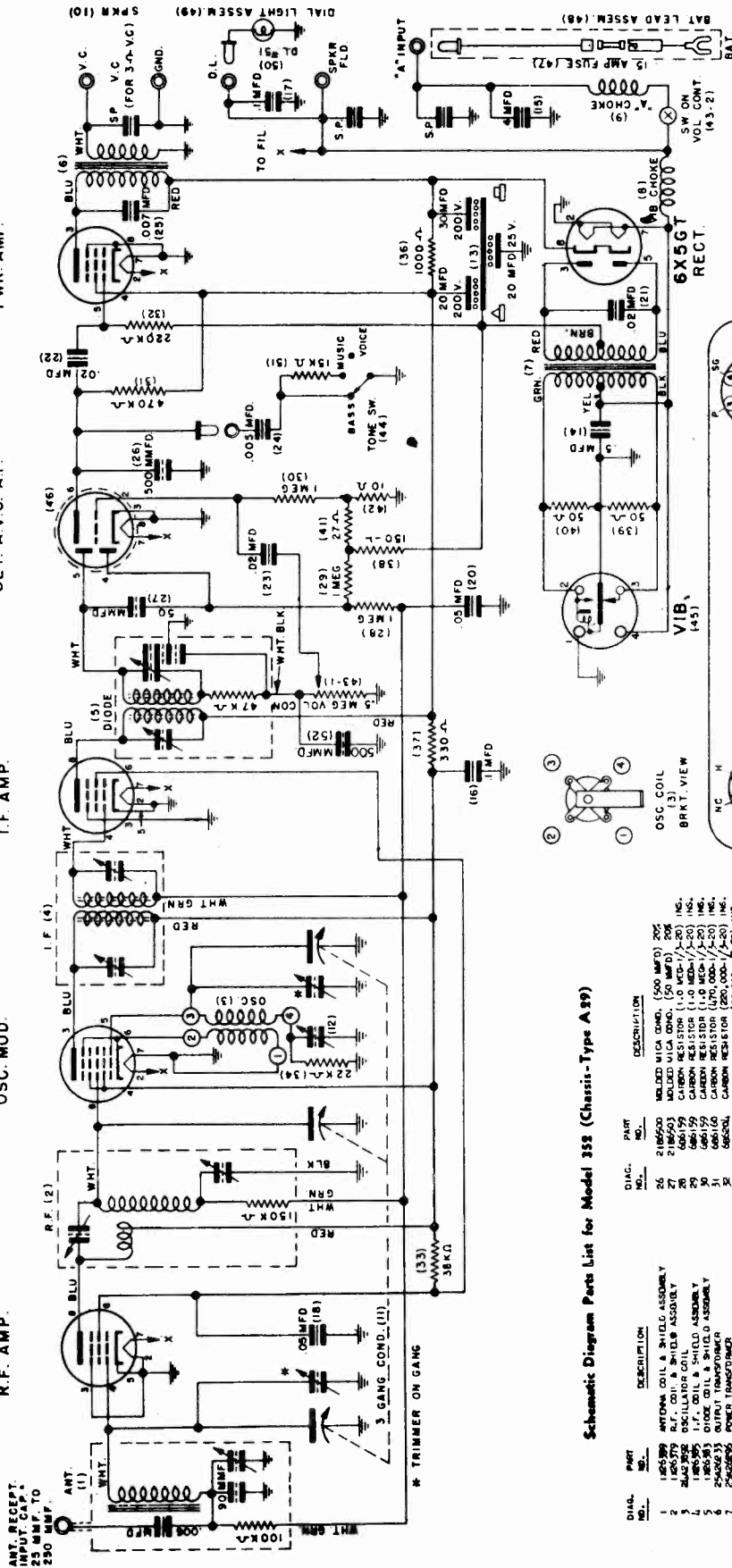
6U6GT
PWR. AMP.

6SQ7GT
DET.-A.V.C.-A.F.

6SK7GT
I.F. AMP.

6SA7GT
OSC. MOD.

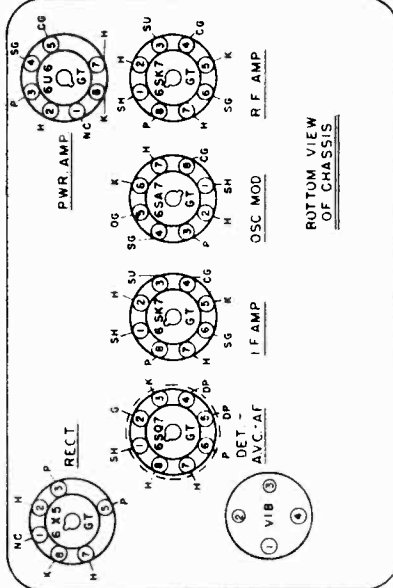
69K7GT
R.F. AMP.



I.F. = 262 KC
FREQUENCY RANGE
545 KC TO 1600 KC

TUBE	PLATE	SCREEN	CATH.
6SK7GT	RF AMP	110 V	90 V 0
6SA7GT	OSC MOD	110 V	110 V 0
6SQ7GT	IF AMP	115 V	90 V 0
6U6GT	DET.	40 V	— 0
6U6GT	PWR AMP	130 V	115 V 0
6X5GT	RECT AC	—	140

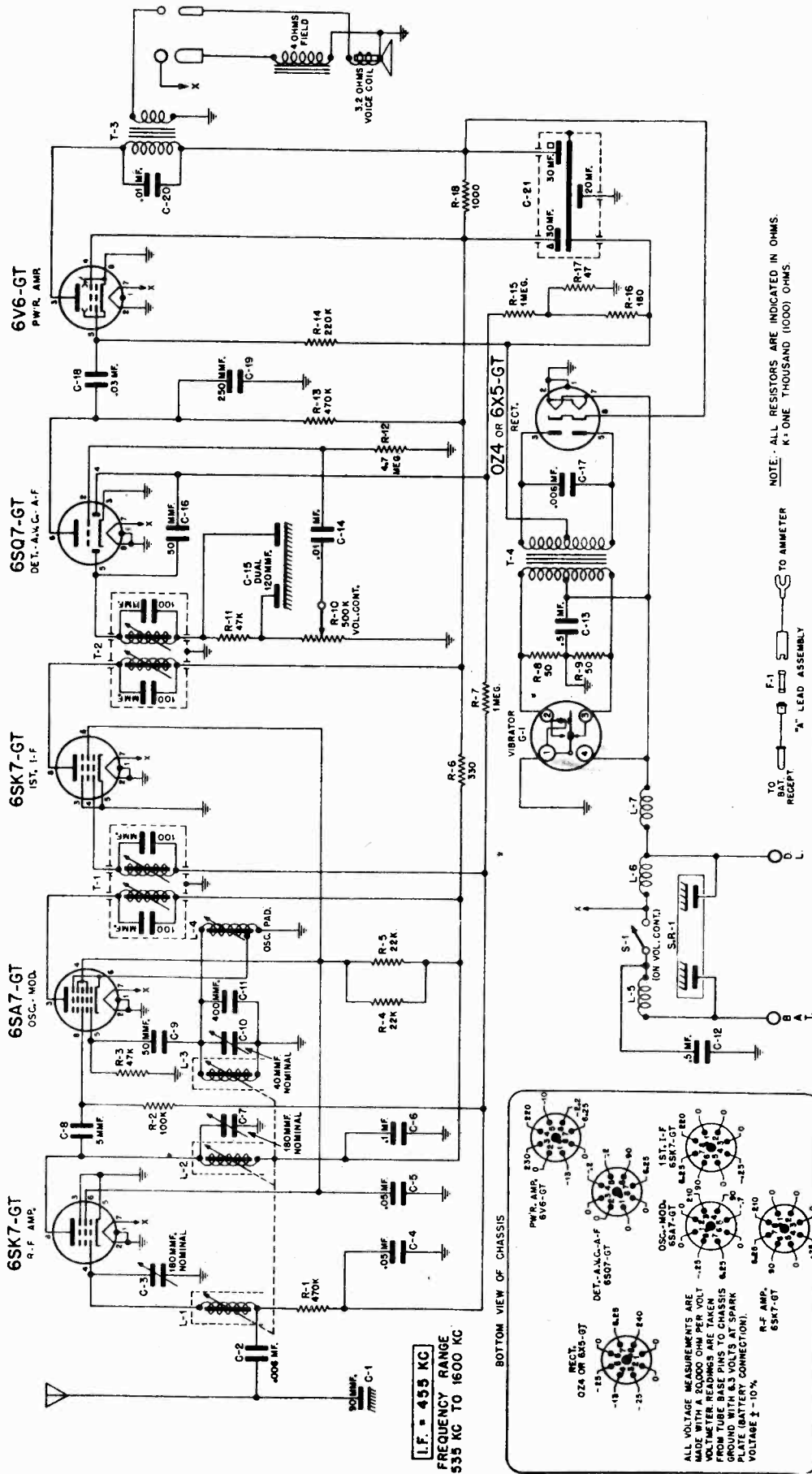
ALL MEASUREMENTS MADE WITH A
1000 OHM PER VOLT METER



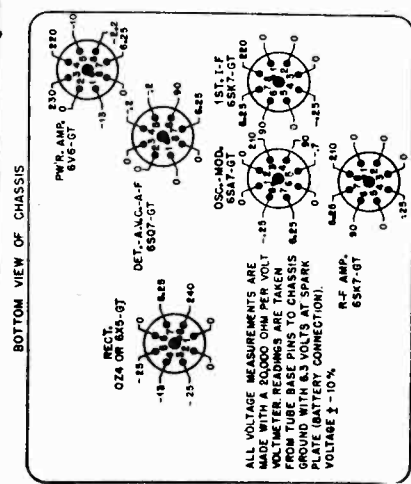
Schematic Diagram Parts List for Model 352 (Chassis-Type A29)

DIAG. NO.	PART NO.	DESCRIPTION
1	180399	ANTENNA COIL & SHIELD ASSEMBLY
2	218520	ANTENNA COIL & SHIELD ASSEMBLY
3	218520	OSCILLATOR COIL
4	180399	I.F. COIL & SHIELD ASSEMBLY
5	180399	DIODE COIL & SHIELD ASSEMBLY
6	218520	POWER TRANSFORMER
7	218520	VIBRATOR CHOK
8	218520	"A" CHOK
9	100000	VARIABLE CONDENSER (5 GANG)
10	218520	SINGLE PADDER & SPRING (500 MFD. MOD.)
11	218520	ELECTROLYTIC COND. (30-20/200V.-20/25V.-)
12	180399	TUBULAR CONDENSER (.001-100V.)
13	180399	TUBULAR CONDENSER (.001-100V.)
14	180399	TUBULAR CONDENSER (.001-100V.)
15	180399	TUBULAR CONDENSER (.001-100V.)
16	180399	TUBULAR CONDENSER (.001-100V.)
17	180399	TUBULAR CONDENSER (.001-100V.)
18	180399	TUBULAR CONDENSER (.001-100V.)
19	180399	TUBULAR CONDENSER (.001-100V.)
20	180399	TUBULAR CONDENSER (.001-100V.)
21	180399	TUBULAR CONDENSER (.001-100V.)
22	180399	TUBULAR CONDENSER (.001-100V.)
23	180399	TUBULAR CONDENSER (.001-100V.)
24	180399	TUBULAR CONDENSER (.001-100V.)
25	180399	TUBULAR CONDENSER (.001-100V.)

GALVIN MFG. CORP.



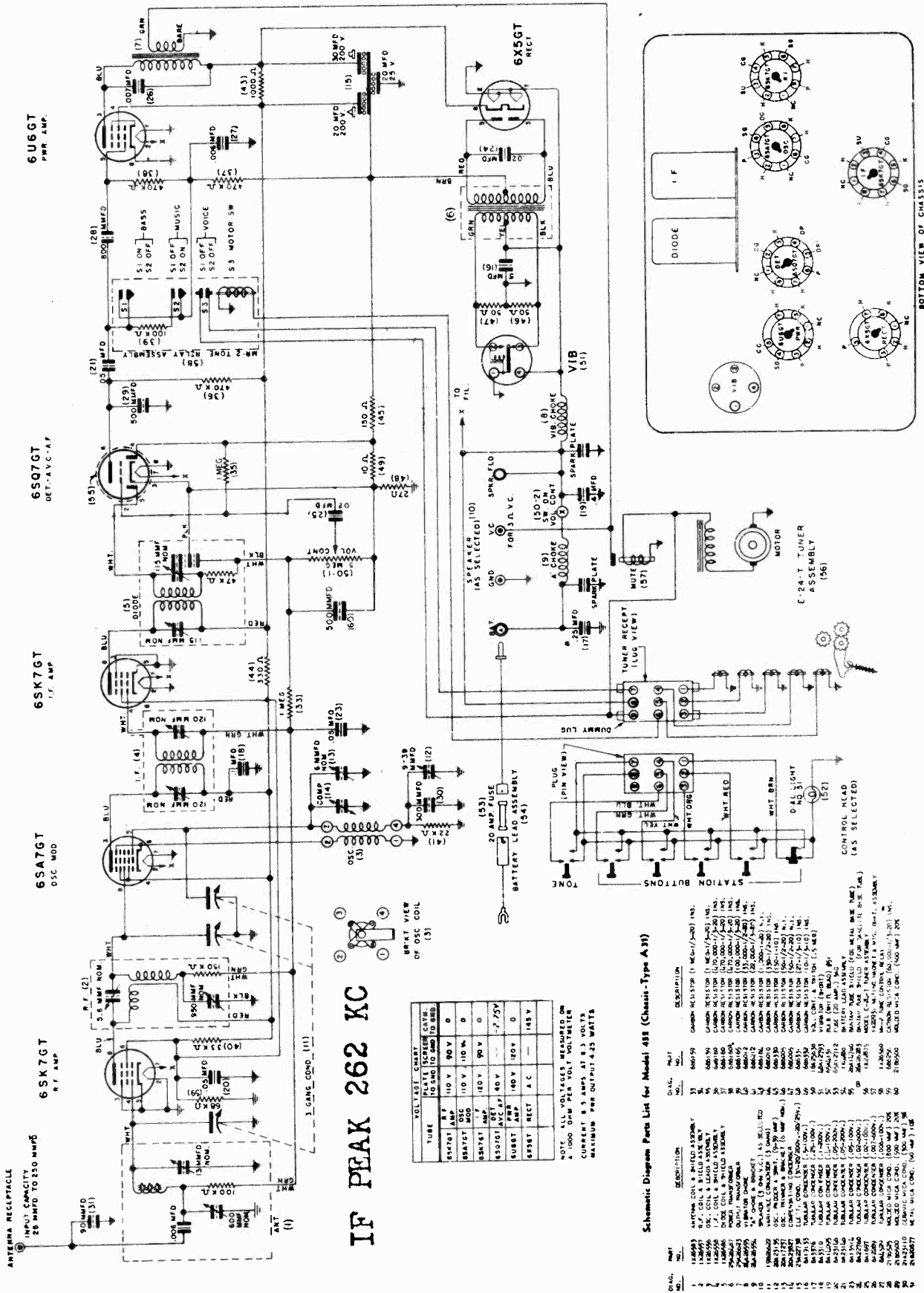
L.F. = 455 KC
FREQUENCY RANGE
535 KC TO 1600 KC



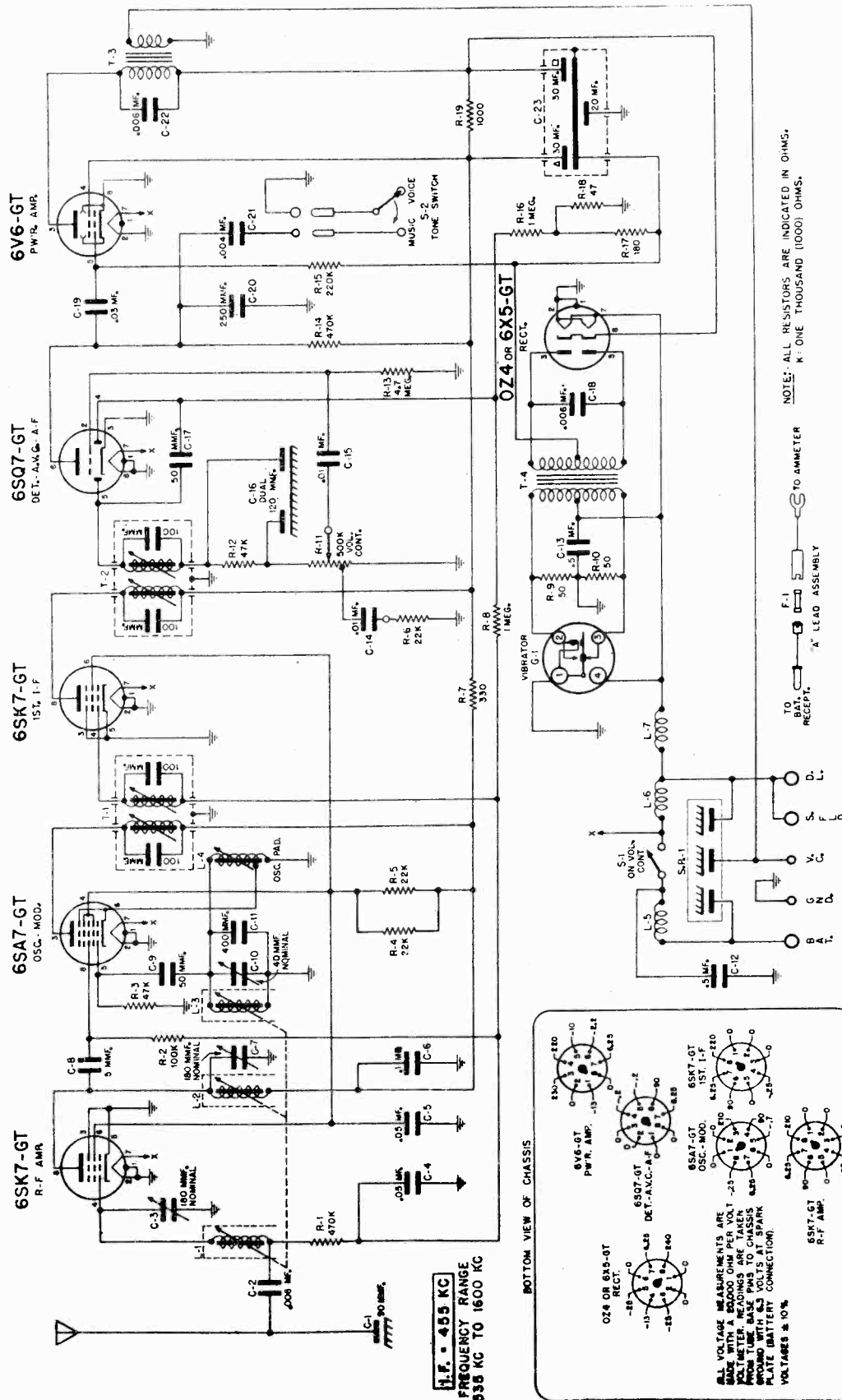
NOTE: ALL RESISTORS ARE INDICATED IN OHMS.
 K-ONE THOUSAND (1000) OHMS.

TO BAT. RECPT. TO AMMETER
 F-1 LEAD ASSEMBLY
 X- LEAD ASSEMBLY

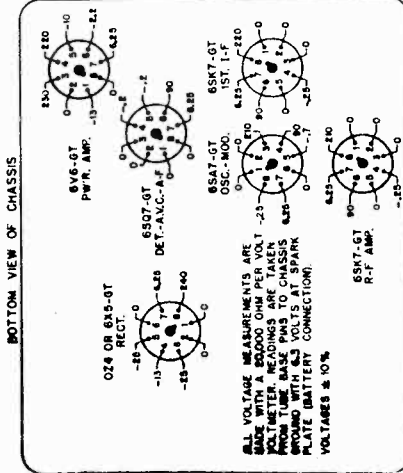
MODEL 405



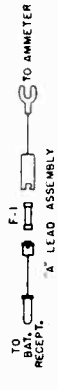
GALVIN MFG. CORP.



H.F. - 455 KC
FREQUENCY RANGE
935 KC TO 1600 KC

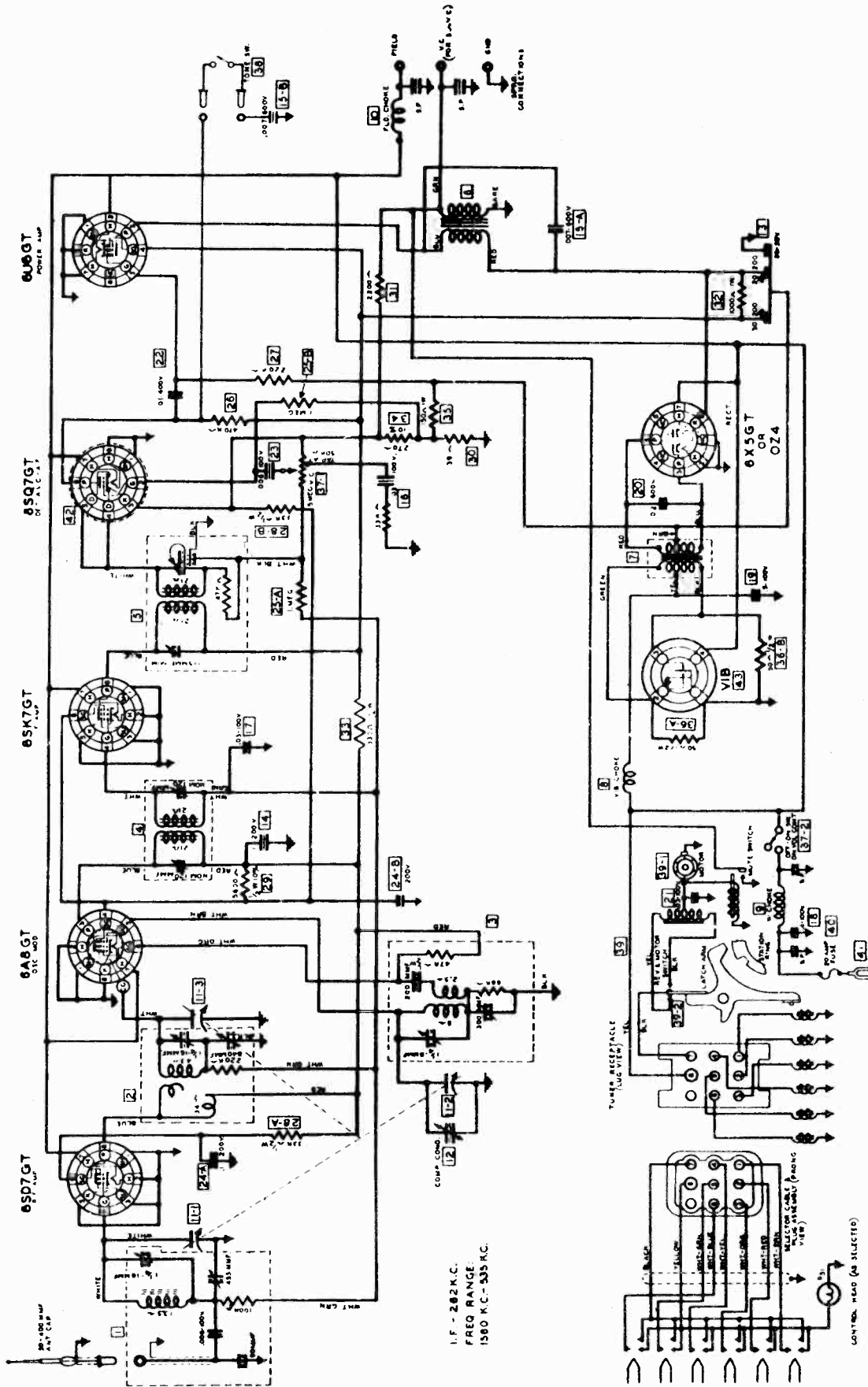


NOTE: ALL RESISTORS ARE INDICATED IN OHMS.
 K: ONE THOUSAND (1000) OHMS.



MODEL 505

GALVIN MFG. CORP.



GALVIN MFG. CORP.

MODEL 550A

SENSITIVITY AND STAGE GAIN MEASUREMENTS

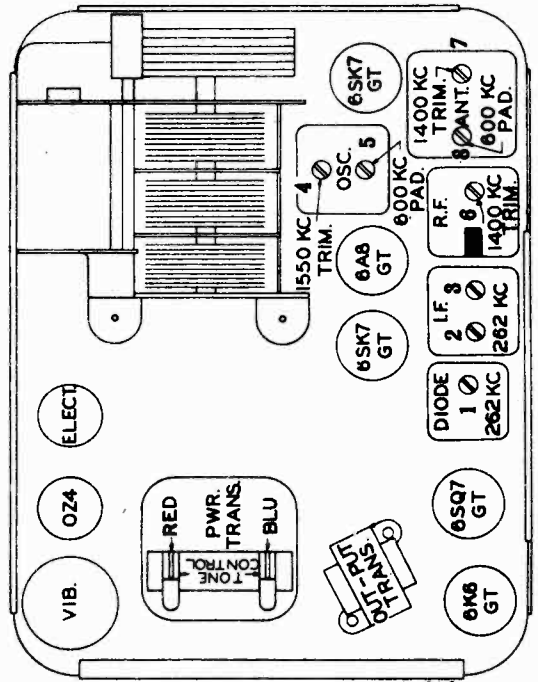
Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
12,000	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
300	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
350	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
12	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
6	600 K.C.	Antenna	***	None	1.74

Volume Control Set At Maximum
 * 1 Watt = 1.74 Volts
 Tone Control Set At Music
 ** Output meter connected across voice coil.
 *** Use Special Dummy Part No. LX18018.

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3	262 K.C.
2	1550 K.C. (Min.)	.1 Mfd.	Osc.-Mod. Grid	4	1550 K.C.
3	535 K.C. (Max.)	.1 Mfd.	Osc.-Mod. Grid	5	535 K.C.
4	1400 K.C.	*	To Special Dummy	6	1400 K.C.
5	1400 K.C.	*	To Special Dummy	7	1400 K.C.
6	600 K.C.	*	To Special Dummy	8	600 K.C.

* Use Special Dummy Part No. LX18018.



VOLTAGE CHART

POSITION	PLATE	SCREEN	CATHODE
R.F.	120	85	0
Osc.Mod.	120	75	0
I.F.	125	75	0
Det-AVC-AF	35	.....	1.5
Pwr. Rect.	140	125	0
	AC	.....	145

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.
 Current Consumption—8.5 Amps.
 Maximum power output 4 Watts

MODEL 550-A

GALVIN MFG. CORP.

MODEL 550A

Same As 550 Except:

8A2289	Tubular Condenser .007-600v	.20
20A4308	Trimmer & Padder	.55
20A4399	Antenna Trimmer & Padder	.45
6B6029	Carbon Resistor 100,000-1/3-20 N.I.	.60
6B6154	Carbon Resistor 150-1-20 N.I.	.10
6B6184	Carbon Resistor 1,000-1-20 N.I.	.10
6B6200	Carbon Resistor 39-1/2-20 N.I.	.60
6B6321	Carbon Resistor 47,000-1/3-20 Ins	.60
6B6322	Carbon Resistor 5,600-1/2-10 N.I.	.60
3S8126	Screw 8 x 1-1/4 CP - Pwr. Trans.	.20
26A13678	Antenna Coil Bottom Shield	.05
8K1R320	Tub. Cond. & Strap .1-200v	\$0.20
23A22738	Electrolytic Condenser FP	.75
25B22739	Power Transformer - Shielded	2.35
1X22743	Diode Coil & Shield Assembly	1.55
25A22745	Output Transformer	1.00
20A22747	Trimmer Diode - Small	.40
20A22751	Double Trimmer - 120 mmf Nom. (I.F.)	.30
1X22752	I.F. Coil & Shield Assembly	1.40
8A22760	Tubular Condenser .02-600v	.15
1X22762	Front Housing Assembly	2.55

MODEL 550

MAJOR PARTS

10	24X4835	Dial Light Choke	.15
43	48A5067	Vibrator	2.50
43	48A5333	Vibrator (3333)	2.50
13	23A17738	Electrolytic Condenser FP	1.00
39	1K19819	E14T Tuner Assembly	14.00
7	25B20011	Power Transformer - Shielded	2.45
38	1X20079	Push Switch Assembly	.35
9	24K20093	Tubular "A" Choke	.20
6	25K20396	Output Transformer	.95
3	1X20417	Osc. Coil & Shield Assembly	1.35
2	1X20419	R.F. Coil & Shield Assembly	1.80
1	1X20423	Ant. Coil & Shield Assembly	2.60
5	1X20426	Diode Coil & Shield Assembly	1.50
4	1X20428	I.F. Coil & Shield Assembly	1.35
37	1A20435	Volume Control & Shaft Assembly	1.00
	18A20439	Volume Control & Switch .5 Meg.	.75
	15K20441	Rear Housing	.55
	15C20444	Front Housing	.55

ACCESSORIES

	41A2157	Backing Coil Spring - Fuse	.50
	14X2423	"A" Lead Insulator	.20
	9X4075	Fuse Receptacle	.20
	14X4076	Fuse Backing Washer - Bakelite	.10
	14X4077	Contact Bushing - Fuse	.20
	6X4141	Distributor Suppressor	.30
	9X4168	"A" Lead Male Ferrule	.25
	1X4171	Flexible Shaft & Housing Assembly	1.00
	8A4491	Generator Condenser	.40
40	65X4637	Fuse 20 AMP (3AG)	.05
	9B6734	Tube Socket - Saddle 4 Prong	.15
	9B6739	Tube Socket - Octal Waferette	.15
	65X12712	Fuse 20 AMP (SFE)	.05
	1X13698	Antenna Receptacle & Bracket Assembly	.10
	1X13699	Antenna Receptacle Assembly	.10
	1X16762	Fuse & Clamp Assembly	.10
41	1X17868	Fuse Lead Assembly 12"	.15
	1X19034	"A" Lead	.10
	1X20098	Accessories Kit Assembly	.90
	1X20160	Receiver Accessories Assembly	2.50
	13K20446	Button Medallion	.20
	1K20476	Spark Plate Assembly	.80

CONDENSERS

24	8A3310	Tubular Condenser .1-200V	.15
14	8A4092	Tubular Condenser & Strap .1-400V	.25
23	8A4529	Tubular Condenser .006-100V	.15
19	8A4588	Tubular Condenser .5-100V	.30
	21A4807	Molded Mica Condenser 90 MMF 10%	.20
21	8A4925	Dual Tubular Condenser .0008-.0008-1000V	.25
	21B6500	Molded Mica Condenser 500 MMF 20%	.15
	21B6501	Molded Mica Condenser 200 MMF 20%	.15
20	8A10432	Tubular Condenser .01-1600V	.35
17	8K13006	Tubular Condenser & Strap .05-100V. LH.	.20
16	8A13134	Condenser Resistor & Strap .03-100V-35K	.30
18	8A14095	Tubular Condenser .4-100V	.30

15	8A17077	Tubular Condenser & Strap .03-600V	.15
	20A19384	Compensating Condenser	.30
22	8A18799	Tubular Condenser .01-400V	.10

RESISTORS

	6B6000	Carbon Resistor 820,000-1/3-20	.60
	6B6002	Carbon Resistor 47,000-1/2-20	.60
27	6B6003	Carbon Resistor 220,000-1/3-20 N.I.	.60
36	6B6005	Carbon Resistor 50-1/2-20	.60
30	6B6006	Carbon Resistor 2,200-1-20	.60
33	6B6010	Carbon Resistor 330-1/2-20 Ins	.60
26	6B6011	Carbon Resistor 470,000-1/3-20	.60
28	6B6012	Carbon Resistor 33,000-1/2-20	.60
25	6B6071	Carbon Resistor 1 MEG-1/3-20 N.I.	.60
31	6B6072	Carbon Resistor 2,200-1/3-20 N.I.	.60
32	6B6103	Carbon Resistor 330-1-10 N.I.	\$0.10
29	6B6106	Carbon Resistor 10,000-1-20 N.I.	.10
35	6B6107	Carbon Resistor 68-1/3-10 N.I.	.60
34	6B6197	Carbon Resistor 270-1/3-10 N.I.	.60
	6B6204	Carbon Resistor 220,000-1/3-20 Ins	.60
	6B6256	Carbon Resistor 68,000-1/3-20 Ins	.60

SCREWS, WASHERS, ETC.

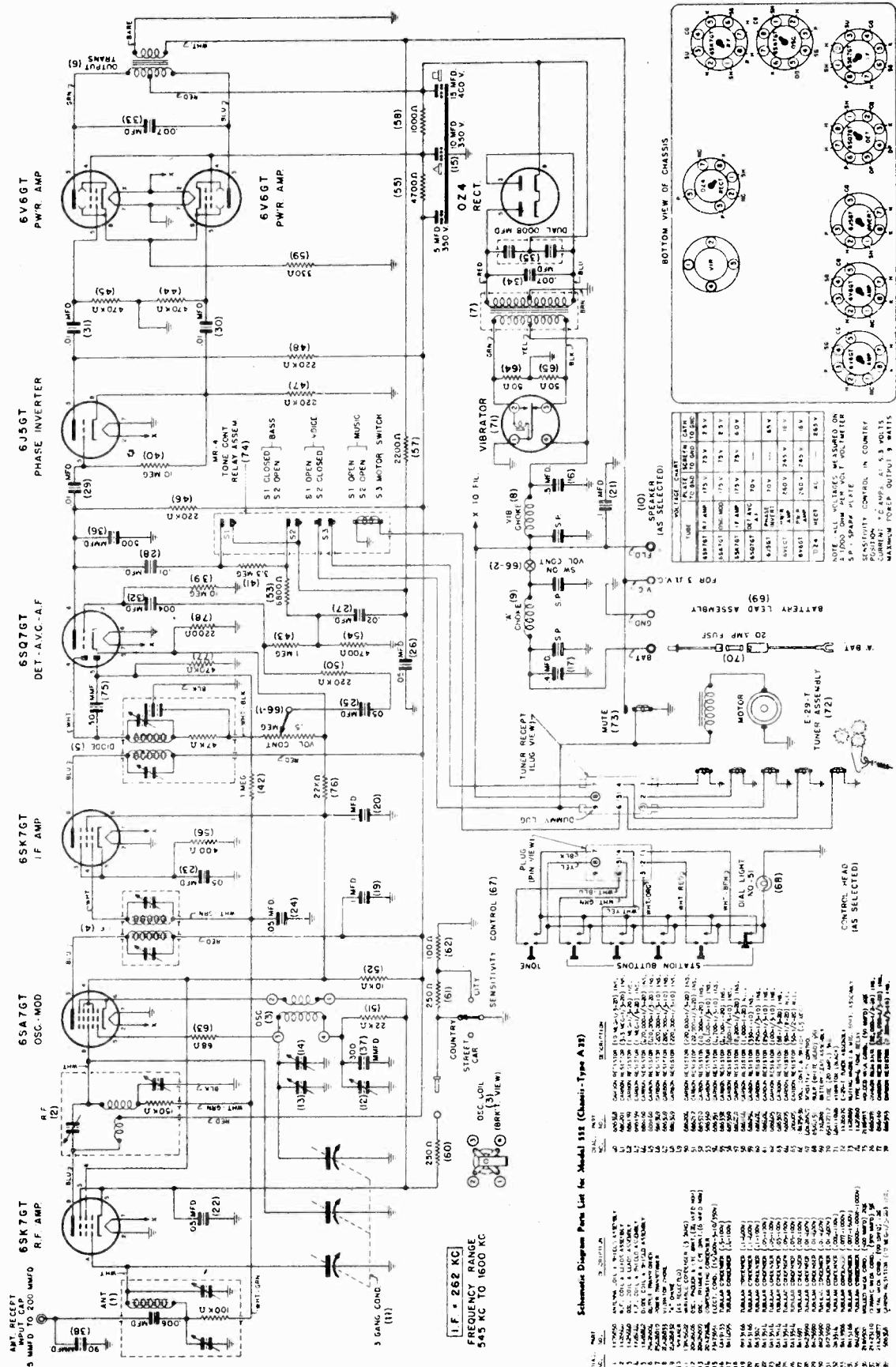
	3A3134	"J" Bolt 5/16 X 3" CP	.75
	2S7003	Nut 8-32 X 11/32 HEX. CP	.50
	2S7004	Nut 3/8-32 X 9/16 HEX. CP	1.00
	2S7035	Nut 3/16-18 x 5/8 Fits "J" Bolt	.20
	2S7050	Nut 6-32 X 5/16 PAL. CP	.50
	3S7224	Screw 6-32 X 1/4 PLHMS Brass	.50
	3S7239	Screw 8-32 X 1" PLHMS CP	.50
	3S7257	Screw 8-32 X 5/8 SLHMS CP	.65
	3S7454	Screw 8 X 1/4 PK Z PLH CP	.60
	3S7456	Housing Screw 8 X 1/4 ACHD PK A	.65
	3S7457	Chassis Mounting Screw 8 x 7/8"	
		PK-A-PLH CP	.25
	3S7461	Screw 8 X 3/4 PK Z SLH	1.00
	3S7509	Screw 6 X 5/8 PK A ACHD CO.	.10
	3S7516	Screw 8 X 3/8 PK A BH BLK. OXD.	1.00
	4S7614	Washer 11/16-.171-.037 CP	.70
	4S7625	Washer 1/4-.125-.018 Plain	.50
	4S7634	Washer 9/16-.390-.031 CO.	.65
	4S7639	Washer 5/8-.406-.125 CP	.30
	4S7650	Lockwasher No.6 Int. CP	.50
	4S7651	Lockwasher No.8 Int. CP	.50
	4S7653	Lockwasher 1-1/4 OD-5/16 I.D. CP	.45
	4S7655	Lockwasher 3/8 Split-Black	.60
	4S7656	Lockwasher No.6 Spec.-Black	.60
	4S7657	Lockwasher No.8 Ext. BO	.50
	4S7665	Lockwasher-Special-Black No.6	.75
	3S8104	Screw 8 X 1 1/2 PK A SLH CP	1.00

MISCELLANEOUS

	58A2581	Flexible Shaft Bushing-C.H. End	.30
	58A3180	Flexible Shaft Square Fitting-Set End	.30
	39X4205	Hood Wiper	.25
	42A4215	Vibrator Grounding Clip	.75
	9K4556	Large Pin Terminal Receptacle	.30
	29B5350	Spade Lug HT.	.30
	42B5480	Grid Clip Small Collar Grip	.15
	5S7820	Eyelet .470-.129-.230 Brs. CSP.	.60
	38X10544	Plug Button 1/4" COP. OXD	.25
	9X10844	Electrolytic Ins. Wafer	.10
	31A11114	Terminal Strip 4 Ins. No.2 GND.	.05
	26B13671	Antenna Coil Shield	.35
	7A13680	Choke Support Bracket	.10
	37A13682	Tuner Mtg. Grommet-Small-Rubber	.30
	43A13730	Tuner Spacer Bushing-Long	.50
	43A13743	Tuner Spacer Bushing-Short	.40
8	24A13775	Vibrator Choke & Mtg. Screw	.50
	42X14564	Cable Clamp	.15
42	26X14760	Bantam Tube Shield	.05
	37K14841	Tuner Mounting Grommet-Red	.60
	41A15214	Volume Control Shaft Spring	.25
	1X16764	Hood Wiper & Screw Assembly	.05
	54X17887	Important P.B. Instr. Sheet	.20
	14A19067	Speaker Terminal Insulator	.20
	7A20008	Volume Control Mtg. Bracket	.05
	31A20397	Tone Control Terminal Strip	.10
	47A20436	Drive Shaft & Coupling	.15
	47A20438	Volume Control Coupling Shaft	.10
	38X20448	Plug Button & Wiper	.10
	54B20449	Drilling Template	.30
	54X20458	Instruction Booklet	.10
	56X20482	Packing Carton & Fillers	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

GALVIN MFG. CORP.



Schematic Diagram Parts List for Model 552 (Chassis-Type A 32)

QTY.	PART NO.	DESCRIPTION
1	6V6GT	6V6GT P.W.R. AMP (7)
1	6V6GT	6V6GT P.W.R. AMP (8)
1	6V6GT	6V6GT P.W.R. AMP (9)
1	6SK7GT	6SK7GT I.F. AMP (4)
1	6SA7GT	6SA7GT OSC.-MOD (3)
1	6SQ7GT	6SQ7GT DET.-AVC.-A.F. (5)
1	6J5GT	6J5GT PHASE INVERTER (6)
1	6X4	6X4 RECT. (10)
1	6X4	6X4 RECT. (15)
1	6X4	6X4 RECT. (16)
1	6X4	6X4 RECT. (17)
1	6X4	6X4 RECT. (18)
1	6X4	6X4 RECT. (19)
1	6X4	6X4 RECT. (20)
1	6X4	6X4 RECT. (21)
1	6X4	6X4 RECT. (22)
1	6X4	6X4 RECT. (23)
1	6X4	6X4 RECT. (24)
1	6X4	6X4 RECT. (25)
1	6X4	6X4 RECT. (26)
1	6X4	6X4 RECT. (27)
1	6X4	6X4 RECT. (28)
1	6X4	6X4 RECT. (29)
1	6X4	6X4 RECT. (30)
1	6X4	6X4 RECT. (31)
1	6X4	6X4 RECT. (32)
1	6X4	6X4 RECT. (33)
1	6X4	6X4 RECT. (34)
1	6X4	6X4 RECT. (35)
1	6X4	6X4 RECT. (36)
1	6X4	6X4 RECT. (37)
1	6X4	6X4 RECT. (38)
1	6X4	6X4 RECT. (39)
1	6X4	6X4 RECT. (40)
1	6X4	6X4 RECT. (41)
1	6X4	6X4 RECT. (42)
1	6X4	6X4 RECT. (43)
1	6X4	6X4 RECT. (44)
1	6X4	6X4 RECT. (45)
1	6X4	6X4 RECT. (46)
1	6X4	6X4 RECT. (47)
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1	6X4	6X4 RECT. (49)
1	6X4	6X4 RECT. (50)
1	6X4	6X4 RECT. (51)
1	6X4	6X4 RECT. (52)
1	6X4	6X4 RECT. (53)
1	6X4	6X4 RECT. (54)
1	6X4	6X4 RECT. (55)
1	6X4	6X4 RECT. (56)
1	6X4	6X4 RECT. (57)
1	6X4	6X4 RECT. (58)
1	6X4	6X4 RECT. (59)
1	6X4	6X4 RECT. (60)
1	6X4	6X4 RECT. (61)
1	6X4	6X4 RECT. (62)
1	6X4	6X4 RECT. (63)
1	6X4	6X4 RECT. (64)
1	6X4	6X4 RECT. (65)
1	6X4	6X4 RECT. (66)
1	6X4	6X4 RECT. (67)
1	6X4	6X4 RECT. (68)
1	6X4	6X4 RECT. (69)
1	6X4	6X4 RECT. (70)
1	6X4	6X4 RECT. (71)
1	6X4	6X4 RECT. (72)
1	6X4	6X4 RECT. (73)
1	6X4	6X4 RECT. (74)
1	6X4	6X4 RECT. (75)
1	6X4	6X4 RECT. (76)
1	6X4	6X4 RECT. (77)
1	6X4	6X4 RECT. (78)
1	6X4	6X4 RECT. (79)
1	6X4	6X4 RECT. (80)

MODEL 552, Ch. A-32

GALVIN MFG. CORP.

SCREWS, WASHERS, ETC. (Cont'd)

237004	Nut 3/8x9/16 CP -Vol. Cont.	Per C	1.00
237007	Nut 8-32x1/4 Hex CP-Gang Mtg.	Per C	.50
237035	Nut 5/16-18x5/8 CP-Set Mtg	Doz.	.20
237070	Nut 6-32x1/4 Inv. Pal CP-Coils	Per C	.50
237084	Speednut 9/16x5/16 Blk. Overlay	Doz.	.25
337205	Lockwasher 8-32x1/4 CP Tone Relay	Per C	.95
337215	Screw 8-32x3/16 CP -Trim Mtg.	Doz.	.25
337256	Screw 8-32x1/4 Brass Choke	Doz.	.35
337375	Screw 8-32x7/16 CP Gang Mtg.	Doz.	.35
357454	Screw 8x1/4 CP. O/P Trans.	Doz.	.20
357456	Housing Screw 8x1/4 AHC Pk A CO Per C	Per C	.65
357457	Screw 8x7/8 Pk A PLH CP Misc.	Doz.	.25
357467	Screw 8x3/8 Pk Z PLH CP	Per C	.60
357506	Screw 6x1/4 CP Osc. Mtg.	Per C	.50
357507	Screw 8x5/8 CP Tun. Mtg.	Per C	.70
437609	Washer 1-5/16x.218x.050 CP Choke	Doz.	.35
457634	Washer 9/16 .390-.031 CO	Doz.	.65
457651	Lockwasher #8 Int. CP Gang Mtg.	Per C	.50
457653	Lockwasher 5/16 Int. Ext. Set Mtg. CP.	Doz.	.45
457655	Lockwasher 3/8 Split Black Sw.	Per C	.60
457657	Lockwasher #8 Ext. 80 Choke	Per C	.50
457666	Lockwasher #6 Ext. Blk. Osc. Coil	Per C	.50
MISCELLANEOUS			
374411	Rubber Grommet-Tub. Mtg.		.05
3744187	Rubber Grommet-Tub. Mtg.	Doz.	.25
4244215	Vibrator Grounding Clip	Doz.	.75
985734	Tube Socket -Saddle 4 Prong		.15
946774	Tube Socket -Saddle Octal		.15
537820	Eyalet .470-.129-.230 Rvs. Tone Cont.	Per C	.60
537830	Eyalet .406x.240 CP-Tun. Mtg.	Doz.	.20
3413748	Locking Screw 8-32x17/32 CP Tun. Unit	Doz.	.20
7423376	Tuner Mounting Bracket Long		.10
43426594	Spacer Bushing, Chamfered	Doz.	.40
1226598	Receptacle & Brkt. Asaby. 9 Prong		.30
7426741	Tuner Mounting Bracket		.10
31426803	Terminal Strip 10 Ins.		.10
43426866	Spacer Sleeve	Doz.	.20
33226922	Plug Button 1/4"	Doz.	.65
31427128	Terminal Strip	Doz.	.30
36430708	Plug Button 3/8"	Doz.	.40

Prices subject to change without notice.

CONDENSERS (Cont'd)

8A13014	Condenser Resistor .006-100V.-100K		.25
8K13166	Tubular Condenser .1-400V		.15
8A13506	Tubular Condenser .007-1000V		.15
8A13514	Tubular Condenser .05-100V		.15
8A14096	Tubular Condenser .4-100V		.30
8K15166	Tubular Condenser .007-1600V		.35
8A13133	Tubular Condenser .5-100V		.50
30A19342	Antenna Trimmer & Padder		.40
20A22747	Diode Trimmer Small		.30
20A22751	I. F. Trimmer Double		.55
20A23102	R. F. Trimmer & Padder		.25
21A23110	Ceramic Mica Condenser 300umf 5K		.10
8K23690	Tubular Condenser .03-400V		.25
20E28808	Osc. Padder & Eye Bracket		.25
20K28809	Osc. Trimmer & Eye Bracket		.25
20A27624	Compensating Condenser		.60
RESISTORS			
6B5669	Carbon Res. 400-1/3-10 Ins.	Doz.	.60
6B5670	Carbon Res. 10,000-1620 Ins.		.10
6B6005	Carbon Res. 50-1/2-20 N.I.	Doz.	.60
6B6028	Carbon Res. 22,000-1/2-20 Ins.	Doz.	.60
6B6159	Carbon Res. 1 Mag 1/3-20 Ins.	Doz.	.60
6B6160	Carbon Res. 470,000-1/3-20 N. I.	Doz.	.60
6B6184	Carbon Res. 1000-1620 N.I.		.10
6B6201	Carbon Res. 3.3 Meg 1/3-20 Ins.	Doz.	.60
6B6204	Carbon Res. 220,000-1/3-20 Ins.	Doz.	.60
6B6212	Carbon Res. 22,000-1/3-20 Ins.	Doz.	.60
6B6240	Carbon Res. 2,200-1/3-20 Ins.	Doz.	.60
6B6254	Carbon Res. 330-1-10 Ins.		.10
6B6321	Carbon Res. 47,000-1/3-20 Ins.	Doz.	.60
6B6339	Carbon Res. 150,000-1/3-20 Ins.	Doz.	.60
6B6348	Carbon Res. 10 Meg. 1/3-20 Ins.	Doz.	.60
6B6349	Carbon Res. 220,000-1/3-10 Ins.	Doz.	.60
6B6350	Carbon Res. 8,900-1/3-10 Ins.	Doz.	.60
6B6351	Carbon Res. 4,700 1/3-10 Ins.	Doz.	.60
6B6352	Carbon Res. 4,700-1-20 Ins.		.10
6B6353	Carbon Res. 2,200-1/3-10 Ins.	Doz.	.60
6B6367	Carbon Res. 68-1/3-20 Ins.	Doz.	.60
6B6404	Carbon Res. 250-1/3-10 Ins.	Doz.	.60
6B6405	Carbon Res. 100-1/3-10 Ins.	Doz.	.60

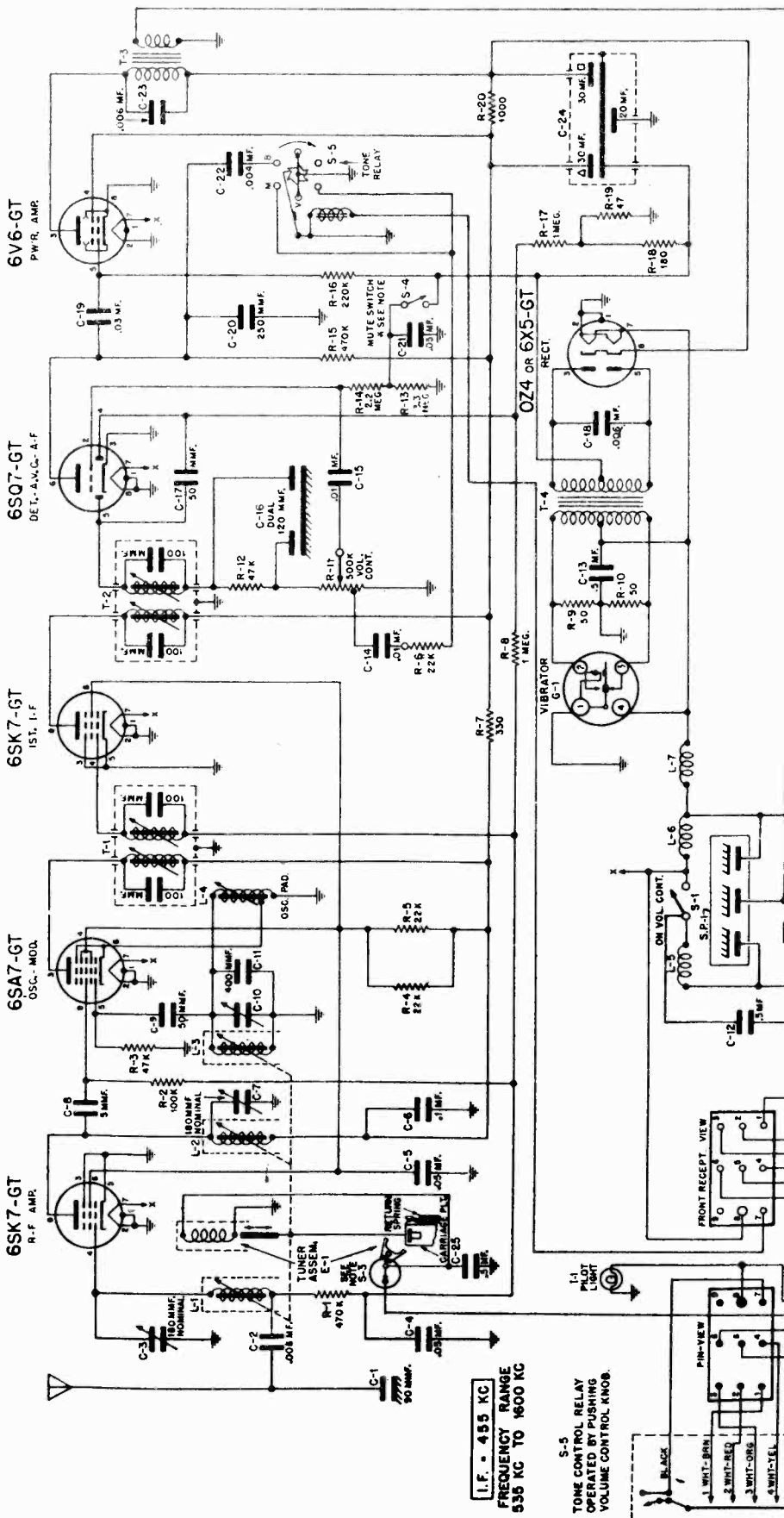
SCREWS, WASHERS, ETC.

3A3134	"J" Bolt 5/16x3/4 CP-Set Mtg.	Doz.	.75
237003	Nut 8-32x5/16 Hex C P-Choke	Per C	.50

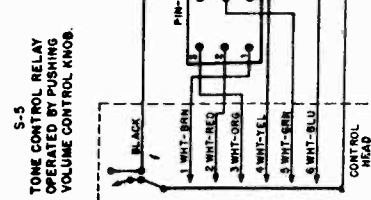
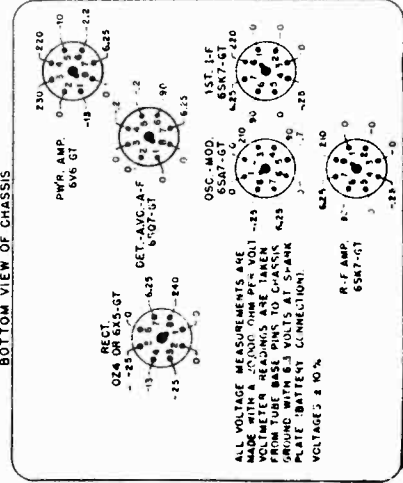
MODEL 552 PARTS PRICE LIST
MAJOR PARTS

48K11026	Vibrator Blk.	2.50
23A23651	Electrolytic Condenser	.85
1K25619	Volume Control & Switch Asby.	.85
19B26622	Variable Condenser 3 Gang	3.95
25A26804	Output Transformer	1.25
25B26910	Power Transformer	2.90
24K26832	"A" Choke	.30
24K26833	Vibrator Choke	.30
1Y26834	Filter Choke & Bracket Asby.	.75
1Y26840	Oscillator Coil & Leads Asby.	.70
1Y26842	Diode Coil & Shield Asby.	1.60
1Y26844	I.F. Coil & Shield Asby.	1.45
1Y26848	R. F. Coil & Shield Asby.	1.75
1Y26850	Antenna Coil & Shield Asby.	2.50
1Y26857	E-29-T Tuner Gang & Leads Asby	13.75
1Y26860	Type W-4 Tone Relay	1.75
1Y26870	E-29-T Electric Tuner Less Gang	9.50
1Y27130	Sensitivity Control Asby.	.75
15K30709	Rear Housing	2.05
1Y31099	Front Housing Asby.	2.90
ACCESSORIES		
1X42423	Fuse Insulator "A" Lead	.20
6X4141	Distributor Suppressor	.30
1X4288	Battery Lead Asby.	.40
8A4491	Generator Condenser	.40
1X4684	Fuse Lead Asby. 20"	.25
1X4685	Short "A" Lead Asby 10"	.25
65X12712	Fuse 20 AMP SFE	.05
1X12820	Antenna Receptacle Asby.	.15
1X20686	Mounting & Filter Parts Asby.	.80
1B26812	Spark Plate Asby.	.55
39X28036	Shirt Marker	.80
1K29864	Flexible Shaft & Housing Asby.	1.00
13B30560	Golden Voice Letters	.10
13D30566	Motorola Overlay Molded	.40
36K30675	Tone Control Knob	.10
1X31103	Receiver Accessories Asby.	2.40
CONDENSERS		
8A11697	Tubular Condenser .02-100V	.15
8A3302	Tubular Condenser .1-100V	.15
8A3314	Tubular Condenser .04-120V	.20
8A4925	Dual Tubular Cons. .0006-.0008-1000V	.25
21B5600	Molded Mica Condenser 500umf 20K	.15
21B5603	Molded Mica Condenser 50umf 20K	.15

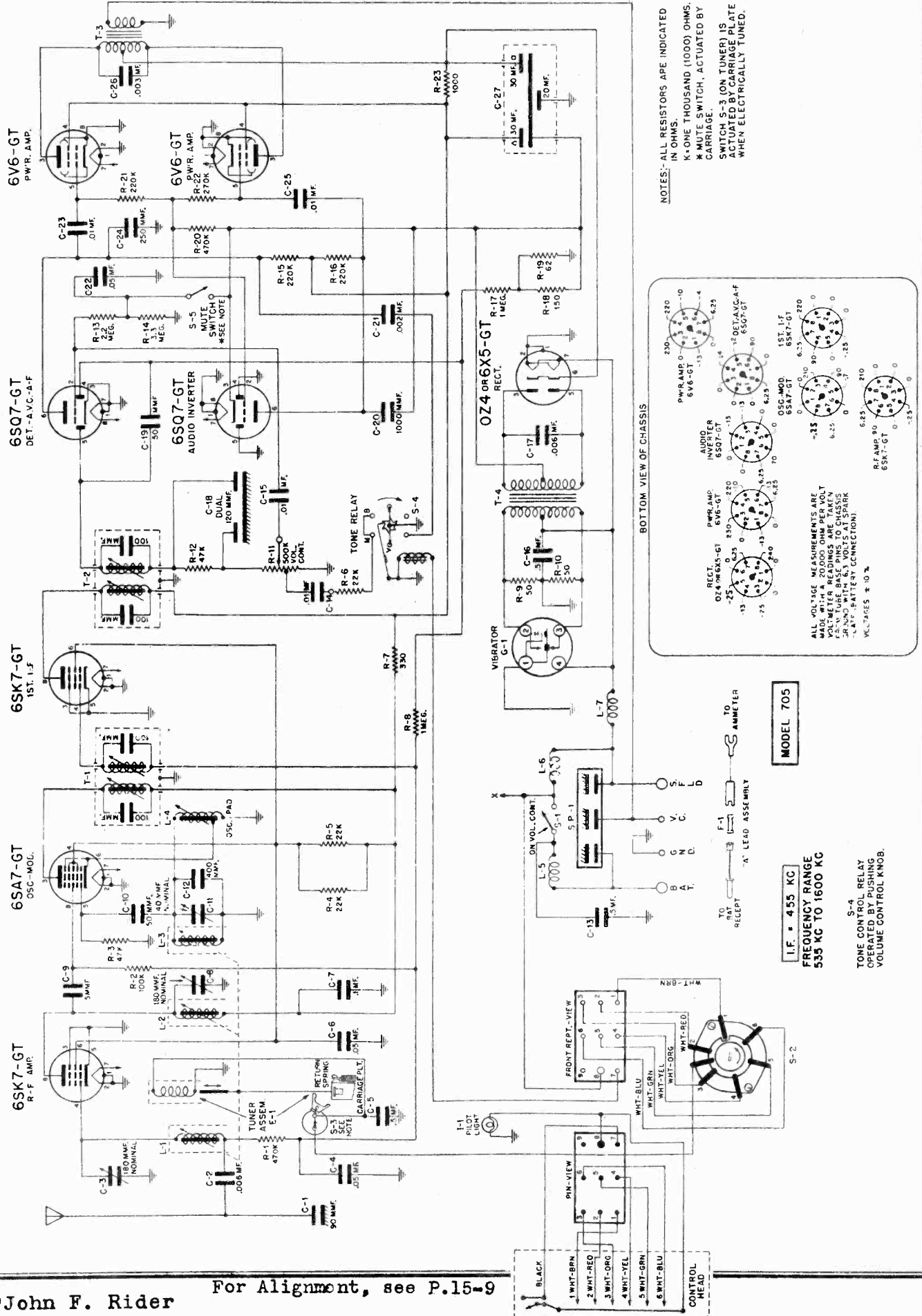
GALVIN MFG. CORP.



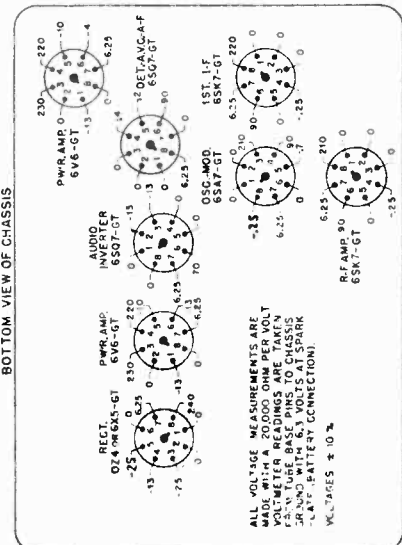
NOTES: ALL RESISTORS ARE INDICATED IN OHMS.
 * ONE THOUSAND (1000) OHMS.
 * MUTE SWITCH, ACTUATED BY SWITCH S-2 (ON, TUNER) IS SWITCHED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.



I.F. - 455 KC
 FREQUENCY RANGE
 535 KC TO 1600 KC



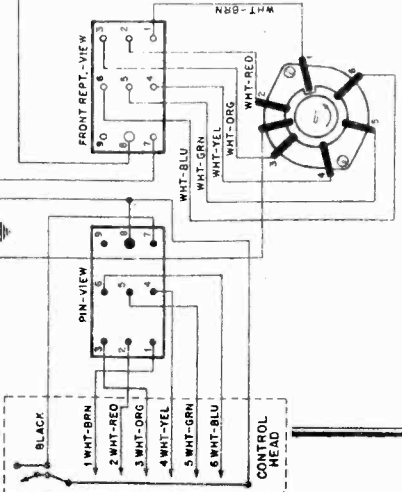
NOTES: ALL RESISTORS ARE INDICATED IN OHMS.
 K=ONE THOUSAND (1000) OHMS.
 * MUTE SWITCH, ACTUATED BY CARRIAGE
 SWITCH S-3 (ON TUNER) IS ACTUATED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.



MODEL 705

I.F. = 455 KC
 FREQUENCY RANGE
 535 KC TO 1600 KC

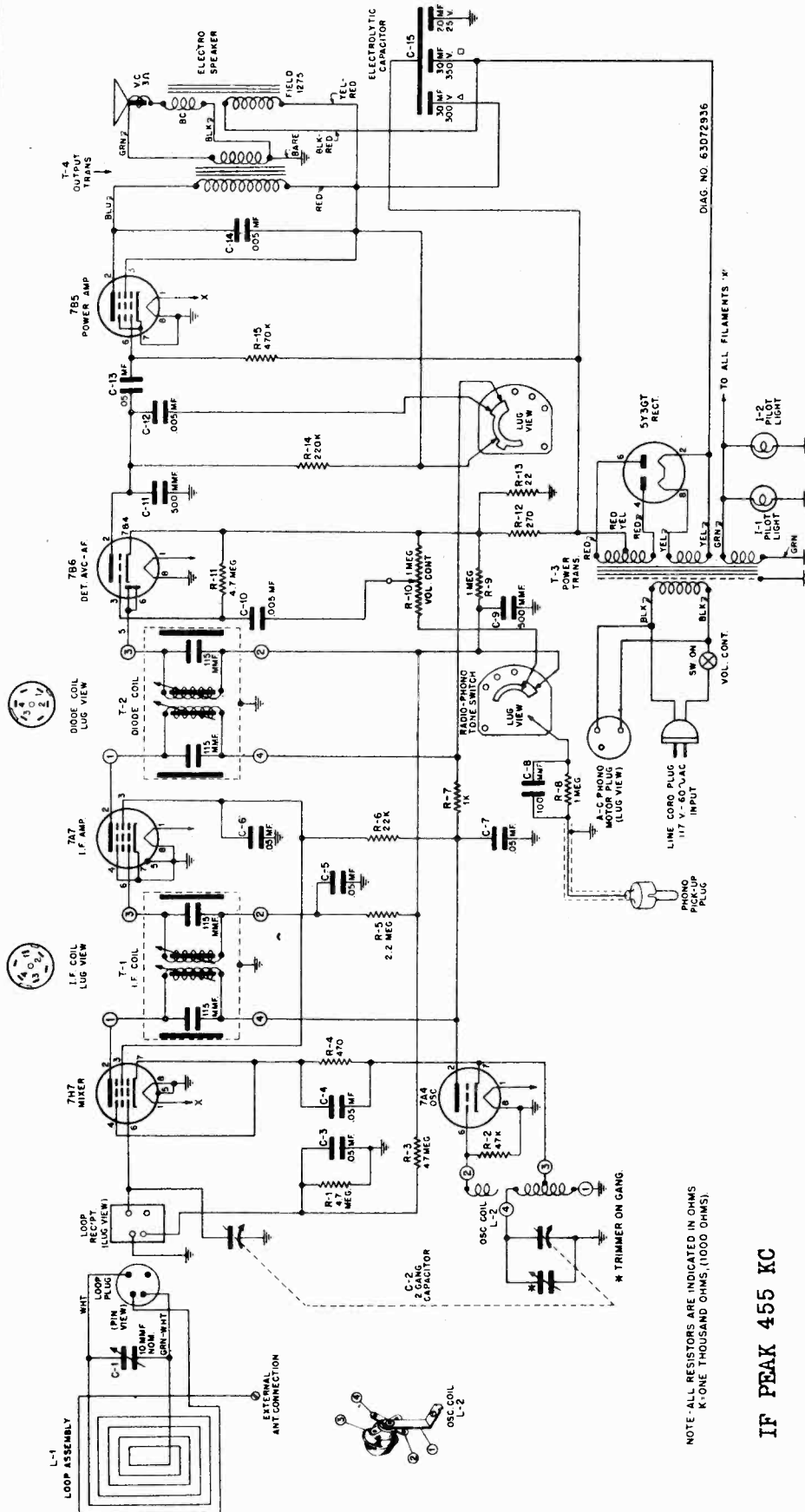
S-4
 TONE CONTROL RELAY
 OPERATED BY PUSHING
 VOLUME CONTROL KNOB.



For Alignment, see P.15-9

GALVIN MFG. CORP.

1946



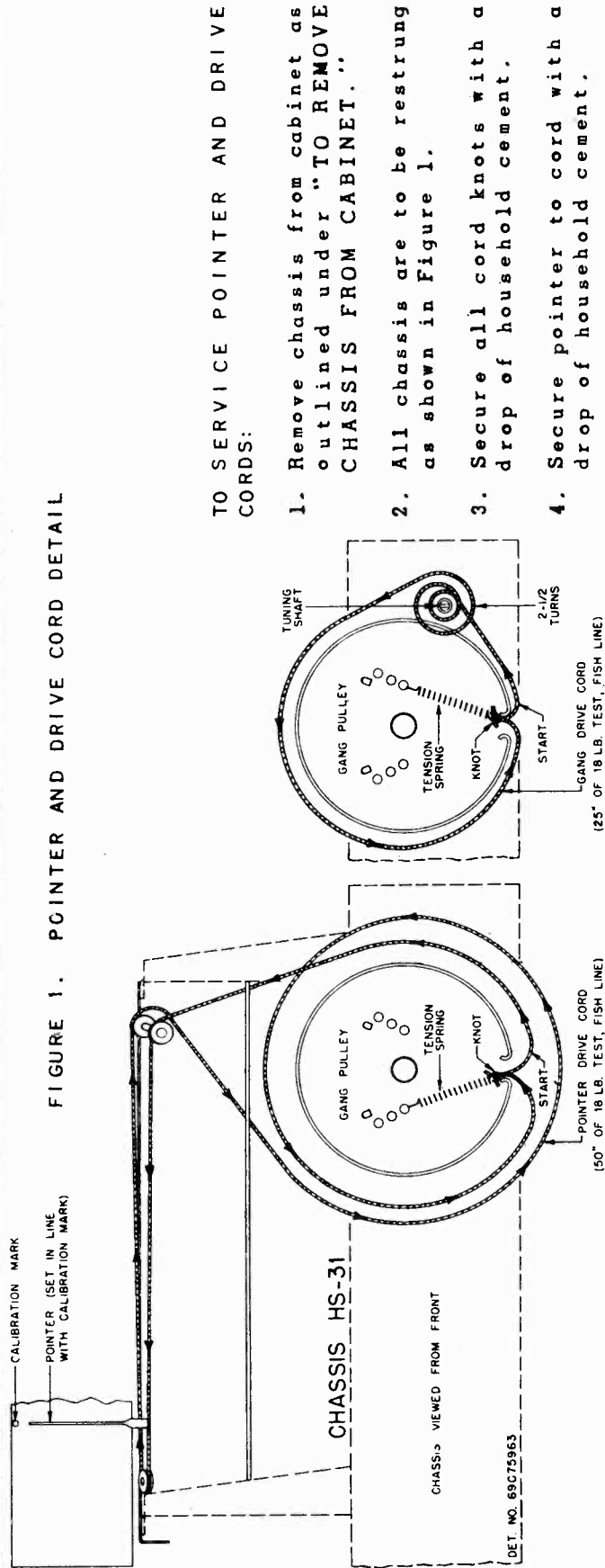
TO REMOVE CHASSIS FROM CABINET:

1. Remove the 3 control knobs.
2. Remove the 7 wood screws from bottom of cabinet.
3. The bottom board with chassis attached may now be removed from the cabinet.
4. The loop, phono pickup and phono motor cords all terminate in plugs. Do not attempt to unsolder them when freeing chassis from cabinet.
5. To expose bottom of chassis, remove the two screws that hold chassis to bottom board.

MODELS 65F11, 65F12
Chassis HS-31

GALVIN MFG. CORP.

FIGURE 1. POINTER AND DRIVE CORD DETAIL



TO SERVICE POINTER AND DRIVE CORDS:

1. Remove chassis from cabinet as outlined under "TO REMOVE CHASSIS FROM CABINET."
2. All chassis are to be restrung as shown in Figure 1.
3. Secure all cord knots with a drop of household cement.
4. Secure pointer to cord with a drop of household cement.

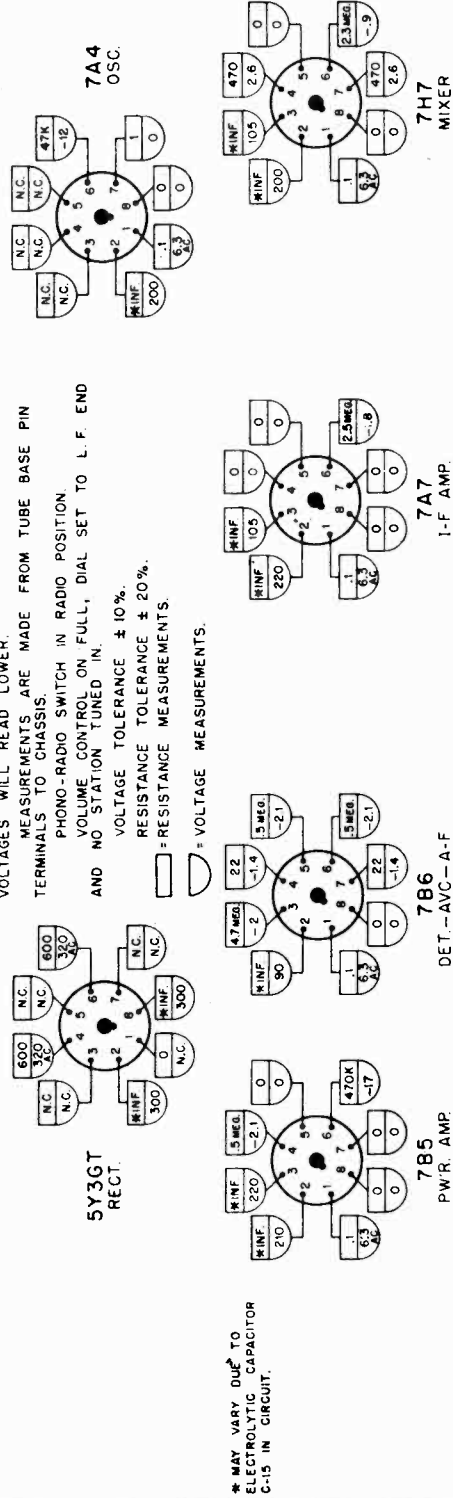
NOTE: ALL RESTRINGING IS PERFORMED WITH GANG FULLY CLOSED.

CHASSIS HS-31

NOTE: A VTVM WAS USED TO MAKE MEASUREMENTS. IF A 20,000 OHM PER VOLT METER IS USED ALL GRID & AVC VOLTAGES WILL READ LOWER.

MEASUREMENTS ARE MADE FROM TUBE BASE PIN TERMINALS TO CHASSIS.
PHONO-RADIO SWITCH IN RADIO POSITION.
VOLUME CONTROL ON FULL, DIAL SET TO L. F. END AND NO STATION TUNED IN.
VOLTAGE TOLERANCE $\pm 10\%$.
RESISTANCE TOLERANCE $\pm 20\%$.

◇ = VOLTAGE MEASUREMENTS.



DIAG. NO. 63C75063

BACK VIEW OF CHASSIS

GALVIN MFG. CORP.

Refer to Figure 3 for location of adjustment trimmers and cores. Connect output meter across speaker voice coil. (.38V = .05 watt). Volume control set at maximum for all operations. The PHONO-RADIO-TONE switch should be set to RADIO treble position. The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008.

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	GENERATOR SET AT (400~30% MODULATED)	ADJUST TRIMMER OR CORE NO.	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
1. Align I.F. & diode for maximum	Minimum	.1 mf.	Mixer Grid	455 Kc.	1,2,3 & 4	6 microvolts
2. Set Oscillator trimmer	Minimum	.1 mf.	Mixer Grid	1620 Kc.	5	
3. Peak loop antenna	1400 Kc.	None	Radiation loop*	1400 Kc.	6 (should be repeaked after loop & set are installed in cabinet.)	

* Connect output of signal generator to a 5" diameter 3 turn loop. See Figure 2. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained. (.38V on output meter). The distance between loops should never be less than 12". Vary distance between generator and receiver loops or adjust generator output to maintain .38V during alignment.

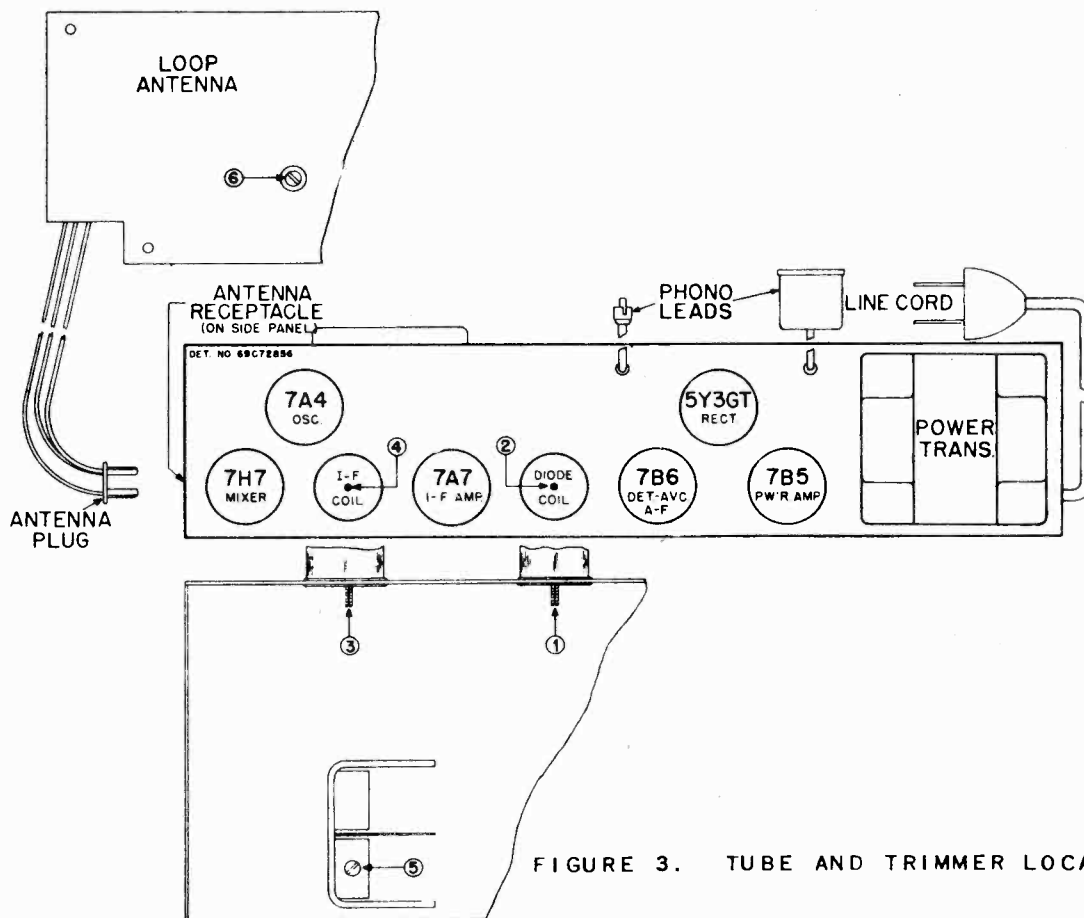


FIGURE 3. TUBE AND TRIMMER LOCATION DETAIL

MODELS 65F11, 65F12
Chassis HS-31

GALVIN MFG. CORP.

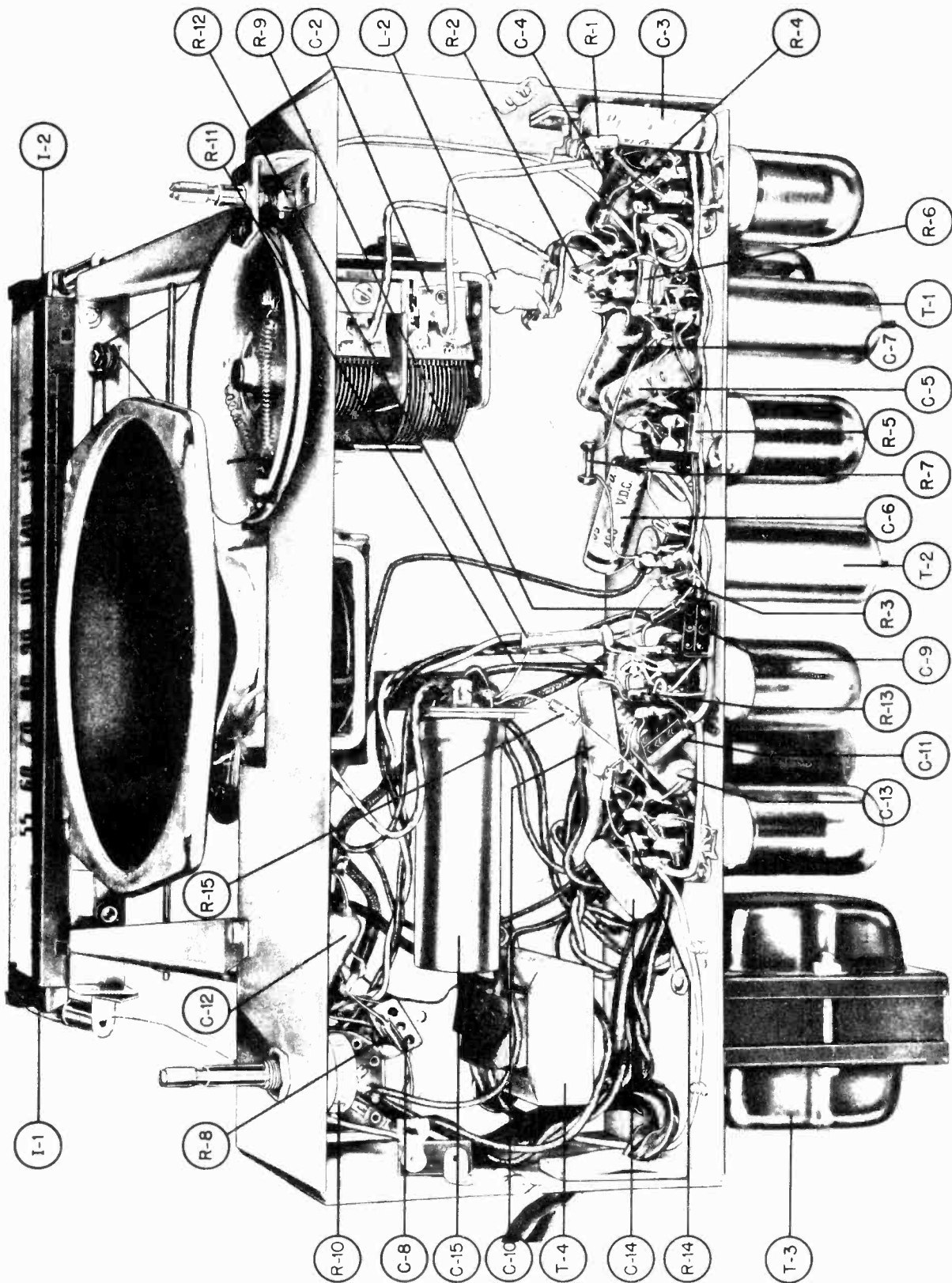


FIGURE 5. CHASSIS BOTTOM VIEW

GALVIN MFG. CORP.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
C-1	20A18740	Capacitor, trimmer: 1.5-15 mmf; includes "U" mounting bracket	.35	R-9	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.	doz. 1.00
C-2	1X72533	Capacitor, variable: 2 gang; cut oscillator plates; includes pulley	4.35	R-10	18A70032	Resistor, variable; 1 meg; with SPST switch	1.10
C-3	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-11	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00
C-4	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-12	6R6035	Resistor, fixed: carbon; 270 10% 1W N.I.	each .15 doz. 1.45
C-5	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-13	6R6406	Resistor, fixed: carbon; 22 10% 1/2W Ins.	doz. 1.00
C-6	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-14	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.	doz. 1.00
C-7	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-15	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.	doz. 1.00
C-8	21R6641	Capacitor, fixed: mica; 100 mmf. 500V	.20	T-1	24B70546	Transformer, I.F.: 455 kc; complete but less shield and iron core sleeve	2.45
C-9	21R6639	Capacitor, fixed: mica; 500 mmf. 500V	.30	T-2	24B70537	Transformer, diode: 455 kc; complete but less shield and iron core sleeve	2.45
C-10	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20	T-3	25C21248	Transformer, power	7.55
C-11	21R6639	Capacitor, fixed: mica; 500 mmf. 500V	.30	T-4	25B21176	Transformer, output	2.85
C-12	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20	1X72531	Bracket & Mounting Plate Assembly: "L" shaped steel bracket and bakelite electrolytic mounting plate	.10	
C-13	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	7371727	Bracket, gang capacitor mounting	.25	
C-14	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20	7A14684	Bracket, tuning shaft	.10	
C-15	23A27718	Capacitor, electrolytic: 30-30-20 mf/350-300-25V	2.70	43A76441	Bushing, felt (used on control shafts, between knob and cabinet)	.10	
or	23K74827	Capacitor, electrolytic: 30-30-20 mf/350-300-25V		16F71015	Cabinet (65F11)	27.00	
I-1 &				16F76443	Cabinet (65F12)	30.00	
I-2	65X10867	Bulb: 6.3V, .25A, tubular bayonet; #44	.15	35K72561	Cloth, grille (65F11)	1.00	
L-1	24K72565	Loop and Panel Assembly: complete with trimmer, connecting leads and plug (65F11)	3.25	35K76444	Cloth, grille (65F12)	1.00	
	24K76412	Loop and Panel Assembly: complete with trimmer, connecting leads and plug. (65F12)	3.25	11M8944	Cord, dial: 18 lb; black	yd. .10	
L-2	24A70547	Coil, B. C. oscillator	1.15	30K75570	Cord, line: 6 ft. long; with plug	.75	
R-1	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00	1X72528	Cord, phono-pick-up; complete with single pin plug	.60	
R-2	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.	doz. 1.00	1X71047	Core & Palnut Assembly (I.F. & diode transformer top tuning iron core and nut)	.20	
R-3	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00	1X71048	Core & Clip Assembly (I.F. & diode transformer bottom tuning iron core and clip)	.20	
R-4	6R6090	Resistor, fixed: carbon; 470 10% 1/2W Ins.	doz. 1.00	1X72543	Dial Assembly: complete with 2 mounting brackets, dial plate (painted brown), pointer slider rail, 3 pointer cord pullies and 2 dial light sockets. No glass dial scale or pointer included.	3.30	
R-5	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.	doz. 1.00	13B72476	Escutcheon, dial: brown plastic	1.05	
R-6	6R6347	Resistor, fixed: carbon; 22,000 10% 1/2W N.I.	doz. 1.20	5A19858	Eyelet: 19/64 x .212 I.D. x 1/2 (gang mounting)	doz. .20	
R-7	6R6053	Resistor, fixed: carbon; 1,000 1/3W N.I.	doz. 1.20	5A70098	Eyelet: 23/64 x 7/32 I.D. x 1/2 (speaker mounting)	doz. .20	
R-8	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.	doz. 1.00	37K15841	Foot, rubber (cabinet foot)	doz. .25	
				13C76344	Grille, cabinet: metal, brass plated (65F12)	2.00	
				5A70404	Grommet, rubber (gang capacitor and speaker cushions)	doz. .60	

MODELS 65F11, 65F12

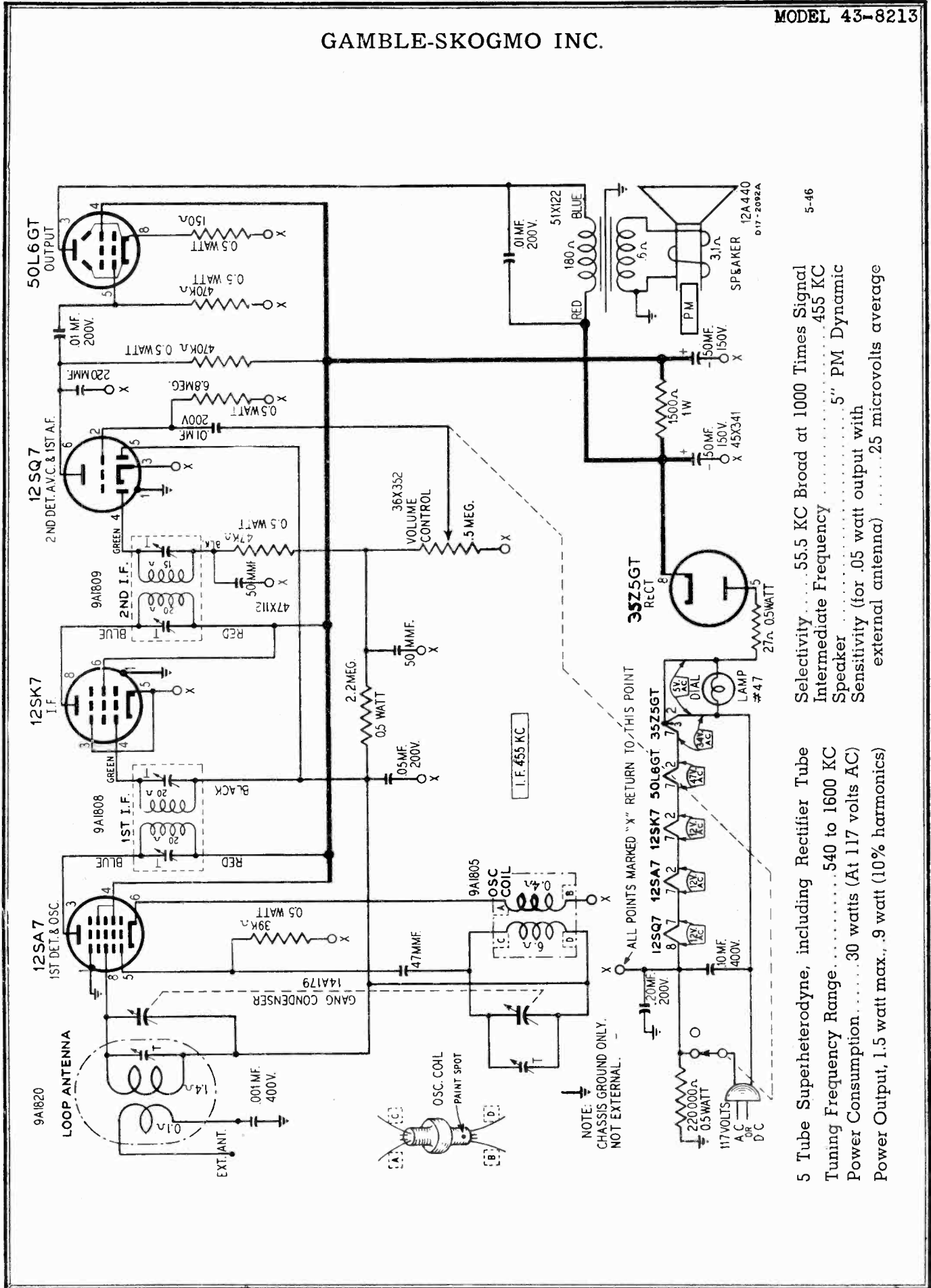
Chassis HS-31

GALVIN MFG. CORP.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
587708		Rivet, steel: .122 x 9/32 nickel plated (line cord lock mounting)	per/c .50	28K71775		Plug, 1 pin (used on phono-pick-up cord)	.10
5A71246		Rivet, shoulder: .187 long (pointer cord guide pulley mounting)	doz. .15	28K19871		Plug, 4 pin (loop plug)	.10
5A13896		Rivet, shoulder: .312 long (pointer cord guide pulley mounting)	doz. .15	52B71098		Pointer, dial	.20
47A71724		Rod, dial cord guide: steel; 9-3/8 long x 3/32 diameter	.05	49A23980		Pulley, cord: bakelite; 1/4 groove (pointer cord guides)	doz. .30
34B71097		Scale, dial: glass	1.10	9A30880		Receptacle, 3 prong; less shell (phono-motor power cord receptacle)	.10
331317		Screw, steel: #2 x 3/8 Phillips oval head wood screw; bronze finish (dial escutcheon mounting)	doz. .20	9K28049		Receptacle, 4 prong (loop receptacle)	.10
337506		Screw, steel: #8 x 1/4 PKZ plain hex head; cadmium plated (Osc. coil mounting)	per/c .50	537707		Rivet, steel: .122 x 5/32; nickel plated (tube socket mounting; terminal strip mounting; output transformer mounting)	per/c .50
337536		Screw, steel: #8 x 3/8 PKA slotted acorn head; antique copper finish (loop mounting)	per/c .50	537701		Rivet, steel: .122 x 3/16; nickel plated (elect. plate and insulator mounting; tuning shaft bracket mounting)	per/c .50
332294		Screw, steel: 6-32 x 1/2 plain hex head locking type machine screw; cadmium plated (gang capacitor mounting)	doz. .15	537700		Rivet, steel: .122 x 1/4; nickel plated (loop receptacle mounting)	per/c .50
337454		Screw, steel: #8 x 1/4 PKZ plain hex head; cadmium plated (gang capacitor bracket mounting)	per/c .50	15K74443		Shell, receptacle & plug (used with phono-motor power cord plug and receptacle)	.05
337475		Screw, steel: #8 x 1/4 PKZ slotted acorn head; cadmium plated (power transformer mounting)	per/c .50	1A71049		Shield, & Iron Core Sleeve Assembly (I.F. & diode transformer shield with internal iron core sleeve)	.30
337512		Screw, steel: #8 x 1/2 PKZ plain hex head; cadmium plated (speaker mounting)	doz. .15	9K72592		Socket, pilot light: with mounting bracket	.25
337528		Screw, steel: #8 x 1-1/8 PKA slotted hex head; cadmium plated (chassis mounting)	doz. .15	9A6771		Socket, tube: octal; saddle type (for rectifier)	.20
337396		Screw, steel: 10-32 x 2" slotted hex head machine screw: copper plated (record changer mounting)	doz. .25	9A72519		Socket, tube: loctal	.20
47A71722		Shaft, tuning	.15	50B71731		Speaker: 6" electro; with mounting bracket	8.00
55K72558		Hinge, cabinet	.15	287087		Speednut: for .093 diameter rods (dial cord guide rod retainer)	per/c .50
55K72559		Hinge & lid support	.95	41A28180		Spring, cushion (top) (record changer mounting)	doz. .25
36K74652		Knob, control: bakelite; with white dot (radio-phono-tone knob)	.10	41A21807		Spring, cushion (bottom) (record changer mounting)	per/c .65
1I78610		Knob, control: clear plastic with gold inset (65F11)	.40	41A14244		Spring, tension coil (pointer and drive cord tension spring)	doz. .55
1I78611		Knob, control: brown (65F11) (tuning & volume knobs)	.40	37K70556		Strip, channel; rubber (dial scale mounting)	doz. .15
36K76373		Knob, control (tuning & volume knobs) (65F12)	.40	31K72404		Strip, terminal: 1 small insulated lug (used on loop)	doz. .50
32A24815		Lock, line cord: fibre (holds line cord to chassis)	doz. .25	31A15433		Strip, terminal: 1 large insulated lug, #2 mounting	.05
437650		Lockwasher: steel: #8 internal; cadmium plated (output transformer mounting)	per/c .50	31A71122		Strip, terminal: 3 insulated lugs, #2 ground	.10
287051		Nut, steel: 3/8-32 x 9/16; Palmnut; cadmium plated (phono-radio-tone switch & volume control mounting)	doz. .15	40A71721		Switch, phono-radio & tone	1.15
9A12705		Plate, electrolytic mounting: bakelite	doz. .80	4A70015		Washer, "C" (tuning shaft retainer)	per/c .50
				4S1719		Washer, steel: 3/8 x .140 x .030 thick; cadmium plated (line cord lock mounting)	per/c .50
				438214		Washer, steel: 7/8 x .203 x .087 thick; cadmium plated (chassis mounting)	doz. .25
				438204		Washer, steel: 1" x .203 x .067 thick (record changer mounting)	doz. .25

Prices Subject To Change Without Notice

GAMBLE-SKOGMO INC.



5-46

Selectivity..... 55.5 KC Broad at 1000 Times Signal
 Intermediate Frequency..... 455 KC
 Speaker..... 5" PM Dynamic
 Sensitivity (for .05 watt output with external antenna)..... .25 microvolts average

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 max., .9 watt (10% harmonics)

NOTE:
 CHASSIS GROUND ONLY.
 NOT EXTERNAL.

ALL POINTS MARKED "X" RETURN TO THIS POINT

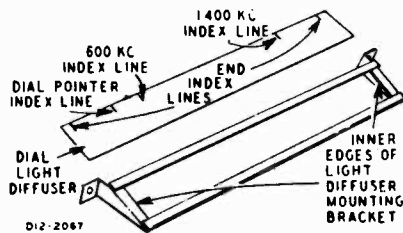
I.F. 455 KC

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.

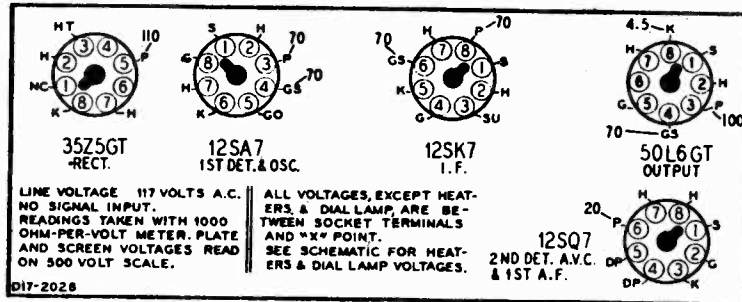
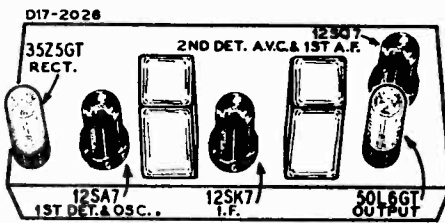
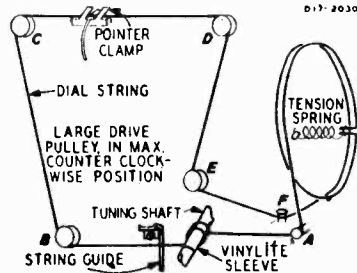
Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement 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).

The 600 KC and 1400 KC index lines are for use when aligning the receiver.



DRIVE CORD REPLACEMENT

Turn gang condenser to fully open position. Use a new drive cord and fasten one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the drive cord through the slot in the drive pulley rim and continue over top of pulley (counterclockwise) one-half turn. Pass cord around idler stud A and wind two turns clockwise around tuning shaft, turns must progress away from chassis. Pass cord in front of string guide, around pulley B, over pulleys C, D, E and around idler stud F. Wind cord counterclockwise one and one-half turns around drive pulley in back of previous one-half turn. Pass cord through slot in pulley rim, stretch the tension spring and fasten free end of cord to spring. Refer to the Replacement Parts List for the number of the drive cord assembly for use with this radio.



ALIGNMENT PROCEDURE

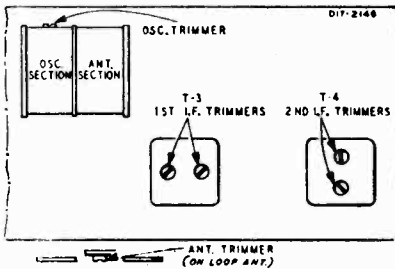
Check dial pointer position, see DIAL CALIBRATION paragraph.
Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.
The equipment in column at right is required for aligning:

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

Output Indicating Meter: Non-Metallic Screwdriver.

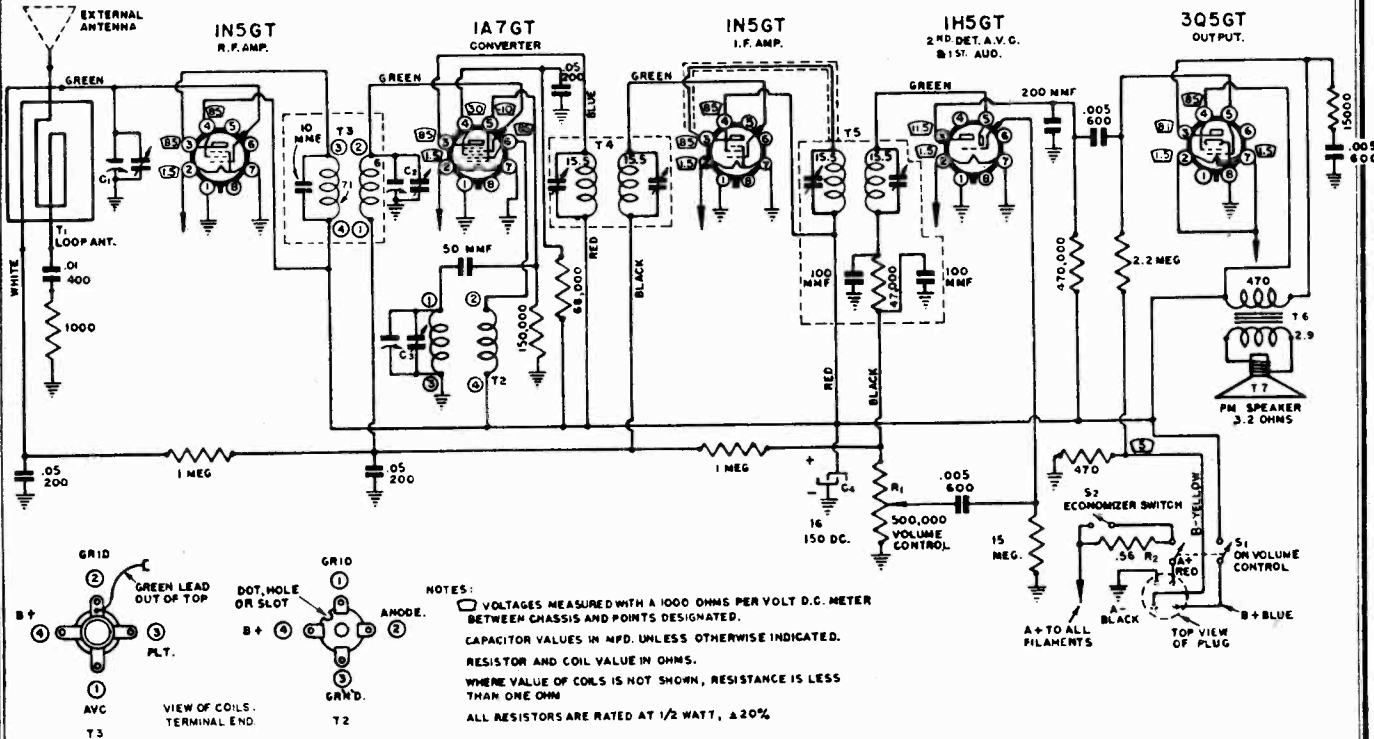
Dummy Antennas—.1mf., 50 mmf.

SIGNAL GENERATOR					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	Point "X" 12SK7—I. F. Prong No. 3	.1 mf.	Turn Rotor to full open	2nd I. F. Trimmers
455 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	1st I. F. Trimmers
1400 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to 1400 KC See Note A	Oscillator Trimmers
1400 KC	External Antenna Clip On Loop	Chassis	50 mmf.	Turn Rotor to 1400 KC See Note A	Antenna Trimmer



NOTE A—Use 1400 KC index line on dial light diffuser. See DIAL CALIBRATION paragraph.

GAMBLE-SKOGMO INC.



SERVICE PARTS LIST MODEL 43-6451

IF PEAK 455 KC

Order Parts by Model No. and Part No.

Part No.	Name
25296	Adaptor, for use with 2 volt storage battery.
25566	Bearing (for wood pulleys)
25561	Cabinet
25597	Coil, R. F. (T3)
25598	Coil, Oscillator (T2)
25600	Condenser, Electrolytic 16 Mfd, 150 V. (C4)
25592	Condenser—Tuning, 3 Gang, less Tuning Shaft (C1, C2, C3)
25367	Control, Volume, with On-Off Switch (R1)
25811	Cord, Dial, complete with Spring and Pointer Coupling
25696	Knob, Tuning or Volume
25609	Loop (T1)
25612	Plug, Battery Cable 4 Prong Pointer, Dial — See "Track-Pointer"
25336	Pulley—Wood
25616	Scale, Dial
25766	Shaft—Tuning with "spool" pulley
25620	Socket—Tube
25593	Speaker 5" P.M. Dynamic (T7) (less Transformer)
25319	Switch, Economizer (S2)
25808	Track, Pointer, complete with Brackets and Pointer
25621	Transformer I. F. Input (T4)
25622	Transformer I. F. Output (T5)
25594	Transformer—Speaker Output (T6)

Reference Numbers such as (C4) are shown on circuit diagram.

Parts not listed above, may be ordered by part number as shown in the picture and by complete description, send a sketch if possible. Order parts from your local Gamble Store.

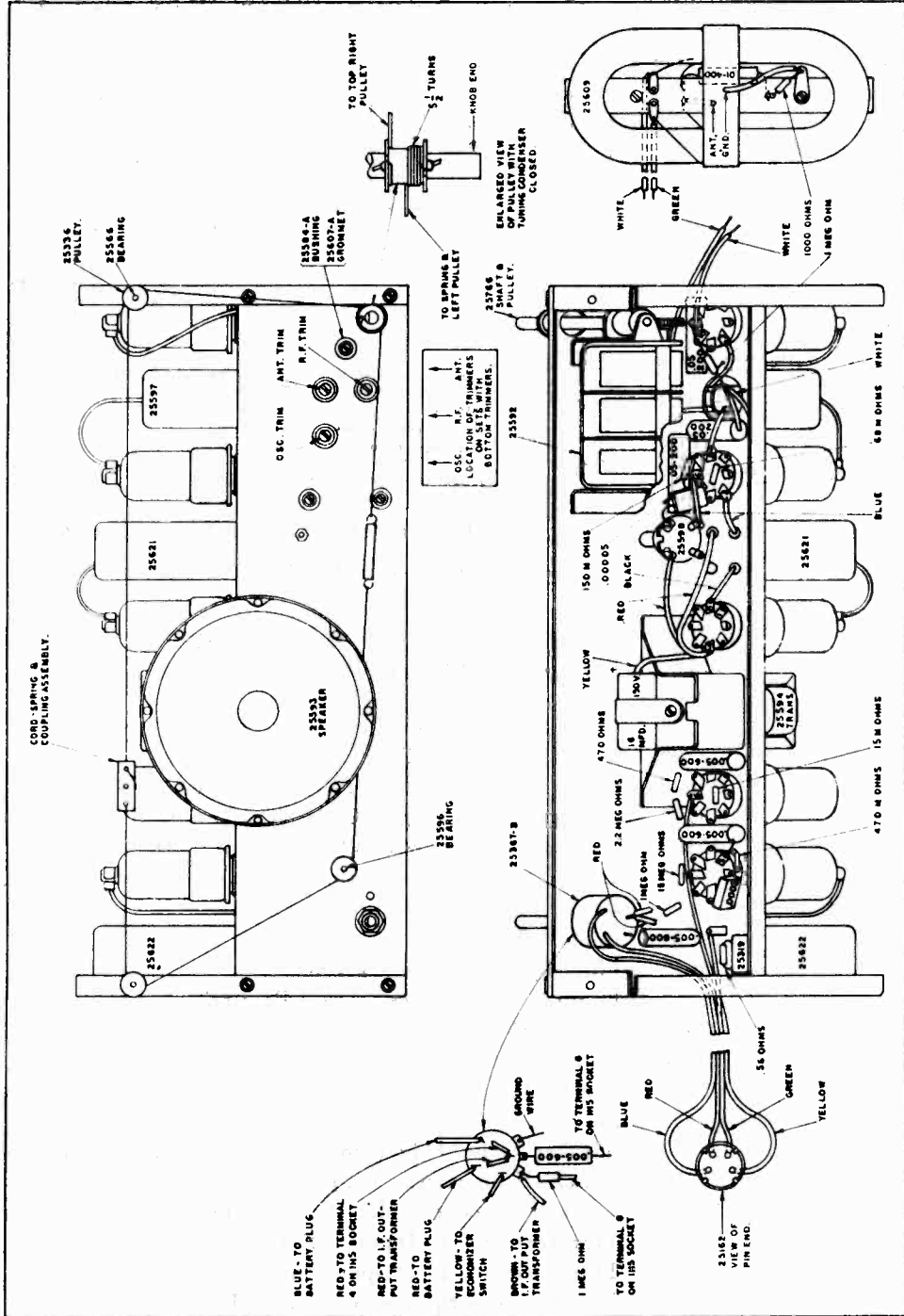
We cannot supply speaker cones. We can replace or repair a damaged speaker for a nominal price if it is returned to our factory, transportation charges prepaid.

GAMBLE-SKOGMO INC.

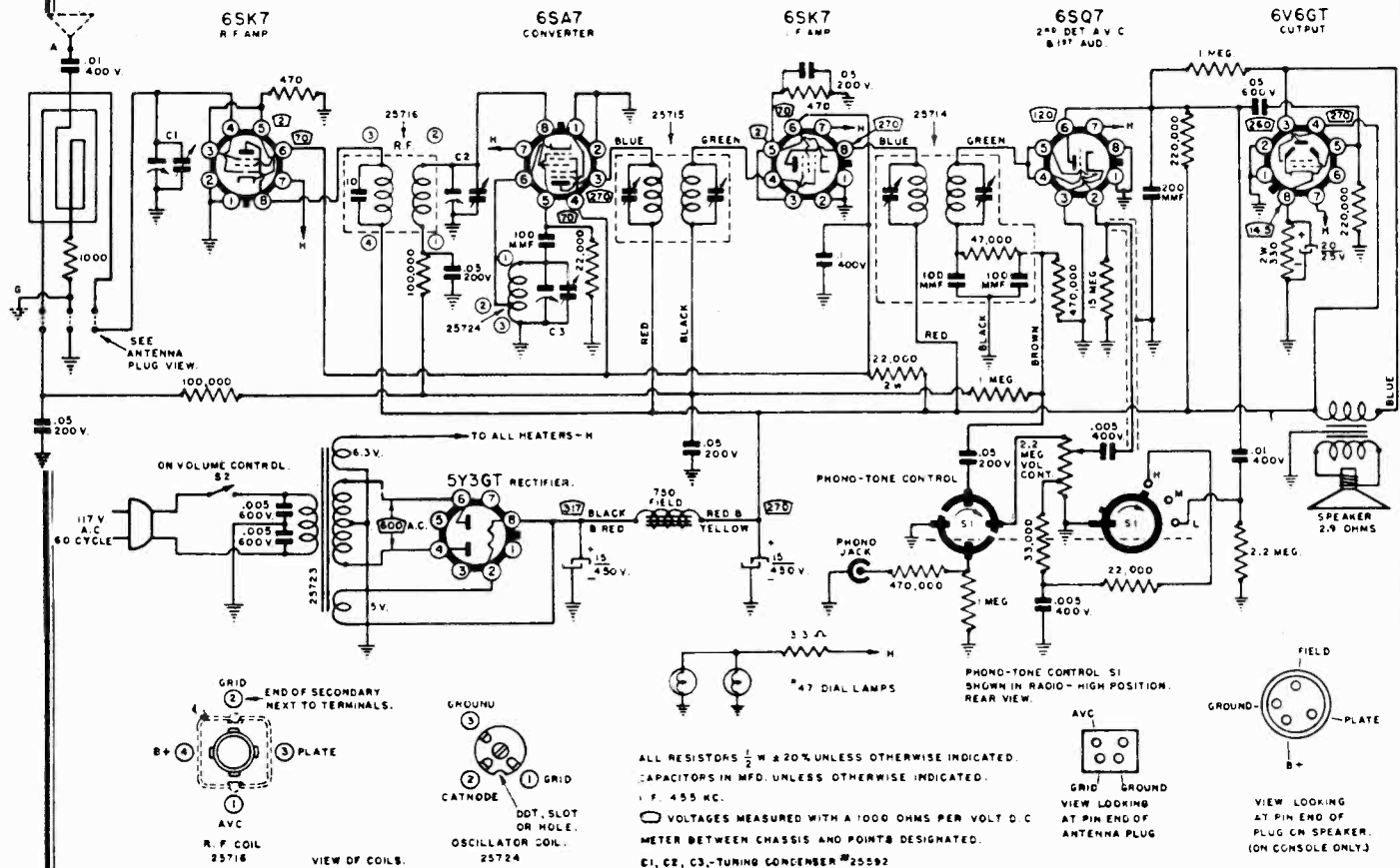
To Properly Align—Remove chassis from cabinet, and align I. F. Transformers in the conventional manner with a test oscillator adjusted to 455 KC, connected to the grid of the 1A7GT through a .1 Mfd condenser, with the tuning condenser set at minimum capacity. To align tuning condenser, connect test oscillator to antenna wire (green) through a .0001 Mfd. condenser. Adjust oscillator trimmer condenser (located on left top) to 1620 KC with tuning condenser at minimum capacity (completely out of mesh). The antenna and R. F. sections are trimmed at 1400 KC. Antenna trimmer is top right; R. F. trimmer is below at right. Dial pointer may be adjusted to scale by slipping bakelite pointer coupling on dial cord.

Battery Unit Voltages—Should be checked with receiver turned on—if B voltage is below 60 Volts, battery unit should be replaced.

Dial Cord Replacement—Is best accomplished by replacing complete cord assembly #25811, which is made up to correct length. In an emergency 30 lb. fish line may be used. See picture of chassis for correct installation.



GAMBLE-SKOGMO INC.



REMOVAL OF CHASSIS—Disconnect set from wall plug. Remove knobs by pulling straight out. Remove loop plug on back of chassis. Remove two screws under cabinet, chassis may be withdrawn from rear.

ALIGNMENT—Sets are properly aligned at the factory with precision equipment and the adjustments should not be disturbed unless a coil, tuning condenser or IF transformer has to be replaced or the set has been subject to damage or tampering. Alignment should only be done with the aid of an accurate signal generator and output indicating instrument.

TO PROPERLY ALIGN—Remove chassis from cabinet, and align I. F. Transformers in the conventional manner with a Signal Generator adjusted to 455 KC, connected to the grid of the 6SA7 through a .1 Mfd. condenser, with the tuning condenser set at minimum capacity. To align tuning condenser, carefully place loop in normal relation to chassis, connect Signal Generator to antenna clip through a .0001 Mfd. condenser. Adjust oscillator trimmer condenser (located on left top) to 1620 KC with tuning condenser at minimum capacity (complete out of mesh). The antenna and R. F. sections are trimmed at 1400 KC. Antenna trimmer is top right; R. F. trimmer is below at right. Dial pointer may be adjusted to scale by slipping pointer coupling on dial cord.

DIAL CORD REPLACEMENT—Is best accomplished by replacing complete cord assembly No. 25834 which is made up to correct length. In an emergency 30 lb. fish line may be used. See picture of chassis for correct installation.

DIAL SCALE REPLACEMENT—Remove chassis. Remove pointer track by removing the two wood screws holding it to the cabinet. Dial scale may now be lifted out from front of cabinet. When installing new scale—see that long screws in track bracket engage the notches in the ends of the scale.

DESCRIPTION

This radio is an AC operated superheterodyne set. It is designed for use on the usual home lighting service of 110 - 120 volts 50 - 60 cycles.

The set contains a built-in loop antenna (aerial) and will receive stations on the standard broadcast band, 535 - 1620 kilocycles.

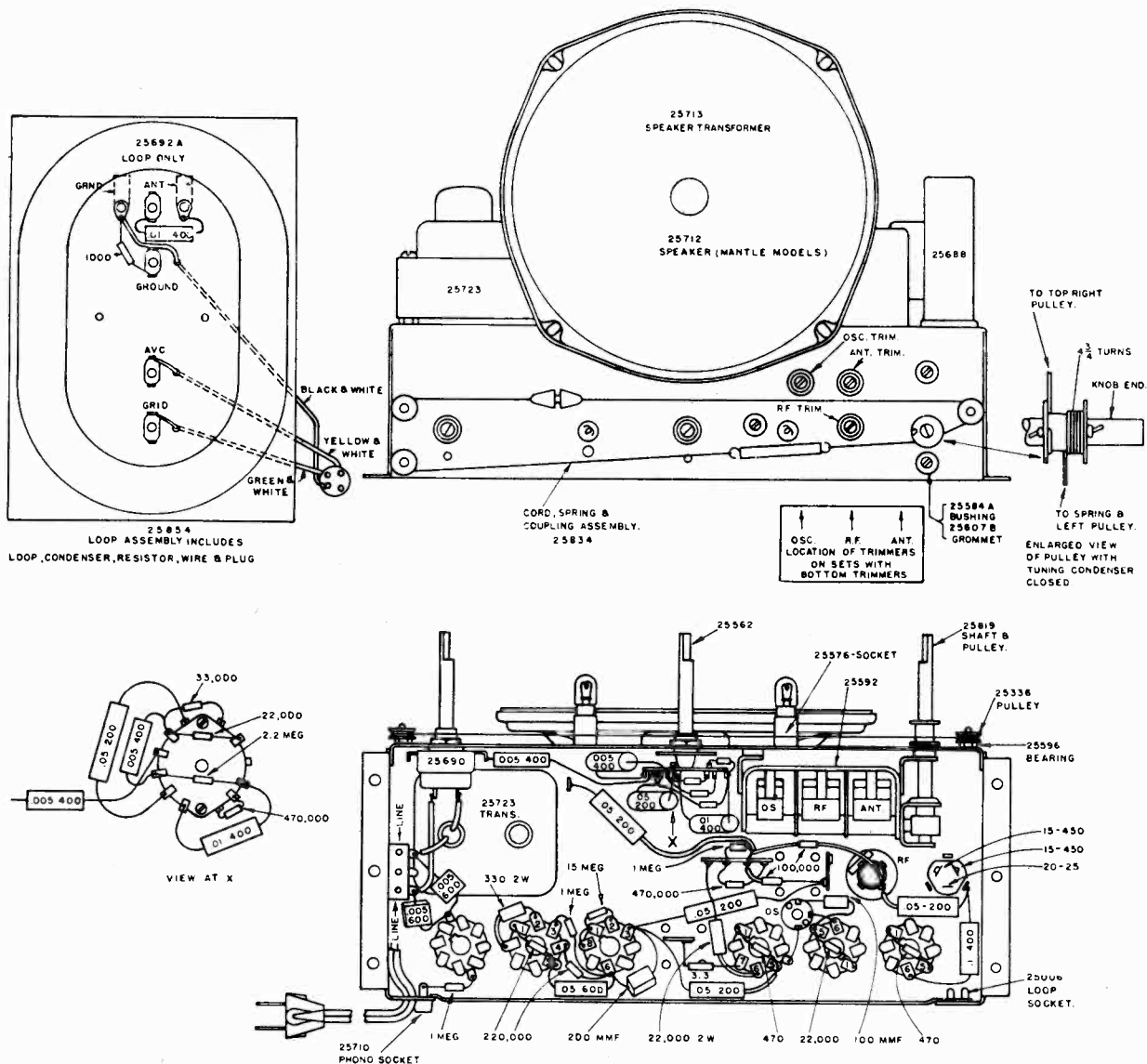
This radio combines many desirable features such as: Oversize eight inch Electro-dynamic speaker for excellent tone; Bass "boost" to give "rich" reproduction at normal volume; Three gang tuning condenser for better selectivity; High efficiency circuit for minimum cost of operation and maintenance.

INSTALLATION

TUBES—All the tubes are properly mounted in their sockets when the set is shipped. There is a possibility, however, that the tubes have worked loose during shipment. Press each tube firmly into its socket.

POWER—Be sure that your home is supplied with current that is within the voltage and frequency ratings given above.

GAMBLE-SKOGMO INC.



SERVICE PARTS LIST
MODEL 43-8685

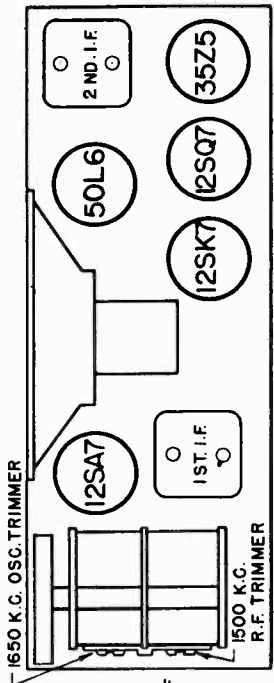
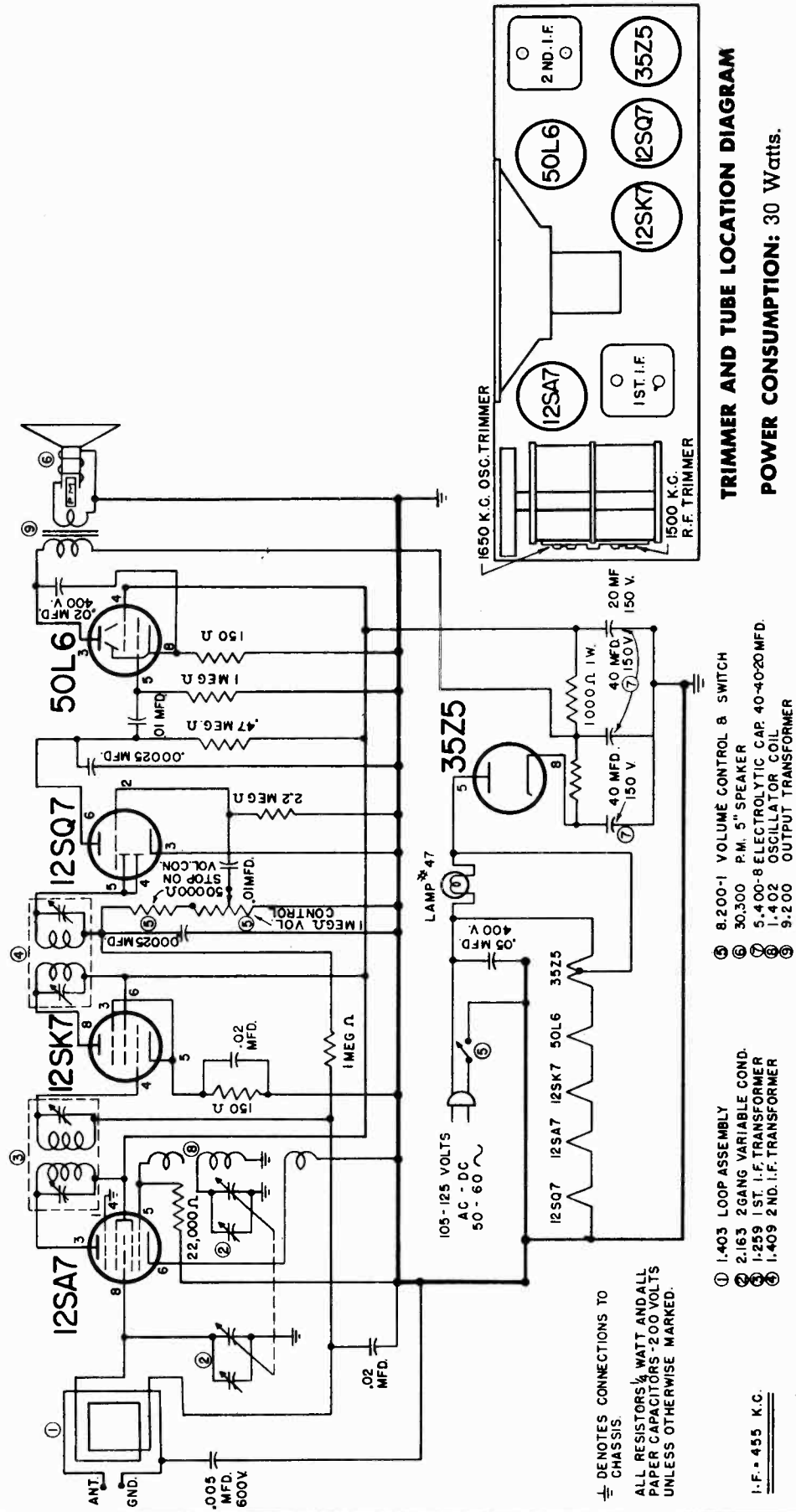
When ordering parts always mention complete factory model number, series and issue.

Part No.	Description	Part No.	Description
25692	Antenna—Loop	25336	Pulley—Wood—Small
25596	Bearings—For Wood Pulleys	25819	Pulley—Manual Drive With Shaft
25572	Bracket—Tuning Condenser—Front	25607	Rubber—Grommets
25573	Bracket—Tuning Condenser—Rear	25774	Screw—Set For Worm Gear (Tuning Condenser)
25574	Bracket—Speaker	25576	Socket—Dial Lamp
25765	Bracket—Pointer Track	25620	Socket—Octal
25660	Cabinet	25006	Socket—For Loop
25597	Coil—R. F.	25712	Speaker—With Transformer
25724	Coil—Oscillator	25562	Switch—Tone S-1,
25688	Condenser—Filter 15-450, 15-450, 20-25	25711	Track—Pointer
25592	Condenser—Tuning C-1, C-2, C-3	25715	Transformer—I. F. Input
25690	Control—Volume (with AC Switch S-2)	25714	Transformer—I. F. Output
25068	Cord—AC and Plug	25713	Transformer—Output—Speaker
25834	Cord—Dial (includes Spring and Pointer Coupling)	25723	Transformer—Power 60 Cycles
25751	Dial Scale—Glass	Note: Resistors and condensers not listed will be supplied on order—specify value.	
25578	Dial Pointer	We cannot supply speaker cones. We can replace or repair a damaged speaker for a nominal price if it is returned to our factory, transportation charges prepaid.	
25829	Knob—Tone		
25696	Knob—Volume and Tuning		
25710	Phono—Pick-Up Socket		
25693	Plug—For Loop		

In ordering any part not listed give complete description and a sketch, if possible.

Order parts from your local Gamble Store.

GAROD ELECTRONICS CORP.



TRIMMER AND TUBE LOCATION DIAGRAM
POWER CONSUMPTION: 30 Watts.

- ① 1.403 LOOP ASSEMBLY
- ② 2.163 2GANG VARIABLE COND.
- ③ 1.239 1ST. I.F. TRANSFORMER
- ④ 1.409 2ND. I.F. TRANSFORMER
- ⑤ 8.200-1 VOLUME CONTROL & SWITCH
- ⑥ 30,300 P.M. 5" SPEAKER
- ⑦ 5.400-8 ELECTROLYTIC CAP. 40-40-20 MFD.
- ⑧ 1.402 OSCILLATOR COIL
- ⑨ 9.200 OUTPUT TRANSFORMER

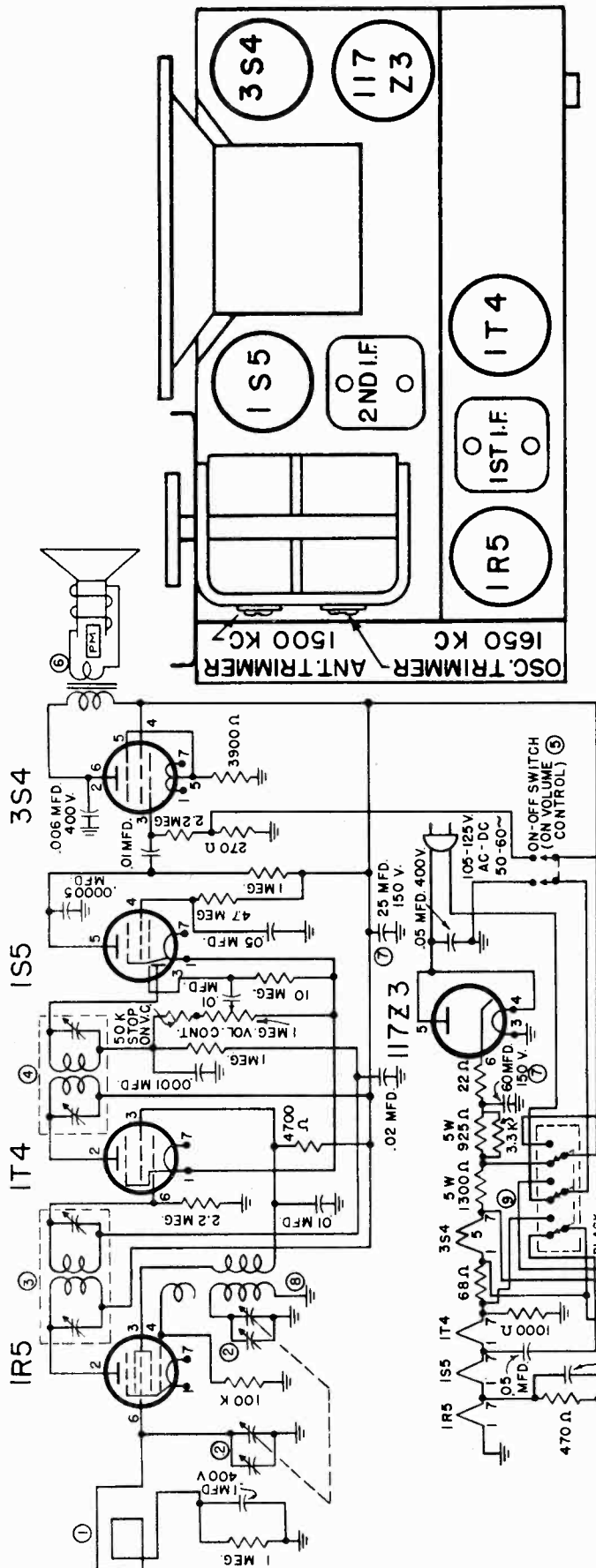
⊥ DENOTES CONNECTIONS TO CHASSIS.
 ALL RESISTORS 1/4 WATT AND ALL PAPER CAPACITORS - 200 VOLTS UNLESS OTHERWISE MARKED.

I.F. - 455 K.C.

ALIGNMENT: Should it become necessary at any time to check the (3) Loosely couple the Signal Generator lead to the Loop and set to 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.

GAROD ELECTRONICS CORP.



-4-45

ALL RESISTORS 1/4 WATT AND ALL PAPER CAPACITORS 200 VOLTS UNLESS OTHERWISE MARKED.
K = KILOHMS
I. F. = 455 K C.

- ① 1-405 LOOP ANTENNA
- ② 2-203 2GANG VARIABLE CONDENSER
- ③ 1-412 1ST I.F. TRANSFORMER
- ④ 1-413 2ND I.F. TRANSFORMER
- ⑤ 8200-2 VOLUME CONTROL & SWITCH
- ⑥ 30302 3 1/2" P.M. SPEAKER
- ⑦ 5-400-3 ELECTROLYTIC CAP. 60-25-150 MFD.

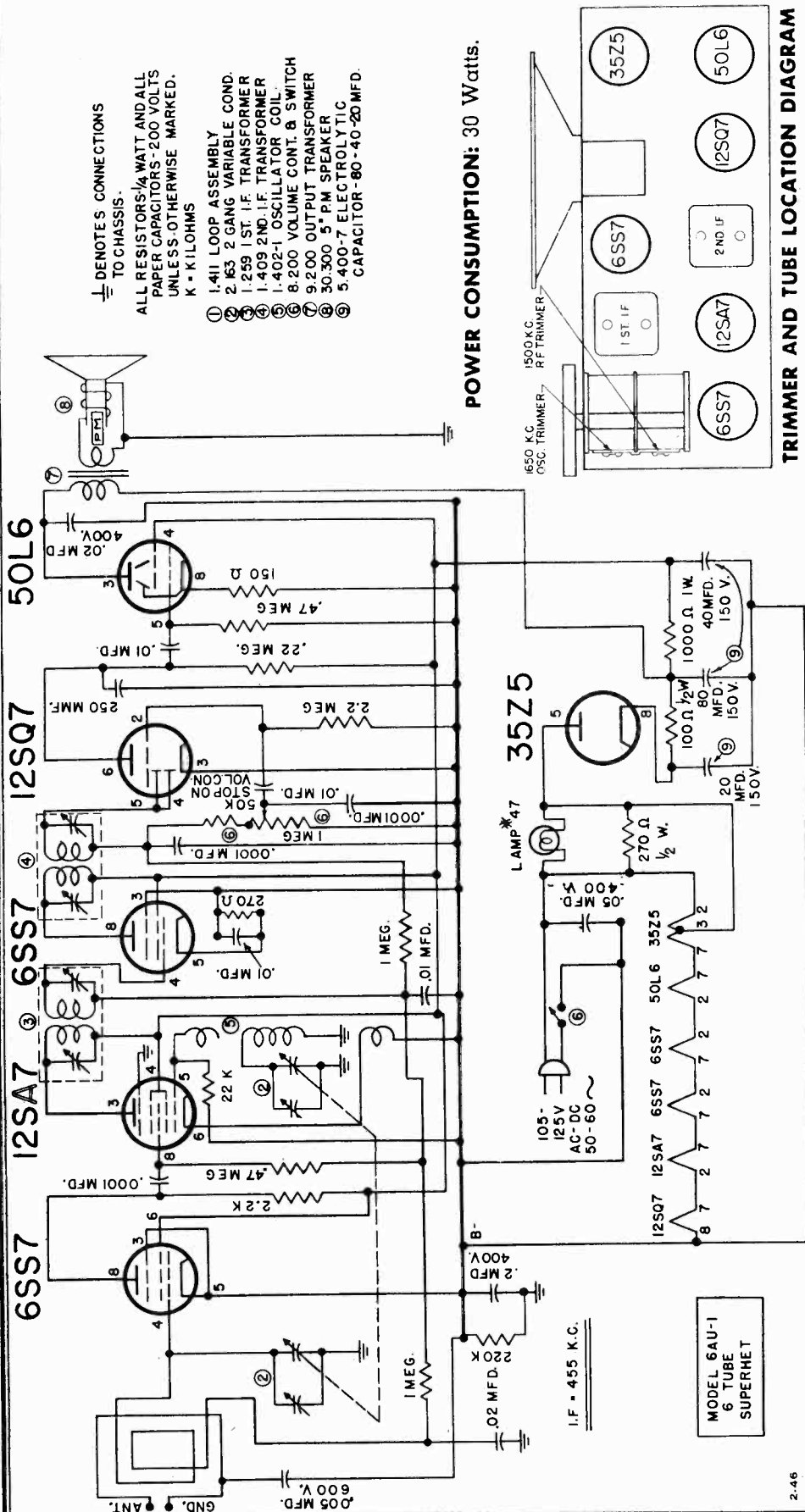
- ⑧ 1-414 OSCILLATOR COIL
- ⑨ II-200 ELECTRIC-BATTERY SWITCH

- (1) Set the Signal Generator to 455 KC and connect to the stator lug (front section) of the Variable Capacitor. Extend Loop leads and connect to Loop contacts inside top of cabinet. 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 the 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 for correct dial calibration. Readjust the Antenna Trimmer for maximum output and replace plug buttons.

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 the Variable Capacitor. Extend Loop leads and connect to Loop contacts inside top of cabinet. 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).

GAROD ELECTRONICS CORP.

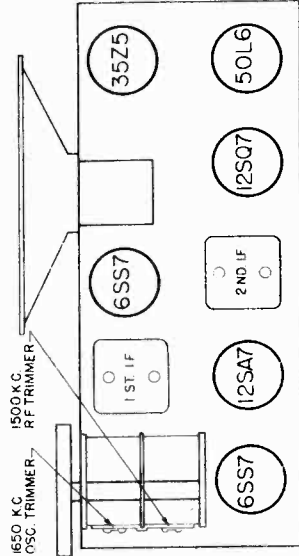


⊥ DENOTES CONNECTIONS TO CHASSIS.

ALL RESISTORS 1/2 WATT AND ALL PAPER CAPACITORS - 200 VOLTS UNLESS OTHERWISE MARKED. K - KILOHMS

- ① 1.411 LOOP ASSEMBLY
- ② 2.163 2 GANG VARIABLE COND.
- ③ 1.259 1ST. I.F. TRANSFORMER
- ④ 1.409 2ND. I.F. TRANSFORMER
- ⑤ 1.402-1 OSCILLATOR COIL
- ⑥ 8.200 VOLUME CONT. & SWITCH
- ⑦ 9.200 OUTPUT TRANSFORMER
- ⑧ 30.300 5" PM SPEAKER
- ⑨ 5.400-7 ELECTROLYTIC CAPACITOR - 80 - 40 - 20 MFD.

POWER CONSUMPTION: 30 Watts.



TRIMMER AND TUBE LOCATION DIAGRAM

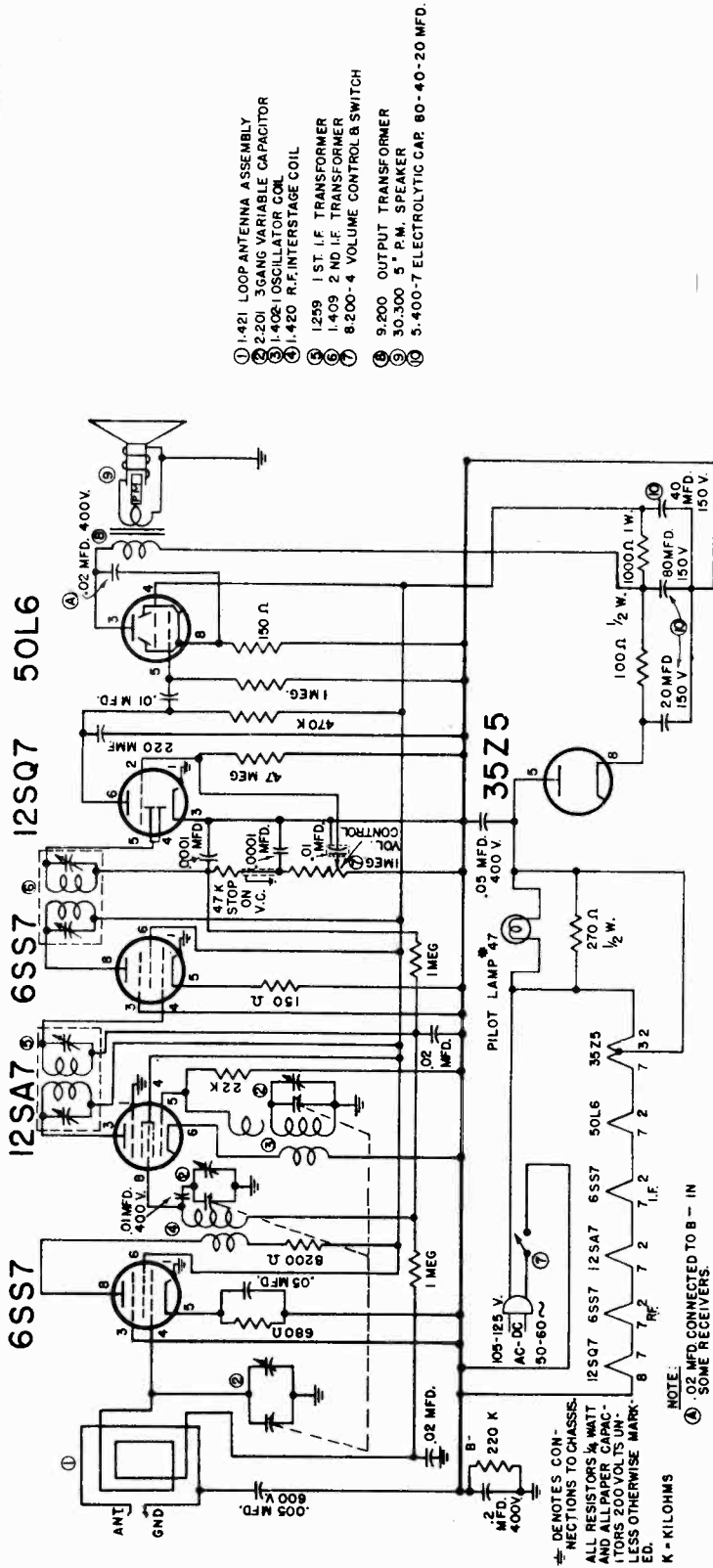
ALIGNMENT: Should it become necessary at any time to check the alignment Loosely couple the Signal Generator lead to the Loop and set to 1650 KC. of this receiver, proceed as follows:

Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to a "B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. First turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.

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).

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.

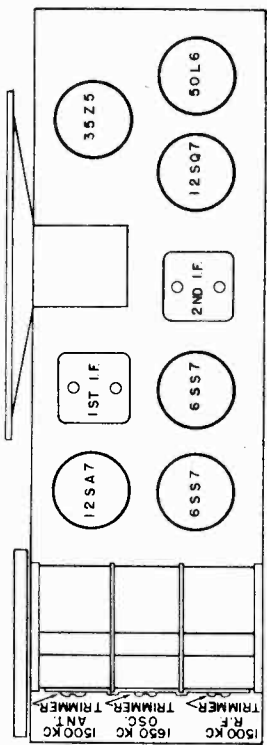
Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.



- ① 1-421 LOOP ANTENNA ASSEMBLY
- ② 2-201 3 GANG VARIABLE CAPACITOR
- ③ 1-406-1 OSCILLATOR COIL
- ④ 1-420 R.F. INTERSTAGE COIL
- ⑤ 1259 1ST. I.F. TRANSFORMER
- ⑥ 1-409 2ND. I.F. TRANSFORMER
- ⑦ 8200-4 VOLUME CONTROL & SWITCH
- ⑧ 9-200 OUTPUT TRANSFORMER
- ⑨ 30-300 5" P.M. SPEAKER
- ⑩ 5-400-7 ELECTROLYTIC CAP. 80-40-20 MFD.

POWER CONSUMPTION: 30 Watts.

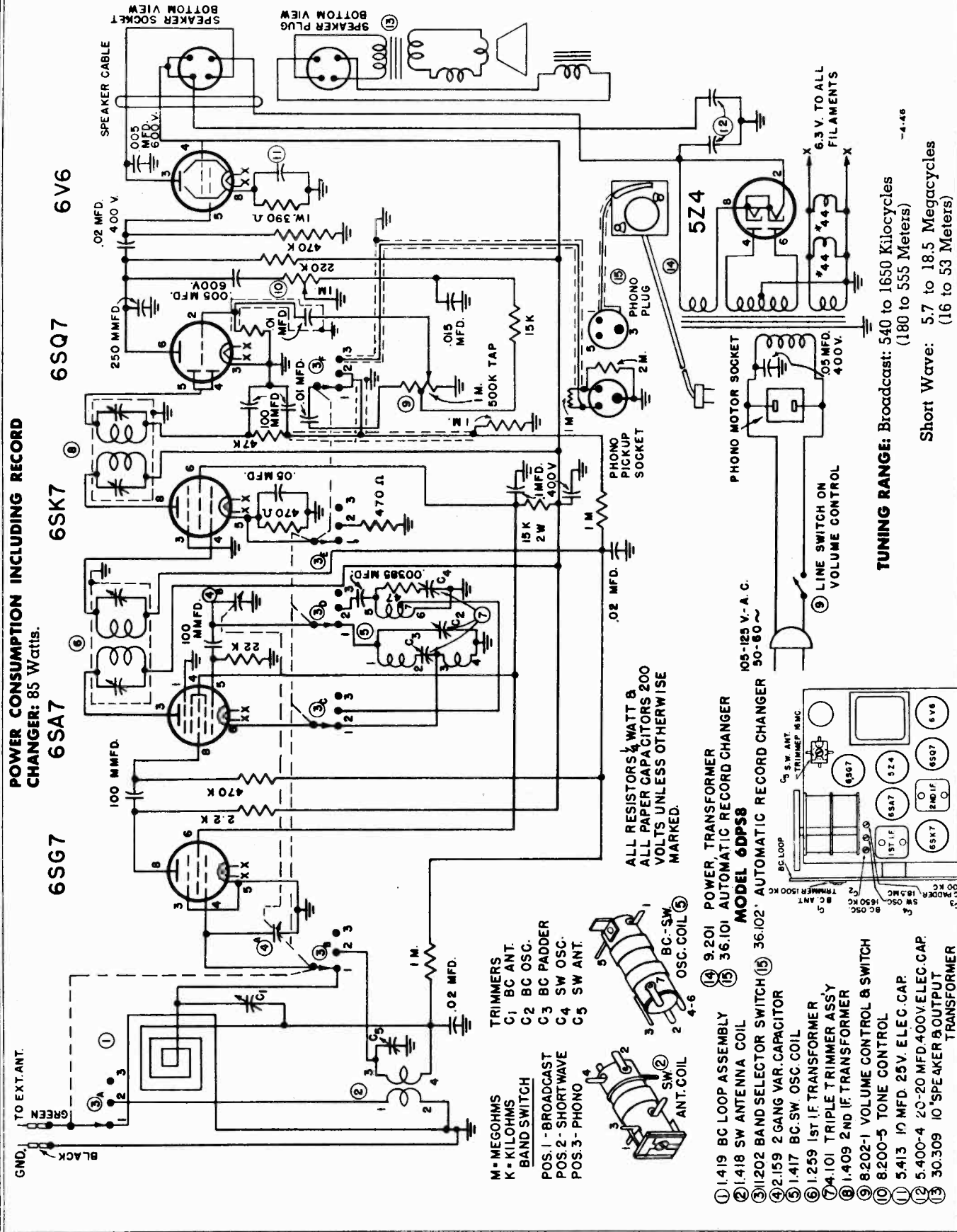
- (1) Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to a "B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme 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 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 (middle section).
- (5) Adjust the R. F. Trimmer (rear section) and the Antenna Trimmer (front section) on the Variable Capacitor for maximum output. No other adjustments are necessary.



TUNING RANGE: Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).
DIAL: The Dial Scale is calibrated in Kilocycles times 10.
TUBES: The tubes used, and their functions, are as follows:

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

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Realignment of this receiver should not be attempted unless all other possible causes have been thoroughly investigated. An accurately calibrated signal generator, which will cover the necessary bands, and an output meter for indicating the effect of adjustments are required. During the alignment procedure, all adjustments should be made under the following conditions (refer to Trimmer and Tube Location Diagram below for trimmer location):

- (a) Line voltage as indicated on instruction sheet.
- (b) Volume Control at maximum position.
- (c) Tone Control at extreme left position (brilliant).
- (d) Minimum input from signal generator. This procedure should be adhered to, otherwise adjustments will be broad, due to the action of the automatic volume control.

BROADCAST (Band Switch in extreme left position)

I. F. Adjustment:

(1) Set the signal generator to 455 KC and connect to the lower side of the Loop Antenna Trimmer through a .1 MFD capacitor. Connect the signal generator ground lead to the chassis. Connect a suitable output meter across the speaker voice coil connections. Turn the Variable Capacitor to the extreme 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.

B.C. R. F. Adjustment: It is desirable to align this band on the loop.

(1) Couple the signal generator to the receiver loop by means of a two or three turn loop.

(2) With the Variable Capacitor set at the extreme clockwise position (minimum capacity), tune in the 1650 KC signal by means of the broadcast oscillator trimmer (C2).

(3) 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 (C3) on the loop for maximum output.

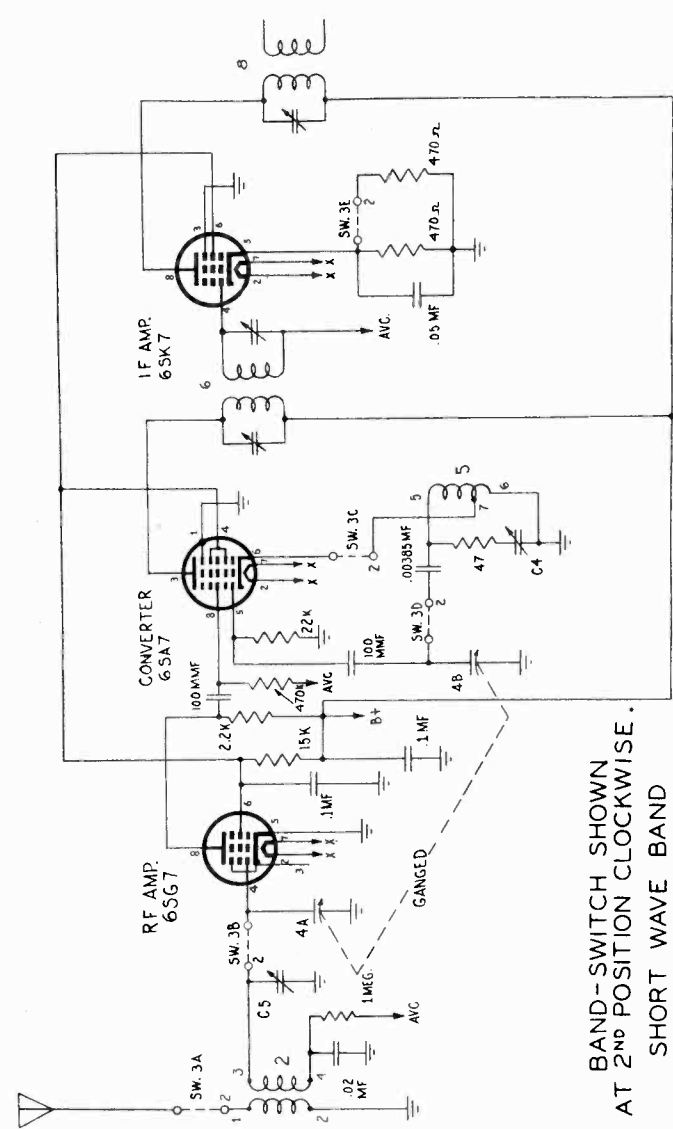
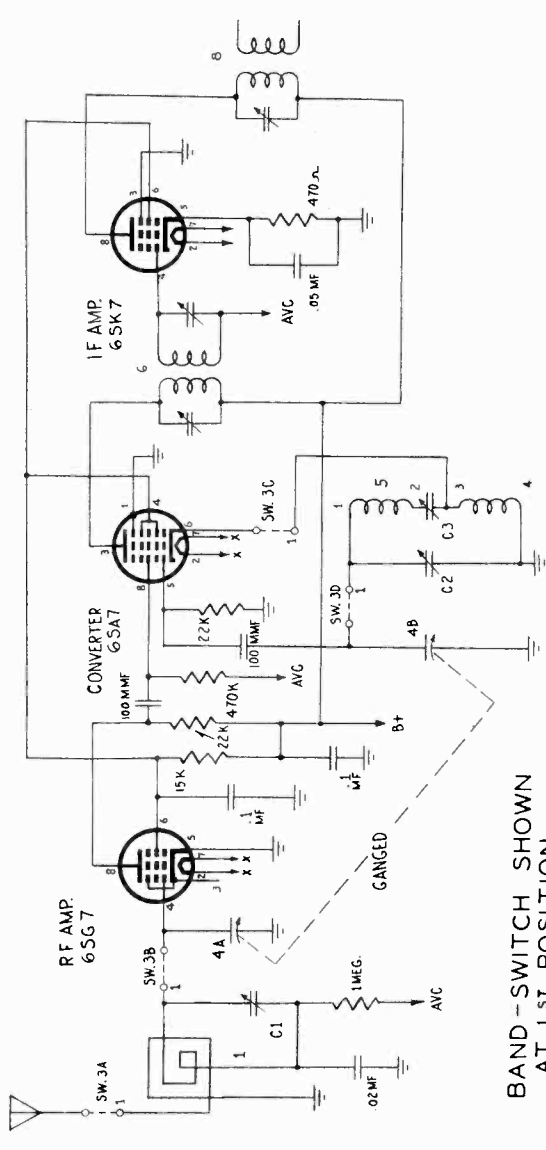
(4) Set the signal generator to 600 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the broadcast oscillator padder capacitor (C3) for maximum response while "rocking" the Variable Capacitor. Recheck the 1500 KC high frequency adjustment trimmer (C3).

SHORT WAVE (Band Switch in the middle position)

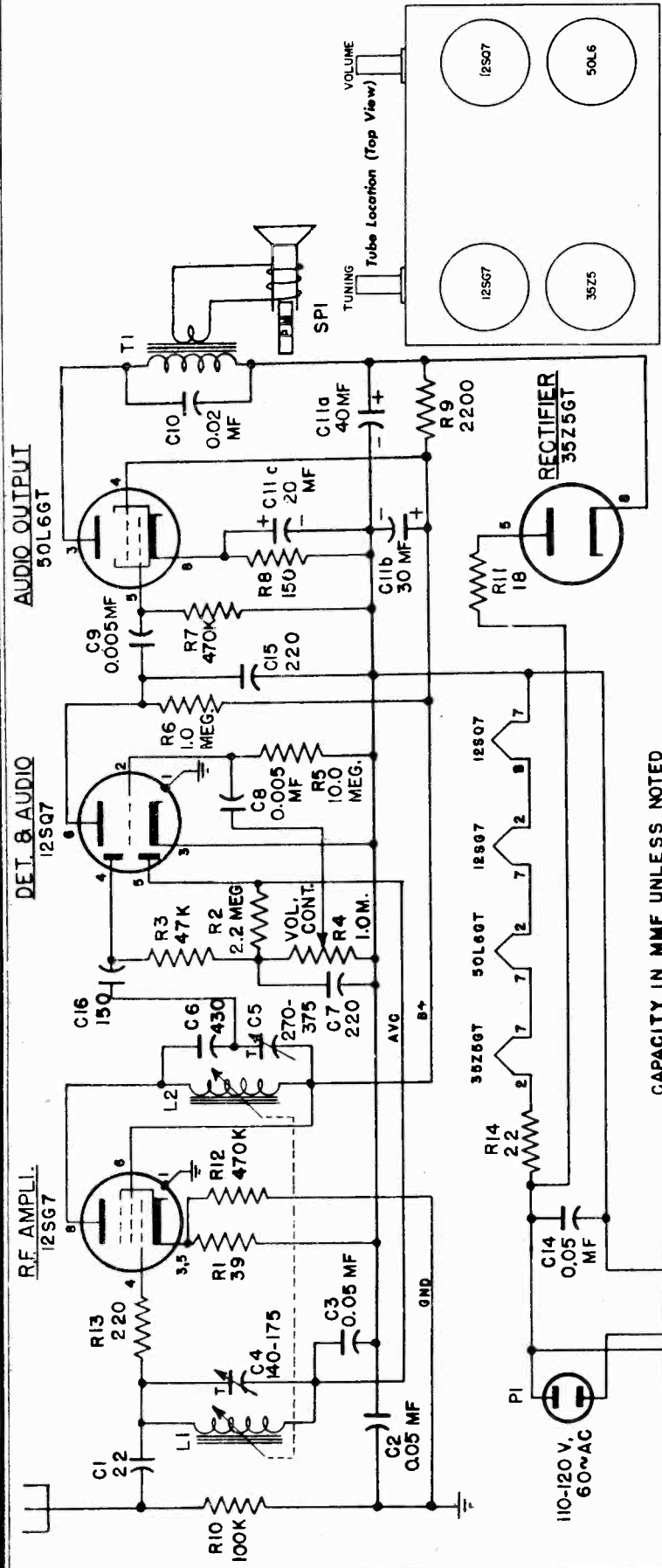
(1) Connect the signal generator through a standard short wave dummy antenna to the antenna (green wire) and the ground lead to the chassis of the receiver. Set the signal generator to 18.5 MC.

(2) With the Variable Capacitor set at the extreme clockwise position (minimum capacity), tune in the 18.5 MC signal by means of the S. W. oscillator trimmer (C4).

(3) Set the signal generator to 16 MC and turn the tuning control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer (C5) on the short wave coil for maximum output while rocking the Variable Capacitor from left to right for maximum output. No other adjustments are necessary.



GENERAL ELECTRIC CO.



CAPACITY IN MMF UNLESS NOTED

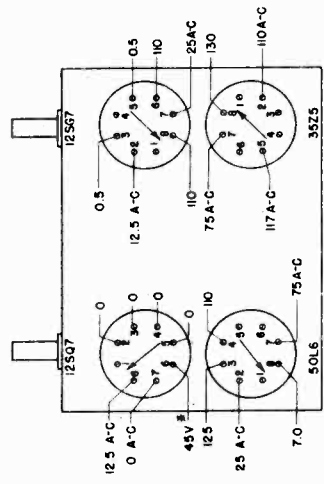
RADIO CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1 1/2 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 1/4 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.



* Measured with 20,000 ohm/volt meter

Fig. 4. Socket Voltages (Bottom View)

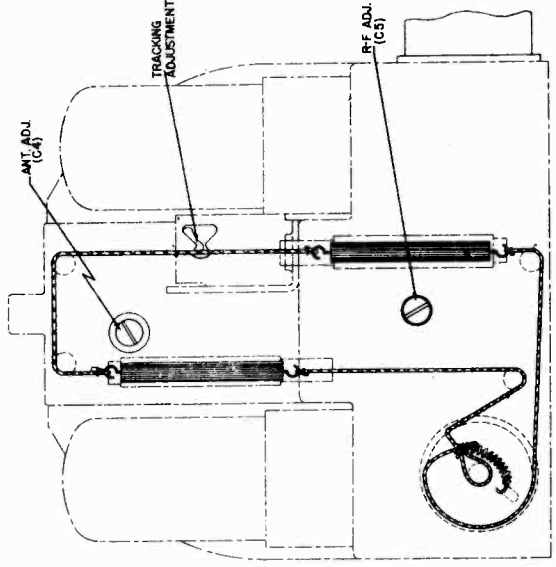


Fig. 1. Drive Stringing and Trimmer Location

MODEL 50

GENERAL ELECTRIC CO.

MODEL 50 ----- Mounting Screws.

To meet Underwriters requirements, the Model 50 chassis must be mounted in its cabinet with non-standard screws that cannot be removed with tools that are generally available to non-technical customers. We have been using spanner-head screws to meet this requirement.

Because our stock became exhausted due to the scarcity of these screws, we have temporarily used a standard Phillips-head screw to mount this radio in the cabinet, and then fill the screw head with solder. Radios mounted in this way may be easily removed from their cabinet by heating the screw head with a soldering iron until the solder becomes liquid enough to permit the insertion of a standard Phillips head screwdriver. CAUTION - Care should be exercised not to apply too much heat as it may damage the cabinet.

MODEL 50 ----- Rectifier 35W4 Substitution.

To overcome a shortage of 35Z5GT tubes, for a large portion of the Model 50 production we have had to substitute the miniature 35W4 rectifier tube. This tube has similar characteristics to the 35Z5GT, however it requires a miniature tube socket. This socket is adapted to the regular chassis hole by an adapter plate.

If it is desired to change a 35W4 for a 35Z5GT, it is only necessary to drill out the 35W4 socket adapter plate and substitute an octal base socket.

MODEL 50 ----- Time Set Incorrect.

Customer complaints of alarm set errors are usually brought about by their turning the Time Set shaft counterclockwise. This knob should only be turned clockwise. For alarm adjustment, refer to the Clock Service section

(Schematic Diagram):- The schematic diagram should be corrected to read:

1. Move the series resistor, R14, from its location between the power plug P1 and the 35Z5GT filament pin, to connect in series with the filament string between the 35Z5GT and 50L6GT filament pins.

2. The filament connections (pins 2 and 7) to the 35Z5GT tube are interchanged.

3. Remove R11 in series with the plate side of the 35Z5GT rectifier tube (pin 5) and connect it in series with the cathode side (pin 8) of the rectifier tube.

4. Late production receivers use a tapped primary on the output transformer, T1. The color code of the primary is: red - B+, white - tap; blue - plate. This tapped transformer replaces the early production transformer and is wired as follows:

(a) Break connection to filter resistor, R9, on the rectifier side of the resistor.

(b) Connect this broken side of R9 to the tap of the output transformer, T1.

The above connects the positive (+) side of C11a, the rectifier output and the red lead of the output transformer together; while the tap lead of T1 connects to R9.

5. In late production receivers, a miniature Type 35W4 tube is substituted in place of the 35Z5GT rectifier tube. This requires installation of a miniature socket and adapter plate in place of the octal socket. The corresponding pin connections are as follows:

	<u>35Z5GT</u>	<u>35W4</u>
Plate.....	Pin 5	Pin 5
Cathode.....	Pin 8	Pin 7
Filament.....	Pin 2	Pin 4
Filament.....	Pin 7	Pin 3

(Radio Replacement Parts List):- Add Part No. RTO-022, symbol T1, Transformer - output transformer. (This part is a direct replacement for late production radios and a replacement with modification for the early production transformer without tap.)

GENERAL ELECTRIC CO.

CLOCK SERVICE

Figure 6 shows clock parts referred to in the following paragraphs and the parts list.

CLOCK MOVEMENT DISASSEMBLY

1. Remove clock movement from case. When removing knobs, note that the Alarm-set knob is a left-hand thread, while Alarm-Radio is a pull-off knob.
2. Remove Bezel Window, Hands and Dial Face.
3. Remove two field screws (A) and break two soldered joints on Field. The Field and Rotor assembly (R) can now be removed. The Rotor is held by friction only to the Field.
4. Remove Switch Assembly (B) by removing two screws from base plate.
5. Remove Switch Shaft Assembly (C) and spacer.
6. Remove Alarm-set Shaft Assembly (D) and spacer.
7. Remove the three front plate assembly screws that are located under the Dial Face and then remove Front Plate.
8. Remove Alarm Gear Sleeve Assembly (E), Hour Gear Sleeve Assembly (F), Minute Gear Sleeve Assembly (G), and Sweep Second Gear Shaft Assembly (H).
9. Remove Alarm Cam Gear Assembly (I) and Spring Washer (J).
10. Remove Alarm-set Gear (K).
11. Remove Time-set Gear and Shaft Assembly (L).
12. Remove Switch Cam Lever (M).

CLOCK MOVEMENT REASSEMBLY

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

1. The spring washer (J) should curve upward when placed on the Alarm Cam Gear (I).
2. The Switch Cam Lever (M) fork must straddle the base plate post as shown in the illustration.
3. After reassembly of front plate, check the Sweep Second Gear (H) through hole in base plate to make sure it is free to turn.

4. Proceed with ALARM AND SWITCH ADJUSTMENTS as described below before installing hands.

ALARM AND SWITCH ADJUSTMENTS

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

CLEANING AND LUBRICATION

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

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

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

CLOCK TROUBLES

1. Clock will not operate—Defective field coil, defective rotor, binding of parts.
2. Clock loses time—Binding parts, too little friction on minute hand sleeve assembly, defective rotor. Clock time set shaft bent and rubs against hole in back cover. Radio pushed against wall so that knob (Q) rubs will cause loss of time.
3. Noisy Clock—Rotor defective, alarm armature improperly adjusted, loose parts, or binding of moving parts.

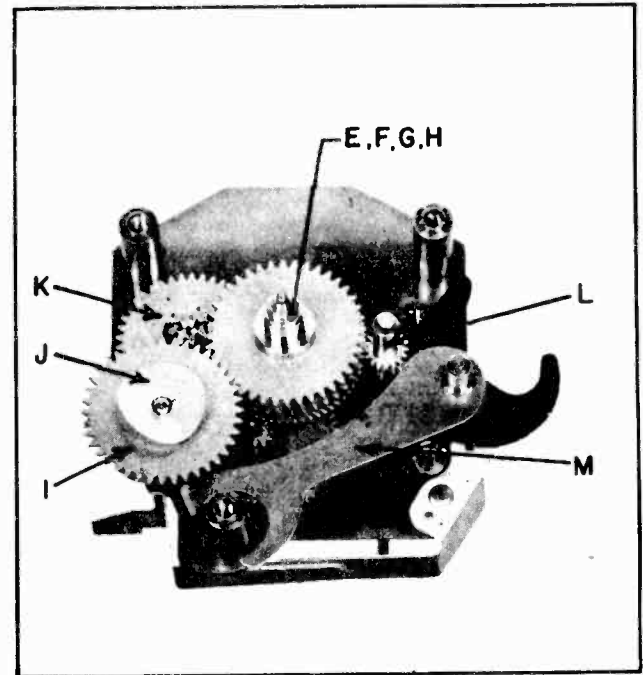
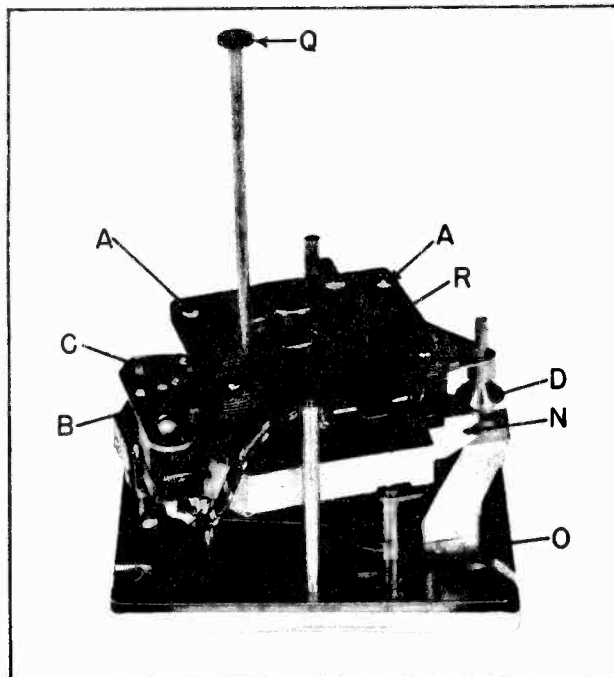


Fig. 6. Clock Part Identification

MODEL 50

GENERAL ELECTRIC CO.

ELECTRICAL RATING (INPUT):

Voltage 105-125 volts, a-c
 Frequency 60 cycles
 Wattage 30 watts

TUNING FREQUENCY (RADIO):

Broadcast Band 540-1600 kc

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

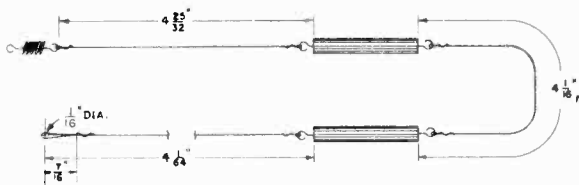


Fig. 2. Drive Cord Assembly

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 1/8-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 1/2-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.

RADIO REPLACEMENT PARTS LIST—MODEL 50

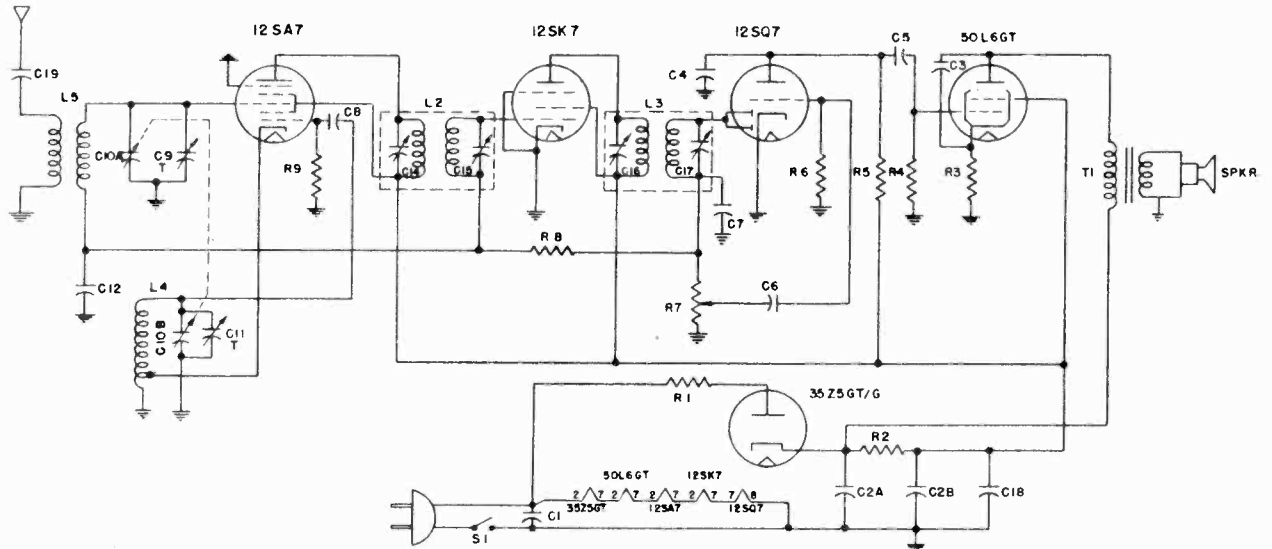
CAT. NO.	SYMBOL	DESCRIPTION	CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E RADIO REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS		
UCC-039	C8	CAPACITOR - 0.005 mfd., 600 v., paper	RAU-009		CABINET—Plastic cabinet
UCC-045	C2, 3	CAPACITOR 0.05 mfd., 600 v., paper	RCC-039	C9	CAPACITOR—0.005 mfd., 600 v., paper
UCG-543	C6	CAPACITOR 430 mmf., silver mica	RCC-041	C10	CAPACITOR—0.02 mfd., 600 v., paper
UCU-512	C1	CAPACITOR 22 mmf., mica	RCC-045	C14	CAPACITOR—0.05 mfd., 600 v., paper
UCU-532	C16	CAPACITOR 150 mmf., mica	RCE-031	C11A, B, C	CAPACITOR—40 mfd., 150 v.; 30 mfd., 150 v.; 20 mfd., 25 v.; electrolytic
UCU-536	C7, 15	CAPACITOR 220 mmf., mica	RCY-007	C4	TRIMMER—140-175 mmf., antenna trimmer
UIC-001		CEMENT Speaker cement	RCY-008	C5	TRIMMER—270-375 mmf., r-f trimmer
UOP-405	SP1	LOUDSPEAKER 4-inch PM speaker	RDC-015		CORD—Tuning drive cord (bulk)
UOX-009		CONE Speaker replacement cone	RDK-028		KNOB—Volume or tuning knob
URD-015	R1	RESISTOR 39 ohms, 1/2 w., carbon	REI-004		CORE—Powdered iron tuning core
URD-020	R8	RESISTOR 150 ohms, 1/2 w., carbon	RHJ-001		ASSEMBLY—Tuning shaft assembly and spacer
URD-033	R13	RESISTOR 220 ohms, 1/2 w., carbon	RIT-005		COVER—Electrolytic cardboard cover (inner and outer)
URD-089	R3	RESISTOR 47,000 ohms, 1/2 w., carbon	RJS-003		SOCKET—Tube socket
URD-097	R10	RESISTOR 100,000 ohms, 1/2 w., carbon	RLA-005	L1, 2	COIL—Antenna or R-F coil
URD-113	R7, 12	RESISTOR 470,000 ohms, 1/2 w., carbon	RMB-003		BUSHING—Drive shaft bushing
URD-121	R6	RESISTOR 1.0 megohms, 1/2 w., carbon	RMS-034		SPRING—Drive cord tension spring
URD-129	R2	RESISTOR 2.2 megohms, 1/2 w., carbon	RMX-006		PULLEY—Drive pulley
URD-145	R5	RESISTOR 10.0 megohms, 1/2 w., carbon	RRW-003	R14	RESISTOR—22 ohms, 1 w., wirewound
URE-057	R9	RESISTOR 2,200 ohms, 1 w., carbon	RRW-008	R11	RESISTOR—18 ohms, 1 w., glassohm W.W.
			RWL-009		CORD—Power cord
			RZC-001		CLOCK—Clock assembly
RAB-016		COVER Cabinet back cover			

CLOCK REPLACEMENT PARTS LIST—MODEL 50

CAT. NO.	SYMBOL	DESCRIPTION	CAT. NO.	SYMBOL	DESCRIPTION
MISCELLANEOUS			CLOCK MOVEMENT		
XC34X110	O	Frontplate Assembly	XC64X1-2-3		Frontplate Screw
XC11X8	D	Alarm Set Shaft Assembly	XC40X202	J	Spreader Post
XC10X115	L	Time Set Gear and Shaft Assembly	XC40X252	A	Cam Gear Spring Washer
XC40X73	C	Switch Shaft Assembly	XC1X1		Field Screws, No. 4-40 x 1 1/8 in. R.H.
XC53X83		Inner Bezel 2 1/4 in. Square—Lacquer	XC1X2		No. 1204 Lockwasher
XC58X15		Crystal—2 1/4 in. Square	XC1X6		Screw No. 4-40 x 3/8 in. R.H.
XC60X707		Dial	XC1X43		Hex Nut
XC32X129		Hands—Gold	XC40X261		Time Set Shaft Spacer
XC55X3		Alarm Dial	XC40X262		Time Set Shaft Spacer (at front plate)
XC3X49	Q	Time Set Shaft Knob—Bronze	XC35X39		Baseplate Assembly
XC4X5		Alarm Set Knob—Ivory	XC14X15	G	Minute Gear Sleeve Assembly
XC40X74		Switch Knob—Ivory	XC13X11	F	Hour Gear Sleeve Assembly
XC31X26		Sweep Second Hand—Gold	XC15X3	E	Alarm Gear Sleeve Assembly
			XC40X77	K	Alarm Set Gear Assembly
			XC17X8	I	Alarm Gear Shaft Assembly
			XC40X78	M	Switch Cam Lever Assembly
			XC16X14	H	Sweep Second Gear Shaft Assembly
			XC40X13		Rivet—Vibrator
XC40X260		Spacer—Switch Shaft	XC40X263		Alarm Shut-off Spacer
XC44X38		Rotor Unit—60 Cycle	XC40X76	B	Switch Assembly
XC45X69	R	Field Coil Assembly—60 Cycle	XC40X79		Upper Contact Spring Assembly
			XC40X80		Lower Contact Spring and Tip Assembly

GENERAL ELECTRIC CO.

MODELS YRB60-1
YRB60-2



Tuning Frequency Range: 540-1725 kc
Intermediate Frequency: 455 kc
LOUDSPEAKER "ALNICO V" MAGNET DYNAMIC
 Outside Cone Diameter 4 in.
 Voice Coil Impedance (400 cycles) 3.5 ohm

ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES

I.F. 455 kc
 R.F. 1725 and 1500 kc
 The location of all trimmers is shown in Fig. 1.

I.F. ALIGNMENT

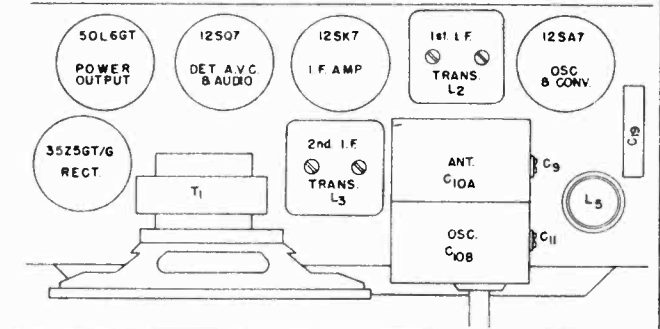
Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 kc and keep the oscillator output as low as a readable meter reading will permit. Apply signal to the converter grid through a .05 mfd capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. ALIGNMENT

Apply the R.F. alignment signals through a standard I.R.E. dummy antenna to the receiver antenna post. With the gang condenser wide open, align the oscillator trimmer (C11) to 1725 kc. Change the generator signal to 1500 kc, tune the receiver to the signal and peak antenna trimmer (C9) for maximum output.

PRECAUTION

If the signal generator is a-c operated, use an isolating transformer between the power supply and the 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.



Cat. No.	Symbol	Description
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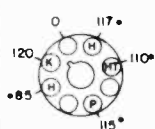
UNIVERSAL G-E REPLACEMENT PARTS

UCC-039	C6, C19	Capacitor—.005 mfd paper
UCC-040	C5, C13	Capacitor—.01 mfd paper
UCC-041	C3	Capacitor—.02 mfd paper
UCC-045	C1, C12, C18	Capacitor—.05 mfd paper
UCU-1020	C8	Capacitor—47 mmfd mica
UCU-1040	C4, C7	Capacitor—330 mmfd mica
URD-029	R3	Resistor—150 ohm 1/2 watt carbon
URD-041	R11	Resistor—470 ohm 1/2 watt carbon
URD-081	R9	Resistor—22,000 ohm 1/2 watt carbon
URD-105	R5	Resistor—220,000 ohm 1/2 watt carbon
URD-113	R4	Resistor—470,000 ohm 1/2 watt carbon
URD-129	R8	Resistor—2.2 megohm 1/2 watt carbon
URD-145	R6	Resistor—10 megohm 1/2 watt carbon
URE-007	R1	Resistor—18 ohm 1 watt carbon
URF-053	R3	Resistor—1500 ohm 2 watt carbon

SPECIALIZED G-E REPLACEMENT PARTS

SAB-009		Back cover for cabinet
SAU-011		Cabinet, Model YRB 60-1
SAU-012		Cabinet, Model YRB 60-2
SCE-003	C2A, C2B	Capacitor—electrolytic filter, 40-40 mfd 150 volts
SCT-003	C10A, C10B	Capacitor—tuning
SDK-005		Knob—tuning, Model YRB 60-1
SDK-006		Knob—tuning, Model YRB 60-2
SDK-007		Knob—volume control, Model YRB 60-1
SDK-008		Knob—volume control, Model YRB 60-2
SDX-002		Grille and dial, Model YRB 60-1
SDX-003		Grille and dial, Model YRB 60-2
SJS-002		Socket, octal tube
SJA-001		Antenna coil
SIC-002		Oscillator coil
SMC-003		Fasteners, speed clip for fastening grille
SMF-003		Fasteners, for fastening cabinet back cover
SOP-001		Speaker, 4 in. PM dynamic
SRC-004		Volume control, 0.5 megohm, with power switch
STL-003		Transformer, 1st I.F.
STL-004		Transformer, 2nd I.F.
SWL-001		Power cord

35Z5GT/G



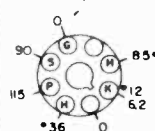
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

● INDICATES A.C. VOLTS
 A.C. LINE 117 VOLTS
 NO SIGNAL INPUT

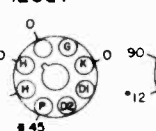
ALL VOLTAGES MEASURED WITH 1000 OHM/VOLT METER

* MEASURED ON 300 V SCALE

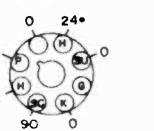
50L6GT



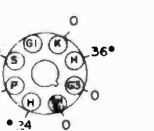
12SQ7



12SK7

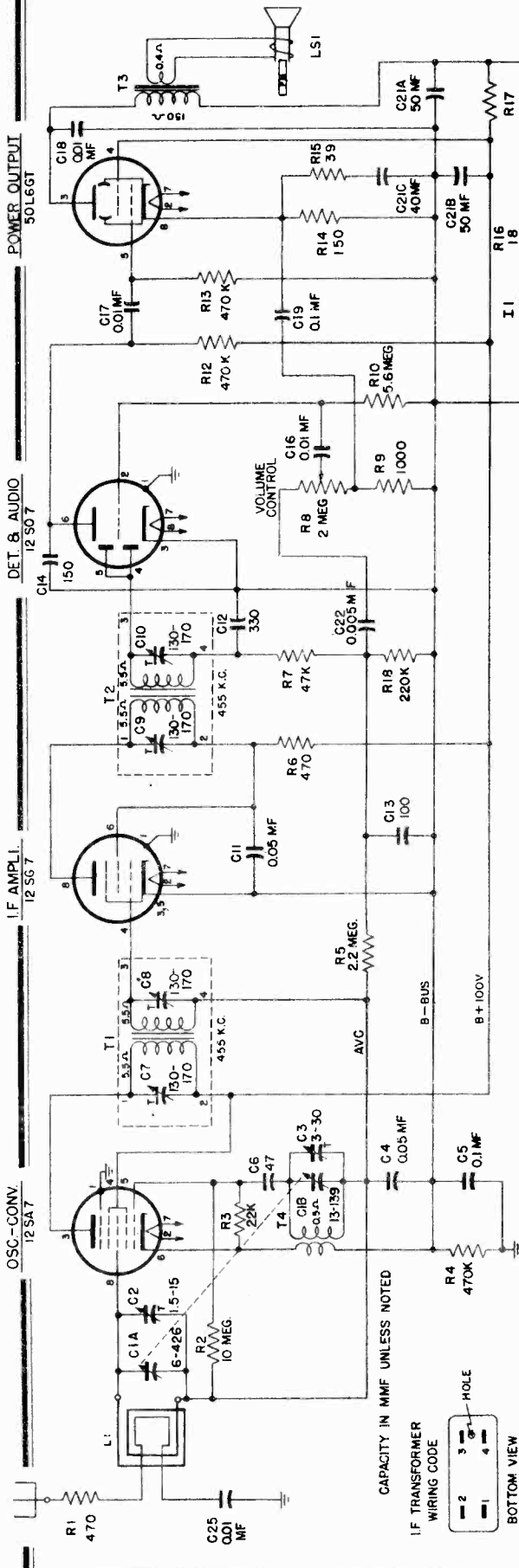


12SA7



GENERAL ELECTRIC CO.

MODELS 100,101,103,105
Under Serial No.5000



OSC-CONV 12 SA 7
I.F. AMPLI 12 SG 7
DET. & AUDIO 12 SO 7
POWER OUTPUT 50 L6 GT

SPECIALIZED G-E REPLACEMENT PARTS (CONTD)

PART NO.	SYMBOL	DESCRIPTION
RCU-112	C13	CAPACITOR—100 mmf., 500 v., mica
RCU-113	C14	CAPACITOR—150 mmf., 500 v., mica
RDC-001	C12	ASSEMBLY—Dial drive cord
RDD-001		DRUM—Dial drive drum
RDE-001		ESCUTCHEON—Dial scale escutcheon (Models 103, 105)
RDF-001		WASHER—Felt washer for controls (Model 101)
RDF-003		WASHER—Felt washer for controls (Models 100, 103, 105)
RDK-001		KNOB—Control knob (Model 101)
RDK-004		KNOB—Control knob (Models 103, 105)
RDK-006		KNOB—Control knob (Model 100)
RDP-002		POINTER—Dial scale pointer
RDS-001		SCALE—Dial scale (Models 100, 101)
RDS-002		SCALE—Dial scale (Models 103, 105)
RDX-001		ASSEMBLY—Dial scale back plate assembly
RHG-001		GRONMET—Tuning capacitor mounting
RHM-001		RING—Pointer shaft retainer ring
RHM-002		CLIP—Speaker mounting clip
RHM-004		CLIP—Dial scale mounting clip (Models 100, 101)
RHM-005		CLIP—Dial scale mounting clip (Models 103, 105)
RHU-001		SPACER—Scale back plate spacer
RHU-002		SPACER—Tuning capacitor mounting spacer
RLC-001	T4	COIL—Loop antenna coil
RLM-001	L1	BEAM—SCOPE Loop antenna assembly
RMS-001		SHIELD—Tube shield
RMU-001		SPRING—Drive cord tension spring
ROP-005	LS1	SHAFT—Tuning control shaft
RRC-002		LOUSPEAKER—5 1/4-inch permanent magnet net
RTL-001	R8, S1	VOLUME CONTROL—2.0 megohm potentiometer (includes power switch)
RTL-002	T1	TRANSFORMER—1st I-I transformer
RTO-001	T2	TRANSFORMER—1st I-I transformer
RTR-001	T3	TRANSFORMER—Output transformer
RTR-003		SOCKET—Pilot lamp socket
RTR-004		SOCKET—Octal base tube socket
RWL-001	PI	SOCKET—Electrolytic capacitor mounting socket
		CORD—Power cord and plug

UNIVERSAL G-E REPLACEMENT PARTS

UCC-013	C19	CAPACITOR—0.1 mfd., 200 v., paper
UCC-019	C22	CAPACITOR—0.005 mfd., 600 v., paper
UCC-040	C25	CAPACITOR—0.01 mfd., 600 v., paper
UCC-045	C4, 11	CAPACITOR—0.05 mfd., 600 v., paper
UCC-048	C5	CAPACITOR—0.1 mfd., 600 v., paper
UCL-018	I1	PILOT LAMP—115 v., 10 watt, candelabra base
URD-015	R15	RESISTOR—39 ohms, 1/2 w., carbon
URD-029	R14	RESISTOR—50 ohms, 1/2 w., carbon
URD-040	R6	RESISTOR—1,000 ohms, 1/2 w., carbon
URD-040	R3	RESISTOR—22,000 ohms, 1/2 w., carbon
URD-080	R7	RESISTOR—47,000 ohms, 1/2 w., carbon
URD-105	R18	RESISTOR—220,000 ohms, 1/2 w., carbon
URD-113	R4, 12, 13	RESISTOR—470,000 ohms, 1/2 w., carbon
URD-129	R5	RESISTOR—2.2 megohms, 1/2 w., carbon
URD-139	R10	RESISTOR—5.6 megohms, 1/2 w., carbon
URD-145	R2	RESISTOR—10 megohms, 1/2 w., carbon
URE-007	R16	RESISTOR—18 ohms, 1 w., carbon
URF-051	R17	RESISTOR—1260 ohms, 2 w., carbon

SPECIALIZED G-E REPLACEMENT PARTS

RAB-001		BACK—Cabinet Back Cover (Models 103, 105)
RAB-002		BACK—Cabinet Back Cover, white (Model 101)
RAB-003		BACK—Cabinet Back Cover, brown (Model 100)
RAD-001		BRACKET—Antenna Bracket, right rear
RAD-002		BRACKET—Antenna Bracket, left rear
RAU-002		CABINET—Brown Plastic, with grille assembly (Model 100)
RAU-003		CABINET—Ivory Plastic, with grille assembly (Model 101)
RAX-001		ASSEMBLY—1st rear pulley assembly
RCC-040	C16, 17, 18	CAPACITOR—0.01 mfd., 600 v., paper
RCC-045	C20	CAPACITOR—0.05 mfd., 600 v., paper
RCE-001	C21A, 21B, C24	CAPACITOR—50 mfd., 150 v., 50 mfd., 150 v., electrolytic
RCT-001	C14, C1B	CAPACITOR—Tuning capacitor assembly
RCU-110	C6	CAPACITOR—47 mmf., 500 v., mica

SPECIFICATIONS

CABINET:

Model	Material	Color	Height	Width	Depth
100	Plastic	Brown	7 1/2"	12"	7 1/2"
101	Plastic	Ivory	7 1/2"	12"	7 1/2"
103	Wood	Maple	8 1/4"	13"	7 15/16"
105	Wood	Wood	8 1/4"	13"	7 15/16"

ELECTRICAL RATING (INPUT)

Voltage	105-125 volts a-c or d-c
Frequency on a-c	25 to 60 cycles
Wattage	40 watts

OPERATING FREQUENCIES

Broadcast Band	540-1600 kilocycles
I-F Amplifier	455 kilocycles

POWER OUTPUT (117 VOLTS LINE)

Undistorted	1.25 watts
Maximum	2.0 watts

LOUSPEAKER

Type	Alnico P.M.
Outside Cone Diameter	5 1/4 in.
Voice Coil Impedance (400 cycles)	3.5 ohms

GENERAL ELECTRIC CO.

MODELS 100,101,103,105
Above Serial No.5000

PRODUCTION CHANGES WERE MADE ON ALL MODELS 100,101,103,AND 105, HAVING SERIAL NUMBERS 5000 AND OVER. THE SERVICING DATA ON THE PRECEDING PAGES APPLY TO THE REVISED MODELS WITH THE FOLLOWING EXCEPTIONS:

(ELECTRICAL CIRCUIT ALIGNMENT)—Under the paragraph PROCEDURE—GENERAL the third sentence should read "If it doesn't, remove chassis and slip pointer on shaft until the pointer is under reference mark when chassis is bolted in place."

For receivers equipped with the Beam-A-Scope which forms a part of the back cover (Part Nos.RLL-009 and RLL-010), paragraph 4 should be changed to read, "Chassis must be removed from cabinet during i-f alignment. For r-f alignment, bolt chassis in cabinet securely; r-f and oscillator trimmers are then available through the hole in the back cover assembly".

(SCHEMATIC DIAGRAM)—A corrected schematic is printed below. Changes were made as follows:

- (1) C18 connects between the output plate and screen instead of between plate and ground.
- (2) The plate and screen filter (C11, R6) is moved

from the IF amplifier circuit to the converter plate and screen circuit.

(3) The filament connections (Pins 2 and 7) to the 12SA7 converter tube are interchanged.

(4) The 10-megohm resistor, R2, is removed.

(Fig.4, Socket Voltages) At 12SA7 socket, pins 3 and 4 should be changed to read +92. At 12SG7 socket, pins 6 and 8 should be changed to read +97 volts.

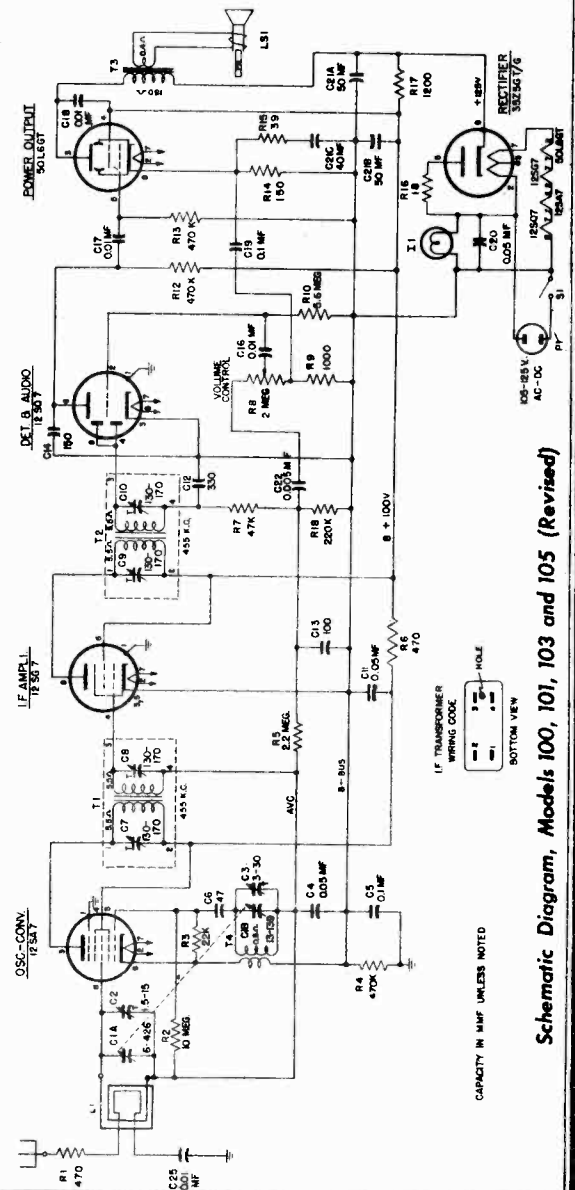
(REPLACEMENT PARTS LIST)—Part Number UCC-013, Symbol C19, becomes Part Number RCC-013. Stock numbers RTS-001, RTS-003, and RTS-004 should be changed to read: RJS-001, RJS-003, and RJS-004, respectively.

(Parts List). Part No.RCE-001 changed to RCE-027. Delete Part Nos.RDF-001,RDF-003,RDX-001, and RMM-001. Part No.RWL-001 changed to RWL-004.Add Part No.RIT-006, Electrolytic cardboard cover.Add Part No.RLL-009,Beam-A-Scope loop ant. and back cover assembly,Models 103,105. Add Part No.RLL-010,Beam-A-Scope loop ant. and back cover assembly,Models 100, 101.Change Part No.ROP-005 to read Part No.UOP-525.

Beam-A-Scope Change. Two different type loop antenna assemblies were used uri Beam-A-Scope Change.--Two different type loop antenna assemblies were used during production. Part No.RLL-001 is secured to the chassis by two metal brackets and needs a separate cabinet back cover. The other type Beam-A-Scope is identified as it is a part of the back cover assembly. This new assembly is stocked as Part No. RLL-009 for Models 103 and 105, and as Part No.RLL-010 for Models 100 and 101.

The Beam-A-Scopes are electrically interchangeable. The loop(RLL-009,RLL-010), which is a part of the back cover can be used without alteration to replace Part No.RLL-001. Part No. RLL-001 may replace Part No.RLL-009 or RLL-010,provided that brackets (Part No.RAD-001 and RAD-002) are added to the chassis to mount the new loop. When connecting the Beam-A-Scopes into the circuit, the inner turn of Part Nos.RLL-009 and RLL-010 must be connected to the converter Grid(pin 8);while on Part No.RLL-001 loop, the turn nearest the back cover connects to the converter grid (pin 8).

REMOVAL OF PILOT LIGHT: In some cases, the glyptal cement used between the pilot light base and socket prevents removal of the light. Repeated applications of acetone or nail-polish remover between the lamp and socket will soften cement sufficiently to permit removal.



Schematic Diagram, Models 100, 101, 103 and 105 (Revised)

TUBE COMPLEMENT

Oscillator-Converter..... Type 12SA7
 I. F. Amplifier..... Type 12SG7
 Detector-Audio..... Type 12SQ7
 Power Output..... Type 50L6GT
 Rectifier..... Type 35Z5GT/G
 Pilot Lamp..... G-E, Type C7, 115-volt, 10-watt, clear, candelabra screw base

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F..... 1500 kilocycles
 I-F..... 455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-C output meter, 1 1/2 volts full scale
3. 0.05 mf. paper capacitor
4. 50 mmf. mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL 1. Turn dial scale pointer as far counter-clockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer drum on cord until pointer is under reference mark when chassis is bolted in place.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.

3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.

4. The chassis must be removed from the cabinet during I-F alignment. For R-F alignment bolt the chassis in the cabinet securely, the rf and osc. trimmers are then available through the hole in the Beam-a-scope assembly when the back cover is removed.

5. Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect test oscillator to	Test osc. setting	Pointer setting on radio	Adjustment for maximum output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1,500 kc	2nd I-F Trans. Trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1,500 kc	1st and 2nd I-F Trans. Trimmers
3	Ant. Post in series with 50 mmf.	1,500 kc	1,500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf.	1,500 kc	1,500 kc	C2 (R-F)

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 12SA7 grid..... 4 @ 1000 kc
 12SA7 grid to 12SG7 grid..... 30 @ 455 kc
 12SG7 grid to 12SQ7 diode plate..... 150 @ 455 kc
- (2) Audio Gain.
 0.06 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately 1/2-watt output across speaker voice coil.
- (3) Oscillator Grid Bias.
 D-C voltage developed across the oscillator grid leak (R3). Averages 7.7 volts at 1000 kc.
- (4) Socket Pin Voltages.
 Figure 4 shows voltages from all tube pins to B- unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes

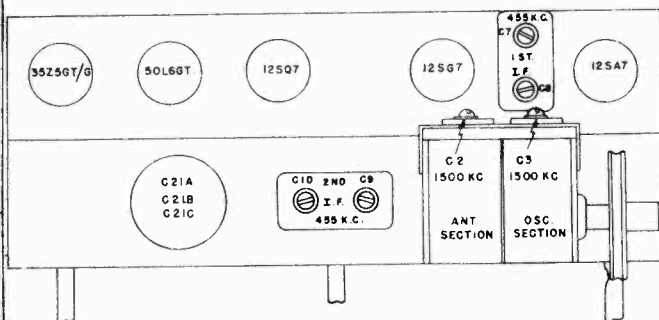


Fig. 1. Tube and Trimmer Location

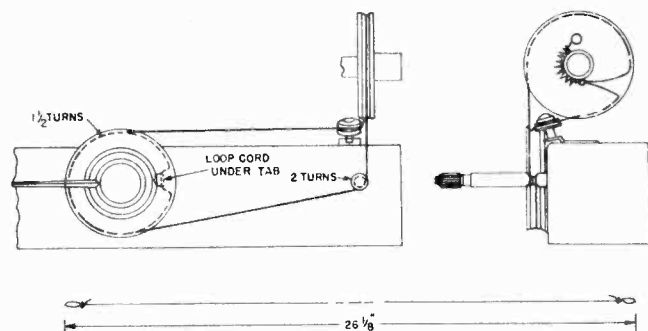


Fig. 2. Dial Stringing Diagram

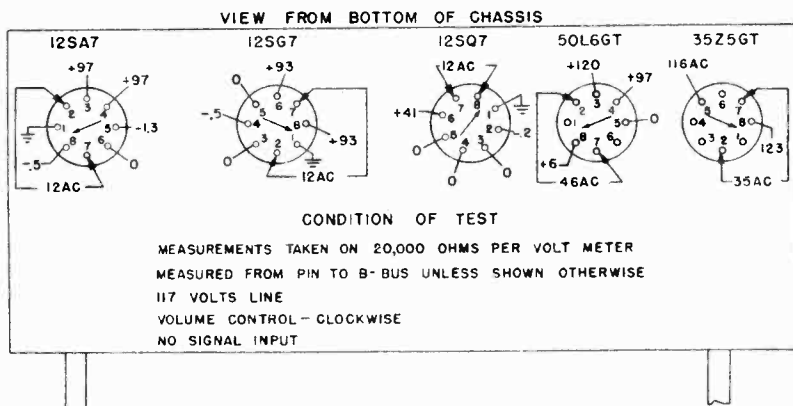
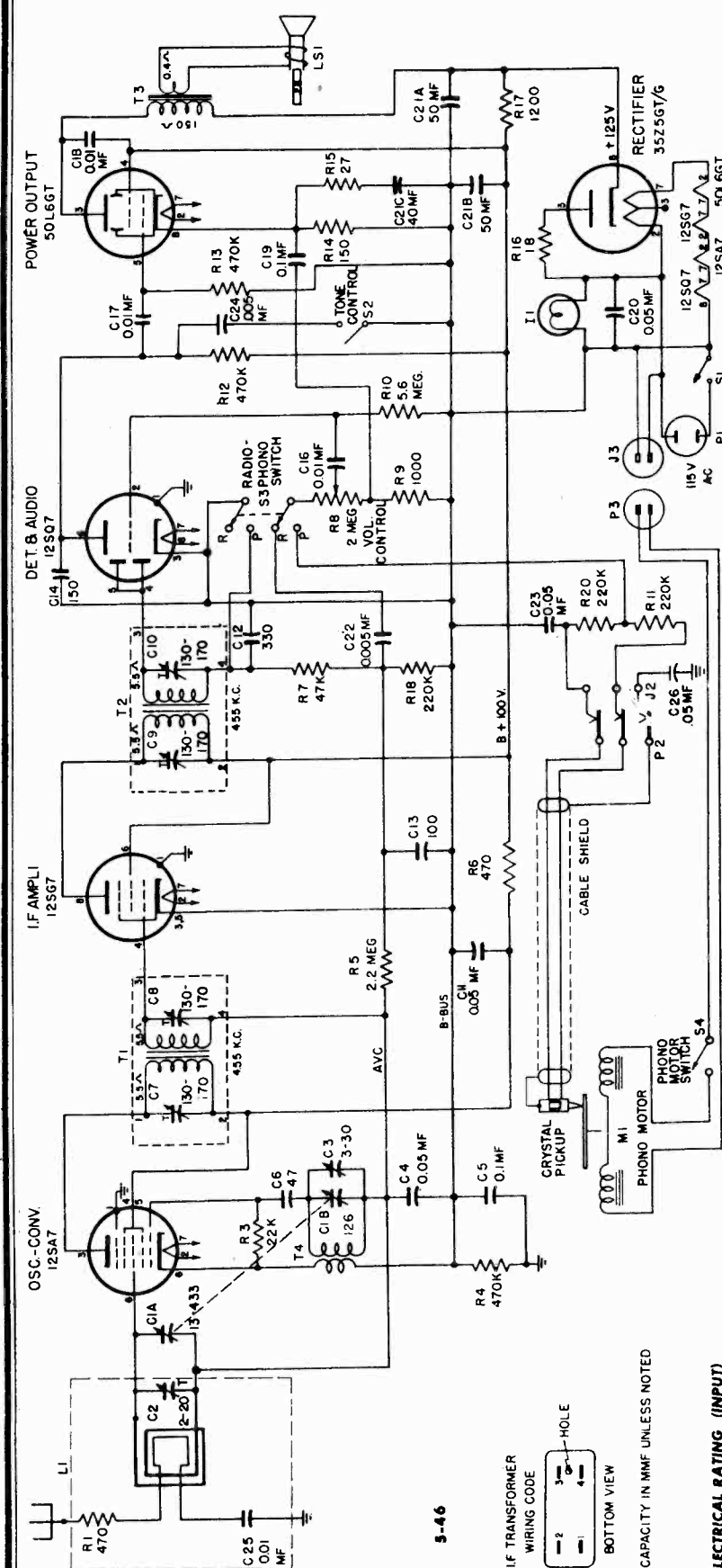
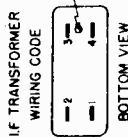


Fig. 4. Socket Voltages

GENERAL ELECTRIC CO.



5-46



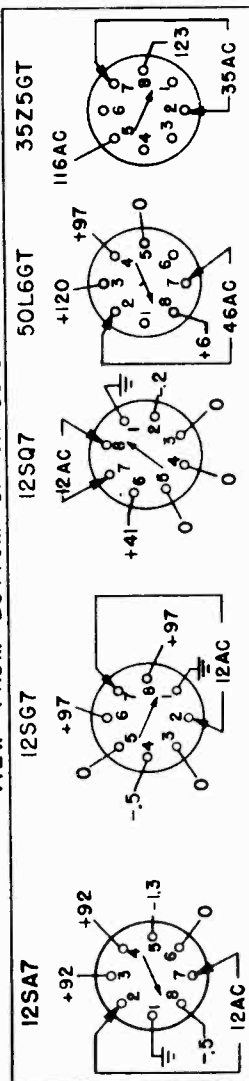
CAPACITY IN MMF UNLESS NOTED

ELECTRICAL RATING (INPUT)

Voltage	105-125 volts a-c
Frequency	60 cycles
Wattage (Including Phonograph)	55 watts

Operating Frequencies	540-1600 kilocycles
Broadcast Band	545 kilocycles
I-F Amplifier	

VIEW FROM BOTTOM OF CHASSIS



CONDITION OF TEST

MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT METER
 MEASURED FROM PIN TO B-BUS UNLESS SHOWN OTHERWISE
 I17 VOLTS LINE
 VOLUME CONTROL - CLOCKWISE
 NO SIGNAL INPUT

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 taken with low signal input so that AVC is not effective.

- (1) R-f Stage Gains.
 Antenna post to 12SA7 grid 4 @ 1000 kc
 12SA7 grid to 12SQ7 grid 30 @ 455 kc
 12SQ7 grid to 12SQ7 diode plate 150 @ 455 kc
- (2) Audio Gain.
 0.06 volts at 400 cycles across volume control (R8) with control set at maximum will give approximately 1/2 watt output across speaker voice coil.
- (3) Oscillator Grid Bias.
 D-c voltage developed across the oscillator grid leak (R3) averages 7.7 volts at 1000 kc.
- (4) Socket Pin Voltages.
 Fig. 4 shows voltages from all tube pins to B—unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

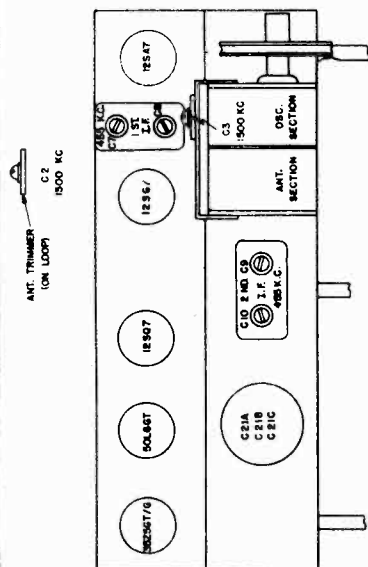


Fig. 1. Tube and Trimmer Location

ELECTRICAL CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-c output meter, 1 1/2 volts, full scale
3. 0.05 mf paper capacitor
4. 50 mmf mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL 1. Turn dial scale pointer as far counterclockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer on drum until pointer is under reference mark when chassis is bolted in place.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.
3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/2 volts.
4. The chassis must be removed from the cabinet during i-f alignment. For r-f alignment, bolt the chassis in the cabinet securely. The r-f trimmer is then available through the hole in the Beam-a-Scope assembly (back cover). The Osc. Trimmer can be reached when the back cover is tilted back.
5. Connect the capacitor as listed in column 2 between the output "High Side" of test oscillator and the point of input specified.

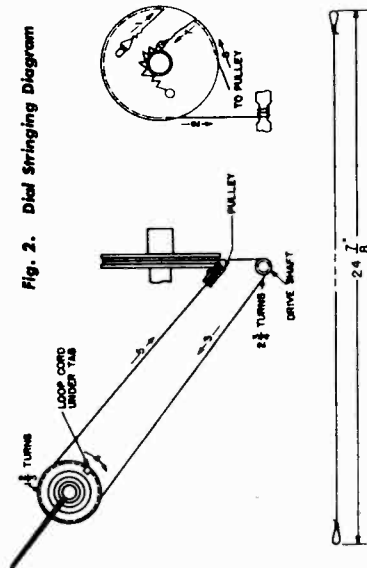
ALIGNMENT CHART

Step	Connect test oscillator to	Test osc setting	Pointer setting on radio	Adjustment for maximum output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	2nd I-F Trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	1st and 2nd I-F Trimmers
3	Ant. Post in series with 50 mmf.	1500 kc	1500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf.	1500 kc	1500 kc	C2 (R-F)

SPECIALIZED G-E REPLACEMENT PARTS (CONT'D)

PART NO.	SYMBOL	DESCRIPTION
RDF-002		WASHER—Felt Washer for Control Knob
RDK-002		KNOB—Radio-phonograph Knob
RDK-003		KNOB—Volume Control Knob
RDK-005		KNOB—Tone Switch Water Knob
RDE-001		SPINNER—Dial Scale Pointer
RDE-002		SPINNER—Dial Scale Pointer
RDE-003		SPINNER—Dial Scale Pointer
RHC-003		PIN—Hairpin Cotter (Fan)
RHC-004		PIN—Hairpin Cotter (Spindle)
RHG-001		GROMMET—Tuning Capacitor Mounting
RHM-001		RING—Pointer Shaft Retaining Ring
RHM-006		CLIP—Speed Clip (Motor Board)
RHQ-001		TIRE—Rubber Tire (Phono-motor Idler)
RHU-001		SPACER—Scale Back Plate Spacer
RHU-002		SPACER—Tuning Capacitor Mounting
RIT-001		COVER—Electrolytic Capacitor
RJP-003		PLUG—Phono Power Plug
RJS-002		SOCKET—Pilot Light Socket
RJS-003		SOCKET—Octal Tube Socket
RJS-004		Socket—Electrolytic Capacitor Mounting
RJS-049		Socket—Phono Power Socket
RJX-005		PLUG AND SOCKET—Phono Plug and Socket
RLC-018		Socket—Oscillator Coil Assembly
RLM-008		SHIELD—Spring Loop Antenna Assembly
RMS-006		SPRING—Idle Wheel Spring
RMT-001		TURNABLE—9-inch diameter Turntable
RMU-002		SHAFT—Tuning Shaft
RMW-005		WHEEL—Turntable Spindle (with Rubber Gasket)
ROP-006		LOUDSPEAKER—6 1/2-inch Permanent Magnet
RPC-014		PICK UP—Crystal Cartridge Pick-up
RPA-012		PICK UP—Phono-motor Pick-up
RRC-001		VOLUME CONTROL—20 ohm Potentiometer (includes 20 ohm switch)
RSS-001		SWITCH—Phono Motor Switch
RSX-001		ASSEMBLY—Phono-motor Switch Assembly
RSX-002		ASSEMBLY—Phono-switch Arm Assembly
RSW-001		SWITCH—Phono radio Switch
RSW-002		SWITCH—Tone Control Switch
RTL-001		TRANSFORMER—1st I-f Transformer
RTL-002		TRANSFORMER—2nd I-f Transformer
RTO-001		TRANSFORMER—Output Transformer
RWL-004		CORD—Power Cord and Plug

Fig. 2. Dial Stringing Diagram



UNIVERSAL G-E REPLACEMENT PARTS

PART NO.	SYMBOL	DESCRIPTION
UCC-039		CAPACITOR—0.005 mfd., 600 v., paper
UCC-040		CAPACITOR—0.01 mfd., 600 v., paper
UCC-045		CAPACITOR—0.05 mfd., 600 v., paper
UCC-048		CAPACITOR—0.1 mfd., 600 v., paper
UDL-018		PILOT LAMP—115 v., 10 watt, candelabra base
UIC-001		CEMENT—Thermoplastic Cement
UP-015		RESISTOR—27 ohms, 1/2 w., carbon
URD-015		RESISTOR—27 ohms, 1/2 w., carbon
URD-029		RESISTOR—470 ohms, 1/2 w., carbon
URD-041		RESISTOR—470 ohms, 1/2 w., carbon
URD-049		RESISTOR—1000 ohms, 1/2 w., carbon
URD-081		RESISTOR—22,000 ohms, 1/2 w., carbon
URD-089		RESISTOR—47,000 ohms, 1/2 w., carbon
URD-105		RESISTOR—220,000 ohms, 1/2 w., carbon
URD-113		RESISTOR—470,000 ohms, 1/2 w., carbon
URD-12, 13		RESISTOR—2.2 megohms, 1/2 w., carbon
URD-139		RESISTOR—5.6 megohms, 1/2 w., carbon
URE-007		RESISTOR—18 ohms, 1 w., carbon
URF-051		RESISTOR—1200 ohms, 2 w., carbon

SPECIALIZED G-E REPLACEMENT PARTS

PART NO.	SYMBOL	DESCRIPTION
RAA-002		ARM—Switch Arm
RAA-003		ARM—Tone Control Switch Arm
RAD-003		BRACKET—Top Bracket Support for Back Plate
RAD-004		BRACKET—Bottom Bracket Support for Back Plate
RAX-003		ASSEMBLY—Idle Pulley Assembly
RAX-003		BRACKET ASSEMBLY—Dial Drum Support
RBI-001	M1	ASSEMBLY—Phono-motor Assembly
RBK-004		ARMATURE—Motor Armature
RBX-001		ASSEMBLY—Phono-motor, Drive Wheel, and Mounting Plate Assembly
RCC-013	C19	CAPACITOR—0.1 mfd., 200 v., paper
RCC-030	C24	CAPACITOR—0.005 mfd., 600 v., paper
RCC-045	C14, 17, 18	CAPACITOR—0.1 mfd., 600 v., paper
RCC-046	C20	CAPACITOR—0.5 mfd., 600 v., paper
RCE-001	C21A, 21B, 21C	CAPACITOR—50 mfd., 150 v., 50 mfd., 150 v., 40 mfd., 25 v. dry electrolytic
RCT-002	C1A, 1B, 3	CAPACITOR—Tuning Capacitor
RCU-110	C6	CAPACITOR—47 mmf., 500 v., mica
RCU-112	C13	CAPACITOR—100 mmf., 500 v., mica
RCU-113	C14	CAPACITOR—150 mmf., 500 v., mica
RCU-115	C12	CAPACITOR—330 mmf., 500 v., mica
RCY-005	C2	CAPACITOR—2.50 mmf. trimmer
RDC-002		CORD—Dial Drive Cord and Spring
RDE-002		DRUM—Dial Drive Drum
RDE-002		ESCUTCHEON—Dial Scale Escutcheon

Part No. RJX-005 should be changed to read RJX-007. Delete Part No. ROP-006. Add Part No. UOX-001, CONE-Replacement speaker cone.

POWER OUTPUT

Undistorted	1.25 watts
Maximum	2.0 watts

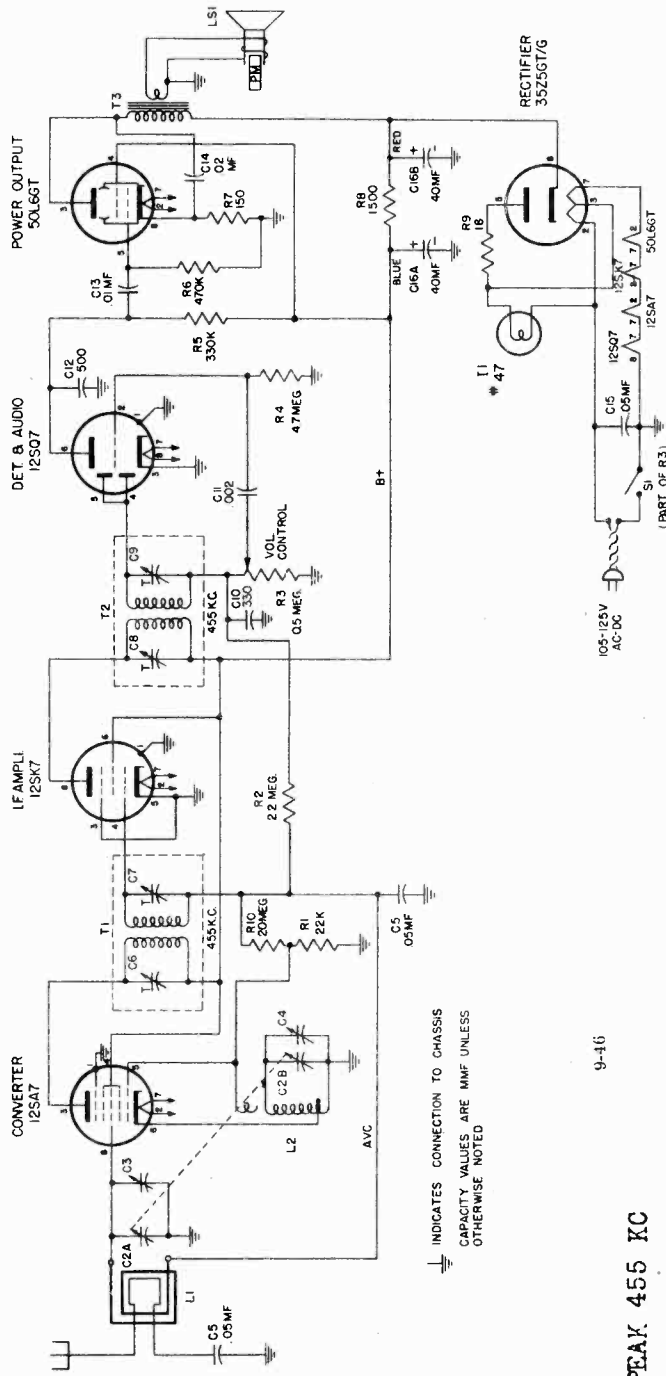
LOUDSPEAKER

Type	Alnico P.M.
Outside Cone Diameter	6 1/2 in.
Voice Coil Impedance (400 cycles)	3.5 ohms

PHONOGRAPH MECHANISM

Type	Manual
Pick-up	Crystal
Needle	Permanent Type
Turntable Speed	78 rpm

GENERAL ELECTRIC CO.



⊥ INDICATES CONNECTION TO CHASSIS
CAPACITY VALUES ARE MMF UNLESS
OTHERWISE NOTED

IF PEAK 455 KC

9-16

REPLACEMENT PARTS LIST

CAT. NO.	SYMBOL	DESCRIPTION	CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL REPLACEMENT PARTS					
UCC-019	C1, 11	CAPACITOR—0.002 mfd., 400 v., paper	RAU-015	C16a, b	CABINET—Ivory cabinet (Model 111)
UCC-025	C13	CAPACITOR—0.01 mfd., 400 v., paper	RCE-040	C2a, 2b	CAPACITOR—40 mfd., 40 mfd., 150 v., electrolytic
UCC-026	C14	CAPACITOR—0.02 mfd., 400 v., paper	RCT-017		CONDENSER—Variable tuning condenser
UCC-028	C5, 15	CAPACITOR—0.05 mfd., 400 v., paper	RDC-022		CORD—Drive cord and spring
UCU-1040	C10	CAPACITOR—330 mmf., mica	RDK-015		KNOB—Control knob (ivory)
UCU-2045	C12	CAPACITOR—510 mmf., mica	RDK-077		KNOB—Control knob (walnut)
UOP-407	LS1	LOUDSPEAKER—4-in. P.M. speaker	RDP-024		POINTER—Dial pointer
UOX-009		CONE—Replacement speaker cone	RDS-035		SCALE—Dial scale assembly
URD-029	R7	RESISTOR—150 ohms, 1/2 w., carbon	RDW-002		WINDOW—Celluloid dial window hardware
URD-081	R1	RESISTOR—22,000 ohms, 1/2 w., carbon	RHF-002		HARDWARE—Tuning condenser mounting
URD-109	R5	RESISTOR—330,000 ohms, 1/2 w., carbon	RJS-006		CLIP—Beam-a-scope and back cover clip
URD-129	R2	RESISTOR—2.2 meg., 1/2 w., carbon	RJS-061		SOCKET—Octal base socket
URD-137	R4	RESISTOR—4.7 meg., 1/2 w., carbon	RJS-061		SOCKET—Pilot lamp socket assembly
URD-153	R10	RESISTOR—20 meg., 1/2 w., carbon	RJC-031		COIL—Oscillator coil
URE-007	R9	RESISTOR—18 ohms, 1 w., carbon	RMS-054		SPRING—Drive cord spring
URF-053	R8	RESISTOR—1500 ohms, 2 w., carbon	RMX-054		SHAFT—Drive shaft assembly
SPECIALIZED REPLACEMENT PARTS					
RAB-043	L1	BEAM-A-SCOPE Back cover and beam-a-scope assembly	RRC-037	R3, S1	VOLUME CONTROL—0.5 meg. potentiometer and switch
RAU-014		CABINET—Walnut cabinet (Model 110)	RTL-035	T1	TRANSFORMER—1st IF transformer
			RTL-036	T2	TRANSFORMER—2nd IF transformer
			RTO-023	T3	TRANSFORMER—Output transformer
			RWL-004		CORD—Power cord assembly
SPECIALIZED REPLACEMENT PARTS (CONT'D)					
					CLIP—Beam-a-scope and back cover clip
					SOCKET—Octal base socket
					SOCKET—Pilot lamp socket assembly
					COIL—Oscillator coil
					SPRING—Drive cord spring
					SHAFT—Drive shaft assembly
					VOLUME CONTROL—0.5 meg. potentiometer and switch
					TRANSFORMER—1st IF transformer
					TRANSFORMER—2nd IF transformer
					TRANSFORMER—Output transformer
					CORD—Power cord assembly

MODELS 110,111

GENERAL ELECTRIC CO.

ELECTRICAL RATING:

Voltage 105-125 v. a-c or d-c
 Frequency on a-c 50/60 cycles
 Wattage 30 watts

OPERATING FREQUENCIES:

Broadcast Band 540-1600 kc
 I-F Amplifier 455 kc

POWER OUTPUT (120 VOLTS LINE):

Undistorted 0.8 watts
 Maximum 1.6 watts

LOUDSPEAKER:

Type Alnico P.M.
 Outside Cone Diameter 4 inches
 Voice Coil Impedance (400 cycles) 3.5 ohms

TUBE COMPLEMENT:

Oscillator-Converter Type 12SA7
 I-F Amplifier Type 12SK7
 Detector-Audio Type 12SQ7
 Power Output Type 50L6GT
 Rectifier Type 35Z5GT/G
 Pilot Lamp GE No. 47

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES:

R-F 1500 kilocycles
 I-F 455 kilocycles

EQUIPMENT REQUIRED:

1. Line isolation transformer.
2. A-c output meter, 1 1/2 volts full scale.
3. Test oscillator with tone modulation.
4. 0.05 mf. paper capacitor.
5. 50 mmf. mica capacitor.
6. Insulated screwdriver.

PROCEDURE—GENERAL. 1. Remove chassis from cabinet. Turn pointer as far counterclockwise as possible. The pointer should set horizontal. If it doesn't, remove the dial window and slip the pointer on its shaft until it is horizontal.

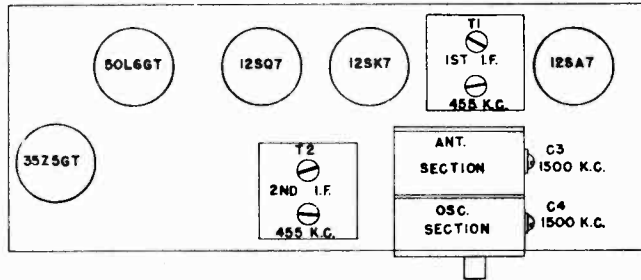


Fig. 2. Tube and Trimmer Location

2. Connect the line cord to the line through an isolation 1:1 ratio transformer.
3. Connect output meter across loudspeaker voice coil terminals.
4. Keep radio volume control at maximum and attenuate the test oscillator signal output so that the output meter reading never exceeds 1 volt.
5. For R-F alignment, the Beam-a-scope assembly should be connected and dressed in exactly the same location it would occupy if installed in the cabinet.
6. Connect the capacitor as listed in column 2, between the output "high side" of the test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Oscillator Setting	Pointer Setting on Radio	Adjustment for Maximum Output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	2nd I-F trans. trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	1st and 2nd I-F trans. trimmers
3	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C4 (osc.)
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C3 (R-F)

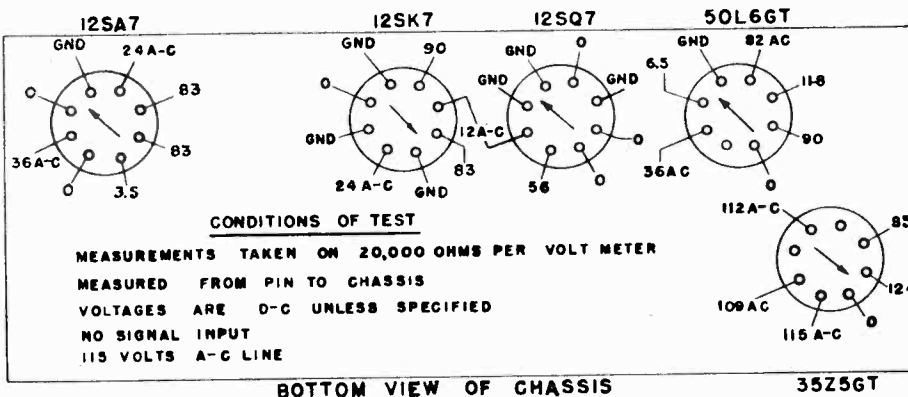


Fig. 1. Socket Voltages

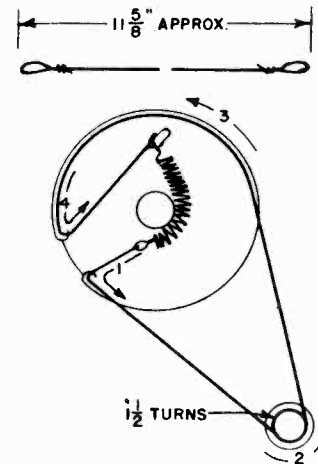


Fig. 3. Drive Stringing

GENERAL ELECTRIC CO.

MODELS XB-121, XM-121,
XR-121, XB-221, XM-221,
XR-221

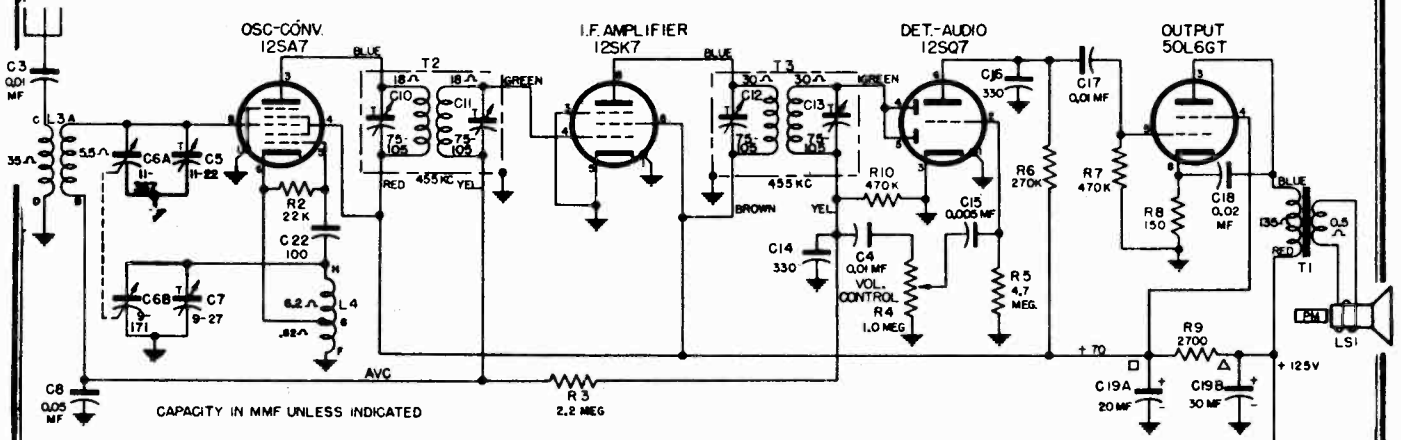


Fig. 2. Schematic Diagram—Model X121 Series

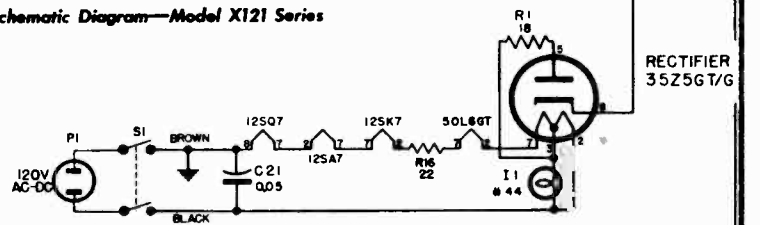


Fig. 3. Schematic Diagram—Model X221 Series

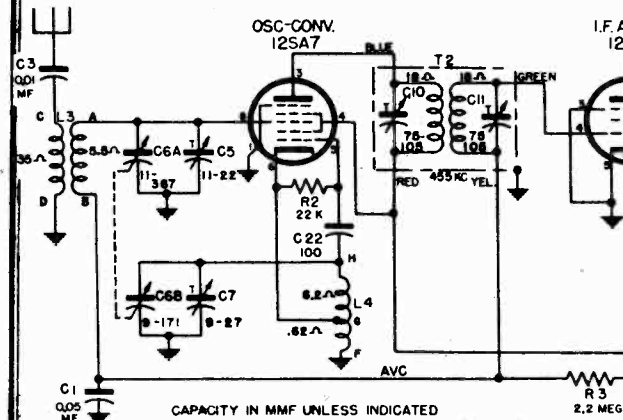
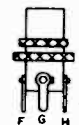
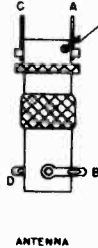


Fig. 4. Coil Terminal Wiring



OSCILLATOR COIL



ANTENNA COIL

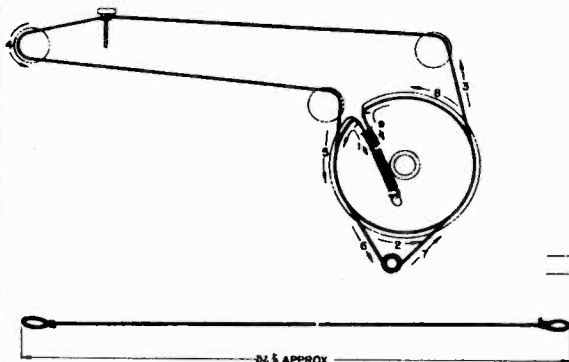


Fig. 5. Dial Stringing Diagram—Model X121 Series (Early Production)

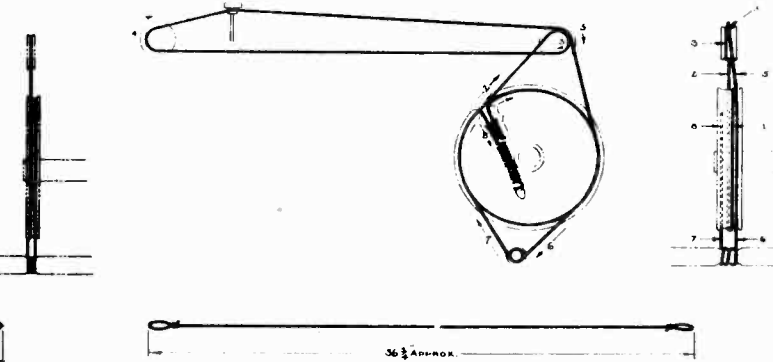


Fig. 6. Dial Stringing Diagram—All Models (Late Production)

MODELS XB-121, XM-121,
XR-121, XB-221, XM-221,
XR-221

GENERAL ELECTRIC CO.

SPECIFICATIONS

CABINET:

Model	Material	Color	Height	Width	Depth
XB121	Wood	Walnut	6 3/4	10 3/8	6 3/4
XM121	Plastic	Mahogany	6	9 1/4	5 7/16
XR121	Plastic	Maroon	6	9 1/4	5 7/16
XB221	Wood	Walnut	6 3/4	10 3/8	6 3/4
XM221	Plastic	Mahogany	6	9 1/4	5 7/16
XR221	Plastic	Maroon	6	9 1/4	5 7/16

ELECTRICAL RATING (INPUT):

D1 Voltage Rating (X121 series)..... 105-135 v. a-c or d-c
 D2 Voltage Rating (X221 series)..... 210-250 v. a-c or d-c
 Frequency on a-c..... 40-60 cycles
 Watts (X121 series)..... 30 watts
 Watts (X221 series)..... 60 watts

OPERATING FREQUENCIES:

Broadcast Band..... 550-1700 kc
 I-F Amplifier..... 455 kc

POWER OUTPUT:

(X121 Series—At 120 Volts Line)
 Undistorted..... 0.9 watts
 Maximum..... 1.4 watts
 (X221 Series—At 230 Volts Line)
 Undistorted..... 1.6 watts
 Maximum..... 2.5 watts

LOUDSPEAKER:

Type..... Alnico P.M.
 Outside Cone Diameter..... 4 inches
 Voice Coil Impedance (400 cycles)..... 3.5 ohms

TUBE COMPLEMENT:

Oscillator-Converter..... Type 12SA7
 I-F Amplifier..... Type 12SK7
 Detector-Audio Amplifier..... Type 12SQ7
 Power Output..... Type 50L6GT
 Rectifier..... Type 35Z5GT/G
 Pilot Lamp..... GE No. 44, 6-8 volt

ELECTRICAL CIRCUIT ALIGNMENT

CAUTION—ONE SIDE OF THE POWER LINE IS CONNECTED TO THE CHASSIS. AVOID ANY GROUND CONNECTIONS TO THE RADIO UNLESS AN ISOLATING TRANSFORMER IS USED IN THE POWER LINE.

ALIGNMENT FREQUENCIES:

R-F..... 1500 kc
 I-F..... 455 kc

EQUIPMENT REQUIRED:

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1 1/2 volts full scale.
3. 0.05 mf. paper capacitor.
4. 200 mmf. mica capacitor.
5. Insulated screwdriver.

PROCEDURE—GENERAL: 1. Turn the tuning knob to its extreme counterclockwise position. If the pointer does not coincide with the first marking at the left of the scale, slide it along the dial cord until it does.

2. Remove chassis from cabinet and connect output meter across speaker voice coil terminals. **NOTE:** For Models XB121 and XB221, use alignment strip in back of dial plate for pointer setting.
 3. Keep radio volume control set at maximum and attenu-

ate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.

4. Connect the capacitor, listed in column 2 of Alignment Chart, between the "high side" of the test oscillator and the point of input specified. The ground terminal of the test oscillator may be connected to the chassis, providing an isolating transformer is used between the radio and the line input.

ALIGNMENT CHART

Step	Connect test oscillator to	Test oscillator setting	Pointer setting on radio	Adjustment for maximum output
1.	12SK7 grid (pin 4) in series with 0.05 mf.	455 kc	1500 kc	C12 and C13 (2nd i-f trans. trimmers)
2.	12SA7 grid (pin 8) in series with 0.05 mf.	455 kc	1500 kc	C10 and C11 (1st i-f trans. trimmers)
3.	Ant. post in series with 200 mmf.	1500 kc	1500 kc	C7 (osc.) on gang condenser.
4.	Ant. post in series with 200 mmf.	1500 kc	1500 kc	C5 (ant.) on gang condenser.

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 12SA7 Grid..... 4.0 @ 1000 kc
 - 12SA7 Grid to 12SK7 Grid..... 55 @ 455 kc
 - 12SA7 Grid to 12SK7 Grid..... 45 @ 1000 kc
 - 12SK7 Grid to 12SQ7 Diode Plate..... 50 @ 455 kc
- (2) Audio Gain.
 - 0.12 volts at 400 cycles across volume control (R4) with control set at maximum will give approximately 1/2-watt output across the speaker voice coil
- (3) Oscillator Grid Bias.
 - D-C voltage developed across the oscillator grid leak (R3) averages 6.0 volts at 1000 kc.
- (4) Socket Pin Voltages.

Figures 7 and 8 show voltages from all tube pins to B—unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

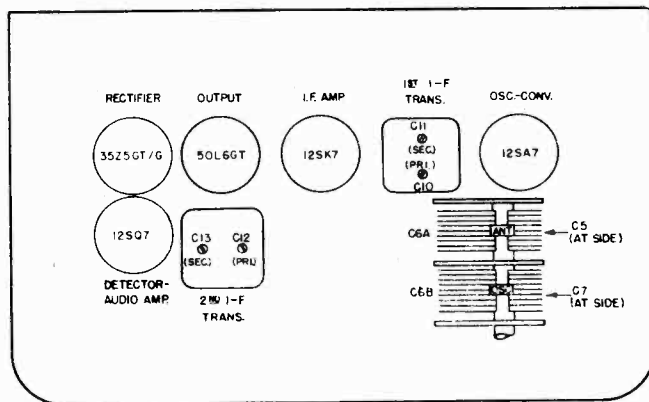


Fig. 1. Tube and Trimmer Location

GENERAL ELECTRIC CO.

MODELS XB-121, XM-121,
XR-121, XB-221, XM-221,
XR-221

Cat. No.	Symbol	Description
UNIVERSAL G-E REPLACEMENT PARTS		
UCC-039	C15	CAPACITOR—0.005 mfd., 600 v., paper
UCC-045	C8	CAPACITOR—0.05 mfd., 600 v., paper
UCU-028	C22	CAPACITOR—100 mmf., mica
UCU-040	C14, 16	CAPACITOR—330 mmf., mica
UOP-403	LS1	LOUDSPEAKER—4" P.M. speaker
URD-029	R8	RESISTOR—150 ohms, 1/2 w., carbon
URD-081	R2	RESISTOR—22,000 ohms, 1/2 w., carbon
URD-107	R6	RESISTOR—270,000 ohms, 1/2 w., carbon
URD-113	R7, 10	RESISTOR—470,000 ohms, 1/2 w., carbon
URD-129	R3	RESISTOR—2.2 megohm, 1/2 w., carbon
URD-137	R5	RESISTOR—4.7 megohm, 1/2 w., carbon
URF-007	R1	RESISTOR—18 ohms, 1 w., carbon (X221 series)
URF-057	R13, 14	RESISTOR—2,200 ohms, 2 w., carbon (X221 series)
URF-059	R9	RESISTOR—2,700 ohms, 2 w., carbon (X121 series)

Cat. No.	Symbol	Description
SPECIALIZED G-E REPLACEMENT PARTS		
RAB-008		BACK—Cabinet back (XB121)
RAB-009		BACK—Cabinet back (XB221)
RAB-010		BACK—Cabinet back (Plastic X121 series)
RAB-011		BACK—Cabinet back (Plastic X221 series)
RAD-009		BRACKET—Scale mounting bracket
RAU-006		CABINET—Mahogany plastic (XM121, XM221)
RAU-008		CABINET—Maroon plastic (XR121, XR221)
RAV-003		CABINET—Wood (XB121, XB221)
RCC-040	C3, 4, 17	CAPACITOR—0.01 mfd., 600 v., paper
RCC-041	C18	CAPACITOR—0.02 mfd., 600 v., paper
RCC-045	C1, 21	CAPACITOR—0.05 mfd., 600 v., paper
RCE-004	C19a, b	CAPACITOR—20 mfd., 30 mfd., dry electrolytic
RCT-006	C6a, b	CONDENSER—Variable tuning condenser
RDC-005		ASSEMBLY—Drive cord assembly (32 1/2" early production)
RDC-012		ASSEMBLY—Drive cord assembly (36 1/2" late production)
RDF-005		WASHER—Felt knob washer
RDK-012		KNOB—Control knob (Tomato Red)
RDK-013		KNOB—Control knob (Oak)
RDK-014		KNOB—Control knob (Mahogany)
RDK-016		KNOB—Control knob (Grey)
RDP-006		POINTER—Dial scale pointer
RDS-006		SCALE—Dial scale pointer (XR121, XR221)
RDS-007		SCALE—Dial scale (XB121, XB221)
RDS-009		SCALE—Dial scale (XM121, XM221)
RDW-001		WINDOW—Dial scale window (plastic cabinets)
RDX-010		ASSEMBLY—Dial scale back plate assembly (XB121, XB221)
RHH-001		FASTENER—Snap fastener (wood cabinets)
RHH-003		FASTENER—Snap fastener (plastic cabinets)
RJS-003		SOCKET—Octal tube socket
RJS-016		SOCKET—Pilot lamp socket
RLA-001	L3	COIL—Antenna coil
RLC-006	L4	COIL—Oscillator coil
RMS-004		SPRING—Drive cord spring
RMU-005		PULLEY—Drive shaft and cotter
RMW-003		PULLEY—Drive cord pulley
RRC-006	R4, S1	VOLUME CONTROL—1.0 megohm control and switch
RRL-001	R12	CORD—Power cord, includes R12 (X221 series)
RRW-001	R11	RESISTOR—250 ohms, 10 w., wirewound
RRT-003	R16	RESISTOR—22 ohms, 1 w., wirewound
RTL-007	T2	TRANSFORMER—1st i-f transformer
RTL-008	T3	TRANSFORMER—2nd i-f transformer
RTO-005	T1	TRANSFORMER—Output transformer
RWL-009		CORD—Power Cord

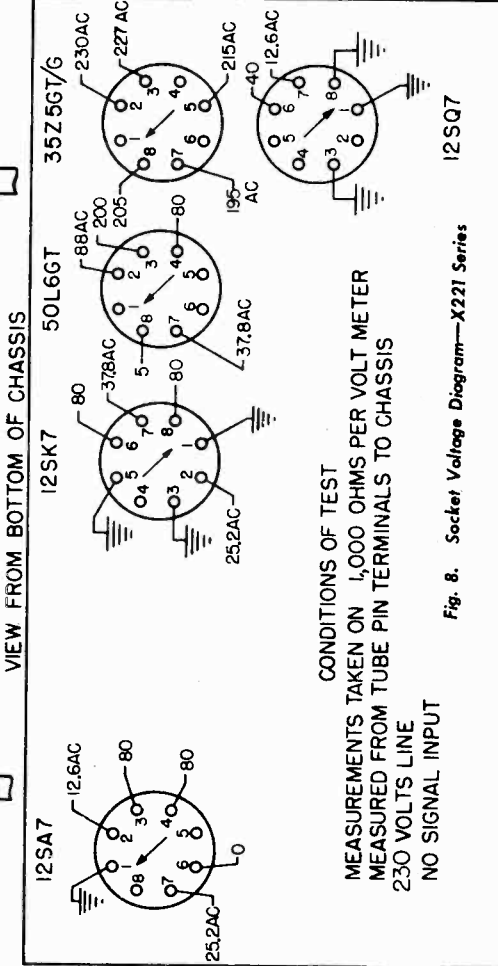
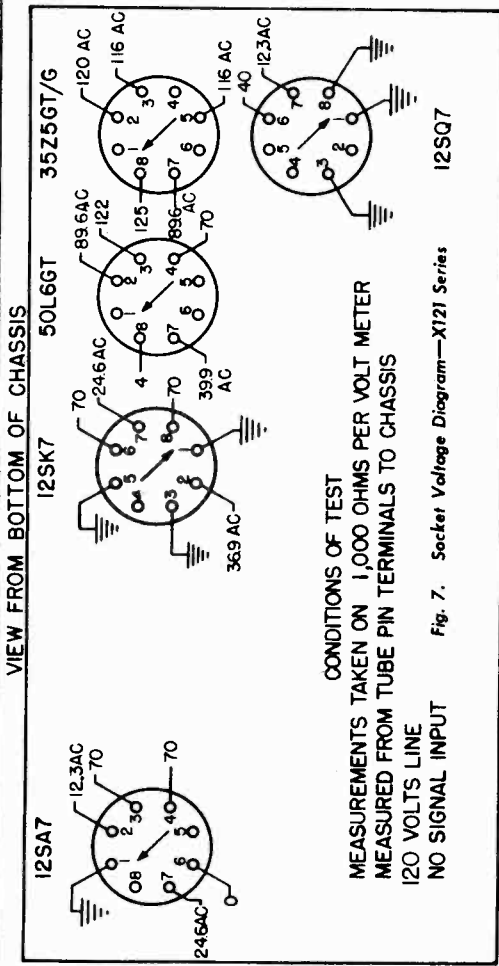


Fig. 8. Socket Voltage Diagram—X221 Series

Note that Part No. UCC-045 and RCC-045 appear to be the same condenser; however, the RCC-type is made with a higher melting point wax and is used in sections of the receiver where more heat is dissipated. The condensers are identical in size, but the RCC type is marked in red instead of black.

MODELS X-153, X-153-A1,
X-153-D2

GENERAL ELECTRIC CO.

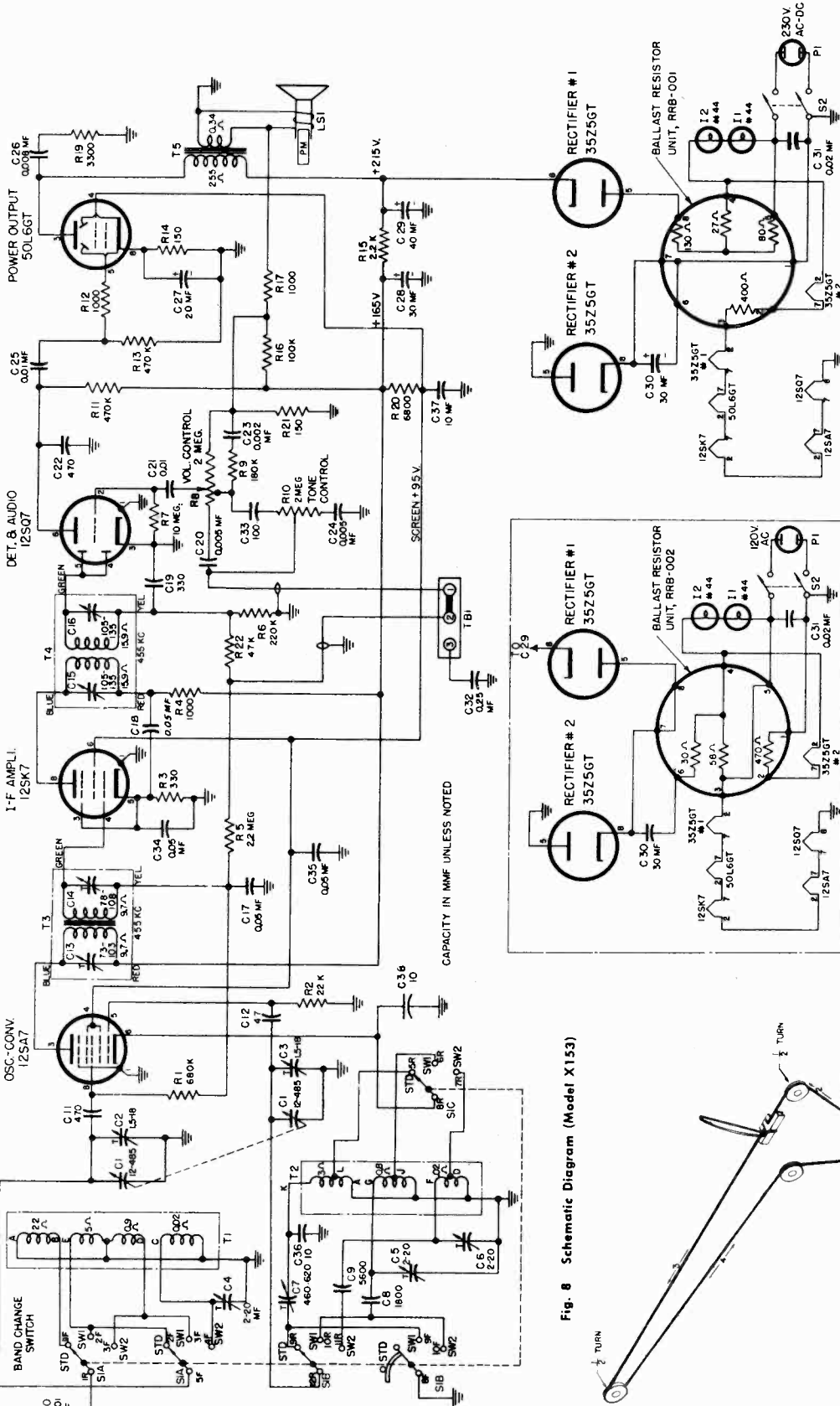


Fig. 8 Schematic Diagram (Model X153)

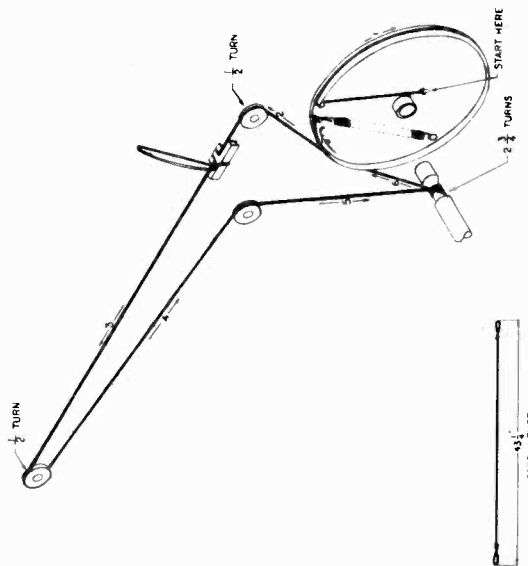


Fig. 9 Drive Stringing

OPERATING FREQUENCIES:
 Standard Wave 540-1720 kc
 Short Wave 1 2.2-7.0 mc
 Short Wave 2 7.0-22 mc
 I-F Amplifier 455 kc

POWER OUTPUT
 Undistorted 2.5 watts
 Maximum 4.3 watts

LOUDSPEAKER:
 Type Alnico PM
 Outside Cone Diameter 5 1/4 inches
 Voice Coil Impedance (400 cycles) 3.5 ohms

GENERAL ELECTRIC CO.

MODELS X-150, X-150C,
X-150V
MODELS X-153, X-153-A1,
X-153-D2

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES:

R-F (Standard Wave)	580 and 1500 kc
R-F (Short Wave 1)	6 mc
R-F (Short Wave 2)	18 mc
I-F	455 kc

EQUIPMENT REQUIRED:

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1 1/2 volts full-scale.
3. 0.05 mfd. paper capacitor.
4. 200 mmf mica capacitor.
5. Insulated screwdriver.

PROCEDURE—GENERAL:

1. The alignment procedure shown in table form should be followed with the chassis removed from the cabinet. Since the dial scale is not a part of the main chassis, it is necessary to use the special alignment scale fastened to the rear of the scale back plate assembly. With the gang condenser fully closed, set the left edge of the pointer to zero on the alignment scale. Then 147 on the alignment scale will correspond to 1500 kc (Standard Wave), approximately 149 to 6 mc (SW 1 band), and 141 to 18 mc (SW 2 band).
2. Connect output meter across speaker voice coil terminals. During alignment keep volume control set at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.
3. Connect the capacitor listed in the chart between the "high side" of the test oscillator and the point of input specified. For Model X153, the ground terminal of the test-oscillator may be connected to the chassis, providing an isolating transformer is used between the radio and the line input.
4. After the chassis has been aligned and replaced into the cabinet, it may be necessary to reset the pointer. It should point to zero on the logging scale when the gang condenser is fully closed (pointer at extreme left of scale).

ALIGNMENT CHART

Step	Test-osc. Connection to	Test-osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	12SK7 or 6SK7 IF grid in series with .05 mfd.	455 kc	"STD" Band 550 kc	C15 and C16 (2nd IF trans. capacitors)
2	12SA7 or 6SA7 Conv. grid in series with .05 mfd.	455 kc	"STD" Band 550 kc	C13 and C14 (1st IF trans. capacitors)
3***	Ant. post in series with 200 mmf.	1500 kc	"STD" Band 1500 kc	C3 (osc.); C2 (ant.)
4	Ant. post in series with 200 mmf.	580 kc	"STD" Band 580 kc	C7**
5	Repeat Step No. 3			
6	Ant. post in series with 200 mmf.	6.0 mc	"SW1" Band 6.0 mc	C5 (osc.)**
7	Ant. post in series with 200 mmf.	18.0 mc	"SW2" Band 18 mc	C6 (osc.)* C4 (ant.)**

* Use minimum capacity peak.
 ** Rock gang condenser for optimum peak.
 *** Note: C2 trimmer is not incorporated on some receivers. This requires that C3 be aligned while rocking the gang condenser.

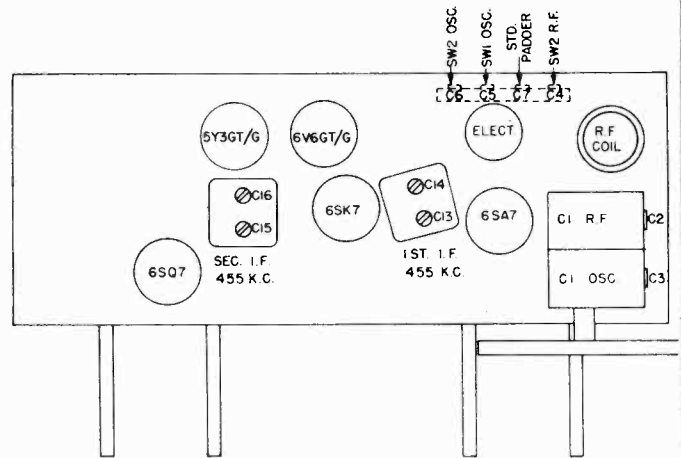


Fig. 1 Tube and Trimmer location (Model X150)

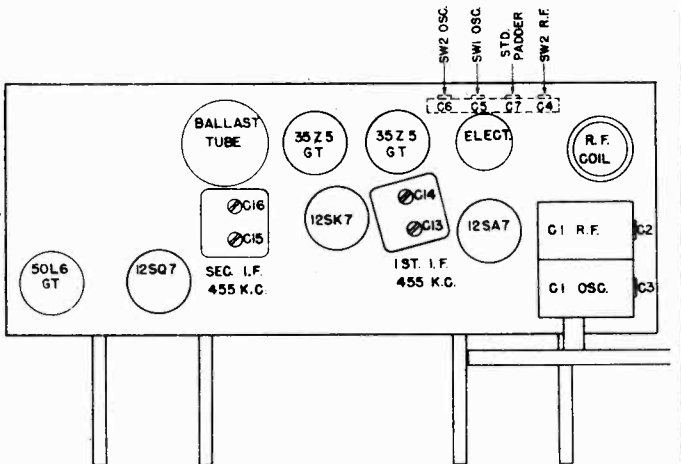


Fig. 2 Tube and Trimmer location (Model X153)

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 12SA7 Grid	5.5 @ 1000 kc
Antenna Post to 12SA7 Grid	3.3 @ 4000 kc
Antenna Post to 12SA7 Grid	2.0 @ 12000 kc
12SA7 Converter Grid to 12SK7 Grid	65 @ 1000 kc
12SA7 Converter Grid to 12SK7 Grid	81 @ 455 kc
12SK7 Grid to 12SQ7 Diode Plate	62 @ 455 kc

(2) Audio Gain.

0.06 volts for Model X150, or 0.03 volts for Model X153, at 400 cycles across volume control (R10) with control set at maximum will give approximately 1/2-watt output across the speaker voice coil.

(3) Oscillator Grid Bias.

D-C voltage developed across the oscillator grid leak (R2) averages 7.3 volts at 1000 kc, 9.9 volts at 4000 kc, and 6.8 volts at 12,000 kc.

(4) Socket Pin Voltages.

Figures 9, 10 and 11 show voltages from all tube pins to B—unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

MODELS X-150, X-150C,
X-150V
MODELS X-153, X-153-A1,
X-153-D?

GENERAL ELECTRIC CO.

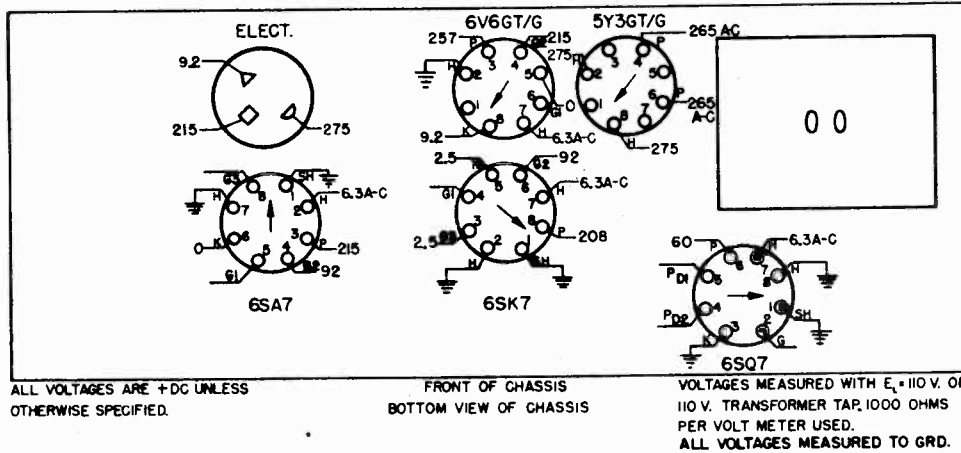


Fig. 9 Socket Voltages (Model X150)

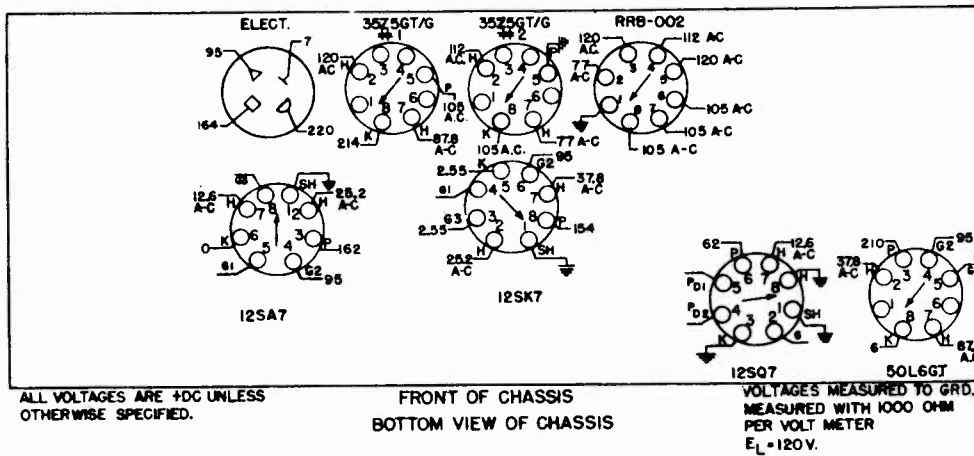


Fig. 10 Socket Voltages (Model X153 A1)

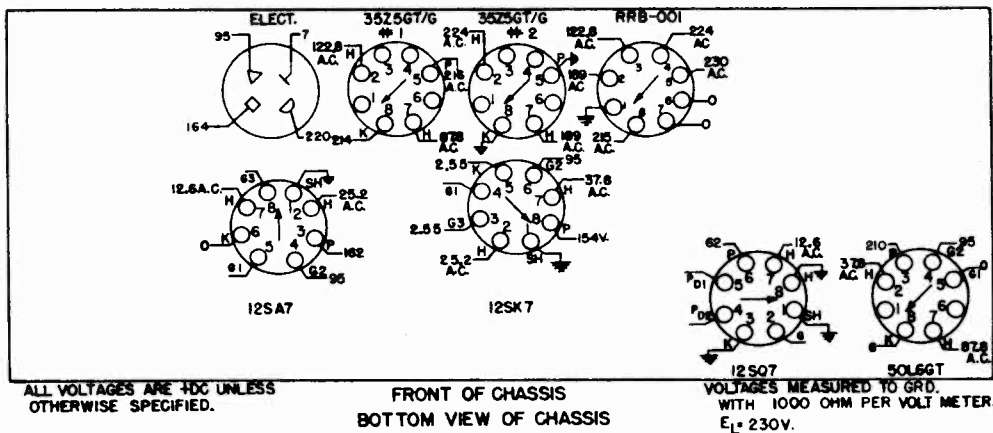


Fig. 11 Socket Voltages (Model X153 D2)

GENERAL ELECTRIC CO.

MODELS X-150, X-150C,
X-150V
MODELS X-153, X-153-A1,
X-153-D2

ELECTRICAL RATING

Model	Rating	Power Supply			Power Consumption
		Nominal Voltage	Voltage Range	Frequency Cycles A-c	
X150	V	110	103-117	50-60	55
		125	117-133		
		150	140-160		
		200	185-213		
		225	213-234		
245	234-260				
X150	C	110	103-117	25-60	55
		125	117-133		
X153	D2	230 Ac-Dc	210-250	40-60	60
X153	A1	120 Ac	105-130	40-60	60

CAUTION:

On the Model X153, one side of the power line is connected to the chassis. Use extreme caution when servicing this receiver unless an isolating transformer is used in the power line. Do not place a ground on the chassis unless an isolating transformer is used.

GENERAL INFORMATION

Power Supply Conversion—Model X150:

The Model X150 "V" rating receiver is equipped with a universal power transformer which permits practically instantaneous conversion for operation on any one of the six voltage ranges shown on the label. Merely loosen the set screw on the control at the top of the power transformer and turn the knob until the correct nominal voltage rating appears in the window. Tighten the set screw.

The Model X150 "C" rating makes use of a tapped transformer. To change voltage rating reconnect transformer primary to proper input color coded leads as shown on schematic.

Power Supply Conversion—Model X153:

The X153 Models with "D2" and "A1" ratings are identical except for the ballast tube that is used. The substitution of the appropriate ballast tube takes care of all the wiring changes necessary to convert from one line voltage range to the other. The "A1" rating may be converted for operation on a line of 230 volts a-c or d-c by removing the ballast resistor unit, Part No. RRB-002, and substituting the ballast resistance unit, Part No. RRB-001, in the same socket. When this is done the label should be changed so that it reads "D2" rating. The "D2" rating may be changed to "A1" rating in like manner—by substitution of Part No. RRB-002 ballast resistor for Part No. RRB-001.

Phonograph or FM Sound Connection:

Figure 4 shows a simple method for connecting a crystal or high impedance magnetic phono pick-up into the circuit of the Models X150 and X153. A double-pole, double-throw type phono switch with a phono motor power switch attached is recommended. This should be mounted close to the rear chassis terminal board on the radio. It is important that if the lead from the record player is shielded that the shield braid be connected to terminal 3, not to chassis ground. As a precaution when operating the Model X153, add spaghetti insulation to the full length of the shield braid so that the braid cannot accidentally touch the chassis. This will also avoid the possibility of the operator receiving a shock under certain conditions.

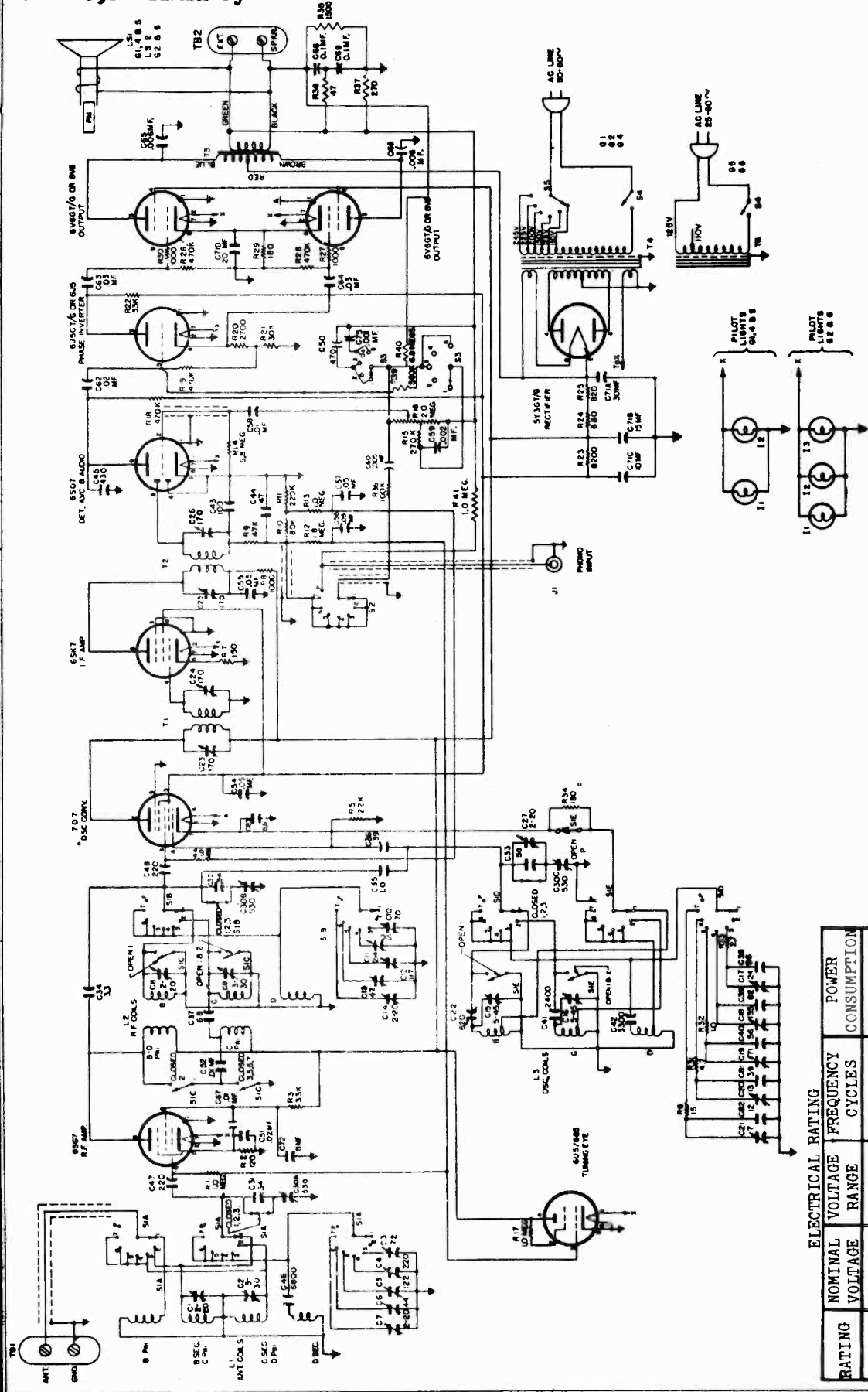
When making this phono connection as a permanent installation, the link between terminals 1 and 2 must be removed.

An FM Translator may be connected in the same manner as for the record player. This permits the FM sound to be reproduced through the radio.

Cat. No.	Symbol	Description	Cat. No.	Symbol	Description
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS		
UCC-036	C23	CAPACITOR—0.002 mf., 600 v., paper	RCE-034	C27, 28, 29	CAPACITOR—30 mf., 350 v.; 30 mf., 350 v.; 30 mf., 25 v., dry electrolytic (Model X150)
UCC-039	C20, 24	CAPACITOR—0.005 mf., 600 v., paper	RCE-009	C30	CAPACITOR—30 mf., 250 v., dry electrolytic (Model X153)
UCC-040	C10, 21, 25	CAPACITOR—0.01 mf., 600 v., paper	RCE-035	C27, 28, 29, 37	CAPACITOR—20 mf., 25 v.; 30 mf., 250 v., 40 mf., 250 v.; 10 mf., 250 v., dry electrolytic (Model X153)
UCC-045	C17, 18, 34, 35	CAPACITOR—0.05 mf., 600 v., paper	RCS-002	C31	CAPACITOR—0.02 mf., 600 v., paper (Model X153)
UCC-050	C32	CAPACITOR—0.25 mf., 600 v., paper (Model X153)	RCT-009	C1, 2, 3	CONDENSER—Tuning condenser, includes trimmers
UCC-061	C26	CAPACITOR—0.008 mf., 1000 v., paper (Model X153)	RDF-005		WASHER—Felt washer for knobs
UCU-028	C33	CAPACITOR—100 mmf., mica	RDK-022		KNOB—Control knob with pointer (painted)
UCU-044	C11	CAPACITOR—470 mmf., mica	RDK-053		KNOB—Control knob with pointer (plain)
UCU-1004	C36, 38	CAPACITOR—10 mmf., mica	RDM-001		CUSHION—Rubber cushions for dial scale
UCU-1040	C19	CAPACITOR—330 mmf., mica	RDP-009		POINTER—Dial scale pointer assembly
UCU-1044	C22	CAPACITOR—470 mmf., mica	RDS-014		SCALE—Dial scale
UCU-1520	C12	CAPACITOR—47 mmf., mica	RDX-012		SCALE PLATE—Scale plate assembly
UCU-2557	C8	CAPACITOR—1800 mmf., mica	RDX-014		CORD—Drive cord assembly
UCU-2570	C9	CAPACITOR—5600 mmf., mica	RIT-002		Cover—Inner and outer cardboard cover for electrolytic capacitor
UIC-001		CEMENT—Cone cement	RIT-003		SOCKET—Octal base tube socket
UOP-520	LS1	LOUDSPEAKER—5 1/4 inch PM speaker	RJS-003		PLATE—Electrolytic mounting plate (4 mtg. lugs)
UOX-008		CONE—Loudspeaker replacement cone assembly	RJS-012		SOCKET—Pilot light socket (Model X150)
URD-029	R14, 21	RESISTOR—150 ohms, 1/2 w., carbon	RJS-022		SOCKET—Pilot light socket (Model X153)
URD-037	R3	RESISTOR—330 ohms, 1/2 w., carbon	RJS-023		PLATE—Electrolytic mounting plate (3 mtg. lugs) (Model X153)
URD-049	R4, 12, 17	RESISTOR—1000 ohms, 1/2 w., carbon	RLA-003	T1	COIL—Antenna coil
URD-061	R19	RESISTOR—3300 ohms, 1/2 w., carbon (Model X153)	RLC-009	T2	COIL—Oscillator coil
URD-065	R19	RESISTOR—4700 ohms, 1/2 w., carbon (Model X150)	RMM-005		SHIELD—Pilot lamp shield
URD-081	R2	RESISTOR—22,000 ohms, 1/2 w., carbon	RMS-007		SPRING—Drive cord tension spring
URD-089	R22	RESISTOR—47,000 ohms, 1/2 w., carbon	RMU-009		SHAFT—Tuning shaft and cotter
URD-097	R16	RESISTOR—100,000 ohms, 1/2 w., carbon (Model X153)	RMW-008		PULLEY—Drive cord idler pulley and stud
URD-103	R9	RESISTOR—180,000 ohms, 1/2 w., carbon	RRB-001		BALLAST—230 volt ballast resistance unit (Model X153)
URD-105	R6	RESISTOR—220,000 ohms, 1/2 w., carbon	RRB-002		BALLAST—120 volt ballast resistance unit (Model X153)
URD-113	R11, 13	RESISTOR—470,000 ohms, 1/2 w., carbon	RRC-009	R8	VOLUME CONTROL—2 meg., potentiometer
URD-117	R1	RESISTOR—680,000 ohms, 1/2 w., carbon	RRC-010	R10, S2	TONE CONTROL—2 meg., potentiometer includes power switch (Model X150)
URD-129	R5	RESISTOR—2.2 meg., 1/2 w., carbon	RRC-011	R10, S2	TONE CONTROL—2 meg., potentiometer, includes power switch (Model X153)
URD-145	R7	RESISTOR—10 meg., 1/2 w., carbon	RSW-011	S1	SWITCH—Band change switch
URE-035	R18	RESISTOR—270 ohms, 1 w., carbon (Model X150)	RTL-013	T3	TRANSFORMER—1st I-F transformer
URF-057	R15	RESISTOR—2200 ohms, 2 w., carbon (Model X153)	RTL-014	T4	TRANSFORMER—2nd I-F transformer
URF-059	R15	RESISTOR—2700 ohms, 2 w., carbon (Model X150)	RTO-008	T5	TRANSFORMER—Output transformer (Model X150)
URF-069	R20	RESISTOR—6800 ohms, 2 w., carbon (Model X153)	RTO-009	T5	TRANSFORMER—Output transformer (Model X153)
URF-077	R20	RESISTOR—15,000 ohms, 2 w., carbon (Model X150)	RTP-014	T6	TRANSFORMER—Power transformer, 60 cycle (Model X150)
SPECIALIZED G-E REPLACEMENT PARTS			RTP-015	T6	TRANSFORMER—Power transformer, 25-60 cycles (Model X150)
RAB-013		BACK—Cabinet back cover (Model X150)	RWL-004		CORD—Power cord
RAB-014		BACK—Cabinet back cover (Model X153)			
RAV-006		CABINET—Wood cabinet			
RCC-040	C30	CAPACITOR—0.01 mf., 600 v., paper			
RCC-059	C26	CAPACITOR—0.005 mf., 1000 v., paper (Model X150)			

MODELS X-181V, XC-181V,
XP-181V, X-182V, X-181C,
XC-181C, Preliminary

GENERAL ELECTRIC CO.



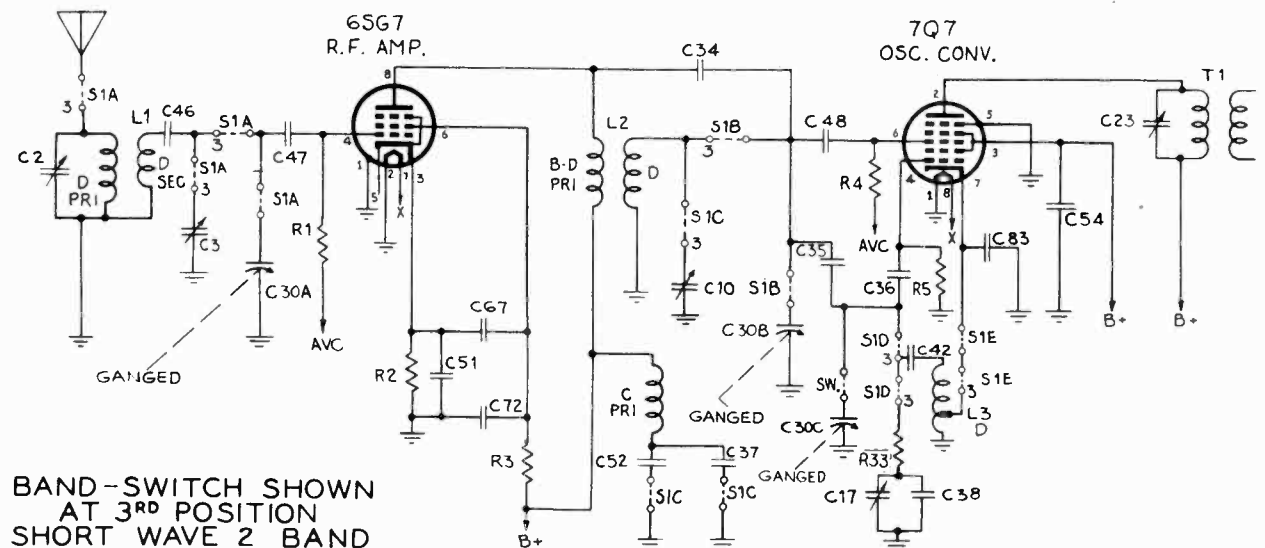
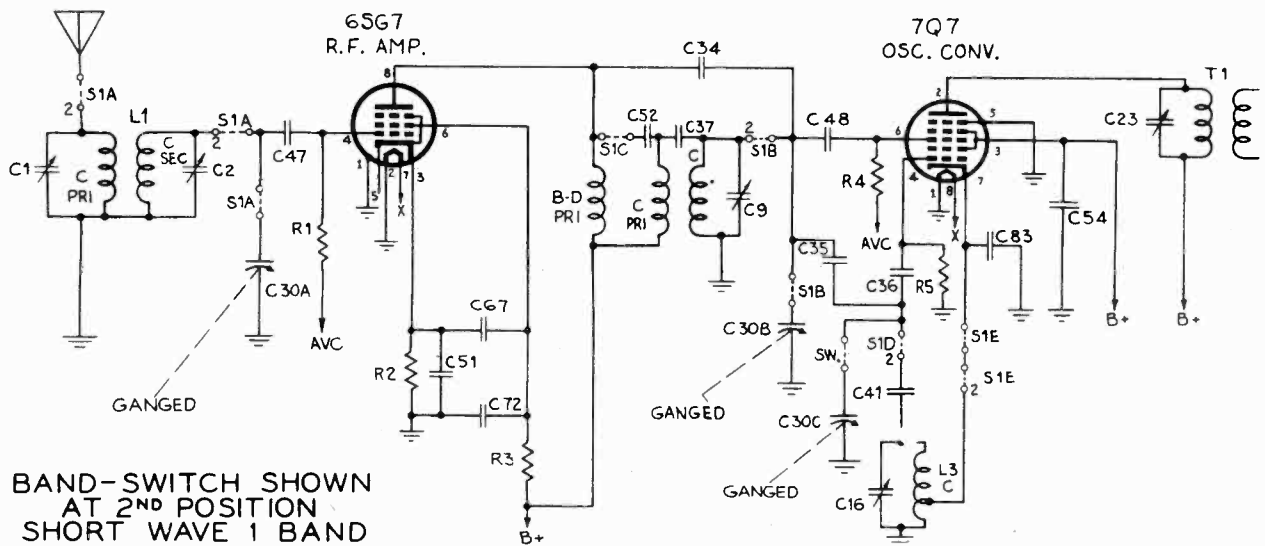
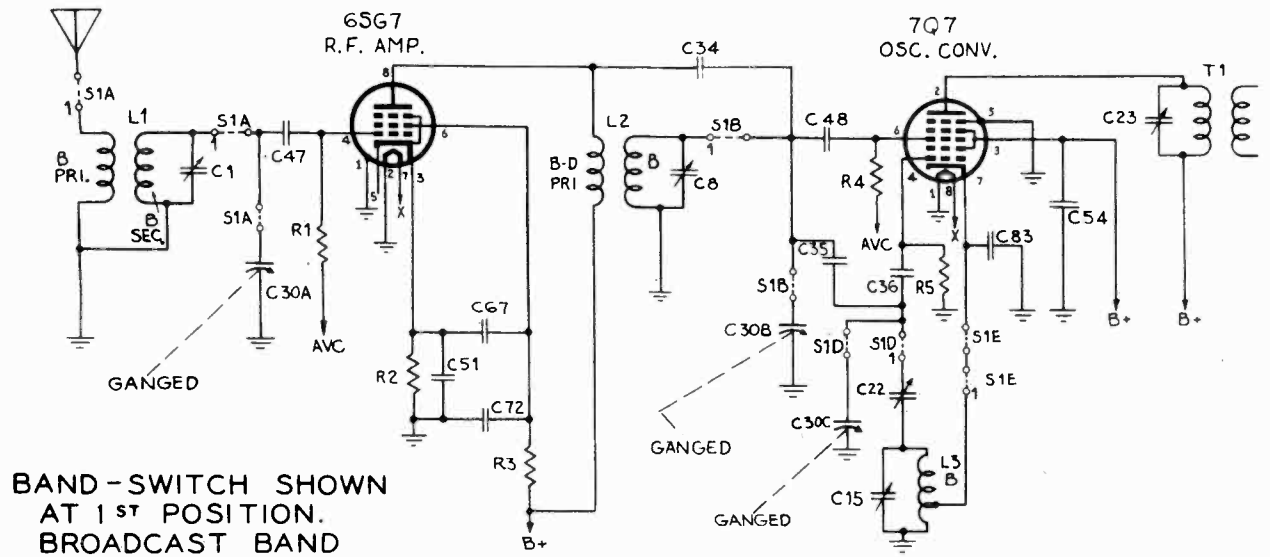
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- (2) XC181V 50/60 cycle
- (3) XP181V 50/60 cycle
- (4) X182V 50/60 cycle
- (5) X181C 25/60 cycle
- (6) XC181C 25/60 cycle

ELECTRICAL RATING

RATING	NOMINAL VOLTAGE	VOLTAGE RANGE	FREQUENCY CYCLES	POWER CONSUMPTION
V	110	103-117	50-60	85
	125	117-133		
	150	140-160		
	200	185-213		
	225	213-234		
C	245	234-260	25-60	85
	110	103-117	25-60	85
	125	117-133		

GENERAL ELECTRIC CO.

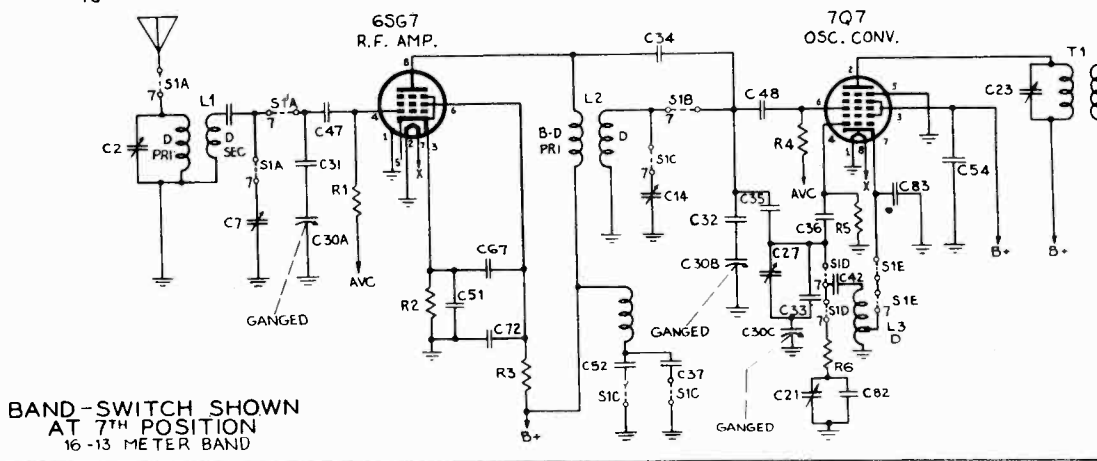
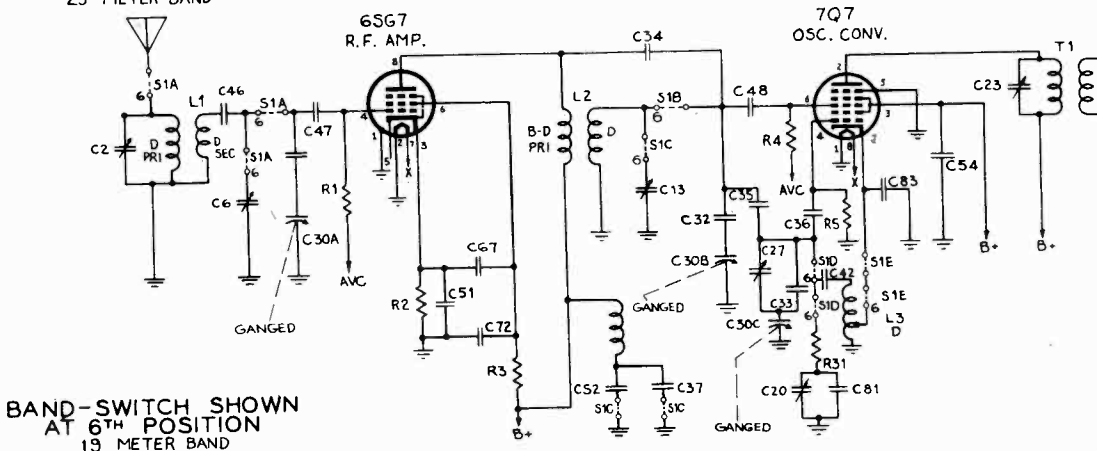
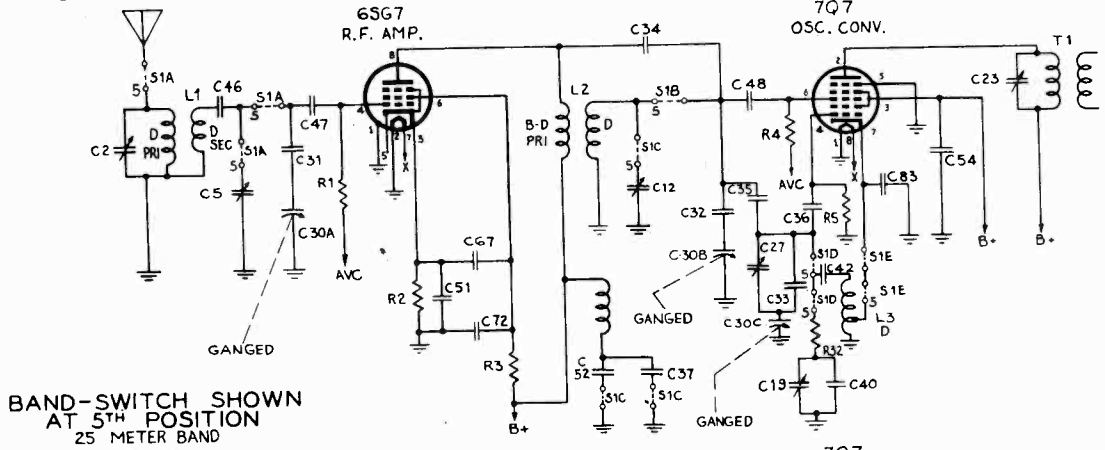
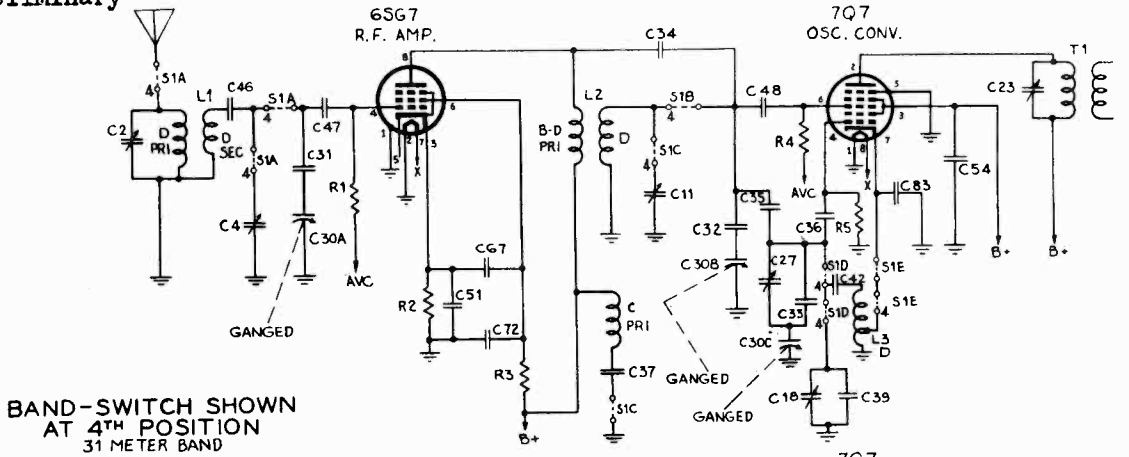
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X-182V, Preliminary



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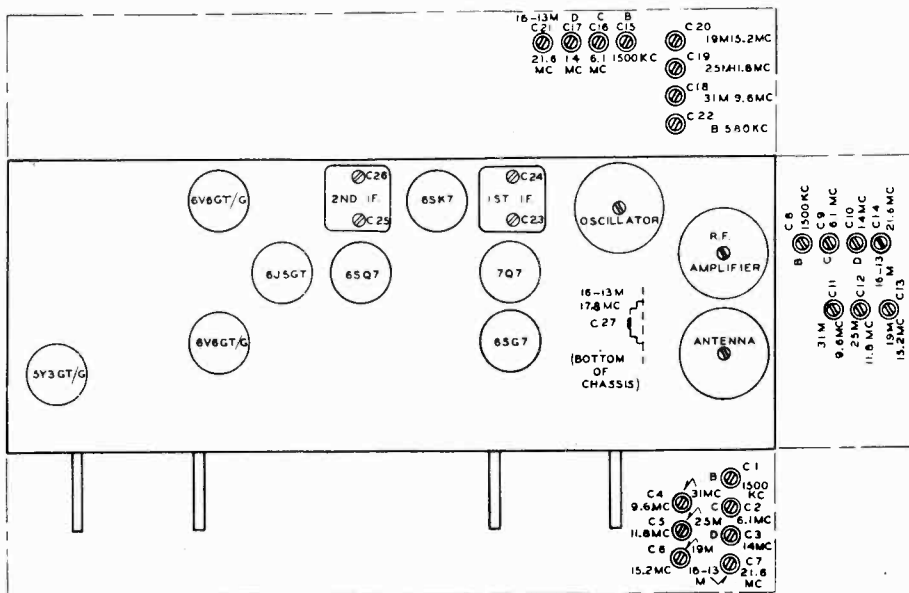
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XP-181V, X-181C, XC-181C,
X-182V, Preliminary

GENERAL ELECTRIC CO.



GENERAL ELECTRIC CO.

MODELS X-181V, XC-181V,
XP-181V, X-181C, XC-181C
X-182V, Preliminary



ELECTRICAL CIRCUIT ALIGNMENT

PROCEDURE: (1) Remove chassis during r-f alignment.

(2) Connect output meter across loudspeaker voice coil leads.

(3) Set radio volume control to its maximum position and attenuate the test oscillator signal

output so that the output meter reading never exceeds 1 1/4 volts.

(4) Connect capacitor or capacitor and resistor listed in column 2 between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Test Osc. Connected To -	Test Osc. Setting	Band & Pointer Setting	Tune Trimmer for Max. Output
1	6SK7 grid in series with .05 mf.	455 KC	"B" BAND 550KC	C25 & C26
2	7Q7 grid in series with .05 mf.	455 KC	"B" BAND 550KC	C23 & C24 Retrim C25 & C26
3	ANT. POST in series with 200 mmf. and 400 ohms	1500 KC	"B" BAND 1500KC	C15, C1, C8
4	ANT. POST in series with 200 mmf. and 400 ohms	580 KC	"B" BAND 580KC	C22*
5	R E P E A T S T E P 3			
6	ANT. POST in series with 200 mmf. and 400 ohms	6.1 MC	SW1, 6.1MC	C16, C2, C9
7	ANT. POST in series with 200 mmf. and 400 ohms	14 MC	SW2, 14MC	C17, C3, C10
8	ANT. POST in series with 200 mmf. and 400 ohms	17.8 MC	16-13M, 17.8MC	C27*
9	ANT. POST in series with 200 mmf. and 400 ohms	21.6 MC	16-13M, 21.6MC	C21**C7, C14***
10	R E P E A T S T E P S 8 A N D 9			
11	ANT. POST in series with 200 mmf. and 400 ohms	9.6 MC	31M, 9.6MC	C18**, C4, C11
12	ANT. POST in series with 200 mmf. and 400 ohms	11.8 MC	25M, 11.8MC	C19**, C5, C12
13	ANT. POST in series with 200 mmf. and 400 ohms	15.2 MC	19M, 15.2MC	C20**, C6, C13

*Rock gang condenser for optimum peak. **Use minimum capacity setting if two are obtainable.
***Use maximum capacity peak if two are obtainable.

SOCKET VOLTAGES

CONDITIONS OF TEST: 1000 ohm/volt meter used. All measurements made to chassis. Values are d-c unless noted. Measurements made using tap voltage shown on schematic.

PIN NO.	1	2	3	4	5	6	7	8
6SG7	0	0	1.2	0	1.2	110	6.3 AC	209
7Q7	0	207	95	0	0	0	0	6.3 AC
6SK7	0	6.3 AC	0	0	1.9	95	0	197
6SQ7	0	0	0	0	0	31	6.3 AC	0
6J5GT	0	0	68	-	-2.1	-	6.3 AC	24
6V6GT/G	0	6.3 AC	264	209	0	-	0	11.2
5Y3GT/G	-	270	-	274 AC	-	274 AC	-	270
6U5/6G5	6.3 AC	-	-	209	-	0	-	-

MODELS X-181V, XC-181V,
 XP-181V, X-181C, XC-181C,
 X-182V, Preliminary

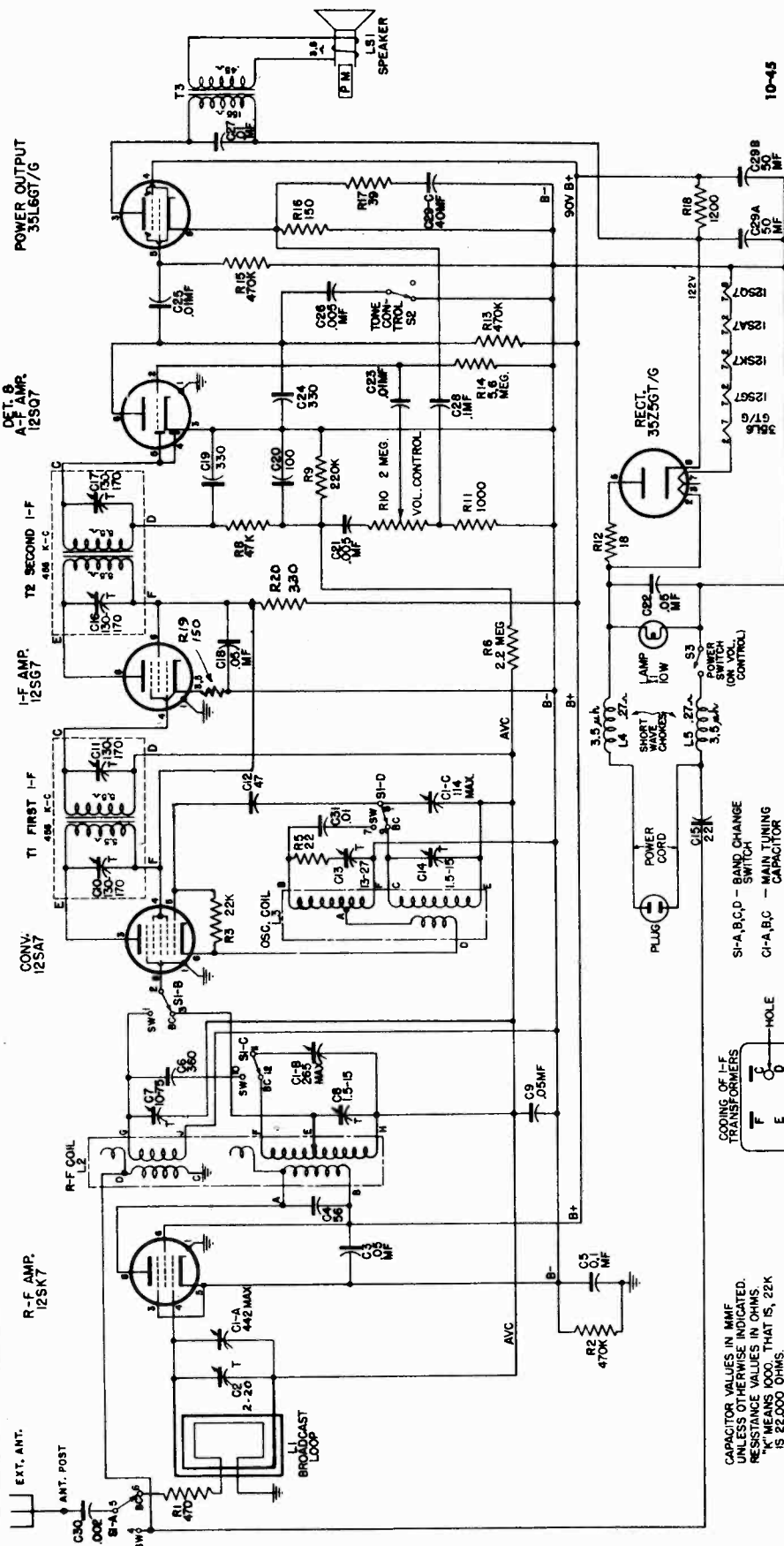
GENERAL ELECTRIC CO.

Cat.No.	Description	Model	Qty. Per Set	Symbol
RAB-015	Cabinet back	1-4-5	1	
RAB-026	" "	3	1	
RAG-004	Grille	1-4-5	1	
RAG-007	" (metal)	3	1	
RAV-013	Cabinet	1-5	1	
RAV-014	"	4	1	
RAV-015	"	2-6	1	
RAV-016	"	3	1	
RCC-036	Capacitor (paper) .1 mfd. 600 V.	All	2	C68,69
RCC-060	" " .006 mfd. 1000 V.	"	2	C65,66
RCE-002	" electrolytic - 15-15 - 350 V.	3	1	C88 A & B
RCE-011	" " - 8 mfd. 250 V.	All	1	C72
RCE-012	(" " - 30-350V, 15-300,10-150,20-25	All	1	C71 A,B,C,D
RCT-010	Capacitor (Tuning)	"	1	C30 A,B,C
RCW-010	" (Mica) 56 muf.	"	1	C38
RCW-011	" (") 56 "	"	1	C40
RCW-012	" (") 39 "	"	1	C81
RCW-058	" (") 54 "	"	2	C31,32
RCW-059	" (") 50 "	"	1	C33
RCX-007	Trimmer strip assembly	"	1	C18,19,20,22
RCX-008	" " "	"	1	C15,16,17,21
RCX-009	" " "	"	2	C1,2,3,7,8,9, 10,14
RCX-010	" " "	"	2	C13,12,11,6, 5,4 C27
RCY-006	Capacitor (trimmer)	"	1	
RDC-008	Drive cord assembly (tuning)	1-4-5	1	
RDC-009	" " " "	1-4-5	1	
RDC-010	" " " (Band)	1-4-5	1	
RDD-005	Drum assembly	All	1	
RDE-012	Escutcheon	2-3-6	1	
RDF-005	Knob felt washer	All	4	
RDG-001	Back plate (background)	1-4-5	1	
RDK-026	Knob (plain)	1-4-5	2	
RDK-027	" (pointer)	1-4-5	2	
RDK-034	"	3	2	
RDK-056	"	3	2	
RDP-011	Pointer & slider assembly	1-4-5	1	
RDP-012	" " "	All	1	
RDP-019	" " "	2-3-6	1	
RDS-017	Dial scale	1-4-5	1	
RDS-027	" "	2-3-6	1	
RDX-023	Background plate assembly	2-6	1	
RDX-024	" " " "	3	1	
RHG-001	Cushion (capacitor)	All	3	
RHG-005	Grommet (power cord)	"	1	
RHM-023	Stud (pulley)	"	2	
RJP-003	Plug (phono motor)	3	1	
RJP-004	" (phono)	All	1	
RJP-010	Phono jack	"	1	
RJS-012	Mtg. Plate (electrolytic)	"	1	
RJS-016	Socket (dial light)	1-4-5	2	
RJS-017	" (tube)	All	7	
RJS-018	" " "	"	1	
RJS-028	Tuning indicator tube connector	"	1	
RJS-037	Mtg. plate (electrolytic)	3	1	
RJS-045	Socket (dial light)	3	1	
RJS-046	" " "	3	1	
RJS-047	" " "	2-3-6	1	
RJS-048	Tuning indicator tube connector	3	1	
RLA-004	Antenna coil	All	1	L-1
RLB-003	R.F. Amplifier coil	"	1	L-2
RLC-010	Oscillator coil	"	1	L-3
RLC-006	Clamp (tuning indicator)	"	1	
RLS-019	Spring (LINK)(Band)	"	1	
RLW-008	Pulley	"	2 or 5	(1) X181V 50/60 cycle
RLW-013	Flywheel	"	1	(2) XC181V 50/60 cycle
RLW-014	Pulley	2-3-6	3	(3) XP181V 50/60 cycle
RLX-007	Lever & Link (Phono Sw.)	All	1	(4) X182V 50/60 cycle
RPX-010	Phono pick-up	3	1	(5) X181C 25/60 cycle
RRC-012	Volume control	All	1	(6) XC181C 25/60 cycle

GENERAL ELECTRIC CO.

MODELS X-181V, XC-181V,
XP-181V, X-181C, XC-181C,
X-182V, Preliminary

<u>Cat. No.</u>	<u>Description</u>	<u>Model</u>	<u>Qty.</u> <u>Per Set</u>	<u>Symbol</u>
RRN-001	Resistor (carbon) 10 ohm. 1/2 W.	"	1	R-32
RRN-002	" " 2.7 ohm. 1/2 W.	"	1	R-33
RRN-003	" " 4.7 " "	"	1	R-31
RRW-006	" " 70 " 25 W.	3	1	R-52
RSW-012	Switch (band)	All	1	S-1
RSW-014	" (radio phono)	"	1	S-2
RSW-015	" (tone & power)	"	1	S-3,4
RTL-015	I.F. Transformer (2nd)	"	1	T-2
RTL-016	" " (1st)	"	1	T-1
RTO-010	Output transformer	"	1	T-3
RTP-016	Power transformer	1-2-4	1	T-4
RTP-017	" "	3	1	T-5
RTP-025	" "	5-6	1	T-6
RWL-004	Power cord	2-3-6	1	
RWL-009	" "	1-4-5	1	
UCC-036	Capacitor (paper) .002 mfd. 600 V.	All	1	C-59
UCC-039	" " .005 " "	"	1	C-60
UCC-040	" " .01 " "	"	3 or 5	C-52, 58, 67, 89, 90
UCC-041	" " .02 " "	"	2 or 3	C-51, 62, 91
UCC-042	" " .03 " "	"	2	C-63, 64
UCC-045	" " .05 " "	"	4 or 5	C-54, 55, 56, 57, 87
UCN-501	Capacitor (Ceramic) 1 mmf.	"	1	C-35
UCN-1052	" (mica) .001 mfd.	"	1	C-75
UCN-1504	" (Ceramic) 3.3 mmf.	"	1	C-34
UCN-1506	" " 6.8 " "	"	2	C-37, 83
UCU-036	" (mica) 220 mmf.	"	2	C-47, 48
UCU-1020	" " 47 " "	"	1	C-44
UCU-1044	" " 470 " "	"	1	C-50
UCU-1572	" " 6800 " "	"	1	C-46
UCU-2043	Capacitor (mica) 430 mmf.	All	1	C-45
UCU-2561	" " 2400 " "	"	1	C-41
UCU-2564	" " 3300 " "	"	1	C-42
UCW-1018	" (ceramic) 39 mmf.	"	1	C-36
UCW-2006	" " 12 " "	"	1	C-82
UCW-2026	" " 82 " "	"	1	C-39
UTC-001	Cement for speaker	"		
UOP-302	Speaker 8" PM.	1-4-5	1	LS-1
UOP-1207	" 12" "	2-3-6	1	LS-2
UOX-004	Cone & voice coil assembly 8"	1-4-5	1	
UOX-005	" " " 12"	2-3-6	1	
URD-005	Resistor (carbon) 150 ohm. 1/2 W.	All	1	R-6
URD-027	" " 120 " "	"	1	R-2
URD-029	" " 150 " "	"	1	R-7
URD-031	" " 180 " "	"	1	R-34
URD-049	" " 1000 " "	"	3	R-8, 27, 30
URD-053	" " 1500 " "	"	1 & 2	R-35, 43
URD-059	" " 2700 " "	"	1	R-20
URD-081	" " 22000 " "	"	1	R-5
URD-083	" " 27000 " "	3	1	R-46
URD-085	" " 33000 " "	All	1	R-22, R-50
URD-089	" " 47000 " "	"	1	R-9
URD-093	" " 68000 " "	3	2	R-48, 51
URD-097	" " 100000 " "	All	1 & 2	R-36, 49
URD-103	" " 180000 " "	"	1	R-10
URD-105	" " 220000 " "	"	1	R-11
URD-107	" " 270000 " "	"	1	R-15
URD-113	" " 470000 " "	"	4	R-18, 19, 26, 28
URD-115	" " 560000 " "	"	1	R-39
URD-121	" " 1 Meg. 1/2 W.	"	5 & 4	R-1, 4, 13, 17, 41
URD-127	" " 1.8 Meg. 1/2 W.	"	1	R-12
URD-133	" " 3.3 " "	3	2	R-44, 45
URD-141	" " 6.8 " "	All	2	R-14, 40
URD-1017	" " 47 ohms. "	"	1	R-38
URD-1035	" " 270 " "	"	1	R-37
URD-1084	" " 30000 " "	"	1	R-21 (1) X181V 50/60 cycle
URD-1104	" " 200000 ohms. "	3	1	R-47 (2) X181V 50/60 cycle
URF-085	" " 33000 " 1 W.	All	1	R-3 (3) XP181V 50/60 cycle
URF-031	" " 180 " 2 W.	"	1	R-29 (4) X182V 50/60 cycle
URF-045	" " 680 " "	"	1	R-24 (5) X181C 25/60 cycle
URF-047	" " 820 " "	"	1	R-25 (6) X181C 25/60 cycle
URF-071	" " 8200 " "	"	1	R-23



POWER OUTPUT
35L6GT/G

DET. &
A-F AMP.
12SO7

I-F AMP.
12SG7

CONV.
12SAT

R-F AMP.
12SK7

EXT. ANT.
ANT. POST

BROADCAST LOOP

OSC. COIL

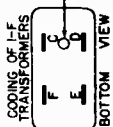
R-F COIL

CONV. COIL

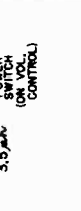
I-F COIL

RECT. 35Z5GT/G

CAPACITOR VALUES IN MME
UNLESS OTHERWISE INDICATED.
RESISTANCE VALUES IN OHMS.
"K" MEANS 1000 THAT IS, 22K
IS 22,000 OHMS.



PLUG IN
POWER CORD



RECT. 35Z5GT/G

90V B+

10-45

ELECTRICAL RATING (INPUT).

Voltage..... 105-125 volts, a-c or d-c
Frequency (a-c)..... 25-60 cps
Wattage..... 45 watts

ELECTRICAL POWER OUTPUT (150 LINE VOLTS).

Undistorted..... 1.25 watts
Maximum..... 2 watts

LOUDSPEAKER.

Type..... "Alnico" permanent magnet
Outside cone diameter..... 5 1/4"
Voice Coil Impedance (400 cycles)..... 3.5 ohms

TUNING BAND.

Standard Broadcast..... 540 KC-1600 KC
Shortwave..... 6 MC-10 MC

INTERMEDIATE FREQUENCY..... 455 KC

Fig. 7. Identification of Terminals on Band Change Switch S1

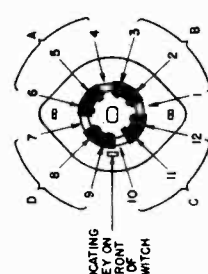


Fig. 5. Identification of Terminals on R-F Coil L2

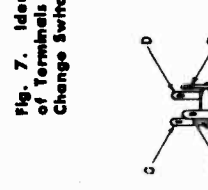


Fig. 6. Identification of Terminals on Oscillator Coil L3

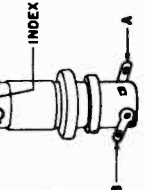
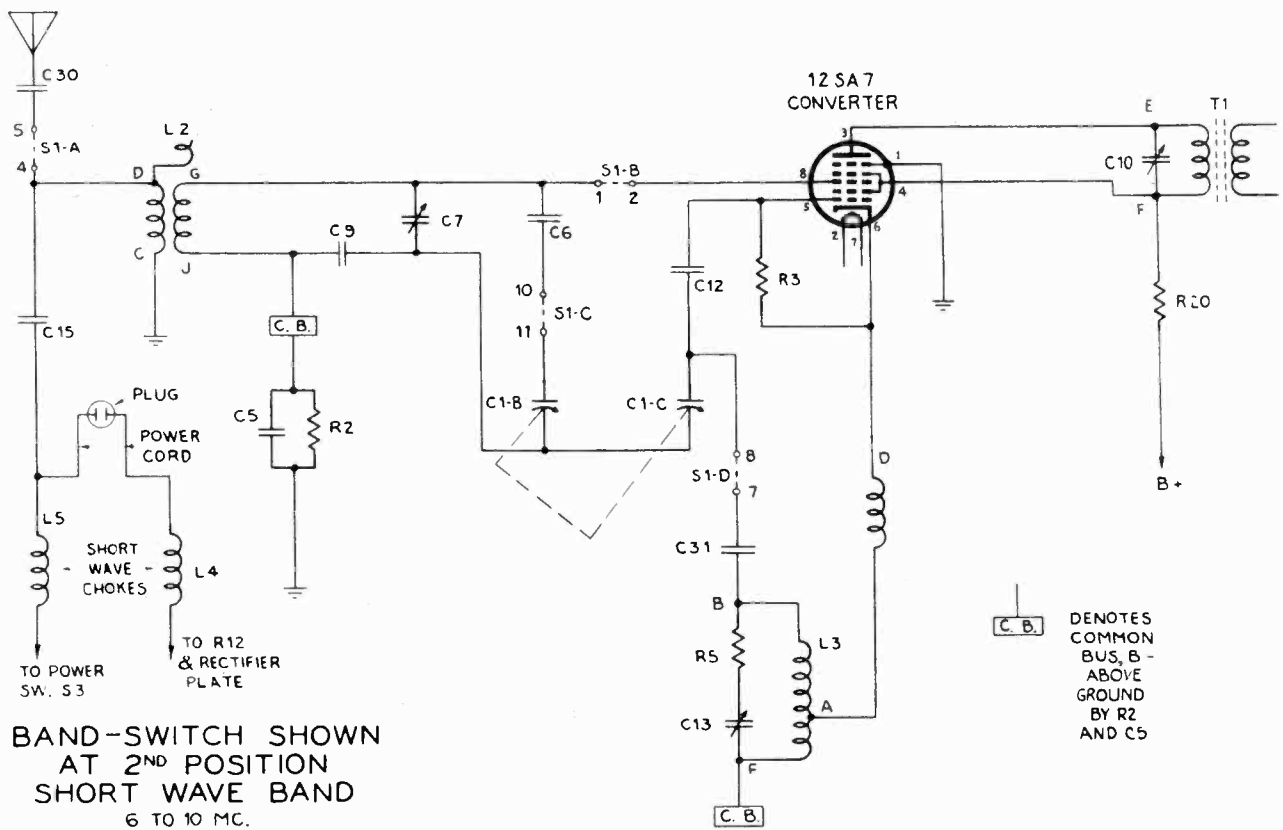
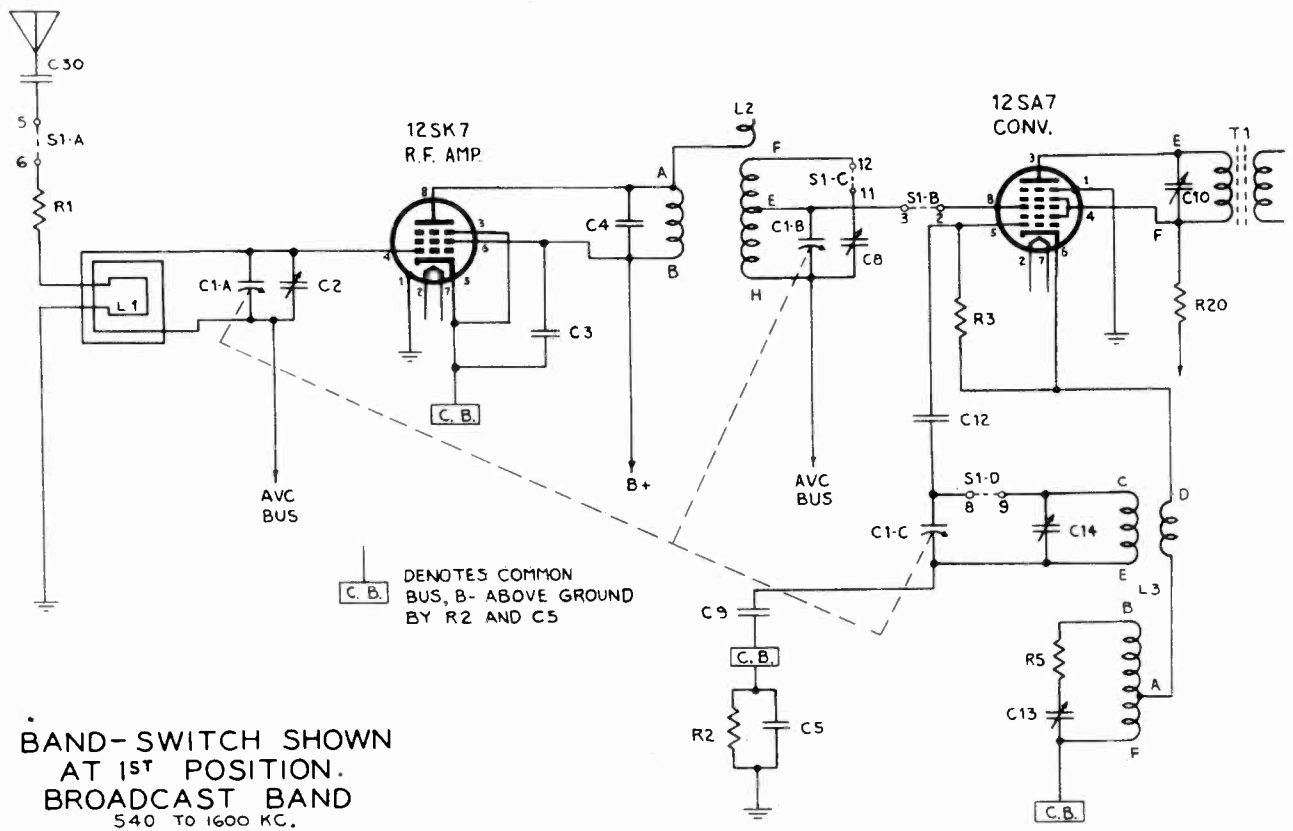


Fig. 7. Identification of Terminals on Band Change Switch S1

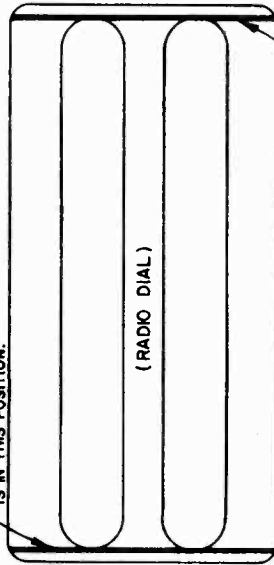
AS SEEN WHEN LOOKING AT SWITCH TERMINALS WITH CHASSIS UPSIDE DOWN

GENERAL ELECTRIC CO.



ANTENNA.
 Broadcast Reception—Built in "Beam-a-Scope" loop antenna.
 Shortwave Reception—Power cord used as antenna. An external antenna is recommended for improvement of long-distance reception.

WITH TUNING CAPACITOR PLATES COMPLETELY CLOSED (TUNING CONTROL MAXIMUM CLOCKWISE), DIAL POINTER SHOULD BE ADJUSTED ON STRING SO THAT IT IS IN THIS POSITION.



WITH TUNING CAPACITOR PLATES COMPLETELY OPEN (TUNING CONTROL MAXIMUM CLOCKWISE), DIAL POINTER SHOULD BE ADJUSTED ON STRING SO THAT IT IS IN THIS POSITION.

Fig. 1. Alignment of Dial Pointer on String

Alignment of Dial Pointer and String.

The extreme left and right positions of the dial pointer should be in accordance with Fig. 1. This adjustment should be checked before proceeding with the r-f alignment.

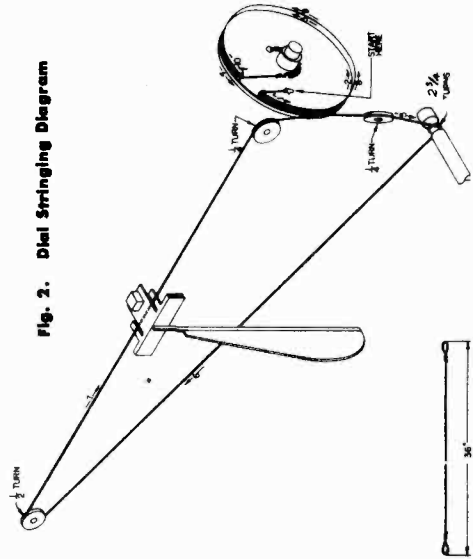


Fig. 2. Dial Stringing Diagram

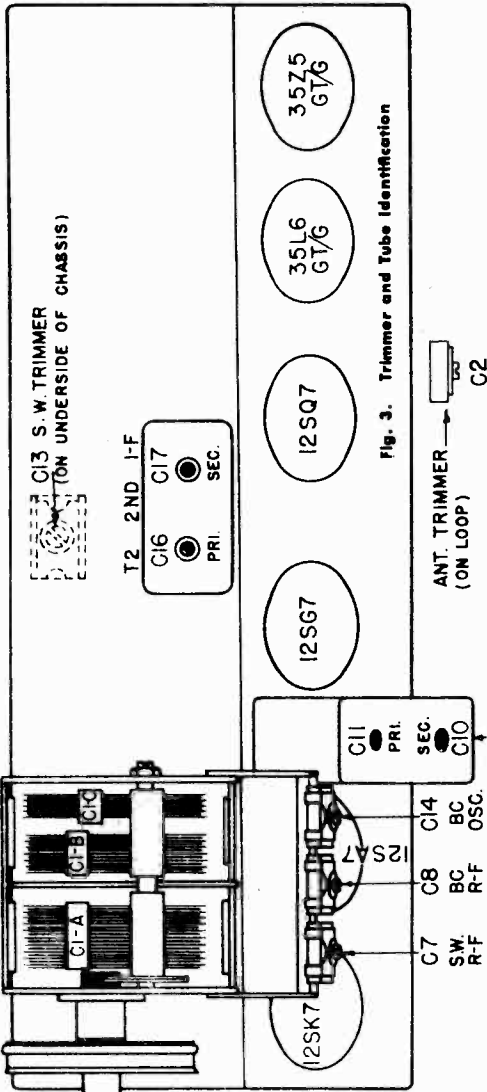


Fig. 3. Trimmer and Tube Identification

9. Disconnect signal generator from 12SG7 and connect (through .05 mf. capacitor) to pin eight of the 12SA7 converter.
10. Keeping output below 1 1/4 volts as before, peak the first i-f trimmers, C10 and C11, for maximum output.
11. Check second and first i-f trimmer adjustments.

Broadcast R-F Alignment.

When making the following alignment, the Beam-a-Scope (loop antenna) must be mounted to the chassis, and the chassis must be installed in the cabinet. All trimmer adjusting screws are available through the hole in the loop antenna frame.

1. Connect the output of the signal generator through a 60 mmf. capacitor, to the radio antenna post.
2. Set the signal generator and dial pointer to 1500 kc.
3. Adjust C14, C8, and C2 for maximum output. If two peaks are obtained when adjusting C14, the correct point is the one with the trimmer plates the furthest apart.

Shortwave R-F Alignment.

1. Set Band Change switch to SW position.
2. Set dial pointer and signal generator to 9.5 mc.
3. Remove chassis carefully, so as not to disturb the setting of the dial pointer.
4. Connect the output of the signal generator through a .05 mf. capacitor to pin eight of the 12SA7 converter tube.
5. Adjust C13 (under the chassis) for maximum output. Two points of maximum output may be obtained. The correct point is the one with the trimmer plates closest together.
6. Remove the signal generator connection, and connect its output through a 400-ohm resistor to the radio antenna post. Peak C7 for maximum output while rocking-in the main tuning condenser.
7. Replace the chassis in the cabinet, and check the setting of C7.

Equipment Needed.

- Signal Generator, modulated 30% with 400 cycles.
- One—60 mmf. capacitor
- One—.05 mf. capacitor
- One—400-ohm resistor
- One—output meter
- One—insulated screw driver.

General.

For a complete alignment, the i-f should be aligned before the r-f.
 The i-f sections may be aligned with the chassis removed from the cabinet, but for the final r-f alignment the chassis should be in place, in the cabinet.

Fig. 3 identifies and locates all trimmers.
 Be sure the radio has been "on" for at least 10 minutes before making any alignment adjustments.
 In order to be sure of frequency stability in the signal generator, follow the manufacturer's recommended procedure for use.

When making connections to the signal generator, avoid any ground connections to the radio unless an isolation transformer is used in the power line.

I-F Alignment.

1. Remove chassis from cabinet.
2. Connect output meter across the speaker voice coil.
3. Set volume control for maximum.
4. Connect output terminal of signal generator through a .05 mf. capacitor to pin 4 of the 12SG7 (i-f amplifier) tube.
5. Set signal generator frequency to 455 kc.
6. Set dial pointer on radio to approximately 1500 kc.
7. Peak second i-f trimmers, C16 and C17, for maximum output.
8. It is important to keep the output reading under 1 1/4 volts by reducing the input or gain control so as to avoid spurious results due to a.v.c. action.

GENERAL ELECTRIC CO.

STAGE GAINS AND VOLTAGE CHECKS

The following information will be useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments. The stage gain values listed may have a tolerance of 20%.

In all measurements, the readings should be kept as low as possible by reducing the signal generator gain control so as to avoid a.v.c. action.

Stage Gains.

- (1) Antenna terminal* to pin 4 of 12SK7... 4 @ 1000 kc
- (2) Pin 4 of 12SK7† to pin 8 of 12SA7... 10 @ 1000 kc
- (3) Pin 8 of 12SA7† to pin 4 of 12SG7... 35 @ 455 kc
- (4) Pin 4 of 12SG7† to pins 4 or 5 of 12SQ7... 100 @ 455 kc

* Connect to signal generator output through a 60 mmf. capacitor.

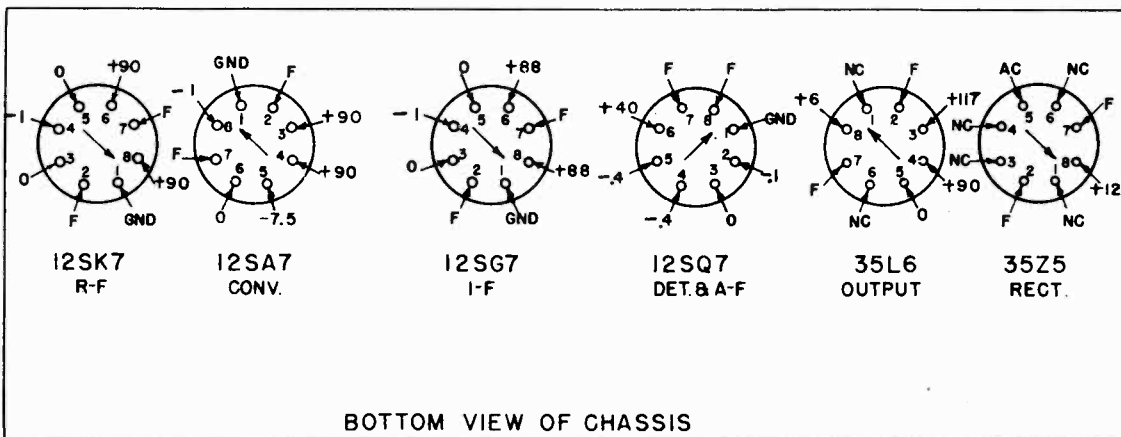
† Connect to signal generator output through a .05 mf. capacitor.

Audio Gain.

0.05 volt at 400 cycles across the volume control (R10), with the control set at maximum, will give approximately 0.5 watt output (1.32 volts) across the speaker voice coil.

Oscillator Grid Voltage.

The d-c voltage developed across the grid leak R3 (22,000 ohms) averages 7.7 volts at 1000 kc. This should be measured with a vacuum tube voltmeter. (The grid current, measured with an ammeter in series with pin 6 of the 12SA7 tube, should be in the order of 350 microamps.)



BOTTOM VIEW OF CHASSIS

CONDITIONS OF TEST

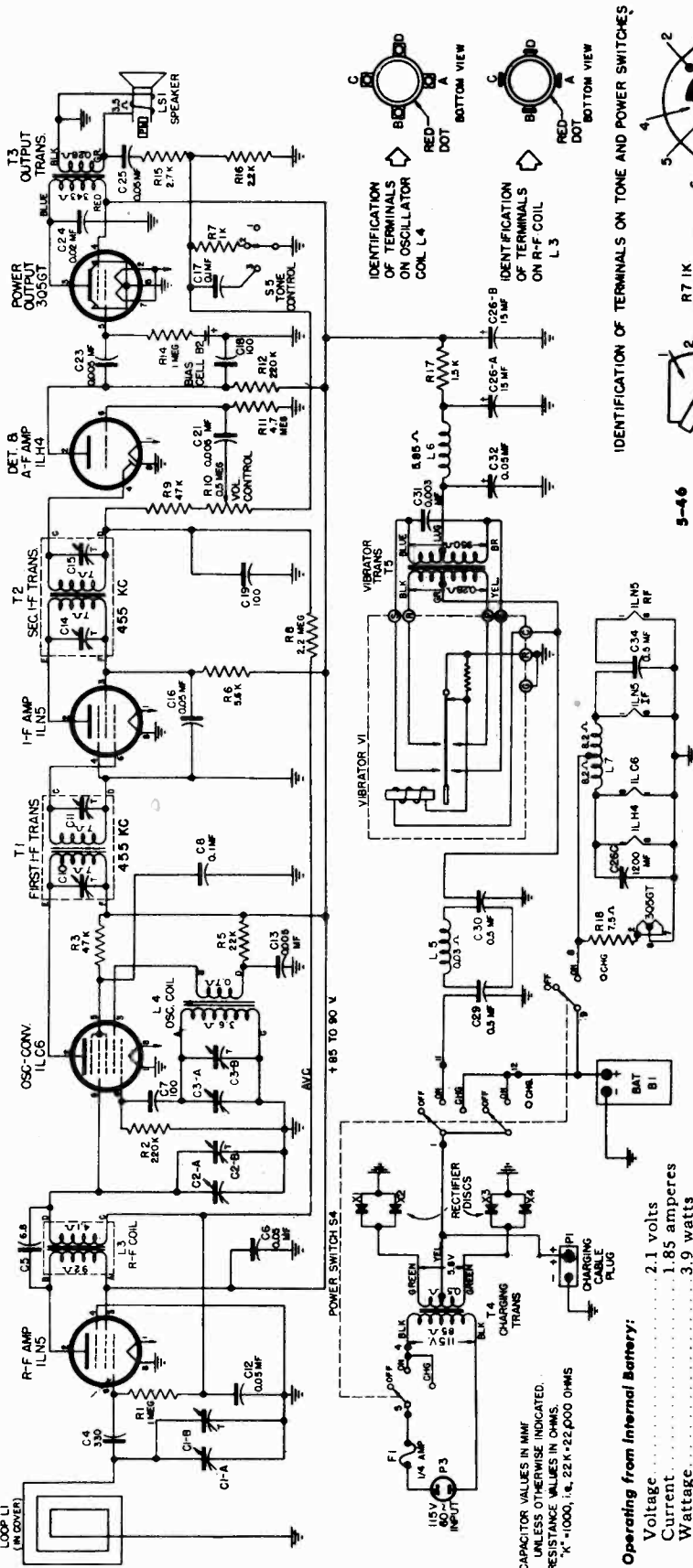
ALL MEASUREMENTS D-C
MEASUREMENTS MADE TO B-BUS
MEASUREMENTS MADE WITH
20,000 OHM/VOLT METER

LINE VOLTAGE 117 VOLTS
VOL. CONTROL MAX. CLOCKWISE
NC - NOT CONNECTED
F - FILAMENT

PART NO.	SYMBOL	DESCRIPTION	PART NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
UCC-036	C30	Capacitor—002 mf, 600 V., paper	RCU-053	C4	Capacitor—56 mmf, mica
UCC-039	C21	Capacitor—005 mf, 600 V., paper	RCU-108	C15	Capacitor—22 mmf, mica
UCC-040	C23, C25, C27, C31	Capacitor—.01 mf, 600 V., paper	RCU-110	C12	Capacitor—47 mmf, mica
UCC-045	C3, C9, C18, C22	Capacitor—.05 mf, 600 V., paper	RCU-112	C20	Capacitor—100 mmf, mica
UDL-018	I1	Lamp—110-125 V., 10 W.	RCU-115	C19, C24	Capacitor—330 mmf, mica
URD-009	R5	Resistor—22 ohm, 1/2 watt, carbon	RCU-164	C6	Capacitor—360 mmf, mica
URD-015	R17	Resistor—39 ohm, 1/2 watt, carbon	RCY-002	C2	Capacitor—trimmer—1.5-15 mmf
URD-029	R16, R10	Resistor—150 ohm, 1/2 watt, carbon	RCY-003	C13	Capacitor—trimmer—13-27 mmf
URD-041	R1, R7	Resistor—470 ohm, 1/2 watt, carbon	RDE-004	—	Escutcheon—model 221
URD-049	R11	Resistor—1000 ohm, 1/2 watt, carbon	RDF-002	—	Felt washer, smaller, under round knobs—models 220, 221
URD-081	R3	Resistor—22,000 ohm, 1/2 watt, carbon	RDF-004	—	Felt washer, larger, under flipper knobs—models 220, 221
URD-089	R8	Resistor—47,000 ohm, 1/2 watt, carbon	RDK-003	—	Knob, round—model 220
URD-105	R9	Resistor—220,000 ohm, 1/2 watt, carbon	RDK-005	—	Knob, flipper—model 220
URD-113	R2, R13, R15	Resistor—470,000 ohm, 1/2 watt, carbon	RDK-008	—	Knob, round—model 249
URD-129	R6	Resistor—2.2 meg., 1/2 watt, carbon	RDK-009	—	Knob, round—model 221
URD-139	R14	Resistor—5.6 meg., 1/2 watt, carbon	RDK-010	—	Knob, flipper—model 221
URE-007	R12	Resistor—18 ohm, 1 watt, carbon	RDK-011	—	Knob, flipper—model 219
URF-051	R18	Resistor—1200 ohm, 2 watt, carbon	RDP-004	—	Pointer assembly
SPECIALIZED G-E REPLACEMENT PARTS			RDS-005	—	Dial scale assembly
RAA-003	—	Switch arm, with set screw, for Band Change and Tone Control switches—switch half	RDX-005	—	Dial parts—back plate and bracket assembly
RAA-004	—	Switch arm, with set screw, for Band Change and Tone Control switches—flipper half	RDX-006	—	Shaft, hair pin cotter, and drive shaft bracket
RAB-005	—	Cabinet back, for Model 220	RDX-007	—	Cord—for dial pointer
RAB-006	—	Cabinet back, for Model 221	RHG-001	—	Grommet—cushion used for mounting tuning capacitor
RAB-007	—	Cabinet back, for Model 219	RHU-002	—	Spacer—for RHG-001
RAD-006	—	Antenna bracket, left side	RHX-001	—	Chassis mounting bolt and washer
RAD-007	—	Antenna bracket, right side	RIT-001	—	Cover for electrolytic capacitor
RAD-008	—	Baffle bracket—models 219, 220	RJS-003	—	Tube socket—octal
RAE-001	—	Baffle shield	RJS-004	—	Socket for electrolytic capacitor
RAG-001	—	Grille—models 219, 220	RJS-010	—	Socket—dial light
RAU-004	—	Cabinet—model 219	RLB-001	L2	Coil—RF
RAU-005	—	Cabinet—model 220	RLC-003	L3	Coil—oscillator
RAV-002	—	Cabinet—model 221	RLI-001	L4, L5	Coil—power cord choke
RCC-004	—	Capacitor—005 mf, 600 V., paper	RLL-003	L1	Loop Assembly
RCC-040	C23, C25, C27	Capacitor—.01 mf, 600 V., paper	RMS-001	—	Spring—on dial string drum
RCC-045	C22	Capacitor—.05 mf, 600 V., paper	ROP-005	LS1	Speaker—5 1/4 in. PM
RCC-046	C5, C28	Capacitor—.01 mf, 600 V., paper	RRC-004	R10	Volume Control—2 meg.
RCE-001	C29-A, -B, -C	Capacitor—50-50-40 mf, 150-150-25 V., electrolytic	RSW-004	S2	Switch—Tone Control
RCT-004	C1, C7, C8, C14	Capacitor—main tuning capacitor assembly	RSW-005	S1	Switch—Band Change
URD-037	R20	RESISTOR—330 ohms 1/2 w., carbon	RTL-001	T1	I-F Transformer assembly
			RTL-002	T2	I-F Transformer assembly
			RTO-003	T3	Transformer—output
			RWL-003	—	Power cord

MODEL 250

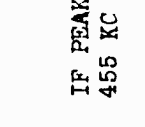
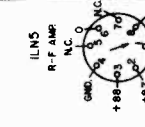
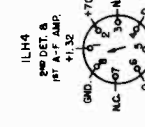
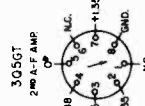
GENERAL ELECTRIC CO.



CAPACITOR VALUES IN MMF UNLESS OTHERWISE INDICATED. RESISTANCE VALUES IN OHMS. "K"=1000, "M"=22K-22,000 OHMS

Operating from Internal Battery:
 Voltage 2.1 volts
 Current 1.85 amperes
 Wattage 3.9 watts
 Hours of Operation without Recharging Battery 20 approx

Battery Requirement:
 Willard 2.0-volt No. 25-2 rechargeable battery or equivalent.



IF PEAK
455 KC

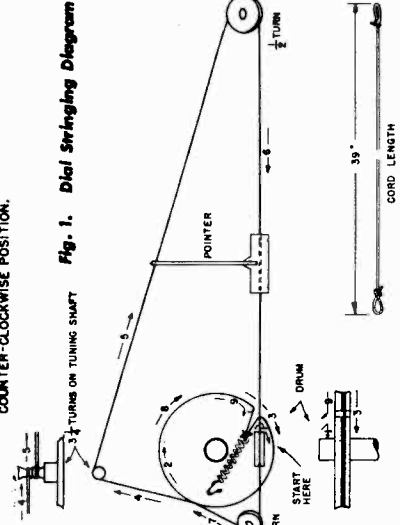
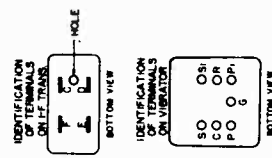


Fig. 6. Coil and Switch Terminal Identification

CONDITIONS OF TEST:
 ALL MEASUREMENTS P-C GROUND
 MEASUREMENTS MADE WITH 20,000 OHM/VOLT METER
 LINE VOLTAGE 117V - BATTERY FULLY CHARGED
 TONE CONTROL MAX. COUNTERCLOCKWISE

GENERAL ELECTRIC CO.

MODEL 250 ----- Battery Filler Cap.

It is important that the battery filler cap be sufficiently tight so that the washer is compressed, otherwise battery acid will leak out and damage the radio. Make sure the washer is replaced when the cap is removed and that possible thread burrs do not prevent the cap from being tightened completely. Use a screwdriver to tighten the cap.

A quantity of Model 250 radios was shipped with the oscillator adjustment plug not locked after alignment. This causes the low frequency calibration to be considerably in error and reduces sensitivity at this end of the band.

Realign the oscillator adjustment (adjacent to 1st IF transformer), $\dot{1}$ 4, then tighten down the lock nut.

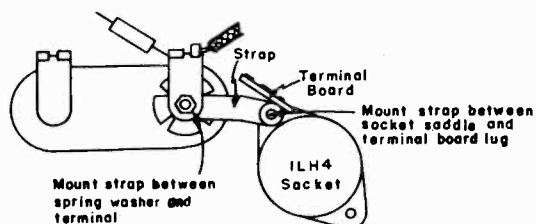
Failure of the vibrator unit REU-001 may be treated in the following manner:

1. The vibrator should be removed from the receiver and a resistance check made with an ohmmeter across terminals C and R.
2. If the resistance checks approximately six ohms and the vibrator will not start, it should be replaced with a new one.
3. If the resistance checks an infinite or high value, the vibrator should be opened up by unsoldering the base from the can. A resistance check should then be made across the terminals of the operating coil, and across the 220 ohm resistor. The operating coil should check approximately six ohms. If the coil is open, the vibrator must be replaced with a new one. If the resistor is open, the resistor should be replaced.
4. If the resistance across terminals C and R checks approximately 220 ohms, the starting contacts that short out the 220 ohm resistor do not make contact. This condition may be corrected by opening the vibrator and turning the small adjustment screw on the resistor side of the vibrator very slowly in the clockwise direction until the resistance across terminals C and R reads approximately six ohms. Care should be taken to see that this adjustment screw is not turned beyond the point where contact is made, and the 220 ohm resistor is shorted out.

A few radios were shipped that did not have the IF transformers peaked for maximum sensitivity. For sets with low sensitivity, realign the IF amplifier

When hum is experienced, the following checks should be made in the order of their listing;

1. Check the battery electrolyte level. It should be maintained at the recommended level.
2. A battery which is nearly discharged caused an excessive hum level.
3. A dirty or loose negative battery terminal contact causes excessive hum. Remove the battery and clean the terminals. Also, clean the negative prong located in the battery compartment, with fine emery; spread the battery spring contacts; and install a rubber insert, V61J551, up through the center of the split spring contacts. Early production radios did not have the rubber insert so that the normal handling causes these spring contacts to be compressed resulting in a high resistance connection. For those receivers not equipped, write your requirements to the Technical Service Section in Bridgeport and they will be forwarded immediately. When reinstalling the battery, spread a thin layer of petroleum jelly on the contacts.
4. Where the previous checks do not remedy the trouble, check the spring washer on the opposite end of the negative prong for a good chassis bond. This requires that the front part of receiver case be removed and then install a bonding strap as shown in the illustration. The factory is now installing an auxiliary copper strap made of $3/8$ " x $.010$ " soft copper strip, fastened between the spring washer and the 1LH4 socket saddle hole as shown in the illustration. Drill out the rivet at the socket saddle and install a bolt and nut to hold it and the socket and terminal board.



In a few remote cases it has been found that the storage battery (25-2) terminals have loosened internally where they are swedged to the plate holder of the battery. This causes low voltage when under load and results in a "dead" or intermittent set. To remedy replace the battery.

MODEL 250

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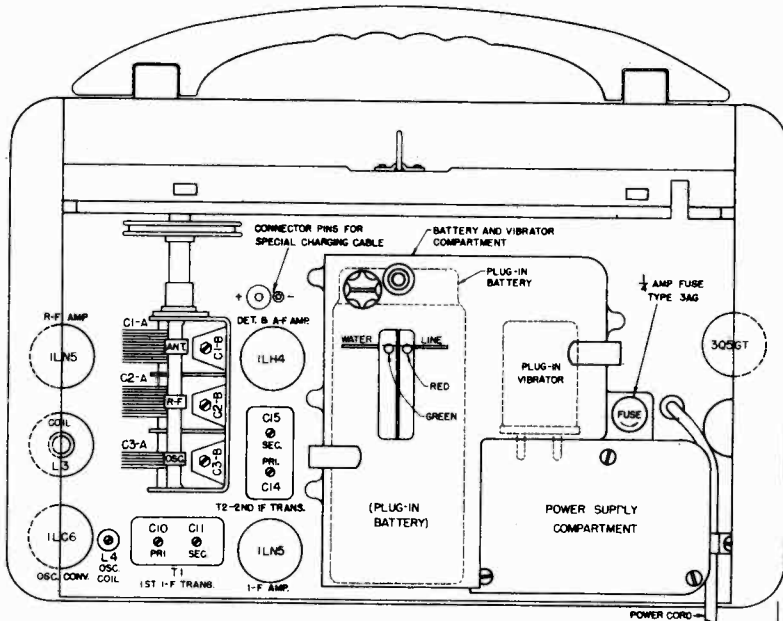


Fig. 3. Tube and Trimmer Location

ELECTRICAL CIRCUIT ALIGNMENT

1. EQUIPMENT REQUIRED.

1. Signal generator with audio tone modulation.
2. A-c output meter, 1 or 1 1/2 volts full scale, 1000 ohms - volt.
3. Insulated screwdriver.

2. ALIGNMENT PROCEDURE.

1. *General.*—The alignment procedure is given in table for convenience. Reference is made to Fig. 3 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 (clockwise), and the Tone Control should be turned to the position of maximum treble (extreme counterclockwise). 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 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 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. A short green lead will be found connected to one terminal of the speaker. This may be pushed through one of the holes in the chassis so that it will be accessible from the back of the radio. 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 is to remove the tone control knob and use a clip lead to the shaft.

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

ELECTRICAL RATING:

Charging from A-c Line:

Voltage.....105-125 volts, a-c only
 Frequency.....50/60 cps
 Wattage.....10 watts

Fuse:

G-E No. 2548, 1/4-ampere rating.

OPERATING FREQUENCIES:

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

POWER OUTPUT:

Undistorted.....248 milliwatts
 Maximum.....365 milliwatts

LOUDSPEAKER:

Type.....Alnico PM
 Outside Cone Diameter.....5 1/4 inches
 Voice Coil Impedance (400 cps)...3.2 ohms

ALIGNMENT CHART

Turn Tone Control CCW (Treble)

Turn Volume Control CW (Maximum)

Step	Connect Signal Generator to	Signal Generator Setting	Dial Setting	Adjust
1	Stator of C2-A in series with 0.05 mf.	455 kc	Reference Point Below 550 kc (Gang Closed)	2nd i-f (T-2) Trimmers for Max.
2	Stator of C2-A in series with 0.05 mf.	455 kc	Reference Point Below 550 kc (Gang Closed)	1st i-f (T-1) Trimmers for Max.
3	† Inductively Coupled	580 kc	580 kc	*L3 and L4 for Maximum.
4	† Inductively Coupled	1500 kc	1500 kc	**C3-B, C2-B, and C1-B for maximum in sequence given.

† Use loop on output of signal generator.

* Adjust L3 and L4 alternately several times to obtain peak.

** Make all adjustments of C1B, C2B, and C3B with rear cover closed, through the three ports provided on cover. Remove snap buttons for access.

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 directly to the converter grid. The low side of the signal generator output should be connected to the chassis ground to complete the circuit.

For aligning the oscillator and r-f coils, the r-f signal should be inductively coupled by connecting a three- or four-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 cover, with cover open. 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.

GENERAL ELECTRIC CO.

1. POWER SUPPLY

All power necessary for the operation of the receiver is supplied by the 2-volt built-in rechargeable battery. Power to the 1.4-volt tube filaments is supplied by the battery through suitable voltage dropping resistors. The high voltage for the screens and plates of the tubes is furnished by a synchronous vibrator used in conjunction with a step-up power transformer and its associated filter circuit. The synchronous vibrator operates directly from the battery voltage.

The receiver power is obtained from the battery at all times in the manner just described, whether the power cord is connected to a power source or not. When the power cord is connected to a receptacle supplying from 105 to 125 volts, 50 or 60 cps, a-c, and the power selector is in either the CHARGE or ON position, the power supplied from the line will be used to charge the battery. The CHARGE position on the three-position power selector switch allows the battery to be charged from the house current when the receiver is not operating. The ON position of the switch permits the radio to be operated at the same time that the battery is being charged. Under this condition, the battery floats in the circuit to keep the voltage at its proper voltage and, with high line voltage, the battery may be charged slowly while the radio is operating.

The battery-charging unit consists of a step-down transformer which converts the house current to approximately 5.8 volts center-tapped at 117 volts line, and a full-wave copper-oxide rectifier circuit which supplies the battery with d-c charging current.

A charging cable is available, which provides a convenient means of charging the radio battery from an automobile or 6-volt storage battery. The cable plug is inserted over the two pins provided, see Fig. 3, and the plug and socket on the other end of the cable are connected to a 6-volt supply. Complete installation instructions are provided with each cable.

2. CHARGER CHARACTERISTICS

Testing the operation of the rectifier unit.—A $\frac{1}{4}$ -ampere fuse is used in series with the primary of the charger transformer. If the battery does not show any signs of becoming charged after a reasonable length of time, check the fuse. If it is necessary to replace the fuse, use a $\frac{1}{4}$ -ampere, Type 3AG fuse.

If one or more of the copper-oxide discs of the rectifier unit are defective, the charger will not operate properly. To test the rectifier unit operation, remove the battery from the unit and reconnect it in series with a d-c ammeter capable of reading at least two amperes. Plug the power cord into a 105-125 volt, 50 or 60 cps, a-c supply, and turn the power selector switch to the CHARGE position. With the a-c line voltage at 117 volts, the average charging current should read about 1.8 amperes at 2.1 volts battery. Care must be exercised in making this test as the charging circuit is of extremely low resistance. *Very heavy* leads must be used, and the use of an ammeter having only 0.05 ohms resistance will introduce considerable error. If the line voltage is greater than 117, or the battery voltage is lower than 2.1 volts, the charging current will be greater. If the current is much less than 1.8 amperes at the rated line voltage of 117 volts, one or more of the copper-oxide discs may be defective.

Testing the individual rectifier discs. Two rectifier assemblies are used in the receiver, each assembly consisting of two rectifier discs held together by an eyelet. A cross section of a rectifier assembly is shown in Fig. 2. The center plate of the assembly is positive and is provided with a soldering tab. A copper-oxide rectifier disc is located on each side of the center plate. The rectifier disc conducts when the positive potential is applied to the copper-oxide surface. The copper oxide is a dark purple coating which has been plated with nickel to afford a good surface contact to the copper oxide. If either or both of the rectifier discs in an assembly become defective, the entire assembly should be replaced.

To check the rectifier assembly, the following tests are recommended. In the conducting direction, the rectifier assembly should pass 0.5 ampere or more when $\frac{1}{2}$ volt is impressed across it. If a d-c ammeter is not available for measuring currents as high as 0.65 ampere, the circuit shown in Fig. 2 can be used for this check. The 2.00-ohm resistance should be fairly accurate. The voltage across the rectifier assembly should read 0.7 volt or less; if this voltage exceeds 0.7 volt, the assembly is defective and should be replaced.

The reverse current flow is as important as the above test and is made as follows: Reverse the battery polarity in the test circuit described for current check, disconnect the voltmeter, and place a milliammeter that will read 10 ma. in series with a lead to one of the battery terminals. A suitable meter fuse should be used in series with the milliammeter to prevent damage to the meter in case the assembly under test

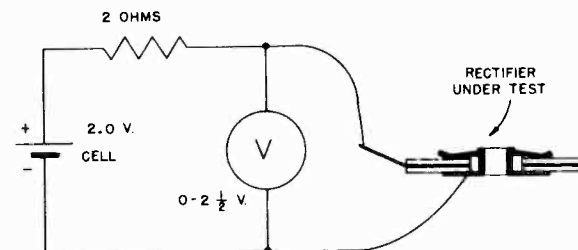


Fig. 2. Rectifier Test Circuit

is shorted. The reverse current should not exceed 10 ma. If the current is considerably above this value, the rectifier assembly should be discarded.

If a milliammeter is not available, a rough check may be made by measuring the resistance of the assembly in the nonconducting direction on the low-resistance range of an ohmmeter. The resistance should measure at least 300 ohms.

3. DISASSEMBLY OF THE RECEIVER

The following outlines should be of assistance in gaining access to the various compartments of the receiver and in dismantling it for replacement of panels.

To Gain Access to Power Supply Compartment.

1. Open the back cover and unsnap the battery compartment cover. Remove the cover by prying gently with a screwdriver.
2. Remove the three flat-head screws on the power supply compartment cover (see Fig. 3).
3. Pry the lid from the power supply compartment and lift it straight outward. All of the power supply components are attached to the lid and will come out with it as far as the connecting leads will permit. In replacing this cover, be careful not to short circuit the B + lead.

To Gain Access to Underside of Radio Chassis.

1. Open the top cover and remove the four Phillips-head screws from the front edge of the escutcheon.
2. Unscrew the three flat-head screws from the bottom of the case, and remove the single sheet of metal which forms the front and bottom of the case. Disconnect the speaker plugs from the speaker to free the front panel from the chassis.

To Remove the Right End Panel.

1. Open the top cover and pull off the four knobs.
2. Remove the two cover stay-arms by unscrewing the screw which holds each to the cover. This allows the loop to fall to its extreme position. Care should be taken to see that the loop connection springs are not broken while the stay-arms are off.
3. Remove the eight Phillips-head screws which hold the escutcheon in place.
4. Bend the ends of the escutcheon inward slightly to free them from the end panels, and remove the escutcheon and dial assembly.
5. Remove the three speed-nuts which hold the end in place. Two of these are located in the top part of the case; the third one is in the bottom rear.
6. Pull off the end panel.

To Remove the Left End Panel.

1. Remove the escutcheon and dial assembly as outlined in steps one through four in the preceding paragraph.
2. Unscrew the three flat-head screws from the bottom of the case, and remove the single sheet of metal which forms the front and bottom of the case. Disconnect the speaker plugs from the speaker to free the front panel from the chassis.
3. Remove the three speed-nuts which hold the end in place. Two of these are located in the top part of the case; the third is in the bottom front.

To Remove Top and Rear Cover Assembly.

1. Open the back cover and unsolder the two antenna loop leads. To facilitate replacement, mark each of the metal strips with the color code of the wire which was unsoldered from it.
2. Remove the escutcheon and dial assembly as outlined in steps one through four of the preceding paragraph, "To Remove the Right End Panel."
3. Unscrew the three flat-head screws located near the ends of the hinge on the top of the chassis, and remove the entire top and rear cover assembly.
4. Pull out the hinge pin to separate the top and rear covers.

STAGE GAIN 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%.

- R-F Stage Gains.
R-F Amplifier grid (1LN5, pin 6) to Osc.-Conv. grid (1LC6, pin 6) 25.0 at 1000 kc
Osc.-Conv. grid (1LC6, pin 6) to I-F Amp. grid (1LN5, pin 6) 33 at 1000 kc
- Audio Gain.
The power output across the speaker voice coil should be approximately 50 milliwatts with a 400 cps signal of 0.07 volts applied across C19 (Volume Control max.—Tone Control CCW).
- Oscillator Grid Bias.
The d-c voltage developed across the oscillator grid leak (R2) averages 8.1 volts at 1000 kc.
- Socket Pin Voltages.

Fig. 4 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

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:

- Green indicator sinks when approximately 20 per cent of battery capacity has been discharged.
- 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 is complete and 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 turning the

selector switch to CHARGE. Frequent check should be taken of the charge indicator and when both indicator balls are visible, the battery is fully 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 turn the power selector switch to the ON position. Prolonged and repeated operation on this position will assure that the battery is always maintained in a nearly fully charged condition.

Battery Operating Instructions

- 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 nonspill feature.
- A fully charged battery will operate the radio in the ON position without being connected to a-c outlet for about 20 hours before recharging is required. 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.
- 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 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:

- Remove battery from packing carton.
- If needed, add water to bring liquid level to indicator mark on battery container. Do not overfill.
- Raise back cover on radio, remove battery case cover. The latter is removed by unclipping the two catches. Pry off cover.
- Unplug battery and replace with new battery.
- Place battery on charge, if necessary, as described in a previous paragraph, until both indicators are showing in the opening in the case cover.

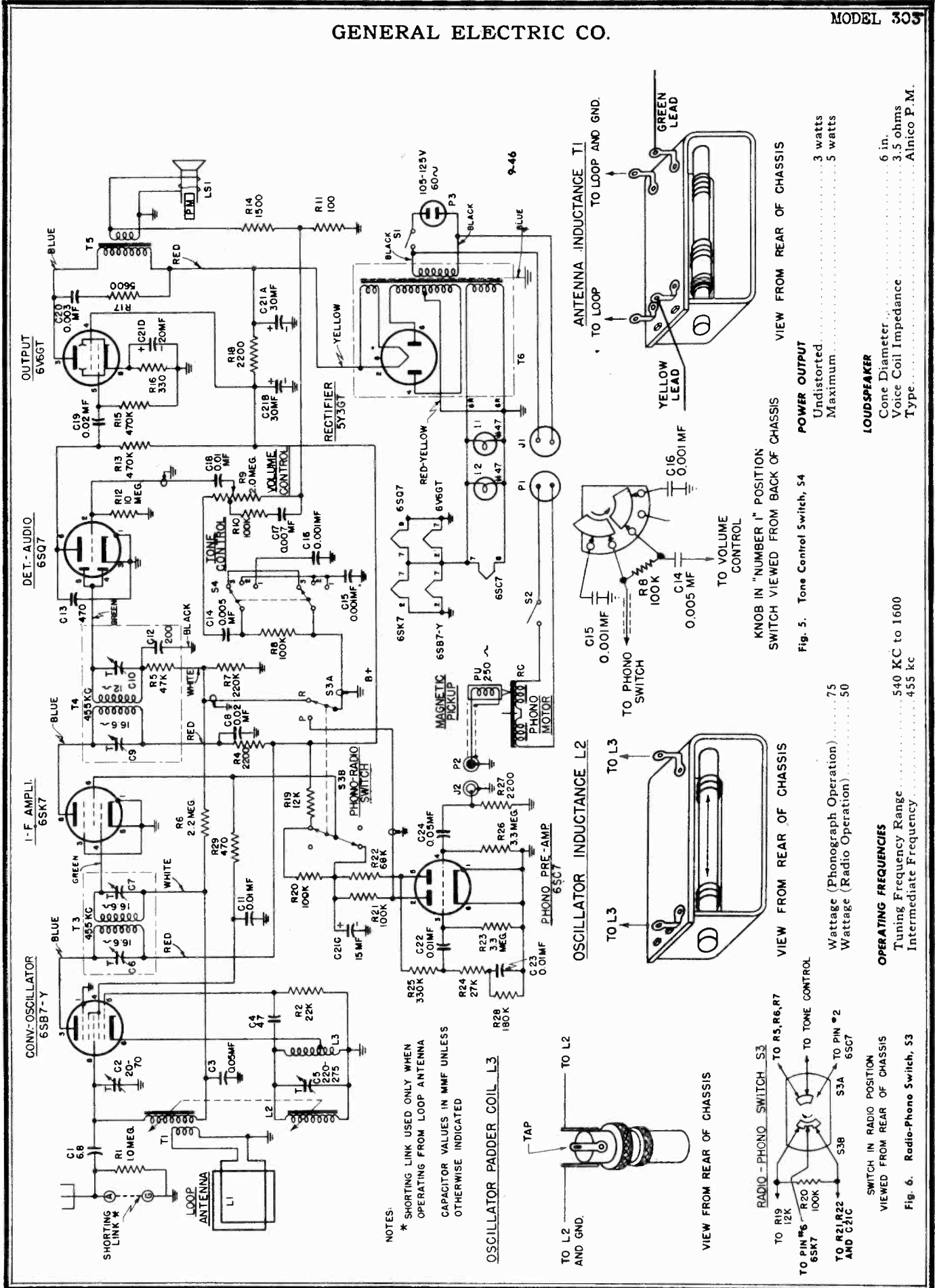
CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS LIST		
UCC-030	C8, 17	CAPACITOR—0.1 mf., 400 v., paper
UCC-039	C13, 21, 23	CAPACITOR—0.005 mf., 600 v., paper
UCC-041	C24	CAPACITOR—0.02 mf., 600 v., paper
UCN-506	C5	CAPACITOR—6.8 mmf., ceramic
UCU-028	C7, 18, 19	CAPACITOR—100 mmf., mica
UCU-040	C4	CAPACITOR—330 mmf., mica
UOP-009	LS1	LOUDSPEAKER—5 1/2-inch PM speaker
URD-049	R7	RESISTOR—1,000 ohms, 1/2 w., carbon
URD-057	R16	RESISTOR—2,200 ohms, 1/2 w., carbon
URD-059	R15	RESISTOR—2,700 ohms, 1/2 w., carbon
URD-067	R6	RESISTOR—5,600 ohms, 1/2 w., carbon
URD-081	R5	RESISTOR—22,000 ohms, 1/2 w., carbon
URD-089	R3, 9	RESISTOR—47,000 ohms, 1/2 w., carbon
URD-105	R2, 12	RESISTOR—220,000 ohms, 1/2 w., carbon
URD-121	R1, 14	RESISTOR—1 meg., 1/2 w., carbon
URD-129	R8	RESISTOR—2.2 meg., 1/2 w., carbon
URD-137	R11	RESISTOR—4.7 meg., 1/2 w., carbon
URE-053	R17	RESISTOR—1,500 ohms, 1 w., carbon

CAT. NO.	SYMBOL	DESCRIPTION
SPECIALIZED G-E REPLACEMENT PARTS		
RAC-002		COVER—Battery compartment cover
RAC-003		COVER—Power supply compartment cover
RAC-006		COVER—Case back cover (brown)
RAC-007		COVER—Case back cover (gray)
RAC-010		COVER—Case left end cover (brown)
RAC-011		COVER—Case left end cover (gray)
RAC-012		COVER—Case right end cover (brown)
RAC-013		COVER—Case right end cover (gray)
RAG-002		COVER—Case front and grille (brown)
RAG-003		COVER—Case front and grille (gray)
RAI-001		BRACE—Case cover brace assembly (brown)
RAI-002		BRACE—Case cover brace assembly (gray)
RAX-004		COVER—Case cover assembly (brown)
RAX-005		ASSEMBLY—Cover stay arm assembly
RAX-006		COVER—Case cover assembly (gray)
RBC-001	B2	CELL—Bias cell
RCC-028	C6, 12, 16, 25, 32	CAPACITOR—0.05 mf., 400 v., paper
RCC-069	C34	CAPACITOR—0.5 mf., 120 v., paper
RCC-070	C29, 30	CAPACITOR—0.5 mf., 120 v., paper
RCC-073	C31	CAPACITOR—0.003 mf., 1500 v., paper

CAT. NO.	SYMBOL	DESCRIPTION
SPECIALIZED G-E REPLACEMENT PARTS		
RCE-007	C26A, B, C	CAPACITOR—15 mf., 150 v.; 15 mf., 150 v.; 1200 mf., 1.5 v. electrolytic
RCT-008	C1A, B, 2A, B, 3A, B	CONDENSER—Tuning condenser and trimmers
RDC-007		CORD—Drive cord and tension spring
RDE-006		ESCUTCHEON—Dial scale escutcheon
RDK-020		KNOB—Control knob (plain)
RDK-021		KNOB—Control knob (pointer)
RDP-008		POINTER—Dial pointer assembly
RDS-013		SCALE—Dial scale
REF-001	F1	FUSE—1/2-amp. fuse, Type 3AG
REU-001	V1	VIBRATOR—Vibrator unit
REX-001	X1, 2, 3, 4	RECTIFIER—Copper-oxide rectifier assembly
RHF-001		FOOT—Cabinet foot
RHK-001		KNOB—Cover lock knob
RHQ-002		TUBE—Battery vent tube
RHX-003		HARDWARE—Tuning condenser mtg. hardware
RIG-001		GASKET—Dial scale gasket
RJS-019		SOCKET—Vibrator socket
RJS-020		SOCKET—Loktal tube socket
RJS-021		PLATE—Electrolytic capacitor mounting plate
RJS-026		SOCKET—Octal base tube socket
RJW-001		HOLDER—Fuse holder
RLB-002	L3	COIL—R-f coil
RLC-008	L4	COIL—Oscillator coil
RLF-001	L5, 6	CHOKE—Vibrator and B+ choke
RLF-002	L7	CHOKE—Filament choke
RLL-008	L1	BEAM-A-SCOPE—Loop antenna assembly (in cover)
RMC-008		CAM—Cover lock mechanism cam
RMC-009		CATCH—Cover lock mechanism catch
RMU-010		SHAFT—Tuning shaft
RMW-004		PULLEY—Pulley and stud (small pulley)
RMW-009		PULLEY—Pulley and stud (large pulley)
RMX-013		CATCH—Battery case catch
RRC-008	R10	VOLUME CONTROL—0.5 meg., potentiometer
RRG-001	R18	RESISTOR—7.5 ohms, 1/2 w., carbon
RSW-009	S4	SWITCH—Power selector switch
RSW-010	S5	SWITCH—Tone selector switch
RTL-001	T4	TRANSFORMER—Rectifier transformer
RTL-011	T1	TRANSFORMER—1st i-f transformer
RTL-012	T2	TRANSFORMER—2nd i-f transformer
RTO-007	T3	TRANSFORMER—Output transformer
RTV-001	T5	TRANSFORMER—Vibrator transformer
RWL-005	P3	PLUG—Power cord and plug

GENERAL ELECTRIC CO.

MODEL 305



NOTES:
 * SHORTING LINK USED ONLY WHEN OPERATING FROM LOOP ANTENNA
 CAPACITOR VALUES IN MMF UNLESS OTHERWISE INDICATED

POWER OUTPUT
 Undistorted 3 watts
 Maximum 5 watts

LOUDSPEAKER
 Cone Diameter 6 in.
 Voice Coil Impedance 3.5 ohms
 Type Alnico P. M.

Fig. 5. Tone Control Switch, S4

Wattage (Phonograph Operation) 75
 Wattage (Radio Operation) 50

OPERATING FREQUENCIES
 Tuning Frequency Range 540 KC to 1600
 Intermediate Frequency 455 kc

SWITCH IN RADIO POSITION VIEWED FROM REAR OF CHASSIS
 TO PIN #6 6SK7
 TO R20 100K
 TO R21, R22 AND C21C
 TO R5, R6, R7
 TO TONE CONTROL
 TO PIN #2 6SQ7
 S3A
 S3B

Fig. 6. Radio-Phono Switch, S3

GENERAL ELECTRIC CO.

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F—1620, 1500, 1000 KC
I-F—455 KC

EQUIPMENT REQUIRED

1. Test Oscillator with Tone Modulation.
2. A-C Output Meter, 1½ volts full scale.
3. .05 Paper Condenser.
4. Insulated Screwdriver.
5. 200 μmf. Mica Condenser.

ALIGNMENT PROCEDURE—GENERAL

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. All i-f and r-f adjustments are accessible from the bottom of the cabinet when the chassis is installed. The location of the i-f and r-f adjustments is shown in Figure 4. Adjustment of inductances L₂ and T₁ is accomplished by loosening the adjustment screws and sliding the inductance to the correct position using the chassis hole as a fulcrum. Retighten the adjustment screw after alignment.

For accurate calibration, the position of the pointer should be established prior to r-f alignment as follows. If no dial scale is available or if the chassis is removed from the cabinet, turn the tuning control knob fully counterclockwise (slugs fully in the coils) and secure the pointer to the dial string at some arbitrary position near the left end of the dial scale or pointer travel. Mark the pointer position on the backplate or note its position with reference to the number scale stamped on the backplate. Proceed with the alignment as indicated in the alignment chart and mark the pointer position for 1500 kc. The distance between the original reference mark and the 1500 kc mark should be 5.25 inches for accurate dial calibration. After installation of the chassis in the cabinet, the tuning control is turned extreme counterclockwise and the pointer slid and secured to the string at the extreme left rectangular dial calibration mark on the scale. The pointer is accessible through the hole in the backplate.

The output meter should be connected across the loud-speaker voice coil terminal. A voice coil terminal is accessible at an insulated rivet in the bottom of the chassis. The low side of the test oscillator output should be connected to the chassis ground; the high side of the test oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the volume control should be at its maximum position. The test oscillator output should be attenuated so that the output meter reading doesn't exceed 1¼ volts.

ALIGNMENT CHART

Step	Connect Test-Osc. To:	Test-Osc. Setting	Pointer Setting on Radio	Adj. for Max. Output
1	6SK7 pin No. 4 in series with .05 mf. paper capacitor	455 kc	1600 kc	2nd I-F Trans Trimmers C9-C10
2	6SB7Y pin No. 8 in series with .05 mf. paper capacitor	455 kc	1600 kc	1st and 2nd I-F Trans. C6, C7, C9, and C10
3	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1620 kc	Extreme Right	Osc. Trimmer C5
4	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1620 kc	Extreme Right	Ant. Trimmer C2
5	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1500 kc	*1500 kc	Oscillator Inductance L2
6	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1000 kc	1000 kc	Antenna Inductance T1
7	Recheck Steps 3, 4, 5, and 6.			
8	Replace shorting link unless installing for antenna operation.			

* 1500 kc is 5.25 inches from extreme low frequency pointer position. (See alignment procedure.)

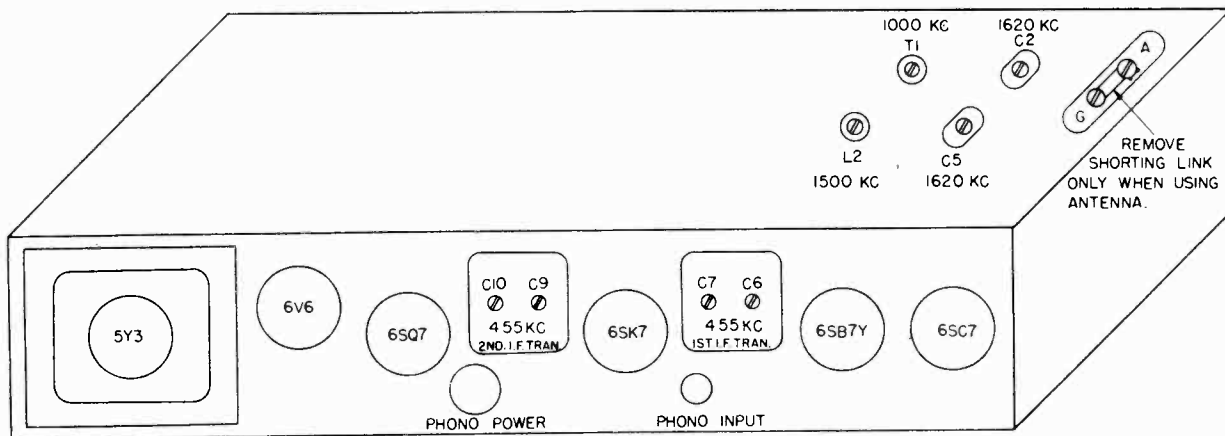


Fig. 4. Tube and Trimmer Location

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STAGE GAIN 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 Stage Gain.

- Antenna post to 6SB7Y grid 3 at 1000 kc
- 6SB7Y grid to 6SK7 grid 70 at 455 kc
- 6SK7 grid to 6SQ7 diode plate 70 at 455 kc

2. Audio Gain.

The power output across the speaker voice coil should be approximately 1/2 watt with .05 volts at 400 cps applied between the high side of the volume control and ground. Approximately .008 volts at 400 cps should be applied to the phonograph input for 1/2 watt output across the speaker voice coil.

3. Oscillator Grid Bias.

The d-c voltage developed across the oscillator grid leak R2 should be approximately 6.6 volts at 1000 kc.

4. Socket Pin Voltages.

Socket pin voltages greatly different than those shown in Figure 1 indicate defective components or tubes. It should be noted that a considerable difference in voltage exists at some voltage check points depending on the position of the radio-phonograph switch. (See Fig. 1).

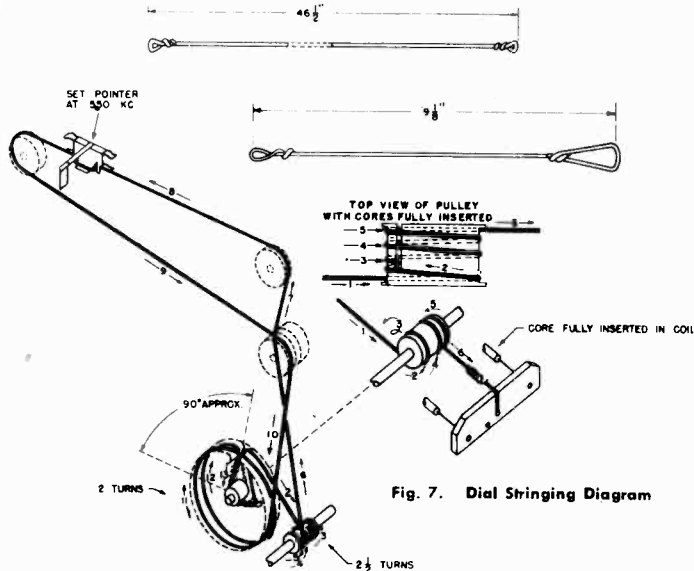


Fig. 7. Dial Stringing Diagram

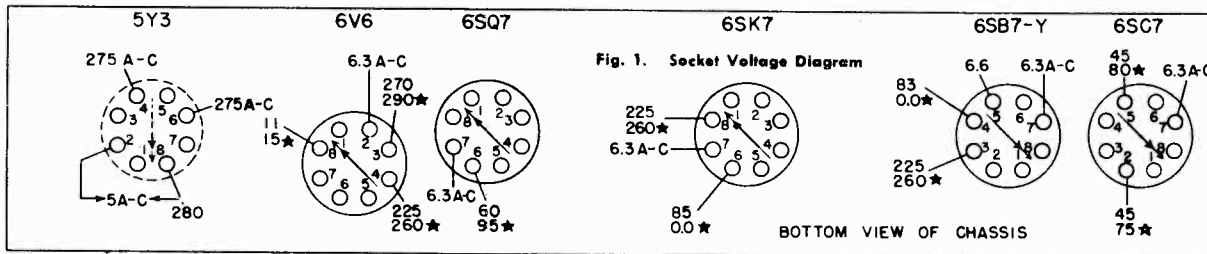


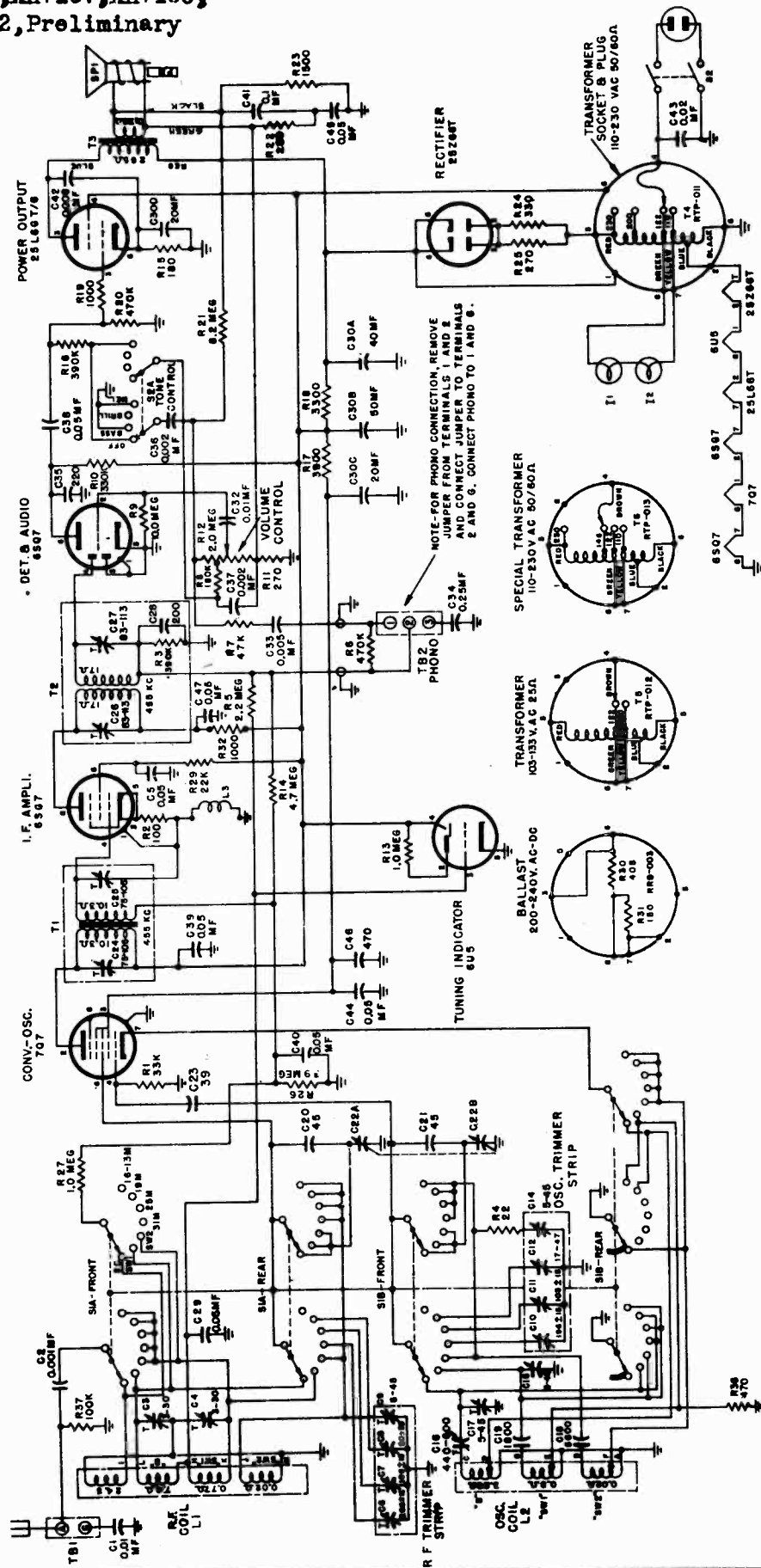
Fig. 1. Socket Voltage Diagram

CONDITIONS OF TEST
 VALUES OBTAINED WITH 20000 OHMS PER VOLT METER
 READINGS ARE BETWEEN PIN AND CHASSIS WITH A LINE VOLTAGE OF 117 VOLTS
 VOLUME CONTROL MINIMUM
 NO SIGNAL INPUT
 ★ VALUES OBTAINED WITH RADIO-PHONO SWITCH IN PHONO POSITION
 ALL READINGS TAKEN WITH RADIO-PHONO SWITCH IN RADIO POSITION UNLESS OTHERWISE INDICATED

PART NO	SYMBOL	DESCRIPTION	PART NO	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
UCC-035	C15, 16	CAPACITOR—.001 mfd., 600 v., paper	RCE-033	C21A	CAPACITOR—30 mf., 350 v., dry electrolytic
UCC-039	C14	CAPACITOR—.005 mfd., 600 v., paper		C21B	CAPACITOR—30 mf., 350 v., dry electrolytic
UCC-040	C11, 18, 22, 23	CAPACITOR—.01 mfd., 600 v., paper		C21C	CAPACITOR—15 mf., 250 v., dry electrolytic
UCC-041	C8, 19	CAPACITOR—.02 mfd., 600 v., paper		C21D	CAPACITOR—20 mf., 25 v., dry electrolytic
UCC-045	C3, 24	CAPACITOR—.05 mfd., 600 v., paper	RCY-013	C2	CAPACITOR—Antenna trimmer, 20-75 mmf.
UCC-057	C20	CAPACITOR—.003 mfd., 1000 v., paper	RDC-013	C5	CAPACITOR—Oscillator trimmer, 220-275 mmf.
UCN-606	C1	CAPACITOR—6.8 mmf., 500 v., ceramic	RDF-005		CORD—Dial drive cord 4 1/2 in.
UCU-020	C4	CAPACITOR—47 mmf., 500 v., mica	RDK-002		CORD—Tuning mechanism drive cord 9 1/2 in.
UCU-044	C13	CAPACITOR—470 mmf., 500 v., mica	RDK-006		WASHER—Felt washers for control knobs
UIC-001		CEMENT—Speaker cone replacement cement	RDP-014		KNOB—Phono-radio and tone control (pointer)
UOP-628	SPKR	SPEAKER—6 inch permanent magnet	RDS-020		KNOB—Tuning and volume control (plain)
UOX-001		CONE—Speaker cone and dust cap	REI-005		POINTER—Dial pointer and slide
URD-026	R11	RESISTOR—100 ohms, 1/2 w., carbon			SCALE—Dial scale and cushion
URD-041	R28	RESISTOR—180,000 ohms, 1/2 w., carbon			CORE—Iron core for tuning antenna and oscillator coils
URD-053	R14	RESISTOR—1500 ohms, 1/2 w., carbon	RHG-003		GROMMET—Mounting grommet for 6SC7 socket
URD-057	R4, 27	RESISTOR—2200 ohms, 1/2 w., carbon	RHH-004		FASTENER—Holds bottom plate on
URD-067	R17	RESISTOR—5500 ohms, 1/2 w., carbon	RJA-001		ADAPTER—Connects control knobs to control shaft
URD-081	R2	RESISTOR—22,000 ohms, 1/2 w., carbon			PLUG—Connects to speaker
URD-083	R24	RESISTOR—27,000 ohms, 1/2 w., carbon	RJC-001	J2	SOCKET—Phono input socket on chassis
URD-093	R22	RESISTOR—68,000 ohms, 1/2 w., carbon	RJP-010		SOCKET—6SB7-Y socket
URD-097	R8, 20, 21, 10	RESISTOR—100,000 ohms, 1/2 w., carbon	RJS-003		SOCKET—Octal socket
URD-103	R28	RESISTOR—180,000 ohms, 1/2 w., carbon	RJS-006		SOCKET—6SC7 socket
URD-106	R7	RESISTOR—220,000 ohms, 1/2 w., carbon	RJS-031	J1	SOCKET—Pilot light socket
URD-109	R25	RESISTOR—330,000 ohms, 1/2 w., carbon	RJS-033		SOCKET—Phono power socket
URD-113	R13, 15	RESISTOR—470,000 ohms, 1/2 w., carbon	RJA-049	T1	COIL—Antenna coil assembly (less iron core)
URD-121	R1	RESISTOR—1.0 meg., 1/2 w., carbon	RLC-019	L2	COIL—Oscillator coil assembly (less iron core)
URD-129	R6	RESISTOR—2.2 meg., 1/2 w., carbon	RLC-020	L3	COIL—Oscillator padder
URD-133	R23, 26	RESISTOR—3.3 meg., 1/2 w., carbon	RLL-011	L1	BEAM-A-SCOPE—Loop antenna assembly
URD-146	R12	RESISTOR—10.0 meg., 1/2 w., carbon	RMS-004		SPRING—Tuning Drive Cord Tension Spring
URE-037	R16	RESISTOR—330 ohms, 1 w., carbon	RMS-056		SPRING—Main Drive Cord Tension Spring
URF-057	R18	RESISTOR—2200 ohms, 2 w., carbon	RMW-003		PULLEY—Idler pulley for dial string
URF-076	R19	RESISTOR—12,000 ohms, 2 w., carbon	RMX-013		SHAFT—Shaft assembly for driving tuning mechanism
SPECIALIZED G-E REPLACEMENT PARTS			RMX-014		SHAFT—Tuning control shaft assembly
RAC-015		COVER—Cabinet bottom	RPX-010	PU	PICK-UP—Magnetic pick-up cartridge
RAD-016		BRACKET—For pilot light	RRC-029	R9	VOLUME CONTROL AND POWER SWITCH—2 meg. tapped at 1 meg.
RCC-001	C17	CAPACITOR—.007 mf., 600 v., paper	RSW-018	S3	SWITCH—Radio phono
RCD-001		SHAFT—Tuner assembly consisting of slide shaft and bracket (less iron cores)	RSW-019	61	SWITCH—Tone control
			RTL-020	T4	TRANSFORMER—2nd IF Transformer
			RTL-021	T3	TRANSFORMER—1st IF Transformer
			RTO-013	T6	TRANSFORMER—Output transformer
			RTP-021	T6	TRANSFORMER—Power transformer
			RWL-009		CORD—Power cord and plug

MODELS X-317V, X317C,
X-317D2, XH715V, XH713C,
XH-713D2, Preliminary

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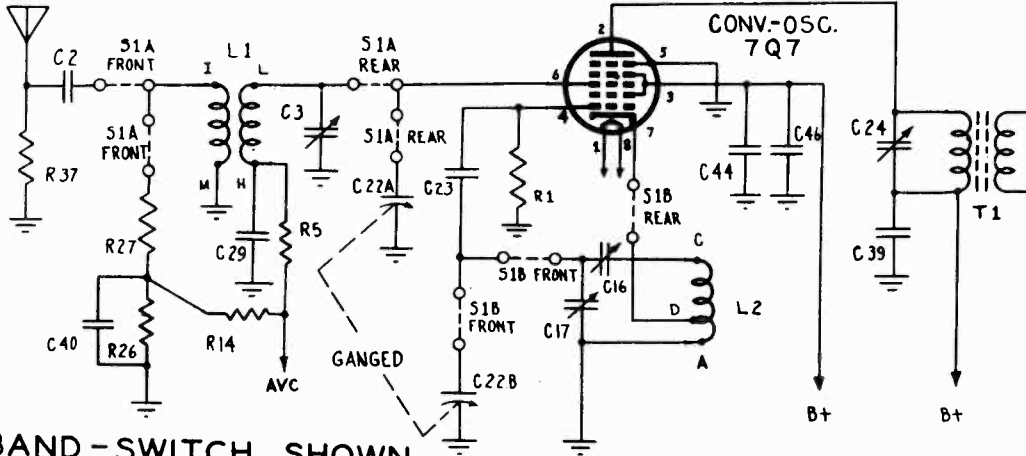


IF PEAK 455 KC

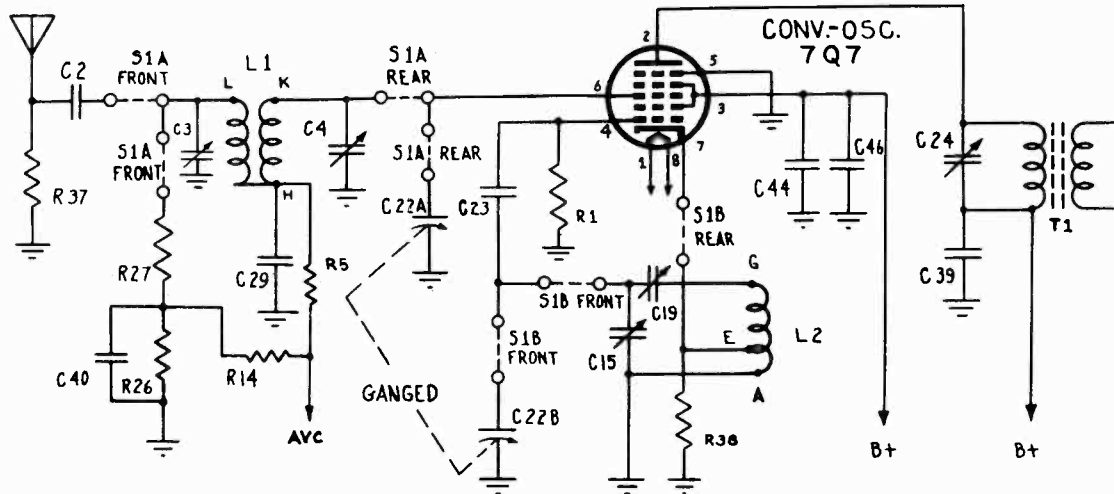
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- (2) X317C 25 cycle
- (3) X317D2 230 V. AC-DC
- (4) XH713V "
- (5) XH713C 25 cycle
- (6) XH713D2 230 V. AC-DC

GENERAL ELECTRIC CO.

MODELS X-317V, X317C,
X-317D2, XH-713V, XH-713C,
XH-713D2, Preliminary

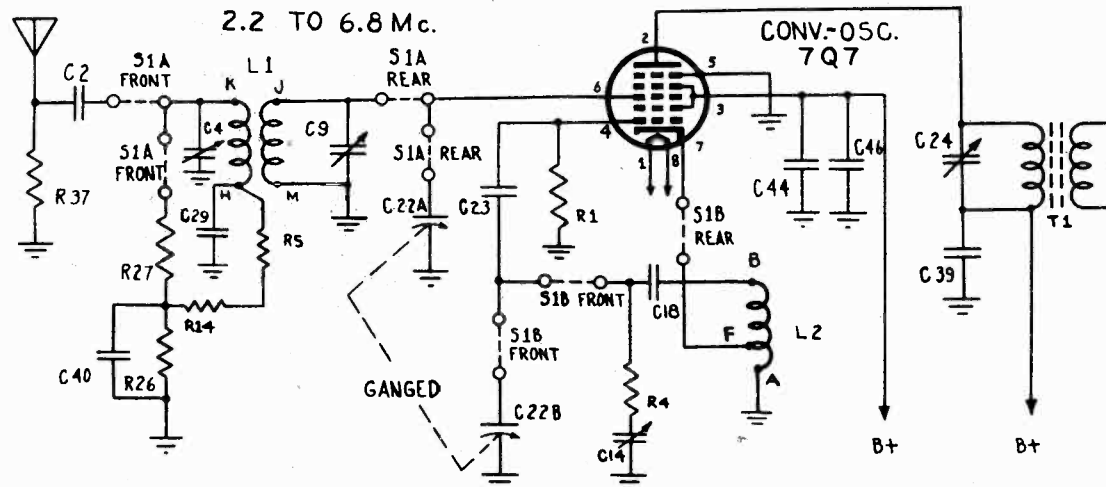


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 TO 1700 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE
SHORT WAVE 1 BAND

2.2 TO 6.8 Mc.



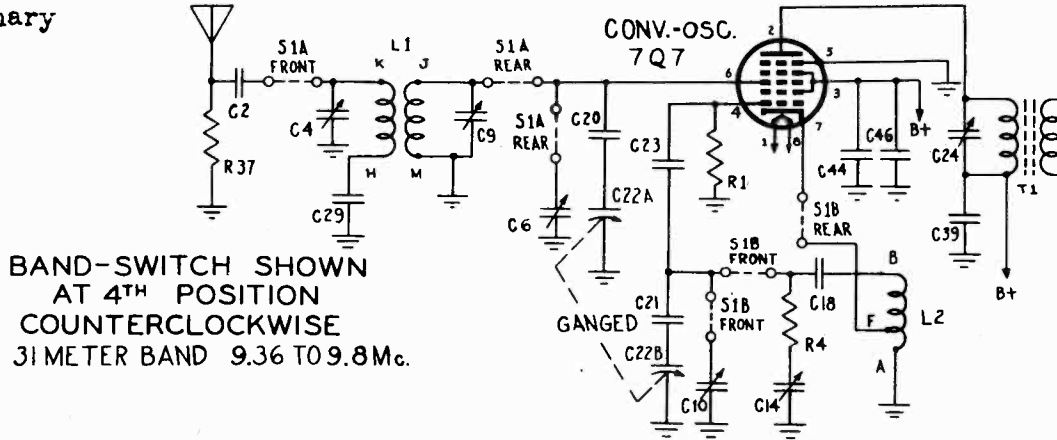
BAND-SWITCH SHOWN
AT 3RD POSITION COUNTERCLOCKWISE
SHORT WAVE 2 BAND

6.8 TO 21.0 Mc.

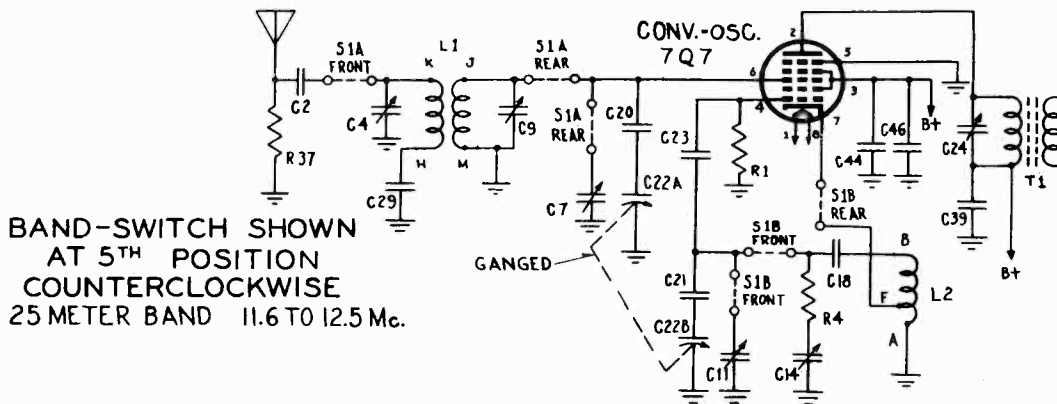
"clarified schematics"

MODELS X-317V, X-317C,
X-317D2, XH-713V,
XH-713C, XH-713D2
Preliminary

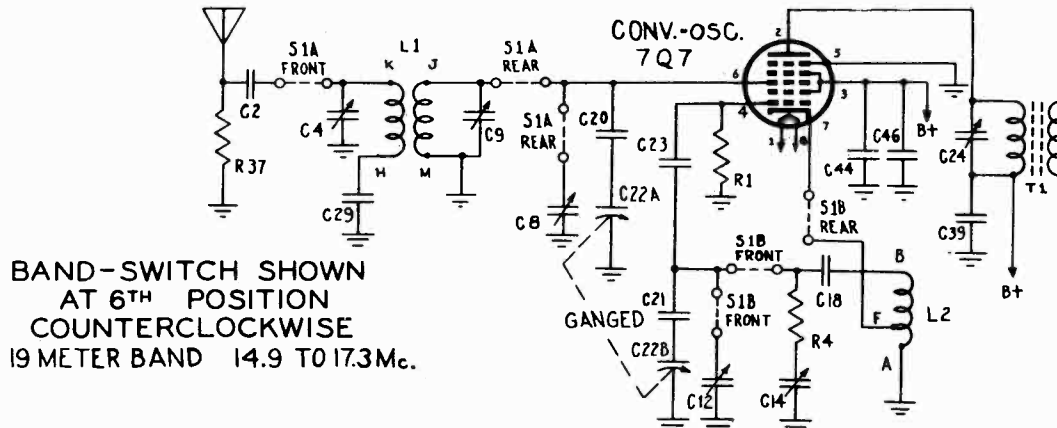
GENERAL ELECTRIC CO.



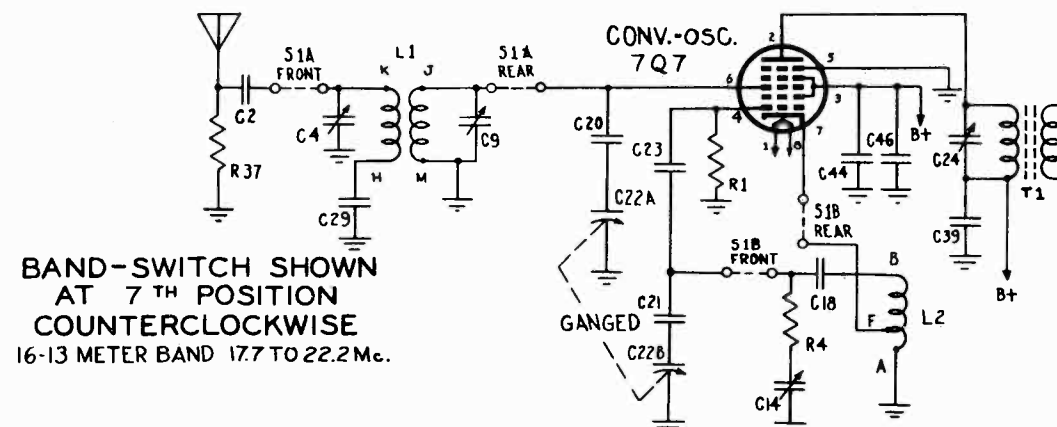
BAND-SWITCH SHOWN
AT 4TH POSITION
COUNTERCLOCKWISE
31 METER BAND 9.36 TO 9.8 Mc.



BAND-SWITCH SHOWN
AT 5TH POSITION
COUNTERCLOCKWISE
25 METER BAND 11.6 TO 12.5 Mc.



BAND-SWITCH SHOWN
AT 6TH POSITION
COUNTERCLOCKWISE
19 METER BAND 14.9 TO 17.3 Mc.



BAND-SWITCH SHOWN
AT 7TH POSITION
COUNTERCLOCKWISE
16-13 METER BAND 17.7 TO 22.2 Mc.

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MODELS X-317V, X-317C
X-317D2, XH-713V,
XH-713C, XH-713D2,
Preliminary

CAUTION

ONE SIDE OF THE POWER LINE IS CONNECTED TO THE CHASSIS. AVOID ANY GROUND CONNECTIONS TO THE RADIO UNLESS AN ISOLATING TRANSFORMER IS USED IN THE POWER LINE.

ELECTRICAL CIRCUIT ALIGNMENT

The following equipment is required: (1) test oscillator with tone modulation, (2) a-c output meter, 1 1/2 volts full scale, (3) 0.05 mf. paper capacitor, (4) 200 mmf. mica capacitor, (5) insulated screwdriver.

PROCEDURE:

- (1) For i-f alignment, the chassis must be removed from the cabinet. For r-f alignment, the chassis should be firmly bolted in place in the cabinet.
- (2) Connect output meter across loudspeaker voice coil leads.
- (3) Set radio volume control to its maximum position and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.
- (4) Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

TUBE COMPLEMENT:

- Converter-Oscillator..... Type 7Q7
- I-F Amplifier..... Type 6SG7
- Detector-Audio..... Type 6SQ7
- Power Output..... Type 25L6GT/G
- Rectifier..... Type 25Z6GT
- Tuning Indicator..... Type 6U5
- Pilot Lamp..... (2) GE #44

ELECTRICAL RATING:

- "C" Voltage Rating
(Transformer RTP-012)... 103-133 v., 25-60 cycles
- "D2" Voltage Rating
(Ballast RRB-003)..... 210-240 v., a-c or d-c
- "V" Voltage Rating
(Transformer RTP-011)... 103-250 v., 50-60 cycles
- Wattage ("C" and "V" Ratings)..... 60 watts
- Wattage (D2 Rating)..... 100 watts

OPERATING FREQUENCIES:

- Broadcast..... 540-1700 kc
- Shortwave 1..... 2.2-6.8 mc
- Shortwave 2..... 6.8-21.0 mc
- 31 Meters..... 9.36-9.8 mc
- 25 Meters..... 11.6-12.5 mc
- 19 Meters..... 14.9-17.3 mc
- 16-13 Meters..... 17.7-22.2 mc
- I-F Amplifier..... 455 kc

ALIGNMENT CHART

Step	Test Osc. Connected to	Test-Osc. Setting	Band & Pointer Setting	Tune Trimmer for Max. Output
1	6SG7 I-F grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550KC	C26 and C27
2	7Q7 CONV. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550KC	C24 and C25
3	ANT. POST in series with 200 mmf.	580 KC	"BC" BAND 580KC	C16**
4	ANT. POST in series with 200 mmf.	1500 KC	"BC" BAND 1500KC	C17 (osc.) C3 (ant.)
5	R E P E A T S T E P 3			
6	ANT. POST in series with 200 mmf.	6.1 MC	"SW-1" BAND 6.1 MC	C15 (osc.) C4 (ant.)
7	ANT. POST in series with 200 mmf.	17.8 MC	16 METER 17.8MC	C14* (osc.)
8	ANT. POST in series with 200 mmf.	21.6 MC	16 METER 21.6MC	C9*** (ant.)
9	ANT. POST in series with 200 mmf.	15.22 MC	19 METER 15.22MC	C12* (osc.) C8*** (ant.) *
10	ANT. POST in series with 200 mmf.	11.8 MC	25 METER 11.8MC	C11* (osc.) C7*** (ant.)
11	ANT. POST in series with 200 mmf.	9.6 MC	31 METER 9.6MC	C10* (osc.) C6*** (ant.)

*Use minimum capacity peak if two are obtainable. ***Use maximum capacity peak if two are obtainable.
**Rock gang condenser for optimum peak.

SOCKET VOLTAGES

CONDITIONS OF TEST: 100 ohm/volt meter used. All measurements made to chassis. Values are +d-c unless otherwise noted.
"C" and "V" Rating - 110 volts on 110 v. tap. "D2" Rating - 220 volts a-c:

Pin Number	1	2	3	4	5	6	7	8
7Q7	12.6 AC	131	98	...	GND	...	0	6.3 AC
6SG7	0	12.6 AC	1.0	...	1.0	82	18.9 AC	131
6SQ7	0	.....	0	0	.....	60	6.3 AC	0
25L6GT/G	.....	43.9 AC	201	131	.....	...	18.9 AC	10
25Z6GT	.....	.....	210 AC	216	210 AC	...	.....	216

MODELS X-317V, X-317C,
X-317D2, XH-713V,
XH-713C, XH-713D2,
Preliminary

GENERAL ELECTRIC CO.

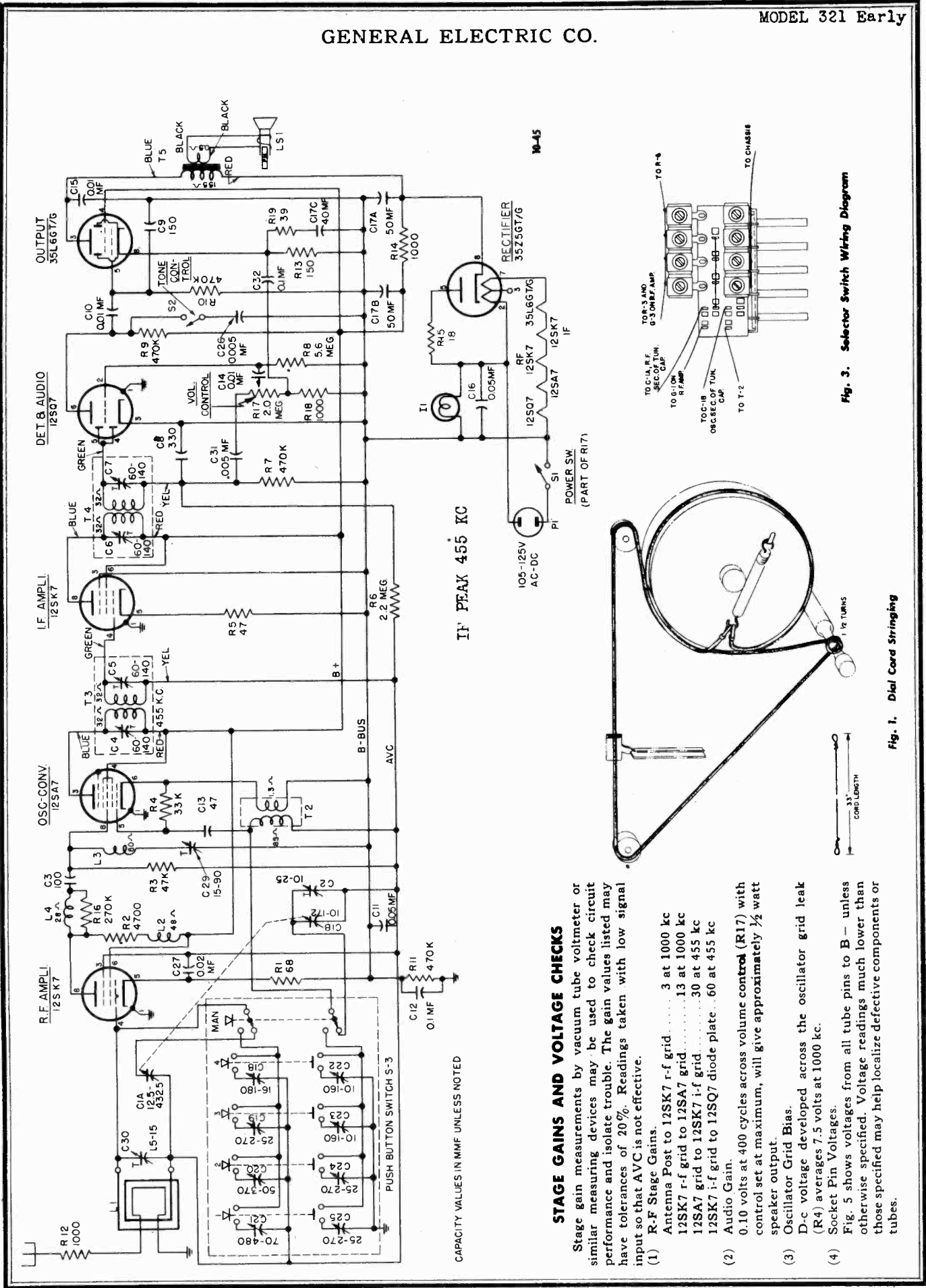
Cat. No.	Description	Model	Quan. Used Per Set	Symbol	Cat. No.	Description	Model	Quan. Used Per Set	Symbol
RAB-012	Cabinet back	All	1		RTP-012	Power transformer	2-5	1	T-5
RAV-004	"	1-2-3	1		RVL-009	Power cord	All	1	
RAV-005	"	4-5-6	1		RUX-001	Cable (tuning eye)	"	1	R-13
RCE-026	Dry Electrolytic 40-300, 50420-250 20-25	All	1	C-30 a-b-c-d.	UCG-036	Capacitor (paper)	"	2	C-36, 37
RCS-001	Line capacitor .02 mfd. 600 V.	All	1	C-43	UCG-039	"	"	1	C-33
RCT-007	Tuning capacitor	"	1	C-22 a & b	UCG-040	"	"	2	C-5, 29, 38, 39, 40, 44, 45
RC7-030	Compensating capacitor 45 mmf.	"	2	C-20, 21	UCG-045	"	"	7	
RCX-004	Trimmer Strip (spread antenna)	"	1	C-6, 7, 8, 9	UCC-048	"	"	1	C-41
RCX-005	" (B-C ant.)	"	1	C-3, 4	UCC-049	"	"	1	C-2
RCX-006	" (oscillator)	"	1	C-10, 11, 12, 14, 15, 16, 17	UCC-050	"	"	1	C-34
RDC-006	Drive cord assembly	"	1		UCC-061	"	"	1	C-42
RDF-005	Felt washer	"	4		UCU-036	Capacitor (mica)	220 mfd.	1	C-35
RDK-017	"	4-5-6	2		UCU-044	"	470 "	1	C-46
RDK-018	"	4-5-6	2		UFU-2557	"	1800 "	1	C-19
RDK-019	"	1-2-3	2		UCU-2570	"	5600 "	1	C-18
RDK-024	"	1-2-3	2		UWH-1018	"	(ceramic) 39 mfd.	1	C-23
RDP-007	Pointer assembly	All	1		UIC-001	Cement for speaker	"	1	
RDS-010	Scale	1-2-3	1		UJP-802	Speaker 8" PM	"	1	
RDS-011	"	4-5-6	1		UCX-004	Cone and voice coil assembly	"	1	
RDX-011	Pilot light socket assembly	All	1		URD-009	Resistor (carbon) 22 ohm. 1/2 W.	"	1	R-4
RDX-016	Drum assembly	"	1		URD-025	"	100 "	1	R-2
RHC-001	Hairpin cotter	"	1		URD-033	"	220 "	1	R-22
RHL-002	Tuning shaft spacer	"	2		URD-035	"	270 "	1	R-11
RHM-019	Tuning eye thumb screw	"	1		URD-041	"	470 "	1	R-38
RHK-004	Mounting plate & bearing assembly	"	1		URD-049	"	1000 "	1	R-19
RJC-003	Contact (female)	"	1		URD-053	"	1500 "	1	R-23
RJS-012	Mtg. plate	"	5		URD-081	"	22000 "	1	R-29
RJS-017	Tube socket	"	1		URD-085	"	33000 "	1	R-1
RJS-018	"	"	5		URD-089	"	42000 "	1	R-7
RLA-002	Antenna coil	"	5		URD-097	"	100000 "	1	R-37
RLC-007	Oscillator coil	"	1		URD-103	"	180000 "	1	R-8
RLN-002	I.F. Neutralizing coil	"	1	L-1	URD-109	"	330000 "	1	R-10
RMC-005	Clamp (scale)	"	1	L-2	URD-111	"	390000 "	2	R-3, 16
RMC-006	Clamp (tuning eye)	"	1	L-3	URD-113	"	470000 "	2	R-6, 20
RAM-006	Pilot light shield	"	2		URD-121	"	1 meg.	1	R-27
RMS-005	Spring (dial cord)	"	1		URD-129	"	2.2 "	1	R-5
RMU-006	Tuning shaft	"	1		URD-135	"	3.9 "	1	R-26
RMV-006	Pulley and pin	"	1		URD-137	"	4.7 "	1	R-14
RRB-003	Ballast tube	"	2		URD-143	"	8.2 "	1	R-21
REC-007	Volume control	3-6	1		URD-145	"	10 "	1	R-9
RES-008	Band change switch	All	1		URD-161	"	180 ohm. 1 W.	1	R-15
RFX-004	Tone control and AC switch	"	1	R-12	URES-063	"	3900 "	1	R-17
RFL-009	1st I.F. transformer	"	1	S-1	URF-035	"	270 "	1	R-25
RFL-010	2nd "	"	1	S-2 a & b	URF-037	"	330 "	1	R-24
RFO-006	Output	"	1	T-1	URF-061	"	3300 "	1	R-18
RTP-011	Power transformer	1-4	1	T-2					
				T-3					
				T-4					

(3) X317D2 230 V. AC-DC
(6) XH713D2 230 V. AC-DC

(2) X317C 25 cycle
(5) XH713C 25 cycle

(1) X317V Univ.
(4) XH713V "

GENERAL ELECTRIC CO.



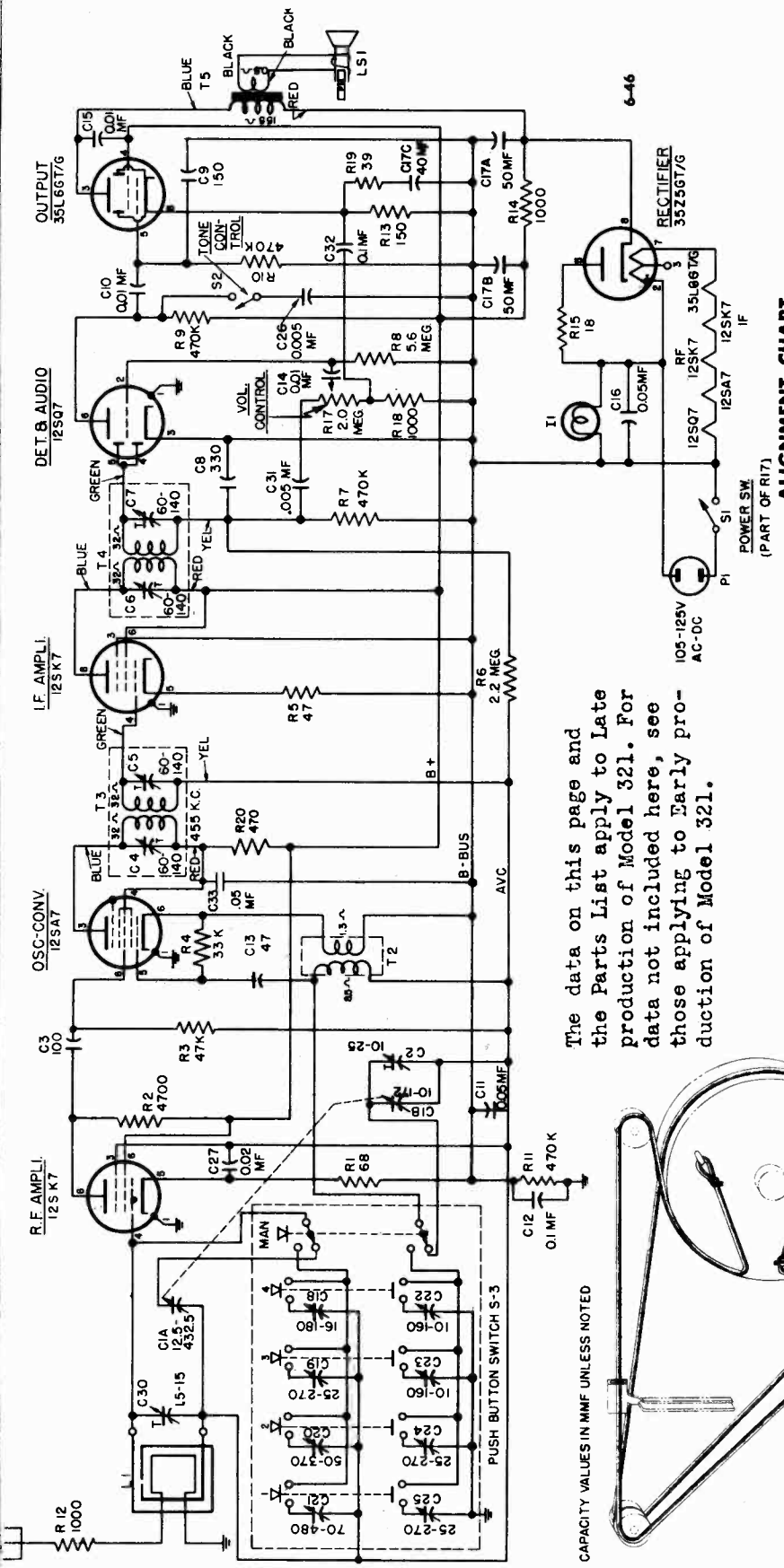
STAGE GAINS AND VOLTAGE CHECKS

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 12SK7 r-f grid 3 at 1000 kc
 - 12SK7 r-f grid to 12SA7 grid 13 at 1000 kc
 - 12SA7 grid to 12SK7 i-f grid 30 at 455 kc
 - 12SK7 i-f grid to 12SQ7 diode plate . . 60 at 455 kc
- (2) Audio Gain.
 - 0.10 volts at 400 cycles across volume control (R17) with control set at maximum, will give approximately 1/2 watt speaker output.
- (3) Oscillator Grid Bias.
 - D-c voltage developed across the oscillator grid leak (R4) averages 7.5 volts at 1000 kc.
- (4) Socket Pin Voltages.
 - Fig. 5 shows voltages from all tube pins to B - unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

MODEL 321 Late

GENERAL ELECTRIC CO.



The data on this page and the Parts List apply to Late production of Model 321. For data not included to Early production of Model 321, see those applying to Early production of Model 321.

CAPACITY VALUES IN MMF UNLESS NOTED

ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Osc. Setting	Pointer Setting on Radio	Adjustment For Maximum Output
1	12SK7 i-f grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	2nd i-f trans. trimmers
2	12SA7 grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	1st and 2nd i-f trans. trimmers
3	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C2 (Osc.)
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C30 (r-f)

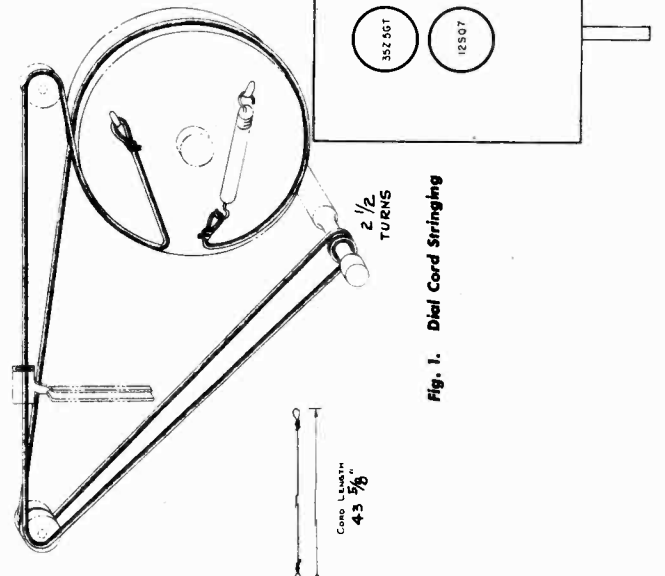


Fig. 1. Dial Cord Stringing

Cord Length: 43 3/8"

GENERAL ELECTRIC CO.

MODEL 321 Early

ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES

R-F.....1500 kilocycles
I-F.....455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-C output meter, 1½ volts full scale
3. 0.05 mf. paper capacitor
4. 50 mmf. mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL

1. Turn dial control until pointer is as far to the left as it will go. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer along drive cord until pointer is under reference mark when chassis is bolted in place.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.

3. Keep radio volume control set at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1¼ volts.

4. For i-f alignment, remove chassis from cabinet. For r-f alignment, the chassis should be bolted in the cabinet. Since the oscillator trimmer (C-2) is not accessible when the chassis is bolted in the cabinet, before C-2 adjustment, set pointer and test oscillator to 1500 kc and then remove chassis carefully from cabinet, so as not to disturb the setting of the dial pointer. Adjust oscillator trimmer (C-2) for maximum output and replace chassis in cabinet, then proceed with r-f trimmer (C-30) alignment.

5. Connect the capacitor as listed in column 2 between the "high side" of the test oscillator and the point of input specified. The ground terminal of the test oscillator may be connected to B- in the chassis providing an isolating transformer is used between the radio and the line input, otherwise use a suitable capacitor.

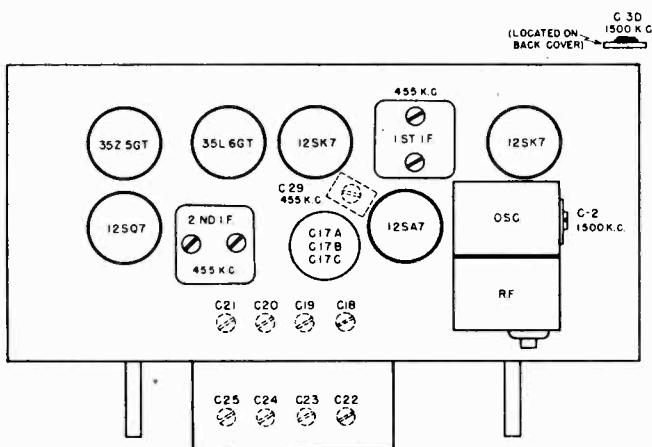


Fig. 4. Tube and Trimmer Location

ELECTRICAL RATING (INPUT)

Voltage.....105-125 volts a-c or d-c
Frequency (on a-c).....25 to 60 cycles
Wattage.....40 watts

OPERATING FREQUENCIES:

Broadcast Band.....540-1600 kilocycles
I-F Amplifier.....455 kilocycles

POWER OUTPUT (117 volts line)

Undistorted.....1.2 watts
Maximum.....1.5 watts

LOUDSPEAKER:

Type.....Alnico P.M.
Outside Cone Diameter.....5¼ inches
Voice Coil Impedance (400 cycles).....3.5 ohms

ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Osc. Setting	Pointer Setting on Radio	Adjustment For Maximum Output
*1	12SK7 i-f grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	2nd i-f trans. trimmers
*2	12SA7 grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	1st and 2nd i-f trans. trimmers
3	Ant. post in series with 50 mmf.	455 kc	1500 kc	C-29 (wave-trap) adjust for minimum output
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C2 (Osc.)
5	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C30 (r-f)

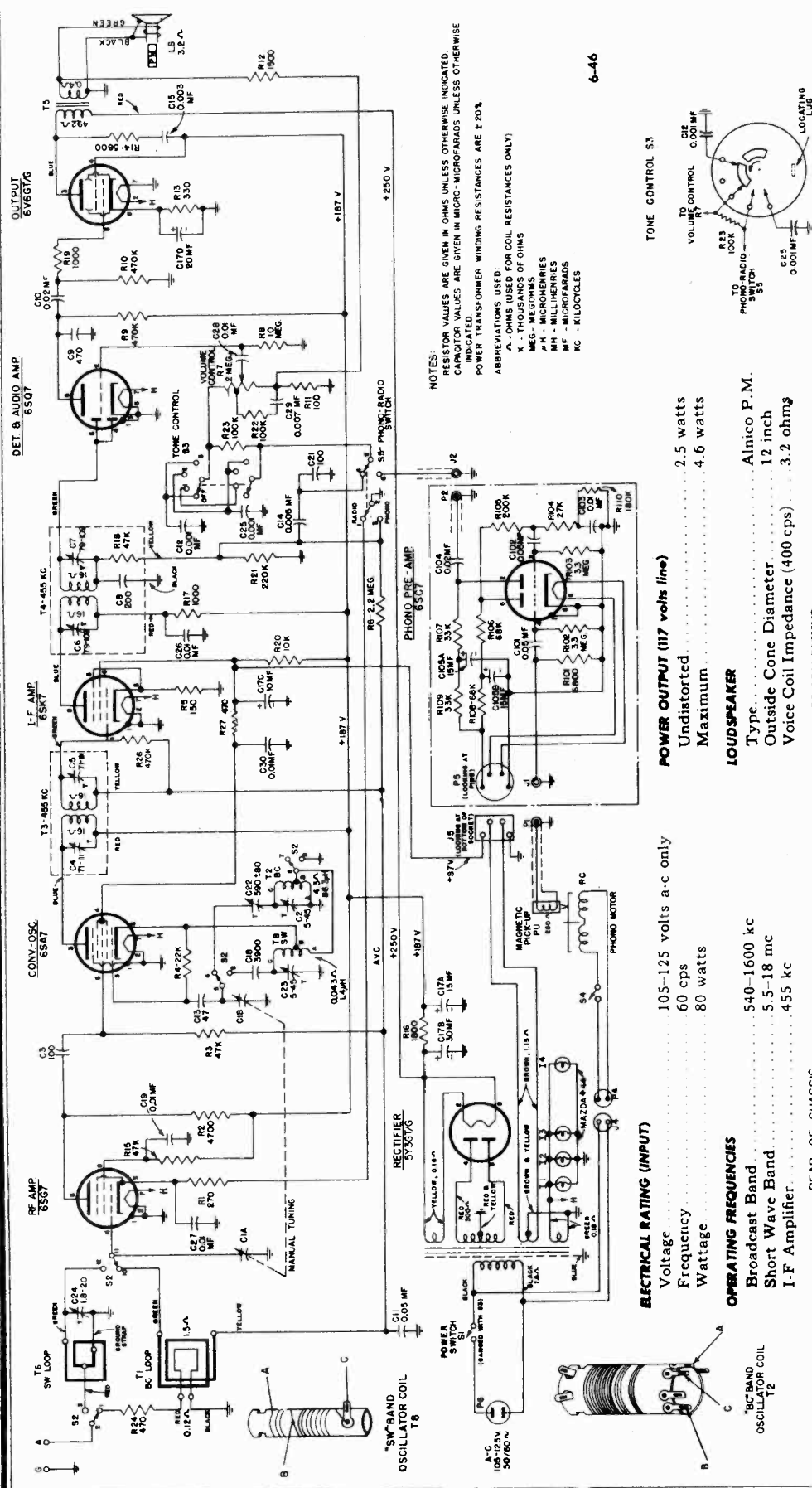
*Disconnect wavetrap (L3, C29) from circuit before making these alignments.

STATION KEY ADJUSTMENTS—The station key adjustments are located on the bottom of the cabinet through the slots designated as "Osc." and "R-F." The extreme left trimmers in rows "Osc." and "R-F" are corresponding adjustments for the first or extreme left station key. The second set of adjustment trimmers is for the No. 2 or second key from the left; correspondingly the remaining sets of trimmers are for the station keys No. 3 and No. 4. Turn power ON and allow radio to operate 15 minutes before making the following adjustments.

1. List the desired station on key, then depress the "Manual" key. Tune in the station desired for the key.
2. Push in station key to be set up, to its depressed position.
3. Adjust its corresponding "Osc." adjustment for the station signal which you tuned in step 1 and which is listed for the key. Peak the adjustment for the clearest program reception.
4. Adjust corresponding "R-F" adjustment for maximum signal strength.
5. Proceed in like manner for adjustment of the remaining keys.

Note: Clockwise rotation of adjustment screws lowers the frequency.

GENERAL ELECTRIC CO.



NOTES:
RESISTOR VALUES ARE GIVEN IN OHMS UNLESS OTHERWISE INDICATED.
CAPACITOR VALUES ARE GIVEN IN MICRO-MICROFARADS UNLESS OTHERWISE INDICATED.
POWER TRANSFORMER WINDING RESISTANCES ARE ± 20%.

ABBREVIATIONS USED:
A. - OHMS USED FOR COIL RESISTANCES ONLY!
K. - THOUSANDS OF OHMS
M. - MILLI-AMPERES
MH - MICROHENRIES
MF - MICROFARADS
MC - KILOCYCLES

6-46

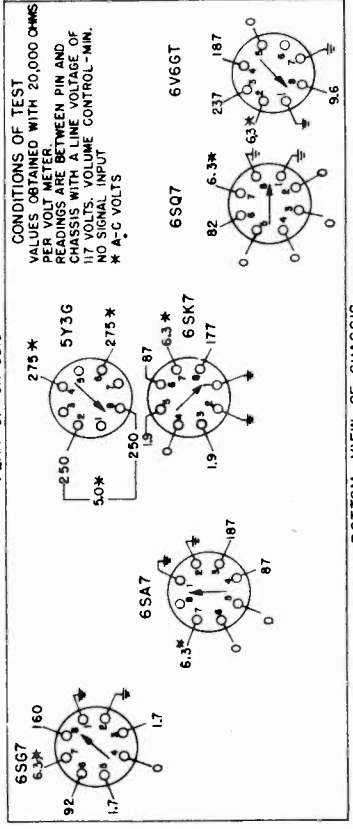
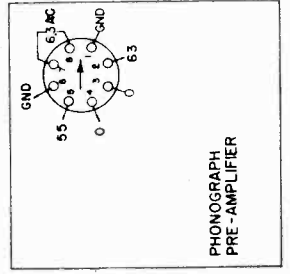
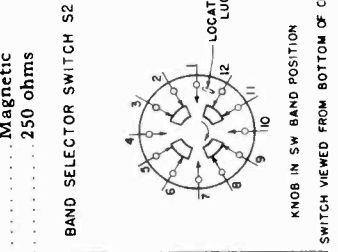
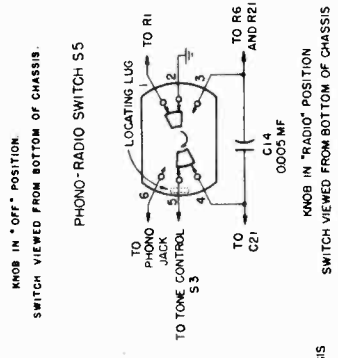
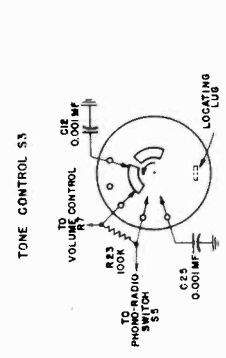
POWER OUTPUT (117 volts line)
Undistorted 2.5 watts
Maximum 4.6 watts

LOUDSPEAKER
Type Alnico P.M.
Outside Cone Diameter 12 inch
Voice Coil Impedance (400 cps) 3.2 ohms

PHONOGRAPH PICKUP
Type Magnetic
D-C Resistance 250 ohms

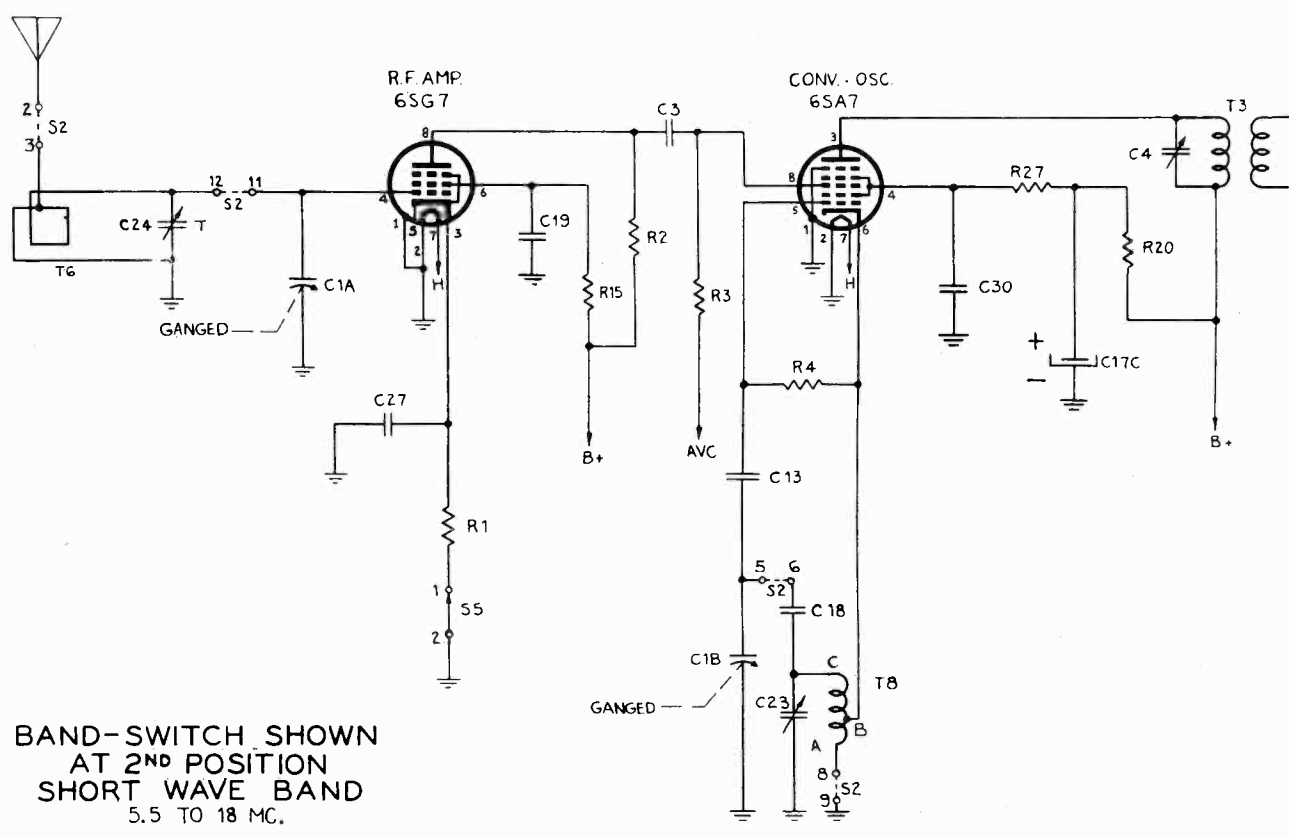
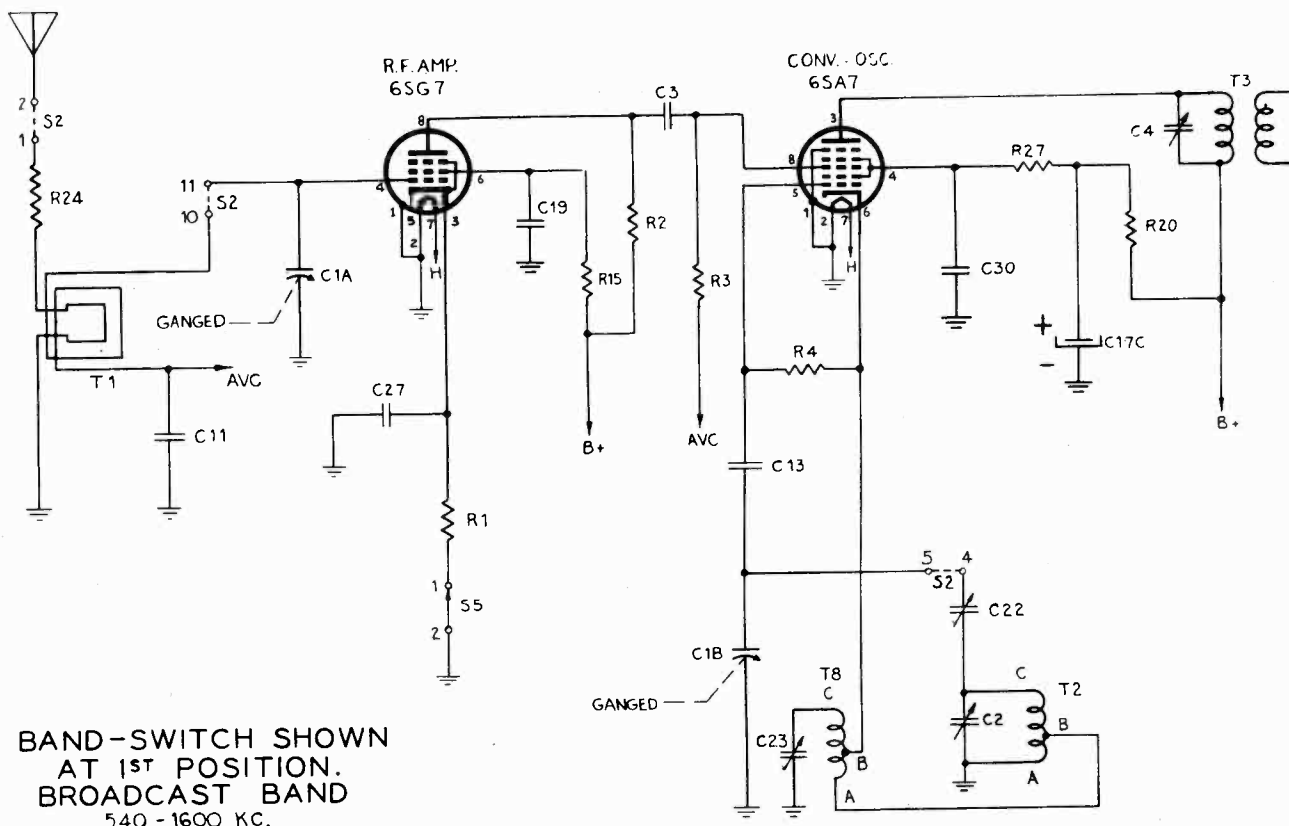
ELECTRICAL RATING (INPUT)
Voltage 105-125 volts a-c only
Frequency 60 cps
Wattage 80 watts

OPERATING FREQUENCIES
Broadcast Band 540-1600 kc
Short Wave Band 5.5-18 mc
I-F Amplifier 455 kc



MODELS 326, 327

GENERAL ELECTRIC CO.



GENERAL ELECTRIC CO.

ELECTRICAL CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full scale.
3. Insulated screwdriver.

ALIGNMENT PROCEDURE

The alignment procedure is given in table form. All i-f alignments may be made with the chassis removed from the cabinet. However, the r-f alignments should be made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects the alignment. All oscillator and r-f trimmers are accessible from the rear of the cabinet when the chassis is installed; the location of these trimmers is shown in Fig. 1.

The r-f signal should be capacity coupled by placing a two-foot wire on the output post (high side) of the test oscillator to act as an antenna. This antenna should be kept two feet or more away from the receiver loop to insure freedom from too much coupling. Metal objects such as meters and tools should not be placed on top of the receiver cabinet.

The output meter should be connected across the loud-speaker voice coil terminals. The low side of the test oscillator output should be connected to the chassis ground; the high side of the test oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the radio volume control should be in its maximum position. The test oscillator output signal should be attenuated so that the output meter reading never exceeds 1¼ volts.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Oscillator Setting	Dial Settings	Adjust Trimmers
1	6SK7, pin 4, in series with 0.05 mf	455 kc	"BC" Band 550 kc	C6 and C7 for maximum
2	6SA7, pin 8, in series with 0.05 mf	455 kc	"BC" Band 550 kc	C4 and C5 for maximum
3	‡Capacity Coupled	1500 kc	"BC" Band 1500 kc	*C2 (Osc.) for maximum
4	‡Capacity Coupled	580 kc	"BC" Band 580 kc	*C22 (Osc.) for maximum
5	‡Capacity Coupled	1500 kc	"BC" Band 1500 kc	*C2 (Osc.) for maximum
6	‡Capacity Coupled	18 mc	"SW" Band 18 mc	**C23 (Osc.) to signal
7	‡Capacity Coupled	18 mc	"SW" Band 18 mc	*C24 (Ant.) for maximum

‡ Use two-foot antenna on output of test oscillator.
 * Rock gang condenser when making alignment.
 ** Use minimum capacity peak.

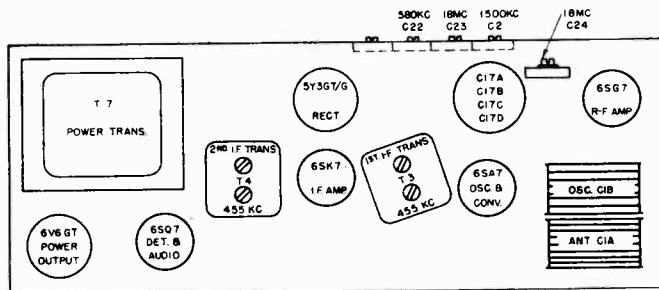


Fig. 1—Tube and Trimmer Location

STAGE GAIN 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%. Readings should be taken with the AVC shorted out. This may be done conveniently by connecting the yellow Beam-a-Scope lead to ground.

1. R-F Stage Gains.

- Antenna to 6SG7 grid..... 4 at 1000 kc
- 6SG7 grid to 6SA7 grid..... 14 at 1000 kc
- 6SA7 grid to 6SK7 grid..... 74 at 455 kc

Audio Gain.

The power output across the speaker voice coil should be approximately ½ watt with 0.06 volts at 400 cps applied between the high side of the volume control and ground.

3. Oscillator Grid Bias.

The d-c voltage developed across the oscillator grid leak (R4) averages 5.7 volts at 1000 kc.

4. Socket Pin Voltages.

Fig. 4 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

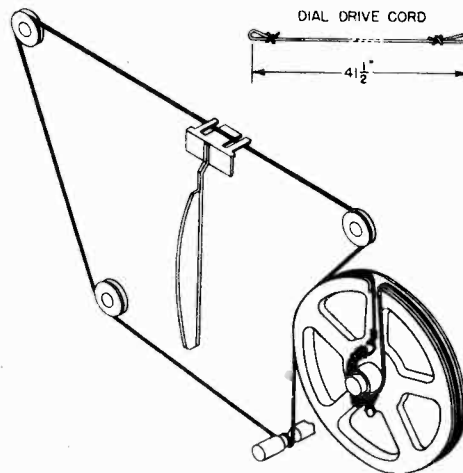


Fig. 3—Dial Stringing Diagram

MODEL 321 Late
MODELS 326, 327

GENERAL ELECTRIC CO.

MODEL 321 (LATE)

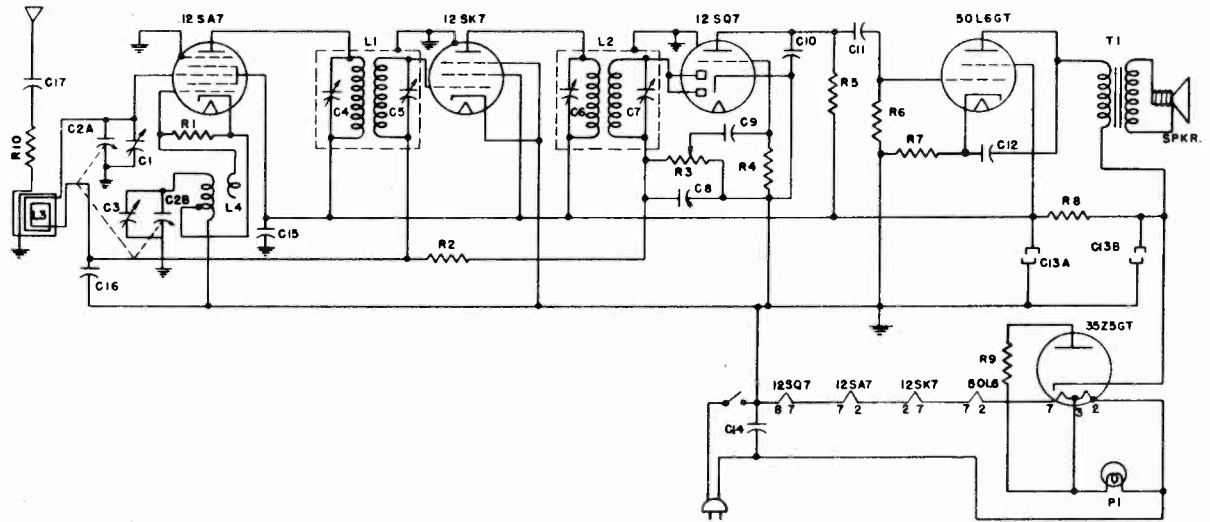
Cat. No.	Symbol	Description	Cat. No.	Symbol	Description
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
UCC-009	C27	Capacitor—0.02 mfd., 200 V., paper	RDK-004		Knob—Control Knob (tuning)
UCC-013	C32	Capacitor—0.1 mfd., 200 V., paper	RDK-007		Key—Station selector key
UCC-025	C10, 14	Capacitor—0.01 mfd., 400 V., paper	RDK-009		Knob—Control knob (volume)
UCC-030	C12	Capacitor—0.1 mfd., 400 V., paper	RDK-023		Knob—Tone control wafer knob
UCC-039	C26, 31	Capacitor—0.005 mfd., 600 V., paper	RDP-003		Pointer—Dial scale pointer
UCC-040	C15	Capacitor—0.01 mfd., 600 V., paper	RDS-004		Scale—Dial scale
UCC-045	C11, 16, 33	Capacitor—0.05 mfd., 600 V., paper	RDX-003		Assembly—Dial scale back plate assembly
UDL-018	I1	Pilot Lamp—115 V., 10 watt candelabra base	RDX-004		Assembly—Drive cord assembly
UOP-525	LS1	Speaker—5 1/4 in. permanent magnet loud-speaker	RHC-001		Cotter—Hairpin shaft retaining cotter
URD-015	R19	Resistor—39 ohms, 1/2 W., carbon	RHG-001		Grommet—Tuning capacitor mtg. grommet
URD-017	R5	Resistor—47 ohms, 1/2 W., carbon	RHM-007		Stud—Idler pulley stud
URD-021	R1	Resistor—68 ohms, 1/2 W., carbon	RHM-008		Cam—Tone switch cam
URD-029	R13	Resistor—150 ohms, 1/2 W., carbon	RHM-009		Link—Tone switch cam link
URD-041	R20	Resistor—470 ohms, 1/2 W., carbon	RHM-010		Clip—Tone control shaft clip
URD-049	R12, 18	Resistor—1000 ohms, 1/2 W., carbon	RHM-011		Bushing—Tuning shaft bushing
URD-065	R2	Resistor—4700 ohms, 1/2 W., carbon	RHX-001		Assembly—Chassis mounting assembly
URD-085	R4	Resistor—33,000 ohms, 1/2 W., carbon	RIT-006		Cover—Electrolytic capacitor cardboard cover
URD-089	R3	Resistor—47,000 ohms, 1/2 W., carbon	RJC-001		Terminal—Loudspeaker lead terminals
URD-113	R7, 9, 10, 11	Resistor—470,000 ohms, 1/2 W., carbon	RJS-007		Socket—Pilot lamp socket
URD-129	R6	Resistor—2.2 megohms, 1/2 W., carbon	RJS-008		Socket—Octal base tube socket
URD-139	R8	Resistor—5.6 megohms, 1/2 W., carbon	RJS-004		Socket—Mtg. socket for electrolytic capacitor
URE-007	R15	Resistor—18 ohms, 1 W., carbon	RLC-002	T2	Coil—Oscillator coil
URF-049	R14	Resistor—1000 ohms, 2 W., carbon	RLL-004	L1	Beam-a-scope—Cabinet back and antenna assembly
			RLP-001	L2	Coil—Plate choke
			RLP-002	L4, R16	Coil—Series peaking coil and resistor assembly
				L3	Coil—Wavetrap coil
			RLW-001		Shield—Tube shield and clip
			RMM-001		Shield—Light shield
			RMM-002		Spring—Drive cord spring
			RMS-001		Spring—Station selector button spring
			RMU-003		Shaft—Tuning shaft and cotter pin
			RRC-001		Pulley—Drive cord idler pulley
			RRC-003	R17	Volume Control—2 meg. potentiometer
			RSP-001	S3	Switch—Station selector push button switch
			RSW-003	S2	Switch—Tone control switch
			RTL-003	T3	Transformer—1st I-F transformer
			RTL-004	T4	Transformer—2nd I-F transformer
			RTO-002	T5	Transformer—Output transformer
			RWL-009	P1	Cord—Power cord and plug
			RYC-001		Card—Station letter cards

MODELS 326, 327

Cat. No.	Symbol	Description	Cat. No.	Symbol	Description
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS		
UCC-037	C15	CAPACITOR—0.003 mf., 600 v., paper	RDK-041		KNOB—Oak knob (pointer)
UCC-039	C14	CAPACITOR—0.005 mf., 600 v., paper	RDP-005		POINTER—Dial scale pointer
UCC-040	C19, 26, 27, 28, 30, 103	CAPACITOR—0.01 mf., 600 v., paper	RDS-016		SCALE—Dial scale
UCC-041	C10, 104	CAPACITOR—0.02 mf., 600 v., paper	RDX-008		BACKPLATE—Dial backplate assembly
UCC-045	C11, 101, 102	CAPACITOR—0.05 mf., 600 v., paper	RHG-001		GROMMET—Tuning capacitor mounting grommet
UDL-005	I1, 2, 3, 4	PILOT LAMP—G.E. No. 44, 6-8 v., 0.25 amp.	RHG-003		GROMMET—Rubber grommet, 1/8 in. I.D. for 1/4 in. hole
UIC-001		CEMENT—Speaker cone replacement cement	RHG-004		GROMMET—Rubber grommet, 3/8 in. I.D. for 1/2 in. hole
UOP-1206	LS	SPEAKER—12 inch PM speaker	RHM-012		CUSHIONS—Rubber dial scale cushions
UOX-005		CONE—Replacement speaker cone kit	RHM-014		STUD—Shaft for upper pulleys on backplate
URD-025	R11	RESISTOR—100 ohms, 1/2 w., carbon	RHM-015		BUSHING—Tuning shaft bushing, washer, and nut
URD-029	R5	RESISTOR—150 ohms, 1/2 w., carbon	RHU-002		SPACER—Tuning capacitor mounting spacer
URD-035	R1	RESISTOR—270 ohms, 1/2 w., carbon	RJS-001		RECEPTACLE—Two-pin speaker receptacle
URD-037	R13	RESISTOR—330 ohms, 1/2 w., carbon	RJB-002		TERMINAL STRIP—Terminal strip for phono pre-amplifier, 2 terminals
URD-041	R24, 27	RESISTOR—470 ohms, 1/2 w., carbon	RJC-001		PLUG—Tip plug for speaker leads
URD-049	R17, 19	RESISTOR—1000 ohms, 1/2 w., carbon	RJC-002		CONNECTOR—Clip for antenna loop connections
URD-053	R12	RESISTOR—1500 ohms, 1/2 w., carbon	RJP-002	P5	PLUG—4-prong plug for pre-amplifier
URD-065	R2	RESISTOR—4700 ohms, 1/2 w., carbon	RJP-004	P2	PLUG—Phono pre-amplifier output plug
URD-067	R14	RESISTOR—5600 ohms, 1/2 w., carbon	RJS-003		SOCKET—Octal socket for receiver chassis
URD-077	R101	RESISTOR—6800 ohms, 1/2 w., carbon	RJS-011		SOCKET—Pilot light socket for cabinet jewel
URD-081	R4	RESISTOR—22,000 ohms, 1/2 w., carbon	RJS-012		PLATE—Mounting plate for capacitor C17A, B, C, D
URD-083	R104	RESISTOR—27,000 ohms, 1/2 w., carbon	RJS-013		SOCKET—Pilot light socket for chassis lights
URD-085	R107, 109	RESISTOR—33,000 ohms, 1/2 w., carbon	RJS-014	J5	RECEPTACLE—Four prong receptacle (Power to pre-amp.)
URD-089	R3, 15	RESISTOR—47,000 ohms, 1/2 w., carbon	RJS-015		SOCKET—Octal socket for pre-amplifier (shock mounted)
URD-093	R106, 108	RESISTOR—68,000 ohms, 1/2 w., carbon	RJX-001	J2	RECEPTACLE—Phono input receptacle on receiver chassis
URD-097	R22, 23	RESISTOR—100,000 ohms, 1/2 w., carbon	RJX-049	J4	RECEPTACLE—Phono motor connector (female)
URD-105	R21	RESISTOR—220,000 ohms, 1/2 w., carbon	RJX-003	J1	RECEPTACLE—Phono input receptacle on pre-amplifier
URD-113	R9, 10, 26	RESISTOR—470,000 ohms, 1/2 w., carbon	RLC-004	T2	COIL—BC Band oscillator coil
URD-129	R6	RESISTOR—2.2 meg., 1/2 w., carbon	RLC-005	T8	COIL—SW Band oscillator coil
URD-133	R102, 103	RESISTOR—3.3 meg., 1/2 w., carbon	RLS-005	T6	LOOP—SW Band antenna loop
URD-145	R8	RESISTOR—10 meg., 1/2 w., carbon	RLL-006	T1	LOOP—Beam-a-scope BC Band loop
URF-055	R16	RESISTOR—1800 ohms, 2 w., carbon	RMC-001		CLAMP—Mounts BC Band oscillator coil
URF-073	R20	RESISTOR—10,000 ohms, 2 w., carbon	RMC-002		CLAMP—Mounts SW Band oscillator coil
			RMC-003		SHIELD—Bottom shield for 2nd I-F transformer
			RMS-001		SPRING—Drive cord tension spring
			RMU-004		SHAFT—Tuning shaft with cotter pin and clip
			RMW-001		PULLEY—Upper back plate pulley
			RMW-002		PULLEY—Chassis idler pulley
			ROC-001		CONE—Speaker cone an dust cap
			RPX-010	PU	PICKUP—Magnetic pickup cartridge
			RRC-005	R7	POTENTIOMETER—Volume control, 2 meg. tapped at 1 meg.
			RRD-089	R18	RESISTOR—47,000 ohms, 1/2 w., carbon
			RRD-104	R105	RESISTOR—200,000 ohms, 1/2 w., carbon
			RSW-006	S5	SWITCH—Phono-Radio switch
			RSW-007	S2	SWITCH—Band switch
			RSX-003	S1	SWITCH—Power switch
			RTL-005	S3	SWITCH—Tone control switch
			RTL-006	T3	TRANSFORMER—1st I-F transformer
			RTO-004	T4	TRANSFORMER—2nd I-F transformer
			RTP-010	T5	TRANSFORMER—Output transformer
			RWL-004	T7	TRANSFORMER—Power transformer
				P6	CORD—Power cord and plug

GENERAL ELECTRIC CO.

MODELS YRB67-1, YRB67-2,
YRB82-1



ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES

I.F.	455 KC
R.F.	1720 and 1500 KC

The location of all trimmers is shown in Fig. 1.

I. F. ALIGNMENT

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit. Apply signal to the converter grid through a .05 mfd capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R. F. ALIGNMENT

Apply the R.F. alignment signals through a standard I.R.E. dummy antenna to the receiver antenna post. With the gang condenser wide open, align the oscillator trimmer (C17B) to 1720 KC. Change the generator signal to 1500 KC, tune the receiver to the signal and peak the antenna trimmer (C17A) for maximum output.

PRECAUTION

If the signal generator is A-C operated, use an isolating transformer between the power supply and the 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.

OVERALL DIMENSIONS—YRB 82-1

Height	8 1/8"
Width	12 1/2"
Depth	7"

YRB 67-1, 2

Height	8 1/2"
Width	13"
Depth	6 7/8"

Rating: 105-125 volts DC
105-125 volts 40-60 cycles AC
28 watts at 117 volts

Tuning Frequency Range: 540-1720 KC

Intermediate Frequency: 455 KC

LOUDSPEAKER "ALNICO V" MAGNET DYNAMIC

Outside Cone Diameter	5 1/4"
Voice Coil Impedance (400 cyc)	3.2 ohms

TUBES

Converter and Oscillator	12SA7
I.F. Amplifier	12SK7
Det. Audio, AVC	12SQ7
Power Output	50L6GT
Rectifier	35Z5GT
Pilot Lamp	GE 51

GENERAL INFORMATION

Models YRB 67-1 and 67-2 are 5 tube (including rectifier) superheterodyne receivers in distinctively styled wood cabinets; Model YRB 82-1 is a rich brown plastic cabinet. These receivers incorporate built-in antenna, automatic volume control, oversize permanent magnet speaker and beam power output.

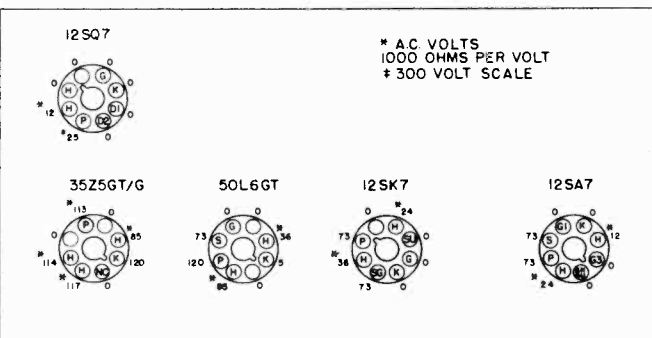


Fig. 2. Socket Voltage Diagram

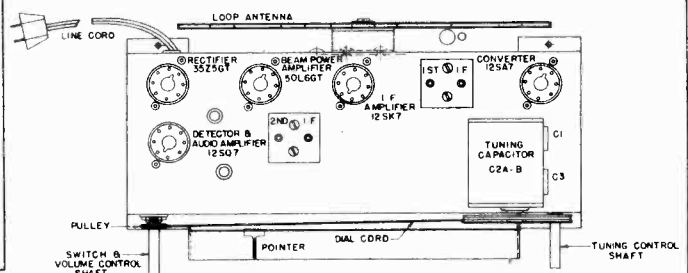


Fig. 1. Tube and Trimmer Location

MODELS YRB67-1, YRB67-2,
YRB82-1
MODELS 200, 203, 205

**GENERAL ELECTRIC CO.
PARTS DESCRIPTION LIST**

MODELS YRB 82-1, YRB 67-1, YRB 67-2

Symbol	Description	Symbol	Description	Symbol	Description
C1	Ant. trimmer condenser	C14	.05 mfd paper capacitor	R2	2.2 megohm carbon resistor
C2A	Tuning condenser ant. section	C15	.05 mfd paper capacitor	R3	Volume control .5 megohm
C2B	Tuning condenser osc. section	C16	.05 mfd paper capacitor	R4	4.7 megohm carbon resistor
C3	Osc. trimmer condenser	C17	.01 mfd paper capacitor	R5	470,000 ohm carbon resistor
C8	220 mmfd mica capacitor	L1	1st I.F. transformer	R6	470,000 ohm carbon resistor
C9	.005 mfd paper capacitor	L2	2nd I.F. transformer	R7	150 ohm carbon resistor
C10	220 mmfd mica capacitor	L3	Loop assembly	R8	2700 ohm carbon resistor
C11	.01 mfd paper capacitor	L4	Oscillator coil	R9	18 ohm carbon resistor
C12	.02 mfd paper capacitor	P1	Pilot lamp	R10	470 ohm carbon resistor
C13A	30 mfd electrolytic capacitor	T1	Output transformer		
C13B	30 mfd electrolytic capacitor	R1	22,000 ohm carbon resistor		

REPLACEMENT PARTS LIST

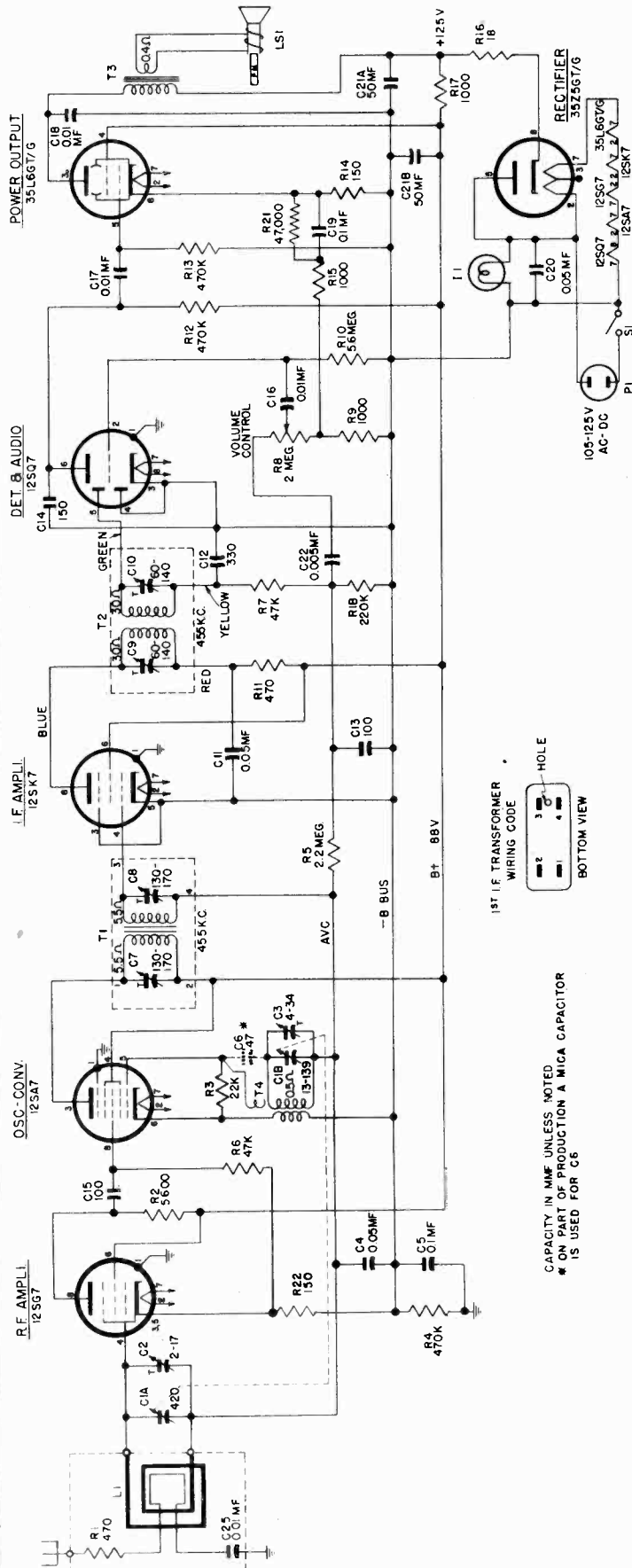
MODELS YRB 82-1, YRB 67-1, YRB 67-2

Stock No.	Description	Stock No.	Description
SPECIALIZED G-E REPLACEMENT PARTS		SPECIALIZED G-E REPLACEMENT PARTS (Cont.)	
SAB 004	Back cover, Models YRB 67-1 and 67-2	STL 001	Transformer, 1st I.F.
SAB 006	Back cover, Model YRB 82-1	STL 002	Transformer, 2nd I.F.
SAU 001	Cabinet, Model YRB 82-1	STO 001	Transformer, output
SAV 003	Cabinet, Model YRB 67-1	SWL 001	Power cord
SAV 015	Cabinet, Model YRB 67-2		
SCE 002	Capacitor, filter electrolytic, 30-30 mfd 150 volt, C13A, C13B	UNIVERSAL G-E REPLACEMENT PARTS	
SCT 002	Capacitor, tuning, C2A, C2B	UCC 039	Capacitor, .005 mfd paper, C9
SDC 001	Cord, dial drive cord	UCC 040	Capacitor, .01 mfd paper, C17
SDK 002	Knob, Models YRB 67-1 and 67-2	UCC 041	Capacitor, .02 mfd paper, C12
SDK 010	Knob, Model YRB 82-1	UCC 045	Capacitor, .05 mfd paper, C14, C15, C16
SDP 001	Pointer, dial scale	UCU 1036	Capacitor, 220 mmfd mica, C8, C10
SDS 004	Dial scale, Models YRB 67-1 and 67-2	UDL 013	Pilot lamp, Mazda 51
SDS 006	Dial scale, Model YRB 82-1	UOP 526	Speaker, 5 1/4 inch PM dynamic
SHC 001	Hair pin cotter for dial drive	URD 007	Resistor, 18 ohm 1/2 watt carbon, R9
SJP 002	Connector, female to speaker	URD 029	Resistor, 150 ohm 1/2 watt carbon, R7
SJS 001	Pilot lamp socket	URD 041	Resistor, 470 ohm 1/2 watt carbon, R10
SJS 003	Socket, octal tube	URD 081	Resistor, 22,000 ohm 1/2 watt carbon, R1
SLC 001	Coil, oscillator	URD 113	Resistor, 470,000 ohm 1/2 watt carbon, R5, R6
SLI 001	Loop, antenna	URD 129	Resistor, 2.2 megohm 1/2 watt carbon, R2
SMF 002	Snap button	URD 137	Resistor, 4.7 megohm 1/2 watt carbon, R4
SMF 003	Fastener, back cover to cabinet	URE 059	Resistor, 2700 ohm 1 watt carbon, R8
SMS 001	Spring, dial drive drum		
SMU 001	Shaft, dial drive		
SMW 001	Pulley, dial drive		
SRC 003	Volume control, 0.5 megohm with power switch		

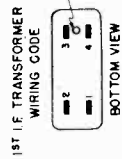
REPLACEMENT PARTS LIST—MODELS 200, 203, & 205

PART NO.	SYMBOL	DESCRIPTION	PART NO.	SYMBOL	DESCRIPTION
UNIVERSAL REPLACEMENT PARTS			SPECIALIZED REPLACEMENT PARTS (Cont'd)		
UCC-039	C22	CAPACITOR—.005 mfd, 600 v, paper	RAX-001		PULLEY—Idler pulley assembly
UCC-040	C25	CAPACITOR—.01 mfd, 600 v, paper	RCC-013	C19	CAPACITOR—.01 mfd, 200 v, paper
UCC-048	C5	CAPACITOR—.01 mfd, 600 v, paper	RCC-040	C16, 17, 18	CAPACITOR—.01 mfd, 600 v, paper
UCU-020	C6	CAPACITOR—47 mmf, 500 v, mica	RCC-045	C4, 11, 20	CAPACITOR—.05 mfd, 600 v, paper
UCU-028	C13, 15	CAPACITOR—100 mmf, 500 v, mica	RCE-037	C21A, 21B	CAPACITOR—50-50 mfd, 150 v, dry electrolytic
UCU-032	C14	CAPACITOR—150 mmf, 500 v, mica	RCT-015	C1A, 1B	CONDENSER Tuning condenser (includes C2 and C3)
UCU-040	C12	CAPACITOR—330 mmf, 500 v, mica	RDC-001		CORD—Drive cord assembly
UIC-001		CEMENT Loudspeaker cone cement	RDD-001		DRUM Drive drum and shaft assembly
UIC-002		THINNER Cone cement thinner	RDE-001		ESCUTCHEON Dial escutcheon (Models 203, 205)
UOP-528	LS1	SPEAKER 5 1/4 in. PM	RDG-002		PLATE Dial back plate assembly
UOX-001		CONE Replacement cone kit	RDK-006		KNOB Control knob
URD-029	R14, 22	RESISTOR 150 ohms, 1/2 w, carbon	RDS-030		SCALE Dial scale (Models 203, 205)
URD-041	R1, 11	RESISTOR 470 ohms, 1/2 w, carbon	RDS-031		SCALE Dial scale (Models 200, 201)
URD-057	R9, 15	RESISTOR 1000 ohms, 1/2 w, carbon	RHM-004		CLIP Speed clip for dial scale (Model 200)
URD 067	R2	RESISTOR 5600 ohms, 1/2 w, carbon	RHM-005		CLIP Speed clip for dial scale (Models 203, 205)
URD 081	R3	RESISTOR 22,000 ohms, 1/2 w, carbon	RHM-010		CLIP—Osc. coil mtg. clip
URD 089	R6, 7, 21	RESISTOR 47,000 ohms, 1/2 w, carbon	RJS-003		TUBE SOCKET Octal base tube socket (12SA7)
URD-105	R18	RESISTOR 220,000 ohms, 1/2 w, carbon	RJS-006		TUBE SOCKET Octal base tube socket
URD-113	R4, 12, 13	RESISTOR 470,000 ohms, 1/2 w, carbon	RJS-053		SOCKET Pilot lamp socket
URD-129	R5	RESISTOR 2.2 meg, 1/2 w, carbon	RLC-021	T4	COIL Oscillator coil
URD-139	R10	RESISTOR 5.6 meg, 1/2 w, carbon	RRC-002	R8, S1	VOLUME CONTROL 2.0 meg potentiometer includes power switch
URF-049	R17	RESISTOR 1000 ohms, 2 w, carbon	RRW-008	R16	RESISTOR 18 ohms, 1 w, wirewound
SPECIALIZED REPLACEMENT PARTS			RTL-001	T1	TRANSFORMER 1st I.F. transformer
RAB-001		REAM-A-SCOPE Cabinet back and loop assembly Models 203, 205	RTL-029	T2	TRANSFORMER 2nd I.F. transformer
RAB-003		REAM-A-SCOPE Cabinet back and loop assembly, Model 200	RTO-003	T3	TRANSFORMER Output transformer
RAU-002		CABINET Brown plastic (Model 200)	RWL-009	P1	CORD Power cord and plug
RAV 025		CABINET Walnut wood (Model 203)			
RAV 026		CABINET Blonde wood (Model 205)			
RAV-027		CABINET Maple wood (Model 205)			

GENERAL ELECTRIC CO.

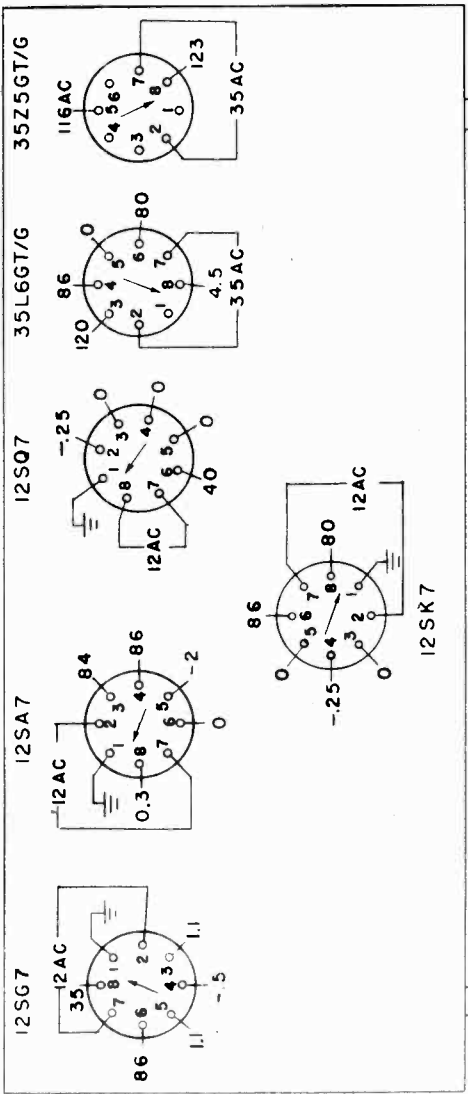


CONDITION OF TEST
 MEASUREMENTS TAKEN ON 20,000 CHMS.-
 PER-VOLT METER
 MEASURED FROM PIN TO B-BUS UNLESS
 SHOWN OTHERWISE.
 117 VOLTS LINE
 VOLUME CONTROL-CLOCKWISE
 NO SIGNAL INPUT



CAPACITY IN MMF UNLESS NOTED
 * ON PART OF PRODUCTION A MICA CAPACITOR
 IS USED FOR C6

VIEW FROM BOTTOM OF CHASSIS



MODELS 200, 203, 205

GENERAL ELECTRIC CO.

SPECIFICATIONS

CABINET:

Model	200	203	205
Material	Plastic	Wood	Wood
Color	Brown	Mahogany	Maple
Height	7 1/2 in.	8 1/4 in.	8 1/4 in.
Width	12 in.	13 in.	13 in.
Depth	7 1/2 in.	7 1/8 in.	7 1/8 in.

ELECTRICAL RATING (INPUT)

Voltage	105-125 volts a-c or d-c
Frequency on a-c	25 to 60 cycles
Wattage	45 watts

OPERATING FREQUENCIES

Broadcast Band	540-1600 kilocycles
I-F Amplifier	455 kilocycles

POWER OUTPUT (117 VOLTS LINE)

Undistorted	1.2 watts
Maximum	1.5 watts

LOUDSPEAKER

Type	Alnico P.M.
Outside Cone Diameter	5 1/4 in.
Voice Coil Impedance (400 cycles)	3.5 ohms

TUBE COMPLEMENT

R.F. Amplifier	Type 12SG7
Oscillator-Converter	Type 12SA7
I.F. Amplifier	Type 12SK7
Detector-Audio	Type 12SQ7
Power Output	Type 35L6GT
Rectifier	Type 35Z5GT/G
Pilot Lamp	G-E, Type C7, 115-volt, 10-watt, clear, candelabra screw base

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F	1500 kilocycles
I-F	455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A.C. output meter, 1 1/2 volts full scale
3. 0.05 mf paper capacitor
4. 50 mmf mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL

1. Turn dial scale pointer as far counterclockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer on shaft until the pointer is under reference mark when chassis is bolted in place.
2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.

3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.

4. The chassis must be removed from the cabinet during I-F alignment. For R-F alignment bolt the chassis in the cabinet securely.

5. Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Osc Setting	Pointer Setting on Radio	Adjustment for Maximum Output
1	12SK7 grid in series with 0.05 mf cap.	455 kc	1500 kc	2nd I-F Trans. Trimmers
2	12SA7 grid in series with 0.05 mf cap.	455 kc	1500 kc	1st and 2nd I-F Trans. Trimmers
3	Ant. Post in series with 50 mmf	1500 kc	1500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf	1500 kc	1500 kc	C2 (R-F)

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 taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna post to 12SG7 grid	4 at 1000 kc
12SG7 grid to 12SA7 grid	8 at 1000 kc
12SA7 grid to 12SK7 grid	30 at 455 kc
12SK7 grid to 12SQ7 diode plate	57 at 455 kc

(2) Audio Gain.

0.12 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately 1 1/2-watt output across speaker voice coil.

(3) Oscillator Grid Bias.

D-C voltage developed across the oscillator grid leak (R3). Averages 7.7 volts at 1000 kc.

(4) Socket Pin Voltages.

Figure 4 shows voltages from all tube pins to B- unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

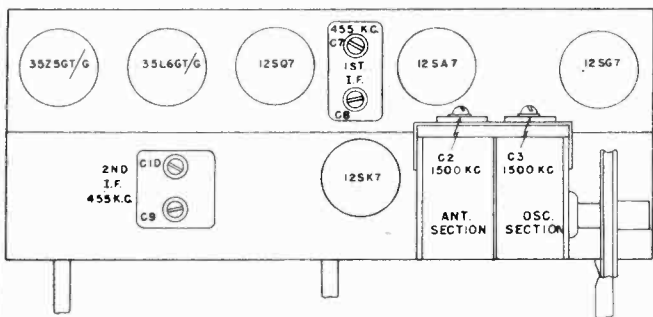


Fig. 1. Tube and Trimmer Location

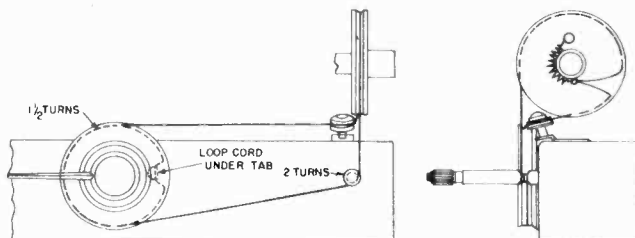
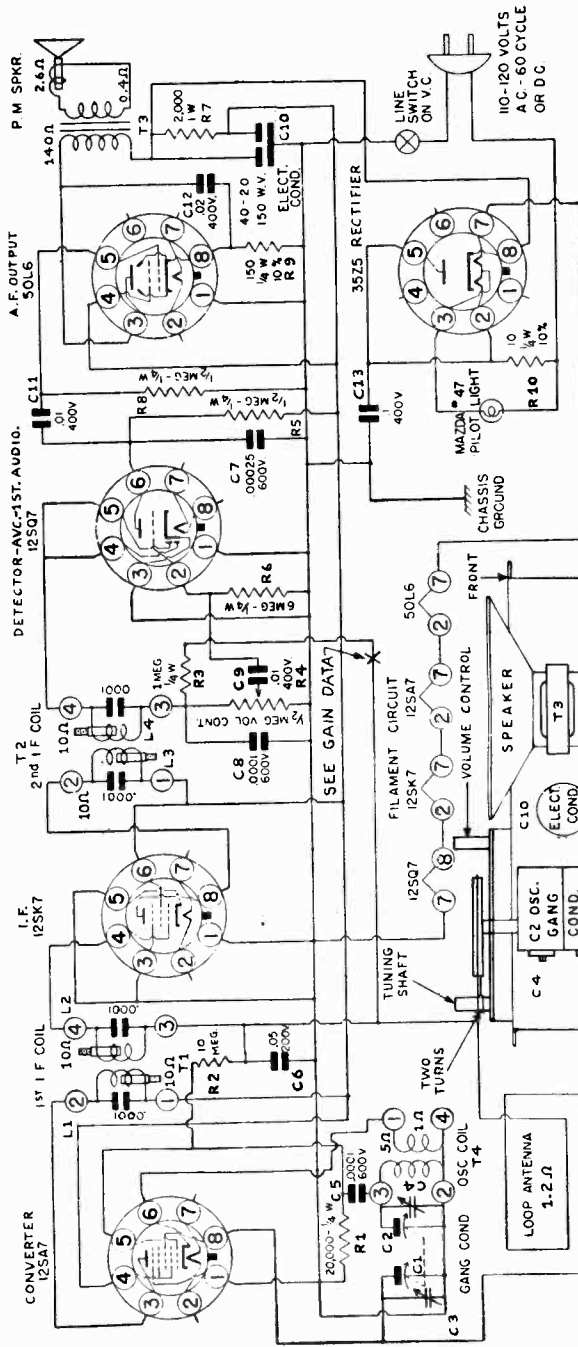
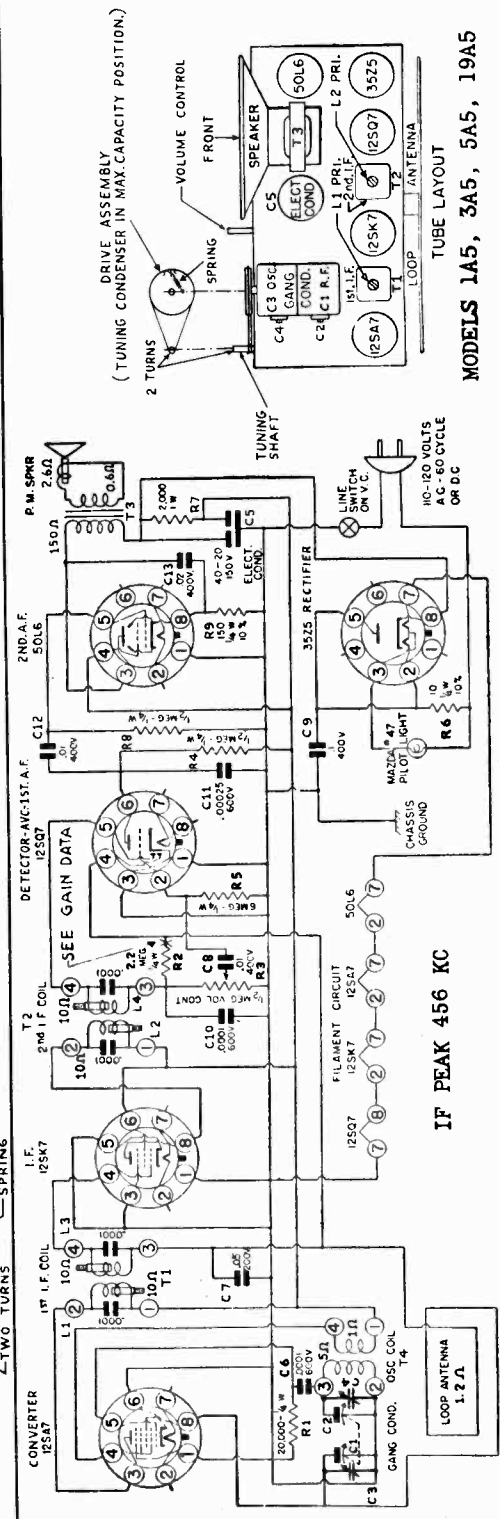


Fig. 2. Dial Stringing Diagram

GENERAL TELEV. & RADIO CORP. MODELS 1A5, 3A5, 5A5
19A5
MODELS 9A5, 15A5, 17A5



MODELS 9A5, 15A5, 17A5
IF PEAK 456 KC

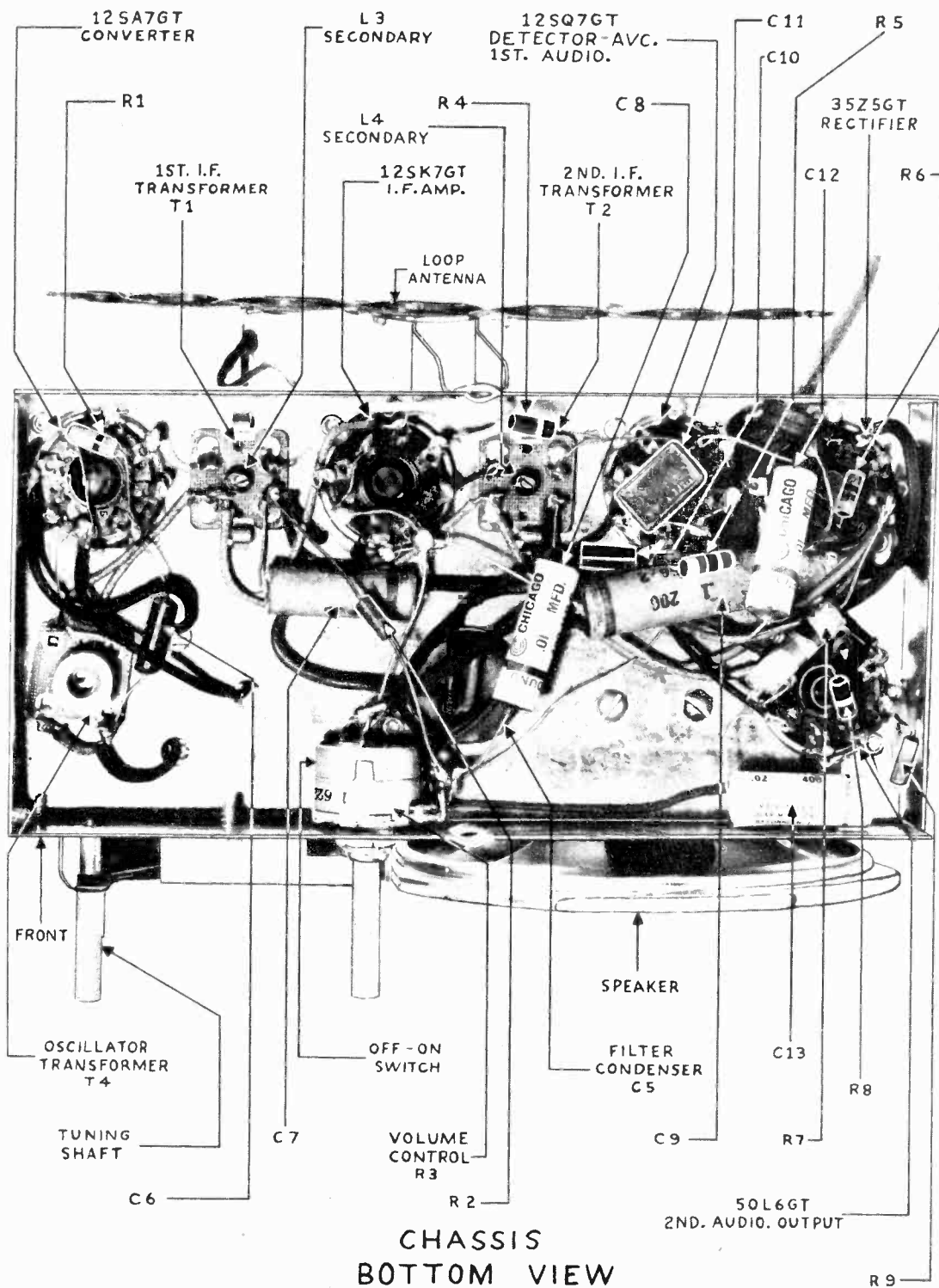


IF PEAK 456 KC

MODELS 1A5, 3A5, 5A5, 19A5

MODEL 5A5

GENERAL TELEV. & RADIO CORP.



CHASSIS
BOTTOM VIEW

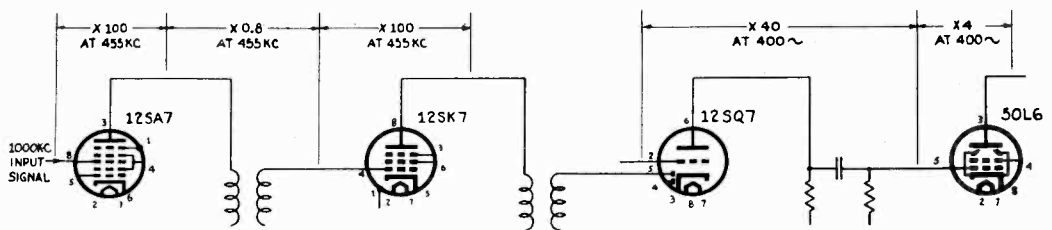
MODELS 9A5, 15A5, 17A5
MODEL 14A4F

GENERAL TELEV. & RADIO CORP.

MODELS 1A5, 3A5, 5A5,
19A5
MODELS 9A5, 15A5, 17A5

MODELS 1A5, 3A5, 5A5, 19A5

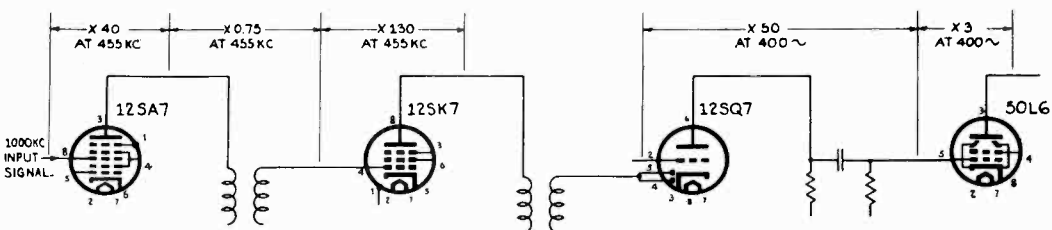
TUBE	PIN	VTVM	D-C VOLTAGE		RESISTANCE		TUBE	PIN	VTVM	D-C VOLTAGE		RESISTANCE	
			20,000 OHMS PER VOLT	1000 OHMS PER VOLT	20,000 OHMS PER VOLT	1000 OHMS PER VOLT				20,000 OHMS PER VOLT	1000 OHMS PER VOLT		
12SA7	1	0	0	0	0	12SA7	1	0	0	0	0	0	0
	2	0	0	0	25		2	0	0	0	24		
	3	+80	+80	+80	5,000,000		3	+80	+80	+78	INFINITE		
	4	+80	+80	+80	5,000,000		4	+80	+80	+78	INFINITE		
	5	-6	-5.6	-2.6	19,000		5	-9.5	-0.5	-4.8	20,000		
	6	0	0	0	0		6	0	0	0	1		
	7	0	0	0	40		7	0	0	0	40		
	8	-1	-0.4	-0.4	5,000,000		8	-1.5	-0.8	-0.2	1,200,000		
12SK7	1	0	0	0	0	12SK7	1	0	0	0	0	0	0
	2	0	0	0	16		2	0	0	0	12		
	3	0	0	0	0		3	0	0	0	0		
	4	-1	-0.4	-0.4	5,000,000		4	-1.5	-0.6	-0.2	1,200,000		
	5	0	0	0	0		5	0	0	0	0		
	6	+80	+80	+78	5,000,000		6	+80	+80	+78	INFINITE		
	7	0	0	0	26		7	0	0	0	26		
	8	+80	+80	+78	5,000,000		8	+80	+80	+78	INFINITE		
12SQ7	1	0	0	0	0	12SQ7	1	0	0	0	0	0	0
	2	-1.2	-0.8	-0.5	10,000,000		2	-0.5	-0.4	-0.2	6,000,000		
	3	0	0	0	0		3	0	0	0	0		
	4	-1	-0.45	-0.4	5,000,000		4	-0.5	-0.4	-0.2	400,000		
	5	-0.7	-0.5	-0.2	500,000		5	-0.5	-0.4	-0.2	400,000		
	6	+54	+48	+42	5,000,000		6	+46	+42	+40	INFINITE		
	7	0	0	0	15		7	0	0	0	14		
	8	0	0	0	0		8	0	0	0	0		
50L6	1	0	0	0	0	50L6	1	0	0	0	0	0	0
	2	0	0	0	40		2	0	0	0	40		
	3	+125	+120	+120	5,000,000		3	+120	+120	+120	INFINITE		
	4	+80	+80	+80	5,000,000		4	+80	+80	+78	INFINITE		
	5	0	0	0	450,000		5	0	0	0	460,000		
	6	0	0	0	INFINITE		6	0	0	0	INFINITE		
	7	0	0	0	90		7	0	0	0	90		
	8	+5.2	+5	+5	140		8	+4.5	+4.5	+4.5	150		
35Z5	1	0	0	0	INFINITE	35Z5	1	0	0	0	0	0	0
	2	0	0	0	120		2	0	0	0	120		
	3	0	0	0	120		3	0	0	0	120		
	4	0	0	0	INFINITE		4	0	0	0	INFINITE		
	5	0	0	0	120		5	0	0	0	120		
	6	0	0	0	120		6	0	0	0	120		
	7	0	0	0	90		7	0	0	0	90		
	8	130	125	125	5,000,000		8	+120	+120	+120	INFINITE		



MODELS
1A5, 3A5,
5A5, 19A5

APPROXIMATE
GAIN PER STAGE
DATA

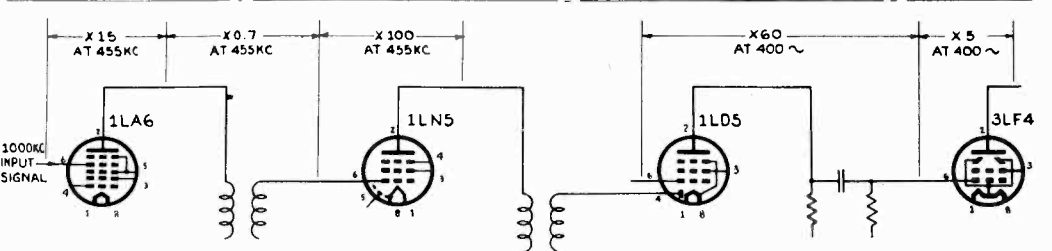
IN MAKING GAIN PER STAGE MEASUREMENTS, CIRCUIT WAS OPENED AT POINT X TO STOP AVC ACTION, AND A 3-VOLT BATTERY CONNECTED BETWEEN THIS POINT AND GROUND.



MODELS
9A5, 15A5,
17A5

APPROXIMATE
GAIN PER STAGE
DATA

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



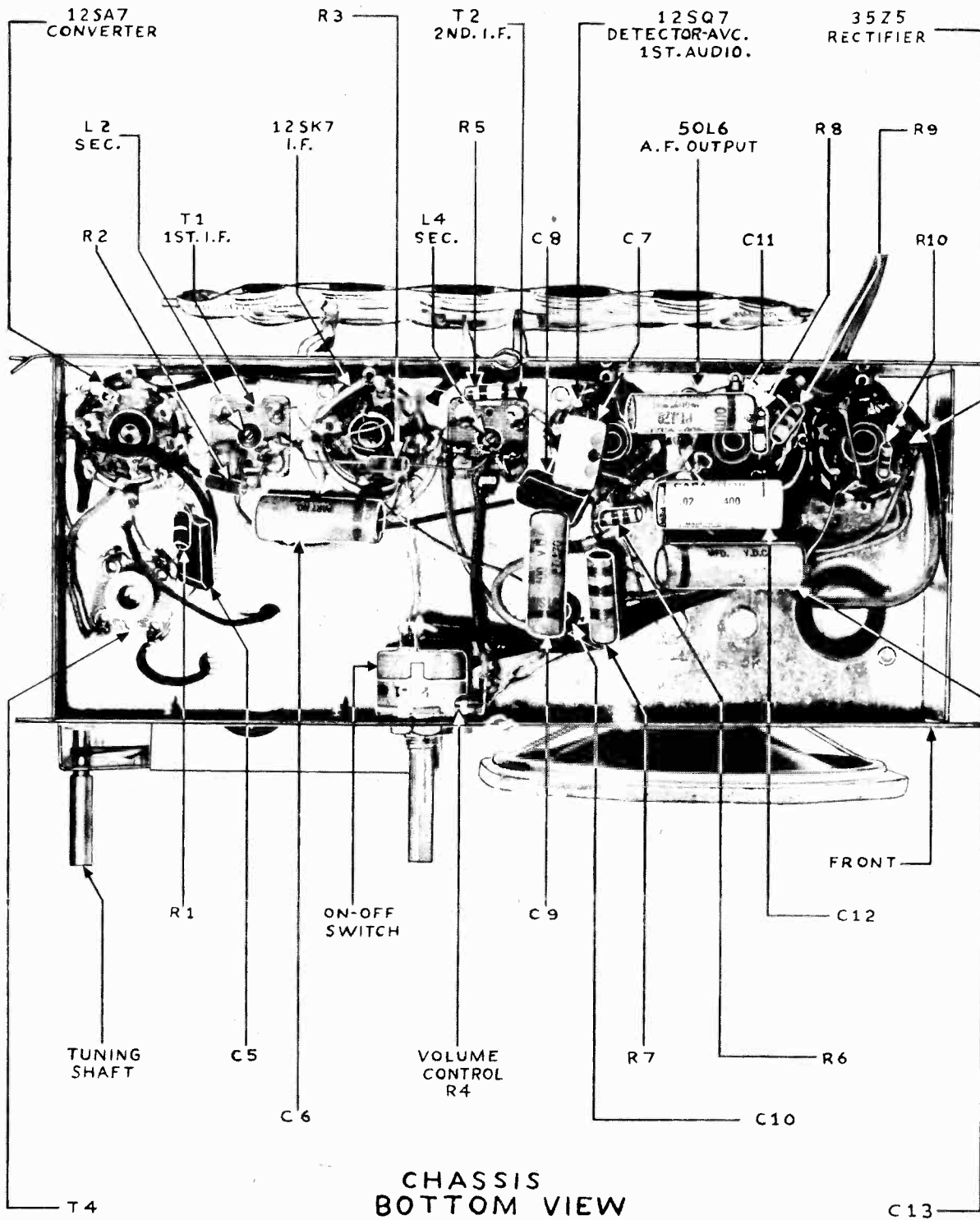
MODEL
14A4F

APPROXIMATE
GAIN PER STAGE
DATA

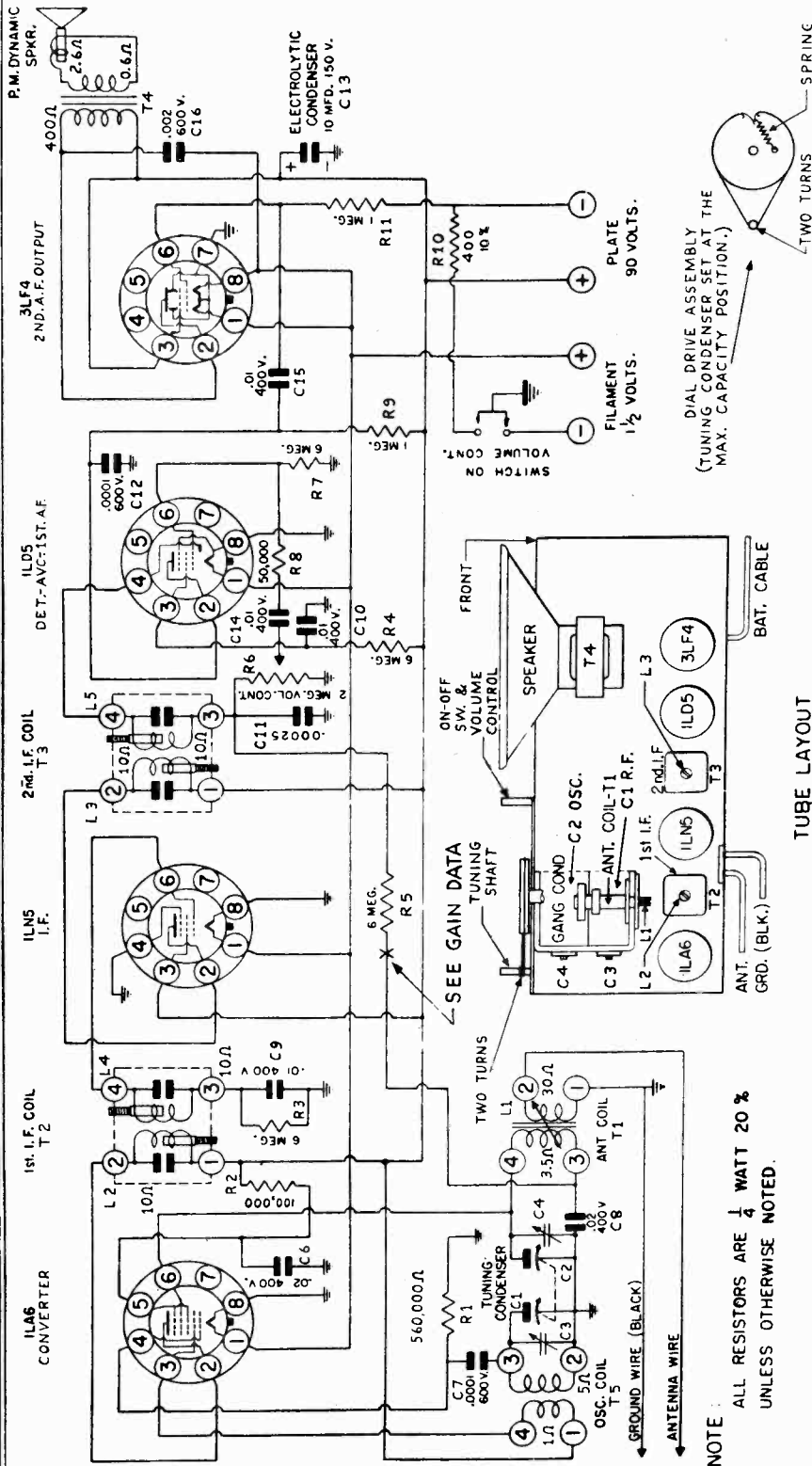
IN MAKING GAIN PER STAGE MEASUREMENTS, CIRCUIT WAS OPENED AT POINT X TO STOP AVC ACTION, AND A 1-1/2 VOLT BATTERY CONNECTED BETWEEN THIS POINT AND GROUND.

MODEL 17A5

GENERAL TELEV. & RADIO CORP.



GENERAL TELEV. & RADIO CORP.



TUBE LAYOUT

D-C VOLTAGE RESISTANCE

D-C VOLTAGE RESISTANCE

D-C VOLTAGE RESISTANCE

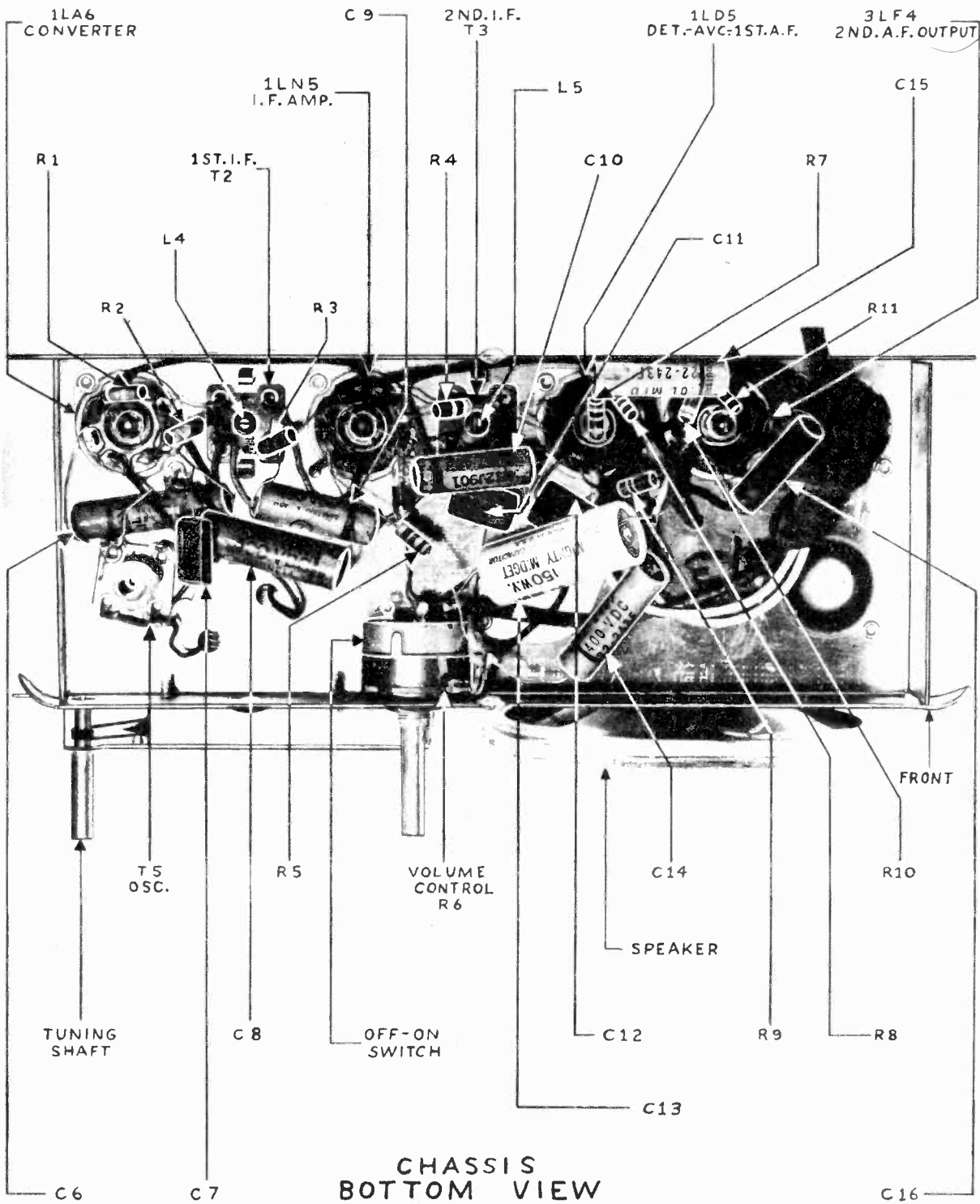
TUBE	PIN	VTVM	20,000 OHMS PER VOLT	1000 OHMS PER VOLT	TUBE	PIN	VTVM	20,000 OHMS PER VOLT	1000 OHMS PER VOLT	
1LA6	1	+1.5	+1.4	+1.4	1LD5	1	+1.5	+1.4	4	
	2	+90	+90	+88		2	+26	+20	INFINITE	INFINITE
	3	+90	+90	+88		3	+21	+10	INFINITE	INFINITE
	4	-3.5	-0.5	0		4	-0.1	0	2,000,000	2,000,000
	5	+34	+32	+26		5	0	0	INFINITE	INFINITE
	6	-0.3	-0.1	0		6	0	0	7,500,000	7,500,000
	7	0	0	0		7	0	0	7,700,000	7,700,000
	8	0	0	0		8	0	0	0	0
1LN5	1	+1.5	+1.4	+1.4	3LF4	1	+1.5	+1.4	4	
	2	+90	+90	+88		2	+86	+84	INFINITE	INFINITE
	3	+90	+90	+88		3	+90	+88	INFINITE	INFINITE
	4	0	0	0		4	0	0	0	0
	5	0	0	0		5	-5.4	-5	450	1,700,000
	6	-0.3	-0.1	0		6	-1	0	0	0
	7	-0.3	-0.1	0		7	0	0	0	0
	8	0	0	0		8	+1.5	+1.4	0	4

NOTE: ALL RESISTORS ARE 1/4 WATT 20% UNLESS OTHERWISE NOTED.

IF PEAK 456 KC

MODEL 14A4F

GENERAL TELEV. & RADIO CORP.



GENERAL TELEV. & RADIO CORP.

MODELS 1A5, 3A5, 5A5, 19A5
 MODELS 9A5, 15A5, 17A5
 MODEL 14A4F

ALIGNMENT

MODELS 1A5, 3A5, 5A5, 19A5

The chassis must be removed from the cabinet in order to align this receiver. Connect the output meter across the voice coil. Connect the signal generator to the Standard Hazeltine 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 at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 456 Kc. Adjust the i-f trimmers for maximum meter deflection in the following sequence: L₄, L₂, L₃, L₁. Set the generator and receiver to 1600 Kc and adjust oscillator trimmer C₄ for maximum output. Set the generator and receiver to 1400 Kc and adjust loop trimmer C₃ for maximum output.

MODELS 9A5, 15A5, 17A5

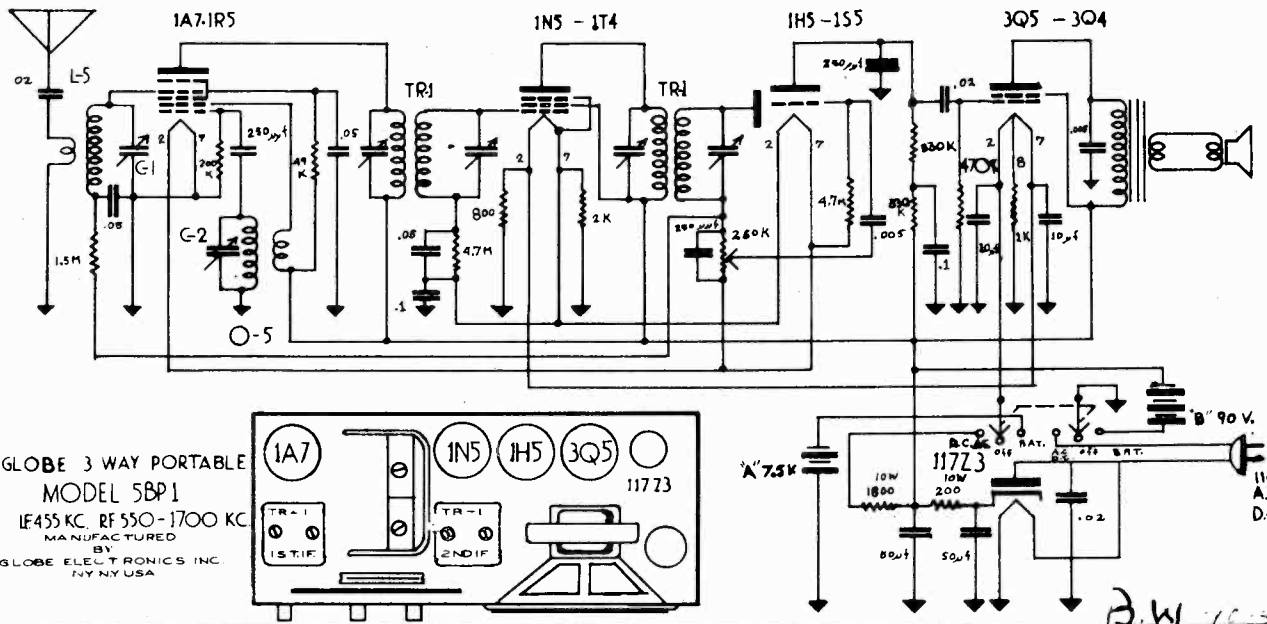
The chassis must be removed from the cabinet in order to align this receiver. Connect the output meter across the voice coil. Connect the signal generator to the standard Hazeltine Loop Model 1150, and couple loosely to the receiver loop. Set the receiver volume control at maximum. The tuning condenser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

MODEL 14A4F

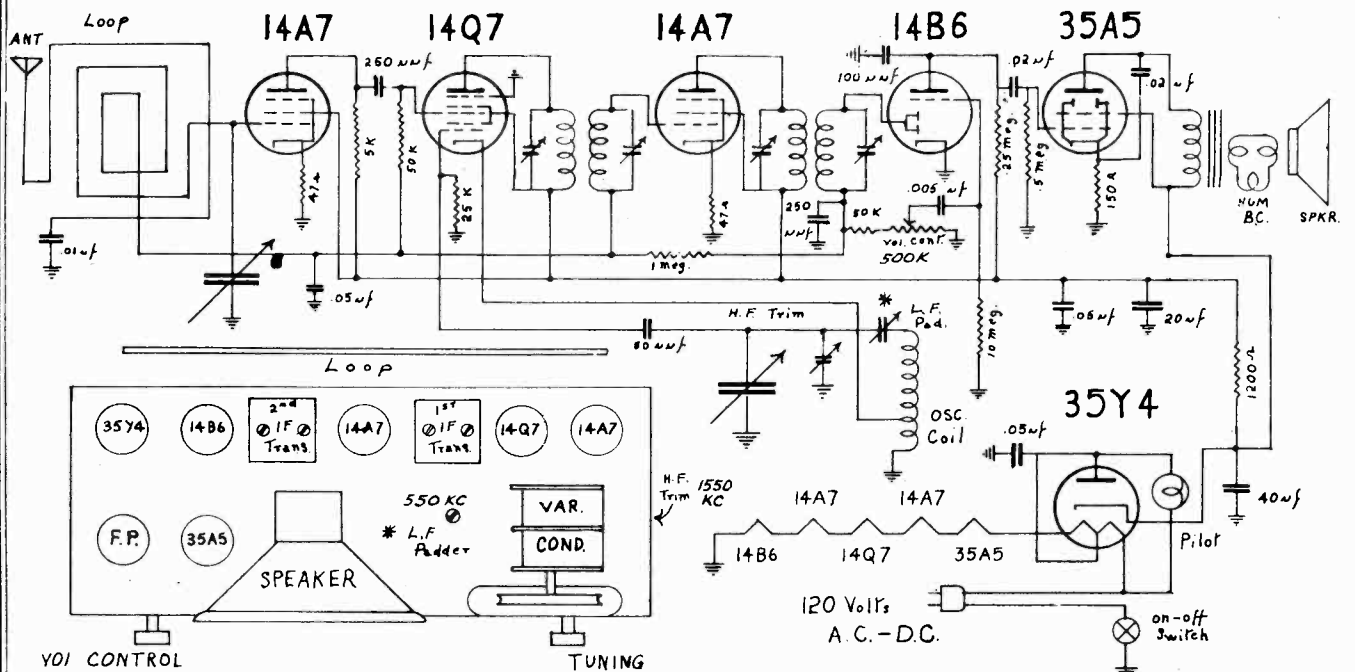
Alignment may be accomplished with the chassis in the cabinet if a small alignment screwdriver is used. Connect the output meter across the voice coil. Connect the high side of the signal generator to the antenna lead through a .01 mf condenser and the low side to the black ground wire. Set the receiver volume control at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 455 Kc and adjust the i-f trimmers for maximum output in the following sequence: L₅, L₃, L₄, L₂. Set the generator and receiver to 1500 Kc and adjust the oscillator shunt trimmer C₄ for maximum output. Set the generator and receiver to 1400 Kc and adjust the antenna trimmer C₃ for maximum output. Set the generator and receiver to 600 Kc and adjust the antenna coil tuning slug L₁ for maximum output. Repeat the high frequency adjustment of the antenna trimmer C₃ at 1400 Kc.

GLOBE ELECTRONICS, INC.

MODEL 5BP1
MODELS 601, 6U1



GLOBE 3 WAY PORTABLE
MODEL 5BP1
1F455 KC. RF 550-1700 KC
MANUFACTURED BY
GLOBE ELECTRONICS INC.
NY NY USA



POWER SUPPLY: A.C.-D.C. (105-125 volts).

RANGE: 540-1620 Kilocycles.

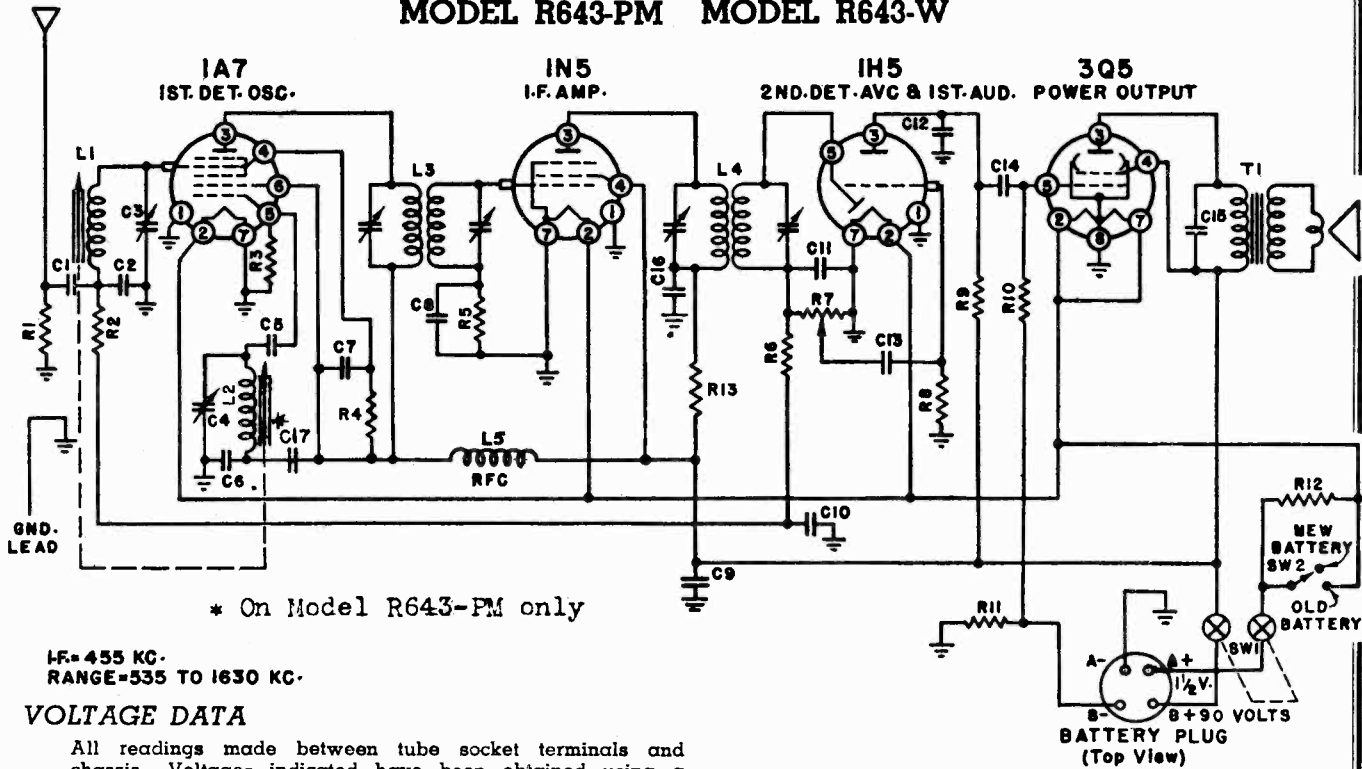
MODEL 601

USE NO GROUND CONNECTIONS.

NOTE: MODEL 6U1 is the same as MODEL 601 except that the frequency range is from 550 to 1700 KC and a cut-plate variable condenser replaces the L.F. padder.

IF PEAK 455 KC
B.W. 9-25 46

MODEL R643-PM MODEL R643-W



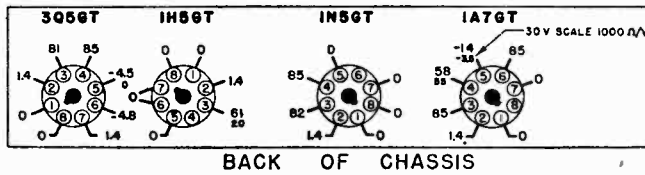
* On Model R643-PM only

IF=455 KC.
RANGE=535 TO 1630 KC.

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. The voltages were measured using a fresh battery, volume control full on, dial at the high frequency end, and no signal.

VOLTAGE CHART



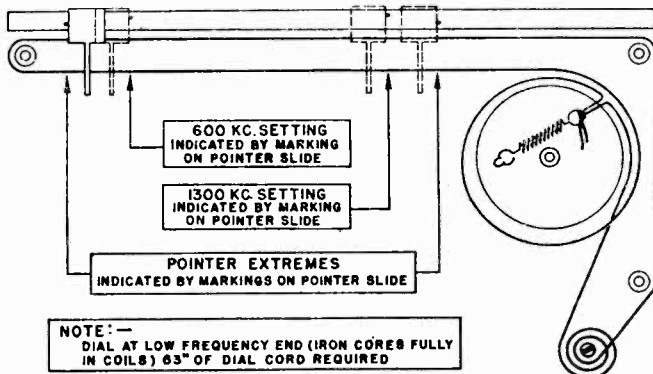
COILS

Symbol No.	Description
L1	Antenna Coil (3 ohms)
L2	Oscillator Coil (3 ohms)
L3	1st I.F. Transformer
L4	2nd I.F. Transformer
L5	R.F. Choke (14.5 ohms)
T1	Output Transformer

8-46

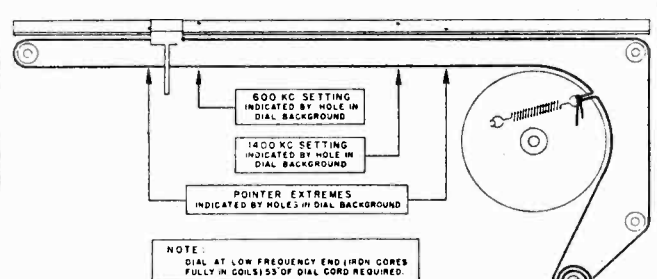
MODEL R643-PM

POINTER SETTINGS AND DIAL CORD STRINGING



MODEL R643-W

POINTER SETTINGS AND DIAL CORD STRINGING

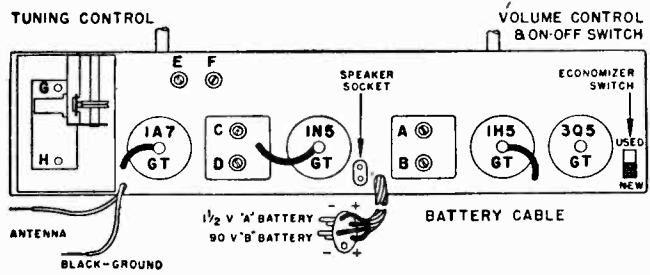


MODEL R643-PM

B. F. GOODRICH CO.

MODEL R643-PM

ALIGNMENT PROCEDURE



● Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as indicated in the chart below.

- **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.
- Volume control—Maximum for all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead, when needed (see below).
- Connect output meter across voice coil of speaker.
- Allow chassis and signal generator to warm up for several minutes.

Band	Signal Generator Frequency	Dummy Antenna	Connection to Radio	Receiver Dial Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Type of Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 1A7 (Cap)	High frequency end of dial	C-D—2nd I.F.	Output I.F.	Adjust to maximum output
	455 KC.	.1 MFD.	Grid of 1A7 (Cap)	High frequency end of dial	A-B—1st I.F.	Input I.F.	Adjust to maximum output
BROADCAST	1630 KC.	.0002 MFD.	Antenna Lead	High frequency end of dial	E—(See note below) F—(See note below)	Oscillator Antenna	Adjust to maximum output
	1300 KC.	.0002 MFD.	Antenna Lead	1300 KC.	G H	Oscillator Antenna	Adjust to maximum output

NOTE: Before adjusting trimmers "E" and "F", make sure that each iron core is 1 3/8" or more outside of its coil form. If necessary, turn adjustments "G" and "H" to accomplish this.

CONDENSERS

Symbol	Description	Part No.
C1	Paper, .01 mfd., 400 V.	64B1-25
C2	Mica, .0008 mfd. ±10%	65B5-31
C3	Trimmer, Antenna	66A21-1
C4	Trimmer, Oscillator	
C5	Mica, .0001 mfd. ±20%	65B7-17
C6	Mica, .0008 mfd. ±10%	65B5-31
C7	Paper, .01 mfd., 400 V.	64B1-25
C8	Paper, .002 mfd., 600 V.	64B1-14
C9	Elect., 4 mfd., 150 V.	67A4-2
C10	Paper, .05 mfd., 200 V.	64B1-32
C11	Mica, .00025 mfd. ±20%	65B7-22
C12	Mica, .00025 mfd. ±20%	65B7-22
C13	Paper, .01 mfd., 400 V.	64B1-25
C14	Paper, .01 mfd., 400 V.	64B1-25
C15	Paper, .005 mfd., 600 V.	64B1-12
C16	Paper, .01 mfd., 400 V.	64B1-25
C17	Paper, .01 mfd., 400 V.	64B1-25

RESISTORS

R1	15,000 ohm ±10%, 1/2W.	60B8-153
R2	470,000 ohm ±10%, 1/4W.	60B2-474
R3	220,000 ohm ±10%, 1/2W.	60B8-224
R4	33,000 ohm ±10%, 1/2W.	60B8-333
R5	4,700,000 ohm ±10%, 1/4W.	60B2-475
R6	2,200,000 ohm ±10%, 1/4W.	60B2-225
R7	1 megohm Volume Control & Switch.	75B1-1
R8	4,700,000 ohm ±10%, 1/4W.	60B2-475
R9	1,000,000 ohm ±10%, 1/4W.	60B2-105
R10	1,000,000 ohm ±10%, 1/4W.	60B2-105
R11	390 ohm ±10%, 1/4W.	60B2-391
R12	0.75 ohm ±10%, 1/4W. (Wire)	61A2-1
R13	2200 ohm ±10%, 1/4W.	60B2-222

TRANSFORMERS AND COILS

L1	Antenna Coil	AC105-1
L2	Oscillator Coil	A1020
L3	1st I.F. Transformer	72B5
L4	2nd I.F. Transformer	72B6
L5	Choke Coil (RF)	AB103-1
T1	Output Transformer	98A5

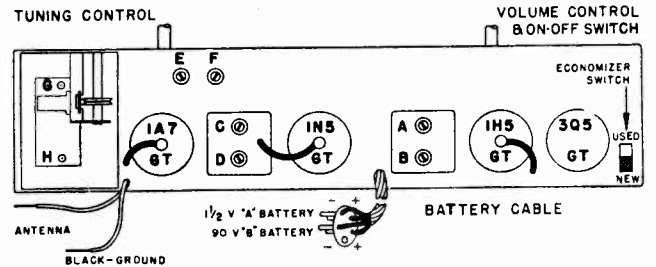
MISCELLANEOUS

Description	Part No.
Background, Dial	X22C5-1
Cabinet, R643-PM (Plastic)	34D10
Caple, Battery (complete with plug)	A1026
Cap, Grid	90A1-2
Clip, Dial Glass	18A2
Cord, Dial (5" on tuner and 63" on dial drive)	50A1-3
Dial Scale, glass	21B25
Drum and Hub, Tuning	A1035
Grille Cloth	36B3-1
Iron Slug, with wire (Oscillator)	71B1-3
Iron Slug, with wire (Antenna)	71B1-4
Knob	33A7-2
Plug, Battery, 5 Prong	88A4-4
Pointer, Dial	25A9-1
Pulley, Fibre Dial	17A1-3
Screw Studs (for iron cores)	27A4
Shaft, Tuning	28A1-1
Shaft and Pulley (Tuner)	A1040
Shield, Tube	87A8
Socket, Octal Tube	87A5-1
Socket, Speaker	87A4-3
Speaker and Output Transformer	78B15-2
Speaker Guard	36A5-2
Spring, Dial Drum Cord Tension	19B1-10
Spring, Hairpin (To hold Ant. or Osc. coil)	19A3-1
Spring, Tuner Slide Cord Tension	19A1-4
Spring, Tuner, back bearing takeup	19A6
Spring, Tuner, front bearing takeup	19A5
Spring, Tuner Slide Pressure	18A9
Switch, SPST (Economizer) SW2	77B1-6
Washer, C	4A4-1
Washer, spring (coils)	4A6-12-0
Washer, spring (shaft)	4A6-3-0

MODEL R643-W

ALIGNMENT PROCEDURE

Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.
 Check setting of Pointer Extremes and note correct 800 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)
 Connect Output Meter across Voice Coil.
 Turn Receiver Volume Control—full on.
 Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.
 Repeat adjustments to insure final overall maximum results.



Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Frequency to—	Set Receiver Dial Frequency to—	Adjust Following Trimmers or Slugs	Type of Adjustment
Grid of 1A7 (Cap)	.1 mfd. Condenser	455 Kc.	High frequency End of dial	A-B—1st I.F. C-D—2nd I.F.	Adjust to maximum Output
Antenna Lead	.0002 mfd. Condenser	1630 Kc.	High frequency End of dial	E—Osc. (Trimmer) F—Ant. (Trimmer)	Adjust to maximum Output
Antenna Lead	.0002 mfd. Condenser	1400 Kc.	Tune in Generator Signal	G—Osc. (iron core) H—Ant. (iron core)	Adjust to maximum Output

PAPER CONDENSERS

Part No.	Symbol No.	Description
64B1-14	C8	.002 mfd. 600 Volt
64B1-12	C15	.005 mfd. 600 Volt
64B1-25	C1, C7, C13, C14, C16	.01 mfd. 400 Volt
64B1-32	C10	.05 mfd. 200 Volt

MICA CONDENSERS

Part No.	Symbol	Description
65B7-17	C5	.0001 mfd.
65B7-22	C11, C12	.00025 mfd.
64B5-31	C2, C6	.0008 mfd.

ELECTROLYTIC CONDENSER

Part No.	Symbol	Description
67A4-2	C9	4. mfd. 150 Volt

TRIMMER CONDENSERS

Part No.	Symbol No.	Description
66A9-1	C3, C4	Dual trimmer

RESISTORS

Part No.	Symbol	Description
61A2-1	R12	.75 ohm 1/4 w (wire)
60B2-391	R11	390. ohm 1/4 w
60B2-222	R13	2200 ohm 1/4 w
60B8-153	R1	15,000 ohm 1/2 w

60B8-333	R4	33,000 ohm 1/2 w
60B8-224	R3	220,000 ohm 1/2 w
60B2-474	R2	470,000 ohm 1/4 w
60B2-105	R9, R10	1,000,000 ohm 1/4 w
60B2-225	R6	2,200,000 ohm 1/4 w
60B2-475	R5, R8	4,700,000 ohm 1/4 w

VOLUME CONTROL

Part No.	Symbol No.	Description
75B1-1	R7	1 megohm Vol. Control and switch

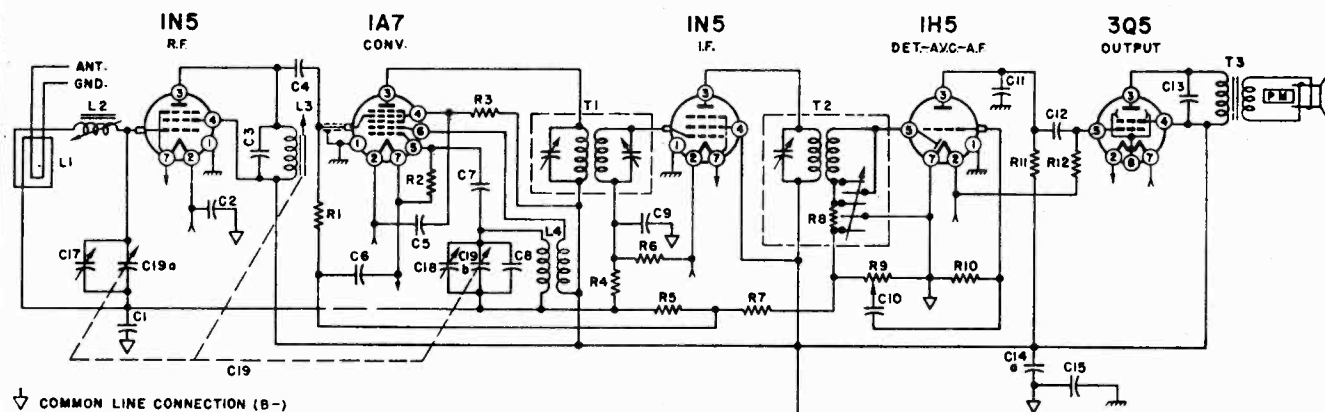
TRANSFORMERS AND COILS

Part No.	Symbol No.	Description
AC105-1	L1	Antenna coil
AB104-4	L2	Oscillator coil
72B5	L3	1st I.F. Transformer
72B6	L4	2nd I.F. Transformer
AB103-1	L5	Choke coil (RF)
	T1	Output Transformer (specify full speaker part no. including mfg. code when ordering)

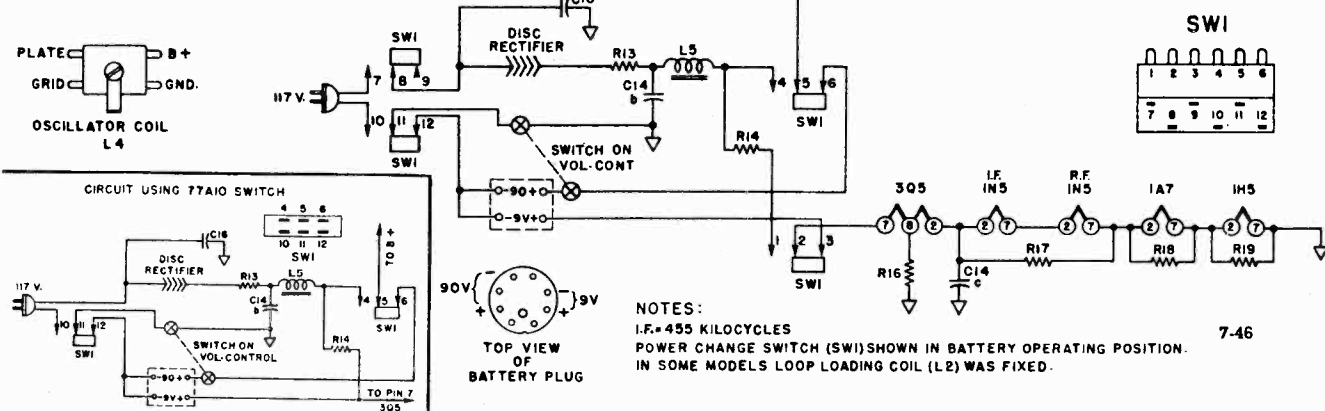
MISCELLANEOUS

22C5-1		Background, Dial
35C25		Cabinet, R643-W
A1026		Cable, Battery (complete with plug)
90A1-4		Cap, Grid
50A1-1		Cord, Dial (5" on tuner) (53" on dial drive)

A1035	Drum and Hub, Tuning
23A8-1	Escutcheon
71B1-3	Iron Core, with wire (Osc.)
71B1-4	Iron Core, with wire (Ant.)
33A7-2	Knob
A1028	Permeability Tuner Assembly, complete
88A4-4	Plug, Battery 5 Prong
25A9-1	Pointer, Dial
17A1-3	Pulley, Fibre Dial
21B13	Scale, Glass Dial
27A4	Screw studs (for iron cores)
87A8	Shield, Tube
28A11-1	Shaft, Tuning
A1040	Shaft and pulley (Tuner)
87A10-2	Socket, octal tube
78B5	Speaker and output Transformer (specify complete part number including mfg. code, when ordering)
19A1-3	Spring, Dial Drum Cord Tension
19A1-4	Spring, Tuner slide cord tension
18A1	Spring, Tuner slide pressure
19A5	Spring, Tuner, front bearing takeup
19A6	Spring, Tuner, back bearing takeup
19A3-1	Spring, Hairpin (To hold Ant.-Osc. coils)
95A9-1	Spirashield (3")
77A1-6	Switch, SPST (Economizer)
9A8-1	Terminal, Tuner slide cord
4A4-1	Washer, C
4A6-3-0	Washer, spring (shaft)
4A6-5-0	Washer, spring (coils)

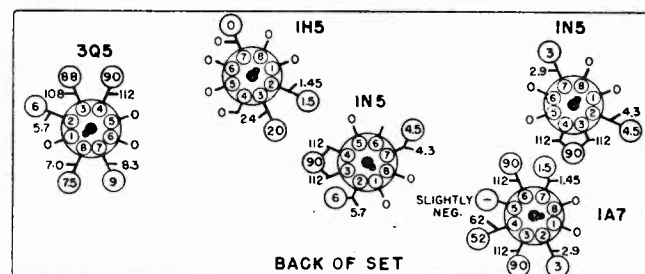


COMMON LINE CONNECTION (B-)
CHASSIS GROUND



NOTES:
I.F. = 455 KILOCYCLES
POWER CHANGE SWITCH (SW1) SHOWN IN BATTERY OPERATING POSITION.
IN SOME MODELS LOOP LOADING COIL (L2) WAS FIXED.

VOLTAGE CHART



VOLTAGE DATA

1. Voltage readings circled (O) are for Battery Operation.
2. All readings made between Tube Socket Terminals and Pin No. 7 on the IH5.
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm-per-volt meter.

CONDENSERS

Symbol	Description	Part No.
C1	.05 Mfd., 200 Volt, Paper	64B1-32
C2	.25 Mfd., 200 Volt, Paper	64B1-28
C3	.00042 Mfd., Mica	65B1-13
C4, C11	.00025 Mfd., Mica	65B5-22
C5, C6, C9, C10, C12	.01 Mfd., 400 Volt, Paper	64B1-25
C7	.00035 Mfd., Mica	65B5-11
C8	.00015 Mfd., Mica	65B5-3
C13	.0002 Mfd., 600 Volt, Paper	64B1-14
C14a	50 Mfd., 150 Volt	Elect. Cond. 67C7-42
C14b	30 Mfd., 150 Volt	
C14c	100 Mfd., 25 Volt	
C15	.2 Mfd., 400 Volt, Paper	64A2-1
C16	.05 Mfd., 400 Volt, Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19 {C19a, C19b}	Condenser, Gang	68B4

RESISTORS

Symbol	Description	Part No.
R6	4.7 Megohms, 1/4 Watt, Carbon	60B2-475
R7	3.3 Megohms, 1/4 Watt, Carbon	60B2-335
R8	47,000 Ohms, 1/2 Watt, Carbon	60B8-473
R9	1 Megohm Volume Control	75B1-10C
R10	15 Megohms, 1/4 Watt, Carbon	60B2-156
R11	1 Megohm, 1/4 Watt, Carbon	60B2-105
R12	2.2 Megohms, 1/4 Watt, Carbon	60B2-225
R13	68 Ohms, Wire Wound, 1 Watt	60B28-4
R14	2,275 Ohms, Wire Wound, 5 Watt	61A3-6
R16	1,500 Ohms, 1/2 Watt, Carbon	60B8-152
R17	560 Ohms, 1/2 Watt, Carbon	60B8-561
R18	220 Ohms, 1/2 Watt, Carbon	60B8-221
R19	120 Ohms, 1/2 Watt, Carbon	60B8-121

COILS & TRANSFORMERS

Symbol	Description	Part No.
T2	2nd I.F. Transformer	72B10-2
T3	Transformer, Output	72B10-2
* When ordering, specify all numbers on the speaker and transformer.		
SW1	Switch, Power Change (R652)	77A6
	Switch, Power Change (R652N)	77A10

RESISTORS

R1	100,000 Ohms, 1/2 Watt, Carbon	60B8-104
R2	220,000 Ohms, 1/2 Watt, Carbon	60B8-224
R3	47,000 Ohms, 1/2 Watt, Carbon	60B8-473
R4, R5	4.7 Megohms, 1/4 Watt, Carbon	60B2-475

COILS & TRANSFORMERS

L2	{ Coil, Loop Loading, (fixed)	AA114
	{ Coil, Loop Loading, (variable)	AA115
L3	{ Iron Slug for plate coil	71B1-3
L4	{ Coil, Plate	AB100-5
L5	Oscillator Coil	69A7
T1	Choke Filter	74A5
	1st I.F. Transformer	72B9-2

MISCELLANEOUS

Description	Part No.
Dial Background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Escutcheon and Dial Scale	23C14
Knob, Tuning	33A14-6
Knob, Volume	33A14-5
Plug, Battery (9 prong)	88A3-3
Pointer, Cream Tenite	25A15-1
Rectifier, Selenium	93A1-2
Speaker & Output Transformer	78B8
Tube Shields	87A8

ALIGNMENT PROCEDURE

1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment, using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

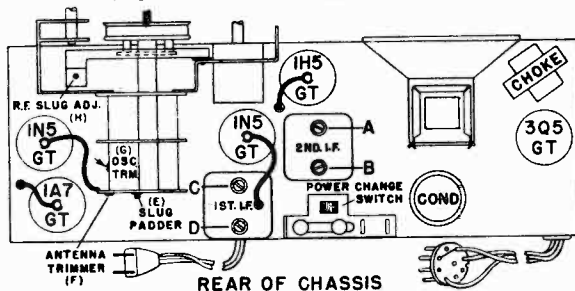
Step	Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Gang Condenser Setting	Trimmer Description and Designation	Type of Adjustment
1	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does 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	Grid Cap 1N5	1620 K.C.	Rotor full open (Plates out of mesh)	Oscillator Trimmer (G)	Maximum Deflection
3	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection
4	Replace Set in Cabinet					
5	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection
6	Disregard the next two steps if the set being aligned is a model with a fixed loop loading coil (L2).					
7	.00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection
8	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection

Seal adjusting screw on the loop loading coil with any quick drying cement.

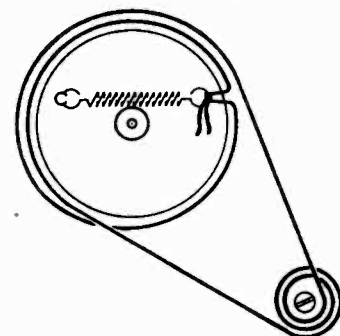
REPLACING R.F. TUNING SLUG

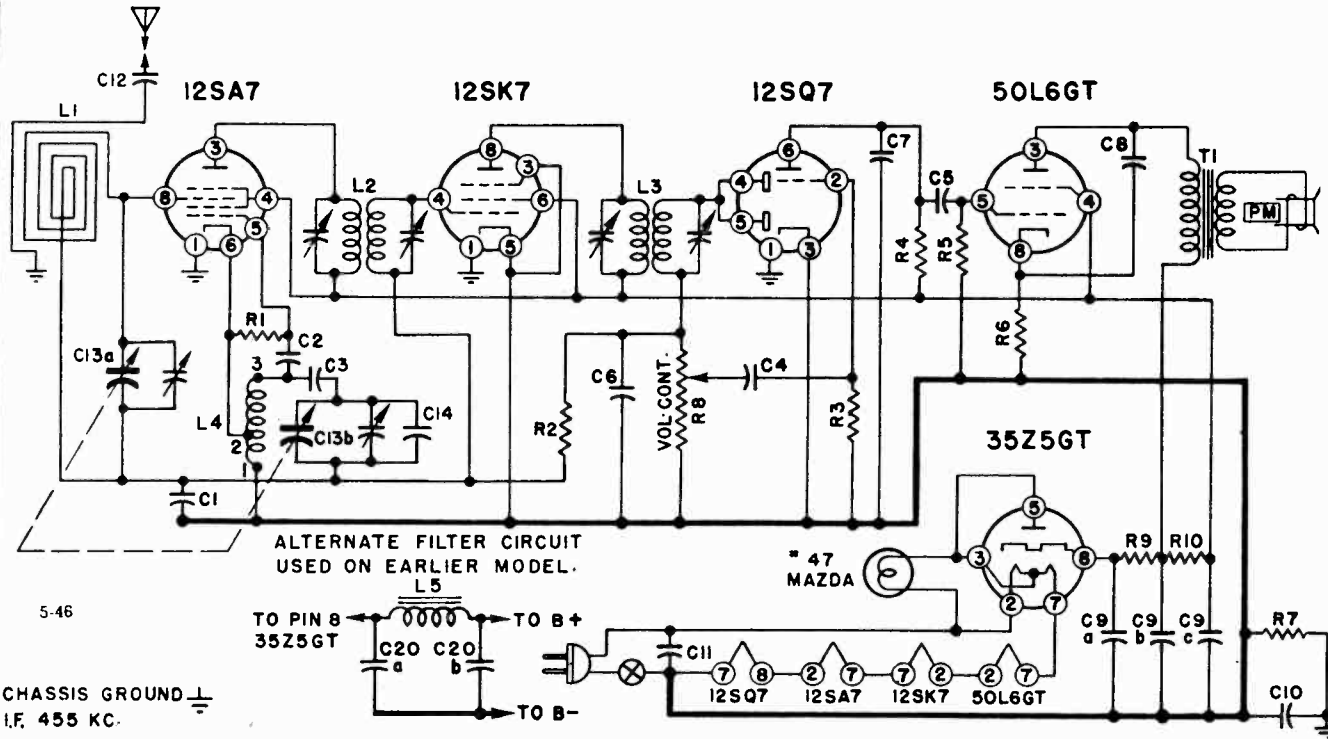
If the R.F. Tuning Slug has to be changed, use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder 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 re-align the set as shown in the chart.

TUBE AND TRIMMER LAYOUT



DIAL CORD STRINGING



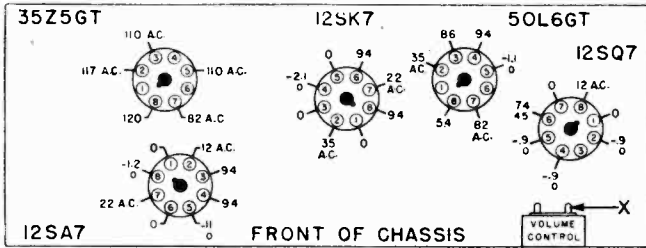


NOTE: 1. In later production R9 and C9a are disconnected from pin No. 8 of the 35Z5 and a 33-ohm 1-watt resistor (R11) is connected between pin No. 8 and the junction of R9 and C9a.

2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L3) and the other pin is connected directly to the junction point of R2 and the secondary of the 1st I.F. (2).

VOLTAGE DATA

All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing). Voltages indicated obtained on 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.



Bottom View

Measured on a 117 Volt A.C. line; volume control full on; dial tuned to low frequency end, no signal.

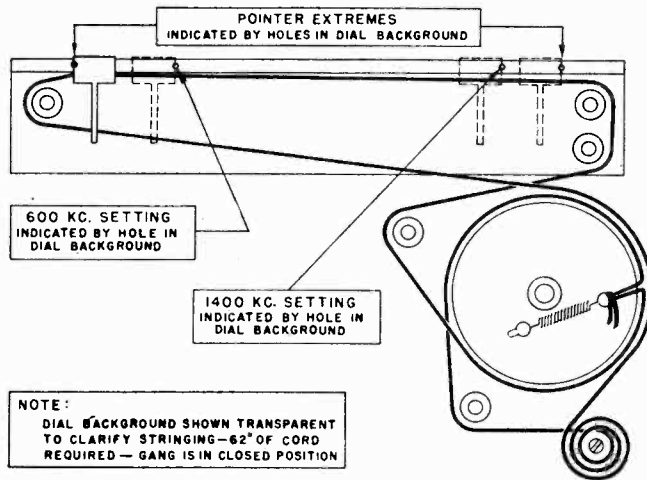
Frequency Range 540-1630 Kc.

POWER SUPPLY

This receiver is designed to operate from any AC (Alternating Current) power supply main of 110-120 volts, 50-60 cycles or DC (Direct Current) power supply main of 110-120 volts. If the receiver fails to operate on DC (Direct Current), reverse the power main plug.

On AC only the line plug should be tried both ways and left in the position that give minimum hum.

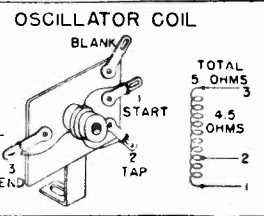
DIAL STRINGING AND POINTER SETTINGS



NOTE: DIAL BACKGROUND SHOWN TRANSPARENT TO CLARIFY STRINGING—62" OF CORD REQUIRED—GANG IS IN CLOSED POSITION

COILS

Symbol	Description
L1 (Sec. 2.3 ohms)	Loop
L2	1st I.F. Trans.
L3	2nd I.F. Trans.
L4	Osc. Coil
L5 (325 ohms)	Choke, Filter

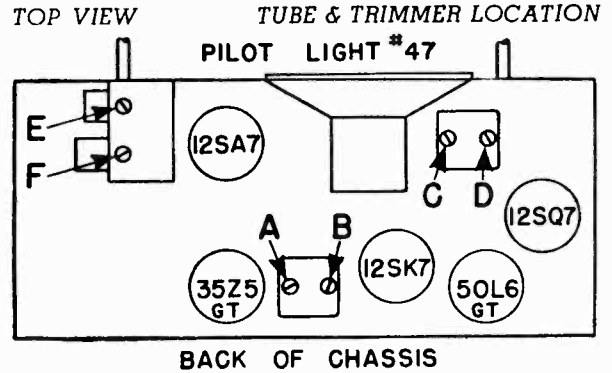


B. F. GOODRICH CO.

MODELS R654-PM, R654-PV
MODEL R655-W

ALIGNMENT PROCEDURE

- Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.
- Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect Output Meter across Voice Coil of Speaker.
- Turn Receiver Volume Control full on.
- Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as outlined in chart below.
- Repeat adjustments to insure final overall maximum results.



Step	Dummy Antenna between Radio and Signal Generator	Connect Signal Generator to	Signal Generator Frequency	Gang Condenser Setting	Trimmers Adjusted for Maximum Output
1	250 mmfd. Condenser	Gang Condenser Antenna Stator	455 KC.	Rotor full open (Plates out of mesh)	C and D—2nd. I.F.
2	250 mmfd. Condenser	Gang Condenser Antenna Stator	455 KC.	Rotor full open (Plates out of mesh)	A and B—1st I.F.
3	250 mmfd. Condenser	Gang Condenser Antenna Stator	1630 KC.	Rotor full open (Plates out of mesh)	E—Oscillator
4	No actual connection between set and generator.	Loop radiator (or place pickup lead from generator close to loop of set to obtain adequate signal).	1400 KC.	Set Gang to tune in Generator Signal	F—Antenna (See Note)

NOTE: Antenna trimmer "F" must be aligned after chassis and loop are mounted in the cabinet. This adjustment can be made by lifting up the top cover and removing the plug button which is directly above trimmer "F".

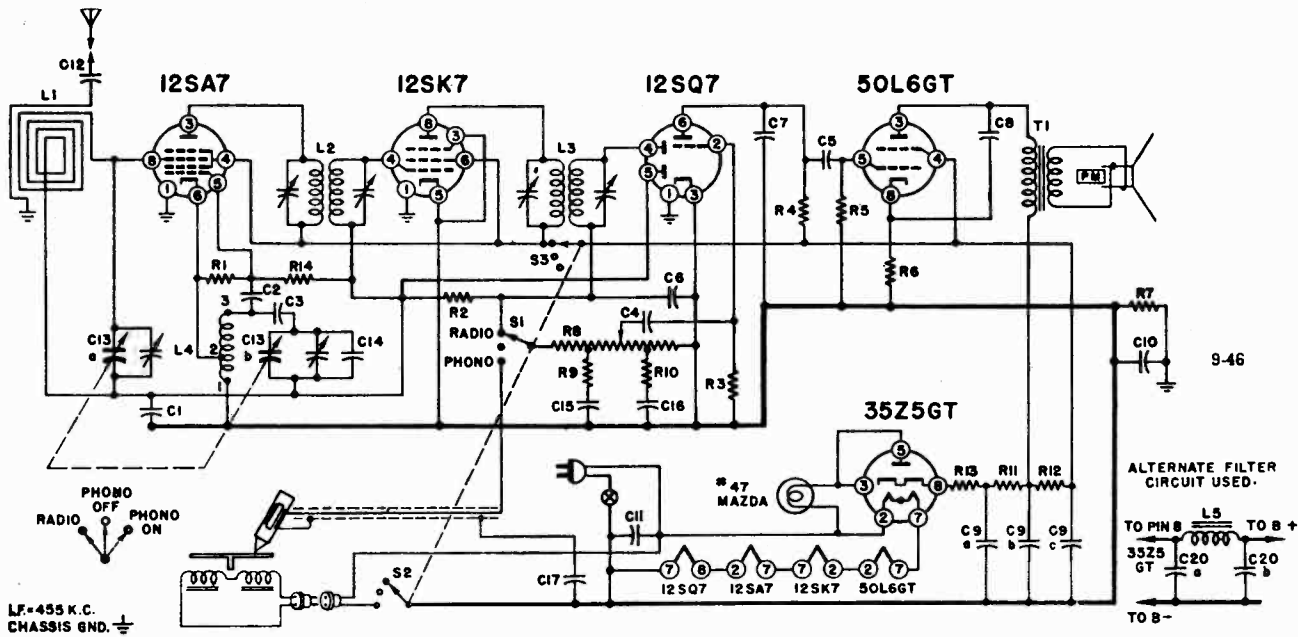
MODEL R655-W

REPLACEMENT PARTS

CONDENSERS			RESISTORS			MISCELLANEOUS	
Symbol	Description	Part No.	Symbol	Description	Part No.	Description	Part No.
C1	.1 mfd., 200 Volts, Paper	64B1-30	R8	1/2 megohm, Volume Control and Switch. Tapped at approx. 100,000 and 200,000 ohms from start.	75B3-2	Background, Dial	X22C3-1
C2	50 mmfd., Mica	65B7-11	R9	47,000 ohms, 1/2 Watt	60B8-473	Dial Scale, Glass	21B27-2
C3	.02 mfd., 400 Volts, Paper	64B1-24	R10	27,000 ohms, 1/2 Watt	60B8-273	Drum and Hub Assembly	A1012
C4	.01 mfd., 400 Volts, Paper	65A3-10	R11	150 ohms, 1 Watt	60B28-1	Grommet, Rubber Insulating	12A1-1
C5	.01 mfd., 400 Volts, Paper	65A3-10	R12	1,000 ohms, 1 Watt	60B28-2	Grommet, Rubber for Drum	12A1-2
C6	250 mmfd., Mica	65B7-22	R13	33 ohms, 1 Watt	60B28-3	Knob, Tuning or Volume Control	33A16-2
C7	500 mmfd., Mica	65B7-27	R14	10 megohms, 1/2 Watt	60B9-106	Knob, Radio-Phono Switch	33A11-5
C8	.02 mfd., 400 Volts, Paper	64B1-24	TRANSFORMERS and COILS			Pilot Light, Mazda No. 47	81A1-8
C9a	30 mfd., 150 V., Electrolytic	67A8	L1	Antenna, Loop	69B6	Pilot Light Socket and Leads	82A2-3
C9b	30 mfd., 150 V., Electrolytic	67A8	L2	Transformer, 1st I. F.	72B3	Plug, Button	13A2-1-57
C9c	20 mfd., 150 V., Electrolytic	67A8	L3	Transformer, 2nd I. F.	72B4	Plug, Alden (Motor Leads)	88A8-1
C10	.1 mfd., 400 Volts, Paper	64B1-20	L4	Oscillator Coil	69A5	Pointer	25A4-1
C11	.05 mfd., 400 Volts, Paper	64B1-22	L5	Choke Coil (Filter)	74A1	Pulley, Fibre Dial	17A1-3
C12	.005 mfd., 600 Volts, Paper	64B1-12	T1	Transformer, Output	98A4	Shaft, Tuning	28A1-1
C13a	.00042 mfd., Gang	68A2	PHONOGRAPH PARTS			Socket and Leads (Alden)	89A6-2
C13b	.00018 mfd., Gang	68A2	Description			Socket, Octal Tube	87A5-1
C14	15 mmfd., Mica	65B5-3	Description			Speaker (5" PM) & Output Transformer	78B13-1
C15	.01 mfd., 400 Volts, Paper	65A3-10	Description			Spring, Dial Cord Tension	19B1-7
C16	.01 mfd., 400 Volts, Paper	65A3-10	Description			Switch, Rotary Radio-Phono	{ 77A8 or 77A11
C17	.05 mfd., 400 Volts, Paper	64B1-22	Description			Washer, Flat Insulating	5A1-6
C20a	30 mfd., 150 V., Electrolytic	67A3	Description			Washer, Offset Insulating	5A2-5
C20b	50 mfd., 150 V., Electrolytic	67A3	Description			Washer, C	4A4-1
RESISTORS			Description			Washer, Spring	4A6-3-0
R1	22,000 ohms, 1/2 Watt	60B8-223	Description			82A2-3	Pilot Light Socket and Leads
R2	1 megohm, 1/2 Watt	60B8-105	Description			25A4-1	Pointer, Metal Dial
R3	10 megohms, 1/2 Watt	60B8-106	Description			17A1-3	Pulley, Fibre Dial
R4	220,000 ohms, 1/2 Watt	60B8-224	Description			21B8-1	Scale, Glass Dial
R5	470,000 ohms, 1/2 Watt	60B8-474	Description			28A1-1	Shaft, Tuning
R6	150 ohms, 1/2 Watt	60B8-151	Description			13A1-4-47	Snap Buttons (for Cabinet Back)
R7	150,000 ohms, 1/2 Watt	60B8-154	Description			87A1C-2	Socket, Laminated Octal Tube
RESISTORS			Description			78B4-1	Speaker, 5" PM and Output Trans.
RESISTORS			Description			19A1-3	Spring, Dial Cord Tension
RESISTORS			Description			5A1-6	Washer, Fibre Flat
RESISTORS			Description			5A2-5	Washer, Fibre Offset
RESISTORS			Description			4A4-1	Washer, C
RESISTORS			Description			4A6-3-0	Washer, Spring
RESISTORS			Description			4B1-55-2	Washer, Flat Mounting 7/16" OD
RESISTORS			Description			3B1-26-2	Washer, Mounting Lock (No. 8)

PARTS FOR MODELS R654-PM, R654-PV THE SAME AS ABOVE EXCEPT FOR THE PHONOGRAPH PARTS AND THE FOLLOWING EXCEPTIONS:

MISCELLANEOUS		MISCELLANEOUS	
Part No.	Description	Part No.	Description
64B1-25	C4 C5 .01 mfd. 400 V.	22C3-1	Background, Dial
64A2-1	C10 .2 mfd. 900 V.	15A14	Bracket, Loop Retainer
MICA CONDENSERS		34D5-1	Cabinet (Ivory)
65B5-5	C14 Mica 20 mmf. ±10%	34D5-2	Cabinet (Mahogany)
60B28-3	R11 33 ohm 1 W. ±10%	43B9	Cover, Back
60B28-1	R9 150 ohm 1 W. ±10%	18A2	Clip, Dial Glass Mtg.
60B28-2	R10 1,000 ohm 1 W. ±10%	89A1	Cord, Line
75B1-6	R8 1 meg Control and Switch	50A1-3	Cord, Dial (62")
		A1012	Drum and Hub Assy., Dial
		12A1-2	Grommets, Rubber
		33A7-1	Knob, Ivory
		33A7-2	Knob, Mahogany
		1A67-27-2	Mounting Bolts, 8-32 x 1/2" lg.
		81A1-8	Pilot Light No. 47



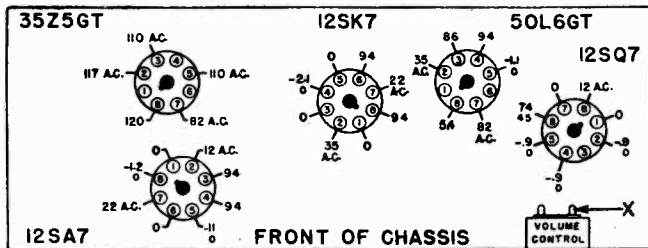
LF=455 K.C.
CHASSIS GND.

TUBES USED

- 12SA7—1st Det. Osc.
- 12SK7—I. F. Amplifier
- 12SQ7—2nd Det.—A. V. C.—1st Audio
- 50L6GT—Beam Power Output
- 35Z5GT—Rectifier

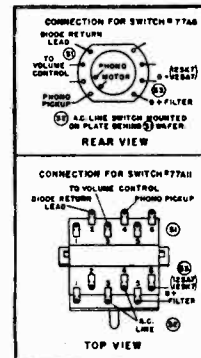
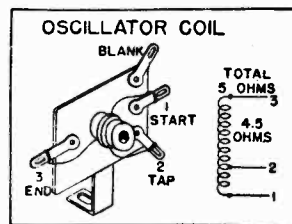
Frequency Range 540-1630 Kilocycles

VOLTAGE DATA

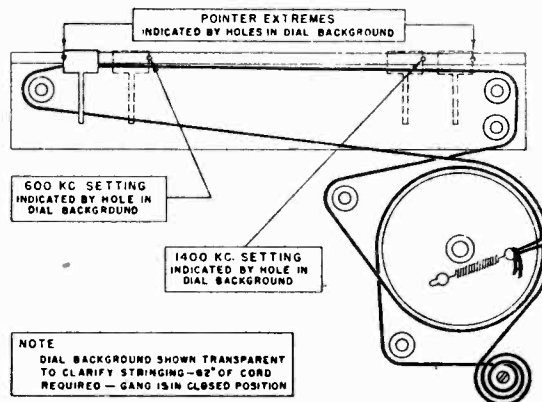


Bottom View of Chassis, Showing Voltages

- All readings made between Tube Socket Terminals and Switch Lug on Volume Control (Point "X" on drawing).
- Measured on a 117 Volt A.C. line.
- Volume control full on.
- Dial tuned to low frequency end, no signal.
- Voltages obtained on 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.

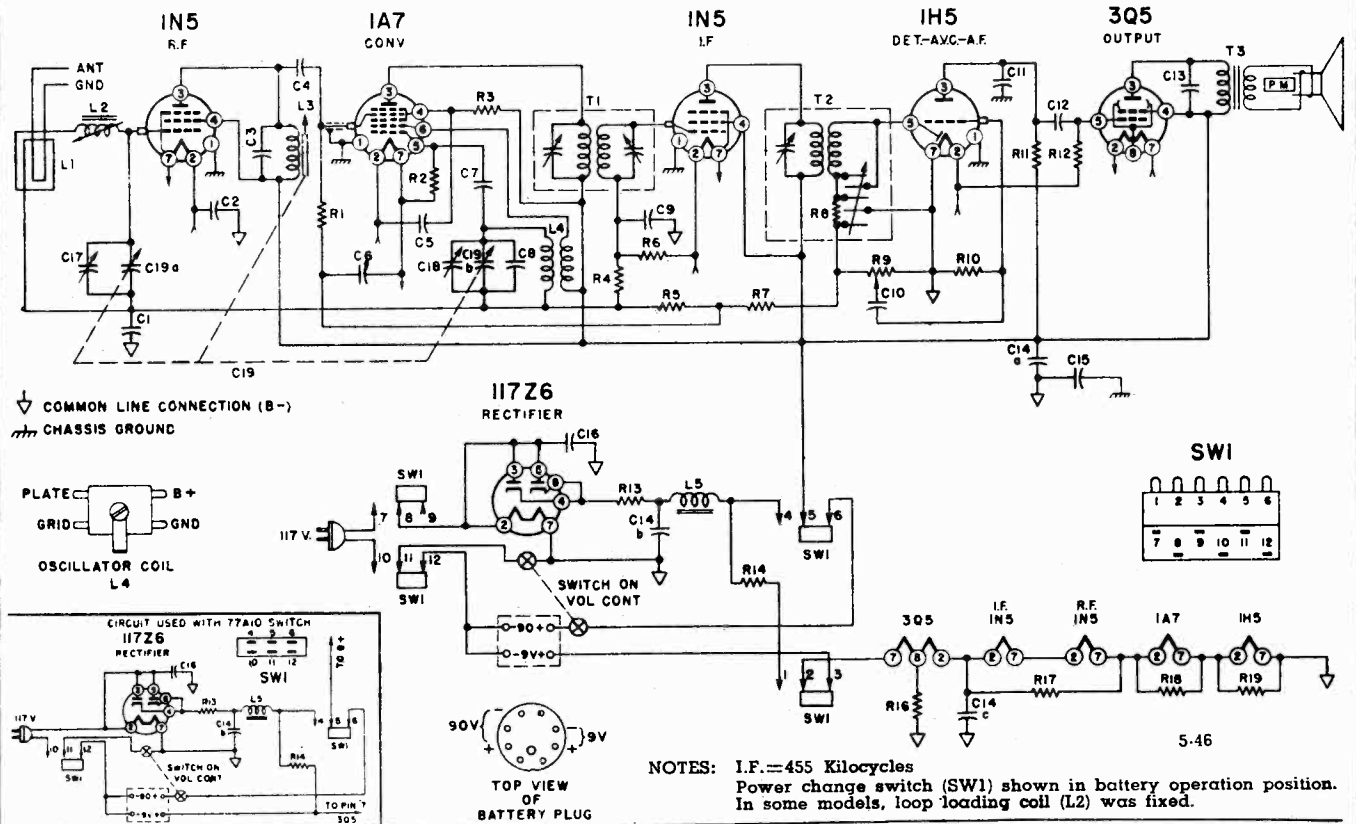


DIAL STRINGING AND POINTER SETTINGS



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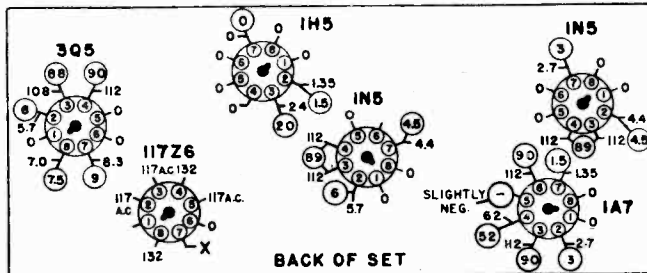
MODELS R662, R662-N



Frequency Range—535 to 1620 Kilocycles

VOLTAGE DATA

1. Voltage readings circled (O) are for Battery Operation.
2. All readings made between Tube Socket Terminals and Terminal No. 7 on the 117Z6 (Point "X" on Voltage Chart).
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm-per-volt meter.



CONDENSERS

Symbol	Description	Part No.
C1	.05 Mid., 200 Volt, Paper	64B1-32
C2	.25 Mid., 200 Volt, Paper	64B1-28
C3	.00042 Mid., Mica	65B1-9
C4, C11	.00025 Mid., Mica	65B5-22
C5, C6, C9, C10, C12	.01 Mid., 400 Volt, Paper	64B1-25
C7	.00005 Mid., Mica	65B5-11
C8	.00015 Mid., Mica	65B5-3
C13	.002 Mid., 600 Volt, Paper	64B1-14
C14a	50 Mid., 150 Volt	Elect. Cond. 67C7-42
C14b	30 Mid., 150 Volt	
C14c	100 Mid., 25 Volt	
C15	.2 Mid., 400 Volt, Paper	64A2-1
C16	.05 Mid., 400 Volt, Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19	{ C19a } Condenser, Gang	68B4

RESISTORS

Symbol	Description	Part No.
R1	100,000 Ohms, 1/2 Watt, Carbon	60B8-104
R2	220,000 Ohms, 1/2 Watt, Carbon	60B8-224
R3	47,000 Ohms, 1/2 Watt, Carbon	60B8-473
R4, R5	4.7 Megohms, 1/2 Watt, Carbon	60B2-475

RESISTORS

Symbol	Description	Part No.
R6	4.7 Megohms, 1/2 Watt, Carbon	60B2-475
R7	3.3 Megohms, 1/2 Watt, Carbon	60B2-335
R8	50,000 Ohms, 1/2 Watt, Carbon	60B8-503
R9	1 Megohm Volume Control	75B1-100
R10	15 Megohms, 1/2 Watt, Carbon	60B2-156
R11	1 Megohm, 1/2 Watt, Carbon	60B2-105
R12	2.2 Megohms, 1/2 Watt, Carbon	60B2-225
R13	22 Ohms, Wire Wound, 1/2 Watt	61A2-2
R14	2,450 Ohms, Wire Wound, 5 Watt	61A3-5
R16	1,500 Ohms, 1/2 Watt, Carbon	60B8-152
R17	560 Ohms, 1/2 Watt, Carbon	60B8-561
R18	220 Ohms, 1/2 Watt, Carbon	60B8-221
R19	120 Ohms, 1/2 Watt, Carbon	60B8-121

COILS & TRANSFORMERS

Symbol	Description	Part No.
L2	{ Coil, Loop Loading, (fixed)	AA114
	{ Coil, Loop Loading, (variable)	AA115
L3	Iron Slug for plate coil	71B1-3
L4	Coil, Plate	70A1-30
L5	Oscillator Coil	69A7
T1	Choke Filter	74A5
	1st I.F. Transformer	72B9-2

COILS & TRANSFORMERS

Symbol	Description	Part No.
T2	2nd I.F. Transformer	72B10-2
T3	Transformer, Output	*
SW1	{ Switch, Power Change (R662)	77A6
	{ Switch, Power Change (R662N)	77A10

MISCELLANEOUS

Description	Part No.
Dial Background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Escutcheon and Dial Scale	23C14
Knob, Tuning	33A14-6
Knob, Volume	33A14-5
Plug, Battery (9 prong)	88A3-3
Pointer, Cream Tenite	25A15-1
Speaker & Output Transformer	78B8
Tube Shields	87A8

ALIGNMENT PROCEDURE

1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment, using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

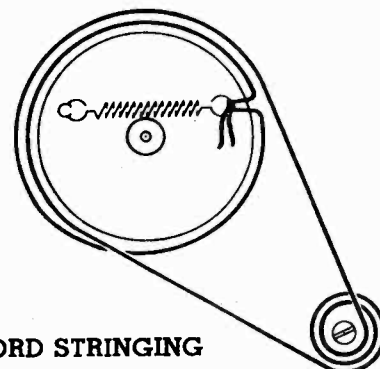
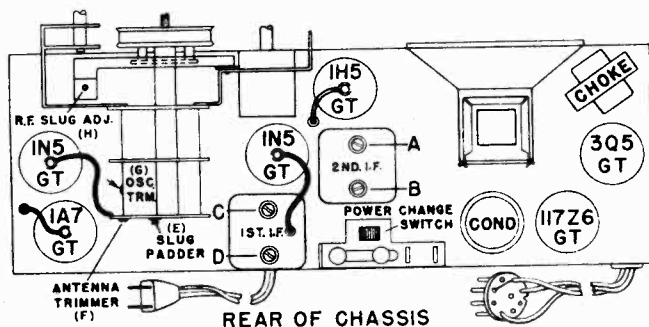
Step	Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Gang Condenser Setting	Trimmer Description and Designation	Type of Adjustment
1	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does 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	Grid Cap 1N5	1620 K.C.	Rotor full open (Plates out of mesh)	Oscillator Trimmer (G)	Maximum Deflection
3	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection
4	Replace Set in Cabinet					
5	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection
6	Disregard the next two steps if the set being aligned is a model with a fixed loop loading coil (L2).					
7	.00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection
8	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection

Seal adjusting screw on the loop loading coil with any quick drying cement.

REPLACING R.F. TUNING SLUG

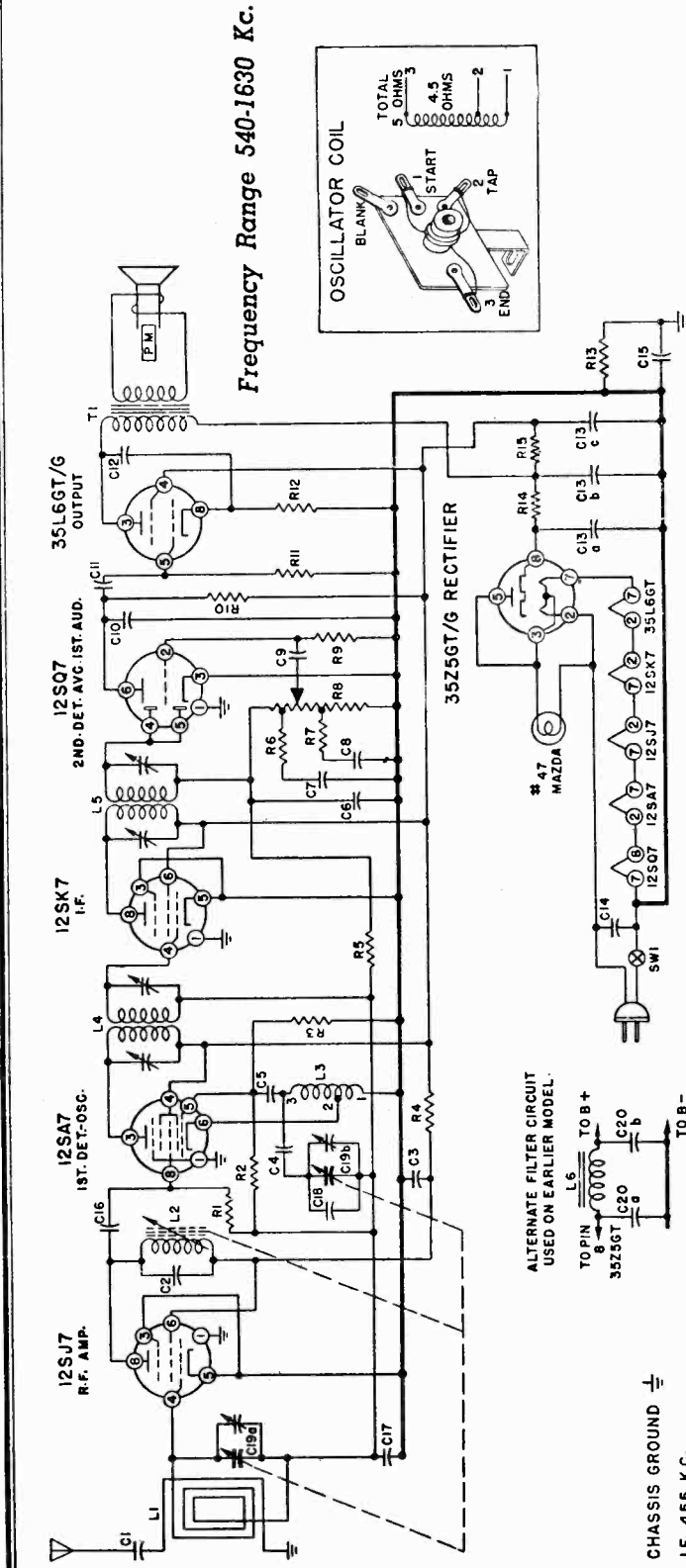
If the R.F. Tuning Slug has to be changed, use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder 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 re-align the set as shown in the chart.

TUBE AND TRIMMER LAYOUT



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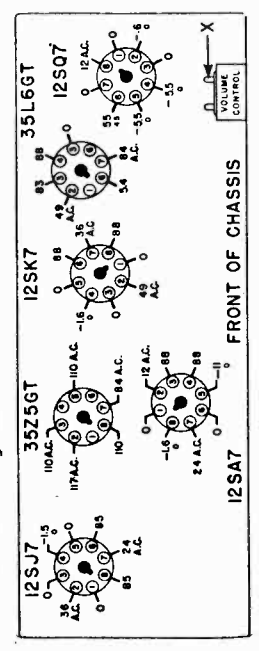
MODELS R664-PM, R664-PV,
R664-W



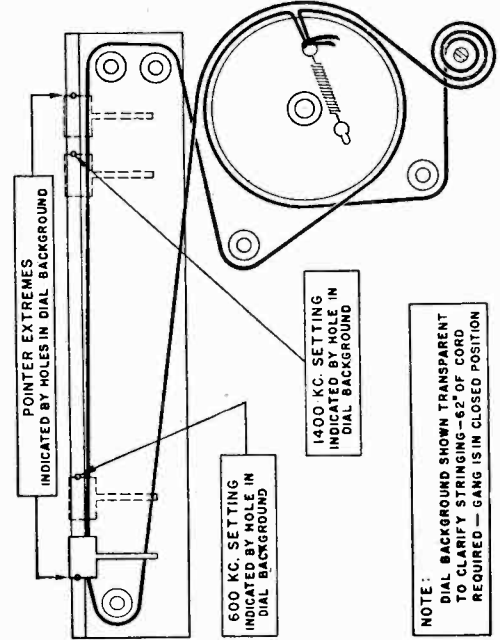
NOTE: 1. In later production R14 and C13a are disconnected from pin #8 of the 35Z5 rectifier and a 33-ohm 1W resistor (R16) is connected from pin #8 to the junction of R14 and C13a.
2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L5) and the other pin is connected directly to the junction point of R5 and the secondary of the 1st I.F. (L4).

VOLTAGE DATA

All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing). Voltages indicated were obtained with a vacuum tube voltmeter. However, when use of a 1000 ohm-per-volt meter results in an appreciably different reading, this reading is shown below that of the vacuum tube voltmeter reading. Voltages are measured using a 117 volt A.C. line with the volume control full on, the dial tuned to the low-frequency end and no signal.



DIAL STRINGING AND POINTER SETTINGS



COILS

Symbol	Description
L1 (Sec. 2.3 ohms)	Loop
L2 (2.5 ohms)	R. F. Coil
L3	Osc. Coil
L4	1st I. F. Trans.
L5	2nd I. F. Trans.
L6 (325 ohms)	Choke, Filter

MODELS R664-PM, R664-PV,
R664-W

B. F. GOODRICH CO.

DIAL DRUM POSITION

If the dial drum position is disturbed, it should be carefully re-positioned to insure correct tuning of the permeability tuned coil. With the gang fully meshed, the drum will be properly positioned if the center of the condenser shaft and the dial cable hole on the drum are in a straight line parallel to the chassis base. Note that the dial cable hole should be on the right side (looking at front) of the chassis.

TUNED SLUG POSITION.

If the tuned coil slug needs replacing or re-positioning, first see that the dial drum is in its proper position. Then with the gang condenser fully meshed and the threaded stud half-way through the bakelite, note that the top of the slug is flush with the top of coil form. Then re-align.

ALIGNMENT PROCEDURE

Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.

Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)

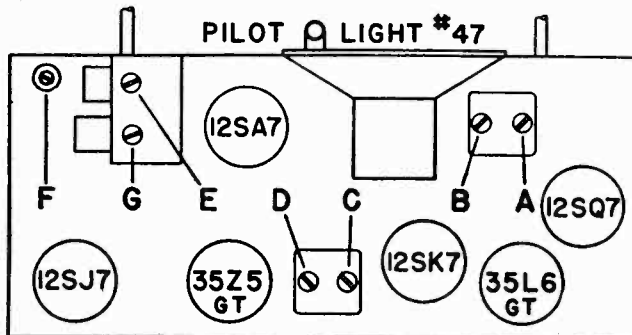
Connect Output Meter across Voice Coil.

Turn Receiver Volume Control full on.

Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as outlined in chart below.

Repeat adjustments to insure final overall maximum results.

TOP VIEW TUBE & TRIMMER LOCATION



BACK OF CHASSIS

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
12SA7 Control Grid	250 mmfd. Mica Condenser	455 KC.	High frequency end of Dial	A and B 2nd I. F. C and D 1st I. F.	Adjust to maximum Output
External Antenna Wire on Loop	250 mmfd. Mica Condenser	1630 KC.	High frequency end of Dial	E—Osc.	Adjust to maximum Output
External Antenna Wire on Loop	250 mmfd. Mica Condenser	1400 KC.	Tune in Generator signal	F—R. F. (Iron Core)	See Note Below
Loop radiator or place pickup lead from gen. close to set loop to obtain adequate signal.	No actual connection between set and generator.	1400 KC.	Tune in Generator signal	G—Ant.	Adjust to maximum Output

NOTE: Adjustment F is the threaded stud at the top end of the slug wire. Screw stud up or down in the bakelite for maximum output. Alignment is correct if the output is reduced

when the position of the lever arm is changed slightly in either direction (up or down).

PAPER CONDENSERS

Part No.	Symbol	Description
64B1-12	C-1	.005 mfd 600 V.....
64B1-22	C-3, C-14	.05 mfd 400 V.....
64B1-24	C-4, C-12	.02 mfd 400 V.....
64B1-25	{C-7, C-8, C-9, C-11}	.01 mfd 400 V.....
64B1-30	C-17	.1 mfd 200 V.....
64A2-1	C-15	.2 mfd. 400 V.....

ELECTROLYTIC CONDENSERS

Part No.	Symbol	Description
67A3	C20a	30 mfd. 150 V.....
	C20b	50 mfd. 150 V.....
67A8	C13a	30 mfd 150 V.....
	C13b	30 mfd 150 V.....
	C13c	20 mfd 150 V.....

VARIABLE CONDENSERS

68A2	C19a, b	Condenser, Gang.....
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RESISTORS

Part No.	Symbol	Description
60B28-3	R-16	33 ohm 1 W. ±10%
60B8-101	R-4	100 ohm ½ W. ±10%
60B8-151	R-12	150 ohm ½ W. ±10%
60B14-151	R-14	150 ohm 1 W. ±10%
60B14-102	R-15	1,000 ohm 1 W. ±10%
60B8-103	R-1	10,000 ohm ½ W. ±10%
60B8-223	R-3	22,000 ohm ½ W. ±10%
60B8-273	R-7	27,000 ohm ½ W. ±10%
60B8-473	R-6	47,000 ohm ½ W. ±10%
60B8-154	R-13	150,000 ohm ½ W. ±10%
60B8-274	R-10	270,000 ohm ½ W. ±10%
60B8-474	R-11	470,000 ohm ½ W. ±10%
60B8-105	R-5	1 meg ohm ½ W. ±10%
60B8-475	R-9	4.7 meg ohm ½ W. ±10%
60B8-106	R-2	10 meg ohm ½ W. ±10%

CERAMIC or MICA CONDENSERS

65B5-5	C-18	20 mmfd. ±10%.....
65B7-11	C-5	50 mmfd. ±20%.....
65B7-22	C-6, C-16	250 mmfd. ±20%.....
65B7-27	C-10	500 mmfd. ±20%.....
65B1-8	C-2	785 mmfd. ±5% (silver)

VARIABLE RESISTORS

75B3-2	R-8	Volume Control (½ meg ohm) and Switch (Tapped).....
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TRANSFORMERS and COILS

69B4	L1	Aeroscope (Loop).....
A1052	L2	R. F. Coil and Mounting
69A5	L3	Oscillator Coil.....
72B3	L4	1st I. F. Transformer.....
72B4	L5	2nd I. F. Transformer.....
74A1	L6	Choke, Filter.....
•	T1	Transformer, Output.....

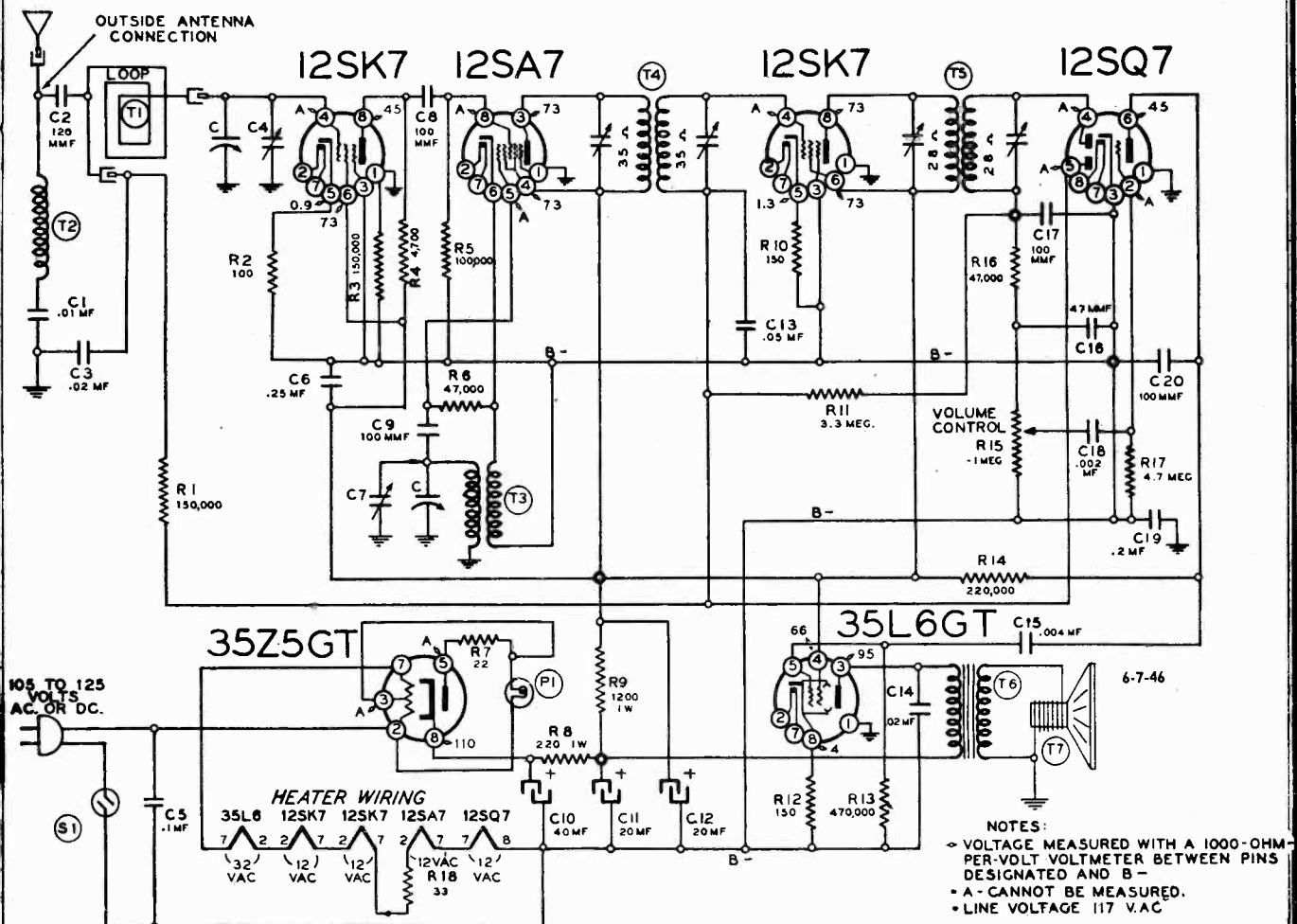
*When ordering, specify all numbers on speaker and transformer.

MISCELLANEOUS

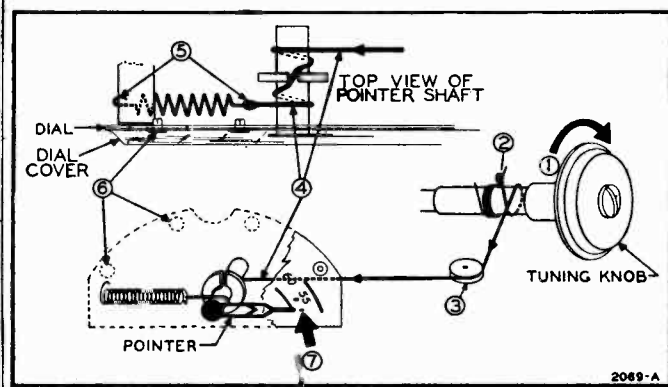
Part No.	Description
22C3-1	Background, Dial (specify blue for plastic, brown for wood cabinets)
15A69	Bracket, Dial glass mtg. (wood Cab.)
13A1-4-47	Buttons, Snap (For cabinet back and R. F. Coil).....

Part No.	Description
15A14	Bracket Plate, Loop Retainer.....
34D8-1	Cabinet, Plastic Ivory.....
34D8-2	Cabinet, Plastic Mahogany.....
18A2	Clip, Dial glass (Plastic Cab.).....
43B10	Cover, Chipboard back (Plastic Cab.)
43B18	Cover, Chipboard back (wood Cab.)
50A1-3	Cord, Dial (62").....
A1049	Drum and Cam Assembly.....
12F1-2	Grommet, Rubber.....
33A7-1	Knob (For Ivory Plastic only).....
33A7-2	Knob (For Mahog. Plastic only).....
33A7-5	Knob (For wood cabinet).....
A1050	Lever arm assembly (R.F.).....
81A1-8	Pilot light, No. 47.....
82A2-3	Pilot light socket and leads.....
25A13-1	Pointer.....
17A1-3	Pulley, Fibre ½ x ½ OD.....
21B10-1	Scale, Glass dial.....
1A5-14	Screw, Set 8-32x½ (Dial Drum).....
1A67-27-2	Screw, Mtg., 8-32x½" lg. (For Plastic only).....
1A67-29-2	Screw, Mtg., 8-32x¾" lg. (For Wood only).....
28A1-1	Shaft, Tuning.....
78B4-2	Speaker and Trans. 5" PM.....
19A1-3	Spring, Tension (Dial).....
19A4	Spring, Lever Arm (R.F.).....
29A2-3-21	Spacer, T (R.F.).....
71F1-2	Slug, R. F. Iron Core (with wire).....
87A10-2	Socket, Octal Tube.....
27A4	Stud, slug adj. (R.F.).....
4A4-1	Washer, C (Tuning shaft).....
4A6-3-C	Washer, Spring (Tuning Shaft).....

W. T. GRANT CO.



NOTES:
 - VOLTAGE MEASURED WITH A 1000-OHM PER-VOLT VOLTMETER BETWEEN PINS DESIGNATED AND B-
 - A - CANNOT BE MEASURED.
 - LINE VOLTAGE 117 V.AC



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.

POWER SUPPLY.....105 to 125 volts, DC or 50-60 cycle AC, 35 watts. Also made for 25 cycles.
 FREQUENCY RANGE.....530 to 1650 kc.
 INTERMEDIATE FREQ.....455 kc.
 TUNING.....Two-gang capacitor.
 ANTENNA.....Built-in loop. Also provisions for external antenna. No ground required.
 SPEAKER.....5-inch; P.M.; voice coil impedance 3.2 ohms.

POWER OUTPUT.....1 watt undistorted. 1.5 watts maximum.
 SENSITIVITY.....10 microvolts average for 50-milliwatt output.
 SELECTIVITY.....55 kc. broad at 1000 times signal at 1000 kc.
 TUBE COMPLEMENT.....12SK7, R. F. amplifier
 12SA7, converter
 12SK7, I. F. amplifier
 12SQ7, 2nd detector, AVC, 1st audio
 35L6GT, output amplifier
 35Z5GT, rectifier

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.

REMOVAL OF CHASSIS—If for any reason you wish to remove the radio chassis from the cabinet, proceed as follows: First be sure the line cord

is disconnected from the house power receptacle. Then take off the back as described under "Dial Light" above. Pull the volume control knob off its shaft. Unscrew the locking screw in the center of the tuning knob and pull the knob off its shaft. Remove the four chassis mounting screws from the bottom of the cabinet. The chassis can now be slipped out.

After the chassis is replaced the automatic pushbuttons will probably have to be reset.

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).

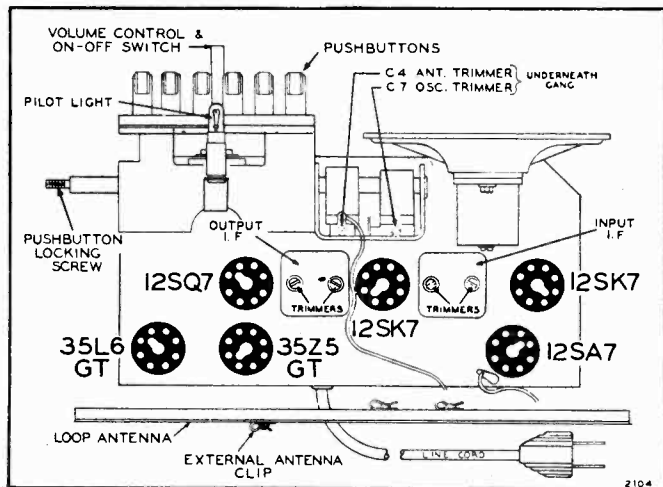
5. Press the first pushbutton down *all the way*. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

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.



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			TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
Frequency	Dummy Antenna	Connection to Radio		
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

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

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

TUNER MECHANICAL PARTS

115146	Cams (6 used on cam shaft)
115143	Key washers (12 used)
117528	Spacer (1 used on shaft)
117602	Spacer (4 used on shaft)
117604	Locking collar
131181	Spring washer for collar
A-3N-11086	Spacer on shaft for drive cord
A-49A-11087	Spring on shaft for drive cord
115361	Cam lever with roller
120283	Return spring for lever
112785	Pointer
A-53A-10989	Drive cord (6 inches)
120143	Tension spring for drive cord
B-6D-10241	Dial scale
112659	Crystal for dial scale
B-2M-7758	Snap-in rivets (4) for crystal

MISCELLANEOUS

T7	114191B	Speaker, 5-inch, P.M.
	121171	Socket for tube (6 used)
P1	10798D	Line cord and plug
	107249	Dial lamp, 6-8 volts, T-47
	107271	Socket assembly for dial lamp
	A-2H-11271	Tube shield for bakelite-base 12SA7GT
	A-2H-10715	Tube shield for metal-base 12SA7GT
	128334B-18	Cabinet, walnut
	128334B-9	Cabinet, ivory
	A-5B-11249-17	Knob, volume, walnut
	A-5B-11249-8	Knob, volume, ivory
	B-5B-10994-18	Knob, tuning, walnut
	B-5B-10994-9	Knob, tuning, ivory
	120388	Locking spring for tuning knob
	A-3F-10995	Locking screw in tuning knob
	128292B-17	Pushbutton, walnut
	128292B-8	Pushbutton, ivory
	134123	Rubber bumper for bottom of cabinet
	131193	Snap-in rivets (4) for mounting back
	112784	Station call letters, 1 set
	112606	Acetate tabs for call letters

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 300 volts, 20%
RMA value—47 mmf, 500 volts, 20%

Ref. No. Part. No. Description

CAPACITORS*

C,C4,C7	B-8A-10211	Two-gang, including antenna and oscillator trimmers
C1	C-8D-10761	.01 mf, 400 volts, 20%
C2	C-8F3-114	120 mmf, 500 volts, 10%, mica
C3,C14	C-8D-10774	.02 mf, 400 volts, 20%
C5	C-8D-10760	.1 mf, 400 volts, +20%—10%
C6	C-8D-10775	.25 mf, 200 volts, +20%—10%
C8,C9	C-8F3-8	100 mmf, 500 volts, 20%, mica
C17,C20	11994	Electrolytic for 60 cycles; 40 mf, 20 mf, 20 mf x 150 volts
C10,C11,	or	
C12	11995	Electrolytic for 25 cycles; 60 mf, 40 mf, 40 mf x 150 volts
C13	C-8D-10770	.05 mf, 200 volts, 20%
C15	C-8D-10788	.004 mf, 600 volts, 20%
C16	C-8F3-6	47 mmf, 500 volts, 20%, mica
C18	C-8D-10778	.002 mf, 600 volts, +40%—15%
C19	C-8D-10942	.2 mf, 400 volts, +30%—10%

RESISTORS*

R1,R3	C-9B1-26	150,000 ohms, 1/2 watt, 20%
R2	C-9B1-50	100 ohms, 1/2 watt, 10%
R4	C-9B1-70	4700 ohms, 1/2 watt, 10%
R5	C-9B1-25	100,000 ohms, 1/2 watt, 20%
R6	C-9B1-82	47,000 ohms, 1/2 watt, 10%
R7	C-9B1-42	22 ohms, 1/2 watt, 10%
R8	C-9B2-54	220 ohms, 1 watt, 10%
R9	C-9B2-63	1200 ohms, 1 watt, 10%
R10,R12	C-9B1-52	150 ohms, 1/2 watt, 10%
R11	C-9B1-34	3-3 megohms, 1/2 watt, 20%
R13	C-9B1-29	470,000 ohms, 1/2 watt, 20%
R14	C-9B1-27	220,000 ohms, 1/2 watt, 20%
R15,S1	101193	Volume control (1 megohm) and on-off switch
R16	C-9B1-23	47,000 ohms, 1/2 watt, 20%
R17	C-9B1-35	4.7 megohms, 1/2 watt, 20%
R18	C-9B2-44	33 ohms, 1 watt, 10%

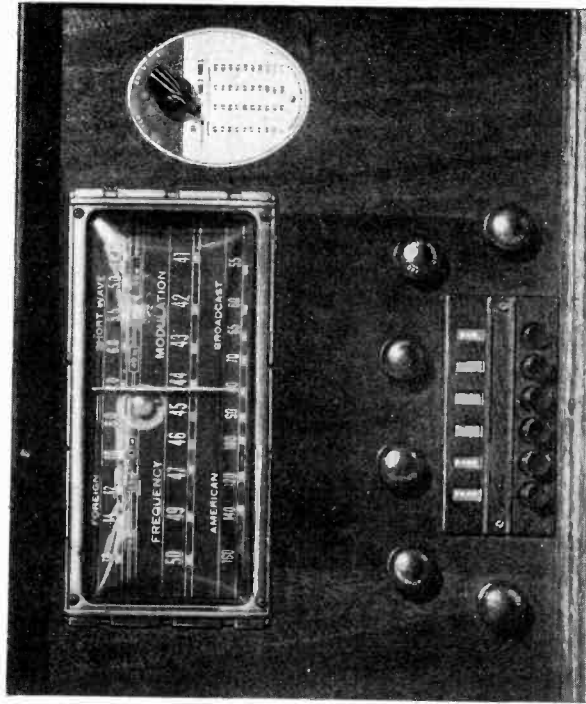
COILS AND TRANSFORMERS

T1,T2	B-212-11062	Loop antenna assembly, including capacitors C1 and C2, coil T2, and cardboard back. Specify brown or ivory back.
T3	A-13D-10215	Oscillator coil
T4	108140G	Input I.F. coil complete in can. Range of trimmers: 56-104 mmf
T5	108145C	Output I.F. coil complete in can. Range of trimmers: 56-104 mmf
T6	10595B	Output transformer

*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:

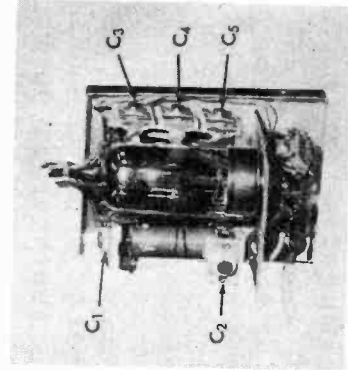
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MODEL CN-1
Converter

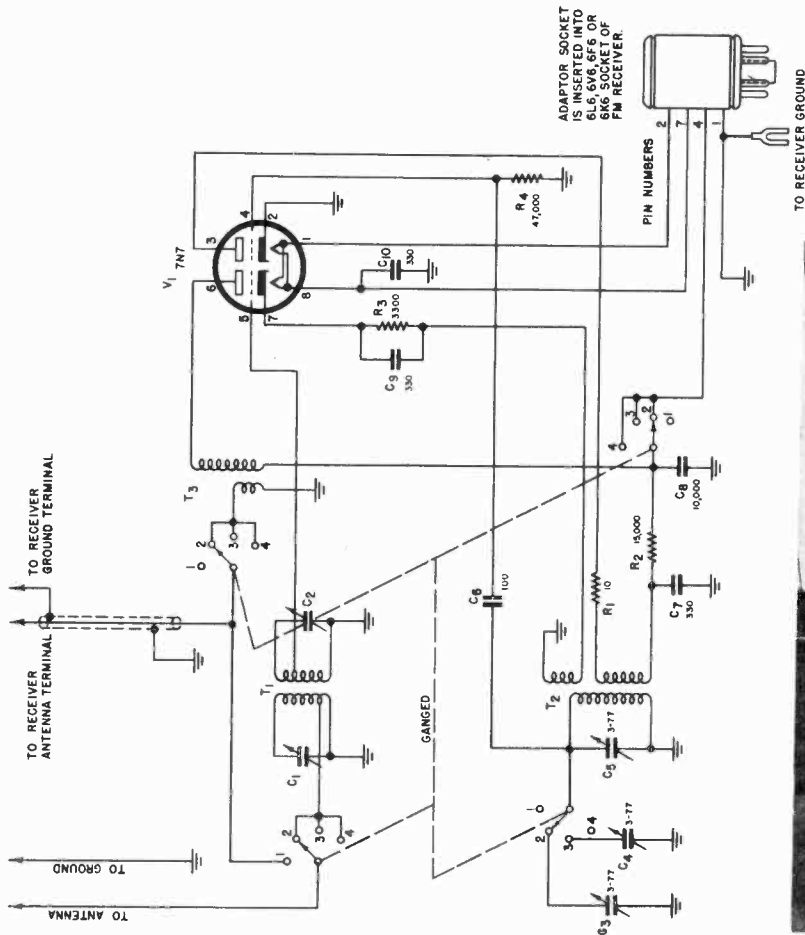


Front view of typical installation.

Can be used with f-m tuner
Can be used with f-m ac/dc tuner, in
which case converter is isolated from
tuner through condenser



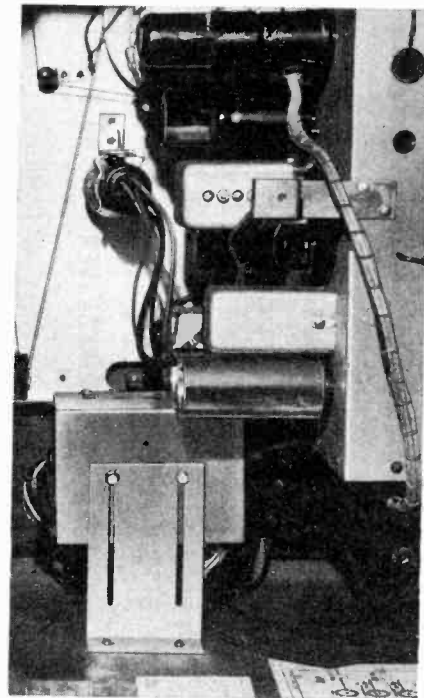
89C200



ALL RESISTOR VALUES IN OHMS.
ALL CAPACITOR VALUES IN MICROMICROFARADS

SWITCH POSITIONS

1—OFF
2—NORMAL OPERATION OF FM RECEIVER
3—RANGE 84 TO 93 MC.
4—RANGE 93 TO 102 MC.
7—RANGE 102 TO 111 MC.



Rear view of typical installation.

MODEL CN-1
Converter

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CONVERTER R-F ADJUSTMENTS

NOTE - Signal generator remains connected the same as for oscillator adjustments. Use audio output meter for proper r-f alignment. The r-f alignment of the converter is performed only with the frequency range selector in positions 1 and 3.

- With the frequency range selector in position 1-
1. Set the receiver at 48 MC on the FM dial scale.
 2. Set the signal generator at 90 MC (Signal should be heard.)
 3. Peak secondary trimmer C-2 for maximum output on output meter.

- With the converter frequency range selector at position 3-
1. Set the receiver at 42 MC on FM dial scale.
 2. Set signal generator at 102 MC. (Signal should be heard.)
 3. Peak aerial trimmer C-1 for maximum output on output meter.

NOTE - It may be necessary to readjust the converter on position 1 to insure maximum output.

A switch is provided on the converter for selecting three frequency ranges (84mc to 93mc, 93mc to 102mc, and 102mc to 111mc) and also for turning off the power to the converter and restoring the receiver for normal operation.

CONVERTER OSCILLATOR ADJUSTMENT

NOTE - A signal generator with a range of 84 MC to 111 MC will be necessary for oscillator and r-f adjustments.

HOW TO CONNECT SIGNAL GENERATOR TO CONVERTER

1. Connect signal generator "hot" lead to converter aerial. (green wire)
2. Connect signal generator ground lead to converter ground lead. (black wire)

WHERE TO SET RECEIVER TUNING DIAL

Set receiver tuning dial at 45 MC on FM dial scale for all of the three oscillator adjustments and use the following:

ADJUSTMENT PROCEDURE

NOTE - Always begin adjustments with converter range selector set at position 3.

Set converter frequency selector at position	Set sig. gen. at	Adjust following trimmer until signal is heard
3	105 MC	C - 5
2	96 MC	C - 4
1	87 MC	C - 3

Refer to photograph on schematic diagram for location of trimmers.

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MODEL CN-1
Converter**HOW TO INSTALL THE CONVERTER**

The converter should be mounted inside of the receiver in such a way that the range selector switch will be easily accessible.

1. Determine suitable location for the converter inside of receiver cabinet on either side of receiver chassis.
2. Remove knob from converter shaft.
3. Place converter in a position such that the switch shaft will rest against inside front of cabinet in such a way as will permit the short side of mounting bracket to rest against inside surface of cabinet.
4. Mark spot on inside front of cabinet where hole is to be drilled and then remove the converter.
5. Drill small pilot hole and enlarge it from the front of the cabinet using a 3/8 inch carpenters drill.
6. Put extension shaft on converter switch shaft and tighten coupling.
7. Replace converter so that shaft extends out through front of cabinet and converter is located where desired.
8. Mark shaft, so when cut, it will extend at least 3/8 inches from front of cabinet and then remove converter from cabinet.
9. Saw off shaft where marked and file off any rough edges on end of shaft.
10. Replace converter in cabinet at desired position and fasten short end of bracket to mounting surface by means of the two wood screws supplied with kit.
11. Fasten frequency conversion chart label to front of receiver cabinet, put knob on shaft and fasten securely by tightening set screw.
12. Remove audio output tube from the receiver. (This will be either a 6V6, 6F6, 6K6 or 6L6 type tube.) In cases where there are two of the type, remove only one.

13. Insert the adapter plug into the audio output tube socket and insert the audio output tube, previously removed, into the adapter socket.
14. Disconnect the aerial from the receiver and connect it to the converter aerial lead. (green wire)
15. Connect inner conductor of shielded lead from the converter output to the aerial terminal on the receiver.
16. Connect shield of converter output lead from the converter to the ground terminal on the receiver.
17. Connect black lead of converter to a ground. (Water or radiator pipe or an external ground)

HOW TO USE THE CONVERTER

Consult frequency label chart for frequency conversions.

Turn converter frequency range switch to position 2. The range of reception on the receiver will now be 84 to 93 MC (megacycles).

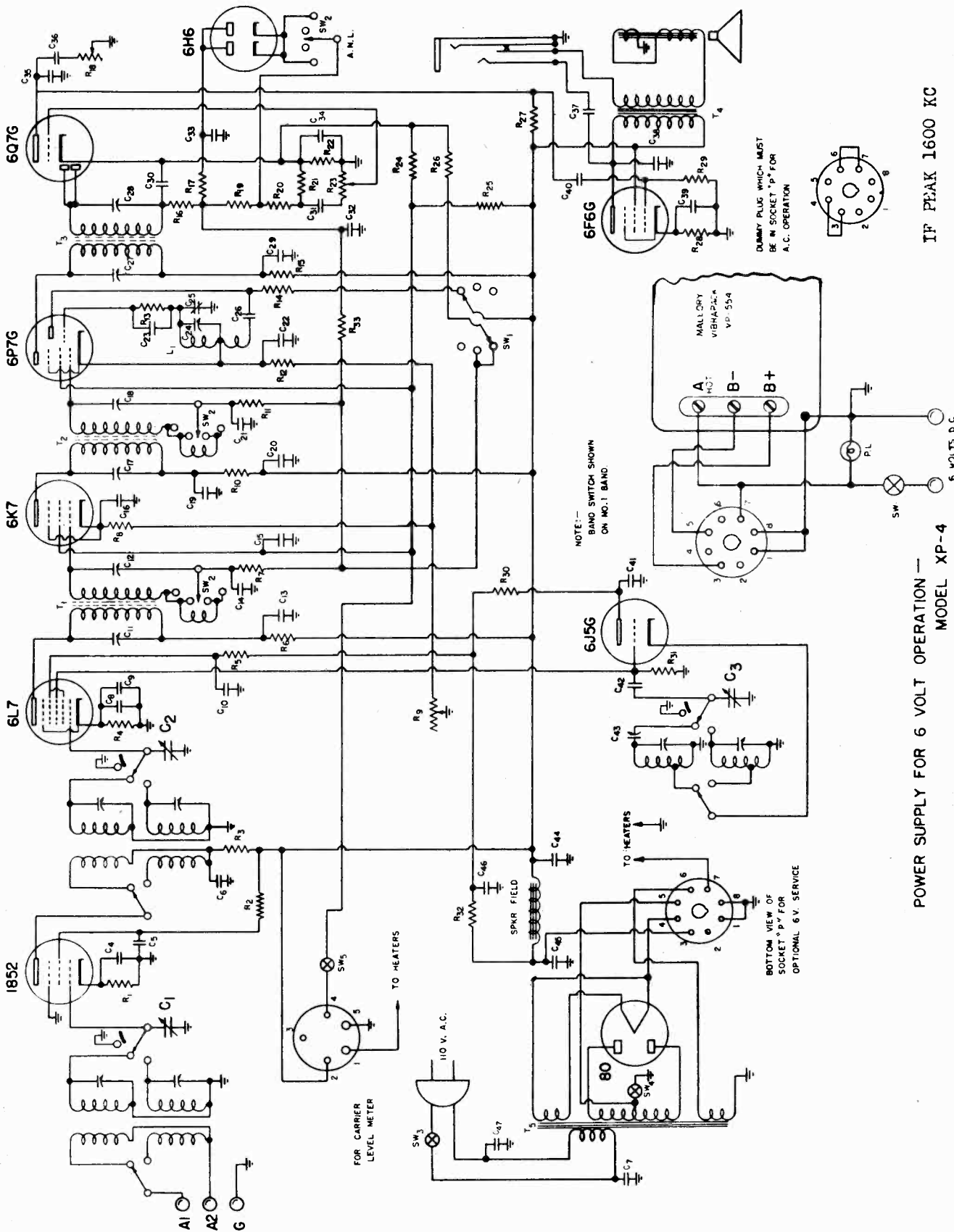
Turn converter frequency range switch to position 3. The range of reception will now be 93 to 102 MC. (megacycles). Or

Turn converter frequency range switch to position 4. The range of reception on the receiver will now be 102 to 111 MC. (megacycles).

Turn converter frequency range switch to position 1 to restore receiver for normal operation.

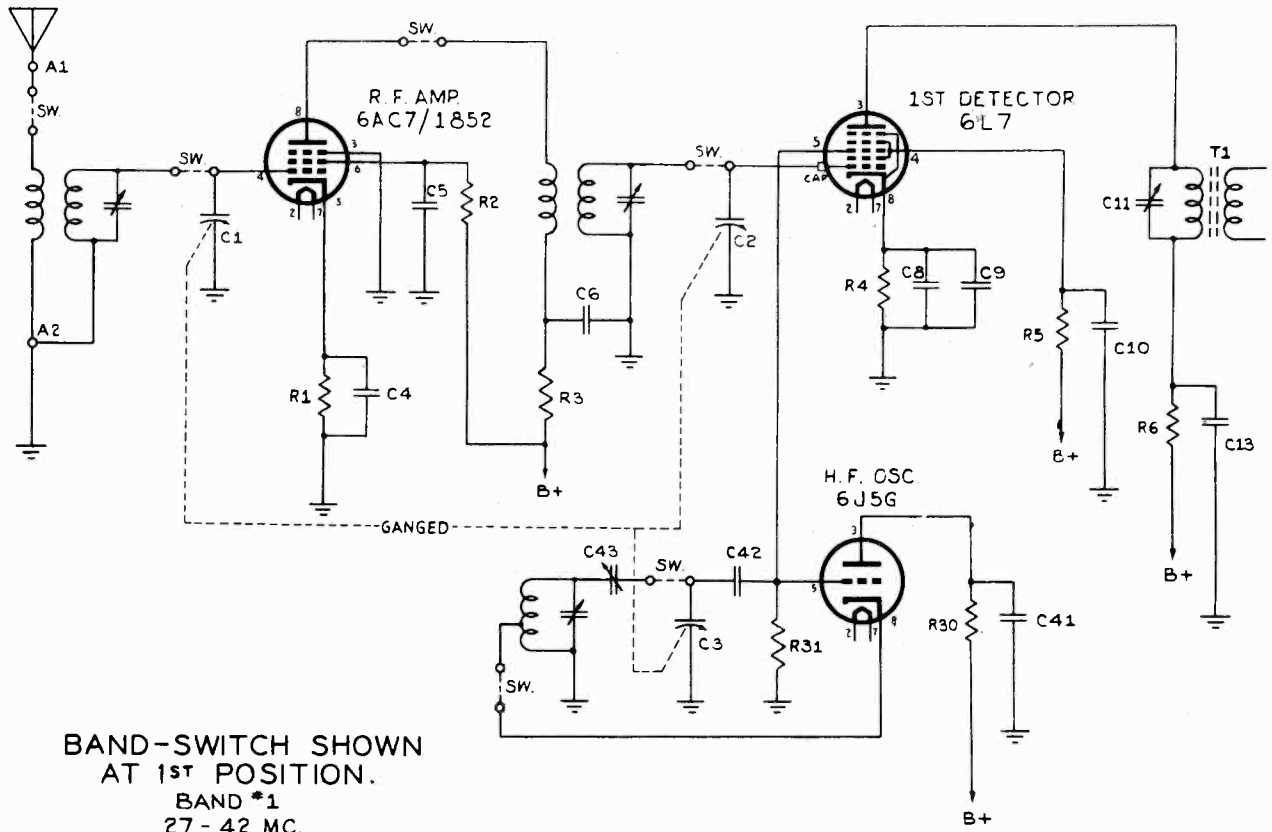
A universal bracket is included for mounting the converter. Power is supplied to the converter tube through an adapter cable from the receiver with which the converter is to be used.

The converter will in no way interfere with the normal operation of the receiver. All tuning is accomplished by the main tuning dial on the receiver.

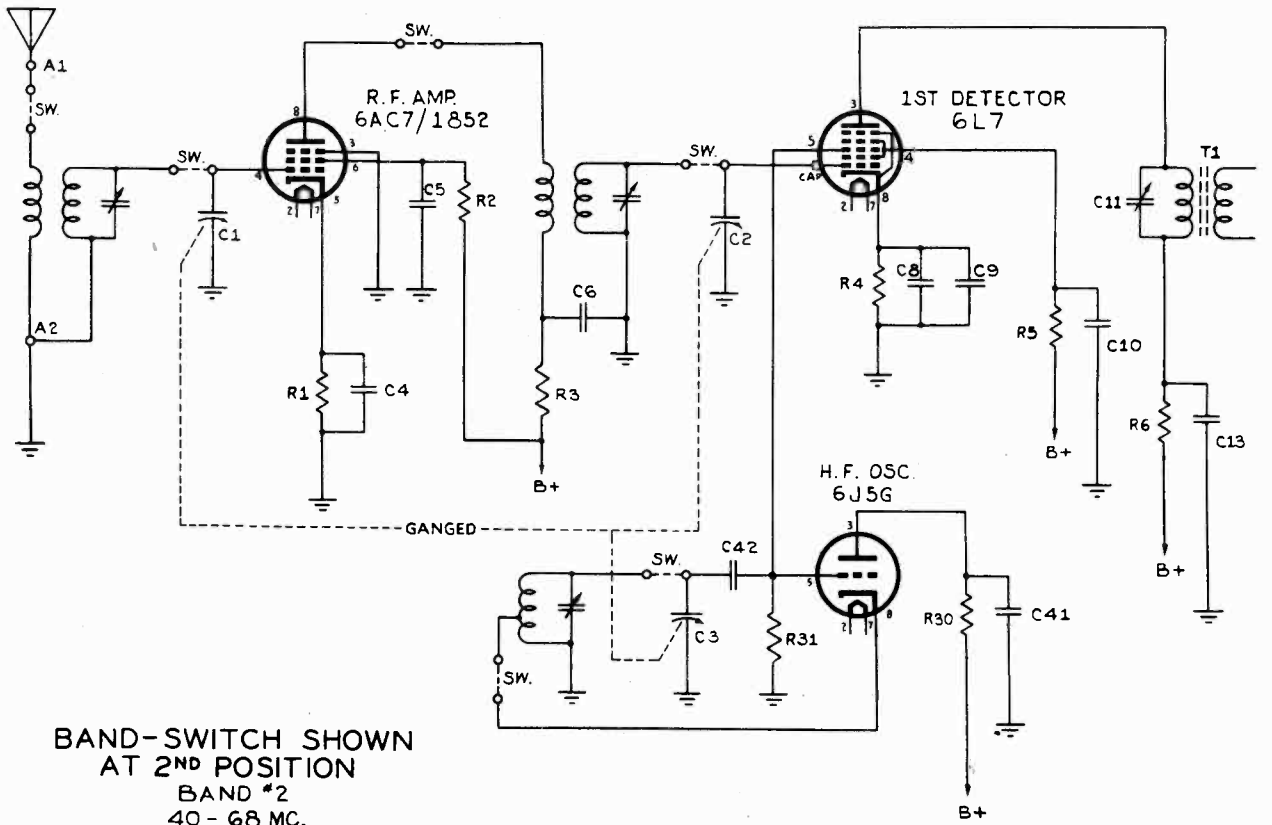


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MODEL Skyrider 5-10
S21

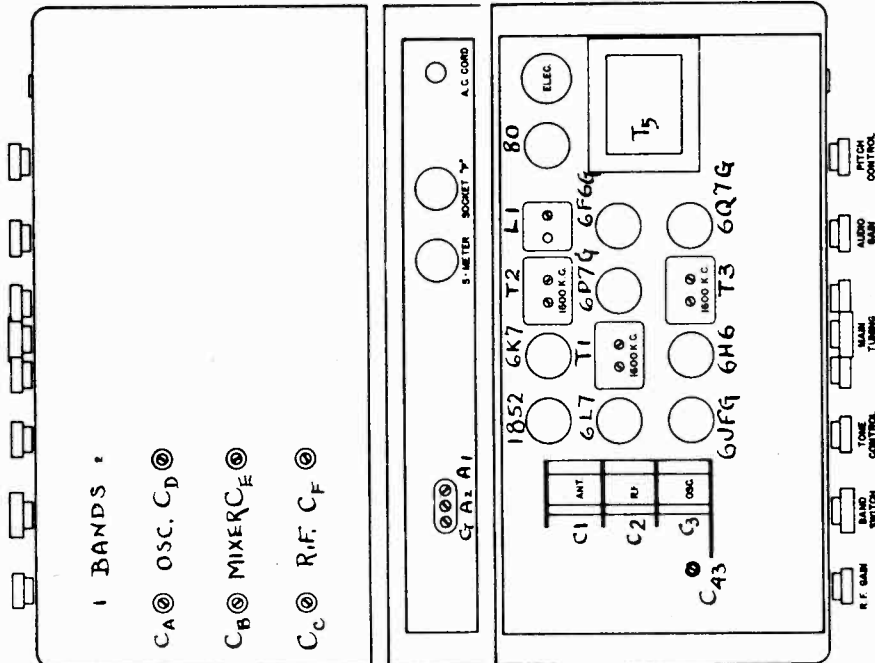


BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND #1
27 - 42 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION
BAND #2
40 - 68 MC.

- Band 1 - 27 MC to 42 MC
- Band 2 - 40 MC to 68 MC
- 1852 - R. F. Amplifier
- 6L7 - First Detector
- 6J5 - High Frequency Oscillator
- 6K7 - 1st I. F. Amplifier
- 6P7G - 2nd I. F. Amplifier, B.F.O.
- 6Q7G - 2nd Detector, A.V.C., 1st Stage of Audio
- 6F6G - Audio Output tube
- 80 - Rectifier



ALIGNMENT PROCEDURE FOR SKYRIDER "5-10" Model S21
Intermediate Frequency Alignment

Have the controls set as follows:

Broad-sharp switch to sharp position.
A.V.C. - B.F.O. switch in "Off" position.
Set R. F. and A. F. gain controls at maximum.
Set band switch on Band #1.
Adjust main dial to minimum capacity or #24 on the Vernier scale.
Remove the 6L7 grid cap - connect the signal generator to this tube, through an .01 mfd condenser.
Now set the signal generator for 1600 KC output.
Adjust trimmers on T1, T2, T3 transformer for exact resonance which will be indicated by maximum output.

For adjustment of the Beat Frequency Oscillator turn the knob on the "pitch control" unit until the dot is straight up. Remove modulation from the 1600 KC signal being fed into the I. F. amplifier and then adjust T4 for zero beat.

R. F. Alignment

Replace the 0.1 mfd condenser in series with the generator to the receiver with a 400 ohm resistor. Connect the generator to the A1 terminal on the antenna terminal strip to be found on the rear apron of the chassis. Leave the jumper connected between A2 and G. There is only one pad adjustment on the "5-10" receiver and that is for the low frequency end of Band #1. This pad is adjusted from the top of the chassis.

Band #1

Place the band switch on Band #1. Set the generator and tuning dial to 28 mc and adjust pad C43 for maximum signal. Reset tuning dial and generator to 40 mc and set oscillator trimmer CA. Now recheck pad C43 and trimmer CA until no change in frequency calibration is noted. When this is accomplished adjust trimmers CB, CC for maximum gain. When making these latter adjustments it is advisable to "rock" the tuning control slightly until the point of exact resonance and maximum output is obtained.

Band #2

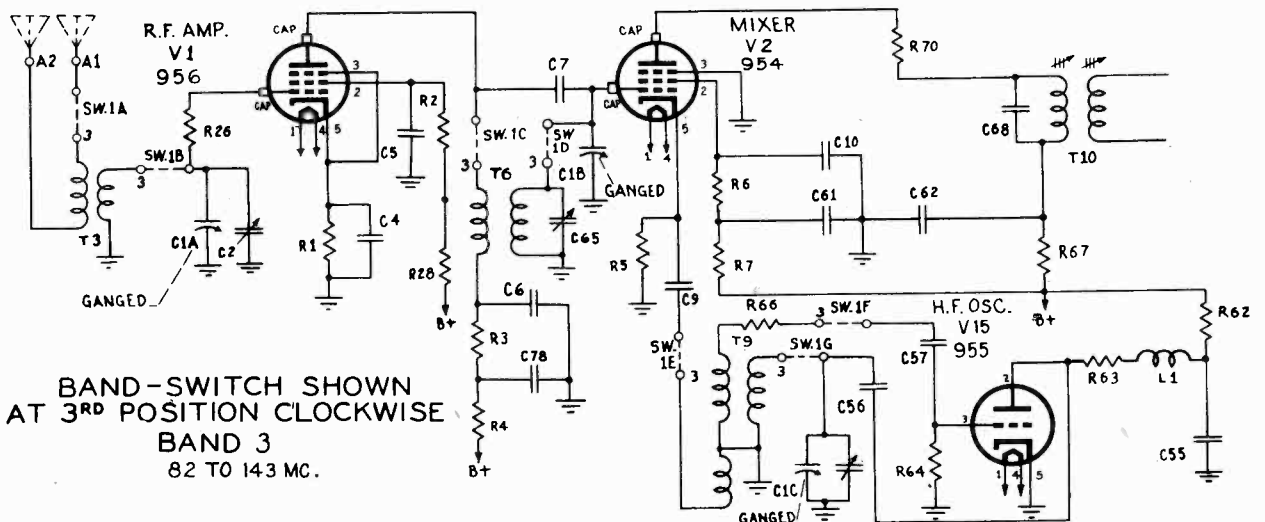
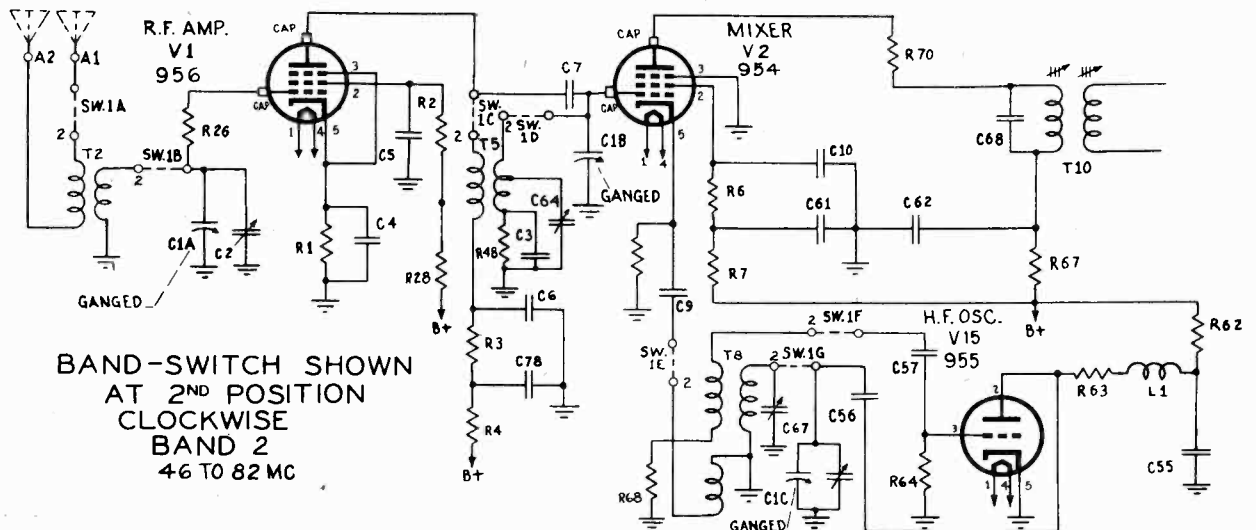
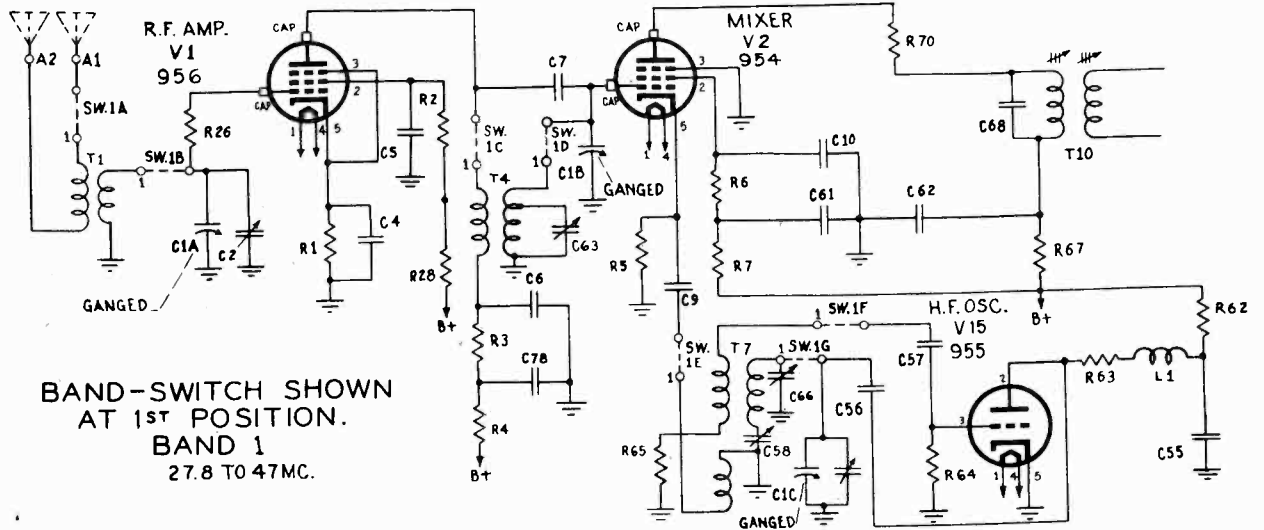
Set signal generator and tuning dial to 60 mc and adjust oscillator trimmer CD to signal. Then adjust CE, CF for maximum gain, slightly rocking the tuning gang while making the adjustment.
There is no pad on Band #2.

NOTE: Should the noise picked up by the receiver interfere seriously with the alignment, increase the signal generator output and reduce the R. F. gain. The noise limiter may also be left on during alignment.

The SKYRIDER "5-10" draws 74 watts at 117 volts 60 cycle A.C.

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MODEL S-36A



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POWER REQUIREMENTS.

The receiver is designed to operate from either a 115-volt or 230-volt 50/60 cycle, single phase, a-c source or from a 6-volt storage battery and 270-volt "B" battery. The "B" batteries may be replaced by a suitable vibrator type power supply if it meets the following current requirements.

A-C Operation	* D-C Operation
Line voltage . . .115 volts, 230 volts	Filament voltage 6.3 volts
Line current . . .1.0 amp., 0.5 amp.	Filament current 4.5 amps.
Power consumption. 115 watts	"B" voltage. 270 volts
	"B" current 145 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 20 to 22 amperes.

Audio Output Connections.--A headset or loudspeaker may be used with the receiver.

(1) The headset jack marked PHONES, located on the front panel, provides a 600-ohm balanced output for headset reception. The center tap of the 600-ohm headset winding is grounded externally at the speaker output terminal board TS-1 by a jumper wire across the terminals marked 600 C.T. If it is desirable to operate with one side of the headset line grounded, disconnect the jumper on terminal board TS-1.

(2) The two sets of speaker terminals located on the rear chassis apron provide output impedances of 500 and 5000 ohms for loudspeaker reception. One side of each of the 500 and 5000-ohm output connections is grounded. This should be kept in mind if this receiver is to work in conjunction with other equipment. A speaker capable of handling 5 watts of audio power should be used with this equipment.

Remote Operation Facilities. - The receiver may be disabled remotely by disconnecting the jumper wire between pins #3 and #4 in the shorting plug PL-2, which is normally plugged into socket SO-1 during a-c operation, and connecting a remote switch or relay across these pins. The stand-by switch is connected in the "B" lead, hence, the remote stand-by switch must be insulated for approximately 270 volts to protect the operator. When using the remote control disabling switch, the SEND/REC switch on the receiver must be set at SEND.

CAUTION - The external stand-by switch and its connections will be approximately 270 volts above ground hence must be well insulated throughout.

PREPARATION FOR USE.

A-C Operation. - The receiver may be operated from either a 115-volt or 230-volt, 50/60 cycle, single phase, a-c source of power. To change over from one line voltage to the other, it is merely necessary to throw the line voltage switch (SW-10) located on the top of the chassis near the power transformer. See Fig. 7-1. for location of the line voltage switch.

CAUTION - Check the line voltage and position of the line voltage switch before connecting the receiver to a source of power. A receiver set for 230-volt operation will not be damaged when connected to a 115-volt line, but a receiver set for 115-volt operation will, in most cases, be damaged when plugged into a 230-volt outlet. When in doubt, set the line voltage switch for 230-volt operation. If the dial lamps light up dimly, indicating a 115-volt line voltage, switch over to the 115-volt position.

D-C Operation. - The receiver may be operated from a 6-volt d-c source, generally a storage battery, and a 270-volt d-c supply in the form of dry batteries or vibrator type power pack. Consult the chart on power requirements for d-c operation in Section I. and provide battery facilities capable of supplying these demands. The receiver is connected to the d-c supply as follows:

(1) Remove the octal "jumper plug" (PL-2) used for a-c operation from socket SO-1. Use No. 18 (AWG) wire leads for the 270-volt "B" supply connections to pins #3 and #5 and No. 12 (AWG) wire leads for the 6-volt "A" battery connections to pins #1, #8 and #7.

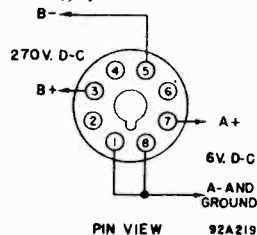


Fig. 2-1. Radio Receiver Model S-36A, wiring diagram for d-c power plug.

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MODEL S-36-A

R.F. GAIN Control. - The radio frequency gain control regulates the sensitivity of the receiver. Turning the control to the right increases the sensitivity of the receiver. Ganged to this control is the "S" meter switch which connects the tuning meter into the circuit when the control is advanced all the way to the right.

SELECTIVITY Switch.-The selectivity switch serves a dual purpose. In position #1 it turns the receiver off when operating from an a-c source of power. (When operating from a d-c supply the power switch is part of the external supply, hence, the SELECTIVITY switch does not function in position #1). In positions #2 and #3 the selectivity switch controls the bandwidth of the i-f amplifier thereby affecting the selectivity of the receiver. In general, the switch is set at SHARP for amplitude modulated signals and at BROAD for frequency modulated signals.

"S" Meter or Tuning Meter.-The tuning meter serves two functions in the receiver depending on the type of reception as follows:

(1) **A.M. Reception.** - When the receiver is adjusted to receive amplitude modulated signals, the tuning meter indicates the relative carrier strength of the received signal. To put the meter in operation, turn the R.F. GAIN control to the right until the switch connected to its shaft clicks, and set the A.V.C. switch at ON.

(2) **F.M. Reception.** - When the receiver is adjusted to receive frequency modulated signals, the tuning meter is used to indicate resonance with the station carrier. As the receiver is tuned through the f-m carrier the indicator will deflect to one side of zero, return to zero and deflect an equal distance to the opposite side of zero, and finally return to zero as the carrier is completely passed. The zero center position in the middle of the swing represents the correct setting of the receiver tuning dial and indicates resonance with the station carrier.

2. OPERATION.

Listed below are the receiver controls and their settings for the three types of reception provided by this receiver, namely, amplitude and frequency modulated telephone and c-w code reception.

a. A.M. (Amplitude Modulation) Telephone Reception - To receive amplitude modulated telephone signals set the front panel controls as follows:

SELECTIVITY switch	- Set at A.C. OFF when the receiver is not in use. Set at SHARP for reception of amplitude modulated phone signals.
SEND/REC. switch	- Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
BAND SWITCH	- Set at range number corresponding to band covering desired frequency.
A.M./F.M. switch	- Set at A.M.
A.V.C.	- Set at ON.
R.F. GAIN control	- Turn to the right until tuning meter switch ganged to the control snaps on.
B.F.O. switch	- Set at OFF.
PITCH CONTROL	- Not used.
TUNING wheel	- Set calibrated dial to frequency of desired signal, adjust for maximum tuning meter deflection.
ANTENNA trimmer	- Adjust for maximum tuning meter deflection.
A.F. GAIN control	- Adjust for desired volume at headset or loudspeaker.
TONE control	- Set to please the listener. Generally set at HIGH FID. or BASS BOOST when signal to noise ratio is high or at NORMAL or LOW when signal to noise ratio is low.
A.N.L. switch	- Normally set at OFF except when background noise is excessive.

MODEL S-36-A

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b. F.M. (Frequency Modulation) Telephone Reception. - To receive frequency modulated telephone signals set the front panel controls as follows:

- SELECTIVITY switch - Set at A.C. OFF when the receiver is not in use. Set at BROAD for reception of frequency modulated phone signals.
- SEND/REC. switch - Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
- BAND SWITCH - Set at range number corresponding to band covering desired frequency.
- A.M./F.M. switch - Set at F.M.
- R.F. GAIN control - Turn all the way to the right. (The switch ganged to this control does not operate during f-m reception).
- A.V.C. switch - Set at OFF.
- B.F.O. switch - Set at OFF.
- PITCH CONTROL - Not used.
- A.N.L. switch - Set at OFF
- TUNING wheel - Set calibrated dial to frequency of desired signal, adjust for "0" position of tuning meter marked for F-M tuning.
- ANTENNA trimmer - Adjust for minimum background noise (Control will only be effective on very weak signals.)
- A.F. GAIN control - Adjust for desired volume at headset or loudspeaker.
- TONE control - Set at BASS BOOST or HIGH FID.

c. C-W Code Reception. - To receive continuous wave (c-w) code signals set the front panel controls as follows:

- SELECTIVITY switch - Set at A.C. OFF when the receiver is not in use. Set at SHARP for reception of c-w code signals.
- SEND/REC. switch - Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
- BAND SWITCH - Set at range number corresponding to band covering desired frequency.
- A.M./F.M. switch - Set at A.M.
- A.V.C. switch - Set at OFF.
- B.F.O. switch - Set at ON.
- PITCH CONTROL - Adjust to produce a 500 to 1000 cycle code signal.
- TUNING wheel - Set calibrated dial to frequency of desired signal. Tune for maximum signal level at headset or loudspeaker.
- R.F. GAIN control - Turn up as high as the signal strength of the code signal will allow. Too much gain will result in distortion of the signal.
- ANTENNA trimmer - Adjust for maximum signal level at the headset or loudspeaker.
- TONE control - Set at LOW or NORMAL.
- A.N.L. switch - Set at OFF.
- A.F. GAIN control - Adjust for desired volume at headset or speaker.

FUNCTIONING OF PARTS

1. GENERAL.

Figure 4-1. shows, in a very simple block form, the plan of the circuit of the Model S-36A receiver. Note that the circuit is that of the conventional superheterodyne receiver up to the second i-f amplifier stage. The output of the 2nd i-f amplifier is fed to two channels, namely, the F-M signal channel and the A-M signal channel. The F-M channel consists of the f-m limiter and discriminator and the A-M channel consists of an additional i-f amplifier stage and second detector stage. The demodulated signal from both channels then feeds the same audio amplifier, being selected by the A.M./F.M. switch.

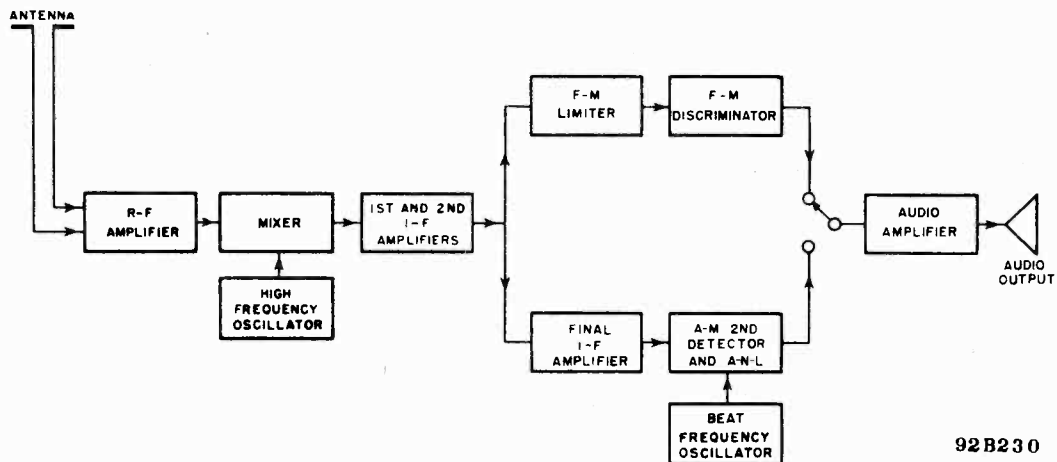


Fig. 4-1. Radio Receiver Model S-36A, block diagram.

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

Since the circuit functions of bands 1, 2 and 3 are essentially identical, this discussion will describe the circuit with BAND SWITCH (SW_{1A} to SW_{1G}) set at band 3 as shown in the schematic diagram.

a. R-F Amplifier. - The r-f amplifier stage employs a type 956 acorn type pentode tube in a conventional class A amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-3 through terminals A₁ and A₂ of the antenna terminal strip TS-2. The secondary is tuned by the ganged tuning capacitor section C-1A and trimmer C-2. Trimmer capacitor C-2 is controlled from the front panel by the control marked ANTENNA to provide accurate alignment of the r-f stage with varying antenna load impedances. R-F signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-6. Parasitic resistor R-26 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-1 by-passed by capacitor C-4 provides self-bias for the stage. Resistor R-2 and capacitor C-5 act as decoupling network for the screen of tube V-1 and resistor R-3 and R-4 and capacitors C-6 and C-78 act as decoupling networks for the plate circuit. The signal across the primary of transformer T-6 is coupled to the grid of tube V-2 inductively by transformer T-6 and capacitively by capacitor C-7. Capacitor C-7 provides a small amount of coupling to improve the response at the high frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The signal developed at the grid of tube V-2 then feeds the mixer stage of the receiver.

b. Mixer. - The mixer stage employs a type 954 acorn type pentode in a cathode coupled mixer circuit. The secondary of transformer T-6 is tuned by section C-1B of the ganged tuning capacitor and trimmer C-65. R-F signals selected by the parallel resonant circuit are applied to the grid of the mixer tube, V-2. A signal from the local oscillator 5.25 mc higher in frequency than the received signal on band #1 and 5.25 mc. lower in frequency than the received signal on bands #2 and #3 is fed to the mixer tube through the cathode and provides the difference frequency of 5.25 mc for the i-f amplifier stages.

c. Oscillator. - The oscillator circuit consists of a type 955 acorn type triode in a tuned-plate untuned grid type of oscillator circuit. The frequency of oscillation is determined by a resonant circuit consisting of the secondary of transformer T-9 and section C-1C of the main tuning capacitor connected in parallel. Capacitor C-11 is used to trim transformer T-9 (Band #3) only, although it remains in the circuit on bands #1 and #2. The r-f energy is fed from the plate of tube V-15 to the tuned circuit by the d-c blocking capacitor C-56. The decoupling network in the plate circuit of the oscillator tube consists of R-63, L-1, C-55 and R-62. Resistor R-66 (in band #3 only) and capacitor C-57 (in all bands) in series with the feed-back winding of transformer T-9 provide grid voltage across resistor R-64 for the oscillator tube. The oscillator voltage is supplied for the mixer stage by a third winding on transformer T-9 which is fed to the mixer tube (V-2) through capacitor C-9.

d. First and 2nd I-F Amplifier. - The 1st and 2nd i-f amplifier stages employ type 6AC7 and 6AB7 pentodes respectively. The i-f amplifier coupling transformers T-10, T-11, and T-12 for these two stages are tuned to 5.25 mc. by adjusting the powdered iron core slugs in both primary and secondary windings. The gain of the 1st and 2nd i-f amplifier stages is varied by the R.F. GAIN control (R-11), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver instead of the usual practice of varying the gain of the r-f amplifier stages. This method of control permits the r-f amplifier stages to operate at maximum gain, thereby providing a high signal to noise ratio at all sensitivity settings. The a-v-c grid voltage is applied to this section of the receiver through the decoupling networks C-12, R-10, C-16, and R-19. The a-v-c voltage is supplied by the 2nd detector tube (V-6) during a-m reception and a small amount of voltage is also supplied for a similar purpose, from the limiter tube (V-7) during f-m reception. Since the 1st and 2nd i-f amplifier stages are used for both a-m and f-m reception, the band width of the i-f amplifier channel is varied to provide a relatively sharp frequency response for a-m reception (SELECTIVITY switch set at SHARP) and a relatively broad frequency response for f-m reception. (SELECTIVITY switch set at BROAD). The selectivity of the i-f amplifier is controlled by switching in a third winding which varies the coupling between the primary and secondary windings. In SHARP position, the coupling winding is disconnected and only the coupling between primary and secondary windings determines the band width of the i-f amplifier. In BROAD position, the coupling winding is introduced to increase the coefficient of coupling between primary and secondary winding. The increase in coupling broadens the i-f amplifier frequency response to accept f-m signals. The signal voltage supplied by the 2nd i-f amplifier is fed to the limiter and discriminator for f-m reception and to the 3rd i-f amplifier stage and 2nd detector for a-m reception.

e. Final I-F Amplifier. - The last i-f amplifier stage, used for a-m reception, employs a type 6SK7 pentode connected in a conventional class A amplifier circuit. The stage is coupled by transformers T-12 and T-13 which are tuned by adjustable powdered iron core slugs. Resistor R-25 by-passed by capacitor C-21 provides self-bias for the stage. The gain of this stage is not varied as was the case for the 1st and 2nd i-f amplifier stages. The amplified signal voltage developed across the secondary of transformer T-13 is then fed to the 2nd detector for demodulation of a-m signals.

f. A-M 2nd Detector and A-N-L. - Both the second detector and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode section of tube V-6 serves as detector for amplitude modulated signals by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-31 and capacitors C-24 and C-26 connected in a pi-section. Automatic volume control voltage and audio frequency voltage is obtained from the load and voltage divider resistors R-33, R-34, and R-36. Resistor R-35 and capacitor C-8 serve as a-v-c decoupling. The remaining diode section of tube V-6 serves as automatic noise limiter as follows: Capacitor C-25 becomes charged by the rectified carrier voltage and the time constant of this capacitor and the filter network associated with it is such that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-25 becomes more negatively charged than the charge held by capacitor C-25, hence, current flows shorting the audio voltage to ground through capacitor C-25 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-25 acquires its normal charge again. By shorting the audio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectional noise pulses from reaching the audio amplifier stages.

g. Beat Frequency Oscillator. - The beat frequency oscillator employs a type 6J5 triode tube in a modified Hartley oscillator circuit. The oscillator frequency is adjusted by a moveable powdered iron core within the field of coil L-5. This iron core adjustment sets the oscillator's frequency at 5.25 mc. and is adjusted by a screw driver during alignment. The fine adjustment of the oscillator frequency re-

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quired to provide control of the beat note frequency is controlled by variable capacitor C-60 (PITCH CONTROL) which tunes a small portion of the total oscillator coil (L-5). The B.F.O. switch controls the use of the oscillator by breaking the plate voltage lead to the tube. The decoupling network R-60 and C-52 prevents the oscillator signal from reaching the other stages through the "B" voltage supply.

h. F-M Limiter and Discriminator. - The frequency modulation detector consists of a limiter stage and a discriminator stage. The 6AC7 limiter tube (V-7) is fed by the second i-f transformer secondary winding along with the third i-f amplifier tube V-5 for a-m reception. The limiter stage operates as a saturated amplifier in which the output voltage remains constant over a large range of input voltage levels, thus eliminating variations in the amplitude of the carrier signal to be demodulated by the discriminator. When operating as an f-m receiver, automatic volume control action is obtained by applying a part of the voltage developed across resistor R-39 in the grid return of the limiter tube (V-7), to the control grids of the 1st and 2nd i-f amplifier tubes (V-3 and V-4) through section SW-8A of the A.M./F.M. switch. The constant level signal voltage from the limiter tube (V-7) is fed to the type 6H6 discriminator tube (V-8) through the discriminator transformer (T-14) and coupling capacitor C-29. The discriminator circuit, consisting of transformer T-14, tube V-9 and load resistors R-40 and R-41, converts the frequency variations of the f-m signal into amplitude variations or the audio signal. The de-emphasis network, consisting of resistor R-42 and capacitor C-32, attenuates the high frequency end of the audio range since these frequencies are emphasized as the f-m transmitter. From the de-emphasis network the audio signal is fed to the A.F. GAIN control (R-43) in the same way as the audio signal from the amplitude modulation detector tube (V-6).

i. Audio Amplifier. - The audio amplifier stages consists of a class A phase inverter amplifier employing a type 6SL7GT twin-triode driving a pair of 6V6GT/G pentodes in push-pull class A. The audio signal from either the a-m detector or the f-m discriminator is fed to the grid of the first triode section of the phase inverter tube (V-9) through the A.F. GAIN control (R-43). The amplified audio signal voltage from the first triode section of tube V-9 is fed to the grid of power amplifier tube V-12 and to the grid of the second triode section of tube V-9 through the voltage divider network consisting of resistors R-50 and R-51 which also serve as grid return for the power amplifier tube (V-12). The audio signal voltage developed across the plate load resistor (R-45) of the second triode section of tube V-9, which is now 180 degrees out of phase, is then fed to the remaining power amplifier tube (V-11) grid. The output of the power amplifier tubes is coupled to the load through transformer T-15, the secondary of which provides output impedances of 500 ohms and 5000 ohms to ground and 600 ohms balanced to ground. The network consisting of R-69, R-53 and C-35 supplies inverse feedback in various amounts to provide tone control ranging from bass boost to high frequency cutoff. The TONE switch SW-9 selects the required network combination.

j. Tuning Meter. - The tuning meter serves two circuits in the receiver depending upon the type of signals being received. It is switched from one circuit to the other by the A.M./F.M. switch (SW-8 sections B and C).

(1) **A-M Reception.** - When metering the reception of a-m signals, the tuning meter measures the plate current of the 2nd i-f amplifier tube (V-4) which varies with the strength of the signal carrier. Resistor R-58 sets the zero (no signal) position of the tuning meter by controlling that part of the plate current of tube V-4 flowing through the meter. The intermediate frequency signal voltage then drives the plate current of tube V-4 to a lower value depending upon the signal strength. The screen grid voltage of tube V-4 is regulated by the voltage regulator tube (V-10) to provide an accurate control over the zero signal plate current so that the meter adjustment resistor (R-58) need not be continually re-set for variations of the a-c line voltage.

(2) **F-M Reception.** - When metering reception of f-m signals the tuning meter measures the unbalanced current in resistors R-40 and R-41 obtained when the receiver is tuned to one side of the f-m carrier. When the receiver is tuned to the exact center of the f-m carrier the meter rests at zero indicating that the currents in the discriminator load resistors are equal. Resistor R-56 functions to limit the maximum current in the meter circuit to a safe value.

k. Power Supply. - The receiver has provisions for operation from either an a-c or d-c source.

(1) **A-C Operation.** - The receiver's power supply provides for operation from 115 or 230-volt a-c mains. The a-c current is fed through the line filter which is a low pass pi-section network connected in each side of the line. The network consists

of inductances L-2 and L-3 and capacitors C-48, C-49, C-50 and C-51. The line filter attenuates all the objectionable noise components coming into the receiver circuit through the a-c power source. The line voltage at which the receiver will operate is determined by the setting of the line voltage switch SW-10. This switch simply connects the two 115-volt primary windings of transformer T-16 in parallel for 115-volt operation or series for 230-volt operation. A type 5U4G (tube V-13) full wave rectifier is employed in a conventional full wave rectifier circuit. The high voltage from this rectifier is fed to the filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The SEND/REC. switch is connected in series with the high voltage lead from the rectifier filament to the shorting plug socket to break the high voltage circuit to the receiver's filter sections, thereby, disabling the receiver but at the same time keeping the tube heaters hot, ready for instant use. The filter circuit consists of two low pass pi-section networks made up of inductances L-6 and L-7 and capacitors C-42, C-43, and C-44. In order to provide a constant "B" voltage for the oscillator, mixer, and screen grid of the 2nd i-f amplifier stages a voltage regulator tube type OD3/VR-150 is used. The voltage supplied to the screen of tube V-4 is regulated to provide accurate current control for the tuning meter connected in the plate circuit of this tube.

(2) D-C Operation. - External 6-volt storage battery and 270-volts of "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is fed to the input side of the filter sections used for a-c operation thereby insuring adequate filtering for vibrator type power supplies.

MAINTENANCE

CAUTION - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high-potential points on the VOLTAGE CHART before attempting to service circuits that are "hot". IT IS A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE.

All components of the receiver should be given a thorough inspection at regular intervals. The time interval between inspections will be determined by the operating conditions of the individual installation. In general, keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean especially the tuning capacitors and associated gear drive. Dust should be blown out with dry air or brushed out carefully. Do not oil the gear teeth or the condenser wipers, as noisy reception will result from intermittent electrical contact at these points. Noisy reception may also be caused by dirty condenser wipers, faulty gain controls and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly, making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, and FUSES.

a. Replacing Tubes. - All tubes with exception of the three acorn types are accessible at the top of the chassis through the hinged cover of the cabinet. The three acorn type tubes are made accessible by removing the top cover of the r-f section which is held down by anchor clips. The acorn type tubes are inserted with the short end of the body in the socket. Acorn tubes are more fragile than the rest and must be handled accordingly. If the grid and plate clips on the connections to these tubes become loose replace or bend them to fit firmly. DO NOT ATTEMPT TO SOLDER DIRECTLY TO THE TUBE PIN as the heat generated by the soldering iron will crack the glass envelope. When replacing tubes, check the tube type carefully and replace with the correct tube type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

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b. **Replacing Lamps.** The receiver employs two lamps with bayonet type sockets to illuminate the calibrated tuning dial and the vernier dial. The lamps are to be replaced with a 6/8-volt, 250 ma. (blue bead) G.E. #44 or equivalent. The color code referred to is the color of the glass bead above the glass stem inside the envelope of the lamp.

3. PERIODIC ADJUSTMENTS.

a. Tuning Meter Adjustment. -

(1) The tuning meter zero setting control is located behind its front panel button type cover, marked METER ADJ. Remove the button with a knife or screw driver blade.

(2) Disconnect the antenna and connect a jumper across terminals A₁, A₂, and GND. on terminal board TS-2.

(3) Set the front panel controls for amplitude modulation reception as follows:

(a) Set A.M./F.M. switch at A.M.

(b) Set A.V.C. switch at ON.

(c) Turn R.F. GAIN control to right until the switch on the control clicks.

(d) Set A.F. GAIN control for minimum gain. (All the way to the left.)

(e) Set A.N.L. switch at OFF.

(f) Set B.F.O. switch at OFF.

(g) Set SEND/REC. switch at REC.

(h) Set SELECTIVITY switch at SHARP.

(4) With a screw driver set the METER ADJ. control for the zero reading on the S-meter scale of the tuning meter.

(5) Remove the antenna terminal jumper and replace antenna leads and meter adjustment cover button, the adjustment is completed.

b. **Receiver Alignment.** - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f amplifier stages, or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f amplifier stages. Alignment should not be attempted by inexperienced personnel as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400-cycle modulated signal at 5.25 mc. and 27 to 145 mc. range. Recommended generators are the Ferris Instrument Corp. Model 18D or 18FS and the Measurements Corp. Model 75.

(b) A 50-ohm non-inductive dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 10 watts of audio power for either 500 or 5000-ohm loads.

(2) I-F Amplifier Alignment. -

(a) Disconnect the grid lead of the type 954 mixer tube (V-2) and connect the "hot" lead of the signal generator to the grid of the mixer tube using a small clip or flexible piece of wire to make the connection. Connect the ground wire of the generator to the receiver chassis.

CAUTION - Do not attempt to solder to the tube terminal as the heat of the soldering iron is certain to crack the glass envelope.

(b) Connect the output meter across the speaker terminals. Set the range of the output meter for its highest range to prevent overloading the meter accidentally.

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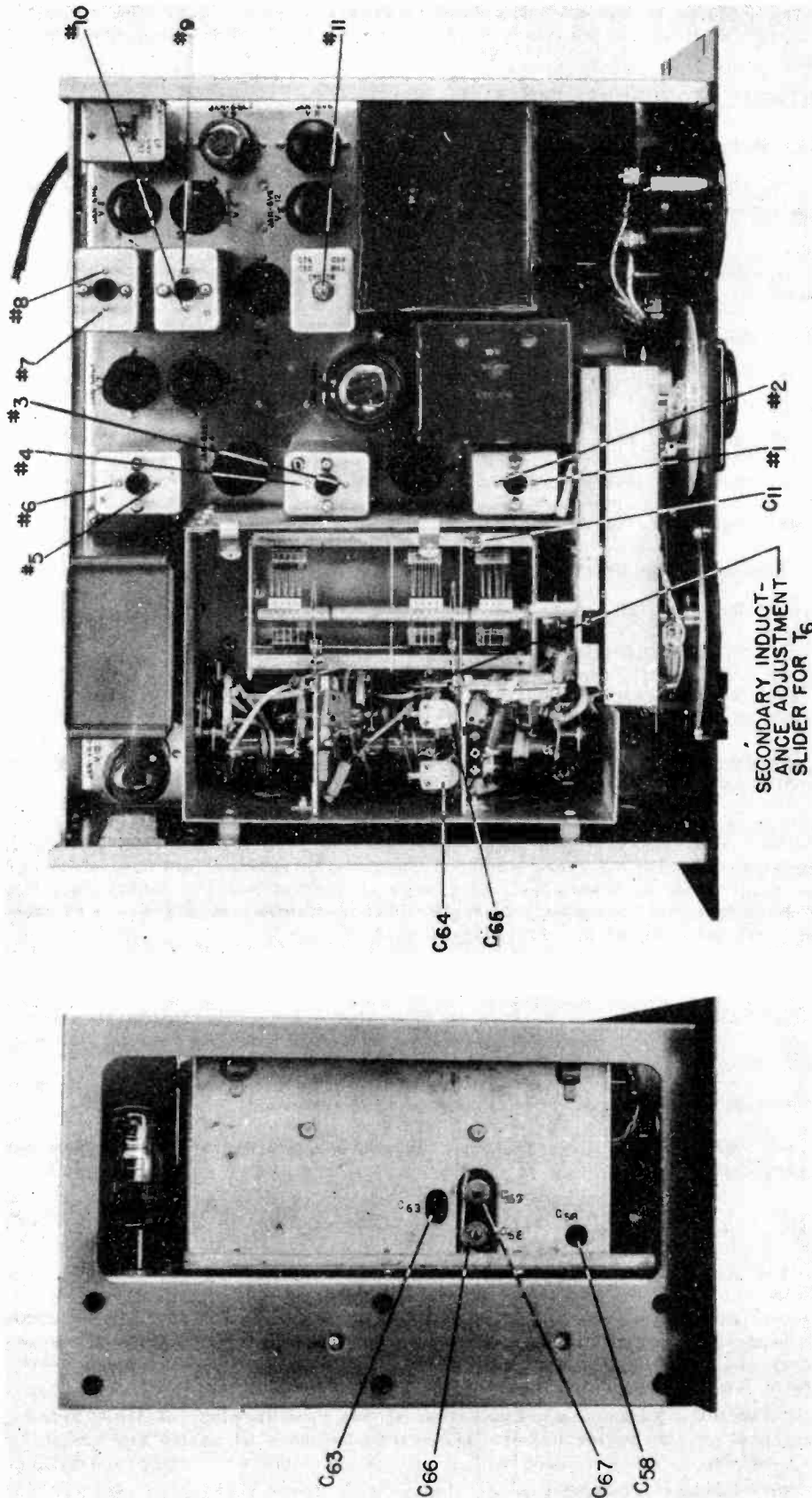


Figure 5-1. Radio Receiver Model S-36A, view showing alignment points.

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(c) Let the receiver warm up for approximately half an hour, then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain. Work in a shielded room if possible.

SELECTIVITY switch at SHARP.

A.M./F.M. switch at A.M.

BAND SWITCH at band #2.

A.V.C. switch at OFF.

SEND/REC. switch at REC.

A.N.L. switch at OFF.

B.F.O. switch at OFF.

TONE control at HIGH FID.

(d) Set the signal generator frequency at 5.25 mc. and turn on the 400-cycle modulation.

(d) Adjust transformers T-10, T-11, T-12 and T-13 for maximum output meter reading using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should not be more than 70 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to figure 5-1. for the location of i-f transformer adjustment screws #1 through #8 inclusive on i-f transformers T-10, T-11, T-12, and T-13.

(3) Discriminator Transformer Alignment. -

(a) Set the A.M./F.M. switch at F.M. and the SELECTIVITY switch at BROAD.

(b) Leave the signal generator set at 5.25 mc. with 400-cycle modulation.

(c) Adjust the secondary slug (#10) of the discriminator transformer (T-14) for zero signal level at the output meter. Note that this adjustment is critical, therefore turn the adjustment screw slowly. Use sufficient signal generator output to provide a good null indication.

(d) Detune the adjustment made in par. (c) slightly so that the output meter gives a readable indication.

(e) Adjust the primary slug adjustment (#9) of the discriminator transformer for maximum response.

(f) Retune the secondary (slug #10) of the discriminator transformer for the null point as in par. (c).

(g) Detune the signal generator to a frequency lower than the i-f frequency until the maximum output point is reached. Note the output meter reading and the frequency deviation from the i-f frequency (5.25 mc.).

(h) Repeat the procedure for the frequency above the i-f frequency. The frequency deviation and maximum output should be the same for good balance. If they are not, then tune the signal generator to the lower of the two peaks and adjust the primary slug adjustment (#9) until the output rises an amount equal to about half the difference of the two peaks previously noted.

(i) Retest for balance as above readjusting the primary slug adjustment until both maximum readings are alike when the signal generator is detuned approximately the same amount on either side of resonance (5.25 mc.). If a balance cannot be obtained, it is an indication that the discriminator transformer secondary slug adjustment (#10) has been misadjusted and will require a very slight correction in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Care must be taken in adjusting the discriminator secondary control as even a very slight misadjustment will result in distortion of frequency modulated signals.

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(4) B.F.O. Adjustment. - Set up the receiver and signal generator as for i-f amplifier alignment and proceed as follows:

- (a) Shut off the 400-cycle modulation of the signal generator.
- (b) Set the PITCH CONTROL at "0" and set the B.F.O. switch at ON.
- (c) Back off the A.F. GAIN control slightly and use just enough signal generator output to provide a clean beat note.
- (d) Plug a headset into the PHONES jack.
- (e) Adjust the slug screw (#11) of coil L-5 for zero beat.
- (f) Check the adjustment by turning the PITCH CONTROL to the right and left of "0". A change in the pitch of the beat note should result. The frequency of the beat note will vary from zero at the "0" setting to a very high pitch at the #5 setting of the control.
- (g) Disconnect the signal generator and reconnect the grid lead to the mixer tube, the alignment of the i-f amplifier stages is complete.

(5) R-F Amplifier Alignment.- The following sequence must be followed to properly align the r-f amplifier stages. Band 3 is aligned first since the adjustment of trimmer C-11 is made for band 3 alignment only and will slightly effect the alignment of bands 1 and 2 if band 3 is not aligned first.

(a) Connect the "hot" lead of the signal generator to terminal "A₁" of the antenna terminal board through a 50-ohm non-inductive resistor (carbon). Connect the ground lead of the generator to the receiver chassis. Leave the jumper connected between terminals "A₂" and "GND". Turn on the 400-cycle modulation.

(b) Let the receiver warm up for approximately half an hour, then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain.

SELECTIVITY switch at SHARP during alignment of band 1. and at BROAD during alignment of bands 2 and 3.

A.M./F.M. switch at A.M.

A.V.C. switch at OFF.

SEND/REC. switch at REC.

A.N.L. switch at OFF.

B.F.O. switch at OFF.

TONE control at HIGH FID.

NOTE For all alignment adjustments the signal generator output attenuator must be adjusted to provide a 500 milliwatt audio signal output at the speaker terminals of the receiver.

NOTE - During each of the following adjustments the ANTENNA control should be touched up to keep the antenna stage in alignment.

(c) Band 3. Alignment. - (BAND SWITCH at 3.)

1. Set the signal generator at 135 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 135 mc. no adjustment of capacitor C-11 is necessary if not, adjust C-11 for maximum output with the receiver dial set at 135 mc.

2. Set the signal generator at 90 mc. and tune in its signal on the receiver. If the receiver dial reads 90 mc. no adjustment of the plate winding inductance of transformer T-9 is necessary - if not, loosen the setscrew at the frame of the main tuning condenser (C-1), holding the end of the plate coil, and adjust the inductance. Increase the inductance if the generator signal falls lower than the 90 mc. calibration point on the receiver dial and reduce the inductance if the signal

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falls above the 90 mc. calibration point. Tighten down the set screw each time before checking the adjustment.

NOTE - If the plate coil inductance was altered it will be necessary to repeat step 1. again. Several adjustments of capacitor C-11 in step 1. and the plate coil inductance in step 2. may be required in cases of where a new transformer (T-9) had to be installed.

3. Set the signal generator and receiver at 135 mc. and adjust trimmer capacitor C-65 for maximum output. Rock the tuning control back and forth slightly to determine the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-3 and T-6 is necessary at 90 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 90 mc. Transformer T-6 is provided with a soldered slider adjustment at the gang condenser frame, however, the ground side of the secondary of transformer T-3 must be unsoldered to be adjusted. The value of inductance that provides maximum audio signal at the output meter is the correct adjustment.

NOTE - If the secondary inductance was altered it will be necessary to repeat step 3. again. Several adjustments of capacitor C-65 in step 3. and inductance in step 4. may be necessary depending upon the condition of the coils.

(d) Band 2. Alignment. - (BAND SWITCH at 2.)

1. Set the signal generator at 80 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 80 mc. no adjustment of capacitor C-67 is necessary - if not, adjust capacitor C-67 for maximum output with the receiver dial set at 80 mc.

2. Set the signal generator at 50 mc. and tune in its signal on the receiver. If the receiver dial reads 50 mc. no adjustment of the plate winding inductance of transformer T-8 is necessary - if not, it will be necessary to loosen the winding from the form with lacquer thinner and shift the individual turns until the signal peaks with the receiver dial set at 50 mc. Repeat step 1. above and recheck step 2. again before cementing the coil in place with Amphenol 912 cement.

NOTE - The presence of lacquer thinner may effect the winding inductance, hence, it is well to allow a few minutes for the lacquer thinner to evaporate before making inductance adjustments.

3. Set the signal generator and receiver at 80 mc. and adjust trimmer capacitor C-64 for maximum output. Rock the tuning control back and forth slightly to determine the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-2 and T-5 is necessary at 50 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 50 mc. To adjust the secondary inductance it will be necessary to use lacquer thinner as in step 2. to loosen and shift turns until the signal peaks with the receiver dial set at 50 mc. Repeat step 3. above and recheck step 4. again before cementing the coils in place with Amphenol 912 cement.

(e) Band 1. Alignment. - (BAND SWITCH at 1.)

1. Set the signal generator at 45 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 45 mc. no adjustment of capacitor C-66 is necessary - if not, adjust capacitor C-66 for maximum response with the receiver dial set at 45 mc.

2. Set the signal generator at 30 mc. and tune in its signal on the receiver. If the receiver dial reads 30 mc. no adjustment of the padder capacitor C-58 is necessary - if not, adjust capacitor C-58 for maximum output with the receiver dial set at 30 mc.

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3. Set the signal generator and receiver at 45 mc. and adjust trimmer capacitor C-63 for maximum response. Rock the tuning control back and forth slightly to obtain the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-1 and T-4 is necessary at 30 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 30 mc. To adjust the secondary inductance it will be necessary to use lacquer thinner as before to loosen and shift turns until the signal peaks with the receiver dial set at 30 mc. Repeat step 3. above and recheck step 4. again before cementing the coils in place with Amphenol 912 cement.

NOTE - After completing the above alignment procedure check the image frequency to determine whether the oscillator frequency is higher than the signal frequency on band 1. and lower than the signal frequency on bands 2 and 3. For example: Set the receiver dial at 100 mc., set the signal generator frequency at twice the i-f frequency lower than 100 mc. or 89.5 mc. and turn up the signal generator output to about 5000 times the normal alignment output. An image signal should be heard. If not, tune the signal generator to twice the i-f frequency higher than the signal frequency or 110.5 mc. and look for the image there. If the image shows up at 110.5 mc., the receiver's oscillator is operating above the signal frequency on this band and must be readjusted so that it falls below the signal frequency. Due to the construction of this receiver it is considered impossible to adjust the oscillator frequency so that it will fall on the wrong side of the signal frequency on any of the three bands, however, it is always well to check for the image after making any extensive alignment adjustments.

(f) When completely aligned the overall receiver sensitivity will usually run from 2 microvolts at 30 mc. to 10 microvolts at 130 mc. for 50 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your job finished.

4. LOCATING FAULTS WITH A VOLT-OHM METER.

a. **Voltage Chart.** - Refer to Fig. 5-2. for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. To identify the tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt-Ohmyst Junior analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A₁, A₂ and GND, disconnect the speaker and replace with a 5000-ohm 10-watt resistor across the 5000-ohm output terminals or a 500-ohm 10-watt resistor across the 500-ohm terminals, and set the controls as follows:

SELECTIVITY switch at SHARP

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

A.V.C., A.N.L., and B.F.O. switches at ON.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

ANTENNA, TONE, TUNING, and PITCH CONTROL adjustments do not effect the readings.

b. **Resistance Chart.** - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements.

The readings were taken with an RCA Volt Ohmyst Junior analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

SELECTIVITY switch at SHARP.

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

A.V.C., A.N.L., and B.F.O. switches at ON.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

TONE control set at BASS BOOST.

ANTENNA, TUNING and PITCH CONTROL adjustments do not effect the readings.

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MODEL S-36-A

c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistance instead of winding resistance alone as indicated in the chart.

Circuit Symbol	Name of Part	Winding	Winding Terminals	D-C Resistance (ohms)
T-15	TRANSFORMER, audio.	Primary	1 to 3	560
		$\frac{1}{2}$ primary	1 to 2/2 to 3	280
		600-ohm secondary	4 to 6	25
		$\frac{1}{2}$ 600-ohm secondary	4 to 5/5 to 6	12.5
		5000-ohm secondary	7 to 9	33
		500-ohm secondary	7 to 8	3
T-16	TRANSFORMER, power.	Primary #1	1 to 3	3.5
		Primary #2	2 to 4	3.5
		H.V. secondary	9 to 11	90
		$\frac{1}{2}$ H.V. secondary	8 to 10/10 to 11	45
		5.0-volt secondary	7 to 8	Zero
		6.3-volt secondary	5 to 6	Zero
L-6/L-7	Reactor, filter.	12-henry coil	1 to 2	215
		3-henry coil	2 to 3	85

SUPPLEMENTARY DATA**FREQUENCY RANGE.**

27.8 mc. - 143 mc. (Covered in three bands).

AUDIO POWER OUTPUT.

Speaker operation - 3 watts with less than 5% distortion (500 or 5000 ohms).
Headset operation - 3 watts with less than 5% distortion (600 ohms).

SENSITIVITY.

At 30 mc. - 2.0 microvolts (For 50 milliwatt audio output).
At 135 mc. - 10.0 microvolts (For 50 milliwatt audio output).
(Signal generator modulated 30% at 400 cycles.)

AUDIO FIDELITY.

Audio response is flat within ± 3 db. from 40 to 10,000 cycles per second.

IMAGE RATIO.

Image ratio exceed 1000:1 at 30 mc., 300:1 at 58 mc.; 100:1 at 80 mc. and 60:1 at 100 mc.

SELECTIVITY.

I-F selectivity measured at the grid of the mixer tube is not less than 10kc. or more than 25 kc. with the SELECTIVITY switch at SHARP and not less than 65 kc. or more than 80 kc. with the SELECTIVITY switch at BROAD. at 6 db. down from resonance.

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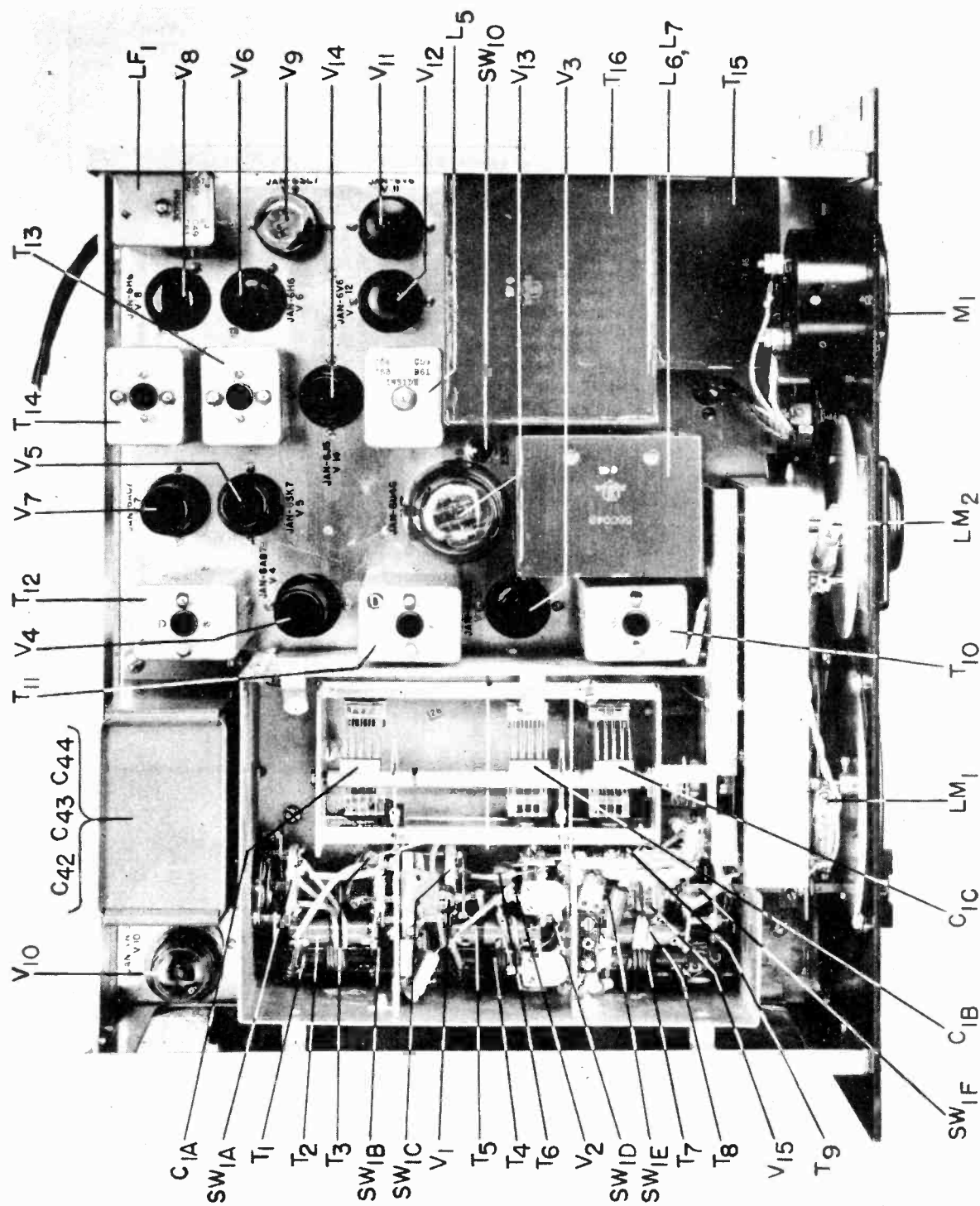


Figure 7-1. Radio Receiver Model S-36A, top view.

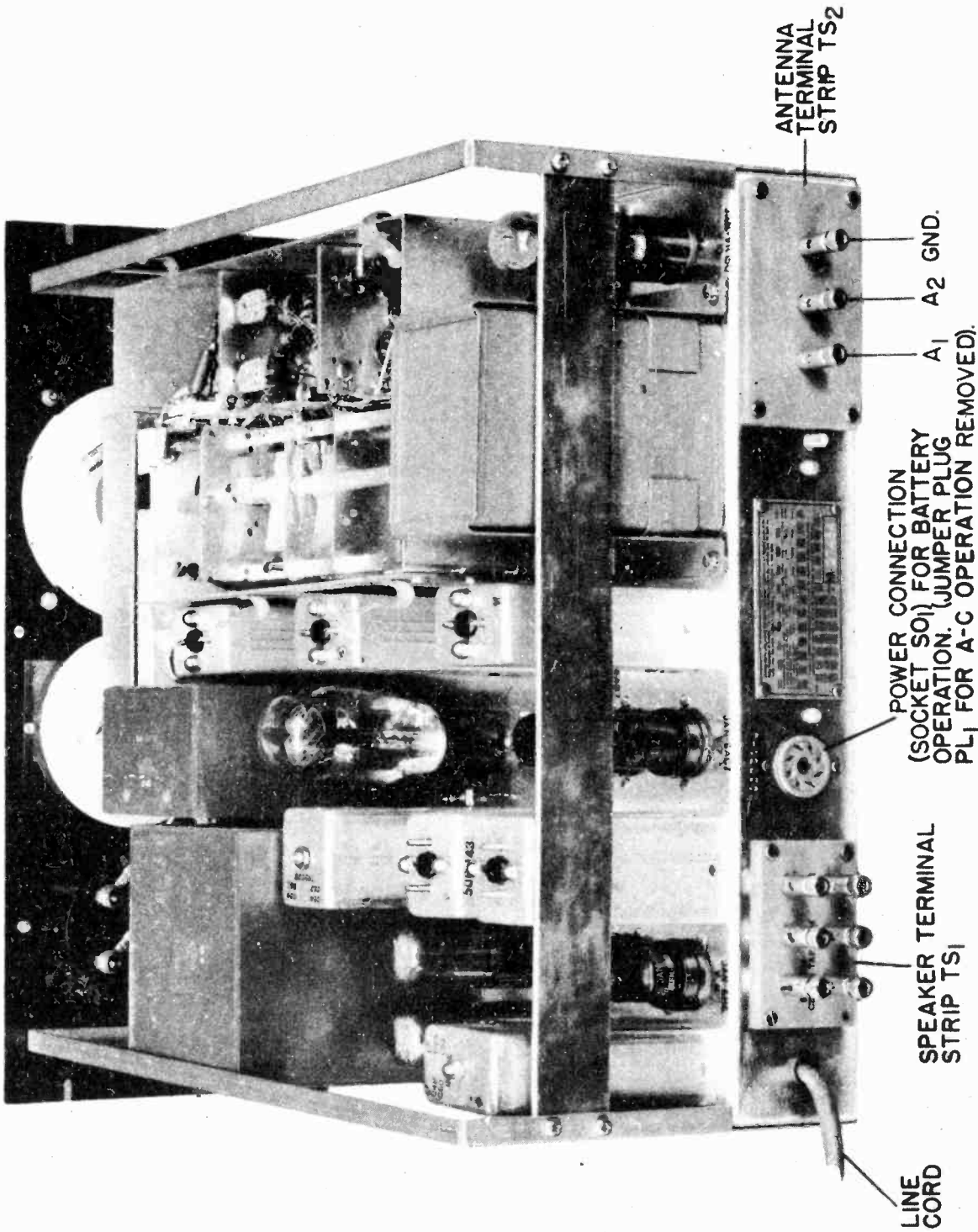


Figure 7-3. Radio Receiver Model S-36A, rear view.

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MODEL 8-36-A

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
C ₂₂	Same as C ₆	-	-
C ₂₃	Same as C ₆	-	-
C ₂₄	Capacitor, fixed: mica dielectric; 56 mfd. ± 10%; 500 V. D-C working: case 51/64" long x 15/32" wide x 7/32" thk same as C ₂₆	ASA	CN20A600K
C ₂₅	Capacitor, fixed: paper dielectric; 0.05 mfd. - 6 × 14K; 600 V. D-C working: metal case 1-25/32" long x 1-1/32" deep x 13/16" high, with 2 mfg. feet with 2-1/8" mtg. centers; 2 solder lug terminals insulated from case by neoprene seals and phenolic washers; same as C ₃₅	IC type 7678	46A006
C ₂₆	Same as C ₂₄	-	-
C ₂₇	Capacitor, fixed: mica dielectric; 100 mfd. ± 10%; 500 V. D-C working: case 51/64" lg x 16/32" wd x 7/32" thick.	ASA	CN20A101K
C ₂₈	Capacitor, fixed: mica dielectric; 560 mfd. ± 10%; 500 V. D-C working: case 53/64" long x 53/64" wide x 9/32" thick.	ASA	CN20A561K
C ₂₉	Capacitor, fixed: ceramic dielectric; 25 mfd. ± 10%; 500 V. D-C working: negative 0 temp. coeff; body 5/8" lg x 3/16" dia.	IRC special	47A142
C ₃₀	Same as C ₆	-	-
C ₃₁	Same as C ₂₉	-	-
C ₃₂	Capacitor, fixed: mica dielectric; 560 mfd. ± 10%; 500 V. D-C working: case 1-1/16" long x 15/32" wide x 7/32" thick.	ASA	CN25A501K
C ₃₃	Same as C ₆	-	-
C ₃₄	Capacitor, fixed: mica dielectric; 1000 mfd. ± 10%; 500 V. D-C working: case 53/64" square x 9/32 thk.	ASA	CN20A102K
C ₃₅	Same as C ₂₅	-	-
C ₃₆	Same as C ₆	-	-
C ₃₇	Same as C ₆	-	-
C ₃₈	Capacitor, fixed: paper dielectric; 20 mfd. - 10 + 70%; 25 V. D-C working: case hermetically sealed metal 2-1/8" long x 1" deep x 13/16" high; 2 mfg. feet with 2-1/8" mtg. centers; 2 solder lug terminals insulated from the case; same as C ₁₀	IC type 1B113	46A011
C ₃₉	Capacitor, fixed: mica dielectric; 150 mfd. ± 10%; 500 V. D-C working: case 51/64" lg x 15/32" wd x 7/32" thk	ASA	CN20A151K
C ₄₀	Same as C ₃₈	-	-
C ₄₁	Not used	-	-
C ₄₂	Capacitor, fixed: paper dielectric; triple unit; unit #1 is 4 mfd. 600 V. D-C working (C ₄₂), unit #2 is 8 mfd. 650 V. D-C working (C ₄₂), unit #3 is 8 mfd. 660 V. D-C working (C ₄₂); hermetically sealed metal case 4-3/4" long x 2-3/4" deep x 3-7/16" high; 2 mfg. feet with 4-3/4" x 2" mtg. centers; 4 solder lug terminals (one common to all units) insulated from the case by bakelite and neoprene washers; terminals marked "9", "4", "8", "8".	-	-
C ₄₃	Same as C ₃₈	-	-
C ₄₄	Same as C ₃₈	-	-
C ₄₅	Same as C ₃₈	-	-
C ₄₆	Same as C ₃₈	-	-
C ₄₇	Same as C ₃₈	-	-

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
CAPACITORS			
C ₁	Capacitor, variable: air dielectric; 3 sections; 9 plates with double spacing between plates; min. cap. 6 mfd., max. cap. 54.7 mfd.; plates are aluminum; shaft, silver plated brass 3/8" long x 0.375" dia., with 2B insulation on stator; front rotor section grounded to frame; other two sections insulated from frame; spade lug mtg.; solder lug terminals.	(M special)	46B147
C ₂	Capacitor, variable: air dielectric; single sections; 7 plates; min. cap. 3 mfd., max. cap. 28 mfd.; aluminum plates; ceramic insulation; brass shaft 3/4" long x 3/8" dia., mfg. base 3/8" thick x 1-7/32" dia., mtg. centers 31/32"; total depth of unit 7/8"; solder lug terminals	IRC type 22-7	46A039
C ₃	Capacitor, fixed: mica dielectric; 2200 mfd. ± 10%; 500 V. D-C working: case 51/81" lg x 15/32" wd x 7/32" thk; same as C ₅ , C ₉ , C ₁₀ , C ₄₅ , C ₄₆ , C ₄₇ , C ₅₅ .	ASA	CN20A231K
C ₄	Capacitor, fixed: mica dielectric; 2200 mfd. ± 10%; 500 V. D-C working: case 53/64" long x 53/64" wide x 9/32" thick; same as C ₆ , C ₃₂ , C ₆₁ .	ASA	CN20A222K
C ₅	Same as C ₃	-	-
C ₆	Same as C ₃	-	-
C ₇	Capacitor, fixed: ceramic dielectric; 10 mfd. ± 10%; 500 V. D-C working: temp. coeff. -0.00055 mfd./deg. Cent.; case 0.625" long x 0.225" dia.	CRL type 811-077	47A006
C ₈	Capacitor, fixed: mica dielectric; 8200 mfd. ± 10%; 500 V. D-C working: case 1-1/32" long x 11/64" wide x 11/32" thick; same as C ₃ , C ₁₄ , C ₁₅ , C ₁₇ , C ₁₈ , C ₁₉ , C ₂₁ , C ₂₂ , C ₂₃ , C ₃₀ , C ₃₉ , C ₃₆ , C ₃₇ , C ₆₂ , C ₇₈ .	ASA	CN20A822K
C ₉	Same as C ₃	-	-
C ₁₀	Same as C ₃	-	-
C ₁₁	Capacitor, variable: air dielectric; small variable electroly formed between a 6-32 metal screw and a C18 plate 9/8" wd x 13/16" lg, rolled to 3/16" ID, at one end, with a 7/32" dia mtg hole 3/16" center from other end x 7/32" center from top side; cadmium plated plate.	H 48A140	48A140
C ₁₂	Capacitor, fixed: paper dielectric; 1000 mfd. ± 100-20%; 600 V. D-C working: case 3/4" lg x 3/8" wd x 7/32" thk.	CE	47A121
C ₁₃	Same as C ₆	-	-
C ₁₄	Same as C ₆	-	-
C ₁₅	Same as C ₆	-	-
C ₁₆	Same as C ₁₂	-	-
C ₁₇	Same as C ₆	-	-
C ₁₈	Same as C ₆	-	-
C ₁₉	Same as C ₆	-	-
C ₂₀	Capacitor, fixed: mica dielectric; 47 mfd. ± 10%; 500 V. D-C working: case 51/64" long x 15/32" wide x 7/32" thick; same as C ₃₁ .	ASA	CN20A470K
C ₂₁	Same as C ₆	-	-

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
C69	Same as C68		
C70	Same as C68		
C71	Same as C68		
C72	Same as C68		
C73	Same as C68		
C74	Capacitor, fixed; ceramic dielectric; 50 mfd \pm 10%; 500 V. D-C working; zero temp. coeff; body 3/4" lg x 1/8" dia.; same as C75.	ER	47A091 Special
C75	Same as C74		
C76	Same as C74		
C77	Same as C74		
C78	Same as C74		
FUSES			
F51	Fuse; 3 ampere; 6250 V.; 1/16" glass enclosed; 1-3/4" long x 9/32" dia.; cone nickel plated copper alloy; carries 110% of rated current; vibration factor is 200.	LF type 1093	31A31K
JACKS			
J1	Jack, phone; switching-one make, one break; steel frame; silver contacts; rubber and bakelite insulation; mounted by 3/8"-32 brass bushing 3/8" long; frame dimensions 1.10/32" x .97/32" x 3/4"; solder lug contacts; 1" from front of bushing to tip contact.	I type 57-087 modified	30B008
INDUCTORS			
L1	Inductor, R-F; 75 turns of #28SCE single layer winding; inductance 15.5 microhenries \pm 10%; d-c resistance 4.10 ohms \pm 3%; wound on molded bakelite coil form 15/16" long x 5/32" dia., coated with Chinese red lacquer; air core.	SWI type 661	53A009
L2	Inductor, line filter; 57 turns of #22SCE universal winding; 46 microhenries inductance; winding 2" ID x 1-1/16" OD x 9/32" lg; air core; coil form 1" lg x 9" dia., tapered 6-32 at each end for mtg.	H 53A062	53A082
L3	Same as L2		
L4	Inductor, R-F; 42 turns of #28SCE single layer winding; inductance 4.20 microhenries \pm 10%; d-c resistance 0.25 ohms \pm 20%; wound on molded bakelite coil form 7/8" long x 9/32" dia., coated with Chinese blue lacquer; air core.	SWI type 662	53A009
L5	Inductor, beat frequency oscillator; 15-7/8 turns of #15/44 D coil, 1/16" single layer winding tapped 3-1/8" turns and 10-7/8" turns from start of winding; coil wound on bakelite tube 1-5/8" long x 3/8" O.D. x 0.400" I.D.; tuned by adjustable iron core; unit shielded; assembly includes resistor R ₁₁ and capacitors C ₅₃ , C ₅₄ , and C ₅₅ .	SWI type 3491	54C124

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
C48	Capacitor, fixed; mica dielectric; 6000 mfd \pm 20%; 500 V. D-C working; case 53/64" square x 11/32" thick; same as C49, C50, C51.	ASA	C65A822U
C49	Same as C48		
C50	Same as C48		
C51	Same as C48		
C52	Same as C48		
C53	Capacitor, fixed; mica dielectric; 100 mfd \pm 20%; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" hbk.	ASA	C62A101K
C54	Capacitor, fixed; ceramic dielectric; 200 mfd \pm 10%; 500 V. D-C working; zero temp. coeff; body 1.875" lg x 0.265" dia.	ER	47A026
C55	Same as C53		
C56	Capacitor, fixed; ceramic dielectric; 50 mfd \pm 2.5 mfd; 500 V. D-C working; neg. 0.00075 mfd/deg. Cent.; body 7/16" lg x 7/32" dia.	ER type V750K	47A109
C57	Capacitor, fixed; ceramic dielectric; 1000 mfd \pm 20%; 500 V. D-C working; body 11/16" lg x 2/16" dia.	WT type 20K1200 UE	47A112
C58	Capacitor, adjustable; mica dielectric; 400 mfd \pm 10%; bakelite mtg. insulation; 2 solder lug terminals to which are attached #18AWG tinned copper leads 1" long, both leads insulated from the frame; special L shaped mtg. frame 1" x 7/8" x 1"; octagon condenser frame 3/4" diam.	SBIA	44A050
C59	Capacitor, fixed; twisted pair of leads to form 1 mfd capacity.		
C60	Capacitor, variable; air dielectric; min. cap. 3.5 mfd, max. cap. 20 mfd; ceramic insulation; 2 mtg. holes with 21/32" mtg. centers; one solder lug terminal (rotor plate); wire slot on stator plates mtg. posts; shaft 28/32" long x 3" dia.; base 1-7/32" long x 15/16" wide; overall depth 2-3/8".	HC type 32-7	44A054
C61	Same as C59		
C62	Same as C59		
C63	Capacitor, adjustable; mica dielectric; min. cap. 3 mfd, max. cap. 50 mfd; ceramic insulation; compression type adjustment; unit is 3/4" long x 5/8" wide x 11/16" deep including 2 solder lug terminals.	UE Special	44A149
C64	Capacitor, adjustable; ceramic dielectric; 4 to 20 mfd; 300 V. D-C working; screw driver adjustment; vertically mounted by a CBS special mtg bracket; same as C65.	H Special	44A101
C65	Same as C64		
C66	Capacitor, adjustable; air dielectric; 1 to 12 mfd; bakelite insulation; screw driver adjustment; 1-11/64" lg x 0.555" dia. overall excluding solder lug terminals; same as C67.	WV type 22-3210 modified	44A110
C67	Same as C66		
C68	Capacitor, fixed; ceramic dielectric; 100 mfd \pm 3%; 500 V. D-C working; neg. 0.00005 mfd temp. coeff.; body 3/4" lg x 3/4" dia.; same as C69, C70, C71, C72, C73, C76, C77.	ER Special	47A117

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
R ₆	Same as R ₂		
R ₇	Resistor, fixed: 100,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₂₃ , R ₃₀ , R ₄₁ , R ₅₁ .	ASA	RC21AE10AK
R ₈	Not used		
R ₉	Resistor, fixed: 10 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₁₆ , R ₂₃ , R ₂₆ .	ASA	RC21AE10AK
R ₁₀	Resistor, fixed: 100,000 ohms ± 10%; ½ watt; carbon; insulated; 0.170" diam x 0.406" long.	ASA	RC10AE10AK
R ₁₁	Resistor, variable: 10,000 ohms ± 20%; ½ watt; carbon; insulated; shaft 1" long x ½ dia.; 3 solder lug terminals; with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taper; includes a toggle action switch (SW) on rear which closes the circuit when the control is turned to the extreme right (clockwise).	CT type 125	29C0586
R ₁₂	Resistor, fixed: 120 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.496" long.	ASA	RC20AE121K
R ₁₃	Resistor, fixed: 120 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₂₀ .	ASA	RC21AE121K
R ₁₄	Resistor, fixed: 39,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE391K
R ₁₅	Resistor, fixed: 330 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₂₂ , R ₂₅ , R ₂₈ .	ASA	RC21AE331K
R ₁₆	Not used.		
R ₁₇	Resistor, fixed: 33 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₅₅ , R ₅₇ , R ₆₅ .	ASA	RC21AE330K
R ₁₉	Same as R ₁₀		
R ₂₀	Same as R ₁₃		
R ₂₁	Same as R ₁₃		
R ₂₂	Same as R ₁₅		
R ₂₃	Same as R ₇		
R ₂₄	Resistor, fixed: 470,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.455" long; same as R ₂₅ , R ₂₆ .	ASA	RC21AE471K
R ₂₅	Same as R ₁₅		
R ₂₆	Same as R ₁₅		
R ₂₇	Same as R ₇		
R ₂₈	Resistor, fixed: 7500 ohms ± 5%; 10 watt; wire wound; coated with baked vitreous enamel; 3" Ø O.D. x 1-3/4" long.	10C Type A11	24R0750D
R ₂₉	Same as R ₅		
R ₃₀	Resistor, fixed: 22,000 ohms ± 10%; 2 watt; carbon; insulated; 0.342" O.D. x 1.70" long; same as R ₆₀ .	ASA	RC14AE221K
R ₃₁	Resistor, fixed: 47,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE471K

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
I ₆	Inductor assembly, filter: 2 section unit; section #1 inductance 2 henries - 10 ± 30% @ 150 milliamperes; d-c resistance 85 ohms ± 10%; connected to solder lug terminals #2 and #3 (I ₆); section #2 inductance 12 henries - 10 ± 20%, @ 90 milliamperes; d-c resistance 215 ohms ± 10%; connected to solder lug terminals #1 and #2 (I ₆); each section has a separate iron core; coils and cores located so no mutual coupling exists; hermetically sealed case 3-3/4" long x 2-9/16" deep x 5-3/4" high; unit mounts by 4 threaded lugs with 2-3/8" x 1-3/16" sq. centers; breakdown between core and windings 2000 V. RMS; heat rise under rated load 40 deg. Cent. or less	ST type 10C123	56C0418
I ₇			
LINE FILTERS			
LF ₁	Line filter assembly: consists of inductors I ₆ and I ₇ and capacitors C ₄₉ , C ₅₀ and C ₅₁ mounted in drawn aluminum can 4-15/32" high, 1-3/8" wide x 1-13/16" deep with solder lug terminals and mounted by 4 spade lugs.	SW type 3492	53A006
LAMPS			
LM ₁	Lamp: bayonet base 6 to 8 volts @ 250 milliamperes; glass bulb; same as LM ₂	GE type 44	39A005
LM ₂	Same as LM ₁		
METERS			
M ₁	Meter, 95 meters; calibrated in 50 units; 100-0-10 micro-ampere movement; body 2.92" dia. x 1.95" deep; round flush type mfg. plate 3.5 O.D., with 3 mfg. holes 1.20 degrees apart; includes 2 terminals ± 24-V ₂ which project 0.69" from rear of meter.	M Special	82A087
PLUGS			
PI ₁	Plug and line cord assembly: 2 conductor #18 type S-J #11 rubber covered cord 6 feet long with a spring type (A)-list type #711 molded on plug at one end and stripped and tinned for 5:00 at the other end.	M type 1760	M7A125
PI ₂	Plug, metal; male, bakelite body 1-3/4" O.D. x 7/16" thick; metal contact prongs 7/16" long; supplied with insulated jumpers between contacts 3 and 4, and contacts 6 and 7.	AP type CP-R	35A003
RESISTORS			
R ₁	Resistor, fixed: 270 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE271K
R ₂	Resistor, fixed: 1000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₃ , R ₀ , R ₂₁ , R ₂₇ , R ₆₇ .	ASA	RC21AE102K
R ₃	Same as R ₂		
R ₄	Resistor, fixed: 10,000 ohms ± 20%; 2 watt; carbon; insulated; 0.342" O.D. x 1.70" long.	ASA	RC14AE102K
R ₅	Resistor, fixed: 2200 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₉ , R ₂₂ .	ASA	RC21AE221K

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
R ₆₃	Resistor, fixed: 4700 ohms \pm 10% $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE172K
R ₆₄	Resistor, fixed: 25,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE220K
R ₆₅	Same as R ₆₄	-	-
R ₆₆	Resistor, fixed: 6 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.215" O.D. x 7/16" long.	ER type 504	23A011
R ₆₇	Same as R ₆₆	-	-
R ₆₈	Resistor, fixed: 8 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.215" O.D. x 7/16" long.	ER type 504	23A019
R ₆₉	Resistor, fixed: 15,000 ohms \pm 20%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" diam x 0.406" long.	ASA	RC20AE18N
R ₇₀	Same as R ₆₉	-	-
R ₇₁	Same as R ₆₉	-	-
R ₇₂	Same as R ₆₉	-	-
SOCKETS			
S ₀₁	Socket, octal; female; high dielectric mica filled bakelite body 1-7/8" dia. x 31/64" thick; silver plated phosphor bronze solder lugs; molded on steel mg. plate 1-8/32" wide x 0.031" thick having 2 mg. holes of 5/32" dia. x 1-8" mg. centers; pins are numbered on back of socket clockwise from locating pin.	AP type MP57M	64200
SWITCHES			
S _{W1}	Switch, rotary selector: 3 position single pole, 7 section; non-shorting type contacts; ceramic wafers oval shaped 1-7/8" x 1-5/8" x 0.32" thick; 2 holes 0.144" dia. x 1-9/16" sq. centers mount wafers individually; entire shaft 11-3/4" long x 0.249" dia. squared on opposite sides to 0.185" dia., with index plate 1-7/8" x 1-3/8" x 0.038" thick and having two 0.1875" stainless steel balls; 3 stops, each 90 degrees apart and position 1 symmetrical to mg. holes; minimum torque not less than 70 inch ounces.	OM type HC	606161
S _{W2}	Switch, toggle: rated 3 amperes @ 250 V.; case 1" long threaded 15/32-32; solder lug contacts; same as S _{W1} .	CH type 6290	60A175
S _{W3}	Switch, toggle action; SPST; part of resistor R ₅₈	-	-
S _{W4}	Same as S _{W2}	-	-
S _{W5}	Same as S _{W2}	-	-
S _{W6}	Switch, toggle: SPST; rated 3 amperes @ 250 V.; case 1-3/32" long x 17/32" wide x 9/16" deep; mounted by bushing 15/32" long threaded 15/32-32; solder lug contacts.	CH type 5690 SZ	60A123

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
R ₃₂	Resistor, fixed: 1 megohm \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE106K
R ₃₃	Same as R ₃₂	-	-
R ₃₄	Resistor, fixed: 220,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₃₂ , R ₃₃ , R ₄₂ , R ₄₄ , R ₄₅ , R ₄₉ , R ₅₀ .	ASA	RC21AE224K
R ₃₅	Same as R ₃₄	-	-
R ₃₆	Same as R ₃₄	-	-
R ₃₇	Resistor, fixed: 15,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₃₄ .	ASA	RC21AE150K
R ₃₈	Resistor, fixed: 66,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE240K
R ₃₉	Same as R ₃₄	-	-
R ₄₀	Same as R ₃₄	-	-
R ₄₁	Same as R ₃₄	-	-
R ₄₂	Same as R ₃₄	-	-
R ₄₃	Resistor, variable: 1 megohm \pm 20%; carbon; #6 taper; shift 1" long x 3" dia.; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps.	CT type 125	24C059
R ₄₄	Same as R ₃₄	-	-
R ₄₅	Same as R ₃₄	-	-
R ₄₆	Resistor, fixed: 3000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₄₇ .	ASA	RC21AE32K
R ₄₇	Same as R ₄₆	-	-
R ₄₈	Resistor, fixed: 100,000 ohms \pm 20%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" diam x 0.655" long.	ASA	RC21AE104M
R ₄₉	Same as R ₃₄	-	-
R ₅₀	Same as R ₃₄	-	-
R ₅₁	Same as R ₃₄	-	-
R ₅₂	Resistor, fixed: 250 ohms \pm 10%; 2 watt; carbon; insulated; 0.342" O.D. x 1.76" long.	ASA	RC11AE221K
R ₅₃	Resistor, fixed: 3900 ohms \pm 10%; 2 watt; carbon; insulated; 0.405" diam x 1.41" long.	ASA	RC10AE324K
R ₅₄	Not used	-	-
R ₅₅	Same as R ₄₇	-	-
R ₅₆	Same as R ₄₇	-	-
R ₅₇	Same as R ₄₇	-	-
R ₅₈	Resistor, variable: 1500 ohms \pm 20%; wire wound; st. line taper; shaft 3/8" long x 3" dia. slotted 1/16" x 1/16"; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps.	CT type 125	24C060
R ₅₉	Resistor, fixed: 3000 ohms \pm 5%; 10 watt; wire wound; coated with baked vitreous enamel; 3/8" O.D. x 1-3/4" long.	IRC type AJ	24HR22D
R ₆₀	Same as R ₃₀	-	-
R ₆₁	Resistor, fixed: 47,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" diam x 0.466" long.	ASA	RC20AE173K
R ₆₂	Same as R ₁₅	-	-

THE HALLICRAFTERS CO.

MODEL S-36-A

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
T ₅	Transformer, R-F: 46 to 82 megacycles; one primary and one secondary winding; primary 11- $\frac{1}{2}$ turns of #34SCE single layer winding (round counter-clockwise), secondary 2- $\frac{1}{2}$ turns of #22 D cell, braided single layer winding (round clockwise); air cores; coils wound on a bakelite tube 1-5/8" long x 3/8" O.D. x 3/8" I.D.; solder lug terminals.	SW1 type 655	51B794
T ₆	Transformer, R-F: 82 to 143 megacycles; one secondary winding; primary 2-3/4 turns of #36SCE single layer winding; secondary 3/4 turns of #18 solid copper single layer winding; air cores; coils are wound on a solid bakelite form 7/8" long x 3/8" dia.; extended coil winding leads for terminals.	SW1 type 656	51A778
T ₇	Transformer, R-F: 27.8 to 47 megacycles; one primary and two secondary windings; primary 1-3/4 turns of #34SCE; first secondary 4-1/4 turns of #22 D cell, braided; second secondary 2- $\frac{1}{2}$ turns of #30DCE; air cores; coils are wound on a bakelite tube 1-5/8" long x 3/8" O.D.; solder lug terminals.	SW1 type 653	51A207
T ₈	Transformer, R-F: 46 to 82 megacycles; one primary and two secondary windings; primary 3.4 turn of #30S cell, braided; first secondary 2-7/8 turns of #18D cell, braided; second secondary 3/4 turn of #22D cell, braided; air cores; coils are wound on a bakelite tube 1-5/8" long x 3/8" O.D.; solder lug terminals.	SW1 type 650	51A270
T ₉	Transformer, R-F: 82 to 143 megacycles; one primary and two secondary windings; primary 1 turn of #14 bare copper wire; second secondary 1-2 turns of #29S cell, braided; air cores; coils are wound on a bakelite tube 1-5/8" long x 3/8" dia.; one solder lug and extended coil winding leads provide terminals.	SW1 type 656	51B774
T ₁₀	Transformer, Intermediate-Frequency: 5.25 megacycles; one primary and three secondary windings; primary 1 $\frac{1}{2}$ turns single layer winding on adjustable polymer core assembly; first secondary 1 $\frac{1}{2}$ turns single layer winding on same form as primary; second secondary 2 $\frac{1}{2}$ turns single layer winding on adjustable polymer core assembly; third secondary 2 $\frac{1}{2}$ turns wound on same form as second secondary; fixed trimmer capacitors (C ₁₀) and (C ₁₁), a fixed resistor (R ₁₀) and a fixed reactor (C ₁₂) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/8" wide with 4 slide lugs centered one on each side of shield; solder lug terminals at base numbered 1 thru 8 and a 7 $\frac{1}{2}$ " insulated stranded wire lead brought out through a hole in the side of the shield provide connections.	SW Special	51C110
T ₁₁	Transformer, Intermediate-Frequency: 5.25 megacycles; one primary and three secondary windings; primary 1 $\frac{1}{2}$ turns single layer winding on adjustable polymer core assembly; first secondary 1 $\frac{1}{2}$ turns single layer winding on same form as primary; second secondary 2 $\frac{1}{2}$ turns single layer winding on adjustable polymer core assembly; third secondary 2 $\frac{1}{2}$ turn winding on same form as second secondary; fixed trimmer capacitors (C ₁₀) and (C ₁₁), a fixed resistor (R ₁₀) and a fixed reactor (C ₁₂) complete the assembly; aluminum shield can 4" high x 1-7/8" wide with 4 slide lugs centered one on each side of shield; solder lug terminals at base numbered 1 thru 8 provide connections.	SW Special	51C111

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
SW7A	Switch, rotary selector: 3 section 3 position; 2 shields separate section #1 from rest of the assembly; a single pole A-C power switch is included at rear and is open at position #1, and closed in positions #2 and #3; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum was impregnated phenolic wafer; non shorting teeth at contacts 5 and 8; frame 5/16" long, mounts by 3/8-32 bushing 3/8" long; shaft 1" long x 3/8" dia.	OM type H	60B178
SW7B	Switch, rotary selector: single section 2 position; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum was impregnated phenolic wafer; non shorting teeth at contacts 5 and 8; frame 5/16" long, mounts by 3/8-32 bushing 3/8" long; shaft 1" long x 3/8" dia.	OM type QH	60A177
SW7C	Switch, rotary selector: 3 circuit; single section 4 position; metal parts brass, fungicide treated bakelite wafer; shorting type contacts; 1-5/8" lg x 1-7/16" wd x 1-5/8" h overall; shaft 1" lg x 3/8" dia.; mtg by 3/8-32 x 3/8" lg brass bushing.	OM Special	60B212
SW7D	Switch, toggle, DPDT, rated 3 amperes @ 250 V., 1-3/4" long x 21/32" wide x 5/8" deep, mounted by bushing 13/32" long threaded 15/32-32, solder lug contacts.	HH	60A190
TRANSFORMERS			
T ₁	Transformer, R-F: 27.8 to 47 megacycles; one primary and one secondary winding; primary 1- $\frac{1}{2}$ turns of #36SCE single layer winding with a 6 of #5 at 43 megacycles with 80-h micro-microfrads; secondary 3 turns of #22 D cell, single layer winding with a 6 of #13 at 26 megacycles with 30.5 micro-microfrads; air cores; coils wound on a bakelite tube 1-5/8" long x 3/8" O.D. x 3/8" I.D.; solder lug terminals.	SW1 type 651	51A205
T ₂	Transformer, R-F: 46 to 82 megacycles; one primary and one secondary winding; primary 1- $\frac{1}{2}$ turns of #36SCE single layer winding with a 6 of #7 at 45 megacycles with 105 micro-microfrads; secondary 1-7/8 turns of #18 D cell, braided single layer winding with a 6 of #18 at 45 megacycles with 105 micro-microfrads; air cores; coils wound on a bakelite tube 1-5/8" long x 3/8" O.D. x 3/8" I.D.; solder lug terminals.	SW1 type 654	51A204
T ₃	Transformer, R-F: 82 to 143 megacycles; one primary and one secondary winding; primary 3- $\frac{1}{2}$ turns of #24 braided cell, single layer winding; secondary 1- $\frac{1}{2}$ turns of #14 solid copper single layer winding; air cores; coils wound on a solid form 3.4" long x 3/8" dia.; extended coil winding leads for terminals.	SW1 type 657	51A782
T ₄	Transformer, R-F: 27.8 to 47 megacycles; one primary and one secondary winding; primary 2 $\frac{1}{2}$ turns of #34SCE single layer winding; secondary 6 turns of #22 D cell, braided; air cores; coils wound on a bakelite tube 1-5/8" long x 3/8" I.D.; solder lug terminals.	SW1 type 652	51B791

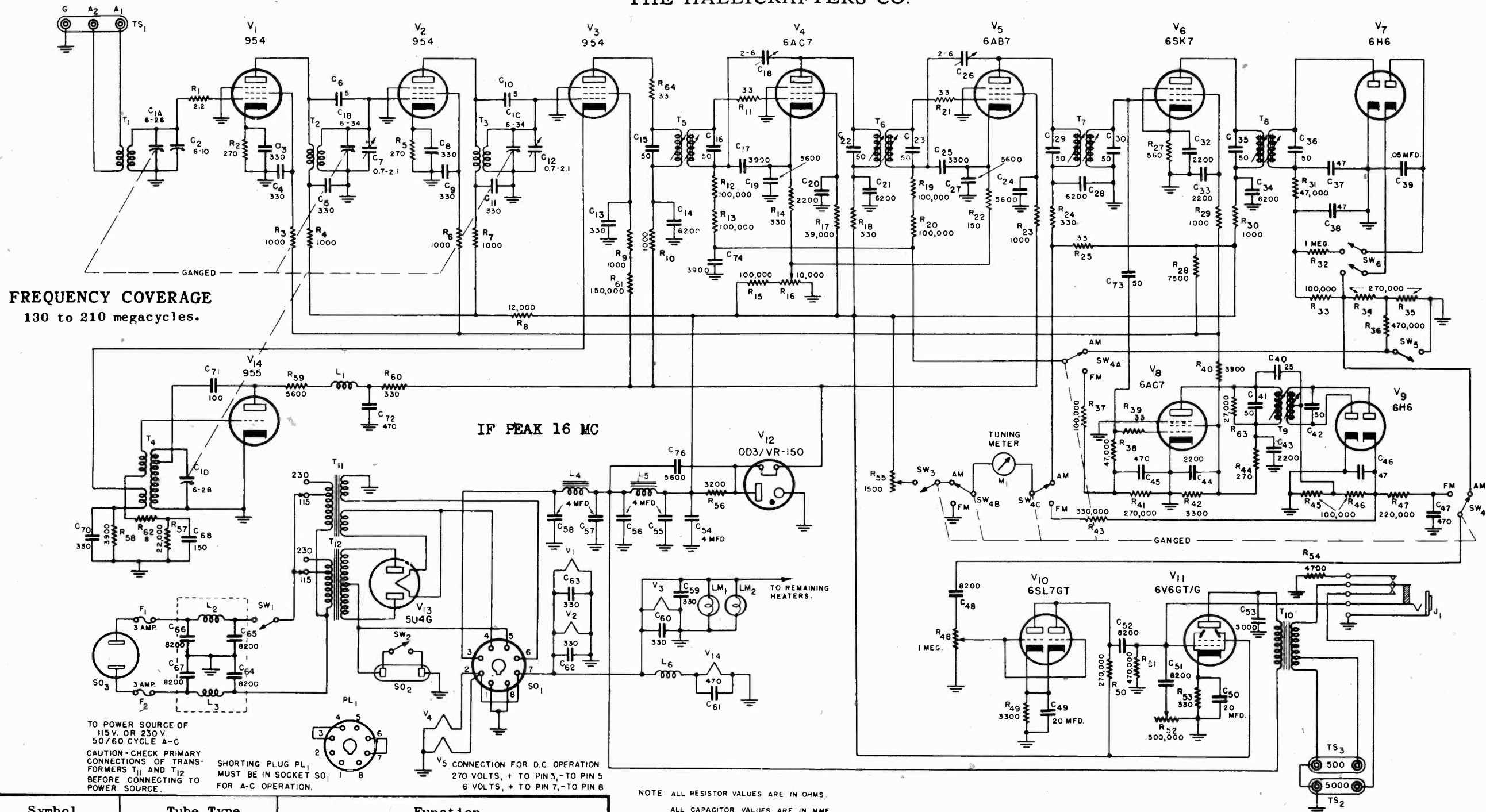
Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
T ₁	TERMINAL BOARDS Board, terminal; output; consists of vacuum impregnated natural linen bakelite mfg. board 3/2" long x 2" wide x 1/8" thick with 4 mtg. holes 0.143" dia. and having 2-7/8" x 1-3/8" mtg. centers, marked "HOM (HOM CENTER TAP - GND. and 500 OHM) 5000 OHM-GND", six brass knurled thumb screw binding posts provide electrical connection.	H Special	41X5506
T ₂	Board, terminal; antenna input; consists of natural paper bakelite mfg. board 4-5/16" long x 2-1/2" wide x 3/16" thick with 4 mtg. holes 0.143" dia. and having 3-13/16" x 2" mtg. centers; marked A, A ₂ , GND; 3 brass knurled thumb screw binding posts provide electrical connections.	H Special	41X5508

INDEX TO PARTS MANUFACTURERS

Symbol	Manufacturer	Symbol	Manufacturer
AP	American Phenolic Corp. Chicago, Illinois	IC	Industrial Condenser Chicago, Illinois
ASA	Any manufacturer meeting the applicable American Standards Association specifications.	IRC	International Resistance Co. Philadelphia, Pa.
B	Belden Mfg. Co. Chicago, Illinois	LF	Littelfuse, Inc. Chicago, Illinois
BC	Brenner Chemical Co. Chicago, Illinois	MW	McClincock Meter Co. Minneapolis, Minn.
CE	Coronet Electric Co. Chicago, Illinois	MM	Meissner Manufacturing Co. Mt. Carmel, Illinois
CH	Cutler-Hammer Milwaukee, Wis.	MT	The Muter Co. Chicago, Illinois
CRL	Centralab Milwaukee, Wis.	OM	Oak Manufacturing Co. Chicago, Illinois
CT	Chicago Telephone & Supply Co. Elkhart, Indiana	RC	Radio Condenser Corp. Chicago, Illinois
ER	Erie Resistor Erie, Pa.	RCA	RCA Manufacturing Co., Inc., Camden, N. J.
EW	Electronic Winding Corp. Chicago, Illinois	ST	Standard Transformer Corp. Chicago, Illinois
GE	General Electric Co. Schenectady, N. Y.	SWI	S. W. Inductor Co. Chicago, Illinois
H	The Hallcrafters Co. Chicago, Illinois	U	Utah Products Company Chicago, Illinois
HH	Hart & Hegeman Electric Co. Hartford, Conn.	EE	Underwood Electric Co. Chicago, Illinois

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
T ₁₂	Transformer, intermediate-frequency; 5.25 megacycles; one primary and three secondary windings; primary lug turns single layer winding on adjustable polytron core assembly; first secondary 1 1/2 turns winding on same form as primary; second secondary 200 turns single layer winding on adjustable polytron core assembly; third secondary 25 turns winding on same form as second secondary; fixed trimmer capacitors (C72) and (C73) complete the expansion; aluminum shield can 4" high x 1-7/8" long x 1-7/16" wide with 4 spade lugs centered one on each side of shield mounted 1/32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C142
T ₁₃	Transformer, intermediate-frequency; 5.25 megacycles; one primary and one secondary winding; primary 3 1/2 turns single layer winding on adjustable polytron core assembly; secondary 2 1/2 turns single layer winding on adjustable polytron core assembly; fixed trimmer capacitors (C74 and C75) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/16" wide with 4 spade lugs centered one on each side of shield mounted 1/32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C143
T ₁₄	Transformer, discriminator; 5.25 megacycles; one primary and one secondary winding; primary 33 turns single layer winding on adjustable polytron core assembly; secondary 35 turns center tapped single layer winding on polytron core assembly; fixed trimmer capacitors (C76 and C77) and a fixed coupling capacitor (C78) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/16" wide with 4 spade lugs centered one on each side of shield mounted 1/32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C144
T ₁₅	Transformer, A-F; one primary and 2 secondary windings; primary to match a 32,000-ohm push-pull load 9 35 ma. for each tube; first secondary to match a load of 600 ohms, center tapped; second secondary to match a load of 5000 ohms; iron core; case hermetically sealed; vacuum impregnated; coil and core assemblies bolted to brackets spot welded to case, solder lugs terminals marked 1 through 8 at base of transformer; 4 mtg. lugs at base with 3-1/16" x 1-1/16" mtg. centers; breakdown between windings and core 1000 k.v.s. volts.	ST Type 10A40	55C062
T ₁₆	Transformer, power; primary, 2 section winding connected in parallel for 115 V. A-C, and series connected for 250 V. A-C operation, 50/60 cycles, single phase; secondary center tapped to provide 270 V. D-C @ 150 milliamperes across 16 mfd. capacitor and a 2 henry 95 ohm choke with a 500 millifarad capacitor and a 2 henry 95 mfd. capacitor; third secondary 5 V. A-C @ 3 amperes; hermetically sealed case 4-15/16" long x 3-3/4" deep x 5-5/16" high spot welded at all joints; coil and core assemblies bolted to brackets spot welded to case; vacuum impregnated; mounted by 4 lugs at base with 3-5/8" x 2-3/8" mtg. centers; 4 terminals threaded M-32 NC-2 connected to primary as follows: 1 and 3 to one section of primary, 2 and 4 to other section of primary; 7 solder lug terminals connected as follows: 5 and 6 connect to secondary #2 (6.4 V. A-C), 7 and 8 connect to secondary #3 (5 V. A-C), 9 and 11 connect to secondary #1 (540 V. A-C), 10 is center tap for secondary #1 and ground for transformer case and core, iron core; breakdown voltages as follows between windings and core and case; primary - 1000 V. RMS, secondary #1-2500 V. RMS, secondary #2-1500 V. RMS, secondary #3-2500 V. RMS.	ST Type 10P51	52C004

THE HALLICRAFTERS CO.



Symbol	Tube Type	Function
V-1	954	1st r-f amplifier
V-2	954	2nd r-f amplifier
V-3	954	Mixer
V-4	6AC7	1st i-f amplifier
V-5	6AB7	2nd i-f amplifier
V-6	6SK7	3rd i-f amplifier
V-7	6H6	A-M detector and noise limiter
V-8	6AC7	F-M limiter
V-9	6H6	F-M discriminator
V-10	6SL7GT	Audio voltage amplifier
V-11	6V6GT/G	Audio power amplifier
V-12	OD3/VR-150	Voltage regulator
V-13	5U4G	Rectifier
V-14	955	High-frequency oscillator

A-C Operation	* D-C Operation
Line Voltage.....117 volts, 230 volts.	Filament voltage..... 6.3 volts.
Line Current.....1.0 amp, 0.5 amp.	Filament current..... 3.6 amps.
Power Consumption..110 watts.	"B" voltage..... 270 volts.
	"B" current..... 125 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 18-20 amperes.

1. GENERAL

Figure 4-1. shows, in very simple block form, the plan of the circuit of the Model S-37 receiver. Note that the circuit is that of the conventional superheterodyne receiver up to the second i-f amplifier stage. The output of the 2nd i-f amplifier is fed to two channels, namely, the F-M signal channel and the A-M signal channel. The F-M channel consists of the f-m limiter and discriminator and the A-M channel consists of an additional i-f amplifier stage and second detector stage. The demodulated signal from both channels then feeds the same audio amplifier being selected by the AM/FM switch.

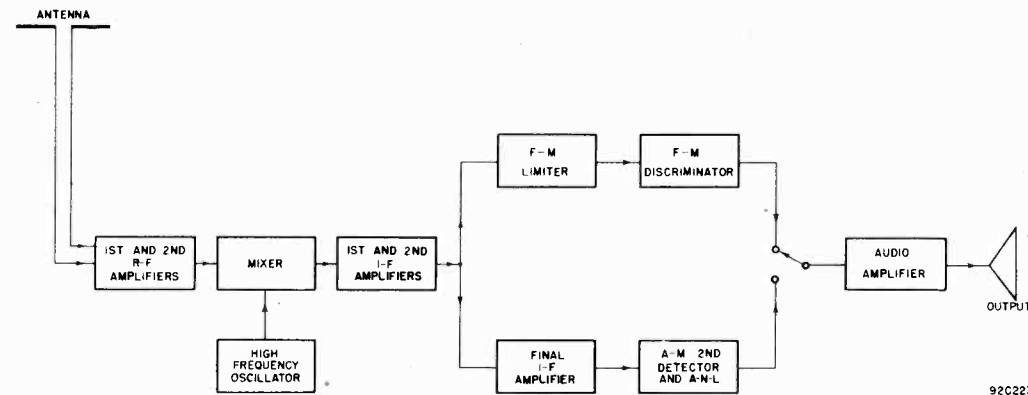


Fig. 4-1. Radio Receiver Model S-37, block diagram

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

a. R-F Amplifier. - The two r-f amplifier stages employ type 954 acorn pentode tubes in a conventional two stage amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-1 through terminals A₁ and A₂ of antenna terminal strip TS-1. The secondary is tuned by the ganged tuning capacitor section C-1A and trimmer C-2. Trimmer capacitor C-2 is controlled from the front panel by the control marked ANTENNA to provide accurate alignment of the r-f stage with varying antenna load impedances. R-F signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-2. Parasitic resistor R-1 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-2 by-passed by capacitor C-3, provides self-bias for the stage. Resistors R-3 and R-4 and capacitors C-4 and C-5 act as decoupling networks for the screen and plate circuit of tube V-1. The signal across the primary of transformer T-2 is coupled to the grid of tube V-2 inductively by transformer T-2 and capacitively by capacitor C-6. Capacitor C-6 provides a small amount of coupling to improve response at the high-frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The secondary of transformer T-2 is tuned by section C-1B of the ganged tuning capacitor and trimmer C-7. R-F signals applied to the grid of tube V-2 by the secondary winding of transformer T-2, appear at the primary of transformer T-3 in greater amplitude as a result of the amplifying action of tube V-2. Resistor R-5 by-passed by capacitor C-8 provides self-bias for the stage. Resistors R-6 and R-7 and capacitors C-9 and C-11 act as decoupling networks for the screen and plate circuit of tube V-2. The signal developed at the primary winding of transformer T-3 then feeds the mixer stage of the receiver.

b. Mixer. - The mixer stage employs a type 954 acorn pentode in a cathode coupled mixer circuit. The signal across the primary of transformer T-3 is coupled to the grid of tube V-3 inductively by transformer T-3 and capacitively by capacitor C-10. Capacitor C-10 provides a small amount of coupling to improve response at the high-frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The secondary of transformer T-3 is tuned by section T-10 of the ganged tuning capacitor and trimmer C-12. R-F signals selected by the parallel resonant circuit are applied to the grid of the mixer tube V-3. A signal from the local oscillator 16 megacycles lower in frequency than the receiver tuning frequency, is fed to the mixer tube through the cathode and provides the difference frequency of 16 mc. for the i-f stages.

c. Oscillator. - The oscillator circuit consists of a type 955 acorn triode in a tuned-plate untuned-grid type of oscillator circuit. The frequency of oscillation is determined by a resonant circuit which consists of the secondary of transformer T-4 and section C-1D of the main tuning gang connected in parallel. The r-f energy is

fed from the plate of tube V-14 to the tuned circuit by the d-c blocking capacitor C-71. The decoupling network in the plate circuit of the oscillator tube consists of R-59, L-1, C-72, and R-60. Resistor R-62 and R-57 by-passed by capacitor C-68 are connected in series with the feedback winding of transformer T-4 to provide equal oscillator voltage to the mixer stage over the entire tuning range. The mixer voltage is further compensated by the network R-58 and C-70, connected in series with the winding feeding the cathode of the mixer tube.

d. First and 2nd I-F Amplifier. - The 1st and 2nd i-f amplifier stages employ type 6AC7 and 6AB7 pentodes respectively. The i-f amplifier coupling transformers T-5, T-6 and T-7 for these two stages are tuned to 16 mc. by adjusting the powdered iron core slugs in both primary and secondary windings. Each stage is neutralized by capacitors C-18 for tube V-4 and C-26 for tube V-5, to provide stable amplification at this relatively high intermediate frequency. The gain of the 1st and 2nd i-f amplifier stages is varied by the R.F. GAIN control (R-16), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver instead of the usual practice of varying the gain of the r-f amplifier stages. This method of control permits the r-f amplifier stages to operate at maximum gain, thereby providing a high signal to noise ratio at all sensitivity settings. The a-v-c grid voltage is applied to this section of the receiver through the decoupling networks C-17, R-12, R-13, C-74, and R-19, R-20 and C-25. The a-v-c voltage is supplied by the 2nd detector during a-m reception and a small amount of voltage is also supplied, for a similar purpose, from the limiter tube (V-8) during f-m reception.

e. Final I-F Amplifier. - The last i-f amplifier, used for a-m reception, employs a type 6SK7 pentode connected in a conventional circuit. The stage is coupled by transformers T-7 and T-8 which are tuned by adjustable iron core slugs. Resistor R-27 by-passed by capacitor C-32 provides self-bias for the stage. The gain of this stage is not varied as was the case for the 1st and 2nd i-f amplifier stages. The amplified voltage developed across the secondary of transformer T-8 is then fed to the 2nd detector for demodulation of a-m signals.

f. A-M 2nd. Detector and A-N-L. - Both the second detector and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode section of tube V-7 serves as detector for amplitude modulated signals by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-31, and capacitors C-37 and C-38 connected in a pi-section. Automatic volume control voltage and audio frequency voltage is obtained from the load and voltage divider resistors R-33, R-34, R-35. Resistor R-36 serves as a-v-c decoupling. The remaining diode section of tube V-7 serves as automatic noise limiter as follows: Capacitor C-39 becomes charged by the rectified carrier voltage and the time constant of this capacitor and the filter network associated with it is such, that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-38 becomes more negative than the charge held by C-39, hence, current flows shorting the audio voltage to ground through capacitor C-39 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-39 acquires its normal charge again. By shorting the audio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectional noise pulses from reaching the audio amplifier stages.

g. F-M Limiter and Discriminator. - The frequency modulation detector consists of a limiter stage and a discriminator stage. The type 6AC7 limiter tube (V-8) is fed by the second i-f transformer secondary winding along with the third i-f amplifier tube V-6 for a-m reception. The limiter stage operates as a saturated amplifier in which the output remains constant over a large range of input voltage levels, thus eliminating variations in the amplitude of the carrier signal to be demodulated by the discriminator. When operating as an f-m receiver, automatic volume control action is obtained by applying a part of the voltage developed across resistor R-41 in the grid return of the limiter tube (V-8), to the control grids of the 1st and 2nd i-f amplifier tubes (V-4 and V-5) through section SW-4A of the F.M./A.M. switch. The constant level signal out of the limiter tube (V-8) is fed to the discriminator tube (V-9) through the discriminator transformer (T-14) and coupling capacitor C-40. The discriminator circuit, consisting of transformer T-9, tube V-9 and load resistors R-45 and R-46, converts the frequency variations of the f-m signal into amplitude variations or the audio signals. The de-emphasis network, consisting of resistor R-47 and capacitor C-47, attenuates the high frequency end of the audio range since these frequencies are emphasized at the f-m transmitter. From the de-emphasis network the audio signal is fed to the A.F. GAIN control (R-48) in the same way as the signal from the amplitude modulation detector tube (V-7).

h. Audio Amplifier. - The audio amplifier consists of a conventional high- μ triode class A voltage amplifier driving a single beam power amplifier also operating class A.

(1) **Voltage Amplifier.** - The voltage amplifier stage employs a type 6SL7GT twin-triode tube with its elements connected in parallel. Self bias voltage obtained from resistor R-49 by-passed by capacitor C-49 provides grid bias voltage for class A operation. The stage operates into its plate load resistor R-50 from which grid voltage for the beam power stage is obtained as well as audio voltage for headset operation. Capacitor C-52 isolates the d-c plate voltage from the headset and beam power amplifier grid.

(2) **Power Amplifier.** - The power amplifier employs a type 6V6GT/G beam-power amplifier in a resistance capacity coupled single ended class A amplifier circuit. Grid bias is obtained from cathode resistor R-53 which is by-passed by capacitor C-50. The output of tube V-11 is coupled to the speaker load by transformer T-10 which provides proper matching for 5000 and 500 ohm loads. When the headset is plugged into the circuit, resistor R-54 is automatically connected across the 5000 - ohm winding to maintain proper load impedance for the beam power stage. If a speaker is connected to the 5000 ohm outlet, it will be automatically disabled when the headset is plugged in. The frequency response of the power amplifier stage is controlled by variable resistor R-52 and capacitor C-51 connected in series from the grid of tube V-11 to ground. As the resistance of R-52 is lowered, the higher audio frequencies are attenuated producing a bass boost effect in the output.

i. **Tuning Meter.** - The tuning meter is switched between two circuits depending upon the type of reception:

(1) **A-M Reception.** - When metering reception of a-m signals the tuning meter measures the plate current of the 2nd i-f amplifier stage which varies as the strength of the signal carrier. Resistor R-55 sets the zero (no signal) position by adjusting the plate current of tube V-5. A carrier then drives the plate current of tube V-5 to a lower value depending upon the signal strength. The screen grid voltage of tube V-5 is regulated by the voltage regulator tube to provide accurate control over the plate current.

(2) **F-M Reception.** - When metering reception of f-m signals the tuning meter measures the unbalanced current in resistors R-45 and R-46 obtained when the receiver is tuned to one side of the f-m carrier. When the receiver is tuned to the exact center of the f-m carrier the meter rests at zero indicating that the currents in the discriminator load resistors are equal. Resistor R-43 functions to limit the maximum current in the meter circuit to a safe value.

j. **Power Supply.** - The receiver has provisions for operation from either an a-c or d-c source.

(1) **A-C Operation.** - The internal power supply provides for operation from 115 or 230-volt a-c mains. The a-c current is fed through a line filter which is a low pass pi-section network connected in each side of the line. The networks consist of inductances L-2 and L-3 and capacitors C-64, C-65, C-66 and C-67. The line filter attenuates all the objectionable noise components coming into the receiver circuit through the a-c power source. The filament and high voltage supply transformers are separate units, each provided with a tapped primary for 115- or 230-volts operation. The taps must be wired accordingly each time the line potential is changed. A type 5U4G (tube V-13) full-wave rectifier is employed in a conventional rectifier circuit. The high voltage from this rectifier is fed to the filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The SEND-REC. switch is connected in series with the center tap of the high voltage secondary of transformer T-12 and ground to break the high voltage circuit in order to disable the receiver and yet keep the tube heaters hot ready for instant use. The filter circuit consists of two low pass pi-section networks made up of inductances L-4 and L-5 and capacitors C-58, C-57, C-56, C-55 and C-54. In order to provide a constant plate voltage to the oscillator, mixer and screen of the second i-f stages a voltage regulator tube type 003/VR-150 is used. The voltage supplied to the screen of tube V-5 is regulated to provide accurate current control for the tuning meter connected in the plate circuit of this tube.

(2) **D-C Operation.** - External storage battery and "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is supplied to the input side of the filter section used for a-c operation there by insuring adequate filtering for vibrator type supplies when used.

ANTENNA Control. - This control is used to compensate for misalignment of the receiver's antenna stage due to antenna impedance variations. Once set for a given antenna, its setting will hold for a wide range of frequencies.

R. F. GAIN Control. - The radio frequency gain control regulates the sensitivity of the receiver. Turning the control to the right increases the sensitivity of the receiver. Ganged to this control is the "S" meter switch which connects the tuning meter into the circuit when the control is advanced all the way to the right during automatic volume control operation.

S-METER ADJ. - This adjustment sets the signal level meter to its zero signal level position when the receiver is set for A.M. (amplitude modulation) reception. The adjustment is made with a screw driver and once set, it is seldom necessary to make further adjustments.

POWER Switch. - The power switch connects the a-c power to the receiver when operating from a-c mains only. When operating the receiver from a battery supply this control function must be handled by a power switch in the battery supply circuit.

CAUTION - When operating the receiver from a d-c supply set the receiver's POWER switch at OFF and do not plug the a-c line cord into an a-c outlet.

"S" Meter or Tuning Meter. - The tuning meter serves two functions in the receiver depending on the type of reception as follows:

A.M. Reception. - When the receiver is adjusted to receive amplitude modulated signals, the tuning meter indicates the relative carrier strength of the received signal. To put the meter in operation, turn the R.F. GAIN control to the right until the switch connected to its shaft clicks, and set the A.V.C. switch at ON.

F.M. Reception. - When the receiver is adjusted to receive frequency modulated signals, the tuning meter is used to indicate resonance with the station carrier. As the receiver is tuned through the f-m carrier the meter pointer will first deflect to one side of zero, return to zero and deflect an equal distance on the opposite side of zero, and finally return to zero as the carrier is completely passed. The zero center position in the middle of the swing represents the current setting of the receiver tuning dial and indicates resonance with the station carrier.

OPERATION.

Listed below are the receiver controls and their settings for the two types of reception provided by this receiver, namely, amplitude modulation reception and frequency modulation reception.

A. A.M. (Amplitude Modulation) Reception. - To receive an amplitude modulated signal, set the panel controls as follows:

- POWER switch - Set at ON when operating receiver on alternating current. To turn off receiver set switch at off.
- CAUTION - Leave switch set at OFF when operating receiver from external batteries.
- SEND/REC. switch - Set at REC. (Set at SEND to disable receiver when desired.)
- A.V./F.M. switch - Set at A.M.

- A.V.C. switch - Set at ON.
- R.F. GAIN control - Turn to right until switch on control clicks.
- TUNING control - Set dial that is calibrated in megacycles to frequency of signal; adjust for maximum tuning meter reading.
- ANTENNA control - Adjust for maximum tuning meter reading.
- A.F. GAIN control - Adjust for desired signal level at headset or speaker.
- TONE control - Set to please the listener.
- A.N.L. switch - Normally set at OFF. Use only when background noise is excessive.

NOTE - The control settings listed above are those necessary for reception using automatic volume control and meter tuning. Should the operator wish to use manual control of the receiver's sensitivity set the A.V.C. switch at OFF and adjust the R.F. GAIN control for maximum required sensitivity. The tuning meter will not function when manual control of the receiver's sensitivity is employed.

F.M. (Frequency Modulation) Reception. - To receive a frequency modulated signal, set the panel controls as follows:

- POWER switch - Set at ON when operating receiver on alternating current. To turn off receiver set switch at OFF.
- CAUTION - Leave switch set at OFF when operating receiver from external batteries.
- SEND/REC. switch - Set at REC. (Set at SEND to disable receiver when desired.)
- A.M./F.M. switch - Set at F.M.
- A.V.C. switch - Set at OFF.
- R.F. GAIN control - Turn all the way to the right. (It is not necessary to actuate the switch.)
- TUNING control - Set dial that is calibrated in megacycles to frequency of signal; adjust for zero setting of tuning meter.
- ANTENNA control - Adjust for maximum signal level in headset or speaker if control is effective. (Adjustment is generally needed only on very weak signals.)
- A.F. GAIN control - Adjust for desired signal level at headset or speaker.
- TONE control - Set to please the listener.
- A.N.L. switch - Set at OFF. (not used)

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CAUTION - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high potential points on the VOLTAGE-RESISTANCE DIAGRAM before attempting to service circuits that are "hot". IT'S A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE

All components of the receiver should be given a thorough inspection at regular intervals. Keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean especially the tuning capacitor and associated gear drive. Dust should be blown out with dry air or brushed out carefully. Do not oil the gear teeth or the condenser wipers as noisy reception will result from intermittent electrical contact at these points. Noisy reception may also be caused by dirty condenser wipers, faulty gain controls, and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, AND FUSES

a. Replacing Tubes. - All tubes with the exception of the four acorn types are accessible at the top of the chassis through the hinged cover of the cabinet. The four acorn type tubes are made accessible by removing the top cover of the r-f section which is held down by thumb screws. The acorn tubes should be inserted with the short end of the body in the socket. Acorn tubes are more fragile than the rest and should be handled accordingly. If the grid and plate clips on the connections to these tubes become loose replace or bend to fit. **DO NOT ATTEMPT TO SOLDER DIRECTLY TO THE TUBE PIN** as the heat generated by the soldering iron will crack the glass envelope. When replacing tubes, check the tube type carefully and replace with the correct tube type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

b. Replacing Lamps. - The receiver employs two lamps with bayonet type sockets to illuminate the vernier dial and the tuning meter. The lamps illuminating the vernier dial scale and tuning meter are to be replaced by a 6/8-volt, 150 ma. (Brown bead) G.E. 47 or equivalent. The color code referred to, is the color of the glass bead above the glass stem inside the envelope of the lamp. The lamp illuminating the meter scale is removed by pulling the lamp socket from the rubber grommet in the meter case. When reinserting the lamp, do not push the socket assembly too far into the meter case as a hot spot of light will appear on the meter scale instead of even area of illumination.

c. Replacing Fuses. - Two fuses are used, one in each side of the a-c line. The fuse holders are located on the rear apron of the chassis and require a screw driver to remove the fuse. Replace burned out fuses with 3-ampere 250-volt, Little Fuse type 3AG or equivalent.

CAUTION - The fuses protect your equipment, don't take chances using fuses rated for a heavier current drain than 3 amperes.

3. PERIODIC ADJUSTMENTS

a. Tuning Meter Adjustment.

(1) The tuning meter zero setting control is located behind its front panel button type cover marked S-METER ADJ. Remove the button with a knife or screw driver blade.

(2) Disconnect the antenna and connect a jumper across terminals A₁, A₂, and GND.

(3) Set the front panel controls for amplitude modulation reception as follows:

(a) Set A.M./F.M. switch at A.M.

(b) Set A.V.C. switch at ON.

- (c) Turn R.F. GAIN control to right until the switch on the control clicks.
- (d) Set A.F. GAIN control for minimum gain. (All the way to the left).
- (e) Set A.N.L. switch at OFF.
- (f) Set SEND-REC. switch at REC.

(4) With a screw driver set the S-METER ADJ. control for the zero reading on the S-meter scale of the tuning meter.

(5) Remove the antenna terminal jumper and replace antenna leads and meter adjustment cover button, the adjustment is completed.

b. Receiver Alignment. - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f stages or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f stages. Alignment should not be attempted by inexperienced personnel as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400-cycle modulated signal at 16 mc. and 130 to 210 mc. range. Recommended generators are the Ferris Instrument Corp. Model 18D or 18FS and the Measurements Corp. Model 75.

(b) A 50-ohm non-inductive dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 5 watts of audio power for either 500 or 5000-ohm loads.

(2) I-F Amplifier Alignment.

(a) Disconnect the grid lead of the type 954 mixer tube (V-3) and connect the signal generator to the grid of the mixer tube, using a small clip or flexible piece of wire to make the connection. Connect the ground wire of the generator to the receiver chassis.

CAUTION - Do not attempt to solder to the tube terminal as the heat of the soldering iron is certain to crack the glass envelope.

(b) Connect the output meter across the speaker terminals. Set the range of the output meter for its highest range to prevent overloading the meter accidentally.

(c) Let the receiver warm up for approximately half an hour then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain permitted by local noise level. Work in a shielded room if possible.

A.M./F.M. switch at A.M.

A.V.C. switch at OFF.

A.N.L. switch at OFF.

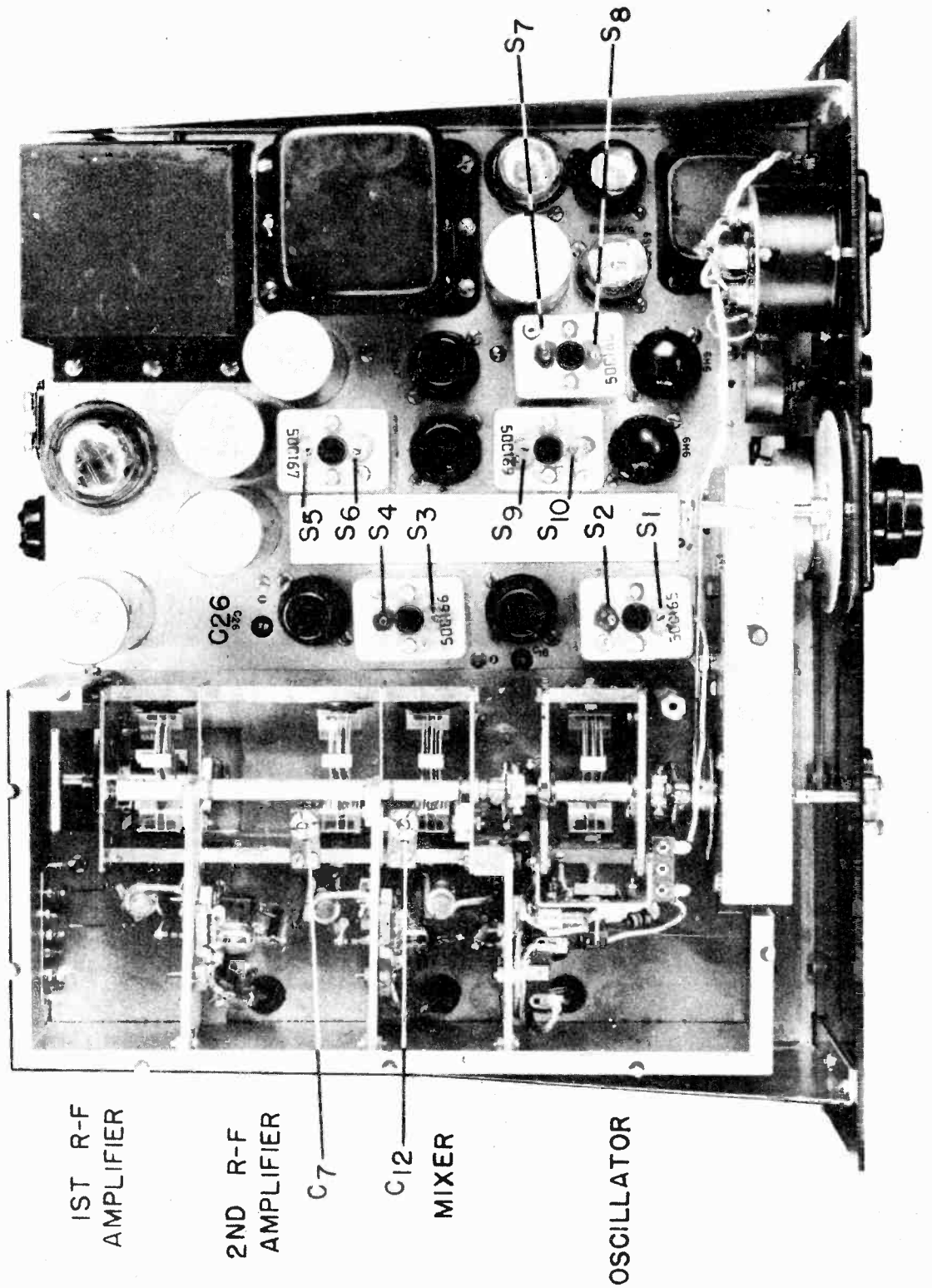
SEND/REC. switch at REC.

(d) Set the signal generator frequency at 16 megacycles and turn on the 400-cycle modulation.

(e) Adjust i-f transformers T-5, T-6, T-7, and T-8 for maximum response by tuning for maximum signal level at the output meter using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should run not more than 70 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to

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1ST R-F
AMPLIFIER

2ND R-F
AMPLIFIER

C7

C12

MIXER

OSCILLATOR

Figure 5-1. Radio Receiver Model S-37, top view showing alignment points.

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figure 5-1 for the location of i-f transformer adjustment screws S_1 through S_8 inclusive on i-f transformers T-5, T-6, T-7, and T-8.

(f) Disconnect the filament lead of the 1st i-f amplifier tube (V-4) at pin #2 of the d-c power input socket (S0-1) on the rear apron of the chassis. Refer to Fig. 7-7. Allow the filament of tube V-4 about one minute to cool off before proceeding.

(g) Increase the output of the signal generator until a readable signal level is indicated by the output meter and adjust neutralizing capacitor C-18 for minimum output. While adjusting capacitor C-18, adjust slug adjustment S_3 on transformer T-6 for maximum output to compensate for detuning caused by adjusting C-18. Repeat the procedure until satisfied that the best possible settings have been obtained.

(h) Reconnect the filament lead of tube V-4 and disconnect the filament lead of the 2nd i-f amplifier tube V-5 at the d-c power input socket. Allow a minute for the tube to cool as before.

(i) Adjust neutralizing capacitor C-26 and slug adjustment S_5 on transformer T-7 for their optimum settings as for the 1st i-f amplifier stage. Reconnect the filament lead again before proceeding.

(j) Detune transformers T-6 (Slugs S_3 and S_4) and T-8 (Slugs S_7 and S_8) until a fairly high signal generator output is required to produce a readable output meter reading. First adjust transformers T-5 and T-7 for maximum output, then adjust transformer T-8 and finally transformer T-6. Do not readjust transformers T-5 and T-7 when adjusting T-8 and T-6. Reduce the signal generator output as required while bringing these last two i-f transformers into alignment.

(3) Discriminator Transformer Alignment. -

(a) Set the A.M./F.M. switch at F.M.

(b) Leave the signal generator set at 16 mc. with 400 cycle modulation.

(c) Adjust the secondary slug (S_{10}) of the discriminator transformer (T_9) for zero signal level at the output meter. Note that this adjustment is critical, therefore turn the screw slowly.

(d) Detune the signal generator from the 16 mc i-f frequency until a readable indication is obtained at the output meter and adjust the primary slug (S_9) for maximum output meter reading.

(e) Balance up the discriminator stage as follows:

1. Detune the signal generator to either side of the 16 mc resonant point and note the maximum output meter readings obtained. If they are equal, the discriminator stage is functioning properly, if not, proceed with the balancing adjustment that follows.

2. To balance up an unbalanced condition, tune the signal generator to the resonant point of the weaker peak and tune the primary slug (S_9) until the output rises about one-half the difference of the unbalanced readings obtained in step 1. Recheck for balance and repeat the balancing procedure if necessary.

NOTE - If a balance cannot be obtained by adjusting the primary slug (S_9), the discriminator's secondary slug (S_{10}) has been misadjusted slightly and will require a very slight re-adjustment in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Note that the quality of the f-m signal will depend materially upon the degree of balance obtained, hence, a little care will be well repaid in performance.

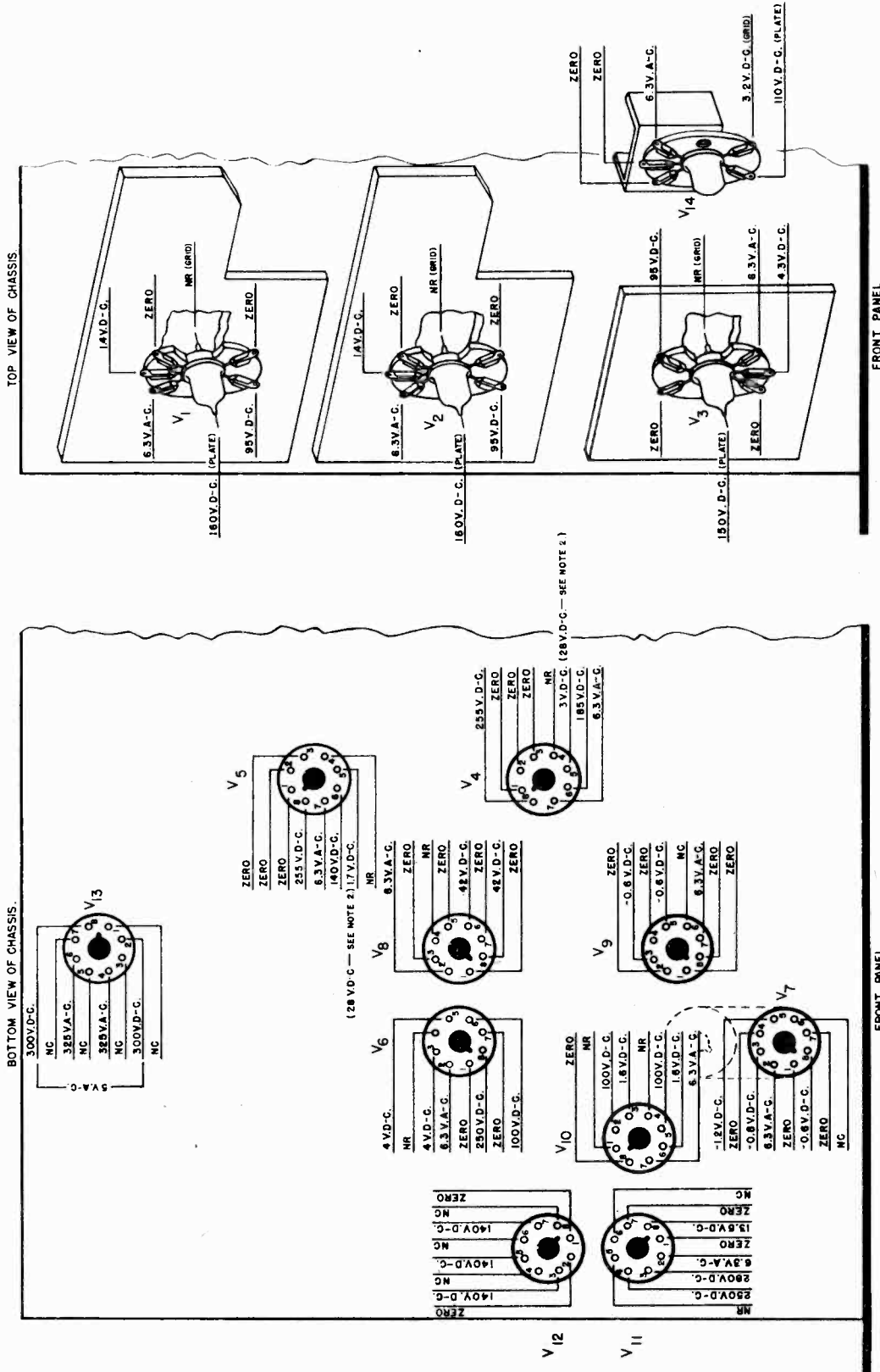
(f) Disconnect the signal generator and reconnect the grid lead to the mixer tube, the alignment of the i-f amplifier stages is completed.

(4) R-F Amplifier Alignment. -

(a) Connect the signal generator to the "A₁" antenna terminal through a 50-ohm resistor and connect the ground wire of the signal generator to terminal "A₂". Disconnect the jumper wire between "A₂" and "GND" as the generator should not be grounded to the receiver's chassis for the following adjustments.

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NOTE: 1. ALL READINGS ARE FOR 117 VOLT A-C LINE VOLTAGE.
 2. VOLTAGE READING WITH "R-F GAIN" AT MINIMUM GAIN POSITION.
 3. NC = NO CONNECTION.
 4. NR = NOT READABLE WITH A 20,000 OHM/VOLT METER.

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Figure 5-2. Radio Receiver Model S-37, voltage chart.

(b) Set the receiver controls as for i-f amplifier alignment. Refer to paragraph 3. b. (2) (c) this section.

(c) Set the signal generator at 210 mc. and turn on 400 cycle modulation.

Note - if your signal generator will not reach 210 mc. use the harmonic of the generator signal.

(d) Set the receiver's TUNING dial at 210 mc. and set the ANTENNA control for maximum output, then adjust capacitors C-7 and C-12 for maximum output while "rocking" the TUNING dial control back and forth across the generator signal. Use just enough signal generator output to provide a readable resonance point at the output meter.

NOTE - Should it be necessary to adjust the frequency of the oscillator to make the receiver's dial reading fall on 210 mc exactly, loosen and shift the heavy wire primary winding (oscillator transformer T-4 primary) nearest to the front panel and the heavy wire coupling loop on the opposite side of the heavy tubing secondary winding. Take care that the coupling between the primary winding and the secondary is not reduced below that necessary to maintain adequate feed back for the oscillator over the entire band. Having obtained proper adjustment recement the winding in place with Amphenol "912" or an equivalent low loss cement. After adjusting the oscillator frequency realign capacitors C-7 and C-12 as described above.

(e) Set the signal generator at 130 mc, tune in the signal on the receiver and check to see that the receiver's main tuning dial reads 130 mc. If not, the secondary (heavy tubular winding) inductance of transformers T-1, T-2, T-3, and T-4 must be adjusted by loosening the clamps and set screws which hold them in place and sliding the transformers back and forth. Tighten all set screws after adjustment.

NOTE - If it is necessary to adjust the inductance of the windings at 130 mc. the adjustments in paragraph (d) must be repeated at 210 mc to bring the high frequency end of the range into alignment again.

(f) Repeat steps (d) and (e) until the receiver alignment and calibration are satisfactory then make the following check to see that the oscillator frequency falls below the signal frequency as it should. For example: Set the receiver dial at 165 mc., turn up the signal generator output to about 5000 times normal, and set the signal generator frequency at twice the i-f frequency lower than 165 mc. or 133 mc. An image signal should be heard. If not, tune the signal generator to twice the i-f frequency higher than the signal frequency or 197 mc. and look for the image there. If the image shows up at the 197 mc. the receiver's oscillator is operating above the signal frequency and must be readjusted so that it falls below the signal frequency. Due to the construction of this receiver it is considered impossible to adjust the oscillator frequency so that it will fall above the signal frequency, however, it is always well to check for the image after making any extensive alignment adjustments.

(g) When completely aligned the overall receiver sensitivity will usually run between 10 to 15 microvolts for 500 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your alignment adjustments satisfactory.

4. LOCATING FAULTS WITH A VOLT-OHM METER

a. Voltage Chart. - Refer to Fig. 5-2. for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. To identify the tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt Ohmyst Junior analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A₁, A₂, and GND., disconnect the speaker and replace with a 5000-ohm 10-watt resistor across the 5000-ohm output terminals or a 500-ohm 10-watt resistor across the 500-ohm terminals, and set the controls as follows:

POWER, A.V.C. and A.N.L. switches at ON.

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

ANTENNA TUNING and TONE controls do not effect readings.

b. **Resistance Chart.** - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements. To identify tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt Ohmyst Junior analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

POWER, A.V.C. and A.N.L. switches at ON.

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

TONE control at maximum clock-wise position.

ANTENNA and TUNING controls do not effect readings.

CAUTION - The receiver's line cord, if operating from an a-c outlet, or the battery supply cord, if operating from a d-c supply, must be disconnected before making resistance measurements.

c. **Checking Transformer and Inductor Windings With an Ohm-meter.** -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistances instead of winding resistance alone as indicated in the chart.

Circuit symbol	Name of part	Winding	Winding terminals	D-C resistance (ohms)
T-10	TRANSFORMER, audio.	Primary.	1 to 2	300
		5000-ohm secondary.	3 to 6	250
		500-ohm secondary.	3 to 5	22
T-11	TRANSFORMER, filament power.	115-volt primary.	\pm to 115 V.	12
		230-volt primary.	\pm to 230 V.	40
		6.3-volt secondary.	-	Less than one ohm.
		5.0-volt secondary.	-	Less than one ohm.
T-12	TRANSFORMER, plate power	115-volt primary.	\pm to 115 V.	7
		230-volt primary.	\pm to 230 V.	20
		$\frac{1}{2}$ secondary.	CT to 288 V.	75
		Secondary	288 V. to 288 V.	150
L-4	REACTOR, filter.	-	1 to 2	85
L-5	REACTOR, filter.	-	-	300

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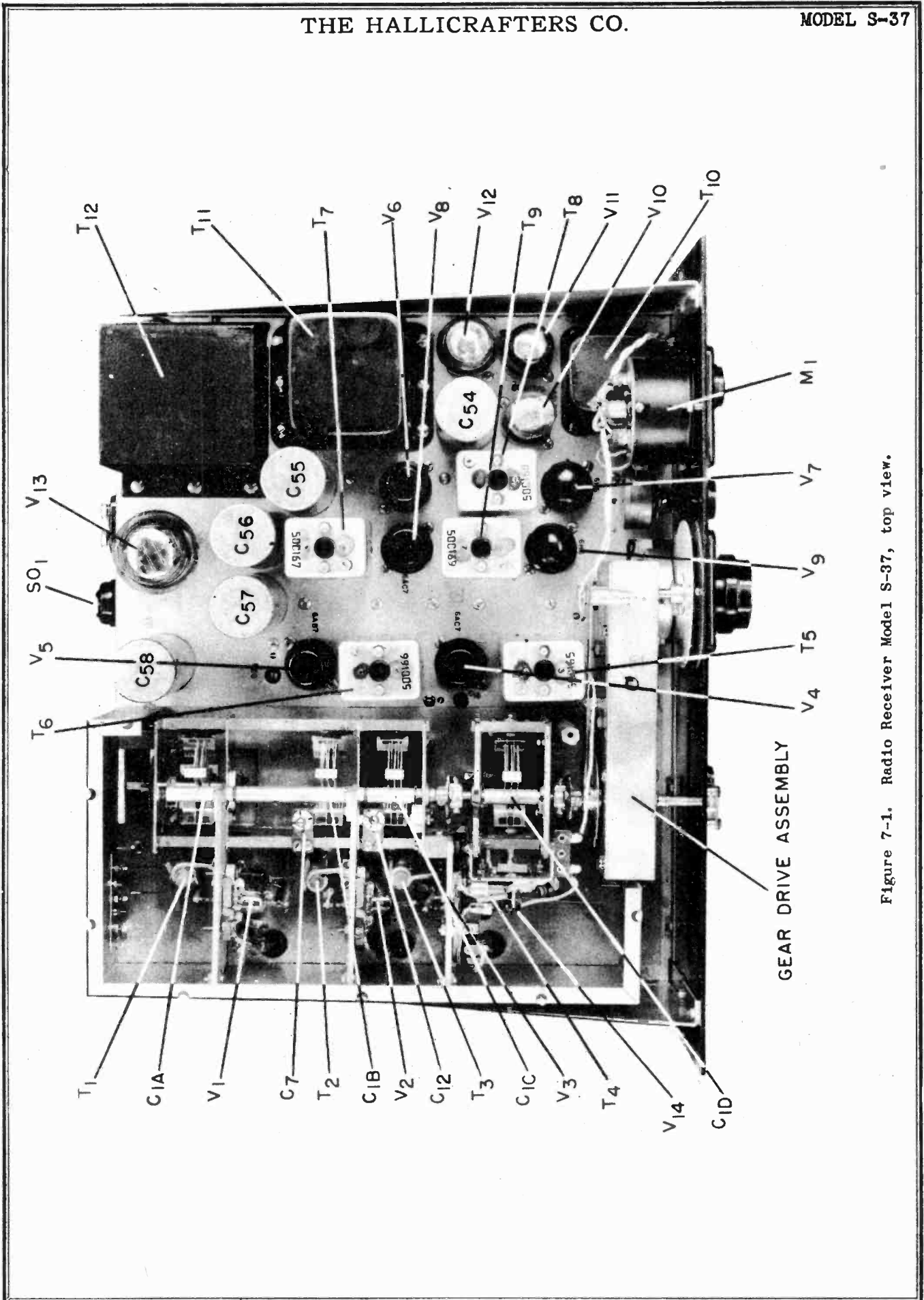


Figure 7-1. Radio Receiver Model S-37, top view.

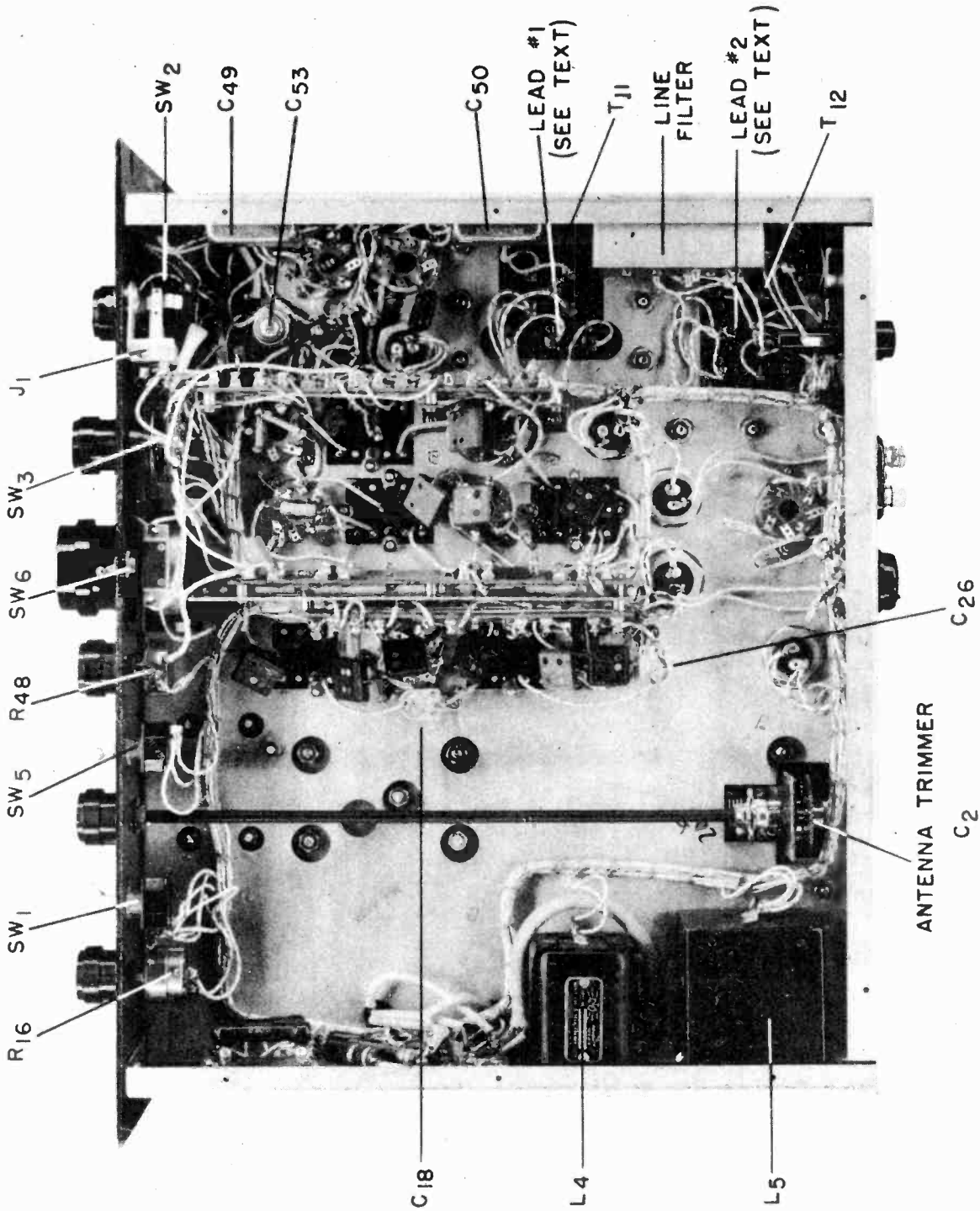


Figure 7-2. Radio Receiver Model S-37, bottom view.

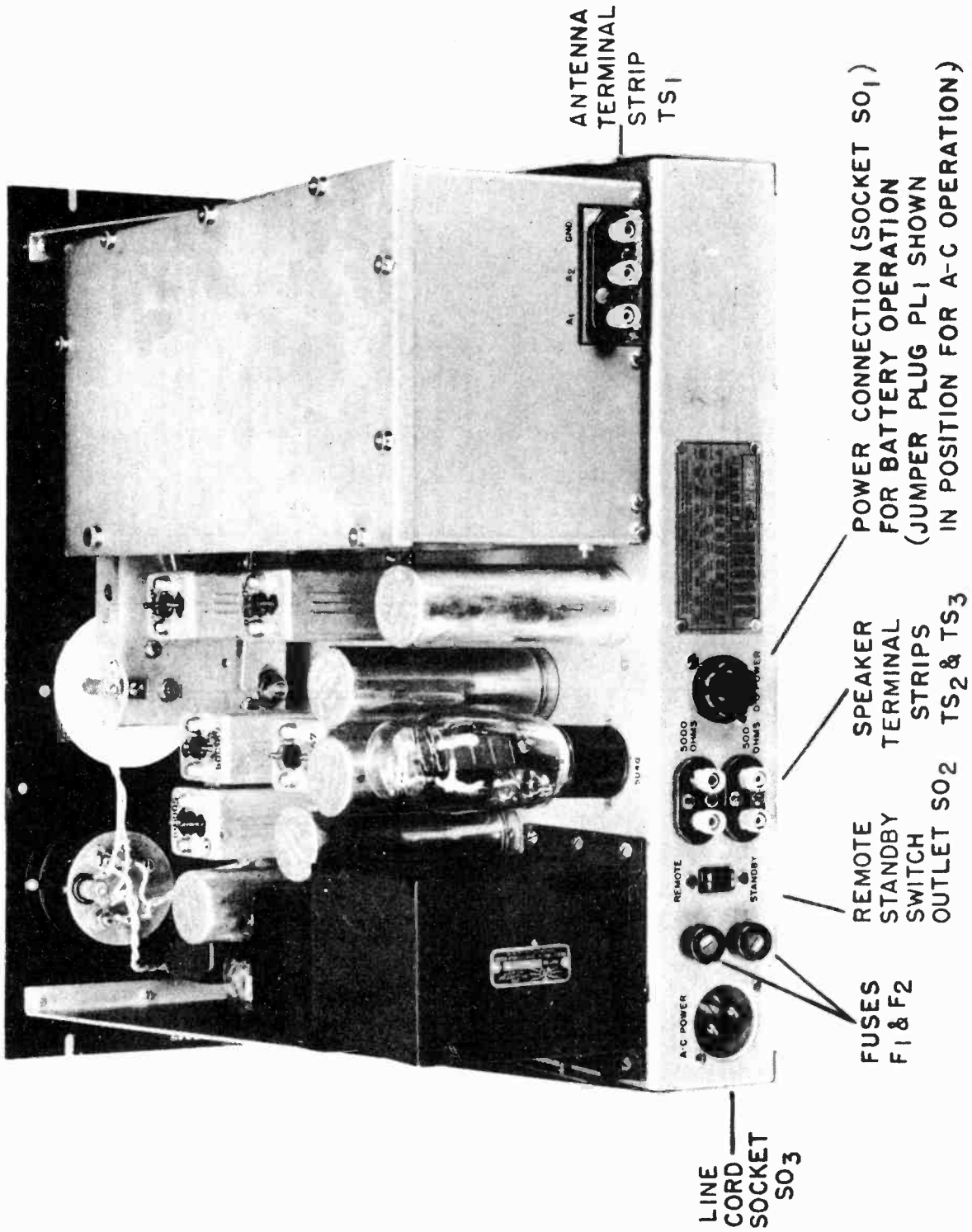


Figure 7-3. Radio Receiver Model S-37, rear view.

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
C ₁₇	Capacitor, fixed; mica dielectric; 3900 muf ± 10%; 500 vdc; case 53/64" x 53/64" x 11/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₇₄ .	ASA	CND5A182K
C ₁₈	Capacitor, variable; ceramic dielectric; 2-6 muf.; slider lug terminals; same as C ₂₆ .	GRD type R50-A	44-1079
C ₁₉	Capacitor, fixed; mica dielectric; 5600 muf. ± 10%; 500 vdc; case body 53/64" x 53/64" x 11/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₂₄ , C ₂₇ , C ₇₆ .	ASA	CND5A182K
C ₂₀	Capacitor, fixed; mica dielectric; 2200 muf ± 20%; 500 vdc; case 53/64" x 53/64" x 9/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg.	ASA	C510A222J
C ₂₁	Same as C ₁₄ .	-	-
C ₂₂	Same as C ₁₆ ; part of transformer T ₆ .	-	-
C ₂₃	Same as C ₁₅ ; part of transformer T ₆ .	-	-
C ₂₄	Same as C ₁₉ .	-	-
C ₂₅	Capacitor, fixed; mica dielectric; 3000 muf ± 10%; 500 vdc; case 53/64" x 53/64" x 9/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg.	ASA	CND5A182K
C ₂₆	Same as C ₁₈ .	-	-
C ₂₇	Same as C ₁₈ .	-	-
C ₂₈	Same as C ₁₄ .	-	-
C ₂₉	Same as C ₁₅ ; part of transformer T ₂ .	-	-
C ₃₀	Same as C ₁₅ ; part of transformer T ₂ .	-	-
C ₃₁	Not used.	-	-
C ₃₂	Capacitor, fixed; mica dielectric; 2200 muf ± 10%; 500 vdc; case 53/64" x 53/64" x 9/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₃₃ , C ₄₃ , C ₄₄ .	ASA	CND5A222K
C ₃₃	Same as C ₃₂ .	-	-
C ₃₄	Capacitor, fixed; mica dielectric; 6200 muf ± 5%; 500 vdc; case body 53/64" square x 11/32" thick; humidity resistant; two #18 AWG wire leads 1-1/8" lg.	ASA	CND5A822J
C ₃₅	Same as C ₁₆ ; part of transformer T ₆ .	-	-
C ₃₆	Same as C ₁₆ ; part of transformer T ₆ .	-	-
C ₃₇	Capacitor, fixed; mica dielectric; 47 muf ± 10%; 500 vdc; case 51/64" x 51/64" x 9/32"; humidity resistant; two #20 AWG wire leads 1-1/8" lg; same as C ₃₈ , C ₄₆ .	ASA	CND5A170E
C ₃₈	Same as C ₃₇ .	-	-
C ₃₉	Capacitor, fixed; paper dielectric; 0.05 mfd ± 20%; 400 vdc; molded bakelite case 1-7/16" lg x 3/4" wd x 3/8" thk; two #20 AWG wire leads 1-3/4" lg.	MIC type 345	46A100R
C ₄₀	Capacitor, fixed; ceramic dielectric; 25 muf ± 10%; 500 vdc; T.C. negative 0.00075 muf/mf/degree C; body 0.025" lg x 0.225" diam; two #22 AWG wire leads 1-3/4" lg; part of discriminator transformer T ₆ .	ER type K	47A100

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
C _{1A}	Capacitor, variable; air dielectric; 4 sections, section 1 (C _{1A}), approx. 6 muf min to 26 muf max. sections 2 & 3 (C _{1B} and C _{1C}) capacity approx. 6 muf min to 34 muf max. section 4 (C _{1D}) capacity approx. 6 muf min. to 10.5 muf max. 6-1/2" lg including shaft, shaft 1/2" lg x 0.378/0.373" diam. for sections 1, 2 and 3, shaft for section 4 is 21/32" lg x 1/2" diam; section 1 has 4 plates, sections 2 & 3 have 5 plates each, section 4 has 6 plates, common stator plates for sections 1 and 4; X2B bakelite insulation; spade lug mtg bolts not supplied with unit; each section has rotor shaft insulated from other sections; section 4 is separate rotor assembly bolted to main unit so that the plates mesh with section 1 stator plates and has its own drive shaft; assembly consisting of a 1 to 1 ratio brass and fibre gear drive assembly.	OM Special	48C007
C _{1D}	Capacitor, variable, single section, effective capacity 28 muf., air dielectric, unit is ganged to C ₁ .	H Special	489006
C ₂	Section 4 of Hallcrafters variable capacitor assembly 48C007; refer to description of C _{1A} , C _{1B} , C _{1C} for details.	-	-
C ₃	Capacitor, fixed; mica dielectric; 330 muf. ± 20%; 500 vdc; case 51/64" lg x 15/32" wd x 7/32" thk; two #20 AWG wire leads 1-1/8" lg; humidity resistant; same as C ₄ , C ₅ , C ₆ , C ₉ , C ₁₁ , C ₁₃ , C ₅₉ , C ₆₁ , C ₆₂ , C ₆₃ , C ₇₀ , C ₇₂ .	ASA	CND5A331M
C ₄	Same as C ₃ .	-	-
C ₅	Same as C ₃ .	-	-
C ₆	Capacitor, fixed; ceramic dielectric; 5-64 muf; 500 vdc; TC-0.00075 muf/mf/°C; case 0.625" lg x 0.225" dia; two #22 AWG tinned copper or brass wire leads 1-3/4" lg; same as C ₁₀ .	GRD type 30700A RTU	47A005
C ₇	Capacitor, variable; polystyrene dielectric; 2 muf; same as C ₁₂ .	H Special	44A081
C ₈	Same as C ₃ .	-	-
C ₉	Same as C ₃ .	-	-
C ₁₀	Same as C ₆ .	-	-
C ₁₁	Same as C ₃ .	-	-
C ₁₂	Same as C ₇ .	-	-
C ₁₃	Same as C ₃ .	-	-
C ₁₄	Capacitor, fixed; mica dielectric; 6200 muf. ± 10%; 500 vdc; case body 53/64" square x 11/32" thk; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₂₁ , C ₂₈ .	ASA	CND5A822J
C ₁₅	Capacitor, fixed; ceramic dielectric; 50 muf. ± 10%; 500 vdc; T.C. 0.00075 muf/mf/degree C; body 7/16" lg x 7/32" diam; two #22 AWG wire leads 1-3/4" lg; part of transformer T ₆ .	ER type K	47A081
C ₁₆	Same as C ₁₆ ; part of transformer T ₆ .	-	-

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
C66 C67 C68	Same as C48. Capacitor, fixed: silver mica dielectric; 100 mfd ± 20%; 500 vdc; butt-on type; 13/32" x 29/64" diam; 2 solder lug terminals; mtg hole tapped #3-48 x 11/64" d.	ER type 370-A	47A135
C69 C70 C71	Not used. Same as C3. Capacitor, fixed: ceramic dielectric; 100 mfd ± 5 mfd; 500 vdc; T.C. positive 0.0007 mmf/degree C; body 11/16" lg x 7/32" diam; vacuum wax impregnated; two #20 AWG wire leads 1-3/8" lg part of oscillator transformer T4.	ER type N-700L	47A108
C72	Same as C45.	-	-
C73 C74	Same as C15; part of transformer T2.	-	-
C75 C76	Not used. Same as C19.	-	-
F1	Fuse, cartridge: 3 amp 250-volt; 3 AG; glass enclosed; ferrule caps; same as F2.	IF type 1043	39A301
F2	Same as F1.	U	36B011
J1	Jack, telephone; headphones; short; takes standard tip and sleeve; mounts by bushing 3/8"-29x3/8"; furnished with one brass hex nut and one brass nut pl 5/8" OD washer; solder lug terminals.	U type ST-327	-
L1	Coil, r-f: 16.5 uh ± 10%; distributed capacity 1 mfd ± 20%; d-c resistance 4.10 ohms ± 3%; "q" with 100 mfd capacity 65 ± 15%; 75 turns #38 SCC wire on molded natural bakelite rod 16/16" lg x 5/32" diam; two wire leads 1-3/8" lg; Ohmasee red lacquer coating.	SFI Special	93A006
L2	Coil, filter: liner; 48 uh; 57 turns #22 SGE wire, universal winding; wound on glazed ceramic form 1" lg x 1/2" diam, tapped #6-32 x 7/16 d; winding is 1" lg x 1-1/16" diam; two extended leads with spaghetti covering; tape over spaghetti and leads to prevent leads breaking; same as L3.	SFI Special	93A006
L3 L4	Same as L2. Coil, filter: input; 2 henries ± 15%; rated d-c current 150 ma; d-c resistance 85 ohms ± 10%; iron core; 1860 turns of #31 enameled copper wire; metal case 2-5/8" h x 2-3/16" wd x 2-11/16" lg; mtg flange has six mtg holes 3 on each side, of 3/16" diam, spaced 3/4" apart, on 2-3/8" mtg centers; two lug terminals on top of case, each terminal 3/16" diam, spaced 5/8" apart; coil is vacuum wax impregnated; voltage breakdown 2400 volts A.M.S. between coil and core or coil and case.	CTC type 7486	58B011
L5	Coil, filter: output; 12 henries; rated d-c current 90 ma; d-c resistance 296 ohms at 75°C; test voltage 2400 volt r.m.s. between coil and core or coil and case; hermetically sealed in metal case 3-1/16" h x 2-3/8" wd x 2-3/8" lg; four #8-32 NC thread mtg studs on 1-3/8" x 1-5/8" mtg centers; hardware included; two lug terminals on top spaced 23-32" apart.	CTC type 7845	58B012

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
C41	Same as C15; part of discriminator transformer T8.	-	-
C42	Same as C15; part of discriminator transformer T8.	-	-
C43	Same as C32.	-	-
C44	Same as C32.	-	-
C45	Capacitor, fixed: mica dielectric; 470 mfd ± 10%; 500 vdc; case 51/64" x 15/32" wd x 7/32" thk; humidity resistant; two #20 AWG wire leads 1-1/8" lg; same as C47.	ASA	CM20M471K
C46	Same as C37.	-	-
C47	Same as C45.	-	-
C48	Capacitor, fixed: mica dielectric; 8200 mfd ± 10%; 500 vdc; case 53/64" x 33/64" x 11/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C51, C52, C64, C65, C66, C67.	ASA	CM20M822X
C49	Capacitor, fixed: electrolytic; 20 mfd -20 + 50%; 100 vdc; bakelite metal case 1-3/4" lg x 1" wd x 13/16" h, excluding lugs; two mtg lugs with 2-1/8" mtg/c; two solder lug terminals; same as C50.	IC type 100B250	45B033
C50	Same as C49.	-	-
C51	Same as C48.	-	-
C52	Same as C48.	-	-
C53	Capacitor, fixed: paper dielectric; 0.005 mfd ± 20%; 1000 vdc; round metal case 2-3/4" h x 11/16" diam; oil filled; one mtg hole 9/16" from center of unit on mtg base; mtg hole .178/189" diam.; base is one terminal, solder lug on top is other terminal.	IC	46A007
C54	Capacitor, fixed: paper dielectric; 4 mfd ± 10%; 500 vdc; tubular metal case 4-1/2" lg x 1-1/2" diam. over-all; mtg by bushing having 3/4"-18 NF-2 thd, nut and lock washer included; solder lug is one terminal, can is other terminal; same as C55, C56, C57, C58.	CD type TL20040	40A018
C55	Same as C54.	-	-
C56	Same as C54.	-	-
C57	Same as C54.	-	-
C58	Same as C54.	-	-
C59	Same as C54.	-	-
C60	Capacitor, fixed: mica dielectric; 330 mfd ± 10%; 500 vdc; case 51/64" lg x 15/32" wd x 7/32" thk; humidity resistant; two #20 AWG wire leads 1-1/8" lg.	ASA	CM20M331K
C61	Same as C45.	-	-
C62	Same as C3.	-	-
C63	Same as C3.	-	-
C64	Same as C48.	-	-
C65	Same as C48.	-	-

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
R ₁₃	Resistor, fixed: 100,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R ₁₅ , R ₃₃ .	ASA	RC21AE101K
R ₁₄	Resistor, fixed: 330 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R ₂₄ , R ₃₃ , R ₅₀ .	ASA	RC21AE331K
R ₁₅	Same as R ₁₃ .	-	-
R ₁₆	Resistor, variable: 10,000 ohm ± 20%; carbon; #8 reversed taper; shaft 1½ long x ½" diam; 3 solder lug terminals; center lug is variable contact; includes switch SW ₂ .	CT type 130	26C088
R ₁₇	Resistor, fixed: 39,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE391K
R ₁₈	Resistor, variable: 300 ohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE311M
R ₁₉	Same as R ₁₂ ; part of transformer T ₆ .	-	-
R ₂₀	Resistor, fixed: 100,000 ohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R ₁₇ , R ₄₅ , R ₄₆ .	ASA	RC21AE101M
R ₂₁	Same as R ₁₁ .	-	-
R ₂₂	Resistor, fixed: 150 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE151K
R ₂₃	Same as R ₁₃ .	-	-
R ₂₄	Same as R ₁₄ .	-	-
R ₂₅	Same as R ₁₁ .	-	-
R ₂₆	Not used.	-	-
R ₂₇	Resistor, fixed: 560 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE561K
R ₂₈	Resistor, fixed: 75,000 ohm ± 10%; 10 watt; wire wound; vitreous binder enameled coated; 1-3 4" lg x 3 8" max diam; two #18 AWG wire leads 1-3 10" lg.	U type CC	34BC752E
R ₂₉	Same as R ₁₃ .	-	-
R ₃₀	Resistor, fixed: 1000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE102K
R ₃₁	Resistor, fixed: 47,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R ₁₃ .	ASA	RC21AE473K
R ₃₂	Resistor, fixed: 1 megohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.055" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE105M
R ₃₃	Same as R ₁₃ .	-	-

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
L ₆	Coil, T-F: 4-2 ohm ± 10%; distributed capacity 1 wef ± 20%; d-c resistance 0.25 ohms ± 10%; "q" with 100 mwf capacitor 100 ± 20%; 42 turns #8 ESCC copper wire on enameled natural bakelite form 7/8" lg x 9/32" diam; Chinese blue lacquer coated; two copper wire leads 1-½" lg.	SWI Special	52A009
LM ₁	Lamp, incandescent: pilot; 6-H volt, 0.15 amp; bayonet type base.	GE type 47	33A004
LM ₂	Same as LM ₁ .	-	-
PL ₁	Connector, male contact: metal; molded bakelite body, 1" lg x 1-½" diam overall; prongs are numbered from 1 to 8 on both sides; includes insulated jumper between 3 and 4 and one between 6 and 7.	AP type CP-8	35A003
M ₁	Meter, micro ammeter: range 100-0-10 microamperes; accuracy ± 20% of full scale length 1-65" covered in 90° of pointer swing; approx resistance 1250 ohms d-c; damping factor 8 (full scale length); metal case 1-3/16 d x 2-½" diam; wtd by metal flange 3-½" diam having 3 #46 holes 1.4" diam spaced 120° apart on 1-3/16" radius; two stud terminals at rear ½" long x #10-32 thread; flange is part of case.	B Special	62A026
R ₁	Resistor, fixed: 2.2 ohm ± 10%; ½ watt; composition; insulated; 7/16" lg x 0.215" diam; two #18 AWG leads 1-½" lg; part of transformer T ₁ .	PR type 514	23A016
R ₂	Resistor, fixed: 270 ohm ± 10%; ½ watt; composition; hum-didly resistant; insulated; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R ₁₇ , R ₁₄ .	ASA	RC21AE271K
R ₃	Resistor, fixed: 1000 ohm ± 20%; ½ watt; composition; hum-didly resistant; insulated; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R ₄ , R ₆ , R ₇ , R ₁₀ , R ₂₃ , R ₂₉ .	ASA	RC21AE105M
R ₄	Same as R ₃ .	-	-
R ₅	Same as R ₂ .	-	-
R ₆	Same as R ₃ .	-	-
R ₇	Same as R ₃ .	-	-
R ₈	Resistor, fixed: 12,000 ohms ± 10%; 2 watt; composition; insulated; humidity resistant; 1.78" lg x 0.342" diam; two #19 AWG wire leads 1-1 1/2" lg.	ASA	RC21AE120K
R ₉	Same as R ₃ .	-	-
R ₁₀	Same as R ₃ .	-	-
R ₁₁	Resistor, fixed: 33 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R ₂₁ , R ₂₅ , R ₂₉ , R ₃₄ .	ASA	RC21AE330K
R ₁₂	Resistor, fixed: 100,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.408" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; part of transformer T ₅ . Same as R ₁₉ , R ₄₅ , R ₄₆ .	ASA	RC21AE104K

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
R ₅₅	Resistor, variable; 1500 ohm ± 20%; wire wound, at line taper; shaft 3/8" long x 3/8" diam, slotted 1/16" x 1/16"; 3 solder lug terminals with variable contact located in the center and fixed contacts 1-7/16" apart; no taps.	CT type 125	25C060
R ₅₆	Resistor, fixed; 3,200 ohm ± 10%; 10 watt; wire wound; vitreous enamel coated; 1-3/4" lg x 3/8" max diam; two #18 AWG wire leads 1-3/8" long.	U type CC	24BC322E
R ₅₇	Resistor, fixed; 22,000 ohm ± 20%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" lg.	ASA	RC21AE233M
R ₅₈	Resistor, fixed; 3800 ohm ± 10%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" lg.	ASA	RC21AE392K
R ₅₉	Resistor, fixed; 5,600 ohm ± 10%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" lg.	ASA	RC21AE362K
R ₆₀	Same as R ₅₄ .	-	-
R ₆₁	Resistor, fixed; 100,000 ohm ± 20%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" lg.	ASA	RC21AE154M
R ₆₂	Resistor, fixed; 8 ohm ± 10%; 1/2 watt; composition; insulated; humidity resistant; 7/16" lg x 0.218" diam; two #21 AWG wire leads.	ER type B04	25A019
R ₆₃	Resistor, fixed; 27,000 ohm ± 10%; 1/2 watt; composition; insulated; humidity resistant; 0.408" lg x 0.249" diam; two #21 AWG leads 1-3/8" lg. Part of transformer T ₉ .	ASA	RC20AE273K
R ₆₄	Same as R ₁₁ .	-	-
S ₀₁	Connector, female contact; octal; high dielectric mica filled bakelite body, 1-7/64" diam x 31/64" thick; silver plated phosphor bronze solder lugs; molded on steel mg plate 1-9/32" wd x 0.031" thk having 2 mtg holes of 5/32" diam x 1-3/8" mtg centers; pins are numbered on back of socket clockwise from locating pin.	AP type M1PT4	6A200
S ₀₂	Connector, female contact; two terminals; bakelite body, 11/16" wd x 3/8" h x 23/32" d + thickness of mtg plates; mounted by cad plated steel plate having 2 mtg holes with 1-1/8" mtg centers; 2 solder lug terminals 5/16" lg x 3/8" wd, rated 10 amp at 250 volts, 15 amp at 125 volts.	AL type 4002-T	10A010
S ₀₃	Connector, male contact; recessed; two brass prongs; screw type terminals; 1-3/4" x 1-5/8" x 1-3/8" overall; molded bakelite body recessed in metal cup 1-3/8" diam with flange type mtg having 1-3/4" mtg centers, mtg holes 0.144" diam.	AP type 60M-10	10M07
S ₀₄	Switch, toggle; SPST; power; rated 3 amp at 250-volt; black enamel steel case 15/16" h x 15/32" d x 3/8" wd; 2 solder lug terminals; mounts by brass bushing 15/32" - 32 to fit a 3/8" hole; mechanism is brass; lugs separated by fibre piece; same as SW ₆ , SW ₅ .	BE type 20604	60A110
S ₀₅	Same as SW ₁ .	-	-

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
R ₃₄	Resistor, fixed; 270,000 ohm ± 10%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" lg; same as R ₃₅ , R ₄₁ , R ₅₀ .	ASA	RC21AE274E
R ₃₅	Same as R ₃₄ .	-	-
R ₃₆	Resistor, fixed; 470,000 ohm ± 20%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" lg.	ASA	RC21AE474M
R ₃₇	Same as R ₃₀ .	-	-
R ₃₈	Same as R ₁₁ .	-	-
R ₃₉	Same as R ₁₁ .	-	-
R ₄₀	Resistor, fixed; 3,900 ohm ± 10%; 2 watt; composition; insulated; humidity resistant; 1.78" lg x 0.249" diam; two #19 AWG wire leads 1-3/8" lg.	ASA	RC41AE392K
R ₄₁	Same as R ₃₄ .	-	-
R ₄₂	Resistor, fixed; 3200 ohm ± 10%; 1 watt; composition; insulated; humidity resistant; 1.28" lg x 0.310" diam; two #20 AWG wire leads 1-3/8" lg.	ASA	RC31AE322K
R ₄₃	Resistor, fixed; 330,000 ohm ± 10%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads.	ASA	RC21AE334K
R ₄₄	Same as R ₃₂ .	-	-
R ₄₅	Same as R ₁₂ ; part of transformer T ₉ .	-	-
R ₄₆	Same as R ₁₂ ; part of transformer T ₉ .	-	-
R ₄₇	Resistor, fixed; 220,000 ohm ± 20%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" lg.	ASA	RC21AE224V
R ₄₈	Resistor, variable; 1 megohm ± 20%; carbon; #6 taper; shaft 1" long x 3/8" diam; 3 solder lug terminals with variable contact located in the center and fixed contacts 1-7/16" apart; no taps.	CEL type 1-010	25C059
R ₄₉	Resistor, fixed; 3300 ohm ± 10%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" long.	ASA	RC21AE332K
R ₅₀	Same as R ₃₄ .	-	-
R ₅₁	Resistor, fixed; 470,000 ohm ± 10%; 1/2 watt; composition; insulated; humidity resistant; 0.050" lg x 0.249" diam; two #21 AWG wire leads 1-3/8" lg.	ASA	RC21AE474E
R ₅₂	Resistor, variable; 500,000 ohm ± 20%; carbon; #6 taper; shaft 1" lg x 3/8" diam; 3 solder lug terminals with variable contact between the outer lug terminals; terminals 1-7/16" apart; no taps.	CT type 31	25C065
R ₅₃	Same as R ₃₄ .	-	-
R ₅₄	Resistor, fixed; 4700 ohm ± 20%; 1 watt; composition; insulated; humidity resistant; 1.28" lg x 0.310" diam; two #20 AWG wire leads 1-3/8" lg.	ASA	RC31AE472M

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
T ₄	wd x 3/4" h x 5/32" thick mounted on coil form by a 1/2" nichel plated brass screw; grid lead is insulated by 3 amphenol #912 beads #73-1. Transformer, r-f: pri, 1-1/2 turns of #10 tinned copper wire; sec, 1-1/2 turns of silver plated copper tubing 1/8" O.D. x 1/16" I.D.; sec winding spaced 1/32"; sec leads are 1-1/2" and 1-3/32" lg respectively; pri leads are 1-3/4" wd 1-1/2" lg respectively and extending from the coil at a 90 degree angle; capacitor C ₇₁ is soldered 1 turn from longest lead of sec; coils are wound on polystyrene from 1-1/2" lg x 3/8" diam; pri is slightly sealed to coil form for shipping, seal may easily be broken for adjustment.	EW Special	01A355
T ₆	Transformer, IF: 10 megacycles; input stage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₁₅ and C ₁₆ and resistor R ₁₃ .	EW Special	00C106
T ₆	Transformer, IF: 10 megacycles; interstage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₂₂ and C ₂₃ , and resistor R ₁₆ .	EW Special	00C106
T ₇	Transformer, IF: 10 megacycles; interstage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₂₉ , C ₃₀ , and C ₇₃ .	EW Special	00C107
T ₈	Transformer, IF: 10 megacycles; diode; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₃₅ and C ₃₆ .	EW Special	00C108
T ₉	Transformer, IF: 10 megacycles; discriminator; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₄₀ , C ₄₁ and C ₄₂ , and resistors R ₄₅ , R ₄₆ and R ₅₀ .	EW Special	00C109
T ₁₀	Transformer, AF: audio output; two windings; primary to match output of tube V ₁₁ (6Y6GT), secondary to match 5000 ohm load; tapped to match 5000 ohm load; enclosed in metal case.	EW Special	00B012
T ₁₁	Transformer, power; filament; primary for 300 volts, 80 cycles with tap for 150-volts; #1 secondary 3 amp 5 volts; #2 secondary 4 amp 6.3 volts; coil and core potted and sealed in metal case 3-15/16" x 3-1/4" x 4" overall, 2 mtg flanges each having 3 mtg holes 7/32" diam spaced 1-1/8" apart, 2 sets of mtg holes have 3-1/2" x 2-1/2" mtg centers.	EW Special	02A044

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
SW ₃	Switch, toggle; SPST; mounts on back of R.F. GAIN control and closes when the R.F. GAIN control is turned all the way to the right (clockwise); part of R.F. GAIN control.		
SW _{4A} SW _{4B} SW _{4C} SW _{4D}	Switch, rotary; single section; 2 position; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum wax impregnated phenolic wafers; non shorting teeth of contacts 5 and 9; frame 5/16" lg; wts by 3/8-32 bushing 1/2" lg, shaft 1/4" lg x 1/4" diam.	OM 1-7PM OR	00A177
SW ₅ SW ₆	Same as SW ₁ . Switch, toggle; DPST; rated 1 amp at 250-volts, 3 amp at 120-volts; metal case, 1-9/16" x 19/32" overall diam; includes fibre separators in assembly; 4 brass lug terminals; wts by brass bushing 15/32-32 x 13/32".	EE	00A117
T ₁	Transformer, r-f; sec, 2 turns of 1/8" O.D. x 1/16" I.D. copper tubing, silver plated; pri, 1-1/2 turns of #28 tinned & single braided celanese size strung thru hole; spacing between sec turns not less than 1/32"; coil wound on polystyrene from 1-13/16" lg x 3/8" diam; includes resistor R ₁ , mounted thru center of form 1/2" top end; one lead of resistor soldered to sec about 1-3/4" turns from winding start; the other lead is cut short and the grid lead with acorn tube clip is attached; the start end of the sec extends 27/32" from the center of the coil form and is flattened 3/16" from the finish end of the secondary; extends 15/16" from the center of the coil form; the primary terminal are two solder lug terminals which are mounted on a ceramic terminal 5/16" lg x 3/4" h x 5/32" thick which is mid near the bottom of the coil form by a 1/2" nichel plated brass screw; start and finish leads of sec extend from coil at a 90 degree angle.	EW Special	01A360
T ₂	Transformer, r-f; pri, 2-1/2 turns of #32 enameled single silk covered wire; spaced one wire diam; sec, 2 turns of silver plated copper tubing 1/8" O.D. x 1/16" I.D.; grid lead is voice coil wire 1-1/2" lg with acorn tube clip and soldered on sec 2 turns from winding start; spacing between sec turns not less than 1/32"; the start end of the sec extends 3/4" from center of coil form and is flattened 3/16" from the finish end; the finish end extends 15/16" from center of coil form; coils are wound on polystyrene from 1-7/16" lg x 3/8" diam at one end and 5/16" diam at other end; secondary leads terminate as two solder lug terminals which are mid on a ceramic terminal 5/8" wd x 3/4" h x 5/32" thick which mounts to coil form by a 1/2" nichel plated brass screw; grid lead insulated by 2 amphenol #912 beads #73-1; start and finish leads of sec extend from coil at a 90 degree angle.	EW Special	01A361
T ₃	Transformer, r-f; pri, 3-3/4" turns of #32 enameled single silk covered wire spaced not less than 1/32" between turns; sec, 1-1/2 turns of silver plated copper tubing, 1/8" O.D. x 1/16" I.D.; grid lead is voice coil wire 1-3/4" lg with acorn tube clip at one end, other end soldered to sec 1 turn from start end; start end of sec extends 1-1/2" from center of coil and is flattened 3/16" from end; finish end of sec extends 15/16" from center of coil; start and finish end of coil extend at a 90 degree angle; pri leads terminate at two solder lug terminals which are mounted on a ceramic terminal 5/8"	EW Special	01A362

THE HALLICRAFTERS CO.

MODEL S-37

SUPPLEMENTARY DATA

AUDIO POWER OUTPUT.

Speaker operation - 2 watts with less than 5% distortion
Headset operation - High impedance.

SENSITIVITY.

At 130 mc. - 15 microvolts. (For 500 milliwatt audio output.)
At 200 mc. - 7 microvolts, (For 500 milliwatt audio output.)

SIGNAL TO NOISE RATIO.

Not less than 5 to 1 when measured with a 3.5 microvolt, 400-cycle 30% modulated signal.

AUDIO FIDELITY.

Audio response is flat within 1 db. from 100 to 10,000 cycles per second.

IMAGE RATIO.

Not less than 60 db. between 130 mc. and 210 mc.

SELECTIVITY.

I-F selectivity measured at the grid of the mixer tube is not less than 140 kc. or more than 180 kc. at 6 db down from resonance. The receiver will be more selective when measured from the antenna terminals.

INDEX TO PARTS MANUFACTURERS

Symbol	Manufacturer	Symbol	Manufacturer
AL	Alden Manufacturing Co. Brookton, Mass.	IC	Industrial Condenser Corp. Chicago, Illinois
AP	American Phenolic Corp. Chicago, Illinois	IRC	International Resistance Co. Philadelphia, Pennsylvania
CD	Cornell-Dubilier Corp. South Plainfield, N.J.	IF	Littlefuse Inc. Chicago, Illinois
CRL	Centralab Milwaukee, Wis.	O	Omite Manufacturing Co. Chicago, Illinois
CT	Chicago Telephone Supply Elkhart, Indiana	OM	Oak Manufacturing Co. Chicago, Illinois
ER	Erie Resistor Co. Erie, Pennsylvania	RCA	RCA Mfg. Co. Chicago, Illinois
GE	General Electric Co. Schenectady, N.Y.	SI	F. W. Sicles Co. Springfield, Mass.
H	The Hallcrafters Co. Chicago, Illinois	U	Utah Products Co. Chicago, Illinois
HM	Hart & Hegeman Hartford, Conn.		

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
T12	Transformer, power: plate; primary 230 volts, 50 cycles with tap for 115 volts; secondary 280 volts each side of center tap, 150 ma using 504G full wave rectifier and 10 mfd filter capacity; coil and core potted and sealed in metal case, 4-3/8" h x 3-21/32" wd x 3-21/32" d; 2 mtg flanges each having 3 mtg holes 7/32" diam spaced 1-3/8" apart, mtg centers 3-7/8" x 2-3/4".	H Special	52A043
TS1	Board, terminal: mounts three brass, cadmium plated binding posts and nuts, and has two brass cadmium plated mtg inserts; base 2-3/8" lg x 7/8" wd x 3/16" thk; mtg inserts centered on 3/4" x 1/2" mtg centers, have 0.144" clearance ID.	H Special	11B163
TS2	Board, terminal: mounts two brass, cadmium plated binding posts and nuts, and has two brass cadmium plated mtg inserts; base of black BM120 or 262 High Impact bakelite; base 1-5/8" lg x 7/8" wd x 3/16" thk; mtg inserts centered on 3/8" mtg centers have 0.144" clearance ID, same as TS3.	H Special	11B162
TS3	Same as TS2.		
V1	Tube, detector amplifier pentode (acorn type); same as V2, V3.	RCA type 684	90X864
V2	Same as V1.		
V3	Same as V1.		
V4	Tube, television amplifier pentode, same as V8.	RCA type 6AC7	90X8AC7
V5	Tube, television amplifier pentode.	RCA type 6AB7	90X8AB7
V6	Tube, triple-grid super-control amplifier.	RCA type 6SK7	90X8SK7
V7	Tube, twin diode; same as V8.	RCA type 6H6	90X8H6
V8	Same as V4.		
V9	Same as V7.		
V10	Tube, twin-triode amplifier.	RCA type 6SL7GT	90X8SL7GT
V11	Tube, beam power amplifier.	RCA type 6V8 GT/G	90X8V8GT/G
V12	Tube, voltage regulator (Glow discharge type).	RCA type 6XV150	90X8V150
V13	Tube, full-wave high-vacuum rectifier.	RCA type 504G	90X8U4G
V14	Tube, detector, amplifier, oscillator (acorn type).	RCA type 965	90X865

MODEL Skyrider 5-10

THE HALLICRAFTERS CO.

S-21

NO.	CAPACITY	TYPE	VOLTAGE	PARTS NO.
C8	.002 mfd.	mica		40-013
9	.05 "		200	41-004
10	.05 "		400	41-005
11	Tuning Condenser in I.F. Transformer			
12	"	"		
13	.01 mfd.		400	41-001
14	.01 "		200	41-000
15	.05 "		400	41-005
16	.01 "		400	41-001
17	Tuning Condenser in I.F. Transformer			
18	"	"		
19	.01 mfd.		400	41-001
20	.25 "		400	
21	.01 "		200	41-000
22	.01 "		400	41-001
23	.00025 "	mica		40-024
24	Pad			
25	.00025 "	air		48-021
26	.01 "		400	41-001
27	Tuning Condenser in I.F. Transformer			
28	"	"		
29	.02 mfd.		400	41-002
30	.0001 "	mica		40-003
31	.02 "		400	41-002
32	.0001 "	mica		40-003
33	.05 "		200	41-004
34	.1 "		200	41-006
35	.0001 "	mica		40-003
36	.01 "		400	41-001
37	.01 "		600	45-002
38	.01 "		600	45-002
39	20. "		25	42-025
40	.05 "		400	41-005
41	.002 "	mica		40-013
42	.0001 "	"		40-003
43	.400 mmfd.	Pad		44-037
44	10. mfd.		450	42-024
45	10. "		450	
46	10. "		450	
47	.01 "		600	45-002
S1	A.V.C. - B.F.O. On-Off Switch			
S2	Automatic Noise Limiter and I.F. Expander Switch			
S3	A.C. On-Off Switch on Tone Control			
S4	Stand By SPST			
S5	Meter Switch on R.F. Gain Control			

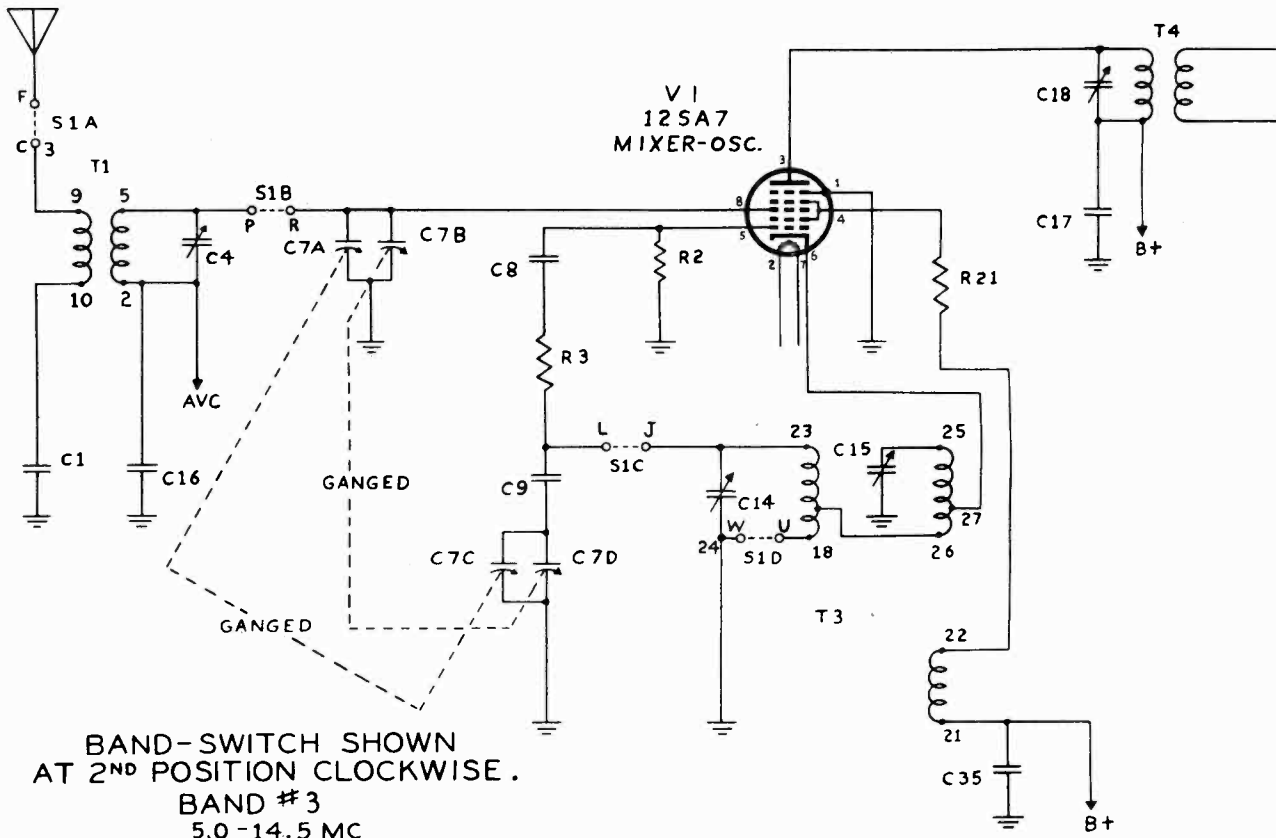
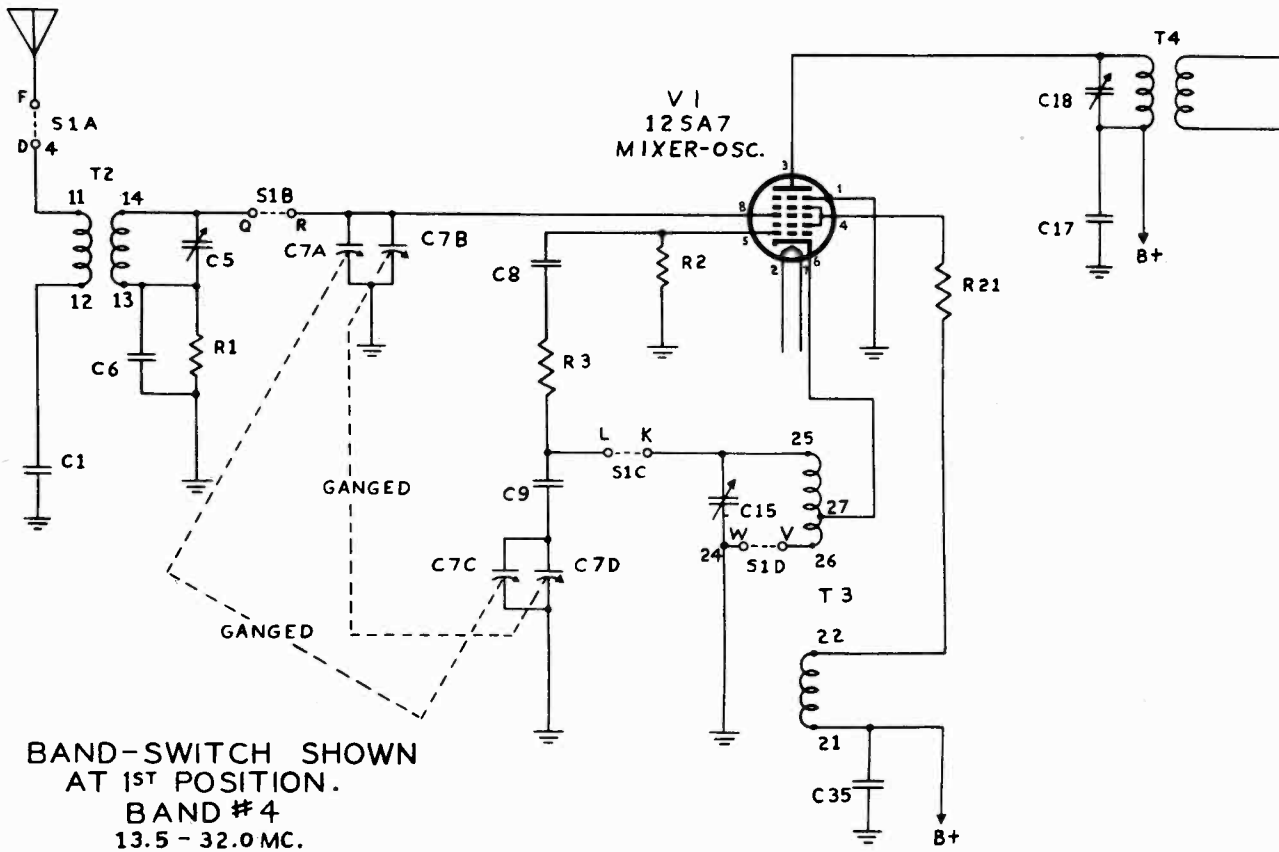
NO.	OHMS	WATTAGE	PARTS NO.
R1	160	1/3	22-011
2	100,000	1/3	20-093
3	1,000	1/3	20-033
4	600	1/3	22-125
5	30,000	1	22-075
6	2,500	1/3	22-044
7	100,000	1/3	20-093
8	500	1/3	22-026
9	10,000	R.F. Gain Control	
10	2,500	1/3	25-029
11	100,000	1/3	22-044
12	500	1/3	20-093
13	50,000	1/3	24-040
14	50,000	1/3	20-084
15	1,000	1/2	22-082
16	20,000	1/3	20-033
17	1,000,000	1/3	22-071
18	500,000	1/3	20-018
19	100,000	Tone Control	
20	100,000	1/3	25-018
21	250,000	1/3	20-093
22	300	1/3	20-099
23	500,000	1/3	20-021
24	25,000	1	25-031
25	20,000	1	20-073
26	150	1/3	20-070
27	100,000	1/3	22-011
28	500	1/3	20-093
29	500,000	1/3	24-040
30	10,000	1	22-101
31	50,000	1	20-061
32	5,000	1/3	20-084
		2	

CONDENSER PARTS LIST - SKYRIDER 5-10 Model S21

NO.	CAPACITY	TYPE	VOLTAGE	PARTS NO.
C1	80 mmfd per section	main tuning gang		48-033
2				
3	.005 mfd.	mica		40-013
4	.002 "	"		41-001
5	.01 "	"	400	
6	.01 "	"	600	
7	.01 "	"		45-002

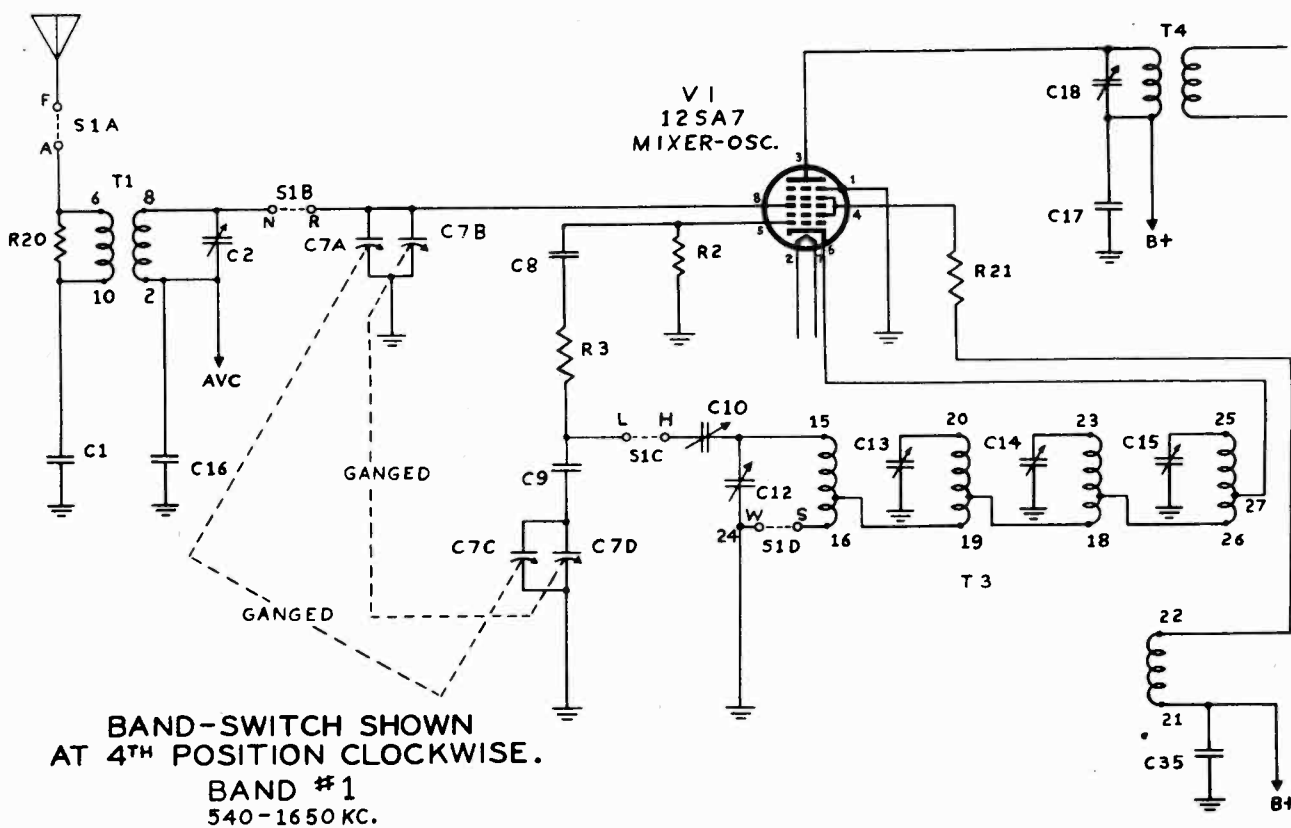
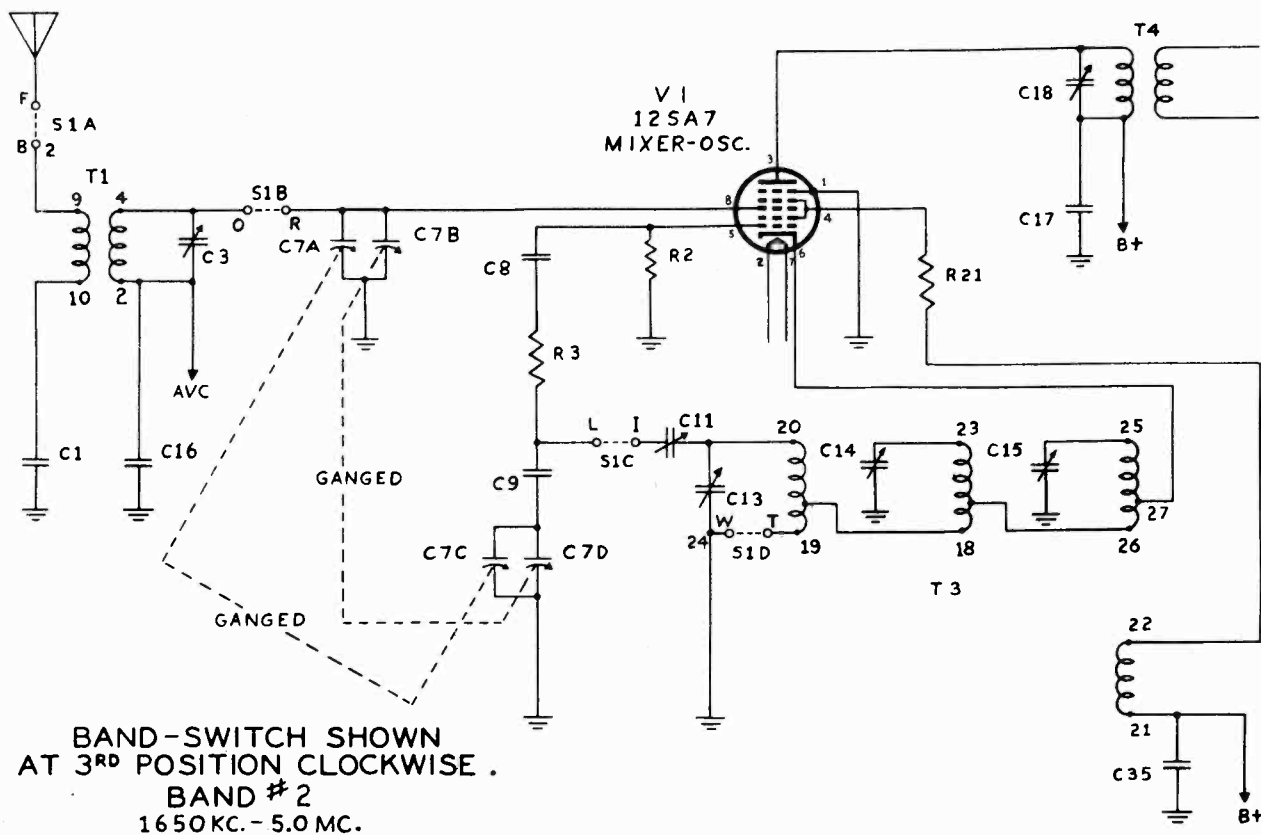
MODEL S-38, Early
and Revised

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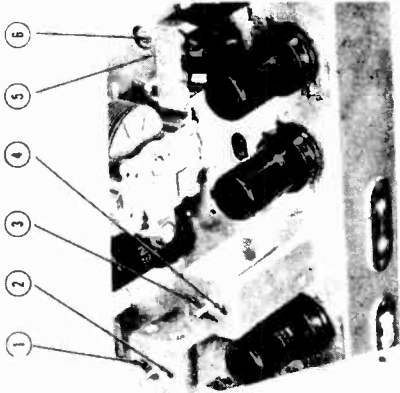
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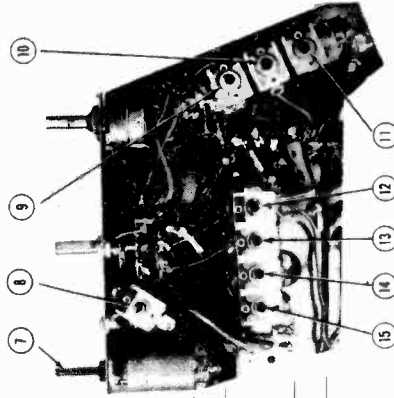


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TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS

Fig. 5. Top and bottom views of the receiver locating slugs, padders and trimmers for alignment purposes.

AUDIO OUTPUT

675 milliwatt with less than 10% distortion at 400 cycles

SENSITIVITY

12 microvolt at 600 kc
12 microvolt at 5 mc
11 microvolt at 14 mc
23 microvolt at 30 mc
(for 50 milliwatt output)

IMAGE RATIO

2.7:1 at 30 mc
6:1 at 14 mc
10:1 at 5 mc
35:1 at 1500 kc

IF SELECTIVITY

7 kc wide at 6 db down
65 kc wide at 60 db down
(for 50 milliwatt output)

Connect the output meter across the terminals of socket SO-1 and remove the speaker plug from the socket and adjust the meter for 3 ohms impedance. Caution: Set the meter at a sufficiently high range to prevent possible damage from overload.

CONTROL SETTINGS: After allowing about a ten minute warm up period, set the receiver's control as follows:

SPEAKER/PHONES switch at "SPEAKER."
VOLUME control at full clockwise (maximum).
CW/AM switch at "AM" (except for BFO adjustment).
NOISE LIMITER switch at "OFF."
BANDSPREAD TUNING control at "0," (min. cap.).
STANDBY/RECEIVE switch at "RECEIVE."

- EQUIPMENT:**
- Signal Generator capable of the ranges indicated in the Alignment Chart, including a 400 cycle audio modulator.
 - Output meter capable of handling 1 watt of audio power.
 - Standard RMA dummy consisting of a 200 mmf condenser in series with a 20uh r-f choke which is shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.
 - Non-metallic screw driver.
- CONNECTIONS:** Connect the Sig. Gen. "cold" lead to "G" on the antenna strip; the "hot" lead is connected as indicated in the Chart.

DUMMY ANT. IN SERIES WITH SIG. GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIG. GEN. FREQUENCY SETTING	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST. SLUG, PADDER, OR TRIMMER NO.	DESCRIPTION	TYPE OF ADJUSTMENT — MAKE ADJUSTMENT FOR:
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None	Stator plates of rear sect. of tuning gang	455 kc	"1"	1000 kc	3 and 4 1 and 2	2nd IF 1st IF	Maximum output Maximum output Repeat steps 1 and 2
None	Stator plates of rear sect. of tuning gang	455 kc	"1"	1000 kc	7	BFO slug	Zero beat

BFO ADJUSTMENT—NOTE: Turn off Sig. Gen. 400 cycle modulation; set CW/AM switch at "CW"; remove Pitch Control knob and adjust slotted screw shaft.

*IF ADJUSTMENT							
None	Stator plates of rear sect. of tuning gang	455 kc	"1"	1000 kc	3 and 4 1 and 2	2nd IF 1st IF	Maximum output Maximum output Repeat steps 1 and 2

BAND #4 ADJUSTMENT—NOTE: Make sure 400 cycle audio modulator is turned on; AM/CW switch should be at "AM."
STANDARD "A1" on antenna 30 mc
RMA Dummy strip 30 mc

BAND #3 ADJUSTMENT							
STANDARD RMA Dummy strip	"A1" on antenna strip	14 mc 14 mc	"3"	14 mc 14 mc	13 9	Osc. Trimmer Mix. Trimmer	Maximum output Maximum output

*BAND #2 ADJUSTMENT							
STANDARD RMA Dummy strip	"A1" on antenna strip	5 mc 1.8 mc	"2"	5 mc 1.8 mc	14 6	Osc. Trimmer Osc. Padder	Maximum output Maximum output and repeat step 8

*BAND #1 ADJUSTMENT							
STANDARD RMA Dummy strip	"A1" on antenna strip	1500 kc 600 kc	"1"	1500 kc 600 kc	15 5	Osc. Trimmer Osc. Padder	Maximum output Maximum output and repeat step 11

*It may be necessary to repeat the indicated adjustments several times.
†Rock the main tuning capacitor slightly (turn back and forth) when making these adjustments.

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MODEL 3-38, Early and Revised

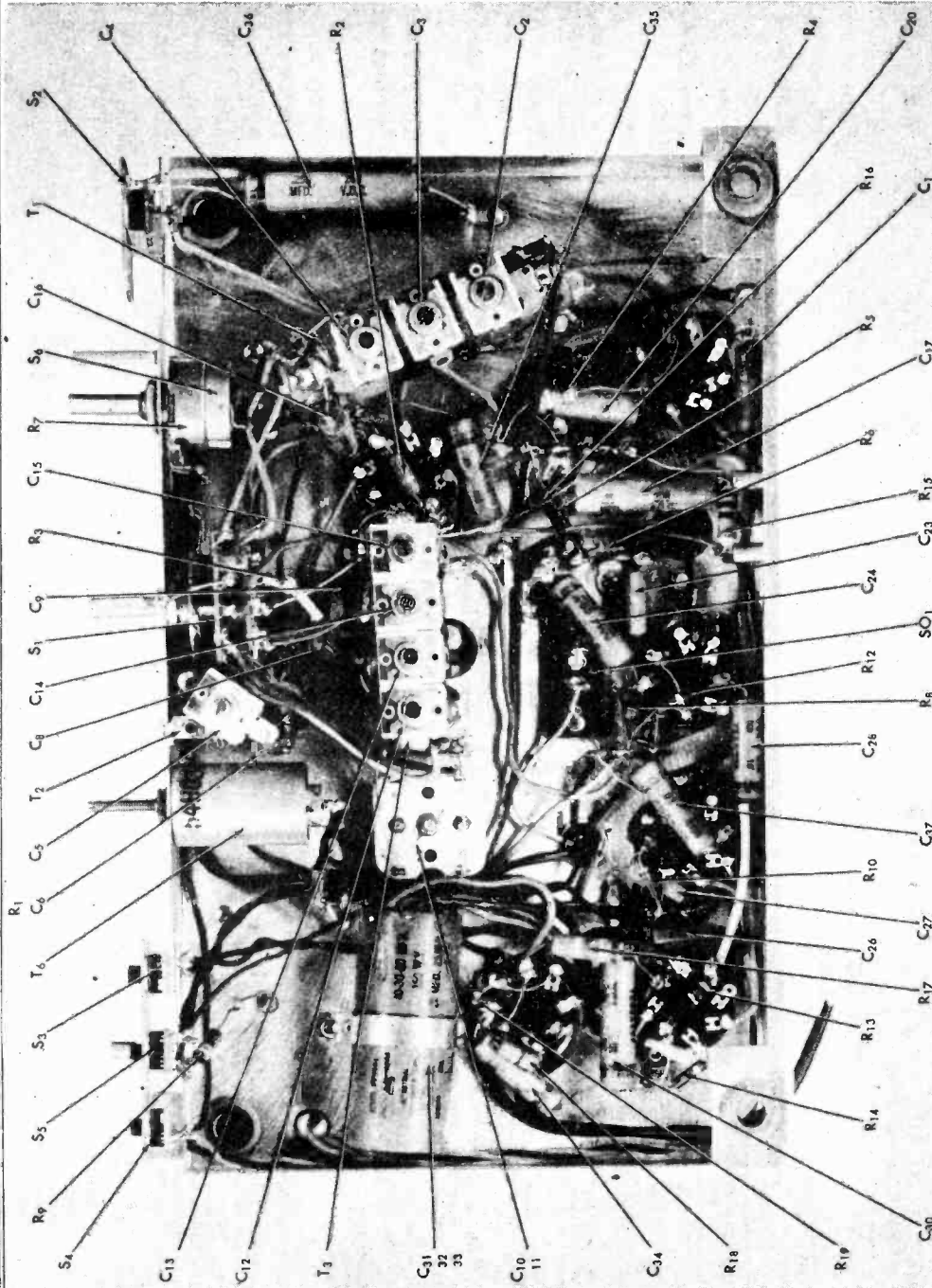


Fig. 4. Bottom view of the receiver showing components location.

CONTROL SETTINGS FOR PRELIMINARY TEST OPERATION (Broadcast Band)

NAME	FUNCTION	SETTING	NAME	FUNCTION	SETTING
STANDBY/RECEIVE	Receiver temporary standby	At "RECEIVE"	SPEAKER/PHONES	Output selector switch	At "SPEAKER"
VOLUME	Audio gain control and receiver on/off switch	Half clockwise; adj. as necessary	CW/AM	BFO on/off switch AVC on/off switch	At "AM" (AVC on)
BAND SELECTOR	Operating band selector	Clockwise to "1"	NOISE LIMITER	Noise peak limiting	At "OFF"
PITCH CONTROL	CW beat note pitch selector	Any position (not in use)	TUNING	Main tuning control	To local station freq. on main dial scale To "0" on small dial scale
			BAND SPREAD	Short wave band spreading	

MODEL S-38, Early and Revised

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MAIN TUNING

BANDSPREAD TUNING

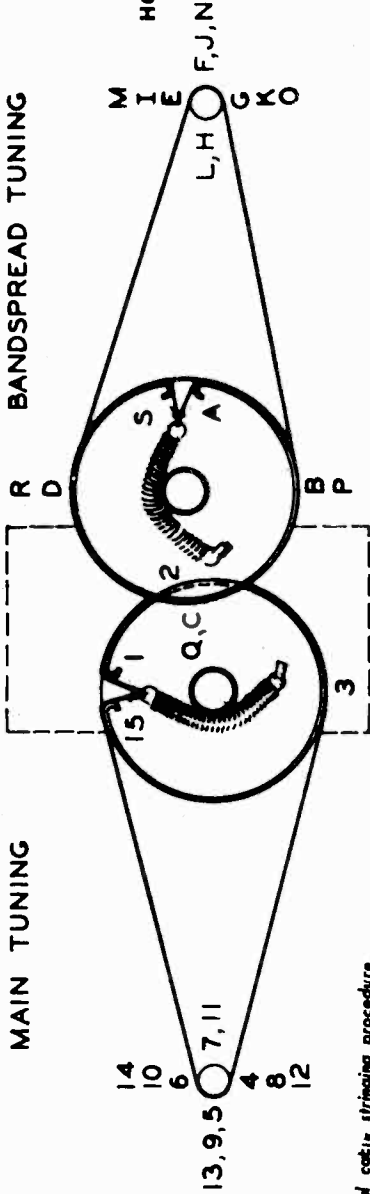


Fig. 2. Dial cord stringing procedure.

HOW TO RESTRING DIAL CORDS

To restring the main tuning dial cord, cut a 14" length of 30 lb. test dial cord and tie one end to the tension spring of the main tuning capacitor drive pulley at position "1" on the diagram. Following the numbers 1 through 15, wind the cord on the pulley and knob drive shaft. At position "15", stretch the tension spring, and tie the cord securely. Cut off the excess cord. Note that two complete turns are wound on the knob drive shaft.

To restring the bandspread tuning dial cord, cut a 16" length of dial cord and follow the procedure as explained above, except start at position "A" on the diagram and proceed through position "S". Note that the knob drive shaft has two complete turns.

TUNING CAPACITOR FULLY CLOSED (BOTH SECTIONS). FRONT VIEW

HALLICRAFTERS LIST PRICE PER COMPONENT

REF. NO.	DESCRIPTION	LIST PRICE PER COMPONENT
C-1	0.01 mfd.; 600 vdw; paper	\$.10
C-2, 3 & 4	Trimmer Unit for antenna transformer T-1	.40
C-5	44B129	.10
C-6	44A039	.10
C-7	2700 mmf.; ± 5%; 500 vdw; mica	.30
C-8	Tuning capacitor; air; 2 sections ganged	2.90
C-8, 23, 27 & 38	220 mmf.; 500 vdw; mica	.15
C-9	3000 mmf.; 5%; 500 vdw; mica	.65
C-10 & 11	Dual padlock for oscillator transformer T-3	.50
C-12, 13, 14 & 15	44B159	.10
C-16 & 34	0.02 mfd.; 400 vdw; paper	.10
C-17 & 36	0.25 mfd.; 200 vdw; paper	.15
C-18, 19, 21 & 22	Trimmers for IF transformers T-4 and T-5	.25
C-20 & 35	0.05 mfd.; 200 vdw; paper	.10
C-24	0.005 mfd.; 400 vdw; paper	.10
C-25	2 mmf.; banded insulated wire leads; NOT AVAILABLE AS A SPARE PART	.20
C-26 & 39	470 mmf.; 500 vdw; mica	.10
C-28 & 37	0.01 mfd.; 400 vdw; paper	.10
C-29, 31, 32 & 33	Electrolytic; 100 section unit; color coded leads; sect. 1 (C-29), 20 mfd.; 25 vdw; sect. 2 (C-31 & 32), 30 mfd.; 150 vdw; sect. 4 (C-33) 40 mfd.; 150 vdw.	.10
C-30	0.02 mfd.; 600 vdw; paper	.80
LM-1	PILOT LAMP	.10
LS-1	LOUDSPEAKER	2.50
PL-1	5' P.M. speaker; brown bead; G. E. type 47	.35
PL-2	Speaker voice coil connector plug	.10
R-1 & 13	470,000 ohm; ½ watt; carbon	.10
R-2	22,000 ohm; ½ watt; carbon	.10
R-3	390 ohm; ± 10%; ½ watt; carbon	.10
R-4	2.2 megohm; ½ watt; carbon	.10
R-5	47,000 ohm; ½ watt; carbon	.10
R-6 & 10	Volume Control; ½ megohm; includes SPST toggle action switch assembly on rear	.50
R-7 & S-6	10 megohm; ½ watt; carbon	.10
R-8	470 ohm; ± 10%; ½ watt; carbon	.10
R-9 & 11	220,000 ohm; ½ watt; carbon	.10
R-12	150 ohm; ± 10%; ½ watt; carbon	.10
R-14	15 ohm; ± 10%; ½ watt; carbon	.10
R-15	1,000 ohm; ½ watt; carbon	.10
R-16	680 ohm; 1 watt; carbon	.10
R-17	22 ohm; ½ watt; carbon	.10
R-18 & 21	330 ohm; ½ watt; carbon	.10
R-19	10,000 ohm; ½ watt; carbon	.10
R-20	10,000 ohm; ½ watt; carbon	.10

REF. NO.	DESCRIPTION	LIST PRICE PER COMPONENT
S-1a, b, c & d	Bandswitch; two sections ganged; rotary four position	60A240
S-2 & 3	"RECEIVE-STANDBY" and "NOISE LIMITER" switches; slide action; SPST	.20
S-4	"SPEAKER-PHONES" switch; slide action; SPDT	.20
S-5	"A.M.-C.W." switch; slide action; DPST	.25
T-1	Antenna coil for bands 1, 2 and 3	51C821
T-2	Oscillator coil for bands 1, 2, 3 and 4	51C818
T-3	Input IF transformer; 455 kc.	51C822
T-4	Diode IF transformer; 455 kc.	50C183
T-5	Beat frequency oscillator coil; 455 kc.	50B184
T-6	Audio output transformer; 3,000 ohm primary	54B031
T-7	—15 ohm secondary tapped at 3 ohms	55A075
TS-1	Antenna and ground connector strip	88A032
TS-2	Headset plug connector strip; bakelite	88A071

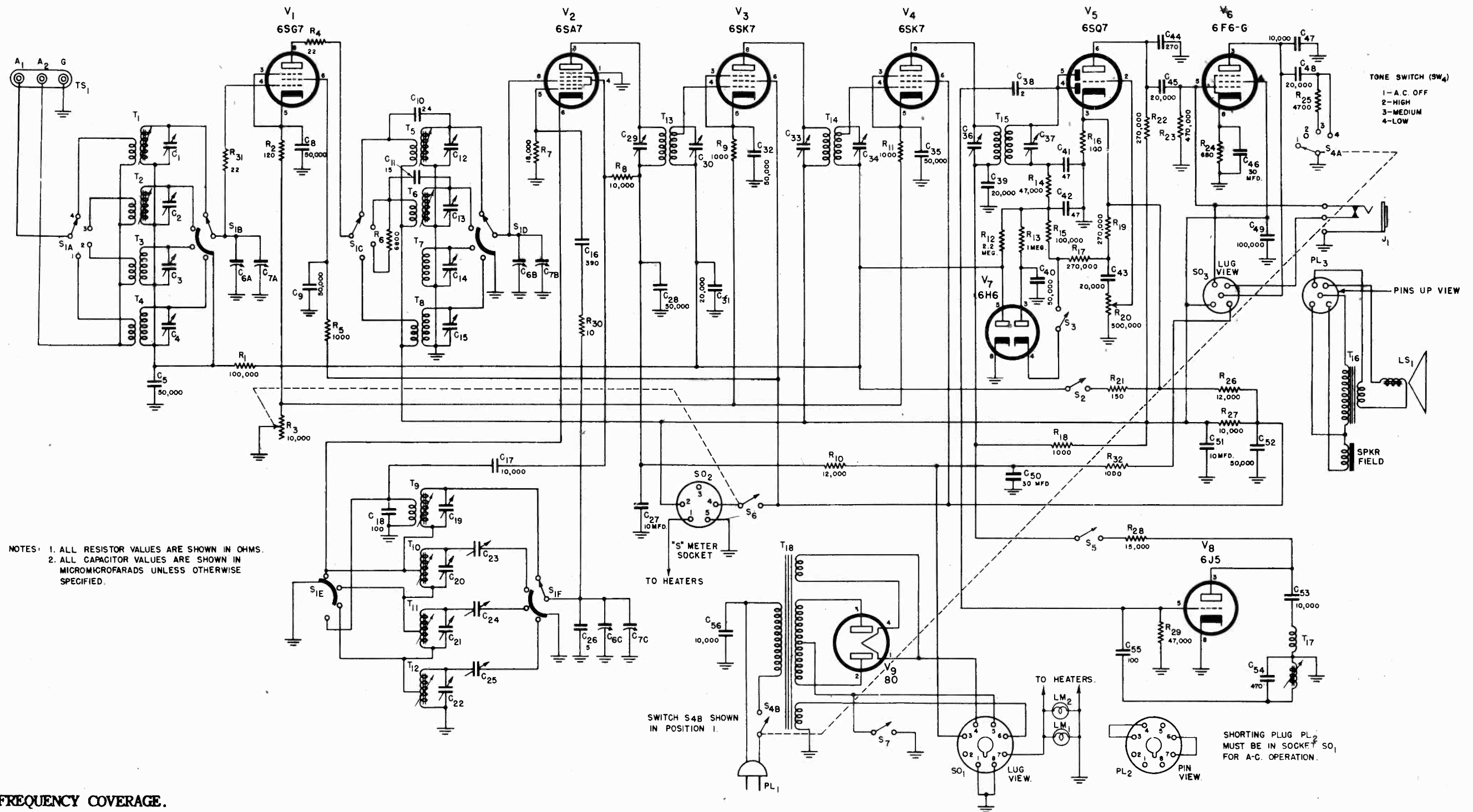
MISCELLANEOUS MECHANICAL COMPONENTS

QUANT. IN EQUIPMENT	DESCRIPTION	HALLICRAFTERS PART NUMBER	LIST PRICE PER COMPONENT
2	Knob; for Volume Control and Band Selector switches	15A049	.15
2	Knob; for C. W. PITCH Control	15A038	.15
1	Pointer; for main tuning dial	15A047	.25
1	Calibrated dial assembly, complete	82A102	.15
1	Dial window; glass	83B257	.15
6	Octal tube sockets; Amphol type MIP-8	22B157	.30
1	Dial lamp socket; bayonet	6A035	.15
2	Tuning capacitor dial drive pulley	86A011	.15
1	Tuning capacitor rear mounting bracket	28A002	.10
1	Tuning capacitor front mounting bracket	67A568	.15
1	Left hand switch mounting bracket	67A559	.10
2	Right hand switch mounting bracket	67B561	.10
4	Rubber mounting feet for cabinet	16A007	.10
4	Spring washers for grounding tuning capacitor drive shafts	4A043	.10
4	"C" washers; (hair-pin type)	75A062	.10
1	Rear cover plate; cardboard	32C331	.10
1	Bottom cover plate; painted steel	63C220	.45

NOTE: ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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MODEL S-40 Early



NOTES: 1. ALL RESISTOR VALUES ARE SHOWN IN OHMS.
2. ALL CAPACITOR VALUES ARE SHOWN IN MICROMICROFARADS UNLESS OTHERWISE SPECIFIED.

FREQUENCY COVERAGE.

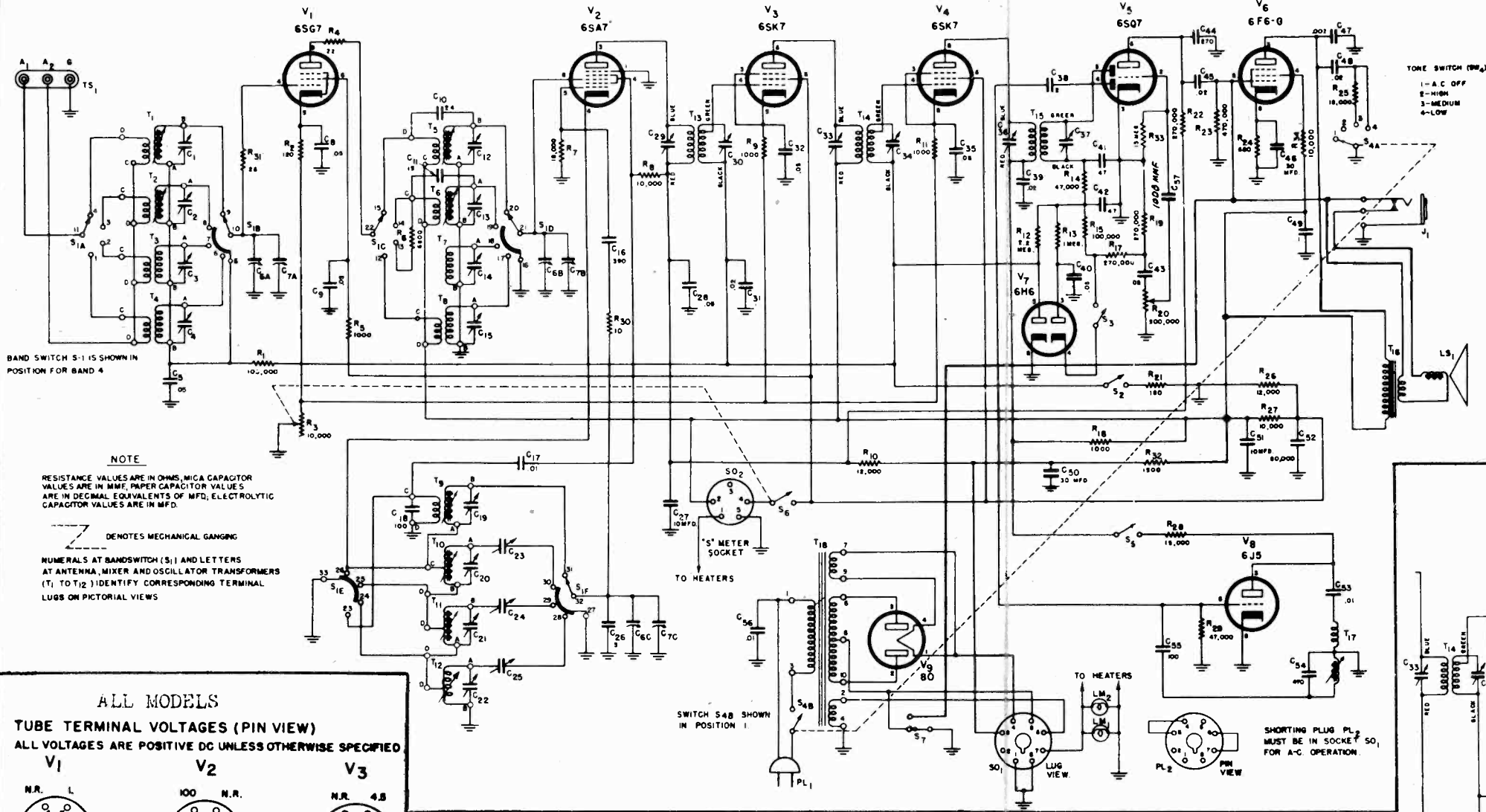
The Model S-40 Radio Receiver provides continuous coverage over the frequency range from 550 kilocycles (kc) to 44 megacycles (mc) in four bands. Each band is provided with sufficient overlap to insure continuity of coverage over the entire tuning range. The frequencies covered per band are as follows:

Band	Coverage
1	550 kc. to 1700 kc.
2	1680 kc. to 5.4 mc.
3	5.3 mc. to 15.8 mc.
4	15.3 mc. to 44 mc.

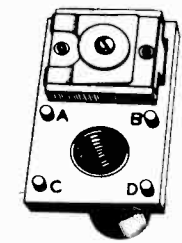
Figure 7-7. Radio Receiver Model S-40, schematic wiring diagram.

MODEL S-40, 1st and 2nd Revisions

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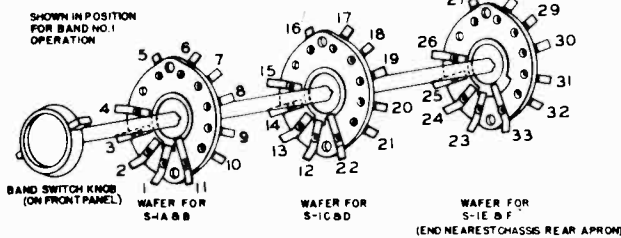


MODEL S-40 2nd revision



REPRESENTS TRANSFORMERS T4 TO T12

BANDSWITCH S-1



BAND SWITCH S-1 IS SHOWN IN POSITION FOR BAND 4

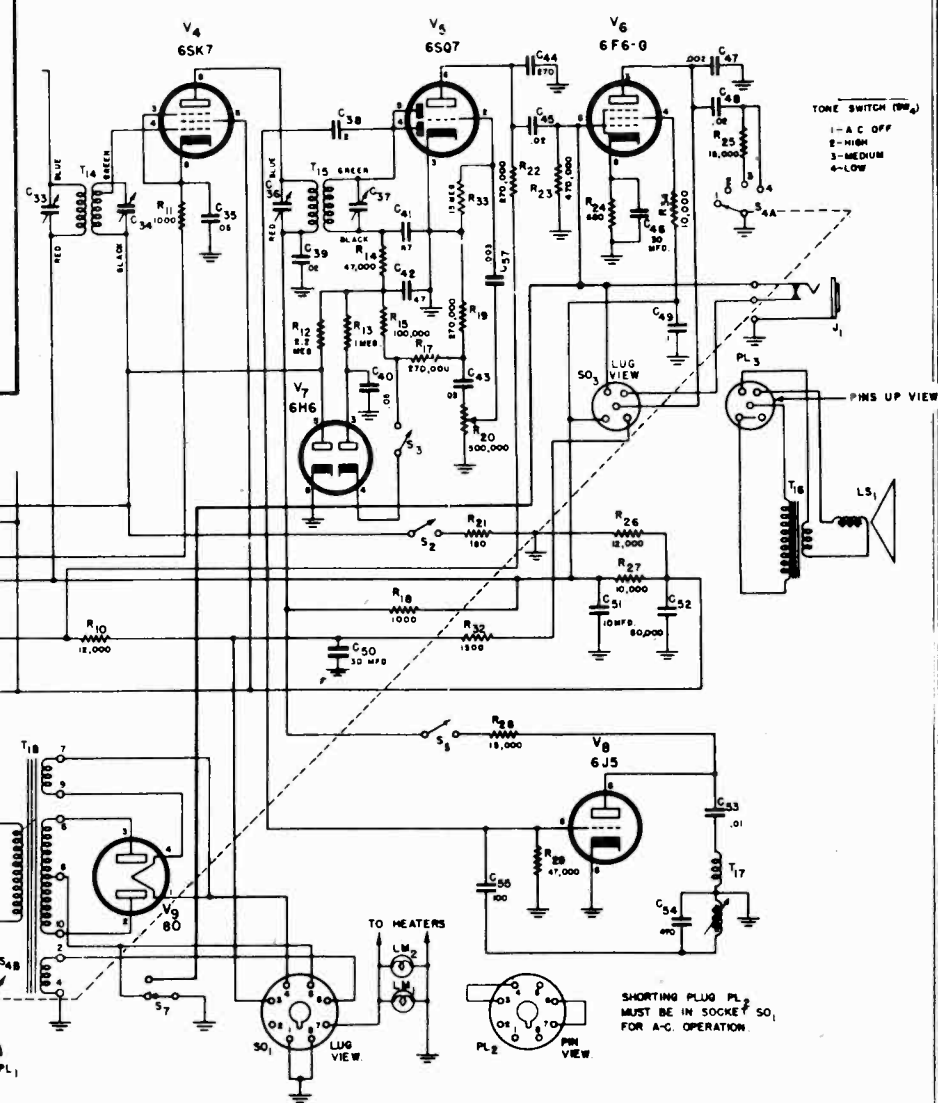
NOTE

RESISTANCE VALUES ARE IN OHMS, MICA CAPACITOR VALUES ARE IN MMF, PAPER CAPACITOR VALUES ARE IN DECIMAL EQUIVALENTS OF MFD, ELECTROLYTIC CAPACITOR VALUES ARE IN MFD.

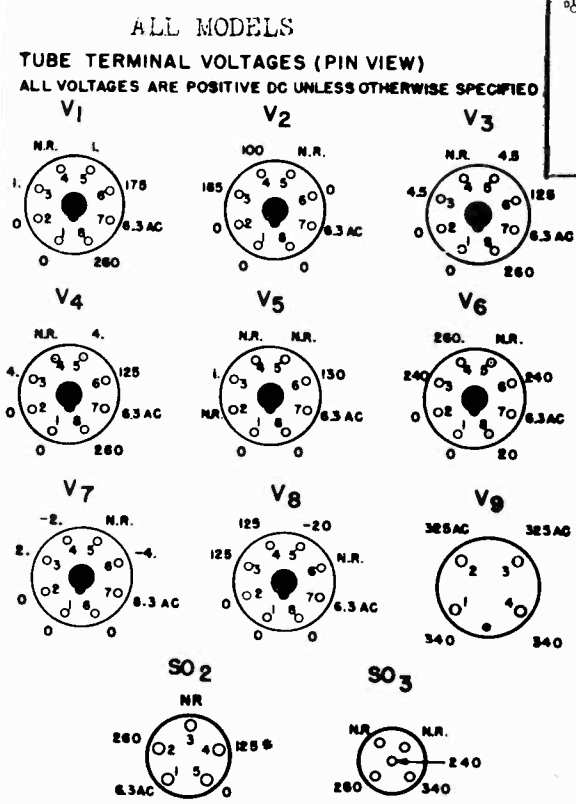
⚡ DENOTES MECHANICAL GANGING

NUMERALS AT BANDSWITCH (S-1) AND LETTERS AT ANTENNA, MIXER AND OSCILLATOR TRANSFORMERS (T1 TO T12) IDENTIFY CORRESPONDING TERMINAL LUGS ON PICTORIAL VIEWS

MODEL S-40 1st revision

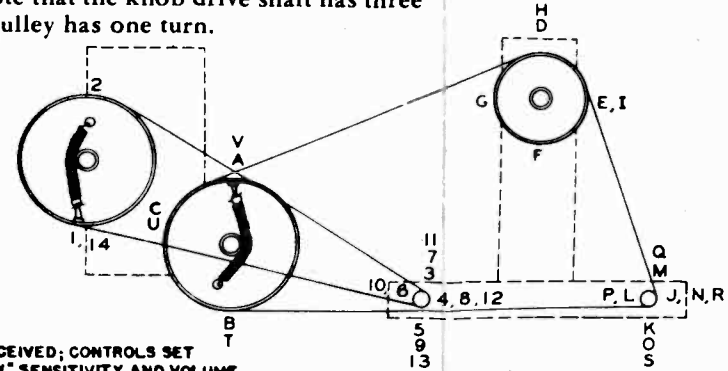


TO NEAREST CHASSIS REAR APRON

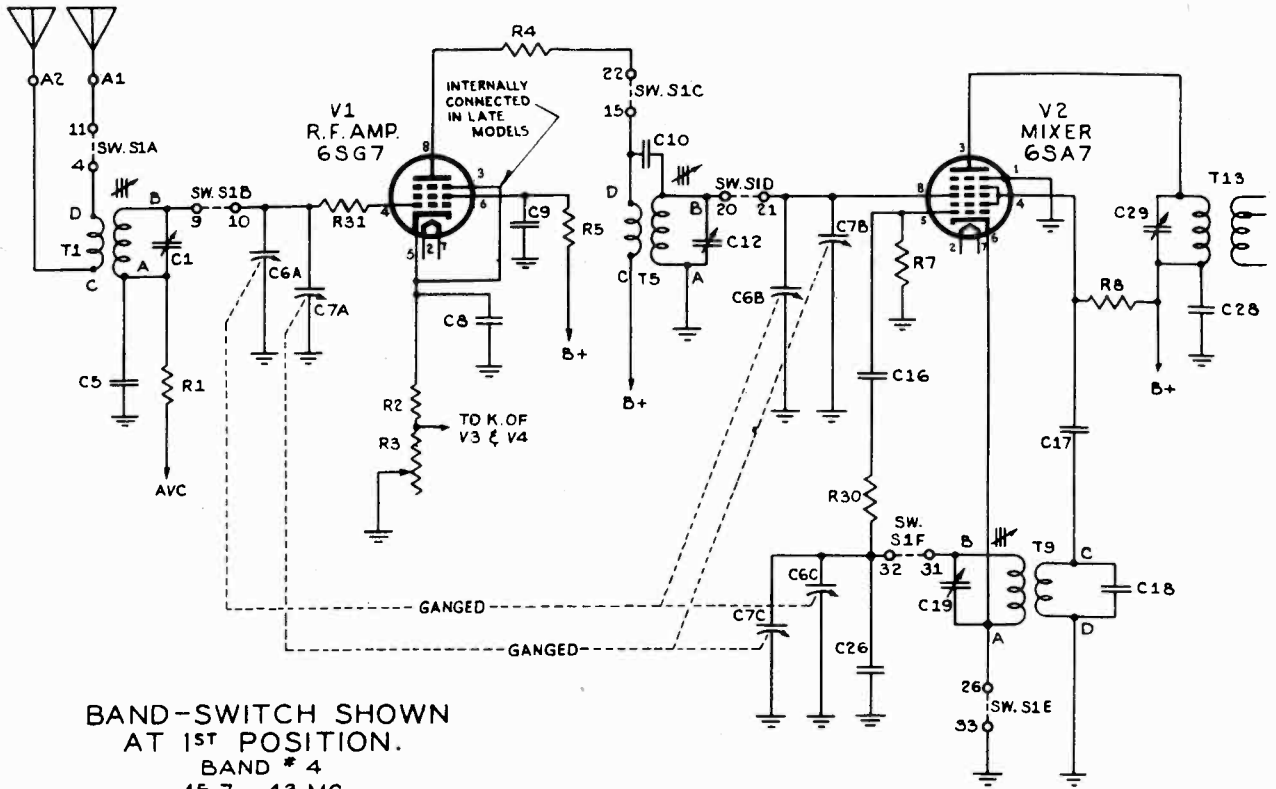


To restring the main tuning dial cord, cut a 25" length of 18 lb. test dial cord and tie one end to the tension spring of the main tuning capacitor drive pulley at position "1" on the diagram. Following the numbers 1 through 14, wind the cord on the pulley and knob drive shaft. At position "14," stretch the tension spring and tie the cord securely. Cut off the excess cord. Note that three turns are wound on the knob drive shaft.

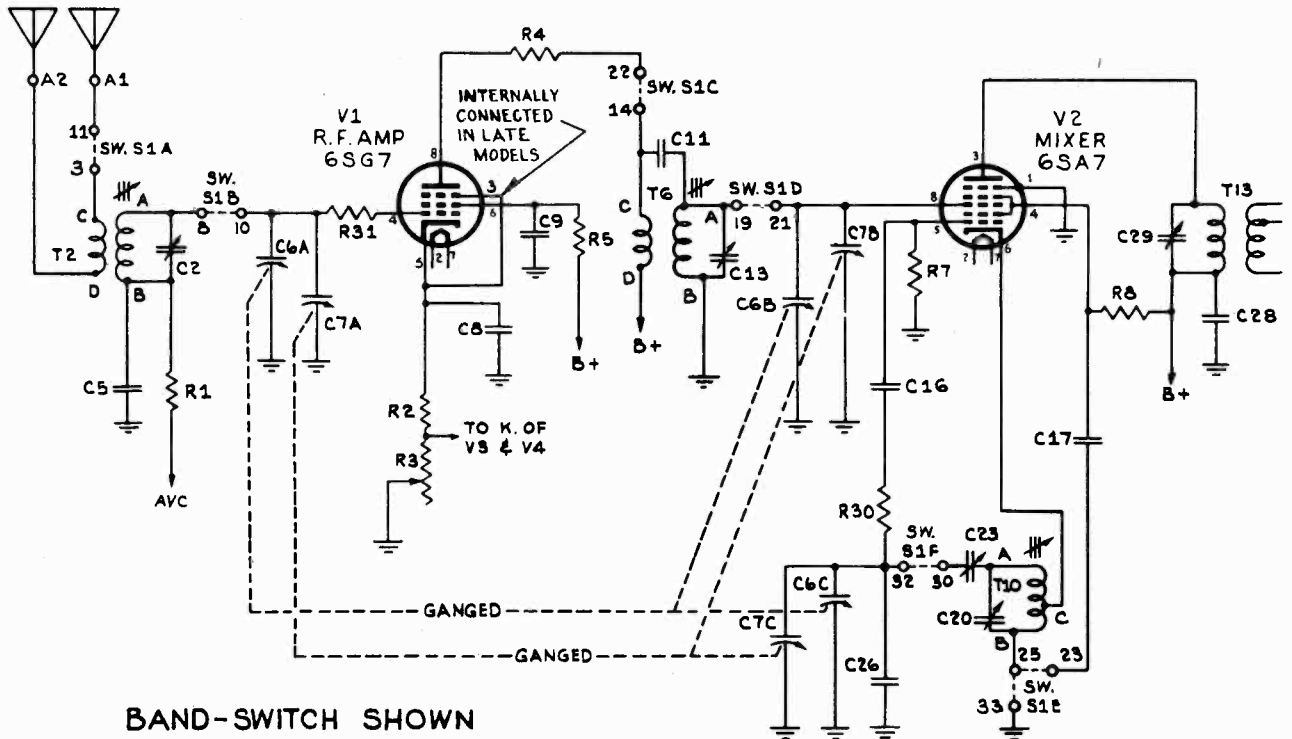
To restring the bandspread tuning dial cord, cut a 35" length of dial cord and follow the procedure as explained above, except start at position "A" on the diagram and proceed through position "V." Note that the knob drive shaft has three turns and the dial drive pulley has one turn.



* "S" METER SWITCH CLOSED (MAX. CLOCKWISE); NR - NOT READABLE WITH METER USED. ALL READINGS TAKEN AT 117 V. AC LINE VOLTAGE, WITH 20,000 OHM/VOLT METER; NO SIGNAL BEING RECEIVED; CONTROLS SET AS FOLLOWS: STANDBY/RECEIVE SWITCH AT "RECEIVE"; AVC, NOISE LIMITER AT "ON"; AM/CW SWITCH AT "CW"; SENSITIVITY AND VOLUME CONTROLS FULL CLOCKWISE; TUNING, PITCH CONTROL AND TONE CONTROLS IN ANY POSITION AS THEY DO NOT AFFECT READINGS.

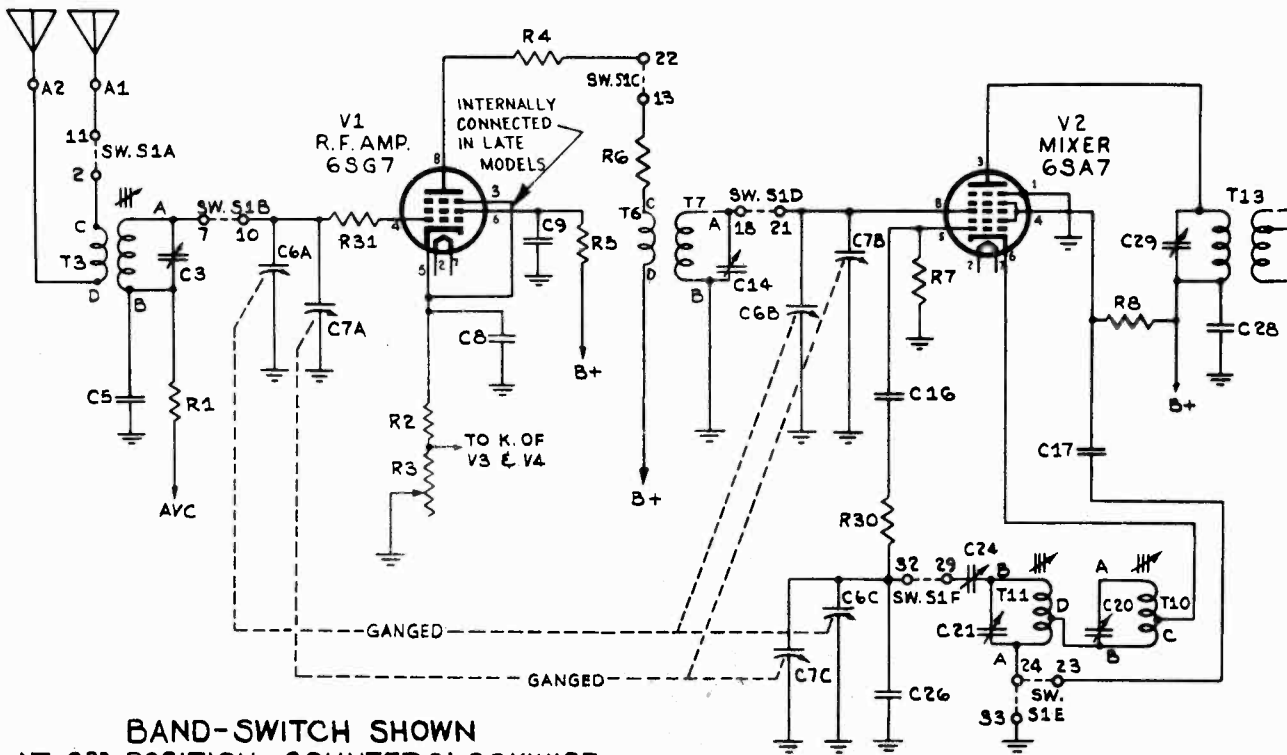


BAND-SWITCH SHOWN AT 1ST POSITION.
BAND # 4
15.7 - 43 MC.

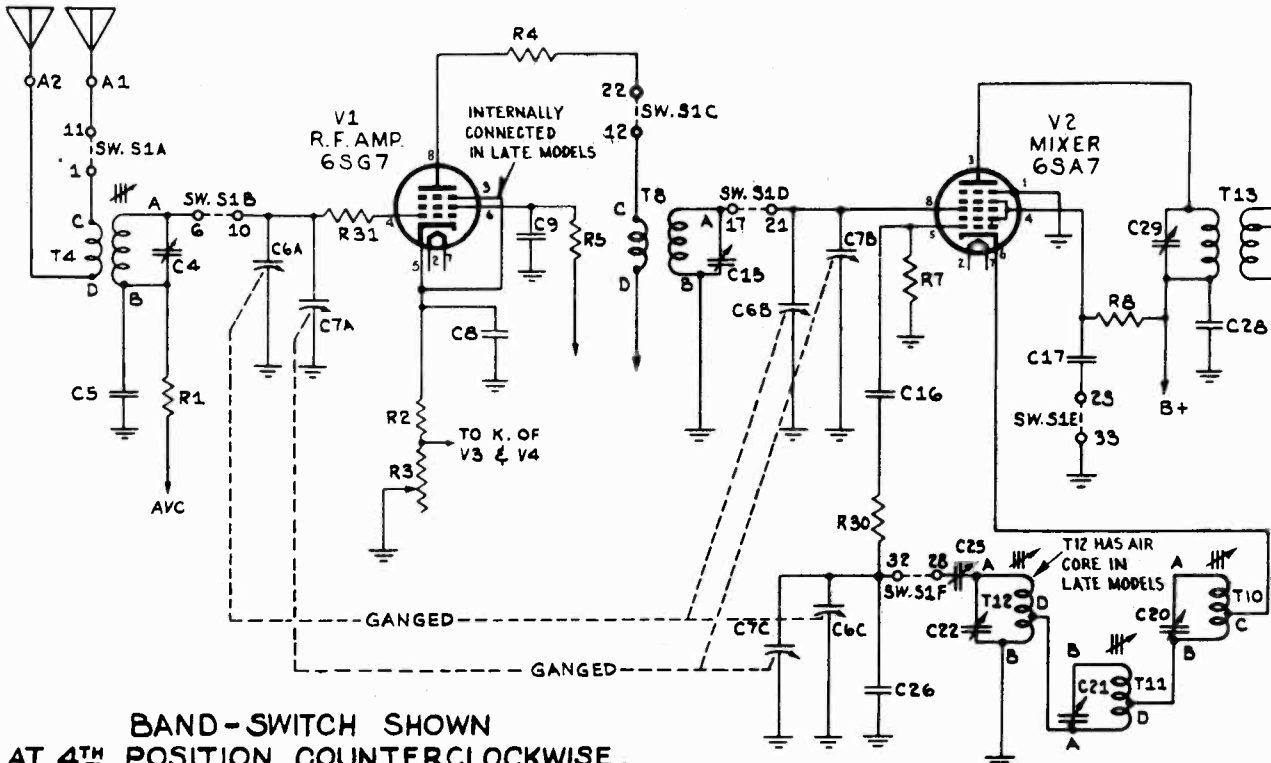


BAND-SWITCH SHOWN AT 2ND POSITION COUNTERCLOCKWISE.
BAND # 3
5.35 - 15.7 MC

MODEL S-40



BAND-SWITCH SHOWN
AT 3RD POSITION COUNTERCLOCKWISE.
BAND # 2
1.7 - 5.35 MC.



BAND-SWITCH SHOWN
AT 4TH POSITION COUNTERCLOCKWISE.
BAND # 1
540 - 1700 KC.

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POWER REQUIREMENTS.

The receiver is designed to operate from a 117-volt, 50/60 cycle single phase, (25/60 cycle if receiver has universal power transformer) a-c source or from a 6-volt storage battery and 260-volts of "B" battery. The "B" batteries may be replaced by a suitable vibrator type power supply if it meets the following current requirements:

A-C Operation	* D-C Operation
Line voltage 117 volts	Filament voltage. 6.3 volts
Line current 0.76 amp.	Filament current. 5 amps.
Power consumption. 75 watts	"B" voltage 260 volts
	"B" current 70 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 10 amperes.

Audio Output Connections. - The headset jack marked PHONES, located on the front panel, provides output for headset reception. The circuit is such, that the speaker circuit is opened when the headset cord plug is inserted into the PHONE jack. The output of the first audio stage is then capacitively coupled to the PHONE jack.

Remote Operation Facilities. - The receiver may be disabled remotely by disconnecting the jumper wire between pins #3 and #4 on the shorting plug (PL-2), which is normally plugged into socket S0-1 during a-c operation, and connecting a remote switch or relay across these pins. The stand-by switch is connected in the "B" lead. When using the remote control disabling switch, the STANDBY/RECEIVE switch on the receiver must be set at STANDBY.

PREPARATION FOR USE.

A-C Operation. - The receiver may be operated from a 117-volt, 50/60 cycle, (25/60 cycle if universal power transformer is used) single phase a-c source of power. In the event that the receiver has a universal power transformer, check the line voltage and set the line voltage switch, located on top of the transformer, before connecting the receiver to a source of power. If the receiver power transformer is set for a higher line voltage than the source, it will not be damaged when connected to a line of lower voltage, but a receiver set for a lower line voltage will, in most cases, be damaged when plugged into an outlet having a higher line voltage.

D-C Operation. - The receiver may be operated from a 6-volt d-c source, generally a storage battery, and a 260-volt d-c supply in the form of dry batteries or vibrator type power pack. Consult the chart on power requirements for d-c operation in Section I, and provide battery facilities capable of supplying these demands. The receiver is connected to the d-c supply as follows:

- (1) Remove the octal "jumper plug" (PL-2) used for a-c operation from socket S0-1. Use #18 (AWG) wire leads for the 260-volt "B" supply connections to pins #3 and #5, and #12 (AWG) wire leads for the 6-volt "A" battery connections to pins #1, #8 and #7.

CAUTION - Check your wiring carefully before connecting up to the battery supply.

OPERATION.

Listed below are the receiver controls and their settings for the two types of reception provided by this receiver, namely, phone and c-w code reception. Refer to Figure 1-1 or the front panel of the receiver.

a. PHONE RECEPTION. - To receive phone signals set the front panel controls as follows:

- STANDBY/RECEIVE switch - Set at RECEIVE. (Set at STANDBY to disable receiver for short standby periods.
- BAND SELECTOR switch - Set at range number corresponding to band covering desired frequency.
- AM-CW switch - Set at AM.
- A.V.C. switch - Set at ON.
- NOISE LIMITER switch - Normally set at OFF.

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- SENSITIVITY control** - Turn the control all the way clockwise to maximum.
- VOLUME control** - Adjust for desired volume at headset or loudspeaker.
- PITCH CONTROL** - Not used.
- TONE control** - Set to please listener. Set at HIGH for normal reception. Generally set at LOW or MED. when noise level is high.
- TUNING control** - Set calibrated dial to frequency of desired signal and adjust for maximum tuning meter deflection (if a tuning meter is used.) Dial frequency calibrations are true only with BANDSPREAD tuning dial set at zero.
- BANDSPREAD Tuning control** - Use this control in conjunction with the TUNING control as described in the paragraph on bandspread tuning in this section. This control is used for finer tuning.

b. C-W Code Reception. - To receive continuous wave (c-w) code signals, set the front panel controls as follows:

- BAND SELECTOR switch** - Set at range number corresponding to band covering desired frequency.
- A.V.C. switch** - Set at OFF.
- AM-CW switch** - Set at CW.
- NOISE LIMITER switch** - Set at OFF.
- TUNING control** - Set calibrated dial at frequency of desired signal. Tune for maximum signal level at headset or loudspeaker. Dial frequency calibrations are true only with the BANDSPREAD tuning dial set at zero.
- SENSITIVITY control** - Turn up as high as the signal strength of the code signal will permit. Too much gain will result in distortion of the signal.
- TONE control** - Set at LOW or MED.
- VOLUME control** - Turn up to full clockwise.
- BANDSPREAD tuning control** - Use this control in conjunction with the MAIN tuning control as described in the paragraph in bandspread tuning in this section. This control is used for finer tuning.
- PITCH CONTROL** - Set at desired pitch of code signal by turning to the right or left.
- STANDBY-RECEIVE** - Set at RECEIVE (Set at STANDBY to disable receiver for short standby periods.)

GENERAL: Model S-40 is a 9 tube commercial superheterodyne table model, radio receiver, incorporating 4 bands of AM/CW reception, as follows: band #1, 540 kc to 1700 kc; band #2, 1.7 mc to 5.35 mc; band #3, 5.35 mc to 15.7 mc; band #4, 15.7 mc to 43 mc. Provision for variable sensitivity control; optional AVC, noise limiting, BFO pitch, tone, headset reception, and use of an external "S" meter; standby operation; and bandspreading are provided.

REAR PANEL CONNECTIONS: Consist of AC line cord with plug, antenna and ground connector strip, dc power input socket and external "S" meter connector socket.

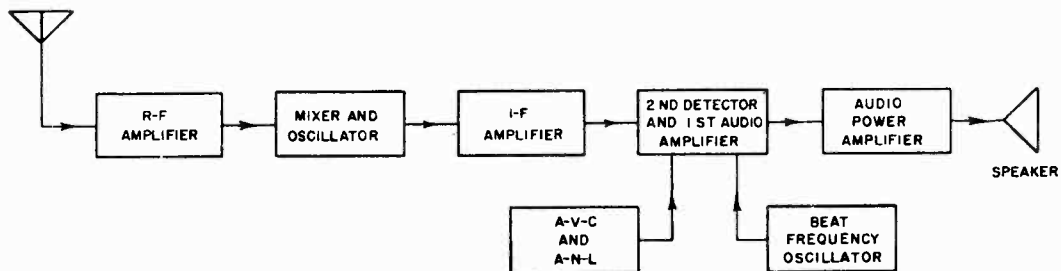
POWER SUPPLY DATA: AC operation—117 volt, 50/60 single phase source. (Also, 110/130/150/220/250 volt, 25 cycles single phase source with special power transformer available, Hallicrafter's part #52CO27.) Power drain is 75 watts.

DC operation—filament 6.3 volt @ 3.5 amp; "B" supply 260 volt @ 70 ma. (The 6 volt battery drain for vibrator type supply for "B" voltage will run about 10 amp.)

FUNCTIONING OF PARTS

1. GENERAL.

Figure 4-1. shows, in a very simple block form, the plan of the circuit of the Model S-40 radio receiver. Note that the circuit is that of the conventional super-heterodyne receiver. A signal received at the antenna is fed through an r-f amplifier stage to a combined mixer-oscillator stage where a local signal is generated and mixed with the incoming signal. An intermediate frequency signal selected at the output of the mixer stage is fed through two i-f amplifier stages to a combined detector audio amplifier stage where it is demodulated, amplified and fed through an audio power amplifier stage to a loud speaker. Provision is made for headset reception. A combined a-v-c and a-n-l stage is also included to provide improved reception. A beat frequency oscillator is incorporated for the reception of continuous wave (c-w) signals. Provision is also made for bandsread operation. An external tuning meter may be used with the receiver, provision being made at the rear of the receiver for connections.



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Figure 4-1. Radio Receiver Model S-40, block diagram.

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

Since the circuit functions of bands 1, 2, 3 and 4 are essentially identical, this discussion will describe the circuit with BAND SELECTOR switch (S-1A through S-1F) set at band 4 as shown in the schematic diagram.

a. **R.F. Amplifier.** - The r-f amplifier stage employs a type 6SG7 pentode tube in a conventional class A amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-1 through terminals A-1 and A-2 of the antenna terminal strip TS-1. The secondary of transformer T-1 is tuned by the ganged tuning capacitor section C-6A and trimmer C-1. Ganged tuning capacitor section C-7A acts as a bandsread for the secondary of transformer T-1. R-f signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-5. Resistor R-1 and capacitor C-5 provide decoupling for the a-v-c voltage applied to the control grid. Parasitic resistors R-4 and R-31 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-2, by-passed by capacitor C-8, provides self-bias for the stage. Resistor R-3 (SENSITIVITY control) regulates the bias to the grid. Resistor R-5 and capacitor C-9 act as a decoupling network for the screen of tube V-1. The signal voltage developed across the primary of transformer T-5 is then coupled to the grid of tube V-2 inductively through transformer T-5 and capacitively through capacitor C-10. Capacitor C-10 provides a small amount of coupling to improve the response at the high frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range.

b. Mixer-Oscillator. - The mixer-oscillator stage employs a type 6SA7 converter tube. The tube functions both as oscillator and mixer. The secondary of r-f transformer T-5 is tuned by section C-6B of the ganged tuning capacitor and trimmer C-12. Ganged tuning capacitor section C-7B acts as bandspread tuning for the secondary of transformer T-5. Ganged tuning capacitor section C-6C, trimmed by capacitor C-19, tunes the secondary of transformer T-9 which is part of the oscillator circuit. Ganged tuning capacitor section C-7C acts as bandspread tuning for the secondary of transformer T-9. A signal generated by the local oscillator, 455 kc. higher in frequency than the received signal on bands #1, #2, #3 and 455 kc. lower in frequency than the received signal on band #4, is mixed electronically in the mixer tube since the oscillator tube elements are included as part of the mixer tube V-2 in the same tube envelope. The frequency of oscillation is determined by a resonant circuit consisting of the secondary of transformer T-9 and section C-6C of the main tuning capacitor and trimmer capacitor C-19 connected in parallel. Section C-7C of the variable ganged bandspread capacitor is connected in parallel with section C-6C of the main tuning capacitor for the purpose of effectively spreading or broadening the frequency range. Capacitor C-26 is an additional fixed trimmer across the resonant circuit. Capacitor C-18 provides increased gain for the oscillator on this band. Variable capacitors C-23, C-24, and C-25 are padders for bands #3, #2, and #1 respectively. Resistor R-7 is a grid return for the oscillator grid in tube V-2. Capacitor C-16 is the oscillator grid coupling capacitor while capacitor C-17 provides coupling and d-c blocking for the oscillator plate circuit. Resistor R-30 suppresses parasitic oscillations. Plate voltage for the screen grid of tube V-2, which also acts as oscillator plate, is applied through resistor R-8. The difference frequency of the oscillator and incoming signal frequencies is applied to the first i-f transformer T-13 primary which is tuned by capacitor C-29. Capacitor C-29 is a by-pass for the mixer plate.

c. First and 2nd I-F Amplifier. - The first and 2nd i-f amplifier stages employ type 6SK7 pentode tubes. I-f amplifier coupling transformer T-13, T-14, and T-15 for these two stages are tuned to 455 kc by adjusting the trimmer capacitors across each transformer primary and secondary. The gain of the 1st and 2nd i-f amplifier stages is varied by the SENSITIVITY control (R-3), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver. The a-v-c grid voltage is applied to this section of the receiver through resistor R-12 when A.V.C. switch S-2 is at OFF or in the open position. C-31 is an a-v-c by-pass for the control grid of 1st i-f amplifier tube V-3. Resistor R-9, by-passed by capacitor C-32, provides fixed bias for tube V-3. Resistor R-11 by-passed by capacitor C-35 provides fixed bias for 2nd i-f amplifier tube V-4. Capacitor C-39 is a plate by-pass for tube V-4. The signal voltage developed across the transformer T-15 primary is fed inductively to the 2nd detector.

d. 2nd Detector and 1st Audio. - Both the second detector and first audio amplifier stages employ a single type 6SQ7 duo diode-triode. The diode section of tube V-5 serves as a detector by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-14 and capacitors C-41 and C-42 connected in a pi-section. Automatic volume control and audio frequency voltage is obtained from a voltage divider consisting of resistors R-19, R-17 and R-15. Capacitor C-43 couples the 2nd detector to the VOLUME control, resistor (R-20). Resistor R-16 is bias for the first audio stage, part of tube V-5. Resistor R-22 is the plate load for the triode part of tube V-5. Capacitor C-44 acts as r-f filter at the plate. The audio frequency voltage is then fed through coupling capacitor C-45 to the grid of the output audio amplifier tube V-6.

e. Power Audio Amplifier. - The power audio amplifier stage is a class A amplifier employing a type 6F6-G pentode. Resistor R-23 is a grid return for the control grid of tube V-6. Resistor R-24, by-passed by capacitor C-46, supplies bias to the control grid. Resistor R-25 and capacitors C-47 and C-48 serve as a tone control circuit. Capacitor C-49 serves as by-pass for the screen grid. The audio signal is then fed through socket SO-3 and plug PL-3 to the primary of output transformer T-16 whence it is coupled inductively to the secondary and fed to the speaker IS-1 voice coil. An audio frequency signal is also fed from the grid of tube V-6 to PHONE jack J-1. Voltage is fed to the plate of tube V-6 through the primary of transformer T-16.

f. A.V.C. and NOISE LIMITER. - Both the automatic volume control and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode of tube V-7 serves as the automatic volume control rectifier. The remaining diode section of tube V-7 serves as an automatic limiter as follows: Capacitor C-40 becomes charged by the rectified carrier voltage and the time constant of this capacitor and filter network associated with it is such that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-40 becomes more negatively charged than the charge held by capacitor

C-40 until the cathode voltage of the a-n-1 diode again reaches a less negative potential than its plate and capacitor C-40 acquires its normal charge. By shorting the audio voltage to ground during a noise pulse, the a-n-1 circuit prevents the objectionable noise pulses from reaching the audio amplifier stages.

g. **Beat Frequency Oscillator.** - The beat frequency oscillator employs a type 6J5 triode tube in a tuned-grid, untuned plate oscillator circuit. The oscillator frequency is adjusted by a moveable powdered iron core in the field of transformer T-17. This iron core adjustment sets the oscillator frequency at 455 kc. and is adjusted by a screw driver during alignment. The fine adjustment of the oscillator frequency required to provide control of the beat note frequency is controlled by a knob (PITCH CONTROL) from the front panel. The AM-CW switch controls the use of the oscillator by opening or closing the plate voltage lead to the tube. Resistor R-28 provides a load for the plate of tube V-8. Resistor R-29 is the oscillator tube V-8 grid return while capacitor C-55 provides grid coupling from the oscillator tank circuit. Capacitor C-54, across part of transformer T-17, resonates the tank circuit. Capacitor C-53 forms part of a series impedance circuit with part of transformer T-17. The beat frequency signal is coupled to the 2nd detector through capacitor C-38.

h. **Power Supply.** - The receiver has provisions for operation from either an a-c or d-c source.

(1) **A-C Operation.** - The receiver's power supply provides for operation from a 117-volt source. The a-c current is fed to the primary of power transformer T-18 through the line cord. A type 80 (tube V-9) full wave rectifier is employed in a conventional full wave rectifier circuit. The high voltage from this rectifier is fed to a filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The STANDBY/RECEIVE switch is connected in series with the transformer T-18 center tap lead to ground (chassis), thereby disabling the receiver but at the same time keeping the tube heaters hot and ready for instant use. The filter circuit consists of a pi network made up of the speaker field coil and capacitors C-50 and C-51. Resistors R-26 and R-27 are part of a voltage divider and capacitor C-52 is a by-pass.

(2) **D-C Operation.** - External 6-volt storage battery and 260-volts of "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is fed to the input side of the filter sections used for a-c operation thereby insuring adequate filtering for vibrator type power supplies.

i. **Tuning Meter.** - The tuning meter "S METER" is not supplied with the receiver, but can be purchased on request from the company. Provision has been made on the rear apron of the receiver for the external connection of the "S" meter. A five prong plug is wired to the meter as indicated in figure 4-2 and should be plugged into socket S0-2. When metering reception, the meter measures a voltage drop across resistor R-27 e. i. a change in screen current of first and second i-f amplifier tubes V-4 and V-3.

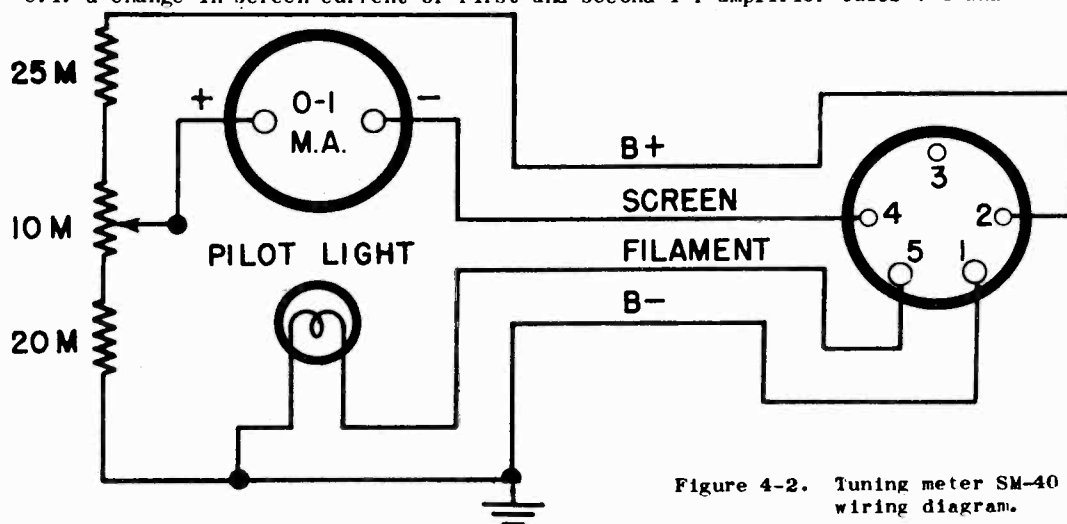


Figure 4-2. Tuning meter SM-40 and schematic wiring diagram.

MAINTENANCE

CAUTION. - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high - potential points on the VOLTAGE CHART before attempting to service circuits that are "hot". IT IS A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE.

All components of the receiver should be given a thorough inspection at regular intervals. The time interval between inspections will be determined by the operating conditions of the individual installation. In general, keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean, especially the tuning capacitors. Dust should be blown out with dry air or brushed out carefully without bending the gang plates in the slightest. Noisy reception may also be caused by dirty condenser wipers, faulty gain controls and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly, making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, and FUSES.

a. **Replacing Tubes.** - All tubes are accessible at the top of the chassis through the hinged cover of the cabinet. When replacing tubes, check the tube type carefully and replace with the correct type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

b. **Replacing Lamps.** - The receiver employs two lamps with bayonet type sockets to illuminate the calibrated tuning dial and the bandspread tuning dial. The lamps are to be replaced with a 8/8-volt, 250 ma. (blue bead) G.E. #44 or equivalent. The color code referred to, is the color of the glass bead above the glass stem inside the envelope of the lamps.

3. PERIODIC ADJUSTMENTS.

a. **Receiver Alignment.** - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f amplifier stages, or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f amplifier stages. Alignment should not be attempted by inexperienced persons as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400 cycle modulated signal at 455 kc, and 550 kc. to 44 mc. range.

(b) A $390 \pm 20\%$ ohm non-inductive carbon dummy antenna resistor.

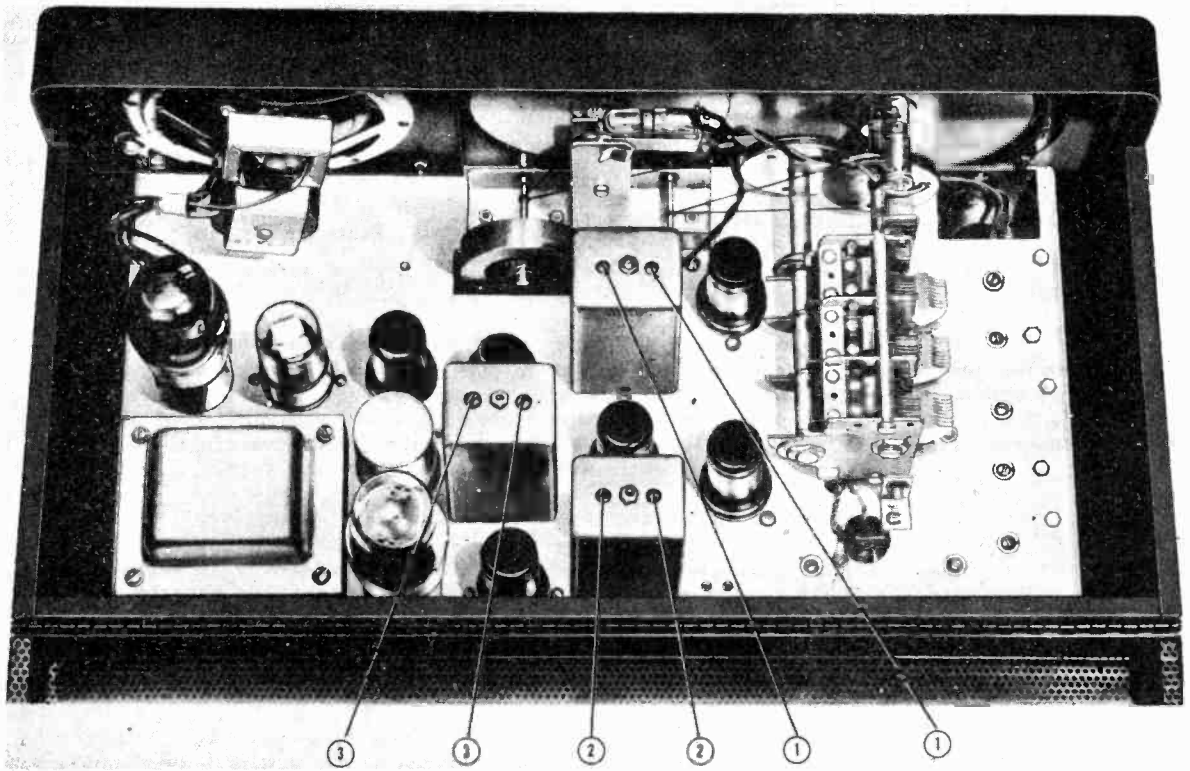
(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 1.5 watts of audio power for speaker load.

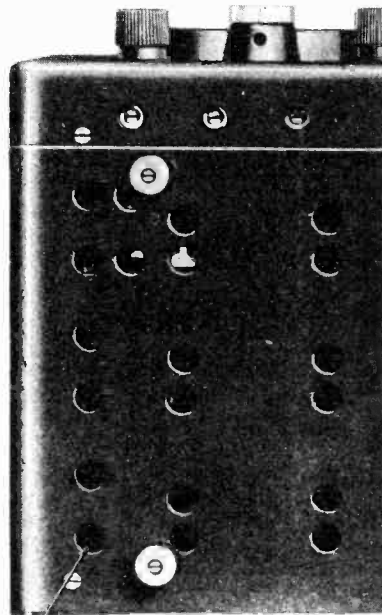
(2) I-F Amplifier Alignment. - (See Fig. 5-1)

(a) Connect the "hot" lead of the generator directly to the stator plates of the center section of the main tuning capacitor gang (the solder lug on top of that section). Connect the ground wire of the generator to the receiver chassis. Set main tuning capacitor at minimum capacity (open).

(b) Connect the output meter across the speaker voice coil and set the meter range switch for its highest range to prevent overloading the meter accidentally.



- ① I-F Adjustments for 1st I-F Transformer T-13
- ② I-F Adjustments for 2nd I-F Transformer T-14
- ③ I-F Adjustments for 3rd I-F Transformer T-15



R-F and oscillator adjustment holes

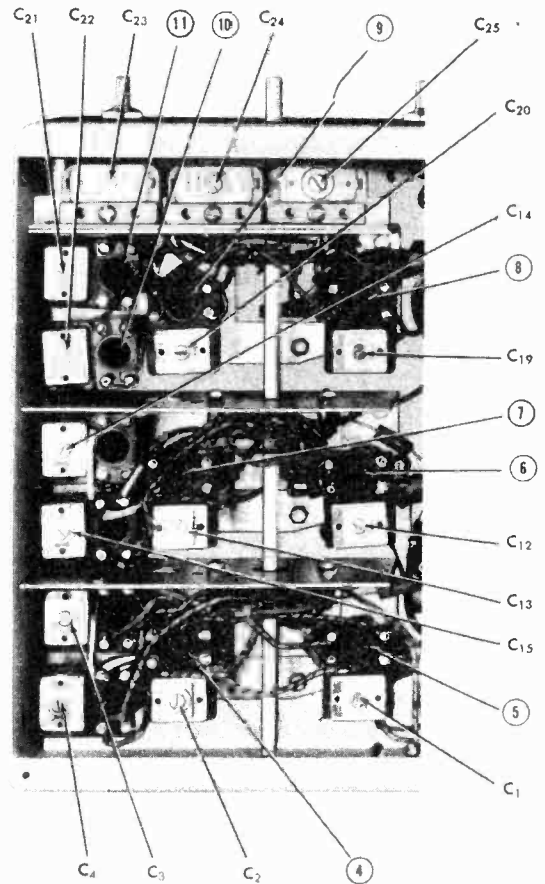


Figure 5-1. Radio Receiver Model S-40, view showing aligning points.

(c) Let the receiver warm up for approximately ten minutes, then set the receiver controls as follows:

SENSITIVITY control at maximum sensitivity (full clockwise).
 VOLUME control at maximum volume (full clockwise).
 A.V.C. switch at OFF.
 NOISE LIMITER switch at OFF.
 CW-AM switch at AM.
 TONE control at HIGH.
 STANDBY/RECEIVE switch at RECEIVE.

(d) Set the signal generator frequency at 455 kc, and turn on the 400-cycle modulation.

(e) Adjust transformers T-13, T-14, and T-15 for maximum output meter reading using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should be approximately 52 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to figure 5-1 for the location of i-f transformer adjustment screws #1 through #3 inclusive on transformers T-13, T-14, and T-15.

(3) Beat Frequency Oscillator Adjustment. -

Connect signal generator as in paragraph (2). Turn 400-cycle modulation off. Remove PITCH CONTROL knob with an Allen wrench and adjust the slotted screw shaft for zero beat. Replace knob so that red mark is on top.

(4) R-F Amplifier Alignment. -

†See note at end of this section.

(a) Connect the "hot" lead of the signal generator to terminal "A1" of the antenna terminal board through a $390 \pm 20\%$ ohm non-inductive carbon resistor. Connect the ground lead of the generator to the receiver chassis. Leave the jumper connected between terminals "A2" and "GND". Turn on the 400-cycle modulation.

(b) Let the receiver warm up for approximately ten minutes, then set the receiver controls as follows:

SENSITIVITY control at maximum sensitivity (full clockwise).
 VOLUME control at maximum volume (full clockwise).
 A.V.C. switch at OFF.
 NOISE LIMITER switch at OFF.
 CW-AM switch at AM.
 TONE control at HIGH.
 STANDBY/RECEIVE switch at RECEIVE.

NOTE - For all alignment adjustments, the signal generator output attenuator must be adjusted to provide a 500 milliwatt audio signal output at the speaker socket of the receiver on the output meter.

NOTE - Refer to figure 5-1 for all r-f alignment points.

(c) Band 4. Alignment. -

(1) Set the signal generator at 36 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 36 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-19 for maximum output with the receiver dial set at 36 mc.

(2) Set the signal generator at 18 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 18 mc. no adjustment is necessary - if not, adjust slug #8 on transformer T-9 for maximum output with the receiver dial set at 18 mc.

NOTE - If slug #8 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-19 in step (1) and slug #8 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

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(3) Set signal generator and receiver at 36 mc. and adjust trimmers C-1 and C-12 for maximum output.

(4) Set signal generator and receiver at 18 mc. and adjust slugs #5 and #6 for maximum output.

NOTE - If slugs #5 and #6 have been adjusted, it will be necessary to repeat step (3) again. Several adjustments of capacitors C-1 and C-12 and slugs #5 and #6 may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(d) Band 3. Alignment. -

(1) Set the signal generator at 14 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 14 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-20 for maximum output with the receiver dial set at 14 mc.

(2) Set the signal generator at 7 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 7 mc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-23 for maximum output with the receiver dial set at 7 mc.

NOTE - If capacitor C-20 has been adjusted, it will be necessary to repeat step (1) again. Several adjustments of capacitor C-20 in step (1) and capacitor C-23 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator at 10 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 10 mc. no adjustment is necessary - if not, adjust slug #9 on transformer T-10 for maximum output with the receiver dial set at 10 mc.

(4). If slug #9 has been adjusted, repeat steps (1) and (2).

(5) Set the signal generator and receiver at 14 mc. and adjust trimmers C-2 and C-13 for maximum output.

(6) Set signal generator and receiver at 7 mc. and adjust slugs #4 and #7 for maximum output.

NOTE - If slugs #4 and #7 have been adjusted, it will be necessary to repeat step (3) again. Several adjustments of capacitors C-2 and C-13 and slugs #4 and #7 may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(e) Band 2. Alignment. -

(1) Set the signal generator at 5 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 5 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-21 for maximum output.

(2) Set the signal generator at 1.8 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1.8 mc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-24 for maximum output with the receiver dial set at 1.8 mc.

NOTE - If capacitor C-21 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-21 in step (1) and capacitor C-24 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator at 3 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 3 mc. no adjustment is necessary - if not, adjust slug #11 on transformer T-11 for maximum output with the receiver dial set at 3 mc.

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(4) If slug #11 has been adjusted repeat steps (1) and (2).

(5) Set the signal generator and receiver at 5 mc. and adjust trimmers C-3 and C-14 for maximum output.

(f) Band 1. Alignment. -

(1) Set the signal generator at 1500 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1500 kc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-22 for maximum output with the receiver dial set at 1500 kc.

(2) Set the signal generator at 600 kc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 600 kc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-25 for maximum output with the receiver dial set at 600 kc.

NOTE - If capacitor C-22 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-22 in step (1) and capacitor C-25 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator and receiver at 1000 kc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1000 kc. no adjustment is necessary - if not, adjust slug #10 on transformer T-12 for maximum output with the receiver dial set at 1000 kc.

(4) If slug #10 has been adjusted repeat steps (1) and (2).

(5) Set the signal generator and receiver at 1500 kc. and adjust trimmers C-4 and C-15 for maximum output.

NOTE - After completing the above r-f alignment procedure check the image frequency to determine whether the oscillator frequency is higher than the signal frequency on bands 1, 2 and 3, and lower than the signal frequency on band 4.

(g) When completely aligned the overall receiver sensitivity will usually run from 7.2 microvolts at 600 kc. to 5 microvolts at 36 mc. for 500 milliwatts audip output. If your receiver falls reasonably close to this sensitivity, consider your job finished.

4. LOCATING FAULTS WITH A VOLT-OHM METER.

a. Voltage Chart. Refer to schematic for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. The readings were taken with a Weston Model 772 Analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A1, A2, and G, and set the controls as follows:

STANDBY/RECEIVE switch at RECEIVE.
A.V.C., NOISE LIMITER at ON and AM-CW switch at CW.
SENSITIVITY and VOLUME controls full clockwise.
TUNING, and PITCH CONTROL adjustments do not effect the reading.
TONE control at any one of the three tone positions.

b. Resistance Chart. - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements. To identify tube socket connections, refer to Fig. 7-6. The readings were taken with a Weston Model 772 Analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

STANDBY/RECEIVE switch at RECEIVE.
A.V.C., NOISE LIMITER at ON and AM-CW switch at CW.
SENSITIVITY and VOLUME controls full clockwise position.
TONE control at any one of the three tone positions.
TUNING and PITCH control adjustments do not effect the readings.

c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistance instead of winding resistance alone as indicated in the chart.

Circuit Symbol	Name of Part	Winding	Winding Terminals	D-C Resistance (Ohms)
T-16	TRANSFORMER, audio	Primary	Primary	400
		Secondary	Secondary	* 5
SPKR FIELD	Speaker field	-	-	1500
T-18	TRANSFORMER, power	Primary	1 to 3	6
		H.V. secondary	6 to 10	280
		$\frac{1}{2}$ H.V. second-	6 to 8	140
		ary	8 to 10	140
		6.3-volt sec-	2 to 4	ZERO
	ondary			
		5.0-volt sec-	7 to 9	ZERO
		ondary		

* With speaker plug in socket.

† Note Rock main tuning gang capacitor when making r-f adjustments on bands 3 and 4.

TUBE COMPLEMENT.

Symbol	Tube Type	Function
V-1	6SG7	R-F amplifier
V-2	6SA7	Mixer and local oscillator.
V-3	6SK7	1st i-f amplifier
V-4	6SK7	2nd i-f amplifier
V-5	6SQ7	Detector, 1st audio amplifier
V-6	6F6-G	Audio power amplifier
V-7	6H6	A-V-C. and noise limiter
V-8	6J5	Beat frequency oscillator
V-9	80	Rectifier

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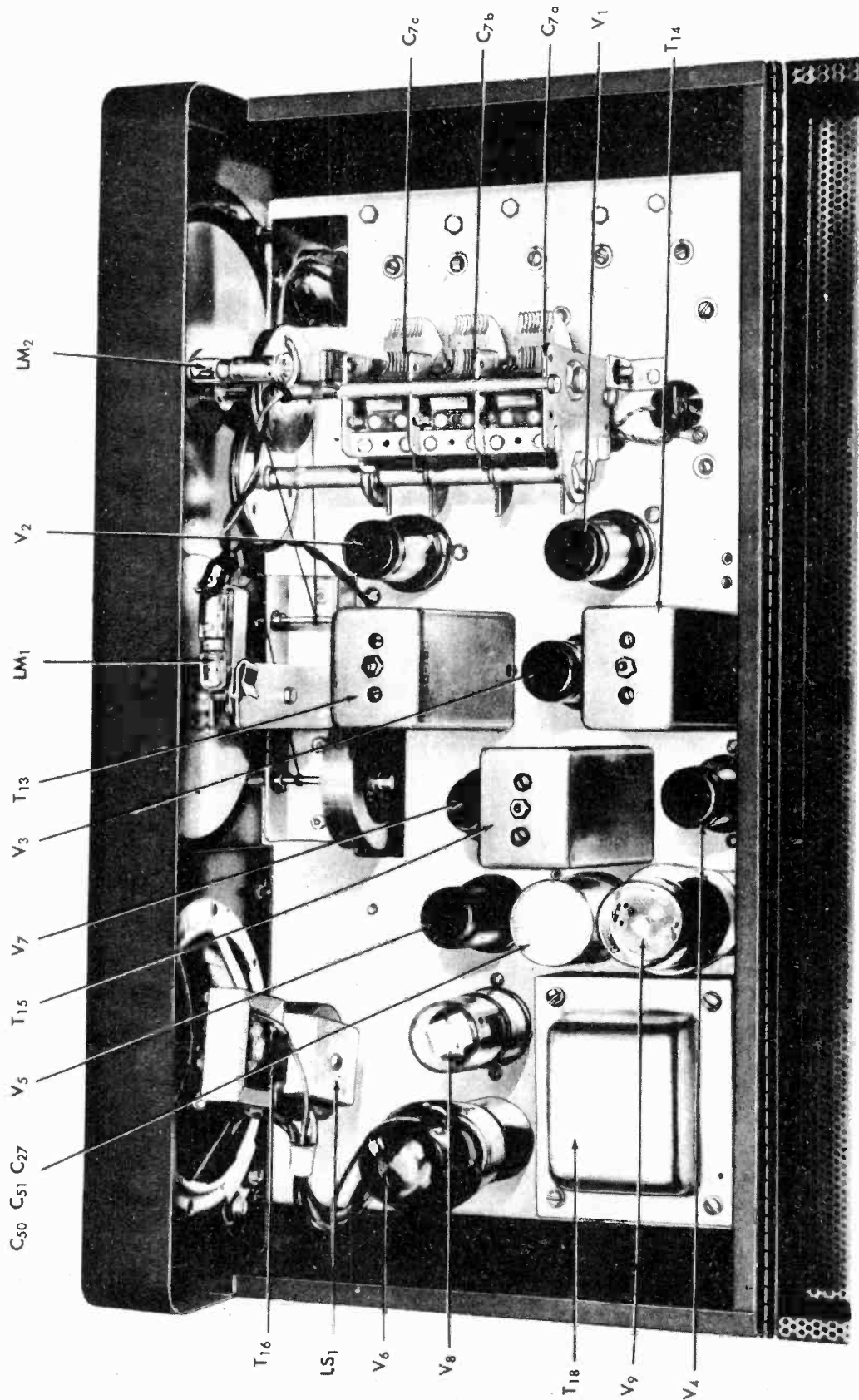


Figure 7-1. Radio Receiver Model S-40, top view.

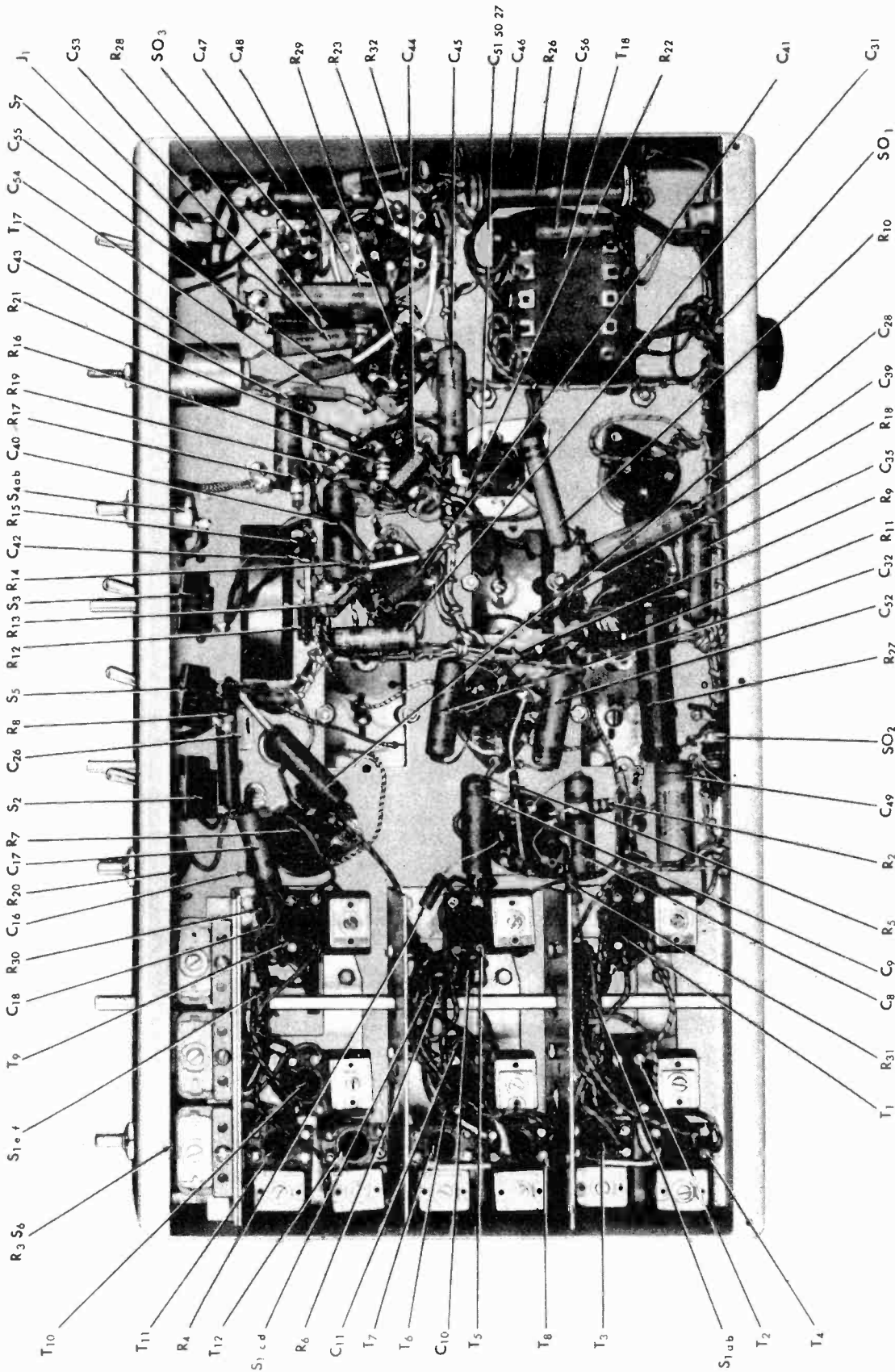


Figure 7-2. Radio Receiver Model S-40, bottom view.

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MODEL 8-40, Revised

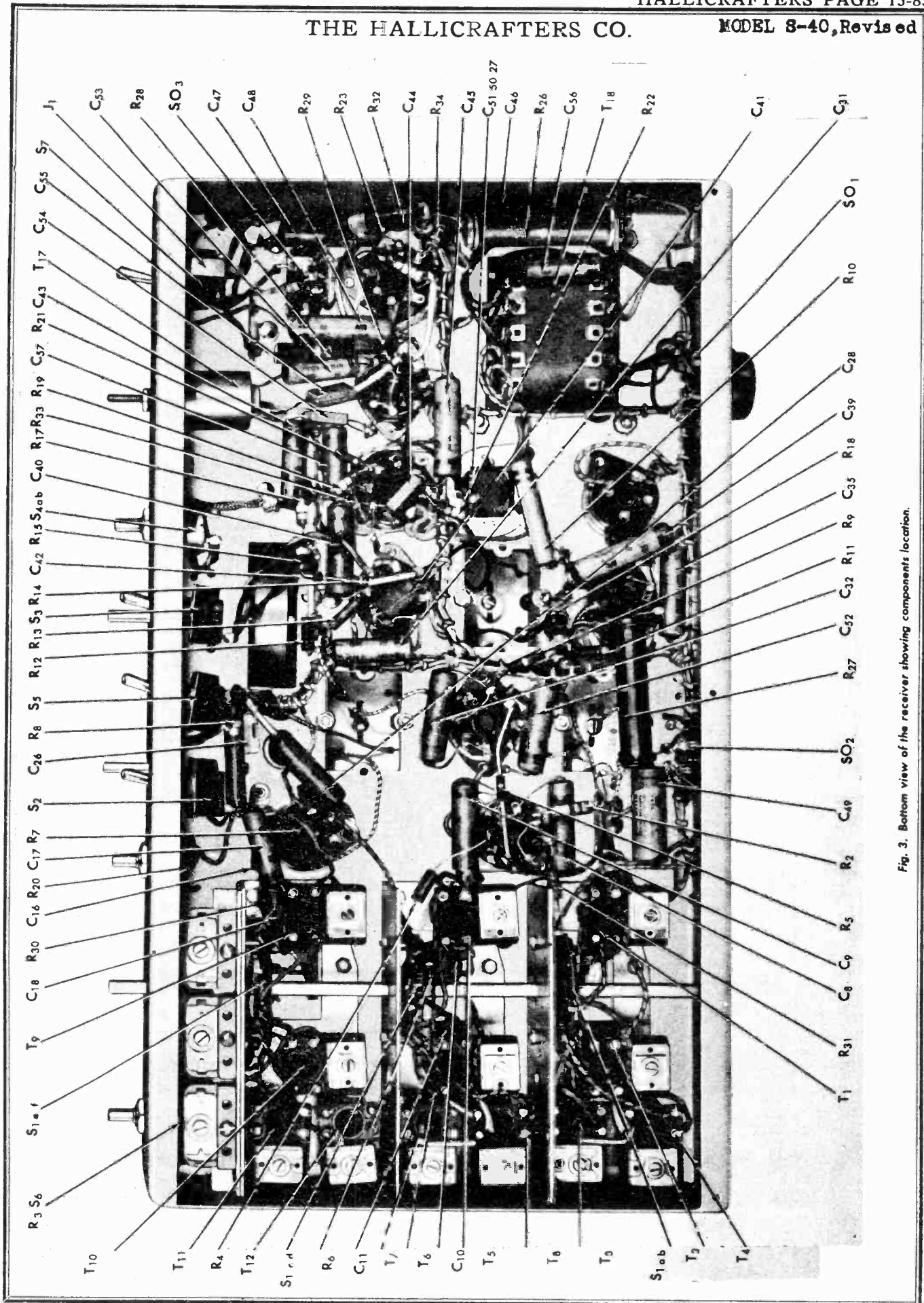


Fig. 3. Bottom view of the receiver showing components location.

IF FREQUENCY	IF SELECTIVITY	IMAGE RATIO	SENSITIVITY
455 kc	6.8 kc wide at 6 db down 40.7 kc wide at 60 db down (for 500 milliwatt output)	6:1 at 30 mc 15:1 at 14 mc 37:1 at 5 mc 1000:1 at 1500 kc	15 microvolt for milliwatt output at 8 microvolt for 5 milliwatt output at

CONTROL SETTINGS FOR PRELIMINARY TEST OPERATION (Broadcast)

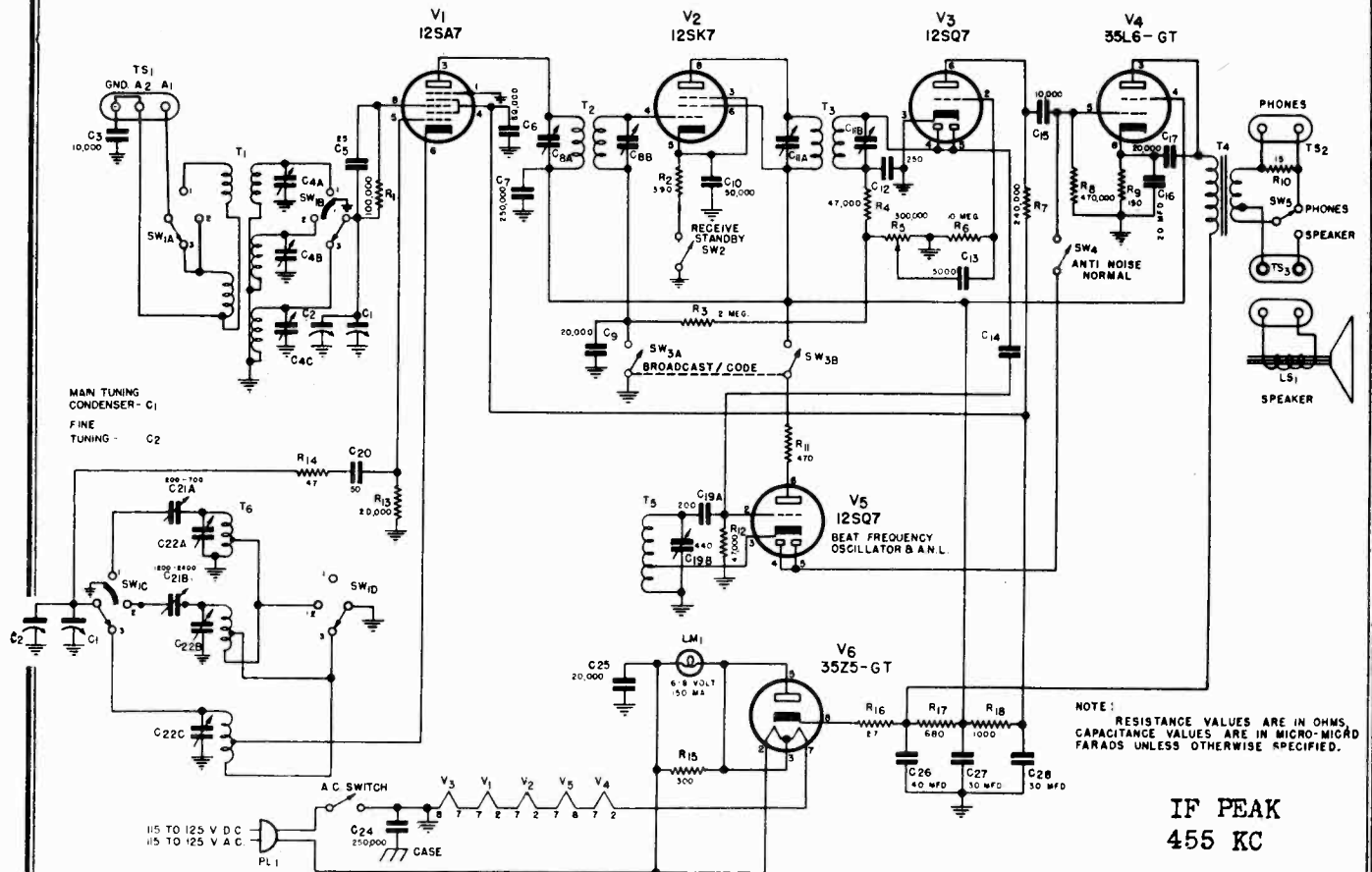
REF. NO. (in Fig. 1)	NAME	FUNCTION	SETTING	REF. NO. (in Fig. 1)	NAME
1	SENSITIVITY	RF gain control	Maximum clockwise	7	NOISE LIMITER
2	BAND SELECTOR	Operating band selector	Counter clockwise to "1"	8	BAND SPREAD
3	VOLUME	Audio gain control	Half clockwise; adjust as necessary	9	PHONE
4	AVC	Automatic volume control	AT "ON"	10	PITCH CONTROL
5	TUNING	Main tuning control	To local station frequency on main dial scale	11	PHONES
6	CW/AM	BFO on/off switch	At "AM"	12	STANDBY RECEIVE

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	COMPONENT LIST PRICE	REF. NO.	DESCRIPTION	QUANTITY IN EQUIP.	PRICE
CAPACITORS							
C-1, 2, 12, 13 and 19	4 to 80 mmf trimmer for transformers T-1, T-2, T-5, T-6 and T-9	44A149	\$ 10	S-1	BAND SELECTOR (with each waffle chassis, ganged)		
C-3, 4, 14, 15, 20, 21 and 22	1.5 to 15 mmf trimmer for transformers T-3, T-4, T-7, T-8, T-10, T-11 and T-12	44A147	10	S-2, 3, 5 and 7	Shaft and insulator assembly		
C-5	0.05 mfd.; +60-20%; 300 vdcw, paper	46A091	20	S-4	A V.C. ON/OFF; SPST; toggle; 3 amp @ 250 volts		60A138 25
C-6 and 7	Tuning capacitor; 3 sections ganged	48C138	3.75	S-6	DC power source input socket; octal, female, Amphenol type MIP-8		60A225 45
C-8, 32, 35 and 40	0.05 mfd.; +40-10%; 500 vdcw, paper	46AU503J	10	SO-1	Connection for external "S" meter; 5 contacts, female, Amphenol type MIP-5		6A035 10
C-9, 28 and 52	0.05 mfd.; +40-10%; 400 vdcw, paper	46AW503J	10	SO-2	Speaker plug connection; 5 contacts, female, Cinch type 2649-B		6A186 10
C-10	24 mmf.; ±20%; 500 vdcw, neg. temp. coeff.	CC21UK240M	15	SO-3	DC power source input socket; octal, female, Amphenol type MIP-8		6A246 10
C-11	750 mmf. mmf. deg. C.; ceramic	CC21UK150M	15				
C-16	15 mmf.; +20%; 500 vdcw, neg. temp. coeff.	CM20A391K	15				
C-17, 53 and 56	750 mmf. mmf. deg. C.; ceramic	46AW103J	10				
C-18	390 mmf.; ±20%; 500 vdcw, mica	CC25UK101K	15				
C-23	0.01 mfd.; +40-10%; 400 vdcw, paper	44B141	50				
C-24	100 mmf.; ±10%; 500 vdcw, neg. temp. coeff.	44A024	35				
C-25	0.00075 mmf./mmf. deg. C.; ceramic	44A142	25				
C-26	2645 mmf. nominal; pad for transformer T-10	44A158	15				
C-27, C-50 and C-51	1300 mmf. nominal; pad for transformer T-11						
	490 mmf. nominal; pad for transformer T-12						
	3 mmf. ± 0.2 mmf. at 25 deg. C.; temp. compensating for oscillator stage						
	Electrolytic; 3 section unit; coded lug terminals; sect. 1 (C-50) 30 mfd., +40-10%; sect. 2 (C-27) and sect. 3 (C-51) each 10 mfd., +40-10%; all sections 450 vdcw.	45A062	1.60				
C-29 and 30, 33 and 34	Dual trimmer unit for IF transformers T-13 and T-14	44A095	25				
C-31 and 43	0.02 mfd.; +40-10%; 200 vdcw, paper	46AU203J	10				
C-36 and 37	Dual trimmer unit for IF transformer T-15	44A098	25				
C-38	2 mmf. gamic k; formed by twisting two insulated wire leads; NOT AVAILABLE AS A REPLACEMENT PART, SHOWN FOR REFERENCE ONLY						
C-39, 45 and 48	0.02 mfd.; +40-10%; 600 vdcw, paper	46AY203J	\$ 10				
C-41 and 42	47 mmf.; ±20%; 500 vdcw, mica	CM20A478M	10				
C-44	270 mmf.; ±10%; 500 vdcw, mica	CM20A271K	15				
C-46	Electrolytic; 30 mfd.; +250-10%; 25 vdcw; axial stranded wire leads	45A034	35				
C-47	0.002 mfd.; +40-15%; 800 vdcw, paper	46A104	10				
C-49	0.01 mfd.; +40-10%; 400 vdcw, paper	46AV104J	10				
C-54	560 mmf.; ±5%; 500 vdcw, mica	CM25A6 J	15				
C-55	100 mmf.; ±20%; 500 vdcw, mica	CM20A101M	10				
C-57	1000 mfd.	46AZ302J	10				
JACKS							
J-1	PHONES jack; closed circuit; short body; accepts standard headset plug	36A002	30				
LAMPS							
LM-1 and 2	6.8 vtr 250 ma; blue bead; G.E. type 44	39A003	10				
LOUDSPEAKER							
LS-1	5" P.M. speaker; 3 1/2 ohm voice coil						
PLUGS							
PL-1	AC line cord and standard 2 prong plug	87A078	35				
PL-2	AC operating shoring plug; Amphenol octal, male, type CP-8; includes jumpers wired between pins 1, 4 and 6, 7	35A003	10				
PL-3	Speaker connecting plug; Cinch type 2749; part of speaker LS-1 assembly	10A197	10				
RESISTORS							
R-1 and 15	100,000 ohm; ±20%; 1/2 watt; carbon	RC20AE104M	\$ 10				
R-2	120 ohm; ±10%; 1/2 watt; carbon	RC20AE121K	10				
R-3 and S-6	SENSITIVITY control; 10,000 ohm; includes SPST toggle action switch (S-6) on rear	25A533	50				
R-4	22 ohm; ±20%; 1/2 watt; carbon	RC20AE220M	10				
R-5, 18 and 32	1,000 ohm; ±20%; 1/2 watt; carbon	RC20AE102M	10				
R-6	6,800 ohm; ±10%; 1 watt; carbon	RC20AE682K	10				
R-7	10,000 ohm; ±10%; 1/2 watt; carbon	RC20AE103K	10				
R-8	10,000 ohm; ±10%; 2 watt; carbon	RC41AE103K	10				
R-9 and 11	1,000 ohm; ±10%; 1/2 watt; carbon	RC20AE102K	10				
R-10	12,000 ohm; ±10%; 4 watt; carbon	RC65CE123K	10				
R-12	2.2 megohm ±20%; 1/2 watt; carbon	RC20AE225M	10				
R-13	1 megohm; ±20%; 1/2 watt; carbon	RC20AE105M	10				
R-14 and 29	47,000 ohm; ±20%; 1/2 watt; carbon	RC20AE473M	10				
R-17, 19 and 22	270,000 ohm; ±10%; 1/2 watt; carbon	RC20AE473M	10				
R-20	AUDIO GAIN control; 500,000 ohm	25A534	35				
R-21	150 ohm; ±20%; 1/2 watt; carbon	RC20AE151M	10				
R-23	470,000 ohm; ±20%; 1/2 watt; carbon	RC20AE474M	10				
R-24	680 ohm; ±10%; 1 watt; carbon	RC31AE681K	10				
R-25	15,000 ohm; ±20%; 1 watt; carbon	RC41AE153M	10				
R-26	12,000 ohm; ±10%; 2 watt; carbon	RC41AE123K	10				
R-27	10,000 ohm; ±10%; 4 watt; carbon	RC65CE103K	10				
R-28	15,000 ohm; ±20%; 2 watt; carbon	RC41AE153M	10				
R-30	10 ohm; ±20%; 1/2 watt; carbon	RC20AE100M	10				
R-32	1,500 ohm; ±10%; 10 watt; wire wound	24B1142E	30				
R-33	15 megohm; ±20%; 1/2 watt; carbon	RC10AE156M	10				
R-34	10,000 ohm; ±20%; 1/2 watt; carbon	RC20AE103M	10				
TRANSFORMERS							
T-1	Antenna coil for Band 4; variable iron core						51B783
T-2	Antenna coil for Band 3; variable iron core						51B782
T-3	Antenna coil for Band 2; air core						51B781
T-4	Antenna coil for Band 1; air core						51B780
T-5	Mixer coil for Band 4; variable iron core						51B787
T-6	Mixer coil for Band 3; variable iron core						51B786
T-7	Mixer coil for Band 2; air core						51B785
T-8	Mixer coil for Band 1; air core						51B784
T-9	Oscillator coil for Band 4; variable iron core						51B791
T-10	Oscillator coil for Band 3; variable iron core						51B790
T-11	Oscillator coil for Band 2; variable iron core						51B789
T-12	Oscillator coil for Band 1; variable iron core						51B788
T-13	1st IF transformer; 455 kc; shielded						50C185
T-14	2nd IF transformer; 455 kc; shielded						50C186
T-15	Diode IF transformer; 455 kc; shielded						50C192
T-16	Audio output transformer; part of loudspeaker LS-1 assembly but is available as a separate replacement part						54B028
T-17	BFO coil; 455 kc; shielded						
T-18	Power transformer; primary—117 volt AC, 50/60 cycle; high voltage secondary 342 volts each side of center tap (no load); filament secondary 6.3 volts @ 3.5 amp; rectifier filament secondary 5 volt @ 2 amp; solder lug terminals at base						52C026 3.30
T-18*	Power transformer; same as T-18 above, except primary—110/130/150/220/250 volt AC, 25 cycles						52C027 8.35
TERMINAL STRIPS							
TS-1	Antenna and ground connector strip; marked "A1", "A2" and "G" on face; Cinch type 1738						88A032 10
MISCELLANEOUS MECHANICAL COMPONENTS							
	Octal tube sockets						6A035 10
	4 prong tube socket; for rectifier						6A025 10
	Pilot lamp socket; main tuning dial; bayonet base						86A033 10
	Pilot lamp socket; bandspread dial light; bayonet base						86A034 10
	Bandspread knob drive shaft						74A170 10
	Main tuning knob drive shaft						74A171 10
	Bandspread dial drive shaft						74A169 10
	Bandspread dial drive pulley						28A012 40
	Bracket; main tuning and bandspread dial drive						67B803 30
	Flywheel; bandspread tuning						71A169 10
	Pulley; 2" O.D.; capacitor drive; main tuning						28A002 50
	Pulley; 2" O.D.; capacitor drive; bandspread tuning						28A019 10
	Calibrated scale; main tuning						83C240 85
	Calibrated scale; bandspread tuning						83B254 75
	Escutcheon; main tuning dial; includes window						78017 75
	Escutcheon; bandspread tuning dial; includes window						70C34 1.85
	Tension springs; dial cabling						75A012 10
	Cabinet mounting feet; rubber						16A007 10
	Knobs; main tuning and bandspread controls						15A047 25
	Knobs; SENSITIVITY, VOLUME and TONE controls						15A048 10
	Knob; BANDSWITCH control; aluminum						15B053 40
	Knob; PITCH CONTROL						15A058 10
	Top cover for receiver cabinet						66D285 2.60
	Receiver cabinet						66E284 2.85

Note: All prices are subject to change without notice.

THE HALLICRAFTERS CO.

MODELS S-41G, S-41W



NOTE: RESISTANCE VALUES ARE IN OHMS. CAPACITANCE VALUES ARE IN MICRO-MICRO FARADS UNLESS OTHERWISE SPECIFIED.

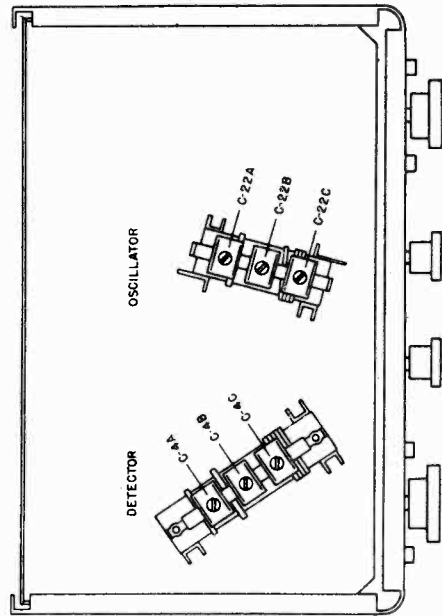
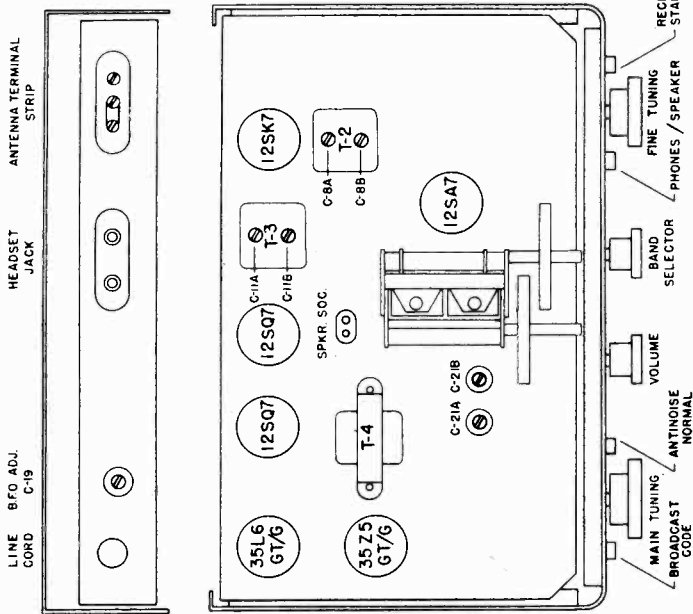
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December 1945

Foreign and Domestic Broadcast Reception. - To receive broadcast stations set the controls as follows:

- VOLUME control** - Set at OFF when the receiver is not in use. Turn to the right until desired volume is obtained after tuning in the station.
- BAND SELECTOR switch** - Set at band number corresponding to the range covering desired frequency of reception.
- BROADCAST-CODE switch** - Set at Broadcast. This switch may be set at CODE to help tune in weak phone signals by tuning for zero beat and then switching back to BROADCAST.
- PHONES/SPEAKER switch** - Set at PHONES for headset reception; set at SPEAKER for loud-speaker reception.
- RECEIVE-STANDBY switch** - Set at RECEIVE when listening, set at STANDBY during short standby periods.
- FINE TUNING control** - Set at zero when tuning in stations with the MAIN TUNING control. Tuning dial calibrations are true only when the FINE TUNING pointer is set at zero. Use the FINE TUNING control for amateur band reception or for vernier tuning in the short wave bands.
- MAIN TUNING control** - Set main tuning pointer at frequency of desired station. FINE TUNING pointer must be set at zero for true calibration.
- ANTI NOISE-NORMAL switch** - Set at NORMAL unless background noise is excessive.

Foreign and Domestic Code Reception. - To receive code stations set the BROADCAST-CODE switch at CODE. All other controls are to be handled as for foreign and domestic broadcast.

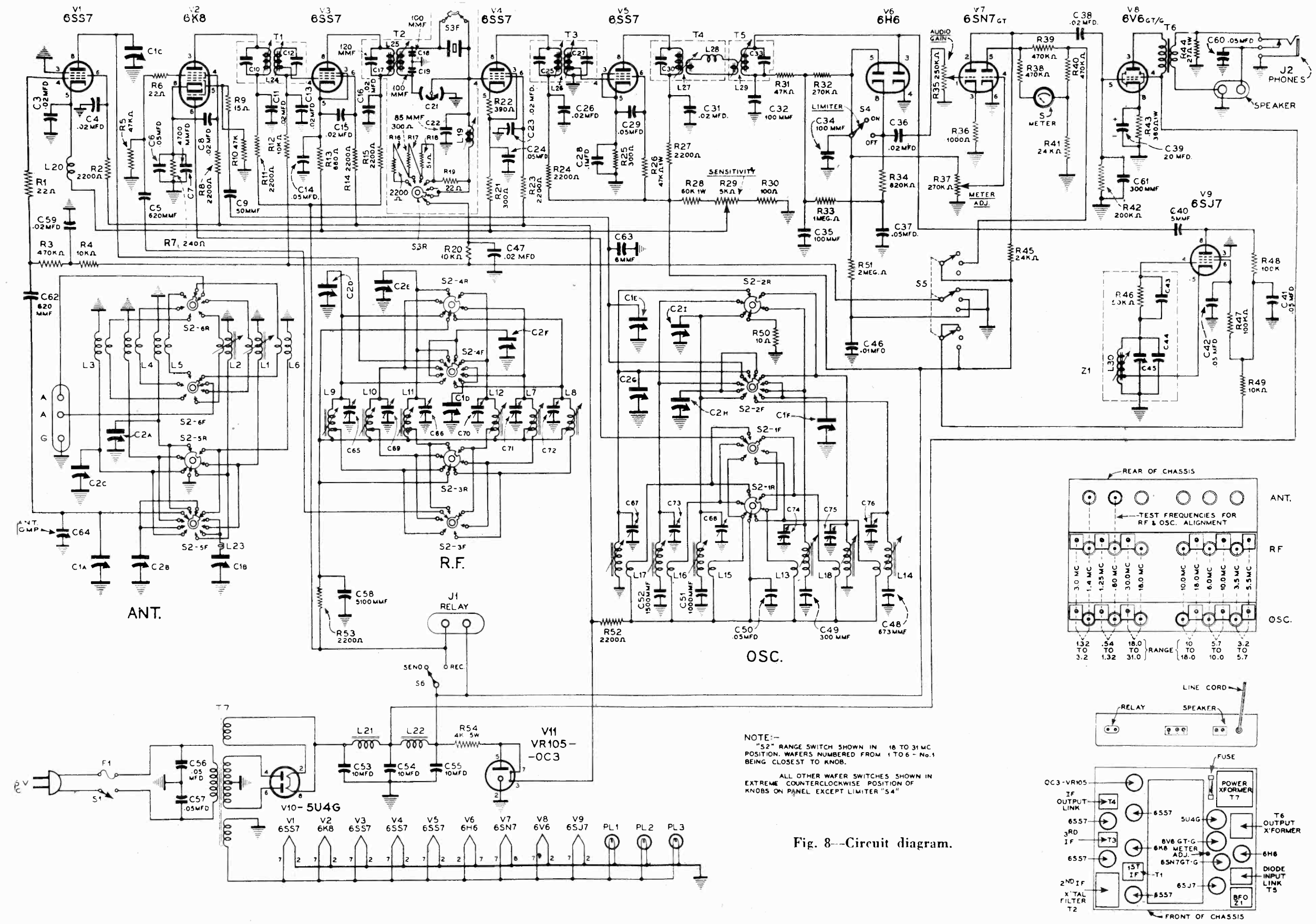


Listed below in table form, are the alignment frequencies and adjustments necessary to align the receiver. CAUTION - Do not connect signal generator ground directly to the chassis, connect it to the "G" terminal of the antenna terminal strip.

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
2	2.4 mc. 7.0 mc.	330 ohm 330 ohm	C-21B None	None C-22B
3	No low frequency adjustment on this band. 28 mc.	330 ohm	None	C-22C

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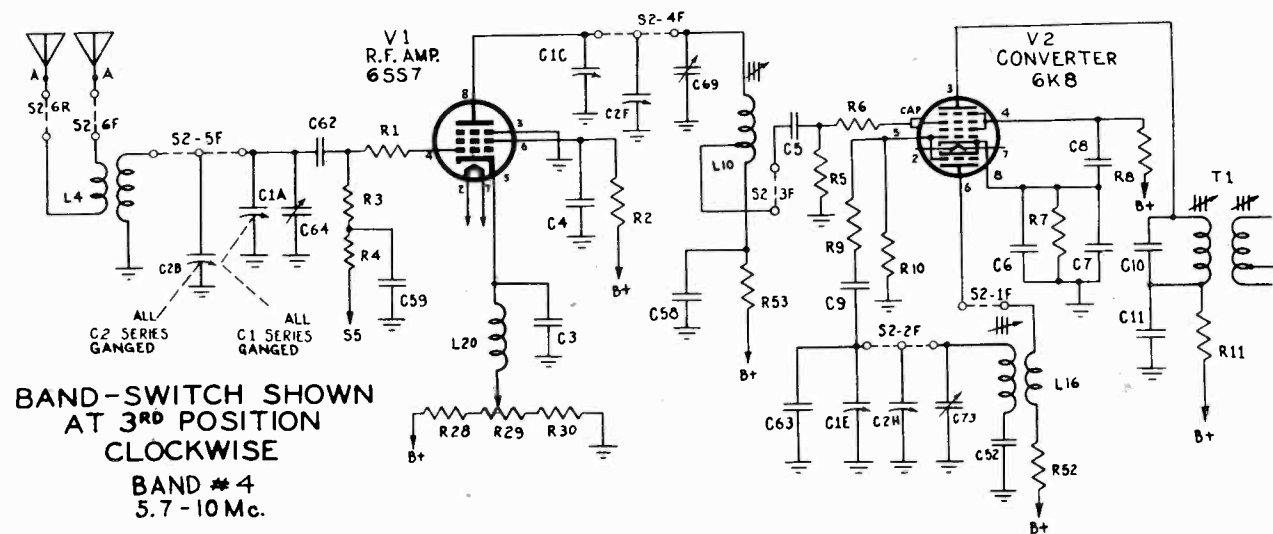
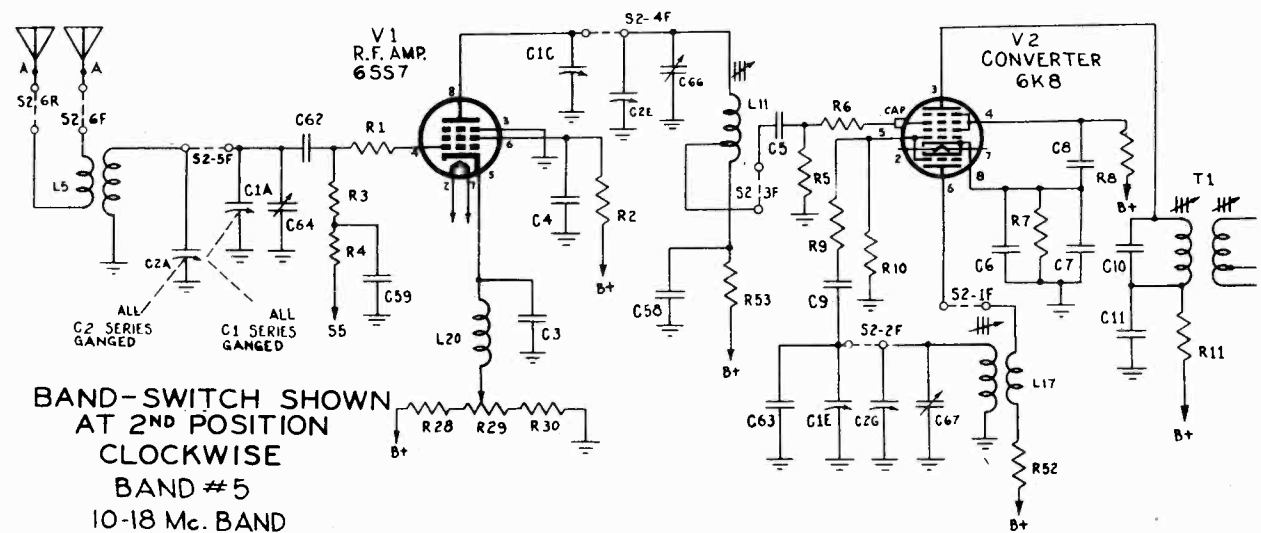
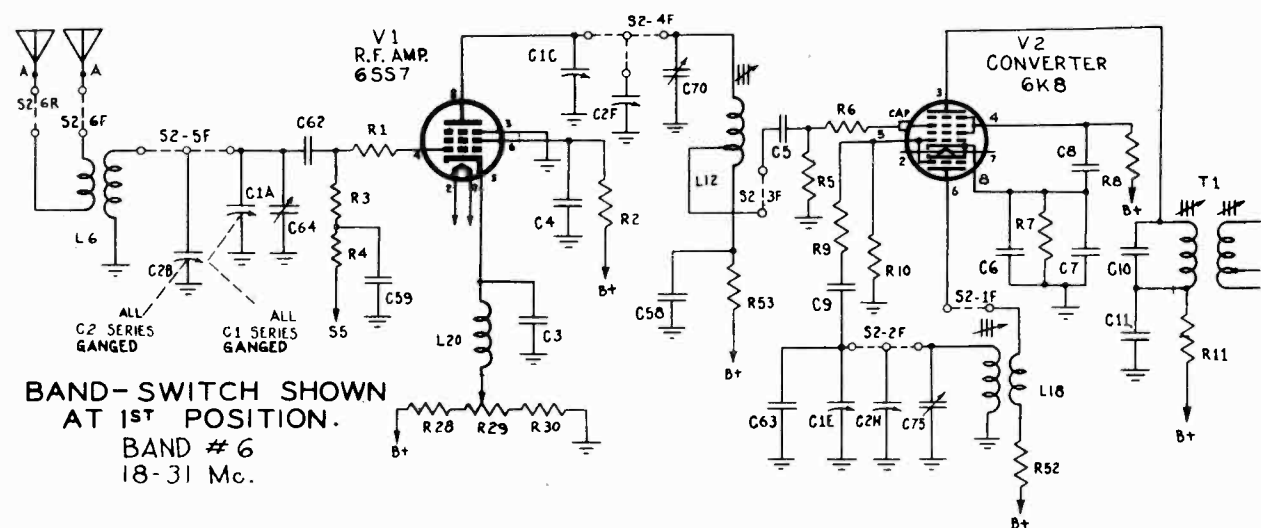


NOTE:-
"S2" RANGE SWITCH SHOWN IN 18 TO 31 MC POSITION. WAFERS NUMBERED FROM 1 TO 6 - No. 1 BEING CLOSEST TO KNOB.
ALL OTHER WAFER SWITCHES SHOWN IN EXTREME COUNTERCLOCKWISE POSITION OF KNOBS ON PANEL EXCEPT LIMITER "S4"

Fig. 8--Circuit diagram.

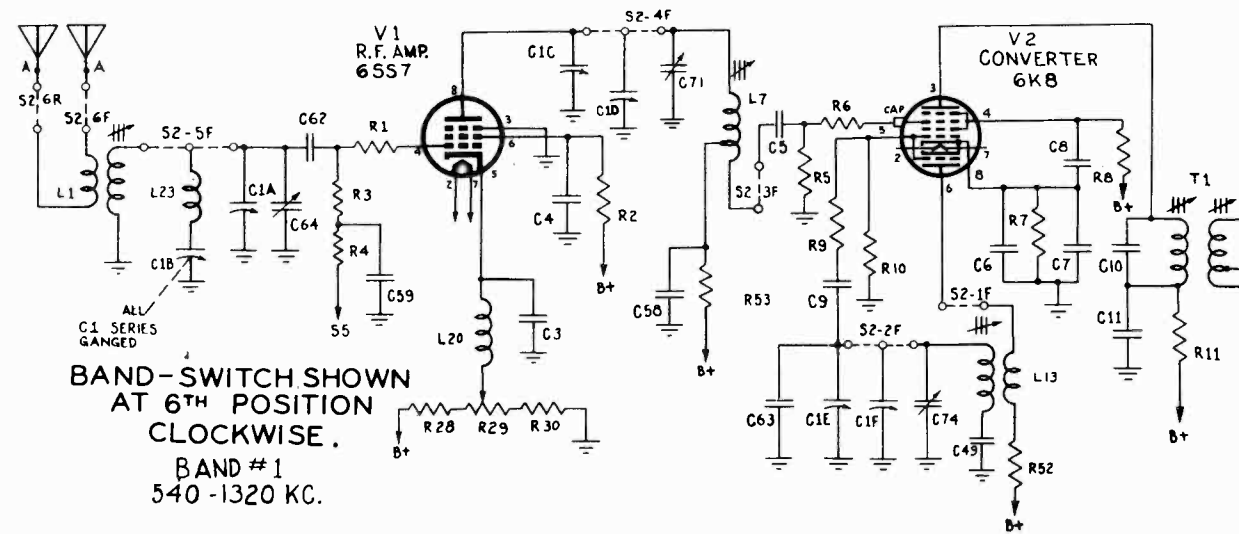
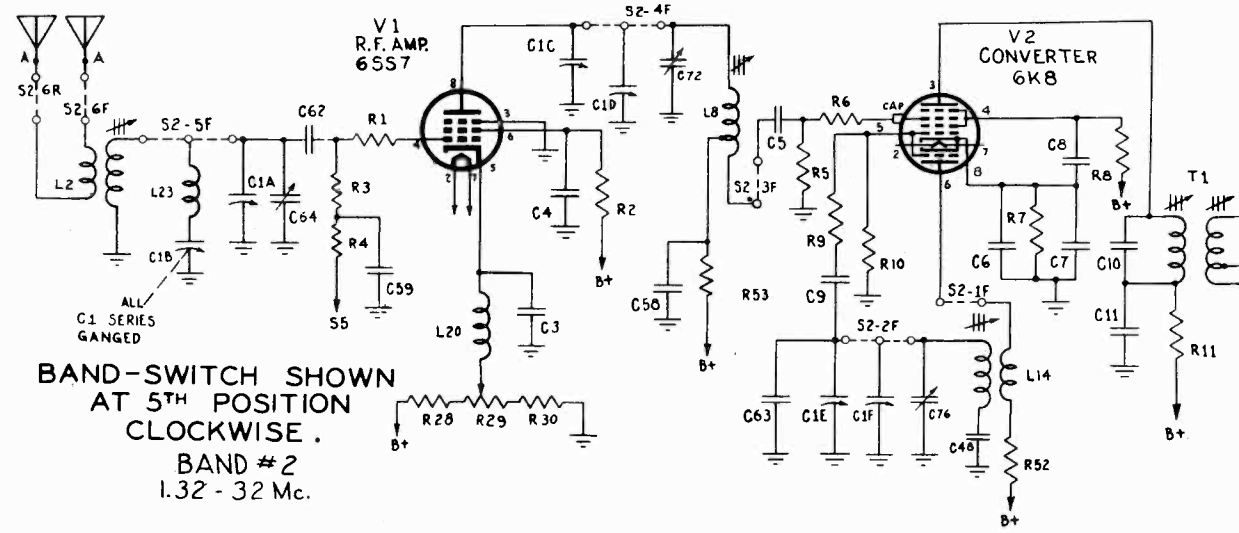
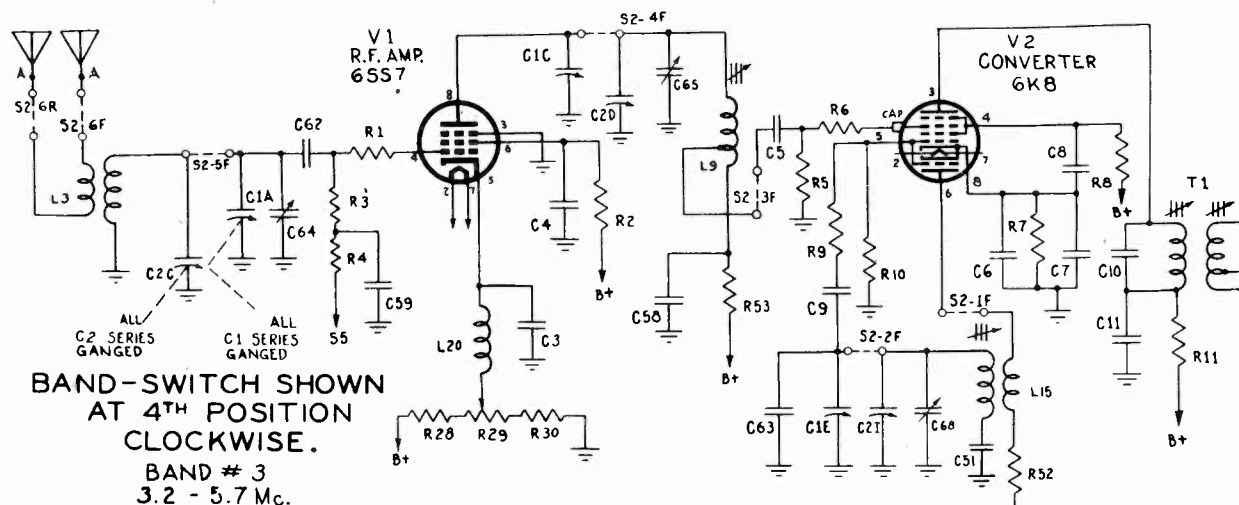
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MODEL HQ-129-X



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MODEL HQ-129-X



TUNING RANGES

Band	Frequency	Meters
1	540—1320 KC	555—227
2	1.32—3.2 MC	227—93.7
3	3.2—5.7 MC	93.7—52.6
4	5.7—10 MC	52.6—30.0
5	10—18 MC	30—16.7
6	18—31 MC	16.7—9.7

TECHNICAL DESCRIPTION

This receiver is sensitive enough to pick up extremely weak signals and has the selectivity to separate signals in the more crowded bands. It covers a continuous range of frequencies from 540 KC. to 31 MC, or from 555 meters to 9.7 meters, in six bands. Band spread tuning is supplied on the four higher frequency bands, with actual calibration in the 80, 40, 20 and 10 meter amateur bands.

DESIGN

PRE-SELECTION

The pre-selection or tuned R.F. stage for each band of this receiver is designed for high performance. Entirely individual tuning coils are used for each band. These along with the multi-section variable condenser permit the proper LC ratio for best performance to be used with each band. Both grid and plate circuits are tuned. A compensating condenser, adjustable from the front of the panel, provides perfectly aligned input circuits with any given antenna system.

These features of design provide high selectivity and high gain and afford maximum signal-to-noise ratio and maximum image signal rejection.

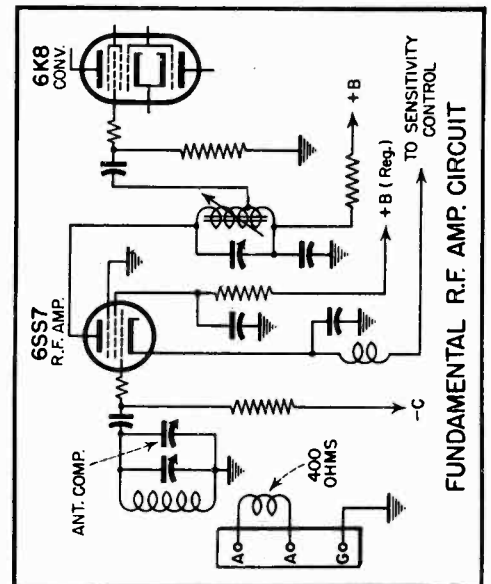


Fig. 2—Tuned R.F. amplifier and converter. Careful circuit design improves signal-to-noise ratio.

TUBE LINE-UP

Symbol	Type	Function
V-1	6SS7 Triple-Grid Super Control Amplifier, Single Ended	R.F. Amplifier
V-2	6K8 Triode-Hexode Converter	Converter or 1st Detector and Oscillator
V-3	6SS7 See Above	1st I.F. Amplifier
V-4	6SS7 See Above	2nd I.F. Amplifier
V-5	6SS7 See Above	3rd I.F. Amplifier
V-6	6H6 Twin Diode	Detector and Noise Limiter
V-7	6SN7GT/G Twin Triode Amplifier	1st Audio Amplifier and "S" Meter Tube
V-8	6V6GT/G Beam Power Amplifier	Audio Power Amplifier and output Tube
V-9	6SJ7 Triple Grid Tube	Beat Frequency Oscillator
V-10	5U4C Full Wave Rectifier	Rectifier
V11	0C3/VR105 Voltage Regulator	Voltage Regulator

BAND SPREAD

An exceptionally wide band spread of 310 degrees supplied by a special 9 section condenser, is provided on the 4 higher frequency ranges. The band spread dial has 5 scales. Four of these are directly calibrated for the 80, 40, 20 and 10 meter amateur bands. The fifth

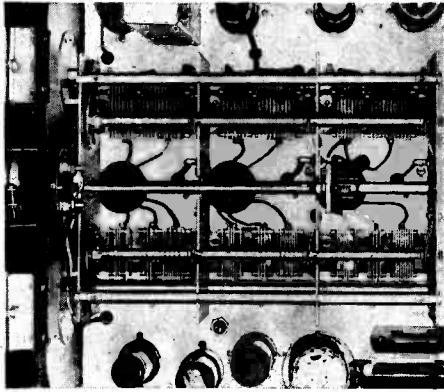


Fig. 3—Precision H.F. tuning assembly.

selected by a six-position panel control, are provided for reducing interference. Steps 1, 2, and 3, varying from broad to fairly sharp, may normally be used for phone reception, depending upon the degree of fidelity desired. Steps 4 and 5, giving sharper selectivity, may be used for CW code reception. The "OFF" position of the control cuts out the crystal filter when broadest selectivity or highest fidelity is desired. The curves of Fig. 5, indicate the degrees of broadness or sharpness that may be obtained.

Along with the crystal filter, a phasing control is provided to eliminate interfering heterodynes, within limits. Fig. 5, is a schematic diagram of the filter and phasing circuit. The complete unit is shown in Fig. 4.

The over-all gain of the receiver is not noticeably affected by the changes in selectivity of the filter nor is the reading of the "S" Meter appreciably affected.

scale is an arbitrary 0-200 division scale, provided for making up calibration charts for other bands, such as the short wave international broadcast bands. It is also of use in logging stations.

The following table shows the approximate frequency range that can be covered by the band spread dial at different points on each of the 4 higher frequency bands.

Band	Low End	Middle	High End
3.2 MC—	5.7 MC	.4 MC	.7 MC
5.7 MC—	10 MC	.2 MC	.5 MC
10 MC—	18 MC	.2 MC	.5 MC
18 MC—	31 MC	.6 MC	1.2 MC
			2.2 MC

It should be noted that the Main Tuning dial has been calibrated with the Band Spread dial set at 200 which corresponds to minimum band spread capacity included in the circuit. To use band spread tuning, the Main Tuning dial should be set at the high frequency end of the desired band with the Band Spread dial set at 200. Lower frequencies such as those in the above table will then be obtained as the Band Spread dial setting is decreased.

CONVERTER STAGE

This converter stage uses the triode-hexode 6K8 tube which becomes more efficient as the frequency increases. The design of this converter stage is such that the over-all RF gain is relatively constant and uniform over the whole range of the receiver. This provides uniform operation and provides a true indication of signal strength, as shown on the "S" meter, over all the bands.

The stability of the oscillator is insured by a drift compensator, by low loss tube sockets, and by a ceramic oscillator switch section. It is further insured by its operation from a controlled voltage circuit which uses the OC3/VR-105 Voltage Regulator tube to keep the voltages constant regardless of line voltage fluctuation.

All these factors aid in maintaining the accuracy of the calibration of the receiver.

CRYSTAL FILTER AND PHASING CIRCUIT

The patented crystal filter included in the HQ-129-X Receiver is an outstanding Hammarlund development. Five degrees of selectivity,

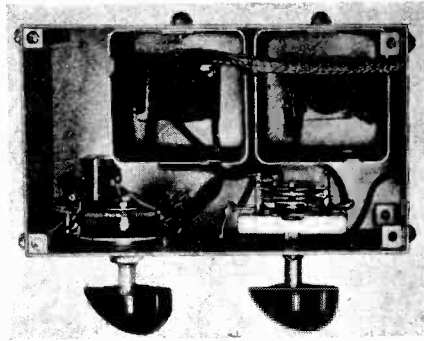


Fig. 4—Crystal Filter unit.

affect the intelligibility of the received signals, and it may be switched off when so desired.

“S” METER

The signal strength “S” meter which is operated from one section of the 6SN7 Tube shows the relative signal strength of the received signal. The dial is calibrated in units of 1 to 9. Each division represents a doubled signal strength over the previous division. For example, if division 6 corresponds to approximately 6.25 microvolts at the antenna terminals, division 7 represents approximately 12.5 microvolts, 8 represents 25 microvolts, and 9 represents 50. Each division therefore represents a 6 DB step. This relative sensitivity of the meter can be adjusted. In production it is arbitrarily adjusted to a reading

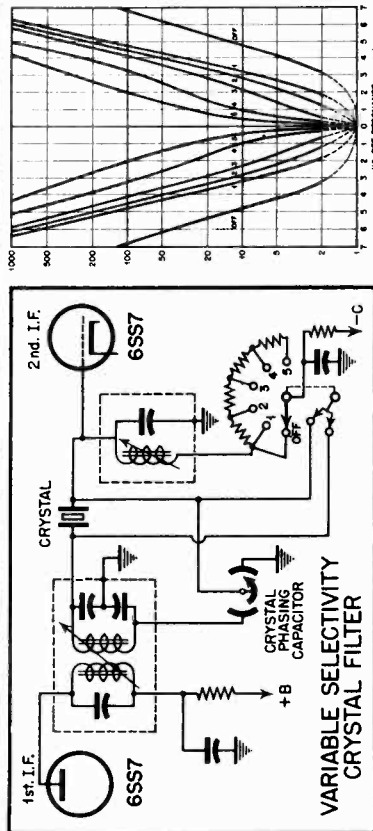


Fig. 5—Selectivity curve and crystal filter circuit.

I. F. AMPLIFIER

Three stages of I.F. amplification are provided. The gain per stage is purposely made low, in order to maintain stability. Iron core permeability-tuned transformers are used for improved performance and for ease of adjusting. Silvered mica condensers are used in each transformer circuit to improve its stability. The intermediate frequency is 455 KC—the R.M.A. standard frequency.

Over-all selectivity curves for this amplifier and the crystal filter are shown in Fig. 5.

A.V.C. SYSTEM

The automatic volume control system in the HQ-129-X gives remarkably smooth operation. The RF stage and the first two I.F. stages are automatically controlled. A switch is provided for shifting from AVC to manual control, when so desired.

SECOND DETECTOR

One section of a 6H6 tube is used for the second detector and for the A.V.C. system. This system is well designed and produces a minimum of distortion.

NOISE LIMITER

The other section of the 6H6 tube is employed as a noise limiter. It is designed to reduce automobile ignition interferences and other similar disturbances to a negligible amount. Its operation does not

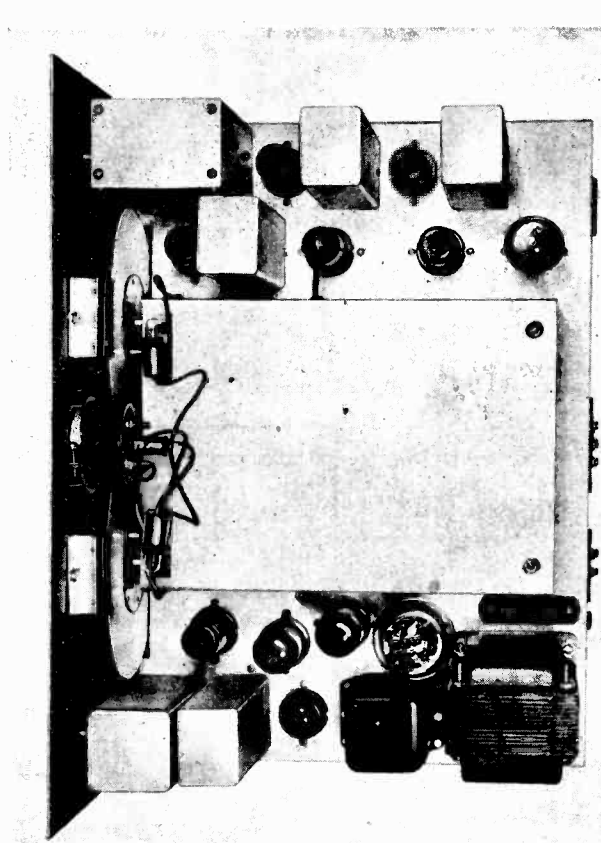


Fig. 6—Top view showing chassis layout.

of 9 for an input of approximately 50 microvolts. Should this not correspond with your previous experience with a strength 9 signal, readjust the slotted shaft, located near the 6V6 and the 6SN7 tubes, as shown on the chart in Fig. 8.

speaker. A phone jack is connected across the same output and disconnects the speaker when headphones are plugged in. A manual gain control is provided.

POWER SUPPLY

All components of the power supply have a very large safety factor in order to insure satisfactory operation over a long period of time. A two-section filter is employed with a total inductance of 40 henries and a total capacitance of 30 microfarads. This heavy duty filter provides humless operation.

ANTENNA SUGGESTIONS

Because of the high sensitivity of the HQ-129-X receiver, the antenna is usually not critical. Often an indoor wire 20 to 50 feet long, strung along the base board or along the ceiling molding of a room will give surprisingly good reception. A long single wire outdoor antenna, such as shown in Fig. 9, will generally give entirely satisfactory reception. This wire may be 50 to 75 feet long. The more isolated this antenna is from neighboring objects the better the reception will be.

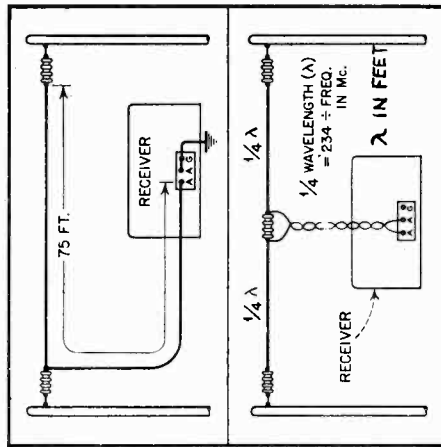


Fig. 9—Antenna suggestions.

REALIGNMENT PROCEDURE—I.F. AMPLIFIER

Tuning of the intermediate-frequency transformers is accomplished by the use of iron-core permeability-tuned coils together with fixed silvered-mica capacitors, resulting in a very high degree of stability. This, together with the mechanical arrangement provided, precludes the possibility of any appreciable drift or change of setting. Therefore, re-alignment should not be necessary, except when parts are re-

BEAT FREQUENCY OSCILLATOR

The Beat Frequency Oscillator is designed for the reception of CW or unmodulated code signals. The control on the front panel provides a wide selection of beat frequencies for the best tone to cut through any interfering signals. The oscillator is of the electron coupled type, has excellent stability, and is designed to have no material affect on the operation of the I.F. Amplifier. A switch is provided for turning this oscillator on or off at will.

AUDIO AMPLIFIER

The first stage of the audio amplifier is a resistance coupled triode voltage amplifier using one section of the twin triode 6SN7 tube. The final stage uses a 6V6 Beam Power amplifier Tube and supplies an undistorted power output of approximately 3 watts. An output transformer with an output impedance of 6 ohms is used to connect directly to the voice coil of a suitable permanent magnet type dynamic

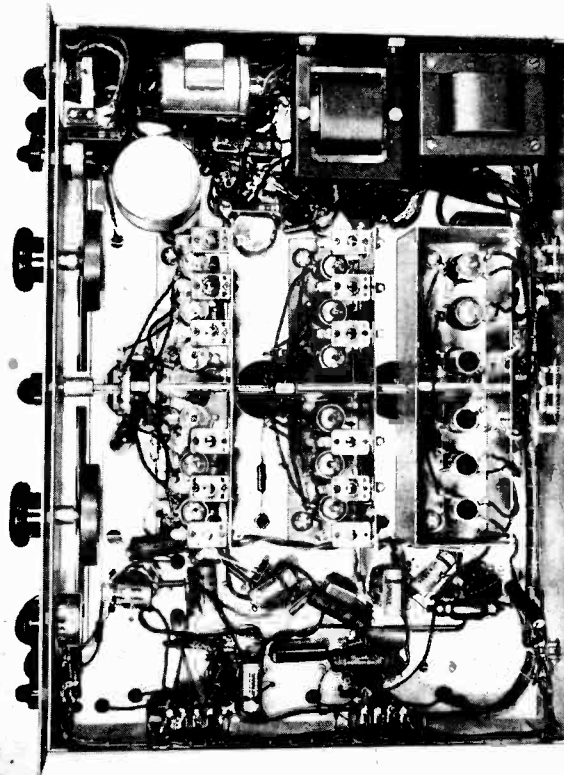


Fig. 7—Bottom view showing placement of parts.

placed which would affect tuning of the I.F. circuits (like I.F. transformer or crystal).

Alignment of the I.F. channel should not be attempted unless suitable equipment is on hand. Proper alignment is accomplished by the visual method employing a cathode-ray oscilloscope used in conjunction with a frequency-modulated (swept) signal generator, having a fairly constant output. The oscilloscope should be externally synchronized by the signal generator.

The transformers must be tuned for symmetry and proper coincidence of the visible curves, as well as for amplitude. This requires a stage-by-stage alignment, starting with the Diode Input Link Transformer (T5) and continuing back through the First I.F. Transformer (T1). The procedure is as follows:

1) Set the Main Tuning capacitor to .54 M.C. and the band-switch to .54-1.32 M.C., the Send-Receive switch to Receive, the Limiter "off", the MAN-AVC-BFO switch to MAN position and the Crystal Selectivity switch to "off" position.

2) Now, with the generator set at 455 K.C. and applying the signal to the grid (pin #4) of the Third J.F. tube (V5), adjust the plate inductor (L27) of the I.F. Output Link (T4) and the Diode Input inductor (L29) of the Diode Input Link (T5), alternately, to obtain maximum amplitude, symmetry and pattern coincidence on the oscilloscope.

3) Apply the signal input lead to the grid (pin #4) of the 2nd I.F. tube (V4). Turn the two adjustment screws of the 3rd I.F. Transformer to obtain symmetrical, coinciding curve with as much amplitude as possible without disturbing the pattern.

4) Switch the signal input lead to the grid (pin #4) of the 1st I.F. tube (V3), and adjust the lower (plate) inductor (L25) of the Crystal Filter (T2) for maximum amplitude at center of curve.

5) Apply the signal input to the grid cap of 6K8 mixer tube (V2). Adjust screws of 1st I.F. Transformer (T1) as in (3). This should result in a tall selectivity curve with a slightly flattened peak.

6) Turn Crystal Selectivity switch to position #1, set Crystal Phasing pointer on arrow, and adjust the upper (grid) inductor (L19) of the Crystal Filter (T2) for maximum amplitude and

symmetry. Adjust signal input or receiver Sensitivity control to prevent overloading.

7) Switch Crystal Selectivity to position #2 and adjust Phasing control slightly from the arrow position, if necessary, to obtain identical images.

Adjust the signal generator frequency to obtain coincidence of the images, and if complete coincidence is not obtained, alternately make slight adjustments of the phasing control and the signal generator frequency, until images coincide.

These last steps have determined the exact frequency of the quartz crystal and the frequency setting of the signal generator should be left undisturbed.

8) Repeat carefully the complete I.F. alignment procedure (steps 1 through 7) for the crystal frequency.

R.F. AND H.F.: OSCILLATOR

As in the case of the I.F. amplifier, the R.F. stage and the H.F. oscillator were accurately aligned at the factory with the aid of calibrated oscillators that are frequently compared with standard frequency crystals. These circuits are designed to insure permanence of adjustment and should not be disturbed unless it is positive that readjustment is necessary.

The front row of adjustments, shown on the chart (Fig. 8), control the H.F. Oscillator circuits and consequently the dial calibration. To check these adjustments the band spread dial must be at 200, since that is the setting at which the main dial was calibrated. An accurate test oscillator is necessary. Connect the test oscillator to the antenna terminals and set it and the MAIN TUNING dial at the frequency indicated on the chart. The inductance is adjusted at a low frequency and the trimmer at a high frequency in each band, each being adjusted for maximum response. Generally a small fraction of a turn will suffice. These adjustments mutually affect each other. Therefore, if much damage is made at one end of a band, the other end of the same band must be readjusted. This procedure must be repeated until further readjustment at either end is unnecessary.

The adjustments in the middle row control the mixer input cir-

PARTS LIST HQ-129X

SCHEMATIC DESIGNATION	DESCRIPTION	HML'D. PART NO.
CAPACITORS		
C1, A-F	Main tuning, variable (Part of SA-610)	23912-1
C2, A-I	Band-spread, variable (Part of SA-610)	23912-2
C3, 4	Paper tubular, .02 uf 500 W.V.D.C.	23005-86B
C5	Mica, 620 uuf 500 W.V.D.C.	23912-2
C6	Paper tubular, .05 uf 500 W.V.D.C.	23015-5B
C7	Mica, 4700 uuf 500 W.V.D.C.	23912-1
C8	Paper tubular, .02 uf 500 W.V.D.C.	23002-11D
C9	Silver mica, 50 uuf 500 W.V.D.C.	23912-1
C10	Silver mica (Part of T1, I.F. Transformer #6335)	23912-1
C11	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C12	Silver mica (Part of T1, I.F. Transformer #6335)	23912-2
C13	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C14	Paper tubular, .05 uf 500 W.V.D.C.	23003-96D
C15, 16	Paper tubular, .02 uf 500 W.V.D.C.	23001-48B
C17	Silver mica, 120 uuf 500 W.V.D.C.	SA-604
C18, 19	Mica, 100 uuf 500 W.V.D.C.	6180
C21	Crystal phasing, variable	23912-1
C22	Silver mica, 85 uuf 500 W.V.D.C.	23912-2
C23	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C24	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C25	Silver mica (Part of T3, I.F. Transformer #6335)	23912-1
C26	Paper tubular, .02 uf 500 W.V.D.C.	23912-3
C27	Silver mica (Part of T3, I.F. Transformer #6335)	23912-2
C28	Paper tubular, 0.1 uf 500 W.V.D.C.	6195
C29	Paper tubular, .05 uf 500 W.V.D.C.	23912-1
C30	Silver mica, 95 uuf 500 W.V.D.C.	23001-48B
C31	Paper tubular, .02 uf 500 W.V.D.C.	6195
C32	Mica, 100 uuf 500 W.V.D.C.	23001-48B
C33	Silver mica, 95 uuf 500 W.V.D.C.	6195
C34, 35	Mica, 100 uuf 500 W.V.D.C.	23001-48B
C36	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C37	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C38	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C39	Electrolytic, 20 uf 25 W.V.D.C. (Part of 23840-1)	23002-1D
C40	Silver mica, 5 uuf 500 W.V.D.C.	23912-2
C41, 42	Paper tubular, .05 uf 500 W.V.D.C.	SA-681
C43	Silver mica (Part of Z1, B.F.O. Assy. #26021-G1)	23912-4
C44	Silver mica (Part of Z1, B.F.O. Assy. #26021-G1)	23912-1
C45	B.F.O., variable (Part of Z1, B.F.O. Assy. #26021-G1)	6061
C46	Paper tubular, .01 uf 200 W.V.D.C.	23912-2
C47	Paper tubular, .02 uf 500 W.V.D.C.	23015-40B
C48	Silver mica 673 uuf 500 W.V.D.C.	23015-20B
C49	Silver mica 300 uuf 500 W.V.D.C.	23912-2
C50	Paper tubular, .05 uf 500 W.V.D.C.	23015-40B
C51	Mica, 1000 uuf 500 W.V.D.C.	23015-20B
C52	Mica, 1500 uuf 500 W.V.D.C.	23912-2
C53, 54, 55	Electrolytic 10/10/10 uf 450 W.V.D.C. (Part of 23840-1)	23015-16B
C56, 57	Paper tubular, .05 uf 500 W.V.D.C.	23912-1
C58	Mica, 5100 uuf 500 W.V.D.C.	23912-2
C59	Paper tubular, .02 uf 500 W.V.D.C.	
C60	Paper tubular, .05 uf 500 W.V.D.C.	

cuits. To adjust these, set the oscillator to the frequency indicated on the chart and tune it in on the receiver. Employing an output meter, make the adjustments for peak meter readings. At 30 mc, there is a certain amount of interlocking between the detector and H.F. oscillator making it necessary to rock the tuning capacitor back and forth while adjusting the trimmer capacitor, in order to avoid a false setting.

The chart below, Fig. 10, gives the values of the voltages between the tube socket terminals and ground or B- negative side of the circuit. The meter scale that should be used for making the check is shown in parenthesis below the voltage. A meter having a resistance of 1000 ohms per volt should be used. Small variations in voltages do not indicate trouble. With the aid of this chart and the circuit diagram (Fig. 8) the ailing capacitor or resistor can be found.

TUBE	LINE VOLTAGE 115V. A.C.		SENSITIVITY MAX. SWITCH ON MAN. NO SIGNAL		SWITCH ON AVC BFO					
	RF 6SS7	Conv. 6K8	1-1F 6SS7	2-1F 6SS7	3-1F 6SS7	Detector Limiter 6H6	Out-put 6V6	Rectifier 5U4G	Reg. VR-105	1st Audio 6SN7-6SU7
Pin 1 to ground.....	...	...	...	...	...	...	...	...	...	...
Pin 2 to ground.....	...	...	...	...	...	6.2 A.C.	...	...	...	113 (150)
Pin 3 to ground.....	...	210 (300)	6.3 (15)	4.3 (15)	3.5 (15)	-0.4 (15)	254 (300)	Tie Point 212 (300)	Tie Point 108 (150)	3.6 (15)
Pin 4 to ground.....	...	91 (150)	...	...	...	...	288 (300)	Tie Point 108 (150)	Tie Point 108 (150)	-0.3 (15)
Pin 5 to ground.....	3.2 (15)	...	6.3 (15)	6.3 (15)	3.5 (15)	-0.2 (15)	...	108 (150)	...	5.6 (15)
Pin 6 to ground.....	102 (150)	98 (150)	105 (150)	105 (150)	97 (150)	Tie Point	Tie Point 210 (300)	280 A.C.	2.8 (15)	...
Pin 7 to ground.....	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	...	6.2 A.C.	Tie Point 108 (150)	Tie Point 108 (150)	6.2 A.C.
Pin 8 to ground.....	196 (300)	3.2 (15)	206 (300)	204 (300)	183 (300)	-0.2 (15)	14 (30)	300 (750)	Tie Point 108 (150)	...

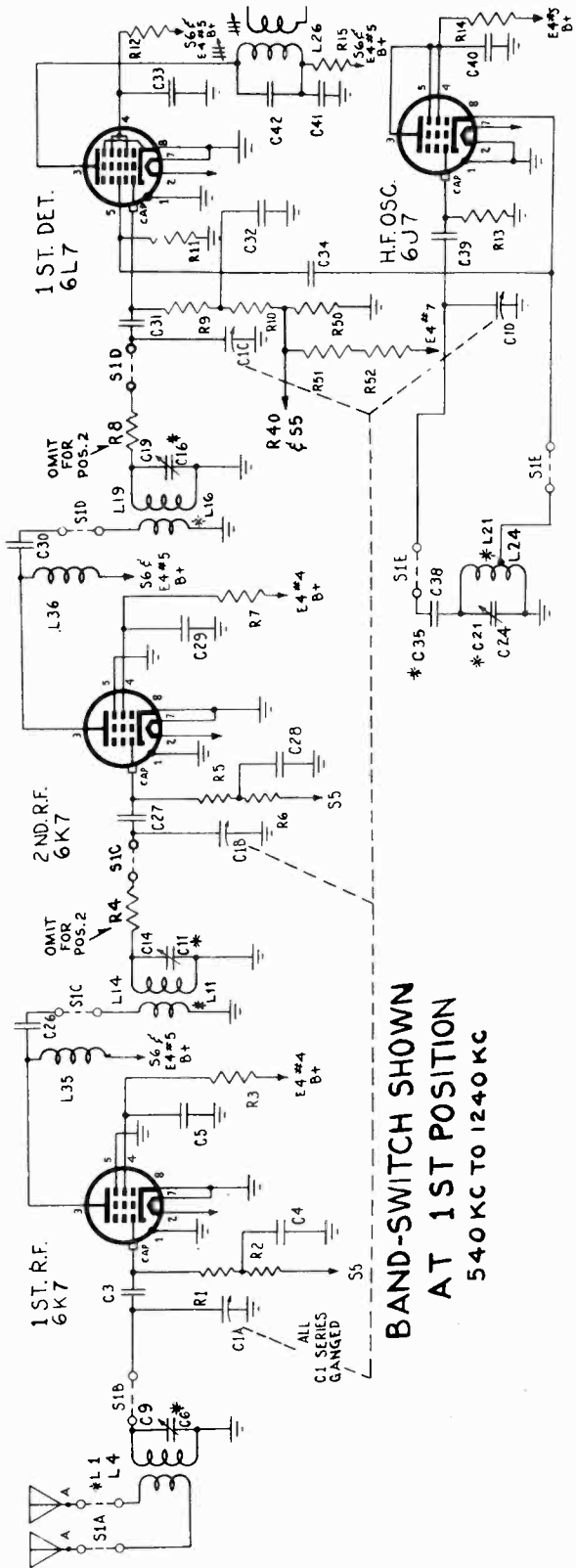
Fig. 10

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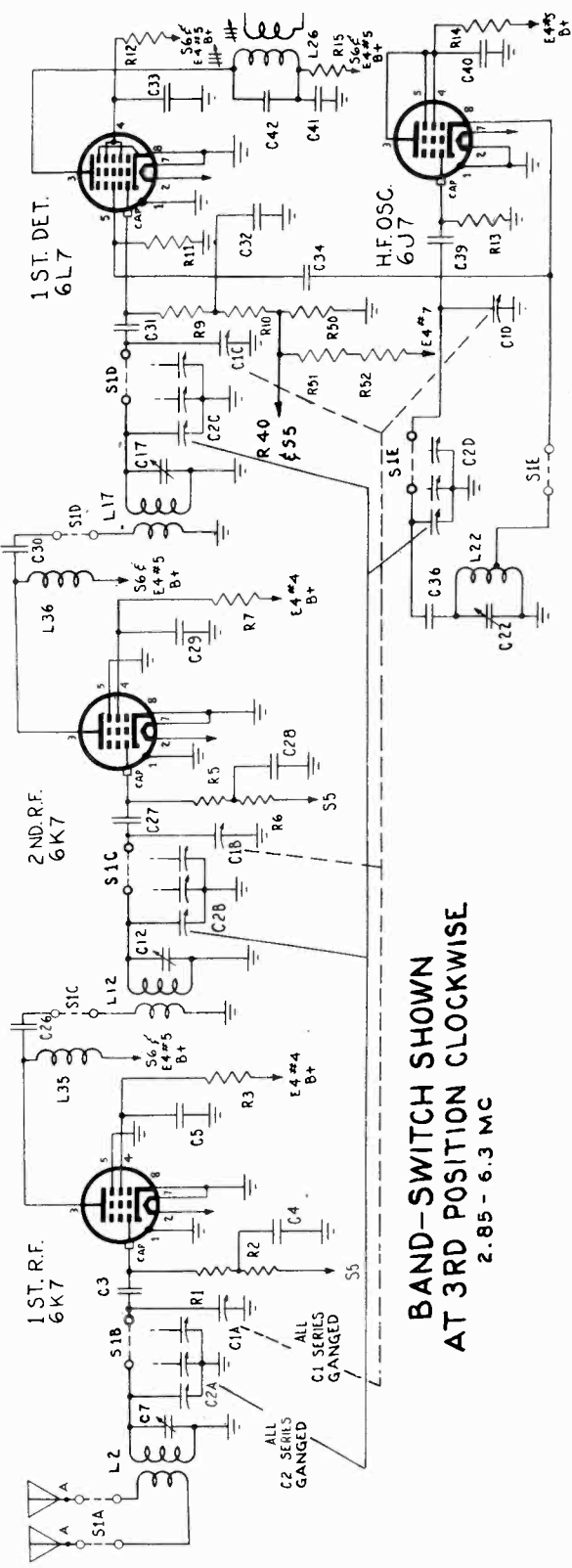
MODEL HQ-129-X

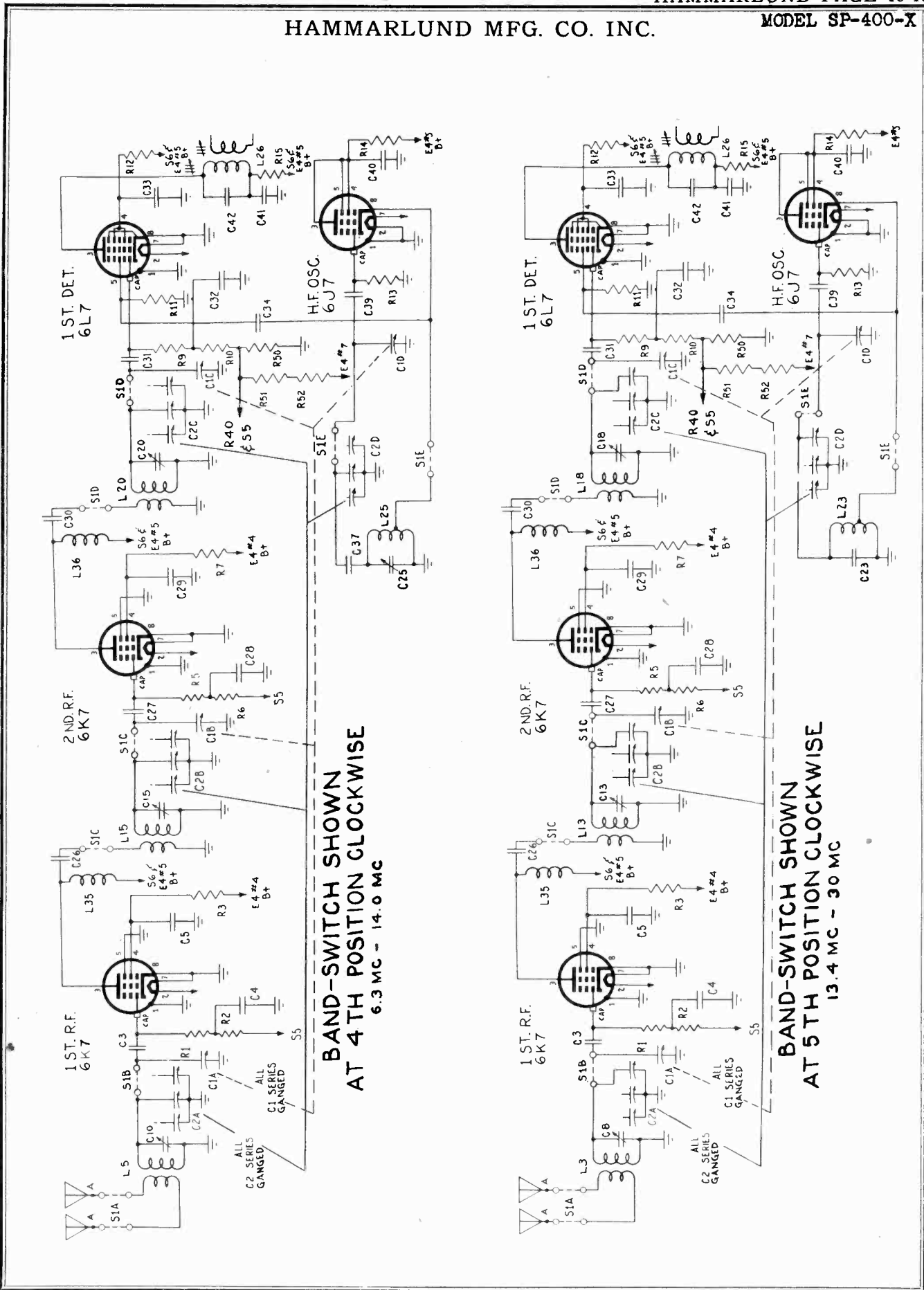
PARTS LIST HQ-129X—Cont.

SCHEMATIC DESIGNATION	DESCRIPTION	HML'D. PART NO.	SCHEMATIC DESIGNATION	DESCRIPTION	HML'D. PART NO.
C61	CAPACITORS—Continued		R14,15,16	RESISTORS—Continued	
C62	Mica 300 uuf 500 W.V.D.C.	23001-75B	R17	2200 ohms, 1/2 W.	19301-40
C63	Mica 620 uuf 500 W.V.D.C.	23005-80B	R18	300 ohms, 1/2 W.	19301-196
C64	Ceramic N750K 6uuf 500 W.V.D.C.	23023-34	R19	51 ohms, 1/2 W.	19301-187
C65-68	Antenna Comp., variable	SA-617	R20	22 ohms, 1/2 W.	19302-9
C-69-76	Trimmer, mica, 1.5 - 9 uuf	6189-G2	R21	10,000 ohms, 1/2 W.	19301-56
	Trimmer, mica, 3.35 uuf	6055-G1	R22	300 ohms, 1/2 W.	19301-196
F1	Fuse, 2 amp. type 3AG	15928-7	R23, 24	390 ohms, 1/2 W.	19301-40
J1	Relay jack	6142	R25	2200 ohms, 1/2 W.	19301-196
J2	Phone jack	6087	R26	300 ohms, 1/2 W.	19303-61
L1	INDUCTORS		R27	47,000 ohms, 1 W.	19301-40
L2	Antenna coil assembly 54-1.32 mc range	26051-G1	R28	2200 ohms, 1/2 W.	19310-231
L3	Antenna coil assembly 1.32-3.2 mc range	26051-G2	R29	60,000 ohms, 1 W.	15305-4
L4	Antenna coil 3.2-5.7 mc range	6013	R30	Potentiometer, 5,000 ohms	19301-8
L5	Antenna coil 5.7-10 mc range	6016	R31	100 ohms, 1/2 W.	19301-72
L6	Antenna coil 10-18 mc range	6019	R32	47,000 ohms, 1/2 W.	19301-90
L7	Antenna coil 18-31 mc range	6022	R33	1 Meg ohms, 1/2 W.	19301-104
L8	R.F. coil assembly 54-1.32 mc range	26047-G2	R34	270,000 ohms, 1/2 W.	19301-102
L9	R.F. coil assembly 1.32-3.2 mc range	26047-G1	R35	1,000 ohms, 1/2 W.	15356-1
L10	R.F. coil assembly 3.2-5.7 mc range	26047-G6	R36	Potentiometer, 250,000 ohms (Switch Attached)	15357-1
L11	R.F. coil assembly 5.7-10 mc range	26047-G5	R37	Potentiometer, 270,000 ohms	19301-32
L12	R.F. coil assembly 10-18 mc range	26047-G4	R38,39,40	24,000 ohms, 1/2 W.	19301-96
L13	R.F. coil assembly 18-31 mc range	26047-G3	R41	200,000 ohms, 1/2 W.	19301-213
L14	H.F. osc. coil assembly 54-1.32 mc range	26030-G2	R42	360 ohms, 1 W.	19305-38
L15	H.F. osc. coil assembly 1.32-3.2 mc range	26030-G1	R43	27 ohms, 1 W.	19305-11
L16	H.F. osc. coil assembly 3.2-5.7 mc range	26030-G6	R44	24,000 ohms, 1 W.	19301-80
L17	H.F. osc. coil assembly 5.7-10 mc range	26030-G5	R45	50,000 ohms	19301-56
L18	H.F. osc. coil assembly 10-18 mc range	26030-G4	R46	100,000 ohms, 1/2 W.	19302-1
L19	H.F. osc. coil assembly 18-31 mc range	26030-G3	R47, 48	10,000 ohms, 1/2 W.	19301-169
L20	Crystal filter grid coil		R49	2 meg. ohms, 1/2 W.	19301-40
L21	Filter choke	6181	R50	4,000 ohms, 5 W., wire wound	19380-47
L22	Filter choke	6083	R51		
L23	Filter choke (CHX)	6084	R52, 53		
L24	1st I.F. coil	26054-1	R54		
L25	Crystal filter plate coil		S1	SWITCHES	
L26	3rd I.F. coil		S2-1 F.R.	H.F. Osc. Plate	6331
L27	I.F. output coil		S2-2 F.R.	H.F. Osc. Grid	6332
L28	Series coupling coil		S2-3 F.R.	Det. Grid Tap	6064
L29	Diode input coil		S2-4 F.R.	R.F. Plate	6063
L30	B.F.O. coil		S2-5 F.R.	R.F. Grid	6062
L31	"S" meter	4903	S2-6 F.R.	Antenna	26035-G1
L32	Pilot lamp #47 6.3 V., .15 amp.	16004	S3 F.R.	Crystal filter assy.	6333
L33			S4	Limiter	6097
L34			S5	MAN-AVC-BFO	6333
L35			S6	Send-Rec.	
L36			T1	TRANSFORMERS	
L37			T2	1st I.F.	6335
L38			T3	Crystal filter assy. (2nd I.F.)	SA785
L39			T4	3rd I.F.	6335
L40			T5	I.F. output coil assy. (Link)	SA797
L41			T6	Diode input coil assy. (Link)	SA799
L42			T7	Audio output transformer	6086
L43			X1	Power transformer	26012
L44			XI	Quartz crystal	6338
L45			Z1	B.F.O. assembly	26021-G1



* STARS SHOW CHANGES IN PARTS DESIGNATIONS FOR 2nd POSITION - OTHERWISE SCHEMATIC REMAINS THE SAME AS 1st POSITION, EXCEPT THAT R4 AND R8 ARE OMITTED.





BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE 6.3 MC - 14.0 MC

BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE 13.4 MC - 30 MC

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place the terminal cover *before* making connections to the batteries. When discontinuing battery operation, disconnect the battery cable from the receiver. All operations of the Receiver are the same with either the Power Supply or the battery set-up.

Chassis Ground: It is not usually necessary to ground the Receiver chassis, but this can be done by connecting the ground lead to the left-hand PHONO or to the left-hand PHONES terminal (located on terminal strip E3, Fig. 3). These two terminals are grounded to the inside of the chassis.

Earphones: Plug a headset into the PHONES jack (J1, Fig. 2), or connect it to screw terminals marked PHONES on rear of chassis. No matching transformer is necessary.

Loudspeaker: The permanent magnet dynamic loudspeaker supplied with the Receiver has a transformer mounted on its housing. This transformer matches the voice coil of the loudspeaker to the 500-ohm output terminals (on terminal strip E3, Fig. 3) located at the rear of the chassis (marked 500 ohms). For loudspeaker operation, connect the two-wire lead attached to the terminals of the loudspeaker transformer to the 500-ohm terminals on the Receiver. Disconnecting the loudspeaker will not impair the operation of the Receiver.

Power Transformer Primary Tap: Before plugging the power cord into the a-c line, remove bottom plate from Power Supply to see that power cord is properly connected for the a-c voltage of the power line being used. One wire of the power cord is permanently connected to the fuse-holder (E3, Fig. 5); the other wire is connected at the factory to one of the screw terminals on terminal strip E2 (Fig. 5). These screw terminals are marked 105, 115 and 125, and are connected to primary taps on the power transformer. See that the power cord wire is connected to the screw terminal most closely agreeing with the available a-c line voltage and replace the bottom cover plate.

Battery Operation . . .

- 6-volt storage battery, drain
- 6.25 amperes for heaters.
- Five 45-volt "B" batteries, drain
- 117 milliamperes at 225 volts:
- 4.5 milliamperes at 90 volts.
- One 45-volt "C" battery, drain
- 10 milliamperes.

POWER SOURCES

A-C Operation . . .

- 105-125 Volts, 50-60 cps
- 180 watts average power consumption

INSTALLATION

Connection to Power Supply—Connect Receiver to Power Supply as follows:

(1) Remove the sheet-metal covers from terminal strip (E4, Fig. 3) on rear of Receiver and from terminal strip (E1, Fig. 3) on Power Supply. See that all ten screws on each strip are unscrewed at least three turns. Then attach one end of the connector cable to each terminal strip *exactly* as shown in Fig. 3 and tighten all screws securely. Make certain that each slotted spade lug on the cable strips makes contact with its respective screw terminal *only*, since a lug jammed between *two* screws could cause considerable trouble. Immediately replace both metal covers and do not remove them while the Power Supply is connected to the a-c power line.

(2) The spacing of spade lugs on cable terminal strips is exactly the same as the spacing of screws on Receiver and Power Supply. If the two fail to go together easily, DON'T USE FORCE. Be sure *all* screws are unscrewed far enough. If a spade lug has been bent or pushed out of place by rough handling, straighten it and try again. Spade lugs should slip under screws from the top.

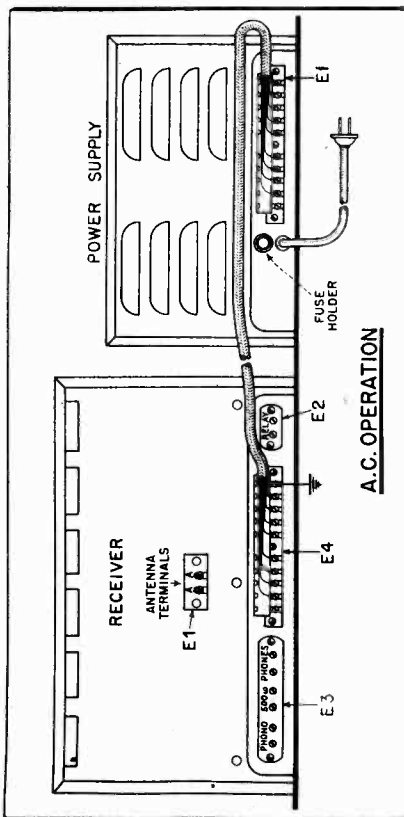


Fig. 3—Connections for power cable—A.C. operation.

Connection for Battery Operation—A cable for use in battery operation is available on special order. This cable (W2 in Parts List) has only one terminal strip. The other end of the cable is made up of eight loose wires. Connect this cable according to Fig. 4 (note the color code for the eight loose wires), or make up connections to serve the purpose. Connect the battery cable to the Receiver *first* and re-

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between oscillator and incoming signal. Use beat oscillator for code reception and for locating weak modulated signals.

(3) Fading signals can be improved by returning AVC-MANUAL switch to AVC.

c. *Crystal Filter*: First three positions of CRYSTAL SELECTIVITY control are generally used for radiophone reception and will serve for code reception where interference is not serious. Last two positions are intended for code reception *only* since they provide so narrow a band that "phone" signals are usually unintelligible. After adjusting CRYSTAL SELECTIVITY control for desired degree of selectivity, use PHASING control to eliminate or reduce any heterodyne interference or "whistle" which may be present.

d. *Receiver Silencing*: Receiver can be silenced by flipping the SEND-REC switch (S6, Fig. 2) to SEND. This operation opens the "B" supply to the R-F and 1st detector tubes (V1, V2 and V3). The Receiver then remains ready for instant service during transmission periods. Note also that instead of using the SEND-REC switch, a relay may be connected to the RELAY terminals (E2, Fig. 3) at rear of Receiver and silencing controlled by relay action, actuated, for example, by the associated transmitter. When using a relay for silencing, flip SEND-REC switch to SEND (open) and *leave* it there. While the transmitter is operating, the relay should remain *open*; when the transmitter is "off the air," the relay contacts should *close* to restore Receiver operation.

e. *Phono Operation*: Leads from a phonograph pickup may be connected to the PHONO terminals (on terminal strip E3, Fig. 3) at the rear of the Receiver. (Note that the left-hand terminal of this pair is grounded to chassis.) Use the SEND-REC switch (S6) as a "phono-radio" switch by flipping it to the SEND position, thus eliminating radio interference and making it unnecessary to hunt for a "dead spot" on the tuning dial.

f. *Tuning*: All tuning can be done with the MAIN TUNING control. In this case, leave the band spread dial at 100. BAND SPREAD control spreads out a narrow band of frequencies *below* the frequency to which the main dial is set. This control operates continuously throughout the entire tuning range of the Receiver, and signals can be spread out in any one of the five bands.

OPERATION
a. *Radiophone Reception*: Set the front panel controls (Fig. 2) as follows:

CONTROL	POSITION
CRYSTAL SELECTIVITY	OFF
PHASING	on arrow
BAND WIDTH	3
LIMITER	Off
AVC-MANUAL	AVC
SENSITIVITY	10
BAND SPREAD	100
SIGNAL-MOD-CW	MOD
AUDIO GAIN	6
SEND-REC	REC
BEAT OSCILLATOR	0

(1) Throw OFF-ON power switch in center of panel to ON. This puts Receiver in operation.

(2) Adjust band switch (S1, Fig. 2) to a band which is likely to be very active. This will facilitate the process of getting familiar with the various adjustments. If interference is not serious, BAND WIDTH control can be adjusted to a wider band width (higher number), depending upon the degree of fidelity desired. In general, adjust this control to band width giving best tone with least interference.

(3) Do all tuning, with or without the meter with BAND WIDTH control set at 3. Other settings give wider bands, making exact tuning difficult. Make band width adjustments *after* signal is tuned properly.

(4) LIMITER-OFF-ON control turns noise limiter on and off. The noise limiter will be most valuable on the higher frequencies, where interference from automobile ignition system is most bothersome.

b. *Code Reception*: Flip AVC-MANUAL switch to MANUAL and turn down SENSITIVITY control to provide proper sensitivity.

(1) On strong signals, do not turn SENSITIVITY control all the way on, because it will cause overloading. If the AUDIO GAIN control is set at about 7, it is possible to regulate volume by using only the sensitivity control.

(2) To turn on the beat oscillator, set SIGNAL-MOD-CW switch at CW. The BEAT OSCILLATOR control varies the pitch of the beat

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Fig. 5—Bottom view of power supply.

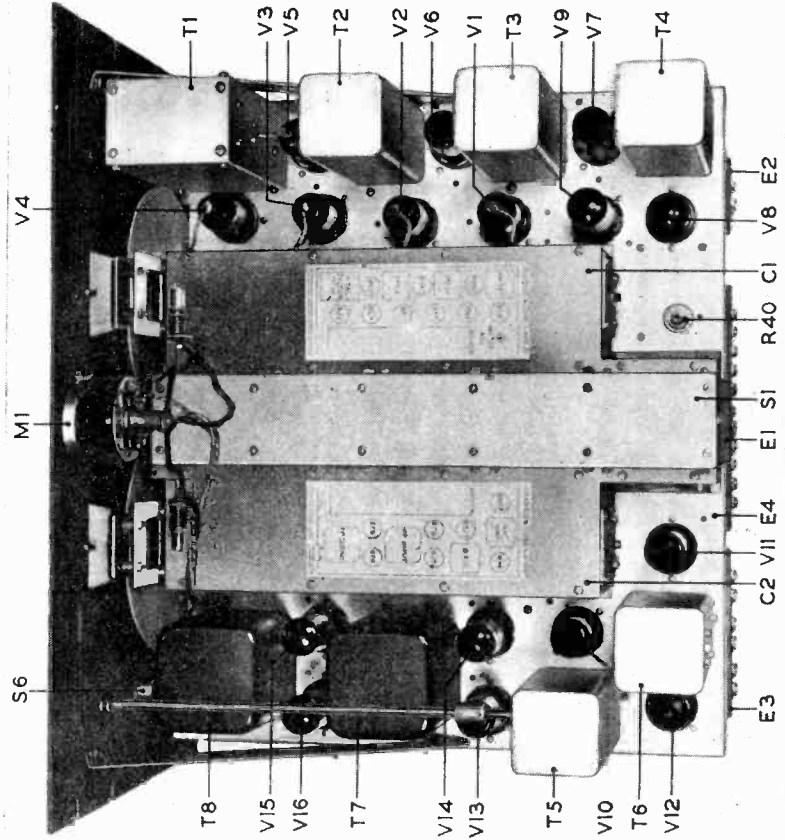
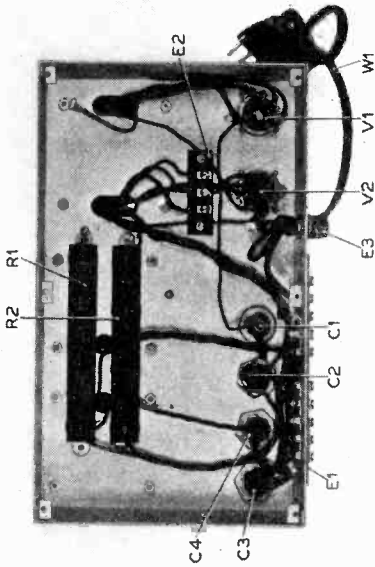


Fig. 7—Top chassis view showing arrangement of components.

RECEIVER

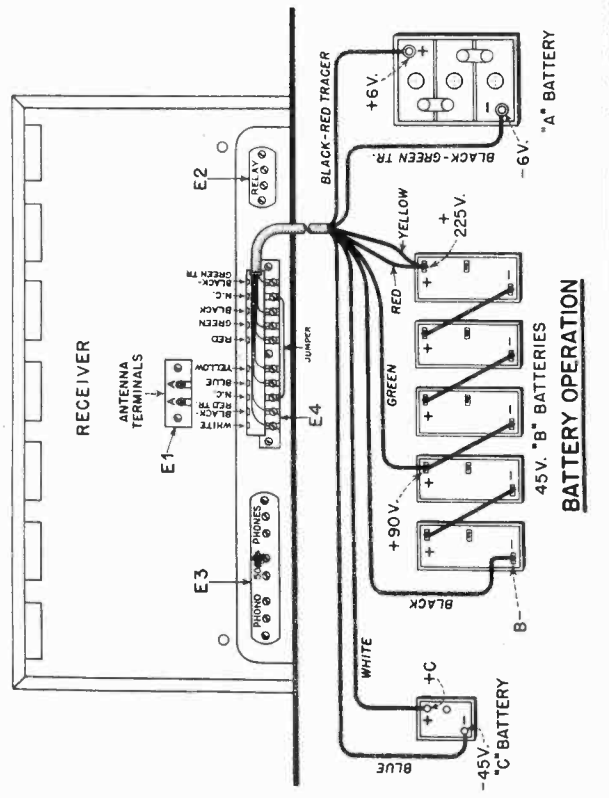


Fig. 4—Connections for power cable—battery operation.

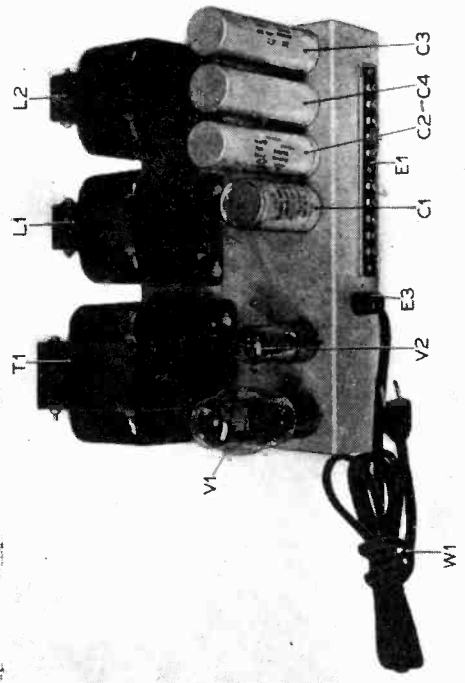


Fig. 6—Top view of power supply.

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540-1240 kc band, normally provide more selectivity than is desirable for the reception of high-fidelity programs. To prevent loss of audio quality resulting from RF side-band cutting, resistors (R4, R8) have been placed in series with the secondaries of RF transformers L14, L19, to broaden their pass band.

CRYSTAL FILTER

a. *Controls:* The Quartz Crystal Filter (T1) couples the 1st detector (V3) to the 1st IF amplifier (V5). Its selectivity can be varied in definite steps by the CRYSTAL SELECTIVITY switch (S2) controlled from the front panel by knob and pointer. In addition, its selectivity characteristic can be greatly sharpened on one side or the other (to avoid heterodyne "whistle") by adjusting the PHASING capacitor (C46), also controlled by a knob on the front panel.

b. Variable Selectivity:

Curves A and B, Fig. 8, show Receiver selectivity curves which indicate certain effects of the Crystal Filter. When the CRYSTAL SELECTIVITY switch is set at OFF, the quartz crystal is short-circuited and signal voltages present in the secondary of the 1st detector plate coil (L26) are impressed directly on the control grid of the first IF amplifier tube (V5). At any other setting (1 to 5), the quartz crystal is in use and acts as an extremely high "Q," high impedance, series tuned circuit interposed between the secondary of plate coil L26 and the 1st IF grid circuit (L27, C48), which constitutes the load into which the crystal works. Selectivity is varied by altering the impedance of this parallel tuned circuit (L27, C48), which is accomplished by adding resistance. (R17, R18, R19, R20) in series with coil L27 and capacitor C48.

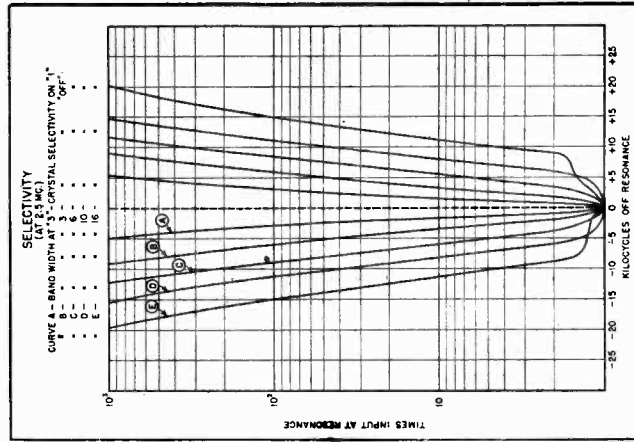


FIG. 8—Selectivity curves.

g. *Earphone Operation:* For earphone operation, plug earphones into the PHONES jack (J1, Fig. 2) provided for them on the front panel, or connect them to the PHONES terminals on the rear of the Receiver chassis. These terminals are connected in parallel with the jack on the front panel.

h. *S-Meter Tuning:* The S-meter (M1, Fig. 2), a tuning guide, operates only when the Receiver is set for AVC. Its reading increases as the Receiver approaches resonance with the incoming signal. Exact resonance is shown by the greatest reading of the meter. BAND WIDTH control must be set at 3 for accurate tuning by means of the meter. A screwdriver adjustment (R40, Fig. 7) at the rear of the chassis varies the resistance in shunt with the meter. By means of this adjustment, an "S9" reading may be obtained on any input between approximately 10 and 10,000 microvolts. The normal factory adjustment is made on an input of 50 microvolts, and when so adjusted each "S" number represents a change in signal input of approximately 6 decibels, or a ratio of two-to-one.

CIRCUIT ARRANGEMENT

RF AMPLIFIER

a. *Antenna Circuit:* The antenna is coupled to the grid of the 1st RF amplifier (V1) through an input transformer having an untuned primary and tuned secondary. The terminals of the primary coils are ungrounded, and are connected through a double-pole section (S1A) of the band switch to the "A," "A" terminals (E1) on the rear of the tuning unit. This symmetrical arrangement of the antenna primary coils permits full advantage to be taken of the noise-reducing properties of a balanced transmission line lead-in. The impedance of the input circuit averages approximately 100 ohms throughout the tuning range of the Receiver.

b. *Amplifier Stages:* There are two stages of RF amplification preceding the first detector or mixer. These stages are coupled by means of RF transformers having tuned secondaries and low inductance untuned primaries. The plates of the two RF amplifier tubes (V1, V2) are shunt fed through RF chokes L35, L36 and are coupled to their respective tuned circuits through fixed capacitors C26, C30. This shunt feed keeps plate voltage off the tuned RF amplifier circuits. Two stages of RF amplification, in the frequency range covered by the

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the secondary and ground, and is made up of R29, R30 and R31. Resistor R29 and two small capacitors (C64, C63) constitute a filter to prevent IF voltages from reaching resistor R31 and the AUDIO GAIN control (R48).

NOISE LIMITER

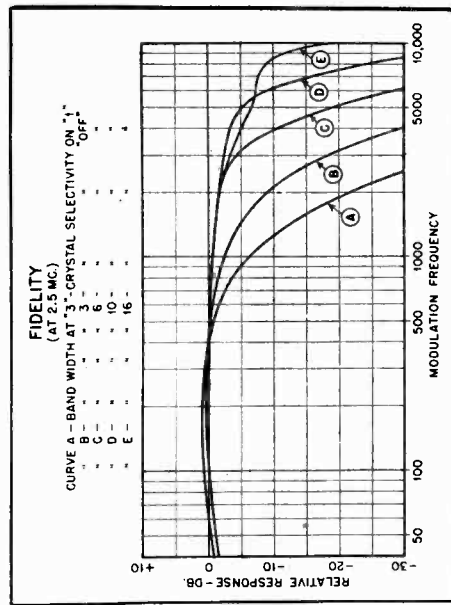
The noise limiter tube (V9) is a 6N7 class B twin triode with its two grids and its two plates connected in parallel in order to secure the lowest possible impedance. The circuit is designed to limit interferences of very short pulse duration such as caused by auto ignition and other similar disturbances. It is designed to work with or without the AVC system and will automatically follow widely different signal levels. Some distortion results at higher modulation percentages but this is unavoidable if effective noise limiting is to be obtained. An "on-off" switch is provided.

"S" METER

The "S" or Signal Strength Meter (M1) is connected for use when the AVC-MANUAL switch (S5) is thrown to AV. This meter shows the relative strength of the received signal. The centrally located dial is calibrated in units of 1 to 9. A variable control (R40) on the rear of the chassis allows the meter to be adjusted to read "S-9" on any signal from 10 to 10,000 microvolts.

The normal factory adjustment for "S-9" is approximately 50 microvolts. Each division represents a ratio of approximately 2 to 1 over the previous division. Thus each division represents a 6db step. The sensitivity control (R46) must be set

FIG. 9—Audio fidelity curves.



at maximum (position 10) for maximum "S" meter accuracy. This "S" meter can also be used as a tuning meter since it will show maximum reading at resonance. In this case, to obtain a relatively sharp resonance indication, the BAND WIDTH control should be set at position 3.

HF OSCILLATOR

The HF oscillator operates at a frequency 455 kc. (the frequency for which the IF amplifier is adjusted) higher than that of the incoming signal. The oscillator section of the variable tuning capacitor (CID) has the same capacitance and plate shape as the RF sections (C1A, C1B, C1C). The constant 455 kc. frequency difference is maintained by means of a padding capacitor in series with the variable, together with appropriate values of oscillator inductance and parallel trimmer capacitance.

FIRST DETECTOR

The 1st detector employs a 6L7 pentagrid mixer (V3). Its injection grid (grid No. 3) is coupled to the HF oscillator cathode, and its signal grid (grid cap) is coupled to the plate of the second RF amplifier tube (V2) by means of the second RF transformer.

IF AMPLIFIER

The intermediate-frequency amplifier has three stages consisting of three coupling transformers (T2, T3 and T4) and three pentode amplifier tubes (V5, V6 and V7) of the remote cutoff or super-control type. The first two transformers (T2, T3) are identical, and have tuned primaries as well as tuned secondaries. The secondary coils are fixed in position, while the primary coils are mounted on slide rods permitting them to move back and forth with respect to the secondaries, thus changing the degree of inductive coupling between them. When the coils are farthest apart the coupling is at its lowest value and the transformers exhibit their maximum selectivity or minimum band width. Conversely, when the coils are pushed close together the coupling is greatly increased and minimum selectivity or maximum band width results. At any adjustment between these two extremes, an intermediate degree of selectivity is obtained.

SECOND DETECTOR

The 2nd detector (V8) is a twin diode operated with both plates and both cathodes connected in parallel. Its IF input is obtained from the untuned secondary of coil L32 in transformer T4 in the plate circuit of the 3rd IF amplifier (V7). To facilitate operation of the limiter tube (V9) the diode load resistance is divided into two approximately equal parts. One part, R33, is placed between the paralleled cathodes and ground and is by-passed (for IF) by a small capacitor (C66). The other part is between the low-potential end of

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AVC AMPLIFIER AND RECTIFIER

Special amplifier and rectifier stages are employed in order to give most satisfactory AVC action. AVC voltages are applied to the two RF stages and to the first two IF stages and compensate for variations in signal strength due to fading. A different rate of compensation is required for voice modulated signals than for code signals. This is automatically adjusted when the beat frequency oscillator is turned on or off.

BEAT OSCILLATOR

The beat oscillator tube (V10) and associated oscillator circuit (T5) provide a voltage at approximately the intermediate frequency. This voltage, when introduced into the input circuit of the 2nd detector (V8) by means of a small coupling capacitor (C60), mixes with the I-F signal being delivered to the detector by the 3rd I-F amplifier (V7). The mixture of these two similar frequencies results in a "beat" or difference frequency in the output of the 2nd detector. The beat oscillator frequency is adjusted so that the pitch of this difference frequency falls within the audio-frequency range. Fine adjustment of the beat frequency pitch is accomplished by means of the BEAT OSCILLATOR control on the front panel which turns a small variable capacitor (C69) in transformer T5. The beat oscillator is turned on by throwing the SIGNAL-MOD-CW switch (S4) to CW. In addition to being necessary for proper reception of CW signals, the beat oscillator is useful for locating weak signals of any kind.

AF AMPLIFIER

a. *Circuits:* The AF amplifier has three stages, using one 6J5 triode (V13) and three 6F6 pentodes (V14, V15, V16). The grid of the first tube (V13) is connected to the moving arm of the AUDIO GAIN control (R48) through a blocking capacitor (C82). Its plate is coupled to the grid of the second AF amplifier by means of capacitor C83, plate resistor R53 and grid leak R54. The second amplifier tube (V14), while a pentode, is operated as a triode by connecting its plate and screen together. It drives the output tubes (V15, V16) through a push-pull input transformer (T7). The output tubes (V15, V16) are also triode-connected pentodes and are operated as class AB₂ amplifiers.

b. *Output Transformer:* The output transformer (T8) has two secondary windings; a 500-ohm secondary (4-5) for power output, and a secondary for earphones (6-7) designed to deliver about 3% of the output power into an 8000-ohm resistive load when the 500-ohm sec-

ondary is connected to a matching load such as the loudspeaker

The turns ratio and resistance of the earphone winding are such that the power delivered to any load between 8000 ohms and 80 ohms varies less than 6 db, and the power input to a 250-ohm load is but 2 db greater than that to a 4000-ohm load. Fig. 16 shows curves of overall audio fidelity with different settings of the CRYSTAL SELECTIVITY and BAND WIDTH controls.

POWER SUPPLY

The Power Supply furnishes "A," "B" and "C" voltages for the Receiver. The "A," or heater voltage, is 6.3 volts AC obtained from a separate secondary winding (1-2) on the power transformer (T1, Fig. 10). "B" voltage is obtained from the center-tapped high-voltage secondary (7-8-10) connected to the plates of the "B" rectifier tube (V1). After this voltage is rectified, it is filtered by the combined action of the first filter choke (L1) and the two filter capacitors C1 and C2. This provides 380 volts DC for the plates of the power output tubes in the Receiver. Further filtering by the second filter choke (L2) and the first two sections of capacitor C3 provides 250 volts DC for the plates of the remaining tubes in the Receiver. Approximately 100 volts DC for the screen grids of the Receiver tubes is obtained from the tap on the bleeder resistor (R1), which is by-passed by the remaining section of capacitor C3. Negative "C" voltage is obtained from a tap (9) on the high-voltage secondary connected to the filament of the "C" rectifier tube (V2). The rectified output from the plates of tube V2 is filtered by the three sections of resistor R2 and the three sections of filter capacitor C4. When connected to the Receiver, the voltage at the end of this filter is approximately minus 50.

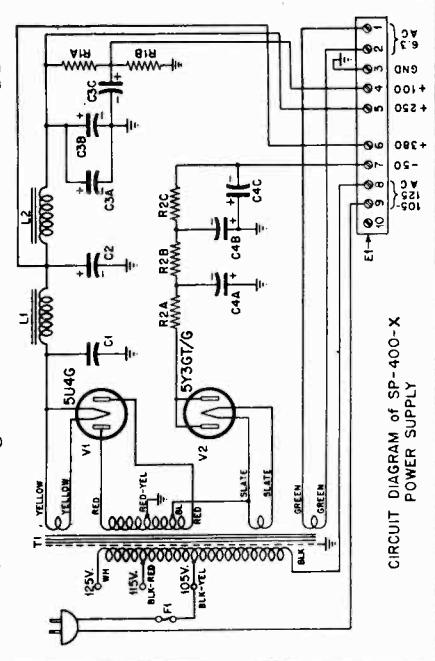


Fig. 10—
Power supply
diagram.

CIRCUIT DIAGRAM OF SP-400-X
POWER SUPPLY

CONTINUITY TESTS

If the Receiver is inoperative, it may have a shorted filter or by-pass capacitor or an open resistor. Remove the cabinet or bottom cover plate to get at all parts. Measure socket voltages and compare them with TABLE 2. (Consult Fig. 11 and TABLE 1 for key to tube base pin connections.) If this measurement does not reveal the trouble, start checking socket terminal resistance values against TABLE 3 (Receiver) or TABLE 4 (Power Supply). Obtain values of resistors and capacitors by locating the reference number on the proper circuit diagram and looking it up in the Table of Parts, Section V. In checking these resistance values be sure to set the "variable" controls to the positions specified in the table.

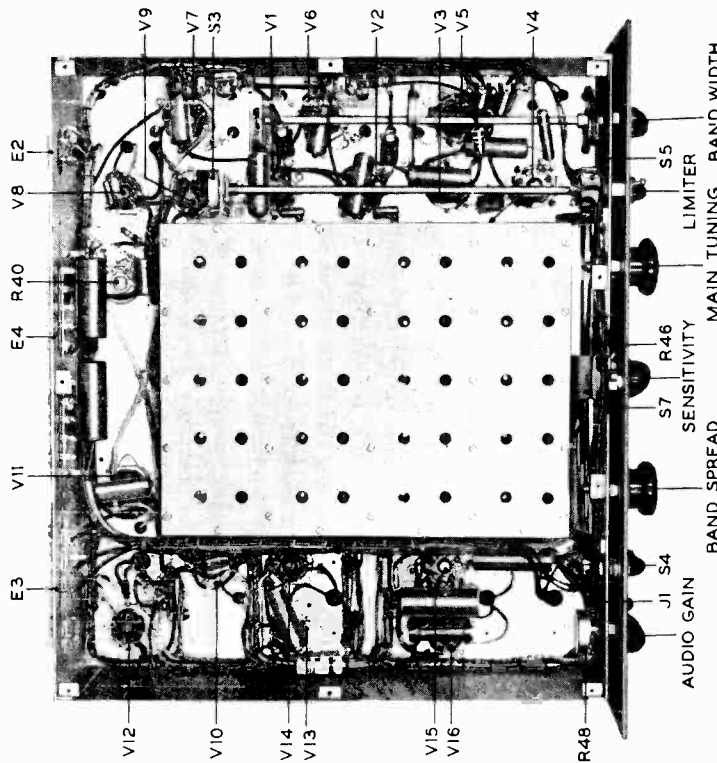


Fig. 12—Bottom view of chassis.

ALIGNMENT—GENERAL

When either selectivity or sensitivity or both appear to be below normal and all tubes have been tested, check the alignment. Remove the dust cover or cabinet and bottom cover plate of the Receiver to get at all parts for making adjustments. CAUTION: ANY CHANGES FROM ORIGINAL SETTINGS WILL BE SMALL SO USE GREAT CARE WHEN CHECKING ADJUSTMENTS. This is especially true of the HF oscillator

circuits, which should NOT be disturbed unless the MAIN TUNING dial is definitely known to be off calibration.

a. **Signal Generator:** This should be an accurately calibrated instrument producing amplitude-modulated radio-frequency signals. In addition to 455 kc. (the IF), the frequency range required of the signal generator depends on the tuning range of the receiver to be aligned. The RF alignment frequencies required for the Series 400-X Super-Pro are shown in Fig. 13. The second harmonic can generally be used when the fundamental frequency is not available. For example, a signal generator covering all frequencies from 455 kc to 15 mc could be used to check the highest frequency band by using the second harmonic of 15 mc to provide the 30 mc called for in Fig. 13. The signal generator should have an output of approximately 100 microvolts and an output impedance of approximately 100 ohms for best results when aligning the RF and HF Oscillator circuits. For IF alignment these values are not critical. The frequency calibration of the signal generator is extremely important if the Receiver dial calibration is to be correct.

b. **Output Meter:** The output meter should respond to the modulation frequency of the signal generator, preferably 400 cps, and should provide at least half-scale deflection for 10 volts. Its resistance should be greater than 500 ohms.

c. **Tools:** An insulated screwdriver 9/64" wide and .025" thick at the bit, is required for alignment of the Receiver.

d. **Preliminary Procedure:** Throw the OFF-ON switch to ON and permit the Receiver to warm up for about an hour before beginning adjustments. Connect the output meter to the 500-ohm terminals located at the rear of the Receiver chassis

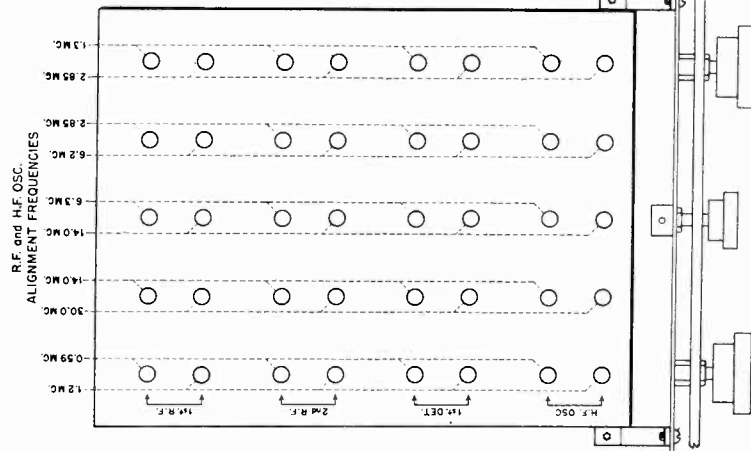


Fig. 13—R.F. and HF. osc. alignment frequencies and location of adjustments.

generator and cathode-ray oscilloscope. If this equipment is available, proceed as follows:

(3) Connect the input of the vertical amplifier of the oscilloscope to the PHONO connections on Terminal strip E3 (FIG. 7) on the rear skirt of the Receiver chassis. The "high" terminal is the second one from the edge of the strip; the first screw is connected to the chassis. Set the frequency-modulated signal generator to approximately 455 kc and connect its output to the control grid cap of the 1st detector (V3) through a fixed capacitor (100 mmf or larger). With the CRYSTAL SELECTIVITY switch at OFF, readjust the signal generator frequency to produce the conventional single-peaked resonance curve on the screen of the oscilloscope. Then turn the CRYSTAL SELECTIVITY switch to position 1. If the grid coil (L27) is correctly tuned the image on the oscilloscope screen will remain symmetrical but will be only about two-thirds as wide as before, indicating an increase in selectivity. The oscilloscope image is also affected by the PHASING control, maximum symmetry occurring at or very near the arrow on its scale. Therefore, when tuning L27, rock the PHASING control back and forth at the same time to secure the best adjustment.

c. *AVC Alignment Check:* Leaving all other controls as in PAR. 26a, and without changing the signal generator frequency, reduce AUDIO GAIN to 0, switch to AVC and increase SENSITIVITY to 10. Increase AUDIO GAIN to restore half-scale reading on the output meter and adjust the single trimmer capacitor in T6 for *minimum* output meter reading. The "S" meter reading should "peak" at the same time the output meter reading "dips."

d. *Beat Oscillator Alignment Check:* Continuing with controls as above switch off the output meter and plug in a pair of earphones, or replace the meter with a suitable loudspeaker. Turn the SIGNAL-MOD-CW switch to CW and see that the BEAT OSCILLATOR control is exactly on 0 (zero). If tone in earphones or speaker is not very low in pitch, readjust the trimmer capacitor near the bottom of T5 until it is. If the beat oscillator is in perfect alignment when this test is made, no sound will be heard since the signal generator and the beat oscillator will be oscillating at the same frequency and there will be no audible difference or "beat." Check this by turning the BEAT OSCILLATOR control knob slightly off 0 (zero) toward one side or the other. If this results in a tone rising in pitch as the pointer is turned away from 0 (zero) to either side, the beat frequency oscillator is perfectly aligned. If no audible tone can be obtained within the range of the BEAT OSCILLATOR control, adjust the trimmer capacitor near the bottom of T5 until an approximate "zero beat" occurs at 0 (zero) setting of the BEAT OSCILLATOR control.

ALIGNMENT PROCEDURE

a. *Preliminary Setup:* Adjust the signal generator to approximately 455 kc and connect its output to the control grid cap of the 1st detector tube (V3) through a fixed capacitor (anything larger than 100 mmf will do). Set the front panel controls as follows:

SENSITIVITY	0
AVC-MANUAL	MANUAL
SIGNAL-MOD-CW	MOD
SEND-REC	REC
BAND SWITCH	2.85-6.3 mc
AUDIO GAIN	10
CRYSTAL SELECTIVITY	OFF
PHASING	on arrow
BAND WIDTH	3
BAND SPREAD DIAL.....	100

b. *IF Alignment Check:*

(1) Set the MAIN TUNING dial near 2.85 mc, but be careful not to tune in a powerful local signal. Set the CRYSTAL SELECTIVITY switch on 3, the AVC-MANUAL switch on AVC, and advance the SENSITIVITY to 10. Turn off the modulation of the signal generator and adjust its frequency slightly to produce maximum deflection of the "S" meter. The adjustment of the signal generator in this manner is necessary in order to get exact agreement with the natural period of the particular quartz crystal in the Receiver being checked. After reducing SENSITIVITY to 0, the modulation may be switched on, but the tuning adjustment of the signal generator must not be altered until the alignment check has been completed. Return the CRYSTAL SELECTIVITY and AVC-MANUAL controls to their original settings of OFF and MANUAL and advance the SENSITIVITY control until a suitable output meter reading is obtained. A half-scale reading in the region of 5 to 10 volts will be satisfactory.

(2) Now check the alignment of both upper (grid) and lower (plate) air trimmer capacitors in IF transformers T2 and T3 and the single trimmer in T4 for peak reading of the output meter. If one or more of these adjustments results in a sizeable increase in output, reduce the SENSITIVITY control enough to bring the meter reading back to half-scale. Alignment of the plate circuit of the crystal filter (T1) can be tested in the same way by means of the lower adjusting screw on the side of the unit. This screw varies the position of the powdered iron core in coil L26. Do not change the setting of the upper adjusting screw which tunes grid coil L27, as this circuit cannot be adjusted properly with the output meter. It can, however, be aligned by the "visual" method using a frequency-modulated signal

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as a separate operation. Efficient weak-signal reception, with low receiver noise level and high image rejection ratios, depends on the relative alignment of these three circuits with respect to the HF oscillator and without regard to calibration accuracy.

(1) Accurate calibration of the signal generator is not required to check these adjustments. Modulation of the signal generator, while convenient, is not strictly necessary. Input to antenna terminals should be through 100 ohms (approximate) including output resistance of signal generator. If signal generator is modulated, Receiver controls should be set as for IF alignment; if unmodulated, set BEAT OSCILLATOR to 2 (either side) and SIGNAL-MOD-CW to CW. Adjust SENSITIVITY for half-scale reading on output meter when signals are exactly in tune.

(2) Starting with 2.85-6.3 mc band, set main dial at 6.3 mc (BAND SPREAD at 100) and adjust frequency of signal generator for peak deflection of output meter. Then check setting of trimmer marked 1st DET 6.3 mc (Fig. 13). Repeat this procedure on trimmers designated as 2nd RF and 1st, RF in same row. If readjustments on one of these settings greatly increases output meter reading, alter SENSITIVITY slightly to reduce reading to half-scale. After each adjustment check tuning of Receiver to make sure test signal is still accurately tuned. BAND SPREAD may be used as a vernier for this purpose.

CAUTION: THIS TUNING CHECK IS EXTREMELY IMPORTANT AT HIGH END OF 6.3-14.0 MC AND 13.4-30.0 MC BANDS WHERE THERE IS SOME SLIGHT INTERACTION BETWEEN 1st DET AND HF OSC CIRCUITS. After checking the three trimmers at high end of this band, turn main dial to 2.85 mc and retune signal generator to suit. Then check the three inductance adjuster settings marked 2.85 mc (Fig. 13) in the same row. Since adjustments at one end of a band also affect the other end of the band (as described under HF OSC alignment), repeat above procedure until no further improvement can be secured. The number of repetitions necessary depends on how much mistuning existed initially. Other bands may be checked in the same manner.

(3) For best possible efficiency with a particular antenna arrangement, the 1st RF circuits may be adjusted with the antenna connected. This can be done by loosely coupling output of signal generator to antenna system instead of directly to antenna terminals through a 100-ohm resistor. Make sure that signal from signal generator actually reaches Receiver by way of antenna rather than by some form of direct coupling.

(4) In all the foregoing tests using output meter readings for circuit adjustment it is recommended that earphones (or speaker) be used to monitor the signal. This will avoid false adjustments caused by overloading or freakish responses.

e. *HF Oscillator Calibration Check:* The accuracy of the MAIN DIAL calibration depends solely on the HF oscillator frequency, which in this Receiver is 455 kc. (the IF) *higher* than the signal frequency. Although the frequency of the HF oscillator can be measured directly if accurate frequency-measuring equipment is on hand, it is far simpler to check it by tuning in signals of known frequency and noting the MAIN DIAL readings. CAUTION: BE SURE THE BAND SPREAD DIAL IS SET AT 100 WHEN MAKING THIS TEST.

(1) To correct dial calibration, refer to alignment chart (Fig. 13) for location of HF oscillator adjustments as well as signal frequencies at which settings should be made. The output of the signal generator should be unmodulated and SIGNAL-MOD-CW switch on Receiver turned to CW. Set BEAT OSCILLATOR at 0, AUDIO GAIN at 10, AVC-MANUAL on MANUAL, BAND WIDTH at 16. Disconnect output meter and use earphones or loudspeaker to make necessary adjustments by "zero beat" method. Connect signal generator to antenna terminals for this test.

(2) If the 2.85-6.3 mc band is to be corrected, tune signal generator accurately to 6.3 mc. Tune in signal generator signal at 6.3 mc end of Receiver dial to zero beat. Notice approximate dial error. Turn main dial slightly toward 6.3 mc calibration line until beat note rises to a high pitch. Do not turn dial far enough to raise beat so high it cannot be heard. With alignment screwdriver adjust trimmer capacitor marked HF OSC 6.3 mc (Fig. 13) until beat is again zero. Turn main dial still farther toward 6.3 mc line and make a further adjustment of trimmer capacitor to return to zero beat. Repeat this process as often as necessary to bring dial to exactly 6.3 mc. (The main dial could be set at once on exactly 6.3 mc and trimmer turned enough at one time to produce zero beat, but the step-by-step method is recommended.) Now retune signal generator to exactly 2.85 mc and tune in signal-generator signal at low-frequency end of main dial and correct the calibration step-by-step as before, using inductance trimming adjustment HF OSC 2.85 mc (Fig. 13). When 6.3 mc signal from signal generator is again tuned in at other end of dial, it will be found that inductance adjustment at 2.85 mc has changed correction previously made at 6.3 mc. This is normal. Go back and forth several times from 2.85 to 6.3 mc in order to bring both ends of dial scale into exact agreement with the signal frequency. CAUTION: DURING THIS ADJUSTMENT BE VERY CAREFUL TO ADJUST THE SENSITIVITY CONTROL TO AVOID OVERLOADING.

f. *RF and 1st Detector Alignment Check:* Although alignment of these three circuits (1st and 2nd RF and 1st Det) can be checked at the same time as the HF oscillator, it is simpler to consider each check

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TABLE OF PARTS—Cont.

TABLE OF PARTS

CIRCUIT REF. NO.	DESCRIPTION	PART No.	CIRCUIT REF. NO.	DESCRIPTION	PART No.
C1	CAPACITORS			CAPACITORS—Continued	
C2	Main Tuning		C59	.05 mf, Paper	23912-2
C3	Band Spread		C60	5 mmf, Silvered Mica	23003-75
C4	620 mmf, Mica	23005-86	C61	Variable, Air, 100 mmf	SA-1
C5	.02 mf, Paper	23912-1	C62	.05 mf, Paper	23912-2
C6	.05 mf, Paper	23912-2	C63	51 mmf, Mica	23001-59
C7	Trimmer, Mica, 3-30 mmf		C64	51 mmf, Mica	23912-2
C8	Trimmer, Mica, 3-30 mmf		C65	.05 mf, Paper	23001-59
C9	Trimmer, Mica, 3-30 mmf		C66	51 mmf, Mica	23001-59
C10	Trimmer, Mica, 3-30 mmf		C67	Variable, Air, 100 mmf	SA-197
C11	Trimmer, Mica, 3-30 mmf		C68	100 mmf, Mica	23001-48
C12	Trimmer, Mica, 3-30 mmf		C69	Variable, Air, 9 mmf	SA-170
C13	Trimmer, Mica, 3-30 mmf		C70	95 mmf, Silvered Mica	6195
C14	Trimmer, Mica, 3-30 mmf		C71	620 mmf, Mica	23005-86
C15	Trimmer, Mica, 3-30 mmf		C72	.25 mf, Paper	23912-38
C16	Trimmer, Mica, 3-30 mmf		C73	.05 mf, Paper	23912-2
C17	Trimmer, Mica, 3-30 mmf		C74	.05 mf, Paper	23912-2
C18	Trimmer, Mica, 3-30 mmf		C75	Variable, Air, 100 mmf	SA-1
C19	Trimmer, Mica, 3-30 mmf		C76	5100 mmf, Mica	23015-16
C20	Trimmer, Mica, 3-30 mmf		C77	.05 mf, Paper	23912-2
C21	Trimmer, Mica, 3-30 mmf		C78	.05 mf, Paper	23912-2
C22	Trimmer, Air, 4-25 mmf		C79	.05 mf, Paper	23912-2
C23	Trimmer, Air, 4-25 mmf		C80	.05 mf, Paper	23912-2
C24	Trimmer, Air, 4-25 mmf		C81	.02 mf, Paper	23912-2
C25	Trimmer, Air, 4-25 mmf		C82	.02 mf, Paper	23912-1
C26	300 mmf, Silver Mica	23003-105D	C83	.05 mf, Paper	23912-2
C27	620 mmf, Mica	23005-86	C84	40 mt, Electrolytic, Dry	6171
C28	.02 mf, Paper	23912-1	C85	.25 mf, Paper	23912-38
C29	.05 mf, Paper	23912-2	C86	.25 mf, Paper	23912-38
C30	300 mmf, Silvered Mica	23003-105D		COILS	
C31	620 mmf, Mica	23005-86	L1	Assembly, Antenna transformer, 1.24-2.86 mc	29529-G1
C32	.02 mf, Paper	23912-1	L2	Assembly, Antenna transformer, 2.85-6.3 mc	29532-G1
C33	.05 mf, Paper	23912-2	L3	Assembly, Antenna transformer, 13.4-30.0 mc	29538-G1
C34	95 mmf, Silvered Mica	6195	L4	Assembly, Antenna transformer, 540-1240 kc	29520-G1
C35	673 mmf, Silvered Mica		L5	Assembly, Antenna transformer, 6.3-14.0 mc	29535-G1
C36	1500 mmf, Silvered Mica		L6	Not Used	
C37	3300 mmf, Silvered Mica		L7	Not Used	
C38	300 mmf, Silvered Mica		L8	Not Used	
C39	51 mmf, Silvered Mica		L9	Not Used	
C40	.05 mf, Paper	23003-50	L10	Not Used	
C41	.05 mf, Paper	23912-2	L11	Assembly, R.F. transformer, 1.24-2.86 mc	29530-G1
C42	120 mmf, Silvered Mica	23912-2	L12	Assembly, R.F. transformer, 2.85-6.3 mc	29533-G1
C43	100 mmf, Mica	23003-96	L13	Assembly, R.F. transformer, 13.4-30.0 mc	29539-G1
C44	100 mmf, Mica	23001-48	L14	Assembly, R.F. transformer, 540-1240 kc	29521-G1
C45	NOT USED	23001-48	L15	Assembly, R.F. transformer, 6.3-14.0 mc	29536-G1
C46	Phasing, Air, 2-6 mmf (ea.)	SA-179	L16	Assembly, Same as L11	29530-G1
C47	.02 mf, Paper	23912-1	L17	Assembly, Same as L12	29533-G1
C48	85 mmf, Silvered Mica, 2%	6180	L18	Assembly, Same as L13	29539-G1
C49	Variable, Air, 100 mmf	23912-2	L19	Assembly, Same as L14	29521-G1
C50	.05 mf, Paper	SA-1	L20	Assembly, Same as L15	29536-G1
C51	.05 mf, Paper	23912-2	L21	Assembly, Oscillator Coil, 1.24-2.86 mc	29531-G1
C52	Variable, Air, 100 mmf	23912-2	L22	Assembly, Oscillator Coil, 2.85-6.3 mc	29534-G1
C53	Variable, Air, 100 mmf	SA-1	L23	Assembly, Oscillator Coil, 13.4-30.0 mc	29540-G1
C54	.05 mf, Paper	23912-2	L24	Assembly, Oscillator Coil, 540-1240 kc	29528-G1
C55	Variable, Air, 100 mmf	SA-1	L25	Assembly, Oscillator Coil, 6.3-14.0 mc	29537-G1
C56	.05 mf, Paper	23912-2	L26	Universal, 7/41 Litz., iron dust core	6146
C57	.05 mf, Paper	23912-2	L27	Universal, 7/41 Litz., iron dust core	6147
C58	Variable, Air, 100 mmf	SA-1	L28	3 pie universal 7/41 Litz., ceramic core	2903-A

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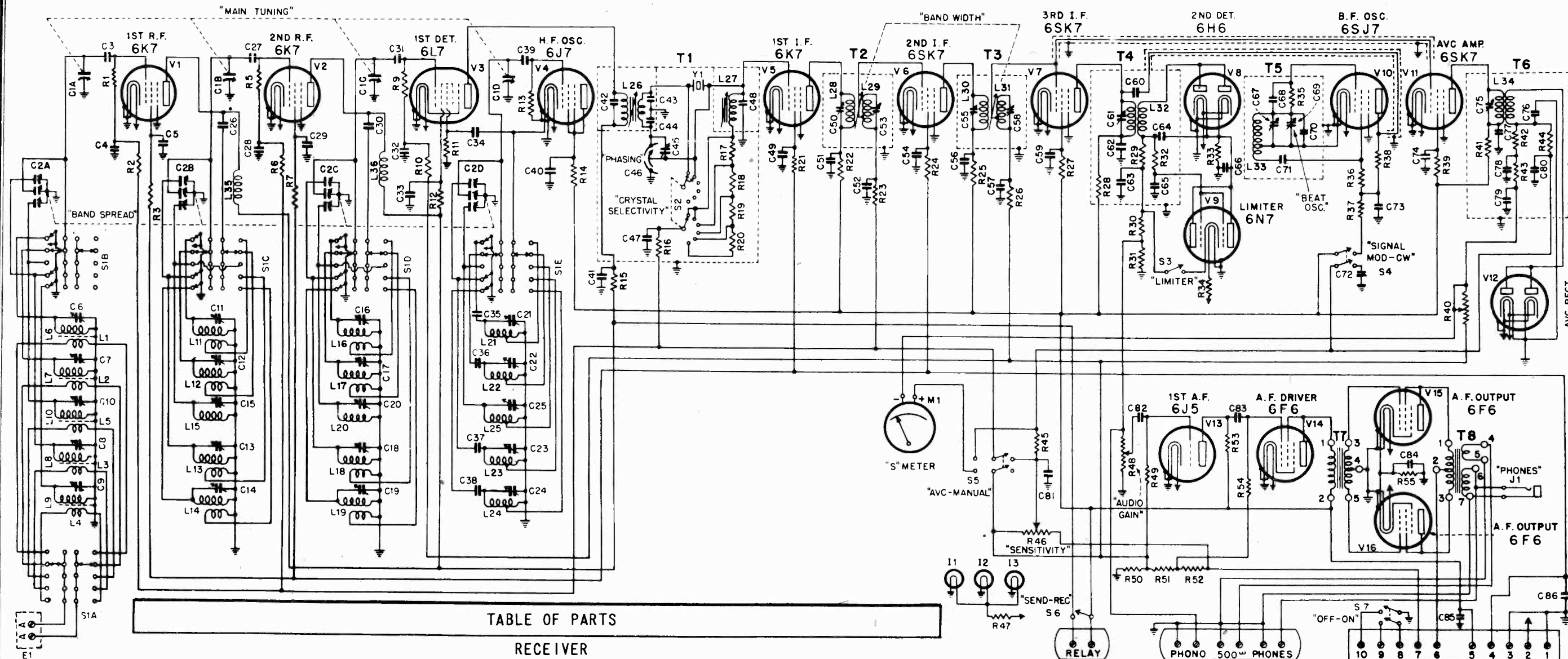
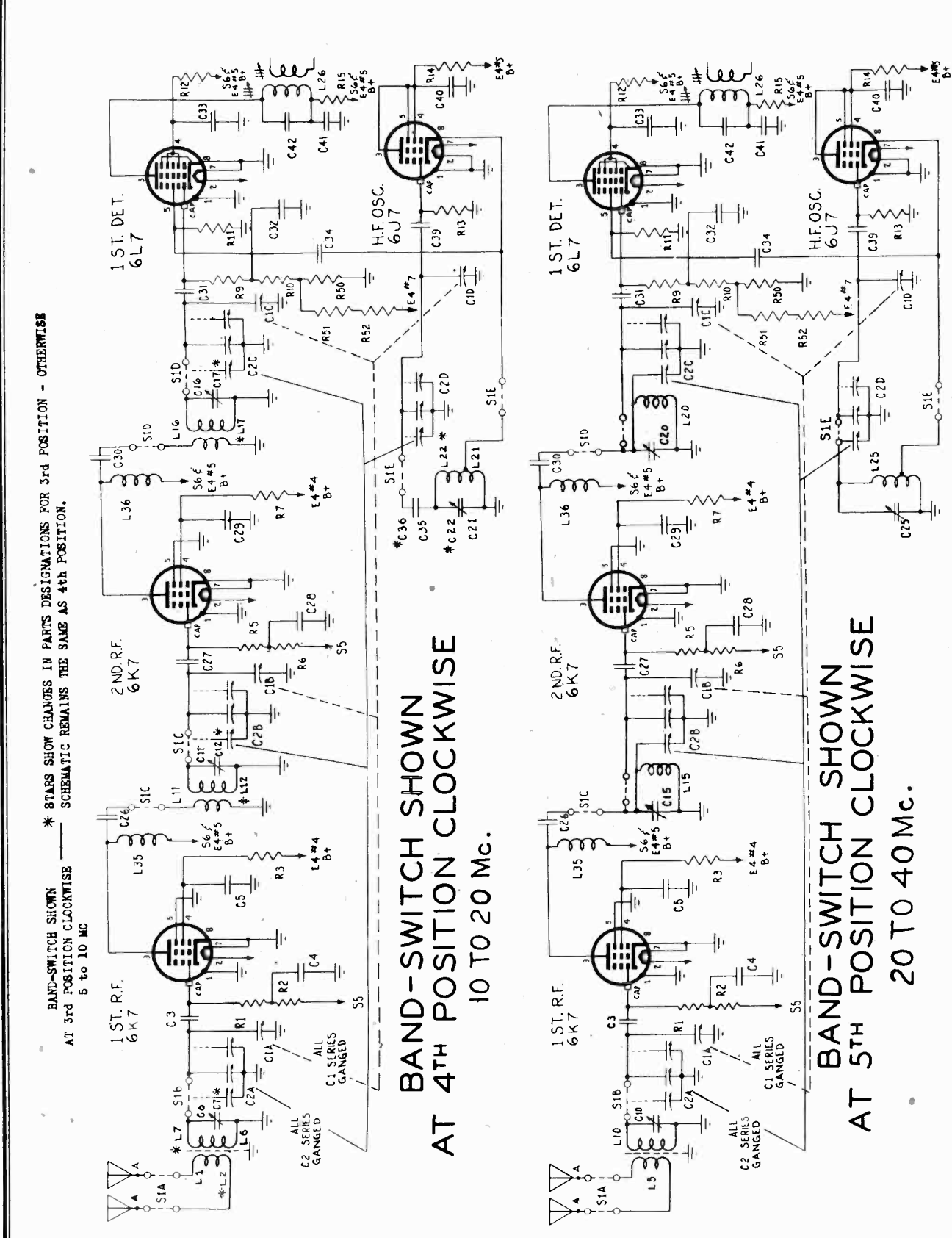
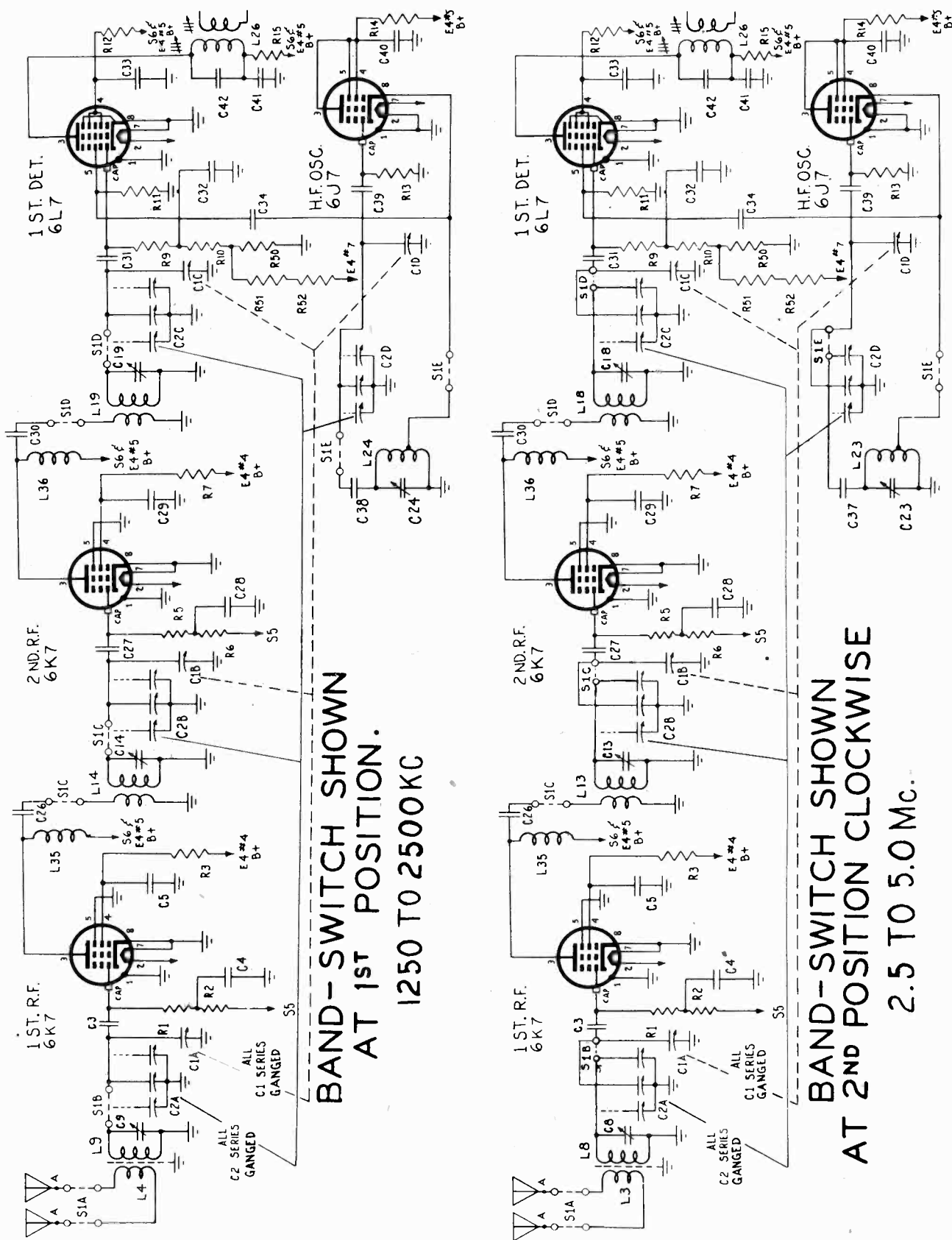


TABLE OF PARTS

RECEIVER

CIRCUIT REF. NO.	DESCRIPTION	PART NO.									
CAPACITORS											
C1	Main Tuning	23005-86	C17	Trimmer, Mica, 3-30 mmf	Part of SA-114	C37	1220 mmf, "Toothpick"	Part of SA 118	C56	.05 mf, Paper	23912-2
C2	Band Spread	23912-1	C18	Trimmer, Mica, 3-30 mmf	Part of SA-117	C38	522 mmf, Silver Mica	Part of SA 138	C57	.05 mf, Paper	23912-2
C3	620 mmf, Mica	23912-2	C19	Trimmer, Mica, 3-30 mmf	Part of SA-137	C39	51 mmf, Silver Mica	23003-50	C58	Variable, Air, 100 mmf	SA-1
C4	.02 mf, Paper	Part of SA-110	C20	Trimmer, Air, 4-16 mmf	Part of SA-131	C40	.05 mf, Paper	23912-2	C59	.05 mf, Paper	23912-2
C5	.05 mf, Paper	Part of SA-113	C21	Trimmer, Air, 4-28 mmf	Part of SA-112	C41	.05 mf, Paper	23912-2	C60	5 mmf, Silver Mica	23003-75
C6	Trimmer, Mica, 3-30 mmf	Part of SA-116	C22	Trimmer, Air, 4-28 mmf	Part of SA-115	C42	120 mmf, Silver Mica	23003-96	C61	Variable, Air, 100 mmf	SA-1
C7	Trimmer, Mica, 3-30 mmf	Part of SA-136	C23	Trimmer, Air, 4-28 mmf	Part of SA-118	C43	100 mmf, Mica	23001-48	C62	.05 mf, Paper	23912-2
C8	Trimmer, Mica, 3-30 mmf	Part of SA-130	C24	Trimmer, Air, 4-28 mmf	Part of SA-138	C44	100 mmf, Mica	23001-48	C63	51 mmf, Mica	23001-59
C9	Trimmer, Mica, 3-30 mmf	Part of SA-111	C25	Trimmer, Air, 4-25 mmf	Part of SA-132	C45	Trimmer, Mica, 1.5-5 mmf	6189	C64	51 mmf, Mica	23001-59
C10	Trimmer, Air, 4-36 mmf	Part of SA-114	C26	300 mmf, Silver Mica	23003-105D	C46	Phasing, Air, 2-6 mmf (ea.)	SA-179	C65	.05 mf, Paper	23912-2
C11	Trimmer, Mica, 3-30 mmf	Part of SA-117	C27	620 mmf, Mica	23005-86	C47	.02 mf, Paper	23912-1	C66	51 mmf, Mica	23001-59
C12	Trimmer, Mica, 3-30 mmf	Part of SA-114	C28	.02 mf, Paper	23912-1	C48	85 mmf, Silver Mica ±2%	6180	C67	Variable, Air, 100 mmf	SA-197
C13	Trimmer, Mica, 3-30 mmf	Part of SA-117	C29	.05 mf, Paper	23912-2	C49	.05 mf, Paper	23912-2	C68	100 mmf, Mica	23001-48
C14	Trimmer, Mica, 3-30 mmf	Part of SA-137	C30	300 mmf, Silver Mica	23003-105D	C50	Variable, Air, 100 mmf	SA-1	C69	Variable, Air, 9 mmf	SA-170
C15	Trimmer, Air, 4-16 mmf	Part of SA-131	C31	620 mmf, Mica	23005-86	C51	.05 mf, Paper	23912-2	C70	95 mmf, Silver Mica	6195
C16	Trimmer, Mica, 3-30 mmf	Part of SA-111	C32	.02 mf, Paper	23912-1	C52	.05 mf, Paper	23912-2	C71	620 mmf, Mica	23005-86
			C33	.05 mf, Paper	23912-2	C53	Variable, Air, 100 mmf	SA-1	C72	.25 mf, Paper	23912-38
			C34	95 mmf, Silver Mica	6195	C54	.05 mf, Paper	23912-2	C73	.05 mf, Paper	23912-2
			C35	4800 mmf, "Toothpick"	Part of SA 112	C55	Variable, Air, 100 mmf	SA-1	C74	.05 mf, Paper	23912-2
			C36	2400 mmf, "Toothpick"	Part of SA 115				C75	Variable, Air, 100 mmf	SA-1



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ALIGNMENT - GENERAL

When either selectivity or sensitivity or both appear to be below normal and all tubes have been tested, check the alignment. Remove the cabinet or dust cover and bottom cover plate of the Receiver to get at all parts for making adjustments. CAUTION: ANY CHANGES FROM ORIGINAL SETTINGS WILL BE SMALL SO USE GREAT CARE WHEN CHECKING ADJUSTMENTS. This is especially true of the H-F oscillator circuits, which should NOT be disturbed unless the MAIN TUNING dial is definitely known to be off calibration.

a. *Signal Generator* - This should be an accurately calibrated instrument producing amplitude-modulated radio-frequency signals. In addition to 465 kc (the I.F.), the frequency range required of the signal generator depends on the tuning range of the receiver to be aligned. The H-F alignment frequencies required for the Series 400-SX Super-Pro are shown in Fig. 13. The second harmonic can generally be used when the fundamental frequency is not available. For example: a signal generator covering all frequencies from 465 kc to 20 mc could be used to check the highest frequency band by using the second harmonic of 20 mc to provide the 40 mc called for in Fig. 13. The signal generator should have an output of approximately 100 microvolts and an output impedance of approximately 100 ohms for best results when aligning the R-F and H-F-Oscillator circuits. For I-F alignment these values are not critical. The frequency calibration of the signal generator is extremely important if the Receiver dial calibration is to be correct.

b. *Output Meter* - The output meter should respond to the modulation frequency of the signal generator, preferably 400 cps, and should provide at least half-scale deflection for 10 volts. Its resistance should be greater than 500 ohms.

c. *Tools* - An insulated screwdriver 9/64" wide and .025" thick at the bit, is required for alignment of the Receiver.

d. *Preliminary Procedure* - Throw the OFF-ON switch to ON and let the Receiver warm up for about an hour before beginning adjustments. Connect the output meter to the 500-ohm terminals located at the rear of the Receiver chassis.

ALIGNMENT PROCEDURE

a. *Preliminary Setup* - Adjust the signal generator to approximately 465 kc and connect its output to the control grid cap of the 1st detector tube (V3) through a fixed capacitor (anything larger than 100 mmf will do). Set the front panel controls as follows:

SENSITIVITY.....0
 AVC-MANUAL.....MANUAL
 SIGNAL-MOD-CW.....MOD
 SEND-REC.....REC
 BAND SWITCH.....2-5-5.0 mc
 AUDIO GAIN.....10
 CRYSTAL SELECTIVITY.....OFF
 PHASING.....on arrow
 BAND WIDTH.....3
 BAND SPREAD DIAL.....100

b. *I-F Alignment Check* -

(1) Set the MAIN TUNING dial near 2.5 mc, but be careful not to tune in a powerful local signal. Set the CRYSTAL SELECTIVITY switch on 3, the AVC-MANUAL switch on AVC, and advance the SENSITIVITY to 10. Turn off the modulation of the signal generator and adjust its frequency slightly to produce maximum deflection of the "S" meter. The adjustment of the signal generator in this manner is necessary in order to get exact agreement with the natural period of the particular quartz crystal in the Receiver being checked. After reducing SENSITIVITY to 0, the modulation may be switched on, but the tuning adjustment of the signal generator must not be altered until the alignment check has been completed. Return the CRYSTAL SELECTIVITY and AVC-MANUAL controls to their original settings of OFF and advance the SENSITIVITY control until a suitable output meter reading is obtained. A half-scale reading in the region of 5 to 10 volts will be satisfactory.

(2) Now check the alignment of both upper (grid) and lower (plate) air trimmer capacitors in I-F transformers T2 and T3 and the single trimmer in T4 for peak reading of the output meter. If one or more of these adjustments results in a sizeable increase in output, reduce the SENSITIVITY control enough to bring the meter reading back to half-scale. Alignment of the plate circuit of the crystal filter (T1) can be tested in the same way by means of the lower adjusting screw on the side of the unit. This screw varies the

position of the powdered iron core in coil L26. Do not change the setting of the upper adjusting screw which tunes grid coil L27, as this circuit cannot be adjusted properly with the output meter. It can, however, be aligned by the "visual" method using a frequency-modulated signal generator and cathode-ray oscilloscope. If this equipment is available, proceed as follows:

(3) Connect the input of the vertical amplifier of the oscilloscope to the PHONO connections on terminal strip E3 (Fig. 6) on the rear skirt of the Receiver chassis. The "high" terminal is the second one from the edge of the strip; the first screw is connected to the chassis. Set the frequency-modulated signal generator to approximately 465 kc and connect its output to the control grid cap of the 1st detector (V3) through a fixed capacitor (100 mmf or larger). With the CRYSTAL SELECTIVITY switch at OFF, readjust the signal generator frequency to produce the conventional single-peaked resonance curve on the screen of the oscilloscope. Then turn the CRYSTAL SELECTIVITY switch to position 1. If the grid coil (L27) is correctly tuned the image on the oscilloscope screen will remain symmetrical but will be only about two-thirds as wide as before, indicating an increase in selectivity. The oscilloscope image is also affected by the PHASING control, maximum symmetry occurring at or very near the arrow on its scale. Therefore, when tuning L27, rock the PHASING control back and forth at the same time to secure the best adjustment.

c. *AVC Alignment Check* - Leaving all other controls as in PAR. 26a, and without changing the signal generator frequency, reduce AUDIO GAIN to 0, switch to AVC and increase SENSITIVITY to 10. Increase AUDIO GAIN to restore half-scale reading on the output meter and adjust the single trimmer capacitor in T6 for minimum output meter reading. The "S" meter reading should "peak" at the same time the output meter reading "dips".

d. *Beat Oscillator Alignment Check* - Continuing with controls as above (PAR. 26c), switch off the output meter and plug in a pair of earphones, or replace the meter with a suitable loudspeaker. Turn the SIGNAL-MOD-CW switch to CW and see that the BEAT OSCILLATOR control is exactly on 0 (zero). If tone in earphones or speaker is not

very low in pitch, readjust the trimmer capacitor near the bottom of T5 until it is. If the beat oscillator is in perfect alignment when this test is made, no sound will be heard since the signal generator and the beat oscillator will be oscillating at the same frequency and there will be no audible difference of "beat". Check this by turning the BEAT OSCILLATOR control knob slightly off 0 (zero) toward one side or the other. If this results in a tone rising in pitch as the pointer is turned away from 0 (zero) to either side, the beat frequency oscillator is perfectly aligned. If no audible tone can be obtained within the range of the BEAT OSCILLATOR control, adjust the trimmer capacitor near the bottom of T5 until an approximate "zero beat" occurs at 0 (zero) setting of the BEAT OSCILLATOR control.

e. *H-F Oscillator Calibration Check* - The accuracy of the MAIN DIAL calibration depends solely on the H-F oscillator frequency, which in this Receiver is 465 kc (the IF) higher than the signal frequency except in the 20-40 mc band, where the H-F oscillator is 465 kc lower than the signal frequency. Although the frequency of the H-F oscillator can be measured directly if accurate frequency-measuring equipment is on hand, it is far simpler to check it by tuning in signals of known frequency and noting the MAIN DIAL readings. CAUTION: BE SURE THE BAND SPREAD DIAL IS SET AT 100 WHEN MAKING THIS TEST.

(1) To correct dial calibration, refer to alignment chart (Fig. 13) for location of H-F oscillator adjustments as well as signal frequencies at which settings should be made. If the 2.5-5.0 mc band is to be corrected, the signal generator may be set accurately to 2.5 mc and its second harmonic (if strong enough) used for the 5.0 mc end of the band. The output of the signal generator should be unmodulated and SIGNAL-MOD-CW switch on Receiver turned to CW. Set BEAT OSCILLATOR at 0, AUDIO GAIN at 10, AVC-MANUAL on MANUAL, BAND WIDTH at 16. Disconnect output meter and use earphones or loudspeaker to make necessary adjustments by "zero beat" method. Connect signal generator to antenna terminals for this test.

(2) Tune in second harmonic at 5.0 mc end of dial to zero beat. Notice approximate dial error. Turn main dial, slightly toward 5.0 mc calibration line until beat note rises to a high pitch. Do not turn dial far enough to

MODEL SP-400-SX

HAMMARLUND MFG. CO. INC.

system instead of directly to antenna terminals through a 100-ohm resistor. Make sure that signal from signal generator actually reaches Receiver by way of antenna rather than by some form of direct coupling.

(4) In all the foregoing tests using output meter readings for circuit adjustment it is recommended that earphones (or speaker) be used to monitor the signal. This will avoid false adjustments caused by overloading or freakish responses.

put resistance of signal generator. If signal generator is modulated, Receiver controls should be set as for I-F alignment; if unmodulated, set BEAT OSCILLATOR to 2 (either side) and SIGNAL-MOD-CW to CW. Adjust SENSITIVITY for half-scale reading on output meter when signals are exactly in tune.

(2) Starting with 2.5-5.0 mc band, set main dial at 5.0 mc (BAND SPREAD at 100) and adjust frequency of signal generator for peak deflection of output meter. Then check setting of trimmer marked 1st DET 5.0 mc (Fig. 13). Repeat this procedure on trimmers designated as 2nd RF and 1st RF in same row. If readjustments on one of these settings greatly increases output meter reading, alter SENSITIVITY slightly to reduce reading to half-scale. After each adjustment check tuning of Receiver to make sure test signal is still accurately tuned. BAND SPREAD may be used as a vernier for this purpose. CAUTION: THIS TUNING CHECK IS EXTREMELY IMPORTANT AT HIGH END OF 10-20 MC AND 20-40 MC BANDS WHERE THERE IS SOME SLIGHT INTERACTION BETWEEN 1ST DET AND H-F OSC CIRCUITS. After checking the three trimmers at high end of this band, turn main dial to 2.5 mc and retune signal generator to suit. Then check the three inductance adjuster settings marked 2.5 mc (Fig. 13) in the same row. Since adjustments at one end of a band also affect the other end of the band (as described under H-F OSC alignment), repeat above procedure until no further improvement can be secured. The number of repetitions necessary depends on how much mistuning existed initially. Other bands may be checked in the same manner.

(3) For best possible efficiency with a particular antenna arrangement, the 1st RF circuits may be adjusted with the antenna connected. This can be done by loosely coupling output of signal generator to antenna

raise beat so high it cannot be heard. With alignment screwdriver adjust trimmer capacitor marked HF OSC 5.0 mc (Fig. 13) until beat is again zero. Turn main dial still farther toward 5.0 mc line and make a further adjustment of trimmer capacitor to return to zero beat. Repeat this process as often as necessary to bring dial to exactly 5.0 mc. (The main dial could be set at once on exactly 5.0 mc and trimmer turned enough at one time to produce zero beat, but the step-by-step method is recommended.) Now tune in 2.5 mc fundamental at low-frequency end of main dial and correct the calibration step-by-step as before, using inductance trimming adjuster HF OSC 2.5 mc (Fig. 13). When second harmonic is again tuned in at other end of dial, it will be found that inductance adjustment at 2.5 mc has changed correction previously made at 5.0 mc. This is normal. Go back and forth several times from 2.5 to 5.0 mc in order to bring both ends of dial scale into exact agreement with the signal frequency. CAUTION: DURING THIS ADJUSTMENT BE VERY CAREFUL TO ADJUST THE SENSITIVITY CONTROL TO AVOID OVERLOADING.

f. R-F and 1st Detector Alignment Check - Although alignment of these three circuits (1st and 2nd RF and 1st Det) can be checked at the same time as the H-F oscillator, it is simpler to consider each check as a separate operation. Efficient weak-signal reception, with low receiver noise level and high image rejection ratios, depends on the relative alignment of these three circuits with respect to the H-F oscillator and without regard to calibration accuracy.

(1) Accurate calibration of the signal generator is not required to check these adjustments. Modulation of the signal generator, while convenient, is not strictly necessary. Input to antenna terminals should be through 100 ohms (approximate) including out-

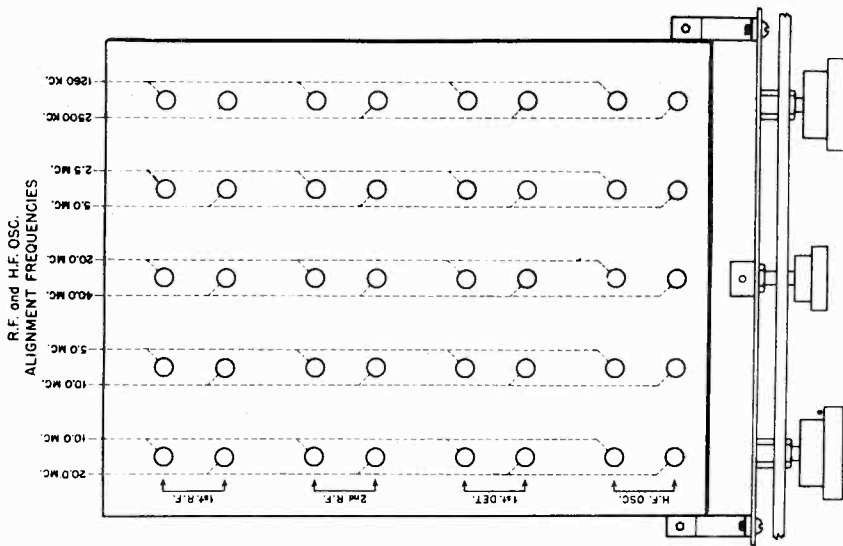


Fig. 13. ALIGNMENT CHART. Shows location of screwdriver adjustments and corresponding test frequencies.

HAMMARLUND MFG. CO. INC.

MODEL SP-400-SX

CIRCUIT REF. NO.	DESCRIPTION	PART NO.	CIRCUIT REF. NO.	DESCRIPTION	PART NO.	CIRCUIT REF. NO.	DESCRIPTION	PART NO.
C76	5100 mf, Mica	23015-16		METERS				
C77	.05 mf, Paper	23912-2	M1	Meter, 0-200 micro-ampere movement	4903	V1, V2, V5	6K7	16244-1
C78	.05 mf, Paper	23912-2				V3	6L7	16212-1
C79	.05 mf, Paper	23912-2		RESISTORS		V4	6J7	16220-1
C80	.05 mf, Paper	23912-2	R1	500,000 ohms, 1/3 W	4959	V6, V7, V11	6SK7	16245-1
C81	.05 mf, Paper	23912-2	R2	10,000 ohms, 1/2 W	19309-73	V8, V12	6H6	16202-1
C82	.02 mf, Paper	23912-1	R3	2,000 ohms, 1/2 W	19301-206	V9	6N7	16246-1
C83	.05 mf, Paper	23912-2	R4	Not used		V10	6SJ7	16236-1
C84	40 mf, Electrolytic, Dry	6171	R5	500,000 ohms, 1/3 W	4959	V13	6J5	16209-1
C85	.25 mf, Paper	23912-38	R6	10,000 ohms, 1/2 W	19309-73	V14, V15, V16	6F6	16239-1
C86	.25 mf, Paper	23912-38	R7	2,000 ohms, 1/2 W	19301-206			
	JACK		R8	Not used			CABLES	
J1	JK-34-A, Phone Jack (Headset)	5066	R9	500,000 ohms, 1/3 W	4959	W1	Connector, nine wire, with two 10 terminal connector strips.	SA-35
	COILS		R10	10,000 ohms, 1/2 W	19309-73			
L1	Coil Assem., Antenna Primary, 10-20 mc	SA-46	R11	50,000 ohms, 1/3 W	4960	W2	Connector, eight wire, with one 10 terminal connector strip (special order only)	SA-67
L2	Coil Assem., Antenna Primary, 5-10 mc	SA-47	R12	24,000 ohms, 2 W	19304-202			
L3	Coil Assem., Antenna Primary, 2.5-5 mc	SA-48	R13	80,000 ohms, 1/3 W	4960		SOCKETS	
L4	Coil Assem., Antenna Primary, 1250-2500 kc	SA-49	R14	12,000 ohms, 2 W	19304-44	X1-X8	Tube socket, molded octal, low loss bakelite.	16082-1
L5	Coil Assem., Antenna Primary, 20-40 mc	SA-46	R15	2,000 ohms, 1/2 W	19301-206	X5-X16	Molded octal, black bakelite	16083-1
L6	Coil Assem., Grid Coil, 10-20 mc	SA-110	R16	10,000 ohms, 1/2 W	19309-73	Y1	Resonator type, ground for 465 kc	4944
L7	Coil Assem., Grid Coil 8-10 mc	SA-113	R17	24 ohms, 1/2 W	19301-178		QUARTZ CRYSTAL	
L8	Coil Assem., Grid Coil, 2.5-5 mc	SA-116	R18	51 ohms, 1/2 W	19301-187			
L9	Coil Assem., Grid Coil, 1250-2500 kc	SA-136	R19	300 ohms, 1/2 W	19301-196			
L10	Coil Assem., Grid Coil, 20-40 mc	SA-130	R20	2,000 ohms, 1/2 W	19301-206			
L11	Coil Assem., R.F. Transformer, 10-20 mc	SA-111	R21	2,000 ohms, 1/2 W	19301-206			
L12	Coil Assem., R.F. Transformer, 5-10 mc	SA-114	R22	2,000 ohms, 1/2 W	19301-206			
L13	Coil Assem., R.F. Transformer, 2.5-5 mc	SA-117	R23	10,000 ohms, 1/2 W	19309-73			
L14	Coil Assem., R.F. Transformer, 1250-2500 kc	SA-137	R24	2,000 ohms, 1/2 W	19301-206			
L15	Coil Assem., R.F. Transformer, 20-40 mc	SA-131	R25	2,000 ohms, 1/2 W	19301-206			
L16	Coil Assem., Same as L11	SA-111	R26	10,000 ohms, 1/2 W	19309-73			
L17	Coil Assem., Same as L12	SA-114	R27	51,000 ohms, 1 W	19303-182			
L18	Coil Assem., Same as L13	SA-117	R28	2,000 ohms, 1/2 W	19301-206			
L19	Coil Assem., Same as L14	SA-137	R29	100,000 ohms, 1/2 W	19301-80	C3-A-B-C	8-8-8 mf, 450 VDCW Dry Electrolytic	23842-28
L20	Coil Assem., Same as L15	SA-131	R30	75,000 ohms, 1/2 W	19301-215	C4-A-B-C	8-8-8 mf, 450 VDCW Dry Electrolytic	23842-28
L21	Coil Assem., Oscillator Coil, 10-20 mc	SA-112	R31	51,000 ohms, 1/2 W	19301-171			
L22	Coil Assem., Oscillator Coil, 8-10 mc	SA-115	R32	1 megohm, 1/2 W	19301-104			
L23	Coil Assem., Oscillator Coil, 2.5-5 mc	SA-118	R33	240,000 ohms, 1/2 W	19301-155	E3	FUSE HOLDER	15923-1
L24	Coil Assem., Oscillator Coil, 1250-2500 kc	SA-138	R34	4 ohms, 5 W	19431-1	F1	FUSE 2 amp 250V, glass enclosed	15928-7
L25	Coil Assem., Oscillator Coil, 20-40 mc	SA-132	R35	100,000 ohms, 1/2 W	19301-80			
L26	Coil, Universal, 7/41 Litz., Iron dust core	4146	R36	510,000 ohms, 1/2 W	19309-159			
L27	Coil, Universal, 7/41 Litz., Iron dust core	6147	R37	5,100 ohms, 1/2 W	19301-210			
L28	Coil, 3 ple universal, 7/41 Litz., ceramic core	2903-A	R38	81,000 ohms, 1/2 W	19301-171	L1	CHOKES Filter, 350 ohms, 25h at 160 mc	2981
L29	Coil, 3 ple universal, 7/41 Litz., ceramic core	3990	R39	51,000 ohms, 1 W	19303-182	L2	Filter, 1150 ohms, 50h at 100 mc	4819
L30	Coil, Same as L28	2903-A	R40	1,000 ohms, Potentiometer	4932			
L31	Coil, Same as L29	3990	R41	2,000 ohms, 1/2 W	19301-206			
L32	Coil, Universal, 7/41 Litz., ceramic core	4907	R42	24,000 ohms, 1/2 W	19301-213			
L33	Coil, 3 ple universal, 7/41 Litz., ceramic core	2931	R43	10,000 ohms, 1/2 W	19309-73	R1	18,000 ohms tapped at 9500, 10 W	4946
L34	Coil, Universal, 7/41 Litz., ceramic core	4906	R44	1 megohm, 1/2 W	19301-104	R1A	8500 ohms	Part of R1
L35	Choke coil, 8 ple universal R.F. Choke, ceramic core, wire leads	609-1	R45	2 megohms, 1/2 W	19301-169	R1B	9500 ohms	Part of R1
L36	Choke Coil, Same as L35	609-1	R46	50,000 ohms, Potentiometer	5023	R2	18,000 ohms tapped at 6500, 6500, 10 W	3997
			R47	4 ohms, 5 W	19431-1	R2A	5000 ohms	Part of R2
			R48	250,000 ohms, Potentiometer	4919	R2B	6500 ohms	Part of R2
			R49	510,000 ohms, 1/2 W	19309-159	R2C	6500 ohms	Part of R2
			R50	300 ohms, 1/2 W	19301-196			
			R51	1,800 ohms, 1/2 W	19301-38	T1	TRANSFORMER , 50-60 cycle, primary tapped at 105, 115, 125 V	4801
			R52	3,000 ohms, 1 W	19303-169			
			R53	51,000 ohms, 1W	19303-182			
			R54	510,000 ohms, 1/2 W	19309-159			
			R55	750 ohms, 10 W	19430-30			
				SWITCHES		V1	5U6G	16215-1
			S1	10 pins, 5 position, 5 section		V2	5Y3GT/G	16252-1
			S2	Wafer type, six position	4911			
			S3	SPST Rotary Snap	4916	W1	CABLE , Power	6143
			S4	SPST Rotary Snap	5733			
			S5	DPDT Toggle	2990	X1, X2	TUBE SOCKET , Molded octal, black bakelite	16083-1
			S6	SPST Rotary Snap	5729			
			S7	DPST Toggle	2983-1			
				FILTER				
			T1	Assem., Variable selectivity quartz crystal filter	SA-178A			
				TRANSFORMERS				
			T2	Variable selectivity, I.F.	SA-166A			
			T3	Same as T2	SA-166A			
			T4	Fixed selectivity, I.F.	SA-167A			
			T5	465 kc oscillator assem.	SA-169A			
			T6	Fixed selectivity, I.F.	SA-168A			
			T7	A.F. push-pull input	4887			
			T8	A.F. push-pull output	4888			

HOFFMAN RADIO CORP.

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 for maximum output on lower half of meter scale.
5. Adjust oscillator trimmer 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, pick up a station of known frequency near the center of the dial and move the pointer by hand as required.

Power Consumption26 Watts
Undistorted Audio Output1.0 Watt
Maximum Audio Output1.5 Watts
Loudspeaker5-inch round P.M.

MAY, 1946

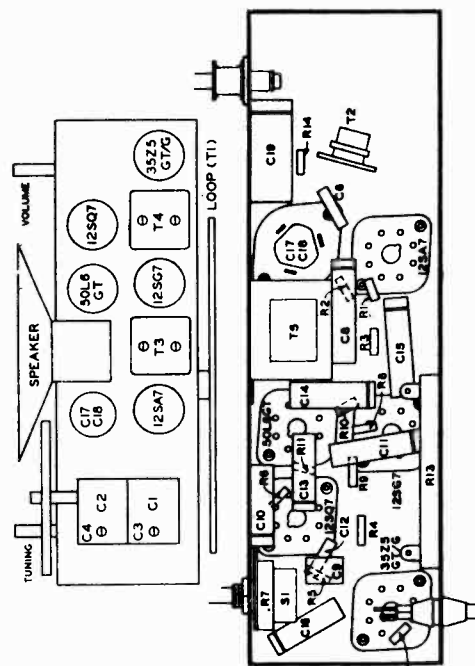
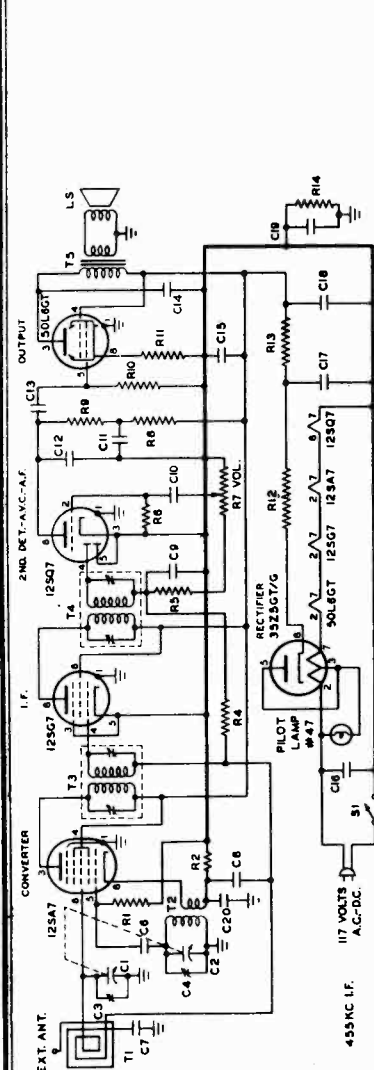


Fig. 2 Bottom of Chassis

NORMAL OPERATING CURRENTS
Cathode Current 57 Ma.
Cathode Current 33 Ma.

35Z5
50L6

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
12SA7		24.5AC	+87	+87	-7	0	12AC	-9
12SG7		36AC	0	-9	0	+87	24AC	+87
12SQ7		-5	0	0	0	+62	0	12AC
50L6GT/G		87AC	+85	+87	0	+77	36AC	+53
35Z5GT/G		117AC	112AC	-	112AC	-	87AC	+117

* Means tie point
NOTE: The above readings are obtained with no signal input to receiver.

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 117.5

HOFFMAN RADIO CORP.

MODEL A300
 MODEL A301
 MODEL A401
 MODEL A500

MODEL A300, Chassis 100, 100S
 MODEL A301, Chassis 101, 101S

DIAL ADJUSTMENTS:

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.

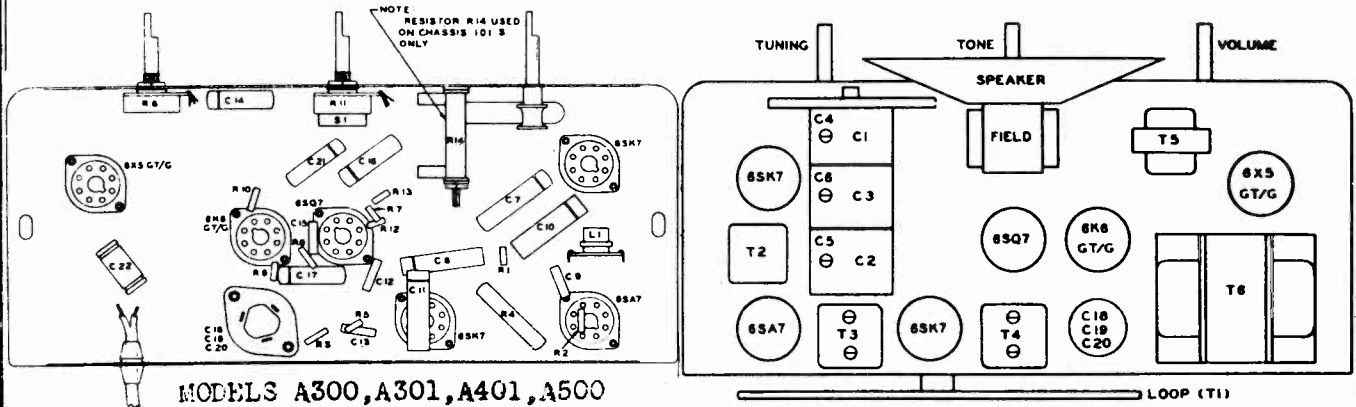


Fig. 1 Top of Chassis

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
6SK7 (R.F.)	0	0	0	-.5	0	+85	6.1A.C.	+227
6SA7	0	0	+227	+85	-7	0	6.1A.C.	-.7
6SK7 (I.F.)	0	0	0	-.7	0	+85	6.1A.C.	+227
6SQ7	0	-.5	0	-.25	0	+95	6.1A.C.	0
6K6GT/G	0	0	+217	+227	0	+325 *	6.1A.C.	+15
6X5GT/G	0	6.1A.C.	290A.C.	-	290A.C.	-	0	+325

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 chassis.
 Line voltage 117.5.

* Means tie point.

NOTE: The above readings are obtained with no signal input to the receiver.

MODELS A300, A301, A401, A500

NORMAL OPERATING CURRENTS

6X5GT/G Cathode Current 65 Ma
 6K6GT/G Cathode Current 24.5 Ma

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 to stator of C2 (see schematic) through a .1 Mfd. condenser; connect ground side of generator directly to chassis of receiver. 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.) The tuning condenser plates should be all

the way out; volume and tone controls should be in extreme clockwise position.

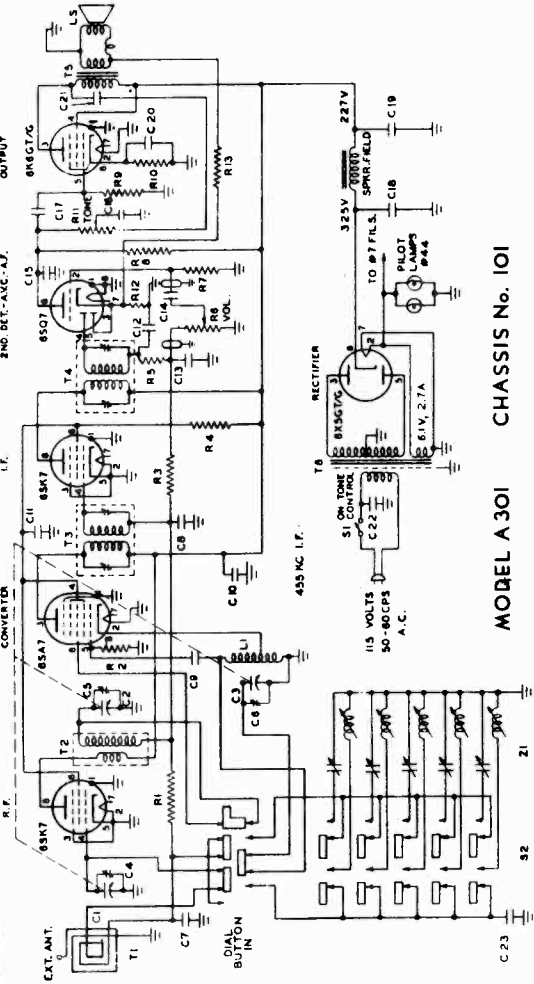
R.F. ALIGNMENT:

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 inches 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 (C6).
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 at 1400 Kc and tune in signal with tuning condenser.
7. Adjust antenna and RF trimmers (C4 and C5) 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.

MODEL A301, Chas. 101,
101S
MODEL A500
MODEL A501

HOFFMAN RADIO CORP.

SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2-C3	Three-Section Variable (318-318-180 Mmf.)	4400
C4, C5, C6	Trimmers: Part of Variable Condenser	4100
C7, C8	.05 Mfd. 200 Volt, Tubular Paper	4000
C9, C12, C13, C15	100 Mmf. ± 20%, Mica	4101
C10-C11	.05 Mfd. 400 Volt, Tubular Paper	4102
C14, C16	.005 Mfd. 600 Volt, Tubular Paper	4103
C17	.01 Mfd. 600 Volt, Tubular Paper	4200
C18-C19-C20	Dry Electrolytic Condenser (20-20-20 Mfd 450-450-25 Volt)	4104
C21	.001 Mfd. 600 Volt, Tubular Paper	4105
C22	.01 Mfd. 600 Volt, Tubular Paper (Metal Can)	4004
C23	500 Mmf. ± 5%, Silver Mica	5200
L1	Oscillator Coil	9003
L5	Loudspeaker, 5" P.M.	4500
R1, R6	.22 Megohm ± 20%, ½ Watt	4501
R2	22,000 Ohm ± 20%, ½ Watt	4501
R3	2.2 Megohm ± 20%, ½ Watt	4502
R4	10,000 Ohm ± 10%, 2 Watt	4503
R5	47,000 Ohm ± 20%, ½ Watt	4504
R6	5 Megohm Potentiometer (Volume)	4804
R7	10 Megohm ± 20%, ½ Watt	4505
R9	47 Megohm ± 20%, ½ Watt	4506
R10	500 Ohm ± 10%, ½ Watt	4507
R11	.25 Megohm Potentiometer With Switch (Tone)	4805
R12	47 Ohm ± 20%, ½ Watt	4508
R13	330 Ohm ± 20%, ½ Watt	4509
R14	1500 Ohm ± 5%, 6 ½ Watt	4701
S1	On-Off Switch (On Tone Control)	
S2	Pushbutton Switch Assembly	
T1	Antenna Loop	6000
T2	R.F. Coil (Shielded)	5201
T3	Input I.F. Transformer (455 K.C.)	5203
T4	Output I.F. Transformer (455 K.C.)	5204
T5	Audio Output Transformer	5100
T6	Power Transformer	9000
Z1	Pushbutton Tuning Assembly	52200



Hoffman Model A301 with Chassis 101S is electrically identical with Chassis 101 except for the following:

1. Five-inch P.M. speaker, part number 9003, has been substituted for 4 x 6-inch oval dynamic speaker, part number 9000.
2. A 1500-ohm resistor, part number 4701, has been connected in the filter circuit in place of the 1500-ohm speaker field.

These changes have been incorporated in the schematic diagram shown below.

PUSHBUTTON ADJUSTMENTS

The frequency ranges for the pushbuttons are given in figure 3. A layout of the pushbutton adjustments is shown in figure 4. Note that in this figure pushbutton number 1 is now to the extreme right, since the pushbutton assembly is being viewed from the rear. To make pushbutton adjustments, proceed as follows:

1. Turn the receiver on and let it warm up for fifteen minutes or longer in order to minimize drift effects.
2. Depress the DIAL pushbutton and tune in the station which is to be set on pushbutton number 1.
3. Now depress pushbutton number 1 and adjust tuning slug 1a and trimmer 1b (figure 4) until the station is accurately tuned in again.
4. Repeat the above procedure for the remaining pushbuttons.

NOTE: When making oscillator coil pushbutton adjustments, it is desirable that this adjustment be made from the high-frequency end (slug all the way out). The proper oscillator coil slug setting will then be reached before there is any possibility of tuning the oscillator to the low-frequency side of the carrier.



PUSHBUTTON NO.	1	2	3	4	5
FREQUENCY RANGE IN KILOCYCLES	550-800	550-800	720-1200	720-1200	900-1500

Fig. 3 Pushbuttons

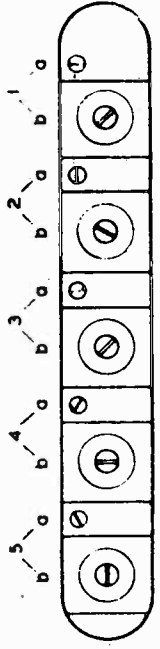
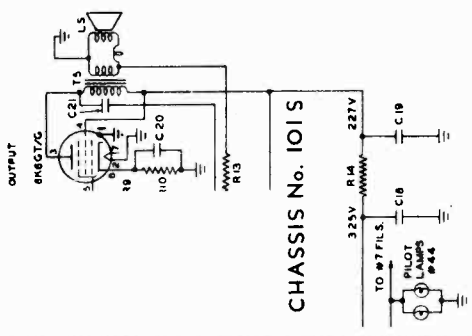
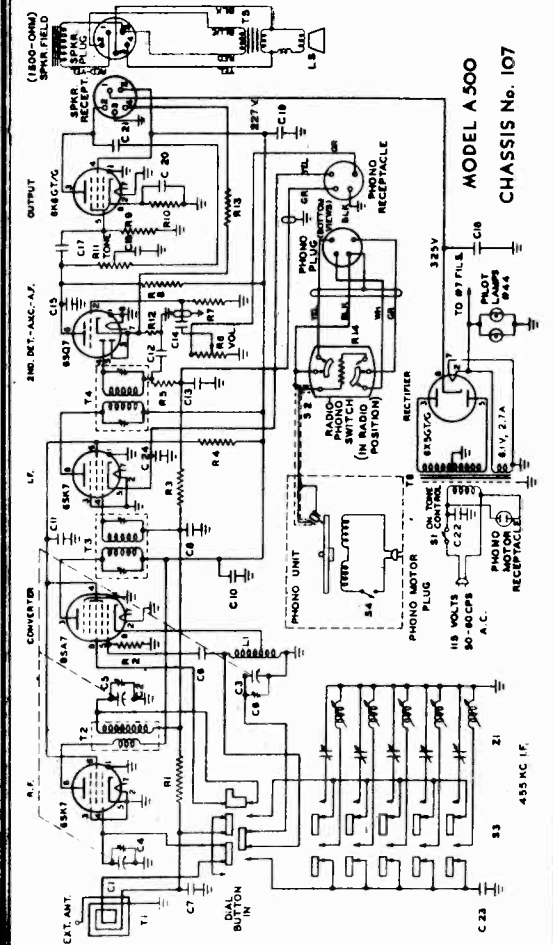


Fig. 4 Adjustment Screws



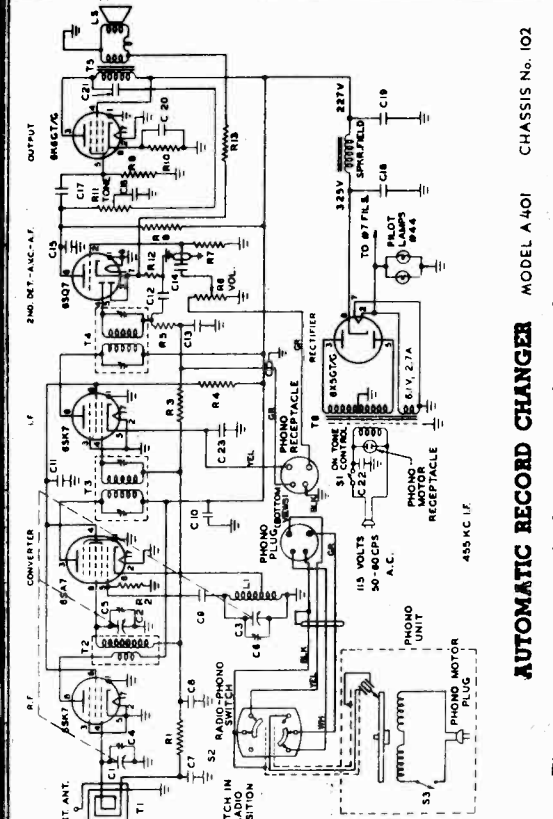
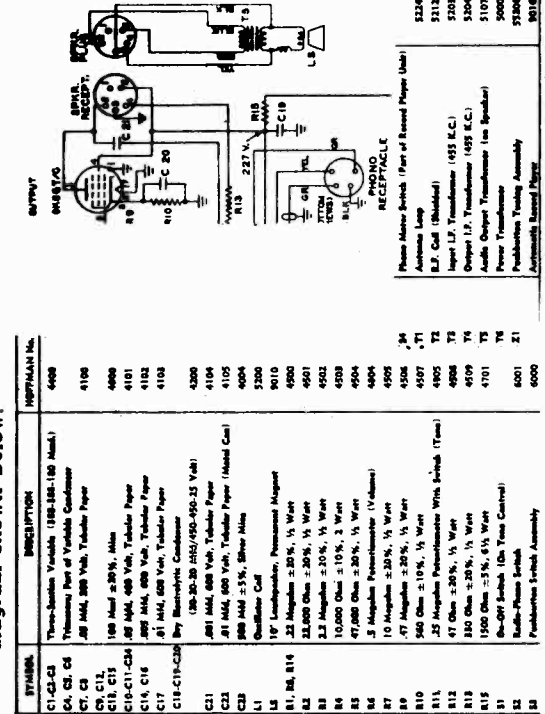
HOFFMAN RADIO CORP.

MODEL A401, Ch. 102
 MODEL A500, Ch. 107,
 107S

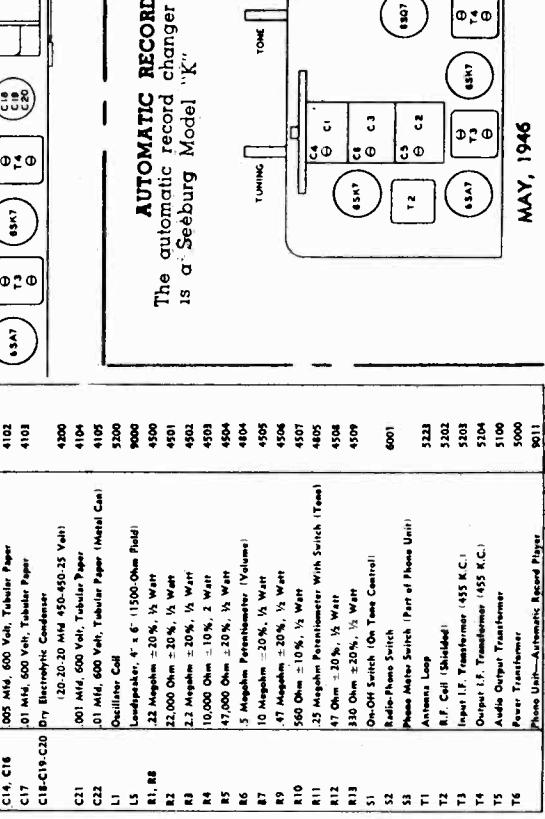
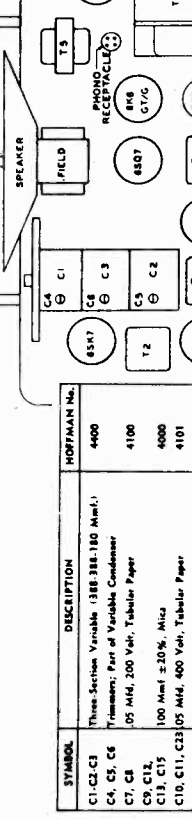


Hoffman Model A500 with Chassis 107S is electrically identical with Chassis 107 except for the following:

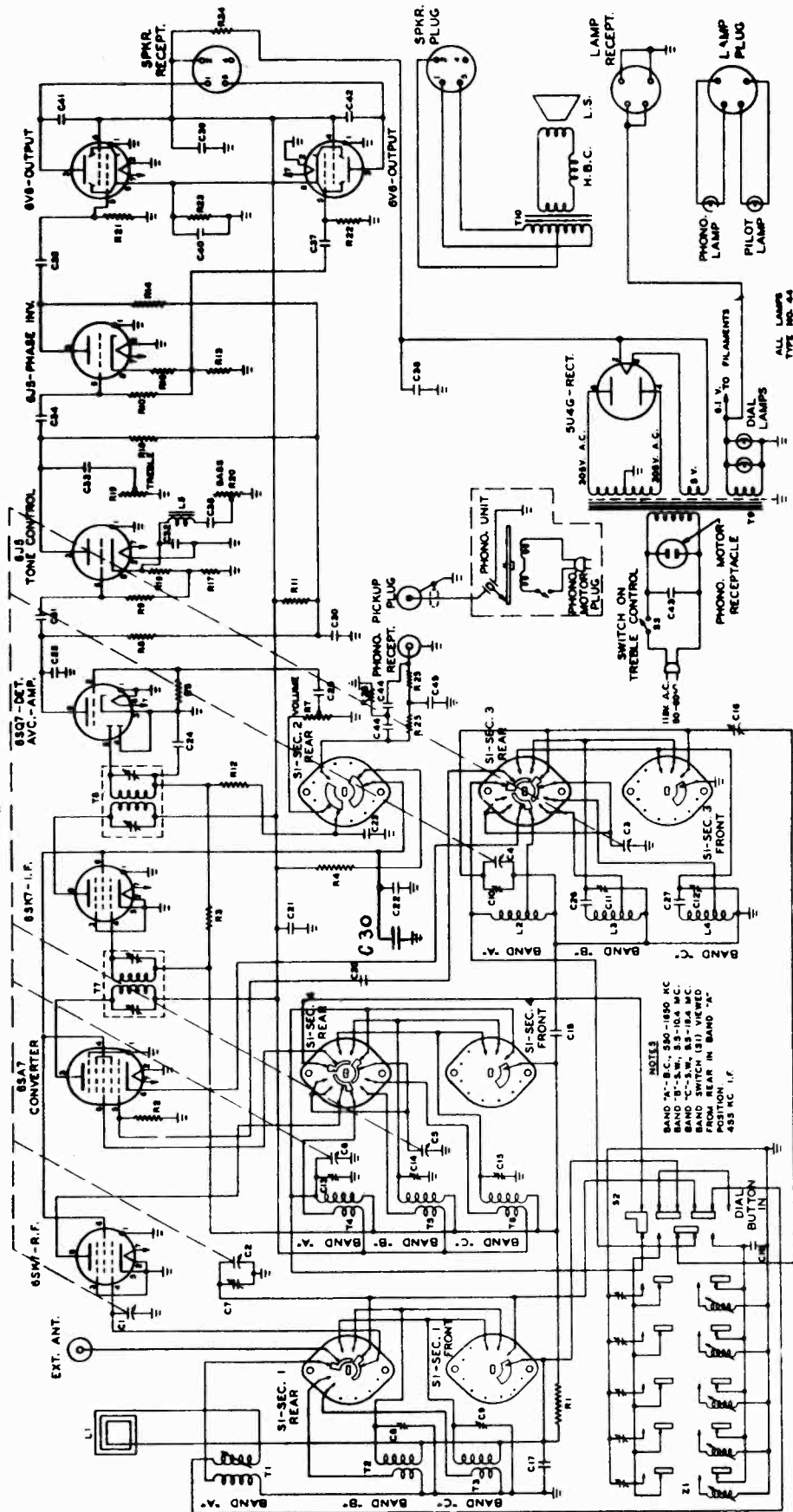
1. Ten-inch P.M. speaker, part number 9010, has been substituted for ten-inch electrodynamic speaker, part number 9012.
 2. A 1500-ohm resistor, part number 4701, has been connected in the filter circuit in place of the 1500-ohm speaker field.
- These changes have been incorporated in the schematic diagram shown below.



AUTOMATIC RECORD CHANGER MODEL A 401 CHASSIS No. 102
 is a General Instrument, Model 205.

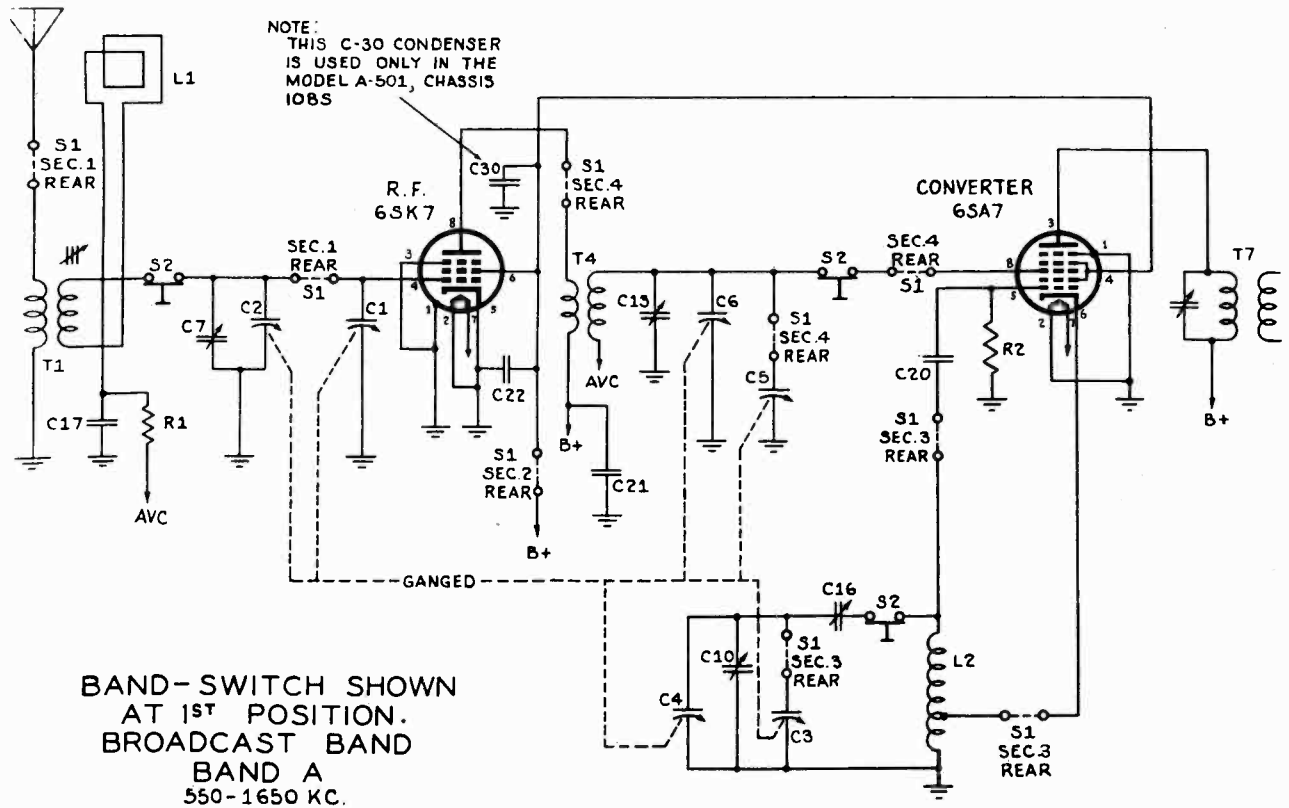
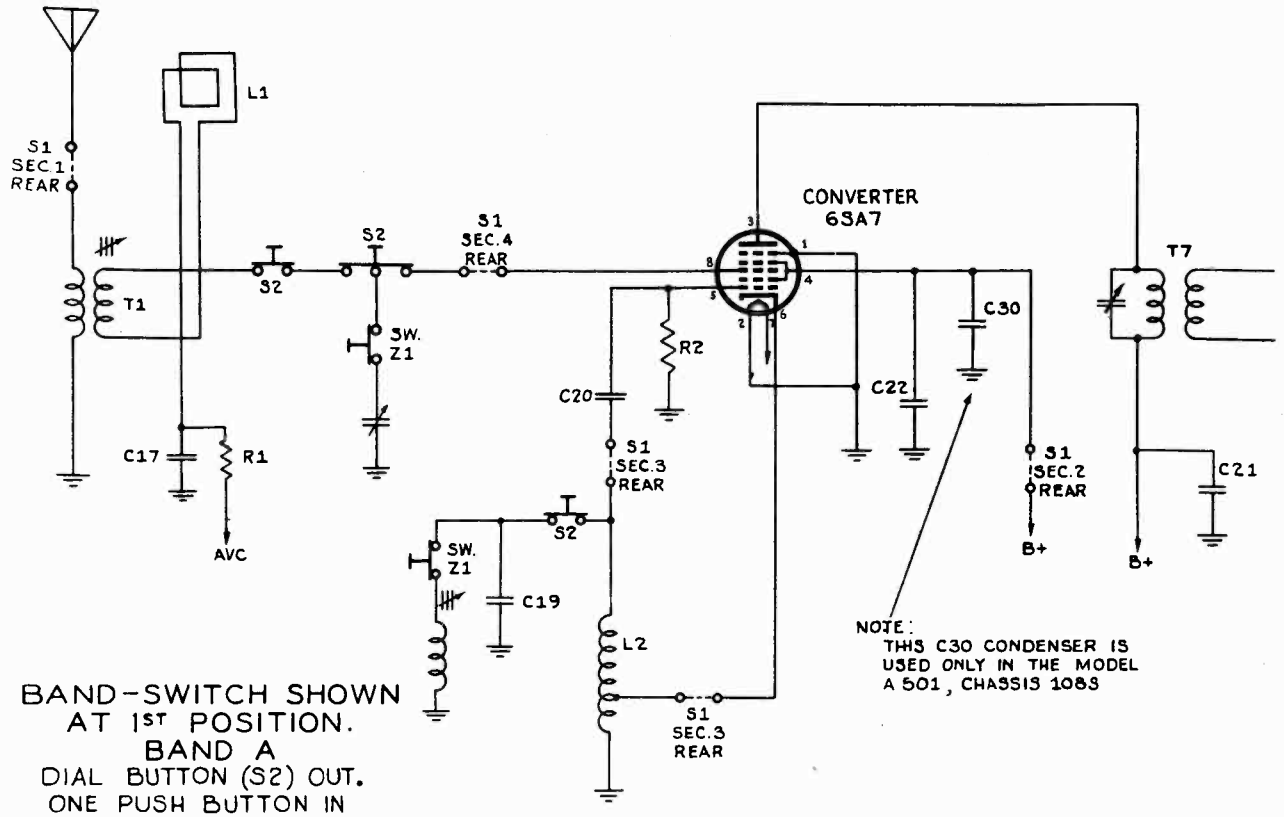


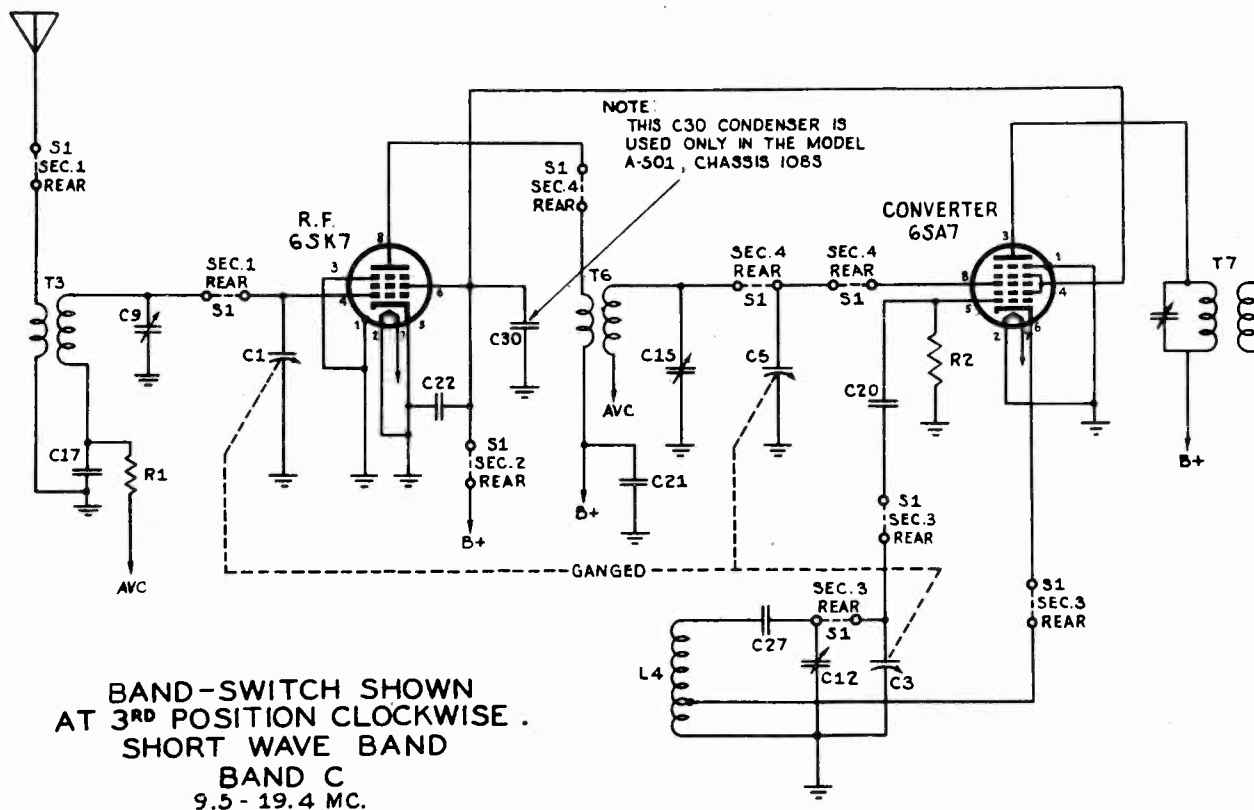
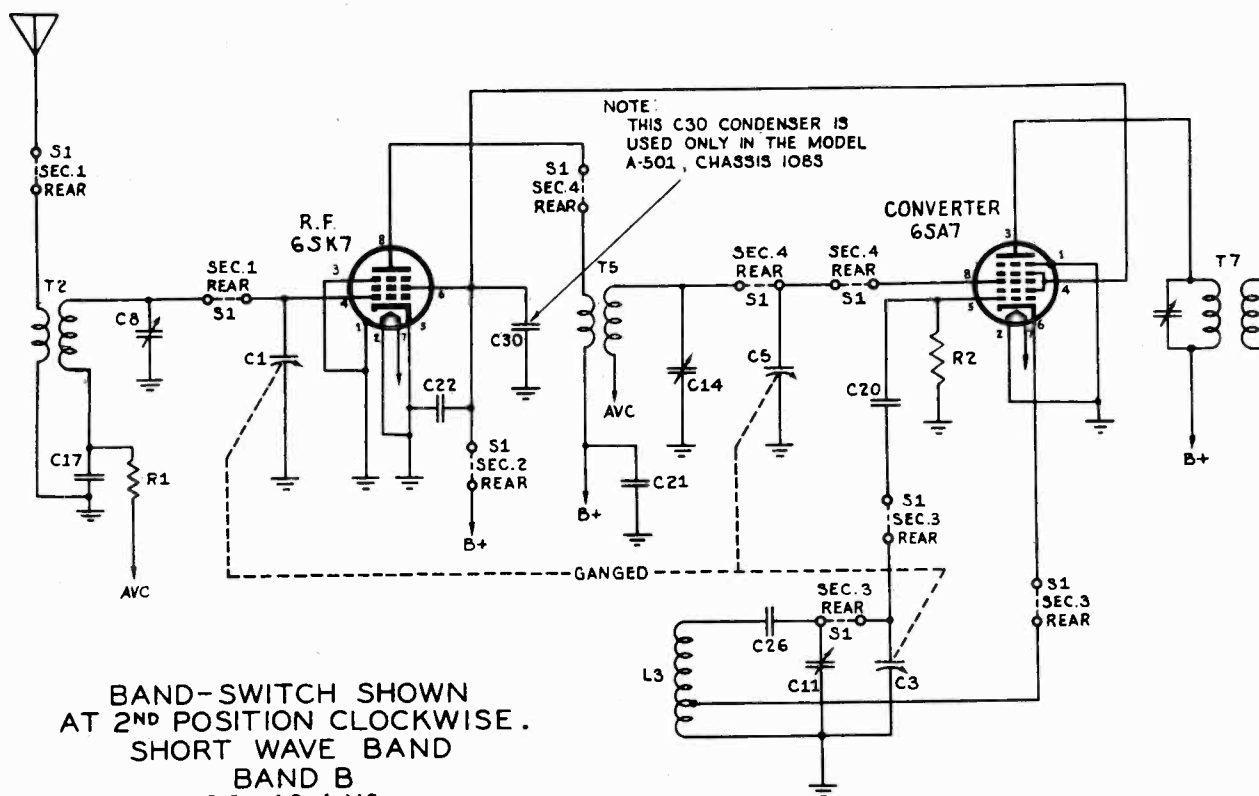
SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2, C3	Three-Section Variable (388-386-180 Mm.)	4400
C4, C5, C6	Transformer, Part of Variable Condenser	4100
C7, C8	50 Mfd., 200 Volt, Tubular Paper	4080
C9, C12	100 Mfd. ±20%, Mica	4101
C10, C11, C13	50 Mfd., 400 Volt, Tubular Paper	4102
C14, C15	500 Mfd., 500 Volt, Tubular Paper	4103
C16	0.1 Mfd., 500 Volt, Tubular Paper	4103
C18-C19, C20	Dry Electrolytic Condenser	4200
C21	0.01 Mfd., 500 Volt, Tubular Paper	4104
C22	0.1 Mfd., 500 Volt, Tubular Paper (Metal Can)	4105
L1	Quartzine Coil	5200
L5	Loopstick, 4" x 6" (1500-Ohm Field)	9000
R1, R2	22 Megohm ±20%, 1/2 Watt	4500
R3	22,000 Ohm ±20%, 1/2 Watt	4501
R4	2.2 Megohm ±20%, 1/2 Watt	4502
R5	10,000 Ohm ±10%, 2 Watt	4503
R6	47,000 Ohm ±10%, 1/2 Watt	4504
R7	5 Megohm Permeometer (Volume)	4604
R8	10 Megohm ±20%, 1/2 Watt	4505
R9	47 Megohm ±20%, 1/2 Watt	4506
R10	560 Ohm ±10%, 1/2 Watt	4507
R11	25 Megohm Permeometer With Switch (Tone)	4805
R12	47 Ohm ±20%, 1/2 Watt	4508
R13	330 Ohm ±20%, 1/2 Watt	4509
S1	On-Off Switch (On Time Control)	6001
S2	Radio-Phono Switch	5200
S3	Radio-Phono Switch (Part of Phono Unit)	5223
T1	Antenna Loop	5202
T2	R.F. Coil (Shielded)	5203
T3	Input I.F. Transformer 455 K.C.	5204
T4	Output I.F. Transformer (455 K.C.)	5205
T5	Audio Output Transformer	5100
T6	Phono Unit—Automatic Record Player	9011



JULY, 1946

HOFFMAN RADIO CORP.





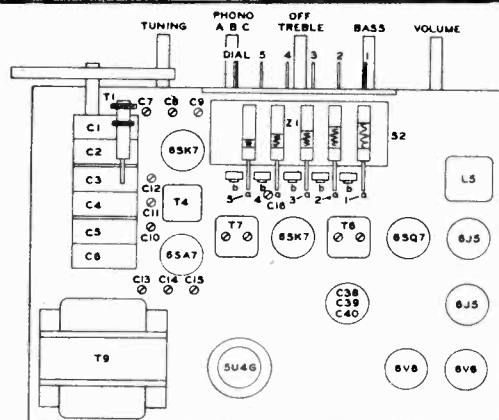
HOFFMAN RADIO CORP.

OPERATIONS IN ORDER	SIGNAL GENERATOR		RECEIVER		TRIMMER ADJ. IN ORDER
	CONNECTIONS TO REC.	FREQUENCY	CONTROL SETTINGS	-DIAL SETTING	
1	To stator of C-6 through .1 mfd. cond.	455 Kc	Vol. Max. Range Sw. on "A" Band	Minimum Capacity	T-8 and T-7
2	To Ant. Term. through a 400-ohm resistor.	18 Mc	Vol. Max. Range Sw. on "C" Band	18 Mc	C-12, C-15, C-9
3	To Ant. Term. through a 400-ohm resistor	10 Mc	Vol. Max. Range Sw. on "B" Band	10 Mc	C-11, C-13, C-8
4	To Ant. Term. through 200 mmf. condenser	1400 Kc	Vol. Max. Range Sw. on "A" Band	1400 Kc	C-10, C-13, C-7
5	To Ant. Term. through 200 mmf. condenser	600 Kc	Vol. Max. Range Sw. on "A" Band	600 Kc	C-16, T-1 tuning slug
6	To Ant. Term. through 200 mmf. condenser	1400 Kc	Vol. Max. Range Sw. on "A" Band	1400 Kc	C-10, C-13, C-7

NOTE: Rocking the condenser gang on the higher frequencies (bands "B" and "C") is necessary in order to avoid a false point of alignment due to "pulling action" between r-f and oscillator circuits.

NOTE: Be sure that the image frequency is not picked up during this adjustment. Note that the signal may be readily heard at two points as C-11 is adjusted. The correct setting for C-11 is with the trimmer in its looser position (adjusting screw further out).

NOTE: It is necessary to align the "C" band first so that "B" band and broadcast band alignment will not be adversely affected by subsequent "C" band adjustment. Alignment of "C" Band:



NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

5U4G
6V6

NORMAL OPERATING CURRENTS

Cathode Current 115 Ma.
Cathode Current (both tubes) 70 Ma.

PIN NO.	1	2	3	4	5	6	7	8
6SK7 (R.F.)	0	0	0	-1	0	+95	6.2 AC	+290
6SA7 (Conv.)	0	0	+290	+95	-5 to -10	0	6.2 AC	-15
6SK7 (I.F.)	0	0	0	-15	0	+95	6.2 AC	+290
6SQ7	0	-2	0	-25	0	+75	6.2 AC	0
6J5 (Tone)	0	0	+130	0	+20 □	0	6.2 AC	+22
6J5 (Inverter)	0	0	+105	0	+50 #	0	6.2 AC	+43
6V6	0	0	+290	+290	0	0	6.2 AC	+17
6V6	0	0	+290	+290	0	0	6.2 AC	+17
5U4G	0	+350 5.2 AC*	0	335 AC	0	335 AC	0	+350 5.2 AC*

D.C. voltages measured with 20,000 ohm/volt meter.
A.C. voltages measured with 1,000 ohm/volt meter.
Line voltage 117.

measured at junction of R13 and R16.
□ measured at junction of R15 and R17.

All voltages measured with reference to chassis except as follows:

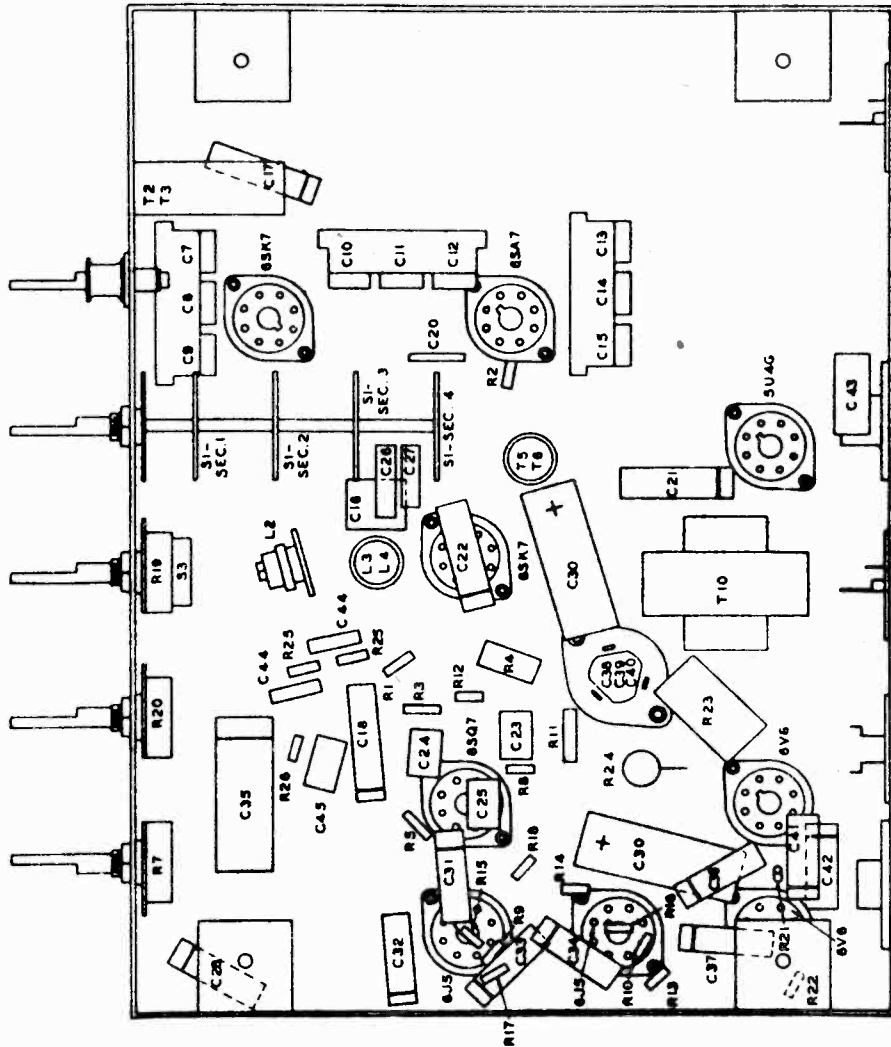
* measured between pins 2 and 8; not to chassis.

NOTE The above readings are obtained with no signal input to receiver and band switch in position "A".

MODEL A501, Ch. 108S,
108ST

HOFFMAN RADIO CORP.

SYMBOL	DESCRIPTION	Hoffman No.
C1-C2, C3-C4, C5-C6	Three-section Variable with Split Stator, (160-260, 160-260, 160-260 Mmf.)	4403
C7, C8, C9	Three-section Trimmer Assembly	4300
C10, C11, C12	Three-section Trimmer Assembly	4300
C13, C14, C15	Three-section Trimmer Assembly	4300
C16	110-560 Mmf. Padder, Band "A"	4301
C17, C18	.05 Mfd., 200 Volt, Tubular Paper	4100
C19	500 Mmf. $\pm 5\%$, Silver Mica	4004
C20	47 Mmf. $\pm 10\%$, Mica	4007
C21, C22	.05 Mfd., 400 Volt, Tubular Paper	4101
C23, C24, C25	1050 Mmf. $\pm 20\%$, Mica	4005
C26	1050 Mmf. $\pm 5\%$, Mica	4000
C27	2300 Mmf. $\pm 5\%$, Mica	4006
C28, C29	.005 Mfd., 600 Volt, Tubular Paper	4102
C30	10 Mfd., 450 Volt, Tubular Electrolytic	4203
C31, C32, C33, C34	.01 Mfd., 400 Volt, Tubular Paper	4112
C35	.5 Mfd., 200 Volt, Tubular Paper	4110
C36, C37	.02 Mfd., 400 Volt, Tubular Paper	4106
C38-C39-C40	20-20-20 Mfd./450-450-25 V. Electrolytic	4200
C41, C42	.01 Mfd., 600 Volt, Tubular Paper	4103
C43	.01 Mfd., 600 Volt, Tubular Paper (Metal Can)	4105
C44	330 Mmf., 5%, Mica	4010
C45	650 Mmf., 5%, Mica	4011
L1	Loop Antenna	5221
L2	Oscillator Coil (Band "A")	5215
L3-L4	Oscillator Coil (Bands "B" and "C")	5218
L5	5 Hy Choke (Bass Boost)	5103
L6	12-inch Loudspeaker, Permanent Magnet	9020
R1	.1 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt	4511
R2	22,000 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt	4501
R3	2.2 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt	4502
R4	10,000 Ohm $\pm 20\%$, 3 Watt	4520
R5	10 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt	4505
R6	15,000 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt	4521
R7	5 Megohm Potentiometer (Volume Control)	4804
R8	22 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt	4500
R9, R10	1 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt	4513
R11	47,000 Ohm $\pm 20\%$, 1 Watt	4516
R12, R13, R14	47,000 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt	4504
R15, R16	2200 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt	4512
R17, R18	10,000 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt	4515
R19	.25 Meg. Pot. with Switch (Treble Control)	4805
R20	50,000 Ohm Potentiometer (Bass Control)	4806
R21, R22	.47 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt	4506
R23	220 Ohm $\pm 20\%$, 3 Watt	4519
R24	500 Ohm $\pm 10\%$, 20 Watt	4702
R25	47,000 Ohm $\pm 10\%$, $\frac{1}{2}$ Watt	4537
R26	22,000 Ohm $\pm 10\%$, $\frac{1}{2}$ Watt	4538
S1	Band Change Switch	6005
S2	Pushbutton Switch Assembly	6004
S3	On-Off Switch (On Treble Control)	5220
T1	Antenna Coil (Band "A")	5217
T2-T3	Antenna Coil (Bands "B" and "C")	5216
T4	R.F. Coil, Shielded (Band "A")	5219
T5-T6	R.F. Coil (Bands "B" and "C")	5213
T7	Input I.F. Transformer	5214
T8	Output I.F. Transformer	5001
T9	Power Transformer	5107
T10	Audio Output Transformer (On Speaker)	5107
Z1	Pushbutton Tuning Assembly	55200



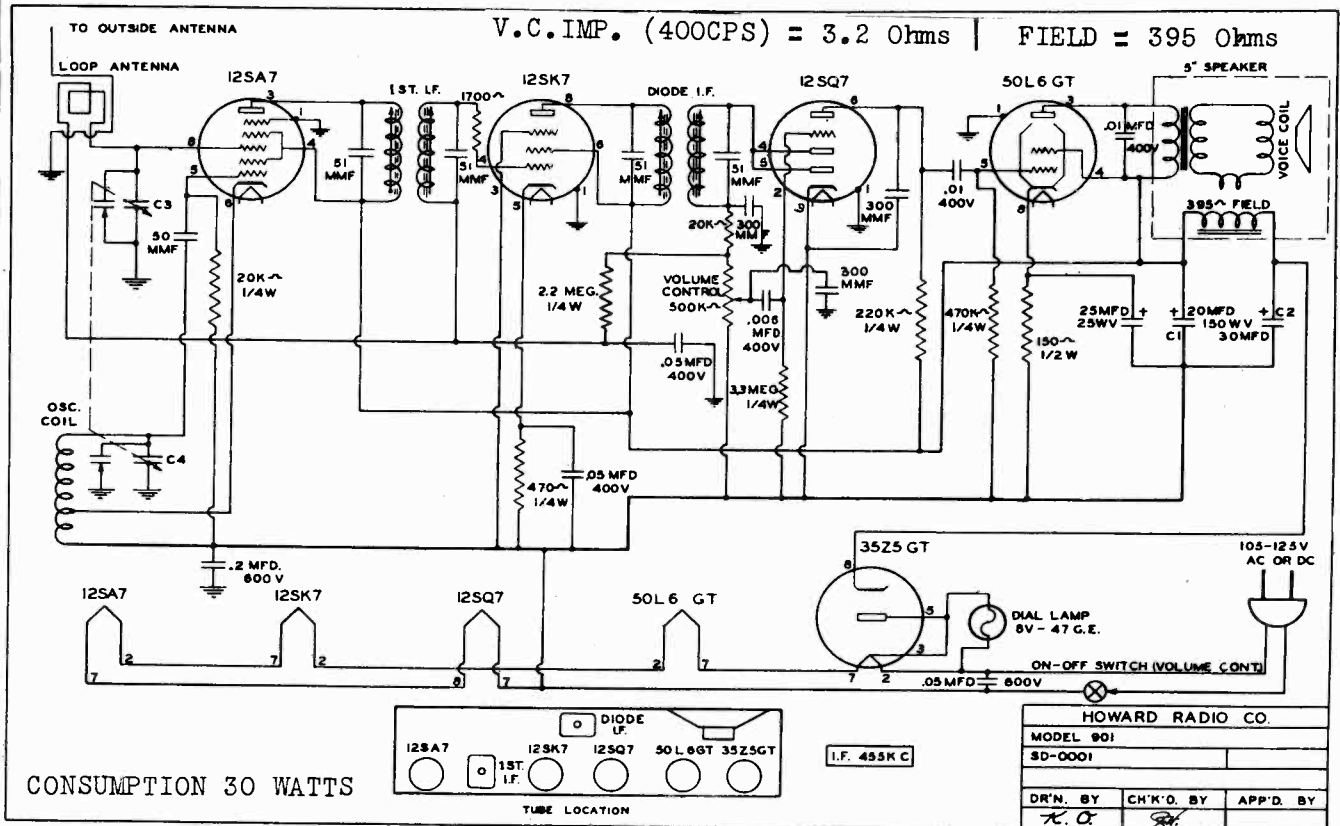
These are electrically identical.

A 10-mf, 450-volt electrolytic condenser, Part No. 4203, has been added from screen to ground on the 6SK7 r-f and i-f tubes to eliminate a hum modulation. It is suggested that this condenser be added on all Model A501 receivers not having it.

TUNING RANGES:
 Band "A" 540 Kc to 1600 Kc.
 Band "B" 5.6 Mc to 10.4 Mc
 Band "C" 9.4 Mc to 19.4 Mc
 Intermediate Frequency 455 Kc
 Power Supply 115V A.C., 50-60 C.P.S.
 Power Consumption (incl. phone) ... 125 Watts
 Undistorted Audio Output 12 Watts
 Model A501 with Chassis 108S
 is electrically identical with
 Chassis 108ST, except for:
 Output transformer, Part No. 5110
 substituted for Part No. 5107.

HOWARD RADIO CO.

MODELS 901, 901AE, 901AH,
901AI, 901AM, 901AW



POWER OUTPUT - (MAX.) 1.25W UPO .5 W. TUNING RANGE = 540-1600 KC

SOCKET VOLTAGE READINGS:

All voltages taken from the back of the AC switch to the socket contacts with a 20,000 ohm per volt D.C. meter and the line voltage fixed at 117 volts A.C.

ALIGNMENT INFORMATION

Each 455 KC I. F. coil has an Iron Core adjustment protruding from the top and the bottom of the I. F. can.

Look beneath the chassis to reach the lower I. F. adjustments.

Repeat the I. F. alignment operation several times to insure accuracy of adjustment.

Add or remove resistance in the cathode circuit of the 12SK7 tube as the I. F. gain indicates.

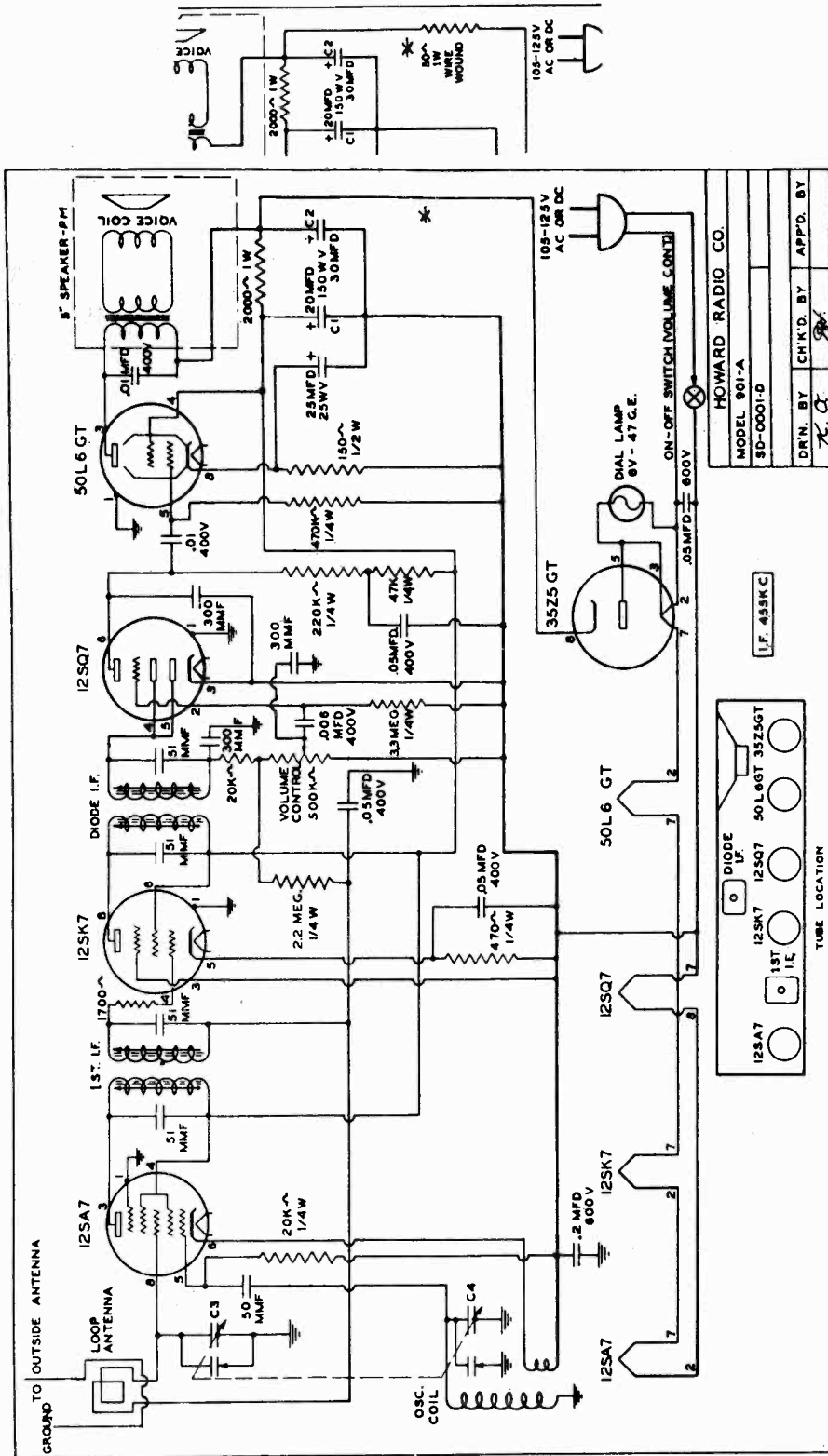
The wire lead running from the loop aerial between the I. F. coils and the condenser gang is important in its placement. Dress this wire tightly to the chassis.

Set dial at 1400 KC. and adjust oscillator trimmer which is located on back section of variable condenser, then peak antenna stage trimmer on front section of variable condenser to 1400 KC. No adjustment is required at the low frequency end of the dial.

The filter condenser has a common negative, but note it does not return to ground and is insulated from the chassis.

MODEL 901A

HOWARD RADIO CO.



CONSUMPTION -- 30 Watts ---- See label on back of chassis.

ANTENNA SYSTEM = Built-in Loop. Available connections for aerial and ground.

TUNING RANGE = 540-1600 KC -- String Drive -- Full Vision Airplane Dial.

SPEAKER = Permo Mag. Dynamic -- SIZE = 5" -- V.C.I.P. (400CPS) 3.2 Ohms.

POWER OUTPUT = (MAX.) 1.5 W. -- UPO 1.1 W.

I.F. = 455KC - 26 Ohms Resistance Primary and Secondary. wood cabinets above Serial No. 70,380

* Circuit change for plastic cabinets
Serial Nos. 31, 321 to 50,000 and

MODELS 901, 901AB, 901AH,
901AI, 901AM, 901AW
MODEL 901A
MODEL 901AP

HOWARD RADIO CO.

MODEL 901 SERIES

Part No.	DESCRIPTION	Part No.	DESCRIPTION
VC-0001	CONTROLS Volume and on-off switch	LS-0001	Dial Lamp-Bayonet Type #47
CV-0008	CONDENSERS	WG-0001	Dial Window (for Plastic Cabinet)
CE-0001	Tuning	WG-0002	Dial Window (for Wood Cabinets)
CE-0003 or	Filter, 30-30-30-MFD, 200 Volt	SP-0005	Tension Spring for Dial Drive Cord
CE-0004 or	Filter, 30-20-MFD, 150 Volt	HD-0001	Dial Indicator Hand (Plastic Cabinet)
CE-0005	Filter, 30-30-MFD, 150 Volt	HD-0002	Dial Indicator Hand (Wood Cabinet)
	Filter, 25-MFD, 25 Volt this used with CE-0003 or CE-0004	SM-0074	Shaft-Tuning
	COIL ASSEMBLIES	GR-0006	Grommet-Dial Drive Cord-Ser. #0 to #6500.
AN-0002	Ant. Loop (for Plastic Cabinet)		KNOBS
LA-0001	Ant. Loop (for Wood Cabinet)	KB-0003	Moulded, Ivory (Plastic Cabinet)
LO-0014	Osc. coil	KB-0004	Moulded, Walnut (Plastic Cabinet)
LI-0006	1st I.F. Assembly complete	KB-0005	Moulded, Brown (Wood Cabinet)
LI-0007	Diode I.F. Assembly complete	CA-0038	LINE CORDS Standard 110 Volt
CB-0001	CABINETS		SOCKETS
CB-0003	Plastic, Ivory	SO-0009	Tube Sockets (Octal Wafer)
CW-0003	Plastic, Walnut	SL-0001	Dial Lamp Socket-Bayonet Type
CW-0004	Wood, Phono Model		SPEAKERS
	Wood, Wraparound Model	SK-0001	5" Dynamic (Serial #1 to 7250)
AR-0002	DIAL AND CONTROL PARTS	TO-0001	Transformer for Above
AR-0003	Calibrated Dial Plate (Plastic)	SK-0002	5" Dynamic (Above Serial #7250)
DC-0001	Calibrated Dial Plate (Wood)	TO-0002	Transformer for Above
	Dial Drive Cord		

MODEL - 901-AP*

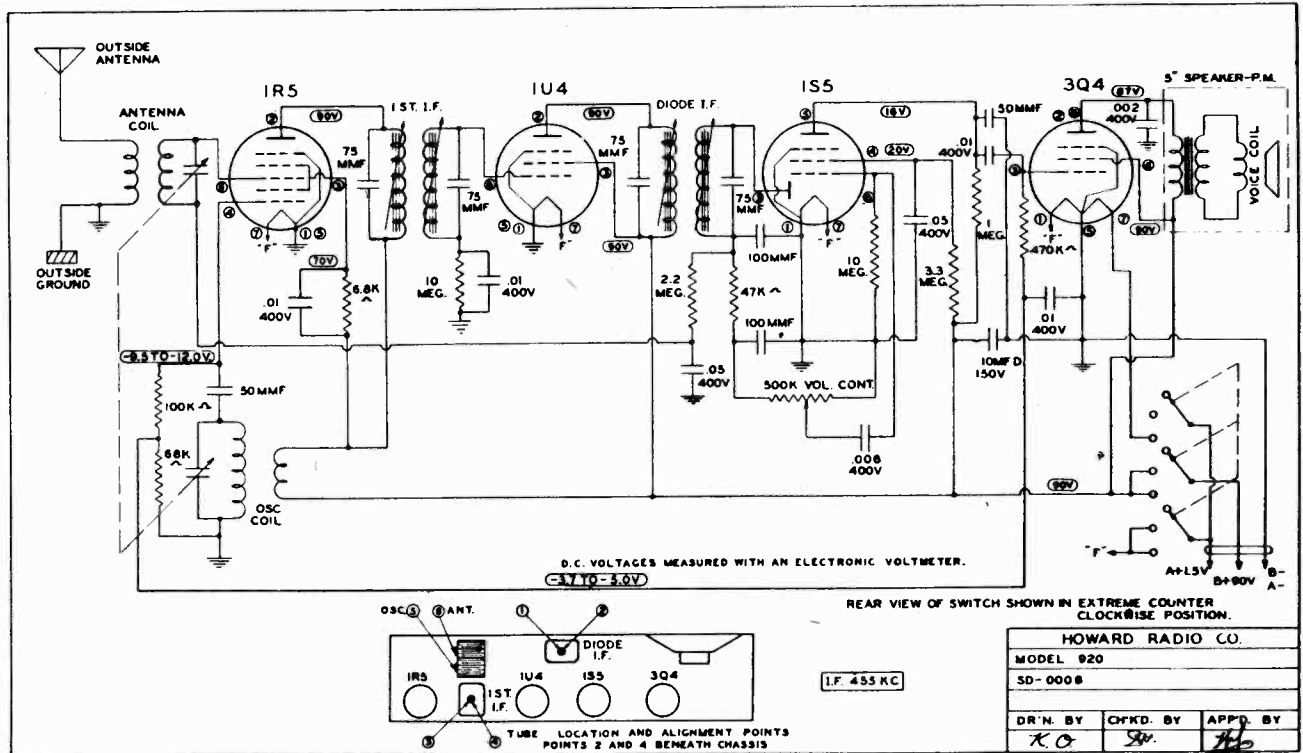
Part No.	DESCRIPTION
SK-0005	Speaker P.M. with trans.
LI-0010	1st I.F. Assembly Complete
LA-0004	Antenna Loading Coil
AN-0003	Loop Antenna works only with models having antenna load coil
LO-0017	Oscillator Coil
LI-0011	Diode I.F. Assembly Complete
SW-0005	Radio Phono Switch

MODEL - 901-A*

Part No.	DESCRIPTION
SK-0003	Speaker P.M. with trans.
LI-0008	1st I.F. Assembly Complete
AN-0004	Loop Antenna Wood Cabinet
LO-0017	Oscillator Coil
LI-0009	Diode I.F. Assembly Complete
KB-0009	Knob with set screw

*REMAINDER OF PARTS LIST SAME AS MODEL 901

HOWARD RADIO CO.

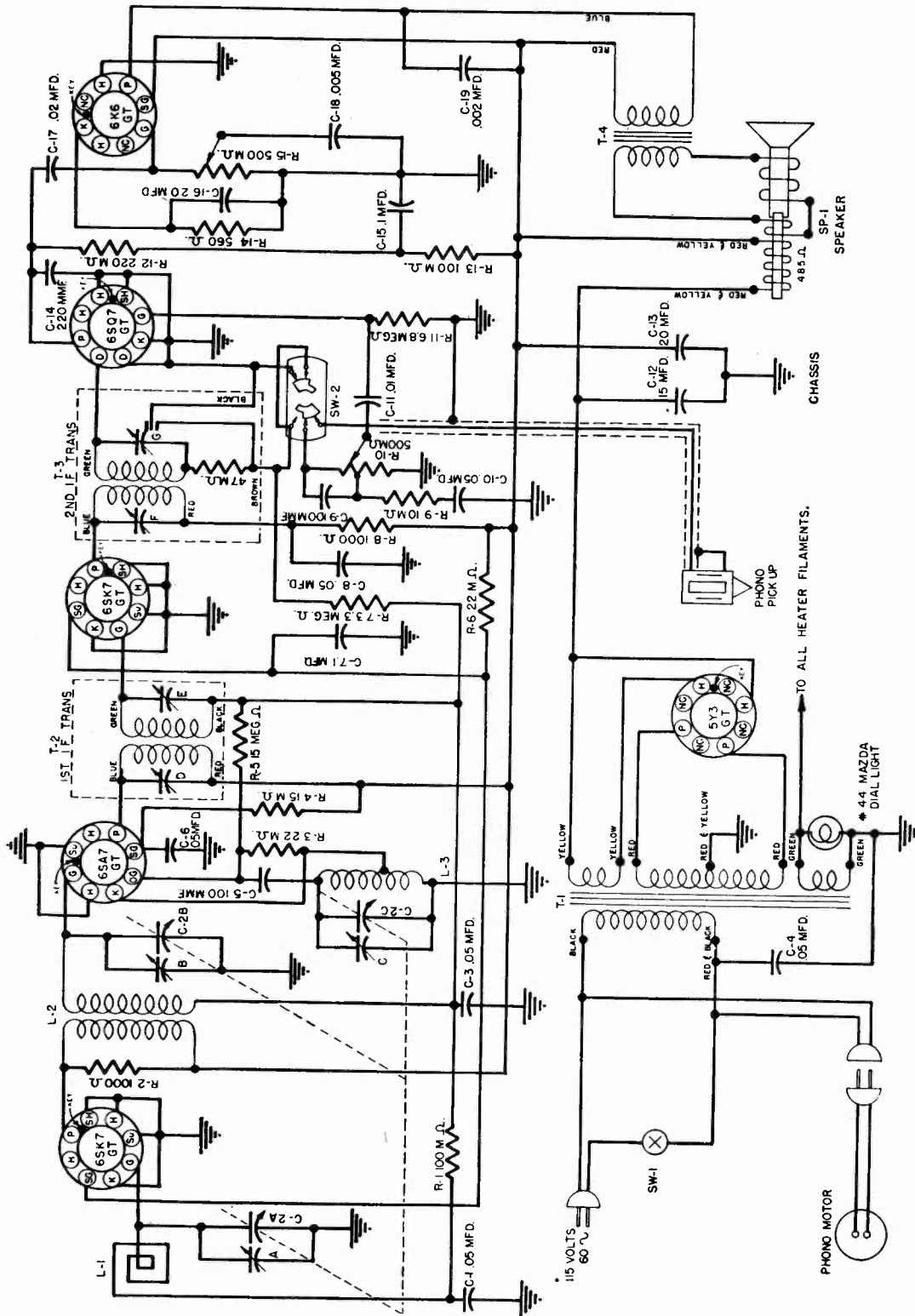


ANTENNA SYSTEM - Iron core high impedance antenna coil.
 TUNING RANGE - 540 - 1600 K.C.
 SPEAKER - Permo. Mag. Dynamic -- Size 5" -- V.C. IMP. (400CPS) 3.2 Ohms.
 POWER OUTPUT - Max. 250MW U.P.O. 100MW.
 I.F. - 455 KC - Iron core tuned.

Part No.	Description	Part No.	Description
	CONTROLS	DC-0001	Dial Drive Cord
VC-0003	Volume 1/2 Meg. R Taper	SP-0005	Tension Spring - Dial Drive Cord
SW-0008	Switch - On-Off - Batt. Saver	WG-0001	Dial Window (Plastic)
	CONDENSERS	HD-0001	Dial Indicator Hand
CV-0008	Tuning - 2 Gang cut Osc. Sec.	SM-0092	Drive Shaft Tuning
CE-0008	Filter - 10 MFD-150 V. Tubular		KNOB
	COIL ASSEMBLIES	KB-0009	Moulded, Walnut (with set screw)
LO-0017	Osc. Coil		CABLE
LA-0003	Ant. Coil	CA-0040	Battery Cable - 3 ft.
LI-0012	1st I.F. Assem. Complete		SOCKETS
LI-0013	Diode I.F. Assem. Complete	SO-0013	Miniature Tube Socket. 7 Pin.
	CABINET		SPEAKERS
CB-0004	Plastic Mottled	SK-0006	P.M. Dynamic Speaker 5"
AR-0011	Back Panel & Clip Assem.	TO-0004	Transformer (speaker)
	DIAL AND CONTROL PARTS	GR-0004	Grommet - Mounting Spk. & Gang
AR-0002	Calibrated Dial Plate (Plastic)	WD-0001	Wood Spacer Spk. Mounting
MP-0179	Battery Saver Red Flag	RB-0001	Sponge Rubber Spk. Support

The following batteries are some well known makes that can be used with this instrument;

Burgess No.17GD60
 Eveready No.758
 General No.60DL-11L
 Ray-0-Vac No.AB-82



455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.

ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

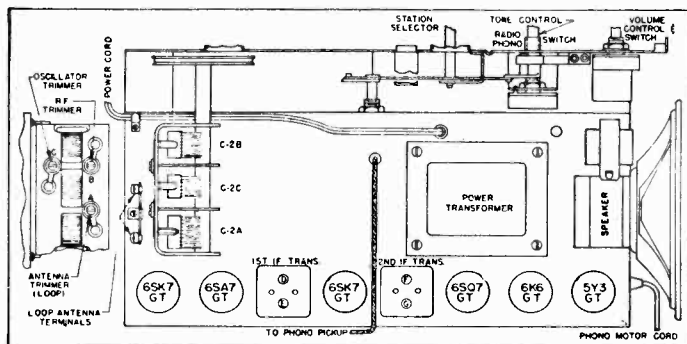
INTERNATIONAL DETROLA CORP

ALIGNMENT PROCEDURE

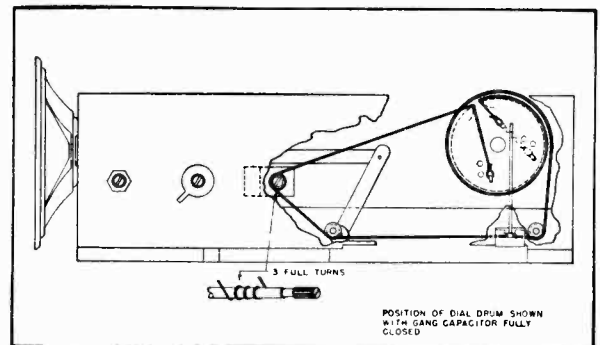
The following equipment is necessary to properly align this chassis:

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. — RMA loop.

CONNECT GEN-ERATOR 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	1620 kc.	Broadcast	HF end	C	Set limit of band
6SK7GT RF grid	.1 mfd	1400 kc.	Broadcast	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	A	Align antenna



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

- | | |
|--------------------------------|--|
| 1—6SK7GT.....RF Amplifier tube | 1—6SQ7GT.....Detector—AVC—1st Audio tube |
| 1—6SA7GT.....Converter tube | 1—6K6GT.....Power Output tube |
| 1—6SK7GT.....IF Amplifier tube | 1—5Y3GT.....Rectifier tube |

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

- | | |
|---|---|
| Frequency Range.....540-1600 kc. | V.C. Impedance.....3.5 ohms at 400 cycles |
| Intermediate Frequency.....455 kc. | Power Output (Undistorted).....1 watt |
| Power Supply.....105-125 volts, 60 cycle A.C. | Power Output (Maximum).....4 watts |
| Loudspeaker.....Electrodynamic | Tuning Drive Ratio.....4¾ to 1 |

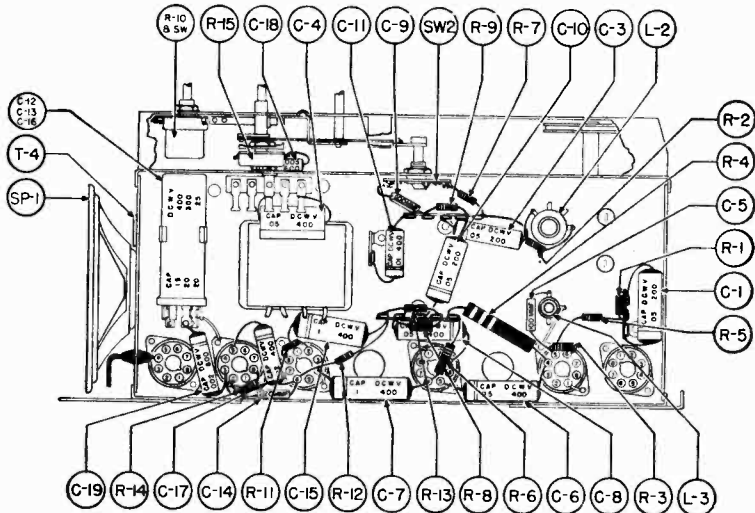
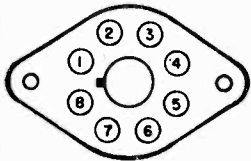
MODEL 554

INTERNATIONAL DETROLA CORP.

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	93	6.3 AC	270
6SA7GT	Converter	0	6.3 AC	270	113	-7.5	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	93	6.3 AC	260
6SQ7GT	Detector—AVC—1st Audio	0	0	0	0	0	88	6.3 AC	0
6K6GT	Power Output	0	0	250	270	0	175	6.3 AC	19
5Y3GT	Rectifier	0	310	0	290 AC	0	290 AC	0	310

NOTE: 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.
 Tone Control in clockwise position.
 Line Voltage 117 volts AC.



Parts Layout
Chassis Model 554

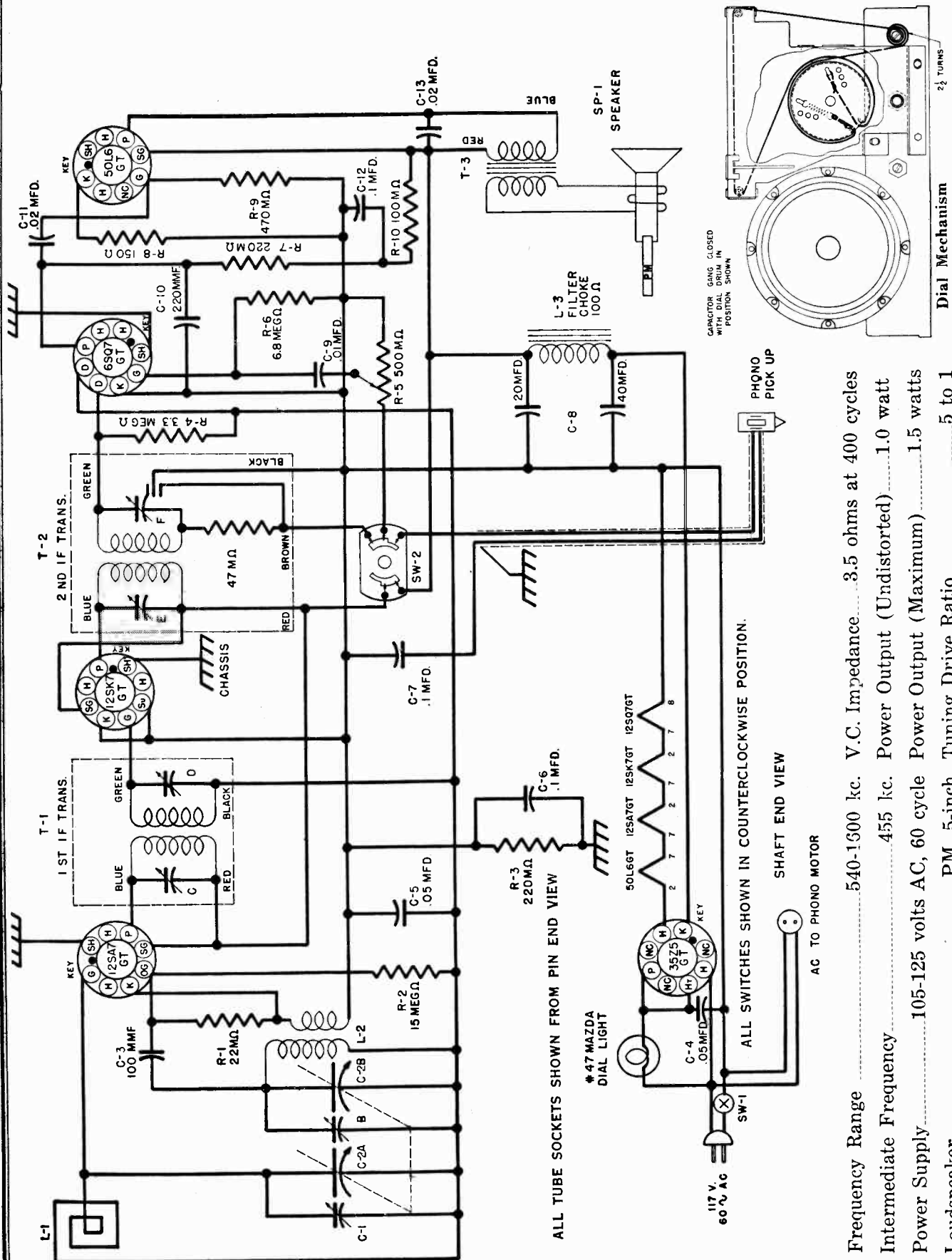
SERVICE PARTS LIST

Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.	A-2163		Cable, Dial
C-1, 3, 10	BD210503	Cap., Paper, .05 mfd., 200 v.	A-3123		Clamp, Cable
C-11	BD410103	Cap., Paper, .01 mfd., 400 v.	A-9285		Lamp, Pilot, Mazda No. 44
C-7, 15	BD410104	Cap., Paper, .1 mfd., 400 v.	A-51160-3		Cord, Power, 6 ft.
C-17	BD410203	Cap., Paper, .02 mfd., 400 v.	A-51163		Clip, Spring
C-6, 8	BD410503	Cap., Paper, .05 mfd., 400 v.	C-12, 13, 16	A-51356	Cap., Electro., 15-20-20 mfd.
C-19	BD610202	Cap., Paper, .002 mfd., 600 v.	C-2	C-51501-1	Capacitor, Variable, 3-section
C-18	BD610502	Cap., Paper, .005 mfd., 600 v.	T-1	C-51502	Transformer, Power
C-5, 9	BM78A101	Cap., Mica, 100 mmf.	L-2	B-51511	Coil, Assembly, RF
C-14	BM78A221	Cap., Mica, 220 mmf.	SP-1	C-51512	Speaker, 5" Dynamic, 485 ohm
R-14	BR16E561	Resistor, 560 ohm, 1 w.	L-3	B-51522	Coil Assembly, Osc.
R-2, 8	BR17B102	Resistor, 1000 ohm, 1/2 w.		A-51531	Shaft, Drive
R-9	BR17B103	Resistor, 10M ohm, 1/2 w.	T-2	B-51416-2	Trans. Assembly, 1st IF
R-1, 13	BR17B104	Resistor, 100M ohm, 1/2 w.	T-3	B-51417-2	Trans. Assembly, 2nd IF
R-5	BR17B156	Resistor, 15 meg., 1/2 w.		B-51591	Spring, Dial Bracket
R-3	BR17B223	Resistor, 22M ohm, 1/2 w.		A-51787	Spring, Cable
R-12	BR17B224	Resistor, 220M ohm, 1/2 w.		A-51801	Rivet, Pronged, 3/32 x 1/8
R-7	BR17B335	Resistor, 3.3 meg., 1/2 w.		B-55300-1	Channel, Rubber
R-11	BR17B685	Resistor, 6.8 meg., 1/2 w.	SW-2	B-55500-1	Switch (Radio-Phono)
R-6	BR17E223	Resistor, 22M ohm, 1 w.	R-15	B-55550-1	Potentiometer, 500M ohm
R-4	BR17G153	Resistor, 15M ohm, 2 w.	R-10	B-55575-1	Potentiometer & Switch, 500M ohm

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash).

INTERNATIONAL DETROLA CORP.

MODEL 558



ALL TUBE SOCKETS SHOWN FROM PIN END VIEW

#47 MAZDA DIAL LIGHT

117 V. AC 60 cycle

SW-1

C-4 .05 MFD

50L6GT 125A7GT 12SK7GT 12SQ7GT

R-3 220MΩ

C-6 .1 MFD.

C-7 .1 MFD.

CHASSIS

SW-2

47 MΩ

2 ND. IF TRANS. T-2

1 ST. IF TRANS. T-1

GREEN BLUE GREEN BLUE

RED BROWN GREEN BLACK

50L6GT 125A7GT 12SK7GT 12SQ7GT

R-1 22MΩ

R-2 15 MEGΩ

C-5 .05 MFD

C-3 100 MMF

KEY

50L6GT 125A7GT 12SK7GT 12SQ7GT

R-7 220MΩ

R-8 150Ω

R-9 470MΩ

R-10 100MΩ

C-12 .1 MFD.

C-11 .02 MFD.

KEY

50L6GT 125A7GT 12SK7GT 12SQ7GT

R-4 3.3 MEGΩ

R-5 500MΩ

R-6 6.8 MEGΩ

C-9 .01 MFD.

C-10 220MMF

50L6GT 125A7GT 12SK7GT 12SQ7GT

L-3 FILTER CHOKE 100Ω

C-8 40MFD

20MFD

SP-1 SPEAKER

PHONO PICK UP

SHAFT END VIEW

AC TO PHONO MOTOR

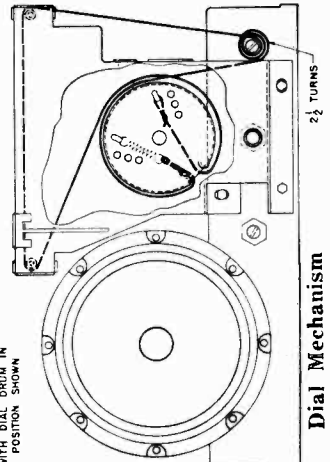
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION.

Frequency Range 540-1500 kc. V.C. Impedance 3.5 ohms at 400 cycles

Intermediate Frequency 455 kc. Power Output (Undistorted) 1.0 watt

Power Supply 105-125 volts AC, 60 cycle Power Output (Maximum) 1.5 watts

Loudspeaker PM, 5-inch Tuning Drive Ratio 5 to 1

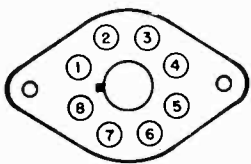


CAPACITOR GANG CLOSED WITH DIAL DRUM IN POSITION SHOWN

MODEL 558

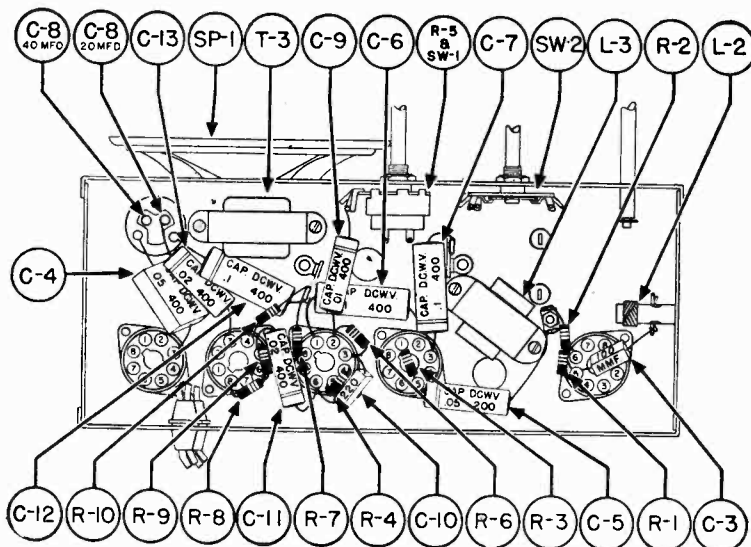
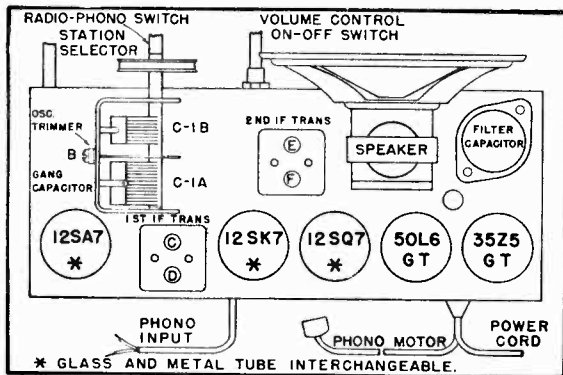
INTERNATIONAL DETROLA CORP.

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Converter	0	36.3 AC	108	108	-5.6	0	23.8 AC	0
12SK7GT	IF Amplifier	0	11.4 AC	0	0	0	108	23.8 AC	108
12SQ7GT	Detector—1st Audio	0	0	0	0	0	43	11.4 AC	0
50L6GT	Power Output	0	85 AC	100	108	0	0	36.3 AC	7.3
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	117



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. No signal. Line voltage 117 volts AC.

Parts Layout Chassis Model 558



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. — 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 12SA7GT 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 loop may be substituted for RMA loop.

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.
1620 kc.	12SA7GT grid	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop*	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.

* Loop trimmer accessible through bottom of cabinet.

INTERNATIONAL DETROLA CORP.

MODEL 558
MODEL 572
MODEL 576
MODEL 579

Chassis Model 558

Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.	C-1	B-8296-1	Trimmer
C-5	BD210503	Cap., Paper, .05 mfd., 200 v.	C-8	A-8948	Capacitor, Electro., 40-20 mfd.
C-9	BD410103	Cap., Paper, .01 mfd., 400 v.	R-5	B-9051-3	Control, Pot.&Sw.(V.C.) 500M ohm.
C-6, 7, 12	BD410104	Cap., Paper, .1 mfd., 400 v.	T-1	B-51010-1	Transformer Assembly, 1st IF
C-11, 13	BD410203	Cap., Paper, .02 mfd., 400 v.	T-2	B-51011-1	Transformer Assembly, 2nd IF
C-3	BM78A101	Cap., Mica, 100 mmf.	L-2	B-51159	Coil Assembly, Oscillator
C-10	BM78A221	Cap., Mica, 220 mmf.	A-51160-1	A-51163	Cord, AC Power, 6 ft. Clip, Spring
R-8	BR16C151	Resistor, 150 ohm, 1/2 w.	C-2	C-51573-1	Cap., Variable
R-10	BR17B104	Resistor, 100,000 ohm, 1/2 w.	SW-2	B-51576-1	Switch, Radio-Phono
R-2	BR17B156	Resistor, 15 megohm, 1/2 w.	SP-1	C-51577	Speaker, 5-inch PM
R-1	BR17B223	Resistor, 22,000 ohm, 1/2 w.	T-3	B-51578-1	Transformer, Output
R-3, 7	BR17B224	Resistor, 220,000 ohm, 1/2 w.	B-51585-1	B-51591	Cord (AC to Phono.) Spring, Dial Bracket
R-4	BR17B335	Resistor, 3.3 megohm, 1/2 w.	B-51599	B-51599	Coil, Loop
R-9	BR17B474	Resistor, 470,000 ohm, 1/2 w.	L-1	A-51726-2	Choke, Filter, 80 ma.
R-6	BR17B685	Resistor, 6.8 megohm, 1/2 w.	L-3	A-51787	Spring, Cable
A-2163	A-2163	Cable, Drive			
A-6158	A-6158	Lamp, Pilot, No. 47 Mazda, 6.3 v.			

Chassis Model 572

Symbol	Part No.	Description	Symbol	Part No.	Description
C-5	BC31B503	Cap., .05 mfd., 400 v. paper	A-9285	A-9285	Lamp, pilot, Mazda No. 44
C-2, 8, 21	BD210503	Cap., .05 mfd., 200 v. paper	A-51160-1	A-51160-1	Cord, power, 6 ft.
C-22	BD410103	Cap., .01 mfd., 400 v. paper	B-51162-3	B-51162-3	Shaft, drive
C-7, 24	BD410104	Cap., .1 mfd., 400 v. paper	A-51163	A-51163	Clip, spring
C-25	BD410203	Cap., .02 mfd., 400 v. paper	A-51260	A-51260	Shield, tube
C-16, 28	BD410503	Cap., .05 mfd., 400 v. paper	C-18,19,26	A-51356	Cap., electro., 15-20-20 mfd.
C-1, 27	BD610202	Cap., .002 mfd., 600 v. paper	C-6	C-51401-1	Capacitor, variable
C-12	BM58D512	Cap., 5100 mmf., mica	SP-1	C-51413	Speaker assembly, 5-inch
C-11, 20	BM78A101	Cap., 100 mmf., mica	T-2	B-51416-1	Trans. assembly, 1st IF
C-23	BM78A221	Cap., 220 mmf., mica	T-3	B-51417-1	Trans. assembly, 2nd IF
R-15	BR16E561	Resistor, 560 ohm, 1 w.	C-17	A-51419	Cap., electro., 10 mfd., 250 v.
R-2, 9	BR17B102	Resistor, 1000 ohm, 1/2 w.	L-5	B-51420	Coil assembly, oscillator
R-10	BR17B103	Resistor, 10M ohm, 1/2 w.	T-1	C-51421	Transformer, power
R-1, 14	BR17B104	Resistor, 100M ohm, 1/2 w.	L-3	B-51422	Coil assembly, antenna loading
R-4	BR17B150	Resistor, 15 ohm, 1/2 w.	L-4	B-51425	Coil assembly, RF
R-5	BR17B156	Resistor, 15 meg., 1/2 w.	C-13	B-51428-5	Capacitor, padder
R-3	BR17B223	Resistor, 22M ohm, 1/2 w.	L-2	B-51430	Coil assembly, SW antenna
R-13	BR17B224	Resistor, 220M ohm, 1/2 w.	SW-2	B-51435-1	Switch assembly, 2-band
R-8	BR17B335	Resistor, 3.3 meg., 1/2 w.	R-11	B-51445-1	Control, Pot. & switch 500,000 ohm.
R-16	BR17B474	Resistor, 470M ohm, 1/2 w.	C-9, 10, 14, A-51656	15	Cap. assembly, trimmer (4)
R-12	BR17B685	Resistor, 6.8 meg., 1/2 w.	C-3	A-51657	Cap. assembly, trimmer (spec.)
R-7	BR17E223	Resistor, 22M ohm, 1 w.	A-51787	A-51787	Spring, cable
R-6	BR17G153	Resistor, 15M ohm, 2 w.	C-4	B-51859-1	Cap. assembly, Ant.—BC
A-2163	A-2163	Cable, drive			

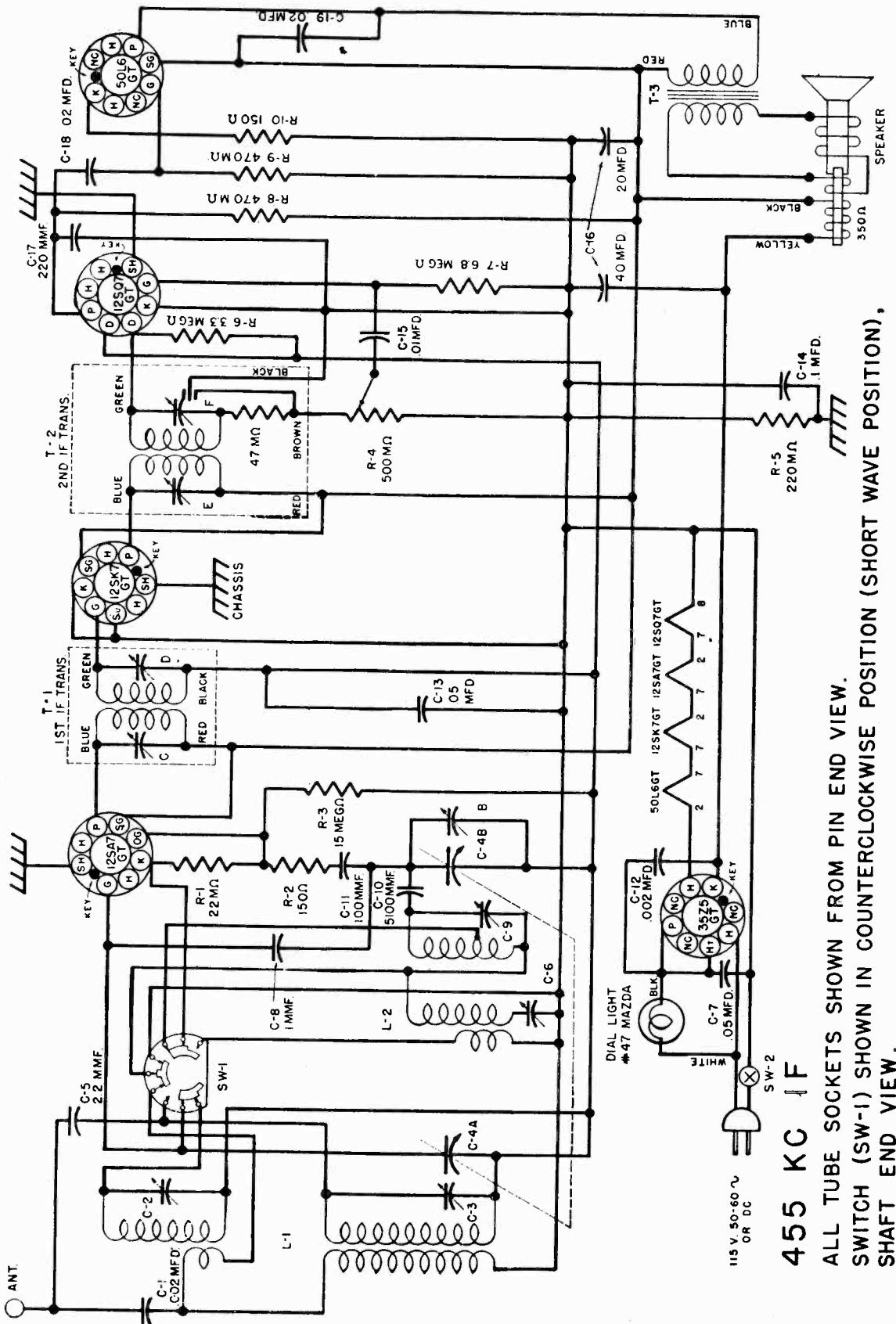
Chassis Model 576

Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.	R-7	BR17B685	Resistor, 6.8 meg., 1/2 w.
C-8	BD210303	Cap., Paper, .03 mfd., 200 v.	A-2163	A-2163	Cable Drive
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.	A-6158	A-6158	Lamp, Pilot No. 47 mazda, 6.3 v.
C-10	BD410103	Cap., Paper, .01 mfd., 400 v.	C-9, 11	A-8948	Cap., Electrolytic, 40-20 mfd., 150 v.
C-6, 13	BD410104	Cap., Paper, .1 mfd., 400 v.	T-1	B-51010-1	Transformer Assembly, 1st IF
C-14	BD410203	Cap., Paper, .02 mfd., 400 v.	T-2	B-51011-1	Transformer Assembly, 2nd IF
C-16	BD610202	Cap., Paper, .002 mfd., 600 v.	A-51160-1	A-51160-1	Cord, AC-DC Line, 6 ft.
C-15	BD610502	Cap., Paper, .005 mfd., 600 v.	A-51163	A-51163	Clip, Spring
C-7	BM78A101	Cap., Mica, 100 mmf., 500 v.	C-1	C-51251	Cap., Variable, 3-section
C-3	BM78A151	Cap., Mica, 150 mmf., 500 v.	L-3	B-51256	Coil Assembly, Oscillator
C-12	BM78A221	Cap., Mica, 220 mmf., 500 v.	L-2	B-51257	Coil Assembly, RF
C-5	BM78A470	Cap., Mica, 47 mmf., 500 v.	A-51260	A-51260	Shield, Tube
R-11	BR16C151	Resistor, 150 ohm, 1/2 w.	SP-1	C-51722	Speaker, 6-inch, PM
R-9	BR17B104	Resistor, 100,000 ohm, 1/2 w.	R-10	B-51724-1	Control, Pot. & Sw.(Tone)500M ohm.
R-4	BR17B153	Resistor, 15,000 ohm, 1/2 w.	R-5	B-51725-2	Control, Pot. (Volume) 500M ohm.
R-3	BR17B156	Resistor, 15 meg., 1/2 w.	L-4	B-51726-1	Choke, Filter, 80 ma.
R-1	BR17B223	Resistor, 22,000 ohm, 1/2 w.	A-51728	A-51728	Shaft, Drive
R-2, 8	BR17B224	Resistor, 220,000 ohm, 1/2 w.	B-51730	B-51730	Socket and Cable Assembly
R-6	BR17B335	Resistor, 3.3 meg., 1/2 w.	C-51735	C-51735	Bracket Assembly, Welded
	BR17B473	Resistor, 47,000 ohm, 1/2 w.	A-51787	A-51787	Spring, Cable
			A-51986	A-51986	Clip, Indicator

Chassis Model 579

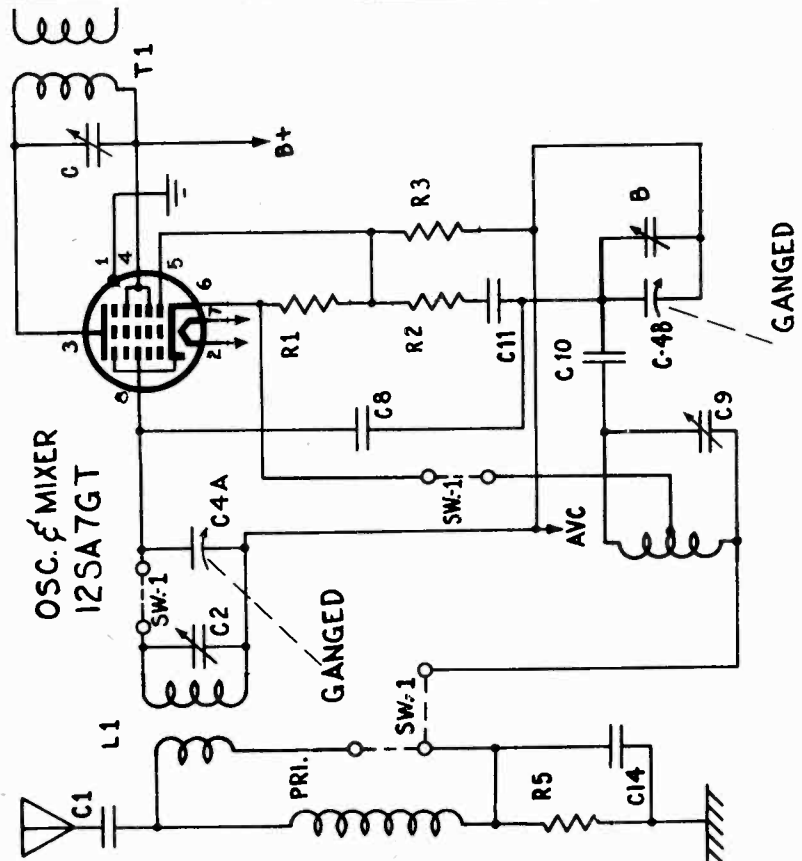
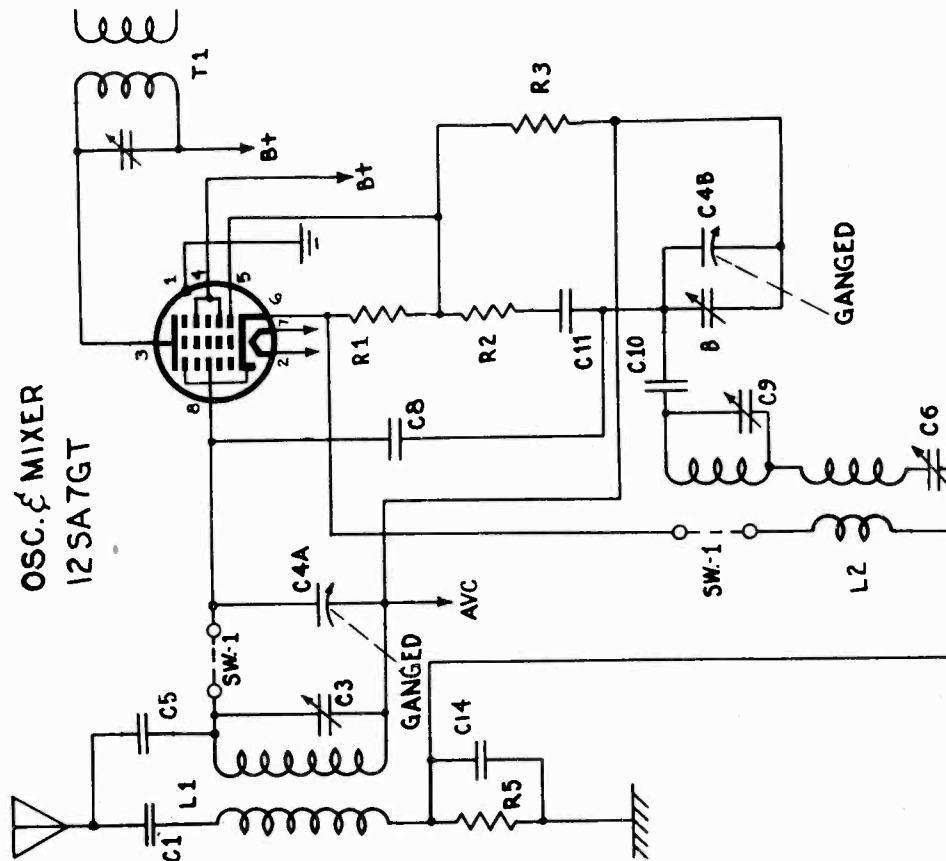
Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., paper, .05 mfd., 400 v.	C-7	A-8948	Cap., electro., 40-20 mfd.
C-2	BD210503	Cap., paper, .05 mfd., 200 v.	R-4	A-9051-2	Potentiometer and switch
C-8	BD410103	Cap., paper, .01 mfd., 400 v.	T-1	B-51010-1	Transformer assembly, 1st IF
C-6	BD410104	Cap., paper, .01 mfd., 400 v.	T-2	B-51011-1	Transformer assembly, 2nd IF
C-10, 11	BD410203	Cap., paper, .02 mfd., 400 v.	SP-1	C-51058	Speaker, 5-inch
C-3	BM78A151	Cap., mica, 150 mmf.	A-51160-1	A-51160-1	Cord, AC line, 6 ft.
C-9	BM78A221	Cap., mica, 220 mmf.	B-51162-2	B-51162-2	Shaft, drive
C-5	BM78A470	Cap., mica, 47 mmf.	A-51163	A-51163	Clip, spring
R-9	BR16C151	Resistor, 150 ohm, 1/2 w.	C-1	C-51251	Capacitor, variable
R-3	BR17B156	Resistor, 15 megohm, 1/2 w.	L-3	B-51256	Coil, oscillator assembly
R-1	BR17B223	Resistor, 22M ohm, 1/2 w.	L-2	B-51257	Coil, RF assembly
R-2	BR17B224	Resistor, 220M ohm, 1/2 w.	A-51260	A-51260	Shield, tube
R-5	BR17B335	Resistor, 3.3 megohm, 1/2 w.	A-51787	A-51787	Spring, cable, music wire
R-7, 8	BR17B474	Resistor, 470M ohm, 1/2 w.	C-51921	C-51921	Dial assembly, welded
R-6	BR17B685	Resistor, 6.8 megohm, 1/2 w.	A-51936	A-51936	Clip, indicator
A-2163	A-2163	Cable, drive			
A-6158	A-6158	Lamp, pilot, No. 47 Mazda 6.3 v.			

Order parts not listed by specifying (1) Part Name and (2) Model Number (Including number following dash).



455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.
 SWITCH (SW-1) SHOWN IN COUNTERCLOCKWISE POSITION (SHORT WAVE POSITION),
 SHAFT END VIEW.



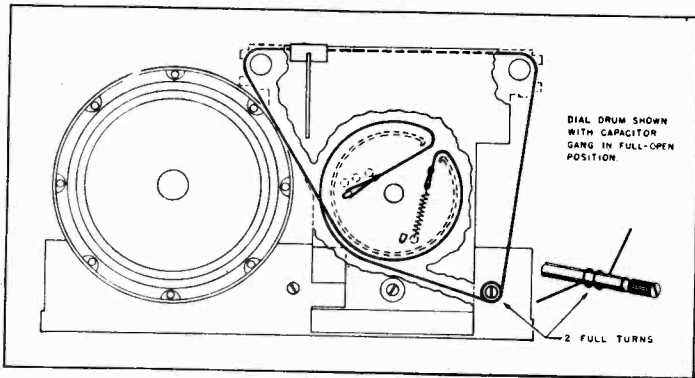
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

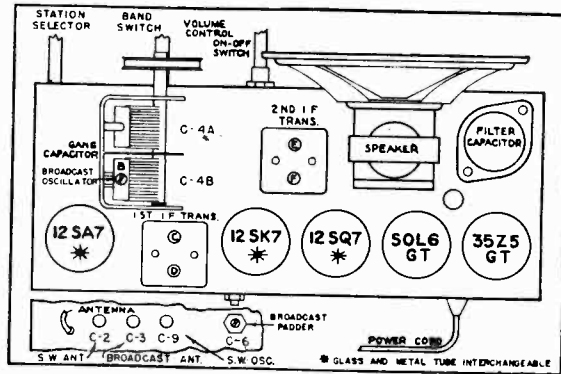
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — 200 mmf. — 400 ohms

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	C D E F	Align IF
12SA7GT grid	.1 mfd.	1620 kc.	Broadcast	HF end	B	Set limit of band
Ant. terminal	400 ohms	18.3 mc.	Short Wave	HF end	C-9	Set limit of band
Ant. terminal	400 ohms	18.0 mc.	Short Wave	18 mc.	C-2	Align antenna
Ant. terminal	200 mmf.	1400 kc.	Broadcast	1400 kc.	C-3	Align antenna
Ant. terminal	200 mmf.	600 kc.	Broadcast	600 kc.	C-6	Rock gang and adjust to max.

NOTE: Recheck alignment of trimmers B and C-3 after adjusting C-6.



Dial Mechanism



Tube Layout

TUBE COMPLEMENT

- | | |
|--|----------------------------|
| 1—12SA7GT Oscillator and Mixer tube | 1—50L6GT Power Output tube |
| 1—12SK7GT IF Amplifier tube | 1—35Z5GT Rectifier tube |
| 1—12SQ7GT Second Detector and First Audio tube | |

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

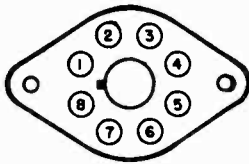
Frequency Range.....	540-1600 kc., 6-18 mc. V.C. Impedance.....	3.5 ohms at 400 cycles
Intermediate Frequency	455 kc. Power Output (Undistorted).....	.75 watt
Power Supply.....	105-125 volts, 50-60 cycle AC or DC Power Output (Maximum).....	1.5 watts
Loudspeaker	Dynamic Tuning Drive Ratio	5-1

INTERNATIONAL DETROLA CORP.

MODEL 568

SOCKET VOLTAGES

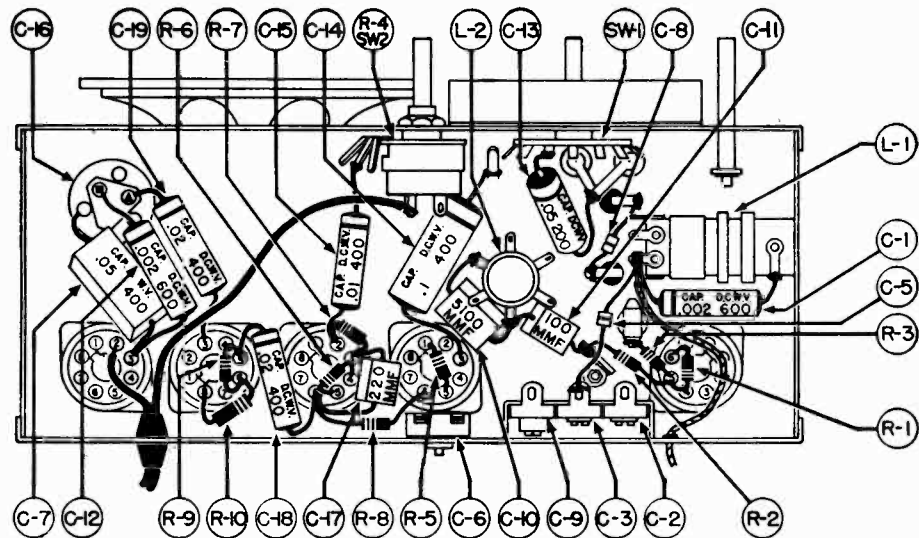
TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Oscillator and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked.

Volume control full on. No signal.

Line Voltage 117 volts AC.



Parts Layout
Chassis Model 568

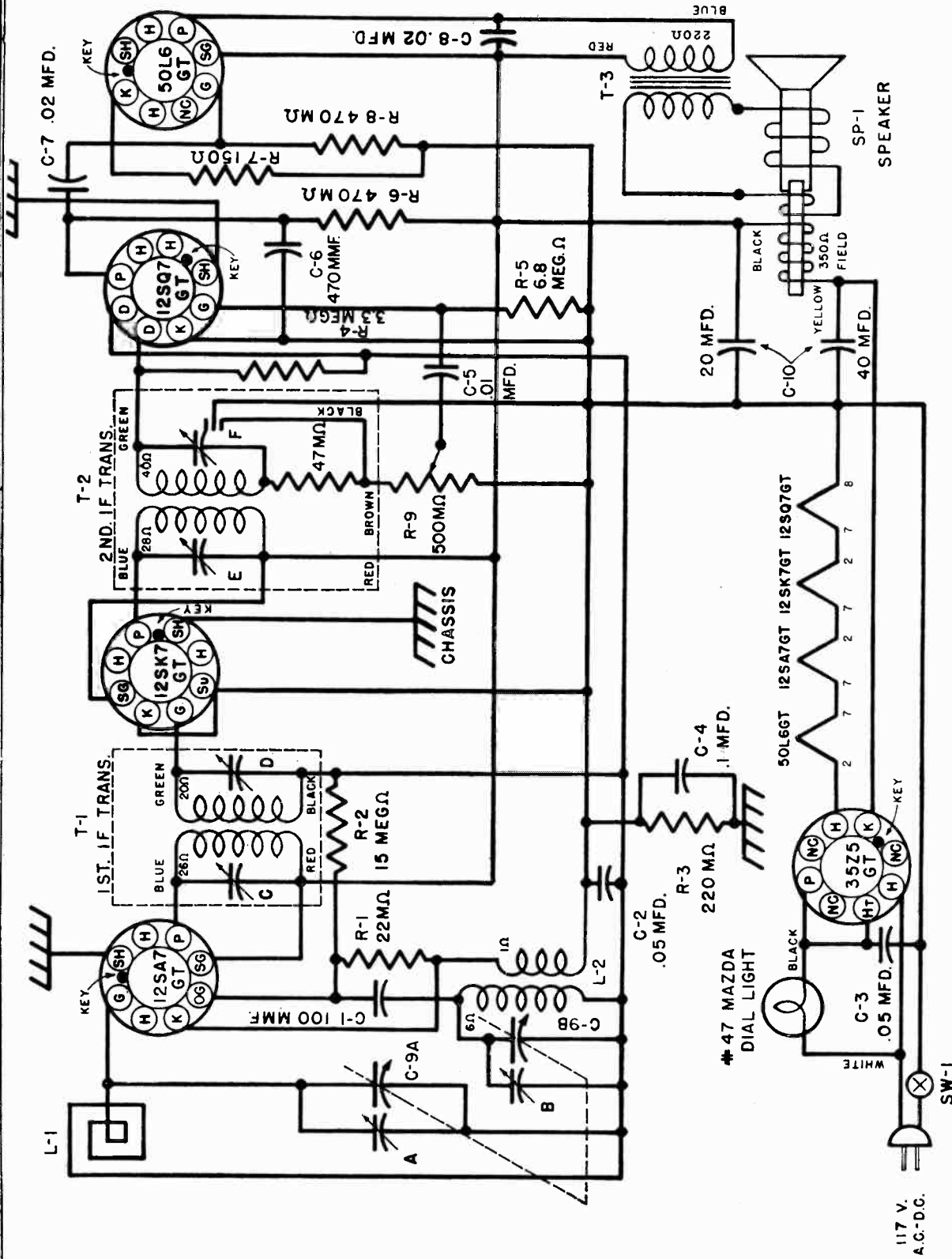
SERVICE PARTS LIST

Symbol	Part No.	Description	Symbol	Part No.	Description
C-7	BC31B503	Cap., Molded Paper, .05 mfd.	C-16	A-8948	Cap., Electrolytic, 40-20 mfd.
C-13	BD210503	Cap., Paper, .05 mfd., 200 v.	R-4	B-9051-5	Control, Vol & Sw. 500,000 ohm
C-15	BD410103	Cap., Paper, .01 mfd., 400 v.	T-1	B-51010-1	Transformer Assembly, 1st IF
C-14	BD410104	Cap., Paper, .1 mfd., 400 v.	T-2	B-51011-1	Transformer Assembly, 2nd IF
C-18, 19	BD410203	Cap., Paper, .02 mfd., 400 v.	C-51014	C-51014	Speaker, 5-inch Dynamic
C-1, 12	BD610202	Cap., Paper, .002 mfd., 600 v.	A-51160-1	A-51160-1	Cord, Power, 6 ft.
C-10	BM58D512	Cap., Mica, 5100 mmf.	A-51163	A-51163	Clip, Spring
C-11	BM78A101	Cap., Mica, 100 mmf.	B-51428-5	B-51428-5	Capacitor, Padder
C-17	BM78A221	Cap., Mica, 220 mmf.	B-51591	B-51591	Spring, Dial Bracket
R-10	BR16C151	Resistor, 150 ohm, 1/2 w.	SW-1	B-51764-1	Switch, Band
R-2	BR17B151	Resistor, 150 ohm, 1/2 w.	A-51787	A-51787	Spring, Cable, Music Wire
R-3	BR17B156	Resistor, 15 meg., 1/2 w.	L-1	B-51828	Coil Assembly, BC & SW Ant.
R-1	BR17B223	Resistor, 22,000 ohm, 1/2 w.	C-2, 3, 9	A-51834	Capacitor, Trimmer, 3-section
R-5	BR17B224	Resistor, 220,000 ohm, 1/2 w.	L-2	B-51836	Coil Assembly, Osc.
R-6	BR17B335	Resistor, 3.3 meg., 1/2 w.	C-4	C-51837-1	Capacitor, Variable
R-8, 9	BR17B474	Resistor, 470,000 ohm, 1/2 w.	C-8	B-51839-2	Capacitor, 1 mmf.
R-7	BR17B685	Resistor, 6.8 meg., 1/2 w.	C-5	B-51839-4	Capacitor, 2.2 mmf.
	A-2163	Cable, Drive	A-51869	A-51869	Antenna Reel Assembly
	A-6158	Lamp, Pilot, No. 47, Mazda, 6.3 v.			

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash)

MODELS 571A,
571B

INTERNATIONAL DETROLA CORP.



455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.

INTERNATIONAL DETROLA CORP.

MODELS 571A,
571B

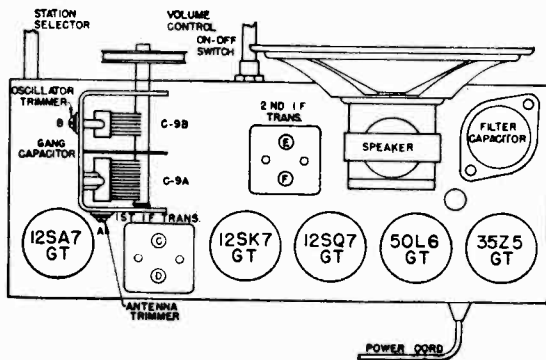
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

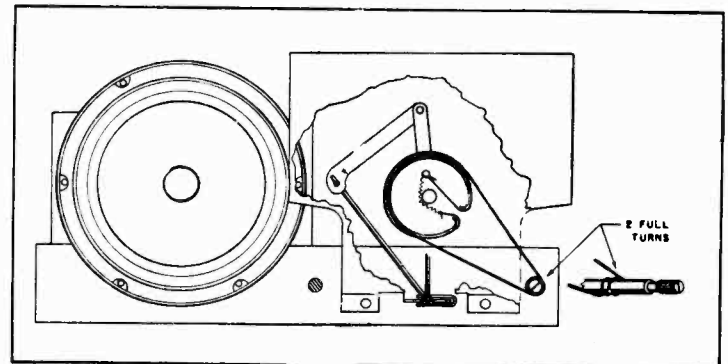
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — RMA loop.

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 12SA7GT 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 loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

- 1—12SA7GT Oscillator and Mixer tube
- 1—50L6GT Power Output tube
- 1—12SK7GT IF Amplifier tube
- 1—35Z5GT Rectifier tube
- 1—12SQ7GT Second Detector and First Audio tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

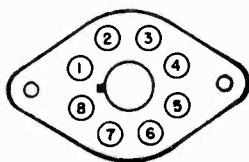
Frequency Range	540-1600 kc.	Power Output (Undistorted) ...	.75 watts
Intermediate Frequency	455 kc.	Power Output (Maximum)	1.5 watts
Power Supply	105-125 volts AC-DC	Tuning Drive Ratio	3 to 1
Loudspeaker	Dynamic		
V.C. Impedence	3.5 ohms at 400 cycles		

MODELS 571A,
571B

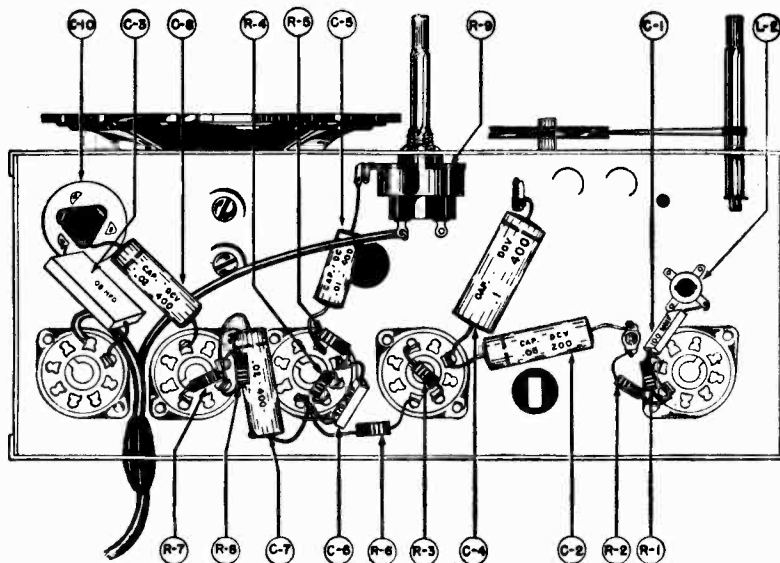
INTERNATIONAL DETROLA CORP.

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.



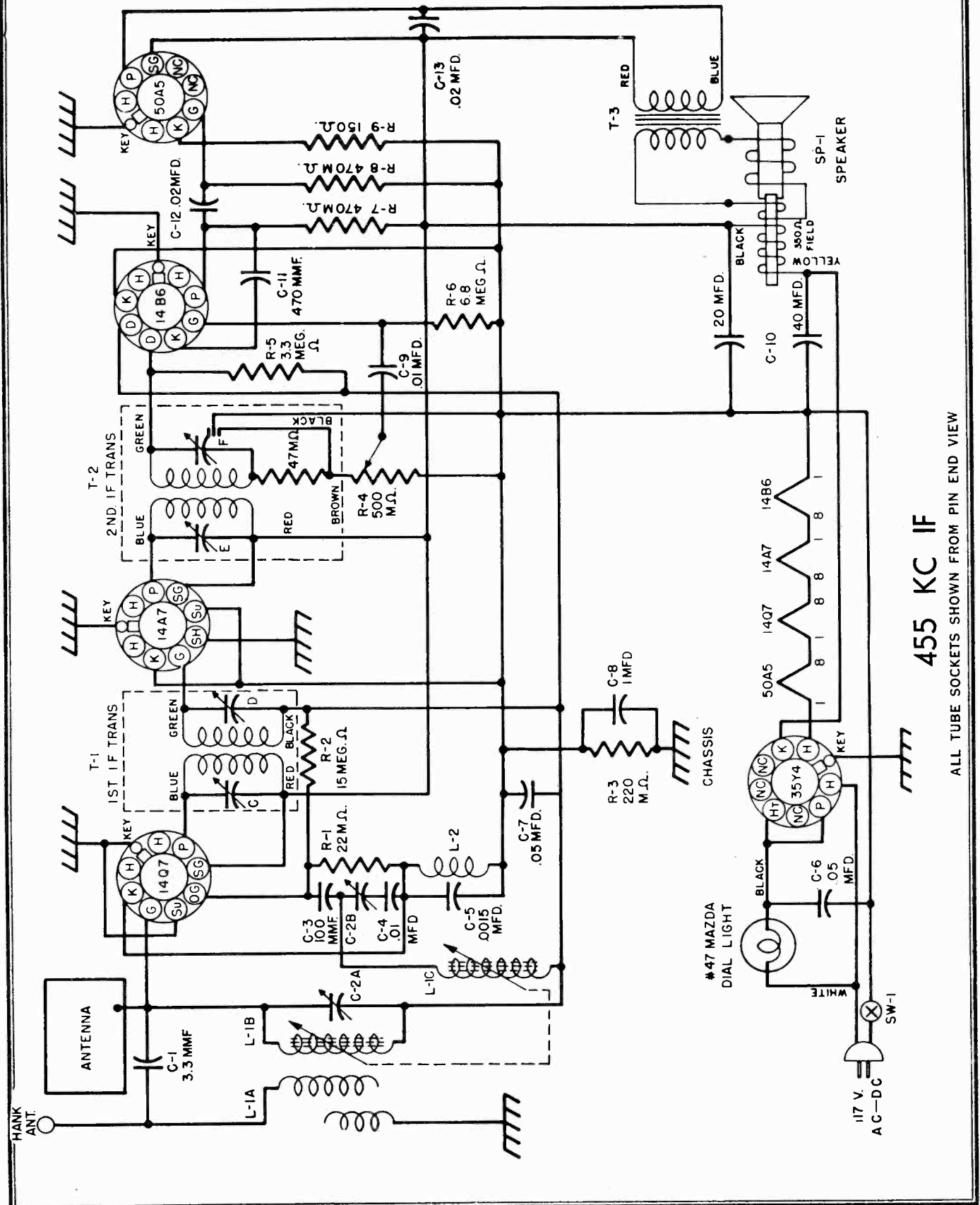
Parts Layout
Chassis Models 571A
and 571B

SERVICE PARTS LIST

Symbol	Part No.	Description	Symbol	Part No.	Description
C-1	BM78A101	Cap., Mica, 100 mmf.	T-2	B-51011	Trans., Assembly, 2nd IF
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.	SP-1	C-51014	Speaker, 5" Dynamic, 350 ohm.
C-3	BC31B503	Cap., Mold., Paper, .05 mfd.	A-2163		Cable, Drive
C-4	BD410104	Cap., Paper, .1 mfd., 400 v.	A-6158		Lamp, Pilot No. 47 Mazda 6.3 v.
C-5	BD410103	Cap., Paper, .01 mfd., 400 v.	A-51160-1		Cord, AC-DC Line, 6 ft.
C-6	BM78A471	Cap., Mica, 470 mmf.	B-51162-1		Shaft, Drive
C-7, 8	BD410203	Cap., Paper, .02 mfd., 400 v.	A-51163		Clip, Spring
C-9	C-51155-1	Cap., Variable, 2 Section	B-51177		Bracket Assembly, Dial
C-10	A-8948	Cap., Electro., 40-20 mfd., 150 v.	A-51202		Link, Insulating
L-1	B-51243	Loop, Antenna	B-51204-1		Pointer
L-2	B-51159	Coil, Osc. Assembly	A-51206		Arm, Dial Drive
R-1	BR17B223	Resistor, 22M ohm 1/3 w.	A-51237-1		Paper Back, Dial
R-2	BR17B156	Resistor, 15 meg. 1/3 w.	D-51240-1		Cabinet (571-1)
R-3	BR17B224	Resistor, 220M ohm 1/3 w.	A-51241-2		Knob
R-4	BR17B335	Resistor, 3.3 meg. 1/3 w.	C-51242-1		Dial, Glass Indicator
R-5	BR17B685	Resistor, 6.8 meg. 1/3 w.	C-51247		Back, Cabinet
R-6, 8	BR17B474	Resistor, 470M ohm 1/3 w.	A-51249		Strip, Sponge Rubber
R-7	BR16C151	Resistor, 150 ohm. 1/2 w.	A-51331		Spring, Dial Bracket
R-9	B-9051-1	Control, Vol. & Sw. 500M ohm.	A-51787		Spring, Cable
T-1	B-51010	Trans., Assembly, 1st IF	B-54000		Carton Assembly

INTERNATIONAL DETROLA CORP.

MODEL 571X



455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW

MODEL 571X

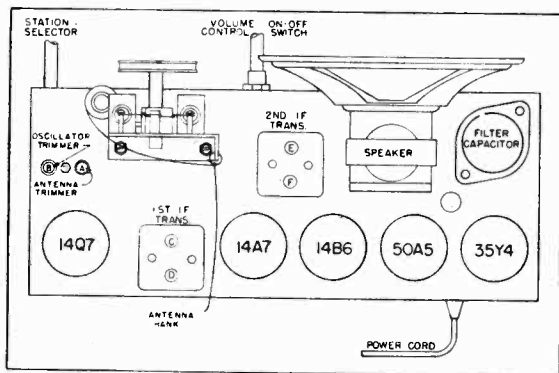
INTERNATIONAL DETROLA CORP.

ALIGNMENT PROCEDURE

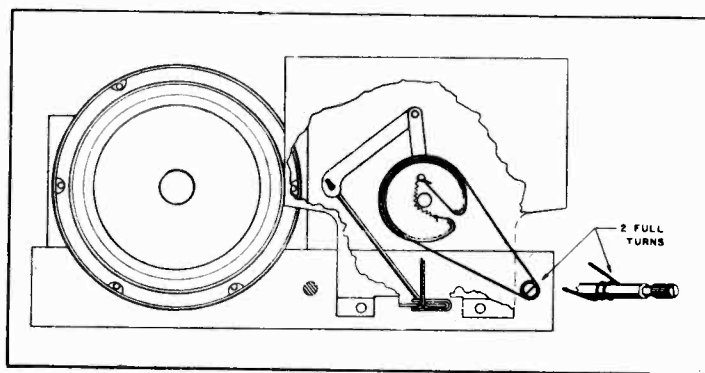
The following equipment is necessary to properly align this chassis:

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
IF 455 kc.	14Q7 grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
535 kc.	14Q7 grid	10 mmf.	LF end	Osc. trimmer B	Set limit of band
1400 kc.	14Q7 grid	10 mmf.	1400 kc.	Ant. trimmer A	Tune to max.



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

- 1—14Q7 Oscillator and Mixer tube
- 1—50A5 Power Output tube
- 1—14A7 IF Amplifier tube
- 1—35Y4 Rectifier tube
- 1—14B6 Second Detector and First Audio tube

Electrical and Mechanical Specifications

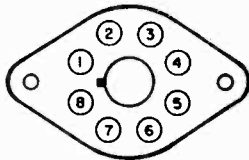
Frequency Range.....	540-1700 kc.	Power Output (Undistorted)...	.75 watts
Intermediate Frequency.....	455 kc.	Power Output (Maximum).....	1.5 watts
Power Supply.....	105-125 volts AC-DC	Tuning Drive Ratio.....	3 to 1
Loudspeaker.....	5-inch Dynamic	Rated Power Input.....	32 watts
V.C. Impedance.....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

INTERNATIONAL DETROLA CORP.

MODEL 571X

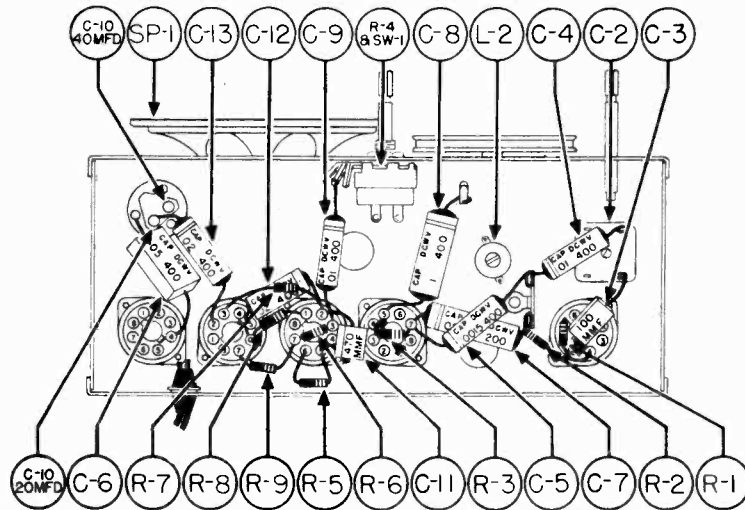
SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
14Q7	Osc. and Mixer	37.5 AC	99	99	-4.2	0	0	0	24.5 AC
14A7	IF Amplifier	12.5 AC	99	99	0	0	0	0	24.5 AC
14B6	2nd Det.—1st Audio	0	16	0	0	0	0	0	12.5 AC
50A5	Power Output	85 AC	91.5	99	0	0	0	5.9	37.5 AC
35Y4	Rectifier	117 AC	112 AC	0	112 AC	0	0	112	85 AC



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.

Parts Layout Chassis Model 571X with Loctal Tubes



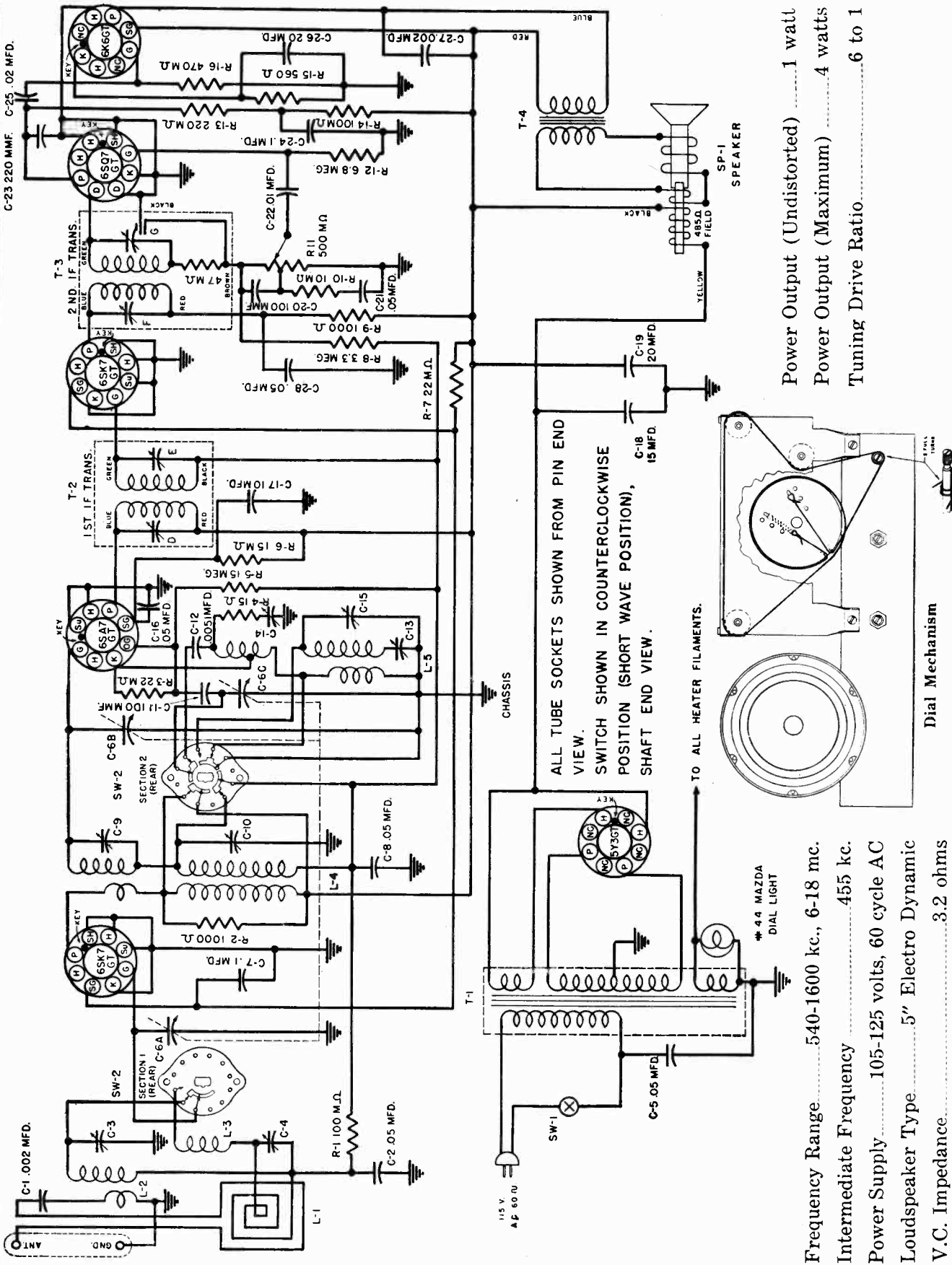
SERVICE PARTS LIST

Symbol	Part No.	Description	Symbol	Part No.	Description
C-6	BC31B503	Cap., Mold. Paper, .05 mfd., 400 v.	T-1	B-51010-1	Transformer Assy., 1st IF
C-7	BD210503	Cap., Paper, .05 mfd., 200 v.	T-2	B-51011-1	Transformer Assy., 2nd IF
C-4, 9	BD410103	Cap., Paper, .01 mfd., 400 v.	SP-1	C-51014	Speaker, 5-inch Dynamic, 350 ohm.
C-8	BD410104	Cap., Paper, .1 mfd., 400 v.		A-51160-1	Cord, Power, 6 ft.
C-12, 13	BD410203	Cap., Paper, .02 mfd., 400 v.		B-51162-1	Shaft, Dial Drive
C-3	BM78A101	Cap., Mica, 100 mmf.		A-51163	Spring Clip for Dial Drive Shaft
C-11	BM78A471	Cap., Mica, 470 mmf.		A-51202	Link, Dial Drive
R-9	BR16C151	Resistor, 150 ohm, 1/2 w.		B-51330-1	Rubber Channel
R-2	BR17B156	Resistor, 15 megohm, 1/3 w.		A-51331	Spring, Dial Bracket
R-1	BR17B223	Resistor, 22,000 ohm, 1/3 w.		A-51778	Service Sheet
R-3	BR17B224	Resistor, 220,000 ohm, 1/3 w.		A-51787	Spring, Cable
R-5	BR17B335	Resistor, 3.3 megohm, 1/3 w.		A-51869	Antenna Reel Assembly
R-7, 8	BR17B474	Resistor, 470,000 ohm, 1/3 w.	L-1A, L-1B,		
R-6	BR17B685	Resistor, 6.8 megohm, 1/3 w.	L-1C	D-54902	Permeability Tuner Assembly
	A-2163	Cable, Dial Drive	L-2	B-54903	Coil Assembly, Cathode
	A-6158	Lamp, Pilot, No. 47 Mazda, 6.3 v.	C-2A;		
C-10	A-8948	Cap., Elec., 40-20 mfd., 150 v.	C-2B	B-54904-1	Capacitor, Trimmer
R-4	B-9051-1	Control, Vol. & Sw., 500,000 ohm.		B-55120-1	Stud, for Dial Drive Link
C-5	A-9672	Cap., Paper, .0015 mfd., 400 v.			

Order parts not listed by specifying (1) Part Name, (2) Model Number (include number following dash), (3) Run Number

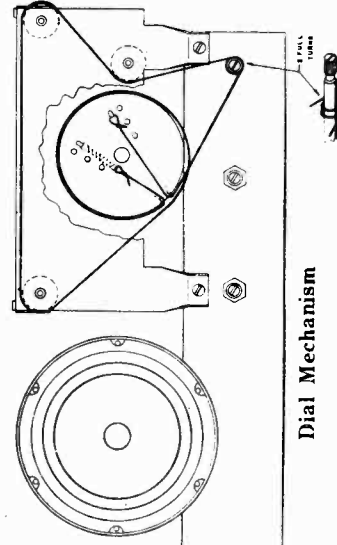
MODEL 572

INTERNATIONAL DETROLA CORP.

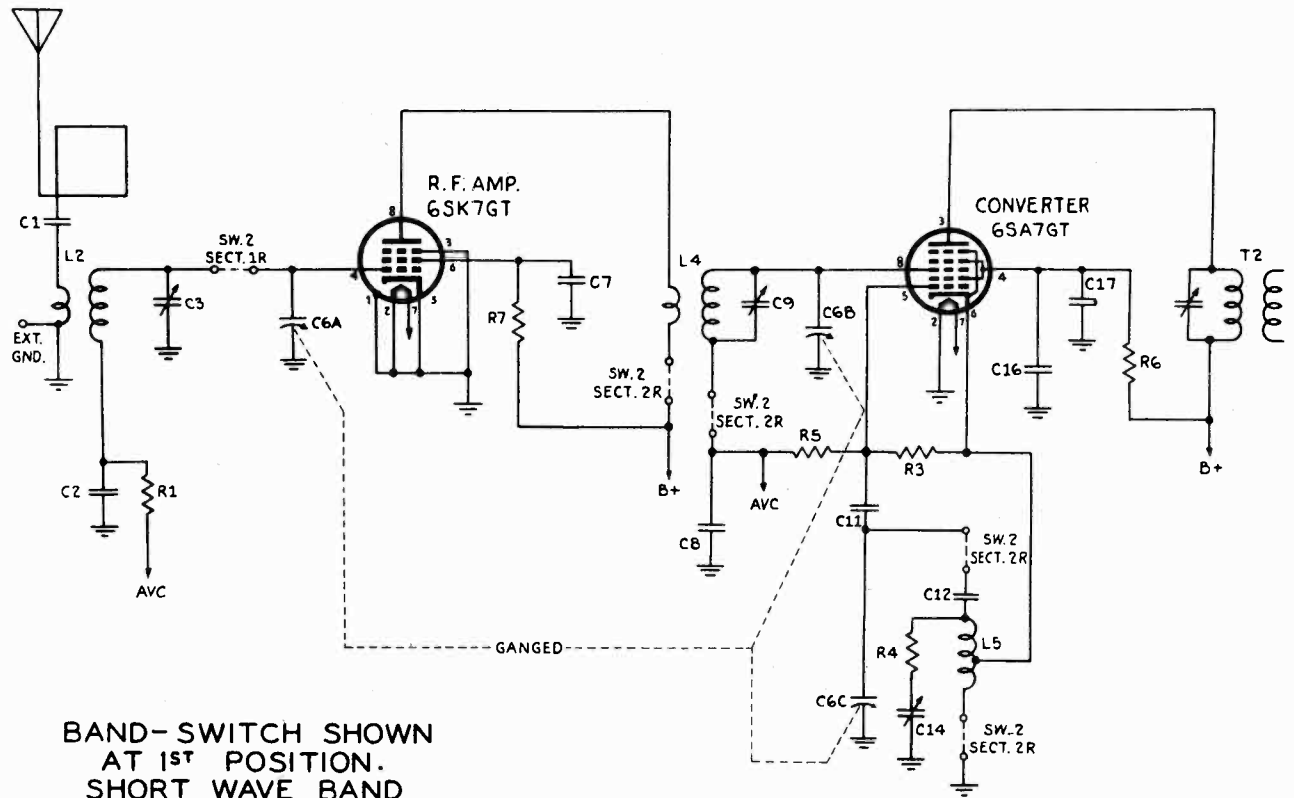


Power Output (Undistorted) 1 watt
 Power Output (Maximum) 4 watts
 Tuning Drive Ratio 6 to 1

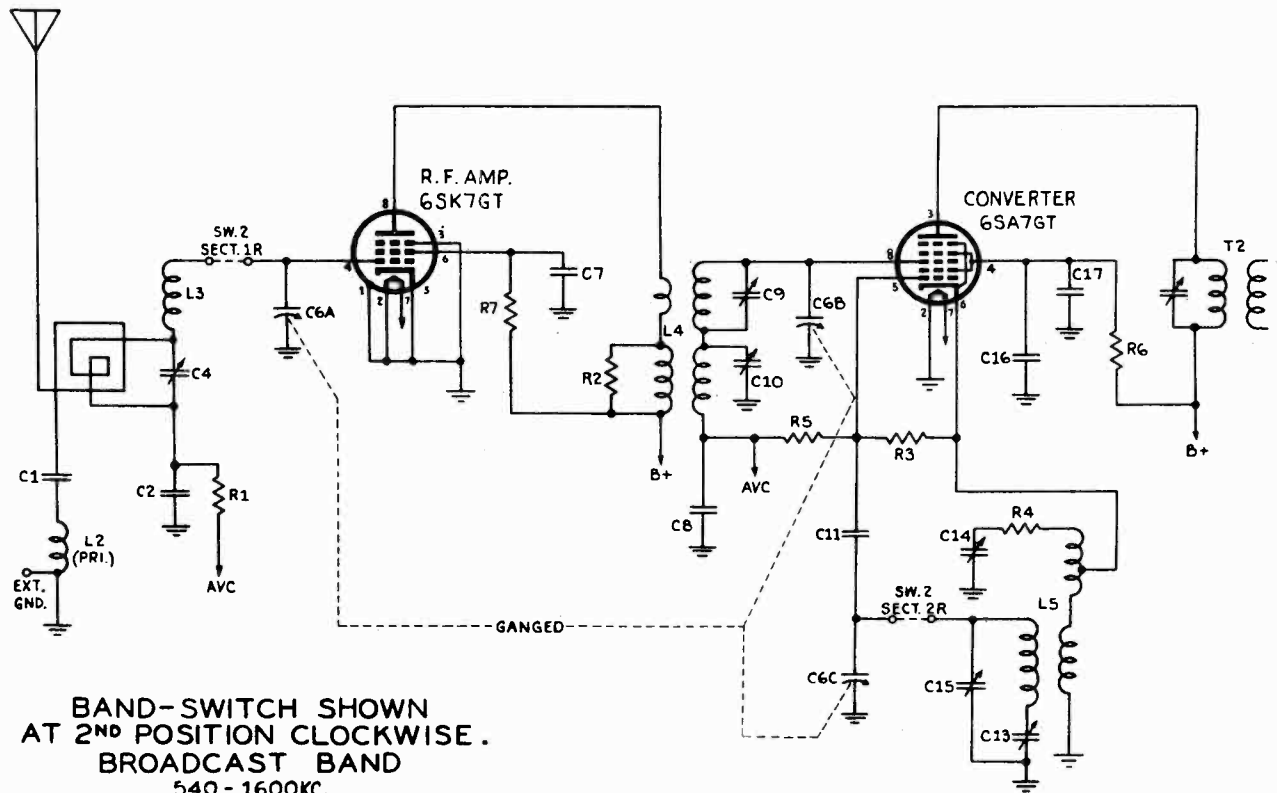
Frequency Range 540-1600 kc., 6-18 mc.
 Intermediate Frequency 455 kc.
 Power Supply 105-125 volts, 60 cycle AC
 Loudspeaker Type 5" Electro Dynamic
 V.C. Impedance 3.2 ohms



Dial Mechanism

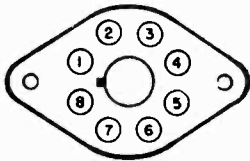


BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND 6 - 18 MC.



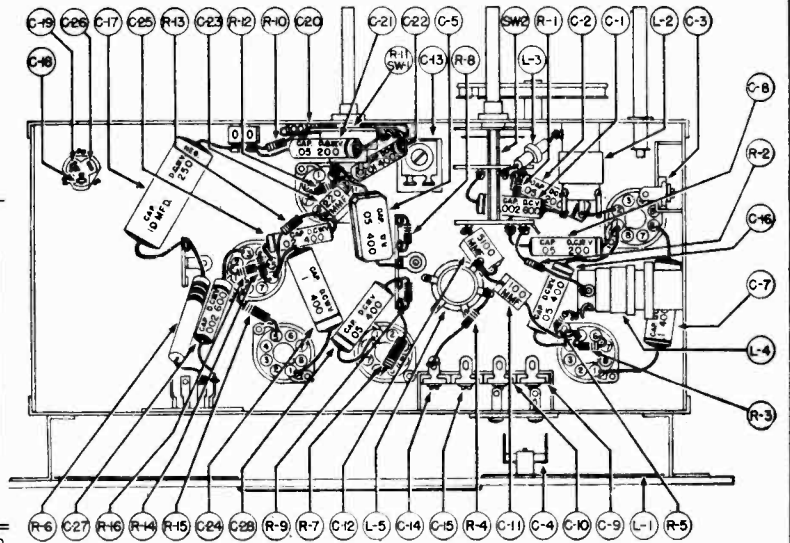
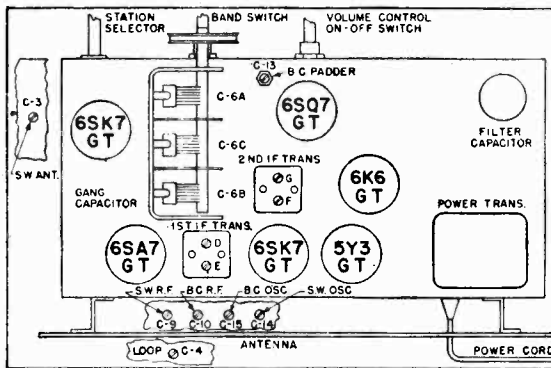
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND 540 - 1600 KC.

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	107	6 AC	255
6SA7GT	Converter	0	6 AC	250	103	0	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	105	6 AC	237
6SQ7GT	Det.—AVC—Audio	0	0	0	0	0	34	6 AC	0
6K6GT	Power Output	0	0	230	240	0	0	6 AC	18
5Y3GT	Rectifier	0	310	0	300 AC	0	300 AC	0	310



NOTE: 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. Receiver not tuned to station. Line voltage 117 volts AC.

Parts Layout Model 572



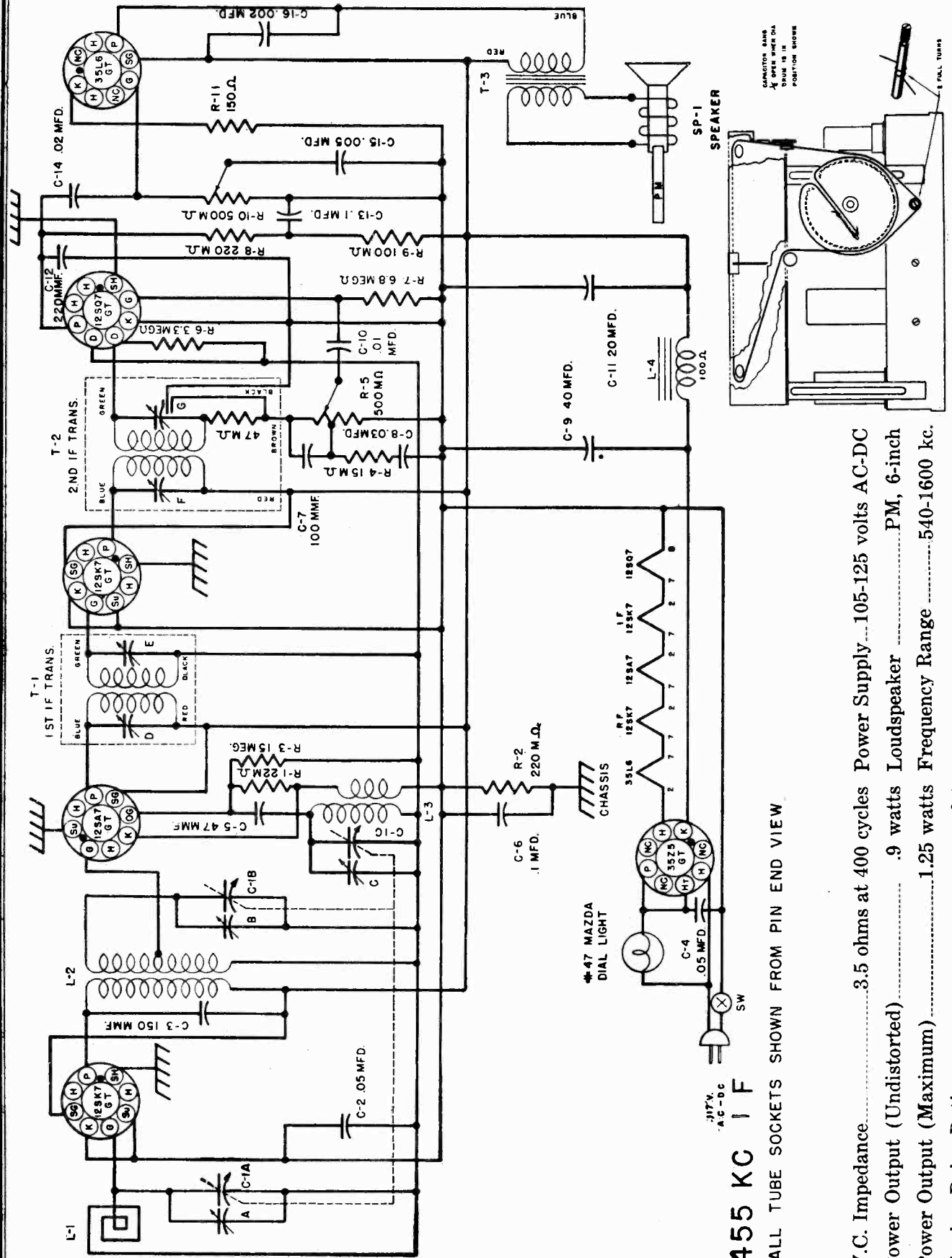
The following equipment is necessary to properly align this chassis:

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. — 400 ohm resistor—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 max.
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	C-4	Align antenna

INTERNATIONAL DETROLA CORP.

MODEL 576

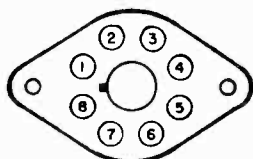


455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW

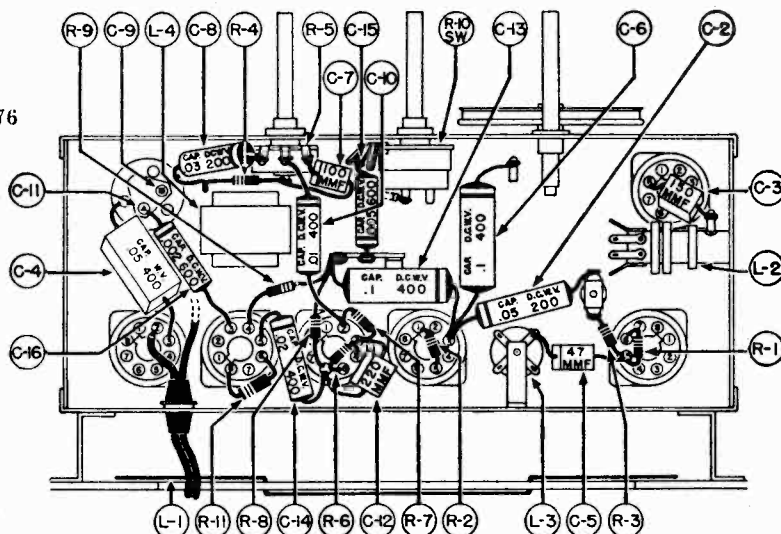
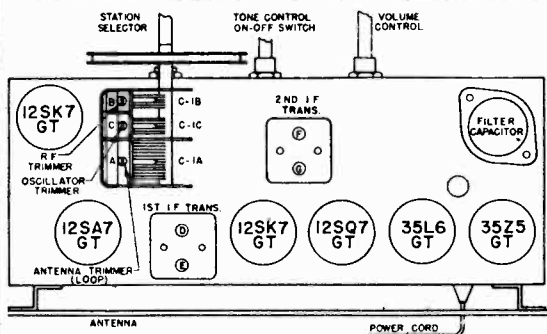
- V.C. Impedance 3.5 ohms at 400 cycles
- Power Supply 105-125 volts AC-DC
- Power Output (Undistorted)9 watts
- Loudspeaker PM, 6-inch
- Power Output (Maximum) 1.25 watts
- Frequency Range 540-1600 kc.
- Tuning Drive Ratio 6-1

TUBE	POSITION	1	2	3	4	5	6	7	8
12SK7GT	RF Amplifier	0	49.5 AC	0	0	0	105	36.5 AC	105
12SA7GT	Converter	0	24.7 AC	105	105	-6.8	0	36.5 AC	0
12SK7GT	IF Amplifier	0	24.7 AC	0	0	0	105	12.5 AC	105
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	43	12.5 AC	0
35L6GT	Power Output	0	85.0 AC	97	105	0	0	49.5 AC	7.2
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	114



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (-B) to socket contact indicated.
 All voltages are positive DC unless otherwise marked.
 Volume Control full on. No signal.
 Tone Control in clockwise position.
 Line voltage 117 volts AC.

Parts Layout
Chassis Model 576



The following equipment is necessary to properly align this chassis:

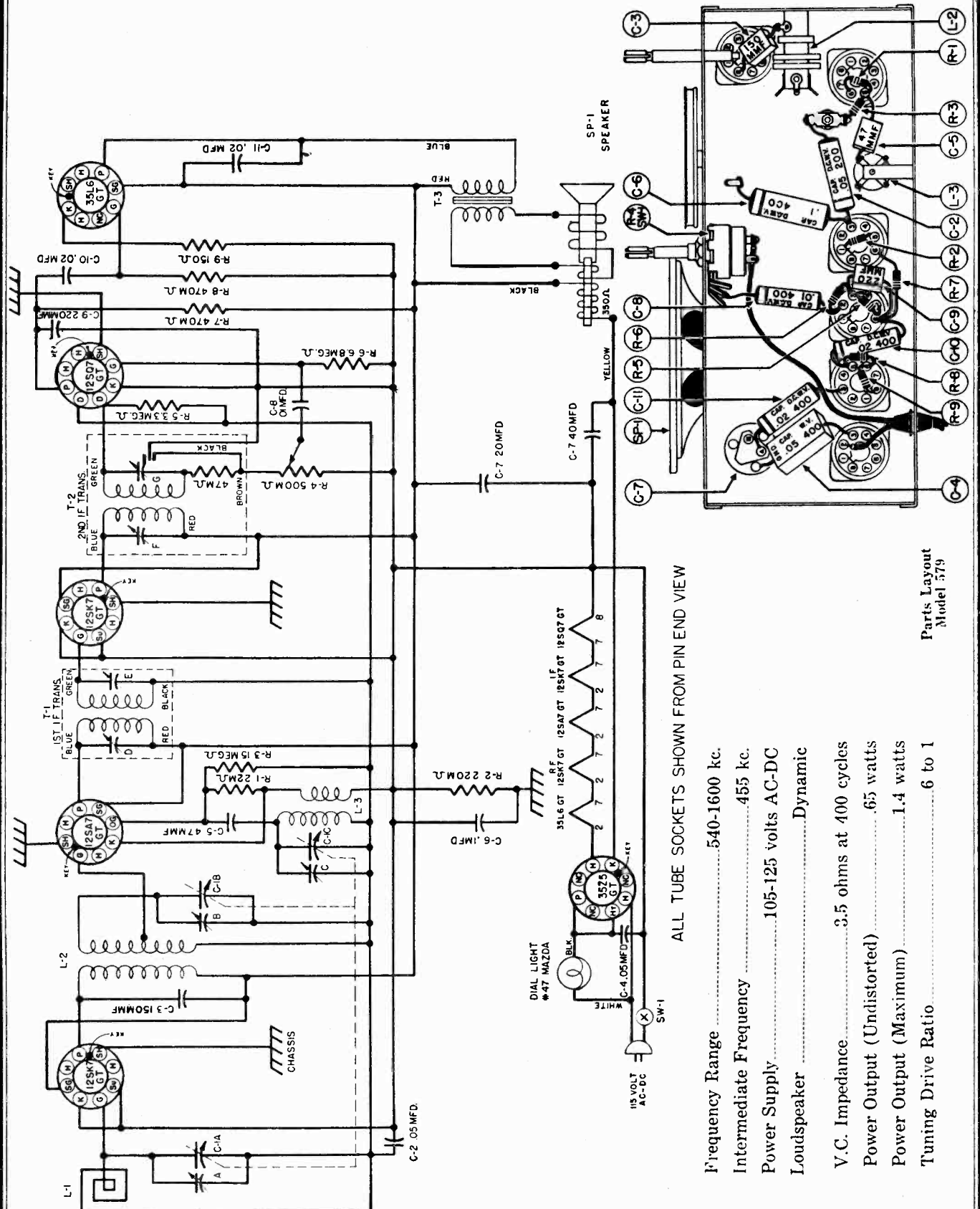
- A signal generator which will provide an accurately calibrated signal at the frequencies listed.
- An output meter.
- A non-metallic screwdriver.
- Dummy antenna: — .1 mfd., — RMA loop.

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 12SA7GT 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 loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers D E F G	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer C	Set limit of band.
1400 kc.	Through loop	RMA loop	1400 kc.	RF trimmer B	Tune to max.
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. Trimmer A	Tune to max.

INTERNATIONAL DETROLA CORP.

MODEL 579

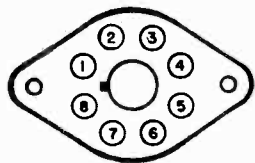


ALL TUBE SOCKETS SHOWN FROM PIN END VIEW

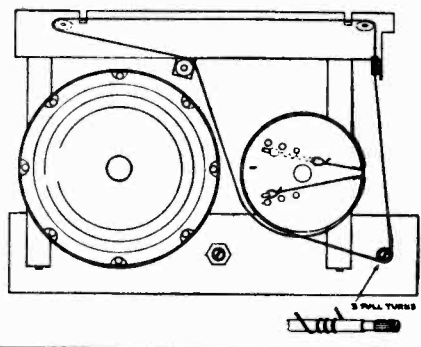
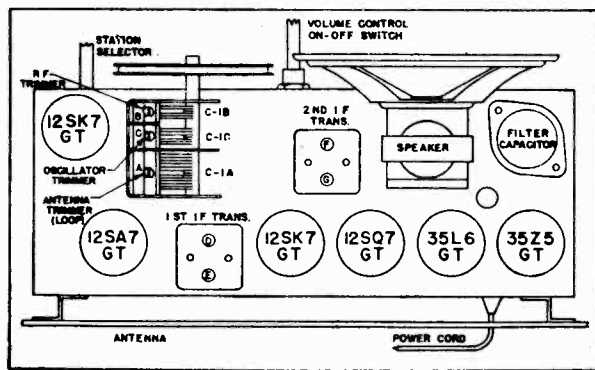
Frequency Range	.....540-1600 kc.
Intermediate Frequency	.....455 kc.
Power Supply	.....105-125 volts AC-DC
Loudspeaker	.....Dynamic
V.C. Impedance	.....3.5 ohms at 400 cycles
Power Output (Undistorted)	......65 watts
Power Output (Maximum)	.....1.4 watts
Tuning Drive Ratio	.....6 to 1

Parts Layout
Model 579

TUBE	POSITION	1	2	3	4	5	6	7	8
12SK7GT	RF Amplifier	0	50 AC	0	0	0	97	38 AC	97
12SA7GT	Converter	0	25 AC	97	97	-6	0	38 AC	0
12SK7GT	IF Amplifier	0	25 AC	0	0	0	97	12 AC	97
12SQ7GT	Detector, 1st Audio	0	0	0	0	0	30	12 AC	0
35L6GT	Output	0	85 AC	92	97	0	0	50 AC	5.7
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	86 AC	125



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. No signal. Line voltage 117 volts AC.



Dial Mechanism

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. — RMA loop.

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 12SK7GT 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 loop may be substituted for RMA loop.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	HF end	D E F G	Align IF
12SK7GT RF grid	.1 mfd.	1620 kc.	HF end	C	Set limit of band
12SK7GT RF grid	.1 mfd.	1400 kc.	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	1400 kc.	A	Align antenna