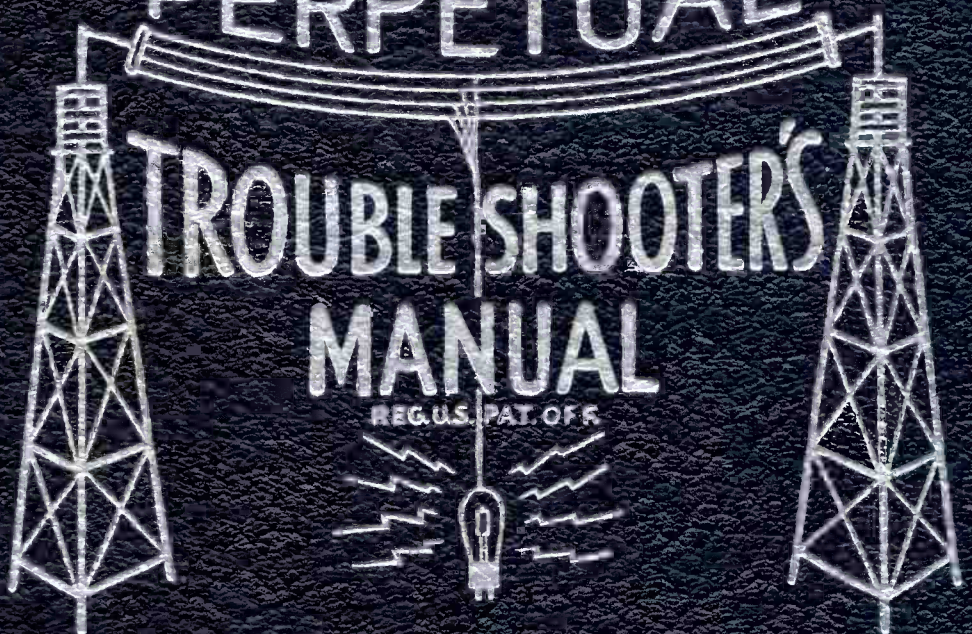
VOLUME XXI

PERPETUAL TROUBLE SHOOTER'S MANUAL

REG. U.S. PAT. OFF.



JOHN F. RIDER

PERPETUAL

TROUBLE SHOOTER'S MANUAL

Reg. U. S. Pat. Off.

VOLUME XXI

JOHN F. RIDER PUBLISHER, INC.

480 Canal Street New York 13, N. Y.

BOOKS BY RIDER

THE RADIO AMATEUR'S BEAM POINTER GUIDE
INSTALLATION AND SERVICING OF LOW POWER PUBLIC ADDRESS SYSTEMS
INSIDE THE VACUUM TUBE
SERVICING SUPERHETERODYNES
SERVICING RECEIVERS BY MEANS OF RESISTANCE MEASUREMENT

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PERPETUAL TROUBLE SHOOTER'S MANUALS
VOLUMES I to V ABRIDGED (ONE VOLUME)

VOLUME VI	VOLUME X	VOLUME XIV	VOLUME XVIII
VOLUME VII	VOLUME XI	VOLUME XV	VOLUME XIX
VOLUME VIII	VOLUME XII	VOLUME XVI	VOLUME XX
VOLUME IX	VOLUME XIII	VOLUME XVII	VOLUME XXI

MASTER INDEX — VOLS. I–XV

TELEVISION—HOW IT WORKS

*

RIDER TELEVISION MANUALS

VOLUME 1	VOLUME 3
VOLUME 2	VOLUME 4

VOLUME 5

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VOLUME I

*

ALIGNING PHILCO RECEIVERS, VOLUMES I AND II
AUTOMATIC FREQUENCY CONTROL SYSTEMS
SERVICING BY SIGNAL TRACING
THE OSCILLATOR AT WORK
THE METER AT WORK
VACUUM TUBE VOLTMETERS

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AN HOUR A DAY WITH RIDER
ON:
RESONANCE AND ALIGNMENT
AUTOMATIC VOLUME CONTROL
ALTERNATING CURRENTS IN RADIO RECEIVERS
D-C VOLTAGE DISTRIBUTION IN RADIO RECEIVERS

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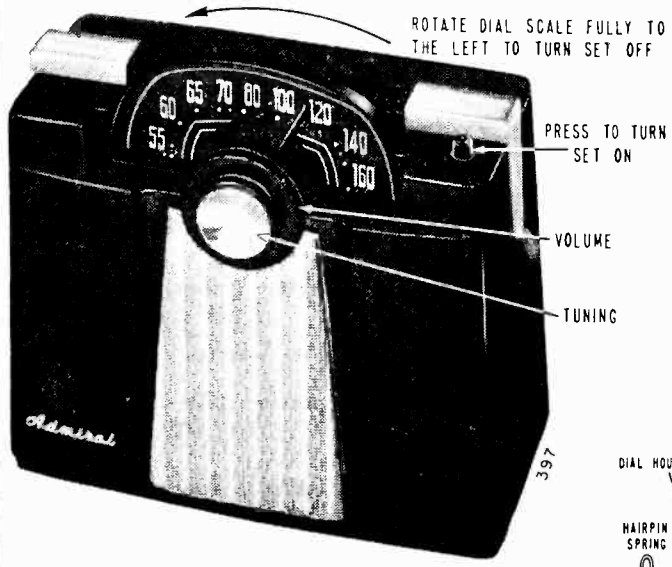
MODELS 4R11, 4R12,
Ch. 4R1



WEAK RECEPTION DUE TO SLIPPING VOLUME DRIVE CORD.

Weak reception can be caused by the slipping of the volume drive cord. If the set is still weak after the batteries and tubes have been checked, it is a good idea to check the volume drive for slipping. To make this check, first remove the "A" battery from the cabinet and connect outside of the set. Turn the set on and fully rotate the volume knob to the right (clockwise). Then reach into the cabinet and rotate the volume pulley on the volume control as far to the right (clockwise) as it will go. If the volume increases, it will be necessary to remove the chassis from the cabinet and check the stringing of the volume drive cord. See paragraph "Stringing Volume Control Drive".

"HIDE-A-WAY" DIAL

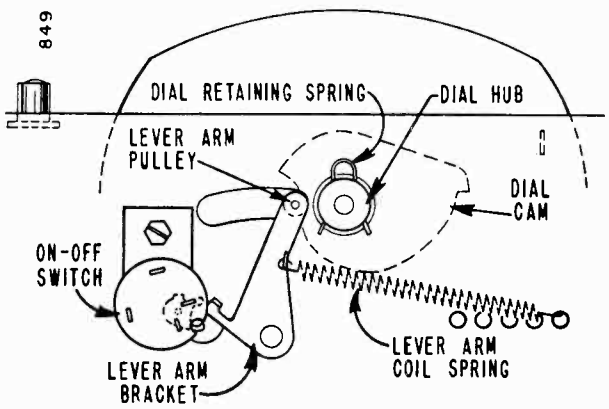
Illustrations below show front, rear and exploded views of dial mechanism. Follow the sequence shown in exploded view for disassembly or reassembly of the knobs, pointer or dial.

The "Hide-A-Way" dial mechanism is operated by the push button which works the trigger release bracket. The trigger bracket releases the dial assembly.

Thrust of the lever arm roller against the cam on back of the dial causes the dial to pop-up while a protruding edge on the lever arm simultaneously trips (turns on) the on-off switch.

Lever arm thrust is adjustable by attaching the far end of the lever arm spring to any of the holes spaced at different distances from the lever arm.

Rotating the dial fully to the left locks the dial into the cabinet and also trips (shuts-off) the on-off switch.



"Hide-A-Way" Dial, Rear View

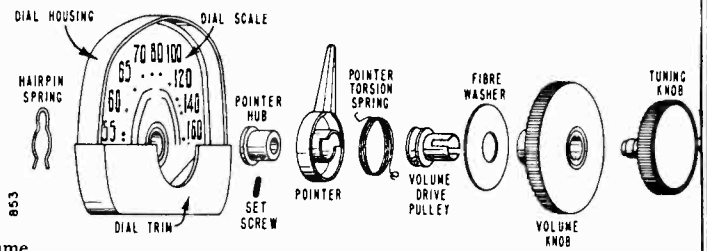
REMOVING AND INSTALLING CHASSIS

To remove the chassis from the cabinet, remove the tuning knobs, cabinet bottom (base) and metal speaker grille. The speaker grille is removed by pulling it down away from the cabinet.

Release the chassis by removing the two mounting screws located in the top inside of the cabinet just below the handle brackets.

Install the chassis in cabinet in the same manner, being sure that the 1 5/16" diameter fibre washer (sleeve retainer) is placed over the volume tuning sleeve just before sliding the chassis into the cabinet.

Also, before tightening the two chassis mounting screws adjust the chassis for even spacing between all sides of the dial and the cut-out in the cabinet, otherwise binding may result. In some early sets, the bottom of the dial can be leveled with the top surface of the cabinet (when dial is fully concealed) by adjusting the bracket adjustment screw called out in the front view illustration of the "Hide-A-Way" dial.

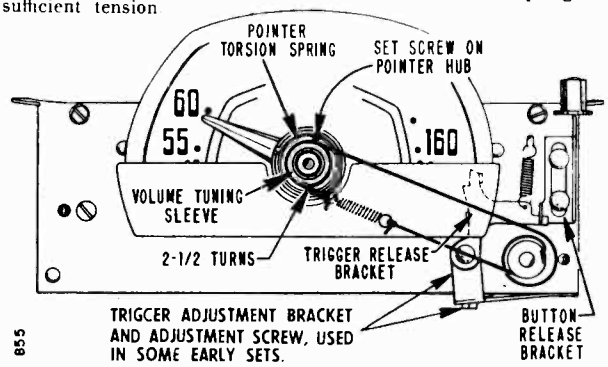


Dial and Tuning Knob Assembly, Exploded View

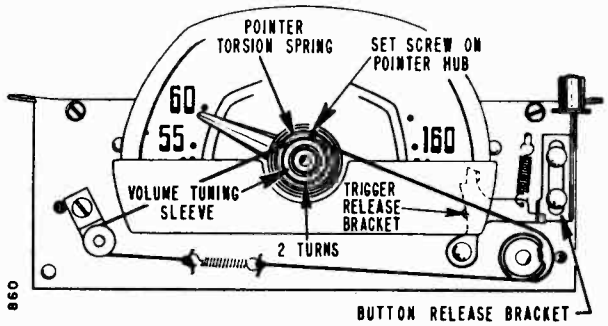
STRINGING VOLUME CONTROL DRIVE

Illustrations below show volume cord stringing used in early and in late production sets.

Before restringing the volume cord, rotate volume control fully clockwise and, using a #6 Allen wrench, tighten the set screw on the volume control pulley, first being sure the cut-out slots on the pulley are in the position shown in the illustration. Loop the cord in the cut-out slots, winding 1½ turns around the volume control pulley, and then winding 2 turns around the volume tuning sleeve. In late sets loop the cord around the fibre pulley to the left of the set. To prevent slipping, be sure that the volume control turns freely and that the dial cord tension spring has sufficient tension.



"Hide-A-Way" Dial, Front View (early set)



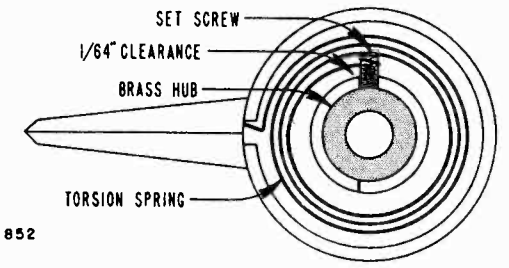
"Hide-A-Way" Dial, Front View (late set)

MODELS 4R11, 4R12, Ch. 4R1

DIAL POINTER

The illustration shows an exploded view of the dial assembly and the sequence in which the pointer hub and torsion spring are to be assembled. When assembling the pointer torsion spring to the pointer, insert the rectangular end into the base of the pointer; compress the spring from about one-half to one turn in a clock-wise direction. Insert the rounded or looped end of the spring over the top end of the pointer set screw. Allow about 1/64" clearance between the inner turn of the pointer spring and pointer hub, or the pointer may bind or stick.

To adjust pointer, fully close the gang condenser. Set the end of the pointer over the two dots below 55 on the dial and tighten the pointer screw with a #4 Allen wrench. Important: Allow approximately 1/32" clearance between the hub on the pointer and the dial scale.



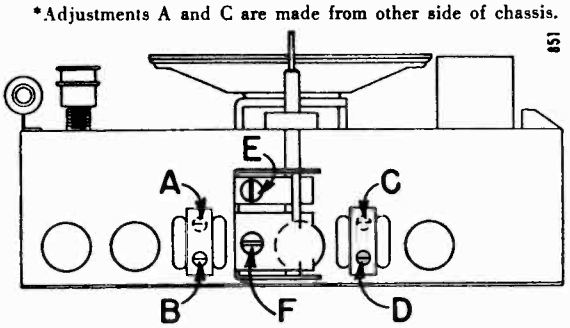
Dial Pointer and Hub Assembly

ALIGNMENT PROCEDURE

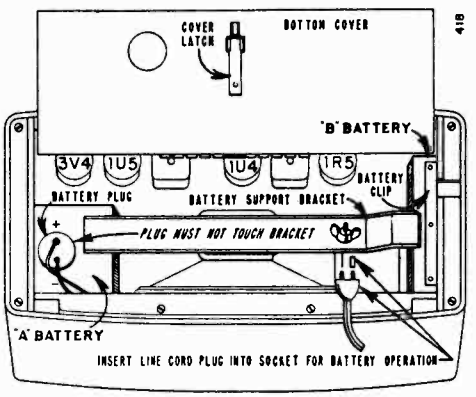
- Use battery power for alignment if fresh batteries are available.
- When using AC power, an isolation transformer should be used if available. If not using an isolating transformer, connect a .1 mfd. condenser in series with the signal generator low side to B minus (Pin 7 of 1U5 tube).
- Batteries should be held in chassis during alignment.
- Set volume control full on.
- Connect output meter across speaker voice coil.
- Use lowest setting of signal generator capable of producing adequate output meter indication and then proceed as outlined below.
- Use a non-metallic alignment tool for IF transformers.
- Repeat adjustments to insure good results.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	.001 mfd. when using A. C. .1 mfd. when using Battery	Tuning condenser, antenna stator	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	"	"	1620 KC	"	Oscillator (on gang)	E	"
	Install metal chassis cover.						
3	Loop of several turns of wire, or place generator lead close to receiver loop for adequate signal.	No physical connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	"

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



Trimmer Location, Underside of Chassis



Tube and Battery Location

REPLACEMENT OF BATTERIES

Use replacement "A" and "B" batteries of the following types:

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

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

Electrical characteristics of recommended batteries for these models provide for equal life for both the "A" and "B" batteries. "A" batteries may give satisfactory performance as low as 5.5 volts; "B" batteries as low as 49.5 volts. Replace batteries when reception is weak and voltage has dropped below values given above.

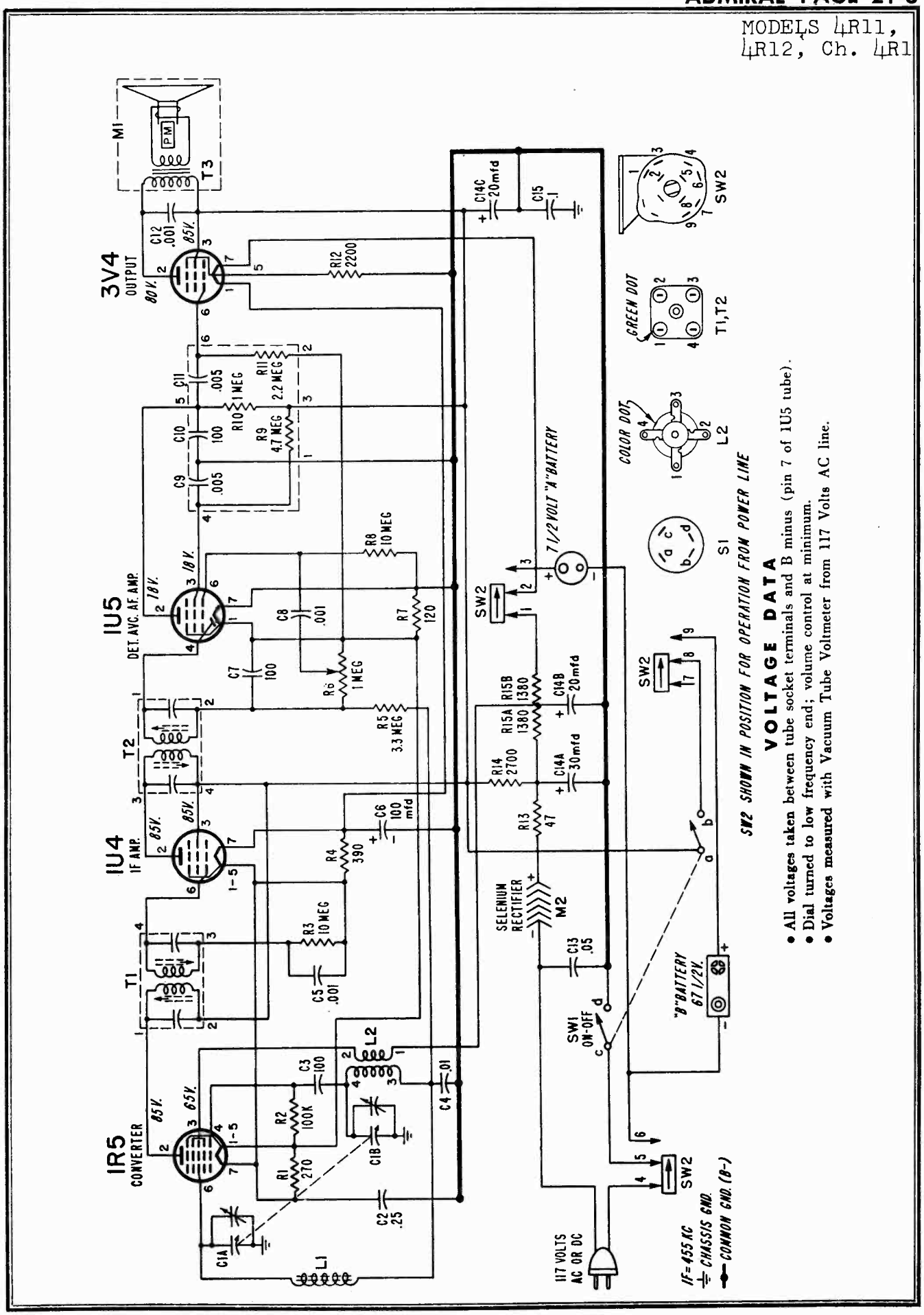
To install replacement batteries, slide the cover latch and open the hinged bottom cover. Then remove the wing nut which holds the battery support bracket in place.

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

REPLACING TUBES

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

MODELS 4R11, 4R12, Ch. 4R1



SW2 SHOWN IN POSITION FOR OPERATION FROM POWER LINE

VOLTAGE DATA

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

MODELS 4R11, 4R12, Ch. 4R1

RESISTORS

Symbol	Description	Part No.
R1	270 ohms, ½ watt (was 180 ohms in early sets)	60B 8-271
R2	100,000 ohms, ½ watt	60B 8-104
R3	10 Megohms, ½ watt	60B 8-106
R4	390 ohms, ½ watt	60B 8-391
R5	3.3 megohms, ½ watt	60B 8-335
R6	1 megohm, Vol. Control	75B 1-37
R7	120 ohms, ½ watt	60B 8-121
R8	10 megohms, ½ watt	60B 8-106
*R9	4.7 megohms, ½ watt	
*R10	1 megohm, ½ watt	
*R11	2.2 megohms, ½ watt	
R12	2,200 ohms, ½ watt	60B 8-222
R13	47 ohms, 1 watt	60B 14-470
R14	2,700 ohm, 1 watt	60B 14-272
R15A R15B	1380 ohms 1380 ohms } Tapped Candohm	61A 5-7

CONDENSERS

C1A C1B	272.3 mmfd. max., Ant. 107.2 mmfd. max., Osc. } Gang	68B 34
C2	.25 mfd, 200 volts, paper	64B 1-28
C3	100 mmfd. ceramic	65B 6-3
C4	.01 mfd, 400 volts, paper	64B 1-25
C5	.001 mfd, min. ceramic	65B 6-41
C6	100 mfd, 25 volts, Electrolytic	67A 4-6
C7	100 mmfd, ceramic	65B 6-3
C8	.001 mfd, min. ceramic	65B 6-41
*C9	.005 mfd, min. ceramic	
*C10	100 mmfd, ceramic	
*C11	.005 mfd, ceramic	

*Part of couplate (part #63A4-3). Replace with exact duplicate or individual components. Note that numbers 1, 2, 3, 4, 5, 6, on schematic correspond to lead numbers printed on face of couplate.

C12	.001 mfd, min. ceramic	65B 6-41
C13	.05 mfd, 400 volts, paper	64B 8-28
C14A C14B C14C	30 mfd, 150 volts 20 mfd, 150 volts 20 mfd, 150 volts } Electrolytic	67C 7-41
C15	.1 mfd, 200 volts, paper	64B 1-30

COILS, TRANSFORMERS, ETC.

L1	Antenna, Rod (Ferro-Scope)	69C 120
L2	Coil, Oscillator	69A 39-4
T1	Transformer, 1st IF	72B 28- 1
T2	Transformer, 2nd IF	72B 28-61
T3	Transformer, Output	98A 21
M1	Speaker (3½" PM) and Output Trans.	78B 58-1
M2	Rectifier, Selenium	93A 1-6
SW1	Switch, On-Off, DPST, (less bracket)	77A 23
SW2	Switch, Power Change	77A 19-1
	*Couplate (includes R9, R10, R11, C9, C10, C11)	63A 4-3

PARTS FOR "HIDE-A-WAY" DIAL

Description	Part No.
Dial Cord (for volume control)	50A 1-3
Dial Scale	
Ebony for 4R11	22C 25-4
Maroon for 4R12	22C 25-1
Housing Assembly, Metal (for dial scale, includes hub and cam)	
Ebony for 4R11	A3264
Maroon for 4R12	A3256
Hub, Brass (for dial pointer)	27A 151
Pointer, Dial	25A 40
Pulley, Brass (volume tuning sleeve)	27A 149
Screw (#6x5/6 S.T.B.H.—for mtg. dial trim)	1A 71-9-71
Screw, Set (#4-40x5/16—for dial pointer hub)	1A 43-4
Spring, Hairpin (for mtg. dial ass'bly)	19A 2-6
Spring, Pointer Torsion	19A 63
Trim, Plastic (front bottom of dial housing)	
Ebony for 4R11	33B 60-1
Maroon for 4R12	33B 60-2

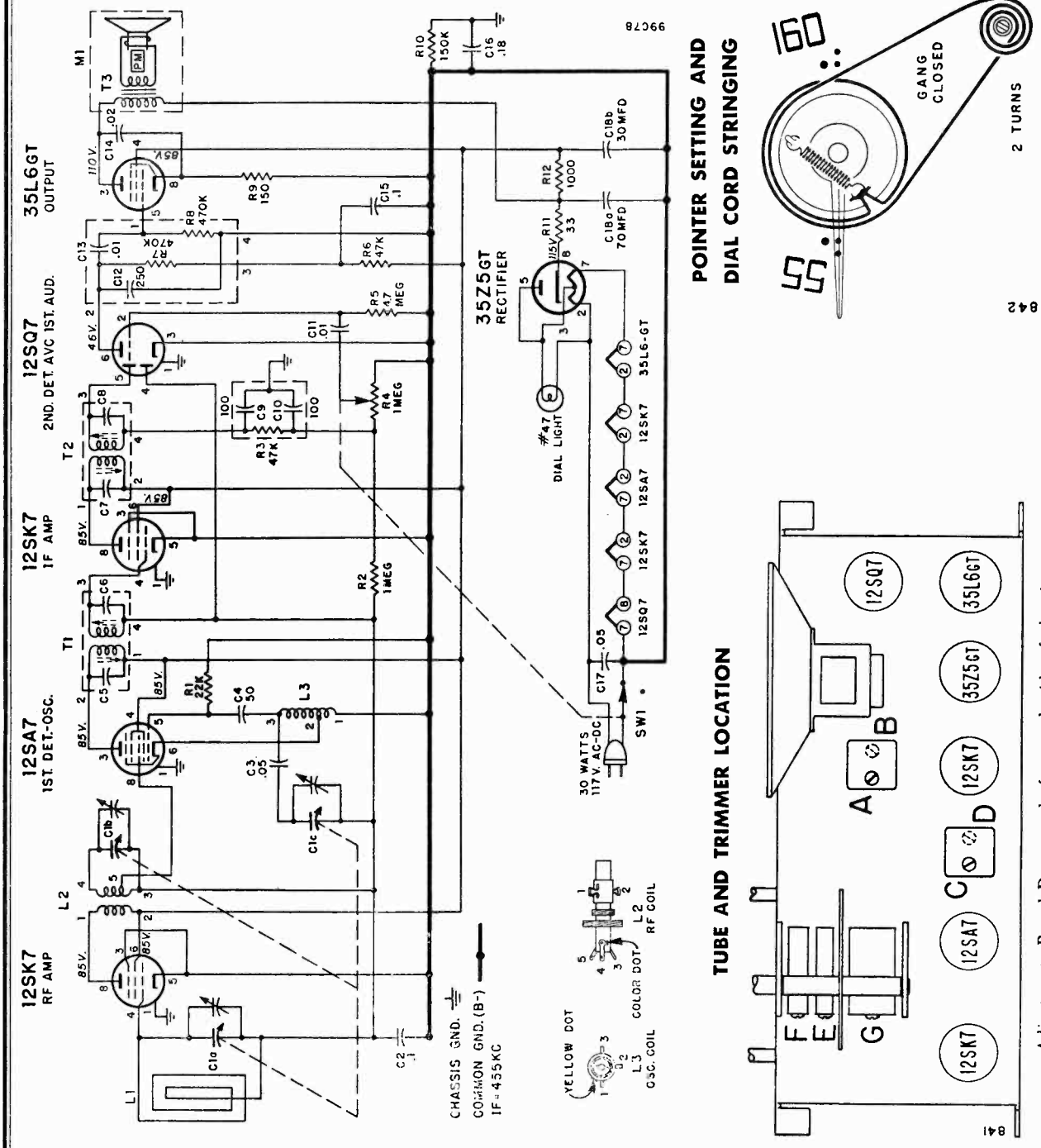
CABINET PARTS

Description	Part No.
Bottom, Cabinet (Base)	
Ebony for 4R11	
complete with metal door	A3270
plastic frame only	34D 35-2
Maroon for 4R12	
complete with metal door	A3260
plastic frame only	34D 35-1
Bracket, Handle Support (metal ends)	20B 14
Button, Push	
Ebony for 4R11	33A 61-1
Maroon for 4R12	33A 61-2
Cabinet (less bottom)	
Ebony for 4R11	A3271
Maroon for 4R12	A3273
Catch, Slide (for bottom door)	15A 291
Grille, Speaker (metal)	
Ebony for 4R11	36B 14-1
Gold for 4R12	36B 14
Handle, Carrying (plastic covering only)	
Ebony for 4R11	33A 58-1
Maroon for 4R12	33A 58-2
Hinge, Bottom Cover	37A 33
Knob	
Volume, Ebony	33C 56-2
Volume, Maroon	33C 56-4
Tuning, Ebony (includes compression ring)	A3272
Tuning, Maroon (includes compression ring)	A3274
Monogram ("Admiral")	26A 36
Ring, Compression (for tuning knob)	18A 5-5
Rivet, Shoulder	
with 5/64 shoulder	6A 4-2-2
with 7/64 shoulder	6A 4-12-71
with 15/64 shoulder	6A 4-11-2
with 3/32 shoulder	6A 4-7-71
Washer, Felt (for volume knob)	5A 4-17
Washer, Fibre (1 5/16" ODx 7/16" ID; for retaining volume pulley)	5A 1-17
Rubber Strap (for carrying handle)	12A 38
Screw	
#4x5/8 self tapping; for mtg. plastic base to cabinet	1A 69-6-71
#8-32x7/16; for mtg. handle and chassis	280-437-C2-71
Slide Arm (for bottom door)	15A 291
Spacer, Brass (for mtg. carrying handle)	29A 1-54
Spring, Support (for carrying handle)	18A 42

MISCELLANEOUS PARTS

Description	Part No.
Baffle, Speaker	43A 111
Bracket	
on-off switch mounting	15A 602
battery support	15A 603
button release	15A 599
trigger release and adjustment bracket assembly (used in early sets only)	A3253
trigger release bracket only	15A 600
volume pulley and bracket assy. (used in late sets only)	A3316
shield for gang	15A 618
cover for AC switch	15A 595
lever arm assembly	A3254
Carton and Fillers	44B 165
Clip, IF Transformer mounting	72B 28-10
Clip "B" Battery Connector	90A 5-3
Cover, Metal	
for chassis	14C 70
for AC switch	15A 595
Dial Cord (24" length needed)	50A 1-3
Insulator, Fibre (for mtg. rectifier)	32A 137
Manual	
Customers Instruction	41A 18-16
Service Manual	S322
Nut, Wing (#6/32 for battery support bracket)	2A 5-4-71
Plate, Electrolytic Mounting	67A 2-1
Plug, "A" Battery Connector	88A 4-6
Pulley, Brass	
mounts on volume control shaft	27A 150
drive for volume control cord	27A 149
riveted to lever arm	27A 146
Screw, Set	
for volume control pulley (#6-32x3/16)	1A 43-8
for pointer hub (#4-40x5/16)	1A 43-4
Snap Button (for mtg. AC switch cover)	13A 1-1-71
Socket, Tube	87A 3-4
Speed Nut, #5/32 (for trigger adjustment bracket)	2B 10-12
Spring, Coil	
for dial release bracket (½"x3/16" dia.)	19B 1-18
for lever arm (1¾" long)	19A 64
for dial cord (volume control) (7/16"x⅛" dia.)	19B 1-16
Spring, Hairpin (for retaining dial housing)	19A 2-6
Washer, Spring (5/16"ODx3/16"ID)	4A 6-13

MODELS 6A21, 6A22, 6A23, Ch. 6A2



POINTER SETTING AND DIAL CORD STRINGING

With gang fully closed, set pointer in horizontal position.

TUBE AND TRIMMER LOCATION

Adjustments B and D are made from underside of chassis.

MODELS 6A21, 6A22, 6A23, Ch. 6A2

ALIGNMENT PROCEDURE

- Turn receiver volume control full on.
- Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator, and connect to B minus (terminal of On-Off switch).

  Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output setting of signal generator capable of producing adequate output meter indication and then proceed as outlined in chart below.
- Repeat adjustments to insure good results.
- Use a non-metallic alignment tool for IF transformers.

Step	Dummy Anntenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Pin 8 of 12SA7 tube	455 KC	Gang fully open	2nd IF 1st IF	A, *B C, *D	Maximum Output
2	250 mmfd. condenser	Tuning condenser Antenna stator	1620 KC	"	Oscillator (on gang)	E	"
3	Loop of several turns of wire (or place generator lead close to receiver loop for adequate signal)	No physical connection (signal by radiation)	1400 KC	Tune in Generator signal	RF (on gang)	F	"
4	"	"	"	"	Antenna (on gang)	G	"

*Adjustments B and D are made from underside of chassis.

VOLTAGE DATA

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

RESISTORS

Symbol	Description	Part No.
R1	22,000 Ohms, ½ Watt	60B 8-223
R2	1 Megohm, ½ Watt	60B 8-105
††R3	47,000 Ohms, ½ Watt	
R4	1 Megohm Volume Control and On-Off switch SW1	75B 1-36
R5	4.7 Megohms, ½ Watt	60B 8-475
R6	47,000 Ohms, ½ Watt	60B 8-473
†R7	470,000 Ohms, ½ Watt	
†R8	470,000 Ohms, ½ Watt	
R9	150 Ohms, ½ Watt	60B 8-151
R10	150,000 Ohms, ½ Watt	60B 8-154
R11	33 Ohms, 1 Watt	60B 28-3
R12	1,000 Ohms, 1 Watt	60B 28-2

CONDENSERS

Symbol	Description	Part No.
C1a	420 mmfd. (max) Ant.	
C1b	193.8 mmfd. (max) RF } Gang	68B 33-2
C1c	90 mmfd. (max) Osc.	
	(Dial drum spot welded to gang)	
C2	.1 mfd., 200 Volts, Paper	64B 1-30
C3	.05 mfd., 400 Volts, Paper	64B 1-22
C4	50 mmfd., Mica	65B 6-4
C5	86 mmfd., part of T1	
C6	107 mmfd., part of T1	
C7	86 mmfd., part of T2	
C8	107 mmfd., part of T2	
††C9	100 mmfd., Ceramic	
††C10	100 mmfd., Ceramic	
C11	.01 mfd., 400 Volts, Paper	64B 1-25
†C12	250 mmfd., Ceramic	
†C13	.01 mfd., Ceramic	
C14	.02 mfd., 400 Volts, Paper	64B 1-24
C15	.1 mfd., 200 Volts, Paper	64B 1-30
C16	.18 mfd., 200 Volts, Paper	64A 2-2
C17	.05 mfd., 400 Volts, Paper	64B 1-22
C18a	70 mfd., 150 Volts } Elect	67A 17
C18b	30 mfd., 150 Volts }	

COILS, TRANSFORMERS, Etc.

Symbol	Description	Part No.
L1	Antenna, Loop (mounted on cardboard back)	69C 19-1
L2	Coil, RF	69A 115-1
L3	Coil, Oscillator	69A 52-2
T1	Transformer, 1st I.F.	72B 28-7
T2	Transformer, 2nd I.F.	72B 28-7
T3	Transformer, Output	98A 4
M1	Speaker (5" PM) and Output Transformer	78B 57-2
SW1	Switch, On-Off	Part of R4
	†Couplate (Includes R7, R8, C12, C13,	63A 5-1
	††Diode Filter (Includes R3, C9, C10)	63A 3-1

CABINET PARTS

Description	Part No.
Back Assembly (includes L1 loop antenna)	69C 19-1
Cabinet, Plastic	
Ebony (6A21)	34D 25-1
Mahogany (6A22)	34D 25-2
Ivory (6A23)	34D 25-3
Clip, Tinnerman (for mtg. escutcheon)	2B 10-6-69
Escutcheon, Dial, (Plastic)	23D 46-3
Knob, Tuning	
Ebony (6A21)	33A 21-11
Mahogany (6A22)	33A 21-12
Ivory (6A23)	33A 21-13
Shield, Fibre (for pilot light)	32A 138
Washer, Felt (for tuning knobs)	5A 4-4

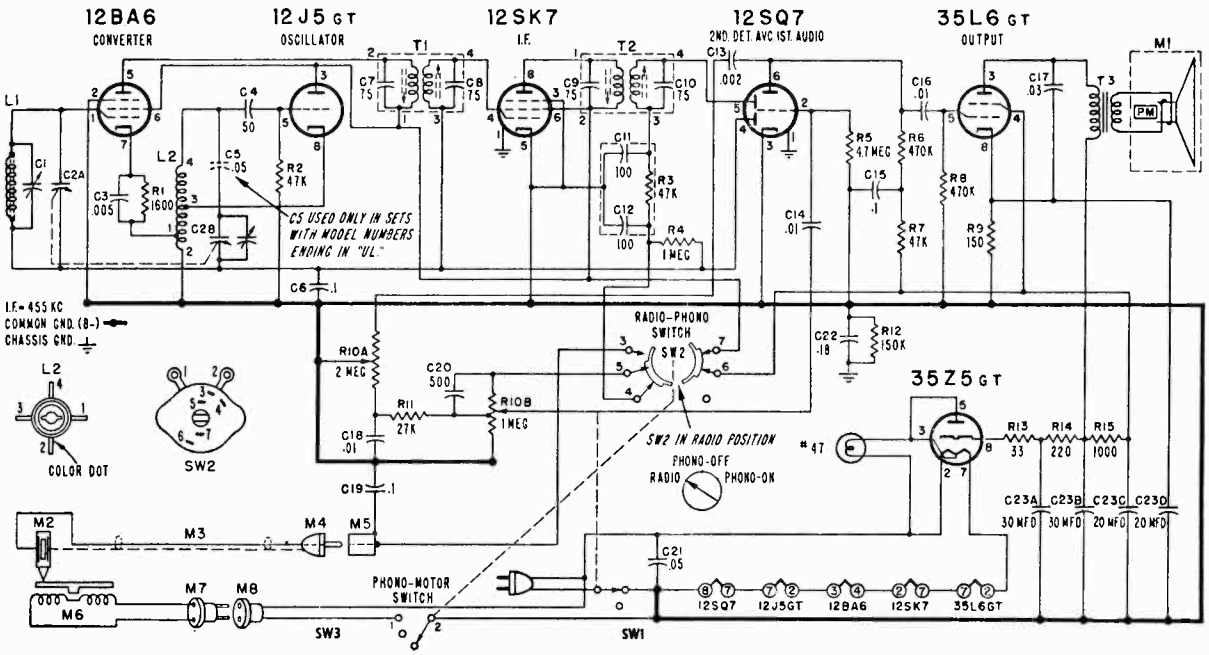
MISCELLANEOUS

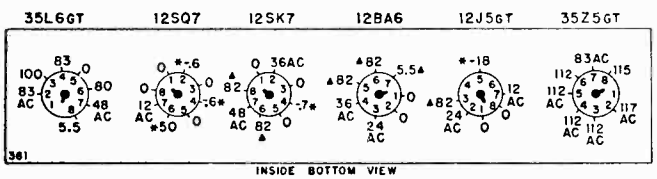
Description	Part No.
Baffle, Speaker	43B 74
Carton and Fillers	44B 150
Clip, IF Transformer Mounting	72B 28-10
Dial Background	22B 24
Dial Cord	50A 1-3
Fastener (for mtg. speaker baffle)	8A 8-4
Grommet, Rubber (for mtg. gang)	12A 1-2
Pilot Light #47	81A 1-8
Pointer, Dial	25A 39
Ring, Pointer Compression	19A 31-1
Service Manual	S320
Shaft, Tuning	28A 11-3
Snap Button, Dial Background Mtg.	13A 1-3-47
Socket, Pilot Light	82A 3-4
Socket, Tube	87A 10-2
Spacer, Metal "T" (for mtg. gang)	29A 2-1-71
Spacer, Speaker Mounting	29A 1-17
Sponge Rubber, (for dial background)	12A 5-17
Spring, Dial Cord Tension	19B 1-2
Washer, "C" (tuning shaft)	4A 4-5
Washer, Spring (tuning shaft)	4A 6-3-0

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

††Part of diode filter (part 63A 3-1). Replace with exact duplicate or individual components.

MODELS 6S11, 6S12, Ch. 6S1





VOLTAGE DATA

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

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

RESISTORS

Symbol	Description	Part No.
R1	1,600 Ohms, ½ Watt, 5%	60B 7-162
R2	47,000 Ohms, ½ Watt	60B 8-473
†R3	47,000 Ohms, ¼ Watt	
R4	1 Megohm, ½ Watt	60B 8-105
R5	4.7 Megohms, ½ Watt	60B 8-475
R6	470,000 Ohms, ½ Watt	60B 8-474
R7	47,000 Ohms, ½ Watt	60B 8-473
R8	470,000 Ohms, ½ Watt	60B 8-474
R9	150 Ohms, 1 Watt	60B 14-151
R10A	2 Megohms, Tone	75B 11-8
R10B	1 Megohm, Volume	
R11	27,000 Ohms, ½ Watt	60B 8-273
R12	150,000 Ohms, ½ Watt	60B 8-154
R13	33 Ohms, 1 Watt	60B 28-3
R14	220 Ohms, 1 Watt	60B 28-7
R15	1,000 Ohms, 1 Watt	60B 28-2

CONDENSERS

Symbol	Description	Part No.
C1	Trimmer, 3 to 30 mmfd.	Part of L1
C2a	Gang-0 to 420 mmfd.	68B 30
C2b	Gang-0 to 108 mmfd.	
	Note—Dial drum spot welded to Gang.	
C3	.005 mfd., min., Ceramic	65A 10-1
C4	50 mmfd., Ceramic	65B 6-4
C5	.05 mfd., 400 Volts, Paper	64B 1-22
C6	.1 mfd., 200 volts, Paper	64B 1-30
C7	75 mmfd., 3%, Ceramic	Part of T1
C8	75 mmfd., 3%, Ceramic	Part of T1
C9	75 mmfd., 3%, Ceramic	Part of T2
C10	75 mmfd., 3%, Ceramic	Part of T2
†C11	100 mmfd., Ceramic	
†C12	100 mmfd., Ceramic	
C13	.002 mfd., 600 Volts, Paper	64B 1-14
C14	.01 mfd., 400 Volts, Paper	64B 1-25
C15	.1 mfd., 200 Volts, Paper	64B 1-30
C16	.01 mfd., 400 Volts, Paper	64B 1-25
C17	.03 mfd., 400 Volts, Paper	64B 1-23
C18	.01 mfd., 400 Volts, Paper	64B 1-25
C19	.1 mfd., 200 Volts, Paper	64B 1-30
C20	500 mmfd., Ceramic	65B 6-6
C21	.05 mfd., 400 Volts, Paper	64B 1-22
C22	.18 mfd., 200 Volts, Paper	64A 2-2
C23a	30 mfd., 150 Volts	
C23b	30 mfd., 150 Volts	
C23c	20 mfd., 150 Volts	Elect. 67A 14-1
C23d	20 mfd., 25 Volts	

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Antenna and Trimmer	69C 118
L2	Coil, Oscillator	69A 113-1
T1	Transformer, 1st IF	72B 50
T2	Transformer, 2nd IF	72B 51
T3	Transformer, Output	79A 11-4
M1	Speaker (5" pm)	78B 39-1
M5	Socket, Phono input	88A 1
M8	Socket & Leads, Motor	89A 6-3
SW1	Switch, On-Off	Part of R10
SW2	Switch, Radio-Phono	77A 28-1
SW3	Switch, Phono Motor	Part of SW2
	†Diode Filter	63A 3-1

MISCELLANEOUS

Carton and Fillers	44B 145
Clip, Electrolytic Mounting	18A 10-6
Cover, Plastic Shaft	45C 11-3
Dial Cord	50A 1-3
Drum, Pointer	17A 27
Gasket, Sponge Rubber (mounts on Speaker)	12A 5-16
Grommet, Rubber (Gang mtg.)	12A 1-2
Insulator, Phono Receptacle	32A 46
Manual	
Customer Instruction	41A 17-45
Service, for 6S1 Chassis	S299
Service, for RC500 Changer	S298
Pilot Light, #47	81A1-8
Pilot Light Socket and Leads	82A2-2
Plate, Pointer Support	15A 498
Pointer, Dial	25A 35-1
Shaft, Pointer	28A 42
Shield, Pilot Light	82A 15-1
Sleeve, Pointer Shaft	27A 124
Sleeve, Tuning (Brass)	27A 123
Spacer, "T" (Gang condenser mtg.)	29A 2-1-71
Spring, Dial Cord Tension	19B 1-5
Socket, Tube (12BA6)	87A 32
Washer, "C" (for pointer drum)	4A 4-6
Washer, Spring	4A 6-10-0

CABINET PARTS

Cabinet, Plastic	
Bottom, less lid (Ebony 6S11)	34D 28-3
Bottom, less lid (Mahogany 6S12)	34D 28-5
Lid only (Ebony 6S11)	34D 28-4
Lid only (Mahogany 6S12)	34D 28-6
Clamp, Cable	11A2-2
Escutcheon, Dial	23C 51-1
Escutcheon Ring (Gold trim)	23A 53
Hinge	37A 8-1

Description	Part No.
Hinge Screw (6/32x¼ BH MS)	365-250-C2-58
Hinge Stud	27A 17-1
Jewel, Pilot Light	82A 14-1
Knobs, Radio, for Ebony 6S11	
"Tuning" (outer knob)	33C 55-11
"Radio-Phono" (inner knob)	33C 55-12
"Off-On Volume" (inner knob)	33C 55-14
"Tone" (outer knob)	33C 55-13
Knobs, Radio, for Mahogany 6S12	
Two types of knobs were used. Early 6S12 sets used dual knobs having an inner knob with a recessed bar. Later 6S12 sets used dual knobs having an inner knob with a raised bar.	
"Tuning"	33C 48-26
"Radio-Phono"	33C 48-23
"Off-On Volume"	33C 48-24
"Tone"	33C 48-25
(Early sets)	
"Tuning"	33C 55-7
"Radio-Phono"	33C 55-8
"Off-On Volume"	33C 55-10
"Tone"	33C 55-9
(Late sets)	
Rubber Bumper for cabinet bottom	12A 3-4
for cabinet top	12A 9-8
Speed Nut (for mtg. pilot light jewel)	2B 10-28-59
Spring, Escutcheon Mtg. (2 reg.)	19A 60
Stay Arm and Plate	37A 9-1
Washer, Felt (for tuning knobs)	5A 4-9

PHONOGRAPH PARTS

M2	Cartridge, Pickup (includes needle)	409A 13
M3	Cable, Shielded Pickup (includes plug)	412A 11-2
M4	Plug, Pickup Cable	88A 2-3
M6	Motor, Phono (3 speed)	407B 19
M7	Plug, Motor (Male)	88A 8-1
	Adapter, 45 RPM (envelope of 12)	48A 8-1
	Button, Snap-in Plug	13A 2-8-57
	Centerpost, Record	G400B 505
	Idler Wheel (includes tire)	G400A 279
	Needle, Pickup for 409A13 cartridge	98A 15-19
	for 409A13-1 cartridge	98A 15-18
	Needle Retaining Nut (for 409A13 cartridge).	98A 54-2
	Service Manual, RC500	S298
	Screw and Washer Changer Mounting (10-32x1¼ RHMS)	AA210
	Spring, Changer Float	19A 10-3

† Part of Diode Filter 63A3-1. This unit, consisting of C11, C12 and R3 may be replaced with individual components.

MODELS 6S11, 6S12, Ch. 6S1

ALIGNMENT PROCEDURE

- Turn receiver volume and tone controls full on.
- Antenna must be connected and placed in the same relative position to the chassis as when in cabinet.
- Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and attach to B minus of chassis (terminal of On-Off Switch). Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output setting of signal generator capable of producing adequate output meter indication and proceed in the following sequence.
- Repeat adjustments to insure good results.
- Use a non-metallic alignment tool for IF transformers.

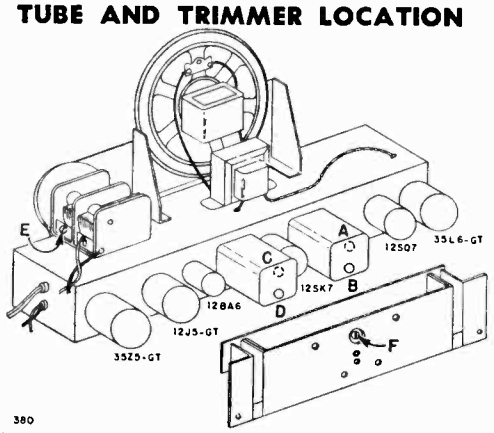
Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Tuning condenser, antenna stator	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C,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

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

3	Loop of several turns of wire, or place generator lead close to receiver antenna for adequate signal.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	†F	Maximum output

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

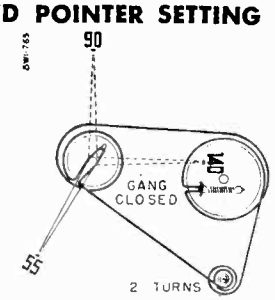
TUBE AND TRIMMER LOCATION



Adjustments A and C made from underside of chassis.

DIAL STRINGING AND POINTER SETTING

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

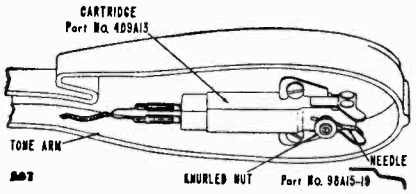


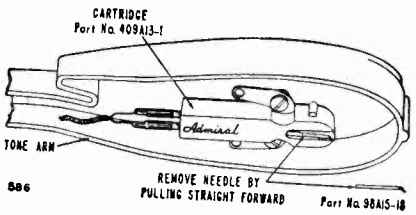
RECORD CHANGER SERVICE DATA

The changer model number will be found stamped at the top rear of the changer base. Complete service information and parts list for the RC500 record changer is contained in Record Changer Service Manual (form number S298).

Cartridge and Needle

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





RECORD CHANGER: Model RC500, see page RCD.CH.21-1.

MODELS AR-250MU, AR-251BU, AR-252MU, AR-253BU, AR-254MU, AR-255BU

Models AR250MU, AR252MU, AR254MU
(Mahogany)

Models AR251BU, AR253BU, AR255BU
(Blond)

DESCRIPTION

TYPE: Eight-tube, two-band, superheterodyne.

FREQUENCY RANGE: Standard Broadcast Band; 540 to 1620 kc. (Selector Switch at middle position).

Frequency Modulation Band; 88 to 108 megacycles (Selector Switch to right).

INTERMEDIATE FREQUENCY: Standard Broadcast Band; 455 kc.

Frequency Modulation Band; 10.7 mc.

FM ANTENNA INPUT IMPEDANCE: 75 ohms balanced.

POWER SUPPLY: a. c. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 60 watts at 117 volt power supply; 20 watts additional for record changer.

POWER OUTPUT: 3.2 watts maximum.

TUBE COMPLEMENT:

Type	Function
6BA6	R. F. Amplifier (AM & FM)
12AT7	Oscillator & Mixer (FM)
6BA6	I. F. Amplifier (AM & FM)
6BA6	2nd I. F. Amplifier (FM)
6T8	Ratio Detector (FM) Diode Det. & AVC (AM) Audio Amp. (AM & FM)
6BE6	Converter (AM)
7A5	Audio Output
5Y3GT	Rectifier

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

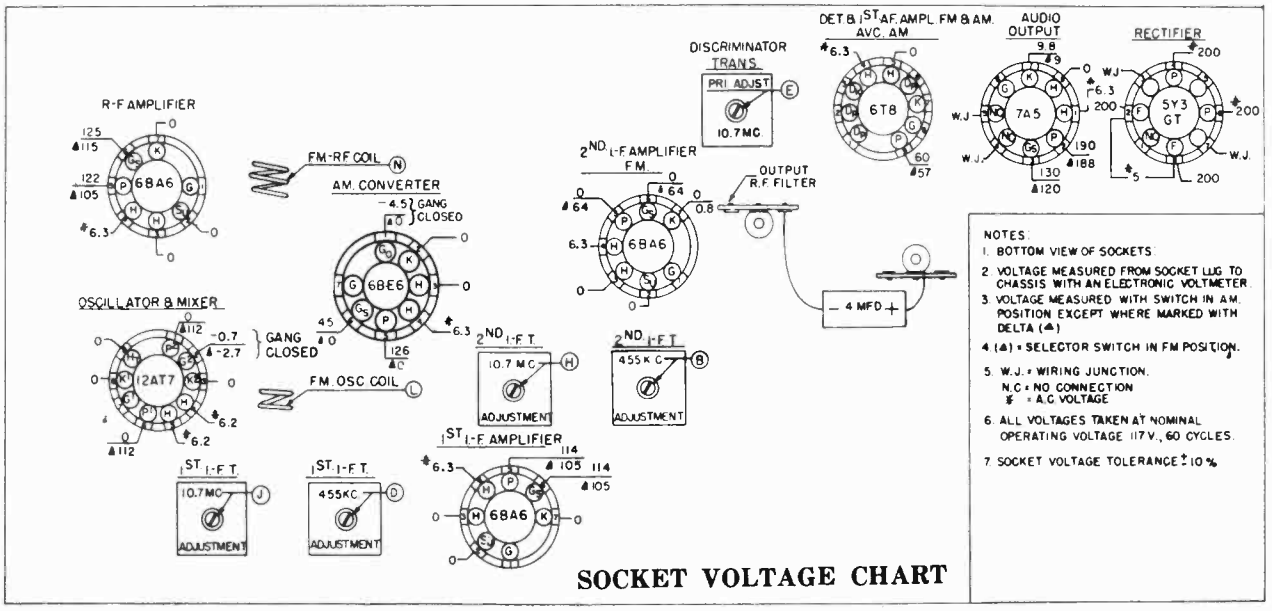
ALIGNMENT PROCEDURE

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

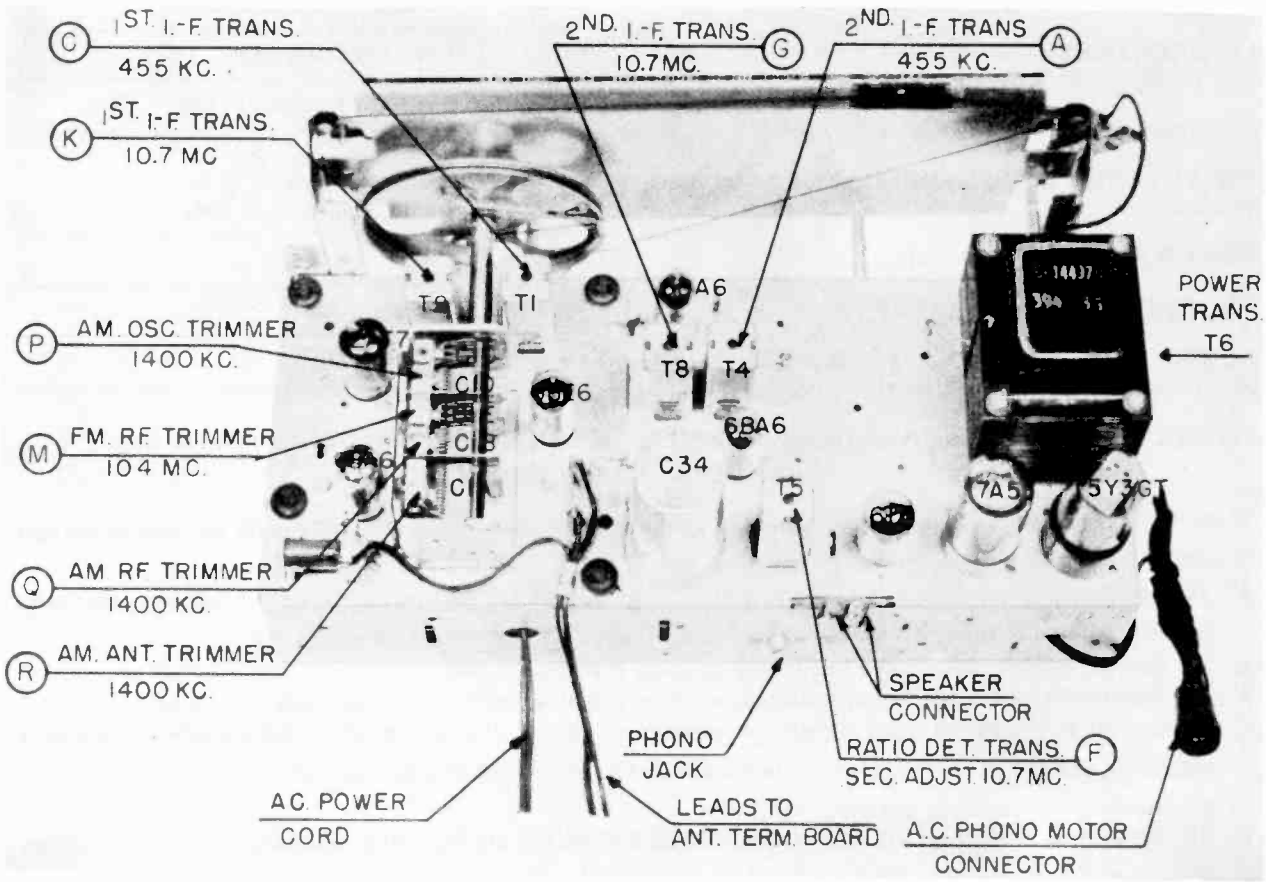
1. Turn the tuning condenser to full mesh, against stop, and set the dial pointer to line up with the right hand vertical portion of the "M" in "AM" and "FM", located to the left of 55 on the dial.
2. Set the tone control knob to the full treble position (extreme right).
3. For Amplitude Modulated signal readings, connect output meter across voice coil (3.2 ohms).
4. All Amplitude Modulated input signals are modulated 30% at 400 cycles with the High side of the signal generator connected to receiver as indicated in the alignment chart. Connect the low side of signal generator to the receiver chassis.
5. All Frequence Modulated signals are modulated 30% at 400 cycles. 30% modulation is equal to a deviation of 22.5 kilocycles. Connect the Frequence Modulated signal generator as indicated in the alignment chart.

MODELS AR-250MU, AR-251BU,
AR-252MU, AR-253BU,
AR-254MU, AR-255BU

6. Turn the volume control to maximum clockwise position and adjust signal generator output to produce a noticeable output meter reading. Keep signal generator output as low as possible to prevent AVC action in the receiver.
7. For F. M. alignment, the loop antenna must remain connected, or a suitable dummy antenna must be connected in its place (See F.M. Dummy Antenna diagram).



SOCKET VOLTAGE CHART

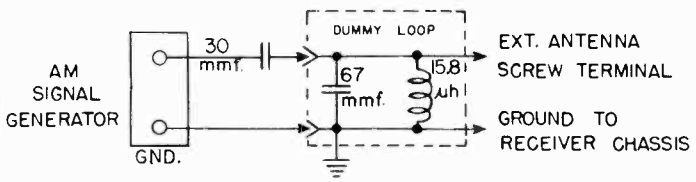


CHASSIS TOP VIEW SHOWING ALIGNMENT ADJUSTMENTS

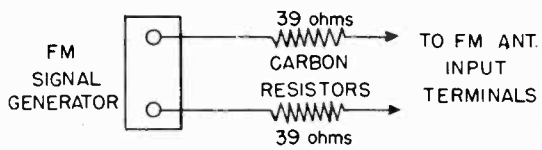
MODELS AR-250MU, AR-251BU,
AR-252MU, AR-253BU,
AR-254MU, AR-255BU

ALIGNMENT CHART

Alignment Sequence	Signal Generator Output			Position of		Adjust	Type of Selectivity Curve	Remarks
	Frequency	In Series With	To	Range Sw.	Tuning Dial or Tun. Cap.			
1	455 kc.	.01 mfd.	Stator plates of C1B	AM	Open	A & B	Single Peak	
2	455 kc.	.01 mfd.	Stator plates of C1B	AM	Open	C & D	Single Peak	
3	10.7 mc.	.01 mfd.	2nd I-F Grid pin 1 V4	FM	Open	E		See note 1
4	10.7 mc.	.01 mfd.	2nd I-F Grid pin 1 V4	FM	Open	F		See note 2
5	Repeat steps 3 and 4							Remove the two 100K ohm resistors after alighment.
6	10.7 mc.	.01 mfd.	1st I-F Grid pin 1 V3	FM	Open	G & H retouch E		See note 3
7	10.7 mc.	.01 mfd.	Stator plates of C1E	FM	Open	J & K		See note 4
8	Readjust G & H and J & K for maximum gain							See note 4
9	98 mc.	F.M. Dummy Ant.	Dipole Ant. Terminals	FM	98 mc.	L		See note 5
10	104 mc.	F.M. Dummy Ant.	Dipole Ant. Terminals	FM	104 mc.	M		See note 6
11	92 mc.	F.M. Dummy Ant.	Dipole Ant. Terminals	FM	92 mc.	N		See note 7
12	Repeat steps 10 and 11 until no further improvement in sensitivity is noted.							
13	1400 kc.	30 mmf.	Ext. Ant. Term. or A.M. Dummy Ant.	AM	1400 kc.	P		See note 8
14	1400 kc.	30 mmf.	Ext. Ant. Term. or A.M. Dummy Ant.	AM	1400 kc.	Q & R		See note 8



A. M. DUMMY ANTENNA



F. M. DUMMY ANTENNA

MODELS AR-250MU, AR-251BU,
AR-252MU, AR-253BU,
AR-254MU, AR-255BU

ALIGNMENT NOTES

1. Connect two 100,000 ohm, 5%, carbon resistors (part no. 39375-97) in series, from pin 2 of V5 to ground. Then, connect an electronic voltmeter (negative polarity) across these resistors. Adjust "E" of T5 for maximum meter reading.

2. With the two 100,000 ohm resistors still connected as explained in note 1, connect the electronic voltmeter from the center junction of the resistors to the junction of R26 and R29. Adjust "F" of T5 for zero volts, first using a high scale on the voltmeter and then the lowest scale to obtain close balance.

3. Connect the electronic voltmeter from pin 2 of V5 to ground. Then adjust "G" and "H" of T3 for maximum meter reading. Retouch "E" of T5 for maximum meter reading.

4. With the voltmeter connected as for note 3, adjust "J" and "K" of T1 for maximum meter reading.

5. Adjust turns on F.M. oscillator coil by spreading apart or squeezing together, as required to make the 98 megacycle signal fall on 98 megacycles on the dial. See F.M. Dummy Antenna diagram.

6. Rotate variable capacitor rotor plates slightly back and forth while adjusting "M" to obtain maximum meter reading. See F.M. Dummy Antenna diagram.

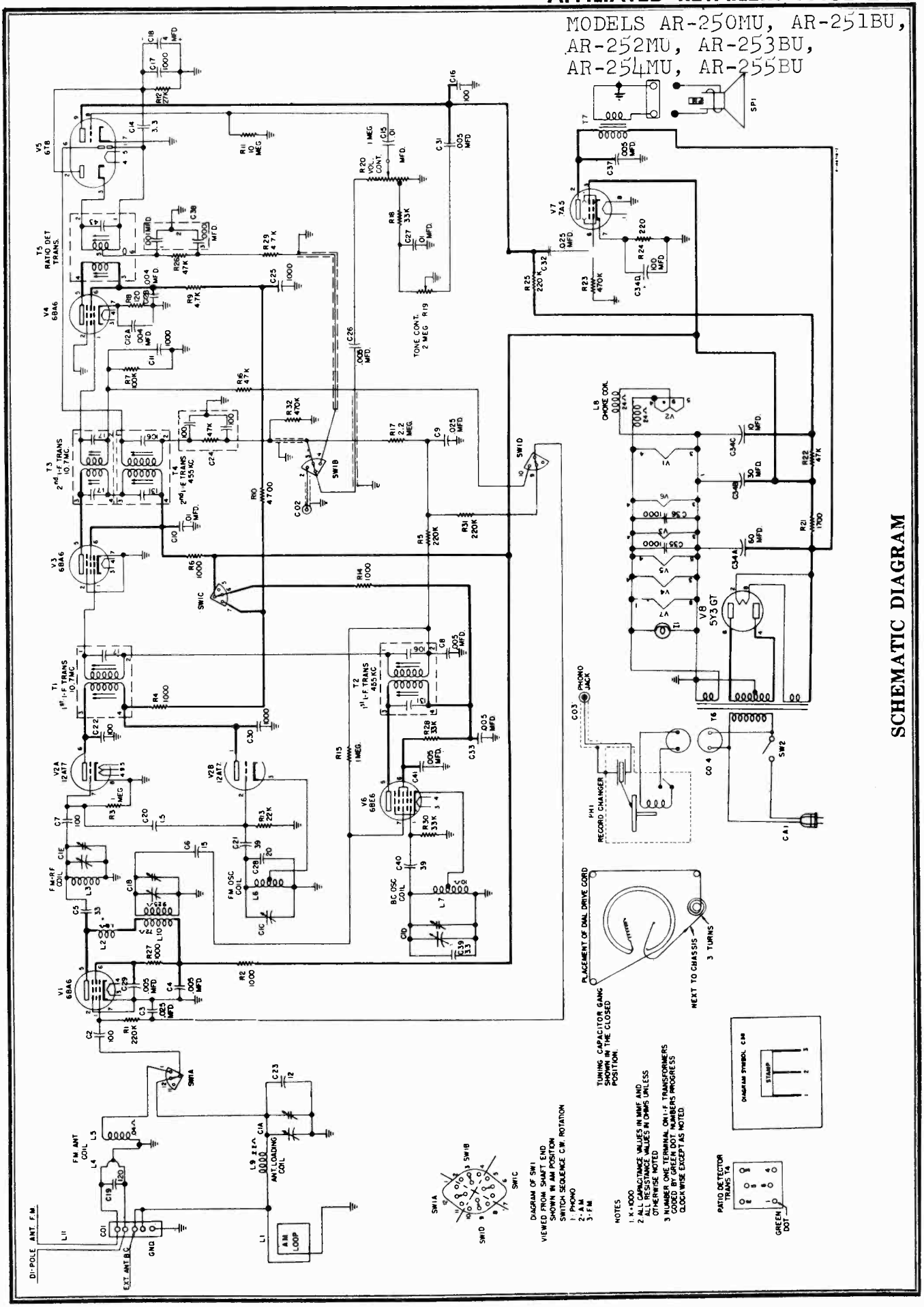
7. Adjust turns on R.F. coil until maximum meter reading is obtained. See F.M. Dummy Antenna diagram.

8. Adjust for maximum output. See A.M. Dummy Antenna diagram.

MEGACYCLES TO CHANNEL NUMBERS "FM" BAND

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

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



MODELS AR-250MU, AR-251BU,
AR-252MU, AR-253BU,
AR-254MU, AR-255BU

REPLACEMENT PARTS LIST

Symbol No.	Part No.	Description
C1A	C-144962-3	Capacitor, Variable
C1B		Capacitor, Variable
C1C		Capacitor, Variable } Five Section
C1D		Capacitor, Variable
C1E		Capacitor, Variable
C2	C-137727-1	Capacitor, 100 mmf., 300 v., ceramic
C3	39001-81	Capacitor, .025 mfd., 600 v., paper
C4	C-144675-2	Capacitor, .005 mfd., 500 v., disc ceramic
C5	C-137727-87	Capacitor, 33 mmf., 500 v., ceramic
C6	C-137727-43	Capacitor, 15 mmf., 500 v., ceramic
C7	C-137727-1	Capacitor, 100 mmf., 300 v., ceramic
C8	C-144675-2	Capacitor, 5000 mmf., 500 v., disc ceramic
C9	39001-81	Capacitor, .025 mfd., 600 v., paper
C10	39001-13	Capacitor, .01 mfd., 600 v., paper
C11	C-137727-8	Capacitor, 1000 mmf., 300 v., ceramic
C12A	C-144675-6	Capacitor, .004 mfd., 500 v. } Two Section,
C12B		Capacitor, .004 mfd., 500 v. } Disc Ceramic
C14	W-137398-5	Capacitor, 3.3 mmf., 500 v.
C15	39001-13	Capacitor, .01 mfd., 600 v., paper
C16	B-143686-3	Capacitor, 100 mmf., 500 v., molded disc ceramic
C17	C-137727-8	Capacitor, 1000 mmf., 300 v., ceramic
C18	B-142958	Capacitor, 4 mfd., 50 v., Electrolytic
C19	W-145913-1	Capacitor, 120 mmf., 5%, 500 v. ceramic
C20	W-137398-3	Capacitor, 1.5 mmf., 500 v.
C21	C-137727-109	Capacitor, 39 mmf., 10%, 200 v., ceramic
C22	C-137727-90	Capacitor, 100 mmf., 5%, 500 v., ceramic
C23	B-143686-8	Capacitor, 12 mmf., 500 v., molded disc ceramic
C24	C-142951-2	Capacitor - Resistor
C25	C-137727-8	Capacitor, 1000 mmf., 300 v., ceramic
C26	39001-11	Capacitor, .005 mfd., 600 v., paper
C27	39001-13	Capacitor, .01 mfd., 600 v., paper
C28	C-137727-99	Capacitor, 20 mmf., 2%, 500 v., ceramic
C29	C-144675-2	Capacitor, .005 mfd., 500 v., disc ceramic
C30	C-137727-8	Capacitor, 1000 mmf., 300 v., ceramic
C31	39001-11	Capacitor, .005 mfd., 600 v., paper
C32	39001-81	Capacitor, .025 mfd., 600 v., paper
C33	C-144675-2	Capacitor, .005 mfd., 500 v., disc ceramic
C34A	B-144990	Capacitor, 60 mfd., 300 v.
C34B		Capacitor, 30 mfd., 300 v., } Four Section
C34C		Capacitor, 10 mfd., 300 v. } Electrolytic
C34D		Capacitor, 100 mfd., 25 v.
C35	C-137727-8	Capacitor, 1000 mmf., 300 v., ceramic
C36	C-137727-8	Capacitor, 1000 mmf., 300 v., ceramic
C37	39001-11	Capacitor, .005 mfd., 600 v., paper
C38	C-144675-12	Capacitor, .001 mfd., 500 v. } Two Section.
C38		Capacitor, .0001 mfd., 500 v. } disc ceramic
C39	W-137398-5	Capacitor, 3.3 mmf., 500 v.
C40	C-137727-109	Capacitor, 39 mmf., 10%, 200 v., ceramic
C41	C-144675-2	Capacitor, .005 mfd., 500 v., disc ceramic
R1	39373-80	Resistor, 220,000 ohm, 1/2 w.
R2	39373-33	Resistor, 1000 ohm, 1/2 w.
R3	39373-92	Resistor, 1 megohm, 1/2 w.
R4	39373-33	Resistor, 1000 ohm, 1/2 w.
R5	39373-80	Resistor, 220,000 ohm, 1/2 w.
R6	39373-33	Resistor, 1000 ohm, 1/2 w.
R7	39373-74	Resistor, 100,000 ohm, 1/2 w.
R8	39374-14	Resistor, 120 ohm, 10%, 1/2 w.
R9	39374-33	Resistor, 4700 ohm, 10%, 1/2 w.
R10	39373-47	Resistor, 4700 ohm, 1/2 w.
R11	39373-107	Resistor, 10 megohm, 1/2 w.
R12	39374-42	Resistor, 27,000 ohm, 10%, 1/2 w.
R13	39374-41	Resistor, 22,000 ohm, 10%, 1/2 w.
R14	39373-33	Resistor, 1000 ohm, 1/2 w.
R15	39373-92	Resistor, 1 megohm, 1/2 w.
R16	39373-67	Resistor, 47,000 ohm, 1/2 w.
R17	39373-97	Resistor, 2.2 megohm, 1/2 w.
R18	39373-64	Resistor, 33,000 ohm, 1/2 w.
R19	39368-11	Control, Tone (2 megohm)
R20	39368-18	Control, Volume (1 megohm, Tap 275,000 ohm)
	39369-1	Switch, Power
	39370-2	Shaft, Volume Control
R21	B-144857-3	Resistor, 1700 ohm, 10%, 7 w., W.W.
R22	39373-67	Resistor, 47,000 ohm, 1/2 w.
R23	39373-87	Resistor, 470,000 ohm, 1/2 w.
R24	39374-17	Resistor, 220 ohm, 10%, 1/2 w.
R25	39373-80	Resistor, 220,000 ohm, 1/2 w.
R26	39373-67	Resistor, 47,000 ohm, 1/2 w.
R27	39373-33	Resistor, 1000 ohm, 1/2 w.
R28	39373-64	Resistor, 33,000 ohm, 1/2 w.
R29	39373-47	Resistor, 4700 ohm, 1/2 w.
R30	39374-43	Resistor, 33,000 ohm, 10%, 1/2 w.
R31	39373-80	Resistor, 220,000 ohm, 1/2 w.
R32	39373-87	Resistor, 470,000 ohm, 1/2 w.
CA1	C-132300-2	Cable & Plug Assy., Power
I1	138437-1	Bulb (Dial), Type 47, 6.3 v., .15 amp.
CO1	AW-148639	Terminal Board, Antenna
CO2	W-136998	Connector (Female), Phono
CO3	AW-143496	Shielded Wire Assy., Phono
CO4	B-139727-3	Connector & Wire Assy., Phono Motor
SP1	138762-5	Speaker, 10" P.M.
T1	C-145025-3	Transformer, 1st I.F. (10.7 mc)
T2	AC-139919-3	Transformer, 1st I.F. (455 kc)
T3	D-145025-1	Transformer, 2nd I.F. (10.7 mc)
T4	AC-139919-3	Transformer, 2nd I.F. (455 kc)
T5	C-145193	Transformer, Ratio Detector
T6	B-144970	Transformer, Power
T7	B-145088	Transformer, Output
L1	Not Stocked	Loop Antenna (270" - No. 22 Wire)
L2	AW-143837	Coil, Choke
L3	AW-145112	Coil, F.M.-R.F.
L4	B-143322	Coil, Antenna Primary (F.M.)
L5	AW-145104	Coil, Antenna Secondary (F.M.)
L6	AW-146004	Coil, Oscillator (F.M.)
L7	AW-145372	Coil, Oscillator (A.M.)
L8	AW-144967	Coil, Choke
L9	AW-148565	Coil, Antenna Loading
L10	AW-145993	Transformer, R.F.
SW1	W-148480	Switch, Band Selector
SW2	39369-1	Switch, Power
PH1	D-148279-1	Record Changer (V950)
	AB-148507	Background Assy., Dial
	148583	Baffle, Speaker
	143485	Bumper (Rubber), Doors
	R-148577	Cabinet (11-250MU, 11-252MU, 11-254MU)
	R-148603	Cabinet (11-251BU, 11-253BU, 11-255BU)
	W-136201	Clip, Dial Glass
	W-145510	Clip, Sub Chassis Mtg.
	W-136999-1	Connector (Male), Shielded Phono Wire
	W-136853	Cushion (Rubber), Dial Glass
	148561	Decal, Off-On-Vol-Tone
	148560	Decal, Tuning-Ph-AM-FM
	C-148587	Dial Glass (11-250MU, 11-251BU)
	C-148701	Dial Glass (11-252MU, 11-253BU, 11-254MU, 11-255BU)
	148605	Door, Radio } 1 Pair(11-251BU, 11-253BU, 11-255BU)
		Front, Drawer }
	148579	Door, Radio } 1 Pair(11-250MU,11-252MU,11-254MU)
		Front, Drawer }
	148608	Doors (1 pair), Record Compartment (11-251BU, 11-253BU, 11-255BU)
	148582	Doors,(1 pair), Record Compartment (11-250MU, 11-252MU, 11-254MU)
	C-145773-1	Escutcheon
	148609	Grille Cloth (11-251BU, 11-253BU, 11-255BU)
	148584	Grille Cloth (11-250MU, 11-252MU, 11-254MU)
	148611-1	Hinge (Upper Left - Lower Right), Door (11-251BU, 11-253BU, 11-255BU)
	146786	Hinge (Upper Left - Lower Right), Door (11-250MU, 11-252MU, 11-254MU)
	148611-2	Hinge (Lower Left - Upper Right), Door (11-251BU, 11-253BU, 11-255BU)
	146787	Hinge (Lower Left - Upper Right), Door (11-250MU, 11-252MU, 11-254MU)
	B-148643-1	Knob, Band Selector
	B-138540-7	Knob, Off-On-Vol., Tone, Tuning
	W-45580	Mounting (Rubber), Band Selector Switch; Speaker
	148610	Panel, Radio Dial (11-251BU, 11-253BU, 11-255BU)
	148586	Panel, Radio Dial (11-250MU, 11-252MU, 11-254MU)
	W-130076CL	Pin, Speaker Cable
	W-143769	Pointer, Dial
	148606	Pull, Handle (11-251BU, 11-253BU, 11-255 BU)
	148505	Pull, Handle (11-250MU, 11-252MU, 11-254MU)
	148607	Pull, Knob (11-251BU, 11-253BU, 11-255BU)
	148581	Pull, Knob (11-250MU, 11-252MU, 11-254MU)
	W-137939-2	Pulley (Idler), Dial Drive Cord
	W-137170	Retainer, Record Changer Mtg. Screw
	W-137940-1	Rivet, Dial Drive Idler Fulley
	W-144498-1	Screw, Escutcheon
	W-148501	Shaft, Dial Drive
	148604	Shelf Assy., Drawer (11-251BU, 11-253BU, 11-255BU)
	148578	Shelf Assy., Drawer (11-250MU, 11-252MU, 11-254MU)
	W-139040	Shock Mount, Sub Chassis Mtg.
	143478	Slide, Drawer
	D-136565-16	Socket, Dial Light
	W-142761	Socket, Tube (V1, V3, V4, V6)
	W-144732	Socket, Tube (V2)
	W-145607	Socket, Tube (V5)
	39232-1	Socket, Tube (V8)
	39441	Socket, Tube (V7)
	W-145757	Spring, Dial Drive Cord
	W-49829	Spring (Lock), Dial Drive Shaft
	W-143552	Strip, Dial Pointer

Operating Instructions

POWER SOURCES: This combination will operate on an alternating (AC) current only, of 110 to 125 volts at 60 cycles.

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

Never try to operate this combination on 50 cycle current, as this will cause the motor to rotate at an incorrect speed. The normal speed is 78 R.P.M., (revolutions per minute) and to insure proper reproduction of recordings 60 cycle current must be used.

This receiver is equipped with a sensitive hank antenna and under ordinary conditions no external antenna would be required. However, in steel constructed buildings or in distant isolated locations, the reception may be improved by using an outside antenna. This should be a single wire not more than 50 feet long and should be connected to the antenna lead that projects from the back of the receiver. No ground wire is required at any time.

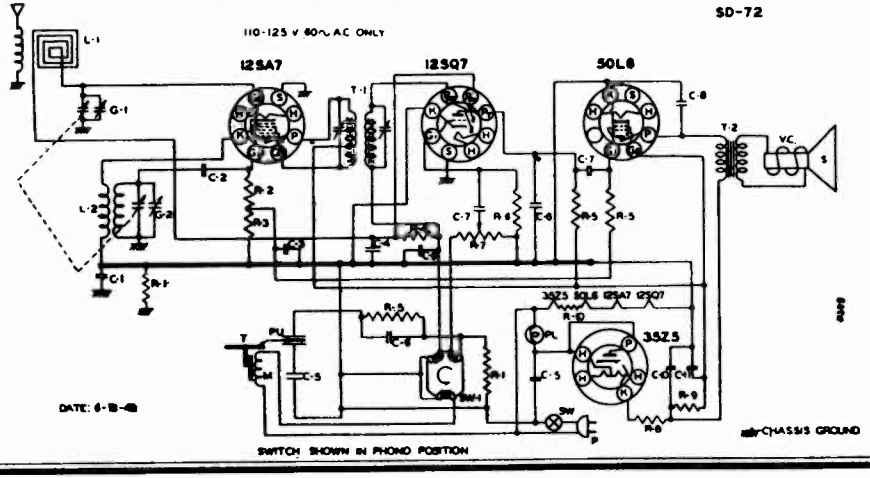
INSTALLATION: Unwind power cord and plug into a convenient power outlet. Follow instructions under "Controls" to operate receiver.

CONTROLS: Three controls are provided on the front panel for operation of this combination. The right hand control is the station selector which is used only in "Radio" operation. The left hand control is a switch which selects operation of either "Radio" or "Phonograph". The center control is used to adjust volume on either "Radio" or "Phonograph" and is also used as a power switch to turn the combination "On" or "Off."

RADIO RECEPTION: After the power cord plug has been connected to your power outlet, turn the center control to the right in a clockwise direction and a click will be heard. This indicates that the power is turned on, and the pilot light in the dial should begin to glow. After about 30 seconds, the set will be ready for operation.

Make sure that the left hand control is turned to the left, in "Radio" position. Turn the center control about halfway on, in a clockwise direction to increase volume. Rotate the right hand control to the right or left to select the desired station. By mentally adding a zero to the figures on the upper half of the dial, the result will be read directly in kilocycles (i.e., 60 plus 0 equals 600KC or 140 plus 0 equals 1400KC). After a station has been tuned in, adjust the center control to your desired volume.

PHONOGRAPH REPRODUCTION: To operate the phonograph, be sure that the left hand control is turned to the right. This puts the circuit in "Phonograph" position and also turns on the power for the motor. The center control must also be turned on (as in Radio instructions) as it is the master control for power to the radio receiver and phonograph motor.



ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

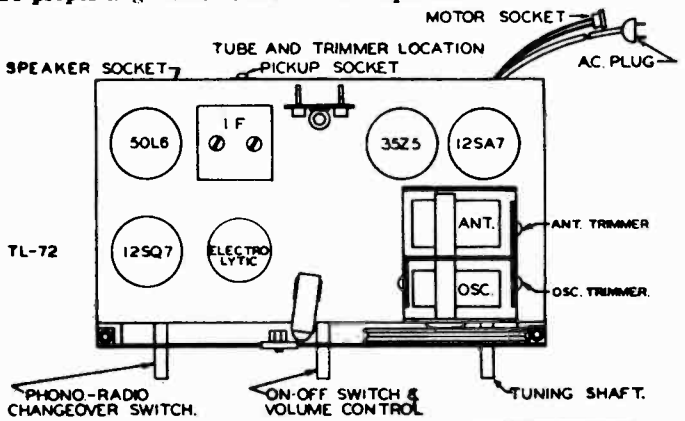
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

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

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

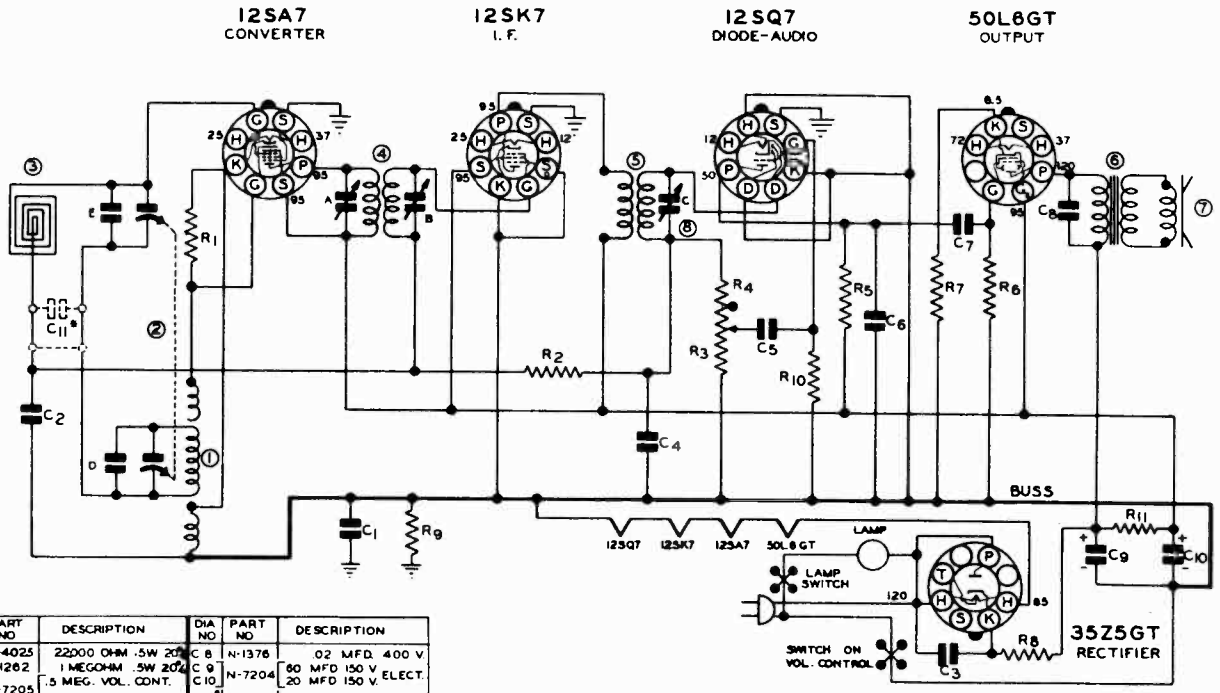
SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

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

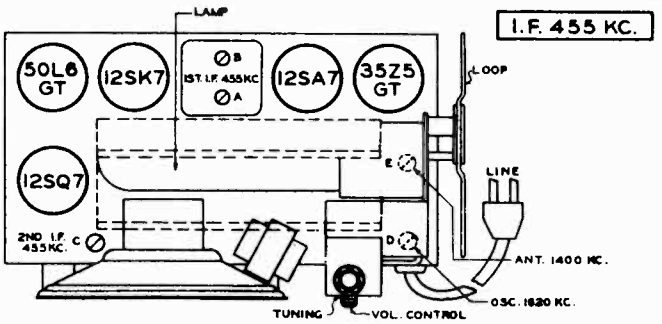


PART NO.		DESCRIPTION	PART NO.		DESCRIPTION
IR-20	R-1	220M Ω RESISTOR 1/2W 20%		SW	SWITCH ON VOLUME CONTROL
IR-9	R-2	22M Ω RESISTOR 1/2W 20%	SW-1	SW-1	RADIO-PHONO SWITCH
IR-10	R-3	47M Ω RESISTOR 1/2W 20%	LI-8	T-1	I F TRANSFORMER
IR-23	R-4	3.3MEG Ω RESISTOR 1/2W 20%		T-2	OUTPUT TRANSFORMER
IR-11	R-5	470M Ω RESISTOR 1/2W 20%	SPK-19	VC	VOICE COIL
IR-3	R-6	10MEG Ω RESISTOR 1/2W 20%		S	4" PM SPEAKER
VC-4	R-7	1 MEG. VOLUME CONTROL	LL-18	L-1	LOOP ANT
IR-17	R-8	.33 Ω RESISTOR 1/2 W 20%	LO-14	L-2	OSC COIL
IR-25	R-9	2200 Ω RESISTOR 1 W 10%	M-2	M-2	110 V 60 CYCLES MOTOR
IR-41	R-10	.47 Ω RESISTOR 1 W 10%	PU-5	PU	TONE ARM WITH L-75 CARTRIDGE
PC-6	C-1	.1 MFD. CONDENSER 400 V	PB-1	PL	#47 PILOT BULB
MC-4	C-2	50MMFD. MICA	CO-1A	P	LINE CORD
PC-4	C-3	.25MFD. CONDENSER 200 V	TT-2	T	8" TURNTABLE
PC-2	C-4	.05MFD. CONDENSER 200 V			
PC-5	C-5	.05MFD. CONDENSER 400 V	GC-6	G-1	GANG CONDENSER
MC-8	C-6	500MMFD. MICA		G-2	
PC-10	C-7	.005 MFD. CONDENSER 400 V			
PC-7	C-8	.01MFD. CONDENSER 400 V			
MC-2	C-9	100MMFD. MICA			
EC-12	C-10	40MFD. ELECTROLYTIC			
	C-11	20MFD.			

MODELS 5F-600,
5F-601



DIA NO	PART NO	DESCRIPTION	DIA NO	PART NO	DESCRIPTION
R1	N-4025	22000 OHM .5W 20%	C 8	N-1378	.02 MFD. 400 V.
R2	N-1262	1 MEGOHM .5W 20%	C 9	N-7204	60 MFD 150 V. ELECT.
R3	N-7205	.5 MEG. VOL. CONT.	C 10		20 MFD 150 V.
R4		IN VOLUME CONTROL	C 11	N-1345	.05 MFD. 200 V. USED IN SOME MODELS
R5	N-4026	220,000 OHM .5W 20%			
R6	N-4027	470,000 OHM .5W 20%			
R7	N-6244 OR N-4024	220 OHM .5W 10% OR 220 OHM 5W 10%			
R8	N-6256	47 OHM LOW 10%			
R9	N-4026	220,000 OHM .5W 20%		N-2084	LAMP SWITCH
R10	N-4028	6.8 MEGOHM .5W 20%		N-2585	25W. T-10 110V. LAMP
R11	N-4900	1200 OHM LOW 10%			
			1	N-7139	OSCILLATOR COIL
C1	N-1345	.05 MFD 200 V.	2	N-7203	2 GANG CONDENSER
C2	N-1345	.05 MFD 200 V.	3	N-7199	ANT. LOOP COIL
C3	N-1346	.05 MFD 400 V.	4	N-4843	1ST I. F.
C4	N-6015	100 MMFD CERAMIC	5	N-4846	2ND I. F.
C5	N-4894	.005 MFD 600 V.	6	N-7197 OR N-7198	SPK'R & OUTPUT XFMR
C6	N-6135	250 MMFD CERAMIC	7		
C7	N-1344	.01 MFD 400 V.	8	N-4985	2ND I.F. TRIMMER



This receiver is designed to operate over the standard broadcast band which extends from 535 to 1620 Kilocycles (KC) (185 to 560 Meters.)

ALIGNMENT PROCEDURE

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

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I.F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cobinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the converter tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to a dummy loop which can be made by coiling 2 turns of hookup wire about 6" in diameter. Place this dummy loop about a foot from the loop on the receiver and in the same plane as the receiver loop. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODELS 5H-605, 5H-606

CONNECTING THE SET

POWER SUPPLY. This receiver is designed to operate on an alternating current supply (AC) ranging from 110 to 120 volts, 60 Cycles only. *Do Not Operate on Direct Current.*

Before connecting the set be sure that your house is wired for the voltage and current for which the set is designed. If in doubt, call your local power company for the necessary information. Connecting the set to a supply outlet furnishing the wrong type of current will result in improper operation or damage.

ANTENNA. This receiver has a built-in "loop" aerial. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial.

TUBES. Five tubes (including rectifier) are used. Type numbers and locations are shown in the tube location diagram on the bottom of the cabinet.

GROUND. No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

CAUTION. Do not place receiver on hot objects such as stoves, radiators, etc. Heat will damage the cabinet and the internal components of the receiver.

RADIO OPERATION

AUTO-OFF-ON SWITCH KNOB (Bottom of Clock Face). Turn this knob to the right (clockwise), so that the indicator points to "ON", to turn on the radio. To turn off the radio, turn this knob so that the indicator points straight up to "OFF"

VOLUME CONTROL KNOB (Bottom Knob on Front of Cabinet) This knob controls the volume of the signal received. To reduce the volume, rotate this knob to the left (counter-clockwise). When this knob is rotated to the right it will increase the volume.

STATION SELECTOR KNOB. (Large Knob on Front of Cabinet) Rotate this knob over a narrow range of the dial where the desired station is located, until the station is received with maximum volume and clarity. Then readjust the volume control to the proper level. NEVER use the station selector knob to adjust the volume as this will result in the signal being received with distorted tone quality.

The station selector knob is calibrated in Kilocycles with the last zero of the actual frequency omitted. For instance, the numeral 55 on the knob indicates 550 Kilocycles and 160 indicates 1600 Kilocycles.

OPERATION OF CLOCK

This clock-radio is equipped with a self-starting clock. As soon as the power plug is inserted into the wall outlet, the sweep second hand will begin to operate.

To set the time hands, rotate the knob located at the rear of the receiver so that the hands will rotate in a clockwise rotation. Once the clock is set, it needs no further attention unless you remove the plug or there is a power interruption.

The clock of this clock-radio is equipped to automatically turn on the radio at any time during the course of approximately 10-½ hours after the controls are properly set. The controls may be properly set by following the instructions itemized below:

1. SET TURN-ON TIME. Pull out and turn the knob at the top of clock face to the left (counter-clockwise) until the selected TURN-ON time is indicated on the small center dial by the small pointer on the opposite end of the hour hand.

   Leave this knob out if you wish the conventional alarm to turn on in addition to the radio. The conventional alarm will sound approximately seven minutes after the radio is turned on.

   If you prefer to have the radio turned on without the conventional alarm, push the knob in after the TURN-ON time is set.

2. SELECT PROGRAM TO BE TURNED ON. Tune in the station that will carry the desired program at the selected time, and adjust the volume to the proper level.

3. SET AUTO-OFF-ON SWITCH KNOB. Turn this knob to the left until the indicator points to "AUTO". This will turn off the radio and set the switch so that it automatically comes on again at the selected time.

To turn the radio on before the "TONE-ALARM" time, turn the AUTO-OFF-ON knob to the "ON" position. It will then be necessary to repeat the steps listed above to again use the alarm feature.

MODELS 5H-605,
5H-606

USE OF "CONVENTIONAL ALARM"

The clock may be set to turn on the conventional buzzer alarm without turning on the radio. To accomplish this set the TURN-ON time as explained under "USE of TONE-ALARM" and leave the knob out from the cabinet. Set "AUTO-OFF-ON" switch knob to the "OFF" position. At the selected time, the buzzer will sound and will continue to sound until you turn it off by pushing knob all the way in.

USE OF TURN-ON FEATURE WITH EXTERNAL APPLIANCES

An electrical outlet is provided at the rear of the receiver to use the TURN-ON feature on any electrical appliance which operates on a 110-120 volt, 60 cycle power supply.

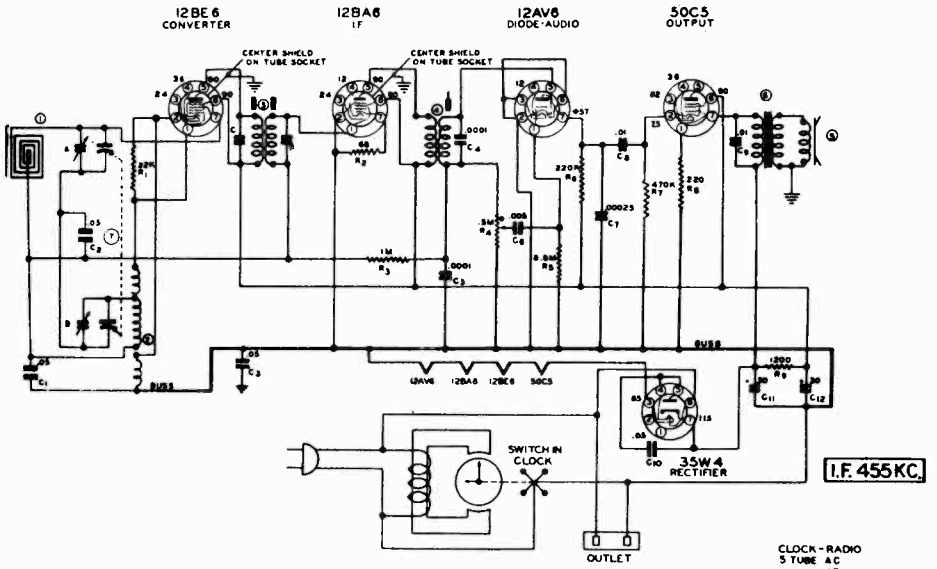
To use this outlet, simply plug in the appliance and set the controls on the clock the same as explained in the paragraph "USE OF TONE-ALARM" This will automatically start the appliance AND the radio at the selected time.

CAUTION: THE RATING OF THE EXTERNAL ELECTRICAL APPLIANCE MUST NOT EXCEED 660 WATTS.

Current is available at this outlet whenever the radio is turned on.

ALIGNMENT

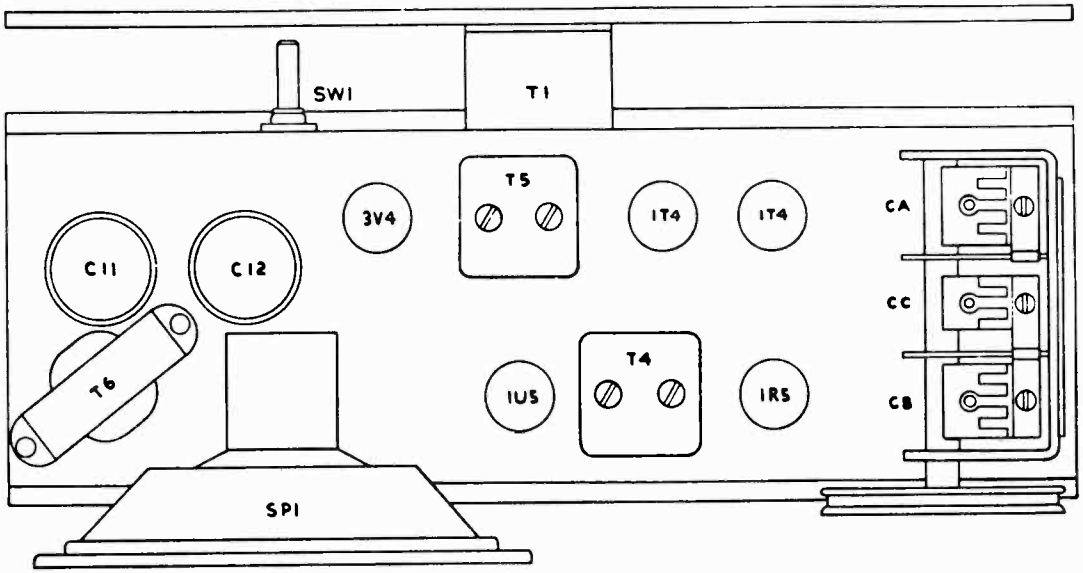
Step No.	Position of Gang	Signal Generator Frequency	Generator Connection	Dummy Antenna	Adjustment	Type of Adjustment
1.	Open	455 KC.	Rear Gang Terminal	.1 Mfd.	I.F. Slugs	Adjust for Maximum Output
2.	Open	1620 KC.	Dummy Antenna	2 Turns of Hookup Wire 6" in Dia. (Place Approx. a Foot from & parallel to loop.)	Front Gang Trimmer	Adjust for Maximum Output
3.	1400 KC	1400 KC.			Rear Gang Trimmer	Adjust for Maximum Output
4.	600 KC	600 KC.				Check Gang Align-ment



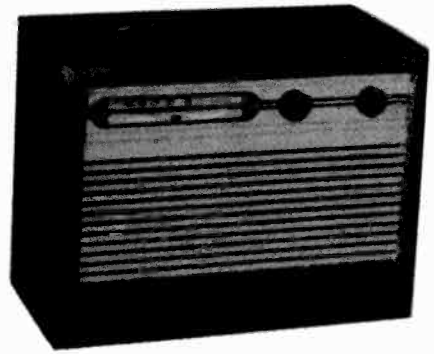
PARTS LIST

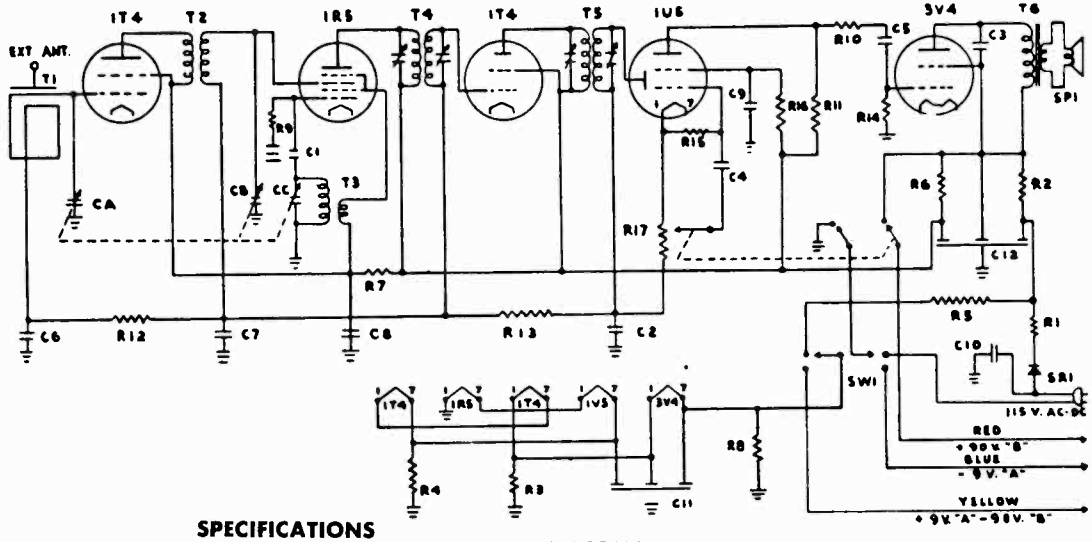
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
C1,C2,C3	N-1345	Capacitor-Paper .05 MFD. 200 V
C4	N-7549	Capacitor-Ceramic 100 MMFD 500 V. 10%
C5	N-6015	Capacitor-Ceramic 100 MMFD 500 V. 20%
C6	N-4894	Capacitor-Paper .005 MFD. 600 V.
C7	N-6468	Capacitor-Ceramic 250 MMFD. 500 V. 20%
C8,C9	N-1344	Capacitor-Paper .01 MFD. 400 V.
C10	N-1346	Capacitor-Paper .05 MFD. 400 V.
C11) C12)	N-7889	Capacitor-Electrolytic 50 MFD. 150 V. 30 MFD. 150 V

R1	N-4025	Resistor - 22,000 Ohm - 1/2W. - 20%
R2	N-6485	Resistor - 68 Ohm - 1/2W. - 10%
R3	N-1262	Resistor - 1.0 Megohm - 1/2 W. - 20%
R4	N-7957	Control - On-Off & Volume
R5	N-4028	Resistor - 6.8 Megohm - 1/2 W. - 20%
R6	N-4026	Resistor - 220,000 Ohm - 1/2W. - 20%
R7	N-4027	Resistor - 470,000 Ohm - 1/2W. - 20%
R8	N-4024	Resistor - 220 Ohm - 1/2W. - 10%
R9	N-4900	Resistor - 1,200 Ohm - 1.0W. - 10%
	N-7824	Speaker - 4" P.M. with Output Transformer
	N-7956	Coil - Loop Antenna
	N-7888	Coil - 1st, I.F.
	N-7542	Coil - 2nd, I.F.
	N-7139	Coil - Oscillator



TOP VIEW





CIRCUIT DIAGRAM

C1 —.0001 MFD. 400 V. CONDENSER
C2 —.0001 MFD. 400 V. CONDENSER
C3 —.006 MFD. 400 V. CONDENSER
C4 —.01 MFD. 400 V. CONDENSER
C5 —.01 MFD. 400 V. CONDENSER
C6 —.05 MFD. 200 V. CONDENSER
C7 —.05 MFD. 200 V. CONDENSER
C8 —.05 MFD. 200 V. CONDENSER
C9 —.05 MFD. 200 V. CONDENSER
C10—.1 MFD. 400 V. CONDENSER
C11—50+50+50 MFD. 150V. COND.
C12—50+50+50 MFD. 150 V. COND.
C A-B-C — 3-GANG. CONDENSER

R1 —100 OHM — 5 W. RESISTOR
R2 —150 OHM — 1/2 W. RESISTOR
R3 —500 OHM — 1/3 W. RESISTOR
R4 —1200 OHM — 1/3 W. RESISTOR
R5 —2000 OHM — 10 W. RESISTOR
R6 —3000 OHM — 1/3 W. RESISTOR
R7 —5000 OHM — 1/3 W. RESISTOR
R8 —25M OHM — 1/3 W. RESISTOR
R9 —100M OHM — 1/3 W. RESISTOR
R10—100M OHM — 1/3 W. RESISTOR
R11—1Meg. OHM — 1/3 W. RESISTOR
R12—2Meg. OHM — 1/3 W. RESISTOR
R13—2Meg. OHM — 1/3 W. RESISTOR
R14—2Meg. OHM — 1/3 W. RESISTOR
R15—5Meg. OHM — 1/3 W. RESISTOR
R16—5Meg. OHM — 1/3 W. RESISTOR
R17—500M OHM POT.—1/3 WITH SWITCH

T1—LOOP ANT.
T2—RF COIL
T3—OSC. COIL
T4—455 KC INPUT I.F. COIL
T5—455 KC OUTPUT I.F. COIL
T6—OUTPUT TRANSFORMER
SW1—2 POLE 2 POS. SWITCH
SP1—5" PM. SPEAKER
SR1—SELENIUM RECTIFIER

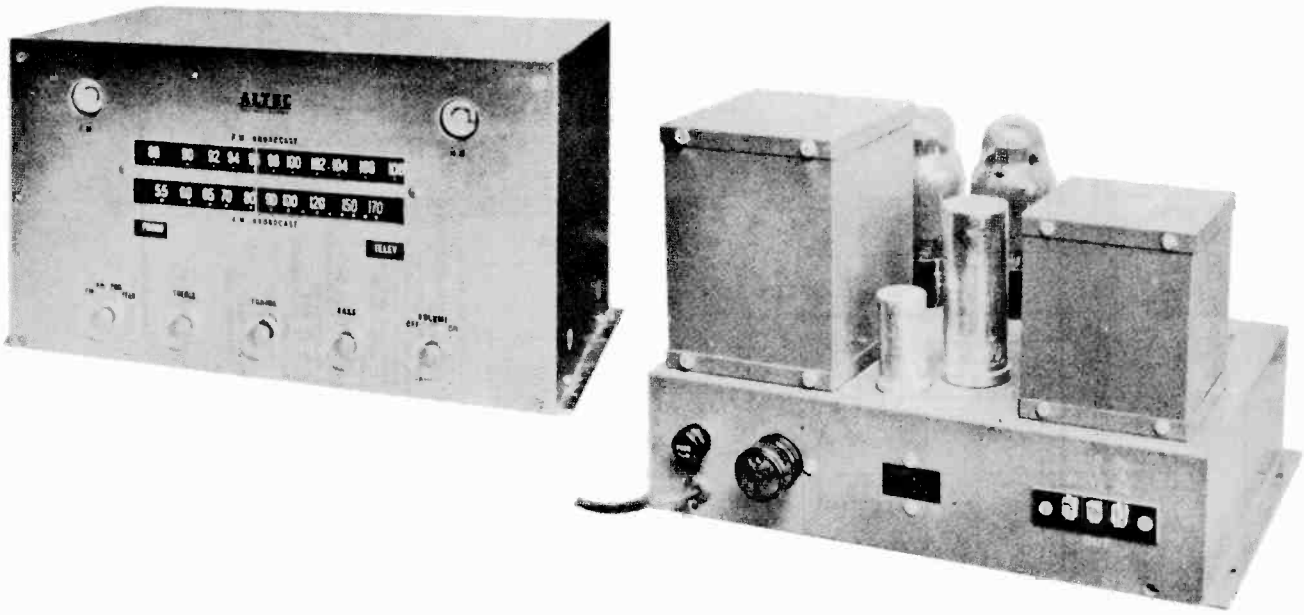
SPECIFICATIONS

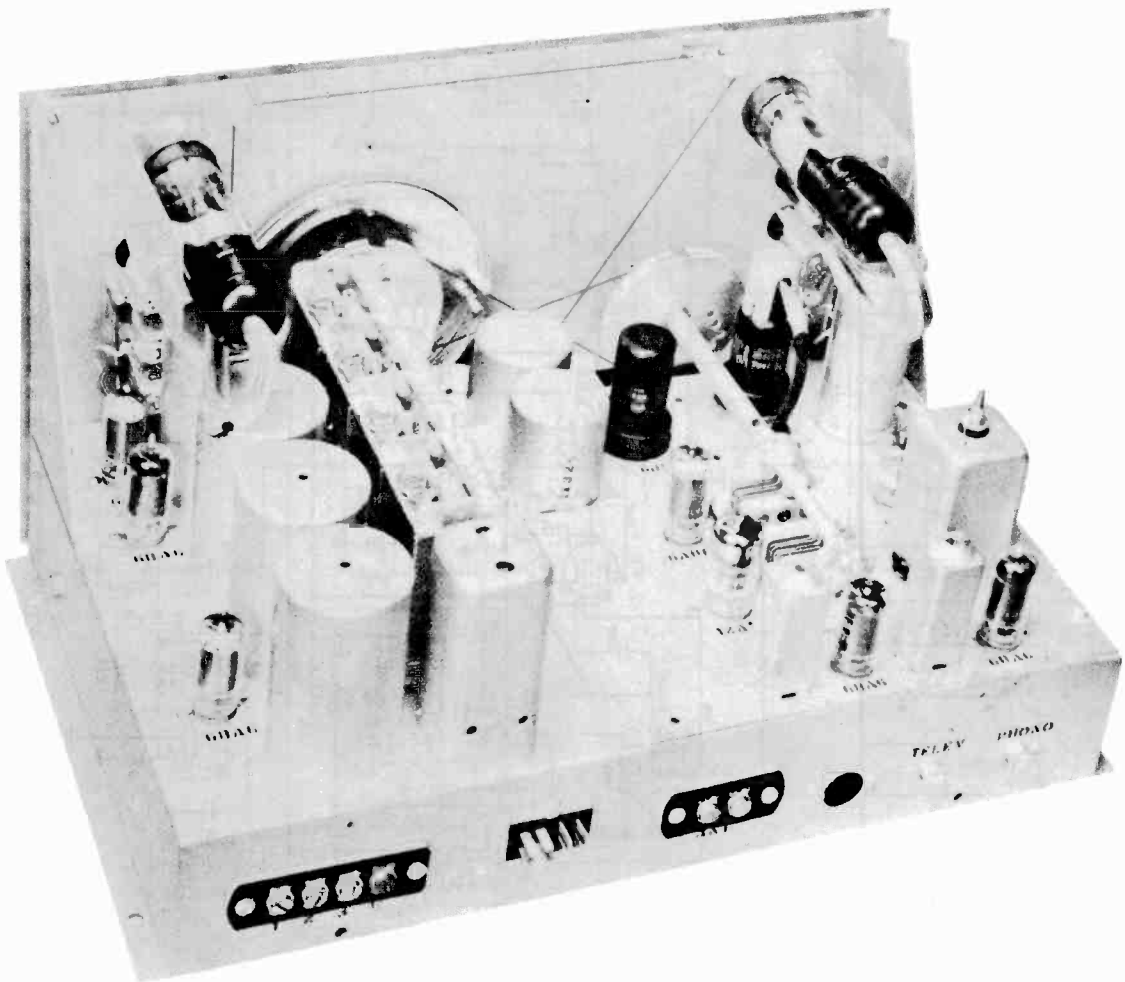
- Super-het circuit—455 KC I. F.
- Band coverage: 540 KC to 1700 KC.
- Five miniature tubes—plus selenium rectifier 1—1T4 R. F., 1—1R5 Mixer, 1—1T4 I. F., 1—1U5 Det. and 1st audio, 1—3V4 Pr. output (6-tube performance).
- Battery life—approximately 170 hours. Burgess No. F6A60, Eveready No. 753, Ray-O-Vac No. AB994.
- Five-inch P. M. dynamic speaker—1.47 oz. Alnico 5.

ALIGNMENT PROCEDURE

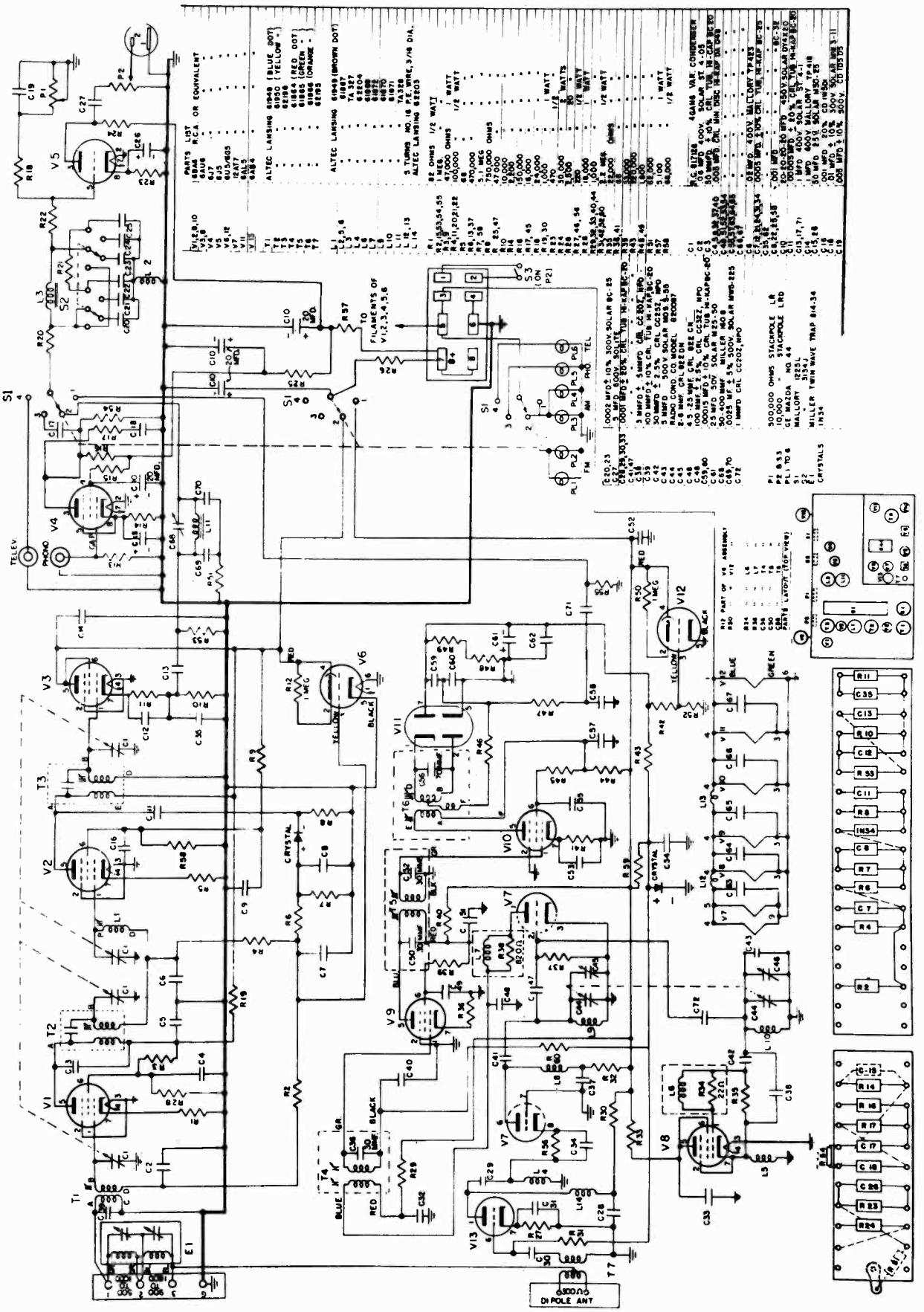
I. F. Alignment 455 KC (Connect to 1R5 Grid) Loop and R. F. Alignment — 1400, 1000 and 600 KC. Dial Pointer Setting—535 KC with fully closed condenser.

MODEL 101B,
Tuner





MODEL 101B,
Tuner



(1) The FM Tuner employs six miniature tubes. The antenna is coupled to the RF stage through a broad band transformer having a high degree of balance. The RF stage consists of a 6AB4 tube and one half of a 12AT7 tube connected in "cascode". A 6AU6 tube is employed as a separate oscillator, the voltage being injected into the grid circuit of the second half of the 12AT7 tube, which operates as a mixer. Two stages of IF amplification, having a frequency of 10.7 megacycles, use 6BA6 tubes. The output of the second IF stage feeds the ratio detector which incorporates a 6AL5 tube. Delayed AVC gives good small signal sensitivity and is applied to the RF and first IF stages. The modified cascode circuit, a wartime "radar" development which is used as the RF amplifier, produces high signal gain with very low noise. The balanced antenna transformer, used as the coupling medium into this stage, gives a high degree of rejection to unwanted interference signals picked up by the antenna lead-in. The triode mixer is used since it has high gain and low noise compared to a pentagrid converter. Accurate tuning is aided by the use of a 6U5/6G5 electron tuning indicator. A half wave dipole antenna, having an impedance of 300 ohms is supplied with a sixty foot transmission cable. Maximum sensitivity of this unit is 5.5 microvolts with a quieting sensitivity of 12 microvolts.

(2) The AM Tuner covers the band of 514-1740 kilocycles. It is of the tuned radio frequency type, employing two 6AU6 type tubes in two stages. Complex coupling networks are used between the various networks to provide nearly constant gain and band width. The detector is of the infinite impedance type and the audio output is obtained across a portion of the cathode resistance. A.V.C. is obtained by means of a 1N34 Crystal and is applied to both RF stages. A separate 6U5/G5 Electron Tuning Indicator is used as an AM tuning indicator. A dual wave trap is provided at the input of the AM section, and is inserted by means of a link on the antenna terminal strip. One section of the trap covers the range from 500-1000 kilocycles. The second section covers the range from 900-1800 kilocycles. This trap provides optional attenuation at any portion of the band so that the signal from a strong interfering local station may be reduced to a point where other weaker stations may be received without interference.

(3) A single stage audio amplifier is provided with the necessary equalization for using a variable reluctance or similar type phonograph pickup. A four position selector switch is supplied to switch between AM-FM, phonograph, and an external connection which is labeled television. This high impedance, low gain input is intended for the audio portion of television, magnetic reproducer, or similar use. After the selector switch there is a bass tone control which gives a range of 15 db variation at 100 cycles. Immediately following the bass boost circuit is a treble tone control having four positions:

Position 1 provides flat response.
Position 2 inserts an 8 KC low pass filter.
Position 3 changes the low pass filter to 6000 cycle cut-off.
Position 4 provides 4000 cycle cut-off.

A sharp 10 KC dip filter is provided on the AM audio output so as to remove the heterodyne whistle of interfering stations. Immediately following the tone controls is a single-stage 6J5 audio output stage.

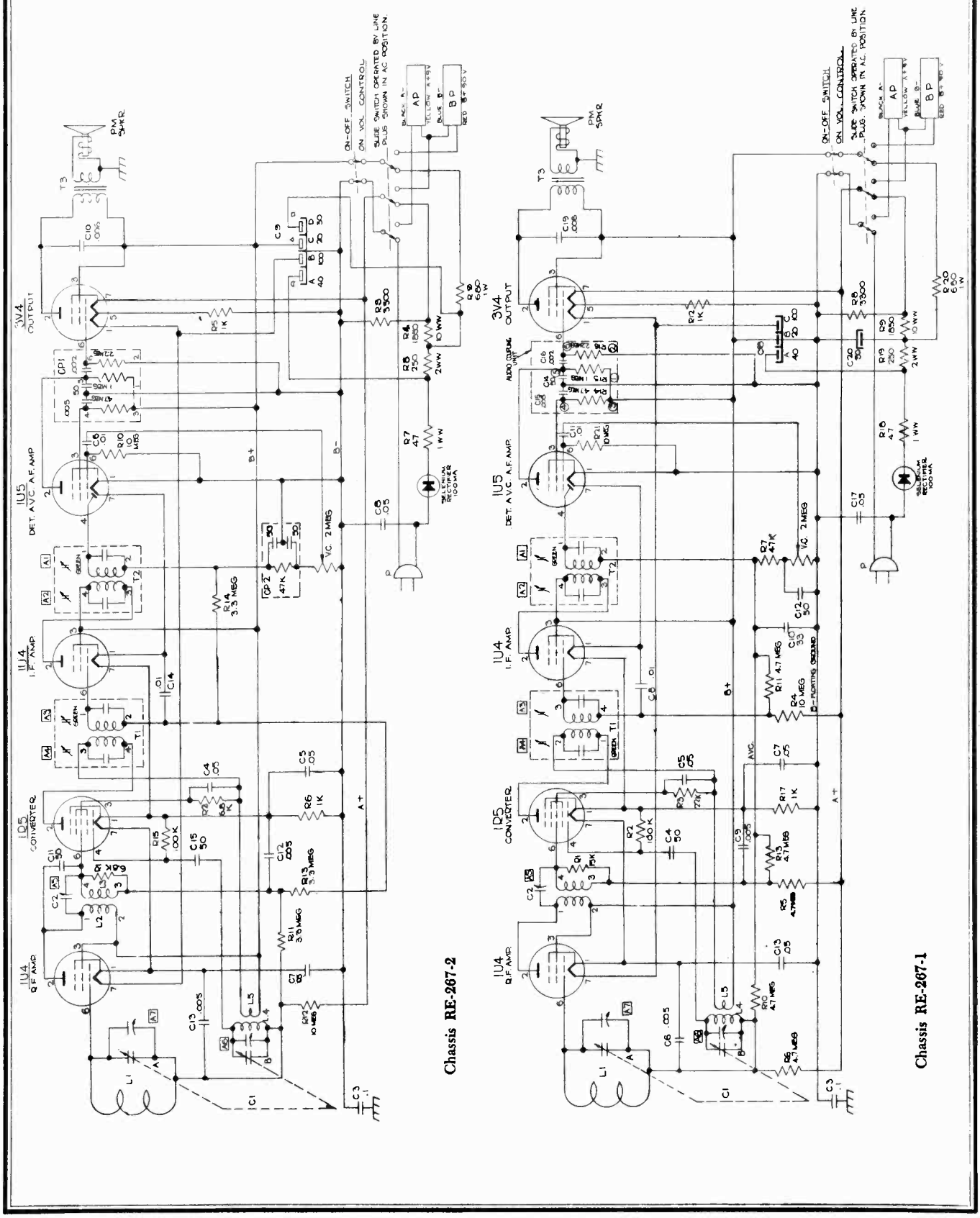
Model 101B Tuner dimensions: 15 inches wide
9½ inches high
11½ inches deep (Chassis 10 inches deep; plus protrude 1½ inches out of rear)

(4) The A-323C amplifier is a separate unit and consists of a pentode connected input stage, a phase inverter, and push-pull 6L6 stages with an output transformer having taps covering the range from 2.5-24 ohms. The output of the A-323C amplifier provides 15 watts with less than 8% intermodulation, and approximately 2% total harmonics at 60 cycles. This amplifier supplies the plate, filament, and pilot lamp power for the tuner chassis. Two interconnecting cables are provided for the power and speech circuits between the amplifier and tuner.

Model A-323C Amplifier dimensions: 13 inches wide
8½ inches high
9 inches deep

(5) Where average to strong signals are available, the FM dipole antenna can be used for both FM and AM by proper strapping on the terminal board. Where weak AM signals are available, it is recommended that a separate 10-30 foot antenna be used on AM.

MODELS 350-PB, 351-PB,
Ch. RE-267-1; 350-PL, 351-PL,
352-PL, 353-PL, Ch. RE-267-2



MODELS 350-PB, 351-PB,
Ch. RE-267-1; 350-PL, 351-PL,
352-PL, 353-PL, Ch. RE-267-2

MODELS 350PB, 351PB, 350PL, 351PL, 352PL & 353PL, CHASSIS RE-267-1 & RE-267-2 5 TUBE AC-DC, BATTERY PORTABLE

Changes covered in this supplement –

1. 350-PB and 351-PB, Chassis RE-267-1, a modified version of the 350-P and 351-P made especially for areas where strong local signals caused overloading.
2. 350-PL, 351-PL, 352-PL and 353-PL, Chassis RE-267-2, a revised version of the 350-P and 351-P to improve it for all locations and relieve crowding of parts. These four models are identical except for color of cabinet and cabinet back assembly.

The only parts in the Parts List which are different from those on 350-P and 351-P are electrical chassis components and colored cabinet parts. The portions of the list which are changed are printed below.

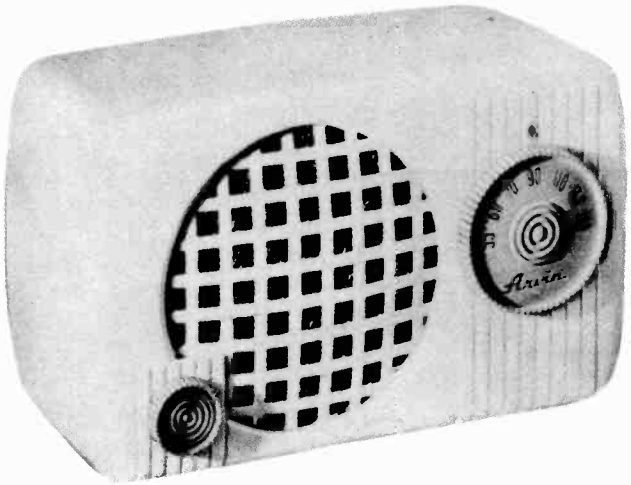
PARTS LIST FOR 350-PL, 351-PL, 352-PL and 353-PL, CHASSIS RE-267-2

SCHEMATIC LOCATION	PART NO.	DESCRIPTION
R1, R2	C20060-682	Resistor, 6.8K, 1/4 W. 20%
R3	C20060-332	Resistor, 3300 ohms, 1/4 W. 20%
R4	A21816	Resistor, 1850 ohms, 10 W. 10%
R5, R6	C20060-102	Resistor, 1000 ohms, 1/4 W. 20%
R7	A19177	Resistor, 47 wire, 1 W. 10%
R8	A22777	Resistor, 250 wire, 2 W.
R9	C20070-681	Resistor, 680 ohms, 1 W. 10%
R10	C20060-106	Resistor, 10 meg., 1/4 W. 20%
R11, R13 R14	C20245-335	Resistor, 3.3 meg., 1/4 W. 5%
R12	C20245-106	Resistor, 10 meg., 1/4 W. 5%
R15	C20060-104	Resistor, 100K, 1/4 W. 20%
C1	AC22277	Variable Condenser Assembly
C2	A20275	Trimmer, 8-75 mmf.
C3	C20273-104	Condenser, P. T., .1 mg. 400 V.
C4, C5, C7	C20272-503	Condenser, P. T., .05 mf., 200 V.
C6	C20272-103	Condenser, P. T., .01 mf., 200 V.
C8	C20067-503	Condenser, P. T., .05 mf., 200 V.
C9A, B,C,D	A22879	Condenser, Electrolytic, 40-20-30 mfd., 150 V., 100 mfd., 10 V.
C10	C20273-602	Condenser, P. T. .006 mfd., 400 V.
C12, C13	A21674	Disc Ceramic Capacitor, .005 mfd.
C14	A22295	Disc Ceramic Capacitor, .01 mfd.
C15, C11	C20065-500	Condenser, Mica, 50 mmf., 500 V.
L2, L3	AC22912-1	RF Trans. Assy.
T1	C21797-5	First IF Transformer
T2	C21797-2	Second IF Transformer
CP1	A22257	Couplate
CP2	A22902	Couplate
L1	AD22258-3	Antenna Loop & Cabinet Back Assy. Sandelwood
L1	AD22258-4	Antenna Loop & Cabinet Back Assy. Burgundy
	AA22380-3	Cabinet Assy. Sandelwood
	AA22380-4	Cabinet Assy. Burgundy

PARTS LIST FOR 350-PB and 351-PB CHASSIS RE-267-1

SCHEMATIC LOCATION	PART NO.	DESCRIPTION
R1	C20271-153	Resistor, 15,000 ohm, 1/3 W. 20%
R2	C20271-104	Resistor, 100K, 1/3 W. 20%
R3	C20271-223	Resistor, 22K ohms, 1/3 W. 20%
R4	C20271-106	Resistor, 10 meg., 1/3 W. 20%
R5, R6, R10 R11, R13	C20271-475	Resistor, 4.7 meg., 1/3 W. 20%
R7	C20271-473	Resistor, 47K, 1/3 W. 20%
R8	C20060-332	Resistor, 3300 ohms, 1/4 W. 20%
R9	A21816	Resistor, 1850 ohms, 10 W. 10%
R14, R15, R16, C14 C15, C16	A22257	Audio Coupling Unit
R17	C20271-102	Resistor, 1000 ohms, 1/3 W. 20%
R18	A19177	Resistor, 47 Wire, 1 W. 10%
R19	A22777	Resistor, 250 Wire, 2 W.
R20	C20070-681	Resistor, 680 ohms, 1 W. 10%
R21	C20271-106	Resistor, 10 meg., 1/3 W. 20%
VC	C22253	Volume Control & Switch, 2 meg.
C1	AC22277-1	Variable Condenser Assembly
C2	A20275	Trimmer, 8-75 uuf.
C3	C20273-104	Condenser, P. T., .1 uf., 400 V.
C4, C12	C20065-500	Condenser, Mica, 50 uuf., 500 V.
C5, C7, C13, C17	C20272-503	Condenser, P. T., .05 uf., 200 V.
C6, C9	A21674	Condenser, P. T., .005 uf.,
C8	A22295	Disc Ceramic Capacitor, .01 uf.
C10	C20065-330	Condenser, Mica 33 uuf., 500 V.
C11	C20272-103	Condenser, P. T., .01 uf., 200 V.
C18A, B, C	A21815	Condenser, Electrolytic, 40-20 mfd., 150 V., 100 mfd., 10 V.
C19	C20273-602	Condenser, P. T., .006 uf., 400 V.
C20	A21675	Condenser, Electrolytic 30 mfd., 150 V.
L1	AD22258-1	Antenna Loop & Cabinet Back Assy. Blue-Green
L1	AD22258-2	Antenna Loop & Cabinet Back Assy. Jade-Green
L2, L3	AC22256-1	R. F. Transformer Assembly
L4, L5	AC22255-1	Oscillator Coil Assembly

MODEL 440T,
Ch. RE-278



MODELS 440T

CHASSIS RE-278 – 4 TUBE AC – DC

ELECTRICAL AND MECHANICAL SPECIFICATIONS

FREQUENCY RANGE
- Broadcast ---------- 540-1600 kc
- IF ---------- 455 kc

TUBES AND FUNCTIONS
- 12SA7 ---------- Mixer-oscillator
- 12SQ7 ---------- Detector – AVC-AF.
- 50L6GT ---------- Output
- 35Z5GT ---------- Rectifier

POWER SUPPLY
105-125 Volts, AC-DC, 30 Watts

POWER OUTPUT
- Type: Beam tube
- Undistorted ---------- 1 Watt
- Maximum ---------- 1.85 Watts
- Plate Load ---------- 2000 Ohms

LOUD SPEAKER
- Type. Permanent magnet
- Size: 4 inch
- Voice coil impedance ---------- 3.2 Ohms

CHASSIS FEATURES
- Automatic Volume Control
- Underwriter's Listed

OPERATING CONTROLS
1. Upper knob ---------- Tuning
   Tuning ratio ---------- 1.1
2. Lower knob ---------- ON-OFF & Volume

GENERAL INFORMATION & SERVICE HINTS

POSITION OF POWER CORD PLUG.

On AC the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. On DC the receiver will work in only one position of the plug in its receptacle.

THE ANTENNA

A 20 ft. antenna hank is attached to the receiver. In metropolitan areas it may be necessary to uncoil only a portion of the antenna to obtain satisfactory reception. For maximum pickup uncoil the antenna hank the full length. Do not attach it to a water pipe, radiator or other grounded object. So doing may result in hum and possibly a burned out antenna coil. If you are located some distance from a broadcasting station, or if local noise from electrical equipment is high, reception will be greatly improved by the addition of an outside antenna which may be connected to the end of the hank.

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

CAUTION:

If any part of the antenna hank is located near the 12SA7 tube, the set is likely to oscillate, especially when the hank is not uncoiled.

ALIGNMENT PROCEDURE

PRELIMINARY.
- Output meter connection ---------- Across loudspeaker voice coil
- Output meter reading to indicate 500 milliwatts (standard output ---------- 1.26 volts
- Dummy antenna to be in series with signal generator output ---------- See chart below
- Connection of generator ground lead ---------- Floating ground
- Generator modulation ---------- 30% 400 cycles
- Position of Volume Control ---------- Fully clockwise

Position of Variable	Generator Frequency	Dummy Antenna	Generator Output Connection	Trimmers Adjusted	Trimmer Function	Approximate Sensitivity
Open	455 Kc	.05 uf.	12SA7 Grid (Stator of C-1)	A1 A2	IF	4000 uv.
1400 Kc	1400 Kc	.00005 uf.	Antenna Lug with Hank Removed	** A3	Oscillator	450 uv.

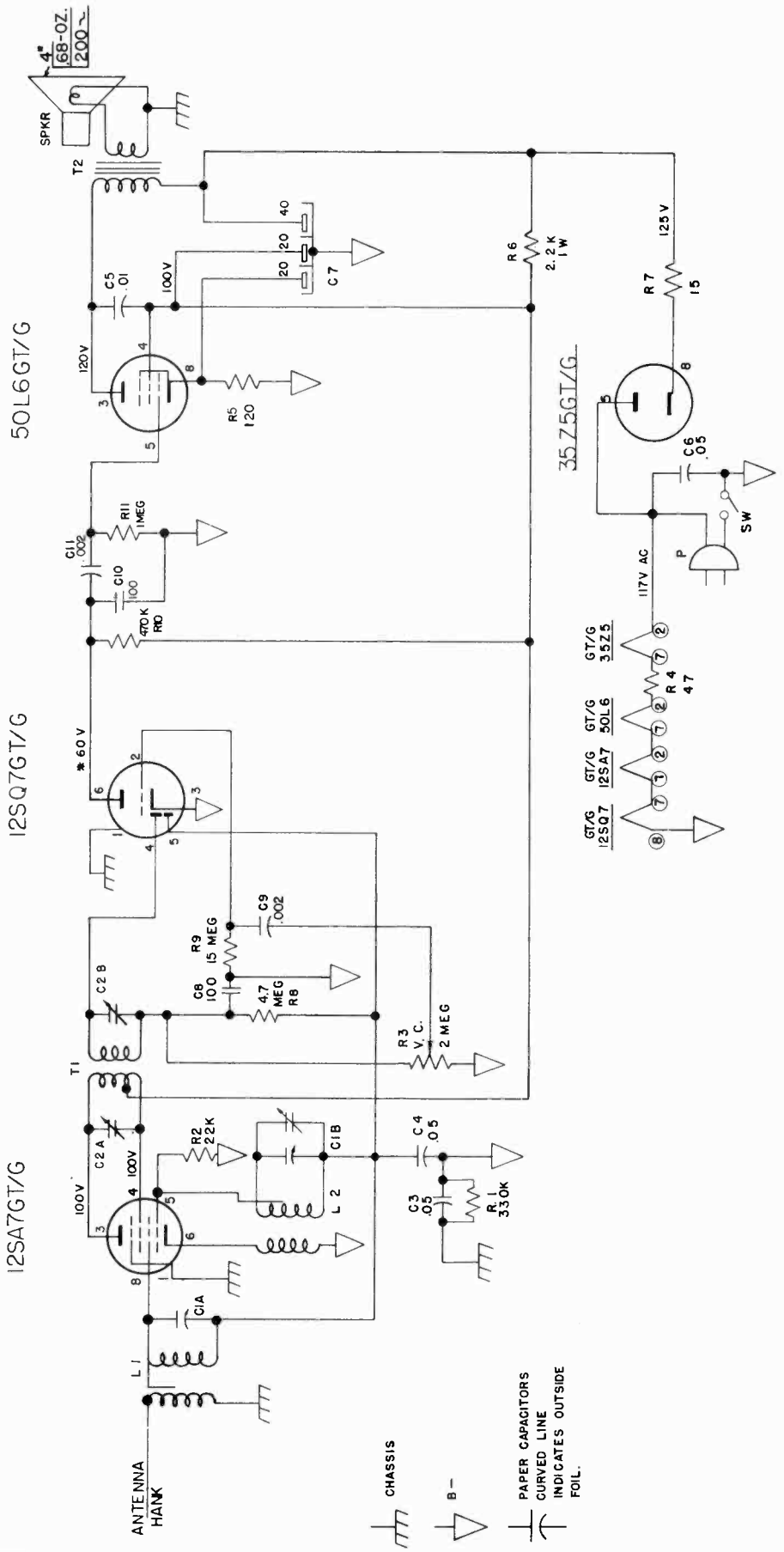
**Since the antenna section of the variable has no trimmer, the rotor of the variable should be rocked back and forth on both sides of 1400 Kc while adjusting the oscillator trimmer for maximum output. This is to obtain the combination of rotor and trimmer setting to give perfect tracking of the two sections of the variable condenser and consequently give maximum output.

Check sensitivity at 600 Kc. If weak, adjust antenna section plates for maximum output at 600 Kc. Tracking of the condenser at points other than 1400 Kc is accomplished by bending the outside plates on the variable condenser rotor, which are cut for this purpose. When bending plates to track the condenser at any given frequency, keep in mind the fact that this will effect the tracking at all frequencies below that point. A tuning wand is very helpful in checking the tracking of this condenser, to indicate whether more or less capacity is needed.

The alignment procedure should be repeated stage by stage in the original order for greatest accuracy.

Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

MODEL 440T,
Ch. RE-278

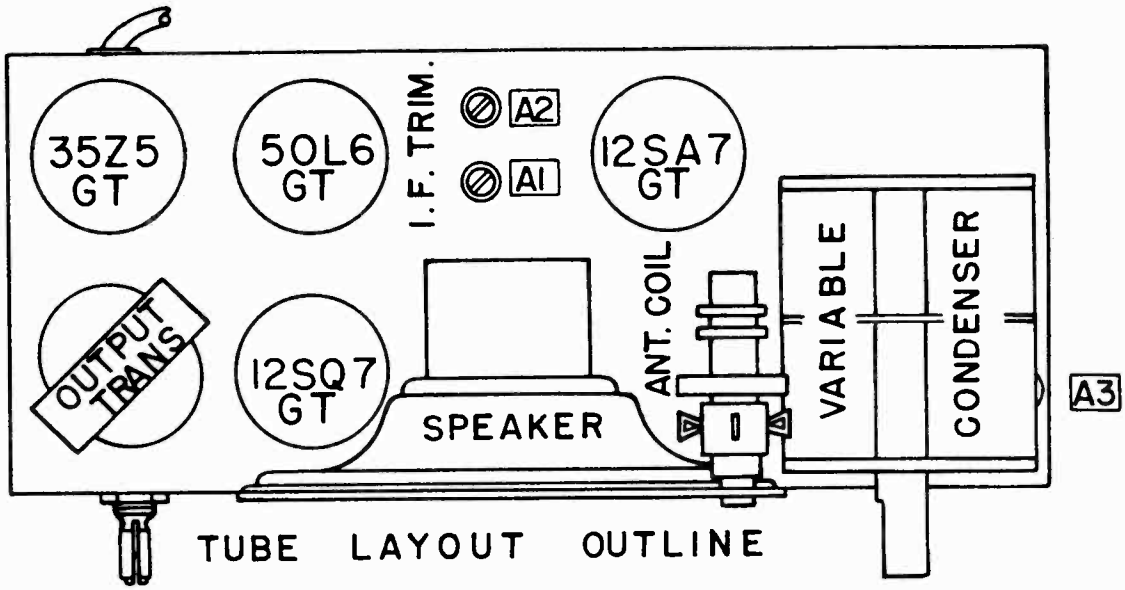


Tube sockets are viewed from under side of chassis. Voltage Readings shown at socket prongs are to floating ground, and are taken with no Signal. AC line voltage at 117 Volts AC.

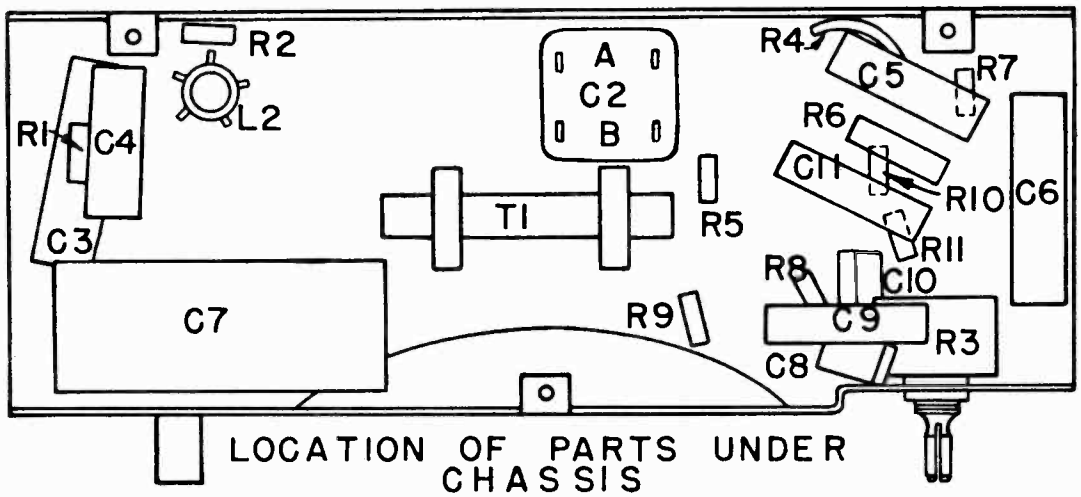
* Measured with Vacuum tube voltmeter.

NOTE: Capacity Coupling is built in the antenna and oscillator coils. On some early Production sets, A 14 uuf. mica. Condenser will be used in place of the built in Capacity on the Antenna Coil.

MODEL 440T,
Ch. RE-278



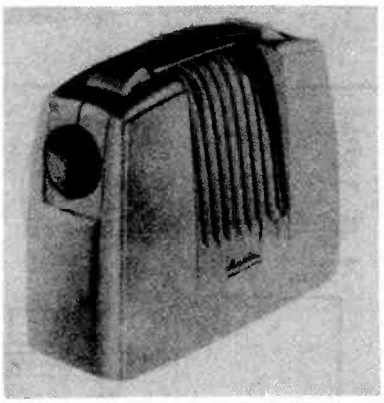
TUBE LAYOUT OUTLINE



LOCATION OF PARTS UNDER CHASSIS

REF. NO.	PART NO.	DESCRIPTION
R1	C20060-334	Resistor, ¼ W., 330 K.
R2	C20060-223	Resistor, ¼ W., 22 K.
R3	C21630	Resistor, Volume Control, 2meg.
R4	A19177	Resistor, 1 W., 47 ohms
R5	C20120-121	Resistor, ¼ W., 120 ohms
R6	C20070-222	Resistor, 1 W., 2200 ohms
R7	C20060-150	Resistor, ¼ W., 15 ohms
R8	C20060-475	Resistor, ¼ W., 4.7 meg.
R9	C20060-156	Resistor, ¼ W., 15 meg.
R10	C20060-474	Resistor, ¼ W. 470 K.
R11	C20060-105	Resistor, ¼ W., 1 meg.
C1A, C1B	C22919	Condenser, Tuning
C2A, C2B	A21042	Condenser, I. F. Trans. Trimmers
C3	C20068-503	Condenser, .05 uf., 400 V.
C4	C20067-503	Condenser, .05 uf, 200 V.
C5	C20068-103	Condenser, .01 uf, 400 V.
C6	C20068-503	Condenser, .05 uf., 400 V.
C7	A22876	Condenser, 40-20, uf, 150 V., 20 uf, 25 V.
C8	C20065-101	Condenser, 100 uf, 500 V.
C9	C20069-202	Condenser, .002 uf, 600 V.
C10	C20065-101	Condenser, 100 uf, 500 V.
C11	C20069-202	Condenser, .002 uf, 600 V.
SPK	C22875	4" P. M. Speaker
T2	C22878	Output Transformer
T1	C22863	I. F. Transformer
L1	C22864	Antenna Coil
L2	C22865	Oscillator Coil
P	B20257-1	Line Cord & Plug Assy.
	AA23438-1	Cabinet with Grille Cloth, Ivory
	AA23438-2	Cabinet with Grille Cloth, Red
	AA23438-3	Cabinet with Grille Cloth, Yellow
	AA23438-4	Cabinet with Grille Cloth, Bronze
	AA23438-5	Cabinet with Grille Cloth, Willow Green
	AA23438-6	Cabinet with Grille Cloth, Burgundy
	C22923-1	Tuning Knob
	A22924-1	Volume Knob
	A21992	Compression Spring

MODEL 446P,
Ch. RE-280



SPECIFICATIONS

FREQUENCY RANGE
- Broadcast ..... 540-1600 kc
- IF ..... 455 kc

TUBES AND FUNCTIONS
- 1R5 ..... Mixer-oscillator
- 1T4 ..... IF Amp.
- 1U5 ..... DET-AVC AF Amp.
- 3S4 ..... Output

POWER SUPPLY
- 1 67½ V. B. Battery, Everyeady Minimax, No. 467 or Equal.
- 2 1½ V. D. Size Flashlight Cells, Connected in Parallel.

POWER OUTPUT
- Undistorted ..... .06 Watts
- Maximum ..... .15 Watts
- Plate Load ..... 10,000 Ohms

LOUD SPEAKER
- Type: Permanent magnet ..... 68 Oz.
- Size: 4 Inch
- Voice: Coil Impedance ..... 3.2 Ohms

CHASSIS FEATURES
- Automatic Volume Control
- Built-in Loop

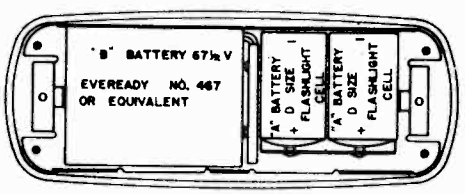
OPERATING CONTROLS
- 1 Left Knob ..... On-Off Switch and Volume
- 2 Right Knob ..... Tuning

PHYSICAL DIMENSIONS
- Length ..... 9 Inches
- Height ..... 6½ Inches
- Depth ..... 3½ Inches

PARTS LIST

REF. No.	PART NO.	DESCRIPTION
R1	C20060-104	Resistor, 100,000 ohm, ¼ watt, 20%
R2	C20060-225	Resistor, 2.2 megohm, ¼ watt, 20%
R3	C20060-106	Resistor, 10 megohm, ¼ watt, 20%
R4	C20060-475	Resistor, 4.7 megohm, ¼ watt, 20%
R5	C20060-105	Resistor, 1 megohm, ¼ watt, 20%
R6	C20060-225	Resistor, 2.2 megohm, ¼ watt, 20%
R7	C20120-391	Resistor, 390 ohm, ¼ watt, 10%
R8	C23138	Volume Control and Switch, 2 megohm
C1	A21811	Condenser, Electrolytic, 10 uf, 150 volts
C2, C11	C20067-503	Condenser, .05 uf, P.T., 200 volts
C3, C10	C20065-500	Condenser, 50 uuf, Mica, 500 volts
C4	C20069-202	Condenser, .002 uf, P.T., 600 volts
C5	C20065-101	Condenser, 100 uuf, Mica, 500 volts
C6	C20067-103	Condenser, .01 uf, P.T., 200 volts
C7	C20069-602	Condenser, .006 uf, P.T., 600 volts
C8	C20069-102	Condenser, .001 uf, P.T., 600 volts
C9 (A-B)	C22966	Condenser, Variable
L1	C23141	Antenna, Loop
L2	AC23139	Oscillator Coil Assembly
T1, T2	C21797-1	I.F. Transformer
	A21792	Spring Clip, I.F. Coil Mounting,
T3	AC23140	Output Transformer
SPK	C22972	Speaker, 4" P.M.
	A21842	"B" Battery Cable and Terminal Strip
	A23136	"A" Battery Clip (Brass)
	A19180	"A" Battery Insulating Washers, 10 for
	A23137	"A" Battery Clip Insulator, 10 for
	C23133	Volume Control Mounting Bracket
	C23134	Variable Condenser, Mounting Bracket
	C23132	Chassis Bottom Cover
	A20243-3	Socket, Miniature, Shielded
	A20243-1	Socket, Miniature, Unshielded
	C23167	Knob, Volume Control
	C23166	Knob, Tuning
	A22572	Tube, Shield (145)
	A22573	Shield Base Clip
	A23172	Carton
	*AA23759-1	Cabinet Assembly, Maroon
	*AA23759-2	Cabinet Assembly, Sandalwood

* Cabinet assembly includes grill cloth, handle, and chassis mounting brackets.



BATTERY INSTALLATION

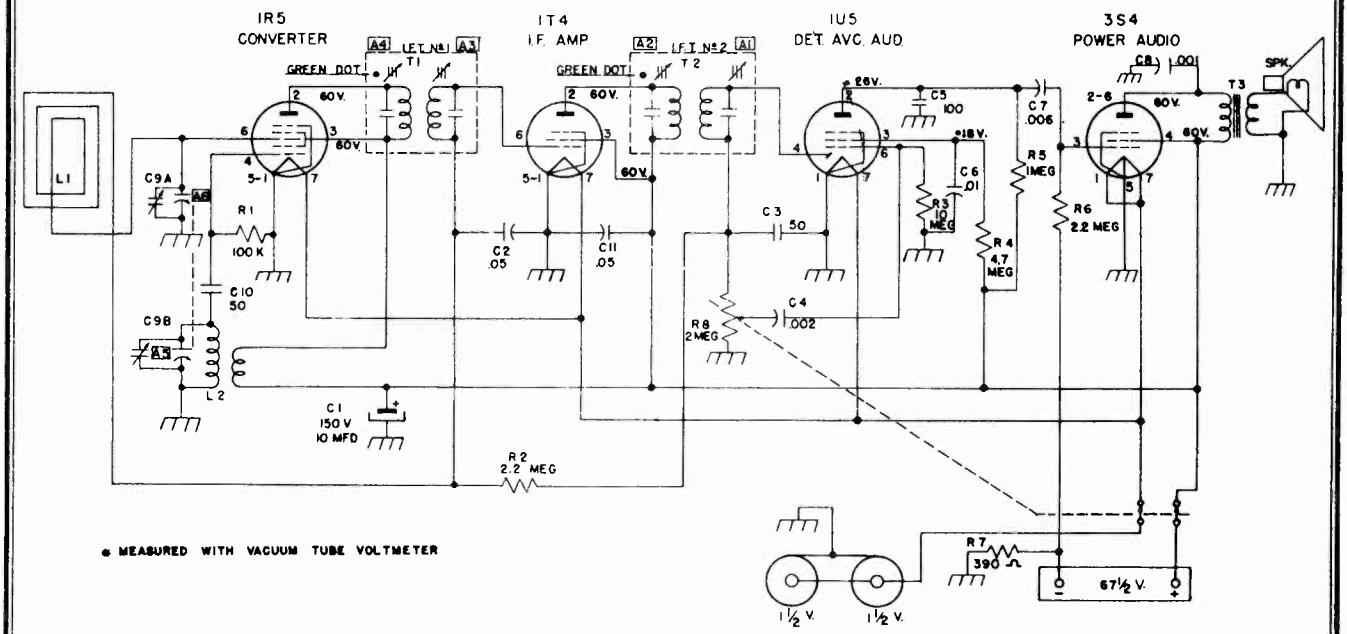
MODEL 446P,
Ch. RE-280

ALIGNMENT DATA

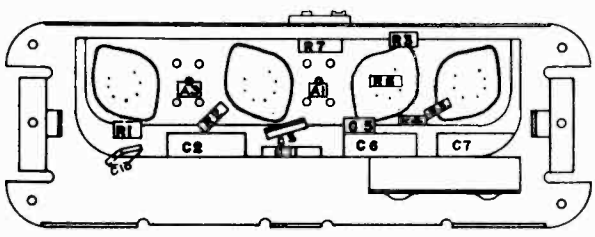
Preliminary

Output meter reading to indicate .05 watt across voice coil ——— 0.4 V.
Generator ground lead connected ——— to metal chassis.
Generator modulation ——— 30%, 400 cycles.
Position of Volume control ——— fully on.

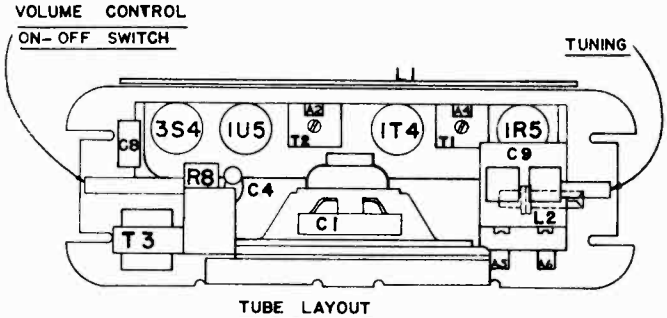
Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Adjust Trimmers (In order shown)	Trimmer Function
Open	455 KC	.05 MFD	Mixer Grid	A1, A2, A3, A4	I.F.
Open	1650 KC		Test Loop	A5	Osc.
1400 KC	1400 KC		Test Loop	A6	Ant.
600 KC	600 KC		Test Loop	Check Point	



SCHEMATIC DIAGRAM

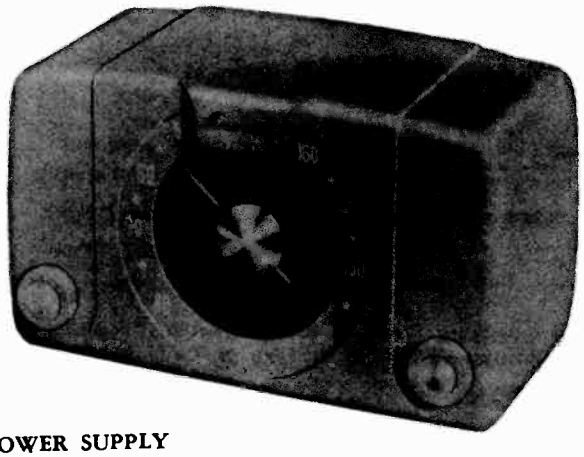


LOCATIONS OF PARTS UNDER CHASSIS



TUBE LAYOUT

MODELS 450T,
451T, Ch. RE-281



SPECIFICATIONS

FREQUENCY RANGE

Broadcast	540-1600 kc
IF	455 kc

TUBES AND FUNCTIONS

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

LOUD SPEAKER

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

POWER SUPPLY

105-125 Volts, AC-DC, 35 Watts

POWER OUTPUT

Undistorted	1 Watt
Maximum	1.5 Watts
Plate load	2000 Ohms

PHYSICAL DIMENSIONS

Length	11 inches
Height	6⅜ inches
Depth	5½ inches

CHASSIS FEATURES

Automatic Volume Control
Built-in Loop
Underwriters' Listed

OPERATING CONTROLS

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

The same chassis is used in models 450T and 451T. 451T has additional cabinet trim and deluxe knobs, which are not used on Model 450T. 450T is made in Ivory and Walnut. 451T is made in the following colors: Ivory, Willow Green, Sandalwood, and Ebony.

THE ANTENNA

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

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

ALIGNMENT PROCEDURE

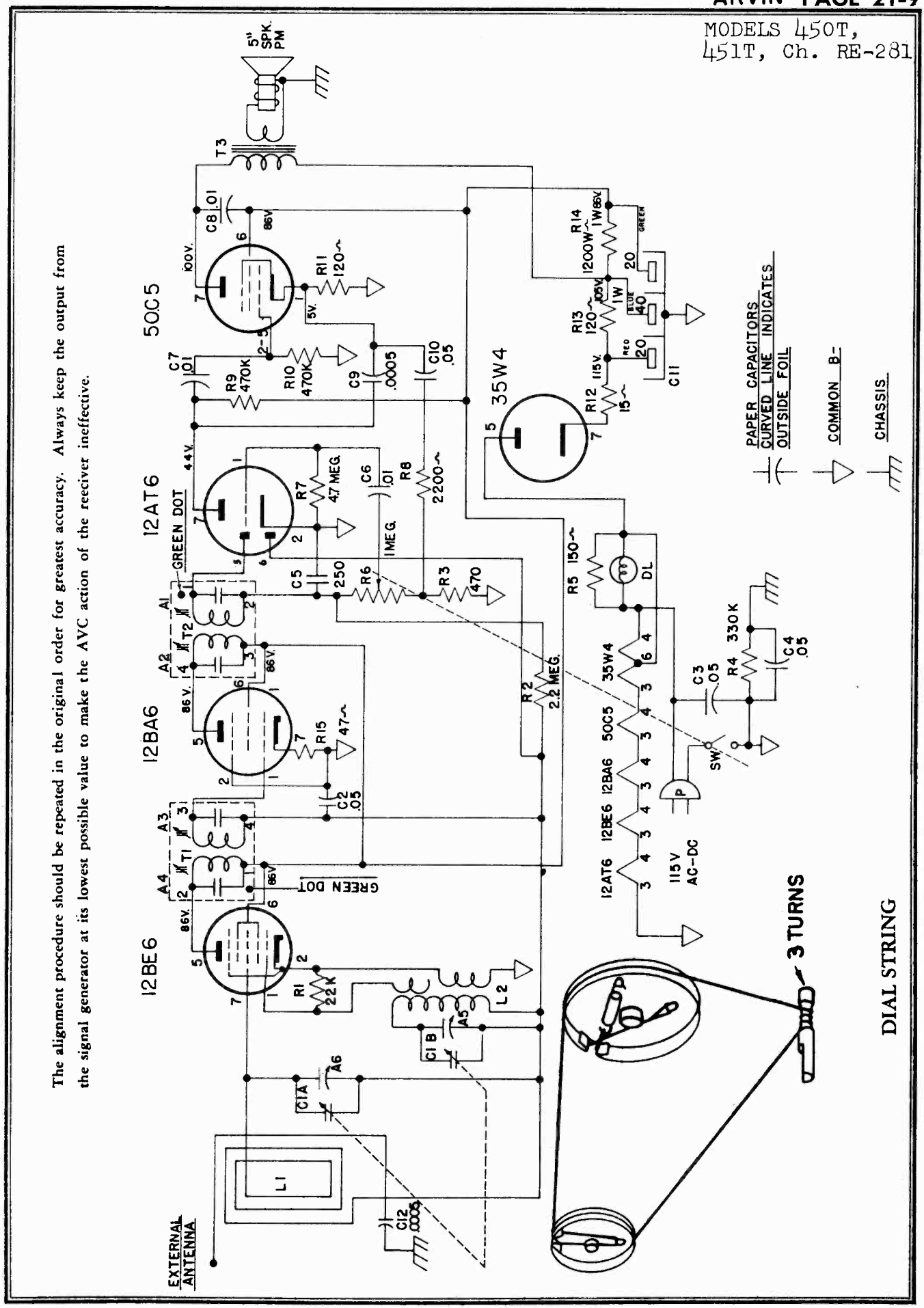
PRELIMINARY:

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

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

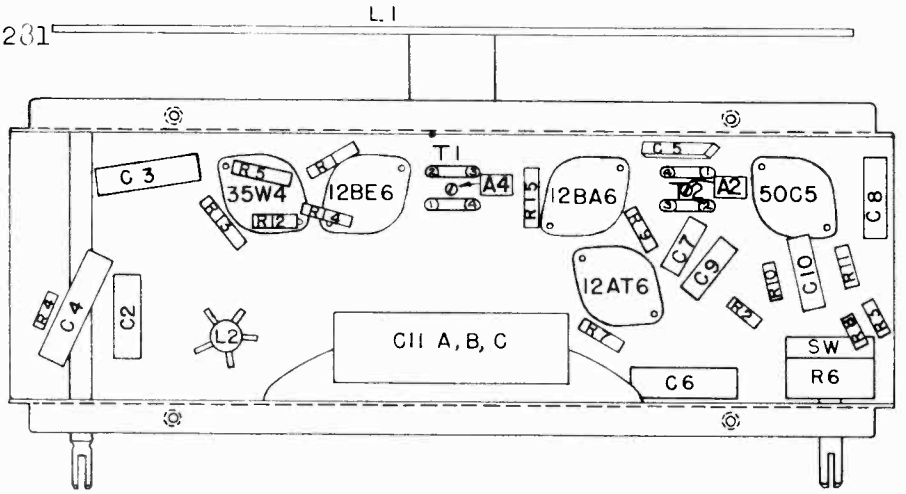
*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter, placed about one foot from the set loop.

MODELS 450T, 451T, Ch. RE-281



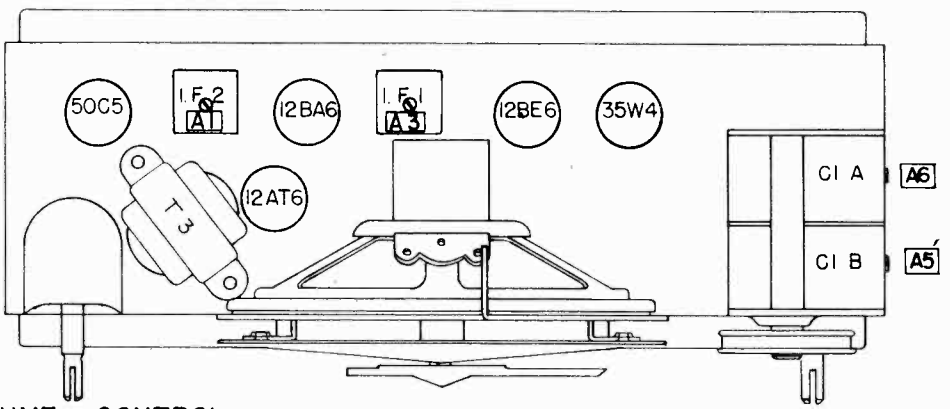
The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

MODELS 450T, 451T, Ch. RE-231



LOCATION OF PARTS UNDER CHASSIS

TUBE LAYOUT



VOLUME CONTROL & SWITCH

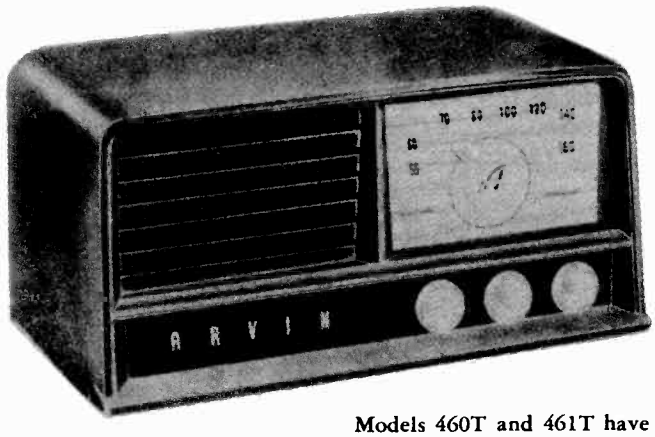
TUNING

LOCATION OF TUBES AND TRIMMERS

PARTS LIST — 450T-451T

REF. NO.	PART NO.	DESCRIPTION
L1	D23465	Antenna Loop and Rear Cover
	B23456	Antenna Loop Mounting Bracket
	AE23499-1	Cabinet Assy., 450T Ivory
	AE23499-2	Cabinet Assy., 450T Walnut
	AE23499-3	Cabinet Assy., 451T Deluxe Ivory
	AE23499-4	Cabinet Assy., 451T Deluxe Willow Green
	AE23499-5	Cabinet Assy., 451T Deluxe Sandalwood
	AE23499-6	Cabinet Assy., 451T Deluxe Ebony
	A23474	Carton with fillers
L2	AC22865-1	Coil, Oscillator
C1 A, B	C23469	Variable Condenser
C2, C10	C20067-503	Condenser, Paper Tubular .05 mf. 200 V
C3, C4	C20068-503	Condenser, Paper Tubular .05 mf. 400 V
C5	C20065-251	Condenser, Mica 250 mmf. 500 V
C6, C7, C8	C20068-103	Condenser, Paper Tubular .01 mf. 400 V
C9, C12	C20069-501	Condenser, Paper Tubular .0005 mf. 600 V
C11	C23470	Condenser, Electrolytic 20-40-20 150 V
	A19351	Dial Light Bulb Mazda No. 47
	A19628-3	Dial Light Socket
	A23453-1	Knob, Clear
	A23453-2	Knob, Ivory
	B20138-16	Line Cord
	C23461	Pointer
R1	C20060-223	Resistor, 22k ¼ watt 20%
R2	C20060-225	Resistor, 2.2 Meg. ¼ watt 20%
R3	C20060-471	Resistor, 470 ¼ watt 20%
R4	C20060-334	Resistor, 330K ¼ watt 20%
R5	C20060-151	Resistor, 150 ¼ watt 20%
R6	C23468	Volume Control, 1 Meg. ¼ watt 20%
R7	C20060-475	Resistor, 4.7 Meg. ¼ watt 20%
R8	C20060-222	Resistor, 2200 ¼ watt 20%
R9, R10	C20060-474	Resistor, 470K ¼ watt 20%
R11	C20120-121	Resistor, 120 ¼ watt 10%
R12	C20060-150	Resistor, 15 ¼ watt 20%
R13	C20070-121	Resistor, 120 1 watt 10%
R14	C20070-122	Resistor, 1200 1 watt 10%
R15	C20060-470	Resistor, 47 ¼ watt 20%
	A20243-1	Socket, Wafer, Plain
	A20243-3	Socket, Wafer, Center Pin Shielded
SPK	C23467	Speaker, 5" PM
	C23462-1	Speaker, Grill
	A23982	Speaker Brkt & Pointer Shaft
T1, T2	C21797-16	Transformer, I. F.
	A21792	Transformer, I. F. Spring Clips 5 for
T3	AC23464-1	Transformer, Output
	A23475	Tuning Shaft
	A19361	Tuning Shaft hair pin Clip

MODELS 460T,
461T, Ch. RE-284



Colors are as follows:

460T — Ivory, Willow Green, and Sandalwood.

461T — Mahogany.

POWER OUTPUT

Undistorted	.8 Watts
Maximum	1.5 Watts
Plate load	2000 Ohms

Models 460T and 461T have the same Chassis, they differ only in cabinet trim and knobs.

SPECIFICATIONS

FREQUENCY RANGE

Broadcast	540-1600 kc
IF	455 kc

TUBES AND FUNCTIONS

12SK7GT	RF Amp.
12SA7GT	Mixer-oscillator
12SK7GT	IF Amp.
12SQ7GT	DET-AVC AF Amp.
35L6GT	Output
35Z5GT	Rectifier

LOUD SPEAKER

Type: Permanent magnet, 1.47 oz. Alnico 5
Size: 5 Inch

Voice coil impedance	3.2 Ohms

CHASSIS FEATURES

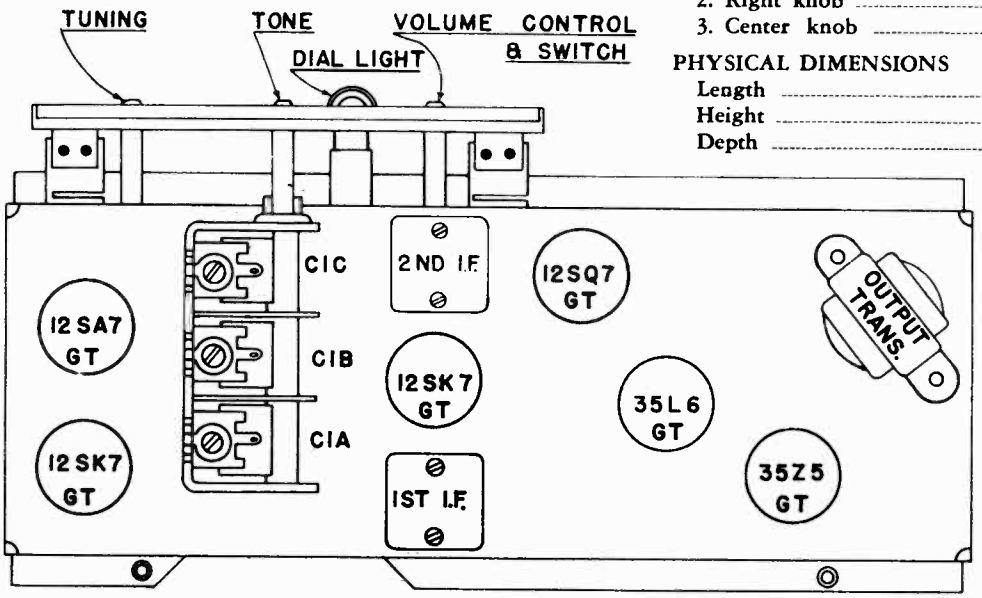
Automatic Volume Control
Built-in Loop
Underwriters' Listed
Tuned RF Stage

OPERATING CONTROLS

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

PHYSICAL DIMENSIONS

Length	13⅞ inches
Height	6⅝ inches
Depth	7⅝ inches



TUBE LAYOUT

ALIGNMENT PROCEDURE

PRELIMINARY:

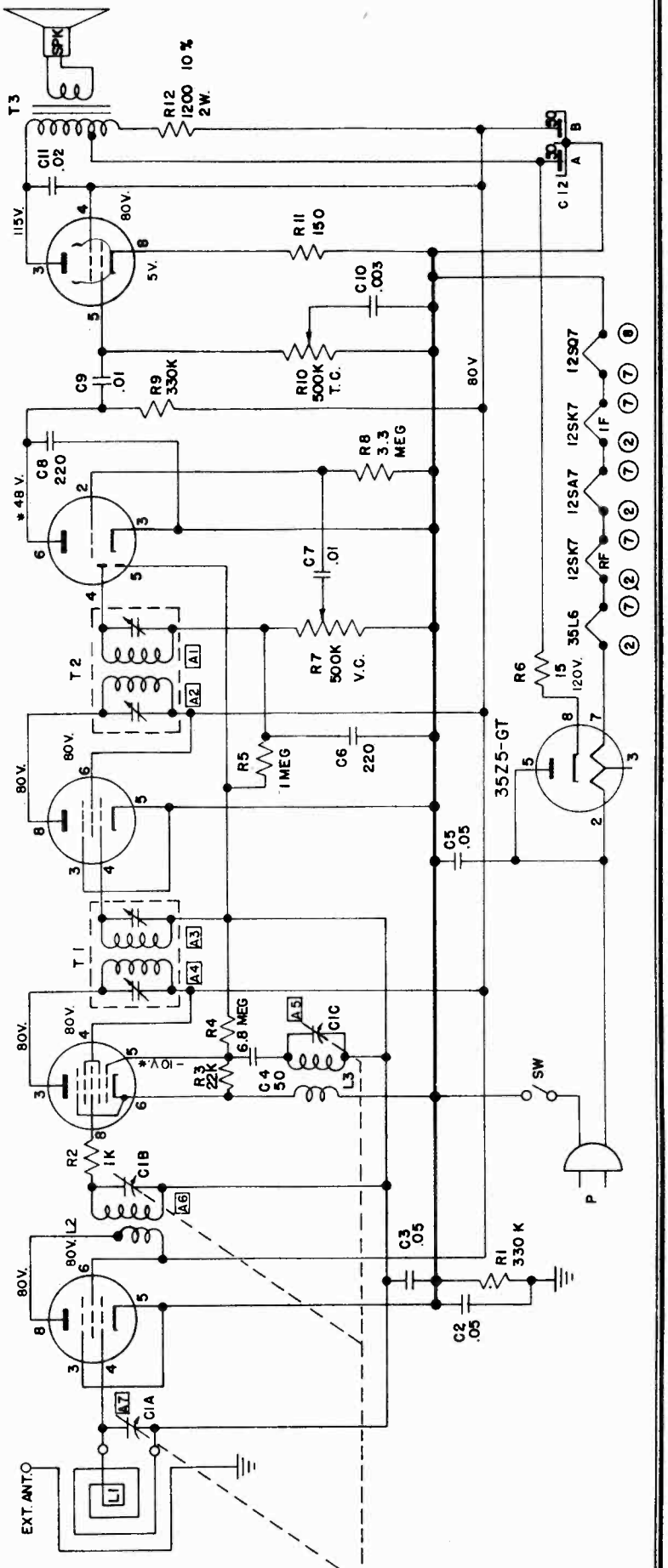
Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate .5 W (standard output)	1.26 volts
Connection of generator ground lead	Floating ground
Generator modulation	30% 400 cycles
Position of volume control	Fully clockwise
Position of dial pointer with variable fully closed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

MODELS 460T, 461T, Ch. RE-284

1. Connect signal generator lead through a .05 uf. condenser to converter grid. Open tuning condenser. Set signal generator to 455 Kc. Tune I. F. Trimmers A1, A2, A3, and A4 for maximum output.
2. Close tuning condenser and set pointer horizontally to left. Open tuning condenser. Connect signal generator to test loop or to blue lead on set loop. Set signal generator to 1650 Kc. Tune A5 trimmer on oscillator section of tuning condenser for maximum output.
3. Set signal generator to 1400 Kc. Adjust tuning shaft until maximum output is obtained. Tune R. F. trimmer A6 and antenna trimmer A7 on tuning condenser for greatest output. Reset tuning shaft until output is again maximum. Retune R. F. and antenna trimmers. Repeat this cycle of operations at 1400 Kc. until no further increase of output can be obtained. Keep generator output at a low value to prevent detuning by A. V. C. action.
4. Set signal generator to 600 Kc. Adjust tuning shaft for maximum output. Adjust tuning condenser plates for maximum output if necessary.

Approximate sensitivities with 117 V. AC line voltage and .5 W output across voice coil, should be: Mixer grid, 455 Kc — 200 uv; Antenna lead 600 Kc. — 250 uv., 1000 Kc — 200 uv., 1400 Kc. — 200 uv.

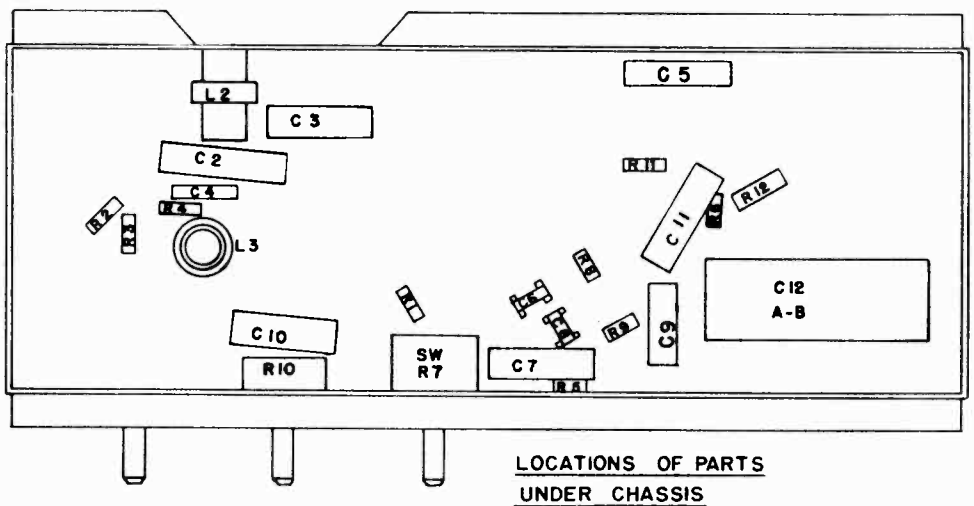
VOLTAGE READINGS TAKEN WITH 117V. A C LINE VOLTAGE
*THESE READINGS TAKEN WITH VACUUM TUBE VOLTMETER



MODELS 460T, 461T, Ch. RE-284

PARTS LIST — 460T-461T

Schematic Location	Part No.	Description
L1	D23159	Antenna Loop
	B22953	Antenna Loop Mtg. Brkt.
	A23830-1	Cabinet (461) Mahogany with carton
	A23829-2	Cabinet (460) Ivory with decorative rail & Carton
	A23829-3	Cabinet (460) Willow Green with decorative Rail & Carton
	A23829-4	Cabinet (460) Sandalwood with decorative Rail & Carton
	C23299	Cabinet - Rear Cover
	C23300	Cabinet decorative Rail with Palnuts & washers.
	A23237	Carton
L2	AC23163	Coil, R. F.
L3	C23751	Coil, Oscillator
C1A,B,C	C23743	Condenser, Variable
C2, C5	C20068-503	Condenser, P. T. .05 uf., 400 V
C3	C20067-503	Condenser, P. T. .05 uf., 200 V
C4	C20065-500	Condenser, Mica 50 uuf., 500 V
C6, C8	C20203-221	Condenser, Ceramic, 220 uuf., 350 V
C7, C9	C20068-103	Condenser, P. T. .01 uf., 400 V
C10	C20069-302	Condenser, P. T. .003 uf., 600 V
C11	C20068-203	Condenser, P. T. .02 uf., 400 V
C12 A, B	A22111	Condenser, Electrolytic 50-50 uf., at 150 V
	A19133	Dial Cord Spring 10 for
	D23235	Dial Crystal
	A19124	Dial Crystal Snap Fasteners 10 for
	A19351	Dial, Lamp Bulb Mazda No. 47
	A22849-1	Dial, Lamp Socket
	AC23302-1	Dial Plate Assy. (Brown)
	AC23302-2	Dial Plate Assy. (Ivory)
	AC23302-3	Dial Plate Assy. (Wil. Green)
	AC23302-4	Dial Plate Assy. (San'wood)
	C23229-1	Knob — on-off Volume (460)
	C23229-3	Knob — Tuning (460)
	C23229-4	Knob — Tone (460)
	C23229-5	Knob — on-off volume (461)
	C23229-7	Knob — Tuning (461)
	C23229-8	Knob — Tone (461)
	B20138-15	Line Cord and Plug
	D23242	Pointer
	A20040-17	Pointer felt washer 10 for
R1, R9	C20060-334	Resistor, 330,000 ohm ¼ W
R2	C20060-102	Resistor, 1000 ohm ¼ W
R3	C20060-223	Resistor, 22,000 ohm ¼ W
R4	C20060-685	Resistor, 6.8 Megohm ¼ W
R5	C20060-105	Resistor, 1 megohm ¼ W
R6	C20060-150	Resistor, ¼ W
R7	C22963	Resistor, Volume control & switch 500,000 ohm
R8	C20060-335	Resistor, 3.3 megohm ¼ W
R10	C23156	Resistor, Tone control 500,000 ohm
R11, R13	C20060-151	Resistor, 150 ¼ W
R12	C20223-122	Resistor, 1200 2 W ± 10%
SPK	C22760-1	Speaker, 5" P. M.
	A19138-8	Speaker, spacer eyelet 10 for
T1	AC23161	Transformer, 1st I. F.
T2	AC23162	Transformer, 2nd I. F.
T3	AC23164	Transformer, Output
	A19233-1	Tube socket, center pin shielded
	A18254-1	Tube Socket Plain
	A22957-1	Tuning shaft
	A19361	Tuning shaft hair pin clip



LOCATIONS OF PARTS UNDER CHASSIS

MODELS 462-CB, 462-CM, Ch. RE-287-1

SPECIFICATIONS

FREQUENCY RANGE

Broadcast	540-1600 kc
IF	455 kc

TUBES AND FUNCTIONS

12SK7GT	RF Amp.
12SA7GT	Mixer-oscillator
12SK7GT	IF Amp.
12SQ7GT	DET-AVC AF Amp.
35L6GT	Output
35Z5GT	Rectifier

POWER OUTPUT

Undistorted	.8 Watts
Maximum	1.5 Watts
Plate load	2000 Ohms

LOUD SPEAKER

Type: Permanent magnet, 1.47 oz. Alnico 5	
Size: 8 Inch	
Voice coil impedance	3.4 Ohms

CHASSIS FEATURES

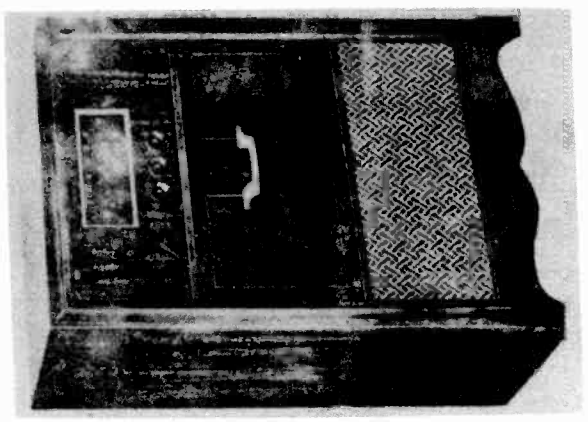
Automatic Volume Control
Built-in Loop
Underwriters' Listed
Tuned RF Stage

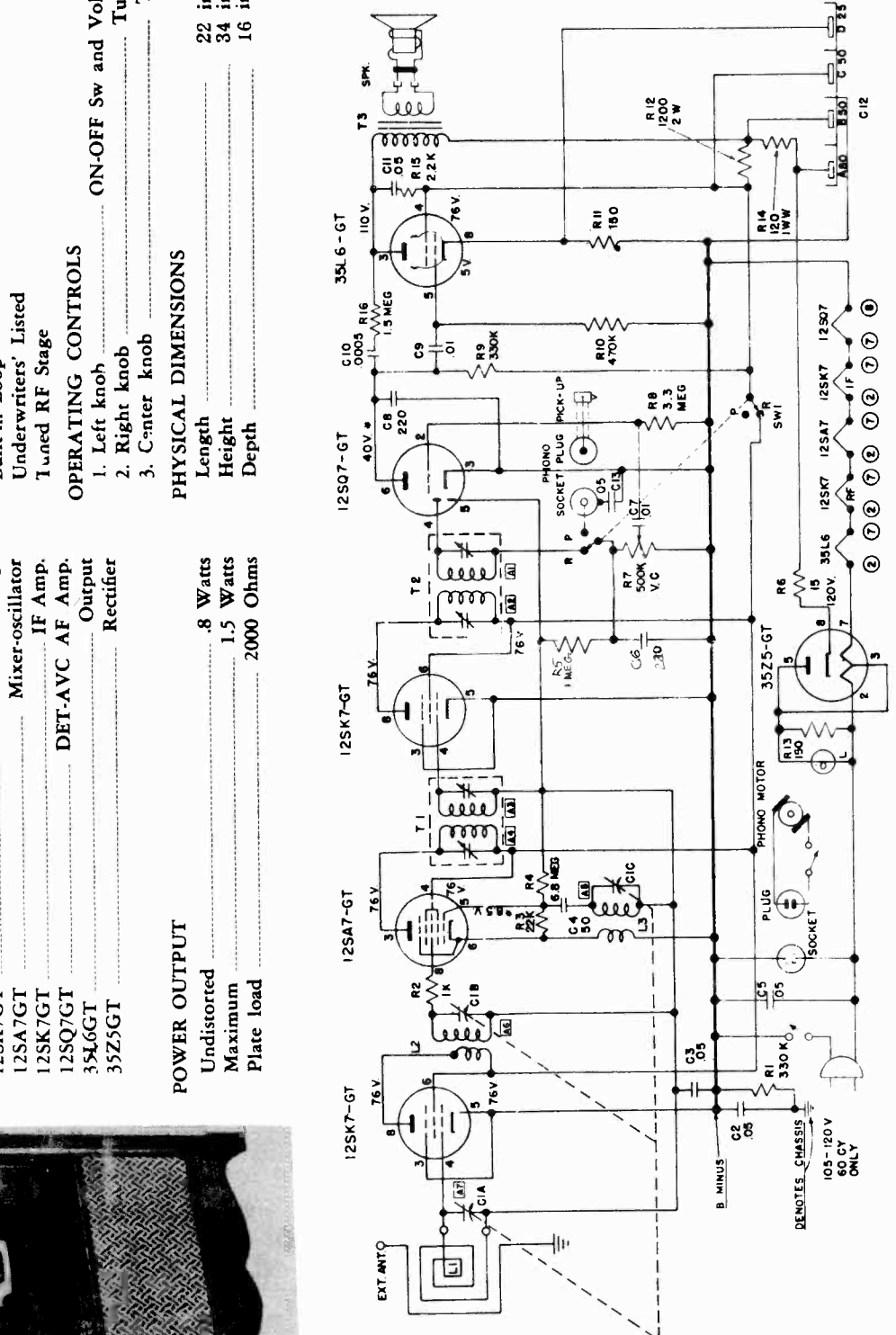
OPERATING CONTROLS

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

PHYSICAL DIMENSIONS

Length	22 inches
Height	34 inches
Depth	16 inches





MODELS 462-CB, 462-CM, Ch. RE-287-1

ALIGNMENT PROCEDURE

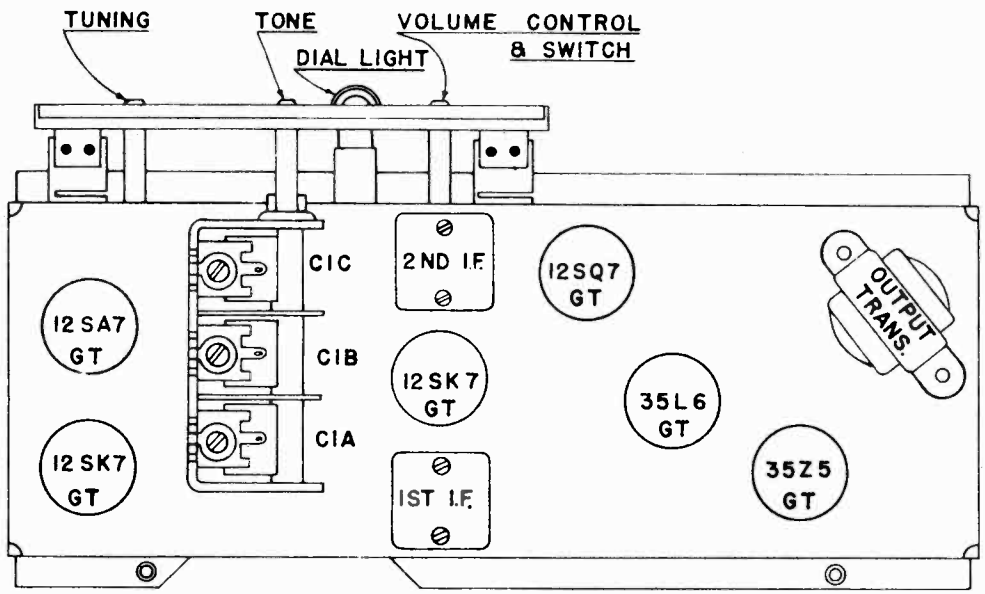
PRELIMINARY:

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

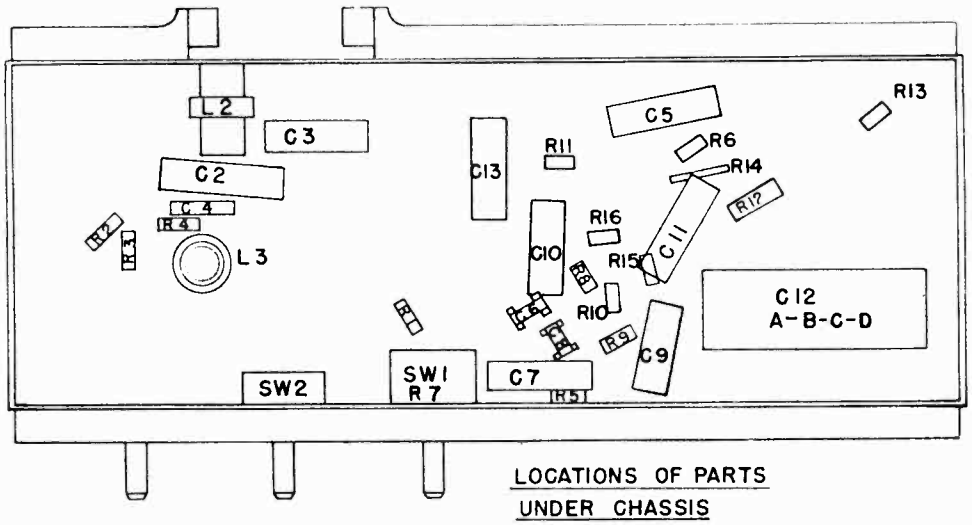
1. Connect signal generator lead through a .05 uf. condenser to converter grid. Open tuning condenser. Set signal generator to 455 Kc. Tune I. F. Trimmers A1, A2, A3, and A4 for maximum output.
2. Close tuning condenser and set pointer horizontally to left. Open tuning condenser. Connect signal generator to test loop or to blue lead on set loop. Set signal generator to 1650 Kc. Tune A5 trimmer on oscillator section of tuning condenser for maximum output.
3. Set signal generator to 1400 Kc. Adjust tuning shaft until maximum output is obtained. Tune R. F. trimmer A6 and antenna trimmer A7 on tuning condenser for greatest output. Reset tuning shaft until output is again maximum. Retune R. F. and antenna trimmers. Repeat this cycle of operations at 1400 Kc. until no further increase of output can be obtained. Keep generator output at a low value to prevent detuning by A. V. C. action.
4. Set signal generator to 600 Kc. Adjust tuning shaft for maximum output. Adjust tuning condenser plates for maximum output if necessary.

Approximate sensitivities with 117 V. AC line voltage and .5 W output across voice coil, should be: Mixer grid, 455 Kc — 200 uv; Antenna lead 600 Kc. — 250 uv., 1000 Kc — 200 uv., 1400 Kc. — 200 uv.

TUBE LAYOUT



MODELS 462-CB, 462-CM, Ch. RE-287-1

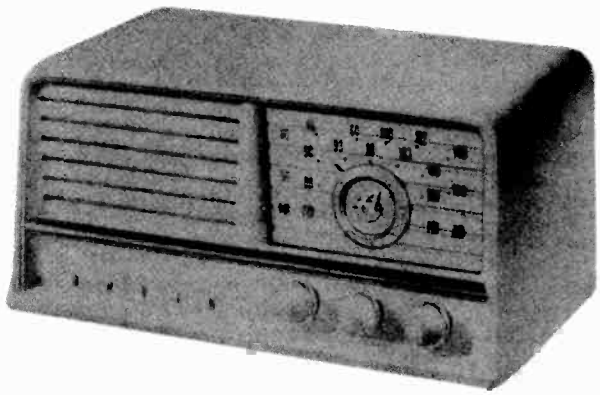


LOCATIONS OF PARTS UNDER CHASSIS

PARTS LIST FOR NO. 462-CM AND NO. 462-CB, RE-287-1

Schematic Location	Part No.	Description
L1	D23159	Antenna Loop Assy.
	B22953	Bracket, Antenna Loop Mtg.
	C23427	Bracket, Dial (2 Used)
	R23689	Cabinet, Mahogany (With Carton)
	R23689-1	Cabinet, Blonde (With Carton)
C1A, B, C	C23743	Capacitor, Variable, 3-Gang
C4	C20065-500	Capacitor, 50 uuf, 500 V, Mica
C6, C8	C20203-221	Capacitor, 220 uuf, 350 V, Ceramic
C10	C20069-501	Capacitor, .0005 MFD,600 V, Paper
C7, C9	C20068-103	Capacitor, .01 MFD, 400 V, Paper
C3	C20067-503	Capacitor, .05 MFD, 200 V, Paper
C2, C5, C11, C13	C20068-503	Capacitor, .05 MFD, 400 V, Paper
C12A, B, C, D	C23930	Capacitor, 80-50-50/150, 25/25, Electrolytic
	E23593	Record Changer Assy. (See V-M Model 950)
L3	AC23751-1	Coil, Oscillator
L2	AC23163-1	Coil, R.F.
R7	C22963	Control, Vol. & Switch, 500K Ohms
	C23707	Cover, Cabinet Rear
	C23578	Cover, Record Changer Bottom
	A23594	Dial Pointer (Mahogany)
	A23594-1	Dial Pointer (Blonde)
	D23695	Dial Scale (Mahogany)
	D23695-1	Dial Scale (Blonde)
	C23402	Escutcheon & Grystal
	D23706-2	Knob, Radio-Phono (Mahogany)
	D23706-10	Knob, Radio-Phono (Blonde)
	D23706-3	Knob, Tuning (Mahogany)
	D23706-11	Knob, Tuning (Blonde)
	D23706-1	Knob, Volume, On-Off (Mahogany)
	D23706-9	Knob, Volume, On-Off (Blonde)
	A19351	Lamp, Dial, Mazda No. 47
	B20138-15	Line Cord & Plug
R6	C20060-150	Resistor, 15 Ohms, 20%, ½W
R14	A23933	Resistor, 120 Ohms 10%, 1W
R11, R13	C20060-151	Resistor, 150 Ohms 20%, ½W
R2	C20060-102	Resistor, 1000 Ohms 20%, ½W
R12	C20223-122	Resistor, 1200 Ohms 10%, 2W
R16	C20060-222	Resistor, 2200 Ohms 20%, ½W
R3	C20060-223	Resistor, 22K Ohms 20%, ½W
R1, R9	C20060-334	Resistor, 330K Ohms 20%, ½W
R10	C20060-474	Resistor, 470K Ohms 20%, ½W
R5	C20060-105	Resistor, 1 Megohm 20%, ½W
R16	C20060-155	Resistor, 1.5 Megohms 20%, ½W
R8	C20060-335	Resistor, 3.3 Megohms 20%, ½W
R4	C20060-685	Resistor, 6.8 Megohms 20%, ½W
	A19551	Socket, A.C., Phono. Motor
	A23537-2	Socket, Dial Lamp
	A19552	Socket, Phono. Pick-up
	A19579	Socket, Speaker
	AD23693-1	Speaker Assy. 8" With Leads & Plug
	A19133	Spring, Dial Cord
	C23486	Switch, Band
T1	AC23161-1	Ist I.F. Transformer
T2	AC23162-1	2nd I.F. Transformer
T3	AC23931-1	Transformer, Output
	A22957-1	Tuning Shaft
	A19361	Tuning Shaft, Hair Pin Clip
	A22763	Weight, Cabinet

MODELS 480TFM, 481TFM,
Ch. RE-277, RE-277-1



SPECIFICATIONS

FREQUENCY RANGE

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

TUBES AND FUNCTIONS

6BA6	FM R. F. Amp.
12AT7	FM Converter
6BE6	AM Converter
6BA6	AM-FM-IF Amp.
6BA6	FM, IF Amp.
6T8	FM-AM DET, 1ST Audio AVC
6V6GT	Output
6X4	Rectifier

POWER OUTPUT

Undistorted	1.5 Watts
Maximum	2.5 Watts
Plate load	2000 Ohms

LOUD SPEAKER

Type: Permanent magnet, 1.47 oz. Alnico 5
Size: 5 Inch

Voice coil impedance	3.2 Ohms

CHASSIS FEATURES

Automatic Volume Control
Built-in Loop
Underwriters' Listed

OPERATING CONTROLS

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

PHYSICAL DIMENSIONS

Length	13⅞ inches
Height	6⅝ inches
Depth	7⅝ inches

Models 480TFM and 481TFM have the same Chassis, they differ only in Cabinet trim and knobs.

Colors are as follows:
480TFM — Ivory, Willow Green, Sandalwood and Rosewood.
481TFM — Mahogany.

Chassis RE-277-1 has a Bass boost and Hum Reduction Circuit which is not incorporated in Chassis RE-277. See note on Schematic Diagram.

THE ANTENNA

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

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

TECHNICAL INFORMATION

AM Tuning range — 540 Kc. to 1600 Kc. Immediate Frequency — 455 Kc. I. F. and R. F. measurements made at 500 milliwatts output — approximately 1.27 volts on a receiver type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I. F. 300 uv; R. F. with standard loop: at 600 Kc. 1200 uv/m; at 1000 Kc. 900 uv/m; at 1400 Kc. 800 uv/m.

FM Tuning range — 88 megacycles to 108 megacycles. Intermediate frequency 10.7 megacycles .I.F. and R.F. measurements made at 500 milliwatts output — approximately 1.27 volts on a rectifier type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I. F. 300 uv; R. F. "Absolute Measurements": 91 megacycles 100 uv; 105 megacycles, 100 uv.

ALIGNMENT PROCEDURE

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

MODELS 480TFM, 481TFM,
Ch. RE-277, RE-277-1

AM ALIGNMENT

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

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

FM ALIGNMENT

1. Turn band switch to FM, (right).

2. Connect (FM) I. F. generator to the second 6BA6 I. F. amp. grid, (lug No. 1) through a .01 uf mica dummy. Connect oscilloscope across volume control. With the I. F. generator tuned to 10.7 mc with 150 Kc deviation, and the same audio voltage used as horizontal sweep on the scope that is used to modulate the generator, adjust the ratio detector transformer slugs A7-A8 for the characteristic "S" curve (See Fig. 1), with maximum vertical height on the scope. After this adjustment the top slug of the ratio detector should not be moved during the rest of the alignment.

3. Connect I. F. generator to mixer grid through .01 mica dummy. Using 23 Kc deviation at 10.7 Mc, adjust for maximum output. Maximum output may be indicated by maximum vertical height on the scope or maixmum voltage on a standard output meter across the voice coil of the receiver. After the two I. F. transformers have been aligned the bottom slug A8 of the ratio detector should also be peaked.

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

4. Connect R. F. (FM) generator (88 to 108Mc) to the antenna terminals through the standard 300 ohm dummy (150 ohm in each side of generator leads). Use R. F. generator with 23 Kc deviation. With the variable condenser completely open and Signal Generator tuned to 108.5 Mc adjust oscillator trimmer A12 (small ceramic trimmer) for maximum reading on output meter.

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

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

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

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

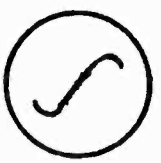


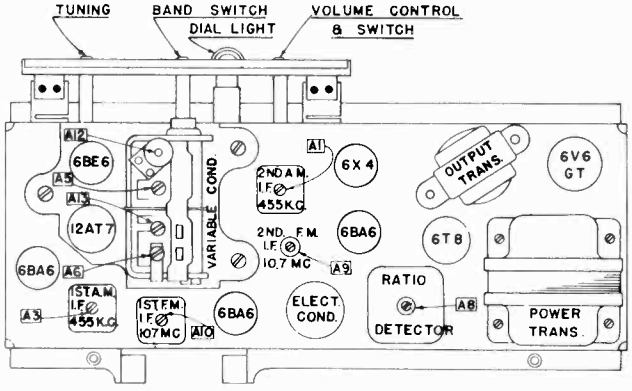
FIG. 1.

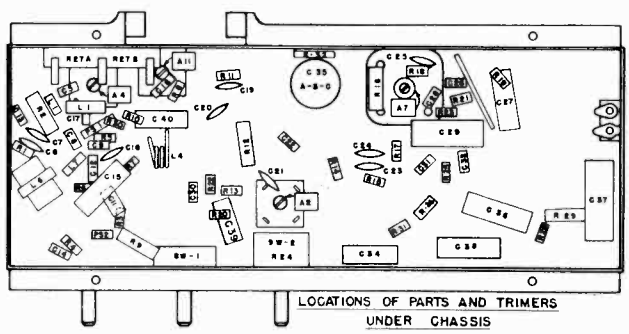
MODELS 480TFM, 481TFM,
Ch. RE-277, RE-277-1

PARTS LIST FOR 480-481 TFM

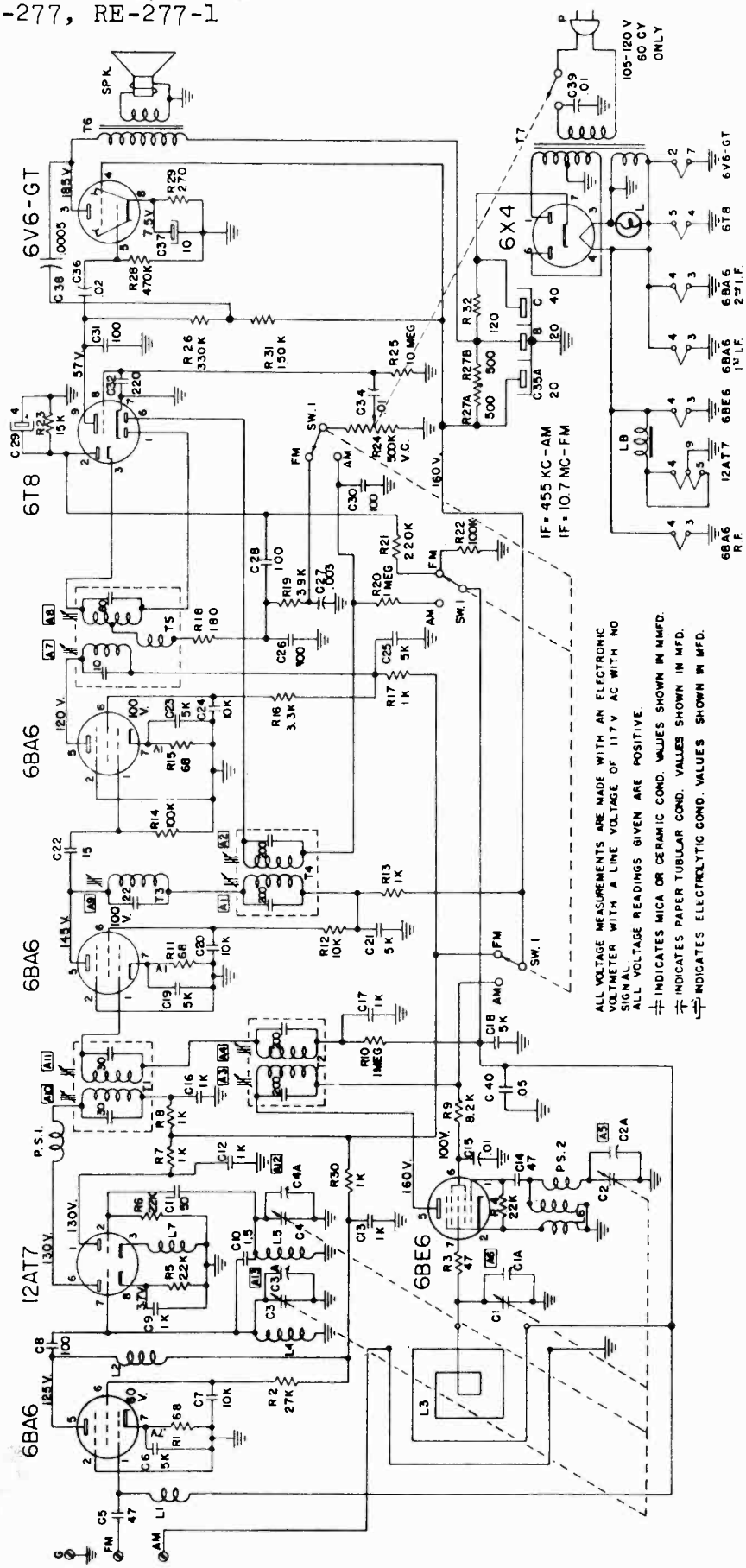
Schematic Location	Part No.	Description
L3	D22586	Antenna Loop Assembly
	B22953	Antenna Loop Mounting Bracket
	A22960	Antenna Terminal Strip
	AA23830-1	Cabinet (481) Mahogany with carton
	AA23829-2	Cabinet (480) Ivory with decorative rail & Carton
	AA23829-3	Cabinet (480) Willow Green with decorative rail and carton
	AA23829-4	Cabinet (480) Sandalwood with decorative rail and carton
	AA23829-1	Cabinet (480) Rosewood with decorative rail and carton
	C23299	Cabinet rear cover
	C23300	Cabinet Decorative Rail with Palnut and Washer
	A23237	Carton
L1	AA22648-1	Choke High Frequency 1.5 uh
L2	AA21445-1	Choke High Frequency 7.5 uh.
L7	AA22597-1	Choke High Frequency 3 uh.
L8	A21673	Choke, RF, Iron Core, 14 uh.
L4	A22593	Coil, R. F. FM
L5	A22594	Coil, Oscillator, FM
L6	AC22587-1	Coil, Oscillator, AM
C1, C2, C3, C4	R22962	Condenser, Variable, 4 Gang AM-FM
C4A	A22724	Condenser, Oscillator Temperature Cor. 5-25 uuf.
C5, C14	C20203-470	Condenser, Ceramic 47 uuf., 350 V
C6, C18, C19, C21, C23, C25	A21674	Condenser, Disc. 5000 uuf., 350 V
C7, C20, C24	A22295	Condenser, Disc Ceramic, .01 uf., 350 V
C8, C26, C30, C31, C20	C20203-101	Condenser, Ceramic 100 uuf., 350 V
C9, C12, C13, C16, C17	C20203-102	Condenser, Ceramic .001 uf., 350 V
C10	A20238-3	Condenser, Ceramic 1.5 uuf., 350 V Gimmick
C11	C20205-3	Condenser, Ceramic 50 uuf., 500 V
C15, C34	C20068-103	Condenser, P. T. .01 uf., 400 V
C22	C20203-150	Condenser, Ceramic 15 uuf., 350 V
C27	C20069-302	Condenser, P. T. .003 uf., 600 V
C29	A22659	Condenser, Electrolytic, 4 uf., 25 V
C32	C20203-221	Condenser, Ceramic, 220 uuf., 350 V
C35 A,B,C	A22806	Condenser, Electrolytic, 20-20-40 at 250 V
C36, C38	C20068-203	Condenser, P. T. .02 uf., 400 V
*C38	C20069-501	Condenser, P. T. .0005 uf., 600 V
C37	A22602	Condenser, Electrolytic 10 uf., 25 V
C39	C20249-103	Condenser, Phenolic, .01 uf., 400 V
C40	C20067-503	Condenser, P. T. .05, 200 V
	A19133	Dial, Cord Spring 10 for
	E23241-1	Dial Crystal
	A19124	Dial, Crystal Snap Fasteners 10 for
	A19351	Dial, Lamp bulb Mazda No. 47
	A23298	Dial, Lamp bracket 10 for
	A22849-1	Dial, Lamp Socket
	AC23302-1	Dial Plate Assembly (Brown)
	AC23302-2	Dial Plate Assembly (Ivory)
	AC23302-3	Dial Plate Assembly (Willow Green)
	AC23302-4	Dial Plate Assembly (Sandalwood)
	C23229-1	Knob, On-Off Volume (480)
	C23229-2	Knob, Band Switch (480)
	C23229-2	Knob, Tuning (480)
	C23229-5	Knob, On-Off Volume
	C23229-6	Knob, Band Switch
	C23229-7	Knob, Tuning
	B20138-14	Line Cord and Plug
	D23242	Pointer
	A20040-17	Pointer felt washer 10 for
PS-1	AA22345-1	Parasitic Suppressor
PS-2	AA22334-1	Parasitic Suppressor
R1, R11 R15	C20060-680	Resistor, 68 ohm 1/4 W 20%
R2	C20070-273	Resistor, 27K ohm 1 W 10%
R3	C20060-470	Resistor, 47 ohm 1/4 W 20%
R4, R6	C20060-223	Resistor, 22K ohm 1/4 W 20%
R5	C20060-222	Resistor, 2.2K ohm 1/4 W 20%
R7, R8 R13, R17 R30	C20060-102	Resistor, 1K ohm 1/4 W 20%
R9	C20070-822	Resistor, 8.2K ohm 1 W 10%
R10, R20	C20060-105	Resistor, 1 megohm 1/4 W 20%
R12	C20070-103	Resistor, 10K ohm 1 W 10%
R14, R22	C20060-104	Resistor, 100K ohm 1/4W 20%
R16	C20070-332	Resistor, 3.3K ohm 1 W 10%
R18	C20060-181	Resistor, 180 ohm 1/4 W 20%
R19	C20120-393	Resistor, 39K ohm 1/4 W 20%
R21	C20060-224	Resistor, 220K ohm 1/4 W 20%
R23	C22381-153	Resistor, 15K ohm 1/4 W 10%
R24, SW-2	B22963	Resistor, Volume Control & Switch 500K ohm
R25	C20060-106	Resistor, 10 megohm 1/4 W 20%
R26	C20060-474	Resistor, 330K ohm 1/4 W 20%
R27 A, B	A22624	Resistor, 2 x 500 ohm 5 Watts
R28	C20060-474	Resistor, 470K ohm 1/4 W 20%
R29	C20070-271	Resistor, 270 ohm 1 W 10%
R30	C20060-102	Resistor, 1K ohm 1/4 W 20%
*R31	C20060-154	Resistor, 150K ohm 1/4 W 20%
*R32	A23933	Resistor, 120 ohm 1 W 10%
SPK	C22760	Speaker 5" PM
Sw-1	C22961	Switch, Band
T1	C22590	Transformer, I. F. 1st F.M. 10.7 Mc
T2, T4	C22352	Transformer, I. F. AM 455 Kc
T3	AC22967-1	Transformer, I. F. 2nd F. M. 10.7 Mc
T5	AD22592-1	Transformer, Ratio Detector
T6	AC22995-1	Transformer output
T7	D22959	Transformer Power
	A20243-1	Tube socket Min Wafer 1" 7 prong plain
	A20243-2	Tube socket Min Wafer 1" 7 prong center shield
	A20274	Tube socket min. wafer 1 1/8" 9 prong, center shield
	A21677	Tube socket min. moulded low loss 9 prong center shield
	A18254-1	Tube socket wafer plain
	A22957	Tuning Shaft
	A19361	Tuning shaft hair pin clip

Used on RE-277-1 only. See Note on Schematic Diagram.





MODELS 480TFM, 481TFM,
Ch. RE-277, RE-277-1

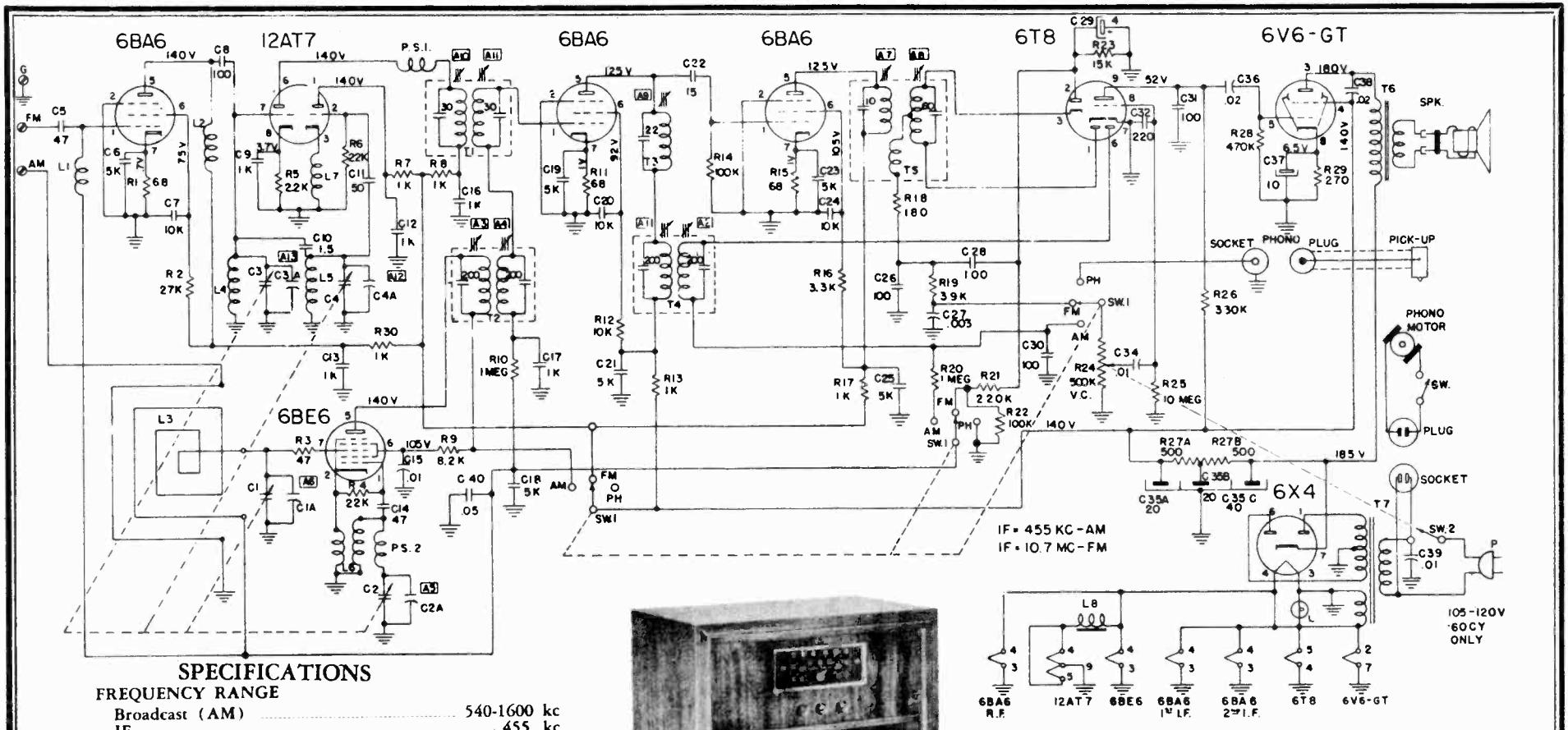


NOTE:
The Schematic Diagram printed in this bulletin is for Chassis RE-277-1 which includes a bass boost & hum reduction circuit. Chassis RE-277 differs from Chassis RE-277-1 in the following respects.

1. C38 was .02 ufd. 400 V., and was connected from plate to screen of the 6V6GT tube.
2. R31, 150 K ohm ¼ watt Resistor, was not included in the circuit and R26 connected directly to B+ 140 V.
3. R32, 120 ohm 1 wat tresistor, was not included in the circuit and C35B electrolytic condenser section connected to the center tap of R27.

The two chassis are identified by the proper RE numbers on the Model Number label on the bottom of the cabinet.

MODELS 482CFB, 482CFM,
Ch. RE-288-1



SPECIFICATIONS

FREQUENCY RANGE

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

TUBES AND FUNCTIONS

6BA6	FM R. F. Amp.
12AT7	FM Converter
6BE6	AM Converter
6BA6	AM-FM-IF Amp.
6BA6	FM, IF Amp.
6T8	FM-AM DET, 1ST Audio AVC
6V6GT	Output
6X4	Rectifier

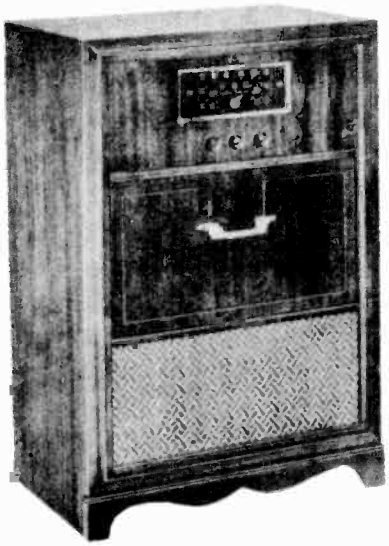
POWER OUTPUT

Undistorted	1.5 Watts
Maximum	2.5 Watts
Plate load	2000 Ohms

LOUD SPEAKER

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

A24218



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

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

MODELS 482CFB, 482CFM,
Ch. RE-288-1

TECHNICAL INFORMATION

AM Tuning range — 540 Kc. to 1600 Kc. Immediate Frequency — 455 Kc. I. F. and R. F. measurements made at 500 milliwatts output — approximately 1.27 volts on a receiver type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I. F. 300 uv; R. F. with standard loop: at 600 Kc. 1200 uv/m; at 1000 Kc. 900 uv/m; at 1400 Kc. 800 uv/m.

FM Tuning range — 88 megacycles to 108 megacycles. Intermediate frequency 10.7 megacycles .I.F. and R.F. measurements made at 500 milliwatts output — approximately 1.27 volts on a rectifier type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I. F. 300 uv; R. F. "Absolute Measurements": 91 megacycles 100 uv; 105 megacycles, 100 uv.

ALIGNMENT PROCEDURE

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

AM ALIGNMENT

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

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

FM ALIGNMENT

1. Turn band switch to FM, (right).

2. Connect (FM) I. F. generator to the second 6BA6 I. F. amp. grid, (lug No. 1) through a .01 uf mica dummy. Connect oscilloscope across volume control. With the I. F. generator tuned to 10.7 mc with 150 Kc deviation, and the same audio voltage used as horizontal sweep on the scope that is used to modulate the generator, adjust the ratio detector transformer slugs A7-A8 for the characteristic "S" curve (See Fig. 1), with maximum vertical height on the scope. After this adjustment the top slug of the ratio detector should not be moved during the rest of the alignment.

3. Connect I. F. generator to mixer grid through .01 mica dummy. Using 23 Kc deviation at 10.7 Mc, adjust for maximum output. Maximum output may be indicated by maximum vertical height on the scope or maixmum voltage on a standard output meter across the voice coil of the receiver. After the two I. F. transformers have been ligned the bottom slug A8 of the ratio detector should also be peaked.

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

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

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

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

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

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

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

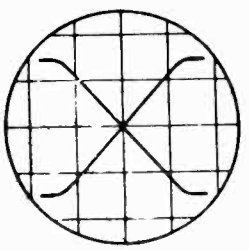
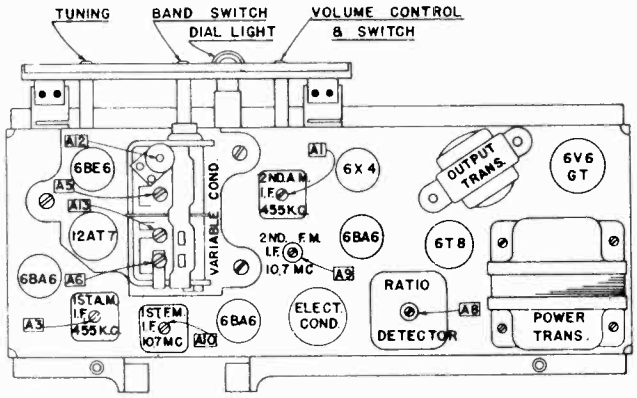
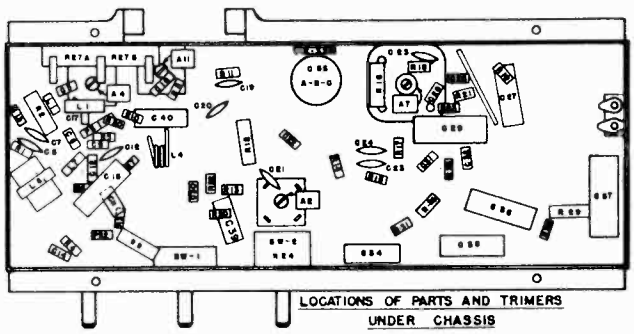


FIG 1

MODELS 482CFB, 482CFM,
Ch. RE-288-1





PARTS LIST FOR 482 CFM, CFB

Schematic Location	Part No.	Description
	D22586	Antenna Loop Assembly
	B22953	Bracket, Antenna Loop Mounting
	C23427	Bracket, Dial [2 used]
	R23689	Cabinet, Mahogany [with Carton]
	R23689-1	Cabinet, Blonde [with Carton]
C1, C2, C3, C4	R22962	Capacitor, Variable, 4-gang
C4A	A22724	Capacitor, FM Oscillator Trimmer, 5-25 uuf
C10	A20238-3	Capacitor, 1.5 uuf, 350 V, Gimmick
C22	C20203-150	Capacitor, 15 uuf, 350V, Ceramic
C5, C14	C20203-470	Capacitor, 47 uuf, 350V, Ceramic
C11	C20205-5	Capacitor, 50 uuf, 500V, Ceramic
C20, C8, C26 C30, C31	C20203-101	Capacitor, 100 uuf, 350V, Ceramic
C32	C20203-221	Capacitor, 220 uuf, 350V, Ceramic
C38	C20069-501	Capacitor, .0005 mfd., 600V, Paper
C9, C12, C13 C16, C17	C20203-102	Capacitor, 1000 uuf, 350V, Ceramic
C27	C20069	Capacitor, .003 mfd., 600V, Paper
C6, C18, C19, C21, C23, C25	A21674	Capacitor, 5000 uuf, 350V, Disc Ceramic
C7, C20, C24	A22295	Capacitor, 10,000 uuf, 350V, Disc Ceramic
C15, C34	C20068-103	Capacitor, .01 mfd., 400V, Paper
C39	C20249-103	Capacitor, .01 mfd., 400V, Phenolic
C36	C20068-203	Capacitor, .02 mfd., 400V, Paper
C40	C20067-503	Capacitor, .05 mfd., 200V, Paper
C29	A22659	Capacitor, 4 mfd., 25V, Electrolytic
C37	A22602	Capacitor, 10 mfd., 25V, Electrolytic
C35	A22806	Capacitor, 20-20-40 mfd., 250V, Electrolytic
		Changer, 3-speed Record [See V-M Model 950]
L1	AA22648-1	Choke, 1.5 uh
L7	AA22597-1	Choke, 3 uh
L2	AA21445-1	Choke, 7.5 uh
L8	A21673	Choke, 14 uh, Iron Core
L6	AC22587-1	Coil, Oscillator, AM
L5	A22594	Coil, Oscillator, FM
L4	A22593	Coil, R F, FM
R24-SW2	C22963	Control, Volume, & Switch, 500K ohms
	C23707	Cover, Cabinet Rear
	C23578	Cover, Record Changer Bottom
	A23594	Dial Pointer [Mahogany]
	A23594-1	Dial Pointer [Blonde]
	D23700	Dial Scale [Mahogany]
	D23700-1	Dial Scale [Blonde]
	C23402	Escutcheon & Crystal
	D23706-4	Knobs, Ph-AM-FM [Mahogany]
	D23706-12	Knob, Ph-AM-FM [Blonde]
	D23706-3	Knob, Tuning [Mahogany]
	D23706-11	Knob, Tuning [Blonde]
	D23706-1	Knob, Volume, On-Off [Mahogany]
	D23706-9	Knob, Volume, On-Off [Blonde]
	A19351	Lamp, Dial, Mazda No. 47
	B20138-14	Line Cord & Plug
PS-1	AA22345-1	Parasitic Suppressor
PS-2	AA22334-1	Parasitic Suppressor
R-3	C20060-470	Resistor, 47 ohms 20%, ½W
R1, R11, R15	C20060-680	Resistor, 68 ohms 20%, ½W
R32	A23933	Resistor, 120 ohms, 10%, 1W
R18	C22381-181	Resistor, 180 ohms 10%, ½W
R29	C20070-271	Resistor, 270 ohms 10%, 1W
R27	A22624	Resistor, 2x500 ohms, 5 Watts
R7, R8, R13, R17, R30	C20060-102	Resistor, 1K ohms 20%, ½W
R5	C20060-222	Resistor, 2.2K ohms 20%, ½W
R16	C20070-332	Resistor, 3.3K ohms 10%, 1W
R9	C20070-822	Resistor, 8.2K ohms 10%, 1W
R12	C20070-103	Resistor, 10K ohms 10%, 1W
R23	C22381-153	Resistor, 15K ohms 10%, ½W
R4, R6	C20060-223	Resistor, 22K ohms 20%, ½W
R2	C20070-273	Resistor, 27K ohms 10%, 1W
R19	C20120-393	Resistor, 39K ohms 20%, ½W
R14, R22	C20060-104	Resistor, 100K ohms 20%, ½W
R31	C20060-154	Resistor, 150K ohms 20%, ½W
R21	C20060-224	Resistor, 220K ohms 20%, ½W
R26	C20060-334	Resistor, 330K ohms 20%, ½W
R28	C20060-474	Resistor, 470K ohms 20%, ½W
R10, R20	C20060-105	Resistor, 1 megohm 20%, ½W
R25	C20060-106	Resistor, 10 megohms 20%, ½W
	A19551	Socket, AC, Phono Motor
	A23537-1	Socket, Dial Lamp
	A19552	Socket, Phono Pickup
	A19579	Socket, Speaker
	AD23693-1	Speaker Assy. 8" PM with Cable And Plug
	A19133	Spring, Dial Cord
	C23485	Switch, Band
	A22960	Terminal Strip, Antenna
TI	C22590	Transformer, I.F., 1st F.M. [10.7 Mc]
T2, T4	C22352	Transformer, I.F. AM [455 Kc]
T3	AC22967-1	Transformer, I.F., 2nd F.M. [10.7 Mc]
T6	AC23669-1	Transformer, Output
T7	D22959	Transformer, Power
T5	AD22592-1	Transformer, Ratio Detector
	A22957	Tuning Shaft
	A19361	Tuning Shaft Hair Pin Clip
	A22763	Weight, Cabinet, Steel

HUDSON, 1948-1949-1950

DESCRIPTION

Your new Automobile Receiver is a 6-tube (including rectifier) superhetrodyne, designed to operate from the 6-volt storage battery in your car. It is custom-built to mount behind the instrument panel in the place provided for a radio by the automobile manufacturer. It has a self-contained PM speaker and covers the frequency range 538 to 1600 KC. Two simple controls are provided for operating the receiver. (See Fig. 1.)

This receiver has been designed with a tuned RF stage and a 3-gang tuning condenser thereby insuring the finest in sensitivity and selectivity. Any standard two or three section whip or "fish pole" antenna will provide good reception of distant or weak stations. The unit is simple to install and requires no electrical adjustment after installation.

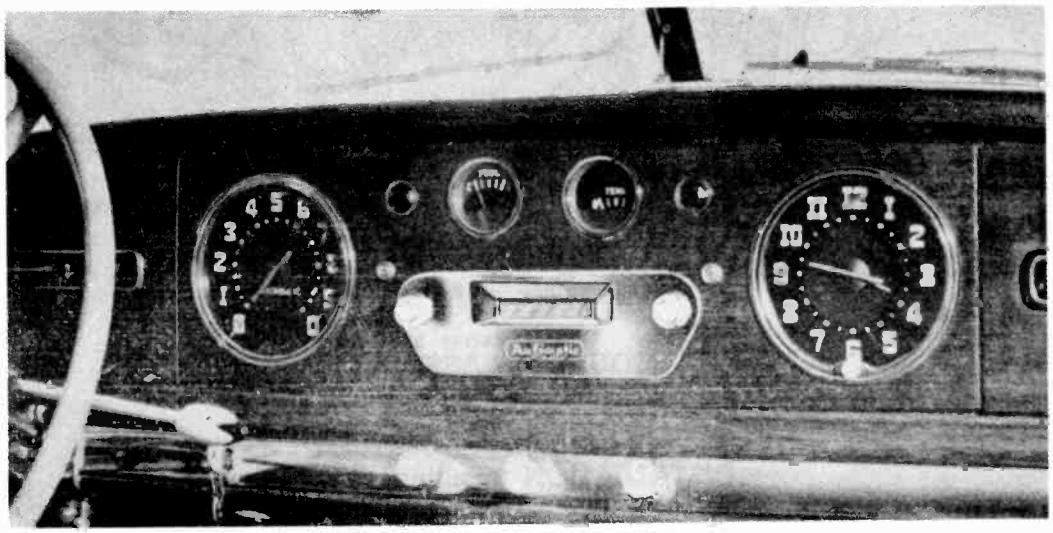


Fig. 1

OPERATION

VOLUME CONTROL KNOB

This knob is located on the left side of the radio. Turning this knob slightly to the right until a slight click is heard will put the radio into operation. Turning this knob further to the right will increase the volume and turning it to the left will decrease the volume. After a station has been selected, the volume control should be adjusted to the desired level. The volume should never be reduced by detuning the station selector knob.

STATION SELECTOR KNOB

This knob is located on the right side of the radio. This knob should be turned until a desired station has been selected. Adjust this knob very carefully until the station comes in with the most natural tone.

INSTALLATION

1. Remove screws securing radio speaker grille and cardboard speaker opening cover plate.
2. Discard cardboard cover plate and speaker mounting screws.
3. Replace radio speaker grille in original position on the instrument panel and secure with 1¼" long No. 8-32 oval head Phillips screws. (4 supplied in kit of hardware.)

   NOTE: Some automobile models are not equipped with a Radio speaker grille. A Radio speaker grille must be obtained from an authorized Hudson dealer before an installation can be made.
4. Insert power supply unit under instrument panel and position so that slots on cover of power supply unit line up with speaker grille mounting screws and power cable is located on left hand side.
5. Secure in place with cupwashers and 8-32 wing nuts.
6. Remove speed nuts attaching radio opening dummy cover plate.
7. Remove dummy cover plate and discard.

HUDSON, 1948-
1949-1950

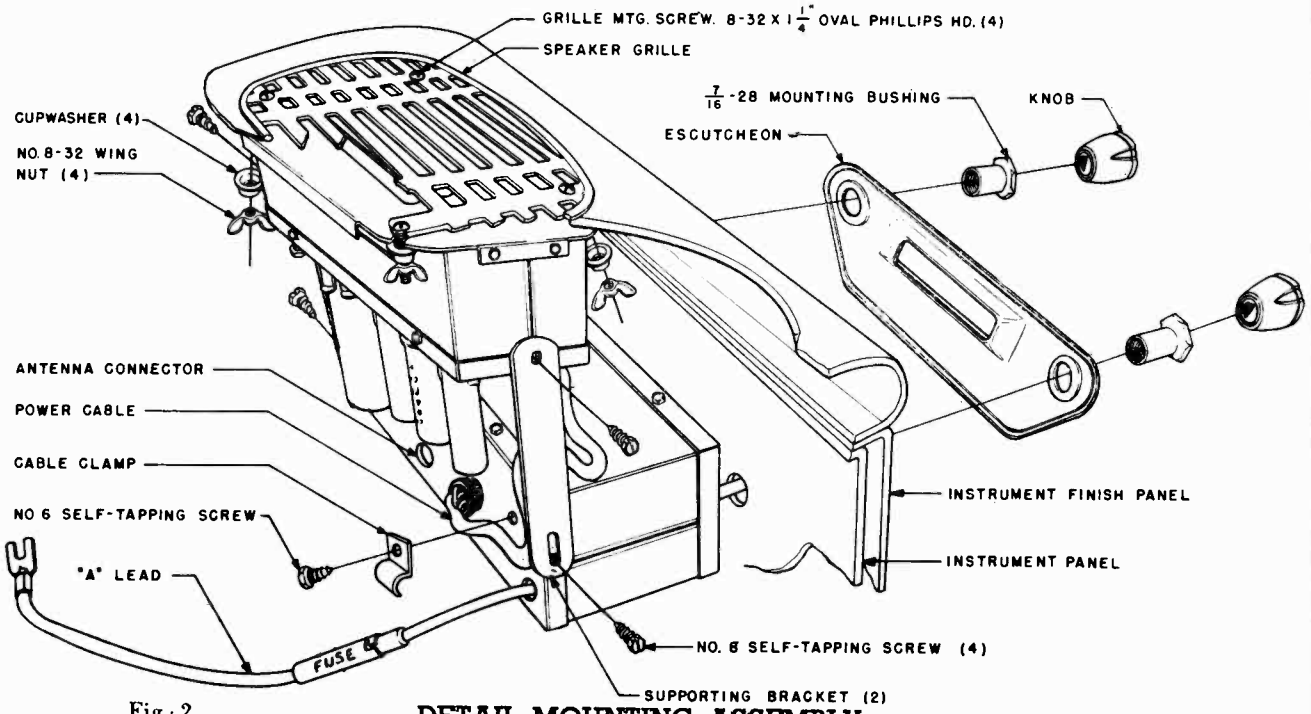


Fig. 2 DETAIL MOUNTING ASSEMBLY

INSTALLATION (Continued)

8. Remove knobs, mounting bushings and escutcheon from RF Tuning Unit.
9. Position RF Tuning Unit behind instrument panel so that control shafts protrude through the instrument panel.
10. Place escutcheon over control shafts on instrument panel front.
11. Attach RF Tuning Unit and escutcheon to instrument panel with two mounting bushings previously removed.
12. Replace knobs on control shafts.
13. Secure a supporting bracket (2 supplied in kit of hardware) to each side of power pack with two No. 8 self-tapping screws. Use end of supporting bracket with round hole.
14. Swing supporting brackets so that slotted holes are in line with holes on each side of tuning unit.
15. Secure to RF tuning unit with two No. 8 self-tapping screws.
16. Connect cable from Power Supply Unit to RF Tuning Unit.
17. Secure Power Supply cable under clamp on RF Tuning Unit.
18. Connect "A" lead to battery terminal on circuit breaker mounted over the steering column behind the instrument panel. (See fig. 3.)
19. Plug antenna cable into tuning unit.

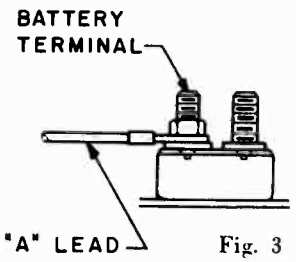


Fig. 3

ACCESSORIES FURNISHED FOR INSTALLATION

MOUNTING PARTS KIT

The following mounting hardware parts are shipped attached to the receiver. (See detail assembly drawing FIG. 2)

2 7/16-28 mounting bushings
2 Knobs
1 Cable clamp

An envelope containing additional mounting hardware is supplied with this receiver. It contains the following parts:

2 Supporting brackets
4 No. 8 self-tapping screws
4 8-32 wing nuts
4 cup washers
4 8-32 x 1¼ oval head Phillips screws.

HUDSON, 1948-1949-1950

MOTOR NOISE ELIMINATION

SUPPRESSION KIT

A suppression kit is shipped with this receiver. It contains the following parts:
1 Generator Condenser.
1 Distributor suppressor.

DISTRIBUTOR SUPPRESSOR

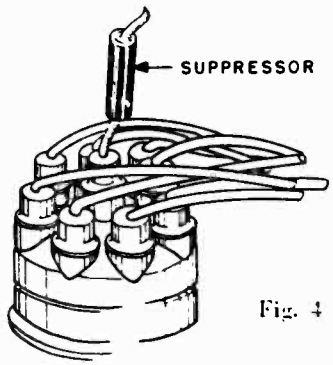


Fig. 4

Disconnect the high tension wire that runs from the ignition coil to the center hole of the distributor cap. Cut lead one inch back from the metal tip end. Screw suppressor into cut end of long lead. Screw cut end of short lead into suppressor. Plug lead with attached suppressor back into distributor cap.

GENERATOR CONDENSER

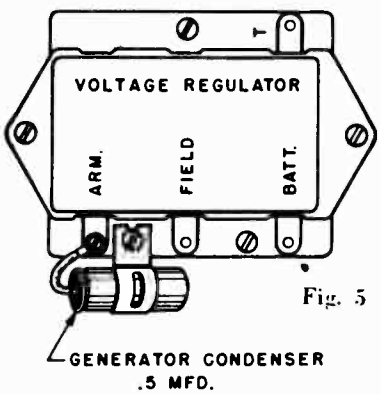


Fig. 5

Loosen voltage regulator mounting screw. Insert slotted end of generator condenser mounting bracket under this screw and tighten screw. Connect condenser lead to armature terminal marked "ARM."

The generator condenser and distributor suppressor will normally eliminate all objectionable motor noise in most cases. If the motor noise persists the following steps should be taken. Check operation of radio as each step is made.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

AMMETER CONDENSER

A .5 MFD by-pass condenser should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

HUDSON, 1948-
1949-1950

SERVICE DATA
ELECTRICAL SPECIFICATIONS

Power Supply	6.3 Volts DC
Current	5.5 Amp. average
Frequency Range	538-1600 KC
Speaker	5¼" PM
Power Output	2 watts, undistorted
	3 watts, maximum
Sensitivity	2-3 microvolts average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:
1—6BA6—RF Amplifier
1—6BE6—Converter
1—6BA6—I. F. Amplifier
1—6AT6—Detector—AVC—1st Audio
1—6AQ5—Power Output
1—6X4—Rectifier

SERVICE NOTES

Voltage taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 Ohms per volt. These voltages are clearly shown on the voltage chart. (Fig. 7 and 7A).
All voltages should be measured with an input voltage of 6.3 volts DC.
To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

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

DIAL CORD DRIVE

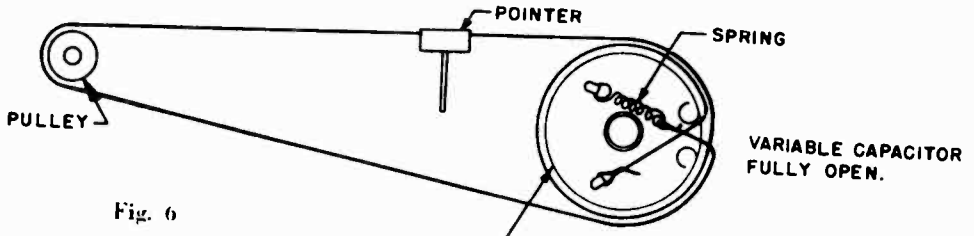


Fig. 6

ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.
No signal applied to antenna.
Power input—6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas—.1 MFD., 100 MMFD.
For alignment points refer to Schematic Diagram.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connection*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L3	Maximum	RF Stage
7) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna
8) Repeat steps 4 and 5						

PARTS LIST

CONDENSERS

Schematic Diagram Reference	Part No	Description
C2, C3, C5	C207	.05 MFD 200 volt condenser
C4, C12	C209	.5 MFD 100 volt condenser
C6	CC200	100 MMFD ceramic condenser
C7, C9	CC201	200 MMFD ceramic condenser
C8	C203	.002 MFD 400 volt condenser
C10, C13	C206	.01 MFD 400 volt condenser
C11	C205	.008 MFD 1600 volt condenser
		20 MFD 350 volt electrolytic condenser
CE86	CE-86	20 MFD 350 volt electrolytic condenser
		20 MFD 25 volt electrolytic condenser
CV1-CV2-CV3	CV-100	3 section variable

RESISTORS

R1	R309	1 megohm ½ watt 20% resistor
R2, R14	R303	330 ohm ½ watt 20% resistor
R3	R306	20K ohm ½ watt 20% resistor
R4	R314	1.5K ohm ½ watt 20% resistor
R5	RV-100	Volume control ¾ megohm with switch
R6	R310	2 megohm ½ watt 20% resistor
R7	R311	10 megohm ½ watt 20% resistor
R8	R313	20K ohm 2 watt 20% resistor
R9	R307	250K ohm ½ watt 20% resistor
R10, R11	R301	100 ohm ½ watt 20% resistor
R12	R312	1K ohm 1 watt 20% resistor
R13	R308	500K ohm ½ watt 20% resistor

COILS AND TRANSFORMERS

L1-C1	L200	Motor noise elimination unit
L2	57FB-3	Antenna coil
L3	57FB-4	R.F. coil
L4	L201	R. F. oscillator coil
L5	L203	Choke, "A" line
L6	L202	Choke, vibrator hash
T2	1655-16	2nd IF transformer
T1	1655-16	1st IF transformer
T3	TV-100 or 318V-2	Vibrator transformer
T4		Output transformer (Part of speaker not furnished separately)

DIAL PARTS

H401	Dial Scale Assembly
D400	Dial Scale Escutcheon
PS100	Dial Pointer
H201	Grommet, rubber drive
T47	Pilot Light
H114	Pilot Light Socket
H203	Pulley, idler
H204	Spring, Dial drive String Tension
H115	String, dial drive

MISCELLANEOUS

A300	"A" lead assembly
H301	Case, less covers for Power Supply Unit
H100	Case, complete with covers for R.F. tuning unit
H207	Clip, Anti-rattle
H208	Clip, coil mounting
H102	Cover, power supply unit mounting (with speaker louvres)
A201	Fuse 15 Amp.
504PC-300	Power Cable Assembly (complete with plug)
H212	Receptacle, Antenna cable
504-FC	Socket, power cable
PM-705	Speaker, 5¼" PM (includes output transformer)
V-83	Vibrator
H310	Knob
H311	Cup washer
H113	7 16-28 Hex nut
C100	.5 MFD generator condenser
R100	Distributor suppressor
H402	7 16-28 Mounting bushing

BOTTOM VIEW OF CHASSIS

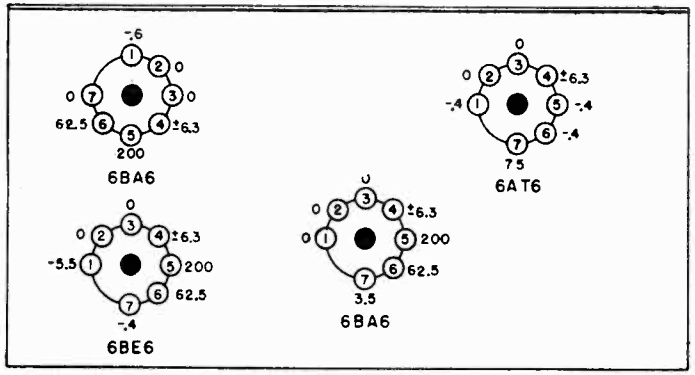


Fig. 7

BOTTOM VIEW OF POWER PACK

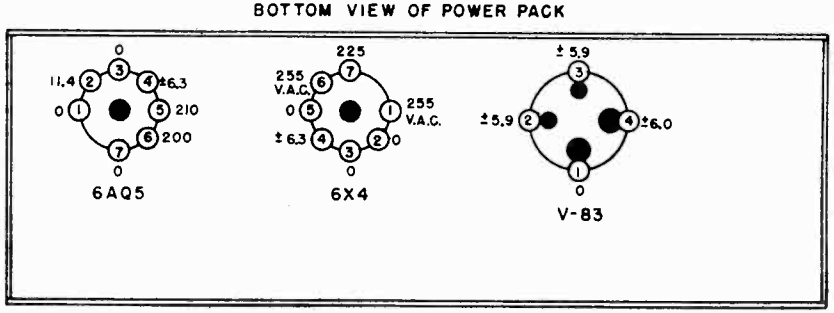


Fig. 7A

SOCKET VOLTAGES

HUDSON, 1948-
1949-1950

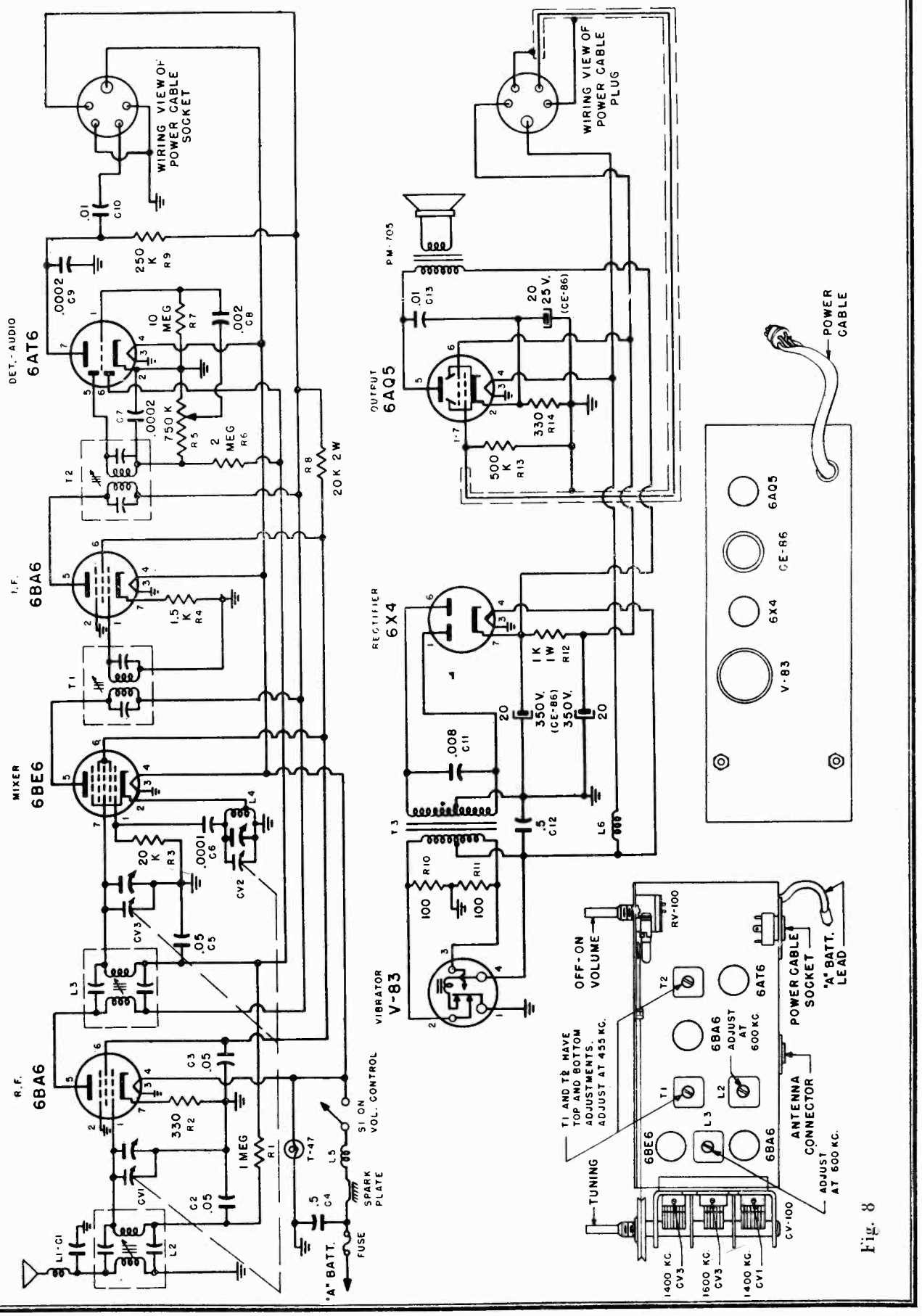


Fig. 8

DESCRIPTION

Your new Automobile Receiver is a 6-tube (including rectifier) superhetrodyne, designed to operate from the 6-volt storage battery in your car. It is custom-built to mount behind the instrument panel in the place provided for a radio by the automobile manufacturer. It has a self-contained PM speaker and covers the frequency range 538 to 1600 KC. Two simple controls are provided for operating the receiver. (See Fig. 1.)

This receiver has been designed with a tuned RF stage and a 3-gang tuning condenser thereby insuring the finest in sensitivity and selectivity. Any standard two or three section whip or "fish pole" antenna will provide good reception of distant or weak stations. The unit is simple to install and requires no electrical adjustment after installation.

Fig. 1

OPERATION

VOLUME CONTROL KNOB

This knob is located on the left side of the radio. Turning this knob slightly to the right until a slight click is heard will put the radio into operation. Turning this knob further to the right will increase the volume and turning it to the left will decrease the volume. After a station has been selected, the volume control should be adjusted to desired level. The volume should never be reduced by detuning the station selector knob.

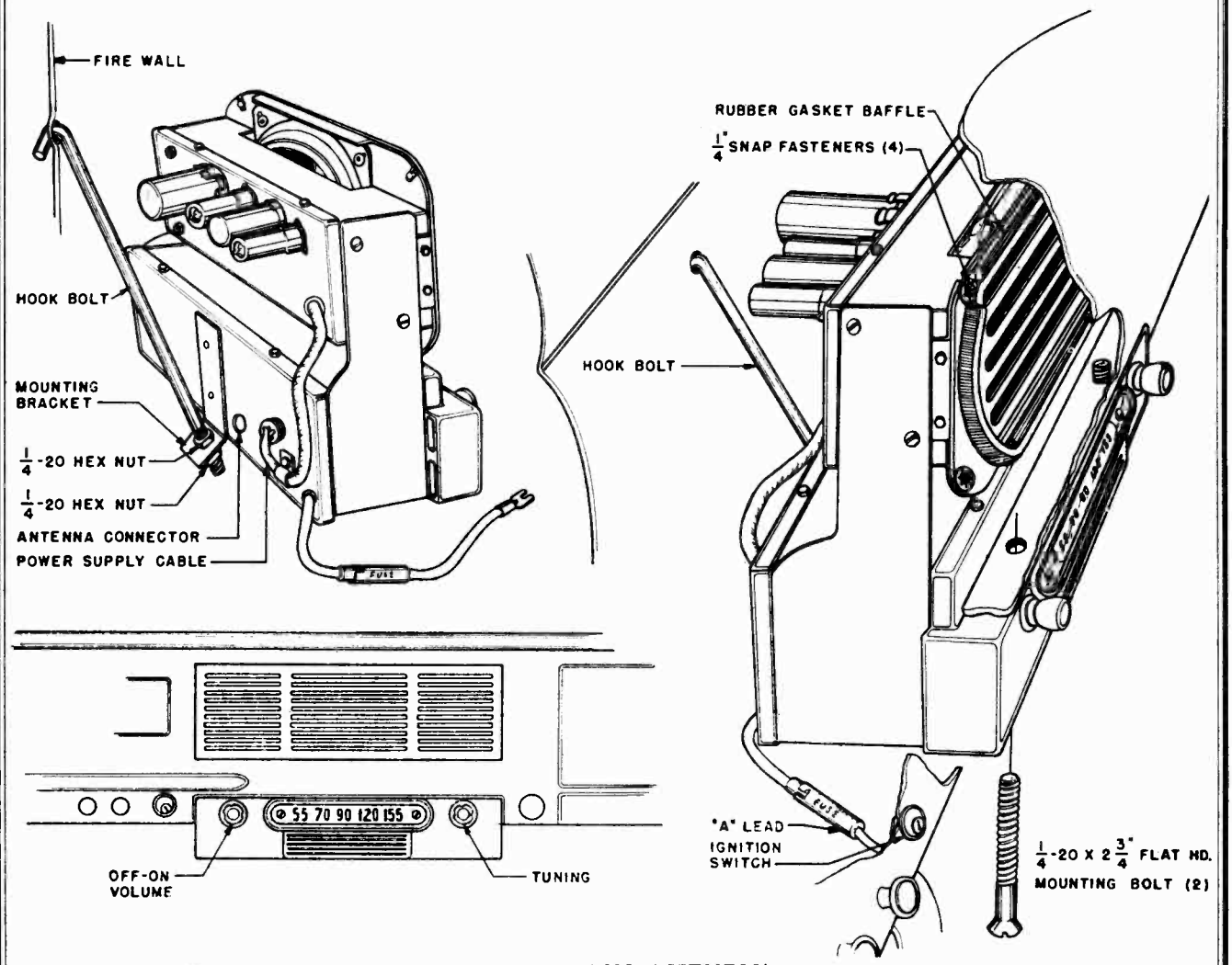
STATION SELECTOR KNOB

This knob is located on the right side of the radio. This knob should be turned until a desired station has been selected. Adjust this knob very carefully until the station comes in with the most natural tone.

INSTALLATION (See Fig. 2)

1. Attach rubber gasket baffle assembly to speaker grille on radio with 4 snap fasteners supplied in kit of mounting hardware.
2. Remove two screws securing radio opening cover plate to instrument panel.
3. Discard cover plate.
4. *Important:* Some car models have a cover over the speaker opening at the back of the instrument panel. Remove and discard this cover.
5. Lift hood of car and locate the two 5/16" holes which are in the Fire Wall just below the windshield wiper motor. Insert hook bolt through the right hand hole on the engine side.
6. Place a 1/4-20 hex nut approximately one inch up on threaded end of hook bolt.
7. Position radio with attached rubber gasket baffle behind instrument panel and insert threaded end of hook bolt through hole on bracket attached to back of radio.
8. Screw 1/4-20 hex nut on hook bolt. Adjust position of the two 1/4-20 hex nuts so that the radio is mounted parallel to instrument panel. Tighten bottom hex nut.
9. Insert two 1/4-20 Flat head bolts supplied in mounting kit through bottom edge of radio and screw into edge of instrument panel.
10. Connect "A" lead to terminal on ignition switch.
11. Plug antenna cable into receiver.

STUDEBAKER, 1950



DETAIL MOUNTING ASSEMBLY

Fig. 2
MOUNTING PARTS KIT

ACCESSORIES FURNISHED FOR INSTALLATION

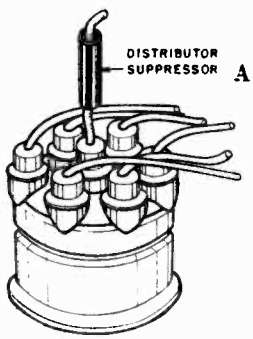
1 Rubber Gasket baffle assembly
4 1/4" snap fasteners
1 Hook bolt
2 1/4-20 hex nuts
2 1/4-20 x 2 3/4" flat head mounting bolts

MOTOR NOISE ELIMINATION

SUPPRESSION KIT

A suppression kit is shipped with this receiver. It contains the following parts:

1 Generator Condenser.
1 Distributor suppressor.



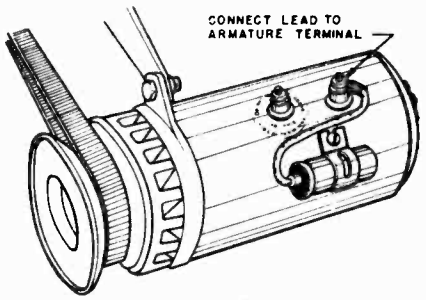
DISTRIBUTOR
Fig. 3

DISTRIBUTOR SUPPRESSOR

Disconnect the high tension wire that runs from the ignition coil to the center hole of the distributor cap. Cut lead one inch back from the metal tip end. Screw suppressor into cut end of long lead. Screw cut end of short lead into suppressor. Plug lead with attached suppressor back into distributor cap.

GENERATOR CONDENSER

Loosen screw on top surface of generator near terminals. Insert slotted generator condenser bracket under screw head and tighten screw. Connect generator condenser lead to armature terminal. *Do not connect to field terminal.*



GENERATOR CONDENSER
Fig. 4

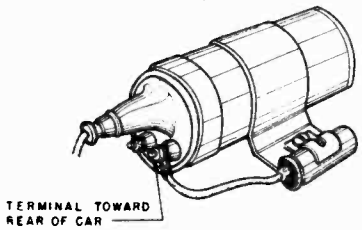
The generator condenser and distributor suppressor will normally eliminate all objectionable motor noise in most cases. If the motor noise persists the following steps should be taken. Check operation of radio as each step is made.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

AMMETER CONDENSER

A .5 MFD by-pass condenser should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.



IGNITION COIL CONDENSER
Fig. 5

COIL CONDENSER

In some extreme cases it may be necessary to connect a .5 MFD by-pass condenser from the rear terminal of the spark coil to ground.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

ELECTRICAL SPECIFICATIONS

Power Supply	6.3 Volts DC
Current	5.5 Amp. average
Frequency Range	538-1600 KC
Speaker	5¼" PM
Power Output	2 watts, undistorted
	3 watts, maximum
Sensitivity	2-3 microvolts average for 1 watt output
Selectivity	40 KC bread at 1000 times signal, at 1000 KC

This receiver contains the following:
1—6BA6—RF Amplifier
1—6BE6—Converter
1—6BA6—I. F. Amplifier
1—6AT6—Detector—AVC—1st Audio
1—6AQ5—Power Output
1—6X4—Rectifier

SERVICE NOTES

Voltage taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a voltmeter having a resistance of 20,000 Ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 7 and 7A).
All voltages should be measured with an input voltage of 6.3 volts DC.
To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

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

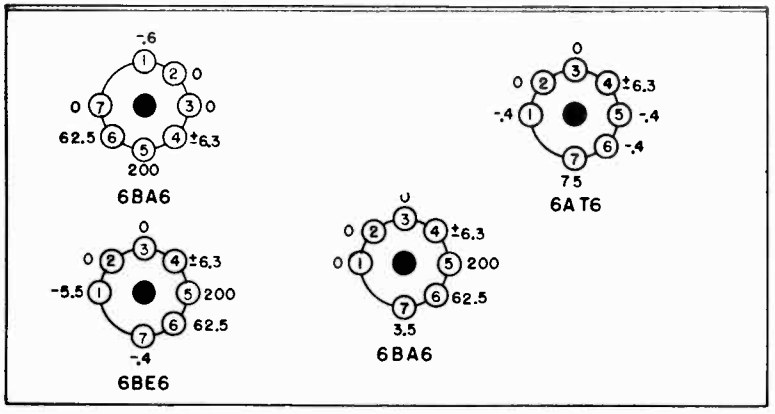
ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.
No signal applied to antenna.
Power input—6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas—.1 MFD., 100 MMFD.
For alignment points refer to Schematic Diagram.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connection*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L3	Maximum	RF Stage
7) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna
8) Repeat steps 4 and 5						

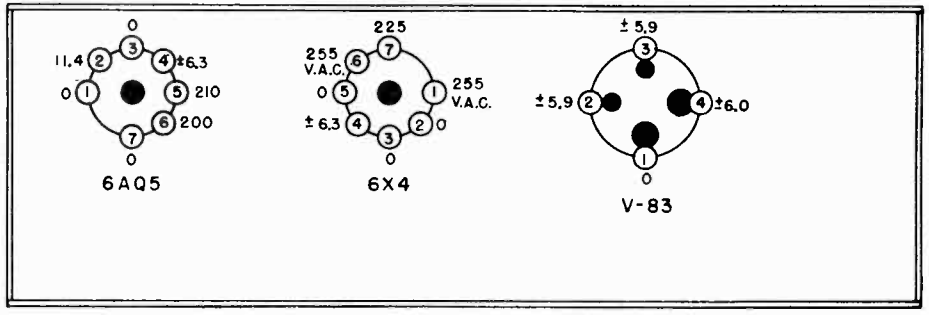
BOTTOM VIEW OF CHASSIS



FRONT OF CHASSIS

Fig. 7

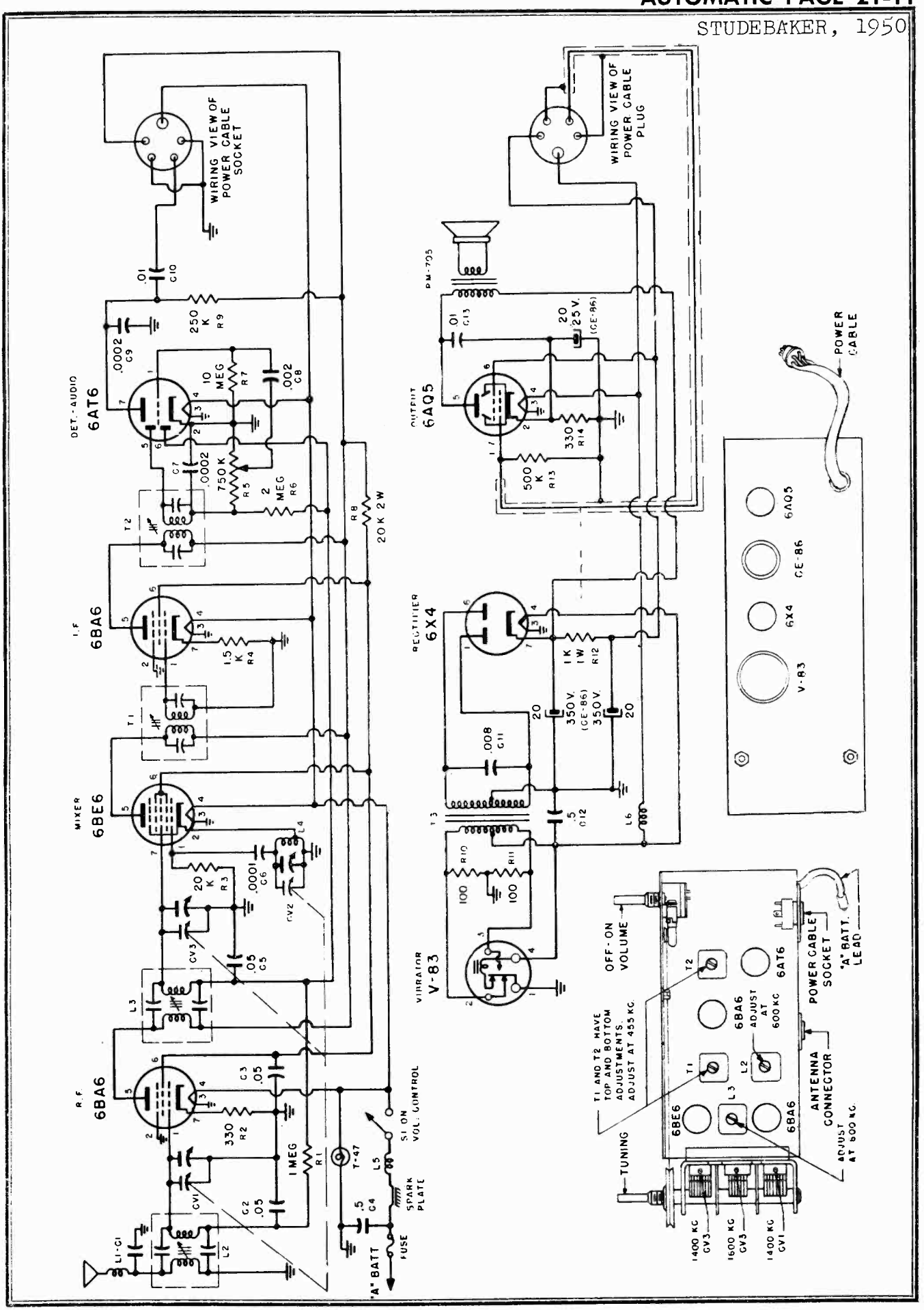
BOTTOM VIEW OF POWER PACK



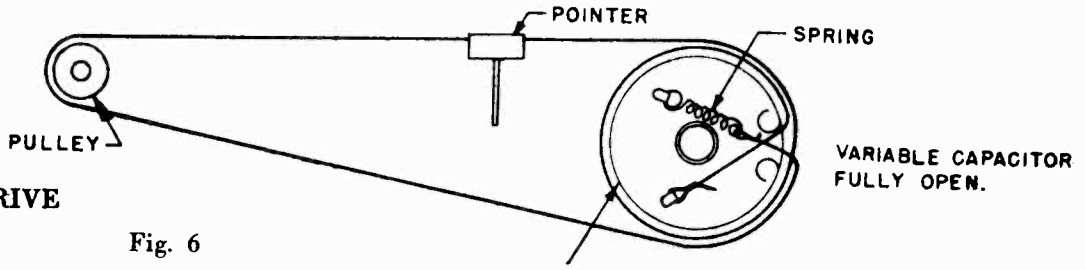
SOCKET VOLTAGES

Fig. 7A

STUDEBAKER, 1950



STUDEBAKER, 1950



DIAL CORD DRIVE

Fig. 6

CONDENSERS

Schematic Diagram Reference	Part No.	Description
C2, C3, C5	C207	.05 MFD 200 volt condenser
C4, C12	C209	.5 MFD 100 volt condenser
C6	CC200	100 MMFD ceramic condenser
C7, C9	CC201	200 MMFD ceramic condenser
C8	C203	.002 MFD 400 volt condenser
C10, C13	C206	.01 MFD 400 volt condenser
C11	C205	.008 MFD 1600 volt condenser
CE86	CE-86	20 MFD 350 volt electrolytic condenser 20 MFD 350 volt electrolytic condenser 20 MFD 25 volt electrolytic condenser
CV1-CV2-CV3	CV-400	3 section variable

RESISTORS

R1	R309	1 megohm ½ watt 20% resistor
R2, R14	R303	330 ohm ½ watt 20% resistor
R3	R306	20K ohm ½ watt 20% resistor
R4	R314	1.5 K ohm ½ watt 20% resistor
R5	RV-570	Volume control ¾ megohm with switch
R6	R310	2 megohm ½ watt 20% resistor
R7	R311	10 megohm ½ watt 20% resistor
R8	R313	20K ohm 2 watt 20% resistor
R9	R307	250K ohm ½ watt 20% resistor
R10, R11	R301	100 ohm ½ watt 20% resistor
R12	R312	1K ohm 1 watt 20% resistor
R13	R308	500K ohm ½ watt 20% resistor

COILS AND TRANSFORMERS

L1-C1	L200	Motor noise elimination unit
L2	15053 or 57FB-3	Antenna coil
L3	15054 or 57FB-4	R.F. coil
L4	L201	R.F. oscillator coil
L5	L203	Choke "A" line
L6	L202	Choke, vibrator hash
T2	14977 or 1655-16	2nd IF transformer
T1	14977 or 1655-16	1st IF transformer
T3	TV-100 or 318V-2	Vibrator transformer
T4		Output transformer (Part of speaker not furnished separately)

MISCELLANEOUS

A300	"A" lead assembly
H521	Case, less covers for Power Supply Unit
H520	Case, complete with covers for R.F. tuning unit
H207	Clip, Anti-rattle
H208	Clip, coil mounting
H102	Cover, power supply unit mounting (with speaker louvres)
H522	Cover, RF tuning unit, front (complete with plastic escutcheon)
A201	Fuse 15 Amp.
H524	Hook bolt
504PC-300	Power Cable Assembly (complete with plug)
H212	Receptable, Antenna cable
504-FC	Socket, power cable
PM-705	Speaker, 5¼" PM (includes output transformer)
V-83	Vibrator
H310	Knob
H311	Cup washer
C100	.5 MFD generator condenser
R100	Distributor suppressor

DIAL PARTS

H523	Dial Scale Escutcheon, Plastic
PS100	Dial Pointer
T47	Pilot Light
H114	Pilot Light Socket
H203	Pulley, idler
H204	Spring, Dial drive String Tension
H115	String, dial drive

MODEL D-200, Dodge, Plymouth, 1949-1950

DESCRIPTION

Your new Automobile Receiver is a 6-tube (including rectifier) superhetrodyne, designed to operate from the 6-volt storage battery in your car. It is custom-built to mount behind the instrument panel in the place provided for a radio by the automobile manufacturer. It has a self-contained PM oval speaker and covers the frequency range 538 to 1600 KC. Two simple controls are provided for operating the receiver. (See Fig. 1.)

This receiver has been designed with a tuned RF stage and a 3-gang tuning condenser thereby insuring the finest in sensitivity and selectivity. Any standard two or three section whip or "fish pole" antenna will provide good reception of distant or weak stations. The unit is simple to install and requires no electrical adjustment after installation.

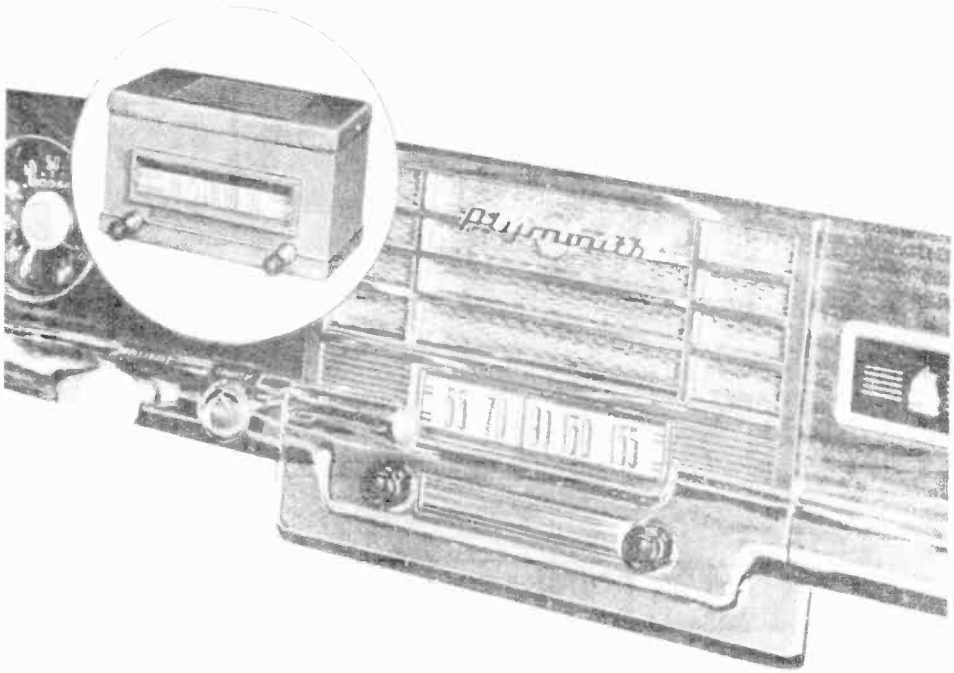


Fig. 1

OPERATION

VOLUME CONTROL KNOB

This knob is located on the left side of the radio. Turning this knob slightly to the right until a slight click is heard will put the radio into operation. Turning this knob further to the right will increase the volume and turning it to the left will decrease the volume. After a station has been selected, the volume control should be adjusted to the required loudness. The volume should never be reduced by detuning the station selector knob.

STATION SELECTOR KNOB

This knob is located on the right side of the radio. This knob should be turned until a desired station has been selected. Adjust this knob very carefully until the station comes in with the most natural tone.

INSTALLATION

PLYMOUTH P18 SPECIAL DELUXE

1. Remove four screws securing Radio Grille in place and remove Radio Grille.
2. Remove dummy plates covering radio dial and control openings.
3. Enlarge holes in radio control cover plate to fit over mounting bushings.
4. Remove knobs, cup washers, hex nuts and washers from control shafts and mounting bushings.
5. Secure two mounting brackets to Radio Grille with ⅜ inch long 10-32 self-tapping screws and cup washers as shown in detail assembly drawing, Fig. 2.
6. Place radio control cover plate over mounting bushings.
7. Position receiver behind Radio Grille so that mounting bushings and shafts protrude through the grille.
8. Attach receiver by replacing washers and hex nuts on mounting bushings.
9. Replace cup washers and knobs over shafts.
10. Secure receiver to mounting brackets with two No. 8 self-tapping wing nut screws.
11. Insert radio with attached grille through front opening on instrument panel.
12. Replace grille mounting screws.
13. Connect battery lead to terminal marked "ACC" on ignition switch.
14. Plug antenna cable into receiver.

MODEL D-200, Dodge,
Plymouth, 1949-1950

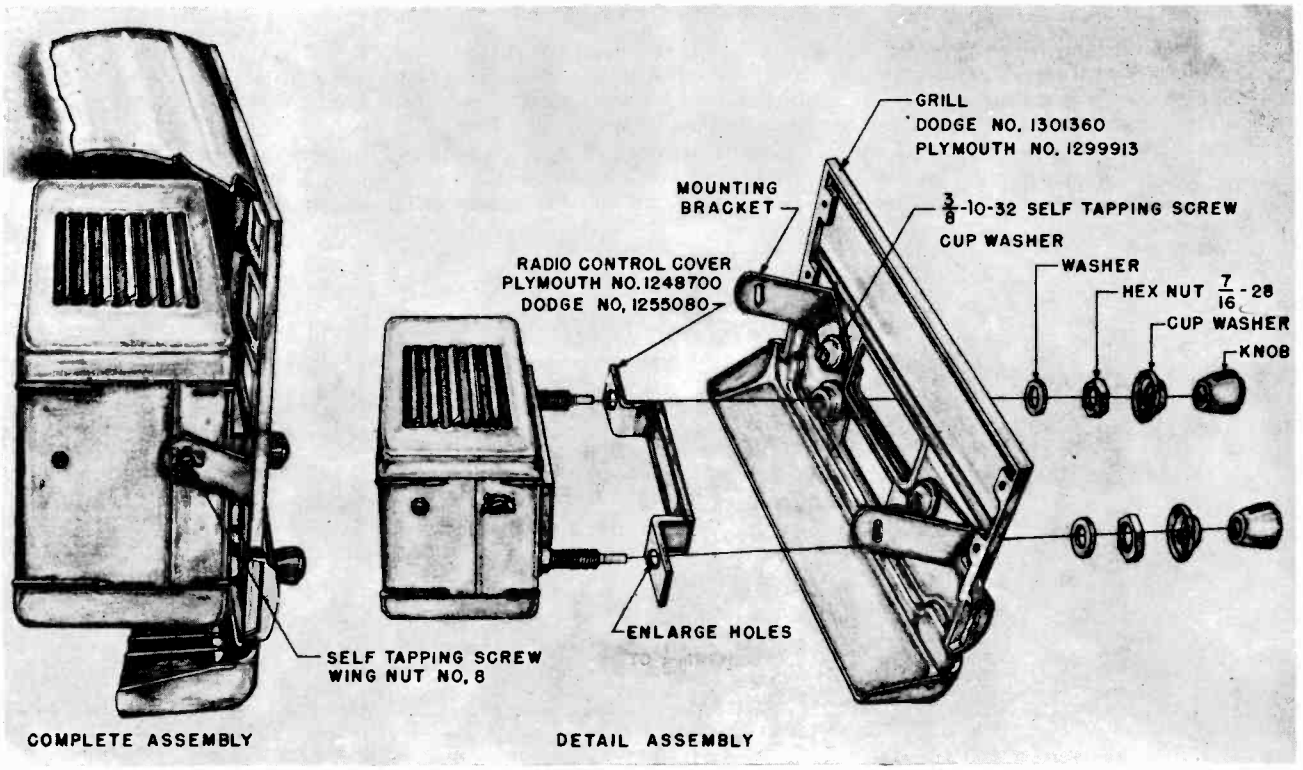


Fig. 2

DODGE "CORONET"

Install in the same manner as outlined for the P18 DeLuxe Plymouth except do not remove radio grille.

PLYMOUTH P17, P18 4-DOOR DELUXE AND P18 CLUB COUPE DELUXE DODGE "WAYFARER" AND "MEADOWBROOK"

These models are not equipped by the car manufacturers with a radio grille or a radio control cover plate.

The following parts must be obtained from any authorized Plymouth or Dodge dealer before an installation can be made in any of these cars.

Plymouth P17, P18 4-Door DeLuxe, P18 Club Coupe DeLuxe
- Radio Grille No. 1299913
- Radio control cover No. 1248700

Dodge "Meadowbrook" or "Wayfarer"
- Radio Grille No. 1301360
- Radio control cover No. 1255080

ACCESSORIES FURNISHED FOR INSTALLATION

MOUNTING PARTS KIT

The following mounting hardware parts are shipped attached to the receiver. (See detail assembly drawing FIG. 2)

- 2 Washers
- 2 7/16-28 hex nuts
- 2 Cup washers
- 2 Knobs
- 2 Mounting Brackets
- 2 No. 8 self-tapping wing nut screws

An envelope containing additional mounting hardware is supplied with this receiver. It contains the following parts:

- 2 3/8 10-32 self-tapping screws
- 2 Cup washers

SUPPRESSION KIT

- 1 Distributor Suppressor
- 1 .5 MFD Generator Condenser

MODEL D-200, Dodge, Plymouth, 1949-1950

MOTOR NOISE ELIMINATION

GENERATOR CONDENSER

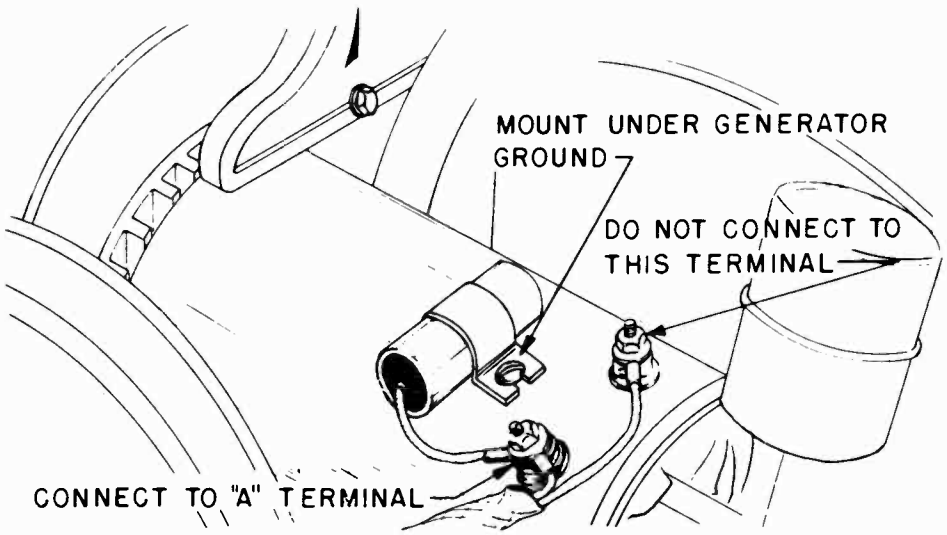


Fig. 3

DISTRIBUTOR SUPPRESSOR

NOTE: 1950 Dodge and Plymouth automobiles do *not* require distributor suppressors.

1949 DODGE AND PLYMOUTH

Remove metal tip from the distributor center tower lead and screw lead into the suppressor. Plug suppressor with attached lead back into distributor head.

The generator condenser and distributor suppressor should eliminate all objectionable motor noise in most cases. If the motor noise persists the following steps should be taken. Check operation of radio as each step is made.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

AMMETER CONDENSER

A .5 MFD by-pass condenser should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

MODEL D-200, Dodge,
Plymouth, 1949-1950

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Power Supply	6.3 Volts DC
Current	5.5 Amp. average
Frequency Range	538-1600 KC
Speaker	5¼" PM
Power Output	2 watts, undistorted
	3 watts, maximum
Sensitivity	2-3 microvolts average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:
1—6BA6—RF Amplifier
1—6BE6—Converter
1—6BA6—I. F. Amplifier
1—6AT6—Detector—AVC—1st Audio
1—6AQ5—Power Output
1—6X4—Rectifier

SERVICE NOTES

Voltage taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 Ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 4).
All voltages should be measured with an input voltage of 6.3 volts DC.
To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

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

INSTRUCTIONS FOR SERVICING RECEIVER COMPONENTS

The novel design of this receiver permits servicing all components without removing the chassis from the case. The top cover (the one with the speaker louvres) can be removed by removing the four (4) screws securing it to the case. This exposes all tube sockets, connectors, resistors and condensers for observation and service.
Removing the bottom cover makes it possible to service tubes, vibrator, and volume control.

ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.
No signal applied to antenna.
Power input—6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas—.1 MFD., 100 MMFD.
For alignment points refer to Schematic Diagram.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connector*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L3	Maximum	RF Stage
7) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna
8) Repeat steps 4 and 5						

PARTS LIST

CONDENSERS

Schematic Diagram Reference	*Part No.*	*Description*
C2, C3, C4	C207	.05 MFD 200 volt condenser
C5	CC200	100 MMFD ceramic condenser
C6, C13, C14	CC201	200 MMFD ceramic condenser
C7	C203	.002 MFD 400 volt condenser
C8, C9	C206	.01 MFD 600 volt condenser
C10, C11	C209	.5 MFD 100 volt condenser
C12	C205	.008 MFD 1600 volt condenser
CE-86	CE-86	20 MFD 350 volt electrolytic condenser 20 MFD 350 volt electrolytic condenser 20 MFD 25 volt electrolytic condenser
CV-200	CV-200	3 section variable tuning condenser

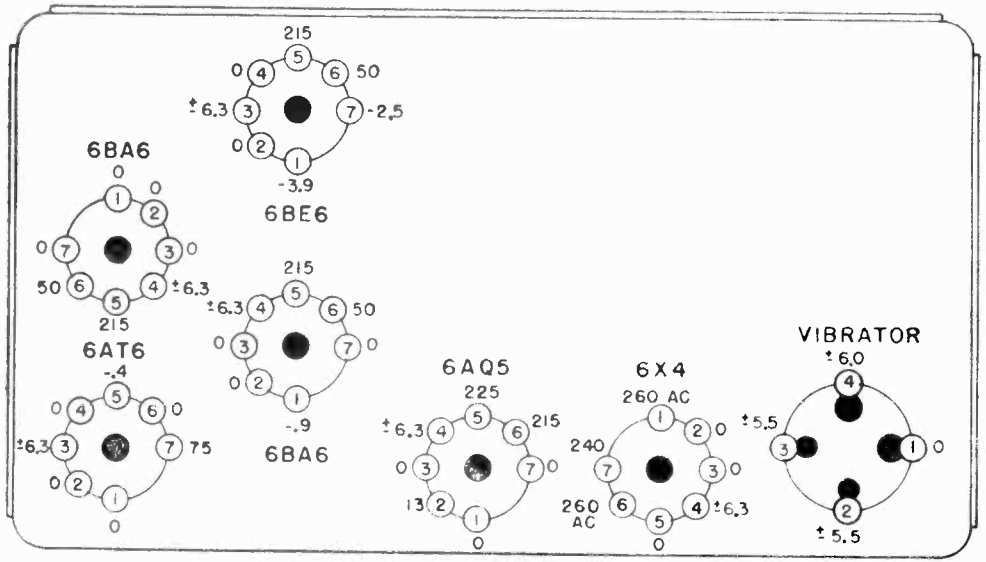
RESISTORS

R1	R309	1 megohm ½ watt 20% resistor
R2	R306	20K ohm ½ watt 20% resistor
R3	R305	2K ohm ½ watt 20% resistor
R4	R310	2 megohm ½ watt 20% resistor
R5	R311	10 megohm ½ watt 20% resistor
R6	R307	250K ohm ½ watt 20% resistor
R7	R308	500K ohm ½ watt 20% resistor
R8	R303	330 ohm ½ watt 20% resistor
R9	R313	20K ohm 2 watt 20% resistor
R10, R11	R301	100 ohm ½ watt 20% resistor
R12	R312	1K ohm 1 watt 20% resistor
RV-200	RV-200	Volume control ¾ megohm with switch

COILS AND TRANSFORMERS

L1-C1	L200	Motor noise elimination unit
L2	57FB-3	Antenna Coil
L3	57FB-4	RF coil
L4	L201	RF Oscillator coil
L5	L202	Choke, vibrator hash
L6	L203	Choke, "A" line
T1	1655-16	1st IF transformer
T2	1655-16	2nd IF transformer
T3		Output transformer (Part of speaker not furnished separately)
T4	TV-86 or TV-86A	Vibrator transformer

BOTTOM VIEW OF CHASSIS



FRONT OF CHASSIS

SOCKET VOLTAGES

Fig. 4

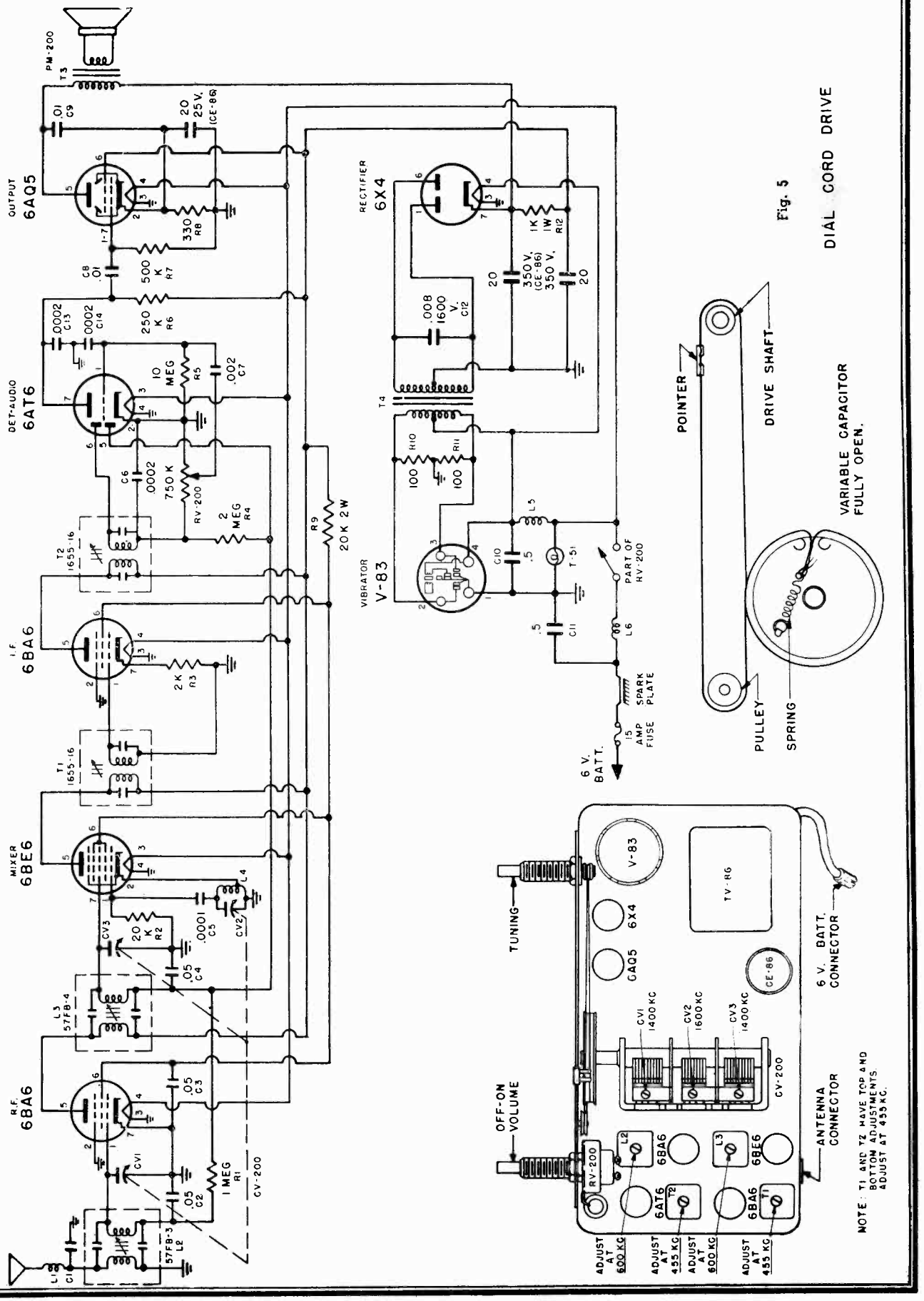
DIAL PARTS

D200	Dial Scale
PS200	Dial Pointer
DS200	Drive shaft assembly
H201	Grommet, rubber drive
T51	Pilot light
H202	Pilot light socket
H203	Pulley, idler
H204	Spring, Dial Drive String Tension
H205	String, Dial Drive

MISCELLANEOUS

A200	"A" lead assembly
H206	Case (less covers)
H207	Clip, anti-rattle
H208	Clip, coil mounting
H209	Cover, bottom case
H210	Cover, top case (with speaker louvres)
A201	Fuse, 15 Amp.
H211	Grommet, rubber, gang mounting
H212	Receptacle, antenna cable
PM-200	Speaker 4" x 6" PM (includes output transformer)
V-83	Vibrator

MODEL D-200, Dodge,
Plymouth, 1949-1950

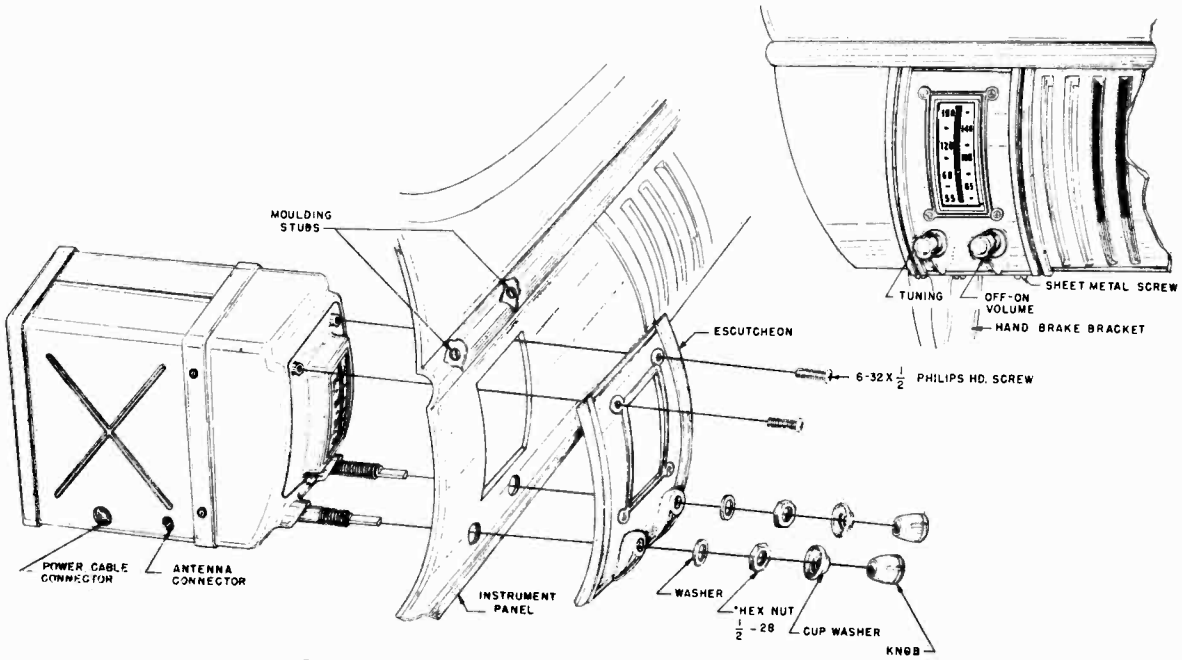


DESCRIPTION

Your new Automobile Receiver is a 6-tube (including rectifier) superhetrodyne, designed to operate from the 6-volt storage battery in your car. It is custom-built to mount behind the instrument panel in the place provided for a radio by the automobile manufacturer. It features a novel two-piece construction and covers the frequency range 538 to 1600 KC. Two simple controls are provided for operating the receiver.

This receiver has been designed with a tuned RF stage and a 3-gang tuning condenser thereby insuring the finest in sensitivity and selectivity. Any standard two or three section whip or "fish pole" antenna will provide good reception of distant or weak stations. The unit is simple to install and requires no electrical adjustment after installation.

INSTALLATION



R.F. TUNING UNIT DETAIL MOUNTING ASSEMBLY

Fig. 1

R. F. TUNING UNIT

1. Loosen nuts on the two moulding studs located behind the instrument panel cover plate.
2. Remove sheet metal screw from the lower edge of the instrument panel cover plate and the two screws and washers attaching the hand brake to the instrument panel. Keep these parts.
3. Remove instrument panel cover plate and discard.
4. Tighten nuts on the two moulding studs located behind the instrument panel cover plate.
5. Drop vent controls by removing screws, lockwashers, and flat washers securing these controls to the instrument panel. This will facilitate installation of both receiver units. Save parts removed.
6. Install R.F. Tuning Unit behind instrument panel so that mounting bushings and tuning shafts protrude through the instrument panel.
7. Slide plastic escutcheon over mounting bushings and secure with flat washers, nuts, cup washers, and knobs as shown in Fig. 1
8. Secure top part of plastic escutcheon to R.F. Tuning Unit with two No. 6-32 x ½" long Philips Head screws.

MODEL C-300,
Chevrolet, 1949-1950

POWER SUPPLY UNIT

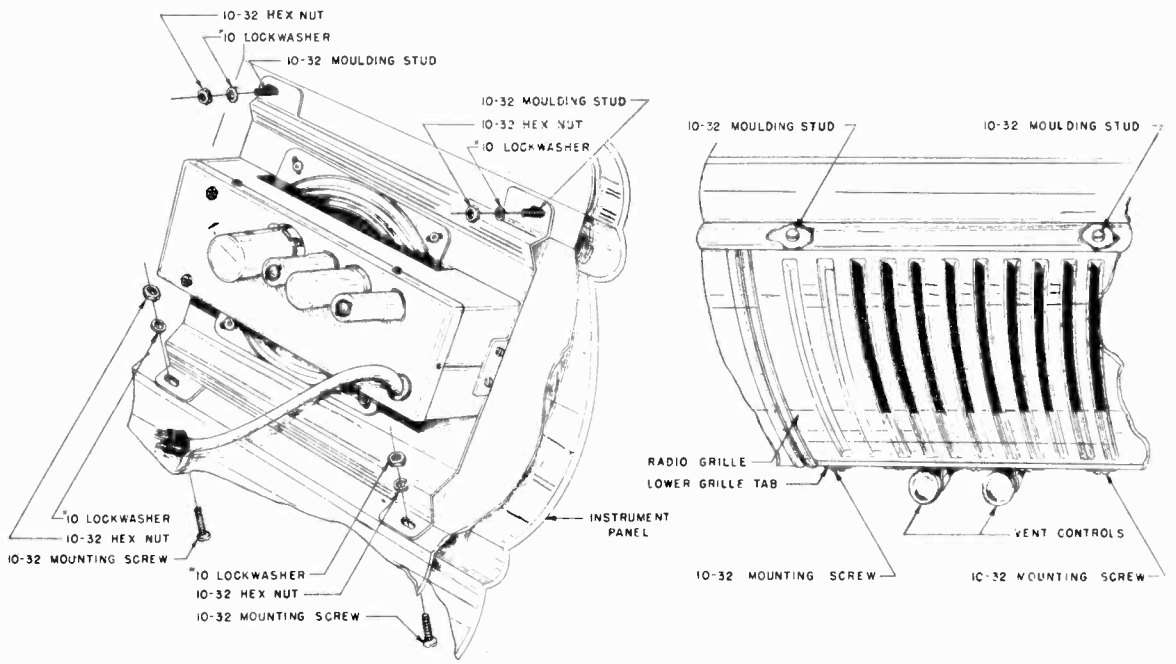
1. Insert a thin blade screwdriver or a flat strip of metal through the Radio Grille and slit fiberboard Radio Grille screen. Reach in back of Radio Grille and remove screen by grasping slit edge. Discard fiberboard screen.
2. Remove 10-32 nuts and washers from the moulding studs behind the Radio Grille.
3. Remove 10-32 nuts screws, and washers securing the lower tabs of the Radio Grille to the instrument panel.
4. Install Power Supply Unit behind Radio Grille and position into place so that holes in top of unit slide over moulding studs as shown in Fig. 2.

NOTE: It may be more convenient, in car models with air conditioner heaters, to remove the vibrator before installing this unit. The vibrator can be replaced after the power unit is mounted.

5. Replace 10-32 nuts and washers on moulding studs.
6. Replace lower grille tab 10-32 mounting screws, nuts, and washers so that screws secure the lower grille tabs and Power Supply Unit to the instrument panel.
7. Connect cable from Power Supply Unit to R.F. Tuning Unit.
8. Replace vent controls.
9. Replace screws and washers securing hand brake.

Connect battery lead to terminal on Ignition Switch.

Plug Antenna cable into receiver.



POWER SUPPLY UNIT DETAIL MOUNTING ASSEMBLY

Fig. 2

OPERATION

VOLUME CONTROL KNOB

This knob is located on the right side of the radio. Turning this knob slightly to the right until a slight click is heard will put the radio into operation. Turning this knob further to the right will increase the volume and turning it to the left will decrease the volume. After a station has been selected, the volume control should be adjusted to the required loudness. The volume should never be reduced by detuning the station selector knob.

STATION SELECTOR KNOB

This knob is located on the left side of the radio. This knob should be turned until a desired station has been selected. Adjust this knob very carefully until the station comes in with the most natural tone.

MODEL C-300,
Chevrolet, 1949-1950

MOTOR NOISE ELIMINATION

SUPPRESSION KIT

A suppression kit is shipped with this receiver. It contains the following parts:
1 Generator Condenser.
1 Distributor Suppressor.

GENERATOR CONDENSER

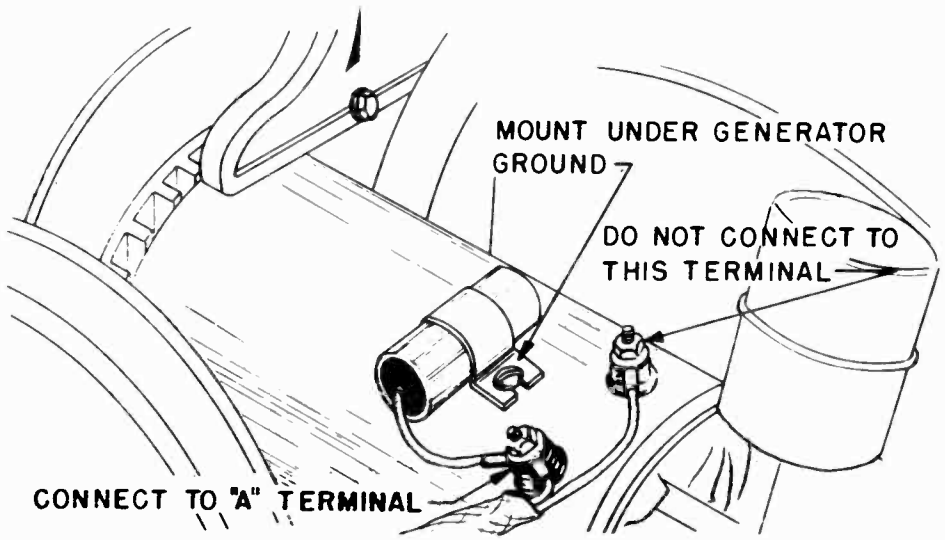


Fig. 3

DISTRIBUTOR SUPPRESSOR

Disconnect the center lead in the distributor head of the motor. Cut lead approximately 2 inches back from metal tip end. Screw suppressor into cut end of long lead. Screw cut end of short lead into suppressor. Plug lead, with attached suppressor, back into distributor head.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

AMMETER CONDENSER

A .5 MFD by-pass condenser should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

MODEL C-300,
Chevrolet, 1949-1950

SERVICE DATA
ELECTRICAL SPECIFICATIONS

Power Supply	6.3 Volts DC
Current	5.5 Amp. average
Frequency Range	538-1600 KC
Speaker	5¼" PM
Power Output	2 watts, undistorted
	3 watts, maximum
Sensitivity	2-3 microvolts average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:
1—6BA6—RF Amplifier
1—6BE6—Converter
1—6BA6—I. F. Amplifier
1—6AT6—Detector—AVC—1st Audio
1—6AQ5—Power Output
1—6X4—Rectifier

SERVICE NOTES

Voltage taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 Ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 4).
All voltages should be measured with an input voltage of 6.3 volts DC.
To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components such as tubes, condensers, resistors, etc. are normal before proceeding with re-alignment.

If realignment is necessary follow the instructions given under the heading "Alignment Procedure". After realignment has been completed repeat the procedure as final check.

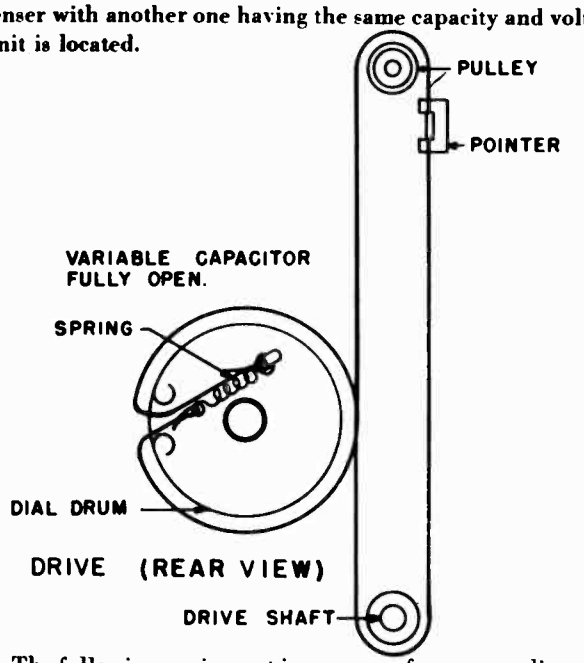


Fig. 4 DIAL CORD DRIVE (REAR VIEW)

ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.
No signal applied to antenna.
Power input—6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas—.1 MFD., 100 MMFD.
For alignment points refer to Schematic Diagram.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connector*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L3	Maximum	RF Stage
7) Tune in Signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna
8) Repeat steps 4 and 5						

PARTS LIST

CONDENSERS

Schematic Diagram Reference	*Part No.*	*Description*
C2, C3, C6, C9	C207	.05 MFD 200 volt condenser
C4, C15	C209	.5 MFD 100 volt condenser
C7	CC200	100 MMFD ceramic condenser
C8	C210	.1 MFD 400 volt condenser
C10, C12	CC201	200 MMFD ceramic condenser
C13, C16	C206	.01 MFD 600 volt condenser
C14	C205	.008 MFD 1600 volt condenser
C11	C211	.002 MFD 400 volt condenser
CE-86	CE-86	20 MFD 350 volt electrolytic condenser 20 MFD 350 volt electrolytic condenser 20 MFD 25 volt electrolytic condenser
CV1-CV2-CV3	CV-300	3 section variable tuning

RESISTORS

R1	R309	1 megohm ½ watt 20% resistor
R2	R306	20K ohm ½ watt 20% resistor
R3	R314	1.5K ohm ½ watt 20% resistor
R4	RV-300	Volume control ¾ megohm with switch
R5	R310	2 megohm ½ watt 20% resistor
R6	R311	10 megohm ½ watt 20% resistor
R7	R307	250K ohm ½ watt 20% resistor
R9	R313	20K ohm 2 watt 20% resistor
R9, R10	R301	100 ohm ½ watt 20% resistor
R11	R312	1K ohm 1 watt 20% resistor
R12	R308	500K ohm ½ watt 20% resistor
R13	R303	330 ohm ½ watt 20% resistor

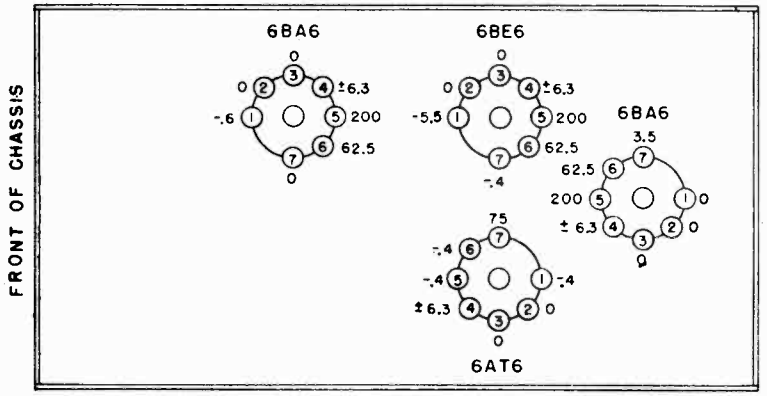
COILS AND TRANSFORMERS

L1-C1	L200	Motor noise elimination unit
L2	57FB-3	Antenna coil
L3	57FB-4	R.F. coil
L4	L201	R.F. oscillator coil
L5	L203	Choke, "A" line
L6	L202	Choke, vibrator hash
T1	1655-16	2nd IF transformer
T2	1655-16	1st IF transformer
T3	TV-100 or 318V-2	Vibrator transformer
T4		Output transformer (Part of speaker not furnished separately)

DIAL PARTS

D300	Dial Scale
PS300	Dial Pointer
DS300	Drive Shaft Assembly
H201	Grommet, rubber drive
T51	Pilot Light
H214	Pilot Light Socket
H203	Pulley, idler
H204	Spring, Dial drive String Tension
H215	String, dial drive

BOTTOM VIEW OF CHASSIS



BOTTOM VIEW OF POWER PACK

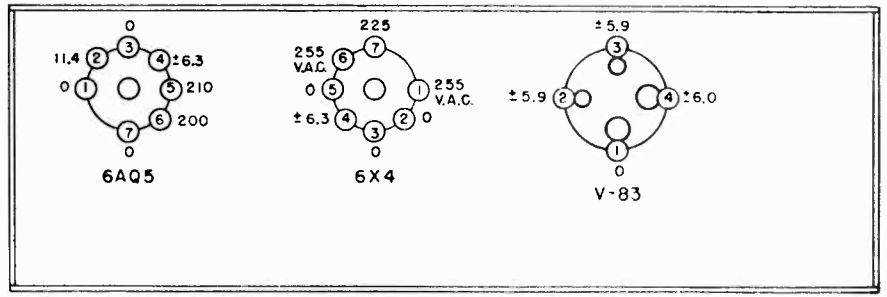


Fig. 5 SOCKET VOLTAGES

MISCELLANEOUS

A300	"A" lead assembly
H301	Case, less covers for Power Supply Unit
H300	Case, complete with covers for R.F. tuning unit
H207	Clip, Anti-rattle
H208	Clip, coil mounting
H302	Cover, power supply unit mounting (with speaker louvres)
A201	Fuse 15 Amp.
504PC-300	Power Cable Assembly (complete with plug)
H212	Receptacle, Antenna cable
504-FC	Socket, power cable
PM-705	Speaker, 5¼" PM (includes output transformer)
V-83	Vibrator
H310	Knob
H311	Cup washer
H312	Plastic Escutcheon

MODEL C-300,
Chevrolet, 1949-1950

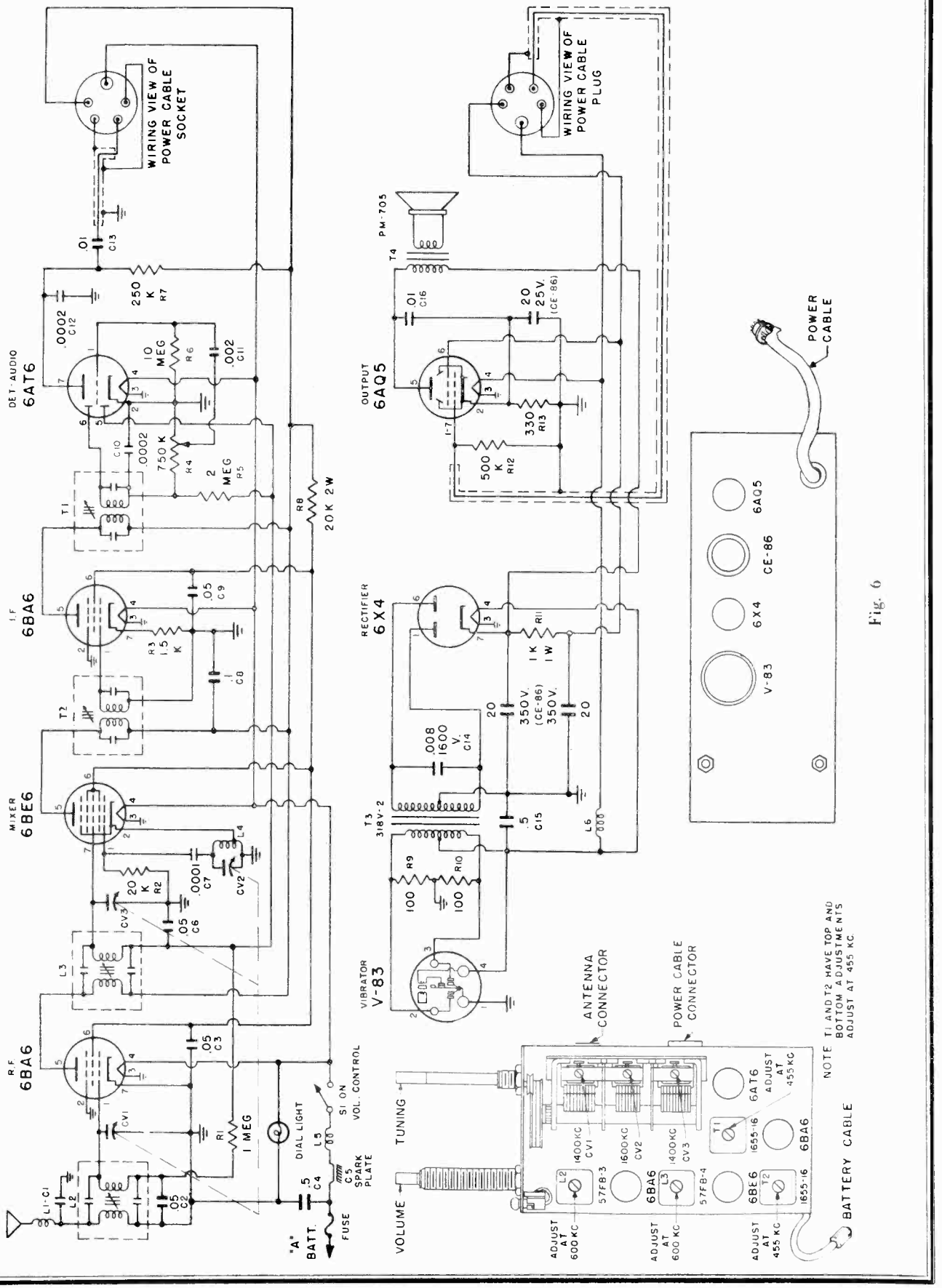
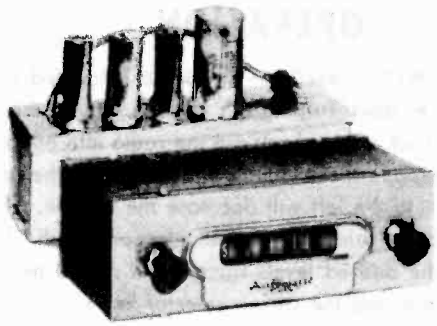


Fig. 6

MODEL F-100,
Ford, 1949-1950

SCHEMATIC DIAGRAM REF. NO.	PART NO.	DESCRIPTION
		CONDENSERS
C2, C3, C5	C207	.05 MFD 200 volt condenser
C4, C12	C209	.5 MFD 100 volt condenser
C6	CC200	100 MMFD ceramic condenser
C7, C9	CC201	200 MMFD ceramic condenser
C8	C203	.002 MFD 400 volt condenser
C10, C13	C206	.01 MFD 400 volt condenser
C11	C205	.008 MFD 1600 volt condenser
CE-86	CE-86	20 MFD 350 volt electrolytic condenser 20 MFD 350 volt electrolytic condenser 20 MFD 25 volt electrolytic condenser
CV1-CV2-CV3	CV-100A	3 section variable
		RESISTORS
R1	R309	1 megohm ½ watt 20% resistor
R2, R14	R303	330 ohm ½ watt 20% resistor
R3	R306	20K ohm ½ watt 20% resistor
R4	R314	1.5K ohm ½ watt 20% resistor
R5	RV-100	Volume control ¾ megohm with switch
R6	R310	2 megohm ½ watt 20% resistor
R7	R311	10 megohm ½ watt 20% resistor
R8	R313	20K ohm 2 watt 20% resistor
R9	R307	250K ohm ½ watt 20% resistor
R10, R11	R301	100 ohm ½ watt 20% resistor
R12	R312	1K ohm 1 watt 20% resistor
R13	R308	500K ohm ½ watt 20% resistor
		COILS AND TRANSFORMERS
L1-C1	L200	Motor noise elimination unit
L2	15053 or 57FB-3	Antenna coil
L3	15054 or 57FB-4	R.F. coil
L4	L201	R. F. oscillator coil
L5	L203	Choke "A" line
L6	L202	Choke, vibrator hash
T2	14977 or 1655-16	2nd IF transformer
T1	14977 or 1655-16	1st IF transformer
T3	TV-100 or 318V-2	Vibrator transformer
T4		Output transformer (Part of speaker not furnished separately)



DESCRIPTION

Your new Automobile Receiver is a 6-tube (including rectifier) superheterodyne, designed to operate from the 6-volt storage battery in your car. It is custom-built to mount behind the instrument panel in the place provided for a radio by the automobile manufacturer: It has a self-contained PM speaker and covers the frequency range 538 to 1600 KC.

This receiver has been designed with a tuned RF stage and a 3-gang tuning condenser thereby insuring the finest in sensitivity and selectivity. Any standard two or three section whip or "fish pole" antenna will provide good reception. The unit is simple to install and requires no electrical adjustment after installation.

	DIAL PARTS
D100	Dial Scale Escutcheon, Plastic
PS100	Dial Pointer
T47	Pilot Light
H114	Pilot Light Socket
H203	Pulley, idler
H204	Spring, Dial drive String Tension
H115	String, dial drive
	MISCELLANEOUS
A300	"A" lead assembly
H301	Case, less covers for Power Supply Unit
H100	Case, complete with covers for R.F. tuning unit
H207	Clip, Anti-rattle
H208	Clip, coil mounting
H102	Cover, power supply unit mounting (with speaker louvres)
A201	Fuse 15 Amp.
504PC-300	Power Cable Assembly (complete with plug)
H212	Receptacle, Antenna cable
504-FC	Socket, power cable
PM-705	Speaker, 5¼" PM (includes output transformer)
V-83	Vibrator
H310	Knob
H311	Cup washer
H113	7/16—28 Hex nut
C100	.5 MFD generator condenser
R100	Distributor suppressor

MODEL F-100,
Ford, 1949-1950

OPERATION

VOLUME CONTROL KNOB — This knob is located on the left side of the radio. Turning this knob slightly to the right until a slight click is heard will put the radio into operation. Turning this knob further to the right will increase the volume and turning it to the left will decrease the volume. After a station has been selected, the volume control should be adjusted to the desired level. The volume should never be reduced by detuning the station selector knob.

STATION SELECTOR KNOB — This knob is located on the right side of the radio. This knob should be turned until a desired station has been selected. Adjust this knob very carefully until the station comes in with the most natural tone. Add a zero to the dial readings to obtain the frequency in kilocycles.

INSTALLATION

1. Remove two speed nuts securing radio opening cover plate to instrument panel.
2. Remove cover plate.
3. Place speaker and power pack unit over four threaded stud bolts located on the underside of the instrument panel. (Position power pack unit so that power cable is located on the left hand side.) See Fig. 1.
4. Secure power pack into position with four 8-32 nuts and washers supplied in kit of mounting hardware.
5. Remove knobs, cup washers and hex mounting nuts from tuning units. Do not remove escutcheon.
6. Place tuning unit behind instrument panel so that mounting bushings and shafts protrude through the front panel.
7. Attach tuning unit with a hex nut on each mounting bushing.
8. Replace cup washers, grommets and knobs over shafts.
9. Secure a supporting bracket (2 supplied in kit of hardware) to each side of the power pack unit by means of two No. 8 self-tapping screws. Use end of supporting bracket with round hole. If more convenient, these brackets may be attached before power pack unit is positioned in place.
10. Swing supporting brackets so that slotted holes are in line with the holes on each side of the tuning unit.
11. Secure to tuning unit with two No. 8 self-tapping screws.
12. Insert power cable plug into socket on rear of tuning unit.
13. Plug antenna cable into tuning unit.
14. Secure power cable under cable clamp and tighten clamp screw.
15. Connect "A" lead to accessory terminal marked RAD. GA, on the ignition switch.

ACCESSORIES FURNISHED FOR INSTALLATION

MOUNTING PARTS KIT

The following mounting hardware parts are shipped attached to the receiver. (See detail assembly drawing Fig. 1).

- 2 7/16-28 hex nuts
- 2 Cup washers
- 2 Grommets
- 2 Knobs
- 1 Cable clamp

An envelope containing additional mounting hardware is supplied with this receiver. It contains the following parts:

- 2 Supporting brackets
- 4 No. 8 self-tapping screws
- 4 8-32 nuts
- 4 No. 8 washers

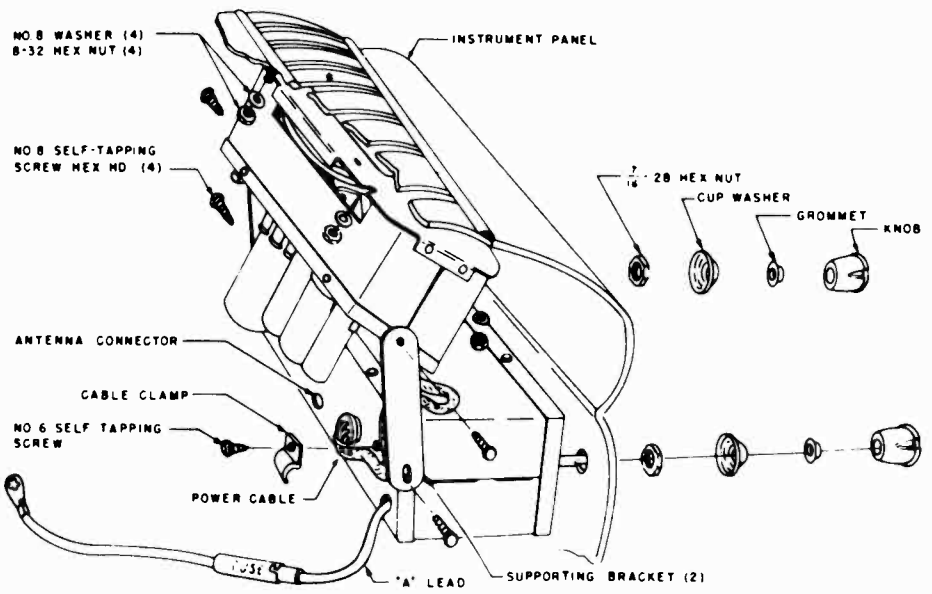


FIG. 1 DETAIL MOUNTING ASSEMBLY

MOTOR NOISE ELIMINATION

MODEL F-100,
Ford, 1949-1950

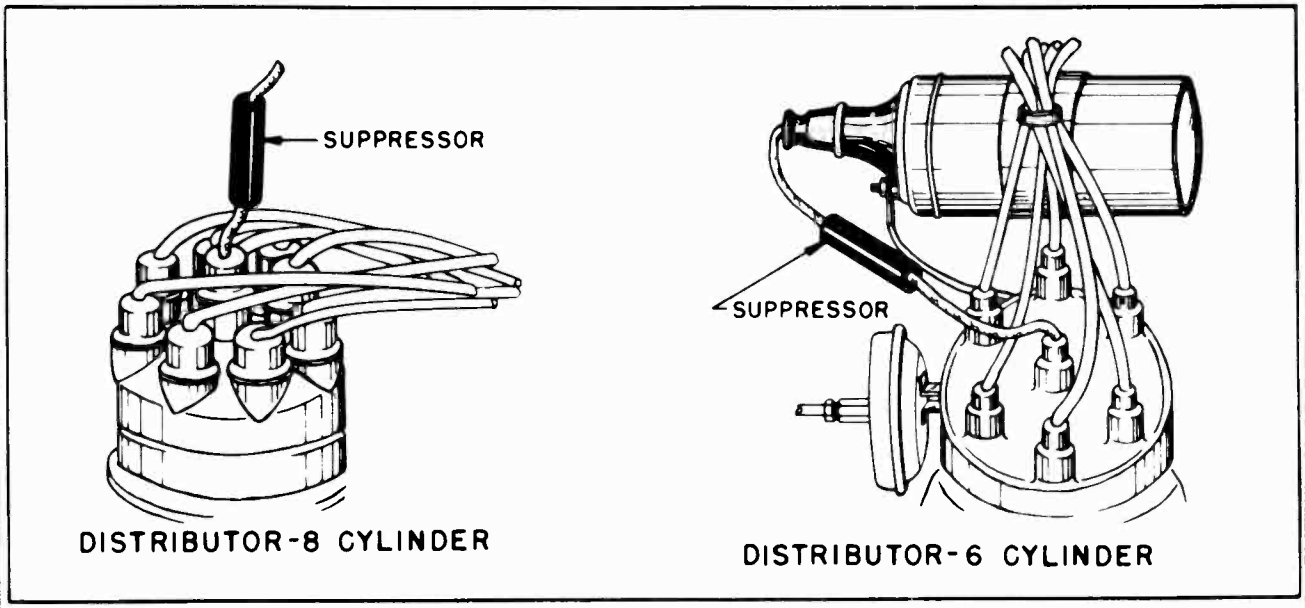


FIG. 2 DISTRIBUTOR SUPPRESSOR

SUPPRESSION KIT

A suppression kit is shipped with this receiver. It contains the following parts:

1 Generator Condenser

1 Distributor suppressor

DISTRIBUTOR SUPPRESSOR

Disconnect high tension wire that runs from the ignition coil to the center hole of the distributor head. Cut lead one and one-half inches back from metal tip end for 8 cylinder Ford or two and one-half inches back for 6 cylinder Ford. Screw suppressor into cut end of long lead. Screw cut end of short lead into suppressor. Plug lead with attached suppressor, back into distributor head.

GENERATOR CONDENSER

Loosen the top assembly bolt from the rear end plate of the generator. DO NOT REMOVE. Mount .5MFD generator condenser under this bolt. Tighten bolt and connect condenser lead to the armature terminal of the generator.

The generator condenser and distributor suppressor should eliminate all objectionable motor noise in most cases. If the motor noise persists the following steps should be taken. Check operation of radio as each step is made.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

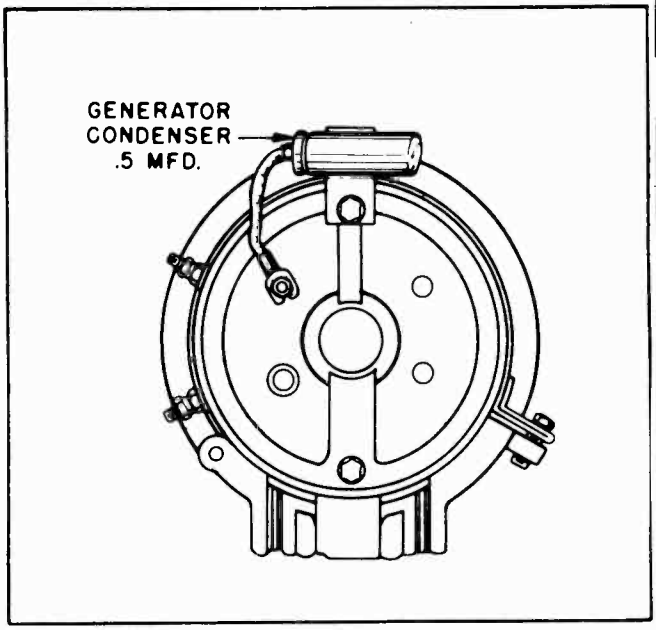


FIG. 3 GENERATOR CONDENSER

AMMETER CONDENSER

A .5 MFD by-pass condenser should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

MODEL F-100,
Ford, 1949-1950

ELECTRICAL SPECIFICATIONS

Power Supply ..... 6.3 Volts DC
Current ..... 5.5 Amp. average
Frequency Range ..... 538-1600 KC
Speaker ..... 5¼" PM 3.2 Ohm V.C.
Power Output ..... 2 watts, undistorted
3 watts, maximum
Sensitivity ..... 2-3 microvolts average for 1 watt output
Selectivity .. 40 KC broad at 1000 times signal, at 1000 KC
This receiver contains the following:
1 — 6BA6 — RF Amplifier
1 — 6BE6 — Converter
1 — 6BA6— I. F. Amplifier
1 — 6AT6 — Detector — AVC — 1st Audio
1 — 6AQ5 — Power Output
1 — 6X4 — Rectifier

SERVICE NOTES

Voltage taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 Ohms per volt. These voltages are clearly shown on the voltage chart.

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "Alignment Procedure." After realignment has been completed repeat the procedure as final check.

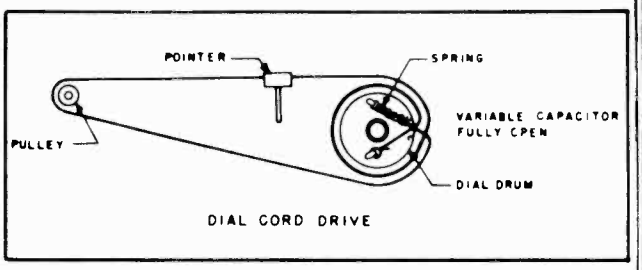


FIG. 4 DIAL CORD DRIVE

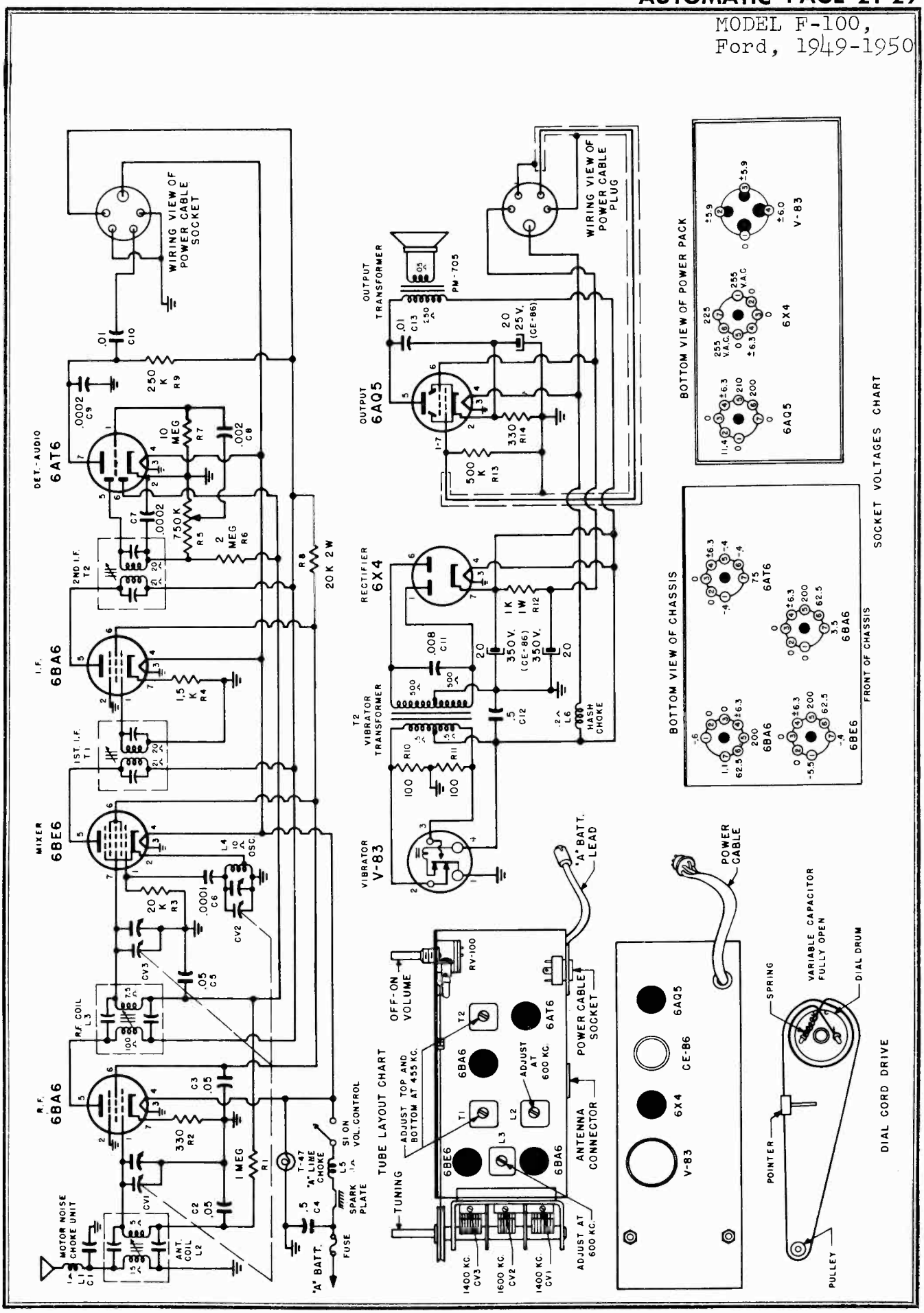
ALIGNMENT PROCEDURE

Volume control — Maximum all adjustments.
No signal applied to antenna.
Power input — 6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

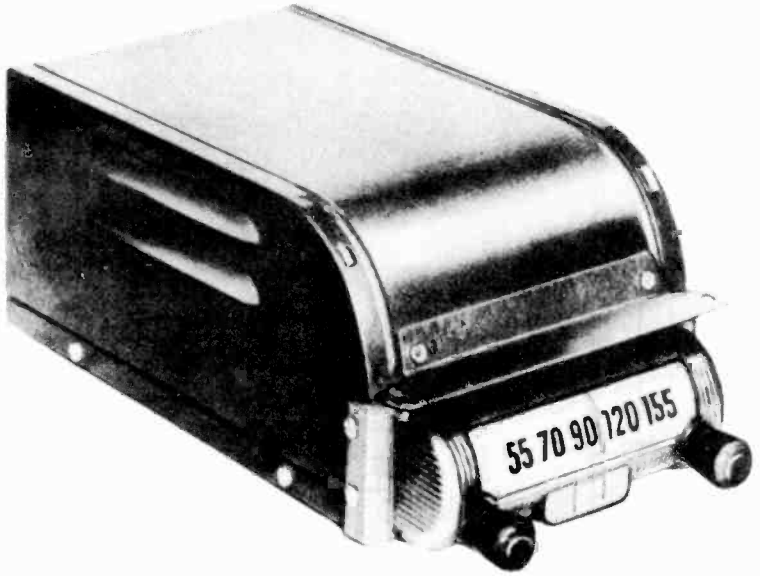
The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas — .1 MFD., 100 MMFD.
For alignment points refer to Schematic Diagram.

DIAL SETTING	GENERATOR FREQUENCY	DUMMY ANT.	GENERATOR CONNECTION	TRIMMER REFERENCE	TRIMMER ADJUSTMENT	TRIMMER FUNCTION
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L3	Maximum	RF Stage
7) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna
8) Repeat steps 4 and 5						

MODEL F-100,
Ford, 1949-1950



MODEL M-90



SCHEMATIC DIAGRAM REFERENCE	PART NO.	DESCRIPTION
		CONDENSERS
C2, C3, C5	C207	.05 MFD 200 volt condenser
C4, C12	C209	.5 MFD 100 volt condenser
C6	CC200	100 MMFD ceramic condenser
C7, C9	CC201	200 MMFD ceramic condenser
C8	C203	.002 MFD 400 volt condenser
C10, C13	C206	.01 MFD 600 volt condenser
C11	C205	.008 MFD 1600 volt condenser
CE-86	CE-86	20 MFD 350 volt electrolytic condenser 20 MFD 350 volt electrolytic condenser 20 MFD 25 volt electrolytic condenser
CV1,CV2, CV3	CV-148	3 section variable condenser
		RESISTORS
R1	R-309	1 megohm ½ watt 20% resistor
R2, R14	R-303	330 ohm ½ watt 20% resistor
R3	R-306	20K ohm ½ watt 20% resistor
R4	R-314	1.5K ohm ½ watt 20% resistor
R5	RV-57	Volume control ¾ megohm with switch
R6	R-310	2 megohm ½ watt 20% resistor
R7	R-311	10 megohm ½ watt 20% resistor
R8	R-313	20K ohm 2 watt 20% resistor
R9	R-307	250K ohm ½ watt 20% resistor
R10, R11	R-301	100 ohm ½ watt 20% resistor
R12	R-312	1k ohm 1 watt 20% resistor
		COILS AND TRANSFORMERS
L1-C1	L-200	Motor Noise elimination unit
L2	57FB-3	Antenna Coil
L3	57FB-4	R.F. Coil
L4	L-201	R.F. Oscillator Coil
L5	L-203	Choke "A" Line
L6	L-202	Choke, vibrator hash
T1	1655-16	1st I.F. Transformer
T2	1655-16	2nd I.F. Transformer
T3	TV86 or TV86A	Vibrator Transformer
T4		Output transformer (Part of speaker not furnished separately)

PART NO.	DESCRIPTION
	DIAL PARTS
H201	Grommet, rubber drive
T51	Pilot light
H202	Pilot light socket
H203	Pulley, idler
H204	Spring, Dial drive string tension
H503	String, Dial drive
DP505	Dial Pan
PS 1024	Dial Pointer
DS -500	Drive shaft assembly
	Plastic Dial Scale front
H508	Knob
	MISCELLANEOUS
A300	"A" lead assembly
A201	Fuse 15 Amp
V-83	Vibrator
H-207	Clip, case anti-rattle
H-208	Clip, coil mounting
H-501	Case bottom
H-502	Case cover
PM-702-A	Speaker 5" (includes output transformer)
H-212	Receptacle, Antenna Cable
GC-507	Speaker Grill Cloth and cardboard baffle

INSTALLATION

Due to the compact size of this receiver, many mounting positions are possible. However, the most convenient is directly below the instrument panel as illustrated in figure 1. The following step by step procedure will facilitate the installation of the receiver.

1. With the receiver itself as a model, select the desired position.

2. Using the front mounting bracket as a template locate the two front mounting holes and a ¼" hole at each point.

3. Attach front mounting bracket to the receiver by two No. 6 self-tapping screws.

4. Locate the position for the rear mounting stud in the bulkhead and drill a ½" hole.

5. With the stud mounted on the receiver and the inside nut and washer in place, insert the stud through the bulkhead hole and attach the front end of the receiver to the instrument panel with two 8-32 machine screws contained in kit of mounting hardware.

6. Open the engine compartment and remove the paint on the bulkhead around the stud. Assemble the washer and nut on this side and adjust both this nut and the inside nut for perfect alignment of the receiver and for good contact with the brightened surface of the bulkhead.
Caution: Do not screw stud in case beyond point necessary to insure support, otherwise, it may penetrate rear wall of case and cause damage to the instrument.

7. Attach the terminal of the "A" battery cable to one of the posts on the ammeter, preferably on the battery side. This may be ascertained by switching the receiver on. If no deflection of the ammeter occurs, the receiver is properly connected.

8. Insert plug on the end of the antenna lead into socket connector located on the left side of the radio.

ACCESSORIES FURNISHED FOR INSTALLATION

MOUNTING PARTS KIT

1 mounting stud
2 ⅜-16 hex nuts
2 ⅜" I.D. washers
2 8-32 machine screws
2 8-32 hex nuts
2 No. 8 washers
2 No. 8 lock washers

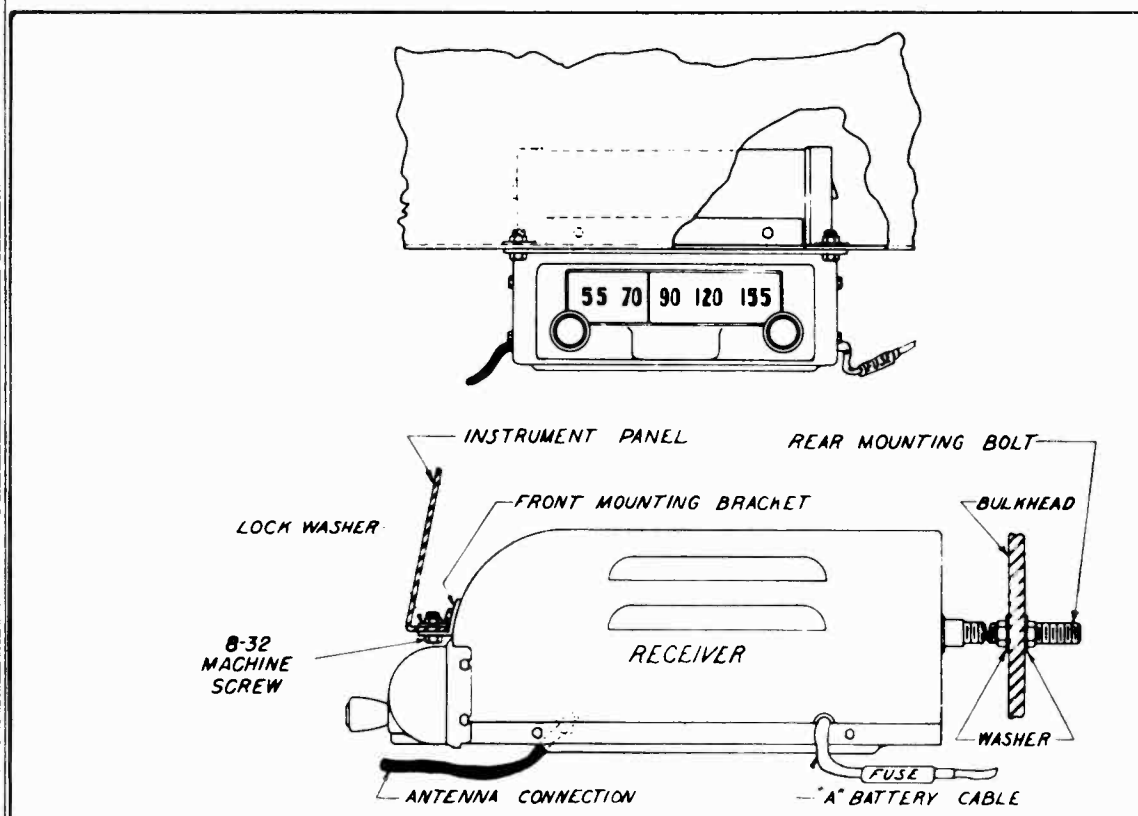


FIG. 1 DETAIL MOUNTING ASSEMBLY

MODEL M-90

MOTOR NOISE ELIMINATION

SUPPRESSION KIT

1 .5 MFD Generator Condenser 1 Distributor Suppressor

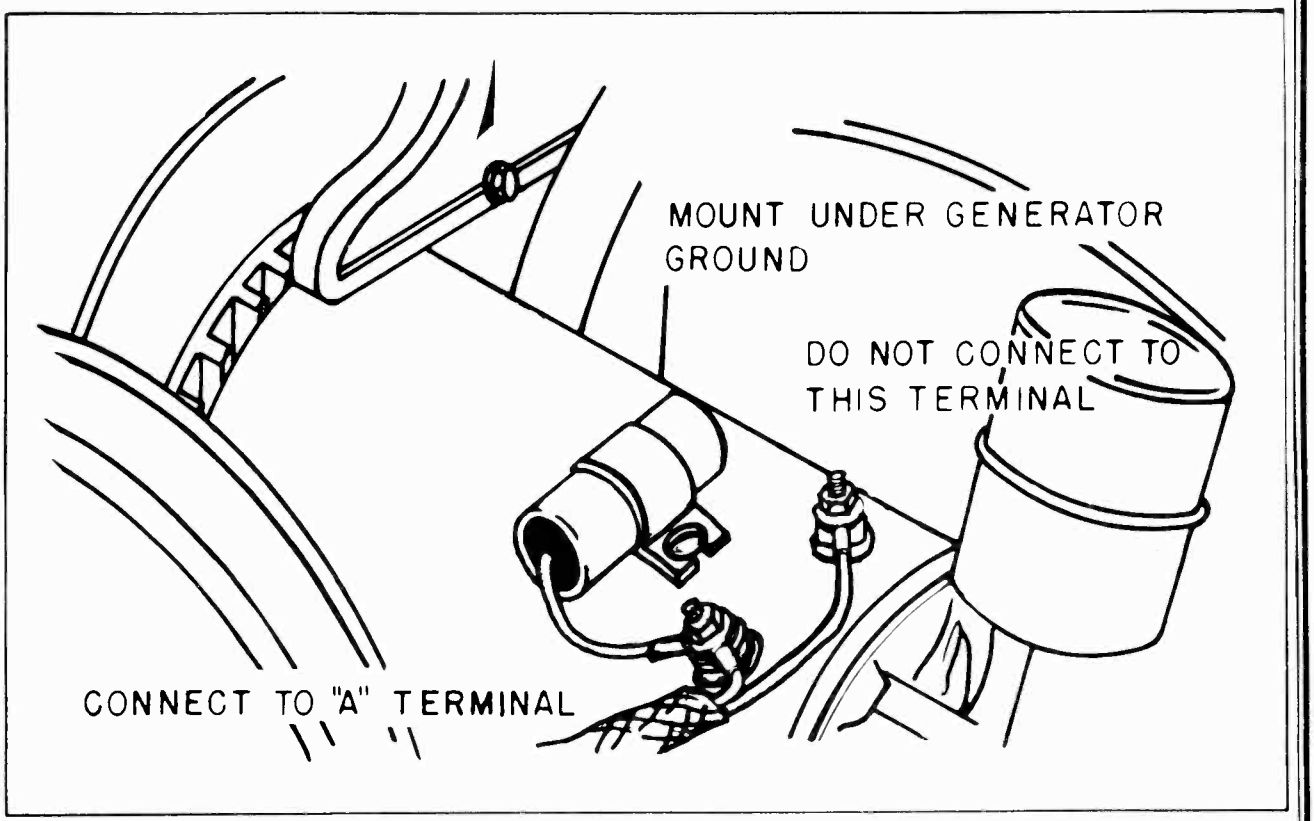


FIG. 2 GENERATOR CONDENSER

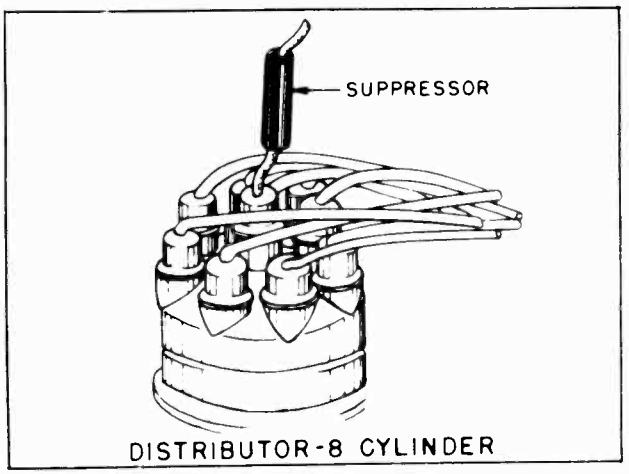


FIG. 3 DISTRIBUTOR SUPPRESSOR

GENERATOR CONDENSER

The generator condenser (Installed as shown in Figure 2) and distributor suppressor will normally eliminate all objectionable motor noise. If the motor noise persists, a .5 MFD by-pass condenser may be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.

DISTRIBUTOR SUPPRESSOR

Disconnect the center lead in the distributor head of the motor (see Fig. 3). Cut lead approximately 2 inches back from metal tip end. Screw suppressor into cut end of long lead. Screw cut end of short lead into suppressor. Plug lead, with attached suppressor, back into distributor head.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

ELECTRICAL SPECIFICATIONS

Power Supply ..... 6.3 Volts DC
Current ..... 5.5 Amp. average
Frequency Range ..... 538-1600 KC
Speaker ..... 5" PM 3.2. Ohm. V.C.
Power Output ..... 2 watts, undistorted
3 watts, maximum
Sensitivity ..... 2-3 microvolts average for 1 watt output
Selectivity . . 40 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:

1 — 6BA6 — RF Amplifier
1 — 6BE6 — Converter
1 — 6BA6 — I. F. Amplifier
1 — 6AT6 — Detector — AVC — 1st Audio
1 — 6AQ5 — Power Output
1 — 6X4 — Rectifier

SERVICE NOTES

Voltage taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 Ohms per volt. These voltages are clearly shown on the voltage chart.

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "Alignment Procedure." After realignment has been completed repeat the procedure as final check.

ALIGNMENT PROCEDURE

Volume control — Maximum, all adjustments.
No signal applied to antenna.
Power input — 6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

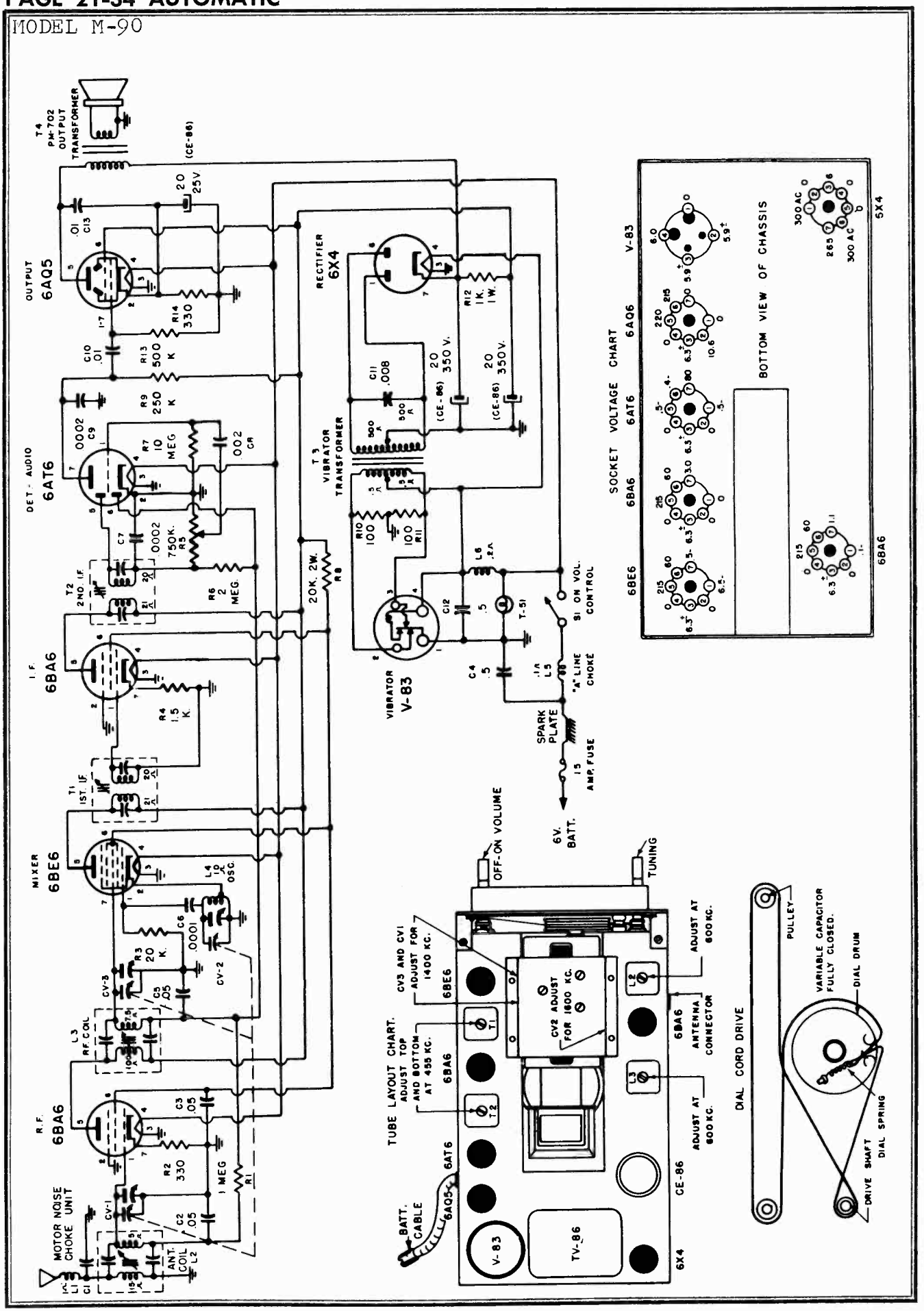
The following equipment is necessary for proper alignment:

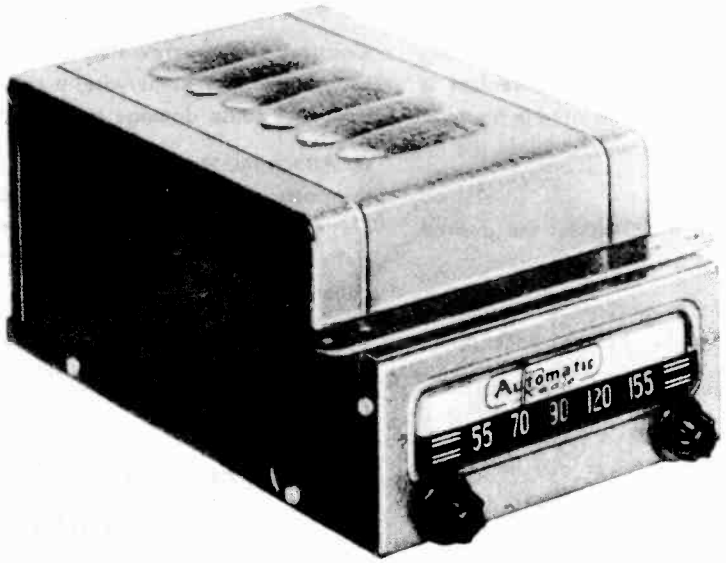
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas — .1 MFD., 100 MMFD.

For alignment points refer to Schematic Diagram.

DIAL SETTING	GENERATOR FREQUENCY	DUMMY ANT.	GENERATOR CONNECTION	TRIMMER REFERENCE	TRIMMER ADJUSTMENT	TRIMMER FUNCTION
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L3	Maximum	RF Stage
7) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna
8) Repeat steps 4 and 5						

MODEL M-90





REPLACEMENT PARTS LIST

SCHEMATIC DIAGRAM REF. NO.	PART NO.	DESCRIPTION
		CONDENSERS
C3, C5	C207	.05 MFD 200 volt condenser
C4, C12	C209	.5 MFD 100 volt condenser
C6	CC200	100 MMFD ceramic condenser
C7, C9	CC201	200 MMFD ceramic condenser
C8	C203	.002 MFD 400 volt condenser
C10, C13	C206	.01 MFD 600 volt condenser
C11	C220	.0125 MFD 1200 volt condenser
C15	CE-X50	20 MFD 150 volt electrolytic condenser 20 MFD 150 volt electrolytic condenser 20 MFD 25 volt electrolytic condenser
		RESISTORS
R3	R306	20K ohm ½ watt 20% resistor
R4, R10, R11	R301	100 ohm ½ watt 20% resistor
R5	RV-X50	Volume control ¾ megohm with switch
R6	R310	2 megohm ½ watt 20% resistor
R8	R326	2K ohm 1 watt 20% resistor
R9	R307	250K ohm ½ watt 20% resistor
R12	R308	500K ohm ½ watt 20% resistor
R13	R327	150 ohm ½ watt 20% resistor
R14	R312	1K ohm 1 watt 20% resistor
		COILS AND TRANSFORMERS
L1-C1	L200	Motor noise elimination Unit
L2	57FB-3	Antenna Coil
L4	L201	R.F. Oscillator coil
L5	L203	Choke "A" line
L6	L202	Choke, vibrator hash

SCHEMATIC DIAGRAM REF. NO.	PART NO.	DESCRIPTION
T1	1655-16	1st IF transformer
T2	1655-16	2nd IF transformer
T3	TV-X50	Vibrator transformer
T4		Output transformer (Part of speaker, not furnished separately)

PART NO.	DESCRIPTION
	DIAL PARTS
H201	Grommet, rubber drive
T51	Pilot light
H202	Pilot light socket
H203	Pulley, idler
H204	Spring, Dial drive string tension
H531	String, Dial drive
DP 530	Dial Pan
PS 800	Dial Pointer
DS 540	Drive shaft assembly
S556	Dial scale window
H508	Knob
F555	Felt washers (for knobs)
	MISCELLANEOUS
A300	"A" lead assembly
A201	Fuse 15 Amp.
V83	Vibrator
H207	Clip, case anti-rattle
H208	Clip, coil mounting
PM611	Speaker 5" (includes output transformer)
H212	Receptacle, Antenna cable
GC607	Speaker Grill cloth
H601	Case bottom
H602	Case cover

MODEL X-50

INSTALLATION

Due to the compact size of this receiver, many mounting positions are possible. However, the most convenient is directly below the instrument panel as illustrated in figure 1. The following step by step procedure will facilitate the installation of the receiver.

1. With the receiver itself as a model, select the desired position.

2. Using the mounting bracket as a template locate the two front mounting holes and drill a $^{1}/_{4}$" hole at each point.

3. Locate the position for the rear mounting stud in the bulkhead and drill a $^{1}/_{2}$" hole.

4. With the stud mounted on the receiver and the inside nut and washer in place, insert the stud through the bulkhead hole and attach the front end of the receiver to the instrument panel with the two 8-32 machine screws contained in kit of mounting hardware.

5. Open the engine compartment and remove the paint on the bulkhead around the stud. Assemble the washer and nut on this side and adjust both this nut and the inside nut for perfect alignment of the receiver and for good contact with the brightened surface of the bulkhead.

Caution: Do not screw stud in case beyond point necessary to insure support, otherwise, it may penetrate rear wall of case and cause damage to the instrument.

6. Attach the terminal of the "A" battery cable to one of the posts on the ammeter, preferably on the battery side. This may be ascertained by switching the receiver on. If no deflection of the ammeter occurs, the receiver is properly connected.

7. Insert plug on the end of the antenna lead into socket connector located on the left side of the radio.

ACCESSORIES FURNISHED FOR INSTALLATION

MOUNTING PARTS KIT

1 mounting stud	2 8-32 machine screws
2 $^{3}/_{8}$-16 hex nuts	2 8-32 hex nuts
2 $^{3}/_{8}$" I.D. washers	2 No. 8 washers
	2 No. 8 lock washers

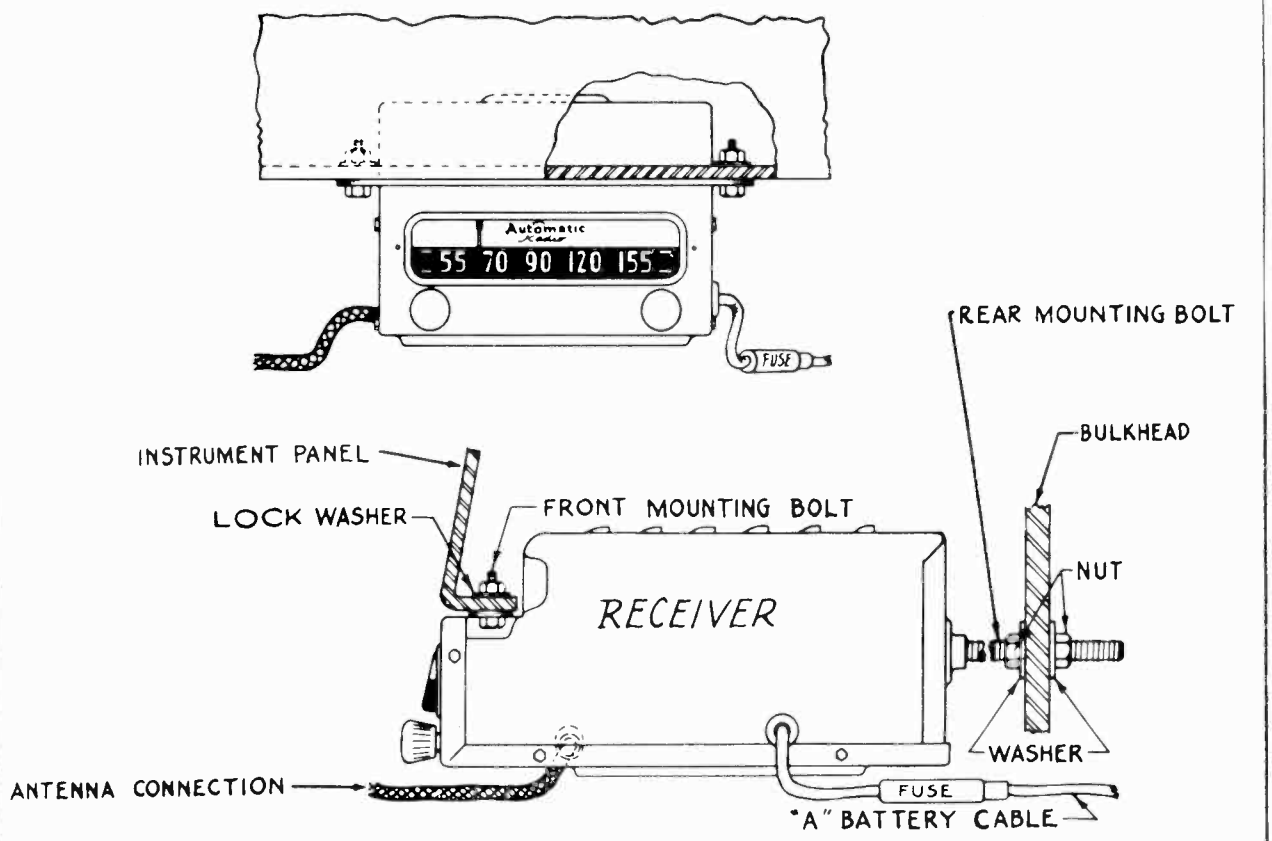


FIG. 1 RECEIVER MOUNTING DIAGRAM

MODEL X-50

MOTOR NOISE ELIMINATION

SUPPRESSION KIT

A suppression kit is shipped with this receiver. It contains the following parts:

1 Generator Condenser. 1 Distributor Suppressor.

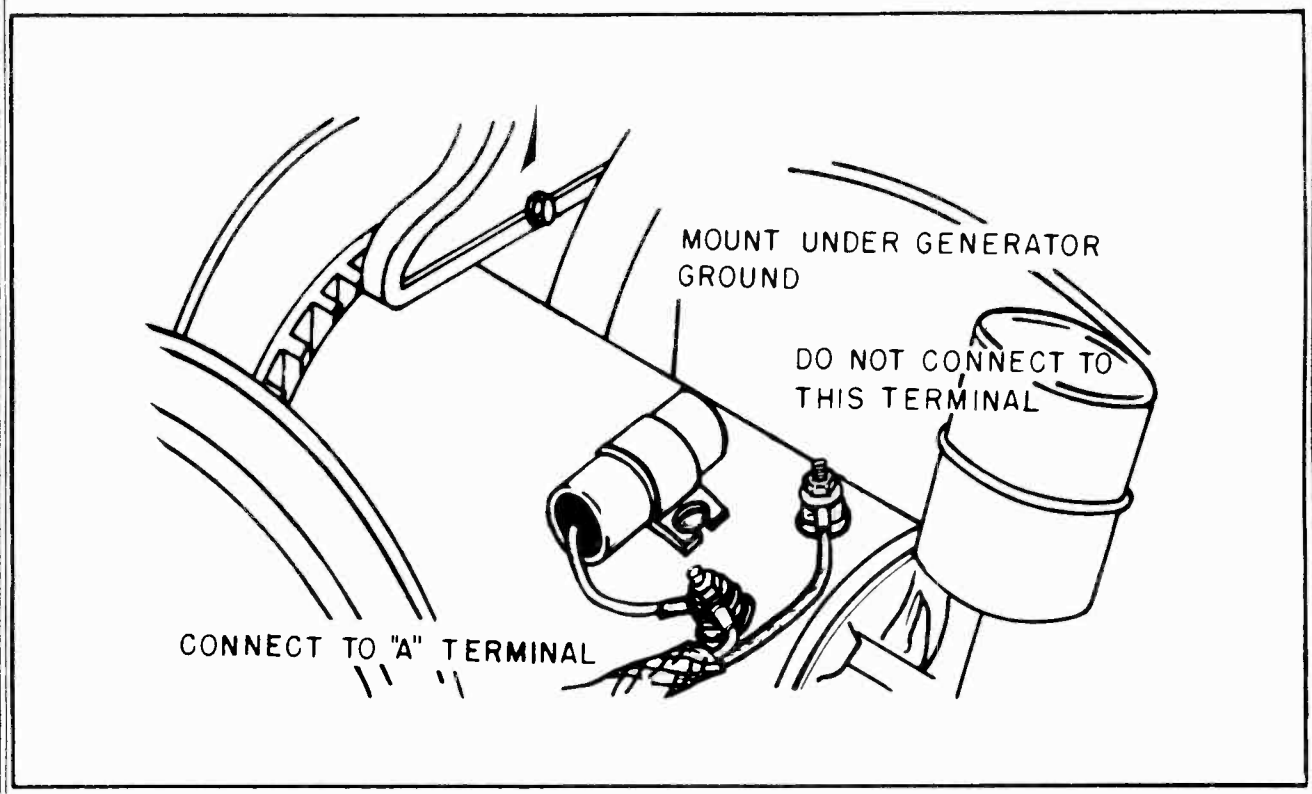


FIG. 2 GENERATOR CONDENSER

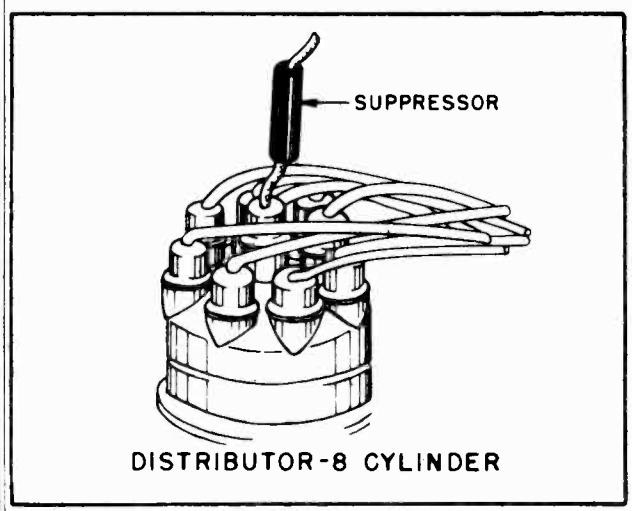


FIG. 3 DISTRIBUTOR SUPPRESSOR

GENERATOR CONDENSER

The generator condenser (Installed as shown in Figure 2) and distributor suppressor will normally eliminate all objectionable motor noise. If the motor noise persists, a .5 MFD by-pass condenser may be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.

DISTRIBUTOR SUPPRESSOR

Disconnect the center lead in the distributor head of the motor (see Fig. 3). Cut lead approximately 2 inches back from metal tip end. Screw suppressor into cut end of long lead. Screw cut end of short lead into suppressor. Plug lead, with attached suppressor, back into distributor head.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

MODEL X-50

ELECTRICAL SPECIFICATIONS

Power Supply .....6.3 Volts DC.
Current .....5.5 Amp. Average
Frequency Range .....538-1600 KC.
Speaker .....5" PM 3.2 Ohm V. C.
Power Output .....1.5 watts, undistorted
2 watts, maximum

This receiver contains the following:

1 — 6BE6 — Converter
1 — 6BA6 — I. F. Amplifier
1 — 6AT6 — Detector — AVC — 1st Audio
1 — 6AS5 — Power Output
1 — 6X4 — Rectifier

SERVICE NOTES

Voltage taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 Ohms per volt. These voltages are clearly shown on the voltage chart.

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "Alignment Procedure." Aftes realignment has been completed repeat the procedure as final check.

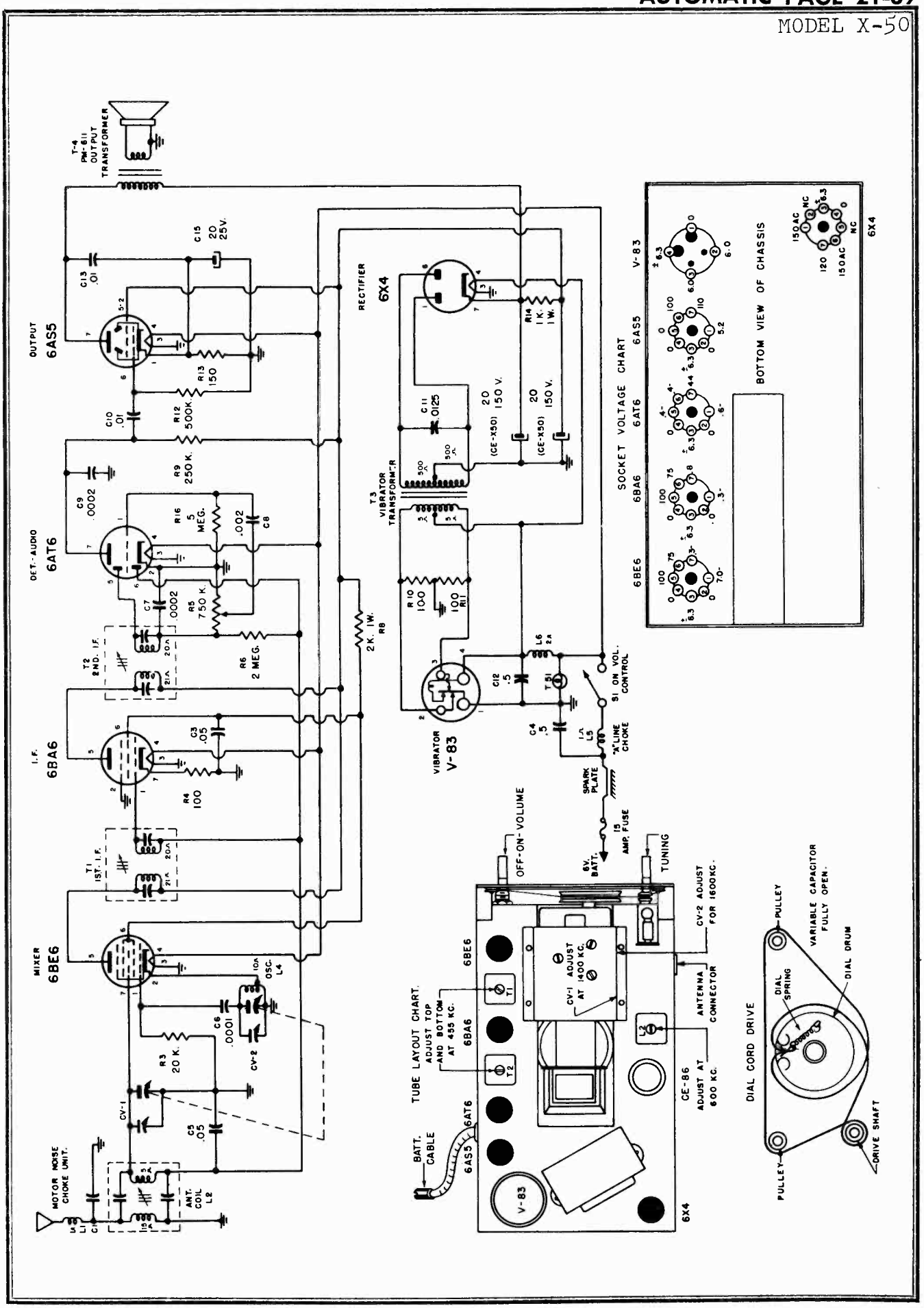
ALIGNMENT PROCEDURE

Volume control — Maximum, all adjustments.
No signal applied to antenna.
Power input — 6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas — .1 MFD., 100 MMFD.
For alignment points refer to Schematic Diagram.

DIAL SETTING	GENERATOR FREQUENCY	DUMMY ANT.	GENERATOR CONNECTION	TRIMMER REFERENCE	TRIMMER ADJUSTMENT	TRIMMER FUNCTION
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
5) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna
6) Repeat steps 4 and 5						

MODEL X-50



BENDIX CAR RADIOS M-1 & M-1A
1949 and Early 1950

General

Bendix Car Radios M-1 and M-1A are six tube superheterodyne receivers with vibrator power supplies and full wave rectifiers. The antenna, radio frequency, and oscillator circuits are inductively tuned, by means of push buttons or the manual tuning control, over a frequency range of 540 to 1610 kilocycles, by means of iron cores.

The On-Off, Volume and Tone Controls are on concentric shafts at the left of the receiver. The Manual Tuning Control is at the right. The Speaker is a separate unit.

TUBE COMPLIMENT

6SK7/GT	R.F. Amplifier	6SQ7/GT	Det., AVC & AF Ampl.
6SA7/GT	Converter	6V6/GT	AF Amplifier
6SK7/GT	I.F. Amplifier	6X5/GT	Rectifier

POWER SUPPLY

The power supply uses a 6X5/GT full wave rectifier tube in conjunction with a four prong full wave primary type vibrator.

ALIGNMENT

Recommended Test Equipment:

Signal Generator - 260 to 1700 KC range. Output from 1 to 100,000 microvolts. Modulation 30% to 400 cycles.

Output meter - 2 watt capability or, P.M. Speaker, for alignment by ear as an alternate.

Dummy Antenna - Constructional circuit included in the rear section of this manual.

General:

Make all alignment adjustments to the receiver with "A" lead connected to a 7.2 volt negative source, and ground the chassis to the positive side of this source. Rotate the volume, tone and sensitivity controls to their maximum clockwise position. Connect the output meter across the speaker voice coil. Use an insulated screw driver for making all adjustments. Use shielded cables for connections between signal generator, dummy antenna, and receiver. For each adjustment, the signal level should be kept as low as possible while still obtaining a reasonable output indication. The signal level should be controlled at the signal generator, and not with the receiver controls. With the sensitivity control turned fully clockwise as instructed above, some of the older type M-1 receivers will have I.F. oscillation during alignment. In these receivers, capacitor C-5 is .1 mfd. Changing the value of this capacitor to .5 mfd will correct this trouble.

1. I.F. Alignment
   (a) Set the signal generator frequency to 262.5 K.C. Connect the signal lead thru a .1 mfd condenser to the receiver antenna connection.
   (b) Turn the receiver manual tuning control for the high frequency end of the dial.
   (c) Adjust the I.F. trimmers "C18B", "C18A", "C15B", and "C15A" for maximum output. Repeat this operation to assure accurate alignment.
   (d) Adjust the I.F. wave trap trimmer, C32, for minimum output.

MODELS M-1,
M-1A, Ford

2. R.F. Alignment

(a) Check to see that the dial pointer stops just off of the left edge of the calibration marker, under the 55, when the manual tuning control has been rotated clockwise to where this pointer stops. If incorrect, the pointer should be bent slightly to correspond to the above instructions.
(b) Set the signal generator to 1610 KC, and connect the signal lead thru the dummy antenna to the receiver antenna socket.
(c) Turn the receiver tuning control until the dial pointer is at the right hand edge of the 16 calibration mark.
(d) Adjust the oscillator trimmer C9 for maximum output.
(e) Set the signal generator to 1400 KC; tune in the signal on the receiver.
(f) Adjust the R.F. trimmer C12 for maximum output.
(g) Adjust the antenna trimmer C1 for maximum output.
(h) Set signal generator to 600 KC and tune in the signal carefully.
(j) Observe the output meter reading.
(k) Turn L6 adjusting screw one turn clockwise. Retune the signal with the tuning control and observe the new output meter reading carefully.
(l) If operation (k) shows an increase in output over (j) continue to turn L6 in single turn clockwise steps, retuning the signal after each turn, and observing the output reading each time. See (n) below.
(m) If operation (k) shows a decrease in output over (j) the direction for turning L6 adjustment must be reversed to counter-clockwise.
(n) Continue the process of adjusting L6 for one turn at a time, retuning the receiver for the greatest output each turn of L6. A peak setting will be reached, at which point the signal can be tuned in for a greater output than at any other setting of L6 adjustment.
(o) Repeat operations (b), (c), (d), (e), (f), and (g).

3. Sensitivity Control Adjustment

(a) Using the dummy antenna, the signal generator should be connected to the receiver as in the R.F. alignment procedure. Make sure the receiver volume control is fully clockwise.
(b) Apply a signal, 30 per cent modulated at 400 cycles, of sufficient strength to produce one watt output, when tuned in on the receiver.
(c) Remove modulation and adjust the sensitivity control R2 for 100 milliwatts of noise, maximum, at the worst point in the band. This will usually be found at the low frequency end of the dial.

4. Alignment With Car Antenna

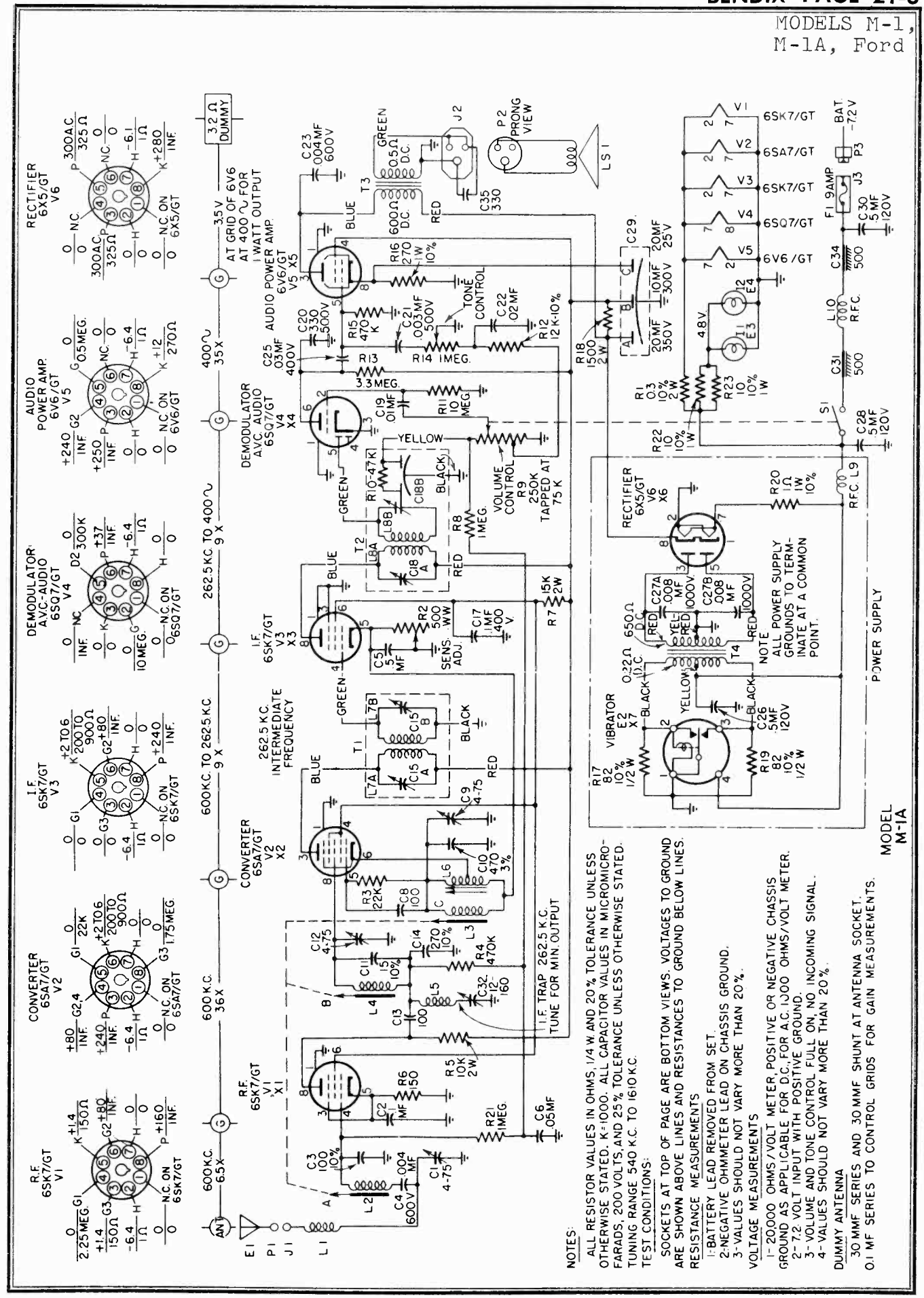
Withe the antenna fully extended, tune in a weak station near 1400 kilocycles and adjust the antenna trimmer C1 for maximum volume.

MODEL M-1 SCHEMATIC CIRCUIT

Use the Schematic Circuit for the Model M-1A, which is included in this manual, except that the following differences should be noted:

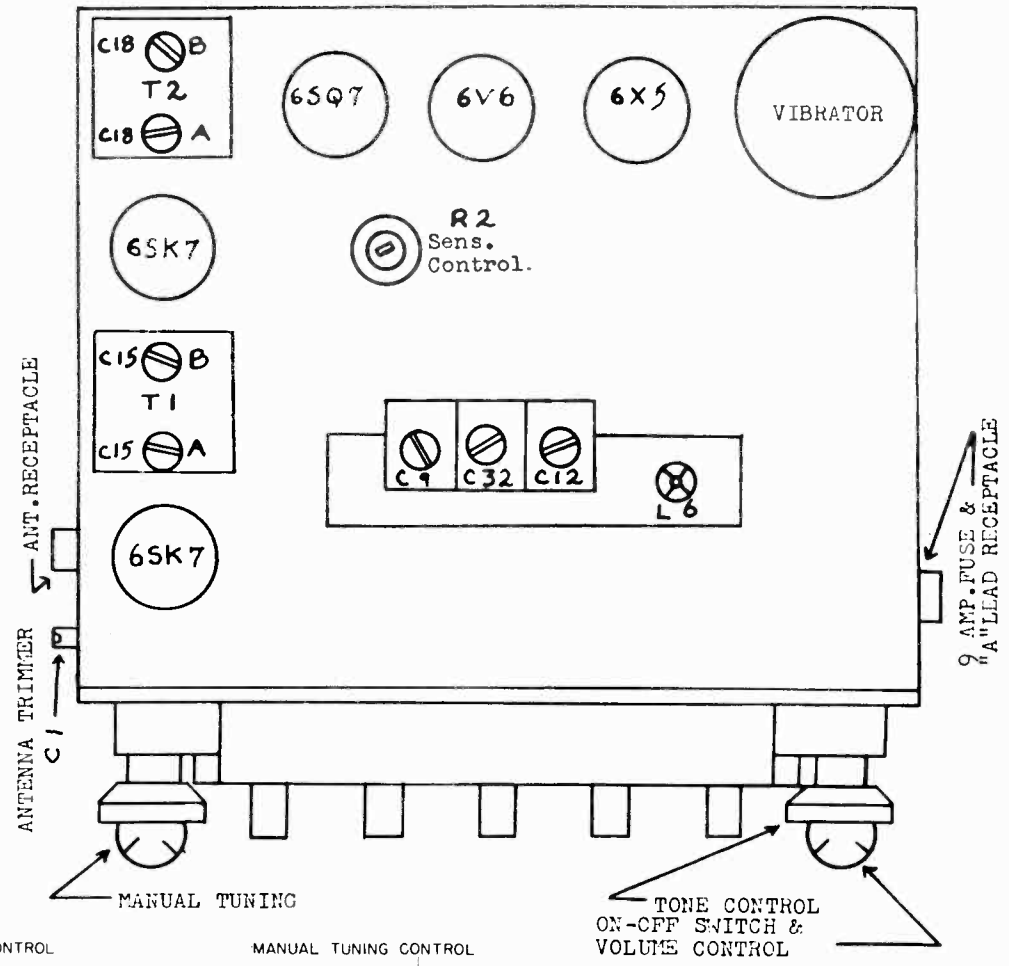
1) The tube socket showing voltage and resistance measurements for the 6SQ7GT tube should read zero voltage and 300K ohms on Pin #4, for the M-1 model.
2) Sensitivity control, R-2 is 900 ohms in the M-1 model.
3) In the 6SQ7GT tube circuit, pin 4 of this socket connects to pin 5 in the M-1 model.

With the exception of the above differences, the Schematic Circuits for Models M-1 and M-1A are identical to each other.



MODELS M-1,
M-1A, Ford

LOCATION PLAN
ALIGNMENT TRIMMERS & TUBES



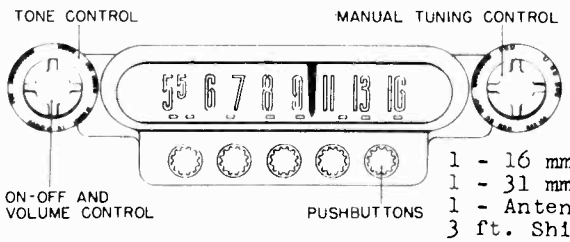
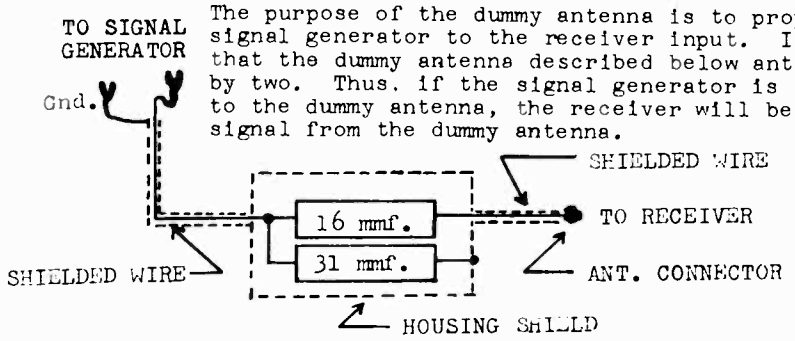


Figure 1—Operating Controls

Material Required

1 - 16 mmf Ceramic Capacitor plus or minus 1 mmf.
1 - 31 mmf Ceramic Capacitor plus or minus 1 mmf.
1 - Antenna Connector, Male, C223183.
3 ft. Shielded Wire.
A shield can, or other material for a shielded housing.

DETAILS FOR CONSTRUCTING
DUMMY ANTENNA



The purpose of the dummy antenna is to properly match the output of the signal generator to the receiver input. It should be remembered, however, that the dummy antenna described below antennuates, or reduces, the signal by two. Thus, if the signal generator is feeding 10 microvolts of signal to the dummy antenna, the receiver will be receiving only 5 microvolts of signal from the dummy antenna.

MODELS 5015I, 5015W

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

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

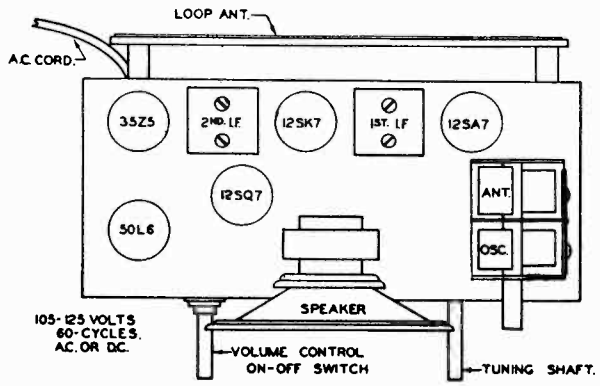
The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

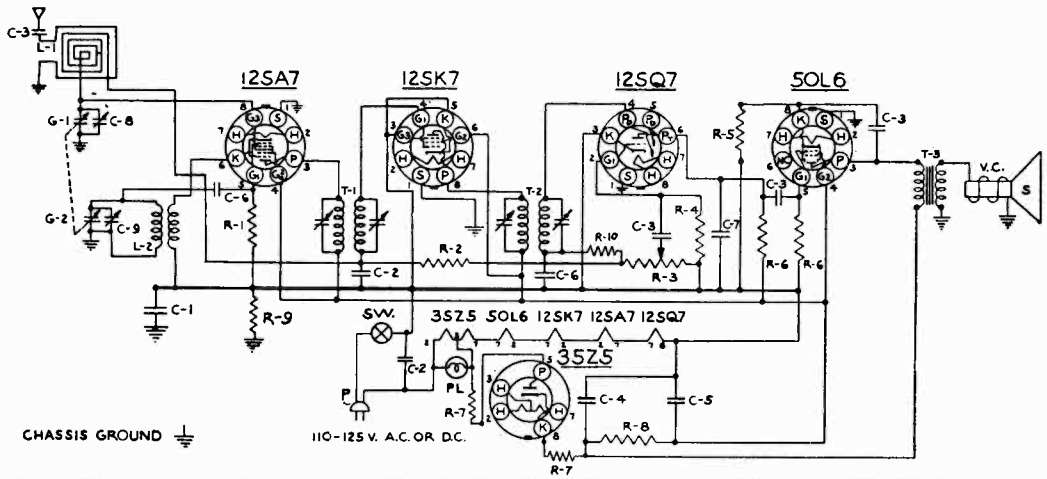
FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to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

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

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

PART NO.		DESCRIPTION
1R-9	R-1	22,000 ohm RESISTOR ½W 20%
1R-23	R-2	3.3 MEG. RESISTOR ½W 20%
VC-4	R-3	1 MEG. VOL. CONTROL & SW.
1R-13	R-4	2.2 MEG. RESISTOR ½W 20%
1R-14	R-5	150 ohm RESISTOR ½W 20%
1R-11	R-6	470M ohm RESISTOR ½W 20%
1R-17	R-7	33 ohm RESISTOR ½W 20%
1R-25	R-8	2200 ohm RESISTOR 1W 10%
PC-8	C-1	.1 MFD. COND.-400V.
PC-5	C-2	.05 MFD. COND.-400V.
PC-7	C-3	.01 MFD. COND.-400V.
EC-12	C-4	40 MFD. 150 V. ELECTROLYTIC
	C-5	20 MFD.
MC-2	C-6	100 MMFD. MICA COND.
MC-5	C-7	500 MMFD. MICA COND.
1R-10	R-10	47M ohm 1/2 W 20 %
	C-8	ANTENNA TRIMMER COND.
	C-9	OSC. TRIMMER COND.
1R-20	R-9	220M ohm RESISTOR ½W 20%
GC-6	G-1	GANG CONDENSER
	G-2	
LL-12	L-1	LOOP ANTENNA
LO-13	L-2	OSC. COIL
LI-1	T-1	INPUT I.F. TRANSFORMER
LI-2	T-2	OUTPUT I.F. TRANSFORMER
	T-3	OUTPUT SPKR. TRANSFORMER
SPK-6	V.C.	VOICE COIL
	S	P.M. SPEAKER
PB-1	P.L.	No 47 PILOT BULB
	SW.	A.C. SW. ON VOL. CONTROL
CO-1	P	LINE CORD
TU-3	———	12SA7 GT 12SK7 GT 12SQ7 GT 50L6 GT 35Z5 GT





MODELS 5066I,
5055W

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

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

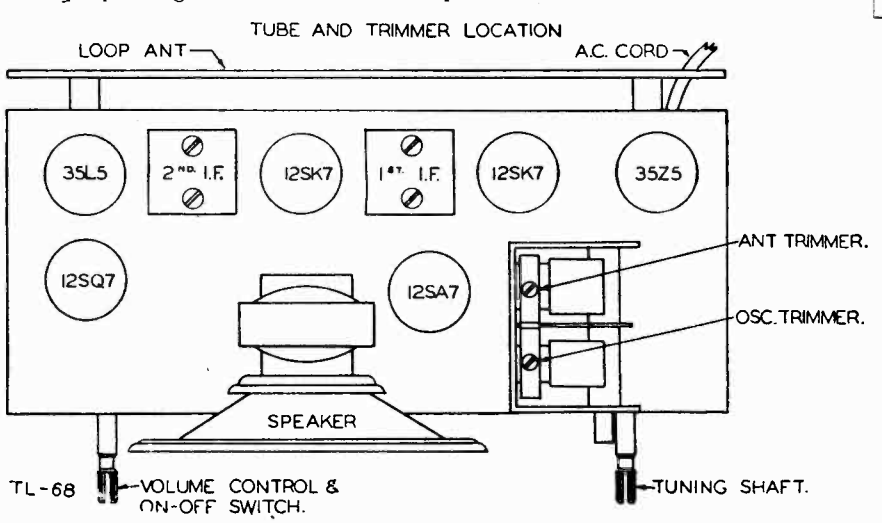
The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

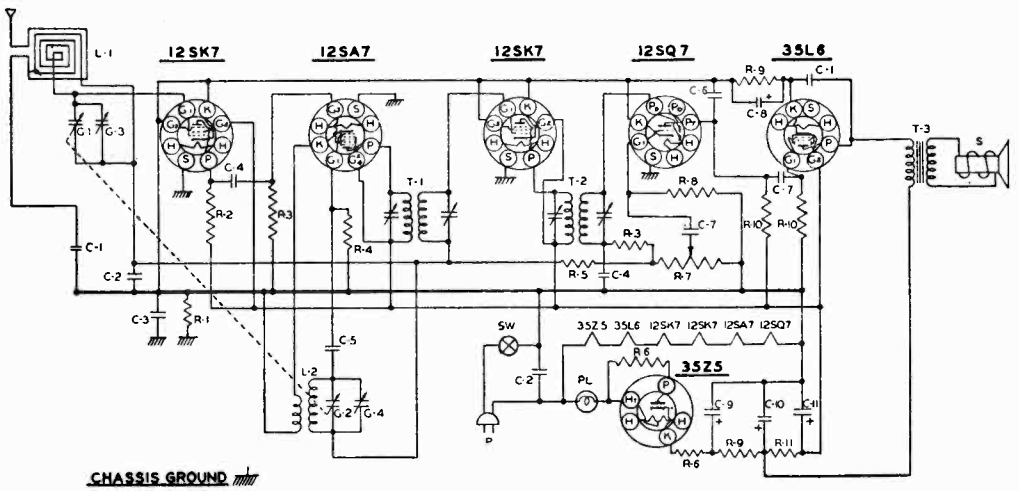
FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to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

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

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

PART NO.		DESCRIPTION
PC-7	C-1	.01MFD CONDENSER 400 V
PC-5	C-2	.05MFD CONDENSER 400 V
PC-8	C-3	.1MFD CONDENSER 400 V
MC-2	C-4	.0001 MICA CONDENSER
MC-4	C-5	.00005 MICA CONDENSER
MC-5	C-6	.0005 MICA CONDENSER
PC-6	C-7	.005MFD. CONDENSER 600 V.
EC-2	C-8	10MFD. 25W.V ELECTROLYTIC
EC-14	C-9	40MFD.
	C-10	40MFD ELECTROLYTIC 150 W.V
	C-11	20MFD.
IR-20	R-1	220M RESISTOR 1/2W 20 %
IR-22	R-2	3900 RESISTOR 1/2W. 10 %
IR-10	R-3	47M RESISTOR 1/2W 20%
IR-9	R-4	22M RESISTOR 1/2W. 20 %
IR-23	R-5	33MEG RESISTOR 1/2W. 20 %
IR-17	R-6	33 RESISTOR 1/2W. 20%
VC-13	R-7	1MEG. VOLUME CONTROL
IR-13	R-8	2.2MEG RESISTOR 1/2W. 20%
IR-5	R-9	220 RESISTOR 1/2W. 10%
IR-11	R-10	470M RESISTOR 1/2W 20%
IR-21	R-11	330 RESISTOR 1/2W 10%
GC-5	G-1	GANG CONDENSER
	G-2	
	G-3	ANT TRIMMER
	G-4	OSC. TRIMMER
LL-16	L-1	LOOP ANT
LO-10	L-2	OSC COIL
LI-6	T-1	INPUT I.F. TRANSFORMER
LI-7	T-2	OUTPUT I.F. TRANSFORMER
	SW	SWITCH ON VOLUME CONTROL
SPK-12	T-3	OUTPUT TRANSFORMER
	S	5" P.M. SPEAKER
PB-1	PL	#47 PILOT BULB
CO-1	P	LINE CORD





MODELS 10-102E, 10-103, 10-104W

Model 10-102E (Ebony)

Model 10-103 (Brown)

Model 10-104W (Ivory)

DESCRIPTION

TYPE: Five-tube, single band, Superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.-d.c.

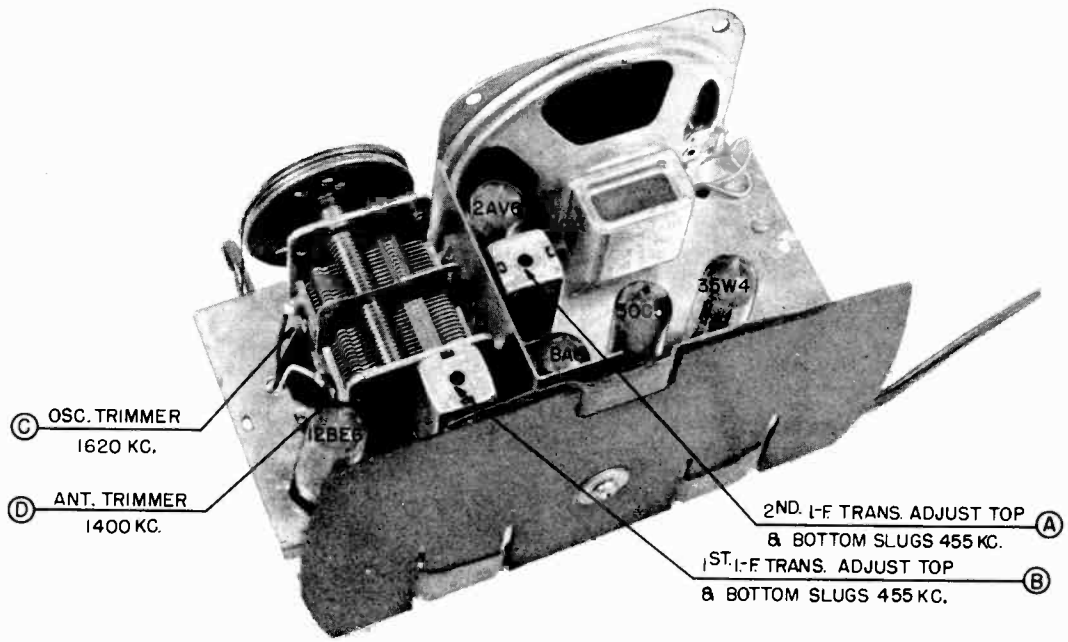
VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

POWER OUTPUT: 1.5 watts maximum.

TUBE COMPLEMENT

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



CHASSIS, TOP VIEW

MODELS 10-102E,
10-103, 10-104W

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

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

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

ALIGNMENT PROCEDURE

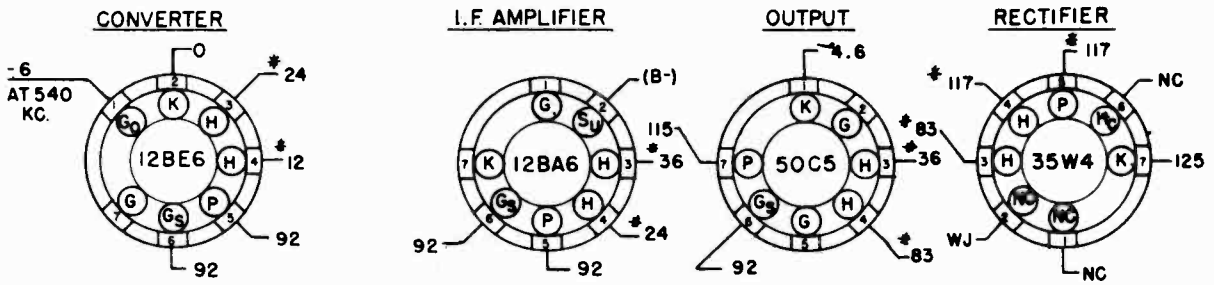
1. Connect an output meter across the speaker voice coil.
2. The r.f. signal input from the signal generator should be connected to the high side of loop antenna. Connect the signal generator ground through a 0.1 mfd. condenser to B— (pin 2 on 12BA6 tube socket).
3. Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

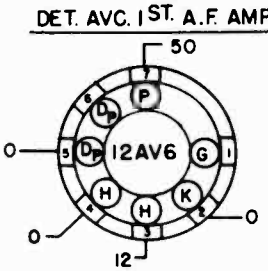
Alignment adjustment locations are shown on page 1, "CHASSIS, TOP VIEW."

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

* Place signal generator output lead near the loop antenna.

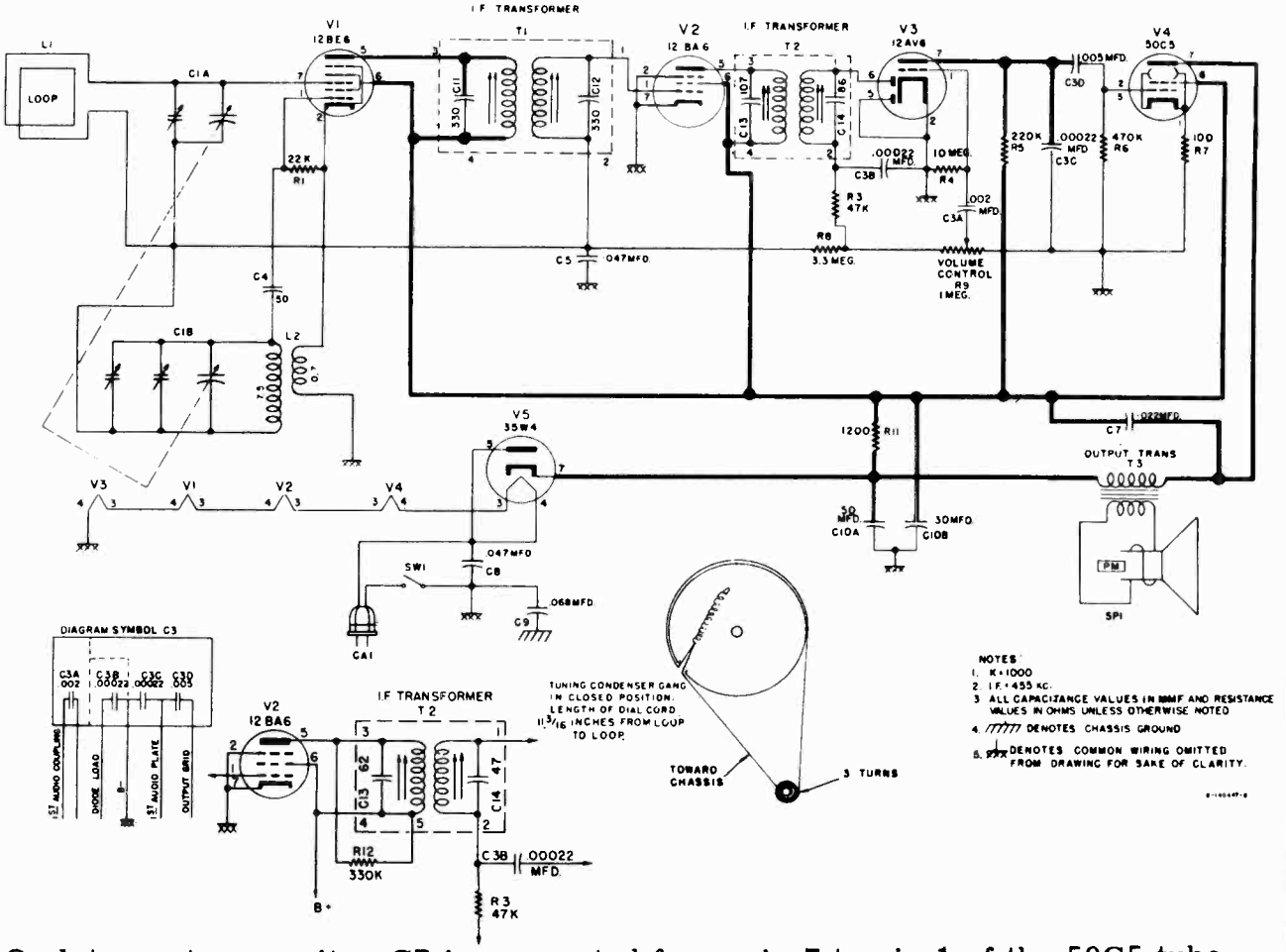


NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. MEASURE VOLTAGE WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B- PIN 2 ON THE 12BA6
3. LINE VOLTAGE 117 V. 60 ~
4. NC = NO CONNECTION
5. W.J. = WIRING JUNCTION
6. * = A.C. VOLTAGE
7. SOCKET VOLTAGE TOLERANCE ± 10%



SOCKET VOLTAGE CHART

MODELS 10-102E, 10-103, 10-104W



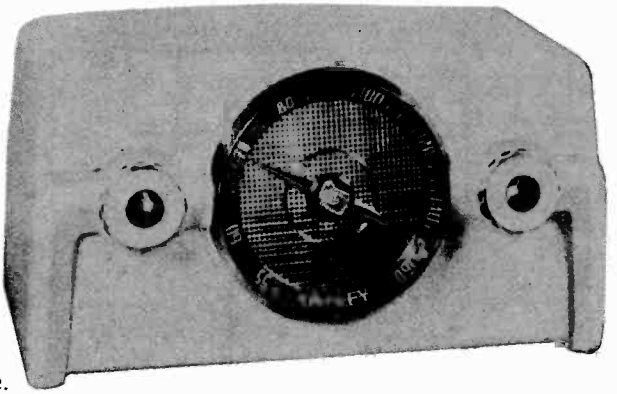
On later sets capacitor C7 is connected from pin 7 to pin 1 of the 50C5 tube instead of across the primary of the output transformer. This will improve stability.

REPLACEMENT PARTS LIST

Symbol No.	Part No.	Description
C1A	B-138292-3	Capacitor, Variable
C1B		Capacitor, Variable
C3A	B-144675-1	Capacitor, .002 mfd.
C3B		Capacitor, .00022 mfd. Four
C3C		Capacitor, .00022 mfd. Section
C3D		Capacitor, .005 mfd.
C4	C-137727-21	Capacitor, 50 mmf., 500 v., ceramic
C5	39477-45	Capacitor, .047 mfd., 600v., molded paper
C7	39477-43	Capacitor, .022 mfd., 600v., molded paper
C8	39477-45	Capacitor, .047 mfd., 600v., molded paper
C9	39477-46	Capacitor, .068 mfd., 600v., molded paper
C10A	B-136770	Capacitor, 50 mfd., 150v. Two Section
C10B		Capacitor, 30 mfd., 150v. Electrolytic
C11	Part of T1	Capacitor, 330 mmf.
C12	Part of T1	Capacitor, 330 mmf.
C13	Part of T2	Capacitor, 107 mmf.
C14	Part of T2	Capacitor, 86 mmf.
R1	39373-60	Resistor, 22,000 ohm, ½w.
R3	39373-67	Resistor, 47,000 ohm, ½w.
R4	39373-107	Resistor, 10 megohm, ½w.
R5	39373-80	Resistor, 220,000 ohm, ½w.
R6	39373-87	Resistor, 470,000 ohm, ½w.
R7	39374-13	Resistor, 100 ohm, ½w.
R8	39373-100	Resistor, 3.3 megohm, ½w.
R9	39368-14	Control, Volume (1 megohm)
R11	39374-114	Resistor, 1200 ohm, 1w.
R12	39373-84	Resistor, 330,000 ohm, ½w.
CA1	C-142769	Cable & Plug Assy., Power
L1	AB-145437	Antenna Loop & Back Assy.
L2	AW-144325	Coil, Oscillator
SW1	39369-1	Switch, Power
SP1	139631	Speaker
T1	AC-139919-4	Transformer, 1st I.F.
T2	AC-139919-5	Transformer, 2nd I.F.
T3	B-138131-1	Transformer, Output
	R-145356-3	Cabinet (10-102E)
	R-145356-1	Cabinet (10-103)
	R-145514	Cabinet (10-104W)
	W-145837	Clip, Spring
	W-131154-1	Cotter (External), Drive Shaft
	B-145121-4	Knob (10-102E)
	B-145121-5	Knob (10-103)
	B-145121-6	Knob (10-104W)
	AB-145431-1	Pointer, Dial (10-102E)
	AB-145431-2	Pointer, Dial (10-103)
	AB-145431-3	Pointer, Dial (10-104W)
	W-145391	Ring (Compression), Dial Pointer
	B-135075-11	Shaft, Dial Drive
	39462-1	Socket, Tube
	W-51752	Spring, Dial Drive Cord
	W-134916	Washer (Spring) Drive Shaft

MODELS 10-135, 10-136E, 10-137, 10-138, 10-139, 10-140

Model No.	Color
10-135	Dulux White and Chrome
10-136E	Ebony and Gold
10-137	Chartreuse and Gold
10-138	Maroon and Gold
10-139	Aqua and Chrome
10-140	Metallic Green and Chrome



DESCRIPTION

TYPE: Five-tube, single band, Superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.-d.c.

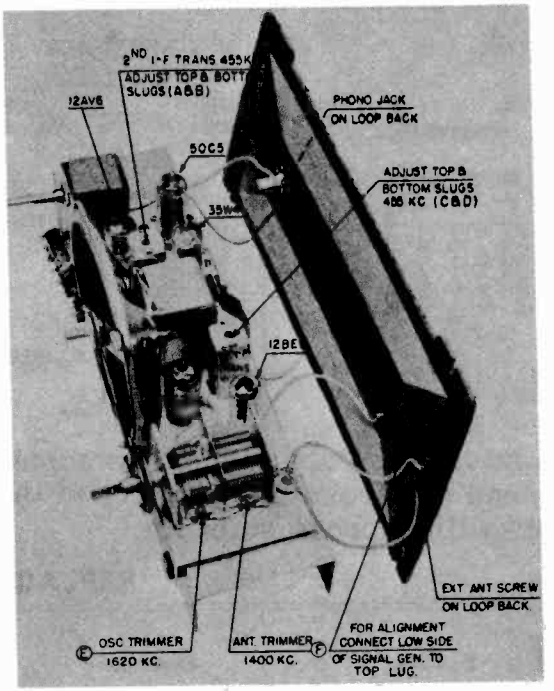
VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

POWER OUTPUT: 1 watt maximum.

TUBE COMPLEMENT

Type	Function
12BE6	Converter
12BA6 or 6BJ6	I. F. Amplifier
12AV6 or 12AT6	Detector, AVC, 1st A. F. Amplifier
50C5	A. F. Power Output
35W4	Rectifier



CHASSIS, TOP VIEW

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

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

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

Phonograph connection— To use a record player with this receiver insert the pickup plug of the record player into the Phono jack on back of receiver (this automatically switches the receiver from radio to phonograph operation). Connect the power cord of the record player to a convenient electric outlet of the correct voltage and frequency. Operate the record player in the normal manner. The controls of the receiver operate the same as for radio programs.

To again use the receiver for radio operation it is necessary to remove the pickup plug of the record player from the Phono jack.

MODELS 10-135, 10-136, 10-137, 10-138, 10-139, 10-140

ALIGNMENT PROCEDURE

Connect an output meter across the speaker voice coil.

The r.f. signal input from the signal generator should be connected, through a 200 mmf. capacitor, to the external antenna screw. Connect the signal generator ground to the top lug on loop antenna (see Chassis Top View, page 1).

Position loop antenna to simulate its position when chassis and antenna are in cabinet.

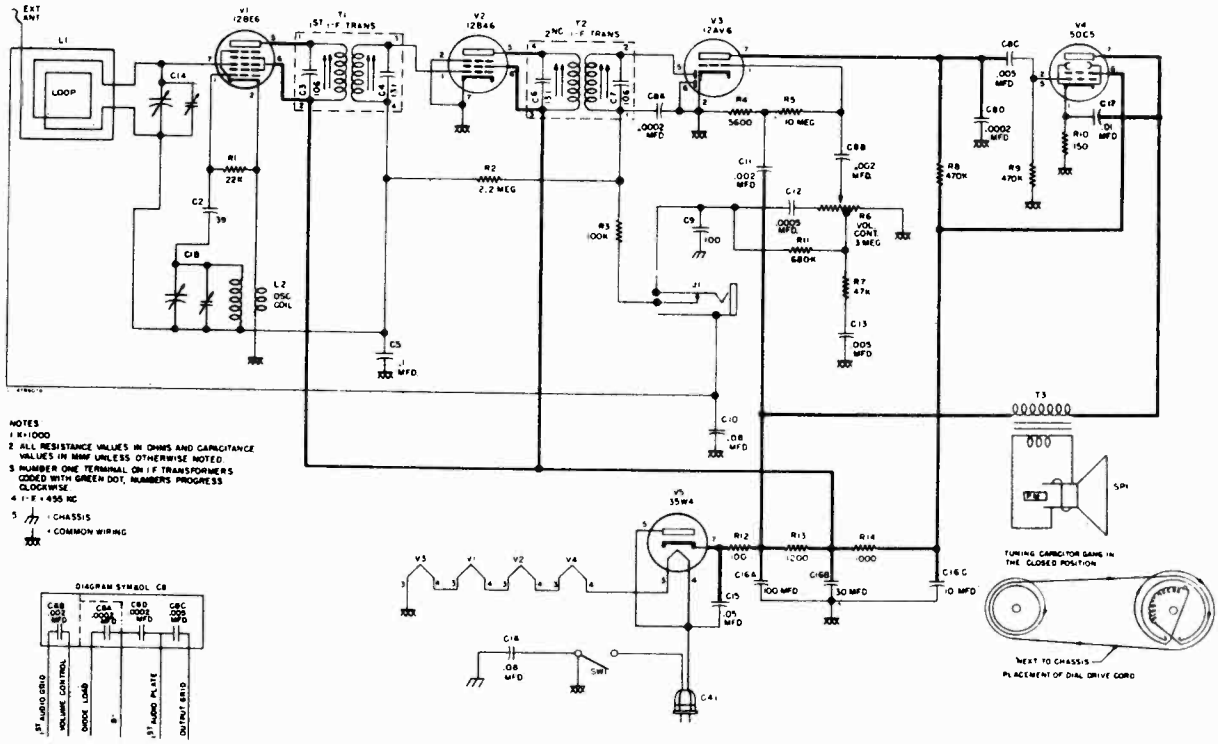
Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown on page 1, "CHASSIS, TOP VIEW."

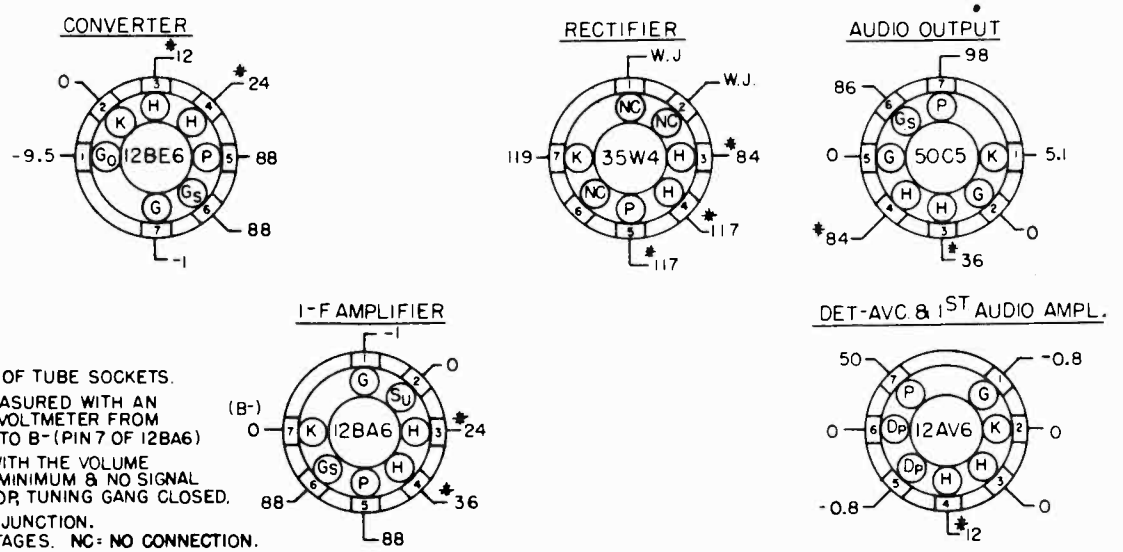
Alignment Sequence	Signal Generator Output			Position of Dial Pointer	Adjust for Maximum Output
	Frequency in kc.	In Series with	To		
1	455	200 mmf.	External Ant. Screw	1620	* A, B, C & D
2	1620	200 mmf.	External Ant. Screw	1620	E
3	1400	200 mmf.	External Ant. Screw	1400	F

* Repeat adjustments until maximum output is obtained.



On some sets of models 10-135 to 10-140 , R2 is a 3.3 megohm, 10%, 1/2 watt resistor instead of a 2.2 megohm resistor; and because of this C5 is an .05 mfd., 600 volt paper capacitor (Part No. 39001-17).

MODELS 10-135, 10-136,
10-137, 10-138, 10-139, 10-140



NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B- (PIN 7 OF 12BA6)
3. MEASURED WITH THE VOLUME CONTROL AT MINIMUM & NO SIGNAL INTO THE LOOP, TUNING GANG CLOSED.
4. W.J. = WIRING JUNCTION.
   * = AC VOLTAGES. NC = NO CONNECTION.
5. LINE VOLTAGE = 117 V., 60~AC.
6. SOCKET VOLTAGE TOLERANCE ± 10%

SOCKET VOLTAGE CHART

REPLACEMENT PARTS LIST

Symbol No.	Part No.	Description
C1A	B-147180	Capacitor, Variable } Two Section
C1B		Capacitor, Variable }
C2	C-137727-109	Capacitor, 39mmf., 10%, 200v., ceramic
C3	Part of T1	Capacitor, 106 mmf.
C4	Part of T1	Capacitor, 131 mmf.
C5	39001-19	Capacitor, .1 mfd., 600 v., paper
C6	Part of T2	Capacitor, 131 mmf.
C7	Part of T2	Capacitor, 106 mmf.
C8A	C-144675-1	Capacitor, .0002 mfd., 500v. } Four Section
C8B		Capacitor, .002 mfd., 500v. }
C8C		Capacitor, .005 mfd., 500v. }
C8D		Capacitor, .0002 mfd., 500v. }
C9	B-143686-3	Capacitor, 100 mmf., 500v., disc ceramic
C10	39001-19	Capacitor, .1 mfd., 600v., paper
C11	39001-74	Capacitor, .002 mfd., 600v., paper
C12	39001-5	Capacitor, .0005 mfd., 600v., paper
C13	39001-11	Capacitor, .005 mfd., 600., paper
C14	39001-19	Capacitor, .1 mfd., 600v., paper
C15	39001-17	Capacitor, .05 mfd., 600v., paper
C16A	B-147174	Capacitor, 100 mfd., 150v. } Three Section Electrolytic
C16B		Capacitor, 30 mfd., 150v. }
C16C		Capacitor, 10 mfd., 150v. }
C17	39001-13	Capacitor, .01 mfd., 600v., paper
R1	39373-60	Resistor, 22,000 ohm, ½w.
R2	39373-97	Resistor, 2.2 megohm, ½w.
R3	39373-74	Resistor, 100,000 ohm, ½w.
R4	39374-34	Resistor, 5600 ohm, 10%, ½w.
R5	39373-107	Resistor, 10 megohm, ½w.
R6	B-147179	Control, Volume (3 megohm, Tap 300,000 ohm)
R7	39373-67	Resistor, 47,000 ohm, ½w.
R8	39373-87	Resistor, 470,000 ohm, ½w.
R9	39373-87	Resistor, 470,000 ohm, ½w.
R10	39373-16	Resistor, 150 ohm, ½w.
R11	39373-90	Resistor, 680,000 ohm, ½w.
R12	39374-189	Resistor, 100 ohm, 10%, 2w.
R13	39374-114	Resistor, 1200 ohm, 10%, 1w.
R14	39373-33	Resistor, 1000 ohm, ½w.
CA1	C-132300-9	Cable & Plug Assy., Power
J1	W-147213	Connector, Phono
L1	AC-147239	Loop Antenna & Back Assy.
L2	AW-146323	Coil, Oscillator
SP1	AD-145956-2	Speaker (5¼" P.M.)
SW1	Part of R6	Switch, Power

Symbol No.	Part No.	Description
T1	AC-139919-3	Transformer, 1st I.F.
T2	AC-139919-3	Transformer, 2nd I.F.
T3	B-147171	Transformer, Output
	AW-147289	Cabinet (10-135)
	AW-147779	Cabinet (10-136E)
	AW-147806	Cabinet (10-137)
	AW-147807	Cabinet (10-138)
	AW-147805	Cabinet (10-139)
	AW-147848	Cabinet (10-140)
	W-139921	Clip (Mtg.)., I.F. Transformer
	W-131154-1	Cotter (External), Pointer Pulley
	W-147216	Cup (Suction) Cabinet Feet
	C-147164-1	Escutcheon, Dial (10-135)
	D-147164-2	Escutcheon, Dial (10-136E, 10-137)
	D-147164-4	Escutcheon, Dial (10-138)
	D-147164-5	Escutcheon, Dial (10-139)
	D-147164-6	Escutcheon, Dial (10-140)
	B-147192	Gasket (Rubber), Escutcheon
	B-147160	Gasket (Rubber), Speaker
	B-147161-1	Grille, Dial (10-135)
	AB-147878-1	Grille, Dial (10-136E)
	C-147161-3	Grille, Dial (10-137)
	C-147161-4	Grille, Dial (10-138)
	C-147161-5	Grille, Dial (10-139)
	C-147161-6	Grille, Dial (10-140)
	W-147245	Hanger, Wall Mtg.
	AB-147159-1	Knob (10-135)
	AB-147159-2	Knob (10-136E)
	AC-147159-3	Knob (10-137)
	AC-147159-4	Knob (10-138)
	AC-147159-5	Knob (10-139)
	AC-147159-6	Knob (10-140)
	W-147275	Mounting (Rubber), Speaker
	W-45580-2	Mounting (Rubber), Var. Capacitor
	B-94704-22	Nut (Speed), Escutcheon
	C-147149-1	Pointer, Dial (10-135, 10-139, 10-140)
	D-147149-2	Pointer, Dial (10-136E, 10-137)
	D-147149-3	Pointer, Dial (10-138)
	W-147181	Pulley, Dial Pointer
	W-142732	Shield, Tube
	39462-2	Socket, Tube
	W-51752	Spring, Drive Cord
	B-147170	Support, Pointer Pulley
	W-134916	Washer (Spring), Pointer Pulley

MODELS 10-310, 10-311, 10-313

DESCRIPTION

TYPE: Four-tube, combination, battery Portable and a.c.-d.c. Superheterodyne with Selenium Rectifier.

FREQUENCY RANGE: 540 to 1600 kilocycles.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.—d.c. or Battery.

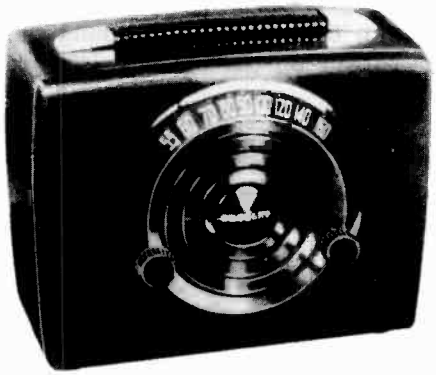
VOLTAGE RATING: a.c.—d.c., 110 to 120 volts. "A" Battery, 4½ volts; "B" Battery, 90 volts.

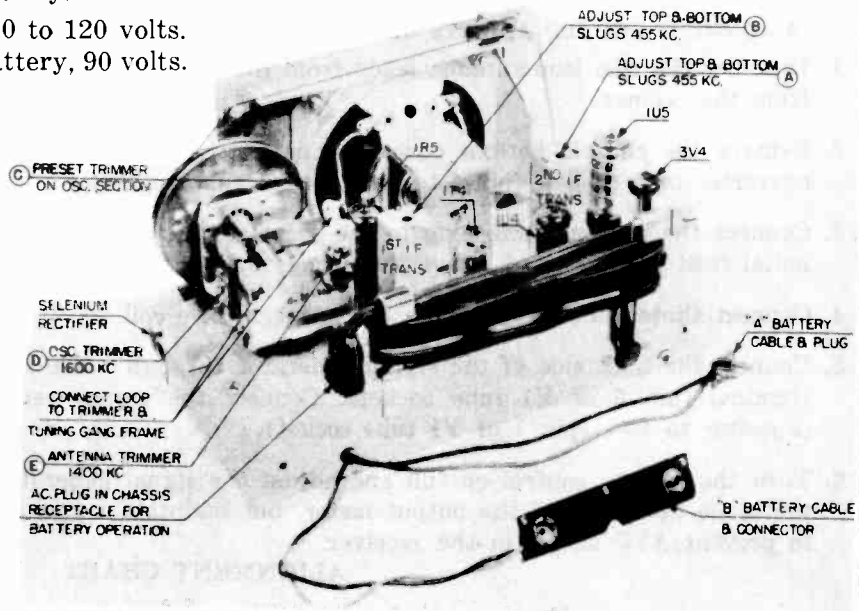
POWER OUTPUT: 200 M.W. maximum.

POWER CONSUMPTION: 15 watts at 125 volts, 60 cycle.

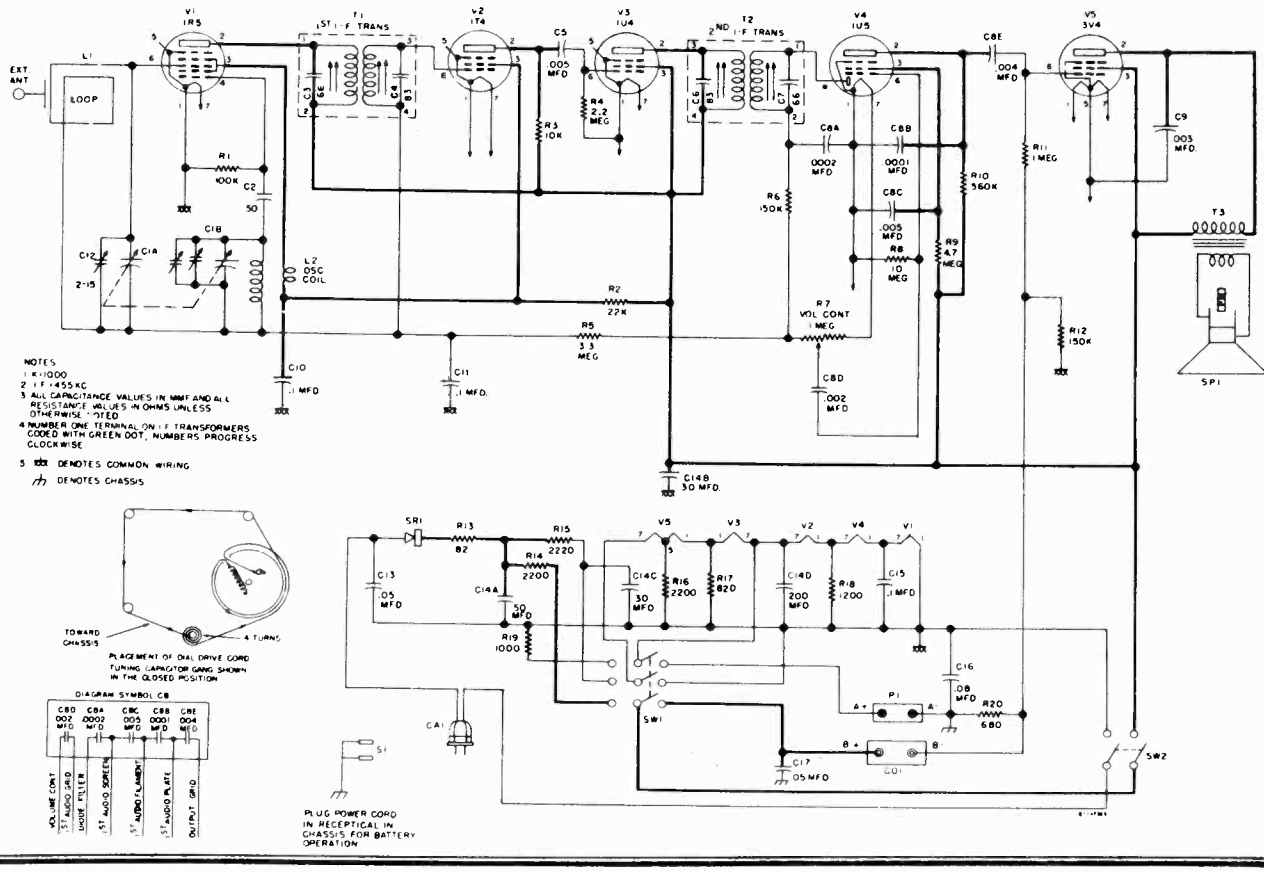
"A" BATTERY: one Crosley CR-72.

"B" BATTERY: one Crosley CR-96.





CHASSIS TOP VIEW



MODELS 10-310, 10-311, 10-313

TUBE COMPLEMENT:

Type	Function
1R5	Converter
1T4	1st I.F. Amplifier
1U4	2nd I. F. Amplifier
1U5	Detector, AVC, 1st A.F. Amplifier
3V4	A.F. Power Output
	Selenium Rectifier

ALIGNMENT PROCEDURE

ALIGNMENT SHOULD ALWAYS BE MADE ON BATTERY OPERATION.

1. Unsolder the two loop antenna leads from the rear of the tuning capacitor and remove the chassis from the cabinet.
2. Remove the chassis bottom cover and connect a 33,000 ohm resistor from the grid of the 1R5 converter tube to B— (pin 6 to pin 1 of V1 tube socket).
3. Connect the battery cable plug to the receptacle on the battery. Wrap the power cord around the metal cord supports and insert the prongs of the plug into the receptacle on the chassis.
4. Connect the output meter across the speaker voice coil.
5. Connect the high side of the signal generator through a 200 mmf. capacitor to the converter grid terminal (pin 6 of V1 tube socket). Connect the signal generator ground through a .05 mfd. capacitor to B— (pin 1 of V1 tube socket).
6. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown on page 1, Chassis Top View

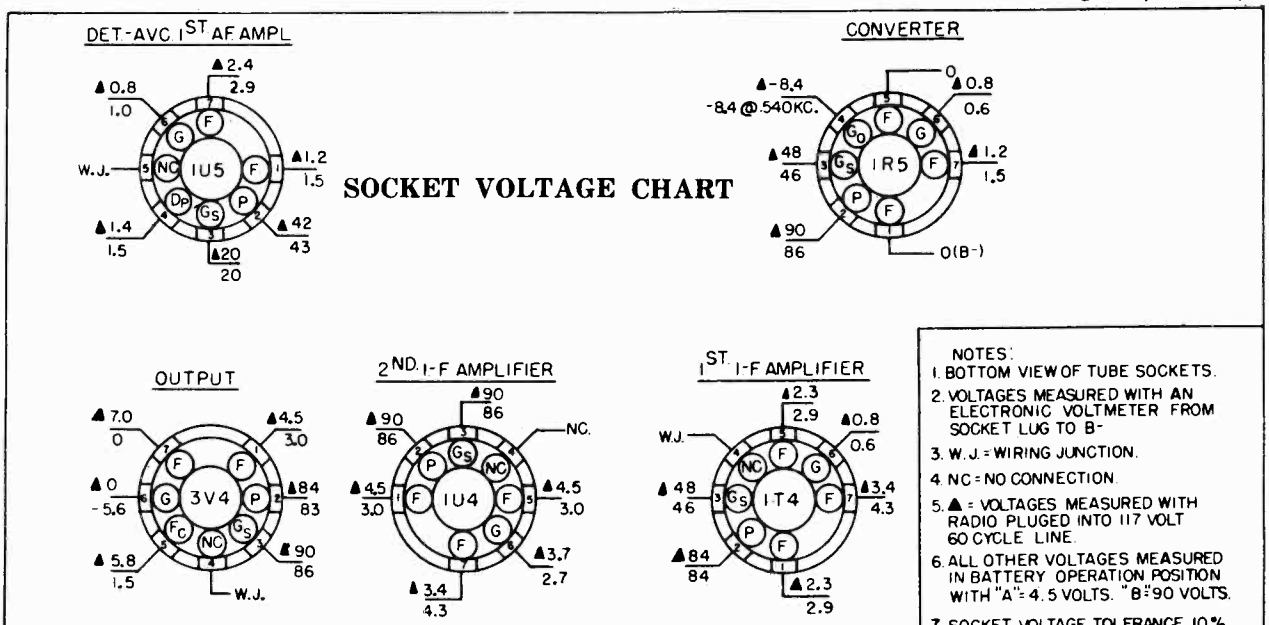
Alignment Sequence	Signal Generator Output			Position of Dial pointer or Var. Cond.	Adjust for Maximum Output	Remarks
	Frequency in KC	In Series with	To			
1	455	200 mmf.	V1 Grid	Open	A & B	See steps 2 & 5 of Alignment procedure
2	1620	200 mmf.	V1 Grid	Open	D	See notes 1 & 2 of Alignment notes
3	1400	Radiated to Loop		1400 kc	E	See notes 3 & 4 of Alignment notes

ALIGNMENT NOTES

1. After adjusting A and B, replace the chassis bottom.
2. Preset C to ¼ turn from its closed position before adjusting D.
3. Before adjusting E remove the 33,000 ohm resistor from pins 6 and 1 of the V1 tube socket. Replace the chassis in the cabinet and connect the antenna loop (see Chassis Top View). Make certain that the battery cable and the power cord are connected for battery operation (see step 3, Alignment Procedure), and that the batteries are in place in the cabinet.
4. To obtain a radiated signal for this alignment, place the signal generator output lead near the loop antenna.

MODELS 10-310, 10-311, 10-313

SOCKET VOLTAGE CHART



NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-
3. W.J. = WIRING JUNCTION.
4. NC = NO CONNECTION.
5. ▲ = VOLTAGES MEASURED WITH RADIO PLUGED INTO 117 VOLT 60 CYCLE LINE.
6. ALL OTHER VOLTAGES MEASURED IN BATTERY OPERATION POSITION WITH "A" = 4.5 VOLTS. "B" 90 VOLTS.
7. SOCKET VOLTAGE TOLERANCE 10%

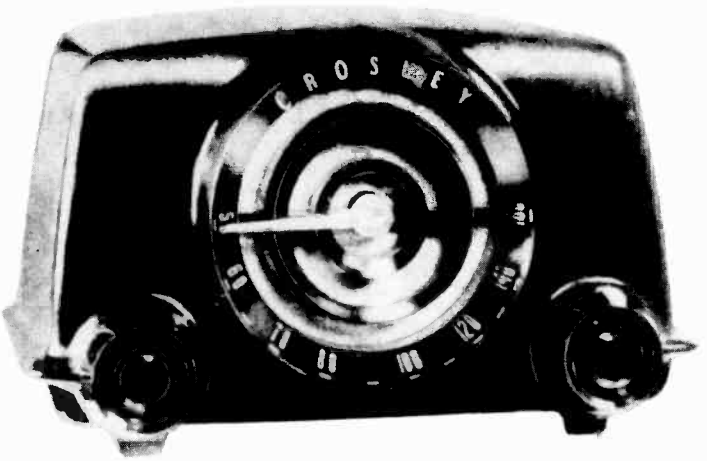
REPLACEMENT PARTS LIST

Symbol No.	Part No.	Description
C1A	AG-137073-38	Capacitor, Variable } Two Section
C1B		Capacitor, Variable }
C2	C-137727-21	Capacitor, 50 mmf., 500 v., ceramic
C3	Part of T1	Capacitor, 66 mmf.
C4	Part of T1	Capacitor, 83 mmf.
C5	39001-11	Capacitor, .005 mfd., 600 v., paper
C6	Part of T2	Capacitor, 83 mmf.
C7	Part of T2	Capacitor, 66 mmf.
C8A	C-144675-10	Capacitor, 200 mmf., 500 v. } Five
C8B		Capacitor, 100 mmf., 500 v. } Section
C8C		Capacitor, .005 mfd., 500 v. }
C8D		Capacitor, .002 mfd., 500 v. }
C8E		Capacitor, .004 mfd., 500 v. }
C9	39001-76	Capacitor, .003 mfd., 600 v., paper
C10	39001-19	Capacitor, .1 mfd., 600 v., paper
C11	39001-19	Capacitor, .1 mfd., 600 v., paper
C12	C-136327-45	Capacitor, 2-15 mmf., Trimmer
C13	39001-17	Capacitor, .05 mfd., 600 v., paper
C14A	B-145261	Capacitor, 50 mfd., 150 v. } Four Section
C14B		Capacitor, 30 mfd., 100 v. } Electrolytic
C14C		Capacitor, 30 mfd., 25 v. }
C14D		Capacitor, 200 mfd., 10 v. }
C15	39001-19	Capacitor, .1 mfd., 600 v., paper
C16	39001-17	Capacitor, .05 mfd., 600 v., paper
C17	39001-17	Capacitor, .05 mfd., 600 v. paper
R1	39373-74	Resistor, 100,000 ohm, ½ w.
R2	39373-60	Resistor, 22,000 ohm, ½ w.
R3	39373-54	Resistor, 10,000 ohm, ½ w.
R4	39373-97	Resistor, 2.2 megohm, ½ w.
R5	39373-100	Resistor, 3.3 megohm, ½ w.
R6	39373-77	Resistor, 150,000 ohm, ½ w.
R7	39368-14	Control, Volume (1 megohm)
R8	39373-107	Resistor, 10 megohm, ½ w.
R9	39373-102	Resistor, 4.7 megohm, ½ w.
R10	39374-58	Resistor, 560,000 ohm, ½ w., 10%
R11	39373-92	Resistor, 1 megohm, ½ w.
R12	39373-77	Resistor, 150,000 ohm, ½ w.
R13	39374-188	Resistor, 82 ohm, 2 w., 10%
R14	39373-40	Resistor, 2200 ohm, ½ w.
R15	B-144857-4	Resistor, 2220 ohm, 7 w.
R16	39373-40	Resistor, 2200 ohm, ½ w.
R17	39374-24	Resistor, 820 ohm, ½ w., 10%
R18	39374-26	Resistor, 1200 ohm, ½ w., 10%
R19	39373-33	Resistor, 1000 ohm, ½ w.
R20	39373-30	Resistor, 680 ohm, ½ w.
CA1	C-132300-8	Cable & Plug Assy., A.C-D.C. Power
CO1	W-146009	Connector Battery

Symbol No.	Part No.	Description
L1	AC-146069	Loop Assembly, Antenna
L2	AW-145006	Coil Assembly, Oscillator
S1	Part of SW1	Socket, Power Cable Plug
SR1	W-145429	Rectifier, Selenium
SW1	W-145922	Switch (T. P. D. T.)
SW2	39369-2	Switch, Power
SP1	139631	Speaker
T1	AC-139919-2	Transformer, 1st I. F.
T2	AC-139919-2	Transformer, 2nd I. F.
T3	138131-3	Transformer, Output
P1	W-136863	Plug, Battery
	D-145984-1	Back, Cabinet (10-310)
	D-145984-2	Back, Cabinet (10-311)
	D-145984-3	Back, Cabinet (10-313)
	AB-145981-2	Background Assembly, Dial
	CR72	Battery, "A" Pack
	CR96	Battery "B" Pack
	AW-145444	Bracket & Terminal Assy., Antenna
	AC-146034-1	Cabinet Assy., Complete (10-310)
	AC-146034-2	Cabinet Assy., Complete (10-311)
	AC-146034-3	Cabinet Assy., Complete (10-313)
	W-139921	Clip, I. F. Transformer
	W-146608	Clip (Tinnerman), Cabinet Back
	W-145420	Clip (Fuse Type), Cabinet Back
	W-131154-1	Cotter, External
	AW-146075	Grille Cloth & Baffle
	W-145996-2	Handle (10-313)
	W-145996-3	Handle (10-310, 10-311)
	W-145232	Hinge, Cabinet Back
	W-145933	Holder, Cabinet Handle
	B-145121-2	Knob (10-310, 10-311)
	B-145121-3	Knob (10-313)
	B-145960	Pointer, Dial
	B-135075-2	Shaft, Dial Drive
	W-142732	Shield, Tube
	W-46065	Shock Mount, Var. Cond. Mtg.
	W-145379-2	Shock Mount, Chassis Mtg.
	W-145379-3	Shock Mount, Chassis Mtg.
	39462-2	Socket, Tube
	W-145757	Spring, Dial Drive Cord
	W-145918	Spring, Cabinet Handle
	W-138136	Strip, Dial Pointer
	C-135038-78	Strip, Terminal (2¼" long; 6 Lugs)
	C-135038-18	Strip, Terminal (¾" long; 2 Lugs)
	W-136630	Stud Trimount (Chassis Bottom)
	W-134916	Washer, Spring (Dial Drive Shaft)

MODELS 11-100U, 11-101U, 11-102U, 11-103U, 11-104U, 11-105U, Ch. 301

Model No.	Color
11-100U	White
11-101U	Blue
11-102U	Green
11-103U	Red
11-104U	Ebony
11-105U	Chartreuse



DESCRIPTION

TYPE: Five-tube, single band, Superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.-d.c.

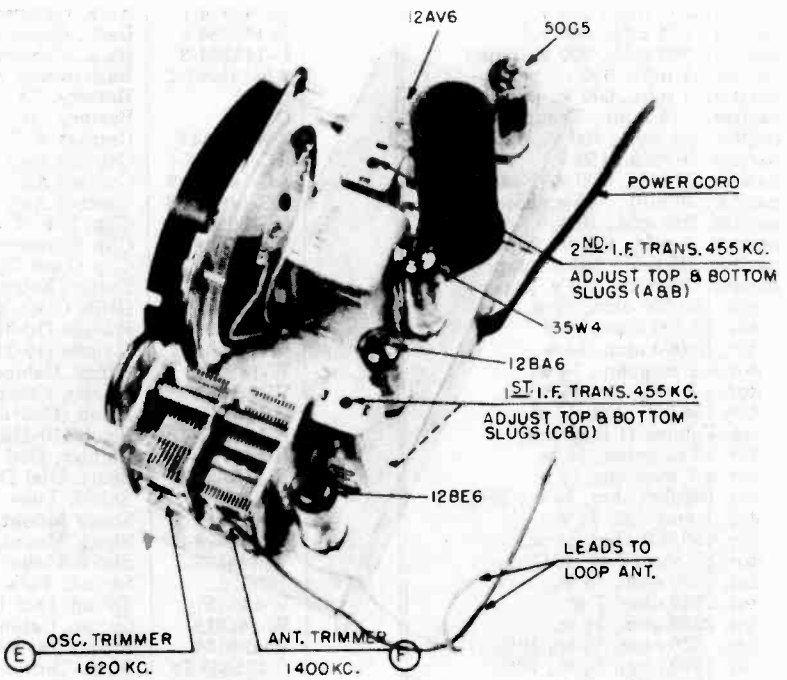
VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

POWER OUTPUT: 1.5 watts maximum.

TUBE COMPLEMENT

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



CHASSIS, TOP VIEW

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

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

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

ALIGNMENT PROCEDURE

1. Connect an output meter across the speaker voice coil.
2. The r.f. signal input from the signal generator should be connected as indicated in the alignment chart. Connect the signal generator ground through a 0.1 mfd. condenser to B - (pin 2 on 12BA6 tube socket).
3. Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

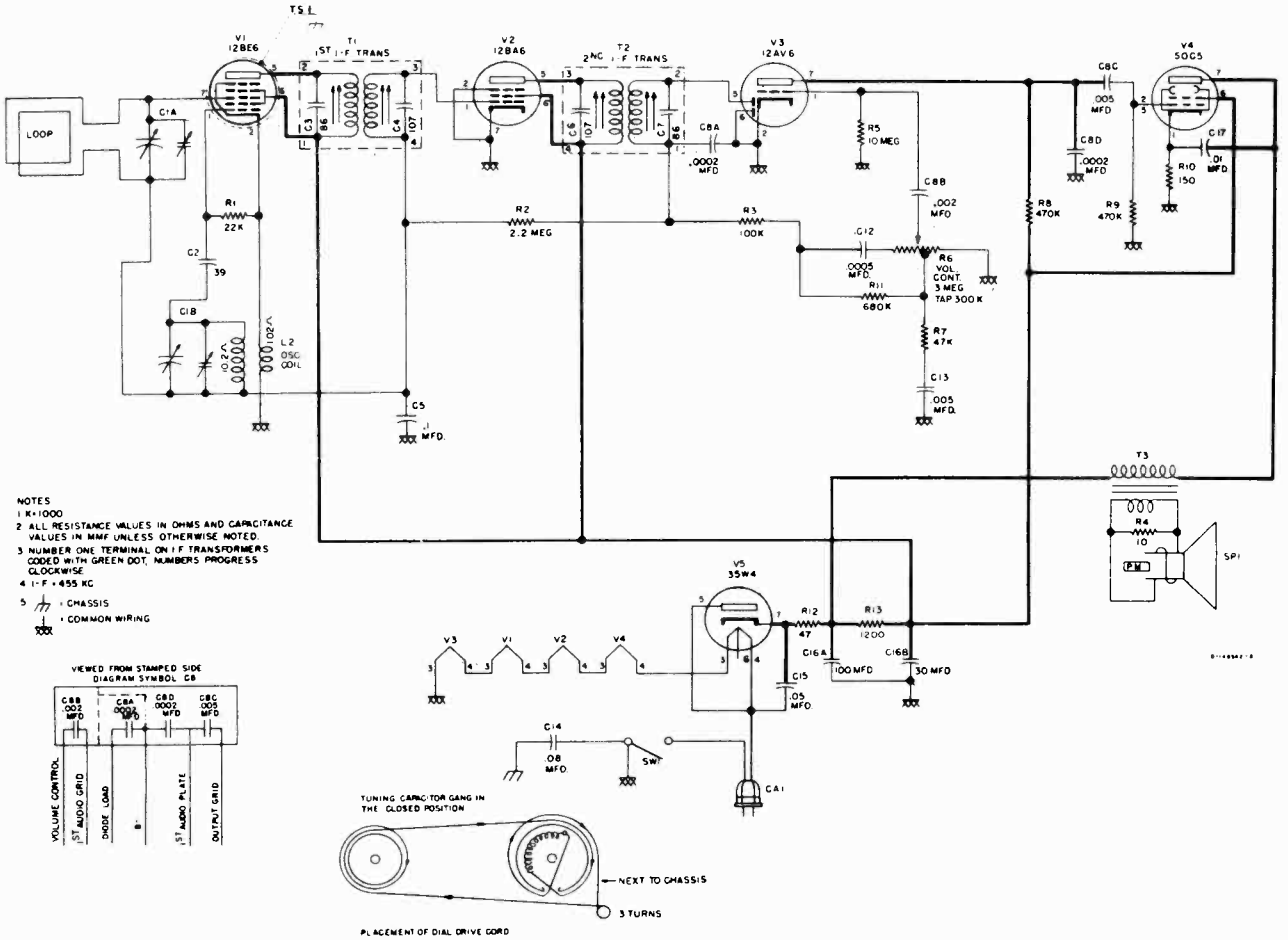
Alignment adjustment locations are shown on page 1, "CHASSIS, TOP VIEW."

Alignment Sequence	Signal Generator Output			Position of Dial pointer	Adjust for Maximum Output
	Frequency in KC	In Series with	To		
1	455	200 mmf.	High Side of Loop	1620	A, B, C & D (See Note 1.)
2	1620	Radiated to Loop		1620	E (See Note 2.)
3	1400	Radiated to Loop		Tune to Signal	F (See Note 2.)

ALIGNMENT NOTES

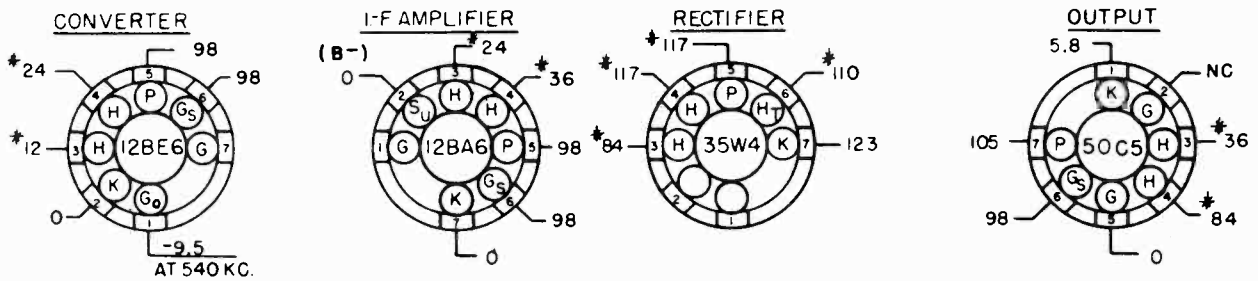
1. Repeat adjustments (A, B, C & D) in sequence, until maximum output is obtained.
2. Place signal generator output lead near the loop antenna. The loop antenna must be positioned with respect to the chassis to simulate its position when chassis and loop are fastened in cabinet.

MODELS 11-100U, 11-101U, 11-102U,
11-103U, 11-104U, 11-105U, Ch. 301



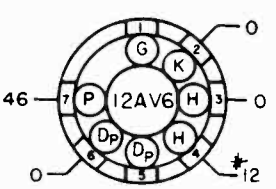
NOTES
1 K=1000
2 ALL RESISTANCE VALUES IN OHMS AND CAPACITANCE VALUES IN MMF UNLESS OTHERWISE NOTED.
3 NUMBER ONE TERMINAL ON I.F. TRANSFORMERS CODED WITH GREEN DOT, NUMBERS PROGRESS CLOCKWISE
4 I.F. = 455 KC
5 ⏚ = CHASSIS
⏚ = COMMON WIRING

SCHEMATIC DIAGRAM



NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. MEASURE VOLTAGE WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B- PIN 2 ON THE 12BA6.
3. LINE VOLTAGE 117 V. 60~
4. NC = NO CONNECTION.
5. * = A.C. VOLTAGE
6. SOCKET VOLTAGE TOLERANCE ±10%.

DET.-AVC.-1ST AUDIO AMPL.



SOCKET VOLTAGE CHART

MODELS 11-100U, 11-101U, 11-102U, 11-103U, 11-104U, 11-105U, Ch. 301

REPLACEMENT PARTS LIST

Symbol No.	Part No.	Description
C1A	B-148350	Capacitor, Variable } Two Section
C1B		Capacitor, Variable }
C2	C-137727-109	Capacitor, 39 mmf., 10%, 200 v., ceramic
C3	Part of T1	Capacitor, 86 mmf.
C4	Part of T1	Capacitor, 107 mmf.
C5	39001-19	Capacitor, .1 mfd., 600 v., paper
C6	Part of T2	Capacitor, 107 mmf.
C7	Part of T2	Capacitor, 86 mmf.
C8A	C-144675-1	Capacitor, .0002 mfd., 500 v. } Four Section disc ceramic
C8B		Capacitor, .002 mfd., 500 v. }
C8C		Capacitor, .005 mfd., 500 v. }
C8D		Capacitor, .0002 mfd., 500 v. }
C12	39001-5	Capacitor, .0005 mfd., 600 v., paper
C13	39001-11	Capacitor, .005 mfd., 600 v., paper
C14	39001-85	Capacitor, .08 mfd., 600 v., paper
C15	39001-17	Capacitor, .05 mfd., 600 v., paper
C16A	B-148357	Capacitor, 100 mfd., 150 v. } Two Section Electrolytic
C16B		Capacitor, 30 mfd., 150 v. }
C17	39001-13	Capacitor, .01 mfd., 600 v., paper
R1	39373-60	Resistor, 22,000 ohm, ½ w.
R2	39373-97	Resistor, 2.2 megohm, ½ w.
R3	39373-74	Resistor, 100,000 ohm, ½ w.
R4	39373-1	Resistor, 10 ohm, ½ w.
R5	39373-107	Resistor, 10 megohm, ½ w.
R6	B-148327	Control, Volume (3 megohm, Tap 300,000 ohm)
R7	39373-67	Resistor, 47,000 ohm, ½ w.
R8	39373-87	Resistor, 470,000 ohm, ½ w.
R9	39373-87	Resistor, 470,000 ohm, ½ w.
R10	39373-16	Resistor, 150 ohm, ½ w.
R11	39373-90	Resistor, 680,000 ohm, ½ w.
R12	39374-97	Resistor, 47 ohm, 10%, 1 w.
R13	39374-114	Resistor, 1200 ohn, 10%, 1 w.
CA1	C142769-1	Cable & Plug Assy., Power
L1	C-148399	Loop & Back Assy.
L2	AW-148259	Coil, Oscillator
SP1	AD-148400	Speaker
SW1	Part of R6	Switch, Power
TS1	W-147784	Shield, Tube (V1)
T1	C-139919-5	Transformer, 1st I.F.
T2	C-139919-5	Transformer, 2nd I.F.
T3	138131-1	Transformer, Output
	AB-148406-1	Baffle & Grille Cloth Assy.
	AB-148465-1	Cabinet (11-100U)
	AB-148465-2	Cabinet (11-101U)
	AB-148465-3	Cabinet (11-102U)
	AB-148465-4	Cabinet (11-103U)
	R-148273-3	Cabinet (11-104U)
	AB-148465-6	Cabinet (11-105U)
	W-148434	Clip, I.F. Transformer Mtg.
	W-131154-1	Cotter (External), Tuning Shaft
	B-148364	Gasket, Speaker
	W-148390	Grommet (3 used), chassis
	B-148318-1	Knob (11-100U)
	B-148318-2	Knob (11-101U)
	B-148318-3	Knob (11-102U)
	B-148318-4	Knob (11-103U)
	B-147318-5	Knob (11-104U)
	B-148318-6	Knob (11-105U)
	B-94704-7	Nut (Push On), Grille Cloth Mtg.
	B-148320	Pointer, Dial
	39176-59	Screw, Chassis Mtg.
	W-148379	Shaft, Tuning
	AW-148806	Shaft & Pulley Assy., Pointer
	39462-2	Socket, Tube
	W-148469	Spring (Retainer), Pointer Pulley
	W-51752	Spring, Drive Cord
	AB-148362	Support & Bushing Assy., Pointer Pulley
	W-134916	Washer (Spring), Tuning Shaft

Slipping of dial drive cords on these models can be corrected by replacing the drive cord with a cord long enough to permit it to be wrapped around the drive shaft four turns instead of three turns.

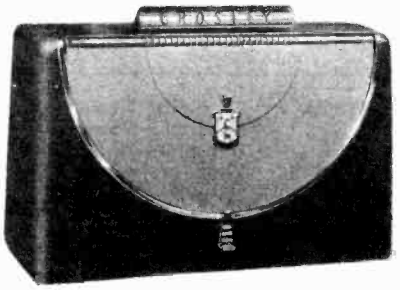
If necessary, place a 1/16" thick #6 flat washer on each screw that mounts the tuning capacitor. The washer should be placed between the rubber grommet eyelet and the capacitor frame. When the mounting screws are drawn tight, the eyelet will then flatten enough to reduce the flexibility of the grommet. This will hold the capacitor rigid and prevent the cord from becoming loose when the drive shaft is rotated.

In addition to the recommendations in the original service instruction it is sometimes necessary to replace the drive shaft with new shaft (part Number 148379). This new shaft does not have a groove for the drive cord.

On some sets of models 11-100U to 11-109U, R2 is a 3.3 megohm, 10%, 1/2 watt resistor instead of a 2.2 megohm resistor; and because of this C5 is an .05 mfd., 600 volt paper capacitor (Part No. 39001-17).

MODELS 11-301U, 11-302U,
11-303U, 11-304U, 11-305U,
Ch. 303

Model No.	Cabinet	Lid
11-301U	New Brunswick Blue	Salvador Blue
11-302U	Meadow Green	Sea
11-303U	Fez Red	Sport Beige
11-304U	Brown	Tan
11-305U	Ebony	Ebony



DESCRIPTION

TYPE: Four-tube, combination, battery Portable and a.c.-d.c. Superheterodyne with Selenium Rectifier.

FREQUENCY RANGE: 540 to 1600 kilocycles.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.-d.c. or Battery.

VOLTAGE RATING: a.c.-d.c., 110 to 120 volts. "A" Battery, 1½ volts; "B" Battery, 67½ volts.

POWER OUTPUT: 200 M.W. maximum.

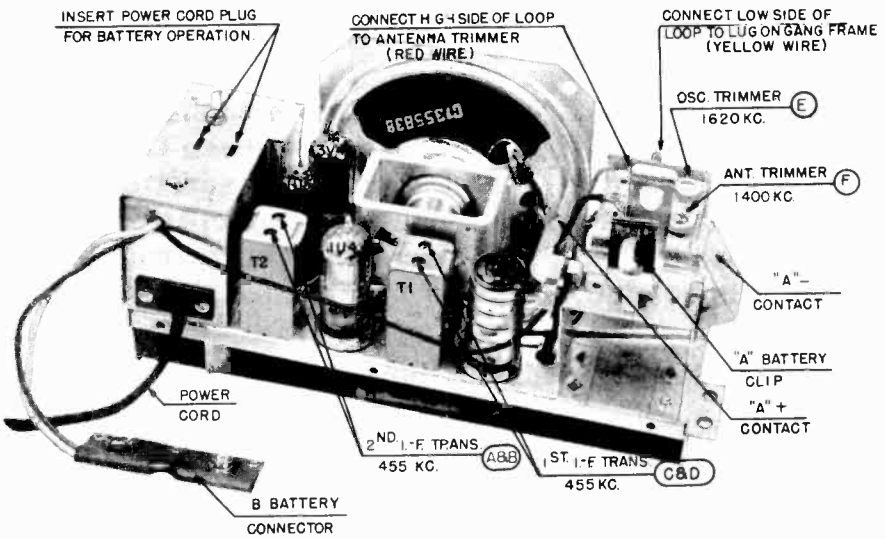
POWER CONSUMPTION: 15 watts at 125 volts, 60 cycle.

"A" BATTERY: One leak resistant "D" cell.

"B" BATTERY: One Crosley CR-88.

TUBE COMPLEMENT:

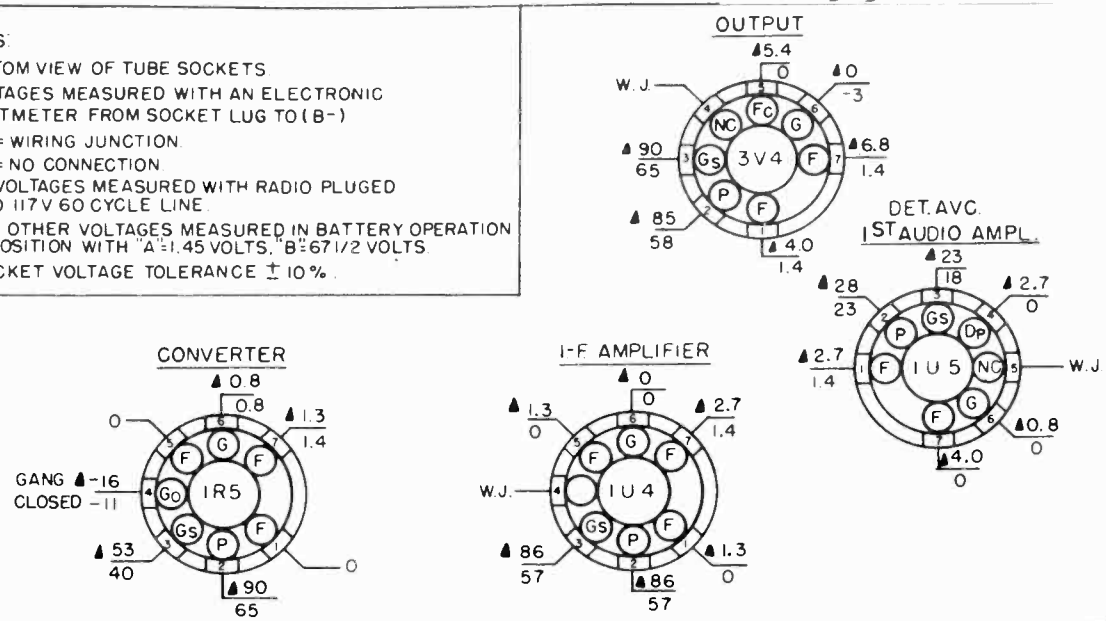
Type	Function
1R5	Converter
1U4	1st I.F. Amplifier
1U5	Detector, AVC, 1st A.F. Amplifier
3V4	A.F. Power Output
	Selenium Rectifier



CHASSIS TOP VIEW

MODELS 11-301U, 11-302U, 11-303U, 11-304U, 11-305U, Ch. 303

NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO (B-)
3. W.J.= WIRING JUNCTION.
4. N.C. = NO CONNECTION.
5. ▲ = VOLTAGES MEASURED WITH RADIO PLUGED INTO 117 V 60 CYCLE LINE.
6. ALL OTHER VOLTAGES MEASURED IN BATTERY OPERATION POSITION WITH "A"=1.45 VOLTS, "B"=67 1/2 VOLTS.
7. SOCKET VOLTAGE TOLERANCE ± 10%.



SOCKET VOLTAGE CHART

(For sets built as shown by solid lines in Schematic Wiring Diagram)

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

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

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

ALIGNMENT PROCEDURE

1. Alignment should be made with the receiver connected to the power line (not in battery operation position).
2. Connect output meter across speaker voice coil (3.2 ohms).
3. With the cabinet front lid open all the way, radiate an R-F signal modulated 30% at 400 cycles to the receiver by placing the output lead from the high side of the signal generator close to the loop antenna in the lid.
4. Turn the volume control to maximum and adjust the signal generator to produce mid-scale deflection of the output meter, but maintain generator output as low as possible to prevent AVC action.

ALIGNMENT CHART

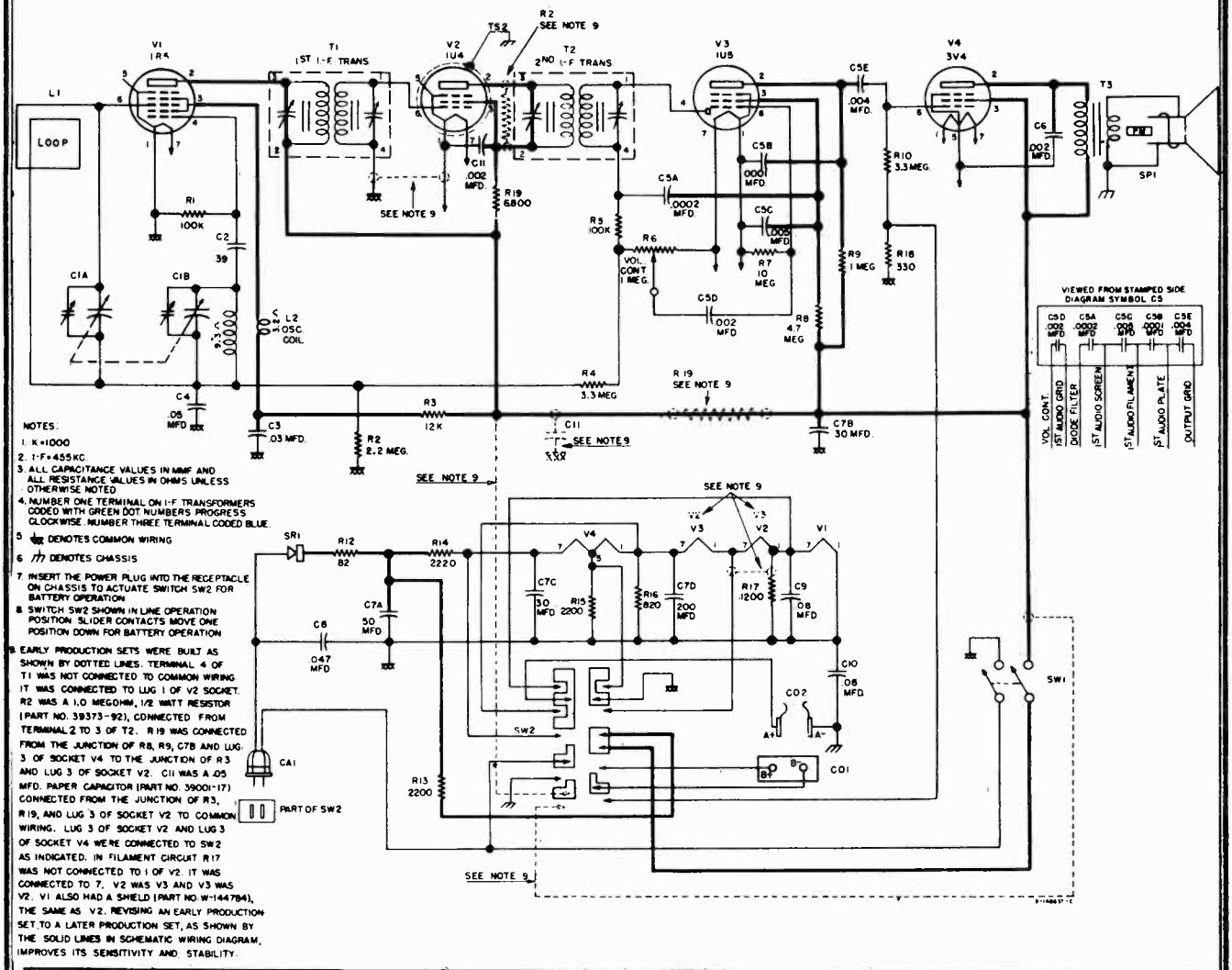
Alignment Sequence	Signal Generator		Position of Tuning Gang or Dial pointer	Adjust for Max. Output	Remarks
	Freq in KC	Output			
1	455	Radiated to Loop	Open	A, B, C & D	See Note
2	1620	Radiated to Loop	Open	E	
3	1400	Radiated to Loop	Tune in Signal	F	

ALIGNMENT NOTE

Repeat adjustment of A, B, C, & D until maximum output is obtained.

MODELS 11-301U, 11-302U, 11-303U, 11-304U, 11-305U, Ch. 303

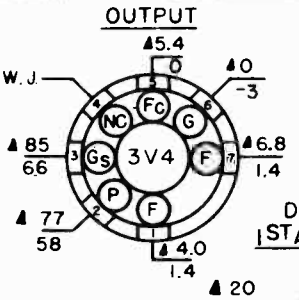
SCHEMATIC DIAGRAM



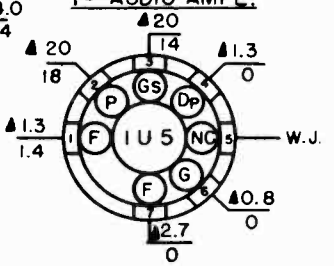
NOTES:
1. K=1000
2. I-F=455KC.
3. ALL CAPACITANCE VALUES IN MMF AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE NOTED.
4. NUMBER ONE TERMINAL ON I-F TRANSFORMERS CODED WITH GREEN DOT. NUMBERS PROGRESS CLOCKWISE. NUMBER THREE TERMINAL CODED BLUE.
5. ⏚ DENOTES COMMON WIRING.
6. ⏚ DENOTES CHASSIS.
7. INSERT THE POWER PLUG INTO THE RECEPTACLE ON CHASSIS TO ACTUATE SWITCH SW2 FOR BATTERY OPERATION.
8. SWITCH SW2 SHOWN IN LINE OPERATION POSITION. SLIDER CONTACTS MOVE ONE POSITION DOWN FOR BATTERY OPERATION.
9. EARLY PRODUCTION SETS WERE BUILT AS SHOWN BY DOTTED LINES. TERMINAL 4 OF T1 WAS NOT CONNECTED TO COMMON WIRING. IT WAS CONNECTED TO LUG 1 OF V2 SOCKET. R2 WAS A 1.0 MEGOHM, 1/2 WATT RESISTOR (PART NO. 39373-92), CONNECTED FROM TERMINAL 2 TO 3 OF T2. R19 WAS CONNECTED FROM THE JUNCTION OF R8, R9, C7B AND LUG 3 OF SOCKET V4 TO THE JUNCTION OF R3 AND LUG 3 OF SOCKET V2. C11 WAS A .05 MFD. PAPER CAPACITOR (PART NO. 39001-17) CONNECTED FROM THE JUNCTION OF R3, R19, AND LUG 3 OF SOCKET V2 TO COMMON WIRING. LUG 3 OF SOCKET V2 AND LUG 3 OF SOCKET V4 WERE CONNECTED TO SW2 AS INDICATED. IN FILAMENT CIRCUIT R17 WAS NOT CONNECTED TO 1 OF V2. IT WAS CONNECTED TO 7. V2 WAS V3 AND V3 WAS V2. V1 ALSO HAD A SHIELD (PART NO. W-144784), THE SAME AS V2. REVISING AN EARLY PRODUCTION SET TO A LATER PRODUCTION SET, AS SHOWN BY THE SOLID LINES IN SCHEMATIC WIRING DIAGRAM, IMPROVES ITS SENSITIVITY AND STABILITY.

NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO (B-)
3. W.J.= WIRING JUNCTION.
4. N.C. = NO CONNECTION.
5. ▲ = VOLTAGES MEASURED WITH RADIO PLUGED INTO 117 V. 60 CYCLE LINE.
6. ALL OTHER VOLTAGES MEASURED IN BATTERY OPERATION POSITION WITH "A"=1.45 VOLTS, "B"=67 1/2 VOLTS.
7. SOCKET VOLTAGE TOLERANCE ± 10%.

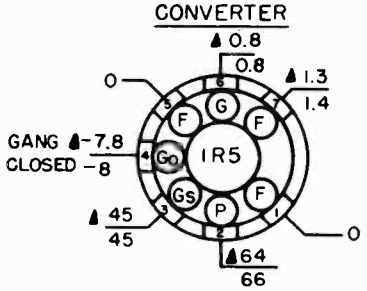
OUTPUT



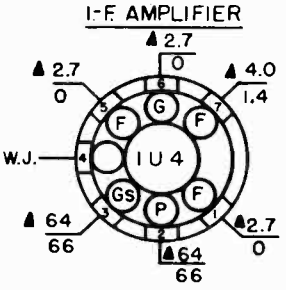
DET. AVC. 1ST AUDIO AMPL.



CONVERTER



I-F AMPLIFIER



SOCKET VOLTAGE CHART

(For sets built as shown by dotted lines in Schematic Wiring Diagram)

MODELS 11-301U, 11-302U,
11-303U, 11-304U, 11-305U,
Ch. 303

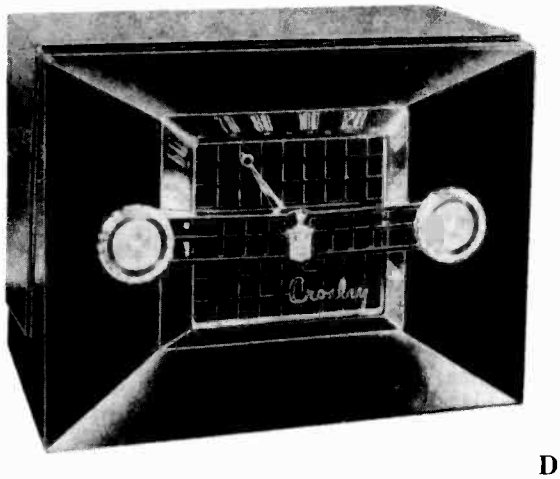
REPLACEMENT PARTS LIST

Symbol No.	Part No.	Description
C1A	B-148204	Capacitor, Variable } Two Section
C1B		Capacitor, Variable }
C2	C-137727-109	Capacitor, 39 mmf., 10%, 200 v., ceramic
C3	39001-82	Capacitor, .03 mfd., 600 v., paper
C4	39001-17	Capacitor, .05 mfd., 600 v., paper
C5A	C-144675-10	Capacitor, .0002 mfd., 500 v. } Five Section disc ceramic
C5B		Capacitor, .0001 mfd., 500 v. }
C5C		Capacitor, .0005 mfd., 500 v. }
C5D		Capacitor, .002 mfd., 500 v. }
C5E		Capacitor, .004 mfd., 500 v. }
C6	C-144675-16	Capacitor, .002 mfd., + 100%—0%, 500 v., disc ceramic
C7A	B-148246	Capacitor, 50 mfd., 150 v. } Four Section Electrolytic
C7B		Capacitor, 30 mfd., 100 v. }
C7C		Capacitor, 30 mfd., 25 v. }
C7D		Capacitor, 200 mfd., 10 v. }
C8	39477-45	Capacitor, .047 mfd., 600 v., paper
C9	39001-85	Capacitor, .08 mfd., 600 v., paper
C10	39001-85	Capacitor, .08 mfd., 600 v., paper
C11	C-144675-16	Capacitor, .002 mfd., 500 v., disc ceramic
R1	39373-74	Resistor, 100,000 ohm, ½ w.
R2	39373-97	Resistor, 2.2 megohm, ½ w.
R3	39374-38	Resistor, 12,000 ohm, 10%, ½ w.
R4	39373-100	Resistor, 3.3 megohm, ½ w.
R5	39373-74	Resistor, 100,000 ohm. ½ w.
R6	B-148240	Control, Volume (1 megohm)
R7	39373-107	Resistor, 10 megohm, ½ w.
R8	39374-77	Resistor, 4.7 megohm, 10%, ½ w.
R9	39374-61	Resistor, 1 megohm, 10%, ½ w.
R10	39373-100	Resistor, 3.3 megohm, ½ w.
R12	39374-188	Resistor, 82 ohm, 10%, 2 w.
R13	39373-40	Resistor, 2200 ohm, ½ w.
R14	B-144857-4	Resistor, 2220 ohm, 5%, 7 w.
R15	39373-40	Resistor, 2200 ohm, ½ w.
R16	39374-24	Resistor, 820 ohm, 10%, ½ w.
R17	39374-26	Resistor, 1200 ohm, 10%, ½ w.
R18	39374-19	Resistor, 330 ohm, 10%, ½ w.
R19	39373-51	Resistor, 6800 ohm, ½ w.
L1		Loop (Part of Lid Assy.)
L2	AW-148420	Coil, Oscillator
T1	C-148449	Transformer, 1st I.F.
T2	C-148449	Transformer, 2nd I.F.
T3	B-148328	Transformer, Output
SW1	B-148392	Switch, Off-On (Power)
SW2	B-148330	Switch, Battery A.C.
SP1	C-148852	Speaker
SR1	W-145429	Rectifier, Selenium
CA1	C-132300-8	Cable & Plug Assy., Power
CO1	W-148414	Connector, "B" Battery
CO2	AB-148062	Support Assembly, Battery
TS2	W-144784	Shield, Tube (V2)
	148875	Antenna & Lid Assy. (11-301U)
	148876	Antenna & Lid Assy. (11-302U)
	148877	Antenna & Lid Assy. (11-303U)
	148878	Antenna & Lid Assy. (11-304U)
	148879	Antenna & Lid Assy. (11-305U)
	AW-149752-1	Bracket (R.H.) Handle
	AW-149752-2	Bracket (L.H.) Handle
	B-148034	Bottom, Chassis
	AD-148370	Bottom Assy., Cabinet
	D-148192-1	Cabinet & Lid Assy. (11-301U)
	D-148192-2	Cabinet & Lid Assy. (11-302U)
	D-148192-3	Cabinet & Lid Assy. (11-303U)
	D-148192-4	Cabinet & Lid Assy. (11-304U)
	D-148192-5	Cabinet & Lid Assy. (11-305U)
	W-148103	Catch, Cabinet Lid
	AC-148443	Grille & Baffle Assy.
	W-148390	Grommet (3 used), Chassis
	W-148107	Guide, Cabinet Lid Catch
	B-147997	Handle
	B-148232-1	Knob, Volume (11-301U)
	B-148233-1	Knob, Tuning (11-301U)
	B-148232-2	Knob, Volume (11-302U)
	B-148233-2	Knob Tuning (11-302U)
	B-148232-3	Knob, Volume (11-303U)
	B-148233-3	Knob, Tuning (11-303U)
	B-148232-4	Knob, Volume (11-304U, 11-305U)
	B-148233-4	Knob, Tuning (11-304U, 11-305U)
	W-148218	Nut (Elastic Stop), Lid Catch Slide
	W-94701-4	Nut (Push-On), Cabinet Trim
	AW-148424	Pointer, Dial
	W-148366-1	Push Button, Off-On (11-301U)
	W-148366-2	Push Button, Off-On (11-302U)
	W-148366-3	Push Button, Off-On (11-303U)
	W-148366-4	Push Button, Off-On (11-304U,11-305U)
	39178-55	Screw, Chassis Mtg.
	39178-28	Screw, Handle
	39178-28	Screw, Cabinet Bottom
	39178-28	Screw, Grille & Baffle Assy.
	W-147784	Shield, Tube
	W-148108	Slide, Cabinet Lid Catch
	W-148346	Socket, Tube
	W-148054	Spacer, Speaker
	W-148523	Spring, Push Button
	W-148111	Spring, Cabinet Lid Catch
	W-148042	Support, Speaker
	B-148082	Trim, Cabinet Lid
	C-148110	Trim, Cabinet
	W-148248	Trimount Stud, Handle
	W-148206-2	Washer (Spring), Lid Catch Slide

Handles pulling off may be prevented by replacing the original equipment handle brackets with the new type that has a rivet brazed to the bracket. The R. H. Bracket part number is AW-149752-1 and the L. H. Bracket number is AW-149752-2.

On some sets of models 11-301U to 11-305U, R2 is a 3.3 megohm resistor instead of 2.2 megohm resistor. In these sets the .05 mfd. capacitor is identified by symbol No. C4. Since this was already a .05 mfd. capacitor, no change was necessary when R2 was substituted.

MODELS 11-106U, 11-107U,
11-108U, 11-109U, Ch. 302



Model No.	Color
11-106U	Nubian Black
11-107U	Bahama Beige
11-108U	Royal Burgundy
11-109U	Hunter Green

DESCRIPTION

TYPE: Five-tube, single band, Superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.-d.c.

VOLTAGE RATING: 105-125 volts.

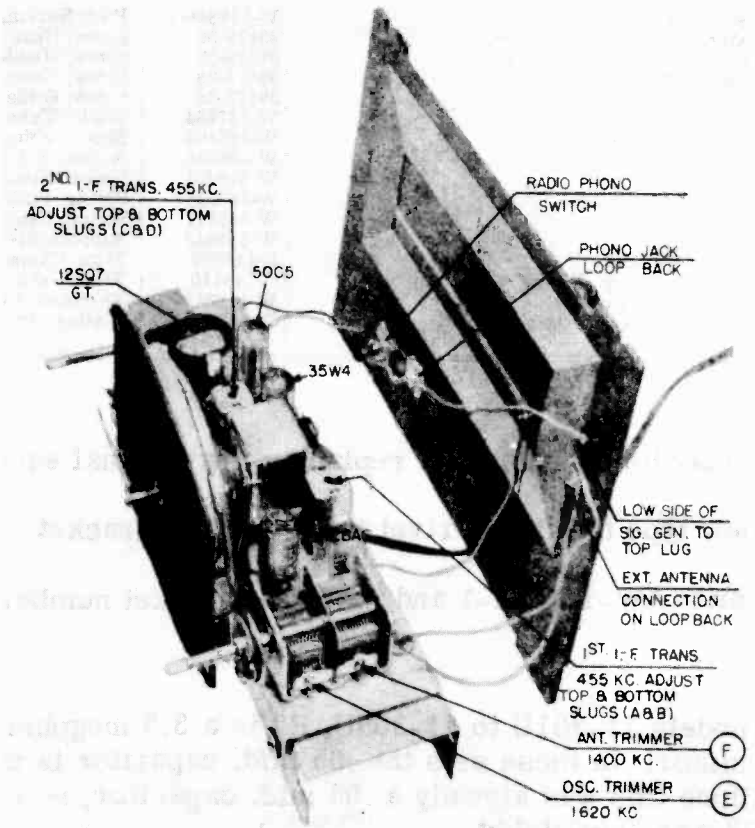
POWER CONSUMPTION: 30 watts maximum.

POWER OUTPUT: 1 watt maximum.

TUBE COMPLEMENT:

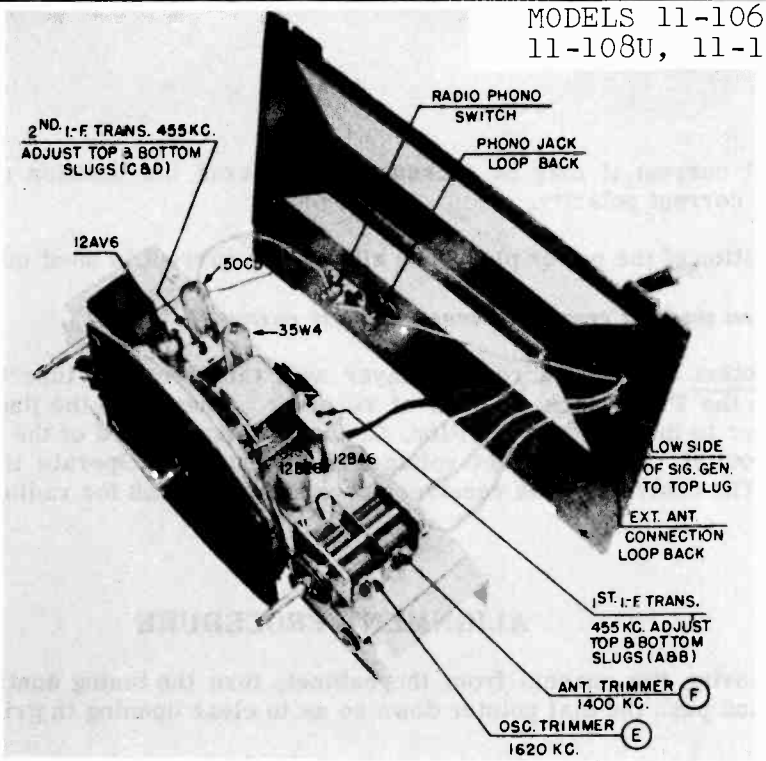
Type	Function
12BE6	Converter
12BA6	I.F. Amplifier
*12AV6	Detector, AVC, 1st A.F. Amplifier
50C5	A.F. Power Output
35W4	Rectifier

* Some sets are equipped with a 12SQ7GT tube.



CHASSIS, TOP VIEW (Sets equipped with 12AV6 Tube)

MODELS 11-106U, 11-107U,
11-108U, 11-109U, Ch. 302



CHASSIS, TOP VIEW (Sets equipped with 12SQ7GT Tube)

REPLACEMENT PARTS LIST

Symbol No.	Part No.	Description
C1A	B-148745	Capacitor, Variable } Two Section
C1B		Capacitor, Variable }
C2	C-137727-109	Capacitor, 39 mmf., 10%, 200 v., ceramic
C3	Part of T1	Capacitor, 106 mmf.
C4	Part of T1	Capacitor, 131 mmf.
C5	39001-19	Capacitor, .1 mfd., 600 v., paper
C6	Part of T2	Capacitor, 131 mmf.
C7	Part of T2	Capacitor, 106 mmf.
C8A	C-144675-1	Capacitor, .0002 mfd., 500 v. } Four Section disc ceramic
C8B		Capacitor, .001 mfd., 500 v. }
C8C		Capacitor, .005 mfd., 500 v. }
C8D		Capacitor, .0002 mfd., 500 v. }
C9	B-143686-3	Capacitor, 100 mmf., 500 v., Molded disc ceramic
C10	39001-85	Capacitor, .08 mfd., 600 v., paper
C11	39001-74	Capacitor, .002 mfd., 600 v., paper
C12	39001-5	Capacitor, .0005 mfd., 600 v., paper
C13	39001-11	Capacitor, .005 mfd., 600 v., paper
C14	39001-85	Capacitor, .08 mfd., 600 v., paper
C15	39001-17	Capacitor, .05 mfd., 600 v., paper
C16A	B-147174	Capacitor, 100 mfd., 150 v. } Three Section Electrolytic
C16B		Capacitor, 30 mfd., 150 v. }
C16C		Capacitor, 10 mfd., 150 v. }
C17	39001-13	Capacitor, .01 mfd., 600 v., paper
R1	39373-60	Resistor, 22,000 ohm, 1/2 w.
R2	39373-97	Resistor, 2.2 megohm, 1/2 w.
R3	39373-74	Resistor, 100,000 ohm, 1/2 w.
R4	39374-34	Resistor, 5600 ohm, 10%, 1/2 w.
R5	39373-107	Resistor, 10 megohm, 1/2 w.
R6	B-148327	Control, Volume (3 megohm)
R7	39373-67	Resistor, 47,000 ohm, 1/2 w.
R8	39373-87	Resistor, 470,000 ohm, 1/2 w.
R9	39373-87	Resistor, 470,000 ohm, 1/2 w.
R10	39373-16	Resistor, 150 ohm, 1/2 w.
R11	39373-90	Resistor, 680,000 ohm, 1/2 w.
R12	39374-189	Resistor, 100 ohm, 10%, 1 w.
R13	39374-114	Resistor, 1200 ohm, 10%, 1 w.
R14	39373-33	Resistor, 1000 ohm, 1/2 w.
CA1	C-132300-2	Cable & Plug Assy., Power
CO1	W-136998	Connector, Phono

Symbol No.	Part No.	Description
L1	AC-148752	Loop & Back Assy.
L2	AW-148259	Coil, Oscillator
SP1	AD-145956-2	Speaker (5-1/4" P.M.)
SW1	Part of R6	Switch, Power
SW2	W-148260	Switch, Phono
T1	AC-139919-3	Transformer, 1st I.F.
T2	AC-139919-3	Transformer, 2nd I.F.
T3	B-147171	Transformer, Output
	C-147934	Bottom, Chassis
	R-148672	Cabinet (11-106U)
	AB-148962-1	Cabinet (11-107U)
	AB-148962-2	Cabinet (11-108U)
	AB-148962-3	Cabinet (11-109U)
	B-94962-5	Clip, Dial Pointer
	W-148434	Clip, I.F. Transformer Mtg.
	W-131154-1	Cotter (External), Dial Pointer Shaft
	C-148674	Escutcheon, Dial
	AB-148743	Grille Cloth & Baffle Assy.
	AW-148774	Grille & Medallion Assy. (11-106U)
	AW-148956	Grille & Medallion Assy. (11-107U)
	AW-148957	Grille & Medallion Assy. (11-108U)
	AW-148955	Grille & Medallion Assy. (11-109U)
	C-148708	Knob
	W-147275	Mounting, Rubber (2 used)
	W-45580-2	Mounting, Rubber (4 used)
	W-148788	Name (CROSLEY)
	AW-148773	Pointer & Clip Assy., Dial
	AW-148779	Pulley & Shaft Assy., Dial Pointer
	39178-57CL	Screw, Grille Mtg.
	39176-61CL	Screw, Chassis Mtg.
	W-147784	Shield, Tube (V2, V3)
	W-46447-1	Shield, Tube (V3), sets equipped with 12SQ7GT Tube
	39462-2	Socket, Tube
	W-149987	Socket, Tube (V3), sets equipped with 12SQ7GT Tube
	W-51752	Spring, Drive Cord
	W-136630	Stud, Trimount
	AB-148775	Support Assy. Pointer Pulley
	W-147168	Support, Speaker

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

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

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

Photograph connection —To use a record player with this receiver insert the pickup plug of the record player into the Phono jack on back of receiver. Then slide the Radio-Phono Switch on the back of the receiver to the "Phono" position. Connect the power cord of the record player to a convenient electric outlet of the correct voltage and frequency. Operate the record player in the normal manner. The controls of the receiver operate the same as for radio programs.

ALIGNMENT PROCEDURE

Note: Before removing the chassis from the cabinet, turn the tuning control completely counter-clockwise and push the dial pointer down so as to clear opening in grille.

1. Connect an output meter across the speaker voice coil.
2. The r.f. signal input from the signal generator should be connected as indicated in the alignment chart. Connect the signal generator ground to the top lug on loop antenna back.
3. Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown on page 1, "CHASSIS, TOP VIEW."

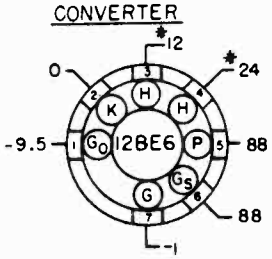
Alignment Sequence	Signal Generator Output			Position of Dial pointer	Adjust for Maximum Output
	Frequency in KC	In Series with	To		
1	455	200 mmf.	External Ant. Screw	1620	A, B, C & D (See Note 1.)
2	1620	200 mmf.	External Ant. Screw	1620	E (See Note 2.)
3	1400	200 mmf.	External Ant. Screw	Tune to Signal	F (See Note 2.)

ALIGNMENT NOTES

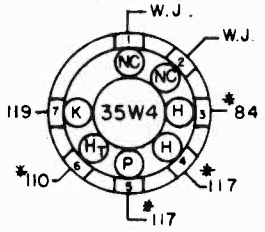
1. Repeat adjustments (A, B, C & D) in sequence, until maximum output is obtained.
2. The loop antenna must be positioned with respect to the chassis to simulate its position when chassis and loop are fastened in cabinet.

MODELS 11-106U, 11-107U,
11-108U, 11-109U, Ch. 302

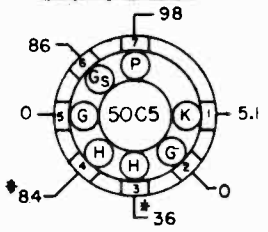
CONVERTER



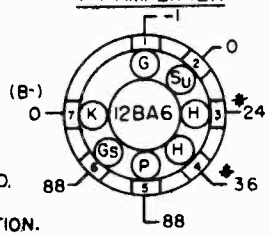
RECTIFIER



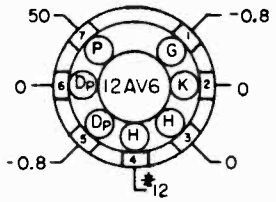
AUDIO OUTPUT



I-F AMPLIFIER



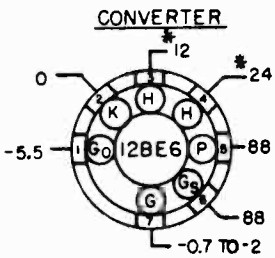
DET-AVC. & 1ST AUDIO AMPL.



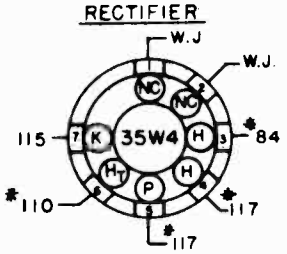
NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B- (PIN 7 OF 12BA6)
3. MEASURED WITH THE VOLUME CONTROL AT MINIMUM & NO SIGNAL INTO THE LOOP, TUNING GANG CLOSED.
4. W.J. = WIRING JUNCTION.
   * = AC. VOLTAGES. NC = NO CONNECTION.
5. LINE VOLTAGE = 117 V., 60~AC.
6. SOCKET VOLTAGE TOLERANCE ± 10%

SOCKET VOLTAGE CHART (Sets equipped with 12AV6 Tube)

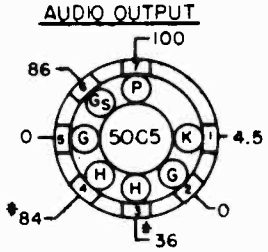
CONVERTER



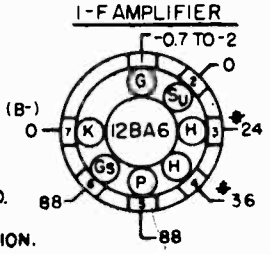
RECTIFIER



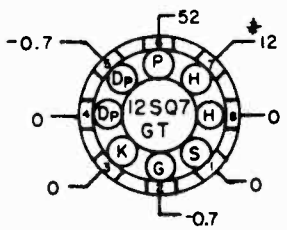
AUDIO OUTPUT



I-F AMPLIFIER



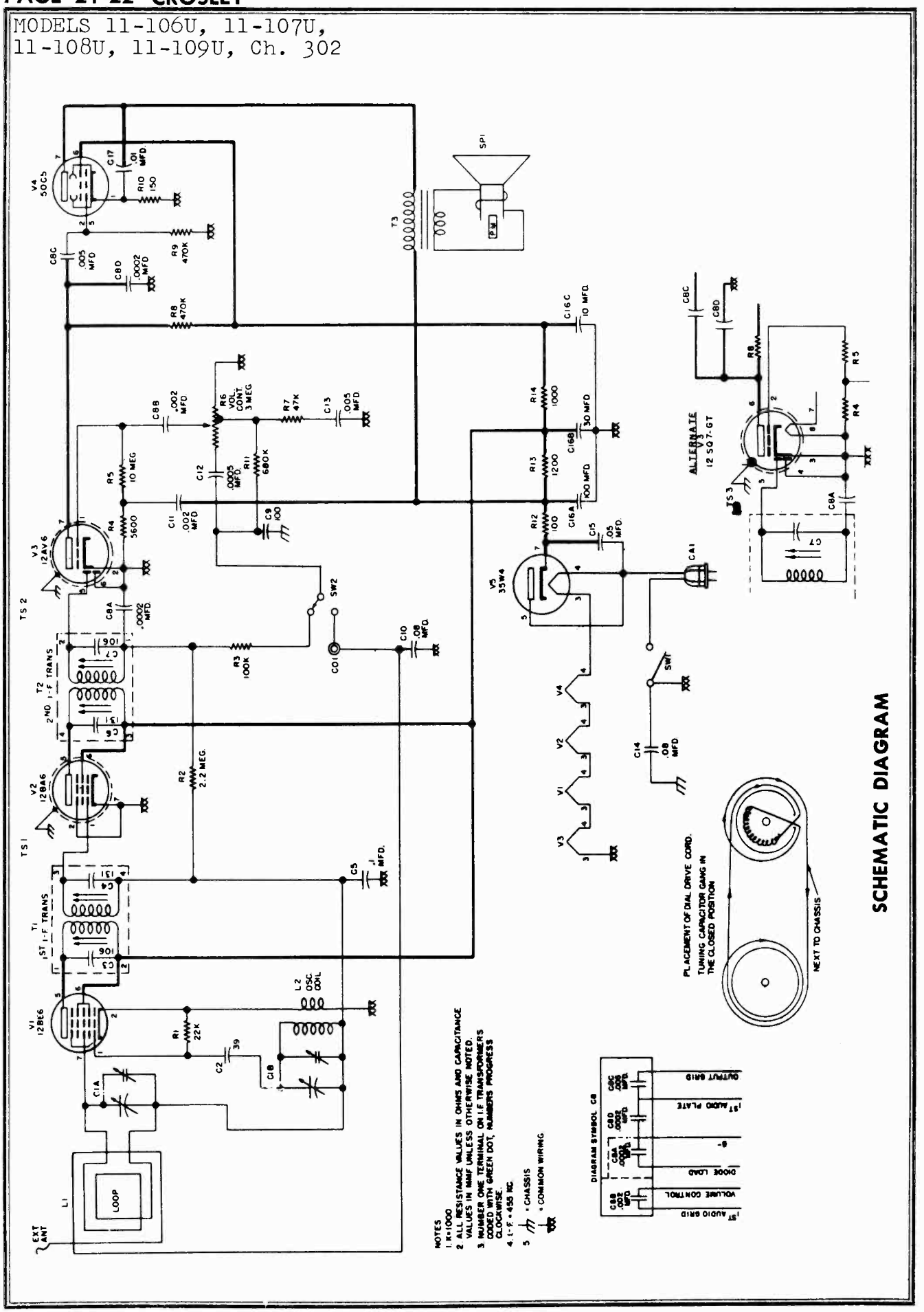
DET-AVC. & 1ST AUDIO AMPL.



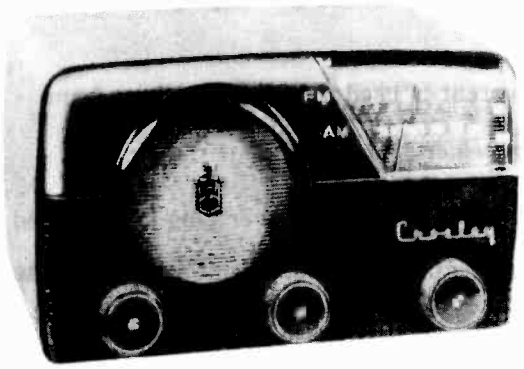
NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B- (PIN 7 OF 12BA6)
3. MEASURED WITH THE VOLUME CONTROL AT MINIMUM & NO SIGNAL INTO THE LOOP, TUNING GANG CLOSED.
4. W.J. = WIRING JUNCTION.
   * = AC. VOLTAGES. NC = NO CONNECTION.
5. LINE VOLTAGE = 117 V., 60~AC.
6. SOCKET VOLTAGE TOLERANCE ± 10%

SOCKET VOLTAGE CHART (Sets equipped with 12SQ7GT Tube)

MODELS 11-106U, 11-107U,
11-108U, 11-109U, Ch. 302



MODELS 11-126U,
11-128U, 11-129U, Ch. 312



Model No.	Cabinet	Front
11-126U	Simulated Saddle Leather	Brown
11-127U	Simulated Green Morroco Leather	Green
11-128U	Simulated Light Rawhide	Ebony
11-129U	Simulated Red Morroco Leather	Maroon

DESCRIPTION

TYPE: Seven-tube, two-band, superheterodyne.

FREQUENCY RANGE: Standard Broadcast Band; 540 to 1620 kc.

Frequency Modulation Band; 88 to 108 megacycles.

INTERMEDIATE FREQUENCY: Standard Broadcast Band; 455 kc.

Frequency Modulation Band; 10.7 mc.

FM ANTENNA INPUT IMPEDANCE: 75 ohms balanced.

POWER SUPPLY: a.c.—d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 40 watts at normal power supply voltage (117 volts).

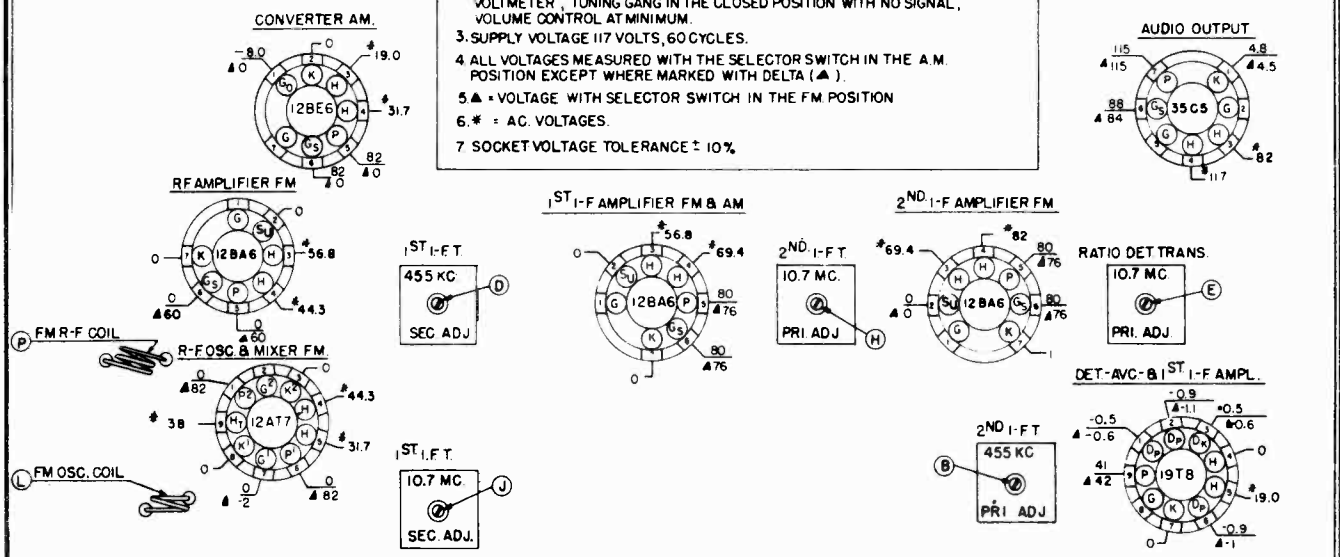
POWER OUTPUT: 1 watt maximum.

TUBE COMPLEMENT:

Type	Function
12BA6	R. F. Amplifier (FM)
12AT7	Oscillator & Mixer (FM)
12BA6	I. F. Amplifier (AM & FM)
12BA6	2nd I. F. Amplifier & AVC (FM)
19T8	Detector & 1st A.F. Ampl. (AM & FM; AVC (AM)
12BE6	Converter (AM)
35C5	Audio Output
	Selenium Rectifier

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

NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGES MEASURED FROM SOCKET LUG TO CHASSIS (B-) WITH AN ELECTRONIC VOLTMETER ; TUNING GANG IN THE CLOSED POSITION WITH NO SIGNAL, VOLUME CONTROL AT MINIMUM.
3. SUPPLY VOLTAGE 117 VOLTS, 60 CYCLES.
4. ALL VOLTAGES MEASURED WITH THE SELECTOR SWITCH IN THE A.M. POSITION EXCEPT WHERE MARKED WITH DELTA (▲).
5. ▲ = VOLTAGE WITH SELECTOR SWITCH IN THE FM POSITION
6. * = A.C. VOLTAGES.
7. SOCKET VOLTAGE TOLERANCE ± 10%



SOCKET VOLTAGE CHART

MODELS 11-126U, 11-128U, 11-129U, Ch. 312

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

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

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

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

ALIGNMENT PROCEDURE

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

1. Turn the tuning condenser to full mesh, against stop, and set the dial pointer to the reference point at the "88" end of the dial.
2. Set the tone control knob to the full treble position (extreme right).
3. For Amplitude Modulated signal readings, connect output meter across voice coil (3.2 ohms).
4. All Amplitude Modulated input signals are modulated 30% at 400 cycles with the High side of the signal generator connected to receiver as indicated in the alignment chart. Connect the low side of signal generator through a 0.1 mfd. condenser to the receiver chassis. If hum is encountered, use a 1 to 1 isolating transformer between the power line outlet and the receiver power line cord. Then connect the low side of the signal generator directly to the receiver chassis.
5. All Frequency Modulated signals are modulated 30% at 400 cycles. 30% modulation is equal to a deviation of 22.5 kilocycles.
6. Turn the volume control to maximum clockwise position and adjust signal generator output to produce a noticeable output meter reading. Keep signal generator output as low as possible to prevent AVC action in the receiver.
7. Disconnect short wire, with spade lug, from F.M. Antenna Terminal.

ALIGNMENT NOTES

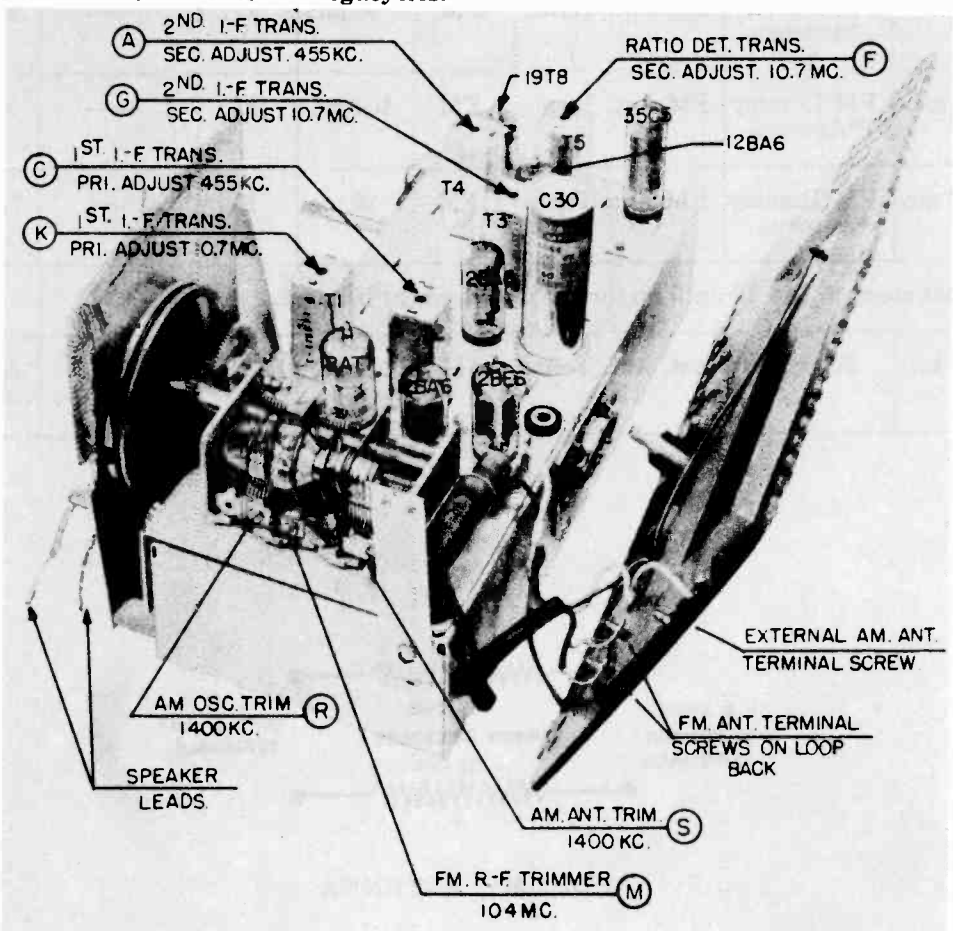
1. Use an unmodulated signal generator with approximately 100,000 mv. output.
2. Connect the electronic voltmeter across the 27,000 ohm diode load resistor (R6).
3. Connect two 100,000 ohm 5% carbon resistors in series, connect these resistors across the 4 mfd. stabilizing capacitor (C17) in the diode circuit, connect the electronic voltmeter between the output of the RF filter network (C22) and the midpoint of the two 100,000 ohm resistors. Align secondary core (F) of T5 for zero volts, first using a high scale on the electronic voltmeter and then switching to the lowest scale for close balance.
4. Use an unmodulated signal. Electronic voltmeter connected across 27,000 ohm load resistor (R6). Limit output of signal generator so that the reading on the electronic voltmeter will not exceed 5 volts.

5. Remove the two 100,000 ohm resistors and electronic voltmeter after alignment.
6. Adjust turns on FM oscillator coil by spreading or squeezing together, so that 98 megacycle signal falls on 98 megacycles on the dial.
7. Rock gang while adjusting FM. RF trimmer until maximum output meter reading is obtained, or align for maximum noise level at zero signal.
8. Adjust turns on FM. RF coil until maximum output meter reading is obtained.

MEGACYCLES TO CHANNEL NUMBERS "FM" BAND

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

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

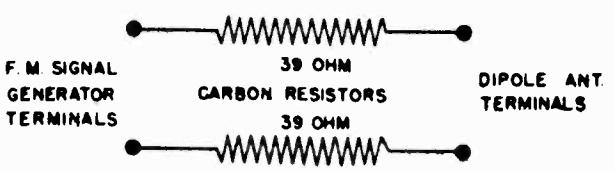


CHASSIS TOP VIEW SHOWING ALIGNMENT ADJUSTMENTS

MODELS 11-126U, 11-128U,
11-129U, Ch. 312

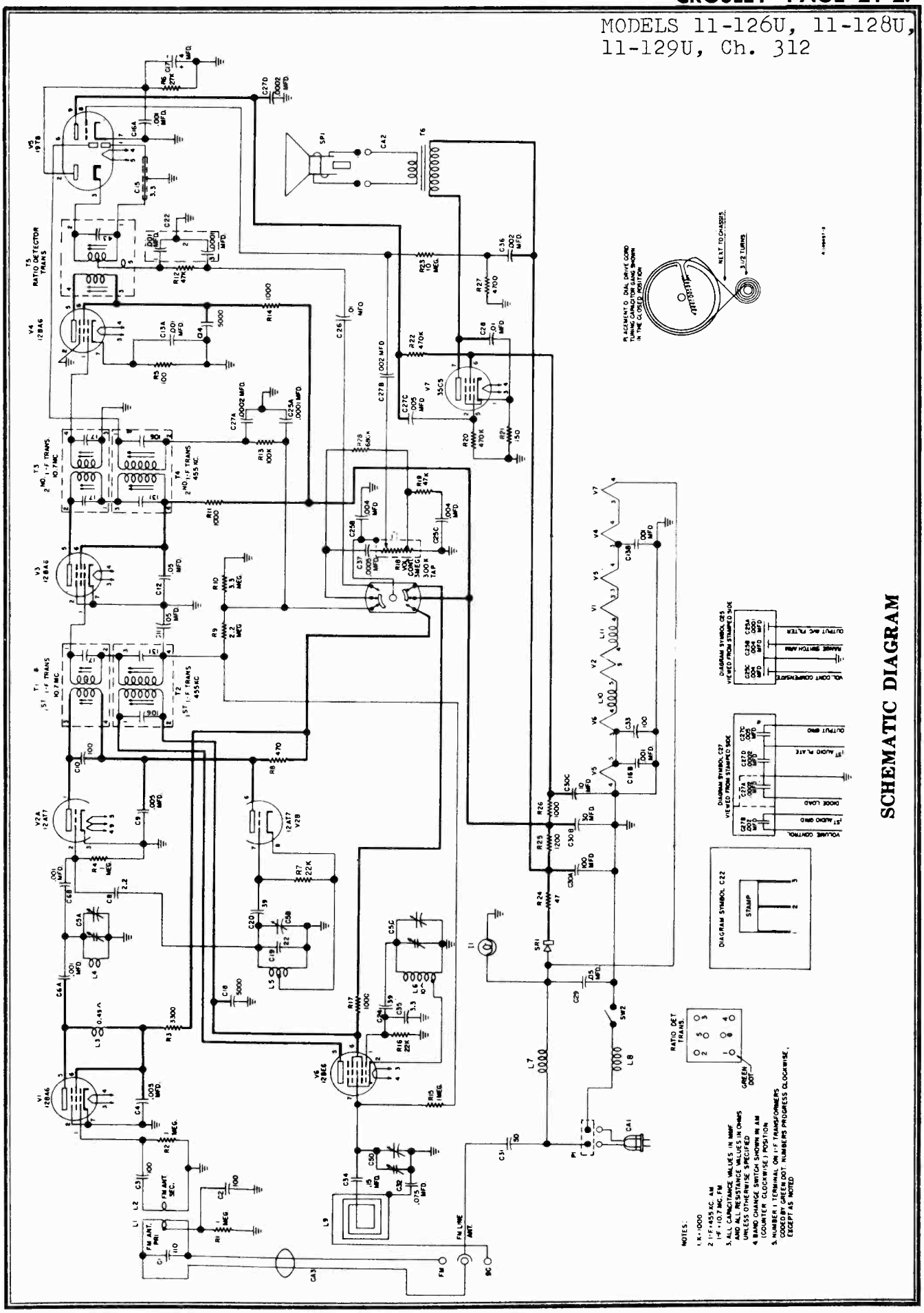
ALIGNMENT CHART

Alignment Sequence	Signal Generator Output			Position of		Adjust	Type of Selectivity Curve	Remarks
	Frequency	In Series With	To	Range Switch	Tuning Dial or Tun. Cap.			
1	455 kc.	.05 mfd.	V3 grid pin 1	AM	Open	A & B	Single peak	
2	455 kc.	.05 mfd.	V6 grid pin 7	AM	Open	C & D	Single peak	Retouch A & B
3	10.7 mc.	.05 mfd.	V4 grid pin 1	FM	Closed	E	Single peak	See note 1 & 2
4	10.7 mc.	.05 mfd.	V4 grid pin 1	FM	Closed	F	—	Balance to zero volts. Note 3
5	10.7 mc.	.05 mfd.	V3 plate pin 5	FM	Closed	E & G	Single peak	See note 4 repeat adj. of E & G for max. alignment
6	10.7 mc.	.05 mfd.	V3 grid pin 1	FM	Closed	H	Single peak	Note 4
7	10.7 mc.	.05 mfd.	Stator center gang section	FM	Closed	J, K & H	Single peak	Note 4 & 5
8	98 mc.	FM Dummy *Antenna	FM Ant. Term.	FM	98 mc.	L	—	Note 6
19	104 mc.	FM Dummy *Antenna	FM Ant. Term.	FM	104 mc.	M	—	Note 7
10	92 mc.	FM Dummy *Antenna	FM Ant. Term.	FM	92 mc.	P	—	Note 8
11	Repeat steps 9 and 10 until no further improvement is noted.							
12	1400 kc.	200 mmf.	Ext. Ant. Term.	AM	1400 kc.	R & S	—	Adjust S for max output



* DUMMY ANTENNA

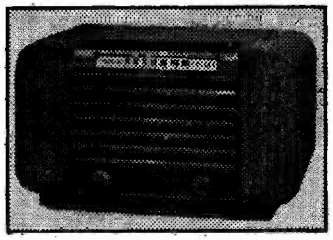
MODELS 11-126U, 11-128U,
11-129U, Ch. 312



MODELS 11-126U, 11-128U,
11-129U, Ch. 312

REPLACEMENT PARTS LIST

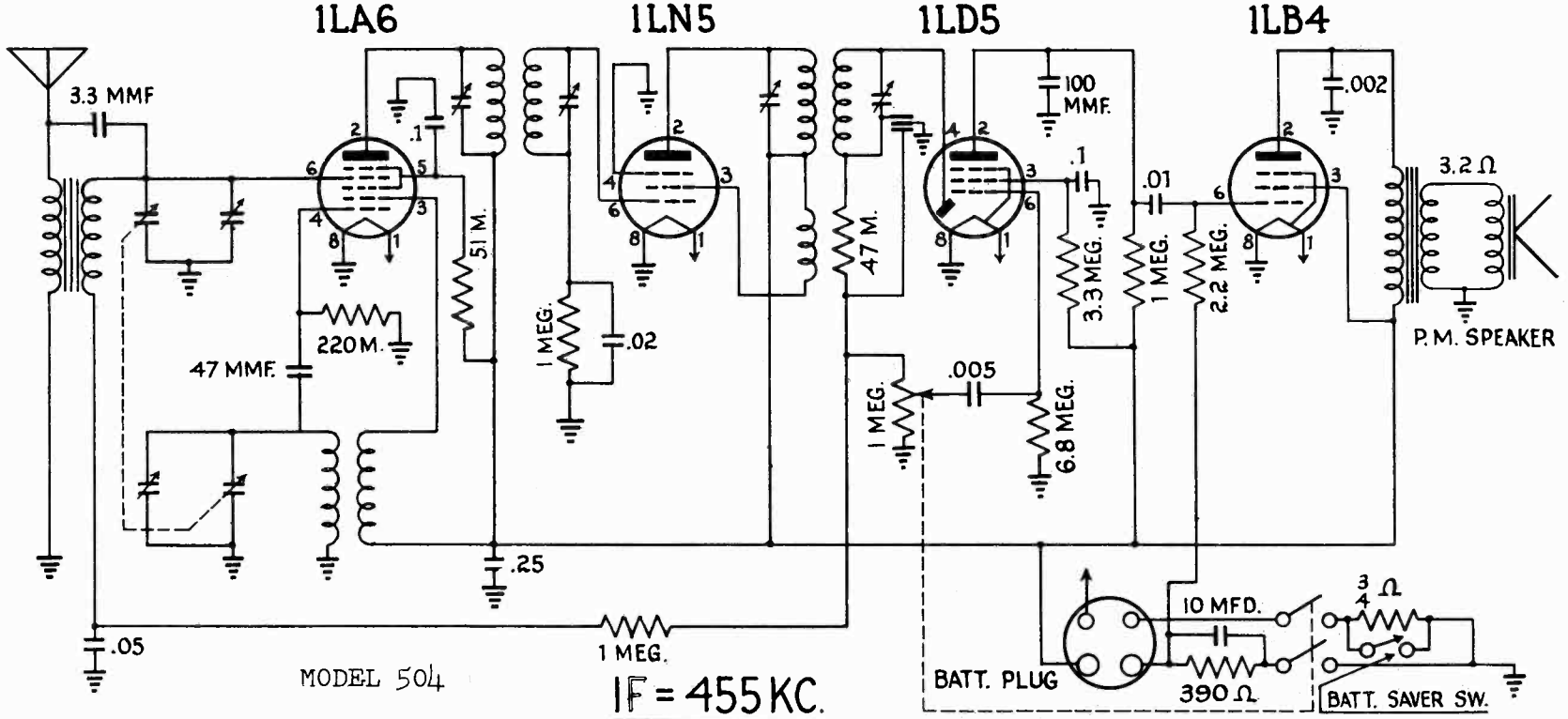
Symbol No.	Part No.	Description
C1	W-145913-2	Capacitor, 110 mmf., 5%, 500 v., ceramic
C2	B-143686-3	Capacitor, 100 mmf., 500 v., molded disc ceramic
C3	B-143223-7	Capacitor, 100 mmf., 500 v., mica
C4	C-144675-2	Capacitor, .005 mfd., 500 v., disc ceramic
C5A	C-149125	Capacitor, Variable }
C5B		Capacitor, Variable } Four Section
C5C		Capacitor, Variable }
C5D		Capacitor, Variable }
C6A	C-144675-7	Capacitor, .001 mfd., 500 v. } Two section
C6B		Capacitor, .001 mfd., 500 v. } disc ceramic
C8	B-143686-5	Capacitor, 2.2 mmf., 500 v., molded disc ceramic
C9	C-137727-48	Capacitor, 5000 mmf., 500 v., ceramic
C10	B-143223-12	Capacitor, 100 mmf., 5%, 500 v., mica
C11	39001-17	Capacitor, .05 mfd., 600 v., paper
C12	39001-17	Capacitor, .05 mfd., 600 v., paper
C13A	C-144675-7	Capacitor, .001 mfd., 500 v. } Two section
C13B		Capacitor, .001 mfd., 500 v. } disc ceramic
C14	C-137727-48	Capacitor, 5000 mmf., 500 v., ceramic
C15	39008-91	Capacitor, 3.3 mmf., Spiral Shield Wire
C16A	C-144675-7	Capacitor, .001 mfd., 500 v. } Two section
C16B		Capacitor, .001 mfd., 500 v. } disc ceramic
C17	B-142958	Capacitor, 4 mfd., 50 v., Electrolytic
C18	C-137727-48	Capacitor, 5000 mmf., 500 v., ceramic
C19	C-137727-98	Capacitor, 22 mmf., 2%, 500 v., ceramic
C20	C-137727-97	Capacitor, 39 mmf., 10%, 500 v., ceramic
C22A	C-144675-12	Capacitor, .001 mfd., 500 v. } Two section
C22B		Capacitor, .0001 mfd., 500 v. } disc ceramic
C24	C-137727-109	Capacitor, 39 mmf. 10%, 200 v., ceramic
C25A	C-144675-18	Capacitor, .0001 mfd., 500 v. } Three sec-
C25B		Capacitor, .004 mfd., 500 v. } tion disc
C25C		Capacitor, .004 mfd., 500 v. } ceramic
C26	39001-13	Capacitor, .01 mfd., 600 v., paper
C27A	C-144675-1	Capacitor, .0002 mfd., 500 v. } Four sec-
C27B		Capacitor, .002 mfd., 500 v. } tion disc
C27C		Capacitor, .005 mfd., 500 v. } ceramic
C27D		Capacitor, .0002 mfd., 500 v. }
C28	39001-13	Capacitor, .01 mfd., 600 v., paper
C29	39001-17	Capacitor, .05 mfd., 600 v., paper
C30A	B-149183	Capacitor, 100 mfd., 150 v. } Three sec-
C30B		Capacitor, 30 mfd., 150 v. } tion elec-
C30C		Capacitor, 10 mfd., 150 v. } trolytic
C31	B-143686-1	Capacitor, 50 mmf., 500 v., molded disc ceramic
C32	39001-18	Capacitor, .075 mfd., 600 v., paper
C33	B-143686-3	Capacitor, 100 mmf., 500 v., molded disc ceramic
C34	39001-20	Capacitor, .15 mfd., 600 v., paper
C35	W-137398-5	Capacitor, 3.3 mmf., 500 v.
C36	39001-74	Capacitor, .002 mfd., 600 v., paper
C37	39001-5	Capacitor, .0005 mfd., 600 v., paper
C38	Part of T1	Capacitor, 17 mmf., 3%
C39	Part of T2	Capacitor, 106 mmf., 5%
C40	Part of T2	Capacitor, 131 mfd., 5%
C41	Part of T3	Capacitor, 17 mmf., 3%
C42	Part of T3	Capacitor, 17 mmf., 3%
C43	Part of T4	Capacitor, 131 mmf., 5%
C44	Part of T4	Capacitor, 106 mmf., 5%
C45	Part of T5	Capacitor, 43 mmf., 5%
R1	39373-92	Resistor, 1 megohm, 1/2 w.
R2	39373-92	Resistor, 1 megohm, 1/2 w.
R3	39373-44	Resistor, 3300 ohm, 1/2 w.
R4	39373-92	Resistor, 1 megohm, 1/2 w.
R5	39373-14	Resistor, 100 ohm, 1/2 w.
R6	39374-42	Resistor, 27,000 ohm, 10% 1/2 w.
R7	39374-41	Resistor, 22,000 ohm, 10%, 1/2 w.
R8	39373-26	Resistor, 470 ohm, 1/2 w.
R9	39373-97	Resistor, 2.2 megohm, 1/2 w.
R10	39373-100	Resistor, 3.3 megohm, 1/2 w.
R11	39373-33	Resistor, 1000 ohm, 1/2 w.
R12	39373-67	Resistor, 47,000 ohm, 1/2 w.
R13	39373-74	Resistor, 100,000 ohm, 1/2 w.
R14	39373-33	Resistor, 1000 ohm, 1/2 w.
R15	39373-92	Resistor, 1 megohm, 1/2 w.
R16	39373-60	Resistor, 22,000 ohm, 1/2 w.
R17	39373-33	Resistor, 1000 ohm, 1/2 w.
R18	B-149184	Control, Volume (3 megohm-Tap 300,000 ohm)
R19	39373-67	Resistor, 47,000 ohm, 1/2 w.
R20	39373-87	Resistor, 470,000 ohm, 1/2 w.
R21	39374-15	Resistor, 150 ohm, 10%, 1/2 w.
R22	39373-87	Resistor, 470,000 ohm, 1/2 w.
R23	39373-107	Resistor, 10 megohm, 1/2 w.
R24	39374-185	Resistor, 47 ohm, 10%, 2 w.
R25	39374-202	Resistor, 1200 ohm, 10%, 2 w.
R26	39374-25	Resistor, 1000 ohm, 10%, 1/2 w.
R27	39374-33	Resistor, 4700 ohm, 10%, 1/2 w.
R28	39373-90	Resistor, 680,000 ohm, 1/2 w.
CA1	C-132300-6	Cable & Plug Assy., Power
I1	W-145851	Bulb (Dial), 7 w., 120 v., Candelabra Base
SP1	C-145768	Speaker
SR1	B-145370	Rectifier, Selenium
SW1	W-145300-2	Switch, Band Change
SW2	Part of R18	Swith, Power
T1	D-145025-3	Transformer, 1st I.F. (10.7 mc.)
T2	AC-139919-3	Transformer, 1st I.F. (455 kc.)
T3	D-145025-1	Transformer, 2nd I.F. (10.7 mc.)
T4	AC-139919-3	Transformer, 2nd I.F. (455 kc.)
T5	C-145193-1	Transformer, Ratio Detector
T6	138131-1	Transformer, Output
L1	AW-145695	Coil Assy., F.M. Antenna Primary
L2	AW-145724	Coil Assy., F.M. Antenna Secondary
L3	AW-143837	Choke Assy., R.F. (F.M.)
L4	AW-145678	Coil Assy., R.F. (F.M.)
L5	AW-145677	Coil Assy., Oscillator (F.M.)
L6	AW-145372	Coil Assy., Oscillator (A.M.)
L7	AW-143934	Choke Assy., R.F.
L8	AW-143934	Choke Assy., R.F.
L9	AC-145876	Loop Antenna, Back & Power Cable Assy.
L10	AW-149187	Choke Assy.
L11	AW-149187	Choke Assy.
P1	W-139900	Plug, Interlock
	AB-149176	Background & Cloth Assy., Dial
	AB-149145	Baffle Assembly, Speaker
	AW-149073	Bracket Assembl, Dial Pointer
	AW-145697	Bushing & Insulator, Drive Shaft
	AC-149317-1	Cabinet (11-126U)
	AC-149317-2	Cabinet (11-127U)
	AC-139317-3	Cabinet (11-128U)
	AC-149317-4	Cabinet (11-129U)
	AW-145103	Connector, F.M. Line Antenna
	W-131154-1	Cotter (External), Drive Shaft
	C-149154	Dial
	W-138853	Insulator, Volume Control
	B-149065-1	Knob (11-126U)
	B-149065-2	Knob (11-127U)
	B-149065-3	Knob (11-128U)
	B-149065-4	Knob (11-129U)
	B-148080-4	Medallion
	W-149104	Pointer, Dial
	W-143206-3	Shaft, Dial Drive
	AB-149113	Shaft & Gear Assy., Dial Pointer
	W-139040	Shock Mount, Sub-Chassis
	AB-145818	Socket & Bracket Assy., Dial Light
	W-144732	Socket, Tube (V2)
	W-145607	Socket, Tube (V5)
	W-142761	Socket, Tube (V6, V1)
	39462-1	Socket, Tube (V7)
	39462-2	Socket, Tube (V3, V4)
	W-149096	Spring, Gear
	W-145757	Spring, Drive Cord
	W-139121	Stud (Insulated), Chassis Mtg.
	W-138976	Washer (Shouldered), Volume Control



ANT. COIL	3D30
OSC. COIL	3D29
GANG COND.	7D6
FIRST I.F.	3D31
SECOND I.F.	3D32
OUTPUT TRANS.	12D10
SPEAKER	18D11

MODELS 504, 504Q
ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIG. GENERATOR TO	SET SIG. GENERATOR TO	TUNE RECEIVER TO	ADJUST THE FOLLOWING FOR MAX. OUTPUT (KEEP SIG FROM GEN AS LOW AS POSSIBLE AT ALL TIMES.
1.	RF SECTION OF TUNING COND. IN SERIES WITH .1 CONDENSER	455KC	FULL CLOCKWISE POSITION (COND PLATES ALL WAY OPEN)	PRIMARY & SECONDARY OF 2nd I.F. TRANSFORMER
2.	" "	" "	" "	PRIMARY & SECONDARY OF 1st I.F. TRANSFORMER



MODEL 504

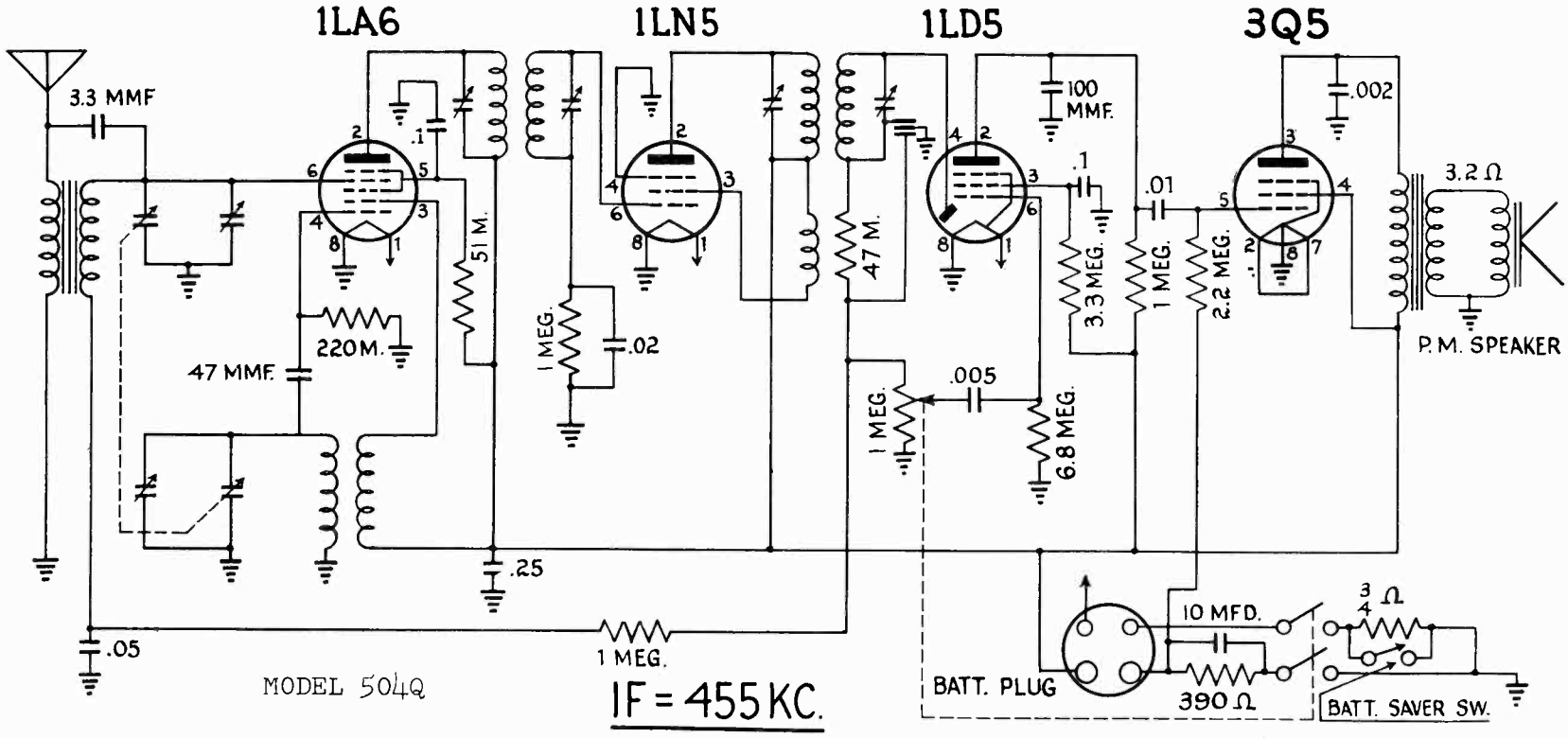
IF = 455 KC.

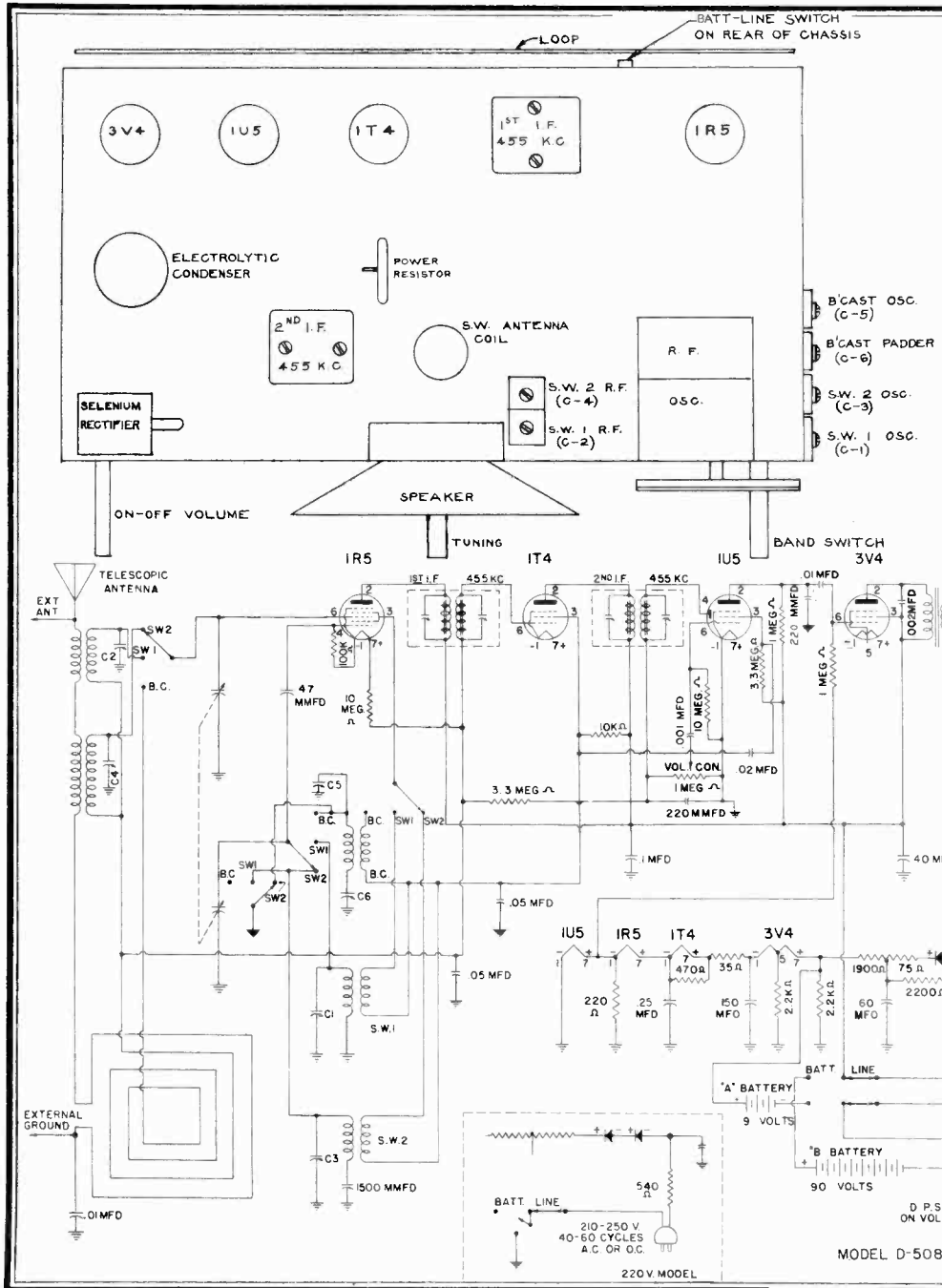
ALIGNMENT PROCEDURE (CONT'D)

3.	REPEAT STEPS #1 & #2.			
4.	ANTENNA WIRE IN SERIES WITH .00025 MICA COND.	1600 KC	1600 KC (160 ON DIAL)	OSC. TRIMMER LOCATED ON VARIABLE COND. ACCESSIBLE THRU HOLE IN DIAL BRACKET
5.	" "	1400 KC	MAX. SIG. APPROX. 140 ON DIAL	ANT. TRIMMER LOCATED ON VARIABLE CONDENSER

ANT. COIL	3D30
OSC. COIL	3D29
GANG COND.	7D6
FIRST I.F.	3D31
SECOND I.F.	3D32
OUTPUT TRANS.	12D2
SPEAKER	18D11

NOTE: BE SURE THAT THE BLACK GROUND LEAD OF RECEIVER IS ATTACHED TO GROUND OF SIGNAL GENERATOR DURING ALL THE ABOVE OPERATIONS.





To calibrate receiver connect the output of signal generator in series with a 200 MMFD fixed condenser to the external antenna lead (coming from the Telescopic Antenna). Connect the low side of signal generator through a 0.1 MFD condenser to receiver chassis. The wave band switch should be in the broadcast position. Adjust signal generator to 455 Kilocycles. Open the receiver variable condenser for minimum capacity. Adjust both I.F. transformers for maximum signal. Turn the bandswitch to Short Wave #1 position. Set signal generator at 16.7 Megacycles. Tune in this signal. Peak Short Wave #1 oscillator trimmer (C1) for maximum signal. Next set signal generator at 15.7 Megacycles. Tune in this signal. Adjust Short Wave #1 R.F. trimmer (C2) for maximum signal strength. The low frequency end of the dial is automatically adjusted. Next turn band switch to Short Wave #2 position. Rotate drive shaft until variable condenser is in minimum capacity position. Adjust signal generator to 5.5 Megacycles. Adjust the Short Wave #2 oscillator trimmer (C3) until maximum signal from generator is heard. Next set signal generator at 5.0 Megacycles. Tune in this signal. Adjust Short Wave #2 R.F. trimmer (C4) for maximum signal strength. The low frequency end of the dial is automatically adjusted. Next turn bandswitch to broadcast position. Rotate drive shaft until variable condenser is in minimum capacity position. Adjust signal generator to 1700 Kilocycles. Adjust broadcast oscillator trimmer (C5) until maximum signal from generator is heard. Set the signal generator and receiver to 600 Kilocycles. Peak the broadcast padder (C6) for maximum output. The variable condenser should be rocked during this operation. Keep the signal generator output as low as possible when making all of these adjustments. Care should be taken in making the Short wave adjustments, that the fundamental oscillator signal be tuned in and not the image frequency, which will fall below the fundamental.

"A" battery (two required)		"B" battery (two required)	
Eveready	#746	Eveready	#482
Bright Star	#361	Bright Star	#30-33
Ray-O-Vac	#P83A	Ray-O-Vac	#P7830
Burgess	#G3	Burgess	#M30
Winchester Olin	#4918	Winchester Olin	#6210

The life of the batteries is from 225-275 hours when the receiver is used about two to four hours per day.

RANGE:

B.C. Band	540-1700 Kilocycles	555-175 meters
S.W., Band 1	16.7 to 5.3 Mc.	18-57 meters
S.W., Band 2	5.5 to 1.9 Mc.	54.5-158 meters

TUBES AND FUNCTION:

1-1R5 . . . . . Converter
1-1T4 . . . . . I.F. Amplifier
1-1U5 . . . . . Second Detector and Audio Amplifier
1-3V4 . . . . . Power Output

REPLACEMENT PARTS LIST

3005-2	35 Ohm, 2 Watt Pigtail	1021-3	Loop Antenna
3007-2	1975 Ohm Metal-Clad Resistor, 10 Watt	1020-2	B.C. Osc. Coil
3006C-3	Volume Cntrl with Switch	1124	S.W. Osc. Coil
4134	Cabinet	1125	S.W. Ant. Coil
4057A-4	Pointer Knobs	1123	2nd I.F.
4145-1	Station Selector Knob	1122	1st I.F.
4137	Name Plate	2005-4	Electrolytic
6042	Dial Scale	2014-5	Variable Condenser
7001D-4	Speaker	2058	Dual Trimmer
8017B-6	Bandswitch	2057	Quadruple Trimmer
8019	Battery-Line Switch	8067-1	Telescopic Antenna
8018B	Selenium Rectifier	5000	Line Cord for 110V Operation
		5015	Resistance Line Cord for 220 V Operation
		9069-3	Drive Spring

MODEL D-503

MODEL D-517

The receiver uses an "A" supply of 4½ volts and a "B" supply of 67½ volts.

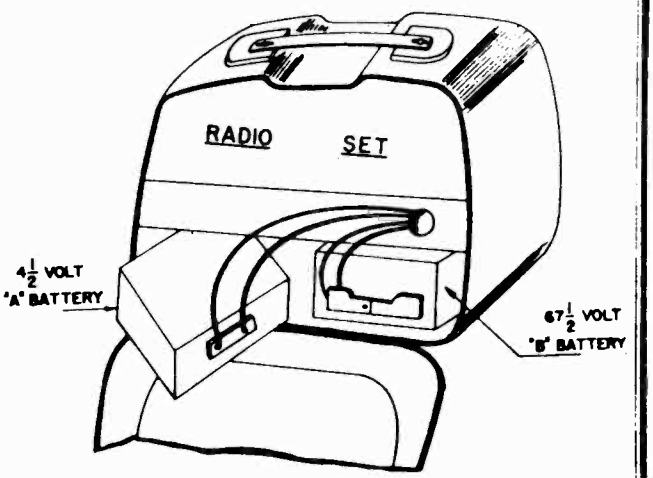
For good reception the life of the batteries is from 70 to 80 hours when the receiver is used about two hours per day.

The following or similar batteries may be used with this receiver:

	"A" BATTERY 4½ V	"B" BATTERY 67½ V
Eveready	#746	#467
General	#3H3	#W45A
Ray O Vac	#P83A	#P4367
Burgess	#G3	#XX45

To install the batteries in the receiver, proceed as follows:

1. Open back by inserting fingers in slots provided on top of cabinet and pull back open.
2. Connect battery clips to batteries.
3. Put batteries in set as shown in sketch. BE CAREFUL NOT TO BREAK WIRES CONNECTED TO LOOPTENNA.



OPERATION

Battery and Electric Power

When the back of the cabinet is opened a lever switch will be seen. To operate the receiver on batteries move switch to the side marked BATT. Fold up line cord, place in set and close back. For operation of the receiver on electric power, move the lever switch to LINE, bring the line cord out of the cabinet so that when the back is closed, the cord is in the cut out provided, in the corner of the cabinet. The back of the cabinet should always be kept closed when operating the receiver.

NOTE:
If the receiver is operated on direct current and no signals are heard, reverse the line plug in the electric outlet.
If slight hum is heard when operating the receiver on alternating current, reverse the line plug in the electric outlet.

OPERATION

The knob on the left is a combination on off switch and volume control. When the knob is turned fully counter clockwise, the receiver is off and the white dot on the knob will give the relative position. To turn the receiver on, rotate this knob in a clockwise direction; further rotation in this direction increases the volume of the receiver. The control on the right is the station selector or tuning knob.

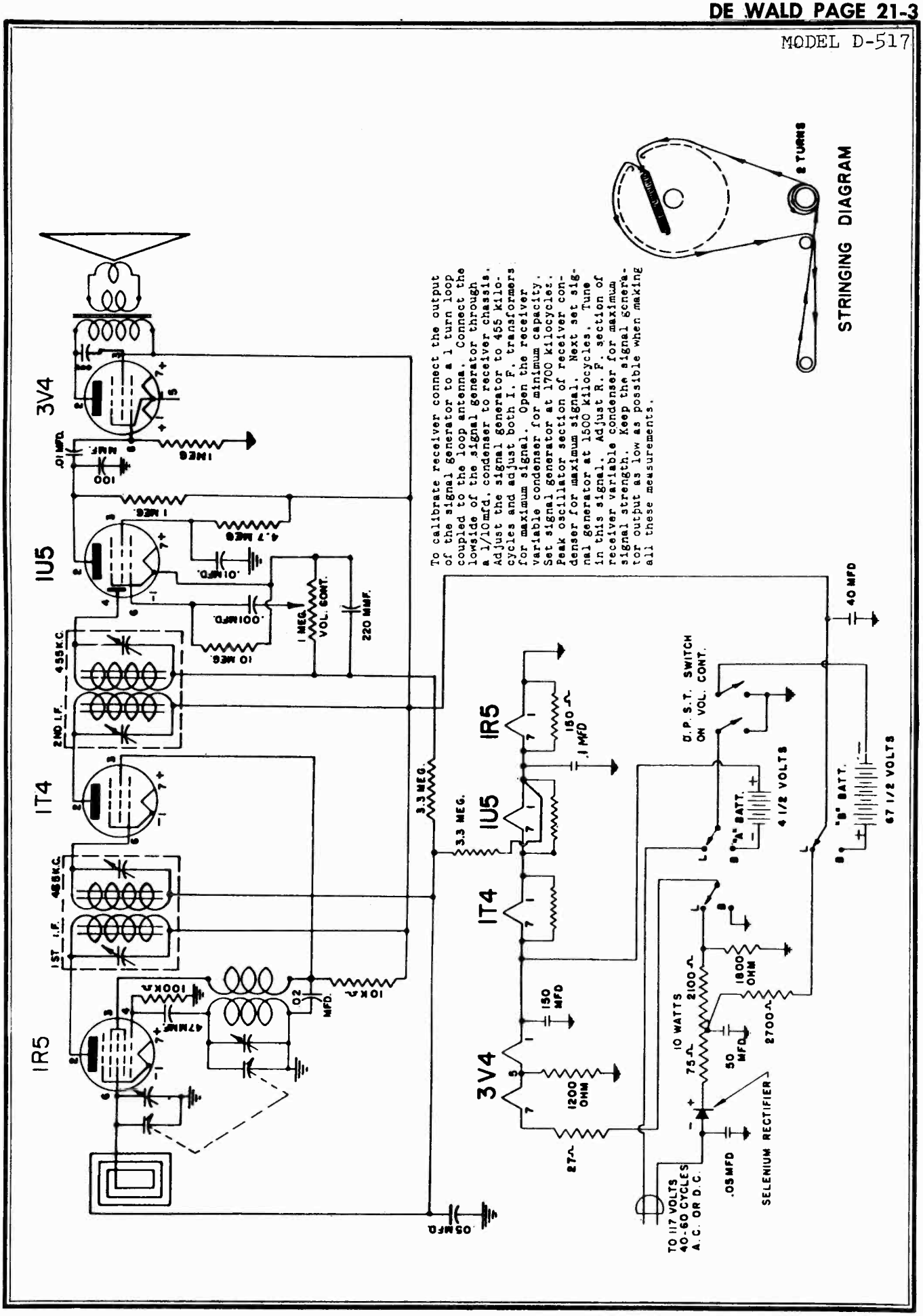
IMPORTANT

BE SURE THE RECEIVER IS TURNED OFF WHEN NOT IN USE. SINCE THE LOOPTENNA USED IN THIS RECEIVER HAS A DIRECTIONAL EFFECT IT MAY BE FOUND NECESSARY AT TIMES TO TURN THE RECEIVER TO OBTAIN BEST RECEPTION AND A MINIMUM OF INTERFERENCE.

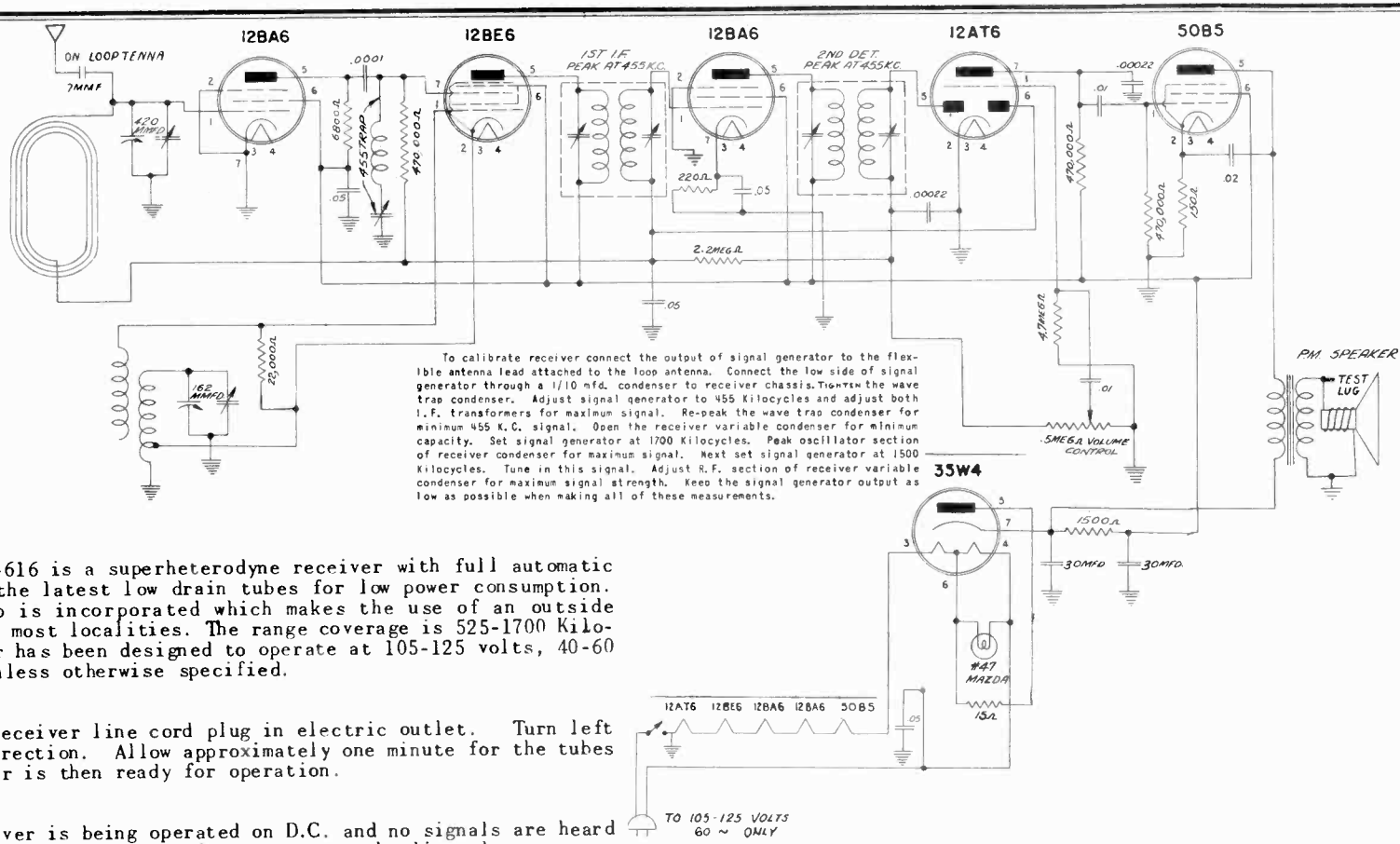
LIST OF REPLACEMENT PARTS

1st I.F.	1027C-4	Variable Cond.	2017B
2nd I.F.	1027-1	Electrolytic Cond.	2020B
Osc. Coil	1034	Volume Control	3012
Ant. Loop	1037	Cabinet	4064
Batt. Cable	5005	Speaker	7003B3
Knobs	4055A	Sel. Rect.	8018A

MODEL D-517



TUBES
12BA6
12BE6
12BA6
12AT6
50B5
35W4



To calibrate receiver connect the output of signal generator to the flexible antenna lead attached to the loop antenna. Connect the low side of signal generator through a 1/10 mfd. condenser to receiver chassis. Tighten the wave trap condenser. Adjust signal generator to 455 Kilocycles and adjust both I.F. transformers for maximum signal. Re-peak the wave trap condenser for minimum 455 K.C. signal. Open the receiver variable condenser for minimum capacity. Set signal generator at 1700 Kilocycles. Peak oscillator section of receiver condenser for maximum signal. Next set signal generator at 1500 Kilocycles. Tune in this signal. Adjust R.F. section of receiver variable condenser for maximum signal strength. Keep the signal generator output as low as possible when making all of these measurements.

The model D-616 is a superheterodyne receiver with full automatic volume control using the latest low drain tubes for low power consumption. A self contained loop is incorporated which makes the use of an outside antenna unnecessary in most localities. The range coverage is 525-1700 Kilocycles. This receiver has been designed to operate at 105-125 volts, 40-60 cycles A.C. or D.C. unless otherwise specified.

OPERATION:
Insert the receiver line cord plug in electric outlet. Turn left knob in a clockwise direction. Allow approximately one minute for the tubes to heat up and receiver is then ready for operation.

NOTE:
If the receiver is being operated on D.C. and no signals are heard after it has been turned "on" for one minute, reverse the line plug.

ANTENNA:
The receiver operates satisfactorily without an antenna. If additional pick-up is desired, an antenna may be connected to the lead extending from the rear of chassis.

VOLUME CONTROL:
The left knob of the receiver is used as the power switch and volume control. Rotation of this knob in a clockwise direction turns the receiver "on". Further rotation in this direction increases the volume.

STATION SELECTOR:
The right hand knob operates the tuning in of stations and pointer. Ease and accuracy in tuning is provided because of a reduction drive.

IMPORTANT:
Since the loop has a directional effect, it may be found necessary to change the angle of the receiver.

REPLACEMENT PARTS

Loop Antenna	1073A	Volume Control and Switch	3013-3
Oscillator coil	1011	Line Cord	5000
1st I.F. coil	1000-3	Dial Scale (Glass)	6000G-3
2nd Detector I.F.	1002B-3	Speaker	7000C-3
Paper Condensers	2000A	Pilot Lamp Socket	8001-1
Ceramic Condensers	2012B	Shaft	9109A-2
Combination Electrolytic	2005-1	Bushing	9818C
Variable Condenser	2003C	Drive Spring	9069-3
½ Watt Resistors	3029	Dial Cord	
1 Watt Resistors	3001A	#47 Pilot Lamp	
2 Watt Resistors	3036	Wave Trap Coil	1005
Trimmer Condenser	2056	Dial Pointer	9113A-1
Cabinet, Molded, Mahogany	4077C-2	Knob, Mahogany	4080-4
Cabinet Back	4079-3		